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
18 Jun 2025	1.2	New functionalities: • Configuration managers: ◦ Application Manager ◦ Data Point Manager ◦ Local IO Manager ◦ BACnet Network Manager ◦ BACnet Device Manager ◦ BACnet Point Manager ◦ Modbus Network Manager ◦ Modbus Device Manager ◦ Modbus Point Manager • Configuration Data Service • Saving logic to Niagara palette • Logs Improvements: • Software Manager update - information about not loaded libraries • Adding extensions directly from the context menu • Reordering option • Cut and paste options

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

2 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 (Recommended)

> nE2 Link is dedicated to work with 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

> In exceptional situations, it is possible to use nE2 Link directly on a Niagara controller with a limitation of opening maximum 2 connections at a time using nE2deviceExt in Niagara controllers. **For effective and seamless work, it is recommended to use nE2 Link with Niagara Workbench.**

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 Configuration

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.

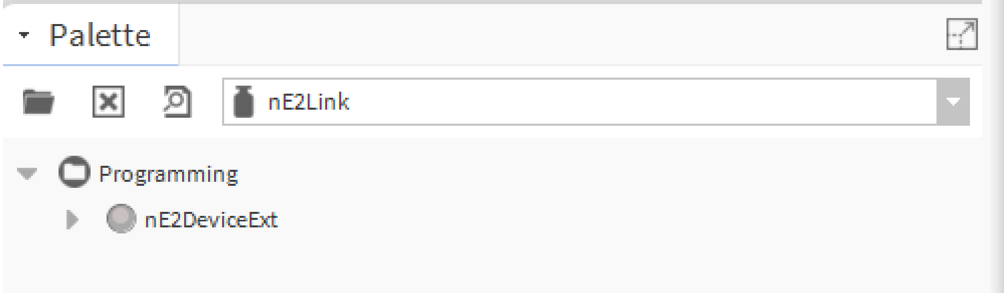


Figure 1. nE2Device extension in the nE2Link module

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.

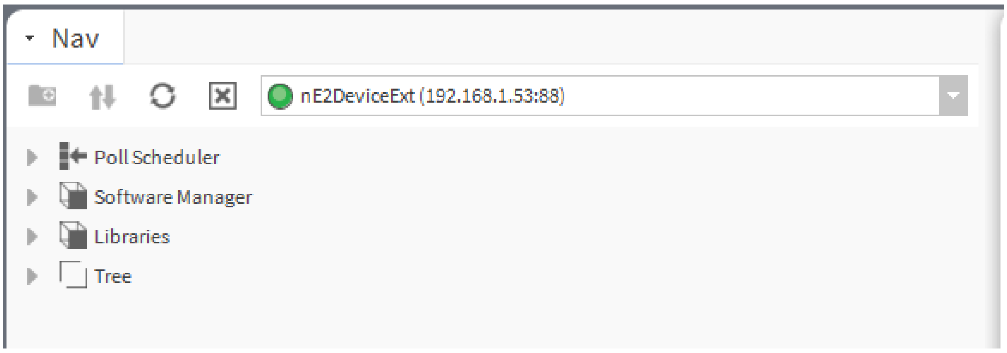


Figure 2. nE2DeviceExt contents

(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 the BACnet device in the Niagara station.

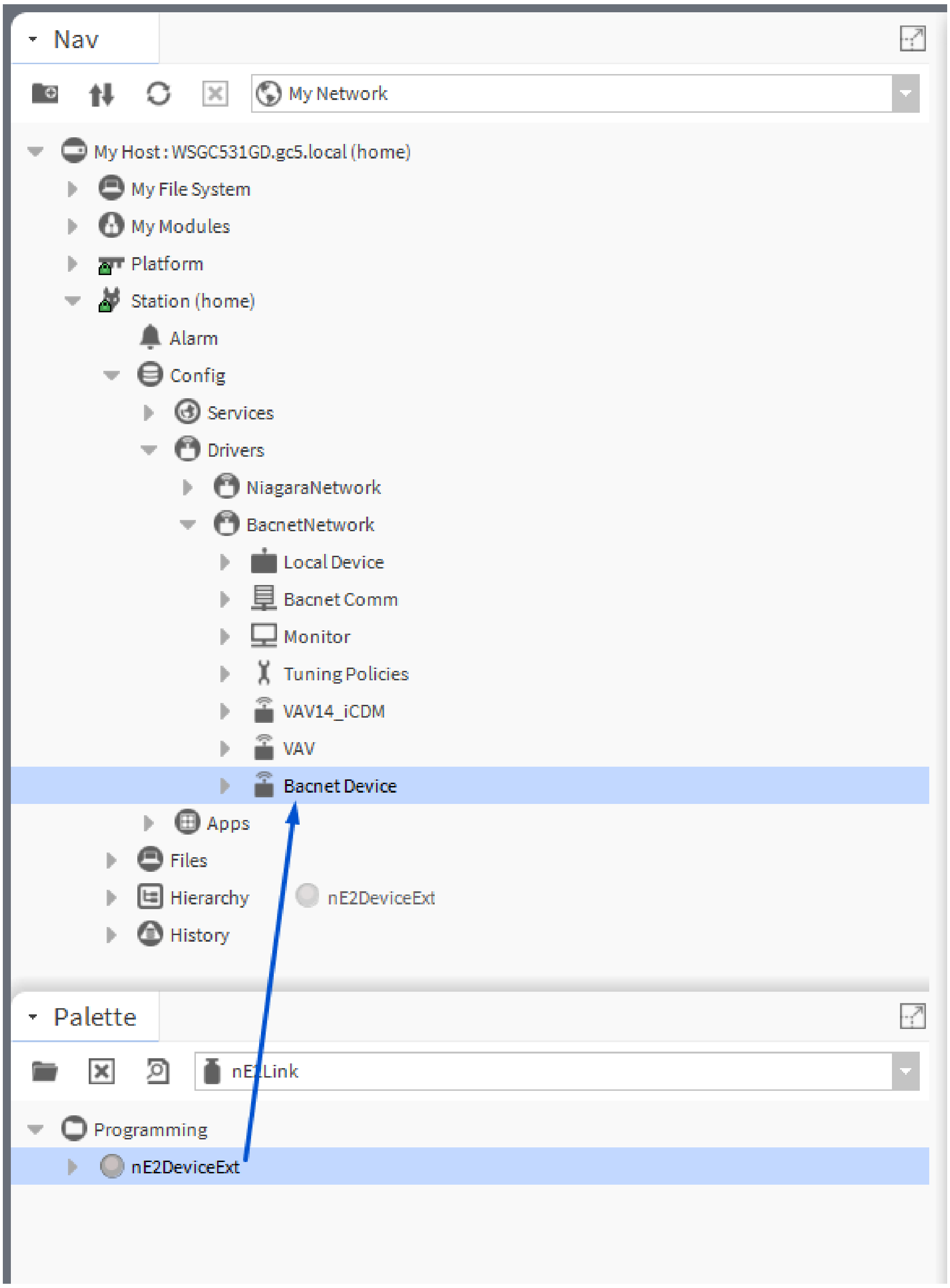


Figure 3. Adding nE2Device Ext to the BACnet device

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.

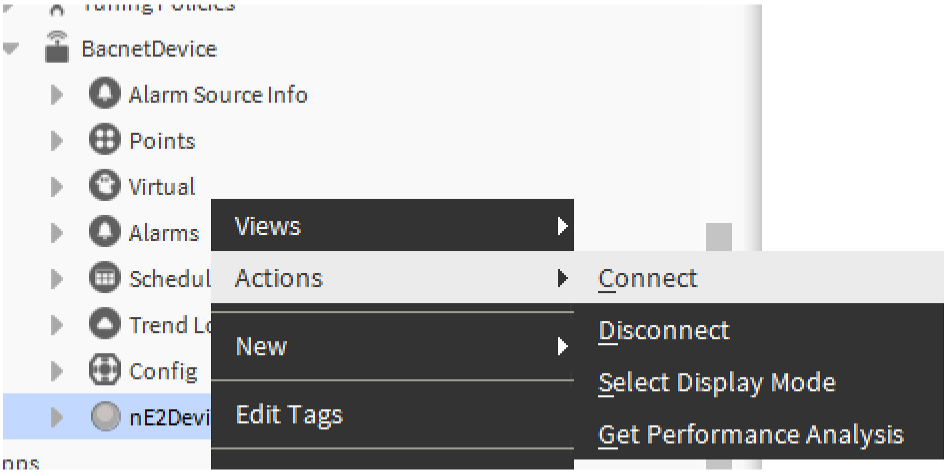
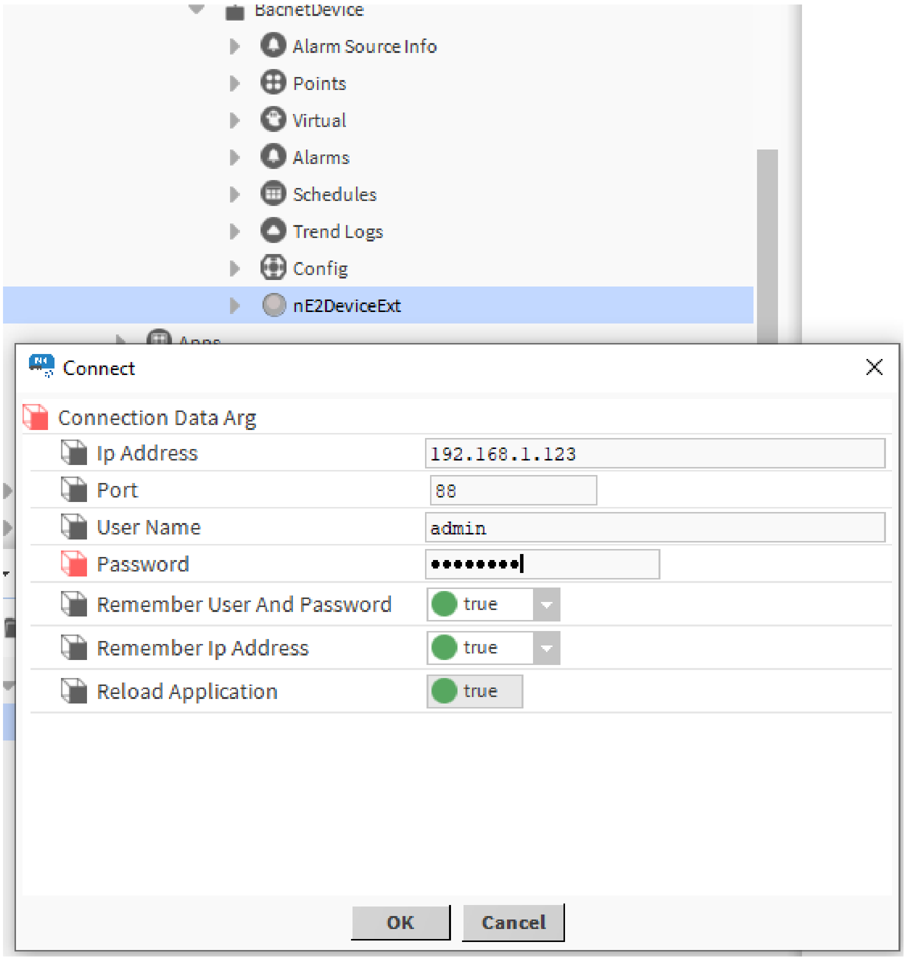


Figure 4. Connect option

(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, see First Connection and Password Setup.



Connect

Connection Data Arg

Ip Address	192.168.1.123
Port	88
User Name	admin
Password	••••••••
Remember User And Password	● true
Remember Ip Address	● true
Reload Application	● true

Figure 5. Filling in connection credentials

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

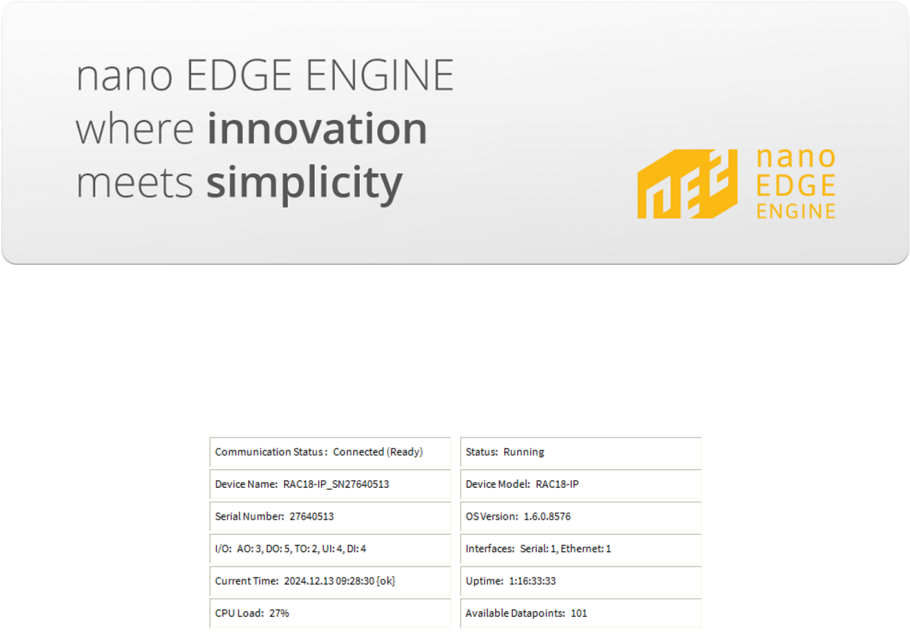
nE2DeviceExt Interactive Connection LED

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

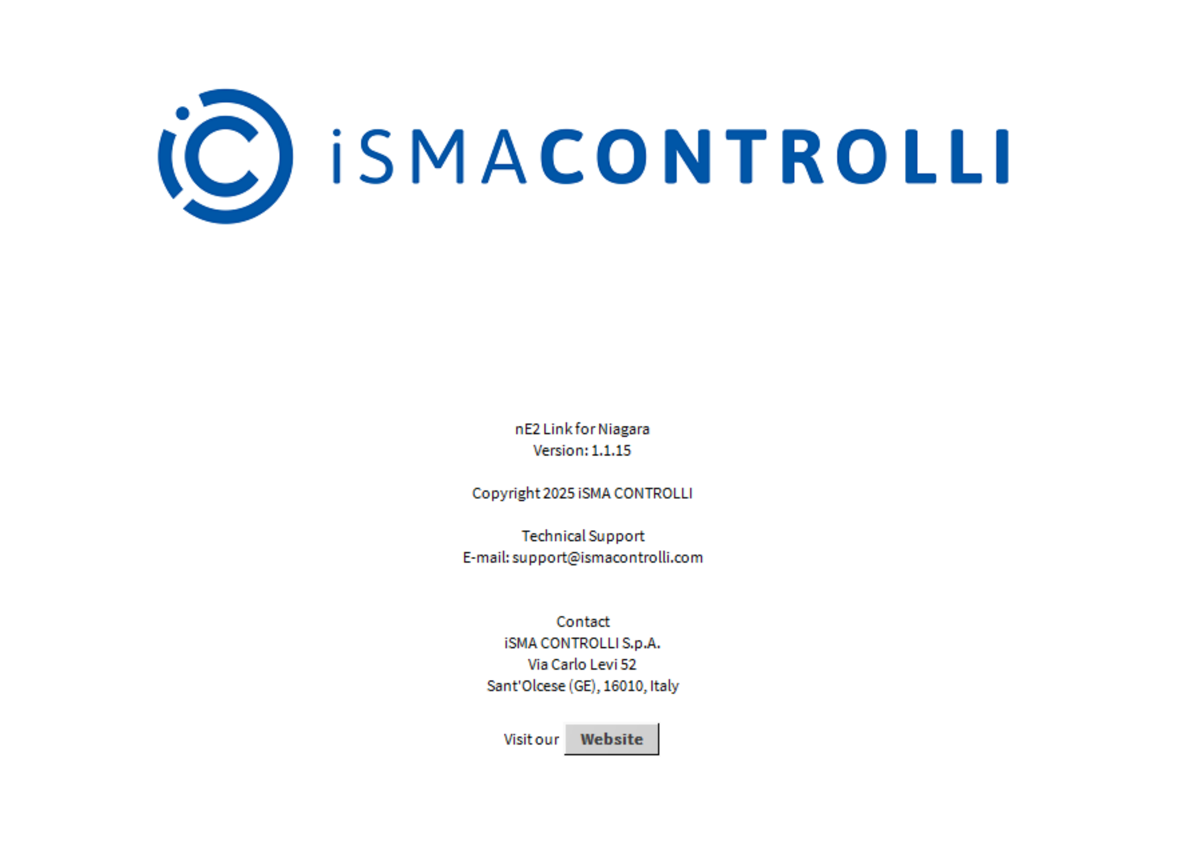
The start screen shows the following information:

- 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: 1.1.15

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Technical Support
E-mail: support@ismacontrolli.com

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

The screen provides information such as:

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

3.2.1 Emergency Mode

The system and application(s) of the nano EDGE ENGINE controllers are stored on an SD card. If the SD card is not detected in the device or the device detects frequent reboots (at least 5 times in 6 minutes), which prevent correct operation, the device enters an emergency mode.

What Causes the Emergency Mode?

- No SD card is detected in the device.
- The diagnostic process reveals error in I/Os.
- Storage limit is exceeded.
- Required files are missing during a start-up of the device.
- Libraries or files are corrupted.

3.2.2 Operation in Emergency Mode

In the emergency mode, the device operation is limited:

- libraries are not loaded;
- the SD card configuration is not loaded;
- only the System container with limited options (only Logs and Platform components) is displayed in the tree;

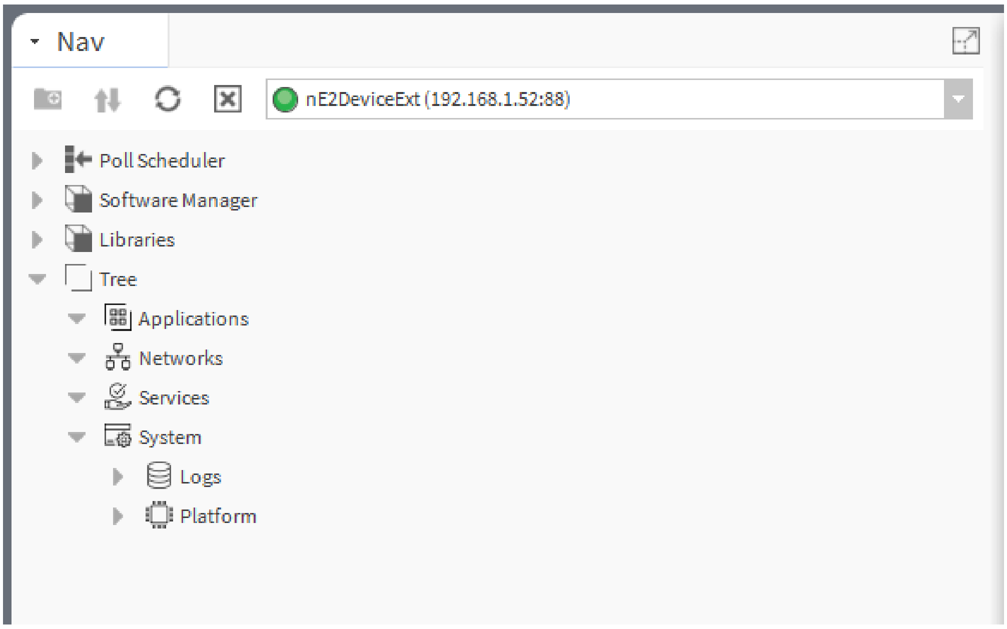
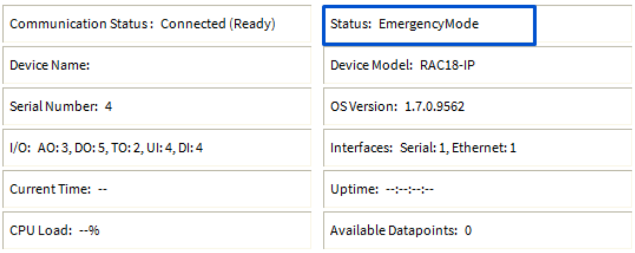


Figure 7. Device tree in the emergency mode

- the ALM LED is lit continuously;
- the iFnet runs with an IP/port taken from a flash storage;

Note: The flash storage must be synchronized to configuration slots when available.

- no authorization or credentials are taken from the flash storage (like IP/port).



Communication Status: Connected (Ready)	Status: EmergencyMode
Device Name:	Device Model: RAC18-IP
Serial Number: 4	OS Version: 1.7.0.9562
I/O: AO: 3, DO: 5, TO: 2, UI: 4, DI: 4	Interfaces: Serial: 1, Ethernet: 1
Current Time: --	Uptime: --:--:--:--
CPU Load: --%	Available Datapoints: 0

Figure 8. Start screen for a connected device in emergency mode

Possible Actions

When the device enters the emergency mode, take one of a few possible actions:

1. read logs from the SD card if available;
2. reboot;
3. restore to defaults (using the Restore in the System context menu): remove files from the SD card (if available and formatted) excluding only files with IP, port, and credentials (libraries must be also removed);

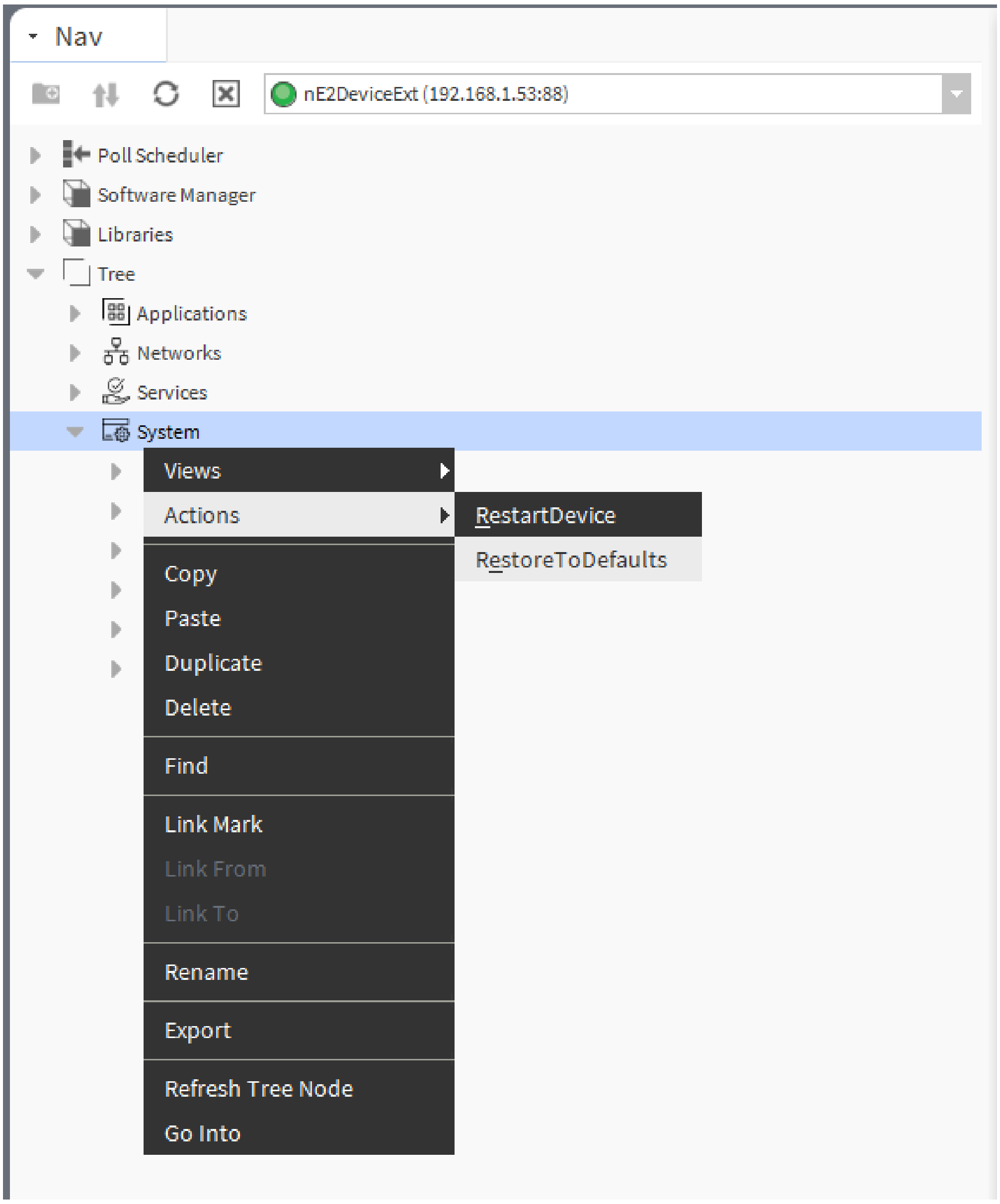


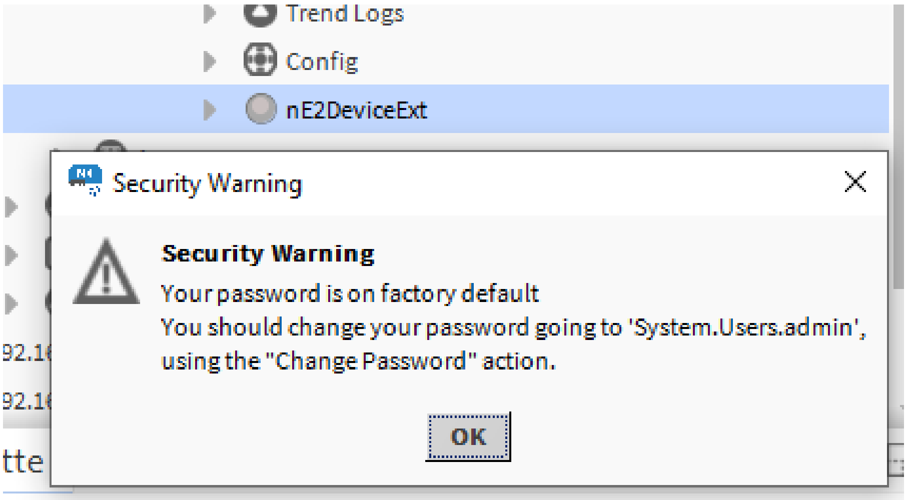
Figure 9. RestoreToDefaults action

4. restore to factory defaults (restoring with S1 6th DIP switch): format the SD card (if available), restore default credentials, IP, mask, gateway, iFnet port.

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.



Security Warning

Your password is on factory default

You should change your password going to 'System.Users.admin', using the "Change Password" action.

Figure 10. 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.

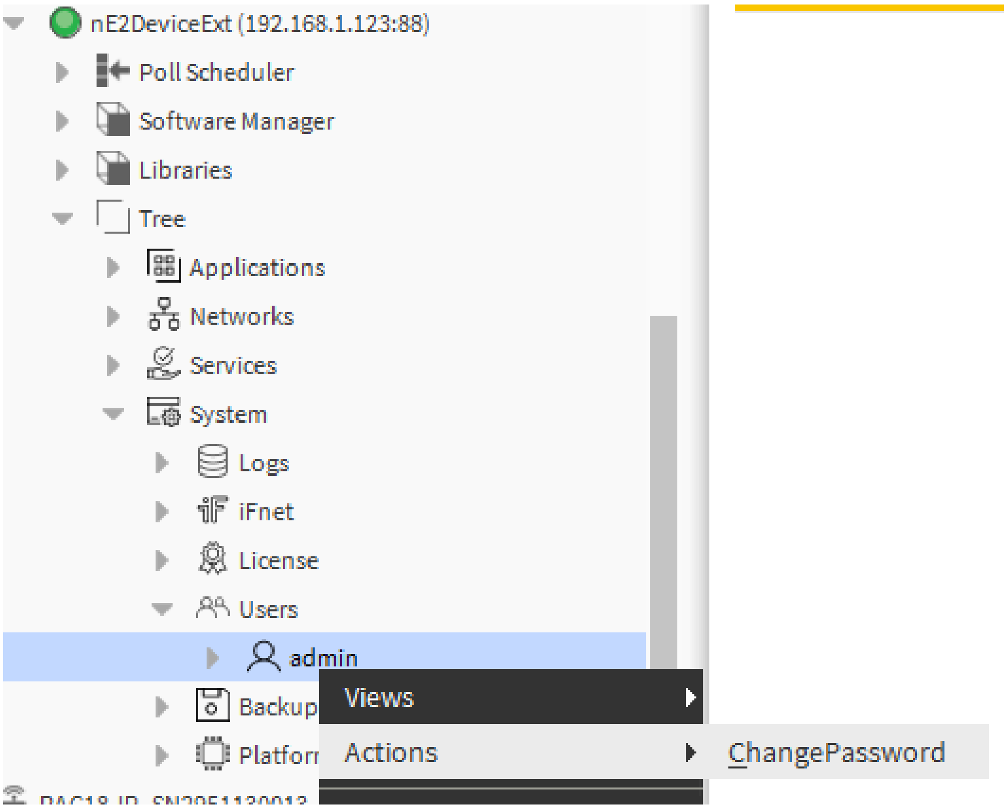
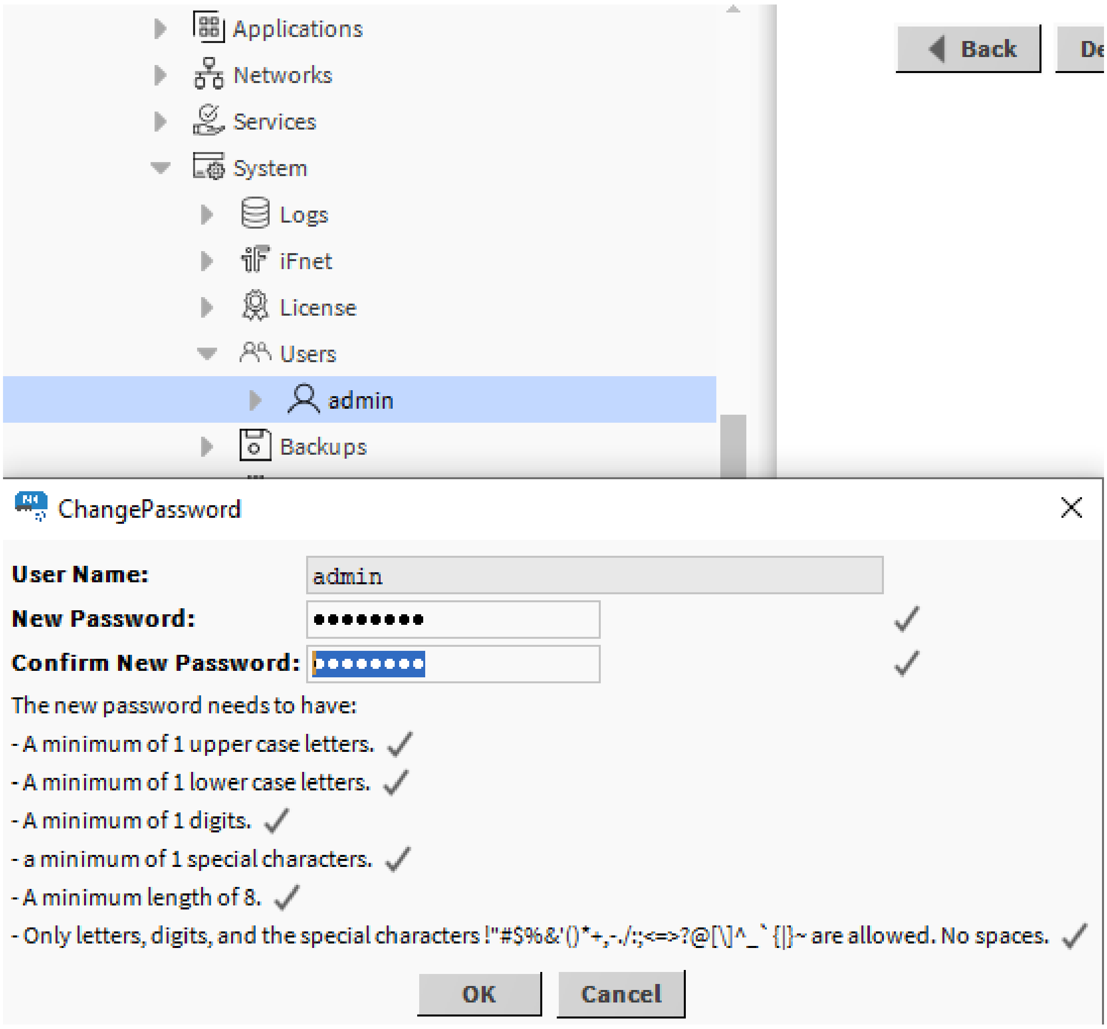


Figure 11. Change password action

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.



User Name: admin

New Password: ●●●●●●●● ✓

Confirm New Password: ●●●●●●●● ✓

The new password needs to have:

- A minimum of 1 upper case letters. ✓

- A minimum of 1 lower case letters. ✓

- A minimum of 1 digits. ✓

- a minimum of 1 special characters. ✓

- A minimum length of 8. ✓

- Only letters, digits, and the special characters !"#$%&'()*+,-./:;<=>?@[\]^_` {|}~ are allowed. No spaces. ✓

Figure 12. ChangePassword dialog window

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

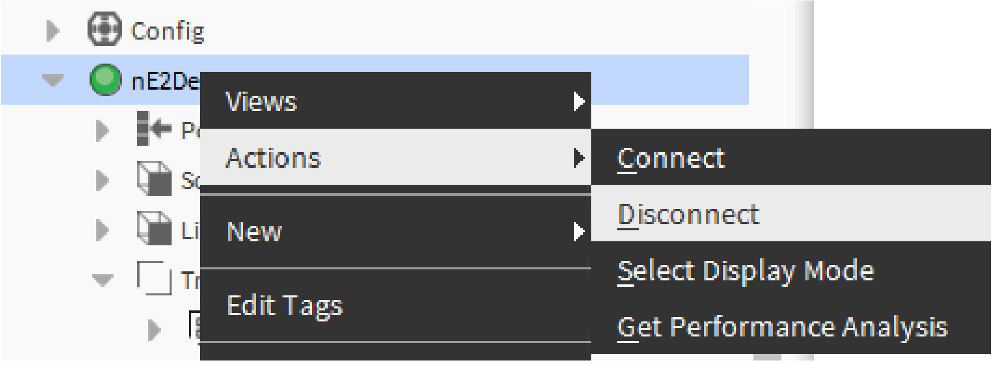


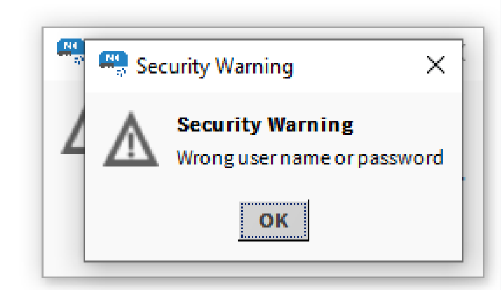
Figure 13. Disconnect option

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.



Security Warning

Security Warning

Wrong user name or password

Figure 14. Wrong password notification

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

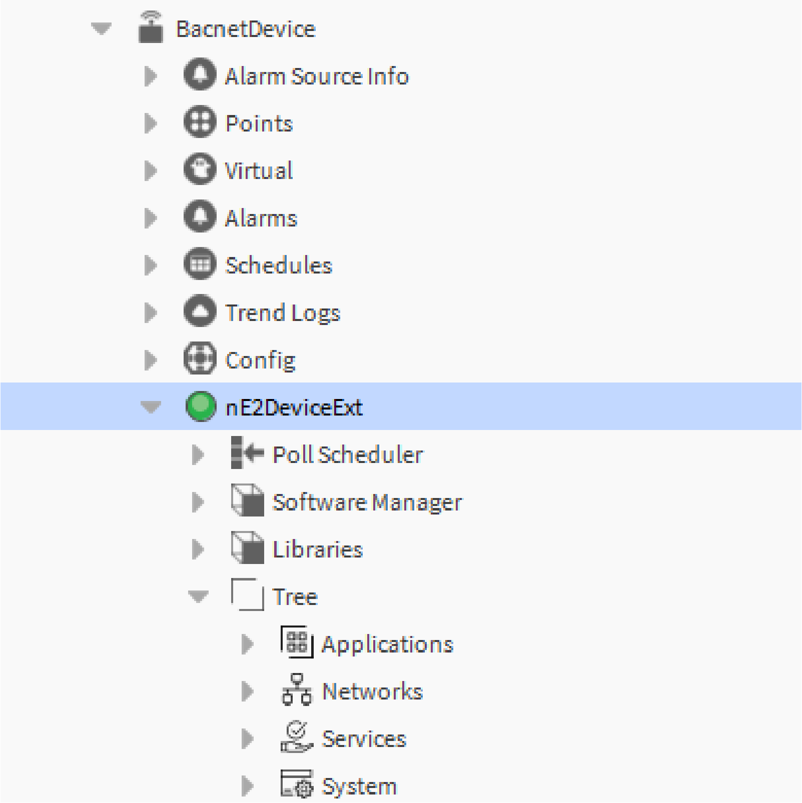


Figure 15. The nE2DeviceExt structure

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.

