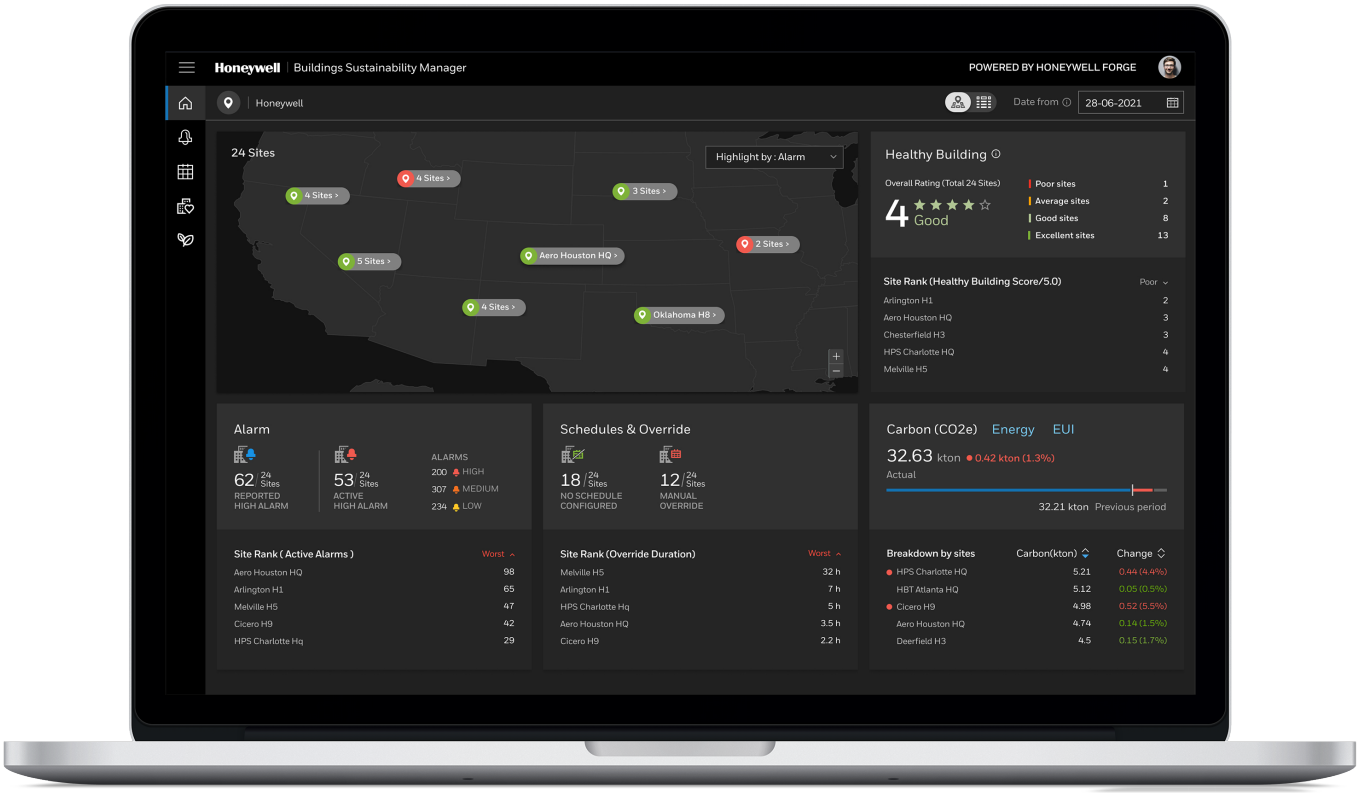
Honeywell

# Forge Sustainability+ for Buildings




# Configuration and Onboarding Guide

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# TABLE OF CONTENTS


## Chapter 1 - Introduction ..... 1

Prerequisites ..... 1
Actions for HBT DigiOps ..... 1
Actions for HCE DigiOps ..... 2

## Chapter 2 - Organization and User Creation ..... 3

Customer Onboarding Workflow ..... 3
Onboarding a Site having Forge Connect ..... 4
Create a New Organization ..... 4
Add New Site to an Existing Node in the Hierarchy ..... 7
Update the Hierarchy Nodes/Site Nodes/Organization Details ..... 8
Delete Hierarchy Node/Site Nodes ..... 9
Adding New Users ..... 10
Add Metadata ..... 12
Onboarding a Site having EBI Cloud Connector ..... 16
Onboarding a Site having Niagara or JACE Device ..... 20
Create a New Organization ..... 20
Add New Site to an Existing Node in the Hierarchy ..... 23
Update the Hierarchy Nodes/Site Nodes/Organization Details ..... 23
Delete Hierarchy Node/Site Nodes ..... 23
Adding New User ..... 23
Add Metadata (Confirm) ..... 23
Adding Subscription for Organization and Site ..... 24
User Sign in ..... 27

## Chapter 3 - Carbon and Energy Management ..... 28

Enable Site Performance ..... 28
Pre-requisite ..... 28
Enable the Feature Flag ..... 28
Create Variable in Octopus ..... 30
Search Variable in Octopus ..... 31
Utility Services ..... 32
Create Utility Service ..... 32
Utility Service Scenarios ..... 33
Incorrect Credentials ..... 34
Password Expired ..... 34
Account Mismatch ..... 35
Deactivate Account ..... 36
Connectivity Error ..... 36
Energy Settings ..... 37
Alarms and Thresholds ..... 38
Alarm Configurations ..... 38
Configure Alarm ..... 39

## Chapter 4 - Intelligent Building Optimization ..... 41

Sequence of Operation Update for IBO BMS-AHU ..... 43
Prerequisites ..... 43
Control Strategy Update for IBO ..... 44
Update to the Control Loops ..... 44
Update to the Sequence of Operations ..... 45
Design Notes ..... 45
Third-Party Controllers ..... 46

## Chapter 5 - Energy Optimization ..... 47

## Chapter 6 - Power Manager ..... 48

Connecting Experion to Niagara ..... 48
Pre-requisite ..... 48

For Nigara ....48
For Experion ....48
Creating a Station....49
Create Station using Default Template....51
Pre-requisite ....51
Commissioning ....54
Create Client Certificate....54
Driver Configuration....56
Add a Device in OpcUaNetwork....60
Discover Points ....61
Grouping of Points ....64
Onboarding ....65
Connecting Experion to EBI....67
Pre-requisite....67
Creating a Station....67
Commissioning ....70
Create Client Certificate....70
Driver Configuration....72
Add a Device in OpcUaNetwork ....72
Discover Points ....72
BACnet Driver Configuration....72
Convert to BACnet Points ....73
Admin Rights to BACnet User ....74
Discover Niagara Station as BACnet device....75

CHAPTER

# 1 INTRODUCTION

Honeywell Forge Sustainability+ for Buildings powered by Honeywell Forge is a ready-now autonomous controls platform with a suite of applications to help customers address the environmental impact of their building to improve their improving carbon-reduction goals.

This configuration and onboarding guide assist new users with deploying Honeywell Forge Sustainability+ on their facility. New users and organizations are created using the onboarding portal.

## Prerequisites

### Actions for HBT DigiOps

Step 1. Write an email to the HCE DigiOps team via email ID: **connectedbuildingsupport@honeywell.com** to get the below inputs required

- Provide input details in the ticket: Customer name, address, Site name, and Site address.
- Request Find API Permissions enabled for the customer (you need to provide client ID to enable permissions).
- Request Customer Id in HCE Admin Portal (for example, id8829c5f4-4767-46b2-a913-59a0efa2381f).
- Request Admin Portal Modal Export file.
- Request System GUID of gateways associated with the requested site.

Step 2. Raise an SPO ticket at the system level to access the system type of Forge Connect and EBI. (you need to provide a client ID) to enable permissions. This could be one time activity since we are requesting permissions at a system level.

## Actions for HCE DigiOps

Step 1. Check if the customer/Site exists in the HCE admin portal.

Step 2. If Yes, Check if the customer exists on EOM.

- Customer is on EOM – Proceed to the next steps.
- Customer is not on EOM – HCE DigiOps to initiate the Migration to EOM and proceed with the next steps.

Step 3. If No, HCE DigiOps to initiate the process of customer onboarding for EBI or Forge Connect sites.

- In this process, HCE DigiOps will involve the FSP role (site contact) and AOC role (HCE team) to support the onboarding.
- By default, new customers are to be created on EOM.

Step 4. Share the below details with HBT DigiOps and close the ticket once the customer or site data is on EOM.

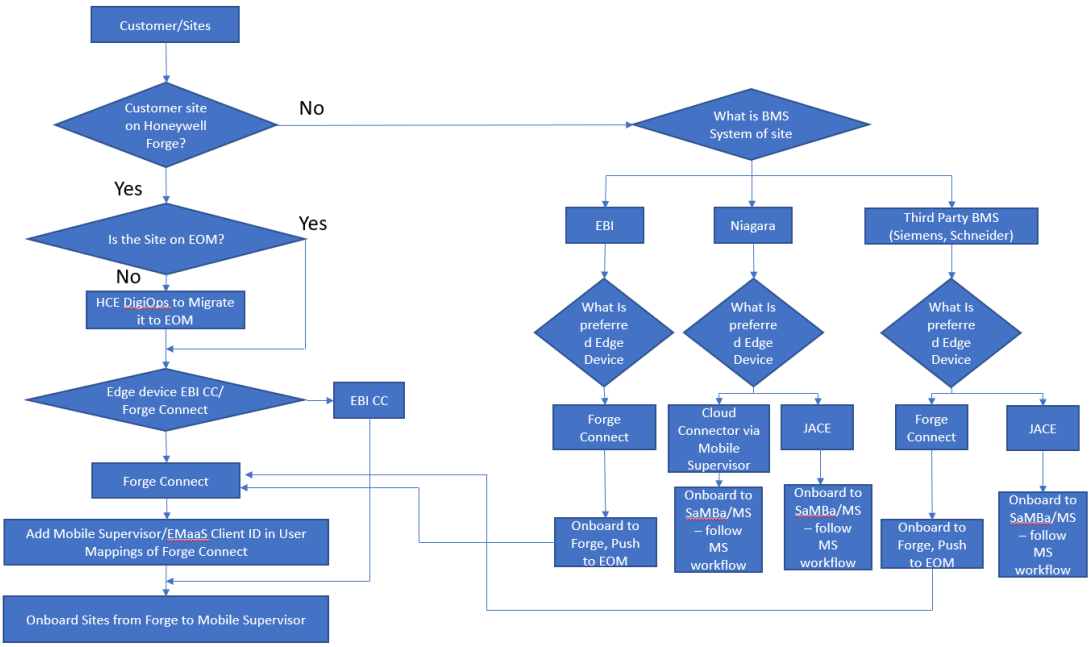
- Permissions will be enabled for Find API to the Customer.
- Admin Portal export file.
- System GUID of gateway of the requested site.
- Customer ID
- Single Line Diagram (indicating meters hierarchy) collected from the site.

CHAPTER

# 2 ORGANIZATION AND USER CREATION

## Customer Onboarding Workflow

Follow the below flowchart for the different scenarios of user onboarding:



# Onboarding a Site having Forge Connect

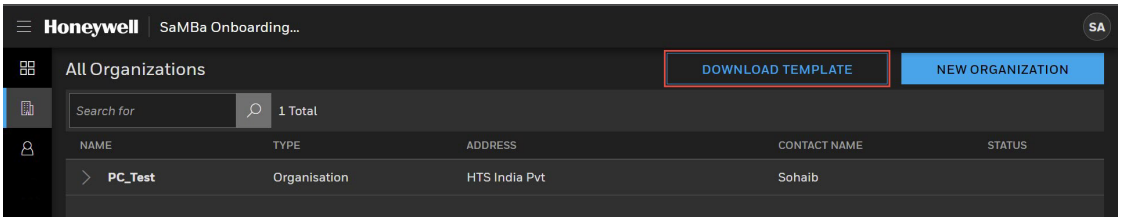
## Create a New Organization

Follow the below-mentioned steps to onboard sites from forge:

Step 1. Sign in to the Honeywell Onboarding Portal.

Step 2. Click **DOWNLOAD TEMPLATE** on the title bar.
A Microsoft Excel file will be downloaded.

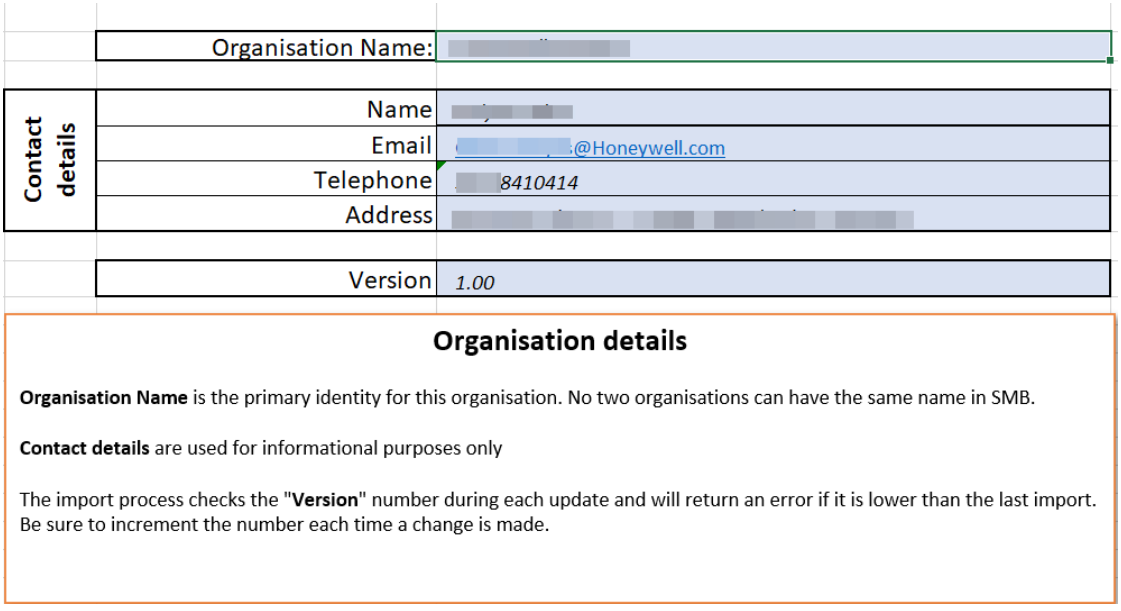
***Note:*** *You need Root User access to create an organization.*



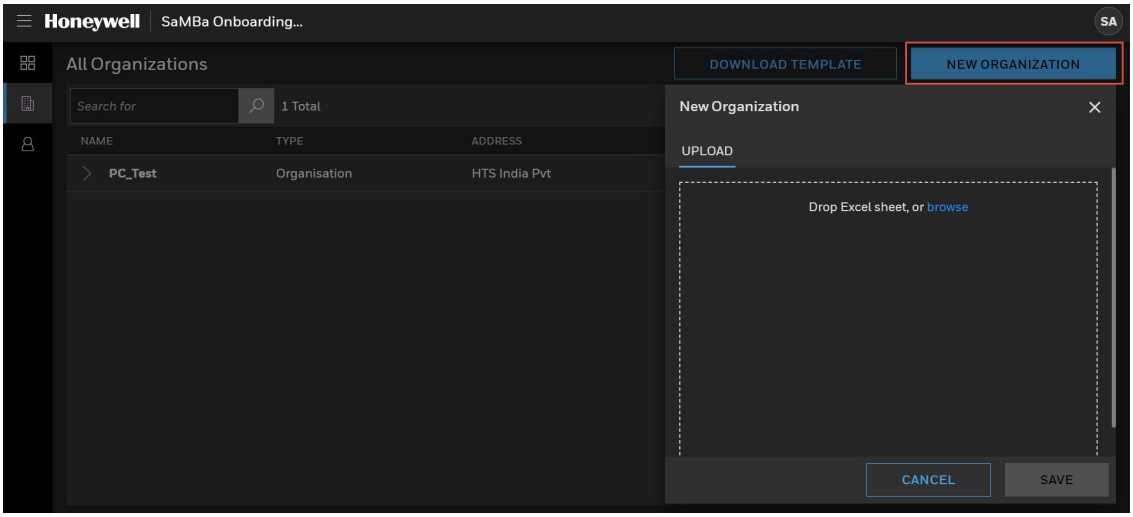

Step 3. Go to the **Organization** tab and fill in the following data:

a. Organization Name
b. Name: Contact person of the organization
c. Email: Email ID of contact person
d. Telephone
e. Address: Site address

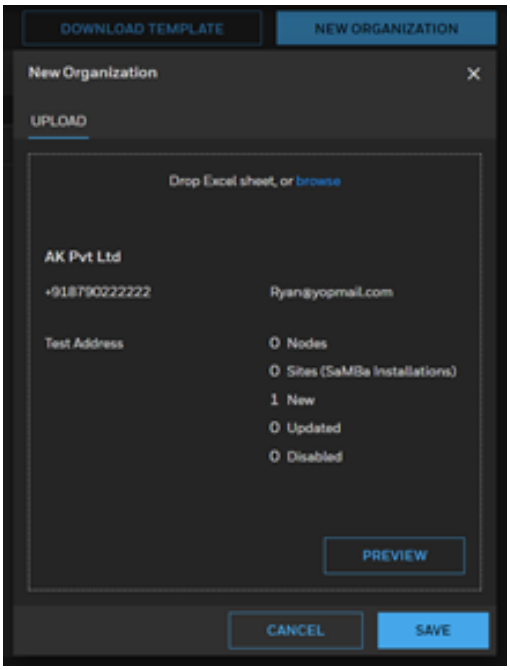
***Note:*** *All the fields in the Excel file are mandatory, and in case of missing information, the system will not upload the template file.*

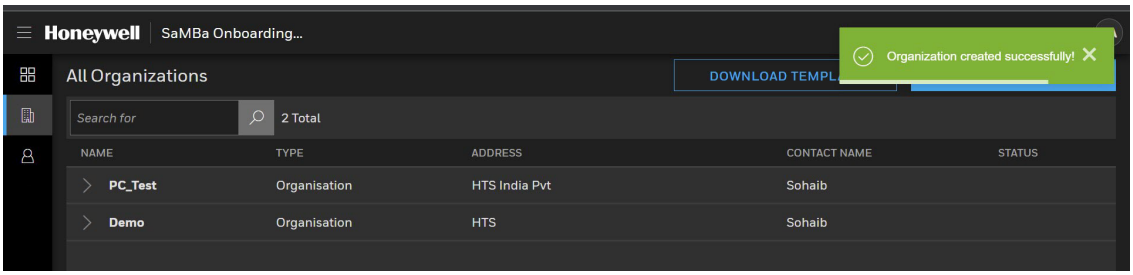


Step 4. Click **NEW ORGANIZATION** and then upload the template.

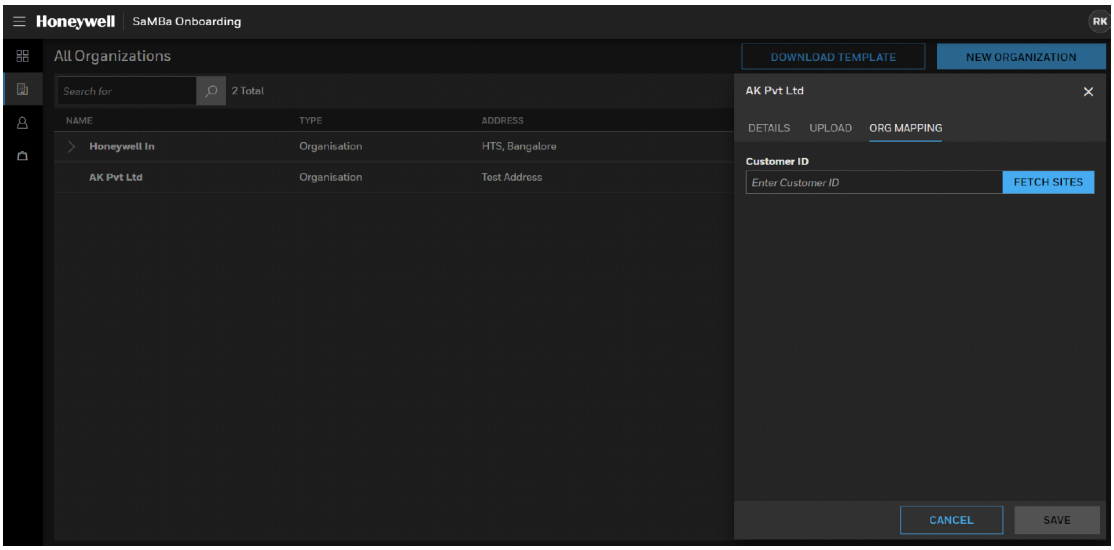



Step 5. Click **SAVE**.
If the organization is created a success notification appears.

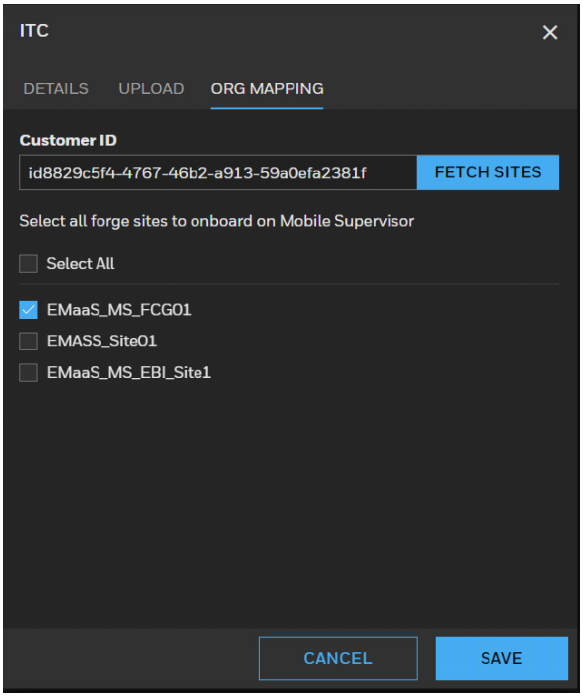


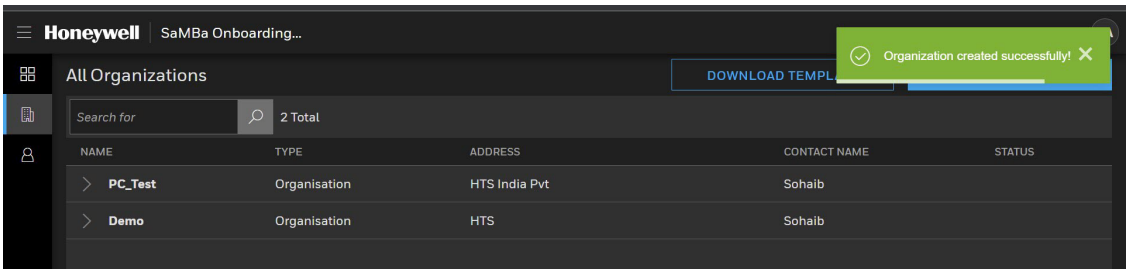
Step 6. Select the newly created organization and navigate to the **ORG MAPPING** tab to onboard the site from Forge.




Step 7. Enter the customer ID received from the HCE DigiOps team and click **FETCH SITES**.



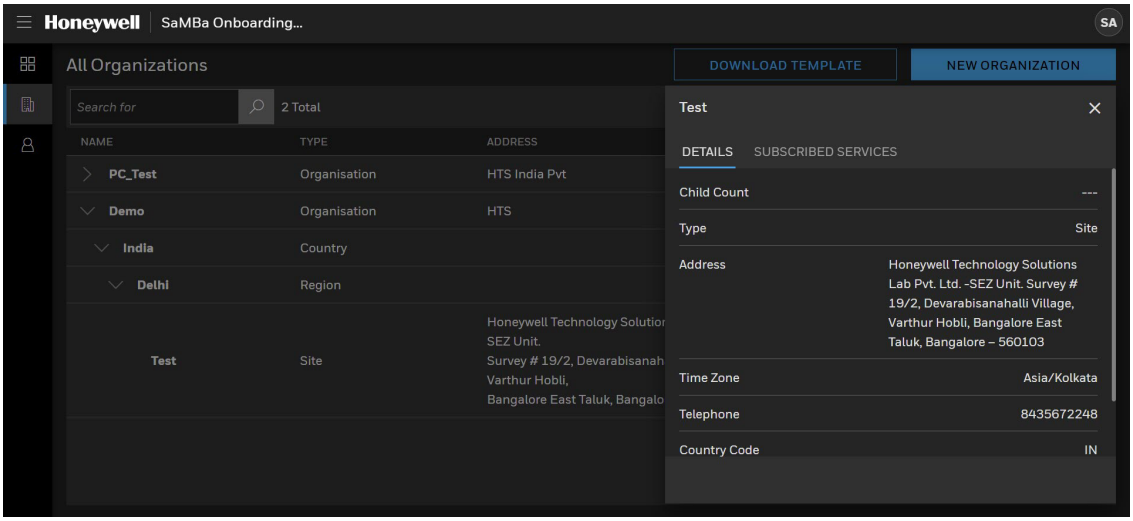
Step 8. Select the required site and click **ONBOARD SELECTED**.
The site gets added under the organization node. You will receive a success message after the model sync is successfully completed.




## Add New Site to an Existing Node in the Hierarchy

Follow the below-mentioned steps to add a new site to an existing node:

Step 1. Select the organization and the organization window is displayed as shown below.

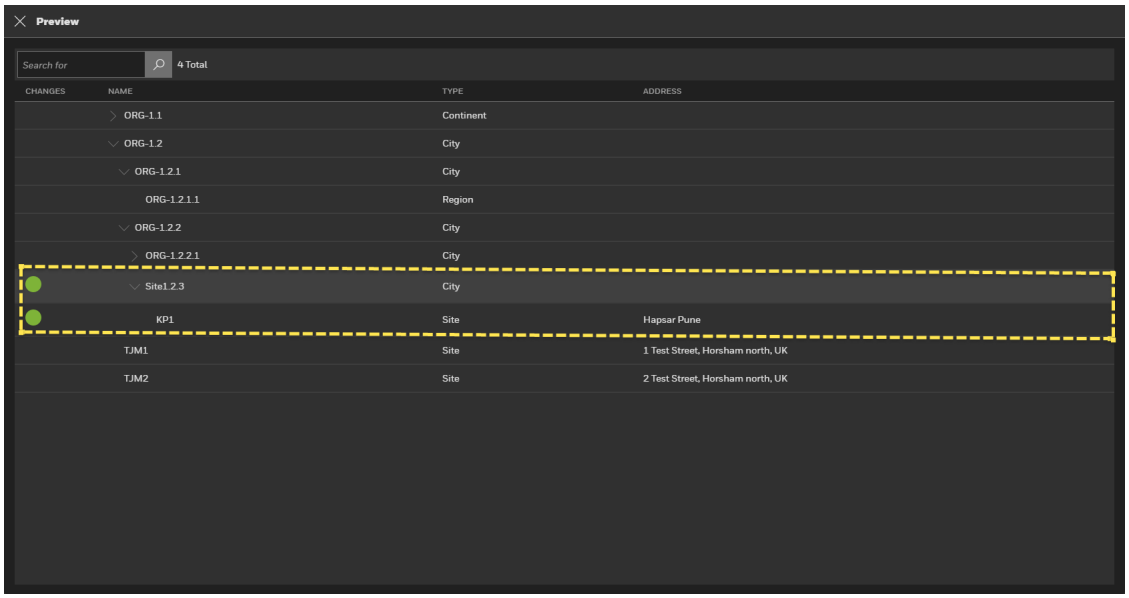



Step 2. Upload the updated Excel template.

