

Emitu Platform with CORE sensors

Quick-Start Guide



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1. Introduction

This document describes the setup of the IoT Body Temperature Monitoring Solution with CORE sensors and Bluetooth Low Energy (BLE) gateways.

CORE is a sensor for body temperature measurement with state-of-the-art technology. It uses BLE to connect to smartphones or gateways.

Emitu is a full-stack IoT platform that combines a low-code framework with application templates to speed up the development of IoT solutions.

The figure below describes the architecture of the platform.

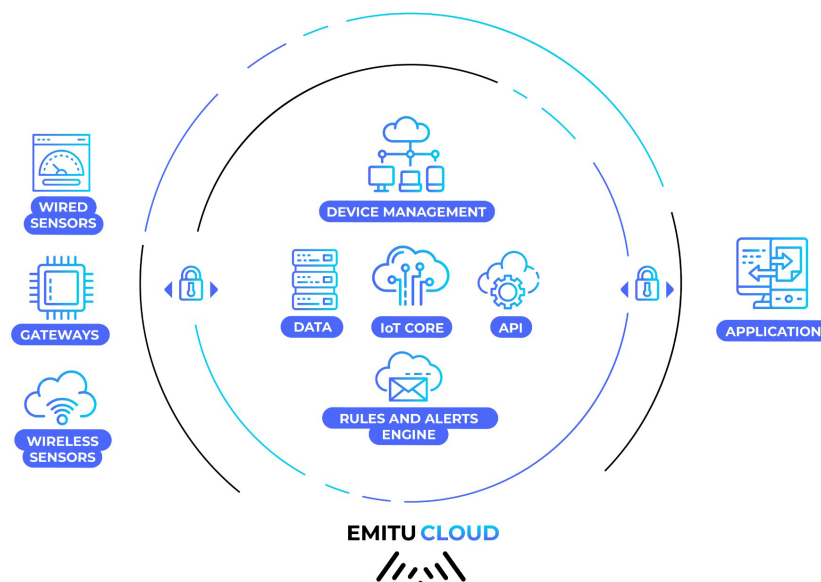


Fig.1

The gateways run a GNU/Linux application that connects to the Emitu Cloud Services to enable remote management and monitoring using MQTT.

The software configures and manages all services on the gateway on-the-fly.

The gateway captures packets the sensors send, processes them, and sends the data to the Emitu IoT Core module.

The gateway software is responsible for:

- Collecting messages from the sensors;
- Storing data appropriately until they can be processed;
- Processing that data;
- Sending the results to the cloud.

2. Basic Configuration

Your CORE sensors and gateways will be previously configured on the platform, and additional configuration to set up the system running is minimal.

The MAC address is the main naming field for each device (sensor and gateway).

You can view the list of your devices by clicking on the sidebar on:

Configuration > Equipment > CORE Sensors;

Address	Serial	Model	Brand	Fields	Battery (%)	Last Detected	Configuration	Pairing	Enabled	History
f7e5			Core	temperature battery	-	-	core	Asset	<input checked="" type="checkbox"/>	History Clone Edit Delete
c4:19			Core	temperature battery	-	-	core	Asset	<input checked="" type="checkbox"/>	History Clone Edit Delete
e3:1d			Core	temperature battery	-	-	core	Asset	<input checked="" type="checkbox"/>	History Clone Edit Delete
d0:e7			Core	temperature battery	-	-	core	Asset	<input checked="" type="checkbox"/>	History Clone Edit Delete
e7:88			Core	temperature battery	-	-	core	Asset	<input checked="" type="checkbox"/>	History Clone Edit Delete

Fig.2

Configuration > Equipment > Gateways;

Name	Address	Serial	Fields	Configuration	Pairing	Last Ping
	b8:71:88:88:88:88			gateway	Area	15-06-2022 00:35:42 (just now)
	b8:71:88:88:88:88			gateway	Area	15-06-2022 00:35:42 (just now)
	b8:71:88:88:88:88			gateway	Area	15-06-2022 00:35:42 (just now)
	b8:71:88:88:88:88			gateway	Area	15-06-2022 00:35:42 (just now)
	b8:71:88:88:88:88			gateway	Area	15-06-2022 00:35:42 (just now)

Fig.3

2.1. Set up Connectivity

The first step would be to plug the gateway into an available power socket and connect it to the network. You can connect it using Ethernet, Wi-Fi, or 3G (if supplied with an optional USB modem).

