

nE2 Link for Niagara

User Manual

Quick Start-up



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1 Introduction

The nE2 Link for Niagara is a comprehensive solution designed to enhance the Niagara Framework by enabling seamless commissioning, programming, and control of nano EDGE ENGINE devices.

The module is addressed to current and future Niagara Framework users who want to comprehensively manage, program, and integrate nano EDGE ENGINE devices directly into the Niagara 4 environment.

Using the built-in functionalities in Niagara, nE2 Link extends its capabilities to include nano EDGE ENGINE functions natively. The extension greatly extends the reach and usability of nano EDGE ENGINE devices, making it easier for users to integrate and manage building systems directly into Niagara 4, without the need for third-party tools.

The purpose of this document is to describe how to correctly install and start using nano EDGE ENGINE devices in a native Niagara environment.

Note

The nE2 Link is designed to enable the programming of controllers with the nano EDGE ENGINE embedded and provides all necessary functionalities for programming and commissioning the controller. However, it is important to note that the Niagara Framework includes a wide range of features, some of which are not supported by the nano EDGE ENGINE. As a result, certain functionalities of the Niagara Workbench may not be fully compatible with the nano EDGE ENGINE.

To assist users in addressing any potential issues, iSMA CONTROLLI has developed detailed troubleshooting materials, which are available at the following link: [nE2 Link](#). For further assistance or to provide suggestions for improvement, please contact iSMA CONTROLLI Support at support@ismacontrolli.com.

1.1 Revision History

Date	Rev.	Description
30 Jan 2025	1.1	General availability edition
18 Jul 2024	1.0	First edition

2 Step 1: Installation

2.1 Supported Niagara Versions

nE2 Link is dedicated to Niagara 4 and supports Niagara 4.11 and higher.

2.2 Required Modules

In order to work properly, the nE2 Link requires the following modules:

- nE2Link-rt.jar,
- nE2Link-ux.jar,
- nE2Link-wb.jar.

Contact the authorized iSMA CONTROLLI distributor to get the latest modules.

2.3 Installation

2.3.1 Niagara Workbench

nE2 Link can work directly on local Workbench stations. In order to use it correctly, follow the steps below:

1. Close the Workbench.
2. Copy the `nE2link-rt.jar`, `nE2link-ux.jar`, and `nE2link-wb.jar` files to the Niagara modules directory. Default Path: `C:\Niagara\Niagara-4.x.x\modules`.
3. Reopen the Workbench.
4. Connect to the local Platform using Workbench and restart the station.

2.3.2 Niagara Controller

It is possible to use the nE2 Link directly on a Niagara controller, such as MAC36 or JACE.

Note: Before proceeding, make sure the module is correctly installed in the local Workbench.

1. In Workbench, connect to the controller's Platform.
2. Open the Software Manager.
3. Locate the `nE2link-rt` and `nE2link-ux` modules in the list and select them.
4. Click the `Install` button at the bottom of the window.
5. Click the `Commit` button at the bottom of the window.
6. The modules will be installed on the station, and the list will reload when the process is complete.
7. Verify the `nE2link` modules are marked as "Up to Date".
8. Restart the Niagara station.

By following these steps, the nE2 Link modules will be successfully installed, enabling to leverage the full capabilities of the nano EDGE ENGINE devices within the Niagara 4 environment.

3 Step 2: Configuration

- Adding nE2DeviceExt in Niagara
- Establishing a Connection with the nano EDGE ENGINE Device
- First Connection and Password Setup
- IP Network Configuration
- Time Settings
- Software Manager
- Backups

3.1 Adding nE2DeviceExt in Niagara

(a) In Workbench, navigate to the **nE2Link** module in the Palette window, search and open the **nE2Link** module.

The module palette contains the Programming folder.

The **nE2DeviceExt** is a network device extension located in the Programming folder. The nE2DeviceExt functions as a device extension inside Niagara networks, the BACnetNetwork or ModbusTcpNetwork, it must be dropped under the proper network device.

(b) Locate the **nE2DeviceExt** extension within the **Programming** folder.



Figure 1. nE2Device extension in the nE2Link module

The nE2DeviceExt extension consist of:

- **Poll Scheduler:** manages communication between the Niagara Framework and the nE2 controller;
- **Software Manager:** allows for managing libraries on the controller.
- **Libraries:** by default, the folder is empty and requires a real-time connection to upload the libraries available on the device. Once connected, the device's library will be populated with data from the device and load all the libraries available on the nano EDGE ENGINE device.

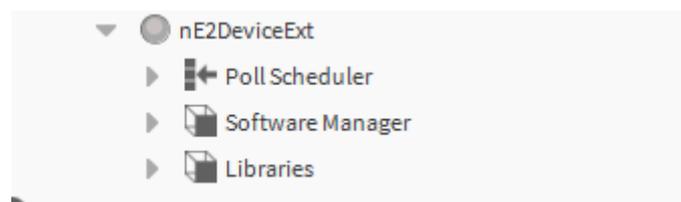


Figure 2. nE2DeviceExt contents

(c) Add nE2DeviceExt to BACnet Device:

- Make sure that the BACnet network is set up in the station.

Note: In nano EDGE ENGINE devices, such as the RAC18-IP, the native BACnet support guarantees that it can be discovered on the BACnet IP network out of the box.

- Drag the **nE2DeviceExt** extension from the **nE2Link** palette and drop it onto your BACnet device in the Niagara station.

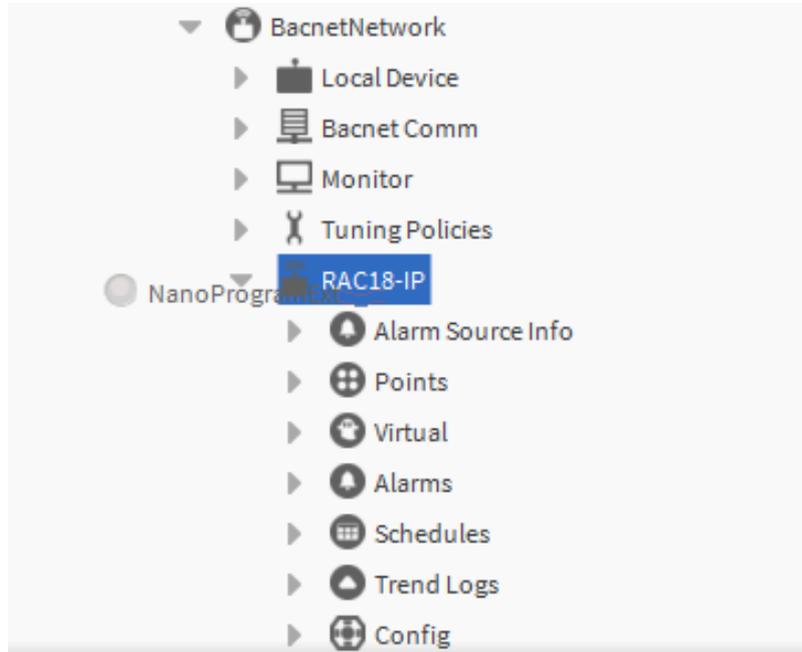


Figure 3. Adding the nE2DeviceExt to the BACnet network

3.2 Establishing a Connection with the nano EDGE ENGINE Device

(a) Once the extension is added to the device, right-click on the **nE2DeviceExt**, go to Actions → Connect.

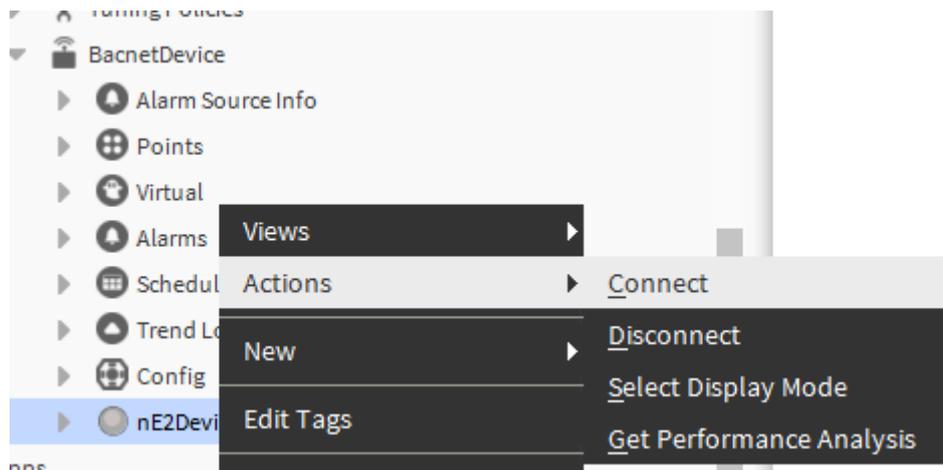


Figure 4. Connect option

(b) A pop-up connection window will open. Fill in the following slots:

- **IP Address:** the nano EDGE ENGINE device address;
- **Port:** iFnet port (by default, 88);
- **User Name:** nano EDGE ENGINE username (by default, admin);
- **Password:** nano EDGE ENGINE user password (by default, admin).

Note: Password must be changed after the first connection to the device in the Device platform.

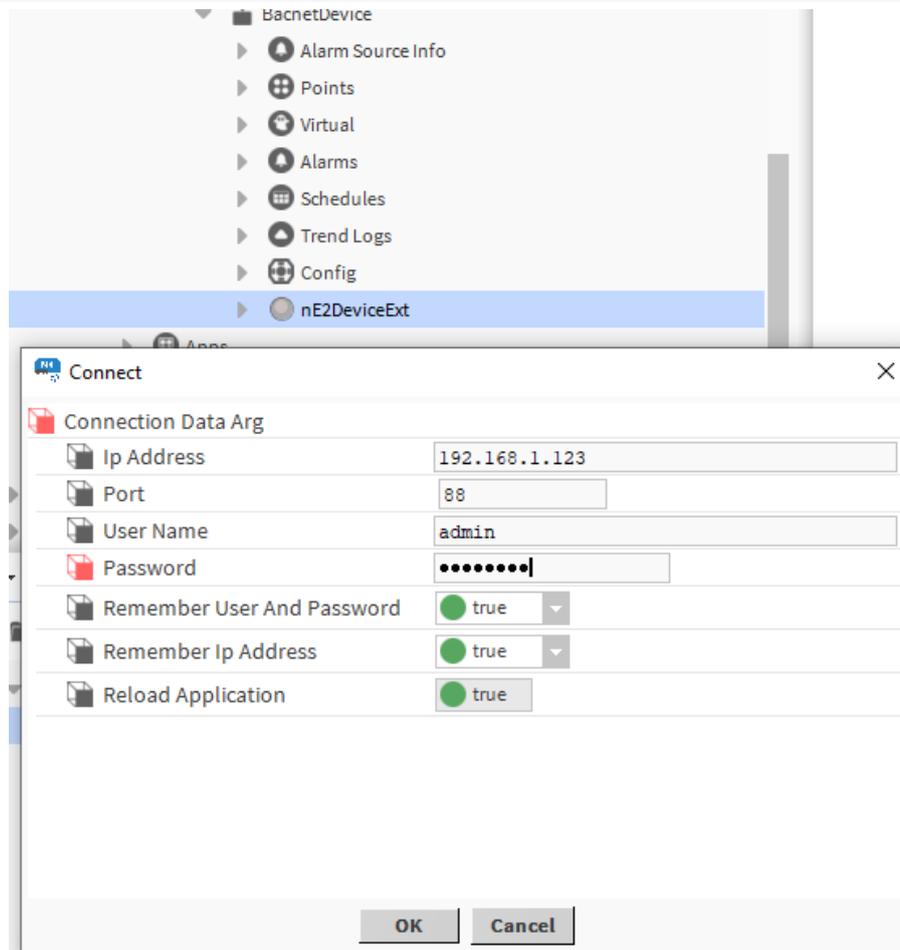


Figure 5. Filling in connection credentials

(c) Click OK to establish connection with the device.

nE2DeviceExt Interactive Connection LED

The **nE2DeviceExt** icon includes a status LED indicator that visually represents the device's connection state to ensure easy monitoring for users:

- **gray LED:** the device is disconnected,
- **orange LED:** the device is connecting,
- **yellow LED:** the device is connected and the application is loading,
- **green LED:** the device is successfully connected and the application has finished loading.

These color-coded LED statuses provide clear feedback to the customer about the current state of the device.

Once the connection with the device has been established (the green LED indicator is displayed), the following start screen is displayed:



Communication Status: Connected (Ready)	Status: Running
Device Name: RAC18-IP_SN27640513	Device Model: RAC18-IP
Serial Number: 27640513	OS Version: 1.6.0.8576
I/O: AO:3, DO:5, TO:2, UI:4, DI:4	Interfaces: Serial:1, Ethernet:1
Current Time: 2024.12.13 09:28:30 [ok]	Uptime: 1:16:33:33
CPU Load: 27%	Available Datapoints: 101

Figure 6. nE2 Link start screen

The start screen shows the following information:

- communication status,
- device status,
- device name,
- device model,
- serial number,
- OS version,
- list of I/Os,
- interfaces,
- current time,
- uptime,
- CPU load,
- available Data Points.

Worth to notice:

If the connection is established for the first time or the extension gets disconnected, the following home screen is displayed:



nE2 Link for Niagara
Version: 0.8.9.8
Copyright 2024 ISMA CONTROLLI
Technical Support
E-mail: support@ismacontrolli.com

Contact
ISMA CONTROLLI S.p.A.
Via Carlo Levi 52
Sant'Olcese (GE), 16010, Italy

Visit our [Website](#)

The screen provides information such as:

- version of the module;
- copyrights;
- support;
- contact information.

3.3 First Connection and Password Setup

When the connection is established correctly, the **nE2DeviceExt** icon will go from gray to green.

During the first connection to the device using a default password, a message will be displayed requesting to change the password.

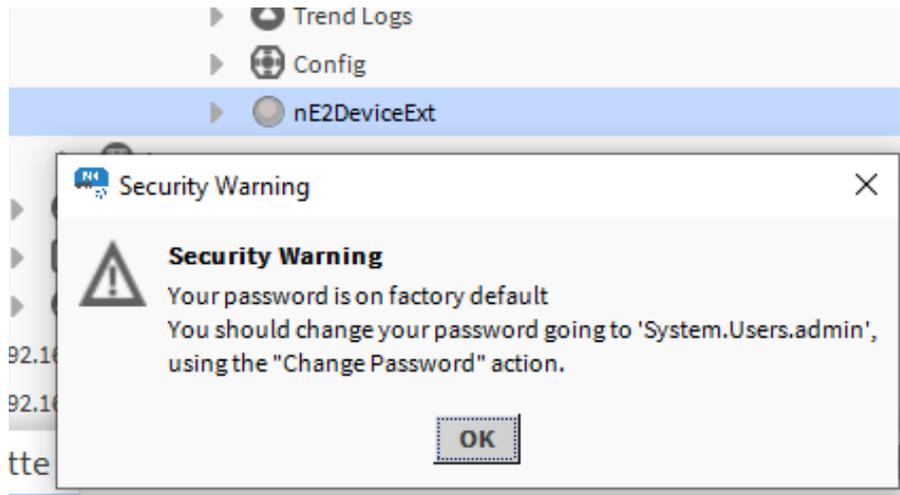


Figure 7. Change password prompt

Changing password is obligatory when first connecting to the device!

To change the password:

- expand the System container;
- expand Users;
- right-click the admin user;
- go to Actions → ChangePassword.

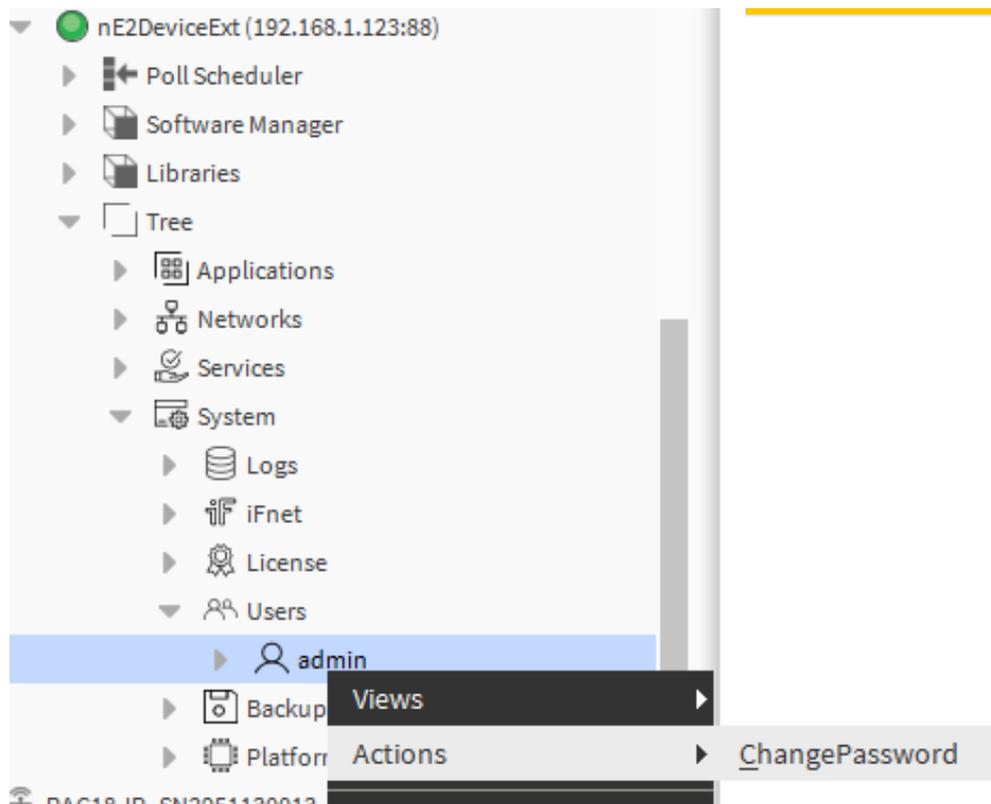


Figure 8. Change password action

A ChangePassword pop-up window will appear on the screen.

- Enter and confirm the new password according to the required length and the number and type of characters.

