SIEMENS

Building X

Building Operator Discovery Onboarding Guide

Table of Contents

1 NOTICE: Document is outdated

Dear user,

This document is in the process of being deprecated.

- If you are an existing Building Operator user and need to migrate to Connect Hub, go to Building X Migration Guide for Operations Manager
- If you are a new user and want to onboard to Building X, please go to one of the following:
  - SID (EN): Building X Onboarding Online Help
  - SID (DE): Building X Onboarding Online Hilfe

This document is not longer available after August 31, 2024.

2 Introduction

This document was formerly titled the *Operations Manager Engineering Guide*. The content, however, remains the same. The title now follows the naming conventions for documentation related to adding devices to the Building X suite during the onboarding process.

Operations Manager remotely operates and monitors building equipment including heating, ventilation, and air conditioning as well as applications and meters for a fleet of connected sites.

Operations Manager provides users with:

- Multi-site overview
- Real-time visibility and operation
- Comfort score monitoring and management
- Data history and trend analysis
- Event information and notifications
- Remote web access

Target groups

The information in this document is intended for the following target groups:

Connectivity and Application Engineers are responsible for planning and configuring a customer project. They provide the parameterization of products, devices, and systems and are responsible for general system troubleshooting. They have the appropriate training to their function and to the products, devices, and systems to be configured. They are familiar with the applied operating system(s) and the related network environment.

3 Engineering checklist

Use the workflow checklist to set up the Connect X200 / X300 and activate Operations Manager. We recommend that you open two browser tabs during the commissioning process: one for the Connect X200 / X300 and the other for Operations Manager.

Before signing up for an account, we recommend that your gateway has been installed and commissioned on-site. When choosing a trial subscription, having your gateway commissioned first, allows you to use the trial subscription for the maximum time allotted.

The recommended browsers are as follows:

- Google Chrome and Chromium based browsers
- Mozilla Firefox

Connect X200 /X300	Installing the device Connecting the device Commissioning the device Logging into the device	Before getting started with Operations Manager, use the Building Operator DiscoveryConnect X200/X300 Installation and Configuration Guide (A6V13057554) to set up your device.
Accounts	Signing Up Accepting invitations for automatic renewal subscription companies	If you have already created an account and company, this is not required. Before using Operations Manager, you need to create a Siemens ID account and accept your company invitation, see the Accounts User Guide.
Devices	Adding a site Adding and activating device Installing the Building Operator Discovery application Updating operating system	Once your device is set up, it will still appear as offline and will need to be activated. To be able to use the device in Operations Manager you need to add a site, add and activate the device, install the application, and update the operating system using the Devices application. For more information, see the Devices User Guide.
Connect X200 / X300	Enabling remote web access in Connect device UI	Proceed to the tunnel page to configure the tunnel endpoints e.g. Building Operator Discovery.
Building Operator Discovery	Organizing your Device View	After enabling remote web access and selecting your

	Discovering a BACnet Device	data point settings, you can now log into Building Operator Discovery remotely. After logging in, you can configure your device to add equipment, data points, and alarms.
	Adding Equipment and Data Points	
	Adding Tags to Data Points	
	Determining BACnet Write Priority for Points	
	Restarting Connect Device to Update Data Point Information	
	Configuring Alarms in Building Operator Discovery	
	Backing Up and Restoring a Building Operator Discovery Database	

4 Setting up Operations Manager

4.1 Getting started with Devices application

Before using Operations Manager, you need to create a site, add and activate your device, and update your device.

◈ Go to **Switch Apps** > **Devices**.

4.1.1 Creating sites

Partitions are created in the Accounts application. Sites can be buildings or campuses. A campus might contain multiple buildings.
Managing campuses functionality is only available for Building X offerings.

▷ A partition has been created in Accounts.

1. Go to **Sites**.
2. Select + **Add**.
3. In the **Add site** dialog, select the type for the new site (**Building** or **Campus**).
4. Fill in the **Site details** appropriately.

The **Address** field will automatically suggest addresses. Selecting a suggested address will automatically populate the **Time Zone** field.
If Google Maps app is not available in your country, the address and time zone must be entered manually.

5. In the **Partition** pane, select the partition to which the building or campus belongs.
6. *(Optional)* Expand the ⌄ **Optional** pane to add additional site and contact information.

A value for **Area** must be entered, if the **Building** option is selected. If this value is not specified, Energy Manager will not display any data for the building.

7. Confirm with **Add**.

4.1.2 Adding devices

1. Go to **Sites**.
2. Select the site where you want to add your device.
3. Select + **Add**.
4. Enter the **device activation key** and select **Validate.**

The **device activation key** can be found in the device UI. The device UI is a web interface and can be accessed using local connection.

Activation key for Intelligent Valves is printed on the device.

5. *(Optional)* Confirm the **Custom name** of your device.
6. *(Optional)* Confirm the **Custom description** of your device.

Defining or changing custom name of the device, only affects the display name in the cloud. The **Custom name** and **Custom description** fields are optional.

7. *(Optional)* Confirm the **External identifier** of your device.

The **External identifier** (optional) can be used for additional, customized asset tracking functionality. And also for other types of information exchange with other systems via the Building X API's. Select the **External identifier** that complies with the following guidelines:
- At least 8 characters.
- Letters, numbers and combinations are supported.
- Uppercase and lowercase letters are supported.
- Symbols are not supported.

8. Confirm with **Add**.

4.1.3 Assigning distributions and applications on devices

Distribution versions are not shown in order. Verify that you are installing the most recent version of your distribution.

If one of the applications, within a current distribution has been discontinued, a warning message displays in the **Distribution details** tab, along with the most recent available distribution version to install.

1. Go to **Sites**.
2. Select the site with the device you want to view.
3. Select the device.
4. Select the **Applications** tab.

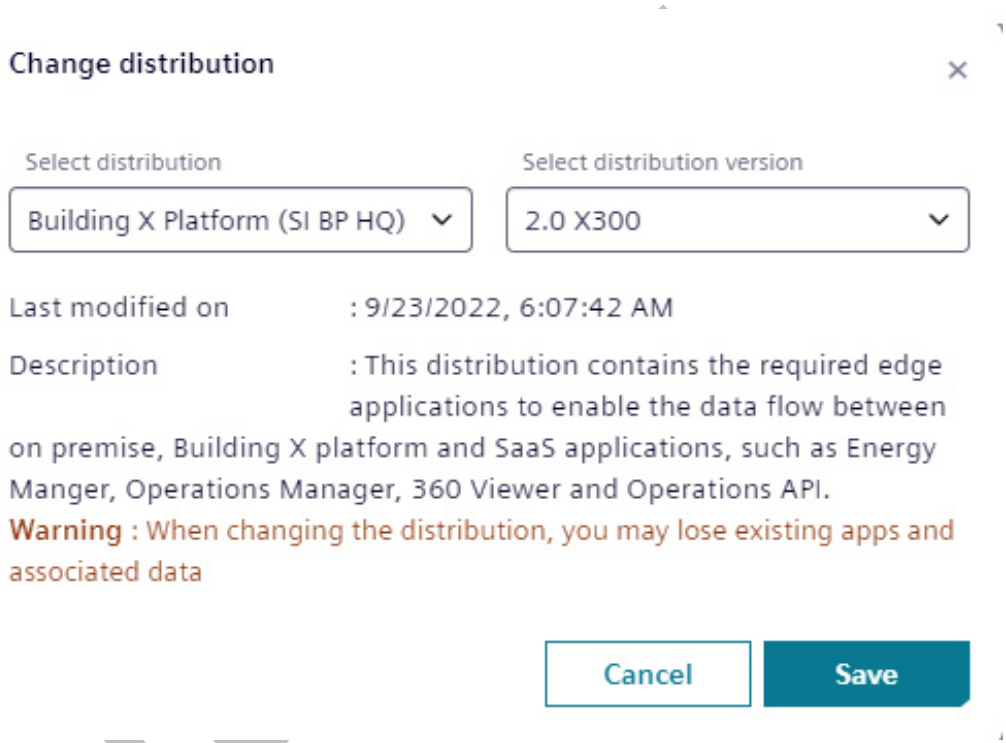
Assigning or changing a distribution

▷ The **Applications** tab is open.

1. In **Distribution details**, select **Change**.
2. Select a distribution from the **Select distribution** drop-down menu.

3. Select a distribution version from the **Select distribution** version from the drop-down menu.
4. Click **Save**.

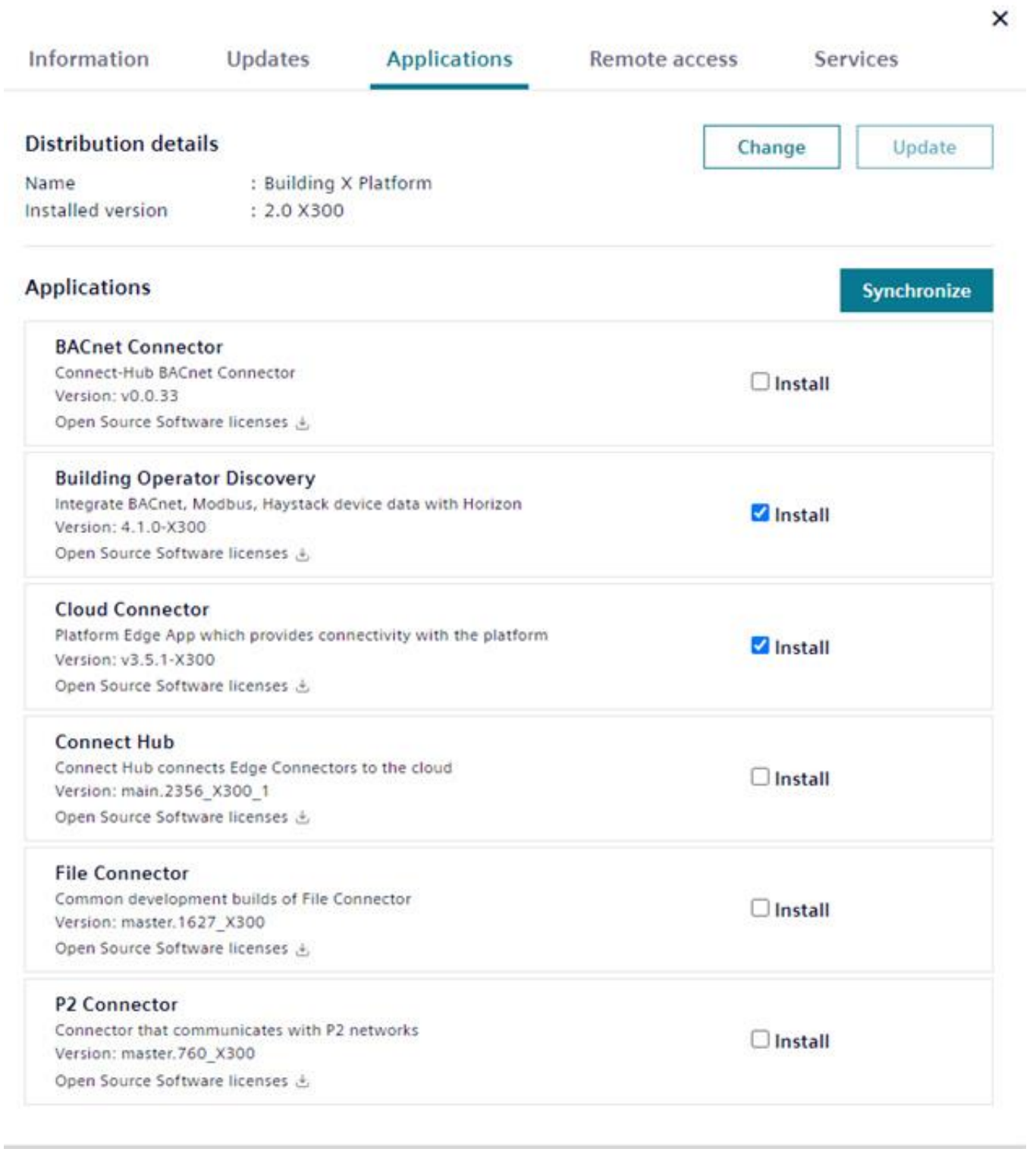
After a shared distribution from different product lines is installed and unshared, a warning message displays.



Installing Edge Applications

1. From the **Applications** tab, select the target applications to install.
2. Click **Synchronize**.

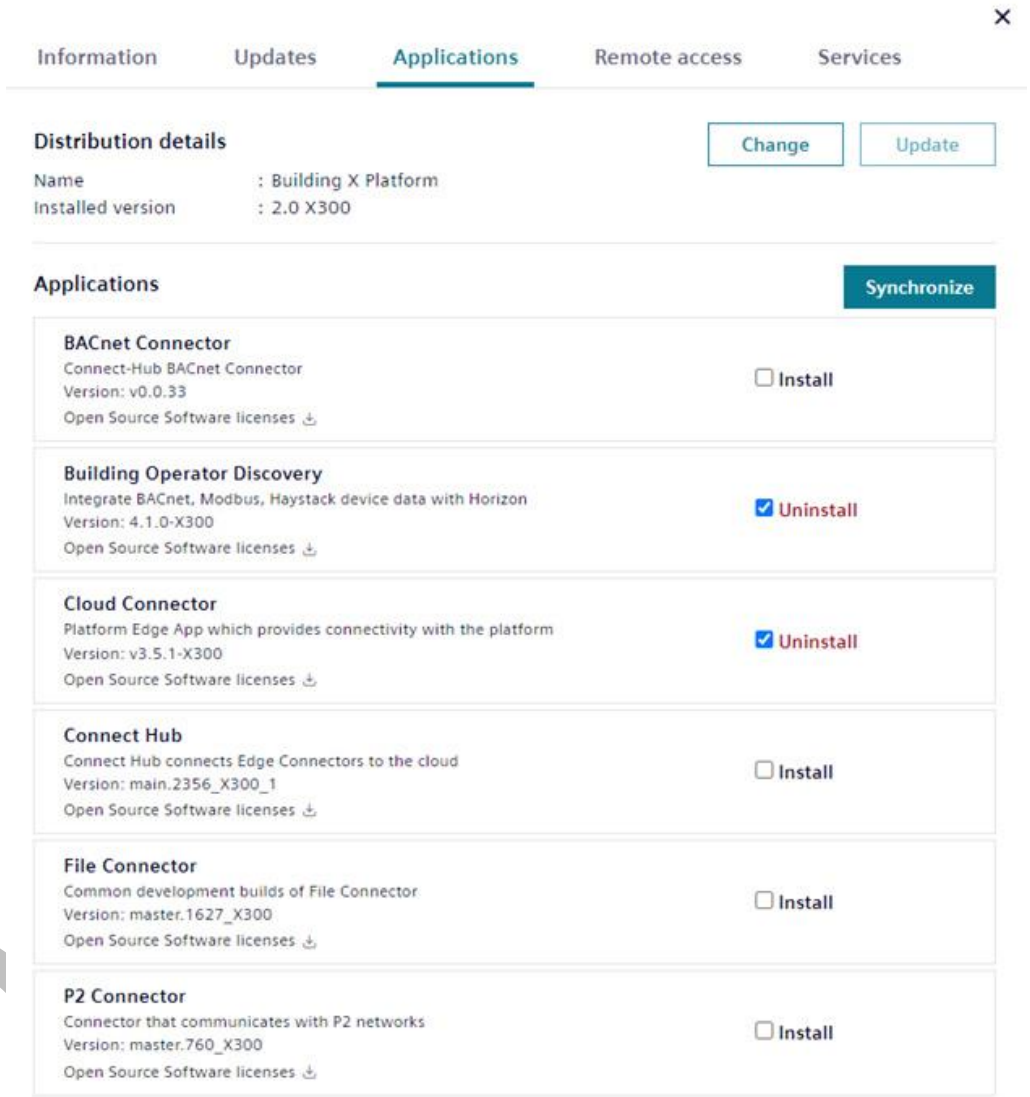
⇨ The Edge applications are installed.


Information
Updates
Applications
Remote access
Services
Distribution details
Change
Update
Name : Building X Platform
Installed version : 2.0 X300
Applications
Synchronize
BACnet Connector
Connect-Hub BACnet Connector
Version: v0.0.33
Open Source Software licenses
Install
Building Operator Discovery
Integrate BACnet, Modbus, Haystack device data with Horizon
Version: 4.1.0-X300
Open Source Software licenses
Install
Cloud Connector
Platform Edge App which provides connectivity with the platform
Version: v3.5.1-X300
Open Source Software licenses
Install
Connect Hub
Connect Hub connects Edge Connectors to the cloud
Version: main.2356_X300_1
Open Source Software licenses
Install
File Connector
Common development builds of File Connector
Version: master.1627_X300
Open Source Software licenses
Install
P2 Connector
Connector that communicates with P2 networks
Version: master.760_X300
Open Source Software licenses
Install

Uninstalling Edge Applications

1. From the **Applications** tab, select the target applications to uninstall.
2. Click **Synchronize**.

⇨ The Edge applications are uninstalled.



