io-base
value-added data

TERĒGA
SOLUTIONS

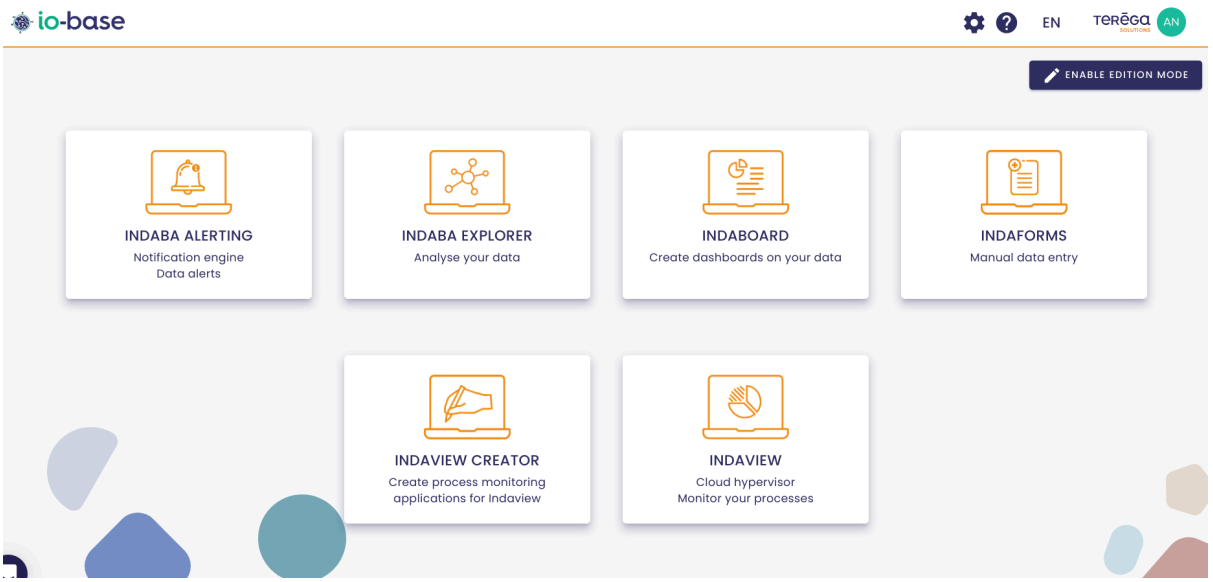
IndaPortal

User Documentation

Content

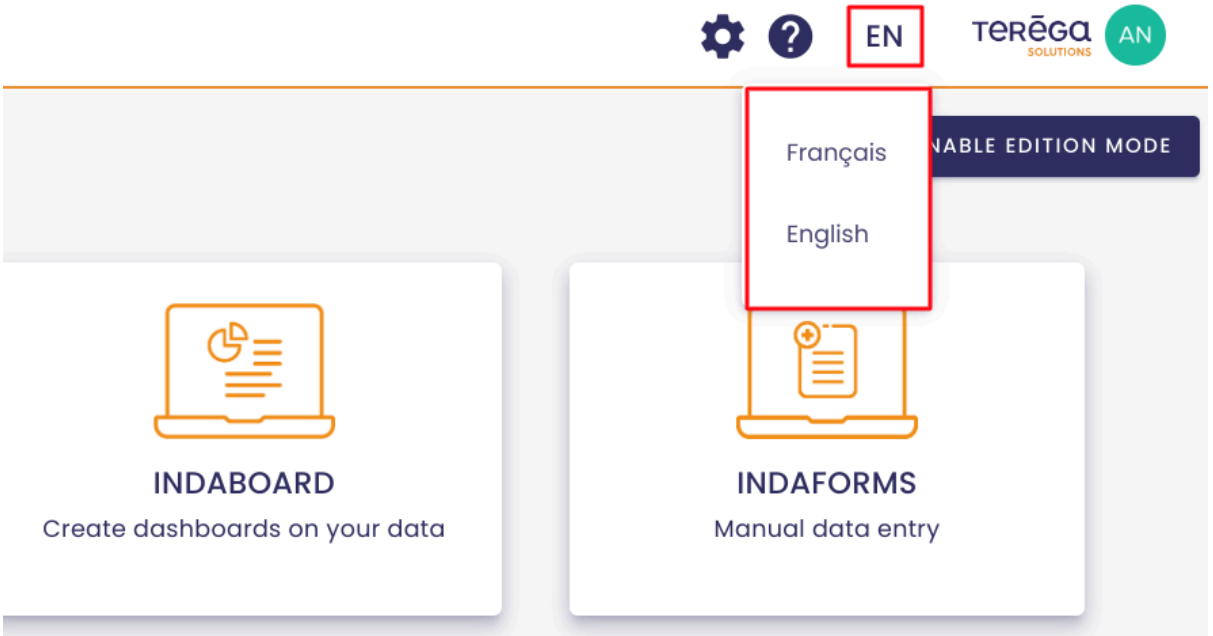
1. Changing the language

Log in to the IndaPortal website.



It is possible to display the web application in English or French. This change of language can be made at any time.

Click on the flag at the top right of the screen.



Both languages are displayed. Click on the desired language.

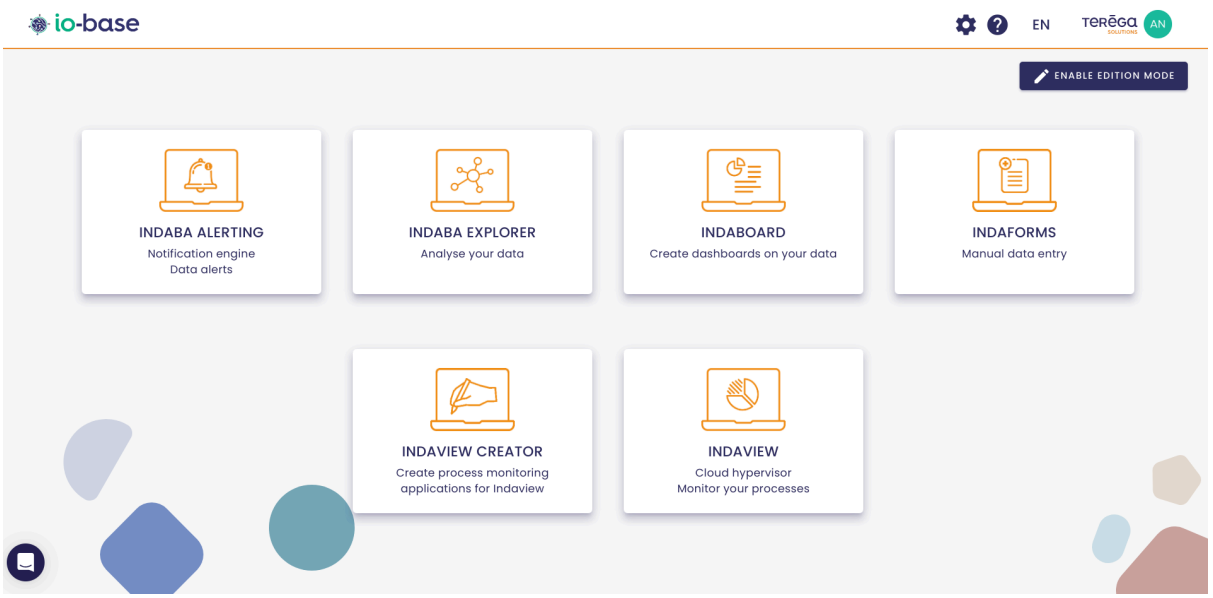
The page is now in the selected language.

2. Dynamic tiles management

A user with the functional administrator role can manage the tiles on the homepage.

Access the Io-base portal.

The **Enable edition mode** button allows you to set up the home screen: add, modify, and delete tiles.

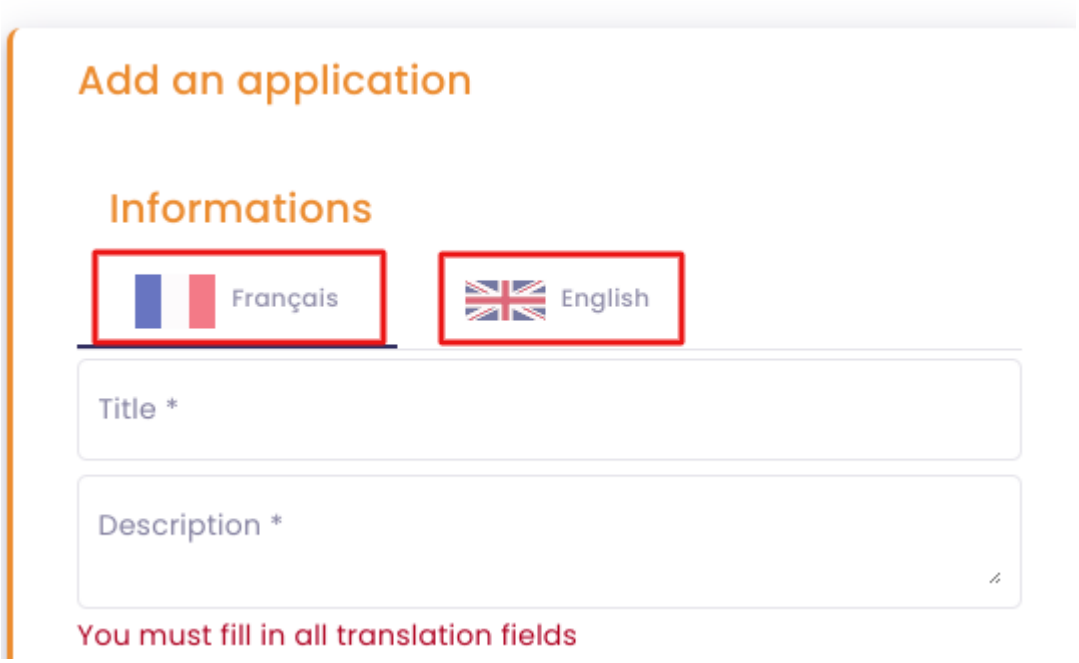


2.1 Adding a tile

To add a tile, click on the **Enable edition mode** button.

Complete the **Add an application** form.

Note : Make sure to complete both the english and the french tab.



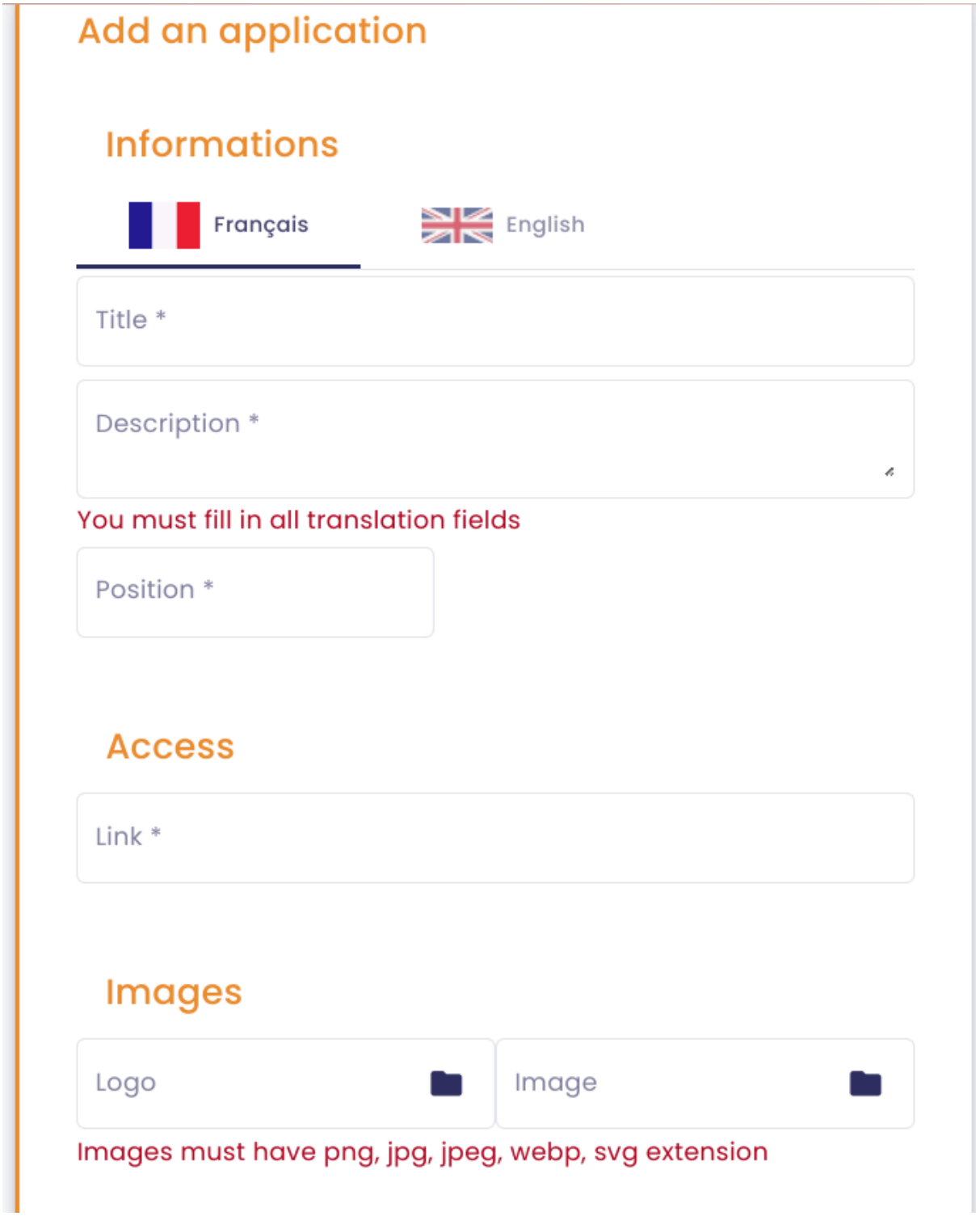
Note: In the **Position** field you can only indicate a value equal or above 5. Places 1,2,3 and 4 are reserved for the Io-Base main applications.

Click on the **Save** button. The new tile has been added.

2.2 Editing a tile

To edit a tile, click on the **Enable edit mode** button.

Select the tile you want to edit.



Modify the required information.

Click on the **Save** button to save the changes.

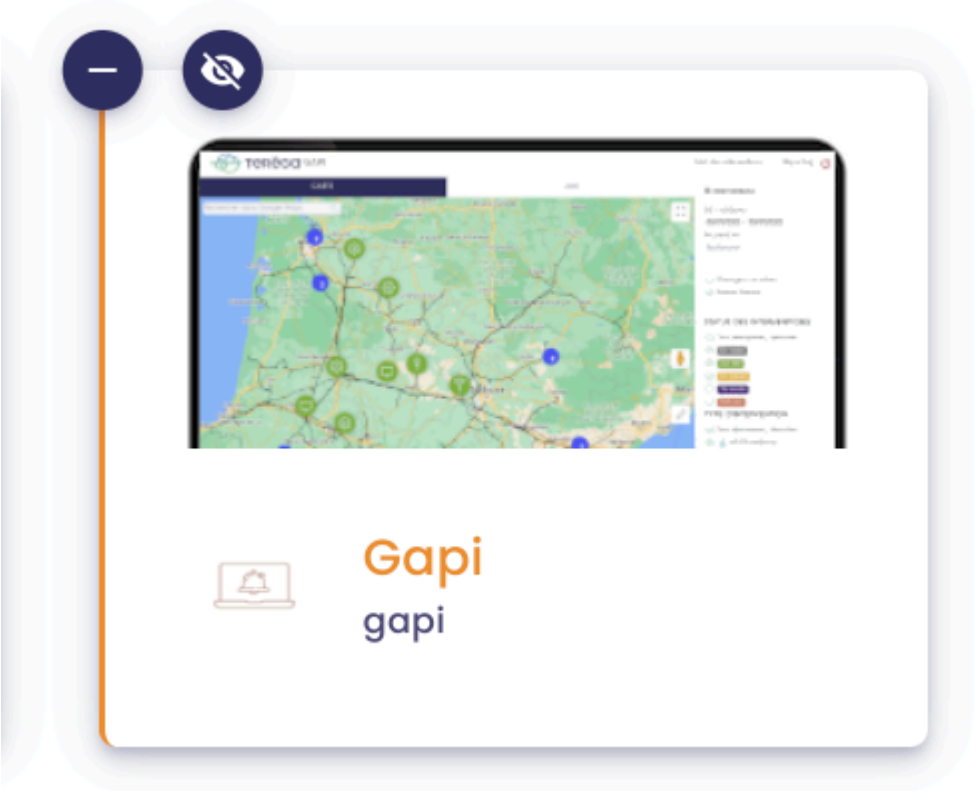
Click on the **Cancel** button to ignore the changes.

Note: In the **Position** field you can only indicate a value equal or above 5. Places 1,2,3 and 4 are reserved for the Io-Base main applications.

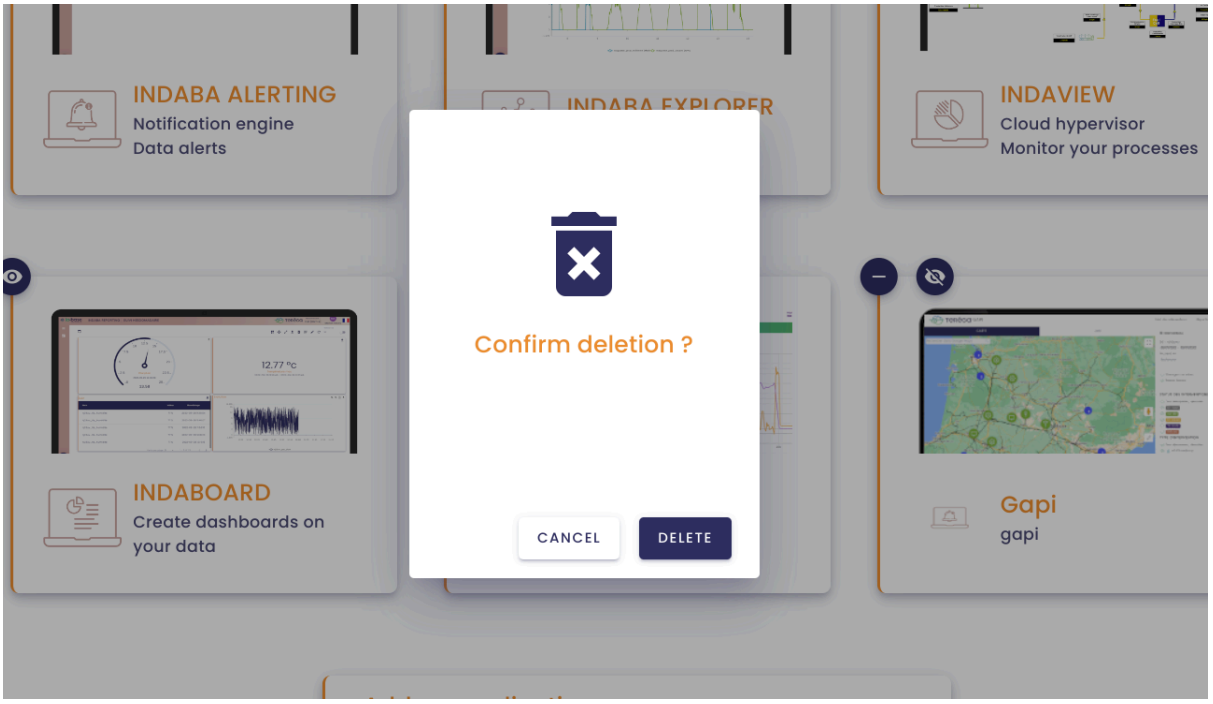
Note: the image formats allowed are PNG, JPG, JPEG, WEBP and SVG.

2.3 Deleting a tile

To delete a tile, click on the **Enable edition mode** button, then the " **-** " icon at the top left of the tile.



A confirmation window opens.



Click on **Delete** to continue.

Click **No** to cancel.

Note: The main tiles of the Io-Base suite cannot be deleted. However, it is possible to hide them.

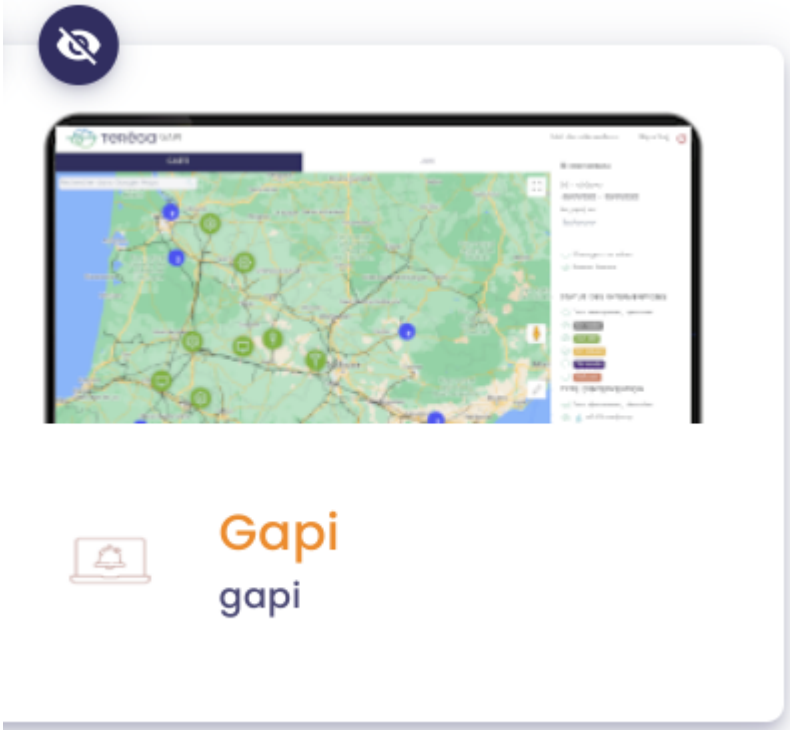
2.4 Hiding a tile

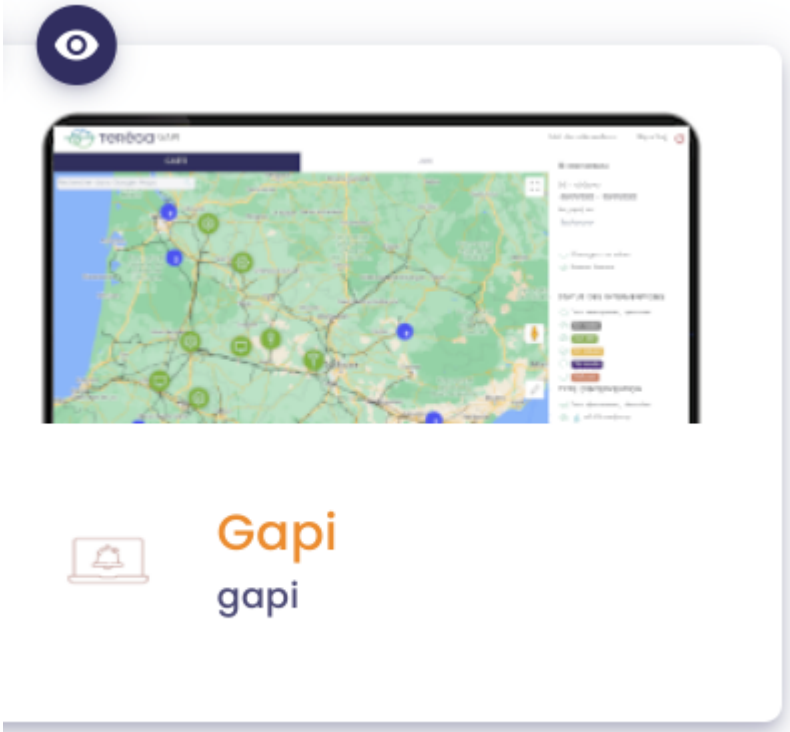
To hide a tile, click on the **Enable edition mode** button.

Then click on the

icon :

- if the eye is not crossed out : the tile is visible from the home screen,
- if the eye is crossed out : the tile is not visible.





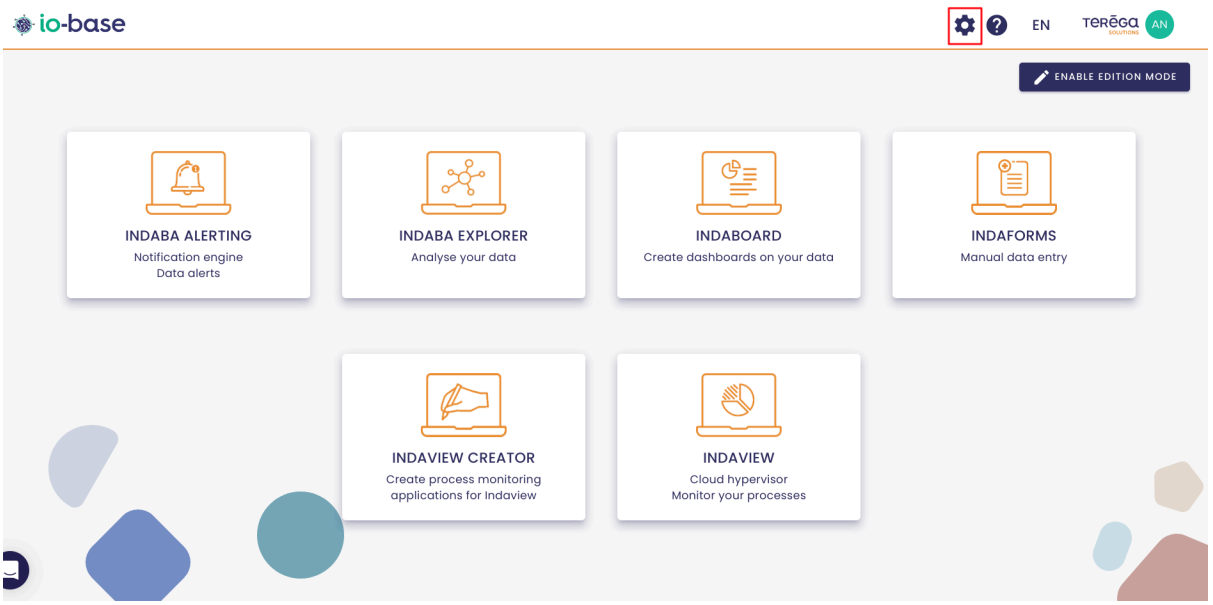
Then click on the **Disable edition mode** button.

3. Import an IndaView file

Prerequisites : this feature is available for users with a **ViewCreator** role.

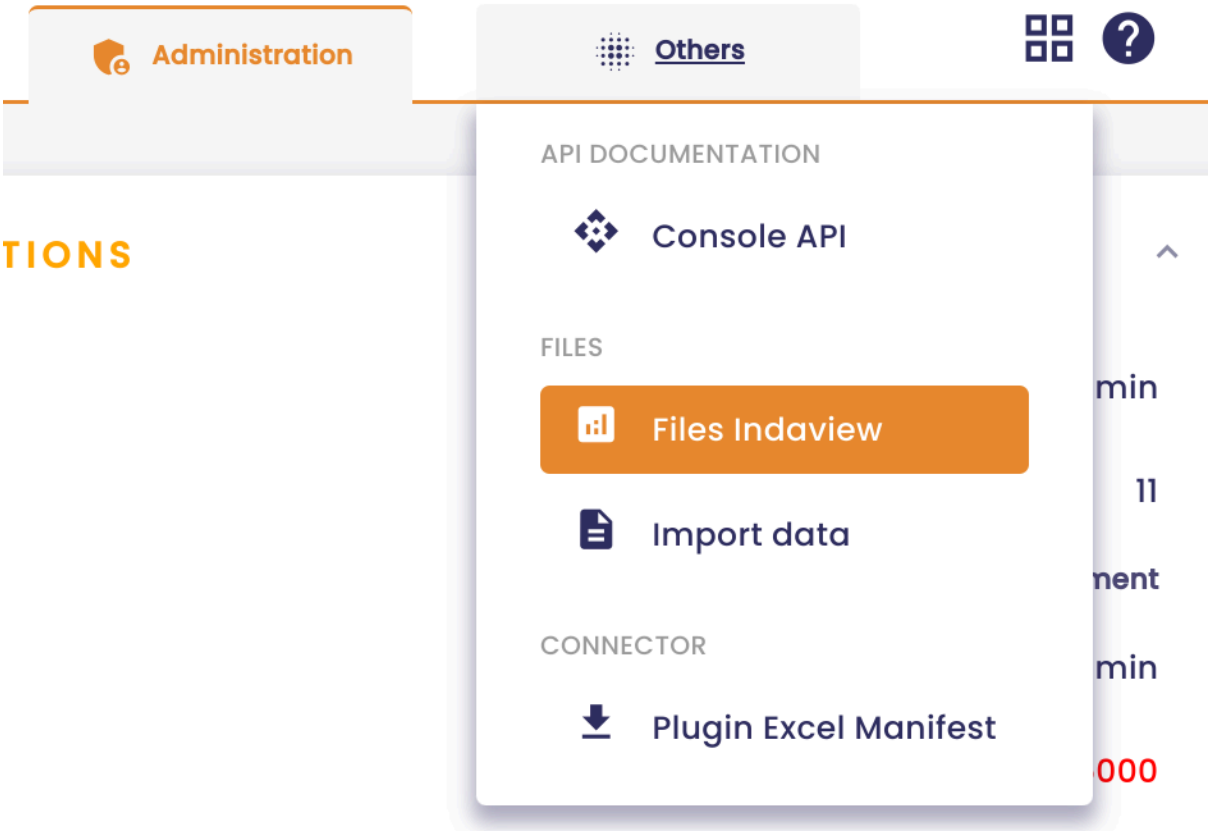
Io-base includes a menu where you can save files to use in IndaView Creator (such as images, synoptics, and more).

To access it, log in to **Io-base** and click the button at the top right of your screen, highlighted below :



The Io-base administration page opens.

Go to the **Others/Files IndaView** menu.

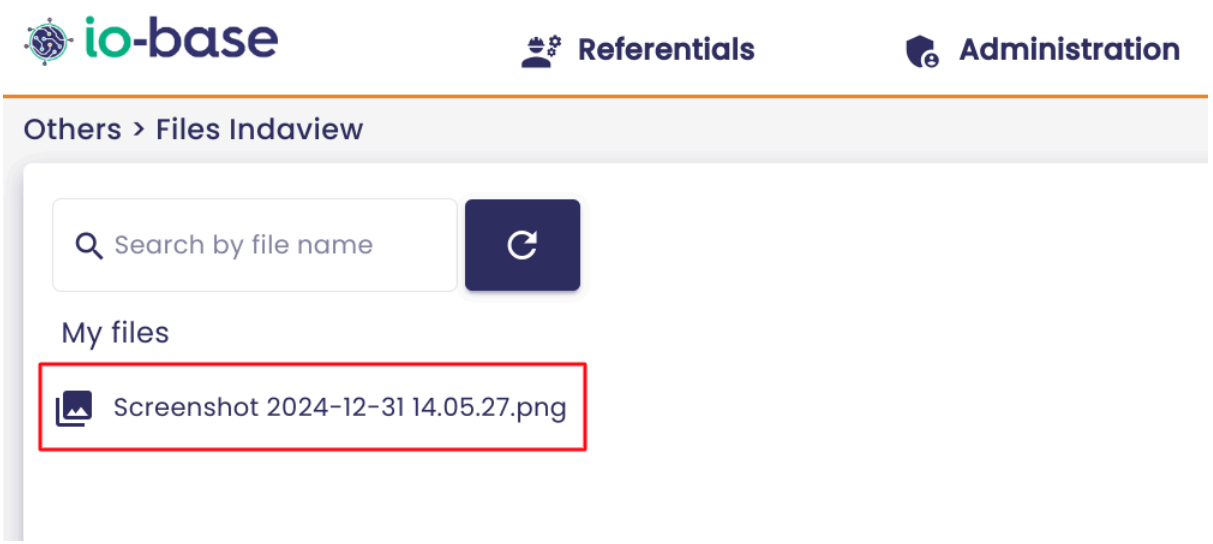


3.1 Import a file

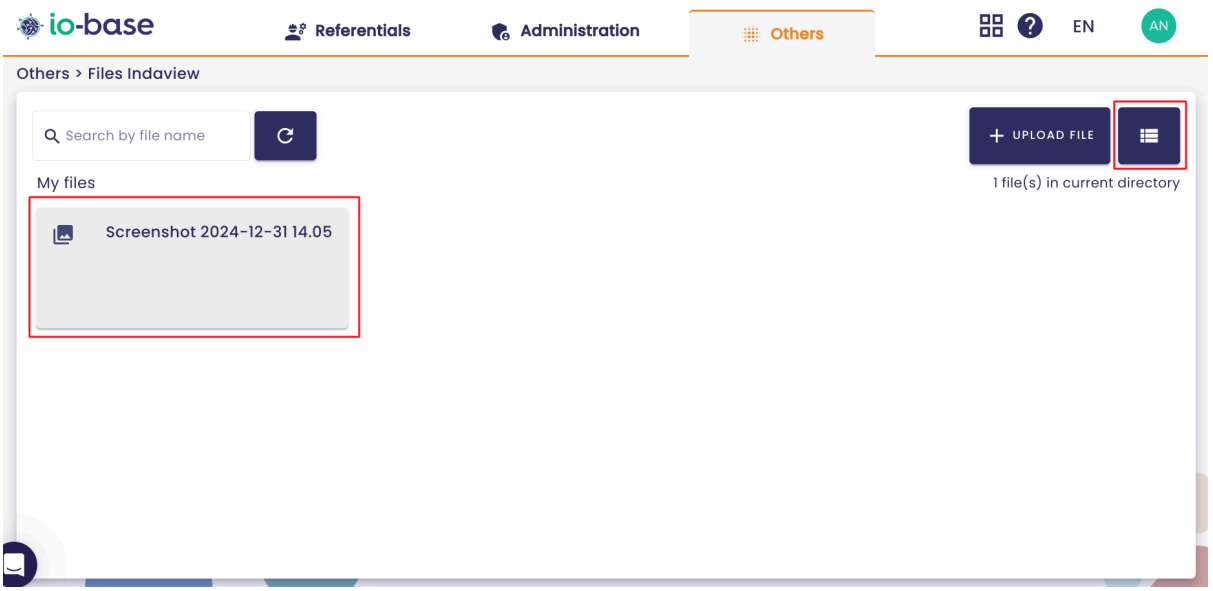
To import a new file, click on the

button.

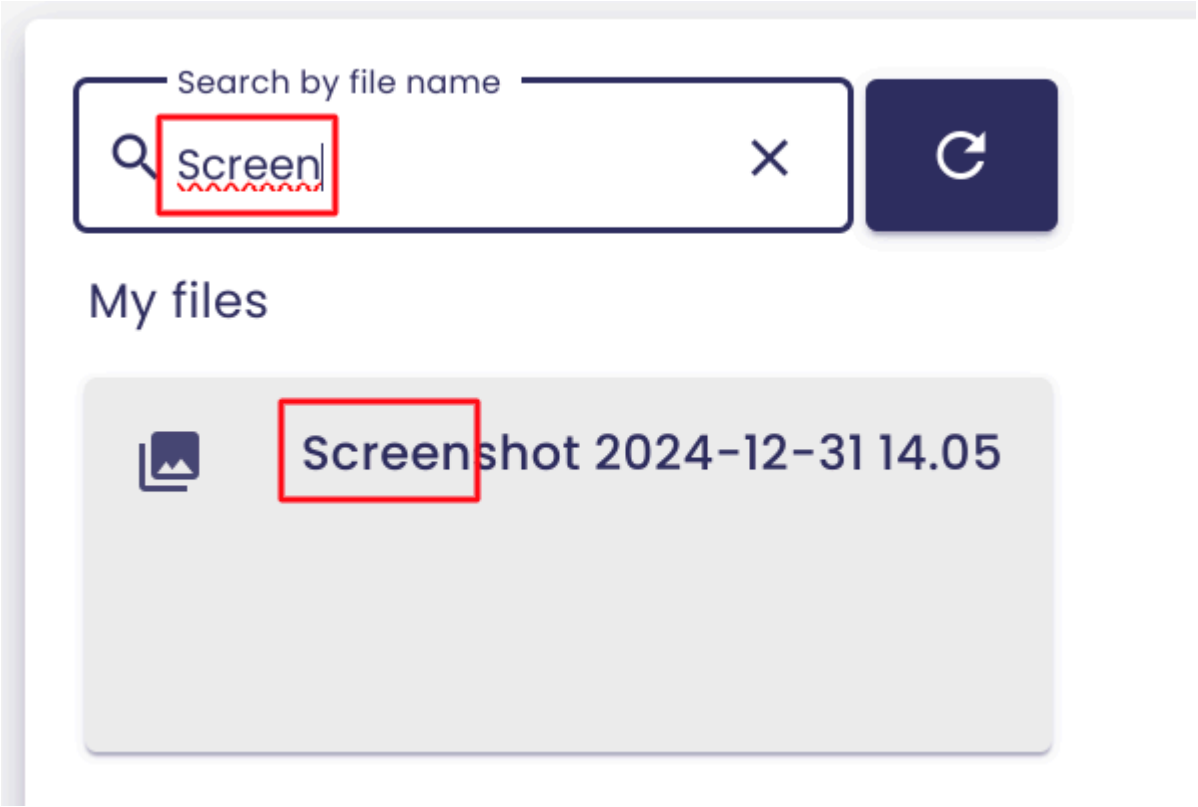
Then, select a file from your library.



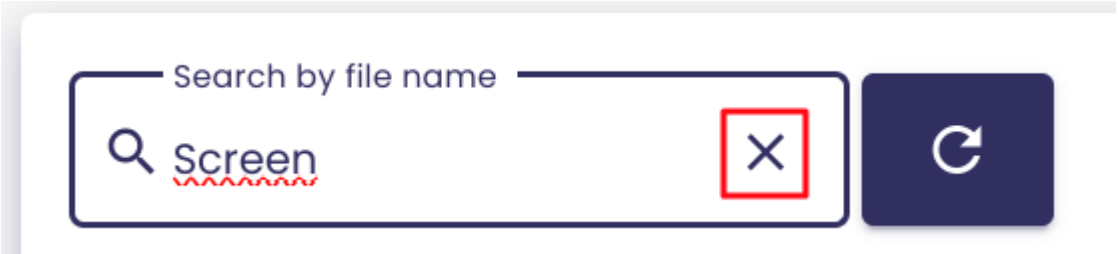
You can choose to display the files in a card view or list view by using the button below :



A search area is available to help you easily find the desired file.



Note : to reset the search area, click on the cross button.

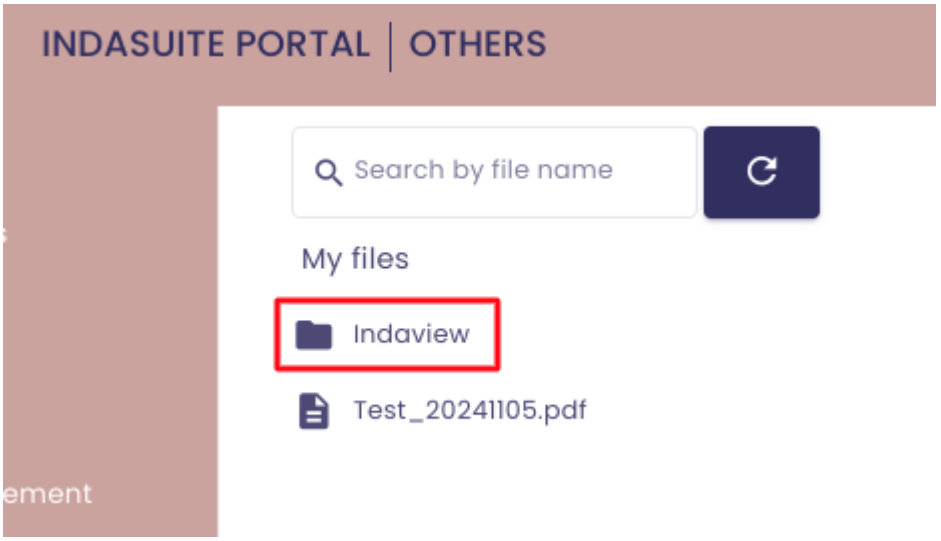


3.2 Importing images to IndaView Creator

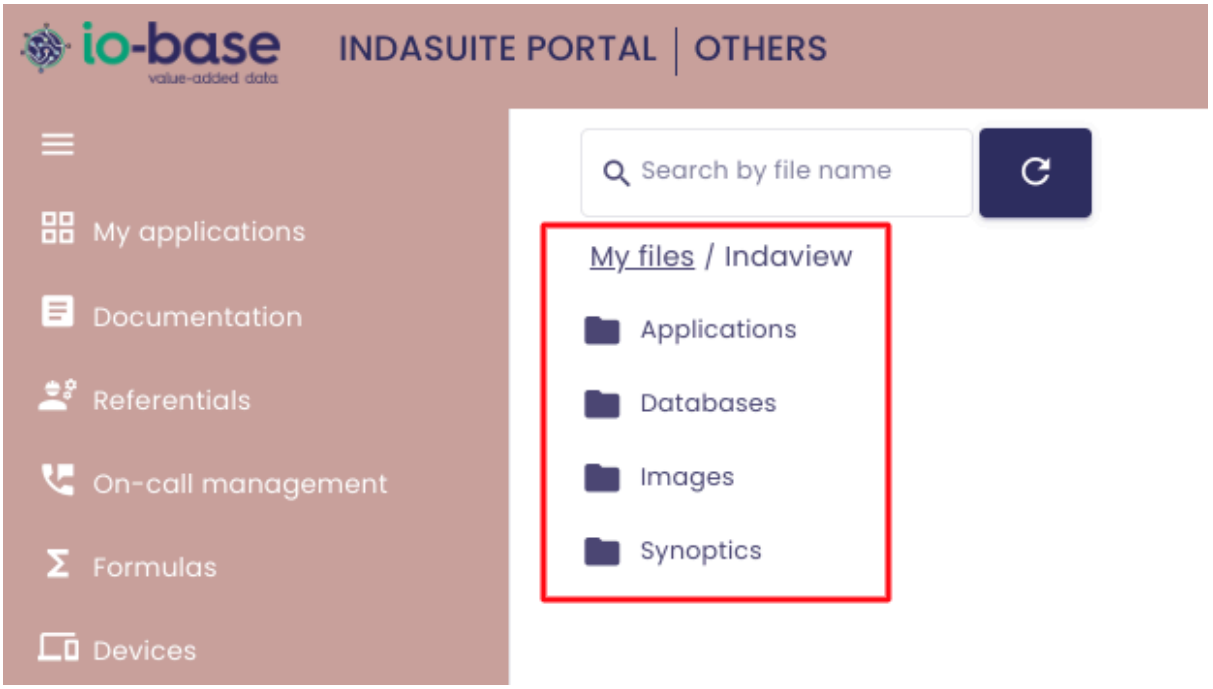
To use images directly in your IndaView Creator synoptics, you will first need to import them into **Io-base**.

To do so, follow the procedure below :

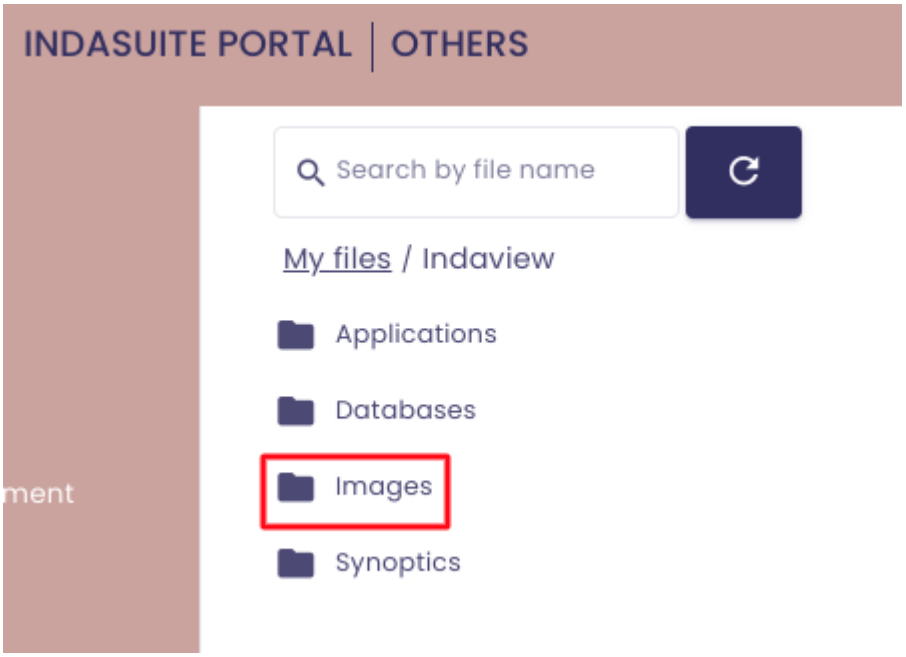
In the **Import IndaView** menu, you will find an "**IndaView**" folder.



Open the folder :



Then, go to the "**Images**" folder :



Now, import the image you want as described earlier.

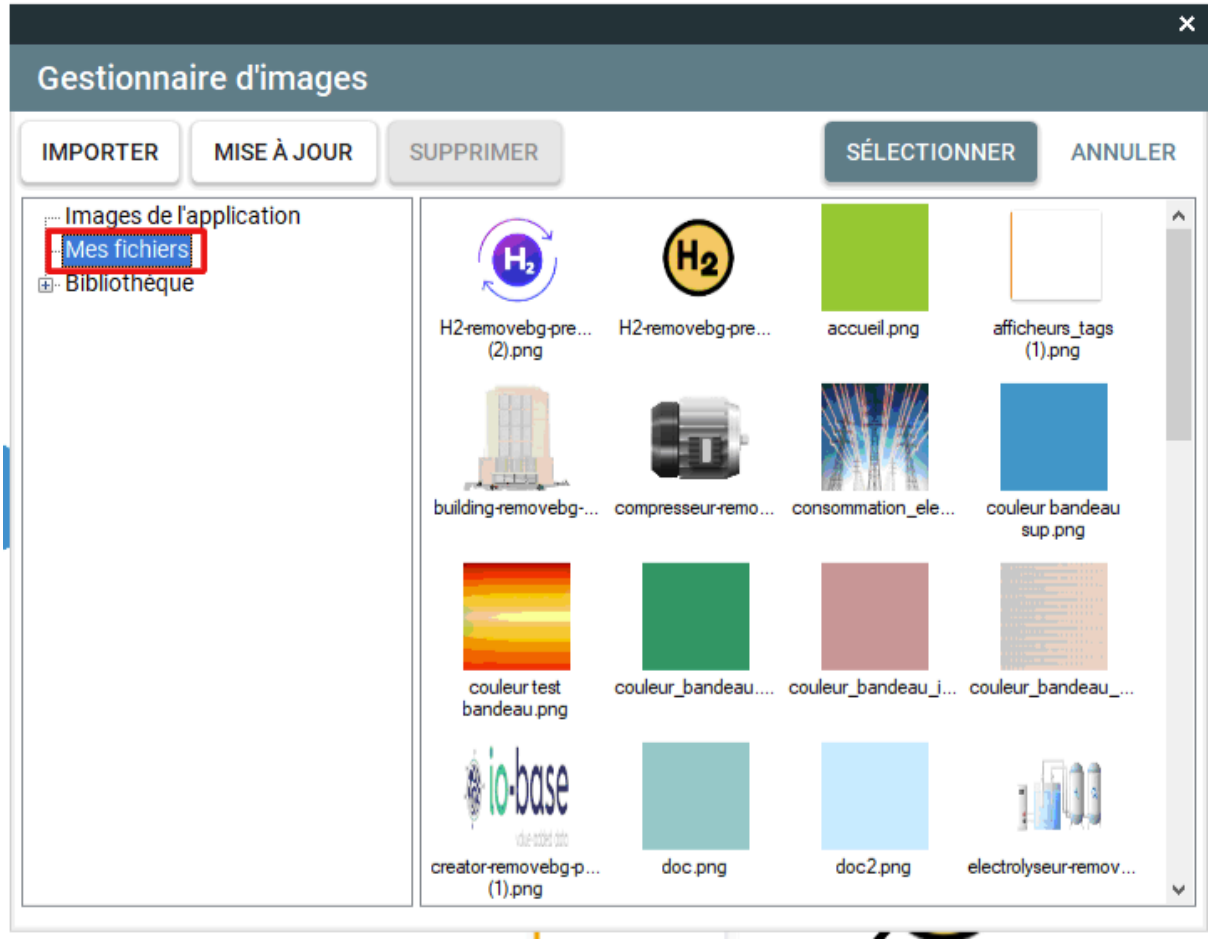
All images imported and stored in this folder will be available in "**IndaView Creator**" :

In the action bar, click on the dropdown menu to create new objects :

Then select "**Image**".

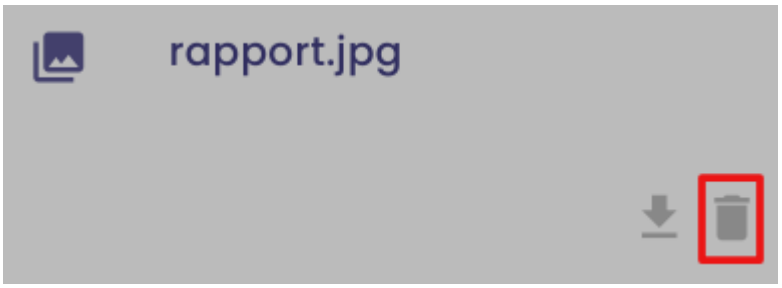
Next, choose **My Files**.

The images stored in the Io-base "**Images**" folder will appear.



3.3 Delete a file

To delete a file, hover the file and click on the bin icon.



3.4 Download a file

To download a file, hover the file and click on the download icon.

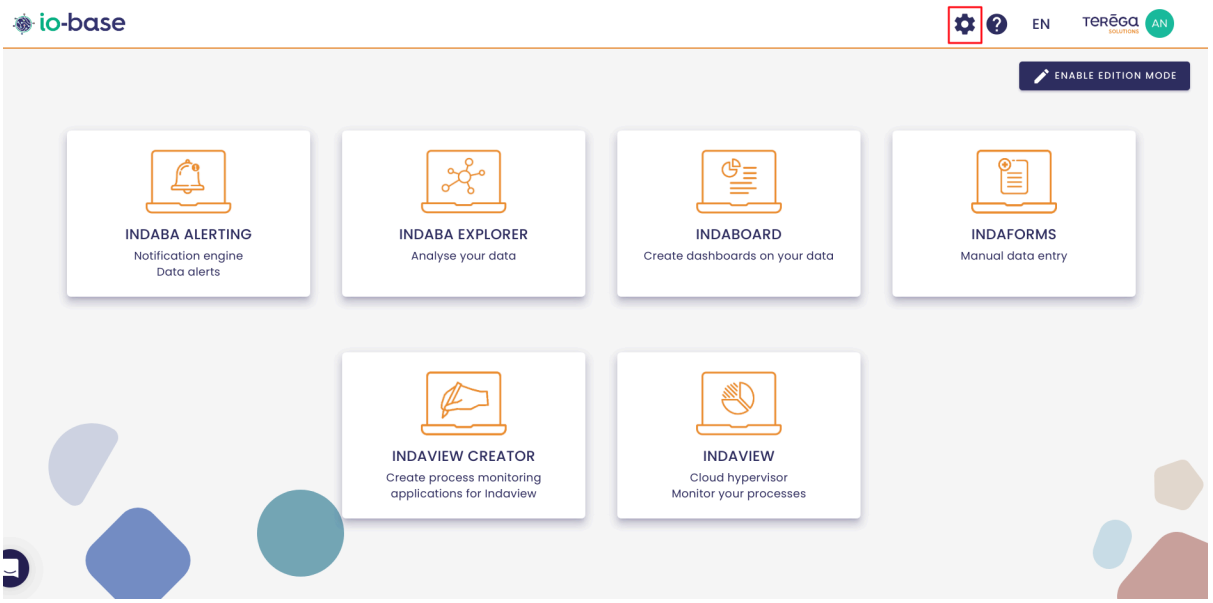
4. Data file import

Prerequisite : this feature is available for users with a writer role.

You can import Indaba data files into Io-base.

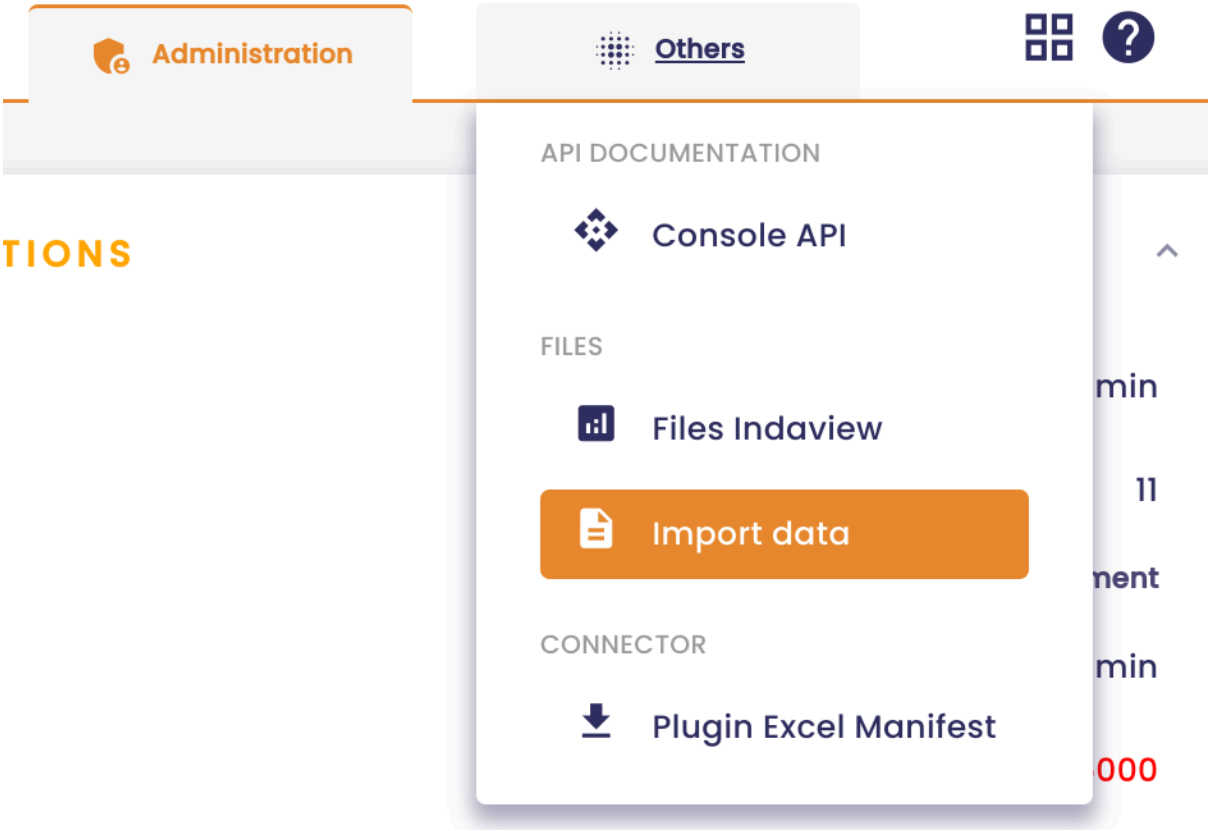
This allows you to keep historical data files and/or add new data.

Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



The Io-base administration page opens.

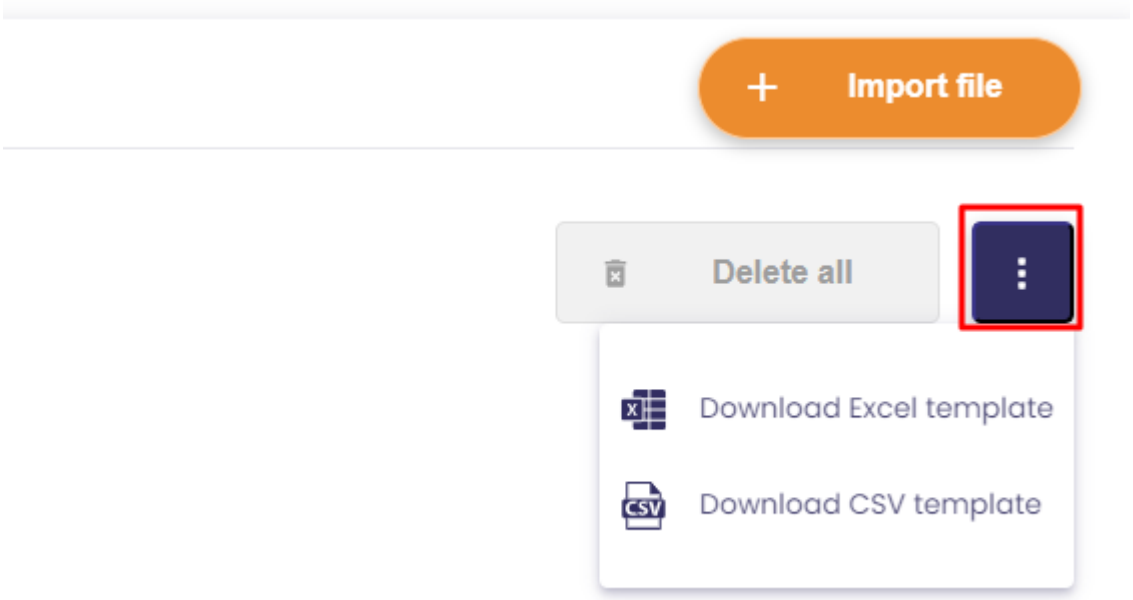
Go to the **Others/Import data** menu.



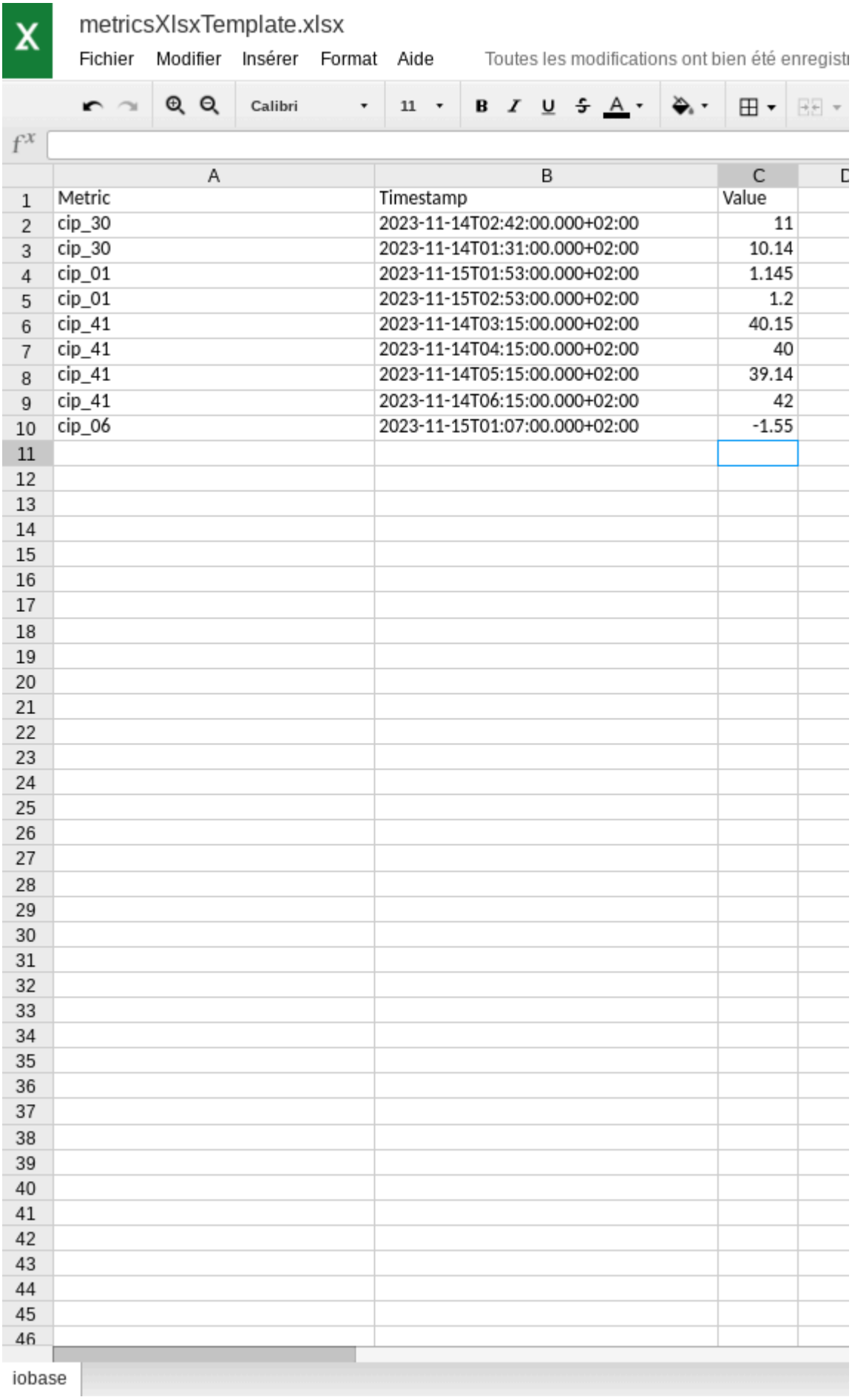
To import a file, it must follow a specific template. Begin by downloading the templates available in Excel and CSV formats.

To do so, click on the

button, on the right side of the screen, then download the file template in your preferred format.



Open the downloaded file :



	A	B	C
1	Metric	Timestamp	Value
2	cip_30	2023-11-14T02:42:00.000+02:00	11
3	cip_30	2023-11-14T01:31:00.000+02:00	10.14
4	cip_01	2023-11-15T01:53:00.000+02:00	1.145
5	cip_01	2023-11-15T02:53:00.000+02:00	1.2
6	cip_41	2023-11-14T03:15:00.000+02:00	40.15
7	cip_41	2023-11-14T04:15:00.000+02:00	40
8	cip_41	2023-11-14T05:15:00.000+02:00	39.14
9	cip_41	2023-11-14T06:15:00.000+02:00	42
10	cip_06	2023-11-15T01:07:00.000+02:00	-1.55
11			
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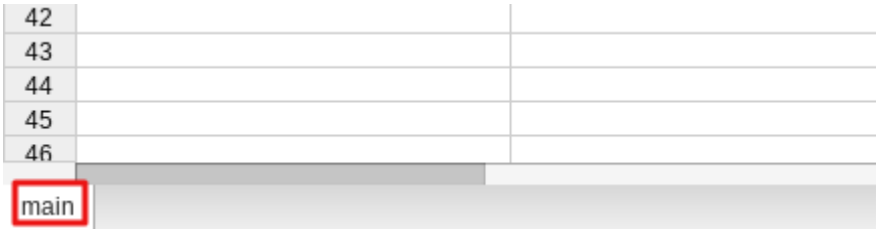
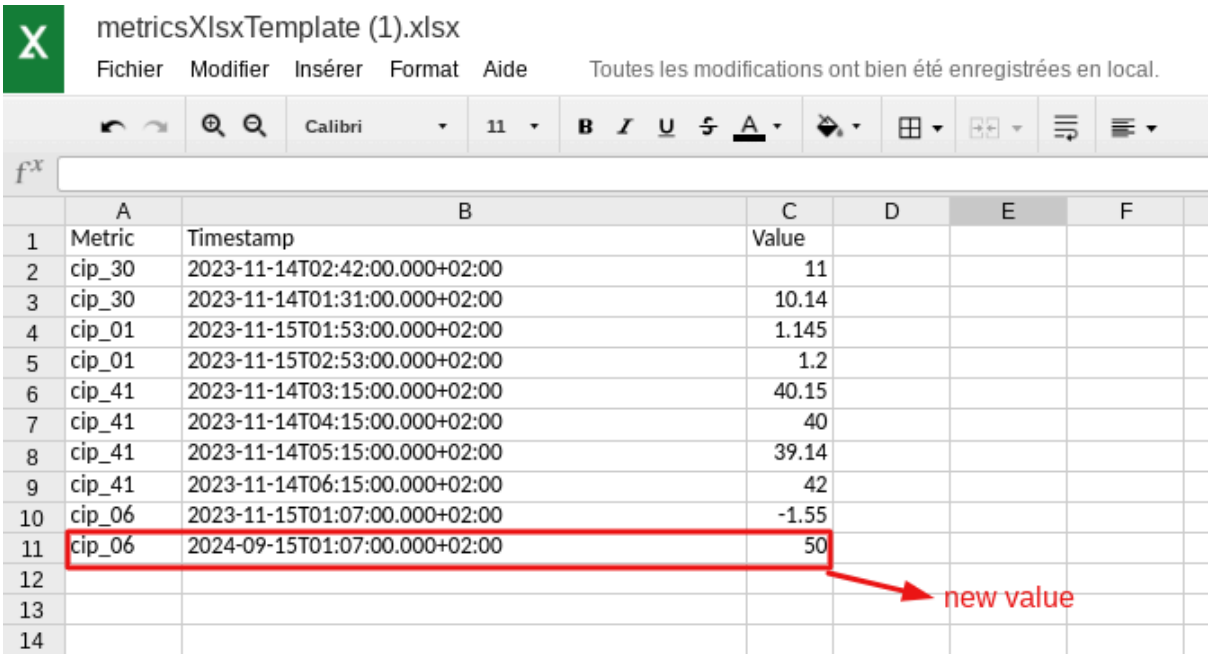
Important : To begin with, change the name of the sheet. It must bear the name of the database containing the metrics.



4.1 Write new values

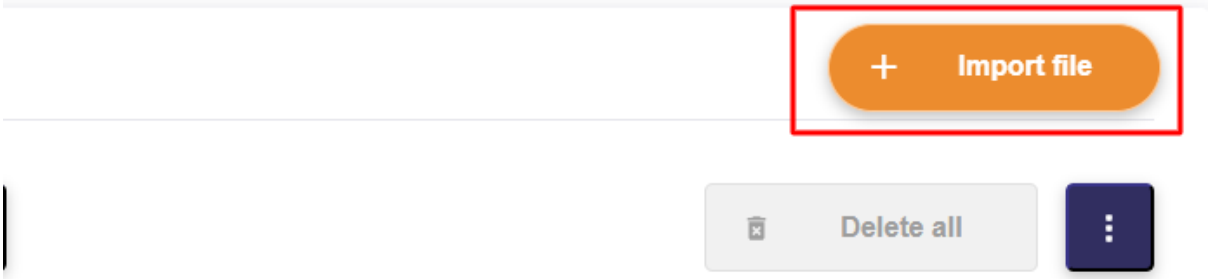
If you want to write new values from your file, enter the following in the corresponding columns :

- Metric : enter the name of the desired metric
- Timestamp : enter the timestamp
- Value : enter the value to be injected

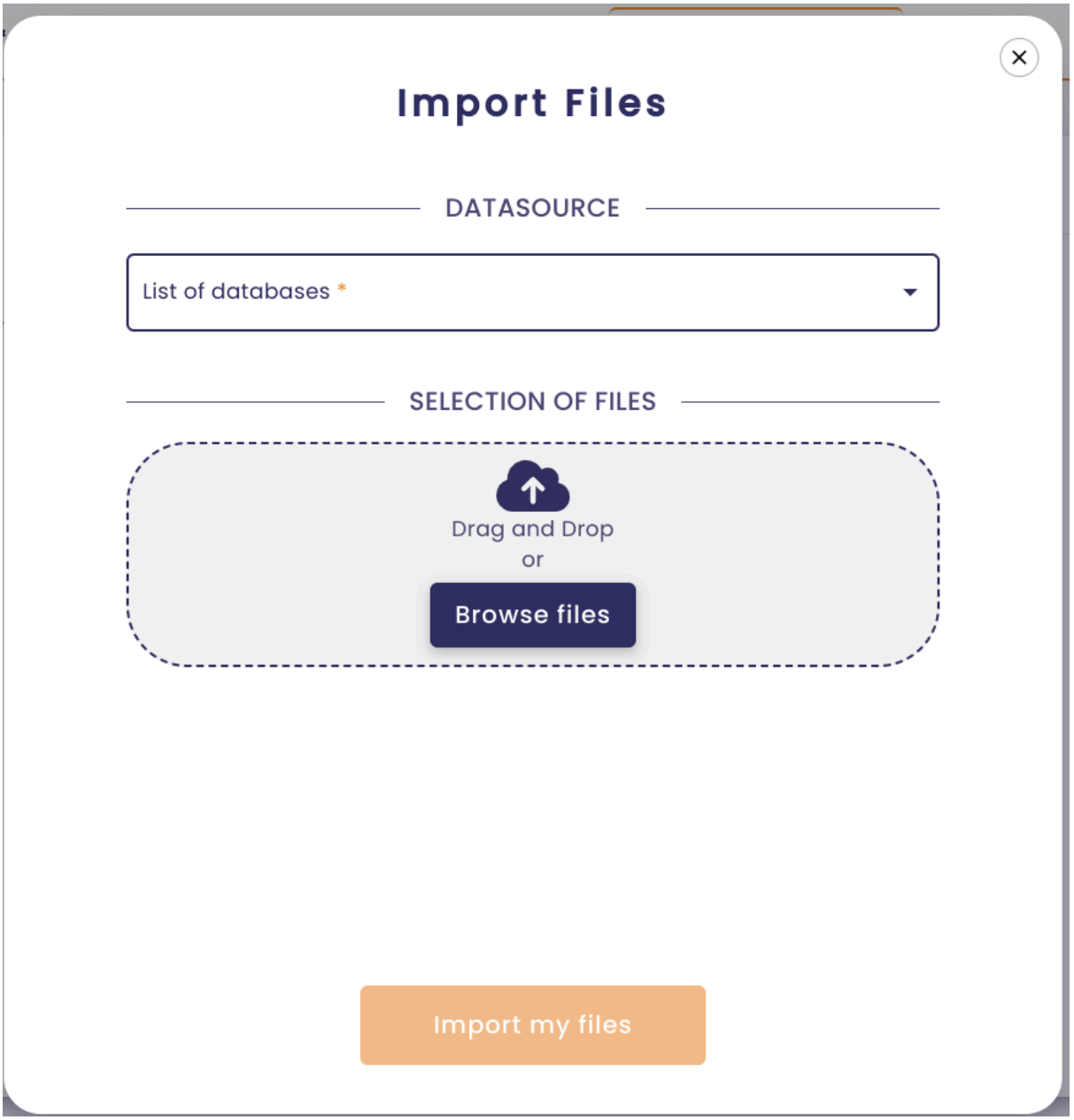


Note : You must have access rights to a metric in order to write values to it.

