SIEMENS

Insights Hub

Asset Manager

System Manual

03/2024

plugin

Visual Flow Creator plugin

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ **DANGER**

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ **WARNING**

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ **CAUTION**

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction 1

1.1 Introduction

In Asset Manager you model the structure of an industrial process using assets, types and aspects.
Asset Manager offers the following functions:

- Create and configure assets

- Generate templates for assets and aspects (so-called "types")

- Create aspects and variables for data evaluation

- Using plugins to connect MindConnect elements with Insights Hub ("onboarding")

- Define data sources and data points in MindConnect plugins

- Link data sources with aspects and variables ("data mapping") in MindConnect plugins

- Enable or disable lock on the data model

- Deleting aspects from types

> ✏️ **How to get started**
>
> For more information on how to connect MindConnect devices and configure Asset Manager [Connectivity concepts](#).

User interface and User Rights

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2.1 User interface and User Rights

The following screen shows the start screen of Asset Manager:

Start Screen
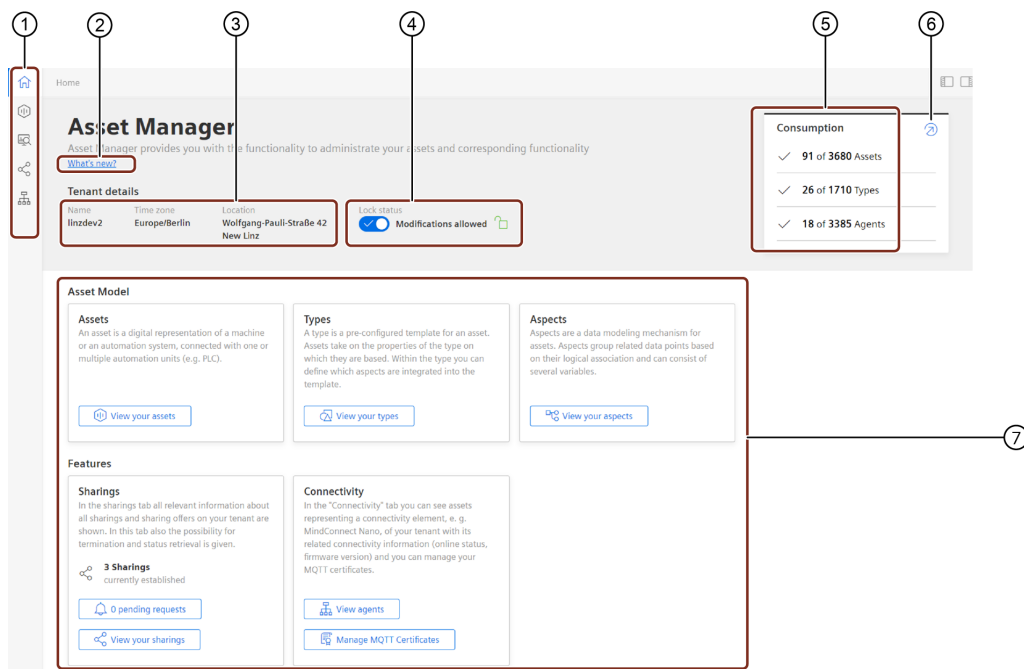
① Navigation area

② Link to release notes

③ Shows the tenant details

④ Toggle button for data model lock

⑤ Shows the consumption of used assets and types

⑥ Opens Usage Transparency app for insights of limits

⑦ Links to operating tabs

> ✏️ Consumption data is not applicable for the subscribers of Capability Package.

User Rights

To access Asset Manager, you need one of the following core app roles:

- Administrator (mdsp:core:assetmanager.admin)

- StandardUser (mdsp:core:assetmanager.standarduser)

- SubtenantUser (mdsp:core:assetmanager.subtenantuser)

These roles can also be part of one of the standard roles. You can find more information about the standard roles in the [Settings documentation](#).

MindConnect plugin access with core app roles In order to enable access to the MindConnect plugins when using a core app role, you need to assign the respective plugin role. The standard roles already contain the plugin roles.
You can find those roles in the roles section in Settings with the prefix "uipluginassetmanager".

Right	Roles: Administrator	StandardUser	SubtenantUser
Delete assets	✓		
Delete assets of type BasicHierarchy and derived	✓	✓	✓
Create assets in tenant[2]	✓	✓	
Create assets in subtenant[2]	✓	✓	✓
Edit assets in tenant	✓	✓	
Edit assets in subtenant[1]	✓	✓	✓
Move assets in tenant	✓	✓	
Move assets in subtenant[1]	✓	✓	✓
Share assets	✓		
Unshare assets	✓		
Add child assets	✓	✓	
Add child assets in subtenant[1]	✓	✓	✓
Navigate to Insights Hub Monitor	✓	✓	✓
Create types in tenant	✓		

Right	Roles: Administrator	StandardUser	SubtenantUser
Create types in subtenant	✓		
Edit types	✓		
Delete types	✓		
Create aspects in tenant	✓		
Create aspects in subtenant	✓		
Edit aspects	✓		
Delete aspects	✓		
Set values for direct variables	✓		
View subtenant assets	✓		
Import time series data	✓		
Upload files	✓	✓	✓
Delete files	✓	✓	✓
View consumption details[3]	✓		
Enable lock status	✓		
Disable lock status	✓		

[1]: Subtenants can move and edit assets of type BasicHierarchy and derived including (Geo) location on all assets.

[2]: StandardUser and SubtenantUser can only create assets of type BasicHierarchy and derived.

[3]: Consumption data is not applicable for the subscribers of Capability Package.

Data model

<div style="text-align:right">

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</div>

3.1 Data model in "Asset Manager"

This chapter describes the data model of Asset Manager. The data model will show you which processes are necessary to connect and use your asset data.

Definition asset

An asset is a digital representation of a machine or an automation system with one or multiple automation units (e.g. PLC).

Data collection and data provisioning is based on so called (virtual) assets. This can be anything like a pump, motor, PLC, an entire tool machine, a production line, a robot, a crane, a car, a windmill and so on. The data of an asset is collected made available for further processing and analytics.

Definition aspect

Aspects are a data modeling mechanism for assets. Aspects group related data points based on their logical association. For example: The pump skid has an aspect e.g. "Energy_consumption" that contains the datapoints: "power", "current", "voltage" etc. Aspect is specified in Asset Manager and its name can be freely chosen, but should have conjunction to datapoints and a physical asset. An aspect can consist of several variables.

Data model

The following graphic shows the data model in Asset Manager:
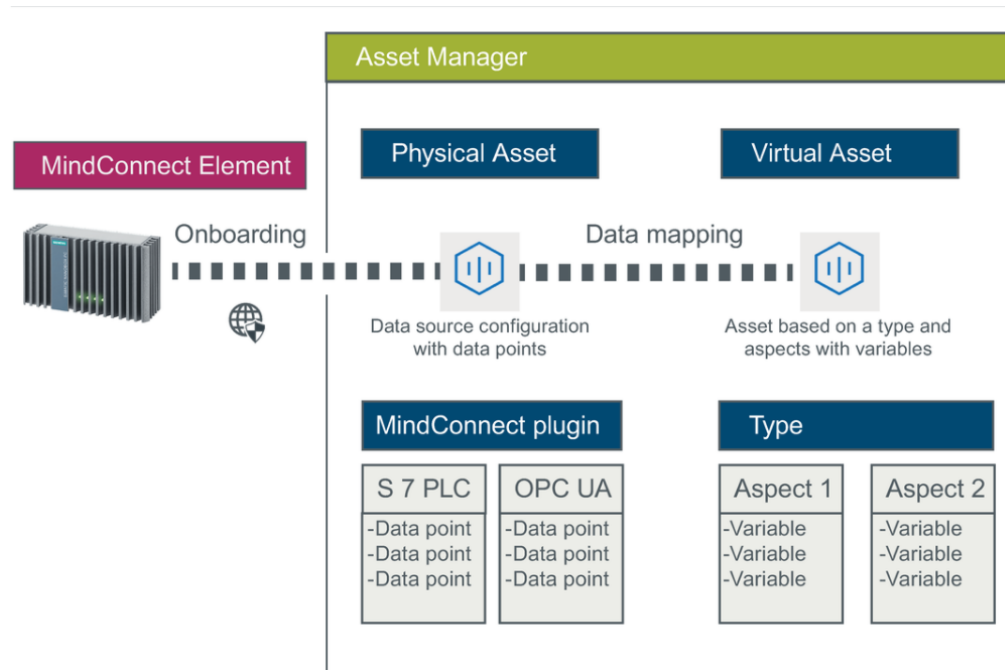
In Asset Manager, devices like MindConnect Nano are defined as the data source. The device sends data points to Industrial IoT. These data points must be connected to the aspects and variables. Asset Manager uses aspects and variables as data containers.

You can add data points to a data source to collect the data, for example from a control unit. In the next step you have to link the data points to the respective variables of an aspect.

You can set the data mapping in the MindConnect Element plugin.

To enable data connecting and in order to use your data, you have to fulfill the following processes:

- **Onboarding**: Onboarding is the process of attaching a MindConnect Element to Industrial IoT.

- **Data mapping**: Data mapping matches variables of an aspect with the respective data points of a data source.

Tenants and subtenants 4

4.1 Using subtenants in "Asset Manager"

You can access Asset Manager as a tenant or a subtenant. You find more information about environments and how to create a subtenant in the Settings documentation.
A subtenant allows an isolated data view on assets for customers of a tenant. Furthermore, the tenant admin is in charge of creating assets for the subtenant or moving some assets from the tenant to the subtenant. A subtenant groups users that can only access assets that are explicitly assigned to the subtenant.

Subtenants in Asset Manager

In Asset Manager, a tenant can identify subtenants by their label.
The following graphic shows the label of a subtenant in the selection list:

Subtenant data view

Within the isolated data view the subtenants only see their assets. The subtenant users are able to see all aspects and types of the tenant.

Delete subtenants

You can delete a subtenant in Settings or with the Tenant Management Service API.
A tenant can delete a subtenant. After the deletion the subtenant users will no longer have access to the subtenant.
The subtenant and the asset structure of the subtenant will still be displayed in the user interface. The tenant can then move or delete the assets.

Example scenario using subtenants

A German wind turbine manufacturer sells their products to different wind parks in the country. As an additional product the manufacturer provides subtenants in their tenant to give the

customers access to data of several sensors of the wind turbines.