4.1.4 Updating multiple devices

▷ Devices with pending updates are available.

1. Go to **Sites**.
2. Select the site with the devices you want to update.
3. Select the devices.
4. Select **Options** > **Updating operating system** or **Updating distribution**.
5. Confirm with **Update**.

4.2 Enabling remote web access

Remote web access can be configured, and other endpoints can be specified on the device user interface. Tunneling for devices in and behind the gateway is supported and must be engineered in the commissioning UI.

Remote web access does not support web interfaces that use Adobe Flash or Microsoft Silverlight. These web interfaces perform certain unsecured operations such as sending unencrypted data over the internet.

1. Go to **Sites**.
2. Select the site with the connected device.
3. Select the device.
4. Select **Remote access**.
5. Go to the required application > **Open.**
   ⇨ A new tab opens, and you are re-directed to the commissioning user interface of the device.

If you are using an iPhone and a new window does not open, you need to allow pop-ups in Safari explorer. Open **Settings** and select **Safari**. Turn off the toggle button for **Block Pop-ups**.

6. Enter your login information and select **Log in.**
7. *(Optional)* Go to **Network** > **Tunnel configuration** to set up further tunnel endpoints if needed.

4.3 Enabling remote web access in Connect X200 / X300 UI

To use remote web access, you must configure your endpoints in the Connect device. For example, to remote web access to an on-premise Desigo CC Flex Client, you must enter the IP address of the Flex web application in the Connect X200 / X300 user interface. Additionally, use the Desigo CC online help in SID: Building X Connector.

1. Go to **Network** > **Tunnel**.
2. Click **Edit**.
3. Click **Add**.
4. Enter the **Name**, **Description**, and **URL**.
5. Click **Save**.

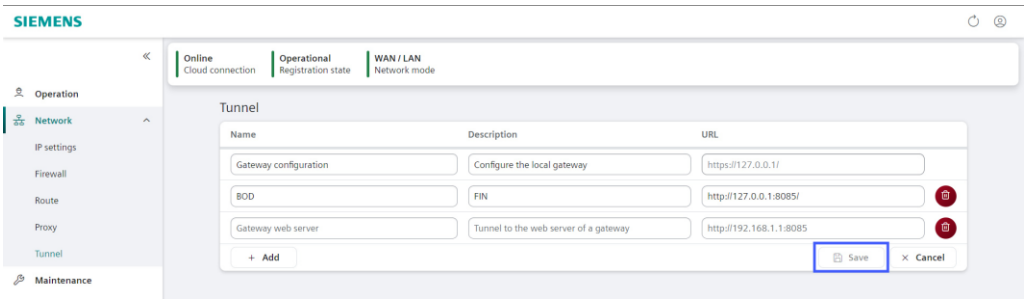


Fig. 1: Connect X200 Tunnel endpoints

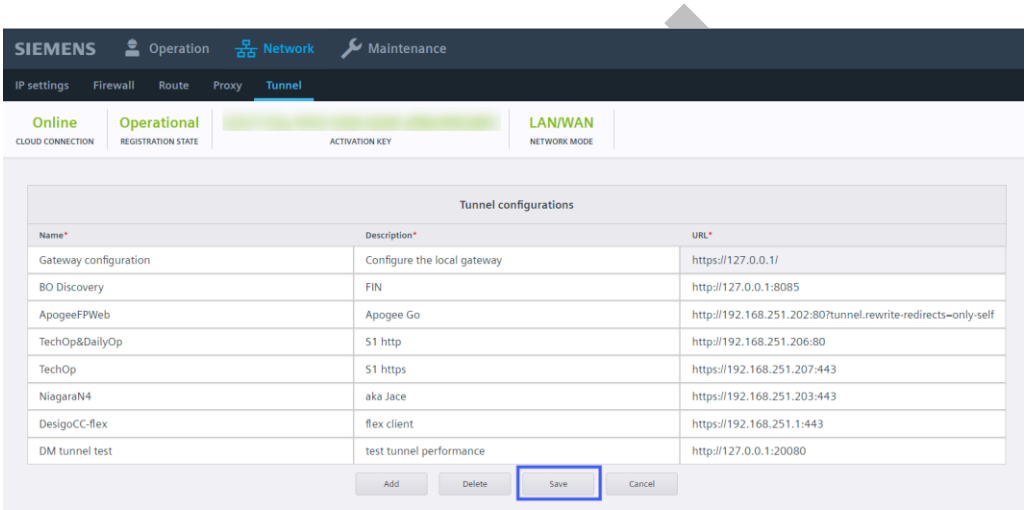


Fig. 2: Connect X300 Tunnel endpoints

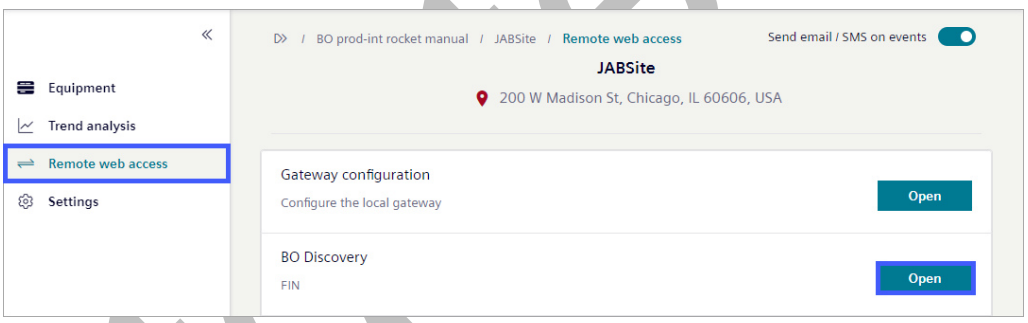
5 Adding data points using Building Operator Discovery

Building Operator Discovery is an engineering tool embedded on the Connect device to configure and provision data points for Operations Manager.

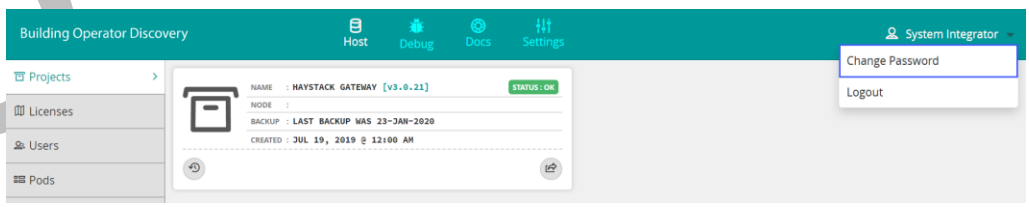
5.1 Logging in to Building Operator Discovery Remotely

You can log in to Building Operator Discovery remotely, or locally. The instructions below outline how to log in remotely. To log in locally, use a local port or network cable. A remote access session will close after one hour, even if you are actively working.

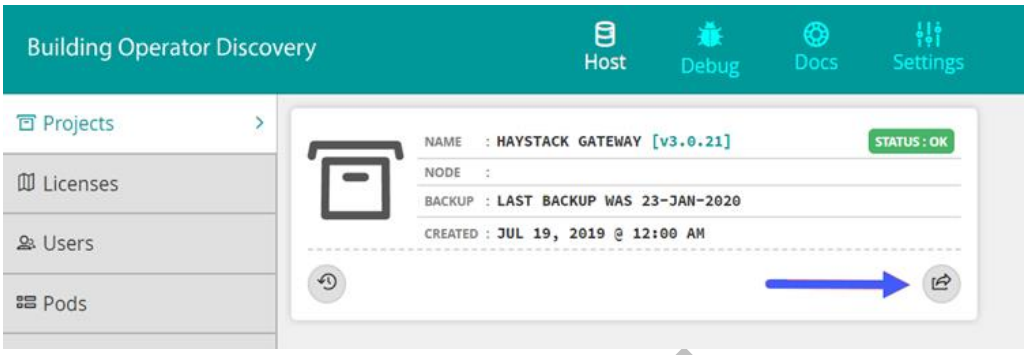
1. Select the site you want to log in to.
2. Go to **Remote Web Access**.
3. Find Building Operator Discovery and click **Open**.



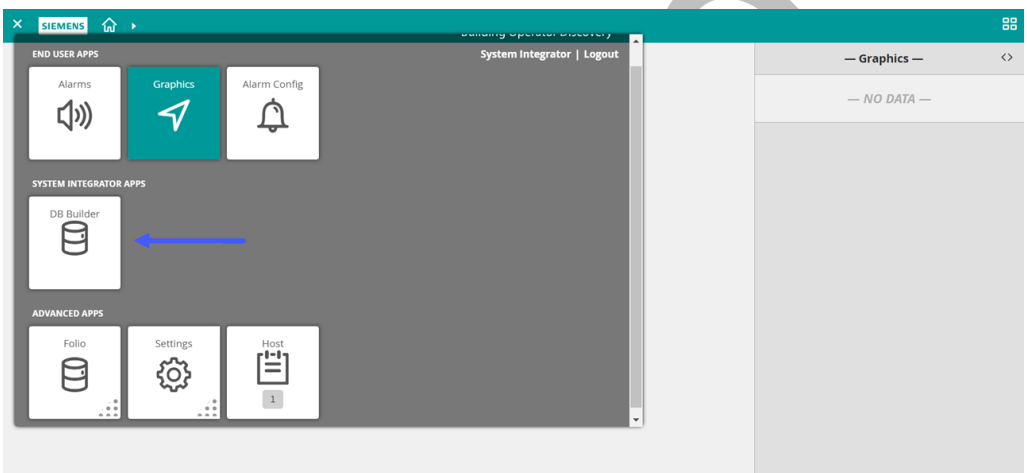
4. Wait for the connection to verify.
5. A new tab will open in the browser. Log in using the following credentials (case-sensitive):
   - **Username:** admin
   - **Password:** admin
6. After you first log in to Building Operator Discovery, you are prompted to change the password. Complete the fields from the pop-up and select **Apply**.



7. Once you've created a more secure password, find and select **Open Project**.



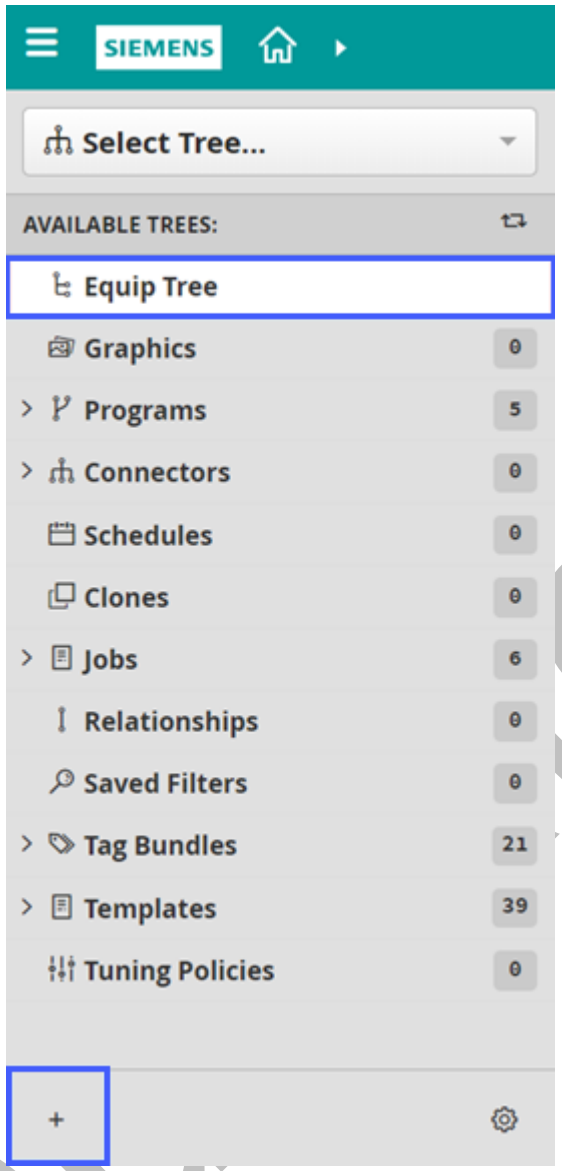
8. A new tab will appear. Select the menu icon in the top left of the screen.
9. Select **DB Builder**.



If the remote access session is interrupted, select **Disconnect** in Operations Manager. Start the Remote Web Access process again.

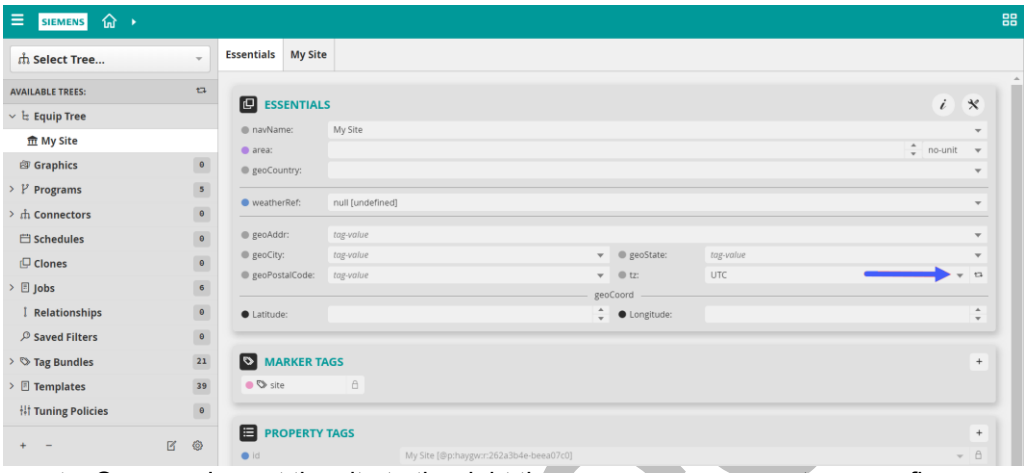
5.2 Organizing your device view

This section will cover how to create a device hierarchy in Building Operator Discovery, and the recommended way to organize your equipment. Prior to organizing your equipment, you will have to add a site in the Equip Tree.



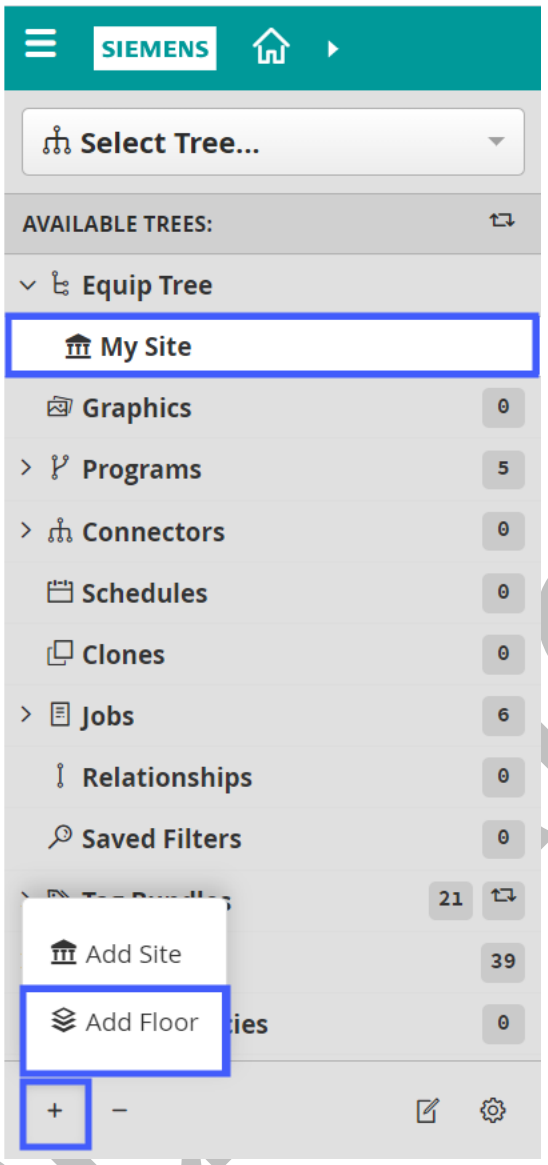
Before you organize the device view, first change the time zone in My Site to the time zone your device resides in. To do so:

1. **IMPORTANT!** Add or change the country and time zone. This is the time zone you set for data points – and their associated historical data – in Operations Manager. The field is called “tz.”



