VERTIV.

Thermal Insight

User Manual

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit https://www.vertiv.com/en-us/support/ for additional assistance.

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1 Software Introduction

1.1 Overview

Vertiv™ Thermal Insight application is a web browser based monitoring tool for your air conditioning facilities and devices and provides a central location to view air conditioning status, alarms, and trends.

1.2 Features and Benefits

Features and benefits of the Thermal Insight are:

- Centralized management and monitoring of air conditioning equipment
- Automatic discovery and monitoring capabilities
- Alert triggered email and SMS notifications
- Protect the server with advance notice of server shutdown in contingency situations
- Support customize shutdown script

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2 Installation of the Software

2.1 Installation Requirements

2.1.1 Hardware

Thermal Insight hardware requirements:

- Minimum configuration
  - CPU: 4 cores
  - Memory: 8 GB
  - Hard drive: 256 GB of free disk space
- Recommended configuration
  - CPU: 8 cores
  - Memory: 8 GB
  - Hard drive: 2 TB free disk space

NOTE: It is recommended that 2 TB space is required to store data of one year operation and historical data retention age.

2.1.2 Software

Thermal Insight supported 64-bit operating system:

- Microsoft Windows 7 and 10
- Microsoft Windows Server 2012 R2 and 2016
- Red Hat Enterprise Linux 7.1 (with graphical interface)
- CentOS Linux release 7.6 (Core)

Thermal Insight supported browsers:

- Google Chrome 120 or later (desktop and tablet)
- Microsoft Edge 120 or later (desktop)

Vertiv™ Trellis™ Automation Agent supported operating systems (for server shutdown):

- Microsoft Windows 7, 8.1, and 10
- Microsoft Windows Server 2008 R2, 2012 R2, and 2016
- Microsoft Hyper-V Server 2012 R2 and 2016
- Red Hat Enterprise Linux 6.7, 6.9, and 7.1 to 7.4
- CentOS Linux release 7.6 (Core)

NOTE: The shutdown function supports virtual machines: VMWare ESXi 5.5, 6.0, and 6.5, but there is no need to install the Automation Agent for virtual machines.

NOTE: x64-bit only support for Hyper-V and Red Hat systems.

2.2 Software Download

The following sections provide information on how to register an official account and download the Automation Agent and Thermal Insight software.

2.2.1 Account registration

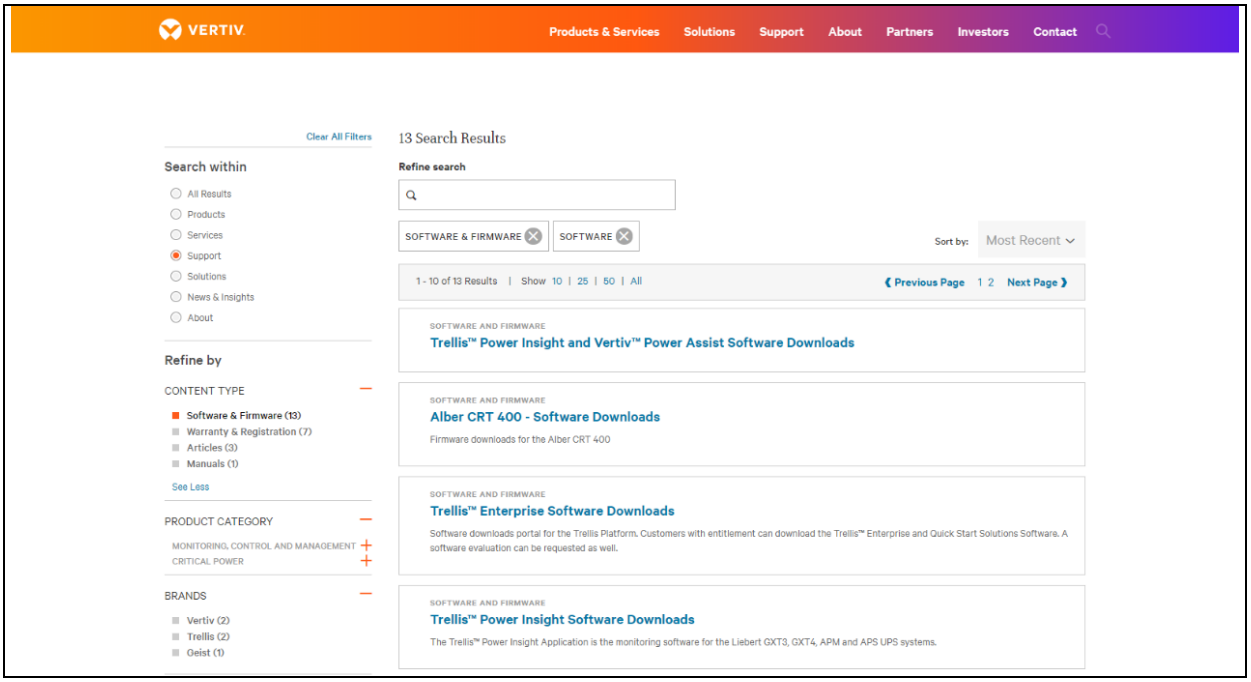
If you do not have a Vertiv account, register on the official website of Vertiv. The latest version of the software cannot be downloaded until registration is complete.

NOTE: The official website of the Chinese version does not provide the download page of Thermal Insight for the time being. If necessary, you can switch the official website to English or contact customer service. The following steps are based on the English version.

To sign up:

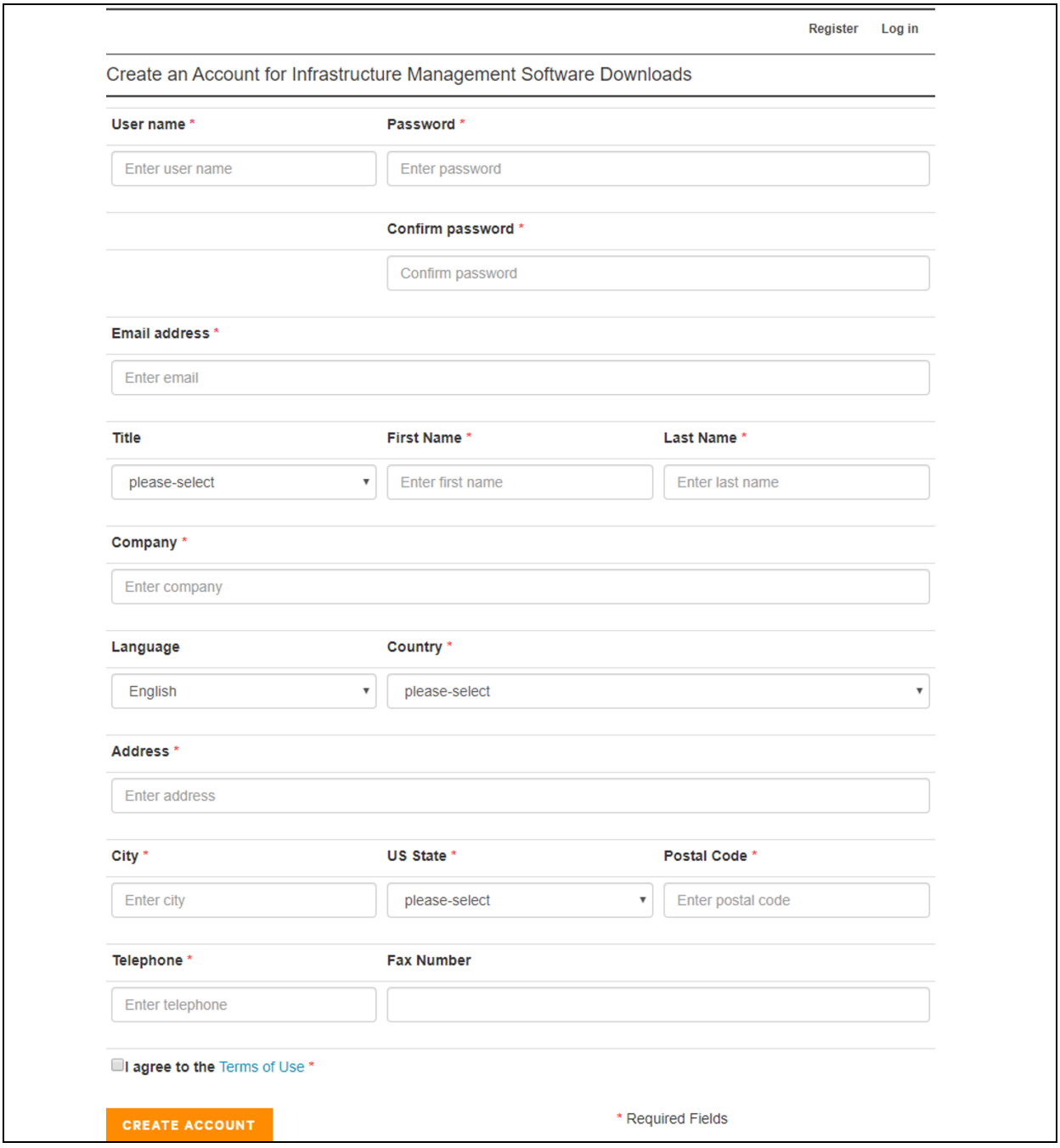
1. From a web browser, navigate to www.vertiv.com and hover your mouse over the Support tab.
2. Click *Software/Firmware Updates*, and click the *Software Product Downloads* menu option. The Software Download page appears.
3. Find the *Vertiv™ Thermal Insight Software Download* in the search box and click on it.

Figure 2.1 Software Download Window



4. Click on the object you need to download below the green box. A small window appears to the login page.
5. Click *Register* in the upper right corner previous to Log in. The browser appears a new window as shown in Figure 2.2 on the facing page.

Figure 2.2 Registration Window



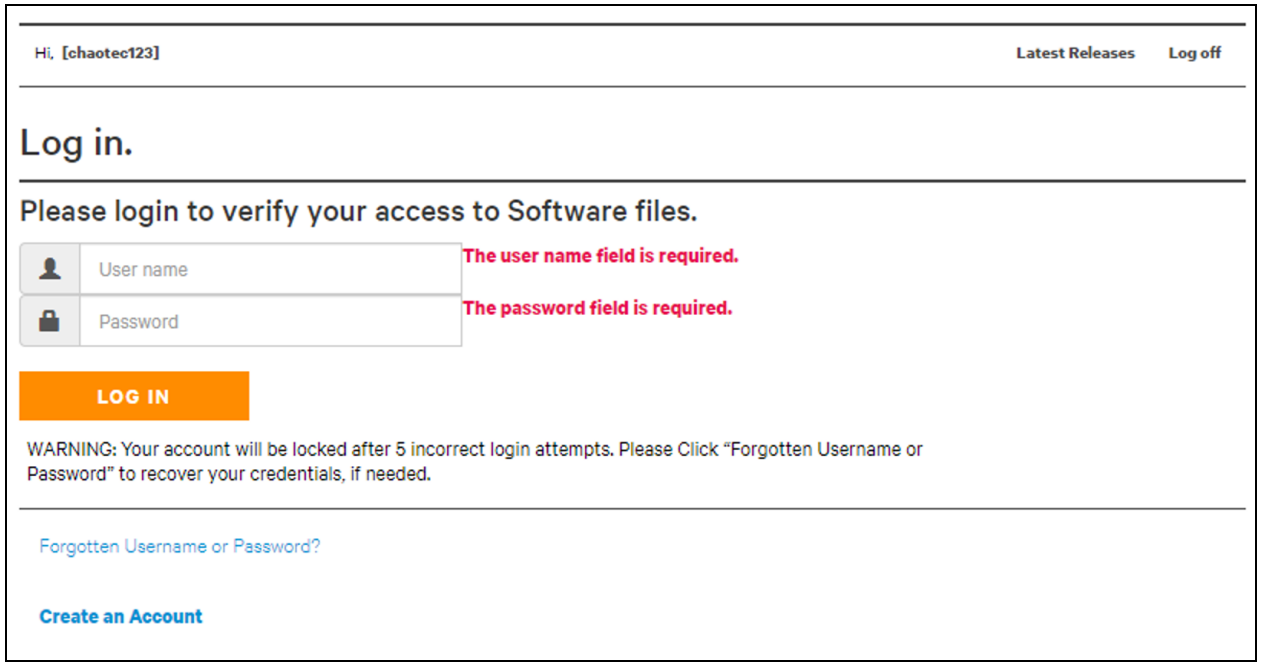
Enter the mandatory field details (fields marked by red asterisk are mandatory) and click *I agree to the Terms of Use*. Click the *Create Account*.

6. An activation code is sent to the email address you provided. Check your email.
7. Enter the activation code in the Code field on the Create an Account for Infrastructure Management Software registration form and click *Submit*.

2.2.2 Download

1. Access the page of Vertiv™ Thermal Insight Software Downloads by following the registration process mentioned in Account registration on page 4.
2. Click *Log in* in the upper right corner next to Register. A new window appears in the browser as shown in **Figure 2.3** below.

Figure 2.3 Log In Window



3. After entering the previously registered username and password, click the *LOG IN* button. Go to the download page.
4. Depending on the operating system, click the link to download the corresponding software versions.

Table 2.1 Software Version

Software Name	Operating System	System Installation Package
Thermal Insight	Windows	Thermal Insight 1.0.0 Windows.zip
	Linux	Thermal Insight 1.0.0 Linux.zip
Automation Agent	Windows 64-bit operating system	Vertiv-Automation-Agent-Installer-2.5-Windows
	Linux	Vertiv-Automation-Agent-Installer-2.5-Linux

NOTE: For specific operating system versions, refer to Software on page 3 for the list of supported versions of the software.

5. Wait until the download is complete.

2.3 Software Installation

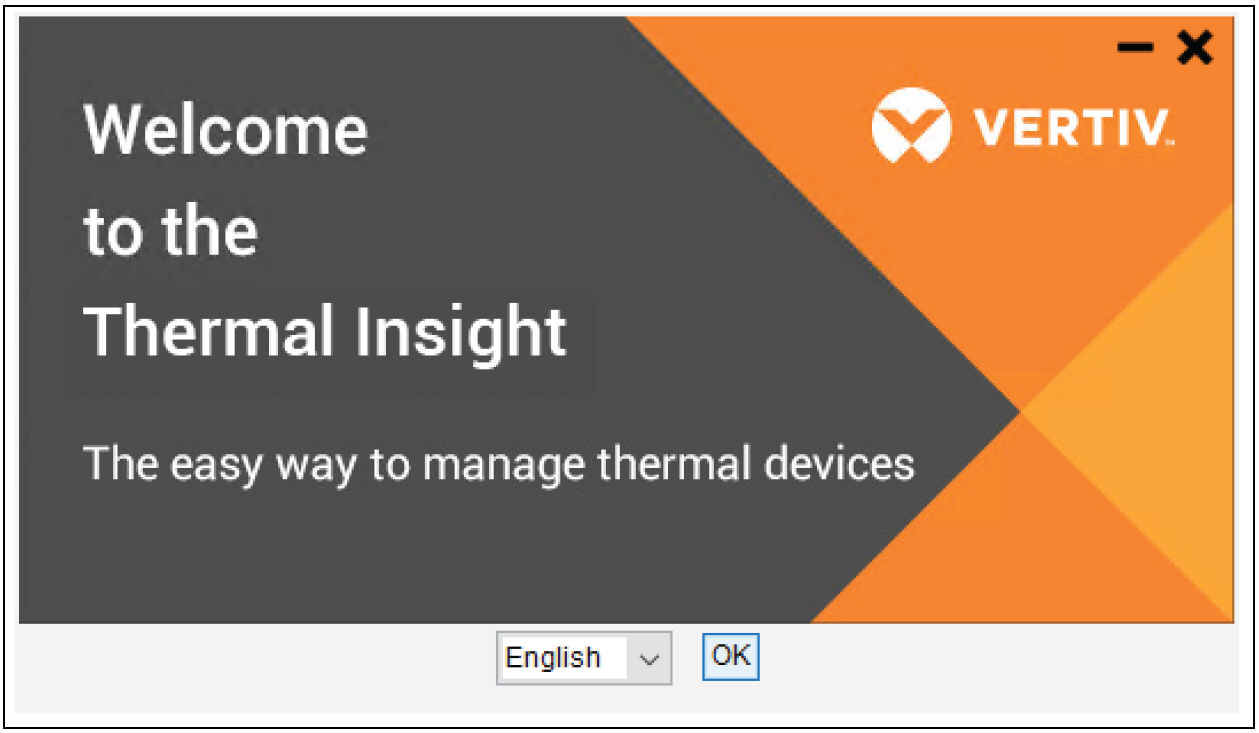
2.3.1 Thermal insight installation

To install the application on the Windows operating system:

NOTE: You must be logged in as a local administrator.

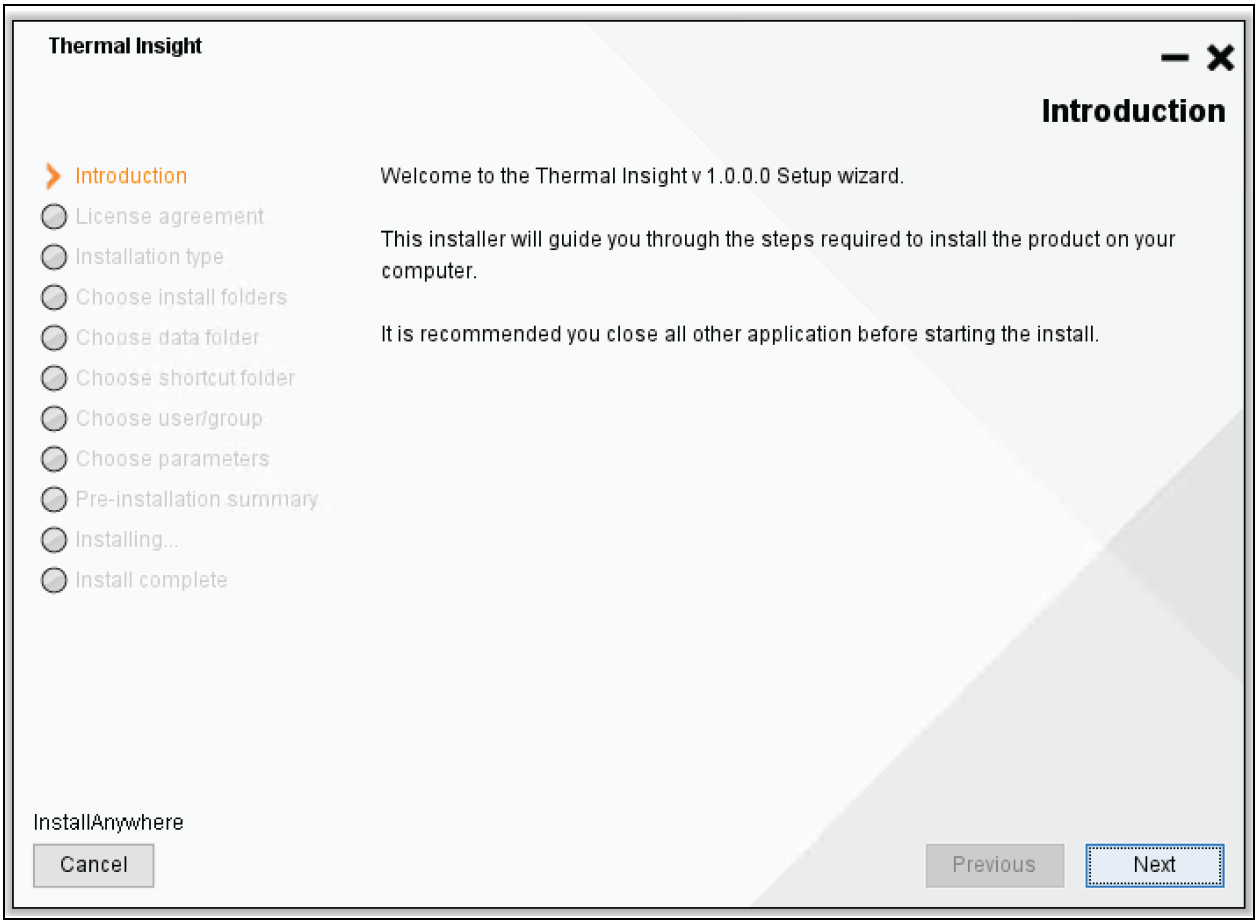
1. Go to the folder where Thermal Insight 1.0.0 Windows.zip is located.
2. Double-click on the *vertivthermalinsight-installer.exe* file in the compressed file.
3. Select the preferred language from the drop-down list and click *OK*.

Figure 2.4 Thermal Insight Welcome Window



4. Click *Next* on the introduction interface.

Figure 2.5 Introduction to Thermal Insight Window

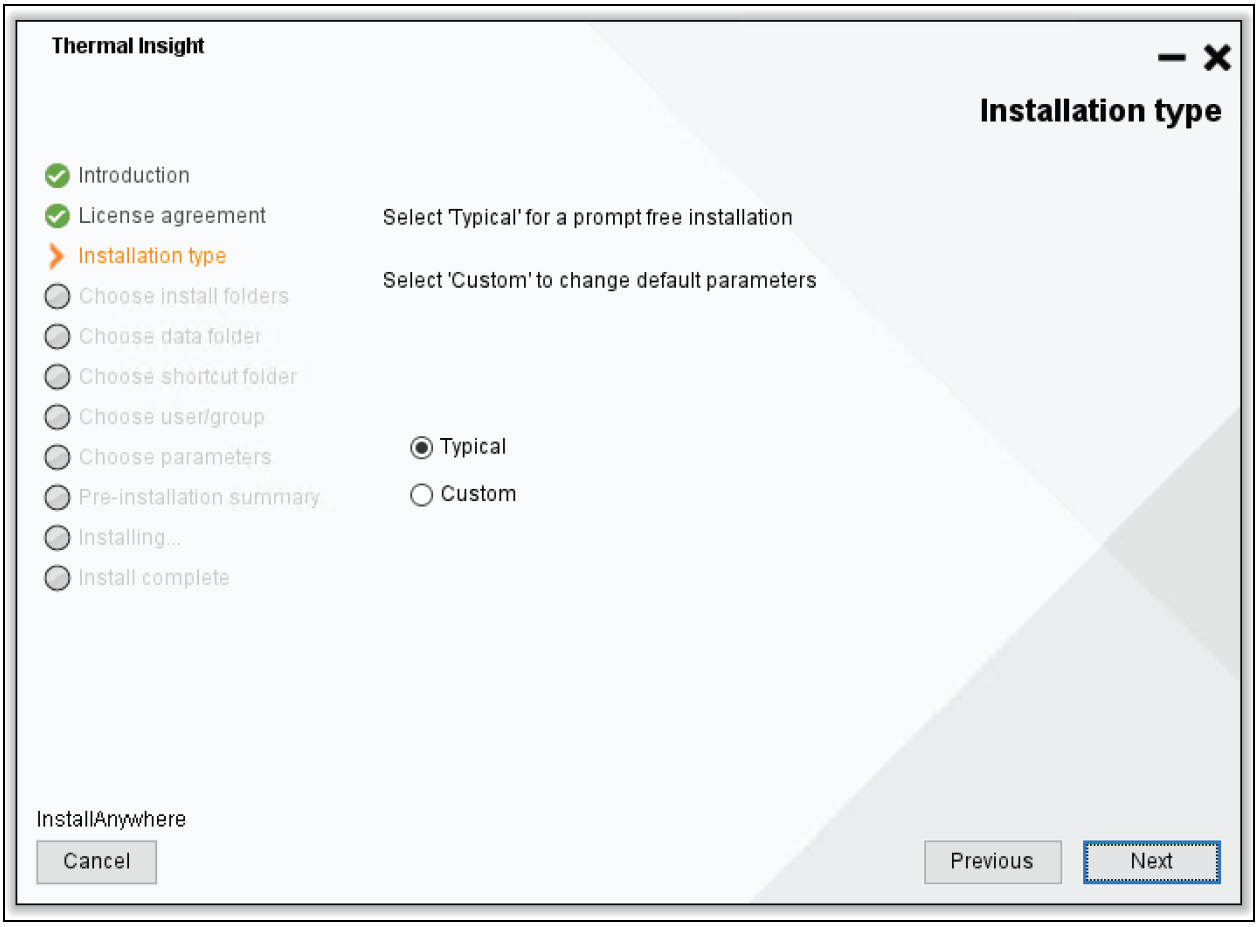


5. Click the checkbox to accept the license agreement and click *Next*.
6. Select the radio button for a typical installation. If you select a typical installation, proceed to step 9 .

   -Or-

   Select the radio button for customized installation and click *Next*.

Figure 2.6 Installation Type Window



7. Select the installation location and click *Next*.
8. Select the location of the data catalog and click *Next*.
9. Select the shortcut folder and click *Next*.
10. Select the parameters and click *Next*.

Figure 2.7 Choose Parameters Window

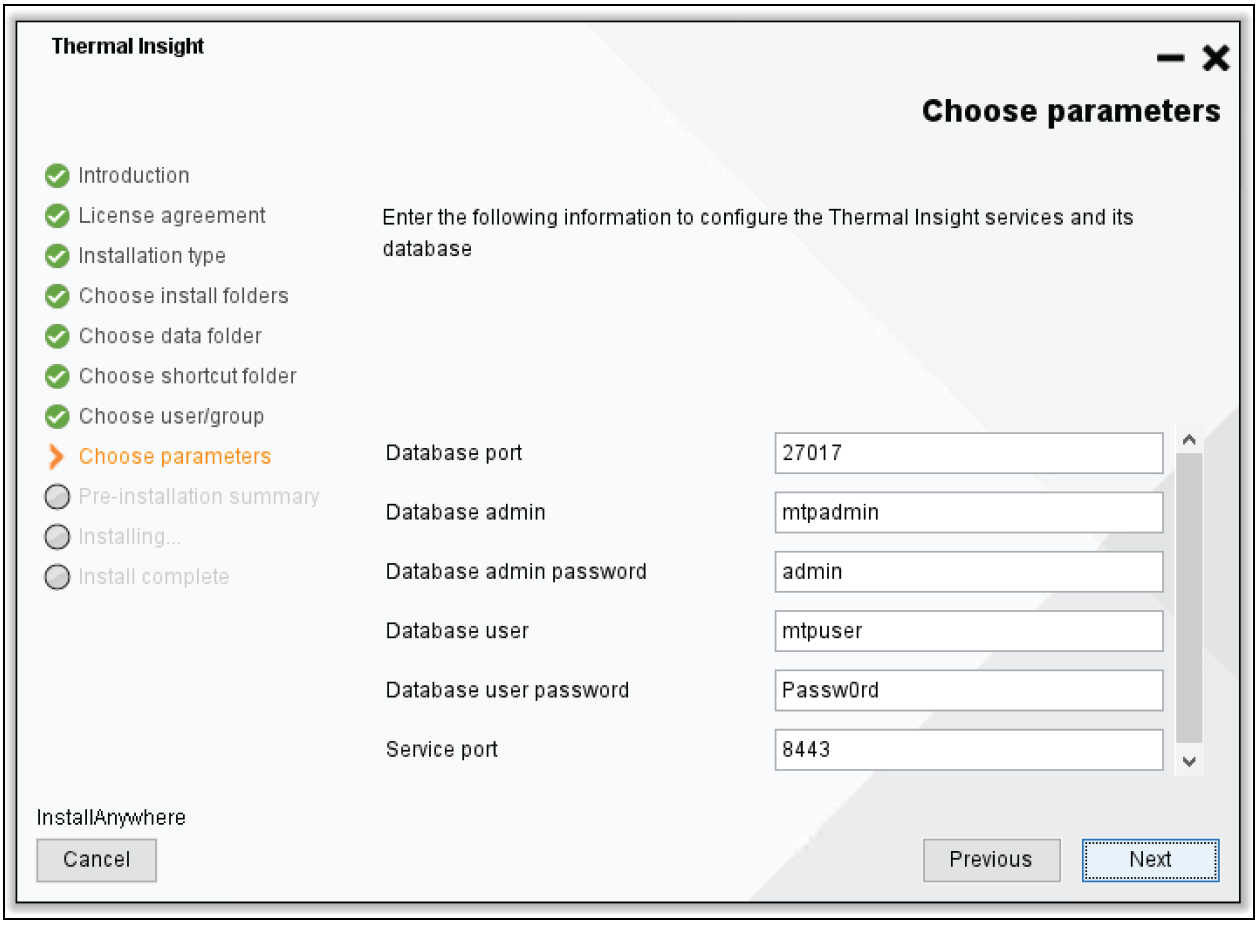


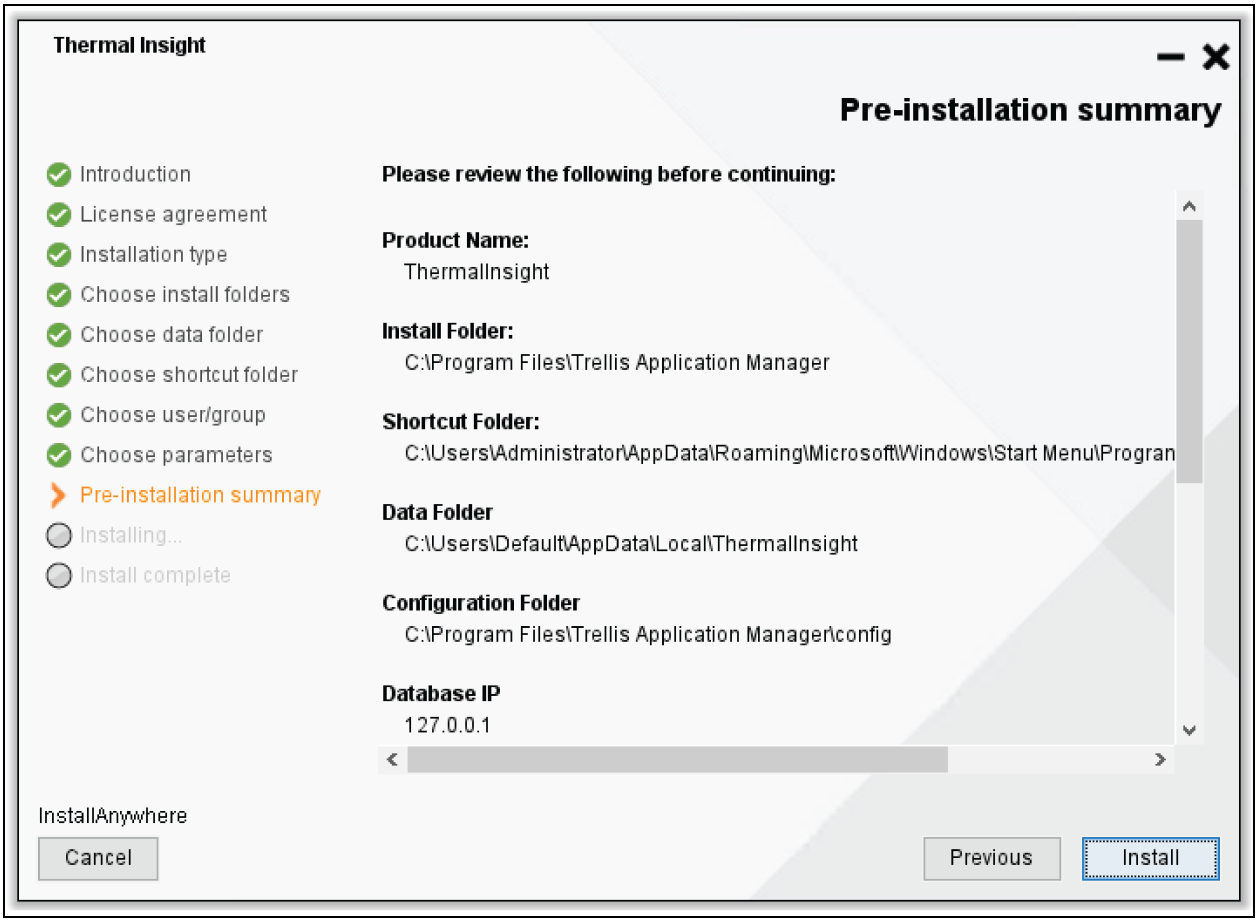
Table 2.2 Default Parameter Window Values

Parameter	Description	Default Value
Database port	The database uses default port. Be sure the port selected is not in use.	27017
Database admin	Administrator of the database.	mtpadmin
Database admin password	The password of the administrator. It is highly recommended to change this password.	admin
Database user	Owner of the database	mtpuser
Database user password	The password of the database owner. It is highly recommended to change this password.	Password
Application service port (server port)	The port on which the service runs. Be sure the port selected is not in use.	8443

NOTE: If there is a port error, you will be prompted to change the port.

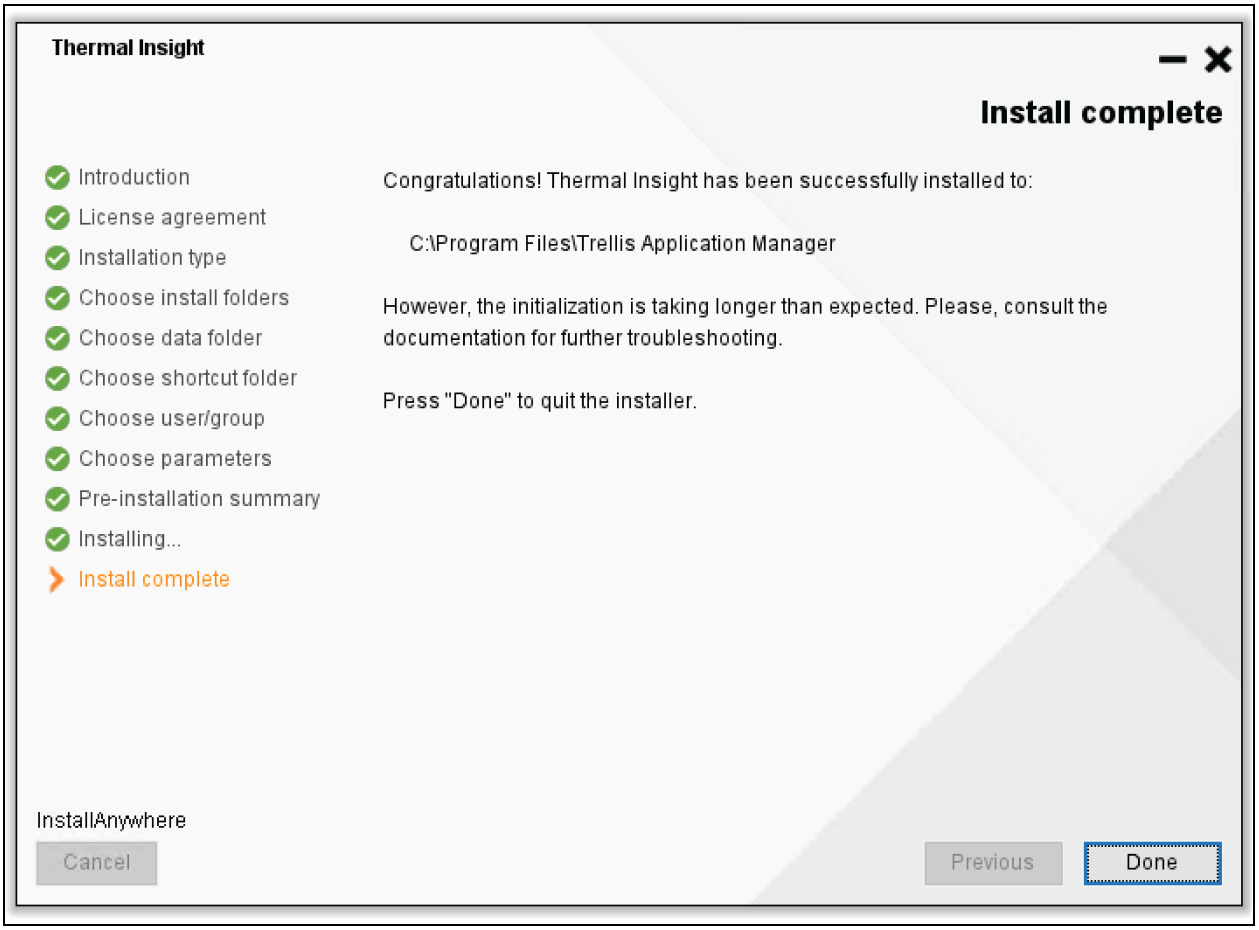
11. Click the *Install* button in the pre-installation summary window.

Figure 2.8 Pre-installation Summary Window



12. Once installed, click *Done*. Shortcuts are added to the location selected during the installation process.

Figure 2.9 Installation Completion Window



To install the application on a Linux operating system:

NOTE: You must have root privileges to install the application.

1. Go to the folder where the **Thermal Insight 1.0.0 Linux .tar.gz** file is located.
2. Extract the installer from the **tar.gz** file.
3. Open a terminal window.
4. Navigate to the directory where the file is copied.
5. If you log in to the console as a root user, enter**./vertiv-thermalinsight-installer.bin**.

   -Or-

   If you have Superuser (SUDO) privileges, enter **sudo ./vertiv-thermalinsight-installer.bin.**
6. If you are logged in to the Graphical User Interface (GUI) as a root user, enter **./vertiv-thermalinsight-installer.bin-igui**.

   -Or-

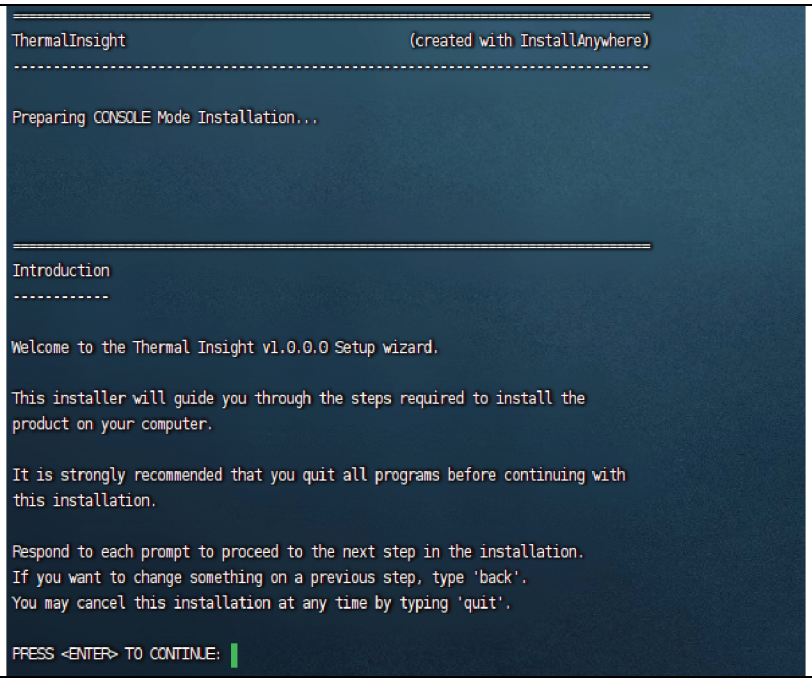
   If you have SUDO privileges, enter **sudo ./vertiv-thermalinsight-installer.bin-igui** to run the GUI installer.

NOTE: For the installation steps of the GUI, refer to the installation steps on Windows operating system section.

NOTE: The following installation steps are based on the terminal window installation.

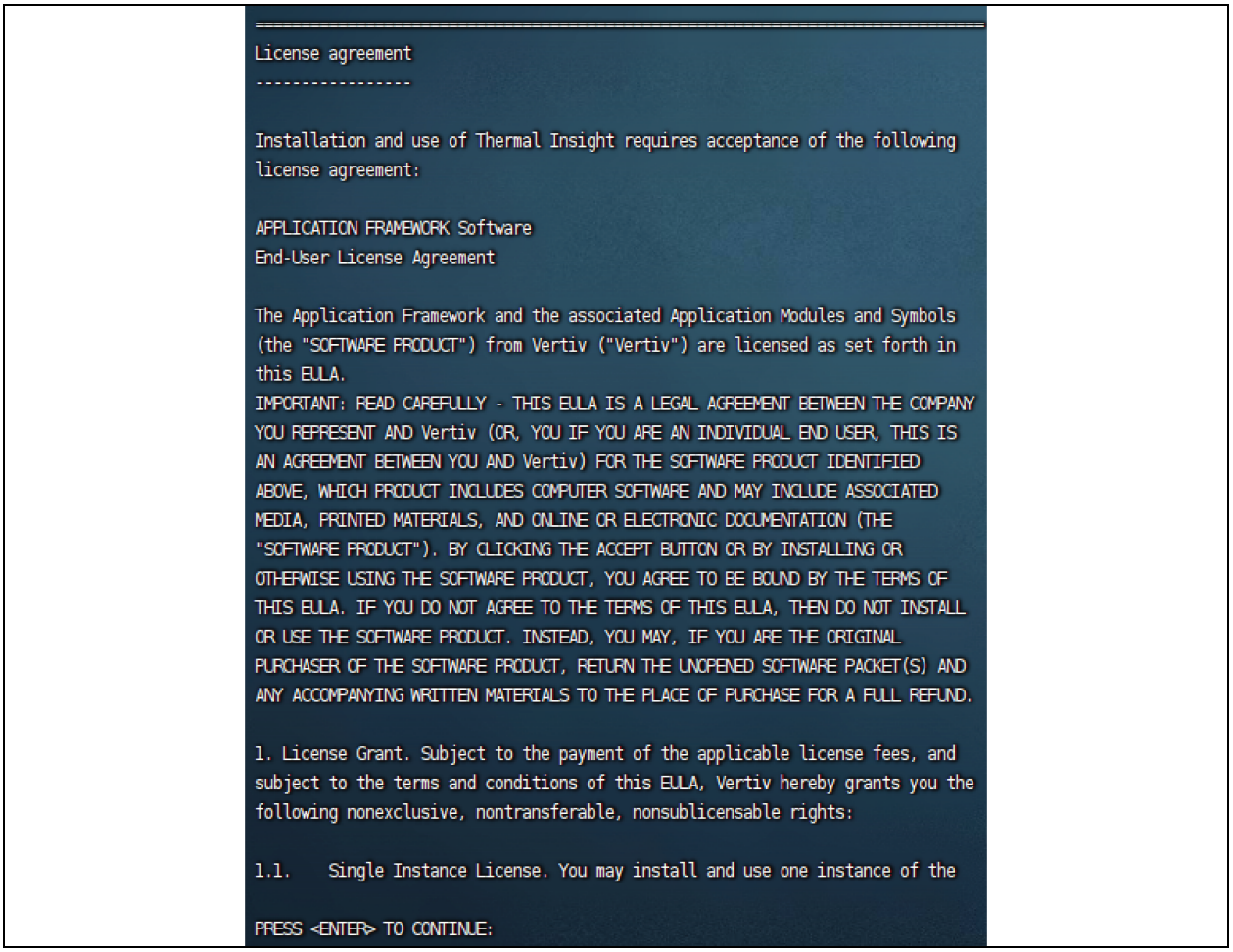
7. Install the dependencies and press the enter key.

Figure 2.10 Installing the Dependencies Window



8. Read the End User License Agreement (EULA) and enter Y to accept the license terms.

Figure 2.11 License Agreement Window

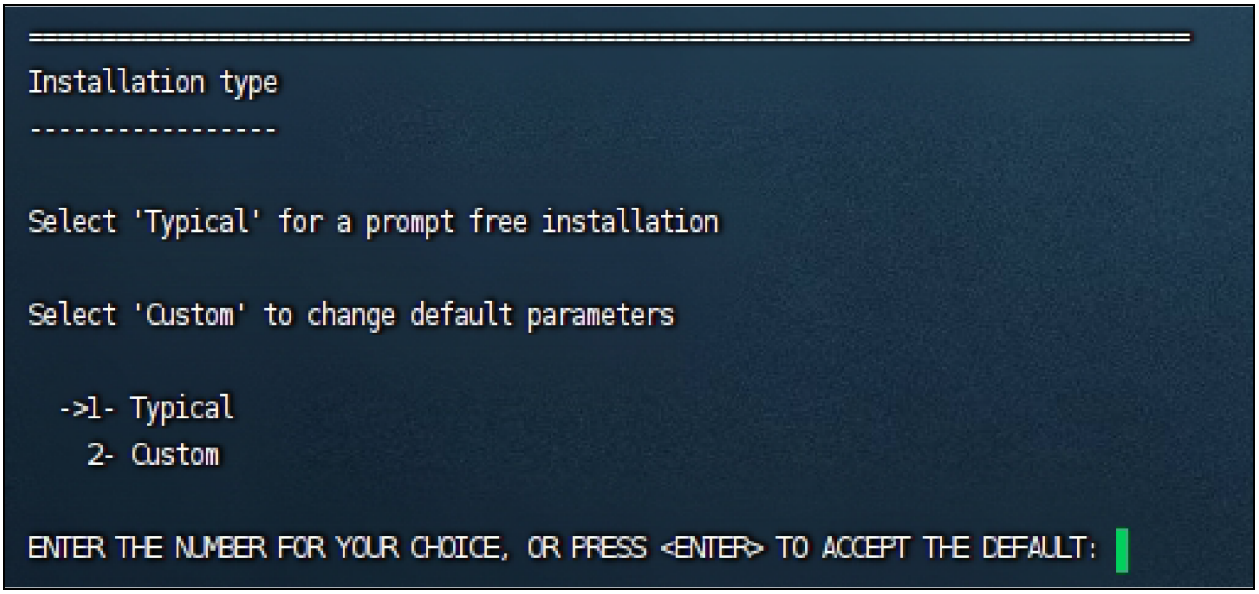


9. Select the installation type. If you select a typical installation, enter **1**, press the **enter** key, and skip to step 9 .