For this, the tenant admin of the manufacturer creates subtenants for each customer in Settings after selling the product. The customers' employees receive Insights Hub user accounts that are assigned to the sold subtenant. The manufacturer then assigns the asset with the sensor data of the wind turbines to the customers' subtenant. The tenant admin assigns each user of the customer to the created subtenant.

Finally, every subtenant user sees the assigned asset with the sensor data of the wind turbines in Insights Hub.

Workflow for creating assets

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</div>

5.1   Workflow for creating assets

In Asset Manager, an asset is based on a type. The type consists of aspects and variables.
In order to use your data in Insights Hub, you have to create an asset for the onboarding process. This asset represents the data connection to your MindConnect Element in Asset Manager. Within this asset you have to proceed with data mapping to use your data as aspects and variables. With this step you enable the data connection to your physical asset. You can find more information about the data model in chapter [Data model in "Asset Manager"](#).
To enable data mapping, you have to use an asset type that is based on a core type. The core type contains a plugin to enable the data connection to Insights Hub. You can find more information about types in chapter [Using types](#).
Once the aspects and variables are linked to a MindConnect Element, they can be used for several assets.
To configure your custom asset, you have to create your own type with the required aspects and variables. Subsequently you can derive your custom asset from this type.
In addition, it is also possible to lock your data model to prevent accidental changes to asset or aspect types. For more information, refer [Locking a data model](#).

Steps to create a new asset

In order to configure data in Asset Manager you need to fulfill the following steps:

- [Creating aspects and variables](#): In this step you create aspects and variables you want to use.

- [Creating a type](#): In this step you create a type with the previous created aspects and variables.

- [Creating an asset](#): In this step you create a new asset by selecting a type with aspects and variables. If you use a MindConnect Element you have to proceed with the data mapping.

Creating aspects

<div style="text-align: right; font-size: 3em;">6</div>

6.1 "Aspects" user interface

Within the "Aspects" tab you can create aspects with variables. An aspect can consist of several variables. In Asset Manager every aspect has a name and a specific ID. Once an aspect has been created, it can be used for multiple assets. The maximum configuration size of an aspect is 200,000 bytes.

The sum total of lengths of all BIG_STRING variables should not exceed 100000.

For example, If there is only one aspect variable of type BIG_STRING, it can have a maximum length of 100000, and if there are 2 BIG_STRING variables they can have maximum lengths of 50000 each or 20000 and 80000 summing to 100000.

Start screen

You operate the "Aspects" user interface using the "navigation area", the "selection list" and the "detail view". In the "Aspects" tab you can create aspects with variables.
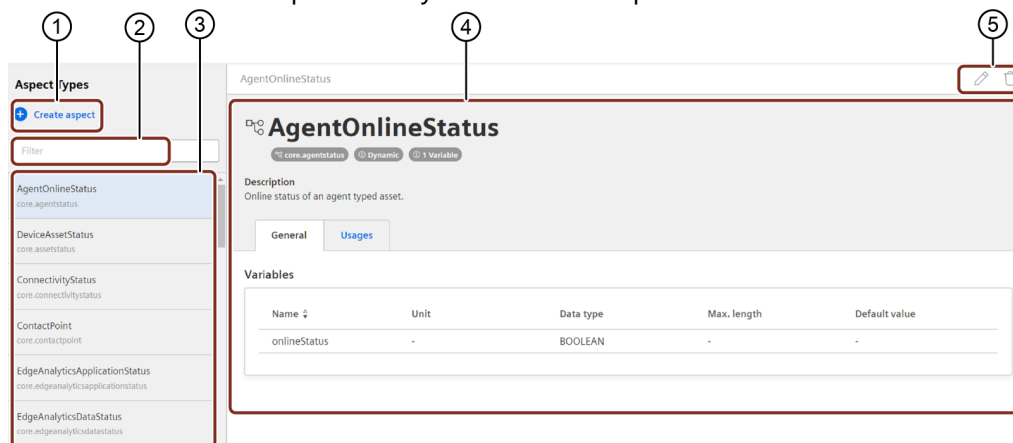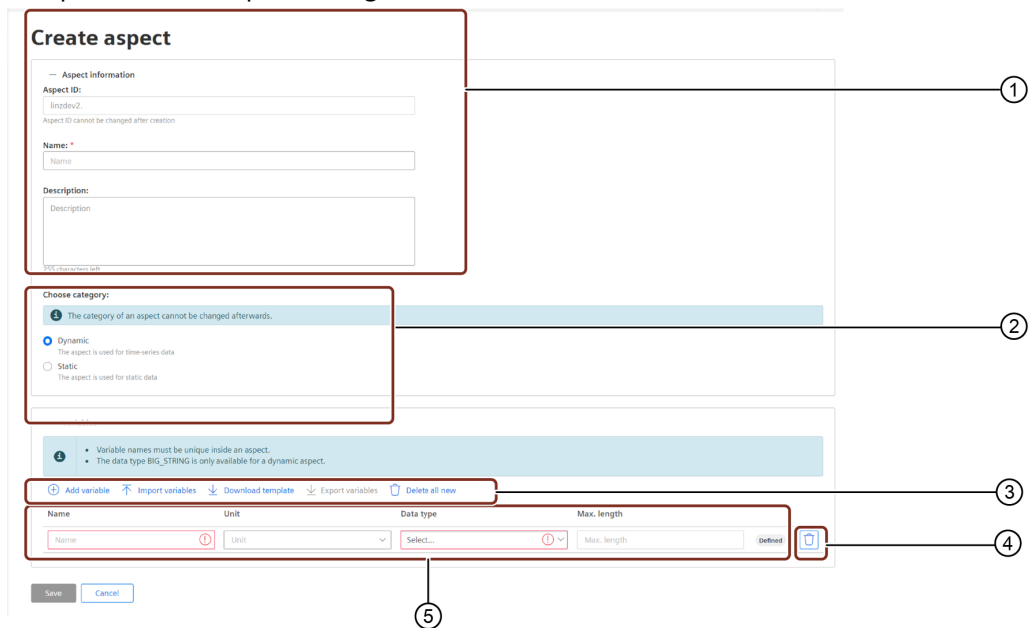
①   Creates a new aspect

②   Search field entry

③   Selection list

④   Detail view

⑤   Edit or delete aspect

> These buttons will be disabled if Structure modification toggle button is deactivated

Create new aspect settings

To open the new aspect dialog click

①   Aspect information

②   Choose aspect category

③   Consider the following:

- Add variable: Opens a new bar to add variable to aspect

- Import variables: Opens local browser to upload a file

- Download template: Downloads the template for variables in .csv

- Export variables: Downloads the variables data in .csv

- Delete all: Deletes all created variables

④   Deletes variable from aspect

⑤   Variable details

⑥   Saves or cancel changes

> ✏️ **Edit aspect information and variable**
>
> - Once you have created and saved the aspect information, you cannot rename and edit the Type ID, Name and Category.
>
> - Once you have added and saved the variables within the aspect, it is possible to edit the Name and Unit. In addition, the default value of the variables can also be edited, if the aspect is set to static.
>
> - You can delete the variable by clicking the Delete icon, next to that variable.
>
> - You can edit or delete a variable, only if there is no Asset Instance created from the Asset type that is associated with the Asset.

Parameters of new aspect settings

The following table describes the parameters of the new aspect settings:

Parameter	Description
Aspect ID	ID of the aspect in the format [Tenant prefix].[Aspect name].
Name	Name of the aspect.
Description	Description of the aspect.
Choose category	Select one of the following options: - **Dynamic**: Dynamic aspects are used for time series data, e.g. power consumption. - **Static**: Static aspects data are used for static data, e.g. serial number of an asset.

Parameter	Description
Variable name	Name of the variable. It is not allowed to use the following variable name: - aspects - description - etag - externalId - extends - hierarchyModel - id - legalName - name - organizationType - tenantFlag - tenant - parentTypeId - properties - propertySets - sameAs - scope - sharerTenantID - url - variables Furthermore the variable name must not start with a number, has to be alphanumeric and must not end with "_qa" or "_qc". The variable name has also to be unique within the aspect.
Data type	- **BOOLEAN**: Variable that stores one of two possible values: true (TRUE) or false (FALSE) - **INT**: Variable that stores an integer up to 32 bits. - **LONG**: Variable that stores an integer up to 64 bits. - **DOUBLE**: Variable that stores a decimal up to 64 bits. - **STRING**: Variable that stores a string up to 255 characters (usually text). - **BIG_STRING**: Variable that stores a string up to 100,000 characters. - **TIMESTAMP**: Variable that stores a time value. This variable needs to be entered in the following format: [YYYY-MM-DDTHH:MM:SS+hh:mm] With "Static" the data type BIG_STRING is not available. You can set default values that are validated according to the data type and length (for string values).
Unit	Unit of variable.
Maximum length	Maximum length of the variable value (only with data type "STRING" and "BIG_STRING").
Default value	Default values are only available for a static aspect. Default values can be predefined values from manufacturers, e.g. maximum rotation speed and are validated according to datatype and length.

> ✏️ **Variable data**
>
> The input fields of the variable details validate the content. You can activate the input check for example with `<Enter>`. If the entry is not valid the edit box is marked red and a message appears when clicking in the edit box.

6.2   Creating a new aspect

Requirement

If you want to use the import function for variables, the uploaded file must comply with the following guideline. The structure of file needs to be as follows and no headline is allowed:

- var_1;BOOLEAN;on;42

- var_2;INT;num;34

- var_3;LONG;lnum;

- var_4;DOUBLE;dnum;42

- var_5;STRING;script;64

- var_6;BIG_STRING;lscript;512

- var_7;TIMESTAMP;s;

- var_8;BOOLEAN;on;42

- var_9;INT;num;34

- var_10;LONG;lnum;

The file can contain a maximum of 100 variables with the specific configuration. An exemplary template file can be downloaded in the variables section.

Procedure

In order to create a new aspect, proceed as follows:

1. Click on "Aspects".

2. Click on "Create aspect" .

3. Enter the data for the new aspect.

4. To add a variable, click on "Add variable" or "Import variables".

  ○ To add a empty row to the table click "Add variable".

- To use import function click "Import variables" and select a file that meets the guidelines under Requirement. After importing the file, all contained and validated variables are displayed in the table and can be saved.

5. Confirm the entries with "Save".

Using types

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7.1 Introduction to using types

A type is a pre-configured template for an asset. Assets take on the properties of the type on which they are based. Within the type you can define which aspects are integrated into the template.