To use the Wi-Fi network, you need to follow the steps below:

1. Navigate in the sidebar to **Configuration > Equipment > Wi-Fi;**
2. Click the **Add New** button at the bottom of the table;
3. Fill in the form;
 - SSID (required) - The name of your Wi-Fi network;
 - Password (required) - The Pre-Shared Key (PSK) of the wireless network;
 - Hidden - Check this box if the SSID is hidden;
4. Click the **Add** button.

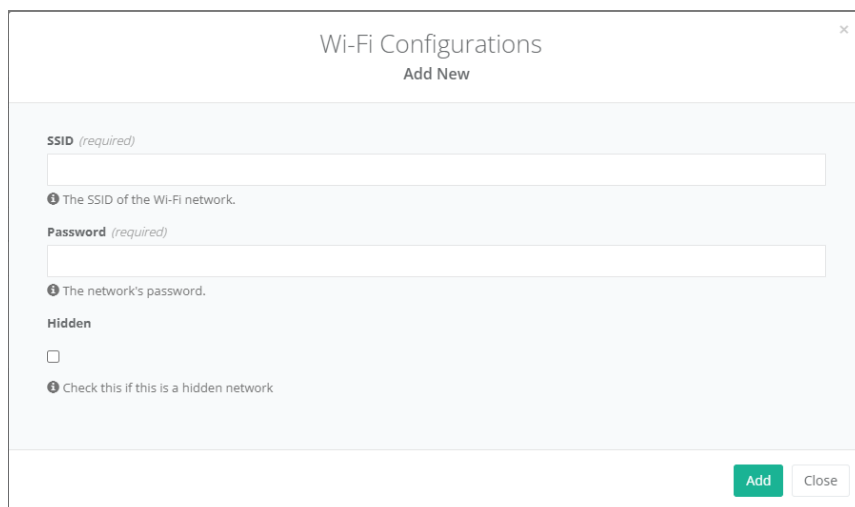


Fig.4

Important: After you add the Wi-Fi details, you need to connect the gateway to an available Ethernet socket for it to get the new configuration from the Emitu Platform. Wait a few minutes for the gateway to retrieve the new configuration, disconnect the Ethernet cable and reboot the gateway.

Check if the gateway connects to the cloud servers by navigating to **Configuration > Equipment > Gateways**, and view if the 'Last Ping' is green (see figure 3).

2.2. Setting up People

The CORE sensors are the physical devices that collect and transmit data, but such data is only meaningful when associated with people whose temperature is to be measured. This association is performed via the **People** page.

People

Show 25 entries

Search:

Export Print Reload Columns

Name	Date of Birth	Sex	Labels	Paired Device			
Hide	19/05/2022	Male	Test	c4:19:00:00:00:00	Pairings	Clone	Edit
Sandra	19/05/2022	Female	Test	de:e0:00:00:00:00	Pairings	Clone	Edit
Luc	19/05/2022	Male	Test	ec:f7:00:00:00:00	Pairings	Clone	Edit
Lee	16/05/2022	Male	Test	f7:e5:00:00:00:00	Pairings	Clone	Edit
Emanuela	19/05/2022	Female	Test	(Unpaired)	Pairings	Clone	Edit
Caroline	19/05/2022	Female	Test	(Unpaired)	Pairings	Clone	Edit

Showing 1 to 6 of 6 entries

Add New Bulk Upload

Previous 1 Next

Fig.5

Here, you can add, edit or remove new individuals, providing additional information, such as date of birth and sex. Once this person is given a CORE sensor to wear, you should identify this association by editing the entry on this page and choosing the device from the list, as shown below:

People Edit

Name (required)

Luc

Date of Birth

19/05/2022

Sex

Male

Labels

Test

(Optional) Descriptive tags to associate. Should be separated by spaces.

Paired Device

ec:f7:00:00:00:00 - (Device)

[Choose an Option]

ec:f7:00:00:00:00 - (Device)

Fig.6

This association of a device to a person is called “pairing”. You can see a log of all previous pairings of a person by clicking the respective link **Pairings** of the intended person entry.

3. Accessing and registering data

There are several ways to get the data of the CORE sensors.

3.1. The quick Dashboard

Select **Dashboard** on the sidebar. On this dashboard, you can see the readings as tiles, providing a bird's view of the different people under monitoring.