   -Or-

   If you choose a Custom Installation, enter **2** and press the **enter** key.

Figure 2.12 Installation Type Window



10. Enter the location of the program installation directory and press the **enter** key.
11. Enter the location of the data storage directory and press the **enter** key.
12. Select the shortcut folder and press the **enter** key.
13. Enter the user/group, user name, and press the **enter** key. Enter the group name and press the **enter** key.
14. Select the parameters, enter the relevant parameters. For specific parameters, refer to the **Table 2.1** on page 6.
15. After confirming the installation path again, press the **enter** key to start the installation.

NOTE: If there is a port error, you will be prompted to change the port.

16. After installation is complete, press the **enter** key.

NOTE: A /var/opt/trellisappmgr directory will be created during installation. The log files are stored in this directory.

2.3.2 Automation agent installation

Automation Agent is an application that accepts the Thermal Insight command such as script, shutdown instructions. To enable server shutdown, the Automation Agent must be installed on the server.

To install the Automation Agent on the Windows server side:

1. Log in to the server with administrative rights.
2. Find the downloaded installation package and unzip the file. Double-click the *trellis-automation-agent-install .exe*.

NOTE: If it is the Microsoft Windows Server or Microsoft Hyper-V Server operating system, navigate to the installation file directory after logging in. Enter trellis-automation-agent-install.exe, and press the enter key.

3. From the new window, select both English and Chinese. For English, enter **1** and press the **enter** key.
4. Read the EULA and enter **Y** to accept the license terms.
5. Select the location of the program installation directory and press the **enter** key.
6. Create an account name and password.

NOTE: The password must be between 8 to 32 characters long. When the server sets a new communication rule, this password is entered.

7. Enter the port address and press the **enter** key.
8. Press the **enter** key to install Automation Agent.

To install Automation Agent on the Linux server side:

1. Sign in to the server with administrative rights.
2. Find the downloaded installation package and unzip the file. If you log in to the console as a root user, enter **./trellis-automation-agent-install.bin**.

   -Or-

   If you have SUDO privileges, enter **sudo ./trellis-automation-agent-install.bin**.
3. Choose Chinese and English. Enter **1** for English and press the **enter** key. Enter **2** for Chinese and press the **enter** key.
4. Read the EULA and enter **Y** to accept the license terms.
5. Select the location of the program installation directory and press the **enter** key.
6. Create an account name and password.

NOTE: The password must be between 8 to 32 characters.

NOTE: This password will be used when the server selects a new communication rule.

7. Enter the port address and press the **enter** key.
8. Press the **enter** key to install the Automation Agent.

2.4 Software Uninstall

2.4.1 Thermal Insight uninstall

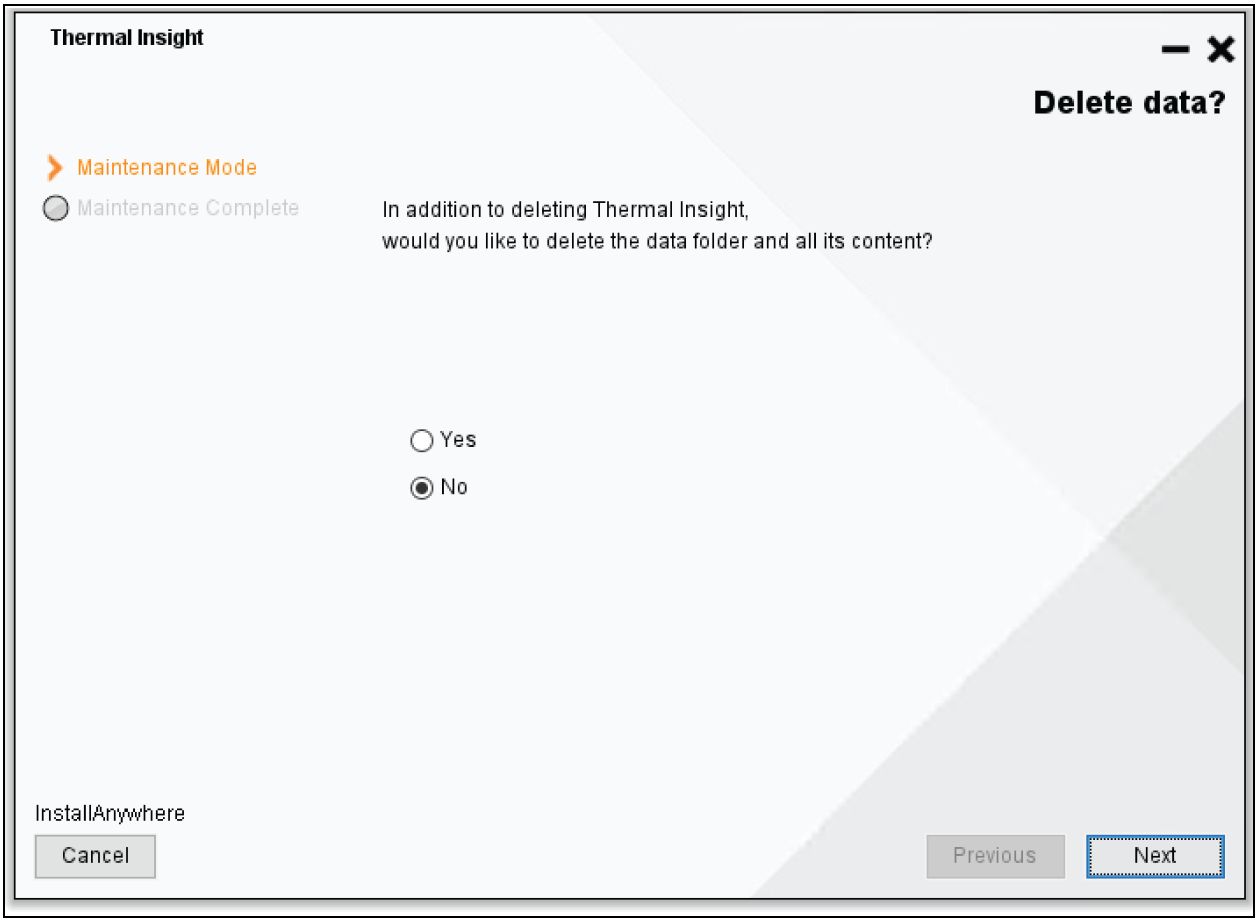
To uninstall from a Windows operating system:

1. Run *Control Panel - Programs and Features*.
2. Find Thermal Insight in the list of programs. Run the uninstall.
3. Click *Next*.
4. In the Get User Input window, if you want to keep the software data, click *No*, and click *Next*.

   -Or-

   If you do not need to keep the data, click *Yes*, and click *Next*.

Figure 2.13 Get User Input Window



5. Click *Done* when the process is completed.

To uninstall from a Linux operating system:

1. If you are logged in to the console as a root user, enter **/<install dir>/_installation/trellisappmgruninstall**.
2. On the Delete Data window, press **enter** to accept the default 2 (No).

   -Or-

   Enter **1** (Yes) to delete the data.
3. Press the **enter** key and wait for the uninstall to complete.

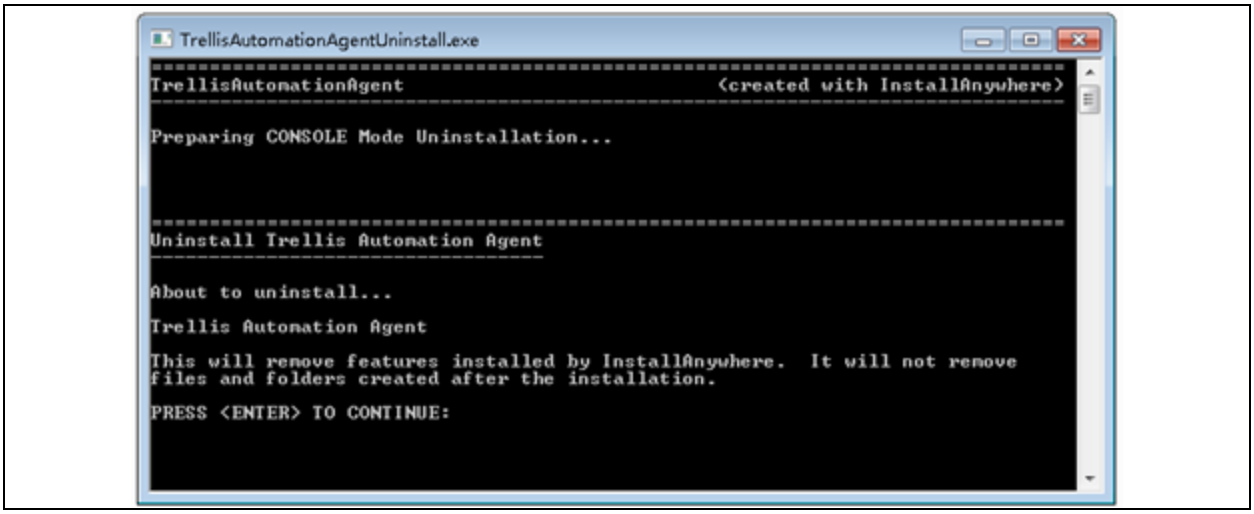
2.4.2 Automation agent uninstall

To uninstall the Windows server side:

1. Log in to the remote server and run *Control Panel - Programs and Features*.
2. Find Trellis Automation Agent in the list of programs. Run the uninstall.

NOTE: If it is the Microsoft Windows server or Microsoft Hyper-V server operating system, after logging in, navigate to the installation file directory, enter TrellisAutomationAgentUninstall.exe, and press the enter key.

Figure 2.14 Trellis Automation Agent Uninstall Page



3. Press the enter key to continue, and wait until uninstallation is complete.

To uninstall the Linux server side:

1. Log in to the Linux server as a root user.
2. Enter the terminal, enter /<install dir>/_installation/TrellisAutomationAgentUninstall, and press the enter key to run the uninstallation program.
3. Wait until uninstallation is completed.

3 Software Log In and Main Interface

3.1 Software Log In

3.1.1 User registration

If you are visiting Thermal Insight for the first time, you need to register an administrator user and password.

To sign up:

1. Open a web browser on your local computer and enter **https://localhost:<service port>**, where <service port> is the service port number, such as 8443. In this example, the address is **https://localhost:8443**.

   -Or-

   On the computer in which the application is installed, double-click the *Thermal Insight Console* shortcut icon.

2. To login on a remote computer, enter **https://<remote IP address>: <service port>;** where the <remote IP address> is the IP address for the installation of Thermal Insight, and the <service port> is the service port number. For example, 8443.
3. Enter the email address at which you want to receive the alert notification. Click *CONTINUE*.

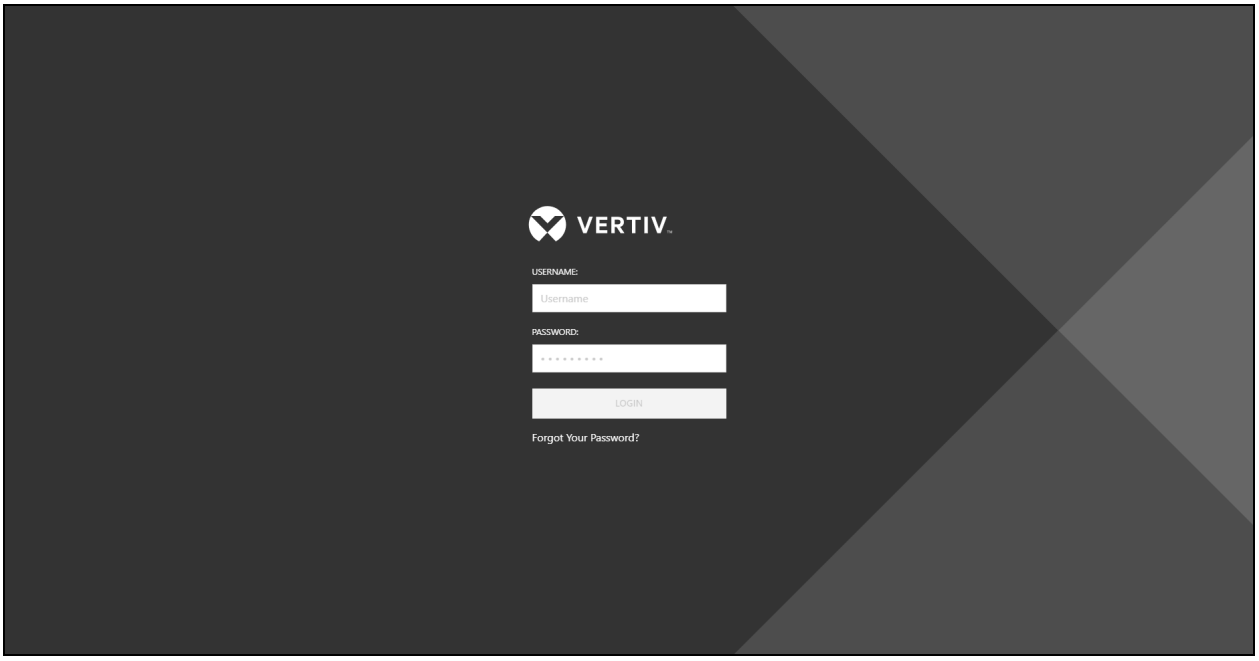
Figure 3.1 User Registration Window

NOTE: The email address entered only receives alert notifications and not your account name. The default account name of the application is admin.

NOTE: In addition to the default email address, users can also add different email addresses to the system to receive alert notifications, specifically referring to the Other Address Book Settings in Contacts settings on page 63.

4. Create a new password. Enter the Password and Confirm Password fields. Click *CONTINUE*.

Figure 3.2 User Password Setup Window



NOTE: The password must be between 10 to 128 characters and contain at least one capital letter, one lowercase letter, and one number.

5. Select the Configuration. If you need to configure your email server in advance, click *Configure the Server*.

   -Or-

   Click Skip and go to step 7 .

NOTE: If the email server is not configured at this time, you can also complete the configuration by accessing to Email and SMS notification settings on page 68 to complete the configuration.

6. Enter the IP address or host name of the mail server in the E-Mail Host field. Enter the email port number (the default is 25), email server account name, and password in the appropriate field. Click the *Use TLS slider* to enable secure communication. Click *Continue*.

NOTE: The Use TLS button is enabled by default. When enabled, an email server account name and password is required. When disabled, an email server account name and password is not required.

Figure 3.3 User Details Window

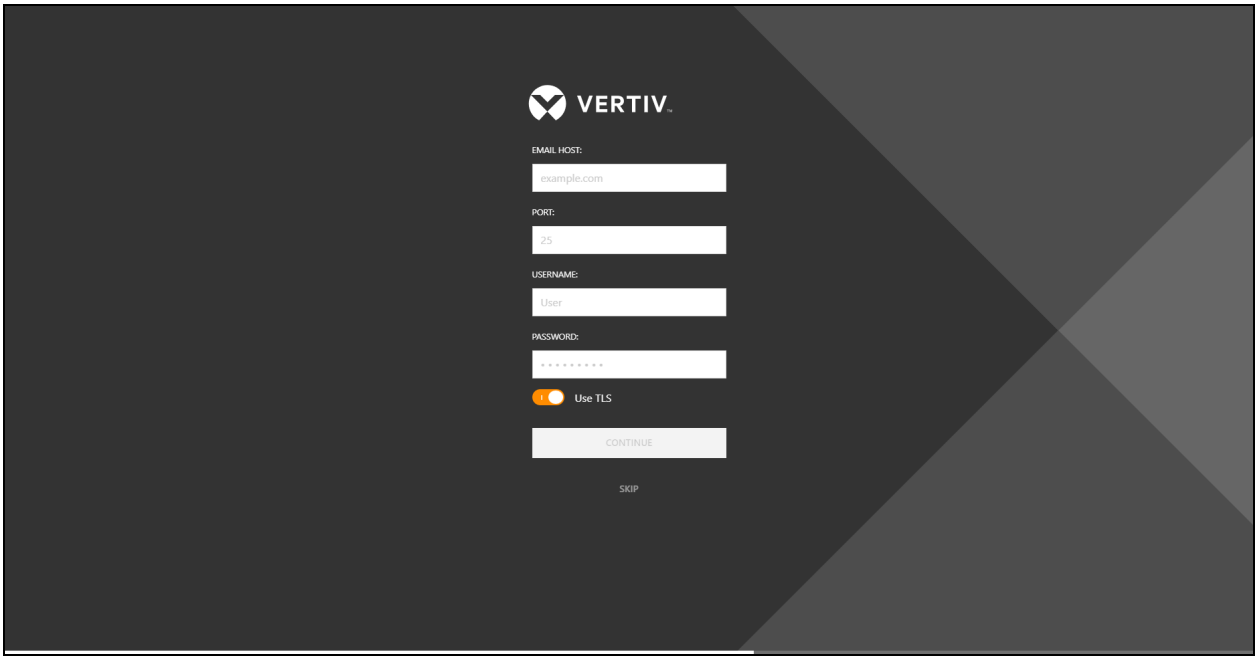


Table 3.1 List of Parameters

Parameter	Description	Default Value
Email host	The IP address of the server where the email is sent.	-
Port	The port on which the mail server sends and receives mail.	25
User name	Mail server user name.	-
Password	Mail server password.	-
Use TLS protocol	Whether to encrypt the transmission.	No

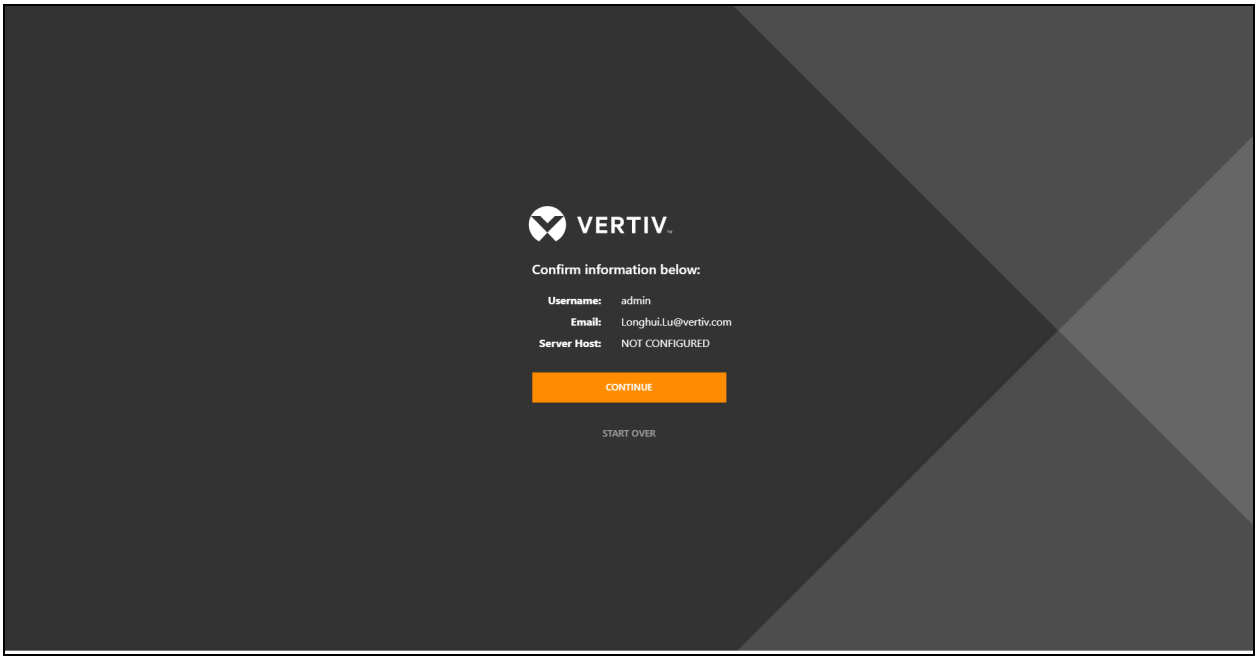
NOTE: If you did not configure an email server here, you can also complete the configuration of your email server by referring to the section Email and SMS notification settings on page 68 to complete the configuration.

7. Go to Installation of the Software on page 3 to start the initial sign in process from scratch, click *START OVER*.

   -Or-

   Go to Software Log In and Main Interface on page 19. Click *Continue* in the next window. Complete the registration.

Figure 3.4 User Details Confirmation Window



3.1.2 User login

You can login once you are registered.

To sign in:

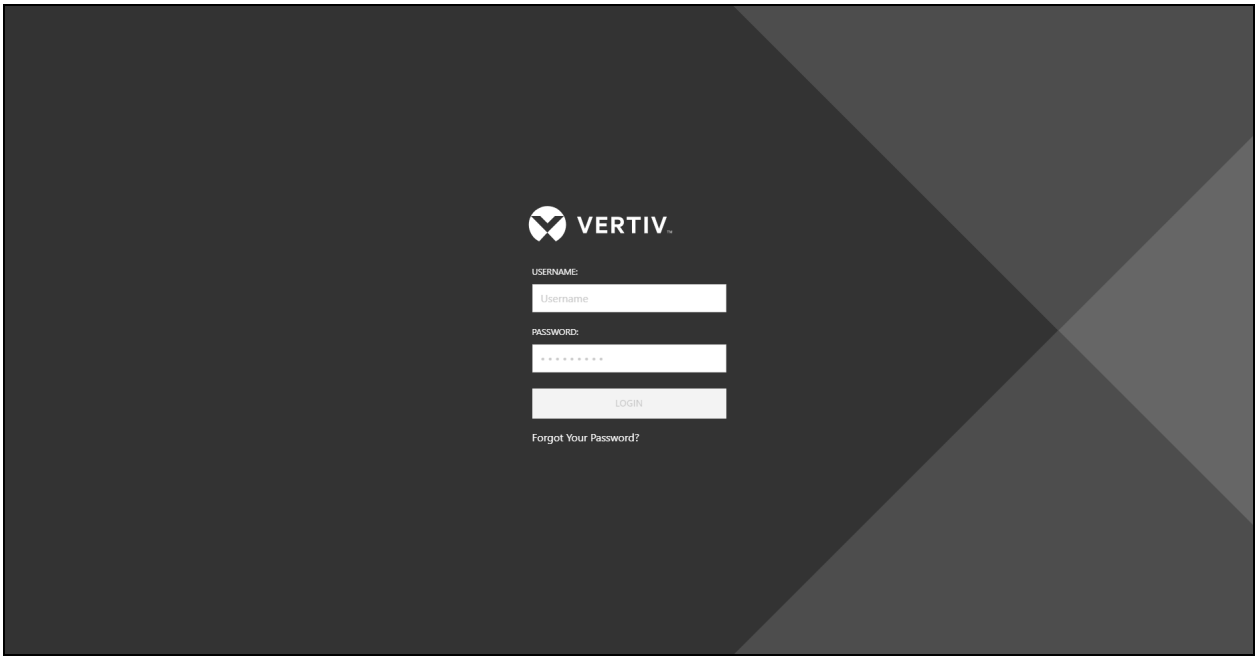
1. Open a web browser on your local computer and enter **https://localhost:<service port>,** where the < service port> is the service port number, such as 8443. In this example, the address is **https://localhost:8443**.

   -Or-

   On the computer on which the application is installed, double-click the *Thermal Insight Console* shortcut icon.

2. To login on a remote computer, enter "https:// <remote IP address>: <service port>; where the <remote IP address> is the IP address for the installation of Thermal Insight, and the <service port> is the service port number. For example, 8443.
3. Enter the username (admin by default) and password. Click *Login*. Complete your login. See Figure 3.5 below.

Figure 3.5 User Login Window

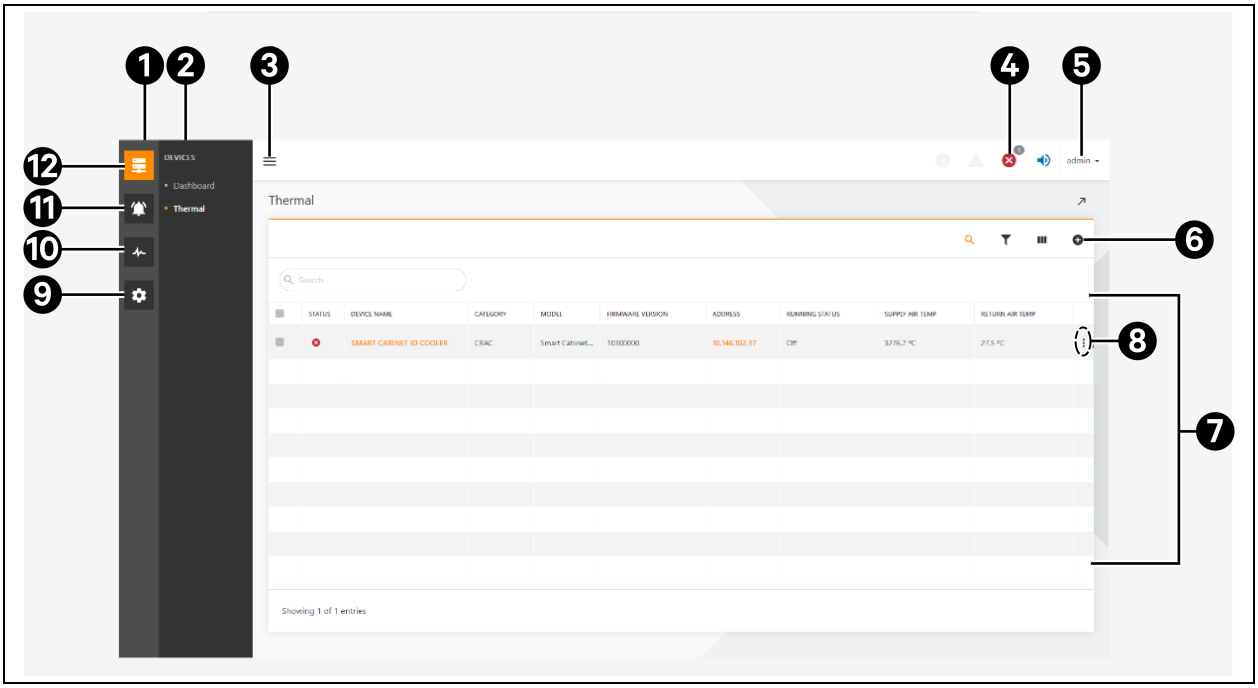


3.2 User Interface

The user interface contains several areas that help you manage the devices being monitored by Thermal Insight application. The pivot bar and context menu on the left contain items that contain connected devices, alarm information, various configurations, and system settings.

The upper right corner consists of the number of alarms. If you click the drop-down menu next to the Alarm notifications, help information and user profiles appear.

Figure 3.6 Main Interface Window



Item	Name	Description
1	Options bar	Provides access to the device list (network device icon), alarm (bell icon), monitoring (heart monitoring icon), and system settings (gear icon) context menu.
2	Context menu	Provides a list of options for the icon selected in the options bar.
3	Expand menu icon	Expand or collapse the options bar and context menu.
4	Alarm notifications	Progressive alarm count for general alarms, important alarms, and emergency alarms.
5	Profile menu	System and user tools, such as help, password reset, current user applications, email settings, and so on.
6	Toolbar	Included icons are used to perform various functions for selected rows or the entire table.
7	Table	Details about the selected menu item. To the right of each line is a vertical ellipses icon that expands to show the functions that can be performed on that line.
8	Vertical ellipses icon	Contains icons for editing, deleting, and running configurations, or to view details.
9	Administration	Contains the context menu items: • Event • Notification settings • System settings • User-defined properties • System diagnostics • Contacts • Trust the certificate • Integrated management
10	Monitoring	Contains the context menu items: • Device search configuration

Item	Name	Description
		• Discovered devices • Communication profile configuration • Server shutdown configuration
11	Alarms	Contains the context menu items: • Alarm • Activity alerts • Historical alerts • Linkage notifications • Action • Action combinations • Alarm binding
12	Devices	Contains the context menu items: • Panel • Refrigeration

4 Add Refrigeration Equipment

4.1 Overview

The first step is to add the refrigeration equipment that needs to be monitored to the device list and when you are done, real time data and alert information for your device are available.

4.2 Get Started Quickly

4.2.1 Quick deployment steps

Adding a refrigeration equipment can be done in two modes:

- Add manually
- Search and add

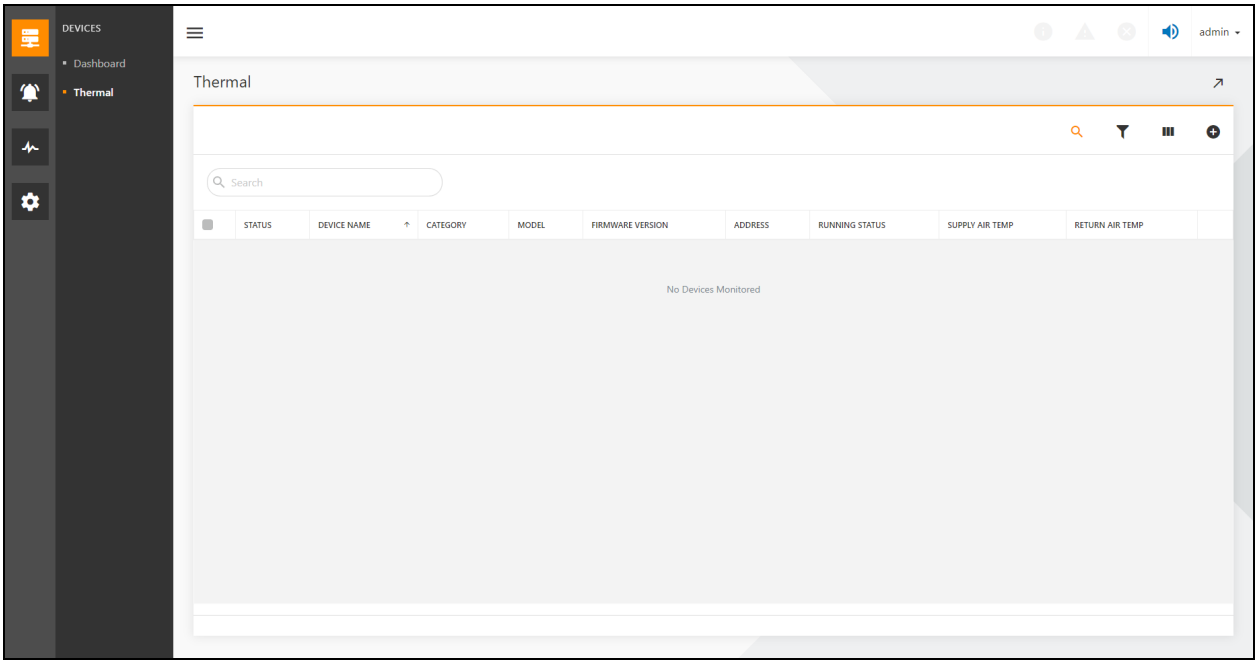
NOTE: If the refrigeration device search or addition is unsuccessful and cannot communicate, check whether the service IP address of Thermal Insight has been added to the whitelist of refrigeration equipment.

4.2.2 Example

Add refrigeration equipment manually

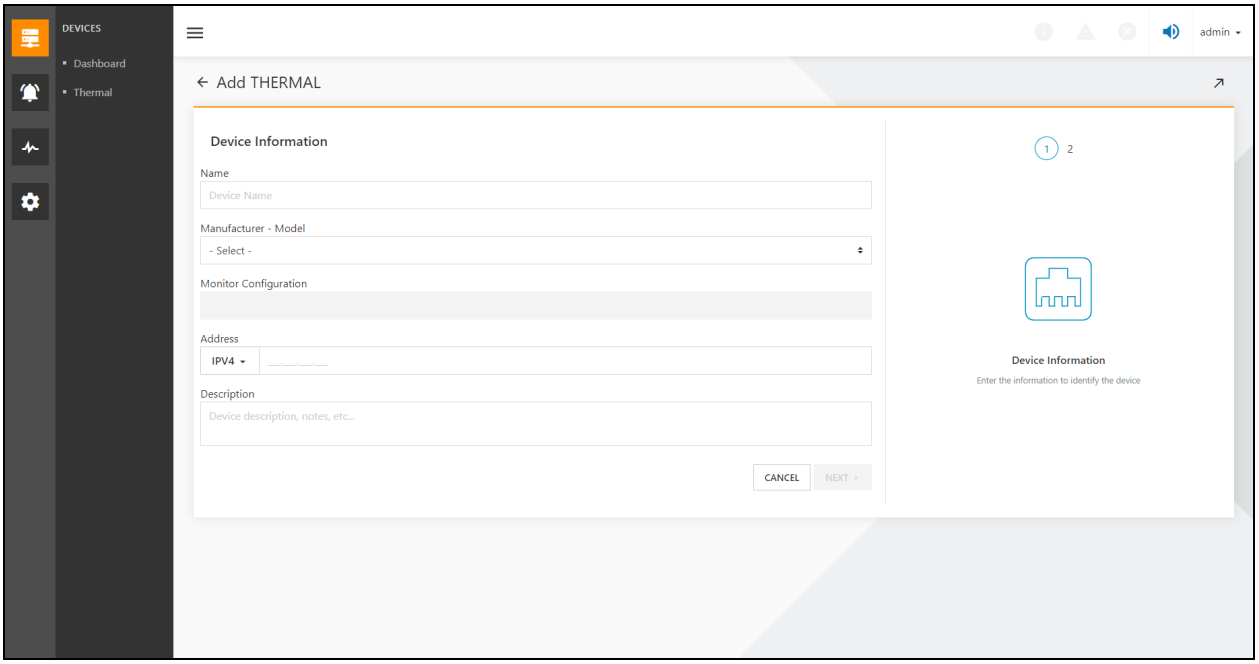
1. Click on the DEVICES icon in the first level menu, and click on the *Thermal* in the secondary menu to add a device, as shown in Figure 4.1 below.

Figure 4.1 Thermal Equipment Window



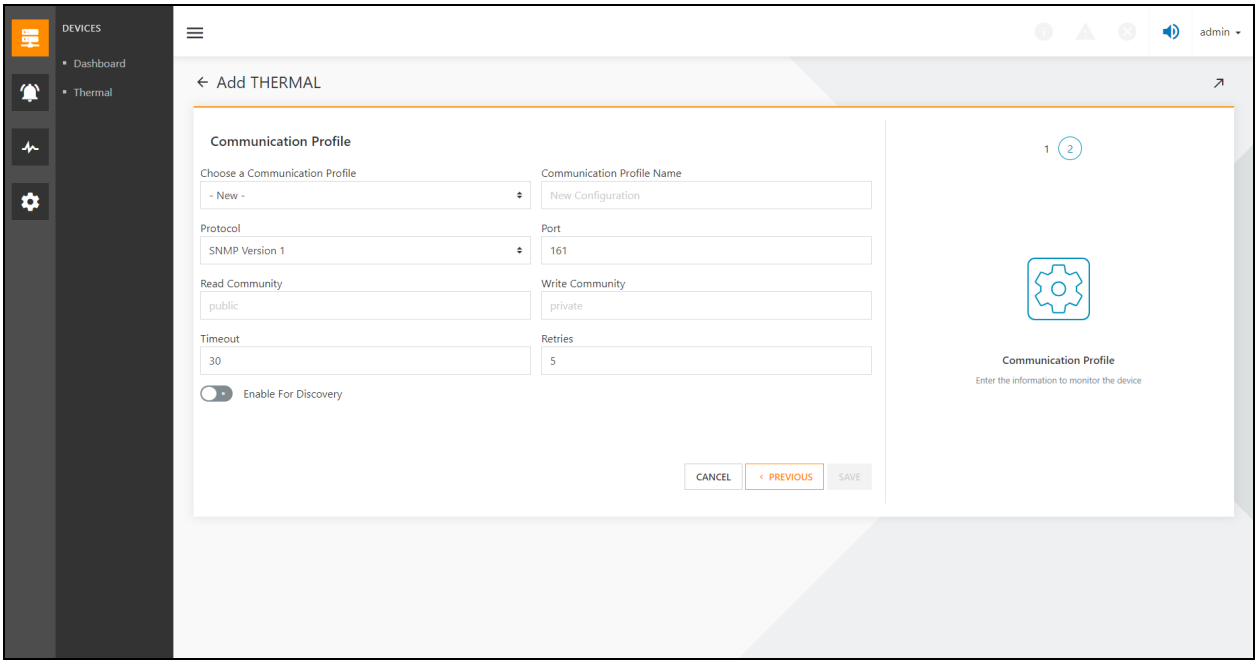
2. Click on the plus (+) icon in the upper right corner to enter the device configuration page.

Figure 4.2 Adding Refrigeration Equipment Manually



3. Enter the Name of the device, Manufacturer - Model (refrigeration equipment model), Monitor Configuration (capture card model), IPV4 Address (IP address of the capture card) and other relevant parameters. Click the *Next* step to enter the communication profile page. (For specific parameters, refer to Add a device thermal on page 32).

Figure 4.3 Communication Profile Window



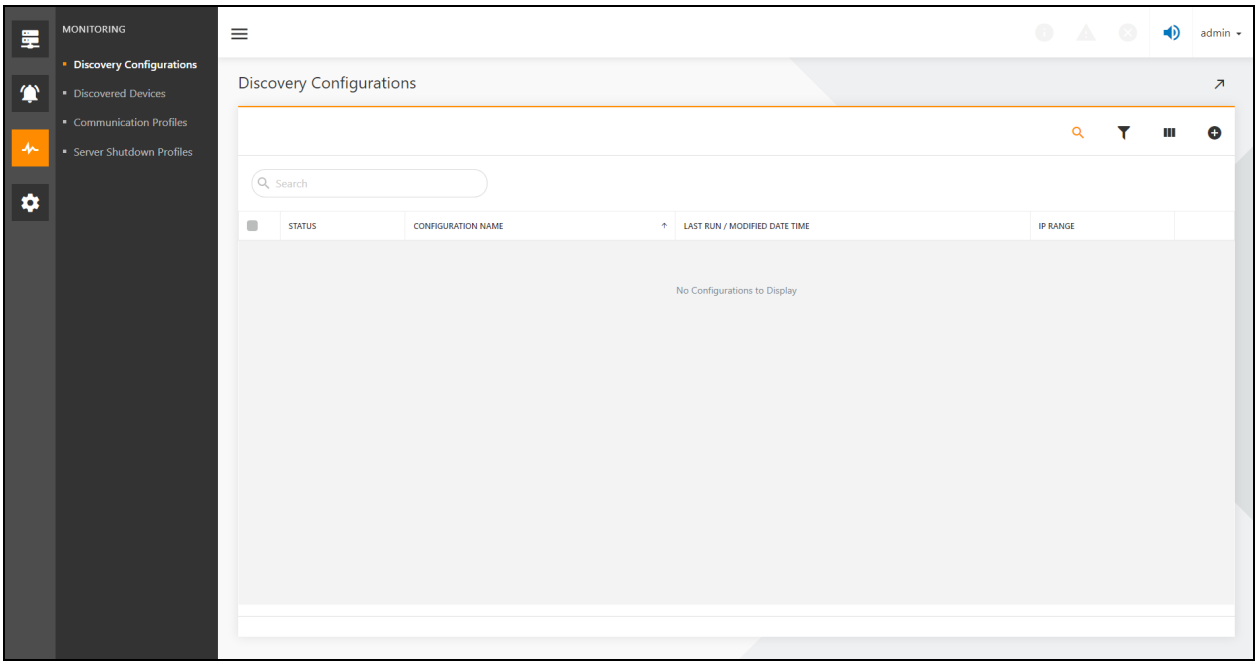
4. On the communication profile page, select communication profile from the existing configuration. Select SNMPv2, and other parameters will be filled in accordingly. Click *Save*, and the entire refrigeration manual addition process is complete. (For specific parameters, refer to Add a device thermal on page 32).

NOTE: To configure SNMP on the Thermal Insight, you need to configure SNMP on the capture card side and add the IP address of the server installed by Thermal Insight to the SNMP white list of the capture card. Similarly, pay attention to reading communication words and writing communication words to be consistent.

Auto discovery configuration

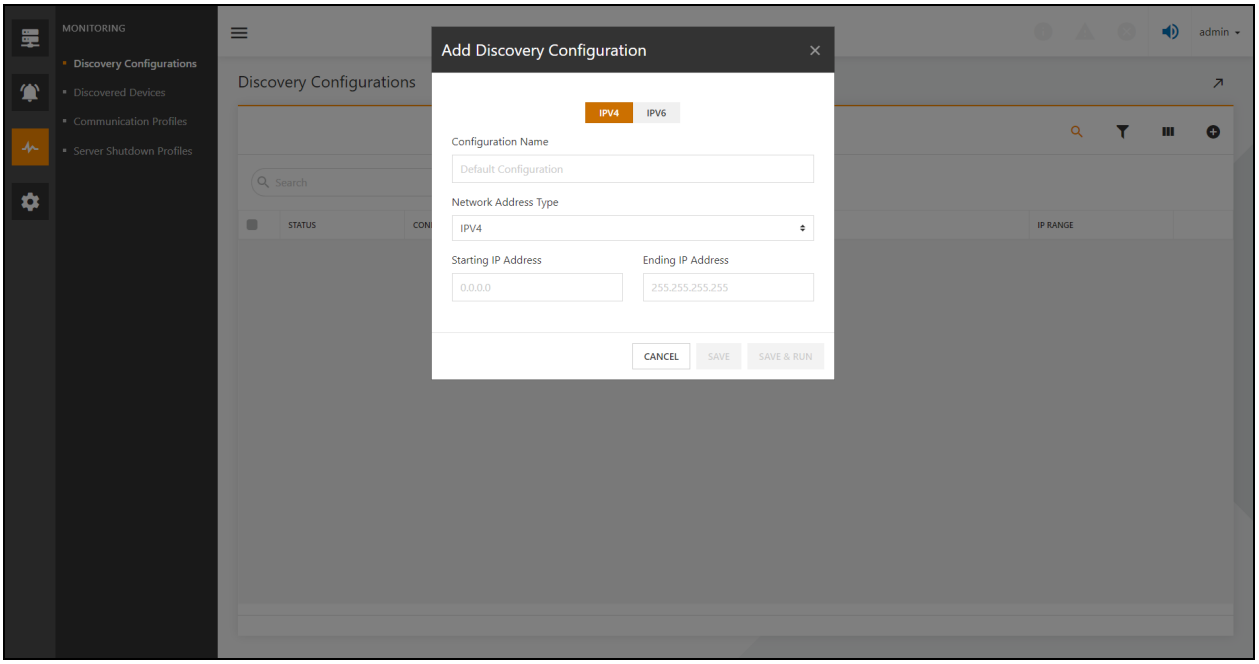
1. Click on the MONITORING icon in the first level menu and click on *Discovery Configurations* in the secondary menu, as shown in Figure 4.4 below.

Figure 4.4 Discovery Configurations Window



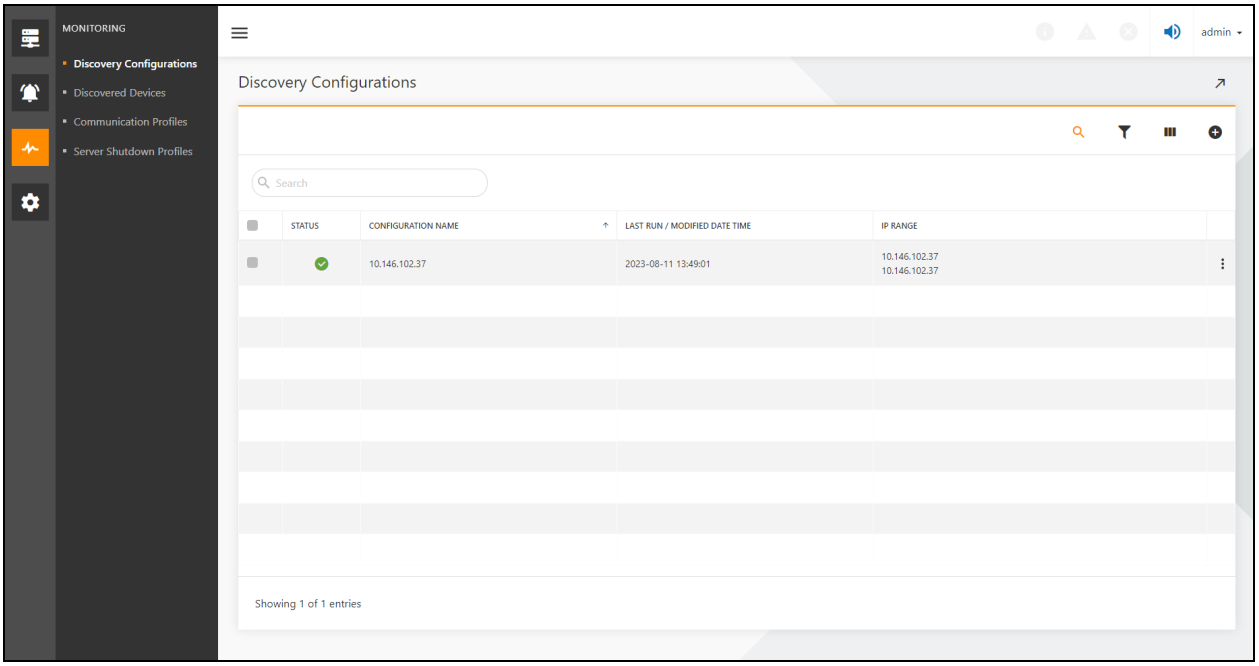
2. Click on the plus (+) sign in the upper right corner, and the Add Discovery Configuration window appears.