   ⇨ Once you’ve set the site to the right time zone, you can create a new floor object. However, before you create a new floor object, you must set the right context in the navigation pane. To do so:

2. Select the **Site** name.
3. Find and select the **(+)** icon at the bottom of the navigation tree. Select **Add Floor**.



4. In the pop-up, type to in the Floor Name field and give your site a unique name.
5. Select **Create** when finished.
6. Close the property editor to proceed.

The floor structure will not appear in Operations Manager. The hierarchy you create is used to organize and engineer items in Building Operator Discovery.

5.3 Discovering a BACnet device

After you've added a floor object, you can now discover a BACnet device. In doing so, you can add that device to the Building Operator Discovery project and sync it with Operations Manager. Complete the instructions below to discover a BACnet device.

▷ You are in the Database Builder application.

▷ You have configured or confirmed the Discover Settings. If not, see Configure Discovery Settings [→ 19].

1. From the Navigation tree, under **Available Trees**, expand **Connectors**.
2. Expand **BACnet**.
3. In the **BACnet Connectors** pane, from the menu bar, click **BACnet Global Config** and then complete the fields in the **BACnet Instance Configuration** pane for your network. Click **Save**.
   Enter custom local addresses as needed (for specific devices).

Operations Manager only allows BACnet networks on ports 47808 – 47823.

4. From the **Navigation tree** under the expanded **BACnet** connector, click **Discover**.
5. In the **Discovered Devices** pane, from the menu bar, click **Discover**.
   ⇨ The discovered BACnet devices display in the top section of the pane.
   NOTE 1: Increasing the **Timeout (seconds)** in the Device Discovery Settings dialog box may allow you to discover more devices. We recommend a 30-second timeout value.
   NOTE: 2: If a BACnet device was not discovered automatically, see Manually Add a BACnet Connector [→ 19] and then return to this topic and proceed to Step 7.
6. From the list of discovered devices, select a device. For multiple devices do one of the following:
   – To select a range of devices: Click on the first device and then press **SHIFT + click on the last device** in the range.
   – To select individual devices: Click **CTRL + click each individual device** you want to add.
7. Click **Add**, and then click **OK**.
8. From the **Discovered Devices** pane, click **Discover**.
9. The added devices display under **Added Devices** and are now greyed-out in the **Discovered Devices** section.

5.3.1 Additional Discovering BACnet Device Procedures

Complete the following procedures as needed:

Configure Discover Settings

1. From the Navigation tree, under **Available Trees**, expand **Connectors**.
2. Expand **BACnet** and then click **Discover**.
3. In the **Added Devices** pane, from the menu bar, click **Discover Settings**.
   ⇨ The Device Discovery Settings dialog box displays

4. Complete the fields as required.
NOTE: A value of 10-seconds or higher is suggested for the **Timeout (seconds) value** in order to allow discovery for as many BACnet devices as possible.
5. Click **Apply**.

Manually Add a BACnet Connector

1. From the Navigation tree, under **Available Trees**, expand **Connectors**.
2. Expand **BACnet.**
3. From the menu at the bottom of the **BACnet Connectors** pane**,** click **Add.**
   ⇨ The Add BACnet Connector dialog box displays.
4. Enter the settings for your device, and then click **Add.**
NOTE: For MS/TP devices the MAC Address is required.
   ⇨ The new BACnet connector displays in the BACnet Connectors pane.
5. Select the newly added connector and then click **Ping** to confirm the connector integrates with the device.
6. If the connector **Status = OK** and **State = Open** the integration was successful. Proceed to Discovering a BACnet device [→ 18] to discover the device and points.
7. If an Error is reported, further investigation is required. [Add Screen capture]

5.4 Adding a Modbus TCP device

If you don't intend on adding a Modbus TCP device, skip to the next section.

The instructions below detail how to integrate multiple Modbus devices in bulk. You'll need to create a .CSV file with the Modbus data point data and import it to Building Operator Discovery. Then, a Modbus device must be created in Building Operator Discovery and the CSV file assigned.

Creating .CSV file

To create a .CSV file, see the information below.

Download Template: http://www.siemens.com/download?A6V11971292

Please note that in this file, you must:

- Begin column "A' data with lowercase letters.
- Add a ping register so that Building Operator Discovery can monitor the controller to make sure it's active.
- Manually upload this file to Building Operator Discovery.

Configuration Information

The following information is required to help configure your .CSV file.

- name (required): Name of the register. It must be unique and must start with a lowercase letter (a-z). A-Z, a-z, 0-9, and underscores are allowed. No spaces or other special characters.
- addr (required): The address of the register that follows the Modbus convention.
  – 0xxxx - Coil (00001-065536)

  - 1xxxx - Discrete Input (10001-165536)
  - 3xxxx - Input Register (30001-365536)
  - 4xxxx - Holding Register (40001-465536)
- data (required) - this defines the data type of the register.
  - Bit Mask Types: Supports a position notation for cases where bits are packed into input or holding registers. Format: name, addr, data, rw.
    Examples:
    - do0, 40101, bit:0, rw
    - do1, 40101, bit:1, rw
    - do2, 40101, bit:2, rw
  - Word and Byte Order: If register data not stored in network byte order, you can specify the order using suffix.
    - u2le Unsigned 16-bit Int - Little endian byte and word order
    - u2leb Unsigned 16-bit Int - Little endian byte order only
    - u2lew Unsigned 16-bit Int - Little endian word order only
- rw (required): Determines read and write permissions.
  - rw: Register may be read and written.
  - r: Register is read-only.
  - w: Register is write-only.
- scale (optional): Allows user to apply a scale factor to the registers. Format: (operator)(number) where the number is a numeric constant.

  Examples:
  - Add: +1.5
  - Minus: -0.25
  - Multiply: *10
  - Division: /1000
- dis (optional): An optional tag that allows the user to specify a display name for the register.
- unit (optional): Defines the unit to use for the register.
- tags (optional): Tags to apply to the point when learned into the database.
- folderPath (optional): Organize points by applying a folderPath.

	A	B	C	D	E	F	G	H	I	J
1	name	addr	data	rw	scale	dis	unit	tags	folderPath	
2	ping	10002	u1	rw	*10	.Ping	-	-	-	
3	xVoltPh1N	65536	u4	r	*10	Voltage L01N	V	volt sensor	-	
4	xCurrPh1	10001	s1	w	-0.25	Current L01	A	amp sensor	-	
5	xActPwrPh1	365536	s8	w	*10	Actual power L01	W	watt sensor	-	
6	xSumPwrPh1	40066	f4	rw	/1000	Summary power L01	W	watt sensor	-	
7	xFctPwrPh1	465536	f8	r	*1	Power factor L01	-	sensor	-	
8										
9										
10										
11										
12										
13										

Meter_Siemens_PAC3200 (003)

Uploading a .CSV File to Building Operator Discovery

Once you've configured the file, it's time to upload it to Building Operator Discovery.

1. Select and expand the **Modbus** drop-down in the Navigation tree.
2. Select **Register Maps**.

3. Select **Upload**, below the Modbus Register Maps list. You won't see any results if you haven't uploaded a Modbus file yet.
4. Select **Choose File**. Select the appropriate file from your device.
5. Select **Upload** to proceed. Your file will now appear in the Modbus Register Maps list results.

Adding a Modbus connector

Once you've uploaded the file, you must then create a Modbus connector. This connector will help you add data points to your Modbus devices later.

Modbus Properties

- Dis: Name of connector
- ModbusSlave: The salve of the Modbus device being connected (default is 1).
- Existing Register Map: If you've already configured a Modbus connector, this property will let you choose from a list of available registers or to create a new one with ModbusRegMapUri.
- ModbusRegMapUri: Specify the name of the register map to link with this connector. Replace "xxx" with whatever the name of the register map is.
- Uri: To specify the Uri, enter the host, protocol, and port (default 502).

Supported Protocols

Protocol Type	Address
TCP/IP	modbus-tcp://host/
RTU over TCP/IP	modbus-rtutcp://host/

To add a Modbus connector:

1. Navigate to and expand **Connectors > Modbus** in the Navigation tree.
2. Select **+ Add**.
3. In the pop-up, select the **Existing Register Map** drop-down and select the file you just uploaded.
4. *(Optional)* If you have not yet uploaded the register map file, you can supply a ModbusRegMapURI.
5. The Uri field gives information on the Modbus address. You can leave "modbus-tcp://" as the protocol address and replace "host" with the device's IP address.
6. Select **Add** when finished.

5.5 Adding Niagara Framework based devices to Building Operator Discovery

This section will cover how to use a Niagara AX or Niagara 4 Framework device with Operations Manager.

Building Operator Discovery has been tested with Niagara AX3.8 and Niagara N4.10U5 versions. Compatibility with older versions of Niagara have not been tested.

For additional information regarding Niagara devices and nHaystack in Building Operator Discovery, see the following: https://finproducts.atlassian.net/wiki/spaces/FINFramework/pages/770708023/NHaystack.

Installing the latest nHaystack module

Before using a Niagara device with Building Operator Discovery, you will need to install nHaystack jar modules to your device. To install these modules, follow the steps below.

▷ In the Niagara workbench:

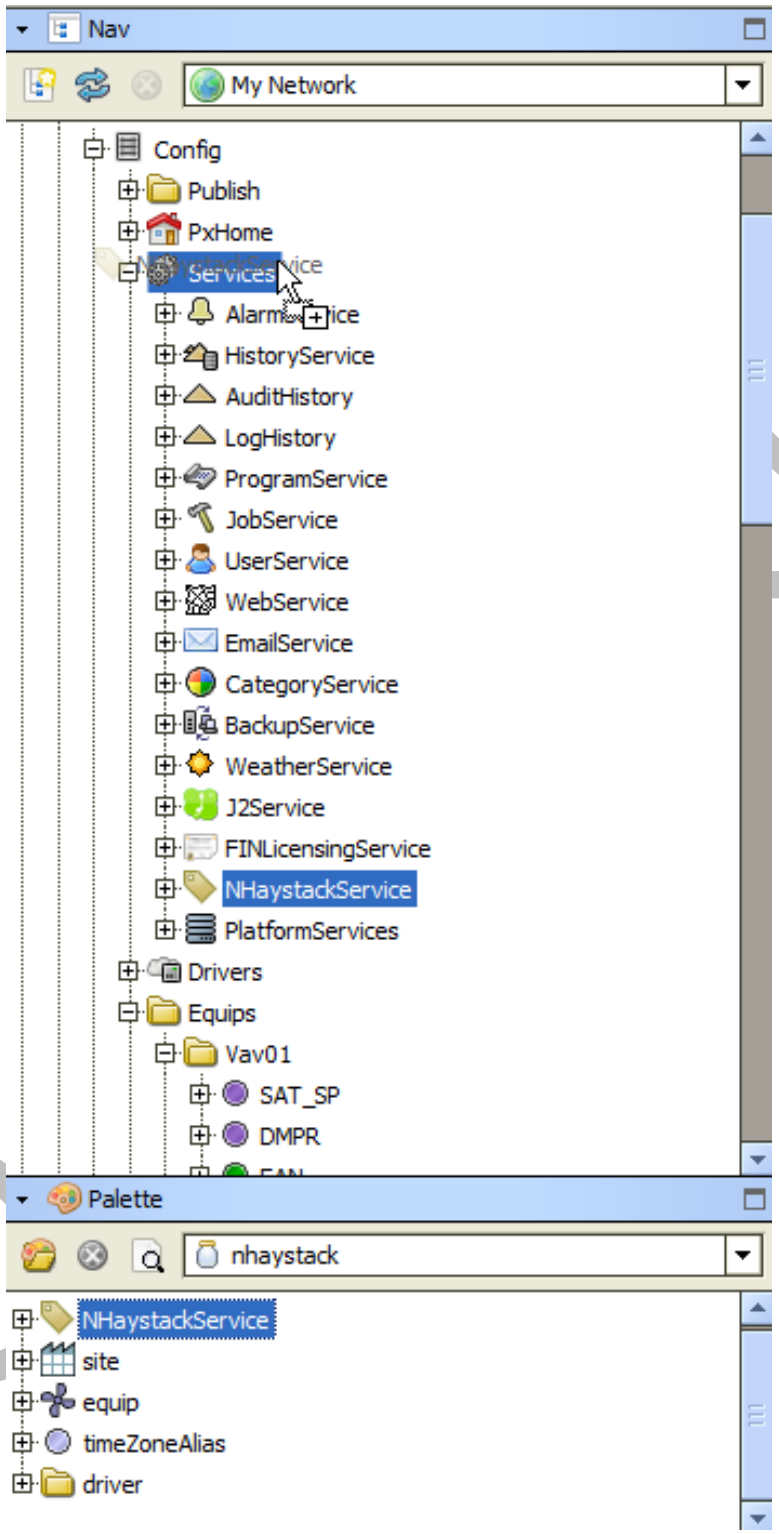
1. Download the latest nHaystack.jar module(s) for your Niagara device.

- For Niagara AX, download here: https://stackhub.org/package/nHaystackAx
- For Niagara 4, there are two modules: **nHaystack-rt** and **nHaystack-wb**. Download here: https://stackhub.org/package/nHaystack

2. Drag the nHaystack.jar file into your modules folder.

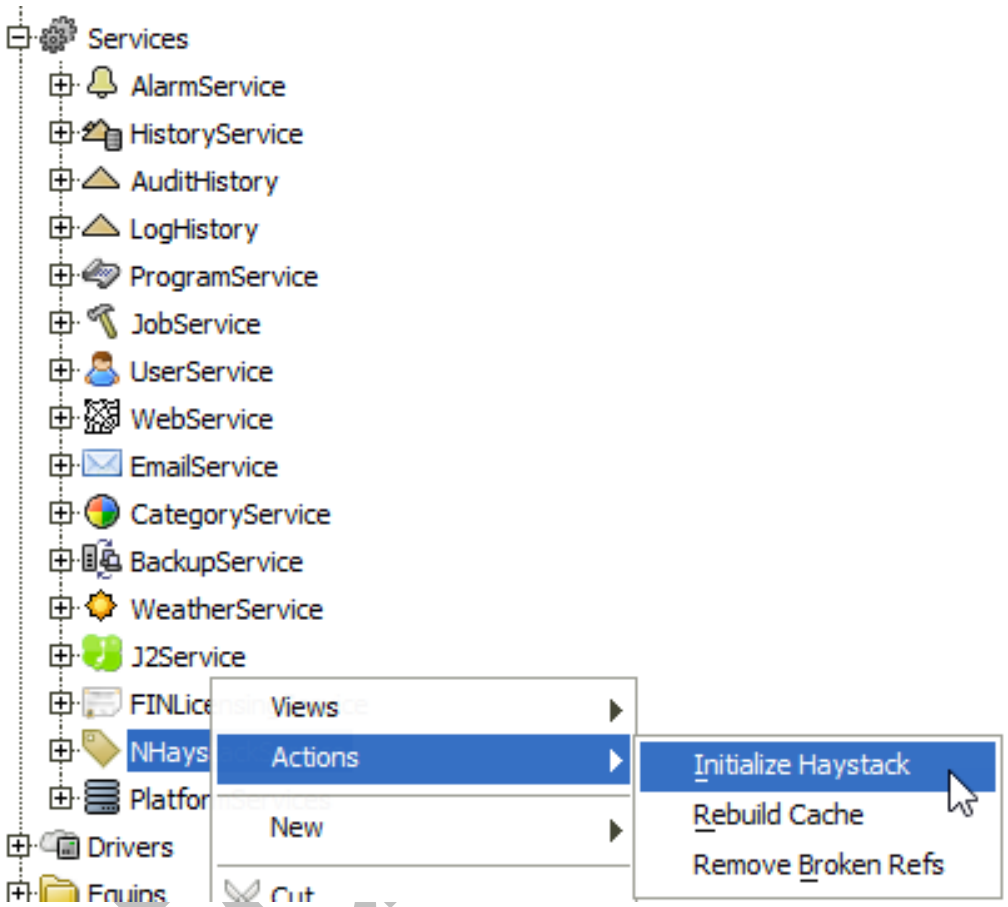
You may need to close/stop your station/workbench in order to add this file to your modules folder.

3. Drag the **NHaystackService** folder from your **Palette** into the **Services** section.



4. Restart your station.
5. Once the station is running, run the following actions in the NHaystackService Folder:
   – NHaystackService > Actions > Initialize Haystack

– NHaystackService > Actions > Rebuild Cache
– NHaystackService > Actions > Remove Broken Refs



To test the connection of your device, type **<niagaraStationIP>/haystack/about** into your browser.

Adding your Niagara device using a nHaystack connector

After installing the nHaystack modules, you can now add your device to Building Operator Discovery. To add a Niagara Framework device via nHaystack connector, follow the steps below.

