io-base
value-added data

TERĒGA
SOLUTIONS

Metrics and referentials management

User documentation

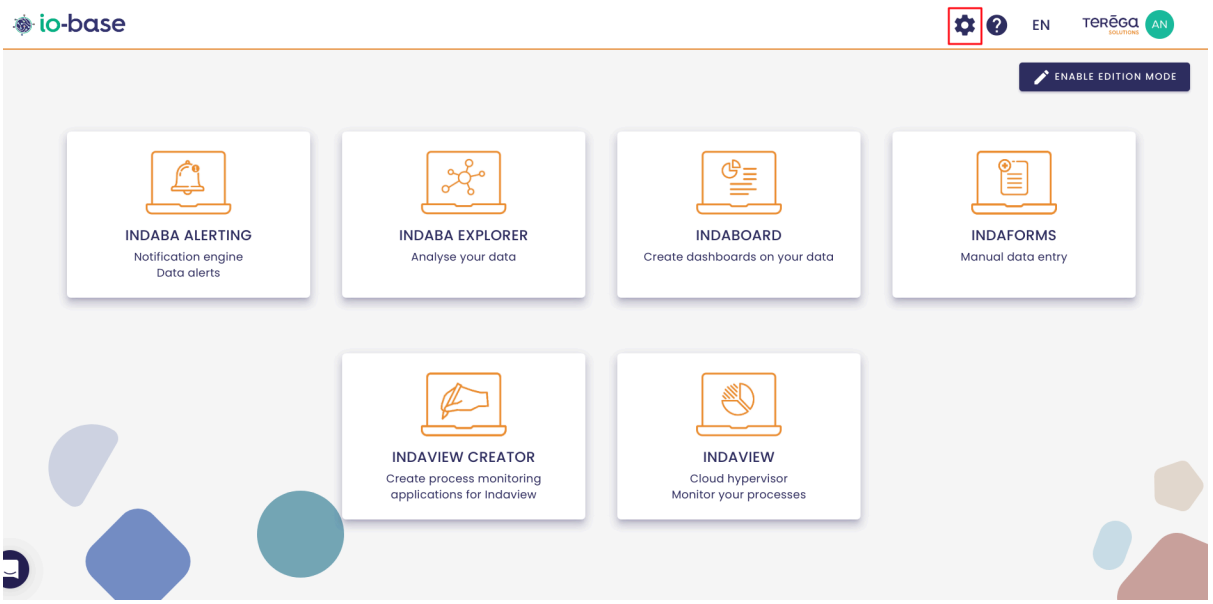
Content

1. Metrics Management

1.1 Metrics referential configuration

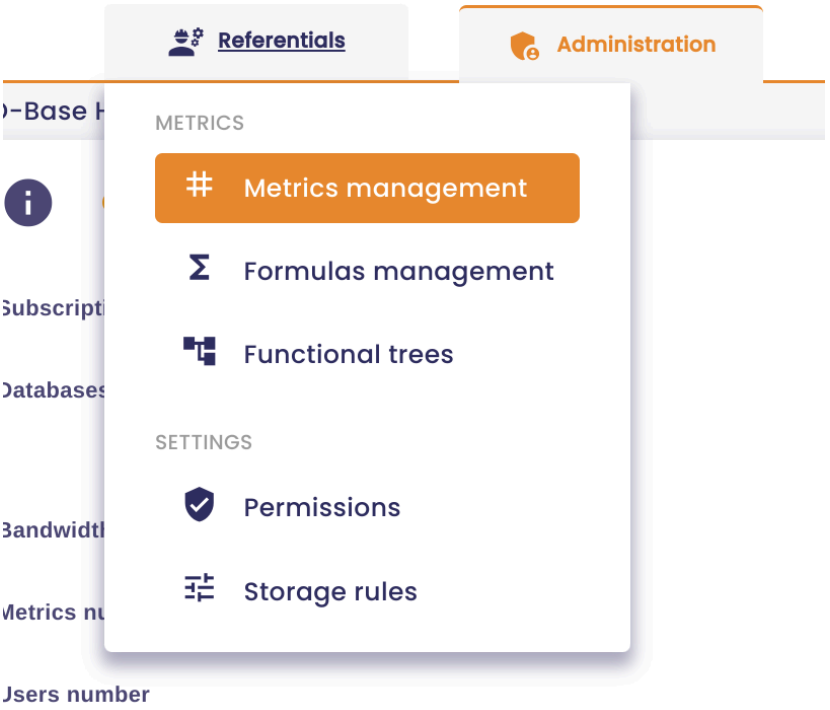
Prerequisites : this feature is available for users with a Functional Administrator role.

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

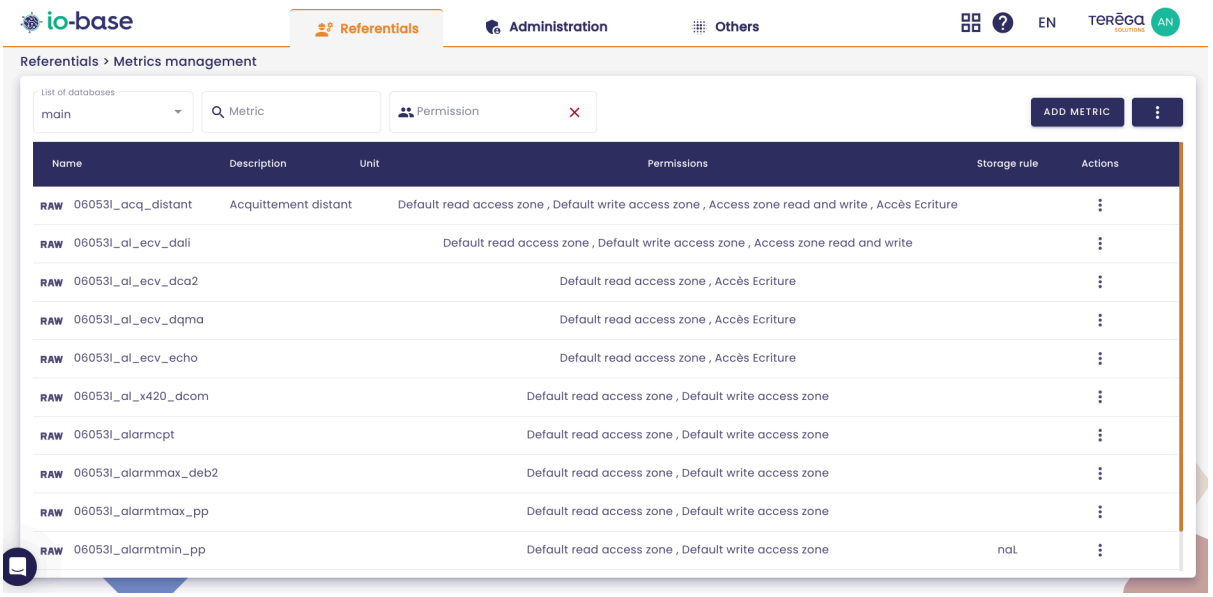


The Io-base administration page opens.

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



The list of the metrics is displayed.



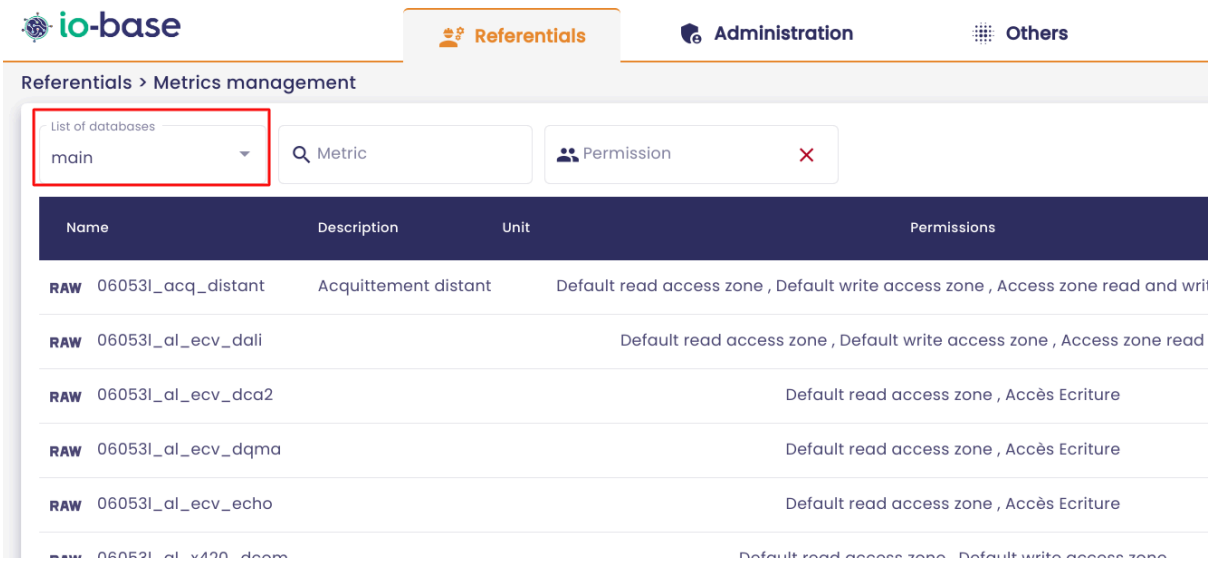
Note : The metrics list is displayed regardless of the functional trees.

1.1.1 Visualization and search of metrics

Above the metrics board, a drop-down list allows you to choose the database you need.

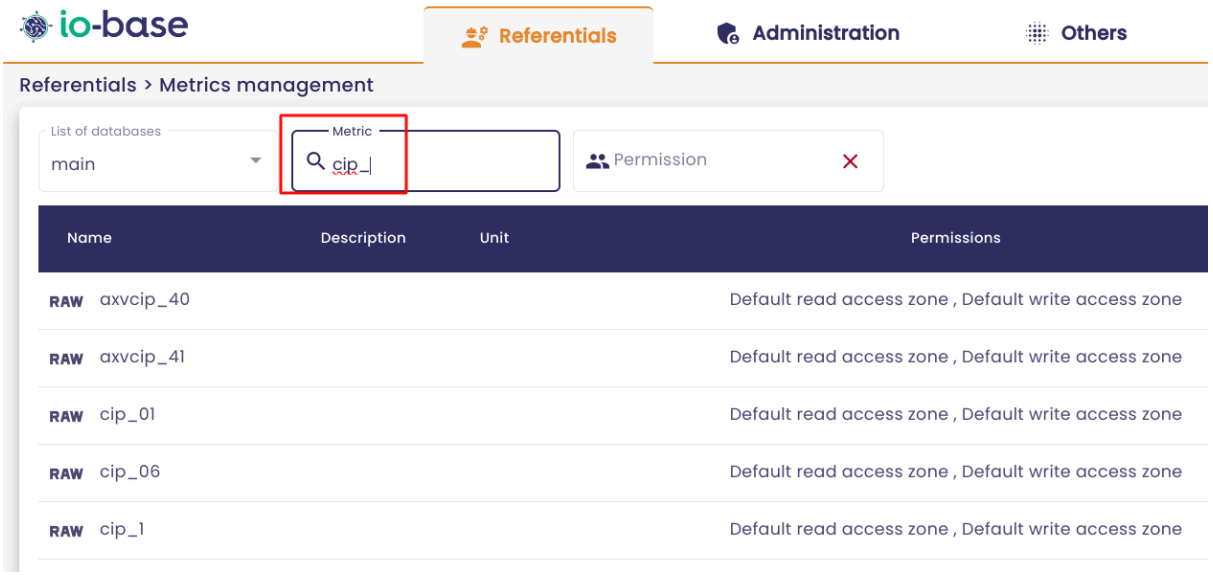
Once the database is selected, the metrics list is updated.

Note : Usually, the production database is called **prod**.



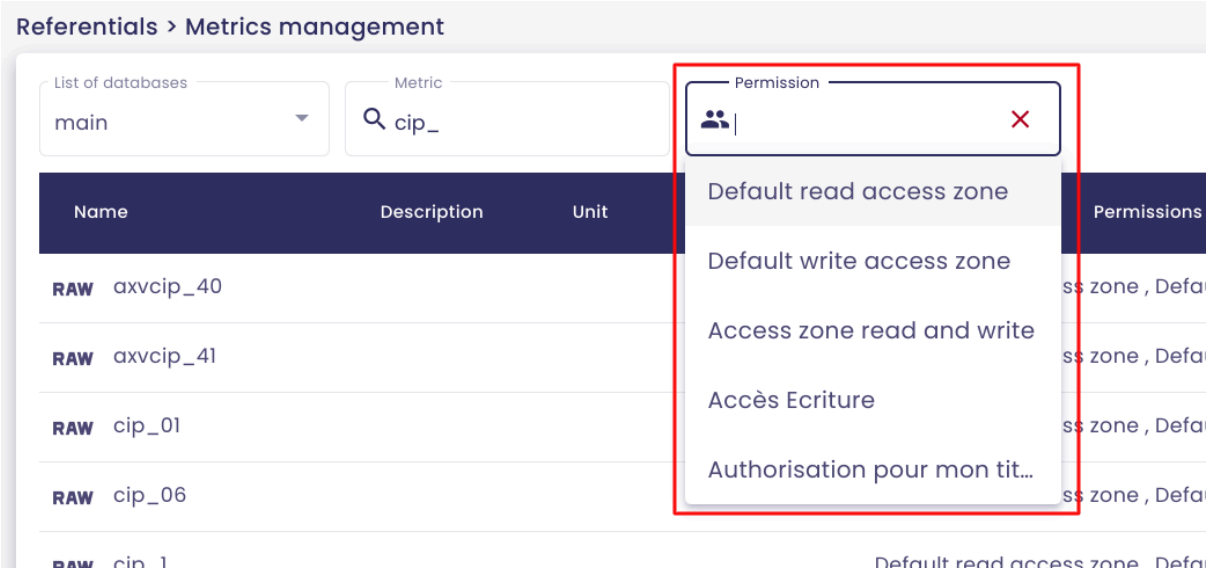
A search area is also available above the table to help you to find the metric you are looking for.

When the text is entered, the table is updated.



A drop-down list allows you to select a permission and display all its associated

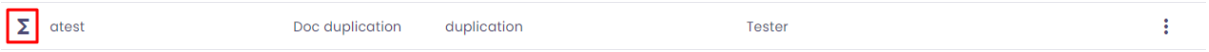
metrics.



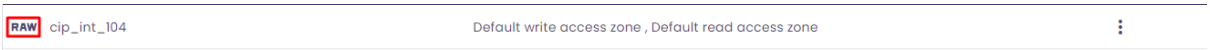
Note : the results in the table are paginated. You can change the number of results returned per page, and navigate through the pages.

Note : You can combine the search by metric name and permission.

In the table, the symbol **Σ** is used to identify the metrics that are calculated metrics (results from the **Formulas** module).



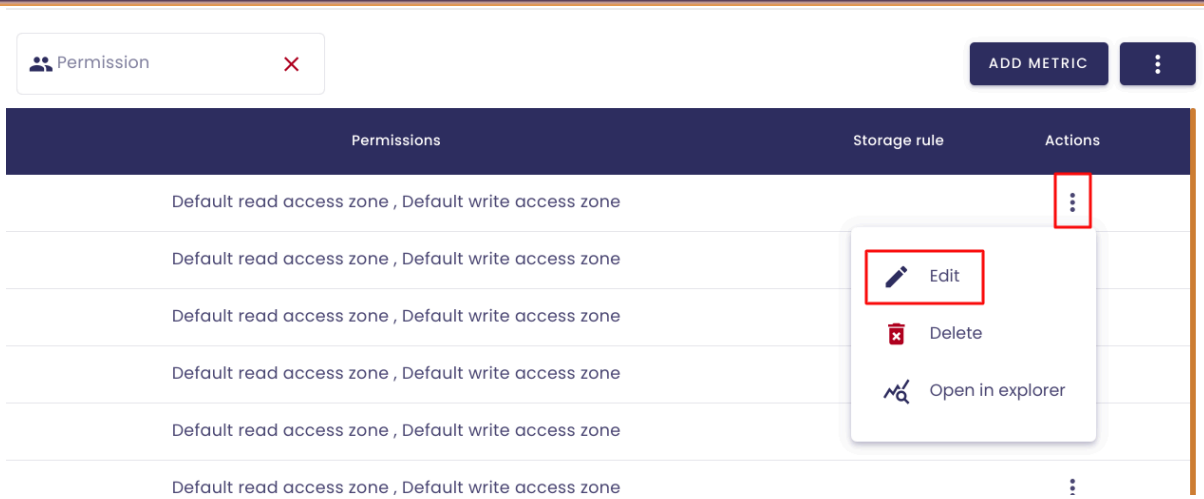
The "**Raw**" symbol below identifies the metrics for which values are automatically retrieved from a piece of equipment.



The boxed symbol below identifies metrics for which values are entered manually.

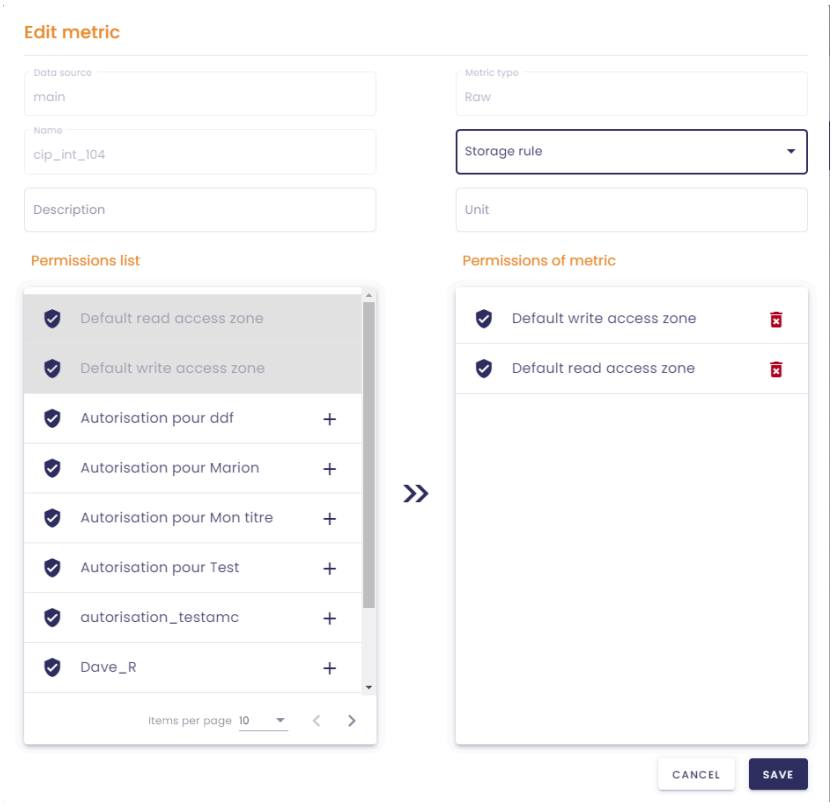
1.1.2 Editing a metric

To edit the properties of a metric, go to the **Actions** column, then click on **Edit**.



The modification window opens. It allows you to change :

- the description
- the storage rule applied (storage rules can be managed from the **Referentials / Storage rules** menu)
- the unit
- The list of permissions (permissions are available from the menu **Referentials / Permissions**)



Note : If there is no permission selected for a metric, no one will be allowed to view its values.

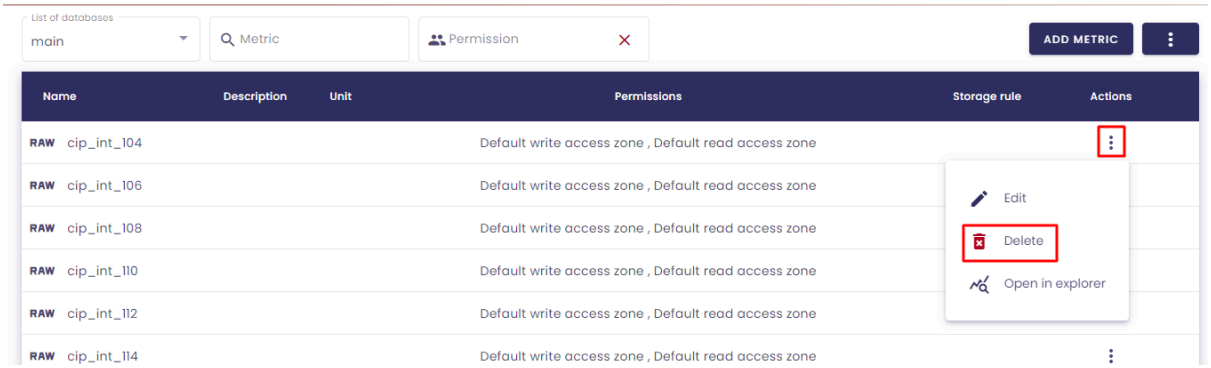
Different permissions can be applied to the same metric.

Click on **Save** to save the values entered.

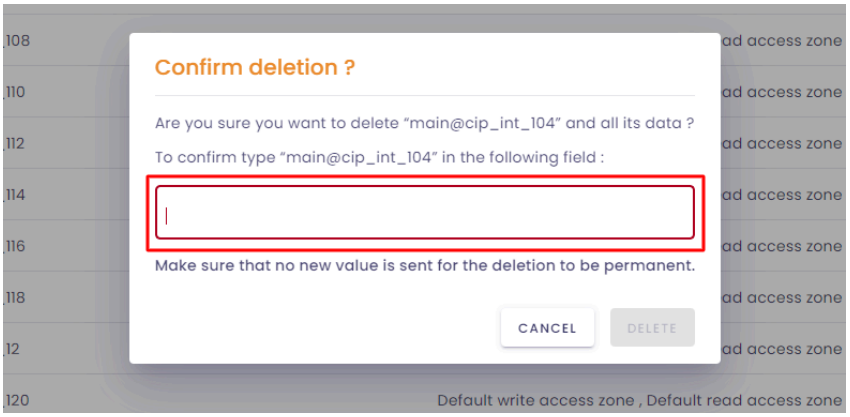
1.1.3 Deleting a metric

In the **Actions** column, click on

, then **Delete**.



A confirmation window appears. To confirm, you must enter manually the exact name of the metric in the area.



Note : for safety reasons, it is not possible to copy and paste in the field.

Warning ! deleting a metric means deleting all its historical values.

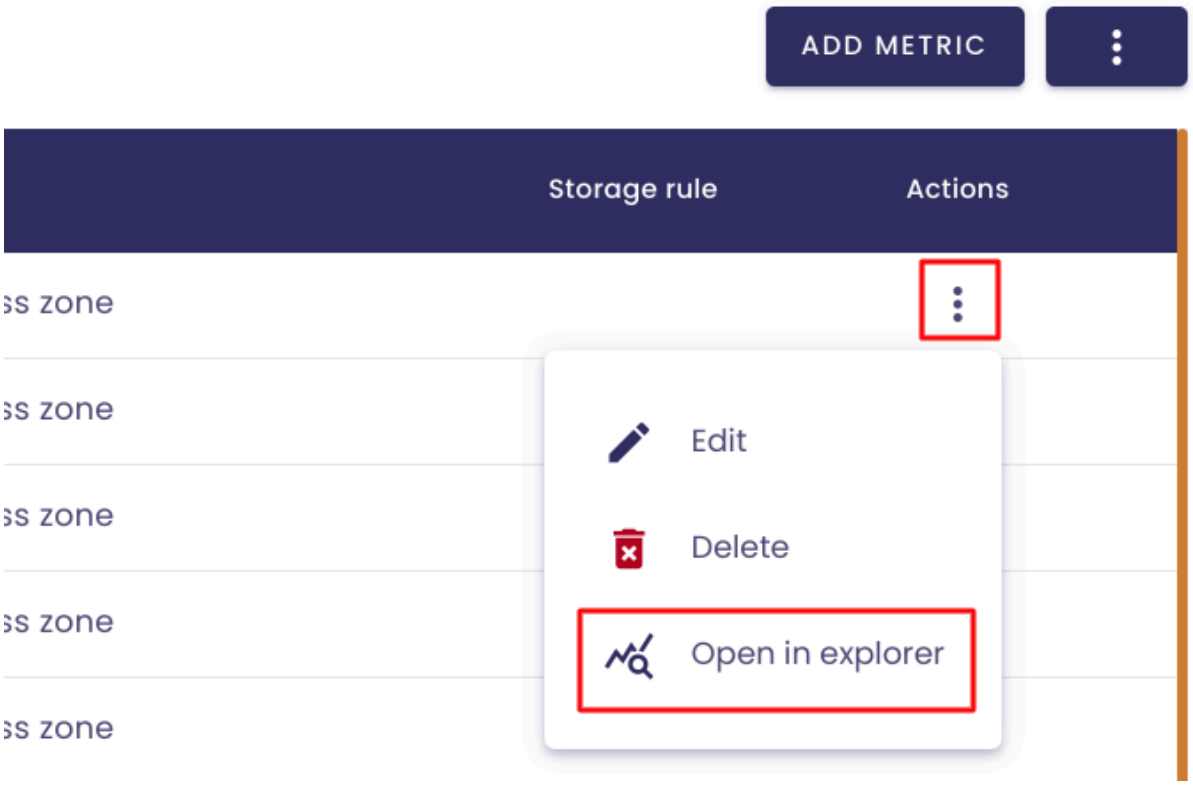
Afterwards, if a value is reinserted into the database with this metric name, it will be automatically recreated, but will have lost its historical values.

Only machine accounts can record values for a metric that does not yet exist. Otherwise, the metric must be created, a write role must be set, and the first value must be inserted.

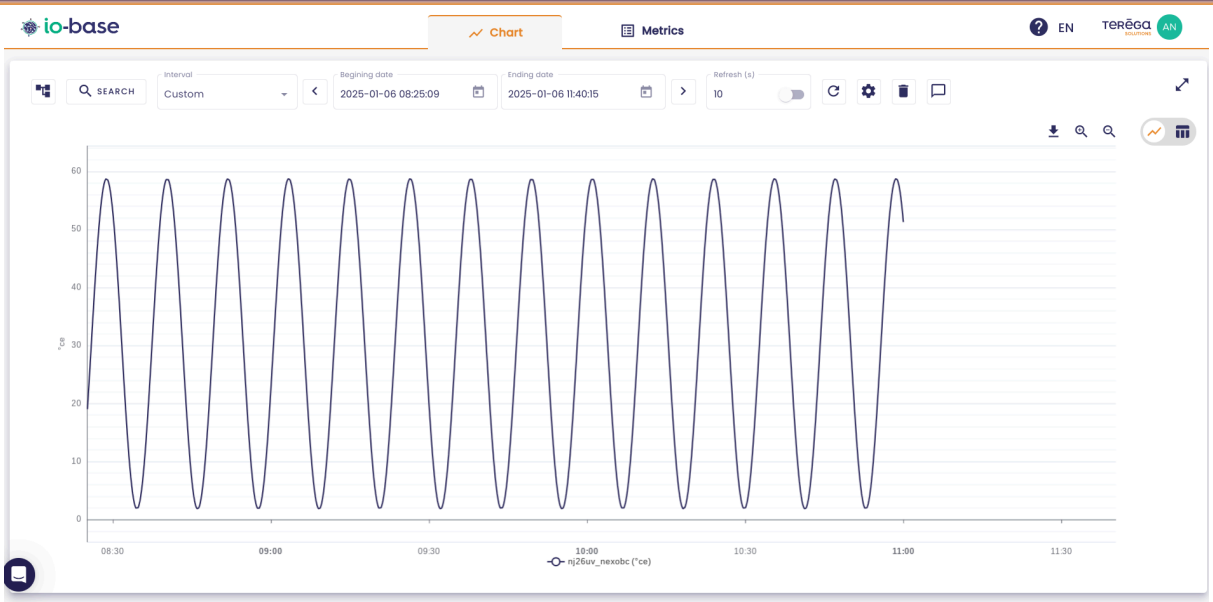
1.1.4 Viewing a metric's curve

You can access the curve of a metric from the metric management screen.

In the **Actions** column, click on the "**Open in explorer**" button.



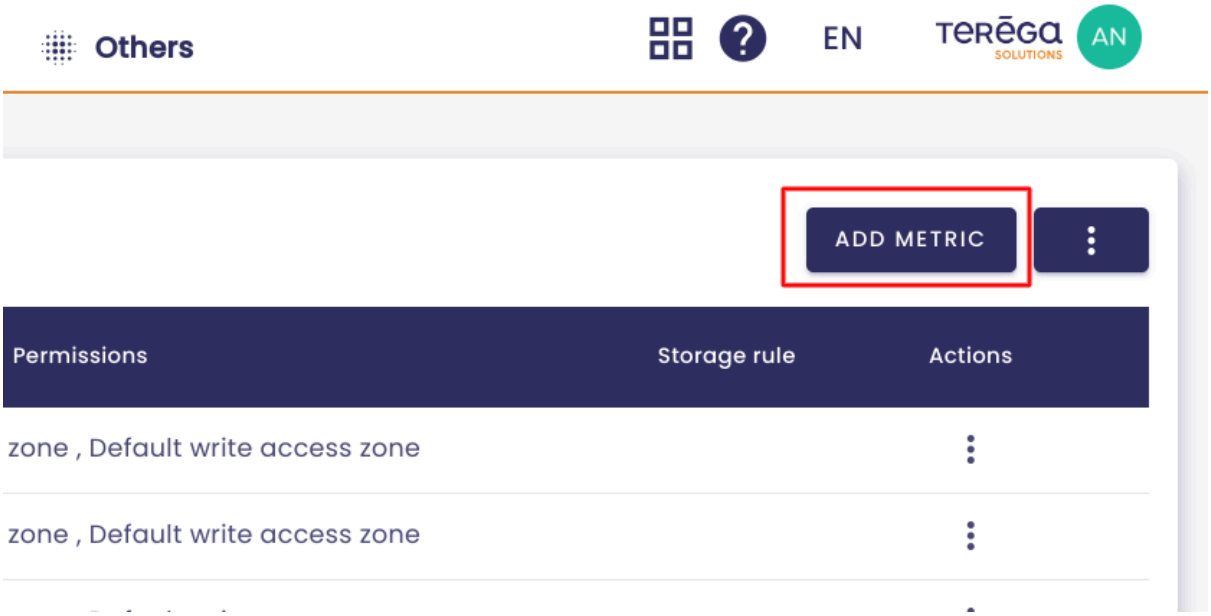
A new window opens, displaying the metric curve in Indaba Explorer.



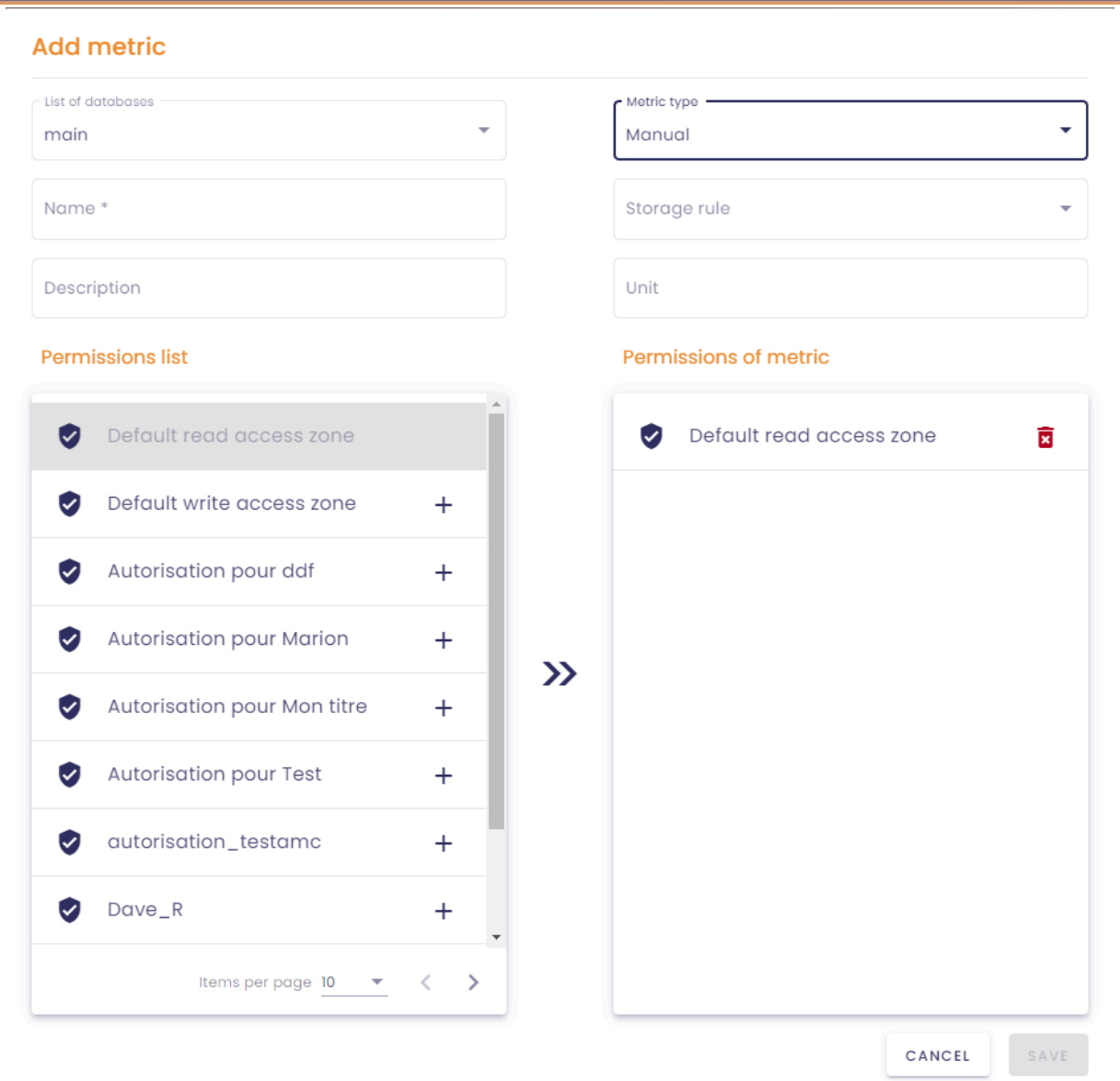
1.1.5 Adding a metric

There are two ways to add a metric :

- Using the import/export feature, adding lines to create new metrics
- Click on the **Add a metric** button



In the displayed window, select the database, enter the metric's name, its description, its type, its unit, its storage rule (if necessary), and finally, the permission(s) to apply to it.



Note : The **Manual** type is used for metrics where values are entered manually. **Raw** metrics are metrics for which values are automatically collected from a device, for example.

Warning : The metric name must not include special characters (only underscores ('_') and periods ('.') are accepted).

1.1.6 Renaming a metric

Renaming a metric is an action that must be done with caution. This is why it is

only available to members of the Global Support group (Terega Solutions support).

If you wish to rename a metric, please contact support.

1.2 Import/export metrics (mass modification)

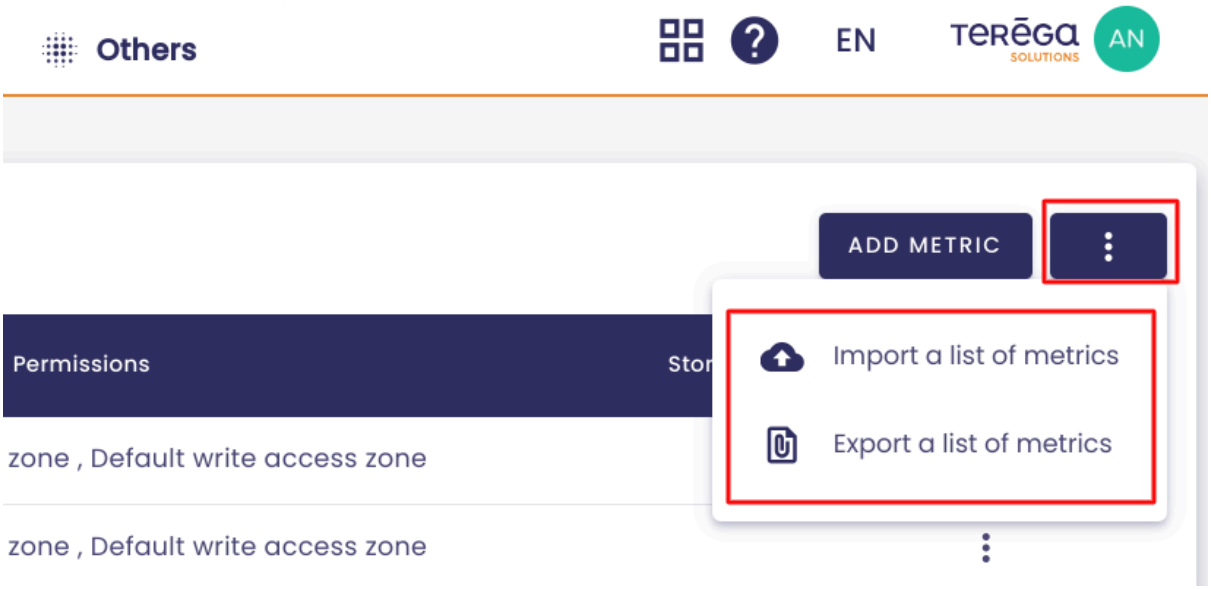
Prerequisites : this feature is available for users with a Functional Administrator role.

Connect to **Io-base** and go to the **Referentials / Metrics management** menu.

Select the relevant database.

At the top right, click on

.



By clicking on "**Export a list of metrics**", you can export all the metrics of the

selected database into an Excel file.

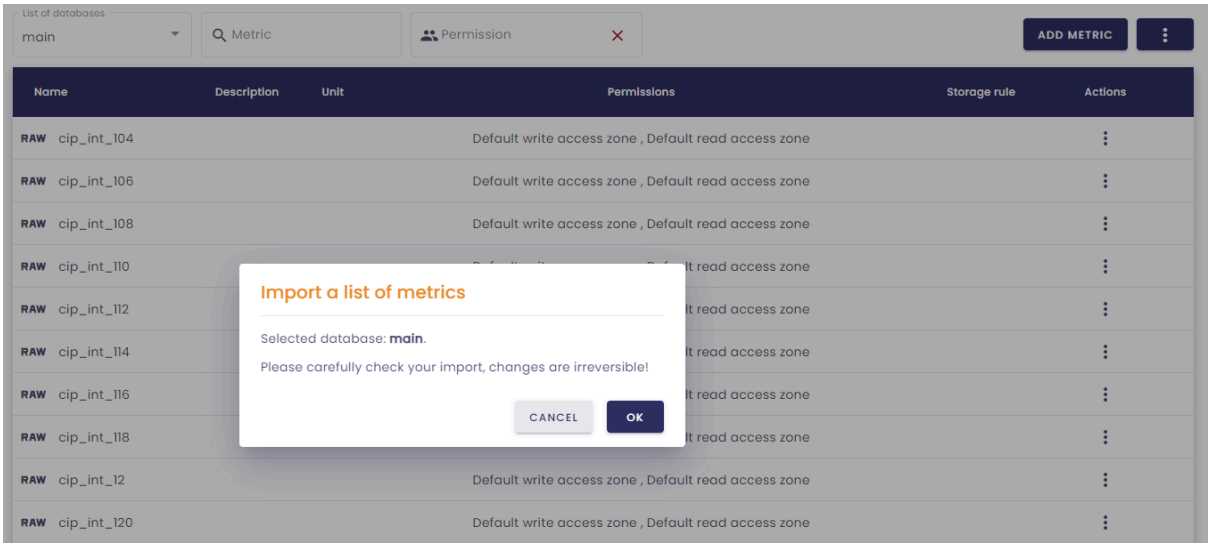
By clicking on "**Import a list of metrics**", you can import metrics from an Excel file, in order to update the referential.

Be careful, when importing, to check that the desired data source is selected.

1.2.1 File structure

The file contains three tabs :

- the metrics referential
- the list of existing permissions
- the list of existing storage rules



The columns in the file include:

- Id = metric identifier
- Name = the name of the metric
- DataSource = the name of the database
- Description = the description of the metric

- Unit = the unit of the metric
- Storage Rule = the storage rule
- Access Zones = the permissions applied to the metric
- Type of the metric = there are several types of metrics

    - raw : it is a value that is automatically returned
    - calculated : it is a value that will be calculated
    - manual : it is a value that will be entered
    - system : it is a system configuration value
- Formula = the formula (for Calculated metrics)

1.2.2 Operating rules of the import

When a file is imported, the following rules apply :

- you cannot delete metrics using an import. If lines are missing in the file compared to the referential, nothing will happen. To delete metrics, go to the **Referentials / Metrics management** menu.

- the import allows the creation of new metrics. To create metrics, when importing, you must add rows without filling in the first column.

- the import only allows the modification of some properties of the metrics :
    - the description
    - the unit
    - the storage rule
    - the permissions

- the formula of a calculated metric cannot be modified through the import. You have to go through the **Formulas** menu.

- the type of a metric cannot be changed

- the value entered in the Storage Rule column must match an existing label in the **StorageRules** tab of the file

- to place several permissions on a metric, it is necessary to separate them by ",".

1.2.3 Creating metrics using the import feature

The import feature also allows the creation of new metrics.

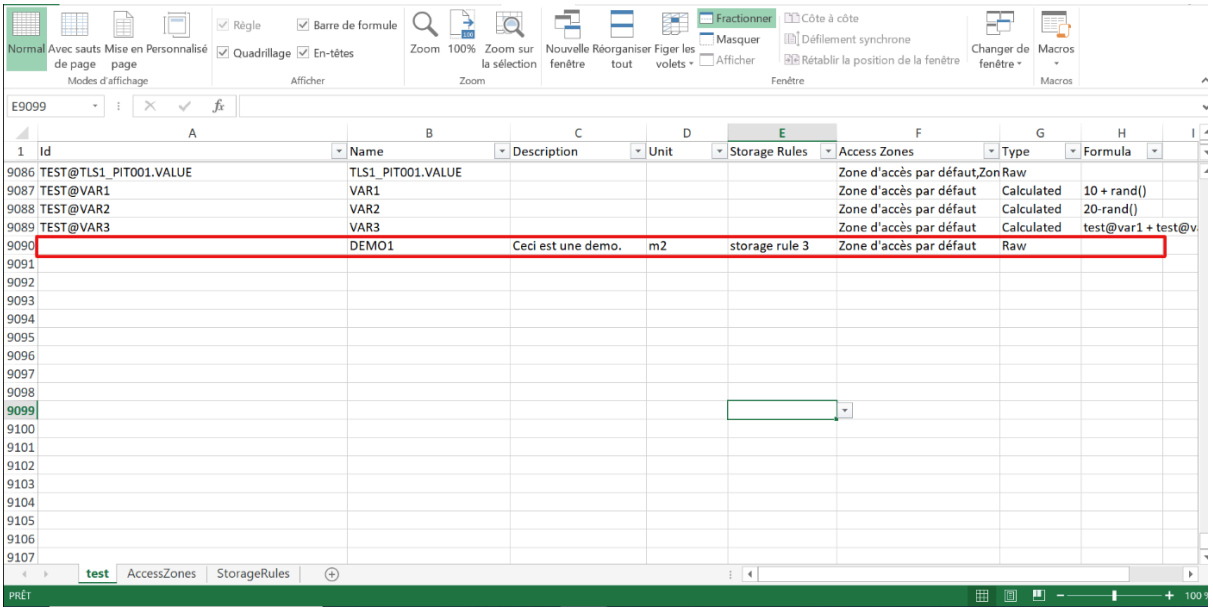
WARNING ! To create metrics using the import feature, you must leave the first column of the excel file ("**ID**") blank.

You can then fill in the other columns as needed. However, be careful not to use formulas (such as Excel formulas) in your entries.

Important : The metric name must not contain special characters (only underscores "_" and periods "." are allowed).

It is only possible to create metrics of type *raw* or *manual* (refer to the metric types mentioned above).

Below, highlighted in red, is an example of a valid entry for creating a metric using import for the "test" dataset.



	Id	Name	Description	Unit	Storage Rules	Access Zones	Type	Formula
9086	TEST@TLS1_PIT001.VALUE	TLS1_PIT001.VALUE				Zone d'accès par défaut,Zon	Raw	
9087	TEST@VAR1	VAR1				Zone d'accès par défaut	Calculated	10 + rand()
9088	TEST@VAR2	VAR2				Zone d'accès par défaut	Calculated	20-rand()
9089	TEST@VAR3	VAR3				Zone d'accès par défaut	Calculated	test@var1 + test@v
9090		DEMO1	Ceci est une demo.	m2	storage rule 3	Zone d'accès par défaut	Raw	

Note : The last column, "Formula," is for informational purposes only. It displays the formula for calculated metrics. Therefore, you do not need to fill it in when creating a new metric.

Note : Creating metrics using import is not available for Google Sheets. We

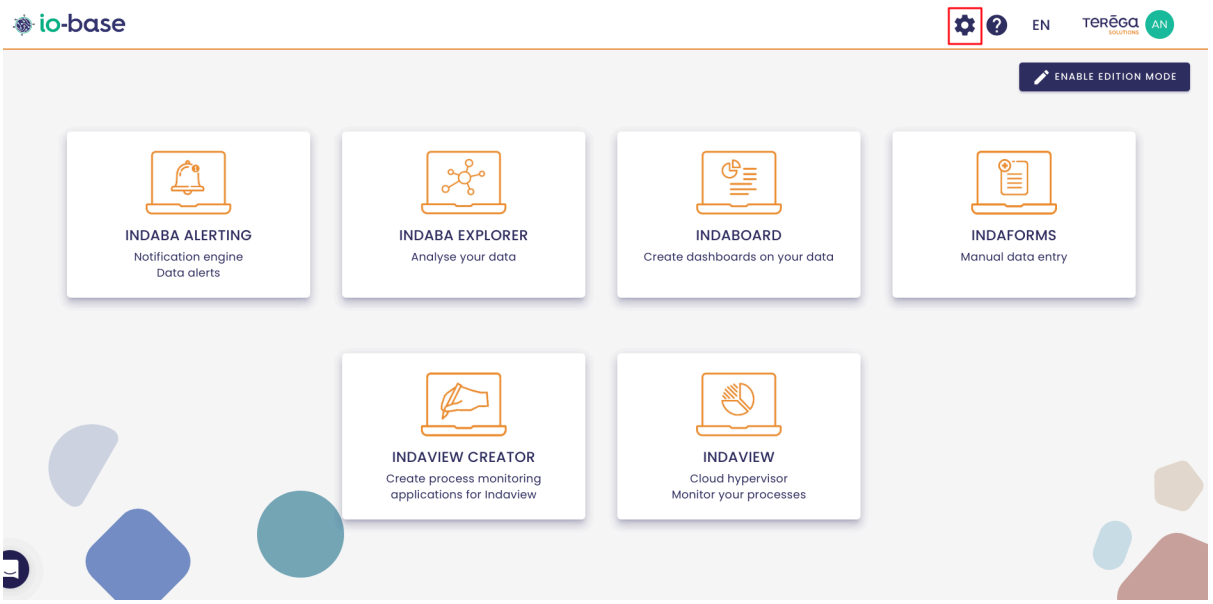
recommend using Excel for this feature.

2. Permissions

2.1 Creating a permission (group access)

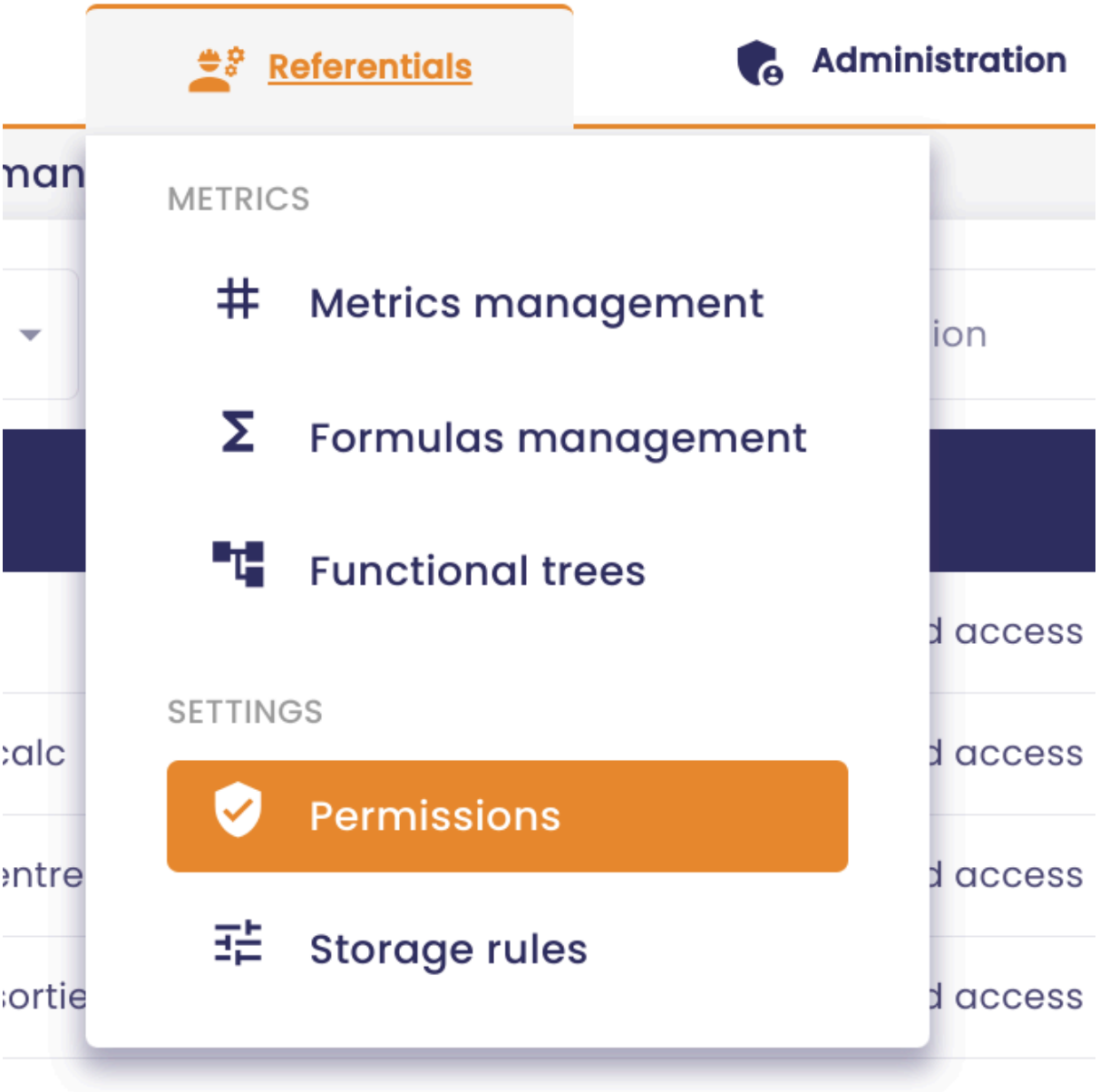
Prerequisites : this feature is available for users with a Functional Administrator role.

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



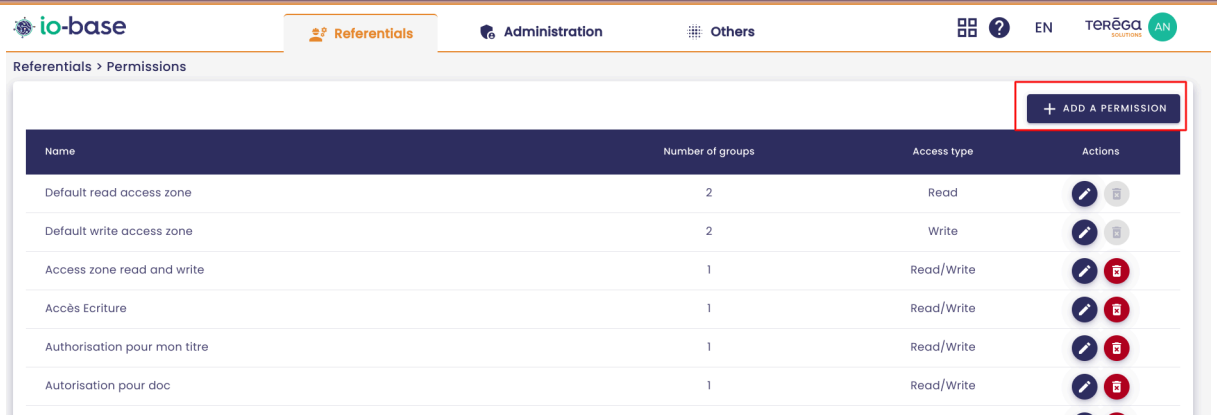
The Io-base administration page opens.

Go to the **Referentials/Permissions** menu.



The list of existing permissions appears.

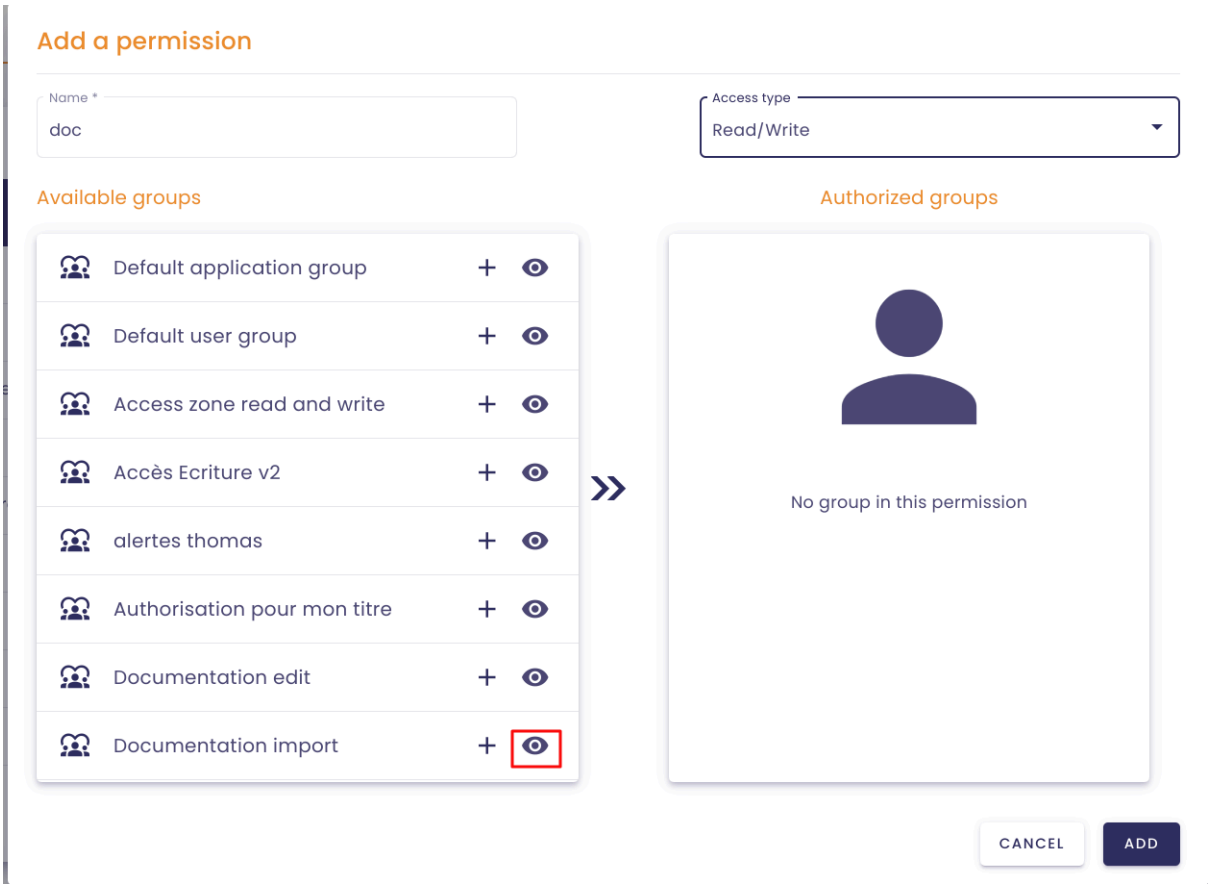
Click on **Add a permission.**



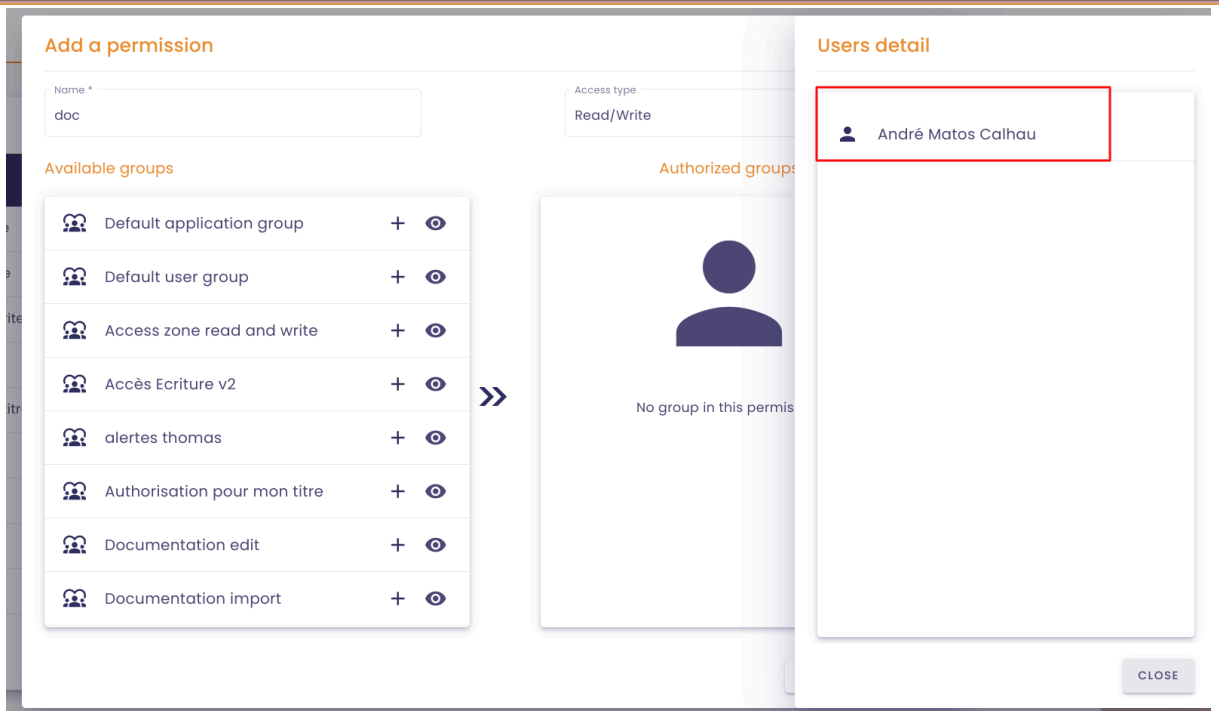
The creation window allows you to enter the following information:

- Name of the permission
- the permission's rights (Read, Write, or Read/Write)
- The groups added to the permission

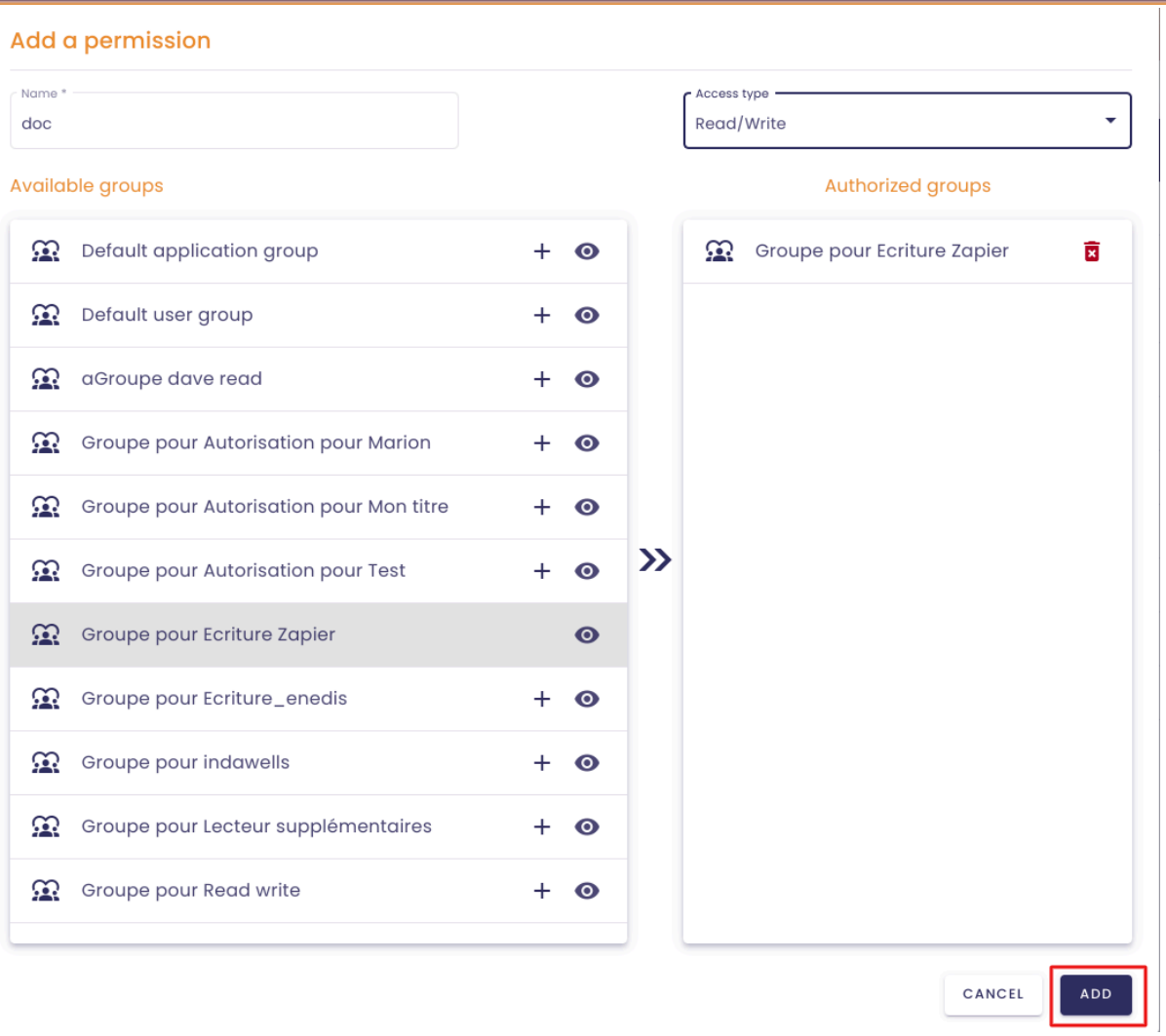
To view the users attached to a group, click on the button with the eye icon :



User details will appear on the right-hand side of your screen :



Once all the fields are complete, click on **Add**.