***Note:*** *Site ID and Organization name should not be changed in the Excel template.*

***Note:*** *Check the version number during each update. If lower than the last imported template, it will show an error. Be sure to increment the number each time a change is made.*

Step 3. Select Preview to check the changes, and select **SAVE** to apply the changes.




Step 4. The added site is highlighted in green.

## Update the Hierarchy Nodes/Site Nodes/Organization Details

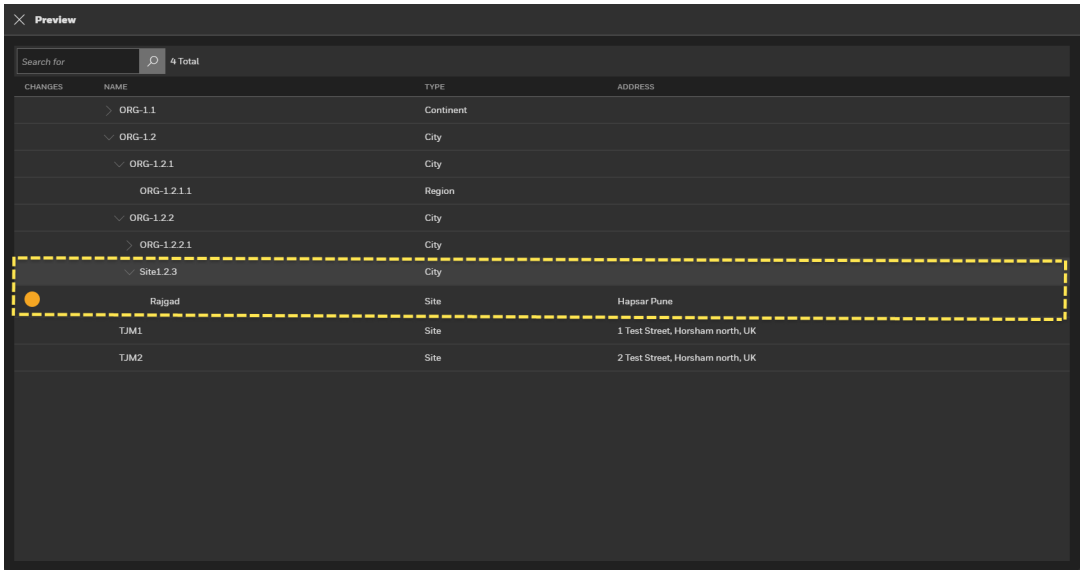
Follow the below-mentioned steps to update hierarchy nodes/site nodes/ organization details:

Step 1. Select the organization and upload the updated Excel template.

***Note:*** *Site ID and Organization name should not be changed in the Excel template.*

***Note:*** *Check the version number during each update. If lower than the last imported template, it will show an error. Be sure to increment the number each time a change is made.*

Step 2. Select preview to check the changes, and select **SAVE** to apply the changes.
The updated site is highlighted in yellow.




Step 3. Verify the changes and ensure the remaining data for that site remains the same.

## Delete Hierarchy Node/Site Nodes

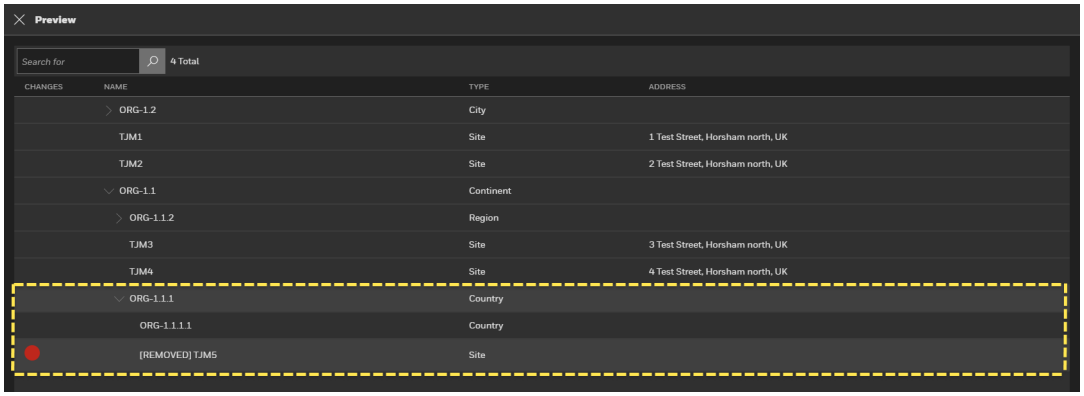
Follow the below-mentioned steps to delete a site:

Step 1. Select the organization and upload the updated Excel template.

***Note:*** *Site ID and Organization name should not be changed in the Excel template.*

***Note:*** *Check the version number during each update. If lower than the last imported template, it will show an error. Be sure to increment the number each time a change is made.*

Step 2. Select preview to check the changes, and select **SAVE** to apply the changes.
The deleted site is highlighted in red.

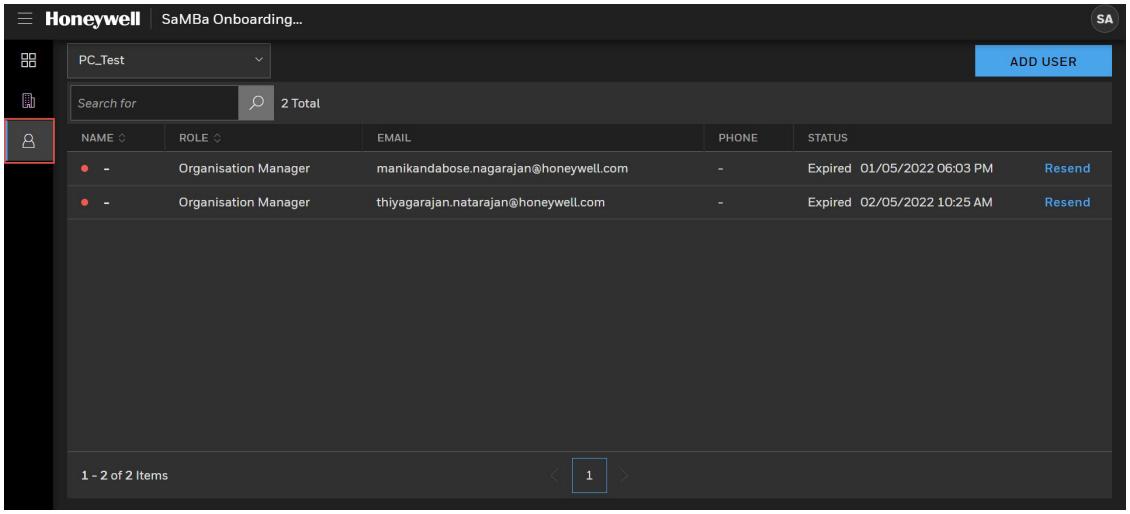



Step 3. Verify if the site name doesn't appear in any views after the Excel processing.

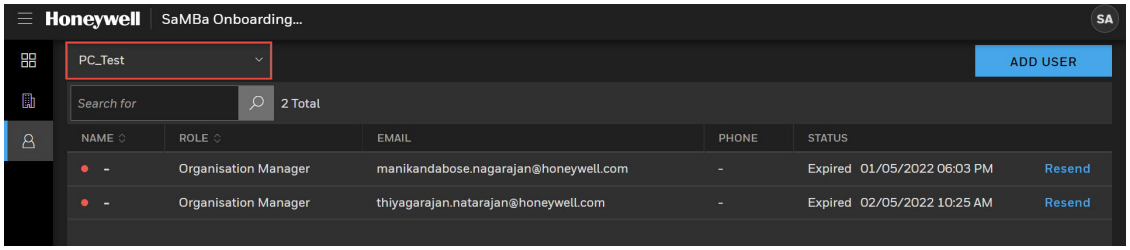
## Adding New Users

Follow the below-mentioned steps to add new users:

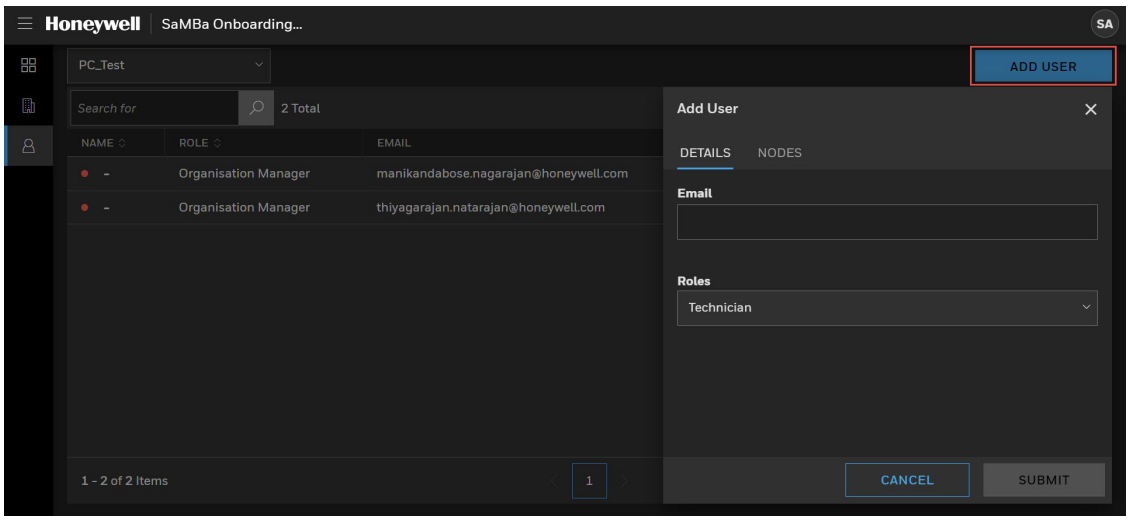
Step 1. Select the user's icon from the navigation pane.




Step 2. Select the organization from the drop-down.




Step 3. Select **ADD USER** on the title bar.
Add User dialog appears.

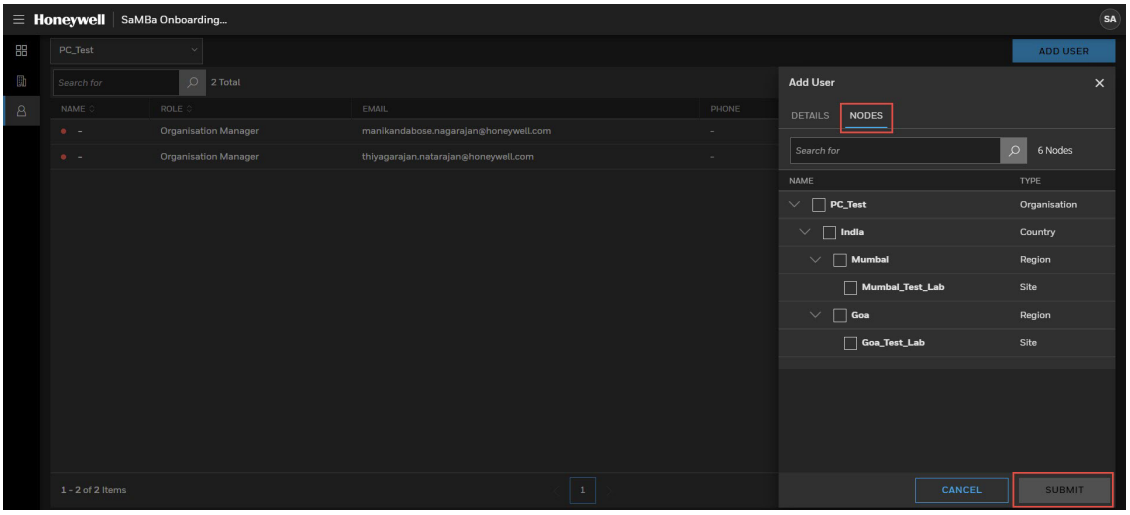



Step 4. Enter the Email address and the role of the new user.

Step 5. Select Roles for the new user from the drop-down. The various roles are explained as follows:

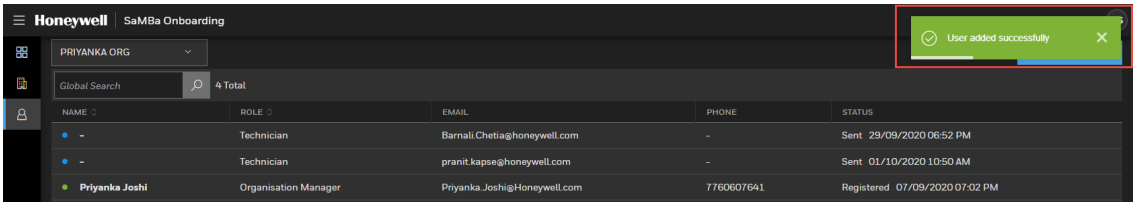
| Roles | Description |
|---|---|
| Honeywell Superuser | This role is linked to the Honeywell account. The responsibilities of this role are as follows:<br>• Creating or editing the organization.<br>• Adding and inviting the users.<br>• Assigning roles like Portfolio Manager, Organization Manager, Facility Manager and Technician.<br>• Manage Subscription for any organization where assigned as Organization Manager |
| Portfolio Manager | The responsibilities of this role are as follows:<br>• Creating or editing the organization.<br>• Adding and inviting the users.<br>• Assigning roles like Portfolio Manager, Organization Manager, Facility Manager and Technician.<br>• Commission, view and monitor assigned sites. |
| Facility Manager | The responsibilities of this role are as follows:<br>• Adding and inviting the users.<br>• Commission, view and monitor assigned sites |
| Energy Manager | The responsibilities of this role are as follows:<br>• Commission, view and monitor assigned sites |
| Site Technicians | The responsibilities of this role are as follows:<br>• Commission, view and monitor assigned sites |

Step 6. Navigate to the nodes in the add user window, and select the organization for the new user from the hierarchy.

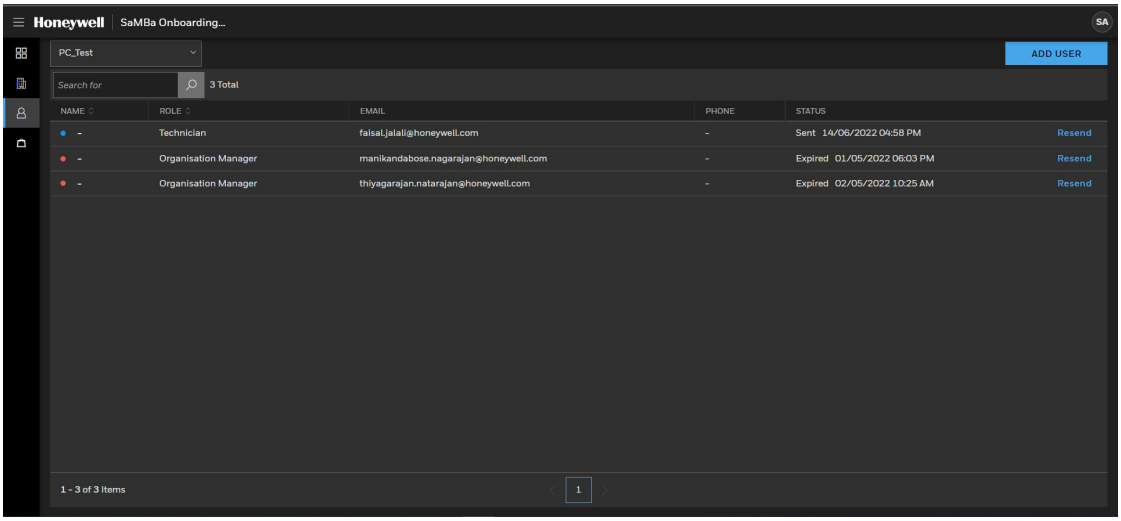



***Note:*** *New users will be able to access the selected node only.*

Step 7. Select submit, and a notification is displayed upon successful completion.




Step 8. Different color codes highlight the account status, as shown below.




| Color Indicator | Description |
|---|---|
| Green | User account is successfully activated. |
| Blue | Registration is set out, and the user is in a pre-activation state. |
| Red | User account is expired or elapsed. |

# Add Metadata

Metadata need to be added to the site using Post API Calls
Below are examples of key-value pairs to be updated using this post API call:

**Path:** SMB_Common_Usage/SMB Metadata/Authorization tab

**URL Syntax:**

```
<base_url>:<organisation_port>/api/v1/metadata/<offering_id>/update/<OrgID>/<SiteID>
```

**Syntax Example:**

https://samba.honeywellcloud.com:443/api/v1/metadata/LCBS/update/3079e1c3-3d91-4ca9-b05d-a8129e97d99e/site-view/3f5e2501-14b7-4b06-aa44-bba12e503490

**Request Example:**

Json Body in API call:

```
{
    "key": "TimeZone",
    "Value": "Asia/Kolkata"
}
```

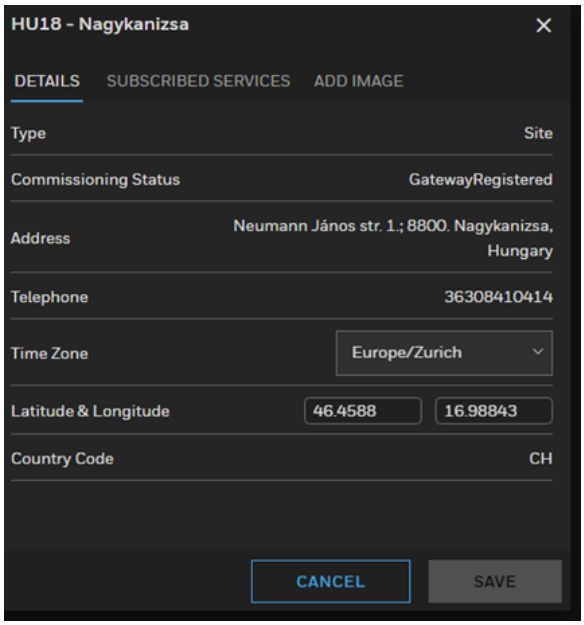
**Response:**

```
"isSuccessStatusCode": true,
"item": {
"key": "ContactEmail",
"value": "venu.n@Honeywell.com"
}
```

| Sr. No. | Key | Value | Required |
|---|---|---|---|
| 1 | Address | Madurai | Yes |
| 2 | Latitude | 15.9716 | Yes |
| 3 | Longitude | 77.5946 | Yes |
| 4 | Timezone | Asia/Kolkata | Yes |
| 5 | Telephone | +91 12345 67890 | Optional |
| 6 | Customer ID | SITE0001 | Yes |
| 7 | Country Code | IN | Yes |
| 8 | Contact Email | venu.n@Honeywell.com | Yes |

***Note:*** *You need to update the value one by one.*

After Metadata update:




Do the following steps to collect the Bearer token:

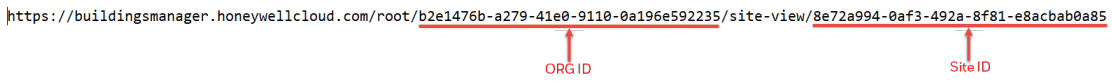
Step 1. Right-click on the onboarding page and select **Inspect**.

Step 2. Navigate to **Application > Storage** and expand **Local Storage**.

Do the following steps to collect the Org ID and Site ID:

Step 1. Go to the site-level dashboard.

Step 2. Collect the Org ID and Site ID from the URL.
The structure of URL in the below example:




Step 1. Add CEM subscription to the site once all the metadata is added.
The offering or CSM would provide the subscription information.
Refer to Adding Subscription for Organization and Site on page 24.

Step 2. Add users and Energy Manager roles to the organization.
The energy manager will have read access to the site and cannot add new users to the site.
Refer to Adding New Users on page 10.

Step 3. Match the equipment and point list from the HCE admin portal to the available equipment and point list and ensure the number of assets and number of points matches.

Step 4. Set the retention policy and annotation filter.
Refer to the link for more information.

This step is specific to Forge Connect: for doing the point read, you need to add user mapping for the client ID of Mobile Supervisor.

To create a new CBDO ticket:

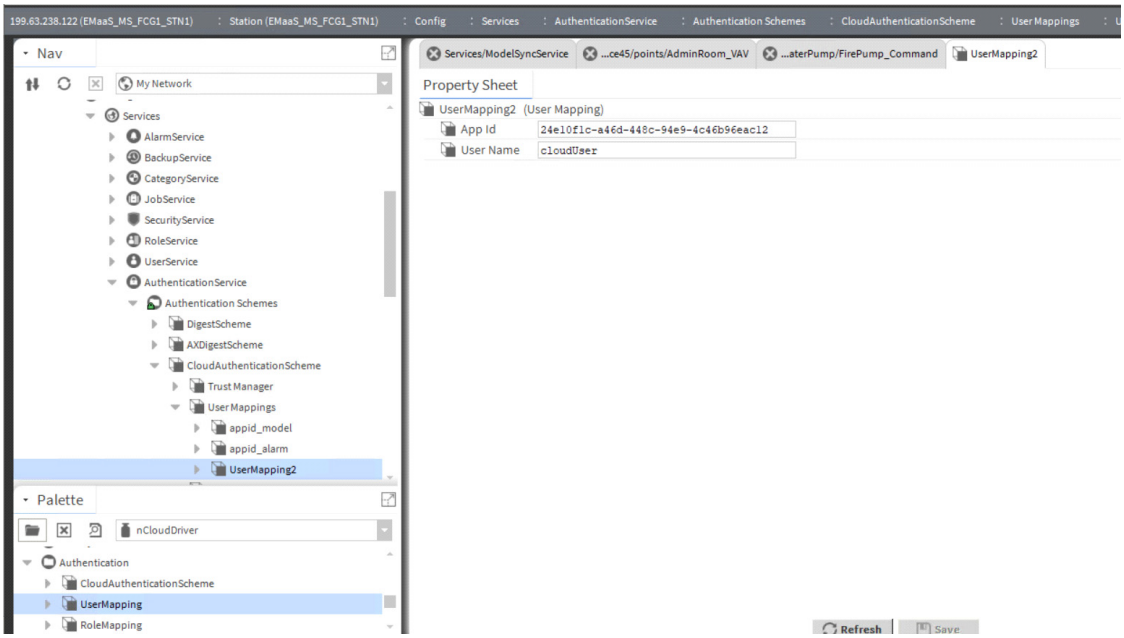
- Send an email to connectedbuildingsupport@honeywell.com.
  Mention the client ID that needs to be added to Forge Connect.

Follow the below-mentioned steps for reference:

Step 1. Open Palette and search for nCloudDriver for Forge Connect.

Step 2. Go to the **Authentication** folder, navigate to **Station** > **Services** > **Authentication Service** > **Authentication Schemes** > **CloudAuthenticationScheme** > **User Mappings**.

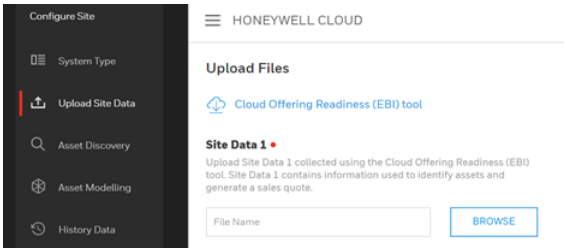
Step 3. Add App ID and User Name – cloudUser.



# Onboarding a Site having EBI Cloud Connector

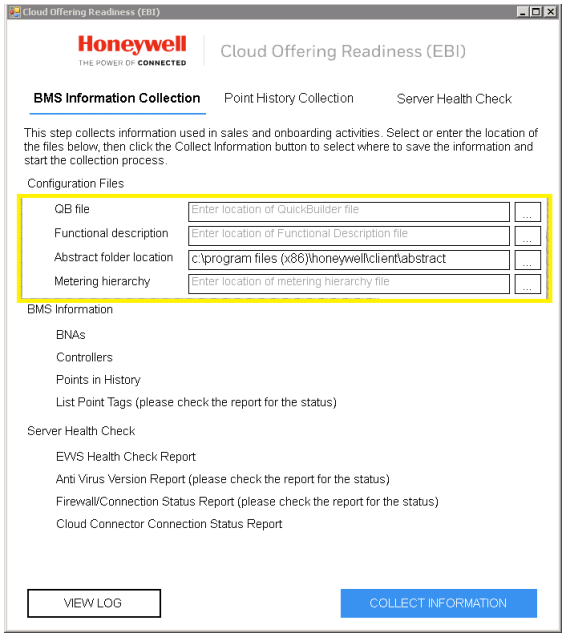
Follow the below-mentioned steps to onboard sites from EBI Cloud Connector:

Step 1. Navigate to the **Upload Site Data** menu in the admin portal and download the COR tool.

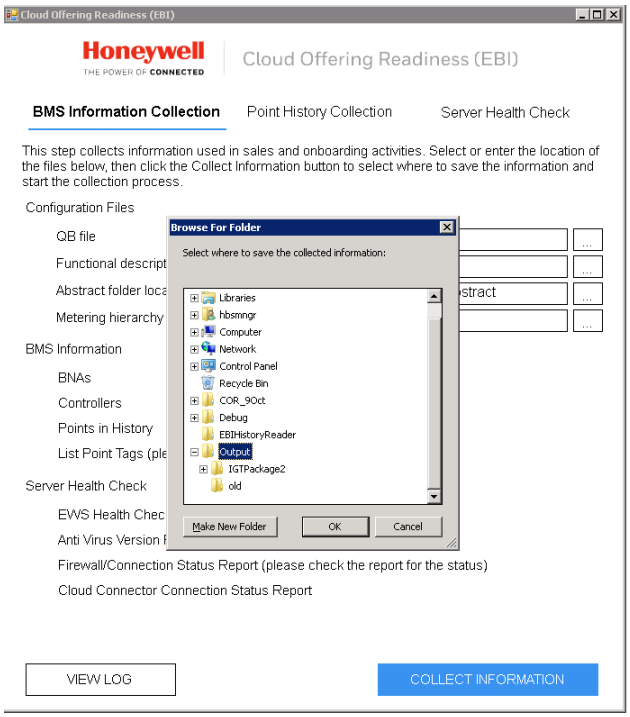



Step 2. Select **OBS.CloudOfferingReadinessTool.exe** in the installation package.

Step 3. Open the tool and enter the respective file or folder location in the edit box under **Configuration Files** pane.

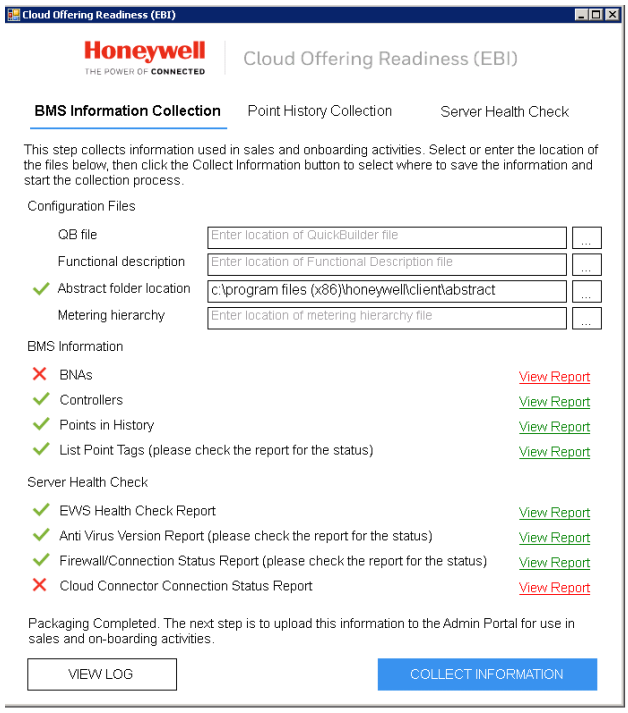


Step 4. Select the **COLLECT INFORMATION** option, configure the output package in the **Browse For Folder** window.




Step 5. Select **OK** to start the process.

