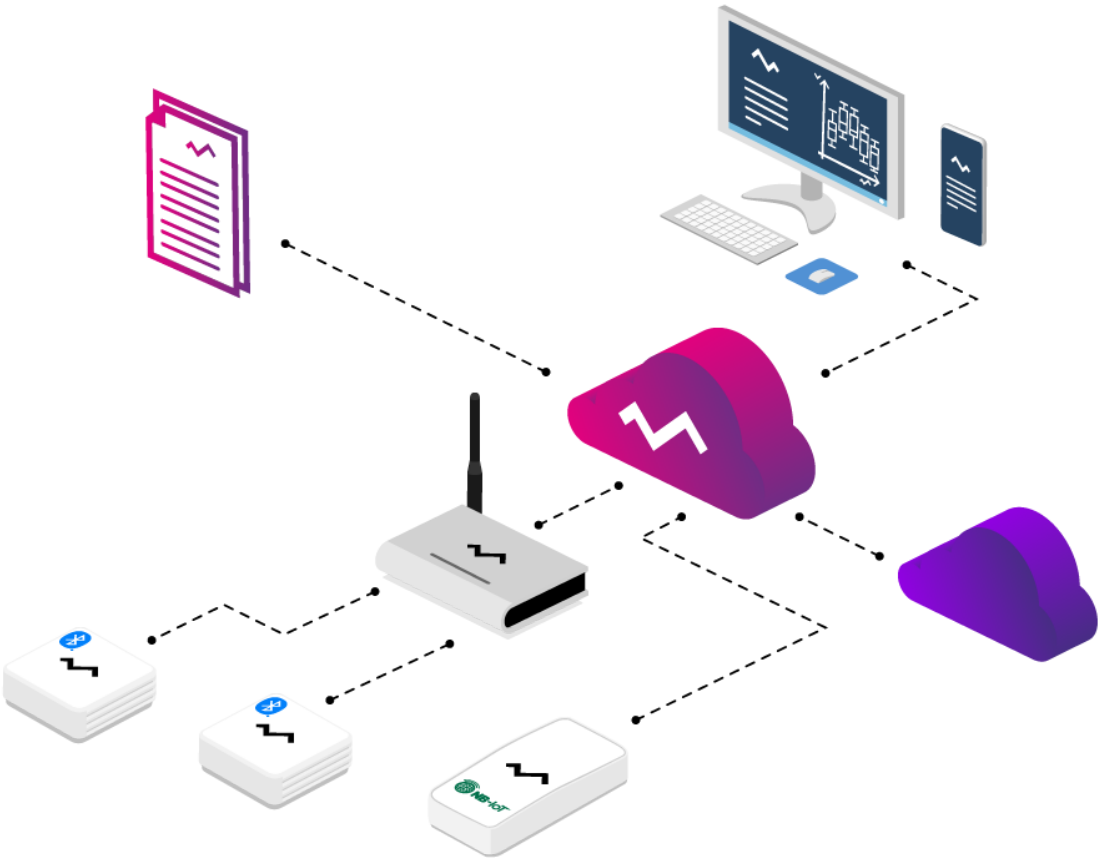
Efento Cloud
User manual



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1. Registration and logging in to Efento Cloud

Using Efento Cloud requires creating an account. To register, go to cloud.efento.io and click “sign up”. You will be asked to provide the data necessary for registration (username, first name, last name, e-mail address, password) and to accept the terms and conditions of using the service. A message with an activation link will be sent to the email address provided. After filling in all the required fields, click Register and then open the verification email sent to your mailbox. After clicking the link in the email, your account will be activated and you will be able to log in.

Users who already have a verified, active account, can skip the steps described above, and log in by entering their email address and password.

2. Organization

Organizations enable the sharing of measurement data from sensors with many users. Additionally, within the Organization, you can create a location structure that allows you to organize your sensors. You can grant the users who have access to your Organization the permissions to view or modify individual locations. The organization has its own unique key, thanks to which specific sensors can be assigned to it. This is done by entering the Organization key in Efento Gateway - a device that sends measurements from wireless sensors to Efento Cloud or directly in NB-IoT sensors. All these steps are described in detail in the next chapters of this manual.

If you have registered with Efento Cloud and are not yet a member of any Organization, you will be asked to create a new Organization and choose its name. After entering this data, you will get full access to managing your Organization, inviting other users to it and configuring sensors. If a new user has been invited to an existing Organization, they will be automatically assigned to it after successful account registration.

If you are already a member of an organization and you want to create a new one, go to *Profile* and click the *New Organization* button in the *My Organizations* section.

3. Configuration of Efento Gateway

Efento Gateway is a device connected to the network that receives the data from Efento wireless sensors within its range and sends it to Efento Cloud. The device can be powered by a USB power supply (5V, 1A) or optionaly PoE (802.3af).

3.1. Configuration of Efento Gateway using the Efento mobile application

The fastest and easiest way to configure Efento Gateway is to configure it using the Efento mobile application. Download the application from the Play Store, run it and log in to your Efento Cloud account. After logging in, enter the main menu of the application (three lines in the upper left corner), then select *Organization settings -> Add sensors -> Bluetooth Low Energy -> Add gateway* and follow the instructions on the screen.

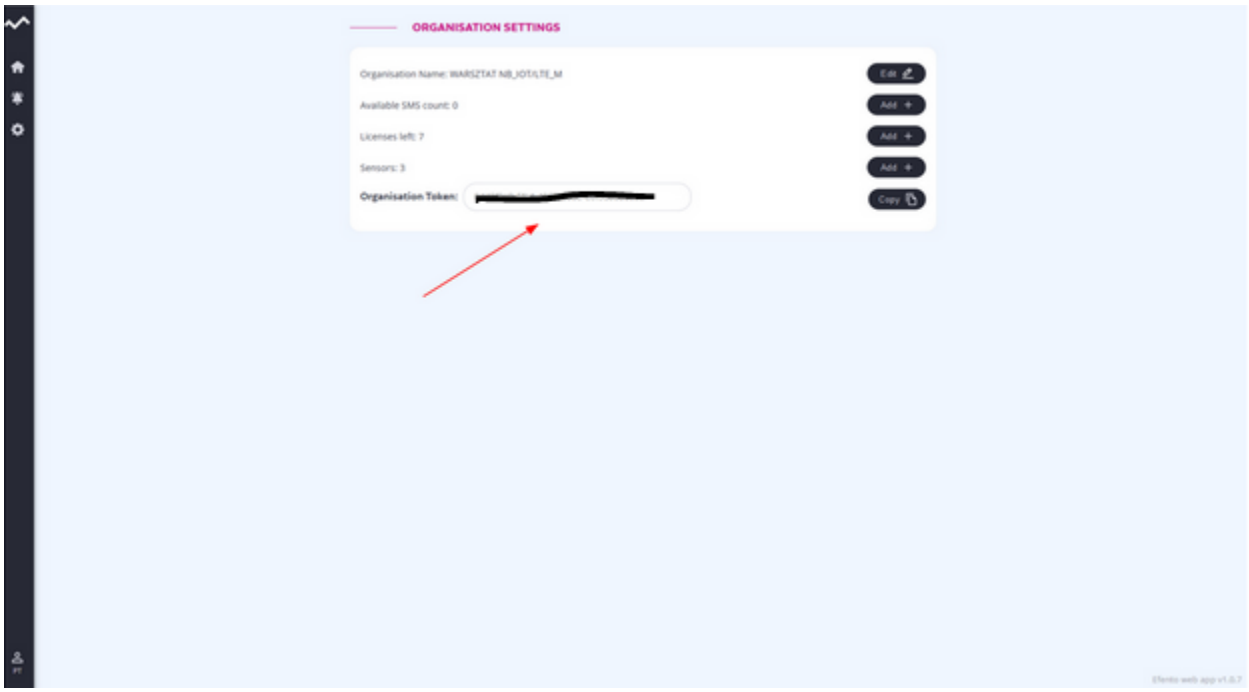
3.2. Configuration of Efento Gateway using a web browser

In order to configure the Efento Gateway using your web browser, connect Efento Gateway to the power supply with a USB cable and to the computer by Ethernet cable. After setting the connection, choose the IP address from subnet 192.168.120.0/24 (e.g. 192.168.120.2, subnet mask 255.255.255.0) and set it on the network card, to which Efento Gateway is connected. Open an Internet browser on your computer and go to address 192.168.120.89 (default Efento Gateway address). Configure the Efento Gateway, so that it has Internet access. In the *Configuration* section, configure all network settings (IP address of the Efento Gateway, IP address of network gateway, subnet mask, DNS address). Apply all changes by clicking *Save*. Efento Gateway supports DHCP. If you choose option ON next to DHCP, then all network configuration of Efento Gateway will be downloaded from the router (Do not forget to turn on the DHCP on the router!).

After finishing this part of configuration, unplug the Efento Gateway from the computer and connect it to the network with Ethernet cable. Some versions of Efento Gateway can be powered by PoE (Power over Ethernet). If you have a switch / router / injector that supports PoE technology (802.3af), then you can plug in only Ethernet cable, which will set up a connection to the network and will also work as a power supply. Otherwise, you also have to plug in a USB power supply (5V, 1A).

Assigning a gateway to your Organization is done by entering the Organization Key. Organization Key is a unique number assigned to your Organization. After entering the key in Efento Gateway, measurement data from all sensors within its range will be automatically sent to your Organization's account in Efento Cloud. Data from many Efento Gateways, located even in distant places can be assigned to a single Organization. Thanks to this, measurement data can go to your Organization's account from many facilities, even hundreds of kilometers away from each other.

You will find your Organization key after logging in to your Efento Cloud account. From the menu on the left, select the settings icon (gear) and then *Organization settings*.

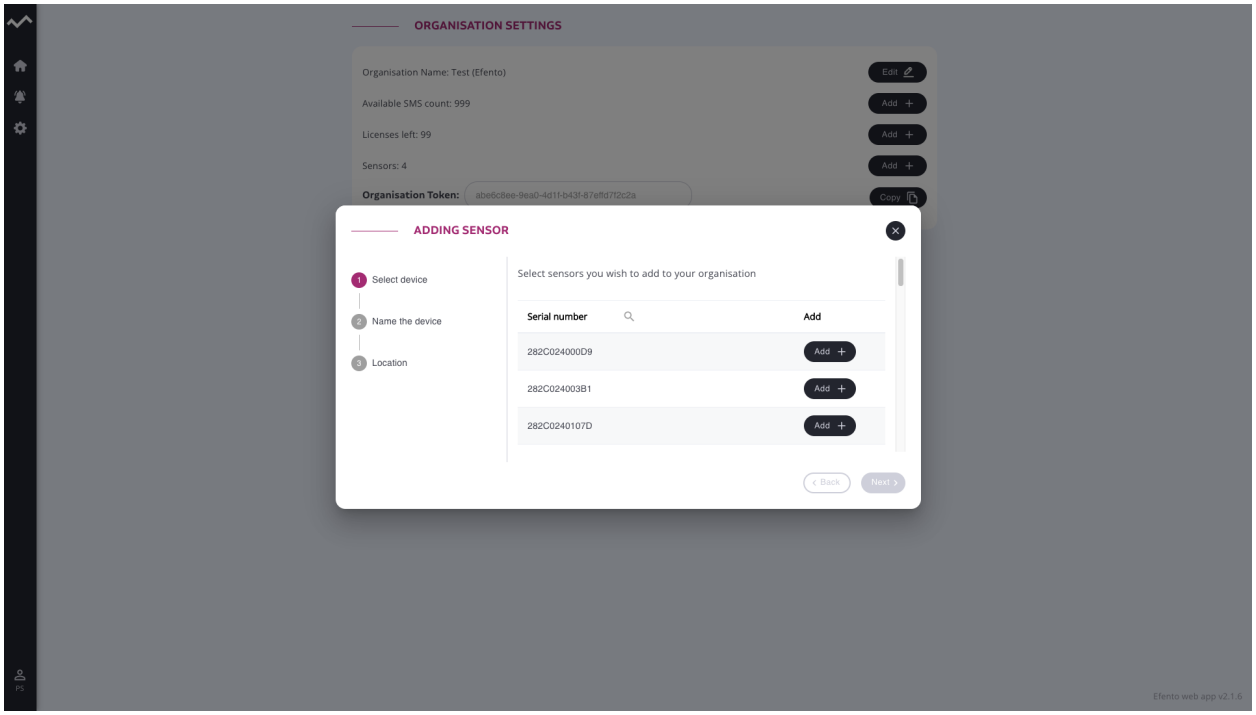


View with the Organization key

Organization key should be entered in the *Token* field in the Efento Gateway configuration page. After entering the Organization key, measurements from all sensors within the Gateway's range will be automatically sent to the Efento Cloud platform.

To assign the sensors to your Organization login to Efento Cloud at cloud.efento.io go to *Settings -> Organization Settings*, and click the *Open* button next to *Licenses manager*. Press the *Add* button and key in the license code that you received when purchasing Efento products. Once the license key is added, you will be able to add sensors to your Organization. Details of licenses are described in the "16. License manager" chapter.

Click the *Add* button next to *Sensors*. If the gateway has been configured correctly, the serial numbers of all sensors within its range will be visible on the list. Press the *Add* button next to the sensor you want to add to your Organization, name it and select the location to which it will be assigned.



Adding sensor

4. Configuration of NB-IoT sensors

The only way to configure NB-IoT sensors is to configure using the Efento mobile application. Download the application from the Play Store, run it and log in to your Efento Cloud account. After logging in, enter the main menu of the application (three lines in the upper left corner), then select *Organization settings* -> *Add sensors* -> *NB-IoT* and follow the instructions on the screen.

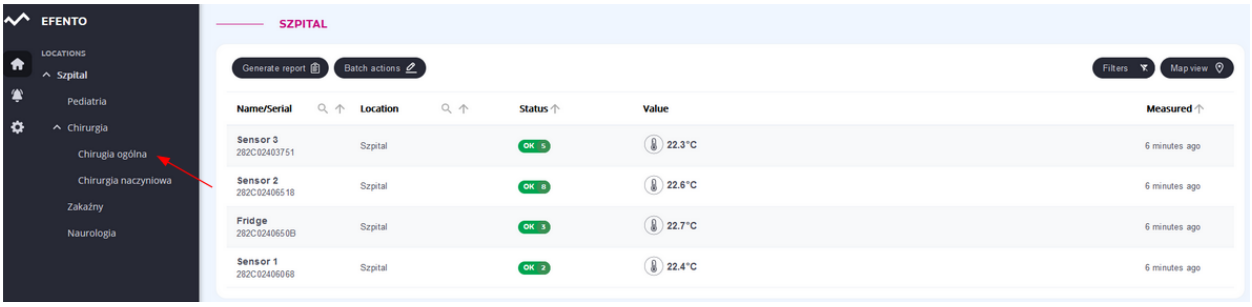
5. Dashboard - preview of sensors added to Efento Cloud

The *Dashboard* presents measurements and other important information about all sensors added to your Organization in the Efento Cloud platform. There you will find: current sensor measurements along with information when the measurement was

taken, the number of alarm occurrences, the location in the organization structure to which the sensor is assigned and the sensor status. In the *Status* column, the number of unconfirmed alarms for the given sensor (active and these waiting for confirmation) is displayed.

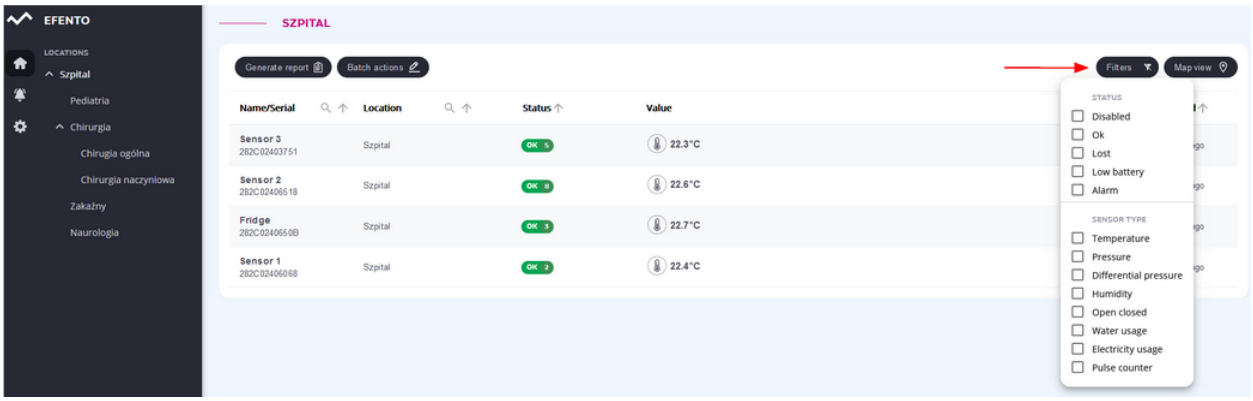
5.1. Filtering

The data displayed in the Dashboard can be filtered so that you can easily find the information you need. The first way is filtering by location. In the *Locations* section, on the left side of the view, select the location you are interested in, and the list of sensors will be narrowed down to those assigned to it. The other described filters only work on sensors from the selected location.