With a type you can create a template, for example, for several wind turbines and then link them to your aspects. When creating a new asset, you can use the created type.

To make it easier to identify your type, you can import images up to 5 MB in size. You can select all images uploaded to the tenant from an image list.

Type variables

Within types you can also define and use variables. With the type variables you can store and use asset values which are not time series specific. The following list shows examples of possible asset values:

- Serial number of the asset

- Date of installation

- Date of last maintenance

- Color

- Width, length and height

- Revision-number of the asset

The type variable can be used as an additional identifier for your asset. You will see the type variable in the asset basic settings of the "Asset" tab. In the basic settings, you can set a new value or reset to the default value by clearing the set value.

Th following image shows the variable input field in the asset basic settings:

Name	Data type	Unit	Max. length	Value
manufacturer	STRING	-	255	102164

Instances of a type

You can use types in various assets. In order to check all created asset instances of a type, you open the "Instances" tab. Here all created asset instances are listed and can be deleted immediately. All delete restrictions (locks, child assets, active sharings) are taken into account and will be displayed accordingly.

7.2   "Types" user interface

Start screen

You operate the "Types" user interface using the "navigation area", the "selection list" and the "detail view of type".
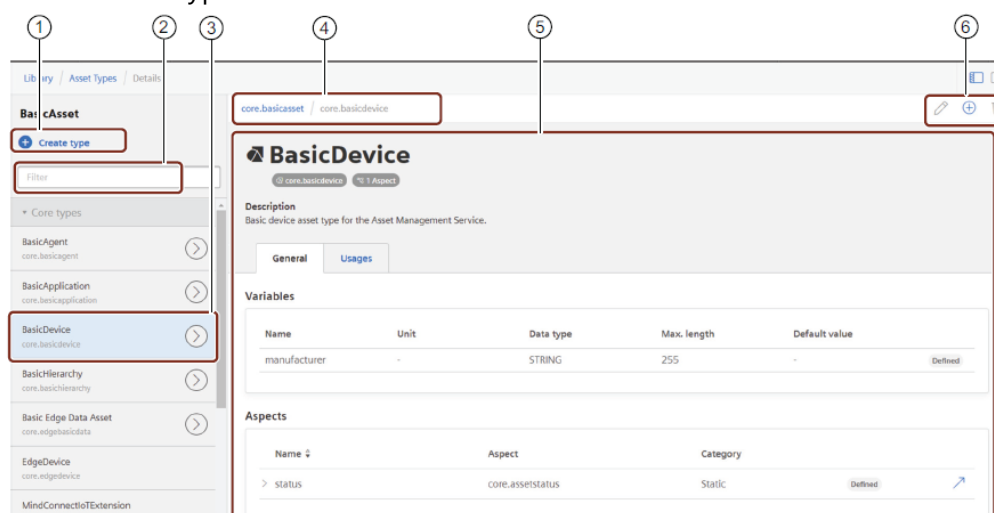
① Creates a new type

② Search field entry

③ Selecting list

④ Type hierarchy

⑤ Detail view of type

⑥ Types:

• Edit type

• Add derived type

• Delete type

Usage

You can use a type in various assets and built several interconections between a type and assets. The "Usage" tab shows all created interconnections in a list. You can navigate to the respective

asset or delete all listed instances immediately.

Create new type settings

①   Type information

②   Image navigation:

- Open a explorer to add an image

- Delete the image

- Browse images already uploaded on the tenant

③   Opens a new bar to add variable to aspect

④   Variable details

⑤   Deletes variable from type

⑥   Adds an aspect to type or open a window to browse aspects

⑦   Aspect details

✏ **Edit type information**

Once you have created the type information, you cannot rename and edit the Parent Type, Type ID, Name.

Parameters of create new type settings

The following table describes the parameter of the new type settings:

Parameter	Description
Parent type	Parent type according to the hierarchical structure.
ID	ID of the type in the format [Tenant prefix].[type name].
Name	Name of the type.
Description	Description of the type.
Variable name	Name of the variable. It is not allowed to use the following variable name: - aspects - description - etag - externalId - extends - hierarchyModel - id - legalName - name - organizationType - tenantFlag - tenant - parentTypeId - properties - propertySets - sameAs - scope - url - variables Furthermore the variable name must not start with a number, has to be alphanumeric and must not end with "_qa" or "_qc". The variable name has to be unique and differ from aspect name.

Parameter	Description
Data type	- **BOOLEAN**: Variable that stores one of two possible values: true (TRUE) or false (FALSE) - **INT**: Variable that stores an integer up to 32 bits. - **LONG**: Variable that stores an integer up to 64 bits. - **DOUBLE**: Variable that stores a decimal up to 64 bits. - **STRING**: Variable that stores a string up to 255 characters (usually text). - **BIG_STRING**: Variable that stores a string up to 100,000 characters. - **TIMESTAMP**: Variable that stores a time value.
Unit	Unit of variable.
Maximum length	Maximum length of the variable value (only with data type "STRING" and "BIG_STRING").
Default value	Default value is validated by the data type
Aspect name	Name of the aspect. You can find more information about aspects in chapter [Creating aspects].
Aspect type	Choose aspect type for respective aspect from dropdown menu. You can find more information about aspects in chapter [Creating aspects].

> ✏️ **Inline editing**
>
> After entering an entry to the variable details, you have to validate it. You validate the entry for example with `<Enter>`. If the entry is not valid, the edit box is marked red and a message appears.

7.3   Predefined types

The basic type on which all other types are based is BasicAsset.

You can use other pre-defined templates to create your own type. These types are called core types. The core type operates as a parent. Out of a core type you can create new types that take into account the parent-child relation. Most of the core types contain a plugin in to enable data connection to Insights Hub.

The following table describes the main categories of the core types:

Type	Application
BasicAgent	Template for creating agent-based assets. You can use this template to connect MindConnect Elements.

Type	Application
BasicApplication	Template for creating application-based assets. You can use this template to connect other applications.
BasicDevice	Template for creating device-based assets.
BasicHierarchy	Template for creating hierarchy-based assets.

Within the pre-defined templates, you can create new types and use templates such as MindConnect Nano.

You can find more information on pre-defined types in the [developer documentation](#).

Create an asset based on core types

When creating a new asset in the "Asset" tab, you can select all created types. You can find more information in chapter [Create an asset](#).

The following graphic shows the core type "MindConnectNano":

7.4   Creating a new type

Prerequisite

- You have created an aspect with variables.

Procedure

In order to create a new type, proceed as follows:

1. Click "Types" in the navigation area.

2. To create a new type, click Create type".

3. Enter a name and description for the type, e. g. "Windturbine".

4. In order to add an image, open the image bar and click "Choose".
Your local file browser opens to select an image.

> ✏️ **Image list**
>
> In order to browse already uploaded images to your tenant, you can use the image list. Click "Browse" to open the image list and choose an image to add.

5.In order to add a variable, open the variable bar and click "Add variable".

6.Enter the variable data.

7.In order to add an aspect, open the aspect bar and click "Add aspect".

8.Enter a name for the new type aspect and choose an aspect from the dropdown menu.

> ✏️ **Browse aspects**
>
> - In order to browse all available aspects click "Browse aspects".
>
> - You can select multiple aspects by activating the checkboxes.
>
> - You can create multiple instances of one aspect by entering the number in the input field.

9.Confirm the entries with "Save".

Result

You have created a type. You can now select this type when creating a new asset in the "Assets" tab.

It is also possible to edit or delete the created type if the lock status is enabled. This can be changed by enabling/disabling the "Lock status" button in the "Home" screen. For more information, refer [Locking a data model](#).

7.5   Deleting aspects from type

It is possible to delete an aspect for an asset type in the "Asset Type" screen. Note that it is only possible to delete an aspect for the "Own types" and is not applicable for "Core Types".

The following steps describe the procedure to delete an aspect:

1. In the "Library" tab, click "Asset Types".

2. Select the asset type under "Own Types" for which you want to delete an aspect.

3. Click the "Edit" icon.

4. In the "Aspects" section, click the delete icon next to the respective aspect.

It is not possible to delete the following core aspects:

- core.agentstatus

- core.connectivitystatus

- core.firmwarestatus

5.Click "Save" to save the deleted aspect changes.

It is possible to still revert the deleted apect changes by clicking the [icon] icon.

6.In the confirmation dialog, click "Save".

Create assets

<div align="right">

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</div>

8.1 "Asset" user interface

You operate assets using the "navigation area", the "selection list" and the "asset detail view".
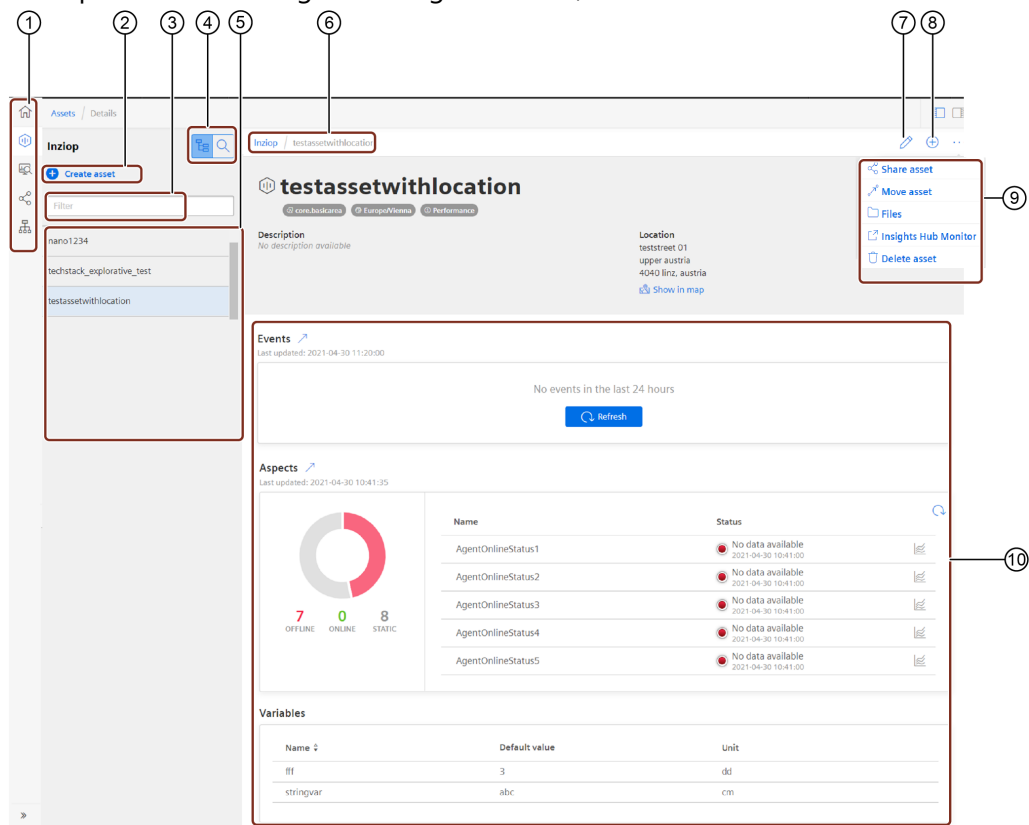
①   Navigation area