The permission is created, it can now be added to the metrics from the **Referentials/Metrics management** menu or to the forms (Create a form).

Note: To be able to give writing rights to a user, he must belong to the Writer role. Contact your administrator.

Note: if a user in a group does not have a sufficient role for the rights applied to the permission, a **warning** icon appears. For instance, if you associate to a permission with "write" rights, a group with a user who does not have a **Writer** role. For further details, please refer to the article on **User administration**.

Users detail

André Matos Calhau

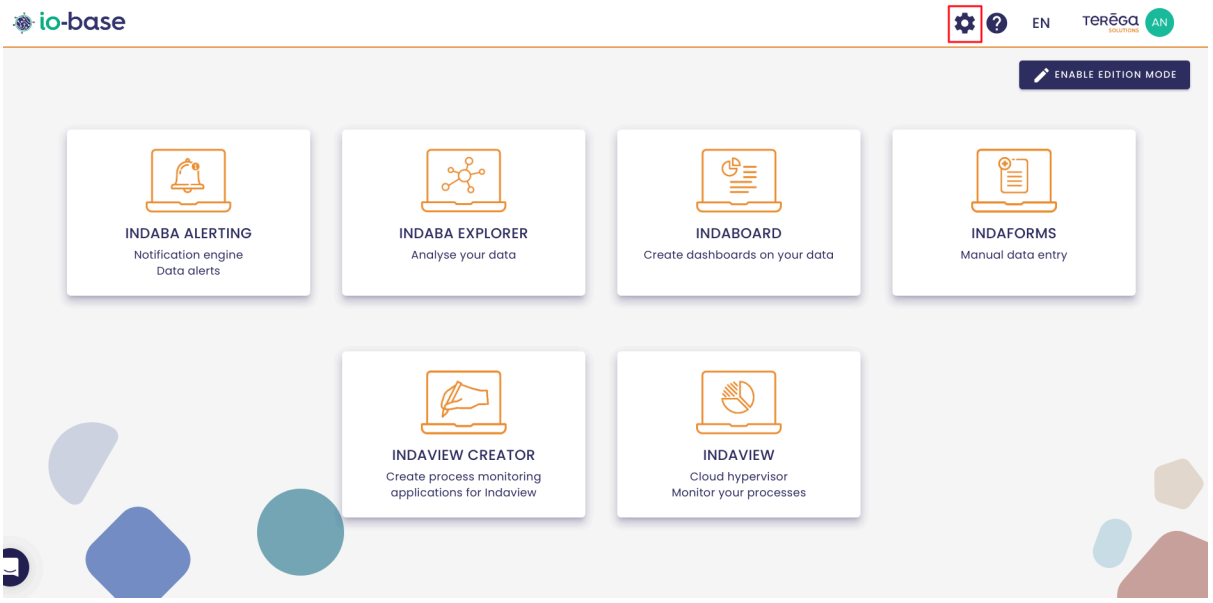
Marion Marion

CLOSE

2.2 Editing a permission (group access)

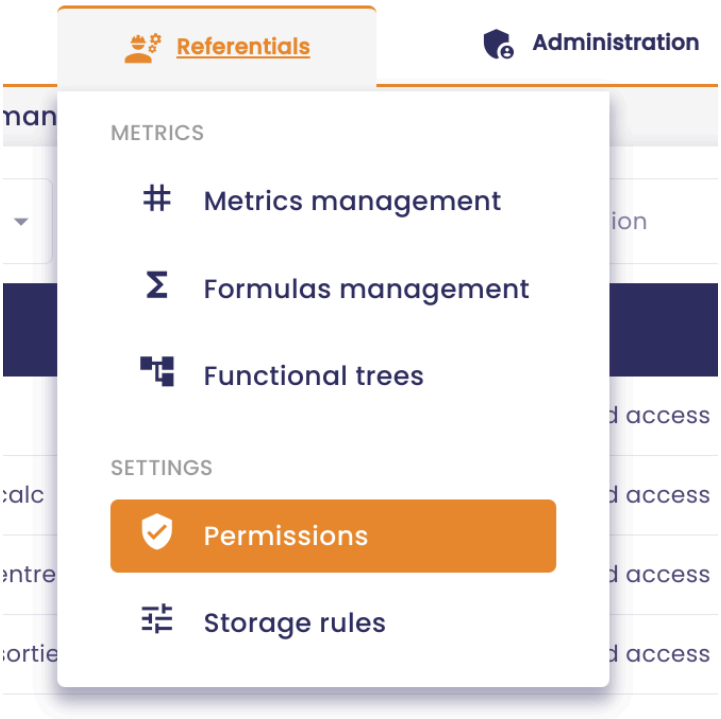
Prerequisites: it is necessary to have a Functional Administrator role to access this functionality.

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

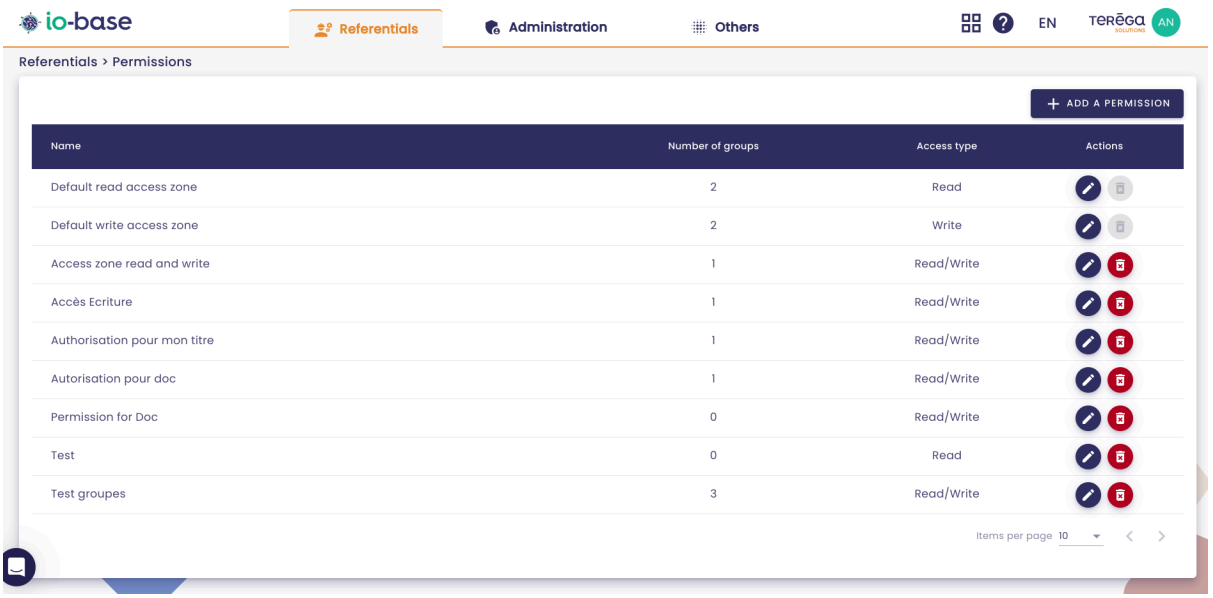


The Io-base administration page opens.

Go to the **Referentials/Permissions** menu.



The list of existing permissions appears :



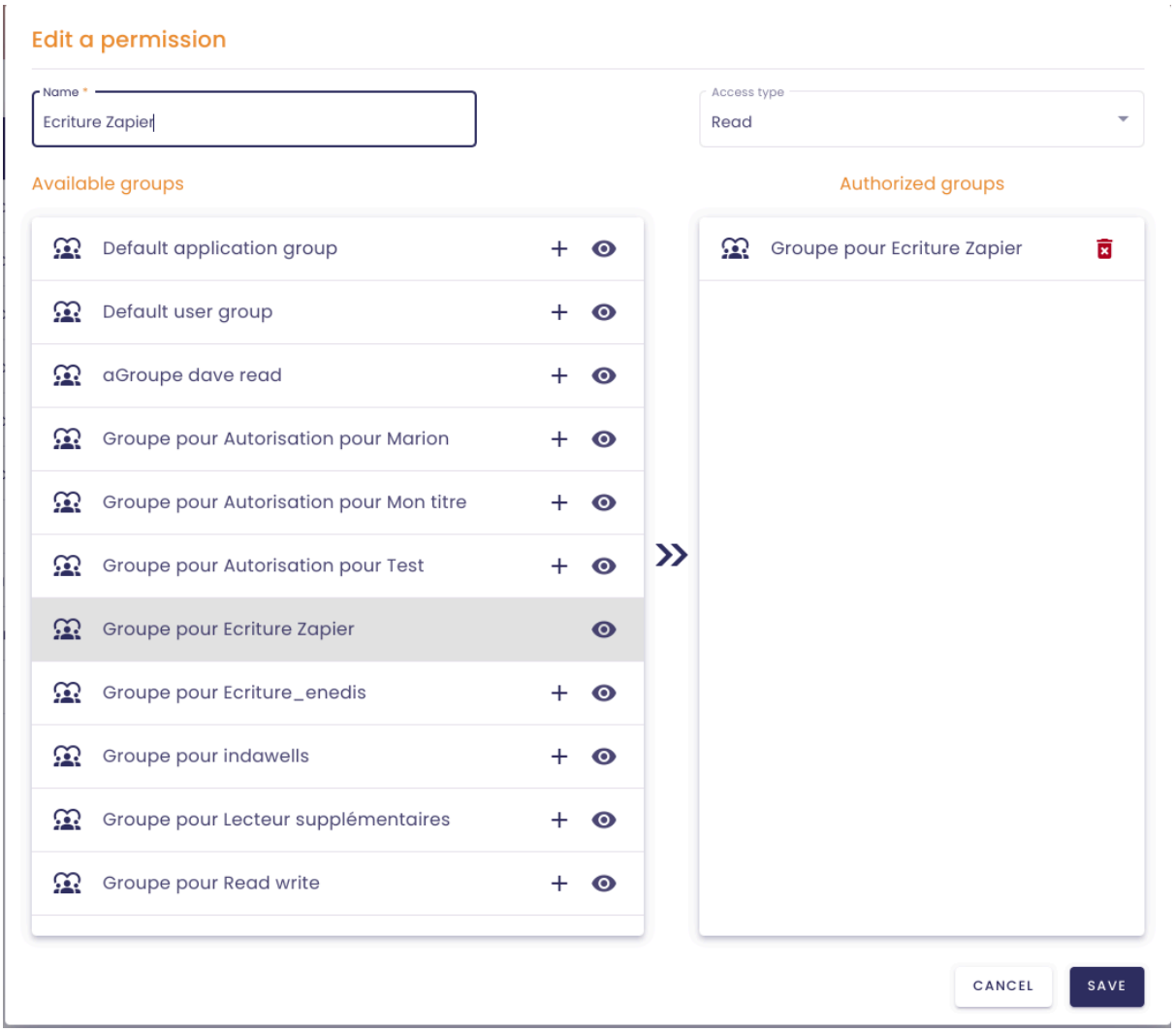
To edit a permission, click on the edit button in the **Actions** column.

Note: for the "Default Access Area" permission, it is only possible to change the group(s) of users associated with the permission. The name and access type

cannot be changed.

The edit window opens.

You can change the name, the rights and the user groups selected.

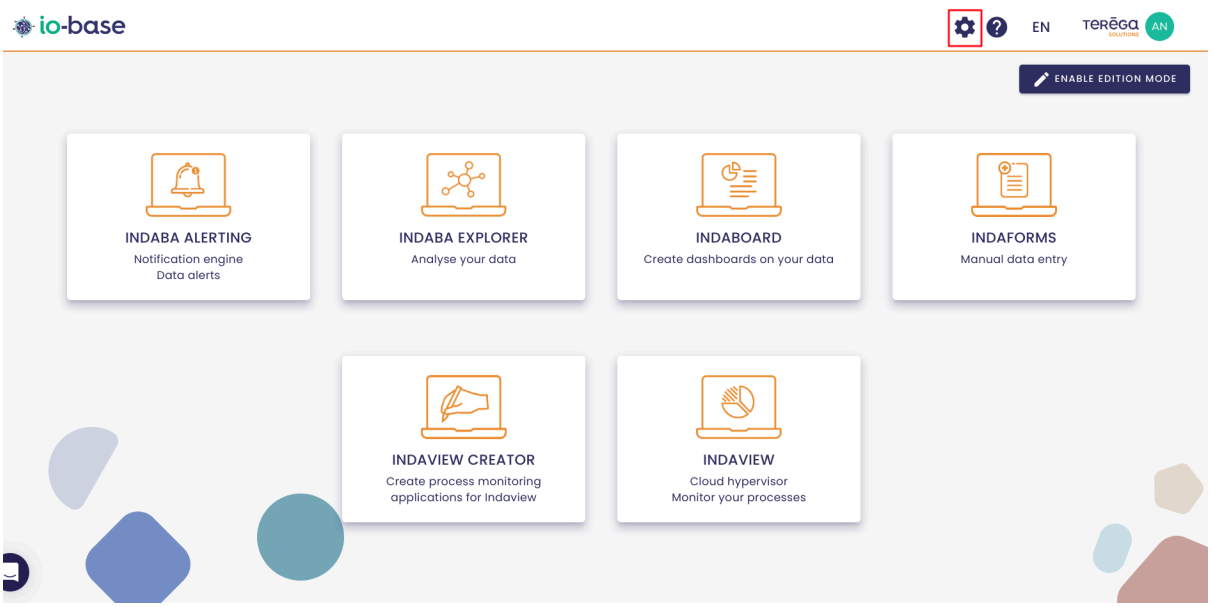


Click on **Save** to save the changes.

2.3 Deleting a permission (group access)

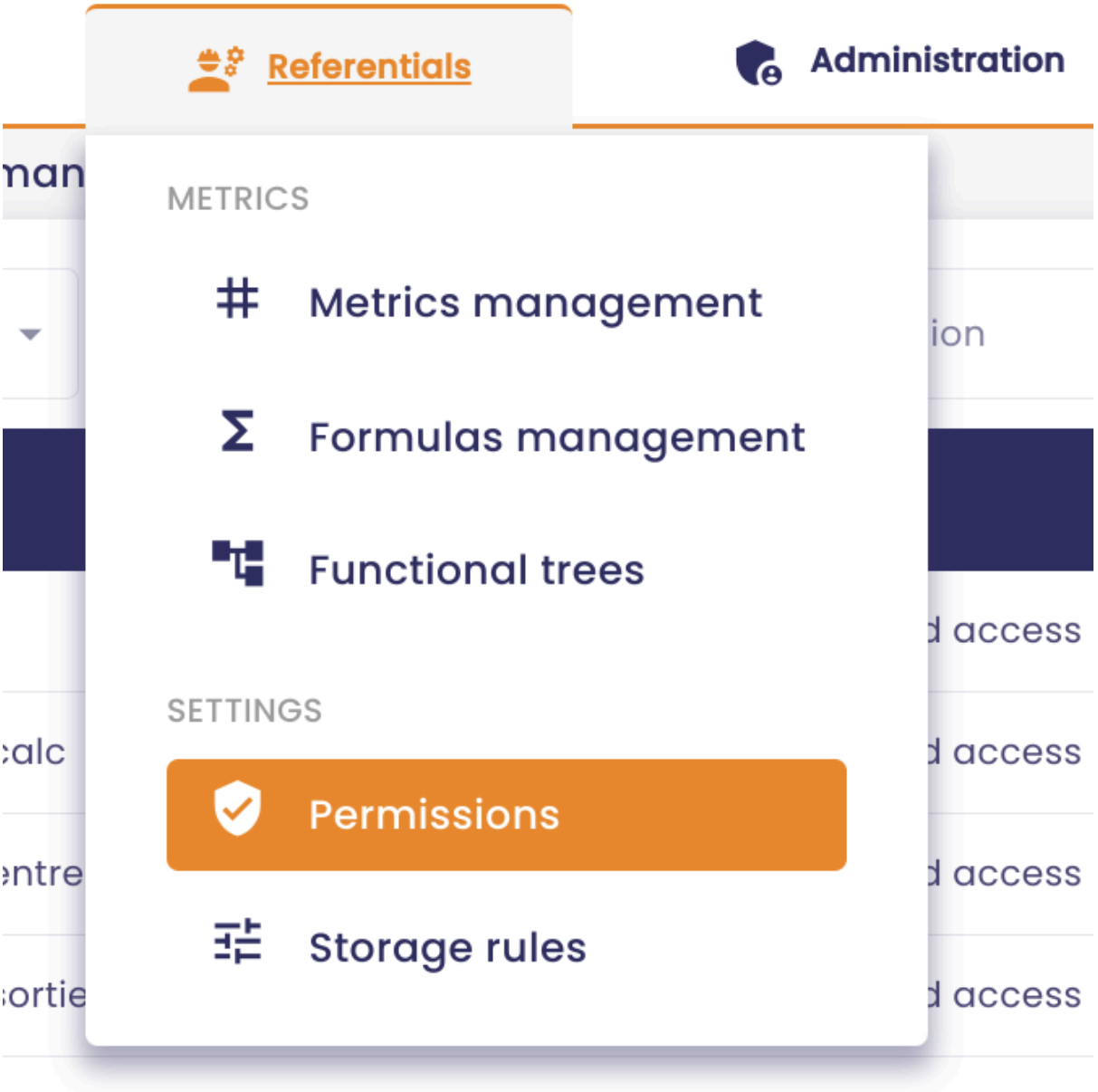
Prerequisites: it is necessary to have a Functional Administrator role to access this functionality.

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

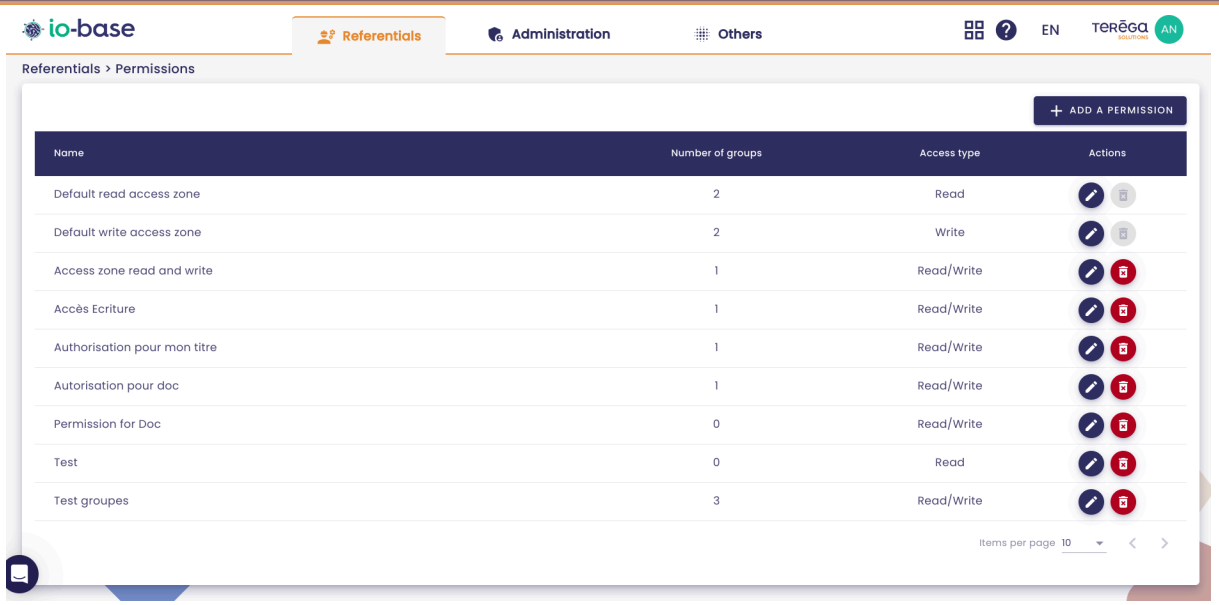


The Io-base administration page opens.

Go to the **Referentials/Permissions** menu.

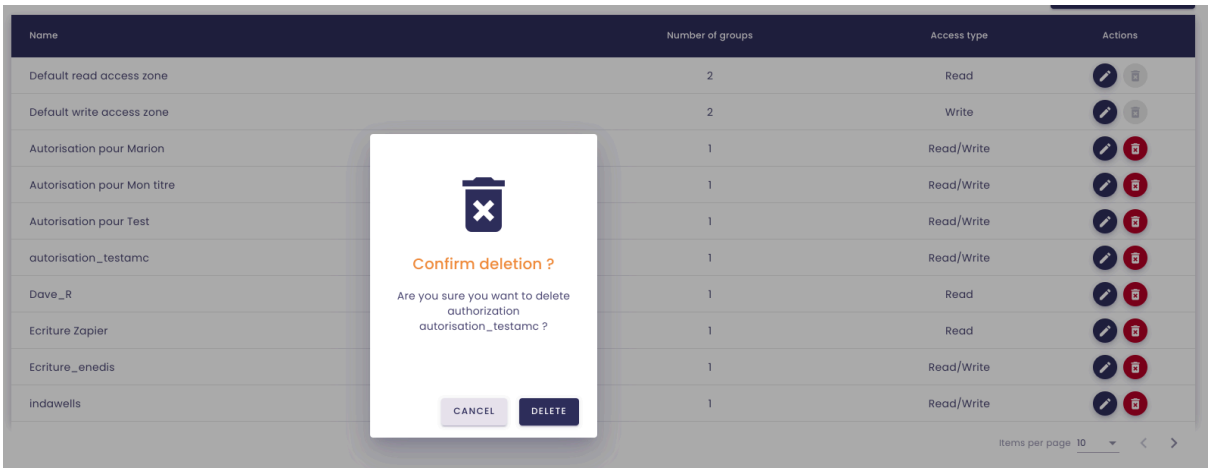


The list of existing permissions appears.



To delete a permission, click on the delete button in the **Actions** column.

A confirmation window will appear. Click on the **Delete** button to confirm.



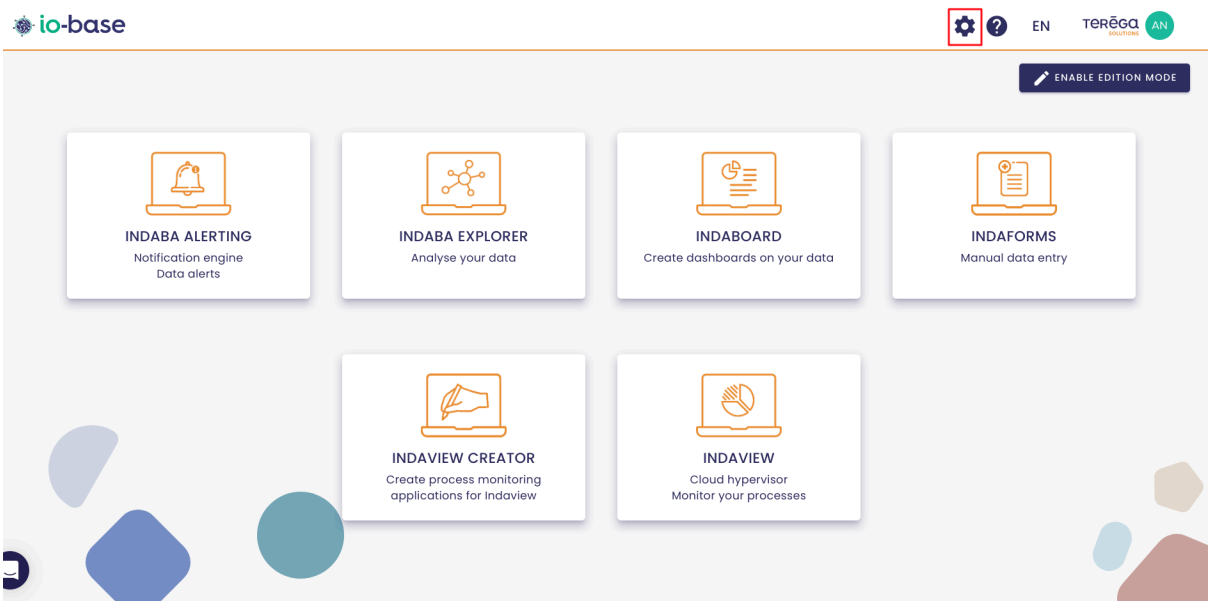
Note: When a permission is deleted, it is automatically removed from all the metrics and forms that use it.

3. Storage rules

3.1 Creating a storage rule

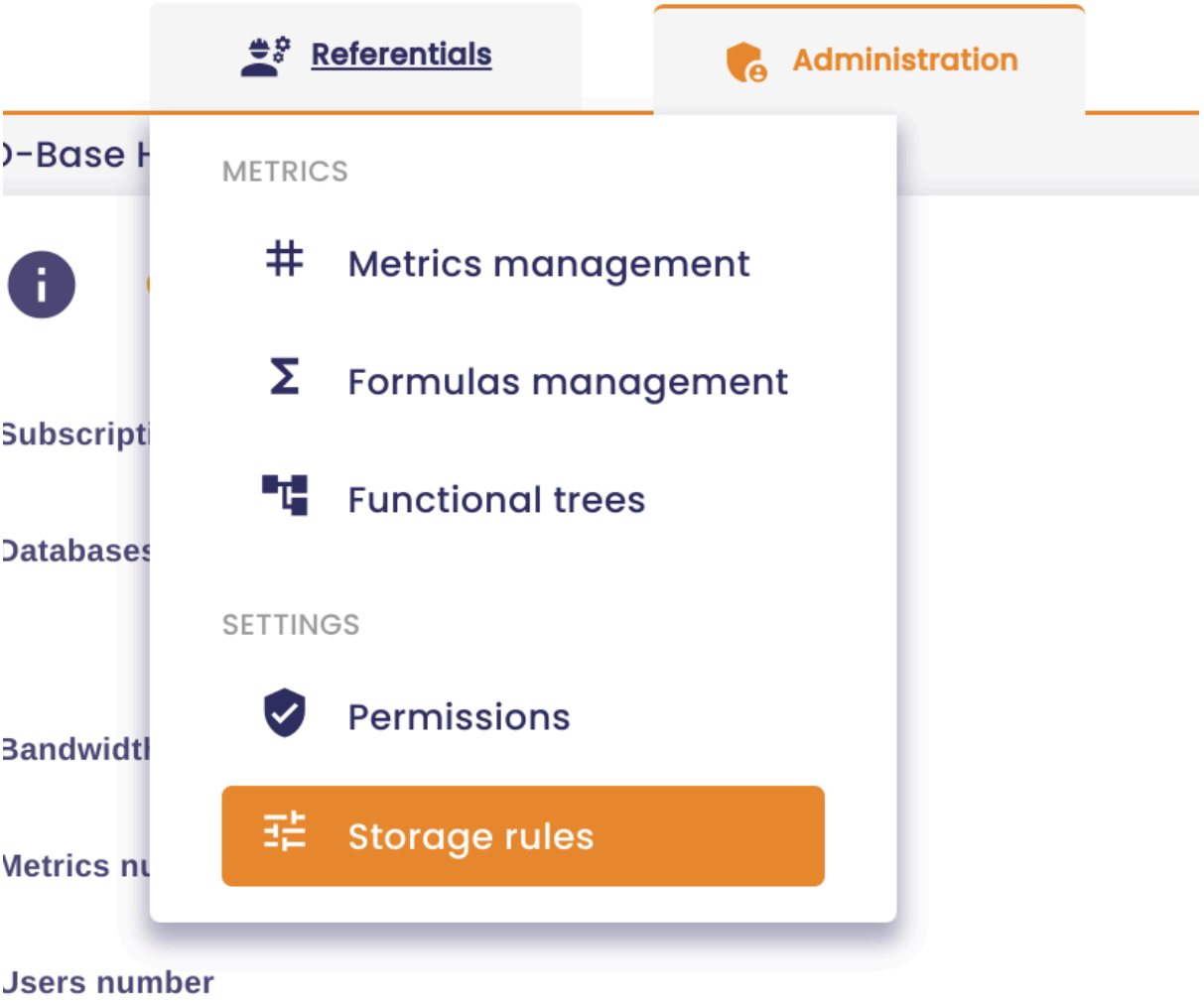
Prerequisites: it is necessary to have the role of Functional Administrator to access this functionality.

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



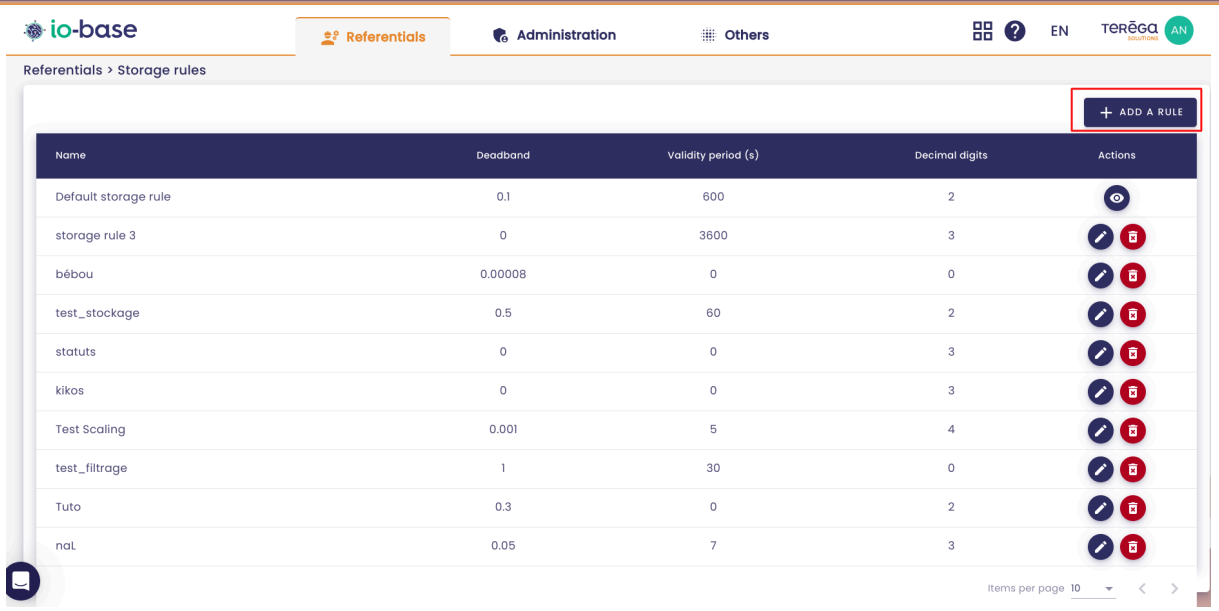
The Io-base administration page opens.

Go to the **Referentials/Storage rules** menu.



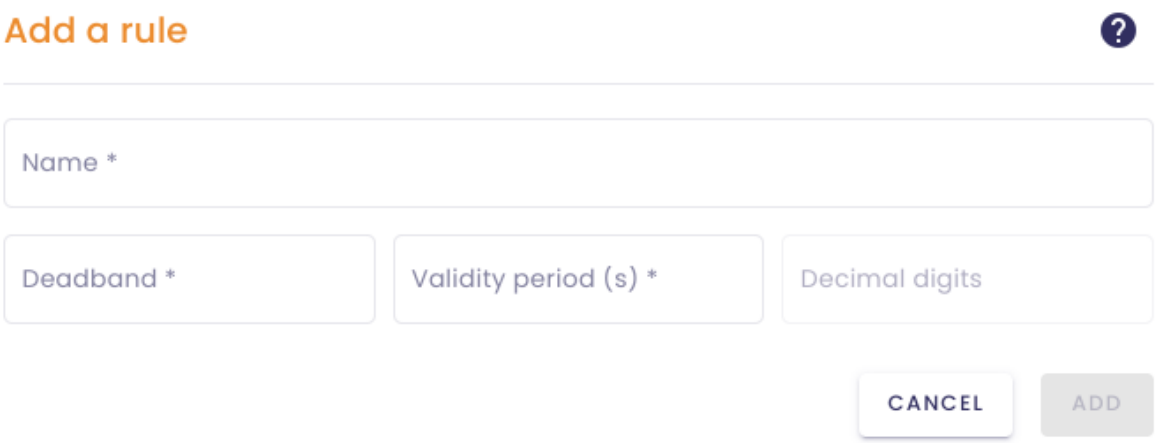
The list of existing storage rules appears.

Click on the "**Add a rule**" button.



The window for entering the rule properties is displayed. It contains the following fields :

- Name (to identify the rule)
- Deadband
- Validity period (s)
- Decimal digits



To confirm the creation, you must at least have entered a name and a validity period. Once it is done, click on **Add**.

To apply a storage rule to a metric, go to the **Referentials/Metrics management** menu.

3.1.1 Instruction and validity period of the deadband

By default, the data sent to the Indaba API is written directly in the database. In order to lighten the database and improve performance, it is advisable to define a deadband.

When a new value is sent to the database, it is saved even if it is equal to the previous value. Defining a deadband allows to give a delta, below which the new value will not be saved if it does not differ enough from the previous one.

For example :

Deadband = 0.5

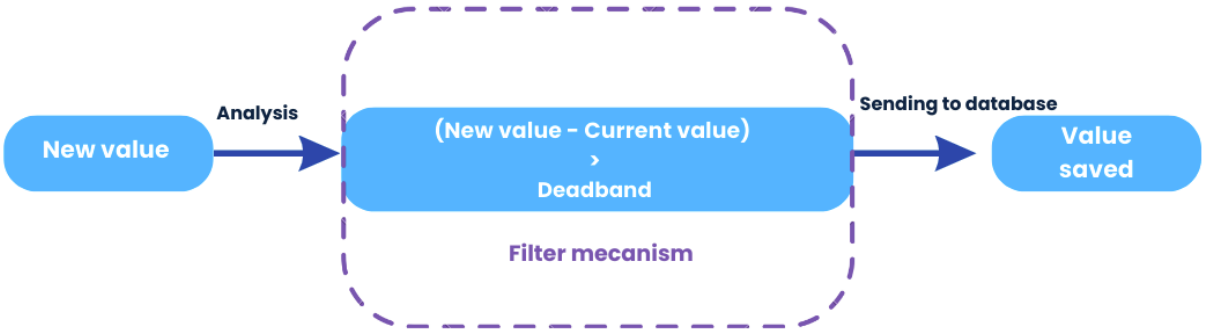
Last value in the base = 3.5

New value = 3.8

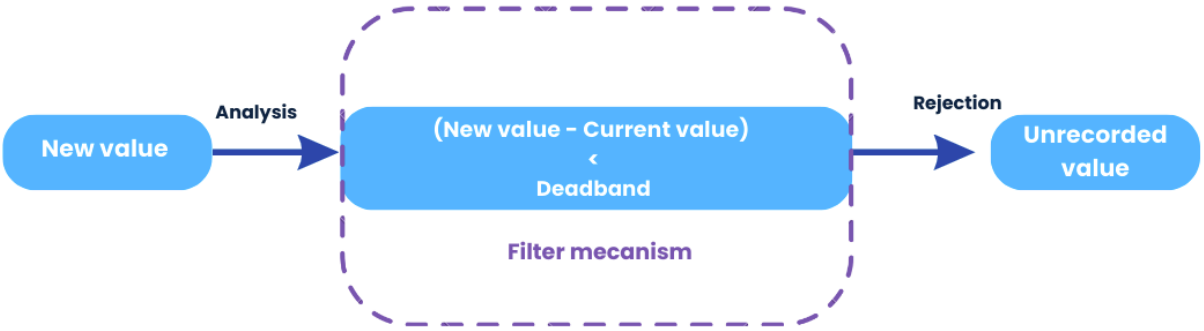
The delta between 3.8 and 3.5 < the deadband, so the new value is not recorded.

Note : To disable the deadband filter, enter '0'.

Value stored in the database :

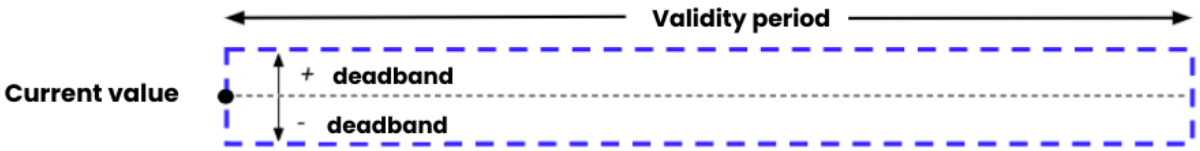


Value not stored in the database :



The validity period is the number of seconds during which a value is not written back to the base, if it has not changed. In the case where a deadband is entered, the value is considered not to have changed if the delta with the old value is less than the deadband value.

Note : To disable the deadband validity period, enter '0'.



If the new value is inside the rectangle drawn above, it will not be stored in the database.

If it is outside the rectangle, it is stored in the database and becomes the new current value of the corresponding metric.

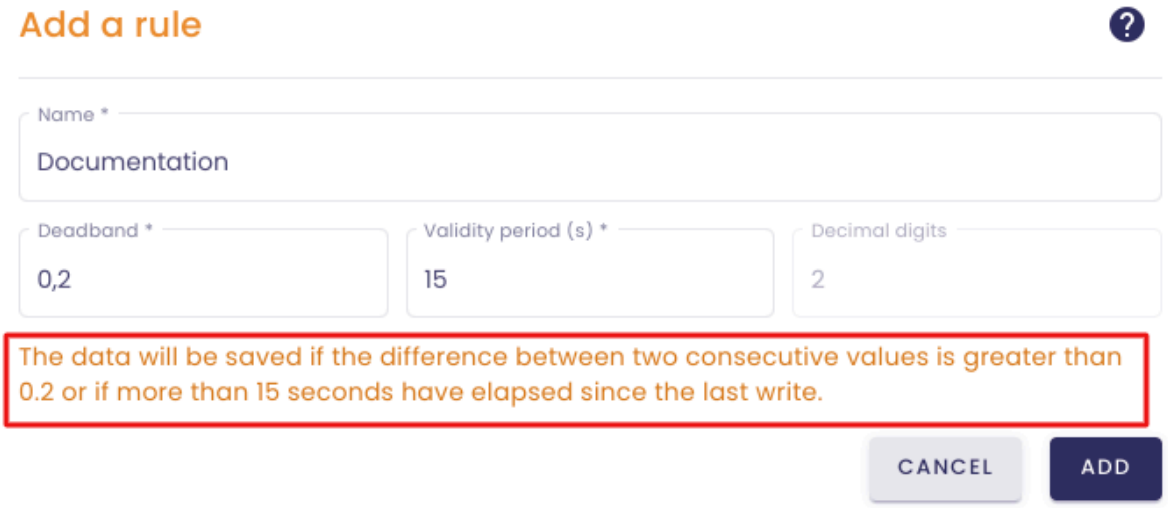
3.1.2 User Assistance

To guide you in creating or modifying a storage rule, a message will indicate the filtering that will be applied to your data.

If 'deadband' > 0 and 'validity period' > 0

The data will be saved if the difference between two consecutive values is greater than X (deadband value) or if more than Y seconds (validity period) have elapsed since the last write.

Example :



If 'deadband' = 0 and 'validity period' > 0

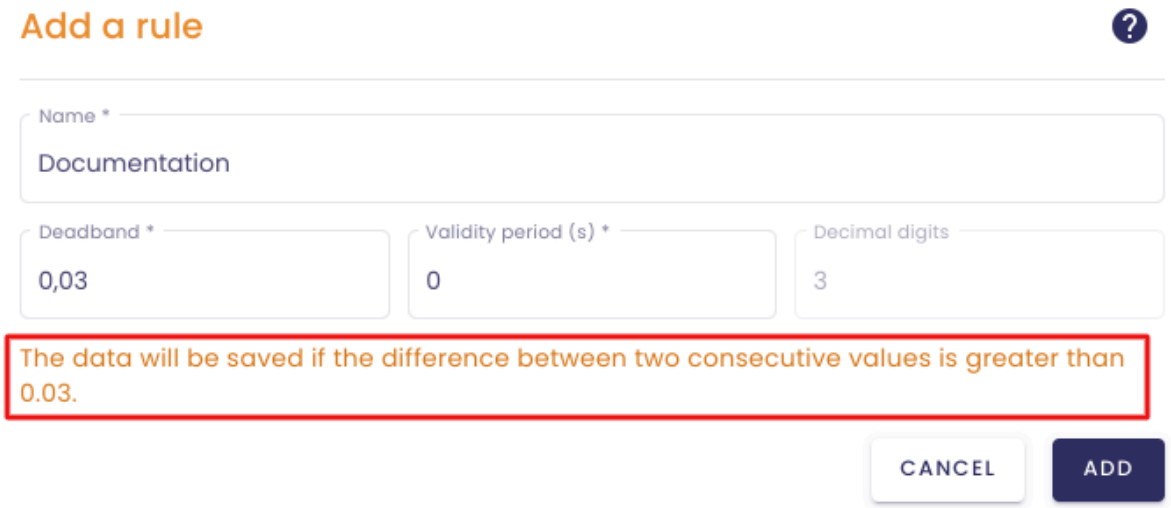
The data will be saved if more than Y seconds (validity period) have elapsed since the last write.

Example :

If **'deadband' > 0 and 'validity period' = 0** :

The data will be recorded if the difference between two consecutive values is greater than X (deadband value).

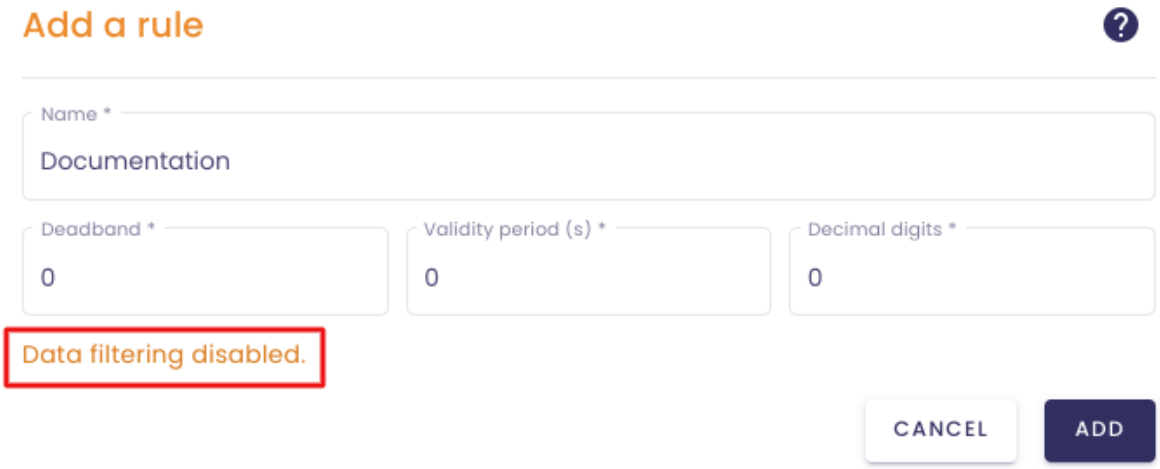
Example :



If **'deadband' = 0 and 'validity period' = 0** :

Data filtering disabled.

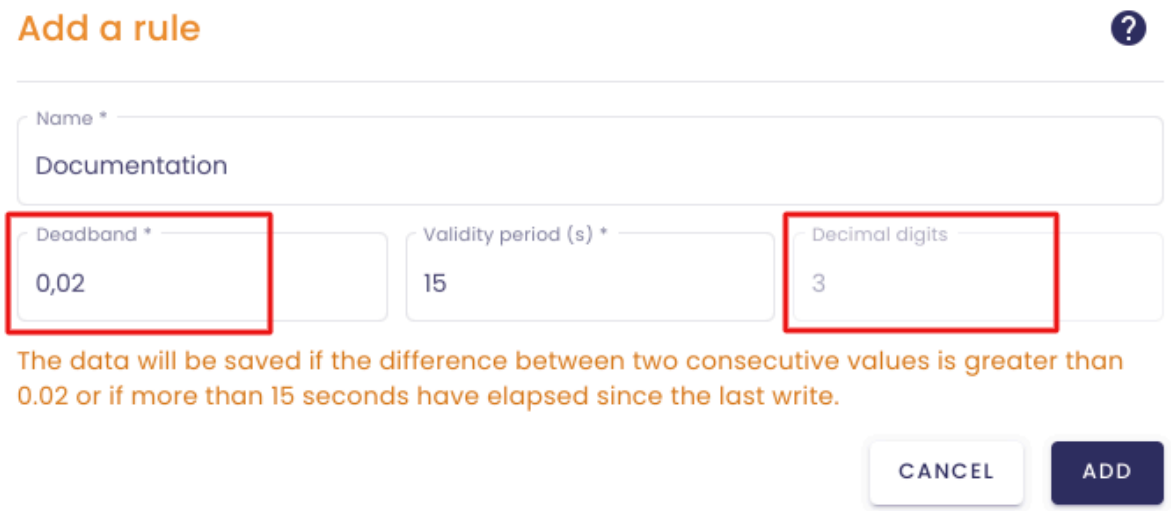
Example :



3.1.3 Number of decimal places

The number of decimal places of the stored data will be deducted from the value entered for the deadband. For example, if this value is 0.02, then the values of the

affected metrics will be stored with a precision of 3 decimal places.



When the deadband is disabled (deadband = 0), the 'decimal places' field becomes active :

Then specify the number of decimal places you want :

Note : If you enter '0', only integer numbers will be saved.

Note : You can enter up to 6 decimal places.

3.1.4 Default values

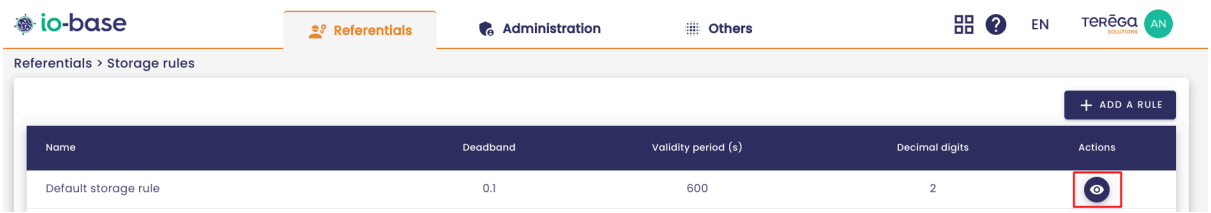
If no storage rule is defined, the default values are as follows :

- deadband : 0.1
- decimal digits : 0.01
- validity period : 10 minutes

If you wish to modify this default storage rule, contact the **Io-base** support.

You can view your default storage rule by clicking the button

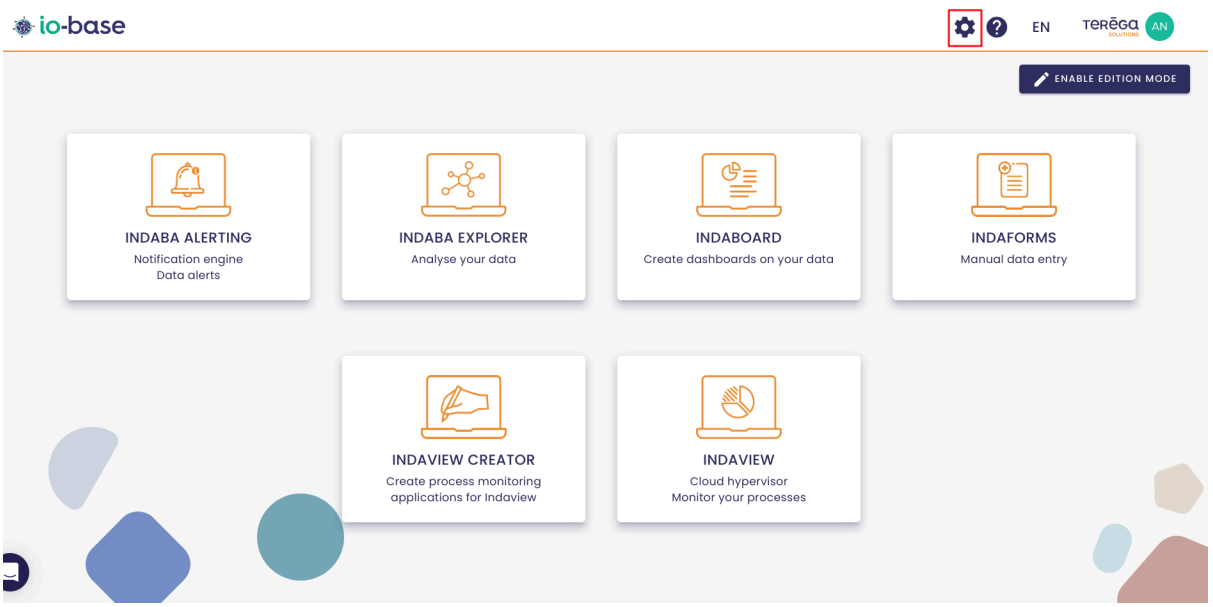
in the **Actions** column :



3.2 Editing a storage rule (for metrics)

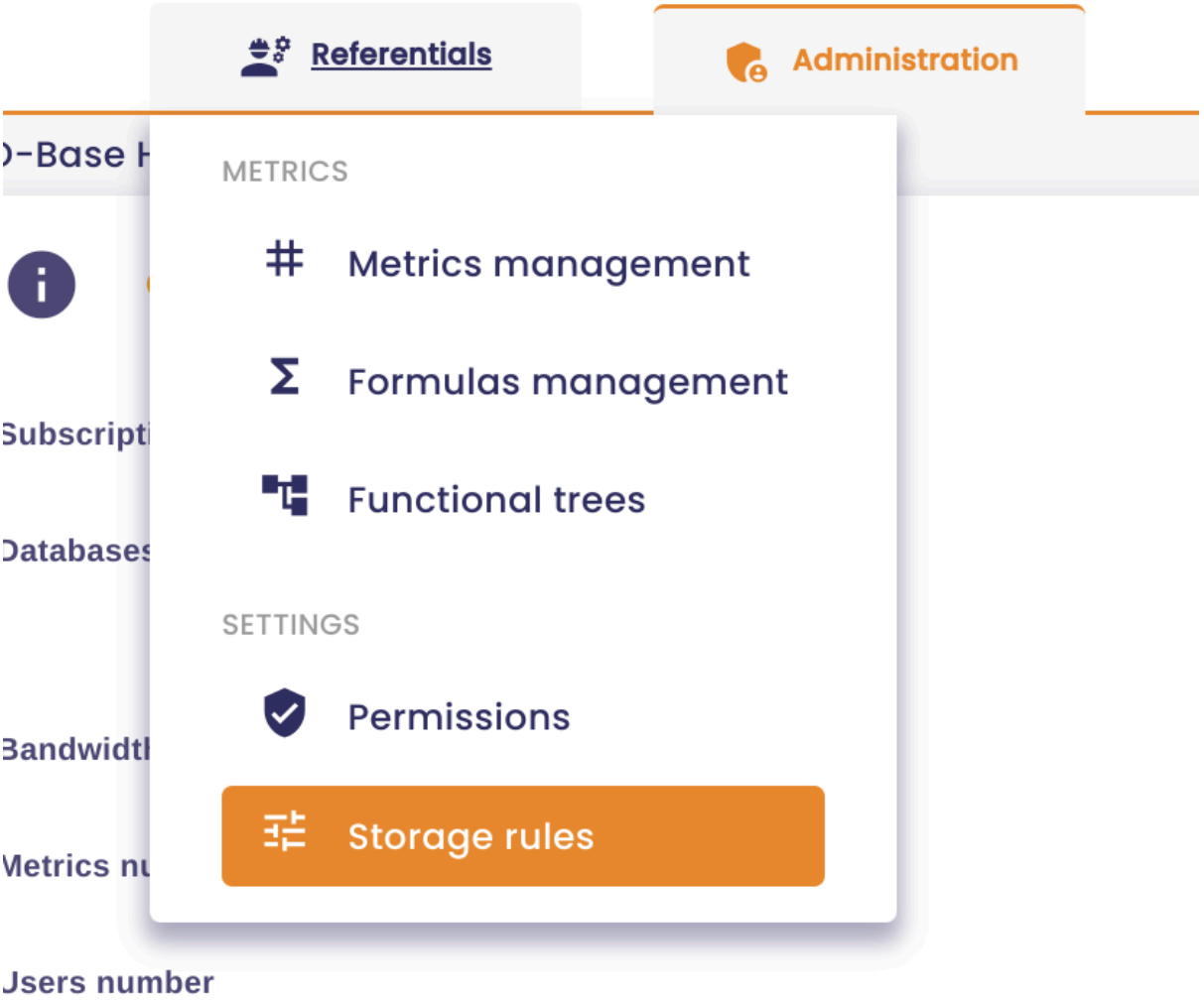
Pre-requisite: it is necessary to have the role of Functional Administrator to access this functionality.

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

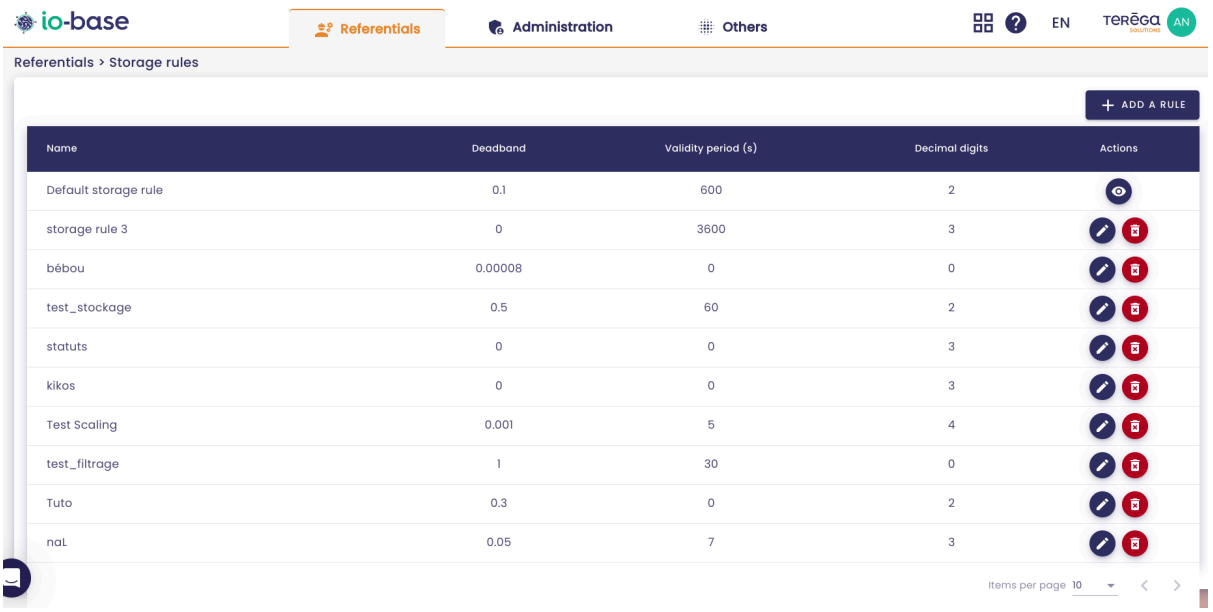


The Io-base administration page opens.