The tiles change colors according to the body temperature temperature:

- Red whenever the temperature is below 34,5°C or above 39,0°C.
- Yellow for readings 34,5<t<35,5°C or 37<t<39°C.
- Green for readings 35,5<t<37,0°C.

If you want to change the thresholds, please contact the support team at Emitu.

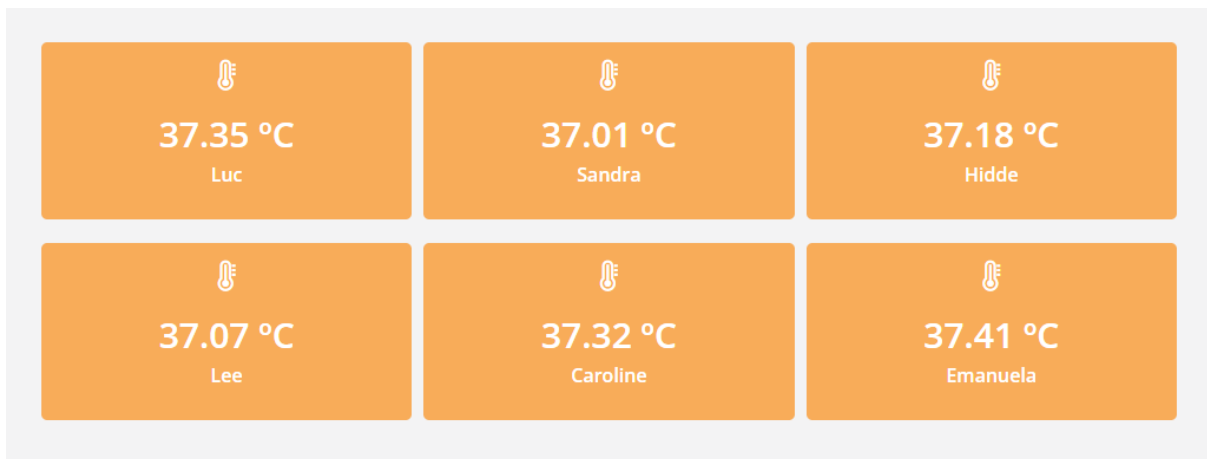


Fig.7

3.2. Last readings

Select **Readings** on the sidebar

Last Readings

Show entries Search: [Export](#) [Print](#) [Reload](#) [Columns](#)

Person	Date of Birth	Sex	Temperature (°C)	Last Updated	
Hidde	19/05/2022	Male	37.10	2022-05-19 16:00:30	History
Sandra	19/05/2022	Female	36.83	2022-05-19 15:09:30	History
Luc	19/05/2022	Male	36.81	2022-05-19 15:09:30	History
Lee	16/05/2022	Male	37.18	2022-05-19 16:12:30	History
Luc 2	19/05/2022	Male	37.41	2022-05-19 13:26:00	History
Luc 3	19/05/2022	Male	37.32	2022-05-19 15:09:30	History

Showing 1 to 6 of 6 entries [Previous](#) [Next](#)

Fig.8

3.3. Reading History

Select "History" on the readings page.

On this page, you can choose to view the data in table or graphical views.