②   Creates a new asset

③   Search entry

④   Switch between selection list and asset search

⑤   Selection list

⑥   Hierarchy

⑦   Edit basic settings of the asset

⑧   Add a child asset to selected asset

⑨   Advanced operating tools:

- Share asset

- Move asset

- Open files function

- Open asset in Insights Hub Monitor

- Create a flow in Visual Flow Creator

- Delete asset

- Open in Settings

⑩   Shows the events, aspects, variables and plugins of the asset

Asset detail view

The asset details show you the details of your asset's direct variables and aspects:
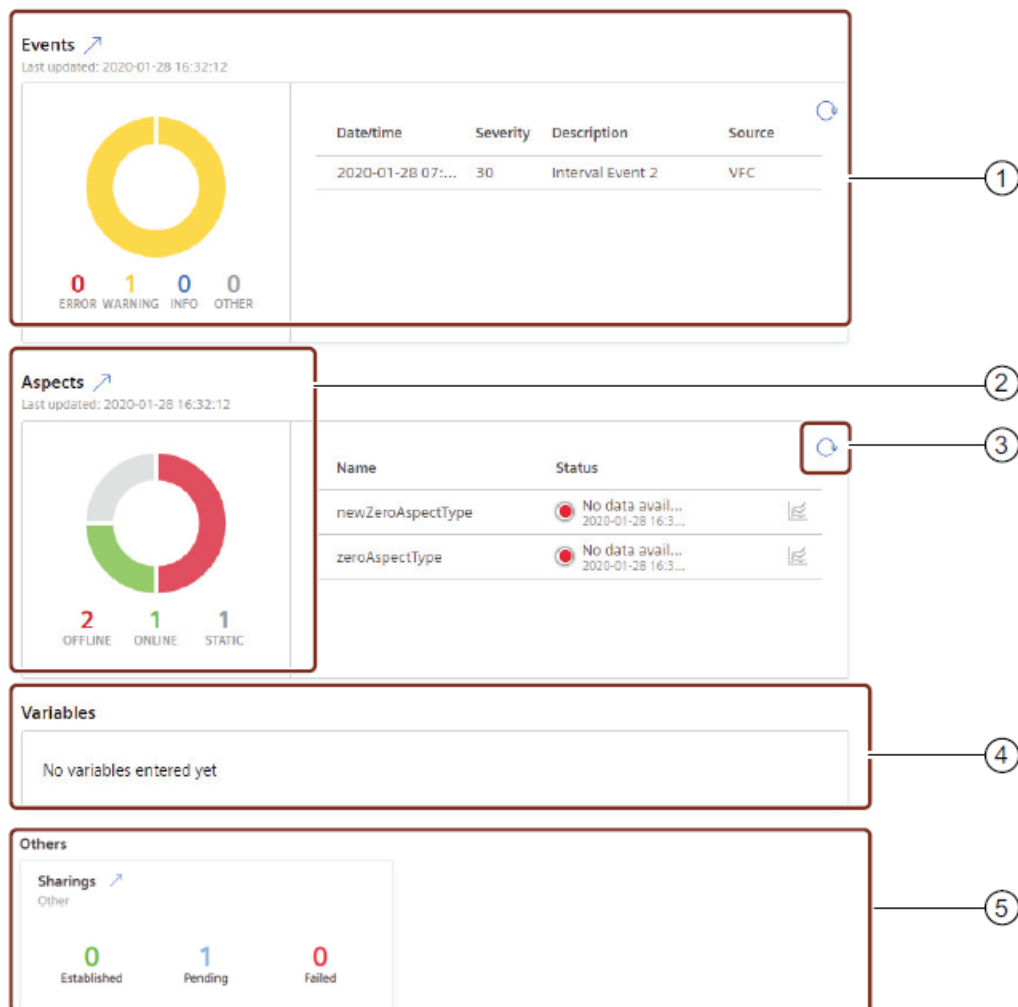
①   Shows the status of the events
②   Shows the status of the aspects of the last 24 hours
③   Refresh of aspects
④   Shows the variables of the asset
⑤   Shows the sharings status

> ✏️ **Events preview**
>
> The events preview shows only standard events. You can find more information in the [event management service documentation](#).

8.2 Create an asset

All new assets are based on a type.

- For connecting MindConnect Elements you can use the core types.

- To configure your custom asset, you have to create your own type with the required aspects and variables. Subsequently you can derive your customized asset based on type.

- The classification information is only shown if an asset is derived from BasicDevice. The classification of an asset cannot be changed afterwards.

- The time zone cannot be changed after the creation of the asset.

You can find more information about types in chapter [Using types](#).

Procedure

In order to create an asset, proceed as follows:

1. Click "Assets" in the navigation area.

2. To create a new asset click ➕ "Create asset".

3. Select the respective asset type for your new asset, from the drop-down.

4. Enter a name and description for the asset.

5. Enter the location details.

6. Upload the appropriate icon for your asset by clicking "Choose".

7. Click "Save".

Add asset

Result

The new asset is now available in the selection list.

Search assets
 9

9.1 Search assets

You can search for assets in the "Asset" tab. Asset Manager provides the following search modes:

- Asset hierarchy

- Asset search

You can switch between the search modes using the following buttons:
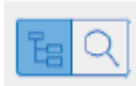
Asset hierarchy

The asset hierarchy sorts assets in the following categories:

- **Subtenants**: This category shows all subtenant assets.

- **Assets**: This category shows all created assets.

- **Shared**: This category shows all shared assets.

- **Received by Sharing**: This category shows all received assets via sharing.

Asset search

With the asset search, you can search for any asset by name regardless of the hierarchy level.

Locking a data model

<div style="text-align: right; font-size: xx-large;">10</div>

10.1 Locking a data model

Any change to an asset or aspect type can impact the already existing assets. To prevent accidental changes, a lock on the data model can be activated. The lock applies to the entire tenant. By default, the lock is inactive.

After the lock is activated, the following operations are still possible:

- Creating a new asset type

- Creating a new aspect type

- Extend existing asset types by adding child with an additional aspect type

- Extend existing asset types by adding child with new direct variables

The following capabilities require the data model of the tenant to be in unlocked state.

Aspect Type

- Create a new aspect type

- Delete an existing aspect type if it is not assigned to an asset type

- Read existing aspect type

Asset Type

- Create a new asset type

- Delete an existing asset type if no instances of the asset type in question exists

- Remove aspect type assigned to the asset type, applies to static and dynamic aspect types

Procedure

To activate the lock, proceed with the following steps:

1. In the Asset Manager "Home" screen, enable the "Lock status" toggle button.

2. In the confirmation window, click Activate to enable the lock. When the lock is enabled, any modifications to the structure will not be possible.

3. To disable the lock, you can proceed in either of the following ways:

- In the "Home" screen, disable the "Lock status" toggle button

- In "Library" tab, in the "Aspect types" screen, click on the "Locked structure" icon at the top right of the screen. A message is displayed with a link to unlock the structure. Click "Unlock structure". In the pop-up window, click "Activate". The same procedure is also valid for the "Asset types" screen.

Contract Administration 11

Contract Administration

A contract is required if you want to access your Industrial IoT data from your Mendix application, using OData via Mendix Data Hub. This contract allows access based on the Asset Structure. For more information, refer [Data Hub Guide](#).

> ✎
>
> "Contract Administration" is available under "Library" only if you have a "Low Code Starter Kit" tenant.

The following steps describe the procedure to create a new contract.

1. In the left navigation, select "Library", and then select "Contract Administration".
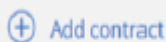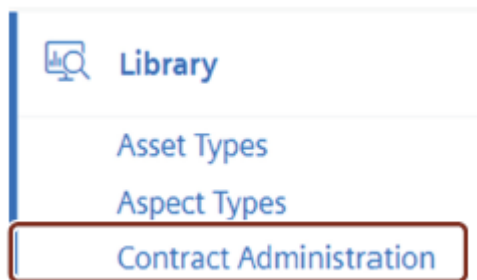
2. Click

3. In the "Asset Type Selection", select the Asset Type from the available list, and click "Next".
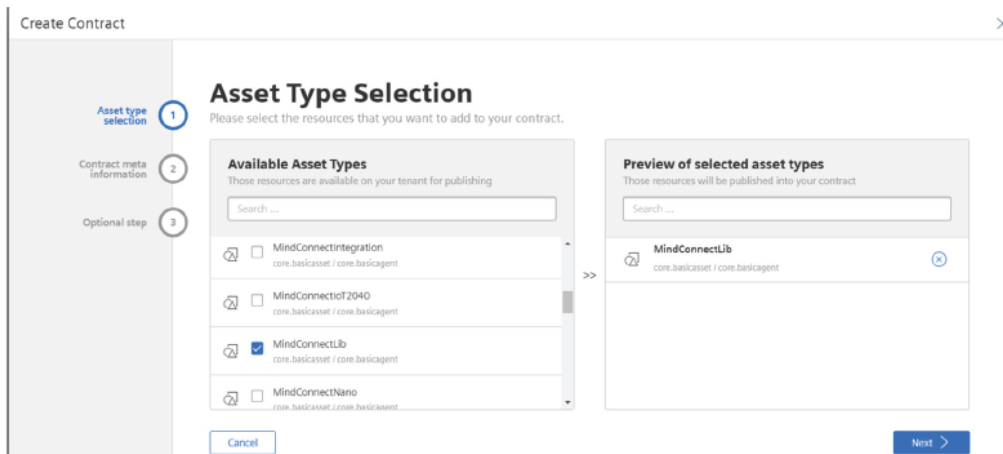
4. In the "Contract Meta Information", enter the following:

- ○ **Contract name**: Name of the contract

- ○ **Version**: The version for the contract that can be used to search on Mendix Datahub

- ○ **Environment name**: Select the environment name from the dropdown or enter the name of your choice

- ○ **Environment type**: Select the type of environment for your contract. The available environment types are: Sandbox, production and non-production

- ○ **Description**: Enter the description for your contract Click "Next".