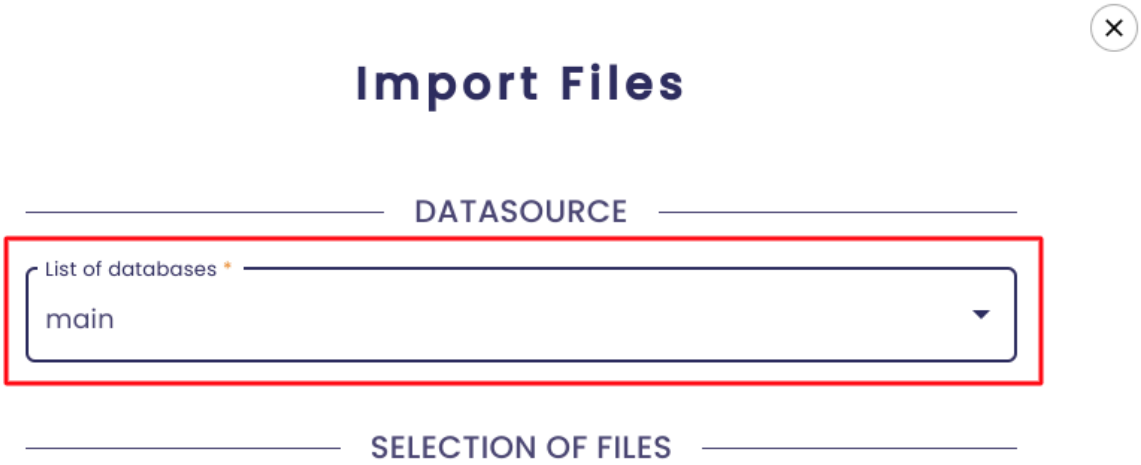
Once you have completed your file with the required data, click on the '**Import file**' button.



The following window will appear :



Select the database that contains the Indaba data included in the file(s) you wish to import.



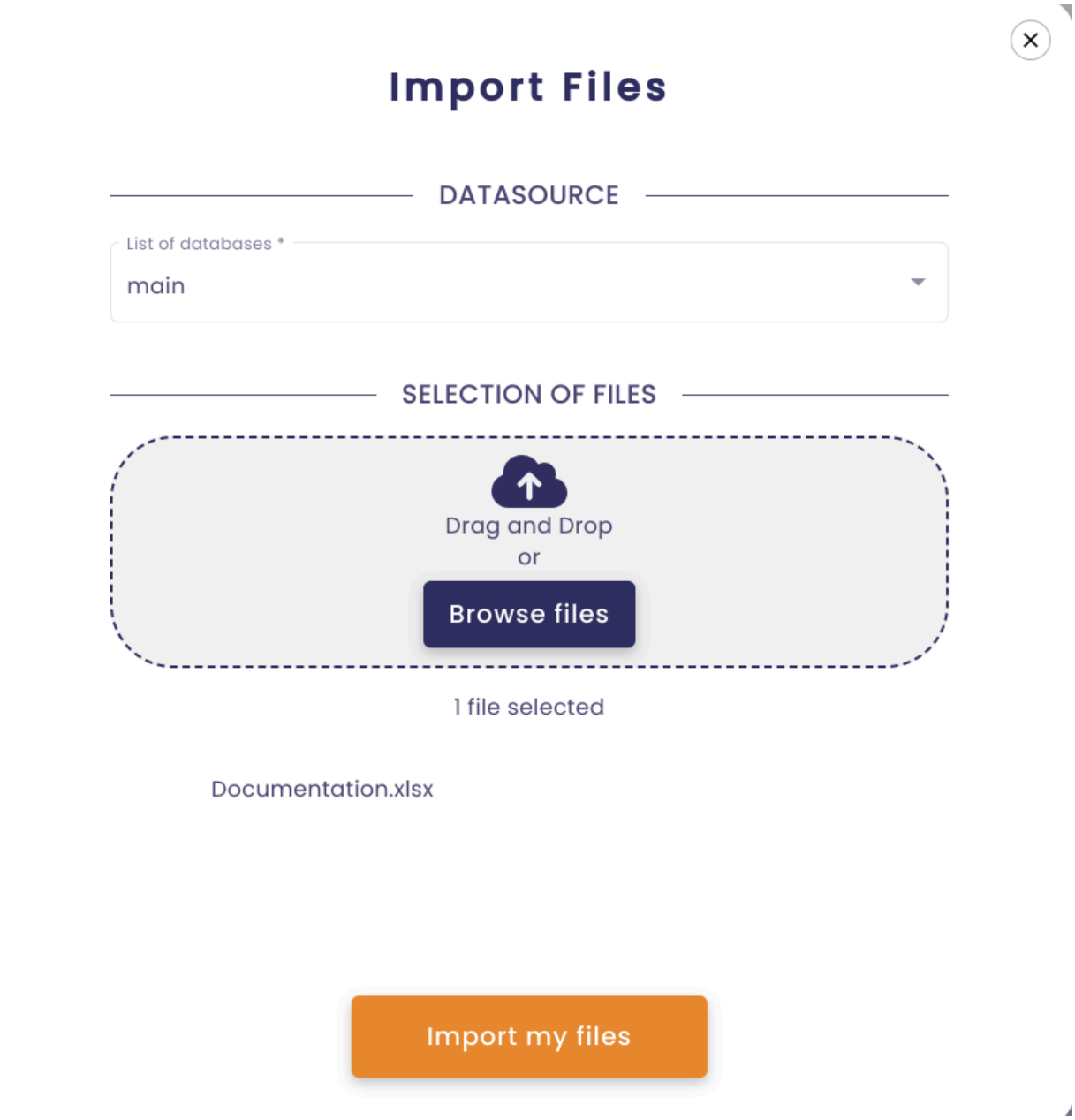
Important : Before importing an Excel data file, make sure the sheet name matches the selected database.

For example, if you select the "main" database, the sheet name must also be "main."

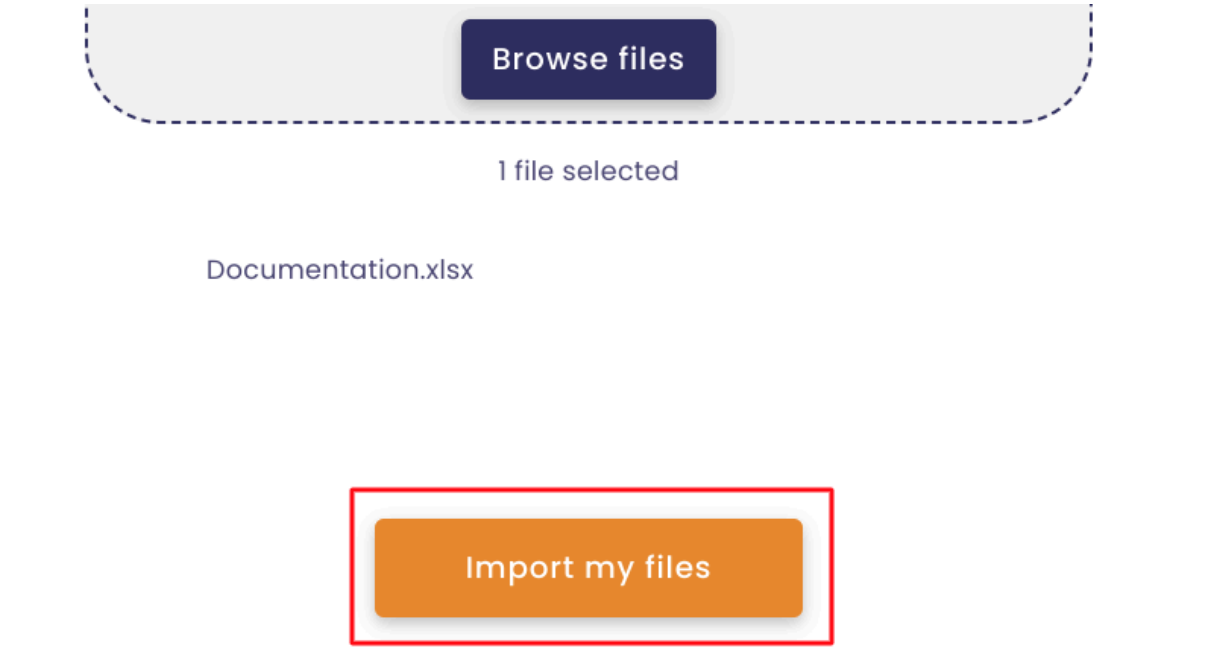
21	nj26uv_etat_	2024-05-21T	-4,1326726
22	nj26uv_etat_	2024-05-21T	-0,9078588
23	nj26uv_etat_	2024-05-21T	-3,2214562
24	nj26uv_etat_	2024-05-21T	4,76446101
25	nj26uv_etat_	2024-05-21T	1,85988623
26	nj26uv_etat_	2024-05-21T	6,77899658
27	nj26uv_etat_	2024-05-21T	7,31003413
28	nj26uv_etat_	2024-05-21T	11,6828588
29	nj26uv_etat_	2024-05-21T	0,52273038
30	nj26uv_etat_	2024-05-21T	-1,5042597
31	nj26uv_etat_	2024-05-21T	0,79192264
32	nj26uv_etat_	2024-05-21T	-11,148849
33	nj26uv_etat_	2024-05-21T	1,71468109
34	nj26uv_etat_	2024-05-21T	-1,1117045
35	nj26uv_etat	2024-05-21T	-1,8194299

main

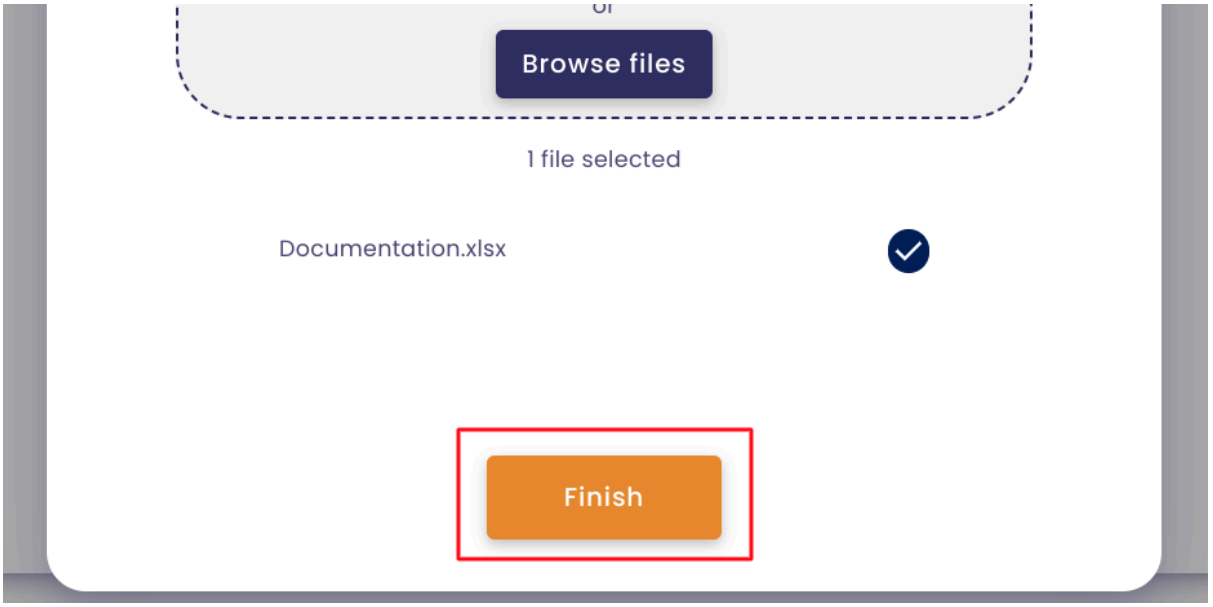
Drop the files to be imported into the "**Selection of files**" area by clicking the "**Browse Files**" button or by dragging the files into the drop zone.



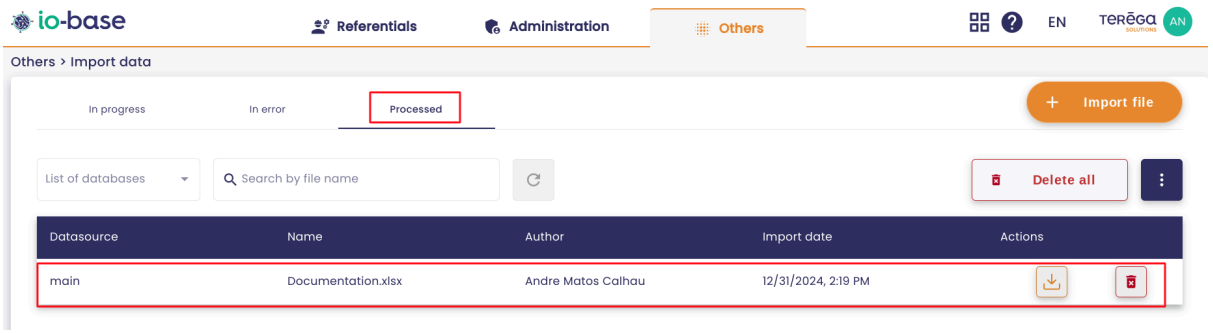
Next, click **Import my files.**



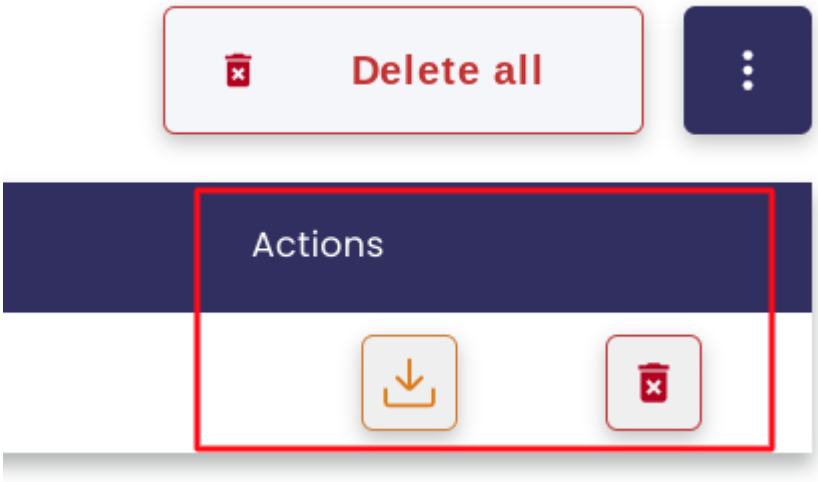
Wait for the import to complete, then click **Finish.**



The file will appear in the **Processed** tab.



You can delete or download it at any time in the **Actions** column.



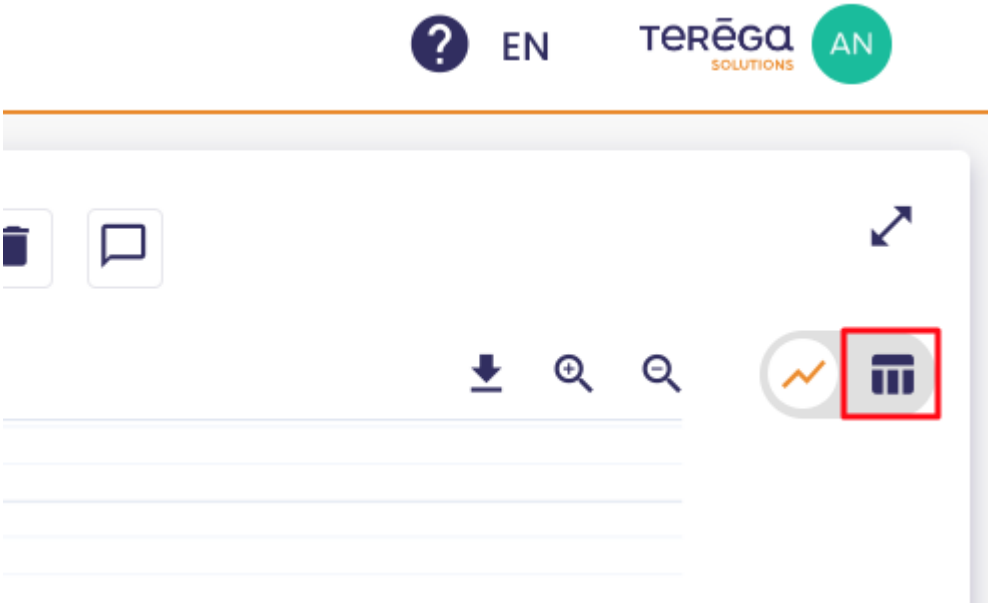
Note : You can import several files at the same time.

4.2 Accessing data files from explorer

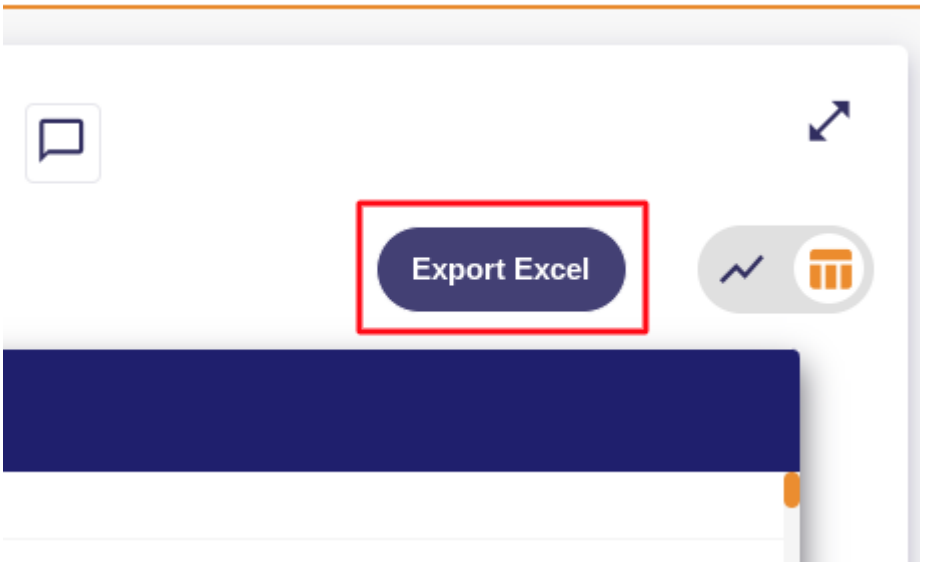
You can directly retrieve data files from Explorer and import them to keep a record.

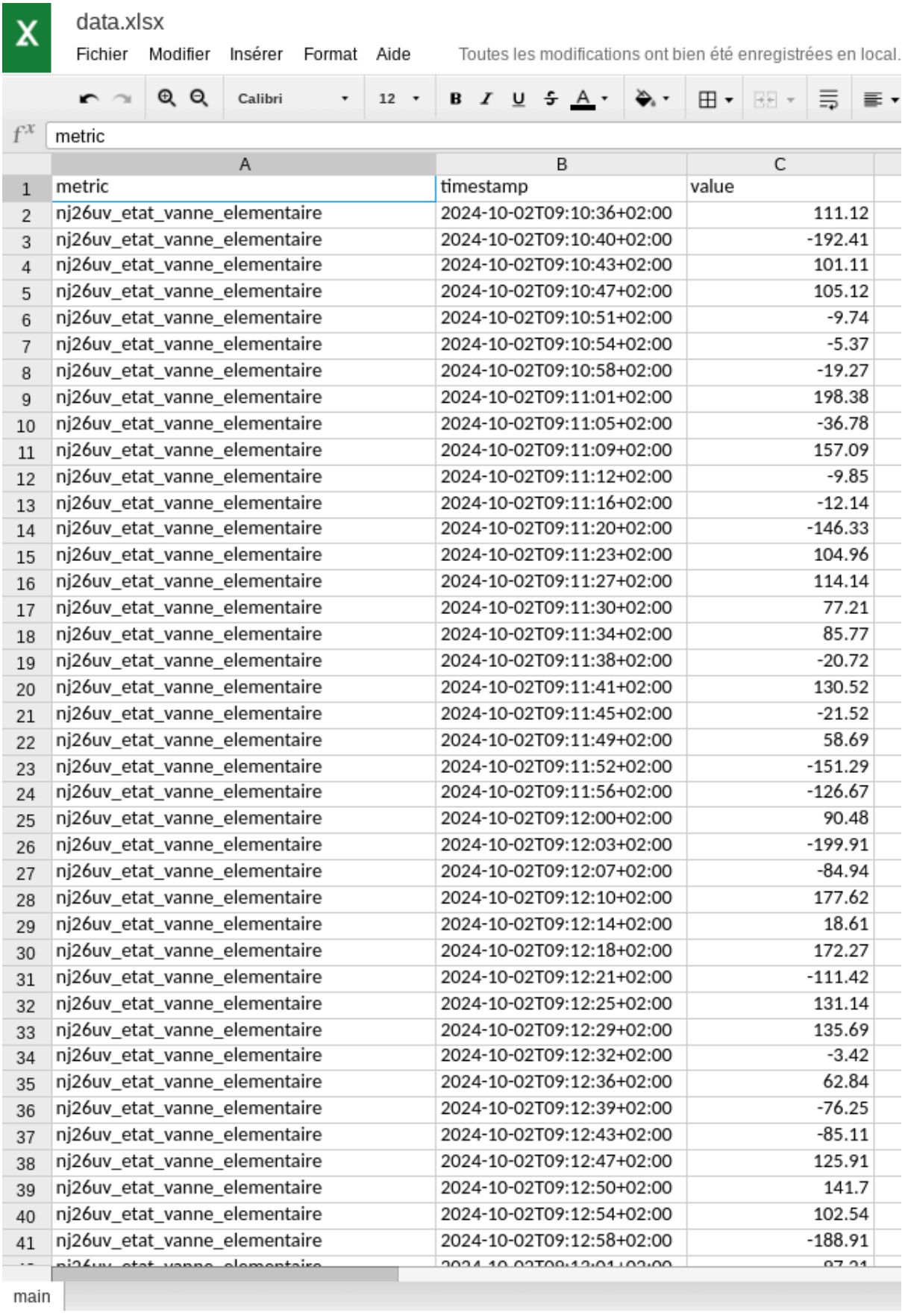
To do so, go to Indaba Explorer and view the graph with the data you want.

Then, click on the boxed button below to display the curve values in tabular form.



Then click Export Excel to download the file.





data.xlsx

Fichier Modifier Insérer Format Aide Toutes les modifications ont bien été enregistrées en local.

Calibri 12

metric

	A	B	C
1	metric	timestamp	value
2	nj26uv_etat_vanne_elementaire	2024-10-02T09:10:36+02:00	111.12
3	nj26uv_etat_vanne_elementaire	2024-10-02T09:10:40+02:00	-192.41
4	nj26uv_etat_vanne_elementaire	2024-10-02T09:10:43+02:00	101.11
5	nj26uv_etat_vanne_elementaire	2024-10-02T09:10:47+02:00	105.12
6	nj26uv_etat_vanne_elementaire	2024-10-02T09:10:51+02:00	-9.74
7	nj26uv_etat_vanne_elementaire	2024-10-02T09:10:54+02:00	-5.37
8	nj26uv_etat_vanne_elementaire	2024-10-02T09:10:58+02:00	-19.27
9	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:01+02:00	198.38
10	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:05+02:00	-36.78
11	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:09+02:00	157.09
12	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:12+02:00	-9.85
13	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:16+02:00	-12.14
14	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:20+02:00	-146.33
15	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:23+02:00	104.96
16	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:27+02:00	114.14
17	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:30+02:00	77.21
18	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:34+02:00	85.77
19	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:38+02:00	-20.72
20	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:41+02:00	130.52
21	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:45+02:00	-21.52
22	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:49+02:00	58.69
23	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:52+02:00	-151.29
24	nj26uv_etat_vanne_elementaire	2024-10-02T09:11:56+02:00	-126.67
25	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:00+02:00	90.48
26	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:03+02:00	-199.91
27	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:07+02:00	-84.94
28	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:10+02:00	177.62
29	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:14+02:00	18.61
30	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:18+02:00	172.27
31	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:21+02:00	-111.42
32	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:25+02:00	131.14
33	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:29+02:00	135.69
34	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:32+02:00	-3.42
35	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:36+02:00	62.84
36	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:39+02:00	-76.25
37	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:43+02:00	-85.11
38	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:47+02:00	125.91
39	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:50+02:00	141.7
40	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:54+02:00	102.54
41	nj26uv_etat_vanne_elementaire	2024-10-02T09:12:58+02:00	-188.91

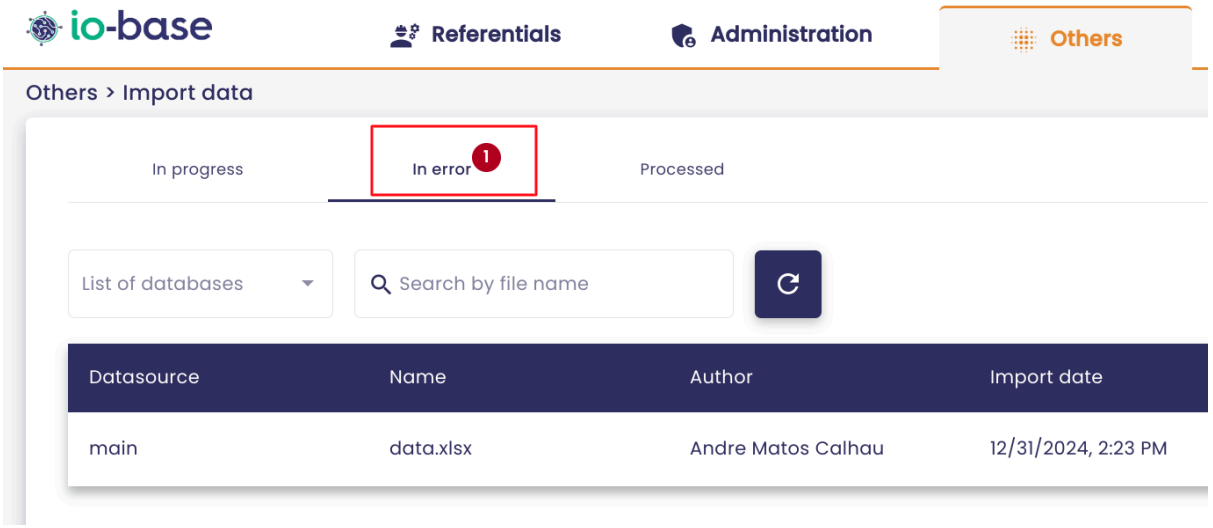
main

Change the name of the Excel sheet to match the database of metrics contained in the file.

Then follow the steps above to import the file.

4.3 “In error” files

Files with errors will appear in the "**In Error**" tab.



Click the eye-shaped icon to view the error preventing the file from being imported.

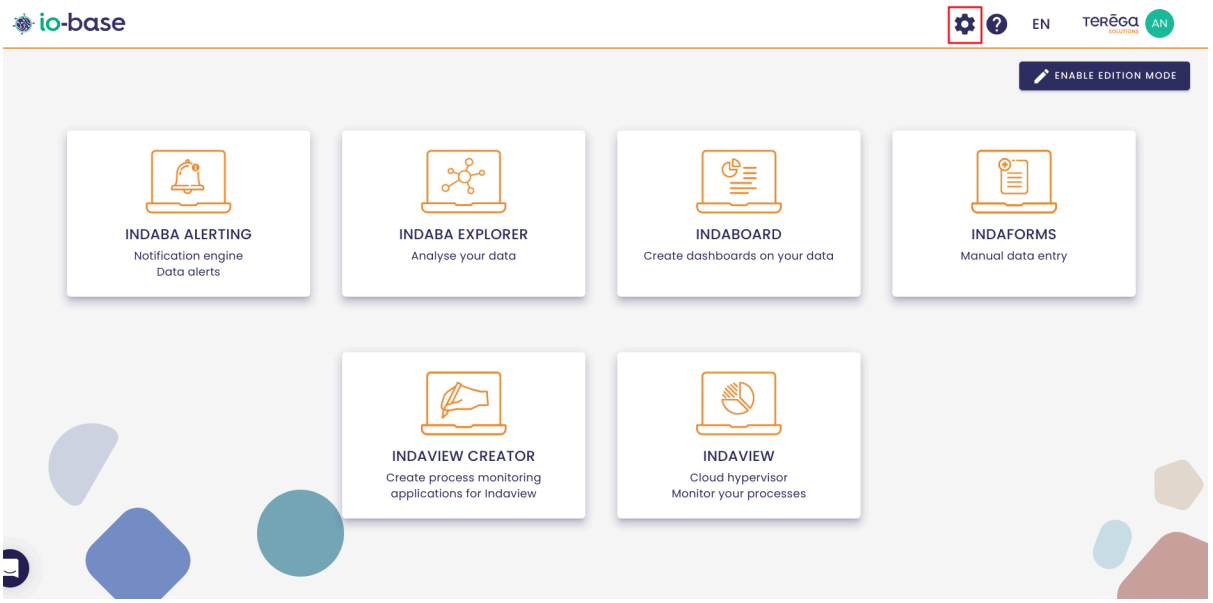
5. Data writing settings

Prerequisite : You must have a functional administrator role to access this feature.

5.1 Setting up writing in the future

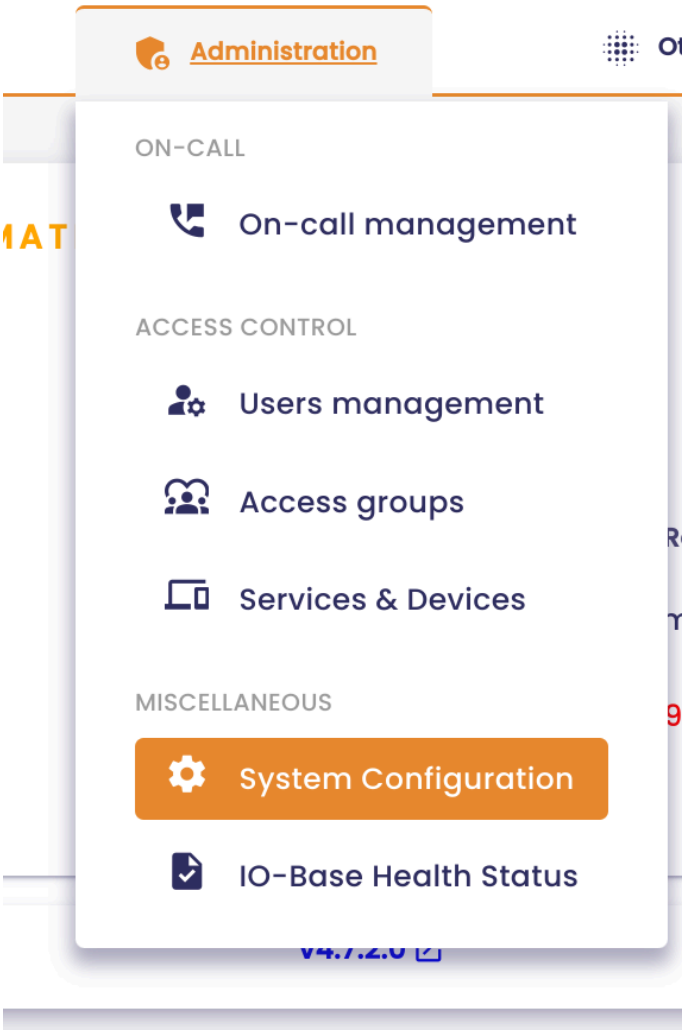
In the Io-base database, it is possible to write data into the future. This writing into the future can be parameterized to define a maximum tolerance time. In concrete terms, values written in the future beyond this time will be rejected.

Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



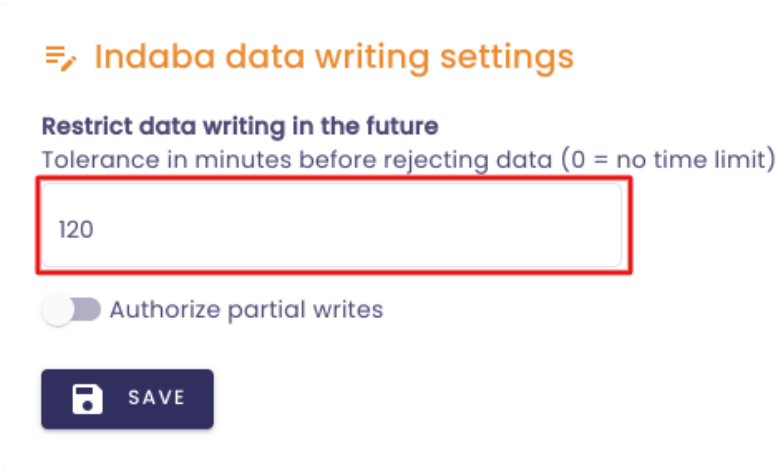
The Io-base administration page opens.

Go to the **Administration/System Configuration** menu.



An input field is available to configure the Indaba data writing settings.

Enter a value that defines the maximum allowed time for future data entry.



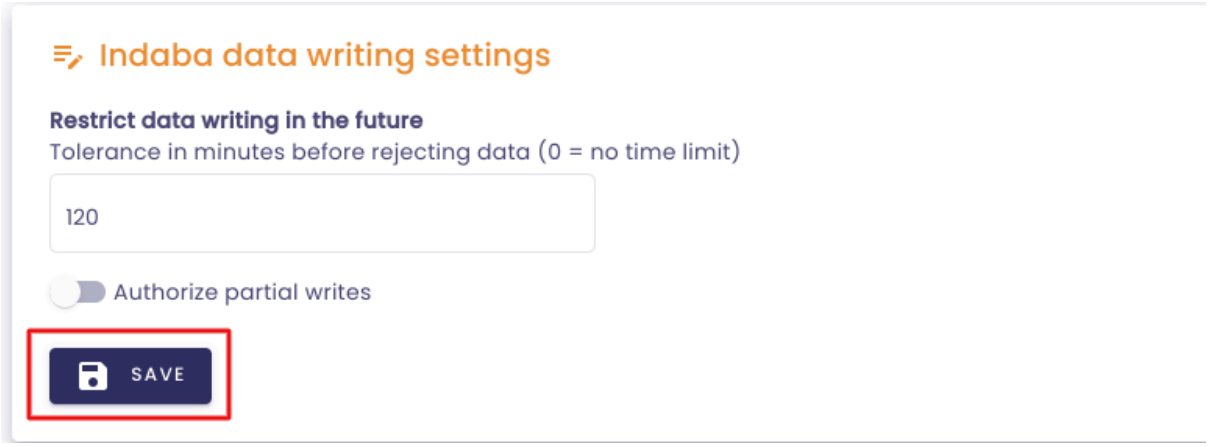
The period is entered in minutes. For example, if you enter "120", it means that it will

be impossible to write data in the database for a date/time greater than 120 minutes in the future. If it is 3pm, no data can be entered after 5pm.

Note : The period is applied to all the metrics in the database.

If you wish to enter data in the future without any restrictions, you must enter 0 in the tolerance period.

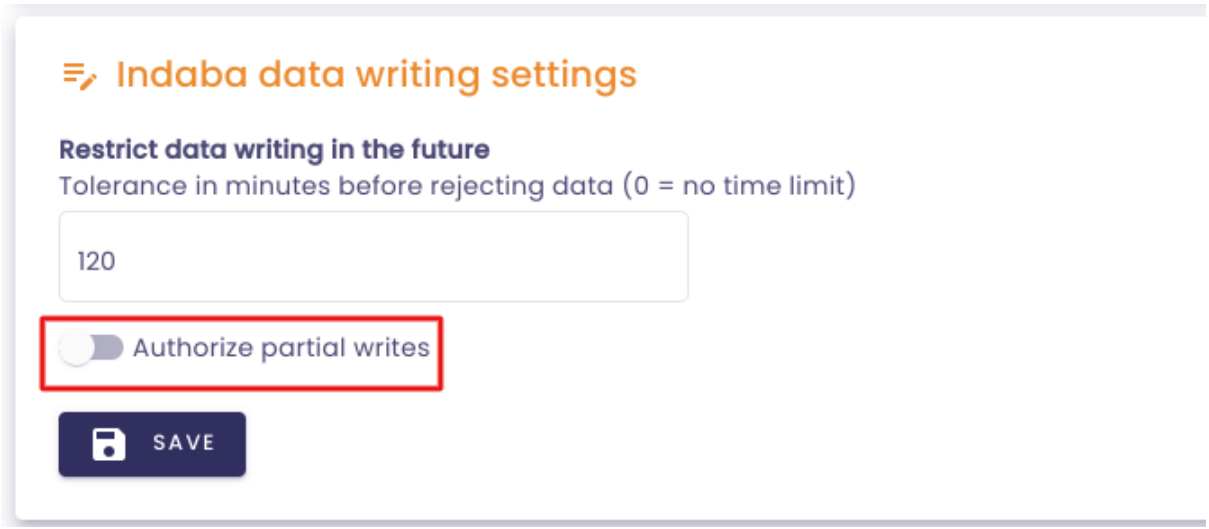
Once you have entered the value you need, click on **Save**.



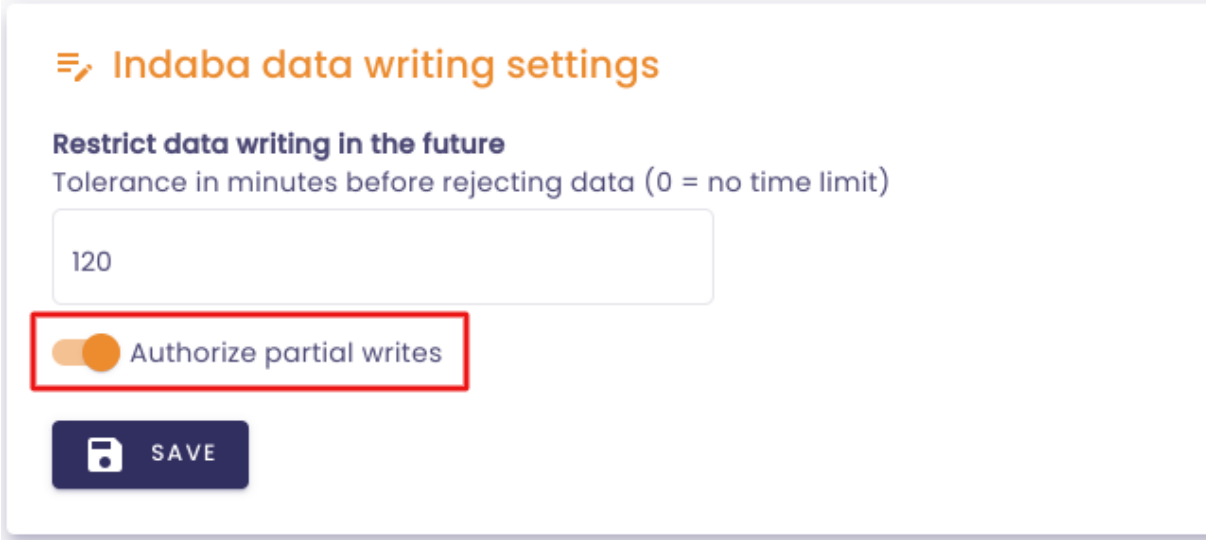
5.2 Partial write settings

The "Authorize partial writes" parameter determines Indaba's behavior if a data write request includes both authorized and unauthorized metrics.

- By default (unchecked), the request is refused (return code 403) and no data is sent to indaba.



- If partial writing is allowed, only authorized metrics will be transmitted to Indaba. A '202 Accepted' return code will indicate that the request has been accepted.



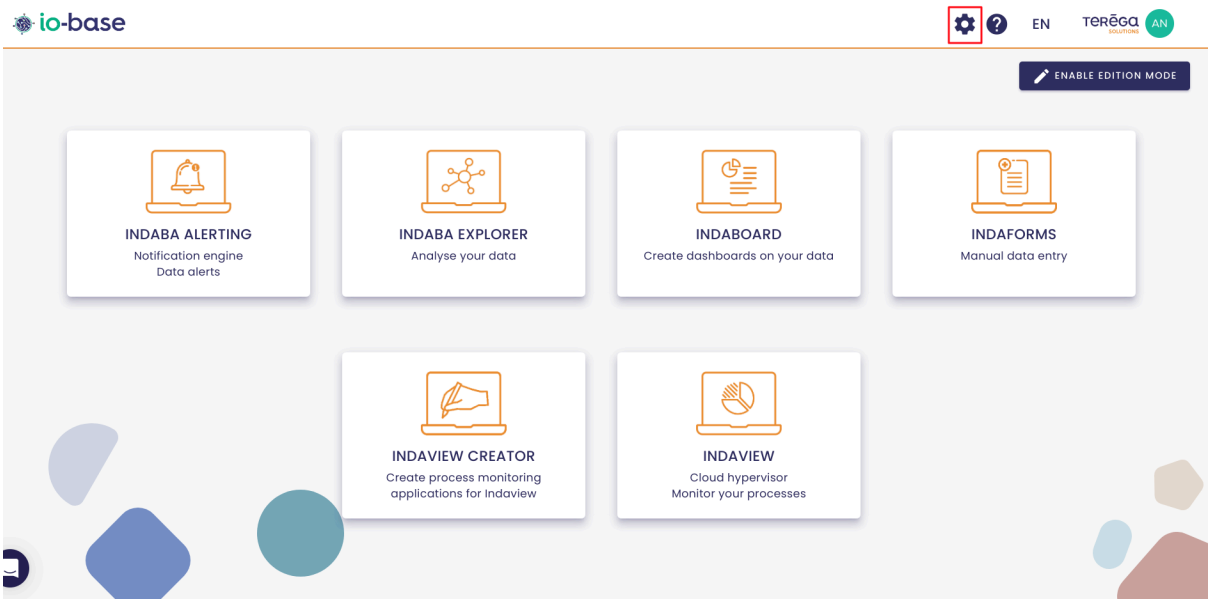
6. Viewing the status page

The **Io-base** status page allows you to quickly check the operational status of the APIs in use and identify any potential issues.

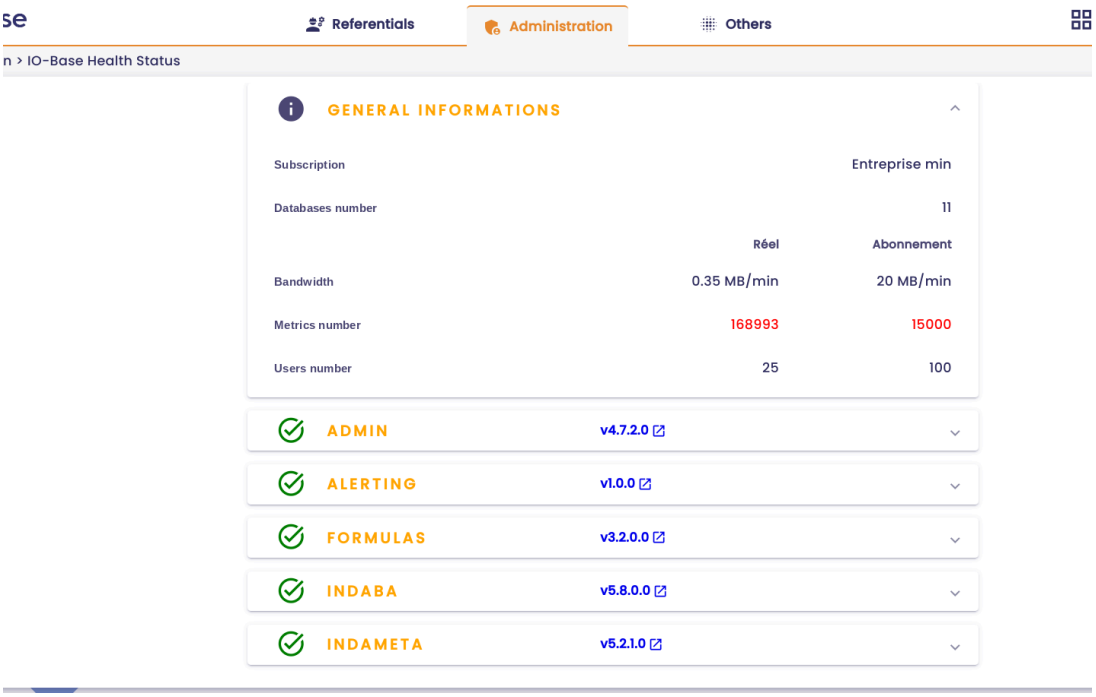
6.1 Accessing the Io-base Health Status Page

To view the status of the APIs, follow these steps :

Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



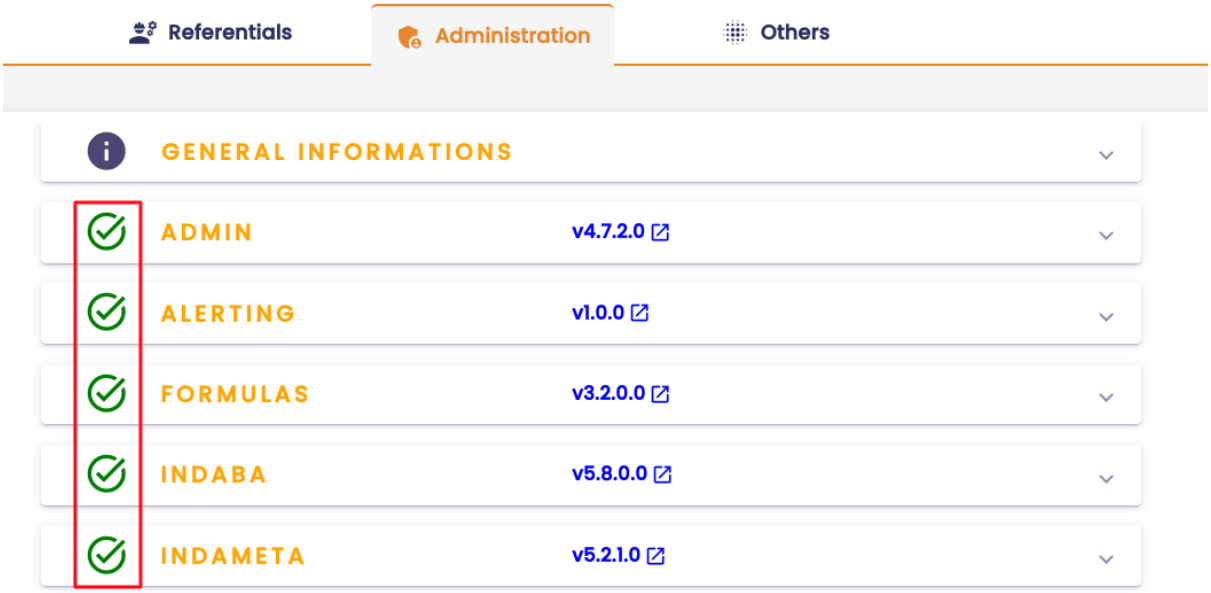
The Io-base administration page opens.



6.2 Interface of the status page

Once on the status page, you will see a list of Io-base APIs, along with icons indicating their status :

- **Green Icon** : The API is functioning normally.

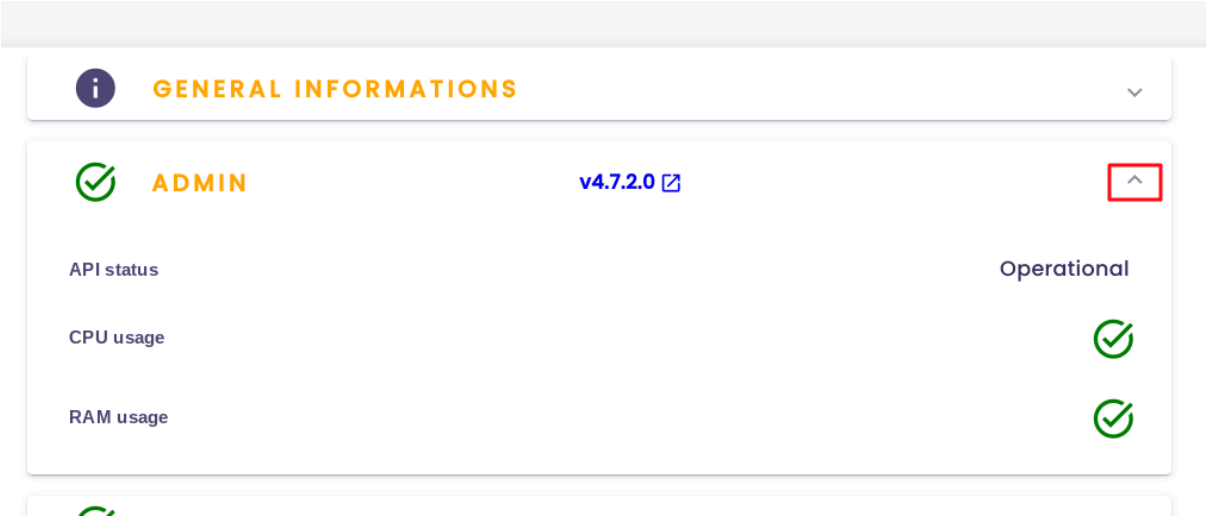


- **Red Icon** : The API is experiencing an issue.

- **Yellow Icon** : The limits of your subscription will soon be exceeded.

6.3 API Details

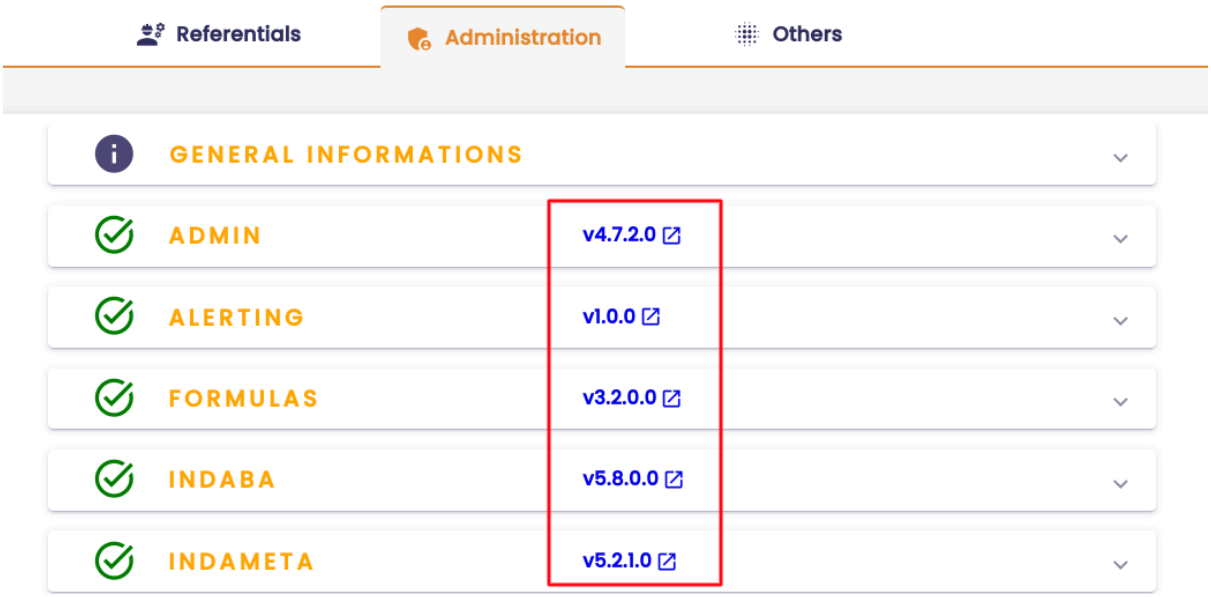
To obtain more information about each API, expand the corresponding section :



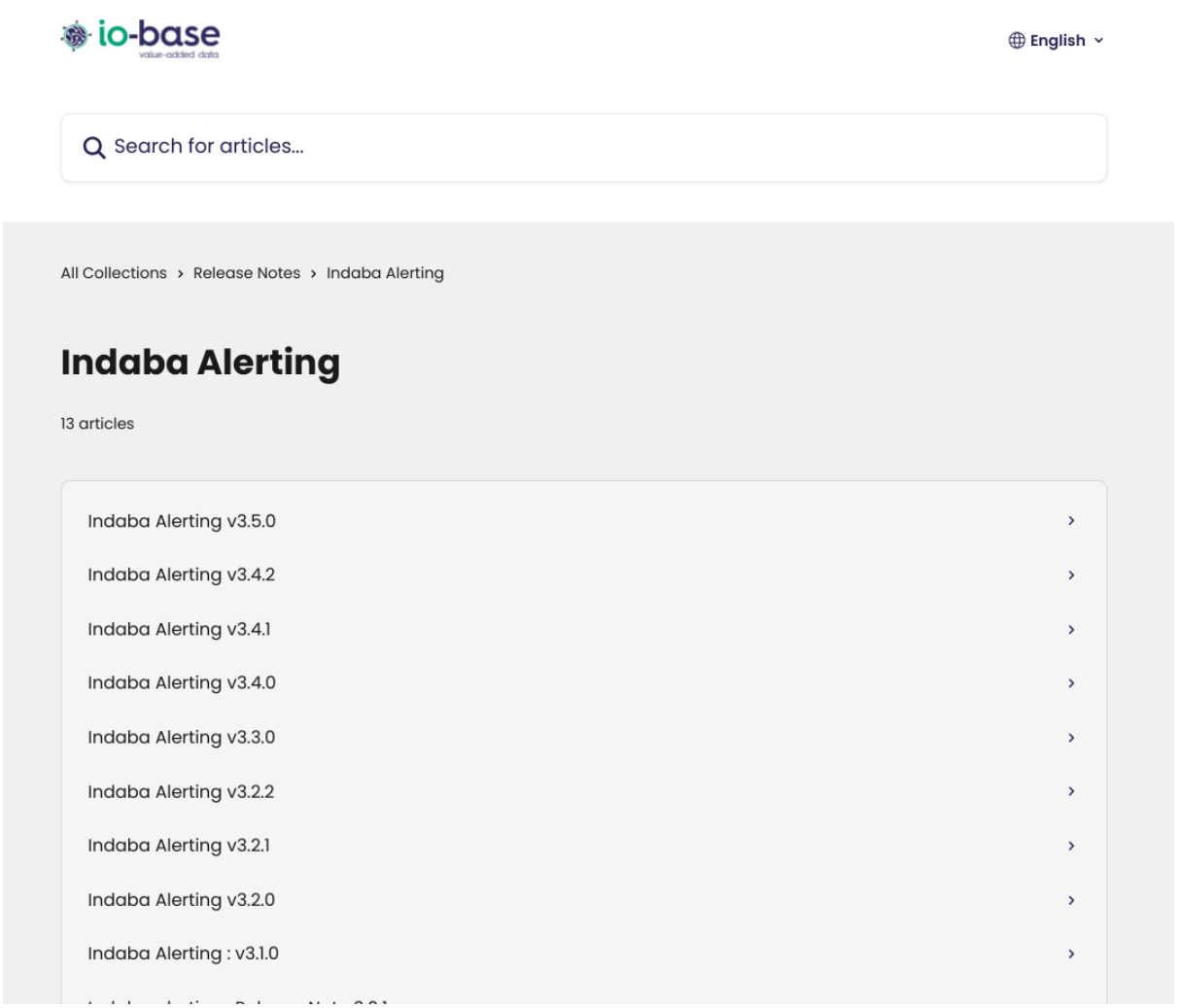
6.4 Accessing Release Notes

You can view the various deployed versions of the APIs. Each line in the list includes a link to the release notes, detailing the changes and improvements made in each update. This allows you to track the evolution of features and fixes.

To do this, click on the link for the corresponding API :



You will be redirected to the user documentation containing all the release notes for that API.



7. Formulas (Calculated metrics)

7.1 Presentation and access to the formulas module

7.1.1 Présentation du module Formules

The **Formulas** module allows you to manage your own metrics, which are calculated from the values of other metrics.

To access the **Formulas** module, you must have the **Functional Administrator** role in io-base.

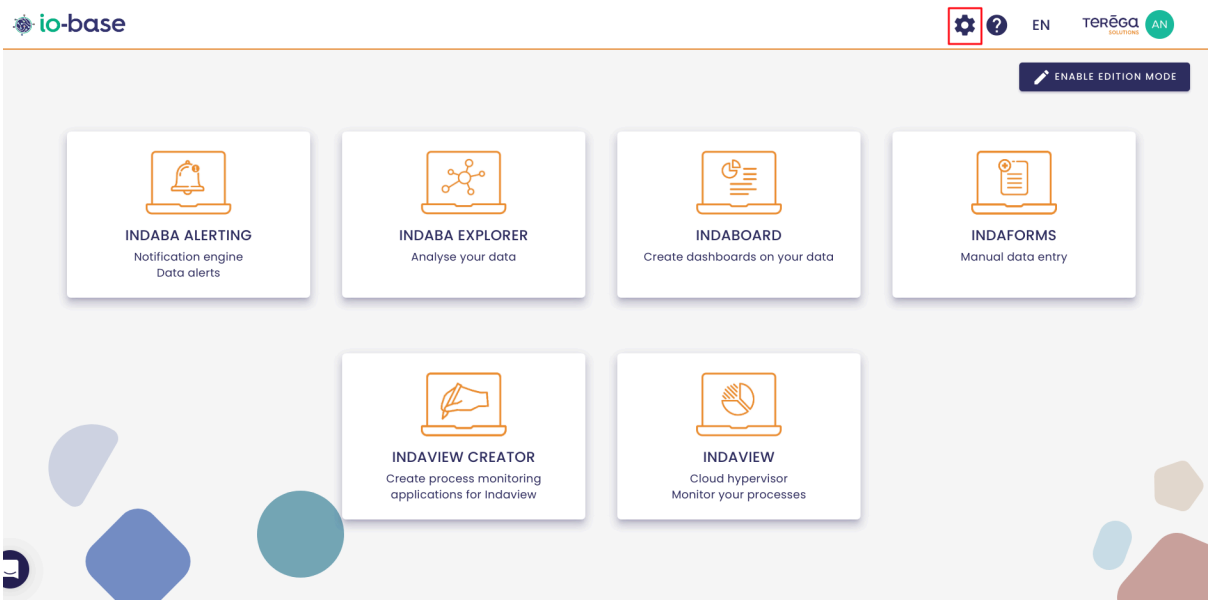
The **Formulas** screen will enable you to create new metrics, whose values will be automatically calculated based on the values of other metrics. These are referred to as **Calculated metrics**.

These metrics are added to your database, just like all the others that are linked to your devices.

You can then view the values of these metrics in Indaba Explorer or Indaview for example.

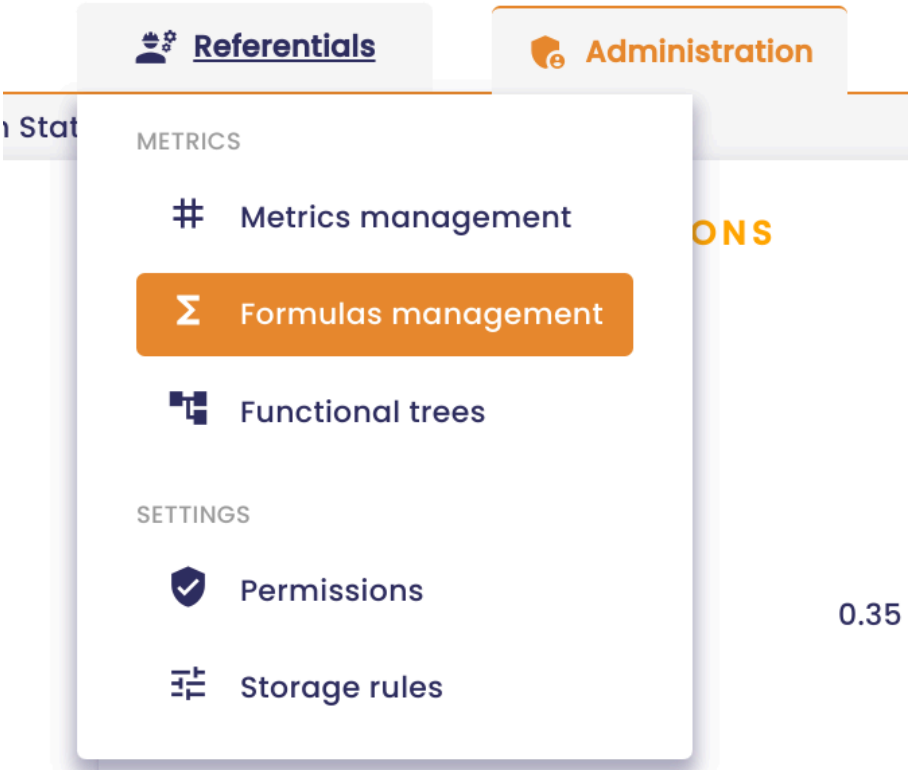
7.1.2 Access to the Formulas module

Log in to **Io-base** and click the button at the top right of your screen, highlighted below :

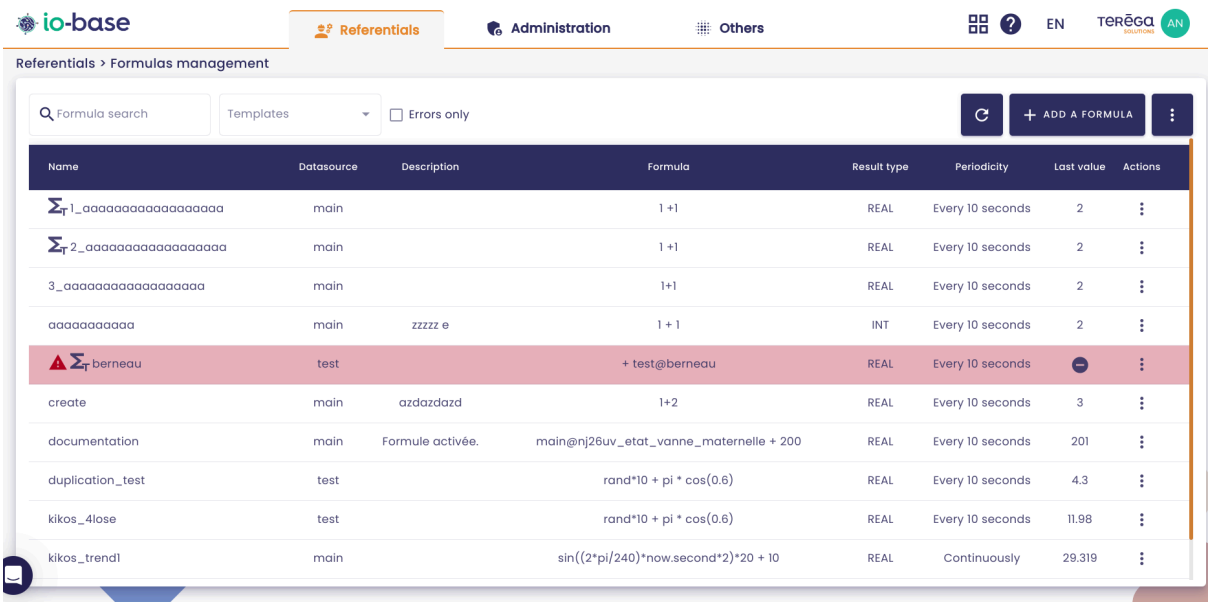


The Io-base administration page opens.

Go to the **Referentials/Formulas management** menu.



The formula management module is displayed. This is where you can create, edit and delete your calculated metrics.



Name	Datasource	Description	Formula	Result type	Periodicity	Last value	Actions
1_aaaaaaaaaaaaaaaaa	main		1 +1	REAL	Every 10 seconds	2	
2_aaaaaaaaaaaaaaaaa	main		1 +1	REAL	Every 10 seconds	2	
3_aaaaaaaaaaaaaaaaa	main		1+1	REAL	Every 10 seconds	2	
aaaaaaaaaaa	main	zzzzz e	1 + 1	INT	Every 10 seconds	2	
berneau	test		+ test@berneau	REAL	Every 10 seconds		
create	main	azdazdazd	1+2	REAL	Every 10 seconds	3	
documentation	main	Formule activée.	main@nj26uv_etat_vanne_maternelle + 200	REAL	Every 10 seconds	201	
duplication_test	test		rand*10 + pi * cos(0.6)	REAL	Every 10 seconds	4.3	
kikos_4lose	test		rand*10 + pi * cos(0.6)	REAL	Every 10 seconds	11.98	
kikos_trend1	main		sin((2*pi/240)*now.second*2)*20 + 10	REAL	Continuously	29.319	

Note : the new metrics created through the formulas are subject to the same

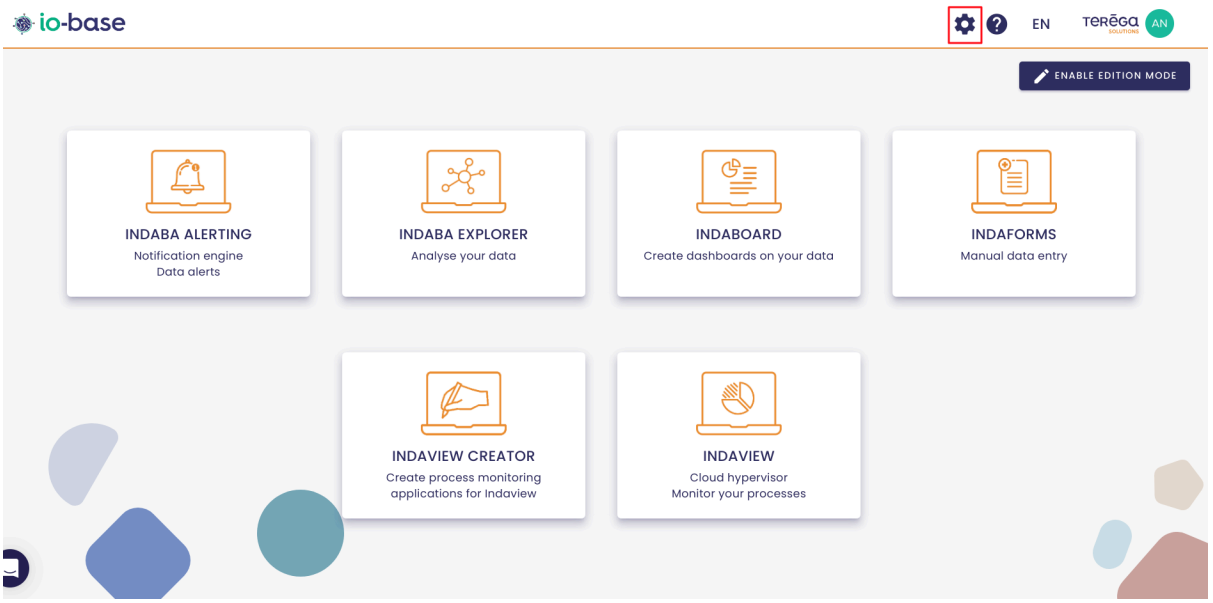
access rules as the classic ones. In order to view the values, you must therefore belong to a sufficient permission group (you can refer to the Permissions documentation for more details).

If you do not have the rights to view the calculated metric, the last result will not appear in the table column. An icon indicates that this is a rights problem.

7.2 Create a formula (calculated metric)

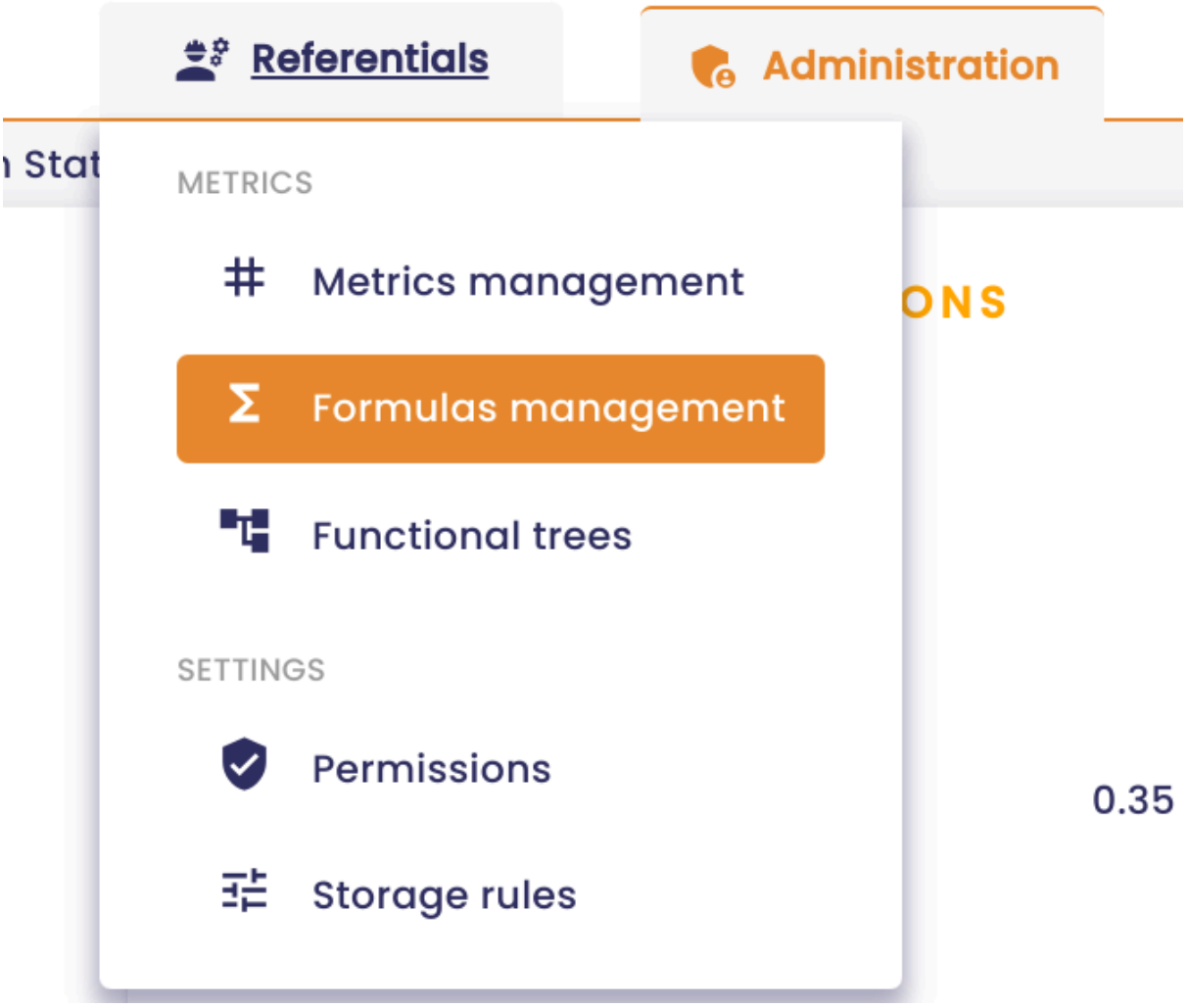
Prerequisite: to manage the calculated metrics, you must have the role of **Functional Administrator** in io-base.