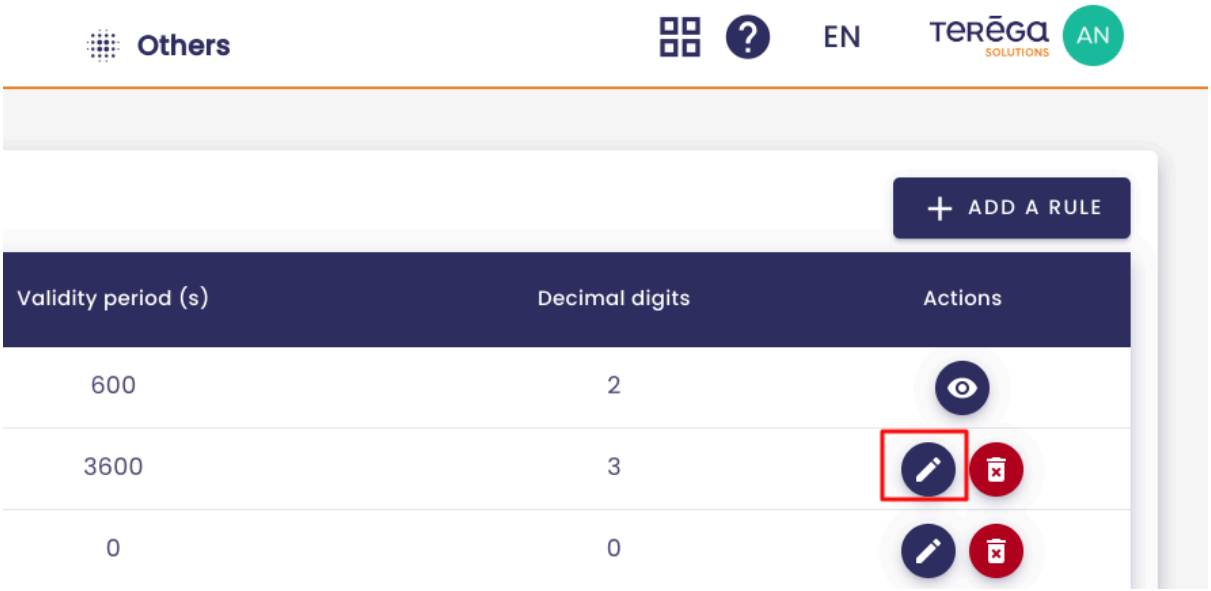
Go to the **Referentials/Storage rules** menu.



The list of existing storage rules appears.

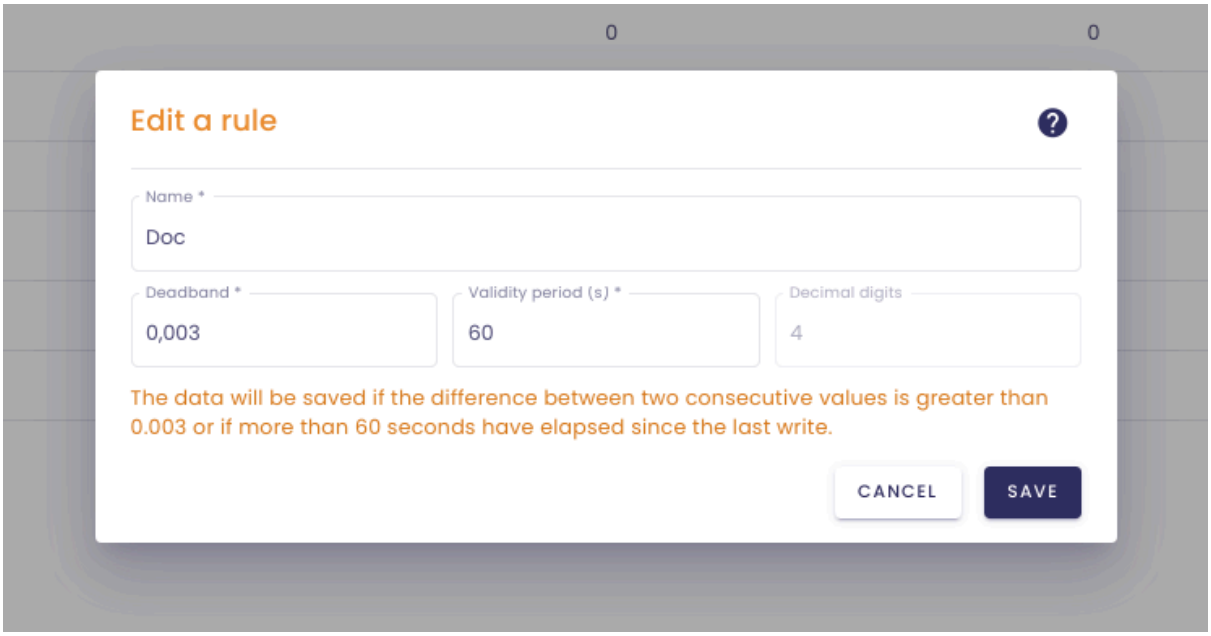


Click on the edit button in the **Actions** column.



The window for entering the rule's properties is displayed. It contains the following fields :

- Name (to identify the rule)
- Deadband
- Validity period (s)
- decimal digits

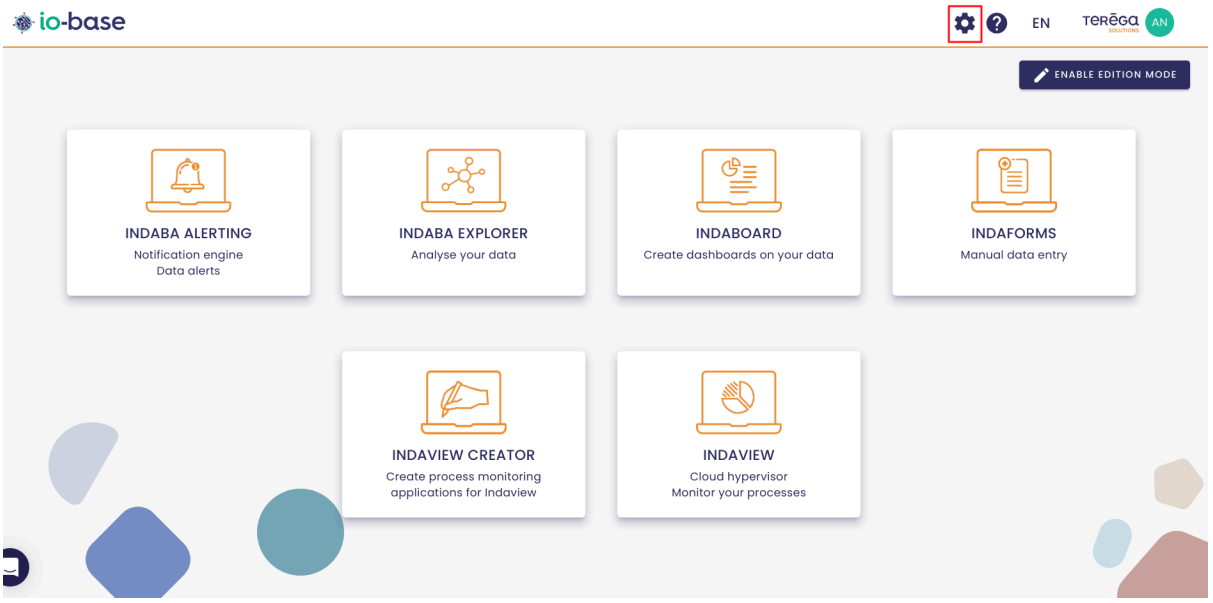


Change the desired values, then click on Save.

3.3 Deleting a storage rule

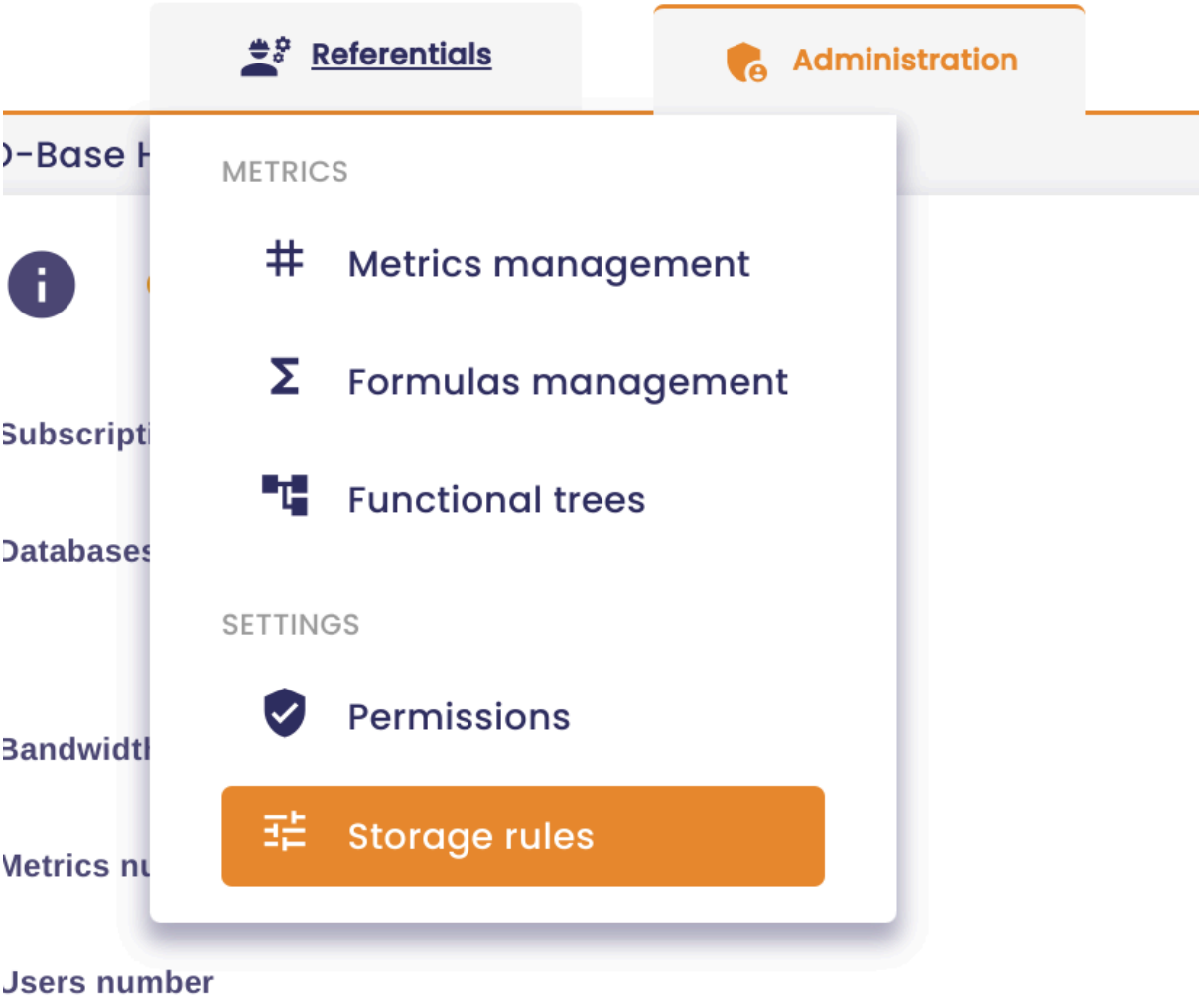
Prerequisite: this feature is available for users with the Functional Administrator role.

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

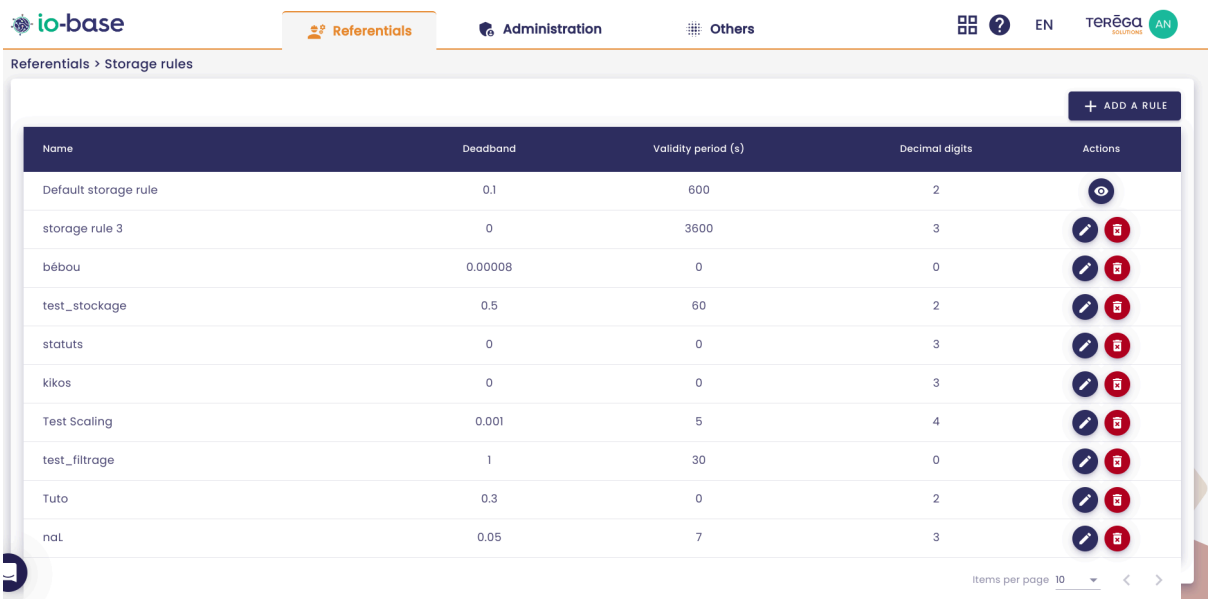


The Io-base administration page opens.

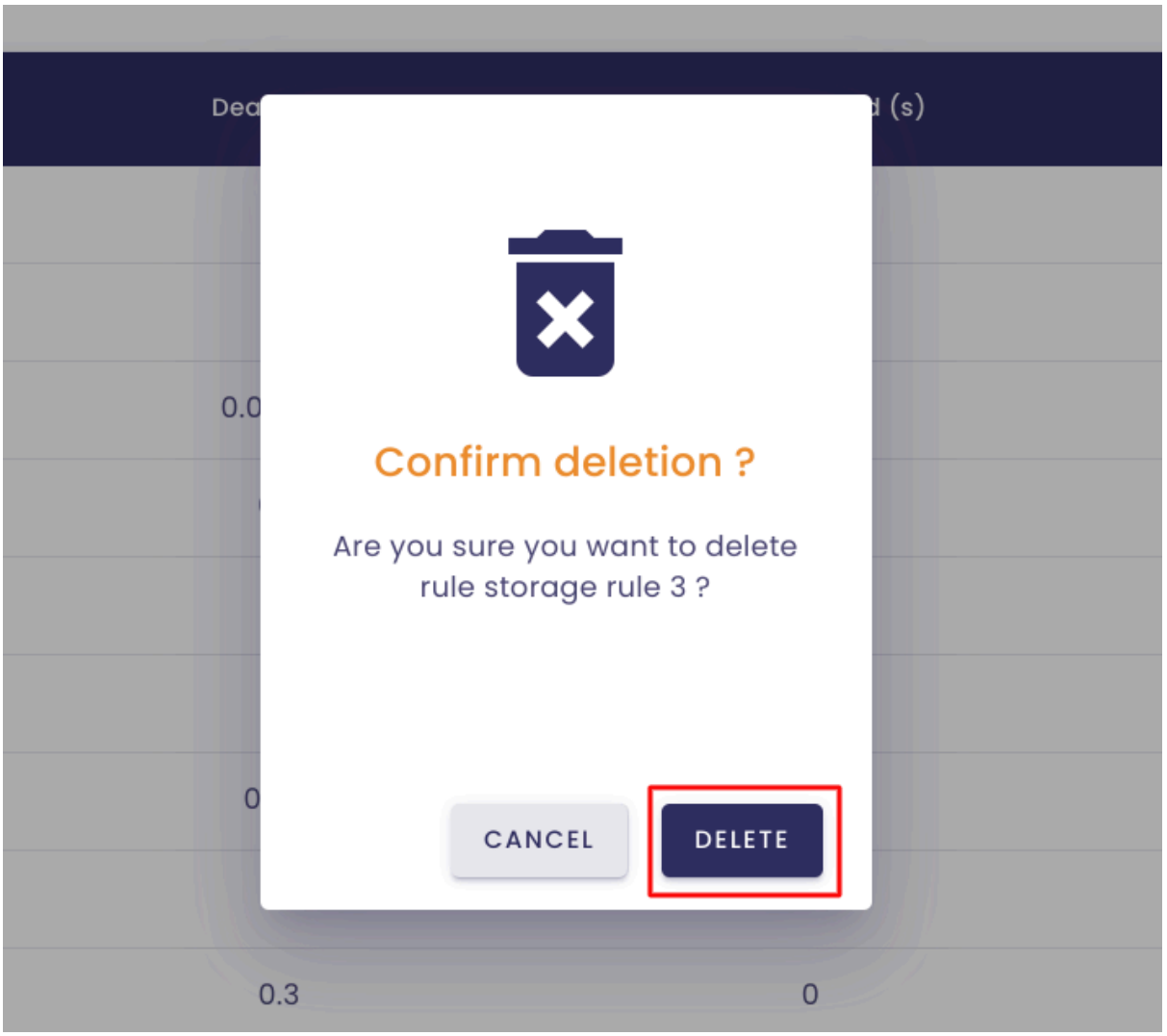
Go to the **Referentials/Storage rules** menu.



The list of existing storage rules appears.



Click on the delete button in the **Actions** column.



Confirm by clicking on **Delete**.

Note : The rule will be automatically removed from the metrics it was assigned to.

4. Functional trees

4.1 Viewing functional trees

Prerequisite : this functionality is only allowed for users with a Functional

Administrator role.

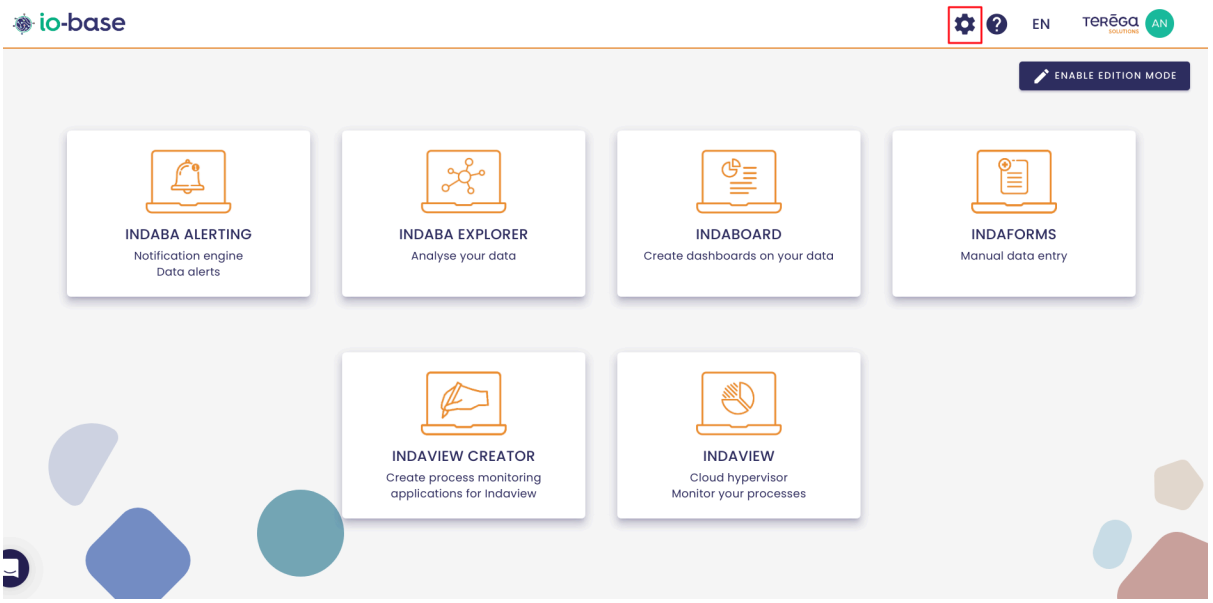
What is the purpose of functional trees?

Functional trees allow you to organize your metrics, so that you can find them more easily. These tree structures are then used in the different io-base bricks (Indaba Explorer, Indaba Alerting...).

You can define several different trees, which will be used by your users according to their needs. The same metric can be contained in several trees.

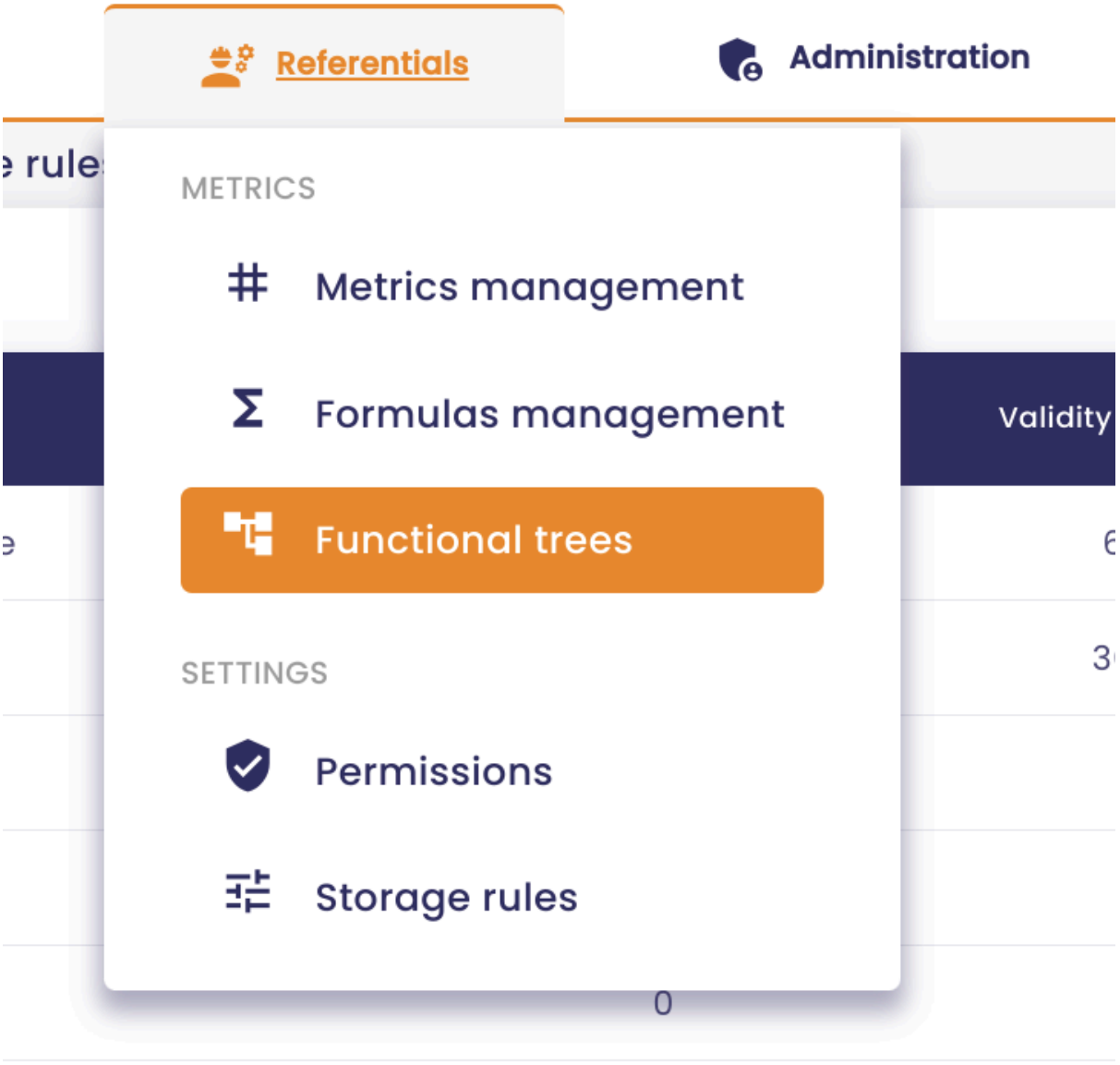
List of functional trees

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

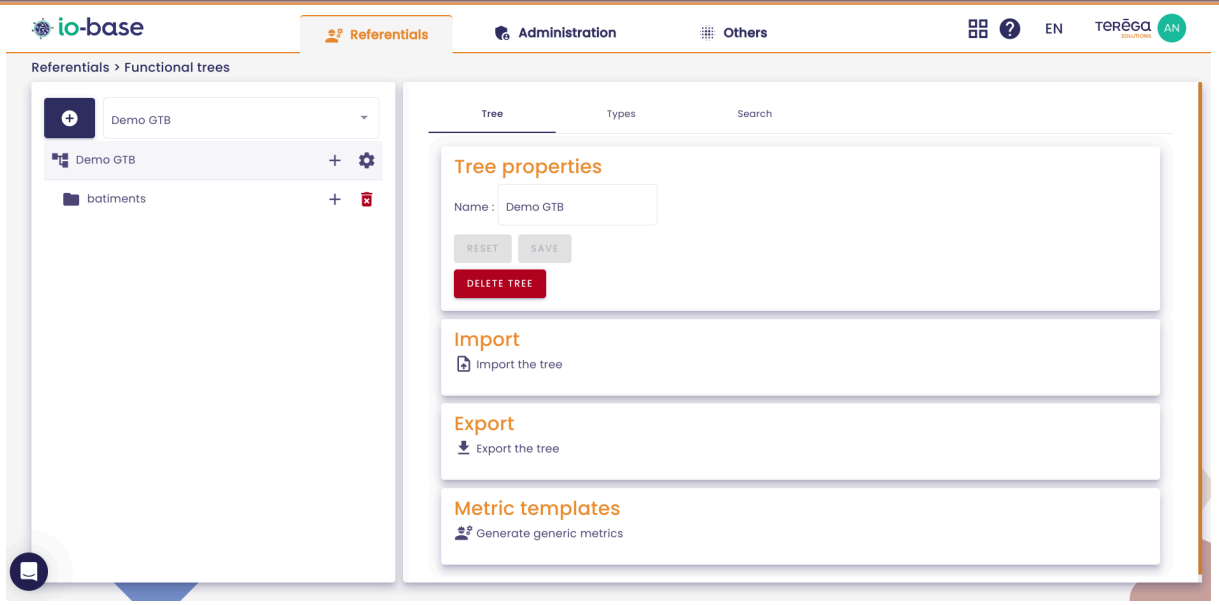


The Io-base administration page opens.

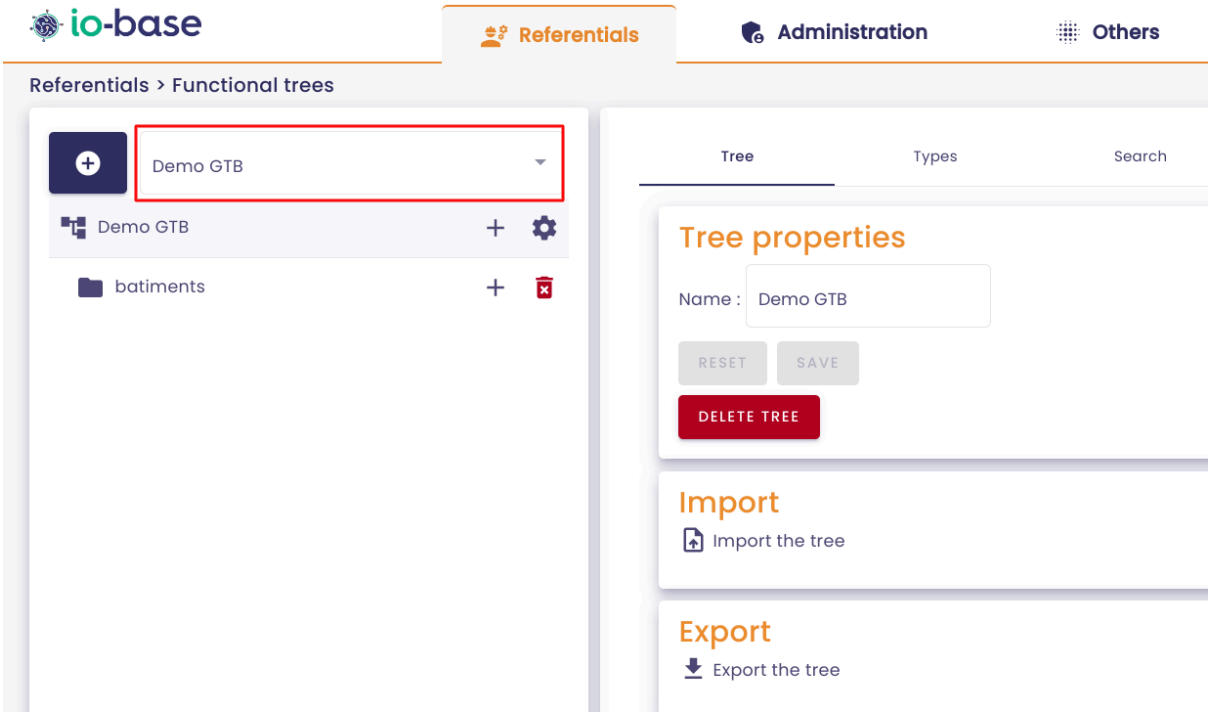
Go to the **Referentials/Functional trees** menu.



The functional trees management screen is displayed.



The list of your functional trees is displayed at the top left.

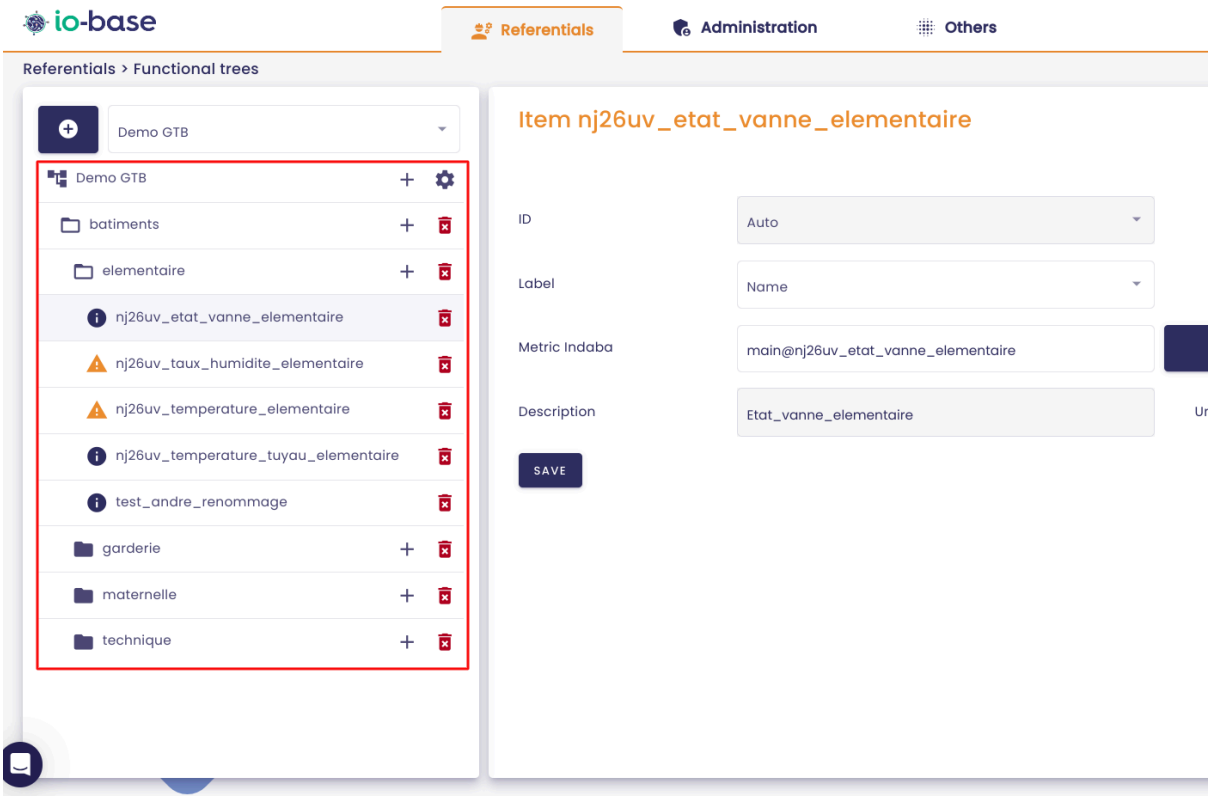


When you select a tree, its content unfolds and you can navigate through the different elements.

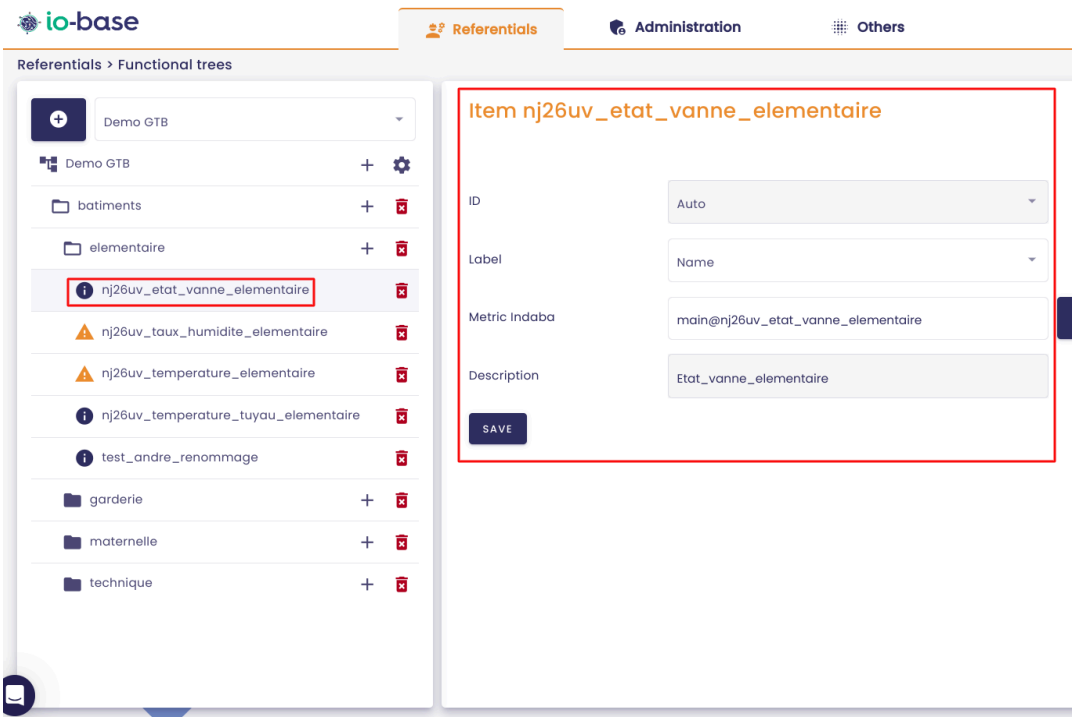
Content of a tree structure

On the left-hand side of the screen, you can navigate through the tree structure

by clicking on the different folders and metrics.



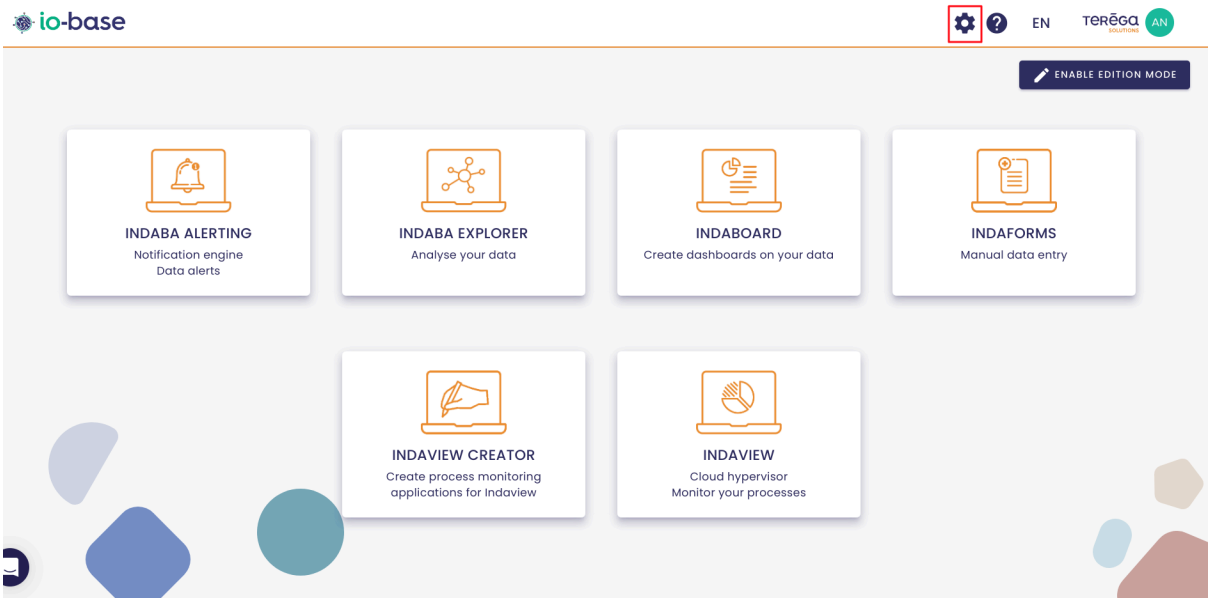
The central part of the screen is updated to show the various properties of the selected item.



4.2 Creating a functional tree

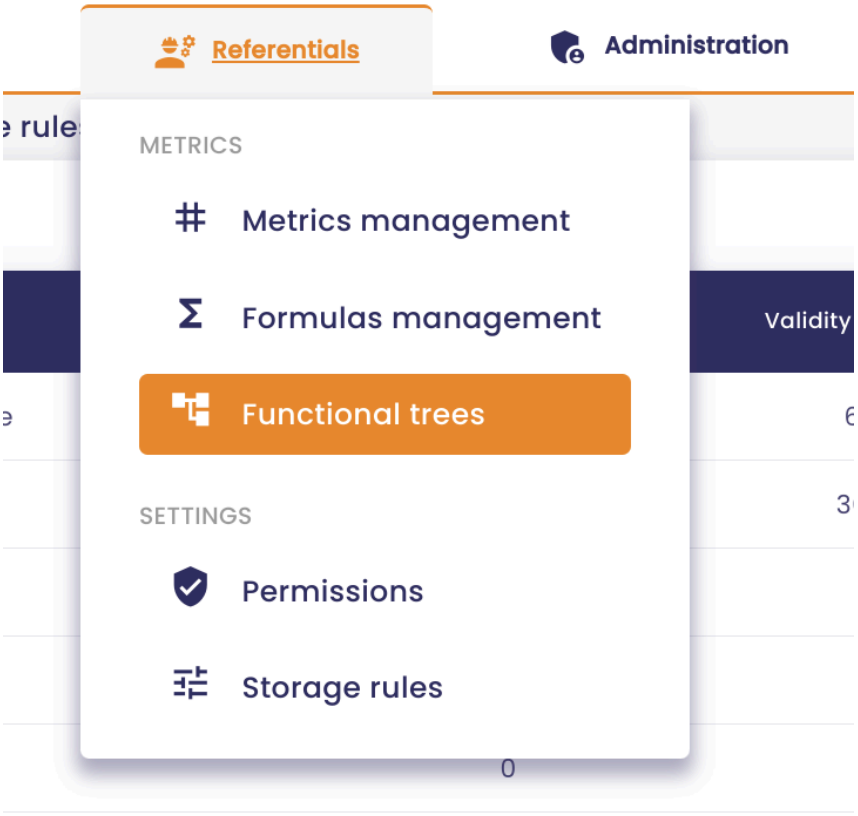
Prerequisites: this functionality is only allowed for users with a Functional Administrator role

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



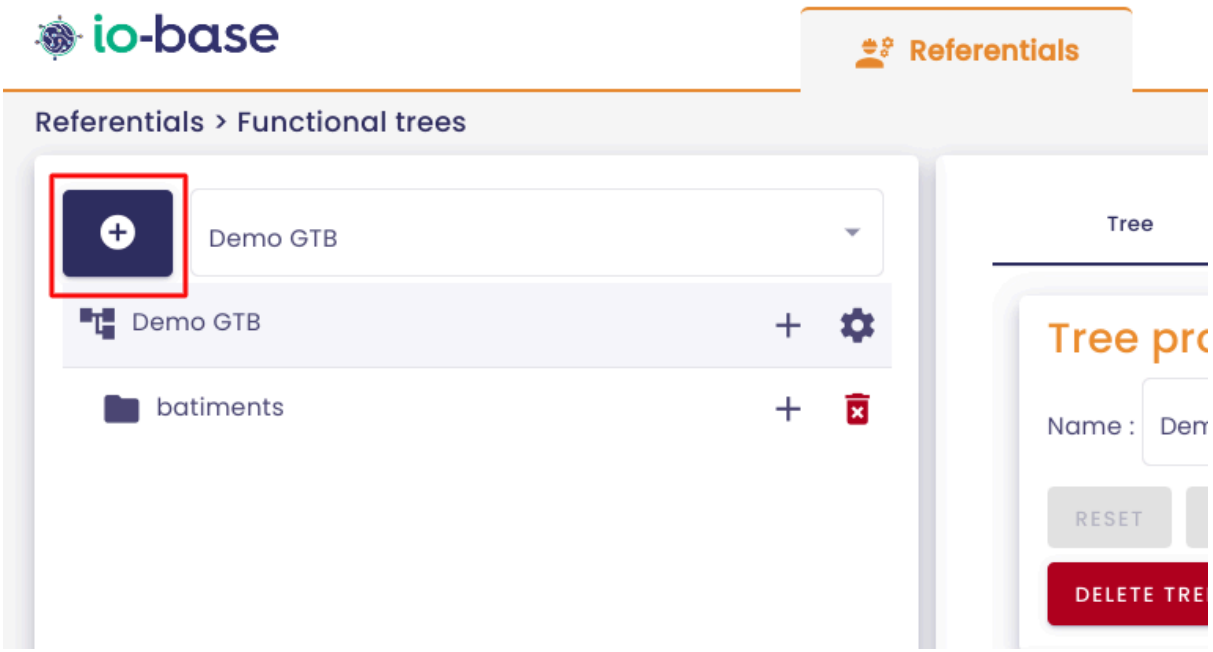
The Io-base administration page opens.

Go to the **Referentials/Functional trees** menu.



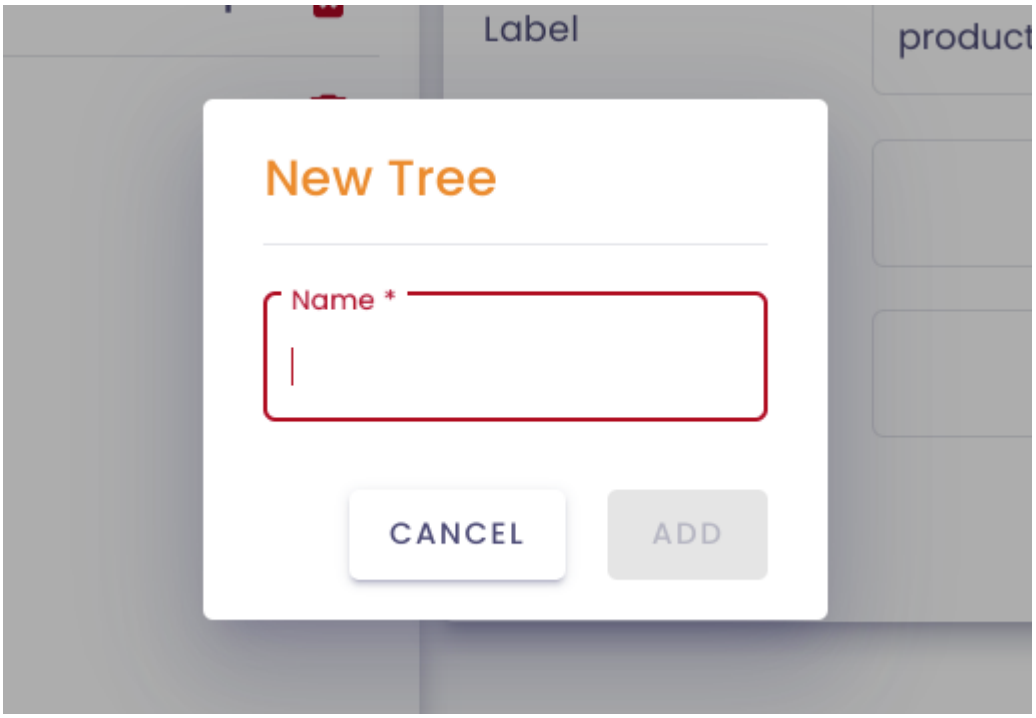
The functional trees management screen is displayed.

To create a new functional tree, click on the "**add button**" at the top left :

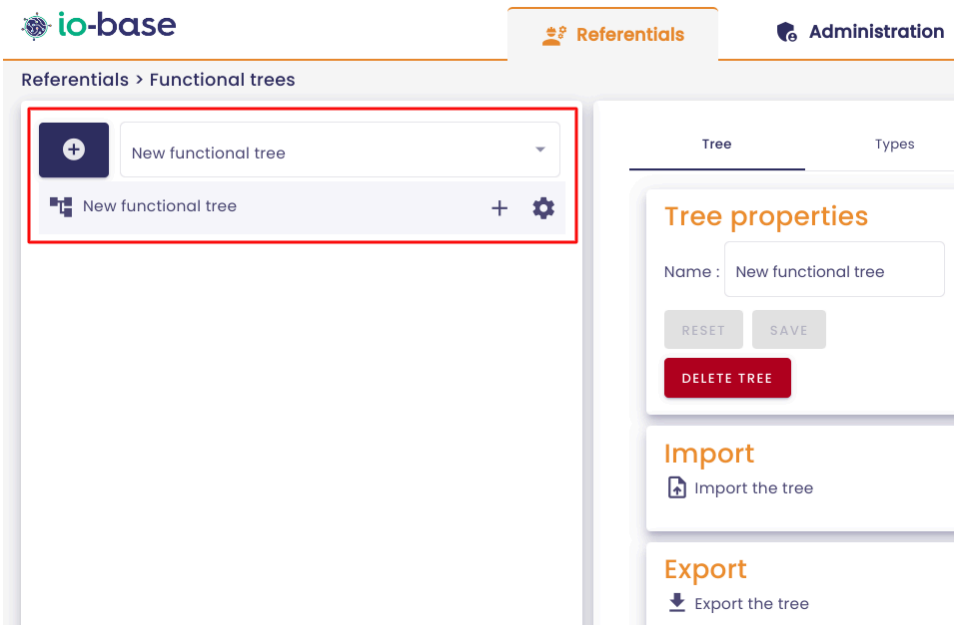


A window appears in which you can define the name of the new tree.

Enter a name, then click **Add**.



The functional tree is created, and appears on the list.



To populate the functional tree, you can use the screens, or the import/export.

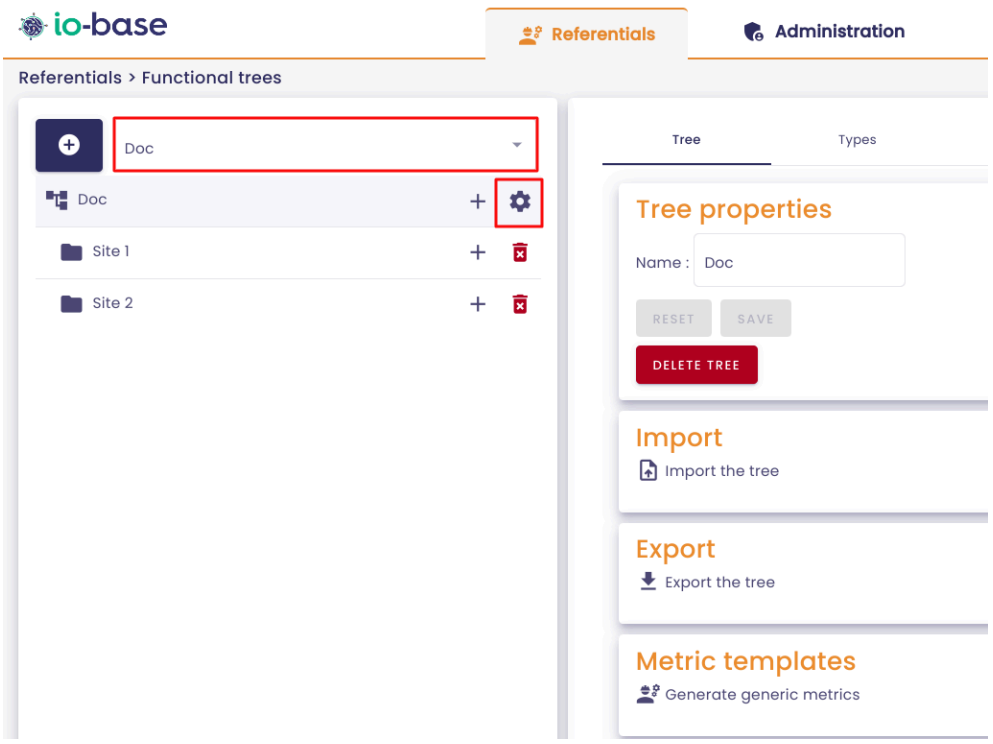
Please refer to the dedicated articles for further explanation.

4.3 Import/export of a complete tree structure

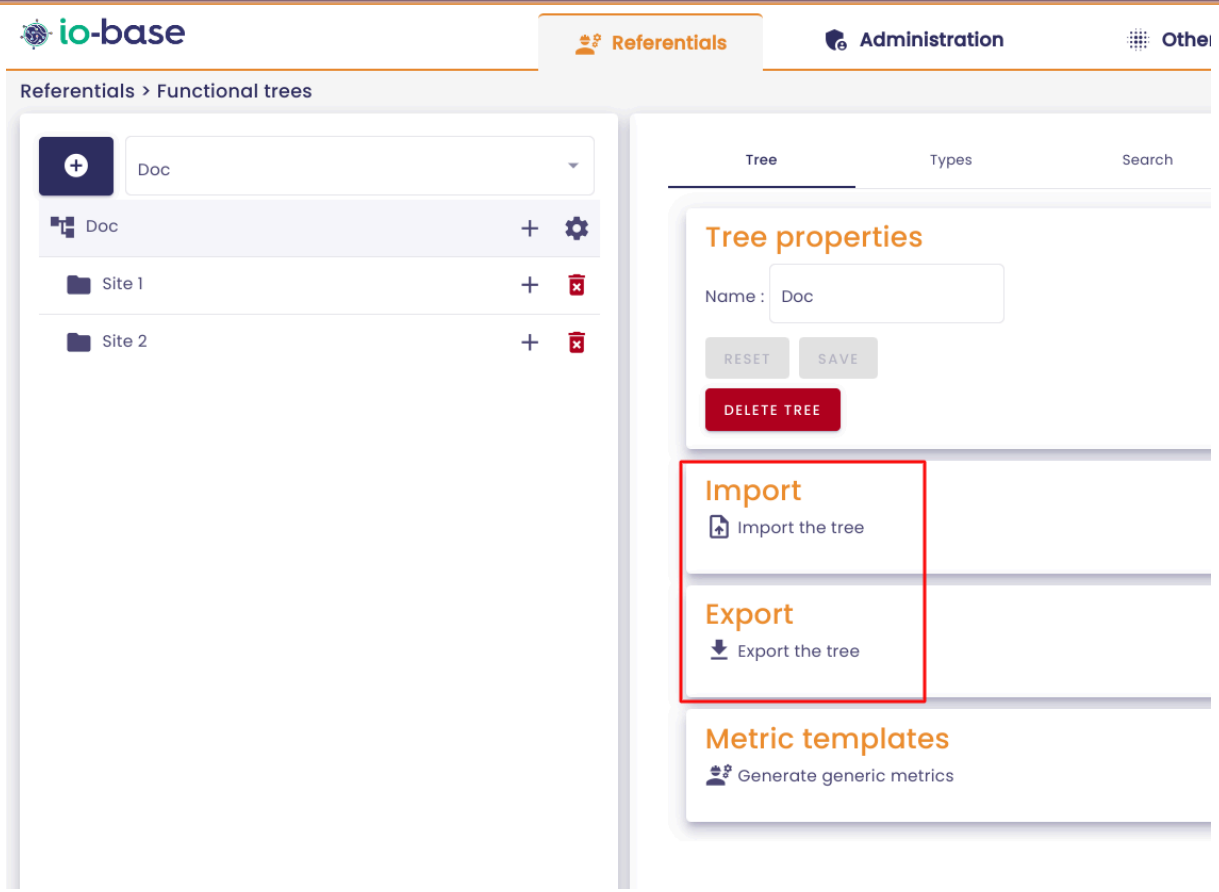
Prerequisites : this feature is only allowed for users with a Functional Administrator role

To manipulate the trees more quickly, it is possible to import/export them and to use an Excel file.

From the **Referentials / Functional tree** menu, select the desired tree and click on the star wheel to display the configuration.

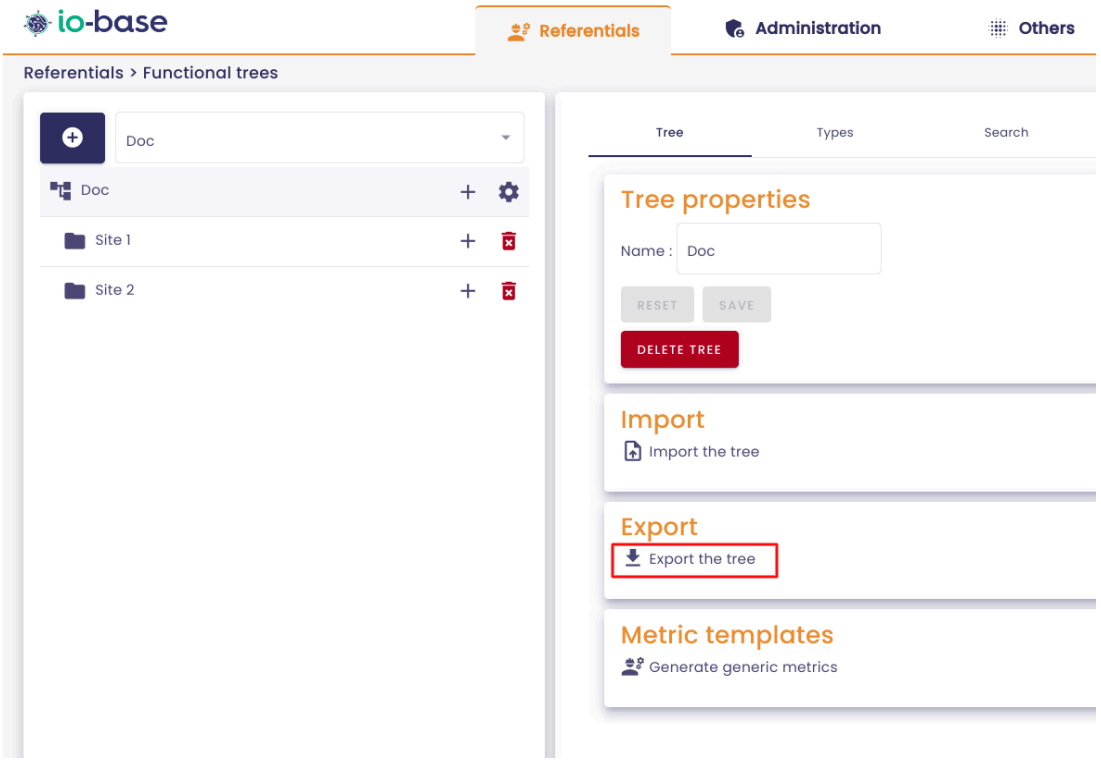


On the right-hand side are the buttons designed to manage imports and exports.