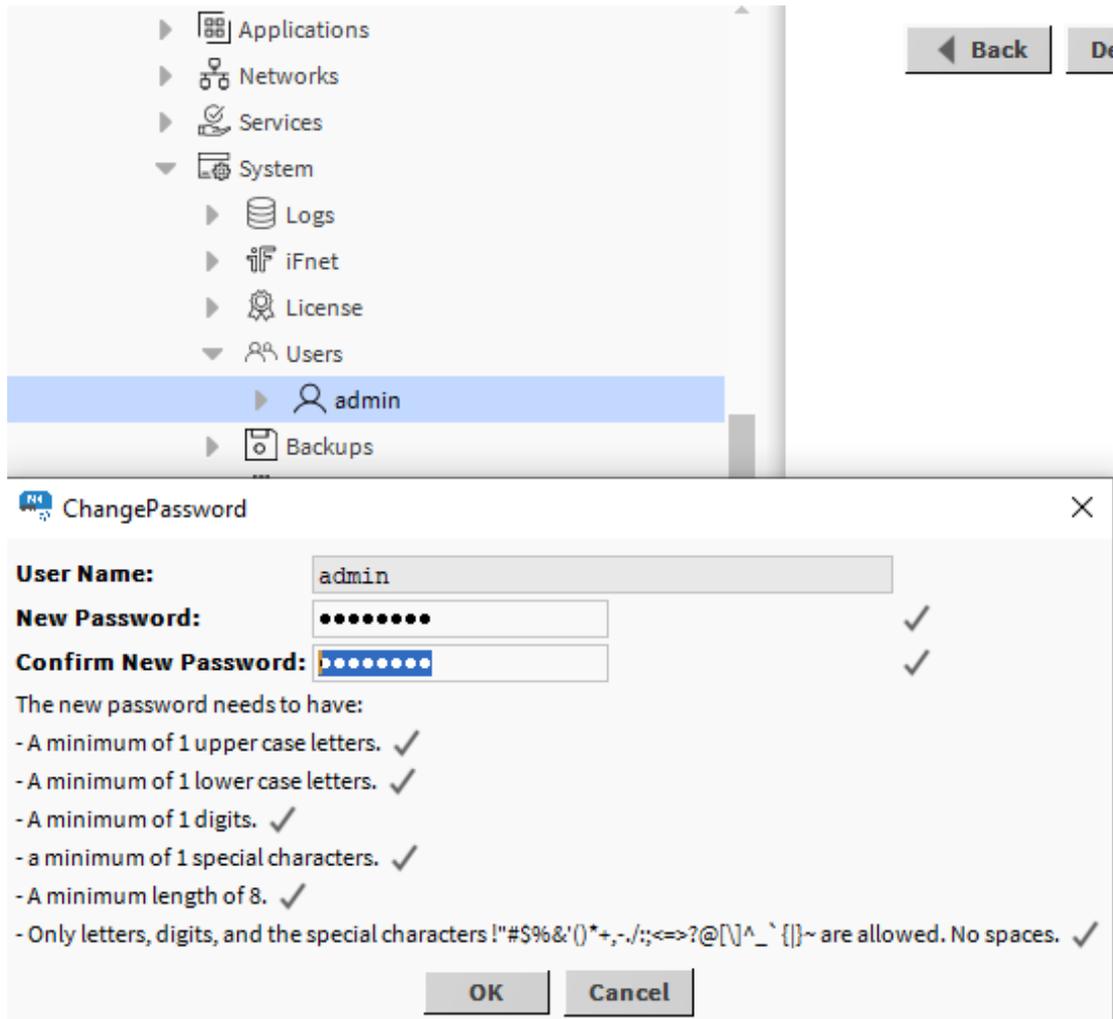


Figure 9. ChangePassword dialog window

- After successfully changing the password, right-click on the `nE2DeviceExt`; go to Actions → Disconnect.

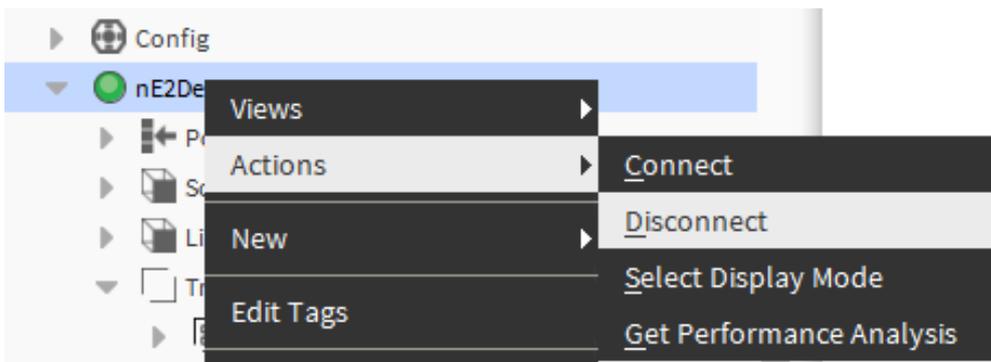


Figure 10. Disconnect option

The device icon will change from green to gray

- Right-click on the `nE2DeviceExt` again; go to Actions → Connect and enter the new password in the password field.

Note

If the typed password is incorrect, a pop-up will appear. Repeat the previous step and input the correct password.



Figure 11. Wrong password notification

Once properly connected, expand the `nE2DeviceExt`. A new tree component is visible.

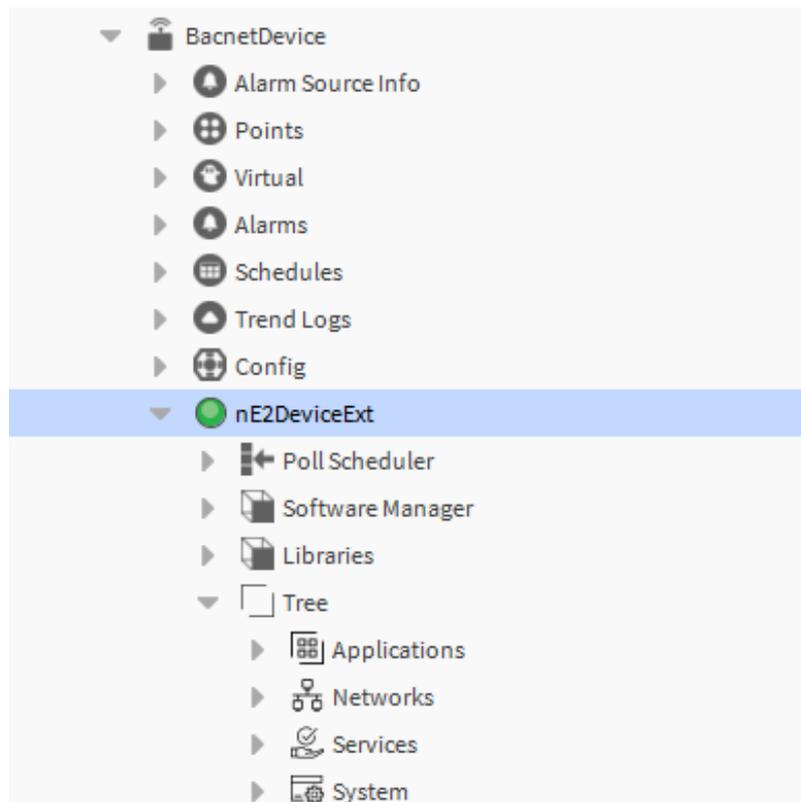


Figure 12. The nE2DeviceExt structure

Once expanded, the default available containers will appear in the device tree structure:

- Applications;
- Networks;
- Services;
- System..

The first connection with the device is fully established.



To learn more about the nano EDGE ENGINE architecture, please refer to the [nano EDGE ENGINE Programming user manual](#).

3.4 IP Network Configuration

3.4.1 Change IP Network Settings

The IP address and other network settings are part of the Ethernet configuration in the Platform component in the System container.

To learn more about the System container, please refer to the [nano EDGE ENGINE Programming user manual](#).

To change the network Settings:

- navigate to the Platform component in the System container;
- double-click on the Ethernet1 component.

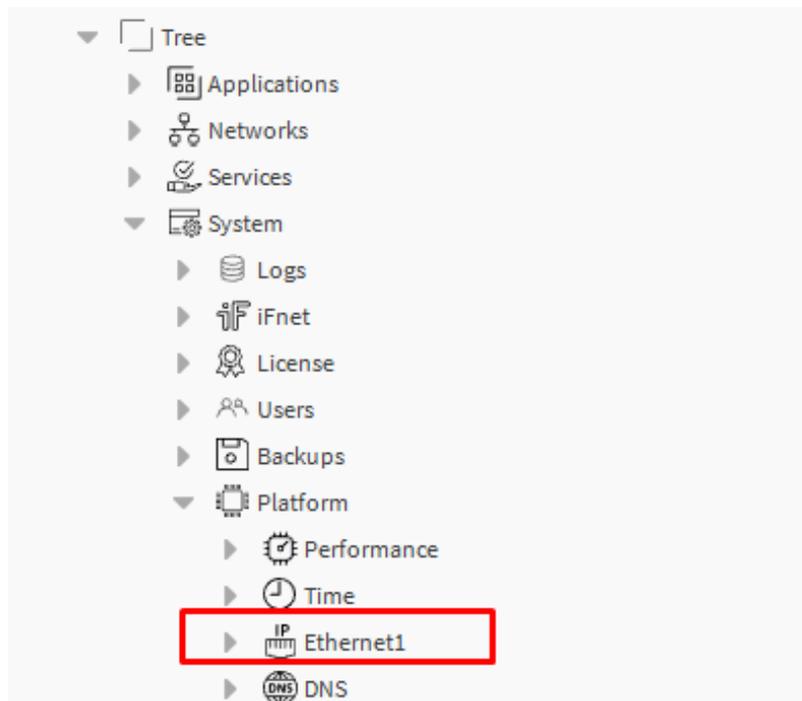


Figure 13. The Ethernet1 component

The Ethernet1 properties sheet will open on the main screen.

- Expand the IPAddress slot and type the new IP address, mask and gateway, or enable the DHCP mode.
- Confirm the new configuration with the Save button.

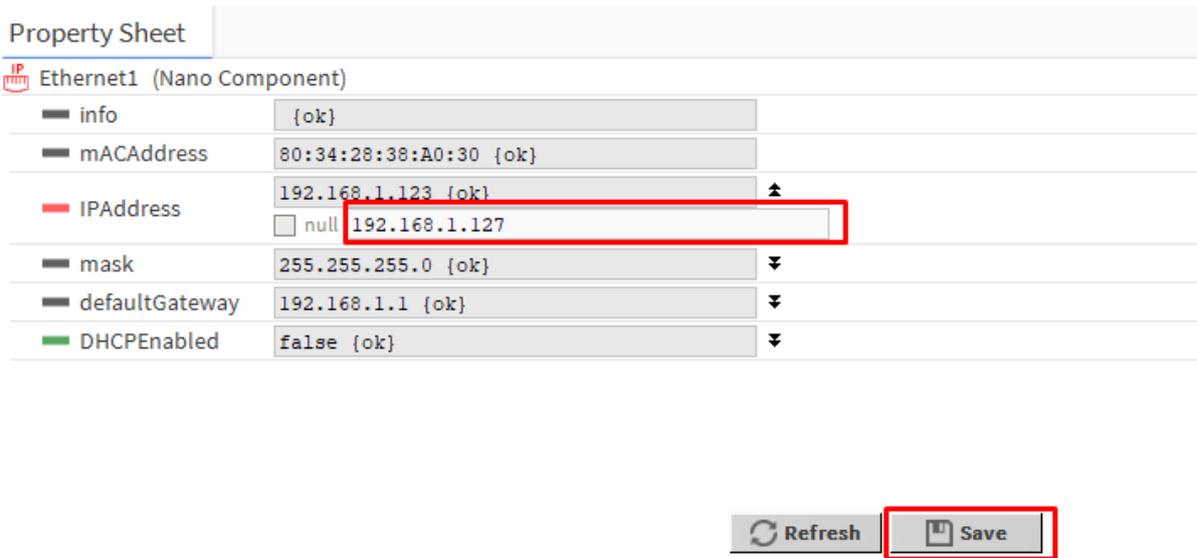


Figure 14. The Ethernet1 properties

To learn more about Ethernet1, please refer to the [nano EDGE ENGINE Programming user manual](#).

- After changing the device address, right-click on Ethernet1 and go to Actions -> RestartDevice;

The device will be rebooted.

- Reconnect to the device by changing the IP address in the nE2DeviceExt using the Connect action.

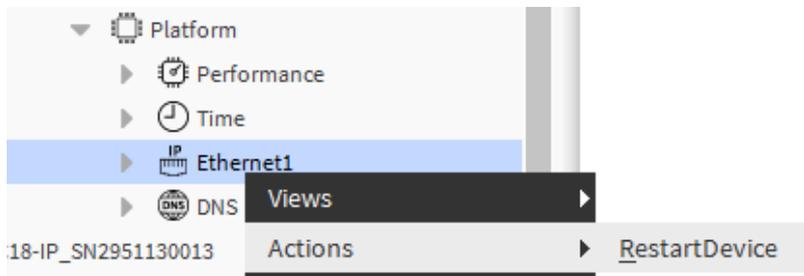


Figure 15. RestartDevice action in the Ethernet1 component

3.5 Time Settings

The time setting function allows users to configure the time settings of the controller directly from the Niagara station or to set a custom time. This feature is a part of the Platform component.

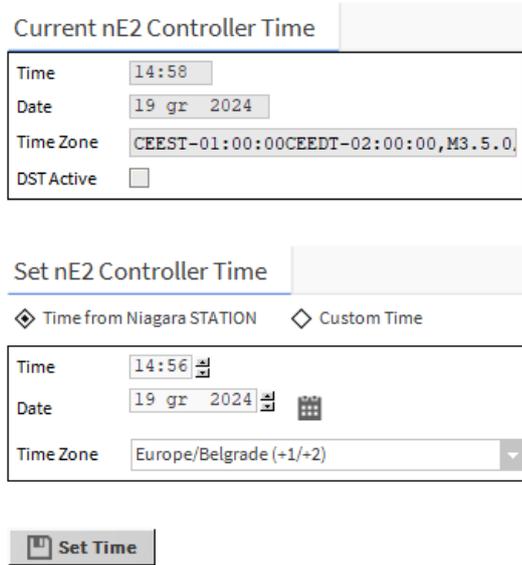


Figure 16. Time settings

To set the time:

- navigate to System>Platform;
- double-click the Time component.

The dialog window will display the following:

- **Current Nano Controller Time:** shows the currently set time, date, and time zone as well as indicates whether the Daylight Saving Time is currently active;



Figure 17. Current nano EDGE ENGINE device time

- **Desired Nano Controller Time:** allows the user to set the time on the controller directly from the Niagara station or to set a custom time.

Desired Nano Controller Time

Time from Niagara STATION
 Custom Time

Time: 15:48

Date: 12 lip 2024

Time Zone: Europe/Belgrade (+1/+2)

Set Time

To set the nano EDGE ENGINE device time based on the Niagara station time:

- confirm that the Time from Niagara Station option is selected;

In this configuration, the displayed time, date, and time zone are in read-only mode.

- click Set Time to configure the time on the nano EDGE ENGINE device as in the station;
- a pop-up asking to restart the device will be displayed;
- click Yes to confirm, the device will be restarted;

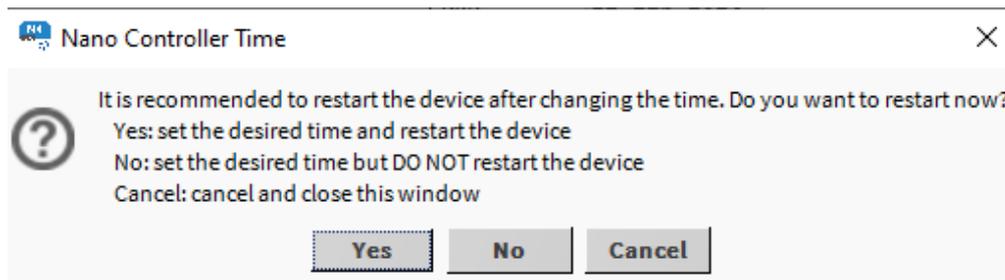


Figure 18. Set the time from the station dialog window

- reconnect with the device using the Connect action in the nE2DeviceExt.

To set a custom time in the controller:

- select the Custom Time option;
- the Time Setting dialog window can now be edited: set the time, date, and time zone;
- click Set Time to confirm;
- a pop-up asking to restart the device will be displayed, click Yes to confirm. The device will be restarted;
- reconnect with the device using the Connect action in the nE2DeviceExt.

To learn more about time settings and configurations, please refer to the [nano EDGE ENGINE Programming user manual](#).

3.6 Software Manager

The Software Manager is synchronized with the Workbench or the Niagara controller shared folder of the station. By default, the Software Manager displays the default nano EDGE ENGINE libraries supported by the version of the module. All third party libraries must be added to the shared folder.

To navigate, double click the Software Manager component in the device tree.

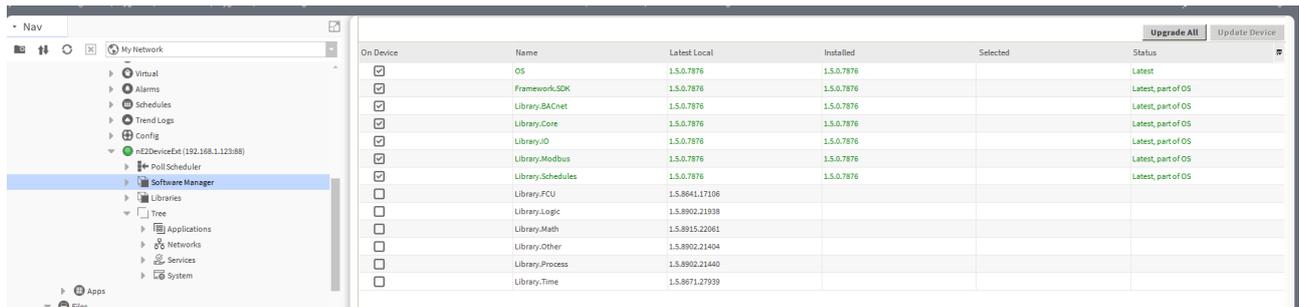


Figure 19. Software Manager view

3.6.1 Using Software Manager

The Software Manager view lists the OS and libraries available locally. The view highlights each row (OS or libraries) according to its status:

- **green:** the element is up to date, and requires no action;
- **orange:** the element is out of date, and can be updated;
- **blue:** the action is about to be taken on the element.