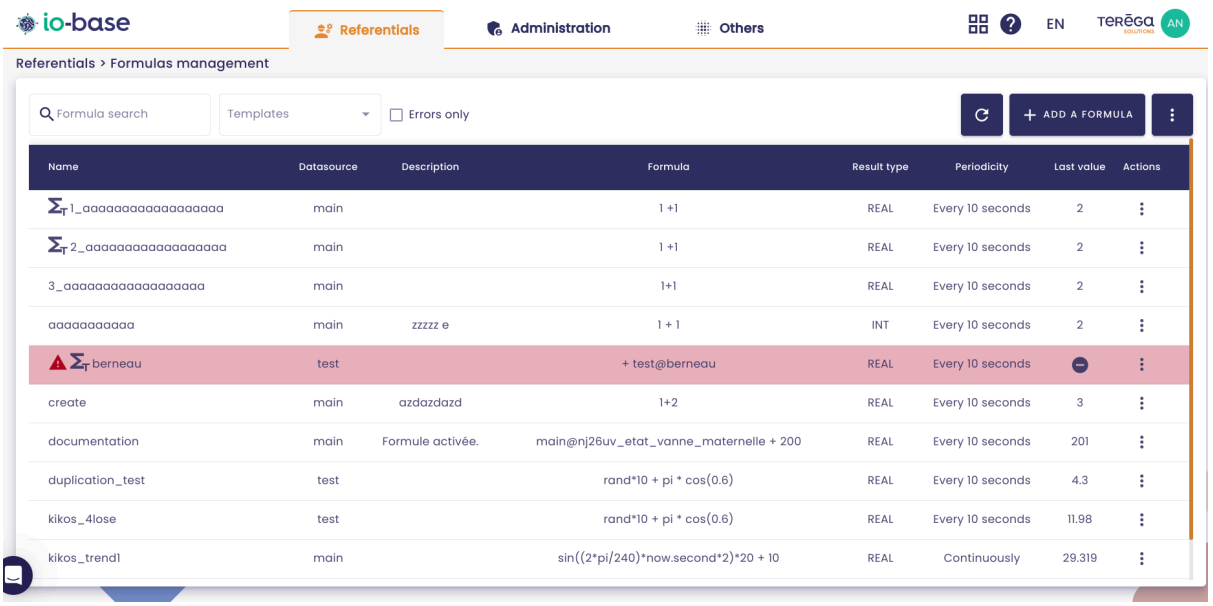
Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



The Io-base administration page opens.

Go to the **Referentials/Formulas management** menu.



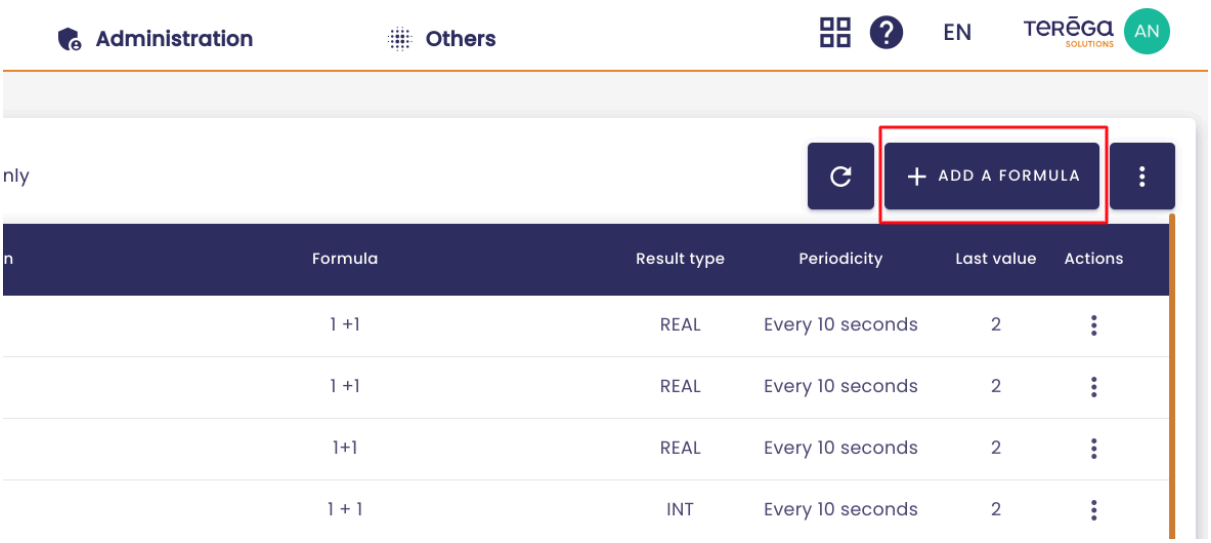


This "**Formulas**" screen allows you to create new metrics, with values

automatically calculated based on the values of other metrics.These metrics are referred to as "**Calculated metrics**".

These metrics are added to your database, in the same way as the metrics coming from the measuring devices.

To begin the creation of a new calculated metric, click on the "**Add a formula**" button :



The creation of a formula involves three steps :

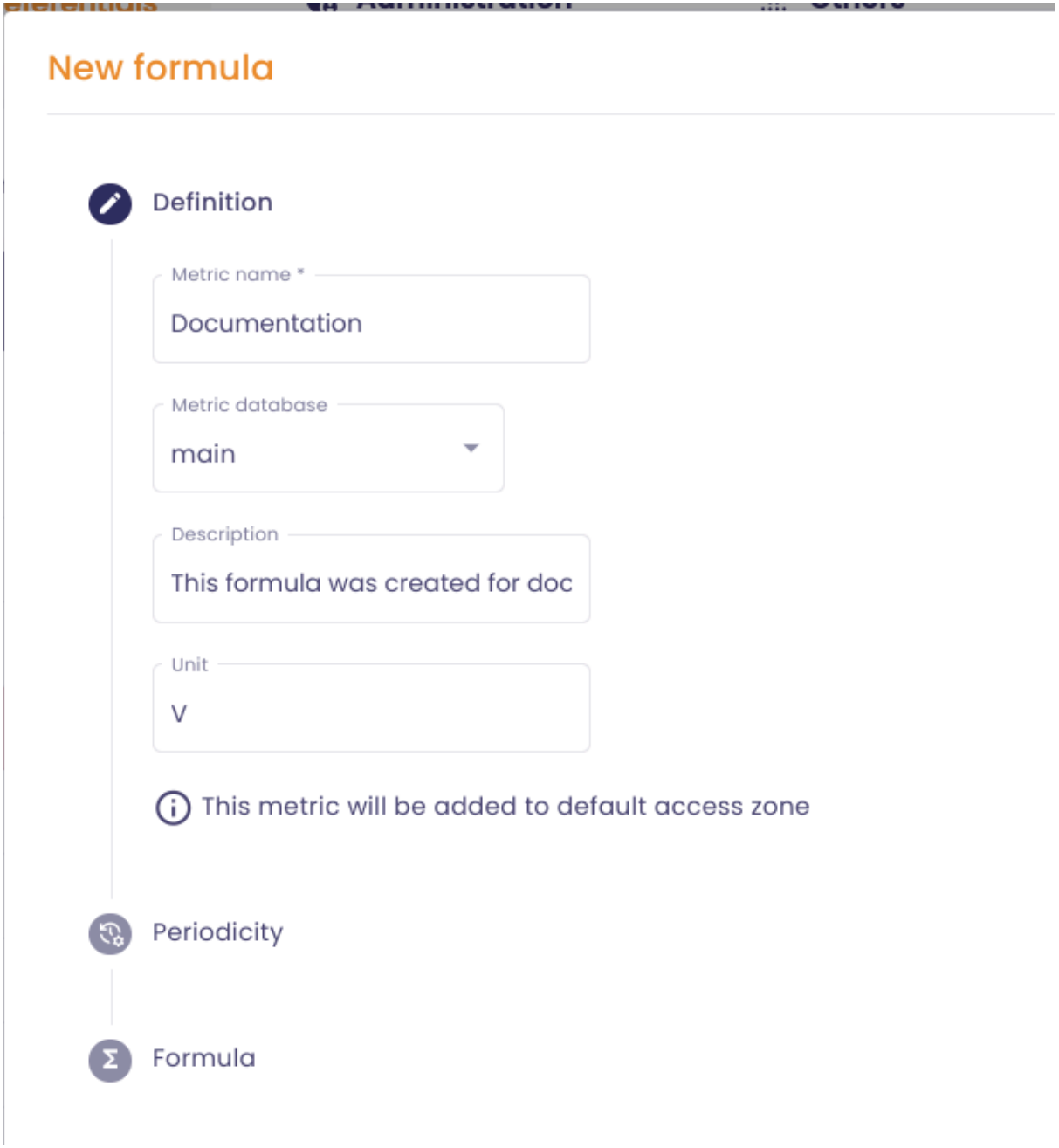
- Defining the metric to be added to the database
- Configuring the frequency (periodicity) for calculating the metric's values
- Writing the formula to calculate the values

Once the three parts have been entered, simply click on the "**Add the formula**" button.

The new formula will appear in the table, and the metric will be created in the database and available in the different tools (Indaba Explorer...).

Note : for the "**Add the formula**" button to be available, all input fields must be valid (including the formula expression and the metric's name).

7.2.1 Definition of the metric

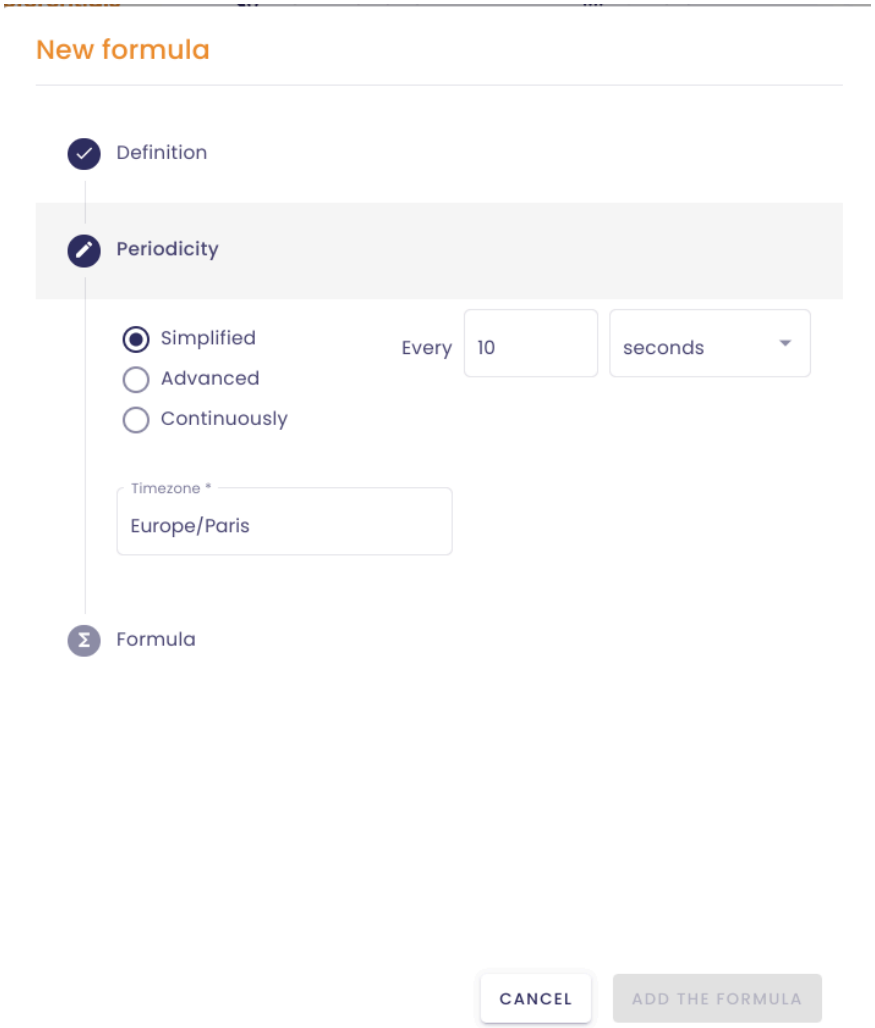


The **Definition** section allows you to give general information about the new metric :

- **Metric name** : special characters and spaces are not allowed
- **Database** : the database in which the metric will be stored
- **Description** : allows you to give indications on the metric
- **Unit** : unit of the metric values

Note : the fields **Metric name** and **Metric database** cannot be modified after the creation of the metric. If you want to modify them, you will have to delete and recreate the metric.

7.2.2 Calculation periodicity



The **Periodicity** field allows you to define the frequency with which the metric values will be calculated. There are three possible options :

- **Continuous** : the values will be calculated continuously (every 10 seconds), if a value of a metric used in the formula changes.
- **Simplified** : allows to define a number of seconds/minutes/hours between the calculation of two values

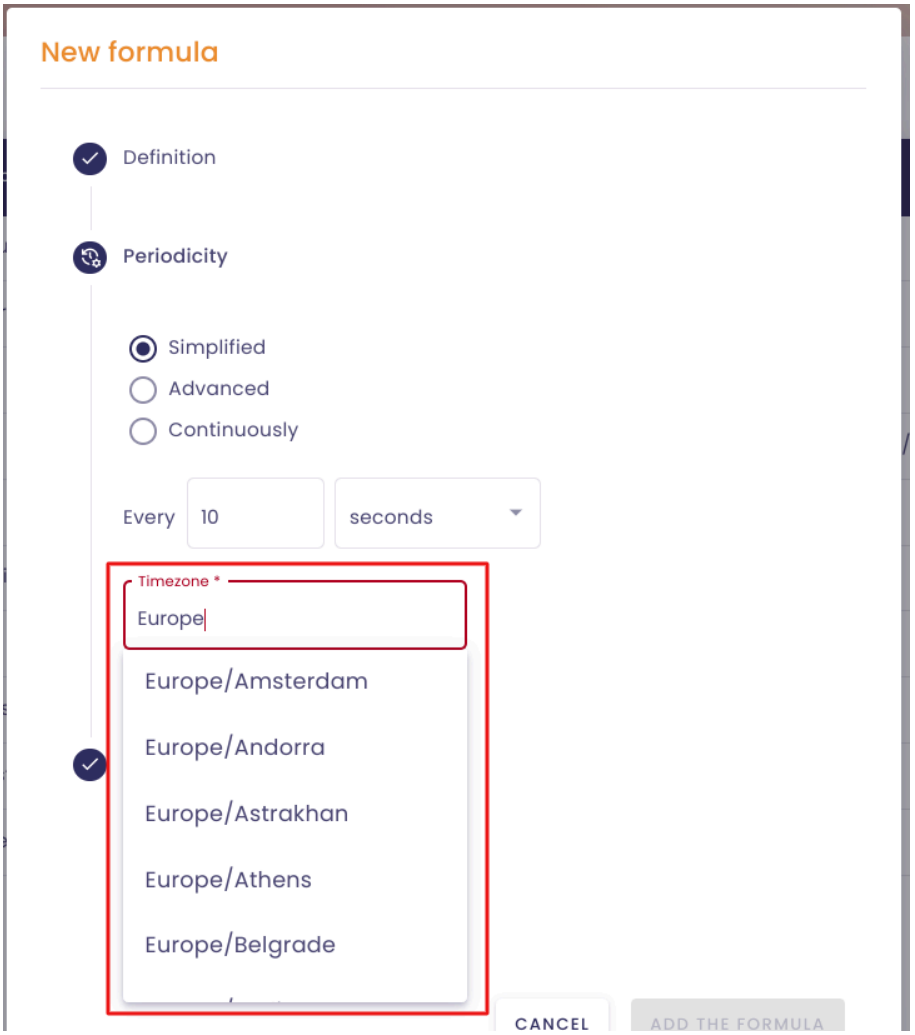
- **Advanced** : allows you to define a more complex frequency, using "**CRON Expressions**". A help link is available on the screen, to help you write this frequency.

  To summarise, the frequency will be defined by 5 characters.
  - minute
  - hour
  - day of the month
  - month
  - day of the week
- Special characters can be entered:
  - * : any value
  - , : value separator for a list
  - - separator for a value range
  - / : step value
    Example: 5 0 * 8 * means "At 00:05 in August".

Note : For the simplified periodicity, it is not possible to enter a value below 10 seconds.

Please also specify the **timezone** you want to configure for your formula.

An **autocomplete feature** is available : simply start typing, and the available timezones will be displayed :



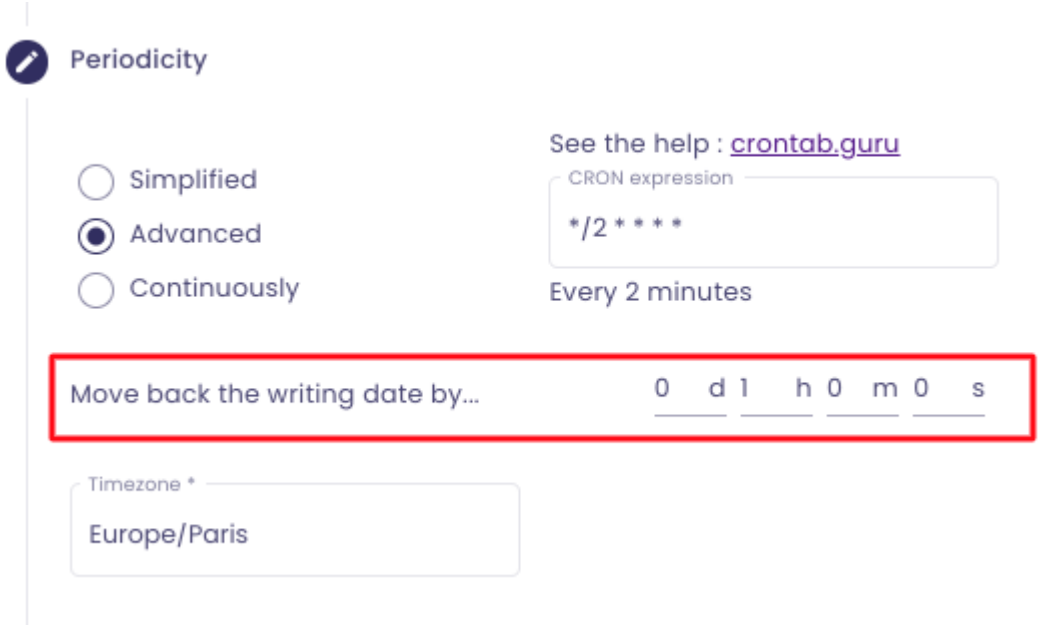
When entering your data, begin by specifying the continent, followed by the capital (or economic capital) of the country, separated by a slash (/).

examples :

Note : You have the option to adjust the timestamp of the result, when your

formula is calculated.

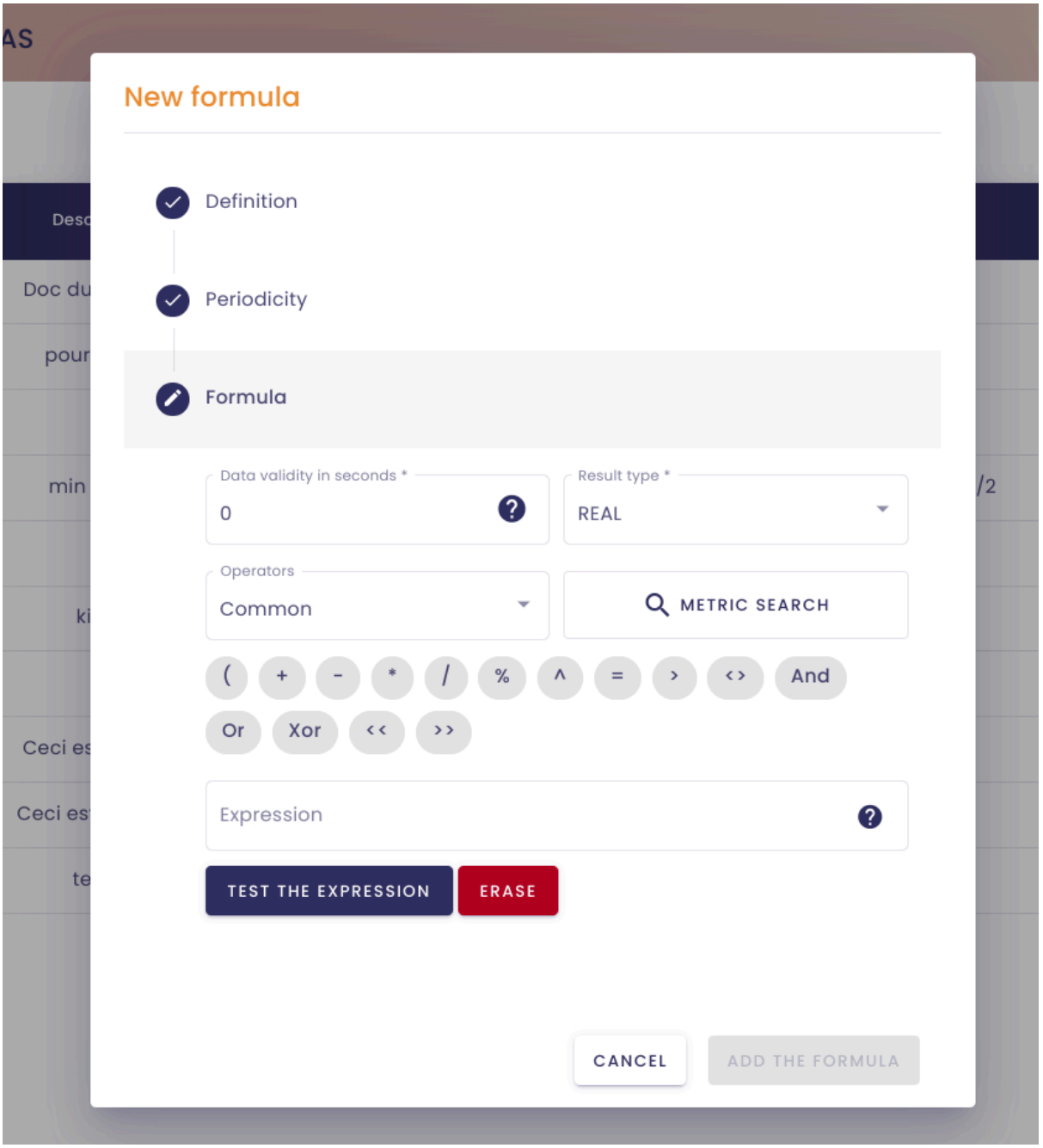
To do so, simply specify the desired offset :



For example, if you enter "1h", the value of your formula will be timestamped one hour **before** the calculation time.

So, if the calculation happens at 12:00 PM, the value will be recorded with a timestamp of 11:00 AM in the database.

7.2.3 Defining the formula



This section was made to define the formula that will be applied to calculate the values of the new metric. It contains the following fields :

- **Data validity in seconds** : This value ensures that the calculated values are based on valid data.
  For example, if the expression is main@tag + 5, and the validity time is 60 seconds. When the formula needs to recalculate, it will analyse the date of the last value in base for main@tag. If this date is older than 60 seconds, then the value is considered unreliable. The formula will not be

recalculated, and no new value will be inserted for the moment.
If you want to recalculate a value every time, and ignore this feature, simply enter 0 in this field.

- **Result type**: indicates in which format the calculated values will be stored in the database:
  - BOOL : boolean
  - INT : integer
  - REAL : decimal

- **Expression** : this is the field that will contain the formula.

You can type directly into the text box, or use the various buttons to help you.

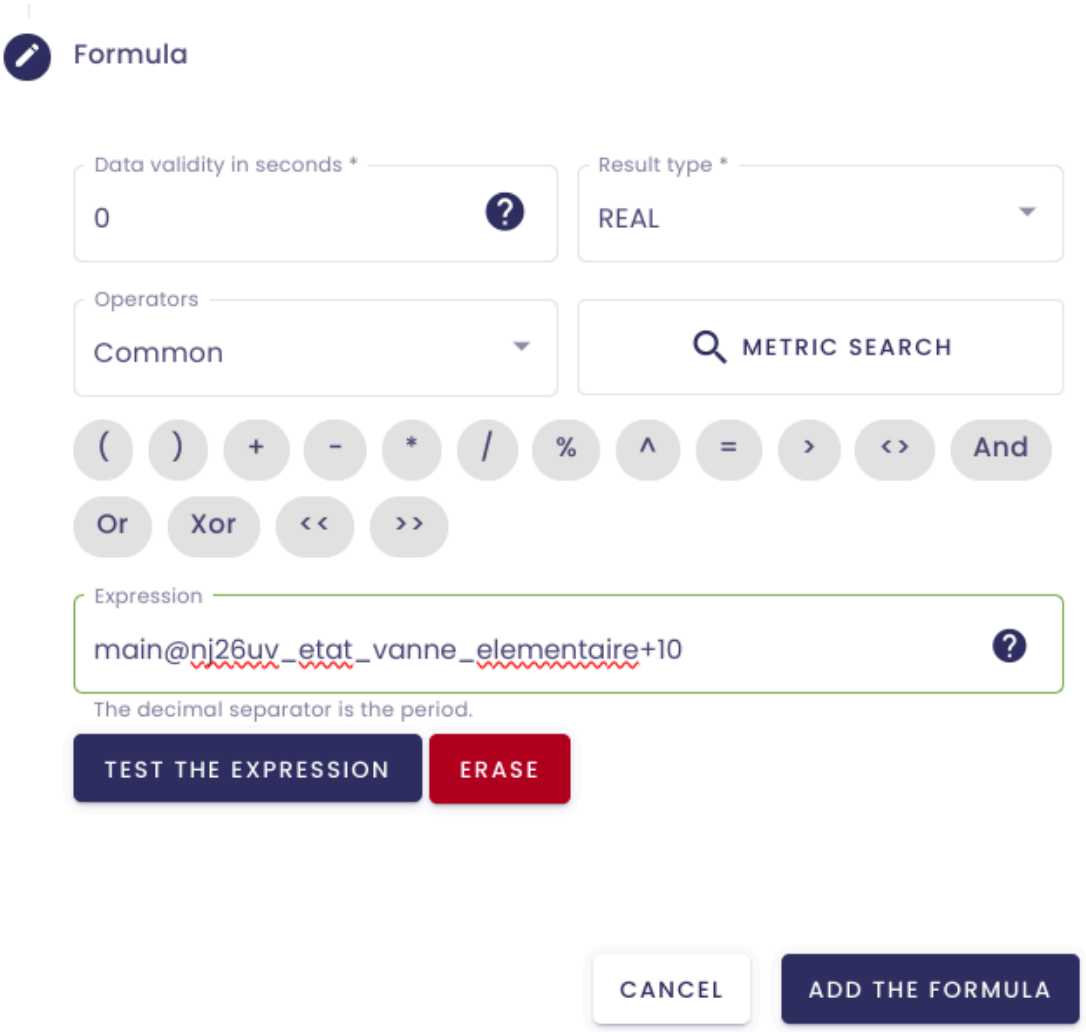
With the **Search Metric** button, you can search for an existing metric in the database to avoid typing it.

The buttons below show the list of operators that can be used in the expression.

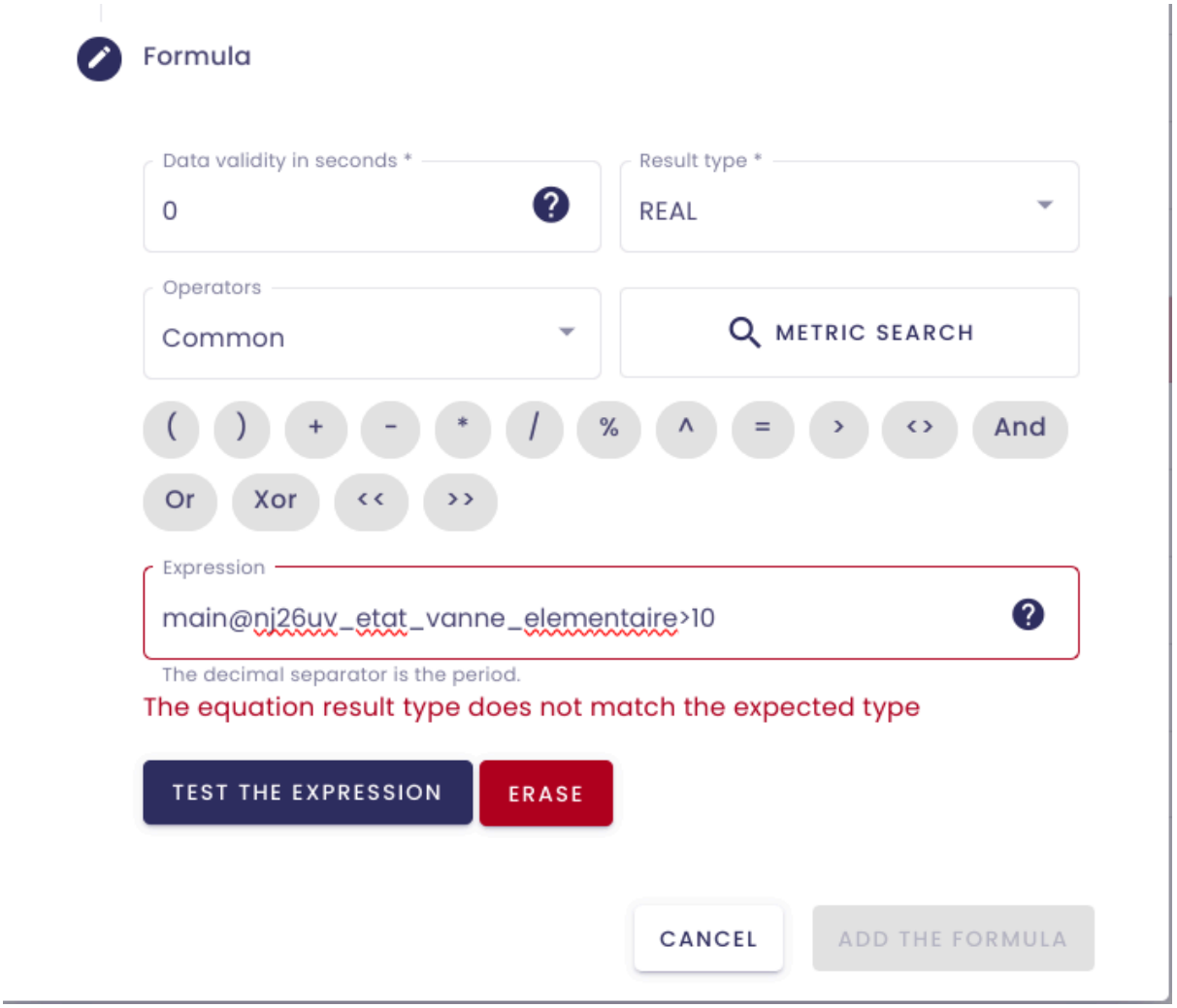
The **?** button available on the **Expression** field gives you additional explanations on how to enter a formula. An article about "Expressions and Formulas" is available.

Once you have entered your formula expression, you need to test it by clicking the **Test Expression** button. If the formula is correct, the expression field will be framed in green. Otherwise, it will be red.

Example of a valid expression :



Example of an invalid expression :



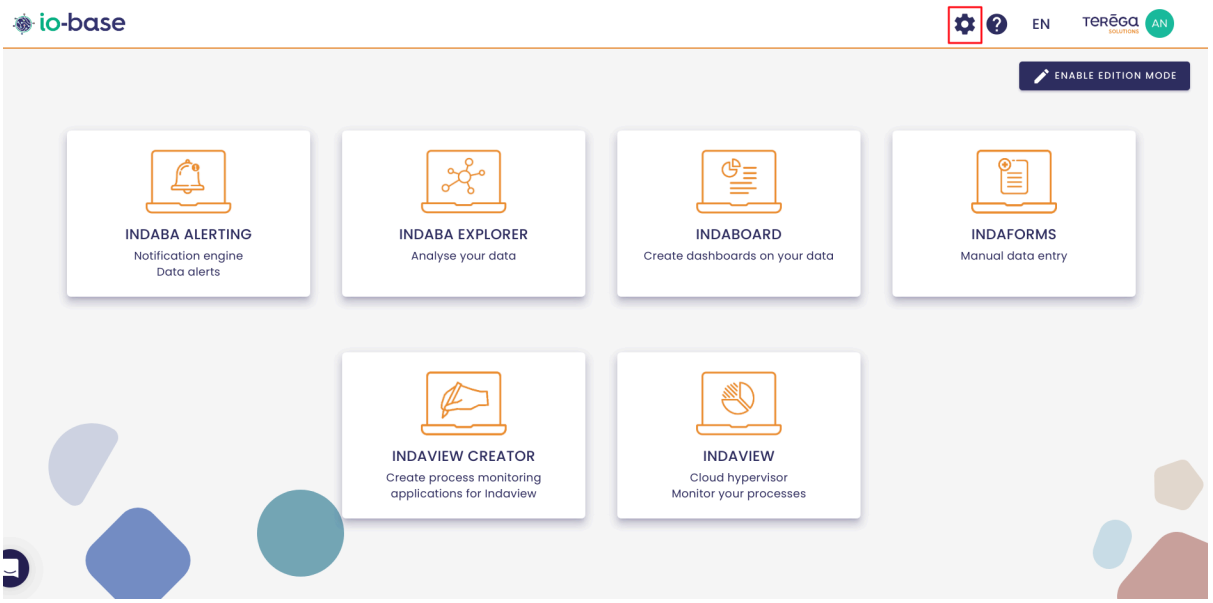
If the expression is invalid, an indication appears to explain where the error comes from.

The **Erase** button allows you to clear the content of the **Expression** field to start the input again.

7.3 Enable/Disable a formula (calculated metric)

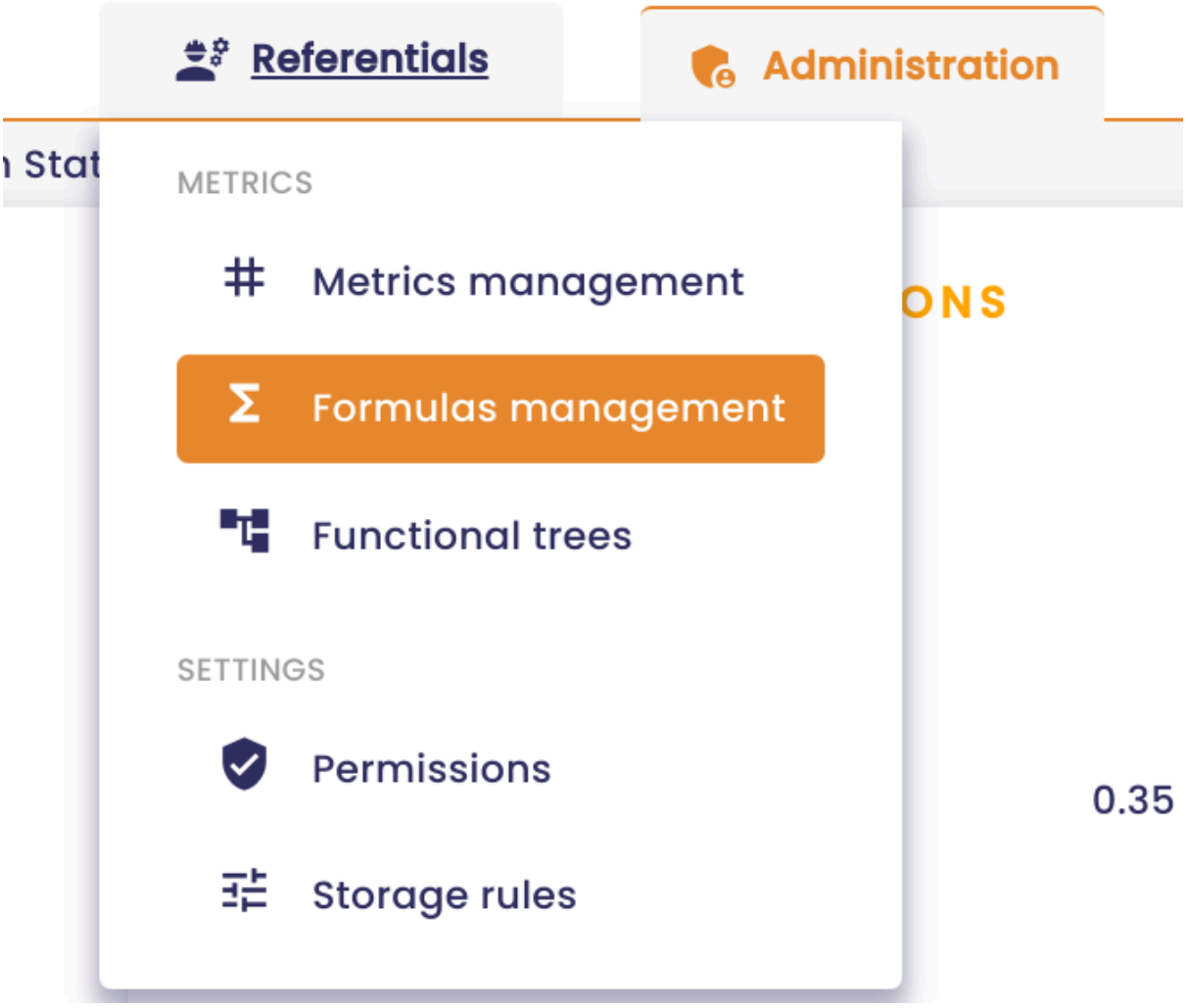
Prerequisite : To access this feature, you must have a **Functional Administrator** role.

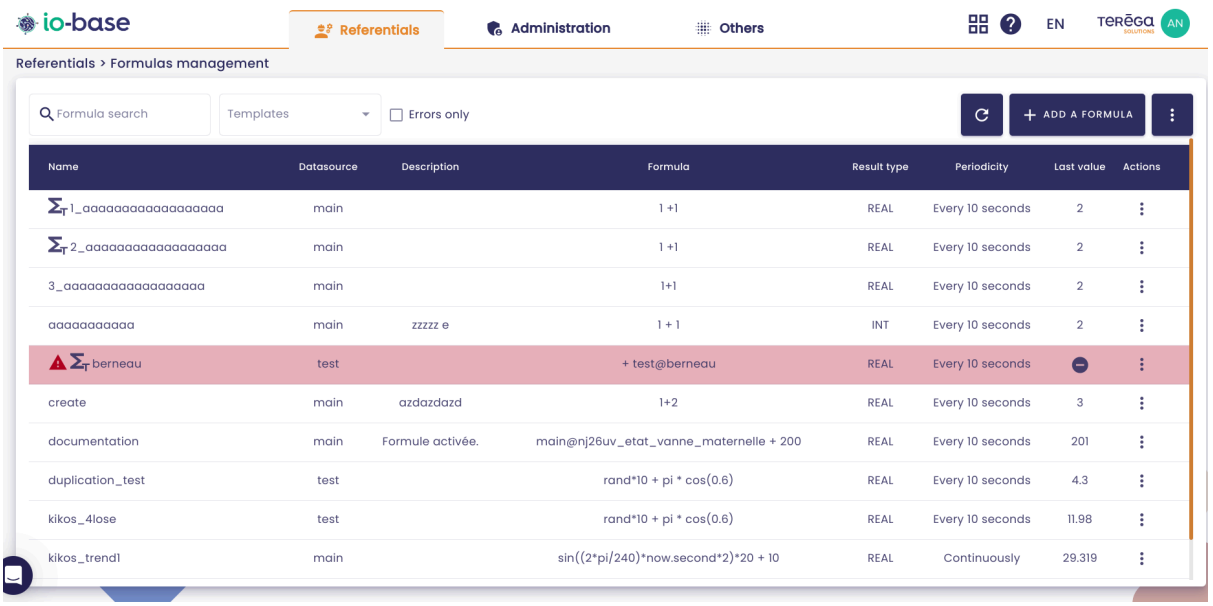
Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



The Io-base administration page opens.

Go to the **Referentials/Formulas management** menu.





This screen shows all the metrics whose values come from a formula.

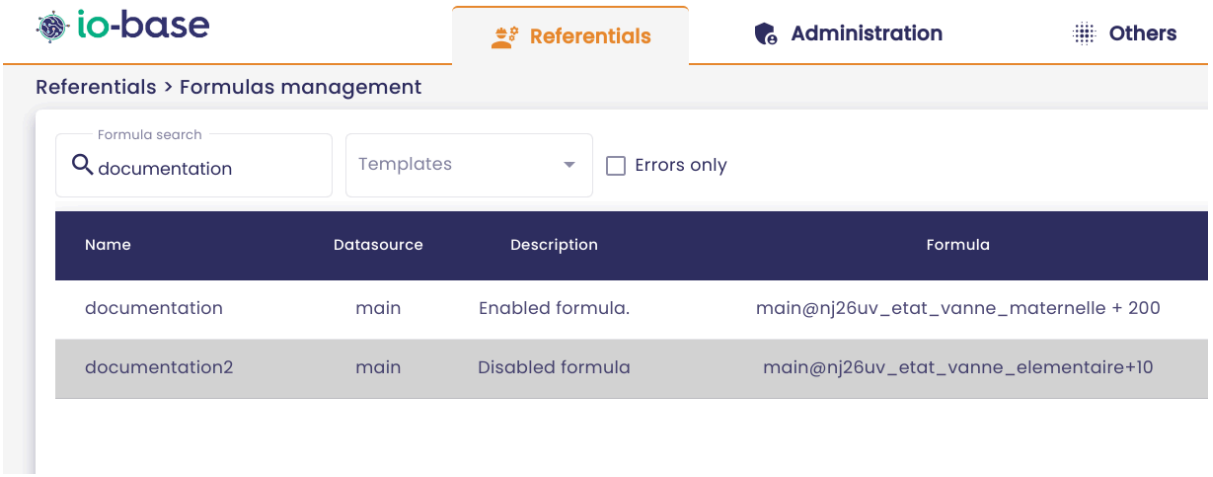
You can decide at any time to disable a formula.

By disabling the formula, no more values will be recorded in the database for the calculated metric.

Note : if a formula is disabled, there will be no more new values for the metric, but the old values will remain in the database. And the calculated metric will always be present in the database. If you want to remove the metric and the old values, you will have to use the delete action.

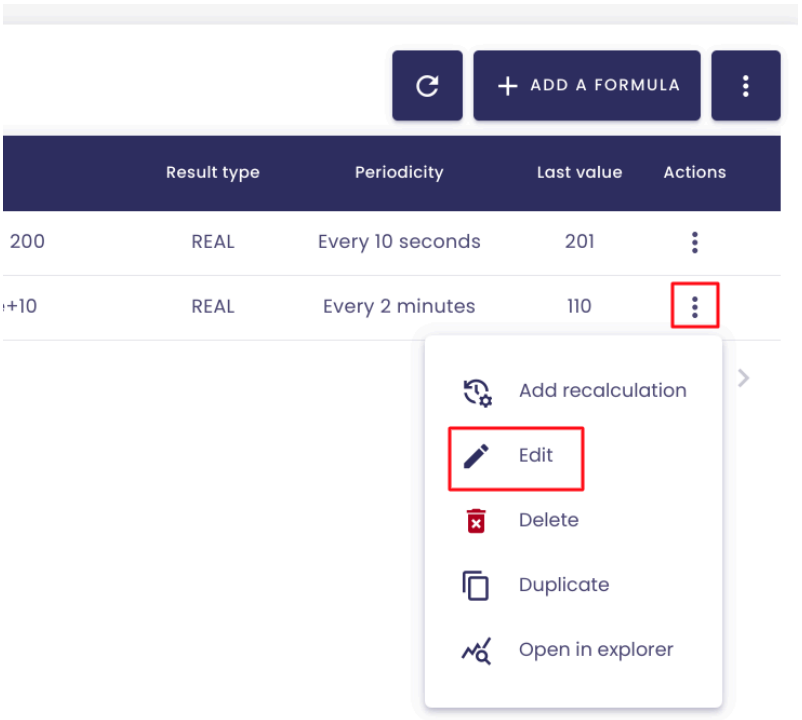
To quickly identify which formulas are active/inactive, simply look at the colours of the lines.

- White : enabled
- Grey : disabled

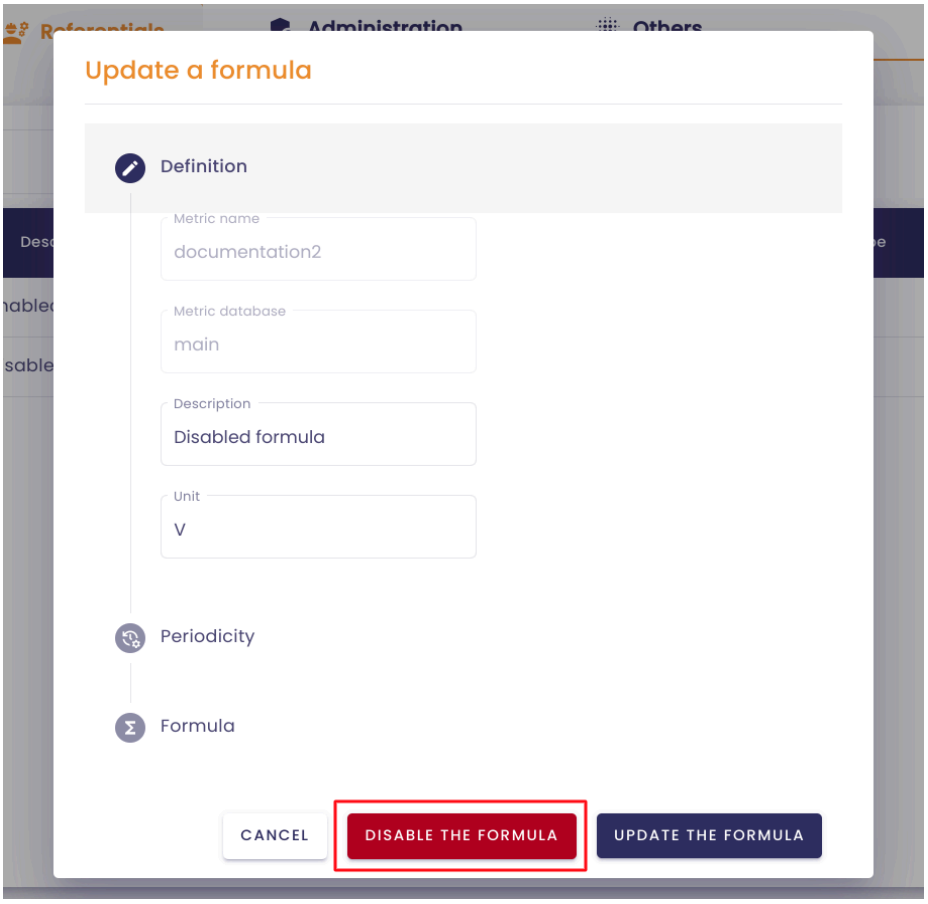


7.3.1 Disable a formula

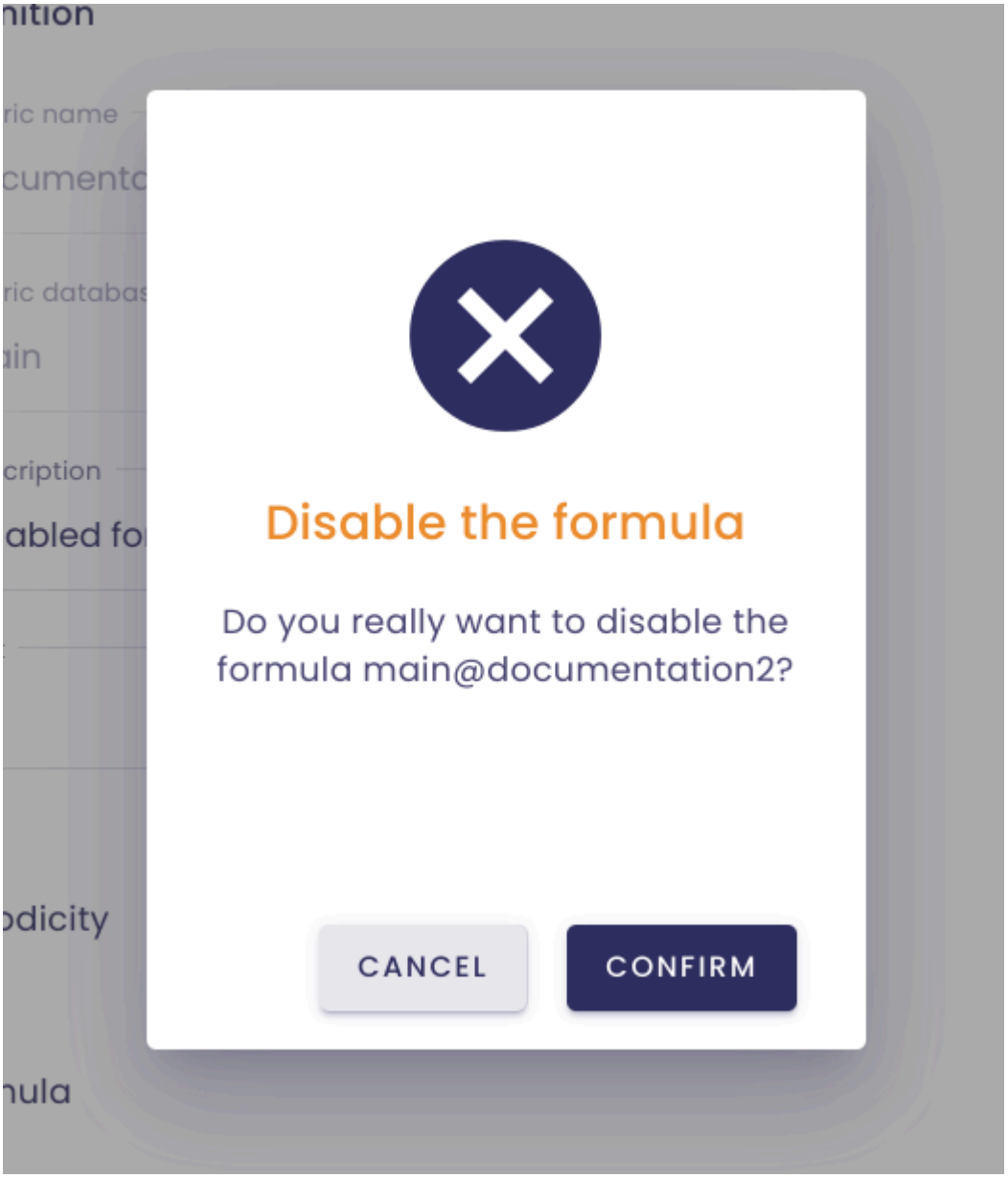
To disable a formula, click on the edit button of the relevant formula.



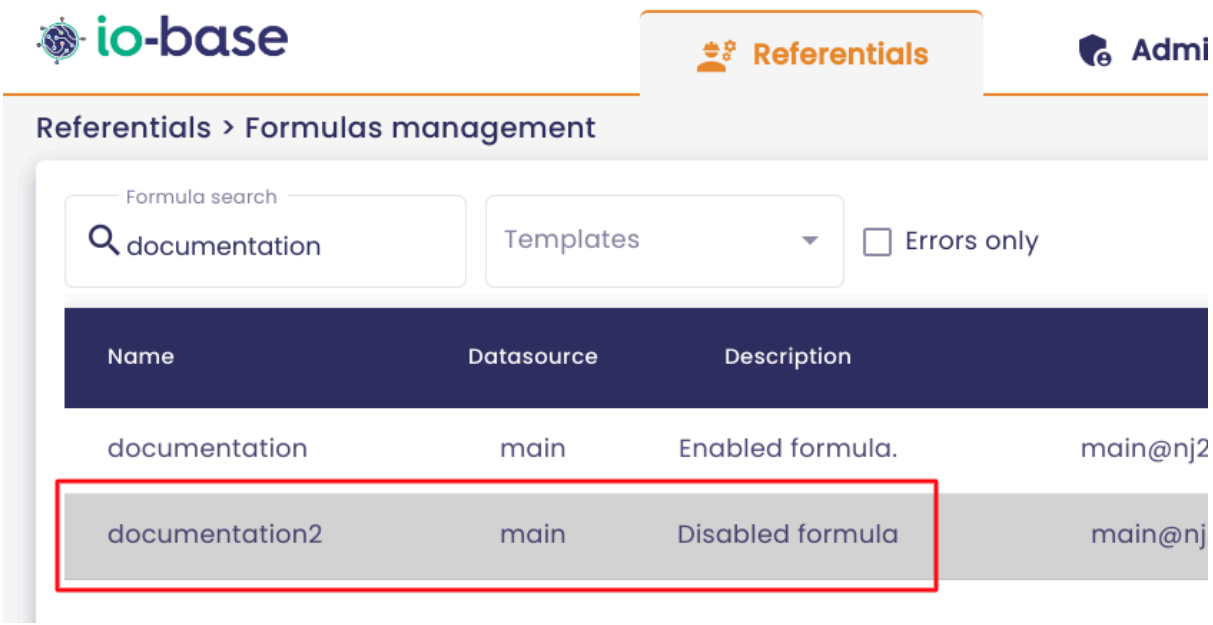
In the edit pop-up, click on the Disable the formula button.



A confirmation message appears. **Confirm** to continue.

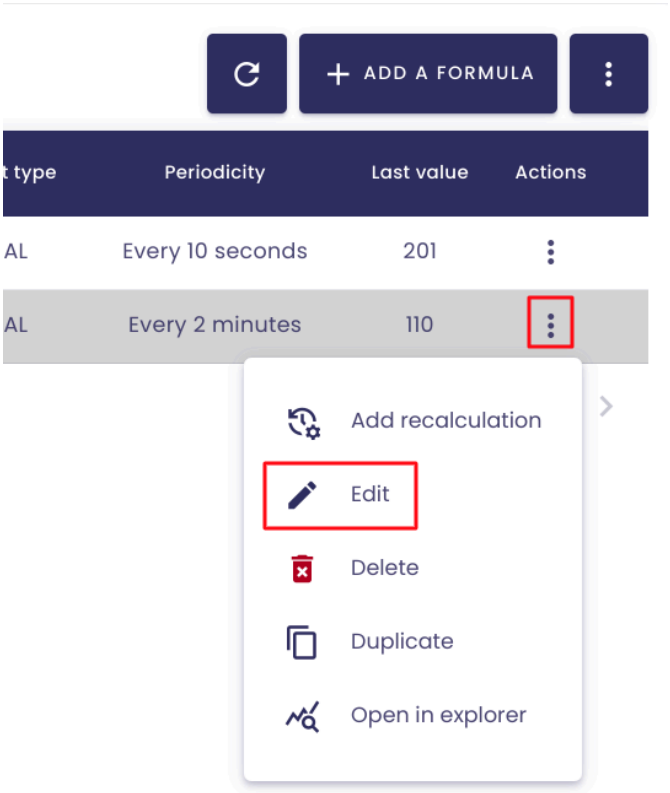


When formulas are disabled, their rows appear in grey in the table.

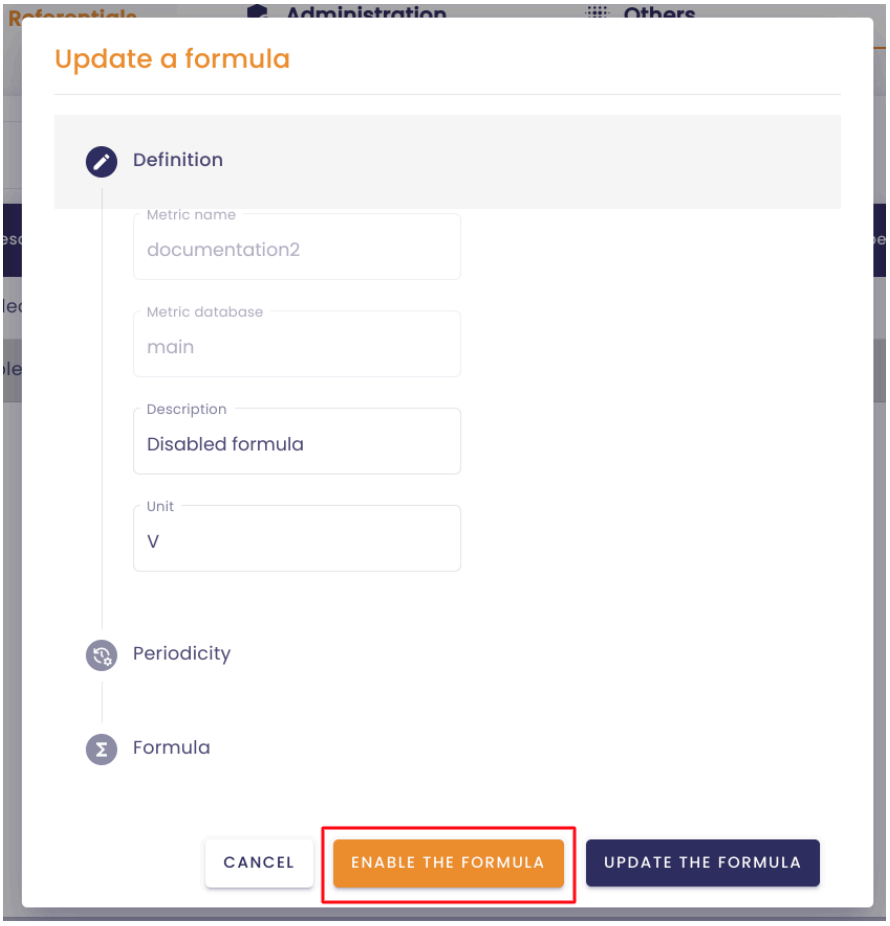


7.3.2 Enable a formula

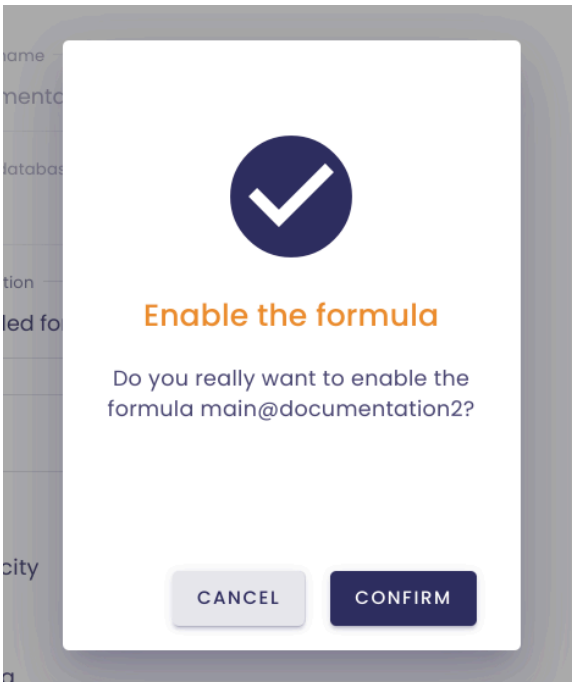
To enable a formula, click on the edit button of the relevant formula.



In the editing window, click on **Enable the formula**.



A confirmation pop-up appears. **Confirm** to continue.

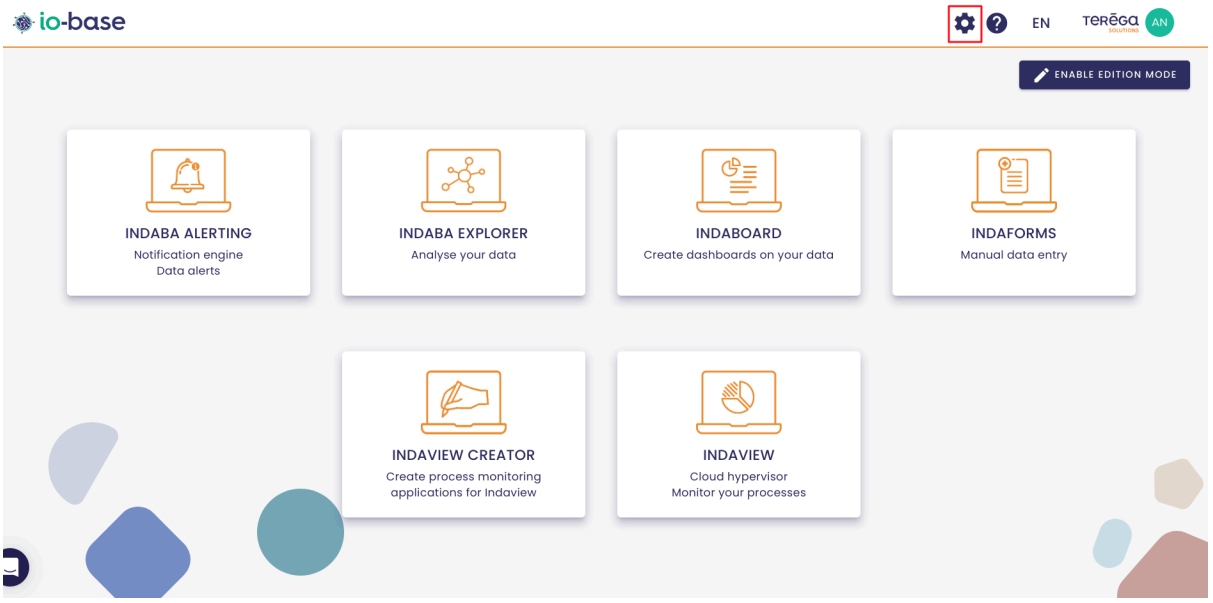


The formula is reactivated, and the row appears again in white in the table.

7.4 Editing a formula (calculated metric)

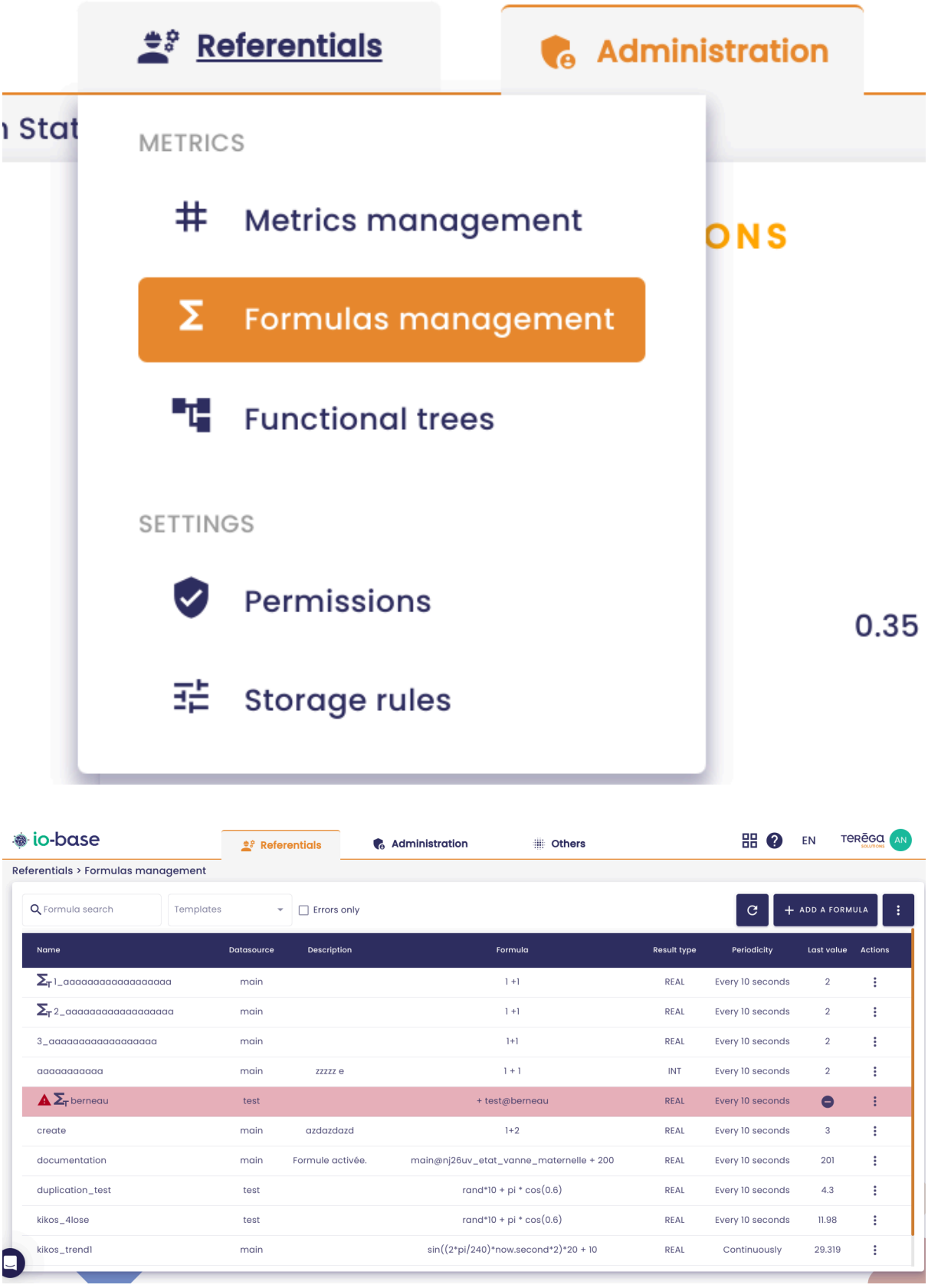
Prerequisite: to manage the calculated metrics, you must have the role of Functional Administrator in io-base.

Log in to Io-base and click the button at the top right of your screen, highlighted below :

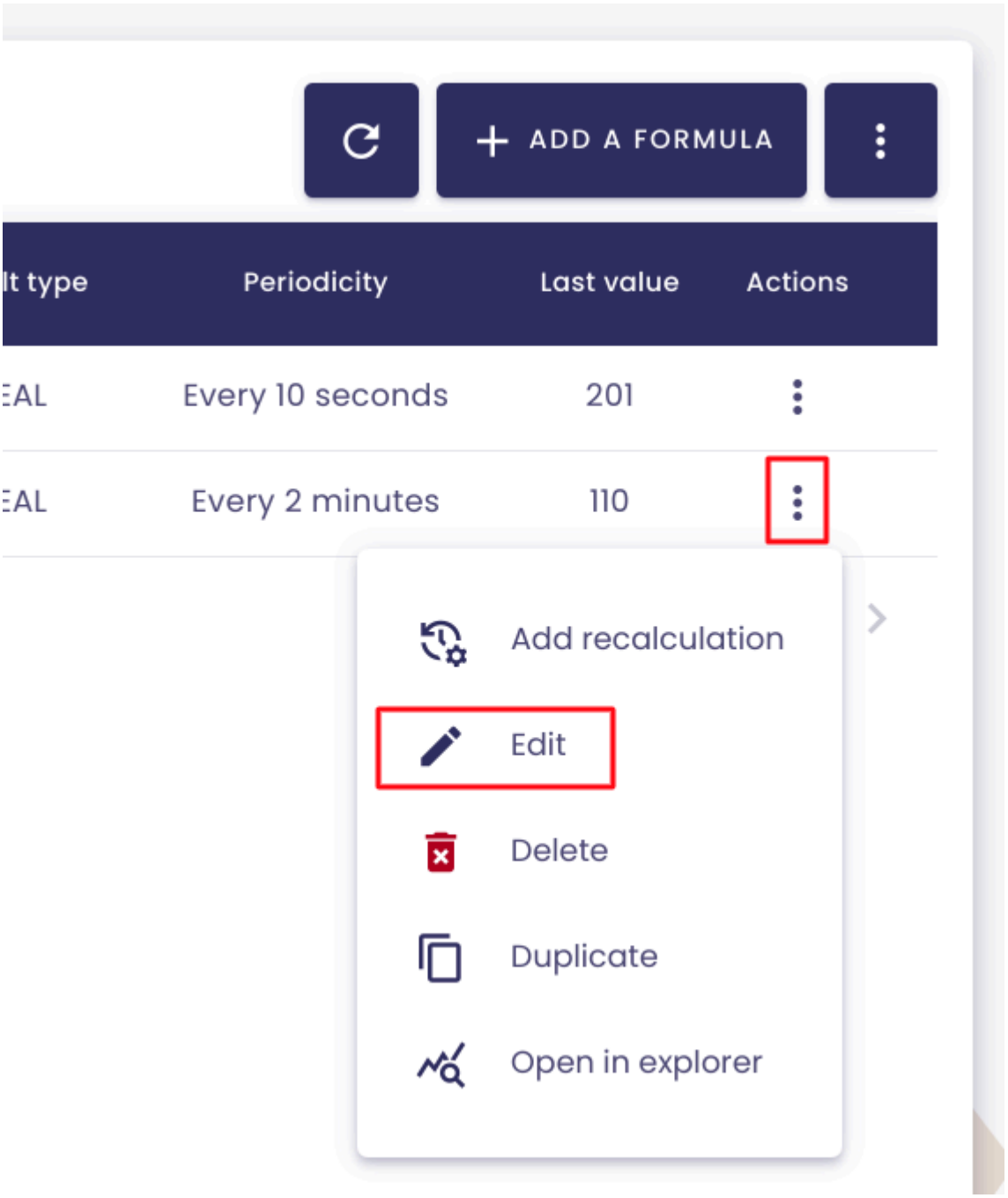


The Io-base administration page opens.

Go to the Referentials/Formulas management menu.



The editing of a formula is accessible from the edit button in the Action column.



From the edit screen, you can disable or enable a formula (click here for further information).

You can also change the settings of the formula.