The second way is to search by name or serial number of the sensor. In the header of the table, which presents information about sensors, there is the *Name / Serial number* field. Enter the serial number or the name of the sensor you want to find in this field, and only the results you are interested in will remain in the list. If several sensors have a similar name or serial number, then by entering its fragment, the names / serial numbers containing the phrase you entered will be automatically filtered out. Next to the names of the other columns in the table, there are arrows that allow you to sort values in descending or ascending. To clear the filter and restore the default sorting, delete the phrase entered in the table header.

You can also sort the sensors according to any value of the list. To do this, click on the arrow symbols next to the desired value (*Name / Serial No.*, *Location*, *Status*).
Using the *Filters* button in the upper right corner of the table you can filter out the sensors of the selected type (e.g. temperature / humidity / pressure) or the sensors according to their status (Ok, Alarm, Battery, Lost, Off). By default, the platform shows all sensors, regardless of their status.

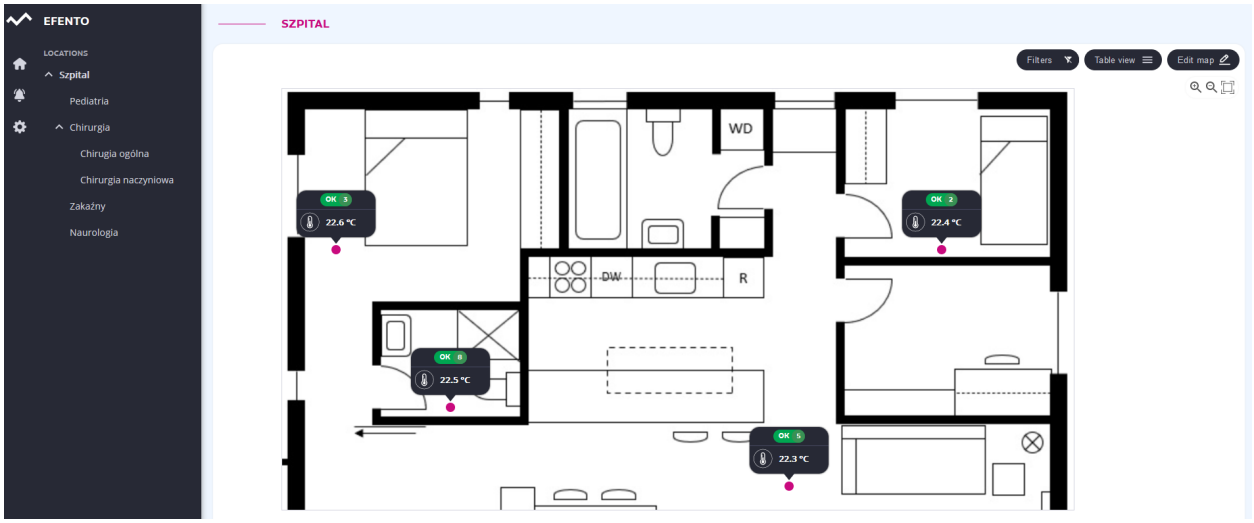


Filters menu

5.2. Location map

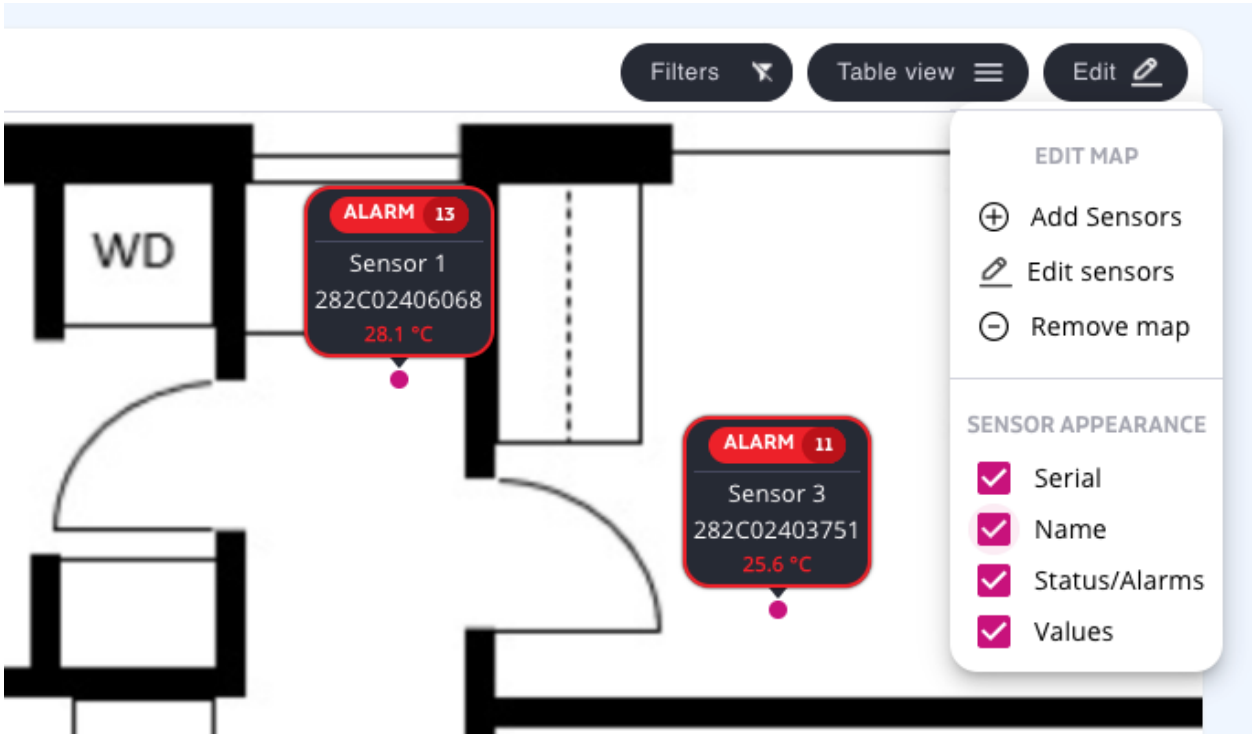
The location map allows you to upload a building or room plan and place sensors on it for more convenient monitoring of their condition. The location map can be uploaded by a user with Administrator or Manager permissions. The platform allows you to upload one map for each location.
You can preview the sensors together with their location on the map by clicking the *Location map* button in the *Dashboard* tab. The map displays the current status of sensors and measurement results, and clicking on the selected sensor takes you to its detailed data.

To change the map image, add / remove / place sensors on the map, click the *Edit* button in the top right corner of the screen. If you haven't added a map before, a blank field will be displayed with the *Add Map* button in the middle. Select the file you want to upload and click *open*. The platform allows you to upload maps / floor plans in PNG, JPEG, BMP and GIF format, and the maximum file size is 4 MB. For large images, adding the map may take several minutes. Removing a previously added map is as simple as clicking the *Remove map* button in the *Map editing* menu in the upper right corner of the view. To place sensors on the map, select *Add sensors* from the menu, click on the sensors you want to add, then drag them with the mouse cursor to the place of your choice on the map and save the changes with the *Save* button. If you want to edit or remove a sensor, select *Edit sensors* from the map editing menu. After adding a map, it will be visible to all users with access to the given location.



Location map

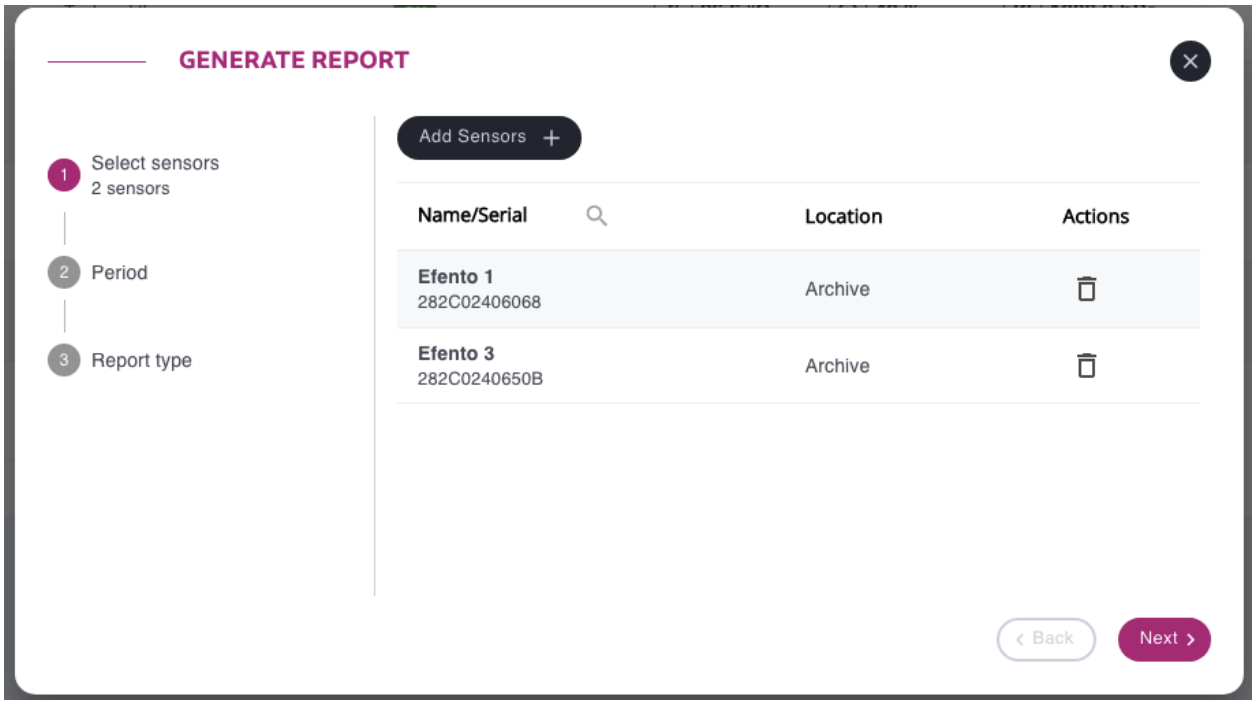
The user can adjust the way of displaying the sensor information to their needs. After clicking the *Edit* button, it is possible to select the information to be displayed: name, serial number, status, current measurements. If all the fields are unchecked, the sensors will be displayed in the form of dots with a color representing their status (green - ok, red - alarm, yellow - low battery, gray - lost).



Location

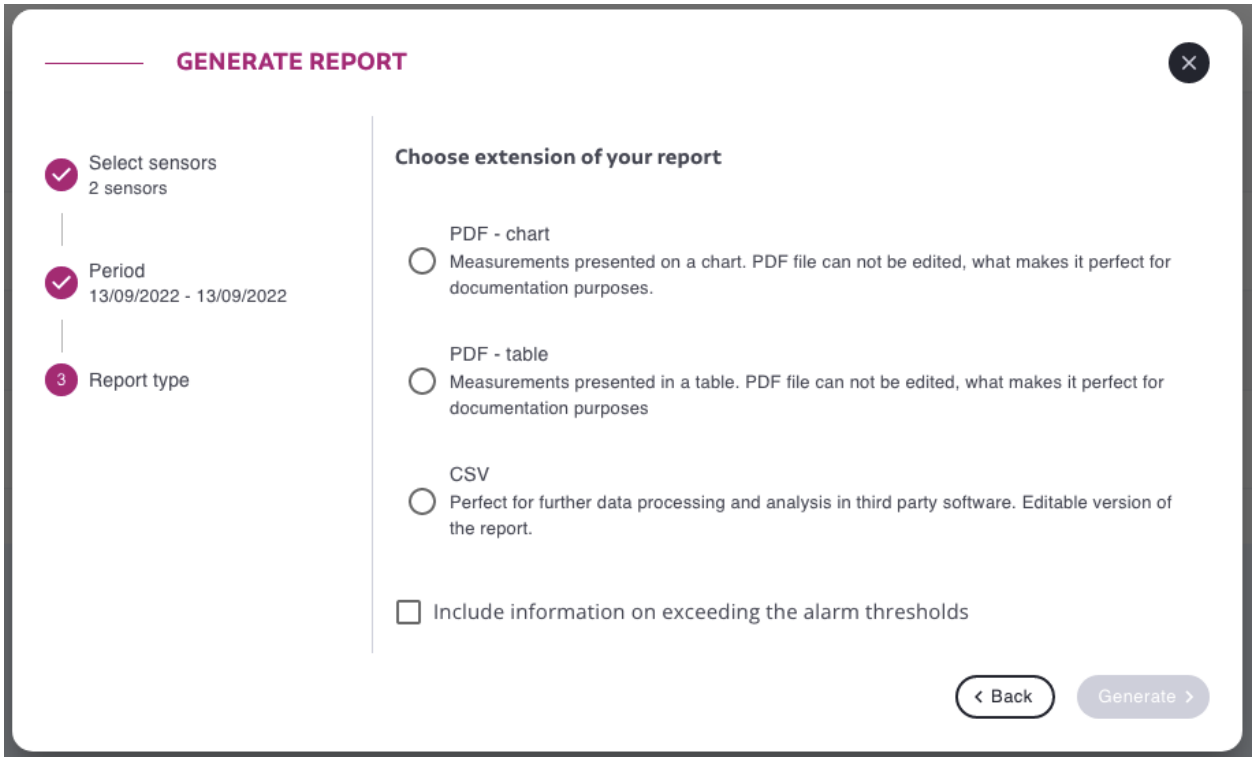
5.3. Reports

Efento Cloud allows you to export measurements from any period of time, from one or more sensors in PDF (chart / table) or CSV format. To generate a report, press the *Generate Report* button in the upper left corner of the table. Press the *Add sensors* button, and then select the sensors that will be included in the report. You can select any number of sensors to be included in the report. If there are many sensors in a given location, to find the sensor you are interested in, enter its name / serial number in the search field above the table with sensors. After selecting the sensors, press *Next*.



In the *Period* section, set: the period from which the measurements are to be exported - enter the dates from - to or select a time period from the list (last 7 days, last month, etc.) and save the changes with the *Next* button.

Select PDF table / chart or CSV report type and generate the report by clicking the *Generate* button. The report in the selected format will be sent to your email address.



5.4. Preview detailed sensor data

After clicking on the sensor on the list in the *Dashboard* or on the *Location Map*, you can see detailed information about the sensor: alarm occurrences with date and time, measurement data in the form of a chart and table. Moreover you can also change the sensor settings or export measurements from any period of time in the form of PDF chart / table or CSV report.

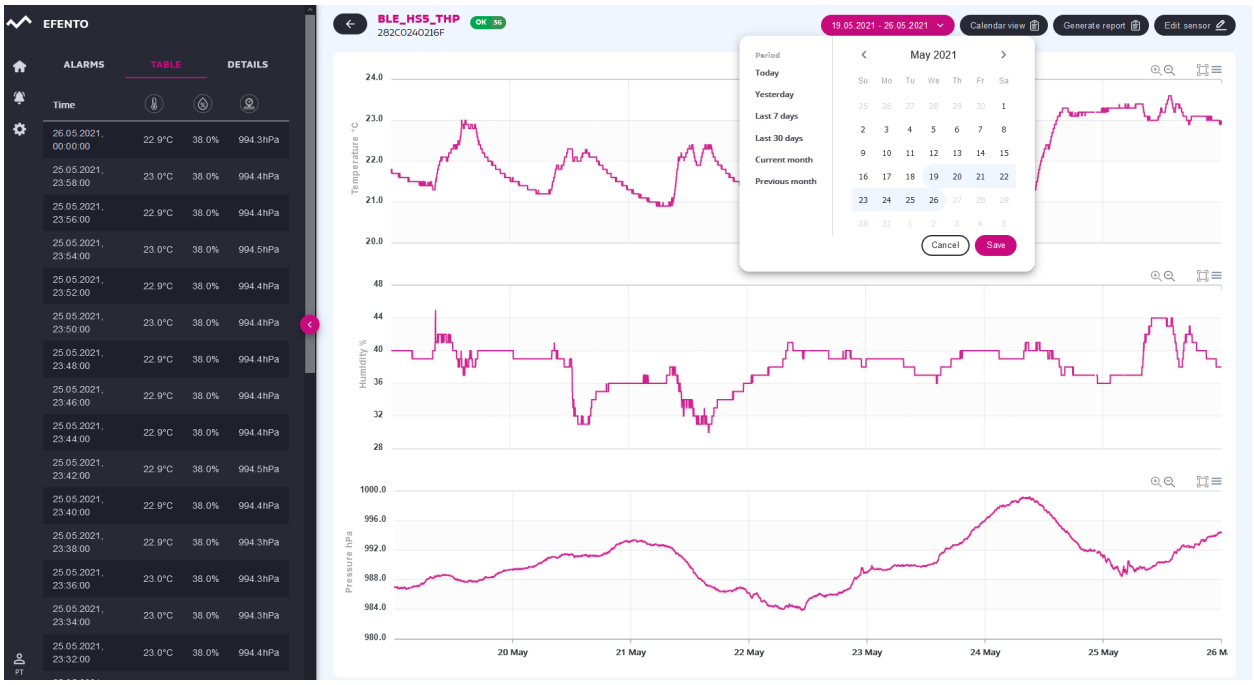
Sensor details

The *Alarms* tab contains a list of all types of alarms (a detailed description of alarms can be found in section *11. Alarms*). Timestamps of the alarm occurrences with the name of the alarm rule are provided here. If the values measured by the sensor get back into the safe range, the user has the option of confirming the alarm in order to mark the occurrence of irregularities and suppress notifications regarding this particular alarm.
The *Table* tab contains measurements presented in tabular form. The data range in the table can be changed using the date selection button in the upper right corner of the screen.
The *Details* tab contains additional information about the sensor - measurement period, minimum and maximum value in the measurement series and the alarm rules assigned to the sensor.