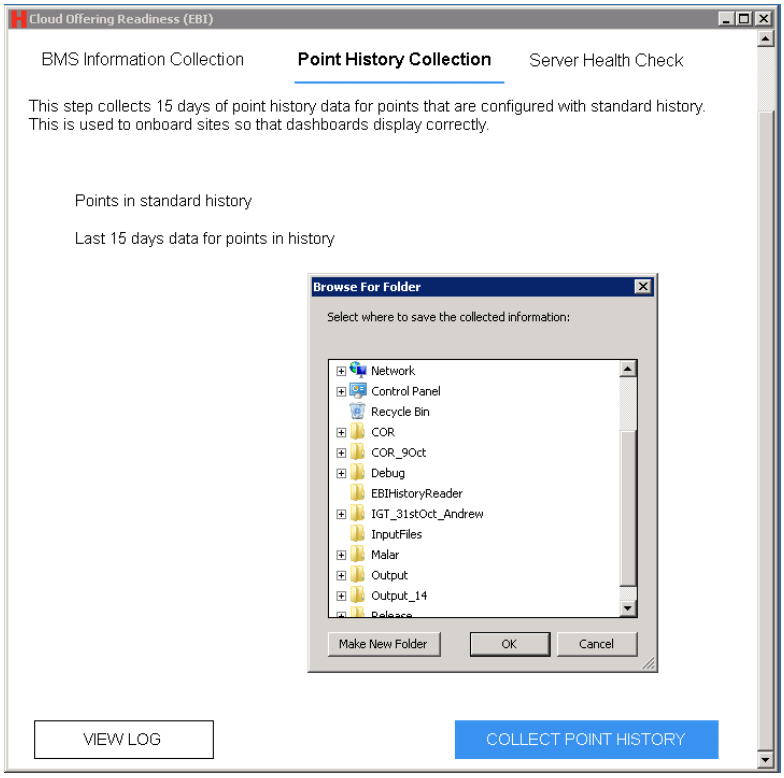
Step 6. Click **COLLECT INFORMATION** to view the statement.




Step 7. Collect two zipped output packages (site data 1 and site data 2) from the configured path and upload them to the admin portal.

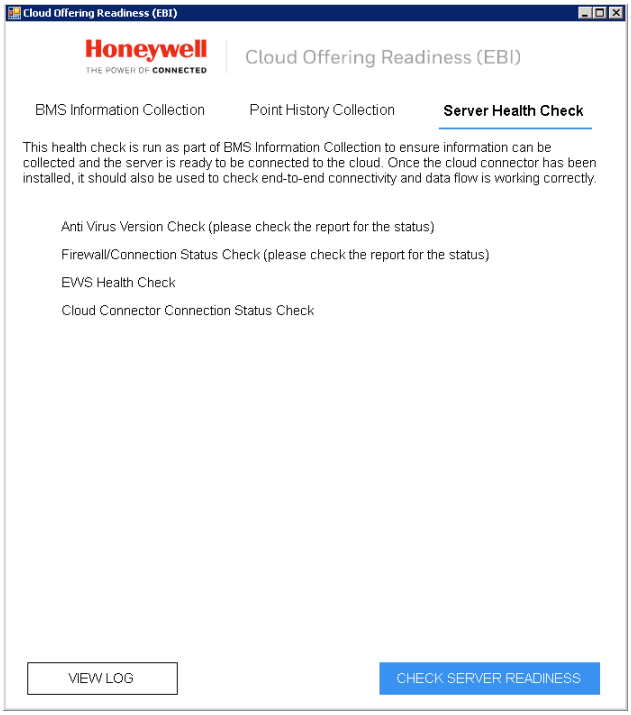
- Site_Data_1 package contains information required for the CDT tool to get asset information.
- Site_Data_2 package contains all the consolidated information (including the Site_Data_1 package details).

Step 8. Navigate to the **Point History Collection** tab and select **COLLECT POINT HISTORY**.
**Browse For Folder** window to configure the output package path.

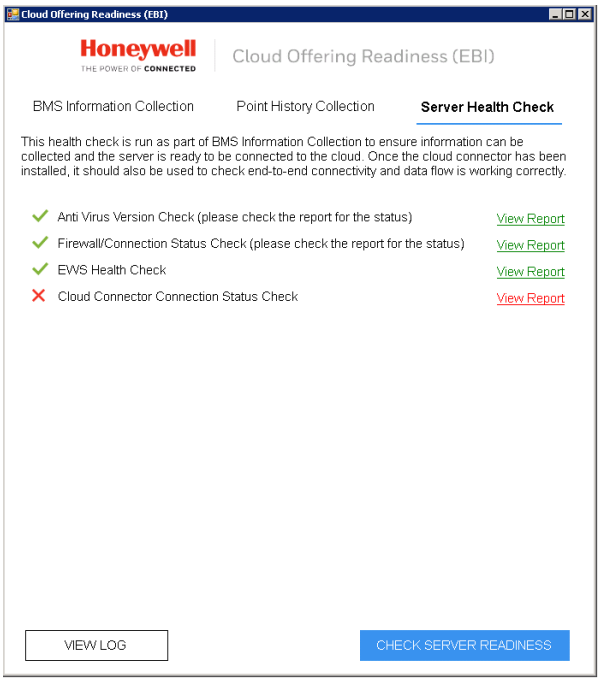



Step 9. Select the location and click **OK**.
The list of points configured in the standard history and the last 15 days of those configured points data will be collected and packaged in Site_Data_3.

Step 10. Navigate to the **Server Health Check** tab and select **CHECK SERVER READINESS**.
It generates a report on the customer's EBI machine environment status by collecting the antivirus, internet connection, and EWS health status details.




Step 11. Select the **VIEW LOG** to view the logs for any diagnosing purpose.




Step 12. Open the output package path and copy the generated zipped packages into a USB drive.

Step 13. Upload the following data:

- site data 1 and site data 3 to the admin portal
- Site data 2 to the DMS portal

# Onboarding a Site having Niagara or JACE Device

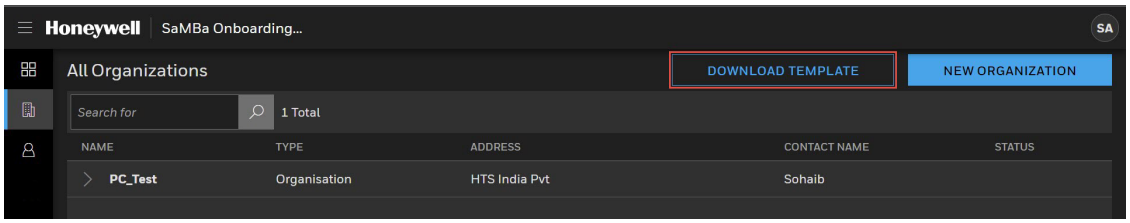
## Create a New Organization

Follow the below-mentioned steps to create a new organization:

Step 1. Sign in to the Honeywell Onboarding Portal.

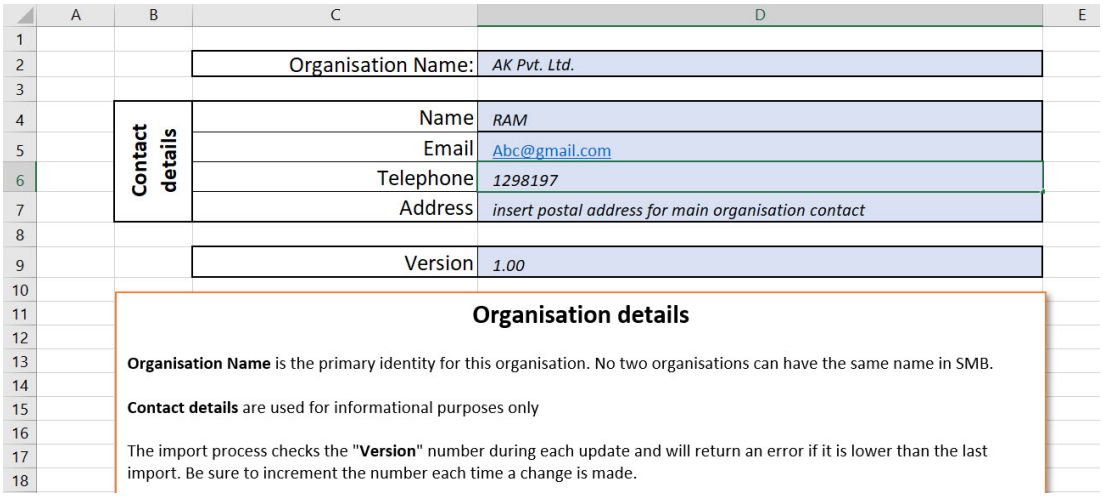
Step 2. Click **DOWNLOAD TEMPLATE** on the title bar.
A Microsoft Excel file will be downloaded.

***Note:*** *You need Root User access to create organization.*

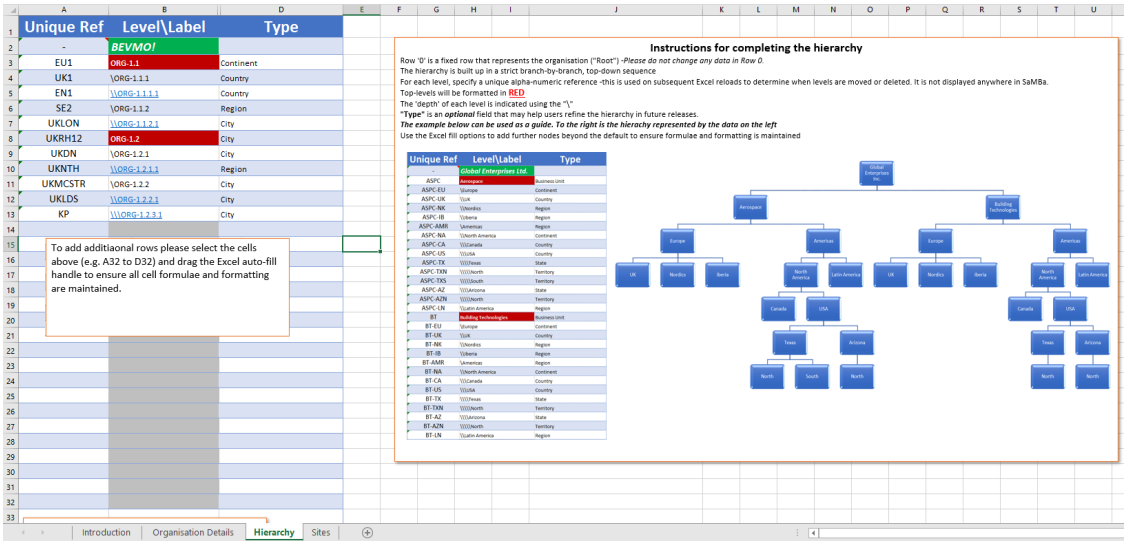



Step 3. Open the template and go to **Organization** tab and fill in the following data:

a. Organization Name
b. Name: Contact person of the organization
c. Email: Email ID of contact person
d. Telephone
e. Address: Site address
f. Telephone



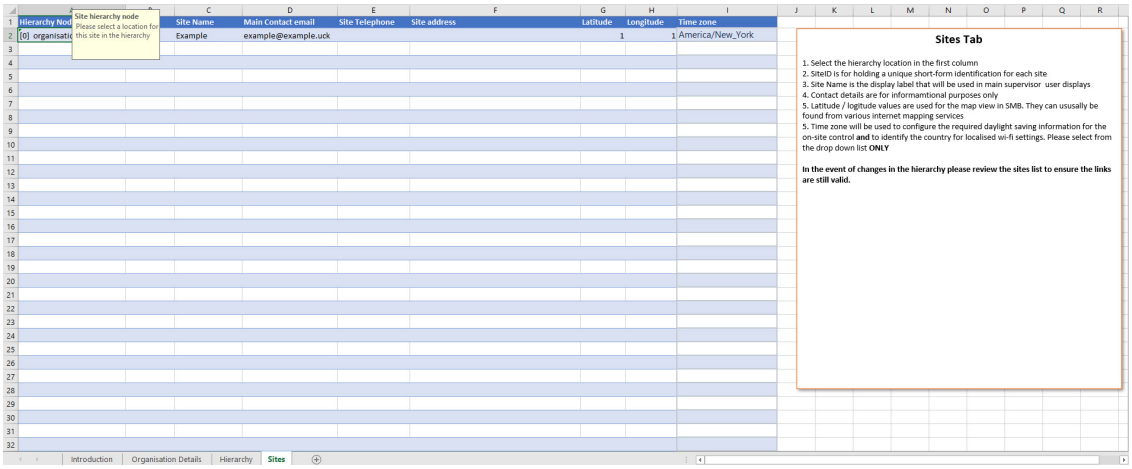
Step 4. Go to the **Hierarchy** tab and enter the organization and site details. The hierarchy is built in branch-by-branch, top-down sequence. The depth of each level is indicated using "\".




Step 5. Go to the **Sites** tab and enter the following:
It is recommended to select hierarchy sequentially.

- Select the hierarchy location in the first column.
- Enter a unique alpha-numeric site ID.
- Enter a unique site name.
- Enter the main contact email address, site telephone number, and address in the columns.
- Enter latitude and longitude in respective columns.
  Go to https://www.latlong.net/ and enter the site address to find the latitude and longitude.
- Select the timezone from the drop-down.
  Go to https://timezonedb.com/ and enter latitude and longitude to find the timezone.

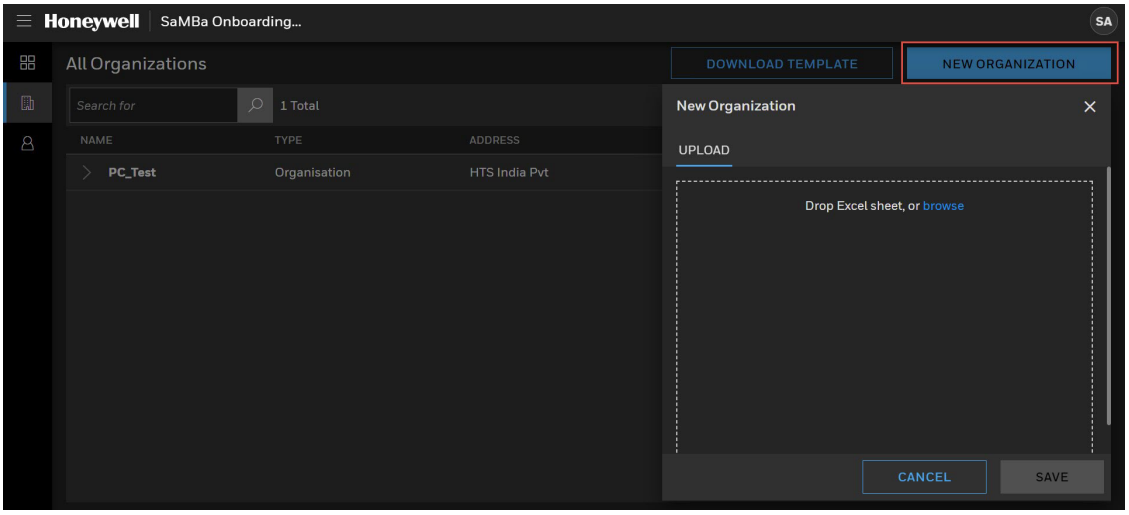
***Note:*** *It is recommended to select the hierarchy sequentially.*




***Note:*** *All the fields in the Excel file are mandatory. In case of missing information, the batch upload will not allow for the successful processing of the content.*

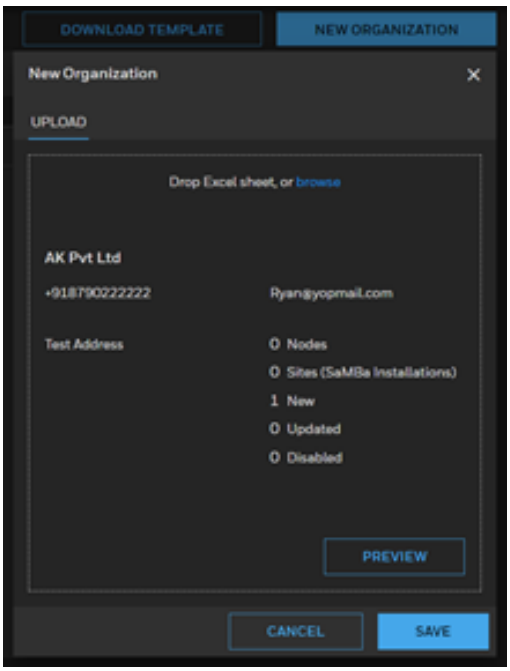
Step 6. Save the template file in the local system.

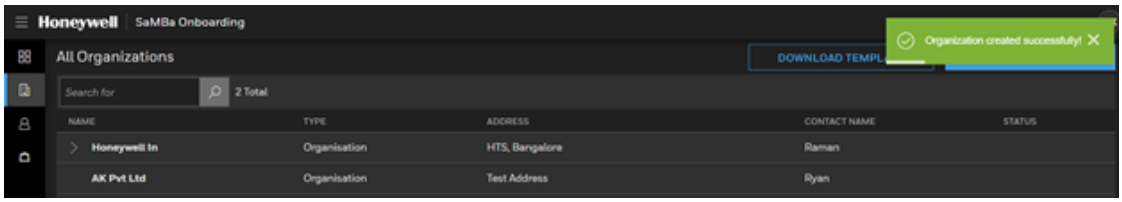
Step 7. Click **NEW ORGANIZATION** and then upload the template.




***Note:*** *The organization's name should be unique for the file upload to process successfully.*

Step 8. Click **SAVE**.
If the organization is created a success notification appears.




## Add New Site to an Existing Node in the Hierarchy

Refer to Add New Site to an Existing Node in the Hierarchy on page 7.

## Update the Hierarchy Nodes/Site Nodes/Organization Details

Refer to Update the Hierarchy Nodes/Site Nodes/Organization Details on page 8

## Delete Hierarchy Node/Site Nodes

Refer to Delete Hierarchy Node/Site Nodes on page 9

## Adding New User

Refer to Adding New Users on page 10

## Add Metadata (Confirm)

# Adding Subscription for Organization and Site

Before the site visit, ensure a subscription is added to the site.

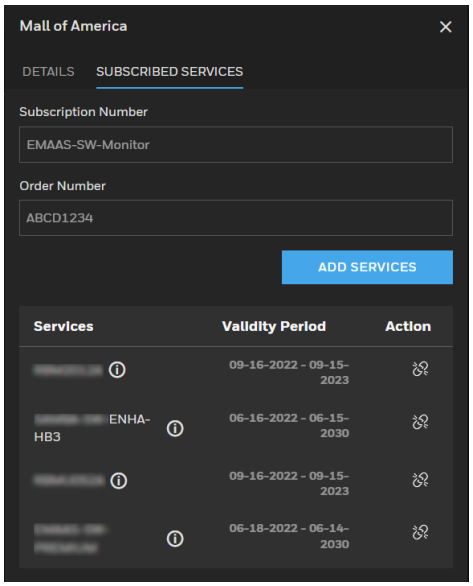
***Note:*** *Subscription added at the organization level is applicable for all the sites in the organization.*
*Subscription added at site level is applicable for that site only.*
*If a site has a subscription at both levels, an organization-level subscription is considered in such cases.*

Follow the below-mentioned steps to add a subscription:

Step 1. Generate order number and subscription number from the Zuora portal.

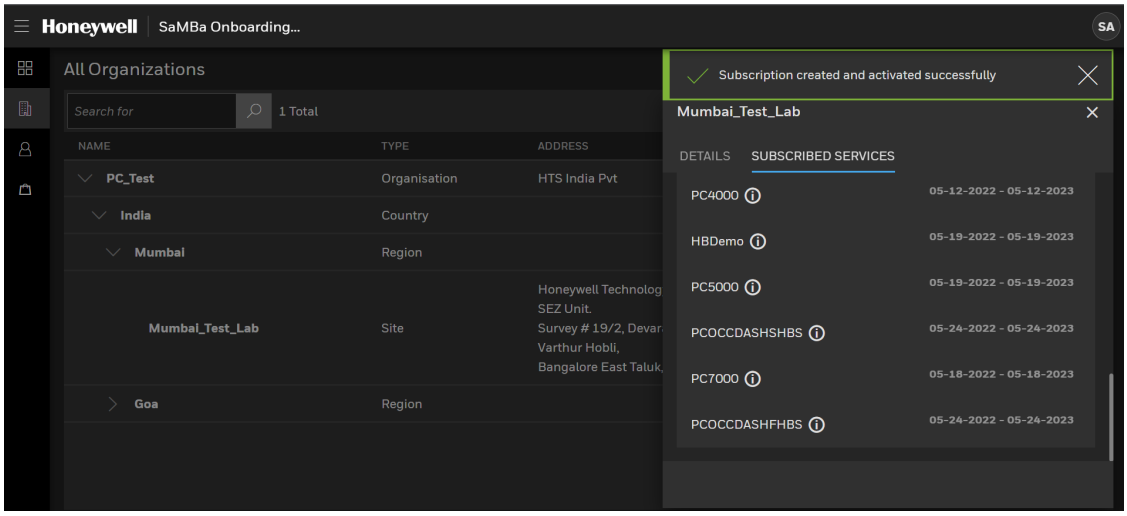
Step 2. Navigate to the organization tab and select a site from it.

Step 3. Go to **SUBSCRIBED SERVICES** tab in the flyout.

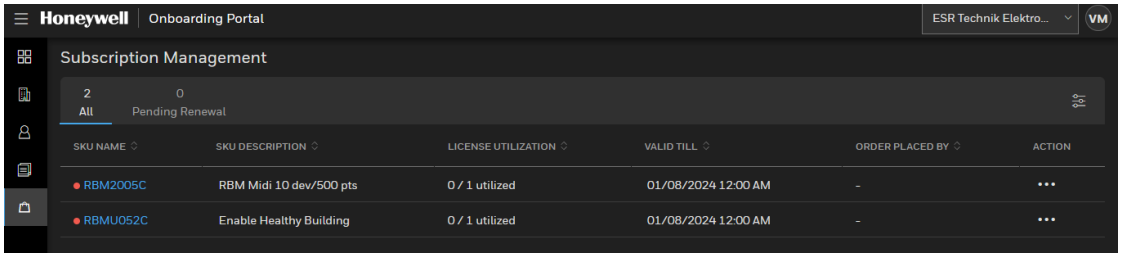



Step 4. Enter the subscription number and order number generated from the Zuora portal and select bundle from the drop-down.

Step 5. Select **ADD SERVICES** to add a subscription.
The below-shown window is displayed upon successful completion.

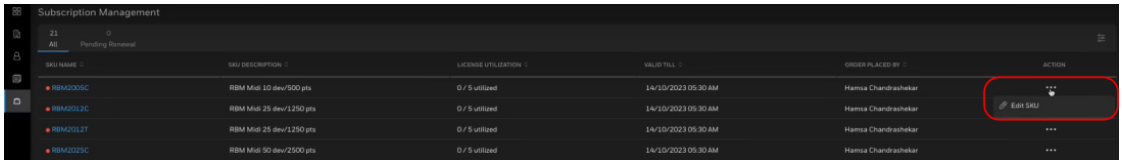


Step 6. In the left pane, click the **Subscription Management** icon.

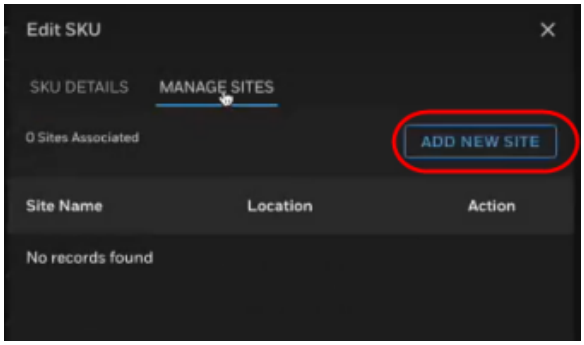



Step 7. Navigate to the site.

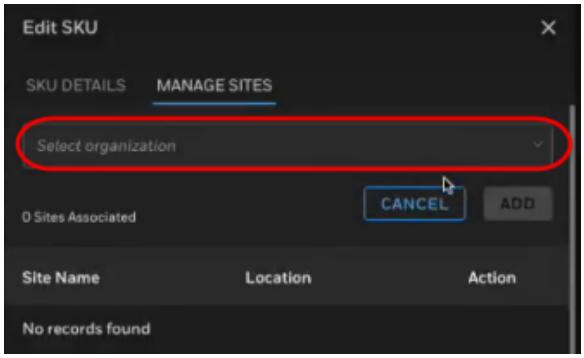
Step 8. Click three dots in the **ACTION** column to the right of the site and then click **Edit SKU**.



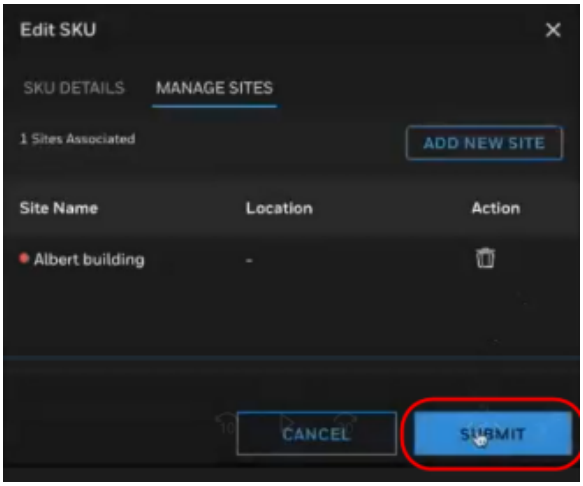

Step 9. Go to **MANAGE SITES** and click **ADD NEW SITES.**




Step 10. Select the organization from the drop-down list and click **ADD**.



Step 11. Click **Submit**.
The subscription is assigned to the site.




The subscription details will be used during the site installation.

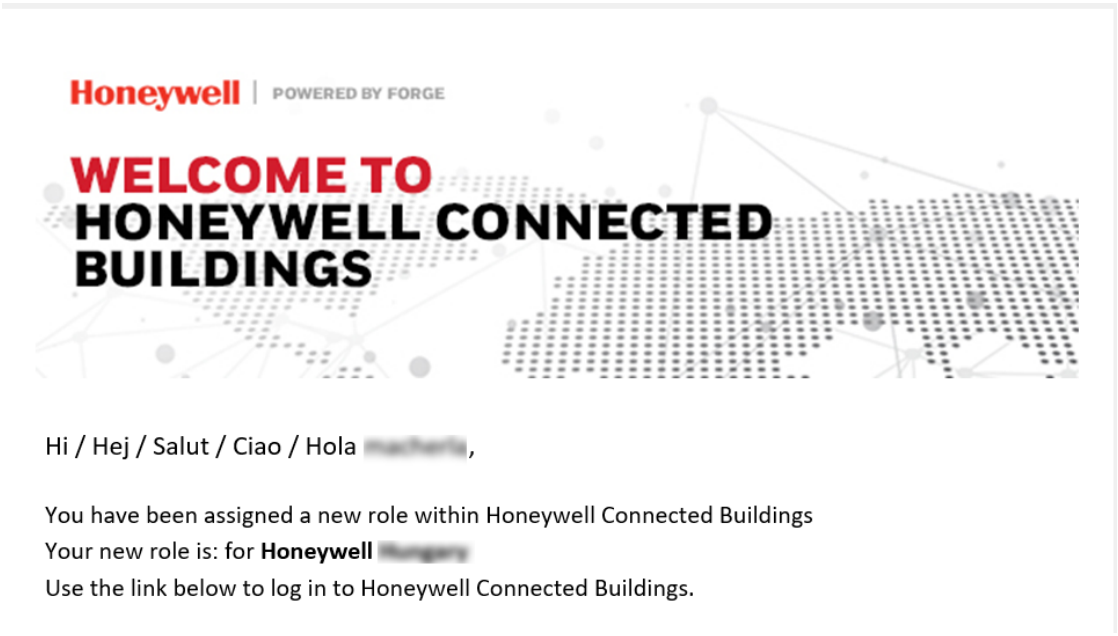
- Verify the subscription type and allow to add only the devices that are part of the subscription.