▷ In Building Operator Discovery:

1. Expand **Connectors** and select **Haystack**.
2. Click **Add**.
3. Type in the appropriate information in the ensuing pop-up.
   – **URI**: Enter the IP address that connects to the station. The URI scheme must be in the following format: http://host/haystack/
   – **Display Name**: Enter the desired name for the connector.

- **Haystack Slot (optional)**: Only points that have haystack slots will be imported into DB Builder. This is applicable if you are dragging in data through the **Site** folder under haystack connector.
- **Equip Filter (optional)**: If haystack slot = YES, then filter equipment can be imported.
- **Point Filter (optional)**: If haystack slot = YES, then filter points can be imported.
- **Username and password**: Same credentials that are used to log in to the station.

4. Once you are connected, you'll be able to see the same structure as you do in Niagara through the Component Space.

5.6 Adding equipment and data points

Once you've added a floor object, you can then add equipment objects (i.e. devices) to the hierarchy. These objects are discoverable through object discovery in Building Operator Discovery.

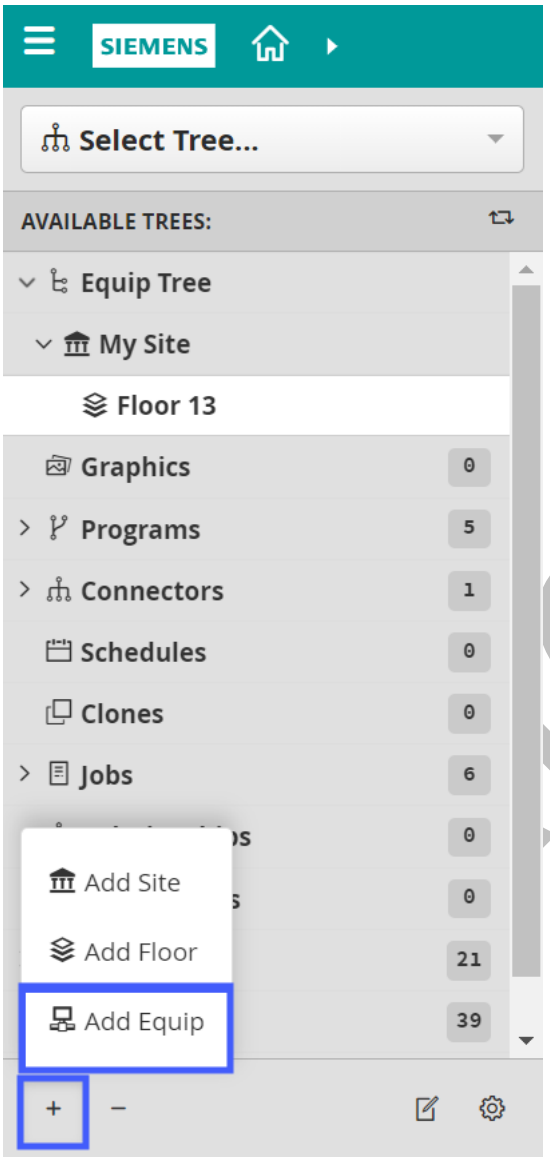
The Equipment hierarchy level, although optional, provides flexibility to structure the device level in Operations Manager. Typically, the equipment corresponds to a BACnet device; however, two or more building equipment of a BACnet device can be mapped to two or more equipment in Building Operator Discovery.

Complete the following steps in order:

Add Equipment

To add an equipment object to a floor object, complete the instructions below:

1. In the Navigation pane, expand the **Equip Tree**.
2. Expand the site object, then select the desired floor object.
3. Select the **plus icon (+)** below the available objects pane, then select **Add Equip**.

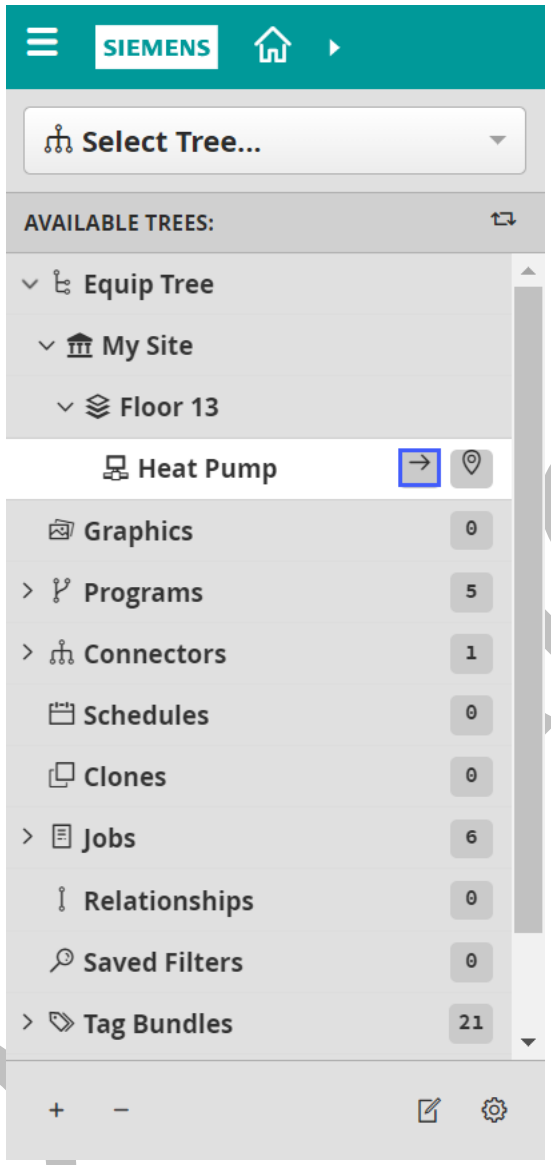


4. In the pop-up, enter the equipment object name. It is highly recommended that the object name matches its name on the BACnet network. In Operations Manager this name displays as the Device Name.
   NOTE: The equipment object name cannot be changed after creation.
5. Select **Create**.

Discover and Add Data Points

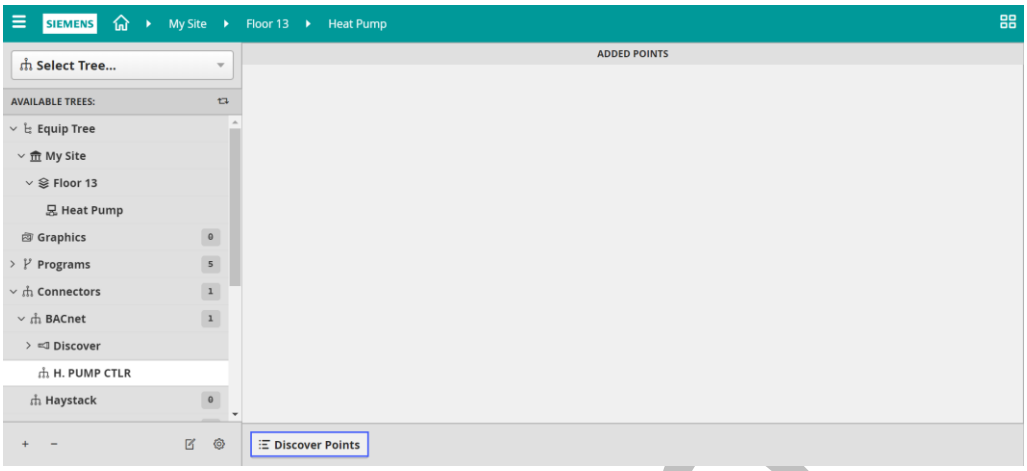
Similar to discovering equipment, you can discover points to add to the equipment you just discovered. To discover points for specific equipment in Building Operator Discovery, complete the following instructions:

1. In the floor object, find and select the right device. Three icons appear once you hover over the device name. Select the arrow icon, closest to the device name, to set that device as your current context in Building Operator Discovery.



2. After setting the context, you will see a breadcrumb trail that reflects this action in the menu bar above.

3. Once you've set the proper context, find and select the appropriate device controller in the Connectors node. Select to expand **Connectors**, then **BACnet** (or whichever type of connector you're using).
4. Find and select the connector you want to add points to. Then, select **Discover Points**, below the Added Points list results (there will be none, if you haven't added any yet).



5. Once loaded, find and select (or multiselect) points you want to add to the device. Drag and drop the point(s) on the equipment name in the Equip Tree on your site to add the points or select **+ Add**.
6. Select **Apply** in the confirmation dialog to add the point.
7. Select **Cancel** in the Batch Record editor: [Your Panel Name]. This functionality is not fully supported yet.
8. Navigate to the appropriate device in the Equip Tree, and you'll see the points you just added.

5.7 Viewing device and data point icons in Operations Manager

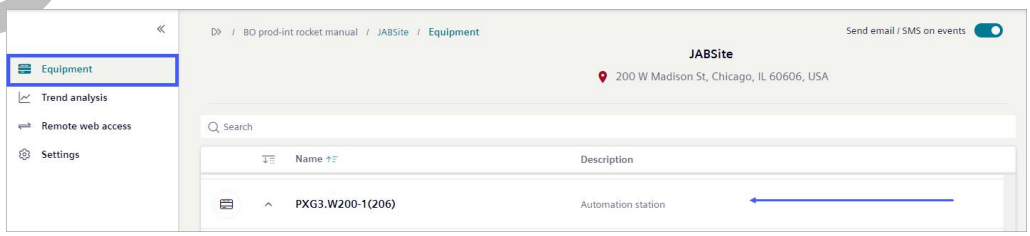
Complete the following steps in order:

View a device in Operations Manager

Immediately after an equipment object has been added in the Building Operator Discovery, it is also populated in Operations Manager.

To see this reflected in Operations Manager:

1. Open a new tab in the browser and log in to Operations Manager.
2. Select the site name to access the site page.
3. Here you'll see the new device in Operations Manager that you added in Building Operator Discovery.



View data point icons in Operations Manager

Once you have added data points in Building Operator Discovery, you can view them in Operations Manager. See the table below for Operations Manager data point icon definitions.

Icon	Definition
	physical-output
	physical-input
	process-value
	other
	analog with "meter" tag

5.8 Deleting data points and equipment

Deleting Data Points: To correctly delete a data point in Operations Manager, you must first delete the point in Building Operator Discovery. If you delete a point in Operations Manager that action won't reflect in Building Operator Discovery.

Deleting Equipment: To correctly delete equipment, you must delete the equipment in both Operations Manager and Building Operator Discovery. If you delete equipment in Building Operator Discovery, you must also manually delete the same device in Operations Manager. Similarly, deleting a device in Operations Manager won't automatically delete the equipment in Building Operator Discovery.

To delete a data point or equipment in Building Operator Discovery:

1. Select the appropriate point or equipment from the Available Equip Tree.
2. Select the **(-) icon** below the Available Equip Tree.
3. Select **Delete [Point or Equipment Name]**.
4. Select **Delete** in the ensuing pop-up to confirm.
5. Go to Operations Manager and see that the point was successfully deleted from that device.

5.9 Adding tags to data points

Now that you have added points to the device, you can configure and tag these data points to meet specific criteria.

Tags are used to standardize data and provide a method for semantic tagging and data modelling in smart buildings. Comprehensive dictionary definitions for HVAC, metering and other building related data make it cost-effective to analyze, visualize and derive value from data.

There are two categories of tags in Building Operator Discovery:

- **Marker** - A one-word string value that describes the role(s) of the data point. For example, a data point could be a temp setpoint so it would have both a "temp" and a "sp" marker tag.
  - A Meter tag is an example of a Marker tag and is used for accumulator data types, such as heating and cooling.
- **Property** – A one-word string that has a value associated with it. In Haystack, the tag is referred to as a “Value” tag.

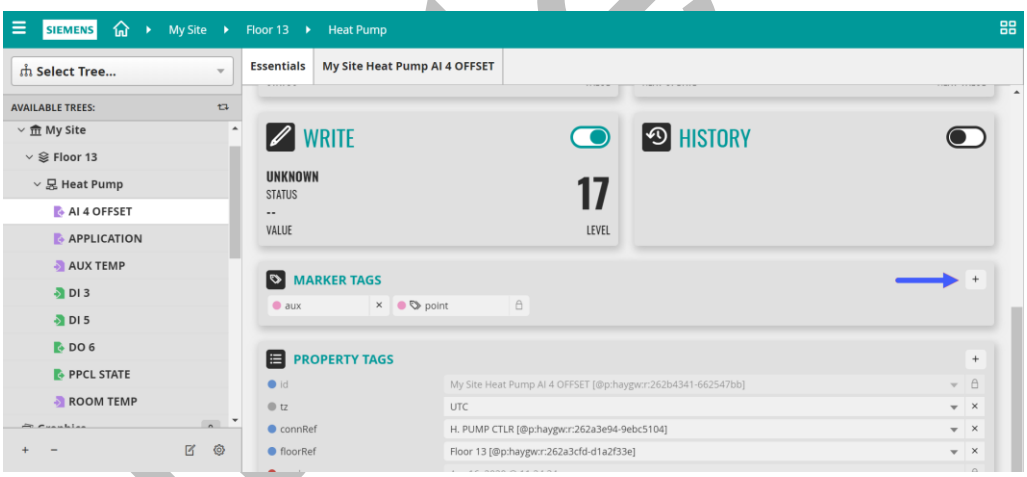
Building Operator Discovery automatically applies some tags for you based on the data point type.

Marker Tags

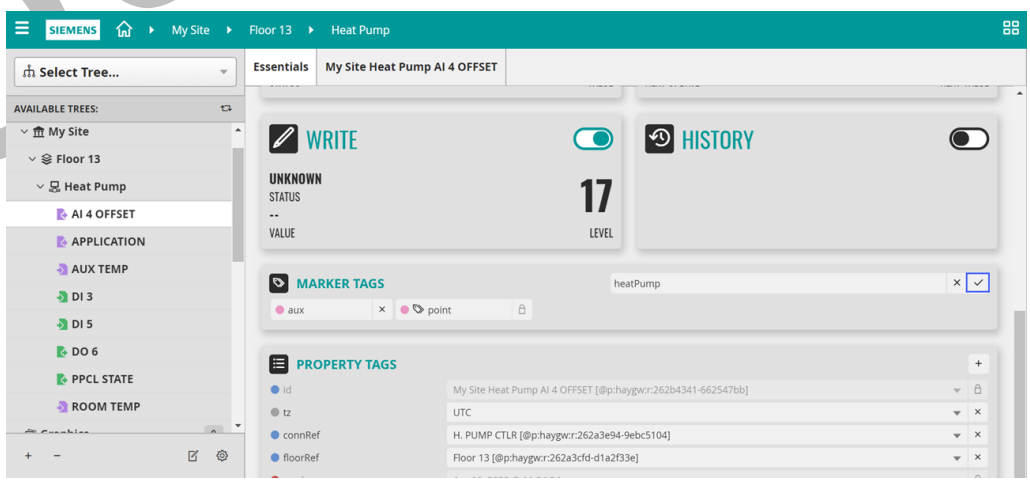
Marker tags are used to indicate the role of a data point.

To add marker tags:

1. In the Marker Tags section, select the **plus icon (+)** to expand the tags menu.



2. Enter or scroll to search for the tag(s) you want to attach to this data point.
3. Select the **check mark icon** to save these changes. Select **Save** to confirm the changes.



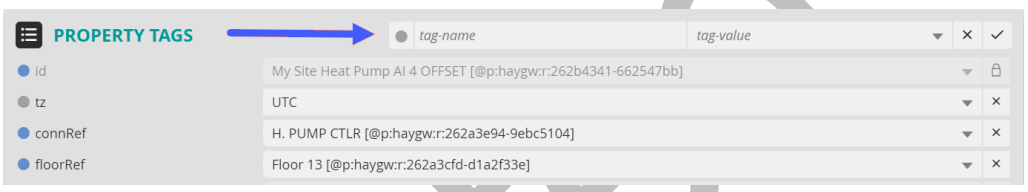
Property Tags

Currently, Operations Manager does not display these tags.