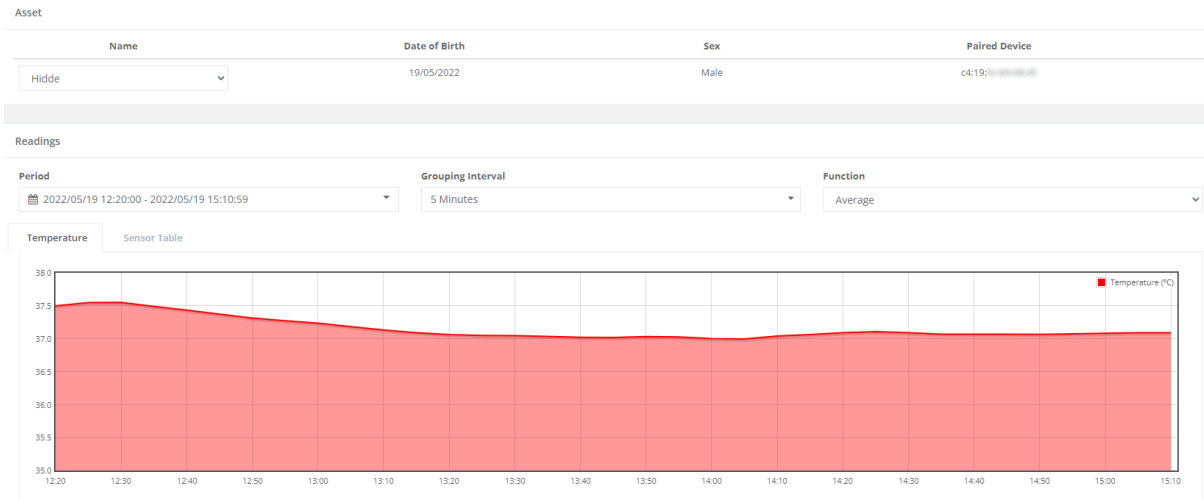


Fig.9

3.4. The tracking board

The tracking board allows manually registering data such as outdoor temperature, readings from other devices, or body temperature before and after an alert.

On the sidebar, select **Tracking Board** and click **Add New** on the bottom of the page.

Select the person you want to add the readings to from the dropdown list.

Add the timestamp of the reading and select the type of record from the list.

Type in the reading.

The screenshot shows the 'Tracking Board Add New' form. It has a title bar with 'Tracking Board' and 'Add New' and a close button (x). The form contains three required fields:

- Person (required):** A dropdown menu with 'Hide' selected.
- Time (required):** A text input field containing '2022-06-17 20:38:04'.
- Record (required):** A dropdown menu with 'Outdoor Temperature' selected. Below the dropdown is a list of options: 'Body Temperature Initial', 'Body Temperature after 30m', 'Body Temperature when Alert', and 'Outdoor Temperature' (highlighted in green).

4. Alerts and Reports

Alerts and Reports are two essential features in Emitu Cloud that allows users to get insights from the sensors without having to explicitly visit the platform.

4.3. Alerts and Rules

Rules allow users to instruct Emitu Cloud to issue alerts when certain conditions are met instead of having to check explicitly the data or device pages for changes. Alerts remain active in the system while the conditions persist and can trigger a notification by e-mail or SMS to inform interested parties.

Different types of rules can be configured, each providing some unique parameters but sharing a common ground.

4.3.1. Sensor Rules

You can use these rule types to be notified if a person's temperature falls below or rises above-given thresholds. To avoid unnecessary notifications caused by short oscillations in a person's body temperature, you can provide a reading duration, which will be used as the sample size. This will check if the average temperature remains out of bounds during this whole period before issuing an alert.

To create a new rule, go to

1. Navigate in the sidebar to **Configuration > Rules > Sensors Rules;**
2. Click the **Add New** button at the bottom of the table;

Sensor Rules
Add New

Condition Targets and Circumstances | **Alert** Message Details | **Contacts** Communication channels | **Execution** Evaluation and Events

Asset (required) Luc
ⓘ The asset to which this rules applies.

Field (required) Temperature
ⓘ Field/Metric to check for.

Min. Value 34
ⓘ If set, the alert will only be triggered if the value is below this minimum.

Max. Value 37.5
ⓘ If set, the alert will only be triggered if the value is above this maximum.

Duration 00:10:00
ⓘ If the average value is outside the limits for this duration. evaluated.

Next

Add Close

Fig.11

There are several other optional rule properties that can be set. The **Alert** tab allows you to identify the severity of the alert (which will be displayed in different colors), additional observations, and the language used in the messages (default being English). You can also indicate if you'd like to receive further notifications, either as reminders or as the last message when the issue is solved.

In the **Contacts** tab, you can indicate the e-mail addresses and telephone numbers for e-mail and SMS notifications, respectively. You can limit such notifications to working hours by setting up day and time restrictions in the **Execution** tab.

Finally, you can temporarily disable rules without removing them by just unchecking the "Enabled" checkbox in the rule table or edit window.

4.3.2. Connectivity Rules

These will trigger alerts when devices stop communicating, either sensors or gateways. On sensors, this might happen if the device falls out of range of the gateways, runs out of

battery, or a malfunction occurs. On gateways, common sources of communication failures arise if it has been unplugged, disconnected, or damaged.

Configuration of connectivity rules is similar to sensor rules, requiring only the indication of the device to check and the period of inactivity.

4.3.3. Battery Rules

Whenever sensors reach low battery levels, batteries should be recharged to avoid downtimes and loss of information. These rules are similar in nature to the previous ones, requiring only the indication of the device to check and the minimum battery level before issuing a notification.