Figure 4.5 Add Discovery Configuration Window



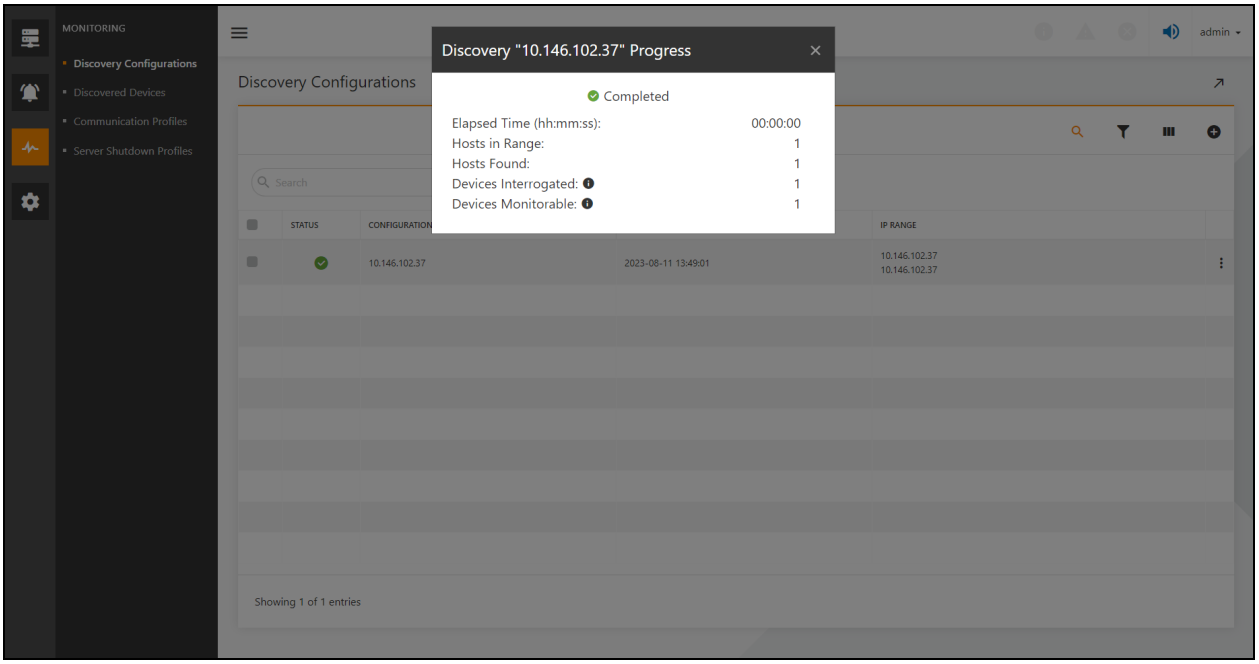
3. Enter the Configuration Name, Network Address Type (IPV4 or IPV6), Starting IP Address, and Ending IP Address (four parameters). Click *SAVE & RUN*.
4. When the run is over, the status turns green. See **Figure 4.6** below.

Figure 4.6 Completion of Operation Status Window



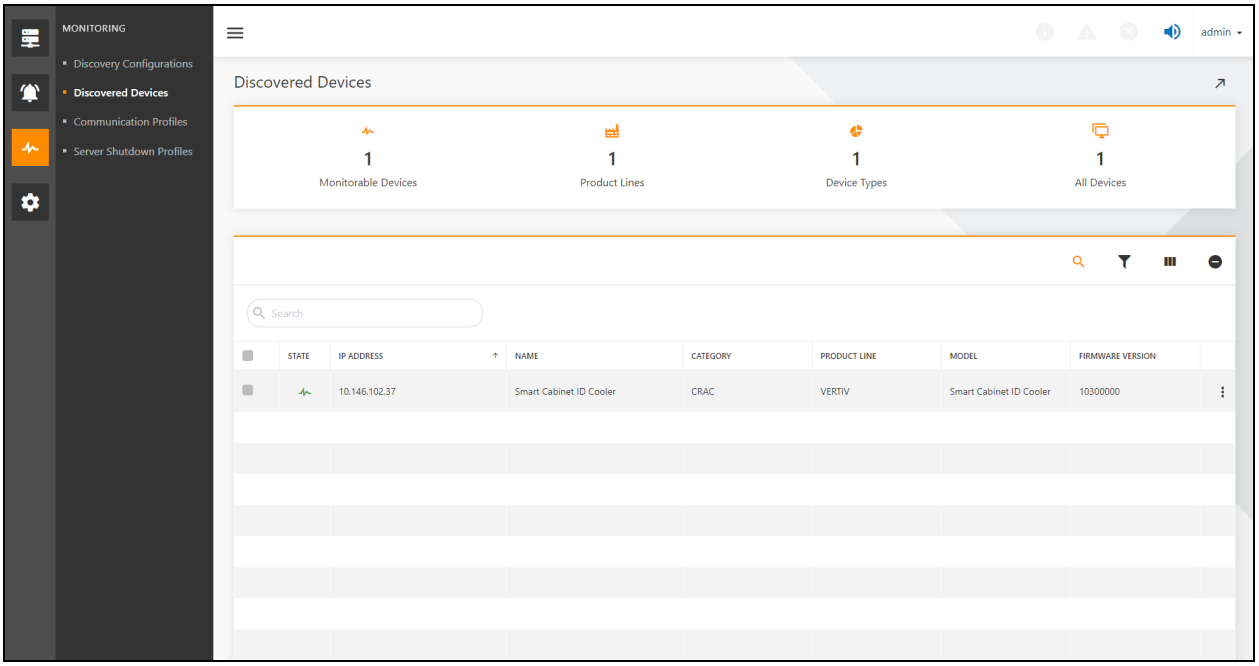
5. Click the green icon, and the new window shows the number of devices searched for to communicate.

Figure 4.7 Discovery Configurations Progress Window



6. If the number of monitorable devices is greater than one, click *Discovered Devices* in the second level menu that displays specific communicable devices. Click the vertical ellipsis on the right side of the firmware version. Click *Monitor*.

Figure 4.8 Discovered Device Window



7. If there is no problem, a green window will appear in the lower right corner to indicate that the device was added.

Figure 4.9 Adding Device Confirmation

NOTE: To configure SNMP on the Thermal Insight, you need to configure SNMP on the capture card side and add the IP address of the server installed by Thermal Insight to the SNMP white list of the capture card. To configure SNMP on the Thermal Insight, you need to configure SNMP on the capture card side.

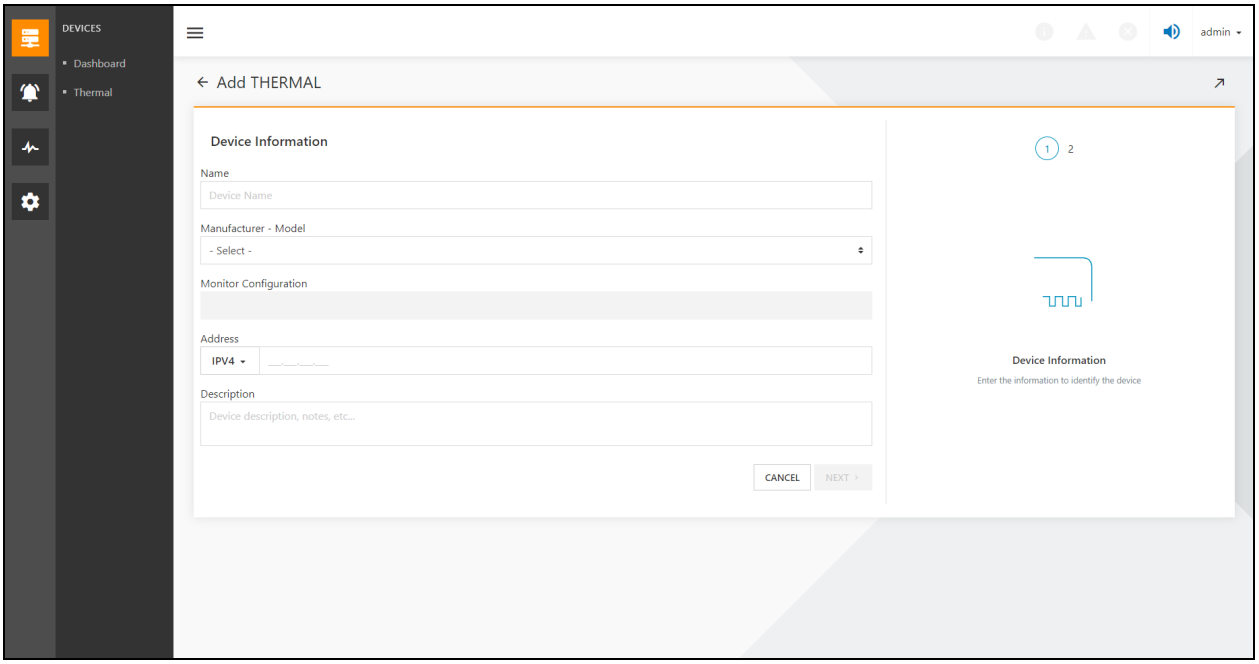
4.3 Detailed Features

4.3.1 Add a device thermal

Click on the DEVICES icon in the first level menu, and click on the *Thermal* in the secondary menu to add a device. Click on the plus (+) sign in the upper right corner to enter the add refrigeration equipment page.

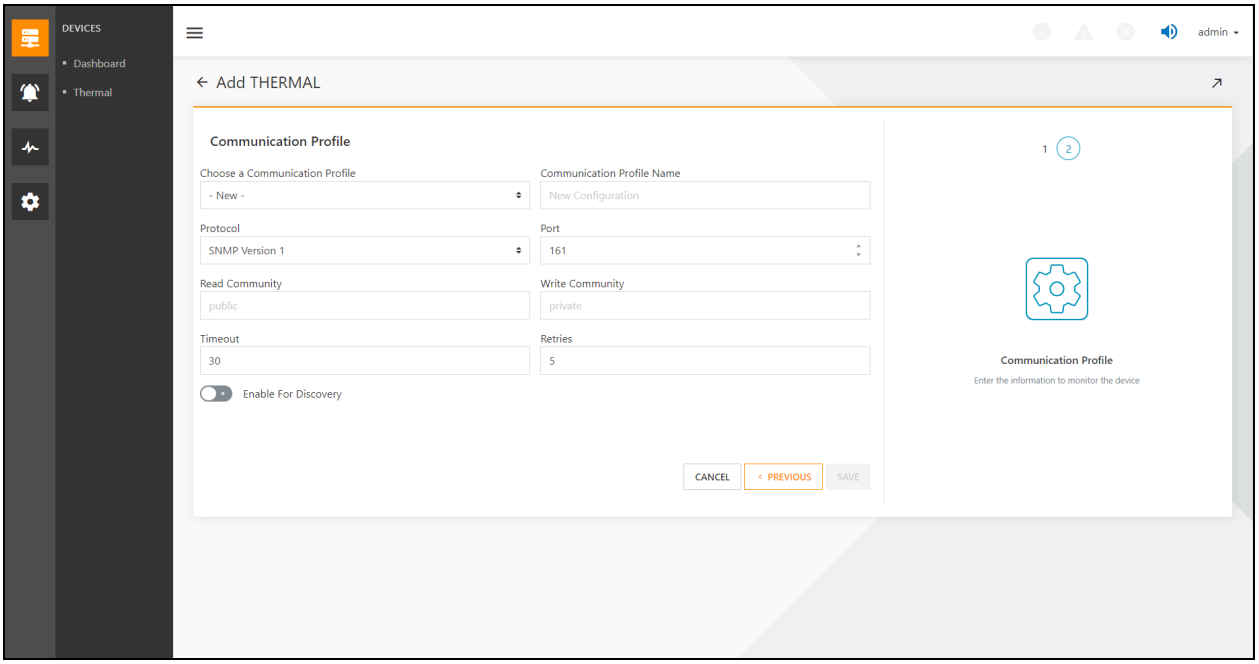
Enter the following information: Name (refrigeration equipment name, user customizable), Manufacturer - Model (actual refrigeration equipment model), Monitoring Configuration (data acquisition card model on refrigeration equipment), Address (IP address of refrigeration equipment), Description (equipment description, information, cannot be filled in). Click the *Next* step to enter the communication profile page.

Figure 4.10 Adding Refrigeration Equipment Manually



On the second page to add refrigeration equipment, enter the following information: Choose a Communication Profile (including all default communication file options), Communication Profile Name (the name of the communication file that can be customized by the user), Protocol (SNMP protocol type, V1, V2), Port (communication port, default is 161), Read Community (SNMP read operation password), Write Community (SNMP write operation password), Timeout (operation has no response time, if this time is exceeded, the same operation is done again), and Retries (timed out the number of retries) for device search (for device search or not). Click *Save*.

Figure 4.11 Communication Profile Window



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5 Device Monitoring

5.1 Overview

After refrigeration units are added, they can be monitored. The Thermal Insight interface helps to monitor cooling parameters of device information such as input, output, load, and environmental parameter information such as temperature. If a device is not added, refer to Add Refrigeration Equipment on page 27.

5.1.1 Functional module

- Status panel
- List on devices
- Device real time signal
- Device details
- Alert notice

5.2 Get Started Quickly

5.2.1 Quick deployment steps

1. Refer to Quick deployment steps on page 27.
2. Quickly monitor entrances:
    a. Click on the DEVICES icon, and click on the *Dashboard* to browse the global device status statistics.
    b. Click on the DEVICES icon and click *Thermal*. Click the button on the right side of the list and select the device details in the list. Click on the vertical ellipses pop up box to view the detailed assets of the device.
    c. In the list of refrigeration equipment, click the vertical ellipses button on the right side of the list and select *Equipment Details* in the pop up box to view the detailed asset information of the equipment.
    d. In the list of refrigeration equipment, click the vertical ellipses button on the right side of the list and select the real time signal of the device in the pop up box to monitor the detailed real time status of the device.

5.2.2 Example

Refer Example on page 27.

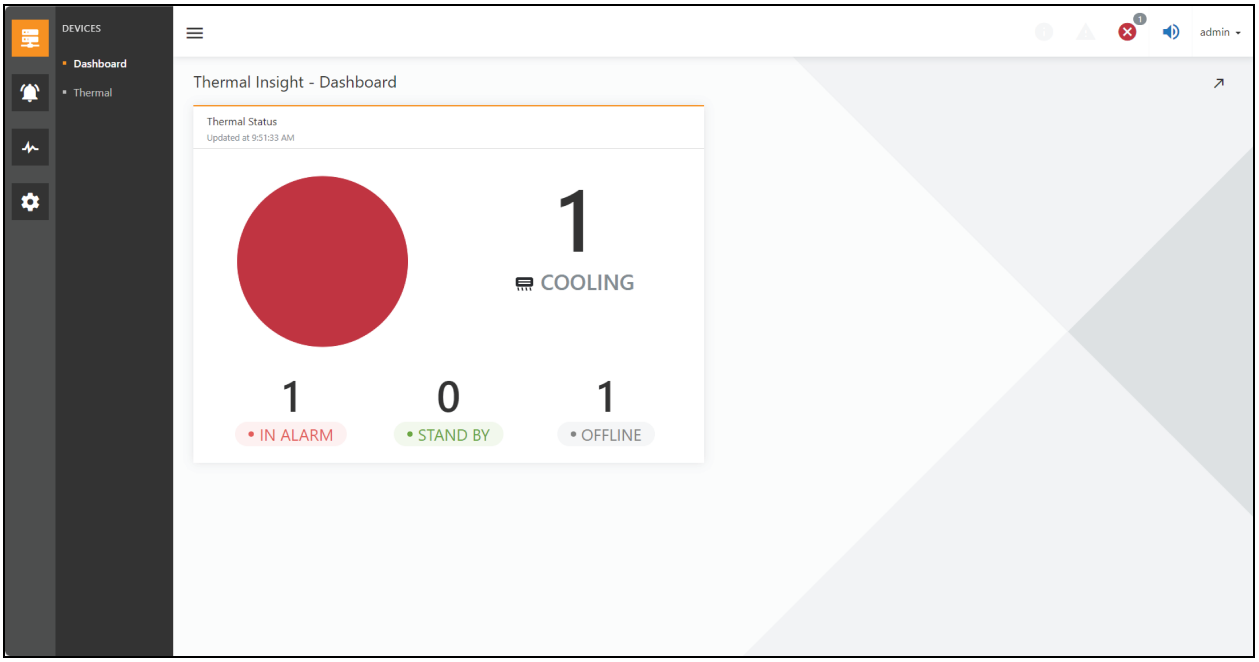
5.3 Detailed Features

5.3.1 Dashboard

Click on the DEVICES icon from first level menu directory to enter the dashboard interface by default.

The dashboard displays an overview of the status of all refrigeration equipment. Above the COOLING icon indicates the total number of devices that are currently monitored by the application, and below the icon indicates the statistics of the number of devices in various states. The refrigeration equipment status is further divided into IN ALARM, STAND BY, and OFFLINE. The pie chart on the left is a summary of the state of the device. It shows green when all devices are online, and in a normal state, it shows red-green pie chart in proportion when there is an abnormal state of the devices. See **Figure 5.1** on the next page for more details.

Figure 5.1 Thermal Insight—Dashboard



Each category shown on the System Status panel is a link that directs you to a Device List window that only displays the devices in that category.

5.3.2 Device list

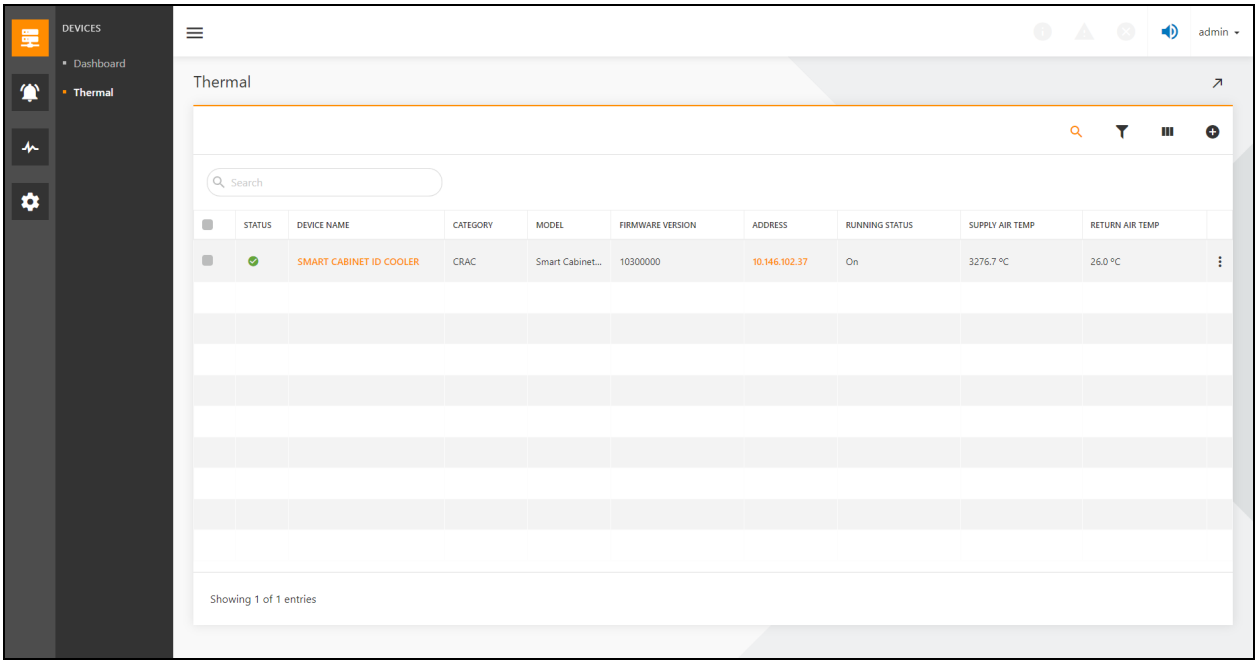
Select the DEVICES icon and click *Thermal* from the secondary level menu to access the Device List window. The Device List window contains the following information for each monitored power supply:

List column analysis

The refrigeration list has the following columns, as shown in Figure 5.2 on the facing page.

- Checkbox: You can use this to select the device when you perform batch operations on the device.
- STATUS: The real time status of the device is displayed by icon, there are three kinds of status: normal, alarm, and offline.
- DEVICE NAME: Click the device name to jump to the real time signal of the device.
- CATEGORY: Product category.
- MODEL: Product specific model.
- FIRMWARE VERSION: Firmware version of the refrigeration.
- ADDRESS: IP address of the refrigeration capture card.
- RUNNING STATUS: State of operation of the refrigeration equipment.
- SUPPLY AIR TEMP: Supply air temperature of the refrigeration equipment.
- RETURN AIR TEMP: Return air temperature of the refrigeration equipment.
- Drop-down selection box: After clicking, three selection items will pop up, device detailed, device real time signal, and delete. You can jump to device detailed information, device real time signal, and delete device, respectively.

Figure 5.2 Columns in Refrigeration List

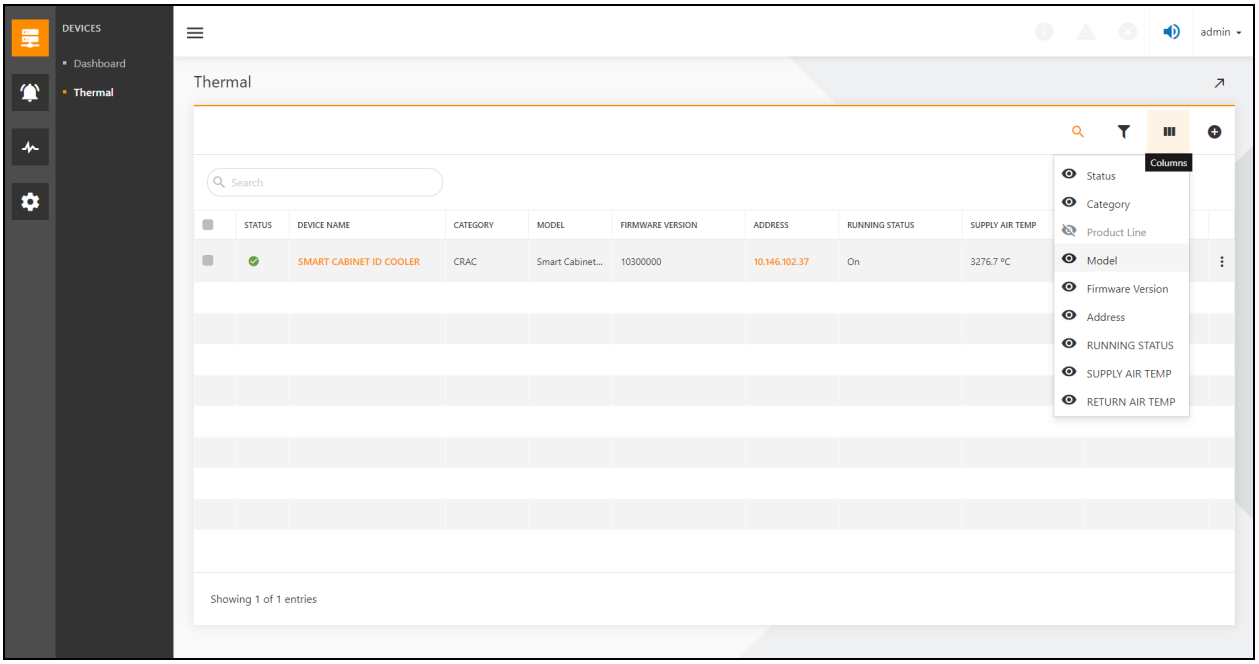


Common list of operations

Search for a device: As shown in Figure 5.2 above, there is a search button in the upper right corner of the list. Click the button to display or hide the search bar. By entering information in the search bar, such as CRAC, you can filter the items in the list against the keyword CRAC and filter out the item that contains CRAC information. Search information is supported by different list is inconsistent. For example, the refrigeration equipment list only supports searching for device names, categories, models, firmware versions, and addresses.

Column Hide: As shown in Figure 5.3 on the next page, clicking on the columns icon in the upper right corner of the list will bring up a drop-down box that lists columns that can be hidden. Click the drop-down box option to show or hide the column. The show icon indicates that the column is being displayed, hidden icon indicates that the column is hidden.

Figure 5.3 Hiding of the Columns



Item filtering: As shown in Figure 5.4 on the facing page, there is a filter icon in the upper right corner of the list. Click to display or hide the filter options bar. There are two single selection drop-down boxes in the filter options bar for grouping and status. Selecting grouping can help you group and display list items. In addition to selecting grouping, the other drop-down boxes are used to filter the status of the listed devices. As shown in Figure 5.4 on the facing page, the device is filtered for status properties, and only devices whose status is offline are displayed.

Figure 5.4 Item Filtering

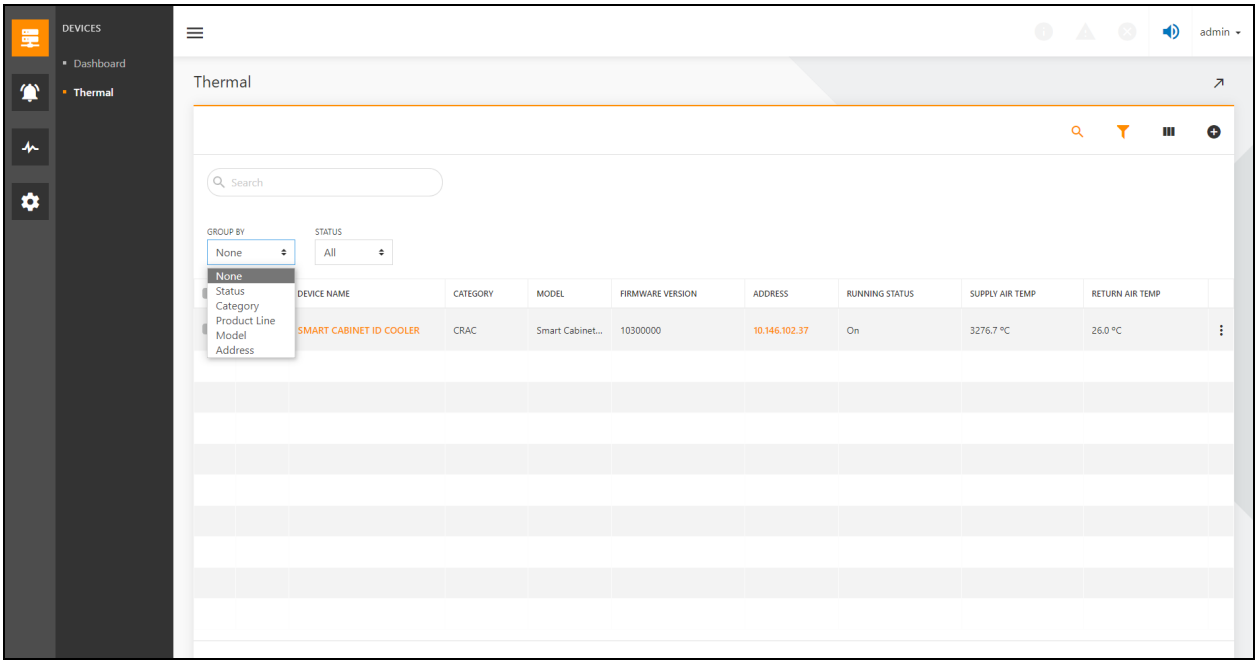
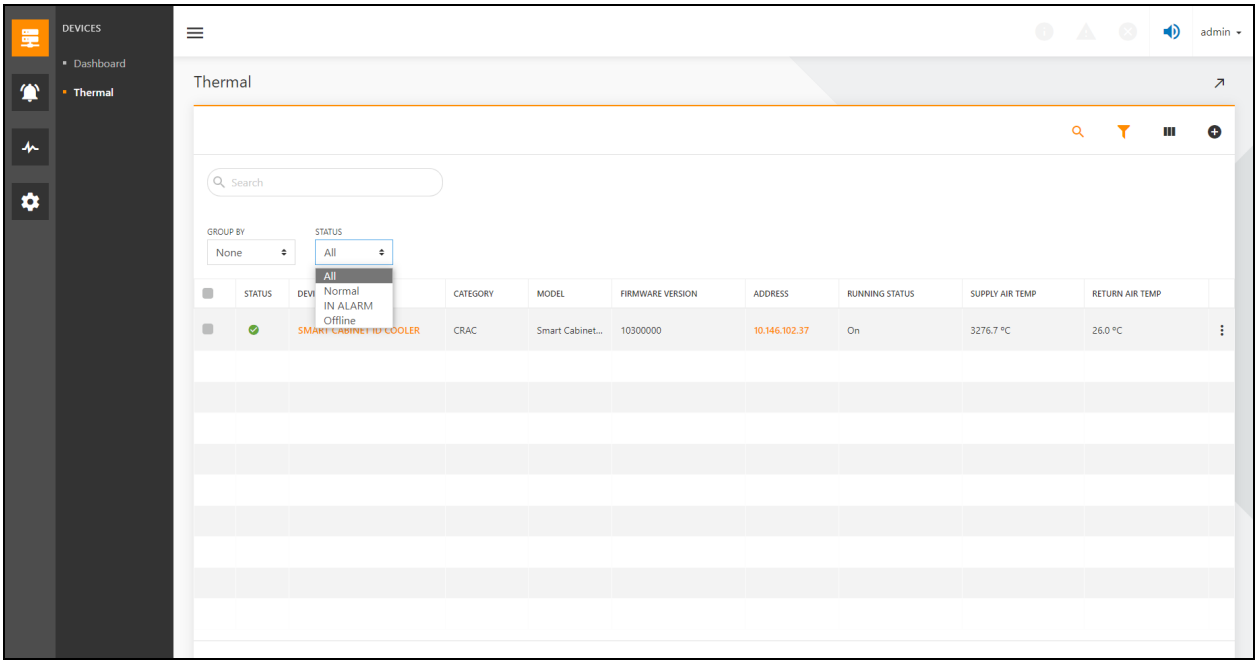
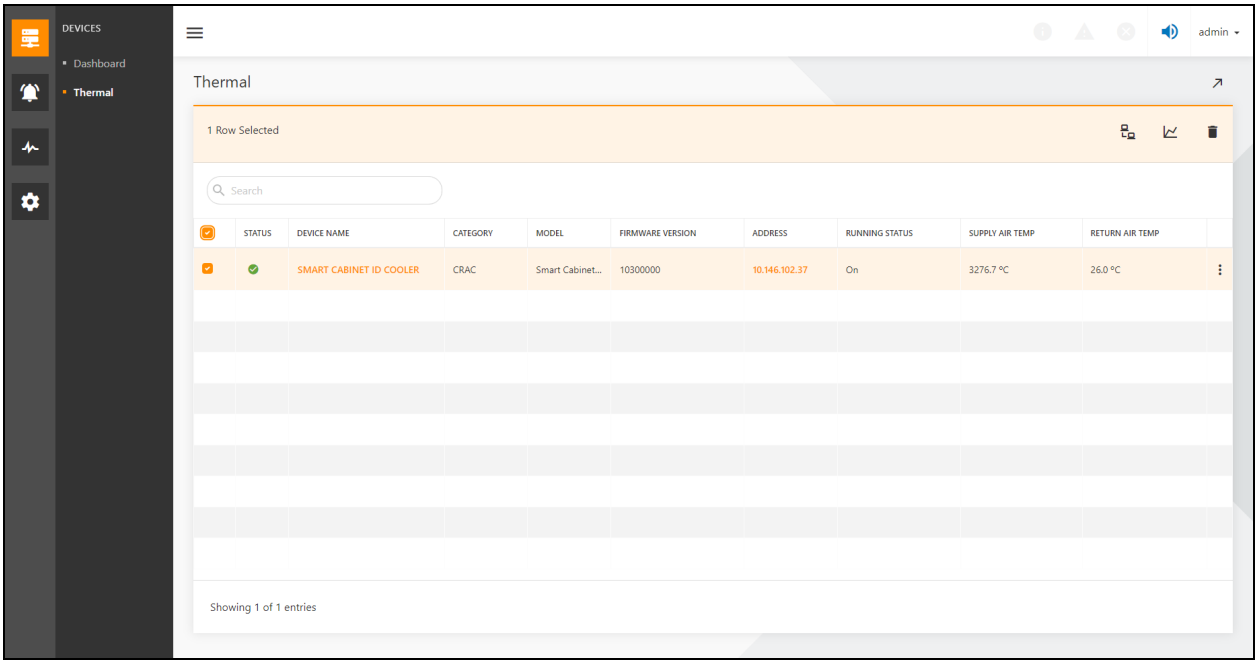


Figure 5.5 Item Filtering by Status



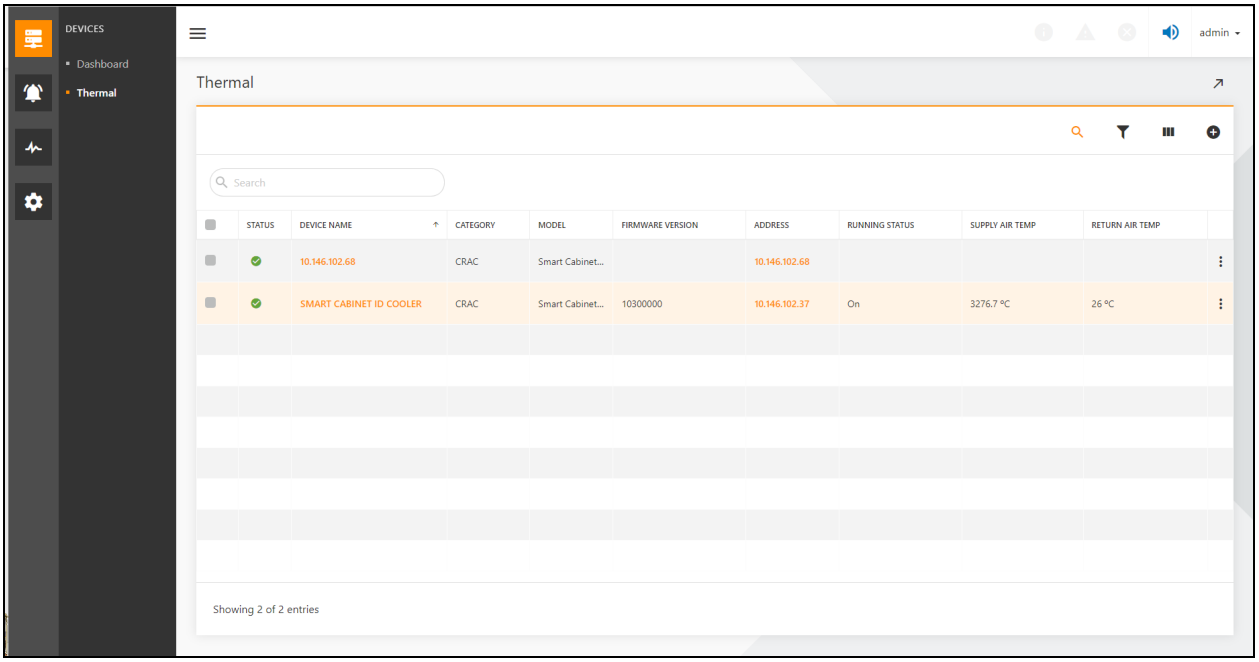
Batch operation: Click on the check box on the left side of the list, by selecting multiple items. Action button appear on top of the list where the gray icons can only operate for a single item in the list and the ungrayed icon can perform the batch operation of the corresponding selected device, For example, click delete icon can delete the devices in bulk.

Figure 5.6 Batch Operation Window



Sorting the list: Hover the mouse over an item in the header list. If there is no prohibited icon prohibiting operation, you can sort the list by clicking the table header. The ascending arrow represents the positive sequence, and the descending arrow represents the reverse sequence, as shown in Figure 5.7 on the facing page, which is to sort in the forward direction based on the device name. The sorting algorithm varies depending on the data format of the column in which the header is clicked. In general, the string uses a dictionary order, the numbers are sorted from small to large, and the normal status on the top.

Figure 5.7 Sorting List Window

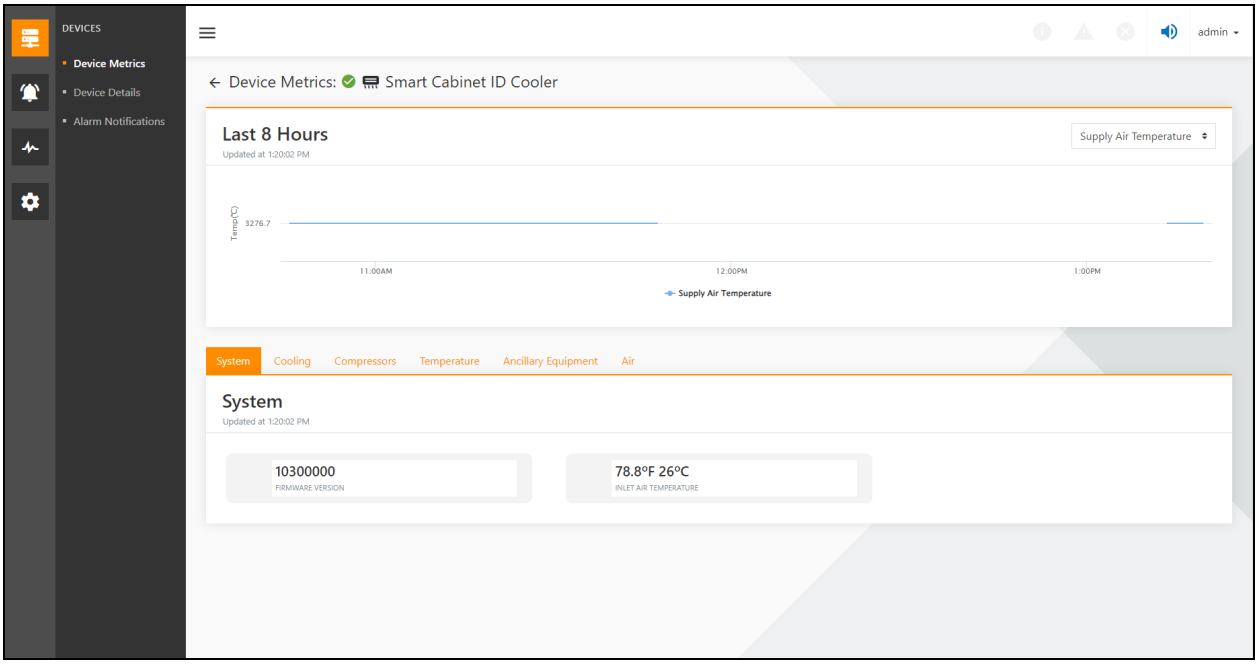


5.3.3 Device Metrics

In the list of refrigeration equipment, click the vertical ellipses icon on the right side of the list and select the device metrics in the pop up box to enter the device metrics page.

As shown in Figure 5.8 on the next page, the real time signal interface of the refrigeration equipment AC-95 is entered. The real time signal interface consists of two blocks. The cards above are used to display the supply air temperature, return air temperature, and an ambient temperature line chart for the last 8 hours. When the mouse hovers over the line chart, a floating box will pop up, and you can see the supply air temperature, return air temperature or ambient temperature at a specific time. The card below lists all the detailed signal values of the device in groups, which can be switched by moving the mouse over the group. The upper left corner of the card shows the time node of signal acquisition. The number of packets and the number of real time signals within each packet vary depending on the class of device and the model of the device.

Figure 5.8 Real Time Signal Interface Window

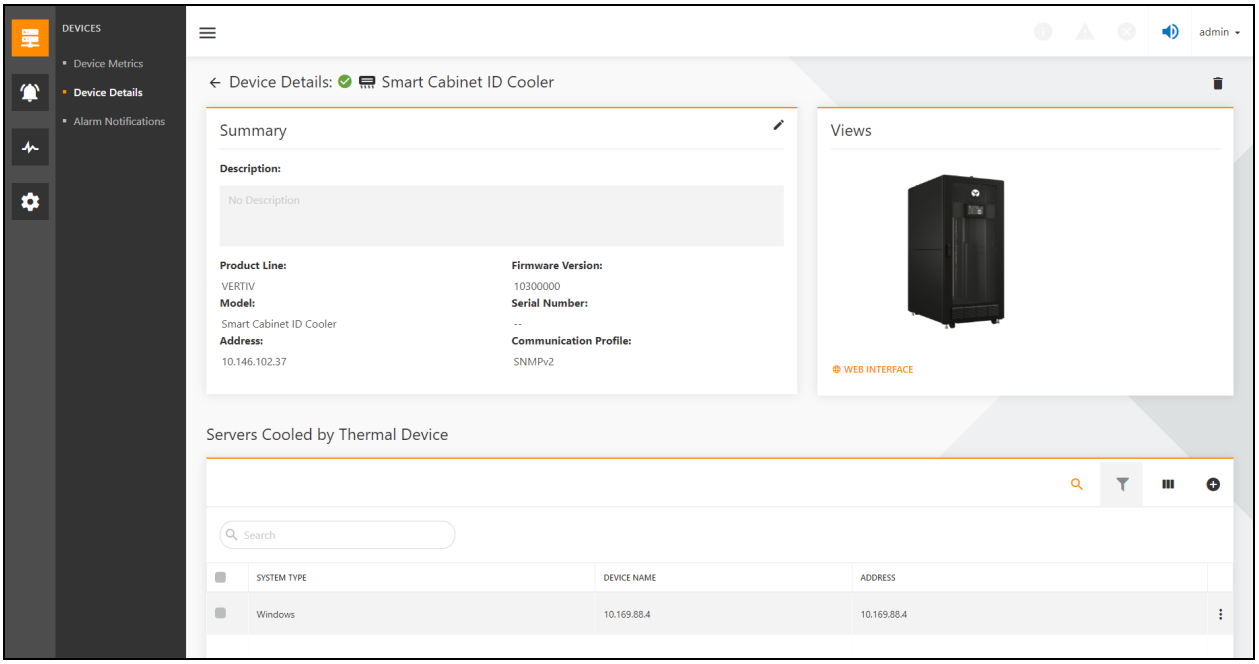


5.3.4 Device details

In the list of refrigeration equipment, click the vertical ellipses icon on the right side of the list and select the refrigeration device details in the pop up box to enter the device details page. This window displays detailed information about the device and allows you to access the web interface of the device and the summary tab. It also displays the servers powered by the Thermal Device. The title shows the device name and device status, and the green circle with check mark icon represents the device status is healthy.

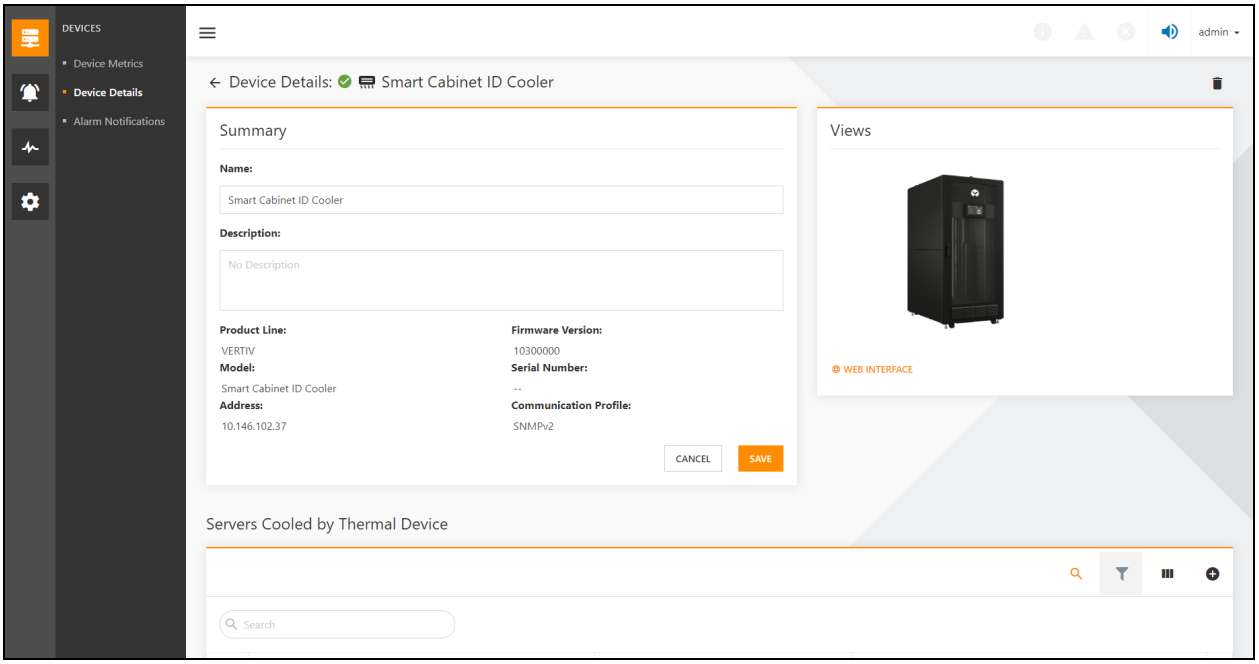
The configuration and function of the servers cooled by refrigeration will be described in Server list on page 86. The summary tab displays the device description, product line, firmware version, model number, serial number, address, and communication profile information.

Figure 5.9 Device Details



Click the edit icon under the summary tab to edit the name and description of the device, as shown in **Figure 5.10** on the next page.