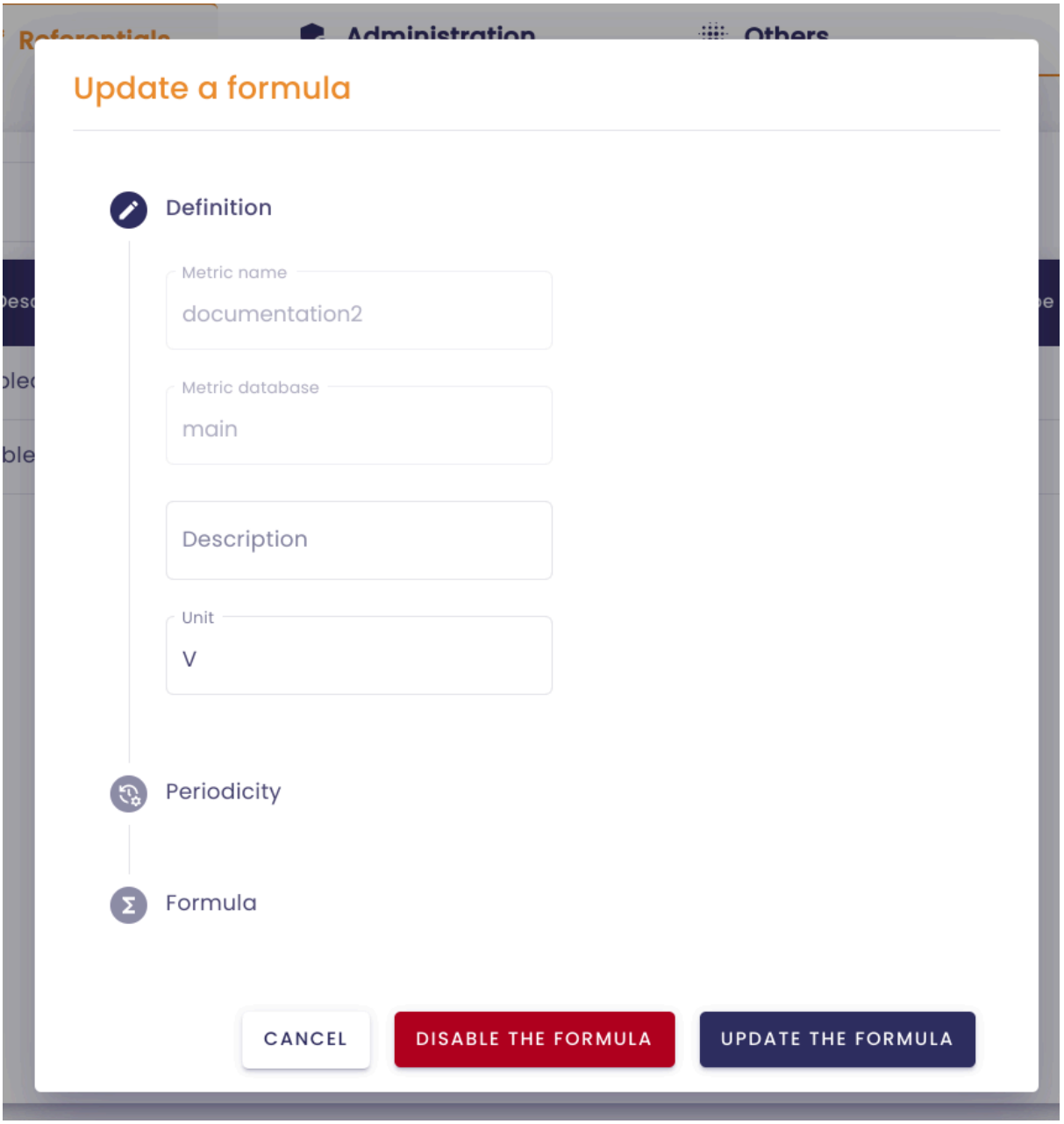
Note: it is impossible to modify the name of the calculated metric, as well as the metric database. To do this, you must delete the formula and recreate it.

The screen for editing a formula is divided into three parts:

- definition of the metric that will be added to the database
- setting up the periodicity for calculating the metric's values
- writing the formula for calculating the values

Once the information has been changed, click on the Update the Formula button. For the button to be available, the formula expression must be tested and valid.

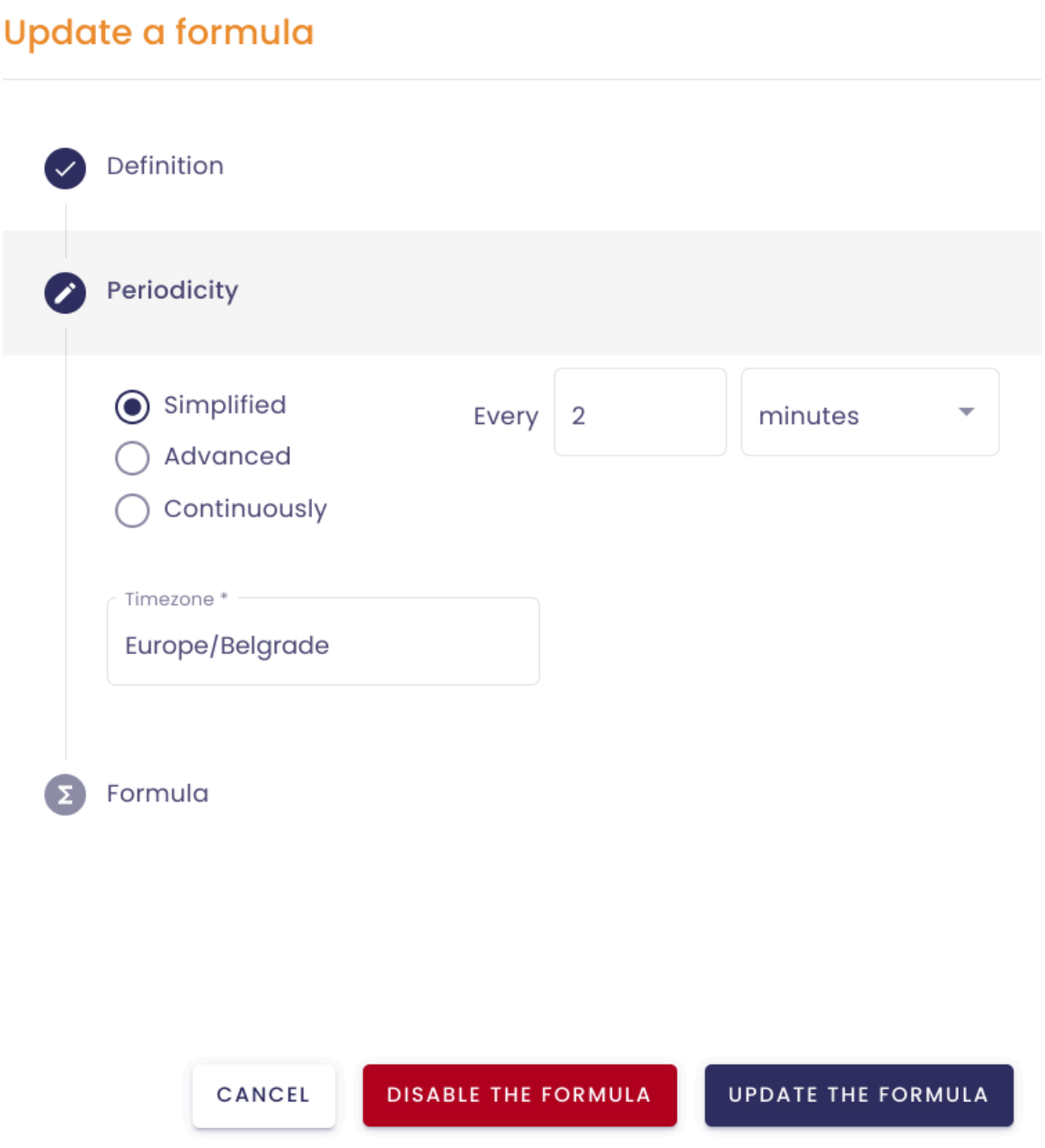
7.4.1 Definition of the metric



The **Definition** zone allows you to modify the general information on the calculated metric :

- Metric name : cannot be modified
- Metric database : the database in which the metric is, cannot be modified
- Description : allows you to give indications on the metric
- Unit : unit of the metric values

7.4.2 Calculation periodicity



The **Periodicity** field allows you to define the frequency with which the metric values will be calculated. There are three possible options:

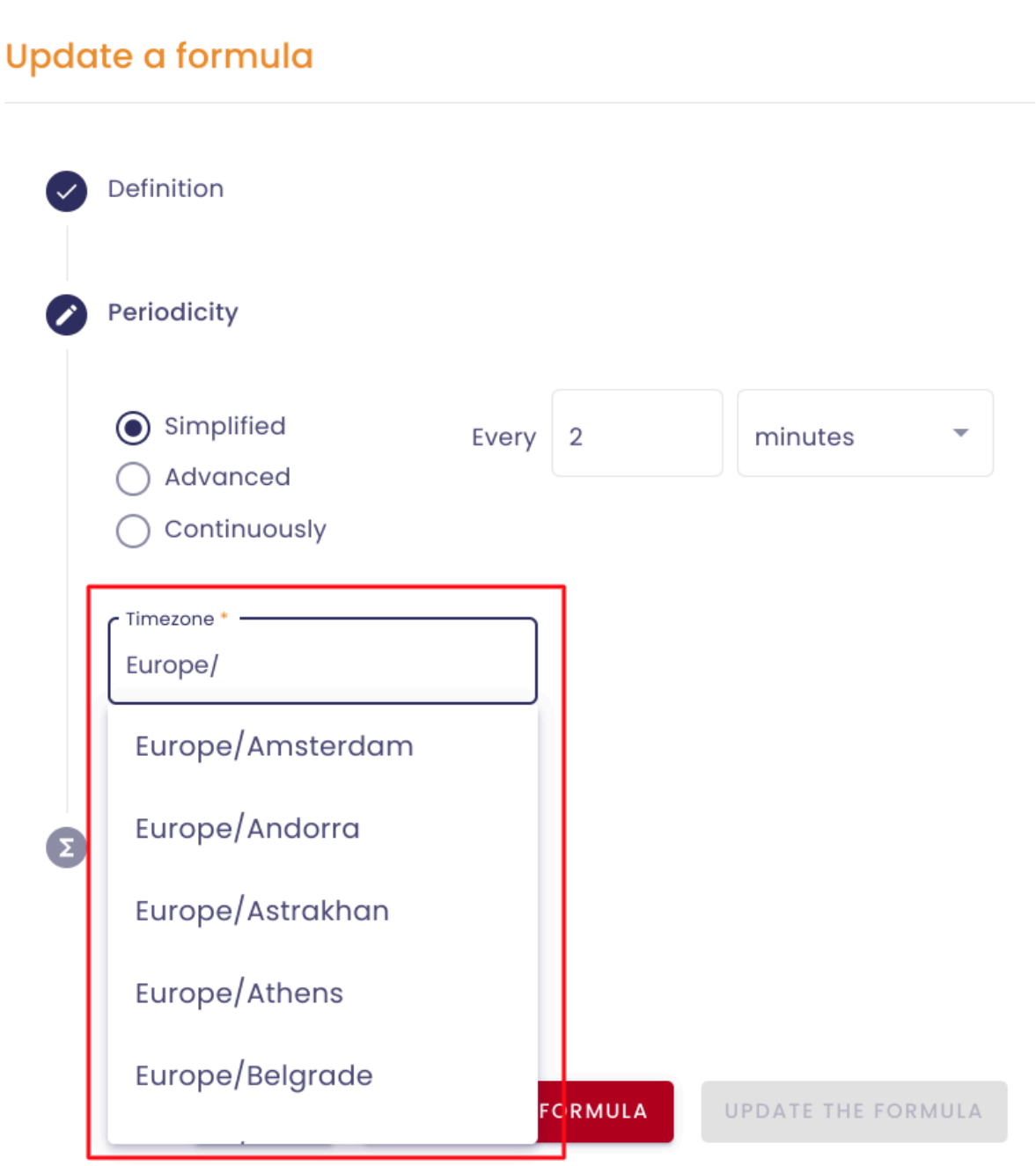
- Continuous: the values will be calculated continuously, if a value of a metric used in the formula changes.
- Simplified: allows to define a number of seconds/minutes/hours between the calculation of two values
- Advanced: allows you to define a more complex frequency, using "CRON Expressions". A help link is available on the screen, to help you write this frequency.

  To summarise, the frequency will be defined by 5 characters.
  - minute
  - hour
  - day of the month
  - month
  - day of the week
- Special characters can be entered:
  - * : any value
  - , : value separator for a list
  - - separator for a value range
  - / : step value
    Example: 50*8* means "At 00:05 in August".

Note : For simplified periodicity, it is not possible to enter a value below 10 seconds.

Please also specify the **timezone** you want to configure for your formula.

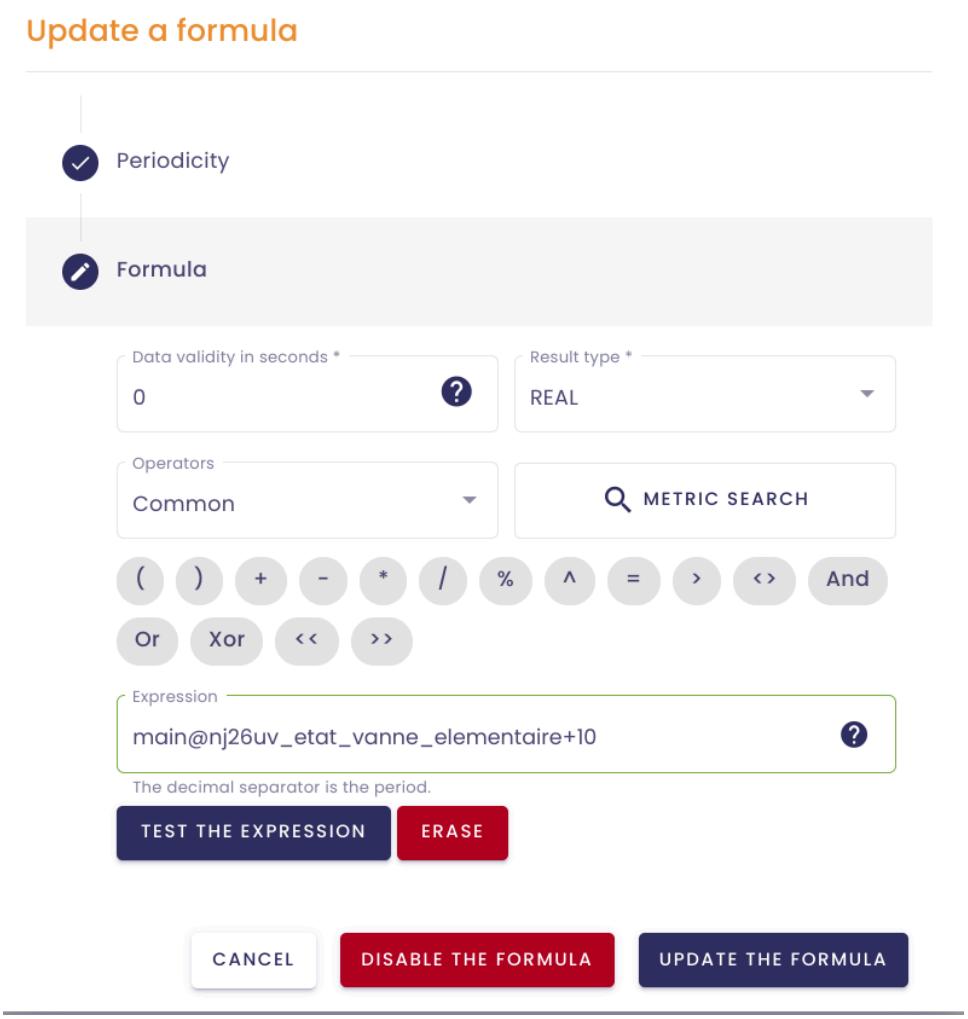
An **autocomplete feature** is available: simply start typing, and the available timezones will be displayed :



When entering your data, begin by specifying the continent, followed by the capital (or economic capital) of the country, separated by a slash (/).

examples :

7.4.3 Defining the formula



This area was made to define the formula that will be applied to calculate the values of the new metric. It contains the following fields:

- **Data validity in seconds** : This value ensures that the calculated values are based on valid data.

For example, if the expression is main@tag>5, and the validity time is 60 seconds. When the formula needs to recalculate, it will look at the date of the last value in base for main@tag. If this date is older than 60 seconds, then the value is considered unreliable. The formula will not be recalculated, and no new value will be inserted for the moment.
If you want to recalculate a value every time, and ignore this feature, just put 0 in this field.

- **Result type** : indicates in which format the calculated values will be stored in the database:
    - BOOL : boolean
    - INT : integer
    - REAL : decimal

- **Expression** : this is the field that will contain the formula.

You can type directly into the text box, or use the various buttons to help you.

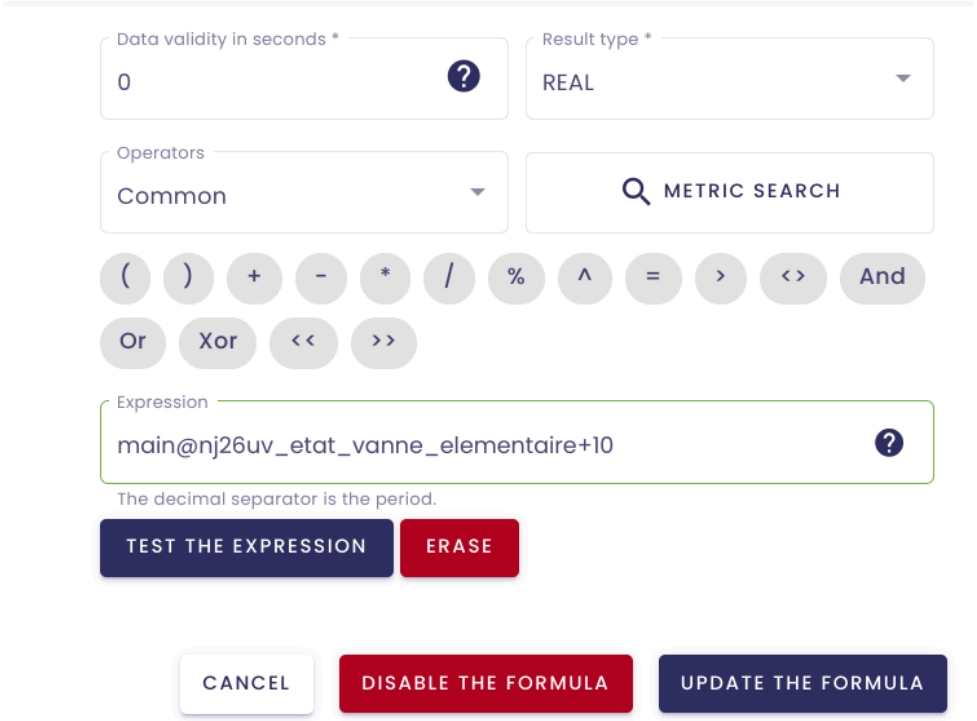
With the **Search Metric** button, you can search for an existing metric in the database to avoid typing it.

The buttons below show the list of operators that can be used in the expression.

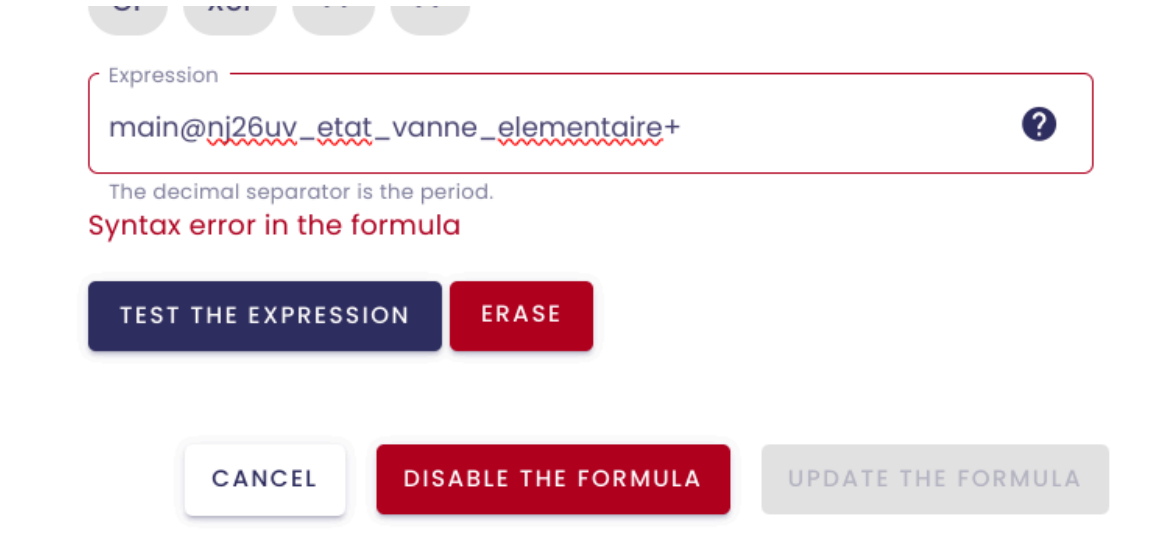
The **?** button available on the **Expression** field gives you additional explanations on how to enter a formula.

Once you have entered your formula expression, you need to test it by clicking the **Test Expression** button. If the formula is correct, the expression field will be framed in green. Otherwise, it will be red.

Example of a valid expression :



Example of an invalid expression :



If the expression is invalid, by passing the mouse over the red circle ? , an indication appears to explain where the error comes from.

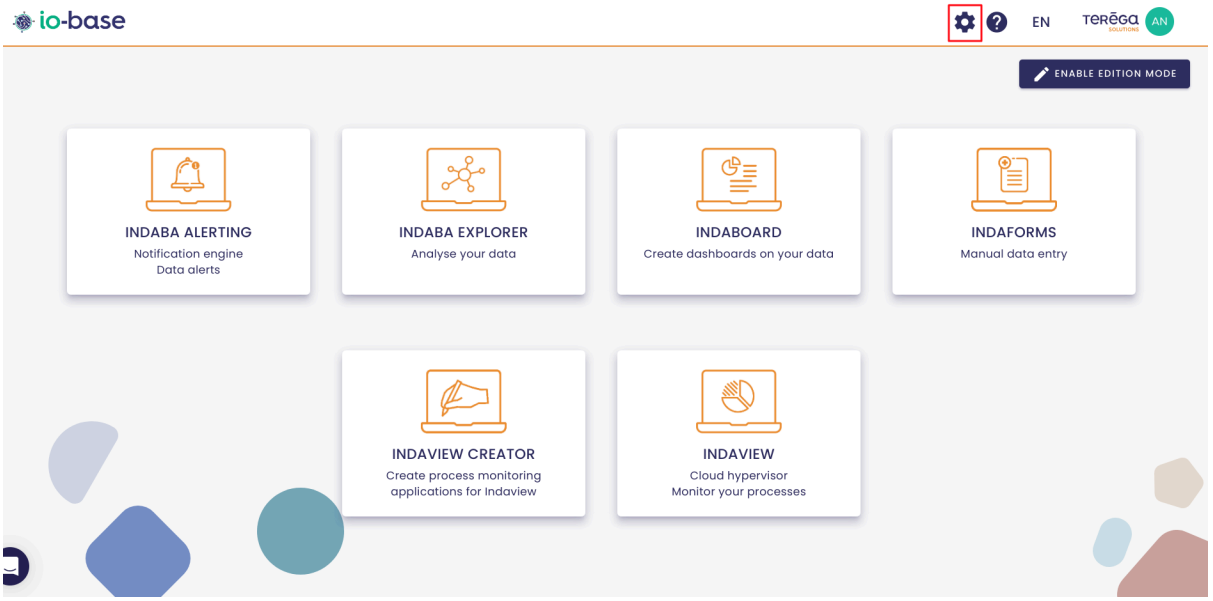
The **Erase** button allows you to clear the content of the **Expression** field to start

the input again.

7.5 Deleting a formula (calculated metric)

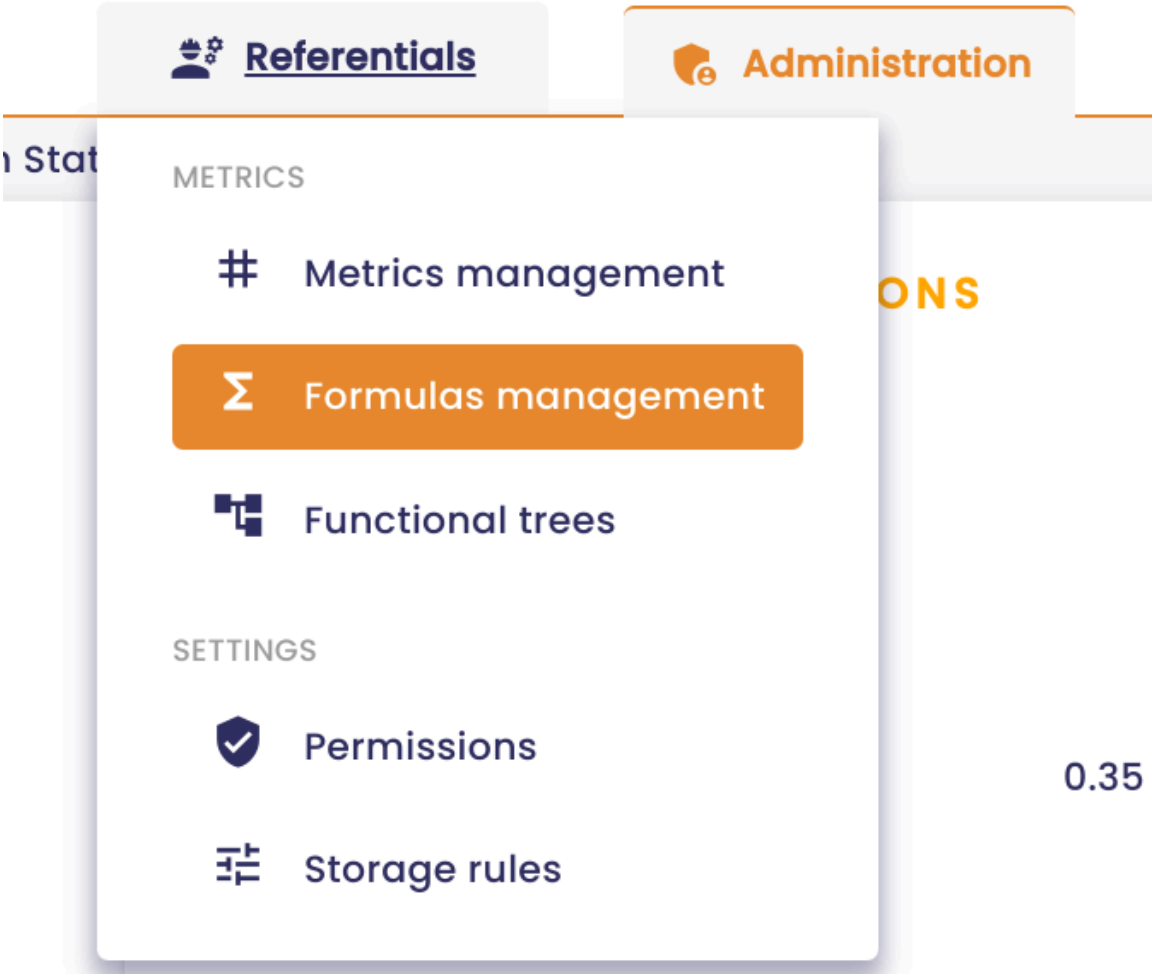
Prerequisite : to manage the calculated metrics, you must have the role of **Functional Administrator** in io-base.

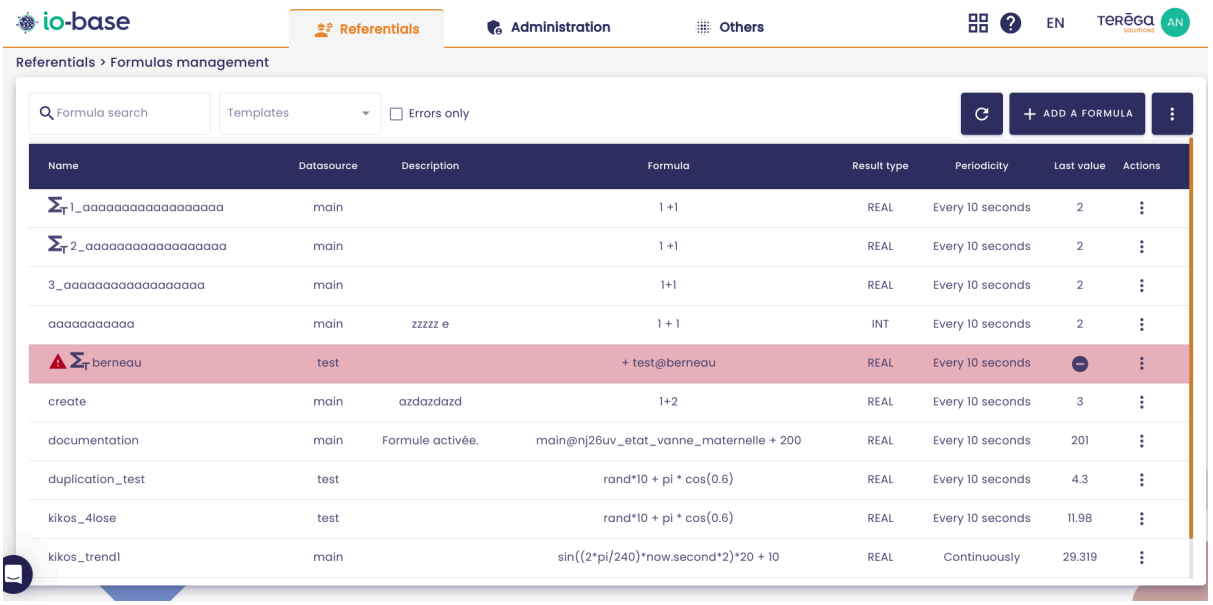
Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



The Io-base administration page opens.

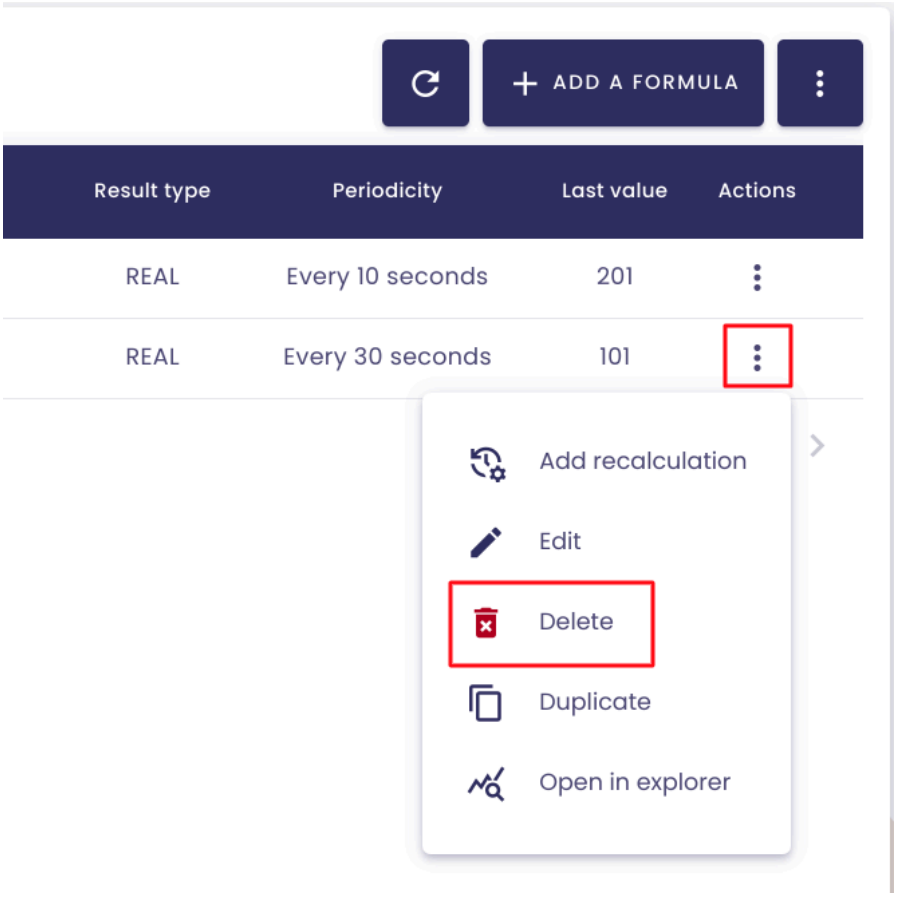
Go to the **Referentials/Formulas management** menu.



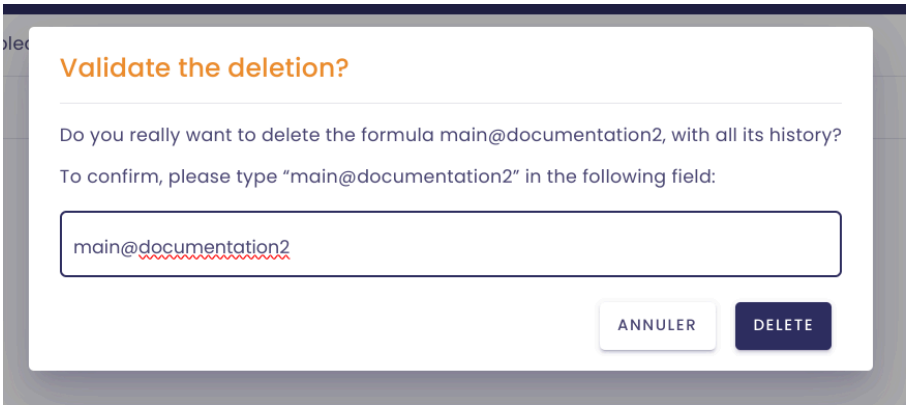


Name	Datasource	Description	Formula	Result type	Periodicity	Last value	Actions
1_aaaaaaaaaaaaaaaaa	main		1 +1	REAL	Every 10 seconds	2	
2_aaaaaaaaaaaaaaaaa	main		1 +1	REAL	Every 10 seconds	2	
3_aaaaaaaaaaaaaaaaa	main		1+1	REAL	Every 10 seconds	2	
aaaaaaaaaaa	main	zzzzz e	1 + 1	INT	Every 10 seconds	2	
berneau	test		+ test@berneau	REAL	Every 10 seconds		
create	main	azdazdazd	1+2	REAL	Every 10 seconds	3	
documentation	main	Formule activée.	main@nj26uv_etat_vanne_maternelle + 200	REAL	Every 10 seconds	201	
duplication_test	test		rand*10 + pi * cos(0.6)	REAL	Every 10 seconds	4.3	
kikos_4lose	test		rand*10 + pi * cos(0.6)	REAL	Every 10 seconds	11.98	
kikos_trend1	main		sin((2*pi/240)*now.second*2)*20 + 10	REAL	Continuously	29.319	

In the **Actions** column, a button allows you to delete a formula :

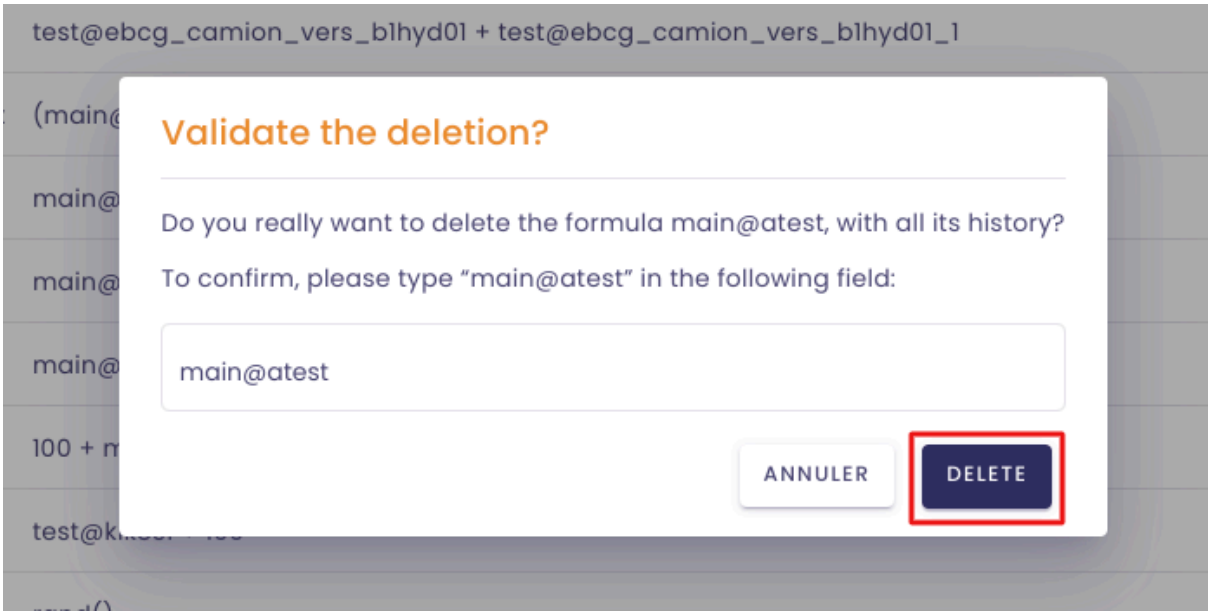


Click on the delete button for the desired formula.



A pop-up window appears. Its purpose is to ensure that no deletions are made by mistake. Also, to be able to delete the selected formula, the exact name of the metric must be re-entered in the field. Once the correct name has been entered,

the **Delete** button becomes accessible.



Note : Copy and paste is not allowed in the field to avoid errors.

Click on **Delete** to continue.

Note : deleting a formula will delete the calculated metric from the database, as well as all the values recorded for this metric.

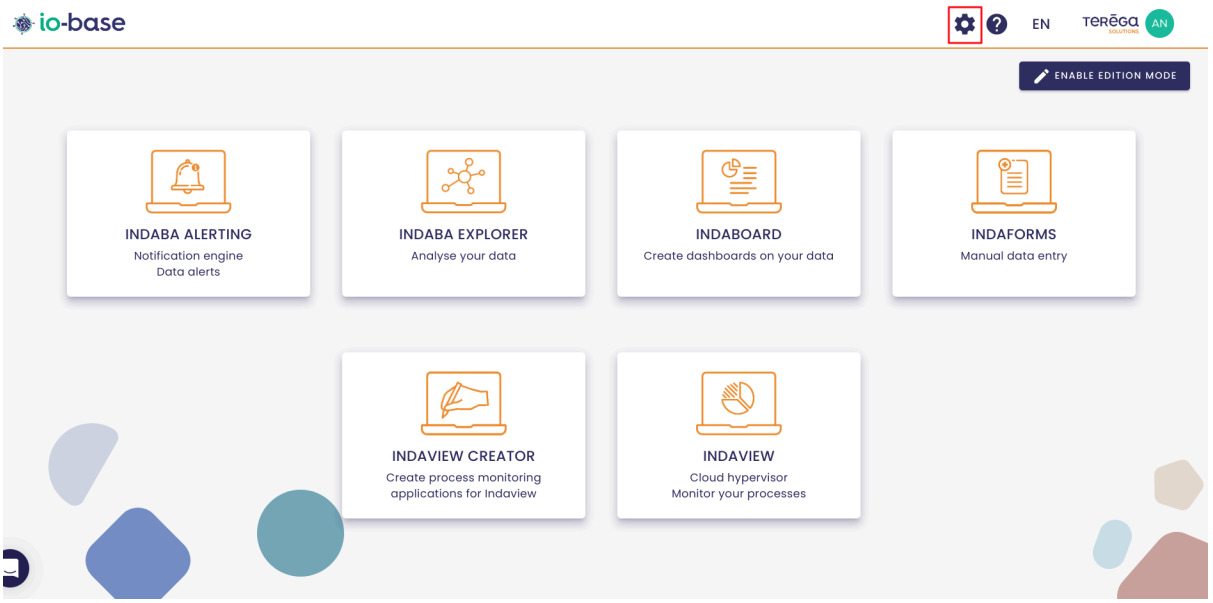
If you wish to keep the metric and the historical values, but no longer update it, you must disable the formula and not delete it.

7.6 Formula recalculation

The formula recalculation function is used to restart the calculation of a formula over a given period of time.

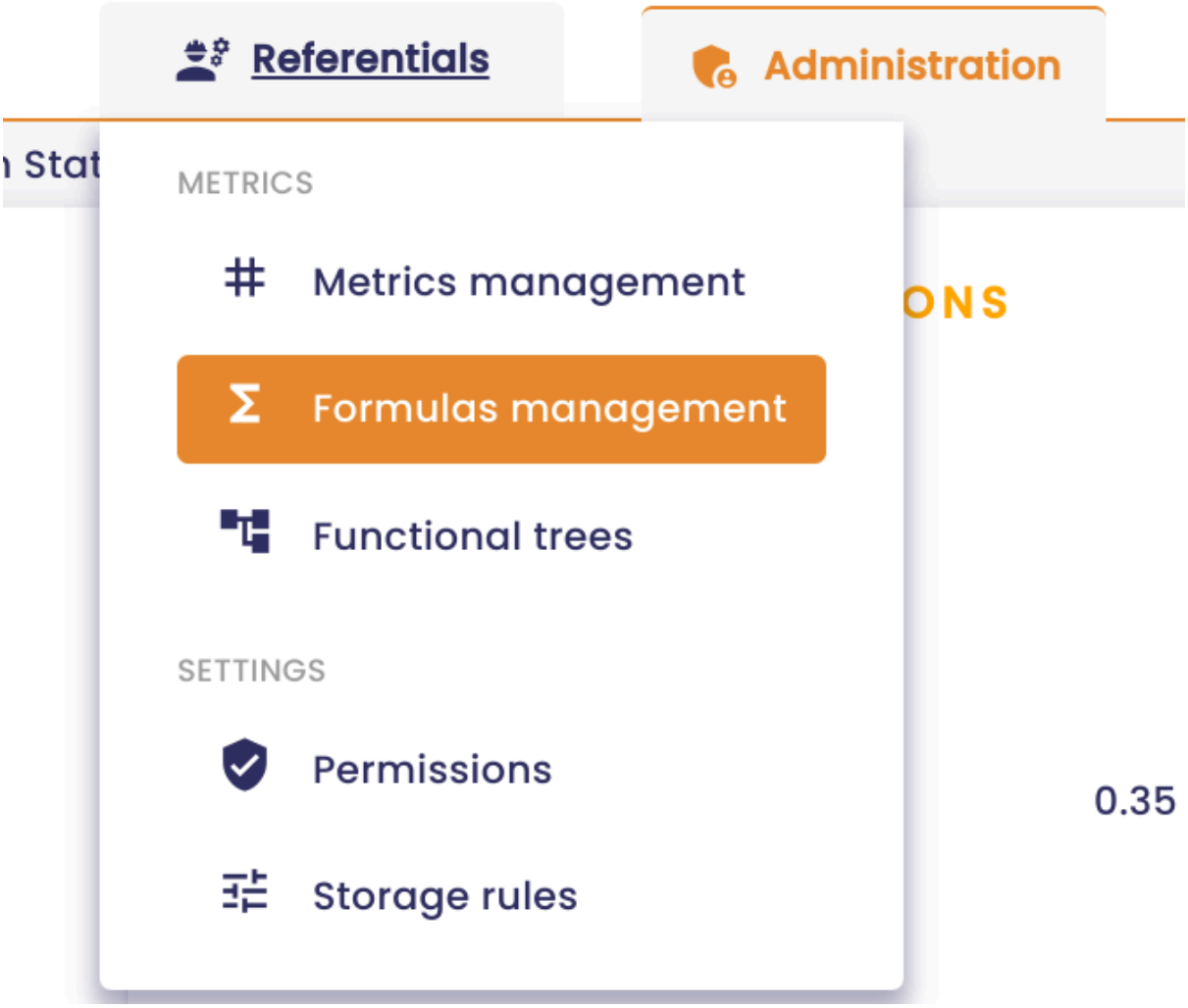
Prerequisite : you must have a functional admin role to access the **Formulas** module

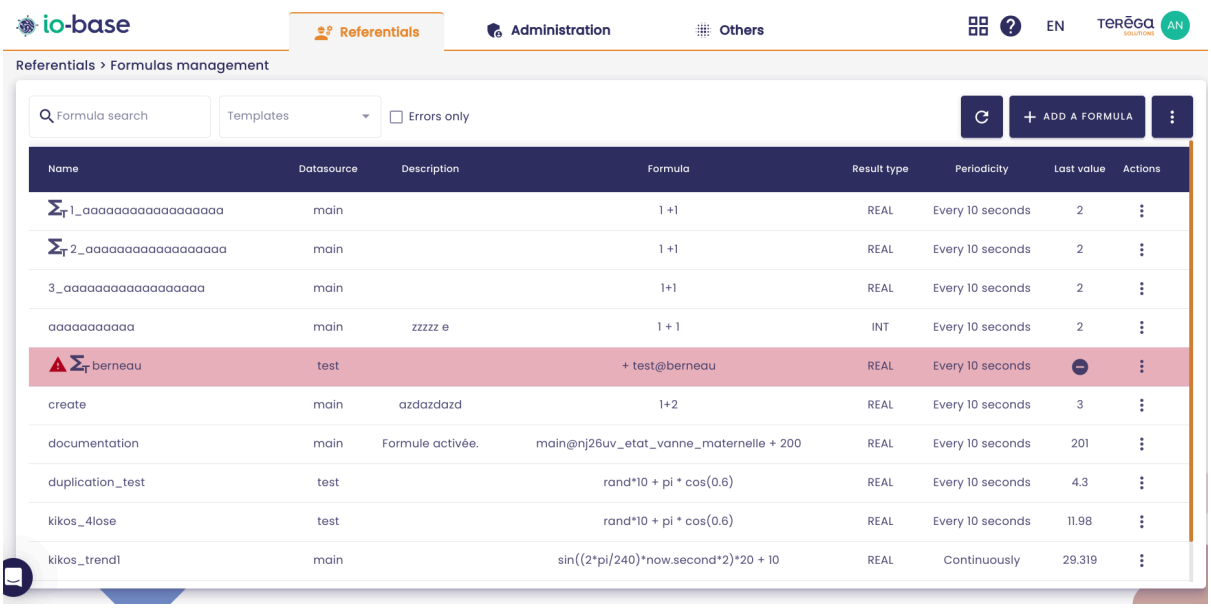
Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



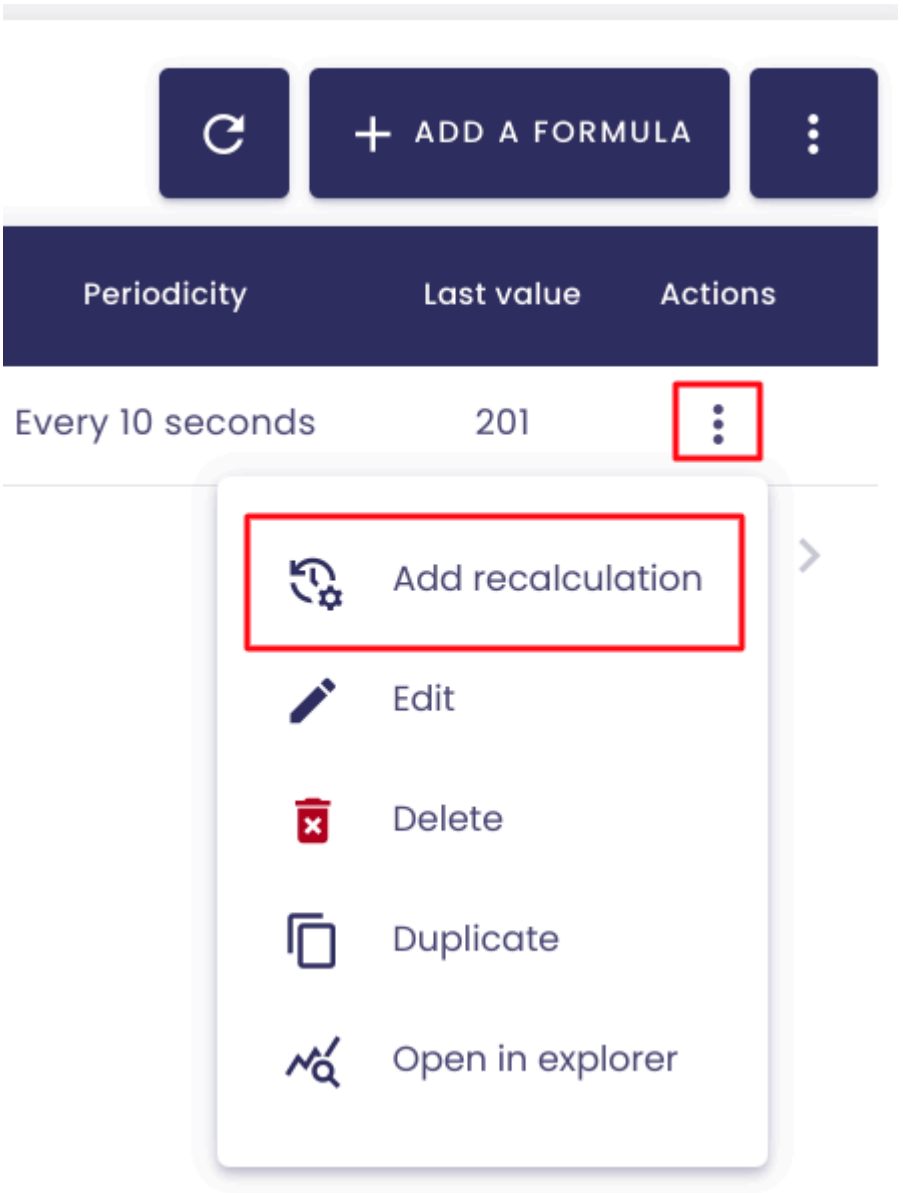
The Io-base administration page opens.

Go to the **Referentials/Formulas management** menu.

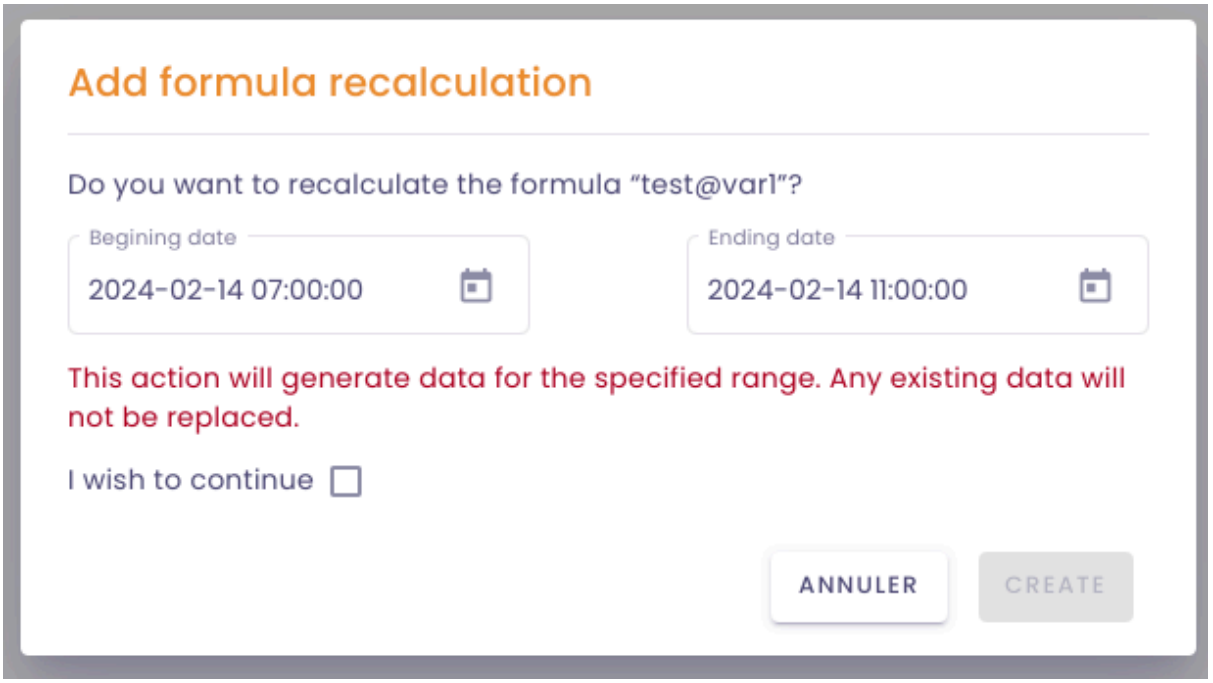




In the **Actions** column, click on the "**Add recalculation**" button.

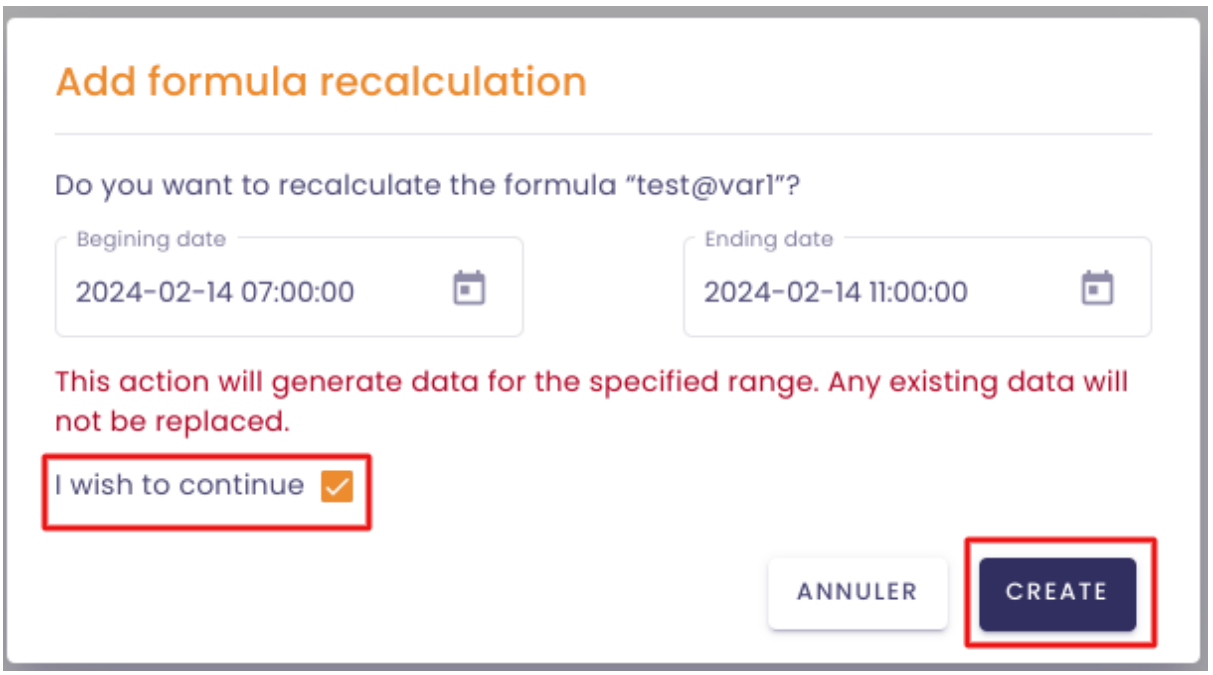


A pop-up window opens. It will allow you to enter the beginning and the ending dates of your recalculation.



The recalculation will generate new values for the period you specify. However, the new values will **NOT** replace the old ones.

To confirm, check the "**I wish to continue**" box and click on **Create**.

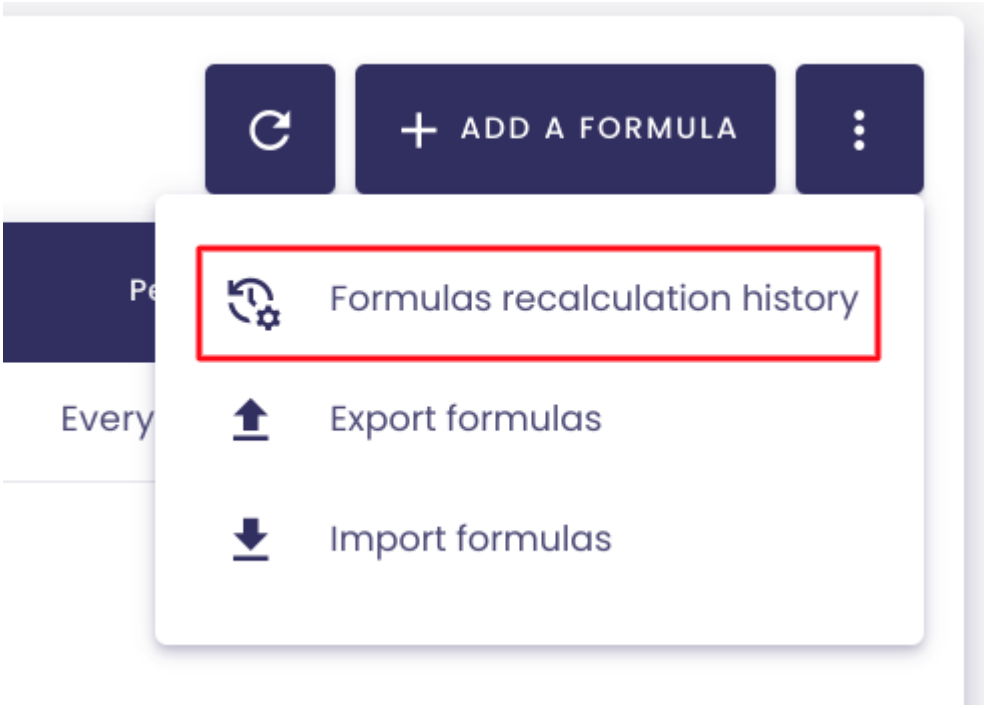


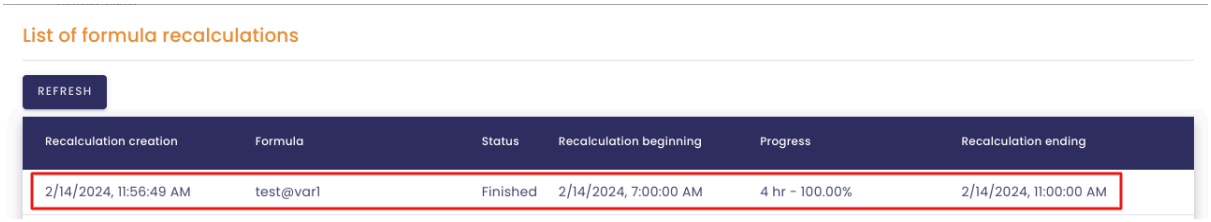
Note : In order for the recalculation to be operated, the selected formulas must contain metrics.

For instance, if the expression of a formula is "rand()+3", the recalculation is not possible.

It becomes possible if you add a metric to the expression.

You can check the progress and history of your formula recalculation by clicking on the button at the top right.



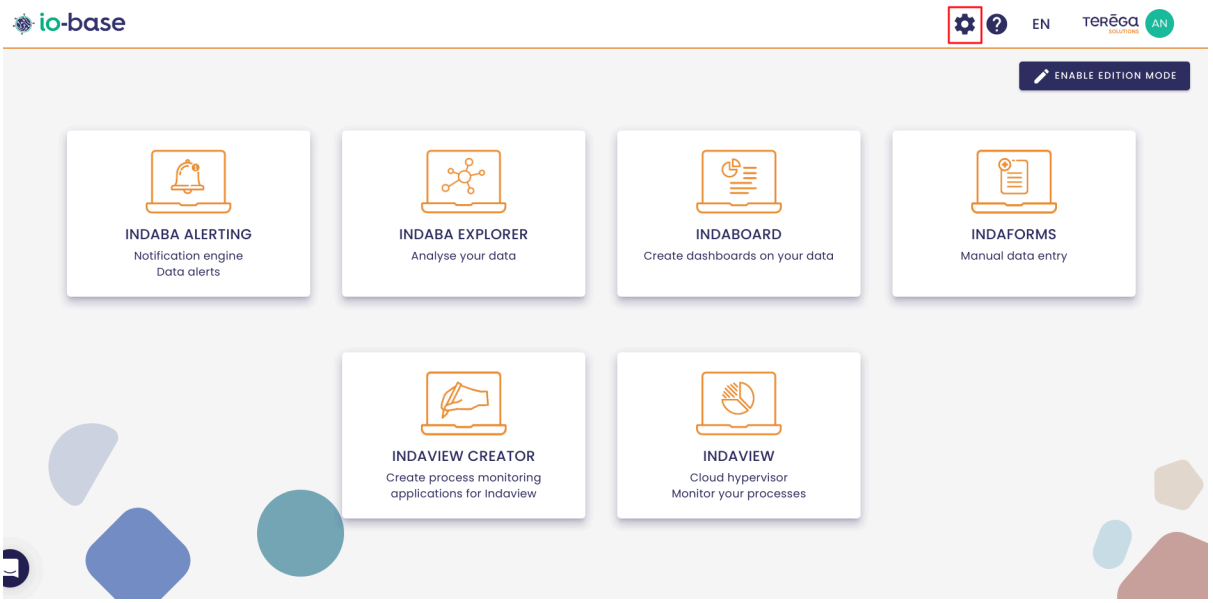


Once the recalculation is complete, you can view the result with **Indaba Explorer**.

7.7 Duplicate a formula

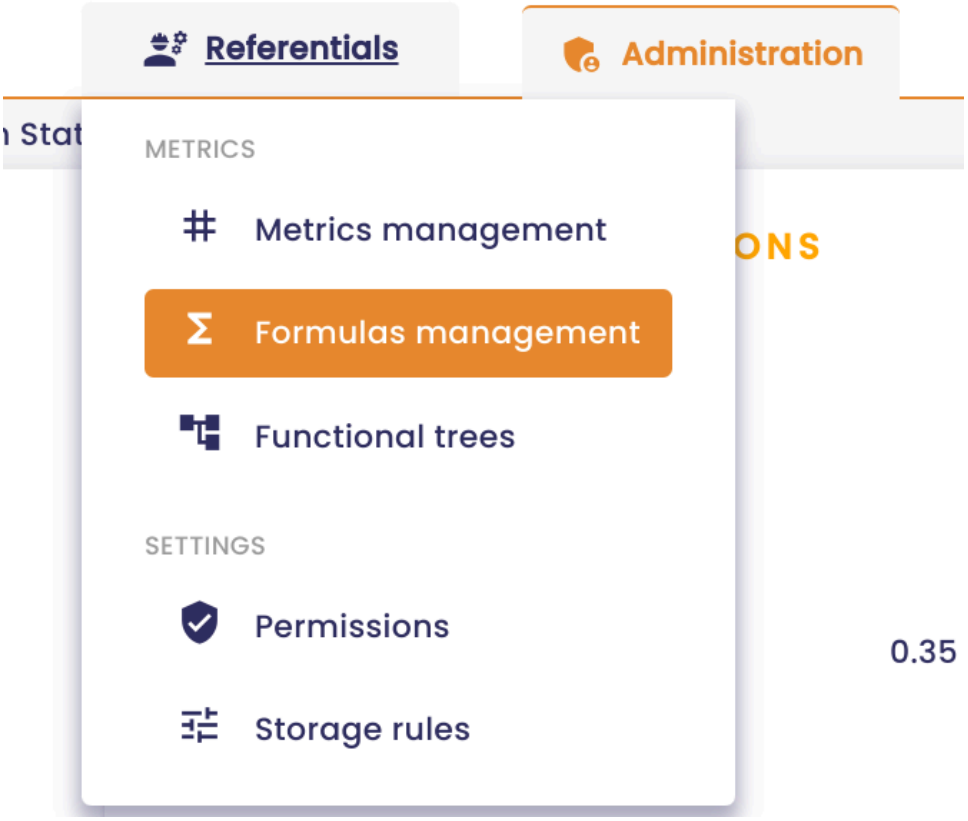
Prerequisite : You must have a functional administrator role to access this feature.

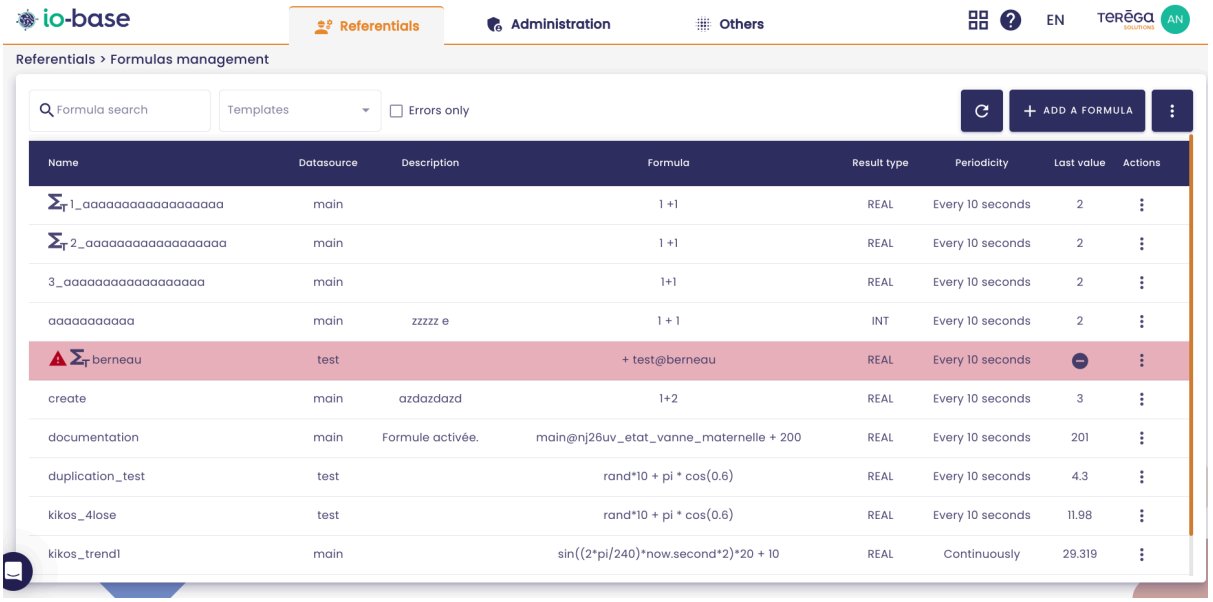
Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



The Io-base administration page opens.

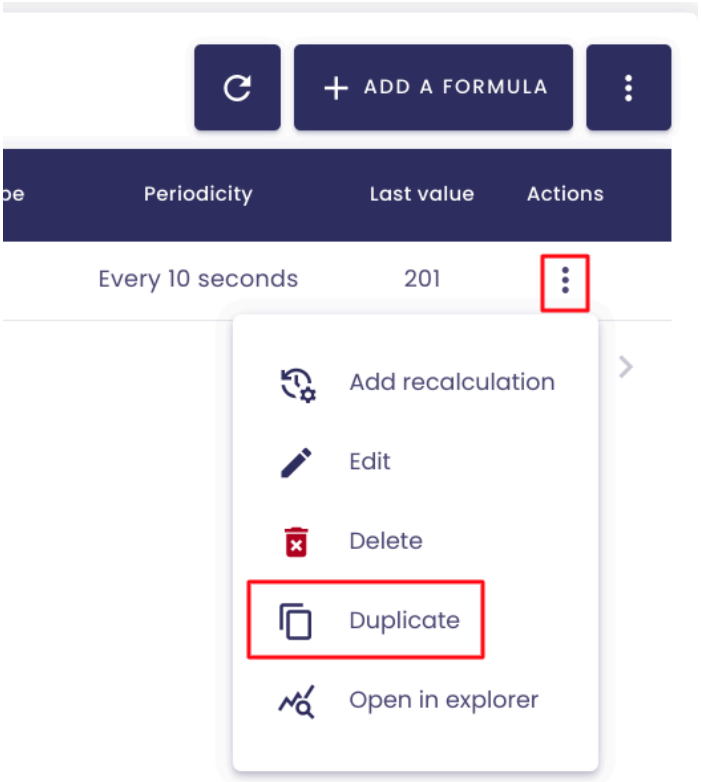
Go to the **Referentials/Formulas management** menu.





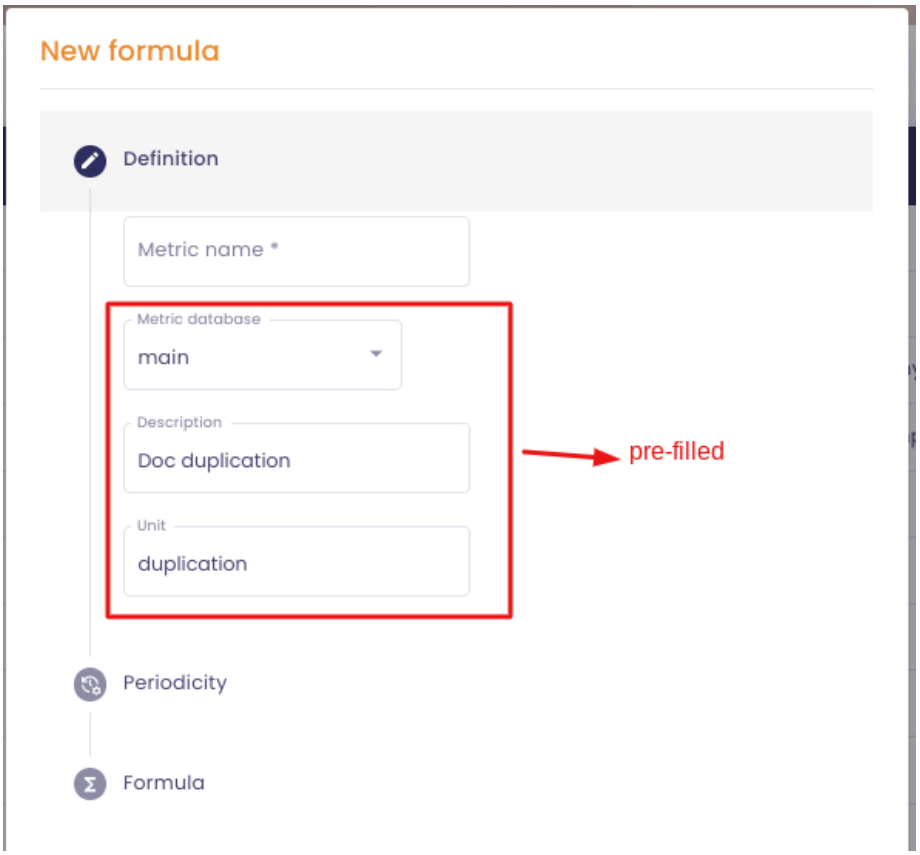
To duplicate a formula, go to the **Actions** column and click on

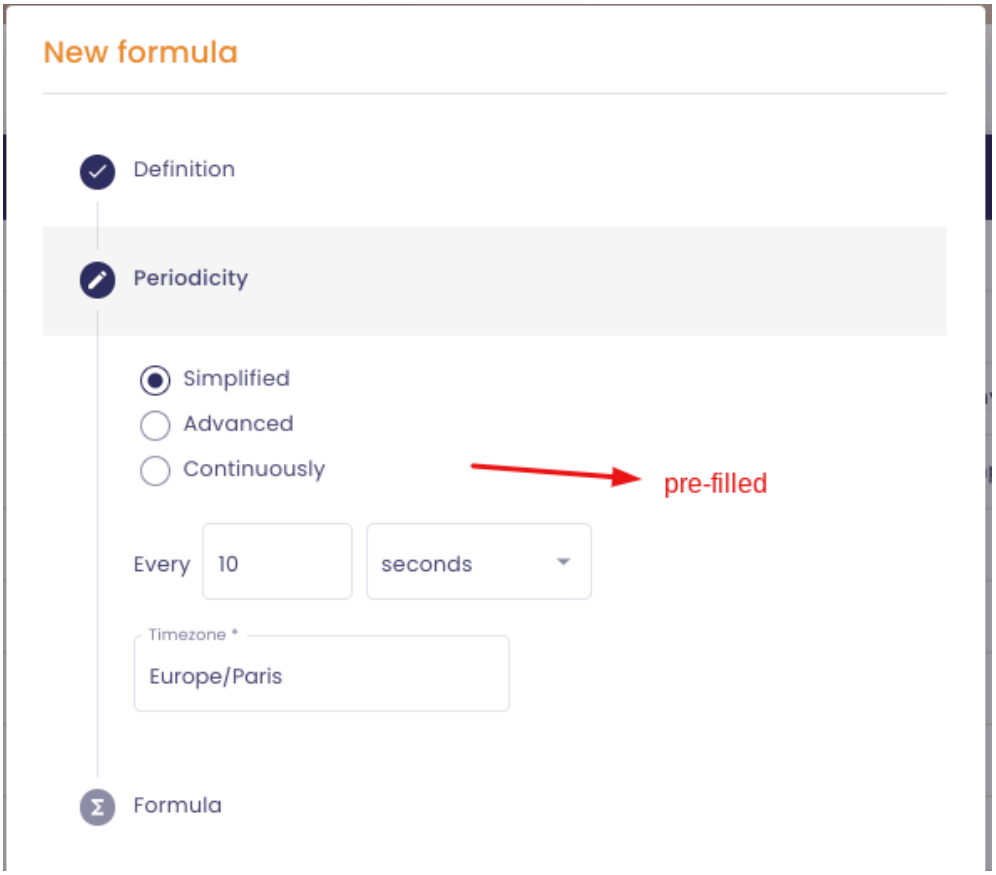
Then, click on **Duplicate**.