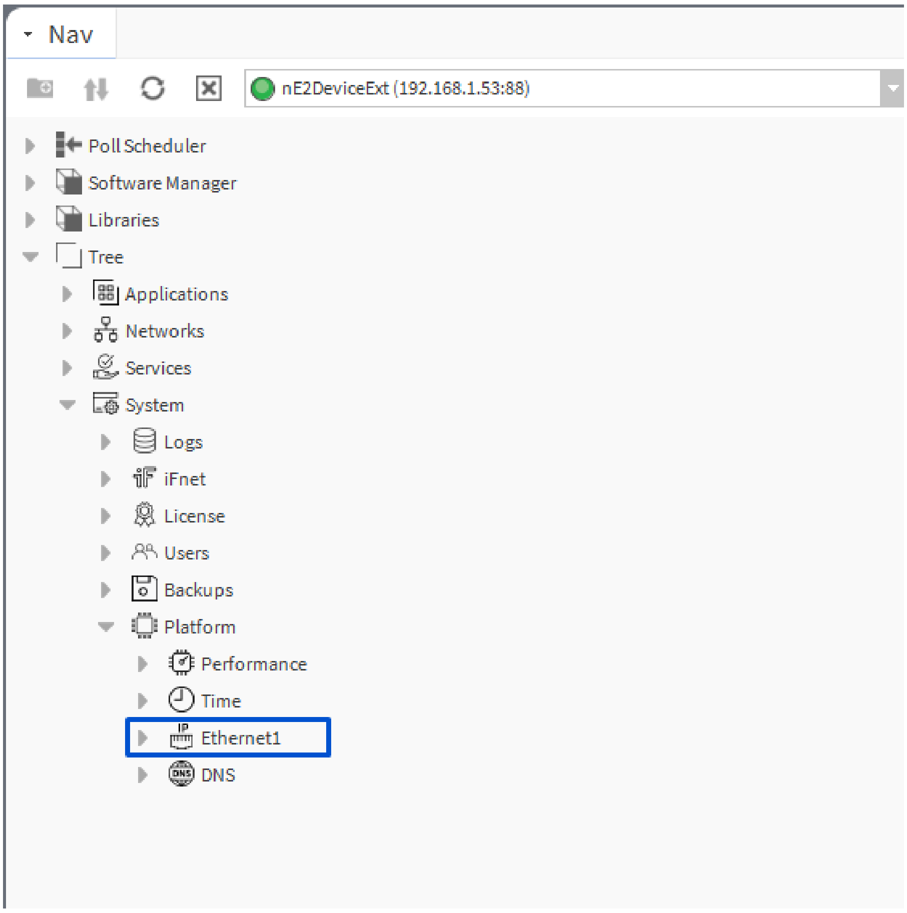
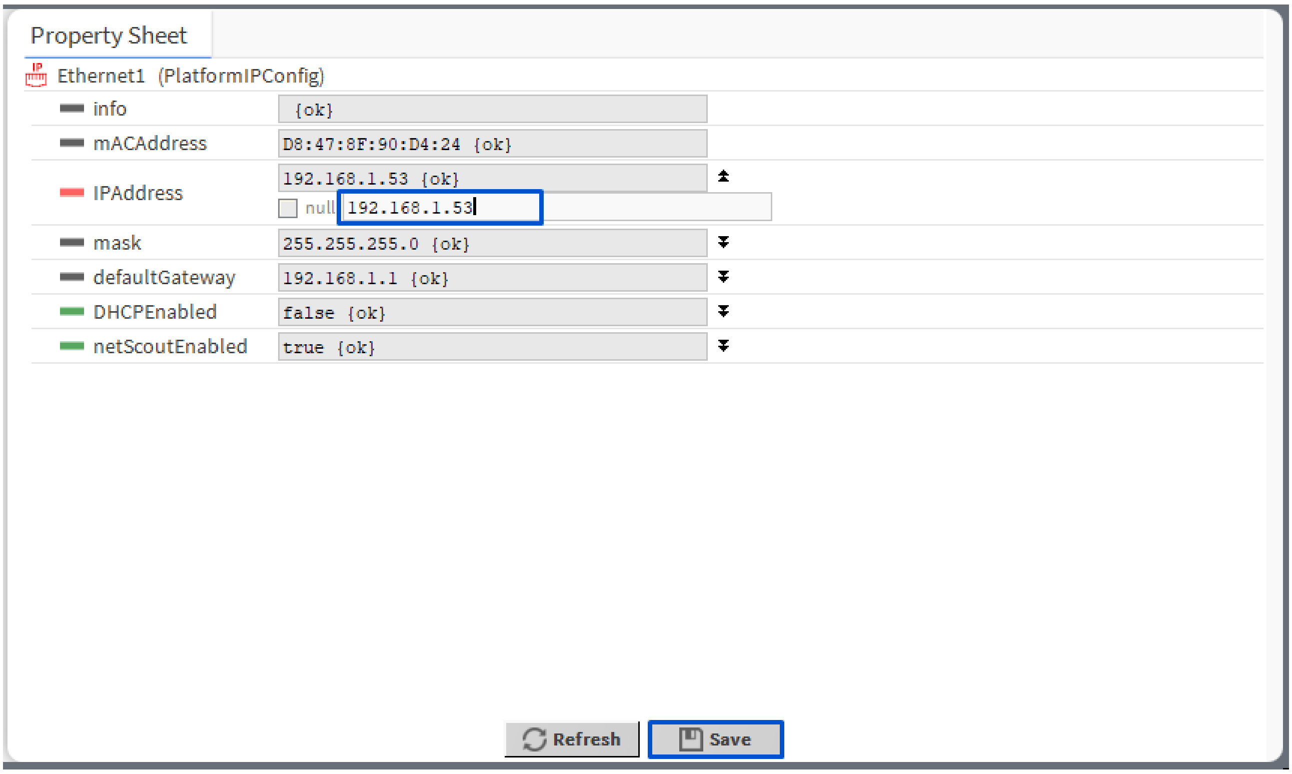


Figure 16. The Ethernet1 component in the tree

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.



Property Sheet

Ethernet1 (PlatformIPConfig)

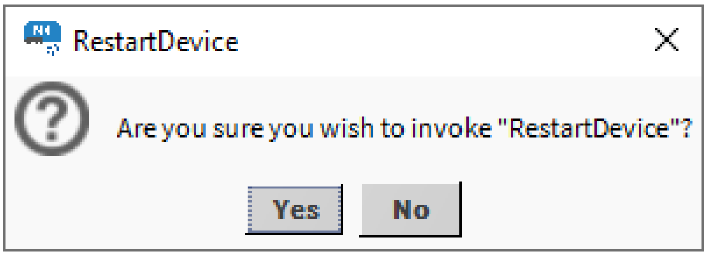
info	{ok}
mACAddress	D8:47:8F:90:D4:24 {ok}
IPAddress	192.168.1.53 {ok} □ null 192.168.1.53
mask	255.255.255.0 {ok}
defaultGateway	192.168.1.1 {ok}
DHCPEnabled	false {ok}
netScoutEnabled	true {ok}

Figure 17. 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 after confirming the RestartDevice prompt:



RestartDevice

Are you sure you wish to invoke "RestartDevice"?

Figure 18. RestartDevcie prompt

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

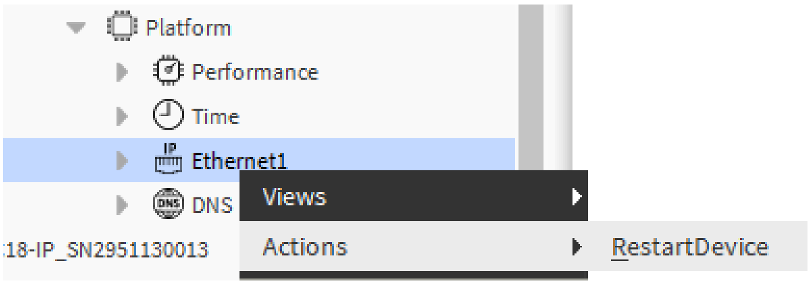
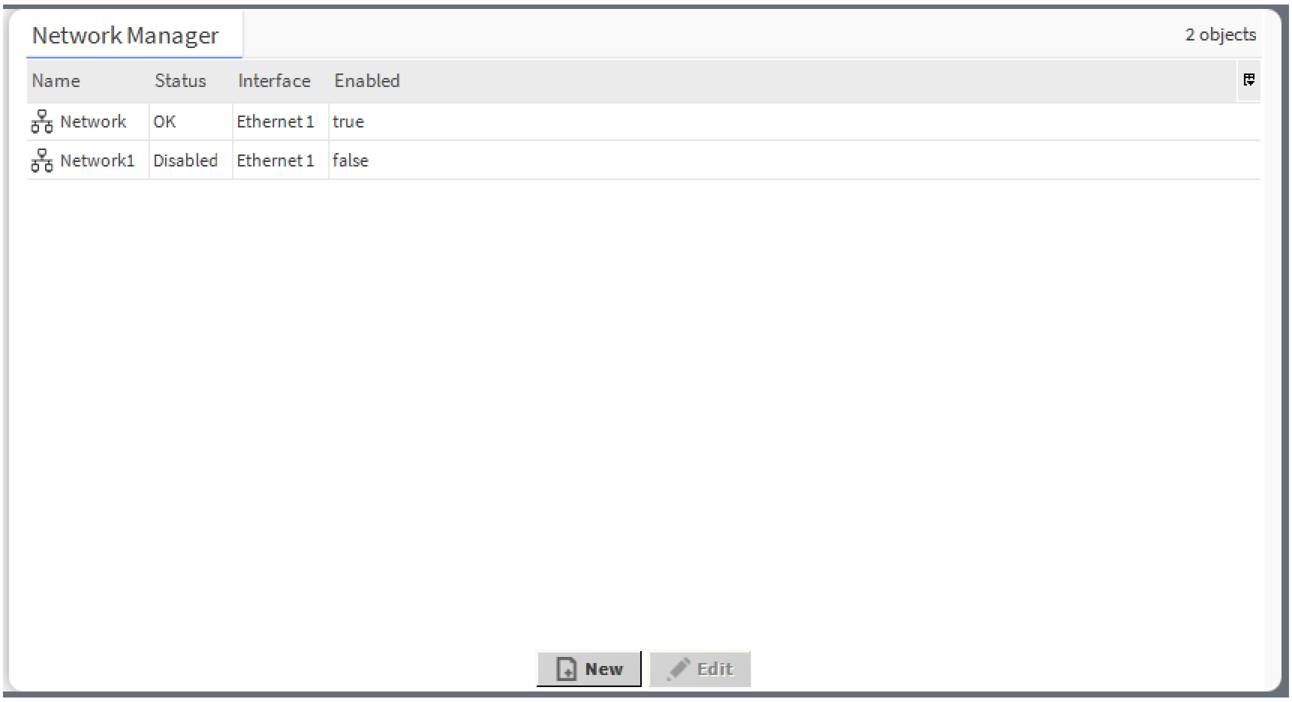


Figure 19. RestartDevice action in the Ethernet1 component

3.4.2 BACnet Network Manager

The Network Manager view is available for the BACnet component. It lists all BACnet networks configured on the device's ports. The Network Manager view shows the statuses, ports (which the network is configured on), and enabled or disabled states of the network.



Network Manager

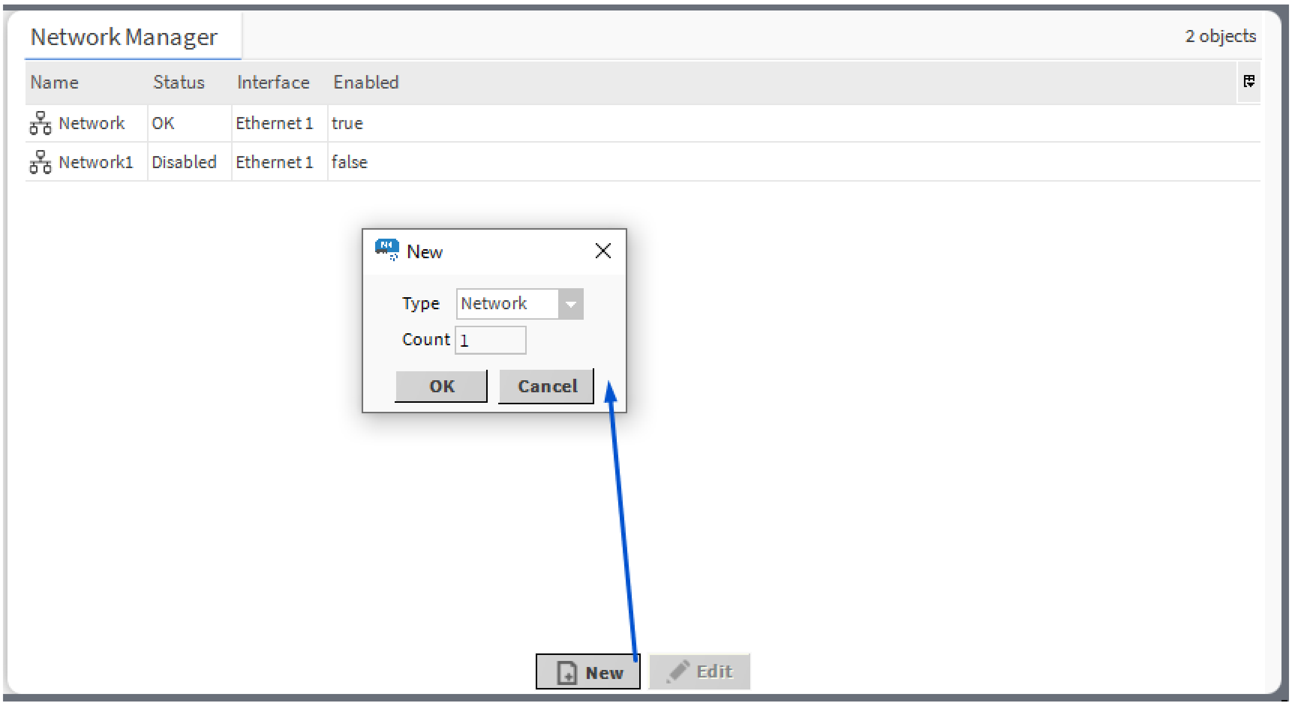
2 objects

Name	Status	Interface	Enabled
Network	OK	Ethernet 1	true
Network1	Disabled	Ethernet 1	false

Figure 20. BACnet Network Manager

In the BACnet Network Manager, it is possible to:

- add BACnet network component:



Network Manager

2 objects

Name	Status	Interface	Enabled
Network	OK	Ethernet 1	true
Network1	Disabled	Ethernet 1	false

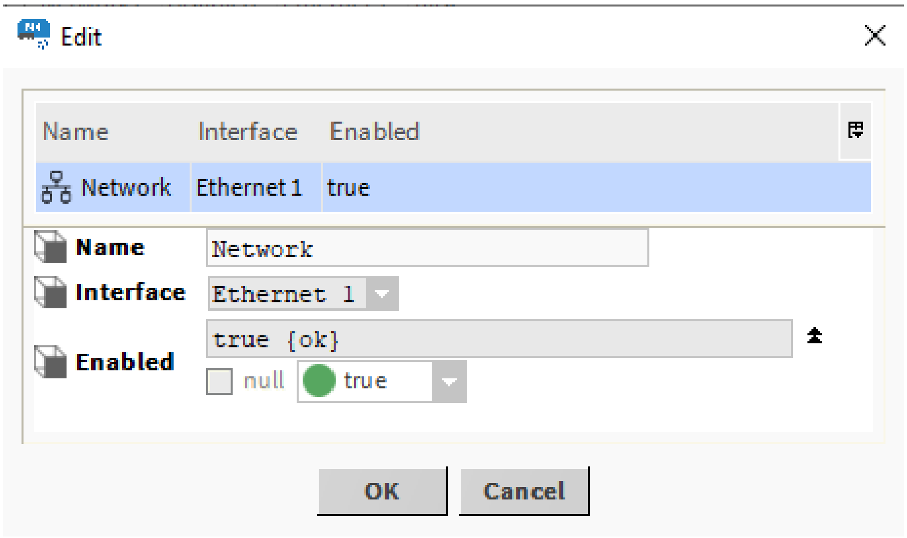
New

Type Network

Count 1

Figure 21. Adding new BACnet network

- edit the BACnet network's name, interface and enable/disable the component:



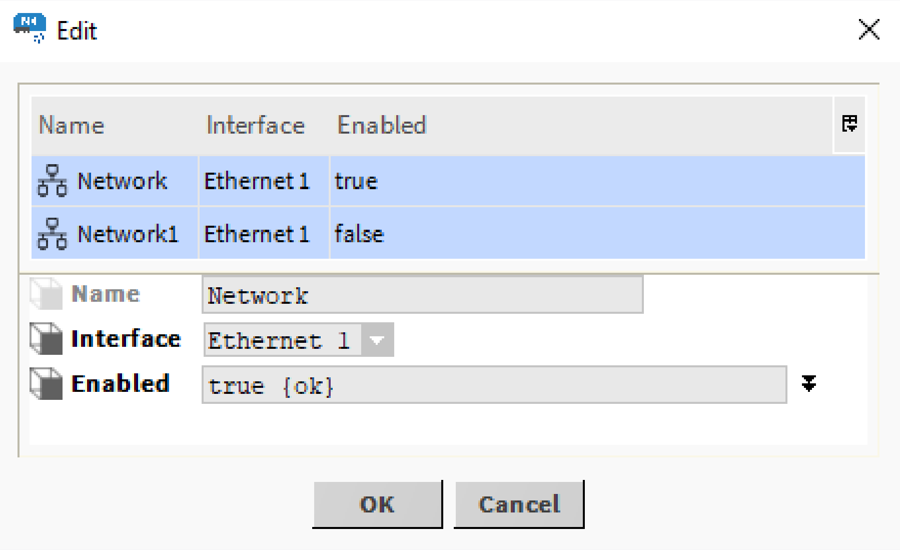
Name	Interface	Enabled
Network	Ethernet 1	true

Name: Network
Interface: Ethernet 1
Enabled: true {ok}
□ null ● true

Figure 22. Editing pop-up

Note

Editing is possible for more than one network at a time. If multiple networks are edited, the same new value is written to common slots, so individual slots, such as Name, cannot be edited in this manner.

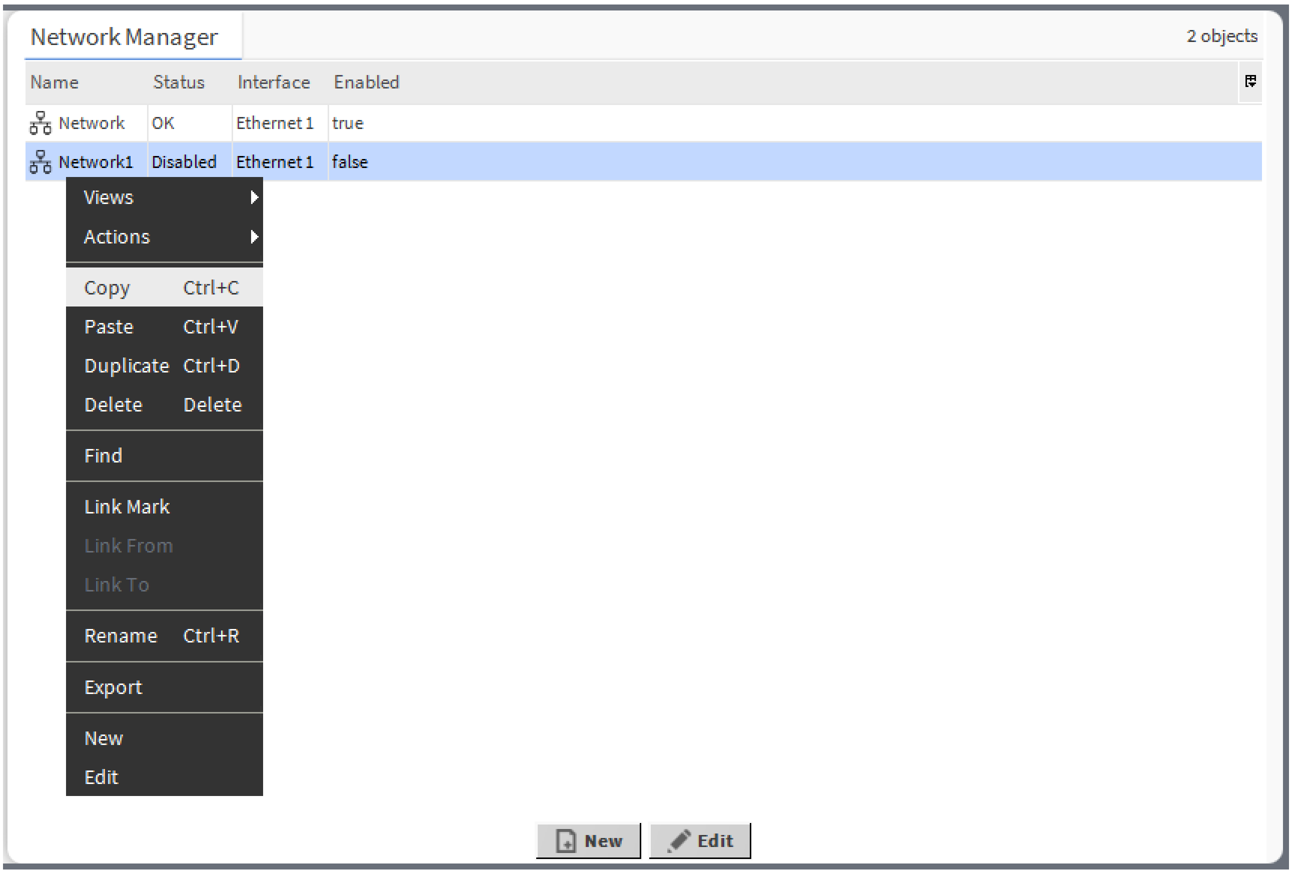


Name	Interface	Enabled
Network	Ethernet 1	true
Network1	Ethernet 1	false

Name: Network
Interface: Ethernet 1
Enabled: true {ok}

Figure 23. Editing multiple BACnet networks

- copy/duplicate/remove BACnet network components:



Network Manager — 2 objects

Name	Status	Interface	Enabled
Network	OK	Ethernet 1	true
Network1	Disabled	Ethernet 1	false

Figure 24. Context menu options for BACnet network

Opening BACnet Network Manager

The BACnet Network Manager view is accessible from the context menu of the BACnet component. It is also automatically opened if the BACnet component is double-clicked in the nav tree window.

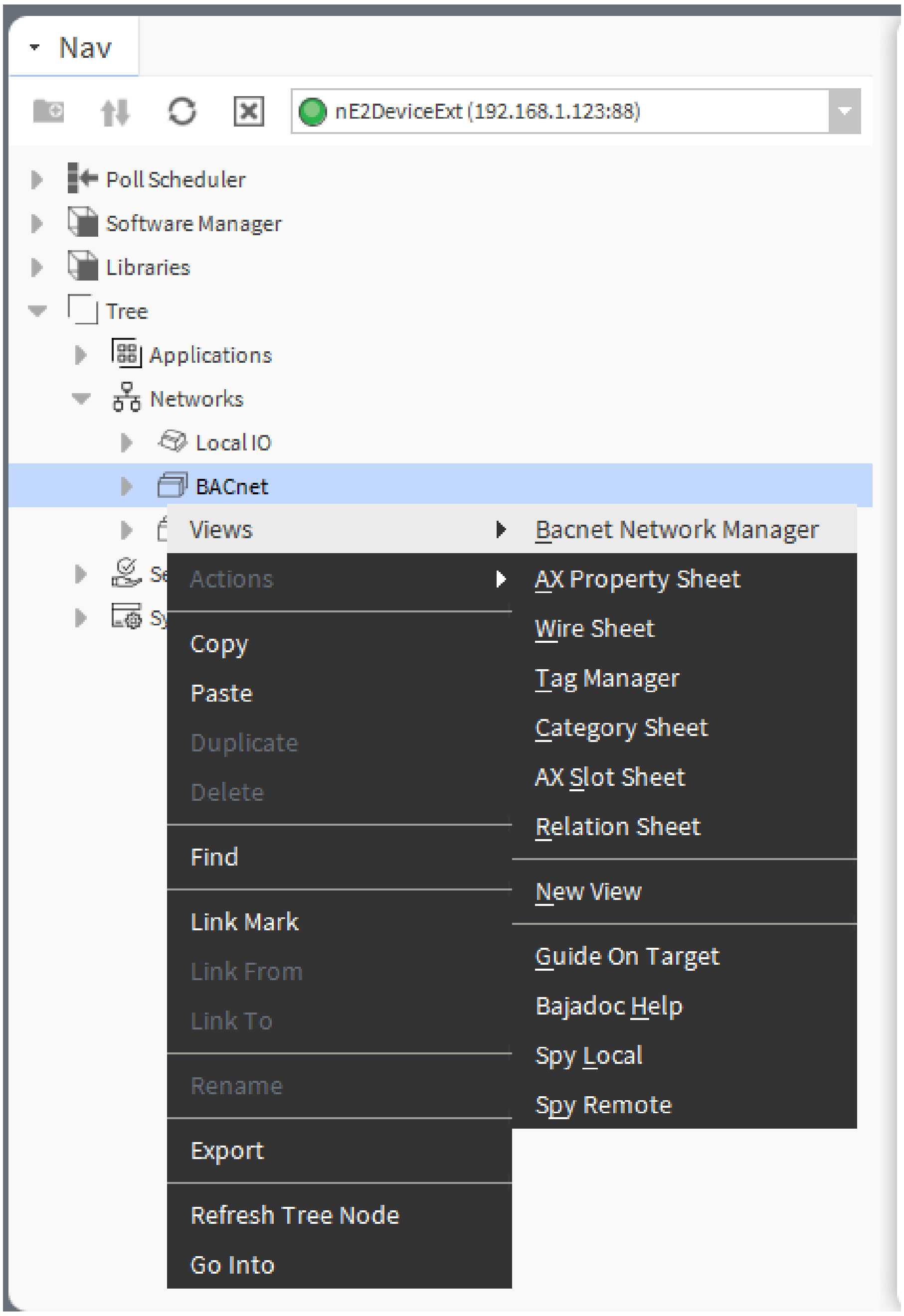
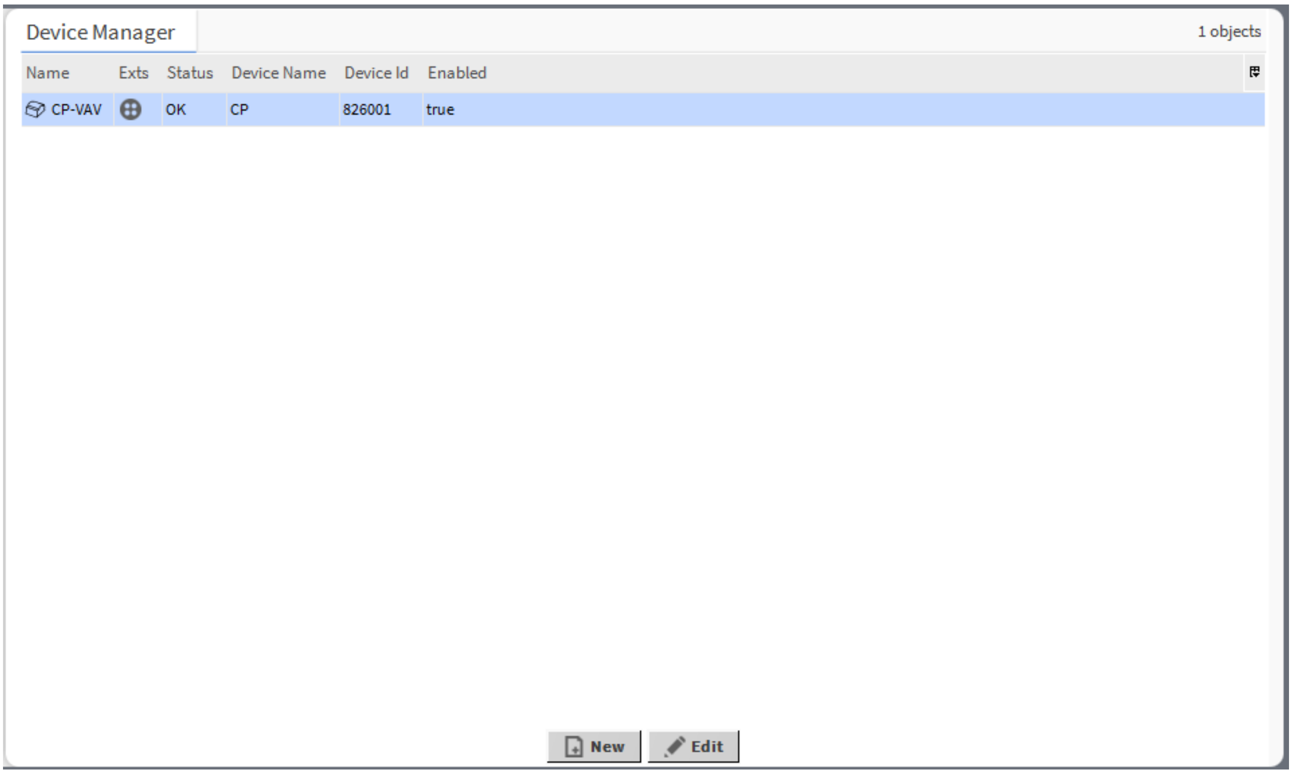


Figure 25. Accessing the BACnet Network Manager

3.4.3 BACnet Device Manager

The Device Manager view is available for the BACnet Network component. It lists all BACnet devices added to the network. The Device Manager view shows the names, statues, device names and ID, and enabled or disabled states of the device. The special Exts columns provides quick access to the Point Manager (with all points of the relevant device).



Device Manager

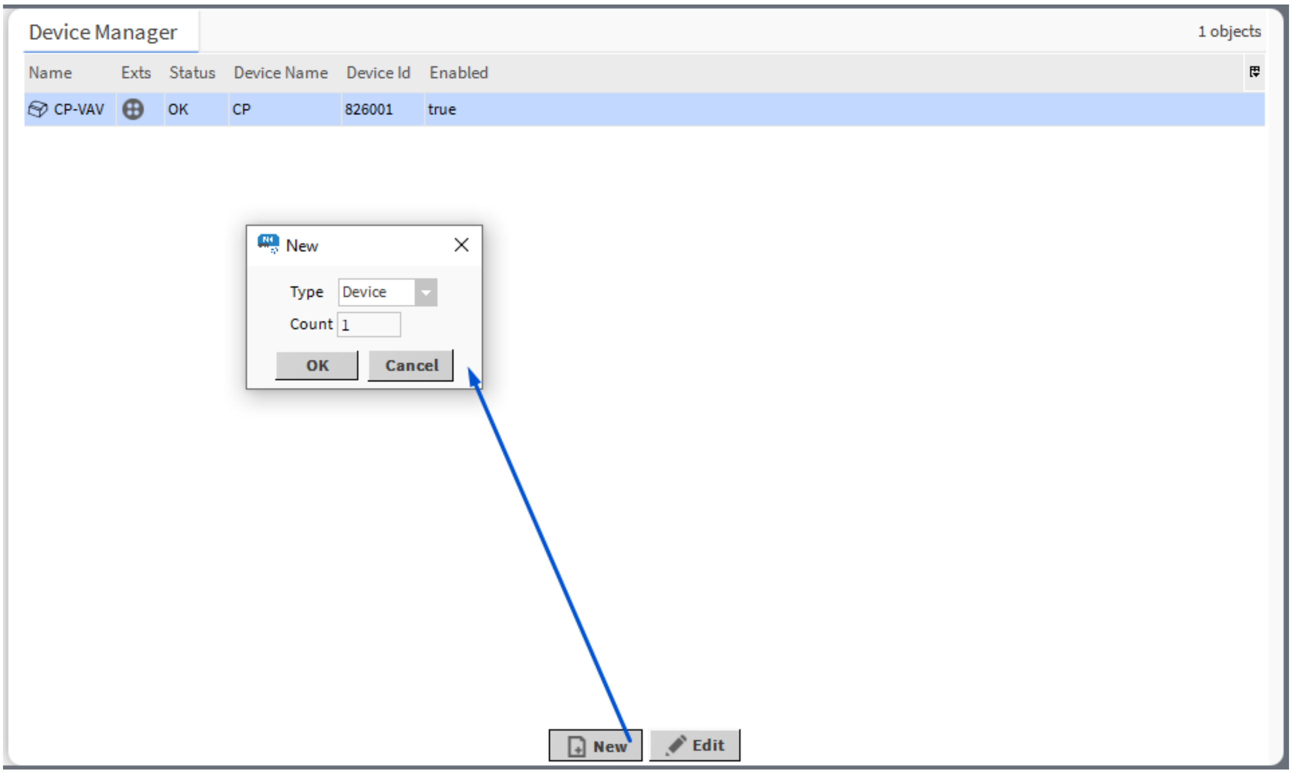
1 objects

Name	Exts	Status	Device Name	Device Id	Enabled
CP-VAV		OK	CP	826001	true

Figure 26. BACnet Device Manager

In the BACnet Device Manager, it is possible to:

- add BACnet Device component:



Device Manager

1 objects

Name	Exts	Status	Device Name	Device Id	Enabled
CP-VAV		OK	CP	826001	true

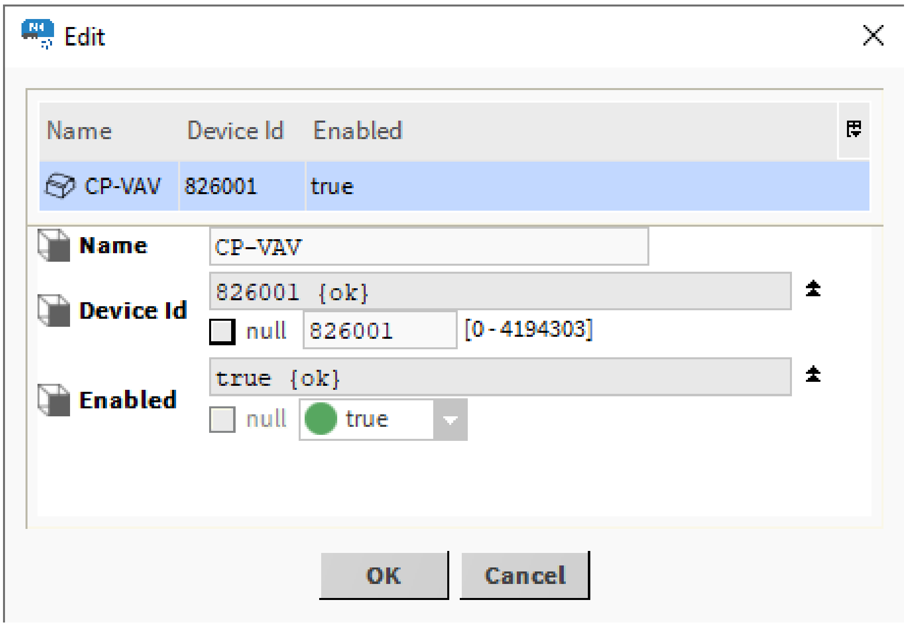
New

Type: Device

Count: 1

Figure 27. Adding new device in the Device Manager

- edit the BACnet device’s name, device ID and enable/disable the component:



Edit

Name	Device Id	Enabled
CP-VAV	826001	true

Name: CP-VAV

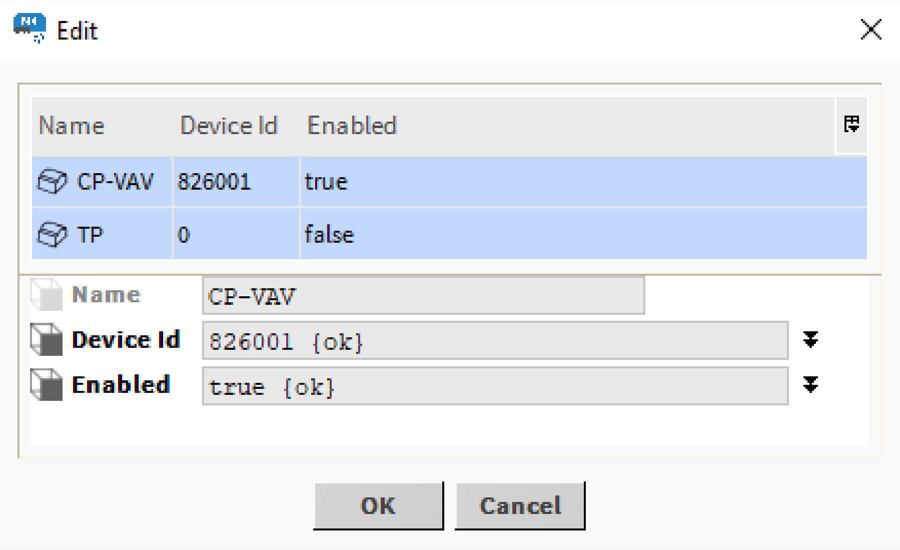
Device Id: 826001 {ok}
□ null 826001 [0 - 4194303]

Enabled: true {ok}
□ null ● true

Figure 28. Editing pop-up

Note

Editing is possible for more than one device at a time. If multiple devices are edited, the same new value is written to common slots, so individual slots, such as Name, cannot be edited in this manner.