The Software Manager table contains the following columns:

- **On Device:** indicates, whether a given element is already installed on the device.
- **Name:** shows the name of the element.
- **Latest Local:** shows the latest version available locally to be installed on the device.
- **Installed:** shows the version of the element installed on the device.
- **Selected:** opens a dropdown list with all versions available locally for a selected element.
- **Status:** indicates, which action is to be performed on the element, once a specific version has been selected in the Action column.
 - Available information: Latest, Out of Date, Upgrade, Downgrade, Install, Uninstall, none (the selected version is the same as the one installed on the device).

In order to upgrade or downgrade the selected element, choose the desired version of the element in the Selected column, and press the Update Device option (highlighted in blue in the right upper corner of the Software Manager). This option executes all actions indicated in the Status column.

						Upgrade All
On Device	Name	Latest Local	Installed	Selected	Status	
<input checked="" type="checkbox"/>	OS	1.5.0.7876	1.6.0.8576		Latest	
<input checked="" type="checkbox"/>	Framework.SDK	1.5.0.7876	1.6.0.8576		Latest, part of OS	
<input checked="" type="checkbox"/>	Library.BACnet	1.5.0.7876	1.6.0.8576		Latest, part of OS	
<input checked="" type="checkbox"/>	Library.Core	1.5.0.7876	1.6.0.8576		Latest, part of OS	
<input checked="" type="checkbox"/>	Library.IO	1.5.0.7876	1.6.0.8576		Latest, part of OS	
<input checked="" type="checkbox"/>	Library.Modbus	1.5.0.7876	1.6.0.8576		Latest, part of OS	
<input checked="" type="checkbox"/>	Library.Schedules	1.5.0.7876	1.6.0.8576		Latest, part of OS	
<input checked="" type="checkbox"/>	Library.FCU	1.5.8641.17106	1.6.8970.25065		Latest	
<input checked="" type="checkbox"/>	Library.Logic	1.5.8902.21938	1.6.9006.19294		Latest	
<input checked="" type="checkbox"/>	Library.Math	1.5.8915.22061	1.6.8970.25082		Latest	
<input checked="" type="checkbox"/>	Library.Other	1.5.8902.21404	1.6.9006.19307	1.5.8902.21404	Downgrade	
<input checked="" type="checkbox"/>	Library.Process	1.5.8902.21440	1.6.9006.25510	1.5.8902.21440	Downgrade	
<input checked="" type="checkbox"/>	Library.Time	1.5.8671.27939	1.6.8970.25114		Latest	

1.5.8671.27939
×

1.5.8671.27939

1.4.8651.22525

1.2.8452.13604

1.1.8242.24711

1.0.8097.16687

Figure 20. Selecting a library's version

Unless the user intends to manually select the versions to be installed, there is also the option to automatically select all newest versions for all out of date elements using the Upgrade All button.

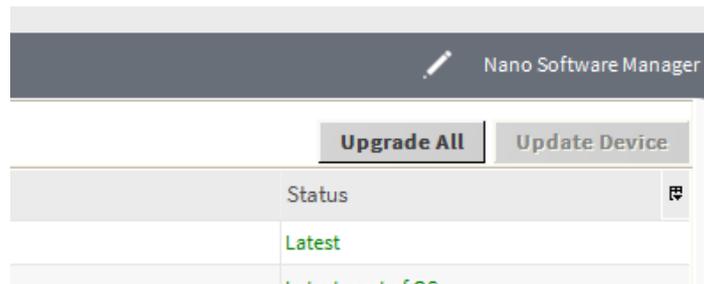


Figure 21. Upgrade All button

Regardless of the fact, whether the user intends to add or remove the library, available in the Software Manager, each operation requires performing three steps:

- check the box in the On Device column to install the library, or uncheck it to uninstall the library;
- provided the library is to be installed on the device, check its preferred version in the Selected column—by default, the newest version available locally is indicated to be installed;
- once selection of all libraries to be installed or uninstalled on the device is complete, hit the Update Device command.

Warning!

The OS cannot be removed from the device; it is preinstalled on the device's SD card, and the only operations, which can be performed on this element, are upgrading or downgrading it.

3.6.2 Uploading New Libraries

To load new libraries to the controller:

- navigate to Station → Files → nanoEdgeEngine folder;

- copy the proper nano EDGE ENGINE libraries and OS folder from the local PC by navigating to the proper location on My Host (local PC);

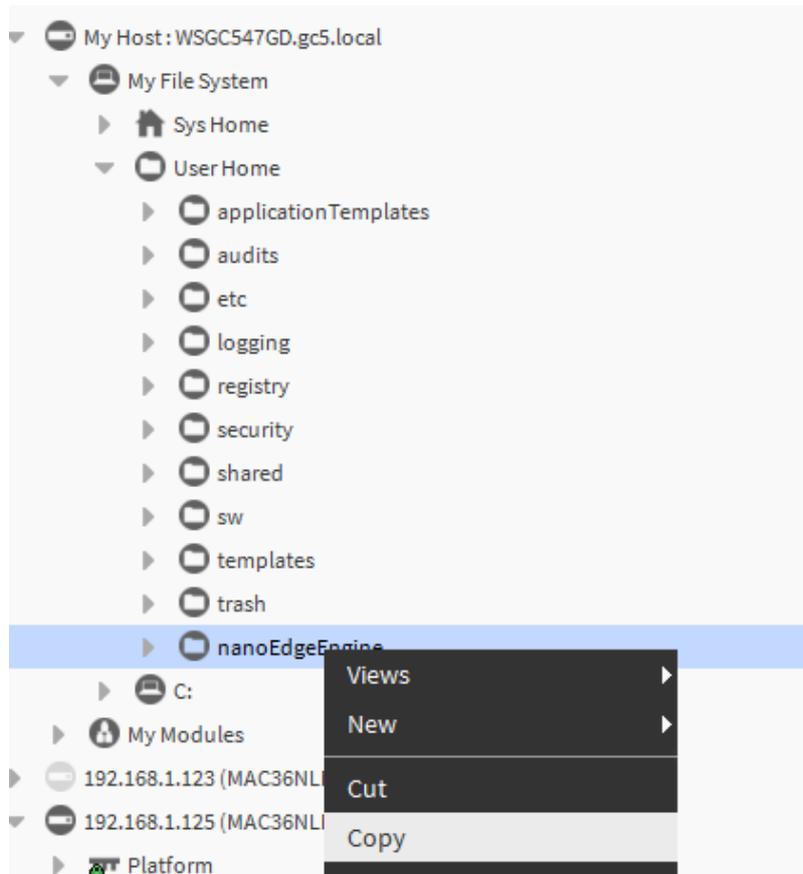


Figure 22. Copying the nanoEdgeEngine folder

- paste it under the Files container in the local station.

Note: Make sure that the folder is called “nanoEdgeEngine”!

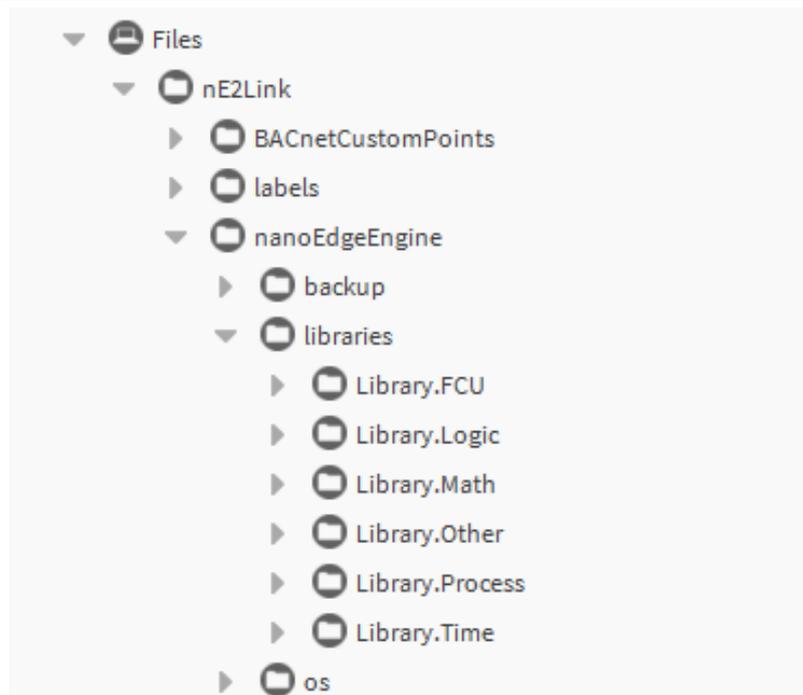


Figure 23. Pasted folder

Once the libraries are added, they will become visible in the Software Manager.

Note: Make sure that all necessary libraries are correctly placed in the Files of the local station.

- Select the libraries and OS version to be installed, upgraded or downgraded on the controller, or select the Upgrade all option;
- once all necessary software is selected, click Update device;
- a pop-up will be shown asking to confirm the action. Click Yes to load the new OS and libraries.

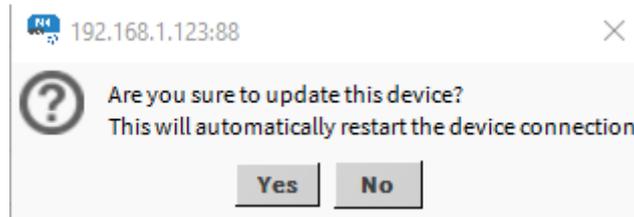


Figure 24. Update device prompt

The device will be restarted automatically.

- Once the device has restarted successfully, right-click on the nE2DeviceExt and connect to the device;
- after reconnection, confirm that selected software was successfully installed on the device.

						Upgrade All	Update Device
On Device	Name	Latest Local	Installed	Selected	Status		
<input checked="" type="checkbox"/>	OS	1.4.1.7340	1.4.1.7340		Latest		
<input checked="" type="checkbox"/>	Framework.SDK	1.4.8585.25238	1.4.8585.25238		Latest, part of OS		
<input checked="" type="checkbox"/>	Library.BACnet	1.4.8655.31468	1.4.8655.31468		Latest, part of OS		
<input checked="" type="checkbox"/>	Library.Core	1.4.8655.31015	1.4.8655.31015		Latest, part of OS		
<input checked="" type="checkbox"/>	Library.IO	1.4.8655.31292	1.4.8655.31292		Latest, part of OS		
<input checked="" type="checkbox"/>	Library.Modbus	1.4.8704.26958	1.4.8704.26958		Latest, part of OS		
<input checked="" type="checkbox"/>	Library.Schedules	1.4.8655.31332	1.4.8655.31332		Latest, part of OS		
<input checked="" type="checkbox"/>	Library.FCU	1.4.8585.25488	1.4.8585.25488		Latest		
<input checked="" type="checkbox"/>	Library.Logic	1.4.8585.25337	1.4.8585.25337		Latest		
<input checked="" type="checkbox"/>	Library.Math	1.4.8621.25370	1.4.8621.25370		Latest		
<input checked="" type="checkbox"/>	Library.Other	1.4.8641.19349	1.4.8641.19349		Latest		
<input checked="" type="checkbox"/>	Library.Process	1.4.8585.25565	1.4.8585.25565		Latest		
<input checked="" type="checkbox"/>	Library.Time	1.4.8651.22525	1.4.8651.22525		Latest		

Figure 25. Updated Software Manager view

3.7 Backups

nE2DeviceExt allows users to invoke the device's backup function. The local backups are saved directly into the station's shared folder.

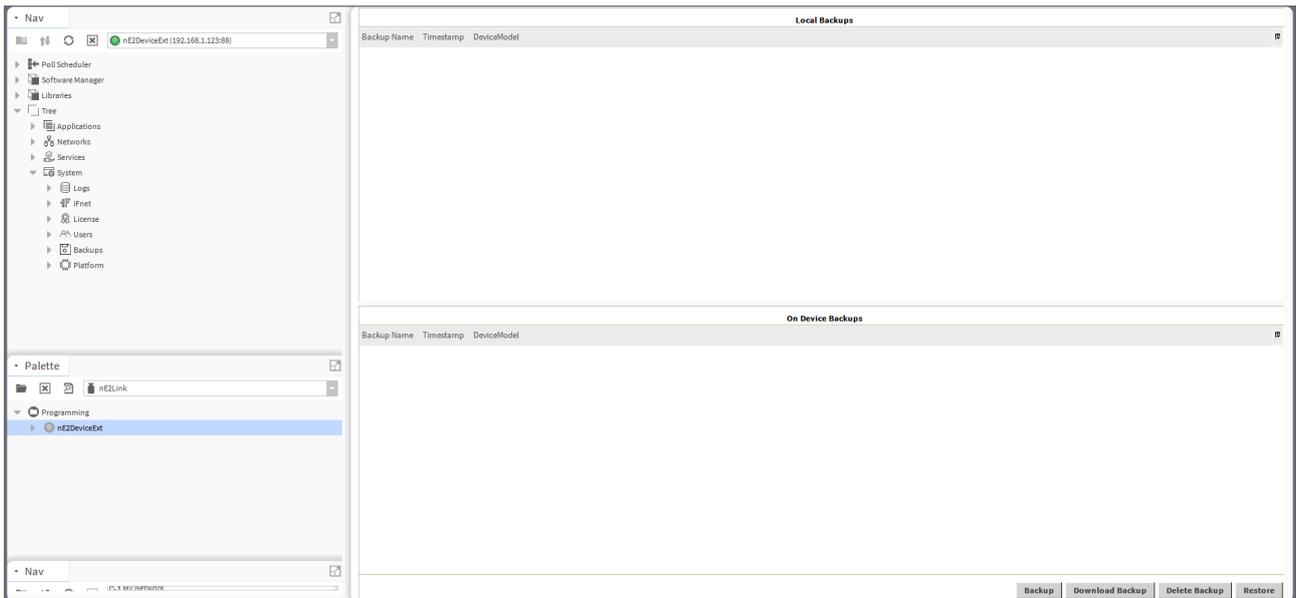


Figure 26. Backup Manager view

To perform a backup, go to the Backup Manager of the device, in the Backups component in the System container. The backup can be restored to the device.

Note: nano EDGE ENGINE controllers allow to store one backup directly in the local device memory. Backups can be downloaded and stored in the Station Files folder.

All local backups are stored in the local Niagara station. To access backups go to Station → Files → nE2Link → nanoEdgeEngine → backup → BackupName. Backups can be imported or exported from this location manually and will become visible in the Backup Manager view.

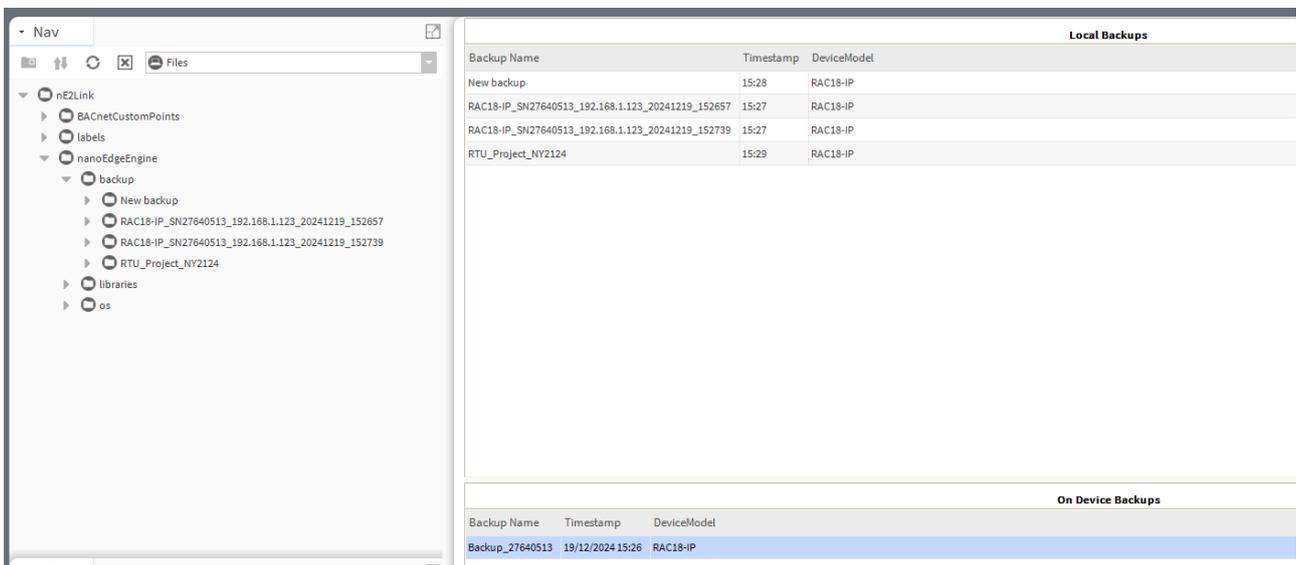


Figure 27. Local station backups stored in the station's Files

To learn more about the Backups, refer to the [nano EDGE ENGINE Programming user manual](#).

3.7.1 Performing Backup

- Click the Backup button to invoke creating a backup.

Warning!

If there is any existing backup on the device, performing the backup action will overwrite it.

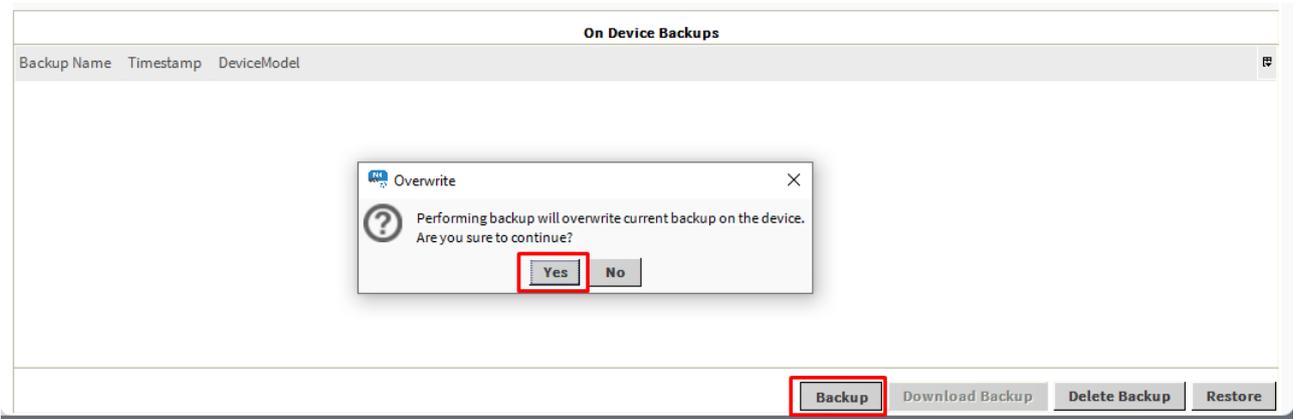


Figure 28. Pop-up informing about the risk of overwriting the existing backup on the device

Once the backup action is confirmed, the device will perform the backup. This process can take up to a few minutes. Wait for the process to finish.