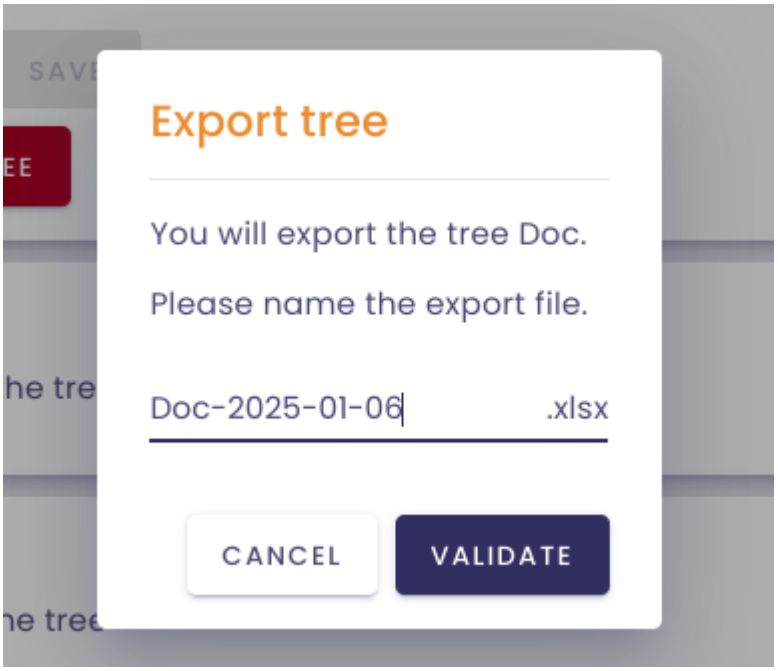


4.3.1 Export a functional tree

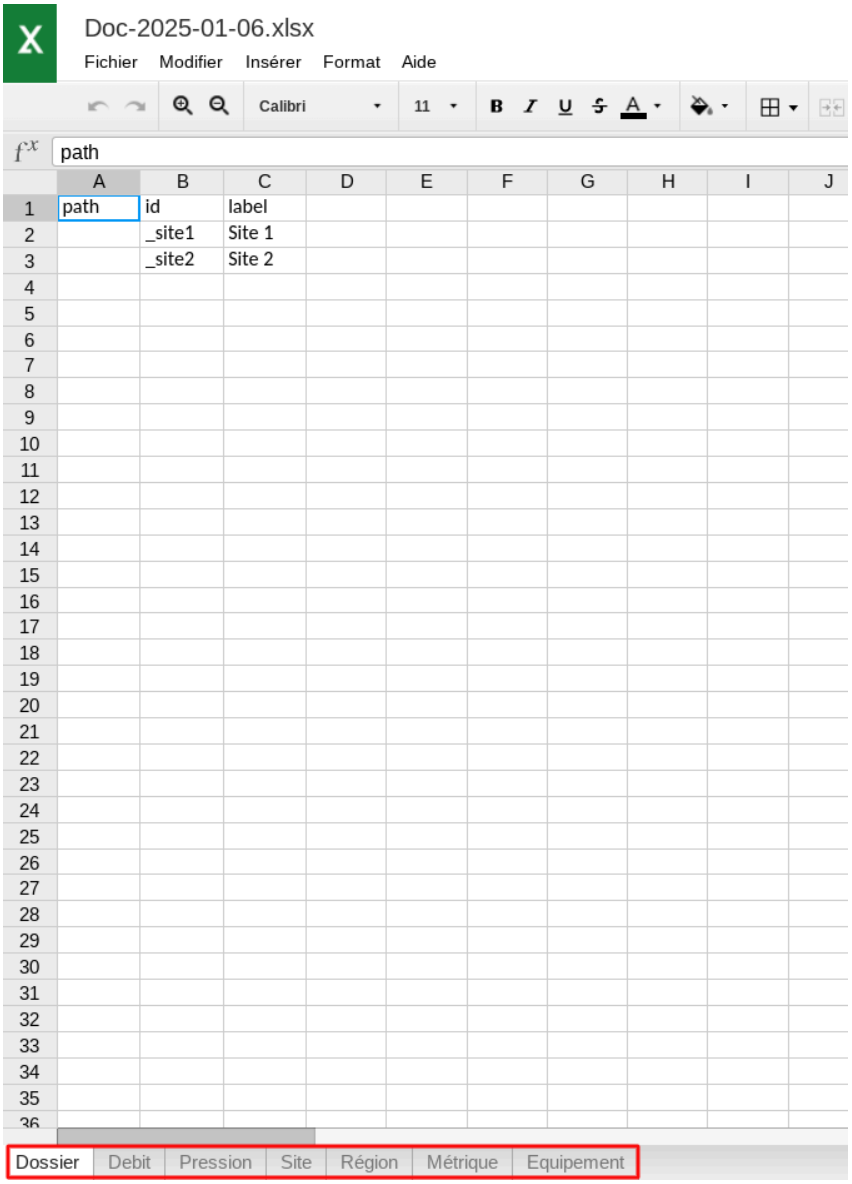
From the functional tree setup screen, click on **Export the tree**.



A window allows you to enter the name of the excel file that will be generated. Then click on **Validate**.



The file will contain as many sheets as there are types in the tree structure. For further details on types, please refer to the dedicated article.



Folder type sheets

Folder type sheets contain 3 columns :

- path : the path of the element in the functional tree (id of the different levels, separated by /)
- id : the identifier of the element

- label : the label of the element.

Note : If you have modified the type properties, the columns will not be the same. Each column corresponds to a property.

You can fill in this sheet to build your functional tree structure.

Metric type sheets

Metric type sheets contain 4 columns:

- path : the path of the element in the tree structure (id of the different levels, separated by /)
- id : the identifier of the element
- label : the label of the element which will be displayed in the tree structure. Here you can enter a variable, which will take the value of the metric:
    - $.metric:name : name of the metric
    - $.metric:description : the description
    - otherwise, enter a custom text
- indabaid: databasename@metricname corresponds to the unique identification of the metric.

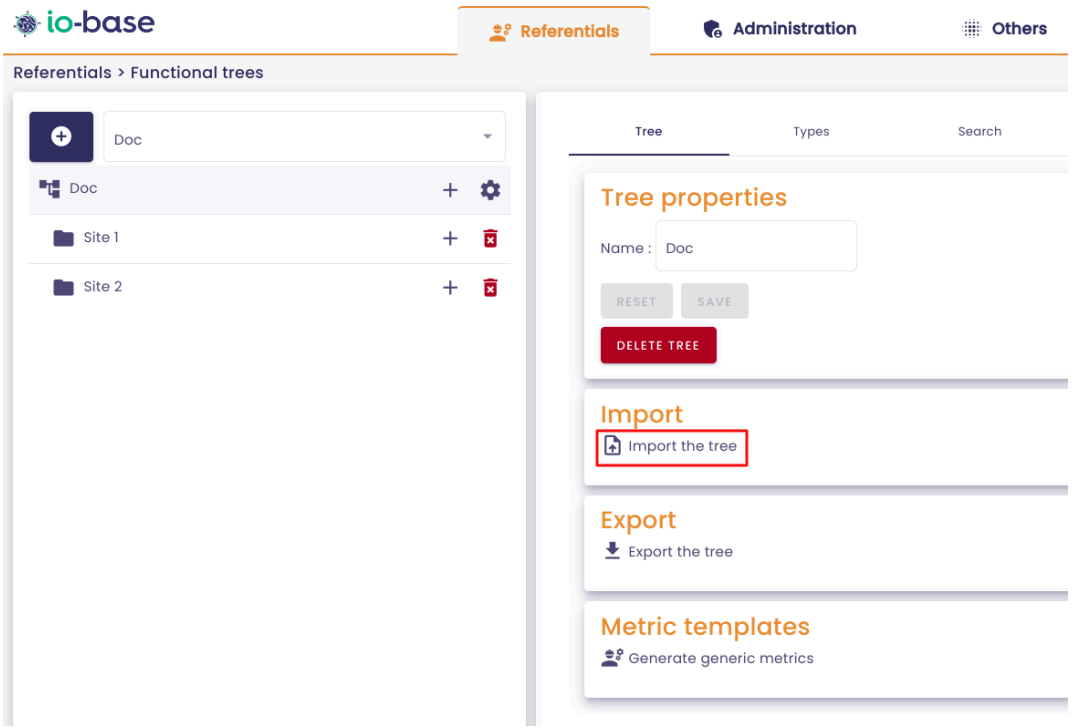
You can populate fill in the sheet, to add metrics to your tree.

Note: If you have changed the properties of the types, the columns will not be the same. Each column corresponds to a property.

Once you have saved your file, you can import it again to apply the changes.

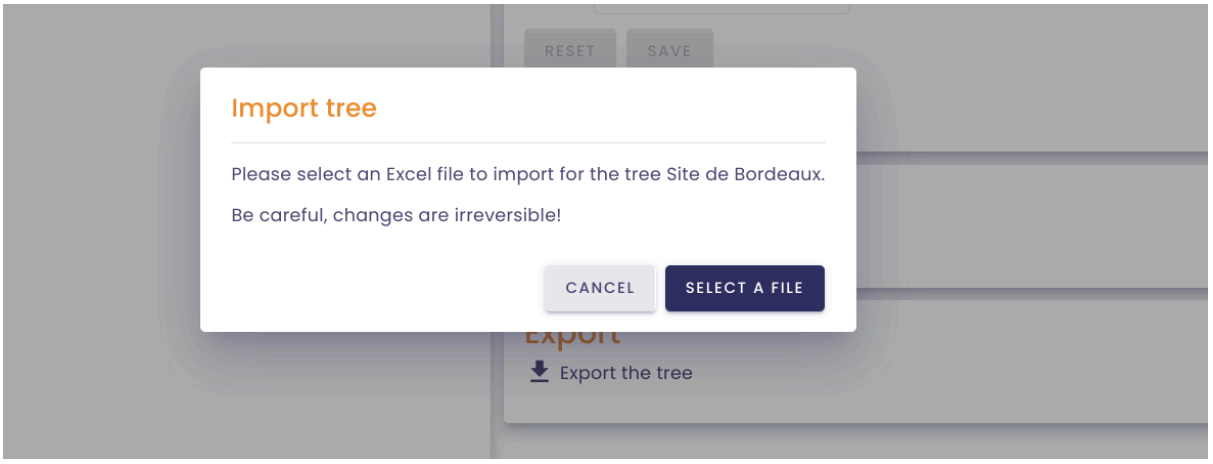
4.3.2 Importing a functional tree

From the functional tree setup screen, click on **Import the tree** :



Warning, make sure you have selected the right functional tree! The import overwrites the selected tree and cannot be cancelled!

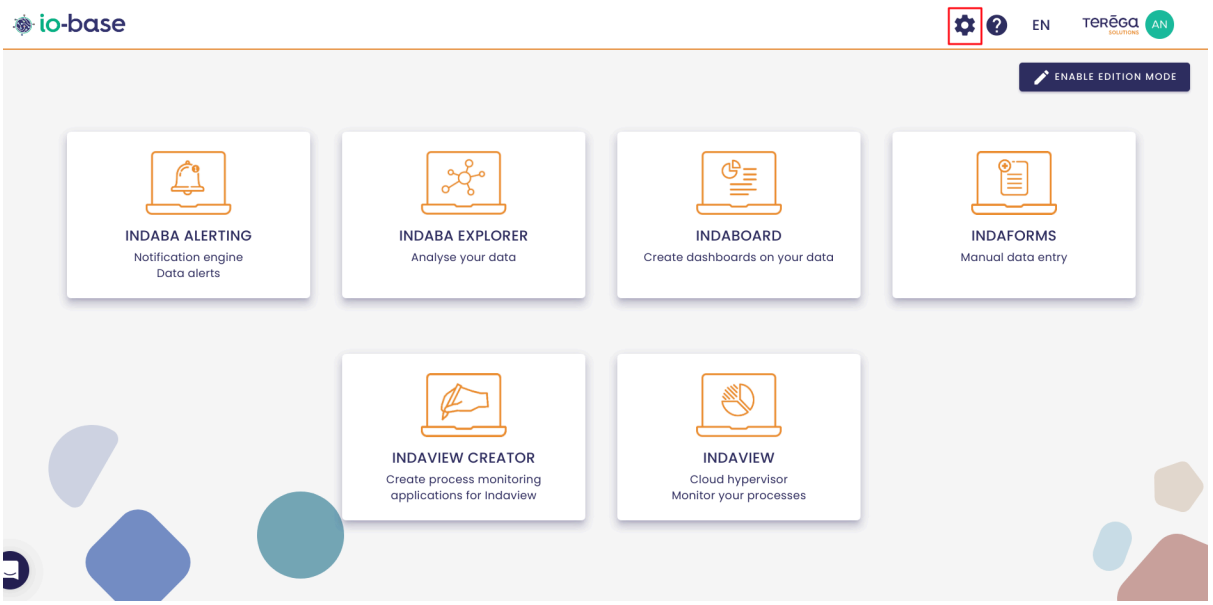
A window is displayed, select the file to be imported.



4.4 Deleting a functional tree

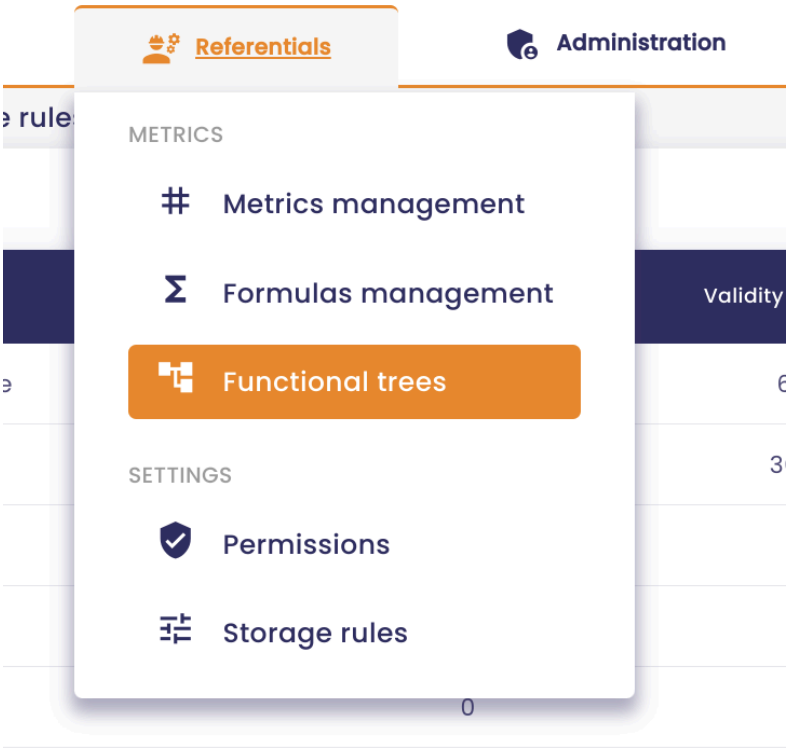
Prerequisite : this functionality is only allowed for users with a Functional Administrator role

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



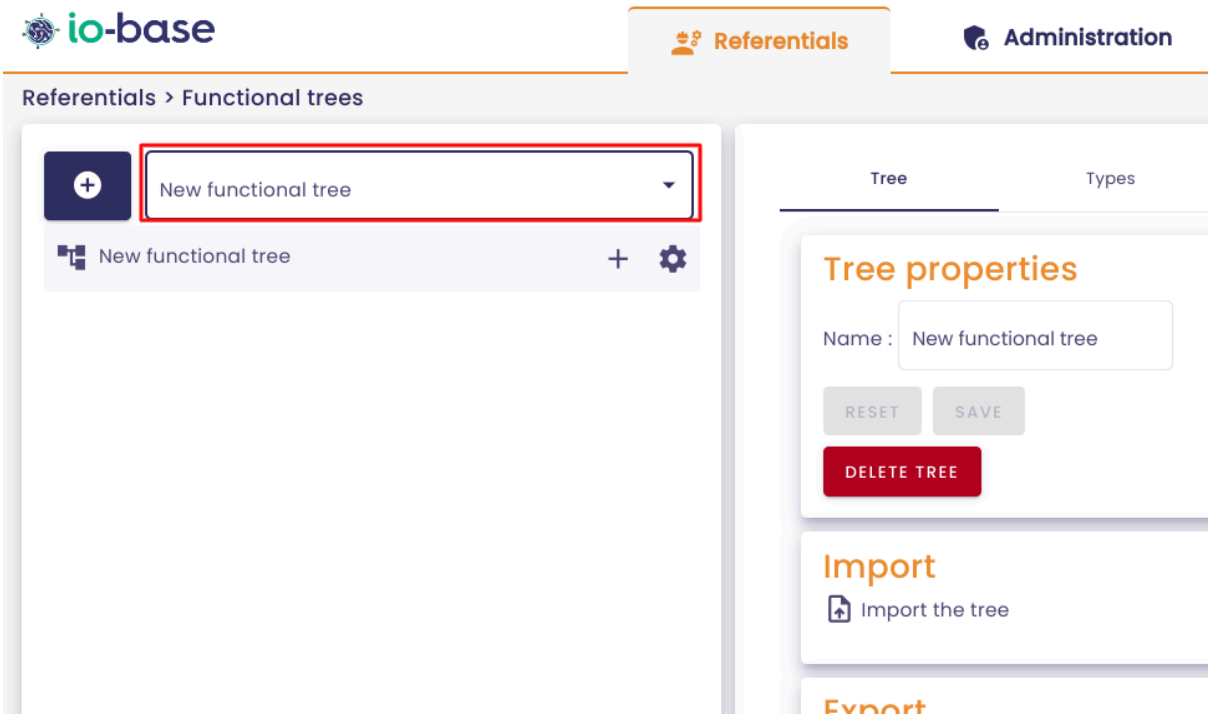
The Io-base administration page opens.

Go to the **Referentials/Functional trees** menu.

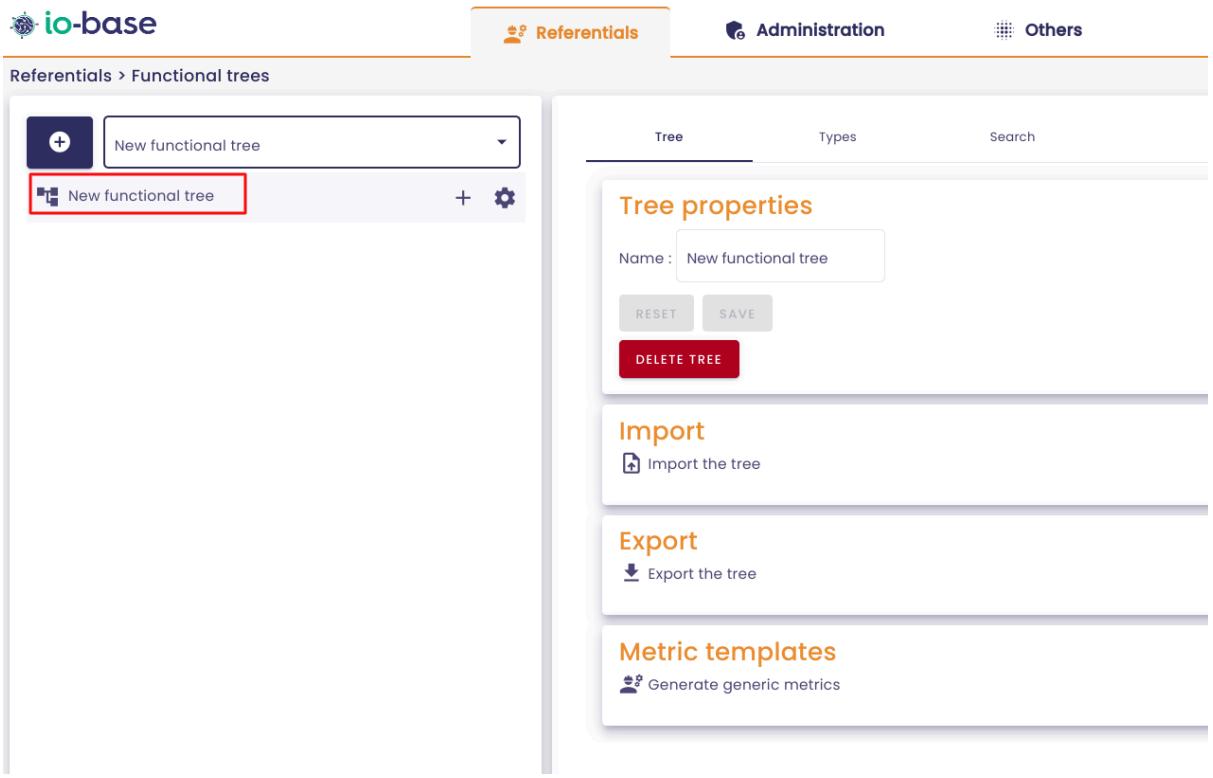


The functional trees management screen is displayed.

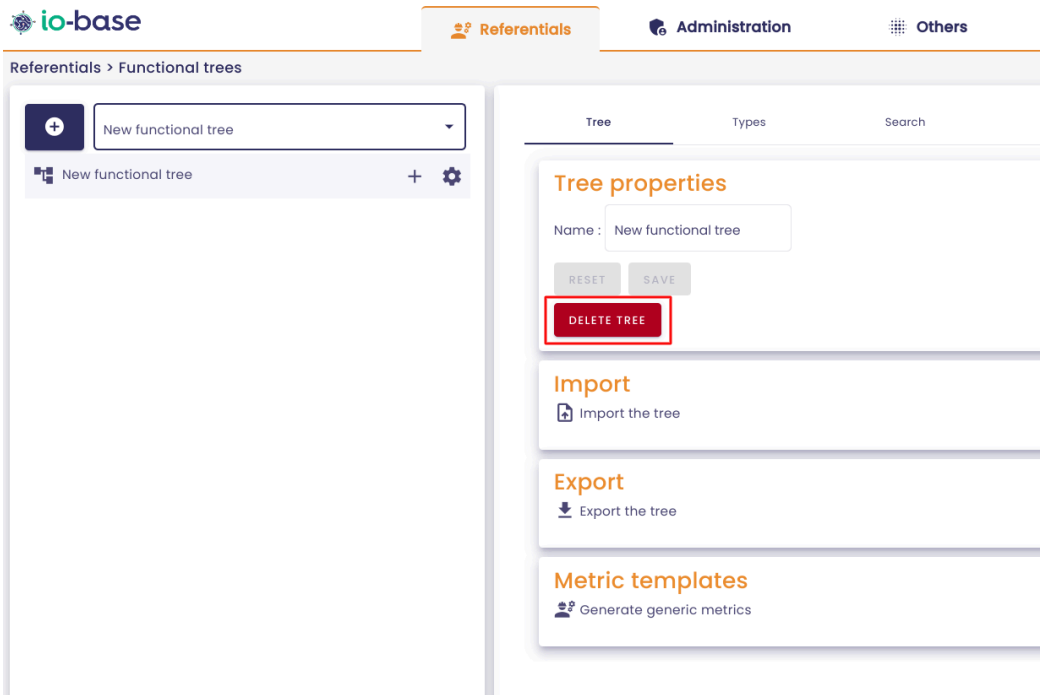
Select the tree to be deleted from the drop-down list.



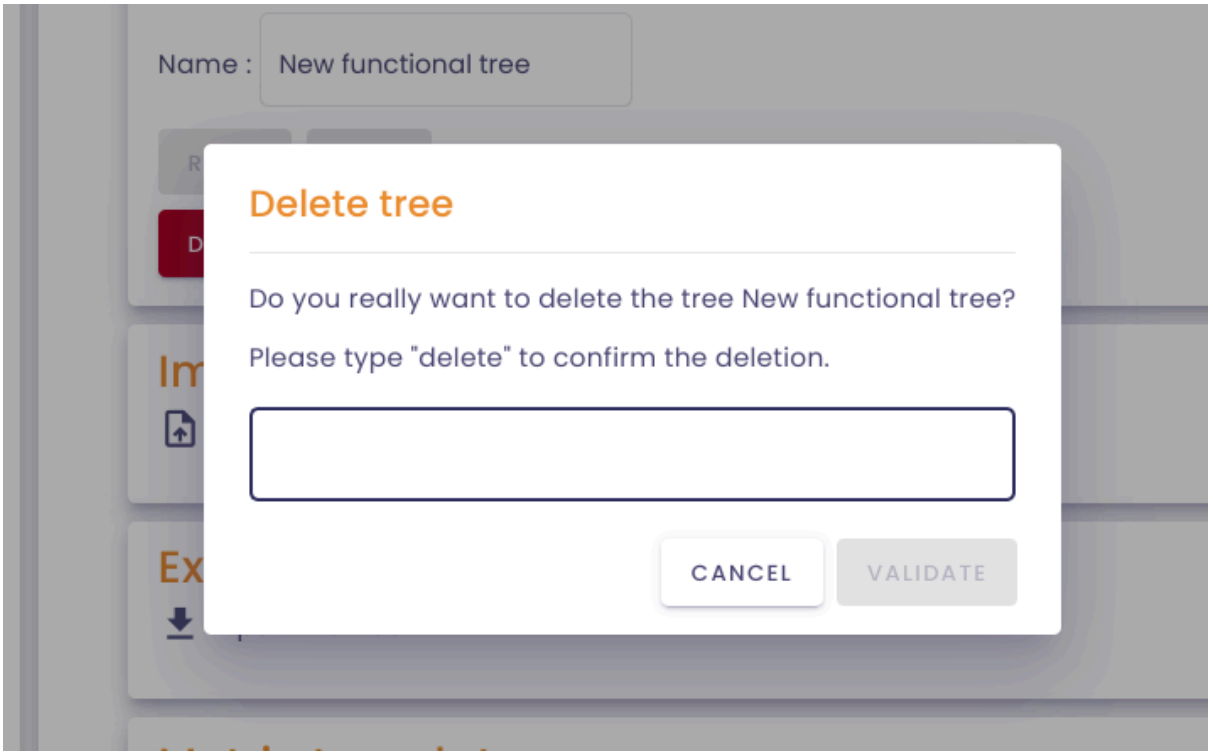
Click on the name of the functional tree to display its properties.



In the **Tree** tab, click on the **Delete Tree** button



In the confirmation window, enter **delete** to confirm the deletion, then click on **Validate**.



The tree is deleted, and no longer appears on the list.

Note: deleting a tree does not delete the metrics it contains.

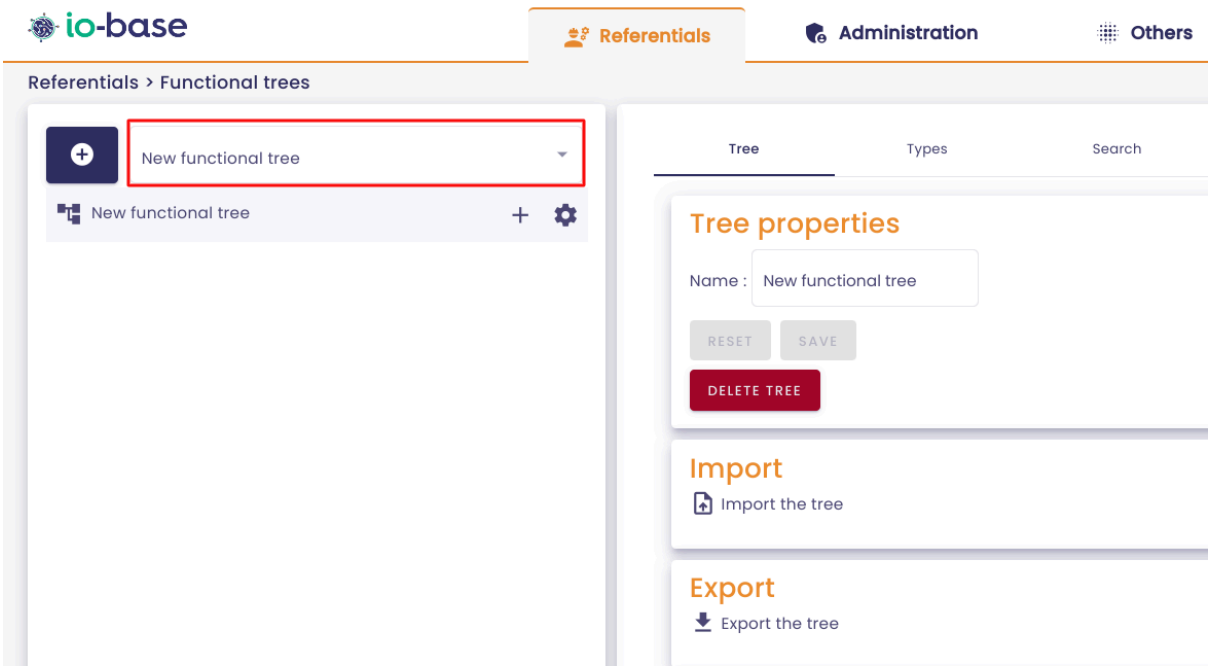
Once the tree is deleted, it is no longer possible to use it in io-base (Indaba Explorer, Indaba Alerting...)

4.5 Editing elements of a tree structure

Prerequisite : this functionality is only allowed for users with a Functional Administrator role

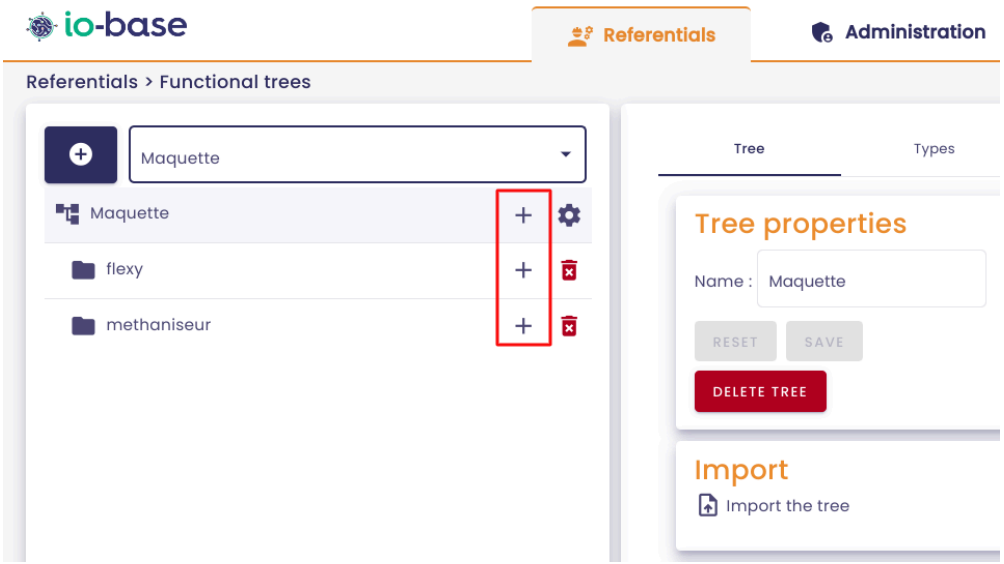
Connect to **io-base**, and access the **Referentials / Functional Tree** menu.

In the drop-down list, select the tree structure you wish to edit.

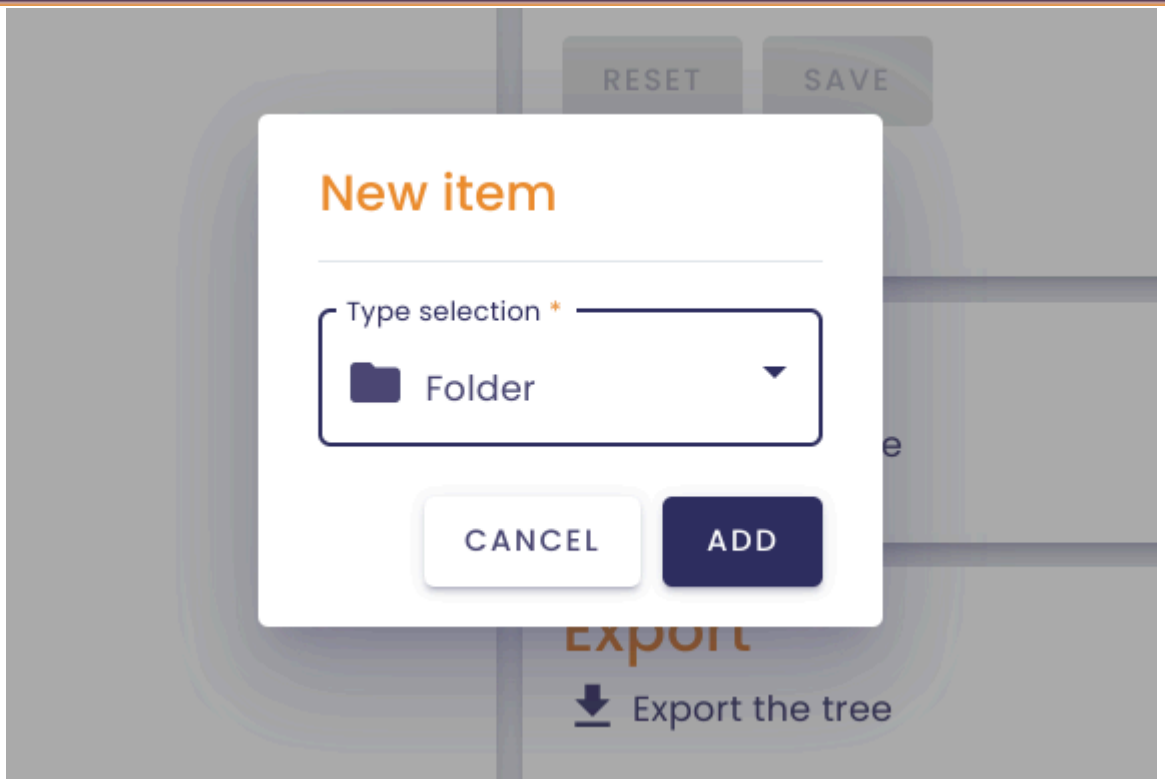


4.5.1 Adding an item to a tree

Functional trees behave like trees in a file explorer. To add an item, click on the + button at the level where you want to add an item.



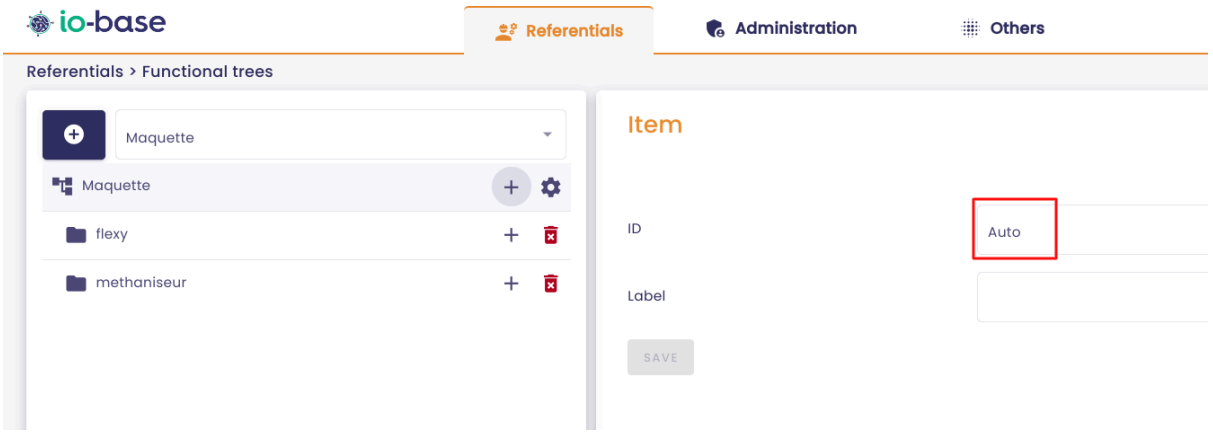
A window appears, allowing you to choose the type of item to be added.



For further details on types, and how to add them, please refer to the dedicated article.

4.5.2 Adding a folder type item

Once the type is selected, a property window appears on the right. It allows you to choose whether you want a default generated identifier, or to define your own identifier. This can be useful, especially if you are handling Json exports.



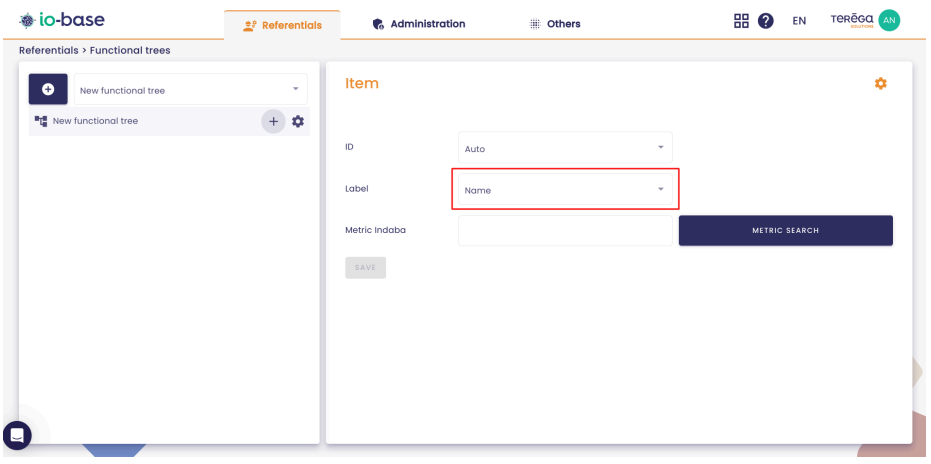
Once the name and ID have been entered, click on Save to **validate**.

The item appears in the tree structure.

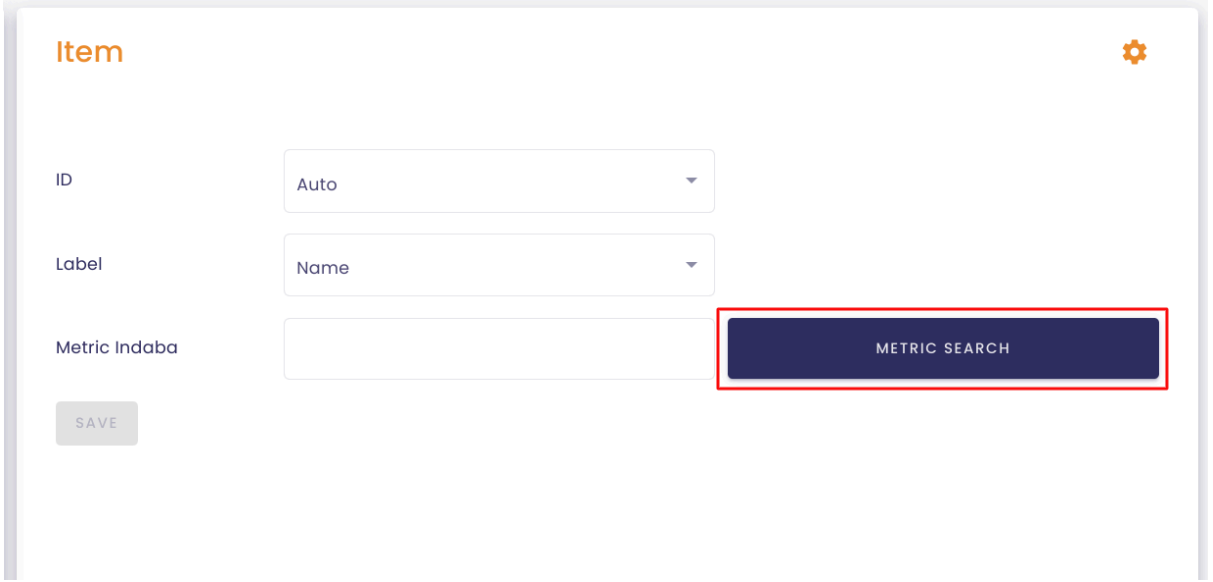
4.5.3 Adding a metric element

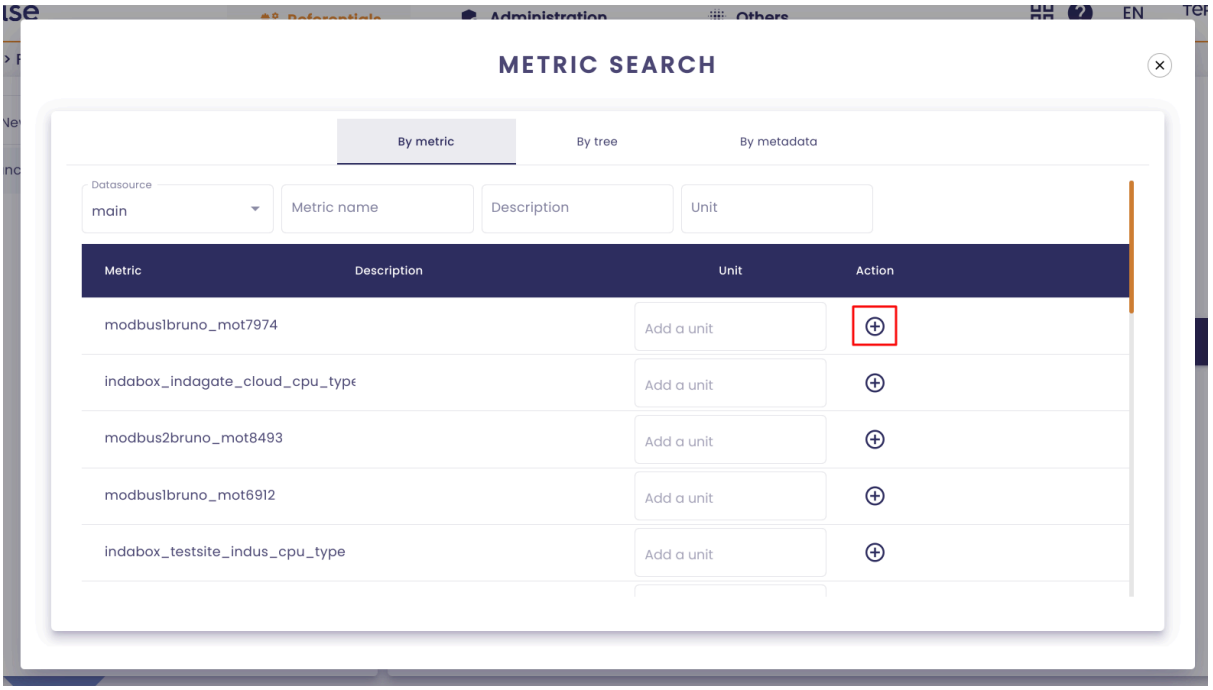
Once the metric type is selected, a property window appears on the right. It allows you to choose whether you want a default generated identifier, or to define your own identifier.

The **Label** field allows you to choose which property of the metric will be displayed in the tree view.



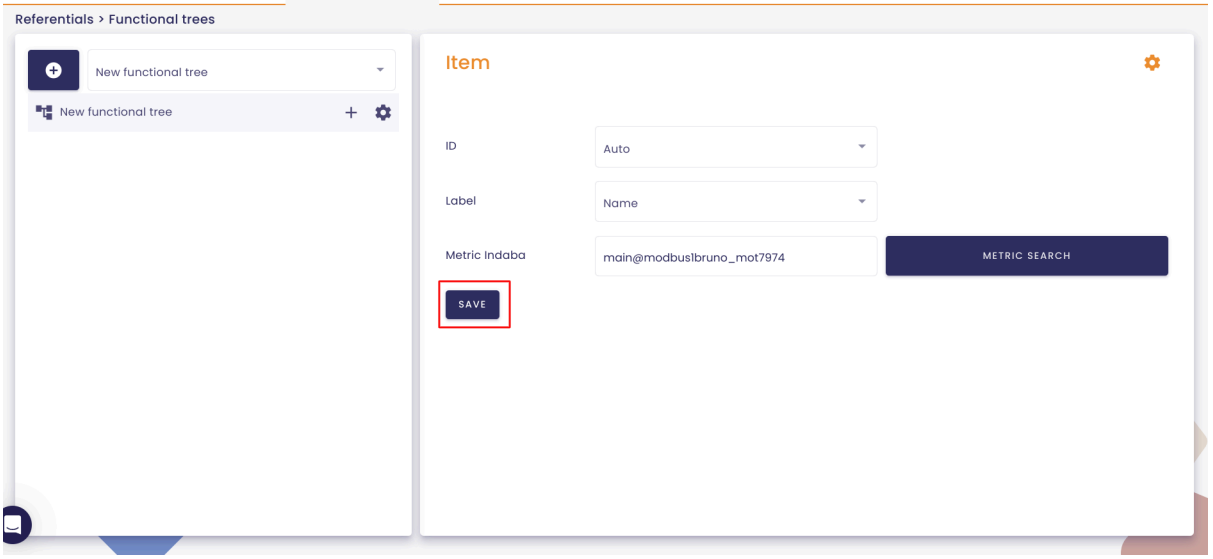
Then use the **Metric Search** button to select the desired metric.





Note : Only one metric can be selected at a time.

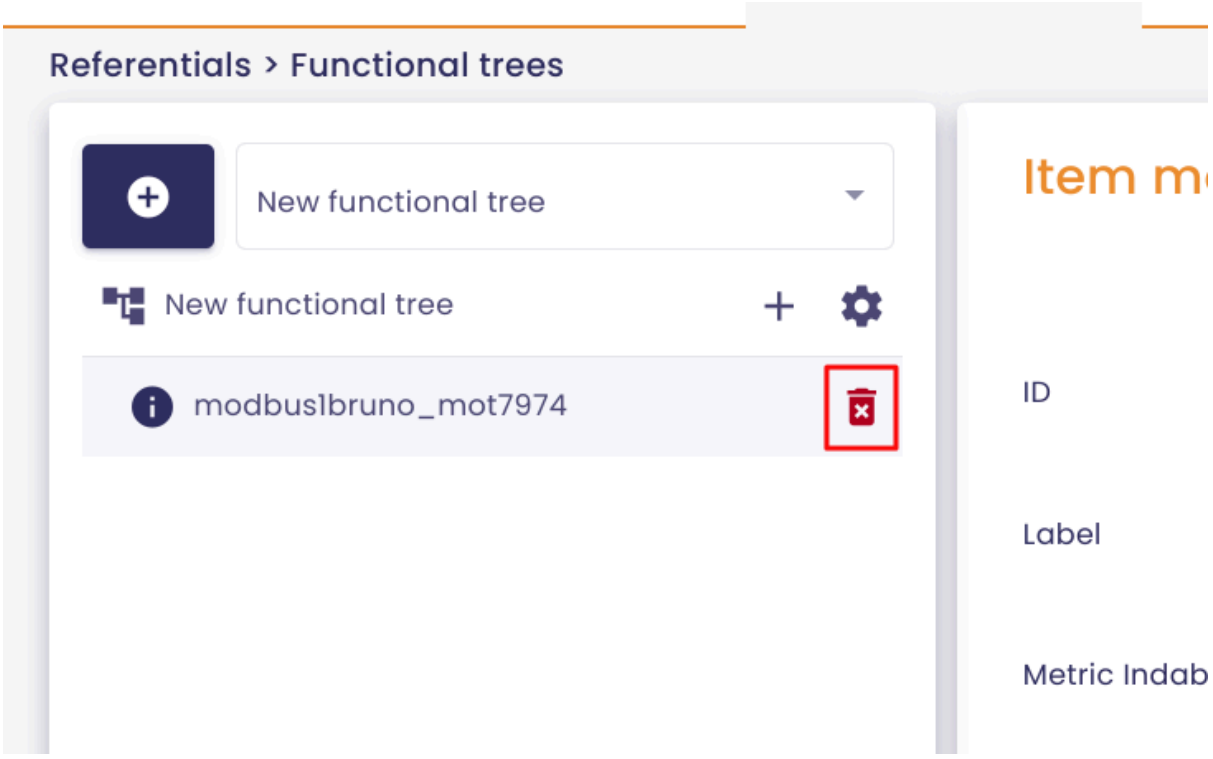
Click on **Save** to validate.



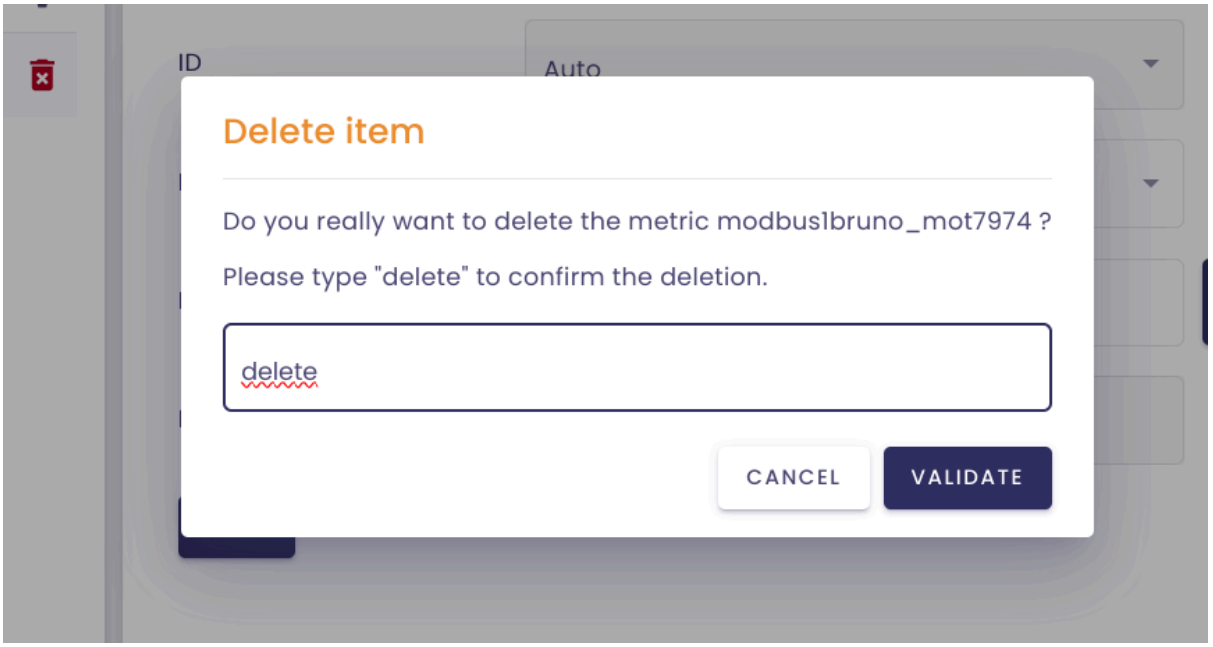
Note : Metrics can be located at any level of the tree structure, and even at different levels.

4.5.4 Delete an item from a tree

To delete an item from a tree, click on the bin on the right of the item's name.



A confirmation message appears. To validate the deletion, enter **delete** and **validate**.



Note : to modify a tree structure, you can also use an **import/export**. Please refer to the dedicated article for further details.

4.6 Functional tree configuration

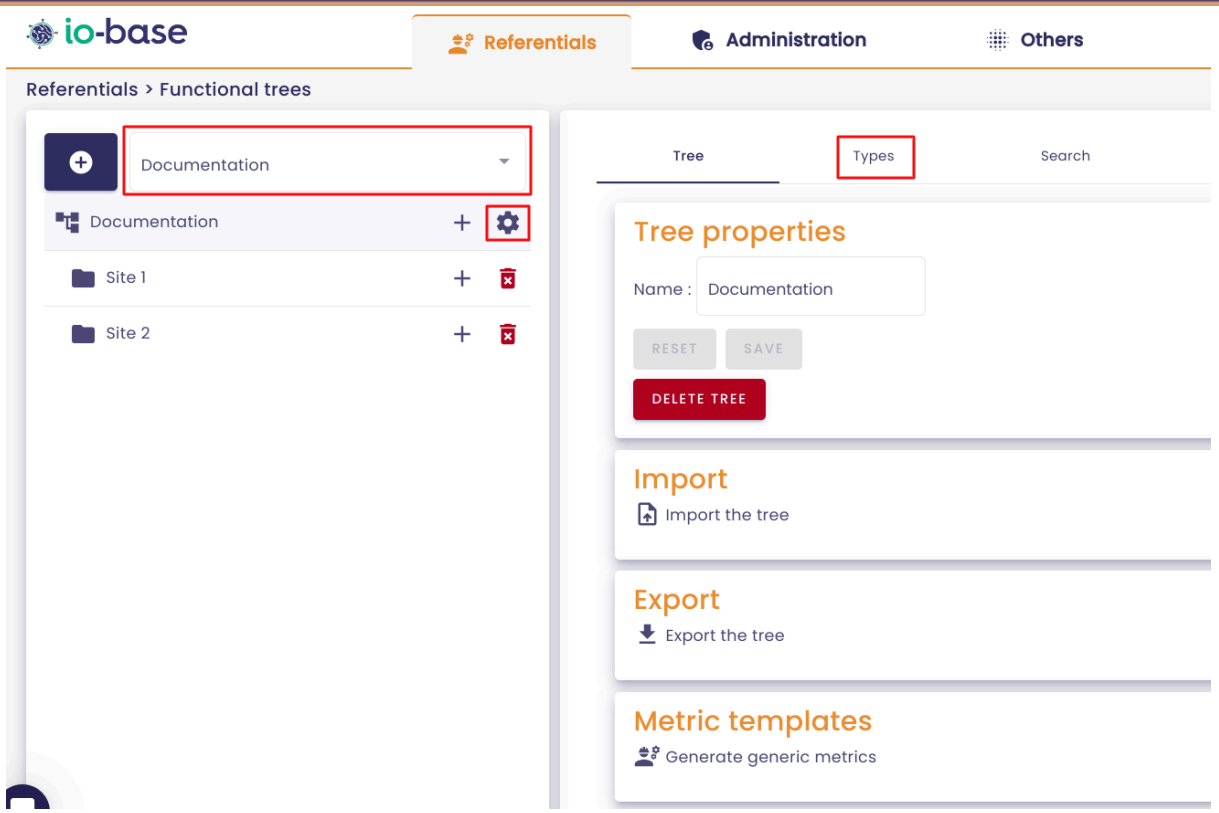
4.6.1 Modifying properties in a tree structure

Prerequisite : this functionality is only allowed for users with a Functional Administrator role

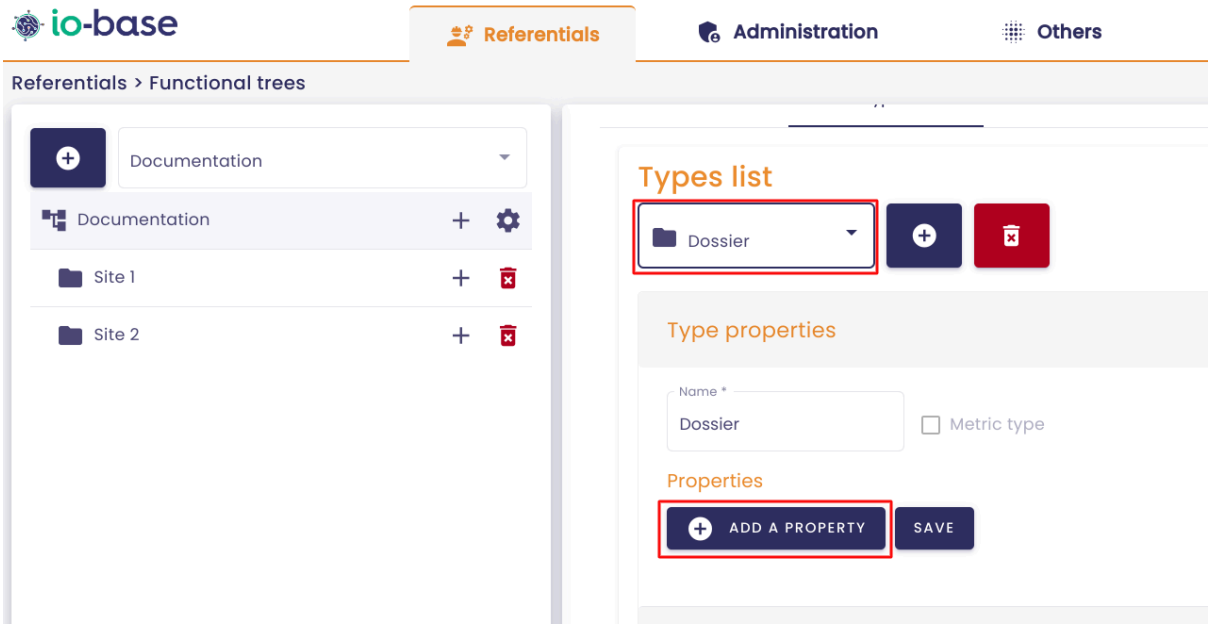
Functional trees are made up of elements of different types. By default, these types have an identifier and a name. But it is also possible to define other properties for them.

Defining the properties of a type :

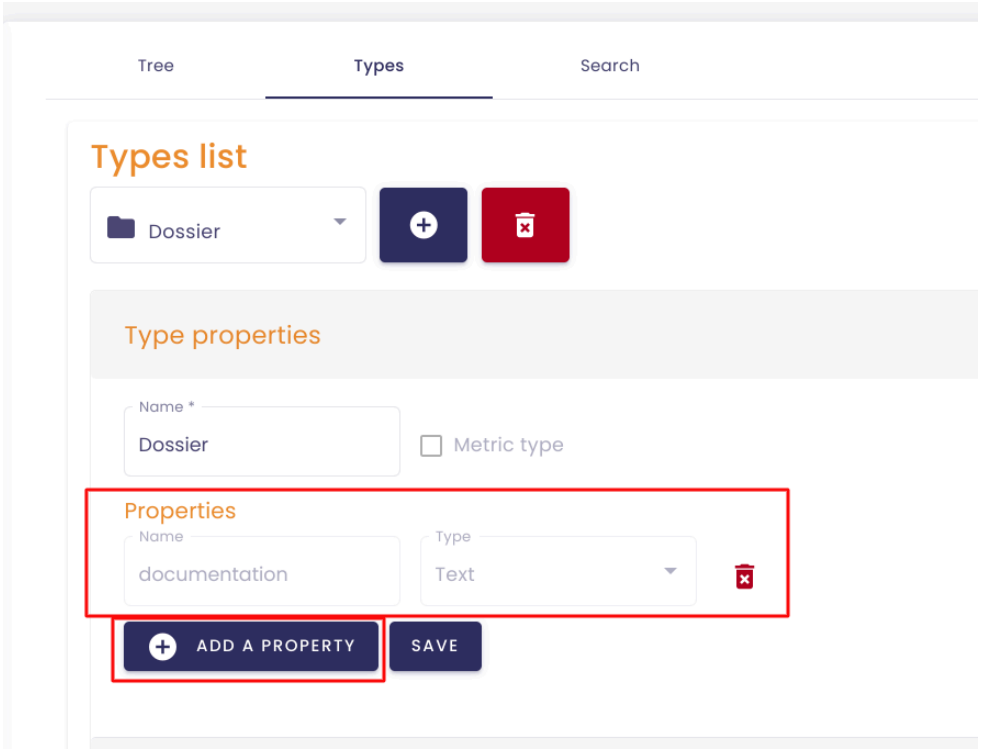
Select the desired tree, then click on the star wheel to display the configuration. Then select the **Types** tab.



The list of types is displayed. You can then choose a type and add a property to it by clicking on **Add a property**.



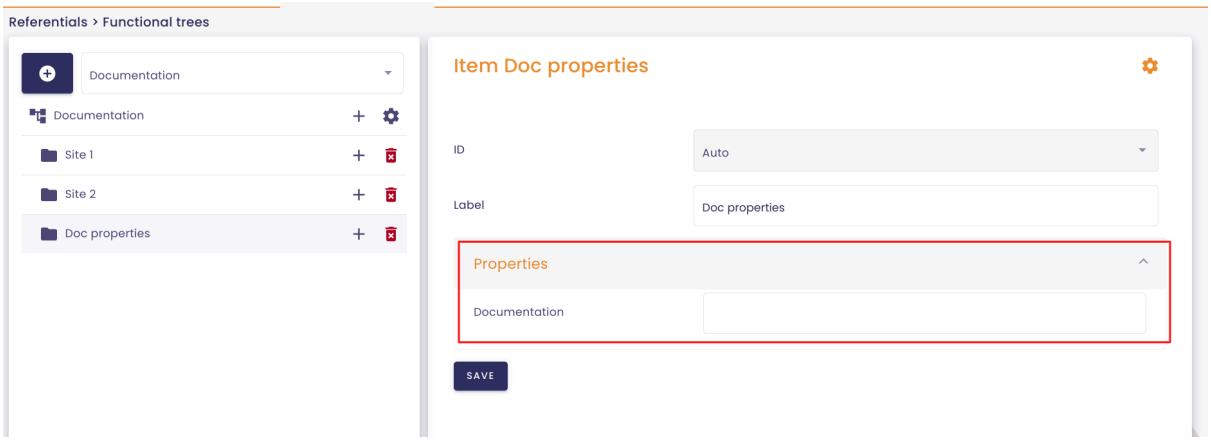
Enter a name, a type and click on **Save**.



You can delete properties by clicking on the recycle bin on the right.

Property values for the elements

For each item in the tree, you can assign values to the properties of its type. To do this, select the item in the functional tree.



The set of properties for the type appears on the right-hand side. You can enter all the values that correspond to the item and then click **Save**.

Note : By clicking on the star wheel at the top right, you can access directly to the type properties edit screen.