Edit

Name	Device Id	Enabled
CP-VAV	826001	true
TP	0	false

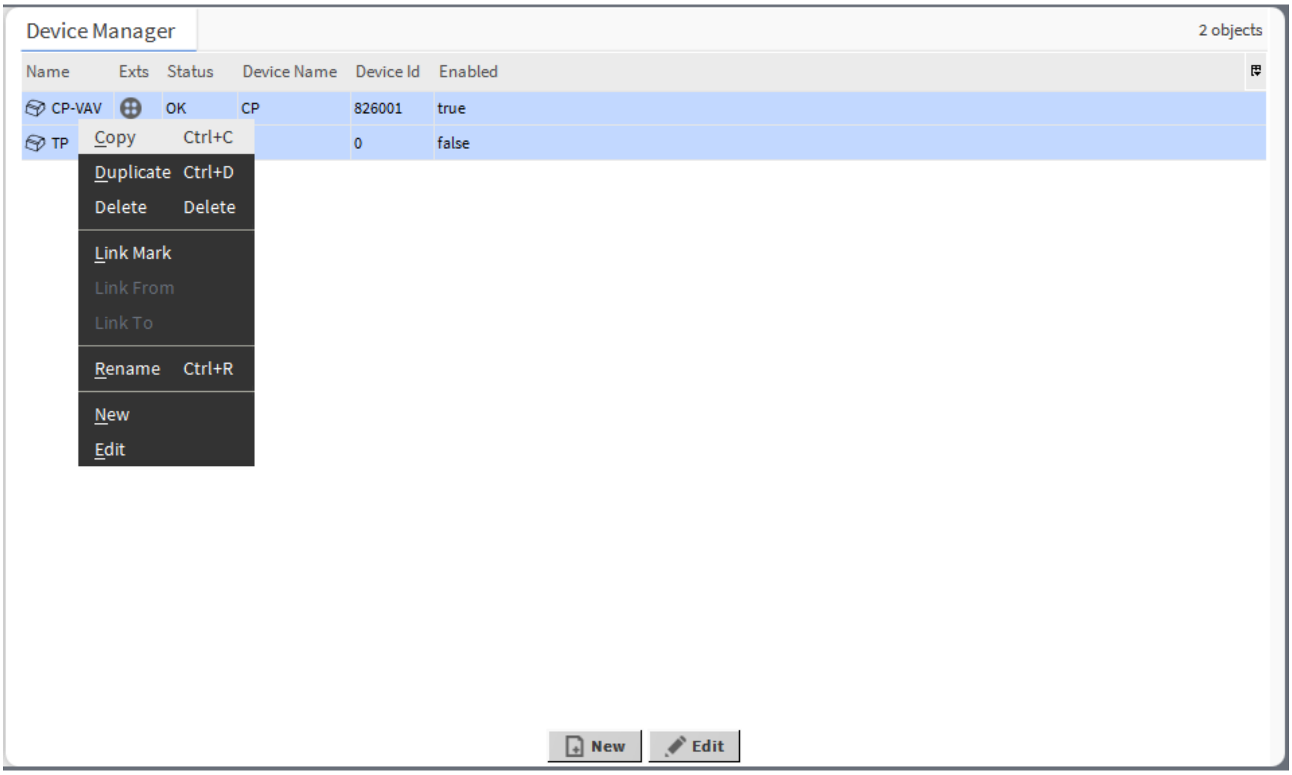
Name: CP-VAV

Device Id: 826001 {ok}

Enabled: true {ok}

Figure 29. Editing multiple devices

- copy/duplicate/remove BACnet device components:



Device Manager

2 objects

Name	Exts	Status	Device Name	Device Id	Enabled
CP-VAV		OK	CP	826001	true
TP				0	false

Figure 30. Context menu options for the BACnet device

Opening BACnet Device Manager

The BACnet Device Manager view is accessible from the context menu of the BACnet Network component. It is also automatically opened if the BACnet Network component is double-clicked in the nav tree window.

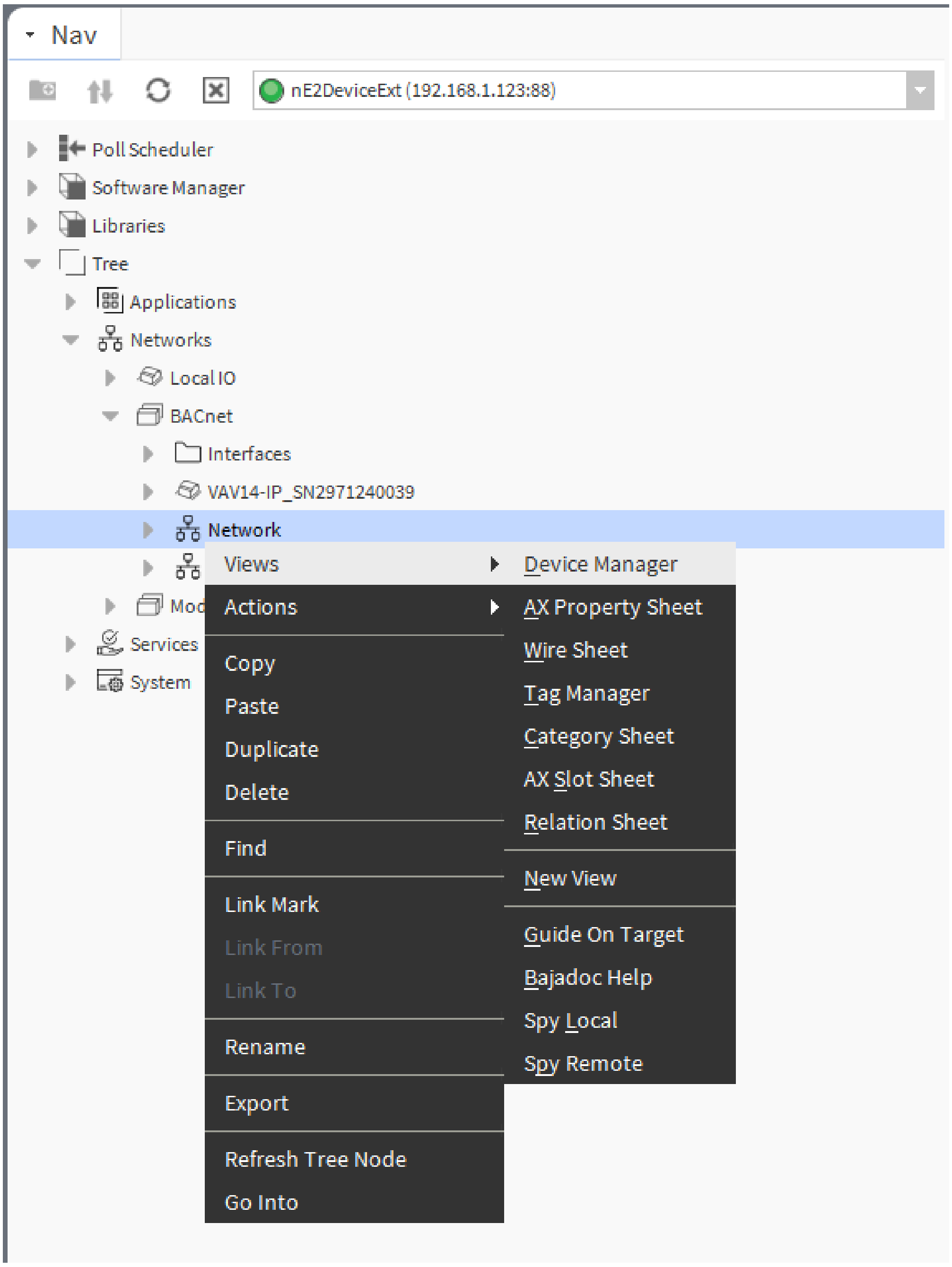
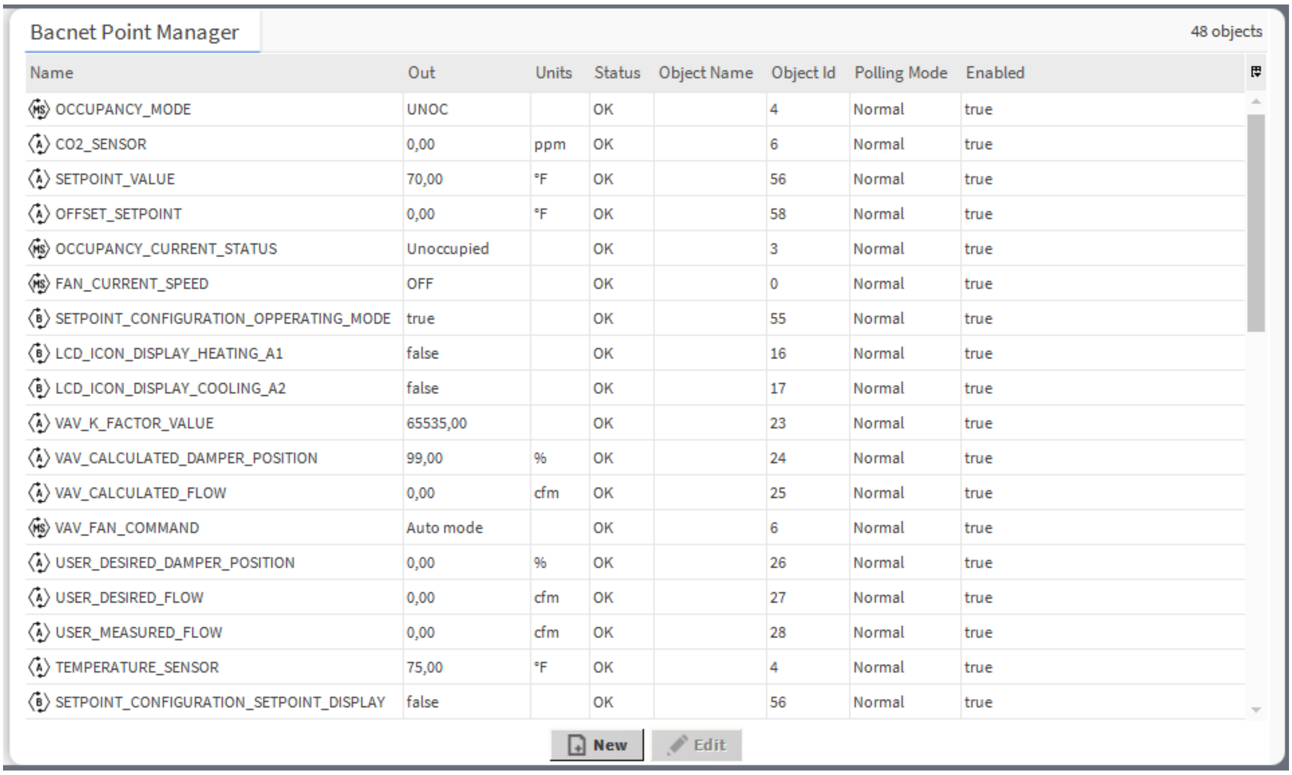


Figure 31. Accessing the BACnet Device Manager

3.4.4 BACnet Point Manager

The BACnet Point Manager view is available for each device added to the BACnet network. It lists all BACnet points added to the Device component, and shows their Out slot value, status, object name and ID, polling mode, and enabled or disabled state.

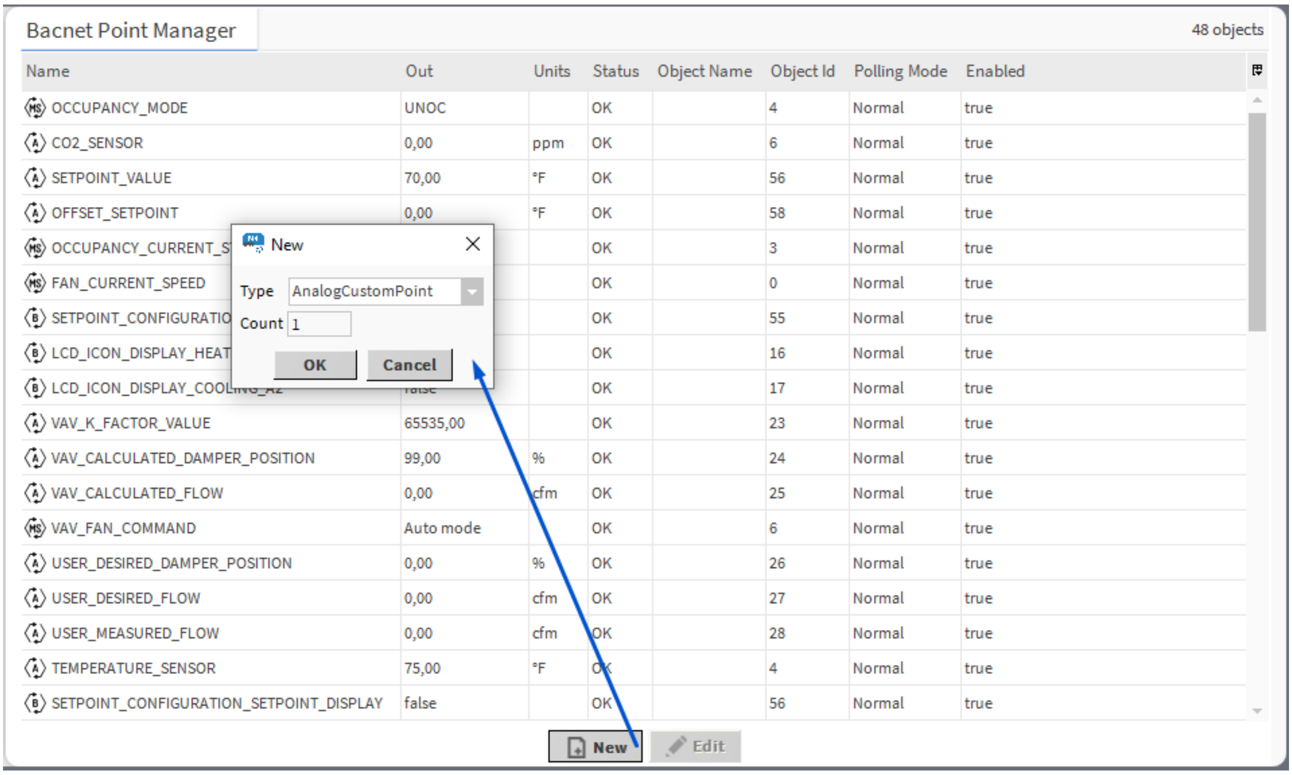


Name	Out	Units	Status	Object Name	Object Id	Polling Mode	Enabled
OCCUPANCY_MODE	UNOC		OK		4	Normal	true
CO2_SENSOR	0,00	ppm	OK		6	Normal	true
SETPOINT_VALUE	70,00	°F	OK		56	Normal	true
OFFSET_SETPOINT	0,00	°F	OK		58	Normal	true
OCCUPANCY_CURRENT_STATUS	Unoccupied		OK		3	Normal	true
FAN_CURRENT_SPEED	OFF		OK		0	Normal	true
SETPOINT_CONFIGURATION_OPPERATING_MODE	true		OK		55	Normal	true
LCD_ICON_DISPLAY_HEATING_A1	false		OK		16	Normal	true
LCD_ICON_DISPLAY_COOLING_A2	false		OK		17	Normal	true
VAV_K_FACTOR_VALUE	65535,00		OK		23	Normal	true
VAV_CALCULATED_DAMPER_POSITION	99,00	%	OK		24	Normal	true
VAV_CALCULATED_FLOW	0,00	cfm	OK		25	Normal	true
VAV_FAN_COMMAND	Auto mode		OK		6	Normal	true
USER_DESIRED_DAMPER_POSITION	0,00	%	OK		26	Normal	true
USER_DESIRED_FLOW	0,00	cfm	OK		27	Normal	true
USER_MEASURED_FLOW	0,00	cfm	OK		28	Normal	true
TEMPERATURE_SENSOR	75,00	°F	OK		4	Normal	true
SETPOINT_CONFIGURATION_SETPOINT_DISPLAY	false		OK		56	Normal	true

Figure 32. BACnet Point Manager

In the BACnet Point Manager, it is possible to:

- add BACnet points:



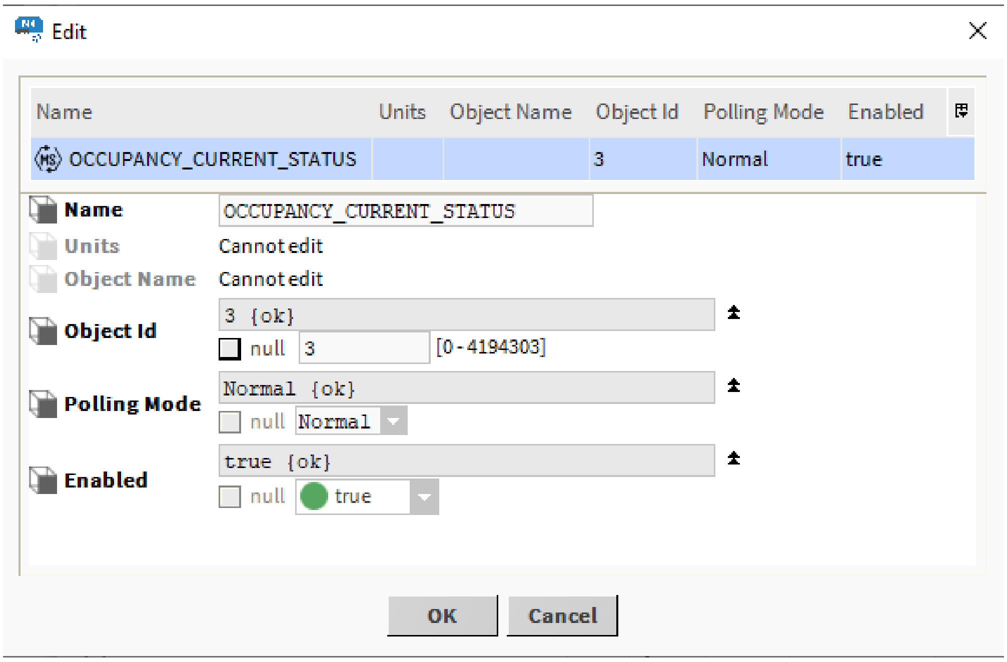
Type AnalogCustomPoint

Count 1

Name	Out	Units	Status	Object Name	Object Id	Polling Mode	Enabled
OCCUPANCY_MODE	UNOC		OK		4	Normal	true
CO2_SENSOR	0,00	ppm	OK		6	Normal	true
SETPOINT_VALUE	70,00	°F	OK		56	Normal	true
OFFSET_SETPOINT	0,00	°F	OK		58	Normal	true
OCCUPANCY_CURRENT_S			OK		3	Normal	true
FAN_CURRENT_SPEED			OK		0	Normal	true
SETPOINT_CONFIGURATIO			OK		55	Normal	true
LCD_ICON_DISPLAY_HEAT			OK		16	Normal	true
LCD_ICON_DISPLAY_COOLING_A2	false		OK		17	Normal	true
VAV_K_FACTOR_VALUE	65535,00		OK		23	Normal	true
VAV_CALCULATED_DAMPER_POSITION	99,00	%	OK		24	Normal	true
VAV_CALCULATED_FLOW	0,00	cfm	OK		25	Normal	true
VAV_FAN_COMMAND	Auto mode		OK		6	Normal	true
USER_DESIRED_DAMPER_POSITION	0,00	%	OK		26	Normal	true
USER_DESIRED_FLOW	0,00	cfm	OK		27	Normal	true
USER_MEASURED_FLOW	0,00	cfm	OK		28	Normal	true
TEMPERATURE_SENSOR	75,00	°F	OK		4	Normal	true
SETPOINT_CONFIGURATION_SETPOINT_DISPLAY	false		OK		56	Normal	true

Figure 33. Adding BACnet point

- edit the BACnet point's name, units, address and enable/disable the component:



Edit

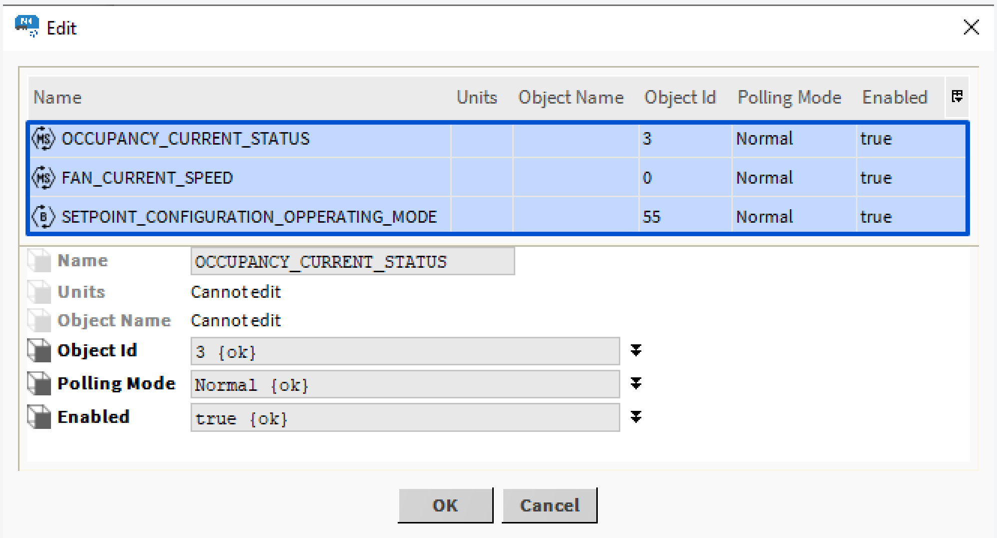
Name	Units	Object Name	Object Id	Polling Mode	Enabled
OCCUPANCY_CURRENT_STATUS			3	Normal	true

Name: OCCUPANCY_CURRENT_STATUS
Units: Cannot edit
Object Name: Cannot edit
Object Id: 3 {ok} □ null 3 [0 - 4194303]
Polling Mode: Normal {ok} □ null Normal
Enabled: true {ok} □ null ● true

Figure 34. Editing pop-up

Note

Editing is possible for more than one point at a time. If multiple points are edited, the same new value is written to common slots, so individual slots, such as Name, cannot be edited in this manner.



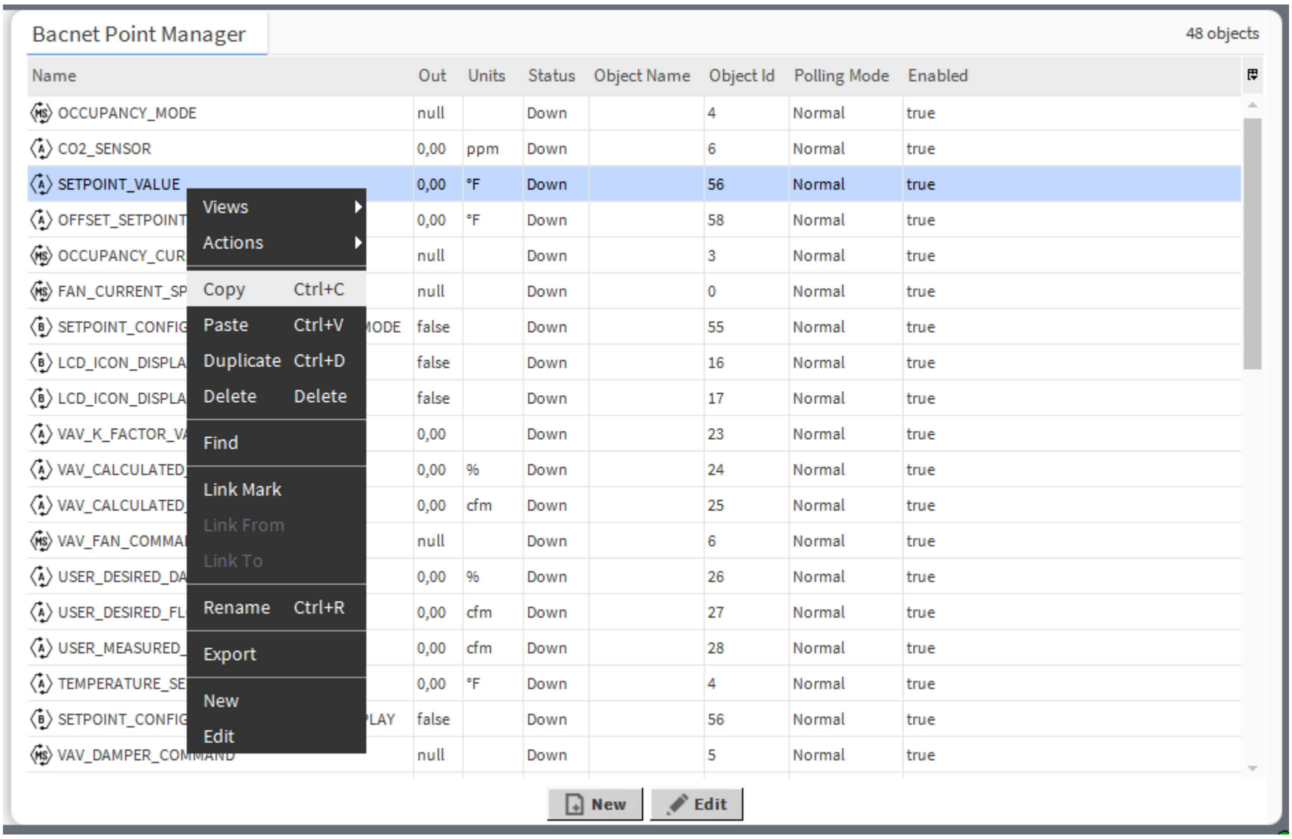
Edit

Name	Units	Object Name	Object Id	Polling Mode	Enabled
OCCUPANCY_CURRENT_STATUS			3	Normal	true
FAN_CURRENT_SPEED			0	Normal	true
SETPOINT_CONFIGURATION_OPPERATING_MODE			55	Normal	true

Name: OCCUPANCY_CURRENT_STATUS
Units: Cannot edit
Object Name: Cannot edit
Object Id: 3 {ok}
Polling Mode: Normal {ok}
Enabled: true {ok}

Figure 35. Editing of multiple points

- copy/duplicate/remove BACnet points:



Name	Out	Units	Status	Object Name	Object Id	Polling Mode	Enabled
OCCUPANCY_MODE	null		Down		4	Normal	true
CO2_SENSOR	0,00	ppm	Down		6	Normal	true
SETPOINT_VALUE	0,00	°F	Down		56	Normal	true
OFFSET_SETPOINT	0,00	°F	Down		58	Normal	true
OCCUPANCY_CUR	null		Down		3	Normal	true
FAN_CURRENT_SP	null		Down		0	Normal	true
SETPOINT_CONFIG ODE	false		Down		55	Normal	true
LCD_ICON_DISPLA	false		Down		16	Normal	true
LCD_ICON_DISPLA	false		Down		17	Normal	true
VAV_K_FACTOR_V	0,00		Down		23	Normal	true
VAV_CALCULATED	0,00	%	Down		24	Normal	true
VAV_CALCULATED	0,00	cfm	Down		25	Normal	true
VAV_FAN_COMMA	null		Down		6	Normal	true
USER_DESIRED_DA	0,00	%	Down		26	Normal	true
USER_DESIRED_FL	0,00	cfm	Down		27	Normal	true
USER_MEASURED	0,00	cfm	Down		28	Normal	true
TEMPERATURE_SE	0,00	°F	Down		4	Normal	true
SETPOINT_CONFIG LAY	false		Down		56	Normal	true
VAV_DAMPER_COMMAND	null		Down		5	Normal	true

Figure 36. Context menu options for the BACnet point

Opening the BACnet Point Manager

The BACnet Point Manager view is accessible from the context menu of the Device component. It is also automatically opened if the Device component is double-clicked in the nav tree window.

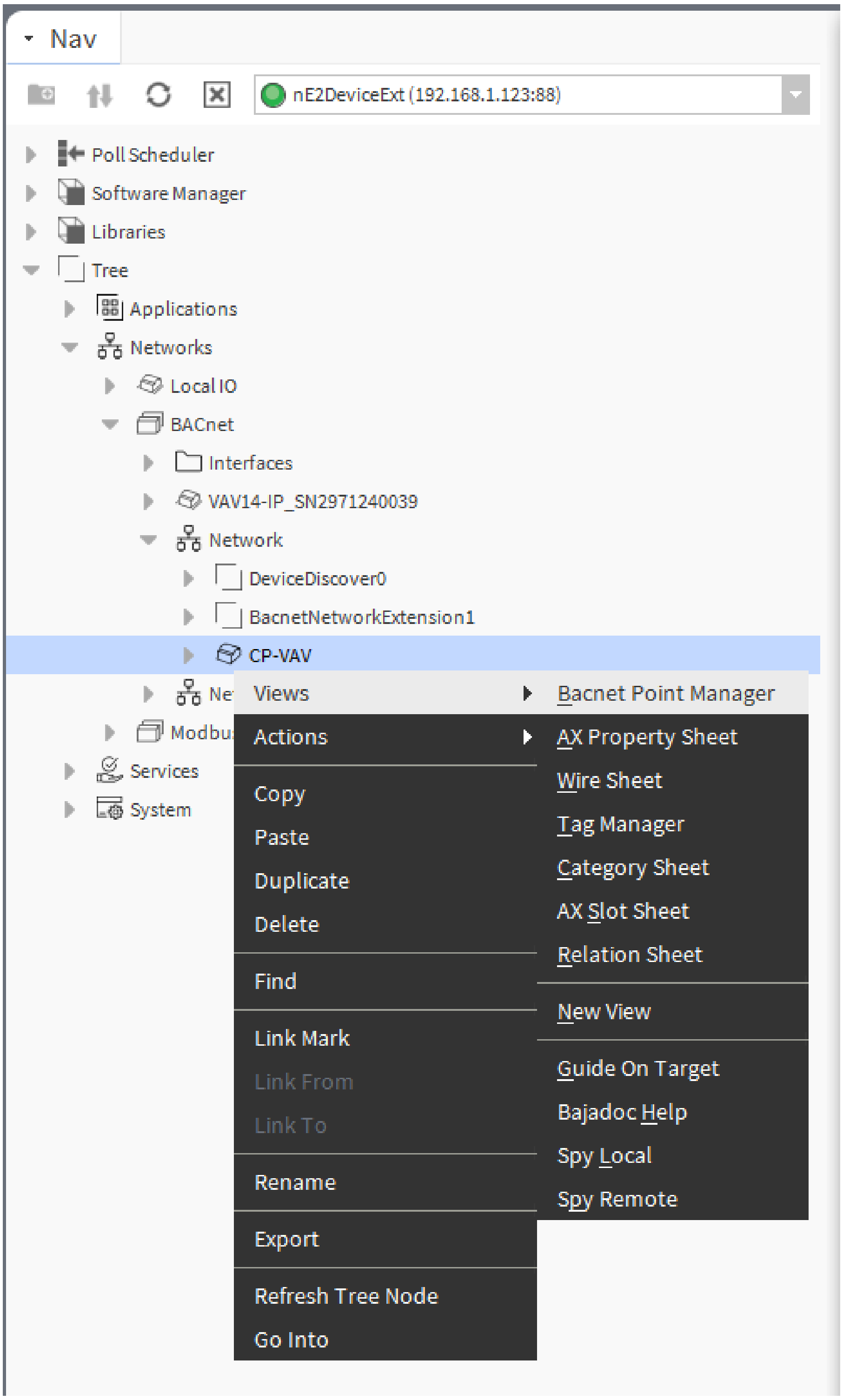
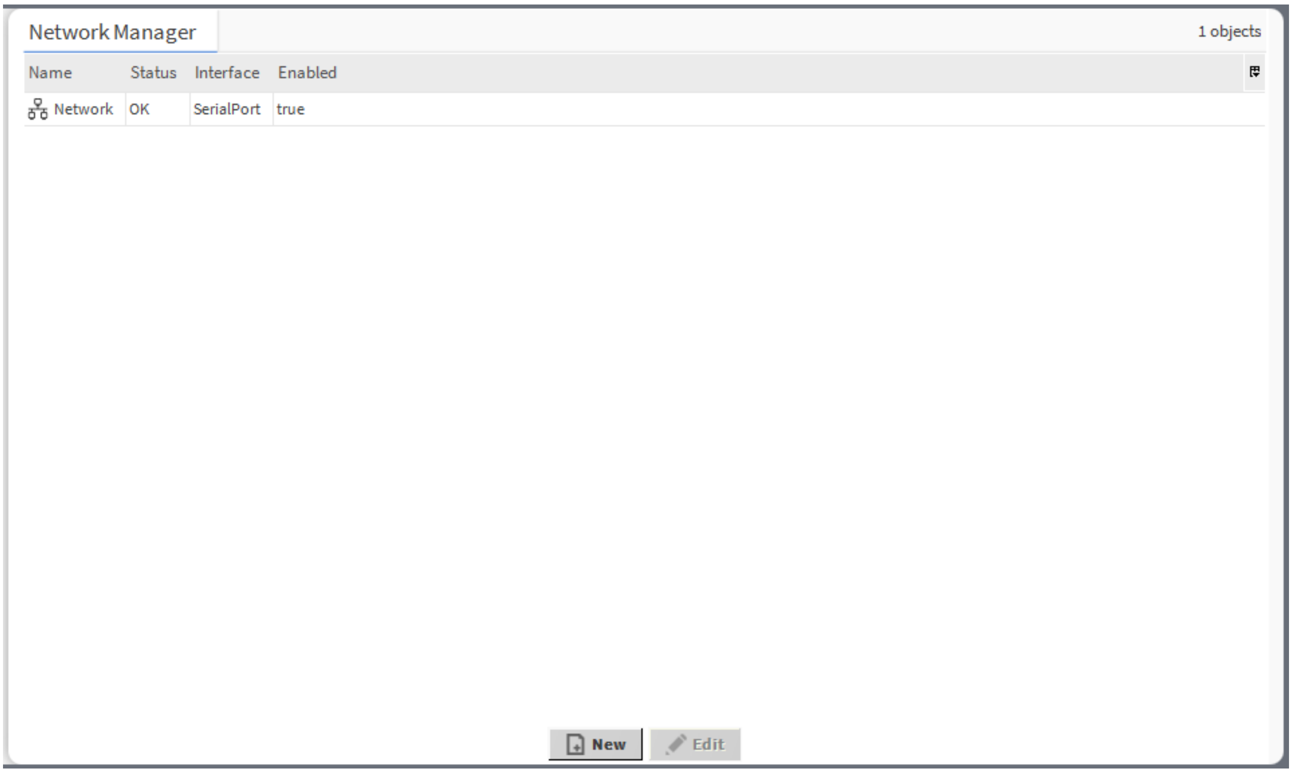


Figure 37. Accessing the BACnet Point Manager from the context menu

3.4.5 Modbus Network Manager

The Network Manager view is available for the Modbus component. It lists all Modbus networks configured on the device's ports. The Network Manager view shows the statuses, ports (which the network is configured on), and enabled or disabled states of the network.