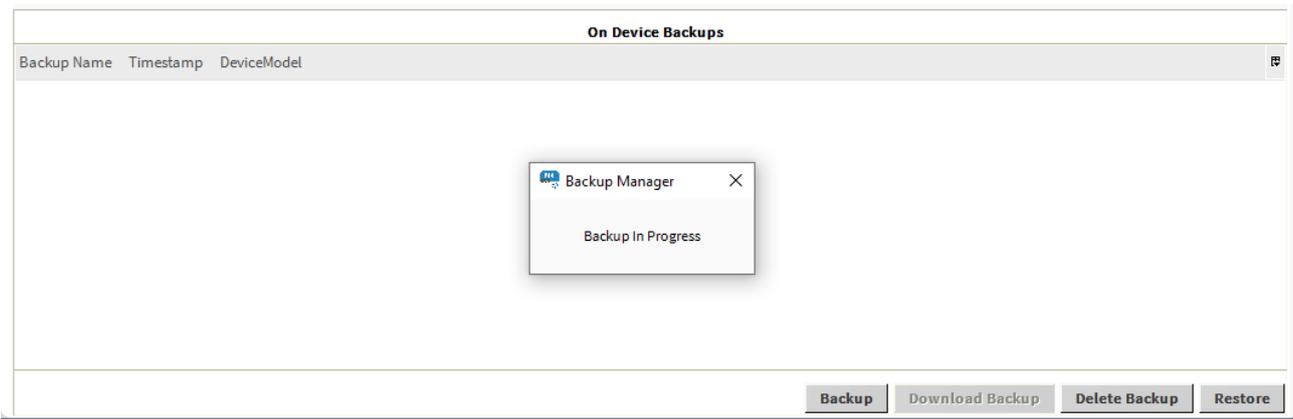


Figure 29. Pop-up informing about the backup progress

Once the process is completed, the backup will be visible in the On Device Backups table in the Backup Manager view.



Figure 30. On Device Backups

3.7.2 Downloading Backup

- Click the Download Backup button to download the backup from the device to the local station.

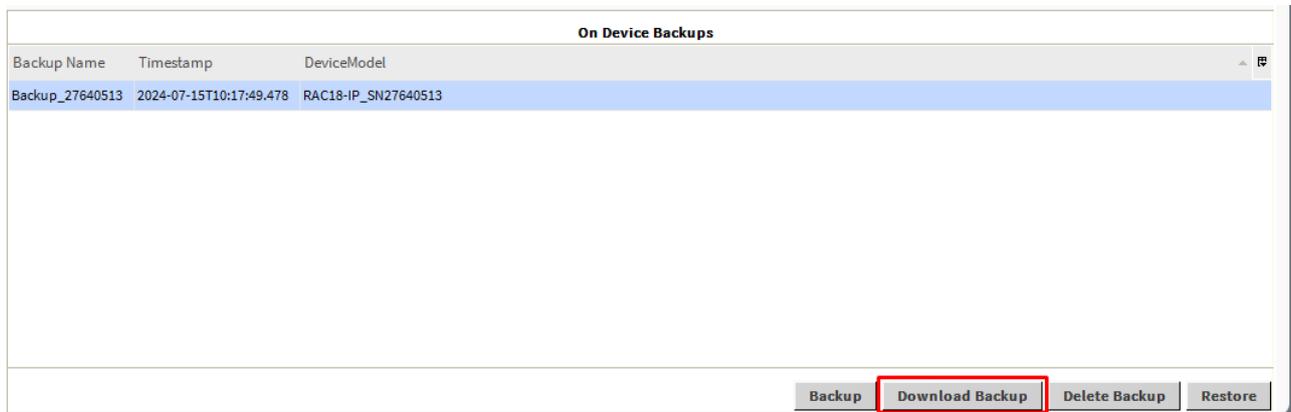


Figure 31. Download Backup button

A pop-up will appear. Set the Backup name or keep the default name. Click Ok to Confirm once the backup name is set. The backup will be downloaded.

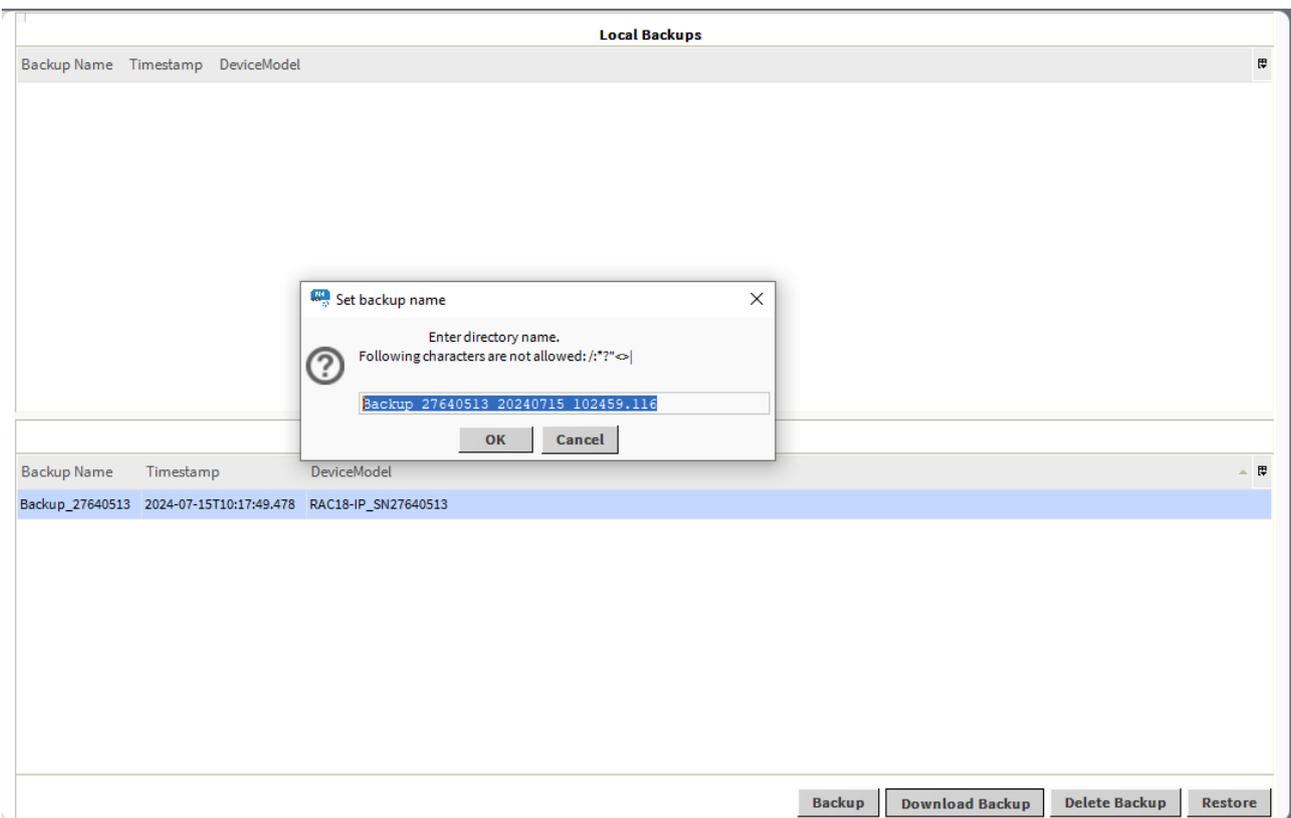


Figure 32. Changing backup name

A pop-up will appear informing about the completed download process.

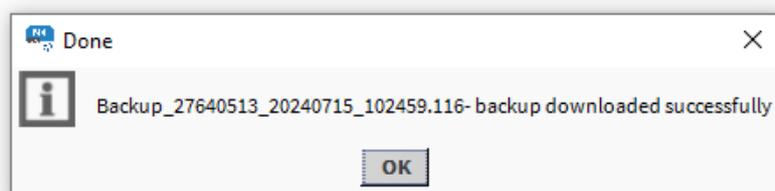


Figure 33. Successful backup confirmation

Once the process is completed, the backup will be visible in the Local Backups table in the Backup Manager view.

All local backups are stored in the local Niagara station. To access backups go to Station → Files → nanoEdgeEngine → backup → BackupName. Backups can be imported or exported from this location manually and will become visible in the Backup Manager view.

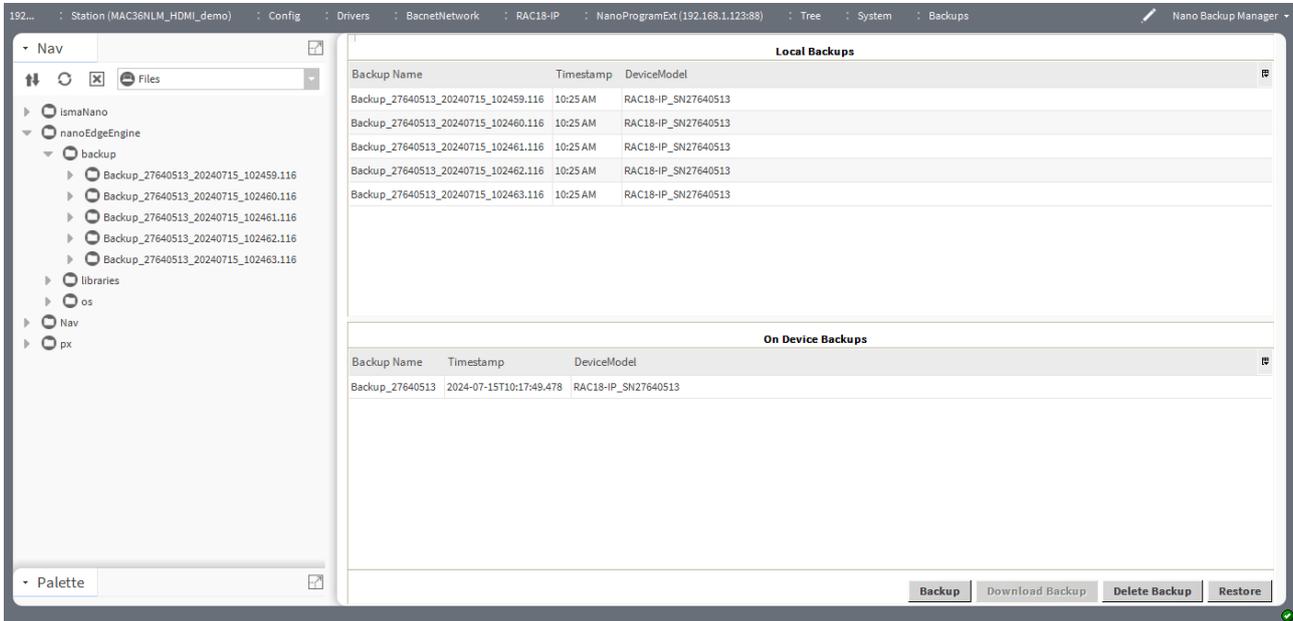


Figure 34. Local station backups stored in the station Files

3.7.3 Restoring Backup

The backup can be restored to the device. To perform the restore function, select the backup to be restored to the device and click the Restore button.

A pop-up will appear with available containers that should be restored to the device. Select the proper configuration and confirm with the OK button.

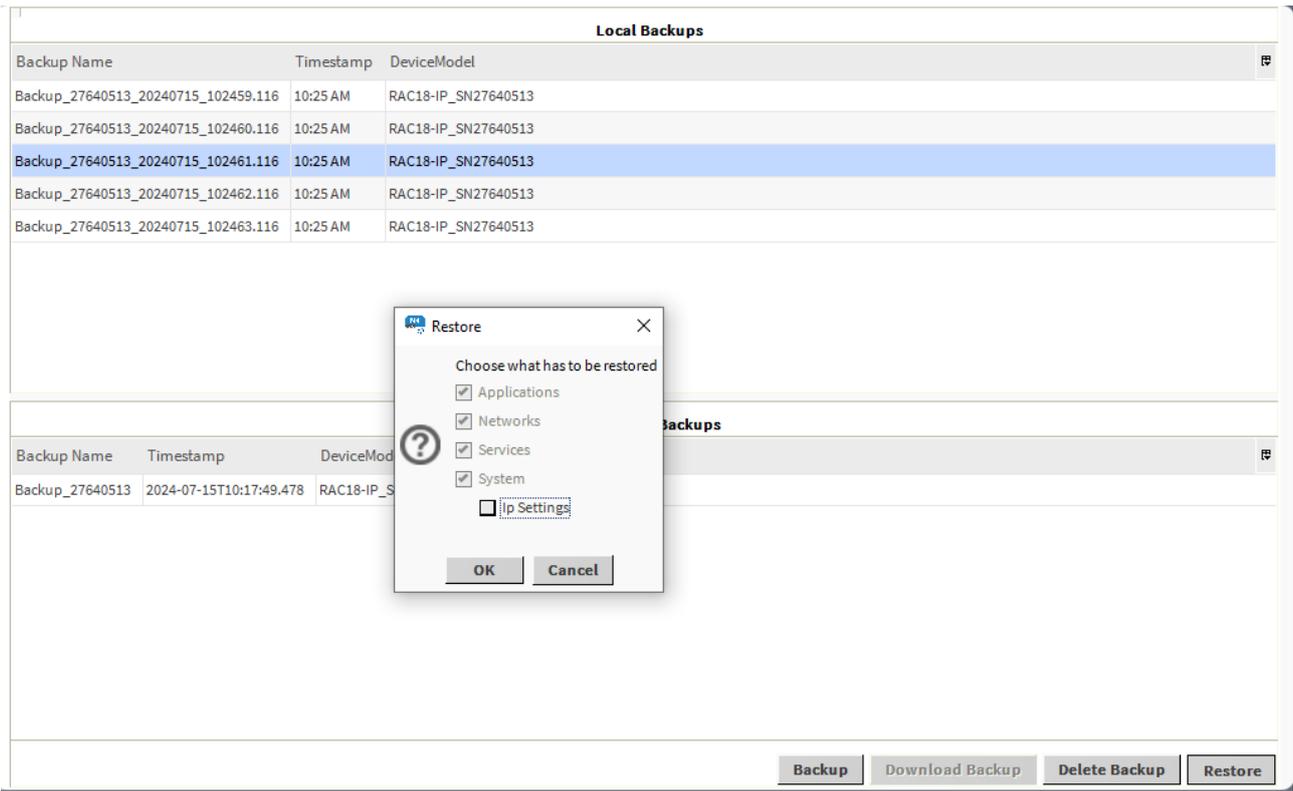


Figure 35. Available restore options will appear after clicking on the Restore button

Warning!

Restoring backup will overwrite the existing application loaded on the device.

A pop-up window will appear to confirm restoring of the backup. Click Yes to start the restoring process.

Please wait until the end of the process a pop-up will inform the user about the process in progress.

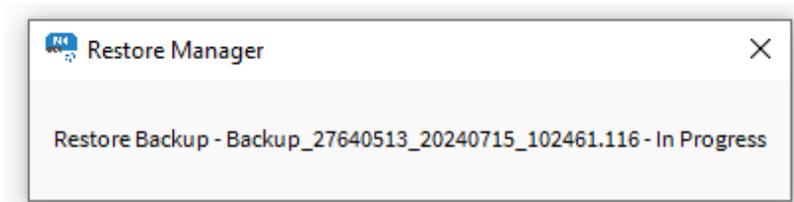


Figure 36. Restoring in progress

Once the process is finished, a pop-up will appear informing that the device has been disconnected. Right-click on the nE2DeviceExt, go to Actions → Connect to reconnect with the device.

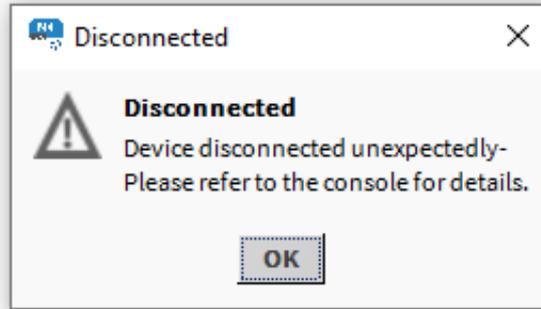


Figure 37. Device disconnected after restoring backup

4 Step 3: Programming

4.1 nano EDGE ENGINE Libraries

nano EDGE ENGINE enables real-time device programming using components from libraries installed on the device. Application programming on the controller is done in the Applications container. The nano EDGE ENGINE controller can run multiple applications in different time cycles, running simultaneously.

To learn more about the Applications, please refer to the [nano EDGE ENGINE Programming user manual](#).

To start programming, make sure that the required libraries are installed on the device.

To learn more about the nano EDGE ENGINE libraries and components, please refer to the [nano EDGE ENGINE Programming user manual](#).

The user can program the nano EDGE ENGINE device using installed libraries and components found in the Libraries folder. In the Application container, basic components can be added by right-clicking on the Application/Equipment.