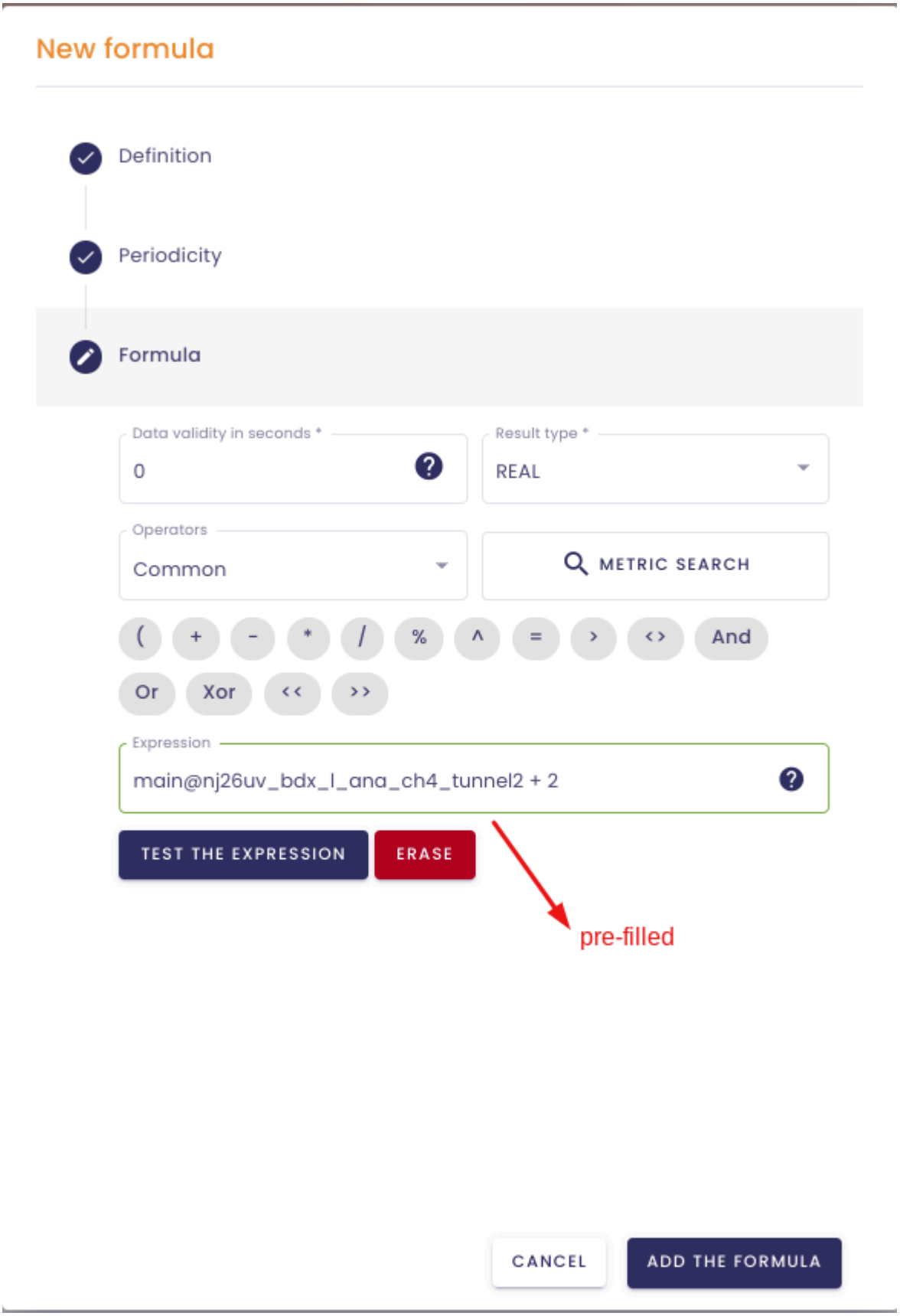


The screen for creating a new formula will open.

In this screen, the fields of the metric will already be pre-filled with the information from the duplicated metric (except for the metric name).




New formula
Definition
Periodicity
Simplified
Advanced
Continuously
pre-filled
Every
10
seconds
Timezone *
Europe/Paris
Formula



Note: However, you still have the option to modify the pre-filled information as you

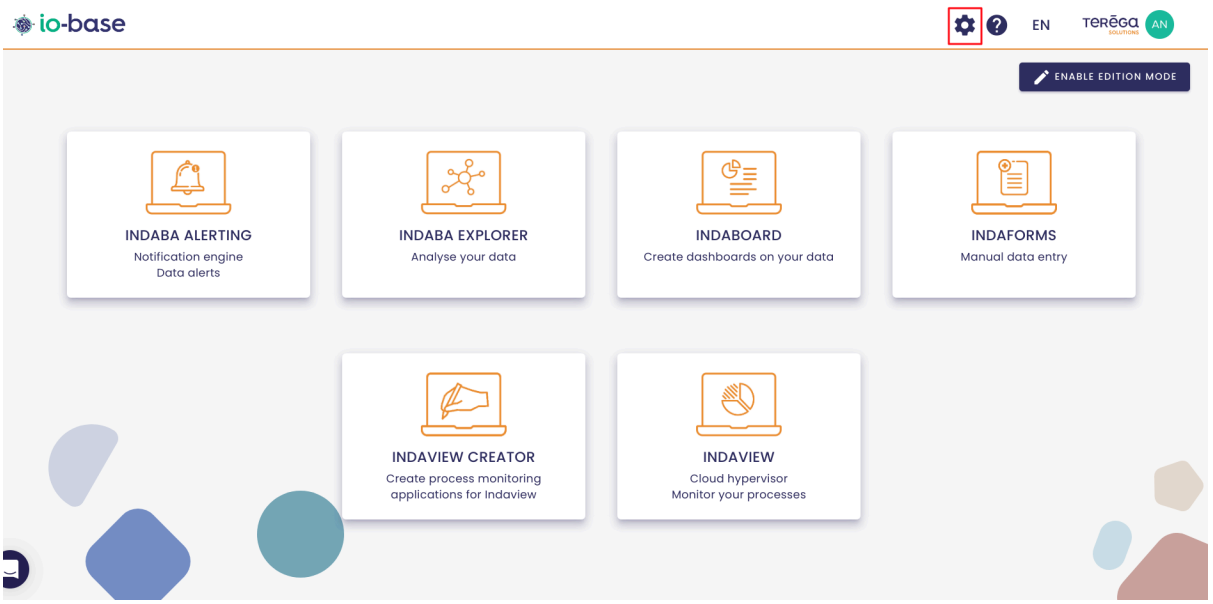
see fit.

Click on **Add Formula**. A copy of your formula has been created.

7.8 Import/Export formulas

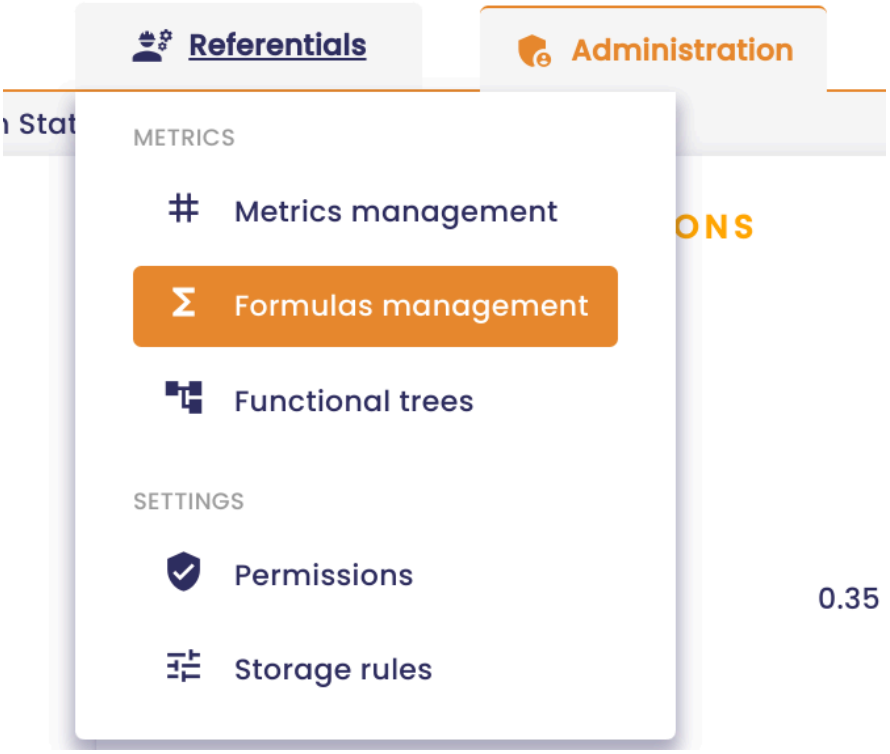
Prerequisites : This feature is available for users with a functional administrator role.

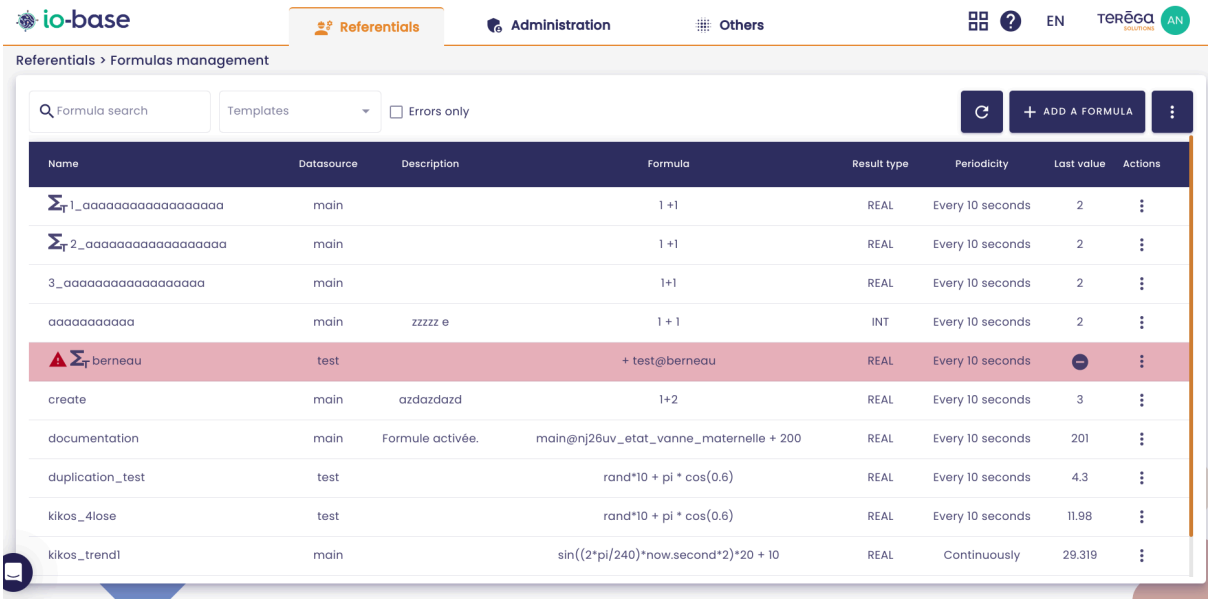
Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



The Io-base administration page opens.

Go to the **Referentials/Formulas management** menu.





Name	Datasource	Description	Formula	Result type	Periodicity	Last value	Actions
1_aaaaaaaaaaaaaaaaa	main		1 +1	REAL	Every 10 seconds	2	
2_aaaaaaaaaaaaaaaaa	main		1 +1	REAL	Every 10 seconds	2	
3_aaaaaaaaaaaaaaaaa	main		1+1	REAL	Every 10 seconds	2	
aaaaaaaaaaa	main	zzzzz e	1 + 1	INT	Every 10 seconds	2	
berneau	test		+ test@berneau	REAL	Every 10 seconds		
create	main	azdazdazd	1+2	REAL	Every 10 seconds	3	
documentation	main	Formule activée.	main@nj26uv_etat_vanne_maternelle + 200	REAL	Every 10 seconds	201	
duplication_test	test		rand*10 + pi * cos(0.6)	REAL	Every 10 seconds	4.3	
kikos_4lose	test		rand*10 + pi * cos(0.6)	REAL	Every 10 seconds	11.98	
kikos_trend1	main		sin((2*pi/240)*now.second*2)*20 + 10	REAL	Continuously	29.319	

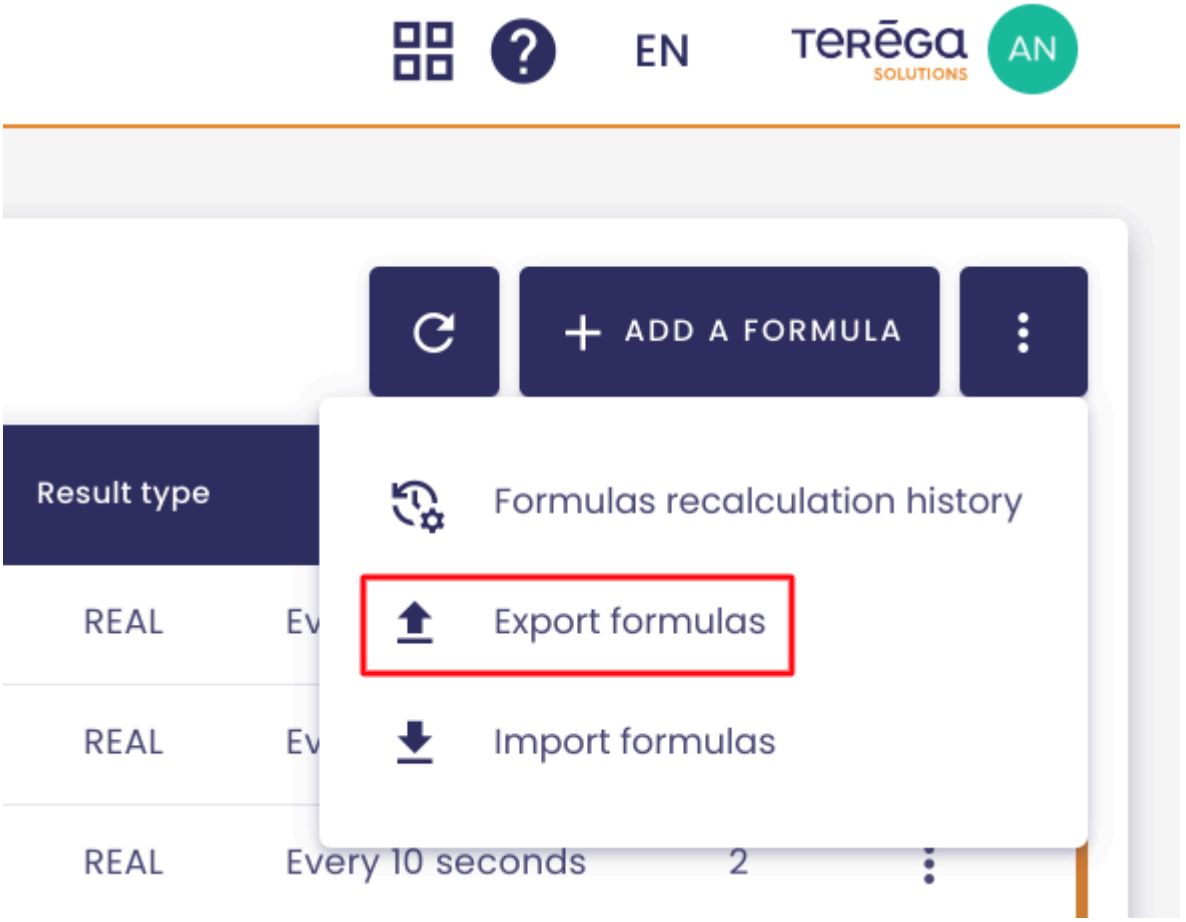
You have the possibility to export and import your formulas.

7.8.1 Export formulas

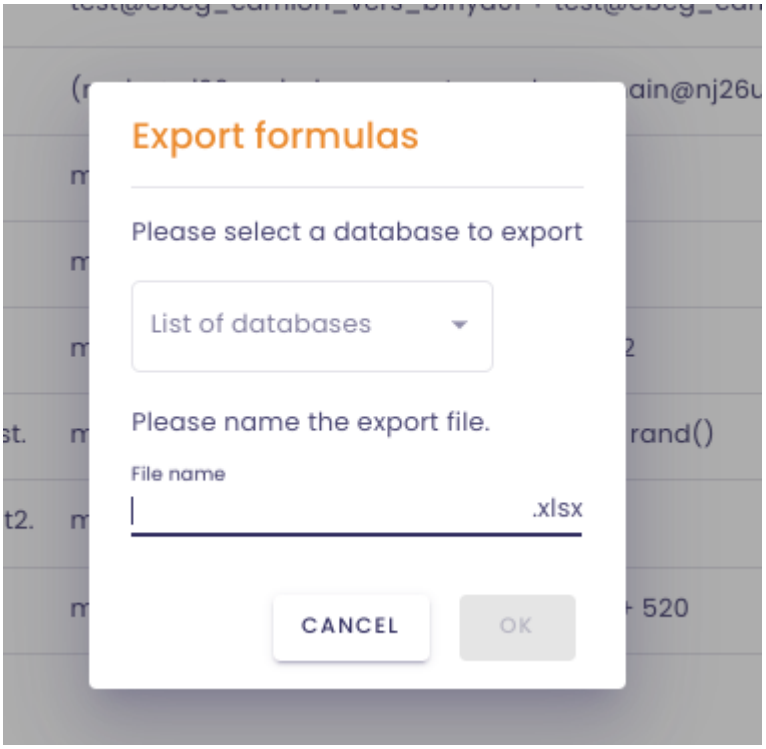
To export formulas, click on the

button, at the top-right of your screen.

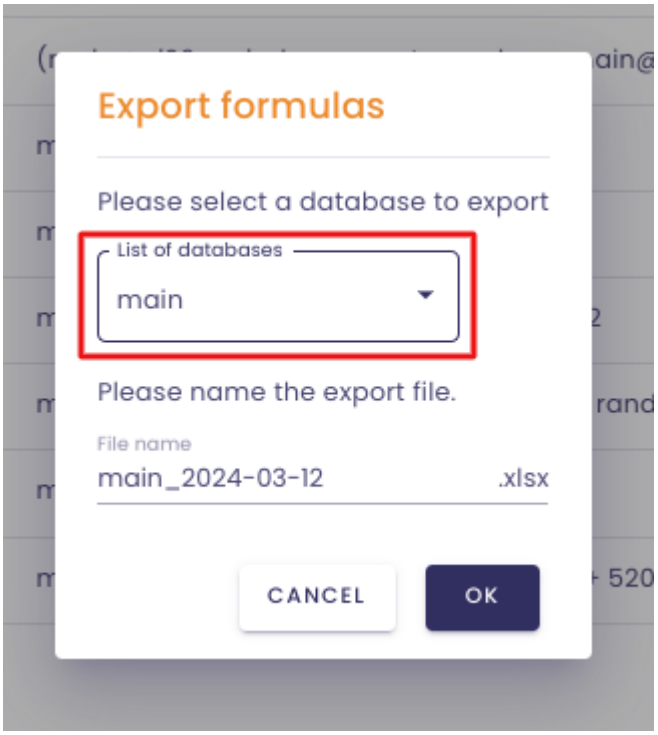
Then, click on **Export formulas**.



A pop-up window with a drop-down list opens.



In the drop-down list, select the database for which you want to export the calculated metrics.

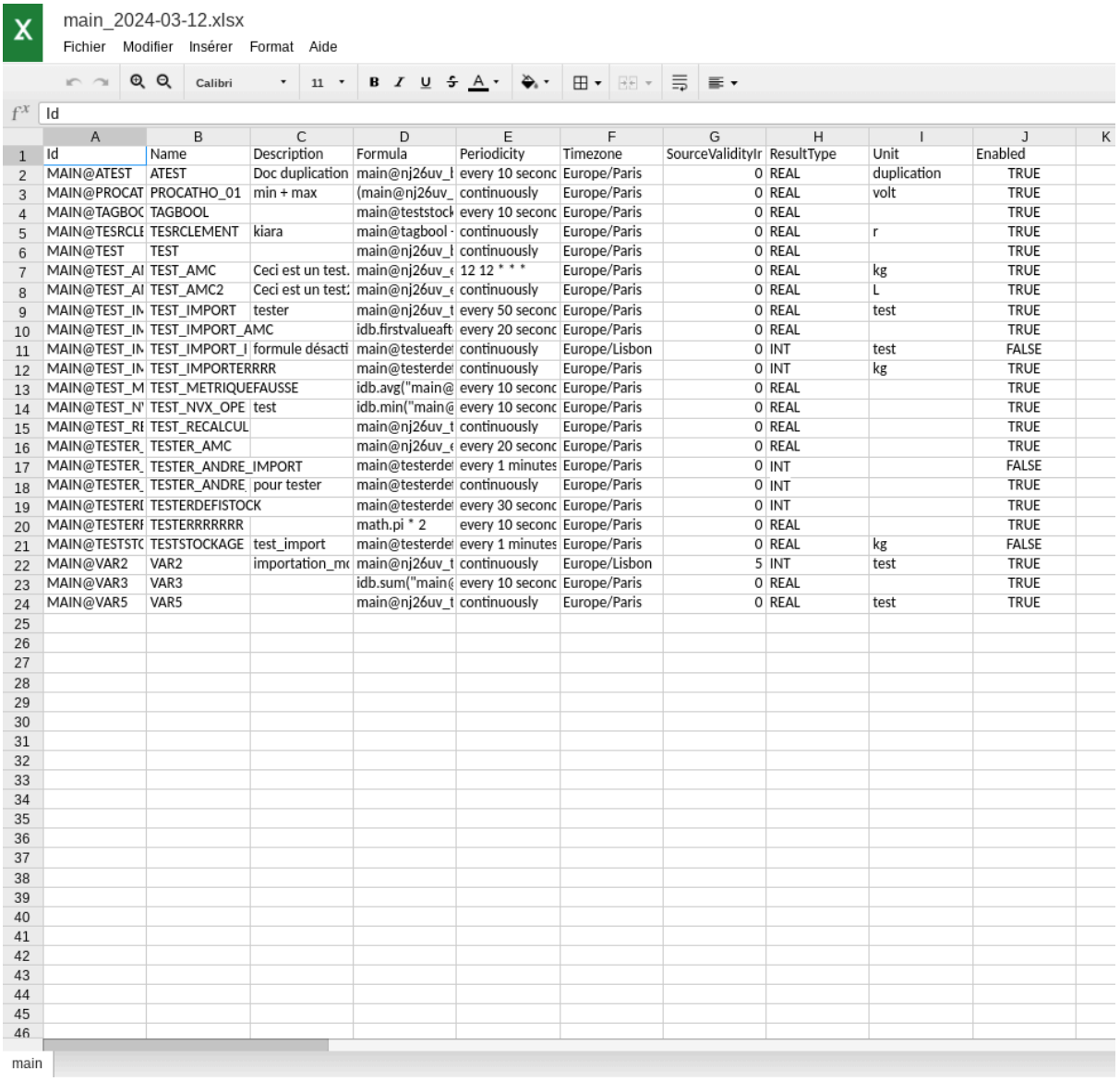


By default, a file name is generated as **[database name]_[today's date]**. You can modify it if you wish.

Then, click on **OK** .

An Excel file containing all the formulas (calculated metrics) within the selected database will be downloaded.

File's structure :


main_2024-03-12.xlsx

Fichier Modifier Insérer Format Aide

Calibri 11

Id

	A	B	C	D	E	F	G	H	I	J	K
1	Id	Name	Description	Formula	Periodicity	Timezone	SourceValidityIr	ResultType	Unit	Enabled	
2	MAIN@ATEST	ATEST	Doc duplication	main@nj26uv_l	every 10 seconc	Europe/Paris	0	REAL	duplication	TRUE	
3	MAIN@PROCAT	PROCATHO_01	min + max	(main@nj26uv_	continuously	Europe/Paris	0	REAL	volt	TRUE	
4	MAIN@TAGBOC	TAGBOOL		main@teststock	every 10 seconc	Europe/Paris	0	REAL		TRUE	
5	MAIN@TESRCLE	TESRCLEMENT	kiara	main@tagbool ·	continuously	Europe/Paris	0	REAL	r	TRUE	
6	MAIN@TEST	TEST		main@nj26uv_l	continuously	Europe/Paris	0	REAL		TRUE	
7	MAIN@TEST_AI	TEST_AMC	Ceci est un test.	main@nj26uv_(	12 12 * * *	Europe/Paris	0	REAL	kg	TRUE	
8	MAIN@TEST_AI	TEST_AMC2	Ceci est un test:	main@nj26uv_(	continuously	Europe/Paris	0	REAL	L	TRUE	
9	MAIN@TEST_IN	TEST_IMPORT	tester	main@nj26uv_t	every 50 seconc	Europe/Paris	0	REAL	test	TRUE	
10	MAIN@TEST_IN	TEST_IMPORT_AMC		idb.firstvalueaft	every 20 seconc	Europe/Paris	0	REAL		TRUE	
11	MAIN@TEST_IN	TEST_IMPORT_I	formule désacti	main@testerde	continuously	Europe/Lisbon	0	INT	test	FALSE	
12	MAIN@TEST_IN	TEST_IMPORTERRRR		main@testerde	continuously	Europe/Paris	0	INT	kg	TRUE	
13	MAIN@TEST_M	TEST_METRIQUEFAUSSE		idb.avg("main@	every 10 seconc	Europe/Paris	0	REAL		TRUE	
14	MAIN@TEST_N	TEST_NVX_OPE	test	idb.min("main@	every 10 seconc	Europe/Paris	0	REAL		TRUE	
15	MAIN@TEST_RE	TEST_RECALCUL		main@nj26uv_t	continuously	Europe/Paris	0	REAL		TRUE	
16	MAIN@TESTER_	TESTER_AMC		main@nj26uv_(	every 20 seconc	Europe/Paris	0	REAL		TRUE	
17	MAIN@TESTER_	TESTER_ANDRE_IMPORT		main@testerde	every 1 minutes	Europe/Paris	0	INT		FALSE	
18	MAIN@TESTER_	TESTER_ANDRE	pour tester	main@testerde	continuously	Europe/Paris	0	INT		TRUE	
19	MAIN@TESTERI	TESTERDEFISTOCK		main@testerde	every 30 seconc	Europe/Paris	0	INT		TRUE	
20	MAIN@TESTERI	TESTERRRRRRR		math.pi * 2	every 10 seconc	Europe/Paris	0	REAL		TRUE	
21	MAIN@TESTSTC	TESTSTOCKAGE	test_import	main@testerde	every 1 minutes	Europe/Paris	0	REAL	kg	FALSE	
22	MAIN@VAR2	VAR2	importation_mc	main@nj26uv_t	continuously	Europe/Lisbon	5	INT	test	TRUE	
23	MAIN@VAR3	VAR3		idb.sum("main@	every 10 seconc	Europe/Paris	0	REAL		TRUE	
24	MAIN@VAR5	VAR5		main@nj26uv_t	continuously	Europe/Paris	0	REAL	test	TRUE	
25											
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main

The file contains a sheet (named after the selected database) with several columns:

- **ID**: Formula identifier
- **Name**: Formula name
- **Description**: Formula description
- **Formula**: Expression of the formula
- **Periodicity**: Calculation frequency of the formula
- **Timezone**: Time zone applied to the formula
- **SourceValidityInSeconds**: The formula won't execute if the data is older than this value
- **ResultType**: Result type (REAL, INT, BOOLEAN)
- **Unit**: Unit of the calculated metric
- **Enabled**: Indicates whether the formula is active (**TRUE**) or inactive (**FALSE**).

7.8.2 Import formulas

You have the possibility to import formulas from an excel file.

7.8.2.1 Import Rules

When a file is imported, the following rules apply:

- Import does **not** allow the deletion of metrics. If there are missing rows in the file compared to the referential, nothing will happen. To delete calculated metrics (formulas), go to the **Referentials / Metrics Management** menu.

- Import allows modification of the following:
    - Description
    - Formula expression
    - Calculation periodicity
    - Time zone
    - Data validity in seconds
    - Result type
    - Unit
    - Enable/disable a formula

7.8.2.2 Creating Formulas via Import

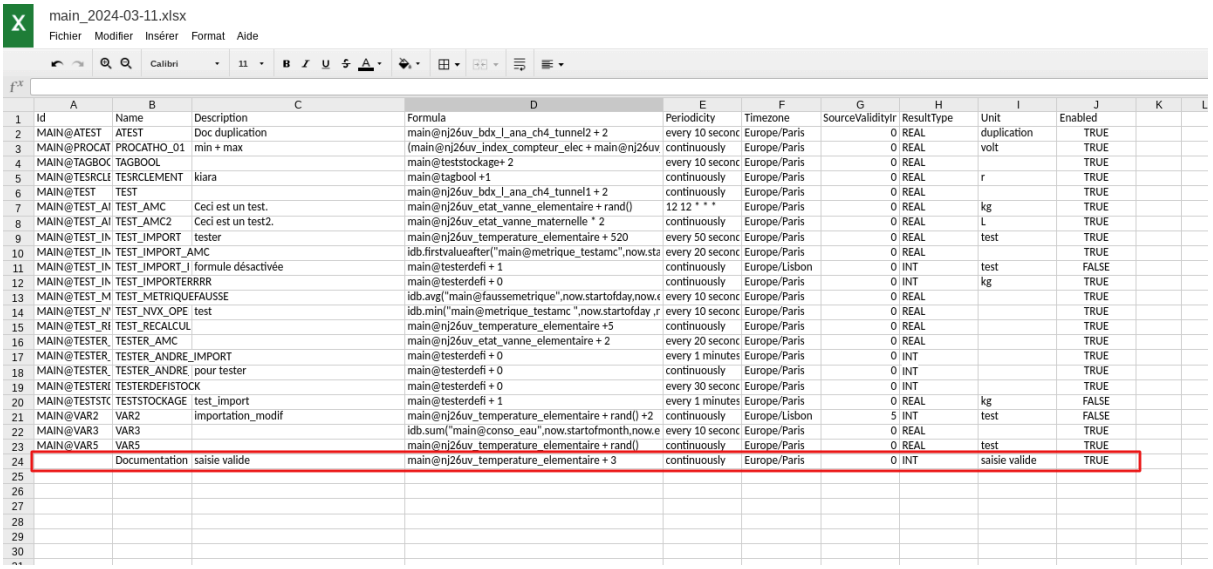
Import also enables you to create calculated metrics (formulas).

Warning! To create metrics via import, leave the first column "**ID**" empty.

Then, you can fill in the other columns as desired. However, be cautious not to use Excel-like formulas during data entry.

Note: The metric name should not contain special characters (only underscores ("_") and periods (".") are accepted).

Below, highlighted in red, is a valid entry for creating a metric via import for the "main" database.


main_2024-03-11.xlsx

Fichier Modifier Insérer Format Aide

	A	B	C	D	E	F	G	H	I	J	K	L
1	Id	Name	Description	Formula	Periodicity	Timezone	SourceValidityIr	ResultType	Unit	Enabled		
2	MAIN@ATEST	ATEST	Doc duplication	main@nj26uv_bdx_l_ana_ch4_tunnel2 + 2	every 10 seconc	Europe/Paris	0	REAL	duplication	TRUE		
3	MAIN@PROCAT	PROCATHO_01	min + max	(main@nj26uv_index_compteur_elec + main@nj26uv	continuously	Europe/Paris	0	REAL	volt	TRUE		
4	MAIN@TAGBOC	TAGBOOL		main@teststockage+ 2	every 10 seconc	Europe/Paris	0	REAL		TRUE		
5	MAIN@TESRCLE	TESRCLEMENT	kiara	main@tagbool +1	continuously	Europe/Paris	0	REAL	r	TRUE		
6	MAIN@TEST	TEST		main@nj26uv_bdx_l_ana_ch4_tunnel1 + 2	continuously	Europe/Paris	0	REAL		TRUE		
7	MAIN@TEST_AI	TEST_AMC	Ceci est un test.	main@nj26uv_etat_vanne_elementaire + rand()	12 12 * * *	Europe/Paris	0	REAL	kg	TRUE		
8	MAIN@TEST_AI	TEST_AMC2	Ceci est un test2.	main@nj26uv_etat_vanne_maternelle * 2	continuously	Europe/Paris	0	REAL	L	TRUE		
9	MAIN@TEST_IN	TEST_IMPORT	tester	main@nj26uv_temperature_elementaire + 520	every 50 seconc	Europe/Paris	0	REAL	test	TRUE		
10	MAIN@TEST_IN	TEST_IMPORT_AMC		idb.firstvalueafter("main@metrique_testamc",now.sta	every 20 seconc	Europe/Paris	0	REAL		TRUE		
11	MAIN@TEST_IN	TEST_IMPORT_I	formule désactivée	main@testerdefi + 1	continuously	Europe/Lisbon	0	INT	test	FALSE		
12	MAIN@TEST_IN	TEST_IMPORTERRRR		main@testerdefi + 0	continuously	Europe/Paris	0	INT	kg	TRUE		
13	MAIN@TEST_M	TEST_METRIQUEFAUSSE		idb.avg("main@faussemetrique",now.startofday,now.e	every 10 seconc	Europe/Paris	0	REAL		TRUE		
14	MAIN@TEST_N	TEST_NVX_OPE	test	idb.min("main@metrique_testamc ",now.startofday ,r	every 10 seconc	Europe/Paris	0	REAL		TRUE		
15	MAIN@TEST_RI	TEST_RECALCUL		main@nj26uv_temperature_elementaire +5	continuously	Europe/Paris	0	REAL		TRUE		
16	MAIN@TESTER_	TESTER_AMC		main@nj26uv_etat_vanne_elementaire + 2	every 20 seconc	Europe/Paris	0	REAL		TRUE		
17	MAIN@TESTER_	TESTER_ANDRE_IMPORT		main@testerdefi + 0	every 1 minutes	Europe/Paris	0	INT		TRUE		
18	MAIN@TESTER_	TESTER_ANDRE	pour tester	main@testerdefi + 0	continuously	Europe/Paris	0	INT		TRUE		
19	MAIN@TESTERI	TESTERDEFISTOCK		main@testerdefi + 0	every 30 seconc	Europe/Paris	0	INT		TRUE		
20	MAIN@TESTSTC	TESTSTOCKAGE	test_import	main@testerdefi + 1	every 1 minutes	Europe/Paris	0	REAL	kg	FALSE		
21	MAIN@VAR2	VAR2	importation_modif	main@nj26uv_temperature_elementaire + rand() +2	continuously	Europe/Lisbon	5	INT	test	FALSE		
22	MAIN@VAR3	VAR3		idb.sum("main@conso_eau",now.startofmonth,now.e	every 10 seconc	Europe/Paris	0	REAL		TRUE		
23	MAIN@VAR5	VAR5		main@nj26uv_temperature_elementaire + rand()	continuously	Europe/Paris	0	REAL	test	TRUE		
24		Documentation	saisie valide	main@nj26uv_temperature_elementaire + 3	continuously	Europe/Paris	0	INT	saisie valide	TRUE		
25												
26												
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29												
30												

Note : The creation of metrics via the importation is not available for Google Sheet.

Therefore, prefer using Excel for this functionality.

7.9 Expressions and formulas (Formulas)

Prerequisites: You must have a functional administrator role for formula creation (calculated metrics).

For the creation of your formulas, the Formulas module includes basic operators

as well as the ability to add certain functions.

7.9.1 Formula with basic operators

A formula can be created with a single metric, or a set of metrics linked together by operators.

List of available operators :

Operator	Description	Example
+,-	Addition/Subtraction	100 + a
*,/,%	Multiplication/Division/Modulo	100*2 / (3 % 2)
^	Exponentiation	2 ^ 16
-	Negation	-6 + 10
+	Concatenation	“abc” + “def”
<<, >>	Offset	0 x 80 >> 2
=, <>, <, >, <=, >=	Comparison	2.5 > 100
And, Or, Xor, Not	Logical operation	(1 > 10) and (true or not false)
And, Or, Xor, Not	Binary operation	100 And 44 or (not 255)
If	Condition	If(a > 100, “greater”, “less”)
“123”	Character string	“String!”
true/false	Boolean constant	true AND false

7.9.2 Advanced functions

The functions allow more complex evaluations to be carried out. Here is the list of functions that are available.

7.9.2.1 "If" function

Purpose : Allows to evaluate the equation passed in the condition parameter. The function returns the values passed in the "trueValue" and "falseValue" parameters according to the result of the evaluation.

Definition : If(condition, trueValue, falseValue)

7.9.2.2 "Ifthen" function

Purpose : Returns a value X if the condition is valid.

Definition : ifthen([condition], [result if true])

7.9.2.3 "Rand" function

Purpose : Generates a random number greater than or equal to 0.0 and less than 1.0

Definition : rand()

7.9.2.4 "Watchdog" function

Purpose : Monitor the status of the data-transmitting equipment (Indabox, eWon, etc.)

Definition : bool Watchdog(string [idMetric], int [duration], bool [watchValueChange])

Functioning :

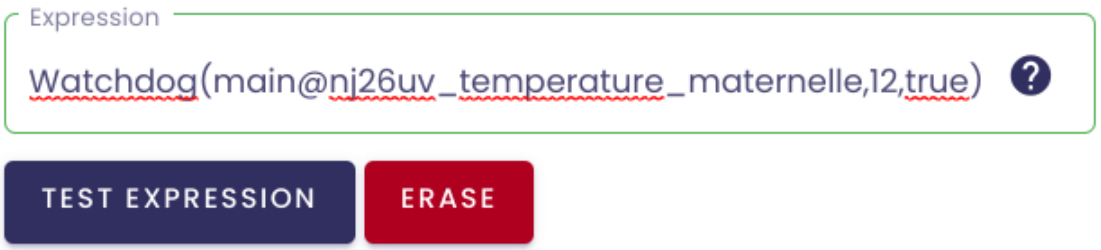
If the metric [idMetric] has not been written within [duration] seconds, the function returns **True**.

If the [watchValueChange] parameter = true, the function monitors the change in value between two writings.

If the last 2 values written in [idMetric] are equal, the function returns **True**.

Equation : result = ([LastRefresh]<[Now]-[Duration]) OR ([watchValueChange]

AND [PreviousValue]=[CurrentValue])



7.9.2.5 "DateFromString" function

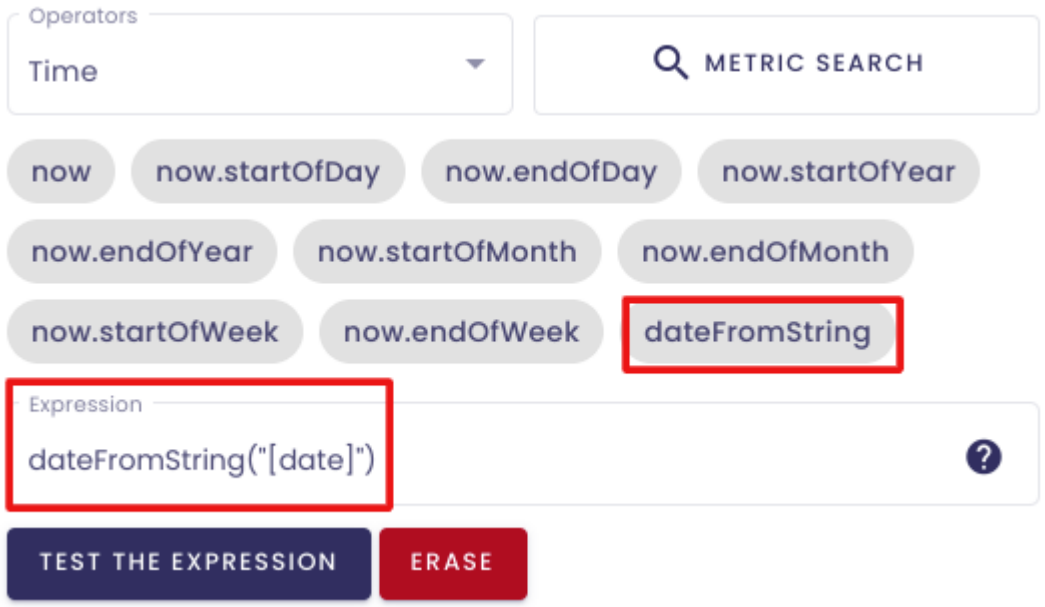
Purpose : To generate a fixed, absolute date from a character string.

Functioning :

Accepted date formats are :

- 2024-04-17T13:49:00Z -> timezone UTC
- 2024-04-17T13:49:00+02 -> timezone hours only
- 2024-04-17T13:49:00+02:30 -> timezone hours + minutes

The formula is invalid if the date is not entered in one of these formats.



Example of a valid expression :

7.9.2.6 PreviousValue function

Purpose : Allows returning the value prior to the current value of a metric.

Definition : previousValue("[metric]")

Functioning : Simply replace the parameter [metric] with the desired metric. The function will return the value that the metric had just before its current value.

Example : To determine the variation in the value of a metric "temperature" between two readings, take the current value of the metric ("main@temperature") and subtract the previous value of the metric ("previousValue(main@temperature)").

7.9.3 Indaba Functions and time operators

In addition to advanced formulas, you have access to "Indaba" operators that allow you to customize your calculated metrics to meet more specific needs.

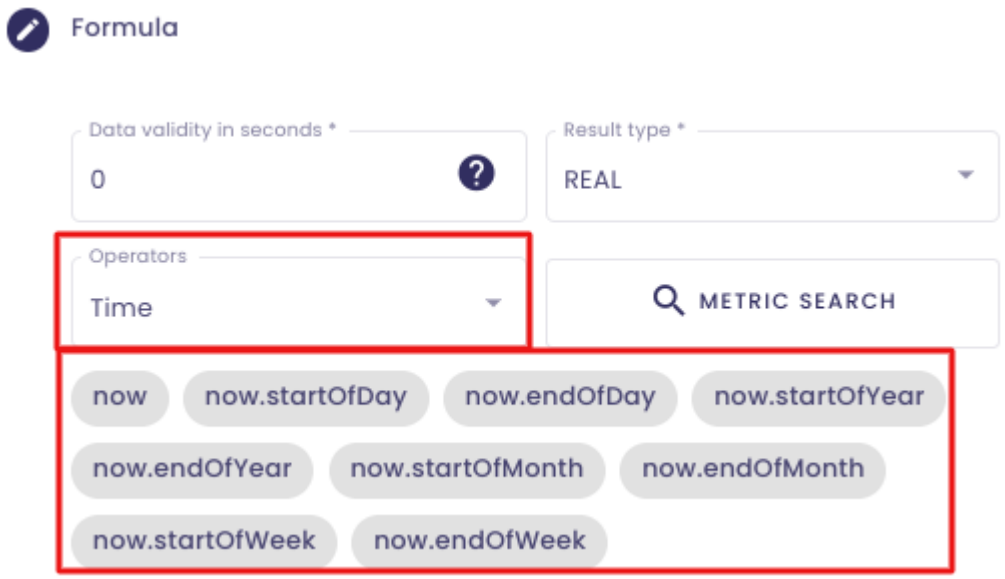
When configuring these Indaba operators, you will need to specify the period you wish to analyze.

To do so, **you must use the time operators provided**.

Note : Indaba functions cannot be used in a formula where the periodicity is "continuous".

Note : You can use a maximum of 4 Indaba functions in a formula.

7.9.3.1 Time Operators



In the system of time operators, the term "now" represents the current date. Then you have several methods (or functions) to manipulate the current date, with each function representing a value :

- now.startOfDay : start of the current day
- now.endOfDay : end of the current day
- now.startOfYear : start of the current year
- now.endOfYear : end of the current year
- now.startOfMonth : start of the current month
- now.endOfMonth : end of the current month
- now.startOfWeek : start of the current week
- now.endOfWeek : end of the current week

For example :

Here, the indicated period will be the start of the current day (start date) and the end of the current day (end date).

7.9.3.2 Indaba Functions

Idb.min :

Purpose : Returns the minimum value of a metric for a given period.

Definition : idb.min("[metric]", [start date], [end date])

Functioning : Replace the [metric] parameter with the metric for which you want to know the minimum value during a period. To define this period, replace the [start date] and [end date] parameters with the aforementioned temporal operators.

Example : Suppose you want to know the minimum humidity level in one of your installations during the current month.

Your humidity level is represented by the metric "humidity_level".

To indicate the desired period, use the temporal operators. Here, we want the data for the current month, so we will use "now.startOfMonth" (start of the month) to indicate the start of the period and "now.endOfMonth" (end of the month) to indicate the end of the period.

This results in the following expression :

Idb.max

Purpose : Returns the maximum value of a metric for a given period.

Definition : idb.max("[metric]", [start date], [end date])

Functioning : Same operation as for the Idb.min operator.

Replace the [metric] parameter with the metric for which you want to know the

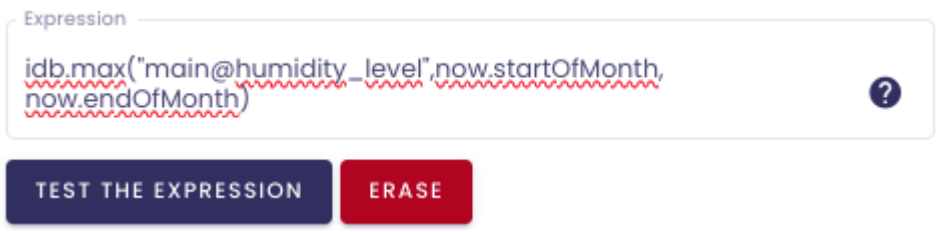
maximum value during a period. To define this period, replace the [start date] and [end date] parameters with the time operators mentionned before.

Example : Suppose you want to know the maximum humidity level in one of your installations during the current month.

Your humidity level is represented by the metric "humidity_level".

To indicate the desired period, use the time operators. Here, we want the data for the current month, so we will use "now.startOfMonth" (start of the month) to indicate the start of the period and "now.endOfMonth" (end of the month) to indicate the end of the period.

This results in the following expression:



Idb.avg :

Purpose : Returns the average value of a metric for a given period.

Definition : idb.max("[metric]", [start date], [end date])

Functioning : Replace the [metric] parameter with the metric for which you want to know the average value during a period. To define this period, replace the [start date] and [end date] parameters with the time operators mentionned before.

Example : Suppose you want to know the average temperature of a compressor during the current week.

Your temperature is represented by the metric "temperature". To indicate the desired period, use the time operators. Here, we want the data for the current week, so we will use "now.startOfWeek" (start of the week) to indicate the start of the period and "now.endOfWeek" (end of the week) to indicate the end of the period.

This results in the following expression :

Idb.sum :

Purpose : Returns the sum of the values of a metric for a given period.

Definition : idb.sum("[metric]", [start date], [end date])

Functioning : Replace the [metric] parameter with the metric for which you want to know the sum of the values reported during a period. To define this period, replace the [start date] and [end date] parameters with the operators mentionned before.

Example : Suppose you want to know the total water consumption of a compressor during the current month.

Your water consumption is represented by the metric "water_consumption". To indicate the desired period, use the time operators. Here, we want the data for the current month, so we will use "now.startOfMonth" (start of the month) to indicate the start of the period and "now.endOfMonth" (end of the month) to indicate the end of the period.

This results in the following expression :

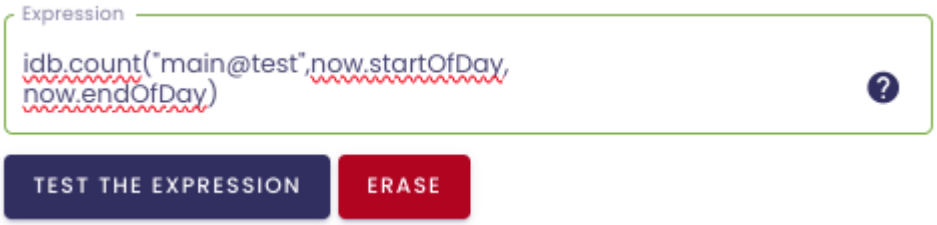
Idb.count :

Purpose : Determines how many times a value has been reported for a given metric.

Definition : idb.count("[metric]", [start date], [end date])

Functioning : Replace the [metric] parameter with the metric for which you want to know the number of reported values during a given period. To define this period, replace the [start date] and [end date] parameters with the time operators mentioned before.

Example : You want to check how often your equipment reports values during the current day.



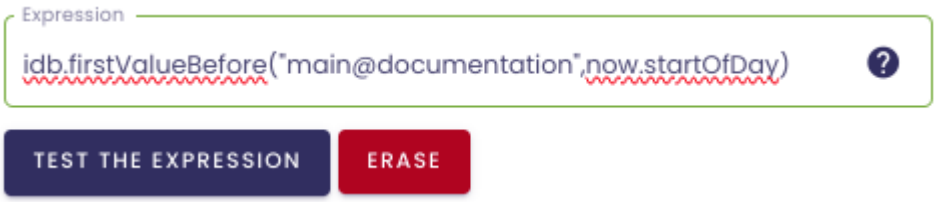
Idb.firstValueBefore :

Purpose : Returns the last value before a given date.

Definition : idb.firstValueBefore("[metric]", [date])

Functioning : Replace the [metric] parameter with the metric for which you want to know the last value before a given date. To define this date, replace the [date] parameter using the time operators mentionned before.

Example : You want to know the last value reported by a piece of equipment before the start of the current day.



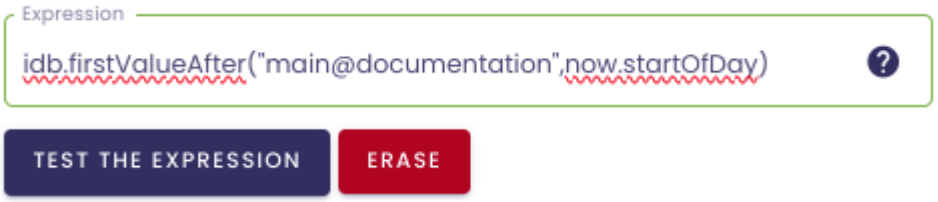
Idb.firstValueAfter :

Purpose : Returns the first value after a given date.

Definition : idb.firstValueAfter("[metric]", [date])

Functioning : Replace the [metric] parameter with the metric for which you want to know the first value after a given date. To define this date, replace the [date] parameter using the time operators mentionned before.

Example : You want to know the first value reported by a piece of equipment within the current day.



Idb.median :

Purpose : Returns the median value of a data range.

Definition : idb.median("[metric]", [start date], [end date])

Operation : Replace the parameter [metric] with the metric for which you want to know the median value over a given period. To define this period, replace the parameters [start date] and [end date] using the temporal operators mentioned above.

Example : You want to know the median temperature value of a device for the current day.

Idb.stdDev :

Purpose : Returns the standard deviation of a data range.

Definition : idb.stdDev("[metric]", [start date], [end date])

Operation : Replace the parameter [metric] with the metric for which you want to know the standard deviation over a given period. To define this period, replace the parameters [start date] and [end date] using the temporal operators mentioned above.

Idb.first :

Purpose: Returns the first value of a data range.

Definition: idb.first("[metric]", [start date], [end date])

Operation: Replace the parameter [metric] with the metric for which you want to know the first value over a given period. To define this period, replace the parameters [start date] and [end date] using the temporal operators mentioned above.

Idb.last :

Purpose: Returns the last value of a data range.

Definition: idb.last("[metric]", [start date], [end date])

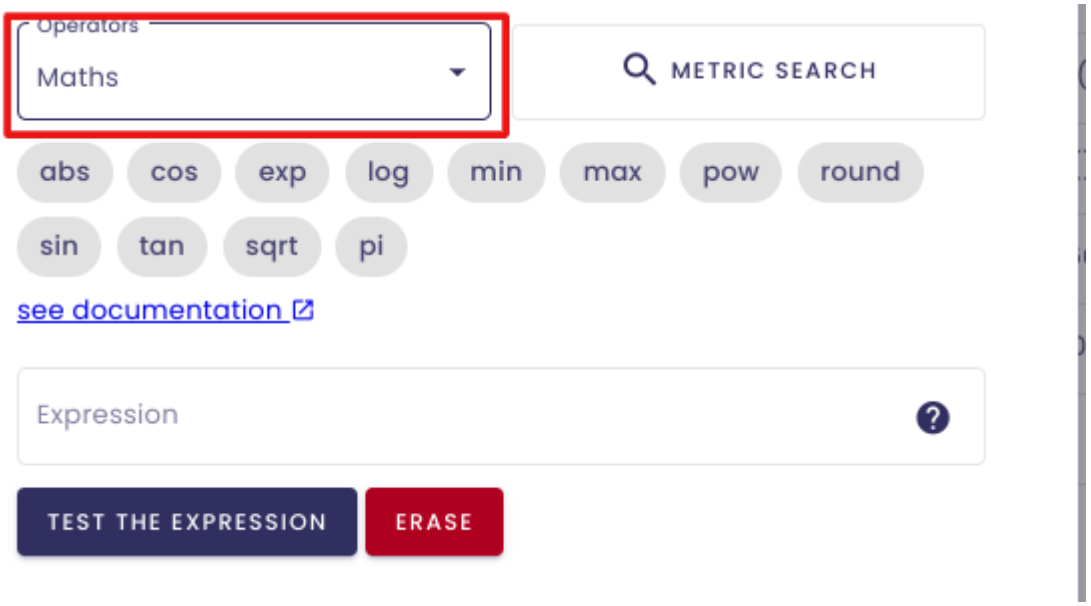
Operation: Replace the parameter [metric] with the metric for which you want to know the last value over a given period. To define this period, replace the parameters [start date] and [end date] using the temporal operators mentioned above.

7.9.4 Additional Features

In addition to the previously mentioned functions, the formula engine allows for other types of calculations.

7.9.4.1 Mathematical Calculations

Various mathematical methods and constants can be used in formulas.



For example, it is possible to return the absolute value of a number by entering : Abs(Double).

Or, to return the logarithm of a specified number :

Log(Double)

You also have the possibility to include mathematical constants.

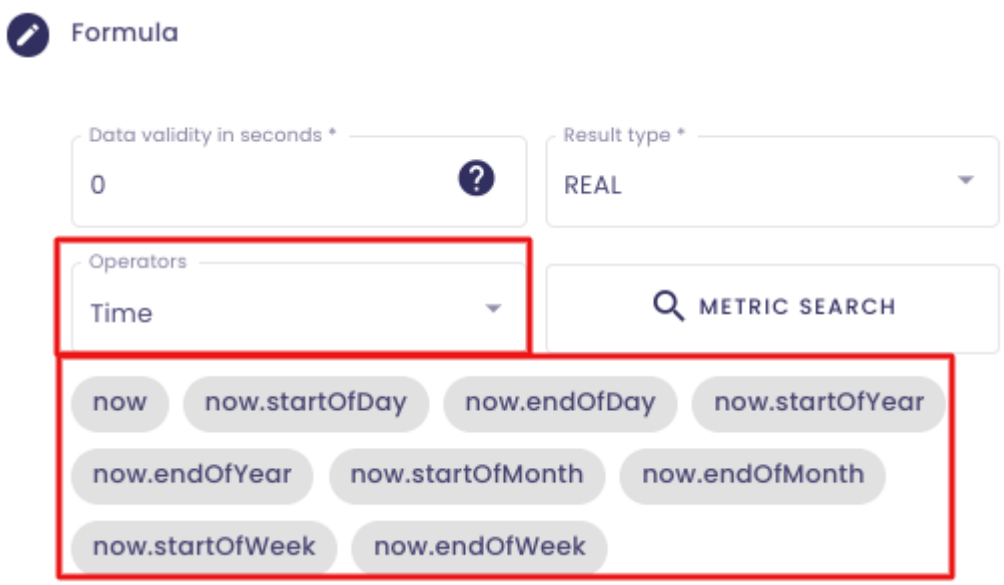
E	Represents the natural logarithmic base specified by the constant `e`.
IP	Represents the ratio of the circumference of a circle to its diameter, specified by the constant π.
tau	Represents the number of radians in a single revolution, specified by the constant, τ.

Example :

Note : The list of operators available in the formula creation screen is not comprehensive. For an exhaustive list of the possibilities, click on "see the documentation."

7.9.4.2 Date configuration

In addition to the time operators seen previously :



You can customize the dates used in your formulas using the following functions :

- AddDays(Double) : Returns a new "DateTimeOffset" object that adds a specified number of whole and fractional days to the value of this instance.

- AddHours(Double) : Returns a new "DateTimeOffset" object that adds a specified number of whole and fractional hours to the value of this instance.

- AddMinutes(Double) : Returns a new "DateTimeOffset" object that adds a specified number of whole and fractional minutes to the value of this instance.

- AddMonths(Double) : Returns a new "DateTimeOffset" object that adds a specified number of months to the value of this instance.

- AddYears(Double) : Returns a new "DateTimeOffset" object that adds a specified number of years to the value of this instance.

This list is not exhaustive, and you can find all the possibilities available by clicking here.

In practice, if we use the "now.startOfDay" operator, for example, it will represent the beginning of the current day.

But let's say we want to have yesterday's date. We can complete our time operator with the AddDays function :

now.StartOfDay.AddDays(-1).

By adding .AddDays(-1), we indicate that we want the current day minus one day.

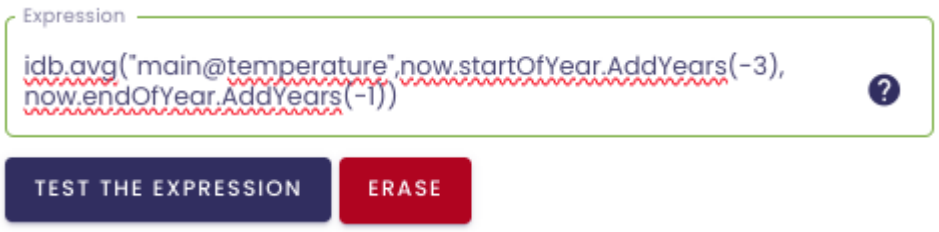
You can thus add/remove days, hours, months, years... to your date.

Example : We want to know the average temperature of an installation over the past 3 years (excluding the current year, which we will call n).

You need to set the period :

- the start of the period represents the beginning of year n-3: now.startOfYear.AddYears(-3)

- the end of the period represents the end of year n-1: now.endOfYear.AddYears(-1)



7.9.5 Calculations Associated with Dates

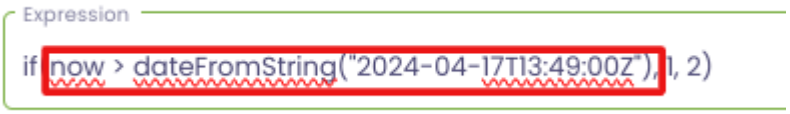
You have the option to include temporal operators outside of Indaba functions.

This feature offers various possible use cases :

7.9.5.1 Date comparison

It is possible to compare dates using comparison operators (>, >=, <, <=, =).

For example :



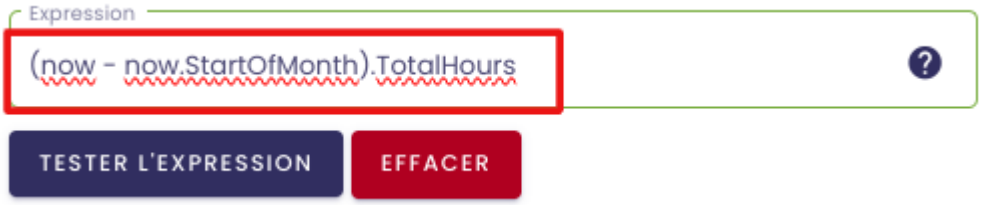
Here, we compare the current date (with the temporal operator "now") and a fixed date.

7.9.5.2 Calculating a duration

A subtraction of dates (date - date) returns an object of type "**TimeSpan**," which represents a duration.

This object can be utilized by combining it with other functions.

For example, it is possible to calculate the number of hours that have elapsed since the beginning of the month :



Here, (now - now.StartOfMonth) represents the duration between the current date and the beginning of the month.

We then multiply this duration by the function TotalHours to return the number of hours passed in the month.

For more use cases, click here.

Note : It is not possible to add two dates. To add a duration to a date, you must

use the .Add[time unit] functions seen previously.

8. Devices management

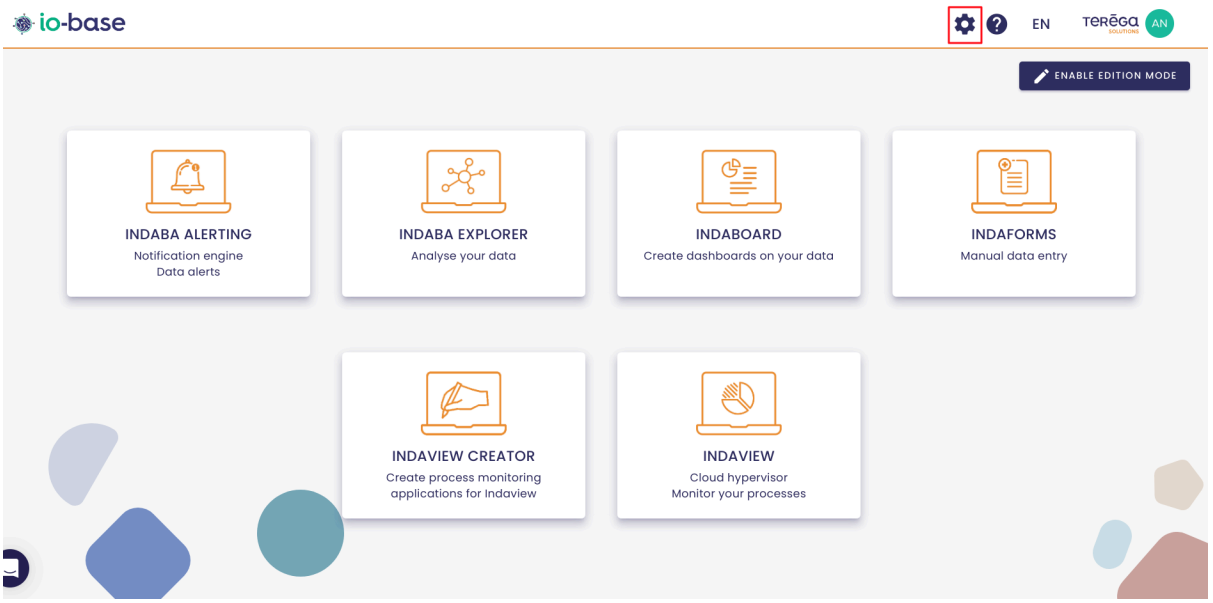
8.1 Overview and access to the devices management portal

Prerequisite: this feature is available to users with the Functional Administrator role.

The **Devices** portal was created to ensure a secure communication between your devices and IO-Base.

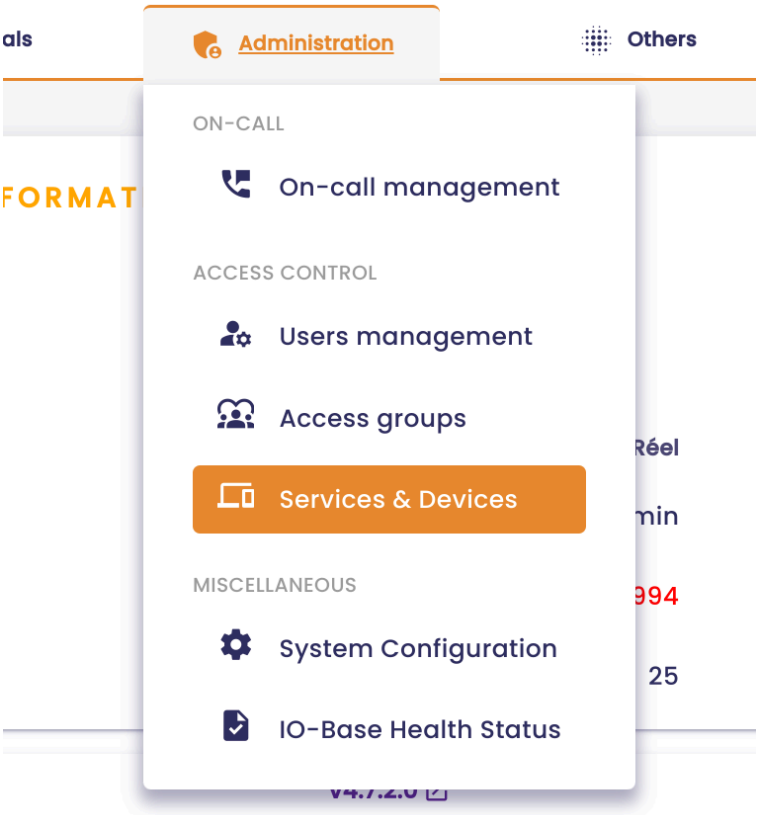
Once installed, functional administrators must validate the authenticity of a device before it can be associated with Io-base.

Log in to **Io-base** and click the button at the top right of your screen, highlighted below :

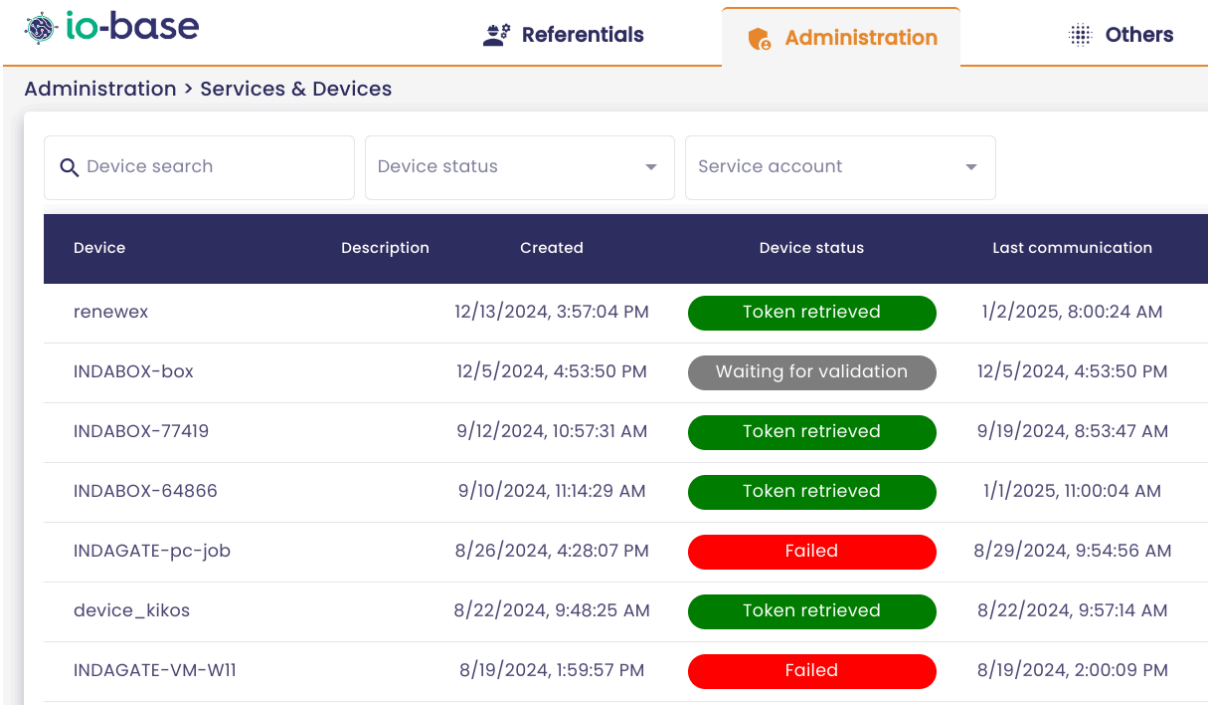


The Io-base administration page opens.

Go to the **Administration/Services and devices** menu.



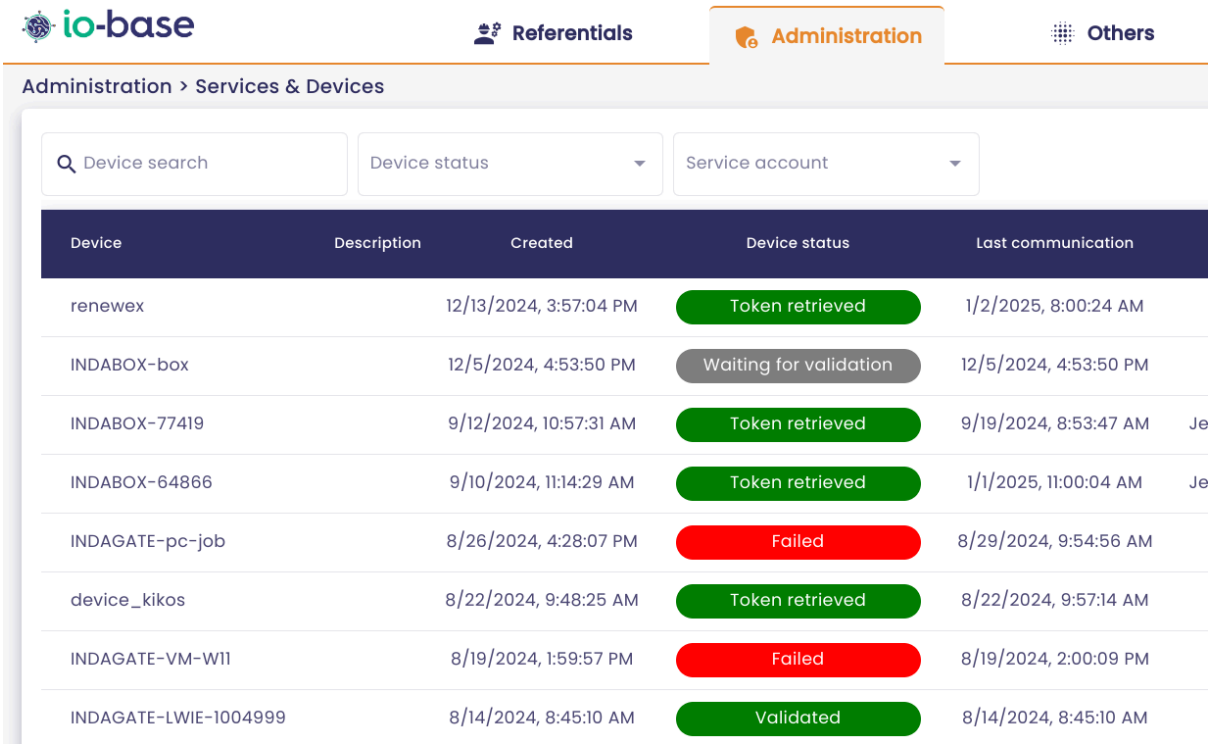
You are redirected to the **Devices** management screen.