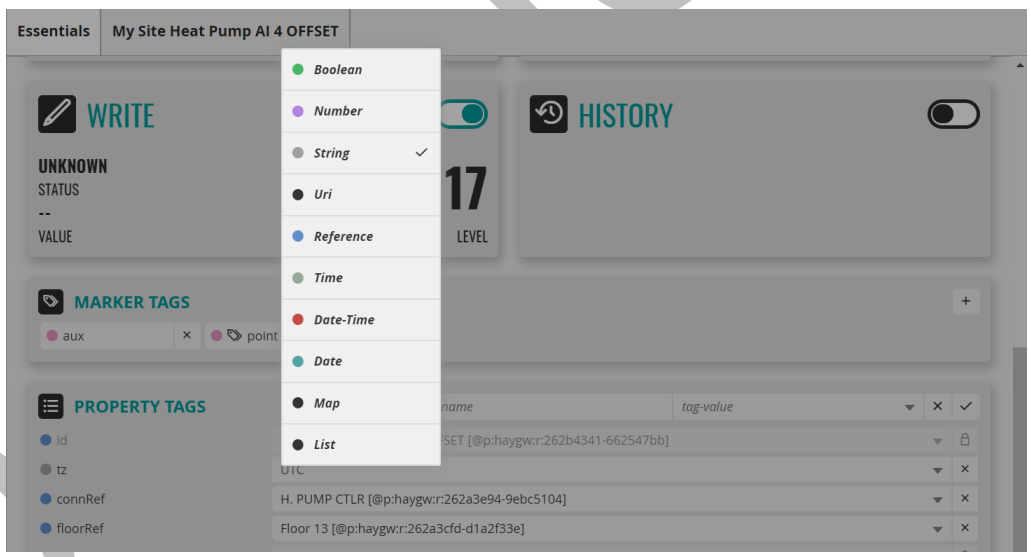
Tags added in Building Operator Discovery won't appear in Operations Manager until there's a change of value on that specific data point. As an Administrator, you can manually override the data point value to push the changes to Operations Manager, or restart the Connect device.

To add a property tag in Building Operator Discovery:

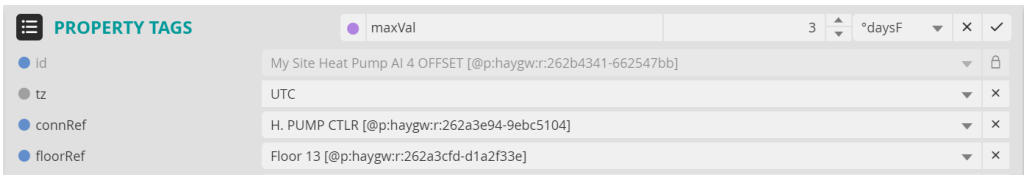
1. Select the + in the **Property Tags** section.
2. The default tag editor is a string type. To change the tag type, select the ● next to tag-name.



3. Select the appropriate property type to execute the type change.



4. Once you've selected the right property tag type, enter the tag-name or manually select the tag-name field to find the right tag name.
5. Set the appropriate value for the tag using the field provided.



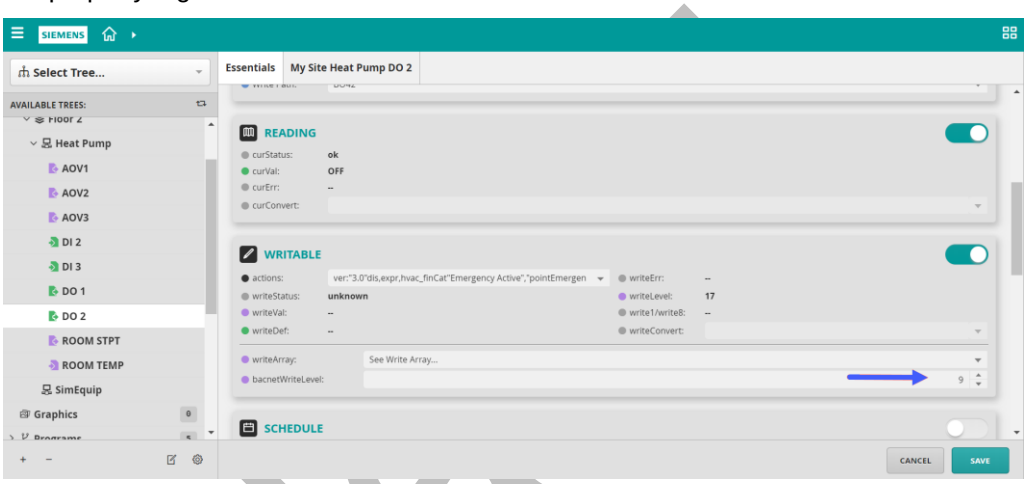
6. Click ✓ to confirm the change, then select **Save** to save the changes.

Adding Marker Tags in Bulk

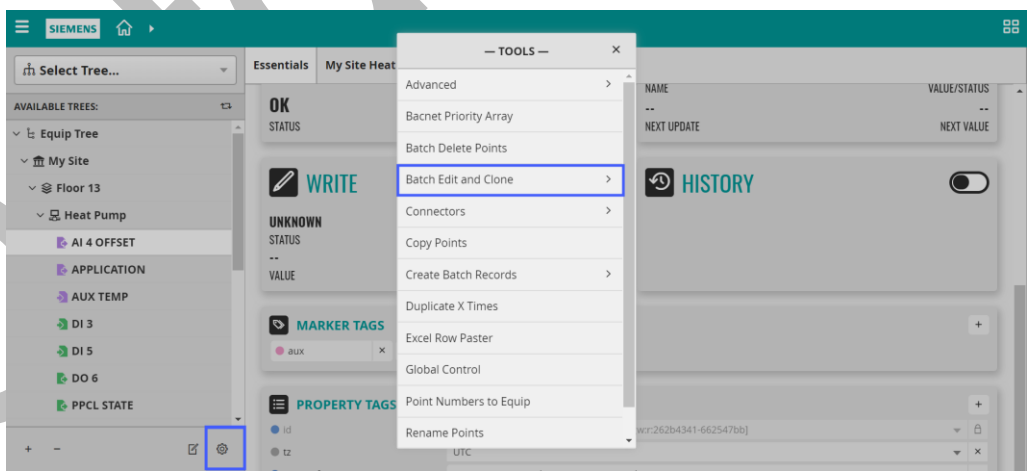
In Building Operator Discovery, you can batch edit tags assigned to points. This saves you from having to manually update point tags individually.

To batch edit tags, do the following:

1. In the **Available Equip Tree**, navigate to the appropriate device and set it as the current context.
2. Navigate to a specific point and change the value of a specific tag to the appropriate value. In the workflow below, we'll outline how to batch change the property tag *bacnetWriteLevel* to 9.



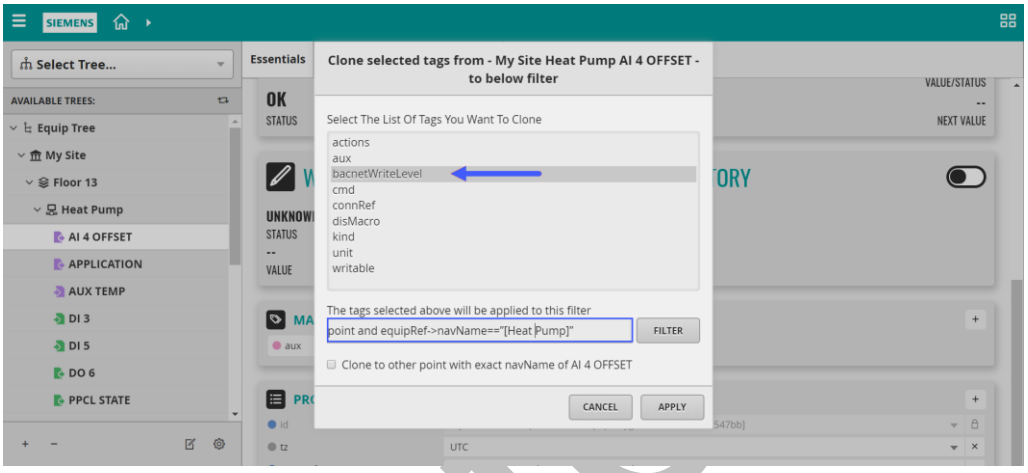
3. To clone this value across all points in a device, select the **settings icon**, below the Available Equip Tree.
4. Select **Batch Edit and Clone**, then **Clone Tags** in the ensuing pop-up.



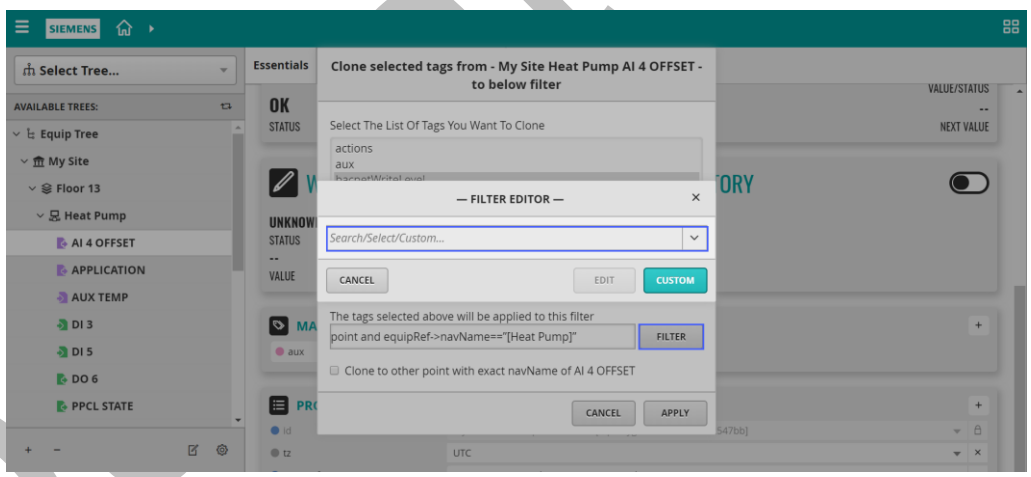
5. *(Required)* Select to select the appropriate tag in the list results. This populated list based on the object you selected in the Available Equip Tree.

6. *(Required)* Type to enter a filter query in the space provided. The tags you selected above are impacted by the search criteria in the filter field. For example, in the image below, the *bacnetWriteLevel* tag would be applied to any object that has a point tag, and the *equipRef* points to a *navName* that matches “Desigo Classic.”

   ⇨ Example: point and *equipRef->navName*==”[EquipName]”



7. *(Optional)* Select **Filter** to open the Filter Editor. Enter a custom filter.



8. *(Optional)* **To create a custom tag, select Custom in the Filter Editor pop-up.**
9. *(Optional)* Navigate to the appropriate device in the filter editor by expanding the drop-down fields. Find and select the right point and select **OK**.
10. *(Optional)* Edit the filter conditions, including Boolean search criteria (and vs. or), conditions, and tags. Select **OK** to proceed, and then **Confirm**. The search filter displays. Test the validity by clicking **Test**.
11. Complete the required fields, and then select **Apply**.

Meter Tags

An example of a marker tag, the “meter” tag is used to identify a data point as an accumulator and is applied to data points that are connected to accumulator type data points, such as cooling energy or cooling volume flow. Operations Manager provides

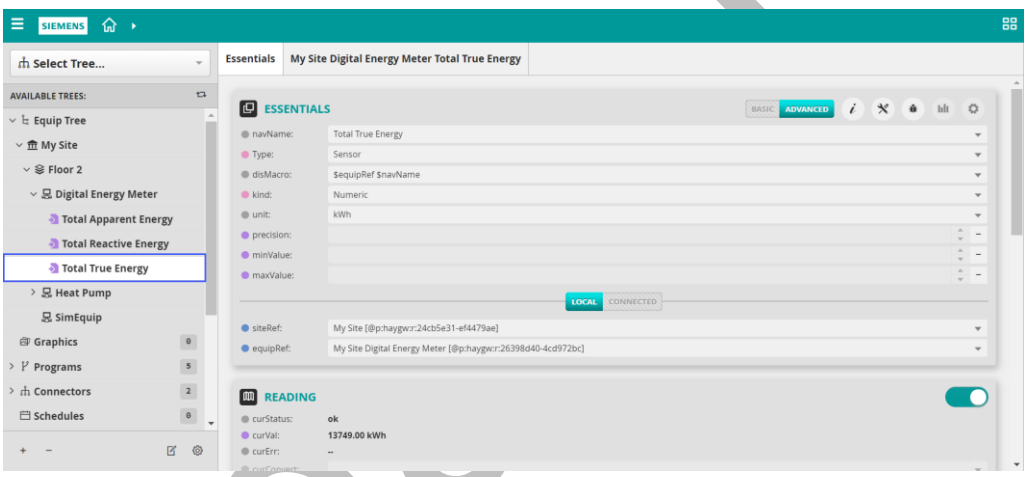
special views, such as bar charts, for viewing consumption over time for these data point types.

If a Siemens Intelligent Valve is being integrated into Operations Manager via Connect X300 instead of directly to the cloud, then the meter tag should be applied to the following four points:

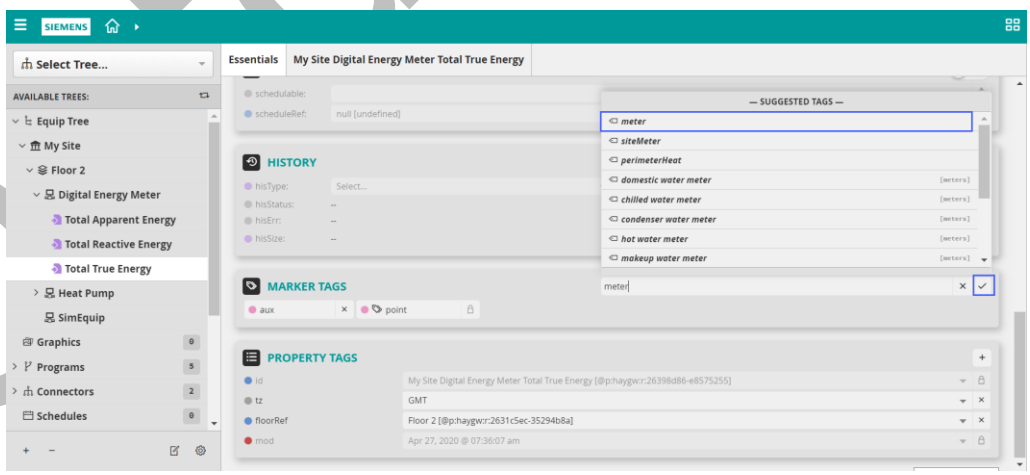
- Total cooling energy
- Total cooling volume flow
- Total heating energy
- Total heating volume flow

To add a meter tag in Building Operator Discovery:

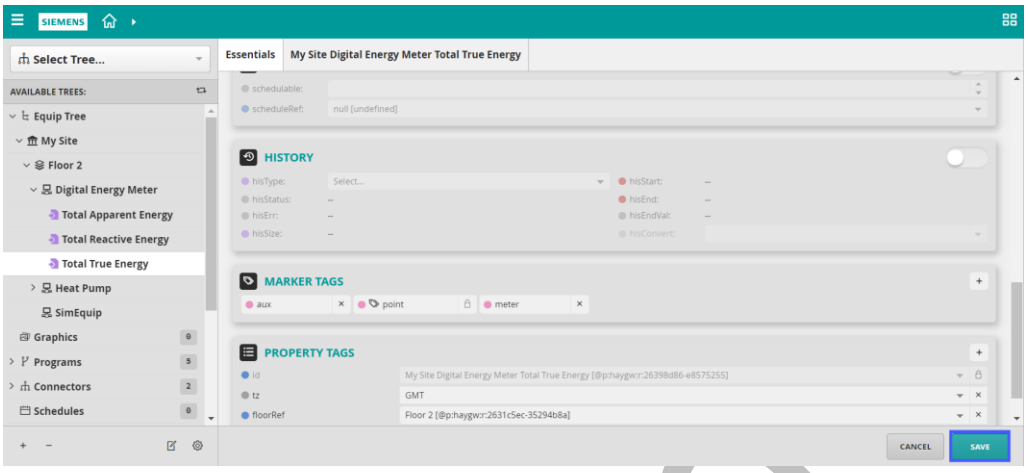
1. In the Meter Tags section, select the + to expand the tags menu.



2. Enter or scroll to search for the tag(s) you want to attach to this point. Select the **check mark icon** to save these changes.



3. Select **Save** to confirm the changes.



See the Appendix for a list of applicable Haystack tags.