In the right part of the view there is a graph with measurements. If the selected sensor measures more than one physical value, they will be presented on several plots, one below the other. In order to zoom in the chart, select the range with the cursor. To return to the default scale, click the Zoom Out button (four arrows icon) in the upper right corner of the graph.
If alarm rules are set for a chosen sensor, they will be visible on the graph in the form of horizontal lines - the red line represents the upper alarm thresholds, the blue line

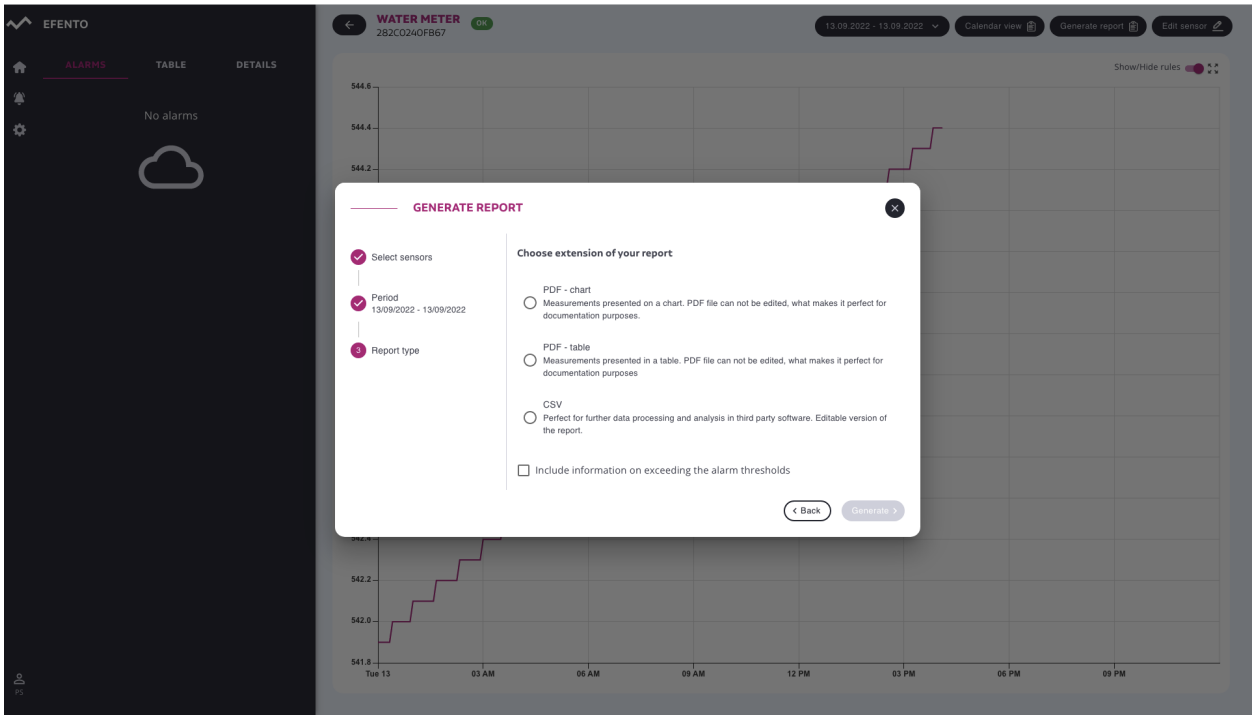
represents the lower thresholds. Each of the thresholds is described by the name of the rule.

Using the date selection button in the upper right corner of the view, you can select the range that you want to be visible on the chart / table. You can select a range by clicking on the suggested ranges on the right side of the menu (Today, Yesterday, Last 7 Days, …) or by selecting the exact date range from the calendar.



Temperature measurement graph - select a date range

The *Generate report* button allows you to generate reports with measurements from any period of time. To generate a report, select the start and end date of the report, the content of the report (measurements sent to the platform by the sensor, event list - alarm threshold exceeded, loss of communication with the sensor, etc. and technical information) and the type of report - PDF (chart / table) or CSV. The report will be generated and automatically sent to your email address within a few minutes.



Generating report on demand

6. Sensor configuration

If the user has Administrator or Manager permissions, the *Edit sensor* button is visible in the upper right corner of the screen in the sensor view. After clicking this button, the user can change the settings of the selected sensor.

6.1. Changing the location of the sensor

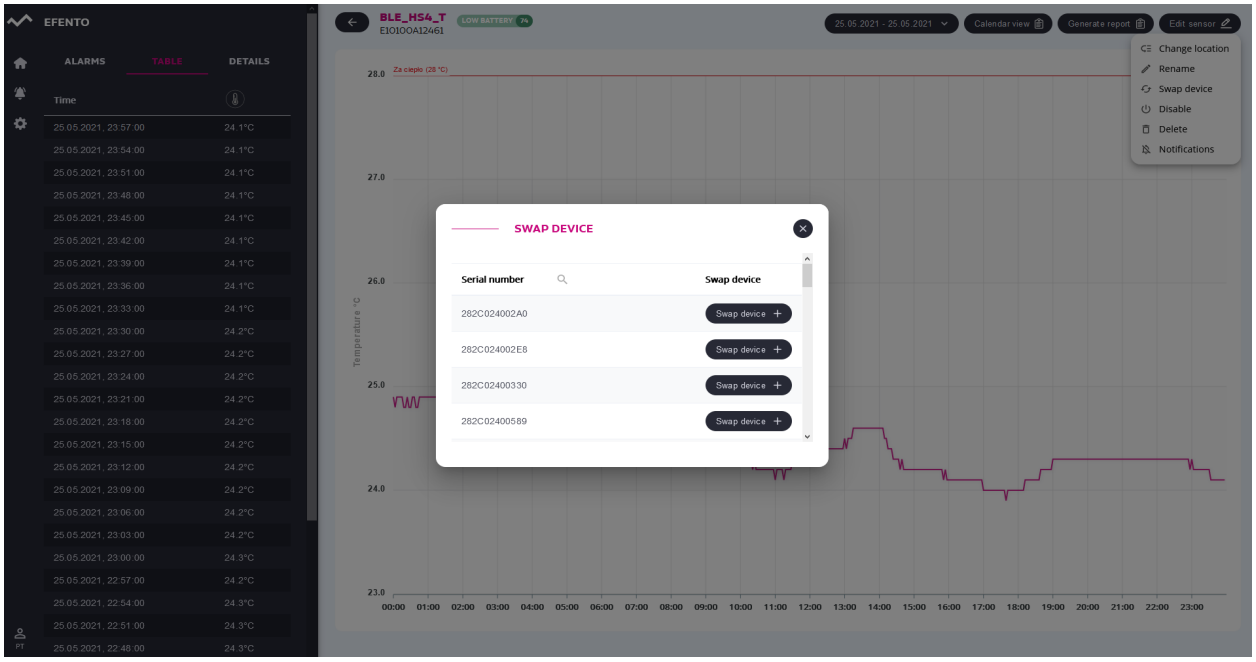
To change the location of the sensor, select *Change location* from the edit menu. In the window that will open, select the new location of the sensor and save the changes with the *Save* button. After saving the changes, the selected sensor will be moved to the new location.

6.2. Changing the name of the sensor

To change the location of the sensor, select *Rename* from the edit menu. In the window that will open, enter the new name of the sensor and save the changes with the *Save* button.

6.3. Replacing a sensor

Thanks to the sensor replacement function, the user can straightforwardly replace the sensors without losing data and maintaining the continuity of existing measurements, e.g. in the case of periodic calibration of the sensor. Replacing the sensor does not require the purchase of an additional license.
To replace the sensor, select *Swap Device* from the sensor editing menu. From the list that appears, select the sensor that will be used for replacement.



Swap device window

Measurement data and configuration (alarm rules, automatic reports, webhooks) of the replaced sensor are retained and the new sensor starts sending data. Information about the replacement will be saved in the audit trails.

6.4. Disabling / enabling sensors

Disabling the sensor means that the sensor measurements are not saved in the platform, data is not pushed over webhooks and if the set thresholds are exceeded, alarms are not triggered. To disable a sensor select *Disable* from the sensor edit menu. To turn the sensor back on, click the *Enable* button. After the sensor is turned off, it will change its status to “Off” until it is turned on again.

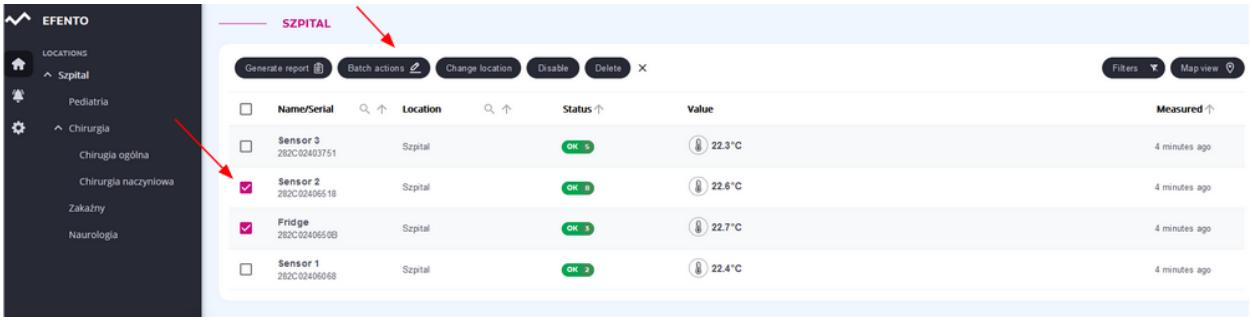
6.5. Removing sensors

Removing the sensor completely removes it from the Efento Cloud platform. All measurements sent by the sensor will also be deleted. To remove a sensor, select *Delete* from the sensor editing menu and confirm deletion.

Attention! Restoring the measurements from a removed sensor is not possible, but it is possible to add the sensor to the platform again in the same way as adding new sensors (described in section 9.1 Adding sensors).

6.6. Batch actions

Some of the operations described above can be performed on sensor groups in the Dashboard view. If you have Administrator or Manager rights, the batch *actions* button is visible in the upper left corner of the table with sensors. After selecting it, a checkbox will appear next to each of the sensors on the list. Select the sensors you want to edit, then select an option from the menu at the top of the table: Remove, change location, or disable sensors.



Batch actions

7. Users

Each user who has access to your Organization in the Efento Cloud platform can be assigned one of three levels of permissions: Administrator, Manager and Analyst. Additionally, you can grant access permissions to each user only to the selected location.

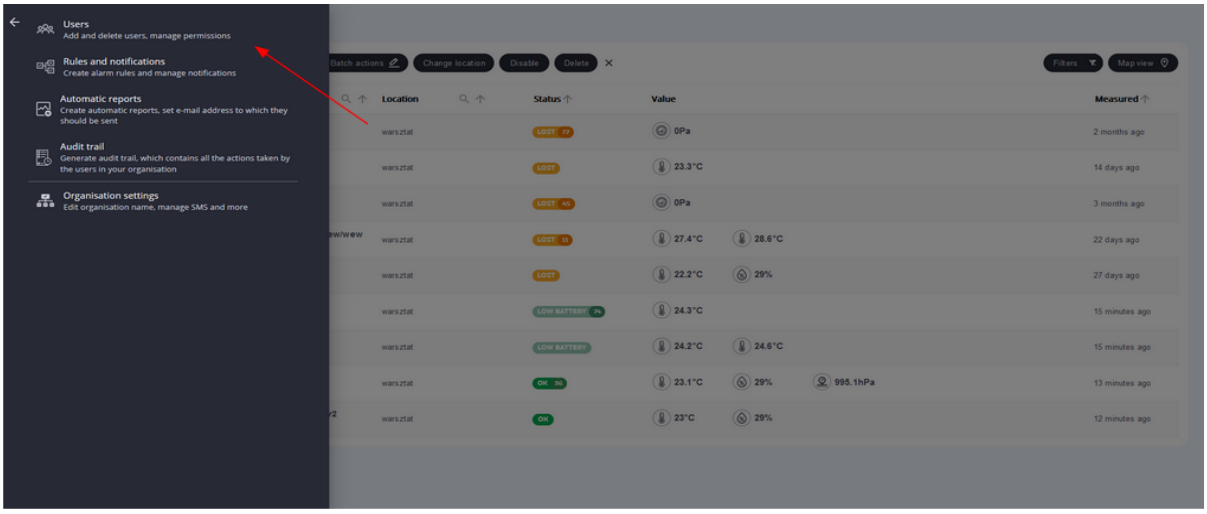
When you create a new Organization, you automatically get Administrator permissions to all locations within it. By inviting other users to join your organization, you can assign them any level of permissions to the selected locations.

Each of the authorization groups has access to other platform functions, as shown in the table below:

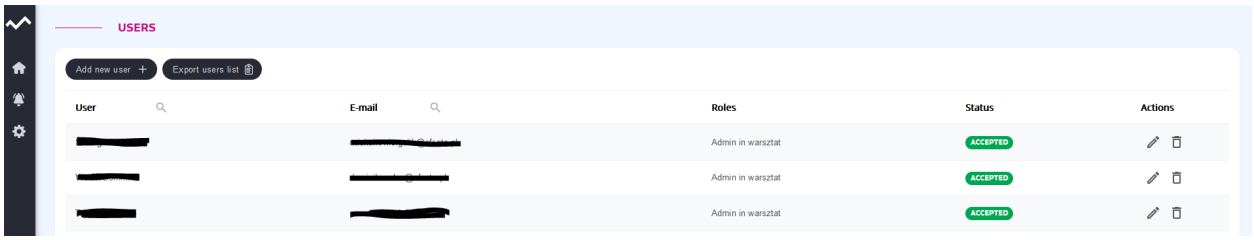
	Administrator	Manager	Analyst
Dashboard review	✔	✔	✔
Generating reports	✔	✔	✔
Alarm preview	✔	✔	✔
Configuration of automatic reports	✔	✔	✘
Configuration of alarm rules	✔	✔	✘
Sensors, structures and location maps configuration	✔	✔	✘
Webhooks	✔	✔	✘
Editing of rights, adding and removing users	✔	✘	✘
System logs preview	✔	✘	✘
Organization account management	✔	✘	✘

7.1. Users management

Adding and editing users is possible in the Users menu by users with Administrator permissions. From the menu on the left, select the settings icon (gear) and then select *Users*.



The table shows all users with access to your organization, along with the permission level they have been granted.



User permissions can be edited by clicking the pencil icon next to the user name. Editing options include changing the user's permission level at specific locations within your Organization.

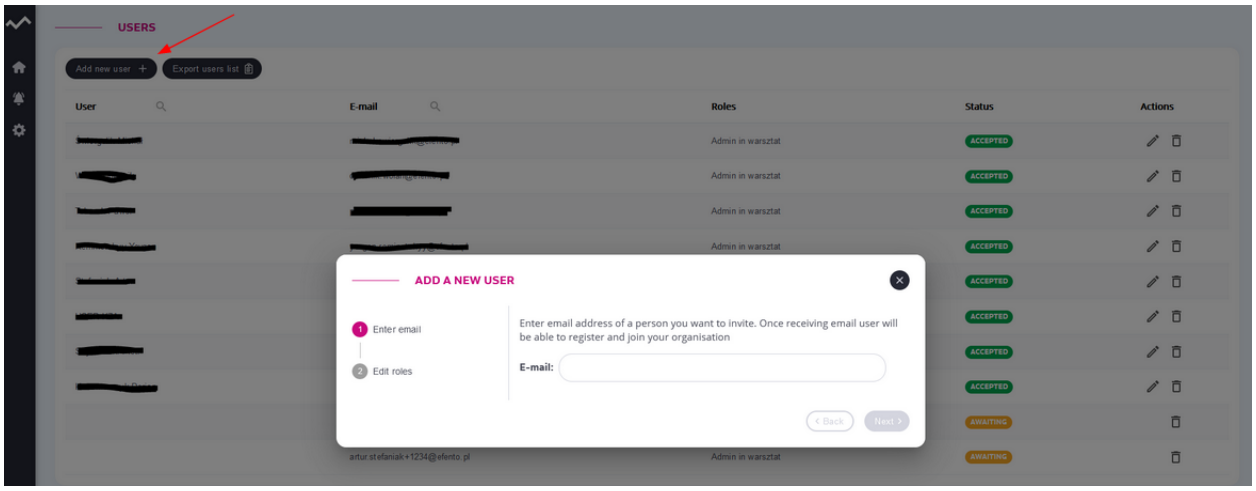
To revoke the user's access to data from your organization, click on the trash can icon. The user account will not be removed from the platform, it will only lose access to your Organization. Only the user can remove the account from the platform completely (12.1. Changing the username, language and password and deleting the account).