***Note:*** *The subscription is activated once all the sites are synchronized after the configuration.*

# User Sign in

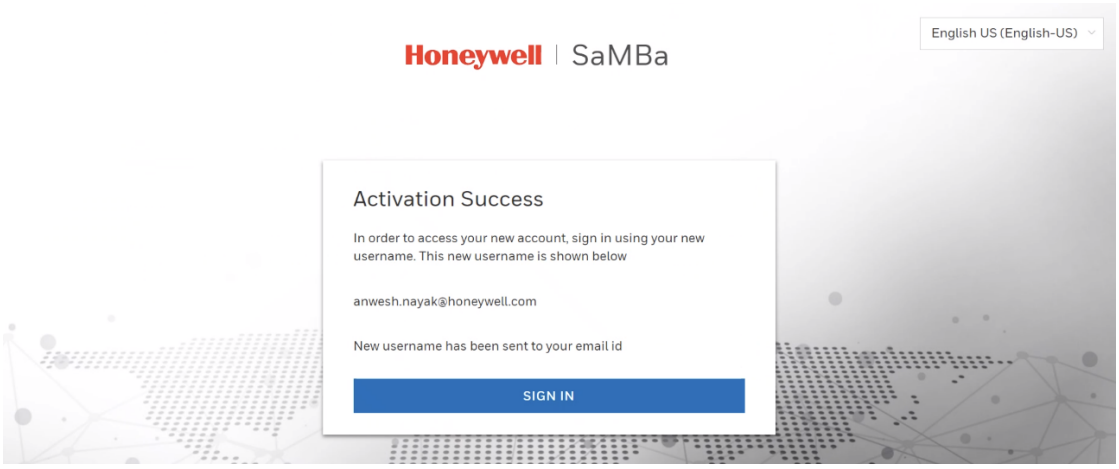
Follow the below-mentioned steps for the user sign in:

Step 1. The portfolio manager/FM receives an automated email to activate the account once the user roles are defined.




Step 2. Select the activate option, enter the required details, and accept the EULA to activate the account.

Step 3. The activation success notification is displayed.




Step 4. The user receives a welcome email along with the new username details and remote building manager link.

Step 5. Open the remote building manager link and log in with the given credentials.

CHAPTER

# 3 CARBON AND ENERGY MANAGEMENT

## Enable Site Performance

The Site Performance helps users navigate to the Honeywell Forge to view the site performance. This feature is helpful to the user who is registered in both Honeywell Forge Sustainability+ and Honeywell Forge.

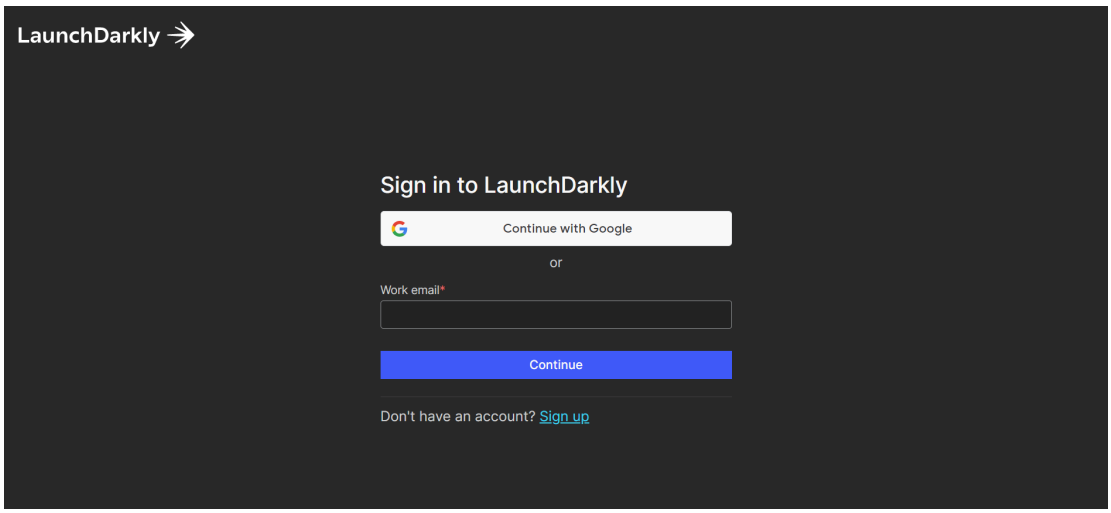
***Note:*** *The Site Performance feature will be available if the user is registered in Honeywell Forge Sustainability+ and Honeywell Forge. Otherwise, the Site Performance feature will not be available.*

## Pre-requisite

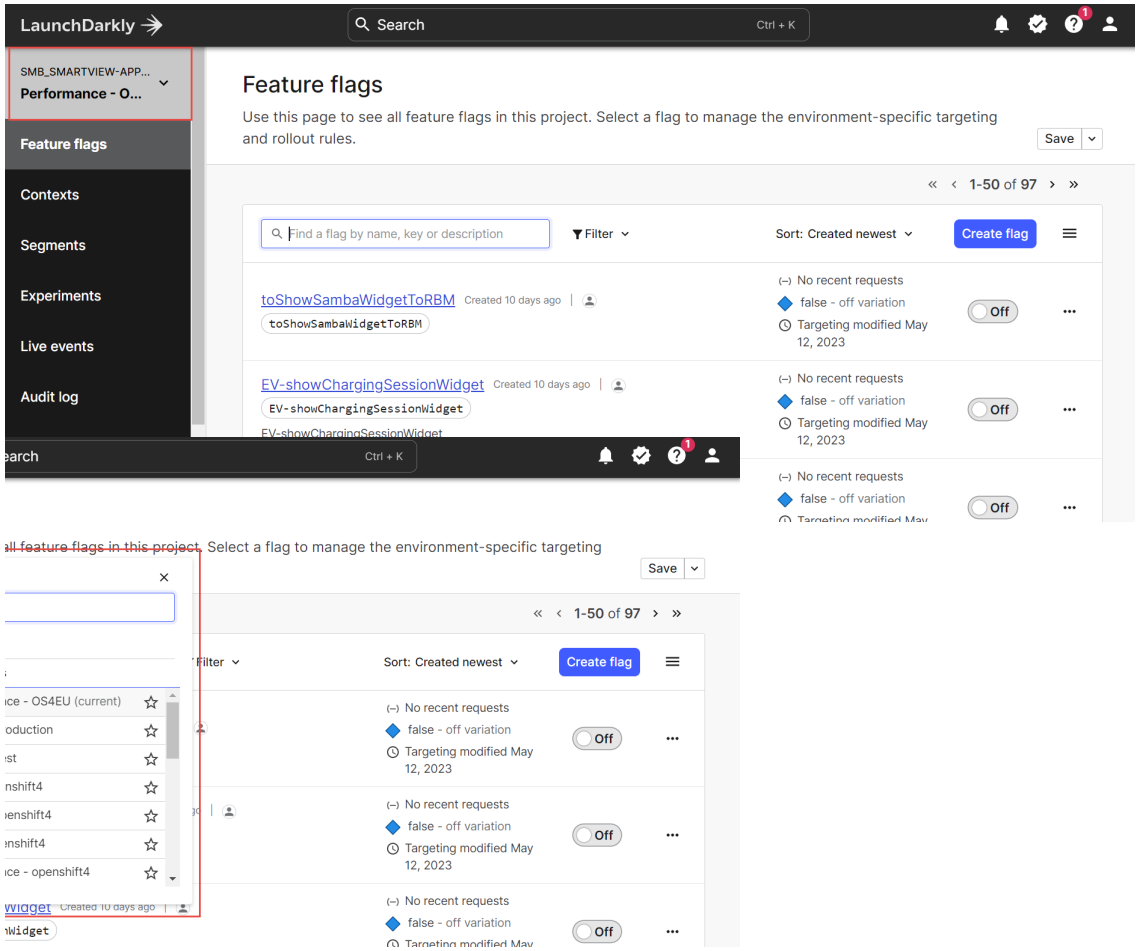
- The organization and site must have the same name in both Honeywell Forge Sustainability+ and Honeywell Forge.
- The organization must have been onboarded using the EOM method.

## Enable the Feature Flag

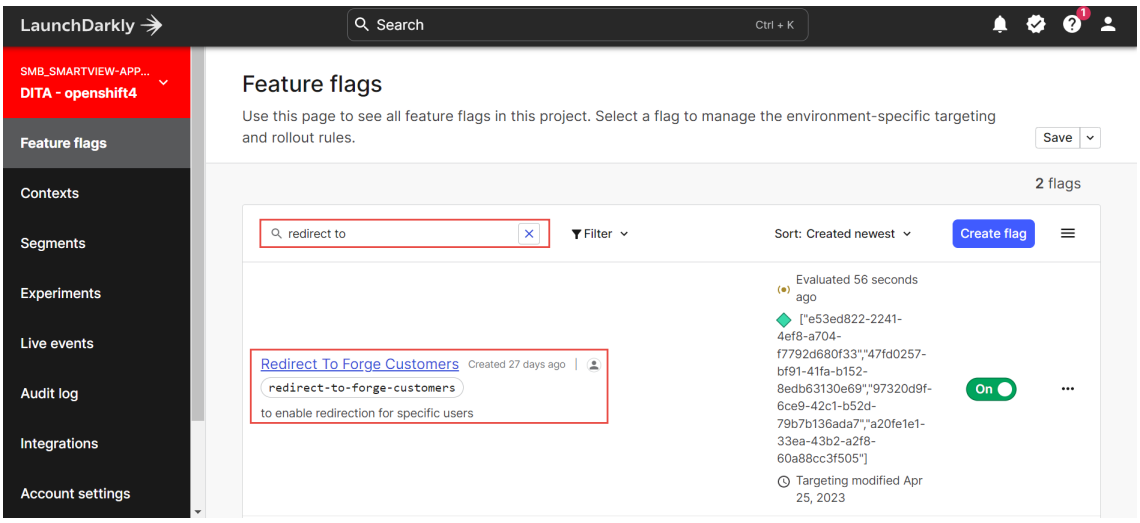
Step 1. Go to the LaunchDarkly site and sign in with your credentials.



Step 2. In the upper-left corner, select an environment from the drop-down list.

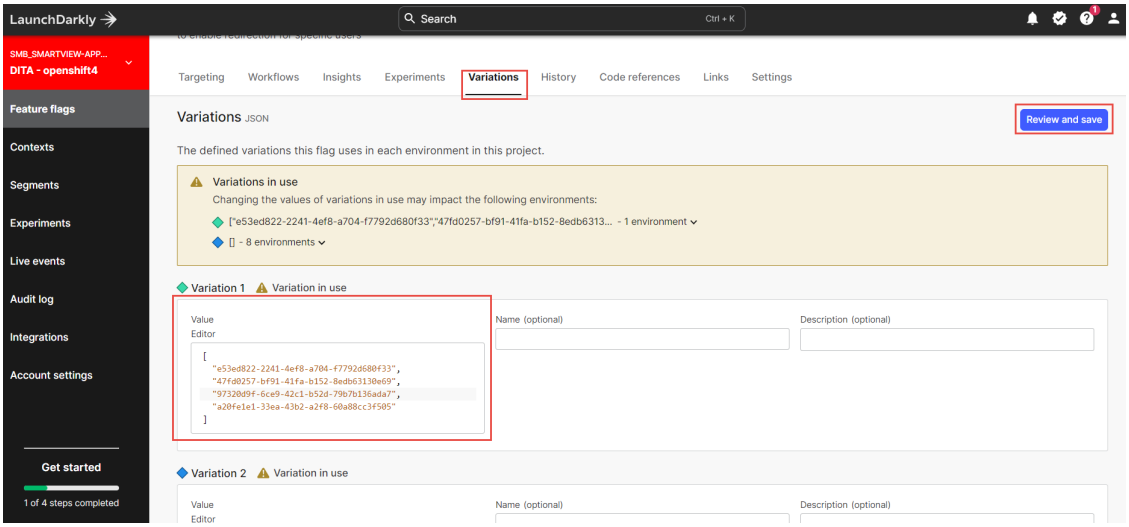



Step 3. Please search for a feature flag in the search box and select it.



Step 4. Go to the **Variations** tab and enter the site ID in the **Value Editor** box separated by a comma.

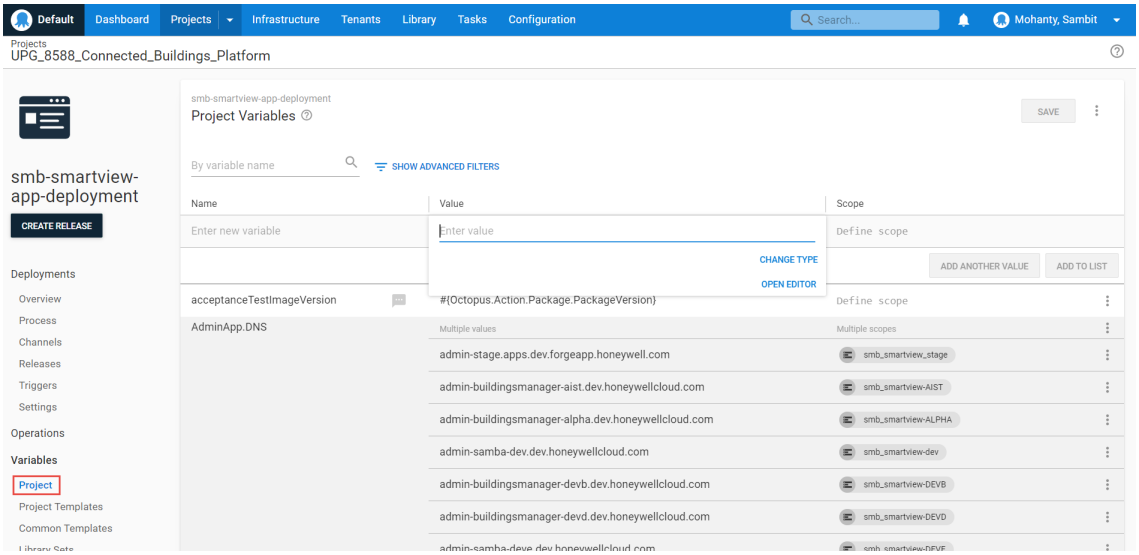
Step 5. Click **Review and Save**.



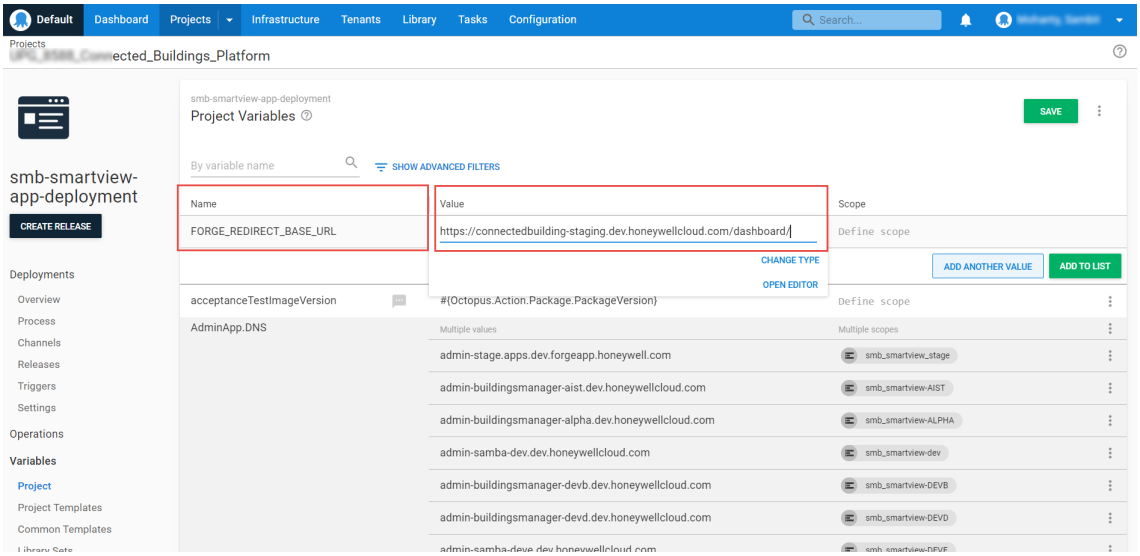

# Create Variable in Octopus

Step 1. Go to the Octopus site and sign in with your credentials.

Step 2. In the left pane, go to **Variable** > **Project**.



Step 3. In the **Name** box, enter a new variable name.
For example, FORGE_REDIRECT_BASE_URL.




Step 4. In the **Value** box, enter the Honeywell Forge URL.
The user will be navigated to this site when clicking the Site Performance button.

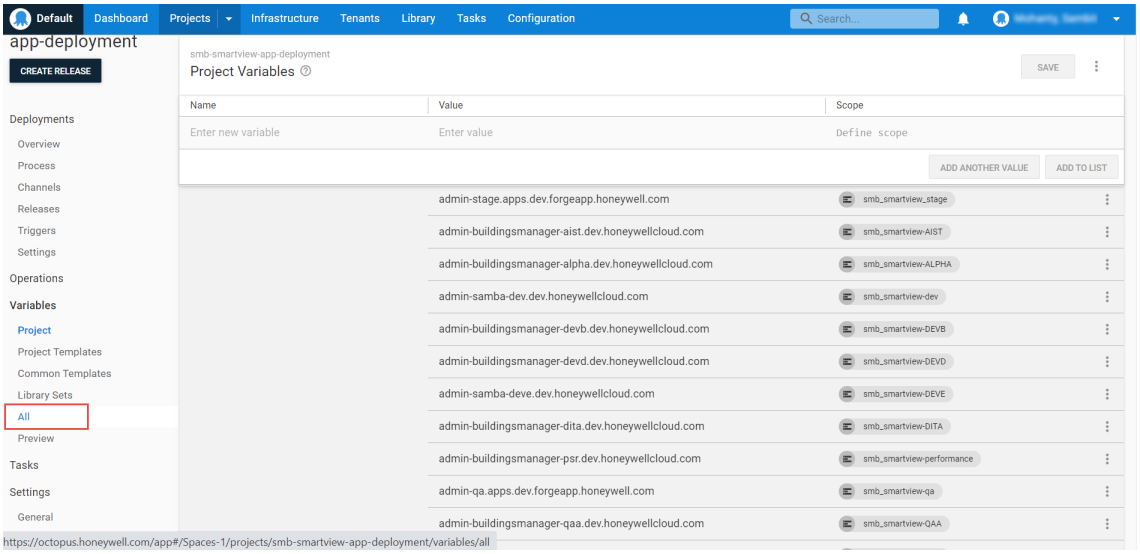
Step 5. Click **ADD TO LIST** and then click **SAVE**.

# Search Variable in Octopus

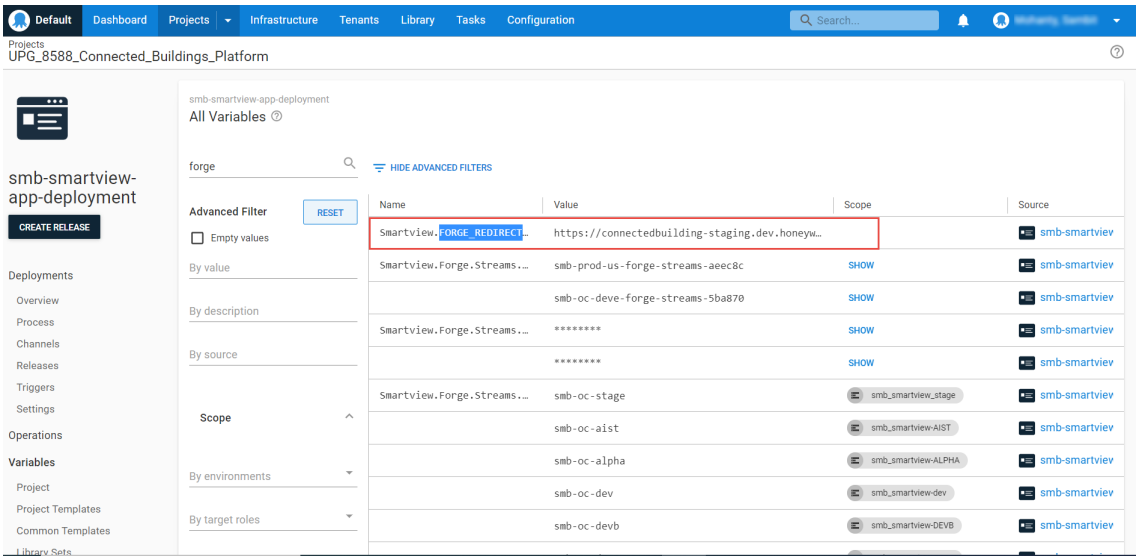
The user can search for the variable after it is successfully created. Do the following steps to create a variable in the Octopus site:

Step 1. Go to the Octopus site and sign in with your credentials.

Step 2. In the left pane, go to **Variable** > **All**.

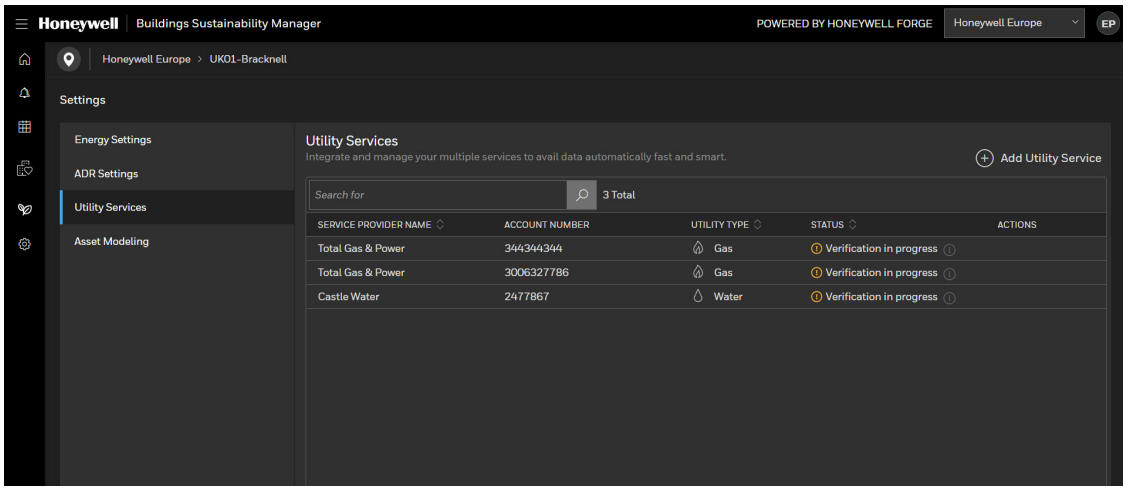


Step 3. Please search the variable in the search box.




# Utility Services

CEM uses the third-party integrator to get the information on the utilities. The user can view previously enrolled accounts and their status.

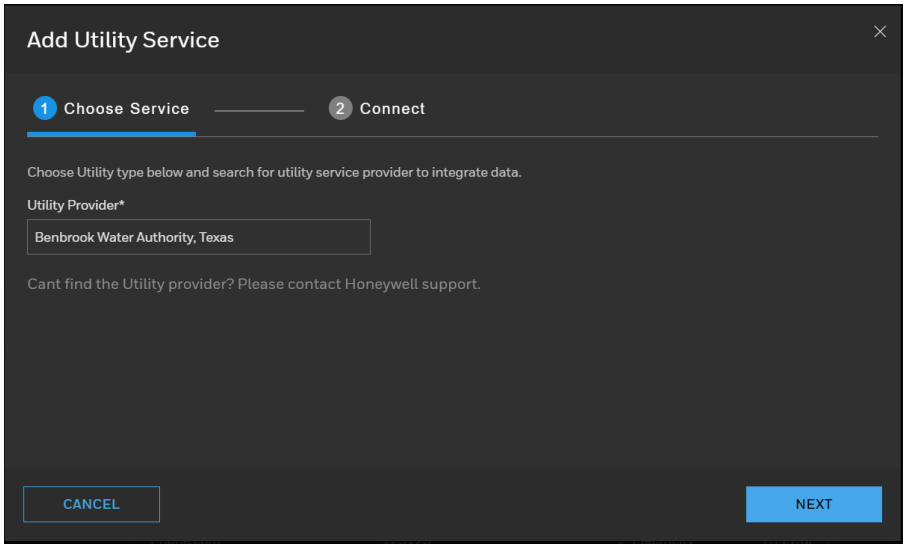



# Create Utility Service

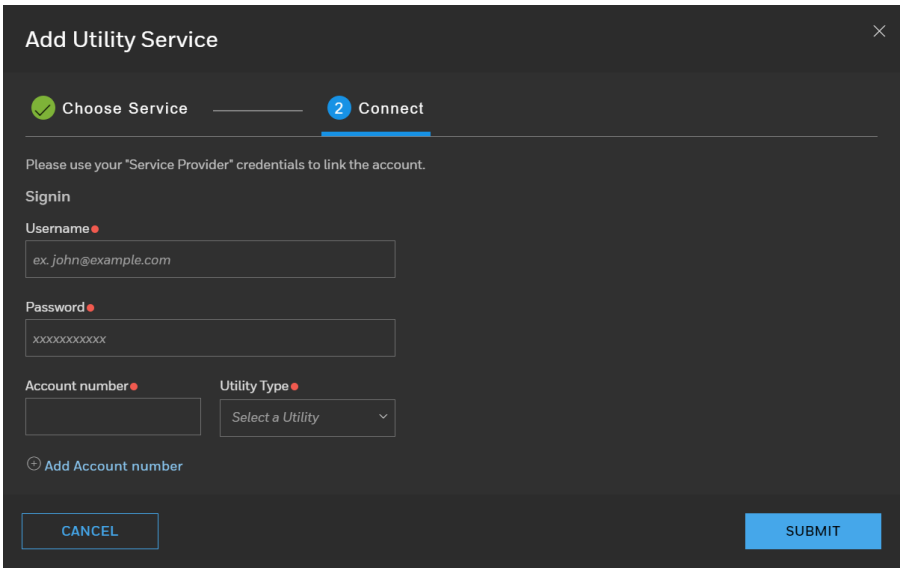
Follow the below-mentioned steps to add the utility service:

Step 1. Select Add Utility Service option from the utility services window.

Step 2. Choose the service provider name from the list and select NEXT.




Step 3. Fill in the required account details and select SUBMIT.