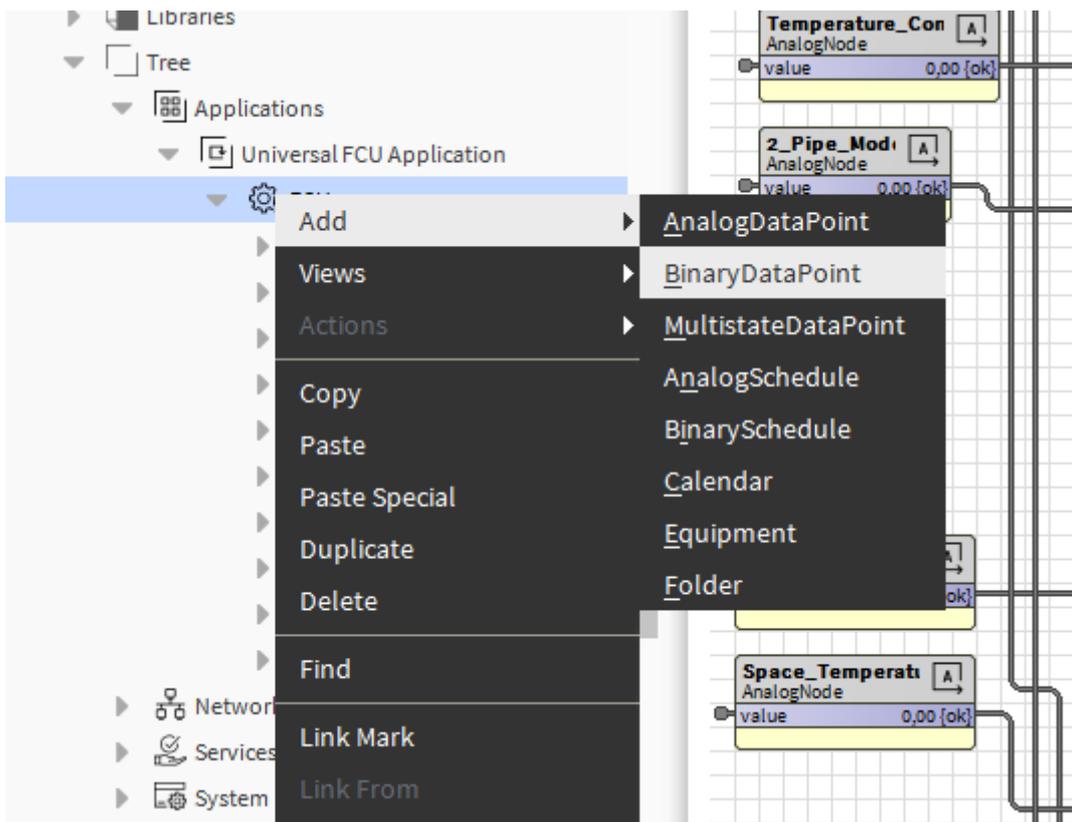


Figure 38. Context menu for adding basic components

The libraries on the device act as a palette of components that can be dropped into the device logic. If the user does not have a dedicated module with nano EDGE ENGINE libraries, it is possible to use those installed on the device. To enhance the user experience, it is recommended to open an additional nav view for the Libraries view:

- in Workbench, go to Window → Sidebar → Nav. Select Nav.

A new Nav view will appear on the left bottom side of the Workbench view. Navigate to the nE2DeviceExt, right-click on the Libraries folder, and select Go Into.

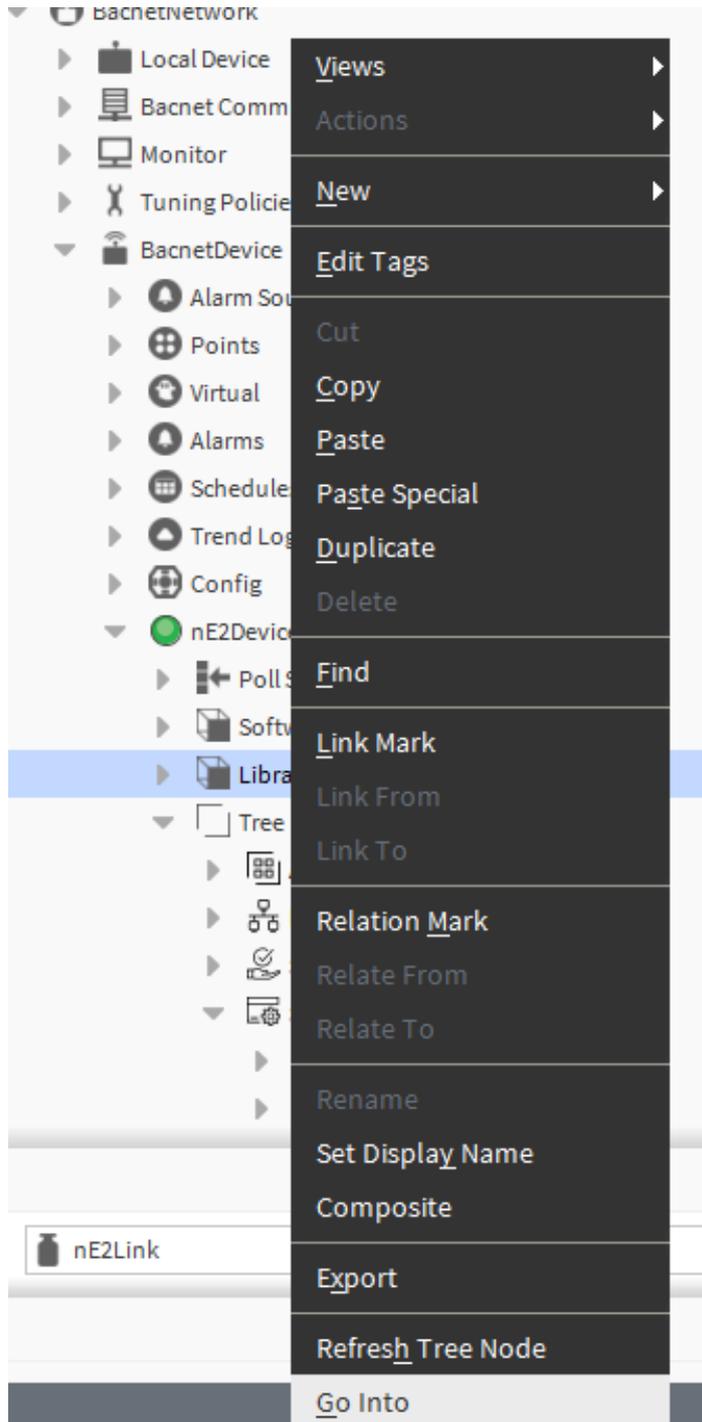


Figure 39. Go Into action in Libraries

An on-device libraries list will appear.

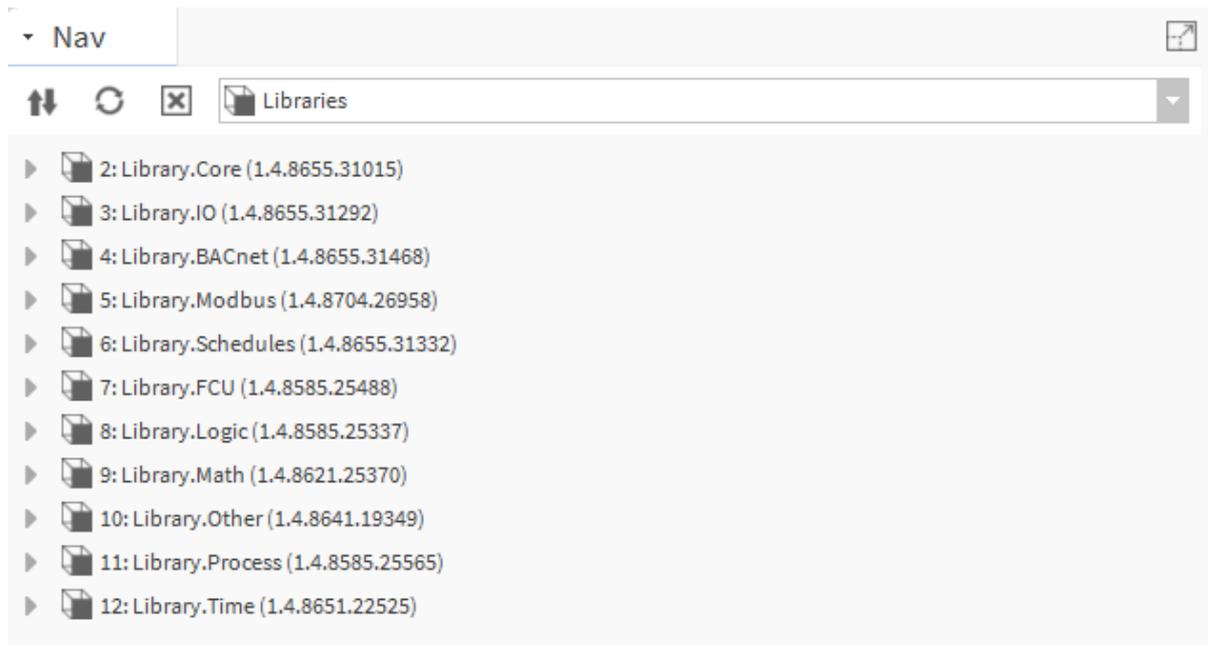


Figure 40. On-device libraries in the Nav view

4.2 Application

The Applications container allows to add multiple Application components for building independent user applications, which are cycle-driven and may work simultaneously.

The user may define the application purpose (heating, lighting, etc.) and a cycle time of algorithms operation (cycles may differ between applications).

To create a first application, drag and drop the Application component from Library.Core to the Applications container and name it as appropriate.

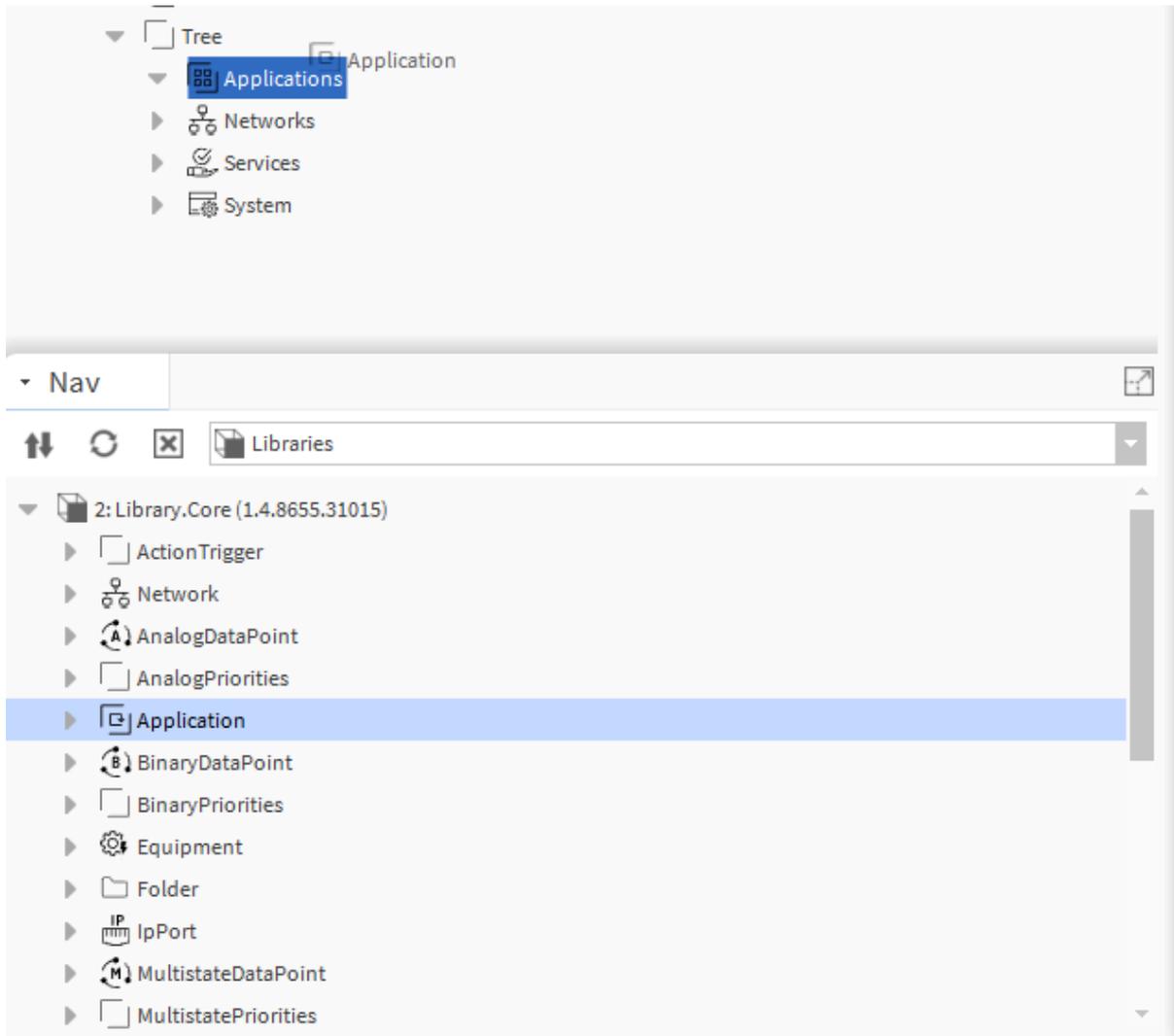


Figure 41. Adding the Application component to the Applications container

Go to the Application AX Property Sheet. Configure the scanPeriod slot and click Save.

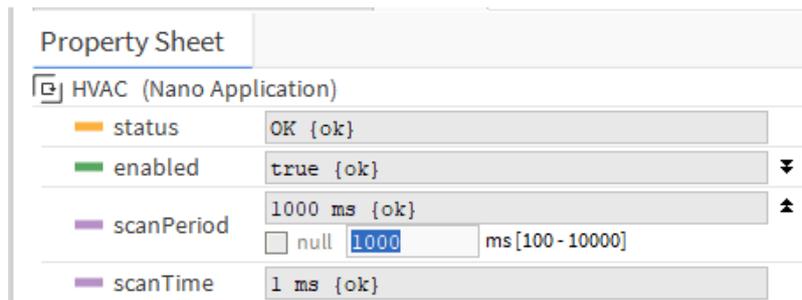


Figure 42. Setting the application's scan period

 To learn more about the Application component, please refer to the [nano EDGE ENGINE Programming user manual](#).

4.2.1 Folder

The Folder component is a grouping component, which can be used to gather other components to help organize the tree. The Folder component can be used both in the Applications and Networks containers, however, it cannot be added directly to the

container. The Folder component can be freely renamed to facilitate categorization of components included within.

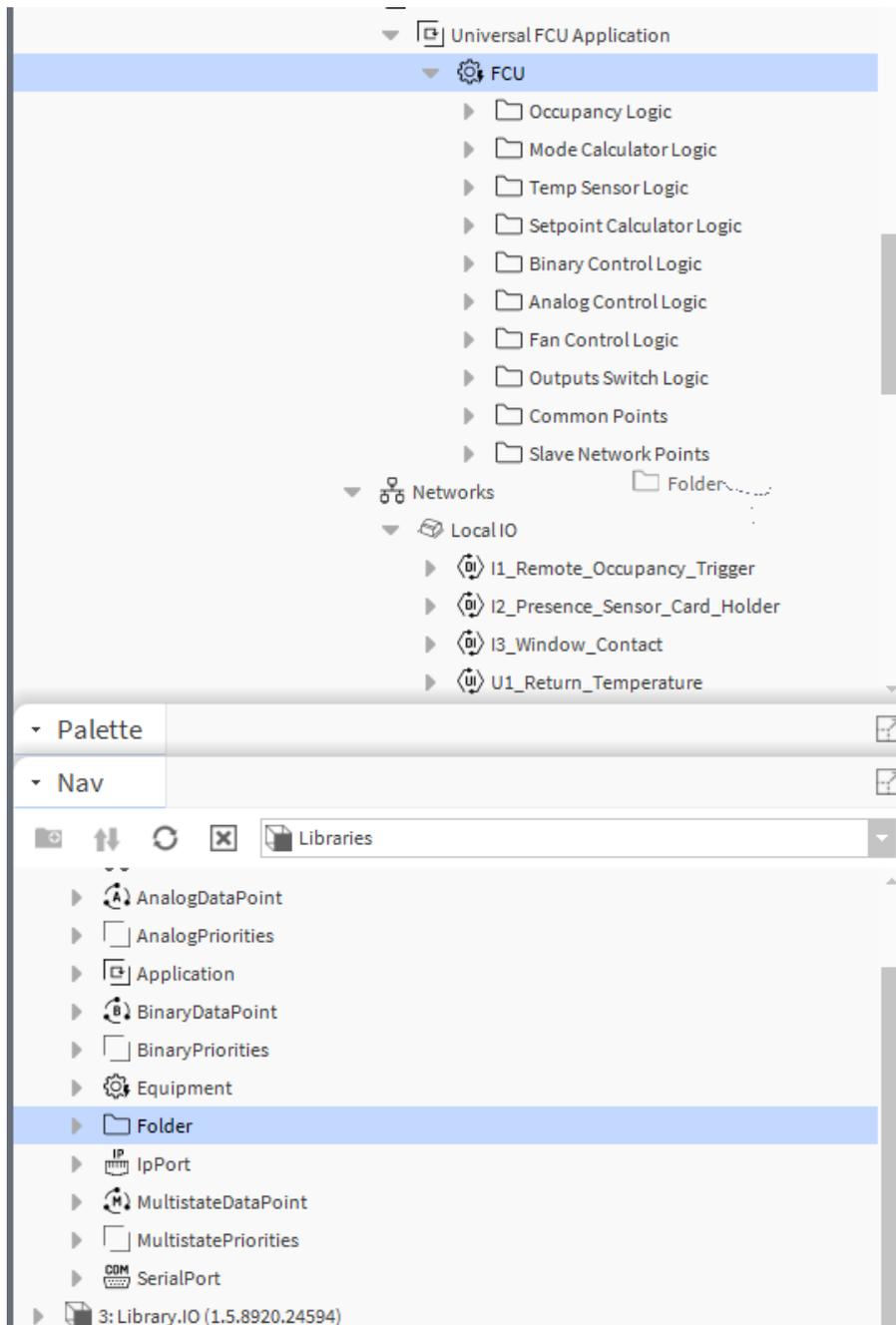


Figure 43. Adding the Folder component from the device libraries

It is also possible to add the Folder component directly from the context menu:

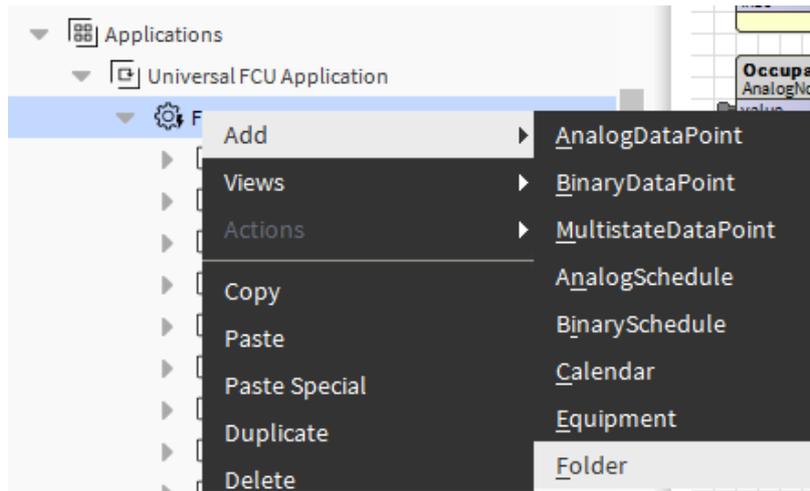


Figure 44. Adding the Folder component from the context menu

To learn more about the Folder component, please refer to the [nano EDGE ENGINE Programming user manual](#).