7.2. Adding new users

Adding new users is done using the invitation system. To edit users, select the settings icon (gear) and then *Users* from the menu on the left.

To add a new user to your organization, select *Add New User* in the upper left corner of the table. In the window that appears, enter the email address of the person you want to

invite to your organization and select the permissions level that will be assigned to them once they accept the invitation.

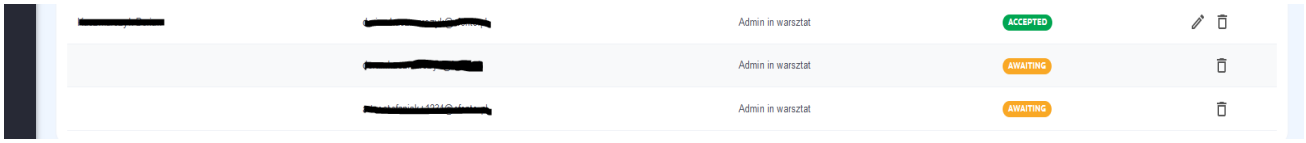


Inviting new users to the organization

After saving the changes, the invited user will receive an email inviting them to join the Organization. If they do not have an account in Efento Cloud yet, they will have to create one before joining the organization.

You can invite any number of users to your Organization and assign them any permissions, but remember that assigning Administrator permissions to a user allows them to fully configure users, sensors, alarm rules and edit your Organization's account. You should not assign these rights to untrusted people.

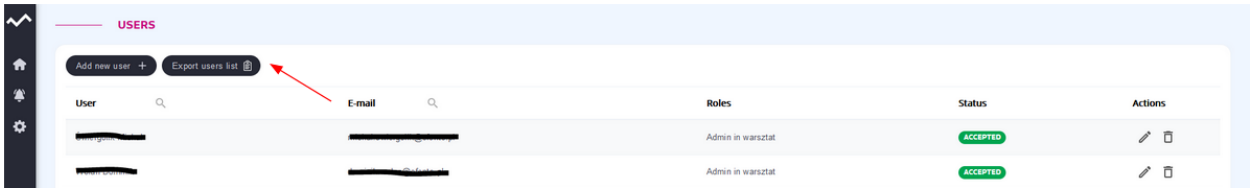
After generating the invitation, a new user will appear on the list with the status “Sent”. This means that an invitation email has been sent to the user but the user has not yet registered an account on the platform. After successful registration, the user's status will be changed to "Accepted".



View the list of users with an active invitation

7.3. Exporting users list

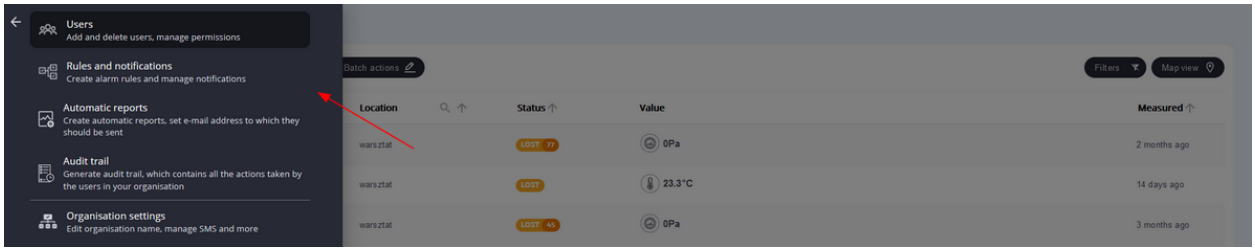
To export the list of users as a PDF file, click the Export users list button in the upper left corner of the table. The list of users in the PDF file will be sent to the e-mail address assigned to your Efento Cloud account.



8. Alarm rules configuration

The alarm rule is a formula that defines which events in Efento Cloud are to initiate the alarm. The rule consists of a stimulus, condition and action, for example: if the temperature (stimulus) rises above 10 degrees (condition), the platform will send an SMS notification to selected recipients (action). The rules can be configured in any way, e.g. sending notifications to different recipients depending on the exceeded threshold, exceeding the set thresholds is only to be recorded in the system (without sending the notification), etc. Users can also define any number of alarm rules and assign sensors to each rule.

To configure the rule, select *Rules and notifications* from the settings menu. The configuration of alarm rules is available to users with Administrator or Manager rights.



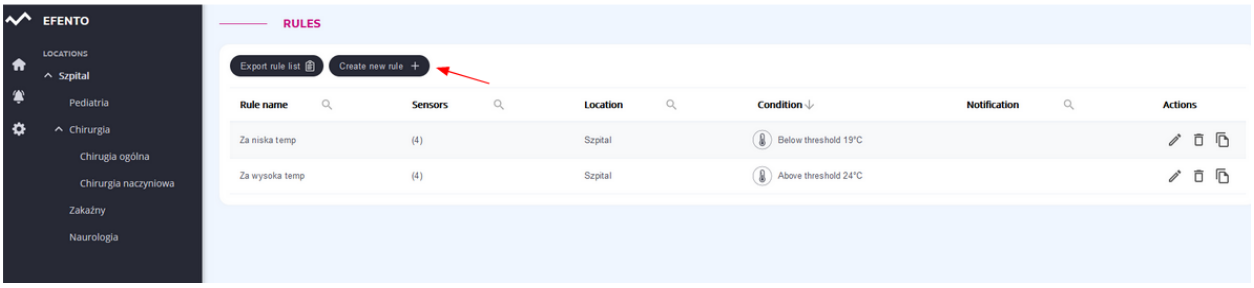
8.1. Types of rules

In the Efento Cloud platform, you can configure several different types of rules depending on the stimulus that initiates the alarm. These are:

- exceeding the set threshold (depending on the physical value measured by the sensor, e.g. temperature, humidity or pressure);
- low power level - if the sensor's battery is low, the platform will notify you about it. After a low battery alarm occurs, the sensor will continue to work for approximately 30 days;
- lost connection with the sensor - if the platform did not receive new measurements from the sensor in expected time.

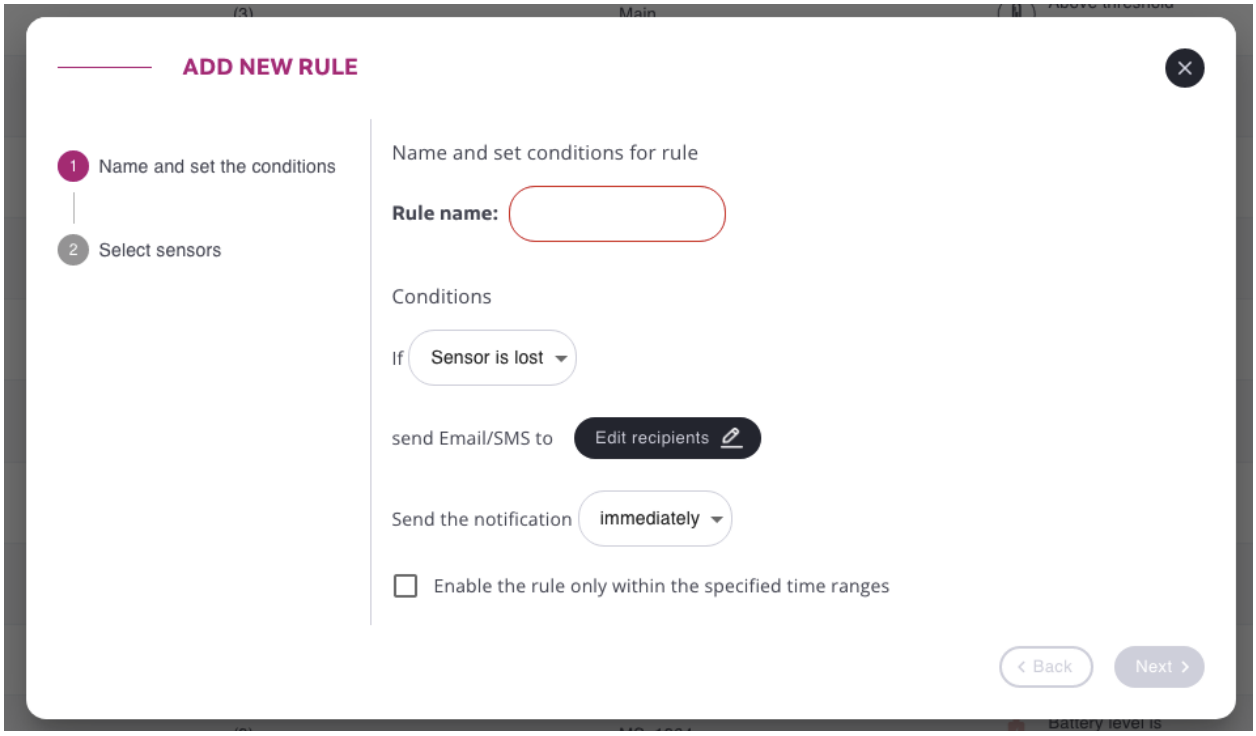
8.2. Adding new alarm rules

To add a new alarm rule, click the *Add rule* button in the upper left corner of the screen.



List of rules with the button for adding a new rule selected

The first field to be filled is the name of the rule, which can be any but not longer than 50 characters. Then select what event the alarm should concern (i.e. the stimulus that initiates the alarm). If you have selected the alert type based on measured values, you must also select whether the alarm should concern the upper threshold exceeded (the measurement value exceeds the set threshold) - the Above option, or the lower threshold exceeded (the measurement value falls below the set threshold) - the Below option, and enter the threshold value in the designated box. In the case of rules regarding low battery or loss of connection with the sensor, there is no need to complete any additional fields.

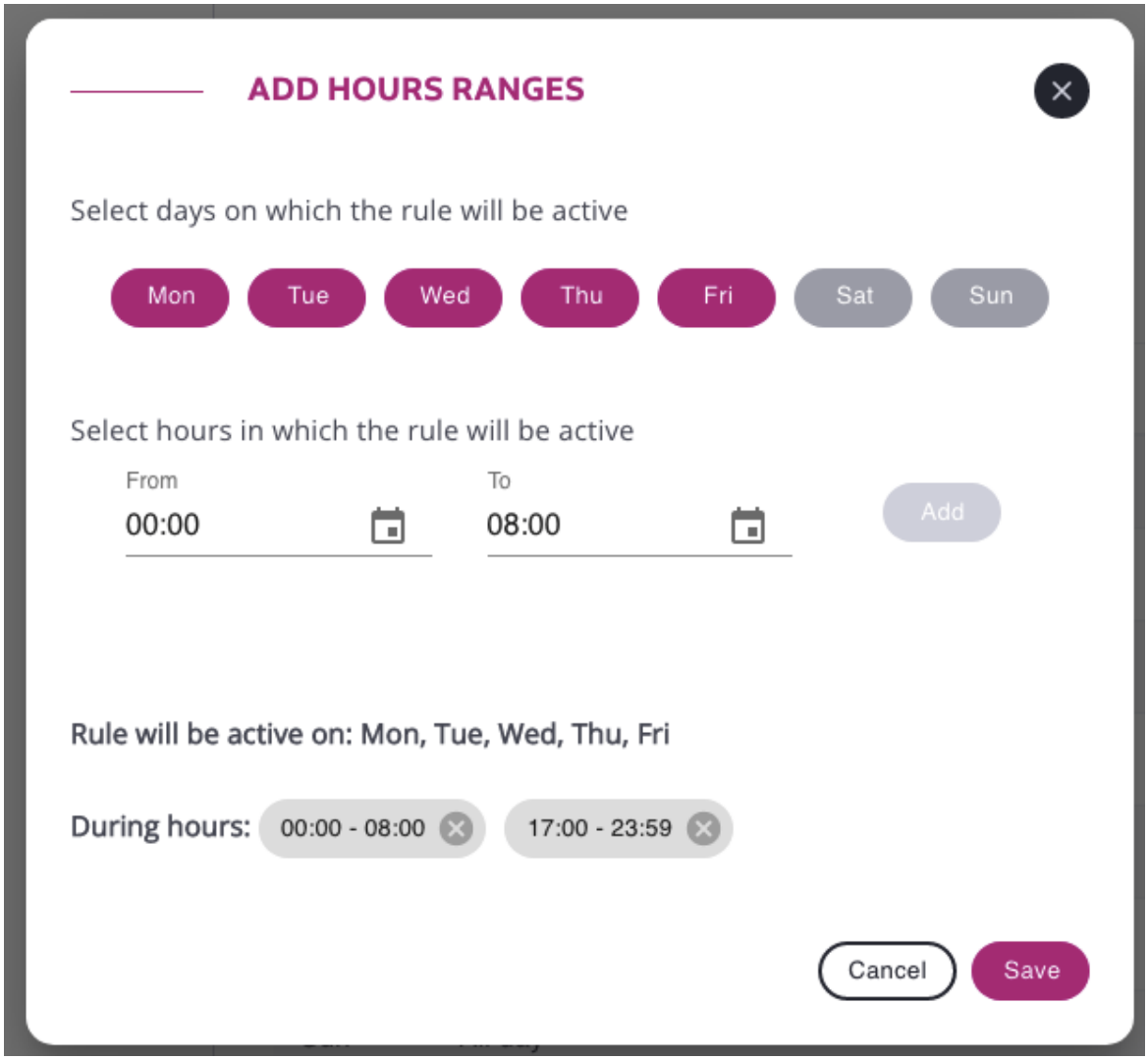


The next step is to add notification recipients. You can add both email addresses and phone numbers. If you do not add any recipient, the alarm alerts will be displayed only on the Efento Cloud platform. Press the *Edit recipients* button, add email addresses and phone numbers and save the changes with the *Save* button. You can enter any number of recipients. E-mail notifications are free, but if you want to receive SMS notifications, you need to have a top-up pool of available SMS messages on the platform (for a description of topping up the pool, see Chapter 13. Topping up the SMS pool).

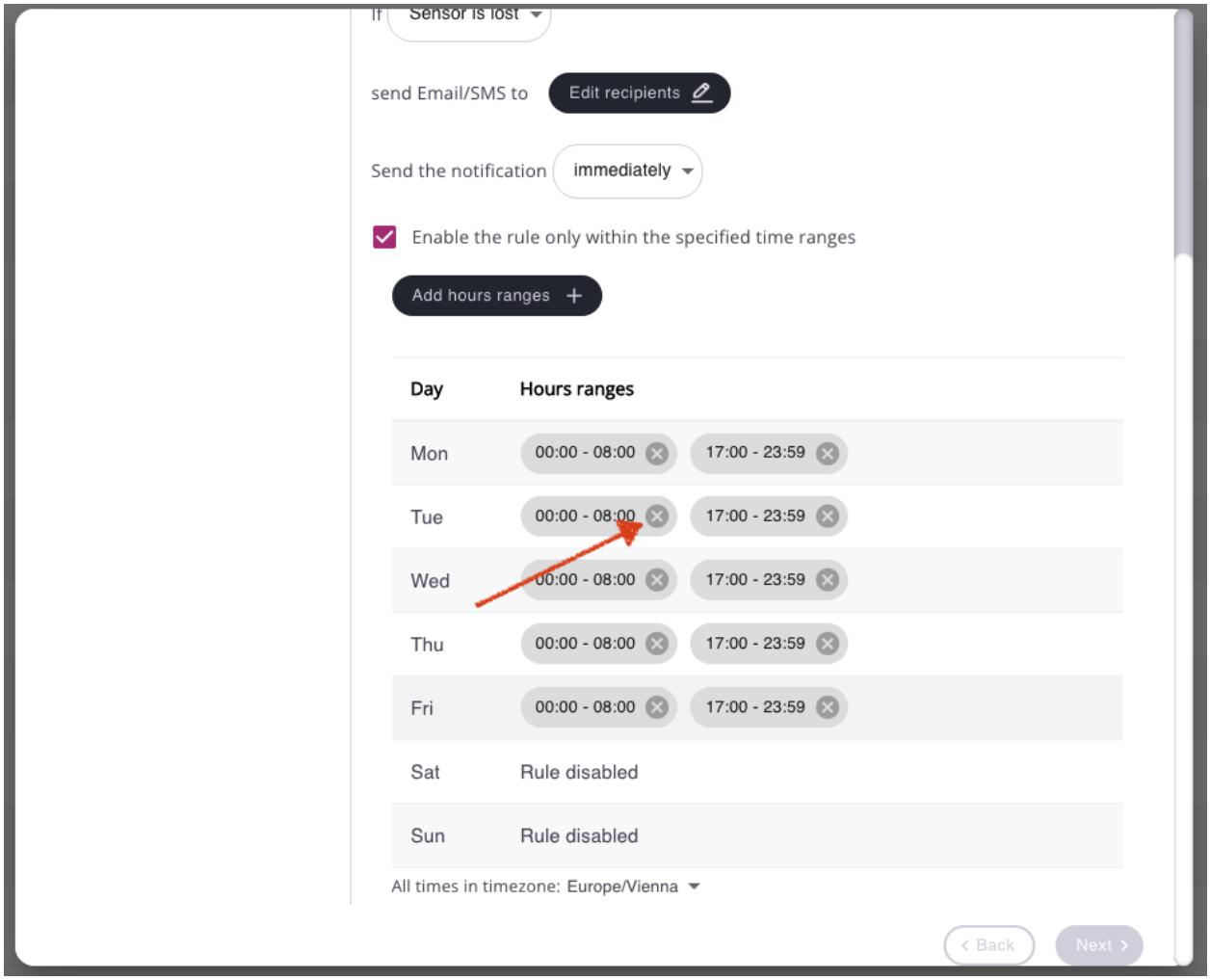
The *Send notifications* field is used to enter the value in minutes after which the alarm is to be initiated. If the measurement exceeds a predefined threshold and does not fall below the alarm threshold for a set period of time, an alarm will be triggered. If the measurement returns to the safe range within the time defined in this field, the alarm will not be triggered. By default, the value is set to *Immediately*, which means that the alarm is triggered when the set threshold is exceeded.