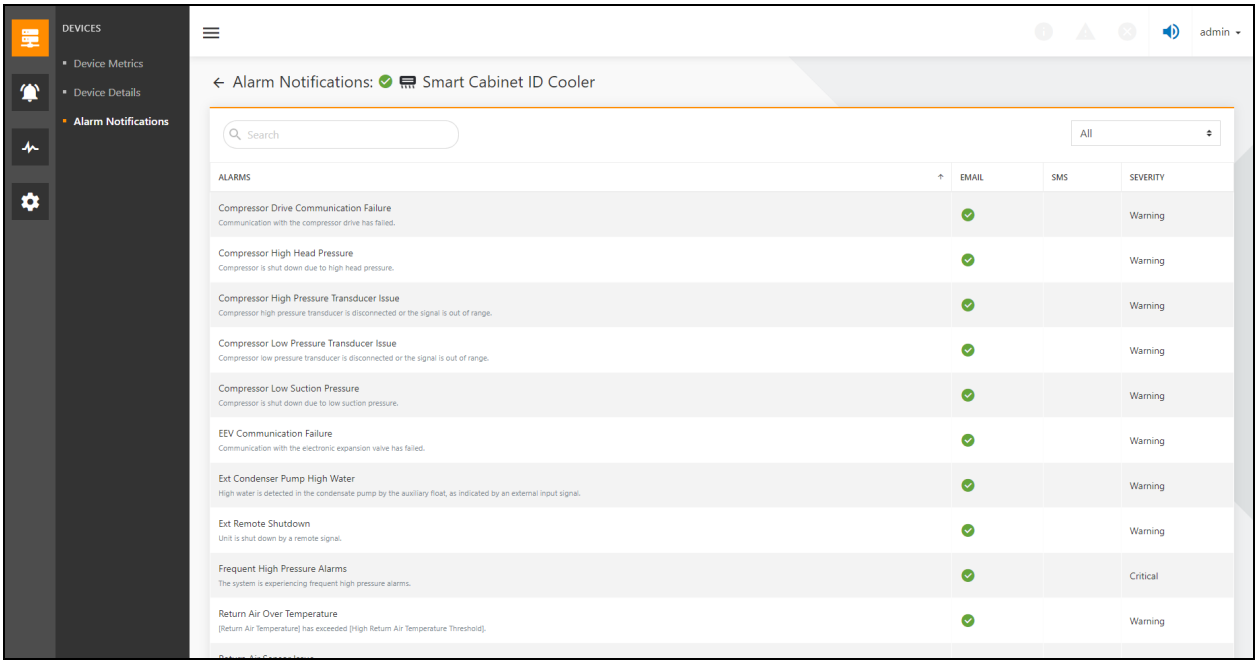
Figure 5.10 Editing the Name and Description of the Device



5.3.5 Alarm notifications

On the device details or device metrics page, click on the *Alarm Notifications* in the secondary directory to enter the alarm notifications interface, as shown in **Figure 5.11** below. Alarm Notifications is a read only window that displays alarms on the device which will trigger an email or SMS text. The mail and SMS columns in the list indicate whether the alert is currently allowed to send an email or text message as per rules defined in the Actions and Automated rules. The green circle with a green check mark represents that the alarm notification has been allowed. Using the search feature, you can also filter alarms based on their severity and locate a specific alarm in the list.

Figure 5.11 Alarm Notification Interface



6 Alarm Management

6.1 Overview

Alarms are the main functional modules for monitoring alarms throughout the Thermal Insight platform and obtaining alarm information. Users can obtain the active alarms and alarm history in the alarm module and can export the alarm list so that they can grasp the alarm status of the equipment under the site.

6.1.1 Functional modules

The Alarm includes the following function modules, each of which is detailed in this manual under Detailed Features on page 47:

- Active alarm
- Alarm history

6.2 Get Started Quickly

6.2.1 Quick deployment steps

To ensure that you can view the alarm information, you need to:

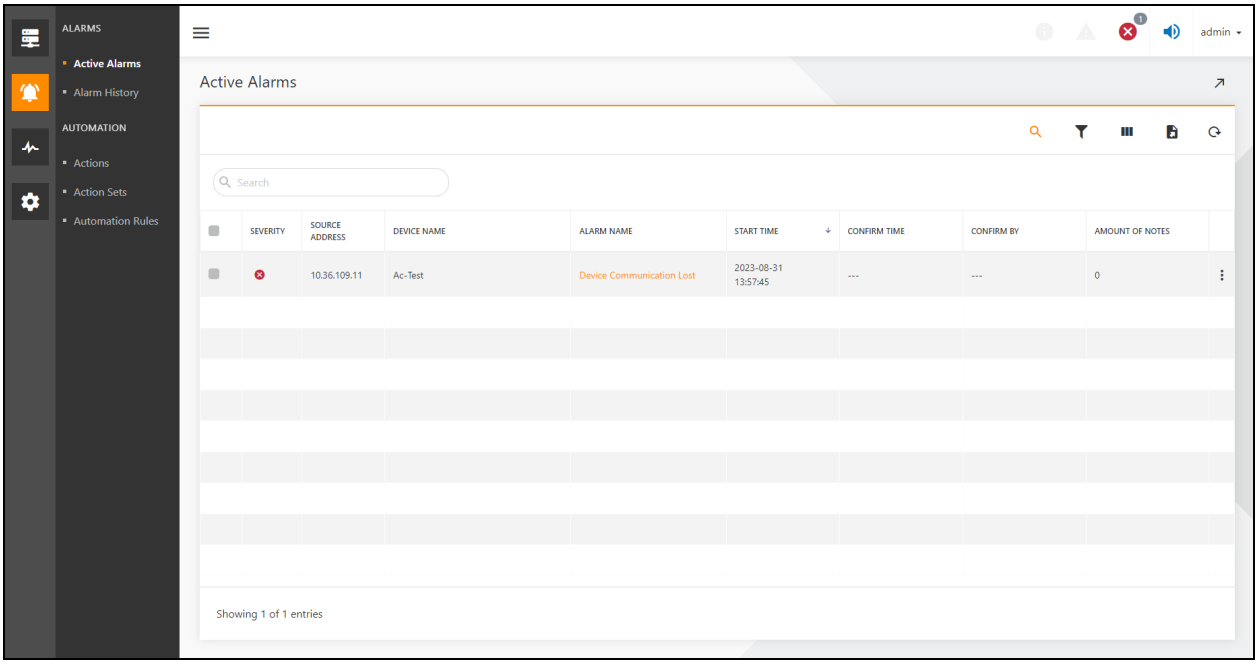
- View the active alarm list
- View the alarm history list

6.2.2 Examples

- Active alarms

  Selecting the ALARM icon provides access to the Active Alarms by default, and the severity, source address, device name, alarm name, start time, confirm time, confirm by, and amount of notes appear in the active alarm list. Alarm list is according to the support list of searches, filtering, column hiding functions, refer to Device list on page 36.

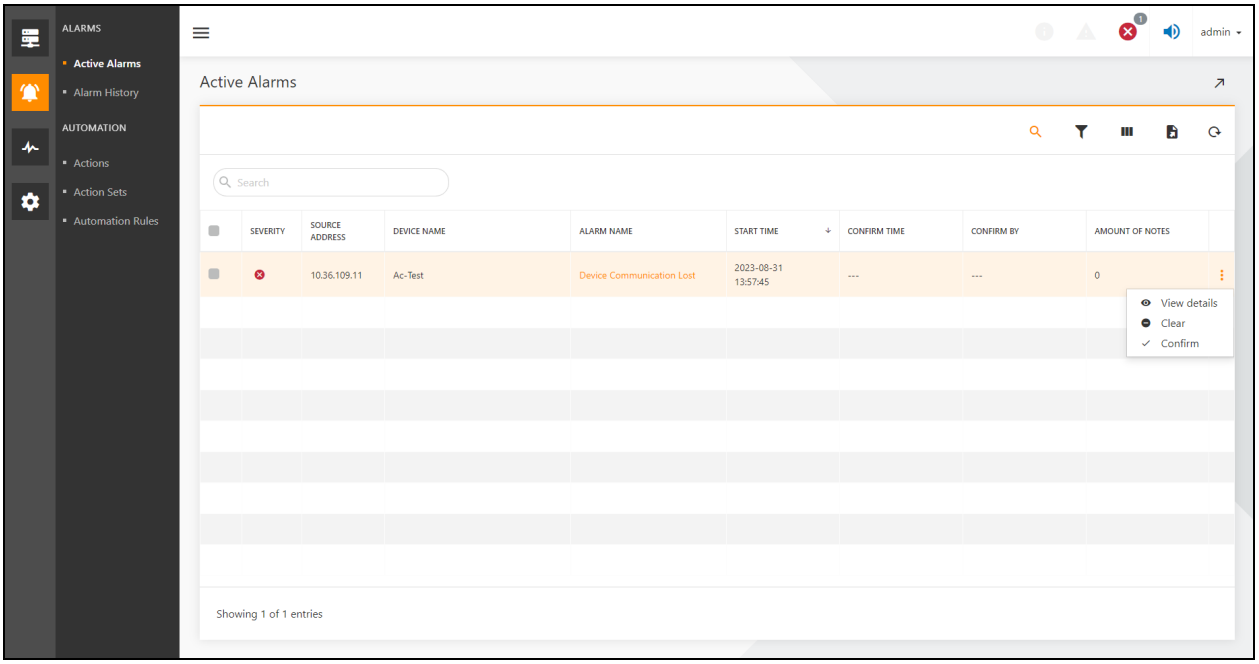
Figure 6.1 Alarm List



- View alarm details

  As shown in **Figure 6.2** below, on the active alarm or alarm history page, click the vertical ellipses icon on the right side of a warning line and click *View details*.

Figure 6.2 View Details of Alarm



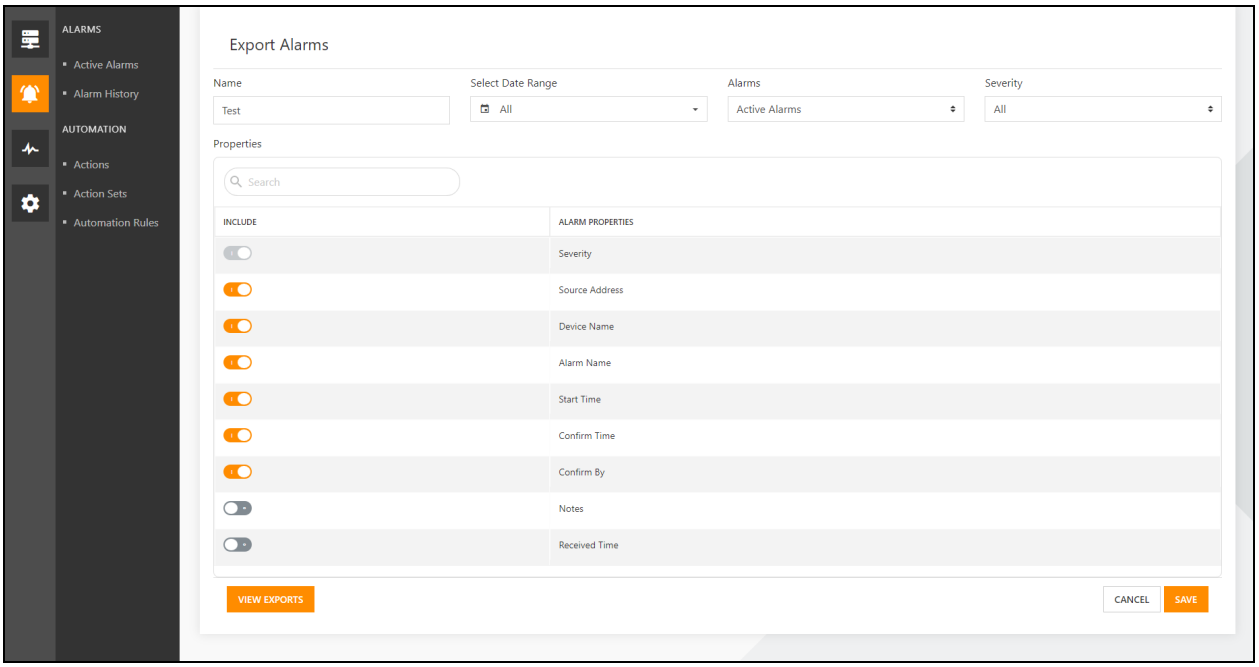
NOTE: When alarm data is not available, no data appears on the alarm list.

NOTE: The purpose of the alarm confirmation button is not to end the alarm, but to stop the alarm notification. It is not allowed to end the alarm manually, only by the alarm device itself, to determine that the trigger condition for alarm is no longer present and thus automatically end an alarm.

- Export alarms

  As shown in Figure 6.3 below, click the Export icon in the upper right corner of the alarm list page. Enter the file name to export, select the type of an alarm, the date range, alarm severity, and the properties to export. Click *Save*.

Figure 6.3 Export Alarms



Click the *VIEW EXPORTS* and enter the list of export records. Click on the download button of the file you want to export, and you can download the exported record. The contents of the file after download are shown in Figure 6.4 below. The header field contained in the file is consistent with the selection in Figure 6.3 above.

Figure 6.4 Contents Shown After Exporting the Details

A	B	C	D	E	F	G
Severity	Device Name	Alarm Name	Start Time	Confirm Time	Confirm By	Source Address
Critical	Ac-Test	Device Communication Lost	2023/08/31 13:57:45			10.36.109.11

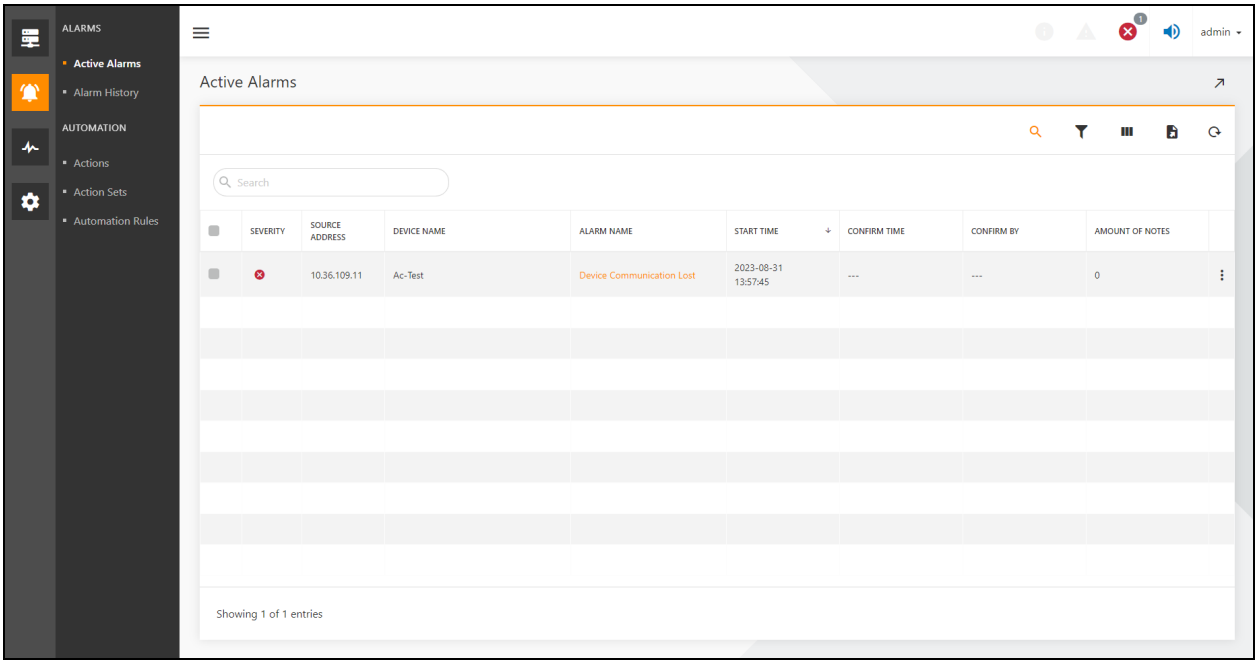
6.3 Detailed Features

6.3.1 Active alarms

Select the ALARMS icon from the first level menu to open the active alarm window page. The Active Alarms window displays alarms that have not been cleared and the severity, source address, device name, alarm name, start time, confirm time, confirm by, and amount of notes appear in the active alarm list. See Figure 6.5 on the next page.

Click the refresh icon in the upper right corner to manually refresh the list information. The general list operation function supported by any list in the alarm function can be described in the Device list on page 36. This will not be repeated later.

Figure 6.5 Active Alarm



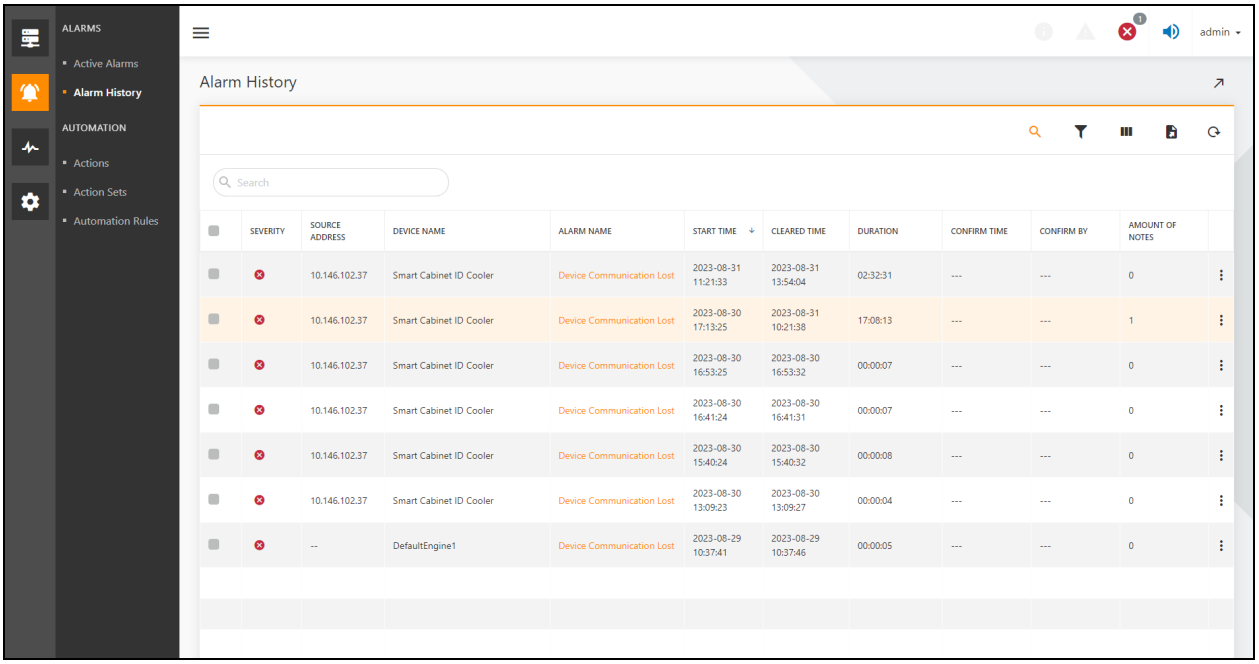
NOTE: When an alarm is not available, no alarm appears on the list.

NOTE: The search icon in the table is orange by default, the search box is displayed by default. When you click the Search icon, the button turns black and the search box is hidden.

6.3.2 Alarm history

Click the ALARM icon in the level one directory, and click on the *Alarm History*. The Alarm History window contains a list of cleared and historical alarms. The alarm level icon, source address, device name, alarm name, start time, end time, duration, confirmation time, confirmation person, and number of notes appear in the list. Click refresh icon in the top right corner to refresh the list information manually.

Figure 6.6 Alarm History



6.3.3 View alarm details

There are two ways to view alarm details:

1. On the Active Alarm or Alarm History page, click the vertical ellipses icon button on the right side of an alarm line. Click on the *View details*.

   -Or-

2. Click a warning in the left multi-select box, and on the top of the search box will show a row selected, click the show icon button on the right to see the view details.

Figure 6.7 Checking Alarm Details form the Historical Alarm Window

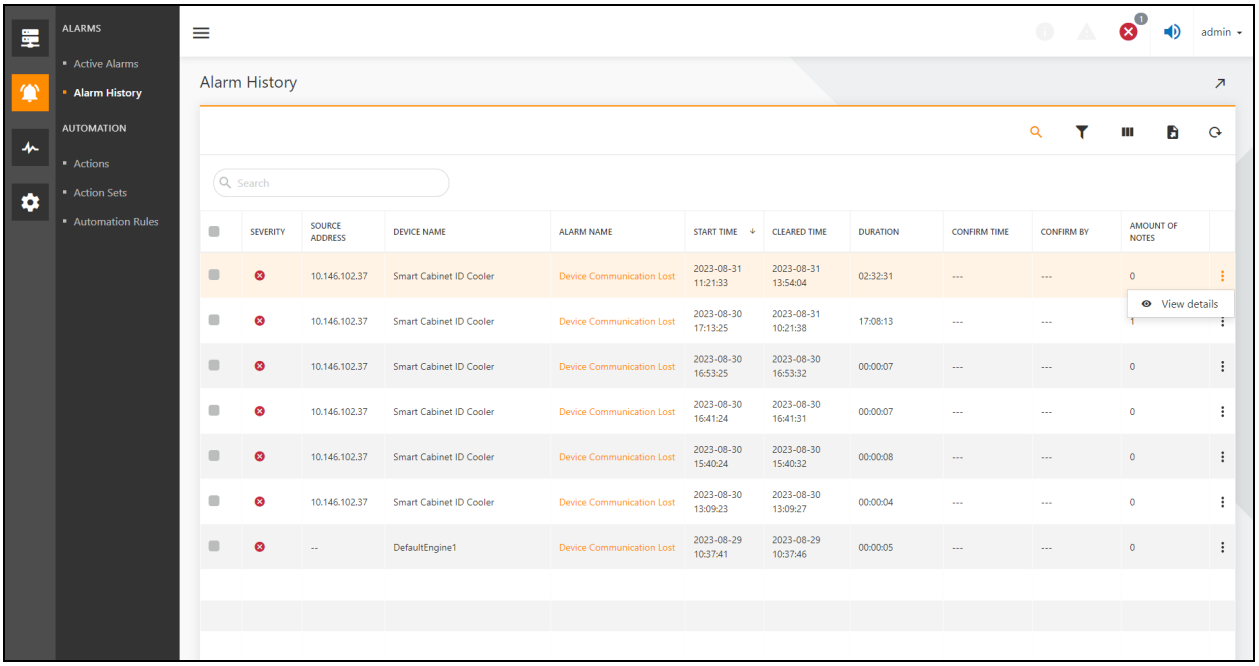
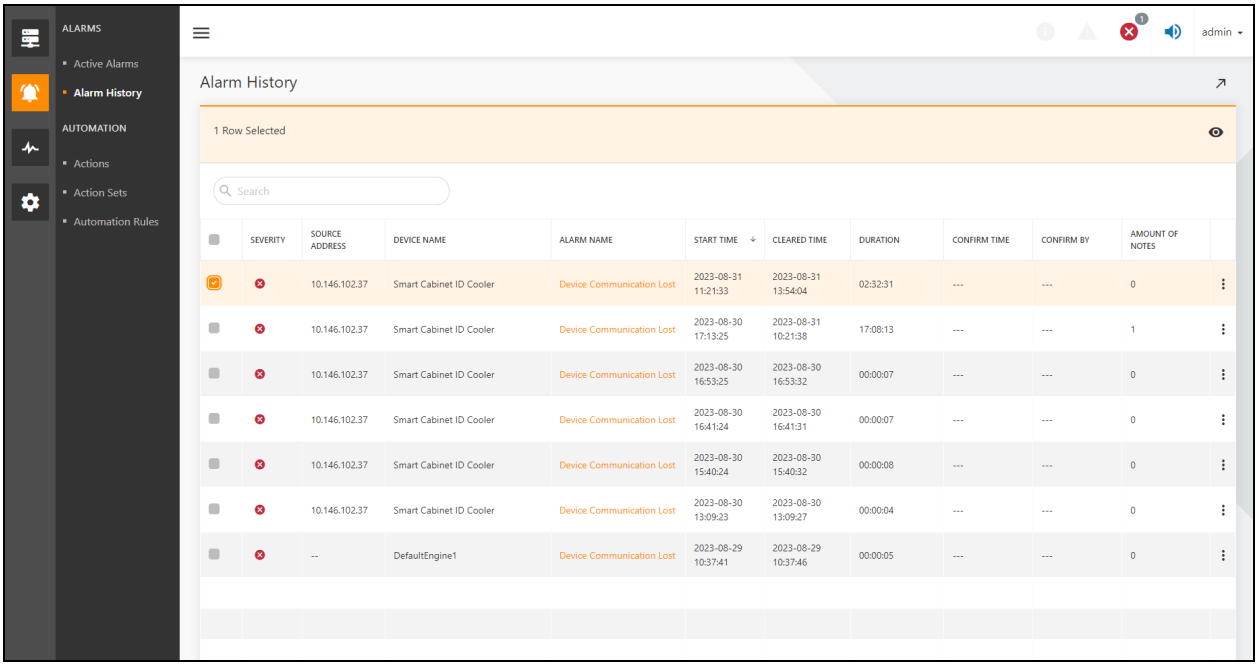


Figure 6.8 Checking Alarm Details

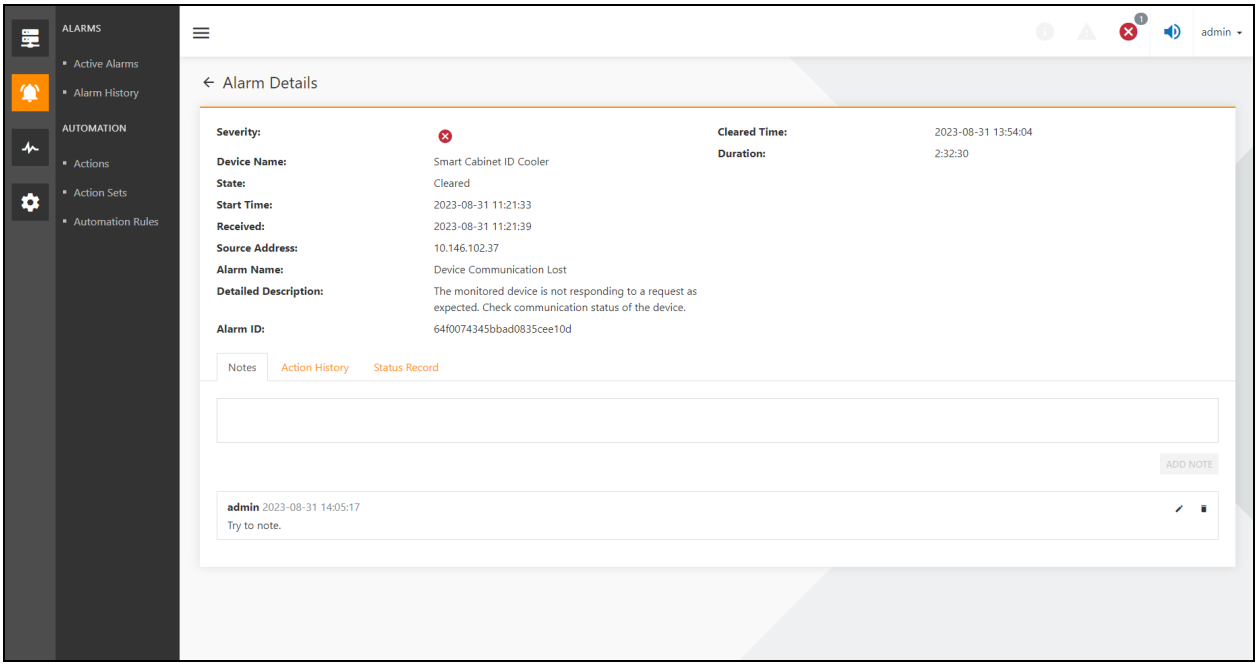


The alert details page displays the properties in the alarm list and includes the add alarm notes, action history, and status records.

6.3.4 Alarm notes

On the alarm details page, click on the *Notes* tab and enter the relevant notes in the input box. Click on the *ADD NOTE* button. Adding a successful note appears in the list of notes below, and you can click the edit icon to edit notes. Click the Delete icon to delete notes.

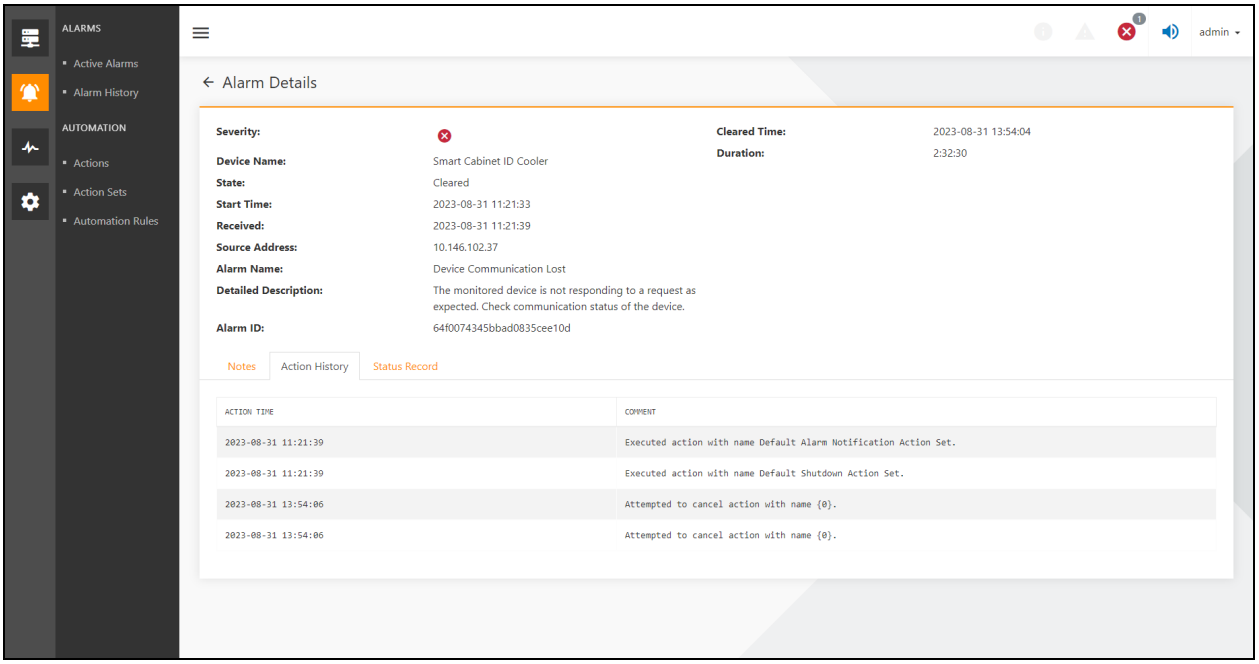
Figure 6.9 Alarm Remarks



6.3.5 Action history

On the Alarm Details page, click on the *Action History* tab page to show a history of the action. Refer to Alarm Linkage Notification on page 57 for the configuration of actions and automation rules.

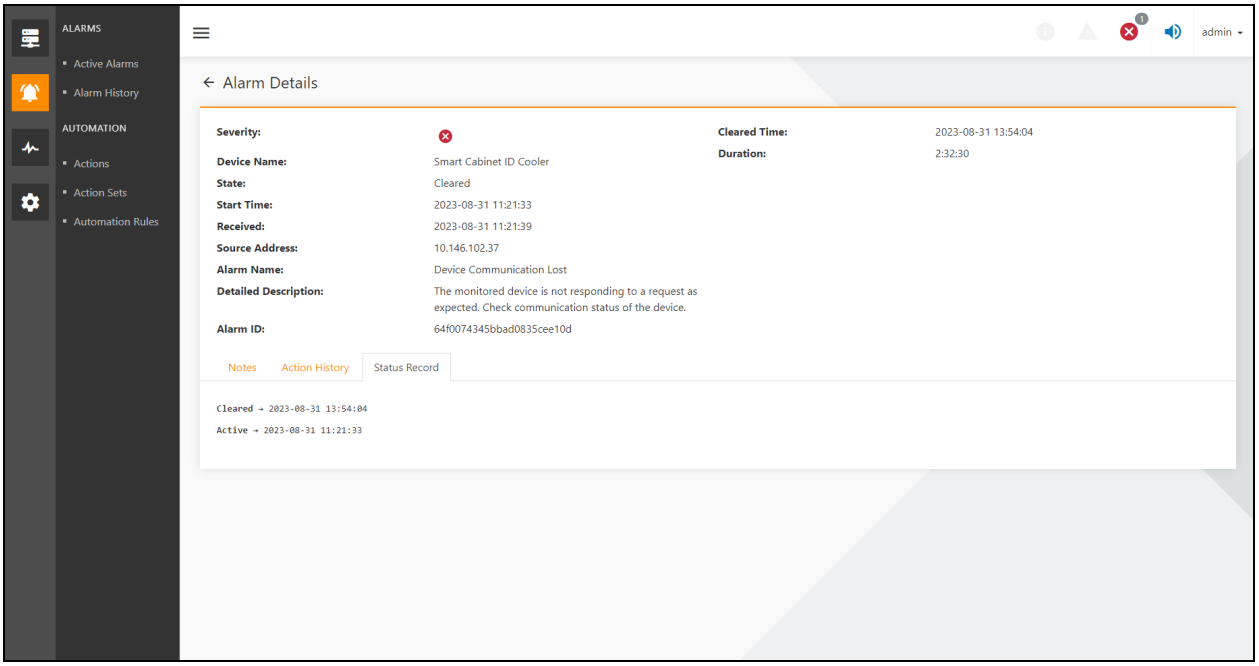
Figure 6.10 Action History Window



6.3.6 Alarm status records

On the alarm details page, click on the *Status Record* tab to display the status record of the alarm (information such as when the alarm generated and ended).

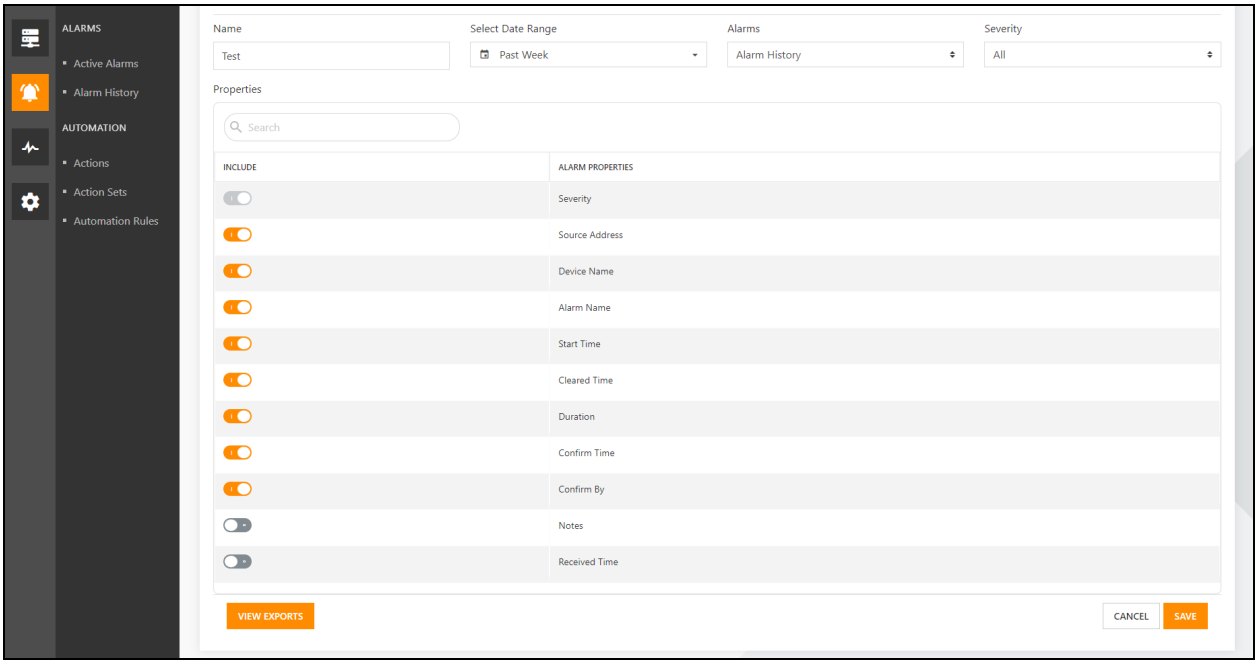
Figure 6.11 Status Record of the Alarm



6.3.7 Export alarms

On the alarms list page, click the Export icon in the upper right corner and enter the export file name. Select the type of alarm to export, the date range, the severity of the alarm, and the properties to export. Click on *Save*. The export alarm record is generated based on the filter conditions.

Figure 6.12 Alarm Export



After the export is successful, you can prompt for the export success in the bottom right corner. Click to view the Alarm exports (**Figure 6.13** on the facing page) and enter the list of export records. Click on the *DOWNLOAD* button of the file you want to export, and you can download the exported record. The contents of the file after download is shown in **Figure 6.14** on the facing page. The header field contained in the file is consistent with the selection in **Figure 6.7** on page 50.

Figure 6.13 Downloading the Alarm

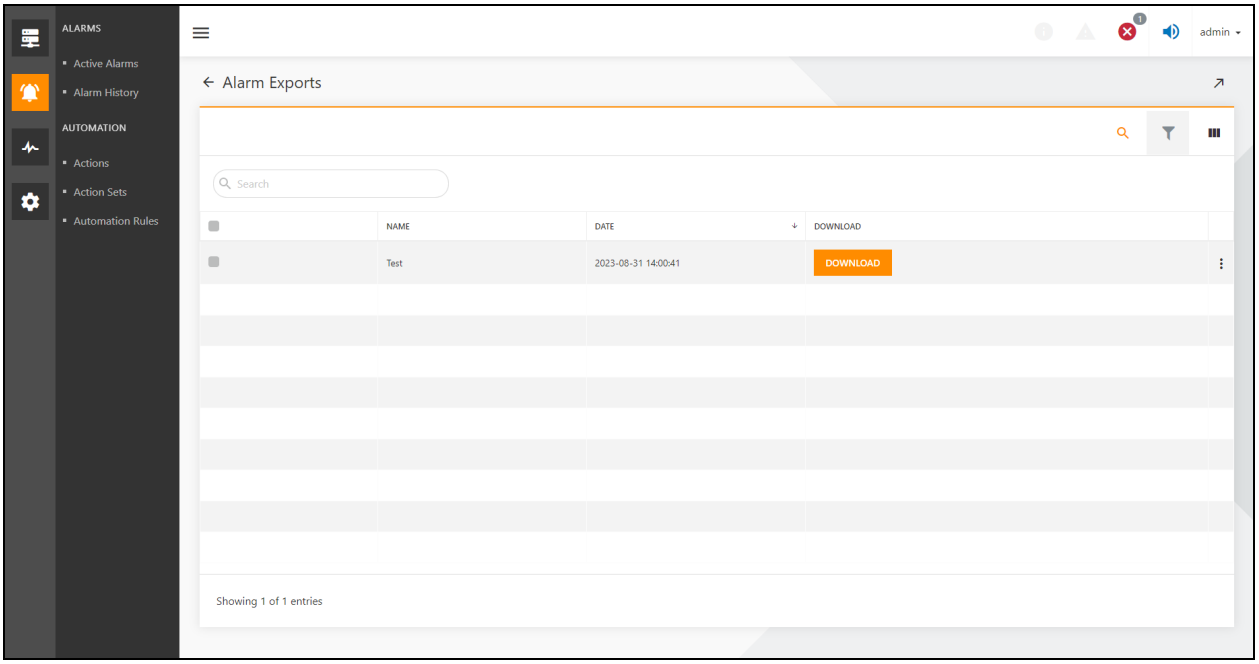


Figure 6.14 Content Downloaded

A	B	C	D	E	F	G
Severity	Device Name	Alarm Name	Start Time	Confirm Time	Confirm By	Source Address
Critical	Ac-Test	Device Communication Lost	2023/08/31 13:57:45			10.36.109.11

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7 Alarm Linkage Notification

7.1 Overview

Alarms generated by the monitoring system needs to be notified to the user by mail or text message. This chapter describes how to set up these two notification methods.

7.1.1 Functional module

For detailed introduction of each function module, refer to Detailed Features on page 63 in this manual. The following functional modules are set for the alarm notification:

- Contacts settings
- Email and SMS notification settings
- Action settings
- Action combination settings
- Alarm binding settings

7.2 Get Started Quickly

7.2.1 Quick deployment steps

Follow the below steps to setup the alarm notification:

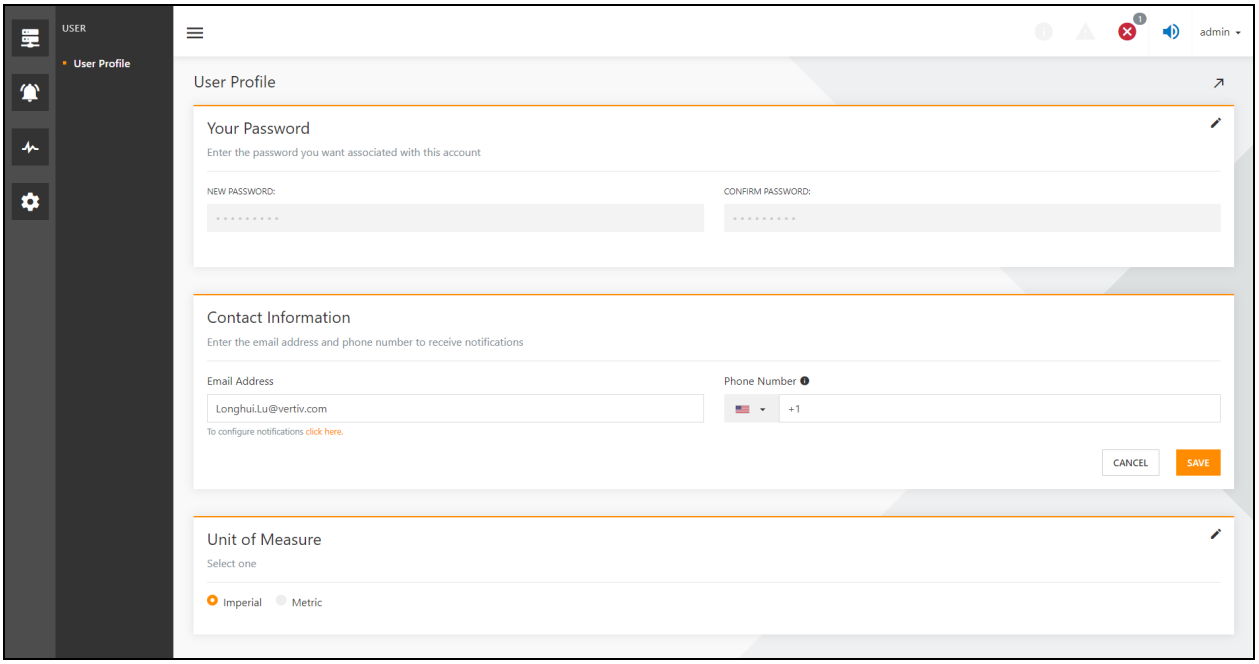
- Set up contacts
- Configure the email server connection and SMS modem connection
- Set the actions
- Configure the action sets
- Set automation rules

7.2.2 Example

Set up contact information

Click on the admin drop-down box in the upper right corner, and select the *User Profile* option. Click the edit option to enter the email address and phone number of your admin account. Refer to Detailed Features on page 63 for detailed functions that can be configured with contacts.

Figure 7.1 User Profile Window



Email and SMS server configuration

Click on the ADMINISTRATION icon, and click on the Notification Settings menu to enter the Notification Settings page. Click on the edit icon in the Email Server Connection Configuration to fill the required fields, as shown in Figure 7.2 on the facing page. Click on the edit icon in the SMS Modem Configuration to fill the required fields.