4.3 Equipment

Double-click the Application component (below, renamed as HVAC, as a reference to the purpose of the application), the wire sheet opens. Drag and drop the Equipment component to the wire sheet, and name the component as appropriate (here, FCU).

The Equipment component is a grouping folder-type component, which can be used to gather other components, regarding specific equipment included in the Application, to help organize the Tree. It can be freely renamed to facilitate categorization of components included within.

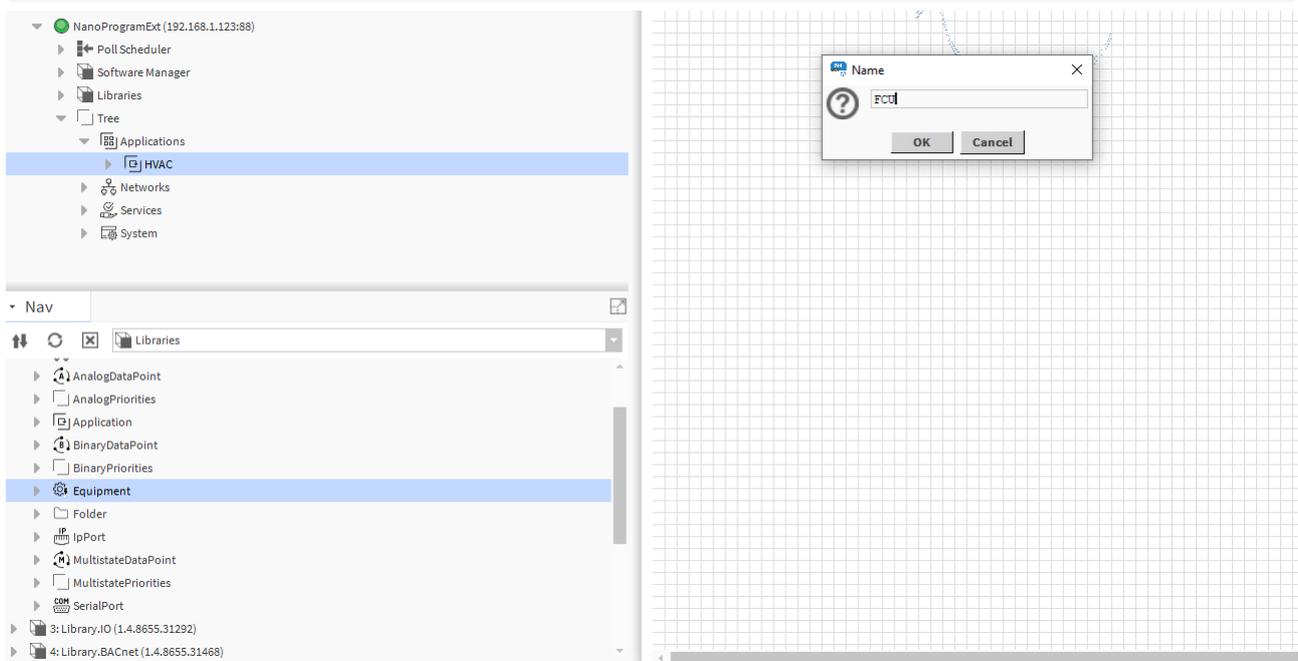


Figure 45. Adding the Equipment component from device libraries

It is also possible to add the Equipment component directly from the context menu of the Application component:

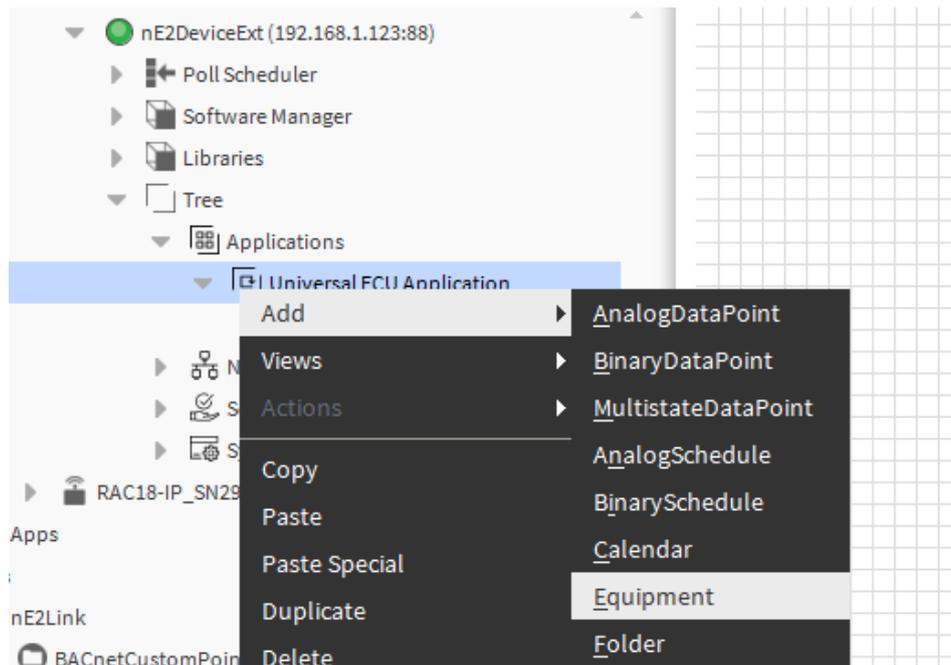


Figure 46. Adding the Equipment component from the context menu



To learn more about the Equipment component, please refer to the [nano EDGE ENGINE Programming user manual](#).

4.4 Data Points

Data Points are universal components that represent a value in the application logic. The available Data Points:

- [AnalogDataPoint](#) with native [BACnetAnalogPoint](#) and [ModbusAnalogPoint](#) extensions;
- [BinaryDataPoint](#) with native [BACnetBinaryPoint](#) and [ModbusBinaryPoint](#) extensions;
- [MultistateDataPoint](#) with native [BACnetMultistatePoint](#) and [ModbusMultistatePoint](#) extensions.



To learn more about Data Points, please refer to the [nano EDGE ENGINE Programming user manual](#).

4.4.1 Adding Data Points

To add a Data Point to the application, drag and drop the relevant component ([AnalogDataPoint](#), [BinaryDataPoint](#), or [MultistateDataPoint](#)) from the [Library.Core](#) to the application.

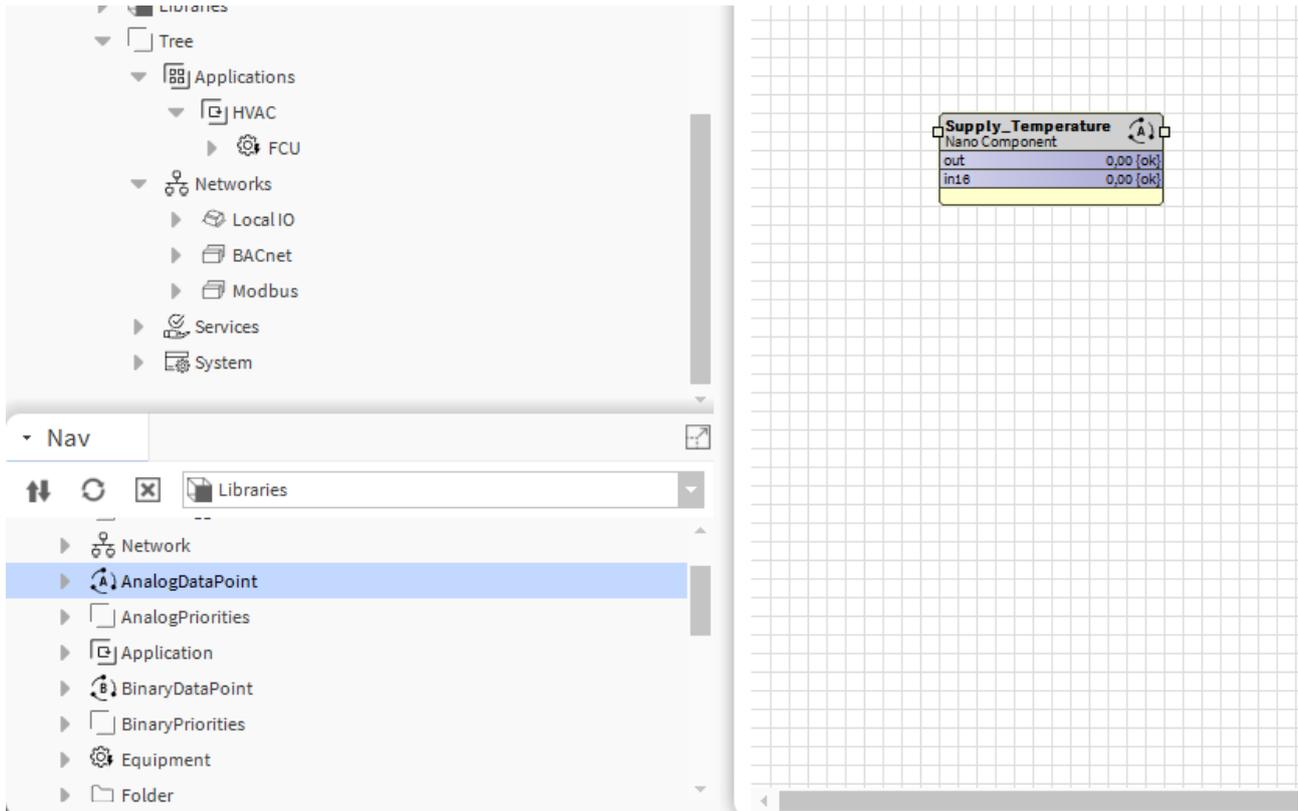


Figure 47. Adding Data Points from device libraries

It is also possible to add Data Points directly from the context menu of the Application component:

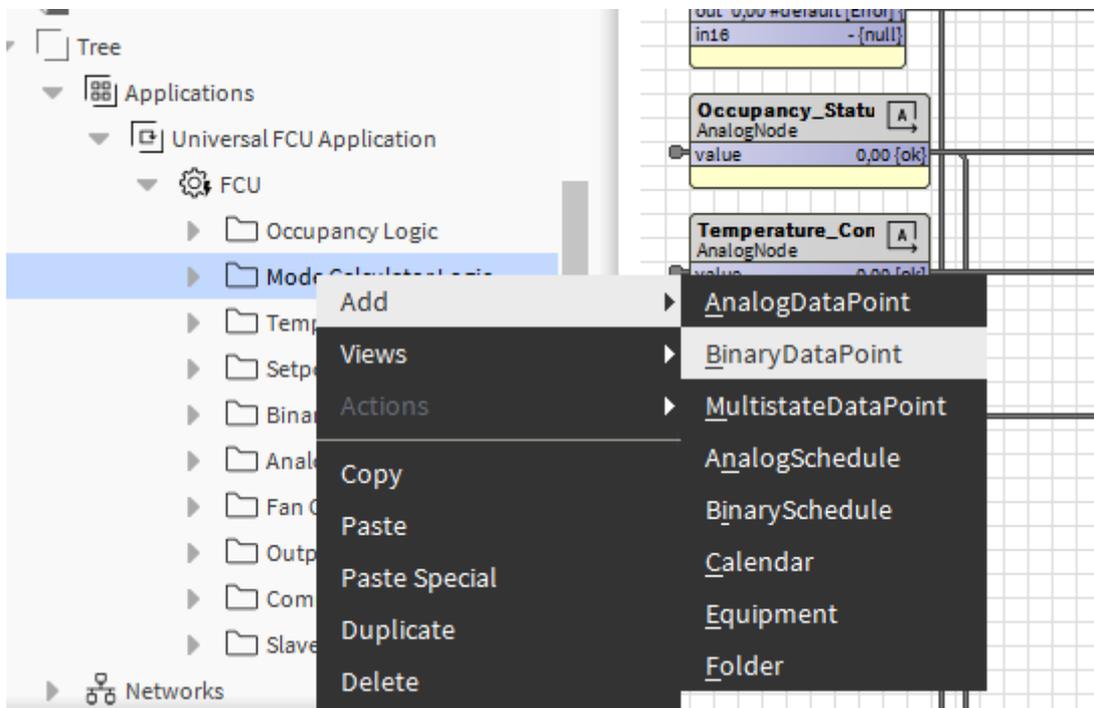


Figure 48. Adding Data Points directly from the context menu

Each Data Point has 4 actions available from the Actions menu. Actions are related with the type of the Data Point and its extensions.

- **Set Display Mode:** allows to switch on the Debug mode for each component. Debug mode displays slots for developers;
- **Set:** allows entering a value to set the In16 slot;

- **SetId:** sets a BACnet object Id of the Data Point (exposed in the BACnetPoint extension);
- **SetAddress:** sets a Modbus address of the Data Point (exposed in the ModbusPoint extension).

 All slots and options are described in the nano EDGE ENGINE Programming user manual: [AnalogDataPoint](#), [BinaryDataPoint](#), [MultistateDataPoint](#).

4.4.2 Data Points Configuration

To configure the added Data Point, go to its Property Sheet. Standard Data Point slots will be visible. The Property Sheet view allows to configure the following parameters:

- mode;
- units;
- extensions;
- other points available for the selected component.

Property Sheet

 **Supply_Temperature** (Nano Component)

 status	OK {ok}	
 reference	Nano Reference	
 description	{ok}	▼
 enabled	true {ok}	▼
 mode	Value {ok}	▼
 out	0,00 {ok}	
 units	{ok}	▲
	<input type="checkbox"/> null 	▼
 in16	0,00 {ok}	▼
▼  BacnetAnalogPoint0	BacnetAnalogPoint0	
 object	Value {ok}	
 objectId	0 {ok}	▼
 expose	false {ok}	▼
 object	Value {ok}	
 objectId	0 {ok}	
 expose	true {ok}	▼
▶  ModbusAnalogPoint1	ModbusAnalogPoint1	
 address	0 {ok}	
 addressFormat	Decimal {ok}	
 inputPriority	In16 {ok}	▼
 expose	true {ok}	▼
 registerType	Holding {ok}	
 dataType	Int {ok}	▼

 Refresh
 Save

Figure 49. Data Point's Property Sheet view

Adding Extensions

Data Points can have their functionality enhanced by extensions. For example, the AnalogDataPoint is originally equipped with the BACnetAnalogPoint and ModbusAnalogPoint extensions (these cannot be added or removed), but other extensions, which offer different functionalities, can be added or removed as necessary. Extensions are added by dropping the desired extension from the Libraries.

To add an extension to a Data Point, drag and drop it from the Libraries to the point in the Property Sheet view.

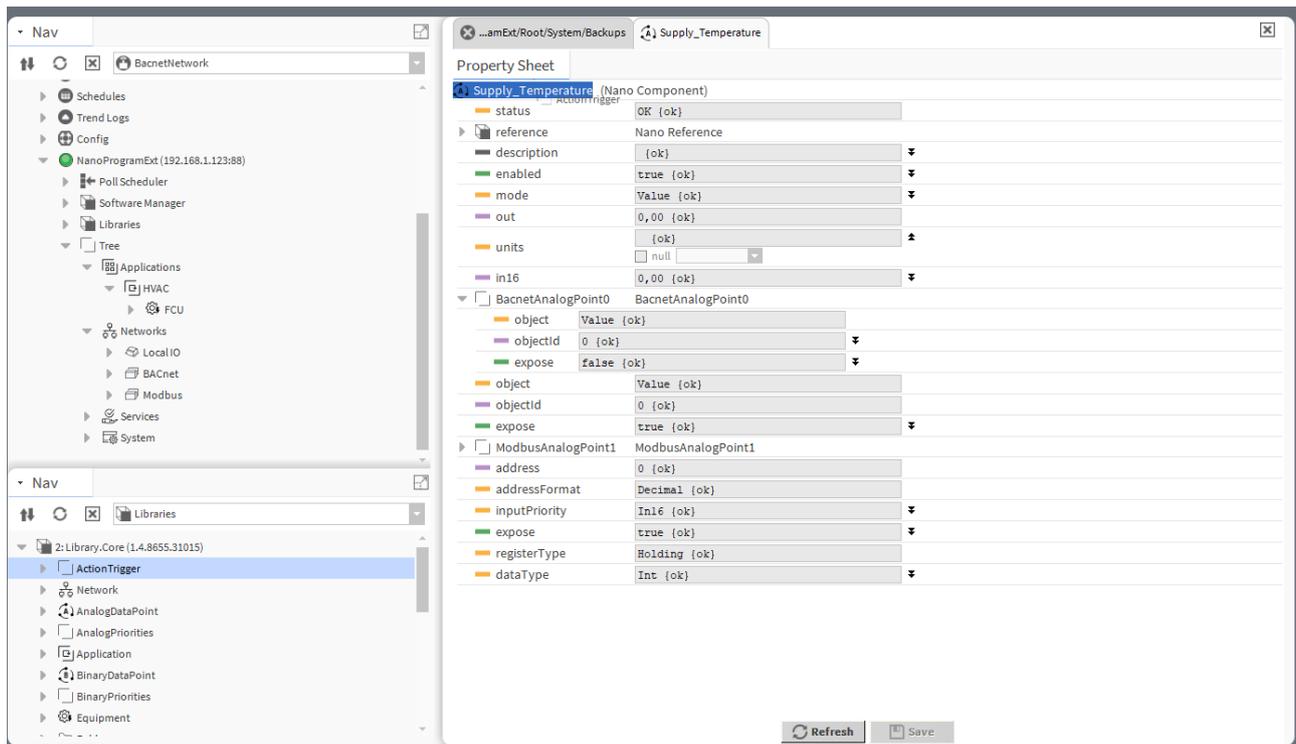


Figure 50. Adding ActionTrigger extension to the AnalogDataPoint

4.5 Local IO

4.5.1 Configuration

To setup local inputs and outputs on the nano EDGE ENGINE device, expand the Library.IO. The IO components must be placed in the Networks container, under the LocalIO component.