4.3.4. Alerts

In addition to the optional e-mail and SMS notification, Emitu Cloud stores a record of the event, which can be consulted in the **Alerts > Alerts** entry on the side menu or the **bell icon** on the top-right corner of the screen.

4.3.5. Past Alerts

The alert disappears once the conditions behind the trigger of the alert have been surpassed or a user has manually archived the alert. Still, it will be listed in the Alerts > Past alerts page, containing information about the start, end, and archiving user.

4.4. Reports

Reports are documents containing aggregated information about a sensor data history, similarly to the information that can be checked on the history page. Reports are issued in pdf or excel format and can be automatically delivered by e-mail without requiring an explicit visit to Emitu Cloud.

4.4.1. Report Routines

Report routine configurations can be accessed via the side menu **Configuration > Report Routines**. A routine should indicate the persons that the generated reports refer to, as well as when and how often. The formats, languages, and methods of delivery are configurable options as well.



The screenshot shows a web form titled "Report Routines" with a sub-header "Edit". The form contains several sections, each with a required field and a descriptive help icon:

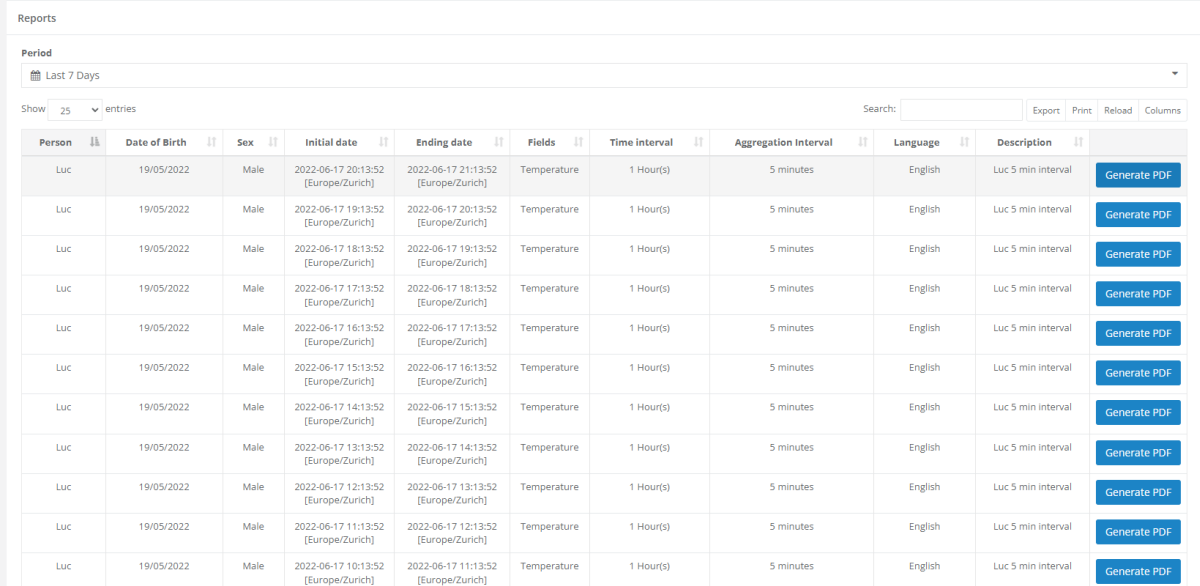
- Person (required):** A dropdown menu with "Luc" selected. Help: "Assets which will be included in the report. More than one can be selected."
- Fields (required):** A dropdown menu with "Temperature" selected. Help: "Field/Metric to check for. More than one can be selected."
- Initial date (required):** A text input field containing "2022-05-19 13:13:52". Help: "Starting date and time to send the report emails."
- Timezone (required):** A dropdown menu with "Europe/Zurich" selected. Help: "Timezone of the indicated time."
- Time interval:** A section with "Every" and "1" in a text input, and "Hour(s)" in a dropdown menu. Help: "Time interval between each sent report."
- Aggregation Interval (required):** A text input field containing "00:05:00". Help: "Interval used to aggregate the records of the selected fields."
- Notif. E-mail(s):** A text input field containing a redacted email address. Help: "An e-mail will be sent to the indicated address. You can indicate several addresses, separated by semicolon (;)."
- File(s) format(s) (required):** A dropdown menu with "PDF file(s)" selected. Help: "Format which the report(s) should be created in."
- Attachment method(s) (required):** A dropdown menu with "Attachment, External link" selected. Help: "Method of accessing the reports. Either receive them as an email attachment, an external link or both. Due to security/external issues such as firewall configurations or spam filters, emails with certain attachments or links can be blocked."
- Short description:** A text input field containing "Luc 5 min interval". Help: "Short description about the routine that will be added in the email's subject. Sample subject: 'Reports - [SHORT DESCRIPTION]'"
- Language (required):** A dropdown menu with "English" selected. Help: "Language used in the report text."