5.10 Determining BACnet Write Priority for data points

BACnet priorities vary for different vendors. Siemens devices abide by the following BACnet priority array:

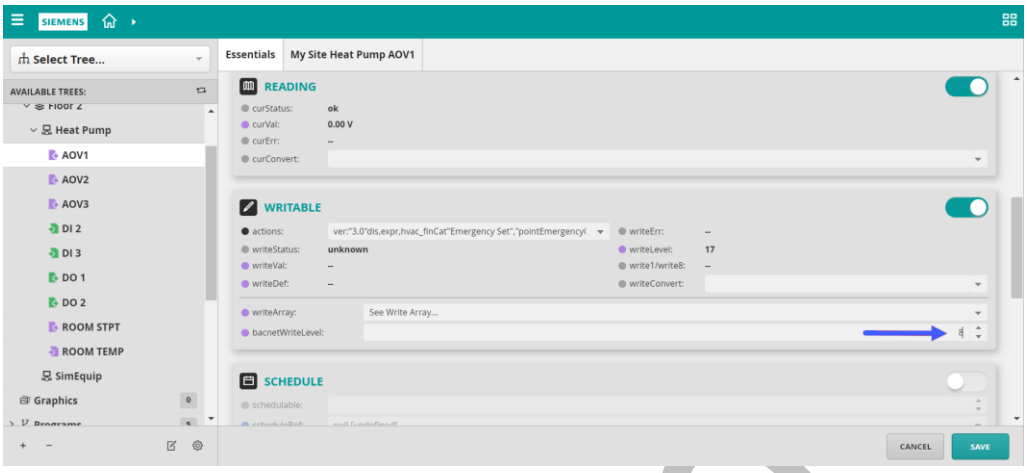
- **1-6:** Safety and protection
- **7:** Delay time on/off
- **8:** Manual operation
- **9-16:** Program mode

If you want Operations Manager to write to any value or output with a BACnet priority array, you must determine a write level. Building Operator Discovery has its own priority array, but it's important to set the BACnet write level appropriately for the end device.

Complete the following instructions to configure the write priority for BACnet points:

Changing Point Priority Individually

1. Find and select the appropriate value or output point beneath the device, in the Available Equip tree.
2. In the point editor, find the BACnet Write Level field.
3. Use the up or down arrows, or type to enter 8 for the field value. Any command you send to the Building Operator Discovery priority array will be sent out to the end BACnet device at slot 8, or manual override.



4. Select **Save** at the bottom of the editor to save your changes.

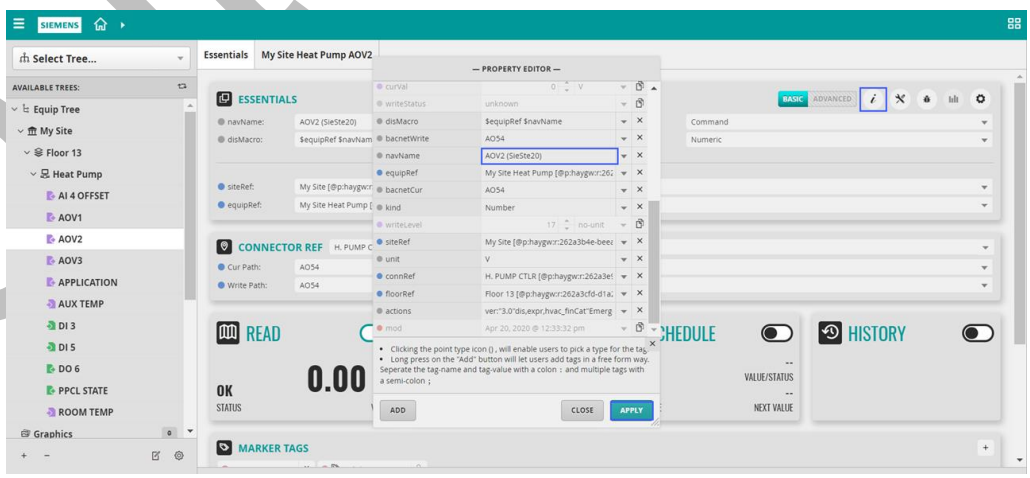
5.11 Restarting Connect device to update data point information

If you want to update data point information or change it for any reason, you're able to do so in Building Operator Discovery.

However, any data point information you update in Building Operator Discovery won't appear in Operations Manager until there's a change of value (COV) on that specific data point. To force a COV, as an Administrator, you must restart the Connect device. The example below outlines how to restart the gateway to force a COV.

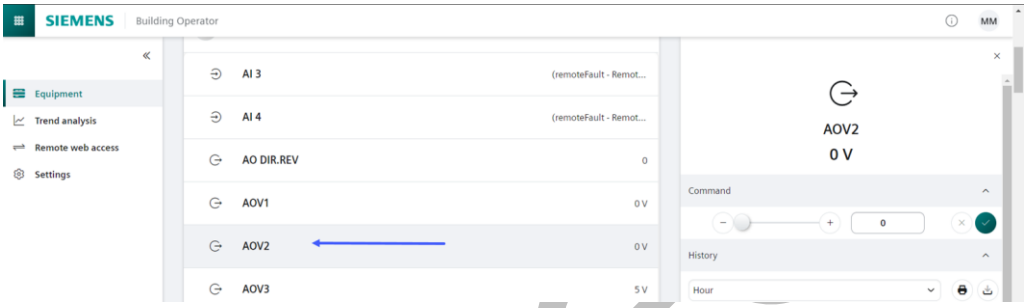
To restart the Connect device to update data points:

1. Navigate to the point you want to change in the Available Equip Tree (Site > Floor > Equipment > Data point) and type to enter the revisions in the appropriate field(s). In this example, we're adding *"(SieSte20)"* to the end of the AOV2 data point name.



2. Select **Apply** when finished.
3. In a separate browser tab, log in to Connect device. Use the same username and password you created earlier when you first activated the device.
4. Select the **Maintenance** tab in the navigation ribbon.

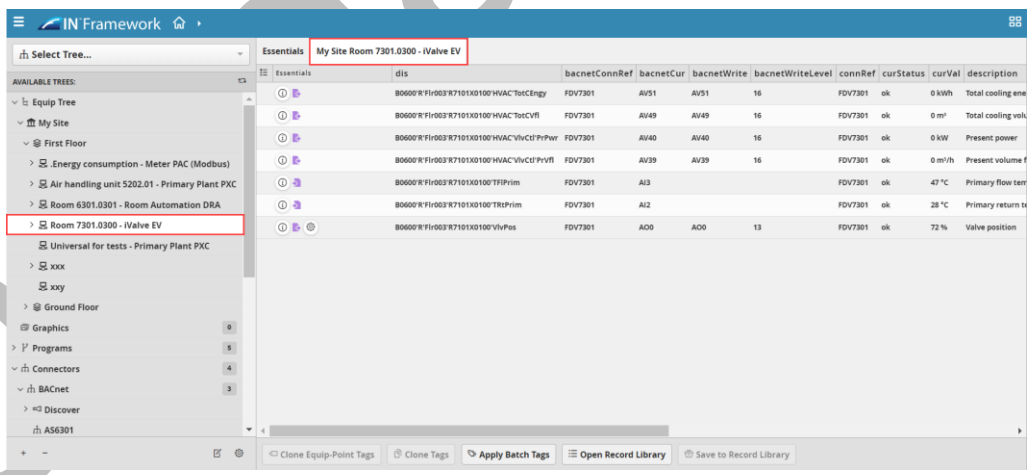
5. Select **Restart** in the **Device operation** section.
6. Select **Restart** in the confirmation pop-up.
   NOTE: You will likely lose and re-gain cloud connectivity during this process.
7. Log back into Building Operator Discovery to confirm the changes reflected after the Connect device restart.
8. Refresh the Site page in Operations Manager if the revisions don't automatically populate.



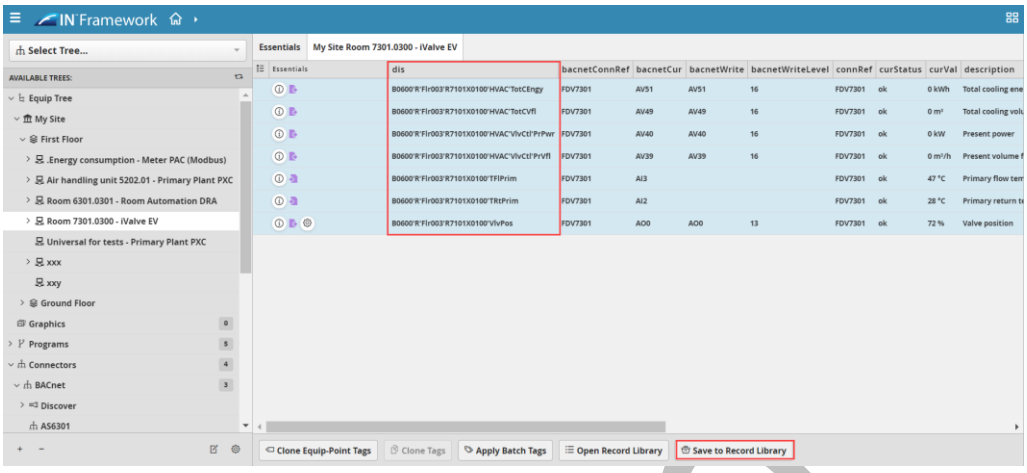
5.12 Creating and restoring a record library

This section will cover the process for creating and restoring custom point and equipment templates to reduce the configuration time of standardized building applications.

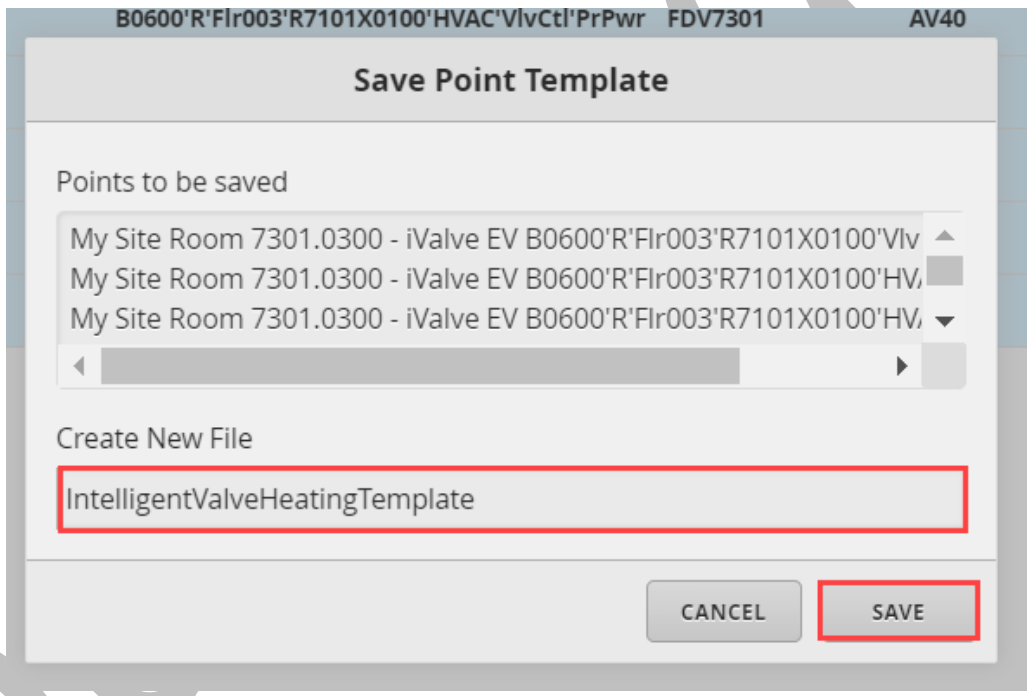
1. Commission one device with the data points named/tagged as desired.
2. Select the device in the equip tree and select the device tab on the main window.



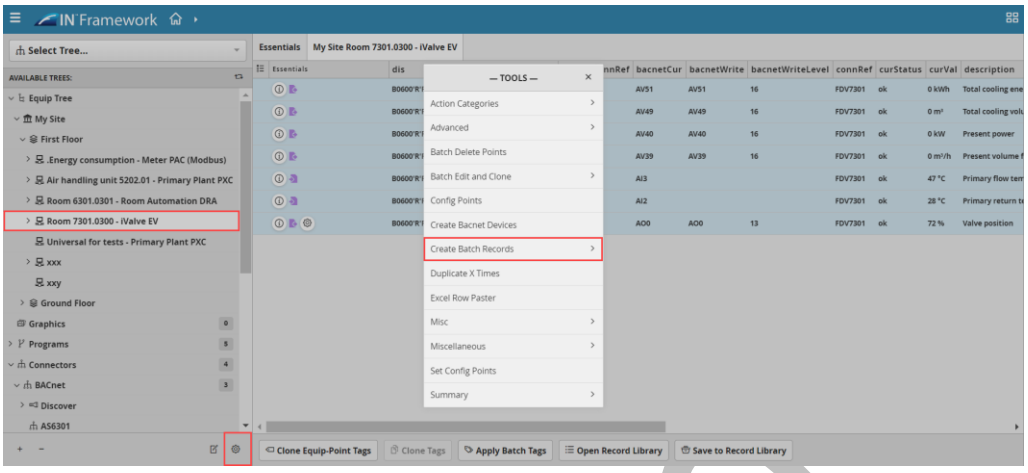
3. Select the data points you would like to add to your record library and click **Save to Record Library**.



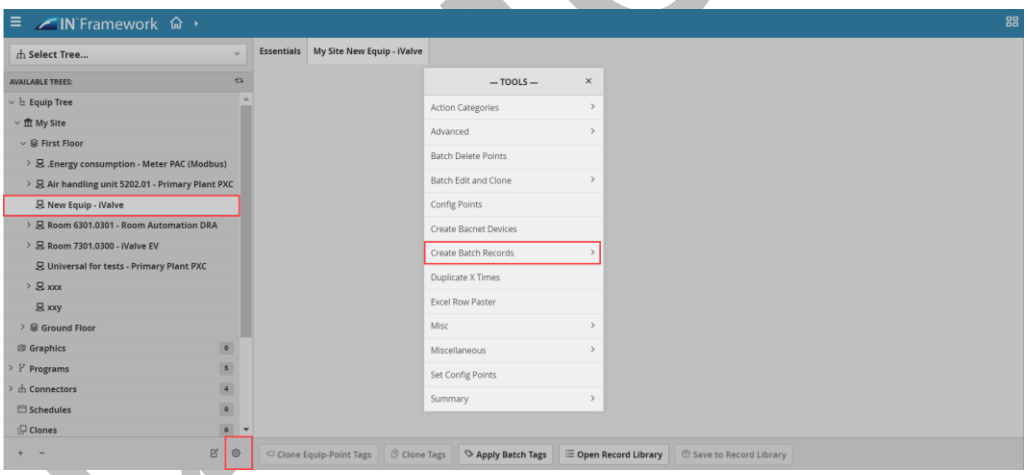
4. Fill in a descriptive name for the record library and click **Save**.



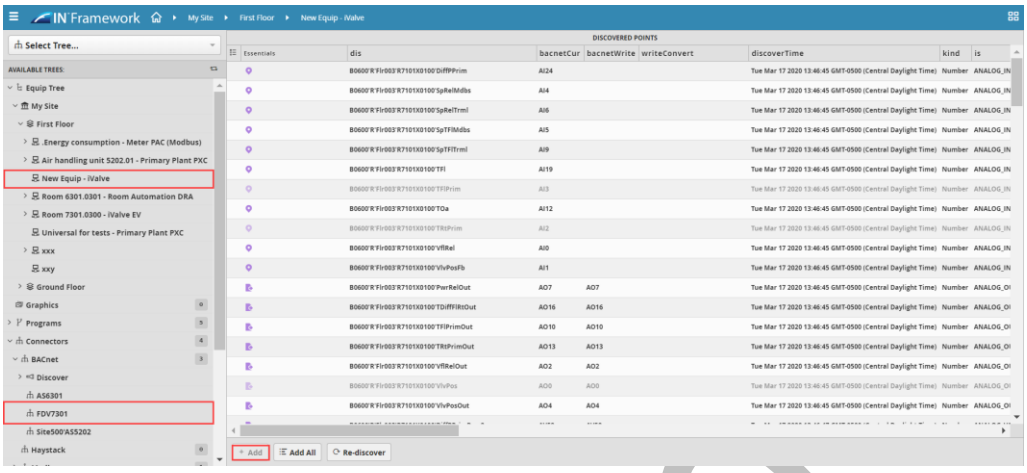
5. Select an equip in the Equip Tree and then select **Gear Icon → Create Batch Records → Download Saved Records**.