8.2 Device validation

Prerequisite: this feature is available to users with the Functional Administrator role.

Connect to Io-base and go to the **Devices** menu.



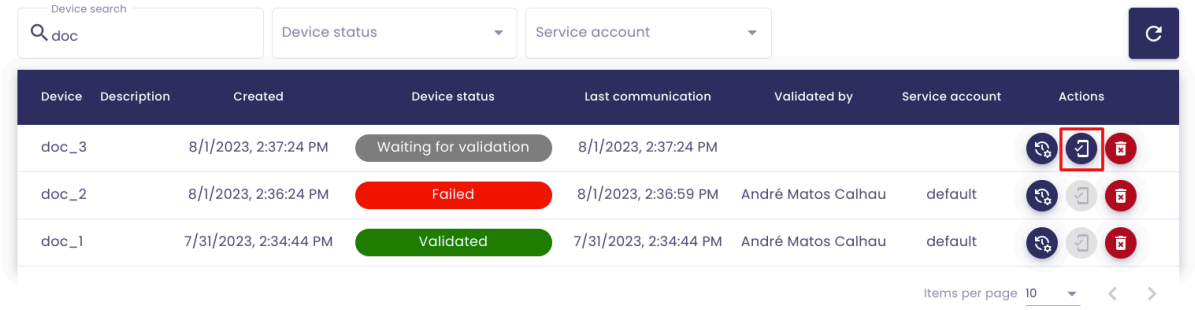
You can view the status of a device in the table. Several statuses are possible:

- Waiting validation (awaiting validation by a functional administrator)
- Validated (a functional administrator has validated the authenticity of the device)
- Token retrieved (the device can now access to Io-base)
- Expired (the device token has expired)
- Failed (device association to Io-base is blocked)

When a device is connected for the first time, its status is **Waiting for validation**.

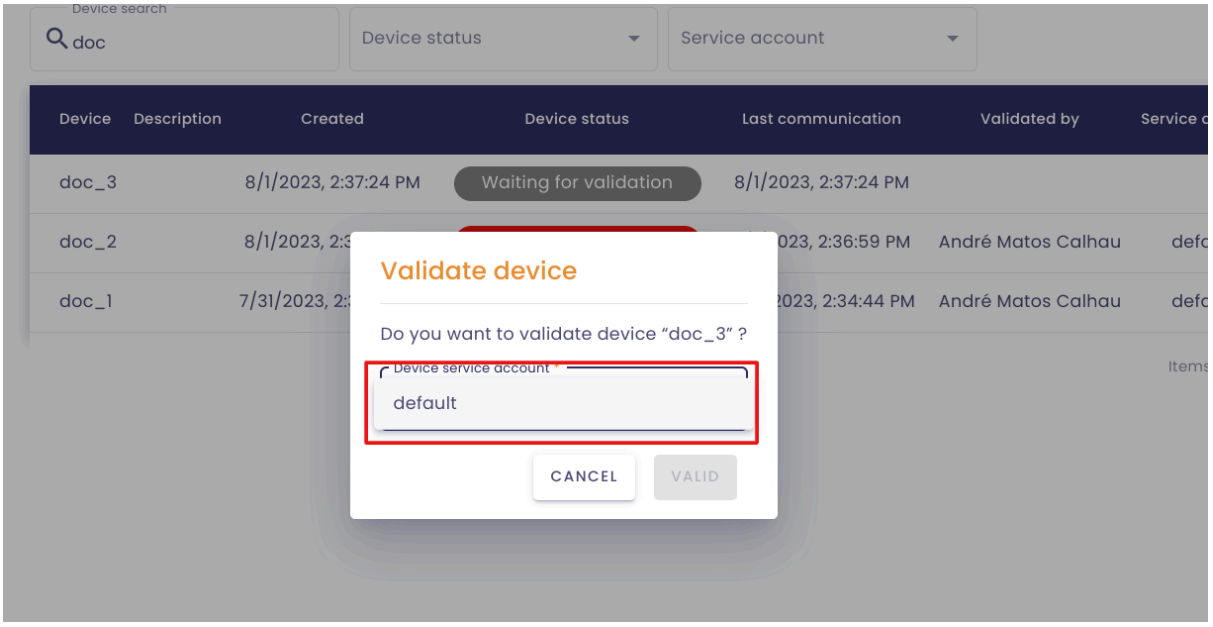
Note : You can now be alerted by e-mail when a device is awaiting validation (click here to see the related article).

Click on the **Validate Device** button.

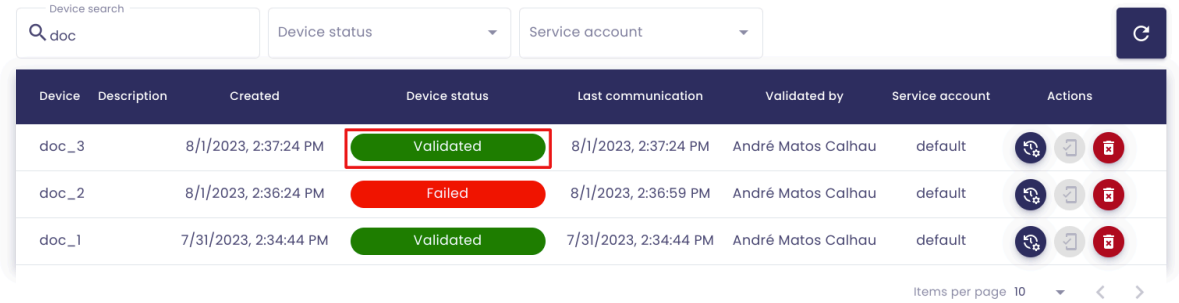


A pop-up opens. From the drop-down list, select the service account you wish to associate with the equipment.

Then, click **Valid**.



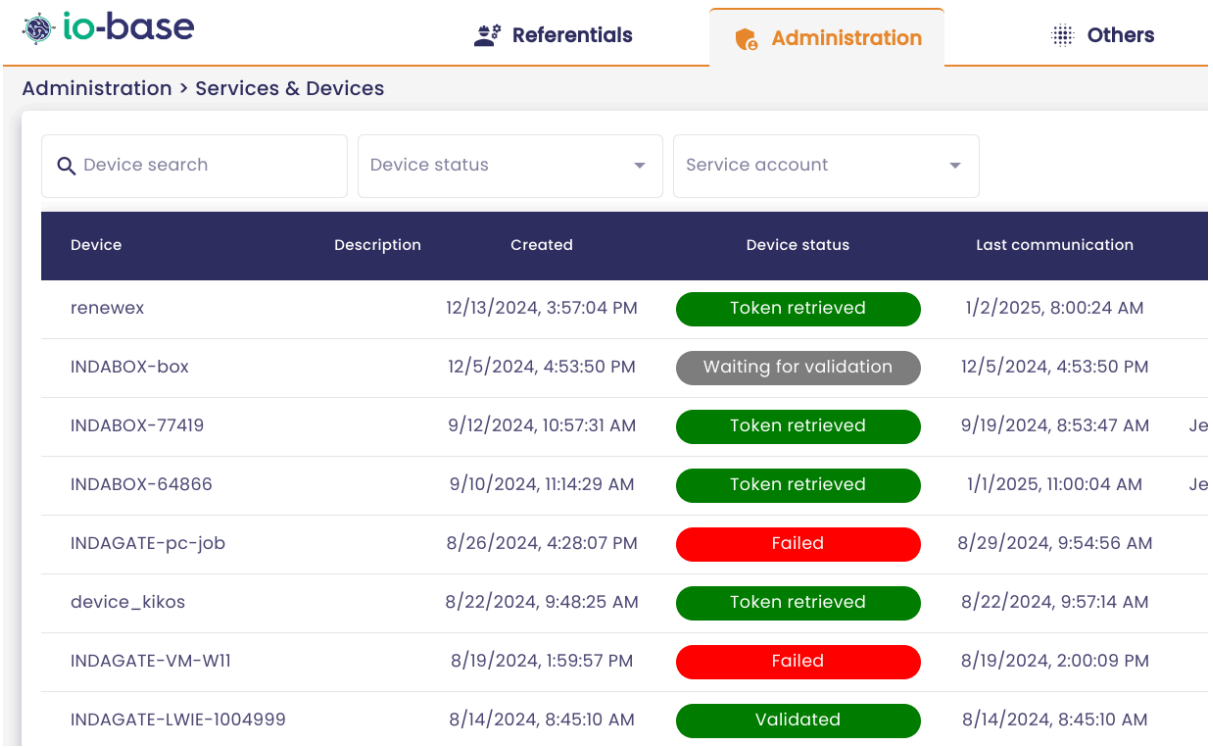
The device is now validated.



8.3 Access a device history

Prerequisite : this feature is available to users with the Functional Administrator role.

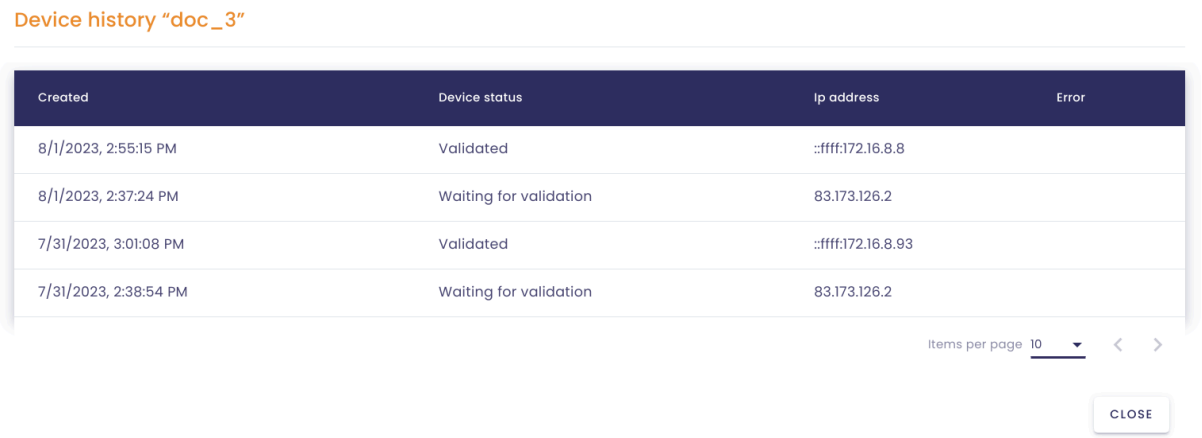
Connect to Io-base and go to the **Devices** menu.



In the **Actions** column, click on the

button.

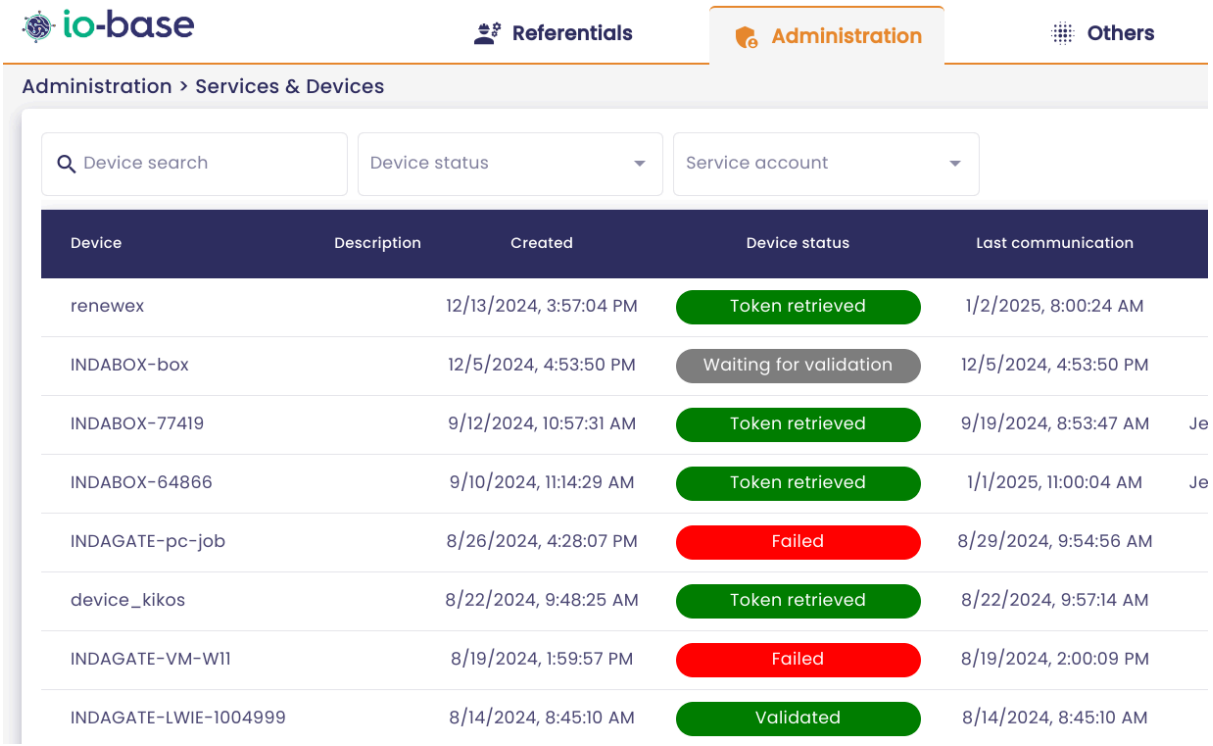
The **Device History** appears.



8.4 Delete a device

Prerequisite: this feature is available to users with the Functional Administrator role.

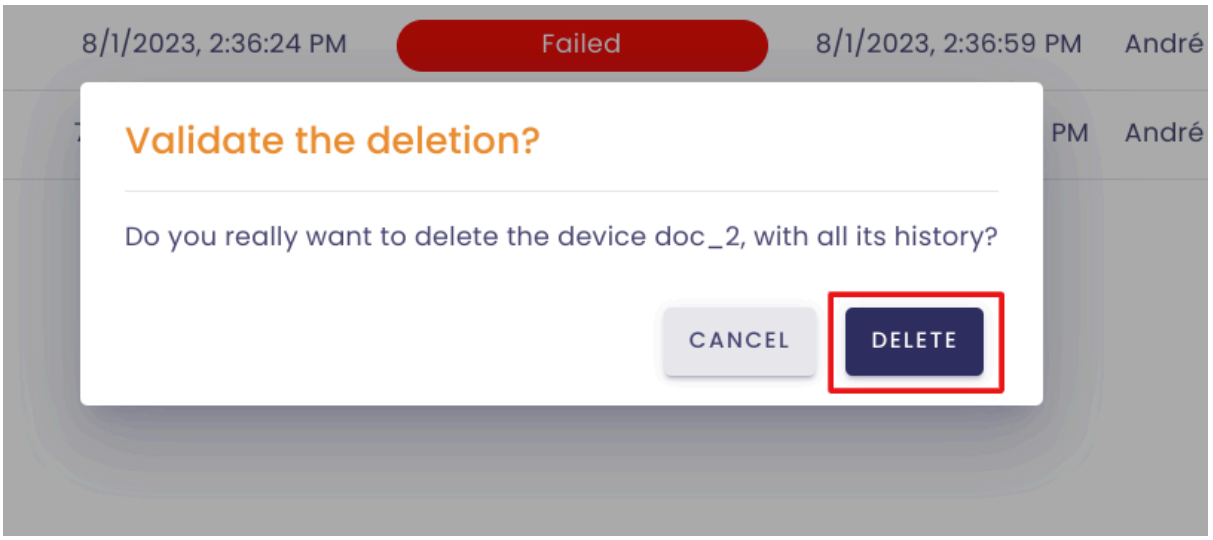
Connect to Io-base and go to the **Devices** menu.



To delete a device, click on the

button.

A confirmation window opens. Click on **Delete**.



The device is now **deleted** and no longer appears in the device list.

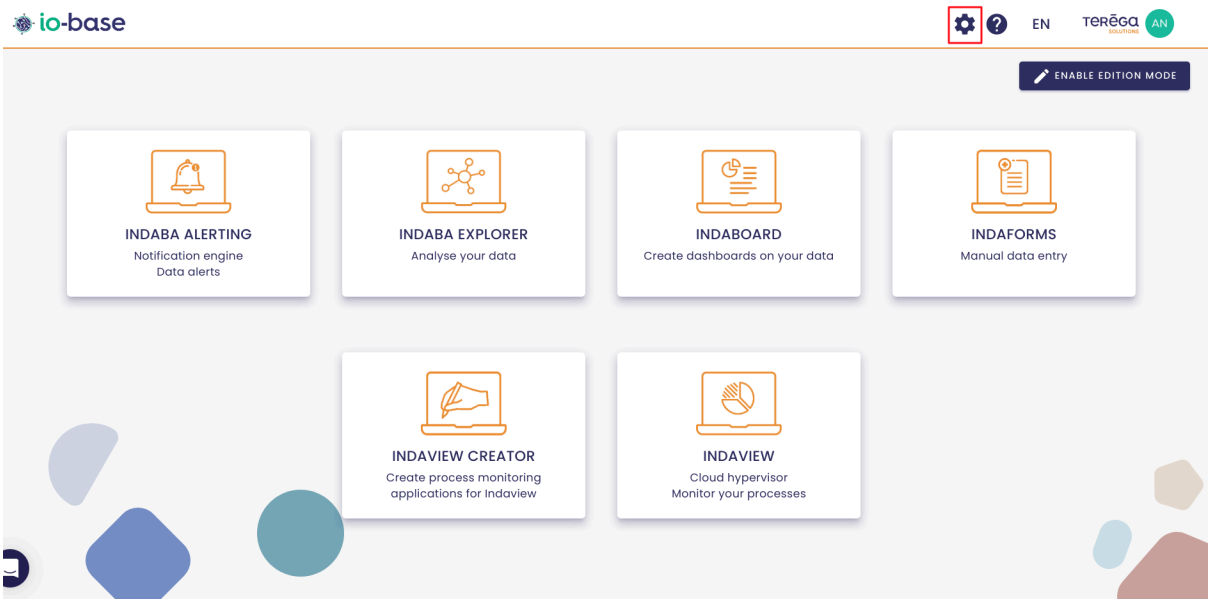
8.5 Email notification settings

Prerequisite: this feature is available to users with the Functional Administrator role.

The email configuration feature is linked to the **Devices** management portal.

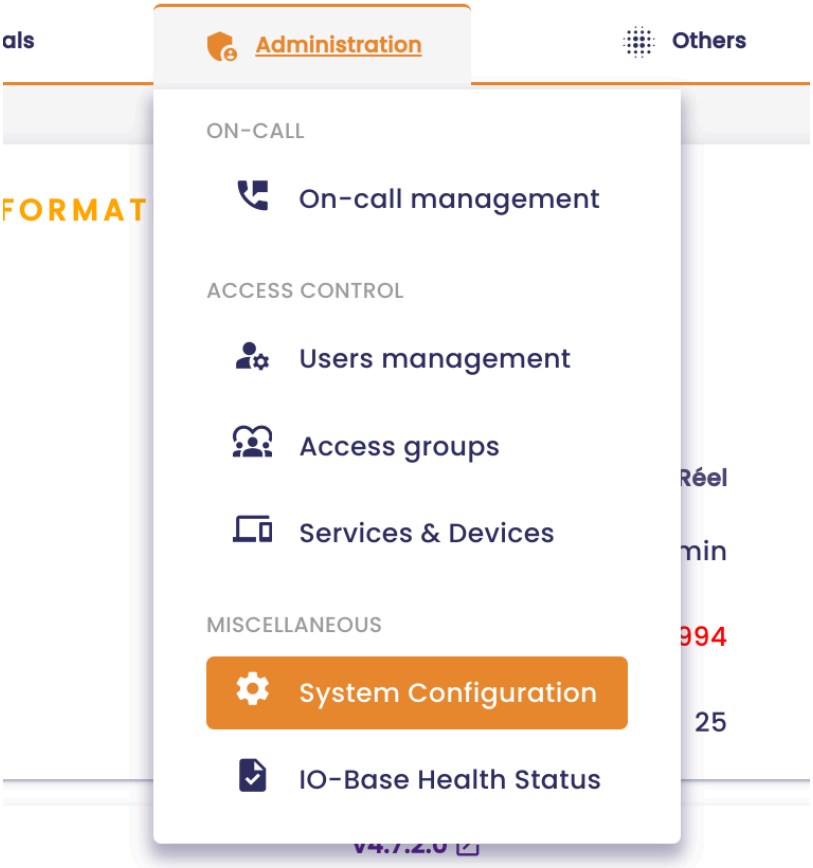
It allows you to set email addresses to which a notification will be sent when a device is awaiting validation by a functional administrator.

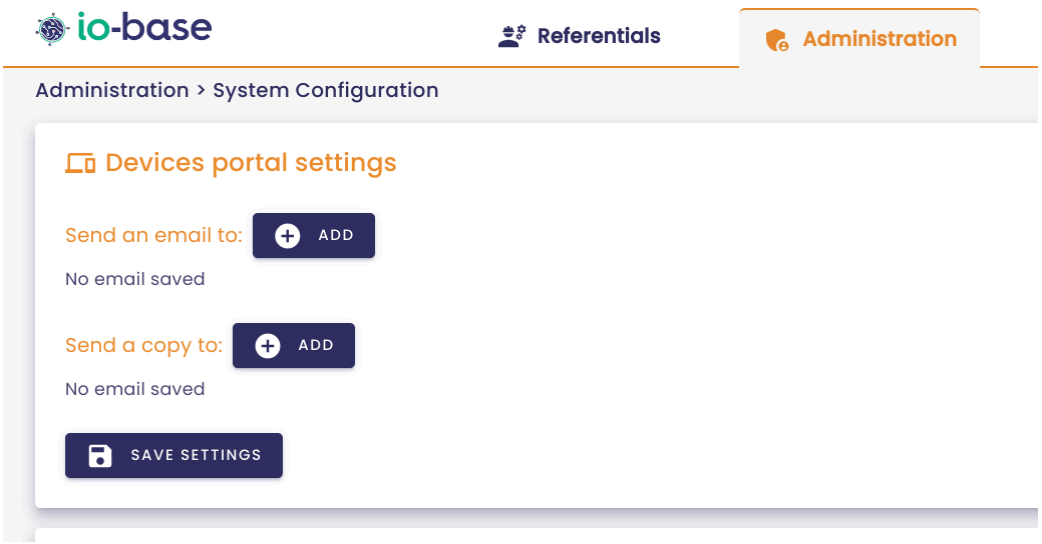
Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



The Io-base administration page opens.

Go to the **Administration/System configuration** menu.

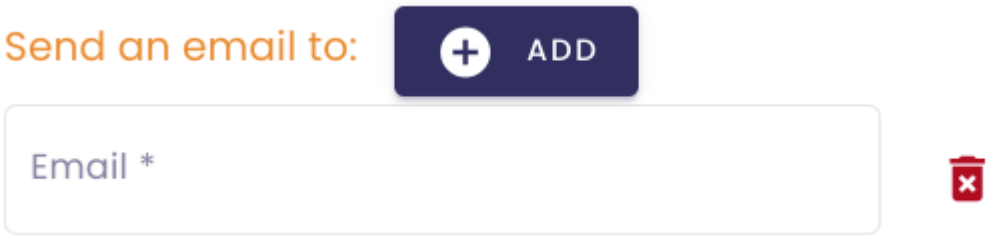




To add an email address, click on the

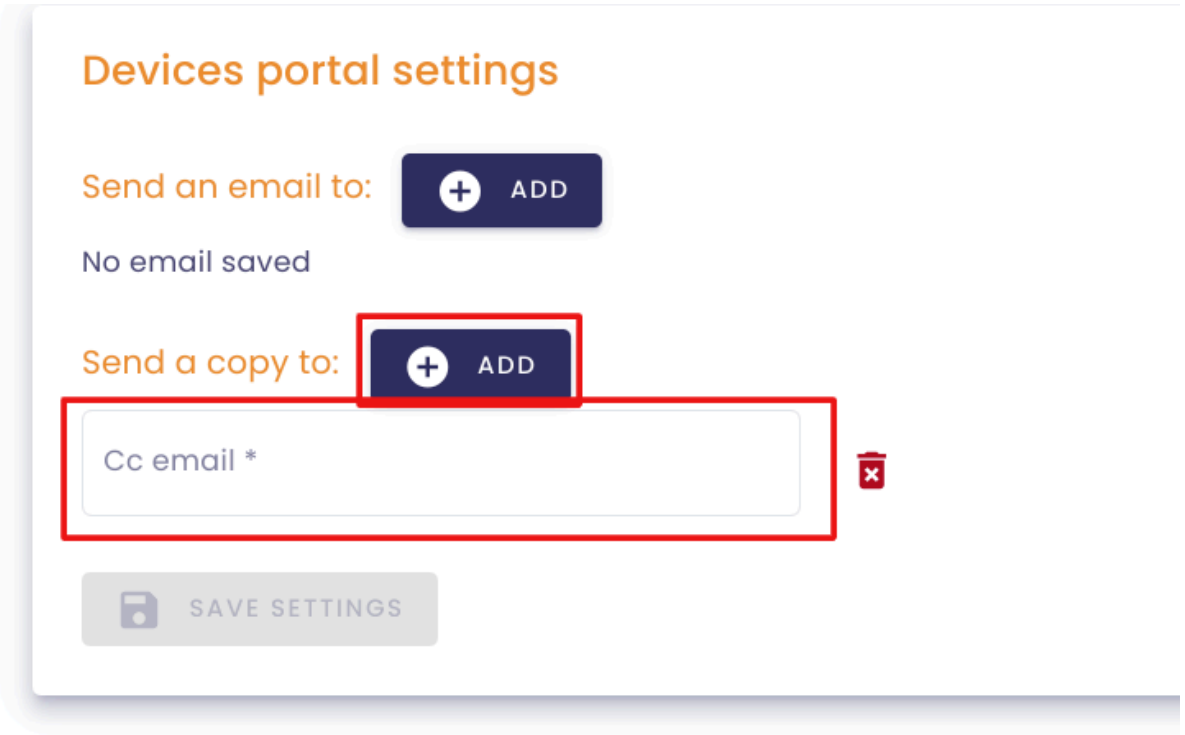
button.

An input area appears. Specify the desired email address.



Note : It is possible to set several email addresses. Click on **Add** again to open a new input area.

You can also add email addresses in CC. To do so, click on the **Add** button.



To confirm, click on

8.6 Io-base authentication procedure (DAP)

8.6.1 Introduction

Purpose of the DAP

The purpose of the Device Access Proxy (DAP) is to secure the communication between devices or services and **Io-base**.

The system relies on the distribution of authentication tokens which ensure that only approved devices can communicate with **Io-base**.

Service accounts

When requesting tokens, the device (or service) will use a service account.

(refer to section 3 : Device validation in Io-base).

There is a generic "default" service account, which should ideally be used for tests.

Before starting the procedure, we highly recommend that you request a service account dedicated to the use of the device (or service), to have better control over access rights on Io-base.

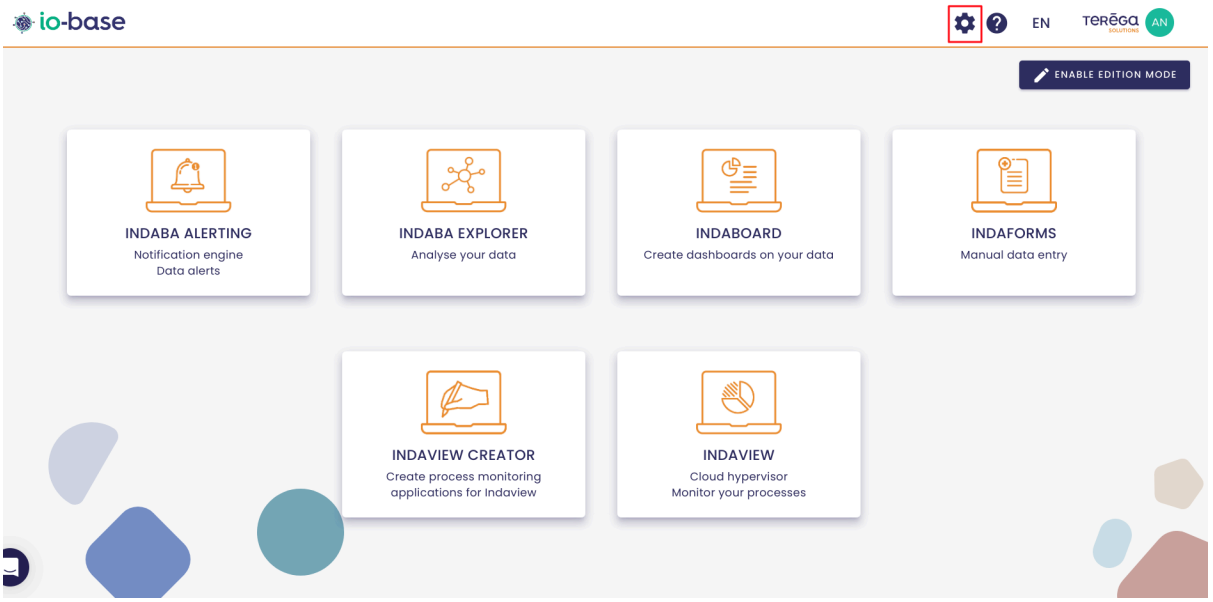
To request a DAP service account, contact support, specifying :

- service account name
- the rights required : read, write or read/write

In this way, if required, you can restrict rights to the metrics you need.

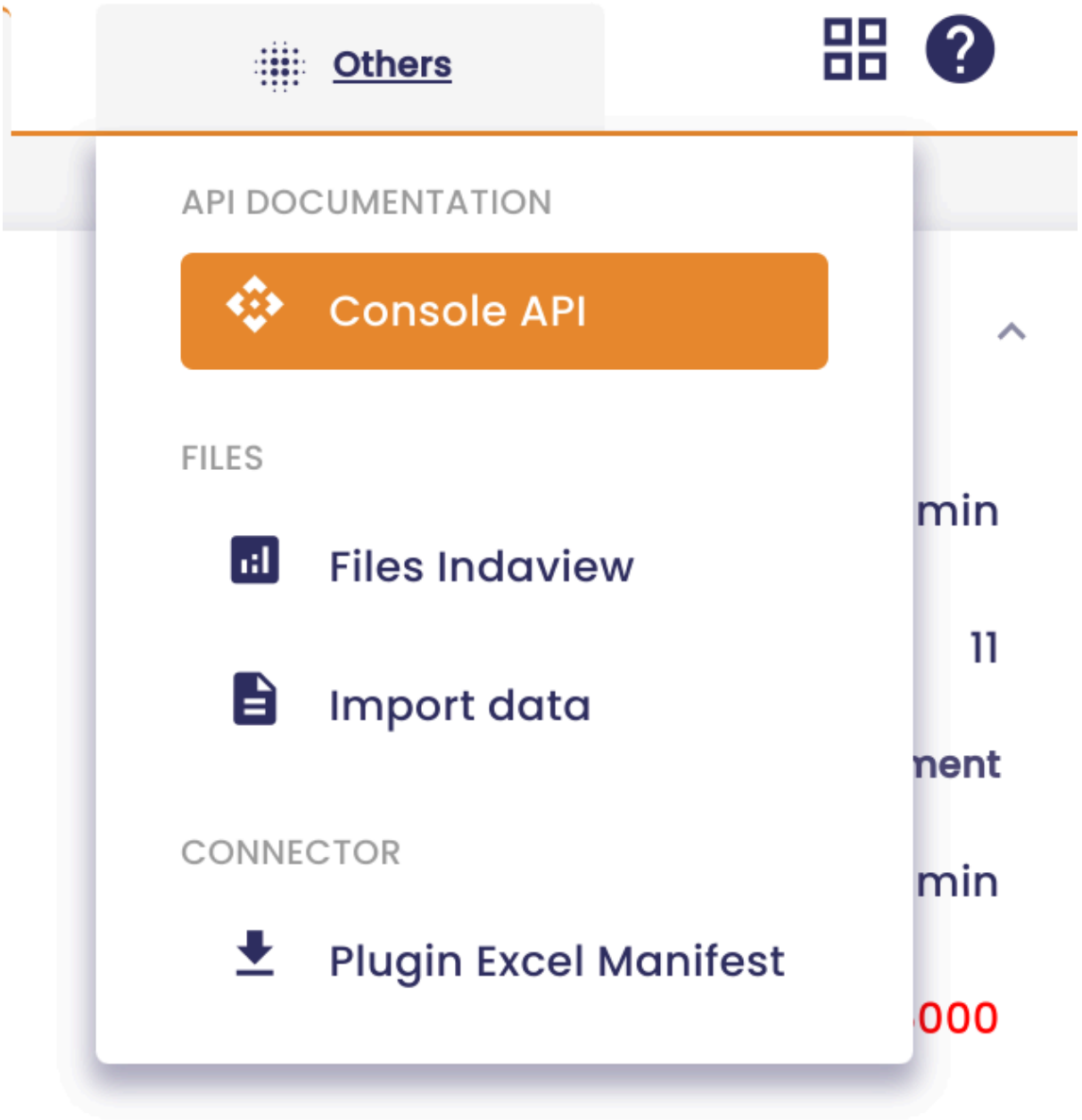
8.6.2 Accessing the API query interface

Log in to **Io-base** and click the button at the top right of your screen, highlighted below :

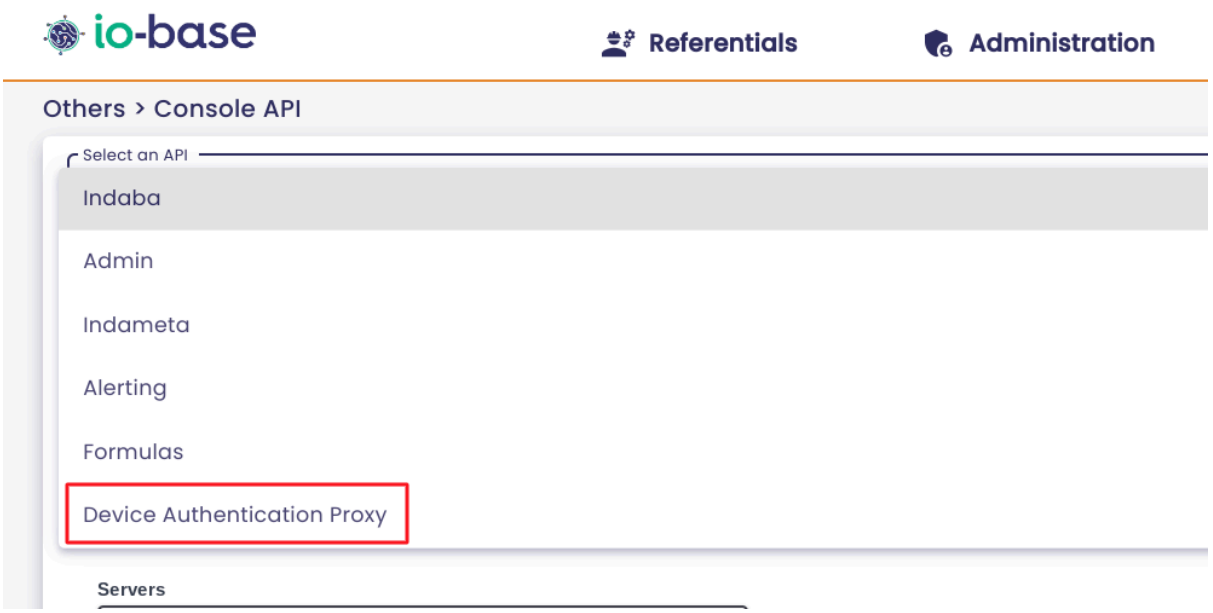


The Io-base administration page opens.

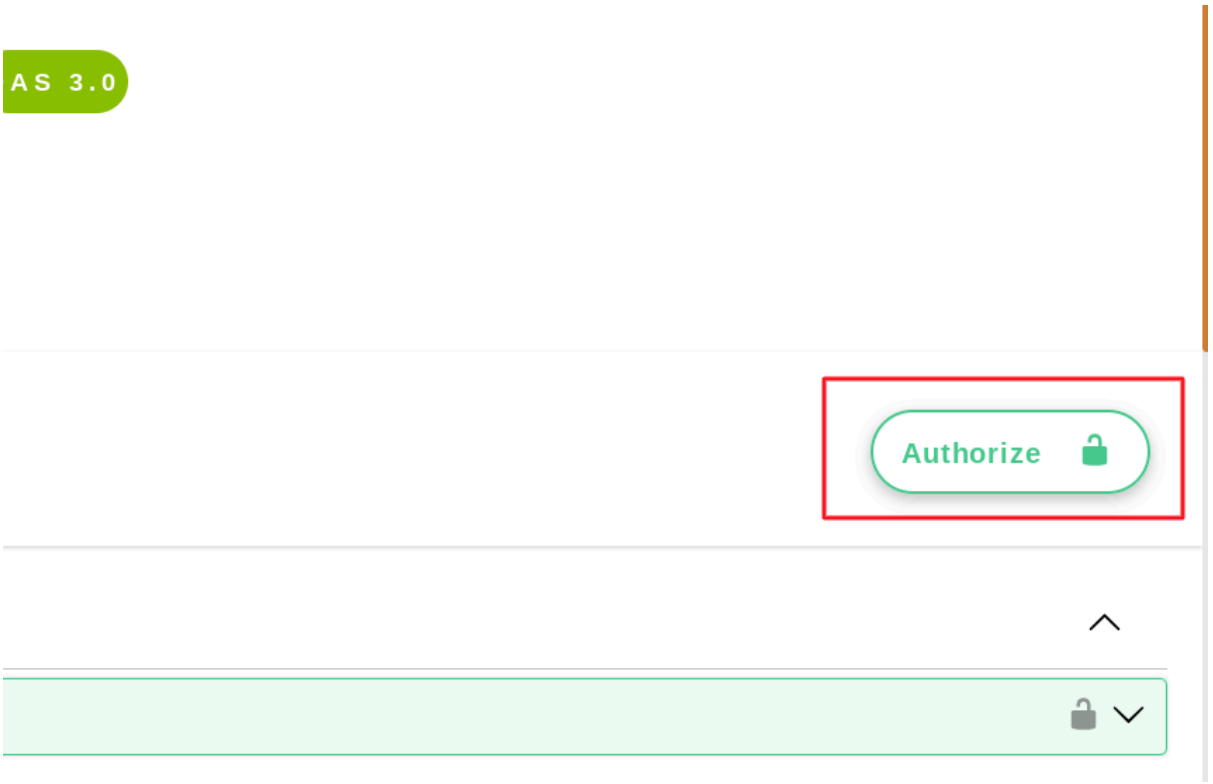
Go to the **Others/Console API** menu.



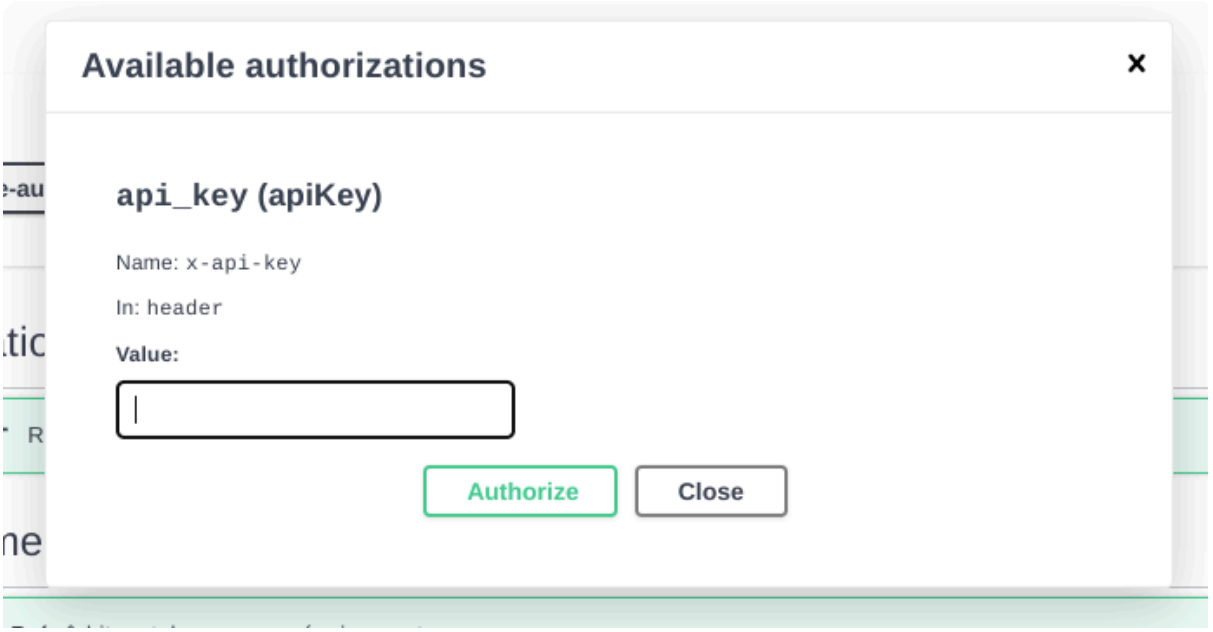
Select the **Device Authentication Proxy** API, using the drop-down list at the top left of the screen.



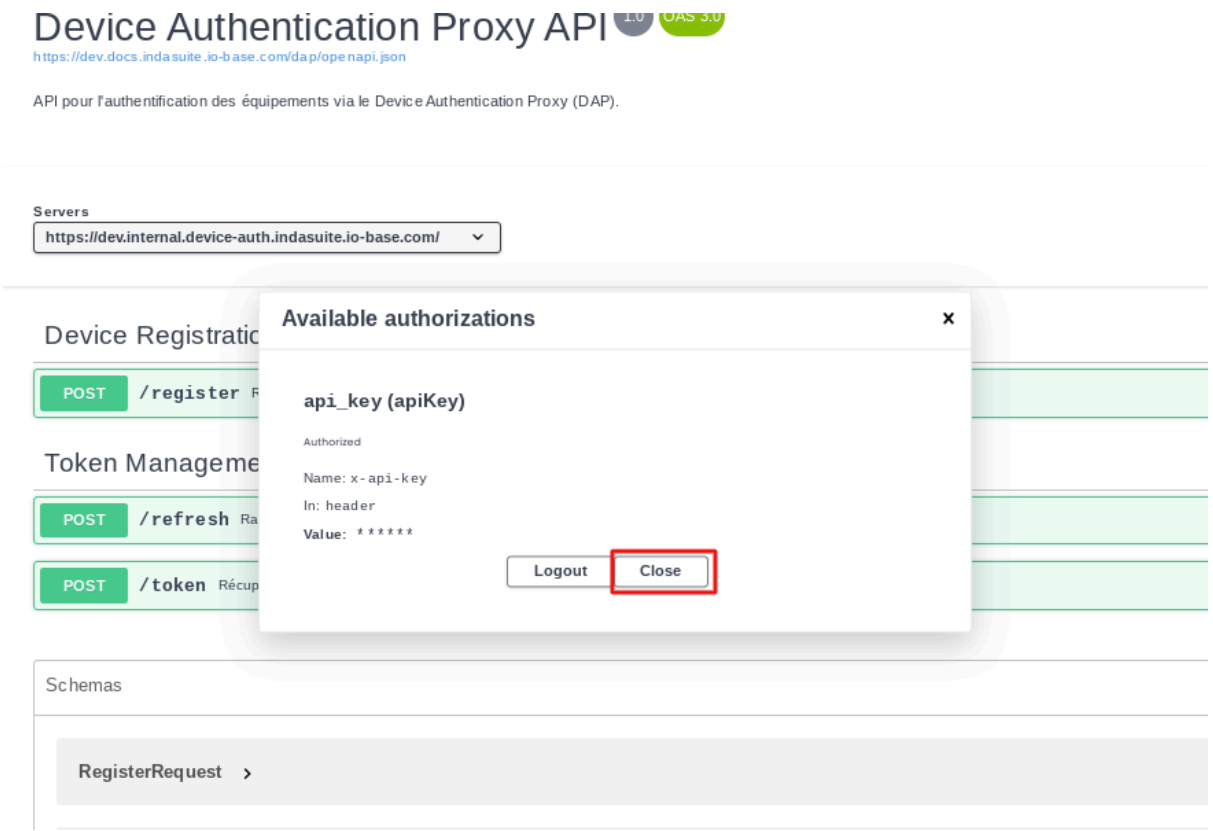
Then, click on the **Authorize** button.



Enter the requested API key (contact your administrator if necessary), then click on **Authorize**.



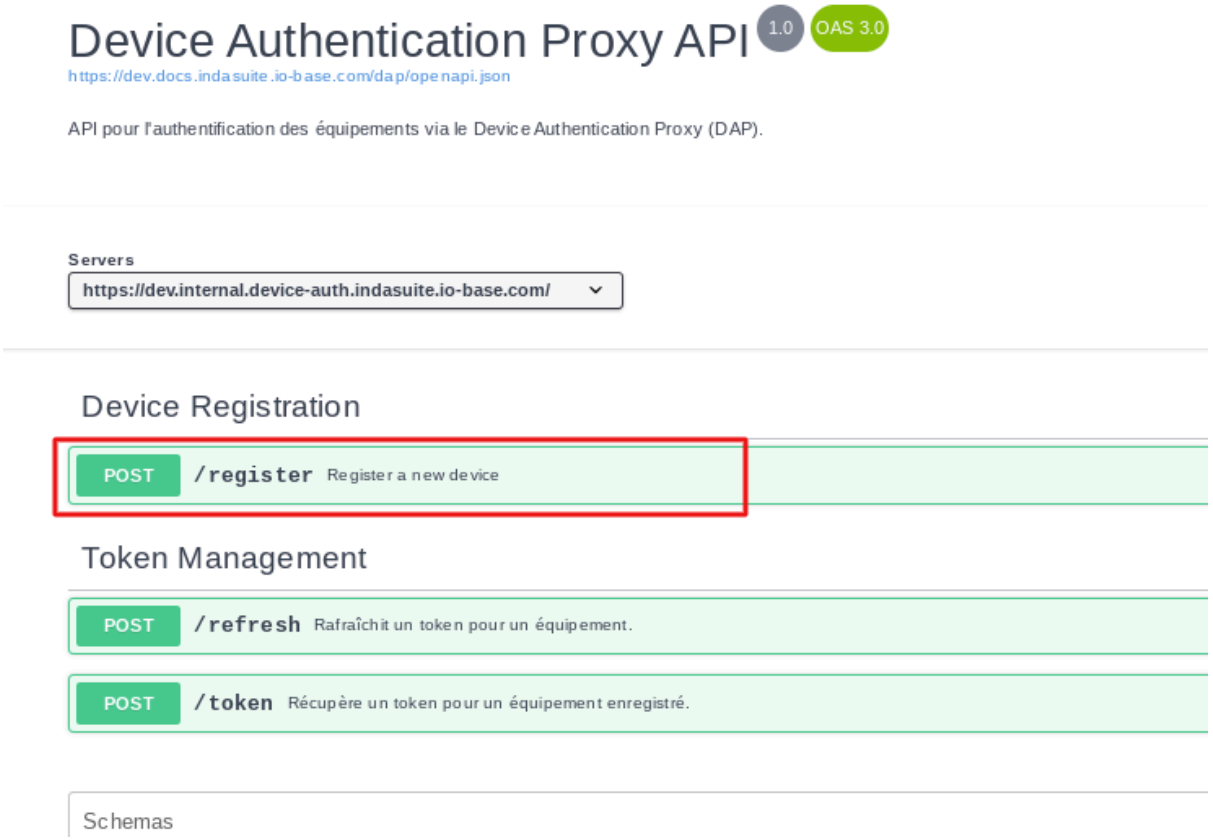
You can now close the window by clicking on **Close**.



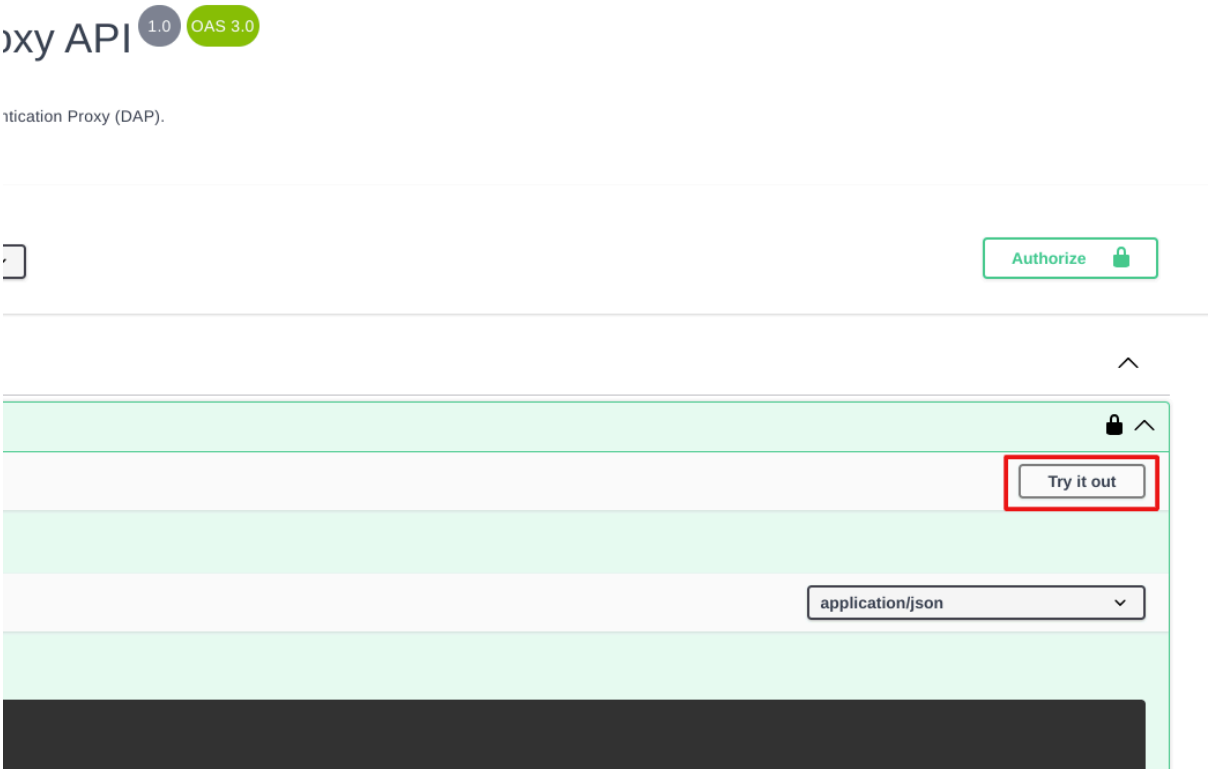
8.6.3 Device registration

You can now register the new device.

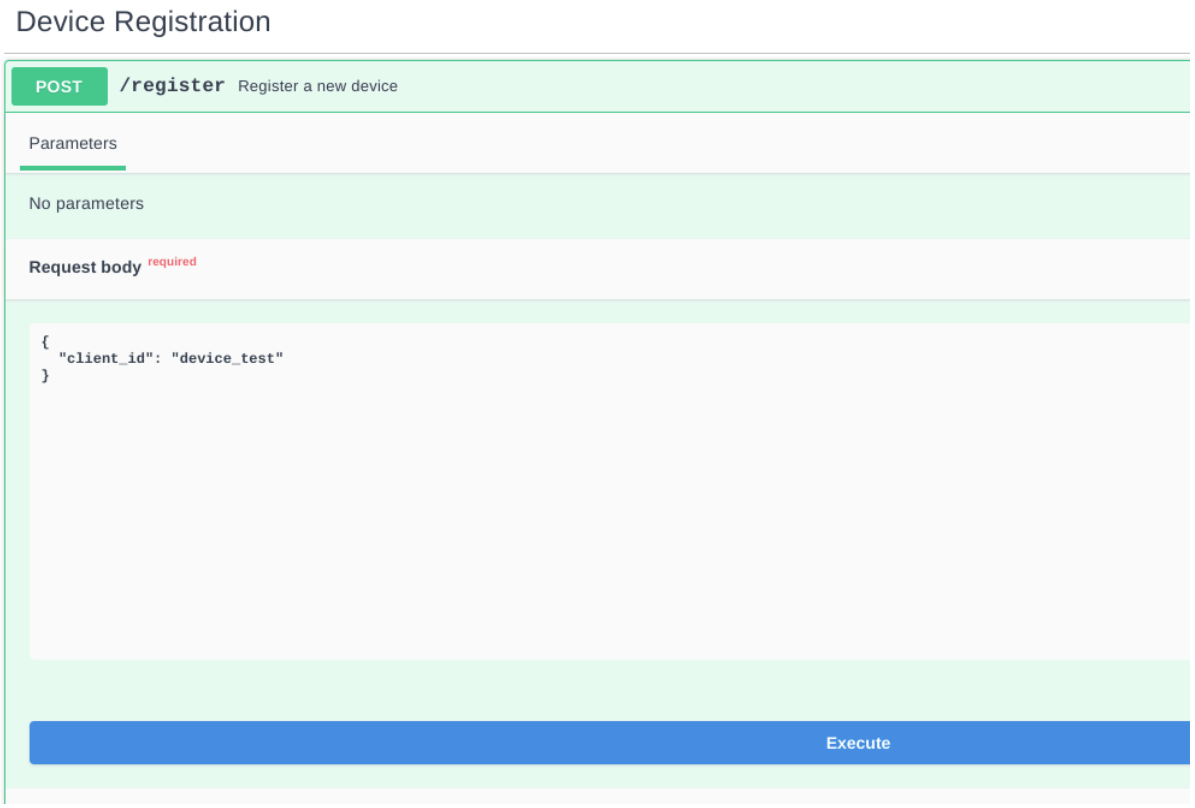
Go to the **Device Registration** section, then click on **POST / register**.



Click on the "**Try it out**" button.

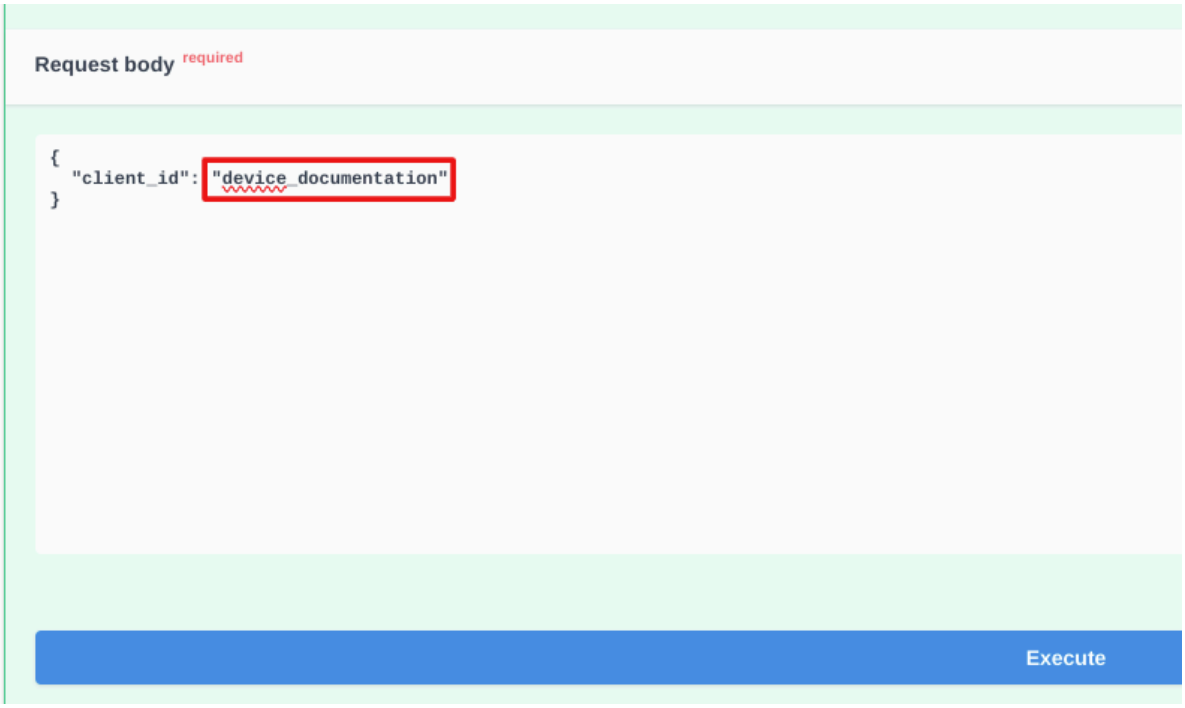


The screen below appears :



Complete the query by entering a name to identify your device. In our example : “device_documentation”.

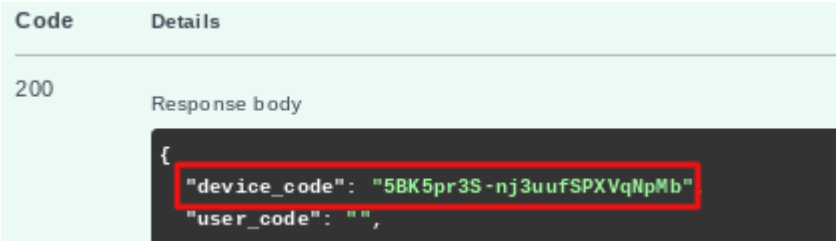
Then, click on **Execute**.



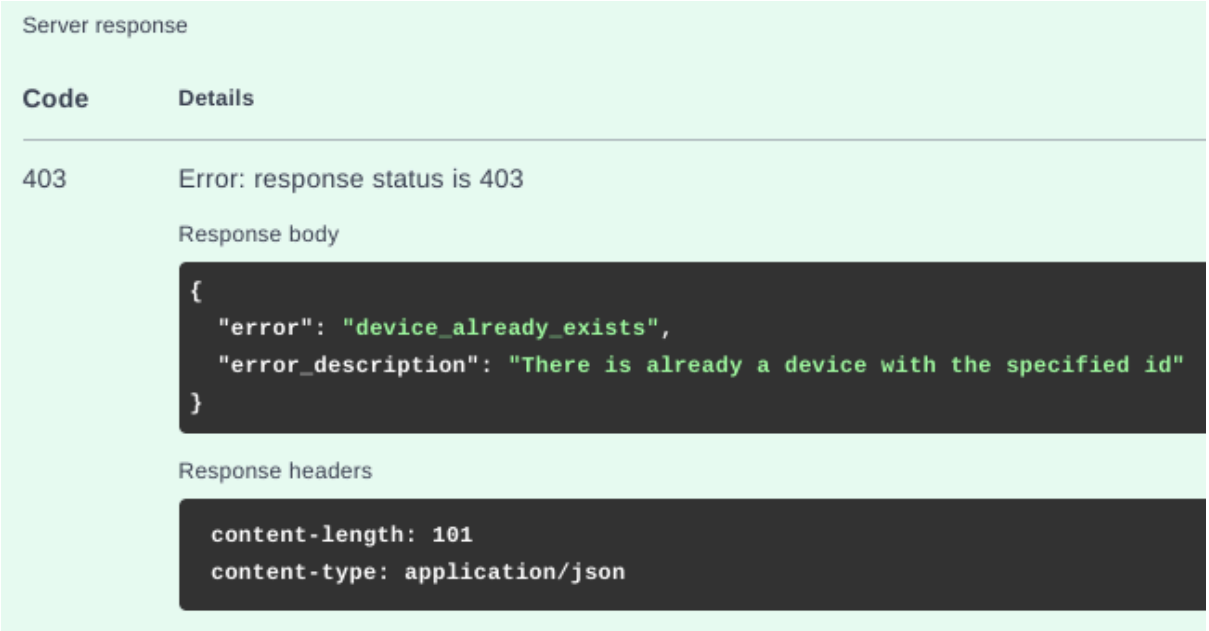
A response with a Code 200 appears : the device has been successfully registered.

In the body of this response, keep the “**device_code**” parameter, as it will be

useful when retrieving the access token (refer to section **4 : Access token retrieval**).



Note : If a device with the same name has already been registered, registration is not possible and you will receive a response with a 403 code :



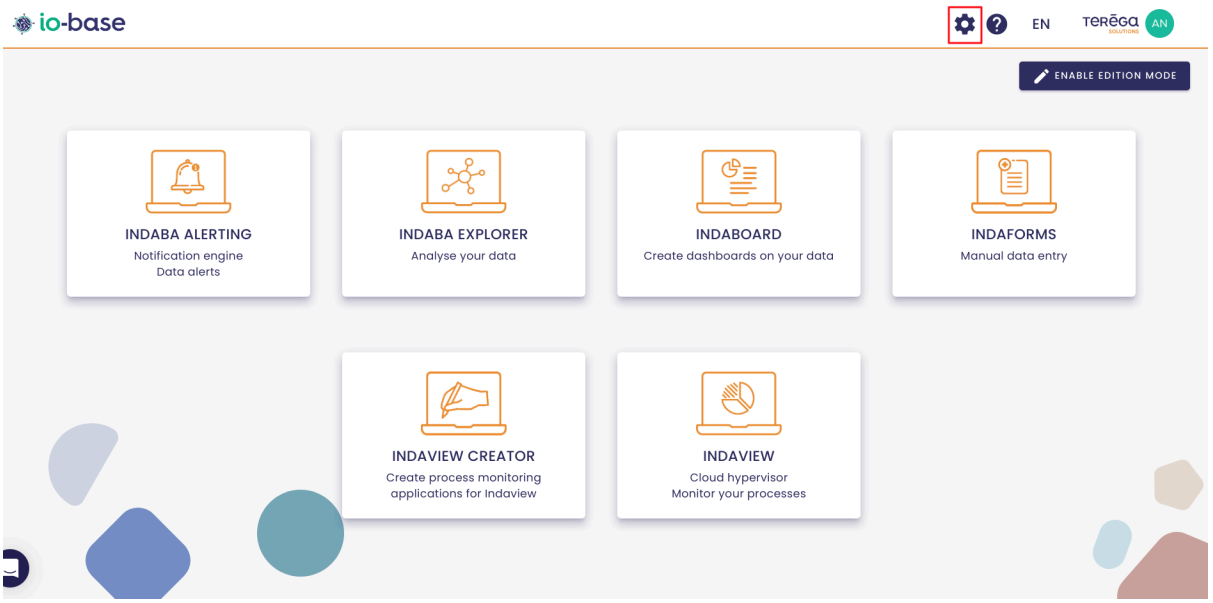
8.6.4 : Device validation in Io-base

This action must be carried out by an administrator.

Your device has been registered. It must now be validated by a user with a functional administrator role.

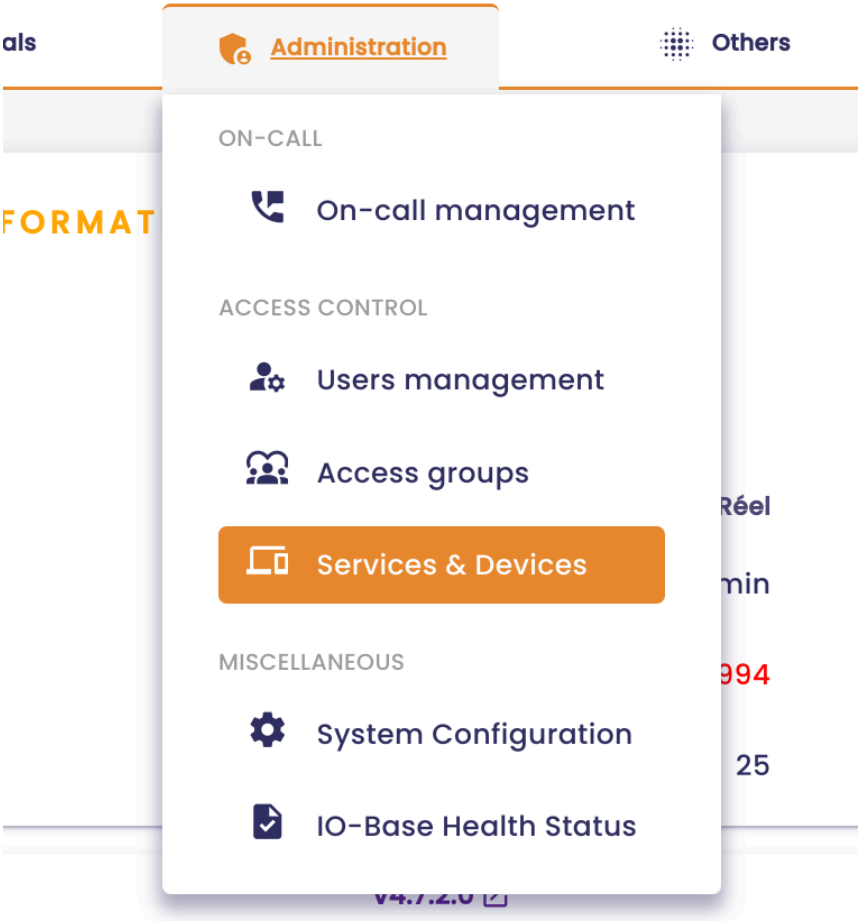
Here's the procedure for the administrator :

Log in to **Io-base** and click the button at the top right of your screen, highlighted below :



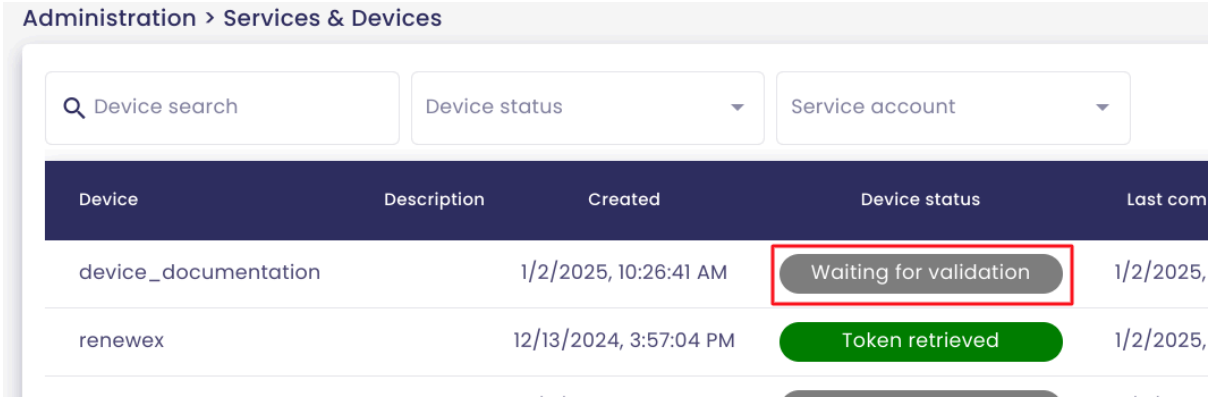
The Io-base administration page opens.

Go to the **Administration/Services and devices** menu.

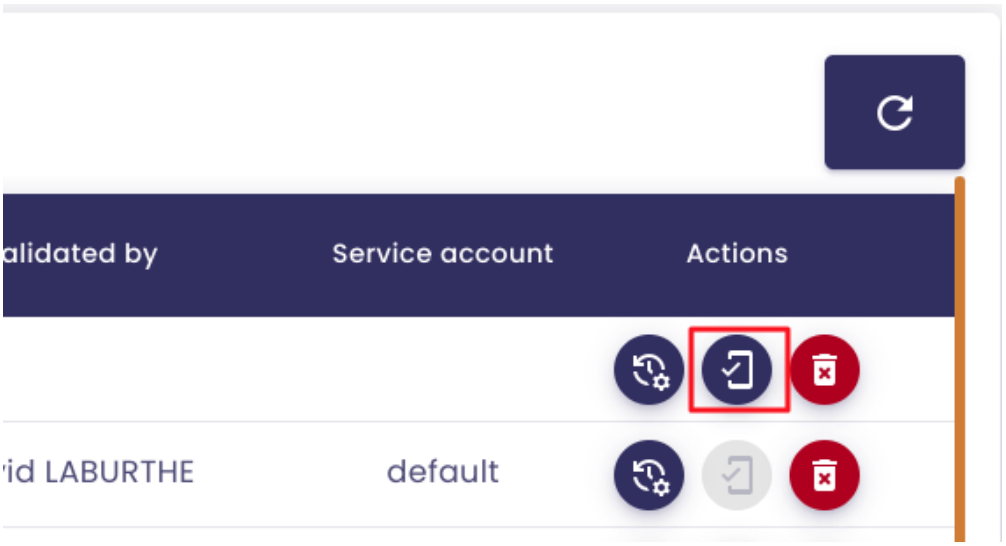


You are redirected to the **Devices** management screen.

The device “device_documentation” is **Waiting for validation**.

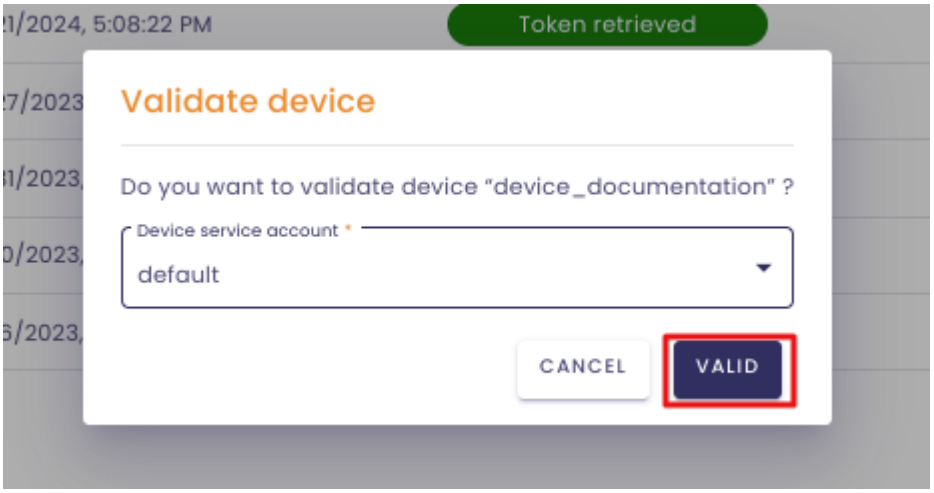


In the **Actions** column, click on the **Validate device** button.