4.6.2 Editing the functional tree types

Prerequisite: this functionality is only allowed for users with a Functional Administrator role

Functional trees allow you to organize your metrics in a way that makes them easier to find. Metrics are stored in a tree, like a file explorer.

By default, the elements that make up a tree can be of two types:

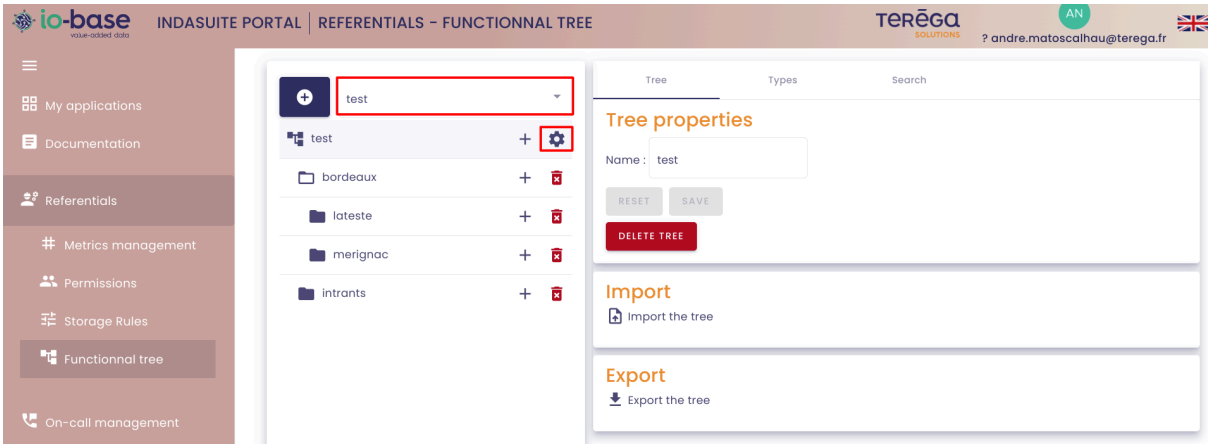
- **Folder**: allows you to create a sub-level, which is generic
- **Metric**: allows you to add a metric element, which is generic

You have the possibility to create more specific types. This way, you can add properties to them later on, which will help you when searching.

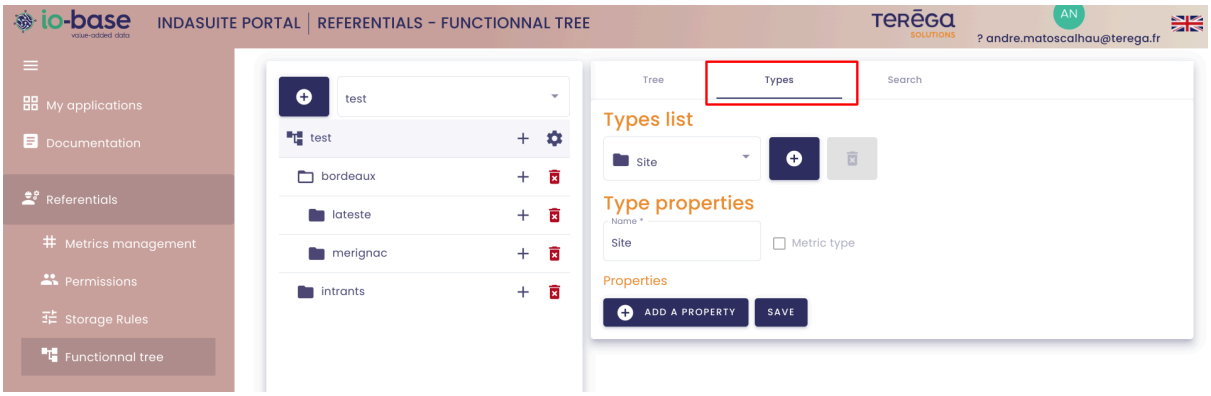
Managing the types of the tree structure

To manage the types of your tree structure, from the portal access the **Referentials/ Functional tree** menu.

Select the desired tree structure, then click on the star wheel.

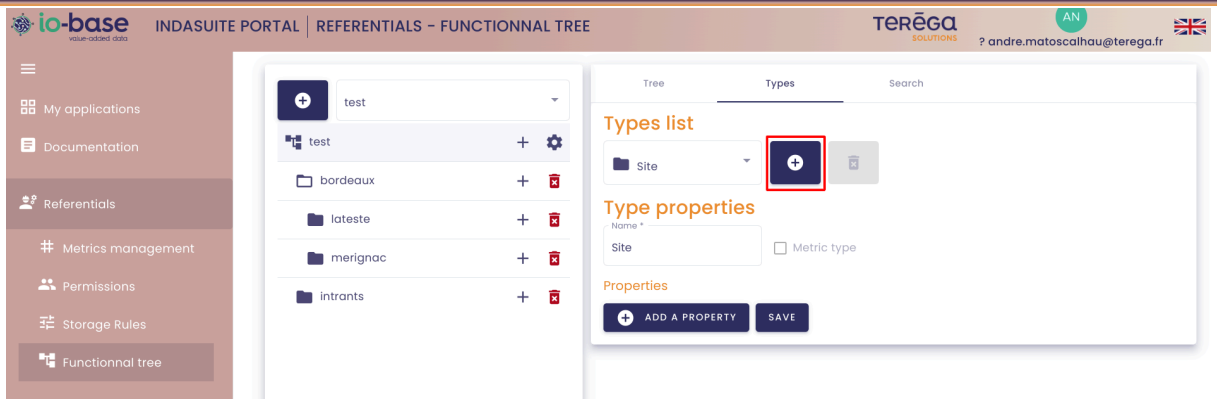


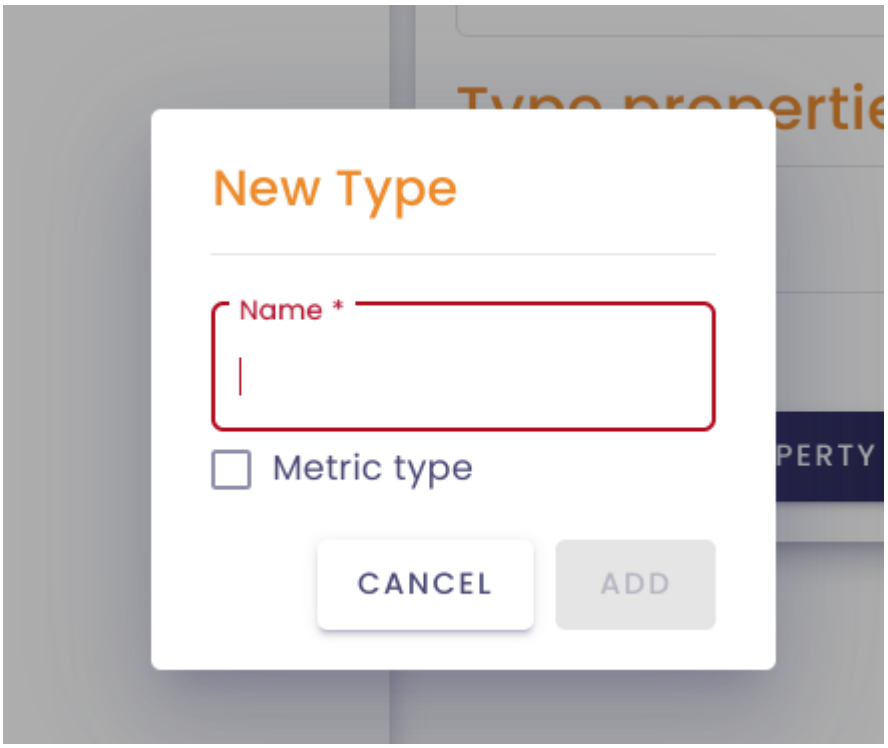
The Tree View configuration screen is displayed. Click on the **Types** tab.



The screen that appears contains all the types in the tree structure.

By clicking on the + button you can define a new type.



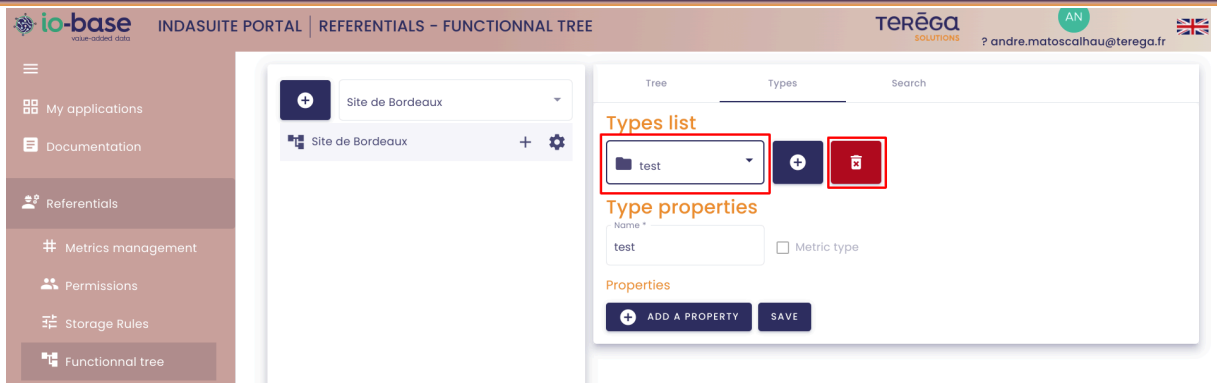


The **Metric type** check box allows you to say whether this type should be a sub-level (such as a folder), or a metric category.

After clicking on **Add**, the new type appears in the drop-down list.

Note : By selecting a type, you can change its properties. Refer to the article on the subject for more details.

To delete a type, simply select it and click on the bin.



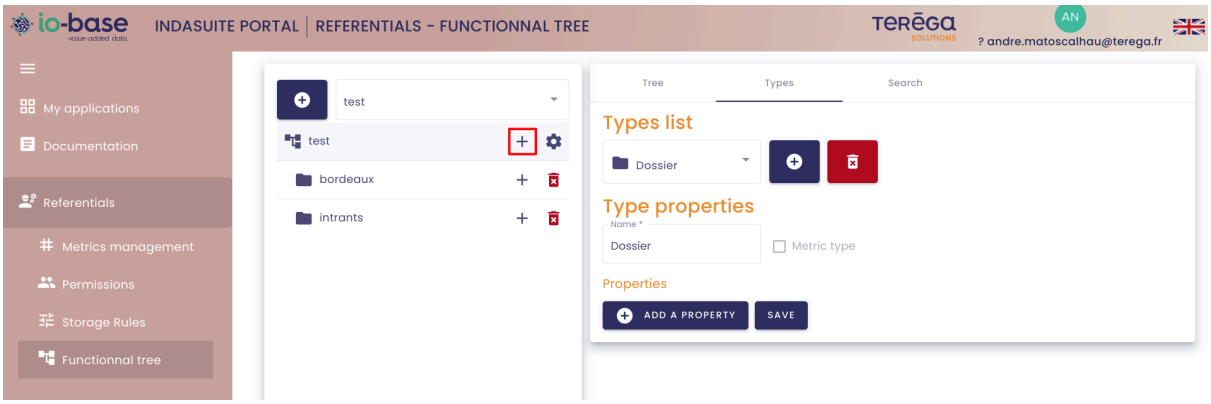
A confirmation message confirms the deletion.

Note: It is not possible to delete a type that is used in the tree structure.

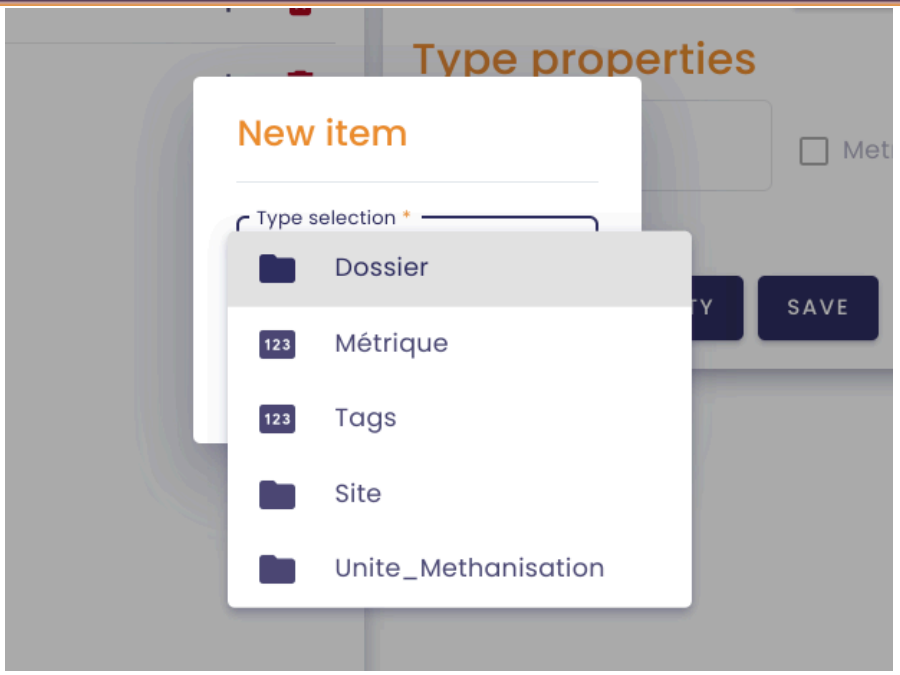
Choice of type when adding an element to a tree structure

Once your types are defined, they can be used in the tree structure.

Position yourself on the level in which you want to add an item, then click on the + button



A window appears, for you to choose the type of the new element. It contains the types set at tree level.



Select the type you want, then click on **Add**.

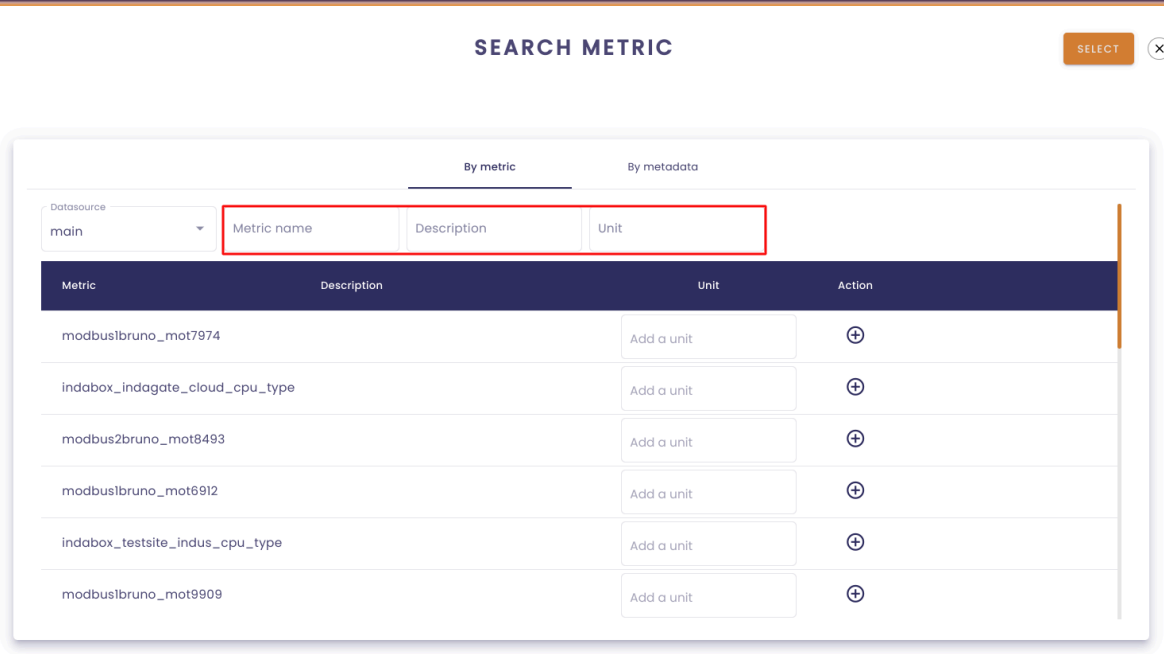
You will then be able to choose an ID and a Label. See the article on adding items to the tree for more details.

4.6.3 Management of search properties

Prerequisite: this functionality is only allowed for users with a Functional Administrator role

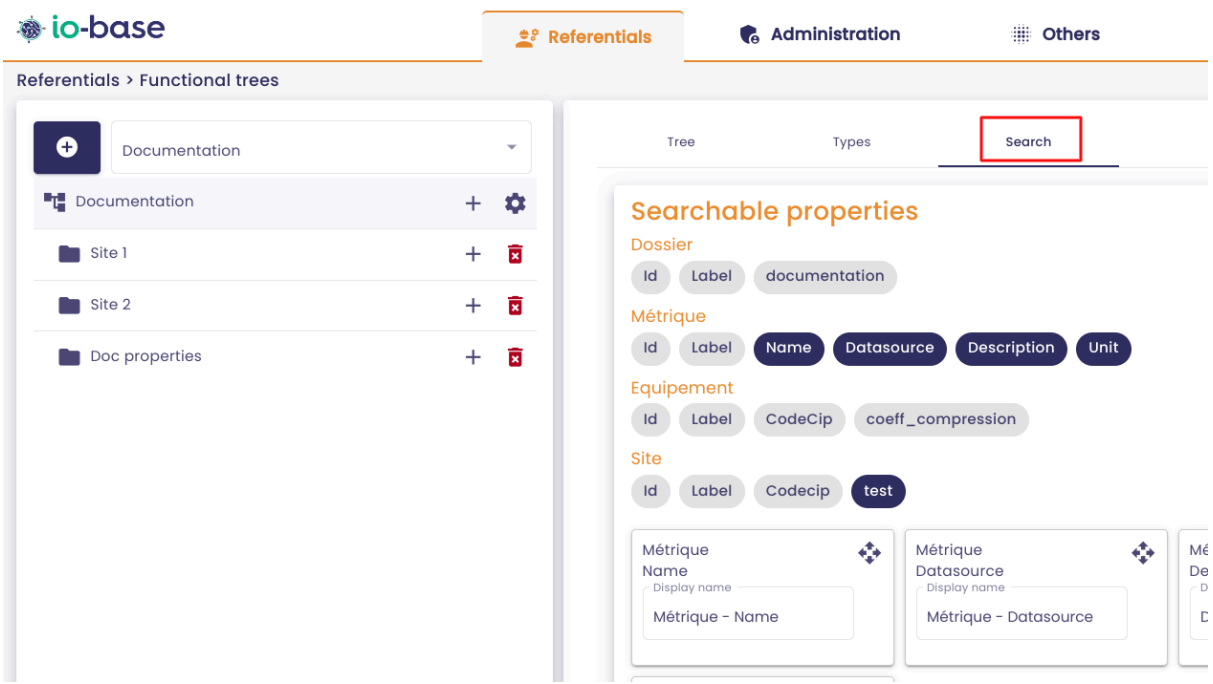
Functional trees help you find your metrics more easily. They appear in the different io-base applications (Indaba Explorer, IndaBoard, search screens...).

To make it easier to find your metrics, you can set up your search zones in detail.



From the io-base portal, access the **Referentials / Functional tree** menu.

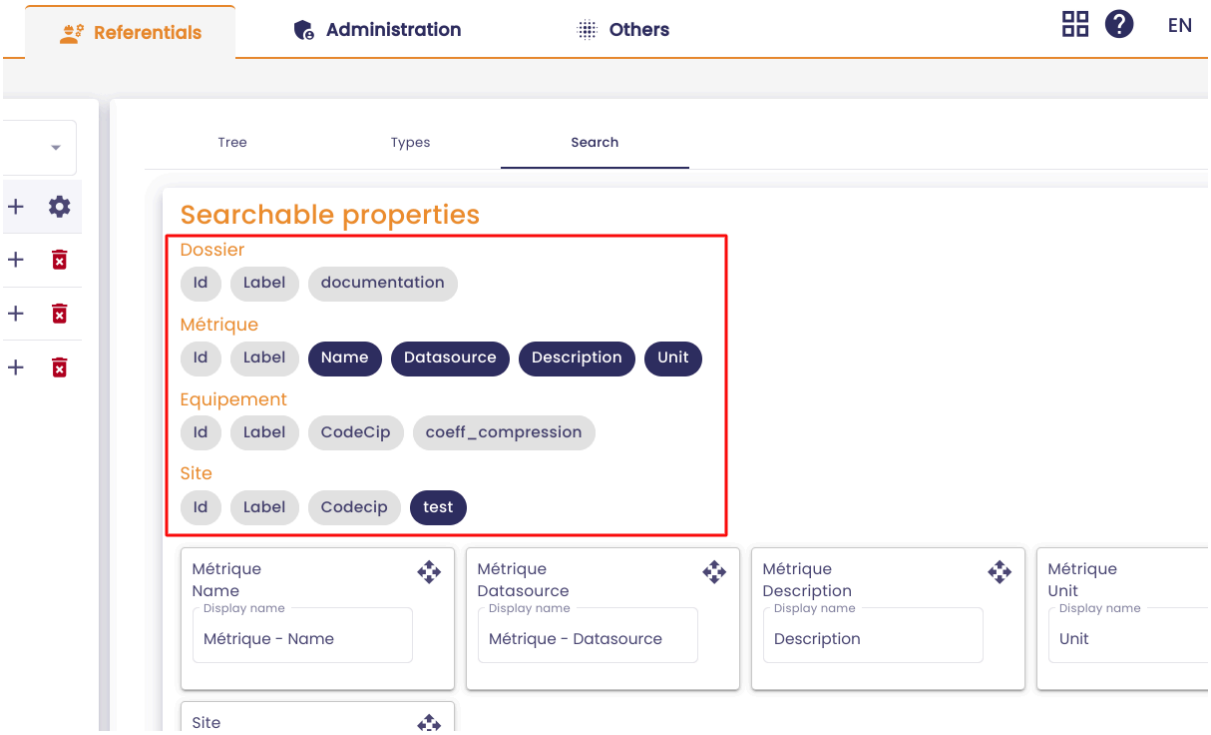
Select the relevant tree, then click on the **Search** tab.



In this screen you will find all the properties of the types that make up your tree structure.

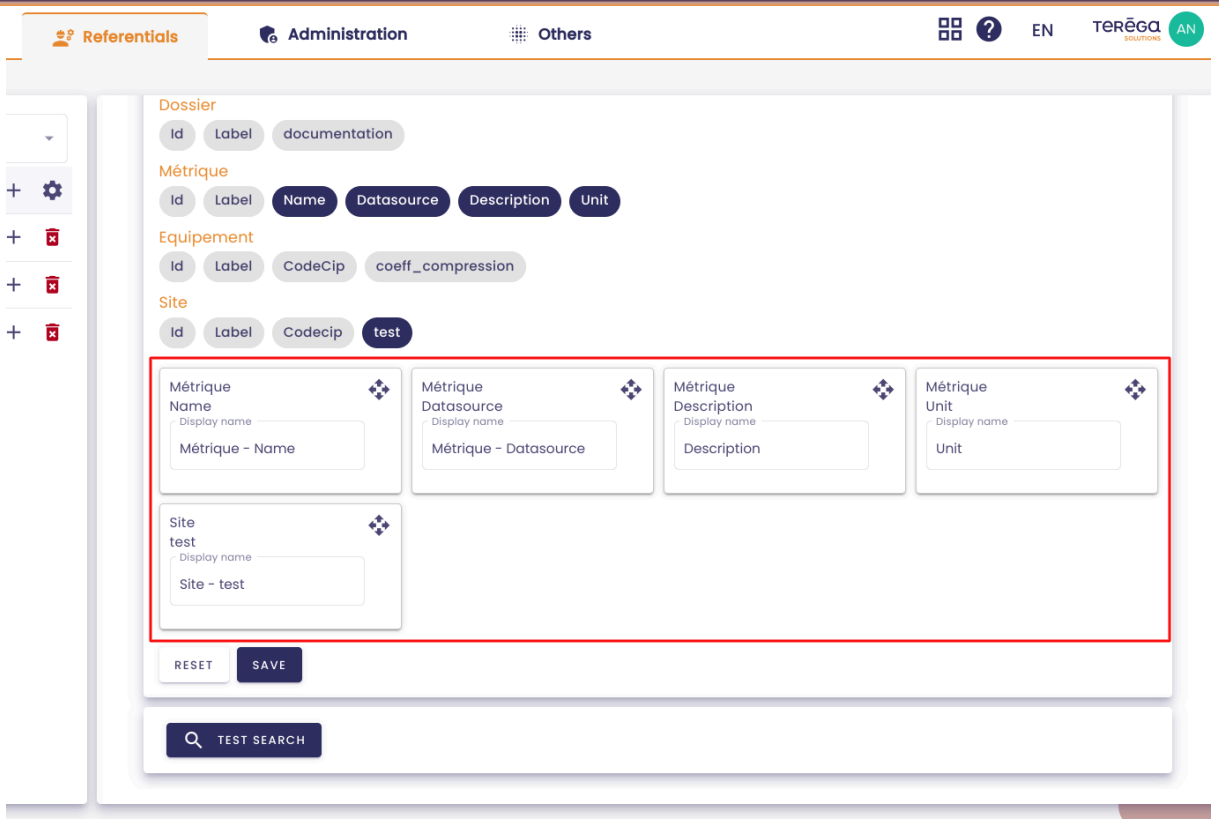
Choice of searchable properties

By selecting properties by clicking on them, you make them "searchable". Thus, all selected properties will appear as fields in the search area.

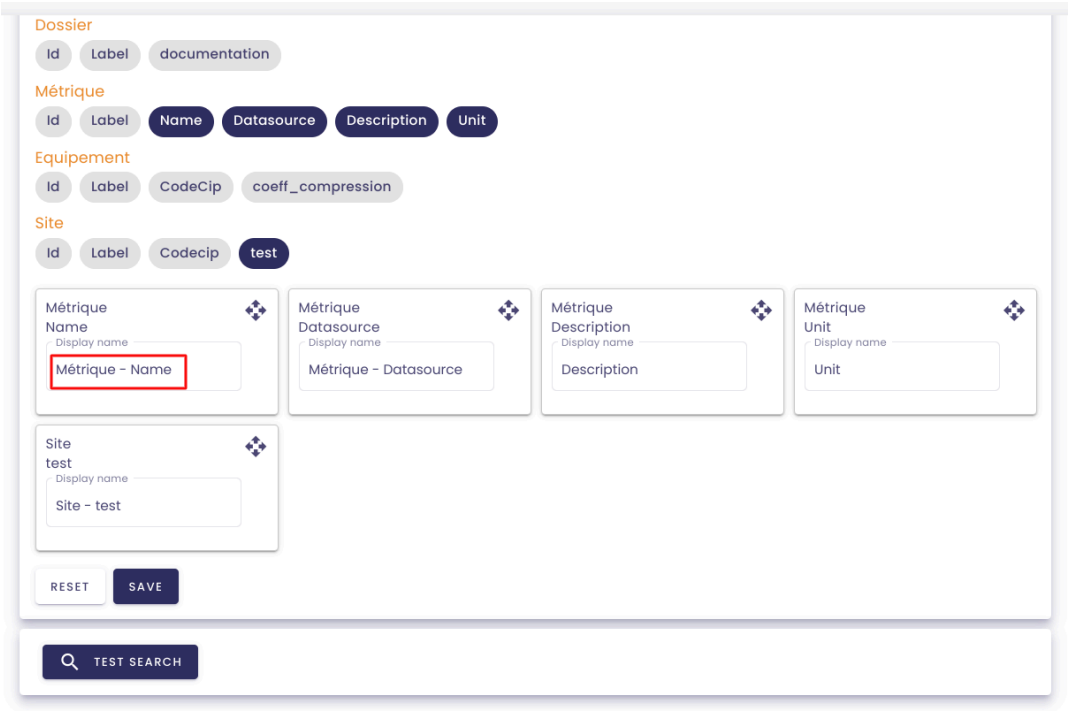


Order of appearance of properties in the search

Once you have selected the properties to be used in the search, you can define the order in which they appear. Drag and drop the different blocks to define the desired order.



For better understanding, you can also change the text that will appear in the search input field.

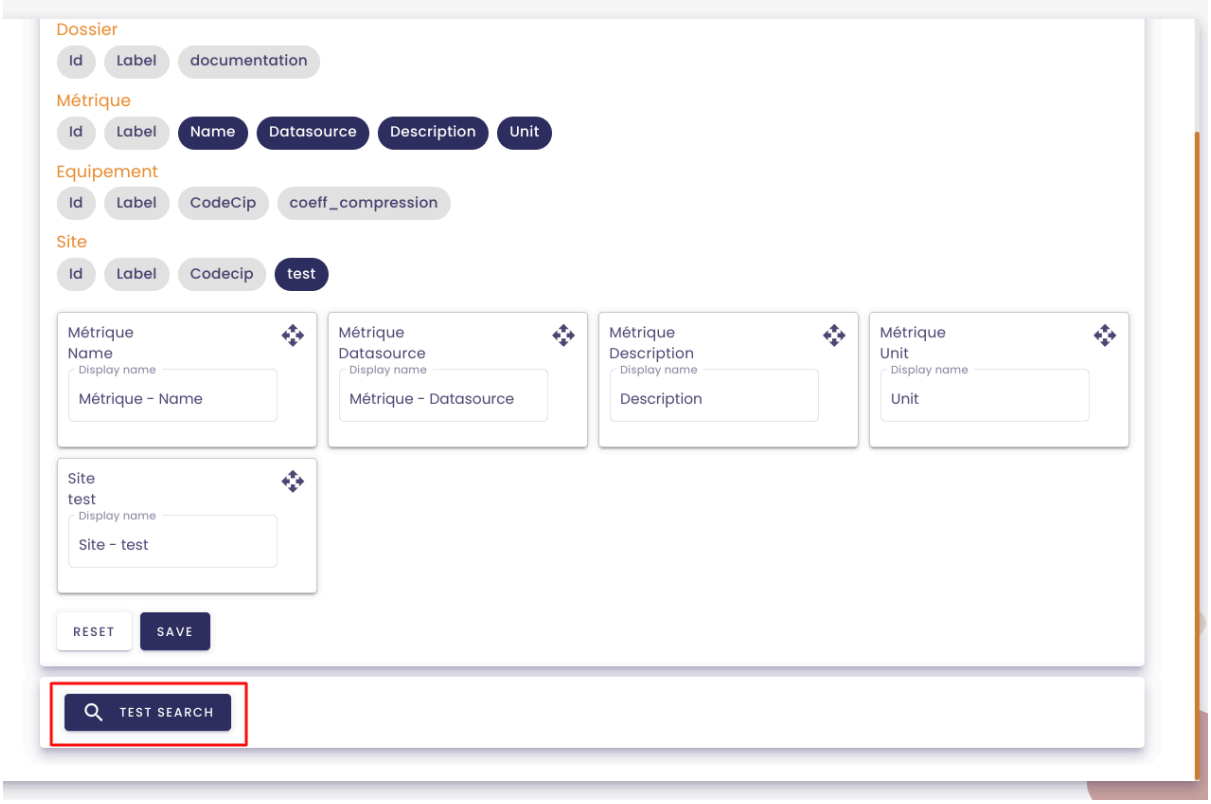


Click on **Save** to save your changes.

Note : By clicking on **Reset**, the default search settings are reapplied.

Testing the search

To test the search screen, click on **Start Search**.



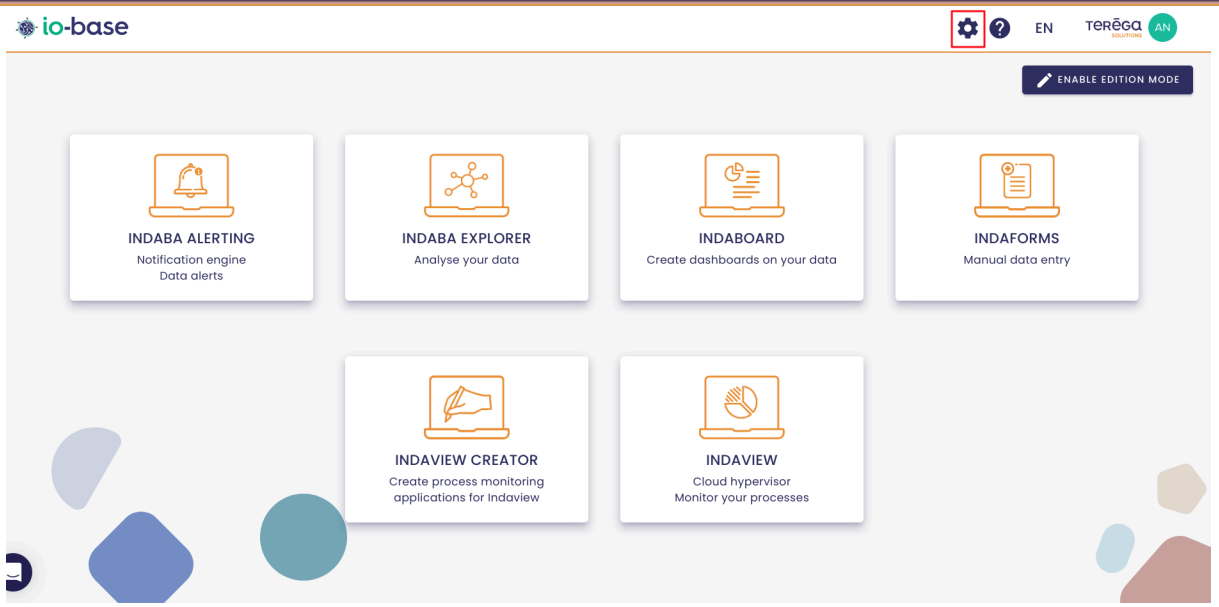
You can see how the io-base search screens will behave for this tree structure

4.7 Metrics templates

4.7.1 Create a metric template

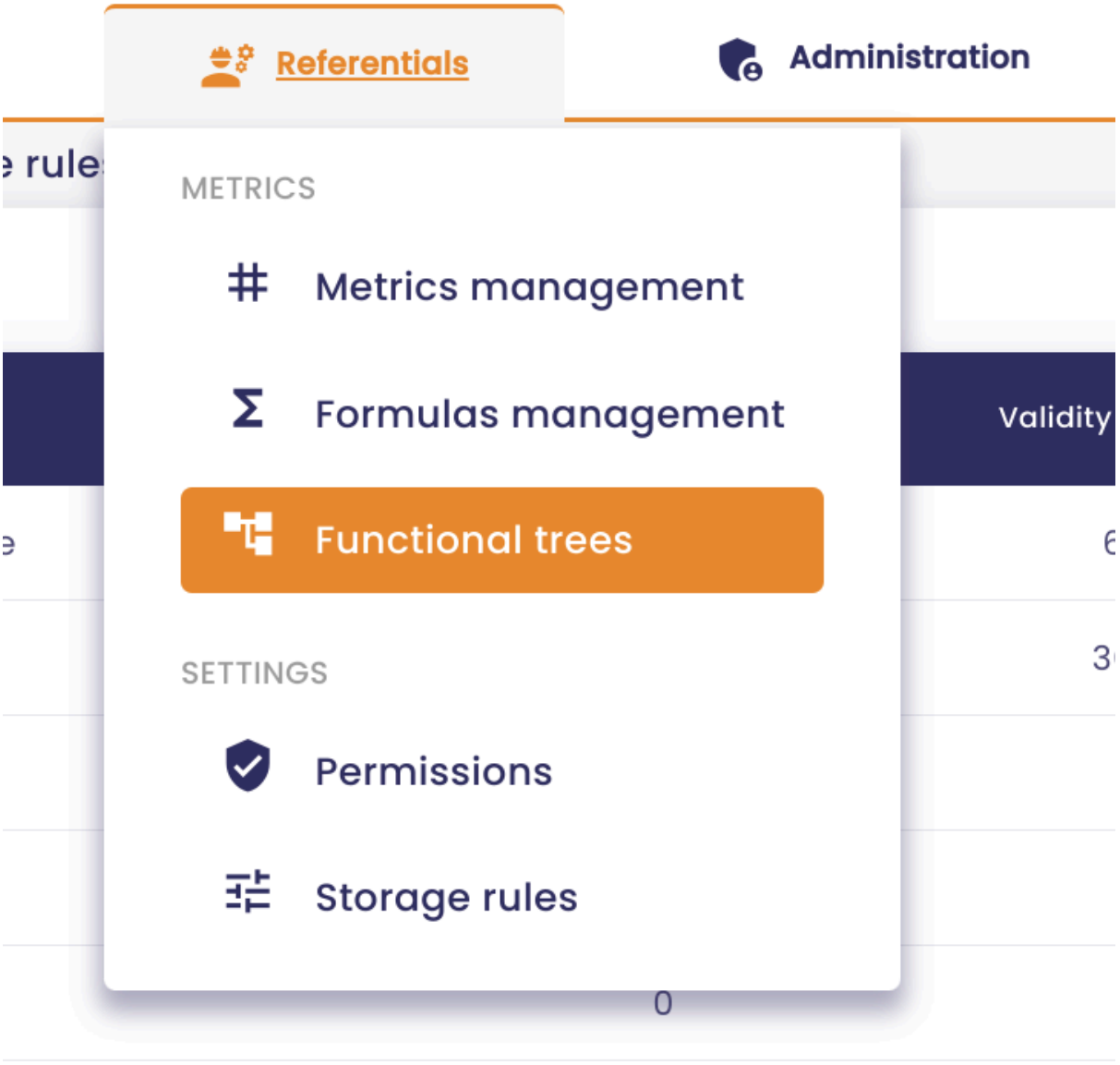
Prerequisite : This feature is available for users with a **Functional Administrator** role.

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



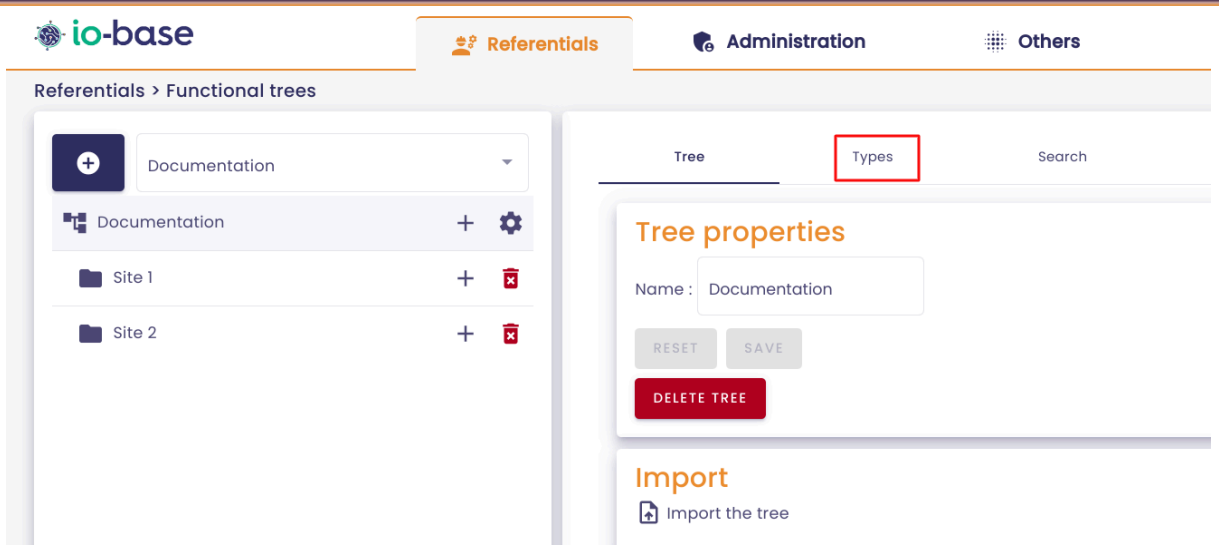
The Io-base administration page opens.

Go to the **Referentials/Functional trees** menu.



The functional trees management screen is displayed.

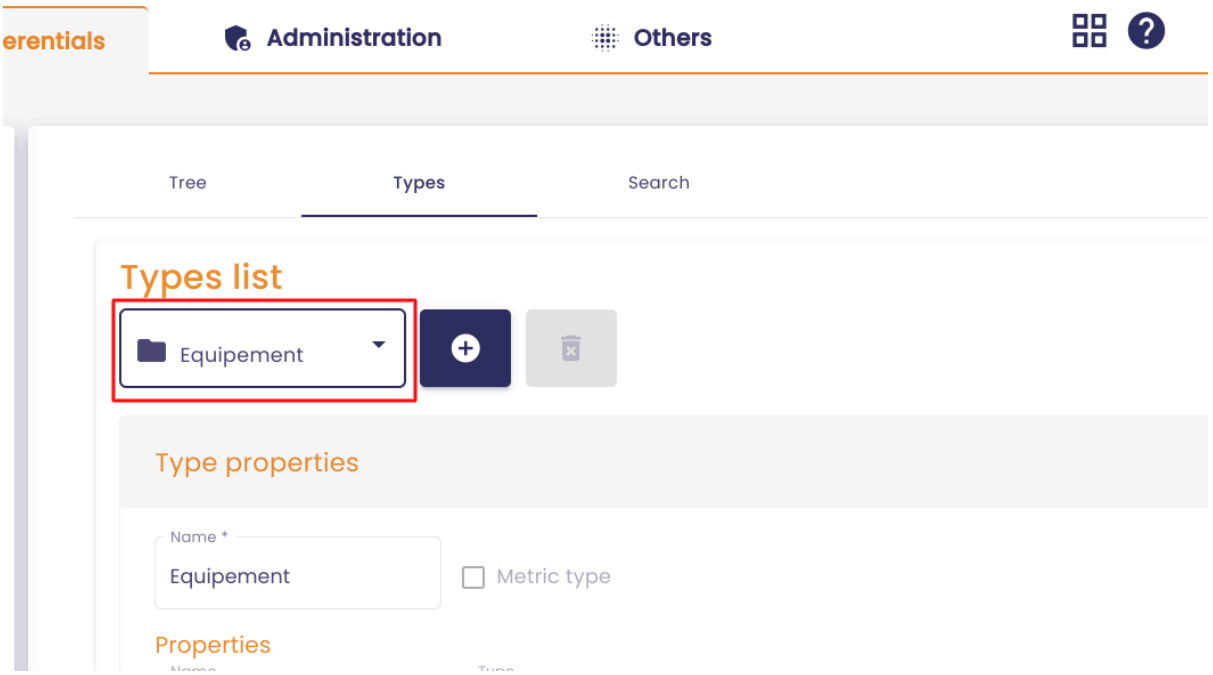
Select the desired functional tree, then go to the **Types** tab.



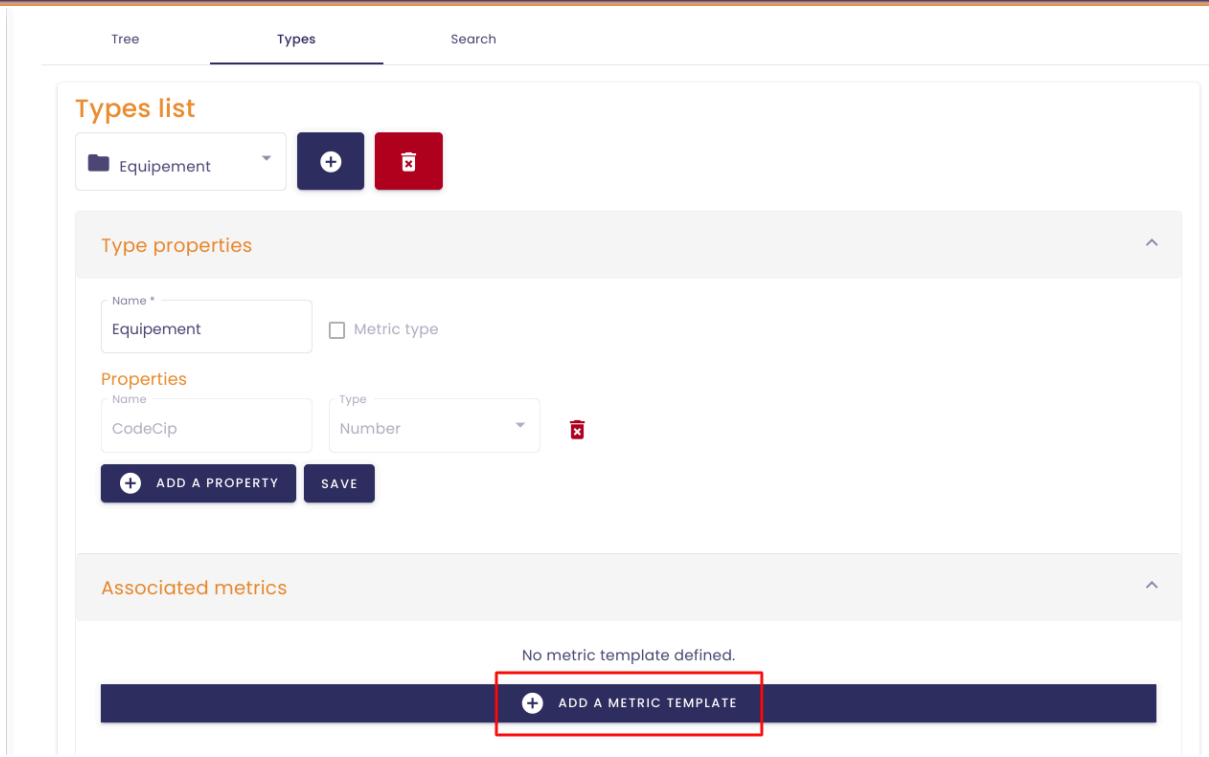
A dropdown list is available for you to select the type of your choice.

Select the type for which you want to create a metric template.

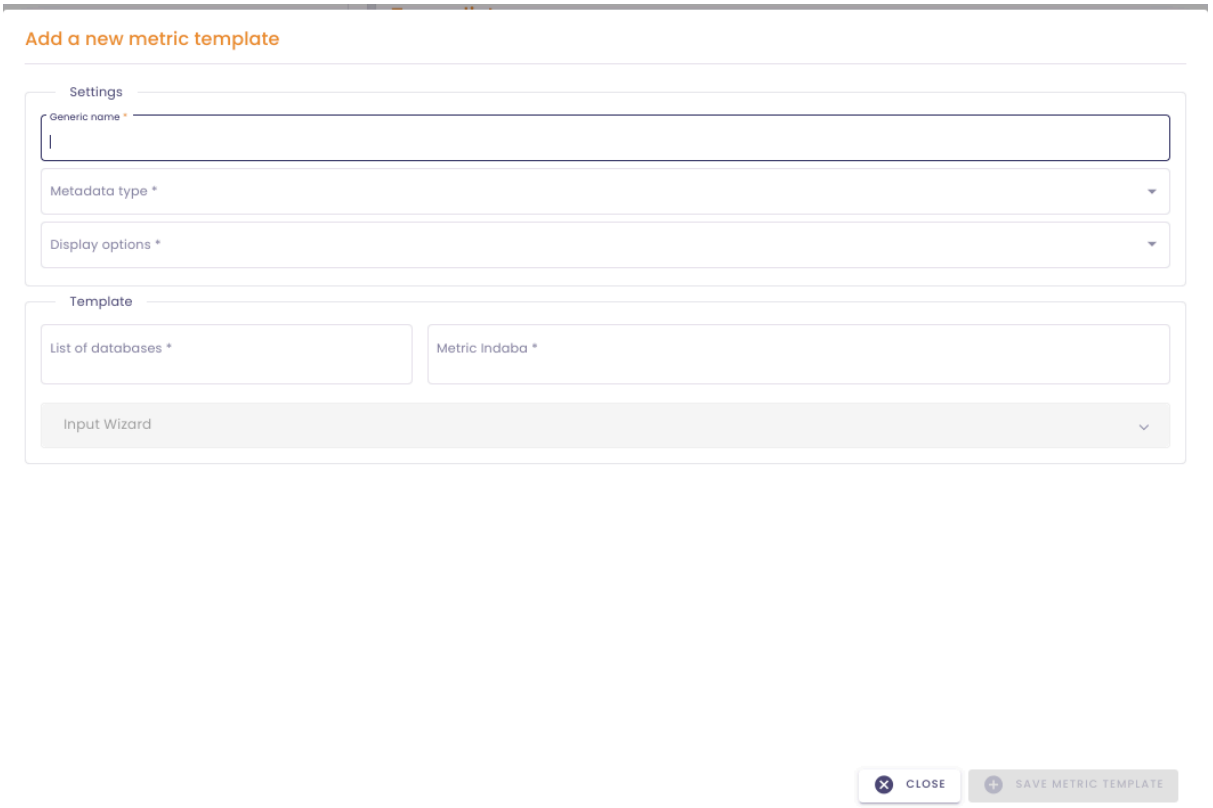
In our example, we select the "**Equipment**" type.



Next, click on the "**Add a Metric template**" button.



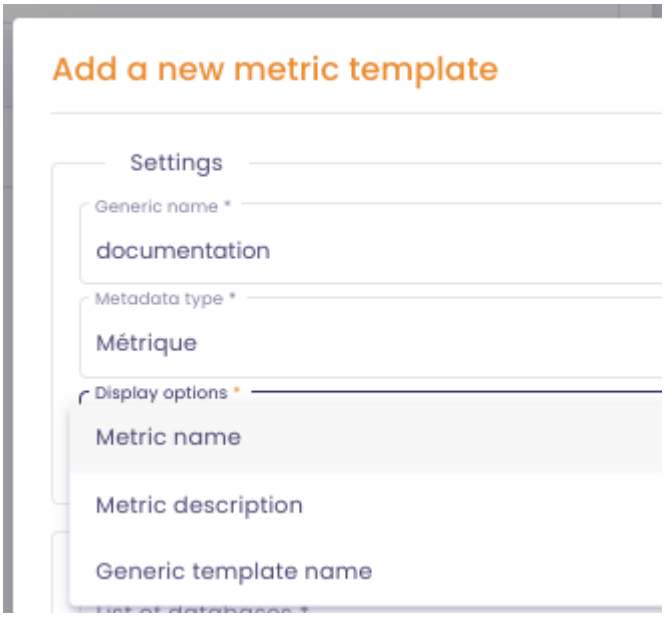
The following window opens :



You have several fields to fill in :

Template naming parameters

- **Generic Name** : this is the name of the metric model, in our case, we choose to name it "documentation"
- **Metadata Type** : select "Metric"
- **Display Options** : metric display setting in the hierarchy, you can choose to display metrics using their name, their description, or the generic name of the template



Expression of the Metric template :

This part will allow you to associate the metric template with the Indaba metrics stored in the database.

Start by indicating the database where the Indaba metrics you want to generate

with the template are contained.

Then, define the desired metric template.

To define a metric template, you must use the naming characteristics of your Indaba metrics.

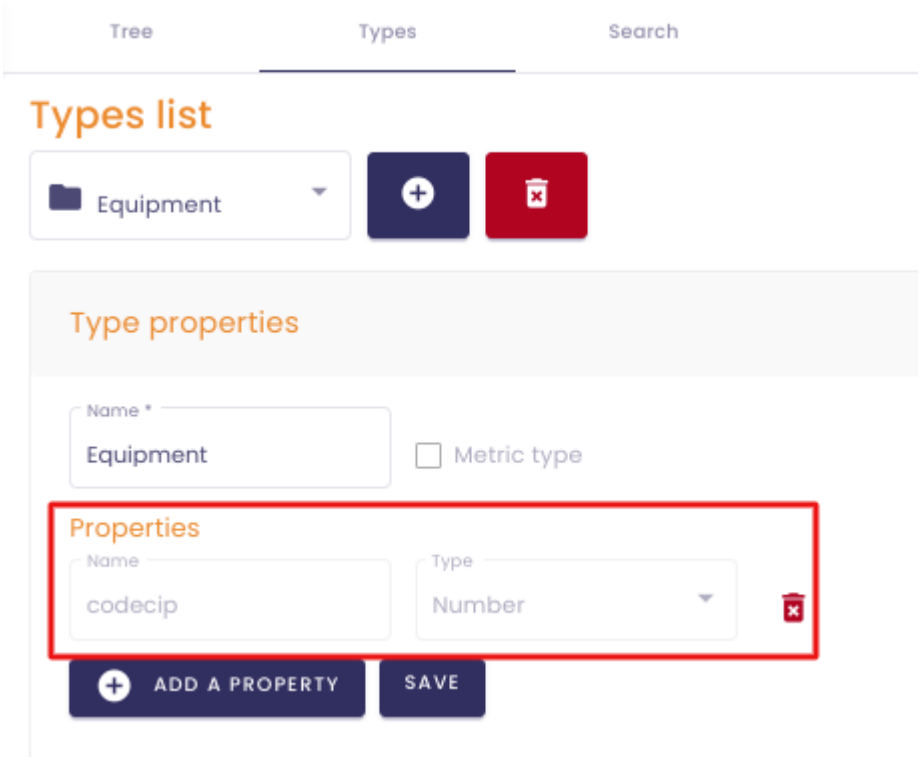
In our example, here are the metrics measuring electricity consumption of equipment in Indaba :

Name
cip_int_1
cip_int_10
cip_int_102
cip_int_104
cip_int_106
cip_int_108
cip_int_110
cip_int_112
cip_int_114
cip_int_116

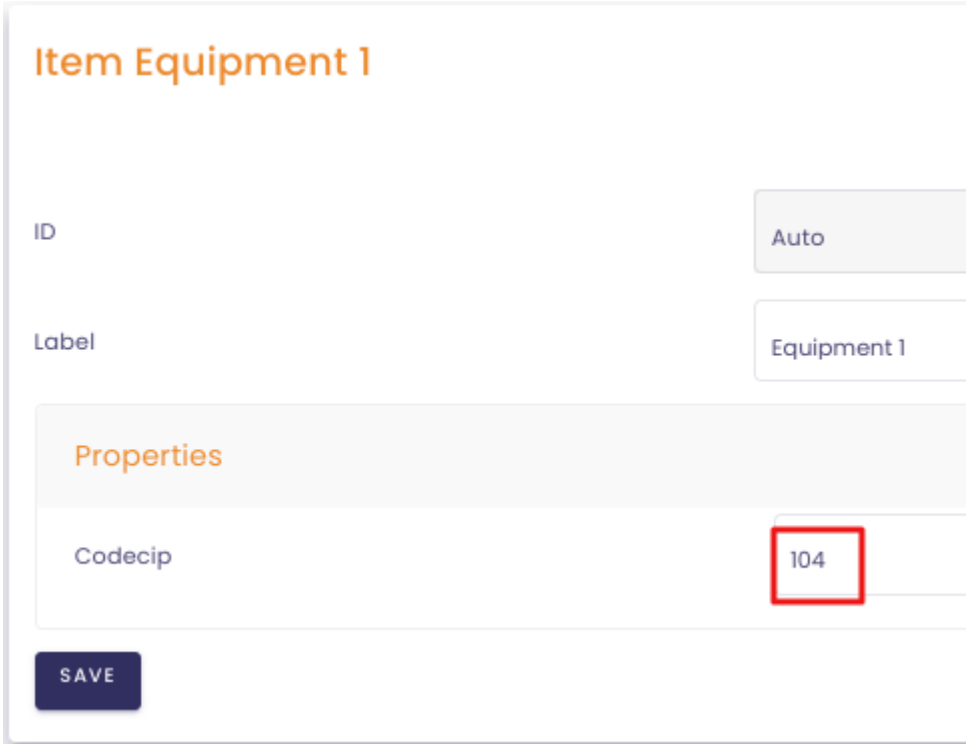
All these metrics have the prefix "cip_int_", so start the expression of your metric template with: cip_int_

Then, use the properties of your functional tree to complete your model.

In our case, we created a “CodeCip” property, which is associated to the “Equipment” type.



In our functional tree, we entered a value for the "codecip" property for all the “Equipment” type items.



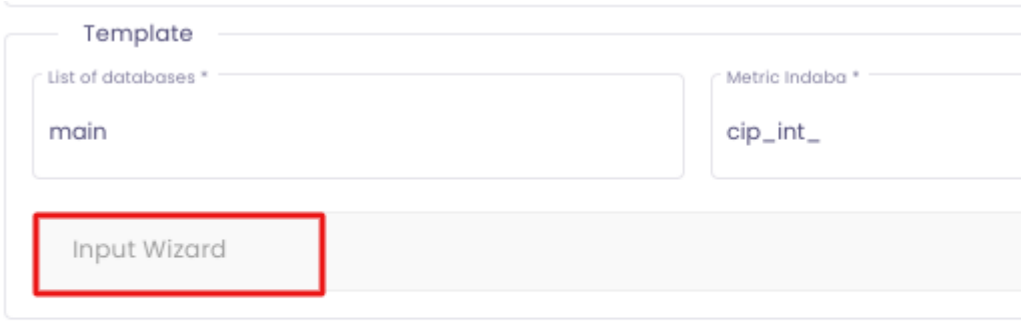
You can then complete the expression of your metric template by adding the "Codecip" property as a parameter.

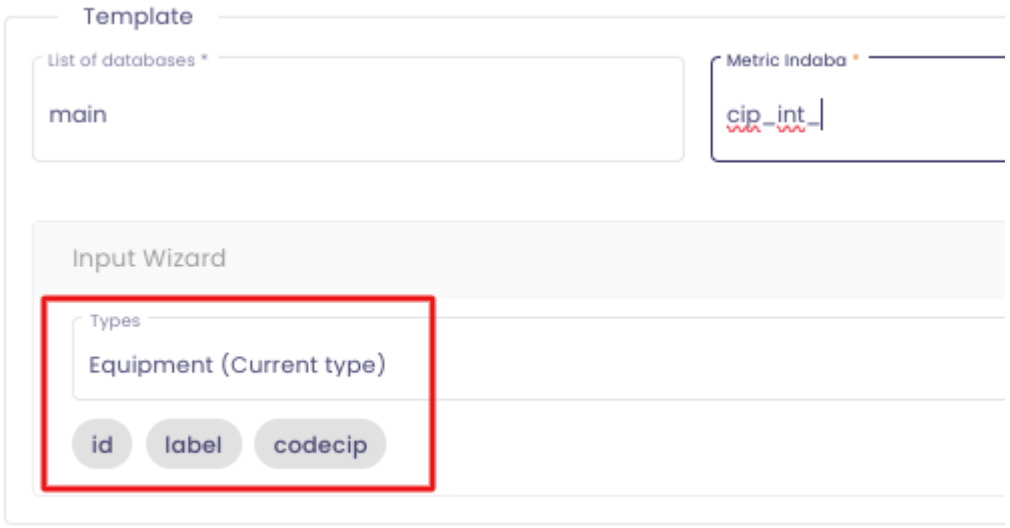
To add a property in the expression, you must respect the following syntax: {property name}

In our example : cip_int_{codecip}

Note : to help you in entering your metric model, an input wizard is available.