By default, the rule will be active 24/7 (no matter at what time, or on what day the measurements received by the platform are above / below threshold, the rule will be triggered and the notifications will be sent). If you prefer the rule to be active only in the selected time periods (eg. Monday to Friday 8 AM to 5 PM or only on the weekends),

you can use the rule calendars. In order to enable it, check the checkbox next to *Enable the rule only within the specified time ranges*.
The table shows days of the week along with the information, when the rule is enabled. To add hours ranges, click on the *Add hours ranges* button and select days and time ranges, in which the rule will be active. Please note that it is possible to set multiple hours ranges for each day. For instance, if the rule should be active outside the business hours each day of the week, set two time ranges: 00:00 - 08:00 and 17:00-23:59. Click the *Save* button to save changes.

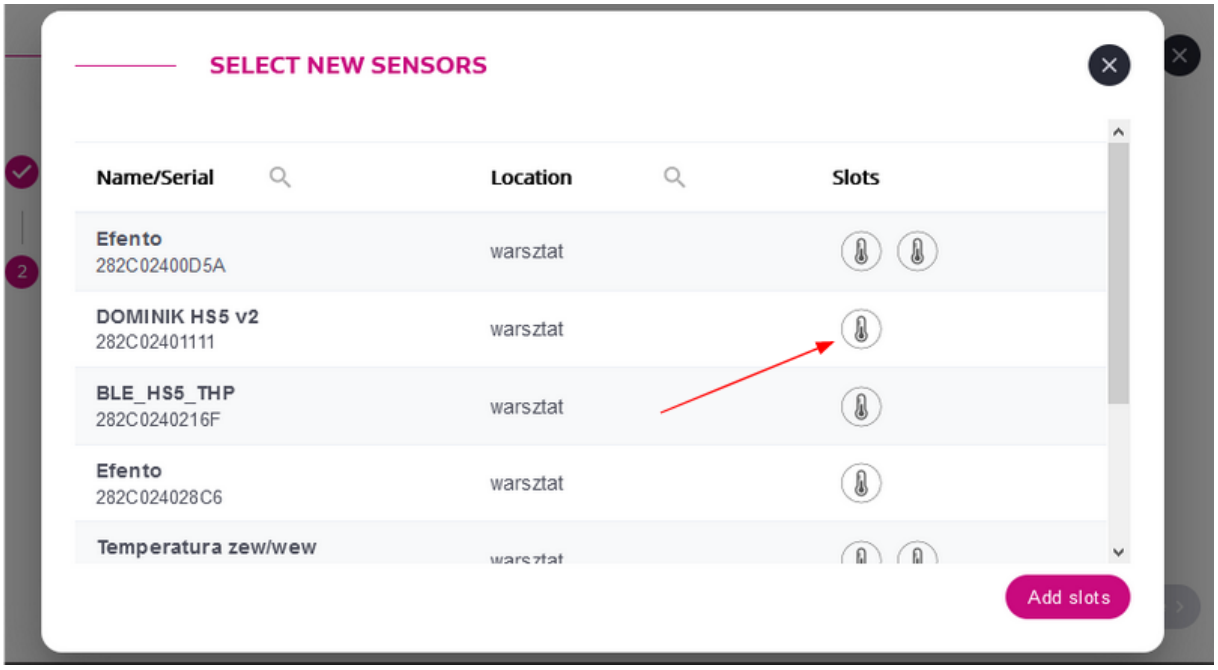


In order to remove the time ranges, click the “X” button in the chip containing the hours range you want to remove.



To remove hours range, click the “X” button in the chip

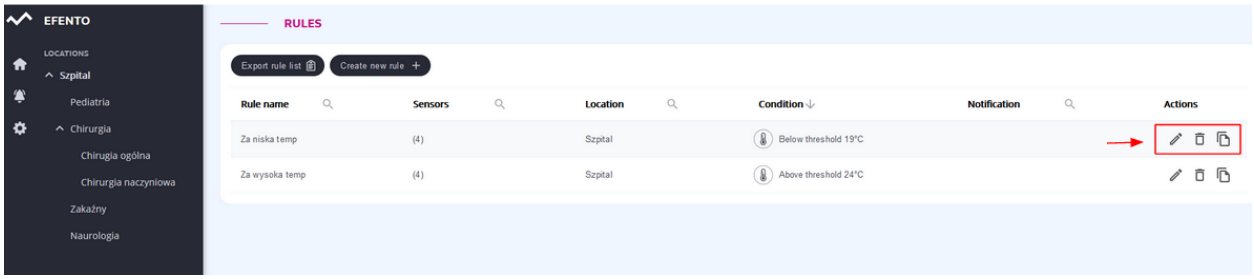
The last step in configuring the rule is selecting the sensors it should apply to. In the *Select sensors* section, click the *Add sensors* button and then select which sensors / channels are to be included in the rule by clicking on the icon symbolizing the type of measurement. The selected channels will be marked in pink. Save the changes with the *Add* button.



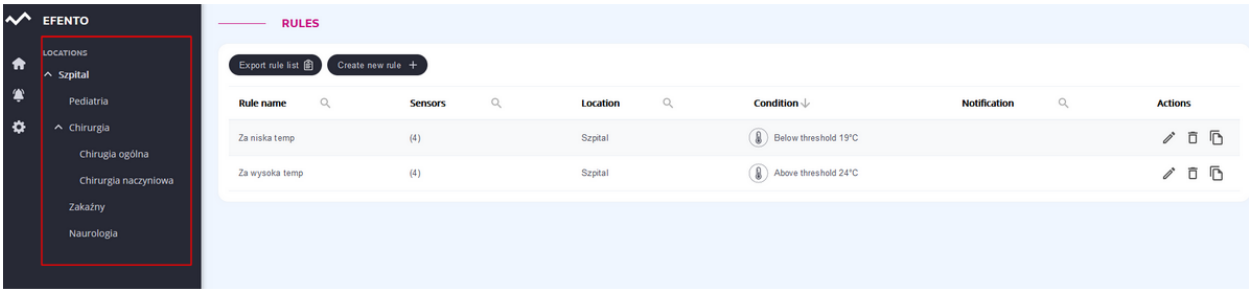
Select the measurement type icon to add a sensor to the alarm rule

Sensors added to the alarm rule are visible in the configuration summary. If you want to remove any of the sensors, click on the trash can icon in the right part of the window. To save the alarm rule, click the Save button. An alarm rule can be edited at any time by clicking on it on the list of added alarm rules.

All configured rules are visible on the list along with information about the value and type of the threshold, recipients and sensors covered by the rule. In the right part of the table, in the Actions column, there are actions that you can perform for a given rule - editing (pencil icon), deleting (trash can icon), cloning. Cloning a rule will create exactly the same rule (same threshold, recipients, sensors). This function is useful if you want to create many similar rules for selected sensors.



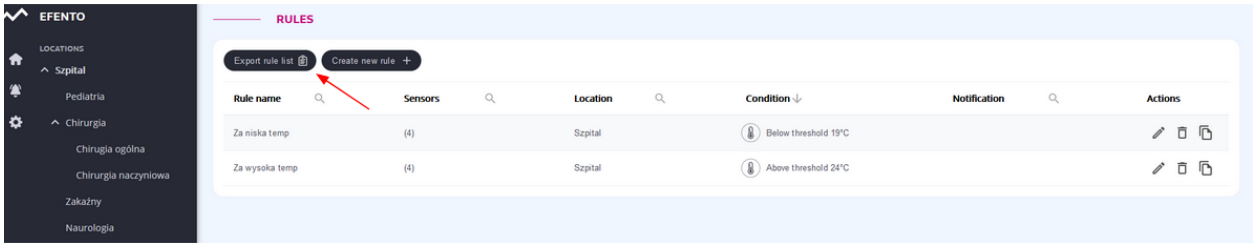
On the left side of the Rules view, there is a location tree that allows you to quickly and easily filter the rules assigned to individual locations. Thanks to this, you can see all the alarm rules concerning the sensors assigned to active location, while other alarm rules are not visible. This allows for convenient grouping of rules, especially in large organizations.



Location tree for alarm rules

8.3. Exporting rule list

To export the list of the alert rules press the *Export rule list* button. The list of alarm rules in a PDF file is sent to the email address assigned to your account.



EFENTO CLOUD

Alarm rules listing for WARSZTAT_BLE

#	Rule name	Sensors	Location	Value	Type	Threshold	Mobile recipients	Alarm delay	Email recipients
1	TEST 2 H		warsztat	Humidity	More than	42.0		0	
2	TEST 1 OZ		warsztat	Open/Close				0	
3	Za zimno		warsztat	Temperature	Less than	18.0		50	
4	Za ciepło	BLE_HS4_T	warsztat	Temperature	More than	28.0		50	
5	temp3		warsztat	Temperature	Less than	15.0		0	
6	temp4		warsztat	Temperature	Less than	14.0		0	
7	TEST 2 T		warsztat	Temperature	More than	27.0		0	
8	temp2		warsztat	Temperature	More than	24.0		0	
9	TestowaTemp	Efento	warsztat	Temperature	More than	33.0		0	
10	temp1		warsztat	Temperature	More than	25.0		0	
11	LOST	BLE_HS4_T, BLE_HS4_DP, BLE_HS5_THP, BLE_HS5_DP, Temperatura zew/wew	warsztat	Lost				0	

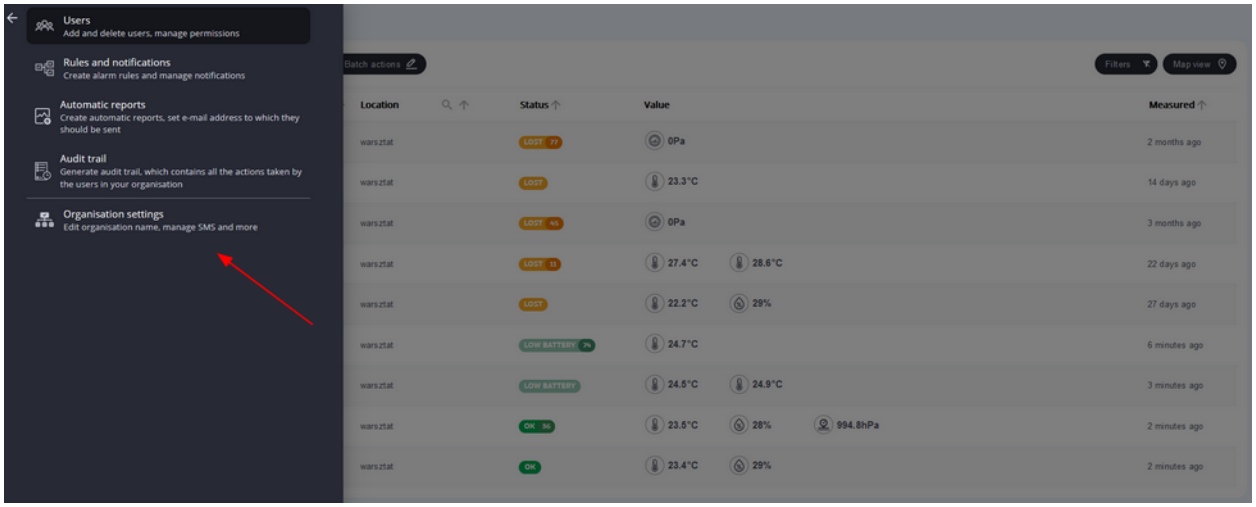
Alarm rules list exported in PDF format

9. Configuration

Users with Administrator or Manager permissions have access to the organization configuration.

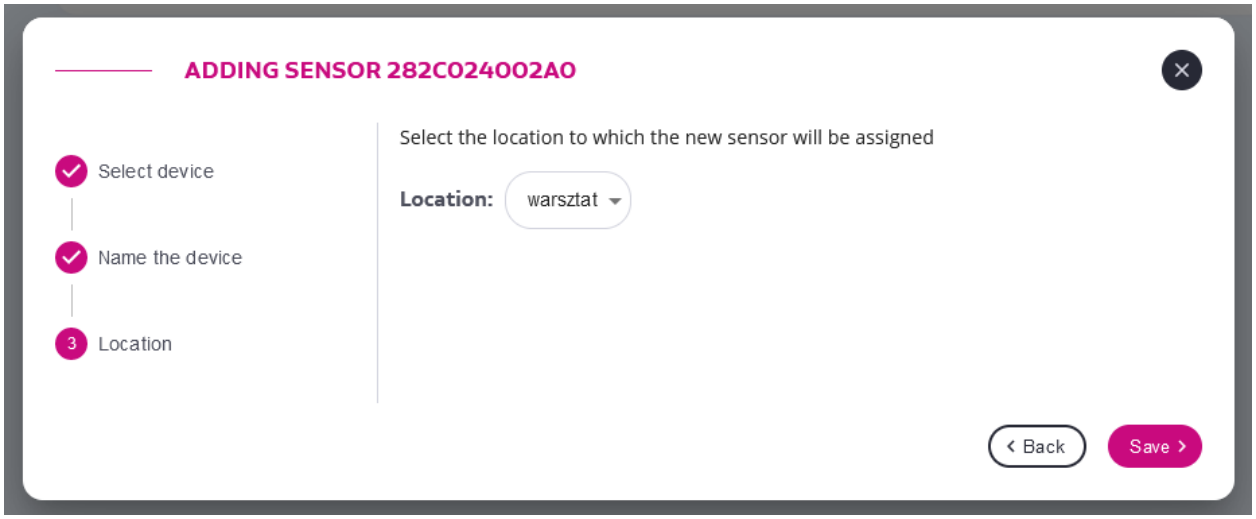
9.1. Adding sensors

To start saving measurements from sensors in the Efento Cloud platform and to be able to fully use the functions it offers (SMS notifications, automatic reports, etc.), you must activate the sensor in the platform. This is done by adding a license key - Cloud Key to the organization. This is a unique number that allows you to enter a specific number of registrars in the platform. To add Cloud Key to your organization, select Organization Settings from the settings menu (the gear icon on the left).



The number of available licenses is shown in the “Licenses left” field. To add sensors, you must have free licenses. Click the *Open* button next to the License manager field and after that click the *Add* button in the upper left part of the license manager view. After adding the license key, you can add any sensors as long as you don't exceed the number of licenses you have. Details of the license manager can be found in chapter “16. License manager“ of this manual.

To add sensors, click the *Add* button next to the Sensors field. From the list that appears, select the sensor you want to add, and then give it a name (by default, all sensors are called New Sensor), which will be assigned to a given sensor and displayed on the platform along with its serial number. It is also necessary to select the location to which the sensor will be assigned. After completing these steps, click *Save*.



If you want to rename the sensor or move it to another location, you can do it at any time. The description of these activities can be found in chapter “6. Sensor configuration”.