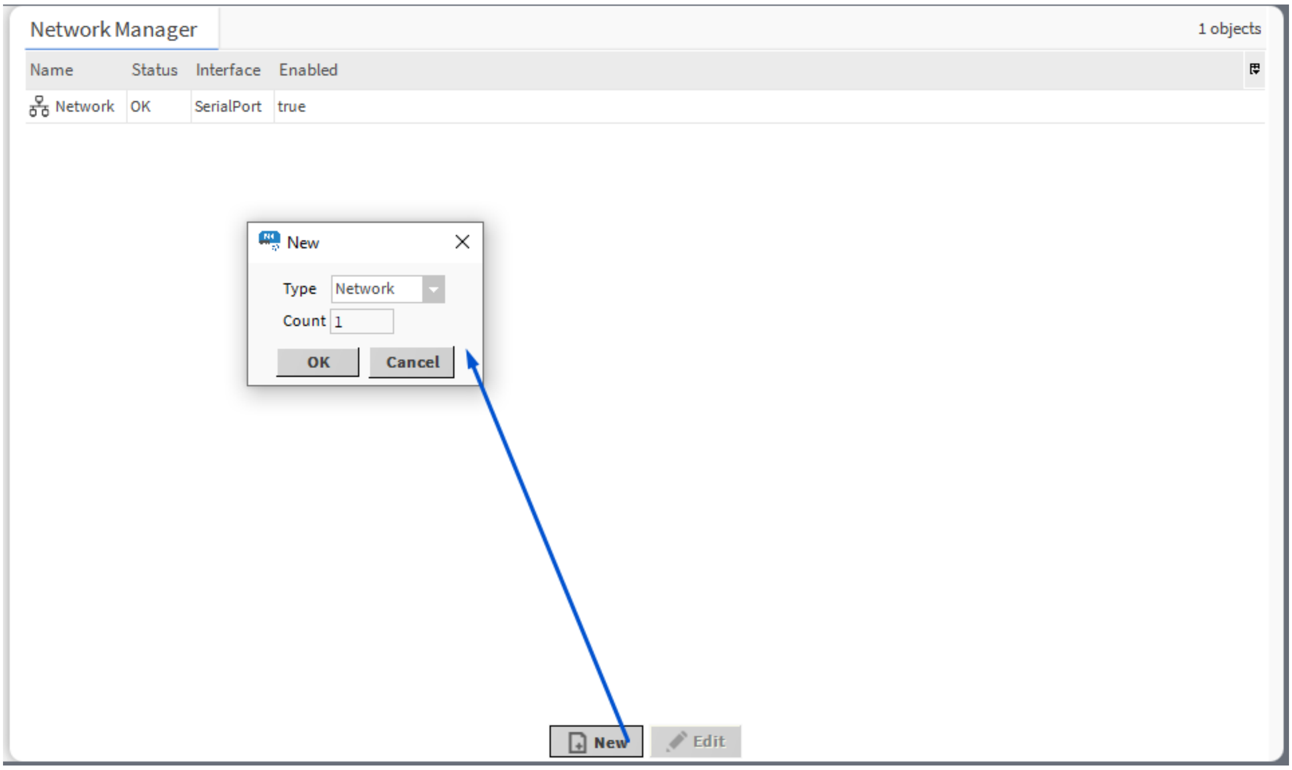


Name	Status	Interface	Enabled
Network	OK	SerialPort	true

Figure 38. Modbus Network Manager

In the Modbus Network Manager, it is possible to:

- add Modbus network component:



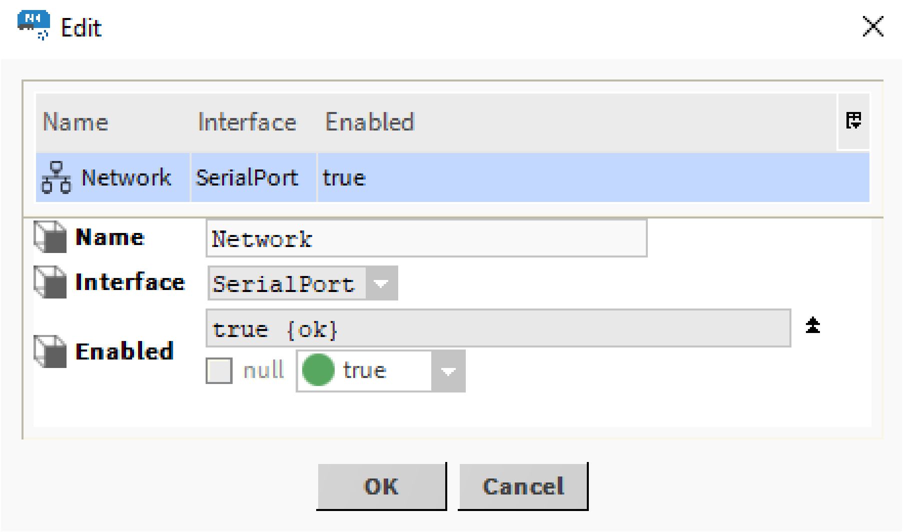
Name	Status	Interface	Enabled
Network	OK	SerialPort	true

Type: Network

Count: 1

Figure 39. Adding new Modbus network

- edit the Modbus network's name, interface and enable/disable the component:



Edit

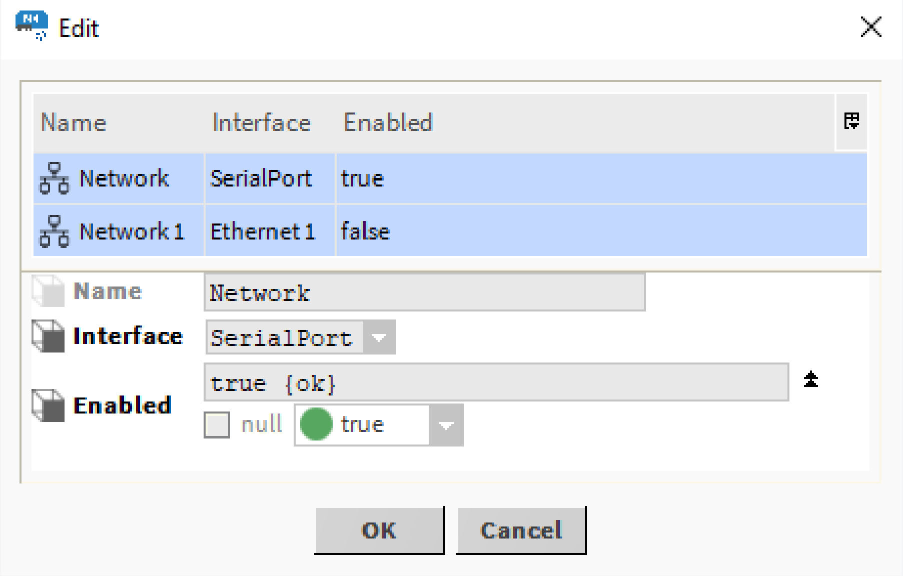
Name	Interface	Enabled
Network	SerialPort	true

Name: Network
Interface: SerialPort
Enabled: true {ok}
□ null ● true

Figure 40. Editing popup

Note

Editing is possible for more than one network at a time. If multiple networks are edited, the same new value is written to common slots, so individual slots, such as Name, cannot be edited in this manner.



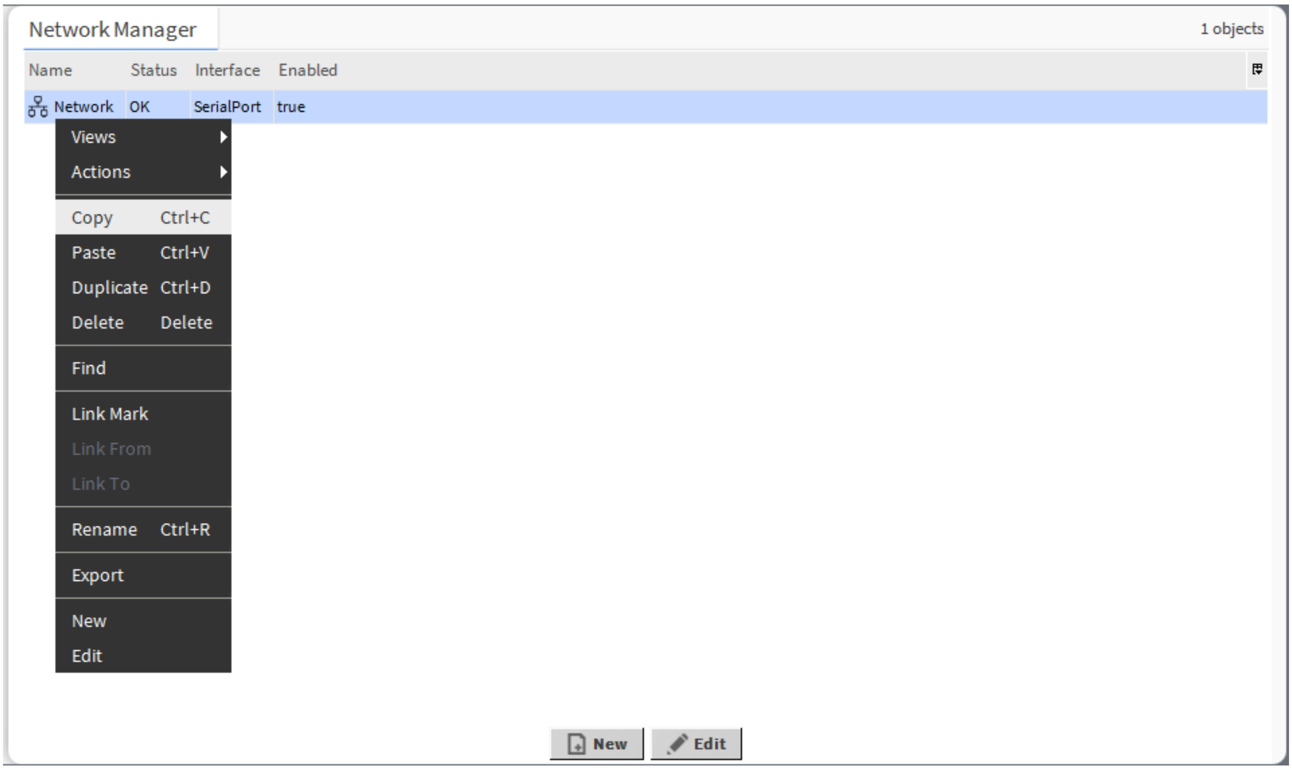
Edit

Name	Interface	Enabled
Network	SerialPort	true
Network1	Ethernet1	false

Name: Network
Interface: SerialPort
Enabled: true {ok}
□ null ● true

Figure 41. Editing multiple Modbus networks

- copy/duplicate/remove Modbus network components:



Network Manager

1 objects

Name	Status	Interface	Enabled
Network	OK	SerialPort	true

Figure 42. Context menu options for Modbus network

Opening Modbus Network Manager

The Modbus Network Manager view is accessible from the context menu of the Modbus component. It is also automatically opened if the Modbus component is double-clicked in the nav tree window.

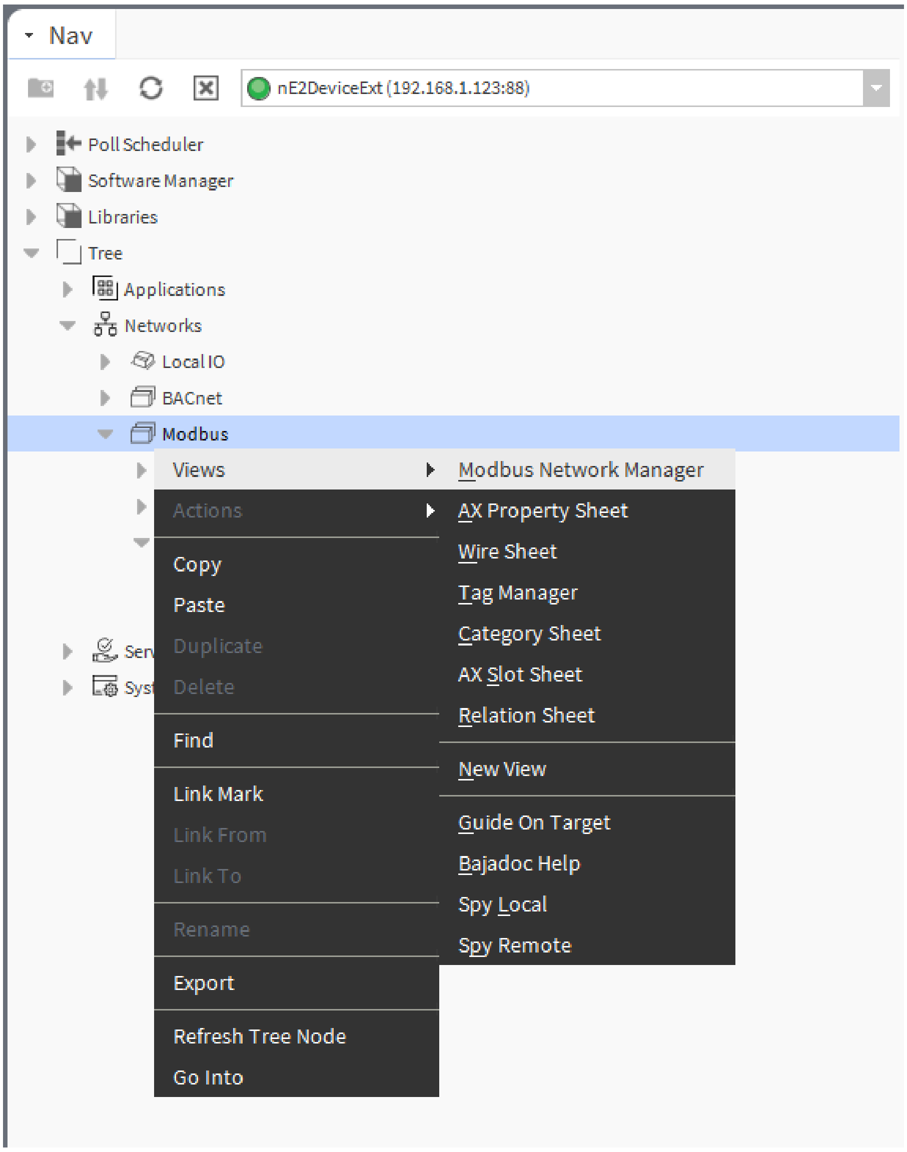
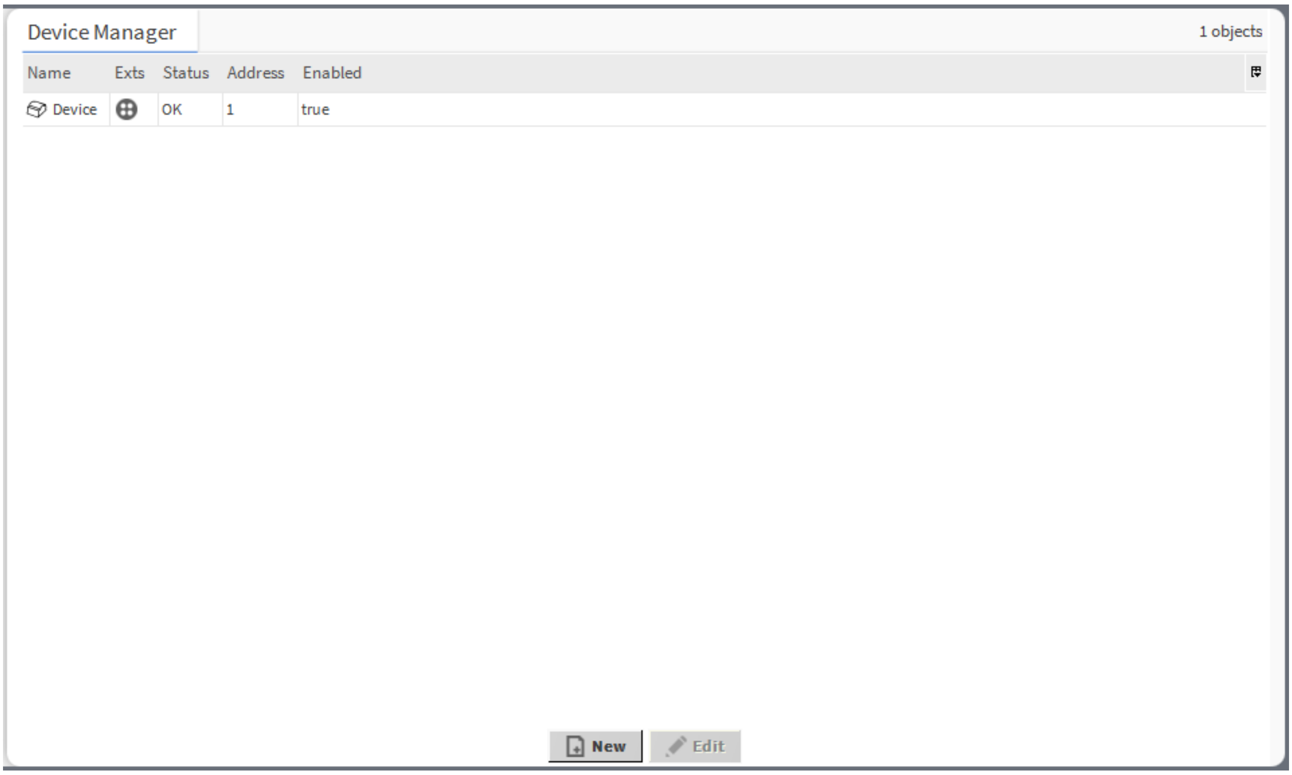


Figure 43. Accessing the Modbus Network Manager

3.4.6 Modbus Device Manager

The Device Manager view is available for the Modbus Network component. It lists all Modbus devices added to the network. The Device Manager view shows the names, statues, device names and ID, and enabled or disabled states of the device. The special Exts columns provides quick access to the Point Manager (with all points of the relevant device).



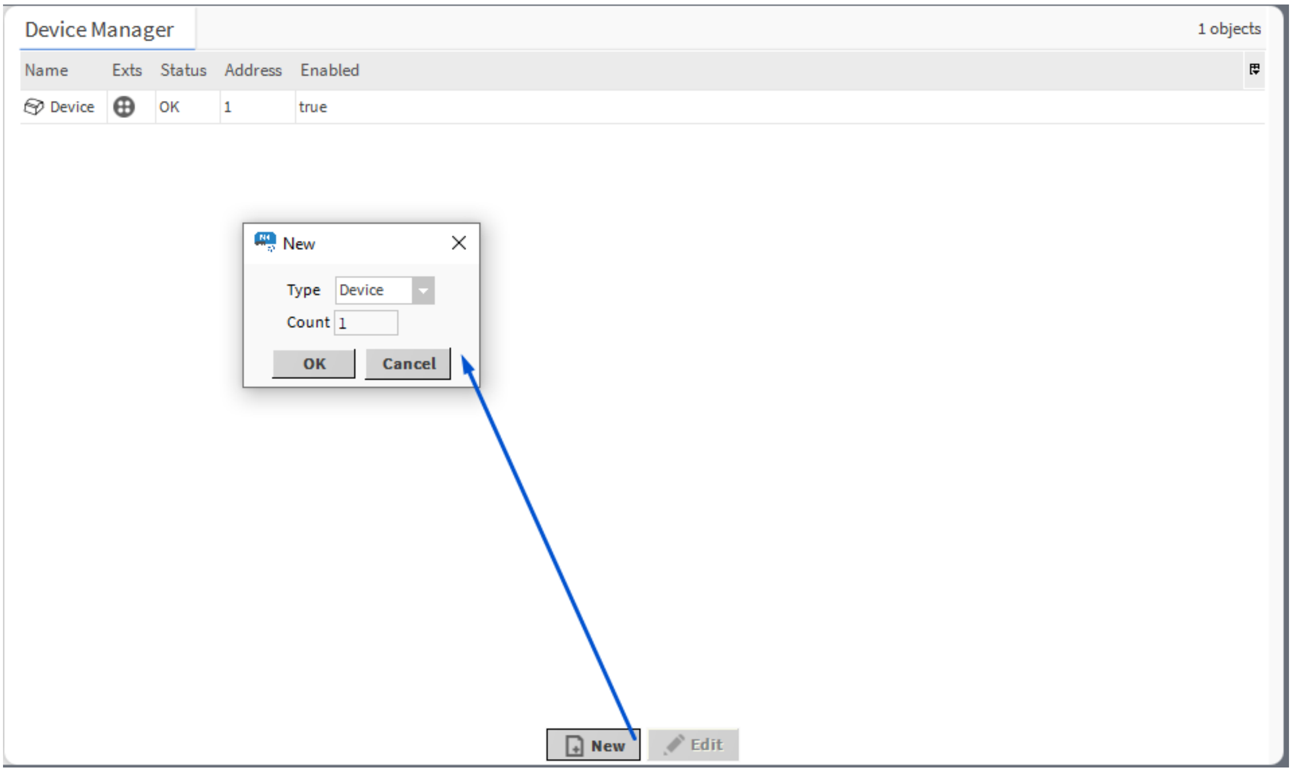
Device Manager 1 objects

Name	Exts	Status	Address	Enabled
Device		OK	1	true

Figure 44. Modbus Device Manager

In the Modbus Device Manager, it is possible to:

- add Modbus Device component:



Device Manager 1 objects

Name	Exts	Status	Address	Enabled
Device		OK	1	true

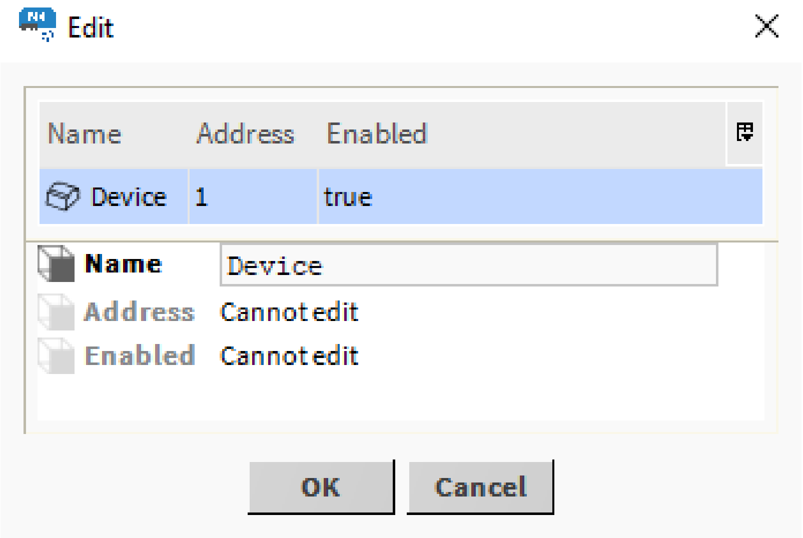
New

Type: Device

Count: 1

Figure 45. Adding new Modbus device

- edit the Modbus device's name:

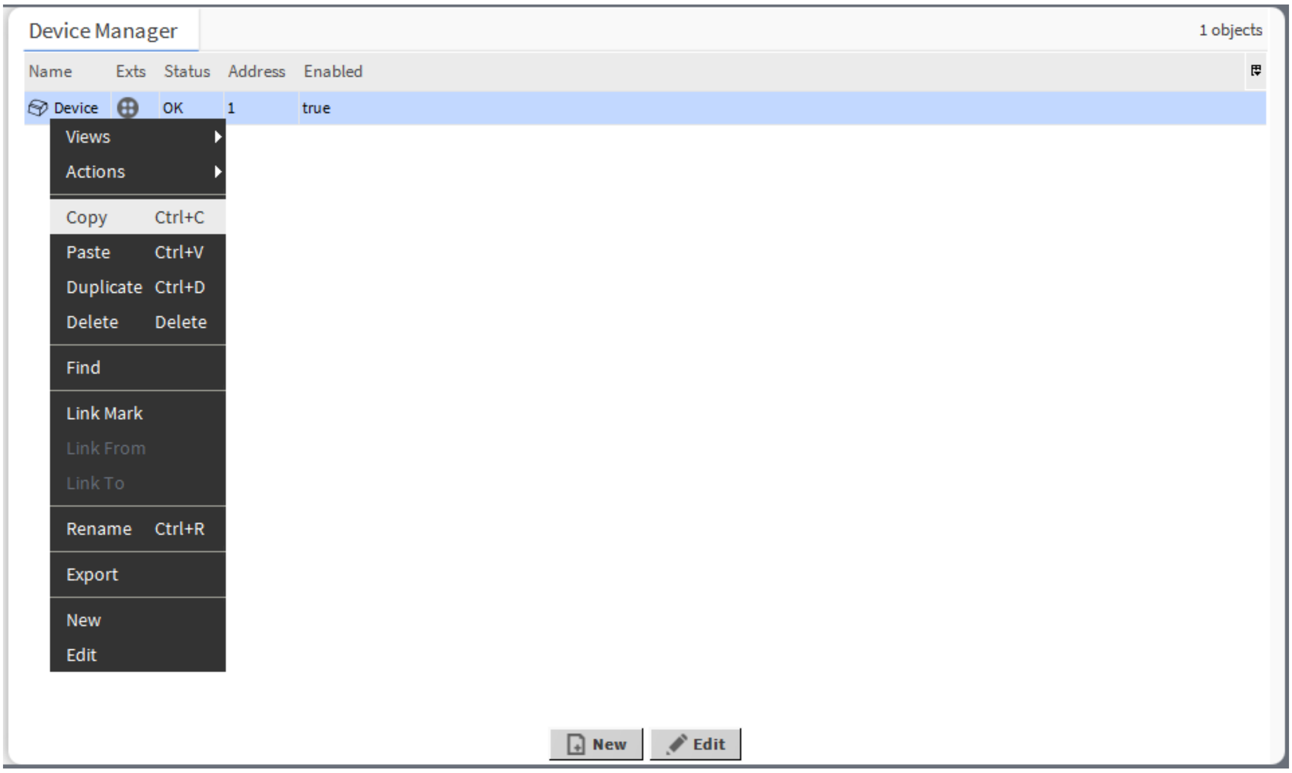


Name	Address	Enabled
Device	1	true

Name Device
Address Cannot edit
Enabled Cannot edit

Figure 46. Editing pop-up

- copy/duplicate/remove Modbus device components:



Name	Exts	Status	Address	Enabled
Device		OK	1	true

Figure 47. Context menu options for Modbus device

Opening Modbus Device Manager

The Modbus Device Manager view is accessible from the context menu of the Modbus Network component. It is also automatically opened if the Modbus Network component is double-clicked in the nav tree window.

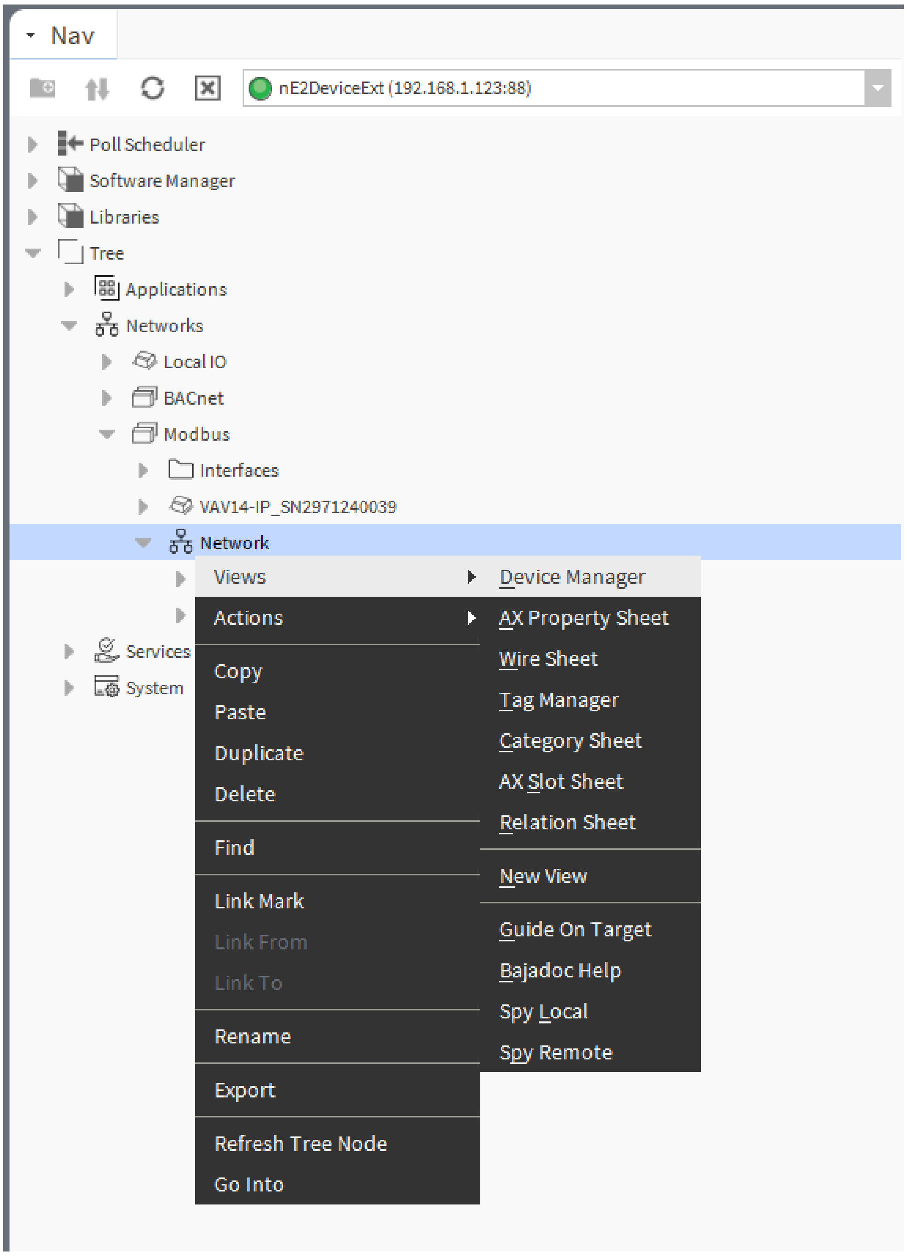
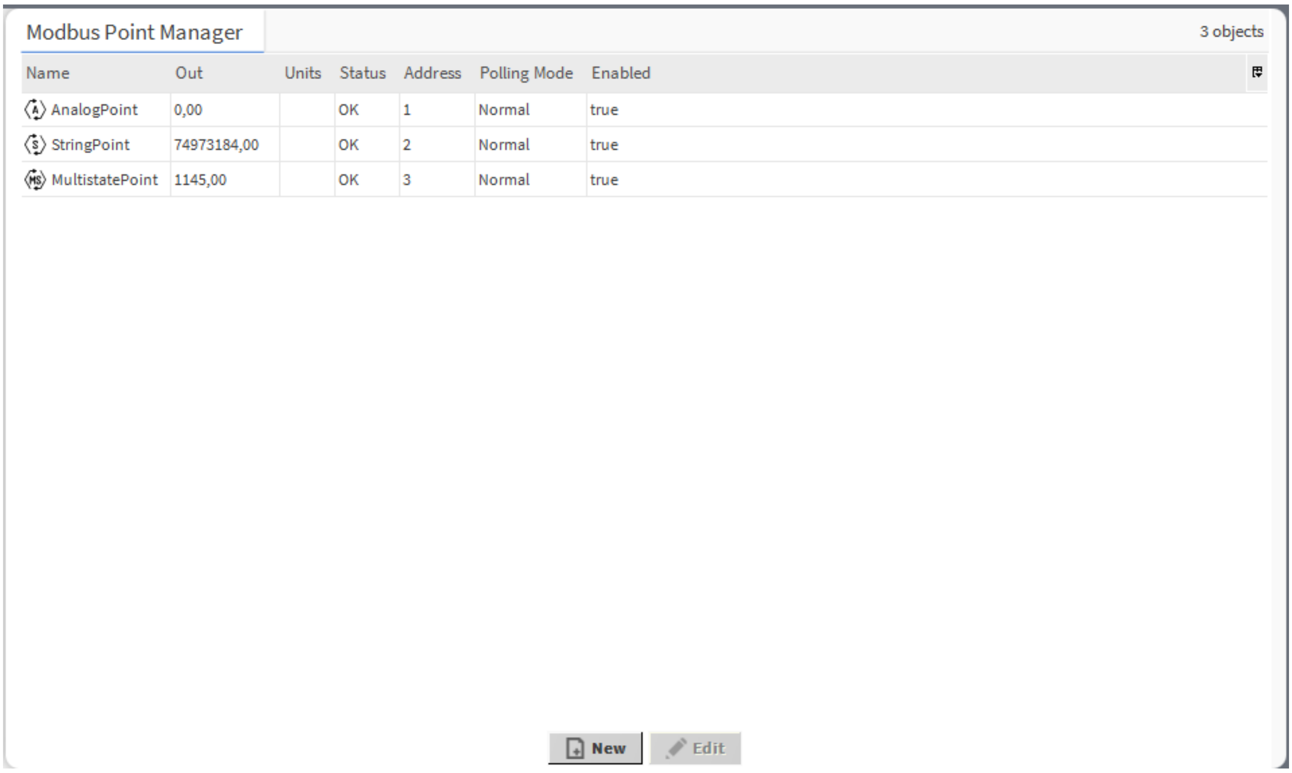


Figure 48. Accessing the Modbus Device Manager

3.4.7 Modbus Point Manager

The Modbus Point Manager view is available for each device added to the Modbus network. It lists all Modbus points added to the Device component, and shows their Out slot value, status, object name and ID, polling mode, and enabled or disabled state.



Modbus Point Manager

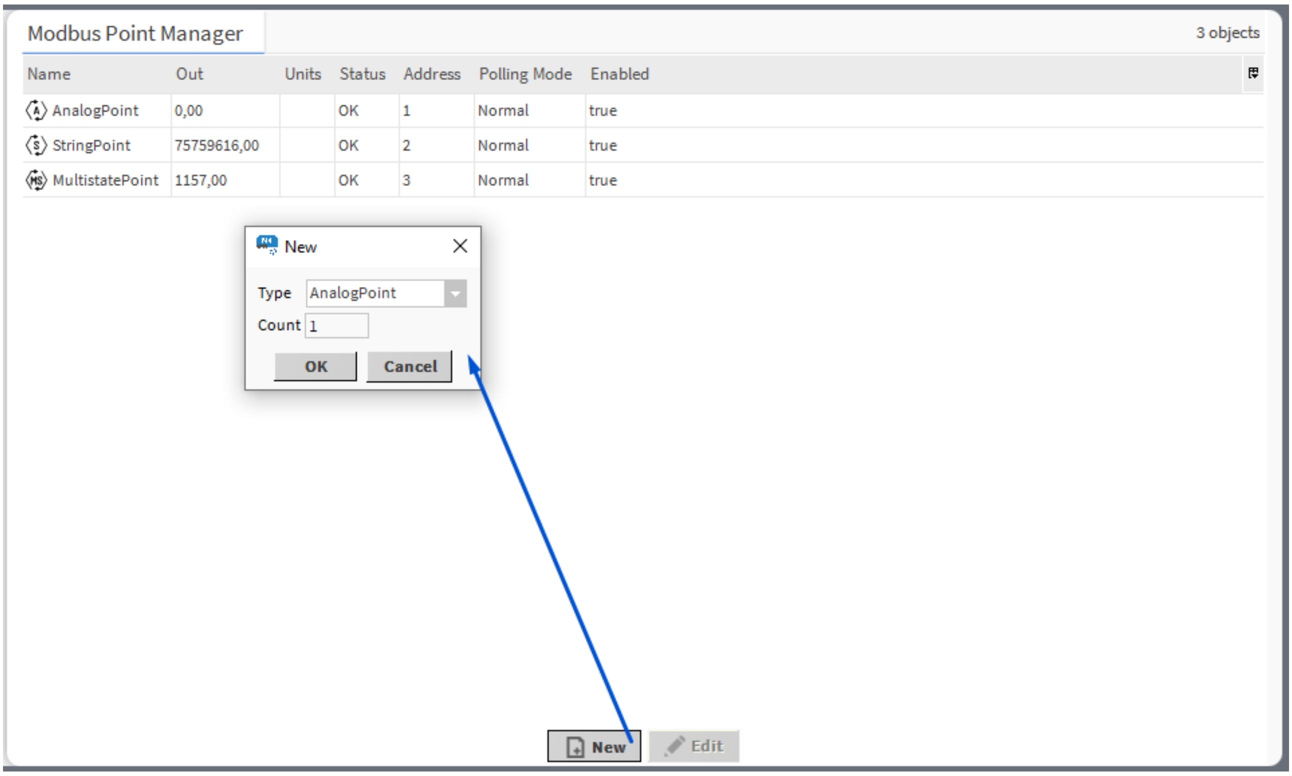
3 objects

Name	Out	Units	Status	Address	Polling Mode	Enabled
AnalogPoint	0,00		OK	1	Normal	true
StringPoint	74973184,00		OK	2	Normal	true
MultistatePoint	1145,00		OK	3	Normal	true

Figure 49. Modbus Point Manager

In the Modbus Point Manager, it is possible to:

- add Modbus points:



Modbus Point Manager

3 objects

Name	Out	Units	Status	Address	Polling Mode	Enabled
AnalogPoint	0,00		OK	1	Normal	true
StringPoint	75759616,00		OK	2	Normal	true
MultistatePoint	1157,00		OK	3	Normal	true

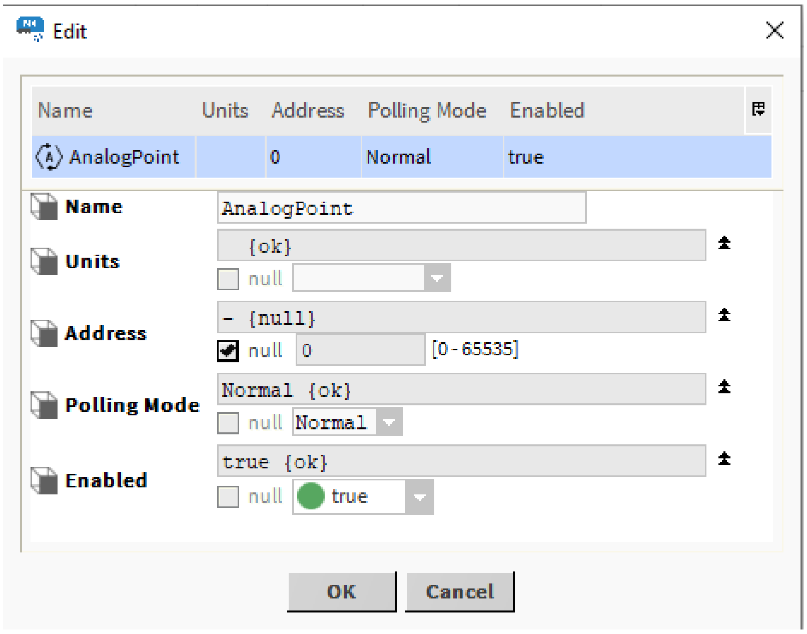
New

Type: AnalogPoint

Count: 1

Figure 50. Adding new Modbus point

- edit the Modbus point’s name, units, address and enable/disable the component:



Edit

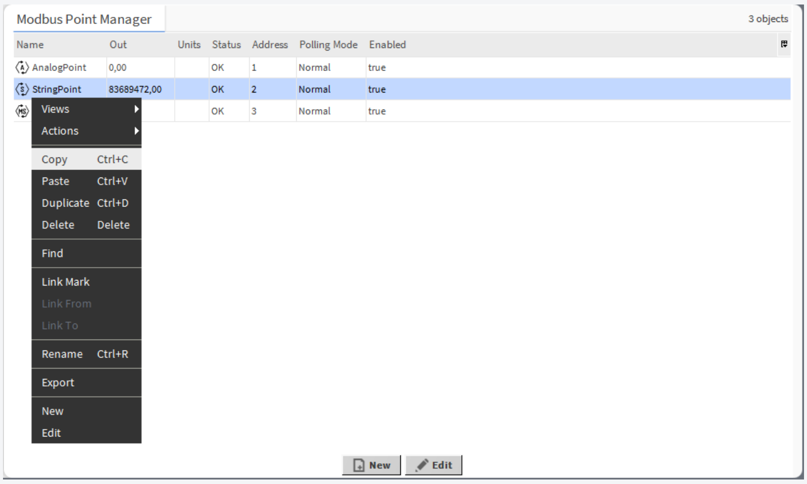
Name	Units	Address	Polling Mode	Enabled
AnalogPoint		0	Normal	true

Name	AnalogPoint
Units	{ok} □ null
Address	- {null} ☑ null 0 [0 - 65535]
Polling Mode	Normal {ok} □ null Normal
Enabled	true {ok} □ null ● true

Figure 51. Editing pop-up

Note

Editing is possible for more than one point at a time. If multiple points are edited, the same new value is written to common slots, so individual slots, such as Name, cannot be edited in this manner.