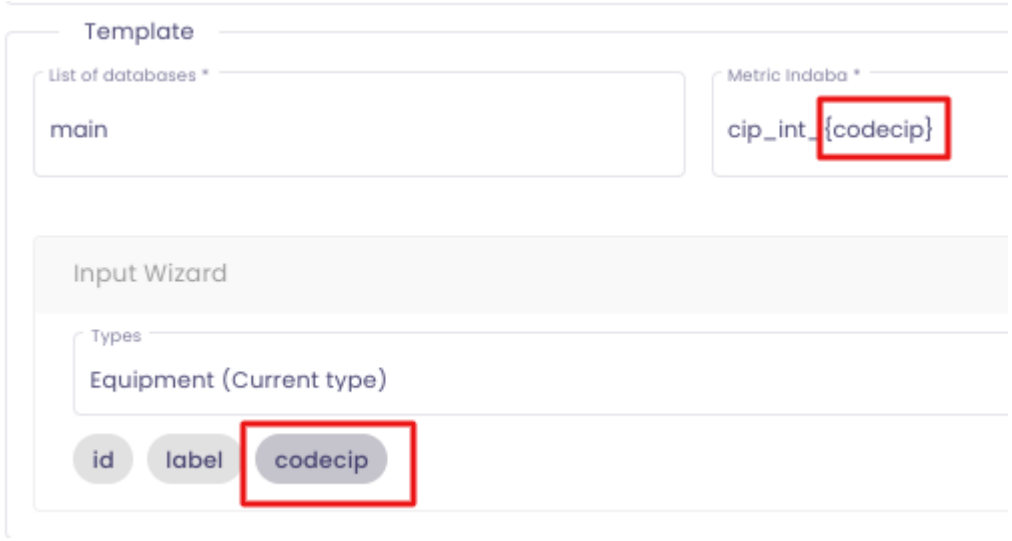
Click on "Input wizard".



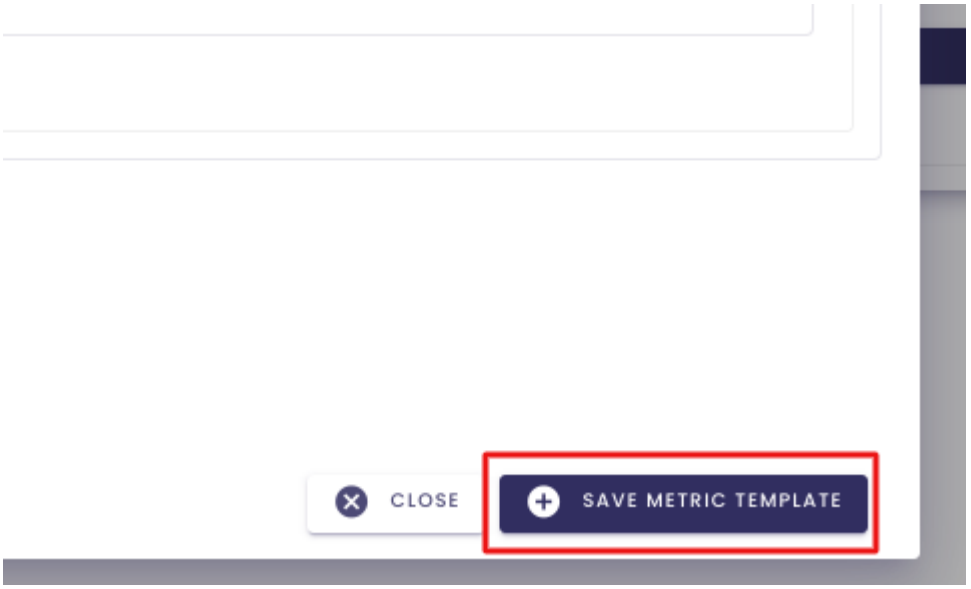


All the properties of the elements contained in the functional tree are at your disposal.

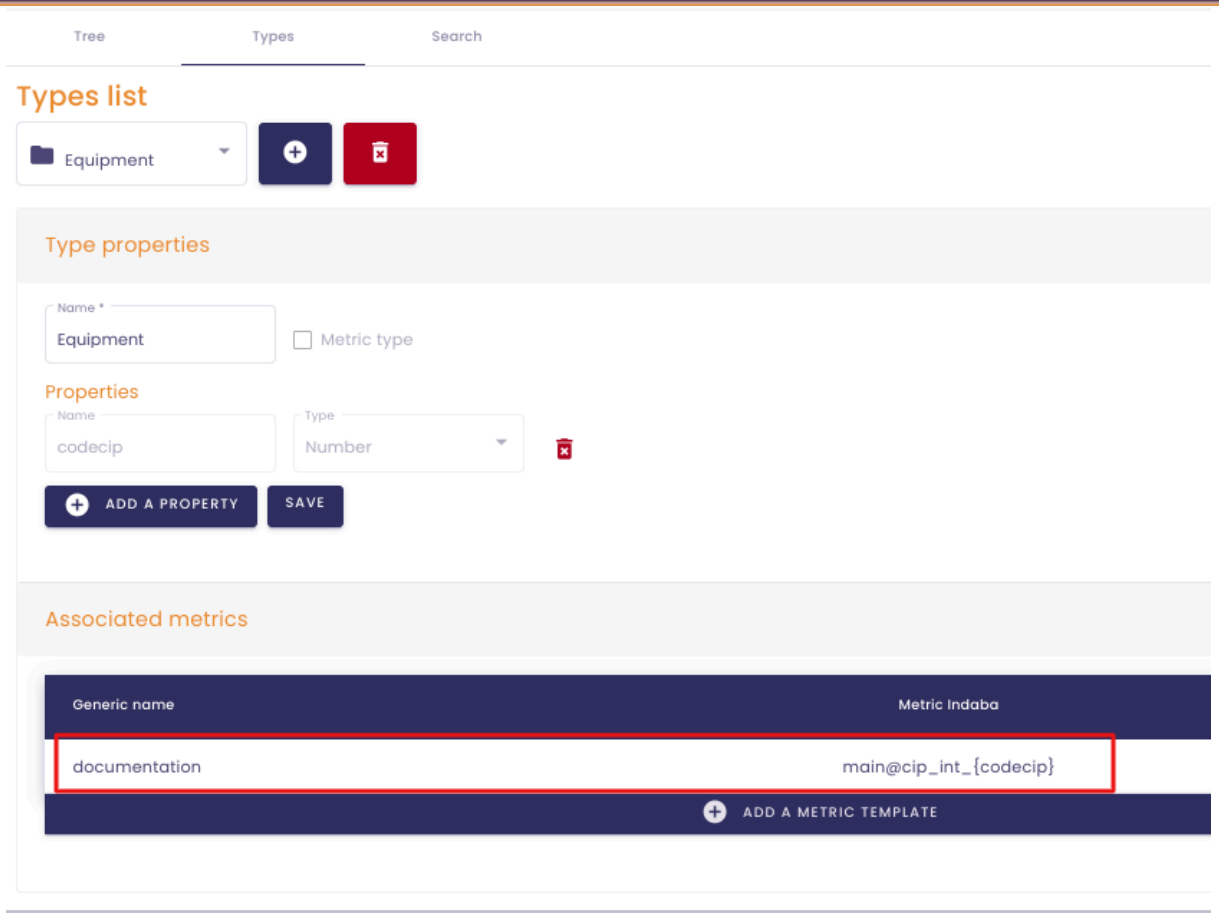
For instance, if you click on "codecip", it appears in the input field.



Once your metric template is completed, click on "**Save metric template**".



Your metric template is now created :

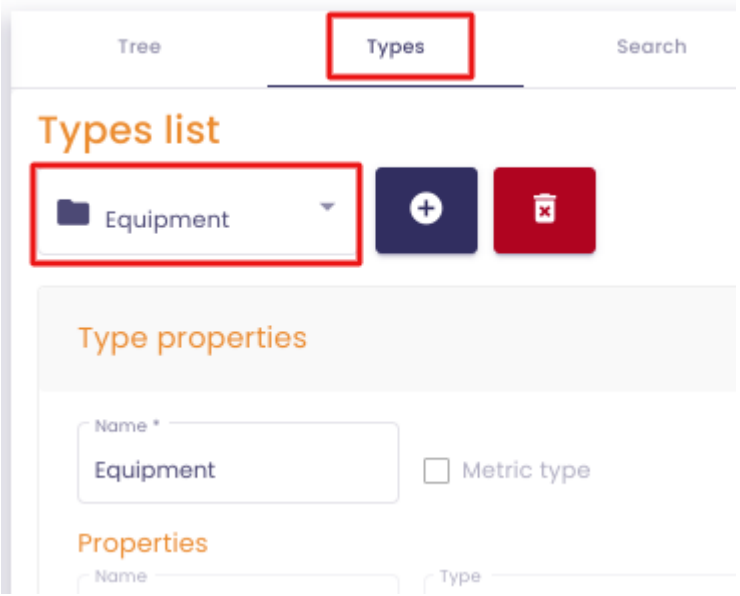


4.7.2 Generate generic metrics

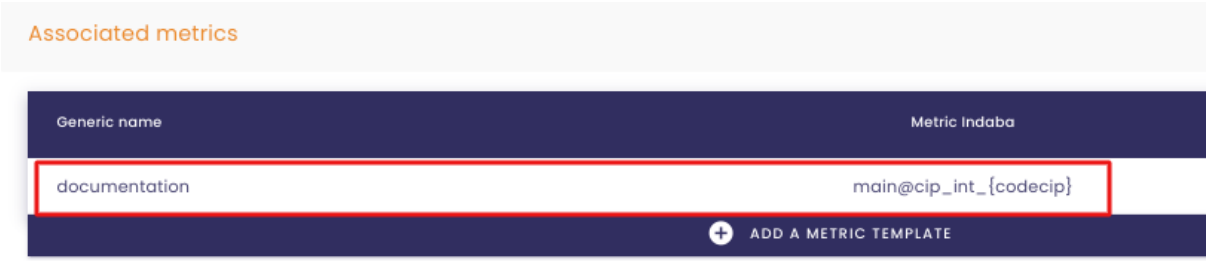
Prerequisite : This feature is available for users with a **Functional Administrator** role.

Once the metric template is created, you can proceed to generating the metrics associated with the template.

Go to the **Types** tab, then select the type in which you want to generate metrics.

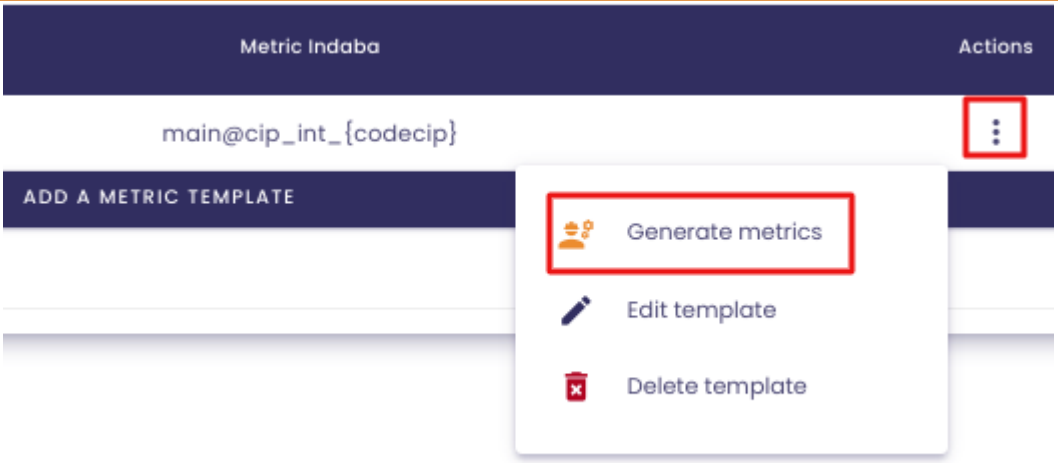


In the "**Associated metrics**" section, the previously created metric template is displayed.



In the **Actions** column, click on

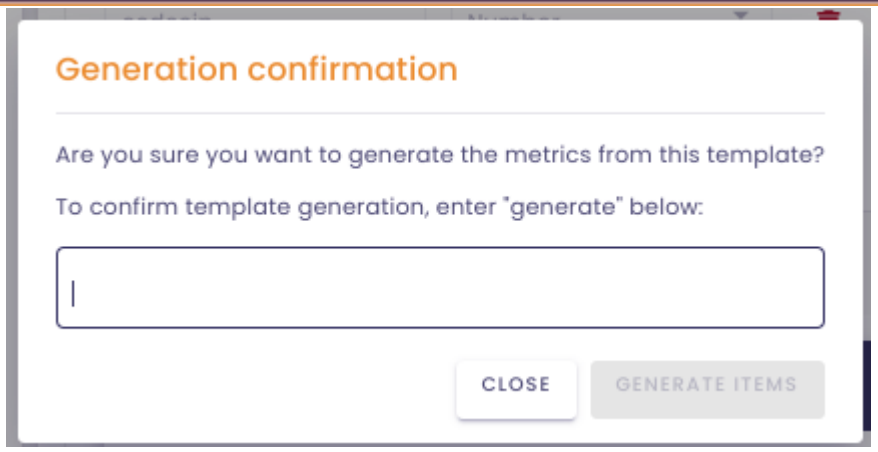
Then **generate metrics.**



A window opens with the generic metrics to be processed :

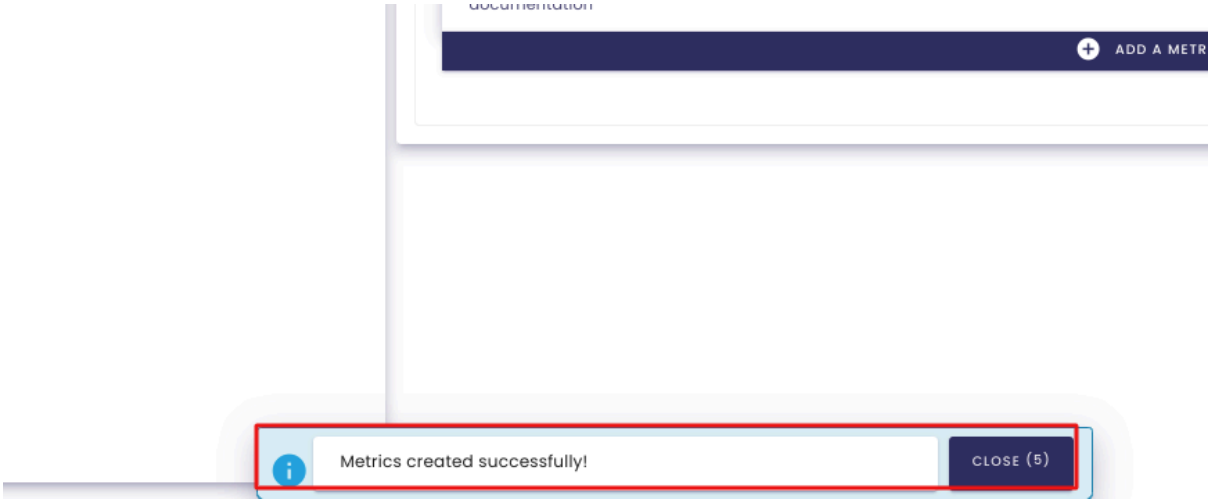
Click on "**generate metrics**" to confirm generation in the functional tree.

A confirmation window appears :

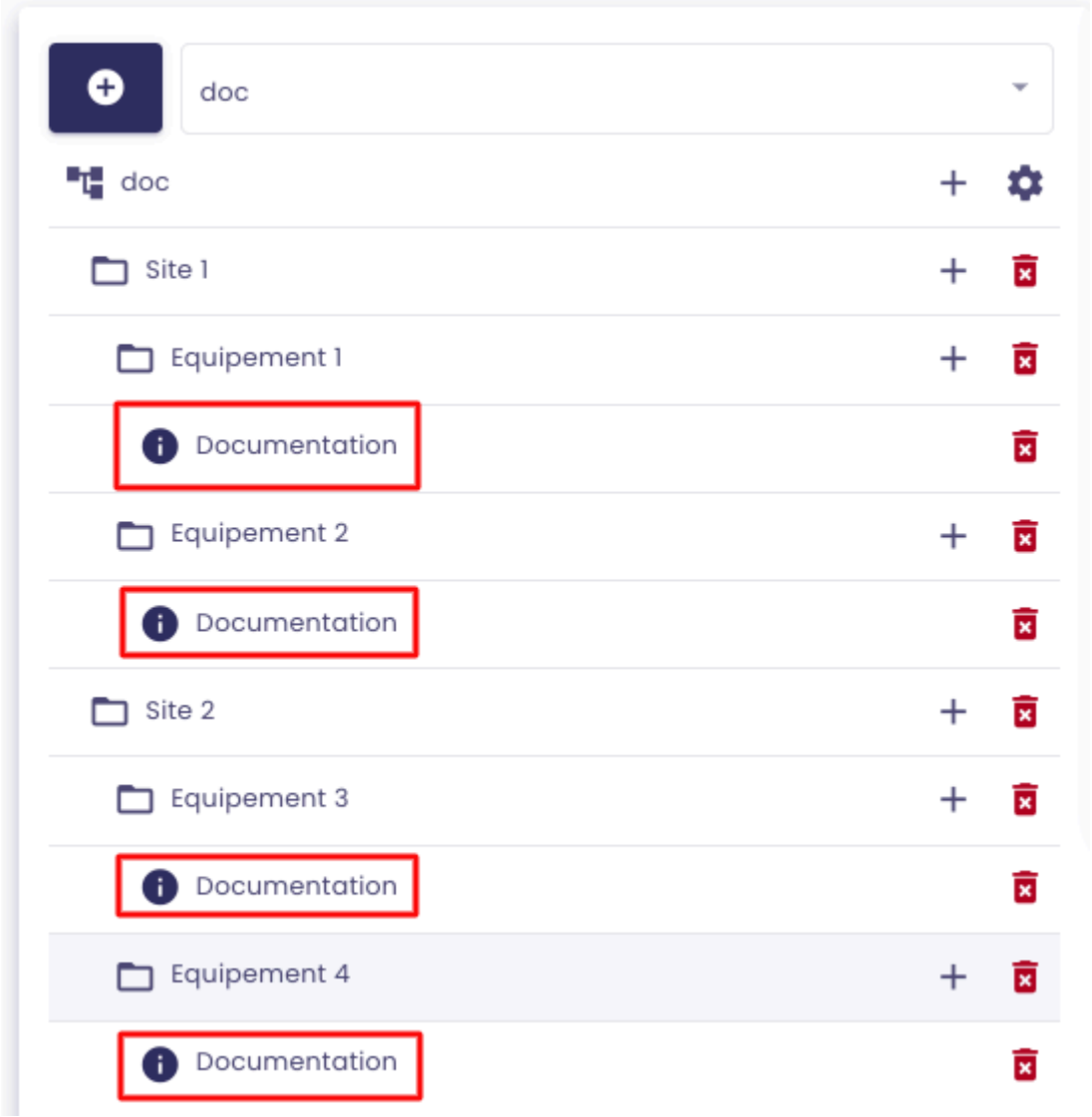


Type "**generate**", then click on "**Generate items**" :

A confirmation message appears, the metrics have been successfully generated.

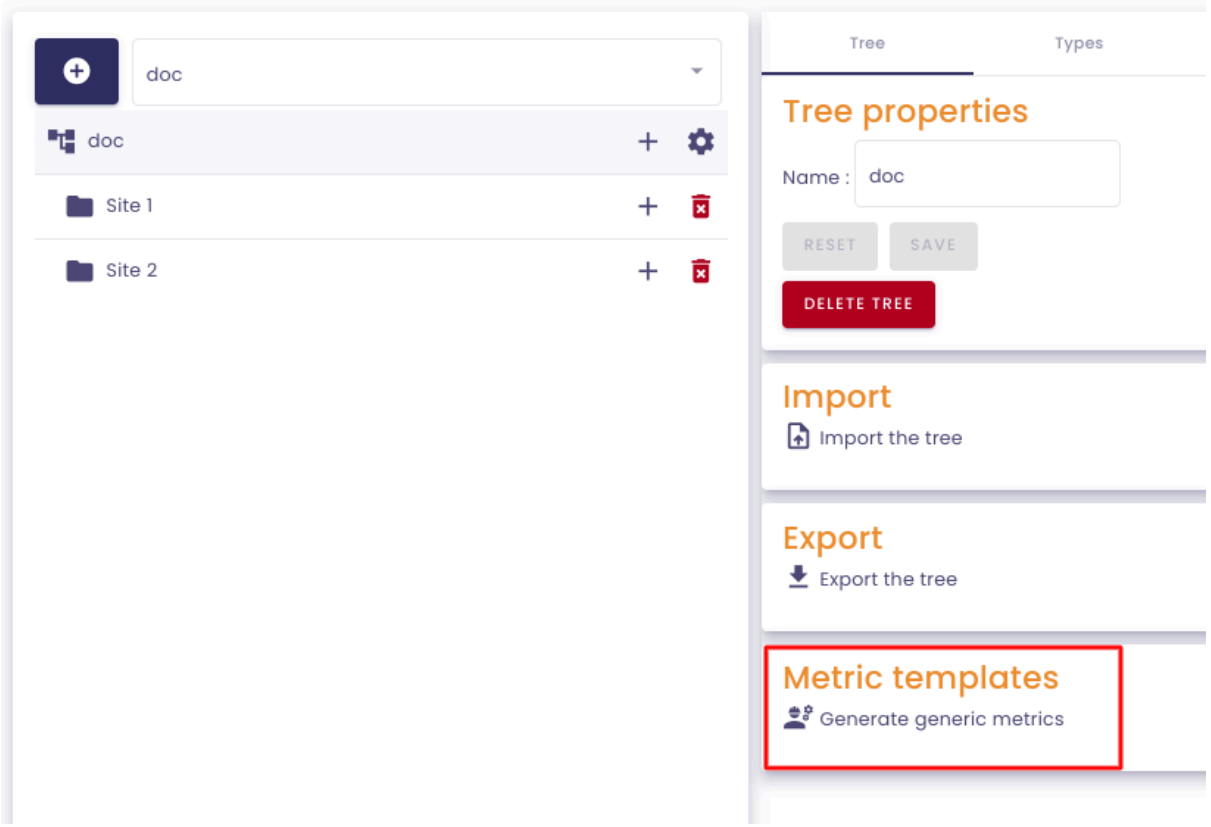


You can then view them in the functional tree.

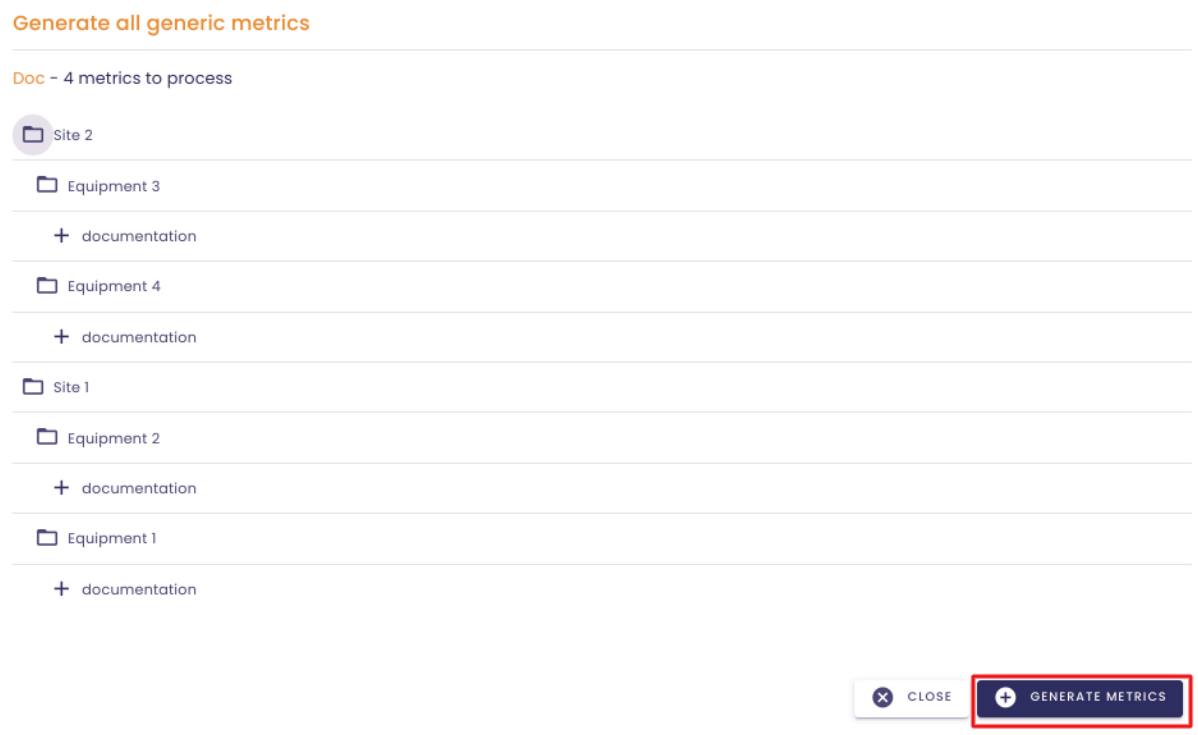


Note : You can also go through the "**Tree**" tab to generate generic metrics.

Click on "**Metric Template**".



Then, "**generate metrics**".



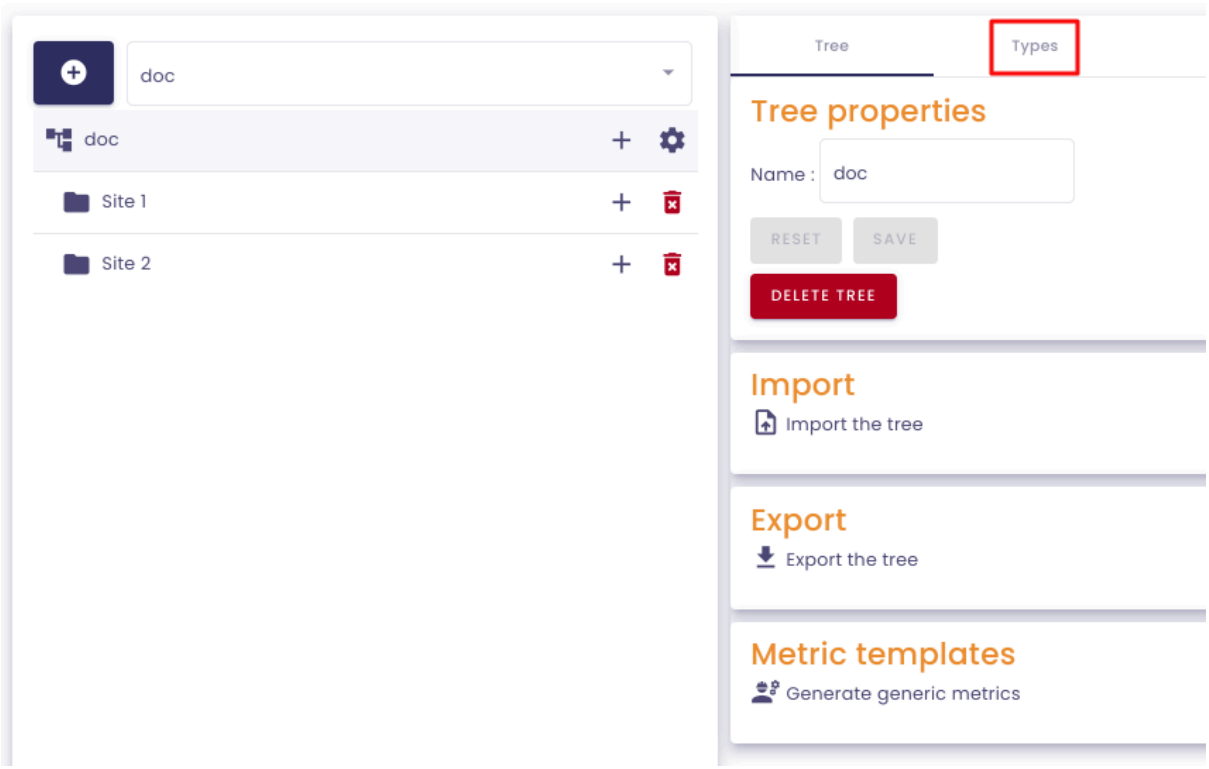
4.7.3 Edit a metric template

Prerequisite : This feature is available for users with a **Functional Administrator** role.

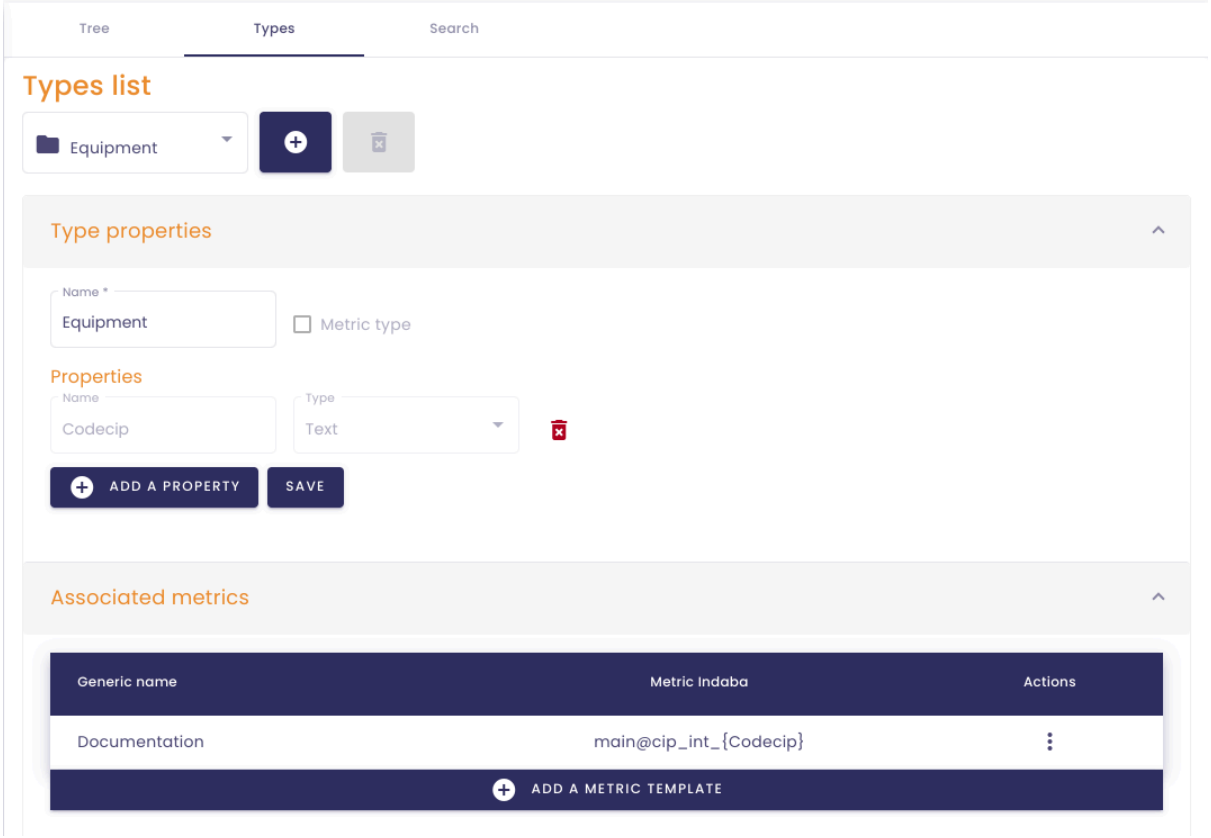
You have the possibility to edit a metric template.

Log in to Io-base and access the **Functional tree** menu.

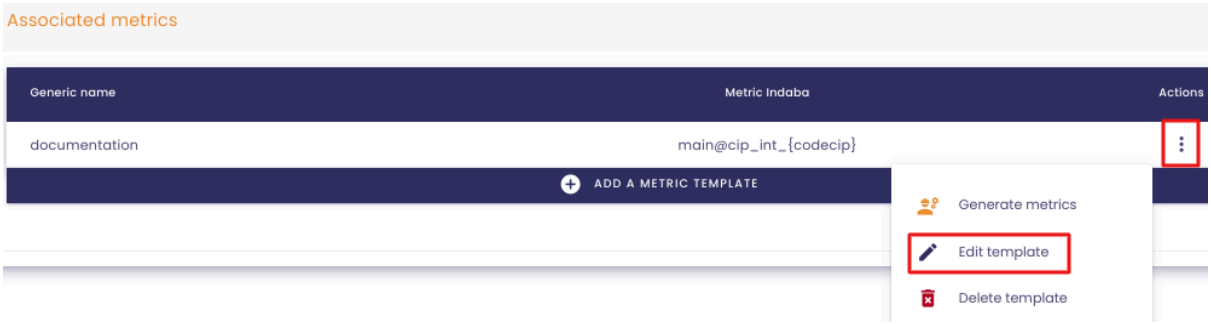
Select the desired functional tree, then go to the **Types** tab.



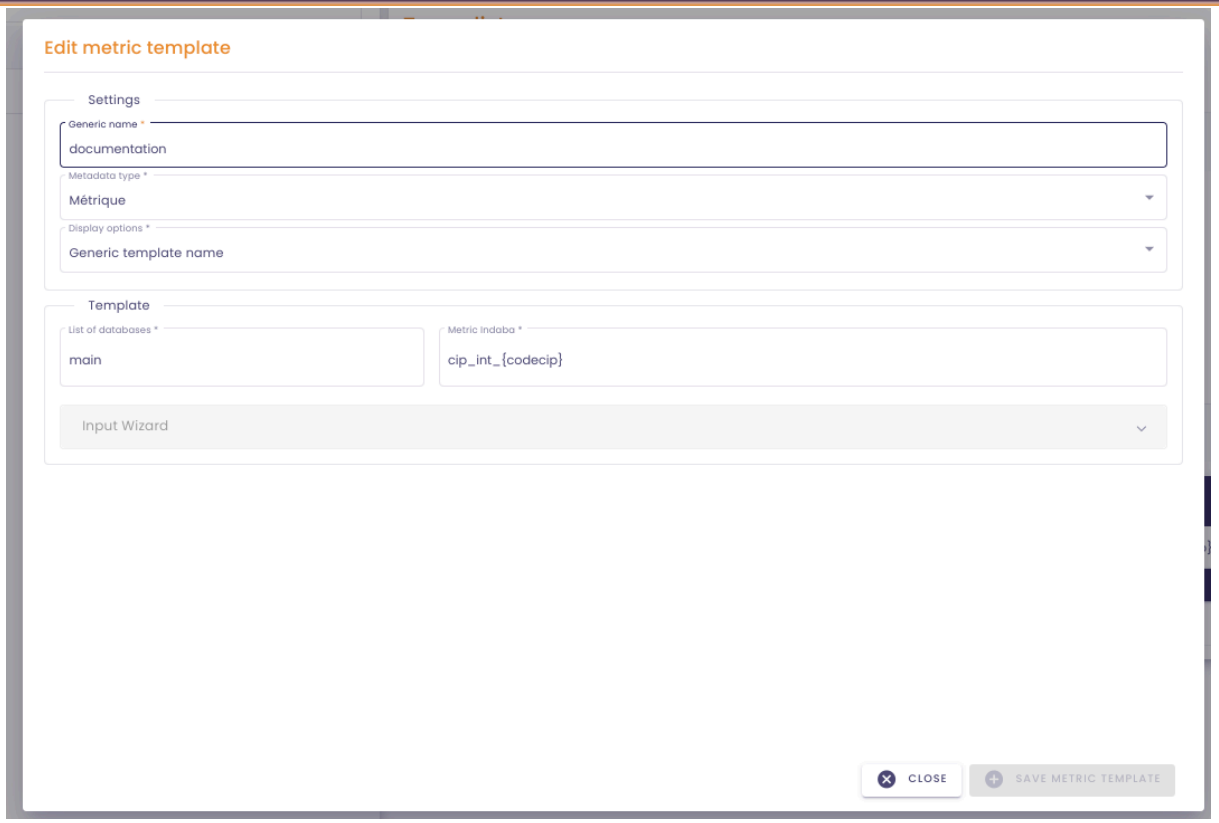
Select the type for which you want to modify a metric template.



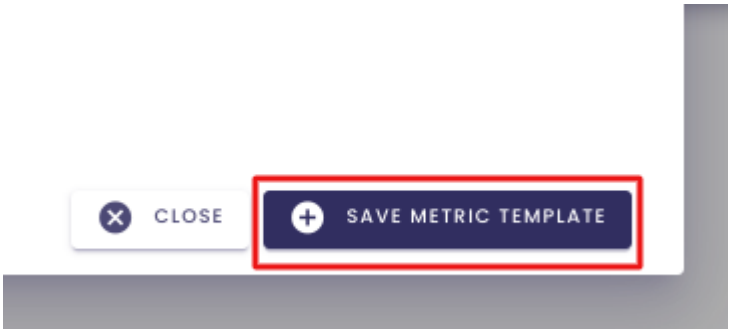
In the "**Associated metrics**" section, go to the **Actions** tab, then edit template :



The template modification window opens :



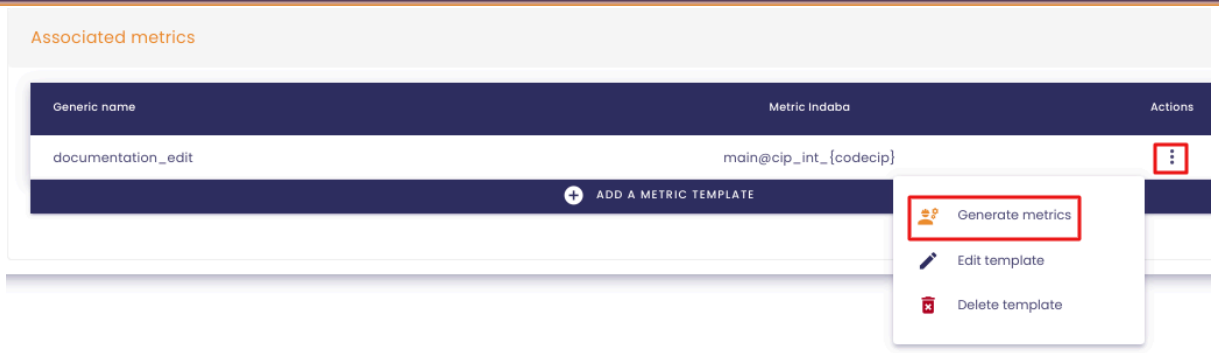
Make the desired changes, then click on "**save metric template**" :



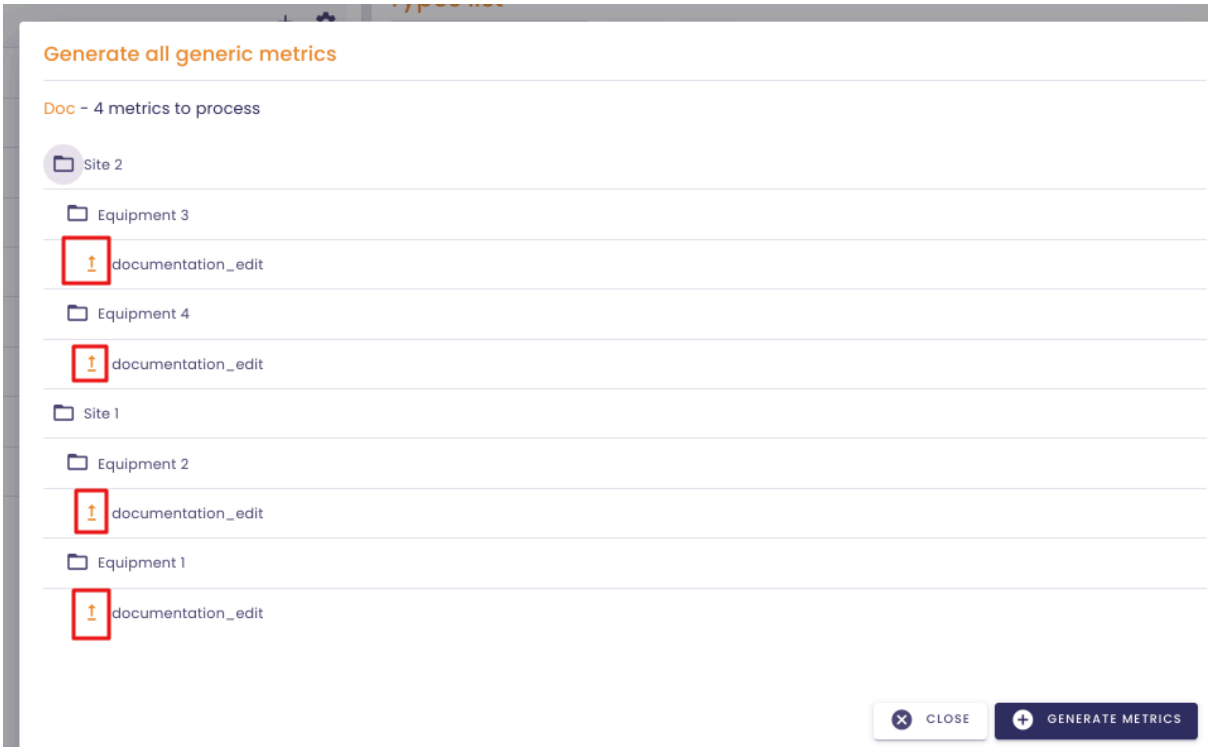
The template modifications are saved.

To apply the changes to the metrics associated with the template, you must generate the metrics again.

To do so, go to the **Actions** column then "**Generate metrics**" :

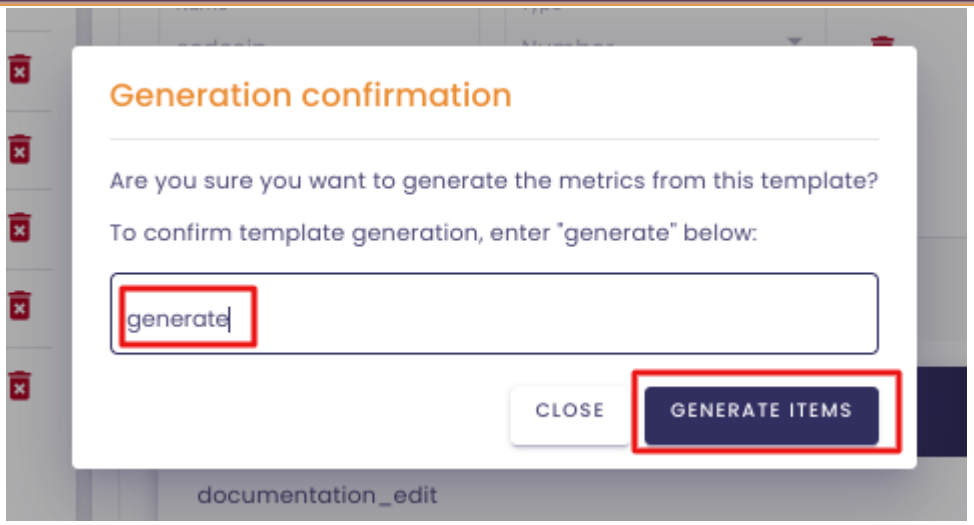


A window opens, the metrics affected by the modification are displayed :

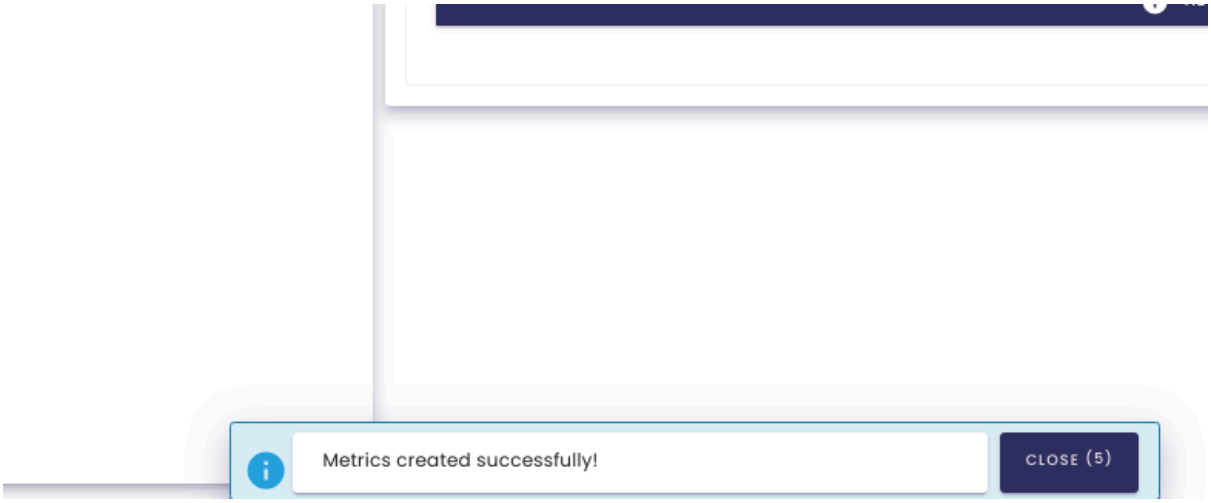


Click on "**generate metrics**".

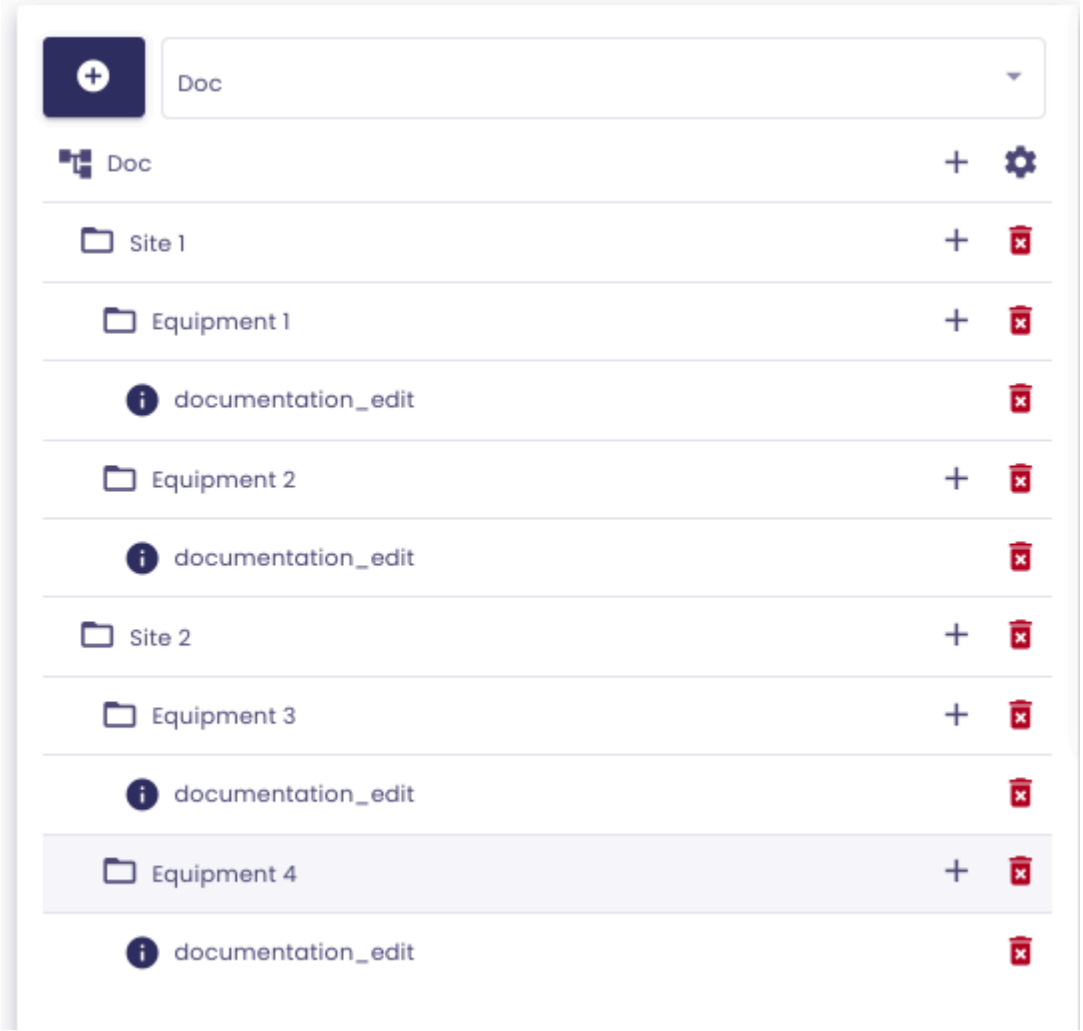
A window opens, enter "**generate**", then click on "**Generate items**" :



A confirmation message appears at the bottom of the screen :



The metrics have been successfully modified.



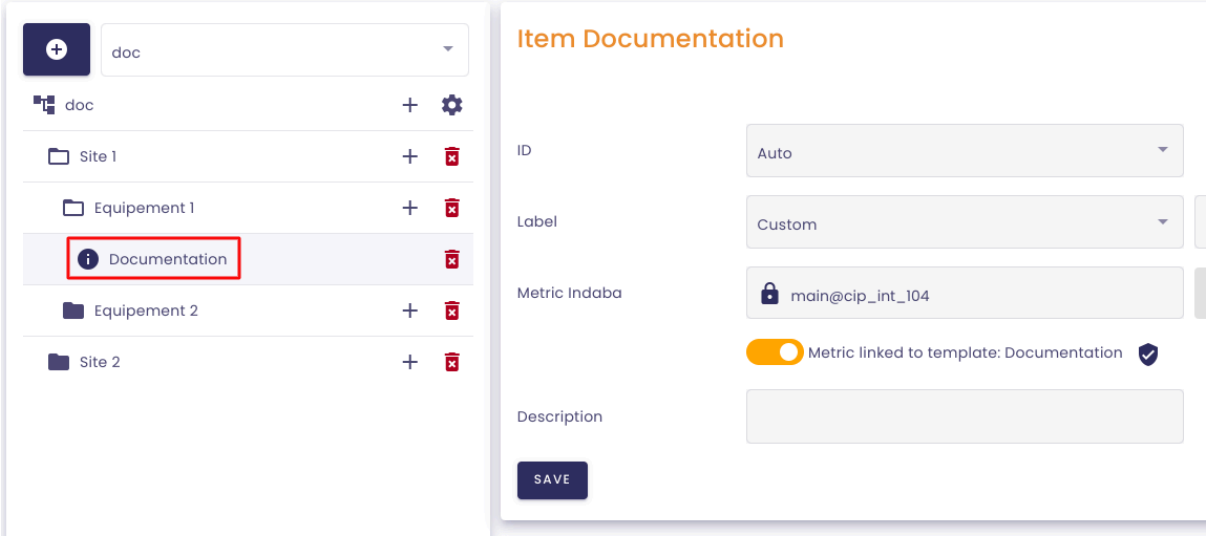
4.7.4 Edit a generic metric

Prerequisite : This feature is available for users with a **Functional Administrator** role.

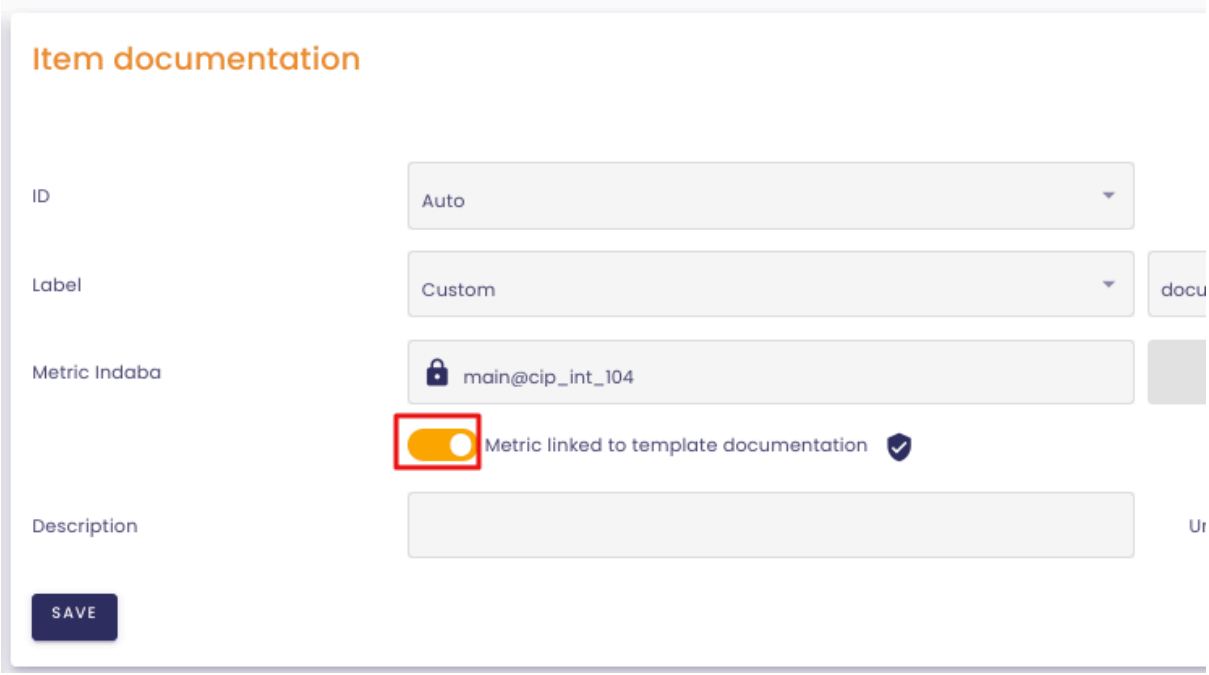
You have the possibility to edit the generic metric that has been associated with your item.

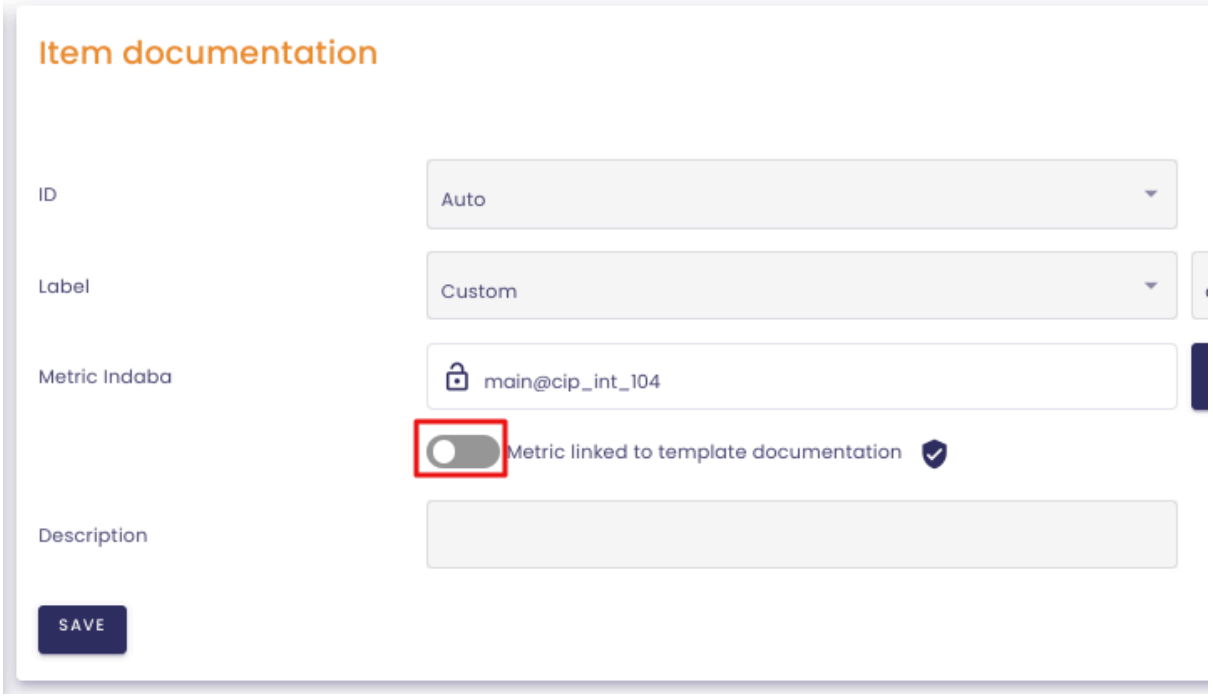
Log in to **Io-base** and access the **Functional tree** menu.

Select the desired functional tree, then click on the desired metric :



Start by unchecking the link between the metric and the template.

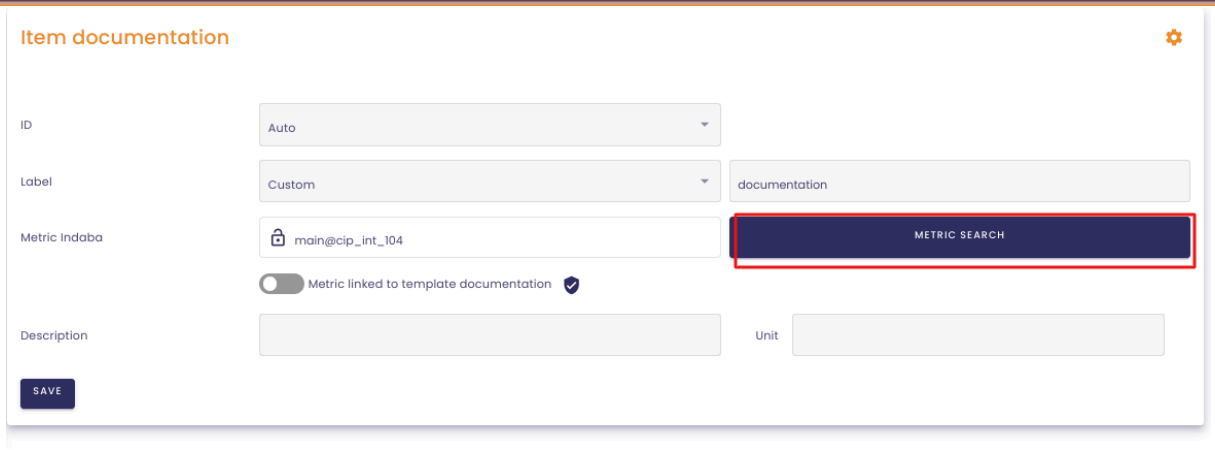




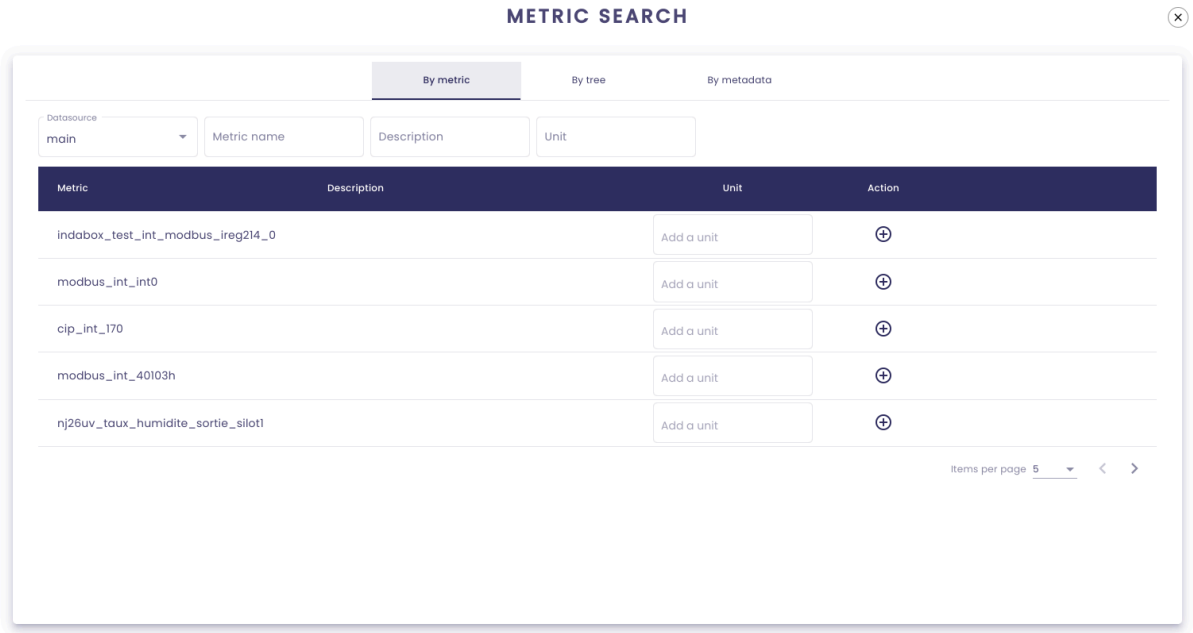
Note : You can view the template associated with the metric by clicking on the symbol highlighted below :

You are then redirected to the **Types** tab, where the associated template is located.