Figure 7.2 Email and SMS Server Configuration

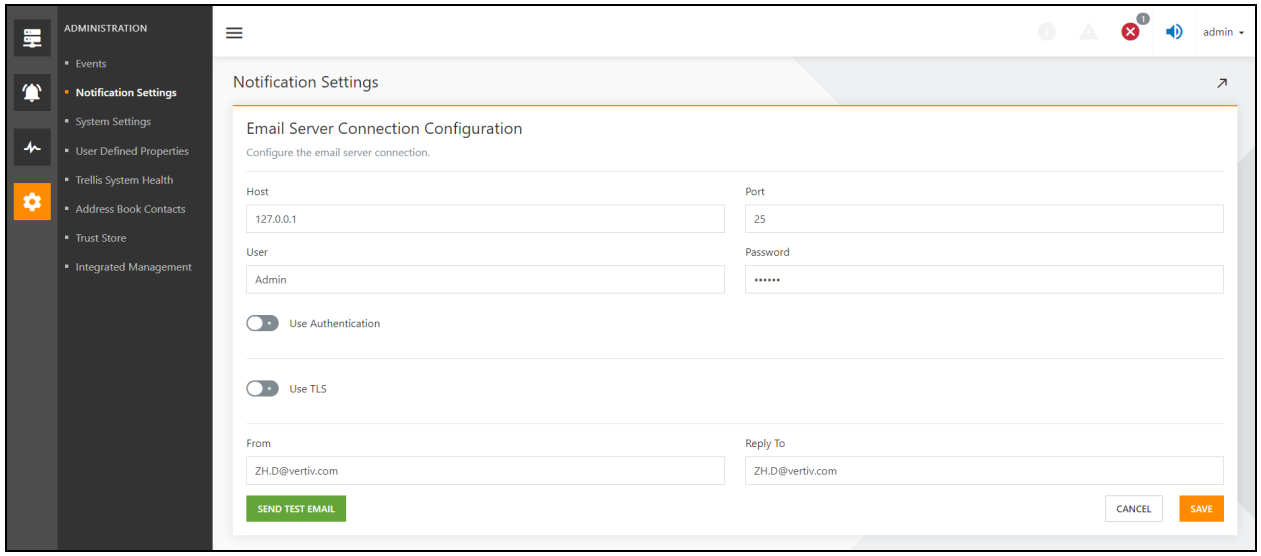
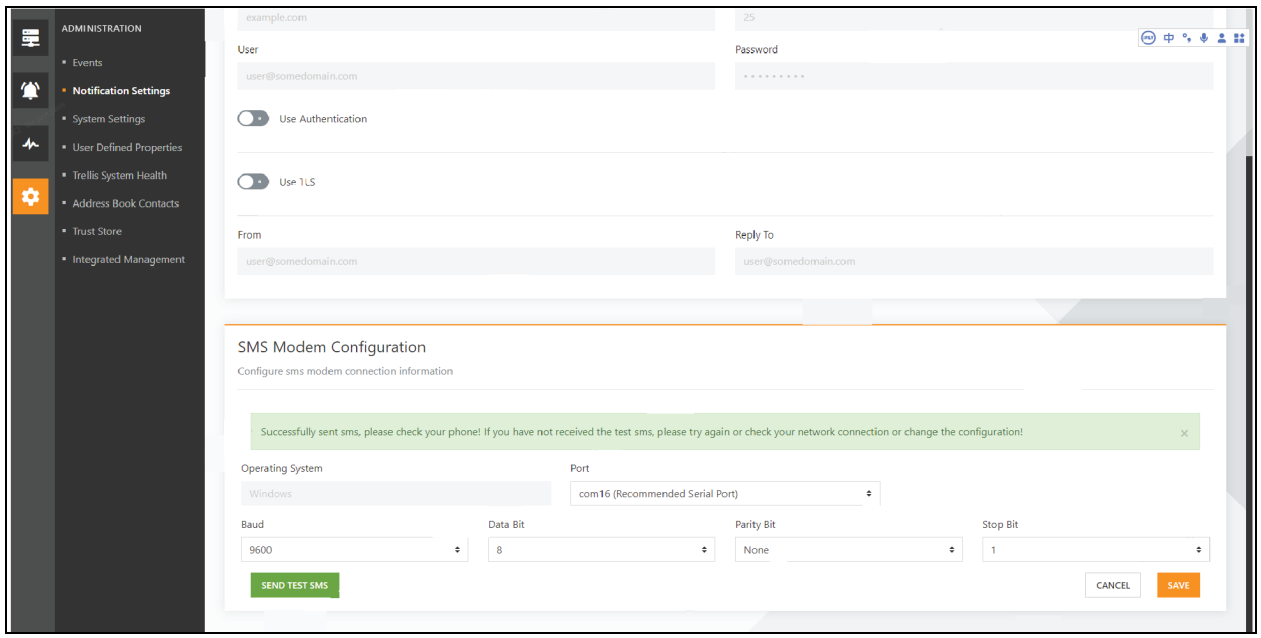


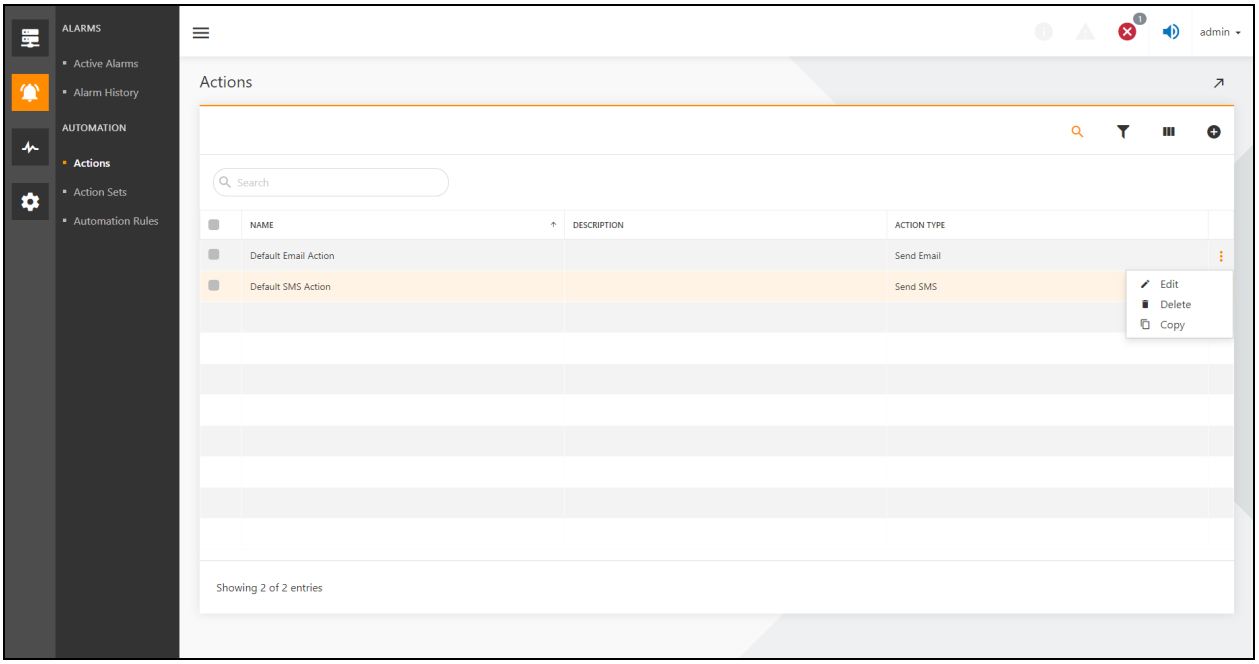
Figure 7.3 Configure SMS Modem



Set the action

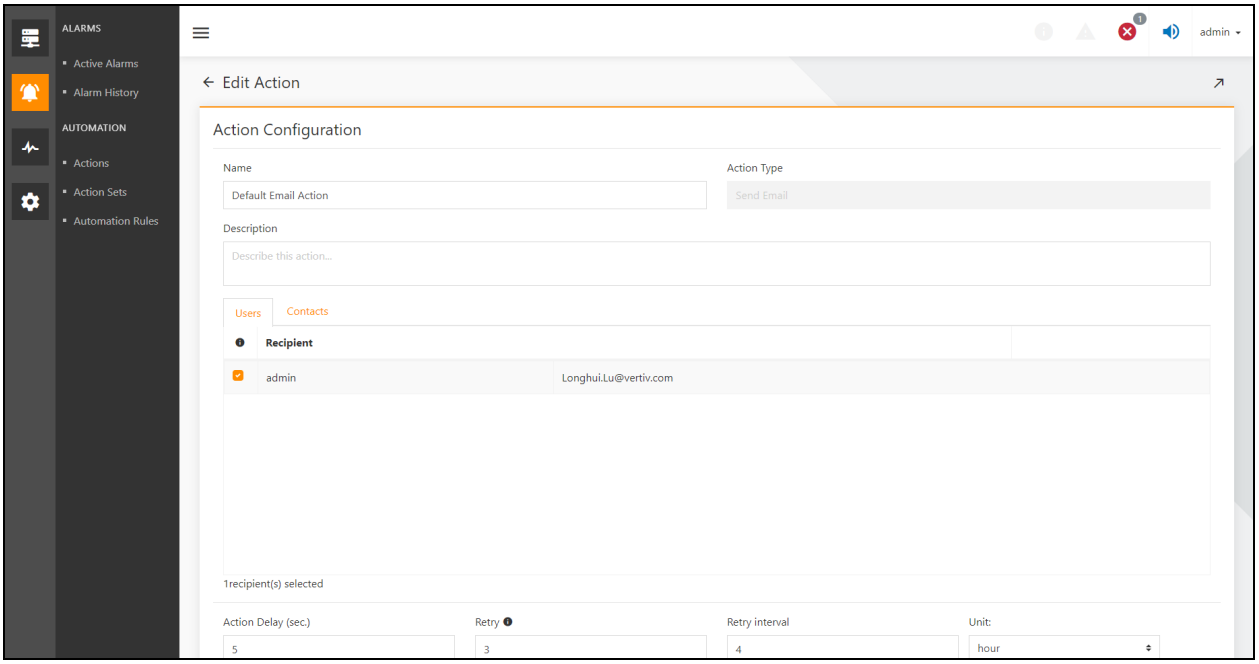
1. Click on the ALARMS icon and click on *Actions* under AUTOMATION to enter the Actions settings page, as shown in **Figure 7.4** on the next page. Click the button on the right to edit the Default Email Action or the Default SMS Action.

Figure 7.4 Action Setting Page



2. Go to the Action Configuration interface, as shown in Figure 7.5 on the facing page. Check with the user admin to accept the email notification. Click *Save*. The same way into the default SMS notification action editing interface, check the user admin to accept the SMS notification. Click *SAVE*.

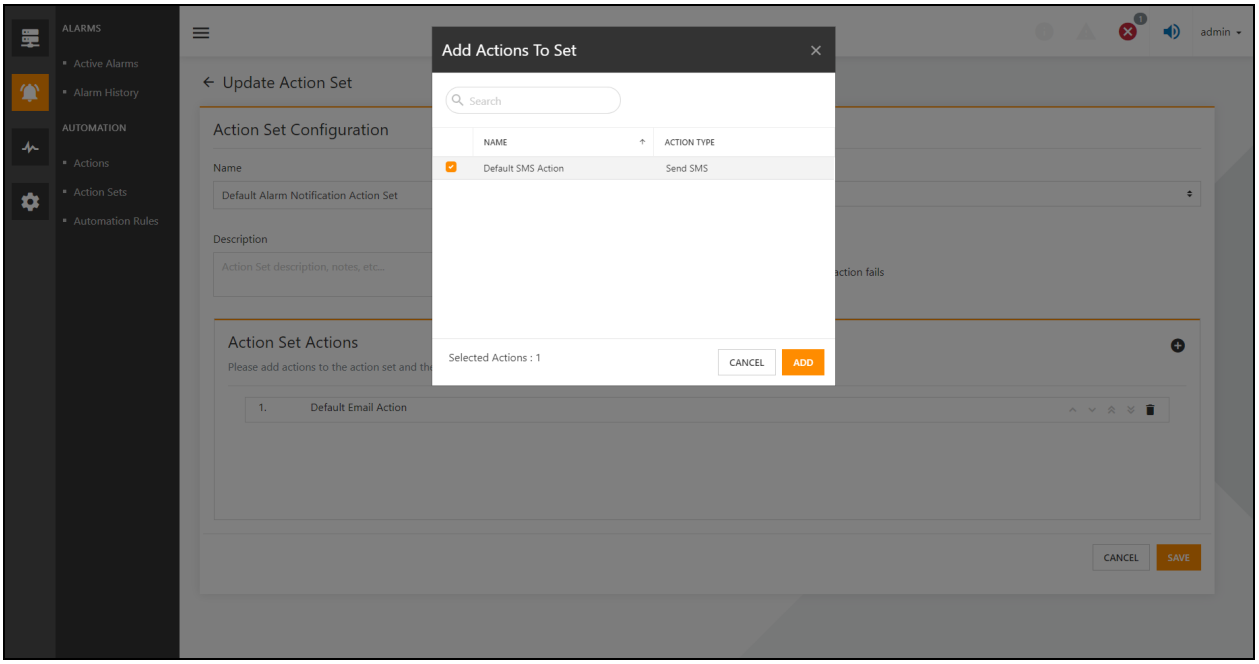
Figure 7.5 Editing of Action Setting



Configure action sets

Click the ALARM icon, and click on *Action Sets* under AUTOMATION to go to the Action sets page. Click the vertical ellipses icon on the right to enter the default action set editing interface. Clicking on the plus (+) button brings up Add Actions To Set interface, as shown in Figure 7.6 on the next page. Add the Default SMS Action to the default action type.

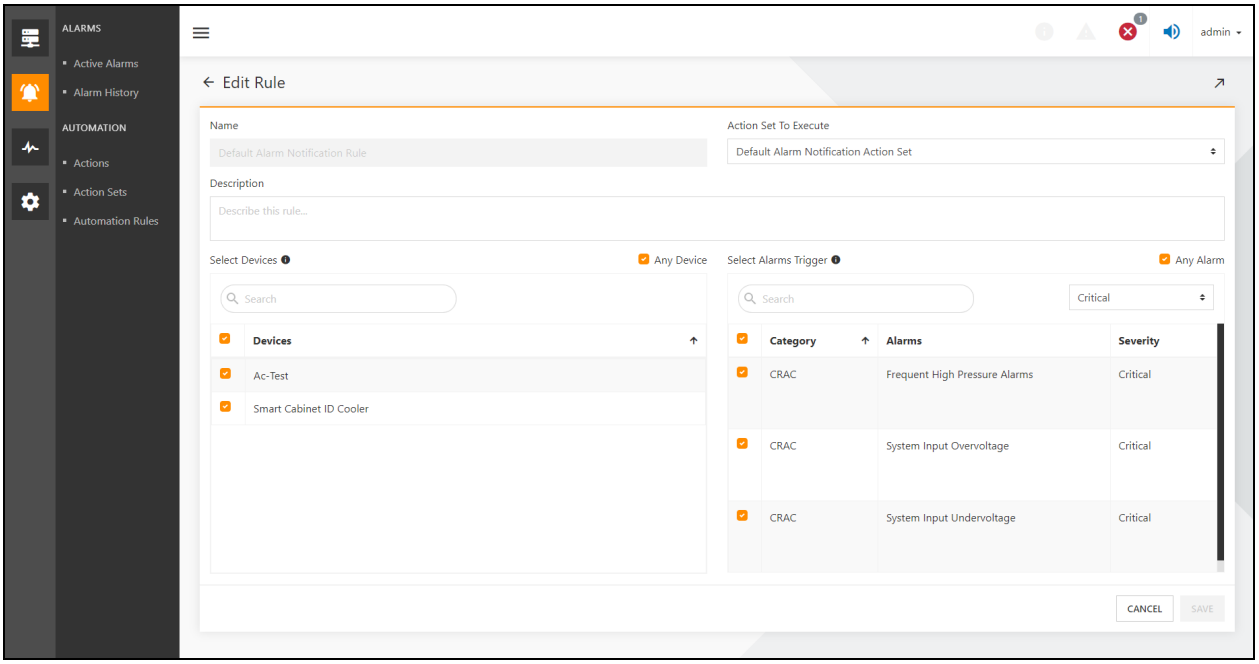
Figure 7.6 Adding Action to Set



Set automation rules

Click the ALARM icon, and click on *Automation Rules* under AUTOMATION to enter the Automation rules interface. Click the vertical ellipses icon on the right to enter the edit rules interface. Select any device check box for the device, and select any alarm check box for the alarm. Click *SAVE*.

Figure 7.7 Editing Alarm Rule



If Thermal Insight finds a new alert, it sends a text message to the admin configured phone number, as well as to the admin configured mailbox.

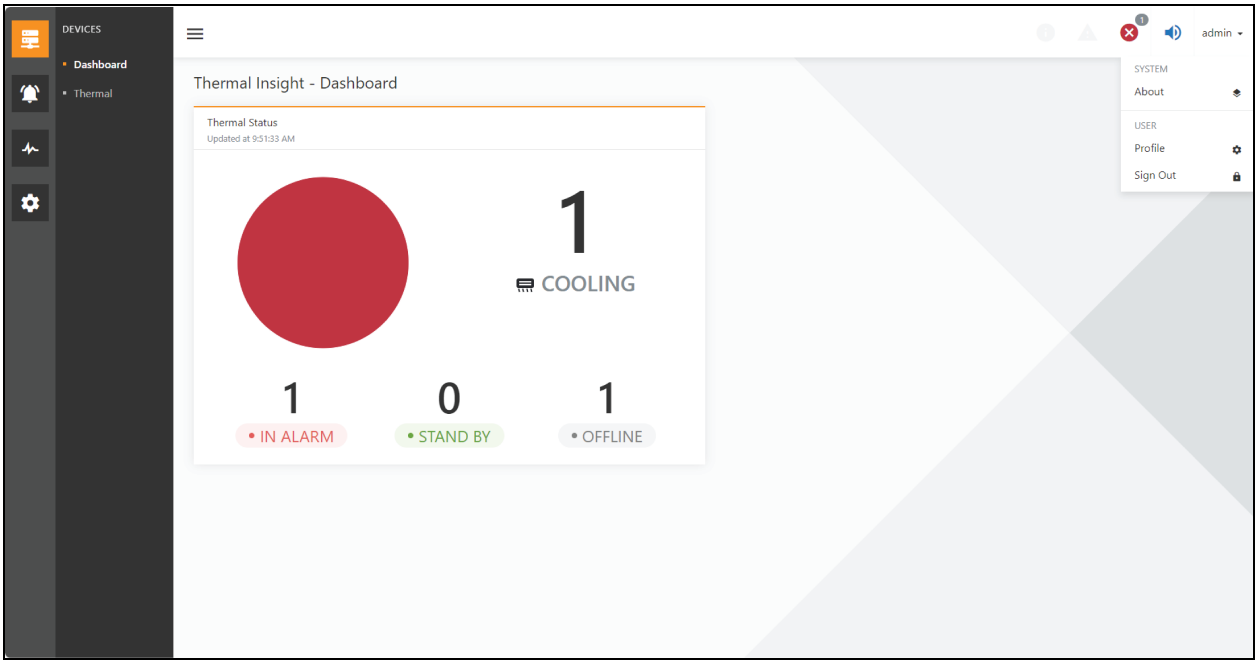
7.3 Detailed Features

7.3.1 Contacts settings

Contacts settings for admin account

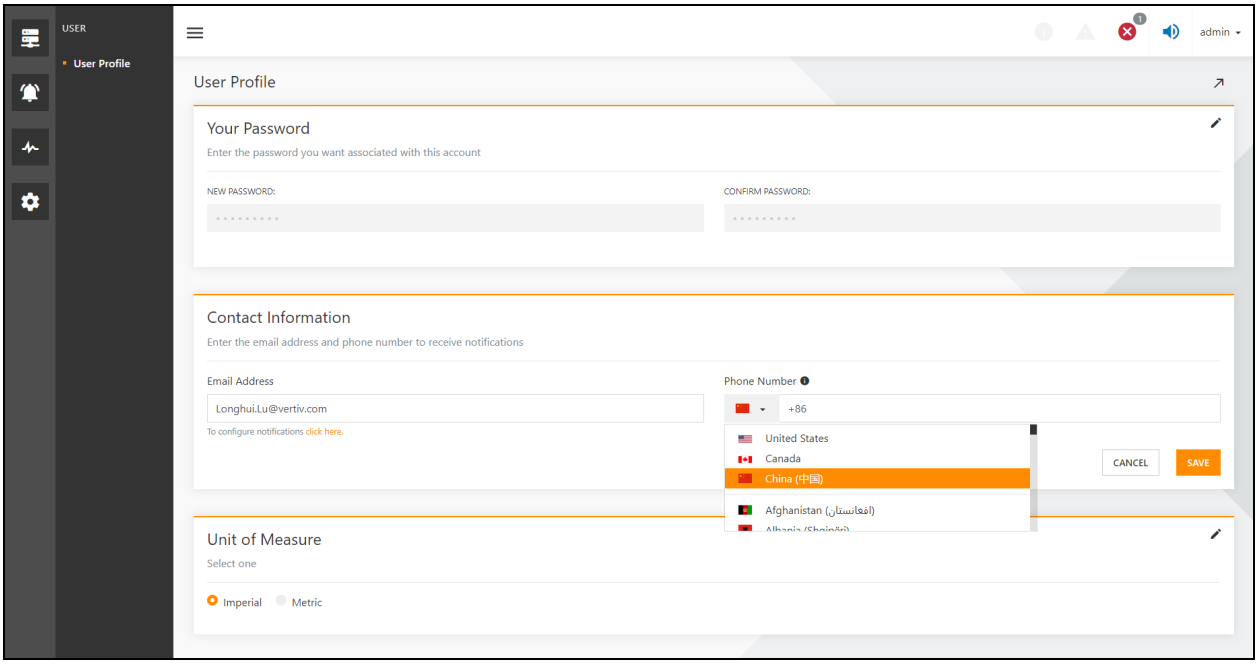
1. Click on the admin drop-down box in the upper right corner. Select the *Profile* option as shown in Figure 7.8 on the next page.

Figure 7.8 Thermal Insight—Dashboard



2. Click the edit icon button in the contact information on the user profile editing interface. You can edit and save the email address and phone number of the admin. Click the cellphone carrier drop-down button to select different countries.

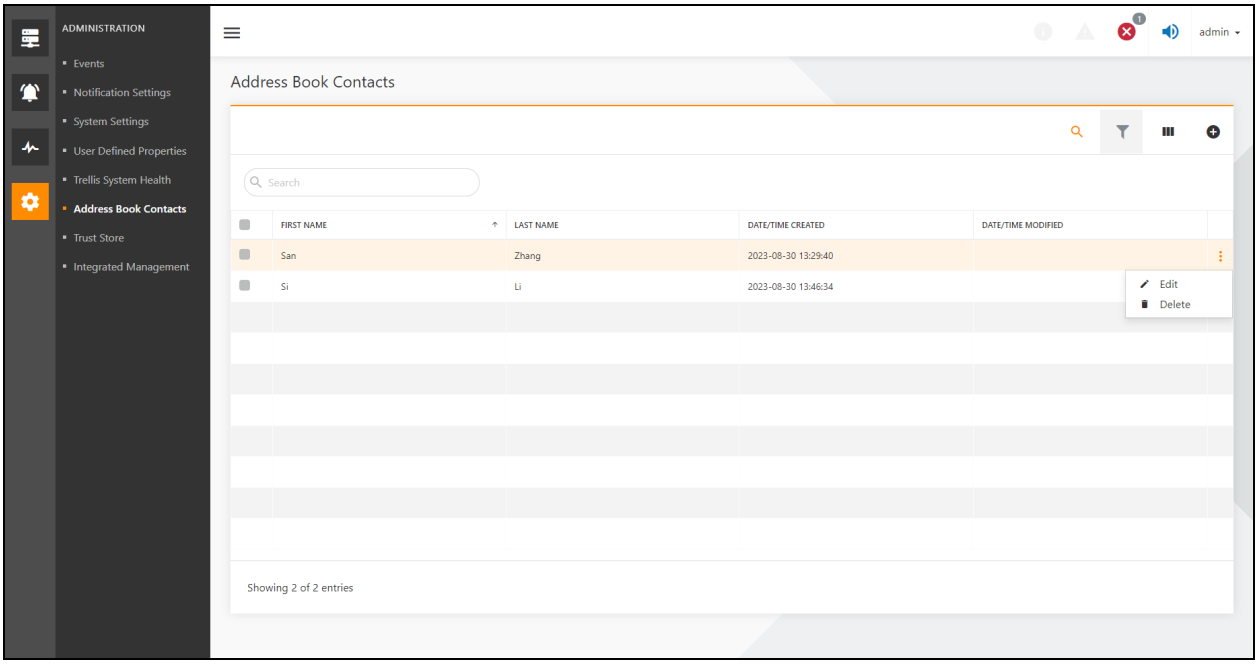
Figure 7.9 Editing Phone Number



Other contacts settings

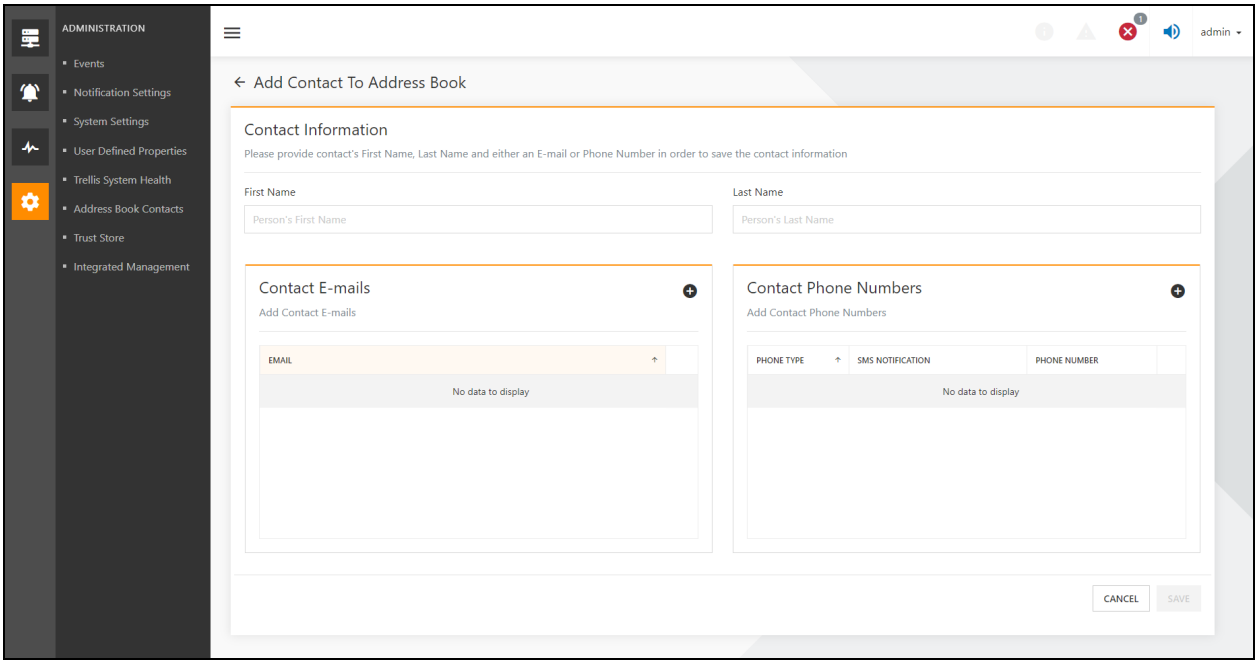
Click on the ADMINISTRATION icon, and click on *Address Book Contacts* to enter the address book contacts page. Click the vertical ellipses button to select edit or delete contacts that you have added. For the general operation of the address book contacts list, refer to Detailed Features on page 63. All the lists in this chapter can be used for general list operations, which will not be repeated later.

Figure 7.10 Address Book Settings



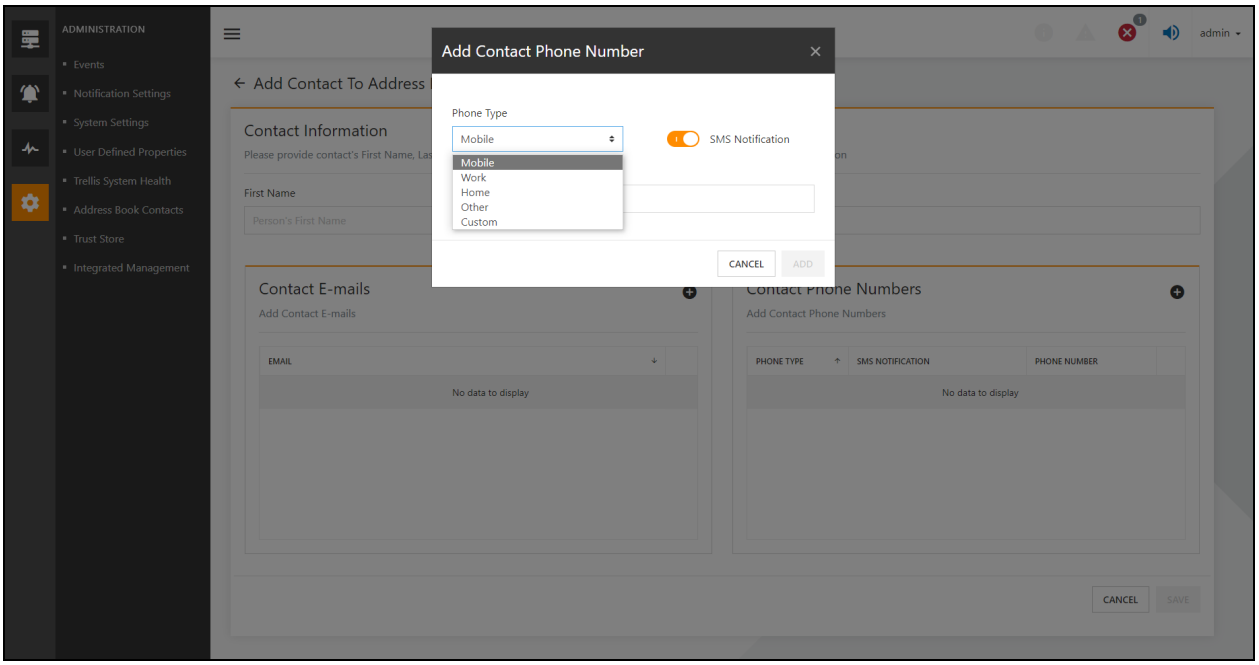
In the **Figure 7.10** above, click on plus (+) icon to enter the new contacts interface, as shown in **Figure 7.11** on the facing page. New contacts require first name, last name, contact email, and contact phone (optional). Click on plus (+) icon on the Contact E-mails section. A new window Add Contact E-mail appears. After entering the email address, click *SAVE* to add the contact email.

Figure 7.11 Adding New Address Book



When you click on plus button plus (+) icon as per shown in **Figure 7.11** above, the Add contact phone number box appears as shown in **Figure 7.12** below where you enter your Phone Type, Phone Number, and click toggle button to activate/deactivate SMS Notification. Click on *ADD* button. After adding a phone number and email ID, click *Save*.

Figure 7.12 Adding Contact Phone Number Window



NOTE: A single contact can add multiple email slots and phone numbers.

NOTE: Make sure to click on *SAVE* button in the Contact Information interface.

NOTE: When you add a contact to an action in the address book, all the email addresses in the contact are notified if the action is to send a message. If the action is to send a text message, the mobile phone number in the contact will only accept then text message if the number that initiates the SMS notification.

7.3.2 Email and SMS notification settings

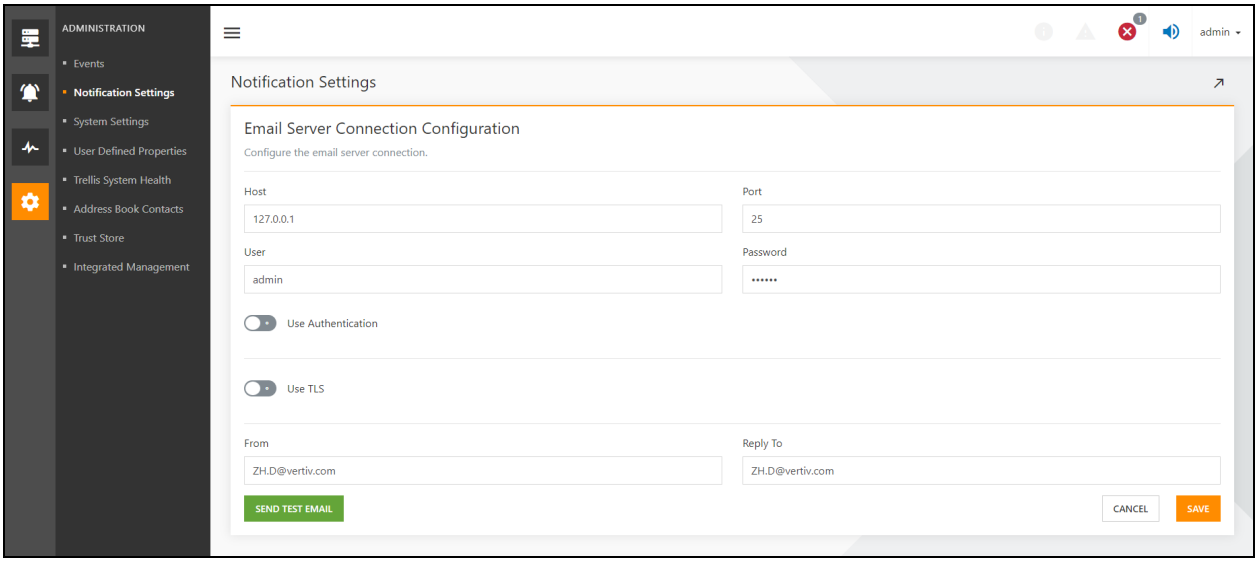
Click on the ADMINISTRATION icon, and click on the *Notification Settings* menu to enter the notification settings page. Click the edit icon to configure the Email Server Connection Configuration page, as shown in Figure 7.13 below. Enter the following information to configure the email server: Host (the host IP address where the mail server is located), Port (mail server process port number), User (the user set by the mail server), Password (password set by the mail server), Use Authentication, Use TLS protocol, mailbox of sender (the sender address needed when the mail server sends the mail), and reply mailbox (the email address used by the mail server to accept the external mail). After the mail server configuration is configured, it is recommended to send a test email first. Click *SAVE* after the test is completed.

NOTE: The user and password are not the same as those used by the host to log in, but they are configured by the mail server process on the host.

NOTE: The mail server configuration in Thermal Insight needs to be consistent with the parameters configured by the mail server process on the remote host.

NOTE: The use of authentication and TLS protocols can enhance the security of the mail server, but the configuration of Thermal Insight is not effective until configuration modifications are made synchronously by the mail server process on the remote host.

Figure 7.13 Email Server Connection Configuration Window



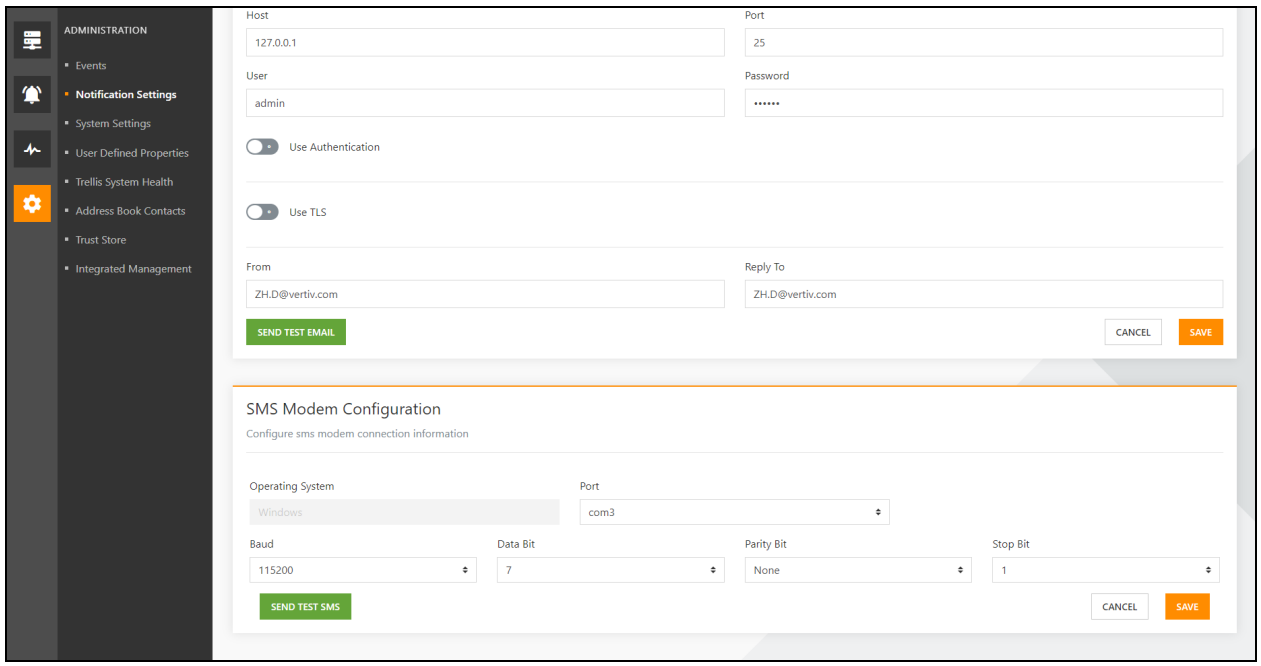
In the Notification Settings interface, click the edit icon to configure SMS Modem Configuration information as shown in Figure 7.14 on the facing page. Users need to select the following information: Port (try to select the recommended port), Baud rate, Data bit, Parity Bit, Stop Bit. Before saving the configuration, it is recommended that the user send a text message to ensure that the configuration is correct.

NOTE: The Thermal Insight reads the operating system automatically and installed the host of the operating system.

NOTE: If you need to use the SMS alarm function, you need to access the SMS modem hardware. Thermal Insight only supports specific models of SMS modem devices (CH-M3G7M7). If necessary, contact the service hotline.

NOTE: Before you configure a SMS modem, you need to connect the SMS to the host installed by Thermal Insight. Install the driver and initialize the configuration for the SMS. A SMS modem configuration of Thermal Insight should be as consistent as possible with the SMS modem initial configuration.

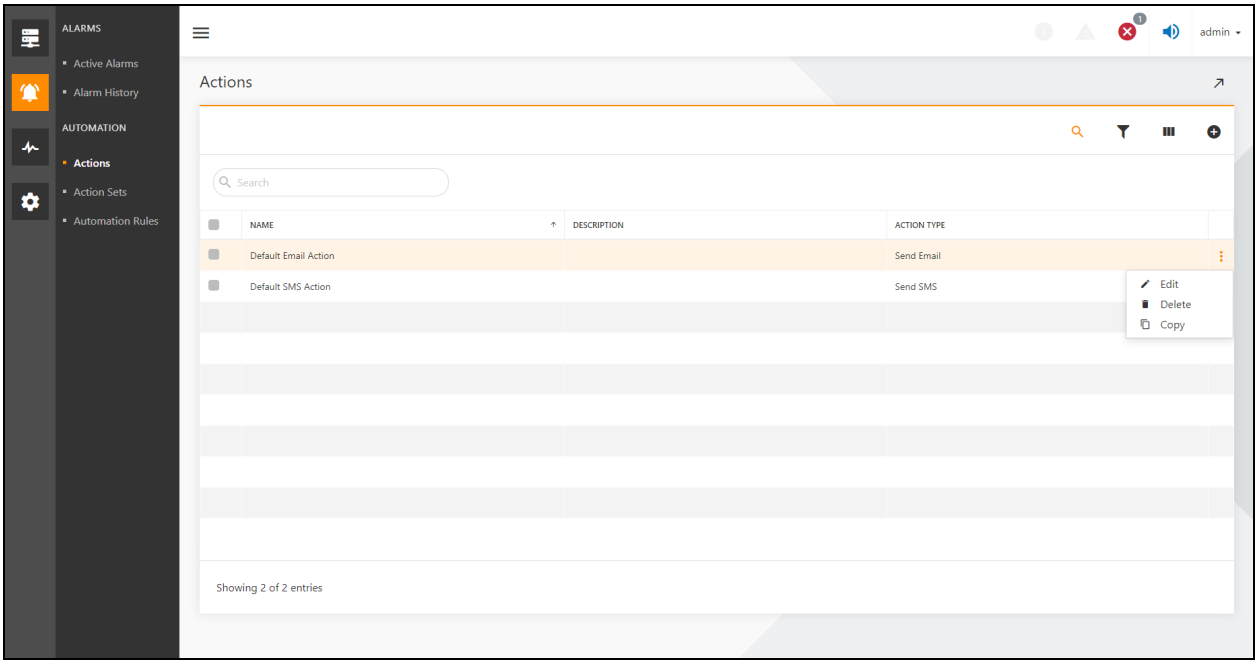
Figure 7.14 SMS Modem Configuration Window



7.3.3 Action settings

1. Click on ALARM icon, and click on the *Actions* menu under AUTOMATION to enter the actions page, as shown in Figure 7.15 on the next page. The system creates the default email notification action and the default SMS notification action by default. Click the vertical ellipses icon on the right to select edit, delete, and copy existing actions. The Action role is used to perform the action which system needs to perform when an alarm is triggered.

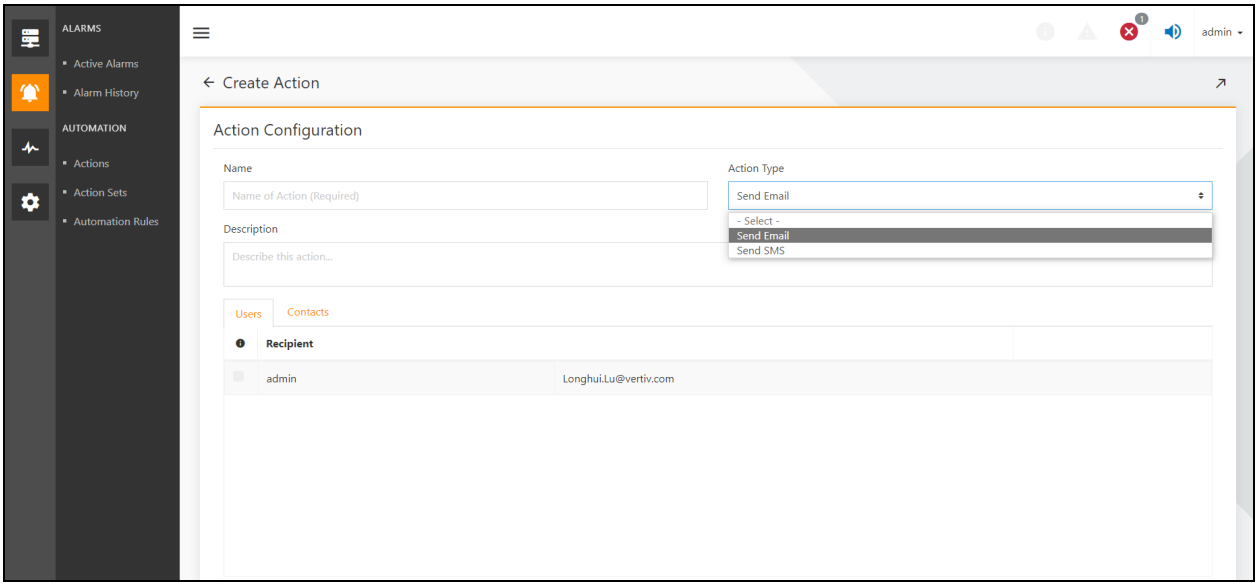
Figure 7.15 Action Settings



2. Click on plus (+) icon to enter the create Action interface, as shown in Figure 7.16 on the facing page. Enter the following information: Name, Action Type (send a text message or email), Description (optional), and Recipient. The recipient can select an admin user, or the contact that the user adds to the contacts. Users can select multiple recipients.

NOTE: Recipient information varies with the choice of action type. When you select the type to send a message, only the users and contacts who have configured the email address are displayed in the recipient list. The same is true of the type of text message that is sent.

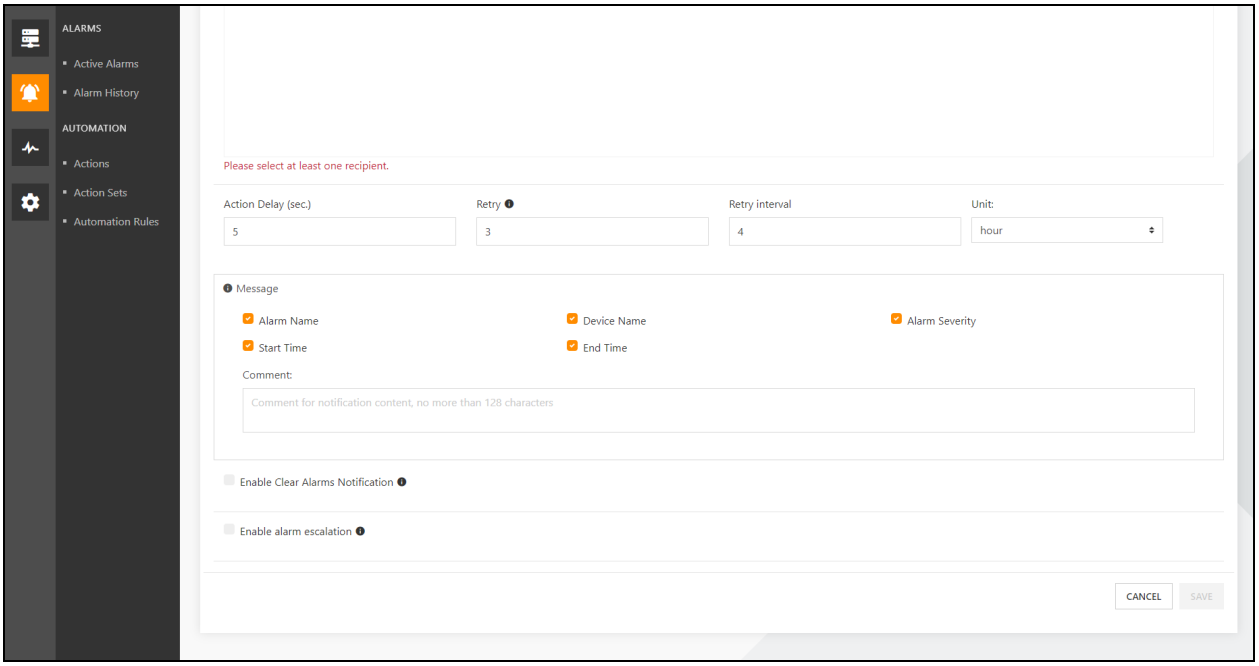
Figure 7.16 Creating New Action Setting Interface



As shown in Figure 7.17 on the next page, scroll down to configure the Action Delay (default 5 seconds, representing the delay time of action start), Retry (the number of repeated notifications when the alarm is not acknowledged), Retry interval, and Unit. You can view the content of preset notifications for alarm notification input including: Alarm Name, Device Name, Alarm Severity, Start Time, End Time. Scroll down to configure whether to enable end of alarm notification. Click *Save*.