5. In the "Optional Steps", it is possible to save and download the contract, and to publish the contract on the Mendix Data Hub.
By default, the "Save Contract" checkbox is enabled.

6. Click "Submit".

The created Contract is visible in the "Mendix Contract Adminstration" screen.

11.1 Contract Administration
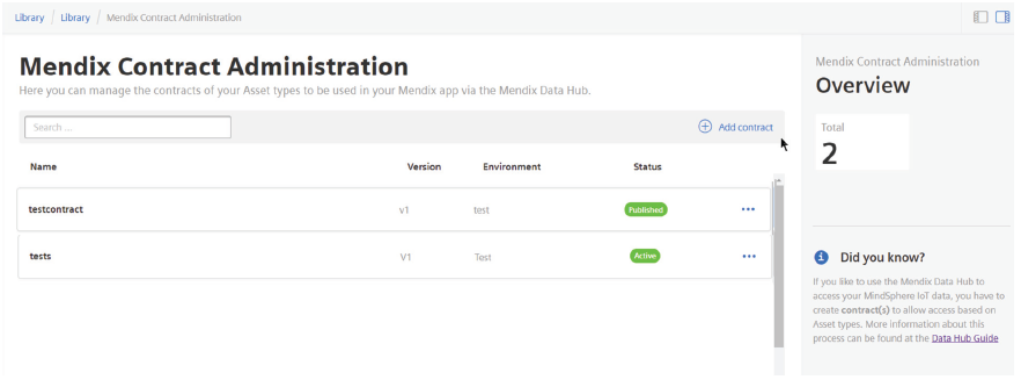
On selecting the contract, the contract details are displayed.

It is also possible to edit or delete the contracts in the "Mendix Contract Administration" screen by clicking the icon next to the specific contract.
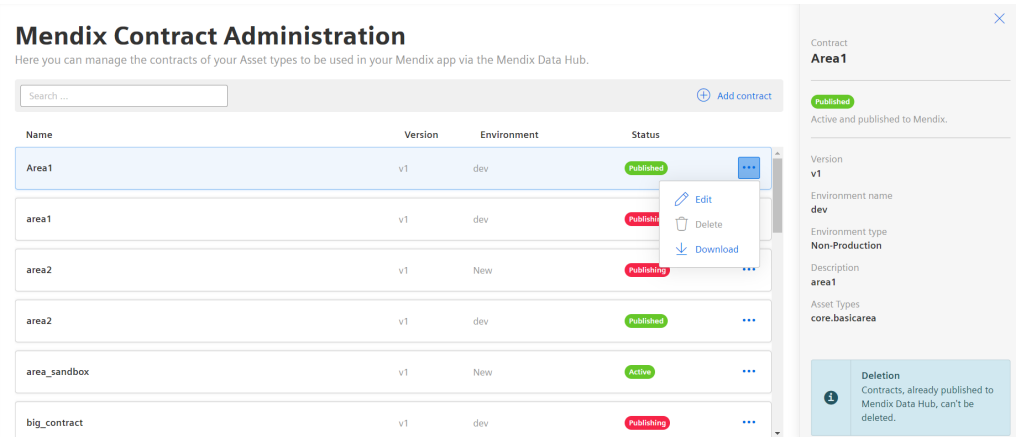
For more information, refer Low Code Starter Kit".

Sharing assets

<div style="text-align: right; font-size: 3em; font-weight: bold;">12</div>

12.1 Introduction sharing assets

You have the opportunity to share assets with other tenants in Asset Manager by using Cross-Tenancy. Therefore you need an existing collaboration with another tenant. You can find more information on how to create a collaboration in the [Settings documentation](#).
Each action of data sharing requires an active approval or rejection by the receiving tenant. Within a collaboration, the sharing tenant always remains the only and exclusive owner of the shared data.
With the Data Sharing functionality you can:

- Share virtual and physical assets with the receiving tenant.

- Send offers to establish a shared asset.

- Accept or decline offers for an asset that is shared with you.

- View shared assets in applications like Asset Manager or Insights Hub Monitor.

You can use shared assets for the following scenarios:

- **Maintenance work on an asset**: You can share the asset with a support technician without having to reveal all the data of your tenant. The support technician only sees the specific data of the shared assets.

- **Share asset configurations as templates**: You can share asset configurations as templates with other tenants. This enables you to clone complete machine configuration and reduces effort.

Shared assets in the selection list

Shared assets can be identified by the following symbol: ⤳
The following image shows a shared asset in the selection list:
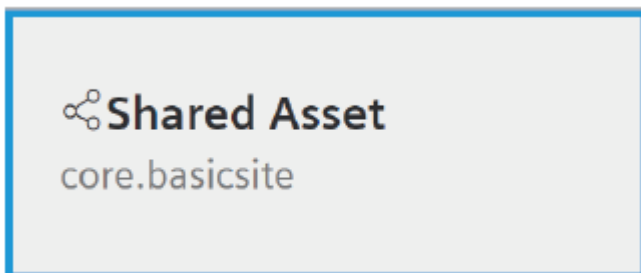
The shared assets appear in the core.shareenterprise folder. This folder is named after the sharer tenant name.

You can also access the "Sharings" option via the asset detail view and terminate existing sharings or revoke sharing offers.

Collaboration

To enable the asset sharing via Data Sharing, you have to create a collaboration in Settings. You can find more information on how to create a collaboration in the [Settings documentation](#).
As soon as the collaboration is established, both tenants will be able to share various types of selected data based on assets via Asset Manager application.
When assets are shared by one of the parties, you will see a notification in the navigation:
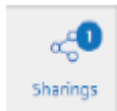
Each party can accept or decline offers for sharing assets in the "Sharings" tab.

Access level

All assets are shared with read access level:

Access level	Permission
Read	- Read and update shared asset static data. - Read time series data of the shared asset. - Read aspect and asset type of the shared asset.

12.2   "Sharings" user interface

The "Sharings" overview shows the assets you shared with other tenants and the assets that have been shared with you:
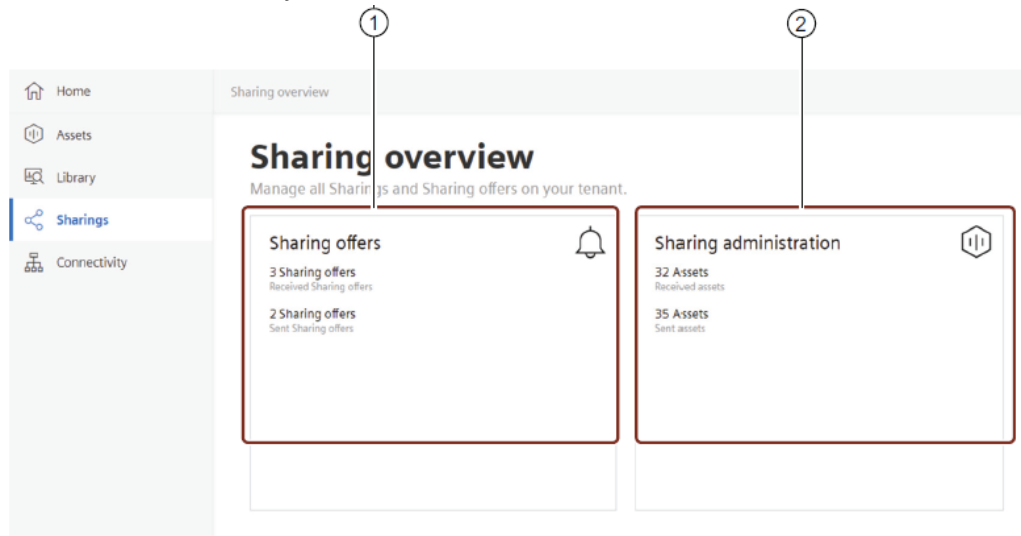
①   Shows an overview of received and sent offers

②   Shows an overview of all assets shared with others or shared with you

12.3   Share an asset

Objective

- You want to share an asset with another tenant.

- The other tenant wants to use the same asset configuration.

- The other tenant wants to see the existing data of the asset.

Prerequisite

- You have created a collaboration with another tenant in "Settings".

Procedure

In order to share an asset proceed as follows:

1. In the "Asset" tab, select the asset you want to share.

2. In order to open the advanced operating tools click " ".

3. In the dropdown menu click "Share asset".

    ○ The "Share asset" popup window opens

4. Choose the collaboration you want to share the asset with

> ✏️
>
> You can only share assets with existing collaborations. You can find more information about creating collaborations in the Settings documentation.

5. Click "Share".

Result

- You have shared the asset with the receiving tenant.

- You can see the sent offers via the "Sharings" tab > "Sharing offers".

- The receiving tenant gets a notification on the "Shared" tab of the new request and can accept or decline it.

- After the acceptance of the receiving tenant, the asset moves to "Received sharings" in the "Sharing Administration".

- You can find the shared asset in the Asset Manager, in the list below the asset which is named as the sharer tenant.

12.4   Unshare assets

You can unshare assets received from other tenants or assets shared with another tenant.

Objective

- You want to remove the access for an asset from another tenant

- The other tenant wants to unshare a shared asset from specific tenant

Prerequisite

- You have created a collaboration with another tenant in "Settings".

- You have shared an asset with your collaborating partner tenant.

Procedure

In order to unshare an asset that you received from another tenant proceed as follows:

1. In the "Asset" tab, select an asset you want to unshare.

2. In order to open the advanced operating tools click .

3. In the dropdown menu click "Terminate".
    - A confirm dialog opens.

4. To confirm the terminate action, click "Terminate".

In order to unshare an asset that you shared with another tenant proceed as follows:

1. In the "Asset" tab, select an asset you want to unshare.

2. Navigate to the "Sharings" section in the asset details and click .

3. Select the receiving tenant from the list and click "Terminate".

○ A confirm dialog opens.

4. To confirm the terminate action, click "Terminate".

> ✏️
>
> The unshare process might take some time and the asset is not disappearing immediately.