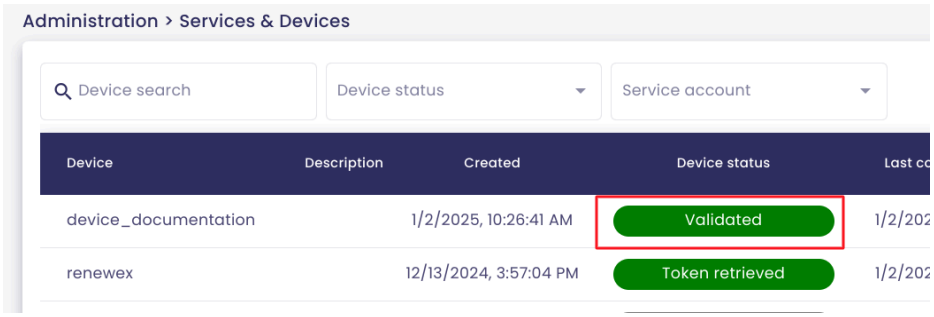


A window opens. In the drop-down list, choose the service account you wish to associate with the equipment.

Then click on **Validate**.



Note : It is preferable here to use a service account dedicated to the device rather than the default service account (refer to the **Introduction**).



The device is now validated.

For further information on the **Devices** portal, refer to our Devices management documentation.

8.6.5 : Access token retrieval

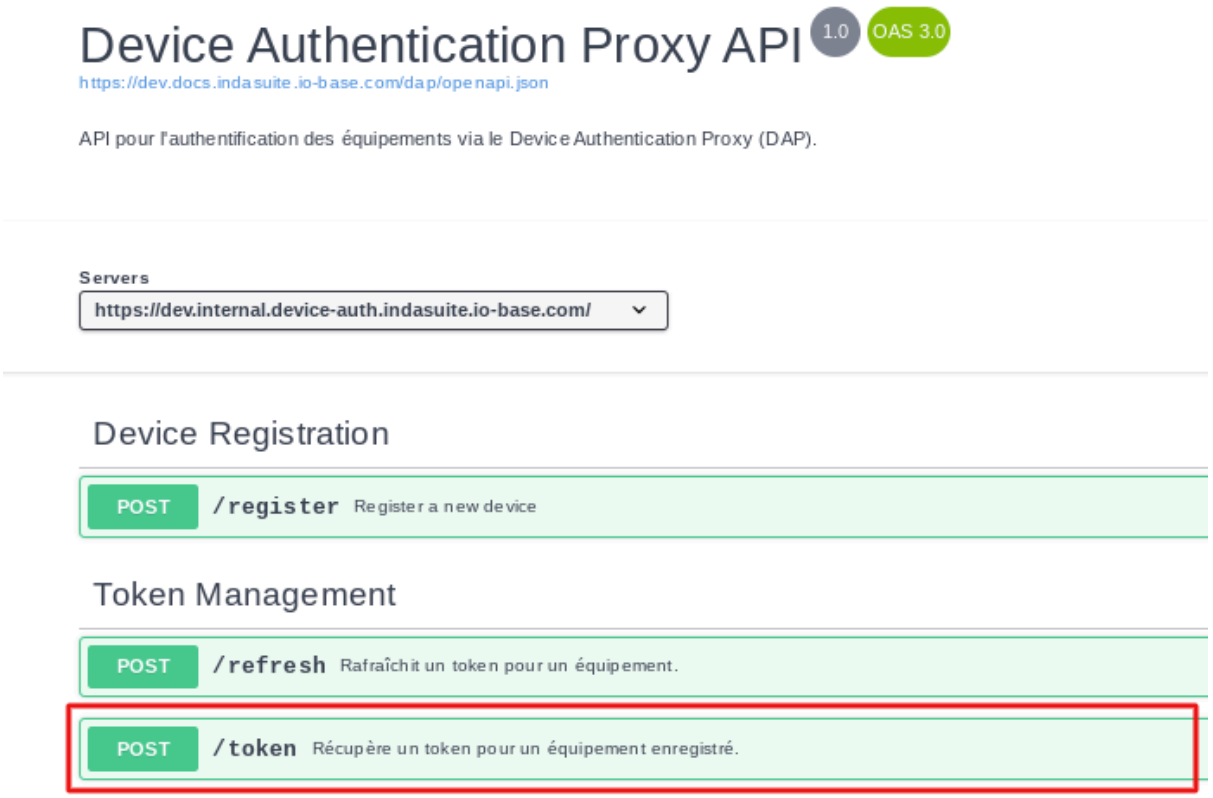
Once your device has been registered and validated by an administrator, it will be able to retrieve an access token, which enables to call Indaba APIs.

The token has a validity period, so once it has expired, a new one needs to be requested (refer to section **5 : Refreshing the token**).

Follow the procedure below to retrieve an access token :

Access the API request interface again (refer to section 1: A**ccessing the API request interface**).

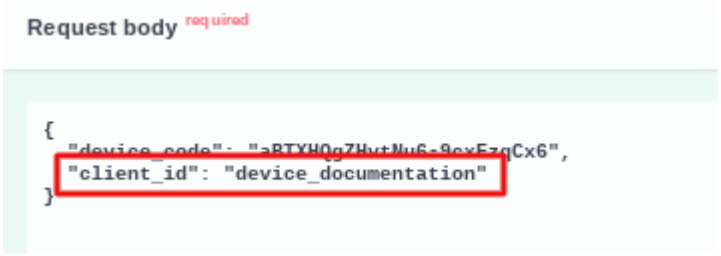
Go to the **Token management** section, then click on **Post / Token**.



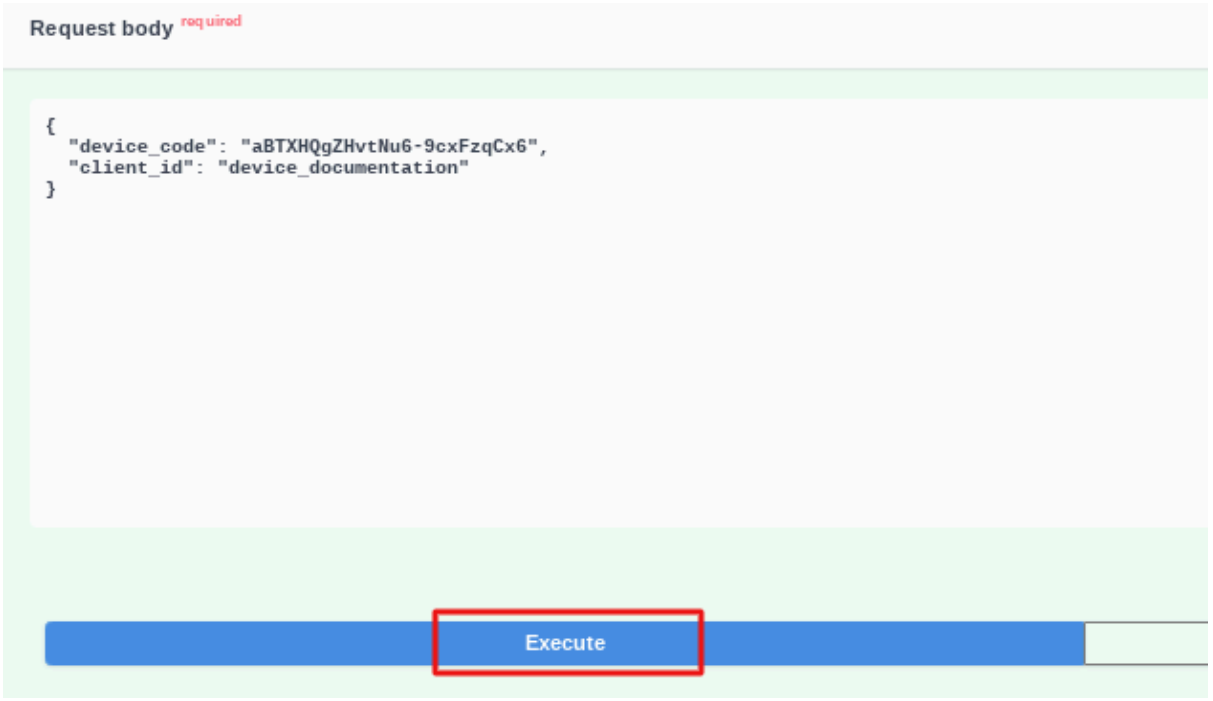
Complete the request by entering :

- **device_code** : code sent in the body of the response received following your device registration request (refer to section **2 : Device registration**).

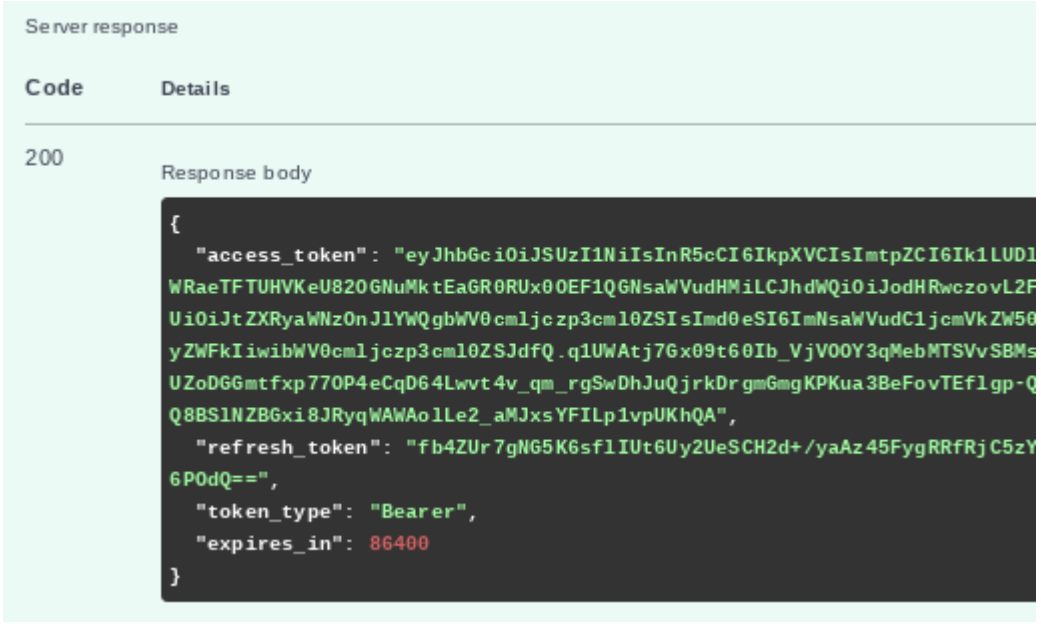
- **client_id** : the name you entered when registering your device, in our example “device_documentation”.



Then, click on **Execute** :

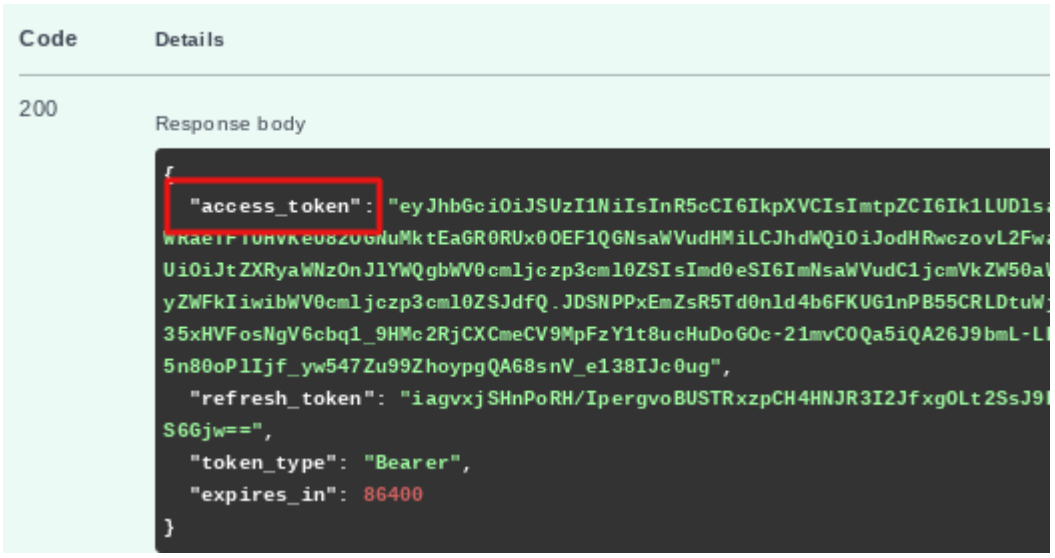


The following response appears :



In the response body, you can find :

- the **access_token**, to call Indaba APIs:

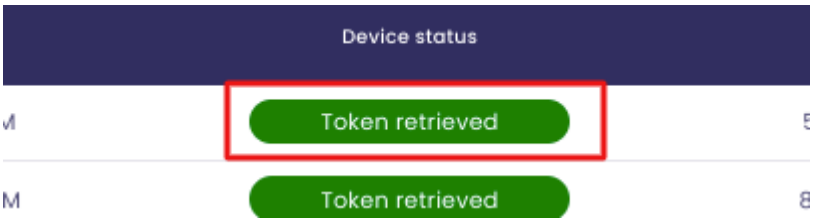


- the **refresh token** : to renew access to Io-base when the validity of the access token has expired

Code	Details
200	Response body


```
{
  "access_token": "eyJhbGciOiJSUzI1NiIsInR5cCI6IkpXVCIsImtpZCI
WRaeTFTUHVKeU82OGNuMktEaGR0RUx0OEF1QGNsaWVudHMiLCJhdWQiOiJodHR
UiOiJtZXRyaWNzOnJlYWQgbWV0cmljczp3cml0ZSIsImd0eSI6ImNsaWVudC1j
yZWFkIiwibWV0cmljczp3cml0ZSJdfQ.JDSNPPxEmZsR5Td0nld4b6FKUG1nPB
35xHVFosNgV6cbq1_9HMc2RjCXCmeCV9MpFzY1t8ucHuDoGOc-21mvCOQa5iQA
5n80oPlIif_yw547Zu99ZhoypgQA68snV_e138IJc0ug",
  "refresh_token": "iagvxjSHnPoRH/IpergvoBUSTRxzpCH4HNJR3I2Jfx
S6Gjw==",
  "token_type": "Bearer",
  "expires_in": 86400
}
```


Note : in the Io-base **Devices** portal, the device status changes to “Token retrieved”.

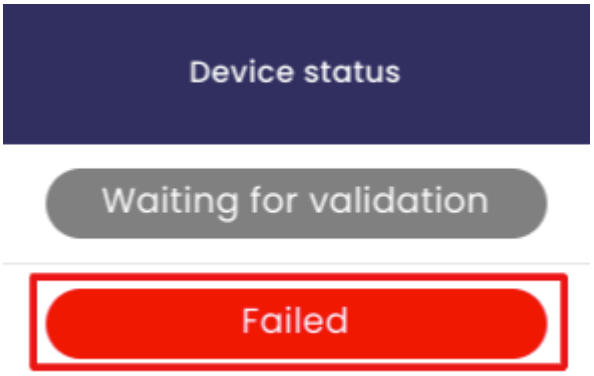


Warning, for security purposes, token calls are only valid once.

If the same token is used twice, the device status switches to "failed".

Code	Details
403	Error: response status is 403 Response body

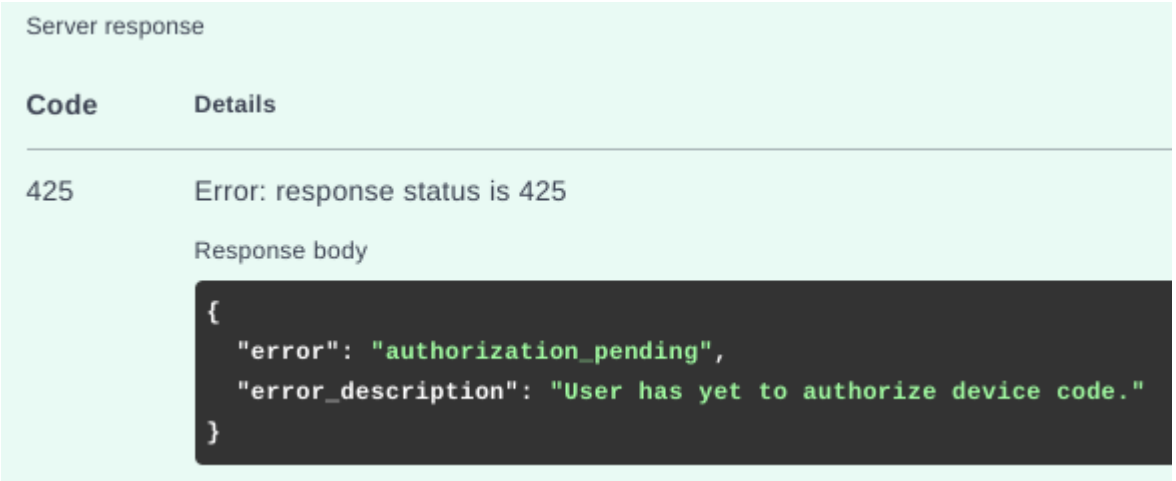

```
{
  "error": "authorization_failed",
  "error_description": "The token was already retrieved, the device is now in error"
}
```



In this case, the device must be deleted by an administrator in Io-base, and the procedure has to be repeated.

Note : If the device has not been validated by an administrator, the access token cannot be retrieved.

The response will be a code 425 : “Authorization Pending”.



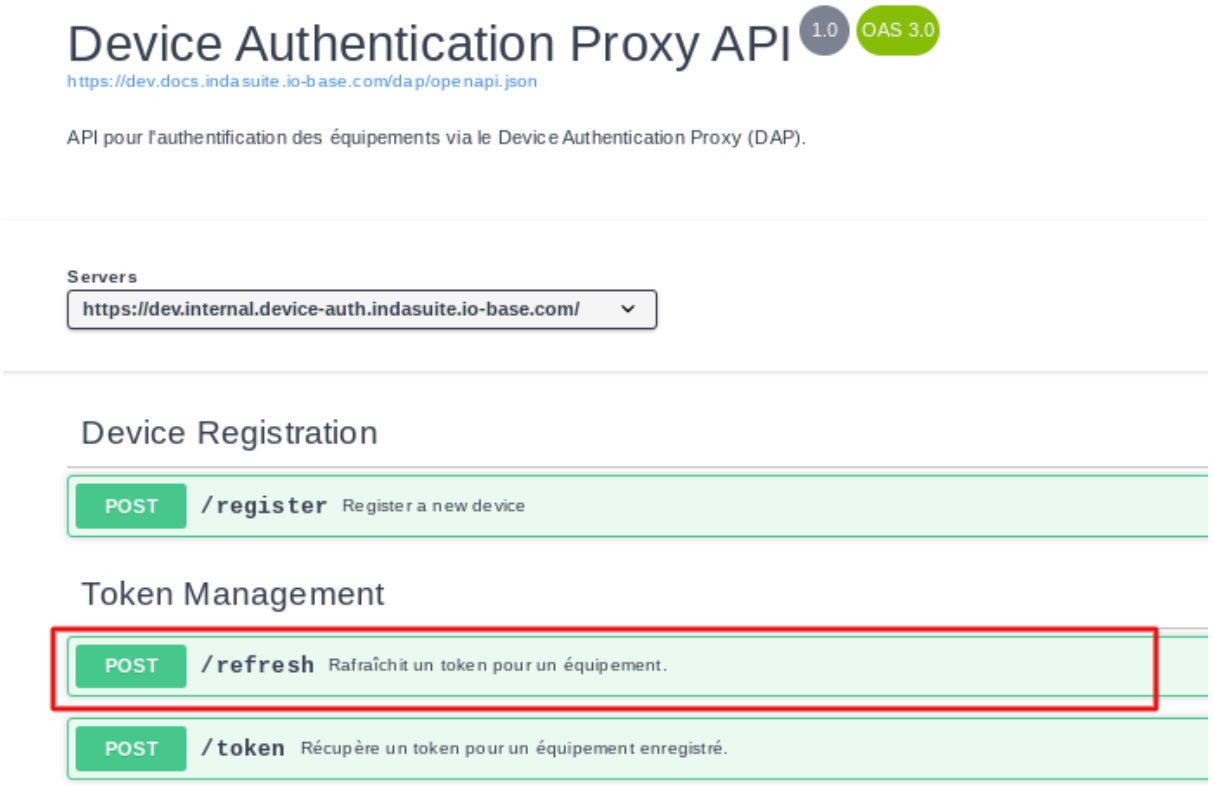
Make sure the device is validated, then perform the operation again.

8.6.6 : Refresh token

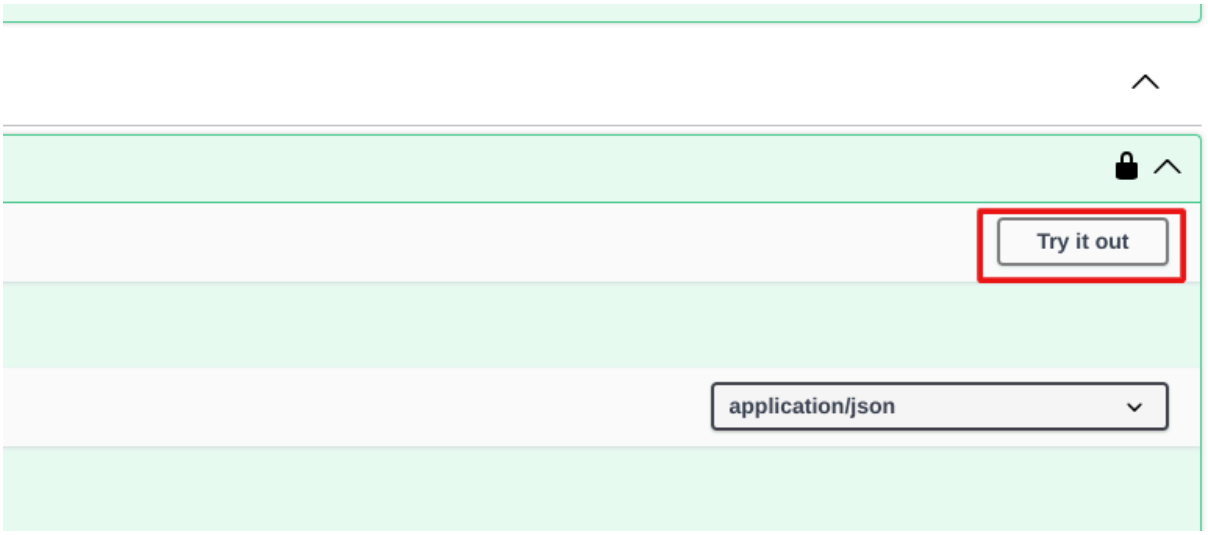
The access token allocated to the equipment has a limited validity period. To continue communicating with Io-base, you'll need to renew this token.

To do this, return to the API request interface (refer to section 1: Accessing the API query interface).

In the **Token Management** section, click on **Post/refresh**.



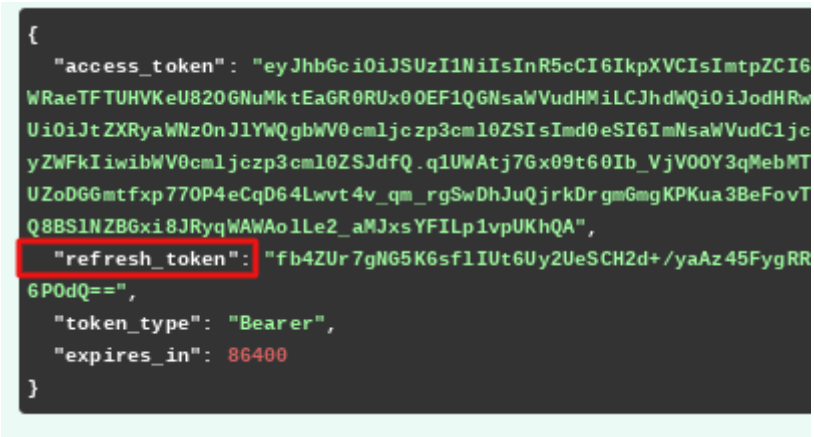
Then, **Try it out**.



The following screen appears :

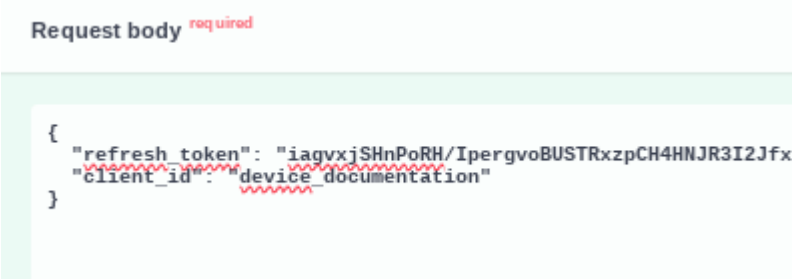
Complete the query by entering :

- the "**refresh_token**": which you can find in the body of the previous retrieved token response. In our case, here :



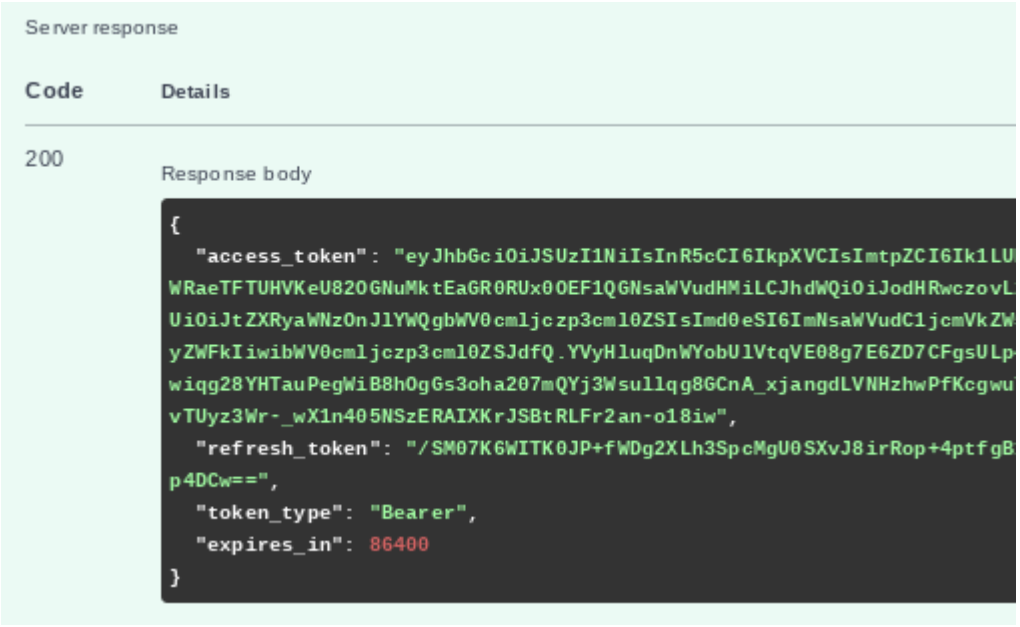
- the "**client_id**" : the name you entered when registering the device, in our case "device_documentation" (refer to section **2 : Device registration**)

The request body for our example will be :



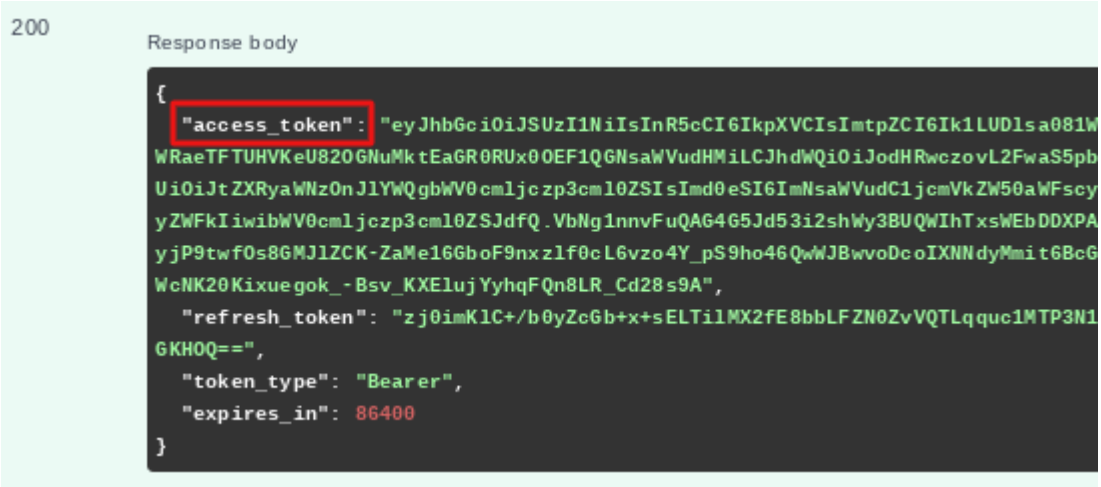
Then, click on **Execute** :

The token has been refreshed and communication between the device and Io-base is ensured (response with code 200) :

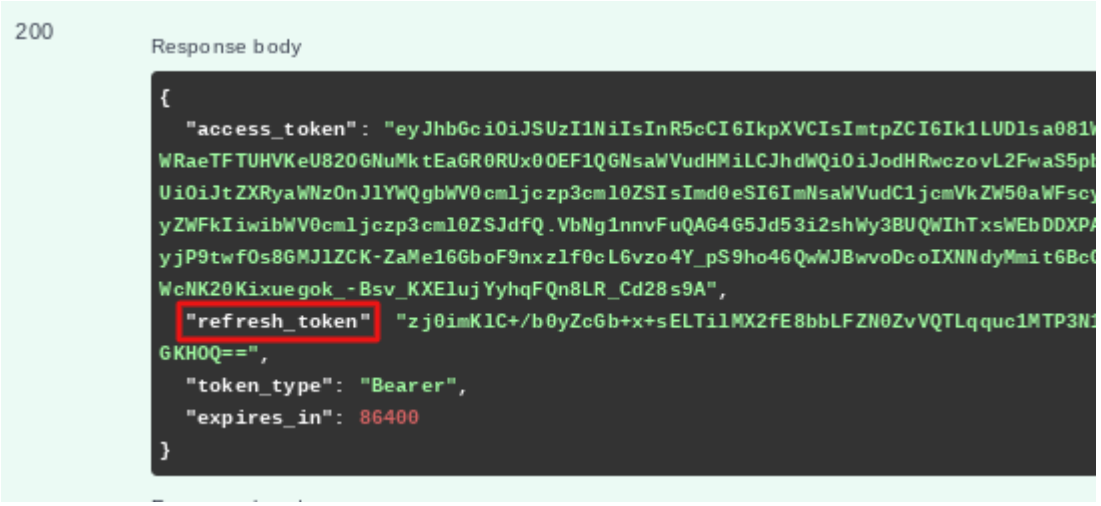


In the response body, you can find :

- the **access_token**, for calling Indaba APIs :



- the **refresh token** : to renew communication between the device and Io-base when the new token expires



Warning, a “**refresh_token**” can only be used once.

If the same token is used twice, the device status switches to "failed".

Server response

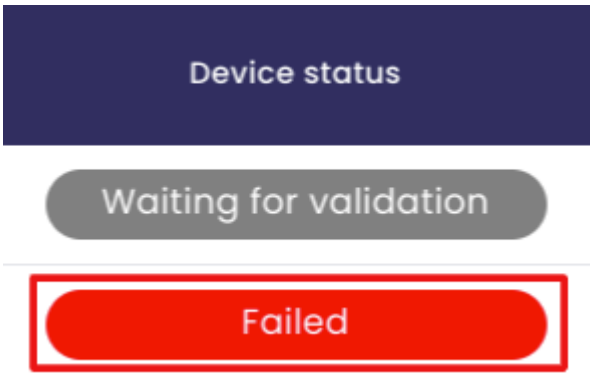
Code	Details
403	Error: response status is 403

Response body

```
{
  "error": "authorization_failed",
  "error_description": "Forbidden operation, wrong refresh token, device is now in error"
}
```

Response headers

```
content-length: 114
content-type: application/json
```



In this case, the device must be deleted by an administrator in Io-base, and the procedure has to be repeated.

9. Users management

9.1 User list

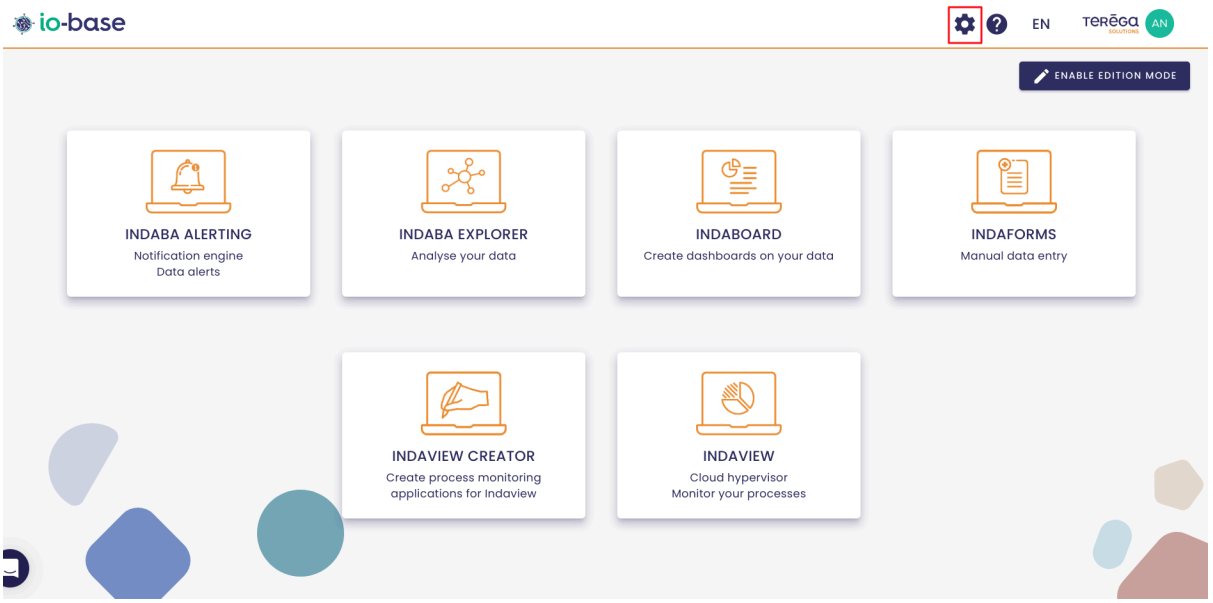
Prerequisite : You must have a functional administrator role to access this feature.

Io-base functional administrators can manage the users of the platform :

- add a user
- delete a user
- manage the rights of a user

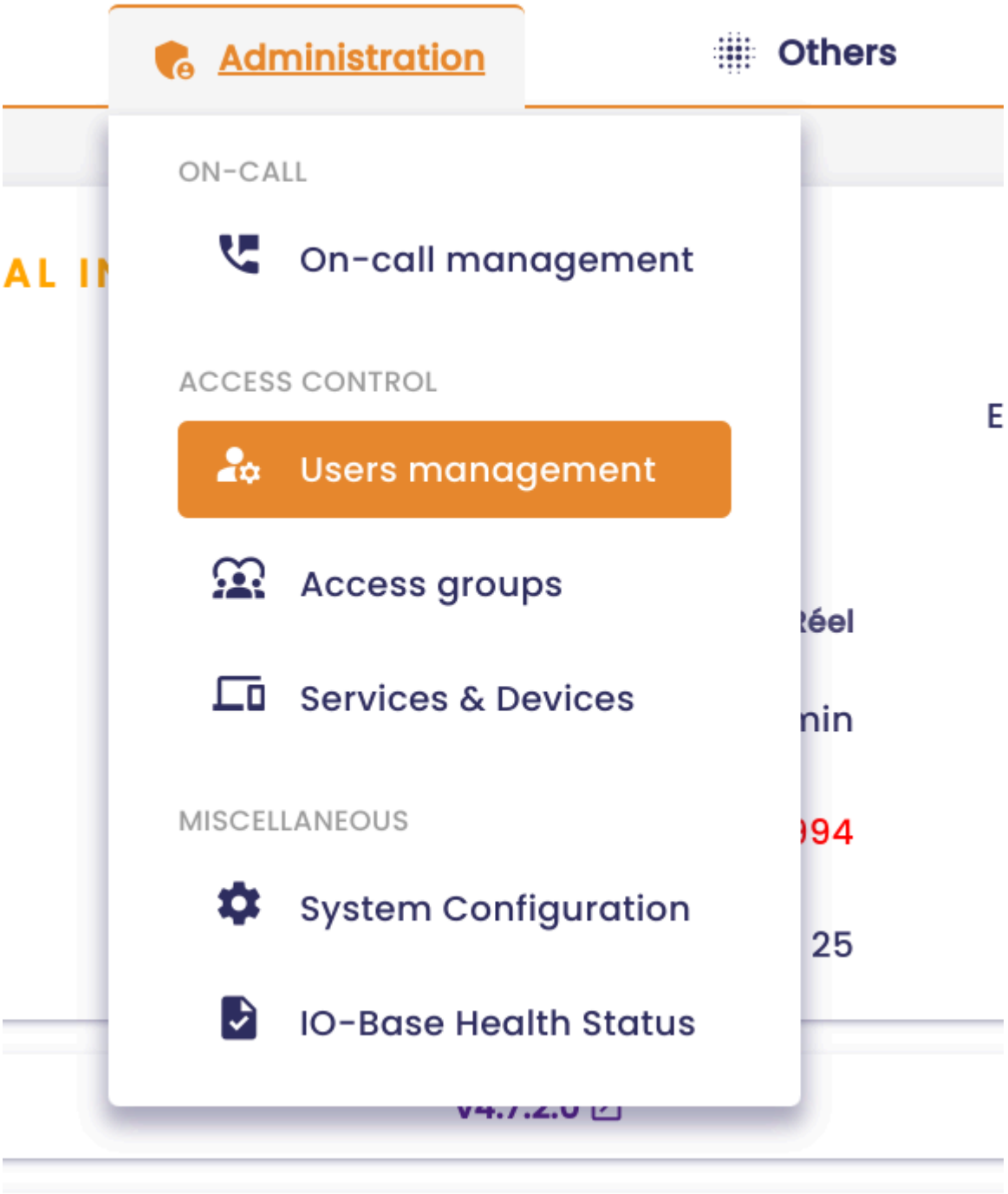
- update the user's information

Login to **Io-base**, and click the button at the top right of your screen, highlighted below :

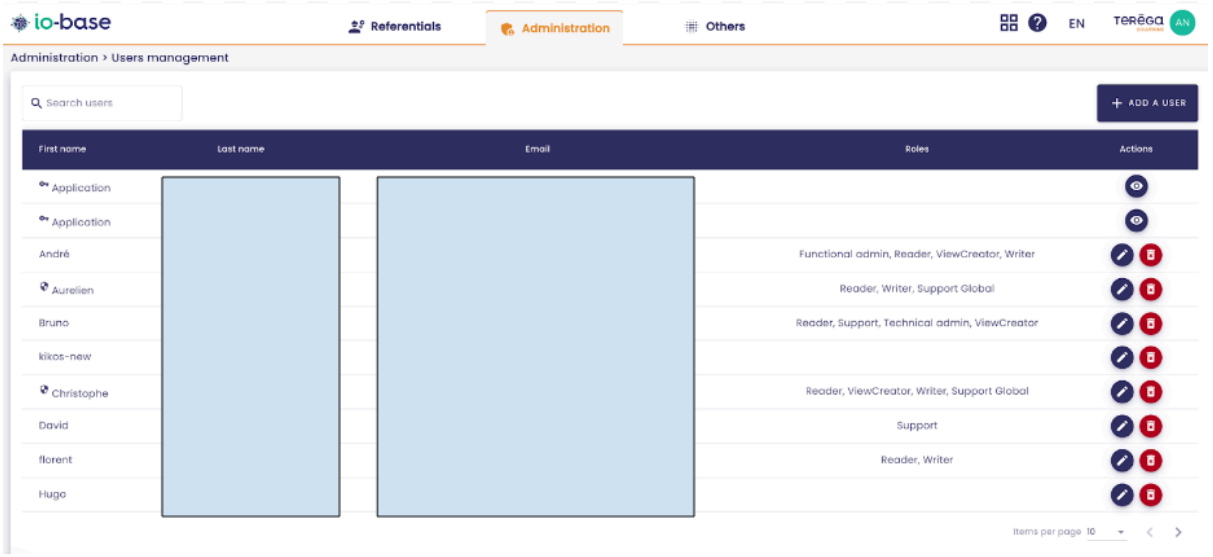


The Io-base administration page opens.

Go to the **Administration/Users management** menu.



The table displays the list of users who can access the **Io-base** platform, as well as their roles. To learn more about the roles, please refer to the article **Editing a User**, which offers a detailed description of each role.



It is possible to filter the table by using the search area.

Note : The search is effective on the **First Name** and **Last Name** fields.

As on most **Io-base** tables, the pagination is available at the bottom right.

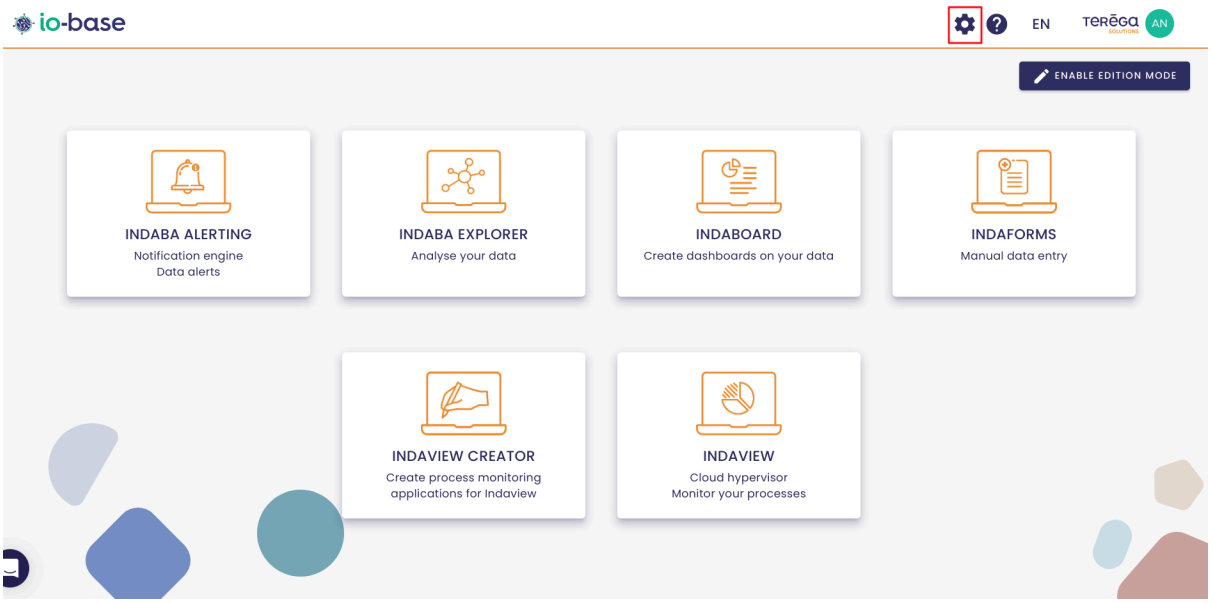
Note : A shield icon is displayed next to the first name of certain users to indicate their **Global Support** role, representing the Terega Solutions support team.

These users can be removed if necessary.

9.2 Adding a user

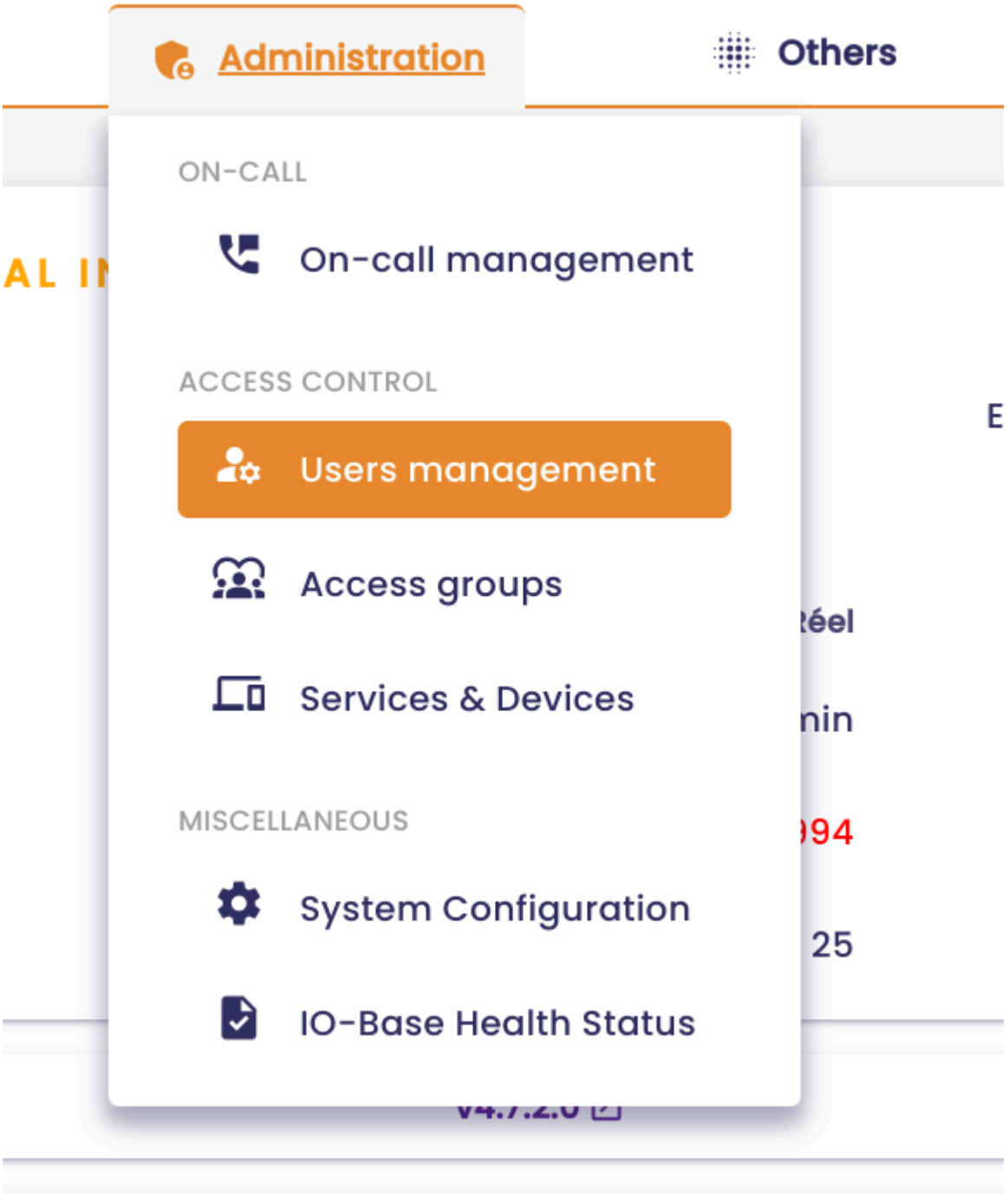
Prerequisite : This feature is available for users with a **functional administrator** role.

Login to **Io-base**, and click the button at the top right of your screen, highlighted below :

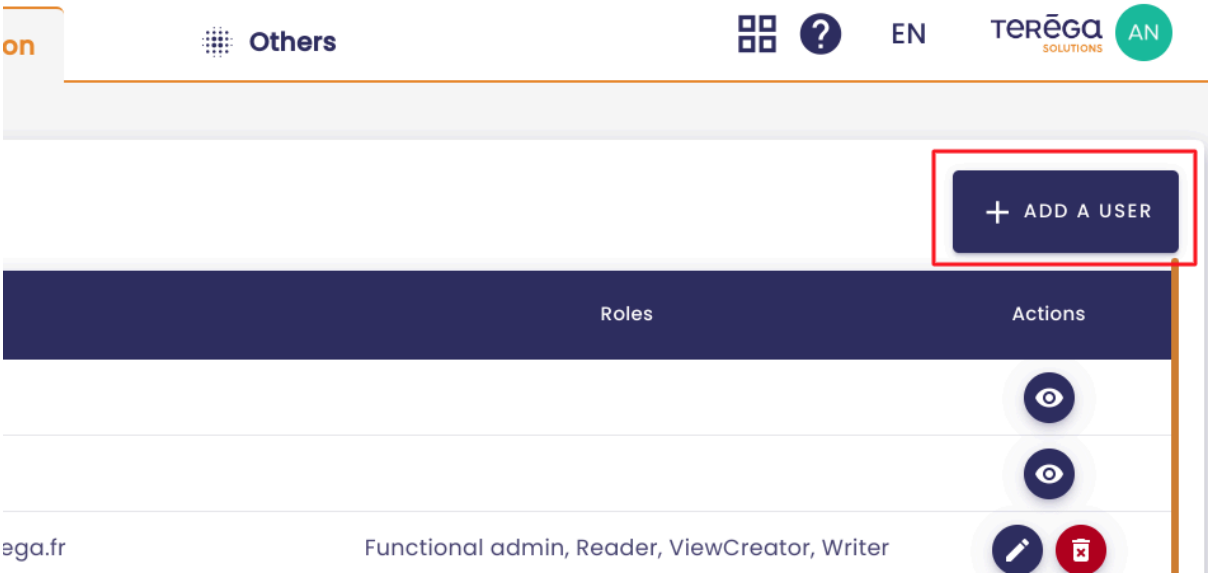


The Io-base administration page opens.

Go to the **Administration/Users management** menu.



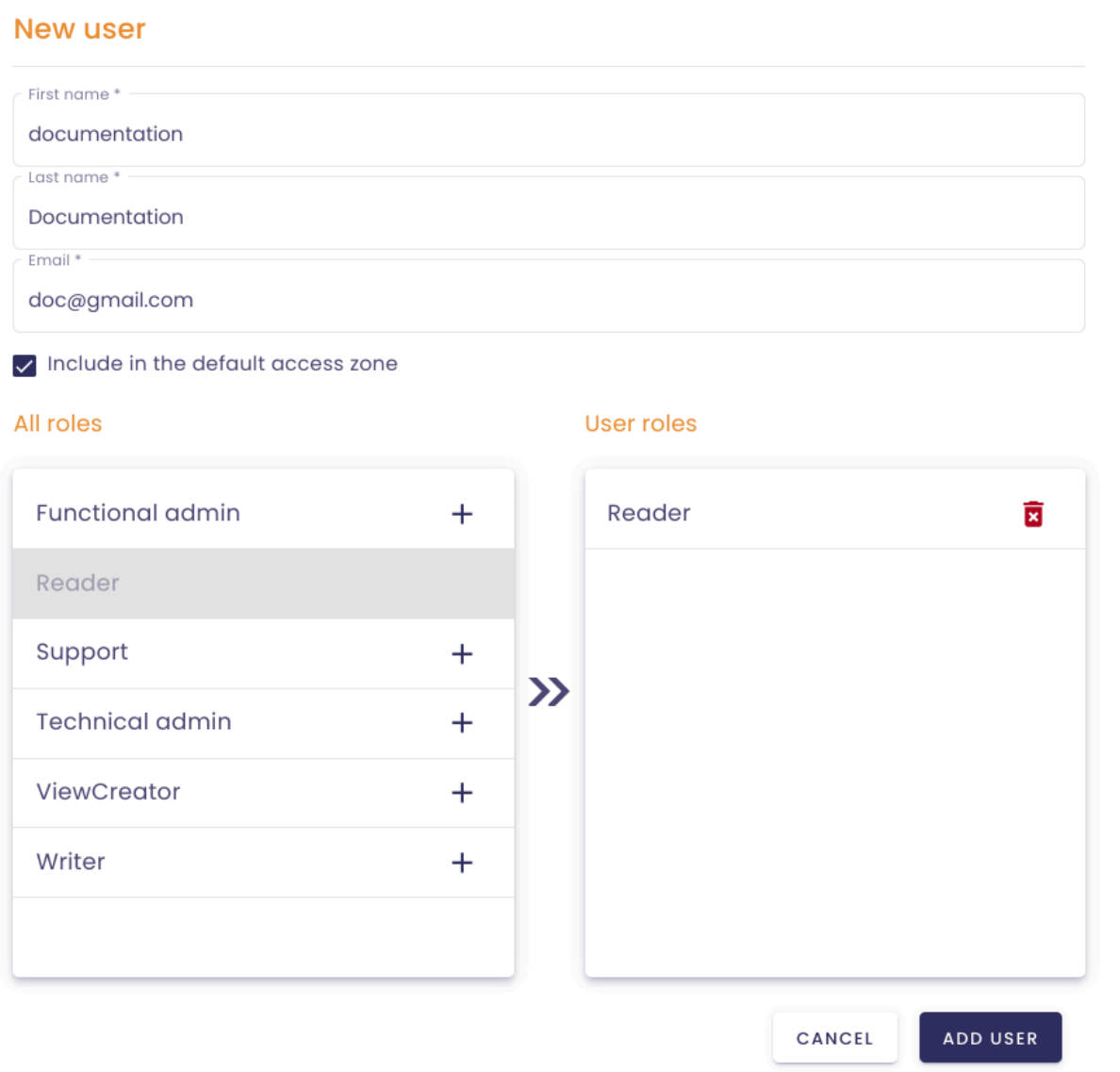
The user listing screen is displayed. Click on the "**Add a user**" button at the top right.



The "**New User**" window appears. It contains the following fields :

- First name (required)
- Last name (required)
- Email (required)

A checkbox enables you to specify whether the new user should have default permissions. For more information on permissions, please refer to the dedicated articles in the Permissions (Metrics Rights) section.



Note : It is not possible to add a user with the same email address as an existing user.

By default, the role assigned to the new user is set to **Reader**. It allows access to the io-base portal with read rights.

The possible roles are as follows :

- **Reader** : read access to the io-base portal
- **Functional Admin** :
    - read access to the io-base portal
    - access to the Forms module
    - access to the administration area

    - access to the administration of repositories
- **Support** : reserved for people who need to access the portal for support purposes
- **Technical Admin** : reserved for technical administrators
- **Writer** : necessary to have writing rights in the Indaba database.

Note : the Writer and Reader roles alone are not sufficient to view the metrics values or add data. They must be completed by the **Permissions** set on the metrics.

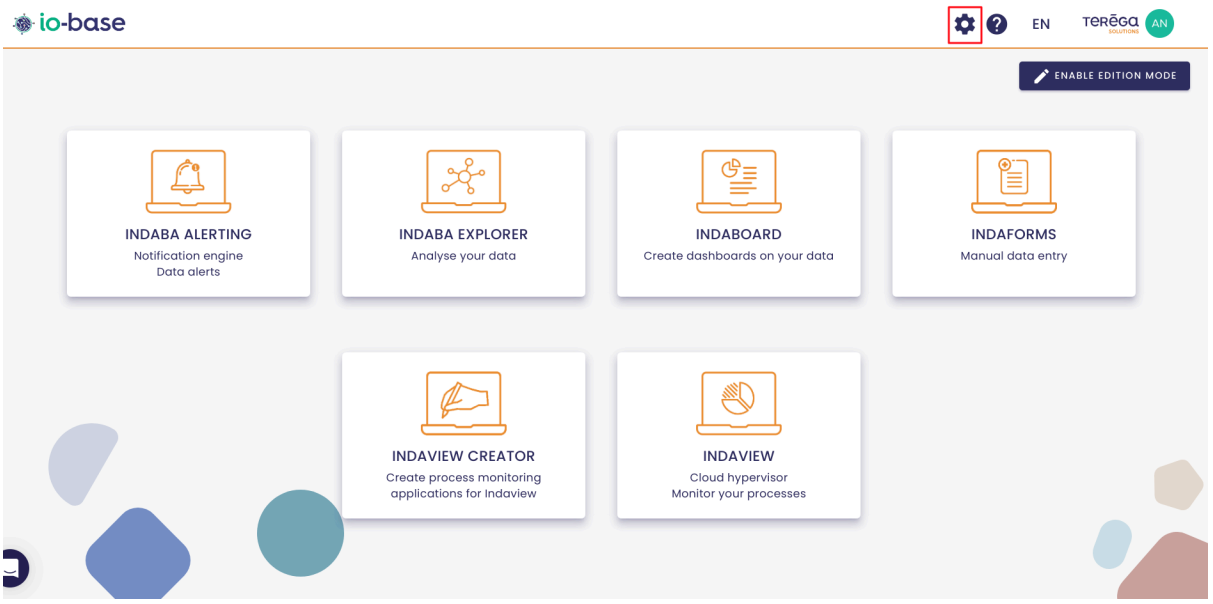
For further details on Permissions, refer to the dedicated articles in the section Permissions (metrics rights).

Once you have entered all the information about the new user, click on **Add user** to confirm.

9.3 Editing a user

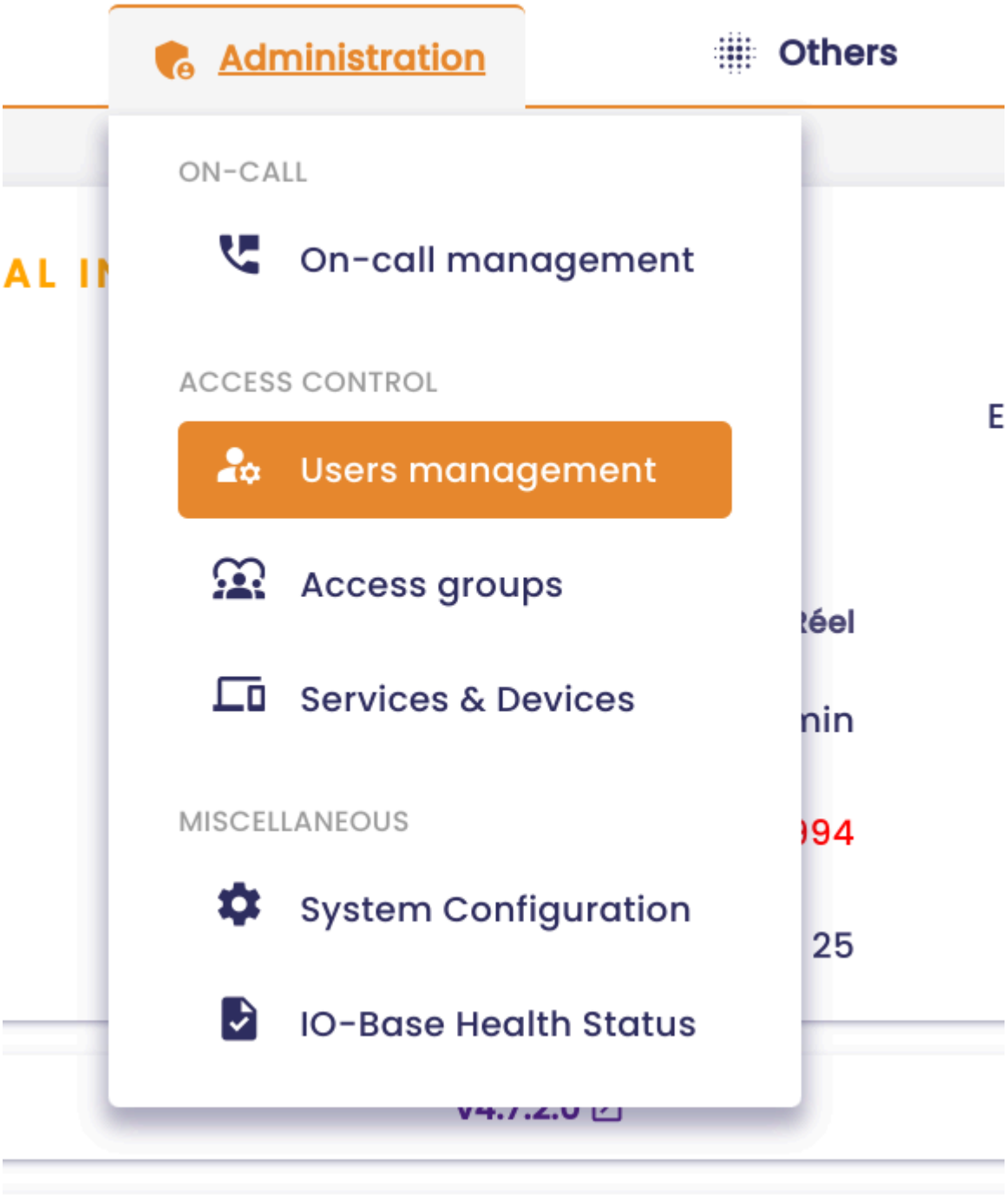
Prerequisite : this feature is available to users with the **Functional Administrator** role.

Login to **Io-base**, and click the button at the top right of your screen, highlighted below :



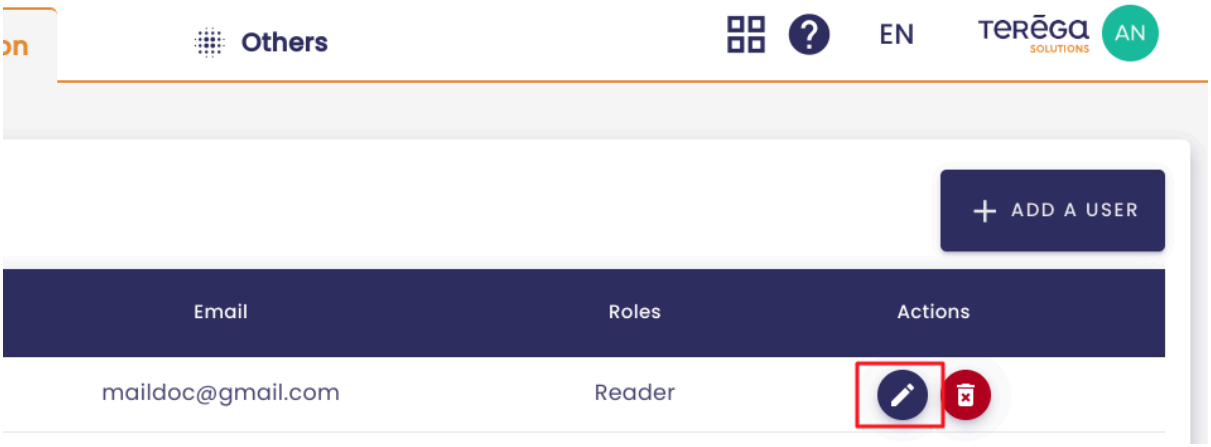
The Io-base administration page opens.

Go to the **Administration/Users management** menu.

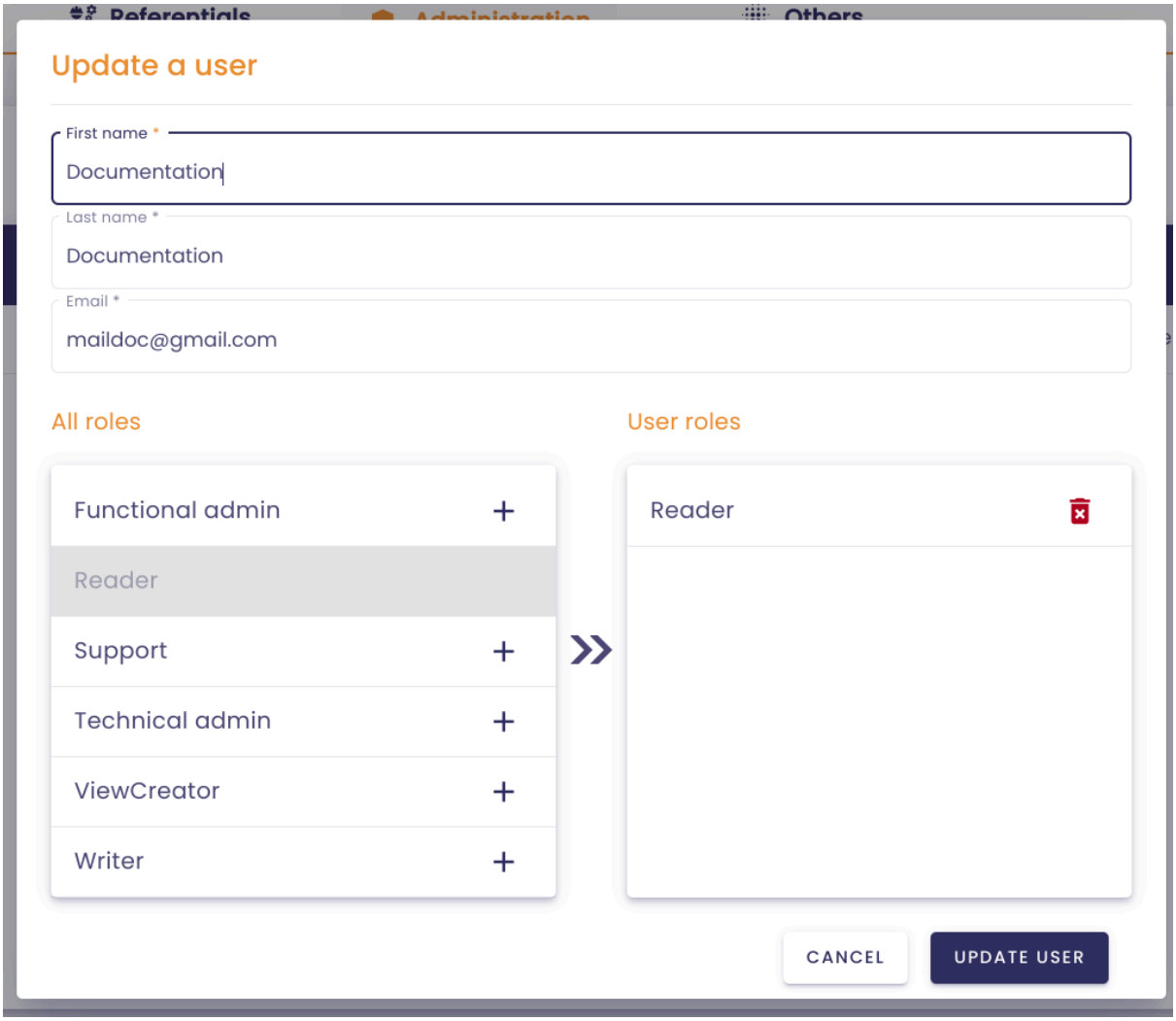


The user listing screen is displayed.

In the **Actions** column, a button allows you to edit users.



Click on the button. The user's editing window is displayed.



Several fields are displayed :

- First name (required)

- Last name (required)
- Email (required)

Note : For users in the **Global Support** role, these values cannot be changed.

Note : It is not possible to edit a user with the same email address as another existing user.

You can change the roles assigned to the user.

The possible roles are as follows :

- Reader : read access to the io-base portal
- Functional Admin :
    - read access to the io-base portal
    - access to the Forms module
    - access to the administration area
    - access to the administration of repositories
- Support: reserved for people who need to access the portal for support purposes
- Technical Admin: reserved for technical administrators
- Writer: necessary to have writing rights in the Indaba database.

Note : the Writer and Reader roles alone are not sufficient to view the metrics values or add data. They must be completed by the **Permissions** set on the metrics.

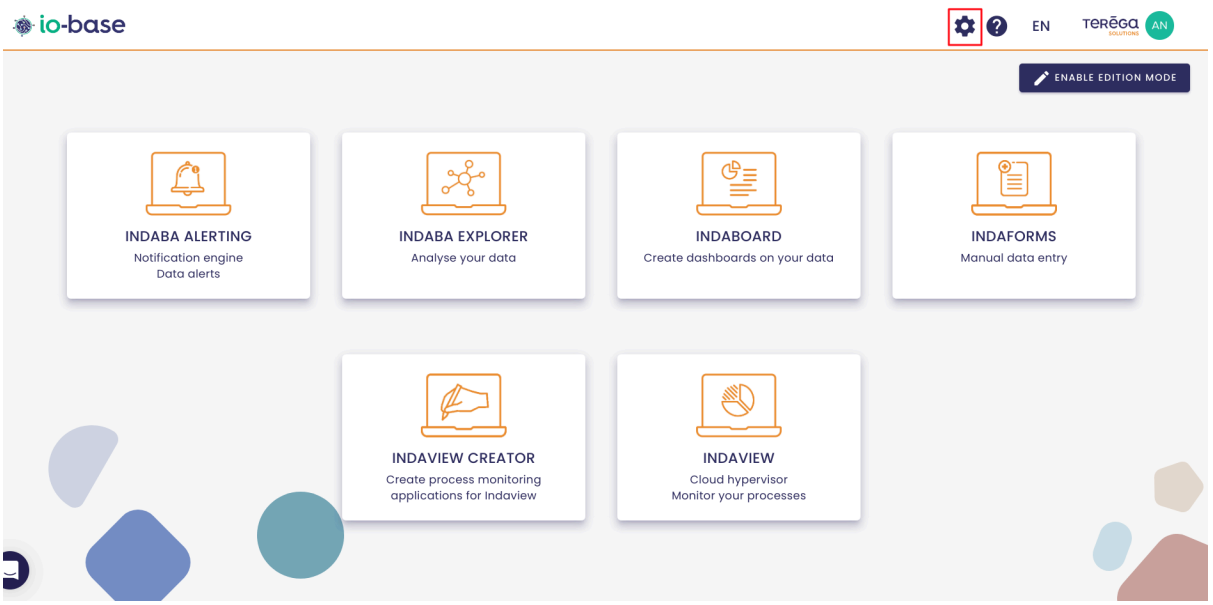
For more details on **Permissions**, refer to the dedicated articles in the section Permissions (metrics rights)

Once you have made the desired changes, click **Update User** to confirm.