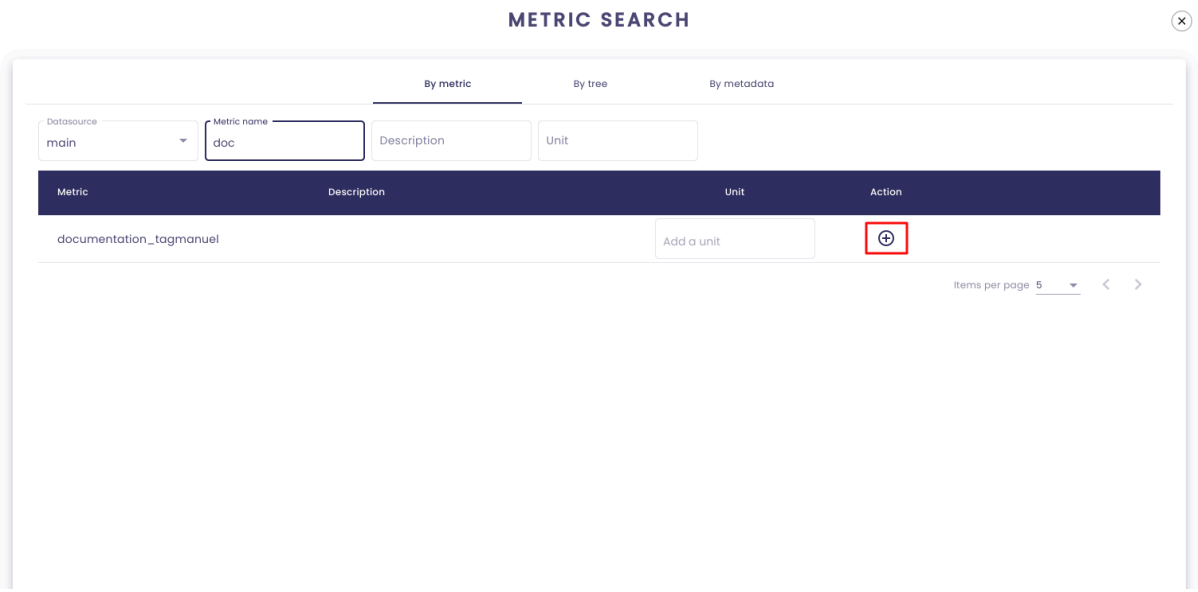
Next, click on the "**Search for a Metric**" button :



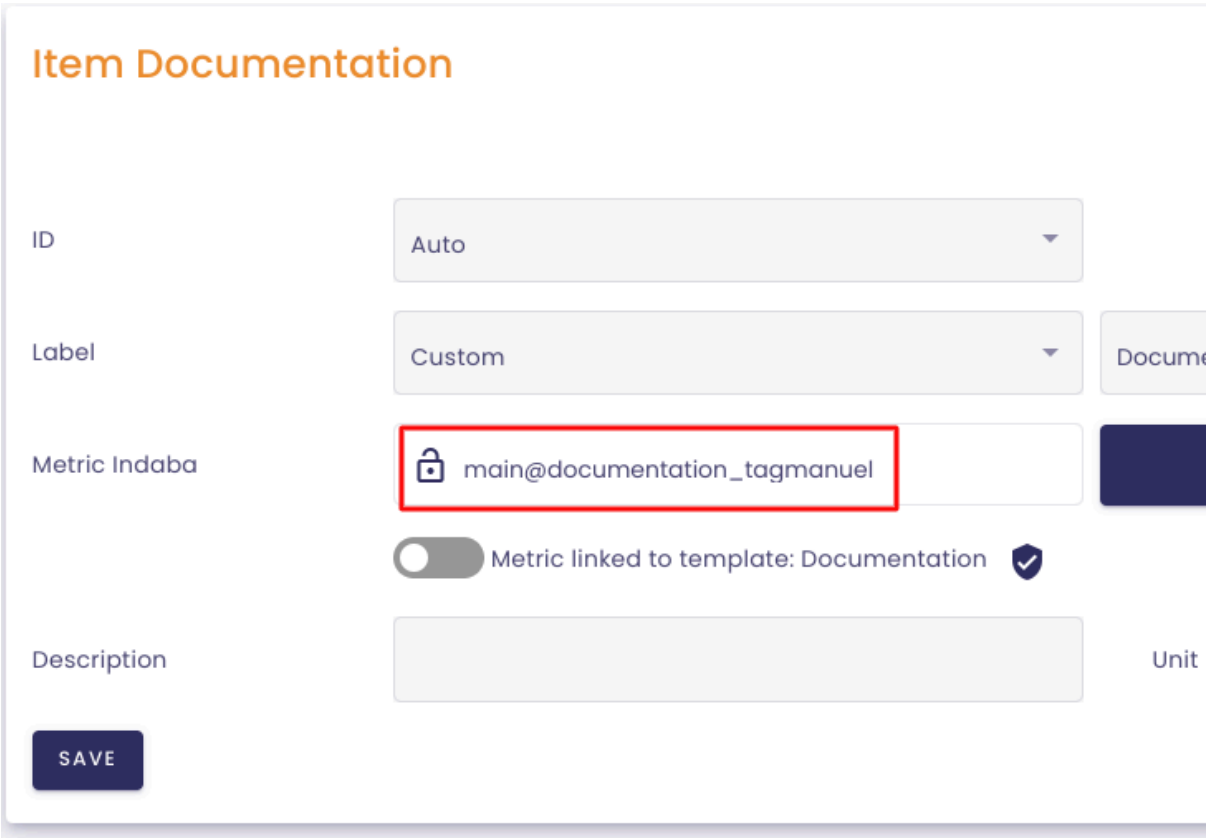
A window opens, allowing you to explore the metric referential :



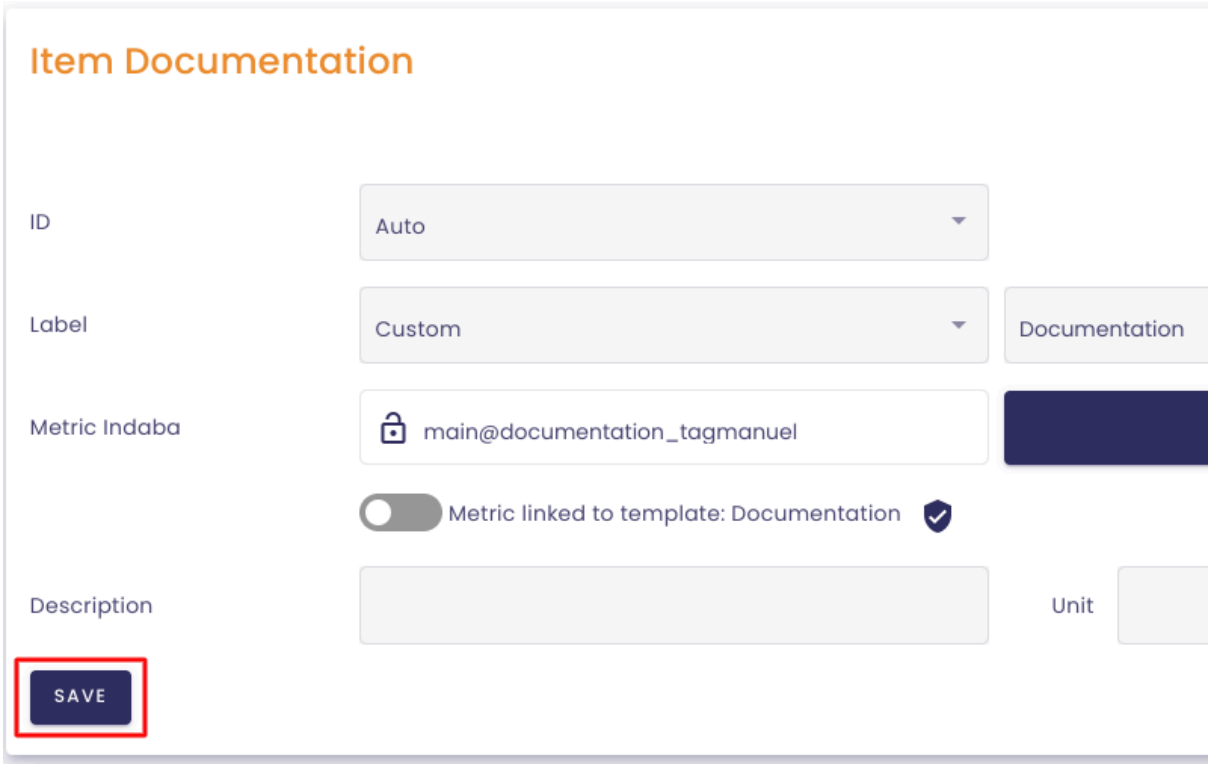
Select the metric you want to replace the generated metric with, by clicking on the "✚":



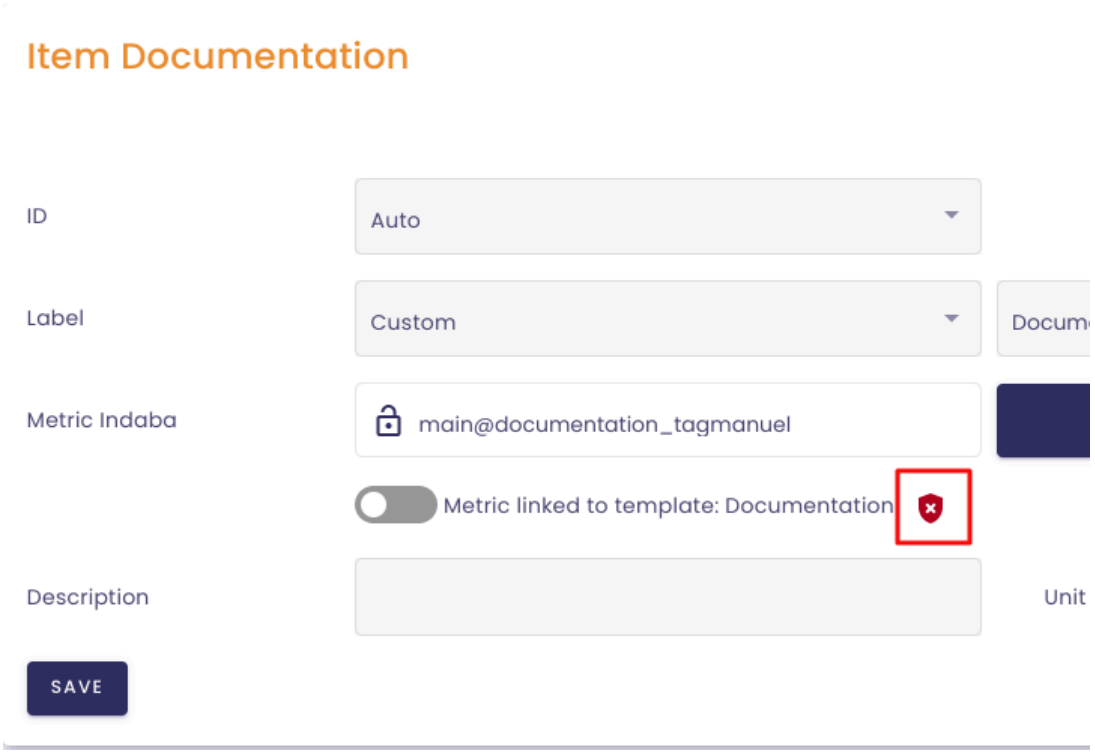
The selected Indaba metric is successfully modified :



Click on **Save** to confirm the modification.



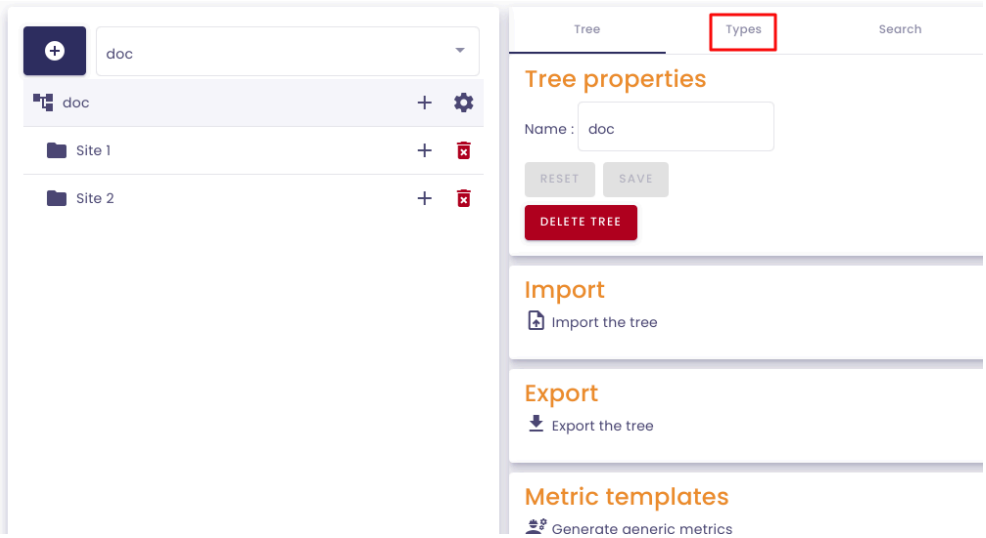
The changes have been saved, the symbol highlighted below indicates that the metric is no longer associated with the metric template.



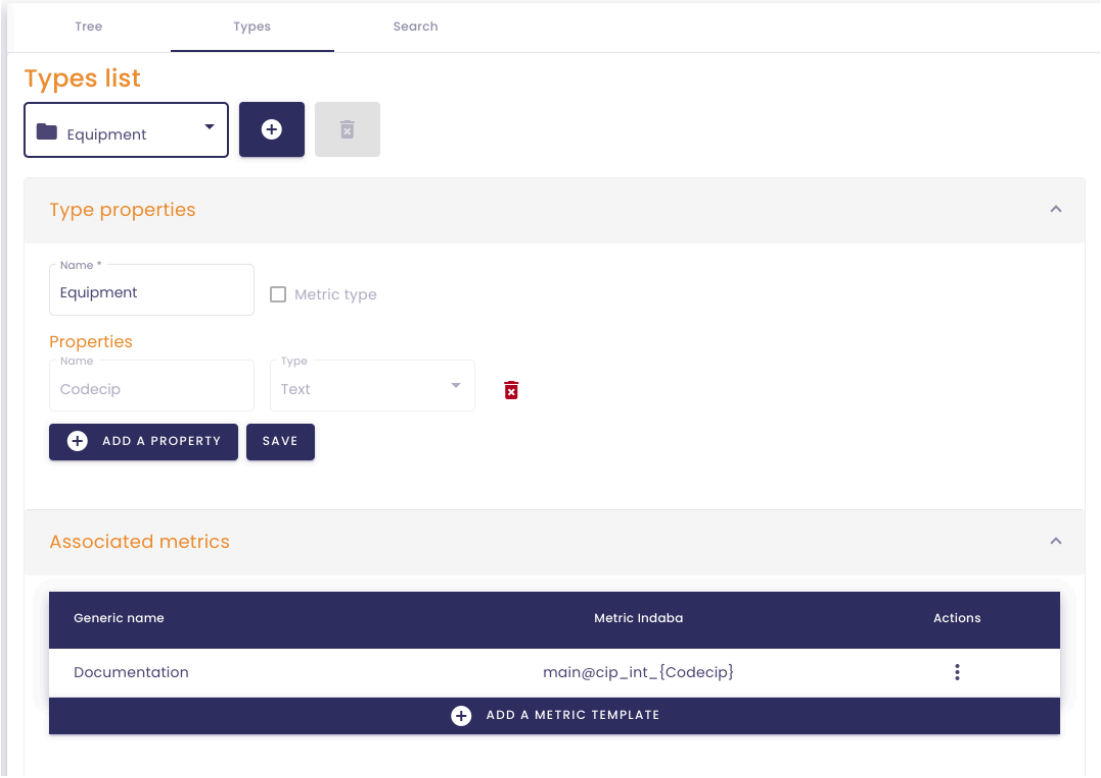
4.7.5 Delete a metric template

Prerequisite : This feature is available for users with a **Functional Administrator** role.

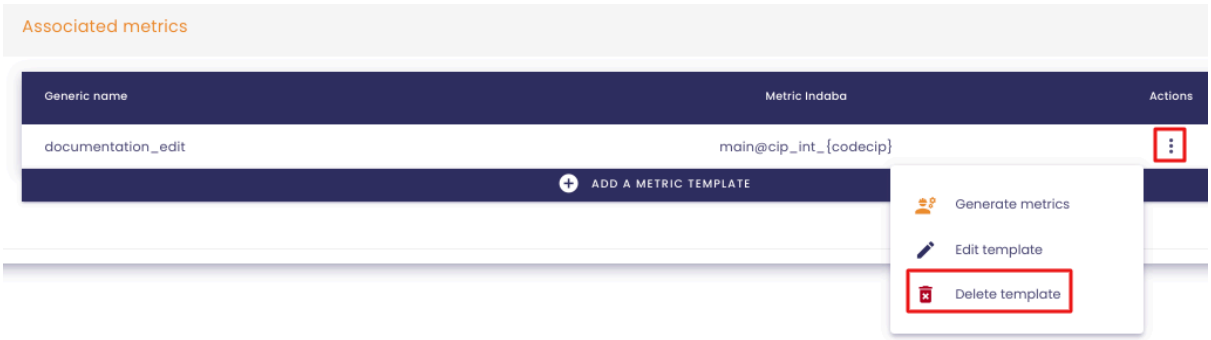
Select the desired functional tree, then go to the **Types** tab.



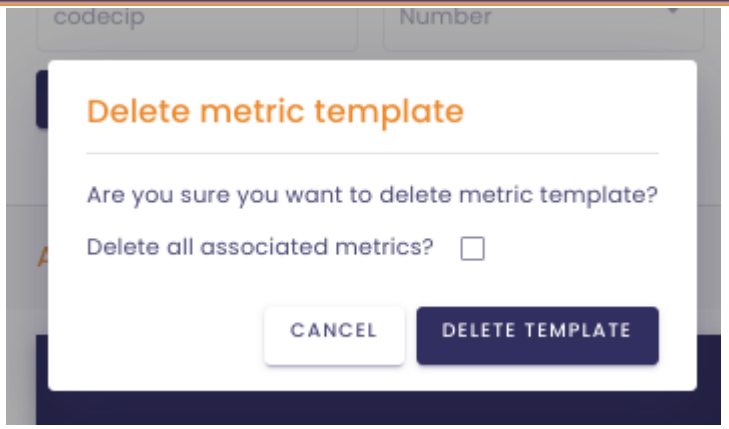
Select the type for which you want to delete a metric template.



In the "**associated metrics**" section, go to the **Actions** tab, then delete the template :

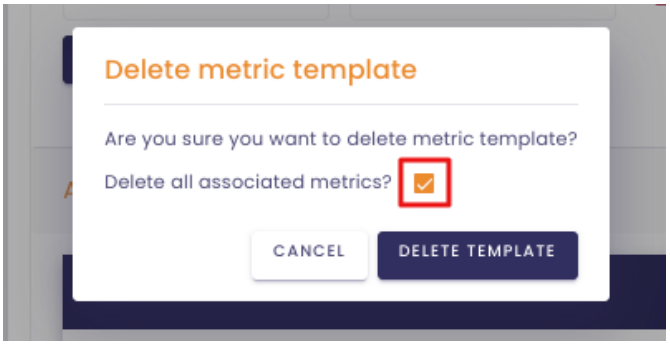


A window opens :

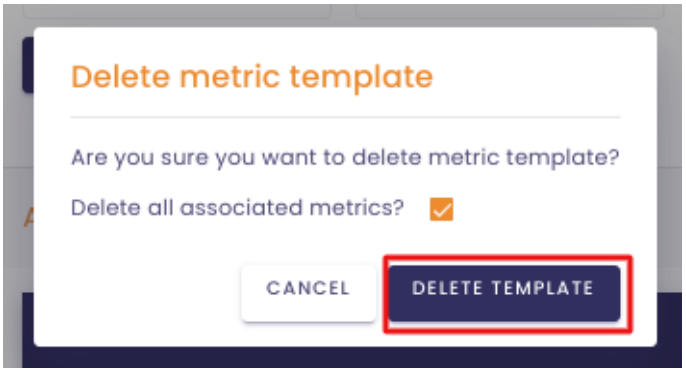


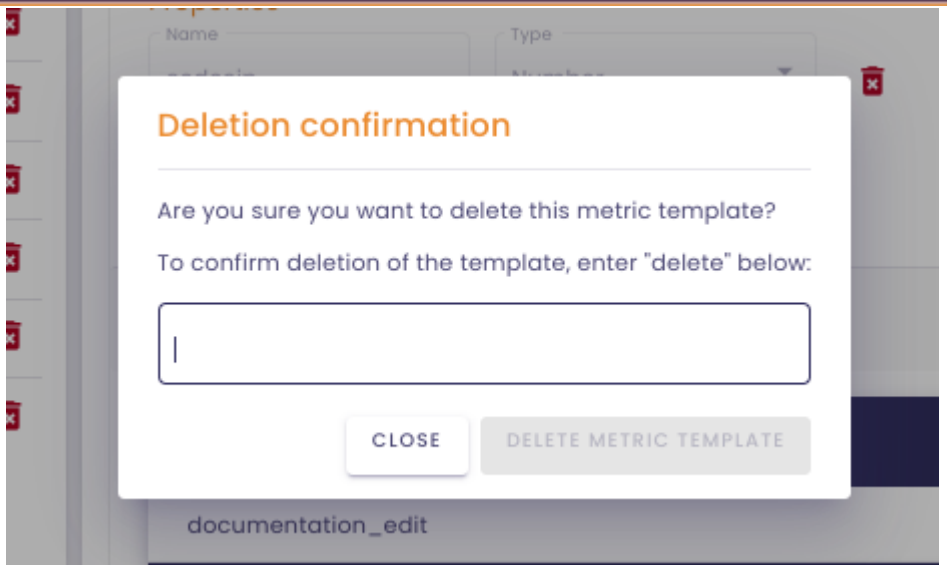
You have the option to delete the metrics associated with the template that were generated earlier.

To do so, check the box "**Delete all associated metrics?**"

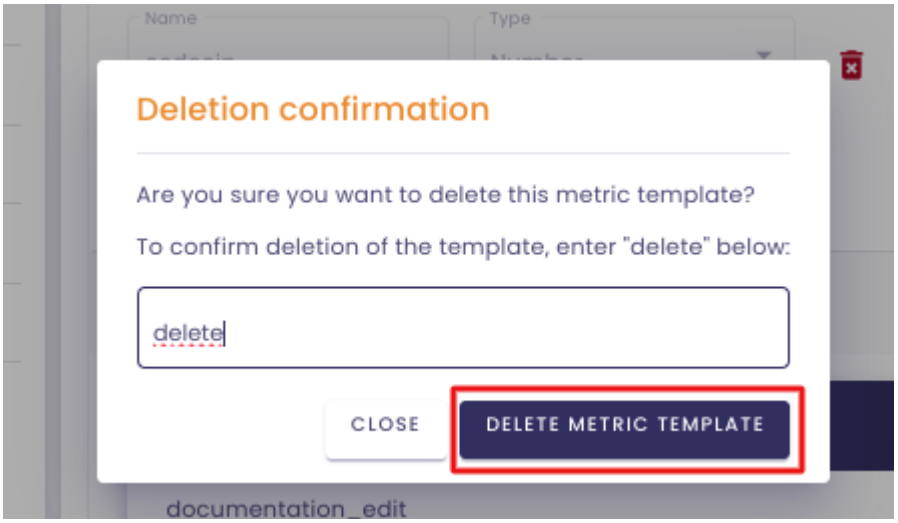


Finally, click on "**delete template**" to confirm the deletion.

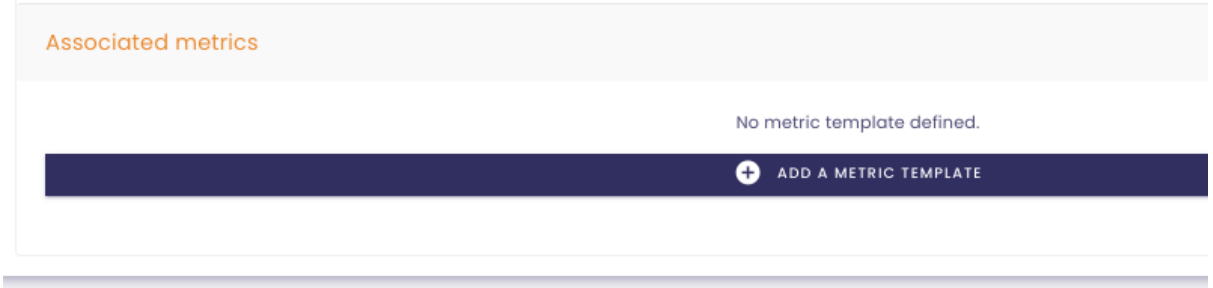




Type "delete" then click on "delete metric template".



The metric template is now deleted.



4.8 Formulas templates

4.8.1 The formula template feature

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

The 'templating' feature allows you to apply a generic calculation formula to all items of the same type within a hierarchy.

This saves considerable time by avoiding the need to input formulas for each individual item.

To understand how to use this feature, let's start with an example.

Imagine we have an operation spread across 2 different regions, with 2 sites per region and 1 compressor per site.
Each compressor returns two different metrics: hydrogen flow rate and pressure.

For each compressor, we want to know the volume of hydrogen compressed.
To do this, we need to create a formula where we multiply our two metrics:
Calculated Metric (Volume) = flow (metric 1) * pressure (metric 2) * compression coefficient.

Creating a formula for each compressor would be long and tedious.
With this new feature, you will be able to create a formula template, which will

automatically generate a formula for each compressor.

Proceed to the next article to learn how to create a formula template.

4.8.2 Creating a formulas template

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

Consider the following example :

Imagine we have an operation spread across 2 different regions, with 2 sites per region and 1 compressor per site.

Each compressor sends two different metrics: hydrogen **flow rate** and **pressure**. These two metrics are associated with a metric template.

For each compressor, we want to know the volume of hydrogen compressed.

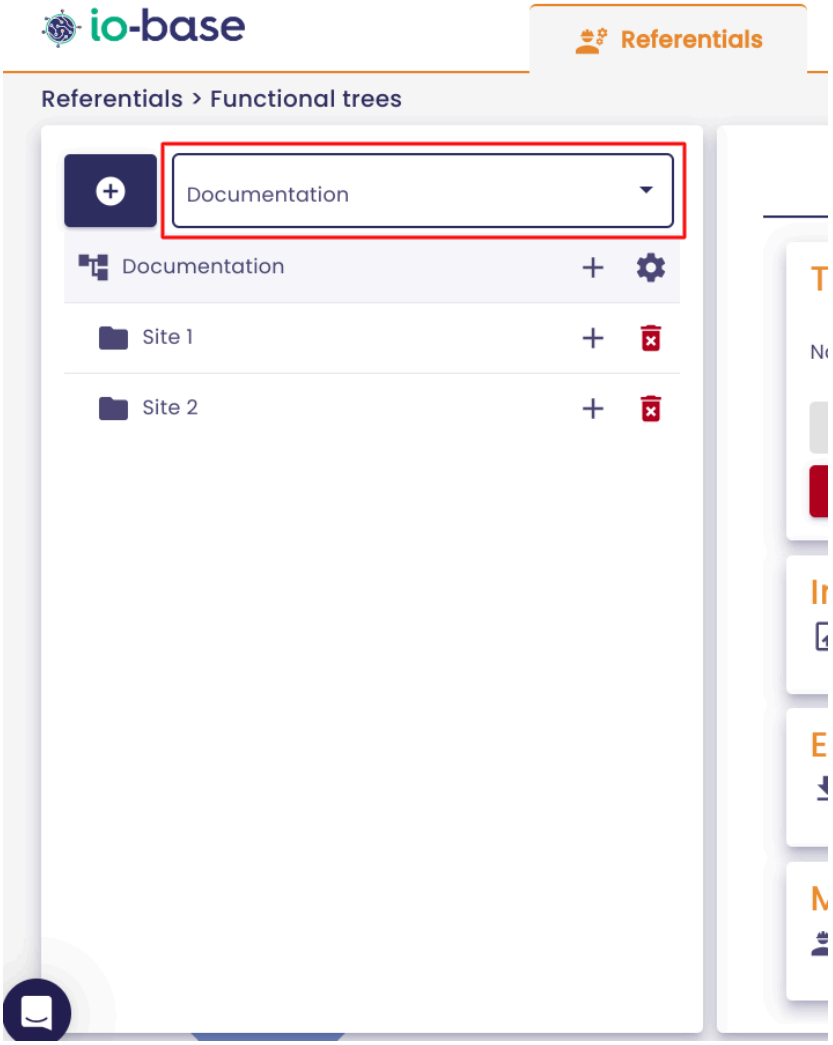
To do so, we need to create a formula where we multiply our two metrics:

Volume (calculated metric) = **flow** (metric 1) * **pressure** (metric 2) * **compression coefficient**.

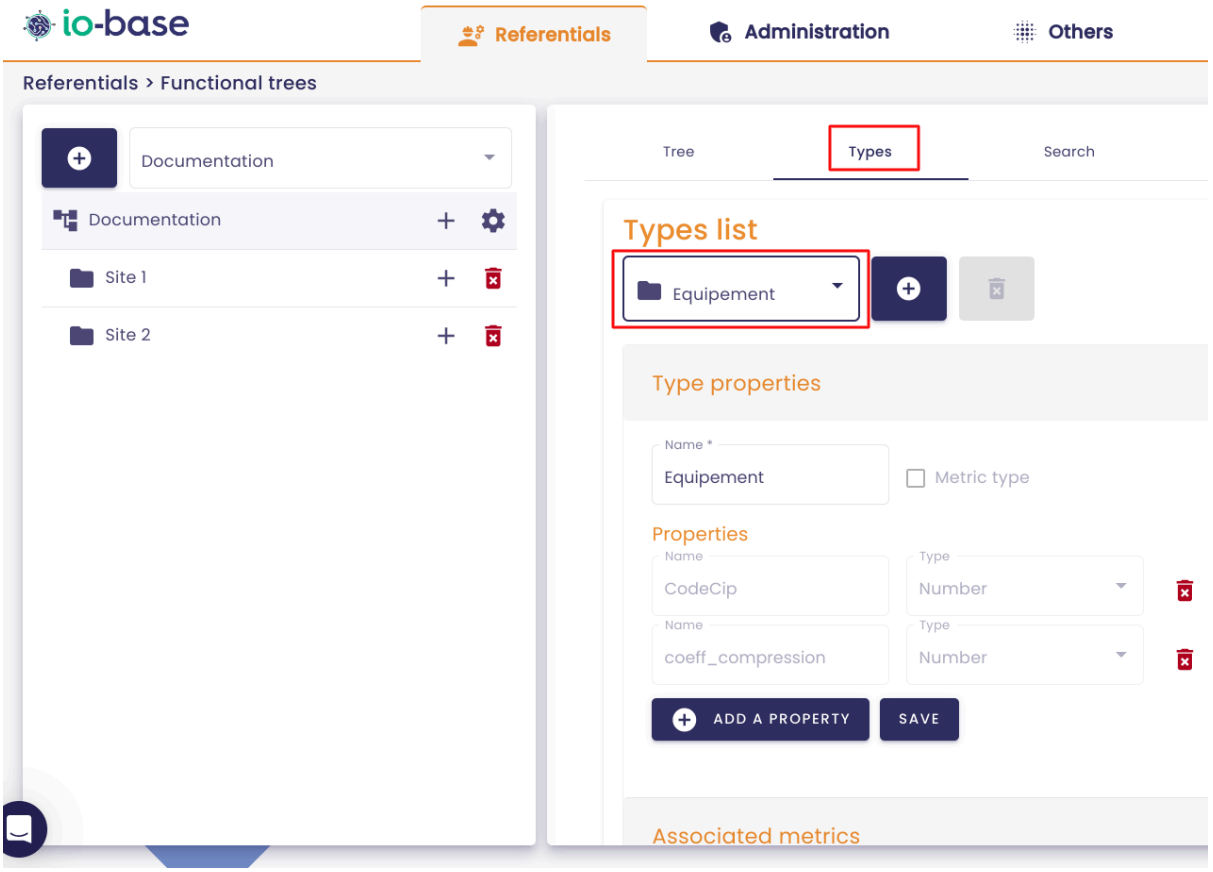
To avoid creating a formula for each compressor, you can create a **formula template** that will automatically generate a formula for each compressor.

To create a formulas model, connect to Io-base, then go to the Functional Tree menu.

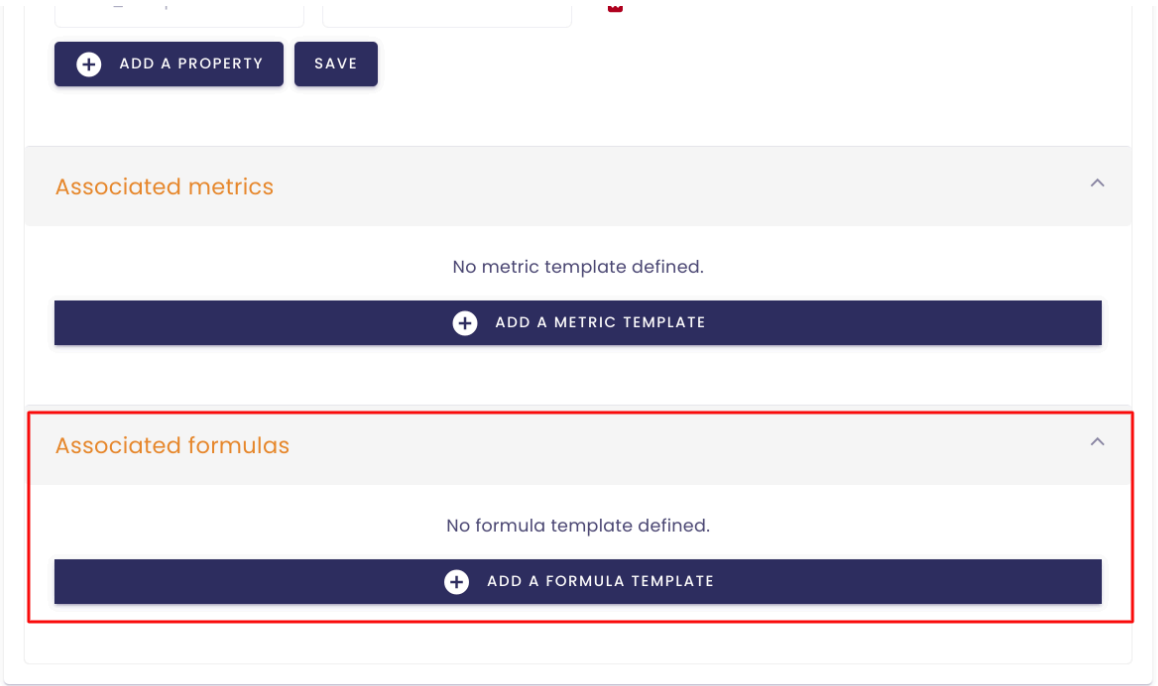
Then, select the desired tree structure.



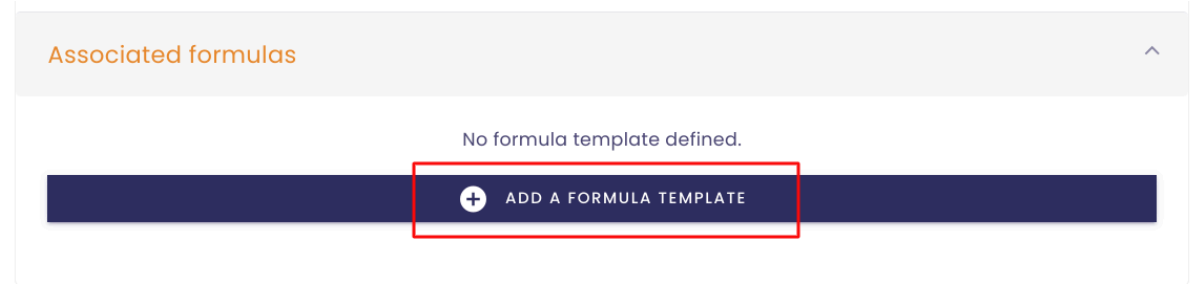
Go to the **Types** tab, and select the type of element for which you want to create a generic formula.



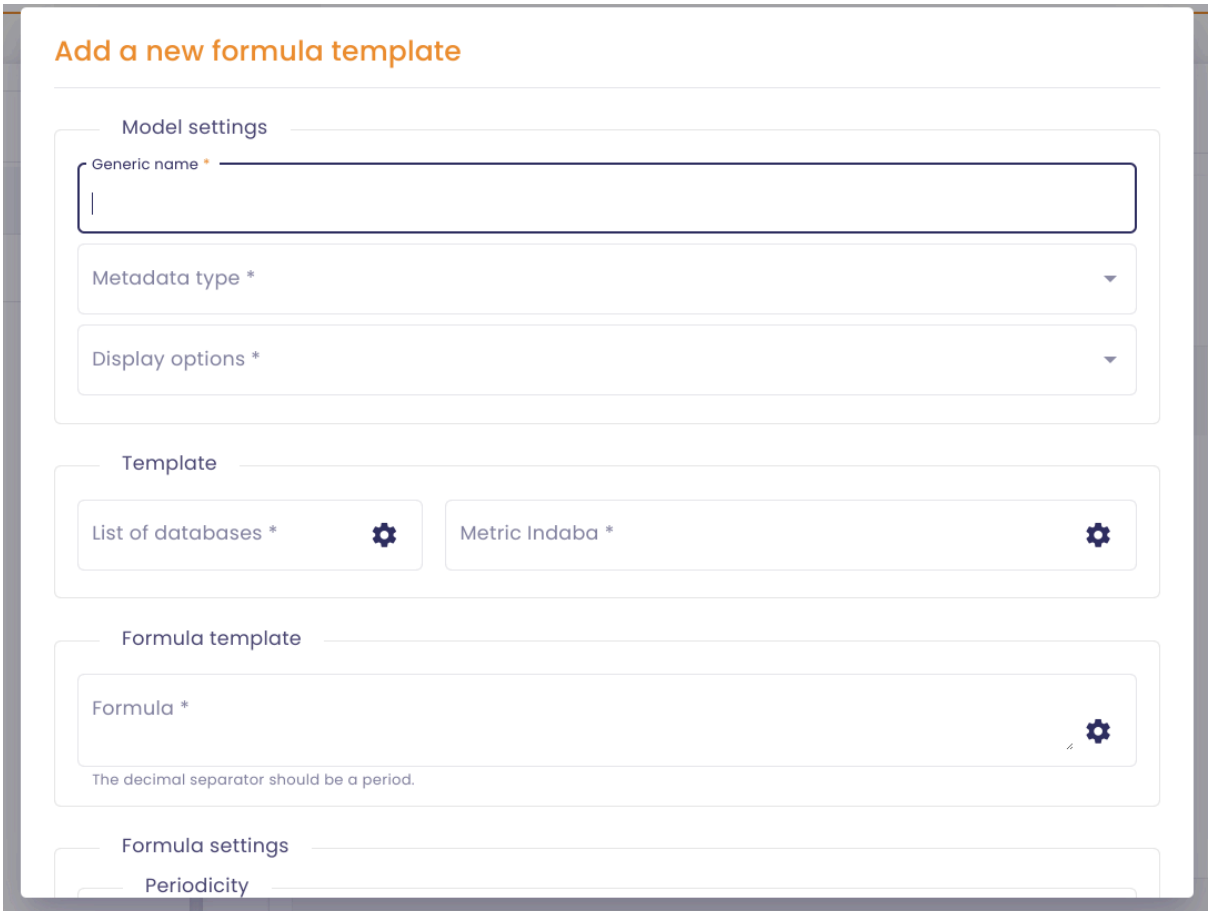
At the bottom right of the screen, the section "**Associated formulas**" is available.



Click on "**Add a formula template**".

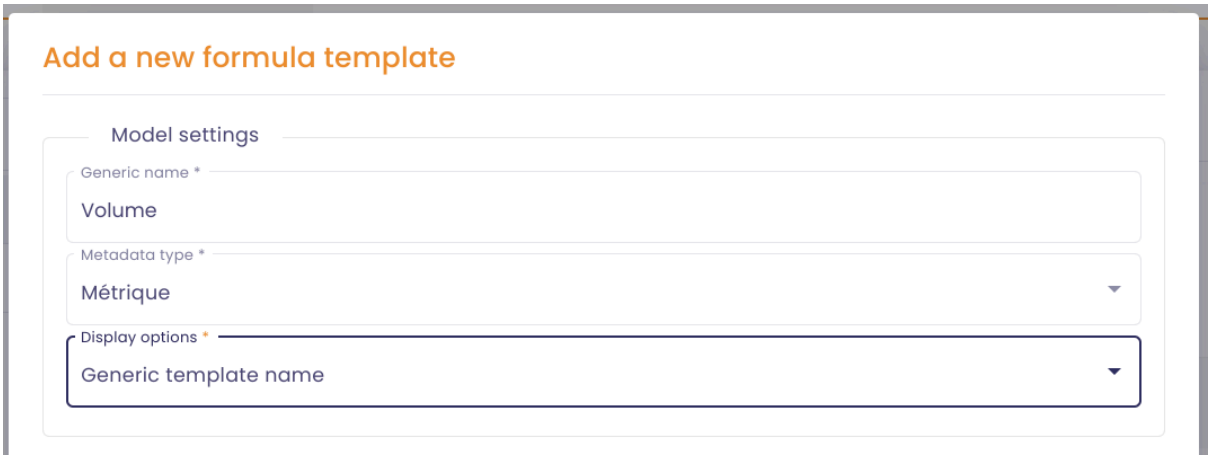


A pop-up window opens to allow you to configure your formula model.



Configuration of the model :

A first section allows you to specify the naming parameters of your formula model :



- **Generic Name** : This is the name of the metric model; in our case, we choose to name it "Volume"

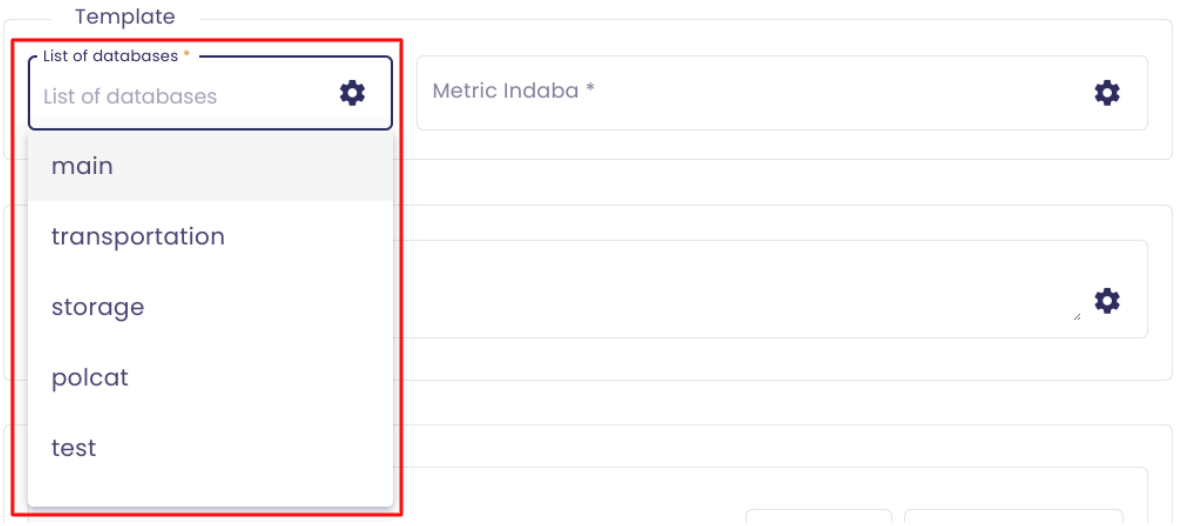
- **Metadata type** : Select a "Metric" type

- **Display options** : This parameter controls how generic metrics are displayed in the tree structure. You can choose to display the metrics using their name, their description, or the generic name of the model.

Metric template

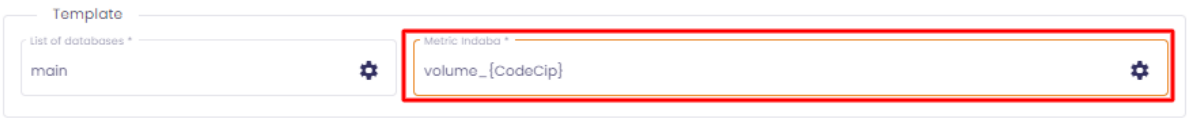
In this section, you need to specify :

- the database where you want to store the formulas generated by your model :

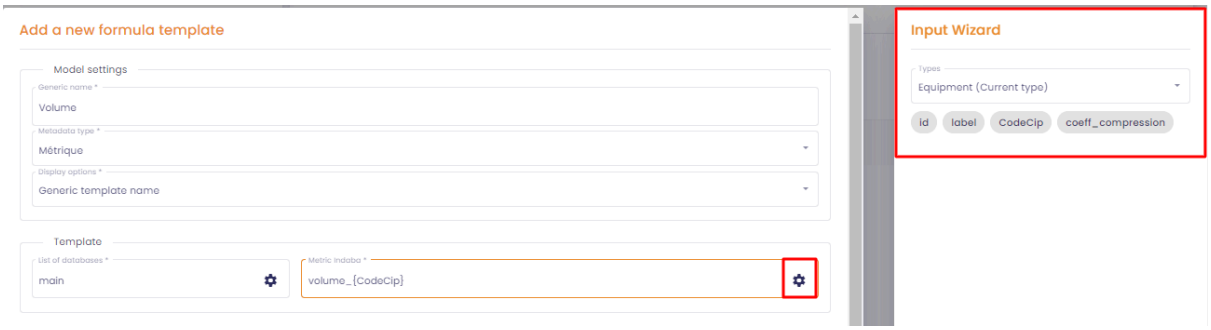


- the naming of Indaba metrics related to the formula model :

For example :



Note : You have an input assistant available where you can retrieve various properties from your tree structure. To open it, click on the enclosed button below :



In our example, we used the property {CodeCip}, which returns the compressor code, to name our metric.

Formula template :

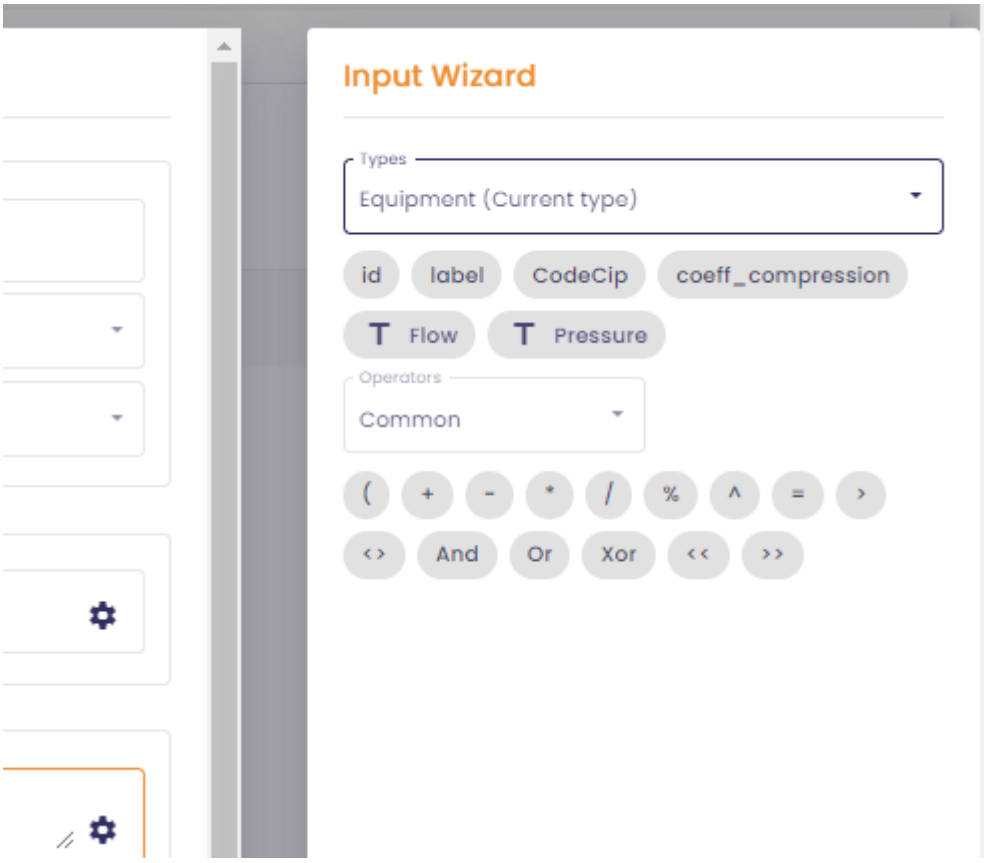
The "**Formula Model**" section allows you to enter the expression of your model :

To enter the expression of the model, you again have an input assistant available.

Click on the button

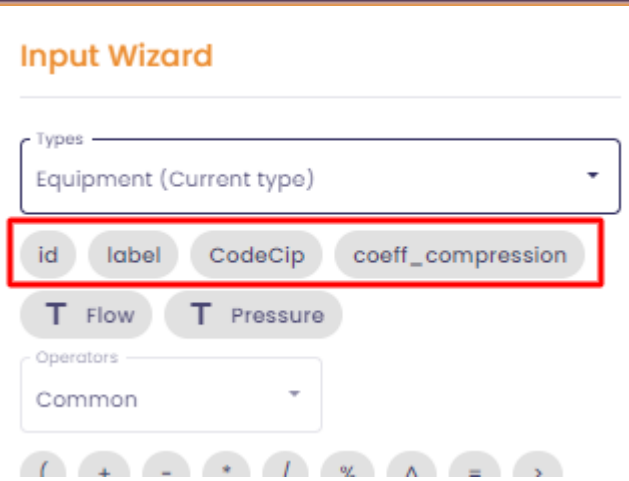
.

On the right side of your screen, the input wizard opens :

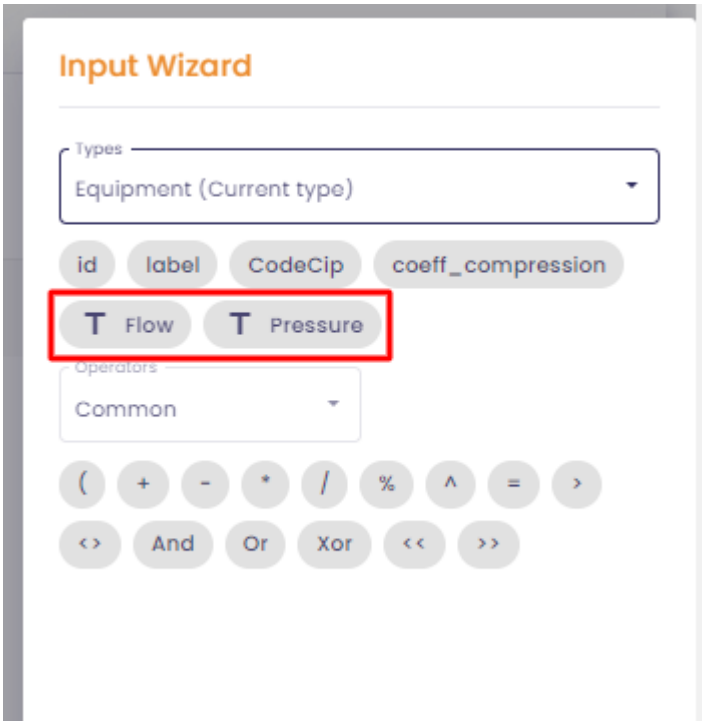


It allows you to add to your expression:

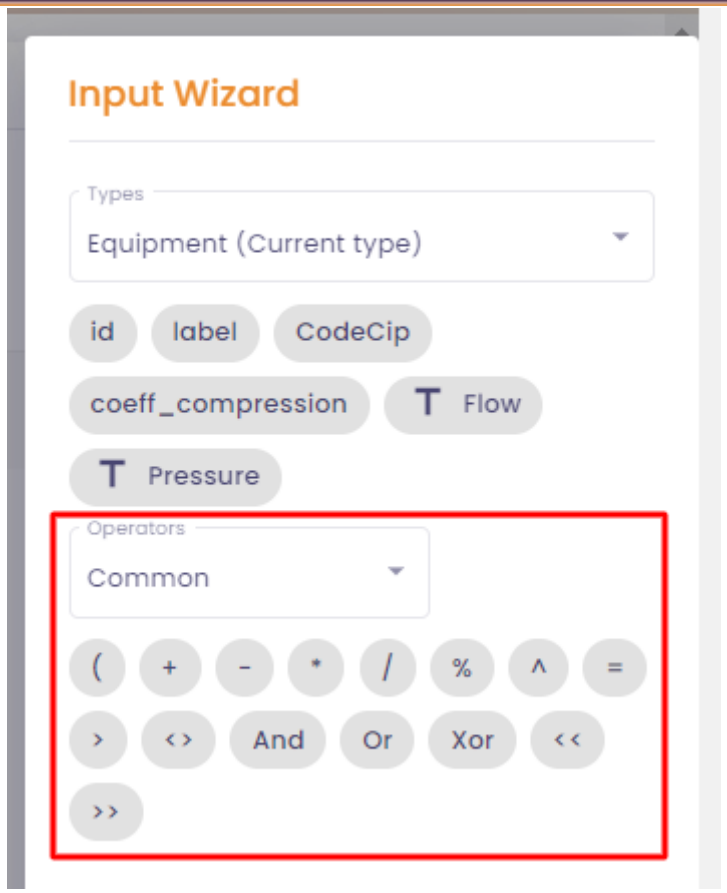
- the properties of the functional tree :



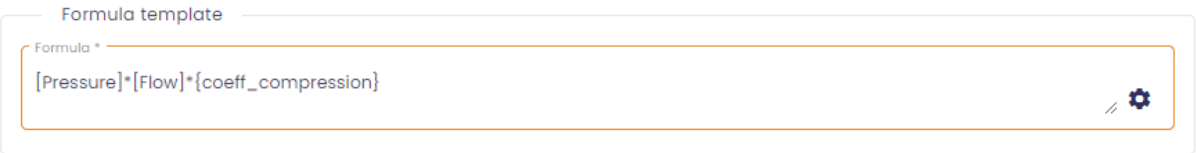
- the generic metrics present in the functional tree, represented by the symbol
  T



- All the operators from the Formulas menu :



In our example, we will have :



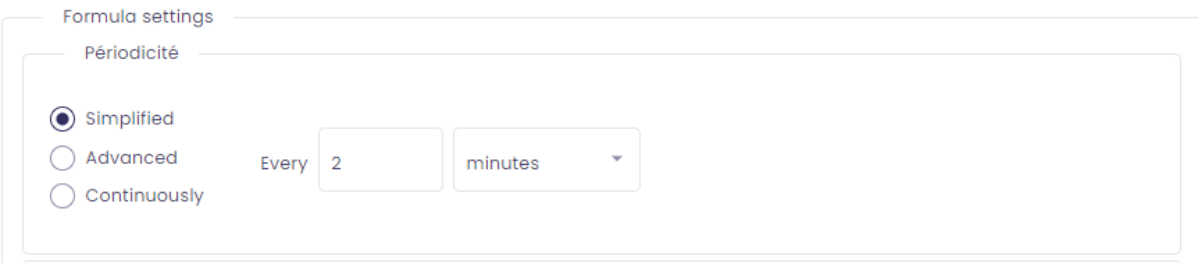
Note : The generic metrics used in the formula expression are enclosed in brackets '[ ]' and the properties of the tree structure in curly braces "{ }".