Result

- You have unshared an asset from your or from another tenant.

- Your collaborating partner is no longer able to see the asset.

- If you terminated the last sharing of a collaboration the collaboration will be terminated as well.

> ✏️
>
> If you are terminating a collaboration, all sharings will be terminated as well.

Using "Files" 13

13.1 Using "Files"

You can use "Files" to upload and manage asset relevant files. You can access "Files" in Asset Manager via the menu of a selected asset. In the "Files" section you can easily upload files, list all files of an asset or delete them one-by-one or in a bulk operation.
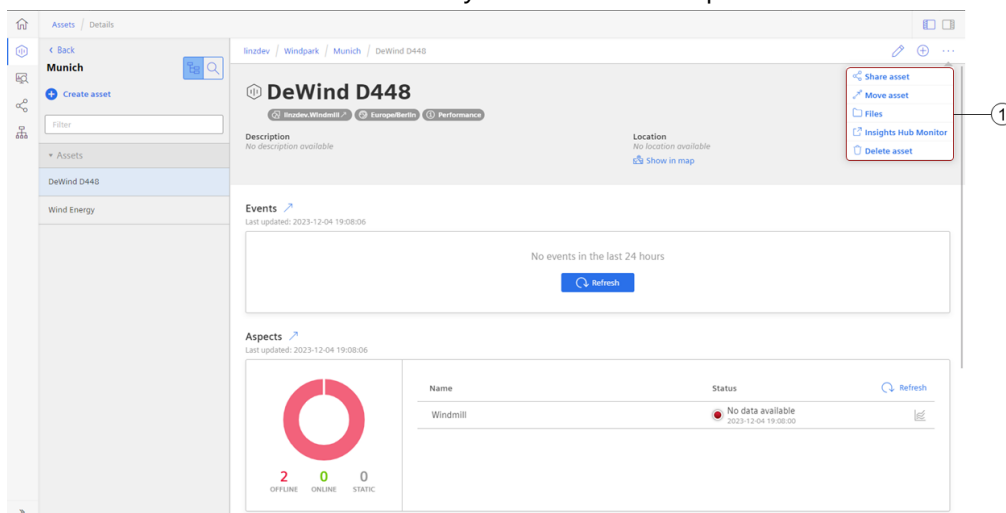
①   Open "Files" via the menu

Using "File deletion rules"

Within the "Files" section you can configure File deletion rules. File deletion rules are an additional possibility to automatically clean up your file storage. They allow you to automatically remove files on a given path, that are older than the specified amount of days.

Prerequisite

- You should have either the standard role TenantAdmin or the app-specific role assetmanager.admin assigned.

Procedure

1. In the "Files" section, select "File deletion rules".
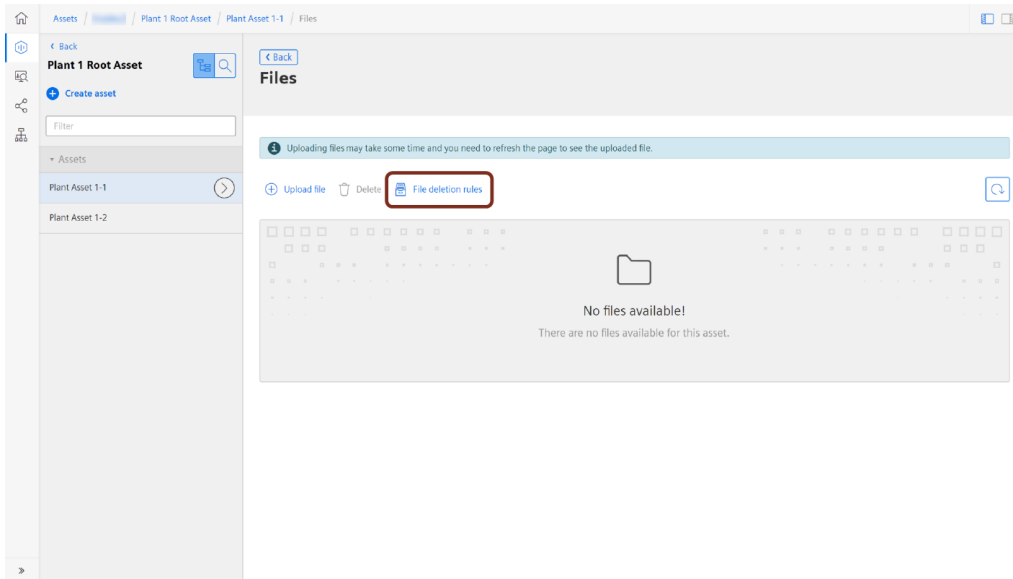
2. Click "Add Rule".
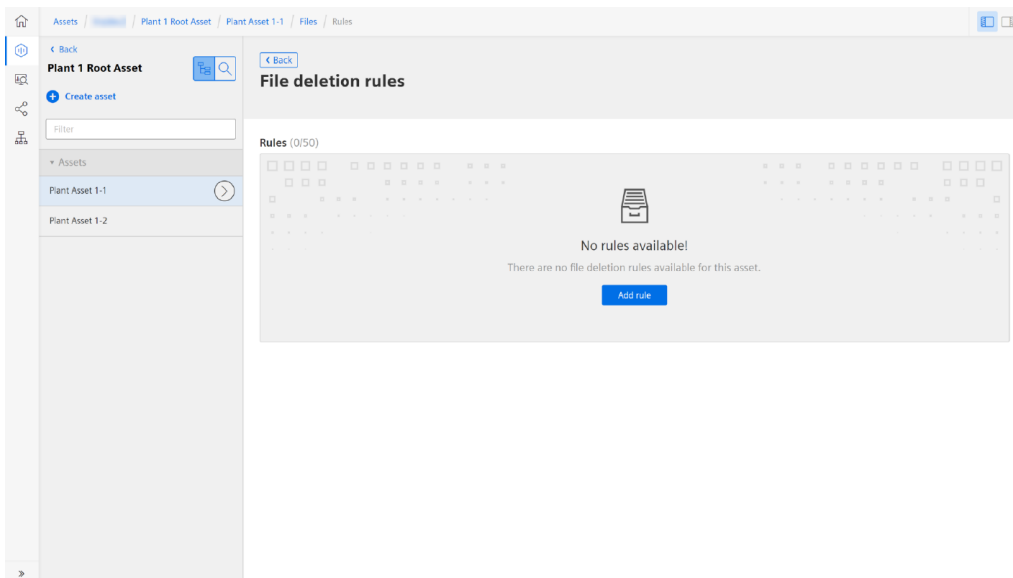
3. To create a new rule, specify a file path and the number of days after which, the files should be deleted.

13.1 Using "Files"
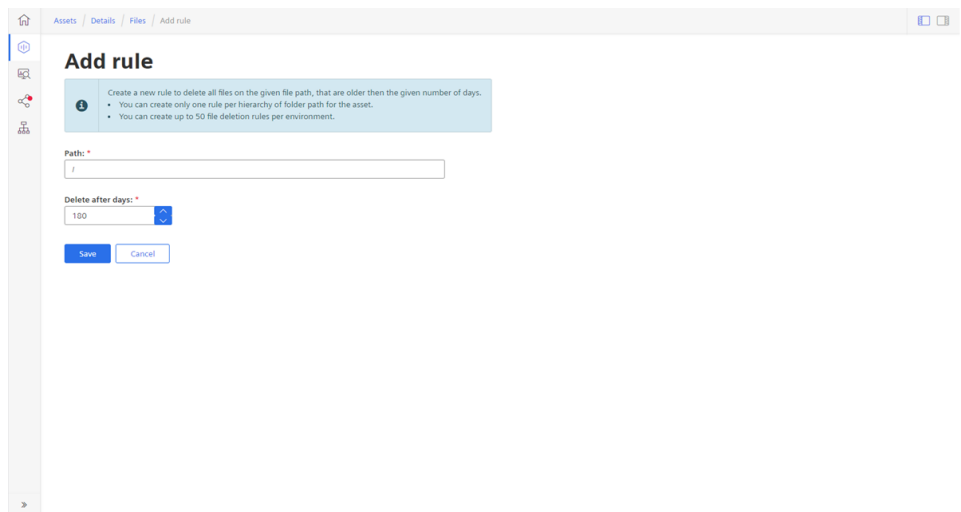
Import time series data

14

14.1   Import time series data

You can upload new time series data to an aspect of an asset as a json file. You can also use previously stored times series data and import it to an aspect.

Objective

- You want to upload time series data to an aspect of an asset.

- You want to view the uploaded data.

Prerequisite

- The time series data to be uploaded must be in a *.json file format that is referring to https://documentation.mindsphere.io/downloads/example.json

- The data in json file needs to be in ascending timestamp order.

- Your asset is a performance asset (not supported yet for simulation asset).

- Variables that are mentioned in the json file must match the selected aspect.

- The maximum volume of time series data cannot exceed 1 GB for performance asset in an import job.

- Import jobs for performance assets are allowed for data in future upto 7 days only.

- Import jobs for performance assets are rejected if timestamps with higher precision than milliseconds are used.

- You have the Asset Manager administrator role.

Procedure

1. In the "Asset" tab, select an asset for which you want to upload your data.

2. To navigate to the asset's aspects in the "Aspect" area click .

3. To open the time series import dialog, click .

4. To start the import process click "Start import job".
You can find the status of your import jobs in "Import Job overview".

5. To upload new times series data click "Upload file".

Previously stored time series data is overwritten when uploading new data for the same time period. The data will be preprocessed and compressed before upload. Therefore, the shown file size might not always match the your local *.json file.

Result

- The time series data has been uploaded to Industrial IoT.

- You can now view times series on the aspect of an asset.

Connectivity Management

<div style="text-align: right; font-size: 2em;">15</div>

15.1   Introduction

In the "Connectivity" tab you can see assets representing a connectivity element, e. g.
MindConnect Nano, of your tenant with its related connectivity information. The status column
indicates a status sent by the device itself. It can either represent the online status or the data
transfer status, depending on the devices' implementation. You can filter the assets via various
parameters.