9.4 Deleting a user

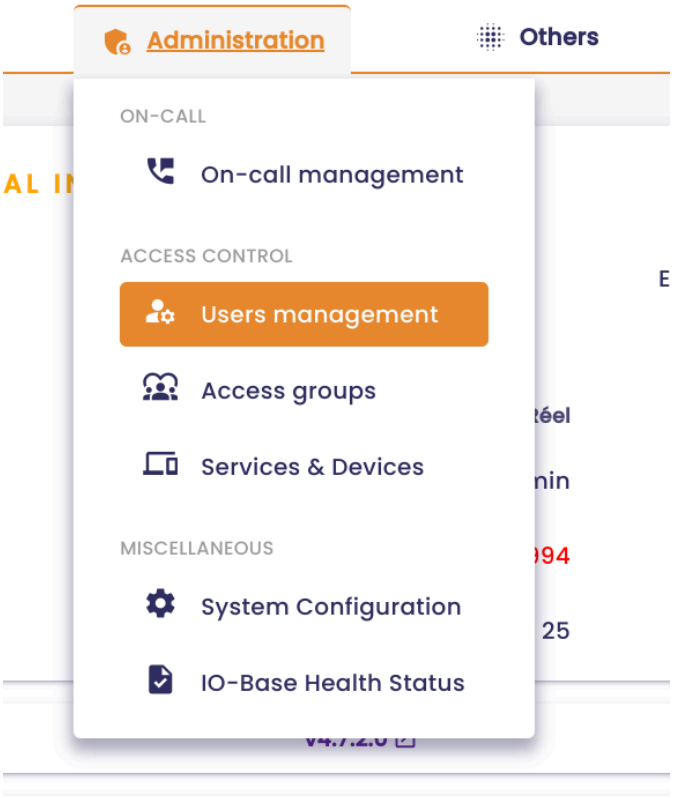
Prerequisite: This feature is available to users with the Functional Administrator role.

Login to **Io-base**, and click the button at the top right of your screen, highlighted below :



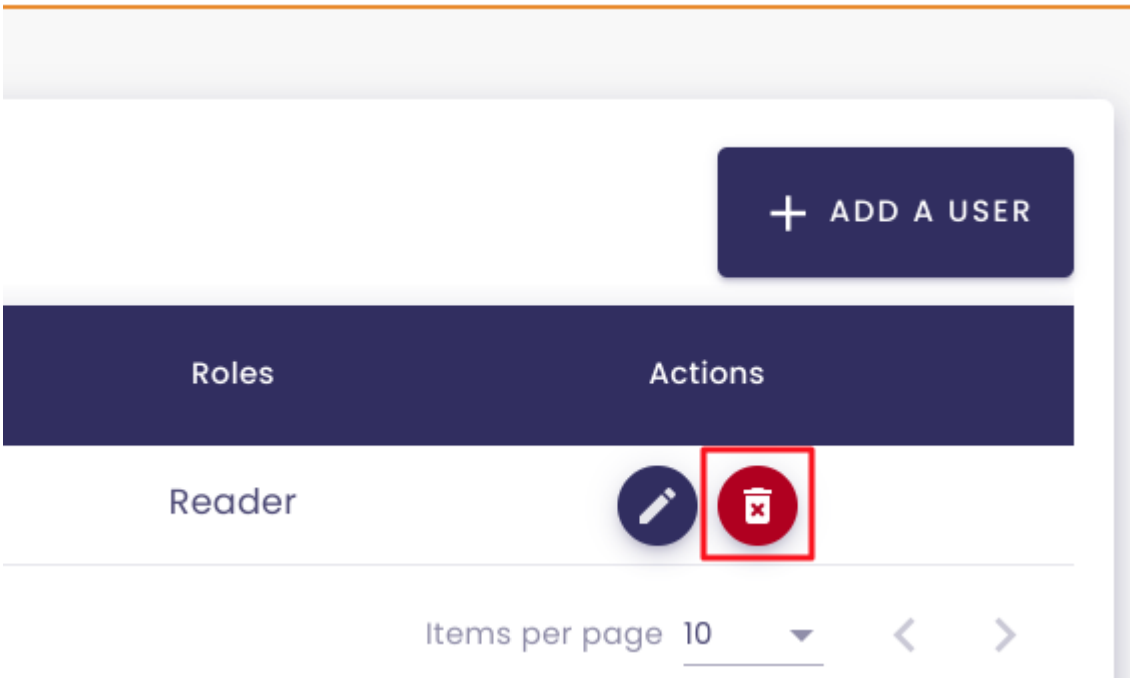
The Io-base administration page opens.

Go to the **Administration/Users management** menu.

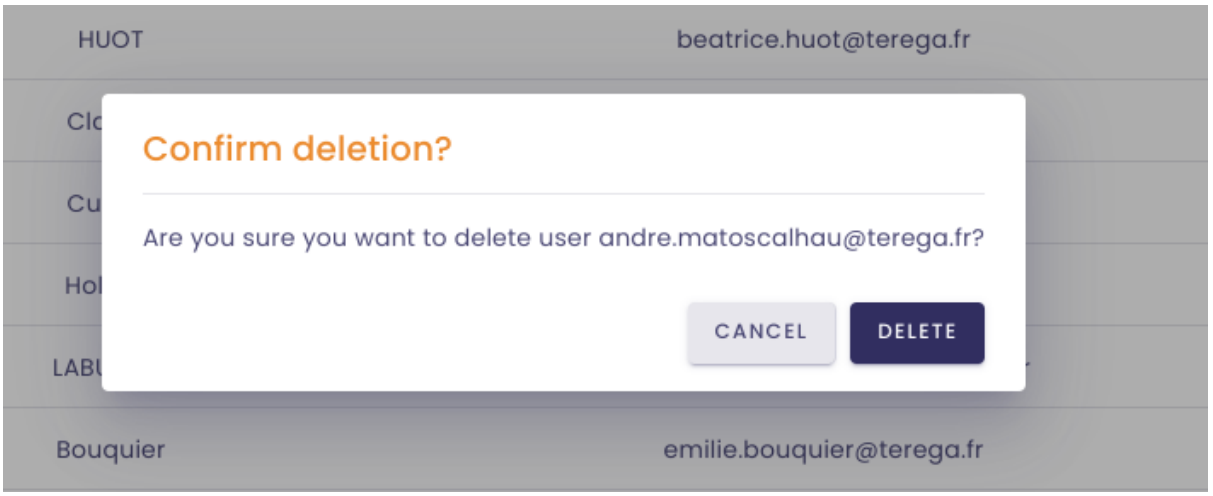


The user listing screen is displayed.

In the **Actions** column, a button allows you to delete a user.



Click on the button. A confirmation message appears.



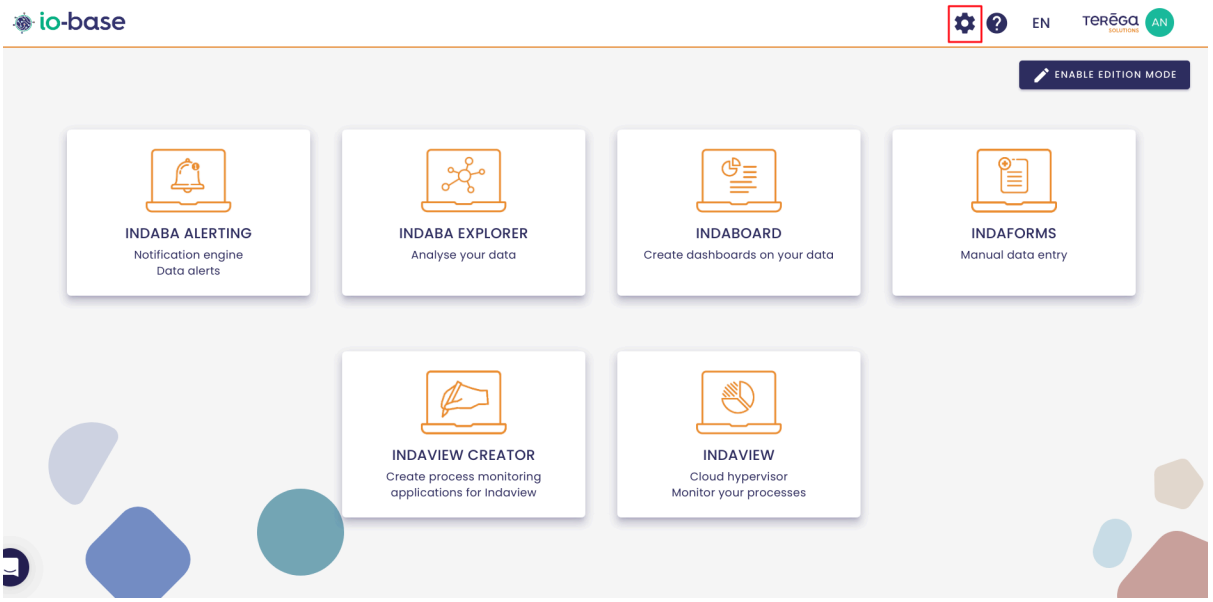
Click on **Delete** to confirm the deletion.

10. User groups management

10.1 Create a group

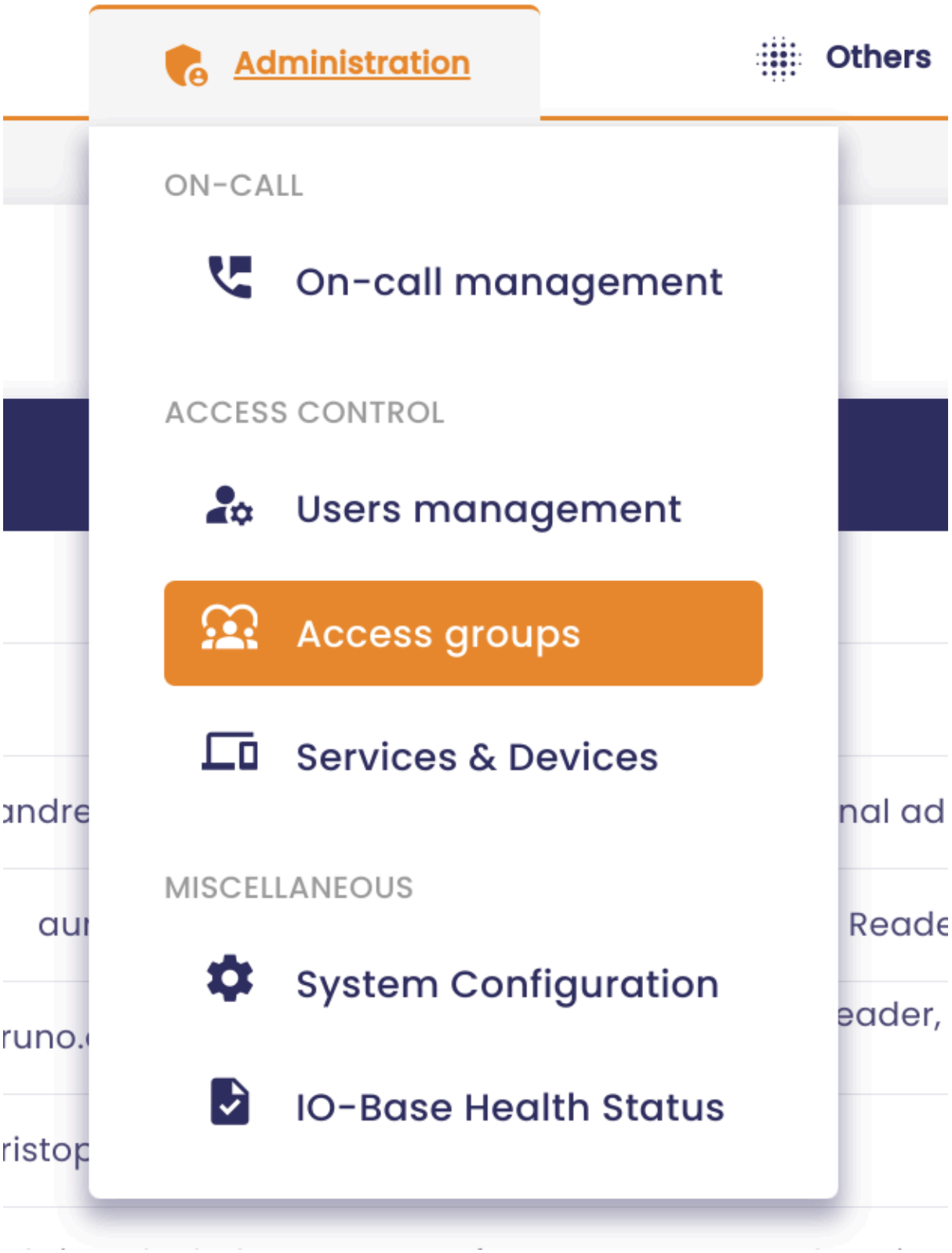
Prerequisite : This feature is available for users with a functional administrator role.

Login to **Io-base**, and click the button at the top right of your screen, highlighted below :



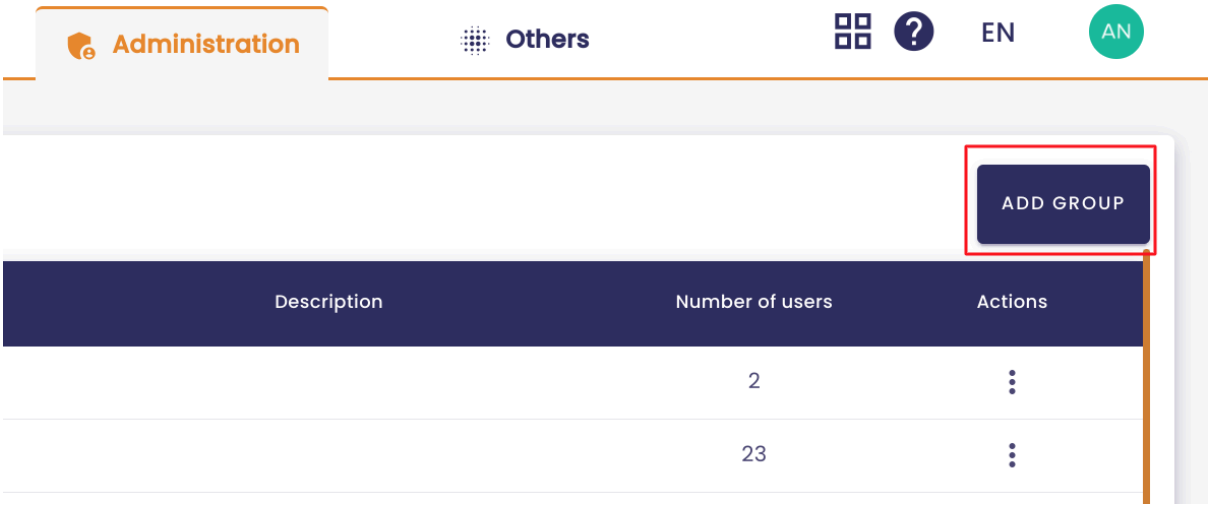
The Io-base administration page opens.

Go to the **Administration/Access Groups** menu.

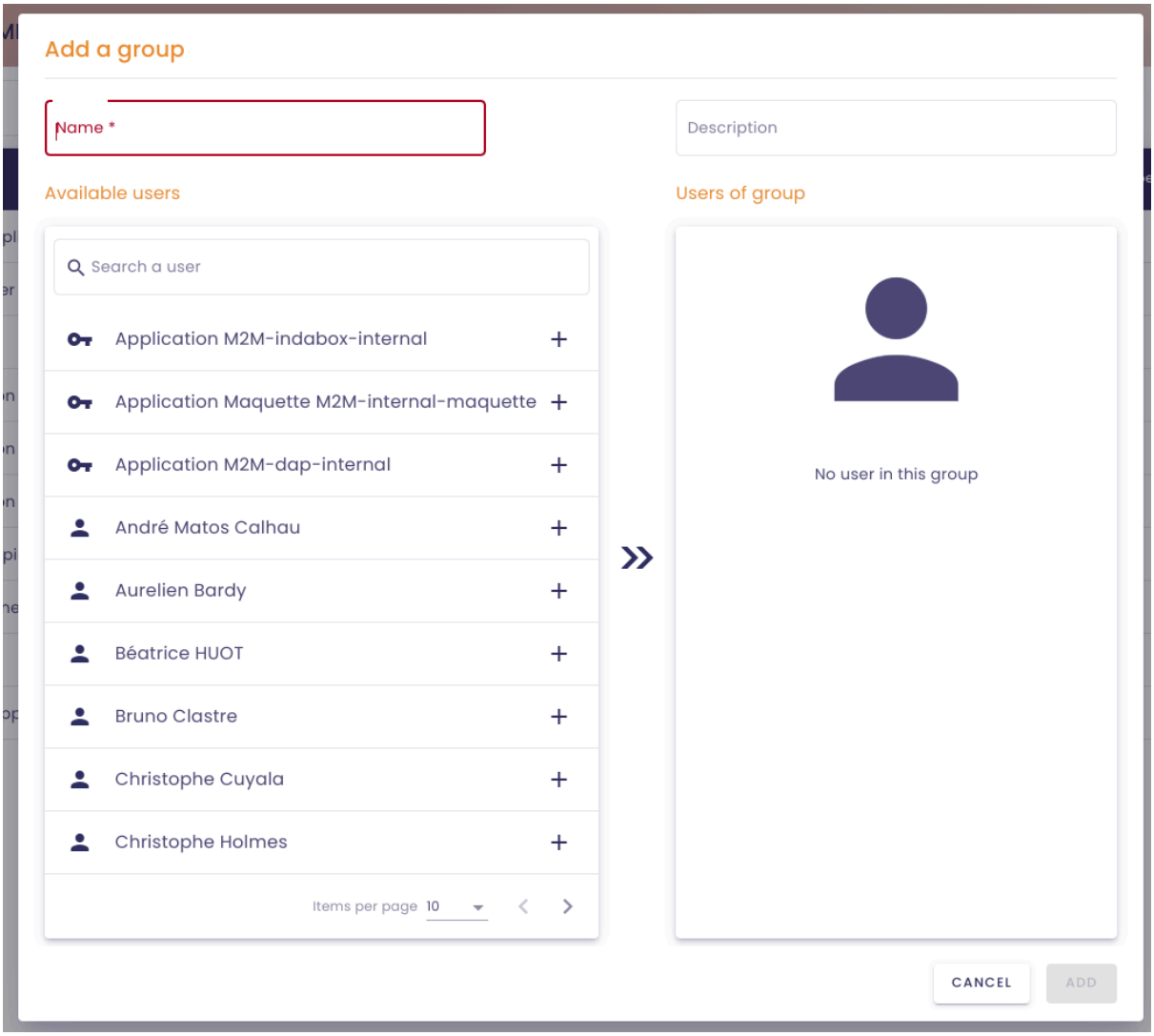


A list of the existing groups appears.

Click on **Add group**.



The "**Add a group**" pop-up window opens.



Specify the following informations :

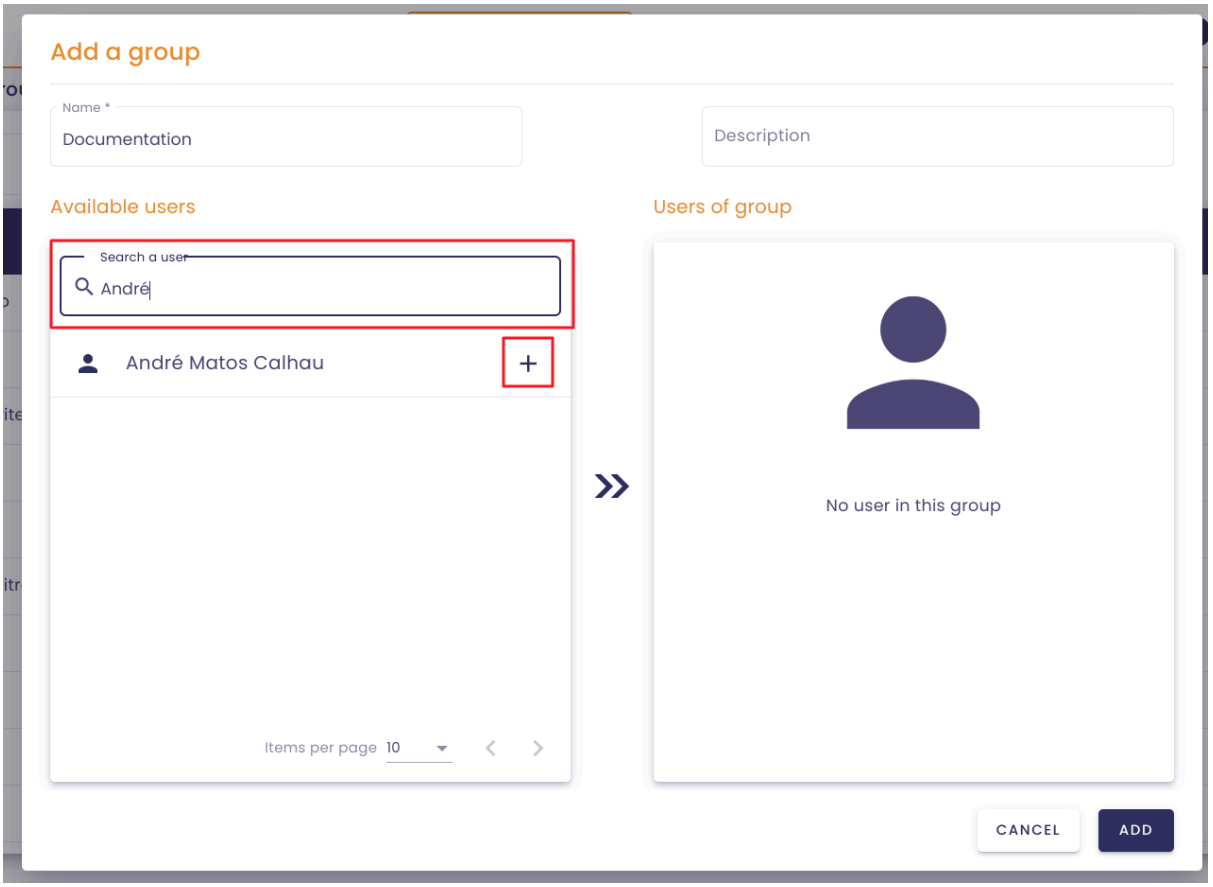
- a name (mandatory)

- a description (optional)

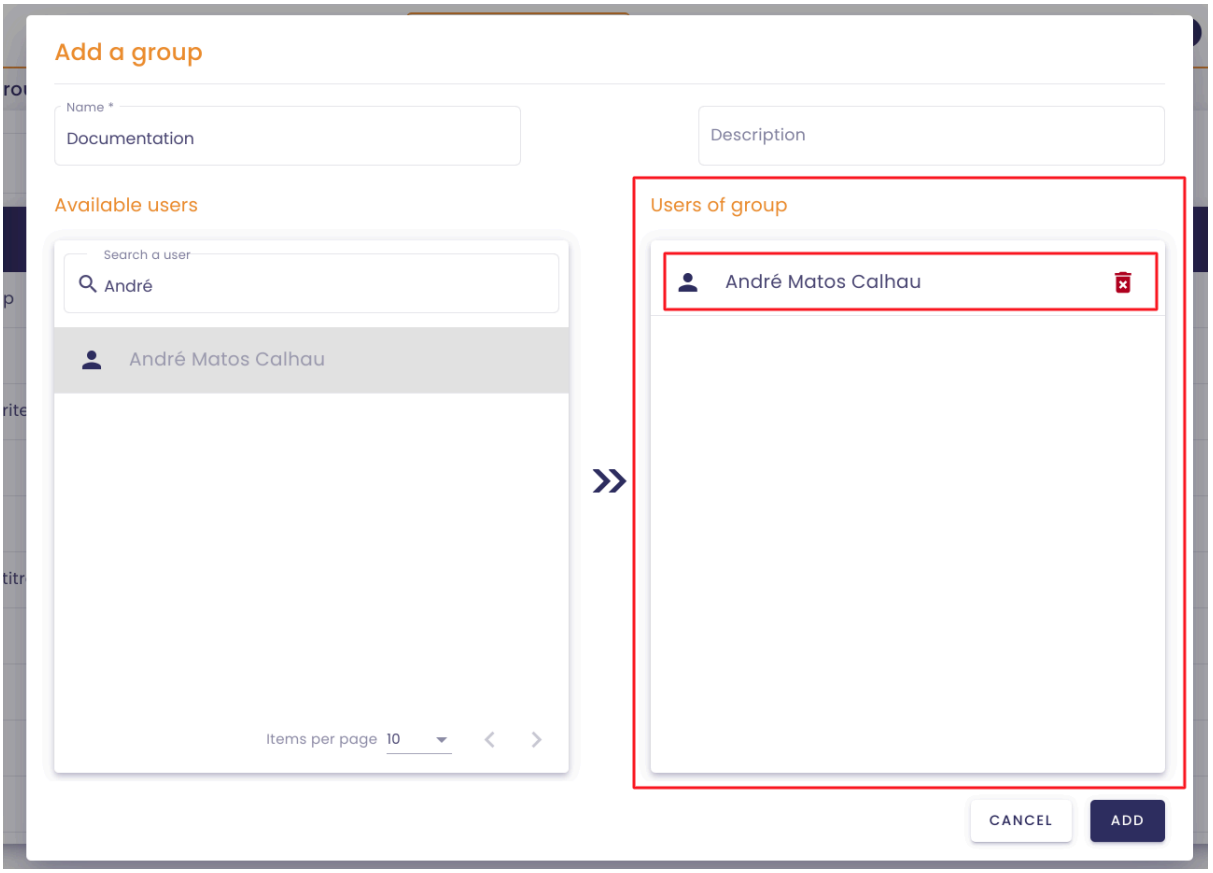
- The list of users associated with the group

The left column allows you to select the user(s) of your choice, by clicking on the "**+**" button.

Note : To find the desired user, a search area is at your disposal.



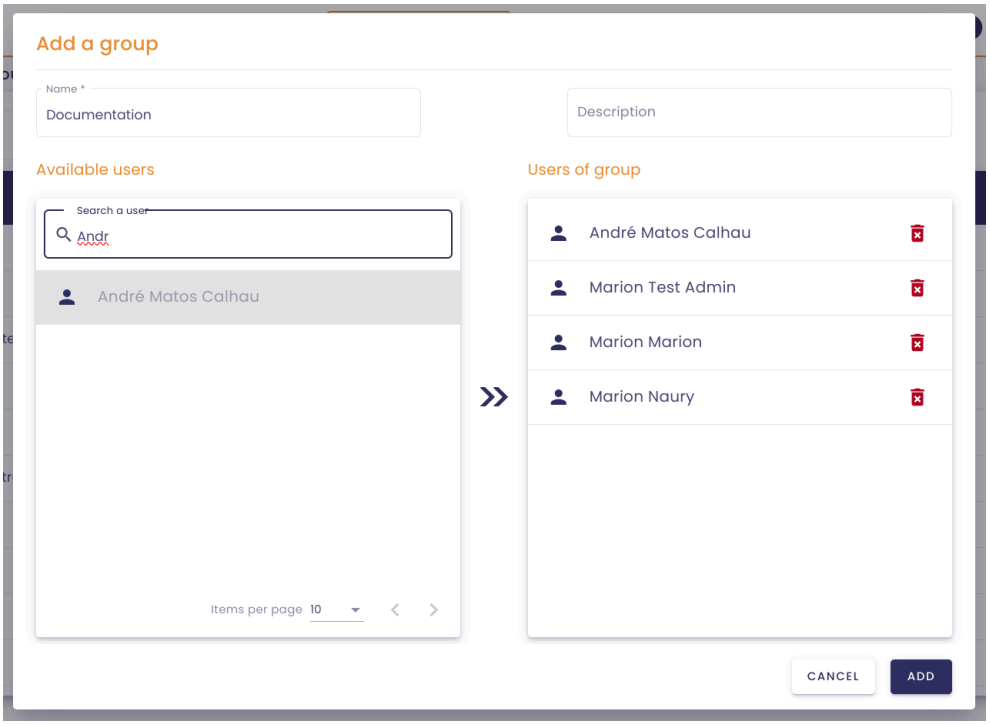
Once the user is selected, he appears on the right column.



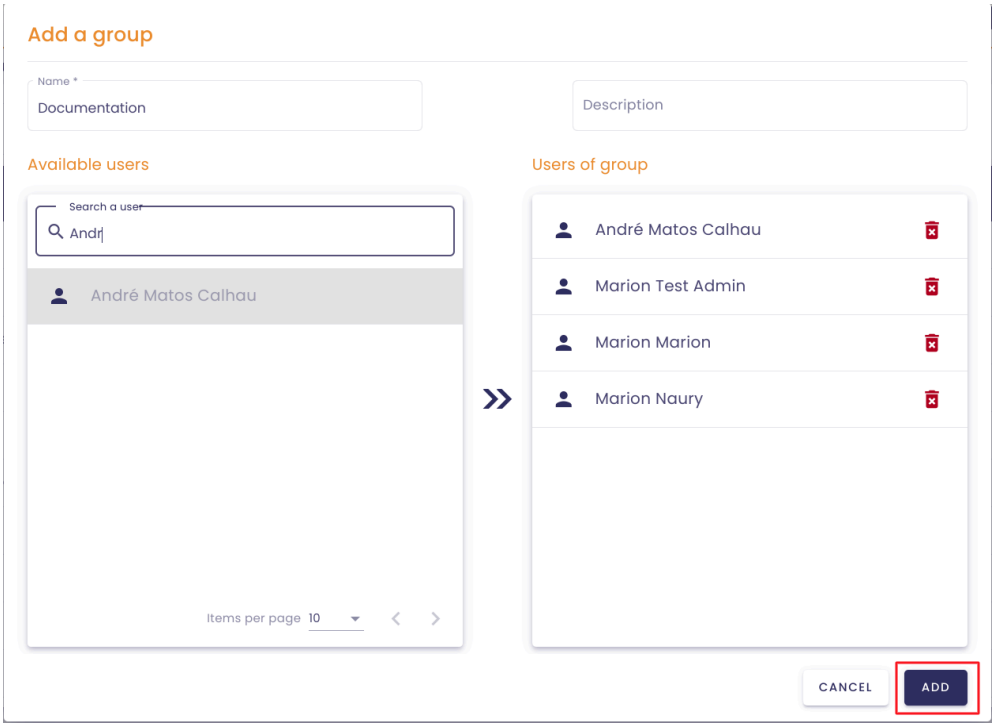
Note : to cancel the selection of a user, click on the

button.

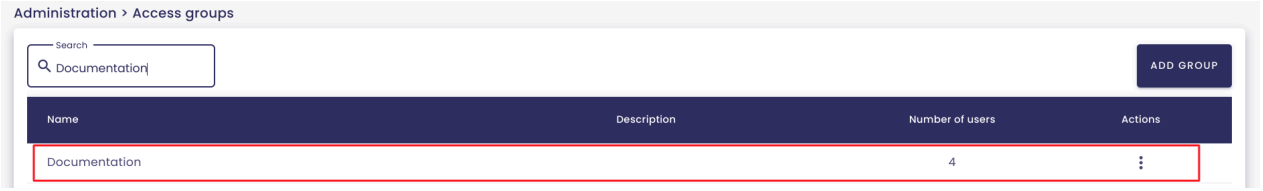
Note : You can add as many users as you want.



Once all the users you need are selected, click on **Add**.



A new group is created and appears in the groups list.



10.2 Edit a group

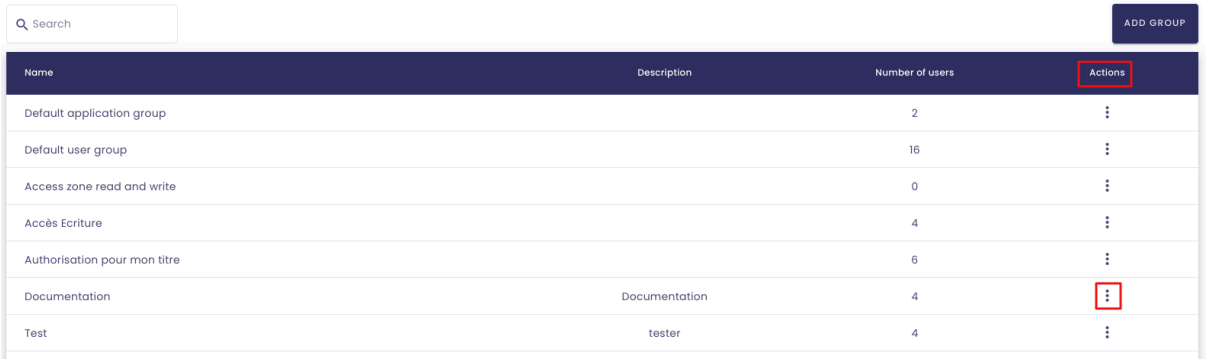
Prerequisite : This feature is available for users with a functional administrator role.

Connect to the Io-base portal and access the **Administration/Access Groups** menu.

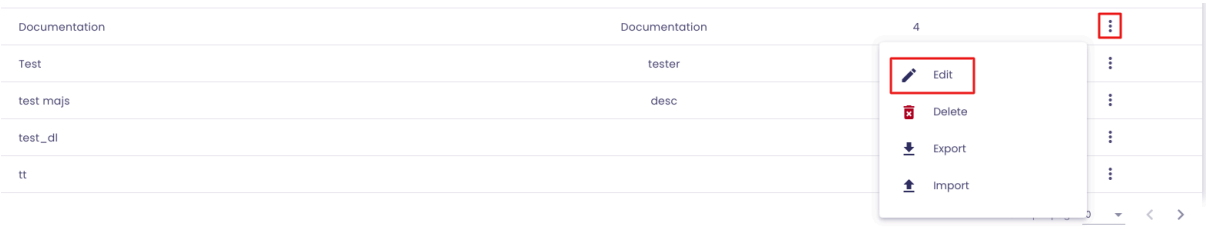
A list of the existing groups appears.

To edit a group, click on the

button, in the **Actions** column.

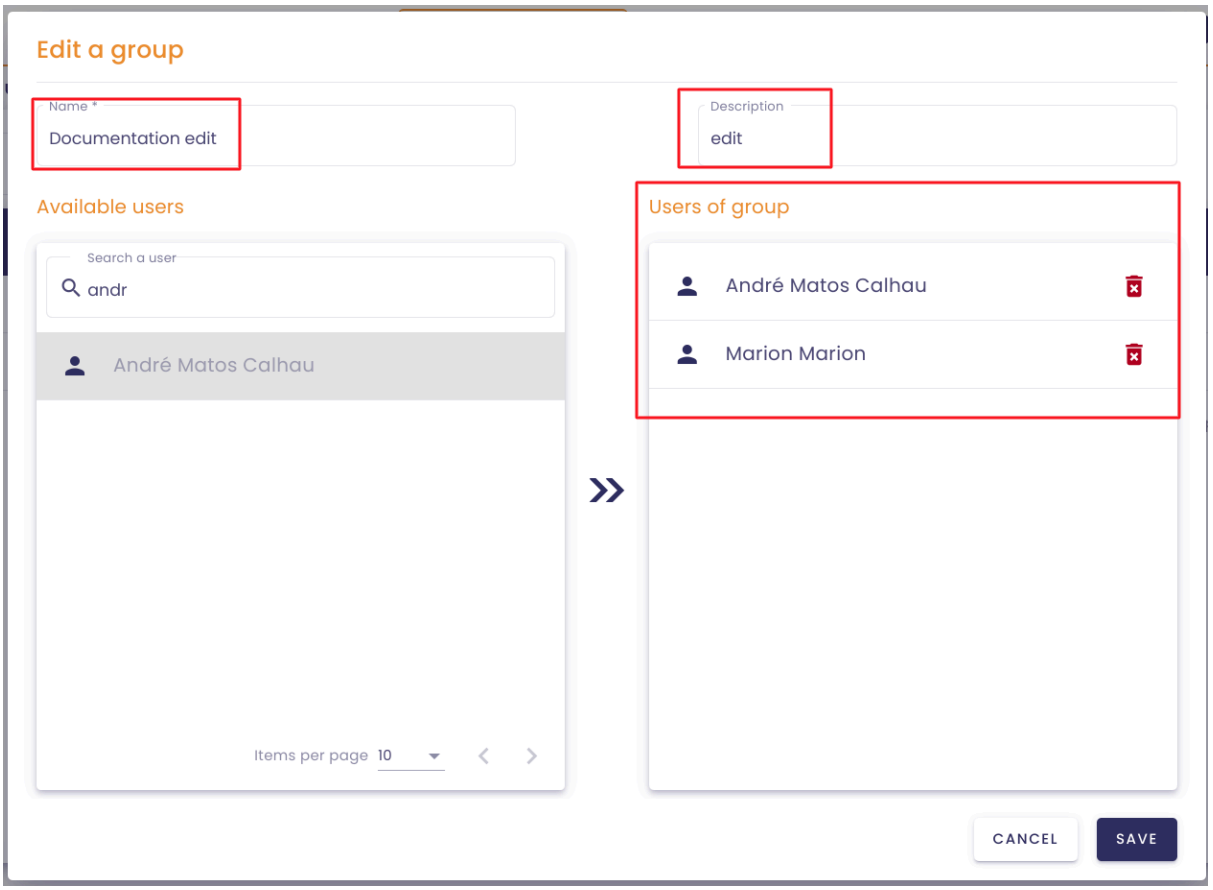


Then, click on **Edit**.

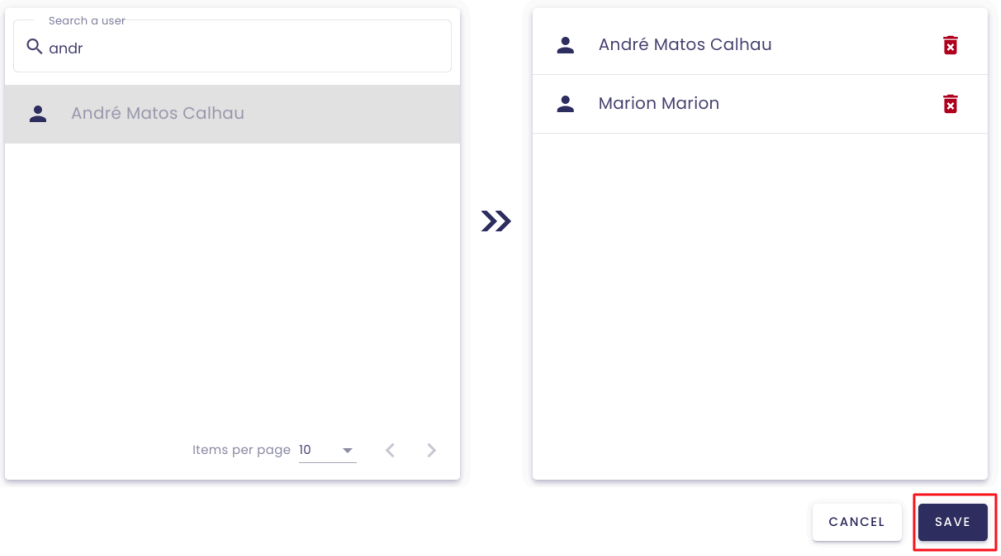


The “**Edit a group**” window appears.

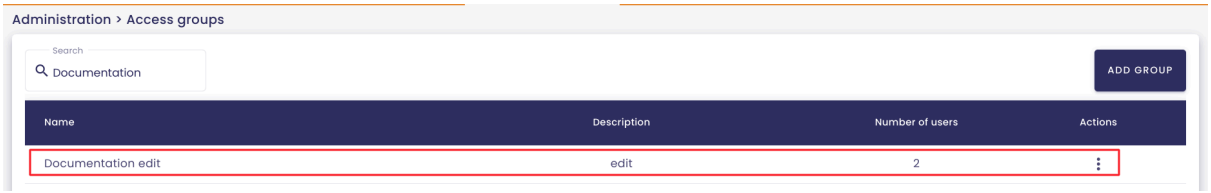
You can change the name, description and users associated with the group.



Once the modifications are made, click on **Save**.



The modifications are saved.



10.3 Delete a group

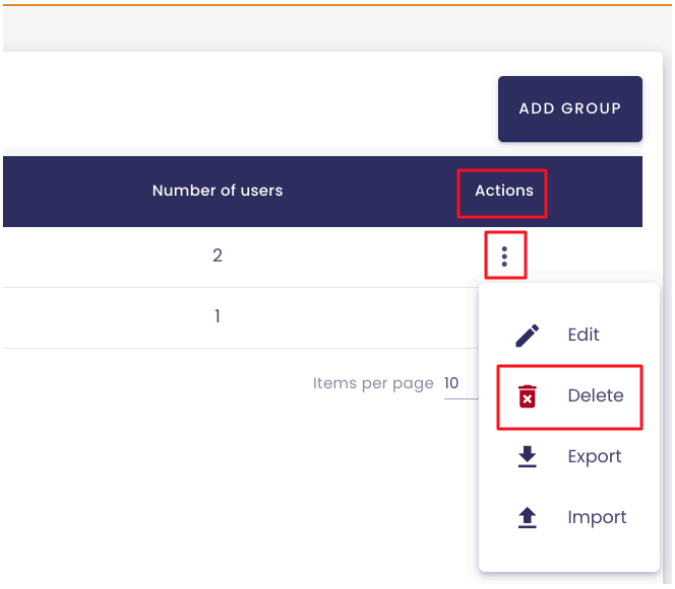
Prerequisite: This feature is available for users with a functional administrator role.

Connect to the Io-base portal and access the **Administration / Groups** menu.

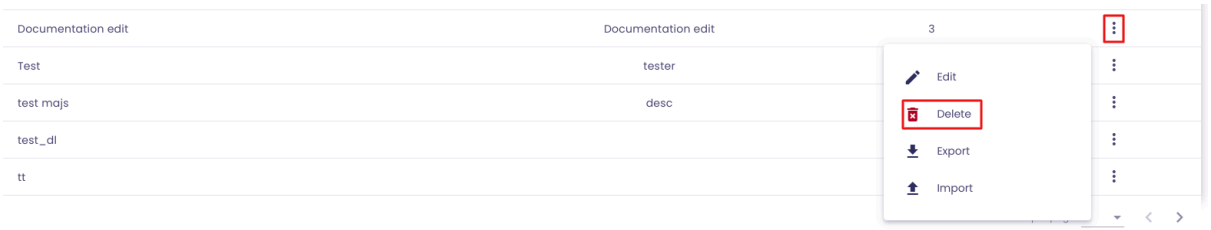
A list of the existing groups appears.

To delete a group, click on the

button, in the **Actions** column.

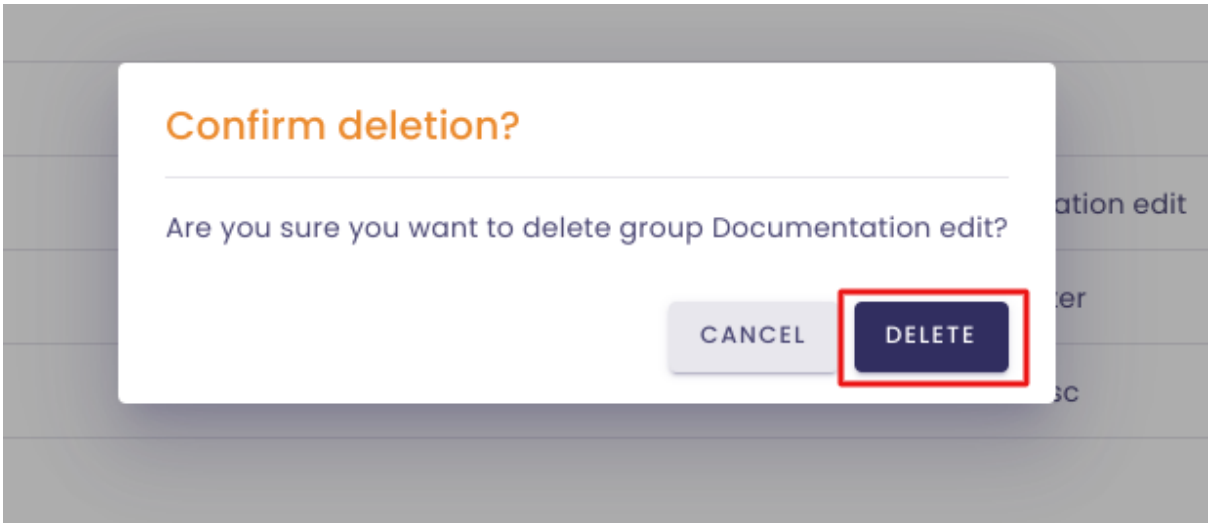


Then, click on **Delete**.



A confirmation message appears.

To confirm the deletion, click on **Delete**.



The group is deleted and no longer appears in the groups' list.

10.4 Import/export groups

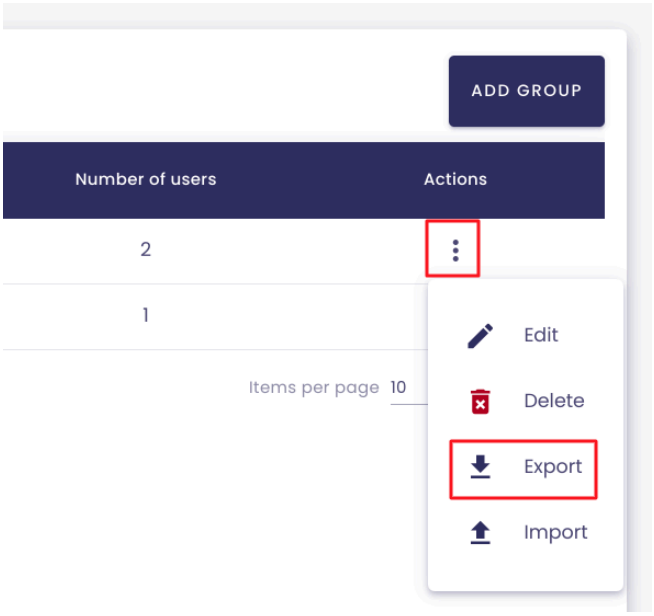
Prerequisite : This feature is available for users with a functional administrator role.

10.4.1 Export a group

Connect to the Io-base portal and access the **Administration/Access Groups** menu.

You can export the properties of a group in an Excel file.

In the **Actions** column, click on **Export**.

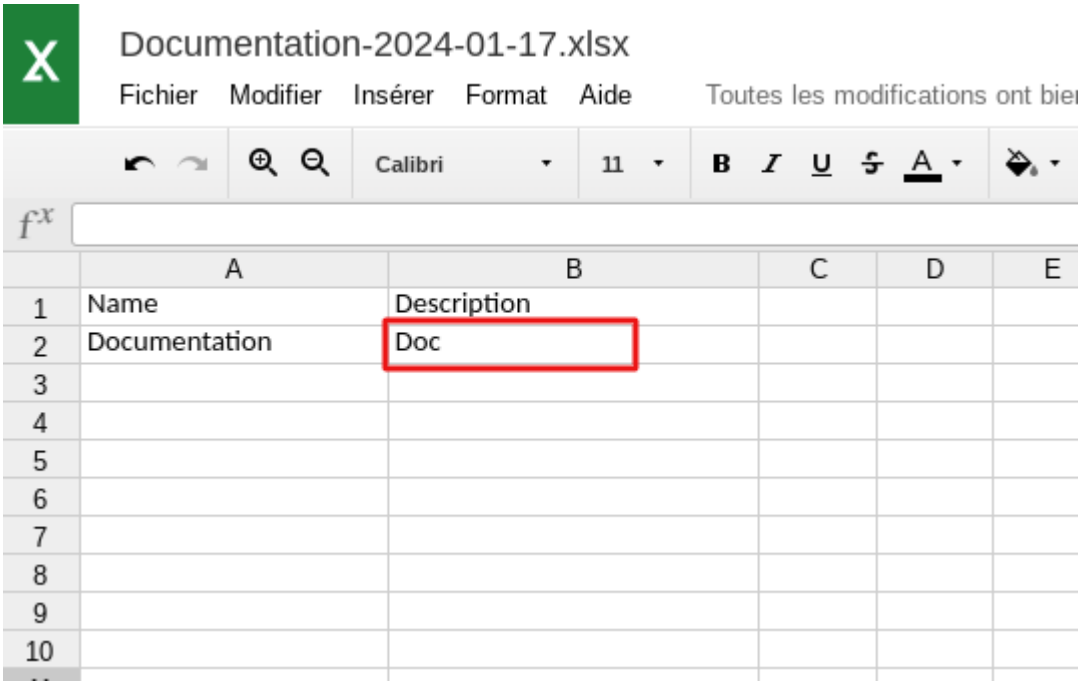


An excel file is generated.

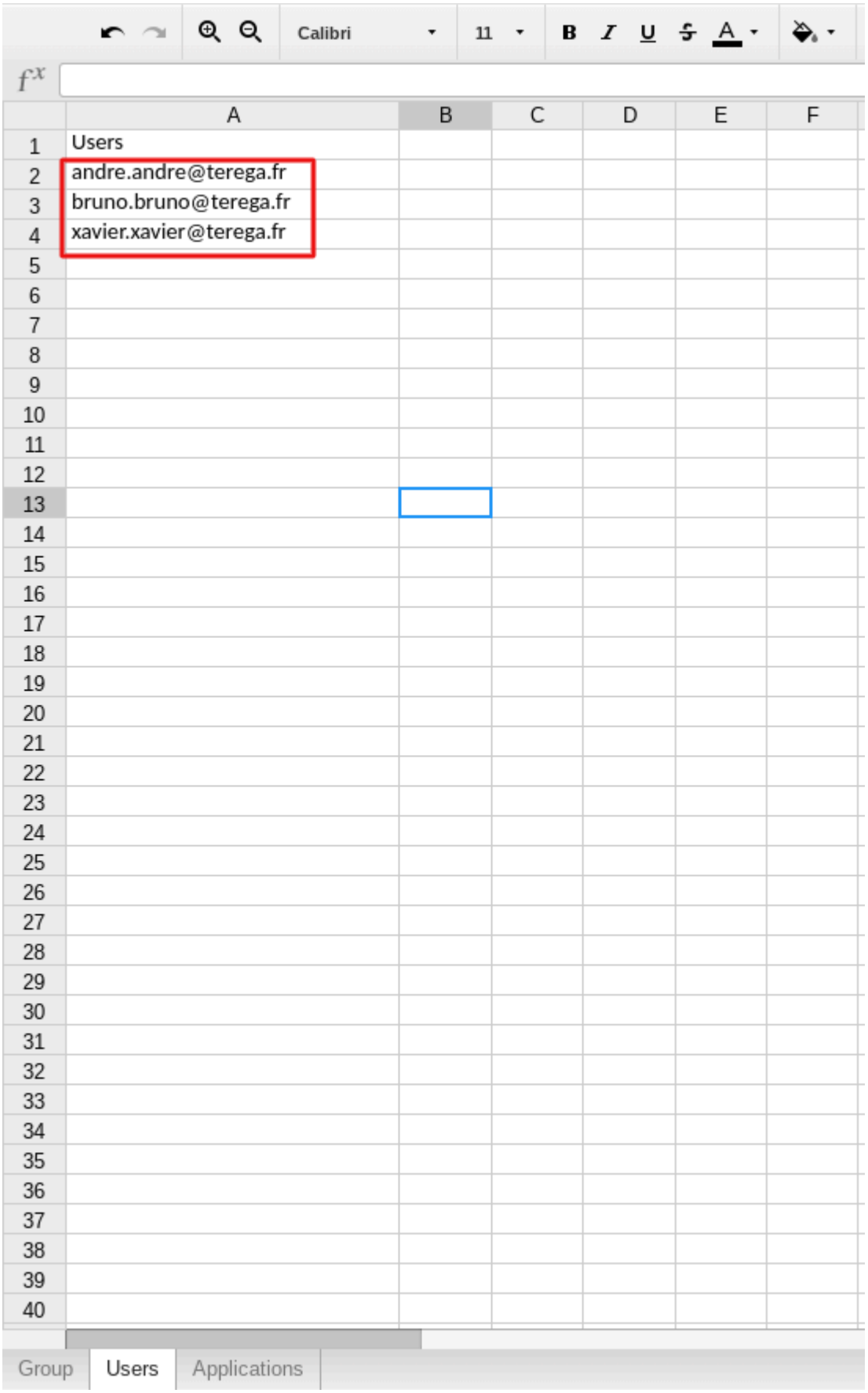
It contains :

- the name of the group

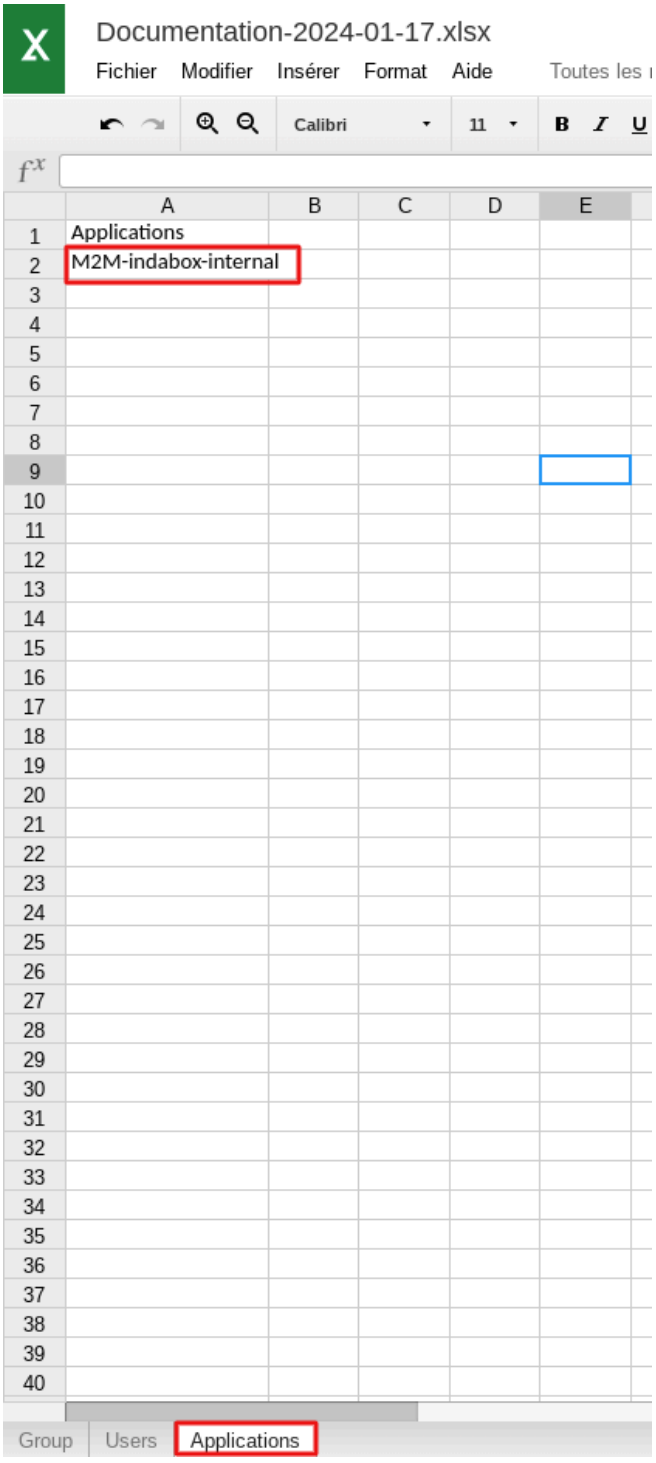
- the group's description (optional)



- The users associated with the group (if there are any)


Calibri
11
A
B
C
D
E
F
1 Users
2 andre.andre@terega.fr
3 bruno.bruno@terega.fr
4 xavier.xavier@terega.fr
Group
Users
Applications

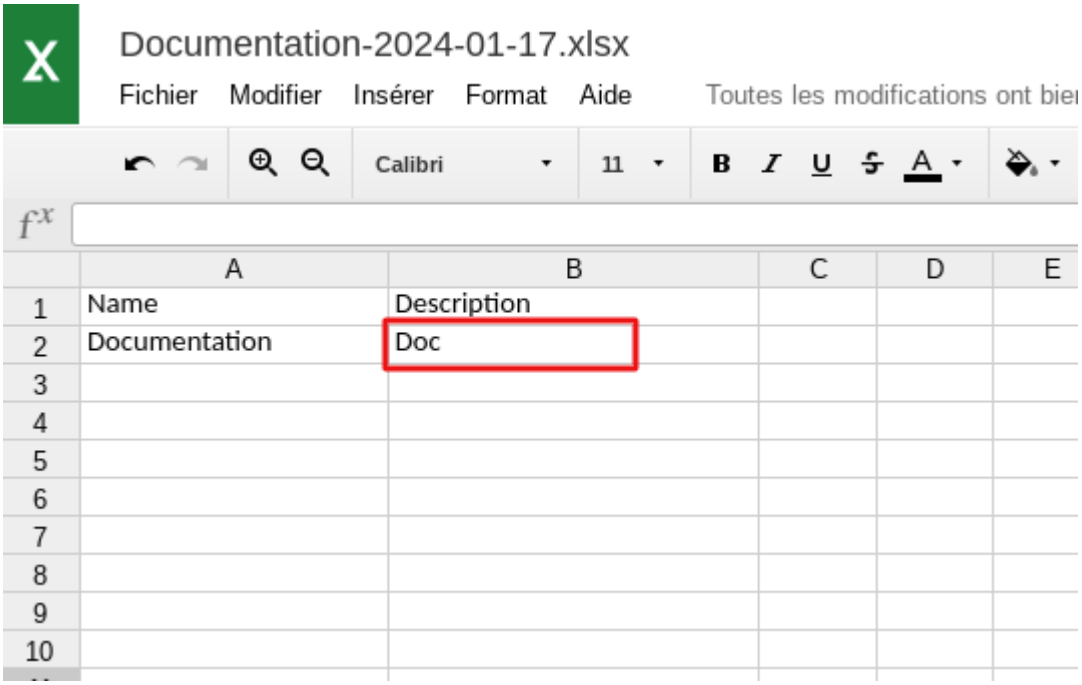
- applications associated with the group (if there are any)



10.4.2 Import a group

You can then complete/edit this Excel file and import it to update the group.

You can edit the description of the group :



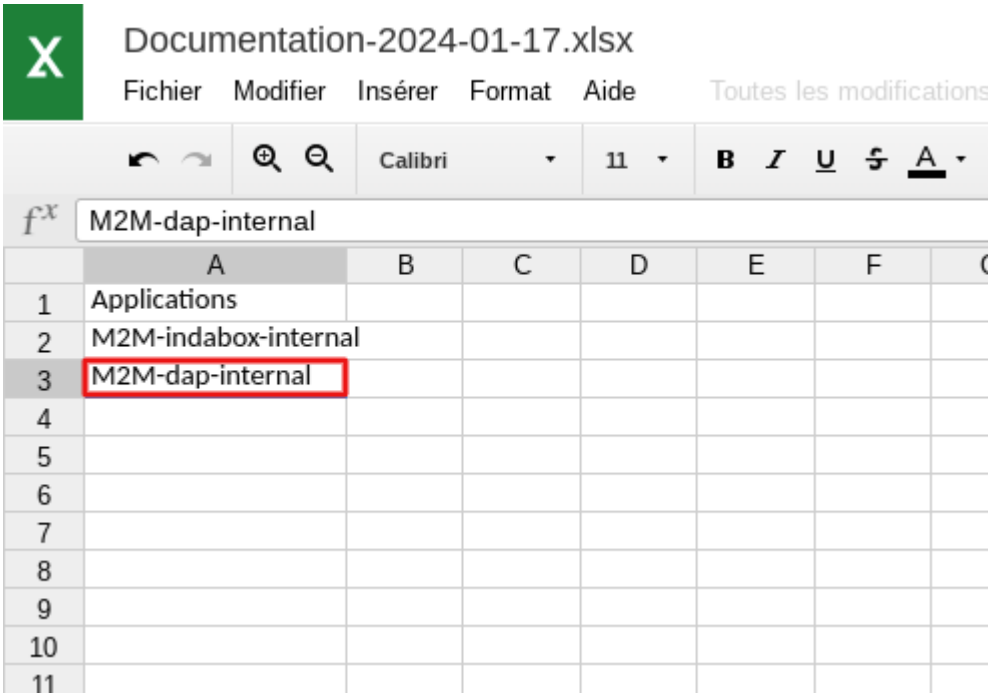
Note : You cannot change the name of the group with an import.

You can also add (or remove) users or applications to the group :

To add a user, enter their email address in the '**Users**' sheet :


Calibri
11
A
B
Users
andre.andre@terega.fr
bruno.bruno@terega.fr
xavier.xavier@terega.fr
marion.marion@terega.fr
Group
Users
Applications

To add an application, enter the **name** of the application in the **Applications** sheet :



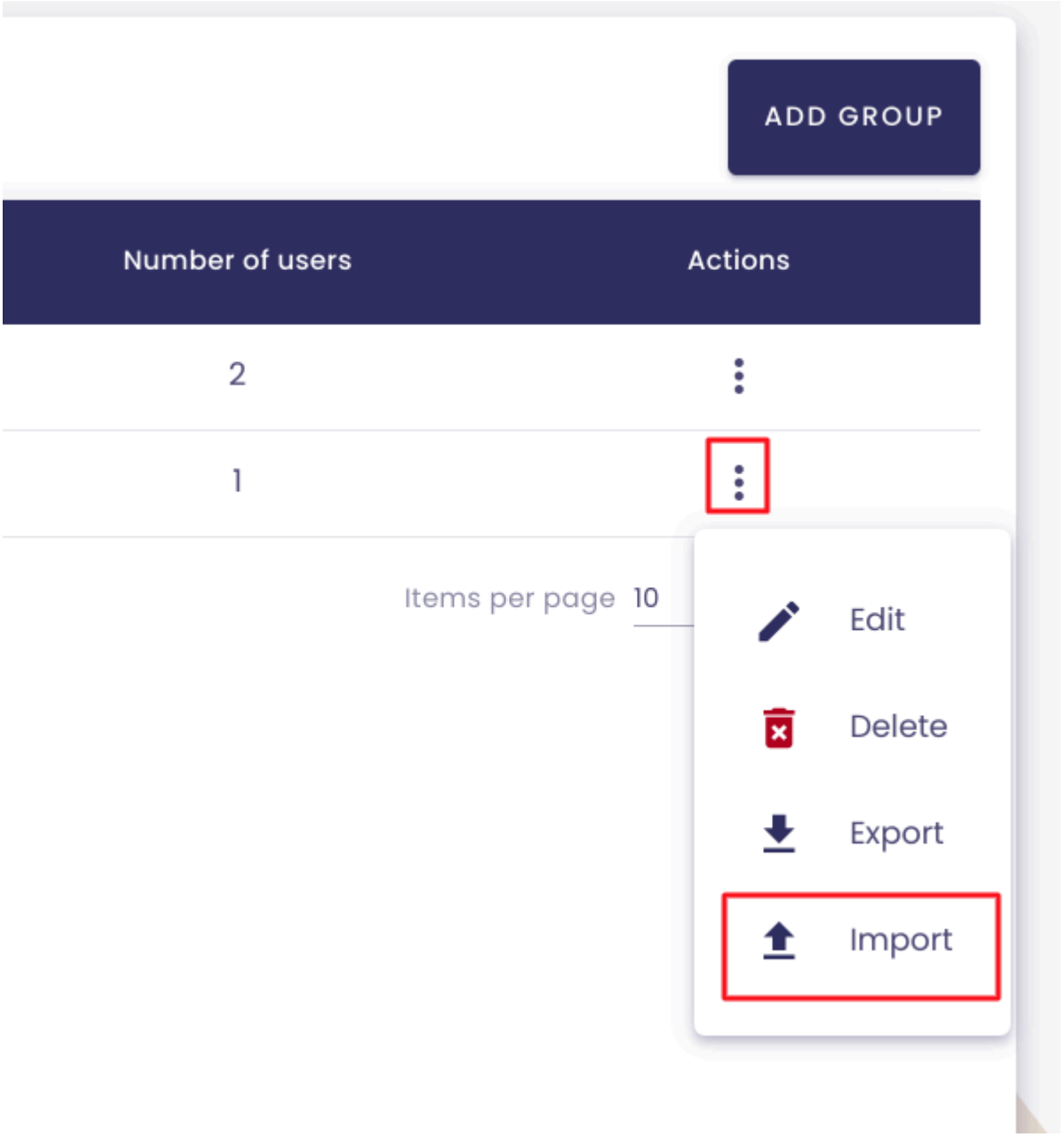
Note : To remove a user/application from the group, delete the line containing their email address/name.

Once you have made the necessary edits, save your file.

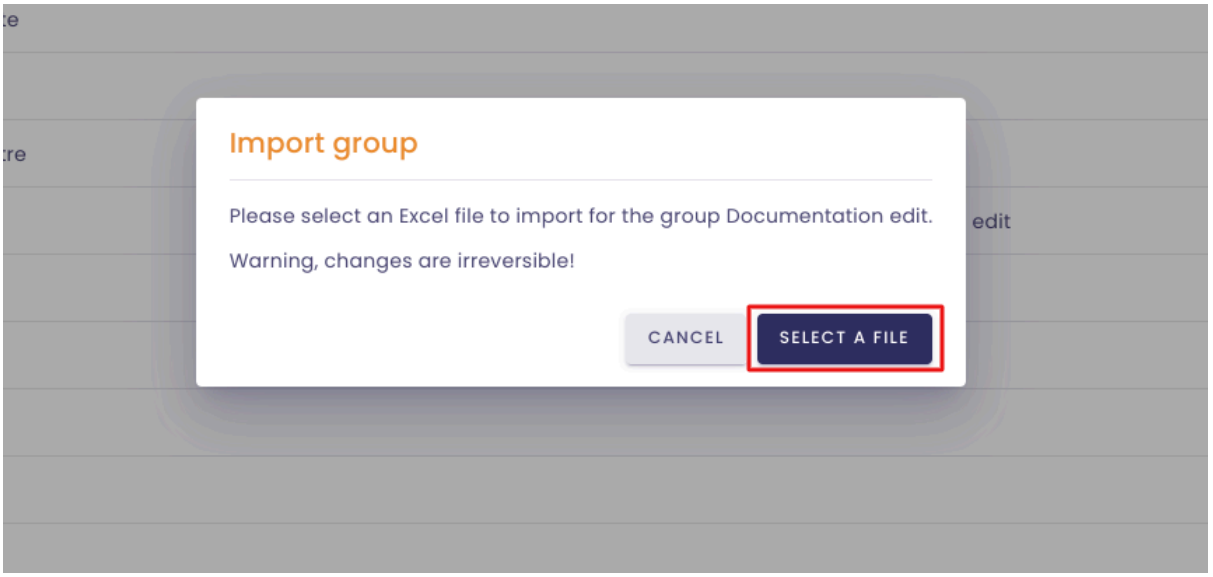
Go back to **Io-base** and access the **Administration/Groups** menu.

In the **Actions** column, click on

then, **Import**.

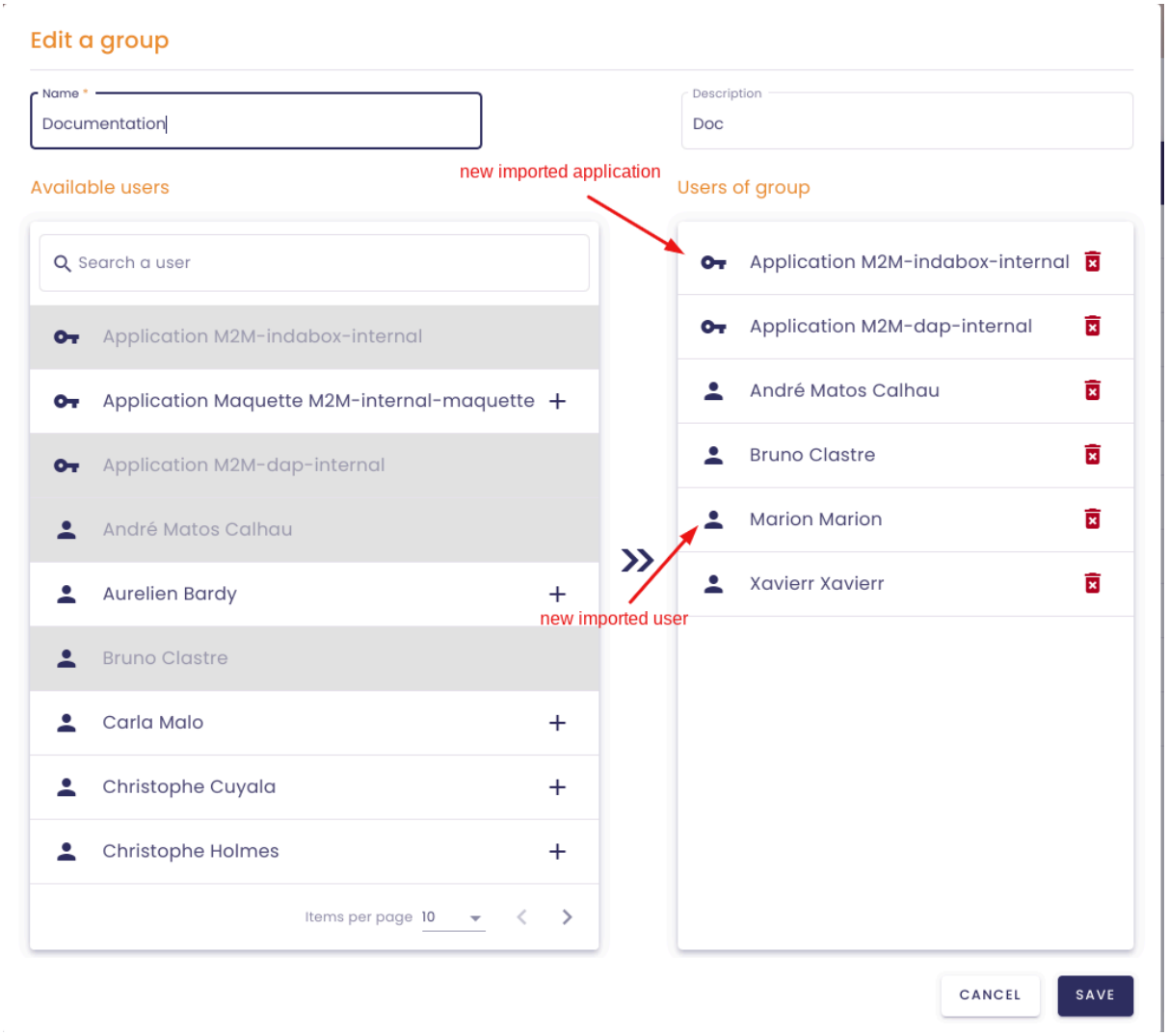


A pop-up window opens, click on **Select a file**.



Select the right Excel file.

The changes are applied to the group.


Edit a group
Name *
Documentation
Description
Doc
Available users
new imported application
Users of group
Search a user
Application M2M-indabox-internal
Application Maquette M2M-internal-maquette
Application M2M-dap-internal
André Matos Calhau
Aurelien Bardy
Bruno Clastre
Carla Malo
Christophe Cuyala
Christophe Holmes
Items per page 10
Application M2M-indabox-internal
Application M2M-dap-internal
André Matos Calhau
Bruno Clastre
Marion Marion
Xavierr Xavierr
new imported user
CANCEL
SAVE