NOTE: After the alarm triggers the action, if the alarm is completed by the system within the time of the operation delay, the action will be canceled.

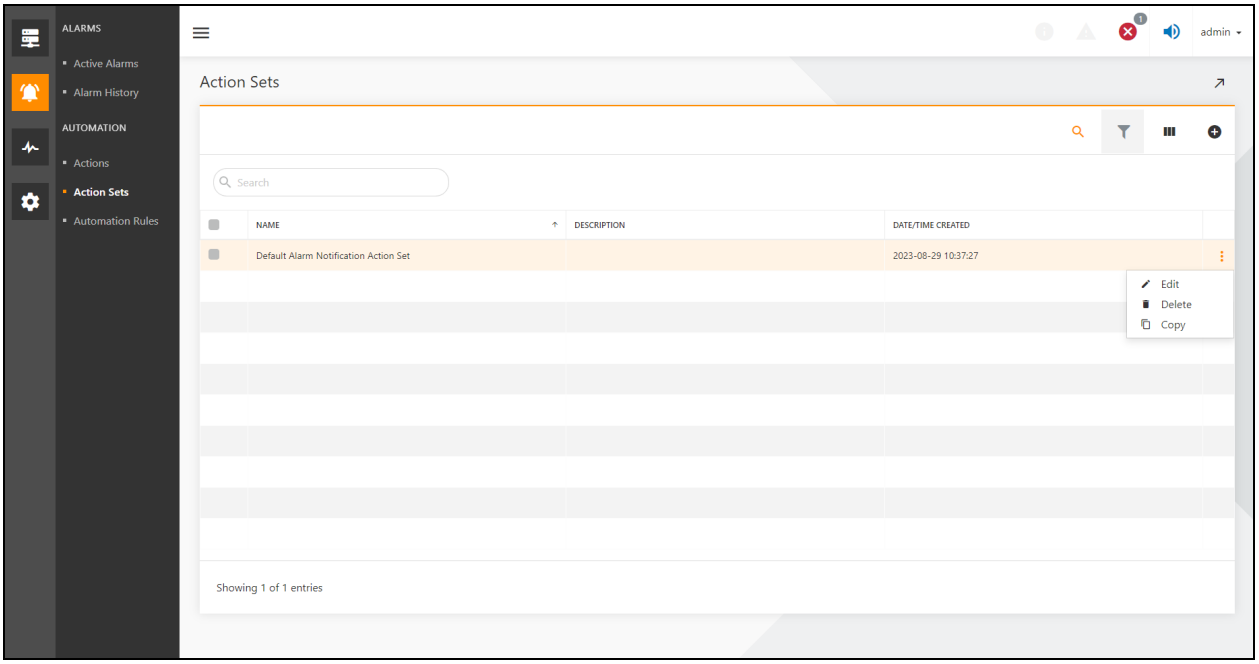
Figure 7.17 Configuration of Action Delay



7.3.4 Action sets settings

1. Click on the ALARM icon, and click Action sets under AUTOMATION to enter the Action sets page. The Action Sets context menu item allows you to group actions and configure their execution when an alarm condition is met. For example, you can group an email and SMS notification to be sent at the same time or one after the other when an alarm is triggered. The system creates a default action sets by default, and the default action combination contains only the default message notification action. Click the vertical ellipses button on the right to edit, delete, and copy the action sets.

Figure 7.18 Action Combination Settings

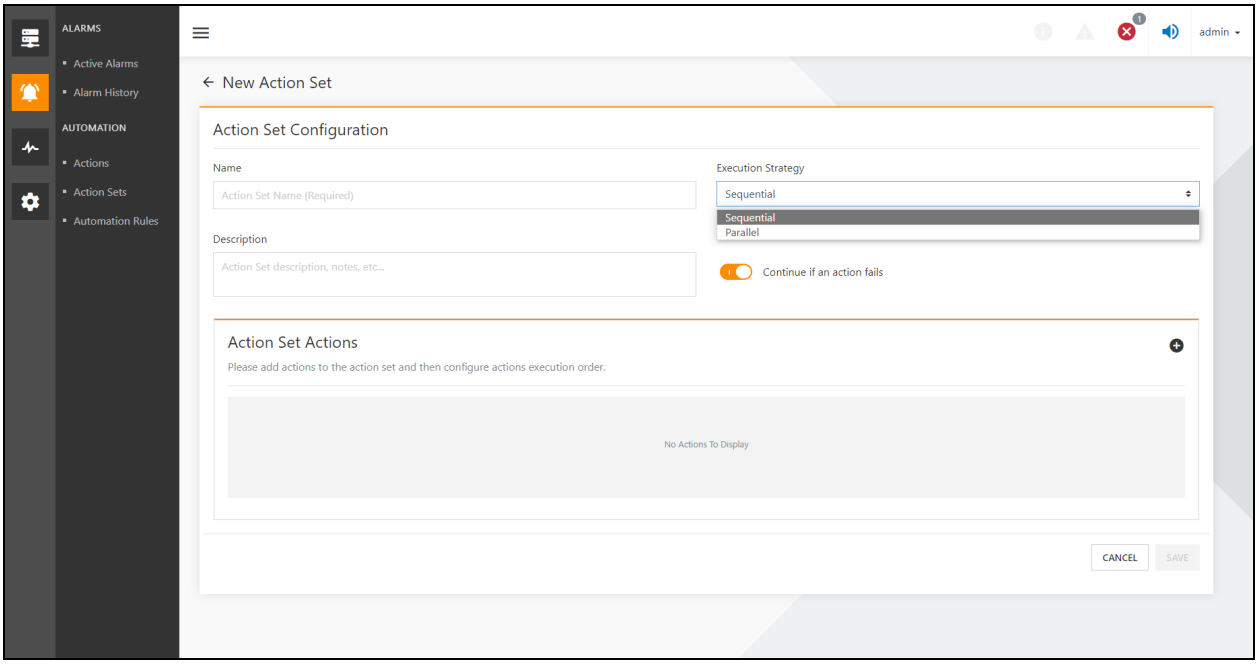


2. Click plus (+) icon to enter the New Action Set interface, where the action set configuration requires the Name, Description, Execution Strategy (Sequential or Parallel), and Action List. If the selected execution strategy is serial, you also need to choose whether to continue to execute the next action when an action fails to execute.

NOTE: **Sequential execution strategy:** The actions in the group are arranged in a queue in order. The actions in the queue are executed in order. The next action can continued only when the execution of the previous action has ends.

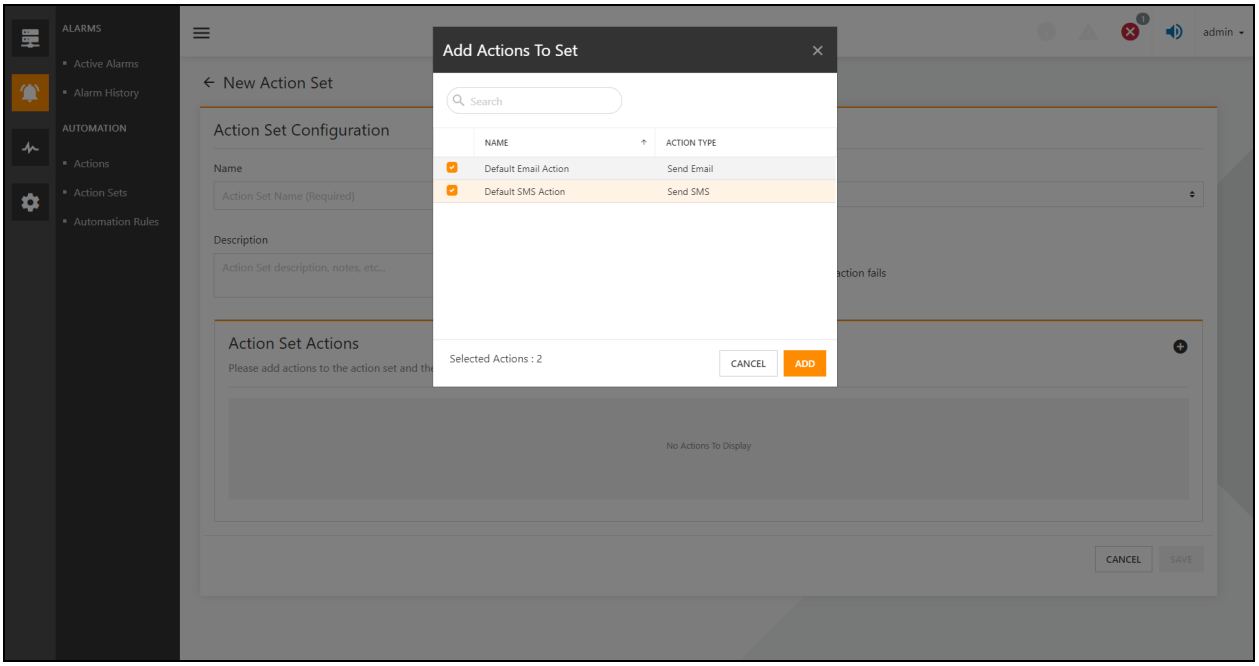
NOTE: **Parallel execution strategy:** All actions are started simultaneously, in no particular order.

Figure 7.19 Creating the New Action Set



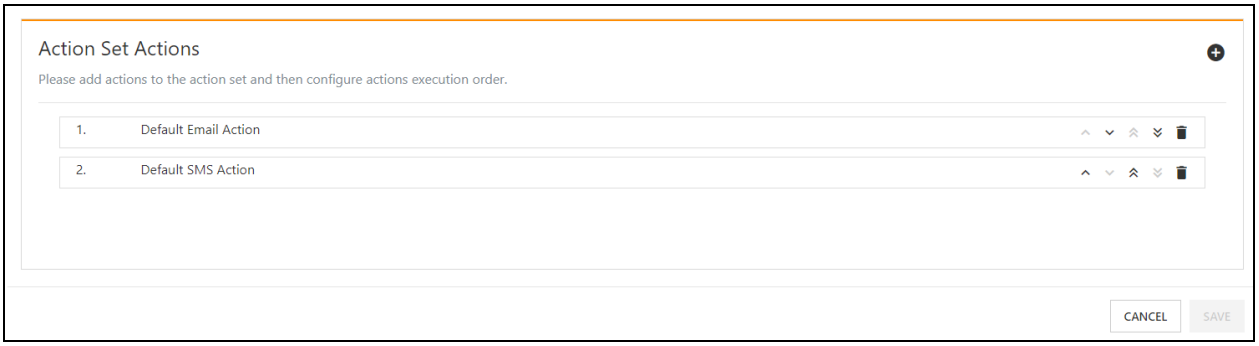
Click the plus (+) icon on the New Action Set window. Actions panel appears the add actions to set window, as shown in Figure 7.20 below . Select the actions to add to the action set and click *ADD*.

Figure 7.20 Adding the Existing Action to the Action List



After you add an action to the action set actions list, you can adjust the order of the actions in the action list, as shown in Figure 7.21 on the facing page. The four arrow buttons before delete icon in the right hand of the action row represent move up, down, move to the top, and move to the bottom. Click *Save*.

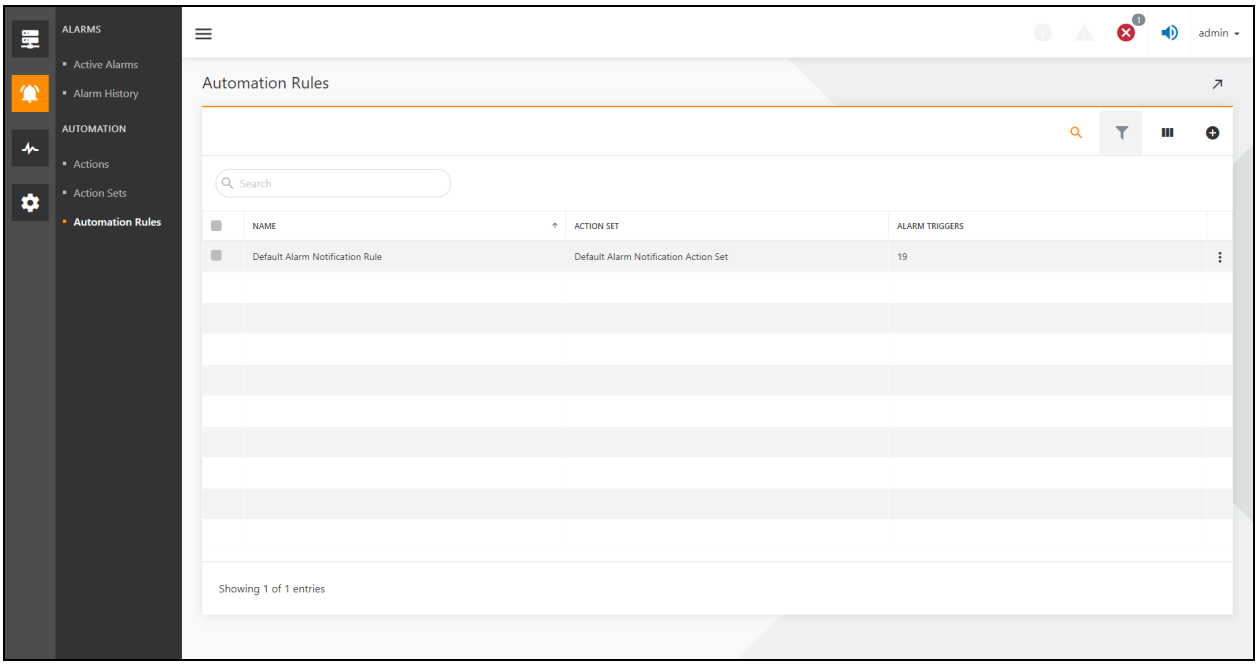
Figure 7.21 Adjusting the Order of Action List



7.3.5 Automation rules settings

Click on ALARM icon, and click on the *Automation Rules* menu under AUTOMATION to enter the Automation rules page, as shown in Figure 7.22 below. The Thermal Insight application allows you to create automation rules to map action sets to an alarm. Automation rules convey the system what actions to execute when alarms are triggered. In the Default Alarm Notification Rule, any alarm on any device will trigger the Default Alarm Notification Action Set. Configure which devices which alarms can trigger which action combinations. Click the vertical ellipses button on the right to select edit, delete, and copy existing automation rules.

Figure 7.22 Automation Rules Window



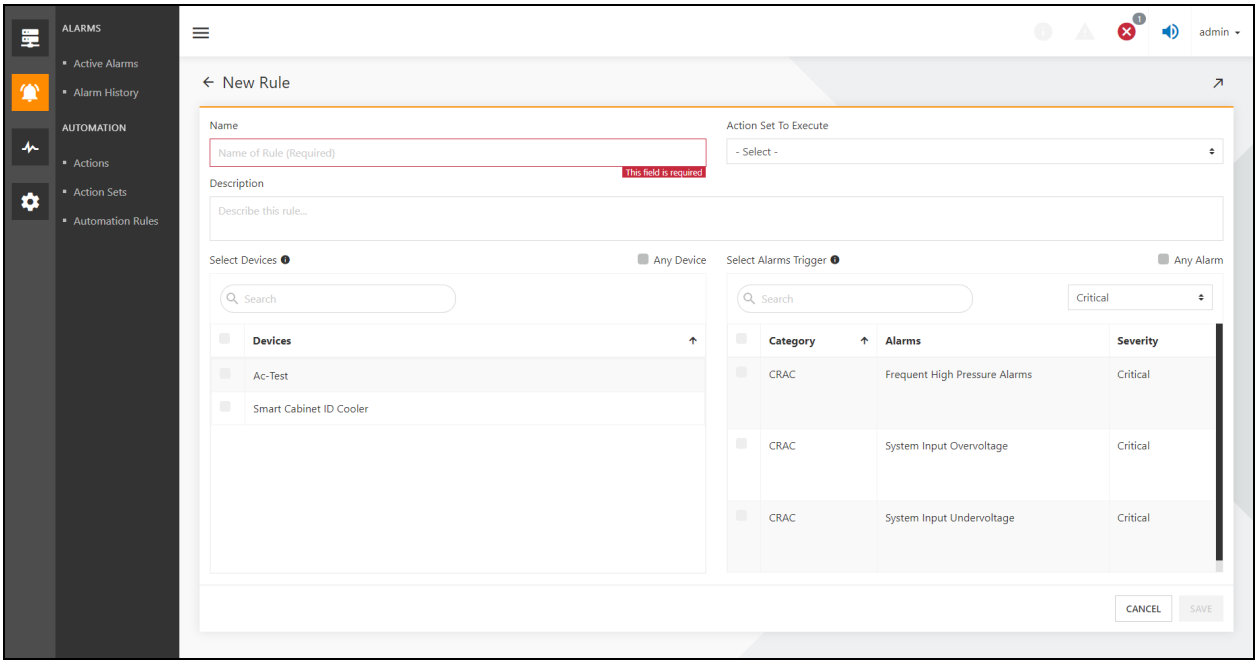
Click the plus (+) icon in Figure 7.22 above to enter the new rule interface, as shown in Figure 7.23 on the next page. Enter the automation rules name, description, and select the action set from the Action Set To Execute drop-down list. Select the devices to which the automated rule will be applied and select the alarms to activate the automated rule. Click *SAVE*.

NOTE: Select the device to select all, select alarm or select any alarm, so that all the current devices and alarms will be selected, and the new equipment will be automatically selected in the future. In this configuration, all alarms for all devices trigger the configuration bound action combination.

NOTE: The alarm list will only display the alarms supported by the added devices.

NOTE: Both the device list and the alarm list can be searched for list, and the alarm list can also be filtered according to the alarm severity.

Figure 7.23 Configuring New Rule



7.3.6 Alarm notification trigger logic

When you complete the configuration from Automation rules settings on the previous page, software can trigger an alarm notification. If the output of CRAC123 has an off alarm, the trigger process is as follows:

1. Check whether the existing automation rules has CRAC123 selected in the device list. At the same time check the alarm list that contain the output off alarm, if so, then execute automation rules.
2. The action set is executed, and all actions in the action sets are executed according to the execution strategy of the action set.
3. When performing an action, if the type of action is to send a text message, the text message is sent to the configured contact person in the action according to the text message content configuration in the action configuration.

8 Communication Profile Configuration

8.1 Overview

Communication profiles define how and through what methods the application communicates with devices. The Thermal Insight application allows you to search for saved profiles and view devices that are associated with the profile you created.

8.1.1 Functional module

Refer to Detailed Features on the next page for detailed information of each function module. The communication profile configuration contains the following function module:

- Communication profile configuration list
- New communication profile
- List of devices

8.2 Get Started Quickly

8.2.1 Quick deployment steps

The quick deployment steps for communication profile configuration are as follows:

- New server communication configuration.

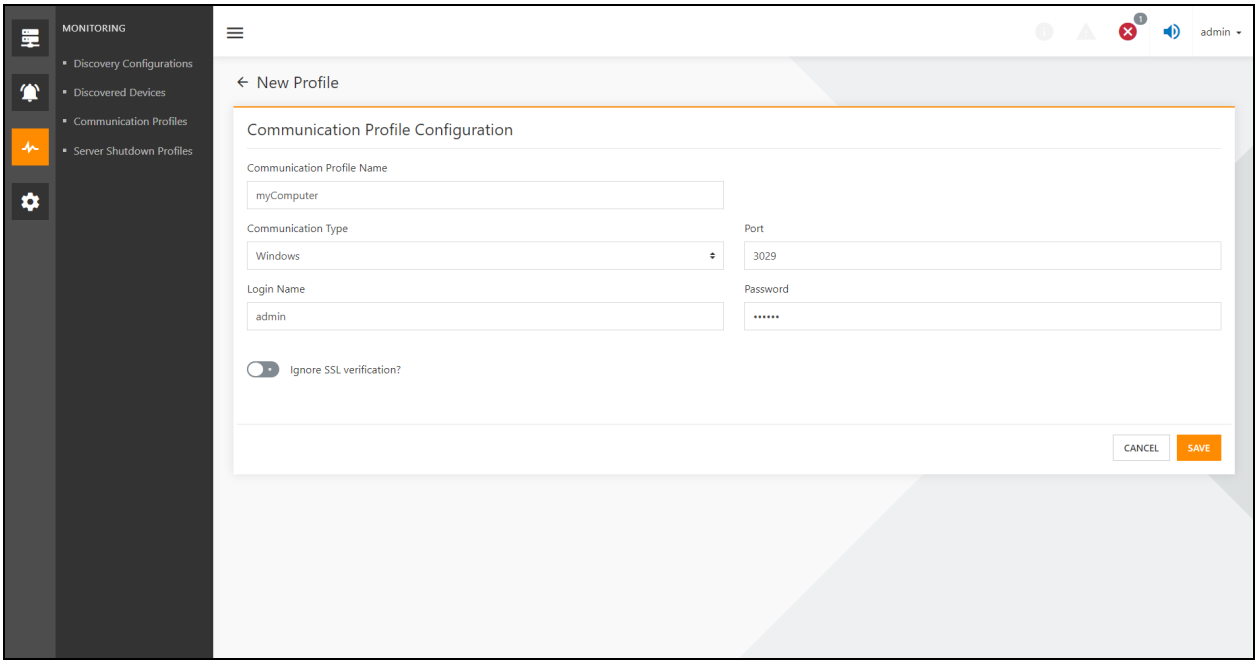
8.2.2 Example

The existing refrigeration equipment uses the communication protocols and communication configurations of SNMPv1 and SNMPv2. The system is created by default. Therefore, the communication profile of the refrigeration equipment do not need to be considered in the rapid deployment, only the communication profile configuration that is created for the server.

Before you can create a server communication configuration, you need to install the server shutdown agent on the server. Refer to Software Download on page 4.

Click on the MONITORING icon and click on the *Communication Profiles* to enter the communication profile configuration. Click the plus (+) icon on the communication profile configuration page to enter the new profile window. Select the Communication Type such as windows/ VMWareESXi / Linux / Hyper-V based on the server operating system, as shown in Figure 8.1 on the next page. Enter the following information: Communication Profile Name, Port (the port number used by the shutdown agent installed on the server, the default is 3029, no change is required), Login Name (the remote login name set by the server shutdown agent), Password (the remote login password set by the server shutdown agent), Ignore SSL verification (because communication with the server shutdown agent temporarily does not support SSL authentication, so the user will be checked for this option). After entering the above information, click *Save* to complete the deployment of the communication profile configuration.

Figure 8.1 Communication Profile Configuration Window



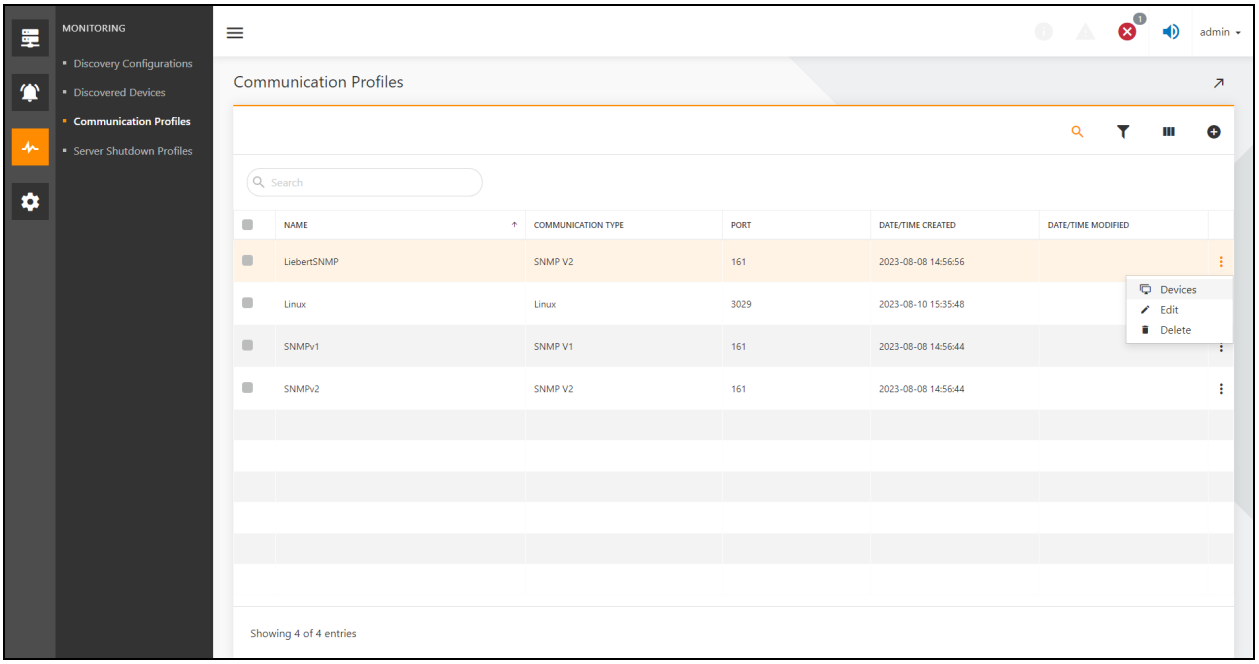
8.3 Detailed Features

8.3.1 List of communication profile configurations

Click on the MONITORING icon, and click on the *Communication Profiles* to enter the Communication Profile configuration page, as shown in Figure 8.2 on the facing page. Click the plus (+) icon on the right to select to edit, delete, or browse the list of devices configured with that communication profile. The system has three communication profile configurations by default: SNMPv1, SNMPv2, Liebert SNMP. The list also supports a common list of operations. Refer to Device list on page 36 for more details, which are not repeated later in this chapter.

NOTE: Communication configuration SNMPv1 is a communication configuration that uses the protocol SNMPv1 and the default read and write communication word (public and private). Communication configuration SNMPv2 and Liebert SNMP are both SNMPv2 protocols, but reads and writes communication words of communication configuration SNMPv2 are private. Liebert EM is the read and write communication words of Liebert SNMP.

Figure 8.2 Editing, Deleting and Browsing of Communication Parameter Configuration



8.3.2 New communication profile configuration

In Figure 8.2 above, click the plus (+) icon to enter the new profile configuration interface.

New communication profile configuration for SNMP protocol supported devices

SNMPv1 or SNMPv2

Click on the MONITORING icon, and click *Communication Profile Configuration* to enter the communication profile configuration page. Click on the plus (+) icon to enter the new profile configuration interface. Select the communication type SNMPv1 or SNMPv2, and a new window appears as shown in Figure 8.3 on the next page .

Enter the following information: Communication Profile Name, Port, Read Community, Write Community, Timeout (trying to establish an SNMP connection in seconds), and Retries (the number of retries after the connection failed). Click *Save*.

You can also choose to set timeouts and retries specifically for device searches. Because device search requires efficiency and performance, specific default timeouts and retries are typically used. You can override the default device search configuration by clicking on enable discovery, and entering a customized timeout (seconds), and retries, click *Save*.

Figure 8.3 Communication Profile Configuration Window

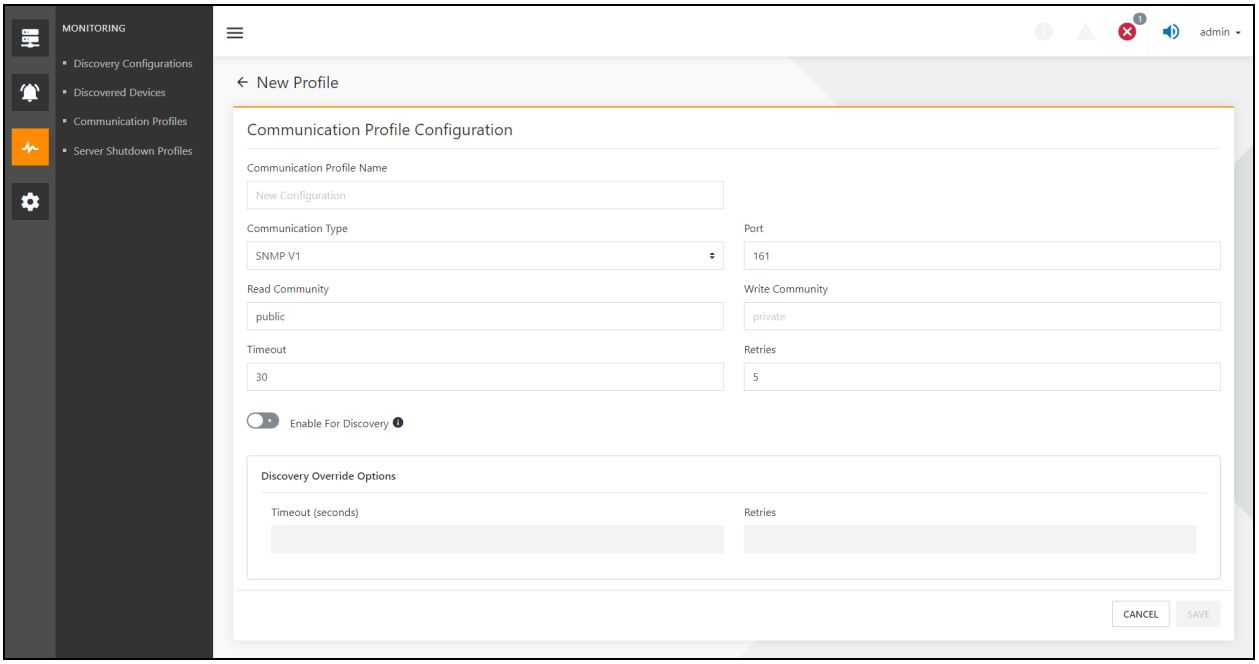
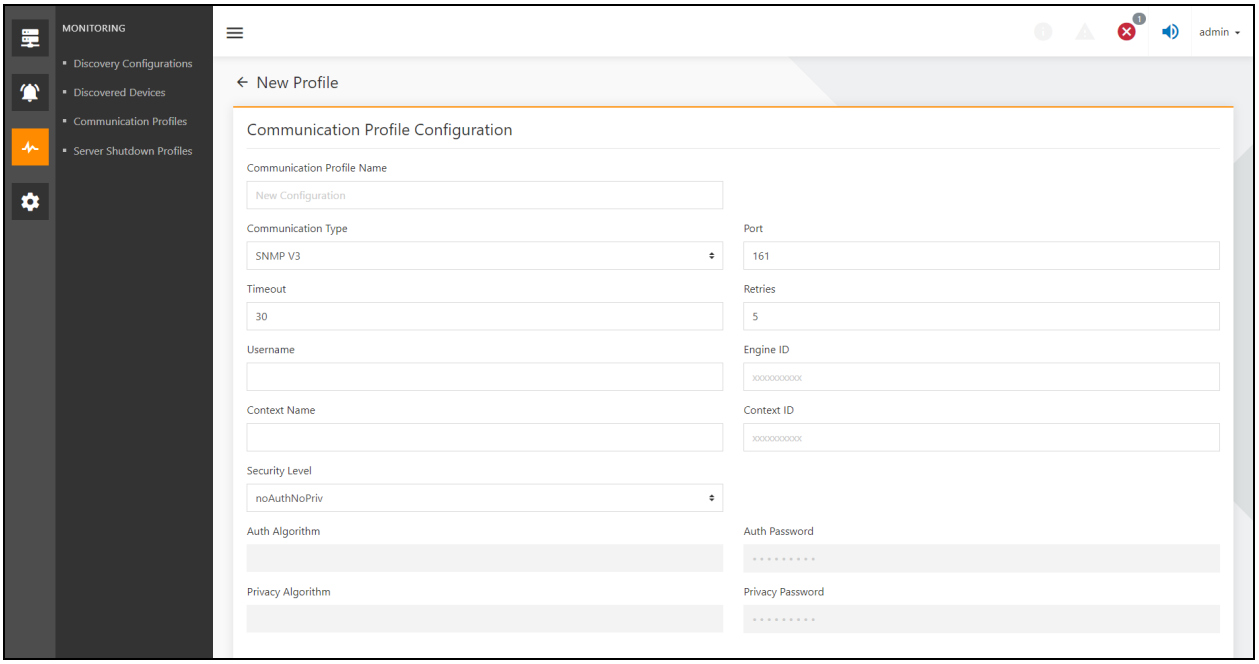


Figure 8.4 Editing Communication Profile Configuration



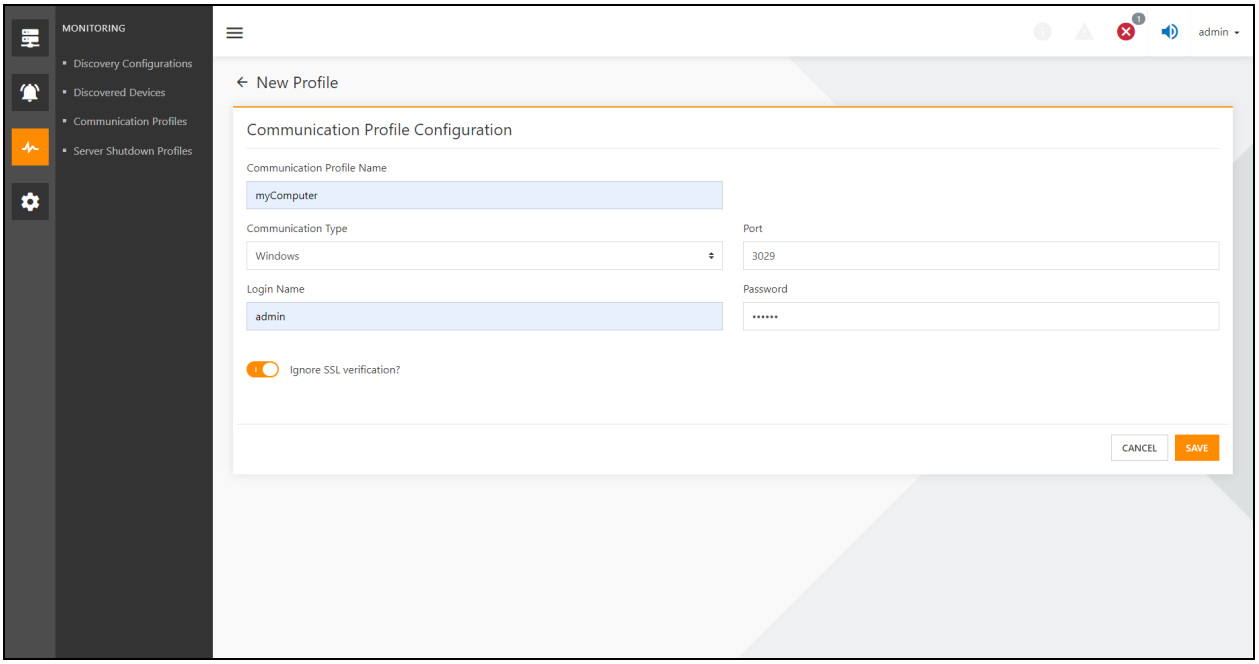
New server communication profile configuration

Before you can add a server communication profile configuration, you need to install the server shutdown agent on the server. Refer to Software Download on page 4 for more details.

Click on the MONITORING icon, and click on the *Communication Profile Configuration* to enter the communication profile configuration page. Click on plus (+) icon to enter the new profile configuration interface, select the communication type such as windows/ VMWareESXi / Linux / Hyper-V based on the server operating system, as shown in Figure 8.1 on page 78. Enter the following information: Communication Profile Name, Port (the port number used by the shutdown agent installed on the server, the default is 3029, no change is required), Login Name (the remote login name set by the server shutdown agent), Password (the remote login password set by the server shutdown agent), Ignore SSL verification (because communication with the server shutdown agent temporarily does not support SSL authentication, so the user will be checked this option). After entering the above information, click *Save* to confirm that the deployment of the communication profile configuration is complete.

NOTE: The information in the server communication profile configuration needs to be consistent with the parameter configuration of the server shutdown agent installed by the server, otherwise the configuration will not work.

Figure 8.5 Creating New Communication Profile Configuration



8.3.3 Device list

Click the *MONITORING,* and click on the *Communication Profile Configuration* menu to enter the communication profile configuration page. Click the vertical ellipses icon located on the right side of the device list that pops up in the window, and click *Devices*.

If the communication profile configuration to which the device list belongs is the configuration of the SNMP protocol, the interface shown in Figure 8.6 on the next page appears. The list of devices for the SNMP protocol is divided into two tab pages: Discovered Devices, Monitored Devices, and showing all IP devices that use this communication configuration. We only need to check about the monitored device. For the source of the device information, see the automatic device discovery and manual device addition in Add Refrigeration Equipment on page 27. If you remove a device from the list of devices, Thermal Insight deletes all information about the device.

If the communication configuration to which the device list belongs is the server communication configuration, the interface shown in Figure 8.7 on the next page appears. The interface shows which communication configurations are used on servers added to Thermal Insight. For the server information source, refer to Server Shutdown Profile on page 83 to add a server.

Figure 8.6 Communication Configuration List belongs to SNMP

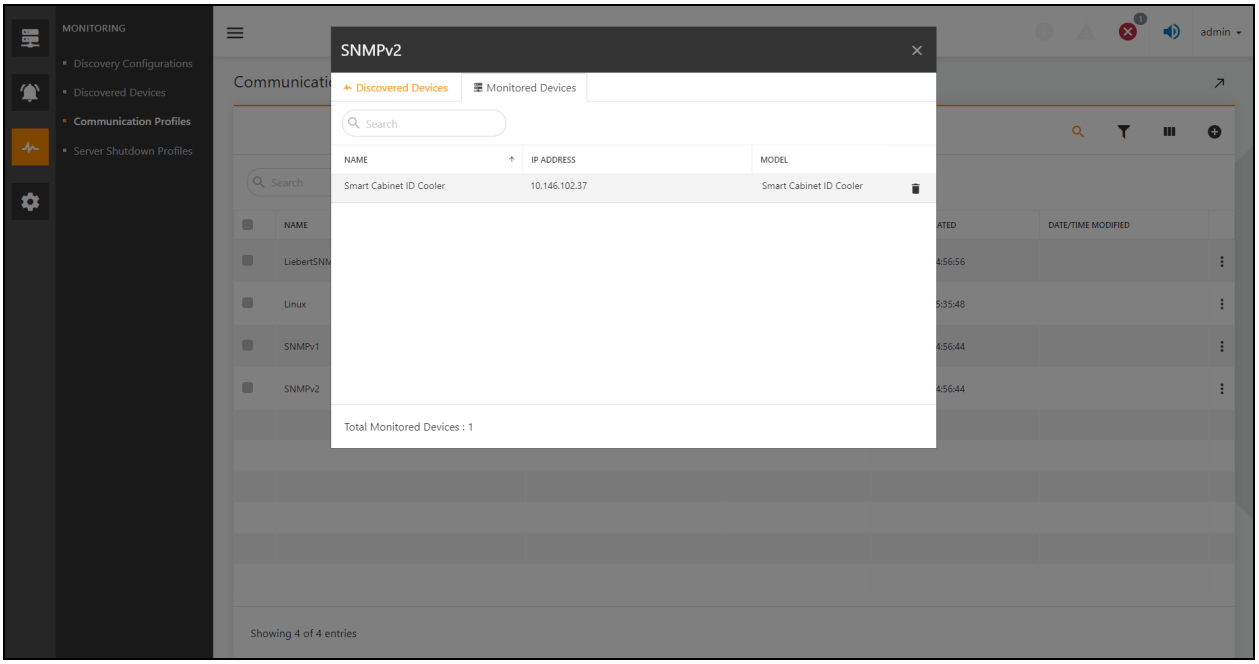
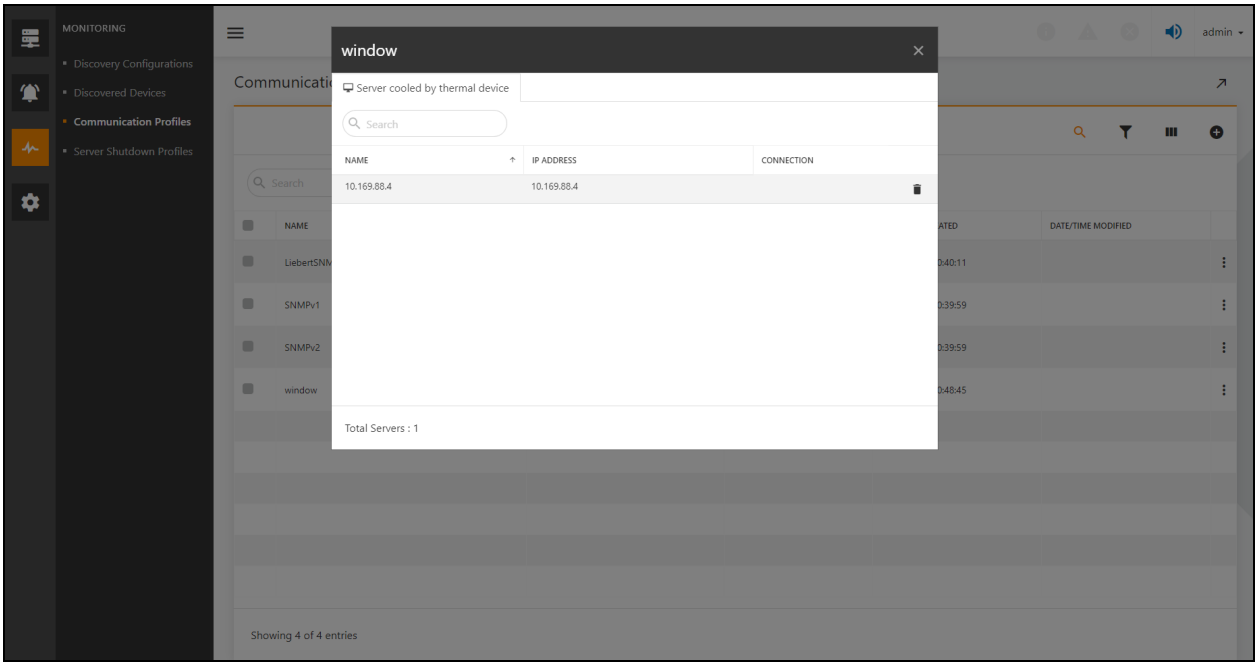


Figure 8.7 Communication Configuration List belongs to Server Communication



9 Server Shutdown Profile

9.1 Overview

The functions of the server and shutdown management modules include:

- Addition, deletion, and modification of server
- Server shutdown configuration management
- Server and server shutdown configuration binding

9.1.1 Functional module

Server shutdown profile management includes the following functional modules, each of which is detailed in this manual in Detailed Features on page 86.

- List of servers
- New servers
- List of server shutdown profiles
- New server shutdown profiles

9.2 Get Started Quickly

9.2.1 Quick deployment steps

The quick deployment steps for server shutdown profile management are as follows:

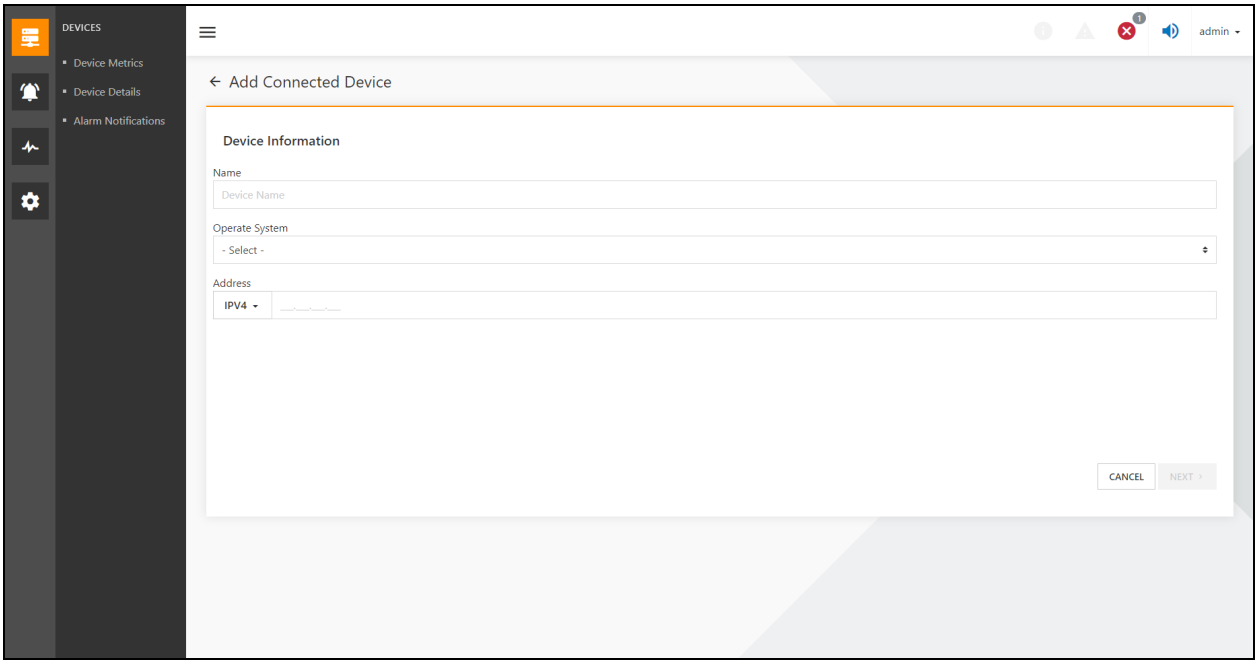
- Add a new server and bind the shutdown configuration.