***Note:*** *The status of the request submitted will be in verification in progress. It takes up to 72hrs for the processing to complete and the data to get reflected in the dashboard.*

## Utility Service Scenarios

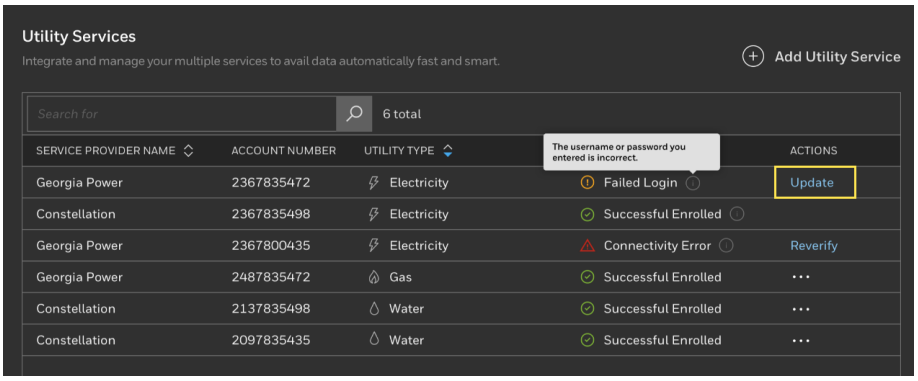
After submitting the utility service request, the user may encounter the following scenarios:

- Incorrect Credentials
- Password Expired
- Account Mismatch
- Deactivate Account

- Connectivity Error

## Incorrect Credentials

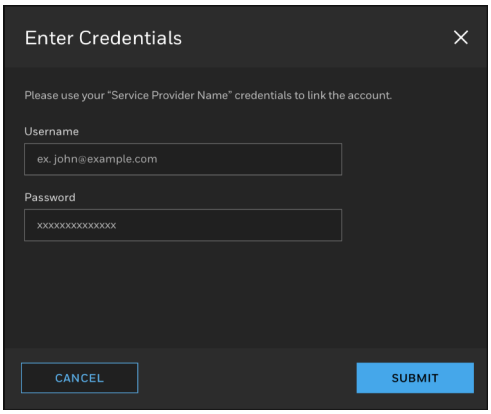
The user will get the failed login message under the status column.




Follow the below-mentioned steps to re-enter the credentials:

Step 1. Select the Update option present under the ACTIONS column.

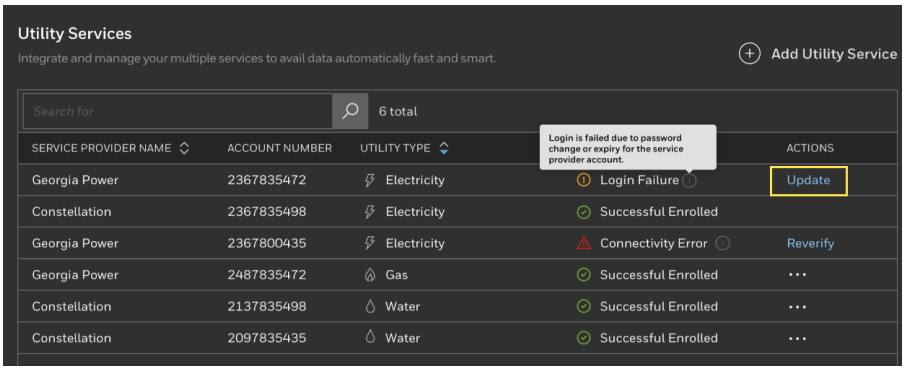
Step 2. Enter the credentials and select SUBMIT.




Step 3. The status column will display a verification in progress message.

## Password Expired

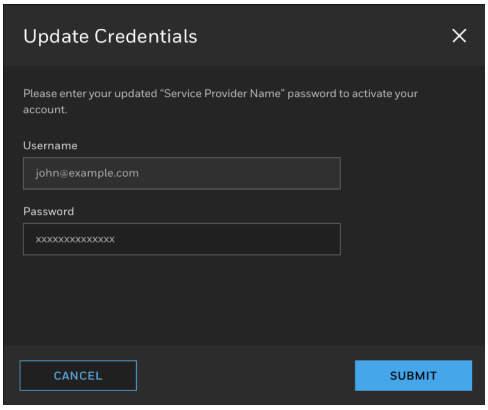
The user will get the login failure message under the status column.



Follow the below-mentioned steps to update the credentials:

Step 1. Select the Update option present under the ACTIONS column.

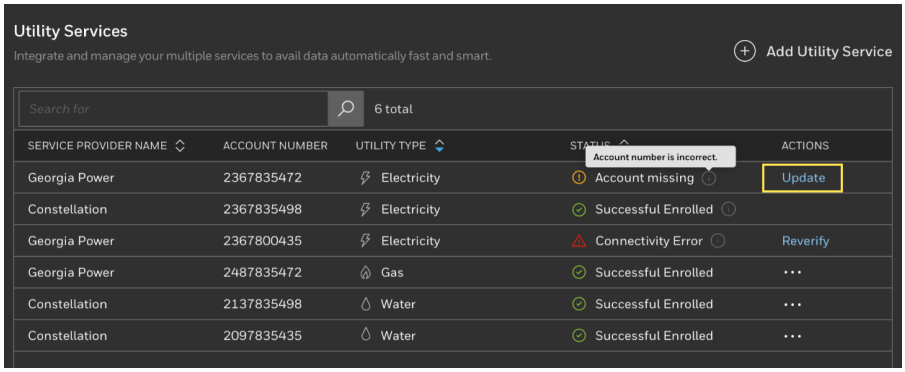
Step 2. Update the credentials and select SUBMIT.




Step 3. The status column will display a verification in progress message.

## Account Mismatch

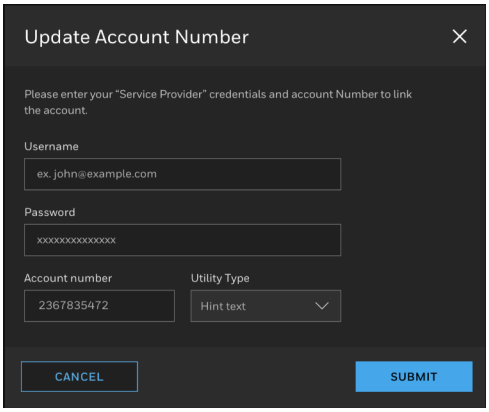
The user will get the account missing message under the status column.




Follow the below-mentioned steps to update the credentials:

Step 1. Select the Update option present under the ACTIONS column.

Step 2. Enter the required credentials and select SUBMIT.

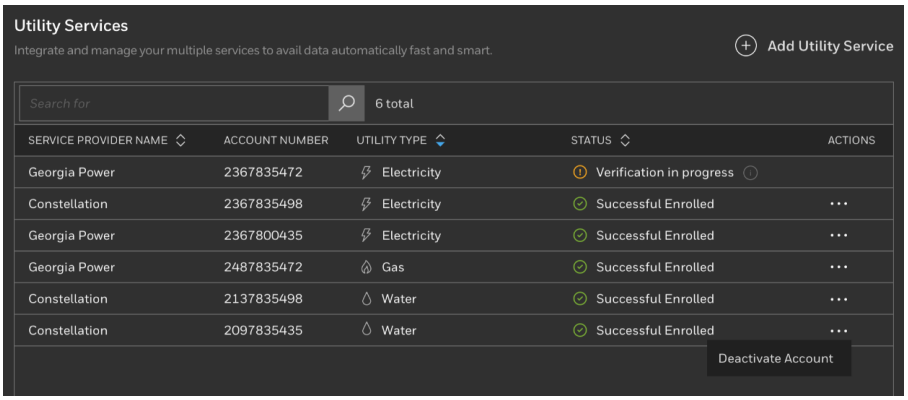


Step 3. The status column will display a verification in progress message.

## Deactivate Account

Follow the below-mentioned steps to delete an account:

Step 1. Navigate to the ellipsis under the actions column and select Deactivate Account.

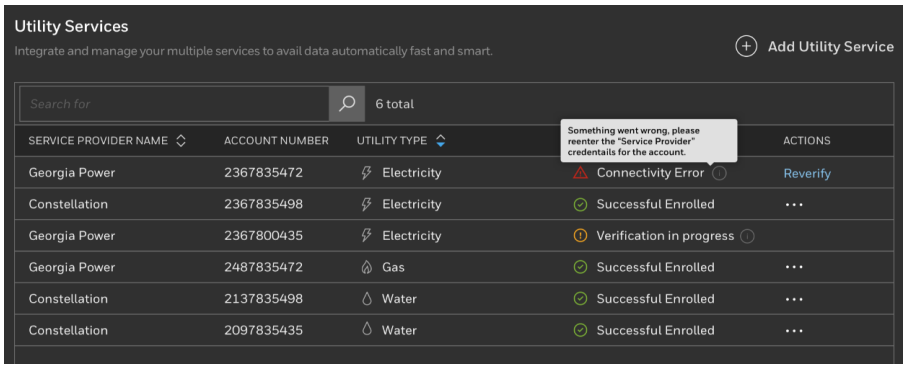



Step 2. Select YES to deactivate the account.

Step 3. The status column will display a deactivated message.

## Connectivity Error

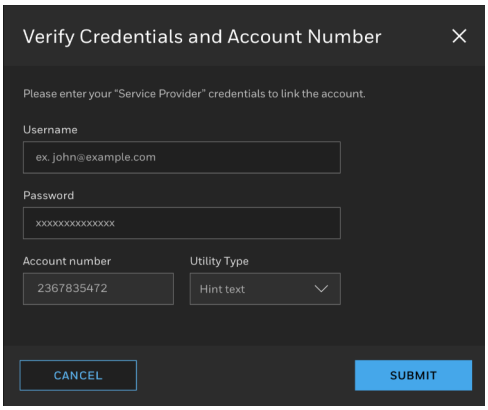
The user will get the connectivity error message under the status column.




Follow the below-mentioned steps to reverify the credentials:

Step 1. Select the Reverify option present under the ACTIONS column.

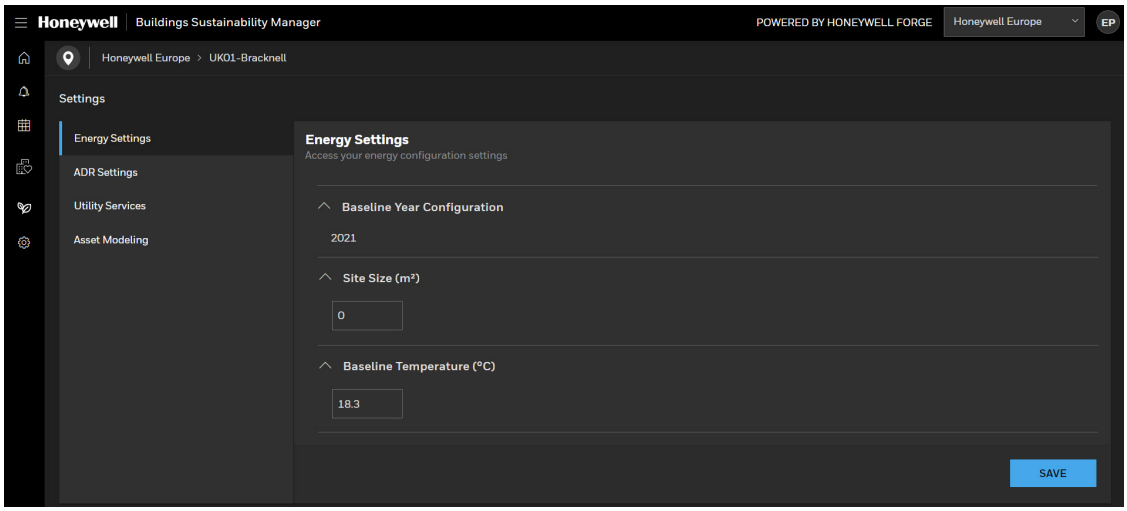
Step 2. Enter the required credentials and select SUBMIT.




The status column will display a verification in progress message.

# Energy Settings

Navigate to the energy settings tab using the settings icon available on the navigation pane. It consists of baseline year configuration, site size, and baseline temperature. Provide the required site details and click Save.




The baseline year configuration is by default given as 2021 and is not configurable by the user.

Site size is the square feet area of the site and is configurable by the user. It is used to calculate EUI.

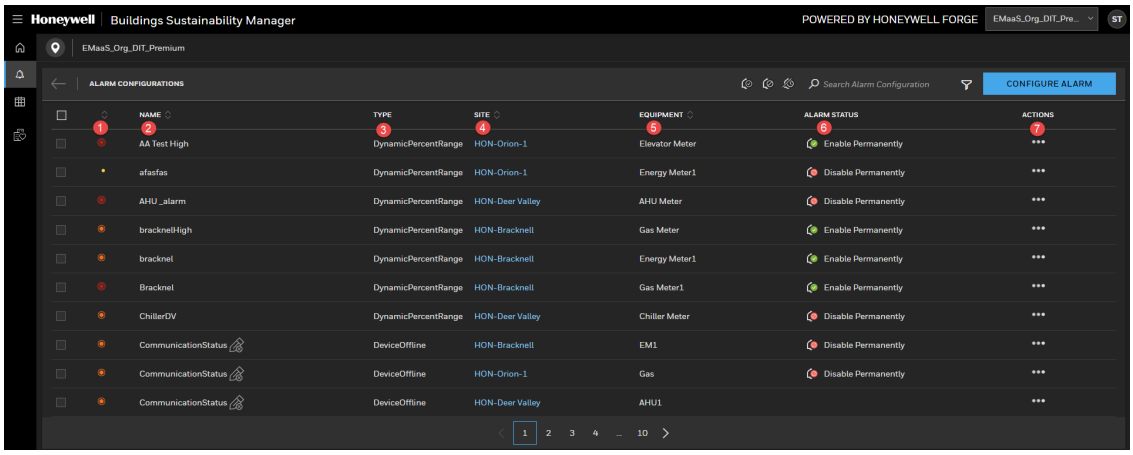
The baseline temperature is the average temperature of the site. It varies based on the geography of the site and is user-configurable.

# Alarms and Thresholds

Configure the alarms after the user onboarding, as shown below.

## Alarm Configurations

A list of pre-configured alarms are shown on the alarm configuration page along with its status. The alarm configuration page appears as shown below.




Select the alarm name to configure it. The following parameters can be updated:

- Alarm Name
- Site
- Equipment
- Min Range (%)
- Max Range (%)
- Priority

Once the alarms are configured, they get updated in the system, the next set of alarms will follow the updated configuration.

The following table describes various columns on the alarm configuration page.

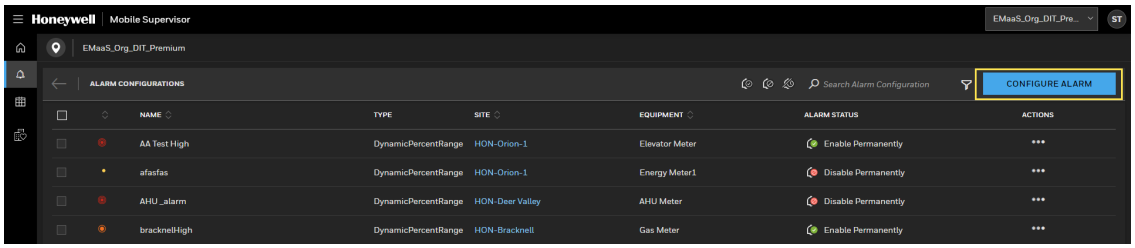
| Sr. No. | Components | Description |
|---|---|---|
| 1 | Priority | It displays the following alarm priority:<br>• High alarm <br>• Medium alarm <br>• Low alarm |

| Sr. No. | Components | Description |
|---|---|---|
| 2 | Name | It displays the alarm name.<br><br>Non-editable alarms are indicated with icon. |
| 3 | Type | It displays the alarm type such as change of state, HighLimit, LowLimit, DeviceOffline, etc. |
| 4 | Site | It displays the name of the site where the alarm occurred. |
| 5 | Equipment | It displays the name of the equipment where the alarm occurred. |
| 6 | Alarm status | It shows the status of the alarms. |
| 7 | Actions | It has the following options:<br>• Enable permanently<br>• Disable permanently<br>• Disable for specific duration |

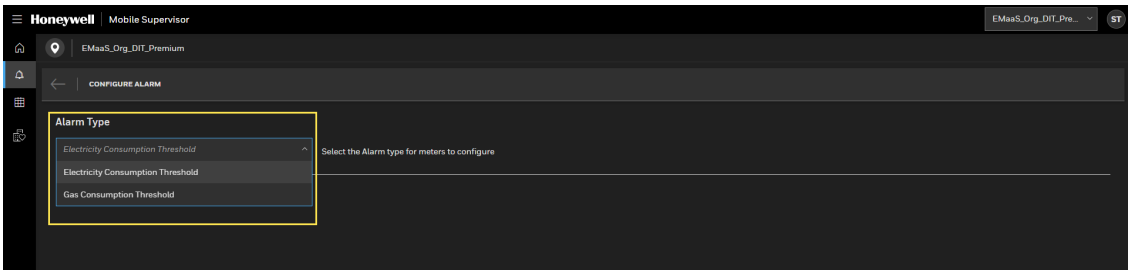
## Configure Alarm

Follow the below-mentioned steps to configure an alarm:

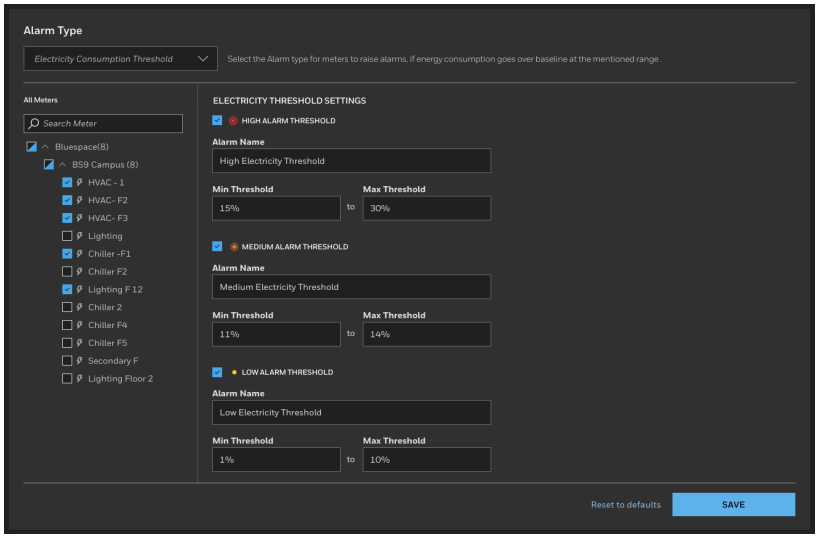
Step 1. Select the CONFIGURE ALARM option from the alarm configurations page.




Step 2. Select the alarm type for meters from the drop-down to configure.



Step 3. Select one or more meters from the left panel to change the threshold values.




Step 4. Edit the required values and select SAVE. A notification is displayed upon the successful completion of the configuration.

***Note:*** *Min and max threshold values cannot overlap for the low, medium, and high alarm threshold.*

CHAPTER

# 4 INTELLIGENT BUILDING OPTIMIZATION

**Actions for Site Technician (GES):**

Follow the below-mentioned steps for site-related updates:

Step 1. Make updates to the control sequences. Refer to the Sequence of Operation Update for IBO BMS-AHU for the detailed steps.

Step 2. Expose the newly setup flow setpoint in the gateway (EBI/Niagara) and make it writable. Also, verify the exposed point for connectivity and control before the physical solution deployment.

Step 3. Update the Niagara cloud network-tuning policies default duration property greater than or equal to 20 min in the case of Niagara CC/Forge Connect.

Step 4. Create and expose Intelligent Building Optimization control On/Off point and make it writable. Also, verify the exposed points.

Step 5. Controller-based schedule (Optional).

Step 6. Perform Control loop testing and tuning.

Step 7. Perform the following site deployment Risk Assessment and Method Statement (RAMS) and get the approval from the FM before its physical deployment:

- **FMEA and Control Plan:** Refer to the procedure given in this link.
- **Test Plan:** Refer to the procedure given in this link.

**Actions for AOC (Context Gathering and Processing):**

Follow the below-mentioned steps for context gathering and processing:

Step 1. Discover the following additional points for flow setpoint and Intelligent Building Optimization control.

- Return air temperature
- Return air relative humidity
- Return airflow rate (cfm)
- Supply air temperature
- Supply air relative humidity
- Supply airflow rate (cfm)

- Outside airflow rate (cfm)
- Cooling/heating valve status/Feedback
- Zone TVOC, PM2.5 (Indoor)
- Zone CO2 (Indoor)
- Supply air Temp Set Point
- Occupancy sensors for real time occupancy - To unlock functionality available in future updates.
- Outside airflow rate (cfm) Setpoint
- Boiler / Chiller Entering water temp
- Boiler / Chiller leaving water temp
- Water flow rate
- Cooling coil capacity
- Heating coil capacity
- Volume and height of area served by AHU
- Outside air temperature
- Outside air relative humidity
- Outside CO2 (Outdoor)
- Outside TVOC, PM2.5 (Outdoor)
- Historical energy consumption from meters and sub-meters

Step 2. Discover IAQ points, duplicate the required IAQ points in the EBI connector, and add local history to it.

Step 3. Add the IAQ points in cloud points available in cloud history from the local workbench.

Step 4. Model sync the cloud only points to the admin portal.

Step 5. Configure the points under AHU in the model editor.

Step 6. Assign roles as per point functionality and publish to EOM.

Step 7. Re-sync to the remote building manager.

Step 8. Points should be verified with the site for validity.

**Smoke Test:**

Step 1. Follow the validation notebook for the data bricks available in this link if the data bricks delta table for all the equipment is created.

Step 2. Follow the energy meter model training procedure available in this link if the site has a meter prediction system and a train prediction model for the energy meters.

Step 3. Verify Telemetry data flow and recommendations.

Step 4. Check if the recommendations are coming to the dashboard.

Step 5. Before deployment, validate the end-to-end connectivity from Common Supervisor to the control element (AHU Outside Air Damper).

# Sequence of Operation Update for IBO BMS-AHU

## Prerequisites

The Intelligent Building Optimization (IBO) building control solution is based on altering the ventilation to the space being served by an AHU. This is accomplished by modulating the fresh air damper through a fresh air flowrate control loop. The IBO algorithm accepts various field parameters such as outdoor air flowrate, CO2, PM2.5, TVOC, supply air flowrate, supply air temperature, etc., as inputs and provides recommendations for the fresh air flowrate set point.

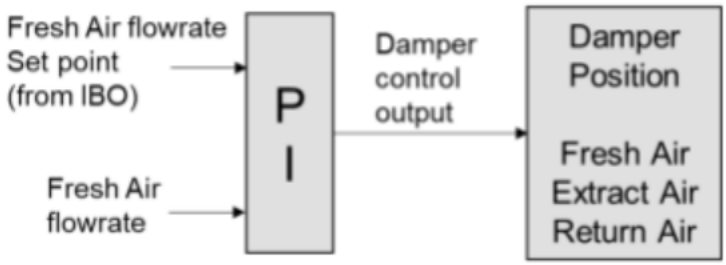
Field parameters required for IBO:

| Sr. No. | Field Parameter | Description |
|---|---|---|
| 1 | Return air temperature | Mandatory |
| 2 | Return air relative humidity | Mandatory |
| 3 | Return airflow rate (cfm) | Good to have (else Estimated) |
| 4 | Supply air temperature | Mandatory |
| 5 | Supply air relative humidity | Mandatory |
| 6 | Supply airflow rate (cfm) | Good to have (else Estimated |
| 7 | Outside/Fresh air flow rate (cfm) | Mandatory |
| 8 | Cooling/heating valve status/Feedback | Mandatory |
| 9 | Zone TVOC, PM2.5 (Indoor) | Mandatory |
| 10 | Zone CO2 (Indoor) | Mandatory |
| 11 | Fan Speed (rpm) & Fan specification sheet | Mandatory |
| 12 | Occupancy sensors for real time occupancy | Required for future release |
| 13 | Outside/Fresh air flow rate (cfm) Setpoint | Mandatory |
| 14 | Boiler / Chiller Entering water temp | Mandatory |
| 15 | Boiler / Chiller Leaving water temp | Mandatory |
| 16 | Water flow rate | Good to have (else Estimated) |
| 17 | Cooling coil capacity (Specification sheet) | Mandatory |
| 18 | Heating coil capacity (Specification sheet) | Mandatory |
| 19 | Volume and height of area served by AHU | Mandatory |
| 20 | Outside air temperature | Weather APIs |
| 21 | Outside air relative humidity | Weather APIs |
| 22 | Outside CO2 | Weather APIs |
| 23 | Outside TVOC, PM2.5 | Weather APIs |
| 24 | BTU meters at AHU level | Good to have (else Estimated |
| 25 | Supply air temperature set point | Not Mandatory (Monitoring) |
| 26 | AHU status/ Fan status | Not Mandatory (Monitoring) |
| 27 | Supply duct static pressure | Not Mandatory (Monitoring) |

# Control Strategy Update for IBO

## Update to the Control Loops

To realize the Intelligent Building Optimization recommendation on the controller, there should be a flow control loop for modulating the fresh air/outdoor air damper. If the flow control loop is unavailable with the existing sequence of operations for the respective AHU, one must be created as shown in the below image.




However, along with the fresh air flow control loop, the existing control loop/logic (for damper modulation) with the default PI controller (Existing) remains within the sequence of operations. The enablement of the existing control loop or the flow control loop (Intelligent Building Optimization) is decided by the state of a multi-state/Enum point.

The multistate point is created within the control sequences. The multistate point can take the following three states:

- Existing (1): The existing control sequences will execute.
- Intelligent Building Optimization (2): Control sequences with the flow control loop will execute.

This multistate point is used to enable the flow control loop through the Intelligent Building Optimization state and to fall back to the existing control strategy in case there is a need to do so (safety, communication failure, etc.).

***Note:*** *The multistate point can also contain the schedule information (time schedule for running Existing control logic and Intelligent Building Optimization) for energy/IAQ baselining.*

To summarize, the following points are to be noted to update the control logic on the controller:

Step 1. A fresh air flow control loop should be designed (if unavailable).

- A reverse-acting PI controller (as per PI controller implementation in CPO) should drive the fresh air flow control loop to modulate the fresh air damper. If the fresh airflow rate is lesser than the fresh airflow rate set point (i.e., the error is negative), the fresh air damper should modulate towards the maximum open position and vice-versa.

- Fresh airflow control loop testing: The dampers should smoothly move in sequence (if multiple fresh air dampers are sequenced) when the flow setpoint is increased. Likewise, when the flow setpoint is decreased, the damper movement should be sequential and smooth.
- PID gain tuning: In case the flow control loop is not behaving as explained above, the flow control loop PID gain tuning may be required.

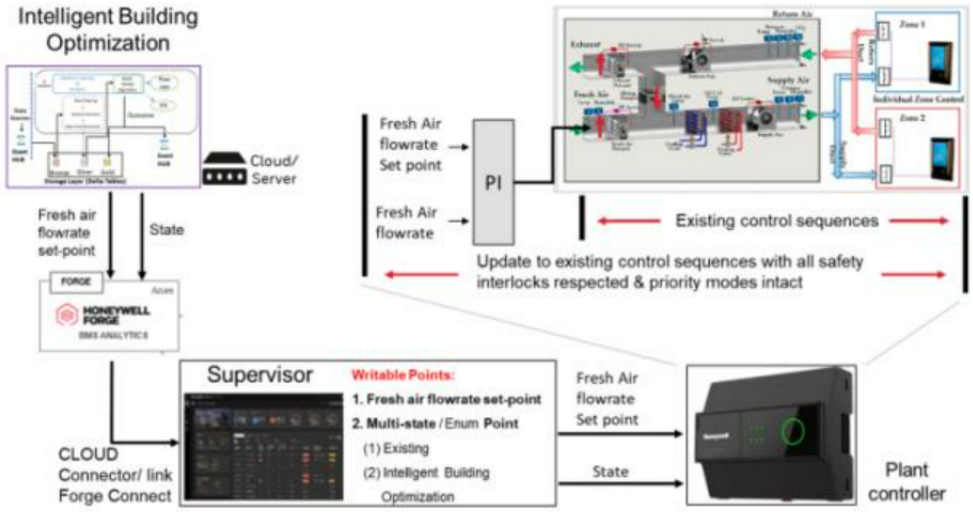
Step 2. Two “writable points” should be created (if not available) on the controller and made available to the EBI/ Niagara supervisor:

- Fresh air flowrate set point.
- Multi-state point.