15.2   "Connectivity" user interface

After pressing the "Retrieve assets and connectivity information" button the Connectivity
Management screen appears:
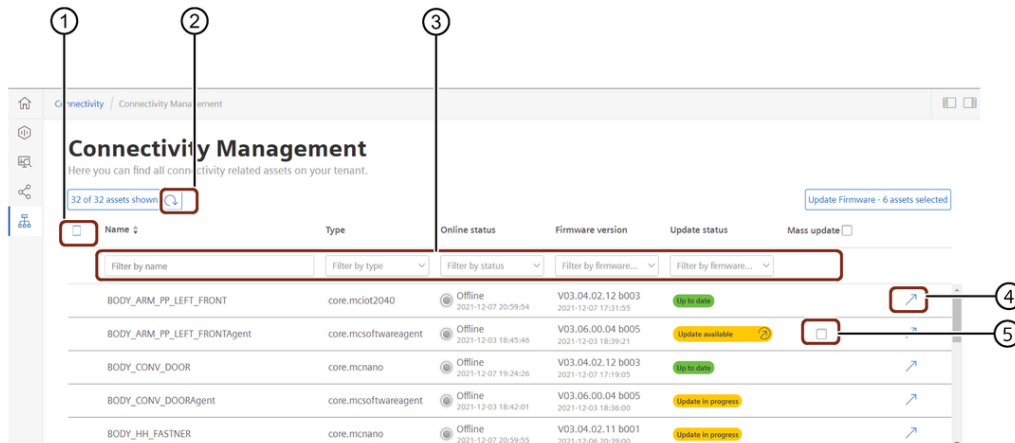
①   Activates or deactivates the filter

②   Updates the list

③   Shows the filter parameter

④   Opens the asset in the "Asset" tab

⑤   Checkbox to select the asset for which firmware needs to be updated

> ✏️
>
> The firmware is only shown for assets instantiated from core.mcnano,
> core.mciot2040 and core.mcsoftwareagent.

Filter parameter of the "Connectivity Management"

The "Connectivity Management"" contains the following filter parameters:

Filter	Description
Name	Filters by the name of the asset.
Description	Filters by the asset description in the basic settings.
Type	You can filter by asset type from a drop-down list.
Online Status	Filters the asset based on Online or Offline status
Firmware Version	Filters the asset based on the firmware version
Update status	Filters the asset based on the status of the firmware update, the available values are: Up to date, Update available, Update in progress, No information found

15.3 Firmware update

Objective

You want to start a firmware update for a MindConnect element.

Prerequisite

- You have the standard role TenantAdmin.

- The asset is not a shared asset.

- No further update procedure or job is running. Only one running job is allowed per asset.

Procedure via Connectivity module

> ✏ **Outdated version**
>
> Please keep your firmware always updated.

> ✏️ **Data loss**
>
> Please note that data loss can occur during the time of the firmware update. The amount of data loss depends on the reading and uploading cycle.

The "Connectivity" tab shows outdated firmware. To perform a firmware update proceed as follows:

1. Open the "Connectivity" tab and click "retrieve assets and connectivity information". On clicking this, the latest information will be retrieved.

2. Click the filter icon and filter the assets based on "Update available", by clicking the "Update status" option.

3. Check the check box under "firmware update" for the asset that needs the firmware to be updated and click "Update Firmware". In case all assets need firmware update, then check "Mass update" and click "Update Firmware".

4. Accept the terms and conditions and click "Update firmware".

Procedure via MindConnect plugin

> ✏️ **Outdated version**
>
> Please keep your firmware always updated.

> ✏️ **Data loss**
>
> Please note that data loss can occur during the time of the firmware update. The amount of data loss depends on the reading and uploading cycle.

To perform a firmware update proceed as follows:

1. Select the asset in the "Asset" tab and open the MindConnect plugin.

2. Click next to "Firmware" on the button ⚙️ .

3. Select the location of the firmware from the drop-down.

4. To enable firmware updates automatically, check the "Auto FW update" checkbox.

5. Accept the terms and conditions and click "Save".

6. To select a firmware release click "Choose another firmware release".
    - The "select firmware" dialog appears.

7. Select product and available version and click "Accept".

8. To update your firmware click "Update your firmware".

Result

You have updated the firmware version of your MindConnect Element.

15.4   Managing MQTT Certificates

MQTT agents which want to interact with your Insights Hub environment need to authenticate themselves by a unique certificate identity.

You can upload up to two X.509-based public certificates to Insights Hub and use those to generate your own agent certificates, or you can request Insights Hub to create such certificates for you. For more information, refer to "[Managing CA certificates](#)".

Configuring MindConnect Element plugin 16

16.1 MindConnect Nano/IoT 2040 plugin

To connect a MindConnect Element you have to configure it with the respective MindConnect Element plugin. You can find the MindConnect plugin in the asset detail view.
Connecting a MindConnect Element to Insights Hub involves the following steps:

Onboarding

- Create asset with MindConnect type

- Create connection to the MindConnect Element

- Perform network configuration

- Onboard with configuration file

Data mapping

- Add data source

- Add data point

- Connecting data point and variable

You can find detailed information for these steps and on how to connect a MindConnect Element in the [MindConnect Hardware General Description documentation](#).

Definition of a "MindConnect Element"

A MindConnect Element is the connecting element between an asset and Insights Hub. MindConnect Nano is an example of a MindConnect Element. For every MindConnect Element, there is a corresponding MindConnect type; this is "core.mcnano" for MindConnect Nano.

16.2 Introduction MindConnect LIB

MindConnect LIB is a software development kit (SDK) which enables self-programming of customer or use case specific connectivity agents. It supports encrypted transmission of on-site data through a secure internet connection, to enable cloud-based applications and services. MindConnect LIB enables connectivity for almost every asset creating flexibility that can drive deeper insights into your business.

You can find more information about MindConnect LIB in the [Developer Documentation](#).

More information about firewall and proxy rules can be found in the section [Firewall/Proxy rules](#).

16.3   Onboarding MindConnect LIB

In order to onboard the MindConnect LIB you have to select security profile and generate and copy the boarding configuration. If the MindConnect LIB is not onboarded, you can change the security profile afterwards.

Security profile

MindConnect LIB creates secure connectivity from an onsite device to Insights Hub.
You can choose between the following security profiles:

- RSA 3072

- Shared Secret

Set up boarding configuration

In order to use MindConnect LIB, you have to generate an onboarding configuration. Afterwards you can copy the onboarding key into the system you want to connect with Insights Hub.

16.4   Adding data source

To receive the data of your MindConnect LIB you need to add a data source.

Requirement

- You have created an asset and an aspect.

- You have enabled the connection to the MindConnect LIB.

Procedure

To add a data source to an asset of type MindConnect LIB, follow these steps:

1. Click on the asset in the "Assets" tab, e. g. "Wind turbine".

2. Click on the plugin icon, e. g. "MindConnect LIB".

3. Click "Add data source".
    ○ The window to enter the name and description data is opened.

4. Enter data source data and confirm with "Accept".
    ○ Confirm dialog is shown.

5. To save the data source click "Save".

Result

You have now created a new data source. The new data source is available at the asset details of your MindConnect LIB.

16.5 Adding data points

A data point is a measurable value of an asset that can be represented numerically and graphically. Examples of a data point are temperature or pressure. You can add data points to a data source to collect the data for example from a control unit. In the next step you have to link the data points of a data source with the respective variables of an aspect.

Requirement

• You have created a data source.

Procedure

To add a data point to a data source, e. g. "RotationSpeed", follow these steps:

1. Click on the asset in the "Assets" tab, e. g. "Wind turbine".

2. Click on the asset icon, e. g. "MindConnect LIB".

3. To edit the data source, you have to click on "Enter edit mode".
    ○ Edit functions appear next to the data source.

4. Click on "Add data point".

5. Enter data point data.

The units and data types specified here will need to match exactly with the aspects and variables. If they are different, the variable cannot be connected to the data point.

6.Confirm with "Accept".

7.To save the added data point in "Edit Mode" click "Save".

Result

The new data point is available at the data source.

16.6   Import configurations

To receive the data of your MindConnect LIB you need to add a data source with corresponding data points. You can upload a file for faster import of the configuration or download an exemplary file.

Requirement

- You have created an asset and an aspect.

- You have enabled the connection to the MindConnect LIB.

- You have prepared a file that can be imported according to the following guidelines.
  The structure of file needs to be as follows and no headline is allowed:
    - DS; datasource-nameX;datasource-description
    - DP; dp-name1;dp-description;LONG;dp-unit
    - DP; dp-name2;dp-description;LONG;dp-unit
    - DP; dp-name3;dp-description;LONG;dp-unit
    - DS; datasource-nameX;datasource-description
    - DP; dp-name1;dp-description;LONG;dp-unit
    - DP; dp-name2;dp-description;LONG;dp-unit
    - DP; dp-name3;dp-description;LONG;dp-unit

Procedure

To import the configuration to an asset of type MindConnect LIB, follow these steps:

1. Select your asset in the "Assets" tab, e.g. "Wind turbine".

2. To open the MindConnect LIB plugin, click on the plugin icon, e.g. "MindConnect LIB".

3. To configure the data sources, click "Configure your data sources" or "Enter edit mode" if you have already created a data source.

    ○ The data source configuration table and the available options appear.

4. To import a file, click "Import configuration".

    ○ Your local file browser opens.

5. Select a file that meets the guidelines under Requirement.

6. To save and configure your MindConnect LIB click "Save".

Result

You have imported your data source configuration. The new data sources are available at the asset details of your MindConnect LIB.

16.7   Connecting data point and variable

Data mapping means matching variables of an aspect with the respective data points of a data source.

• Variables of an aspect represent data.

• Data points of a data source represent the data of the MindConnect LIB.

To use the data of your MindConnect LIB you have to map the data points to the respective variables of an aspect.

Requirement

You have created an asset based on your desired aspect and type.

Procedure

To map a variable to a data point, e. g. "RotationSpeed", follow these steps:

1. Click on the asset in the "Assets" tab, e. g. "Wind turbine".

2. Click on the MindConnect LIB plugin, e. g. "MindConnect LIB".

3. Click on the tab "Data mappings".

Select the data point you want to map and click "Link variable".

4. The following graphic shows the "Link variable" option:
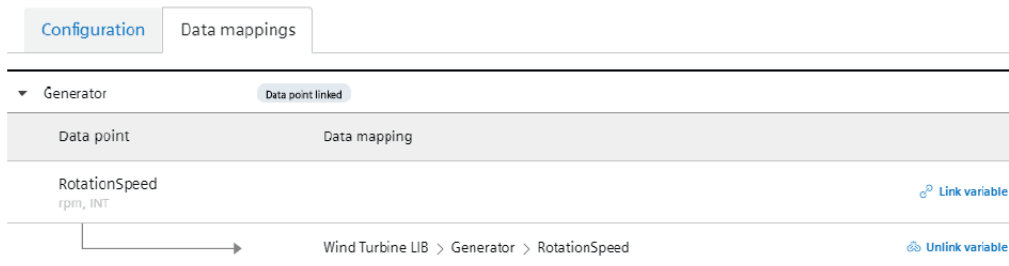
5. Select the previously created asset and click "Accept", e. g. "Wind turbine".