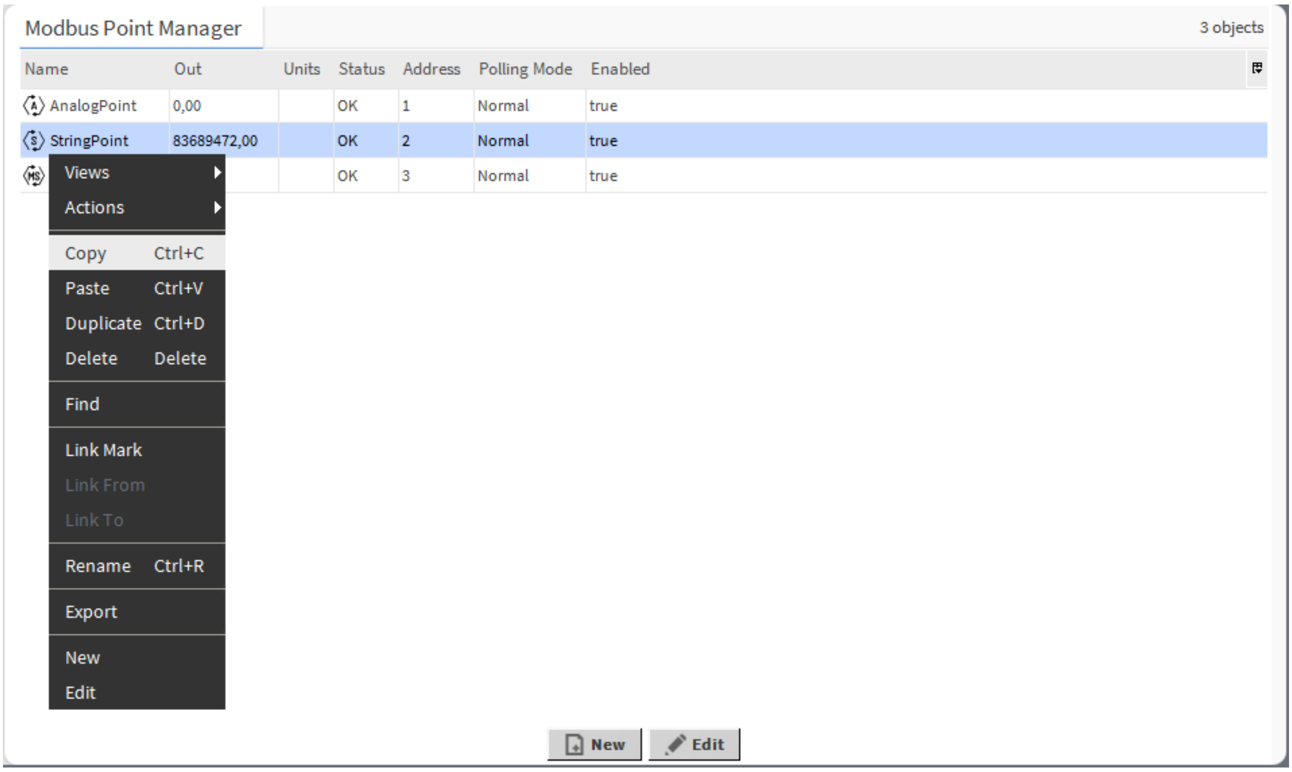
Modbus Point Manager

3 objects

Name	Out	Units	Status	Address	Polling Mode	Enabled
AnalogPoint	0,00		OK	1	Normal	true
StringPoint	83689472,00		OK	2	Normal	true
			OK	3	Normal	true

Figure 52. Editing multiple Modbus points

- copy/duplicate/remove Modbus points:



Modbus Point Manager

3 objects

Name	Out	Units	Status	Address	Polling Mode	Enabled
AnalogPoint	0,00		OK	1	Normal	true
StringPoint	83689472,00		OK	2	Normal	true
			OK	3	Normal	true

Figure 53. Context menu for Modbus points

Opening the Modbus Point Manager

The Modbus Point Manager view is accessible from the context menu of the Device component. It is also automatically opened if the Device component is double-clicked in the nav tree window.

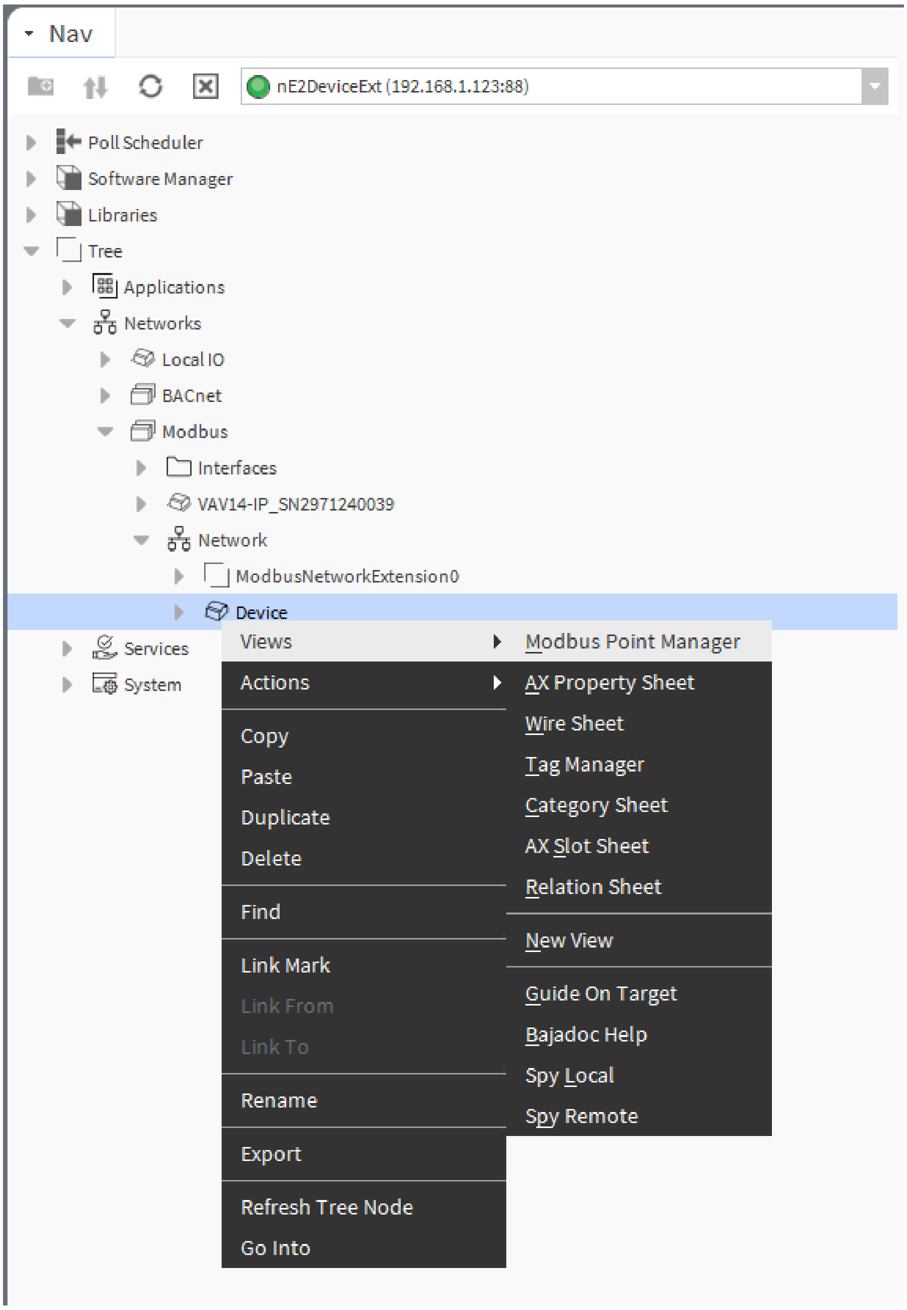
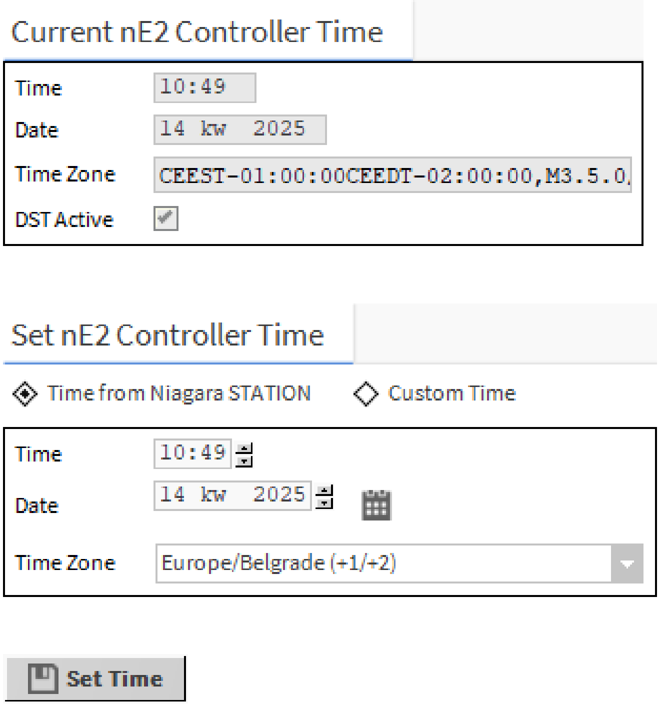


Figure 54. Accessing the Modbus Point Manager from the context menu

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.



Current nE2 Controller Time

Time 10:49

Date 14 kw 2025

Time Zone CEEST-01:00:00CEEDT-02:00:00,M3.5.0,

DST Active ☑

Set nE2 Controller Time

● Time from Niagara STATION ○ Custom Time

Time 10:49

Date 14 kw 2025

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

Set Time

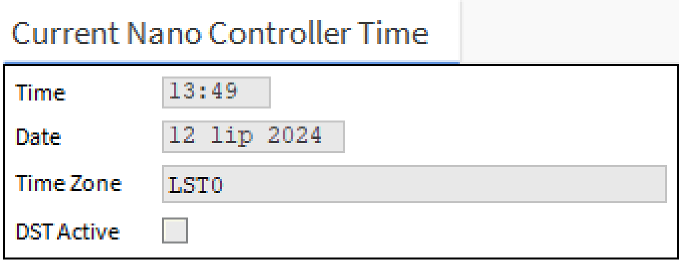
Figure 55. Time settings

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;



Current Nano Controller Time

Time 13:49

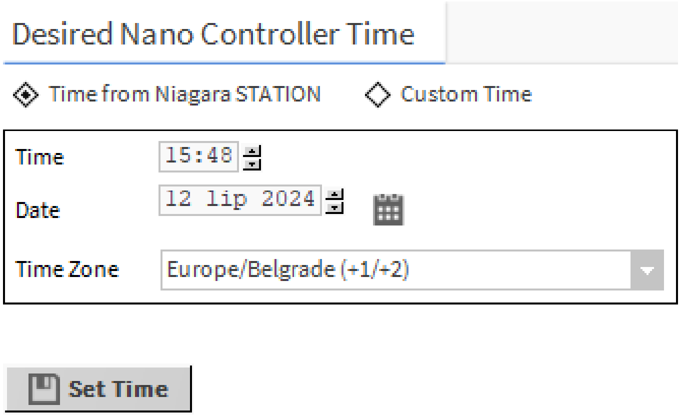
Date 12 lip 2024

Time Zone LST0

DST Active □

Figure 56. 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

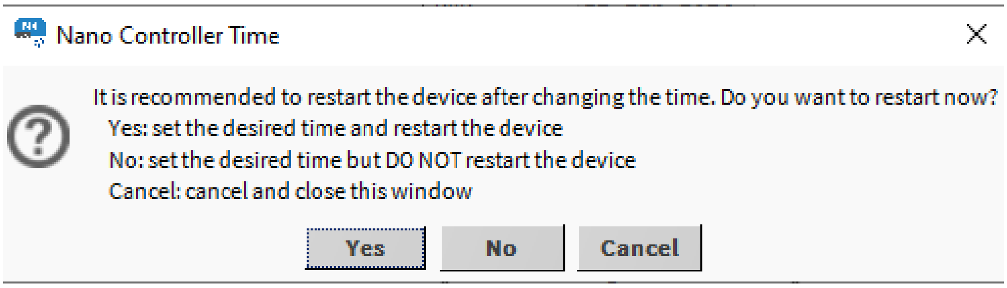
Time Zone Europe/Belgrade (+1/+2)

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;



Nano Controller Time

It is recommended to restart the device after changing the time. Do you want to restart now?
Yes: set the desired time and restart the device
No: set the desired time but DO NOT restart the device
Cancel: cancel and close this window

Figure 57. Set the time from the station dialog window

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

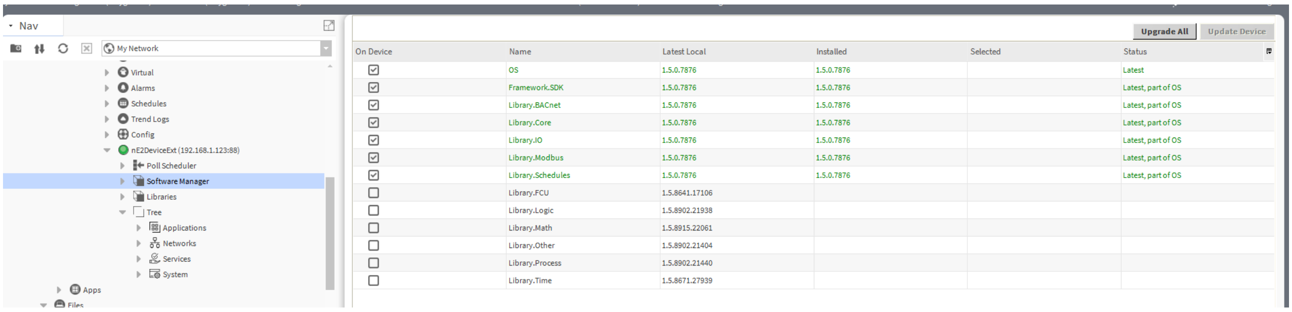
To set a custom time in the controller:

- 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.



On Device	Name	Latest Local	Installed	Selected	Status
☑	OS	1.5.0.7876	1.5.0.7876		Latest
☑	Framework.SDK	1.5.0.7876	1.5.0.7876		Latest, part of OS
☑	Library.BACnet	1.5.0.7876	1.5.0.7876		Latest, part of OS
☑	Library.Core	1.5.0.7876	1.5.0.7876		Latest, part of OS
☑	Library.IO	1.5.0.7876	1.5.0.7876		Latest, part of OS
☑	Library.Modbus	1.5.0.7876	1.5.0.7876		Latest, part of OS
☑	Library.Schedules	1.5.0.7876	1.5.0.7876		Latest, part of OS
□	Library.FCU	1.5.8641.17106			
□	Library.Logic	1.5.8902.21938			
□	Library.Math	1.5.8915.22061			
□	Library.Other	1.5.8902.21404			
□	Library.Process	1.5.8902.21440			
□	Library.Time	1.5.8671.27939			

Figure 58. Software Manager view

3.6.1 Using Software Manager

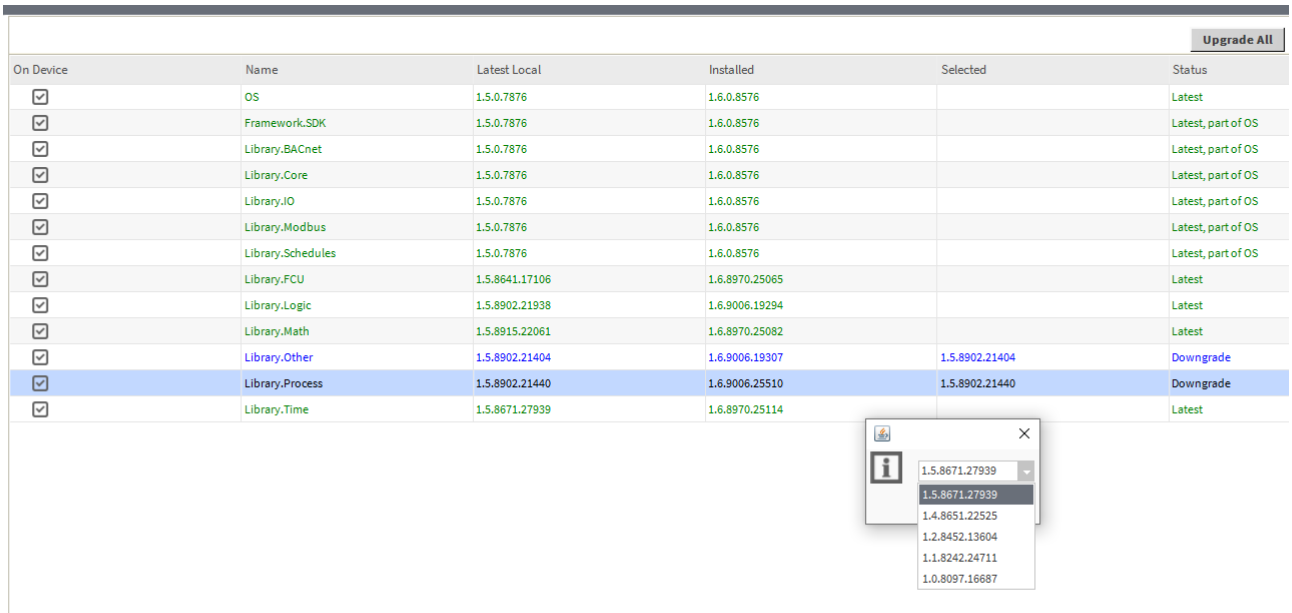
The Software Manager view lists the OS and libraries available locally. The view highlights each row (OS or libraries) according to its status:

- 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).

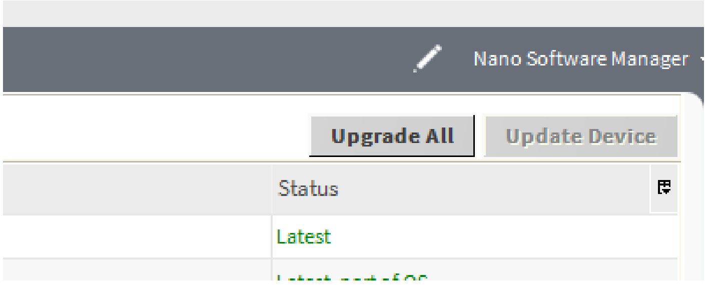
In order to upgrade or downgrade the selected element, choose the desired version of the element in the Selected column, and press the Update Device option (highlighted in blue in the right upper corner of the Software Manager). This option executes all actions indicated in the Status column.



On Device	Name	Latest Local	Installed	Selected	Status
☑	OS	1.5.0.7876	1.6.0.8576		Latest
☑	Framework.SDK	1.5.0.7876	1.6.0.8576		Latest, part of OS
☑	Library.BACnet	1.5.0.7876	1.6.0.8576		Latest, part of OS
☑	Library.Core	1.5.0.7876	1.6.0.8576		Latest, part of OS
☑	Library.IO	1.5.0.7876	1.6.0.8576		Latest, part of OS
☑	Library.Modbus	1.5.0.7876	1.6.0.8576		Latest, part of OS
☑	Library.Schedules	1.5.0.7876	1.6.0.8576		Latest, part of OS
☑	Library.FCU	1.5.8641.17106	1.6.8970.25065		Latest
☑	Library.Logic	1.5.8902.21938	1.6.9006.19294		Latest
☑	Library.Math	1.5.8915.22061	1.6.8970.25082		Latest
☑	Library.Other	1.5.8902.21404	1.6.9006.19307	1.5.8902.21404	Downgrade
☑	Library.Process	1.5.8902.21440	1.6.9006.25510	1.5.8902.21440	Downgrade
☑	Library.Time	1.5.8671.27939	1.6.8970.25114		Latest

Figure 59. 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.



Status
Latest

Figure 60. 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

With the nE2Link, it is possible to upload libraries and/or OS files to the controller, which were not pre-loaded in the nE2DeviceExt. New libraries have to be saved on a local PC and then copied to the nanoEdgeEngine folder on the station:

- save new libraries in a folder selected location on the local PC;
- copy the proper nano EDGE ENGINE libraries and/or OS files from the local PC by navigating to the proper location on My Host (local PC); (it is possible to copy the whole folder with proper contents but please make sure then that the folder is named 'nanoEdgeEngine');

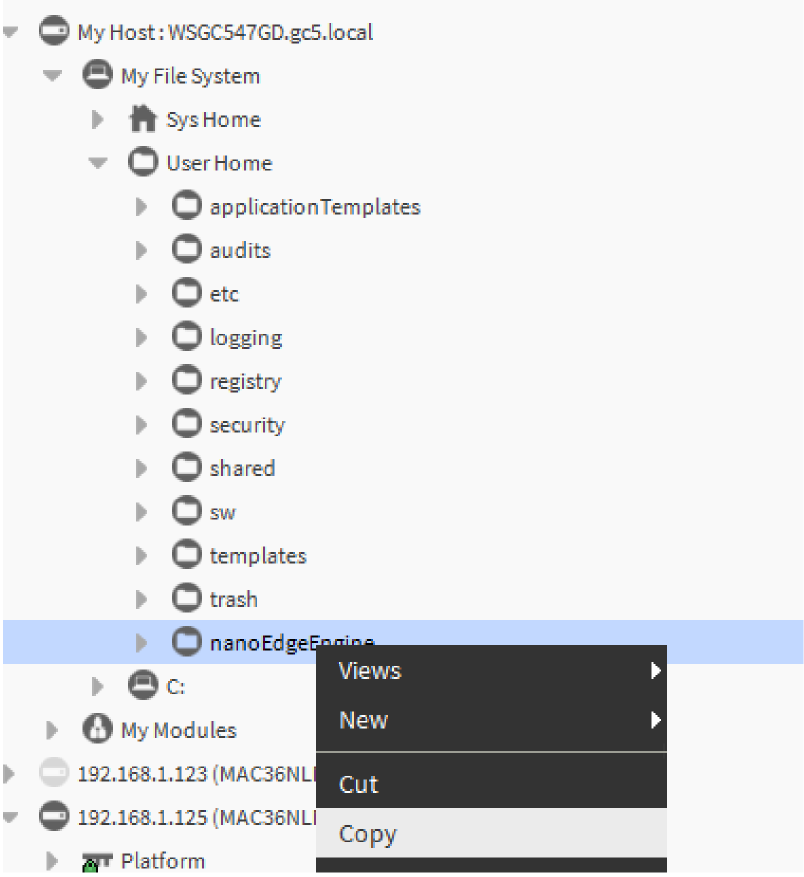


Figure 61. Copying the nanoEdgeEngine folder

- navigate to Station → Files → nE2Link →nanoEdgeEngine folder;

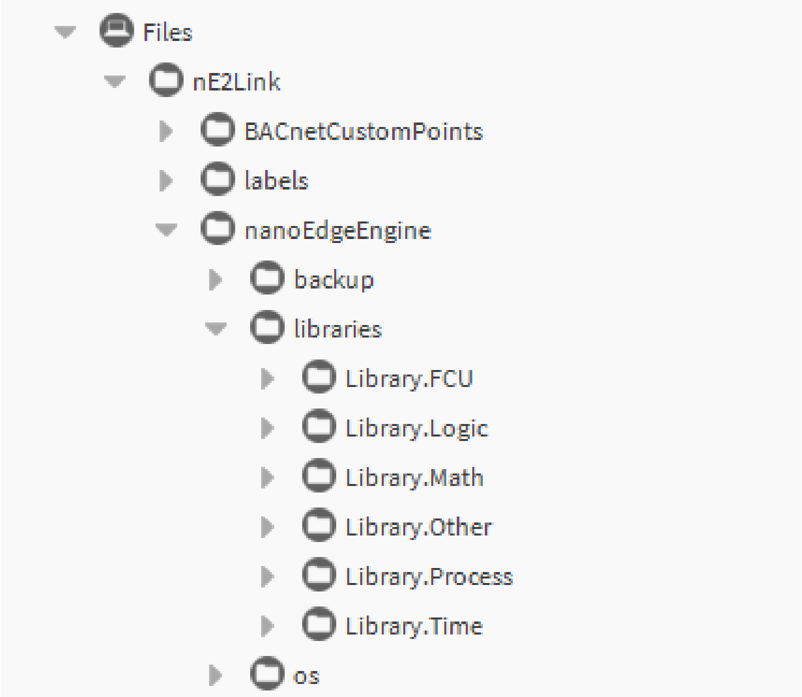


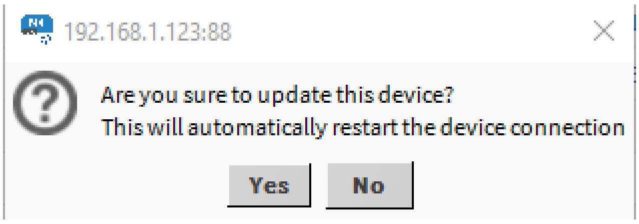
Figure 62. Pasted folder

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

> Note: Please make sure to preserve a proper structure of subfolders: new libraries files have to be stored in the libraries subfolder, OS files in the os subfolder, and backup files in the backup subfolder.

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

- 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.

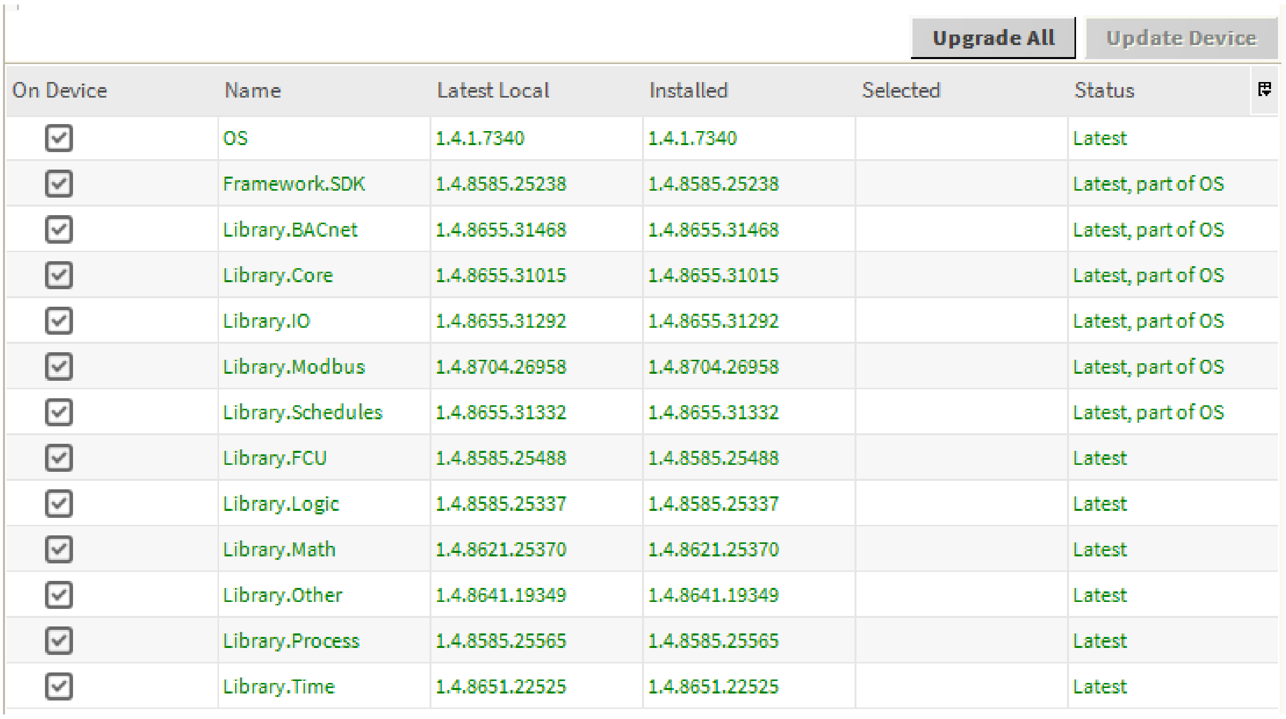


Are you sure to update this device?
This will automatically restart the device connection

Figure 63. 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.

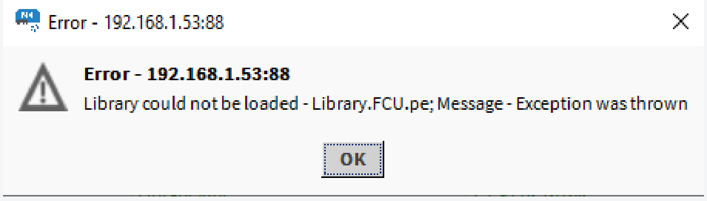


On Device	Name	Latest Local	Installed	Selected	Status
☑	OS	1.4.1.7340	1.4.1.7340		Latest
☑	Framework.SDK	1.4.8585.25238	1.4.8585.25238		Latest, part of OS
☑	Library.BACnet	1.4.8655.31468	1.4.8655.31468		Latest, part of OS
☑	Library.Core	1.4.8655.31015	1.4.8655.31015		Latest, part of OS
☑	Library.IO	1.4.8655.31292	1.4.8655.31292		Latest, part of OS
☑	Library.Modbus	1.4.8704.26958	1.4.8704.26958		Latest, part of OS
☑	Library.Schedules	1.4.8655.31332	1.4.8655.31332		Latest, part of OS
☑	Library.FCU	1.4.8585.25488	1.4.8585.25488		Latest
☑	Library.Logic	1.4.8585.25337	1.4.8585.25337		Latest
☑	Library.Math	1.4.8621.25370	1.4.8621.25370		Latest
☑	Library.Other	1.4.8641.19349	1.4.8641.19349		Latest
☑	Library.Process	1.4.8585.25565	1.4.8585.25565		Latest
☑	Library.Time	1.4.8651.22525	1.4.8651.22525		Latest

Figure 64. Updated Software Manager view

Library Not Loaded

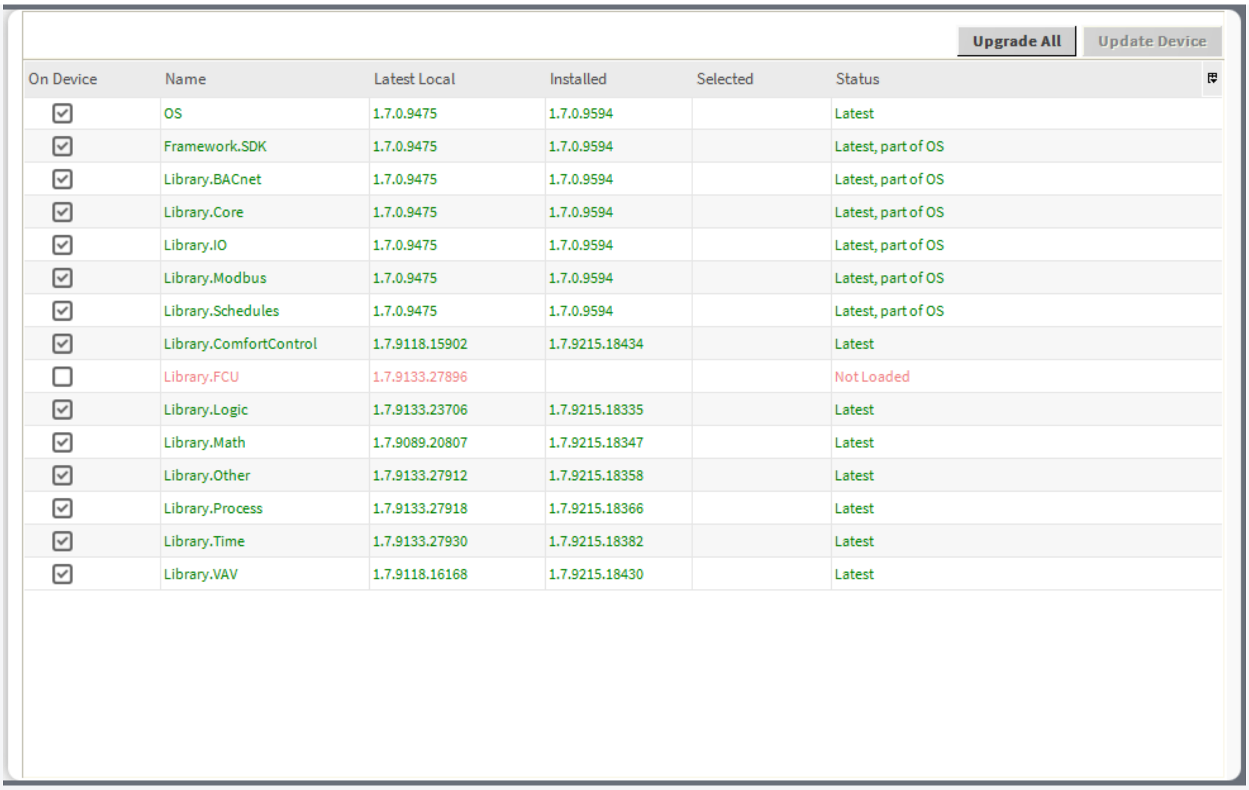
The Software Manager has a mechanism informing the user about the libraries compatibility. For a proper operation, libraries versions have to be supported by the OS. If the library installed on the device has a version, which is not supported by the OS, Software Manager displays an error prompt and marks the library as 'not loaded'. In such case, it is required to upgrade the library.



Error - 192.168.1.53:88

Library could not be loaded - Library.FCU.pe; Message - Exception was thrown

Figure 65. Error prompt



On Device	Name	Latest Local	Installed	Selected	Status
☑	OS	1.7.0.9475	1.7.0.9594		Latest
☑	Framework.SDK	1.7.0.9475	1.7.0.9594		Latest, part of OS
☑	Library.BACnet	1.7.0.9475	1.7.0.9594		Latest, part of OS
☑	Library.Core	1.7.0.9475	1.7.0.9594		Latest, part of OS
☑	Library.IO	1.7.0.9475	1.7.0.9594		Latest, part of OS
☑	Library.Modbus	1.7.0.9475	1.7.0.9594		Latest, part of OS
☑	Library.Schedules	1.7.0.9475	1.7.0.9594		Latest, part of OS
☑	Library.ComfortControl	1.7.9118.15902	1.7.9215.18434		Latest
□	Library.FCU	1.7.9133.27896			Not Loaded
☑	Library.Logic	1.7.9133.23706	1.7.9215.18335		Latest
☑	Library.Math	1.7.9089.20807	1.7.9215.18347		Latest
☑	Library.Other	1.7.9133.27912	1.7.9215.18358		Latest
☑	Library.Process	1.7.9133.27918	1.7.9215.18366		Latest
☑	Library.Time	1.7.9133.27930	1.7.9215.18382		Latest
☑	Library.VAV	1.7.9118.16168	1.7.9215.18430		Latest

Figure 66. Library not loaded

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.