## Update to the Sequence of Operations

Once AHU supply fan status is proven “On” and “Intelligent Building Optimization” is selected as the state on the multistate point, the fresh air flow control loop will be enabled. As recommended by IBO, the fresh air damper will be modulated to maintain fresh air flow at its set point value.

The fresh air flow set-point will be overridden via a network signal (flow set-point recommendation from IBO) sent to the controller. The data flow pipeline from the IBO algorithm running at the server/cloud to the controller on site is shown in the below image.




As can be seen, apart from the fresh air flowrate recommendation coming from the IBO deployed on the cloud, the point state for the multistate point is also written from the mobile supervisor and communicated to the plant controller as well as the Intelligent Building Optimization.

## Design Notes

- While updating the existing control strategy, safety interlocks (fire, frost, mixed-air temperature, etc.) will always be respected (irrespective of the operation mode).

- The existing interlink operation of the fresh air, return air and extract air dampers remains as-is.
- The proposed control logic implementation on the controller and the existing sequence of operations will be discussed with the AOC/ site team.
- For energy/IAQ baselining, a schedule can be defined on the controller to switch between the existing control and IBO.

## Third-Party Controllers

- The Intelligent Building Optimization (IBO) building control solution alters the ventilation to the space being served by an AHU by modulating the fresh air damper. Hence, along with an airflow measuring station for the fresh air and the supply air/return air, a fresh air flow control loop is required to modulate the fresh air damper.
- It is expected that there may be limited/no access to the control program (sequence of operations) on the controller. In such a case, the field engineer should ensure that the site has the required sensors, as mentioned in section 1. Later, with the support of the AOC/third party controller handling team, ensure that the steps mentioned in section 2 are followed, i.e., (i) Design and testing of the fresh air flowrate control loop; (ii) Two writable points, viz., fresh air flowrate set point and multistate point (for mode selection) on the controller and available on the EBI/ Niagara supervisor.

CHAPTER

# 5 ENERGY OPTIMIZATION

Refer to this link for the EO deployment process.

CHAPTER

# 6 POWER MANAGER

There are two ways to integrate Experion into the Power Manager, namely:

- If the site is installed with the Niagara supervisor then refer to the Connecting Experion to Niagara
- If the site is installed with EBI systems then refer to the Connecting Experion to EBI

## Connecting Experion to Niagara

Experion is connected to Niagara to establish a secure connection and share the data received from the microgrid to Niagara via OPC UA communication.

### Pre-requisite

- Make sure that the site is successfully onboarded before configuring the Honeywell Power Manager.
- Make sure that the site is subscribed to the Control package or above.

#### For Nigara

1. Niagara 4.12u2 (4.12.2.16.1) or higher
2. Make sure that the RBM Station Template is available in the *C:\Niagara\<Niagara Version>\default\workbench\newStations*.
3. Make sure that the modules are available in the location *C:\Niagara\<Niagara Version>\modules*.
   All modules are composed of a single Java Archive (.jar) file that complies with PKZIP compression.

#### For Experion

Step 1. Enable the OPC UA server from Application Connections.

Step 2. Uncheck **Enable device read** from Common options under the OPC Options menu.

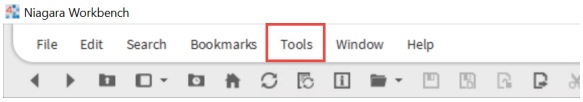
Step 3. Check **Disable SCADA device read via OPC** from Common options under the OPC Options menu.

Step 4. Add a user for OPC UA secure communication in the operator's menu with read and write access.

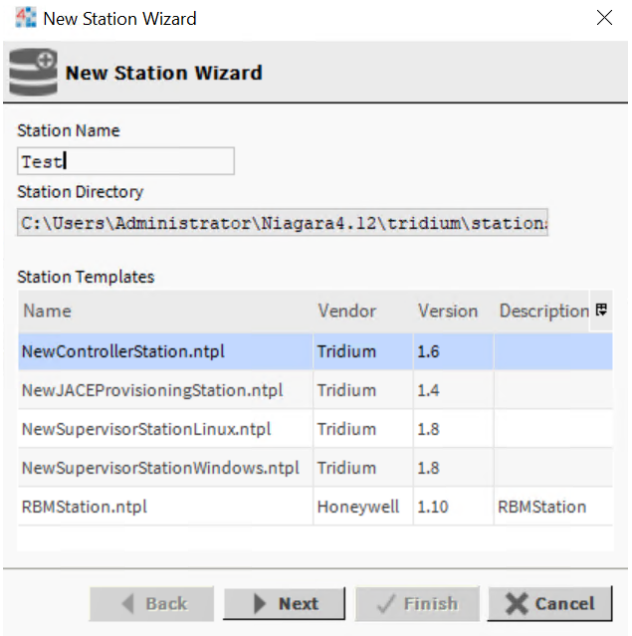
## Creating a Station

A station is the main unit of server processing in the framework architecture. It runs the components of the framework and provides access for client browsers to view and control these components. The primary parts of a station include components and services. A station combines a database, a web server, and a control engine.

Step 1. Go to **Tools**>**New Station**.
The **New Station Wizard** appears.

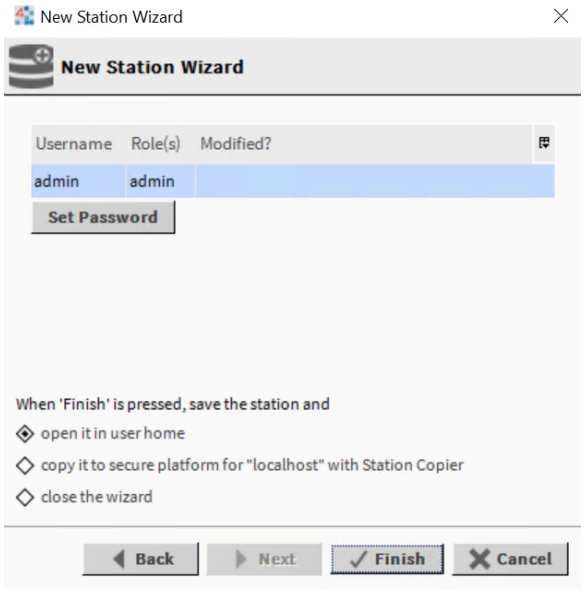


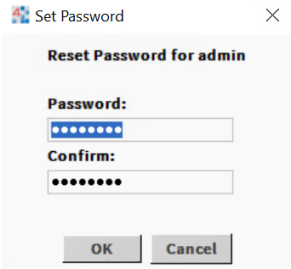

Step 2. Type a station name in the **Station Name** text box and then click **Next**.
The Station Name property is case-sensitive and must begin with a letter. The best practice is to keep station names short and use a station display name if a longer name with spaces or other characters is required. If you enter a duplicate station name, the system prompts you to delete the existing station.




Step 3. Select **RBMStation.ntpl** and then click **Next**.
The **Station Templates** table contains the default new station templates provided in Workbench as well as any user-defined templates. A second window opens to set the admin user password and prompts you to choose an action to take once the station creation is complete.

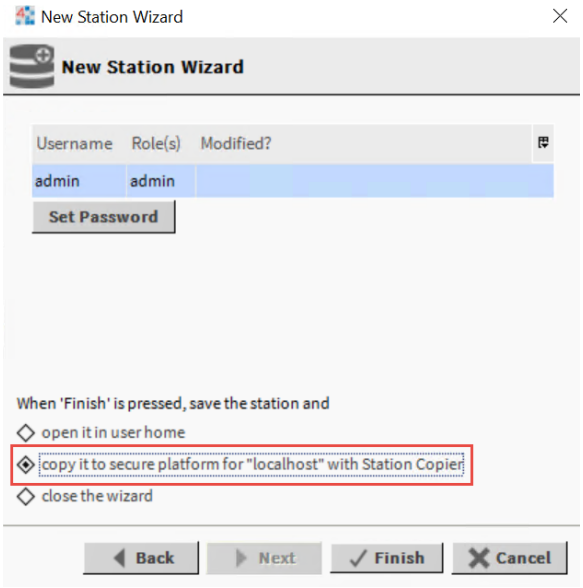
Step 4. Click on **Set Password** to set a password and then click **OK**.
The **Set Password** window opens. Your password must contain at least 10 characters, one digit, one lowercase character, and one uppercase character.




Step 5. In the **New Station Wizard** dialog box, select **copy it to secure platform for 'localhost' with Station Copier** and then click **Finish**.

The new station will be created and copied to the location where the station is running.




| Component | Description |
|---|---|
| Open it in user home | If you select this option then the station will be created and opened in the **Station copier** tab on the local computer. The user needs to transfer the station to the live station (localhost) manually. |
| Copy it to secure platform for 'localhost' with Station Copier | If you choose this option then the newly created station will be automatically transferred to the live station (localhost). |
| Close to wizard | If you choose this option then the station will be created and the wizard will be closed. The user needs to manually navigate to the **Station copier** tab to transfer it to localhost. |

## Create Station using Default Template

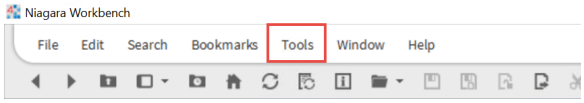
### Pre-requisite

- Make sure that the modules are available in the *C:\Niagara\<Niagara Version>\modules*. All modules are composed of a single Java Archive (.jar) file that complies with PKZIP compression.
- You should have a default point name mapping file for creating point tagging configuration.

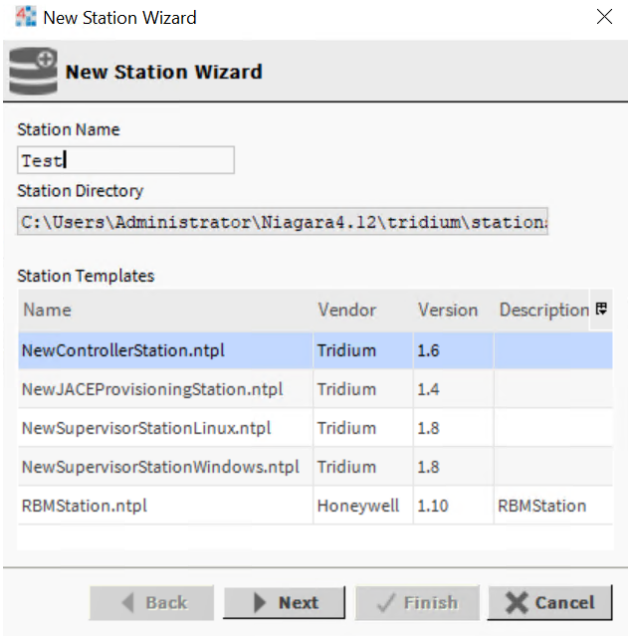
Follow the below-given steps to create a station:

***Note:*** *If you use the default station template then you need to manually create the Easy On Boarding Service, Drivers, and Point name mapping file.*

Step 1. Go to **Tools** > **New Station**.
The **New Station Wizard** appears.

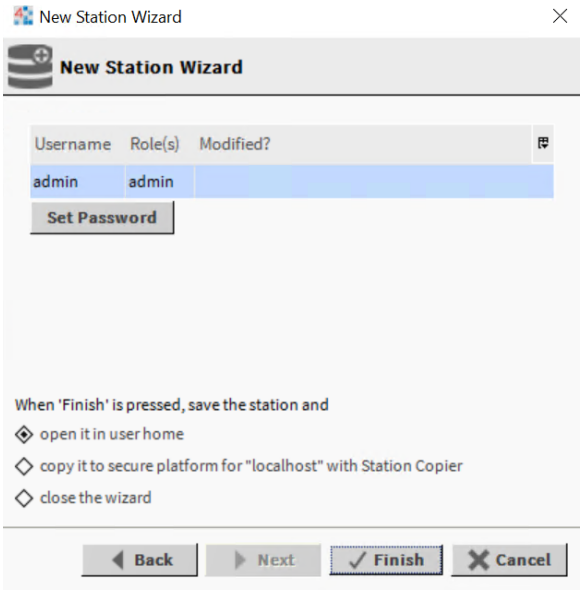


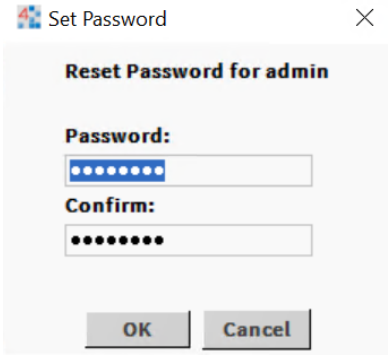

Step 2. Type the station name in the **Station Name** text box and then click **Next**.
The Station Name property is case-sensitive and must begin with a letter. The best practice is to keep station names short and use a station display name if a longer name with spaces or other characters is required. If you enter a duplicate station name, the system prompts you to delete the existing station.




Step 3. Select a station template and then click **Next**.
The Station Templates table contains the default new station templates provided in Workbench as well as any user-defined templates. A second window opens to set the admin user password and prompts you to choose an action to take once the station creation is complete.

Step 4. Click on **Set Password** to create a password and then click **OK**.
The Set Password window opens. Your password must contain at least 10 characters, one digit, one lowercase character, and one uppercase character.




Step 5. In the **New Station Wizard** dialog box, select **copy it to secure platform for 'localhost' with Station Copier** and then click **Finish**.
The new station will be created and copied to the location where the station is running.

| Option | Description |
|---|---|
| Open it in user home | If you select this option then the station will be created and opened on home page on the local computer. The user needs to transfer the station to the live station (localhost) manually. |
| Copy it to secure platform for 'localhost' with Station Copier | If you choose this option then the newly created station will be automatically transferred to the live station (localhost). |
| Close to wizard | If you choose this option then the station will be created and the wizard will be closed. The user needs to manually navigate to the **Station copier** tab to transfer it to localhost. |

# Commissioning

We use the OPC UA protocol to read the microgrid points from the Experion system. Niagara will act as an OPC UA client. Through a secure OPC UA connection (certificate and user authentication) to the Experion server, Niagara will read the microgrid points and forward them to the Honeywell Forge Sustainability+ dashboard through the building BMS system.

## Create Client Certificate

***Note:*** *To create a certificate, a **gen-opc-cert.bat** file is shared by the Niagara.*

***Note:*** *You can either create a certificate in the system where Niagara is installed or copy the certificate to the Niagara machine.*

Step 1. Run the **gen-opc-cert.bat** file.

Step 2. Enter the client hostname and then hit **Enter**.
Enter **ipconfig/all** in the Command Prompt to get the Host Name.
If the **Primary Dns Suffix** is empty then you can use Host Name as the client host name.
If the Primary Dns suffix is given then the client hostname will be **<Host Name.Primary Dns Suffix>**.

Step 3. Enter certificate validity in days and hit **Enter**.
By default, certificate validity is 365 days.

Step 4. Enter a destination file name and then hit **Enter**.
By default, the destination file name is **client.pem**.

Step 5. Enter a password for the certificate and re-enter it again to verify.
Be careful while creating the password, the password will not be visible when you enter it.

Step 6. Enter the following details:

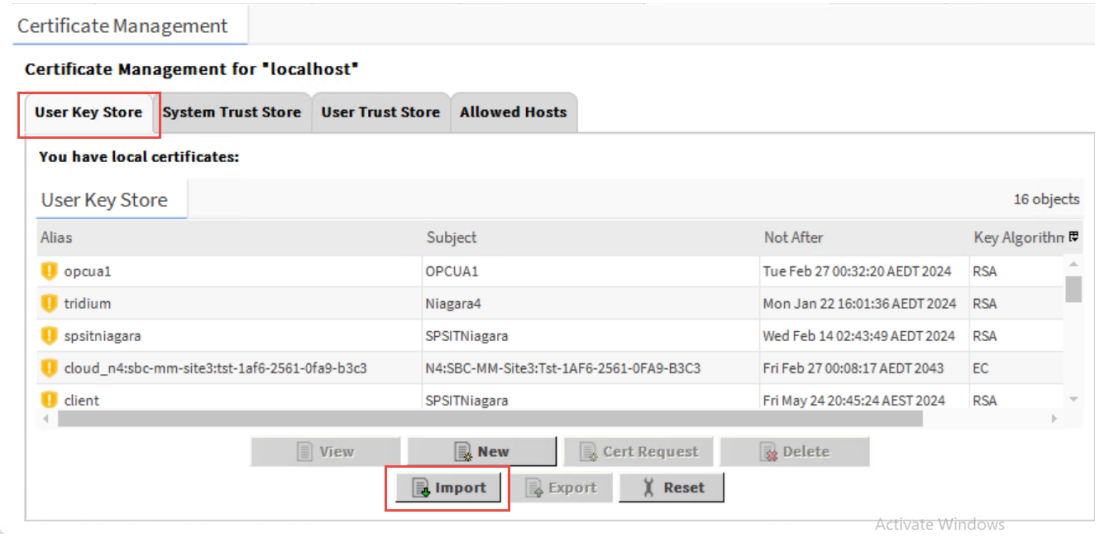
- Country name in two letters: For example, if the country is India then the country name will be **IN**.
- State or Province: For example, if the state is Maharashtra then you can write **MH**.
- Organization name: For example, Honeywell
- Organization Unit Name: For example, SBT.
- Common Name: By default, it is Host Name but you can write Server FQDN or your name.
- Customer email address.

Step 7. A certificate with the name you gave in the client hostname is created in the same location where the .bat file is copied.

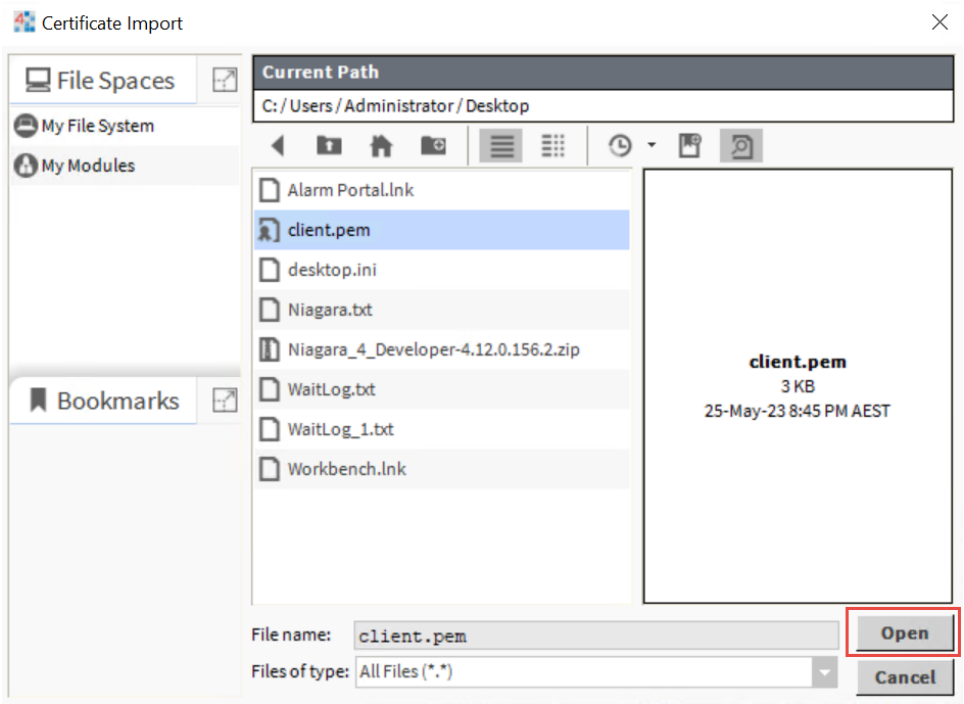
Step 8. Copy the certificate to the Niagara machine if it is created in another machine.

Step 9. In your Niagara system, go to the station that you have created for OPC communication then go to **Config > Services** > **PlatformServices > CertManagerService**.

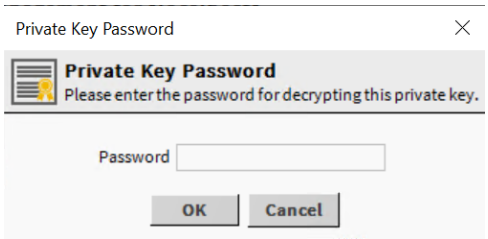
Step 10. Go to the **User Key Store** tab and click **Import**.
The **Certificate Import** dialog box appears.




Step 11. Locate the certificate you have created and click **Open**.




Step 12. Enter the password that was used while creating the certificate.
The **Certificate Import** dialog box will show the preview of the certificate.

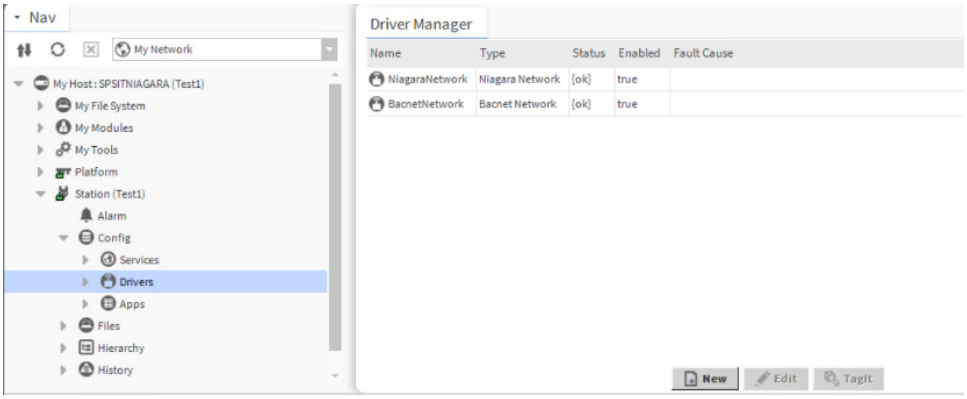


Step 13. Click **OK**.
**Private Key Password** dialog bow appears.

Step 14. Create a password and click **OK**.

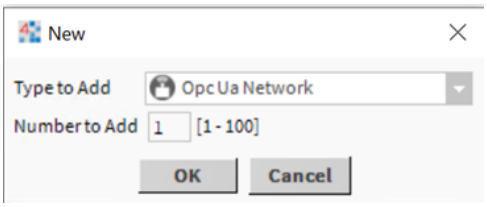
## Driver Configuration

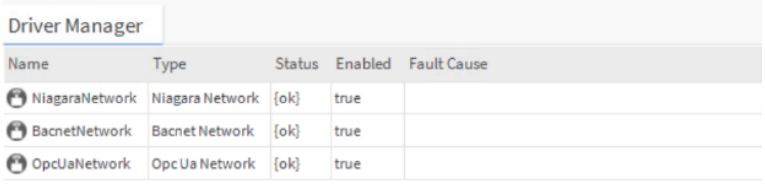
Step 1. Go to **Stations** > **< Station name>** > **Config** and then double-click **Drivers**.



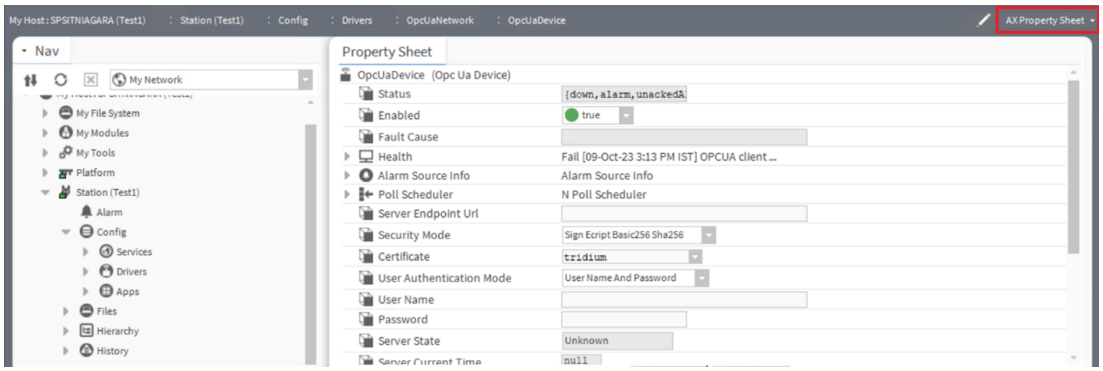

Step 2. In the **Driver Manager** tab, click **New.**

Step 3. Click **OpcUaNetwork** from the drop-down list and click **OK**.
OpcUaNetwork is added in Drivers.

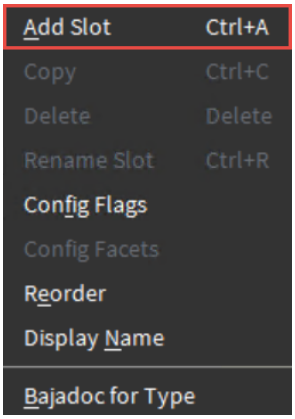


Step 4. Go to the **AX property sheet** in the upper-right corner and click **AX Slot Sheet**.
The **Slot Sheet tab** opens.

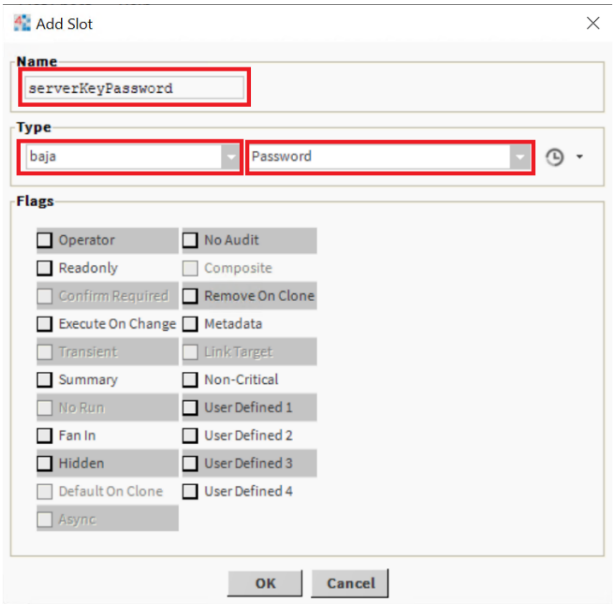



Step 5. Right-click anywhere in the **AX Slot Sheet** tab and then click **Add Slot**.
**Add Slot** dialog box appears.



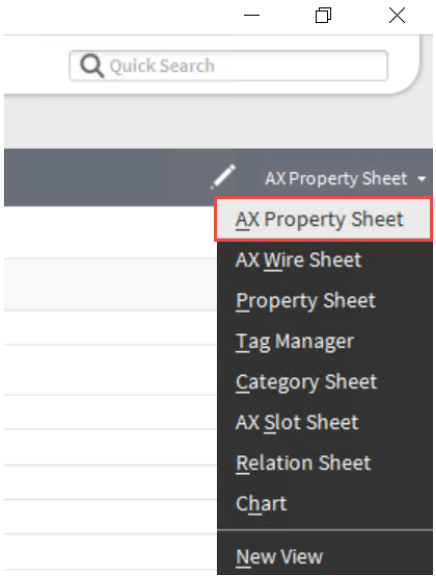

Step 6. Do the following steps in the **Add Slot** dialog box:

- Enter **serverKeyPassword** in the **Name** box.
- Select **baja** and **Password** in the Type drop-down list.




Step 7. Click **OK**.

Step 8. Go to **AX Slot Sheet** in the upper-right corner and click **AX Property Sheet**. The AX Property Sheet tab opens.