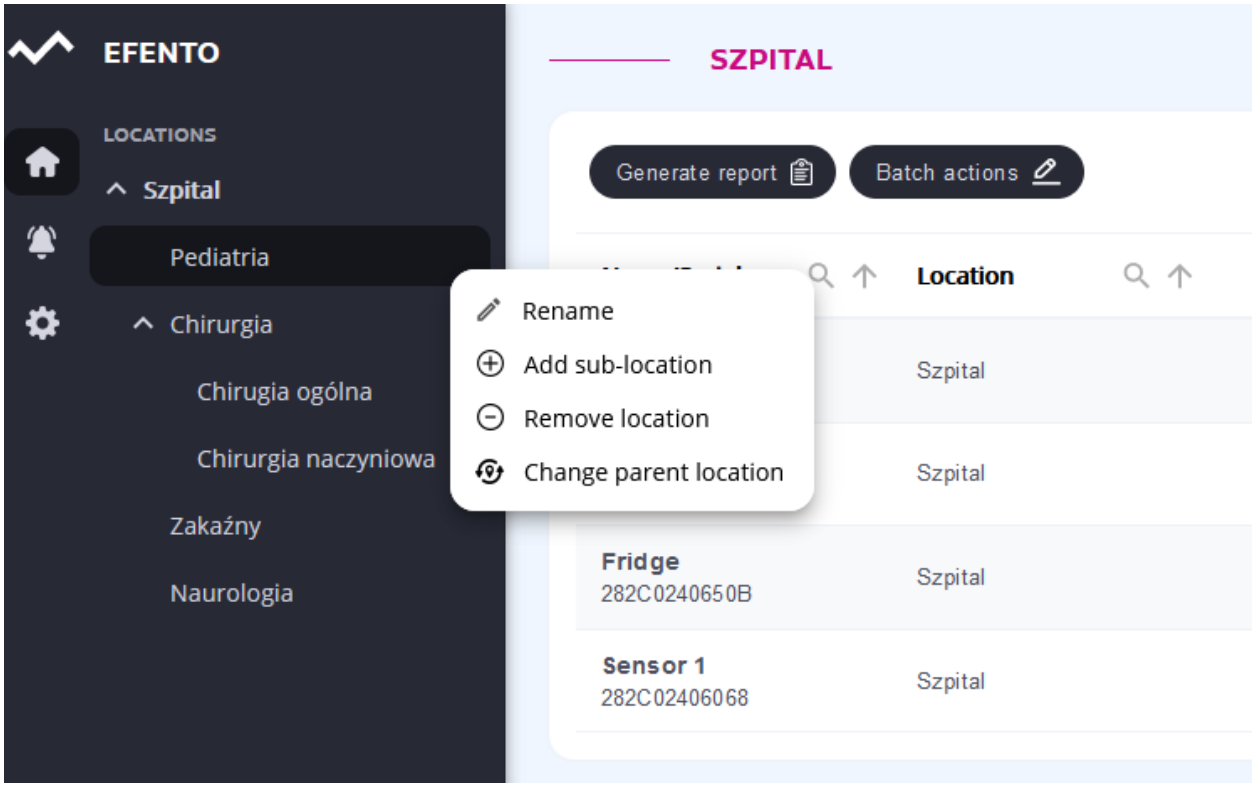
9.2. Create and manage locations

Thanks to Efento Cloud, you can easily organize locations and sensors assigned to them. The platform allows you to map the structure of your organization in the form of a tree and assign individual sensors to its branches. The grouping method is not subject to any limitations, you can use a geographical division (eg Country -> States -> Cities -> Objects), functional (eg Object type -> City -> Exact location) or other, better suited to

your Organization. Additionally, by assigning permissions to users in your Organization, you can assign them to a specific location. Locations significantly facilitate system administration and give full control over user access.

Location configuration is available to users with Administrator or Manager permissions. Locations are edited from the organization structure panel on the left side of the screen. There you will find a tree of already created locations, the root of which is the root cannot be deleted (by default, its name is the name of your Organization). All successively added locations are subordinate to and are part of the primary location.

To edit a location, select its name and then click on the three dots on the right.



To add a new sub-location, select Add sub-location from the menu. In the window that appears, enter the name of the new location, and then save the changes.

To change a location position in the location tree, select Change parent location from the menu, set a new location in the location hierarchy and save the changes with the *Save* button.

To remove a location, select *Remove Location* from the menu. If a location has sub-locations or any sensors assigned to it, you need to remove them first.

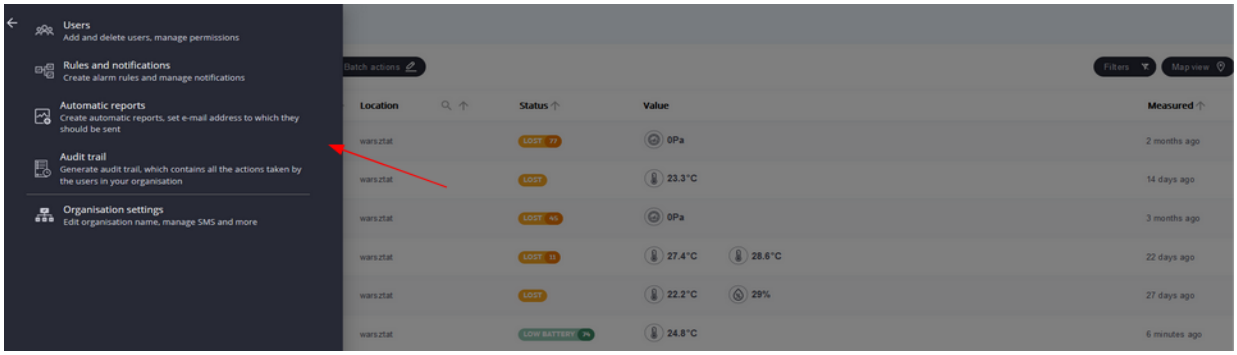
10. Automatic reports

Efento Cloud enables automatic sending of reports in PDF (chart / table) or CSV file format. Reports can be sent to any email address with a selected frequency: once a day, once a week, once a month.

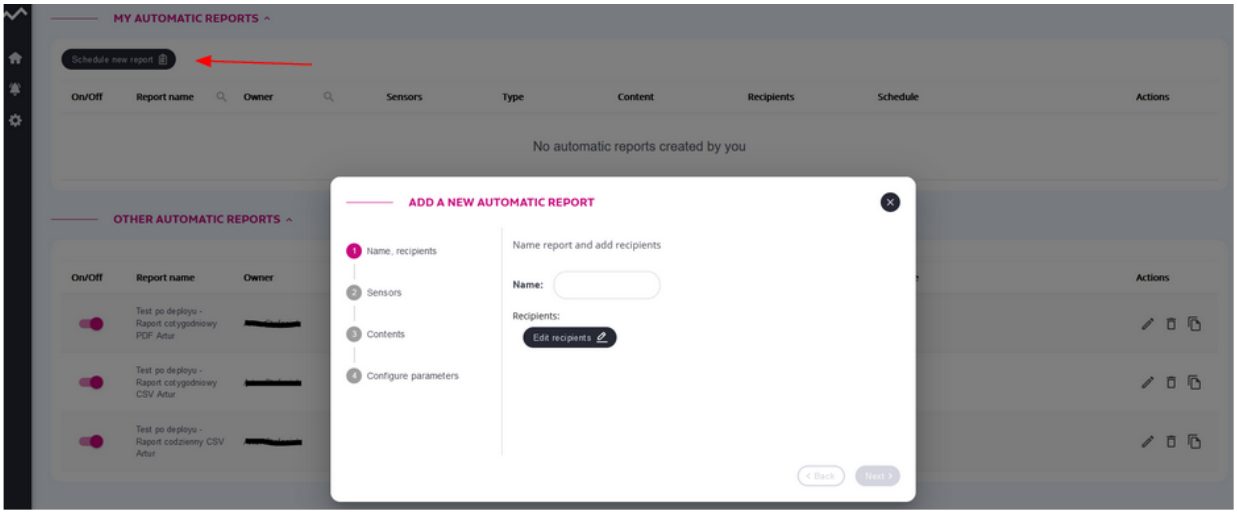
Reports contain measurements taken by sensors, additionally they can contain information about events (exceeded alarm thresholds, loss of communication, low battery level, etc.).

10.1. Automatic reports settings

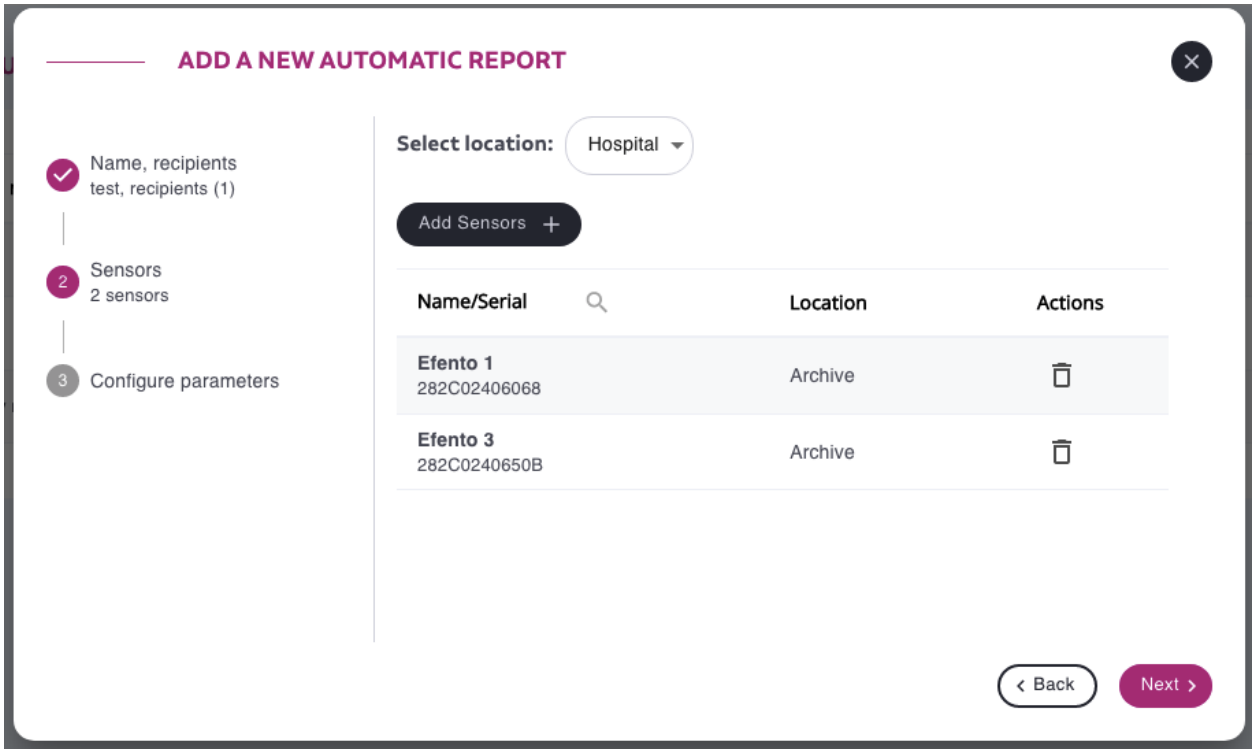
Automatic reports can be configured by users with Manager or Administrator permissions. To configure automatic reports, select Settings (the gear icon) from the menu on the left, and then *Automatic reports*.



Click on the *Schedule new report* button in the upper left corner of the table. Enter the name of the new report and add email addresses of the recipients of the report and save the changes with the *Next* button.

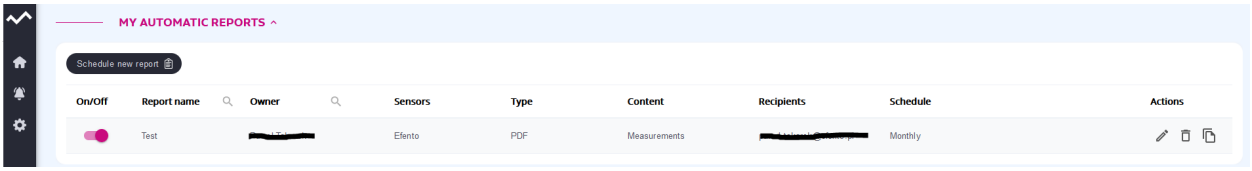


Press the *Add sensors* button and then select the sensors that will be included in the automatic report. You can select any number of sensors to be included in the report. If there are many sensors in a given location, to find the sensor you are interested in, enter its name / serial number in the search field above the table with sensors. After selecting the sensors, press *Next*.



The last step is to set the report format (PDF table / chart or CSV) and the reporting frequency (daily, weekly or monthly). After filling in all the fields, press the *Save* button, which will create an automatic report. From now on, the automatic report is active and will be sent with the frequency you set. Automatic reports are generated and sent to recipients at 4:00 AM on the scheduled dates.

All configured reports are visible in the Automatic reports tab. To delete a configured report, click the trash can icon in the right part of the table with the defined reports. You can also edit a selected report by clicking the pencil icon. If you want to create a new automatic report, similar to a report which is already scheduled, click on the clone icon. Automatic reports can be disabled - to disable a report, use the switch next to the report you want to disable.

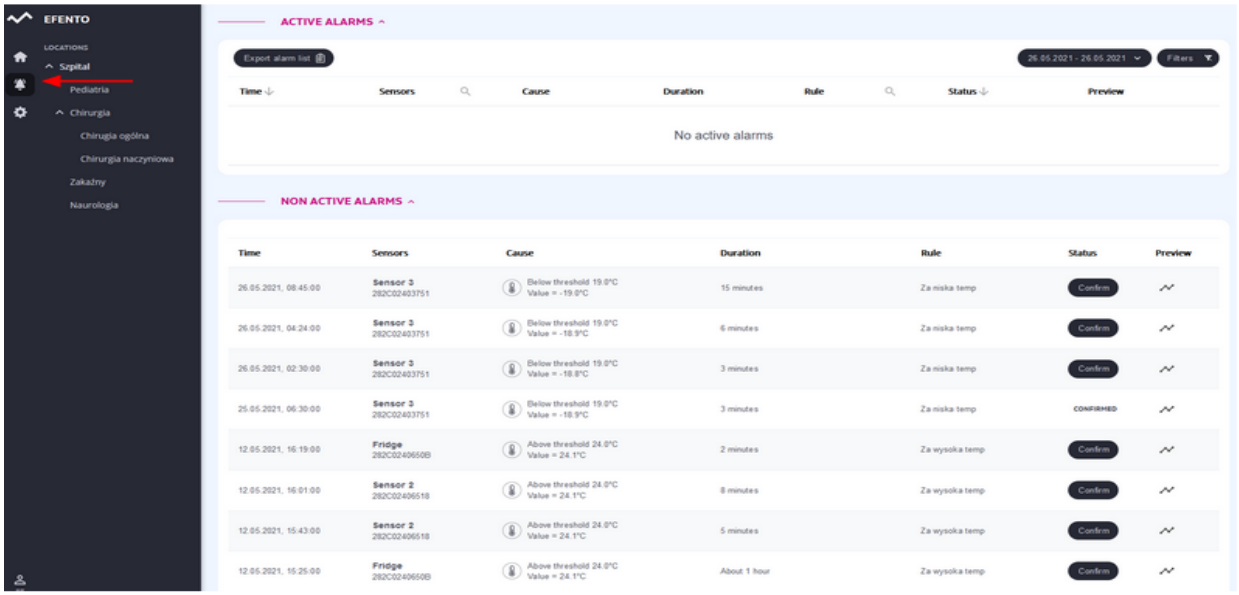


11. Alarms

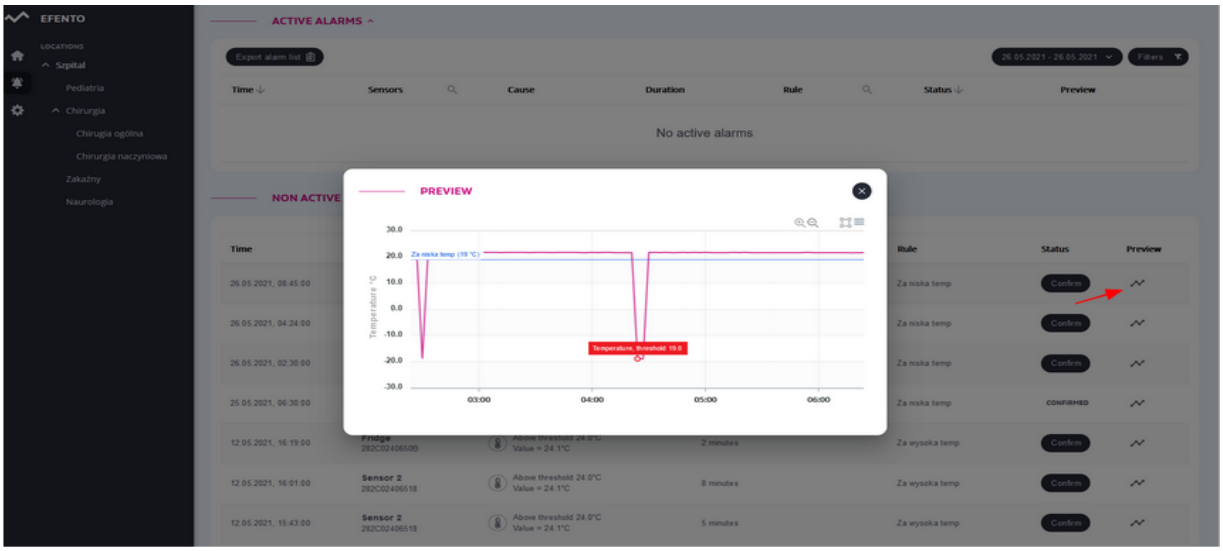
11.1. Alarms preview

In the Alarms menu, you will find a preview of all alarms currently active and those that have occurred in the past. The list of alarms is divided into two sections: Active alarms (the alarm threshold is still exceeded) and Inactive alarms (the threshold has been exceeded in the past). Additionally, the Status column shows whether the report has already been confirmed (another user has reacted to the alarm; the rule is no longer exceeded), or is waiting for confirmation (the alarm threshold is no longer exceeded, but one of the users must confirm that the alarm was recorded). The alarms can only be confirmed when the measurements sent by the sensor do not exceed the alarm threshold. Alarms can be sorted by date of occurrence, alarm type, cause, current sensor measurement, name of rule or recipients of notifications assigned to the alarm. It is also possible to search for specific sensors on the list by entering their name or serial number. It is also possible to limit the date range of displayed alarms. The buttons in the upper right corner of the table with alarms are used for this. Additionally, it is possible to

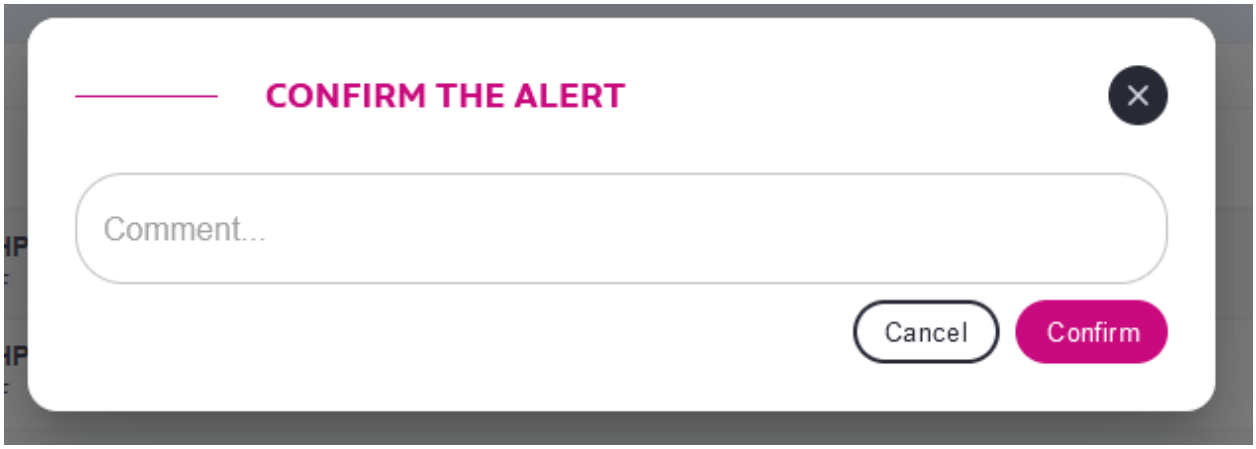
display only the alarms related to the selected location by selecting it from the menu on the left side of the view.