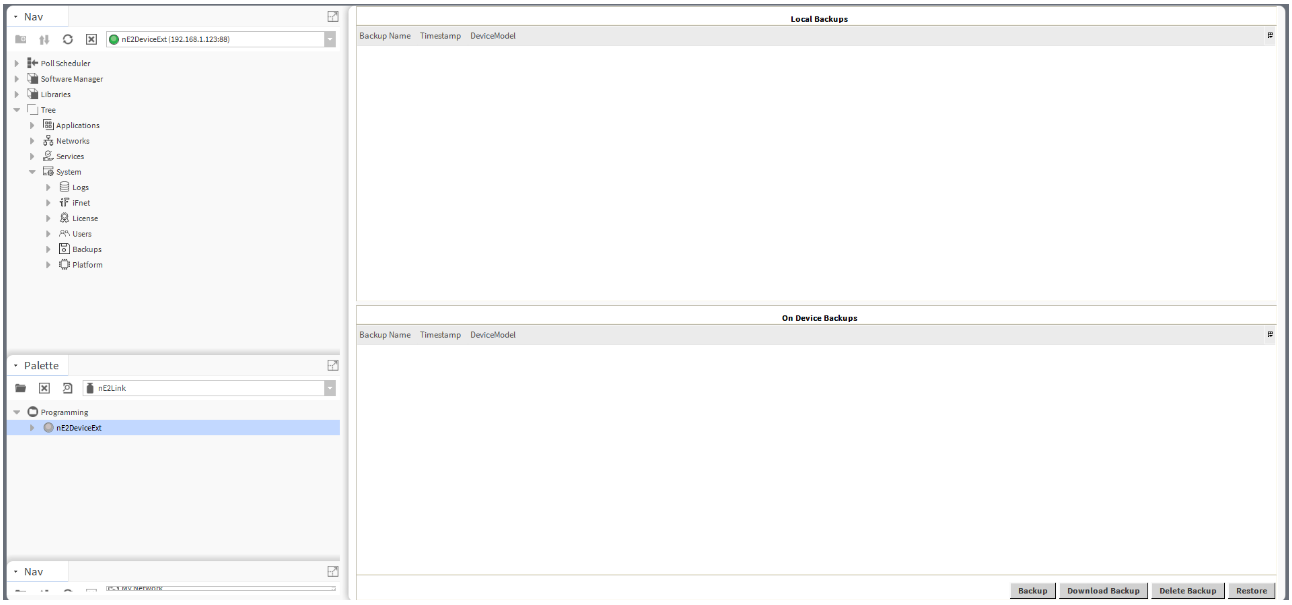
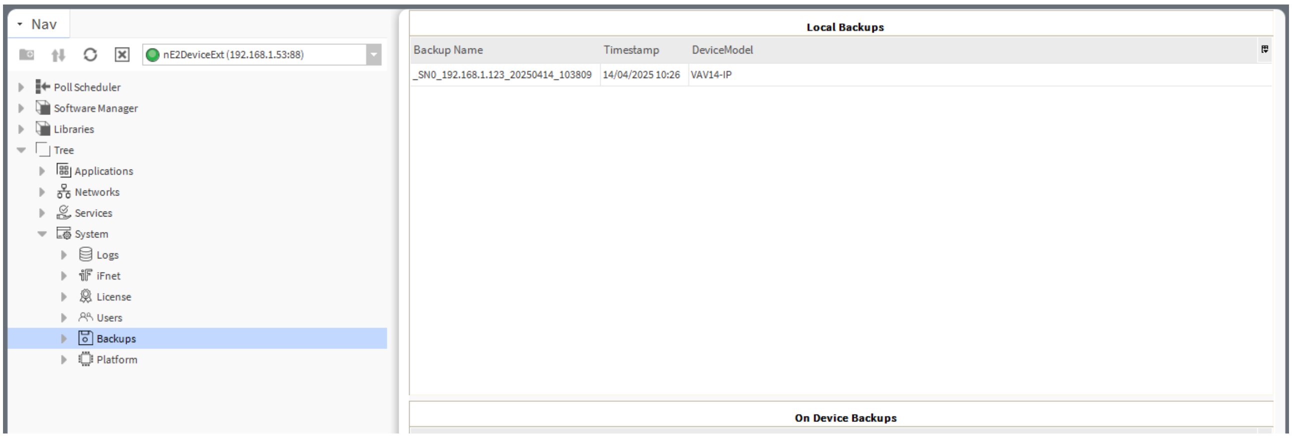


Figure 67. Backup Manager view

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.



Local Backups

Backup Name	Timestamp	DeviceModel
_SN0_192.168.1.123_20250414_103809	14/04/2025 10:26	VAV14-IP

On Device Backups

Figure 68. Local station backup stored in the station's Files

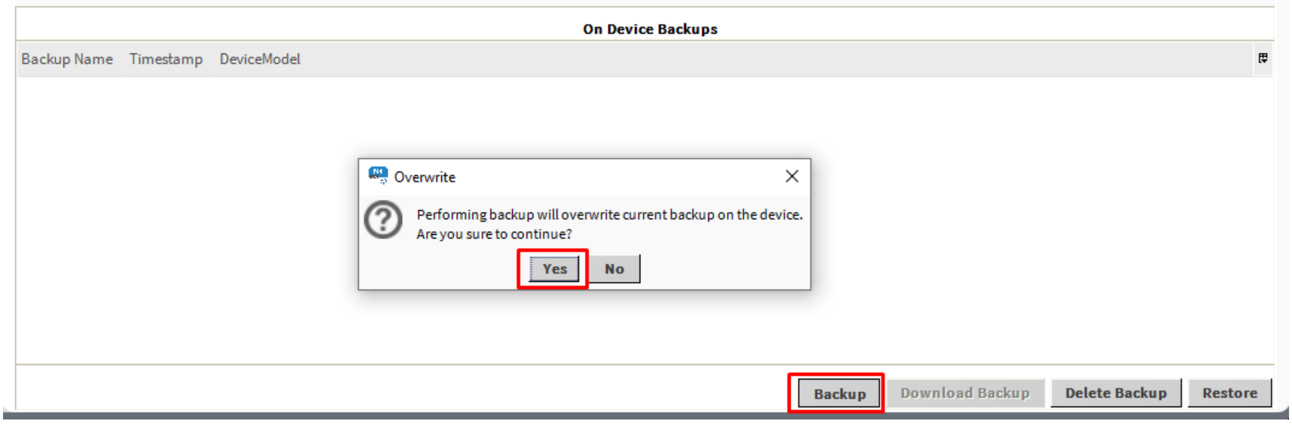
To learn more about the Backups, refer to the nano EDGE ENGINE Programming user manual.

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.



On Device Backups

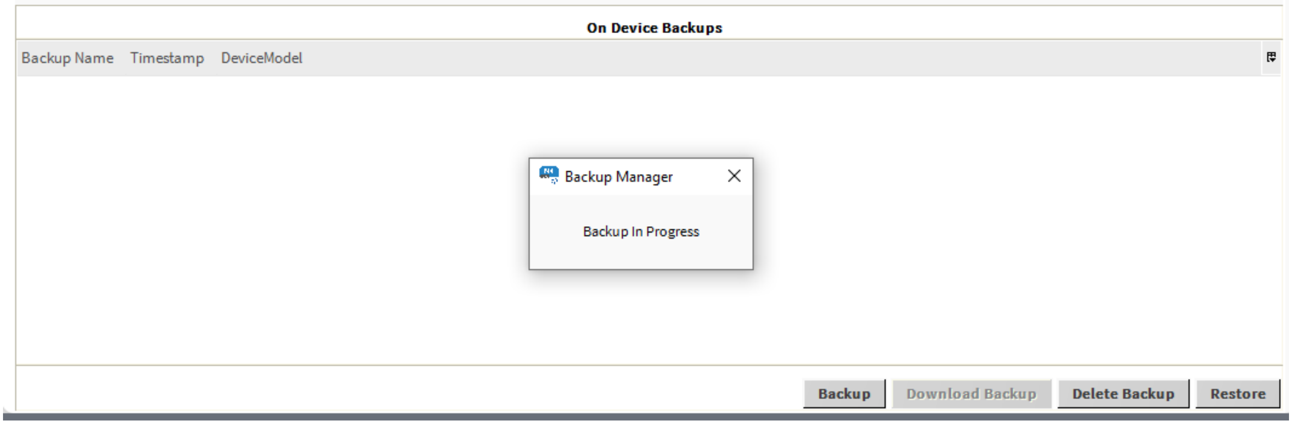
Backup Name	Timestamp	DeviceModel

Overwrite

Performing backup will overwrite current backup on the device. Are you sure to continue?

Figure 69. 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.



On Device Backups

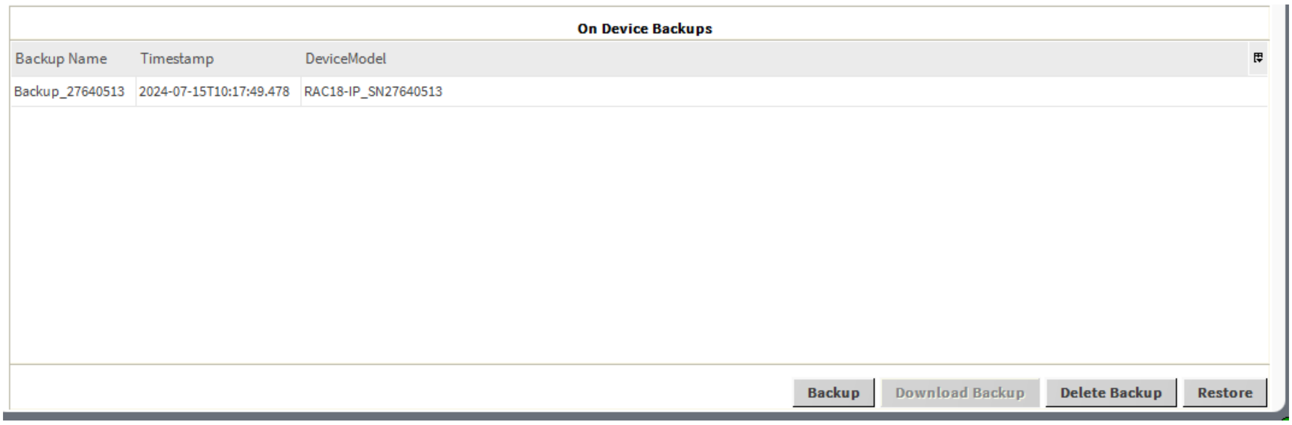
Backup Name	Timestamp	DeviceModel

Backup Manager

Backup In Progress

Figure 70. 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.



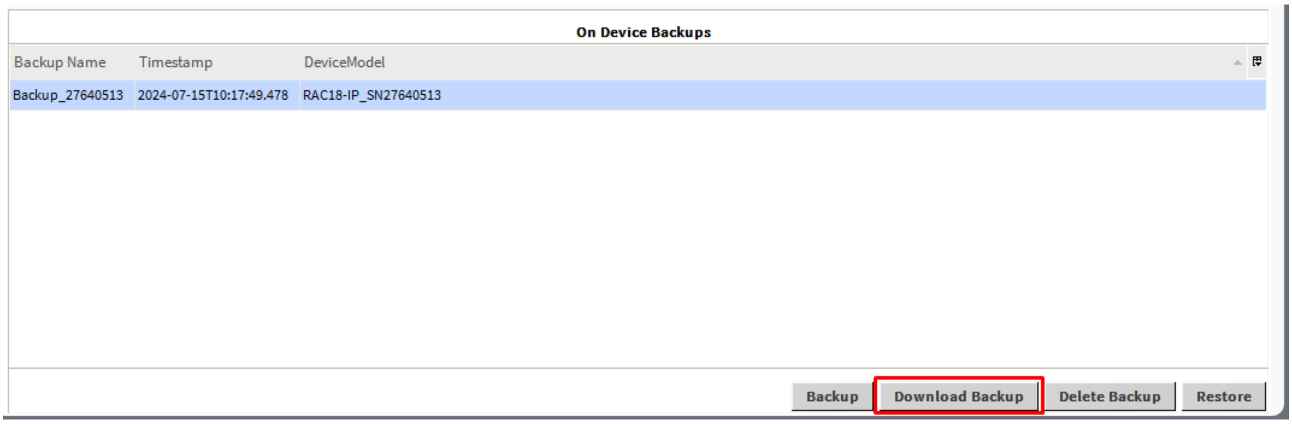
On Device Backups

Backup Name	Timestamp	DeviceModel
Backup_27640513	2024-07-15T10:17:49.478	RAC18-IP_SN27640513

Figure 71. On Device Backups

3.7.2 Downloading Backup

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

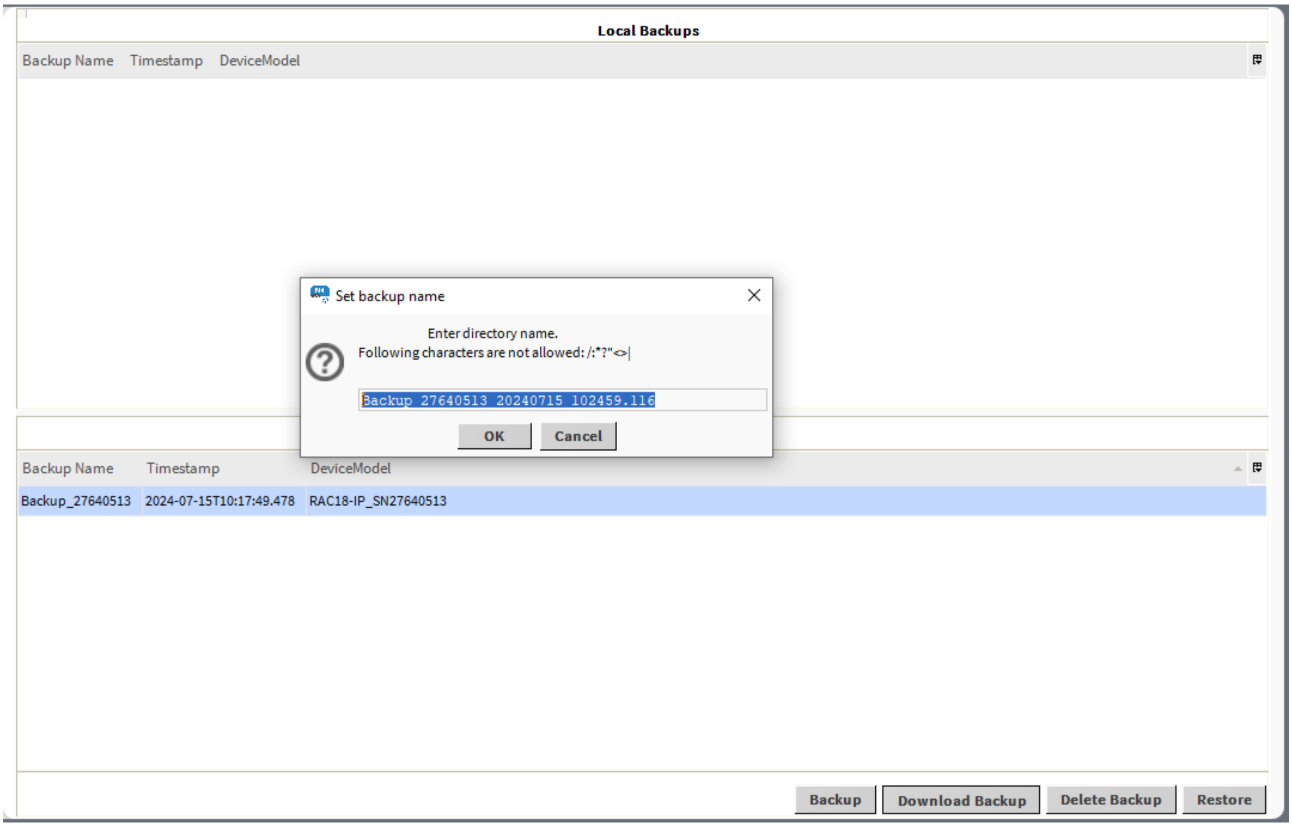


On Device Backups

Backup Name	Timestamp	DeviceModel
Backup_27640513	2024-07-15T10:17:49.478	RAC18-IP_SN27640513

Figure 72. 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.



Enter directory name.
Following characters are not allowed: /:*?"<>|

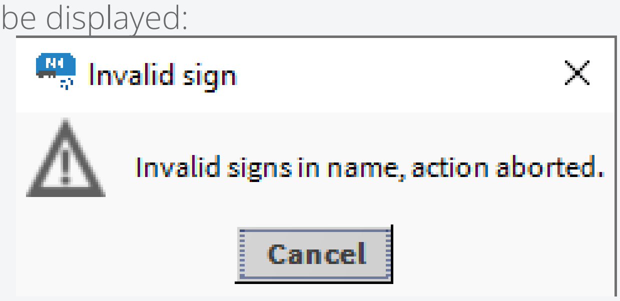
Backup_27640513_20240715_102459.116

Backup Name	Timestamp	DeviceModel
Backup_27640513	2024-07-15T10:17:49.478	RAC18-IP_SN27640513

Figure 73. Changing backup name

Note

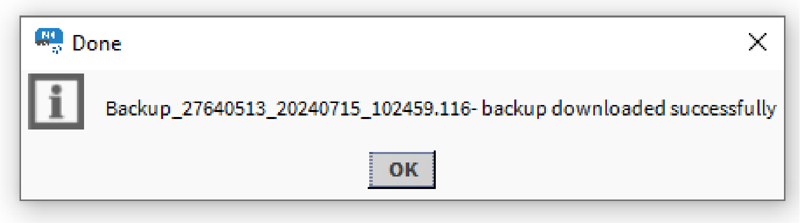
The Set backup name pop-up informs about characters that are not allowed to be included in a backup's name. If one of them is, the action will be aborted and the following prompt will be displayed:



Invalid signs in name, action aborted.

Figure 74. Invalid characters included in the backup's name

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

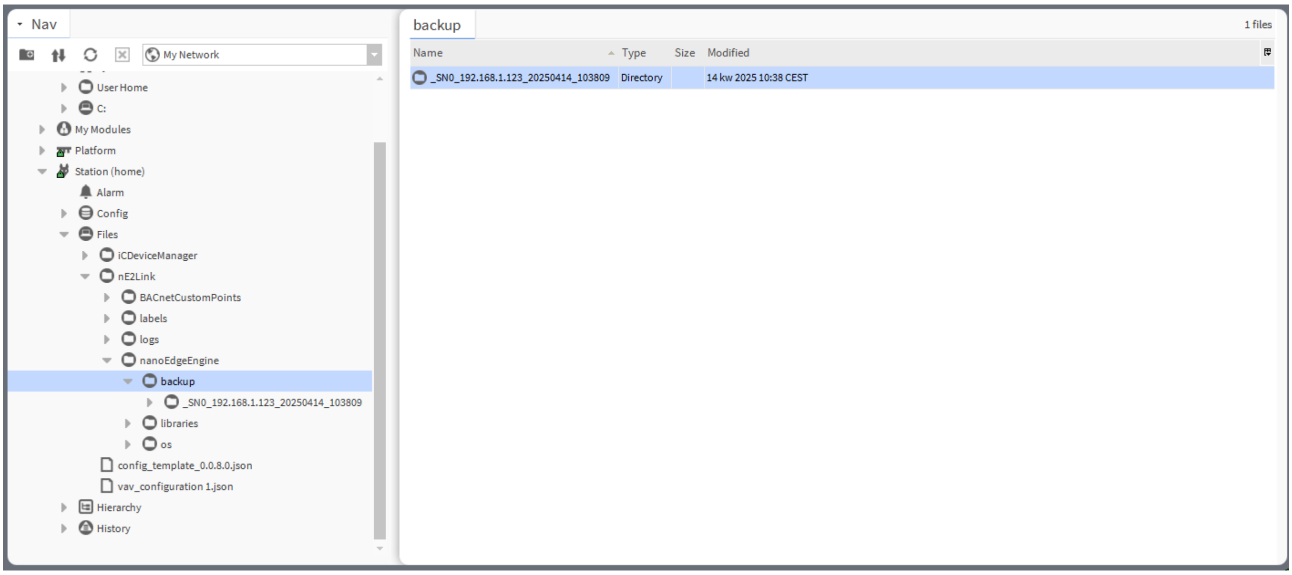


Backup_27640513_20240715_102459.116- backup downloaded successfully

Figure 75. 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 → nE2Link → nanoEdgeEngine ->backup → *BackupName*. Backups can be imported or exported from this location manually and will become visible in the Backup Manager view.



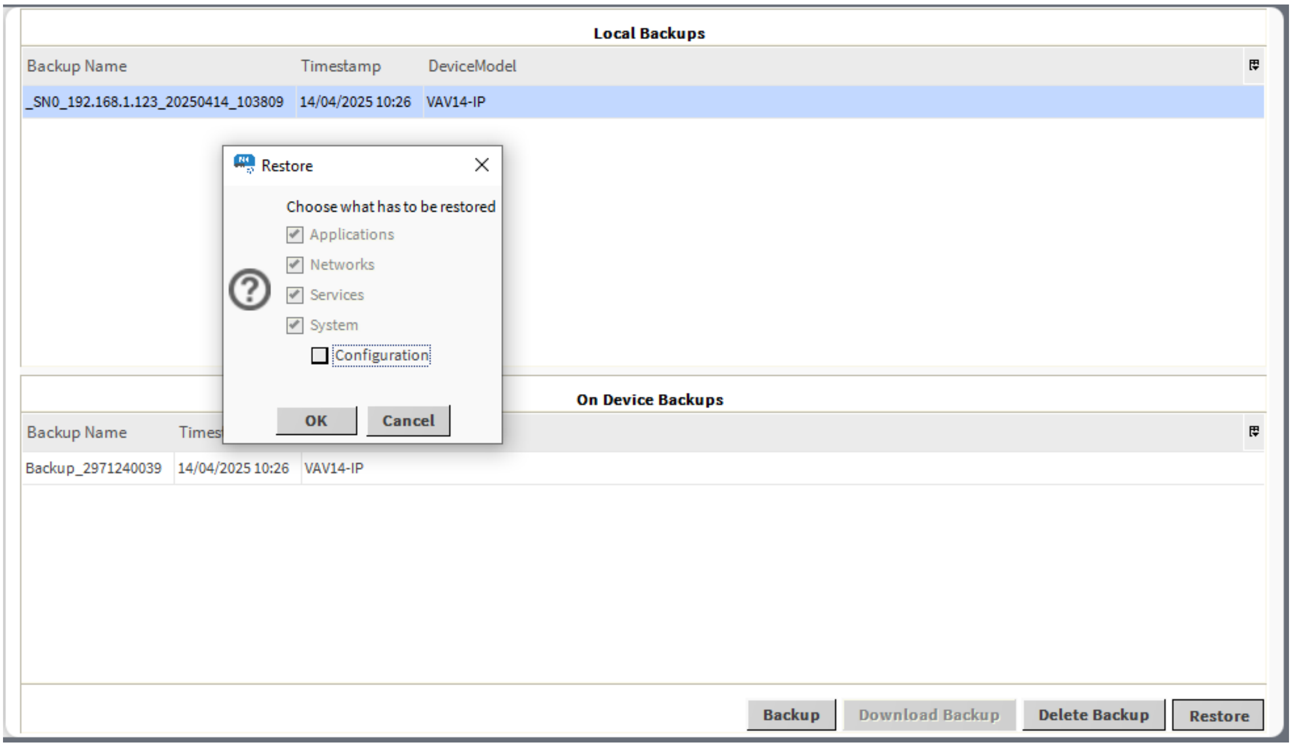
Name	Type	Size	Modified
_SN0_192.168.1.123_20250414_103809	Directory		14 kw 2025 10:38 CEST

Figure 76. Backup 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.


Local Backups

Backup Name	Timestamp	DeviceModel
_SN0_192.168.1.123_20250414_103809	14/04/2025 10:26	VAV14-IP

Restore

Choose what has to be restored

- ☑ Applications
- ☑ Networks
- ☑ Services
- ☑ System
- □ Configuration

On Device Backups

Backup Name	Times	
Backup_2971240039	14/04/2025 10:26	VAV14-IP

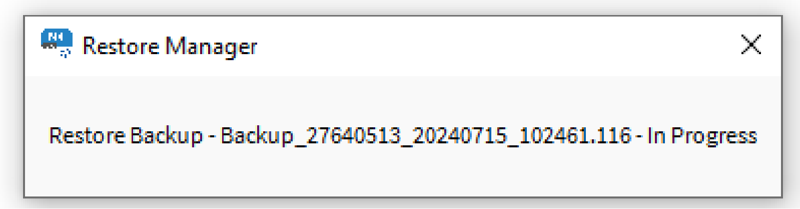
Figure 77. Available restore options will appear after clicking on the Restore button

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.

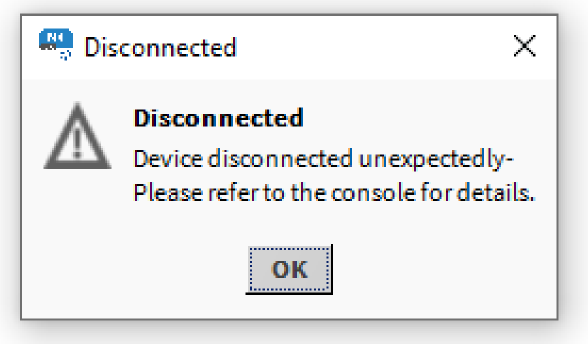
Please wait until the end of the process a pop-up will inform the user about the process in progress.


Restore Manager

Restore Backup - Backup_27640513_20240715_102461.116 - In Progress

Figure 78. 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.


Disconnected

Disconnected

Device disconnected unexpectedly-
Please refer to the console for details.

Figure 79. Device disconnected after restoring backup

4 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.

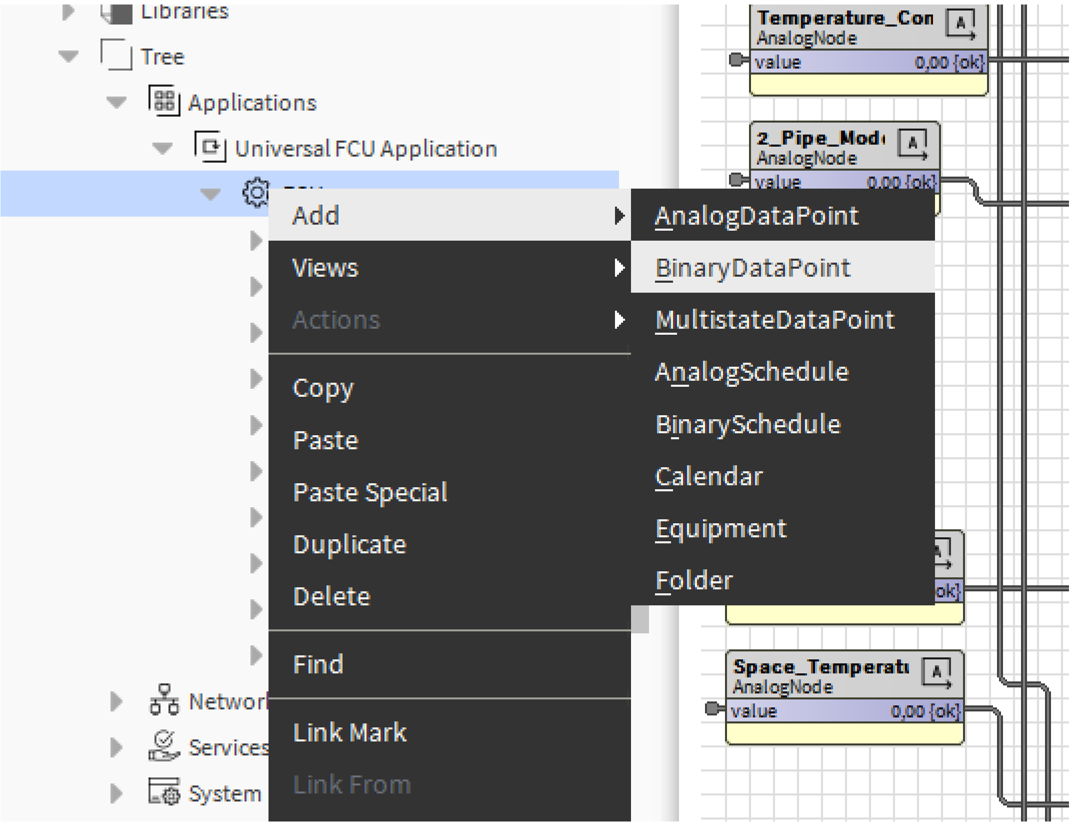


Figure 80. Context menu for adding basic components

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.

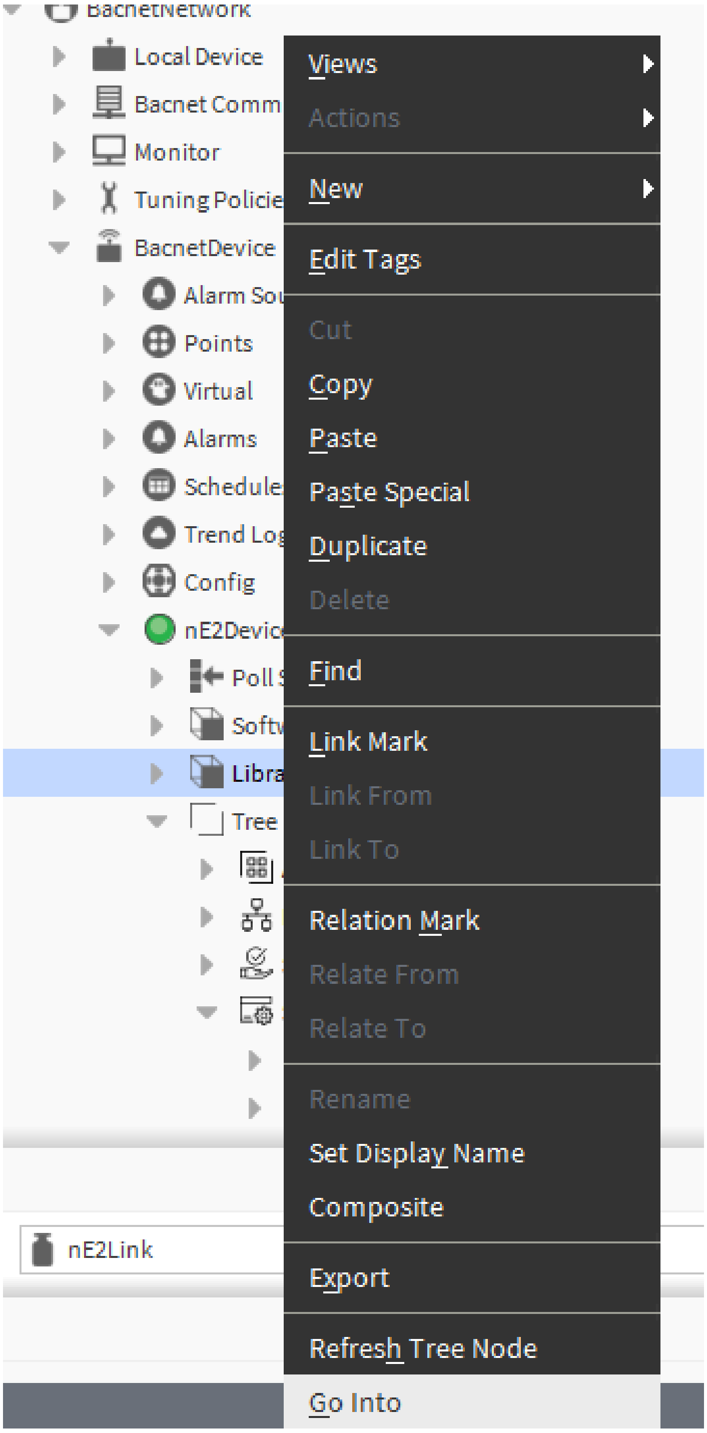
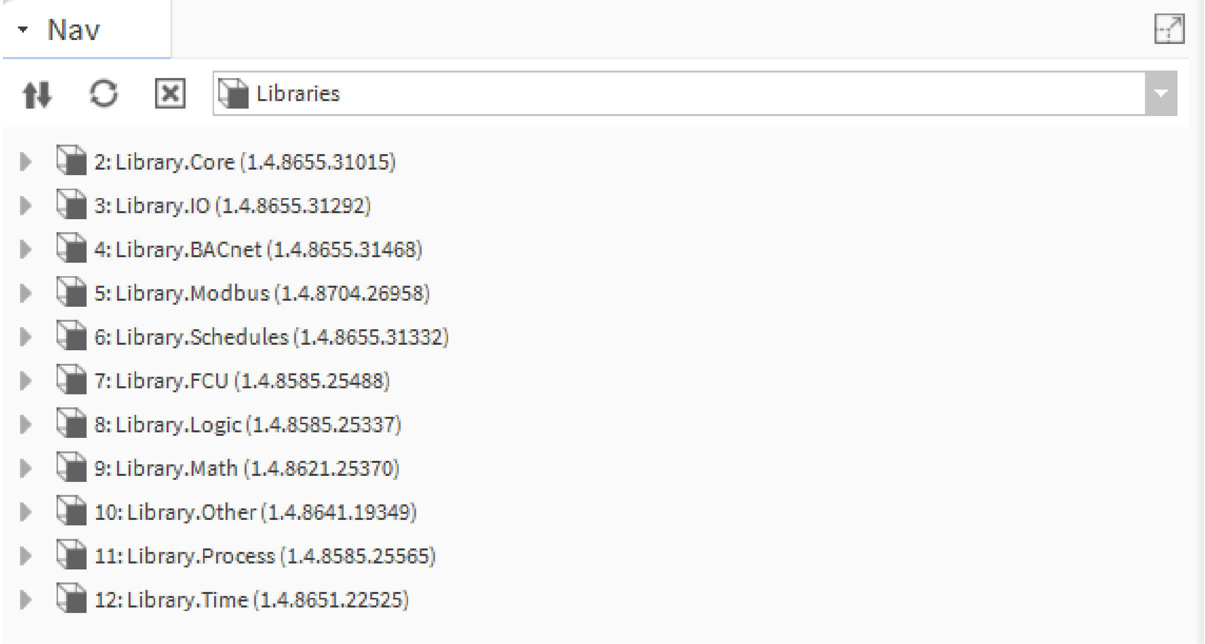


Figure 81. Go Into action in Libraries

An on-device libraries list will appear.



2: Library.Core (1.4.8655.31015)
3: Library.IO (1.4.8655.31292)
4: Library.BACnet (1.4.8655.31468)
5: Library.Modbus (1.4.8704.26958)
6: Library.Schedules (1.4.8655.31332)
7: Library.FCU (1.4.8585.25488)
8: Library.Logic (1.4.8585.25337)
9: Library.Math (1.4.8621.25370)
10: Library.Other (1.4.8641.19349)
11: Library.Process (1.4.8585.25565)
12: Library.Time (1.4.8651.22525)

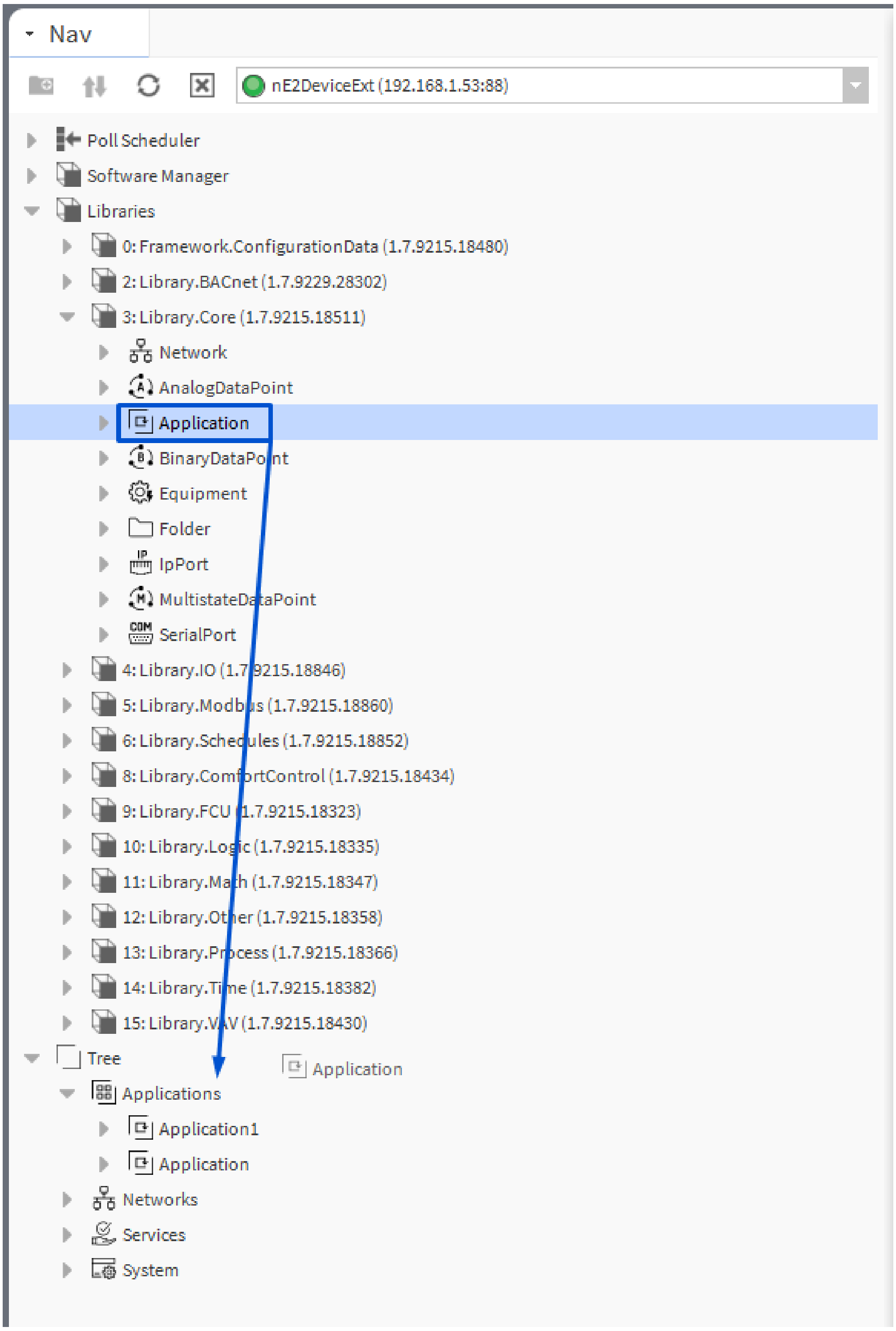
Figure 82. On-device libraries in the Nav view

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).