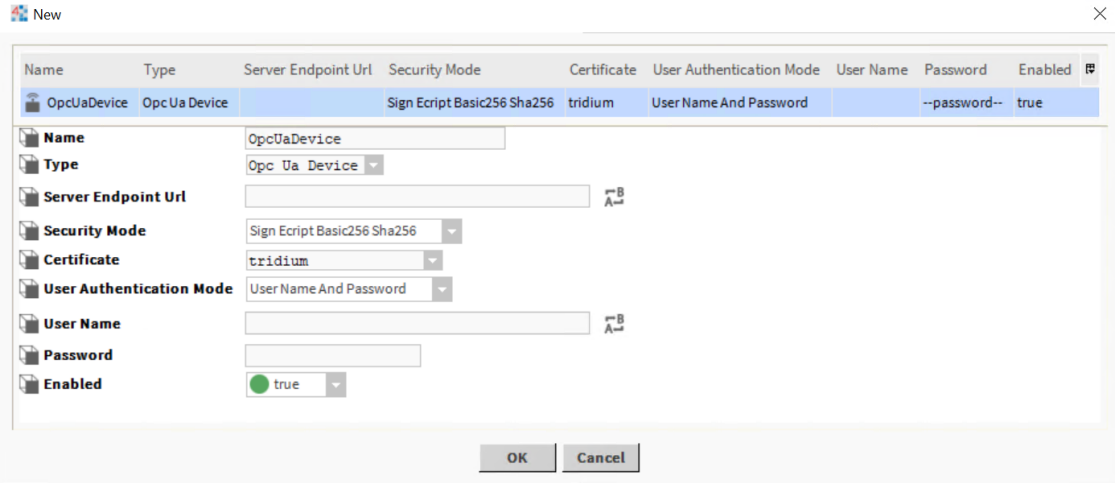



Step 9. Enter the Private Key Password.
Refer to Step-14 of Create Client Certificate on page 54.

Step 10. Enter the URL in the **Server Endpoint Url**.
Server Endpoint Url formats:
opc.tcp//<hostname>:<port> or opc.tcp//<IP address>:<port>

***Note:*** *Hostname or the IP address should be of the Experion OPC UA server machine's Port: 4840 (Default OPC UA communication port)*

Step 11. Select **Sign Ecript Basic256 Sha256** in the **Security mode**.




Step 12. Select the certificate that is imported.
Refer to Create Client Certificate on page 54.

Step 13. Select **User Name and Password** in the **User Authentication Mode**.

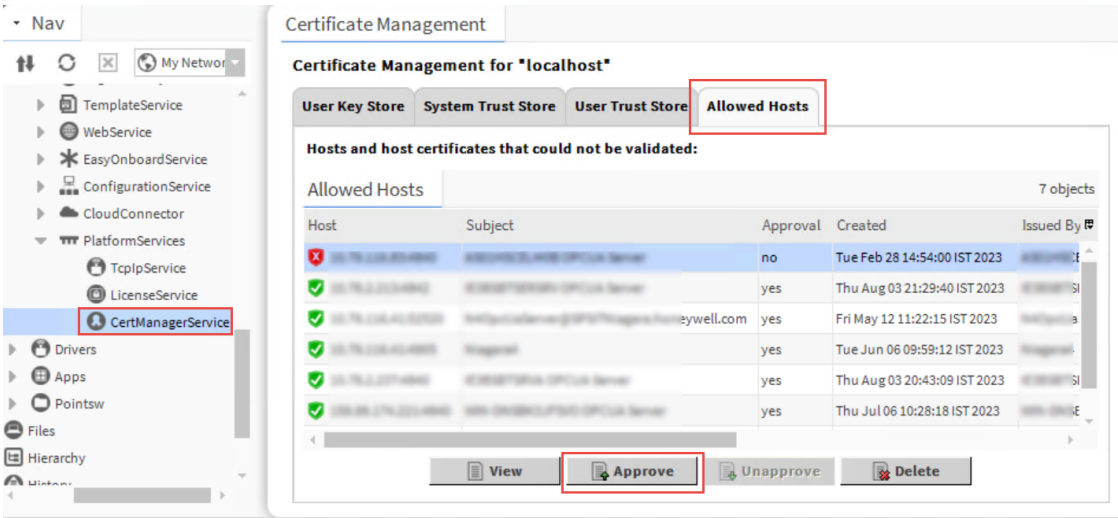
Step 14. Enter the username and password created for OPC UA communication in the Experion OPC UA server.

Step 15. Make sure **True** is selected in **Enabled**.

Step 16. Click **OK**.

Step 17. Communication will fail with Fault cause 'Invalid Server Certificate'.

Step 18. Go to **Station** > **Services** > **PlatformServices** > **CertManagerServices**, open the **Allowed Hosts** tab, and approve the Experion Certificate.




Step 19. Go to OPC UA Device and right-click OpcUaDevice, select **Actions** > **Ping**. OPC Communication will fail with fault cause.

Step 20. In Experion Server, go to C;\ProgramData\Honeywell\Experion PKS\Server\data\CertStore\opcuserserver\pki\DefaultapplicationGroup\rejected\cert and move the Niagara certificate to the **trusted** folder.

Step 21. Restart the opcuaserver.exe from the windows task manager in the Experion server.

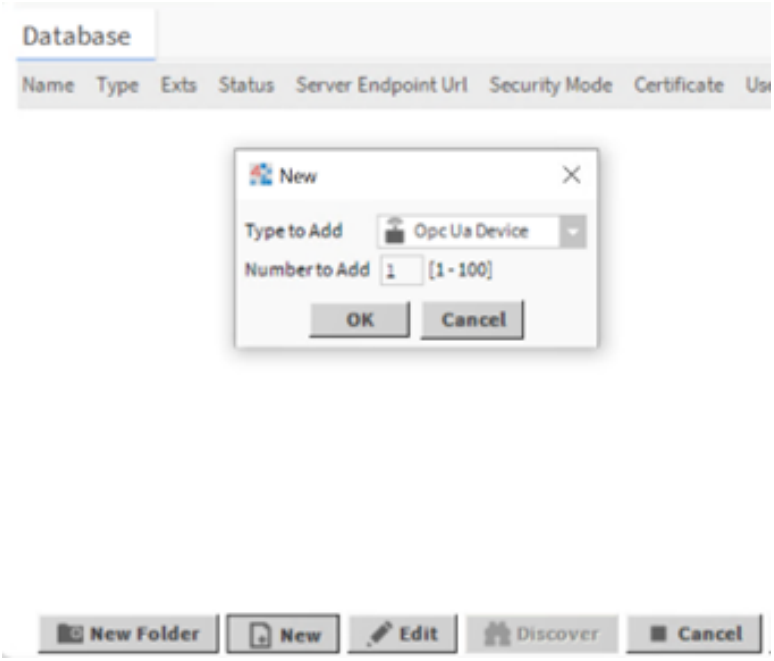
Step 22. Right-click **OpcUaDevice**, go to **Actions,** and click **Ping**. Secure communication will be established.

## Add a Device in OpcUaNetwork

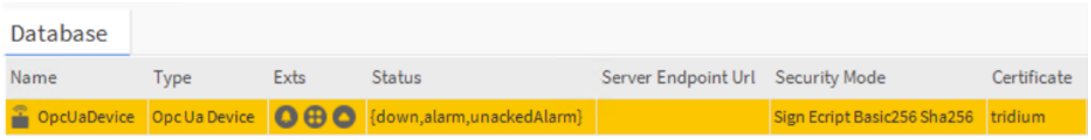
Do the following steps to add devices in OpcUaNetwork:

Step 1. Double-click OpcUaNetwork.

Step 2. Click **New** and then click **OK**.




Step 3. Rename the device if required then click **OK**.

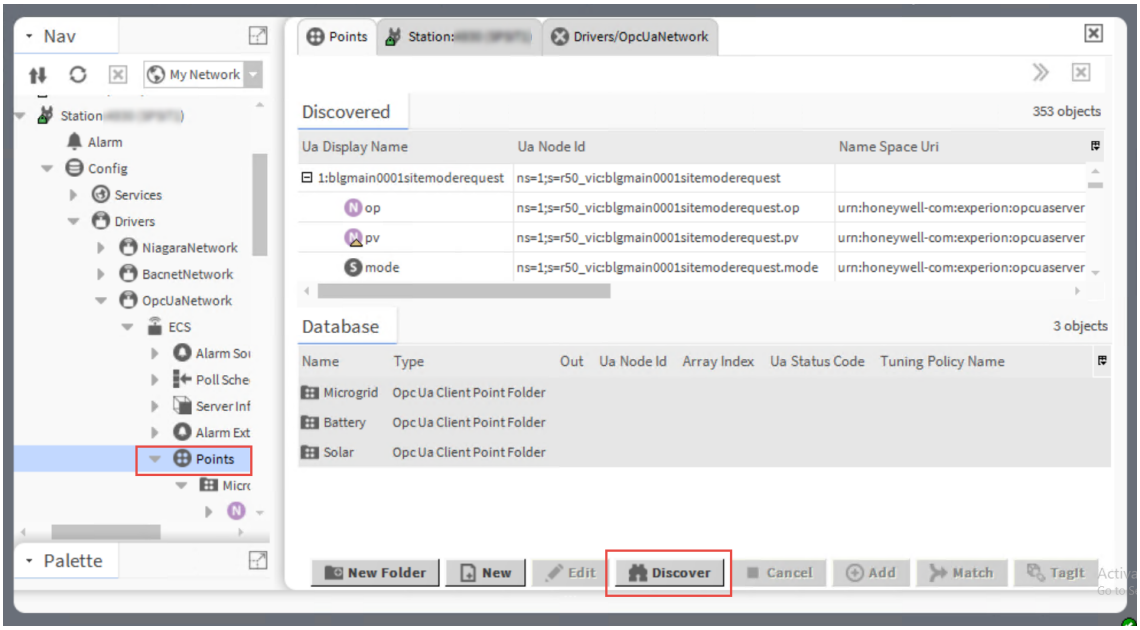


## Discover Points

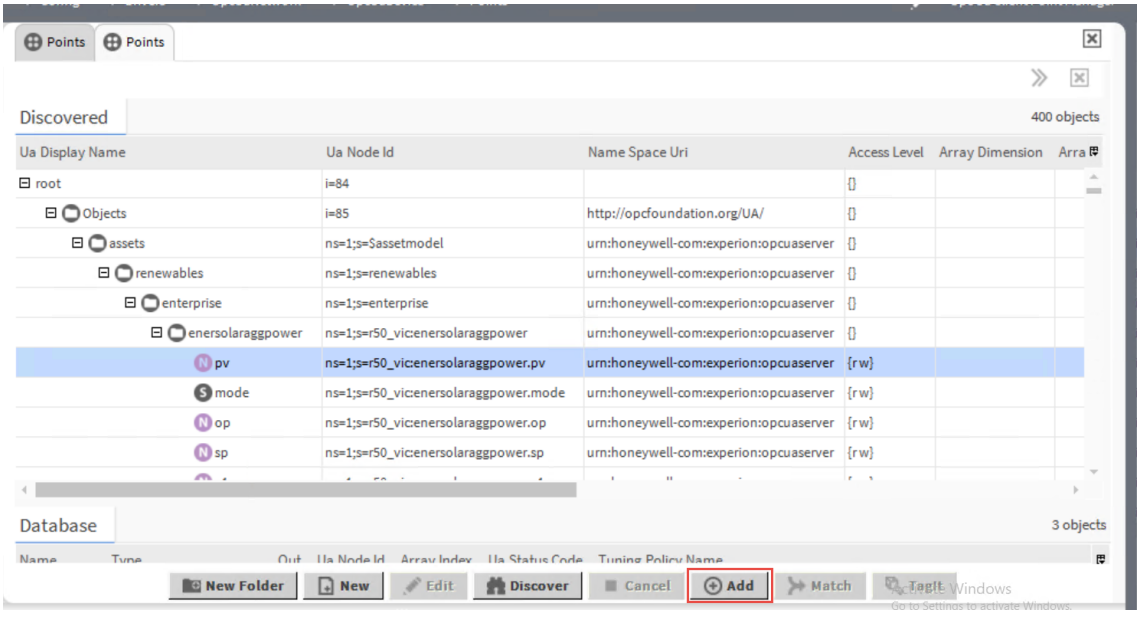
After the configuration is completed, you need to discover the points.

Step 1. In the left pane, go to **Station > Config > Drivers > OpcUaNetwork > OpcUaDevice > Points** and click **Discover**.
It will show the list of assets the user has access to.

***Note:*** *The duration of points and device discovery depends on the number of points configured with the device.*




Step 2. In the **root** drop-down list, expand the points.

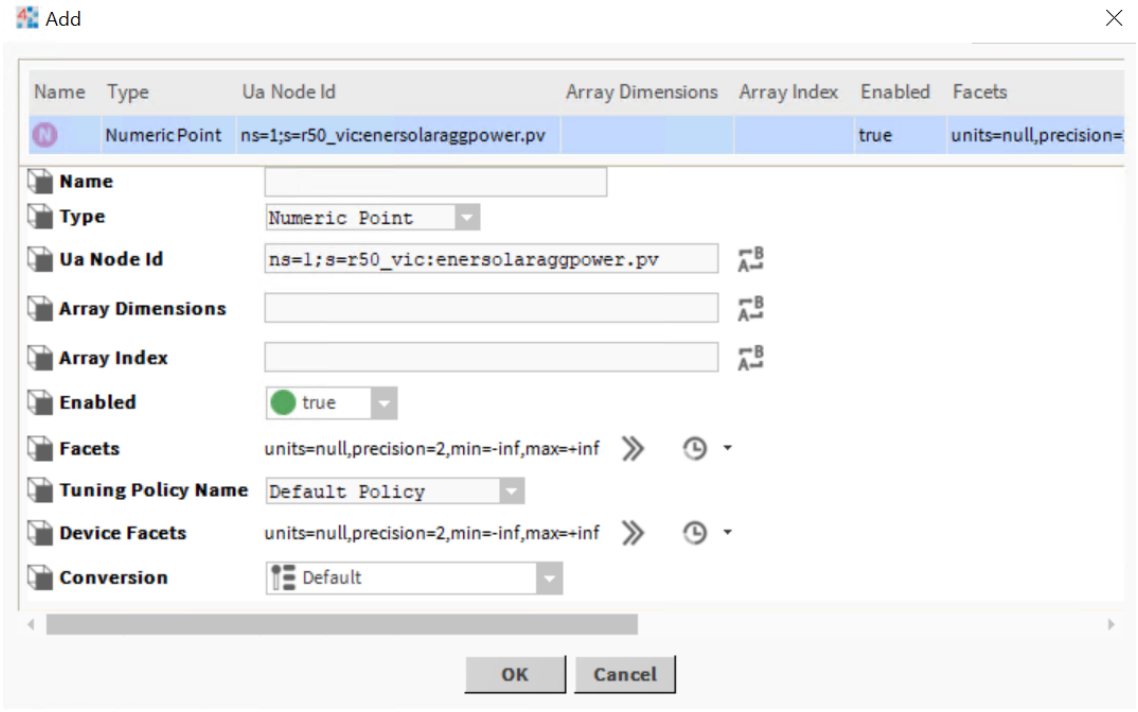



Step 3. Select a node and then click **Add.**
For example, the nodes can be **PV**, **OP,** or **SP**.

Step 4. In the **Add** dialog box, do the following:

a. Enter your name in the **Name** box.

b. Select the unit in the **Facets**.



Step 5. Do step 3 and step 4 to add the required points and click **OK**.
Refer to the below given table for the points that are required to add for the Honeywell Power Manager dashboard,

| S.No | Equipment | Node ID | Point Name | Unit | Property Role |
|---|---|---|---|---|---|
| 1 | MicroGrid | ns=1;s=dnsbk3jfsvo_svr:lgojsitepowerusage.m1.value | SiteGridActivePower | KW | GridPower |
| 2 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitepowerusage.m2.value | BESSActivePower | KW | BESSPower |
| 3 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitedgpower.pv | DGActivePower | KW | DGPower |
| 4 | | ns=1;s=dnsbk3jfsvo_svr:lgojsolaraggpower.pv | SolarActivePower | KW | SolarPower |
| 5 | | ns=1;s=dnsbk3jfsvo_svr:lgojfacility0001load.pv | SiteLoad | KW | SiteDemand |
| 6 | | ns=1;s=dnsbk3jfsvo_svr:lgojsiteactualmode.pv | MicrogridActualMode | | ActualMode |
| 7 | | ns=1;s=dnsbk3jfsvo_svr:lgojbess0001currentsoc.pv | BESSStateofCharge | % | StateOfCharge |
| 8 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitesitegeneration.pv | MicrogridGeneration | KW | SiteGeneration |
| 9 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitegridstatus.pv | SiteGridConnectionStatus | | SiteMicrogridStatus |
| 10 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitedgmaxpower.pv | DGMaximumPower | KW | DGMaxPower |
| 11 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitemoderequest.op | MicrogridModeRequest | | ModeRequestCommand |
| 12 | | ns=1;s=dnsbk3jfsvo_svr:lgojsiteislandstarttime.sp | SiteIslandStartTime | S | IslandStartTimeCommand |
| 13 | | ns=1;s=dnsbk3jfsvo_svr:lgojsiteislandduration.sp | SiteIslandDuration | hr | IslandDurationCommand |
| 14 | | ns=1;s=dnsbk3jfsvo_svr:lgojsiteprepislandstarttime.sp | SitePrepareToIslandStartTime | s | PrepIslandStartTimeCommand |
| 15 | | ns=1;s=dnsbk3jfsvo_svr:lgojsiteprepislandduration.sp | SitePrepareToIslandDuration | hr | PrepIslandDurationCommand |
| 16 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitebackupduration.pv | SiteBackupDuration | hr | BackupDuration |
| 17 | | ns=1;s=dnsbk3jfsvo_svr:lgojsiteexportcapacity.pv | SiteAvailableBackup | KWh | ExportCapacity |
| 18 | | ns=1;s=dnsbk3jfsvo_svr:lgojfacility0001load.hourlyaverage.value | FacilityLoadAverage | KW | FacilityLoadH1H |
| 19 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitebessavailtime.pv | SiteBessBackupDuration | hr | BessAvailTime |
| 20 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitedgavailtime.pv | SiteDGBackupDuration | hr | DGAvailTime |
| 21 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitedgavailenergy.pv | DGAvailableEnergy | KWh | DGAvailEnergy |
| 22 | | ns=1;s=dnsbk3jfsvo_svr:lgojsitedgfuelacclast.pv | DGFuelLastMonthConsumption | Litre | DGFuelAccLast |
| 23 | | ns=1;s=dnsbk3jfsvo_svr:lgojsolaraggenergyacc.energyacclast | SolarEnergyLastMonthConsumption | KWh | SolarGenAccLast |
| 24 | | ns=1;s=dnsbk3jfsvo_svr:lgojsite.dgmaxenergycapacity | DGMaximumEnergyCapacity | KWh | DGMaxEnergyCapacity |
| 25 | Battery | ns=1;s=dnsbk3jfsvo_svr:lgojbess0001exportcapacity.pv | BESSExportCapacity | KWh | ExportCapacity |
| 26 | | ns=1;s=dnsbk3jfsvo_svr:lgojbess0001maxenergycapacity.pv | BESSMaximumEnergyCapacity | KWh | MaxEnergyCapacity |
| 27 | | ns=1;s=dnsbk3jfsvo_svr:lgojbess0001maxdischargerate.pv | BESSMaxDischargePower | KW | MaxDischargeRate |
| 28 | Solar | ns=1;s=dnsbk3jfsvo_svr:lgojsolaragg.maxpower | SolarMaximumPower | KW | MaxPower |

| Point | Enum Facet | |
|---|---|---|
| MicrogridActualMode | 1 | Manual |
| | 2 | Island |
| | 3 | PrepareforIsland |
| | 4 | CostOptimizedoperation |
| | 5 | CarbonOptimizedoperation |
| | 6 | Schedule |
| MicrogridModeRequest | 1 | Manual |
| | 2 | Island |
| | 3 | PrepareforIsland |
| | 4 | CostOptimizedoperation |
| | 5 | CarbonOptimizedoperation |
| | 6 | Schedule |

| Point | Boolean Facet | |
|---|---|---|
| SiteGridConnectionStatus | 0 | Island |
| | 1 | GridConnected |

<server_name>: Experion OPC server name

<site_abbr>: Site abbreviation used when commissioning the Experion ECS templates.

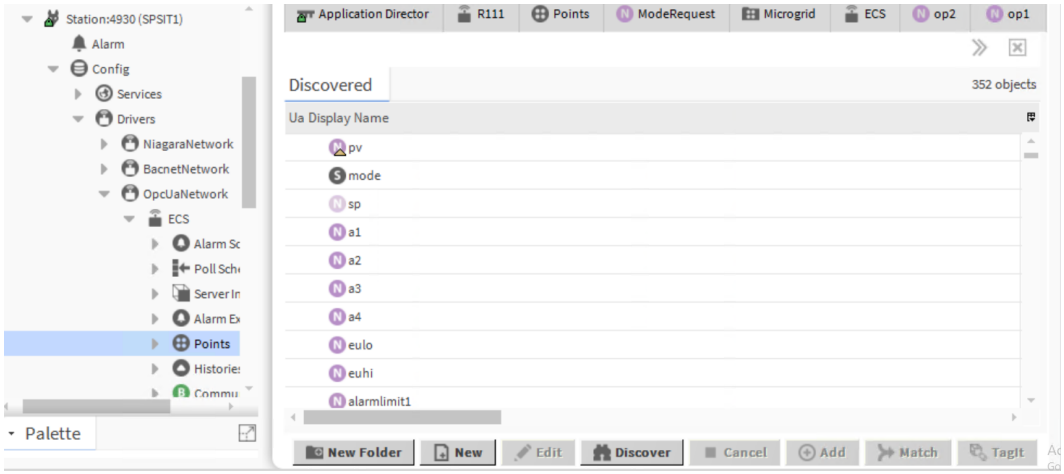
The added points will appear in the **Database** tab.

## Grouping of Points

In any station, all real-time data are normalized within the station database as points, a special group of components.

Each type of point may be used for different purposes. Points may be named and renamed but they retain their initial point type characteristics and their characteristic icon color.

Step 1. Go to **Station** > **Config** > **Drivers** > **OpcUaNetwork** > **Opcuadevice**, and double-click on **Points**.
**Dicovered** tab opens.




Step 2. Click **New Folder** and enter a name for the folder.

Step 3. Do steps 1 and 2 (optional) to create more folders.

Step 4. Move the points to the required folders.
Refer to Step-5 on page 63 for more details.

***Note:*** *The Niagara gateway is onboarded with buildings data into Honeywell Forge Sustainability+ during the process of onboarding CEMS.*

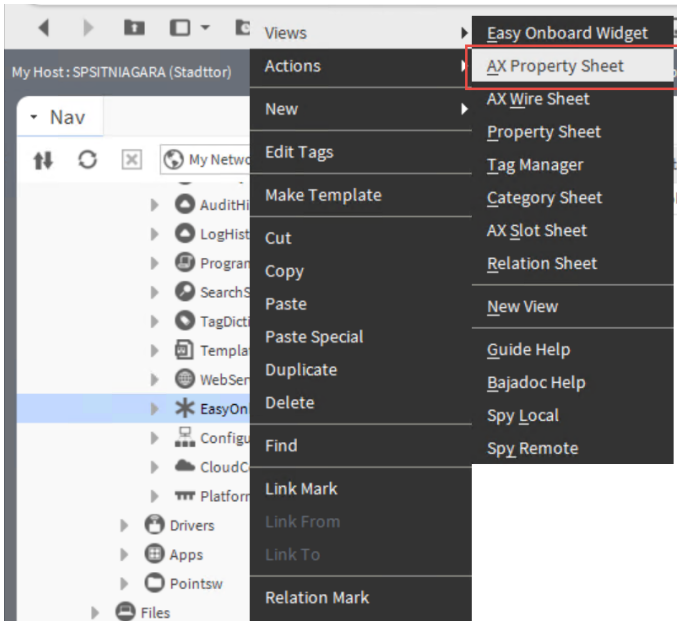
Step 1. Add the equipment type in the TagDictionaryService for the equipment tagging.

Step 2. Update the PointNameMapping.xlsx file with the required point roles.

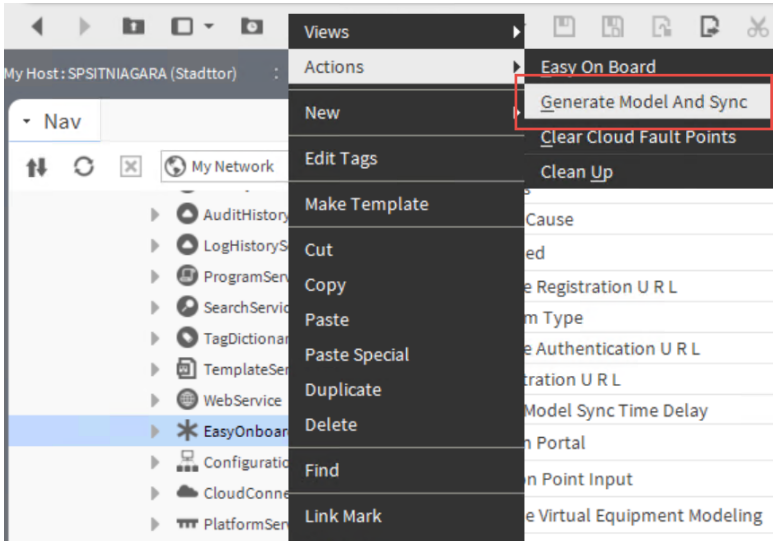
| S.No | Equipment | Node ID | Point Name | Unit | Property Role |
|---|---|---|---|---|---|
| 1 | MicroGrid | ns=1;s=<server_name>:<site_abbr>sitepowerusage.m1.value | SiteGridActivePower | MW | GridPower |
| 2 | | ns=1;s=<server_name>:<site_abbr>sitepowerusage.m2.value | BESSActivePower | MW | BESSPower |
| 3 | | ns=1;s=<server_name>:<site_abbr>sitedgpower.pv | DGActivePower | MW | DGPower |
| 4 | | ns=1;s=<server_name>:<site_abbr>solaraggpower.pv | SolarActivePower | MW | SolarPower |
| 5 | | ns=1;s=<server_name>:<site_abbr>facility0001load.pv | SiteLoad | MW | SiteDemand |
| 6 | | ns=1;s=<server_name>:<site_abbr>siteactualmode.pv | MicrogridActualMode | | ActualMode |
| 7 | | ns=1;s=<server_name>:<site_abbr>bess0001currentsoc.pv | BESSStateofCharge | % | StateOfCharge |
| 8 | | ns=1;s=<server_name>:<site_abbr>sitesitegeneration.pv | MicrogridGeneration | MW | SiteGeneration |
| 9 | | ns=1;s=<server_name>:<site_abbr>sitegridstatus.pv | SiteGridConnectionStatus | | SiteMicrogridStatus |
| 10 | | ns=1;s=<server_name>:<site_abbr>sitedgmaxpower.pv | DGMaximumPower | MW | DGMaxPower |
| 11 | | ns=1;s=<server_name>:<site_abbr>sitemoderequest.op | MicrogridModeRequest | | ModeRequestCommand |
| 12 | | ns=1;s=<server_name>:<site_abbr>siteislandstarttime.sp | SiteIslandStartTime | S | IslandStartTimeCommand |
| 13 | | ns=1;s=<server_name>:<site_abbr>siteislandduration.sp | SiteIslandDuration | hr | IslandDurationCommand |
| 14 | | ns=1;s=<server_name>:<site_abbr>siteprepislandstarttime.sp | SitePrepareToIslandStartTime | s | PrepIslandStartTimeCommand |
| 15 | | ns=1;s=<server_name>:<site_abbr>siteprepislandduration.sp | SitePrepareToIslandDuration | hr | PrepIslandDurationCommand |
| 16 | | ns=1;s=<server_name>:<site_abbr>sitebackupduration.pv | SiteBackupDuration | hr | BackupDuration |
| 17 | | ns=1;s=<server_name>:<site_abbr>siteexportcapacity.pv | SiteAvailableBackup | MWh | ExportCapacity |
| 18 | | ns=1;s=<server_name>:<site_abbr>facility0001load.hourlyaverage.value | FacilityLoadAverage | MW | FacilityLoadH1H |
| 19 | | ns=1;s=<server_name>:<site_abbr>sitebessavailtime.pv | SiteBessBackupDuration | hr | BessAvailTime |
| 20 | | ns=1;s=<server_name>:<site_abbr>sitedgavailtime.pv | SiteDGBackupDuration | hr | DGAvailTime |
| 21 | | ns=1;s=<server_name>:<site_abbr>sitedgavailenergy.pv | DGAvailableEnergy | MWh | DGAvailEnergy |
| 22 | | ns=1;s=<server_name>:<site_abbr>sitedgfuelacclast.pv | DGFuelLastMonthConsumption | Litre | DGFuelAccLast |
| 23 | | ns=1;s=<server_name>:<site_abbr>solaraggenergyacc.energyacclast | SolarEnergyLastMonthConsumption | MWh | SolarGenAccLast |
| 24 | | ns=1;s=<server_name>:<site_abbr>site.dgmaxenergycapacity | DGMaxEnergyCapacity | MWh | DGMaxEnergyCapacity |
| 25 | Battery | ns=1;s=<server_name>:<site_abbr>bess0001exportcapacity.pv | BESSExportCapacity | MWh | ExportCapacity |
| 26 | | ns=1;s=<server_name>:<site_abbr>bess0001maxenergycapacity.pv | BESSMaxEnergyCapacity | MWh | MaxEnergyCapacity |
| 27 | | ns=1;s=<server_name>:<site_abbr>bess0001maxdischargerate.pv | BESSMaxDischargePower | MW | MaxDischargeRate |
| 28 | Solar | ns=1;s=<server_name>:<site_abbr>solaragg.maxpower | SolarMaximumPower | MW | MaxPower |

<server_name>: Experion OPC server name
<site_abbr>: Site abbreviation used when commissioning the Experion ECS templates.