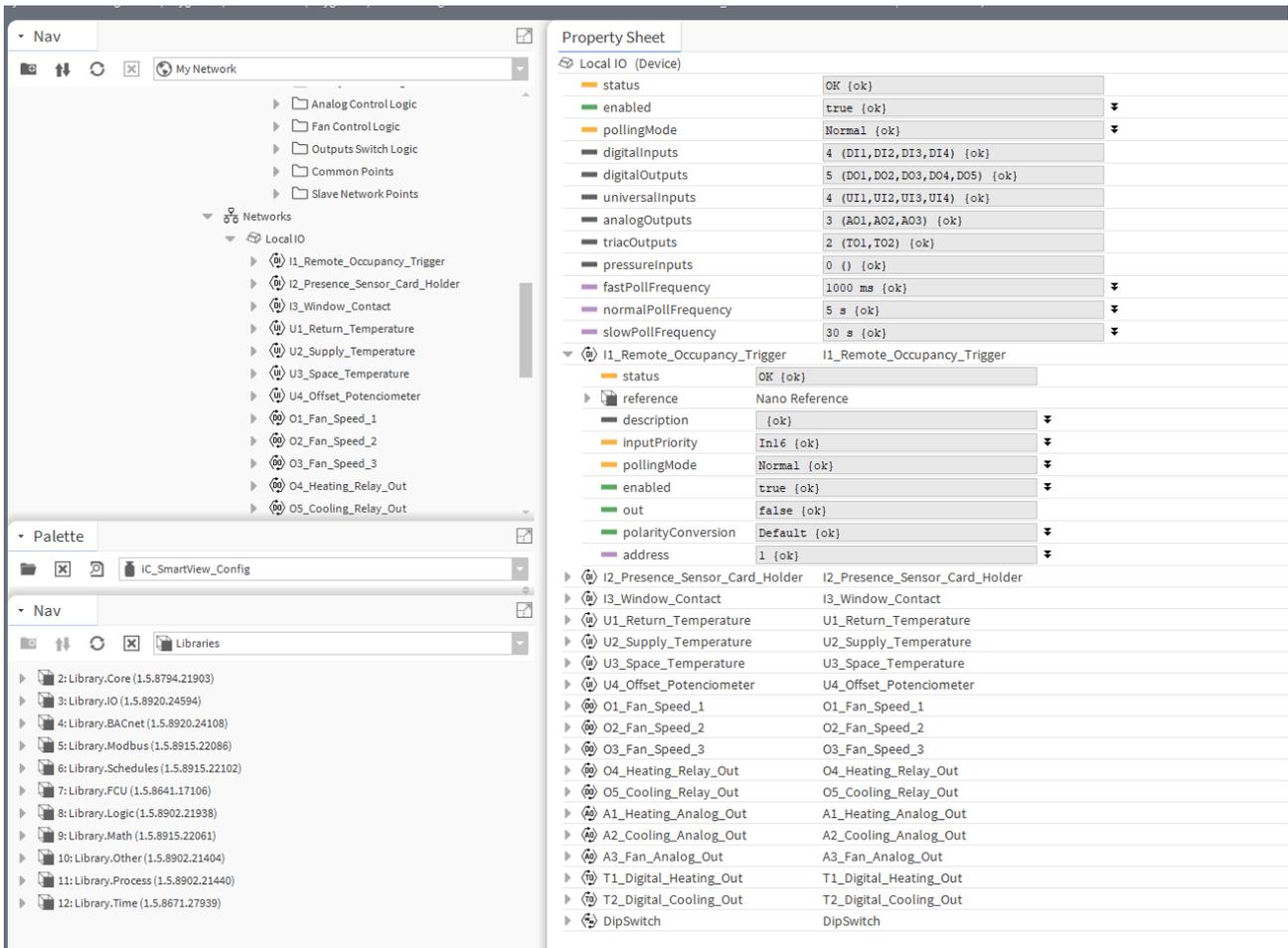


Figure 51. LocalIO components added to the Networks container

To learn more about the local IO components, please refer to the [nano EDGE ENGINE Programming user manual](#).

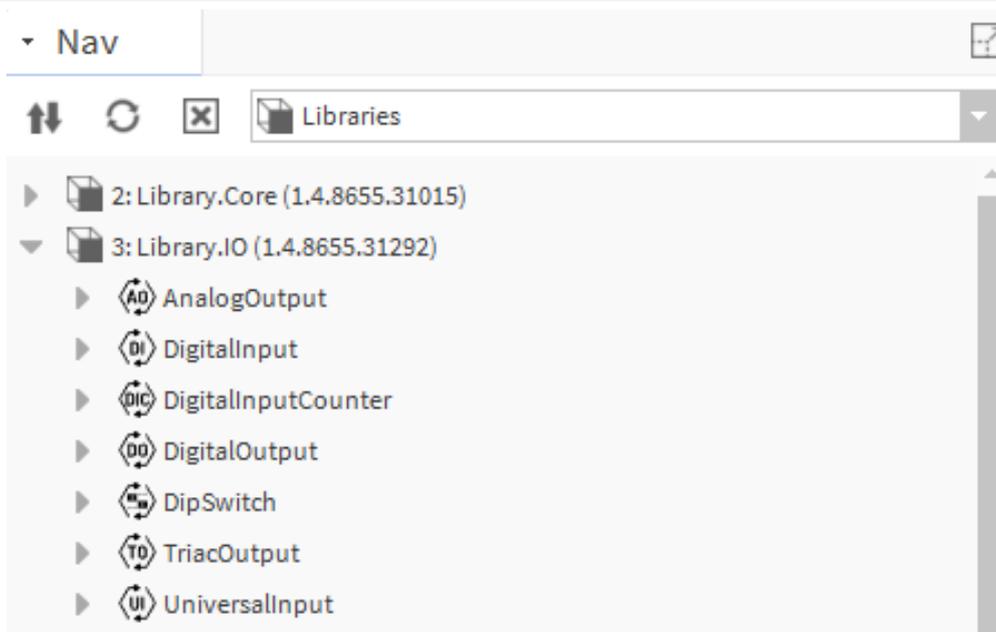


Figure 52. Library.IO

Drag and drop the desired IO component under the Local IO network.

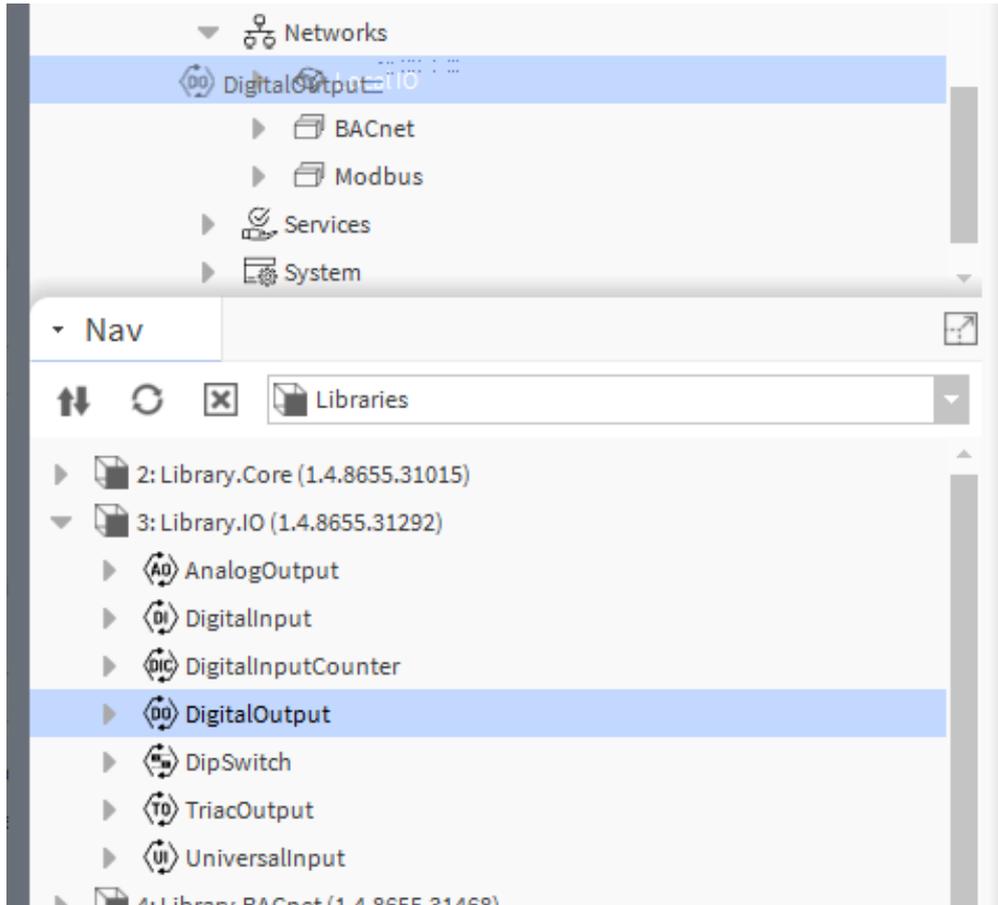


Figure 53. Adding DigitalOutput to the Local IO network

Double-click the IO point to open its property sheet. By default, the status of the point is Fault because the address must be set. Configure the point's address in the Address slot and click Save.

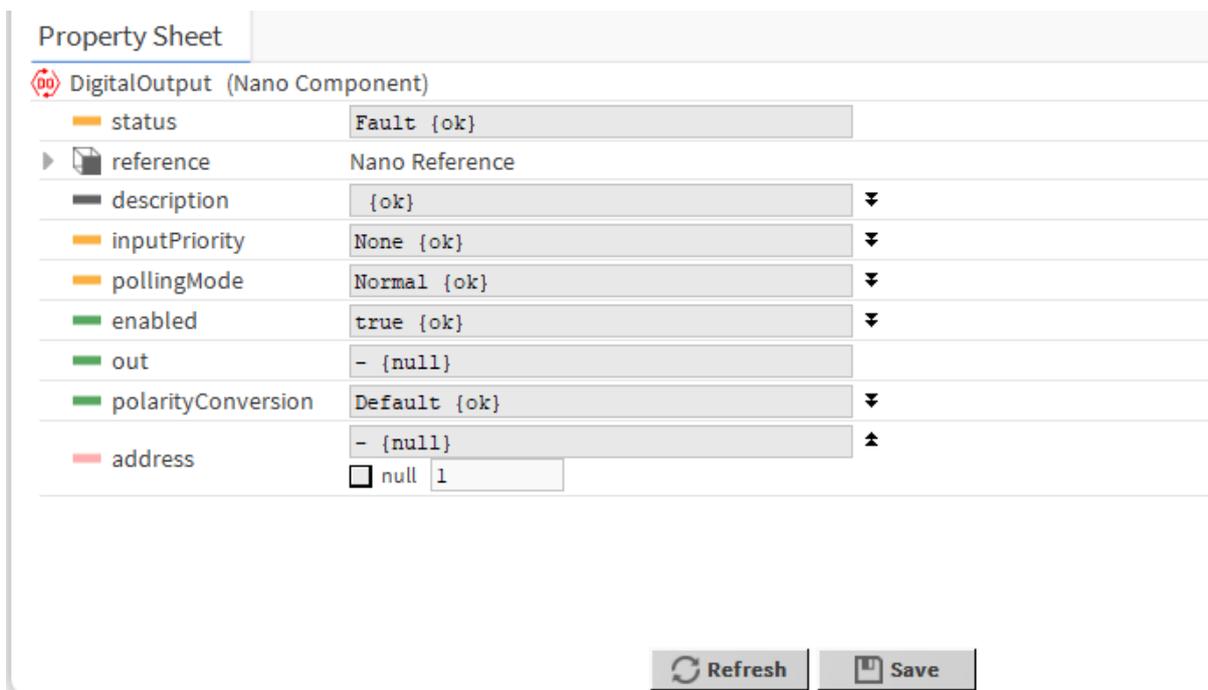


Figure 54. Setting the IO point address

4.6 Linking

In NanoProgramExt, it is possible to link nano EDGE ENGINE components by dragging a wire from one component to another.

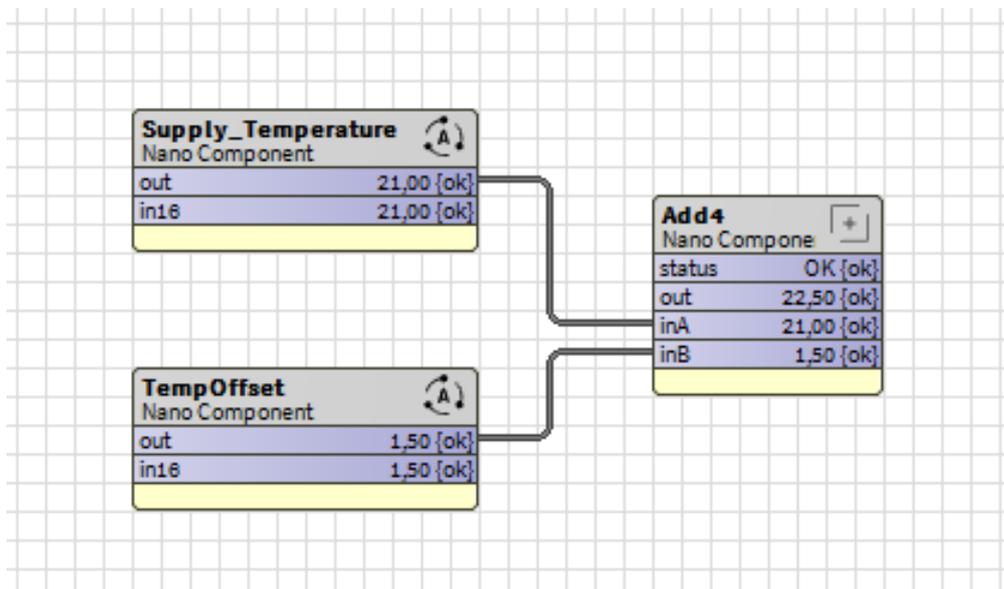


Figure 55. Linked components

Warning!

Linking in NanoProgramExt works only between nano EDGE ENGINE components. Do not link Niagara components from other modules/drivers with nano EDGE ENGINE components.

4.6.1 Reference Linking

Reference link is designed specifically to connect Data Point class components (in the Applications container) with network point class components (in the Networks container). A reference link transfers values along with the component's status.

 To learn more about the reference linking, please refer to the [nano EDGE ENGINE Programming user manual](#).

As network points are situated in the Networks container and Data Points are situated in the Applications container, Reference links are created using the Link Mark and Link From options from the context menu.

To create a reference link, right-click a network point and select the Link Mark option.

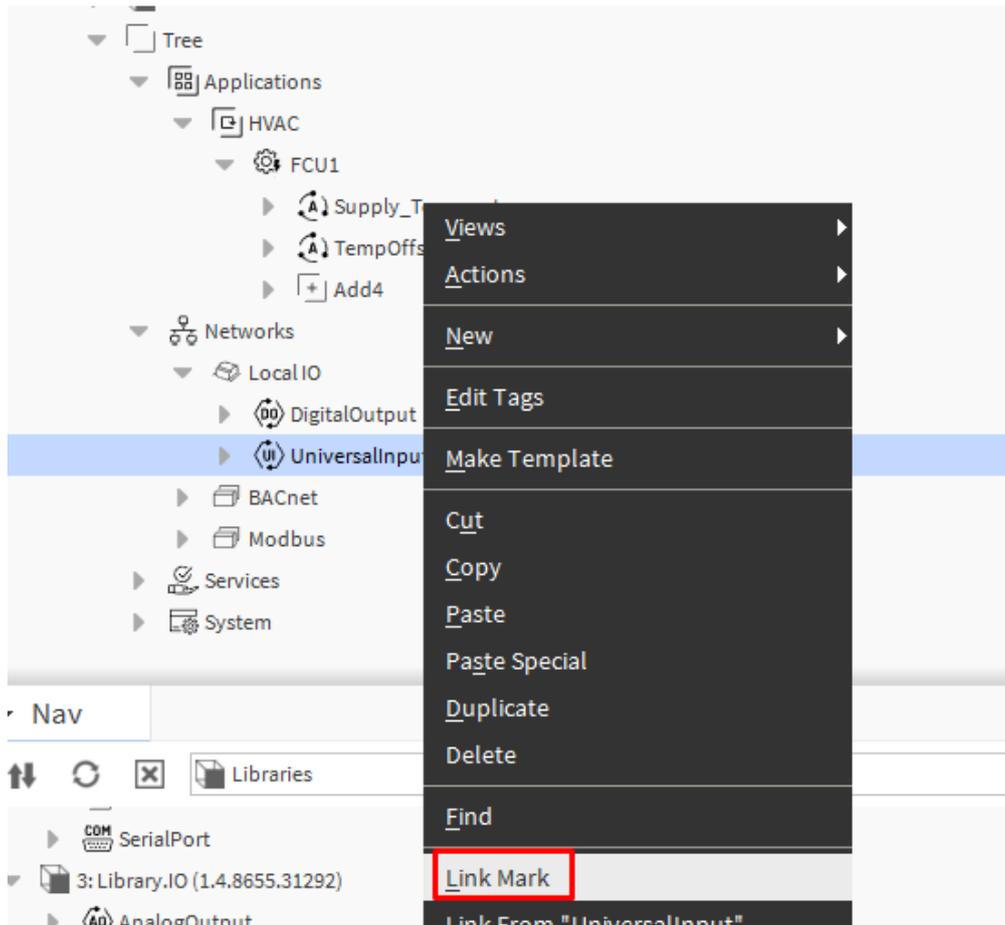


Figure 56. Link Mark option

Once the link is marked, right-click on the desired Data Point and click the Link From option.