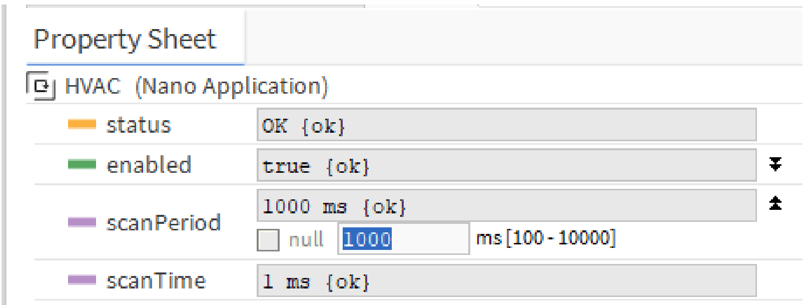
To create a first application, drag and drop the Application component from Library.Core to the Applications container and name it as appropriate.



Nav
nE2DeviceExt (192.168.1.53:88)
Poll Scheduler
Software Manager
Libraries
0: Framework.ConfigurationData (1.7.9215.18480)
2: Library.BACnet (1.7.9229.28302)
3: Library.Core (1.7.9215.18511)
Network
AnalogDataPoint
Application
BinaryDataPoint
Equipment
Folder
IpPort
MultistateDataPoint
SerialPort
4: Library.IO (1.7.9215.18846)
5: Library.Modbus (1.7.9215.18860)
6: Library.Schedules (1.7.9215.18852)
8: Library.ComfortControl (1.7.9215.18434)
9: Library.FCU (1.7.9215.18323)
10: Library.Logic (1.7.9215.18335)
11: Library.Math (1.7.9215.18347)
12: Library.Other (1.7.9215.18358)
13: Library.Process (1.7.9215.18366)
14: Library.Time (1.7.9215.18382)
15: Library.VAV (1.7.9215.18430)
Tree
Application
Applications
Application1
Application
Networks
Services
System

Figure 83. Drag and drop the Application component to Applications

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



Property Sheet

HVAC (Nano Application)

status	OK {ok}
enabled	true {ok}
scanPeriod	1000 ms {ok} □ null 1000 ms [100 - 10000]
scanTime	1 ms {ok}

Figure 84. 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.

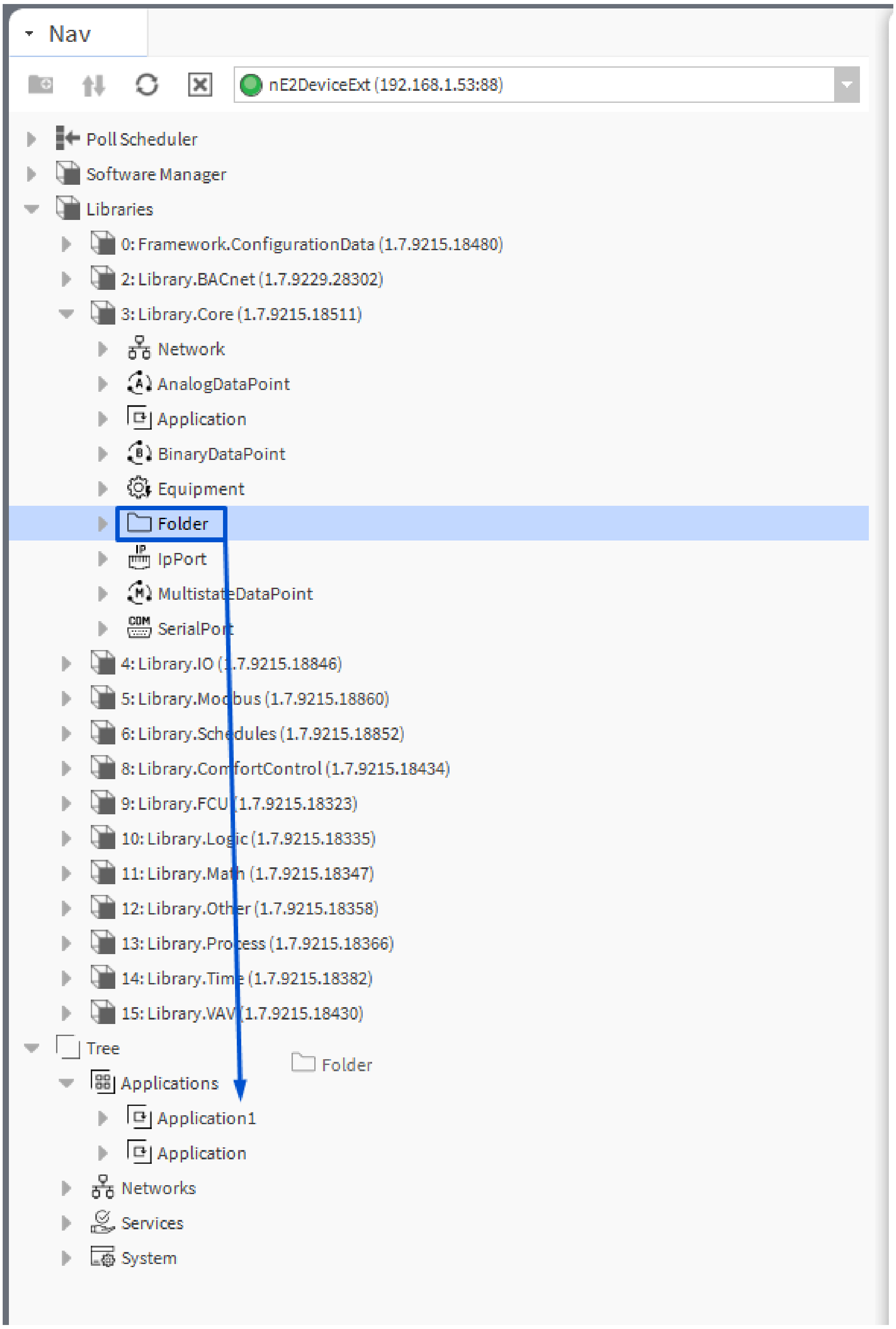

Nav
nE2DeviceExt (192.168.1.53:88)
Poll Scheduler
Software Manager
Libraries
0: Framework.ConfigurationData (1.7.9215.18480)
2: Library.BACnet (1.7.9229.28302)
3: Library.Core (1.7.9215.18511)
Network
AnalogDataPoint
Application
BinaryDataPoint
Equipment
Folder
IpPort
MultistateDataPoint
SerialPort
4: Library.IO (1.7.9215.18846)
5: Library.Modbus (1.7.9215.18860)
6: Library.Schedules (1.7.9215.18852)
8: Library.ComfortControl (1.7.9215.18434)
9: Library.FCU (1.7.9215.18323)
10: Library.Logic (1.7.9215.18335)
11: Library.Math (1.7.9215.18347)
12: Library.Other (1.7.9215.18358)
13: Library.Process (1.7.9215.18366)
14: Library.Time (1.7.9215.18382)
15: Library.VAV (1.7.9215.18430)
Tree
Folder
Applications
Application1
Application
Networks
Services
System

Figure 85. Drag and drop Folder to the Application

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

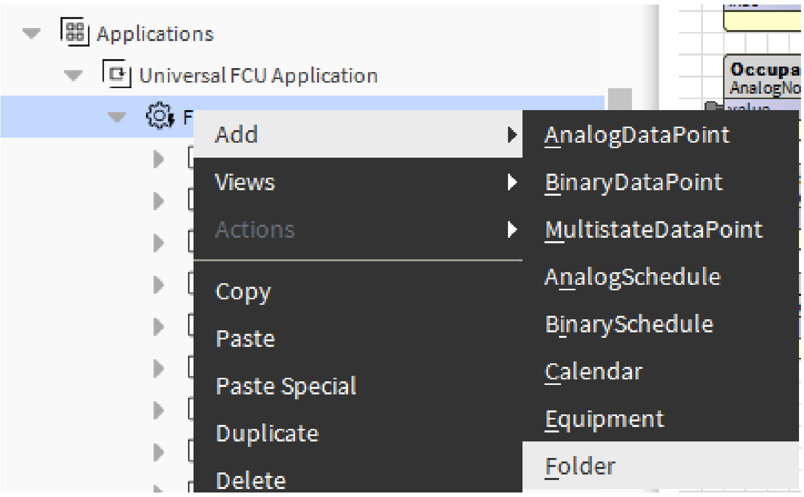
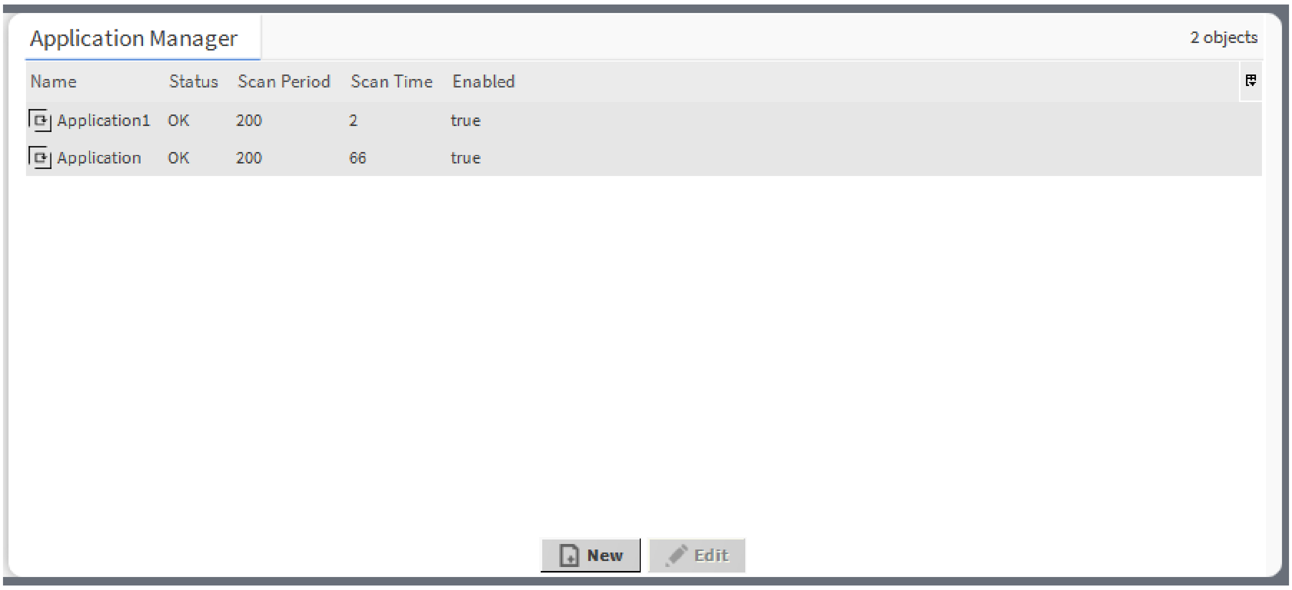


Figure 86. Adding the Folder component from the context menu

To learn more about the Folder component, please refer to the nano EDGE ENGINE Programming user manual.

4.2.2 Application Manager

The Application Manager is a special view that allows to manage the Application components added to the Applications container.


Application Manager

2 objects

Name	Status	Scan Period	Scan Time	Enabled
Application1	OK	200	2	true
Application	OK	200	66	true

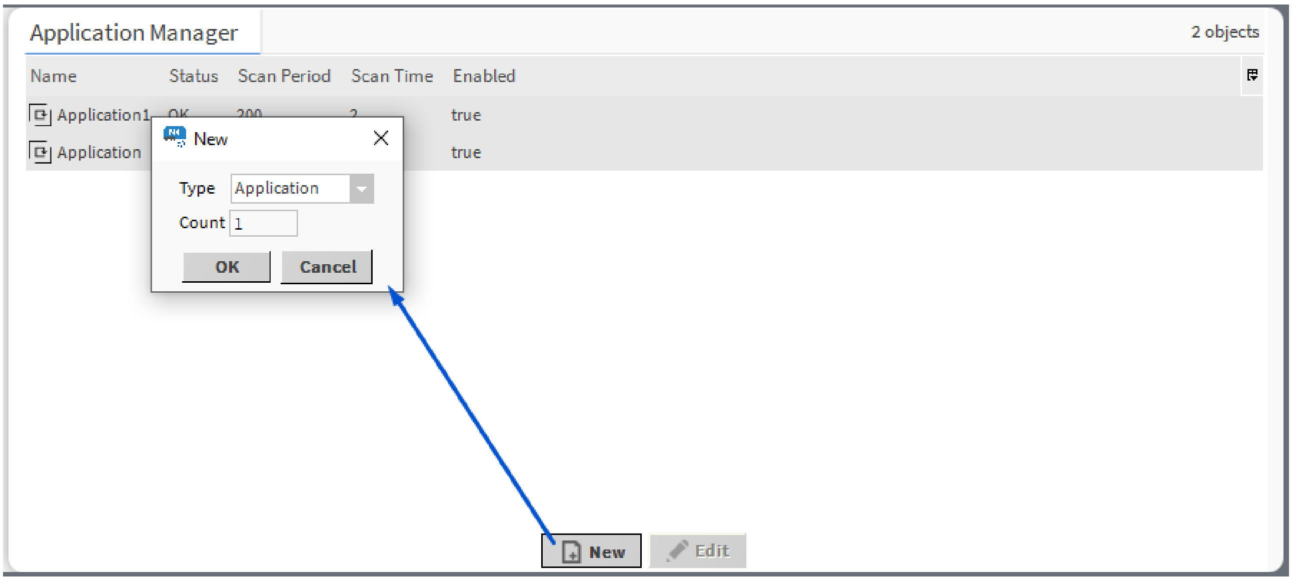
Figure 87. Application Mananger

The Application Manager lists all the Application components used on the device. The view shows the following fields:

- name of the application;
- status;
- scan period;
- scan time;
- enabled or disabled status.

In the Application Manager, it is possible to:

- add Application components:



Application Manager

2 objects

Name	Status	Scan Period	Scan Time	Enabled
Application1	OK	200	2	true
Application				true

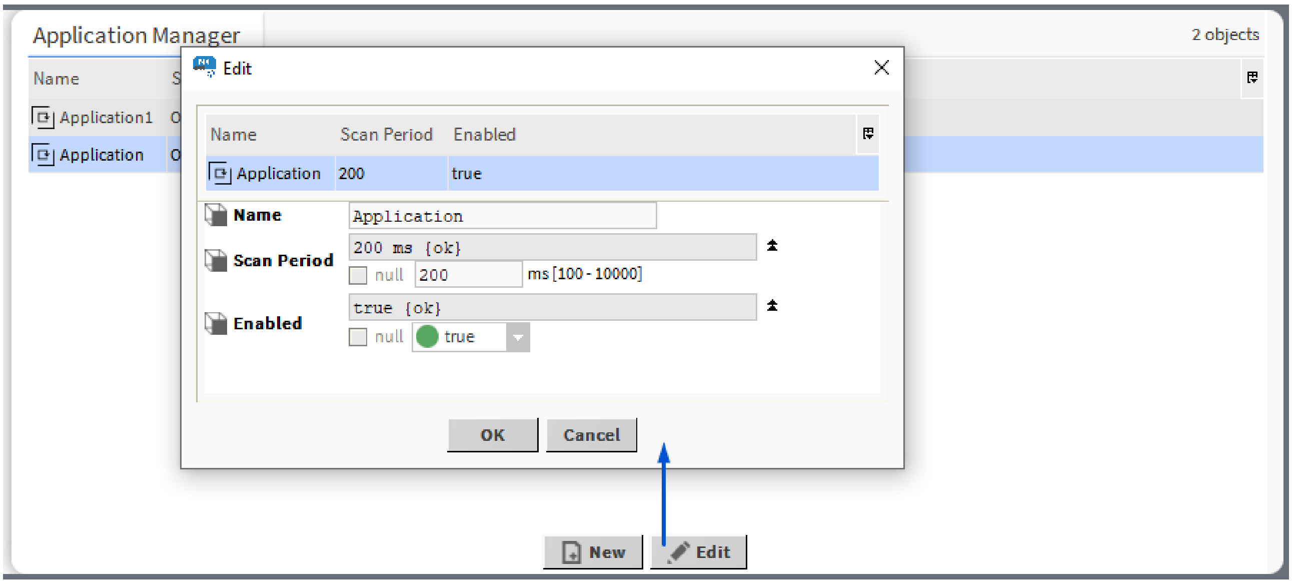
New

Type Application

Count 1

Figure 88. Adding new Application component in the Application Manager

- edit the Application's name and scan period and enable/disable the component:



Application Manager

2 objects

Name	S
Application1	O
Application	O

Edit

Name	Scan Period	Enabled
Application	200	true

Name Application

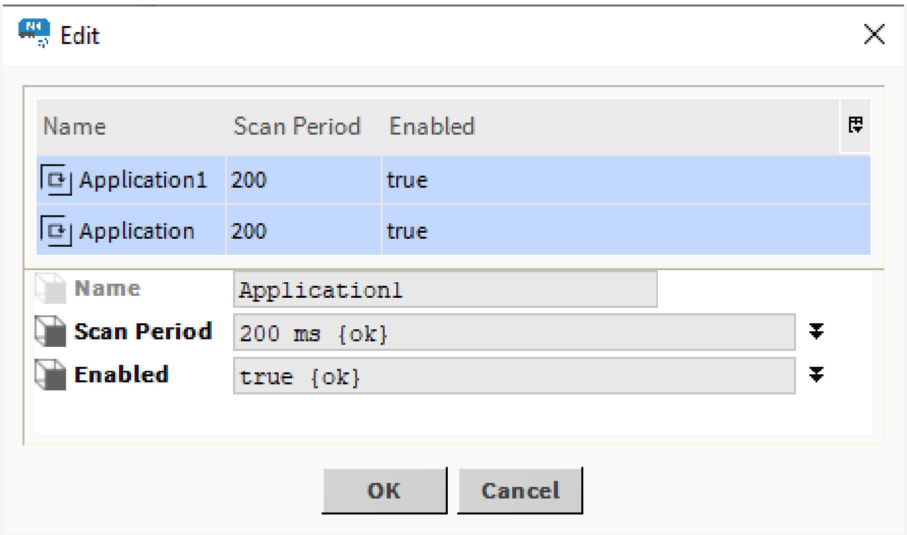
Scan Period 200 ms {ok}
□ null 200 ms [100 - 10000]

Enabled true {ok}
□ null ● true

Figure 89. Edit pop-up

Note

Editing is possible for more than one component at a time. If multiple components are edited, the same new value is written to common slots, so individual slots, such as Name, cannot be edited in this manner.



Edit

Name	Scan Period	Enabled
Application1	200	true
Application	200	true

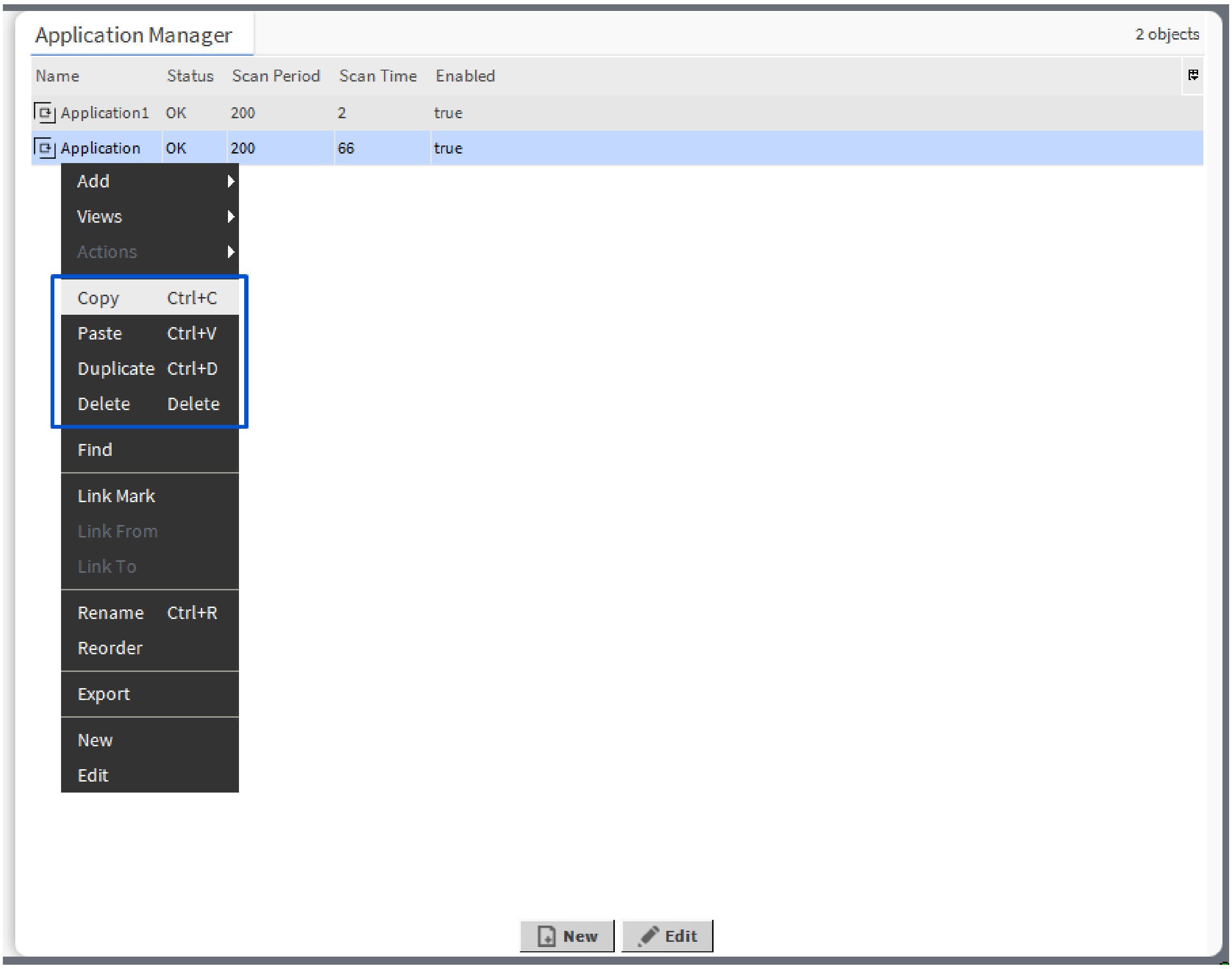
Name: Application1

Scan Period: 200 ms {ok}

Enabled: true {ok}

Figure 90. Editing of multiple components

- copy/duplicate/remove Application components:



Application Manager

2 objects

Name	Status	Scan Period	Scan Time	Enabled
Application1	OK	200	2	true
Application	OK	200	66	true

Figure 91. Context menu options for the Application

Opening the Application Manager

The Application Manager view is accessible in the context menu of the Applications container.

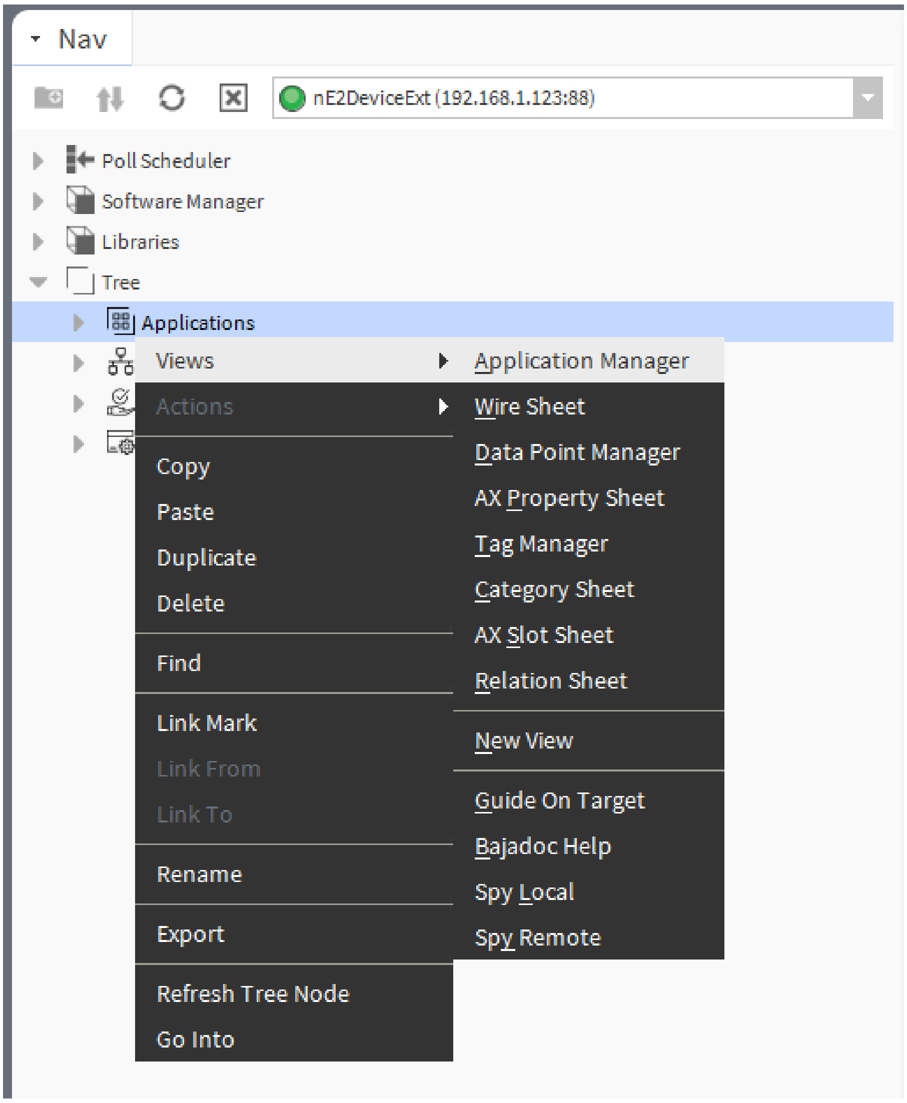


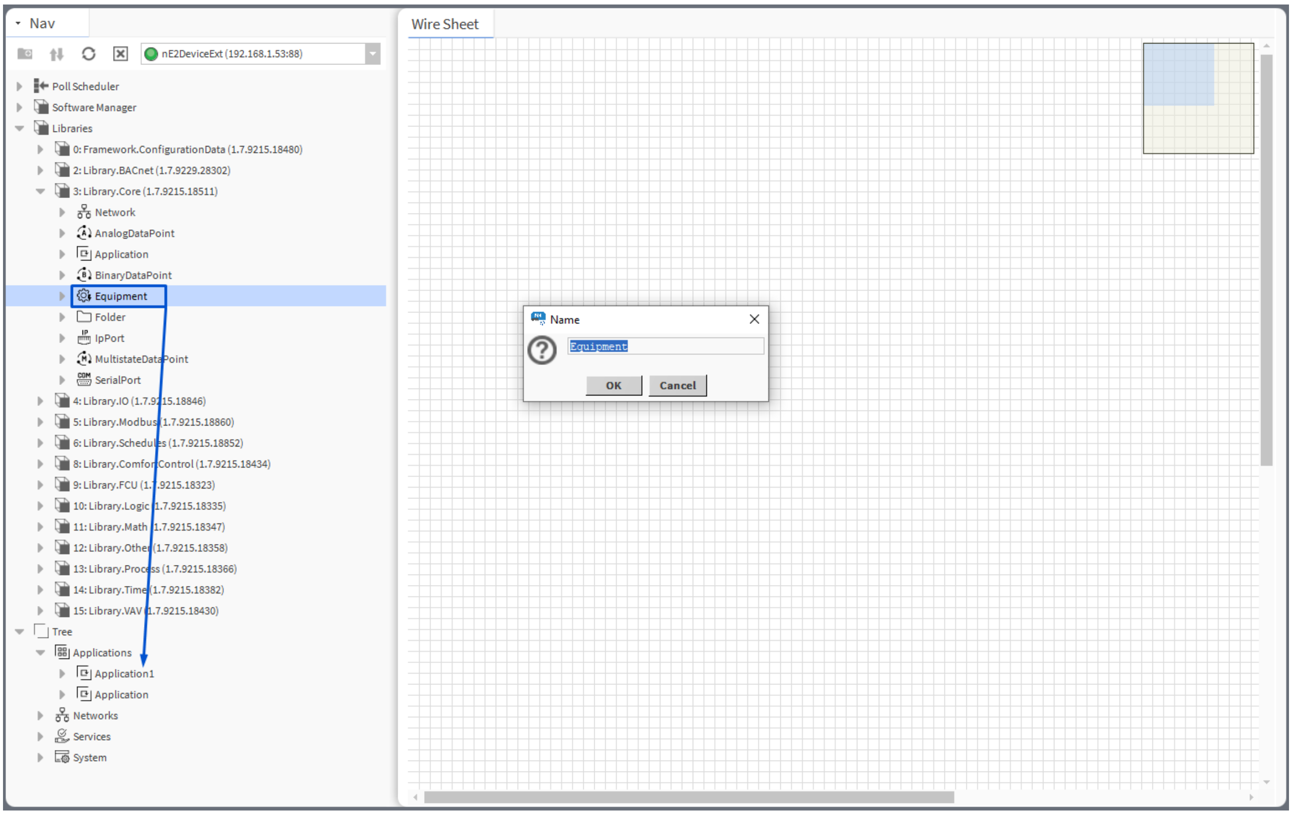
Figure 92. Accessing the Application Manager

The Application Manager view is also automatically opened if the Applications container is double-clicked in the nav tree window.

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.


Nav
nE2DeviceExt (192.168.1.53:88)
Poll Scheduler
Software Manager
Libraries
0: Framework.ConfigurationData (1.7.9215.18480)
2: Library.BACnet (1.7.9229.28302)
3: Library.Core (1.7.9215.18511)
Network
AnalogDataPoint
Application
BinaryDataPoint
Equipment
Folder
IpPort
MultistateDataPoint
SerialPort
4: Library.IO (1.7.9215.18846)
5: Library.Modbus (1.7.9215.18860)
6: Library.Schedules (1.7.9215.18852)
8: Library.ComfortControl (1.7.9215.18434)
9: Library.FCU (1.7.9215.18323)
10: Library.Logic (1.7.9215.18335)
11: Library.Math (1.7.9215.18347)
12: Library.Other (1.7.9215.18358)
13: Library.Process (1.7.9215.18366)
14: Library.Time (1.7.9215.18382)
15: Library.VAV (1.7.9215.18430)
Tree
Applications
Application1
Application
Networks
Services
System
Wire Sheet
Name
OK
Cancel

Name: Equipment

Figure 93. Add (drag and drop) and rename the Equipment component

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

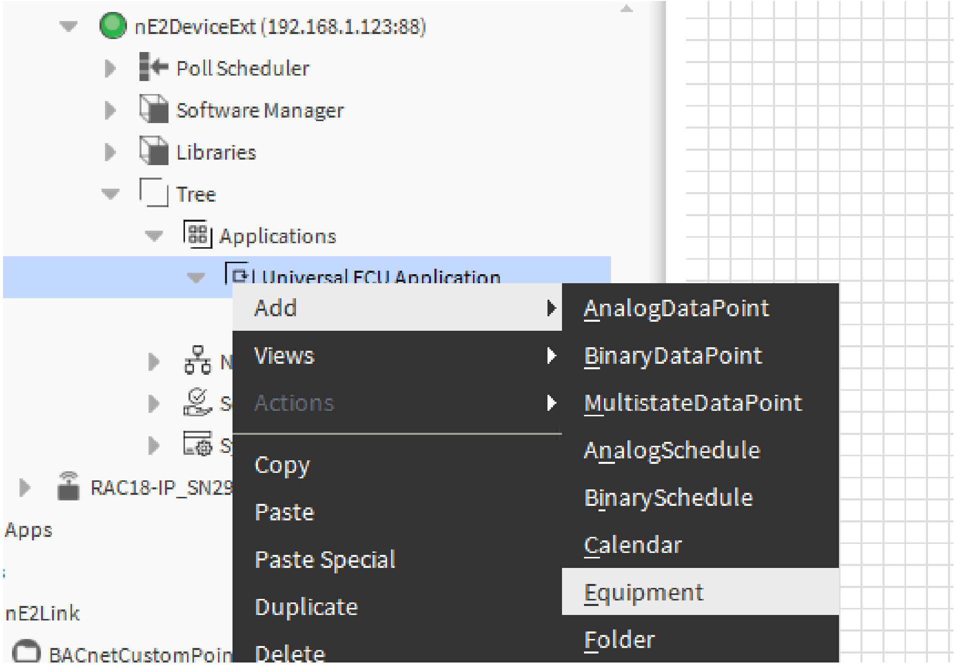


Figure 94. Adding the Equipment component from the context menu

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.

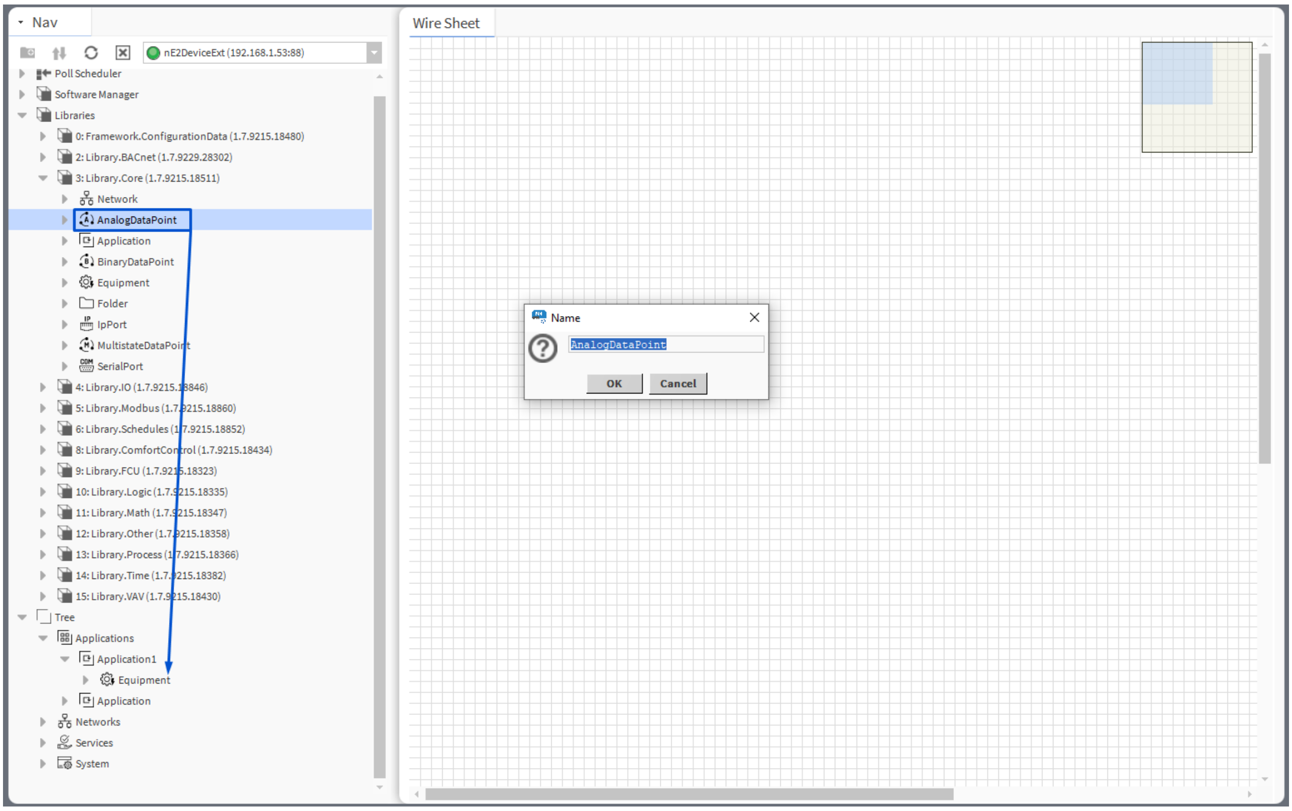

Nav
nE2DeviceExt (192.168.1.53:88)
Poll Scheduler
Software Manager
Libraries
0: Framework.ConfigurationData (1.7.9215.18480)
2: Library.BACnet (1.7.9229.28302)
3: Library.Core (1.7.9215.18511)
Network
AnalogDataPoint
Application
BinaryDataPoint
Equipment
Folder
IpPort
MultistateDataPoint
SerialPort
4: Library.IO (1.7.9215.18846)
5: Library.Modbus (1.7.9215.18860)
6: Library.Schedules (1.7.9215.18852)
8: Library.ComfortControl (1.7.9215.18434)
9: Library.FCU (1.7.9215.18323)
10: Library.Logic (1.7.9215.18335)
11: Library.Math (1.7.9215.18347)
12: Library.Other (1.7.9215.18358)
13: Library.Process (1.7.9215.18366)
14: Library.Time (1.7.9215.18382)
15: Library.VAV (1.7.9215.18430)
Tree
Applications
Application1
Equipment
Application
Networks
Services
System
Wire Sheet
Name
AnalogDataPoint
OK
Cancel

Figure 95. Add (drag and drop) and rename Data Points

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

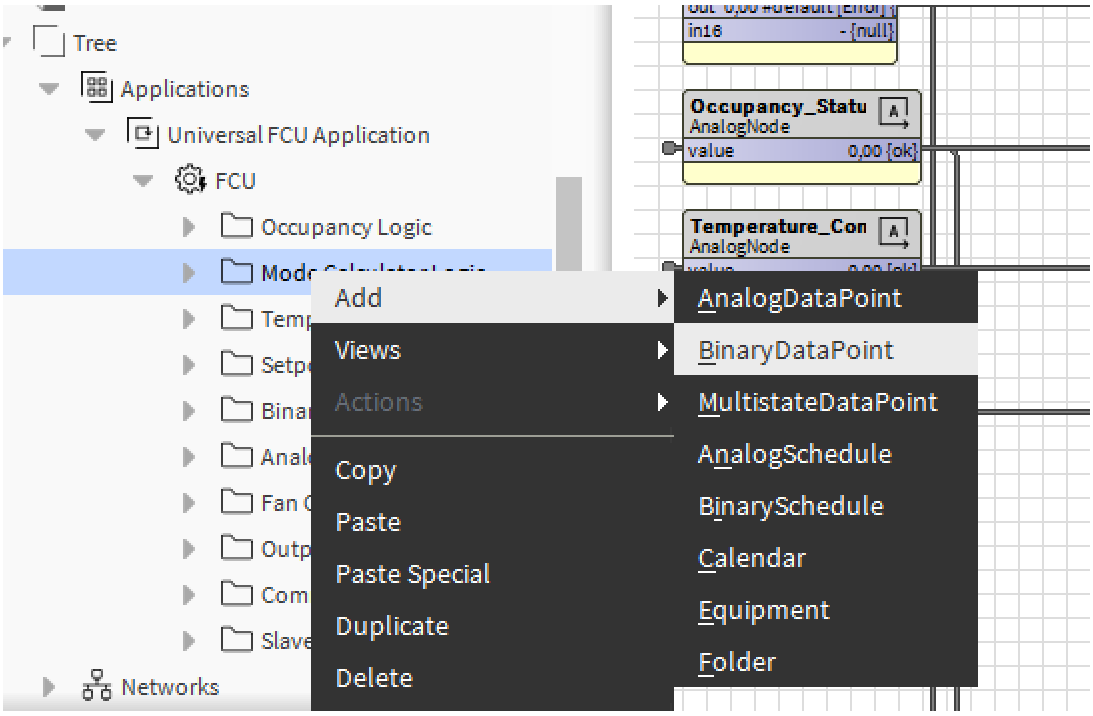


Figure 96. Adding Data Points directly from the context menu

Each Data Point has 3 actions available from the Actions menu. Actions are related with the type of the Data Point and its extensions.