- In order to select a different asset click "Change".

- In order to show only compatible assets, you can activate the filter "Only compatible".
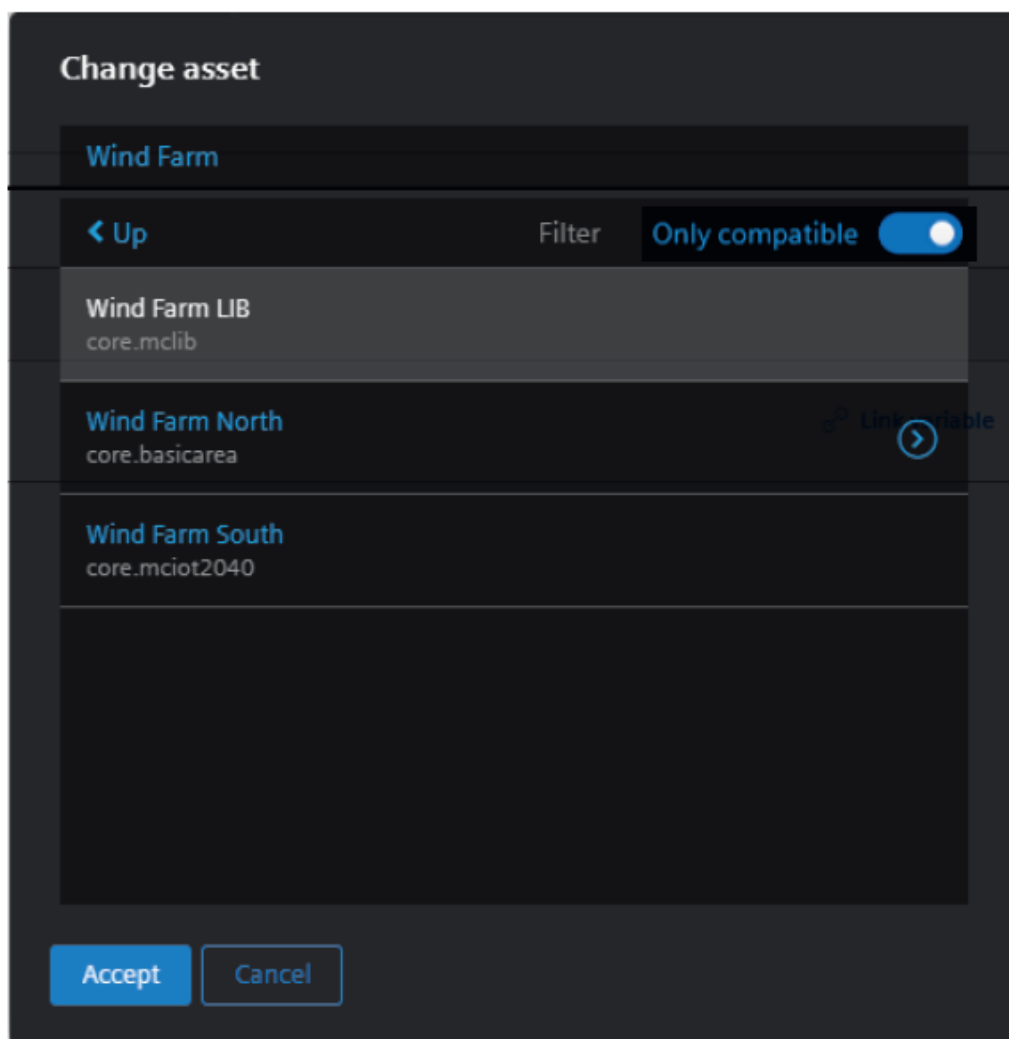
6. Select the variable you want to link, e. g. "RotationSpeed".

Only units and data types that match exactly with the aspects and variables are available. If they are different, the aspect cannot be connected to the data point (also case sensitive).

7.To link the variable click "Accept".

Result

The data point is now mapped to the variable.

The following graphic shows a mapped variable:

16.8 Deprecated data mapping

Deprecated data mappings may appear in your MindConnectLib agent if you have changed your data source configuration.

The MindConnect Lib plugin shows deprecated data mappings in the "Data mappings" window:
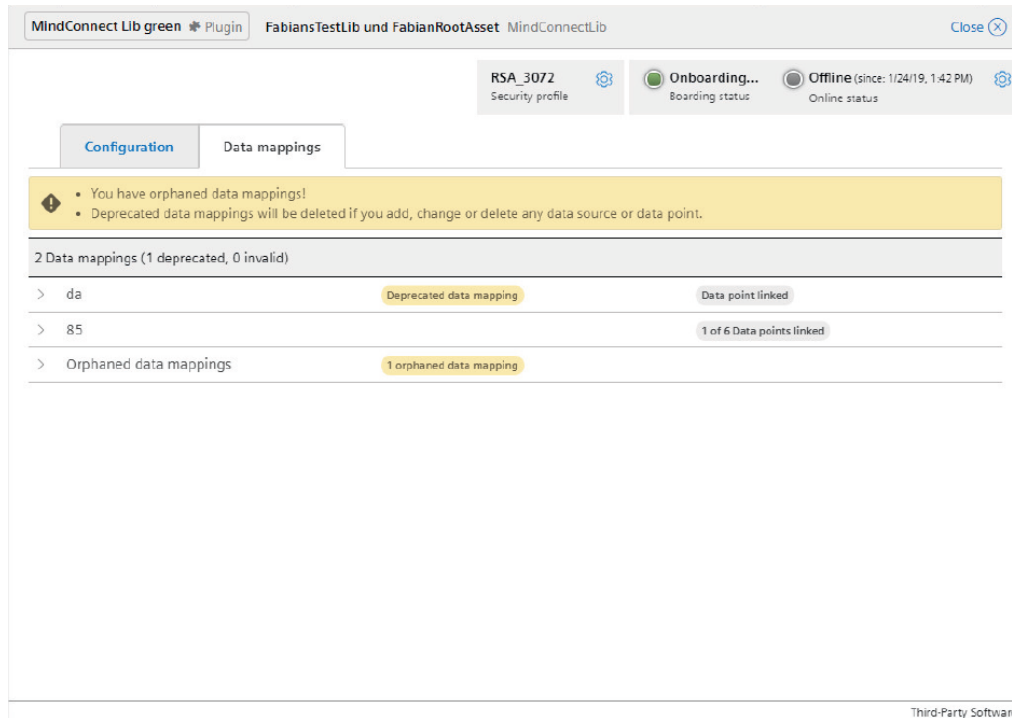
Deprecated mappings are completely functional. But they disappear when editing the data source configuration.

All new created data mappings are persistent. This also applies if you update your data source configuration.

Orphaned data mappings

Orphaned data mappings are caused by outdated mappings or if you configure the data mapping via an API. E. g. If you delete a datapoint /data source or edit the unit or datatype of a datapoint, which is currently connected via a data mapping this data mapping will appear as orphaned data mapping.

Visual Flow Creator plugin

17

17.1 Using Visual Flow Creator flows

> ✏️ **Activate Visual Flow Creator plugin**
>
> The Visual Flow Creator plugin is only enabled if you have enabled the Visual Flow Creator on your tenant. You also need have one of the Visual Flow Creator roles assigned.

Asset Manager enables you to create a new Visual Flow Creator flow for an asset.

To create a new flow, click "Create VFC flow" in the advanced operating tools.

The asset detail view shows successfully created and saved VFC flows as a plugin element.
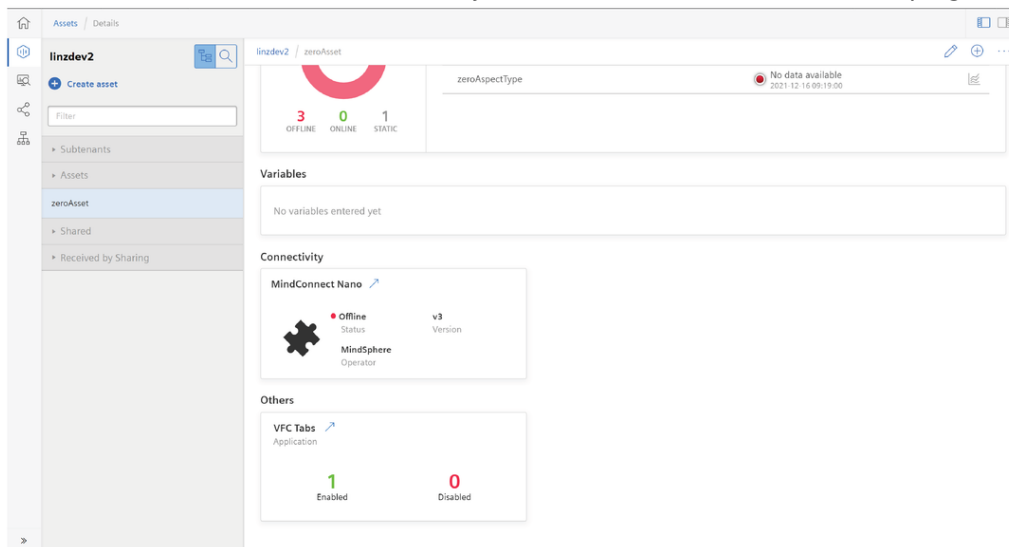
The Visual Flow Creator plugin provides an overview of all activated or deactivated tabs in Visual Flow Creator and enables you to open the flow in Visual Flow Creator.

The following image shows the activated and deactivated flows in the plugin window:

Visual Flow Creator Tabs

‹ Back

▽ Name ⇕	Status	
Flow 1	🟢 Enabled	⬀
Flow 2	🟢 Enabled	⬀
Flow 3	🟢 Enabled	⬀
Flow 4	🟢 Enabled	⬀
Flow 5	🟢 Enabled	⬀
Flow 6	🟢 Enabled	⬀
Flow 7	🟢 Enabled	⬀
Flow 8	🟢 Enabled	⬀

|< < **1** 2 > >|