Formula configuration :

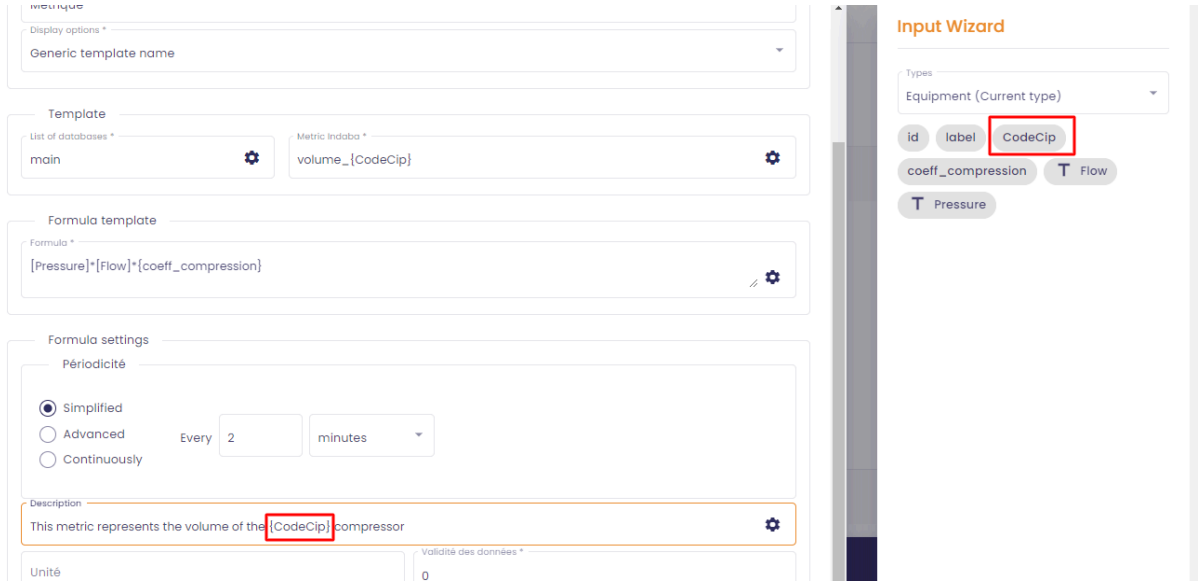
As with the creation of a standard formula, you need to specify parameters for the formulas generated by your model :

- the calculation periodicity: the frequency at which the metric values will be

calculated



- a description (optional), where you can add parameters using the input wizard :



- an **unit** (optional)
- **data validity in seconds (optional)** : this value ensures that calculated values are based on valid data.

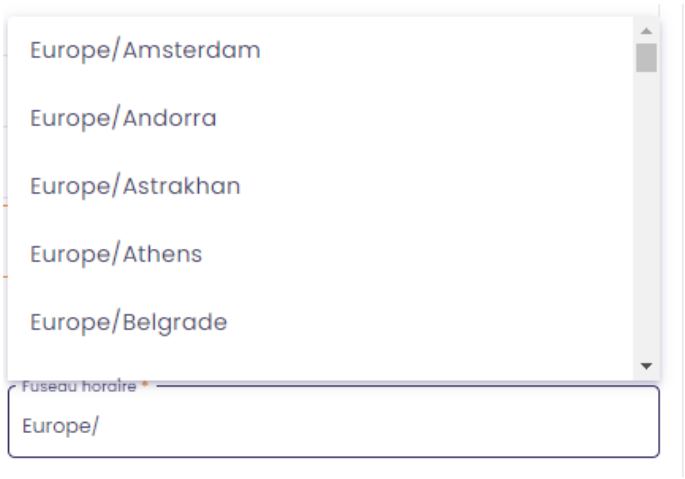
  For example, if the expression is main@tag>5, and the validity duration is set to 60 seconds. At the time the formula needs to recalculate, it will check the timestamp of the last value in the database for main@tag. If this timestamp is older than 60 seconds, the value is considered unreliable. Therefore, the formula will not recalculate, and no new value will be inserted at that time.

If you want to recalculate a value regardless of this validity check, simply enter 0 in this field.

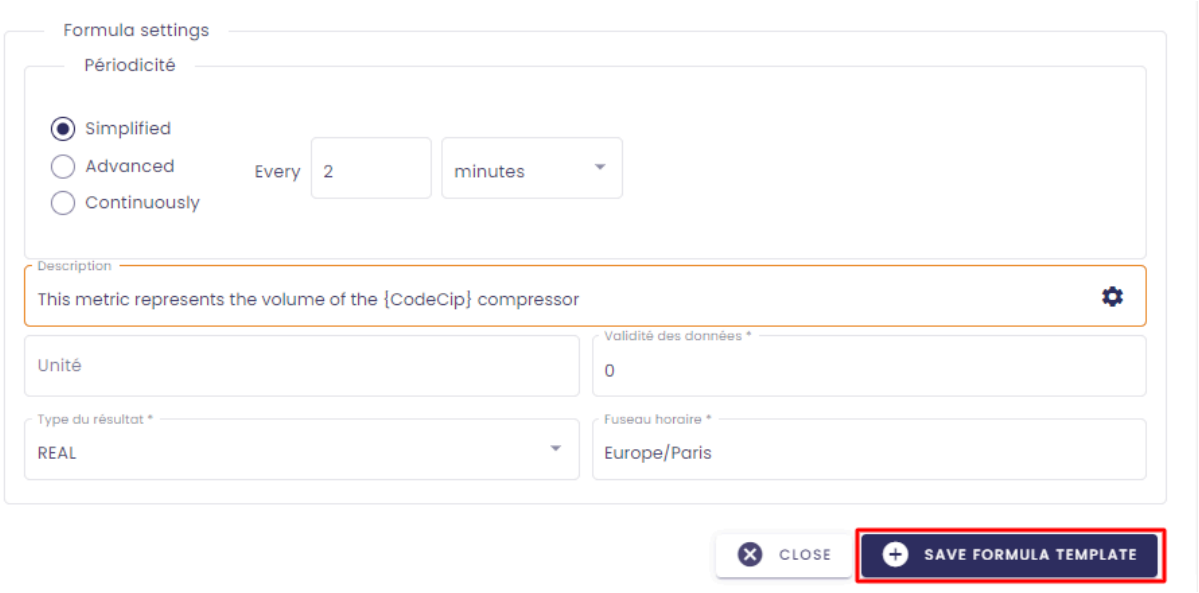
- **result type (mandatory)** : indicates in which format the calculated values will be stored in the database :
    - BOOL: boolean
    - INT: integer
    - REAL: decimal

- **timezone** (mandatory): specifies the time zone you want to set for your formula.

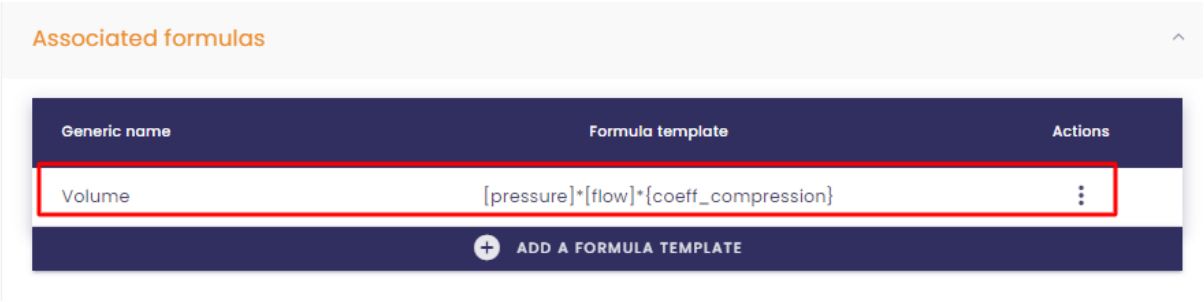
Note : An input assistance is provided; simply type the beginning of your input, and the available time zones will be displayed.



Once all the parameters are entered, you can save your formula model.



Your model appears correctly in the "**Associated Formulas**" section.



4.8.3 Generate generic formulas

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

Consider the following example :

Imagine we have an operation spread across 2 different regions, with 2 sites per region and 1 compressor per site.

Each compressor sends two different metrics: hydrogen **flow rate** and **pressure**. These two metrics are associated with a metric template.

For each compressor, we want to know the volume of hydrogen compressed.

To do so, we need to create a formula where we multiply our two metrics:

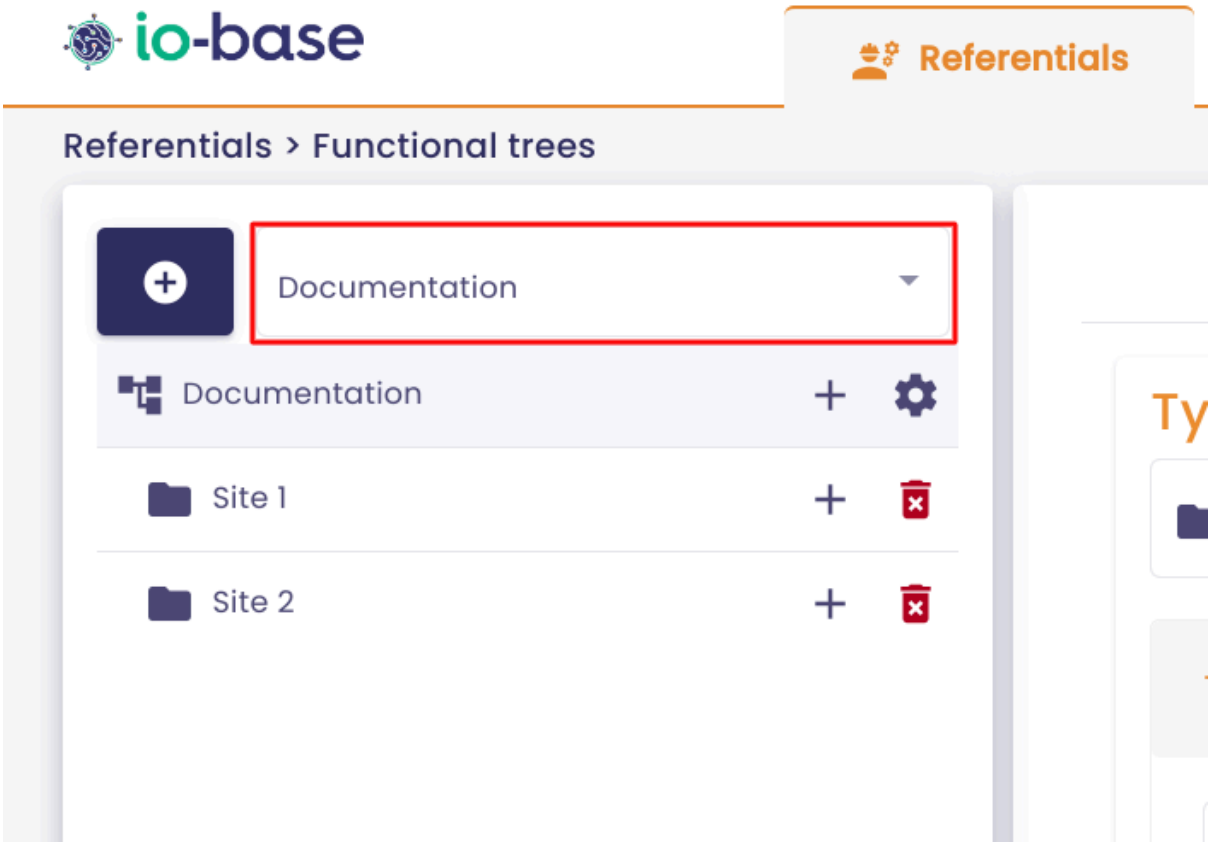
Volume (calculated metric) = **flow** (metric 1) * **pressure** (metric 2) * **compression coefficient**.

To avoid creating a formula for each compressor, we have created a formulas template , which will automatically generate a formula for each compressor.

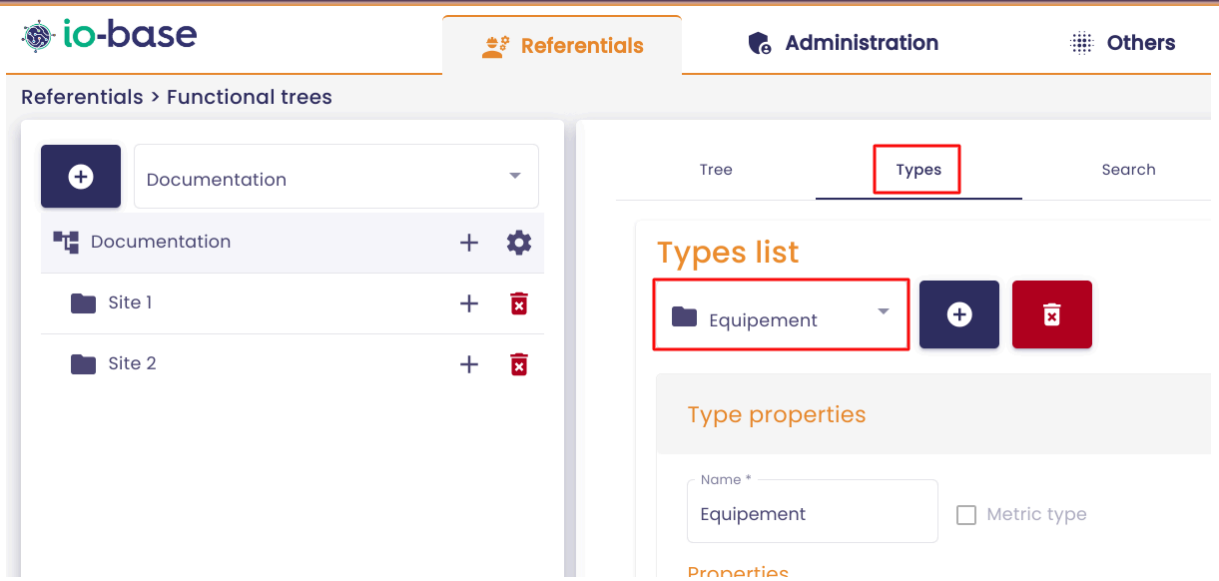
To generate these formulas, follow the procedure below :

Connect to Io-base, and access the Functional Tree menu.

Then, select the desired functional tree.

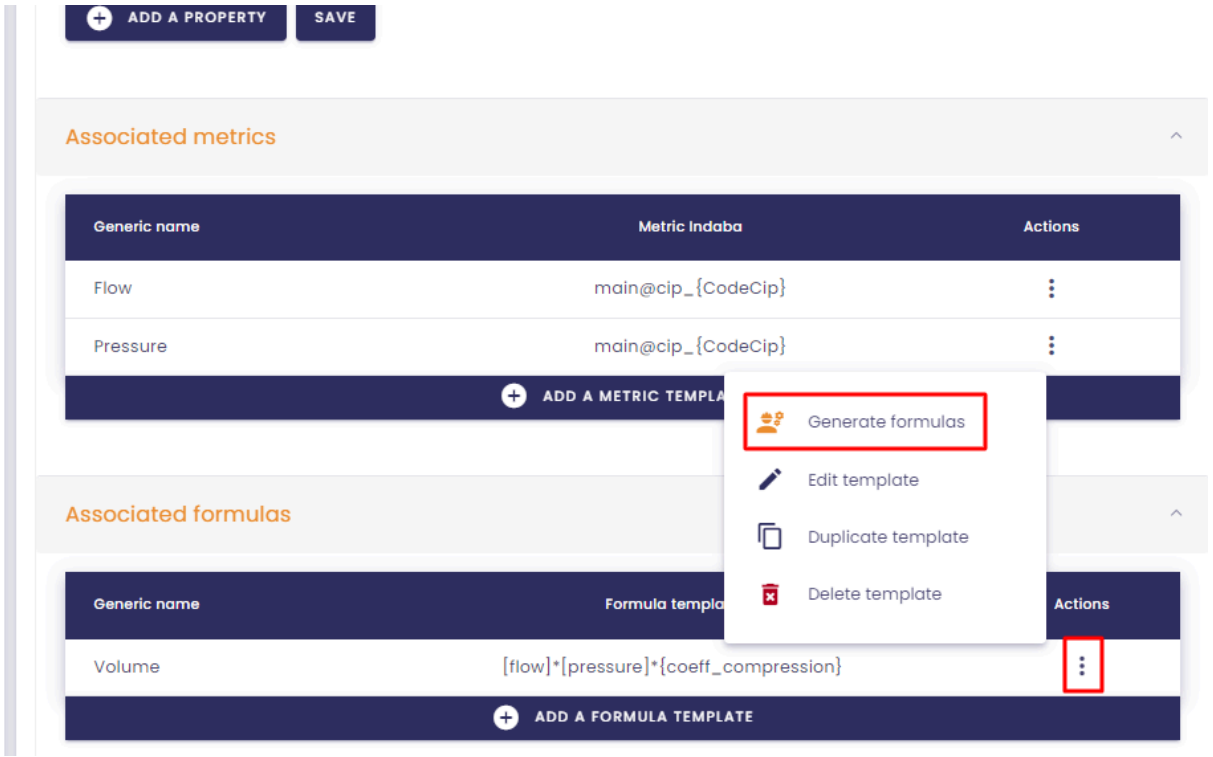


Go to the **Types** tab, and select the type of element for which you want to create a generic formula.

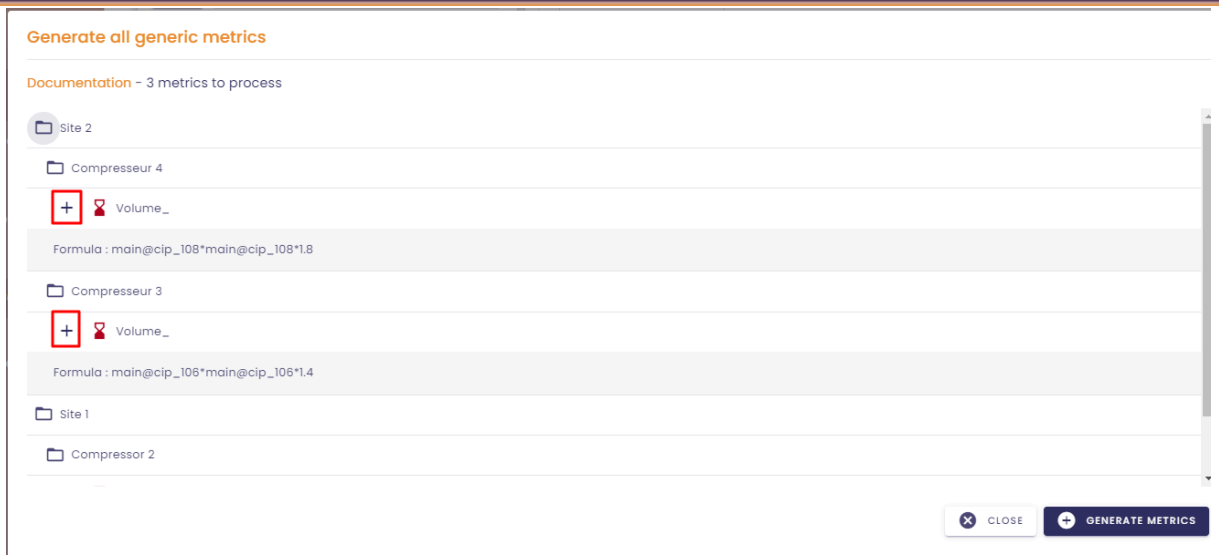


At the bottom right of the screen, the section "**Associated formulas**" is available.

Identify the template you want to use. Then, in the **Actions** column, click on "**Generate formulas**".

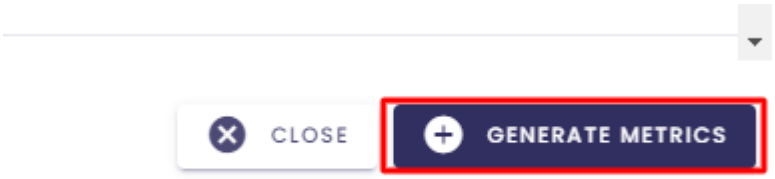


The following window opens :



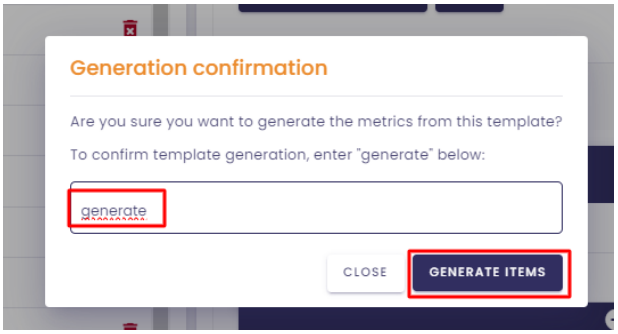
Note : The boxed "**+**" symbol above indicates that new formulas will be added.

Click on "**Generate Metrics**".

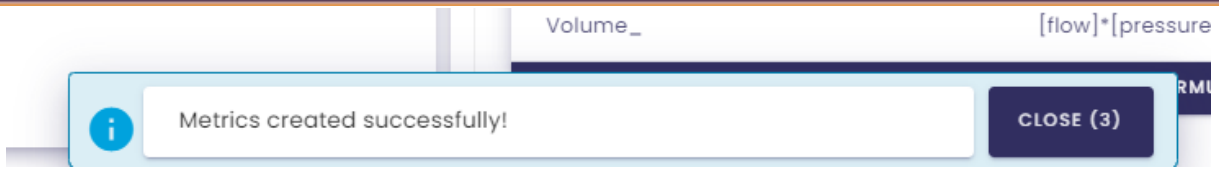


The confirmation window opens.

Enter "**generate**" and click on "**Generate items**".

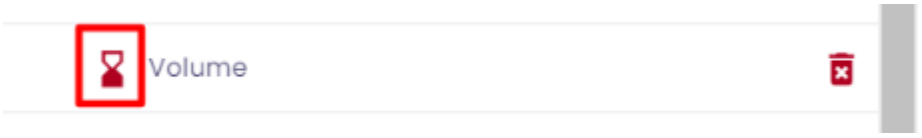


Your formulas have been successfully generated.



Note : The hourglass icon in the functional tree indicates that the formula has not been created yet.

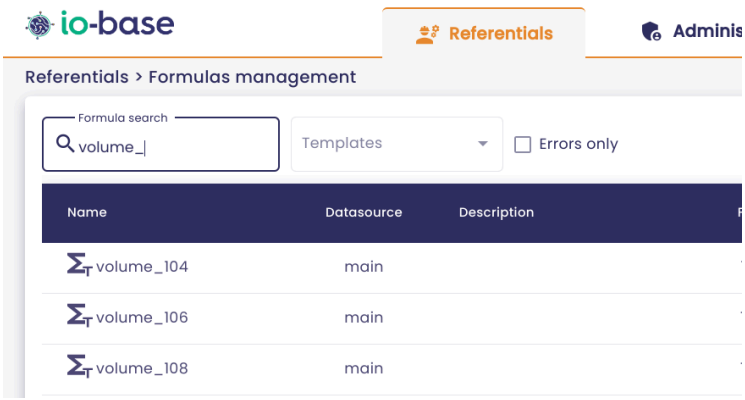
Wait a few seconds, then refresh the page.



Formulas associated with a template (generic formulas) are represented by the symbol

.

You can also find them in the **Formulas** menu.



4.8.4 Edit a formula template

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

Consider the following example :

Imagine we have an operation spread across 2 different regions, with 2 sites per region and 1 compressor per site.

Each compressor sends two different metrics: hydrogen **flow rate** and **pressure**. These two metrics are based on a metric model.

For each compressor, we want to know the volume of hydrogen compressed.

To do so, we need to create a formula where we multiply our two metrics:

Volume (calculated metric) = **flow** (metric 1) * **pressure** (metric 2) * **compression coefficient**.

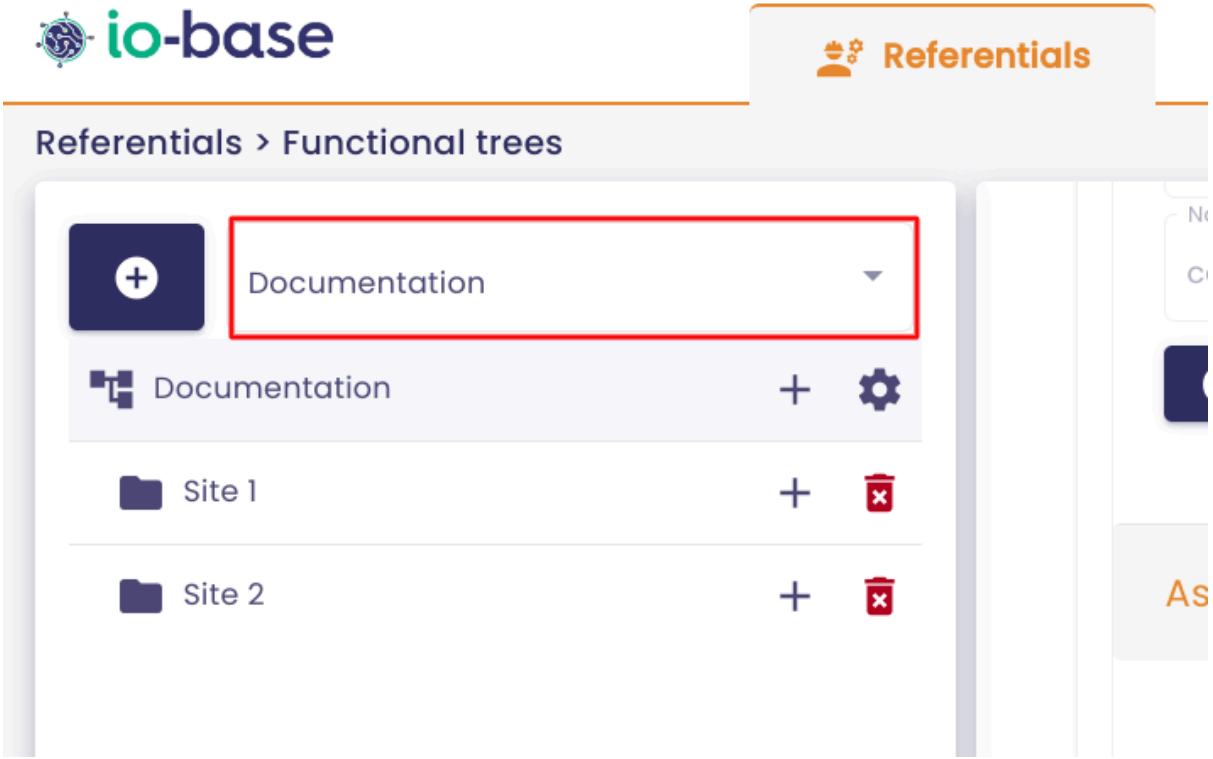
To avoid creating a formula for each compressor, we created a **formula template** (link to the article) that will automatically generate a formula for each compressor.

Now, imagine we consider the compression coefficient negligible in the volume formula and want to remove it.

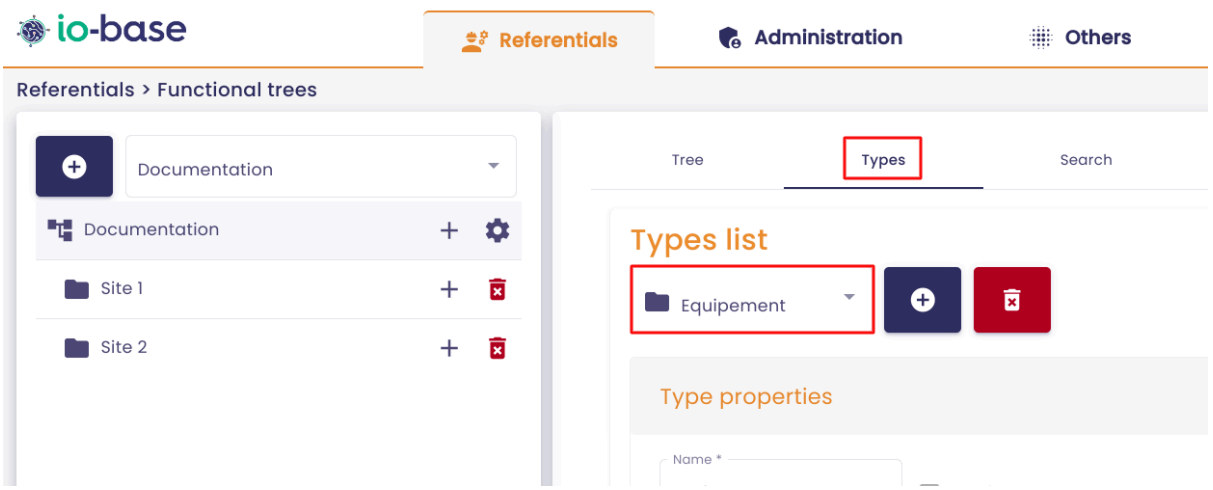
It is possible to edit the formula template and apply the changes to all formulas generated from the model. To do this, follow the procedure below:

To edit a formula template, connect to Io-base, then go to the Functional Tree menu.

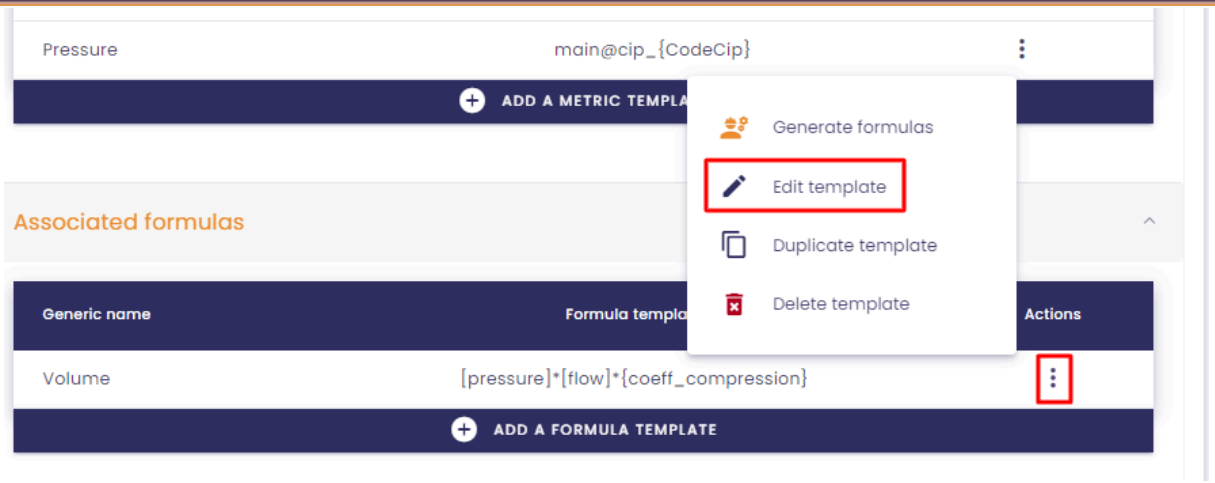
Then, select the desired tree structure.



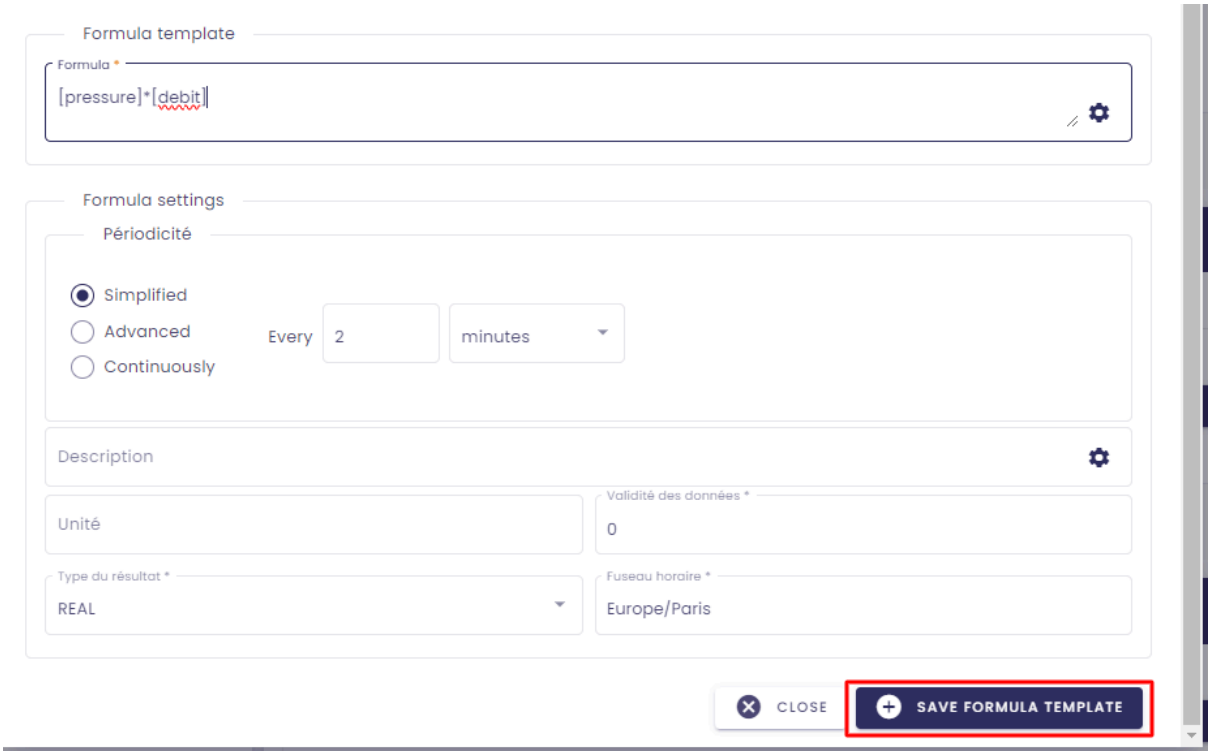
Go to the **Types** tab, and select the type of element for which you want to create a generic formula.



In the "**Associated Formulas**" section, go to the **Actions** tab, then select "**Edit Template**" :



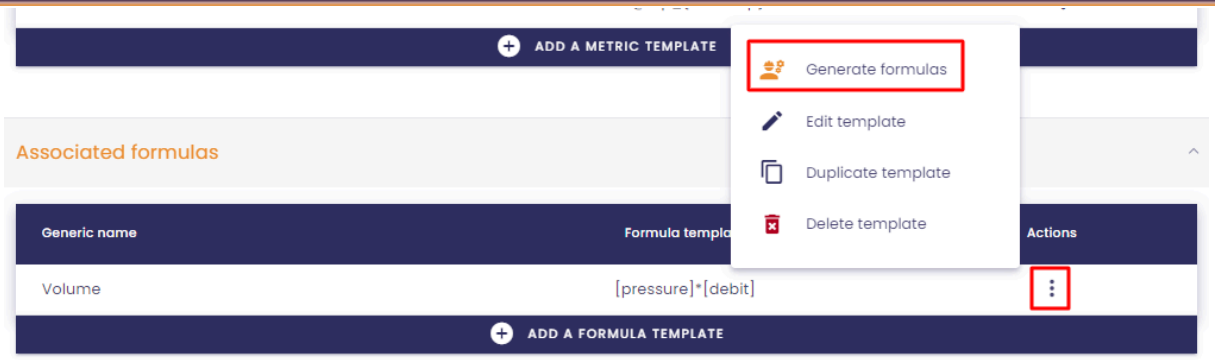
Make the desired modifications, then click on "**Save Formula Template**".



Your template has now been modified.

To apply these changes to previously generated formulas by the model, they need to be regenerated.

Go to the **Actions** menu, then click on "**Generate formulas**" :

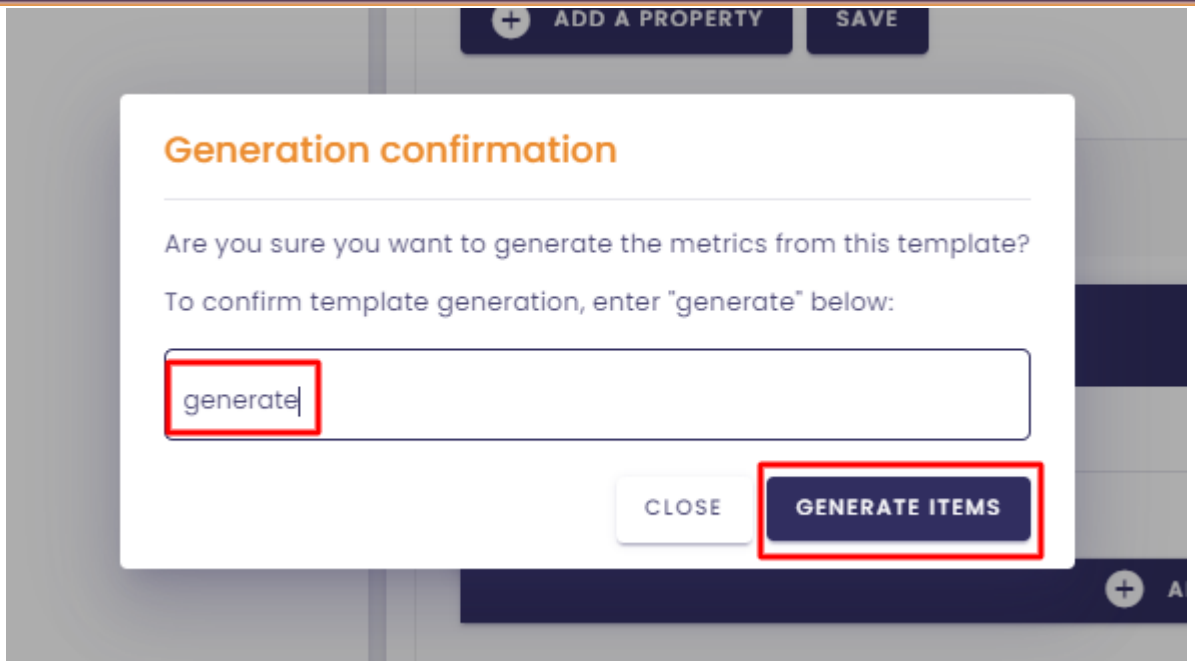


The following window opens :

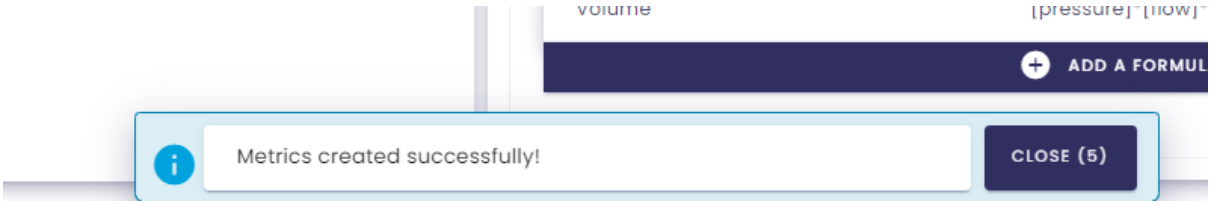
The boxed symbol above indicates that the generic formulas will be updated.

Click on "**Generate Metrics**".

The confirmation window opens. Enter "**generate**" and then click on "**Generate items**".



The formulas associated with the model have been updated.

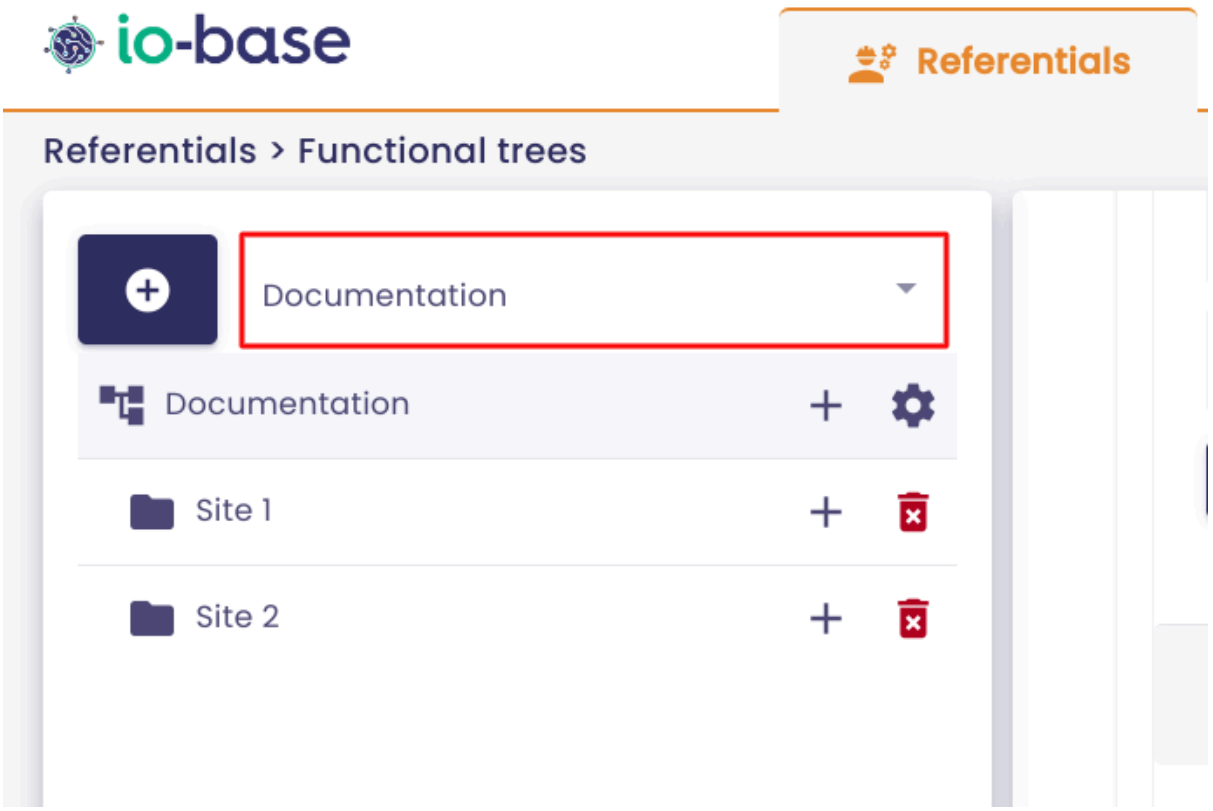


4.8.5 Delete a formulas template

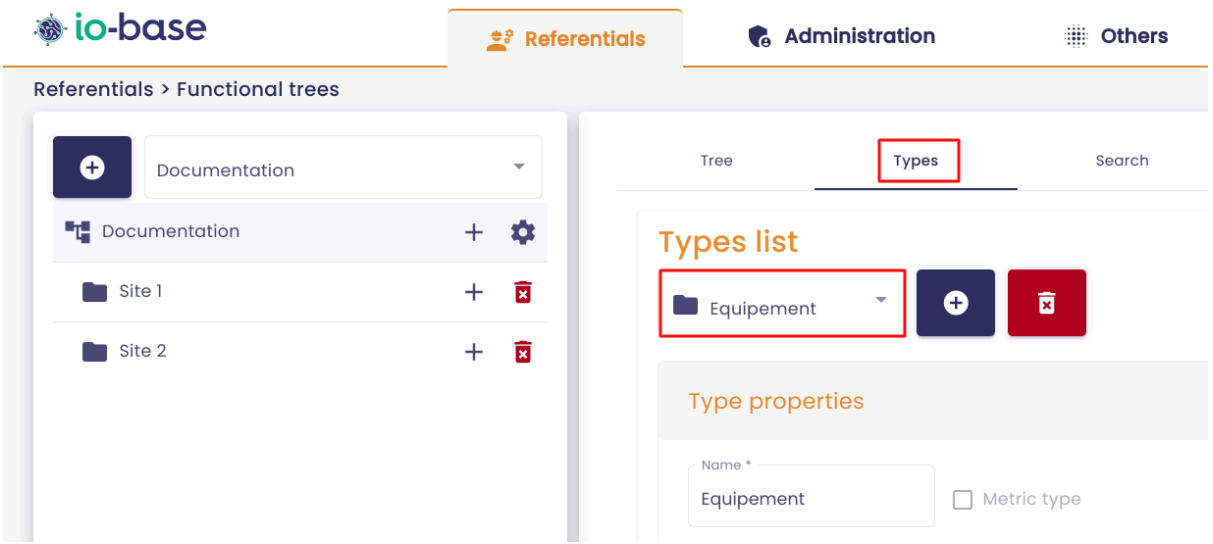
Prerequisite : This feature is available for users with a functional administrator role.

To create a formulas template, connect to Io-base, then go to the Functional Tree menu.

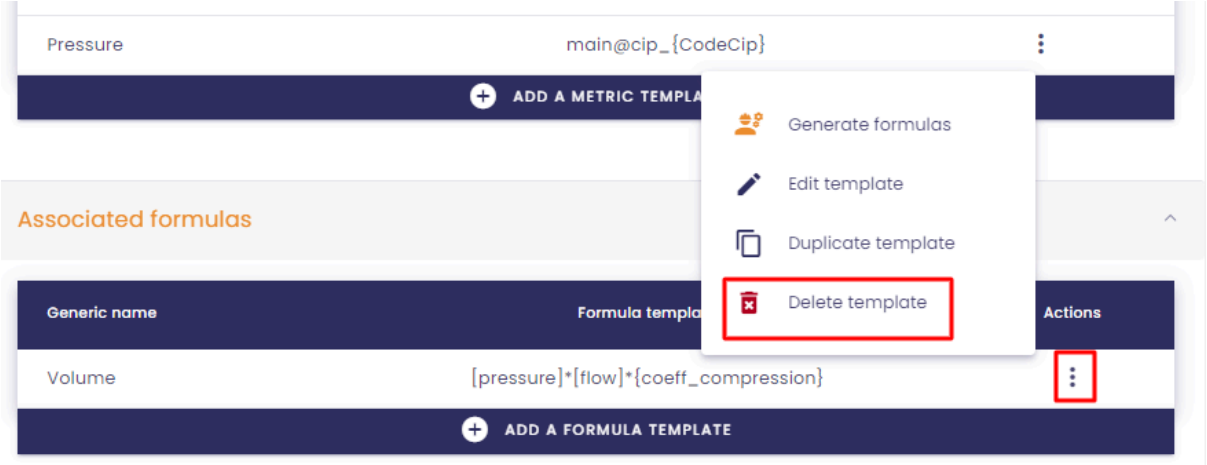
Then, select the desired tree structure.



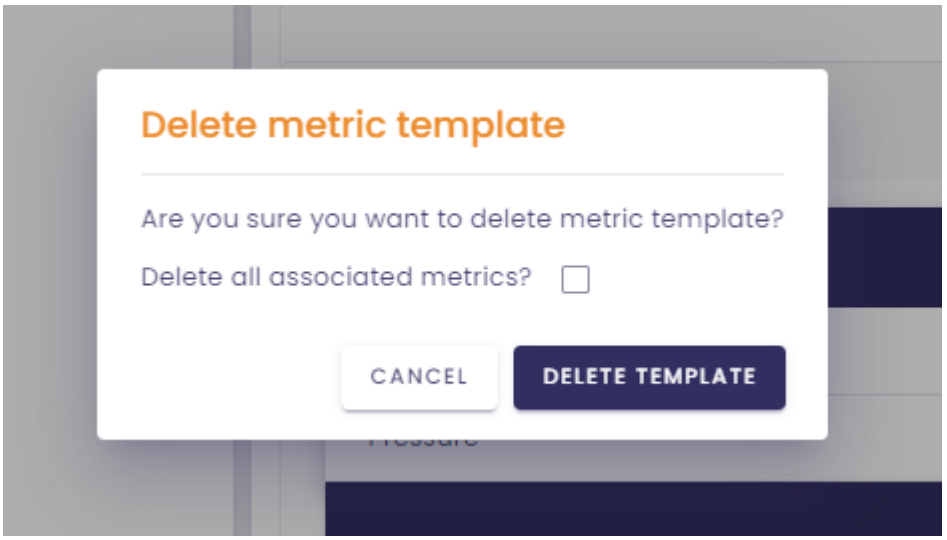
Go to the **Types** tab, and select the type of element for which you want to delete a formulas template.



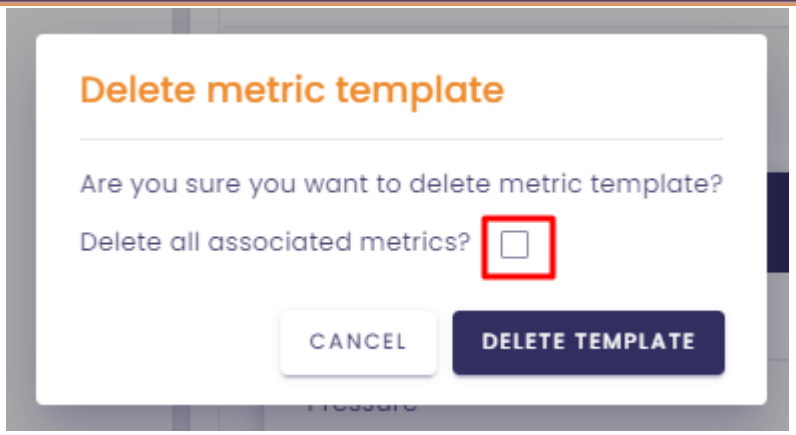
In the "**Associated Formulas**" section, go to the **Actions** tab, then select "**Delete template**" :



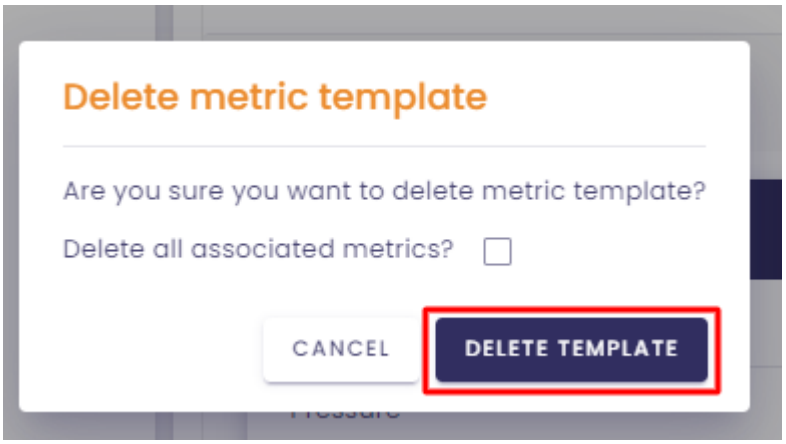
The following pop-up appears :



If you check the box "**Delete associated metrics ?**", the formulas associated with this template will be deleted **from the functional tree**.

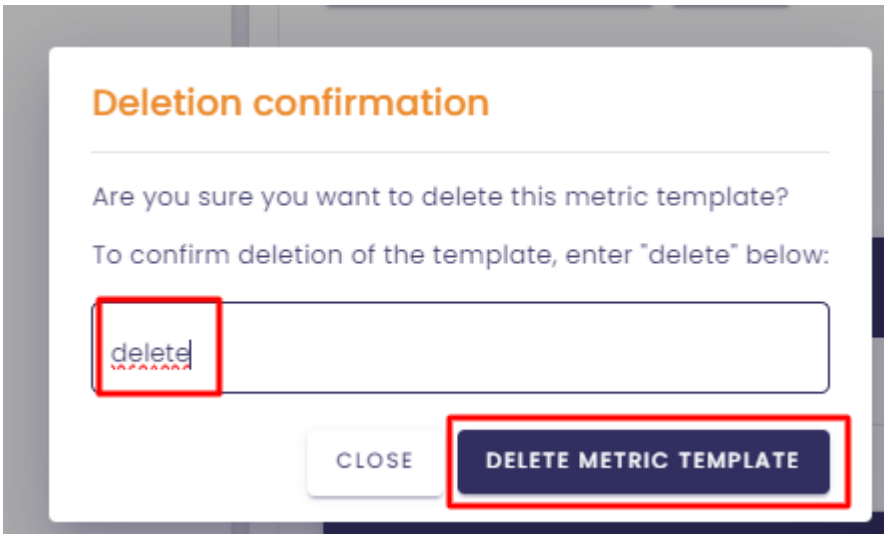


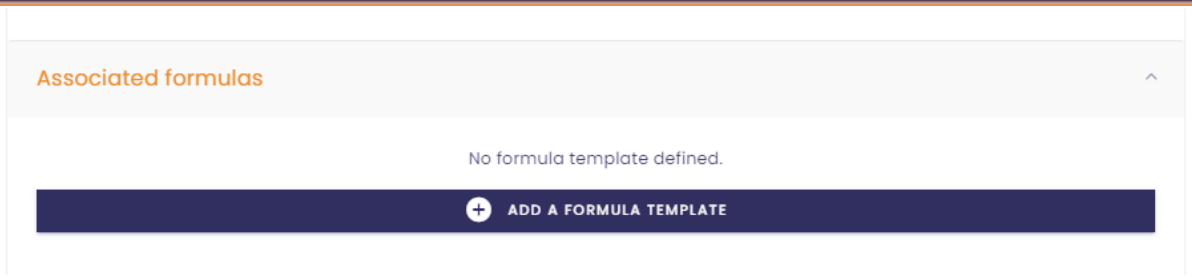
Click on "**Delete template**" :



A confirmation window opens.

Enter "**delete**", then click on "**Delete metric template**".



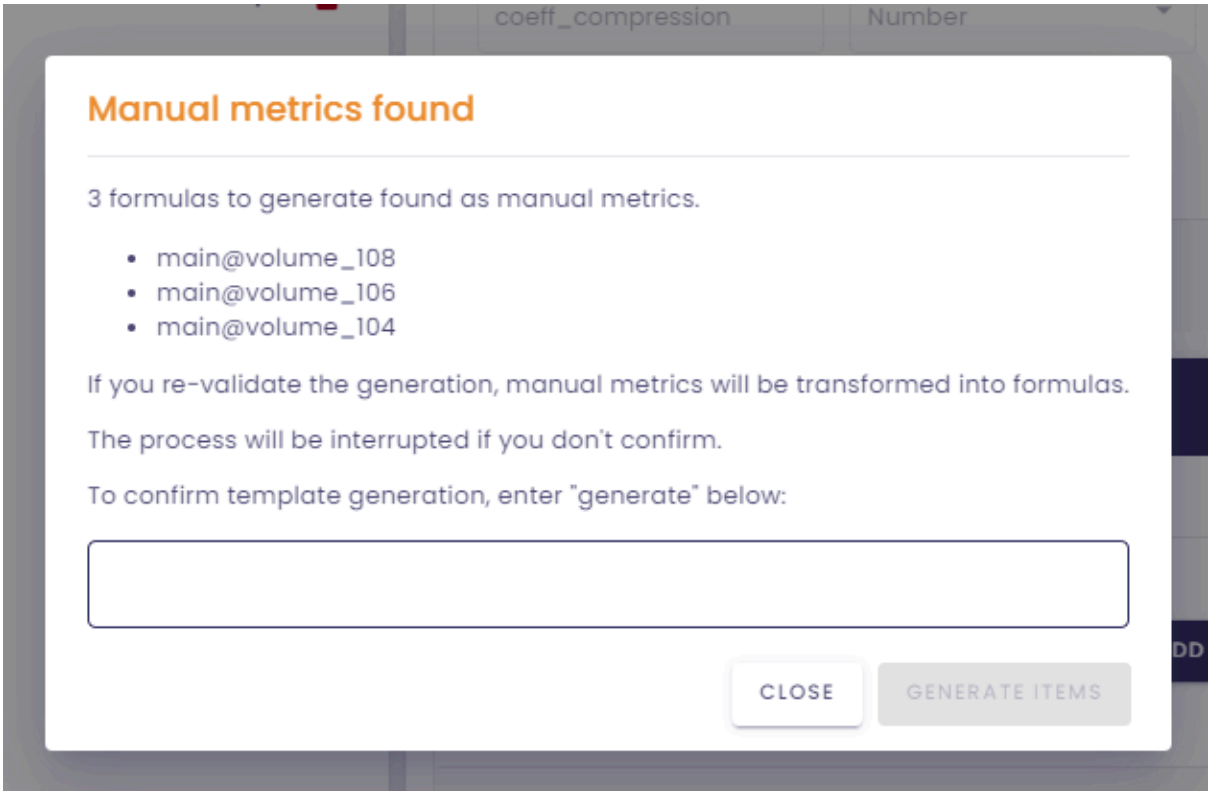


Please note, the formulas associated with the model are not deleted from the database.

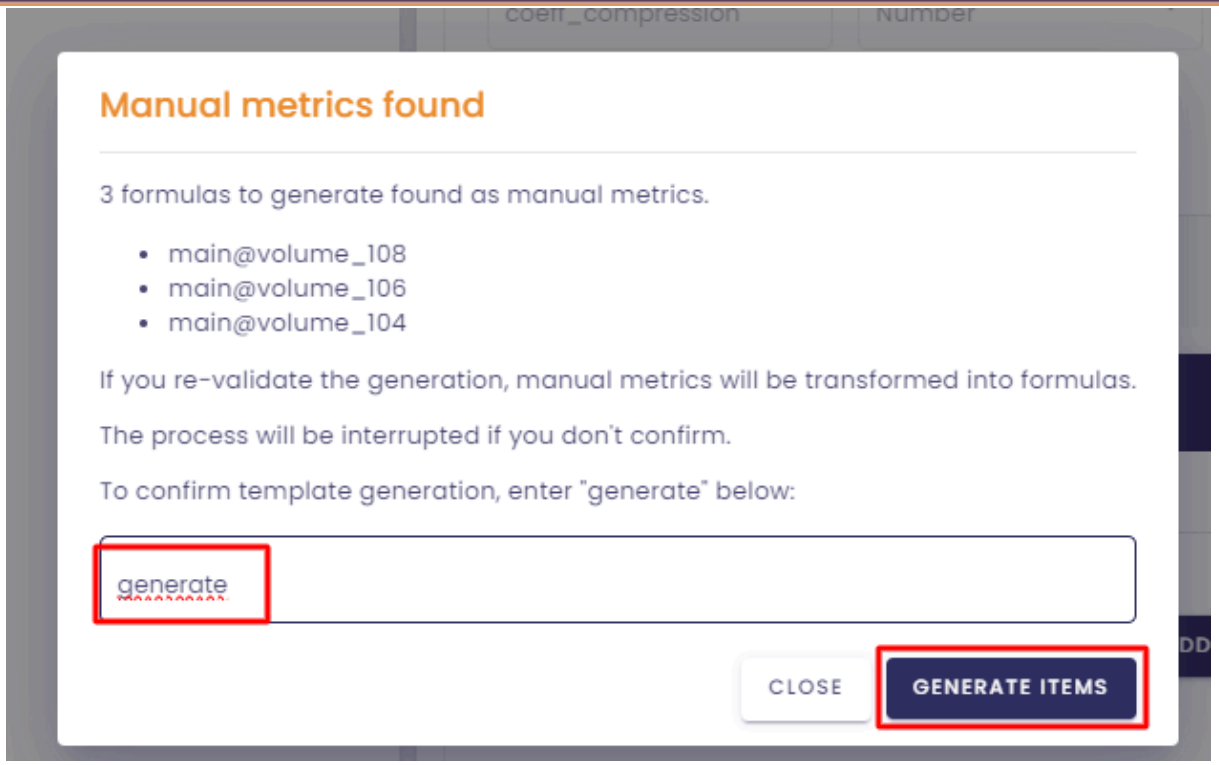
They are converted into manual metrics.

These manual metrics can be converted back into formulas if you decide to create a formula template with the same naming convention.

During the generation of formulas, the following message will appear:



To confirm, enter "**generate**" and then click on "**Generate Metrics**"



The manual metrics will then become formulas associated with the model.