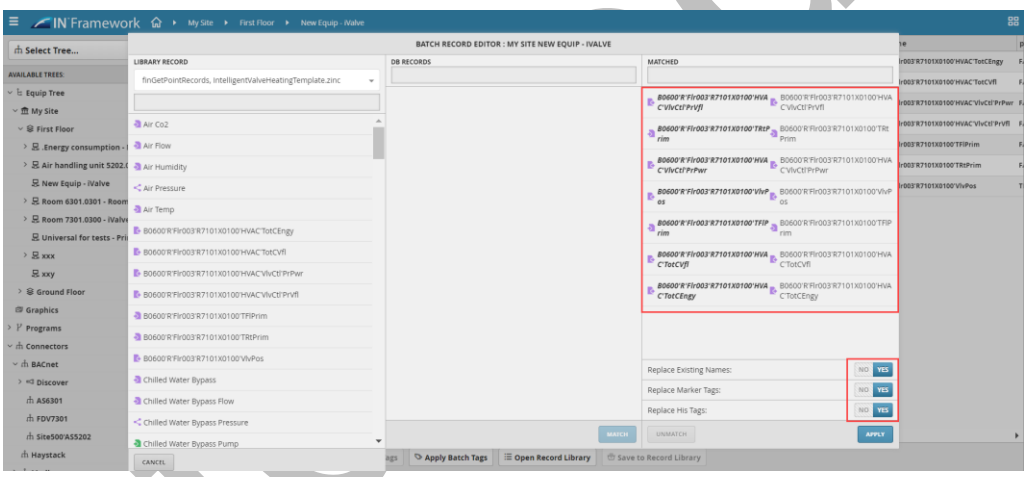
6. Select your record library from the drop-down box and click **OK**.
7. Click **Download**.
8. The file should now be placed in your browser's download location.
9. After commissioning a new site, you can then upload a record library. Create an empty equip, select it, and then select **Gear Icon** → **Create Batch Records** → **Upload Saved Records**.



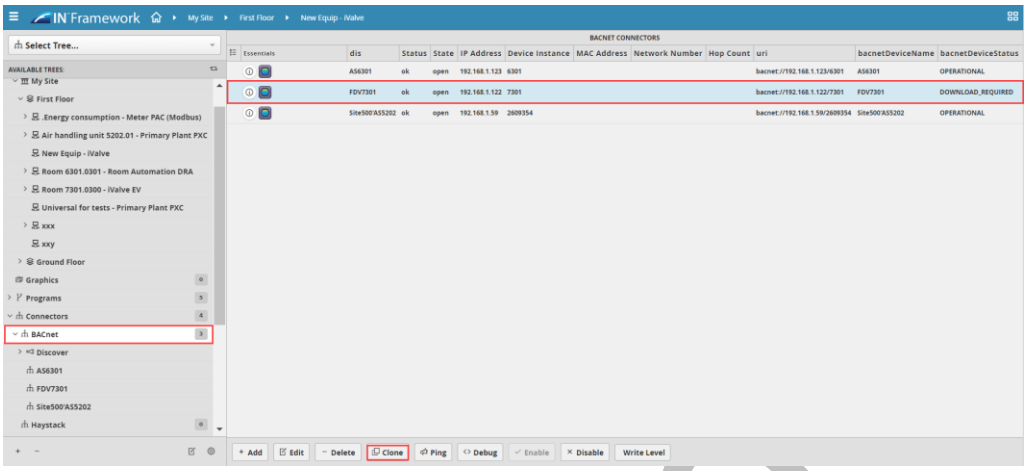
10. Click **Choose File** and browse to your saved record library, then click **Upload**.
11. Create your equip in the equip tree and make it the current context. Discover the appropriate connector's points and select the data points that were saved in your library. Add them to your new equip record.



12. When the Batch Record Editor window pops up, select your record library from the dropdown box in upper left corner.



13. The data points have been matched against your record library. Leave the three toggle switches to Replace Existing Names, Marker Tags, His Tags, and click Apply.
14. The data points are brought in with the correct name and tags. You can now clone your equip to other devices of the same type. Before cloning, the equip with the data points you had setup should be the current context. Select BACnet under Connectors in the Equip Tree.
15. Select the connectors you want to clone the equip to and click **Clone**.



16. If the equip was set to the current context, the Clone Options will be prepopulated with the correct settings. Click **Create**.
17. To see the new equip refresh the Floor View.

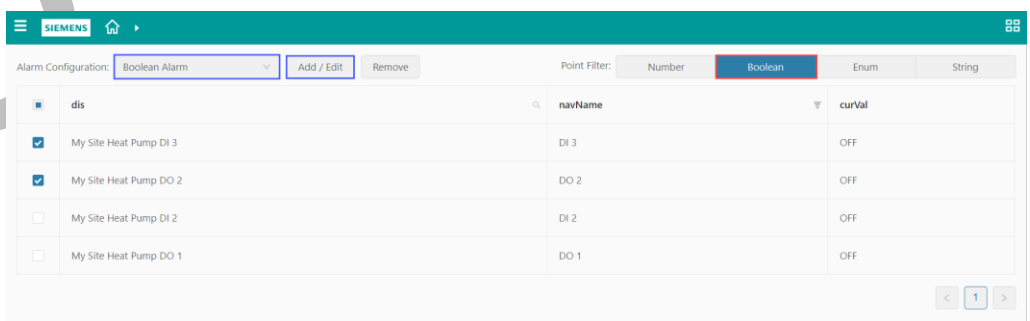
6 Configuring alarms in Building Operator Discovery

⚠ CAUTION	
	Only use Alarm Config to add, modify or remove alarms. COVs may be needed to ensure alarms are operating.

NOTE: To manage alarm events in the Operations Manager, application, go to the following for more information: Operations Manager User Guide > Equipment > Data point details > Event settings.

To configure alarms in Building Operator Discovery, please complete the following instructions:

1. Log in to Building Operator Discovery.
2. Select the menu icon in the top-left corner.
3. Find and select **Alarm Config**.
4. In Alarm Config, you can set alarm configurations for the points on your device. To do so, first select the appropriate **Point Filter** above the list results. Choose from **Number**, **Boolean**, **Enum** or **String** value.
5. Then, select the box next to the appropriate point name(s). A blue check mark will appear to the left of the data point name. When multi-selecting points, all data points are written with the same values. Furthermore, the **Select All** box only selects all the fields on the current list results page. If you have more than one page of list results, you must manually scroll and Select All for each page.
6. Next, find and select the appropriate configuration type from the **Alarm Configuration** drop-down menu.
7. Select **Add / Edit** to edit the point alarm values.



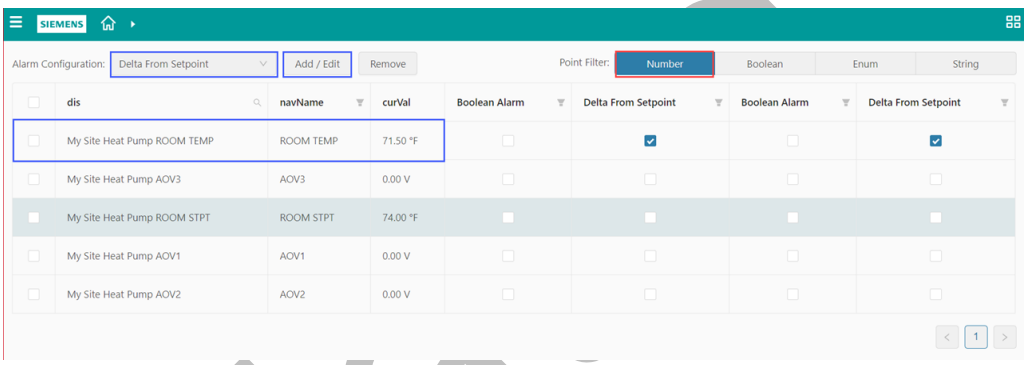
8. In the pop-up, change the value(s) in the fields provided to meet the parameters for your data point alarm. Select **OK** when finished.

The values you apply in this window are written to the data points selected in the Alarm Config list.

6.1 Configuring Number alarms

When configuring a Number alarm with a **Delta From Setpoint** value, follow the instructions below:

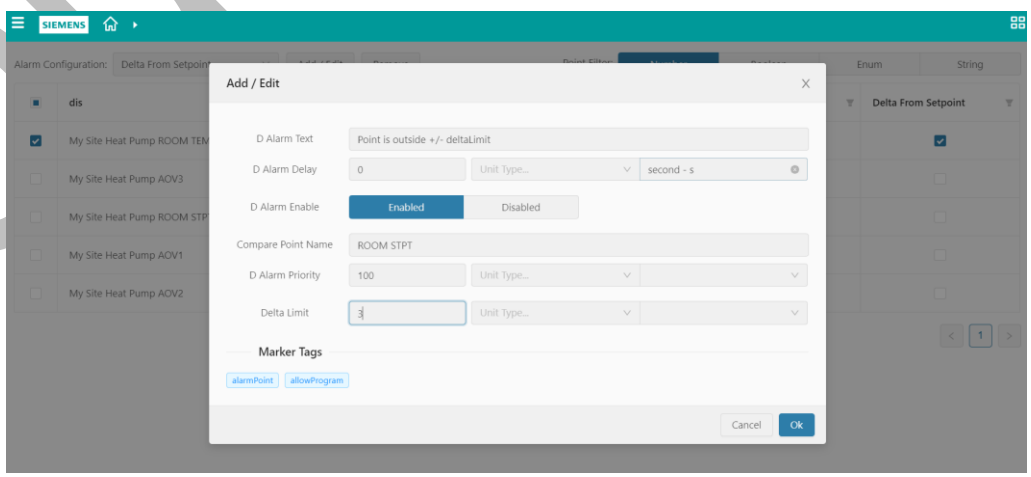
1. Open and launch **Alarm Config** from the Building Operator Discovery applications menu.
2. Select the Number point filter, select Number Alarm in the Alarm Configuration drop-down, then select Add/Edit.



3. In the pop-up, change the value(s) in the fields provided to meet the parameters for your point alarm. In the **Compare Point Name** field**,** copy and paste the **NavName** of the point you want to compare to. The data point you want to compare to, must exist within the same equip as the data point the alarm is being configured for.

The **Compare Point Name** field is case sensitive.

4. Select **OK** when finished.

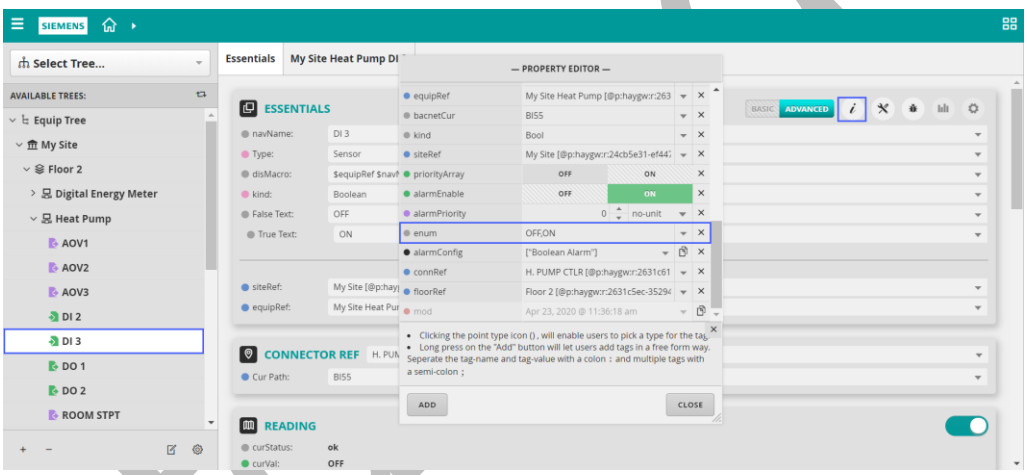


6.2 Configuring Boolean alarm state text

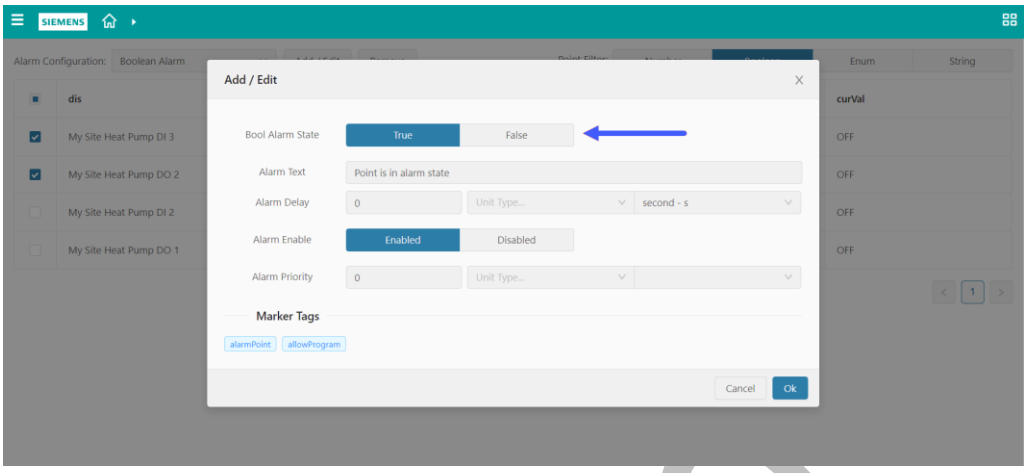
When configuring alarms in Building Operator Discovery, there are a few nuances you should be aware of. First, if you're configuring a Boolean alarm that has different values than "True" or "False," you need to know how to determine which of these binary values are true, and which is false.

To determine this, please complete the instructions below:

1. Open and launch DB Builder from the Building Operator Discovery applications menu.
2. Navigate to and select the **Boolean point** on the appropriate device, within the device hierarchy.
3. Find and select the **information icon (i)**, above the Point Name field.
4. Scroll down to find the **enum** property.



5. Once you've determined the correct value, navigate back to the Alarm Config application (we recommend opening two separate browser tabs).
6. Select the check box next to the appropriate point.
7. Select the **Boolean** data point filter, select **Boolean Alarm** in the Alarm Configuration drop-down, then select Add/Edit.
8. Select either **True** or **False**, depending on the alarm value you want to set.



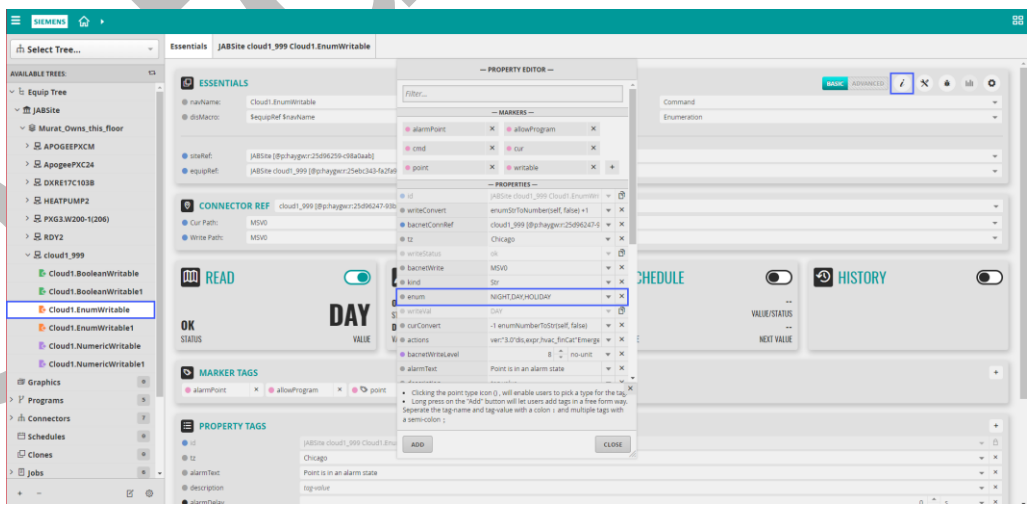
9. Select **OK** to proceed.

6.3 Configuring multi-state alarm state text

If you're configuring a multi-state alarm that has multiple values, you need to know which of these values to manually add to trigger an alarm.

To determine this, please complete the instructions below:

1. Open and launch DB Builder from the Building Operator Discovery applications menu.
2. Navigate to and select the multi-state point on the appropriate device.
3. Find and select the **information icon (i)**, above the **Point Name** field. Scroll down to find the **enum** property. To the right, you'll find the multi-state point values, listed in ascending order (0, 1, 2, 3, 4, etc.).

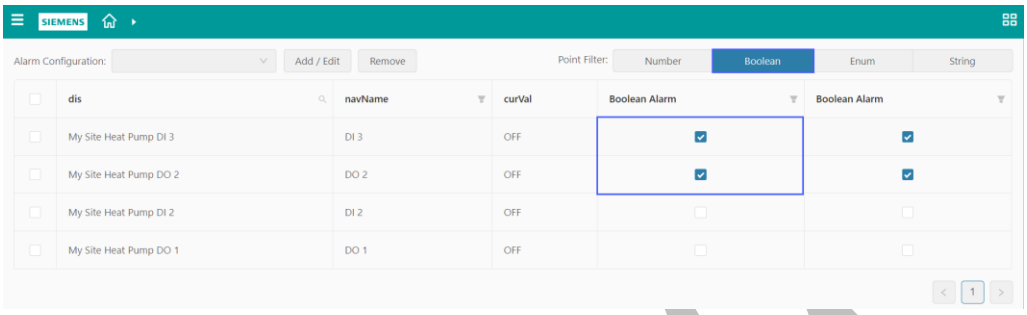


4. Once you've determined which value(s) you'd like to manually add, navigate to the **Alarm Config** application.
5. Enter the multi-state value in the **Alarm State Text** field. Note that spacing is critical in this field. If you enter a multi-state field value with incorrect spacing, the alarm will not work. Use a semicolon to separate state text.
6. Select **OK**.