On the right side of the alarms table there is a preview icon (chart symbol). Clicking on it will open a window with a graph showing when the alarm occurred.

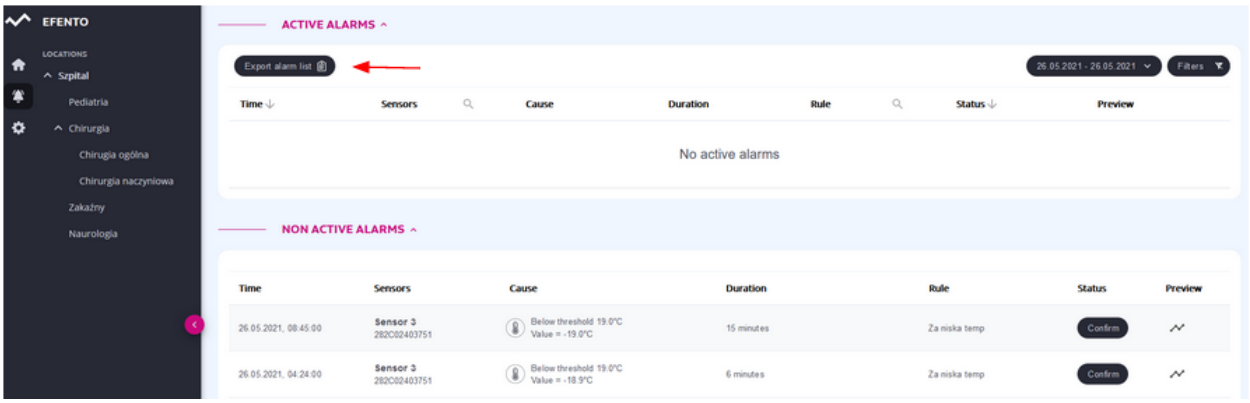


To confirm the alarm, click the *Confirm* button. You can enter a comment about the alarm in the newly opened window. The comment will appear on the alarm list after hovering the cursor over the word “Confirmed”. Entering a comment is optional.



11.2. Exporting alarm list

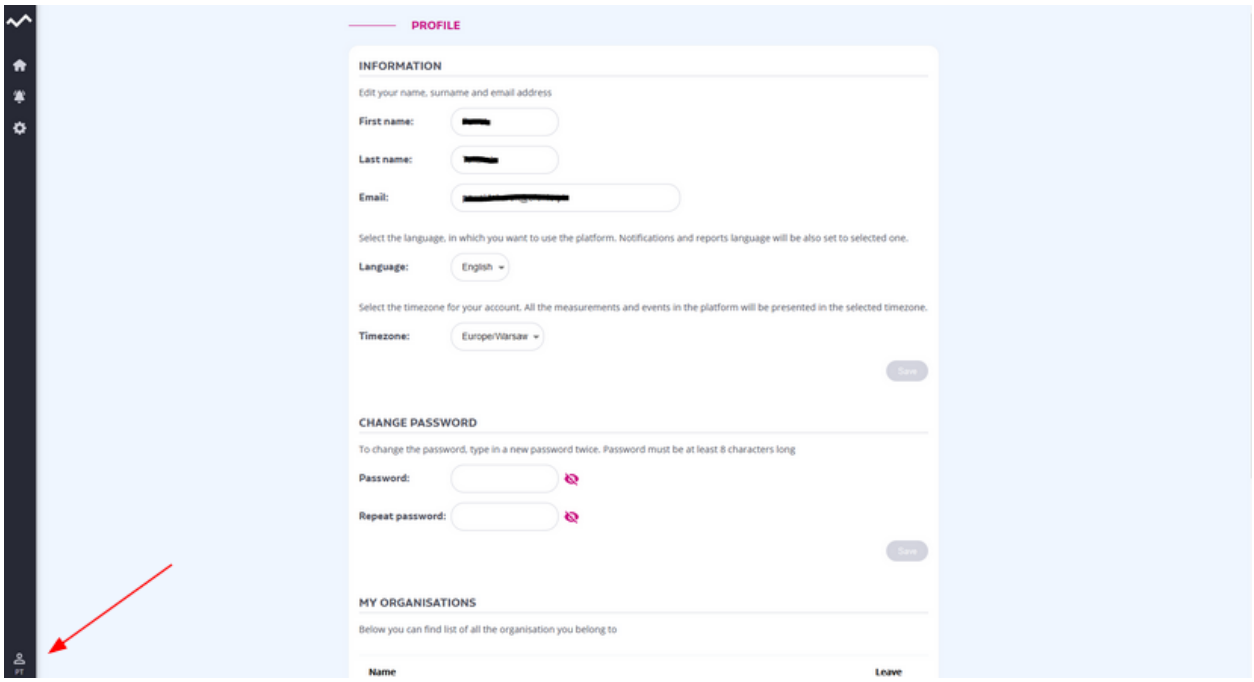
After pressing the *Export alarm list* button, the alarm list is sent in a PDF file to the e-mail address assigned to your account.



12. Editing user and organization data

12.1. Changing the username, language and password, and deleting the account

To access your profile settings click on your initials in the lower left corner of the screen. There, you have the option to log out of your account or go to your profile settings. In the Profile tab, you can edit your data such as: name, surname, e-mail address and password for the account in the Efento Cloud platform. It is also possible to change the language and time zone. After making changes, click Save to accept them.



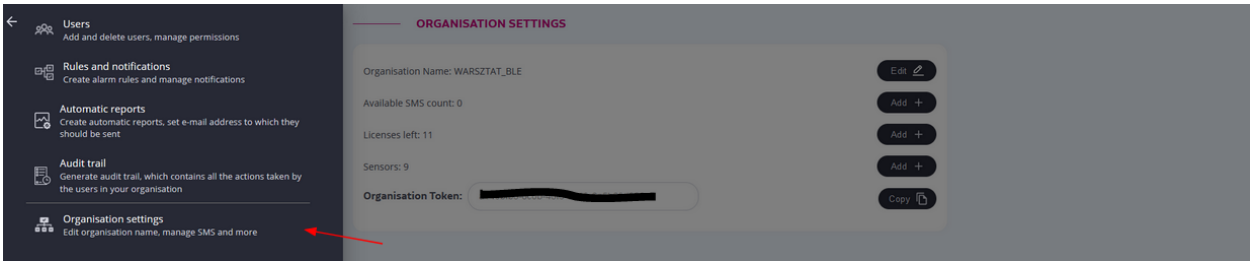
profile settings

In the Profile tab, you can also leave the selected organization. To do this, in the My Organizations section, click the *Leave* button next to the organization you want to leave. Leaving an organization means losing access to its measurements. If you are the last member of a given organization, when you leave it, it will be removed from Efento Cloud along with all measurements taken by sensors that were added to this organization.

To delete an account, click the Delete Account button. This way you will delete your account along with all the information entered in the system (name, surname, e-mail address, password).

12.2. Changing Organization settings

To make changes to the Organization settings, select Settings (the gear icon) from the menu on the left, and then *Organization settings*.

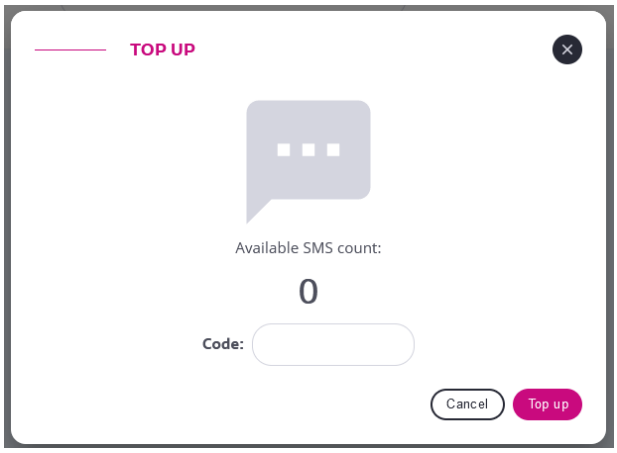


In this view you can change the name of the organization, top up the SMS pool, add new sensors and licenses, and view the organization Token.

13. Topping up the SMS pool

13.1 Topping up the SMS pool

If you want to receive SMS notifications about alarms, it is necessary to have SMSes in the pool. You can check the number of available SMSs in the organization's edit menu. To top up the pool of available SMSes, click the *Add* button next to the Available SMS field. In the window that will appear, enter the top-up code and click the *Top up* button. If the code was correct, the pool of available SMSs will be increased by a specific value.

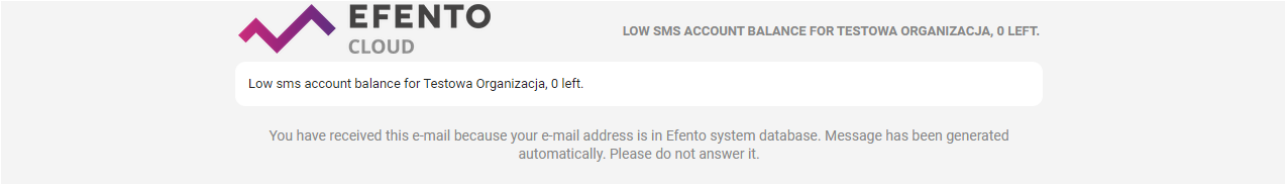


Top up SMS dialog

13.2 Low SMS balance notification

When the number of available SMSes drops below a certain level, an email notification will be automatically sent to all administrators of the organization with information about the current status of the SMS pool. By default, the platform will notify the administrators, if the number of available SMSes drops below 10. Notifications will be resent, if the number of the available SMSes drops below 5 and 0.

It is possible to set the available SMS threshold, at which the notifications will be sent. To change the threshold value, go to Settings -> Organization settings and enter the threshold value in the Low SMS notification threshold field. Efento Cloud will send the notifications once the number of available SMSes drops to that value, drops to 50% of that value, 25% of that value and to 0.

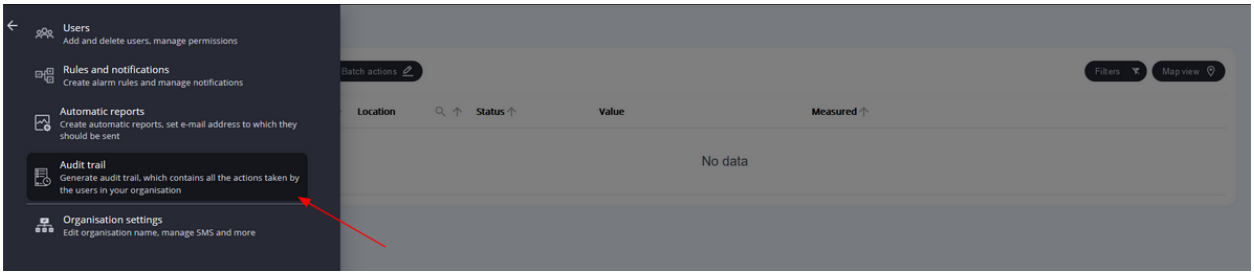


Email notification for low SMS status

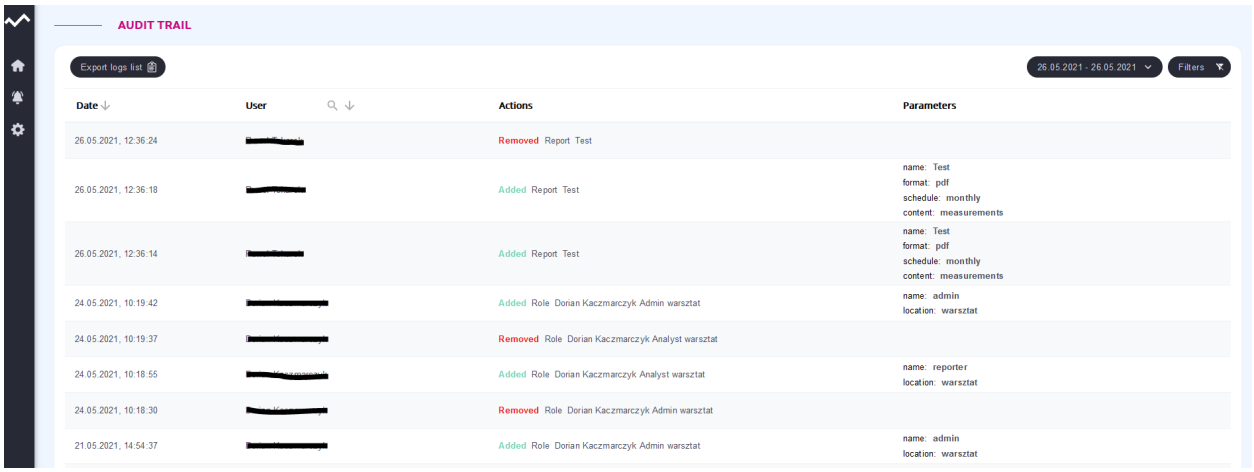
14. Audit trail

14.1 Audit trail preview

Audit trail, is a list of all changes within the organization and can be viewed by the users with Administrator permissions. The Audit trail includes changes in the configuration of the sensors, locations, reports, rules and changes to user / organization settings. To view the Audit trail, from the menu on the left, select Settings (the gear icon), and then *Audit trail*.



The list can be sorted / filtered based on the date of record, the user who made the change or the type of action (added, deleted, changed).



System logs preview

14.2 Exporting the Audit trail

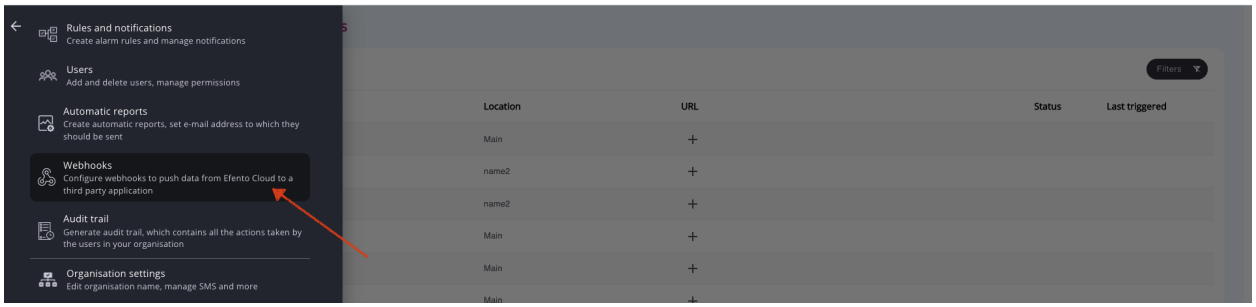
To export the Audit trail, press the *Export logs list* button, the Audit trail will be sent as a PDF file to the email address assigned to your account.