At the bottom right of the form, there are two buttons: "Save" (in a green box) and "Close".

Fig.12

4.4.2. Accessing Reports

In addition to being sent by e-mail, reports can be downloaded directly at any time. Once a routine has been configured, reports can be viewed in the **Reports** page accessible through the side menu.



Reports

Period: Last 7 Days

Show: 25 entries

Search: [] Export Print Reload Columns

Person	Date of Birth	Sex	Initial date	Ending date	Fields	Time interval	Aggregation Interval	Language	Description	
Luc	19/05/2022	Male	2022-06-17 20:13:52 [Europe/Zurich]	2022-06-17 21:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 19:13:52 [Europe/Zurich]	2022-06-17 20:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 18:13:52 [Europe/Zurich]	2022-06-17 19:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 17:13:52 [Europe/Zurich]	2022-06-17 18:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 16:13:52 [Europe/Zurich]	2022-06-17 17:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 15:13:52 [Europe/Zurich]	2022-06-17 16:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 14:13:52 [Europe/Zurich]	2022-06-17 15:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 13:13:52 [Europe/Zurich]	2022-06-17 14:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 12:13:52 [Europe/Zurich]	2022-06-17 13:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 11:13:52 [Europe/Zurich]	2022-06-17 12:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF
Luc	19/05/2022	Male	2022-06-17 10:13:52 [Europe/Zurich]	2022-06-17 11:13:52 [Europe/Zurich]	Temperature	1 Hour(s)	5 minutes	English	Luc 5 min interval	Generate PDF

Fig.13

5. Integrating with our platform

5.1. Using the API

Emitu platform uses a token-based authentication and authorization schema. This means that each request to a protected resource must be authorized by presenting a valid access token.

Obtaining an access token

An access token can be requested by sending a **POST** request to **/api/login** with a **JSON** format as follows:

```
{  
  "email": "<email>",  
  "password": "<password>"  
}
```

```
}
```

In response, you will receive a **JSON** with the following format:

```
{
  "accessToken": "<access token>",
  "refreshToken": "<refresh token>"
}
```

The refresh token is used to request a new access token whenever this expires, preventing the user from re-authenticating. If you would like to directly login to a specific company, you can provide the company id directly into the request, as follows:

```
{
  "accessToken": "<access token>",
  "refreshToken": "<refresh token>",
  "companyId": <companyId>
}
```

NOTE: Currently, users with 2FA enabled on their accounts cannot access API functionalities. Each attempt to get an access token will be rejected automatically.

Authorizing requests

Requests can be authorized by using the Bearer schema:

Authorization: Bearer <token>

However, keep in mind that an access token has a validity time which will make the requests fail on expiration. Using the refresh token, you can avoid re-authenticating on access token expiration, thus attempting again a request. To obtain a new access token, send a **POST** request to **/api/refresh** with the following request format:

```
{
  "refreshToken": "<refresh token>"
}
```

The response will be a **JSON** containing a new access token with the following format:

```
{
  "accessToken": "<access token>"
}
```

The refresh token remains the same on refresh requests, but the expiration period gets automatically prolonged on successful requests. However, when the refresh token expires, you will be forced to authenticate again. If you would like to change the current company for the user, you can send a company id along with the request, as follows:

```
{
  "refreshToken": "<refresh token>",
```

```
    "companyId": <companyId>  
  }
```

Using API Keys/Tokens

1. Navigate to **Access > API Keys**;
2. Click the **Add New** button;
3. Fill in the form.
 - Description (required) – A way to visually identify the API key.
 - Privileges – For example, to be able to add antennas, the **Add Antennas** privilege needs to be selected; otherwise it will not work.
4. Click the **Add** button.

Once the **Add** button is clicked, a dialog with the bearer token will appear. Be sure to save the key somewhere safe, as it will not be shown again after closing the dialog.