6.4 Verifying alarms in Building Operator Discovery

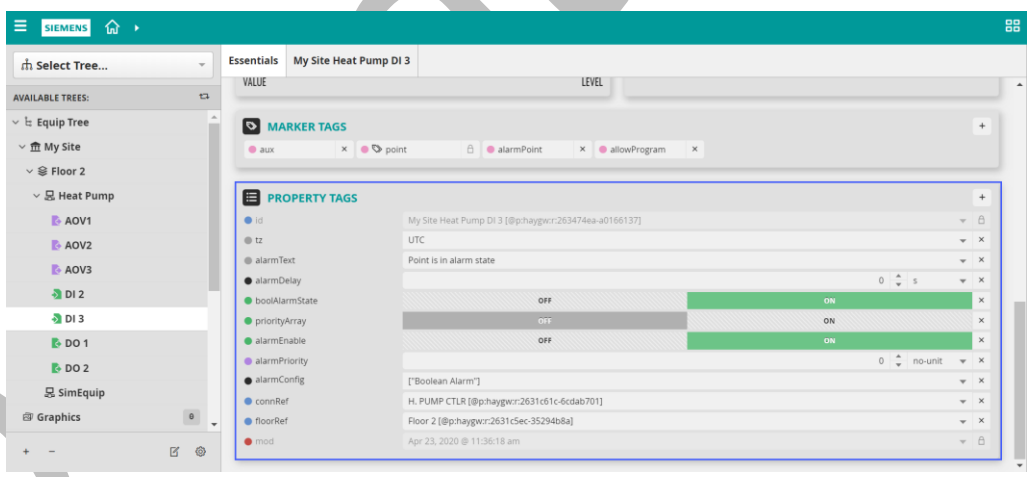
Once you've configured point alarms, you can verify that these changes executed in Building Operator Discovery. You can do so one of two ways:

First, after you select **OK** in the Edit/Add pop-up, you'll see a blue check box below a new [Alarm Type] Alarm column in the Alarm Config list results.



However, if you're interested in seeing which value was configured to set the alarm, follow the instructions below:

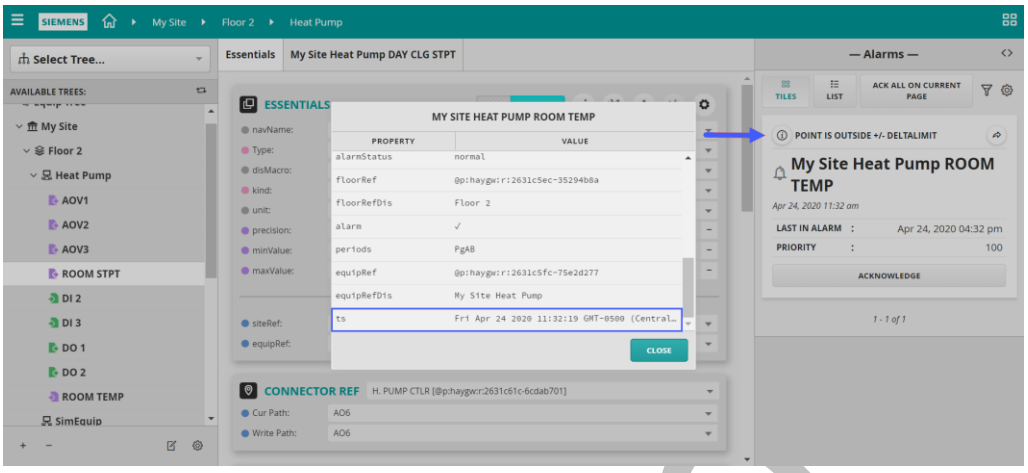
1. Navigate to and launch **DB Builder** from the **Applications** menu.
2. Find and select the appropriate point on the device within the site hierarchy.
3. Beneath **Property Tags**, you'll note new tags were created. These tags outline various Alarm Config parameters, or the values that you just manually set.



6.5 Viewing alarms in Building Operator Discovery

Once you've set parameters for your alarm, you can then view the alarm status and associated tags in Building Operator Discovery (pending the alarm has gone off). To do so:

1. Select the menu icon in the top-left corner, and then select **Alarms**.
2. To view the point alarm details, select the **(i) information icon** directly above the point name.
3. Here you'll find the point alarm details and associated tags. For example, you can see the timestamp of when that specific point went into alarm (as outlined below).



4. Select **Close**.

6.6 Viewing alarms in Operations Manager

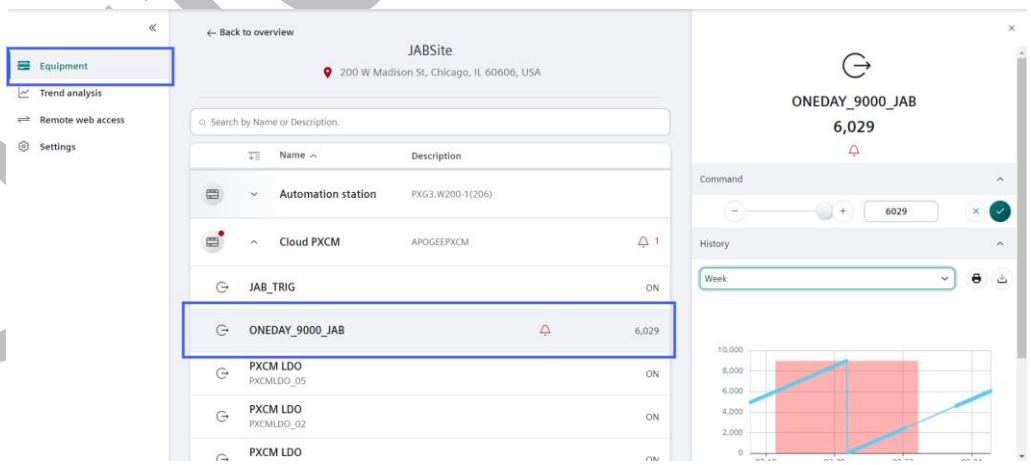
Once a data point goes into alarm in Building Operator Discovery, that state also reflects in Operations Manager.

Operations Manager displays when a data point is in and out of an alarm state.

To view a data point an alarm state, complete the following instructions:

▷ In Operations Manager:

1. Select the site with the **Alarm** 🔔.
2. Go to **Equipment**.
3. Select the device with the alarm.
4. Select the point name that has the **Alarm** 🔔.



7 Backing up and restoring a Building Operator Discovery database

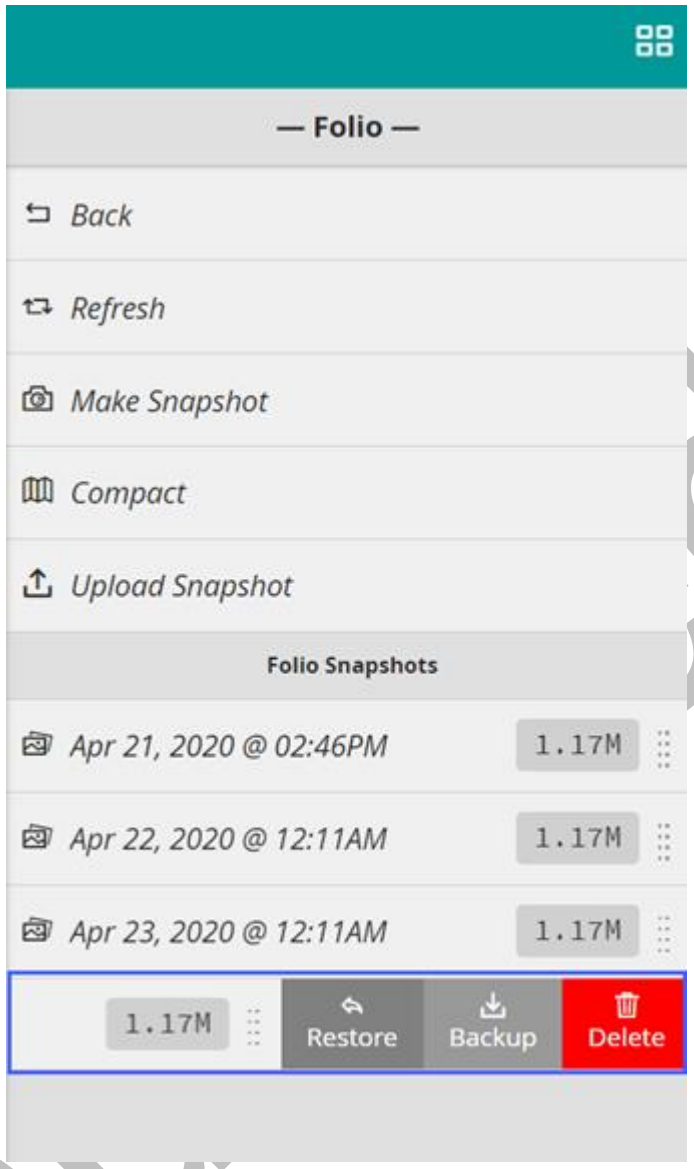
In Building Operator Discovery, you can back up and/or restore a database you have already created. This is useful if you want to save engineering configurations and data to apply on a replacement Connect device (for example: due to device damage).

NOTE: Generating a backup is a general safeguard before starting any type of project/device upgrades and is not a requirement.

7.1 Creating a backup

The following backup steps apply to Building Operator Discovery projects in general. For projects using Modbus connectors there is an additional procedure to back-up the **Register Maps**. See, *Modbus Connectors: Backing-up the register map(s)*.

1. From the menu, select **Folio** in the Building Operator Discovery menu. Select **Menu**.
   For more information on Folio in Building Operator Discovery, see the Building Operator Discovery documentation.
2. In the Folio pane, select **Snapshots**.
3. From the menu, select **Make Snapshot**.
4. Once the loading bar reaches 100 percent, your database snapshot displays directly below the menu in the Folio pane.



5. Select the Folio snapshot name you want to back up to your computer, and then select one of the following:
   - **Restore:** This will upload the same version of the database you created when you made a snapshot. See below for instructions on how to properly restore.
   - **Backup:** This will save the database locally to your device in a Zip file.
   - **Delete:** This will remove the folio snapshot of the database.
6. Select **Backup**. Save the zip file to a safe location on your computer for a later restore.
7. If you are creating a backup of a project using Modbus connectors, to complete the backup, go to the next procedure: *Modbus Connectors: Backing-up the register maps(s).*
8. If you are not creating a backup of a project using Modbus connectors, your backup is complete.

Modbus Connectors: Backing-up the register map(s)

After creating and saving the project snapshot in Building Operator Discovery, do the following additional steps to save and backup the Register Map source for a Modbus connector:

NOTE: The CSV backup file created in this procedure must match the current name of the Register Maps for the Modbus devices in your project.

1. From the DB Building project tree, select **Connectors > Modbus > Register Maps > <MyMap>**.

   NOTE: <MyMap> is the name of a register map for one of the Modbus devices in your project.

2. Select **Edit Source** at the bottom of the pane.

   ⇨ The Edit Source dialog box displays.

3. Copy the Register Map source to the clipboard.

4. Save the clipboard data to a CSV file, named: <My*Map>.csv.*

   NOTE: "MyMap" is the name of the register map for the Modbus device selected in *Step 1*.

5. Repeat for each register map as required.

6. Keep the CSV file(s) together with the project snapshot file.

⇨ When you are ready to restore your project backup, you will also have to restore the register map file(s). See, *Modbus Connectors: Restoring the register map(s).*

7.2 Restoring a backup

The following steps to restore a snapshot from your computer apply to Building Operator Discovery projects in general. For projects using Modbus connectors, you will also need to restore the **Register Maps** CSV file(s), you created when you created the project backup. See *Modbus Connectors: Backing-up the Register Map(s).*

1. Select **Folio**. Select **Menu**, then **Snapshots**.

2. Select **Upload Snapshot**.

3. Choose the zip file that you previously backed up. The snapshot displays under **Folio snapshots**.

4. In the restored snapshot, select **Restore**.

   ⇨ The restore is executed.

5. If you have also backed-up a Modbus register map, see the procedure below to restore the Modbus register map.

6. Once you have restored all your backups, navigate to the Connect device and select the **Maintenance** tab.

7. Select **Restart** and wait approximately 10 minutes to execute a proper restore in Building Operator Discovery.

Modbus Connectors: Restoring the register map(s)

▷ You have a backup of your Modbus **Register Maps**. See *Modbus Connectors: Backing-up the register map(s).*

▷ You have completed a project restore in the previous procedure.

1. From the **DB Building** project tree, select **Connectors > Modbus > Register Maps**.
2. Select the **Upload** button at the bottom of the pane.

   ⇨ The Upload Register Map dialog box displays.
3. From the dialog box, select **File**.
4. Find and select the CSV backup file (our example: MyMaps.csv). See, *Modbus Connectors: Backing-up the register map(s)*.
5. Repeat Steps 1-4 for each CSV backup file.
6. When you have restored all Modbus CSV files, return to Step 6 in the previous procedure to restart the Connect device to complete the restore process.

8 System limits

For ideal performance, ensure that your system is configured with the following limitations in mind:

- Maximum number of regular and AUX data points per Connect device: 500
- Maximum number of COVs per Connect device: 200/minute
- Maximum number of alarms per Connect device: 200/minute

For devices that do not support COVs, Building Operator Discovery will poll the network according to its default tuning policy. On slow networks, such as MSTP, this tuning policy may not be ideal. Refer to the Building Operator Discoverydocumentation for instructions to configure a custom tuning policy

AUX data points and system limits

Unlike regular data points, AUX data points do not collect historical information and are identifiable by an “aux” tag. However, AUX points are counted in the maximum number of data points per Connect device.

BACnet

Building Operator Discovery supports BACnet services to discover, subscribe, read, and write the main value of BACnet analog, binary, multi state, and other object types. The following object types are available:

- BACnet Analog Input
- BACnet Analog Output
- BACnet Analog Value
- BACnet Binary Input
- BACnet Binary Output
- BACnet Binary Value
- BACnet Multi state Input
- BACnet Multi state Output
- BACnet Multi state Value
- BACnet Command
- BACnet Accumulator
- BACnet Large-Analog-Value
- BACnet Loop
- BACnet Positive-Integer-Value
- BACnet Pulse Convertor
- BACnet Averaging
- BACnet Integer-Value
- BACnet Load-Control

Modbus

Building Operator Discovery supports Modbus function codes to read/write single Modbus coils and register.

- Modbus FC01 Read Coils
- Modbus FC02 Read Discrete Register

- Modbus FC03 Holding Register
- Modbus FC04 Input Register
- Modbus FC05 Write Single Coil
- Modbus FC06 Write Single Register

nHaystack

Building Operator Discovery supports Haystack REST API services to discover, read, and write Niagara framework-based control point objects.

- nHaystack Boolean Point
- nHaystack Boolean Writeable
- nHaystack Numeric Point
- nHaystack Numeric Writeable
- nHaystack Enum Point
- nHaystack Enum Writeable

Edition notice

Technical specifications and availability subject to change without notice.

Any references to companies or persons are for purposes of illustration only and are not intended to refer to actual individuals or organizations.

Edition:

Document ID: A6V11881627_en--_t

Cybersecurity disclaimer

Siemens provides a portfolio of products, solutions, systems and services that includes security functions that support the secure operation of plants, systems, machines and networks. In the field of Building Technologies, this includes building automation and control, fire safety, security management as well as physical security systems.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art security concept. Siemens' portfolio only forms one element of such a concept.

You are responsible for preventing unauthorized access to your plants, systems, machines and networks which should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place. Additionally, Siemens' guidance on appropriate security measures should be taken into account. For additional information, please contact your Siemens sales representative or visit https://www.siemens.com/global/en/home/company/topic-areas/future-of-manufacturing/industrial-security.html.

Siemens' portfolio undergoes continuous development to make it more secure. Siemens strongly recommends that updates are applied as soon as they are available and that the latest versions are used. Use of versions that are no longer supported, and failure to apply the latest updates may increase your exposure to cyber threats. Siemens strongly recommends to comply with security advisories on the latest security threats, patches and other related measures, published, among others, under https://www.siemens.com/cert/ => 'Siemens Security Advisories'.

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
www.siemens.com/buildingtechnologies