9.2.2 Example

To add a server cooled by a refrigeration equipment:

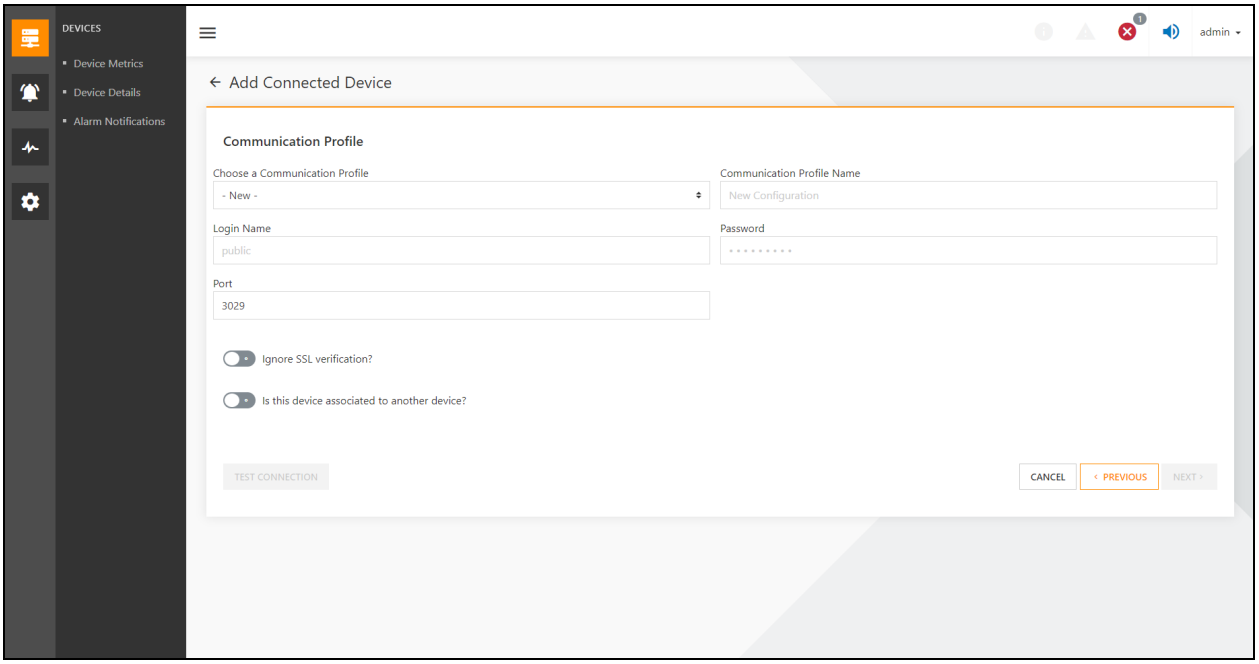
1. Click on the DEVICES icon, and click on the *Refrigeration list*.
2. By clicking vertical ellipses icon on the far right of the list item, a new window appears.
3. Click on *Device Details* to enter device information where you can see the list of servers cooled by refrigeration equipment.
4. Click the add plus (+) icon button in the list to open the new server page, as shown Figure 9.1 on the next page. Enter the server name, select the operating system type (windows / VMWare ESXi / Linux / Hyper-V), enter the IP address. Click *Next*.

Figure 9.1 Add a New Server Window



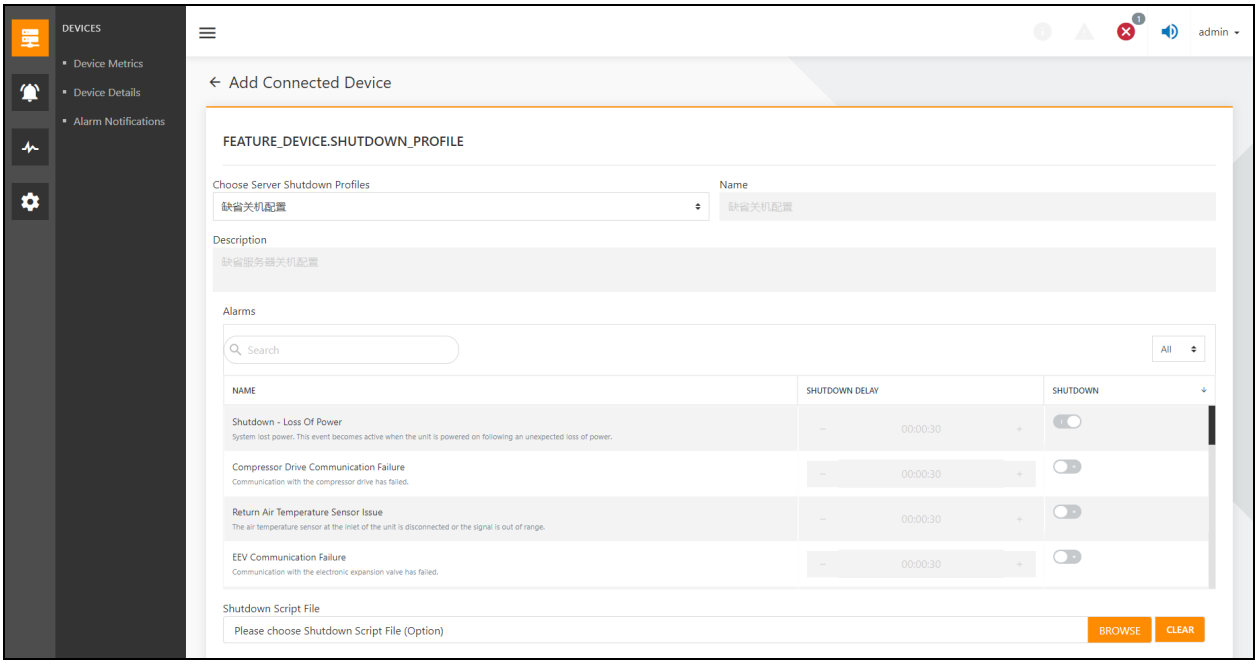
The next step is to configure the server communication profile as shown in **Figure 9.2** on the facing page. You can choose an existing communication profile, or you can create a new communication profile on this interface. Refer to New communication profile configuration on page 79 to configure communication profile. After the configuration of the communication, it is recommended to test the connection. Click *Next*.

Figure 9.2 Configure the Server Communication Configuration



The next step is to bind the server shutdown configuration as shown in Figure 9.3 on the next page. The system helps you select the default shutdown configuration by default. The default shutdown configuration contains alarms that trigger a server to shutdown. The parameters that trigger a server to shutdown are system lost power, compressor drive communication failure, return air temperature sensor issue, and EEV communication failure. If you need to execute a shutdown script when the server shutdown, you can browse and import a shutdown script from the local computer and click *Save*. Return to the list of servers cooled by refrigeration equipment. You can see the servers cooled by the refrigeration equipment by going to the list.

Figure 9.3 Bind the Server Shutdown Configuration



9.3 Detailed Features

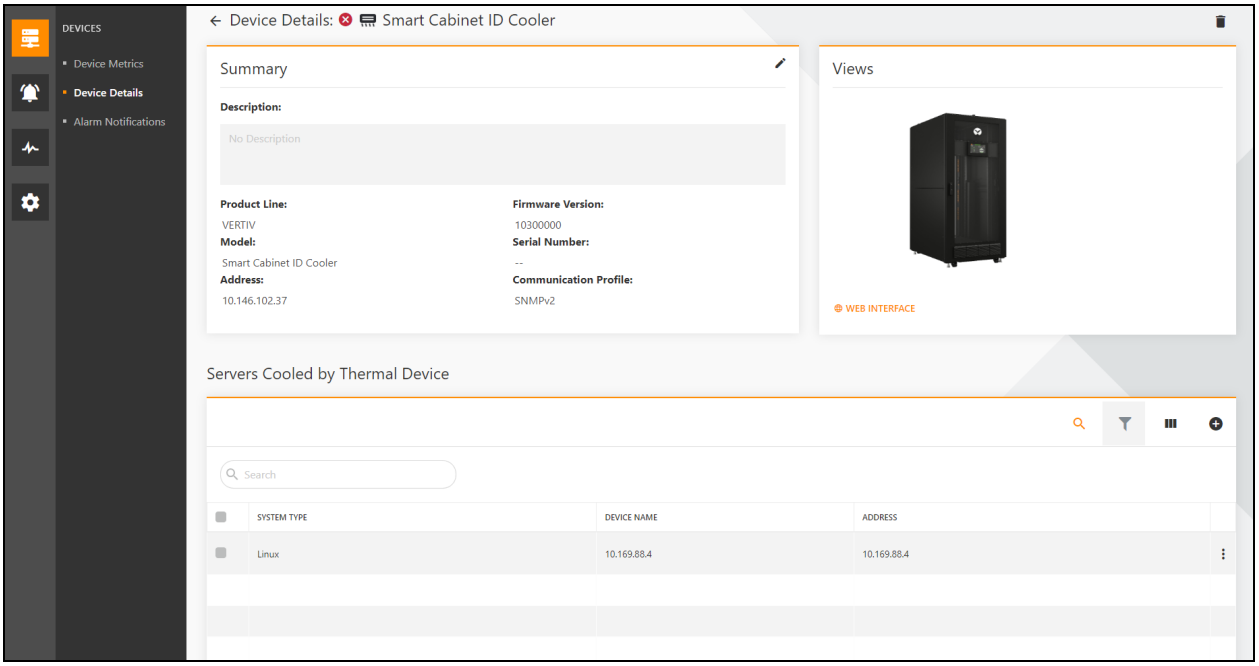
9.3.1 Server list

Thermal Insight does not specifically manage servers. All server lists are based on server lists cooled by a certain refrigeration plant.

Click on the DEVICES icon, and click on the Refrigeration list. By clicking the vertical ellipses icon on the far right of the refrigeration list, a new window appears. Click on the *Device Details* to enter device information, where you can see the list of servers powered by refrigeration equipment, as shown in **Figure 9.4** on the facing page. You can see that the server Linux has been added. The list contains system type, device name, address, and powered by (there may be multiple devices connected to the same server). Click on the vertical ellipses icon on the right side of the list to edit and delete the server.

The server lists can also be used for common list of operations. Refer to Device list on page 36 for more information. The common list of operations in this chapter is no longer repeated.

Figure 9.4 List of Servers Cooled by Thermal Device

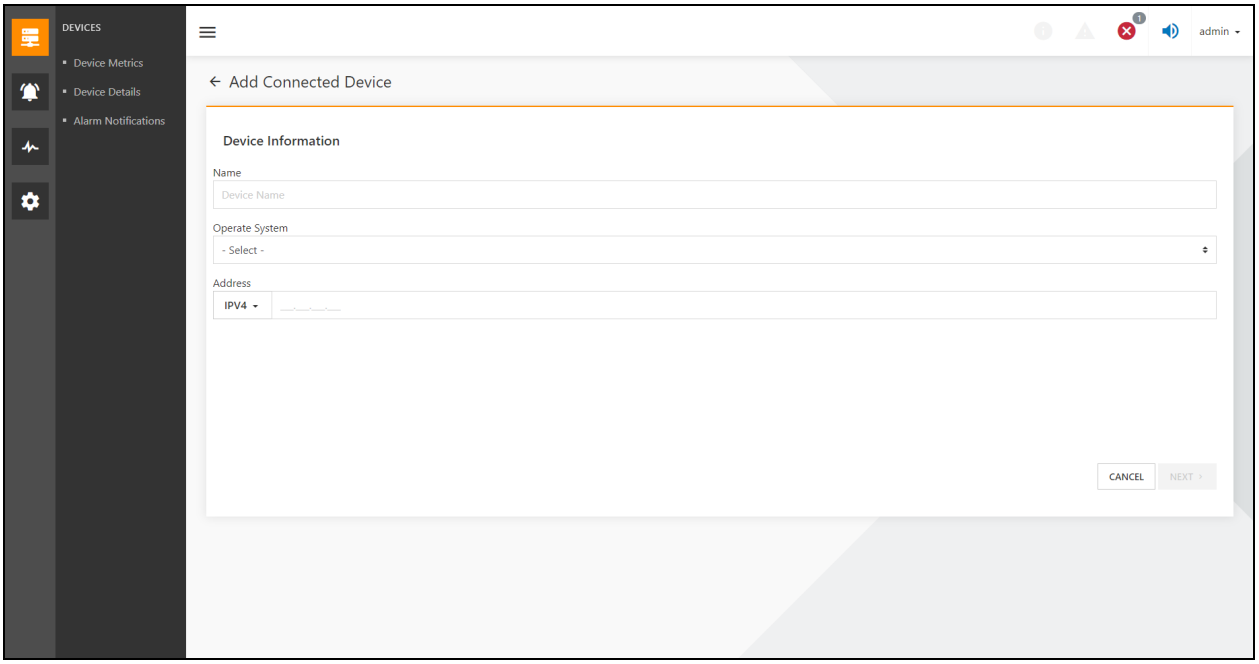


9.3.2 New servers

Click the add plus (+) icon button in Figure 9.4 above to enter the new server page, as shown in Figure 9.6 on page 89. Enter the server name, select the operating system type (Windows/VMWare ESXi/Linux/Hyper-V (via os), and enter the IP address. Click *Next*.

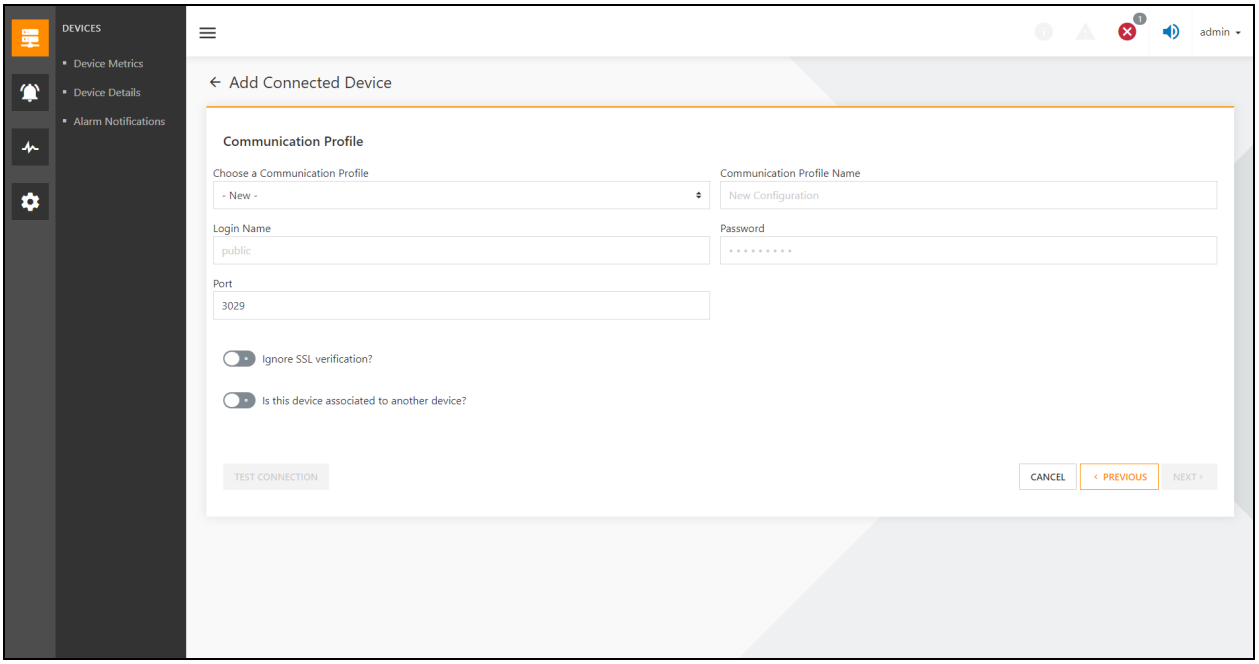
NOTE: If you select an operating system type that is VMWare, the server cannot create a shutdown script configuration for subsequent use because VMWare does not currently support shutdown scripts.

Figure 9.5 Adding Connected Device



Go to the second page, as shown in Figure 9.6 on the facing page to configure the server communication profile. You can choose an existing communication profile, or you can create a new communication profile on this interface. Refer to New communication profile configuration on page 79 to configure the communication profile. After the configuration of the communication, it is recommended to test the connection. Click *Next*.

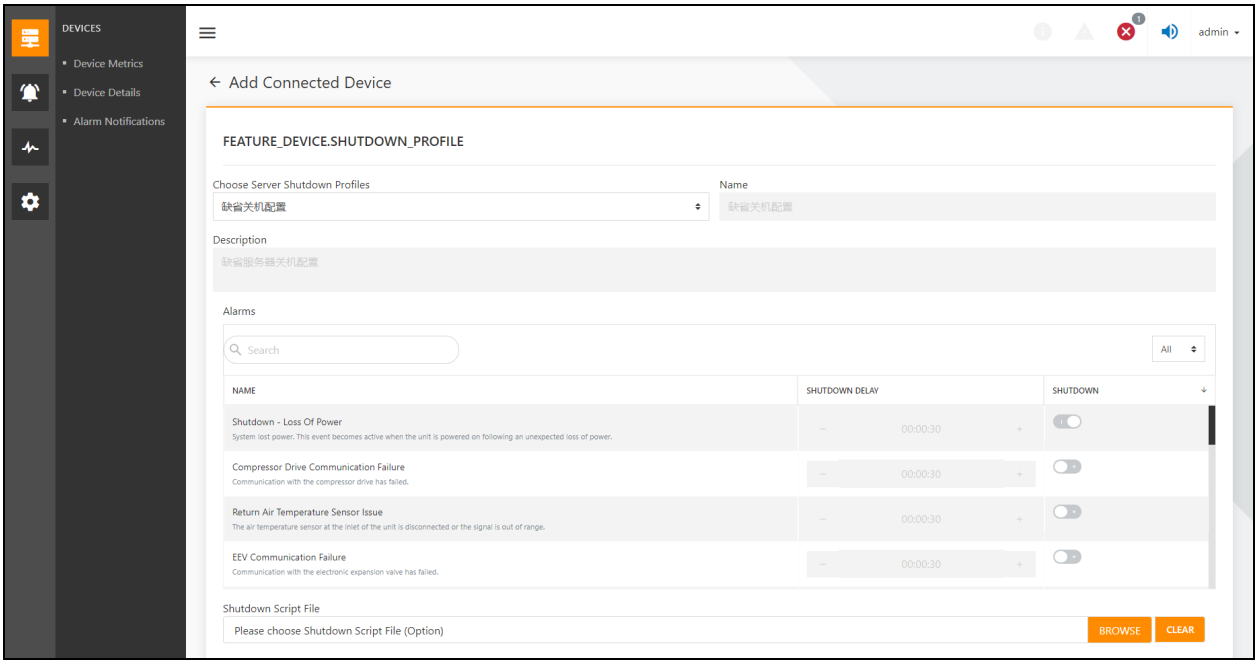
Figure 9.6 Configuring the Server Communication



Go to the next step, binding the server shutdown configuration, as shown in **Figure 9.7** on the next page. The system will help to select the default shutdown configuration by default. The default shutdown configuration contains alarms that trigger a server to shutdown. You can also select *New* in the Select Server Shutdown configuration. This allows the new server shutdown configuration in this interface and binds to the current server by default. For details of the new server shutdown configuration, refer to New server shutdown configuration on page 91.

If you need to execute the shutdown script when the server shuts down, you can browse the shutdown script from the local computer, and import it. Click *Save*. After saving successfully, return to the list of servers cooled by refrigeration equipment. At the same time, some alerts for refrigeration equipment can also trigger the server to shutdown and execute the script that you specified before shutting down.

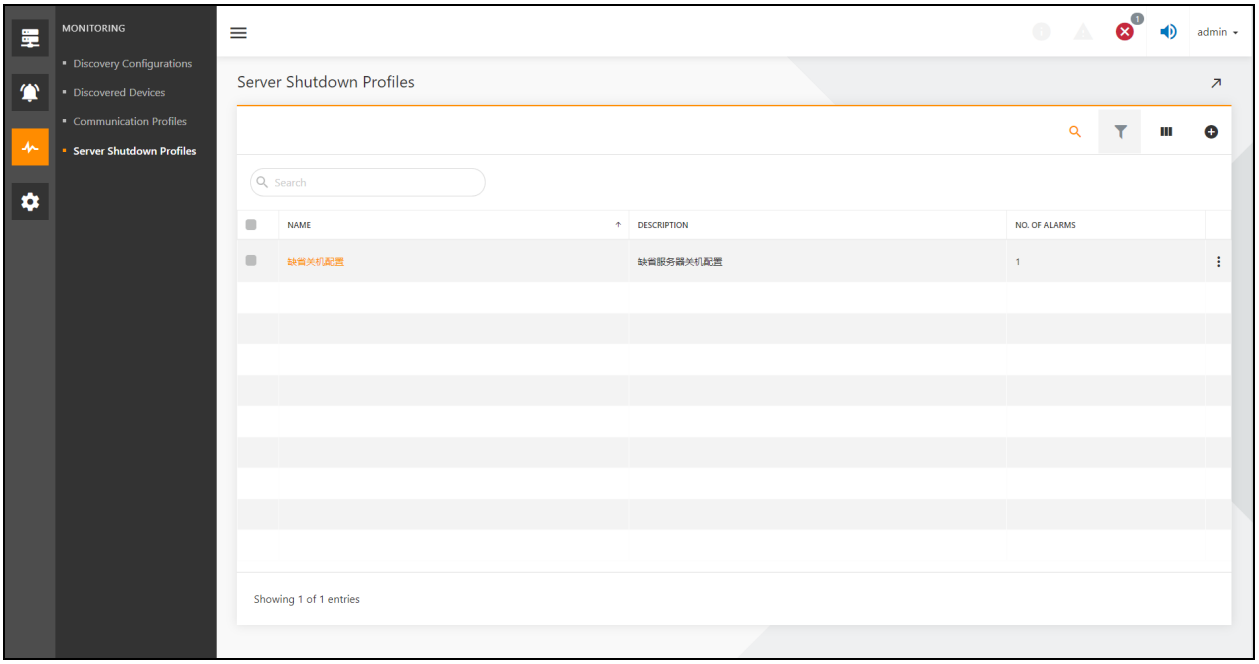
Figure 9.7 Binding the Server Shutdown Configuration



9.3.3 List of server shutdown profiles

Click on the MONITORING icon, and click on the Server Shutdown Profiles to enter the Server shutdown profiles page, as shown in Figure 9.8 on the facing page. The system creates a default shutdown configuration by default. This configuration only binds to one alarm: shutdown power failure, and the default delay of the alarm is 30 seconds. Click on the vertical ellipses icon on the right side of the list to edit and delete the server shutdown configuration.

Figure 9.8 Server Shutdown Profile Window



9.3.4 New server shutdown configuration

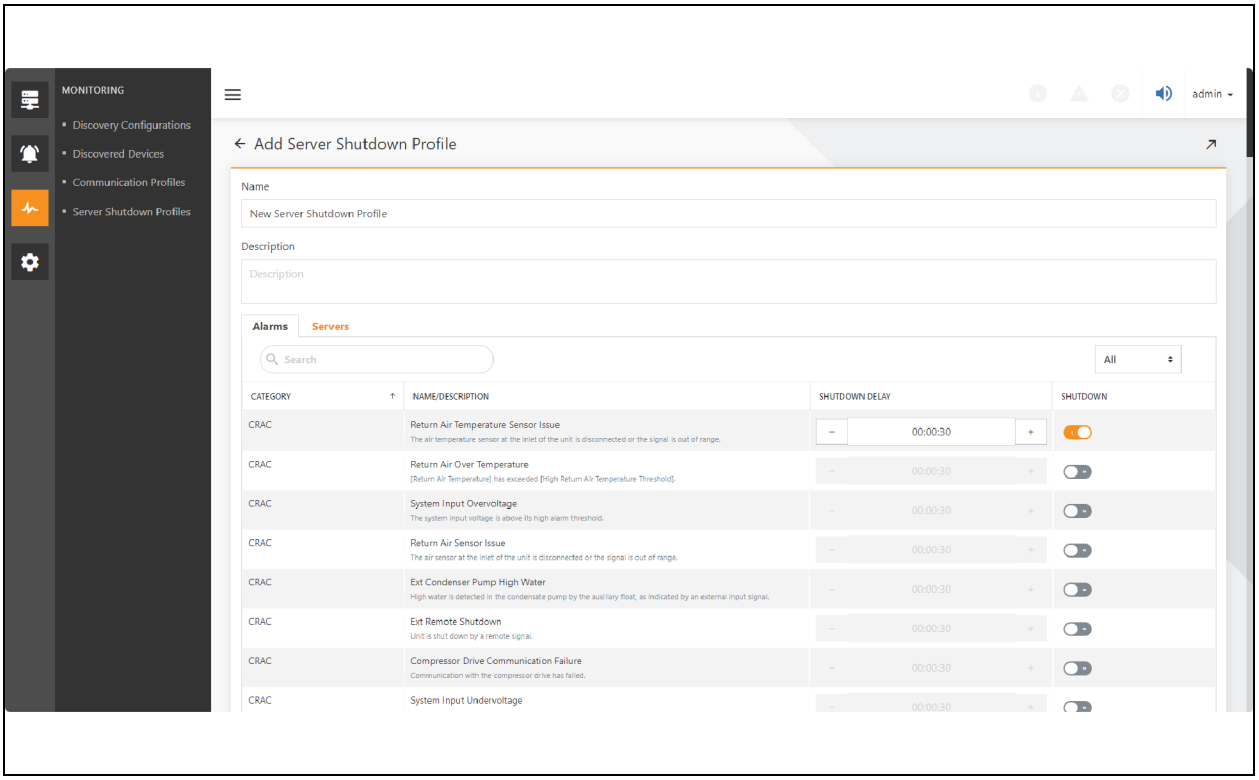
Click the plus (+) icon in Figure 9.8 above to enter the new interface of the server shutdown configuration, as shown in Figure 9.9 on the next page. Enter the Name and Description of the server shutdown configuration. A newly added server shutdown configuration is divided into the alarm configuration and the associated server.

Alarm configuration

As shown on the Alarms tab page in Figure 9.9 on the next page, the alarm configuration displays all alarms supported in Thermal Insight in the form of a list. Users can enable or disable an alarm by clicking the toggle icon on the far right side of the tab. When some alarm is enabled, if the server is bound to the server shutdown configuration, and the connected refrigeration equipment triggers an alarm, and the server will be shutdown. After enabling certain alarms, shutdown delay can be edited. The compressor high head pressure alarm is enabled as shown in Figure 9.9 on the next page. The default shutdown delay is 30 seconds, after which the shutdown delay can be modified. The maximum shutdown delay is 8 hours. The effect of shutdown delay is that when an alarm is triggered, the server shutdown is delayed for a period of time.

NOTE: If the alarm is ended by the system, the shutdown countdown is canceled, and the server will not be shutdown.

Figure 9.9 Add Server Shutdown Profile—Alarms



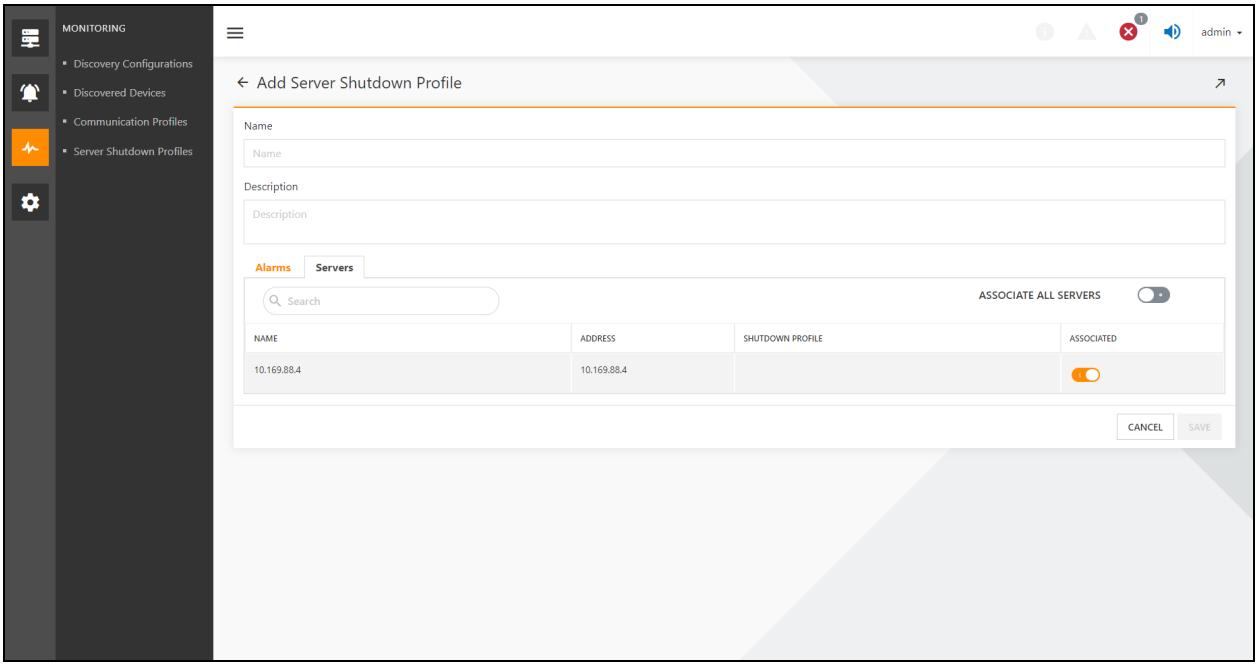
Associated server

As shown in Figure 9.10 on the facing page, all the servers in the current system, show the name, address, shutdown profile (the shutdown configuration file currently bound to the server). Click the toggle icon in the last column of the list to associate or untie the server for the list item with the current server shutdown configuration. Click the toggle icon to enable ASSOCIATE ALL SERVERS or untie all servers with the current shutdown configuration.

NOTE: Make sure to click the *SAVE* button for the changes to take effect after you configure an alarm and associated server.

NOTE: When you click the *Associate* button to unbind it, the shutdown file bound by the server will be restored to its previous state (empty before unbound).

Figure 9.10 Add Server Shutdown Profile—Servers



9.3.5 Alarm trigger server shutdown process

If the battery discharge alarm for CRAC123 is triggered, the server shutdown process is as follows：

1. Find all the servers that CRAC123 is connected to the shutdown configurations.
2. Check that excessive gas supply temperature alarms are enabled in the shutdown configuration of the server.
3. If step 2 is established, start the countdown according to the shutdown delay of the alarm that the gas supply temperature is too high in the server shutdown configuration. The server shuts down after the countdown ends. If the gas supply temperature of the CRAC123 during the countdown period is too high, alarm ends, the shutdown process is terminated, and no shutdown is performed.

NOTE: The shutdown process of the server includes shutdown delay countdown, execution of shutdown script, and execution of server shutdown.

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10 System Settings

10.1 Overview

System Settings of the Thermal Insight view all event records, configure notification mails, text messages, security settings, user defined properties, system diagnostics, contacts, and trust certificates.

10.1.1 Function modules

The system settings include the following functional modules:

- Events
- Notification settings
- System settings
- User defined properties
- System health
- Contacts
- Trust store
- Integrated management

10.2 Get Started Quickly

10.2.1 Quick deployment steps

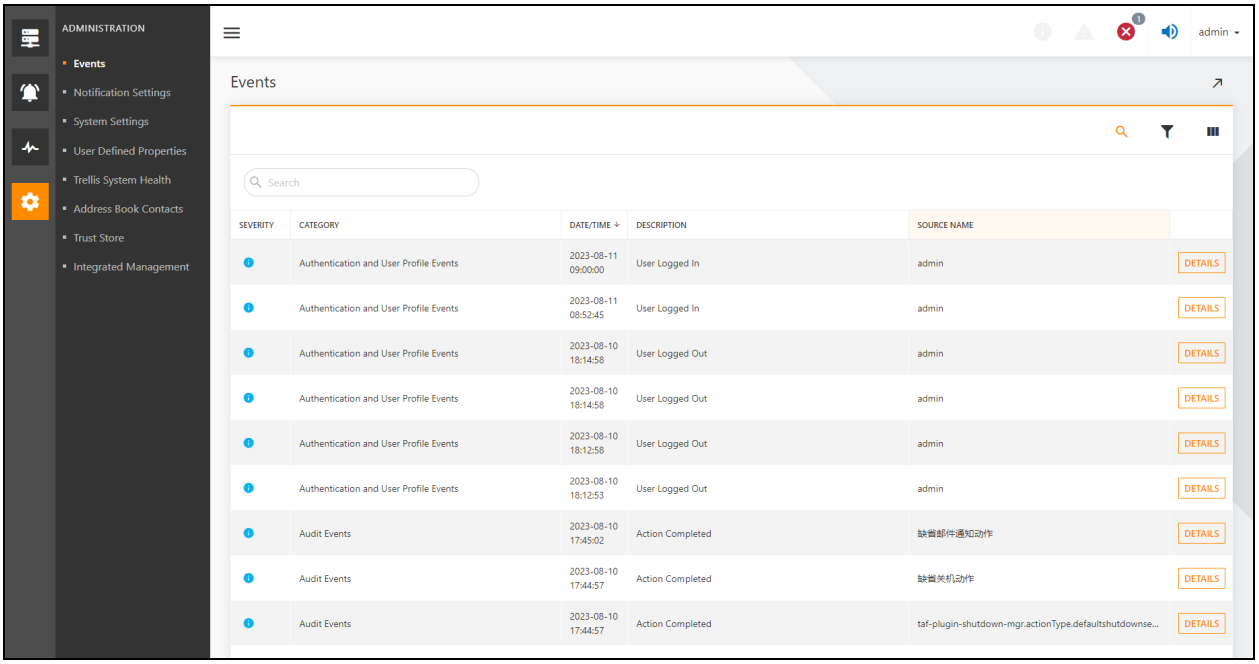
- List of events
- Notification settings
- System settings
- User defined properties
- System health
- Contacts
- Trust store
- Integrated management

10.2.2 Example

- List of events

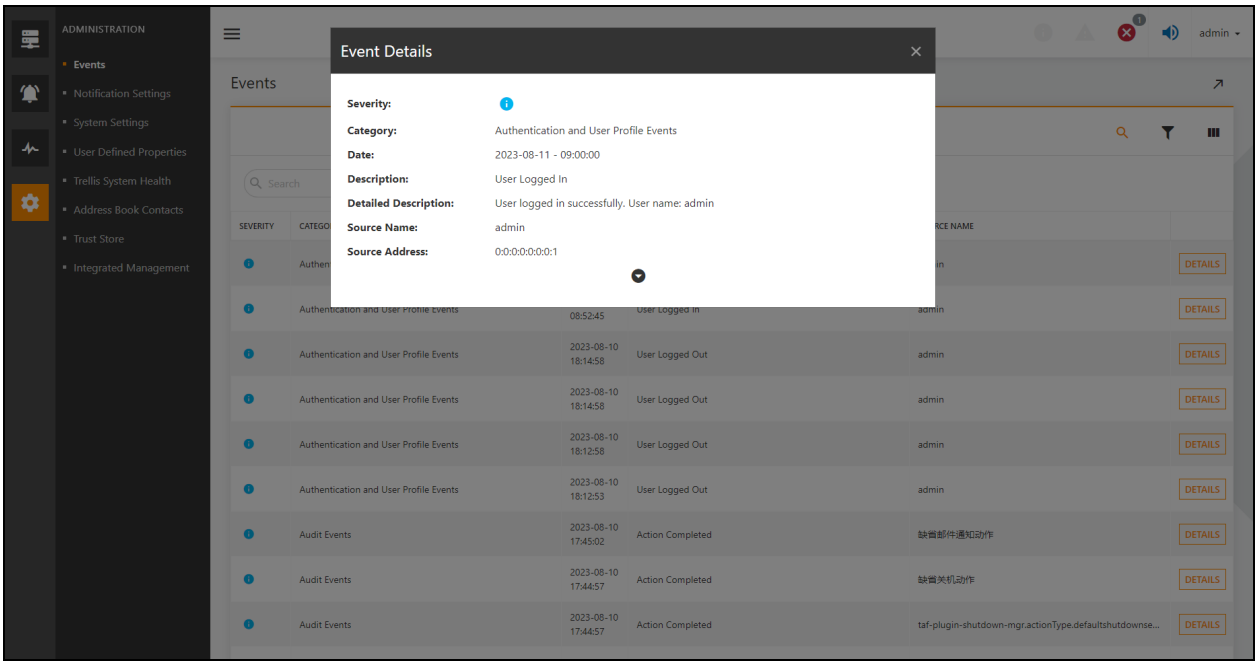
  Click on the ADMINISTRATION icon, and click on the *Events* in the secondary menu. A list of all user actions and device actions is displayed, as shown in **Figure 10.1** on the next page. For more information, refer to Event on page 101.

Figure 10.1 List of Events



Click *Details* on the right of Source Name to see the specific information about the operation:

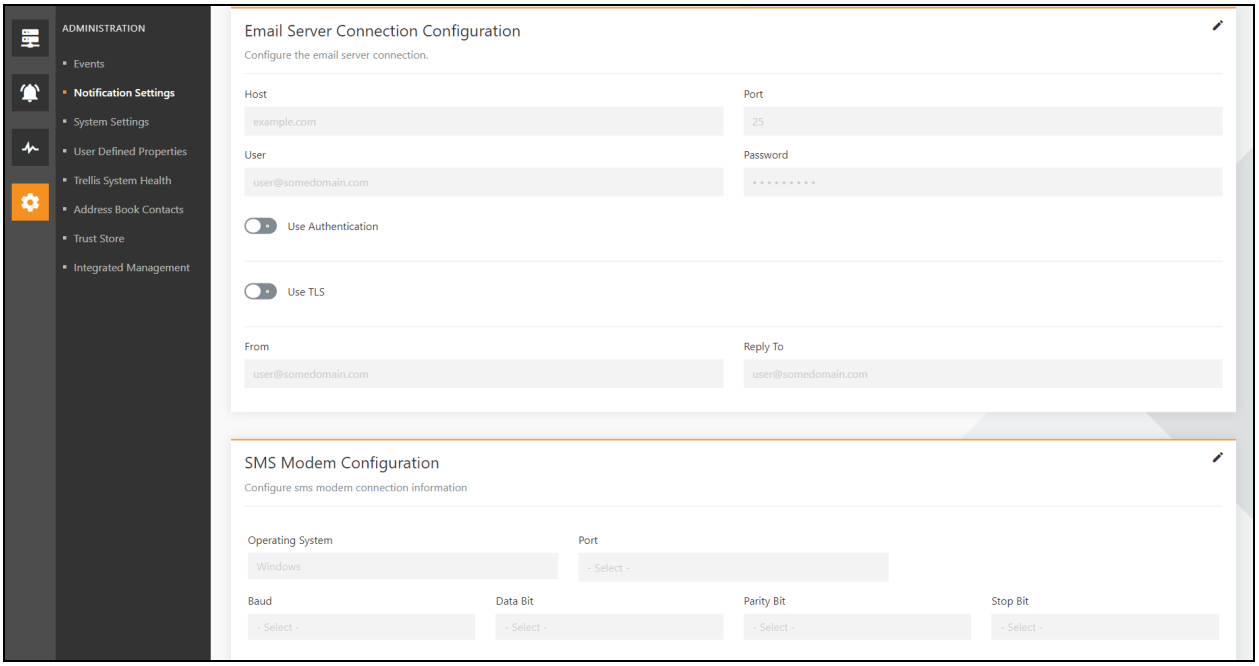
Figure 10.2 Event Details Window



- **Notification settings**

  Click on the ADMINISTRATION icon, and click on the *Notification Settings* in the secondary menu. You can see mail server and SMS Modem Configuration on the right side, as shown in **Figure 10.3** on the facing page (refer to System settings on page 103 for specific parameters).

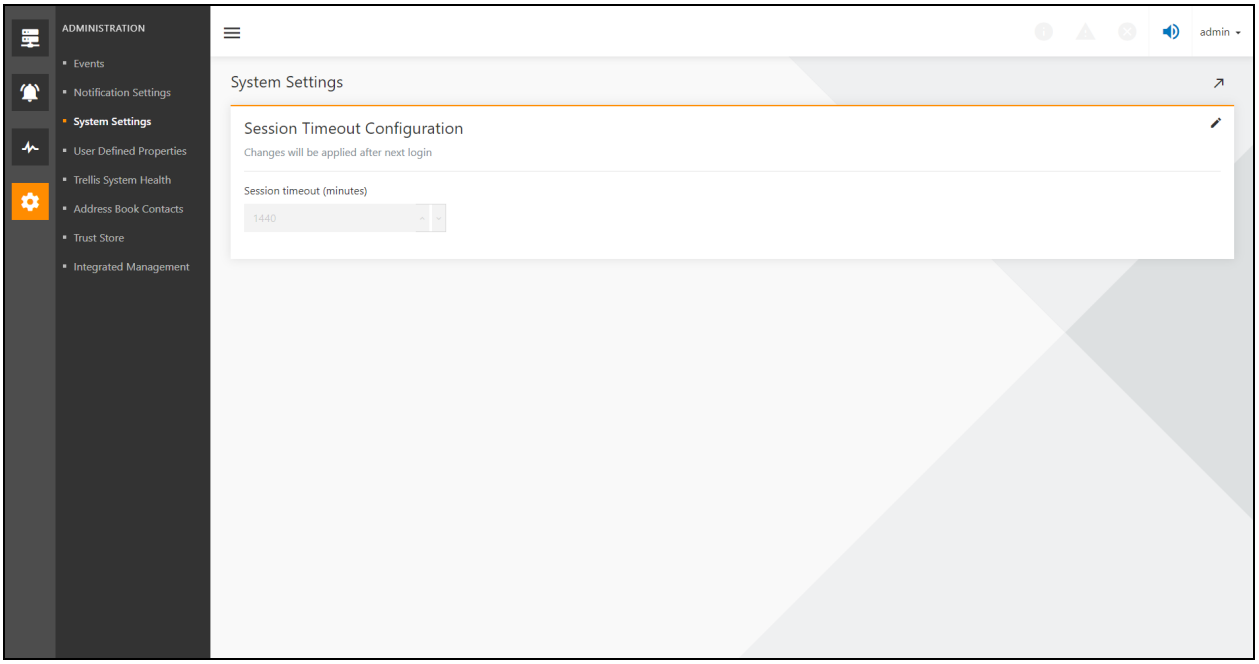
Figure 10.3 Notification Setting



- System settings

  Click on the ADMINISTRATION icon, and click *System Settings* in the secondary menu. You can see Session Timeout Configuration as shown in **Figure 10.4** below (refer to System settings on page 103 for specific parameters).

Figure 10.4 System Setting

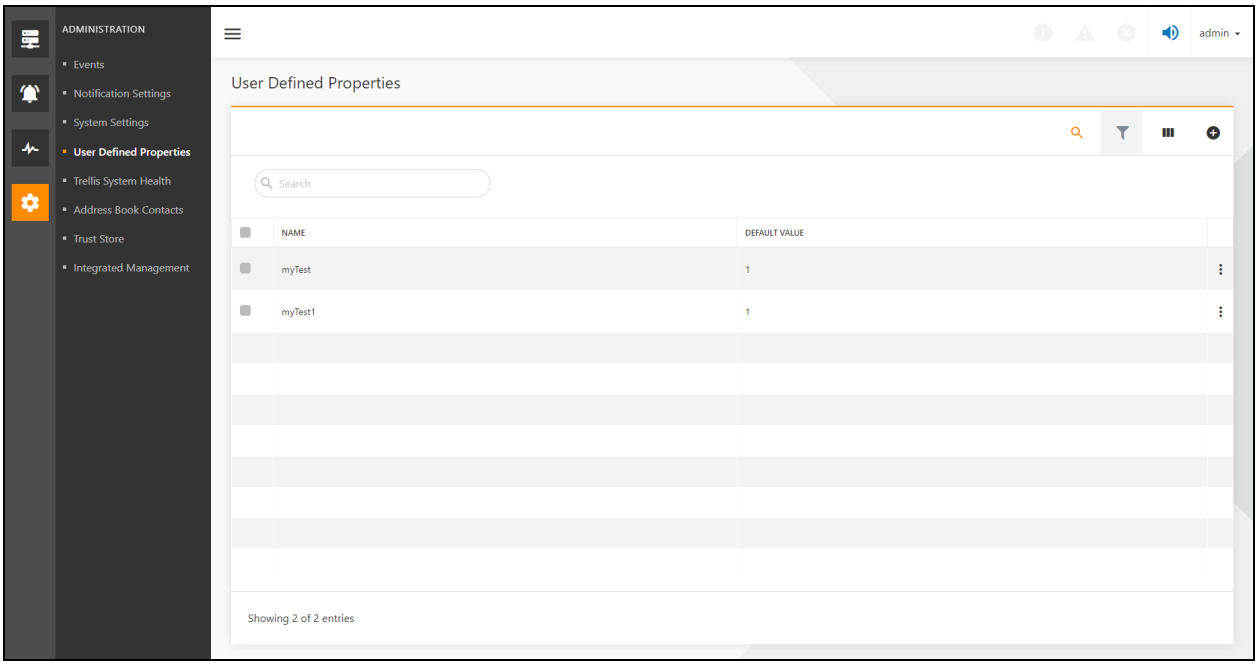


Click on the edit icon in the upper right corner to edit the time. Click *Save*.

- **User defined properties**

  Click on ADMINISTRATION icon and click on the *User Defined Properties* in the secondary menu. You can see some properties defined by the Thermal Insight as shown in **Figure 10.5** below (refer to User defined properties on page 104 for specific parameters).