Step 3. Right-click the **EasyOnboardService** in the left pane and go to **Views** > **AX Property Sheet**.
**Property Sheet** tab opens.



Step 4. Right-click on the **EasyOnboardService** in the left pane and go to **Actions** > **Generate Model and Sync**.




Step 5. Make sure that the **Site Id** and **Site Name** are correct in the Generate Model and Sync Window.

Step 6. Click **OK**.
The data is pushed to Forge and then to the Honeywell Power Manager dashboard.

Refer to the Onboarding a Site having Forge Connect on page 4 for more details.

Refer to the Onboarding a Site having Niagara or JACE Device on page 20 for more details.

# Connecting Experion to EBI

Experion is connected to Enterprise Buildings Integrator (EBI) through the Niagara JACE to establish a secure connection and share the data received from the microgrid with EBI.

## Pre-requisite

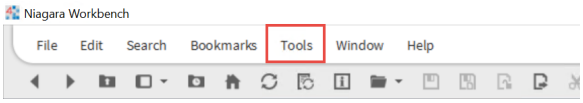
Step 1. Niagara 4.12u2(4.12.2.16.1) or higher version of JACE device.

Step 2. A Niagara workbench to commission the JACE.

## Creating a Station

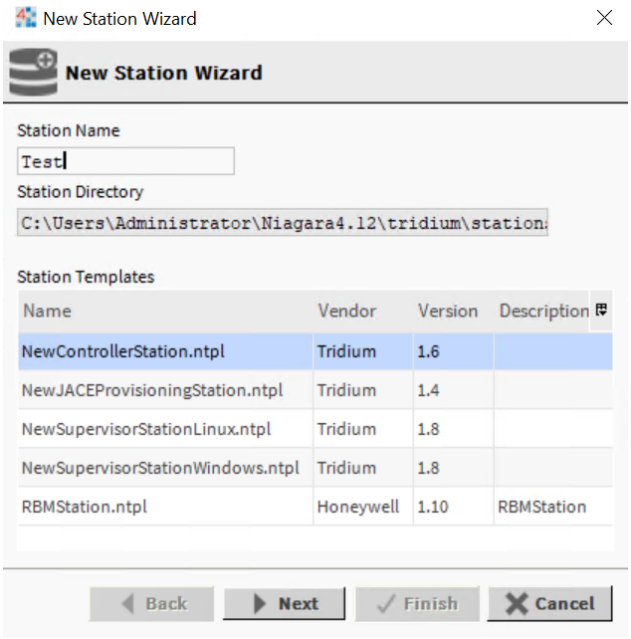
***Note:*** *It is not necessary to create a station using the RBM Station Template because the Niagara system will be used only to transfer the data to EBI.*

Step 1. Go to **Tools** > **New Station**.
The **New Station Wizard** appears.



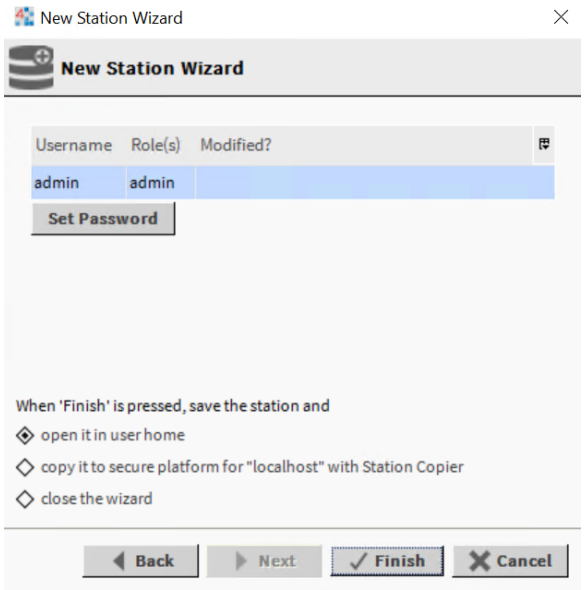

Step 2. Type the station name in the **Station Name** text box.

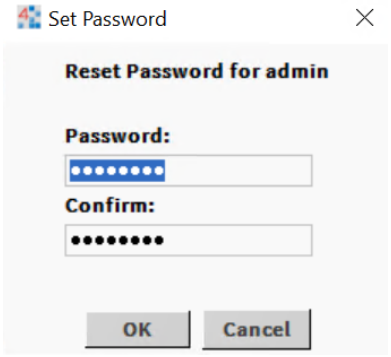
Step 3. Select **NewControllerStation.ntpl** template and then click **Next**.
The Station Name property is case-sensitive and must begin with a letter. The best practice is to keep station names short and use a station display name if a longer name with spaces or other characters is required. If you enter a duplicate station name, the system prompts you to delete the existing station.



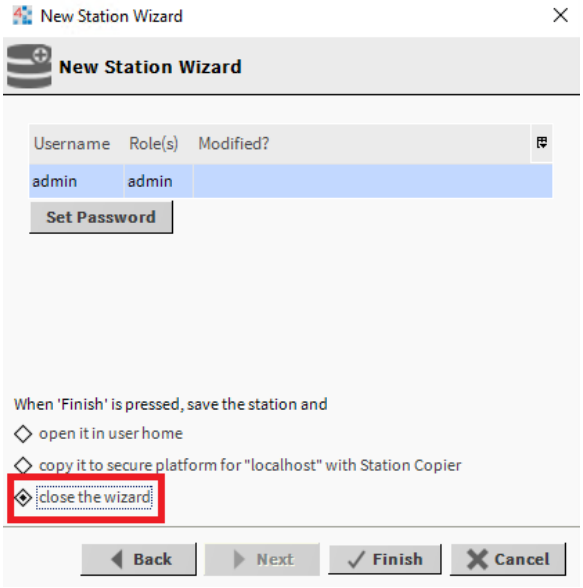

Step 4. Select **NewControllerStation.ntpl** and then click **Next**.
The Station Templates table contains the default new station templates provided in Workbench as well as any user-defined templates. A second window opens to set the admin user password and prompts you to choose an action to take once the station creation is complete.

Step 5. Click **Set Password** to set a password and then click **OK**.
The Set Password window opens. Your password must contain at least 11 characters, one digit, one lowercase character, and one uppercase character.






Step 6. In **New Station Wizard** dialog box, select **close the wizard** and then click **Finish**.




| Option | Description |
|---|---|
| Open it in user home | If you select this option then the station will be created and opened in the **Station copier** tab on the local computer. The user needs to transfer the station to the live station (localhost) manually. |
| Copy it to secure platform for 'localhost' with Station Copier | If you choose this option then the newly created station will be automatically transferred to the live station (localhost).<br>**Warning: Make sure that no other station is running before selecting option because JACE can run one station at a time. The existing station will be stopped and the data will be erased to start the new station.** |
| Close to wizard | If you choose this option then the station will be created and the wizard will be closed. The user needs to manually navigate to the **Station copier** tab to transfer it to localhost. |

Step 7. Go to **Platform** and double-click on **Station Copier**.

Step 8. Select the new station in the **Station on this computer** pane that you have created and click **Copy**.

The station will move to **Station on <localhost>** and the **Station Transfer Wizard** appears.

Step 9. Click **Next** and then click **Finish**.
The station will be copied and available in **Application Director**.

Step 10. Go to **Platform** and double-click on **Application Director**.
**Application Director** tab opens.

Step 11. Select the station and click **Start** to start the station.

# Commissioning

We use the OPC UA protocol to read the microgrid points from the Experion system. Niagara will act as an OPC UA client. Through a secure OPC UA connection (certificate and user authentication) to the Experion server, Niagara will read the microgrid points and forward them to the HBSM dashboard through the building BMS system.

## Create Client Certificate

***Note:*** *To create a certificate, a **gen-opc-cert.bat** file is shared by the Niagara.*

***Note:*** *You can either create certificate in which Niagara is installed or copy the certificate to the Niagara machine.*

Step 1. Run the **gen-opc-cert.bat** file.

Step 2. Enter the client hostname and then hit **Enter**.
The hostname can be found under TCP/IP configuration window from Platform. It is mandatory to change the default hostname(localhost) before creating the certificate.

Step 3. Enter certificate validity in days and hit **Enter**.
By default, certificate validity is 365 days.

Step 4. Enter destination file name and then hit **Enter**.
By default, the destination file name is **client.pem**.

Step 5. Enter a password for the certificate and re-enter it again to verify.
Be careful while creating the password, the password will not be visible when you enter it.

Step 6. Enter the following details:

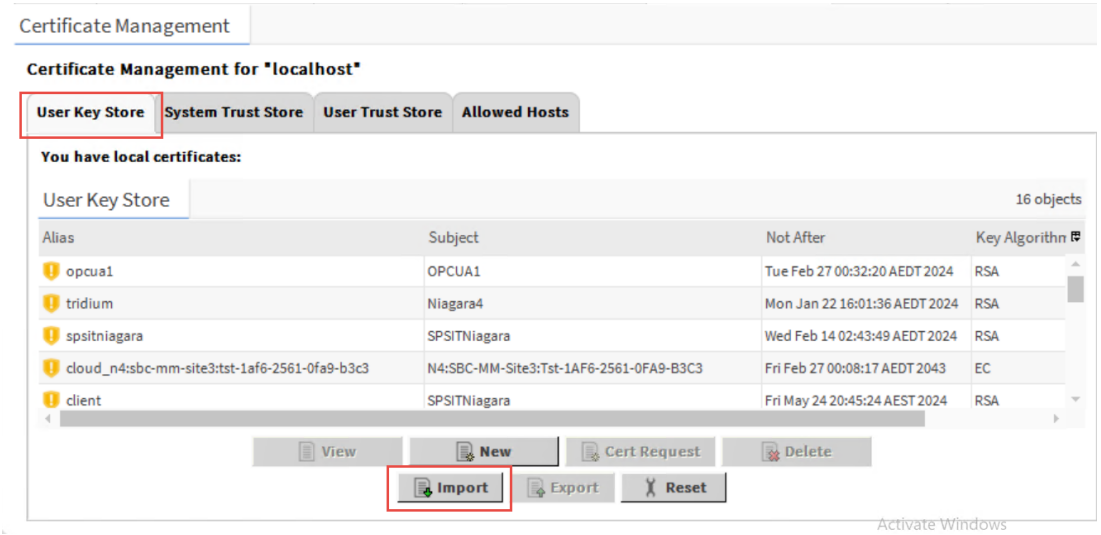
- Country name in two letters: For example, if the country is India then the country name will be **IN**.
- State or Province: For example, if the state is Maharashtra then you can write **MH**.
- Organization name: For example, Honeywell
- Organization Unit Name: For example, SBT.
- Common Name: By default, it is Host Name but you can write Server FQDN or your name.
- Customer email address.

Step 7. A certificate with the name you gave in the client hostname is created in the same location where the .bat file is copied.

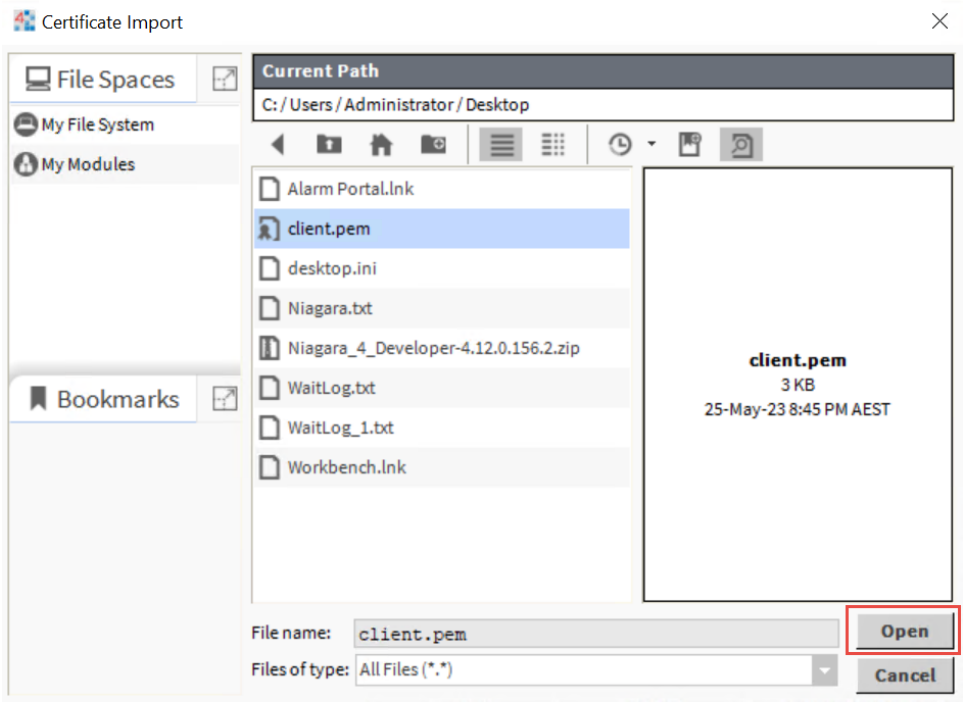
Step 8. If you have created the certificate in another machine then copy the certificate to the Niagara machine.

Step 9. In your Niagara JACE system, go to the station that you have created for OPC communication then go to **Config** > **Services** > **PlatformServices** > **CertManagerService**.

Step 10. Go to **User Key Store** tab, click **Import**.
**Certificate Import** dialog box appears.



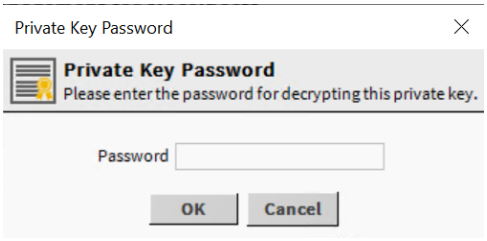

Step 11. Locate the certificate you have created and click **Open**.




Step 12. Enter the password that was used while creating the certificate.
**Certificate Import** dialog box will show the preview of the certificate.

Step 13. Click **OK**.
**Private Key Password** dialog bow appears.

Step 14. Create a password and click **OK**.




## Driver Configuration

Refer to Driver Configuration on page 56 for more details.

### Add a Device in OpcUaNetwork

Refer to Add a Device in OpcUaNetwork on page 60 for more details.

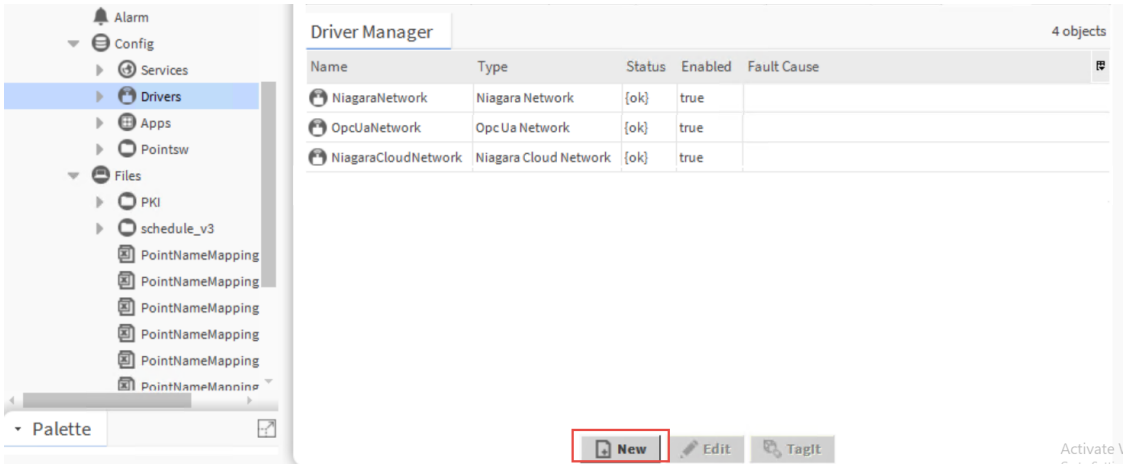
## Discover Points

Refer to Discover Points on page 61 for more details.

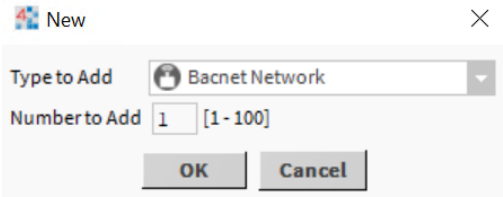
## BACnet Driver Configuration

Step 1. In the left pane, click **Drivers**.

Step 2. In the **Driver Manager** tab, click **New**.



Step 3. Click **BacnetNetwork** from the drop-down list and click **OK**.
BacnetNetwork is added in Drivers.




## Convert to BACnet Points

After the points are discovered in OpcUaNetwork then it is necessary to convert the points to BACnet points. There are two types of Point, namely:

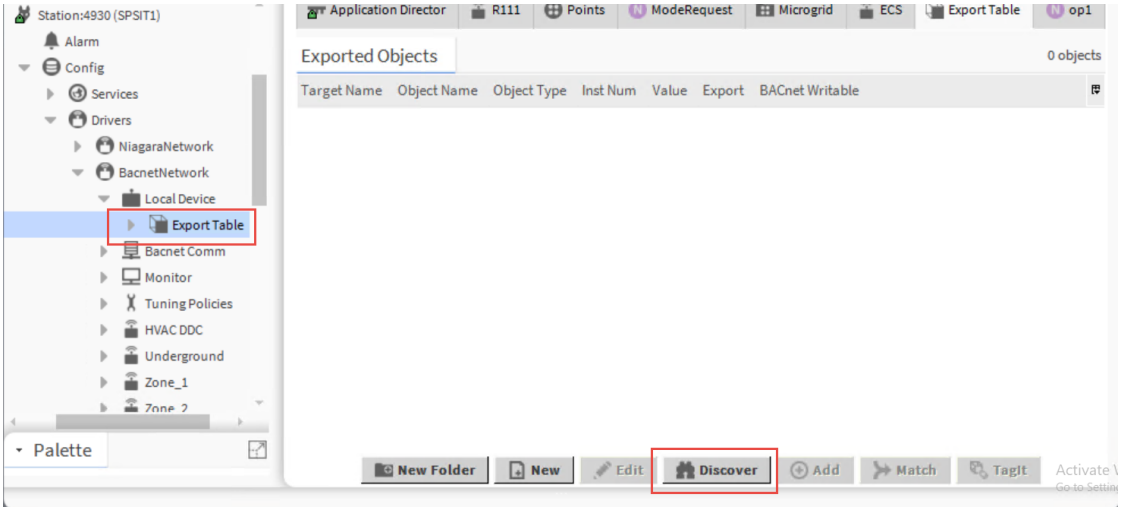
1. **Writable:** It helps to change the mode of the microgrid, for example, Islanding mode and Prepare to Islanding mode.
2. **Readable:** The points are simply readable points and are used for monitoring purposes only.

Do the following steps to convert the Points to Readable Points:

Step 1. Go to **Drivers** > **BacnetNetwork** and double-click **Local Device**.

Step 2. Change the Object Id and click **Save**.

Step 3. Go to **Drivers > BacnetNetwork > Local Device** and double-click on **Export Table**.
Export Table tab page opens.




Step 4. Click **Discover**.
It discovers all the points available in the station.

Step 5. Select the points you want to convert to Bacnet point and click **Add**.
**Add** dialog box appears.

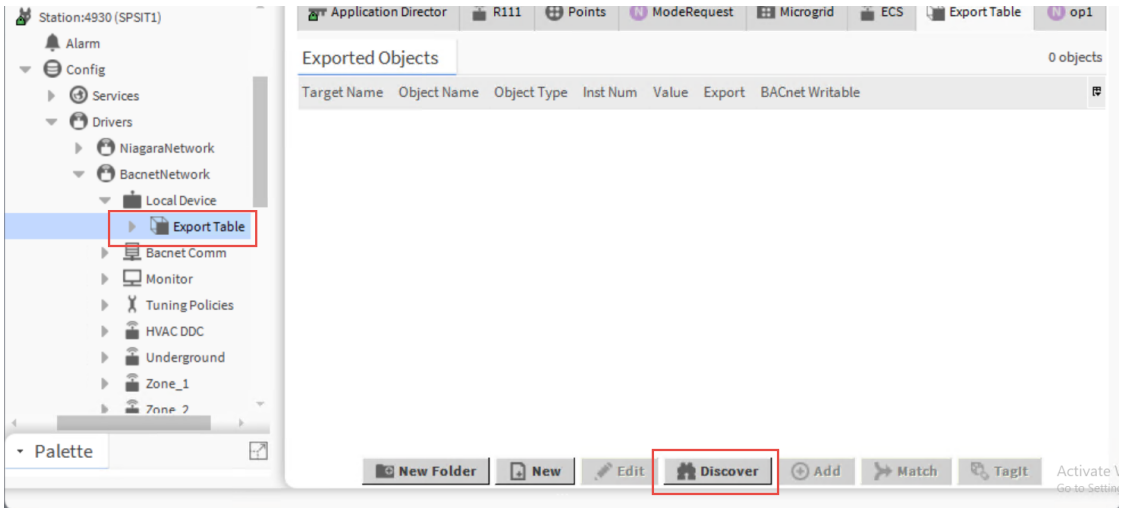
Step 6. Change the name if required.

Step 7. Select **Bacnet analog Value Descriptor** in the **Type** drop-down list.

Step 8. Click **OK**.

Do the following steps to convert the points to Writable Points:

Step 1. Go to **Drivers > BacnetNetwork > Local Device** and double-click on **Export Table**.
Export Table tab page opens.




Step 2. Click **Discover**.
It discovers all the points available in the station.

Step 3. Select the points you want to convert to Bacnet point and click **Add**.
**Add** dialog box appears.

Step 4. Change the name if required.

Step 5. Select **Bacnet Multi State Value Priorotized Descriptor** in the **Type** drop-down list.

Step 6. In the **Bacnet Writable**, select **all**.

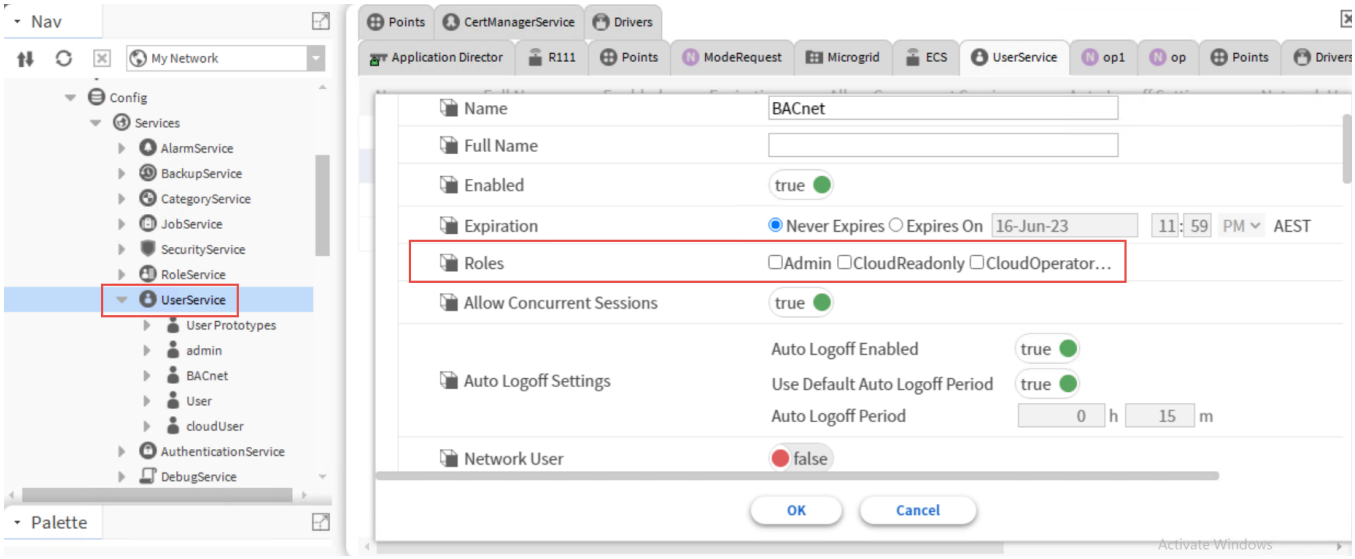
Step 7. Click **Ok**.

## Admin Rights to BACnet User

Step 1. Go to **Config > Services** and double-click on **UserService**.
**UserService** page opens.

Step 2. Double-click Bacnet user.
**Edit** dialog box opens.

Step 3. In the **Roles**, enable the Admin role and click **OK**.




## Discover Niagara Station as BACnet device

EBI is configured using an extremely flexible and powerful engineering tool called Quick Builder. Quick Builder allows both novice and power users to configure points, controllers, Stations, and printers. It promotes quicker and easier implementation of systems with automated discover wizards available for many of the interfaces to identify controllers and points to add to the EBI database.

Step 1. In the EBI system, go to **Quick Builder**.

Step 2. Go to **Tools** and then click on **BACnet Discovery Wizard**.

Step 3. Click **WhoIs** button.
It will discover all the BACnet devices.

Step 4. In **WhoIs Device Range** section, enter the device number given to the BACnet device and click **Next**.

Step 5. Select the device discovered and click **Next**.

Step 6. Select the Analog and Boolean object types and click **Discover**.

Step 7. Once the discovery is completed, click **Finish**.

Step 8. Select the discovered BACnet controller and download it to the EBI station.

Step 9. Select the discovered points and download them to the EBI station.

Refer to the Onboarding a Site having Forge Connect on page 4 for the onboarding site with Forge Connect.

Refer to the Onboarding a Site having EBI Cloud Connector on page 16 for the onboarding site with EBI cloud connector

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