15. Webhooks

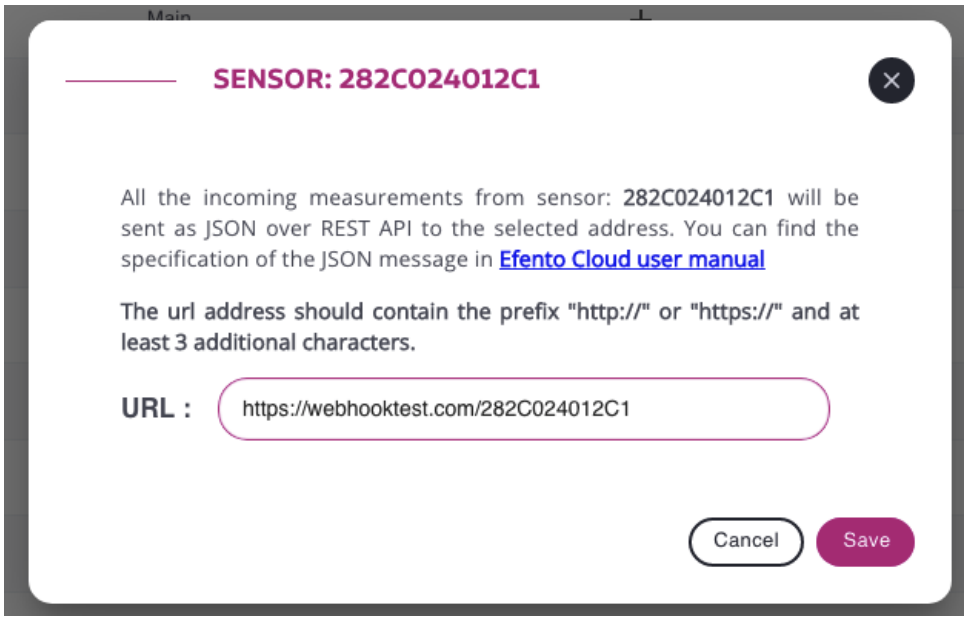
Webhooks are used to integrate Efento Cloud with any third party application. If a webhook is configured, once a new measurement arrives in Efento Cloud, it will be automatically sent as JSON over REST (POST) to the set URL. Efento Cloud allows users to configure a separate URL for each sensor added to the platform.

15.1 Configuration

Webhooks configuration can be accessed by users with Administrator or Manager permissions.
In order to configure webhooks, from the menu on the left, select Settings (the gear icon), and then Webhooks.

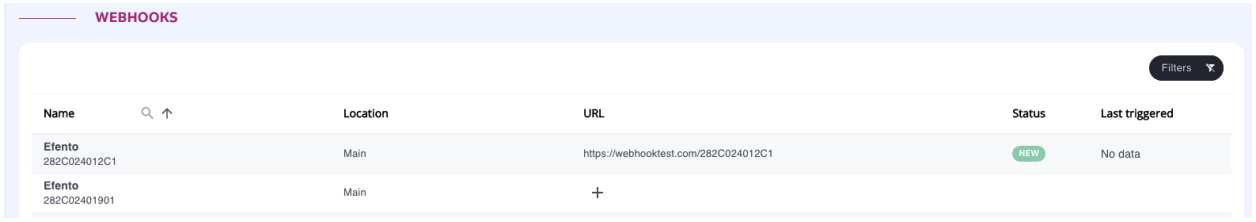


On the list you can see all the sensors added to your organization along with the information, if the webhook is set for this device, when the webhook was triggered last time and what was the received response. To add a webhook, click on the + button in the URL column and add the URL, to which the incoming measurements will be pushed. The URL must contain “http://” or “https://” prefix and at least three characters (including the dots in the URL).



Webhook configuration dialog

Once a webhook is set, it will be visible on the list of sensors along with the information on when it was triggered and status, based on the response received from the third party application.



There are four possible statuses of a webhook:

- New - webhook was configured but never triggered yet
- OK - webhook was triggered and proper response (2XX, e.g. 200, 201) received from the server
- No response - webhook was triggered, but the server did not return any response (timeout)
- Error - webhook was triggered but the server returned response with the code different then 2XX

To edit or remove a webhook, click on its URL.

The webhook configuration dashboard allows also searching for the specified measurement point on the webhooks list, filtering the webhooks by their statuses (*Filters -> Status*) and filtering the measurement points based on the webhook assignment (*Filters -> webhook configured? -> Yes* / *No*).

15.2 Payload (JSON) documentation

Efento Cloud sends the measurements as JSON using the POST method. The JSON contains:

- Information about measurement point (ID and its name in Efento Cloud)
- Serial number of the sensor that took the measurements
- Channel types
- Time range of the measurements (from, to)
- Measurement values along with the measurement period, timestamps and statuses

In order to minimize the payload sent over the webhooks, Efento Cloud sends the measurements in the form of Measurement Events. A Measurement Event occurs, if there was a change in the measurement value, measurement period or measurement status.
When receiving the data, the third party application has to extrapolate the measurements. Examples of data extrapolation are included in this user manual in chapter ‘15.3 Extrapolating the measurements’.

JSON is structured as below:

```
{
   "deviceSerialNumber": "282C024FFFFF",
   "firstMeasurementTimestamp": "2023-02-01 08:08:00",
   "lastMeasurementTimestamp": "2023-02-01 08:12:00",
   "measurementPointId": 70437,
   "measurementPointName": "Test sensor",
   "measurementsReceivedAt": "2023-02-01 08:13:28",
   "measurementsEvents": [
       {
           "channelNumber": 1,
           "channelType": "TEMPERATURE",
           "events": [
               {
                   "timestamp": "2023-02-01 08:08:00",
                   "value": 21,
                   "period": 60,
                   "status": "OK"
               }
           ]
       },
       {
           "channelNumber": 2,
           "channelType": "HUMIDITY",
           "events": [
               {
                   "timestamp": "2023-02-01 08:08:00",
                   "value": 45,
                   "period": 60,
                   "status": "OK"
               }
           ]
       },
       {
           "channelNumber": 3,
           "channelType": "PULSE_COUNTER",
           "events": [
               {
                   "timestamp": "2023-02-01 08:08:00",
```

```
                    "value": 0,
                    "period": 60,
                    "status": "OK"
                }
            ]
        }
    ]
}
```


deviceSerialNumber	Serial number of the sensor that took the measurements
firstMeasurementTimestamp	Timestamp of the first measurement in the batch
lastMeasurementTimestamp	Timestamp of the last measurement in the batch
measurementPointId	ID of the measurement point in Efento Cloud
measurementPointName	Name of the measurement point in Efento Cloud
measurementsReceivedAt	Timestamp when Efento Cloud received the measurements batch that is sent over webhook
measurementsEvents	Array of the sensor's channels. Contains measurements taken by the sensor on all its channels.
channelNumber	Channel number (a single sensor can have up to 6 channels)
channelType	Channel type. Units of the measurement ("value" field) are based on the channel type.
events	Array of Measurement Events - measurements taken by a sensor on a particular channel. Includes only the measurements that have different values than the previous ones.
timestamp	Measurement Event timestamp
value	Measurement value. Depending on the "status" value: ● for statuses from OK group, value of the measurement,

	unit based on the “channelType” ● for status MISSING, the value is always NULL ● for status ERROR, value contains the error code
`period`	Measurement period set on the sensor
`status`	Status of the measurement. Available statuses: ● OK - default status. There are no issues with the measurement ● MISSING - there is a gap in the measurements received by Efento Cloud (e.g. a sensor was out of the gateway’s range and did not resent the data yet) ● OK_CALIBRATION_REQUIRED - used only for VOC (IAQ) sensors. Information that the measured values are inaccurate, as the device needs to perform auto-calibration ● OK_ACCURACY_LOW - used only for VOC (IAQ) sensors. Information that the measured values may have poor accuracy, as the device is performing auto-calibration ● OK_ACCURACY_HIGH - used only for VOC (IAQ) sensors. Information that the measured values may have good ● ERROR - the measurement sent by the sensor is out of the specified range. This usually mean that there is a hardware issue with the sensor (e.g. the probe is not connected or the sensor is physically damaged)

15.3 Extrapolating the measurements

In order to minimize the payload sent over the webhooks, Efento Cloud sends the measurements in the form of Measurement Events. A Measurement Event occurs, if there was a change in the measurement value, measurement period or measurement status.

This means that if the value measured by the sensor did not change, it is not included in the JSON. The third party application that receives the data from Efento Cloud has to extrapolate the measurement based on the measurement period (“period” field in the JSON’s objects “events”) and the time range of measurements (“firstMeasurementTimestamp”, “lastMeasurementTimestamp”). Examples:

Changes in the “value” field

Measurement period of the sensor is set to 60 seconds.

1. At 12:00:00 the sensor measured 20°C
2. At 12:01:00 the sensor measured 20°C
3. At 12:02:00 the sensor measured 20°C
4. At 12:03:00 the sensor measured 21°C
5. At 12:04:00 the sensor measured 21°C

Data sent over the webhook contains: 12:00:00 value: 20°C and 12:03:00 value: 21°C, as the measurement values at 12:01:00 and 12:02:00 were the same as the one at 12:00:00 and the value at 12:04:00 was the same as the one at 12:03:00. The JSON will look as below:


```
{
   "deviceSerialNumber": "282C024FFFFF",
   "firstMeasurementTimestamp": "2023-02-01 12:00:00",
   "lastMeasurementTimestamp": "2023-02-01 12:04:00",
   "measurementPointId": 70437,
   "measurementPointName": "Test sensor",
   "measurementsReceivedAt": "2023-02-01 11:46:10",
   "measurementsEvents": [
       {
           "channelNumber": 1,
           "channelType": "TEMPERATURE",
           "events": [
               {
                   "timestamp": "2023-02-01 12:00:00",
                   "value": 20,
                   "period": 60,
                   "status": "OK"
               },
               {
                   "timestamp": "2023-02-01 12:03:00",
                   "value": 21,
                   "period": 60,
                   "status": "OK"
               }
```

```
            ]
        }
    ]
}
```

Changes in the “period” field

Initially, the measurement period of the sensor is set to 180 seconds. Measurement period was later on changed to 60 seconds.

1. At 12:00:00 the sensor measured 20°C
2. At 12:01:00 the measurement period changed to 60 seconds and the sensor measured 20°C
3. At 12:02:00 the sensor measured 20°C
4. At 12:03:00 the sensor measured 21°C

Data sent over the webhook contains 12:00:00 value: 20°C, 12:01:00 value: 20°C, 12:03:00 value: 21°C. As there was a change in the measurement period at 12:01:00. The “events” array in the JSON will look as below:

```
"events": [
                {
                    "timestamp": "2023-02-01 12:00:00",
                    "value": 20,
                    "period": 180,
                    "status": "OK"
                },
                {
                    "timestamp": "2023-02-01 12:01:00",
                    "value": 20,
                    "period": 60,
                    "status": "OK"
                },
                {
                    "timestamp": "2023-02-01 12:03:00",
                    "value": 21,
                    "period": 60,
```

```
                "status": "OK"
            }
]
```


Changes in the “status” field

Measurement period of the sensor is set to 60 seconds.

1. At 12:00:00 the sensor measured 20°C
2. At 12:01:00 the sensor’s probe was unplugged and the device was not able to take a measurement
3. At 12:05:00 the sensor’s probe was plugged again and the sensor measured 20°C

Data sent over the webhook contains: 12:00:00 value: 20°C (status: OK), 12:01:00 value: 10000 (status: ERROR), 12:05:00 value: 20°C (status: OK). The “events” array in the JSON will look as below:


```
"events": [
            {
                "timestamp": "2023-02-01 12:00:00",
                "value": 20,
                "period": 60,
                "status": "OK"
            },
            {
                "timestamp": "2023-02-01 12:01:00",
                "value": 10000,
                "period": 60,
                "status": "ERROR"
            },
            {
                "timestamp": "2023-02-01 12:05:00",
                "value": 20,
                "period": 60,
                "status": "OK"
            }
]
```

None of the fields (“value”, “period”, “status”) did not change their values in the whole batch of the measurements sent over webhook

In this case the “events” array will only contain a single value. This means that the value was the same for the whole time period defined by "firstMeasurementTimestamp" and "lastMeasurementTimestamp". The JSON will look as below:


```
{
   "deviceSerialNumber": "282C024FFFFF",
   "firstMeasurementTimestamp": "2023-02-01 11:00:00",
   "lastMeasurementTimestamp": "2023-02-01 11:42:00",
   "measurementPointId": 70437,
   "measurementPointName": "Test sensor",
   "measurementsReceivedAt": "2023-02-01 11:46:10",
   "measurementsEvents": [
       {
           "channelNumber": 1,
           "channelType": "TEMPERATURE",
           "events": [
               {
                   "timestamp": "2023-02-01 11:00:00",
                   "value": 20,
                   "period": 60,
                   "status": "OK"
               }
           ]
       }
   ]
}
```


In this example, the sensor took 43 measurements (11:00:00, 11:01:00, 11:02:00, …, 11:42:00), but as their value was always 20°C, only the first one was included in the JSON.

15.4 Limitations

There are few limitations that should be considered when using the webhook service:

- It is possible to configure one webhook per measurement point
- The application, to which Efento Cloud sends the data, needs to respond within 10 seconds from the moment when the webhook was triggered
- Efento Cloud does not resend the measurements. If the application that receives the data was not responding the data will not be resent and needs to be pulled using Efento Cloud API
- The only accepted response codes, confirming that the measurements were received are 2XX codes (200, 201, etc.)
- The maximum URL length is 500 characters, including the mandatory “http://” or “https://” prefixes
- It is impossible to add custom headers to the messages or change the structure of the payload (JSON) sent

16. License manager

Each sensor that is added to Efento Cloud requires a license. Licenses are added by keying in a license key in Efento Cloud platform. Each license key has two parameters: number of devices and lifetime. When placing an order with Efento, the customer can order licenses with required lifetime and that will allow them to add the required number of sensors. A single license key can generate any number of licenses (e.g. if a customer ordered 5 sensors, a signal license key will be provided and keying it in Efento cloud will allow the user to add 5 sensors to Efento Cloud).

16.1 Adding licenses

In order to add licenses, open the license manager: from the menu on the left select *Settings* (gear icon) -> *Organization settings* -> click the *Open* button next to the “License manager”. Press the Add button and key in the license key provided by Efento. Once the key is added. The value next to “Licenses left” will increase. After a license is added, you can add Efento sensors to Efento Cloud.

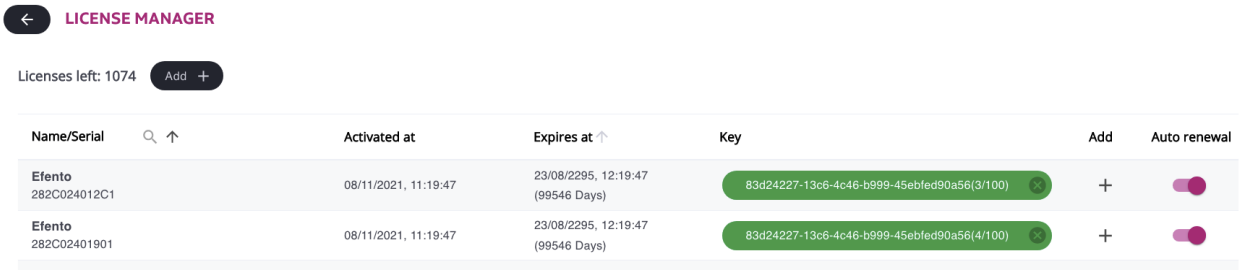
16.2 License lifetime

Each license has a defined lifetime - a period of time in which the sensors assigned to this license can send the data to Efento Cloud. Once the lifetime expires, new measurements coming from the sensor assigned to this license will not be saved and proceeded by Efento Cloud. The user will still have access to the historical measurements and alerts.

When the lifetime of the license is expiring, the user will be notified by email. Email notifications will be sent twice: 1 month before the expiration date and on the expiration day. In order to continue using a sensor whose license is expiring, a new license key has to be provided. **If there are any free licenses (unassigned to any sensors), a license will renew automatically.**

16.3 Managing licenses

Information about all the sensors along with the licenses assigned to them is visible in the License manager.



The list contains the following information:

- Sensor serial number / name
- Activation date - the date when the sensor was assigned to a license key. The license lifetime is counted from this date
- Expires at - license expiration date along with the number of days left
- Key - license key assigned to this sensor. As a single license key may add multiple licenses, there is information in the brackets containing the number of the licenses assigned to this license key

Moreover, there are two configuration buttons:

- Add (“+” button next to each sensor) - allows adding a license key to a particular sensor. If the user selects this option, all the license keys added to the organization will be displayed. The user can assign a particular license to a particular sensor. It is possible to assign multiple licenses to a sensor. In that case, once the currently active license expires, the next one will be automatically used.
- Auto renewal - If this feature is enabled, Efento Cloud will automatically assign a new license key to a sensor once the currently active license expires. **License auto renewal is enabled by default and thanks to this, the user does not need to control the expiration date of the licenses and manually assign the**

licenses to the sensors. The only thing the user needs to do is key in a new license key to the platform before the current one expires.

16.4 Detaching license from sensor

It is possible to detach the license from a sensor. Once the license is detached, it gets back to the pool of available licenses and can be used to add another sensor. The sensor that has been detached from the license, will still be visible in the platform, but the new measurements from this sensor won't be saved and proceeded by Efento Cloud until a new (or the same) license is assigned to it. Detaching license from a sensor does not restart its lifetime (e.g. if a 12 month license was used for 4 months with Sensor 1, once it's detached its remaining lifetime will be 8 months).