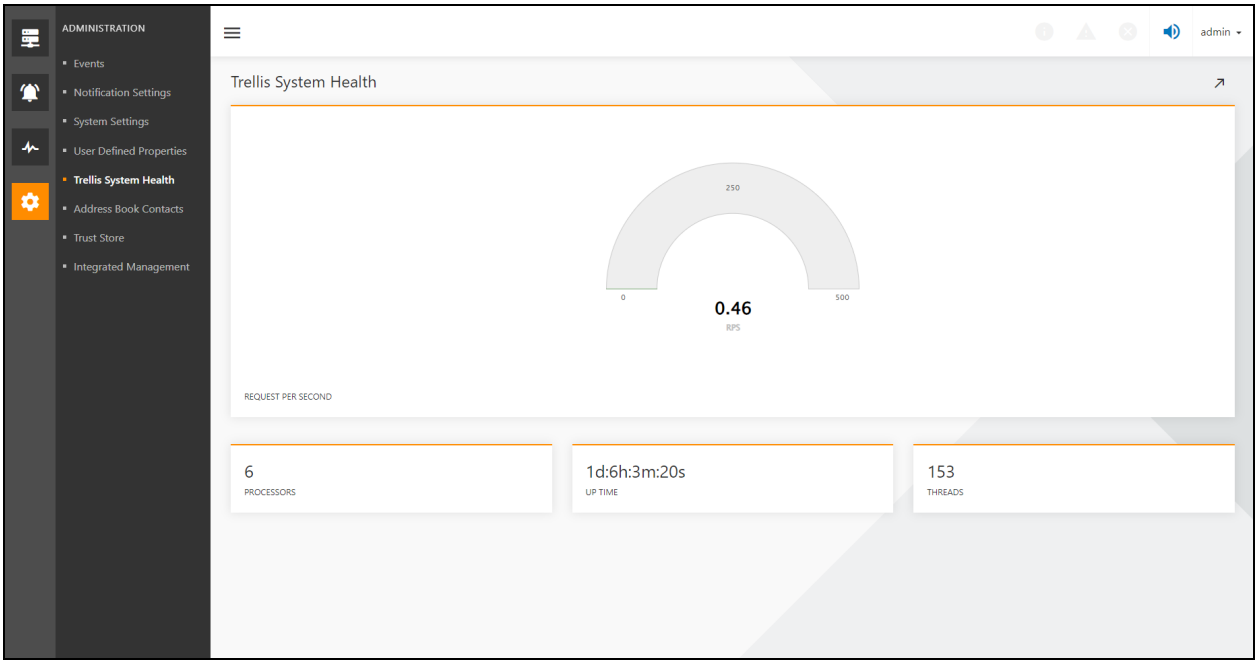
Figure 10.5 User Defined Properties



- **System health**

  Click on ADMINISTRATION icon, and click on the *Trellis system Health* in the secondary menu. Some of the status of the server located at Thermal Insight is displayed, as shown in **Figure 10.6** on the facing page (refer to System health on page 105 for specific parameters).

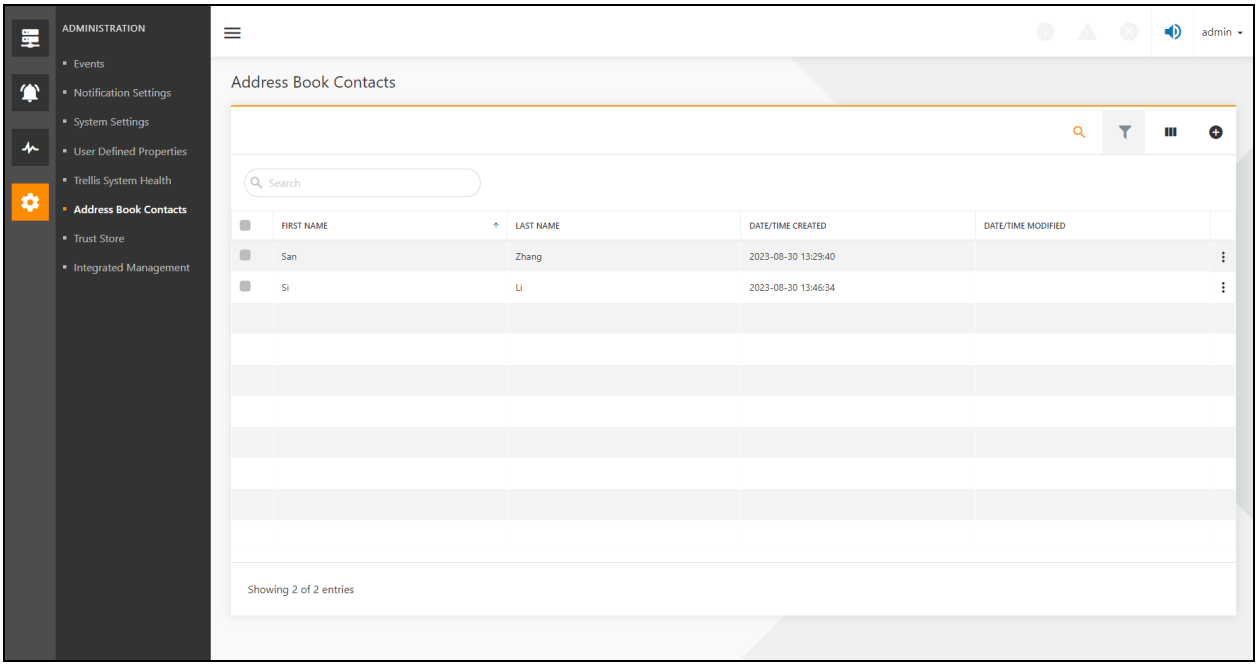
Figure 10.6 System Health



- Address book contact

  Click on ADMINISTRATION icon, and click on the *Address Book Contacts* in the secondary menu. You can see the contact name as shown in **Figure 10.7** below (refer to Contacts on page 106 for specific parameters).

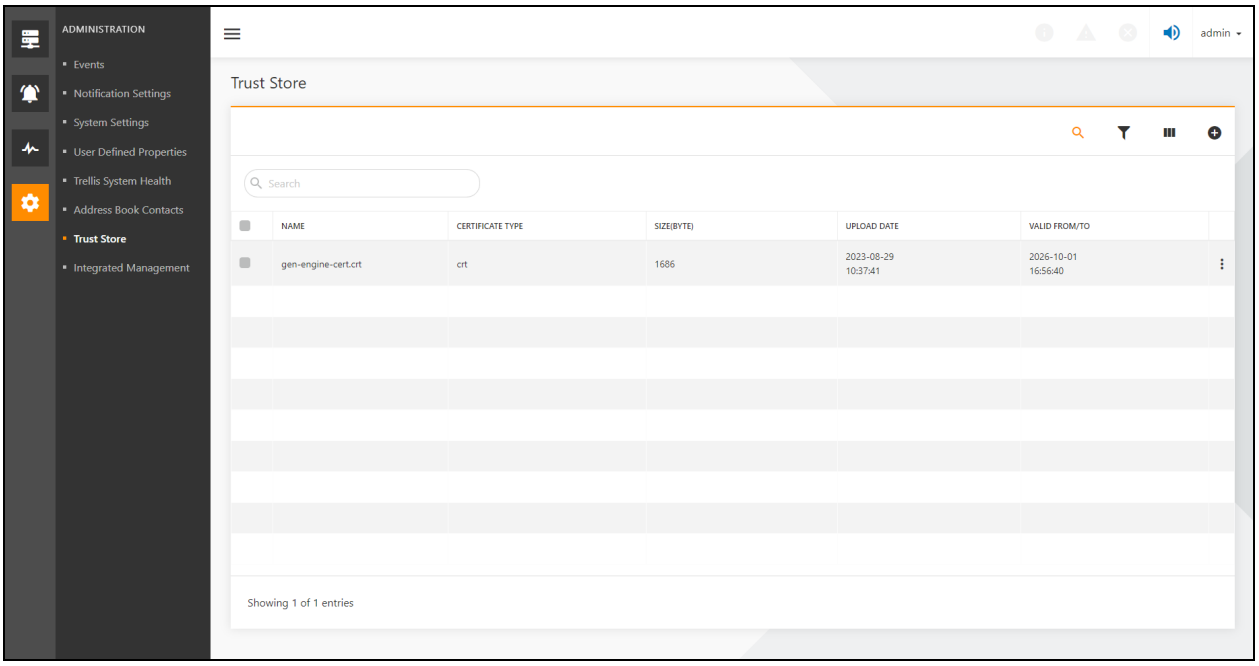
Figure 10.7 Address Book Contacts



- **Trust Store**

  Click on ADMINISTRATION icon, and click on the *Trust Store* in the secondary menu. The certificates included in Thermal Insight are displayed as shown in **Figure 10.8** below. For more information, refer to Trust store on page 108 for specific parameters.

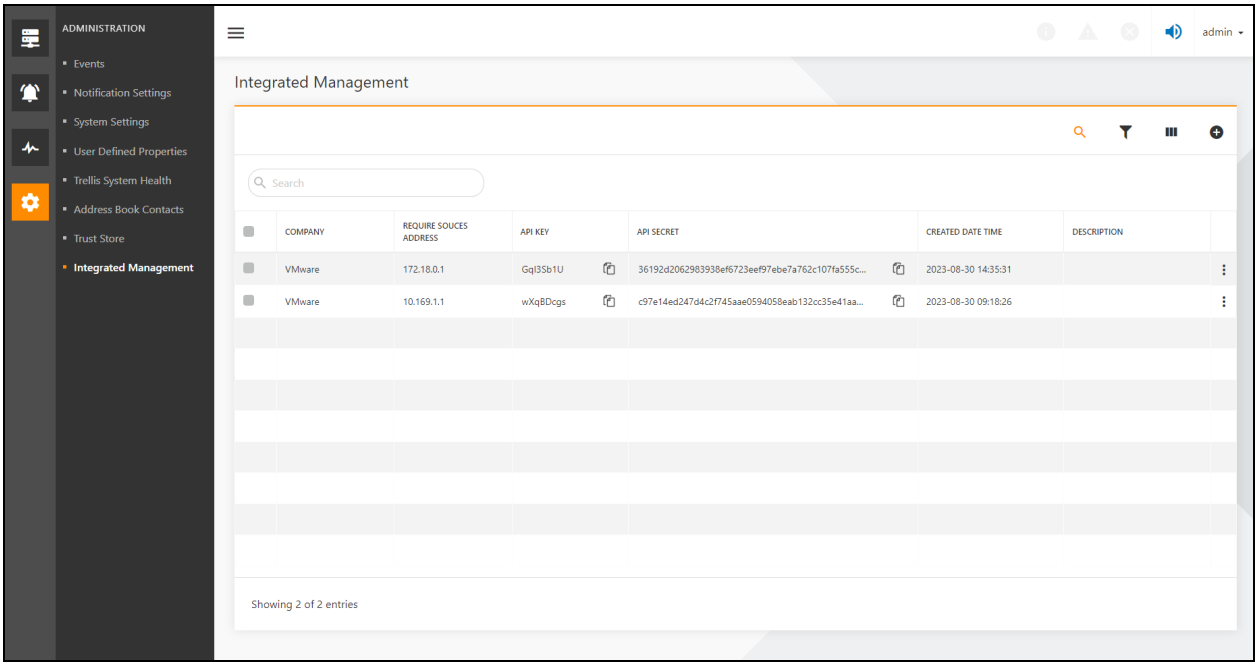
Figure 10.8 Trust Certificate



- **Integrated management**

  Click on the ADMINISTRATION icon, and click *Integrated Management* in the secondary menu. The plugins included in Thermal Insight are displayed as shown in **Figure 10.9** on the facing page (refer to Integrated management on page 109 for more details).

Figure 10.9 Integrated Management



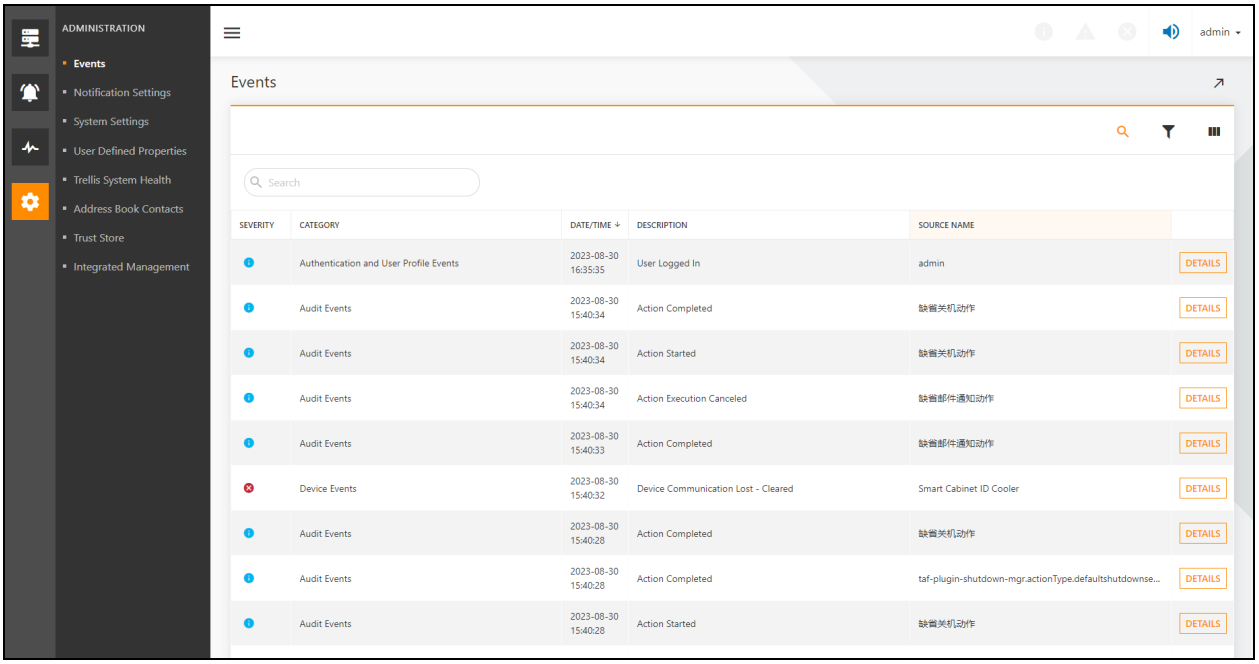
10.3 Detailed Features

10.3.1 Event

Click on the ADMINISTRATION icon, and click *Events* in the secondary menu to see the list of events.

The Thermal Insight application records each action or event that occurs in the application. Events are grouped in categories that identify each event with a time/date stamp. They are categorized as Audit Events, Device Events, System Events, System Events Administration, Authentication, and User Profile Events, and Application Level Events. Each event has a severity level of informational, warning, or critical. You can add or remove columns and filters to show only the events that are important. You can also retrieve detailed information about each event listed under the link in the Details column.

Figure 10.10 List of Events



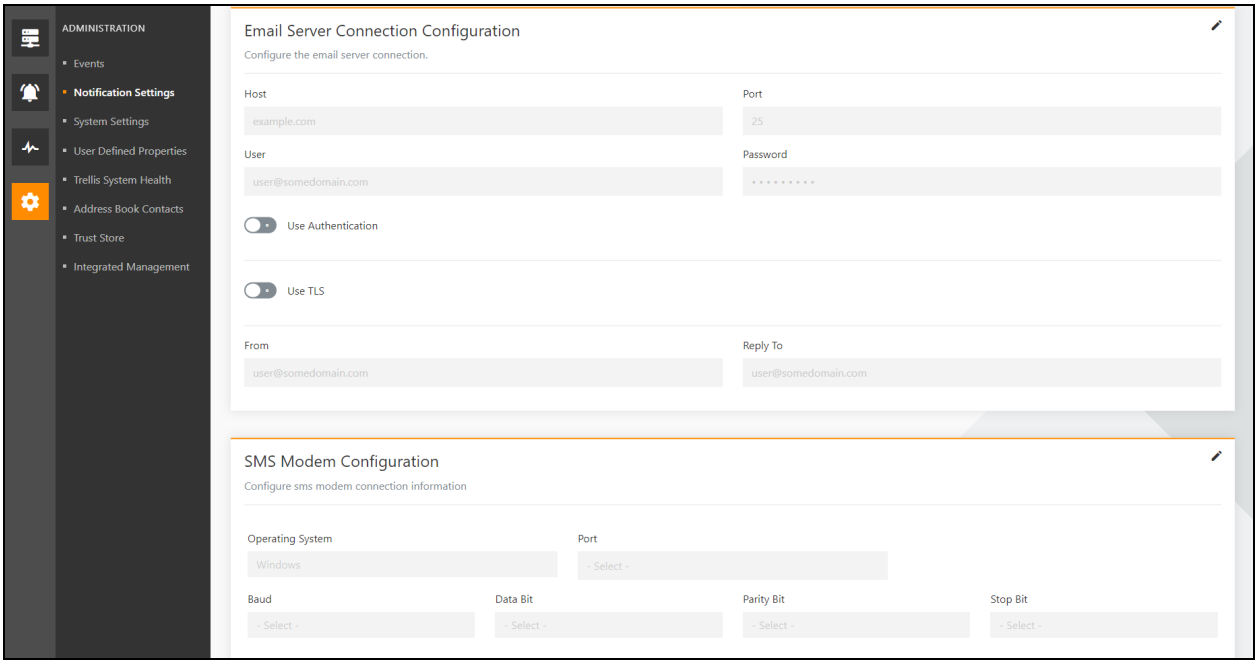
10.3.2 Notification settings

The notification settings of the application are used to configure the mail and SMS servers for the application. A user can remain logged in to the system until after the next login if no changes are made to configure the mail and SMS servers.

To configure the mail and SMS server:

1. Click the ADMINISTRATION icon and click the *Notification Settings*.
2. Click the edit icon on the upper right corner of the window.
3. Enter the required details in the field and click *SAVE*.

Figure 10.11 Email Server Connection Configuration



10.3.3 System settings

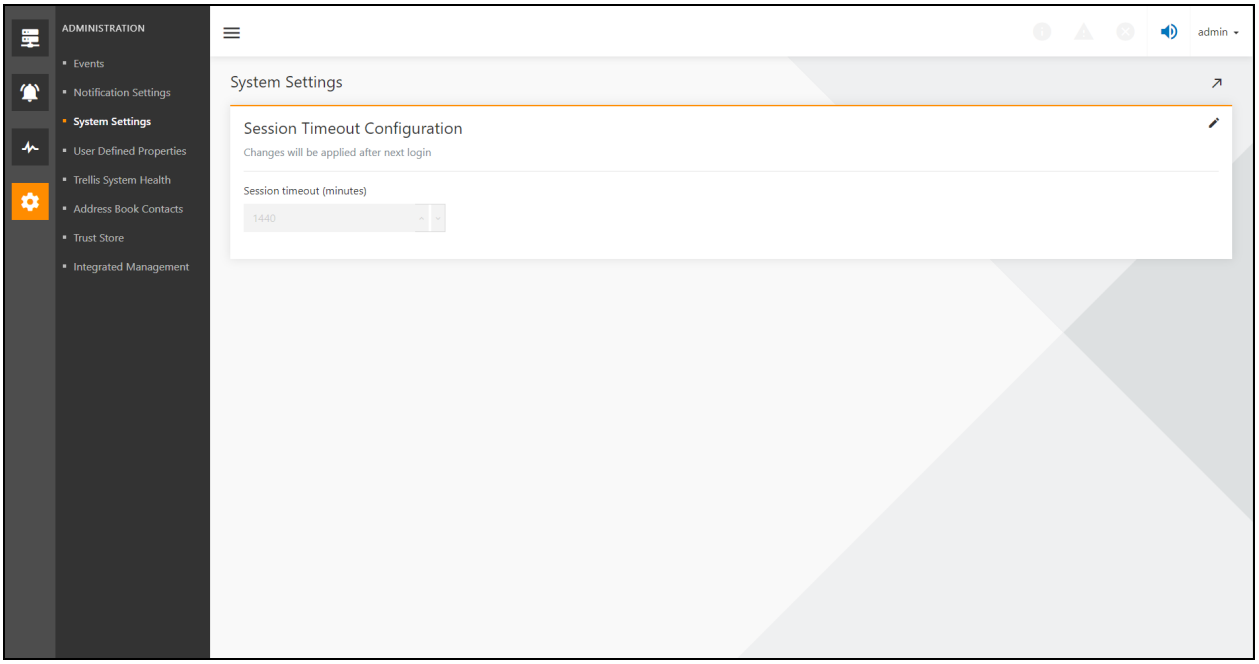
The system settings of the application are used to configure the login session timeout in minutes for the application. A user can remain logged in to the system until after the next login if no changes are made to reduce or extend the amount of time.

To set a session timeout:

1. Click ADMINISTRATION icon and click the *System Settings*.
2. Click the edit icon on the upper right corner of the window.
3. Enter the number of minutes in the Session Timeout field and click *SAVE*.

NOTE: If you need to use the SMS alarm function, you need to access the SMS cat hardware, Thermal Insight only supports specific models of SMS cat devices (CH-M3G7M7), contact the service hotline if necessary.

Figure 10.12 System Settings



10.3.4 User defined properties

The user defined properties of the application are used to see the attribute information.

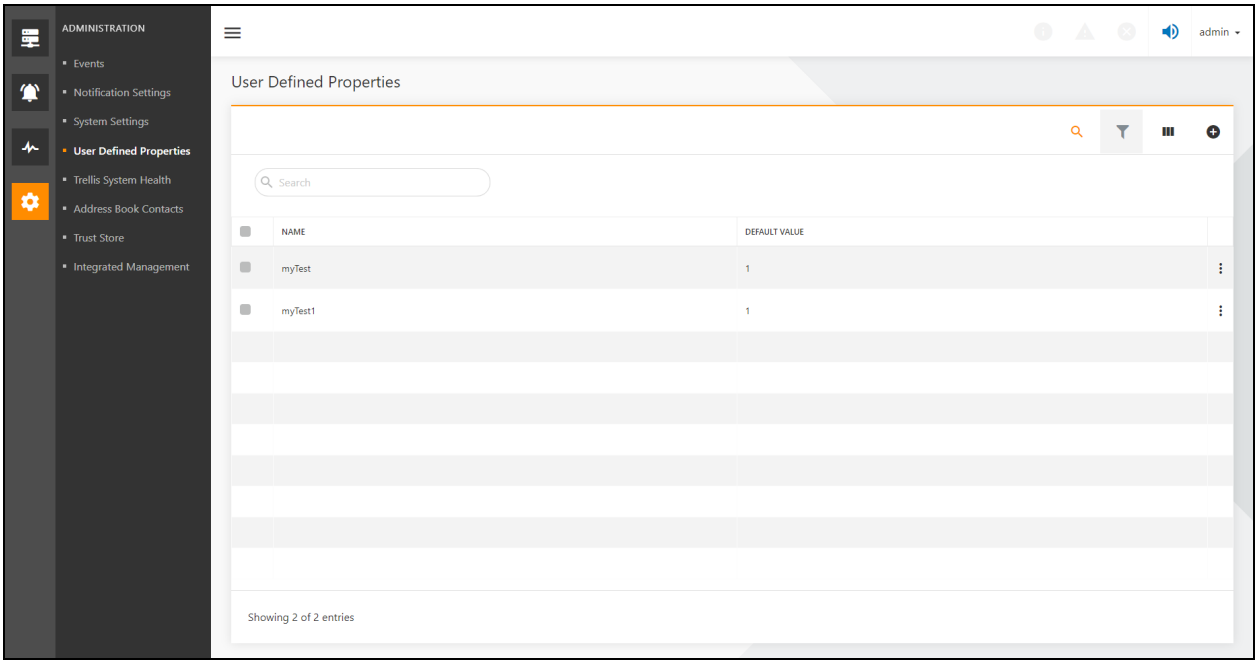
To see user defined properties:

- Click the ADMINISTRATION icon and click the *User Defined Properties*.

The property list has two main columns:

- NAME: The name of the property.
- DEFAULT VALUE: The default value of the property.

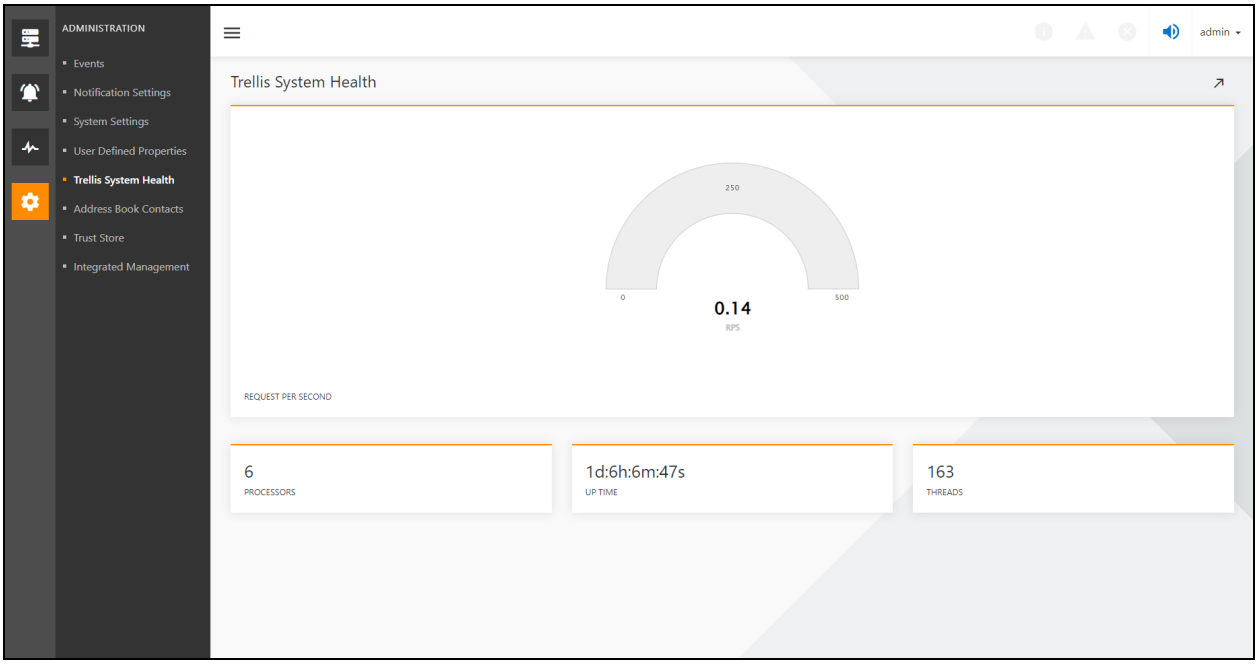
Figure 10.13 User Defined Properties



10.3.5 System health

The system health window displays a visual dashboard illustrating how the host system running the Thermal Insight application is functioning. This window provides information on how many requests per second are being filtered through the computer. It also displays the number of processors in the computer and the total accumulated time the computer has run without interruption.

Figure 10.14 System Health



10.3.6 Contacts

The contacts in the application are used to save contact information, including the last name, first name, email, and phone number.

To save contact information, email and phone number:

1. Click the ADMINISTRATION icon.
2. Click the *Address Book Contacts* and you can see Contact Information window on the right side.
3. Enter the First Name and Last Name.
4. Click the plus (+) icon in the upper right corner under the Contact E-mails to add email to the address book.
5. Click the plus (+) icon in the upper right corner under the Contact Phone Numbers to add a phone number to the address book.

Figure 10.15 Adding Contacts to Address Book

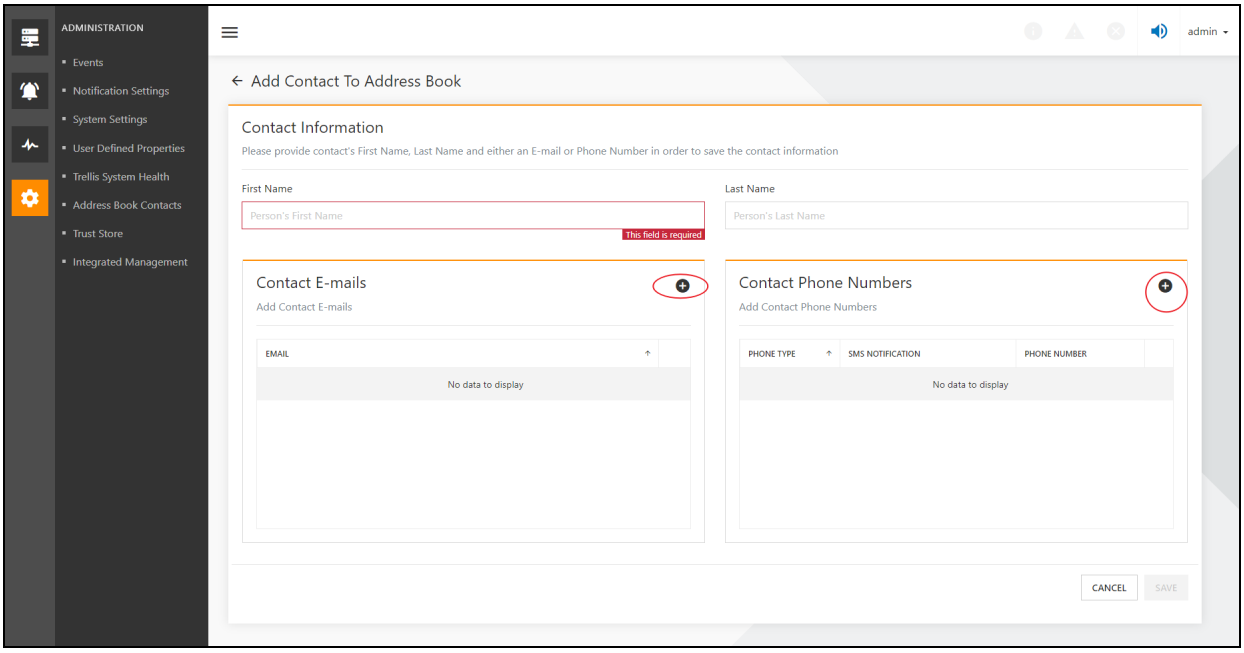


Figure 10.16 Adding Email as Contact

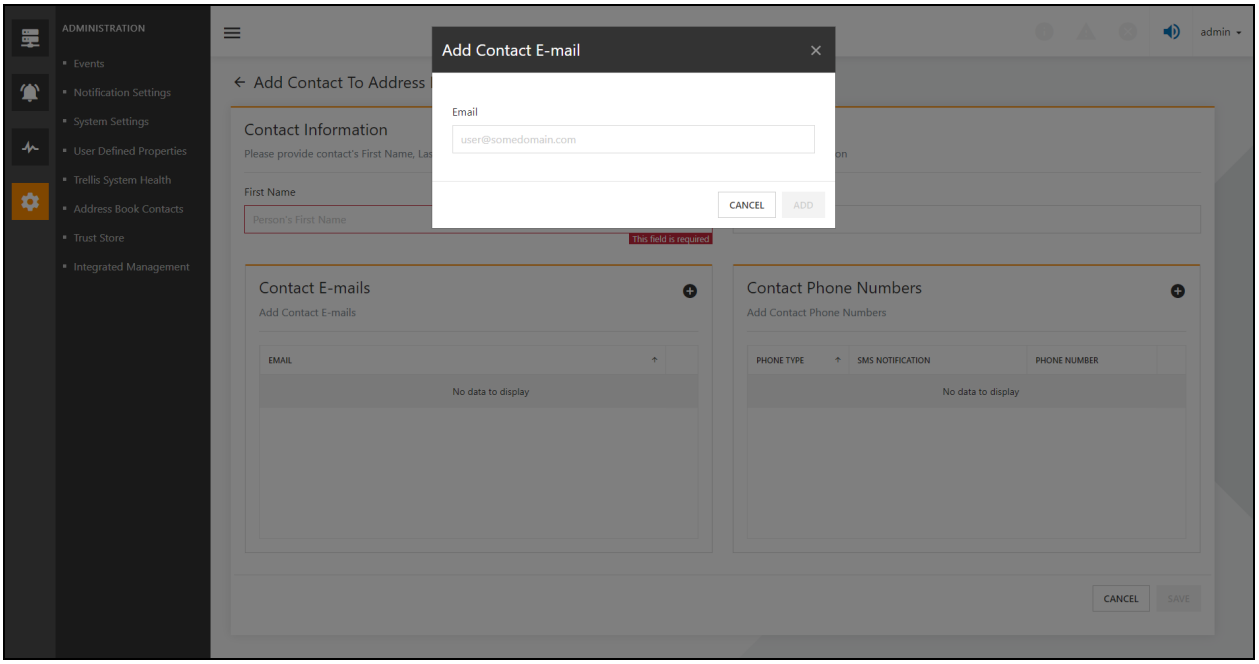
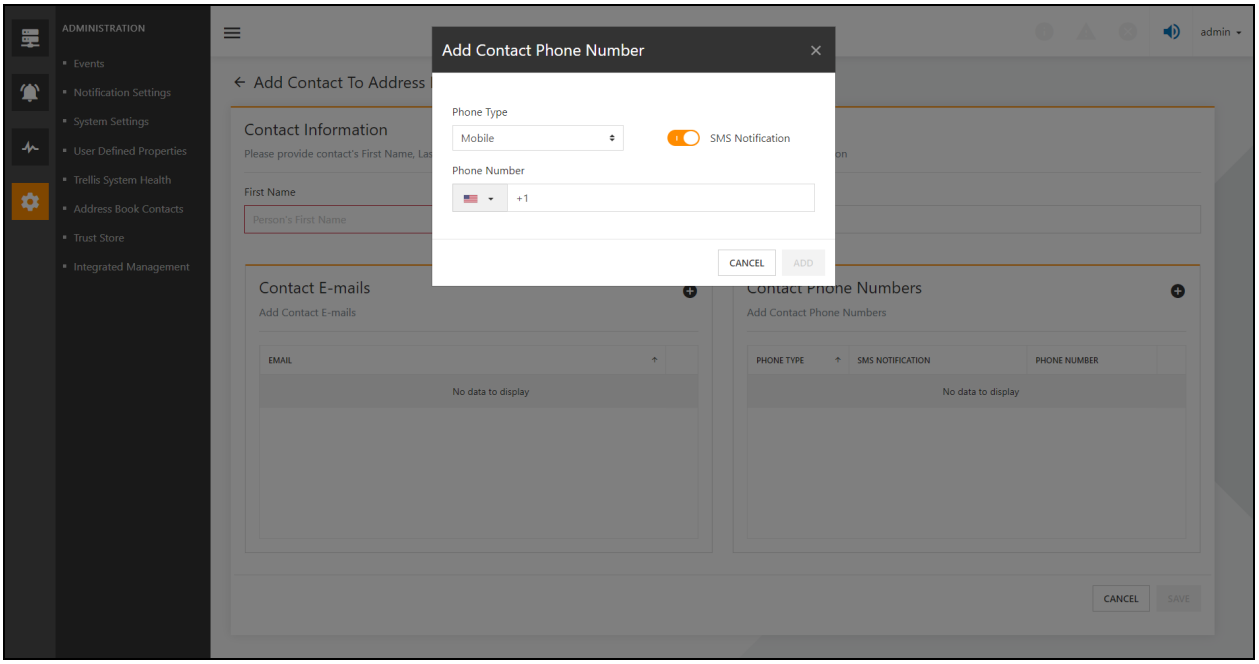


Figure 10.17 Adding Phone Number as Contact



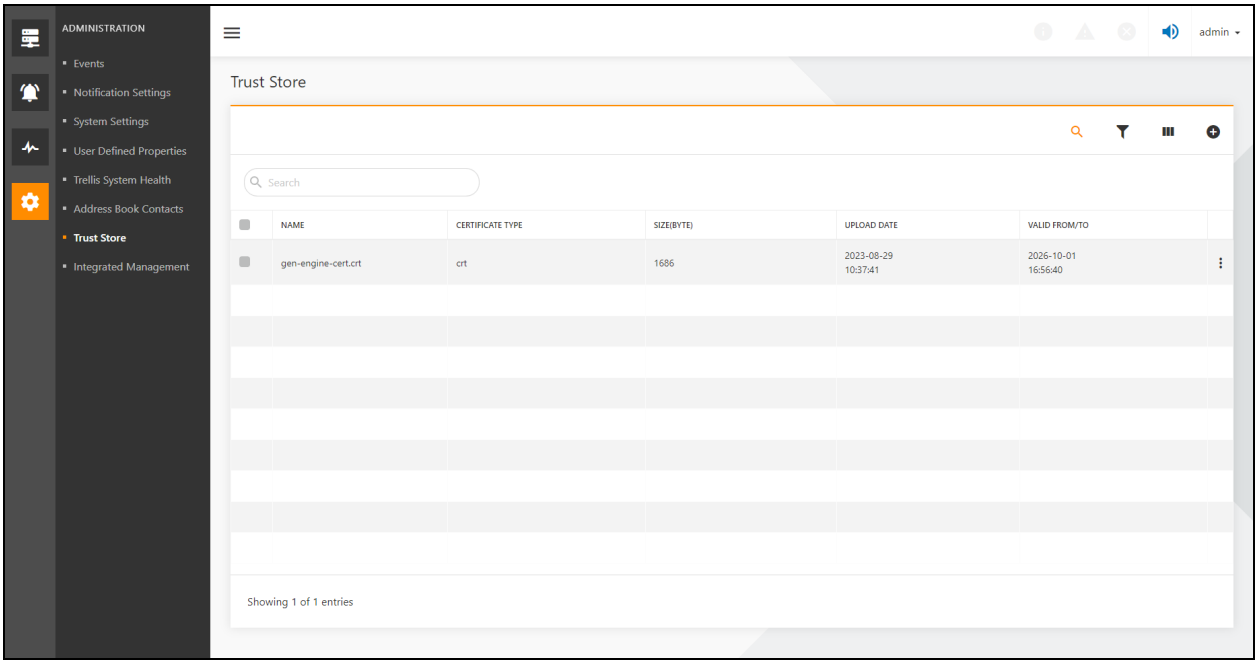
10.3.7 Trust store

The trust store allows you to add, delete, or review security certificates. The content includes a list of the current certificate and provides each certificates type, size, date of validation, and date that are added to the application.

To see a security certificate:

- Click the ADMINISTRATION icon and click the *Trust Store*.

Figure 10.18 Trust Store Window



10.3.8 Integrated management

Integrated management menu provides the generation of API key and API secret for authentication between Thermal Insight and various plugins. Plugin users can only obtain the monitoring information of Thermal Insight if they hold the API key and API secret.

To generate an API key and API secrete to access the plugin:

1. Click the ADMINISTRATION icon.
2. Click *Integrated Management* from the secondary menu option.
3. Click the plus (+) icon in the upper right corner of the Integrated Management registration window. A new plugin registration box appears. Enter the following details:
    a. In the Category field, drop down to select the company to which the plugin belongs.
    b. In the Required Sources Address field, enter the FQDN or IP address.
    c. In the Description field, enter the plugin description.
4. Click *OK*. The API key and API secret are generated. This is the authentication information that needs to be entered when the plugin is registered.

To modify API key and API secret:

1. Click the vertical ellipse icon next to the API key and API secret that need to be modified.
2. Click *Edit*. The Edit registered address box appears.
3. Modify the FQDN or IP address of the plugin as needed.
4. Click *OK*.

To delete API key and API secret:

1. Click the vertical ellipse icon next to the API key and API secret that needs to be deleted.
2. Click *Delete*. The confirmation box appears.

3. Click *OK* to delete the API key and API secret or click *Cancel* to keep API key and API secret.

Figure 10.19 Integrated Management

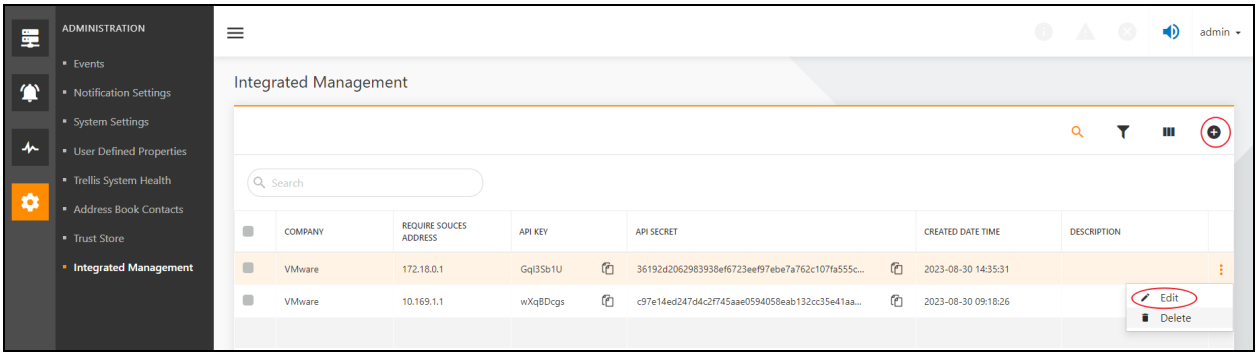


Figure 10.20 Adding Details into Integrated Management

Figure 10.21 Editing Details in Integrated Management

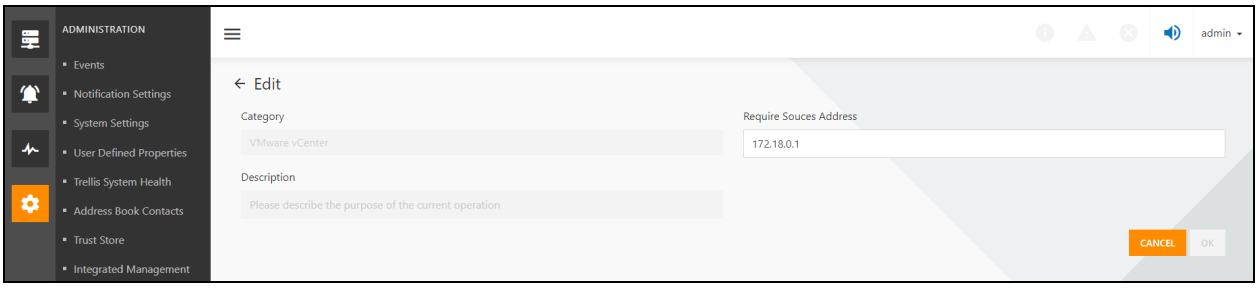
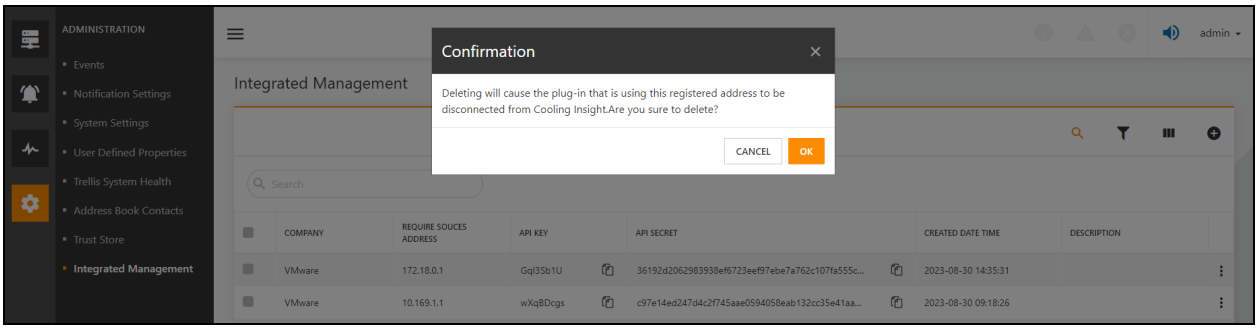


Figure 10.22 Deleting Confirmation Window



11 Troubleshooting

Numbering	Description of the problem	Cause	Workaround
1	For Windows, Thermal Insight is not uninstalled cleanly.	Thermal Insight unload failure causes program files and database files to remain on disk.	1. Enable the Windows show hidden files and folders feature. 2. Delete the Thermal Insight program folder, the default path is C:\Program Files\Trellis Application Manager. 3. Delete the Thermal Insight database folder, the default path is C:\Users\Default\AppData\Local\ThermalInsight. 4. Delete the Thermal Insight registry folder at C:\Program Files\Zero G Registry.
2	After updating Windows 10, Intelligence Engine data was lost.	If the default data directory for PostgreSQL is C:\Users\Default, it will be overwritten by C:\Users\Default.migrated during Windows 10 updates.	1. Go to the Windows registry. 2. Locate: **\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\postgresql-x64-9.5** Register the entry. 3. Click *Image Path* to change the default data directory to C:\Users\Default. 4. Restart the following services in Services tab: a. postgresql-x64-9.5 b. TRELLIS Intelligence Engine MSS Engine Service. c. Trellis Application Framework.
3	The Thermal Insight Linux version failed to install under Red Hat (7.5, 7.6 or 7.7 repository).	The installation package for the Thermal Insight Linux version does not include any third party dependencies.	1. Thermal Insight is connected to the World Wide Web when it is installed, and third party library files are automatically downloaded during installation. 2. First install the following dependencies in various ways: a. net-tools b. psmisc c. log4cpp d. jsoncpp e. net-snmp f. openssl g. postgresql h. postgresql-contrib i. postgresql-server j. libpqxx k. glibmm24 Then install it.

Numbering	Description of the problem	Cause	Workaround
4	The remote Automation Agent is installed and cannot communicate with Thermal Insight.	Windows or Linux firewalls close port 3029 (the communication port used by Automation Agent) by default.	1. Turn off the firewall or open port 3029 on the remote computer.
5	For Windows, Windows shuts down and then boots, and occasionally Thermal Insight fails to start.	In very few Windows systems, possible system problems or discrepancies are caused.	1. Open the service. 2. Find Trellis Application Framework, right-click, and click *Start*. 3. Wait for the service to finish starting and become running.

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