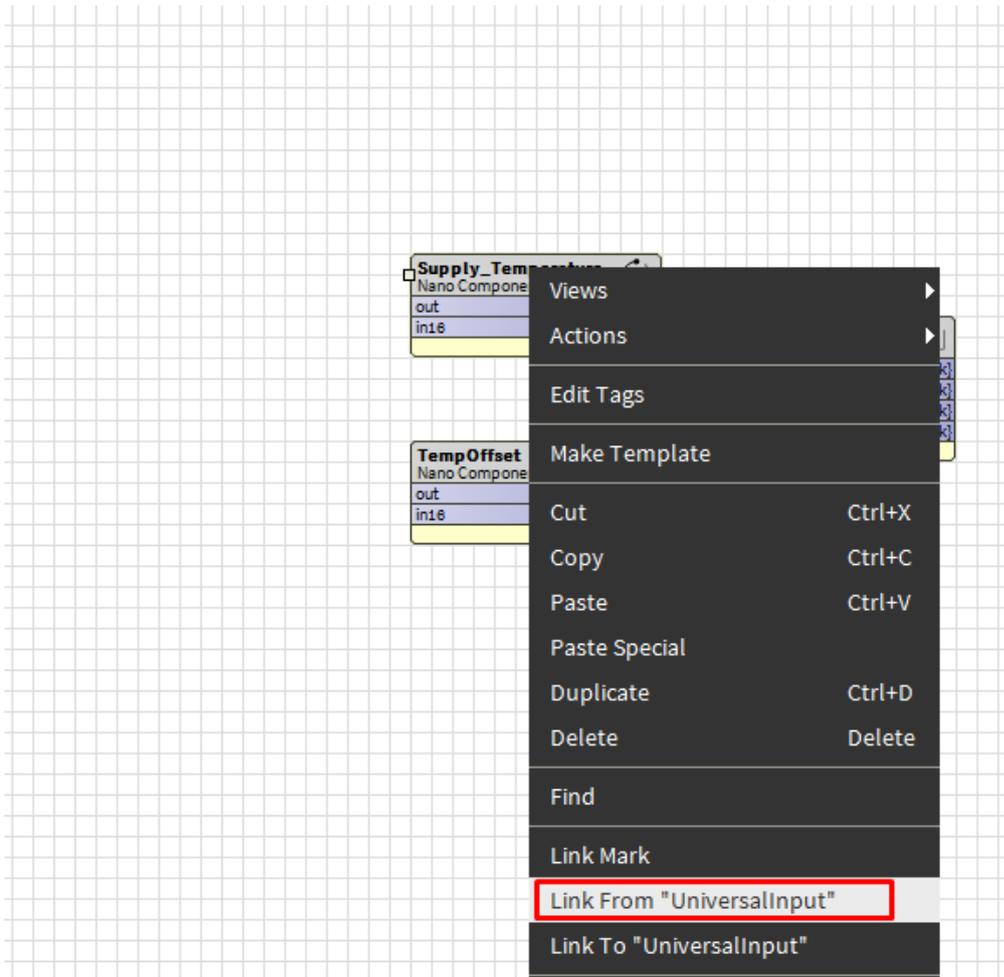


Figure 57. Link From option

In the dialog window that pops up, select "reference" slots on both Source and Target points.

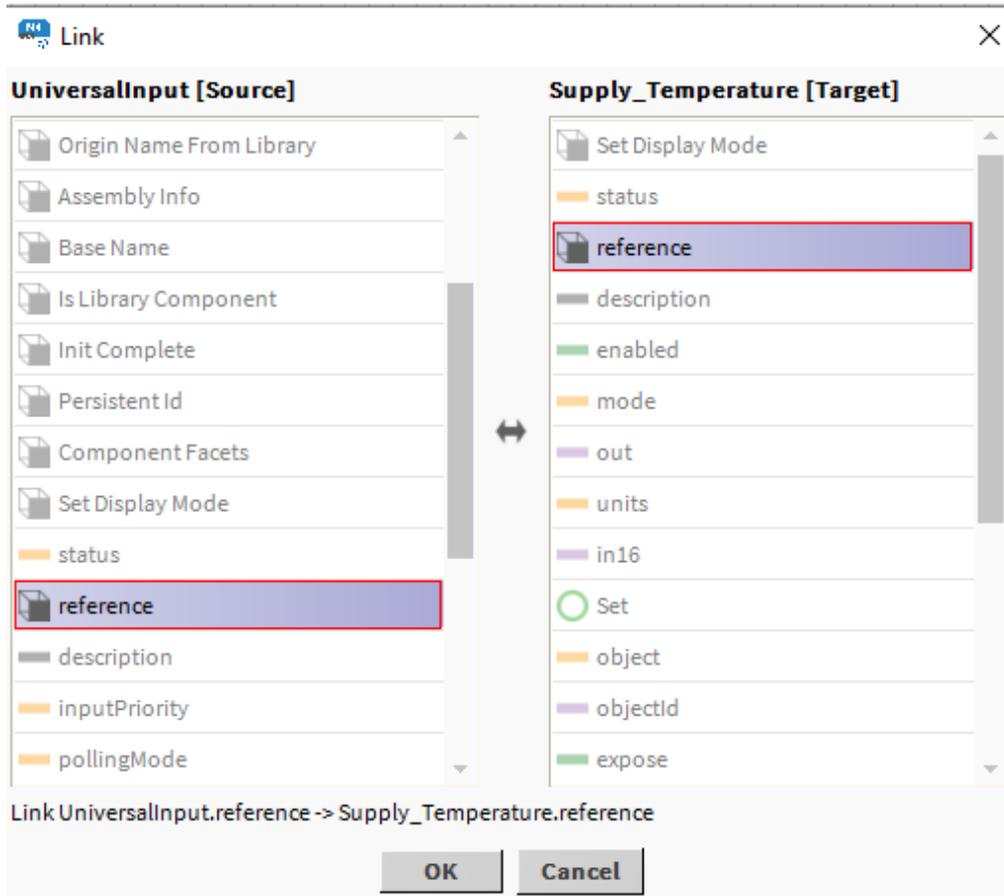


Figure 58. Creating reference between points

Once the reference is created, a new 'Nano Reference' slot appears in the component.

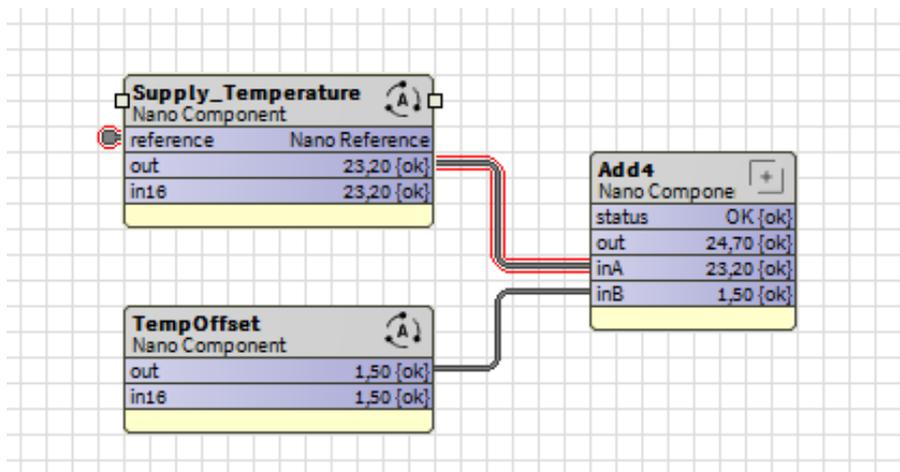


Figure 59. Data Point with a reference

5 Step 4: Integration to Niagara

Warning!

To integrate data in the Niagara Framework, user must use standard Niagara networks. nano EDGE ENGINE components must not be linked to Niagara components.

To integrate with Niagara, it is important to note that only Data Points can be exposed over networks. Each nano EDGE ENGINE device has a limit on the number of Data Points that can be exposed. The available number of Data Points can be found in the License component in the System container.

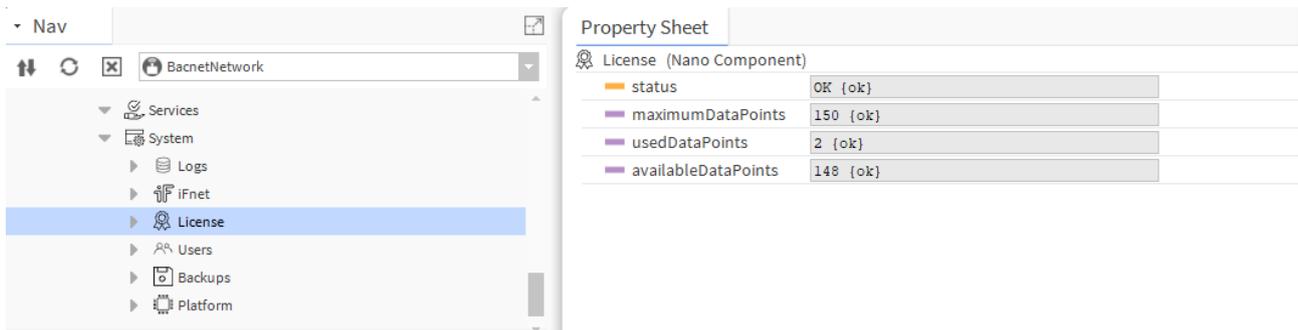


Figure 60. Number of available Data Points visible in the License component

5.1 Exposing Data Points

To integrate Data Points with Niagara, the points must be exposed over networks. By default, nano EDGE ENGINE exposes points over BACnet and Modbus.

In BACnet, all Data Points are exposed as BACnet objects by default. Individual Data Points can be hidden by manually changing the Expose slot value in their BACnet extension (e.g., BACnetAnalogPoint, BACnetBinaryPoint, BACnetMultistatePoint). The BACnet object type and object Id is visible in the Data Point BACnet extension. To change the Data Point's BACnetID, right-click on the Data Point and select the SetId action.

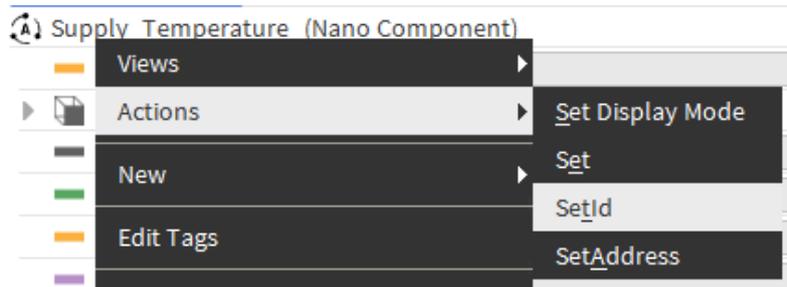


Figure 61. Setting ObjectID to the Data Point

In Modbus, all Data Points in the device are automatically exposed as the Modbus server device. In order to disable the Data Point in the Modbus server network, either set the Autoexposition slot in the Modbus component to false (all Data Points hidden) or go to each Data Point individually and set the Expose slot to false.

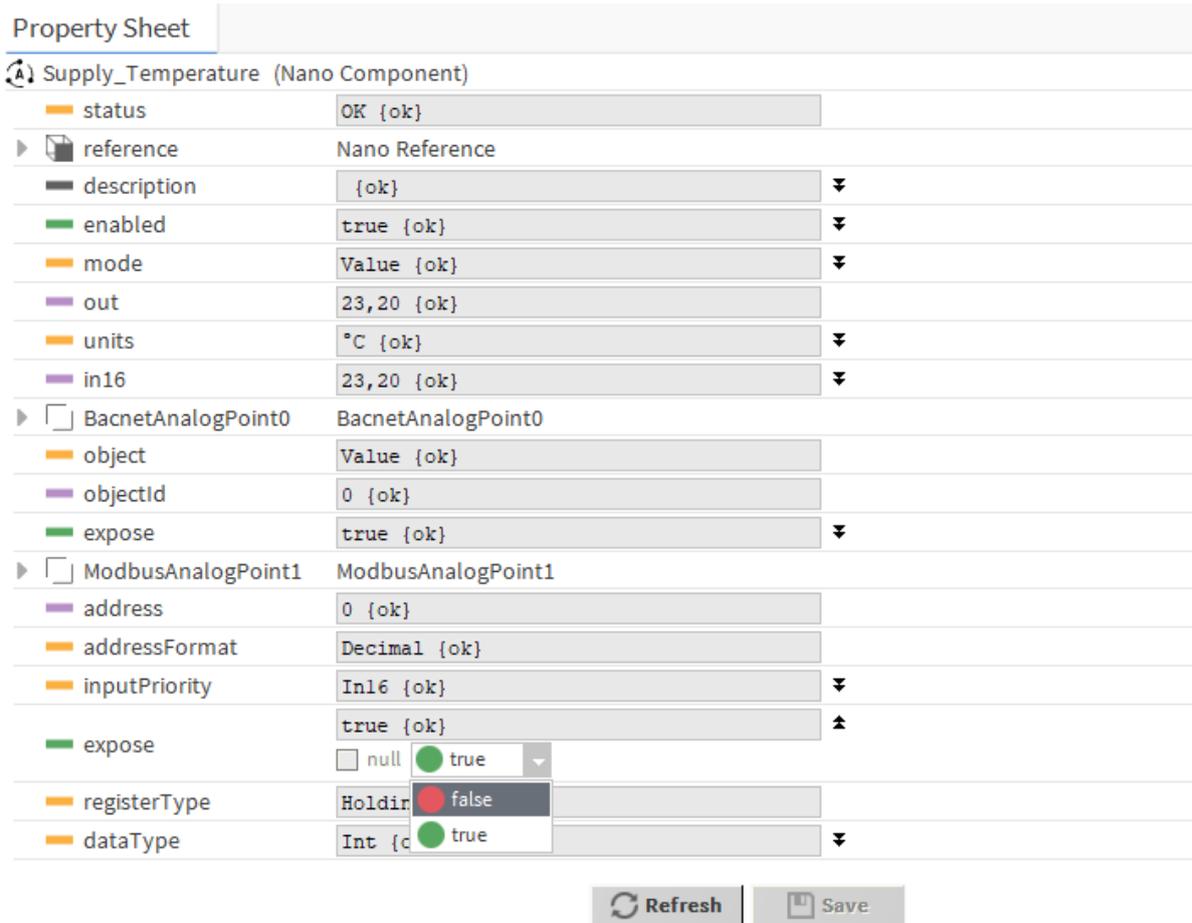


Figure 62. Possibility to disable the exposition on Modbus or BACnet in the Data Point's extension

Modbus address is set automatically. In order to set Modbus address manually, right-click the Data Point and select the SetAddress action.

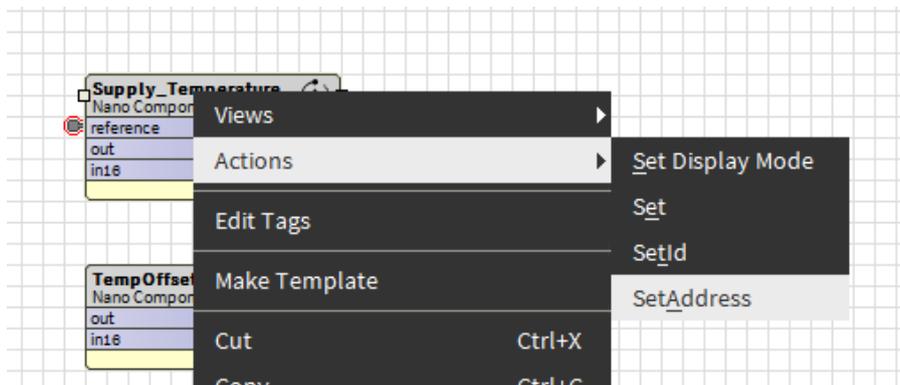


Figure 63. The SetAddress action

5.2 BACnetNetwork Niagara Integration

To integrate the nano EDGE ENGINE device and Data Points exposed over BACnet, make sure the LocalDevice component is properly configured. To change the BACnet Device settings, go to Networks → BACnet → LocalDevice, e.g., RAC18-IP.

 To learn more about the LocalDevice, please refer to the [nano EDGE ENGINE Programming user manual](#).

Property Sheet	
RAC18-IP_SN27640513 (Nano Component)	
status	OK {ok}
systemStatus	Operational {ok}
vendorName	Global Control 5 S.A. {ok}
vendorId	826 {ok}
deviceModel	RAC18-IP {ok}
firmware	1.4.1.7340 {ok}
software	1.4.1.7340 {ok}
apduTimeout	3000 ms {ok}
apduRetries	1 {ok}
deviceId	2474689 {ok} ▼
location	{ok} ▼
description	{ok} ▼
macAddress	0 {ok} ▼
maxMaster	127 {ok} ▼
maxInfoFrames	3 {ok} ▼
password	nEEBACnet {ok}
DeviceExposition0	DeviceExposition0
interface	Ethernet 1

Figure 64. LocalDevice property sheet

Once the deviceId and other parameters are properly configured, go to the BACnetNetwork device in the Niagara station and make sure the configuration of the device is correct.

Database										
Name	Exts	Device ID	Status	Netwk	MAC Addr	Vendor	Model	Firmware Rev	App SW Version	
RAC18-IP	⊕ ⊕ ⊕ ⊕ ⊕	device:2474689	{ok}	1	192.168.1.123:0xBAC0	Global Control 5 S.A.	RAC18-IP	1.4.1.7340	1.4.1.7340	

Figure 65. RAC18-IP integrated to Niagara over the BACnet network

To integrate points, go to the device → Points and click Discover. Add required points to Niagara database.

Bacnet Discover Points Success >> [X]

Discovered 3 objects

Object Name	Object ID	Property ID	Index	Value	Description
RAC18-IP_SN27640513	device:2474689	systemStatus		Operational	
Supply_Temperature	analogValue:2	presentValue		28,70	
TempOffset	analogValue:1	presentValue		1,50	

Database 1 objects

Name	Out	Object ID	Property ID	Index	Read	Write
Supply_Temperature	28,70 °C [ok]	analogValue:2	Present Value	-1	Polled	readonly

Figure 66. Points added to the Niagara BACnet database

The points have been successfully integrated into the Niagara BACnet network.