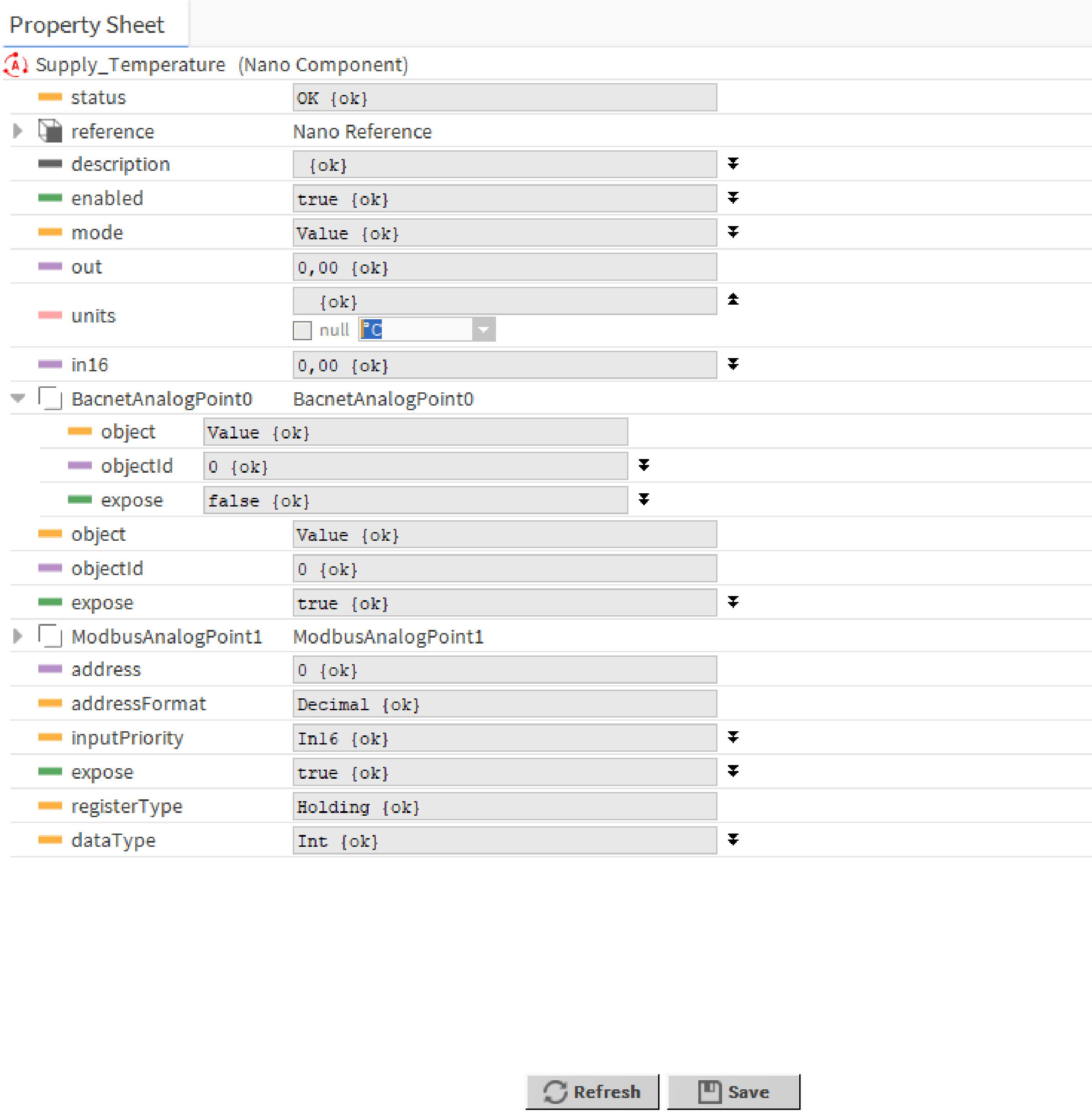
- Set: allows entering a value to set the In16 slot;
- SetId: sets a BACnet object Id of the Data Point (exposed in the BACnetPoint extension);
- SetAddress: sets a Modbus address of the Data Point (exposed in the ModbusPoint extension).

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} □ null °C
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}

Figure 97. Data Point's Property Sheet view

4.4.3 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 from the context menu, select the Add Extension option; add the extension from the list of available options.

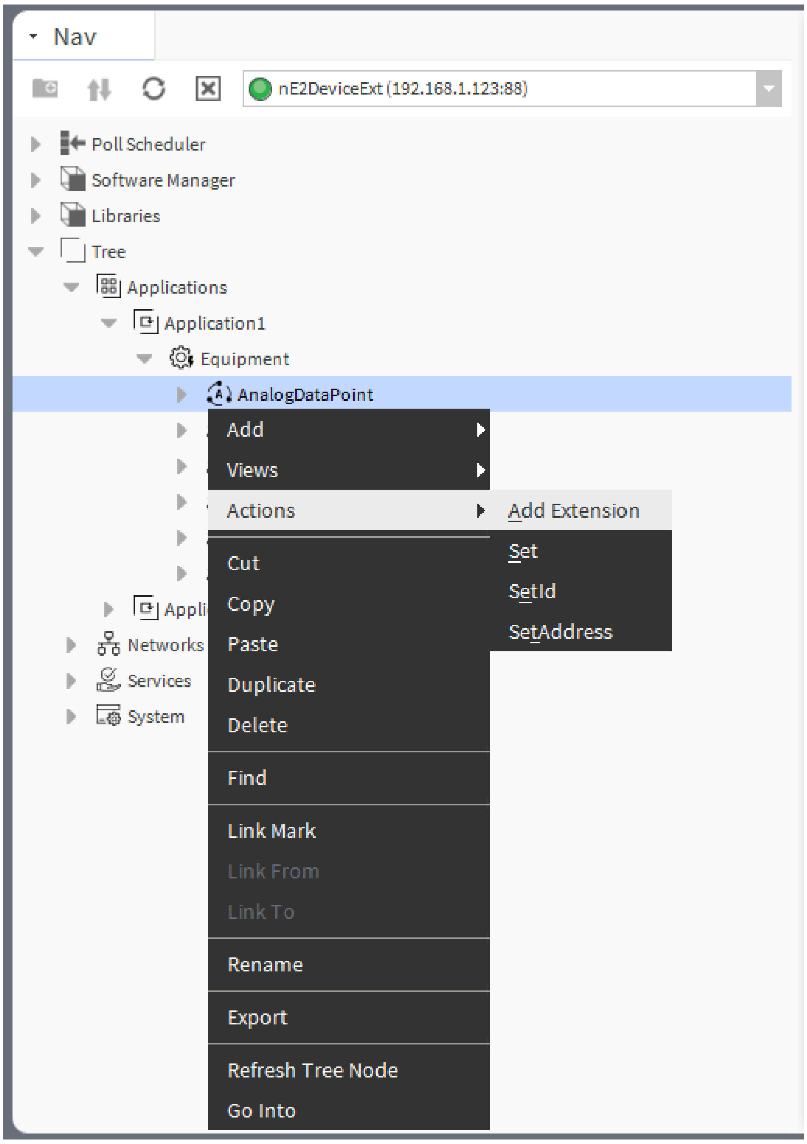


Figure 98. Add Extension action

Available Extensions

BACnetPoint

The BACnetAnalogPoint/BACnetBinaryPoint/BACnetMultistatePoint extension expands the Data Point's functionality giving it an option to expose it to the BACnet IP network as an Analog/Binary/Multistate Value object, and, otherwise, it allows to manually hide it from the network yet preserving its function in the application. It also transfers information to the BACnet IP network about the Data Point's status. The extension is native (cannot be removed), and is visible along with the regular slots and actions of the Data Point as a separate, integral part in the property sheet view.

The extension has the following slots:

- Object: a read-only slot showing a type of BACnet object attributed to the extension;
- ObjectID: a BACnet object ID, which is automatically numbered from 0 up;
- Expose: enables the Data Point to be recognized within the BACnet IP network;
  - Available settings: true (exposed), false (hidden).

ModbusPoint

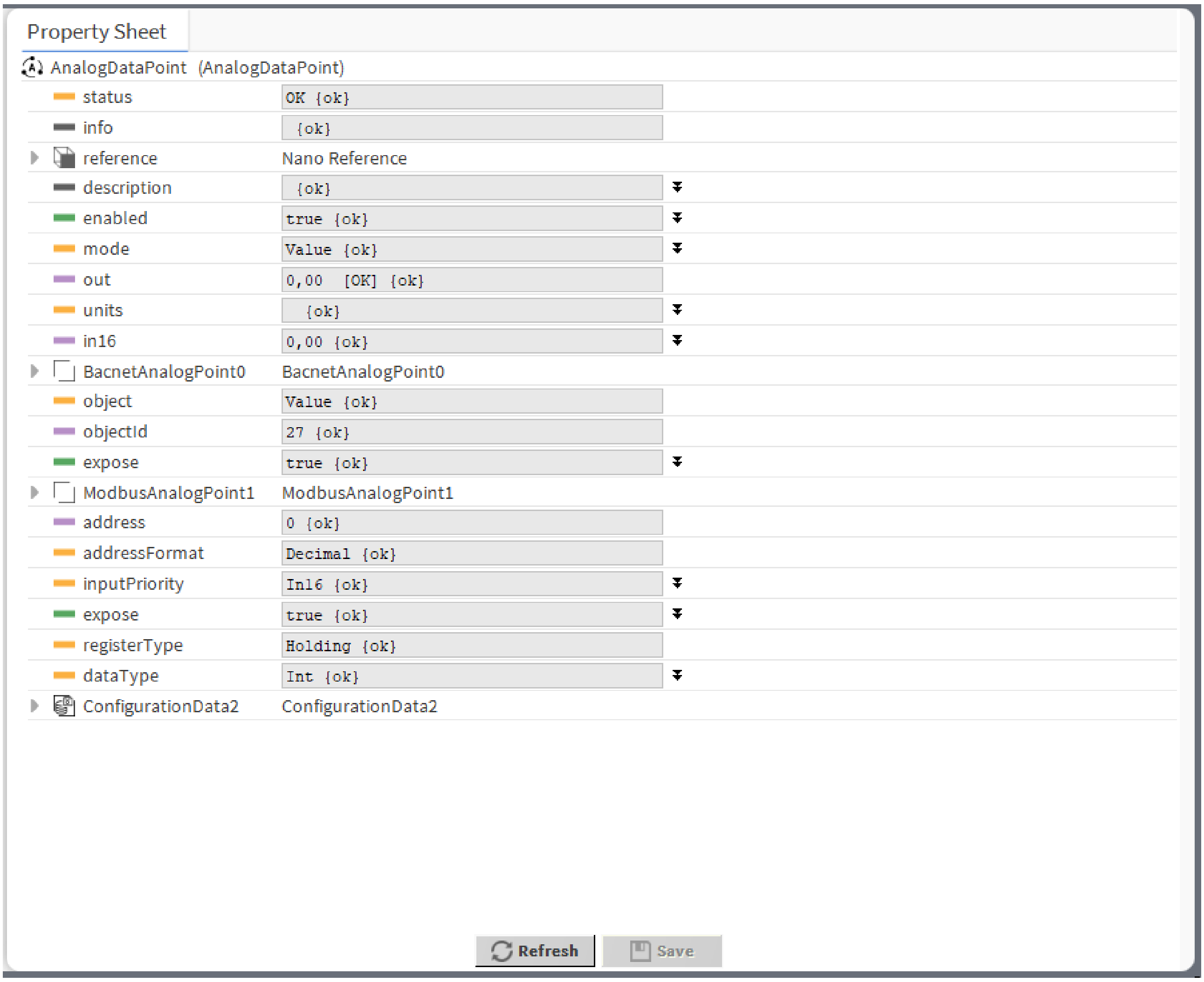
The ModbusAnalogPoint/ModbusBinaryPoint/ModbusMultistatePoint extension expands the Data Point's functionality giving it an option to expose it to the Modbus TCP/IP network as a Modbus point, and, otherwise, it allows to manually hide it from the network yet preserving its function in the application. It also transfers information to the Modbus TCP/IP network about the Data Point's status. The extension is native (cannot be removed), and is visible along with the regular slots and actions of the Data Point as a separate, integral part in the property sheet view.

The extension has the following slots:

- Address: a read-only slot showing a Modbus register, which the Data Point is exposed on;
- Address Format: a read-only slot showing a register address format;
  - Available information: decimal, Modbus, HEX;
- Input Priority: allows to select the input number in the Data Point, which the value from the register is synchronized on;
- Expose: enables the Data Point to be recognized within the Modbus TCP/IP network;
  - Available settings: true (exposed), false (hidden);
- Register: a read-only slot showing the type of the register used;
  - Available information: holding register;
- Data Type: allows to select a value data type;
  - Available settings: integer (default), signed integer, long, signed long, float, double.

Configuration Data

The Configuration Data extension has no slots. Its functionality is fully achieved by adding it to the Data Point. It is automatically enabled and allows the Configuration Data service to save and upload slots values of the Data Point.



Property Sheet

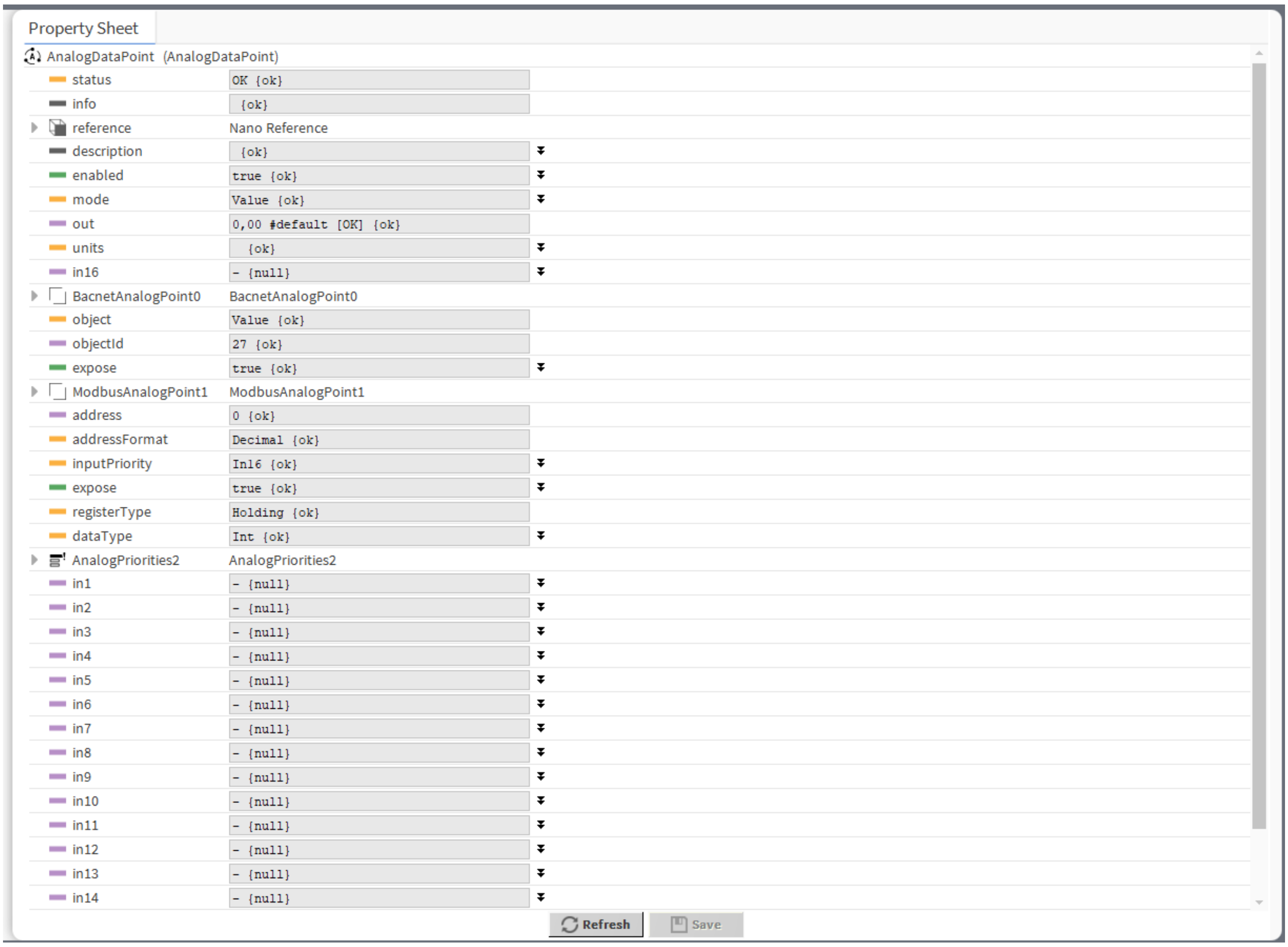
AnalogDataPoint (AnalogDataPoint)

status	OK {ok}
info	{ok}
reference	Nano Reference
description	{ok}
enabled	true {ok}
mode	Value {ok}
out	0,00 [OK] {ok}
units	{ok}
in16	0,00 {ok}
BacnetAnalogPoint0	BacnetAnalogPoint0
object	Value {ok}
objectId	27 {ok}
expose	true {ok}
ModbusAnalogPoint1	ModbusAnalogPoint1
address	0 {ok}
addressFormat	Decimal {ok}
inputPriority	In16 {ok}
expose	true {ok}
registerType	Holding {ok}
dataType	Int {ok}
ConfigurationData2	ConfigurationData2

Figure 99. Configuration Data service extension added to the AnalogDataPoint

Priorities

The AnalogPriorities/BinaryPriorities/MultistatePriorities extension adds fifteen writable input slots and the default (lowest) priority slot to the Data Point. The extension includes the Priority slot indicating, which slot is transferring value to the Out slot. The Priorites extension adds In1–In15 slots and the Default slot, which is the lowest, 17th priority. The extension also introduces new actions to the Data Point: EmergencyOverride, EmergencyAuto, Override, and OverrideAuto.



AnalogDataPoint (AnalogDataPoint)

status	OK {ok}
info	{ok}
reference	Nano Reference
description	{ok}
enabled	true {ok}
mode	Value {ok}
out	0,00 #default [OK] {ok}
units	{ok}
in16	- {null}
BacnetAnalogPoint0	BacnetAnalogPoint0
object	Value {ok}
objectId	27 {ok}
expose	true {ok}
ModbusAnalogPoint1	ModbusAnalogPoint1
address	0 {ok}
addressFormat	Decimal {ok}
inputPriority	In16 {ok}
expose	true {ok}
registerType	Holding {ok}
dataType	Int {ok}
AnalogPriorities2	AnalogPriorities2
in1	- {null}
in2	- {null}
in3	- {null}
in4	- {null}
in5	- {null}
in6	- {null}
in7	- {null}
in8	- {null}
in9	- {null}
in10	- {null}
in11	- {null}
in12	- {null}
in13	- {null}
in14	- {null}

Figure 100. Priorities extension added to the AnalogDataPoint

The extension has the following slots:

- In1-In15: input slots providing values to the Out slot (from 1 to 16, the highest priority is In1); only the highest priority value is provided to the Out slot, the rest is dismissed. All input slots are linkable. In the extended mode, the In1 and In8 slots have actions available for overriding their values.

Note: By default, only the In16 is displayed in the Wire Sheet. In case any other input slot receives a value via link, is it displayed in the Wire Sheet along with the In16. Only the null input, which is a lack of value, allows the higher priority input to be dismissed–zero (0) is still a value that will be provided to the Out slot.

- Default: the 17th, lowest priority input slot; allows to introduce a default value to the Data Point in case there are no links providing values from other components. If the value to the Data Point is provided by the Reference link, then the Default value is automatically dismissed (the Reference link cannot be directed to the 17th priority, only from the 16th up).

Note: According to BACnet requirements, the Default slot value can never be null; if no other value is set on the slot, it is zero (0).

- Priority: shows, which slot is currently providing the value to the Out slot.

The Data Point has the following actions available in the Priorities extension:

- EmergencyOverride: enables entering an analog value to the In1 slot;

- **EmergencyAuto:** sets the null value to the In1 slot (cancels the EmergencyOverride action);
- **Override:** enables entering an analog value to the In8 slot;
- **OverrideAuto:** sets the null value to the In8 slot (cancels the Override action).

Note: If the link is connected to the slot that may be affected by an action, the value coming from the link connection has priority over the manually evoked action.

ActionTrigger

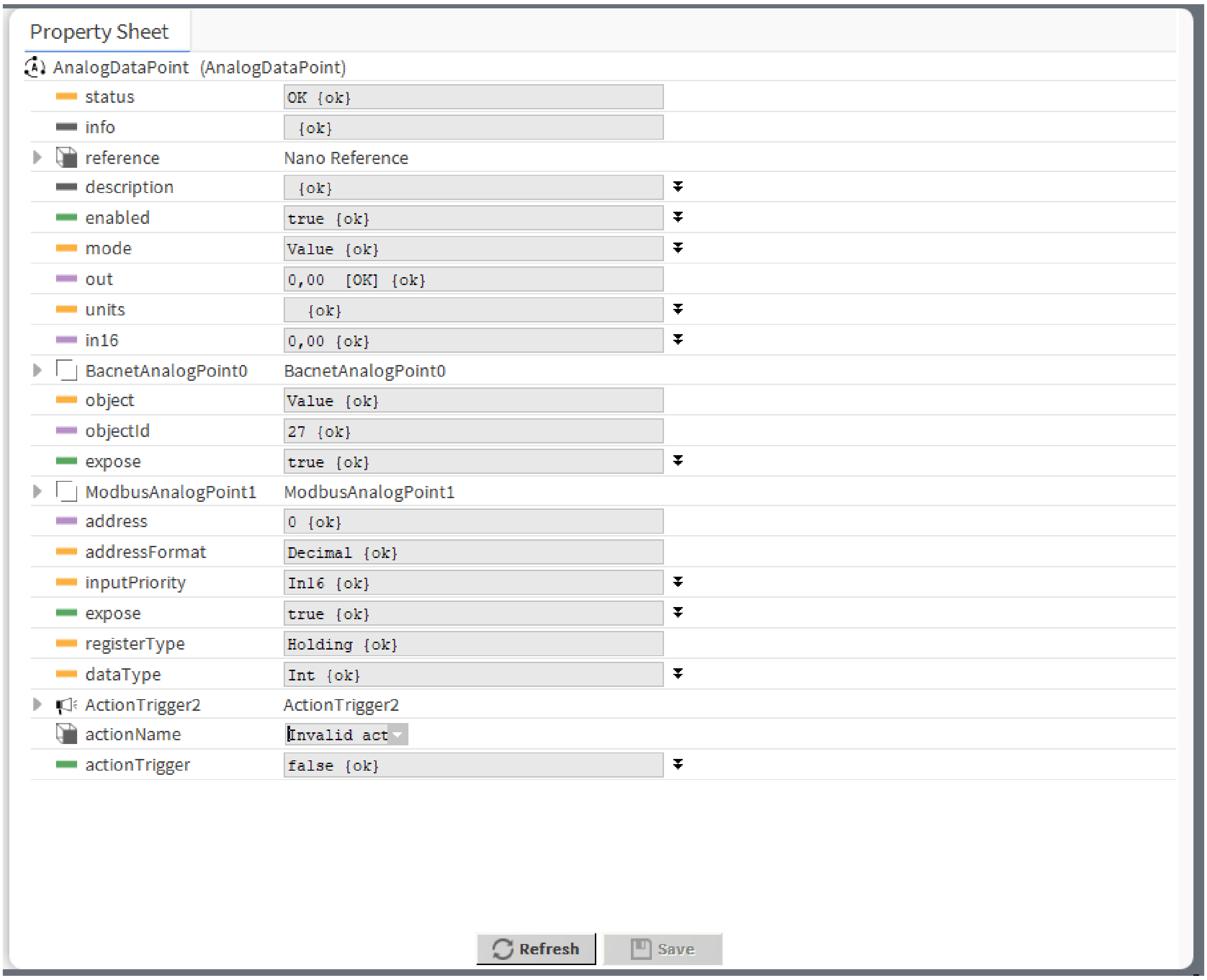
The ActionTrigger extension is designed to invoke any action that is available for the component. The extension triggers an action selected in the Action Name on the rising edge of the Action Trigger slot. If the action has parameters to set, the parameter is taken from a relevant slot automatically added to the extension (Analog Value/Binary Value/String Value).

It is possible to add more than one ActionTrigger extension to the component (for example, one for each action in the component).

The extension is added from the context menu of the component.

The ActionTrigger extension has the following slots:

- **Action Name:** allows to select an action to invoke;
- **Action Trigger:** triggers an action selected in the Action Name slot;
- **Action Analog Value/Action Binary Value/Action String Value:** a slot added automatically to the extension if an action selected in the Action Name slot has any specific parameters to set (depending on the type of action and its parameters, the relevant type of value is matched).



Property Sheet

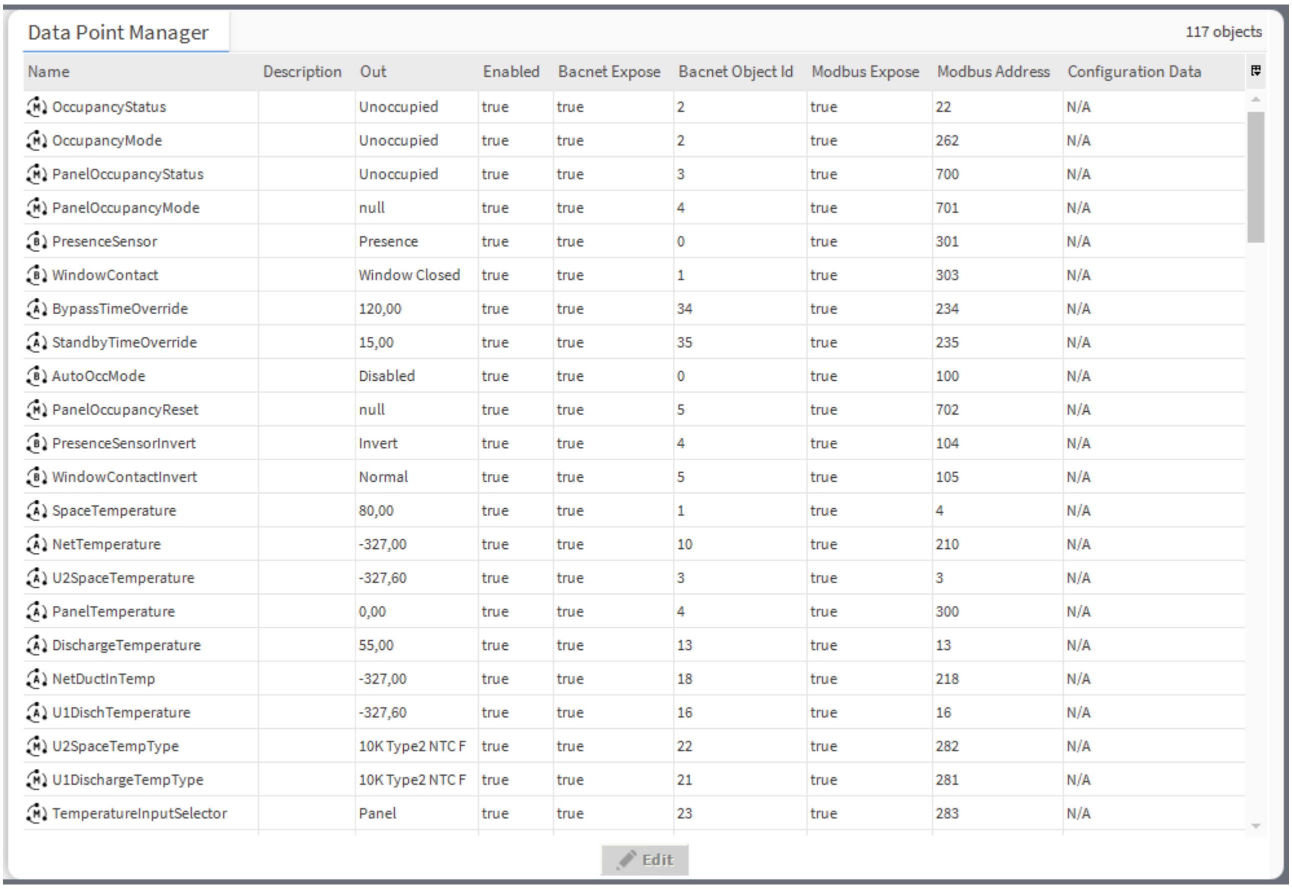
AnalogDataPoint (AnalogDataPoint)

status	OK {ok}
info	{ok}
reference	Nano Reference
description	{ok}
enabled	true {ok}
mode	Value {ok}
out	0,00 [OK] {ok}
units	{ok}
in16	0,00 {ok}
BacnetAnalogPoint0	BacnetAnalogPoint0
object	Value {ok}
objectId	27 {ok}
expose	true {ok}
ModbusAnalogPoint1	ModbusAnalogPoint1
address	0 {ok}
addressFormat	Decimal {ok}
inputPriority	In16 {ok}
expose	true {ok}
registerType	Holding {ok}
dataType	Int {ok}
ActionTrigger2	ActionTrigger2
actionName	Invalid act
actionTrigger	false {ok}

Figure 101. ActionTrigger extension added to the AnalogDataPoint

4.4.4 Data Point Manager

The Data Point Manager is a special view that allows to manage the Data Points available within the nano EDGE ENGINE license.



Data Point Manager

117 objects

Name	Description	Out	Enabled	Bacnet Expose	Bacnet Object Id	Modbus Expose	Modbus Address	Configuration Data
OccupancyStatus		Unoccupied	true	true	2	true	22	N/A
OccupancyMode		Unoccupied	true	true	2	true	262	N/A
PanelOccupancyStatus		Unoccupied	true	true	3	true	700	N/A
PanelOccupancyMode		null	true	true	4	true	701	N/A
PresenceSensor		Presence	true	true	0	true	301	N/A
WindowContact		Window Closed	true	true	1	true	303	N/A
BypassTimeOverride		120,00	true	true	34	true	234	N/A
StandbyTimeOverride		15,00	true	true	35	true	235	N/A
AutoOccMode		Disabled	true	true	0	true	100	N/A
PanelOccupancyReset		null	true	true	5	true	702	N/A
PresenceSensorInvert		Invert	true	true	4	true	104	N/A
WindowContactInvert		Normal	true	true	5	true	105	N/A
SpaceTemperature		80,00	true	true	1	true	4	N/A
NetTemperature		-327,00	true	true	10	true	210	N/A
U2SpaceTemperature		-327,60	true	true	3	true	3	N/A
PanelTemperature		0,00	true	true	4	true	300	N/A
DischargeTemperature		55,00	true	true	13	true	13	N/A
NetDuctInTemp		-327,00	true	true	18	true	218	N/A
U1DischTemperature		-327,60	true	true	16	true	16	N/A
U2SpaceTempType		10K Type2 NTC F	true	true	22	true	282	N/A
U1DischargeTempType		10K Type2 NTC F	true	true	21	true	281	N/A
TemperatureInputSelector		Panel	true	true	23	true	283	N/A

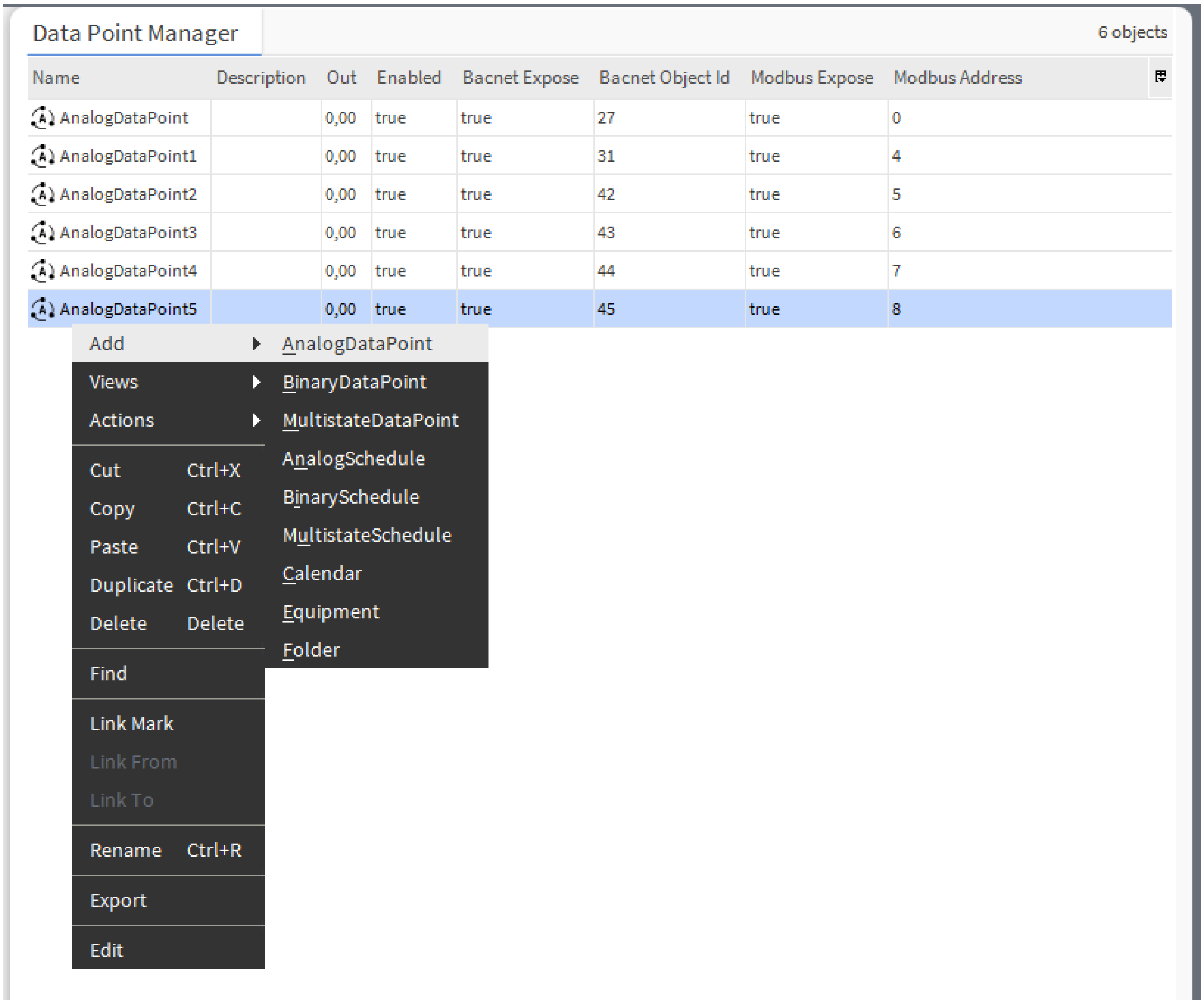
Figure 102. Data Point Manager

The Data Point Manager lists all the Data Points used in applications saved on the device. The view shows the following fields:

- name of the Data Point;
- description;
- value on the Out slot;
- enabled or disabled status;
- exposed on BACnet status;
- BACnet object Id;
- exposed on Modbus status;
- Modbus address;
- Configuration Data extension status.

In the Data Point Manager, it is possible to:

- add Data Point components:

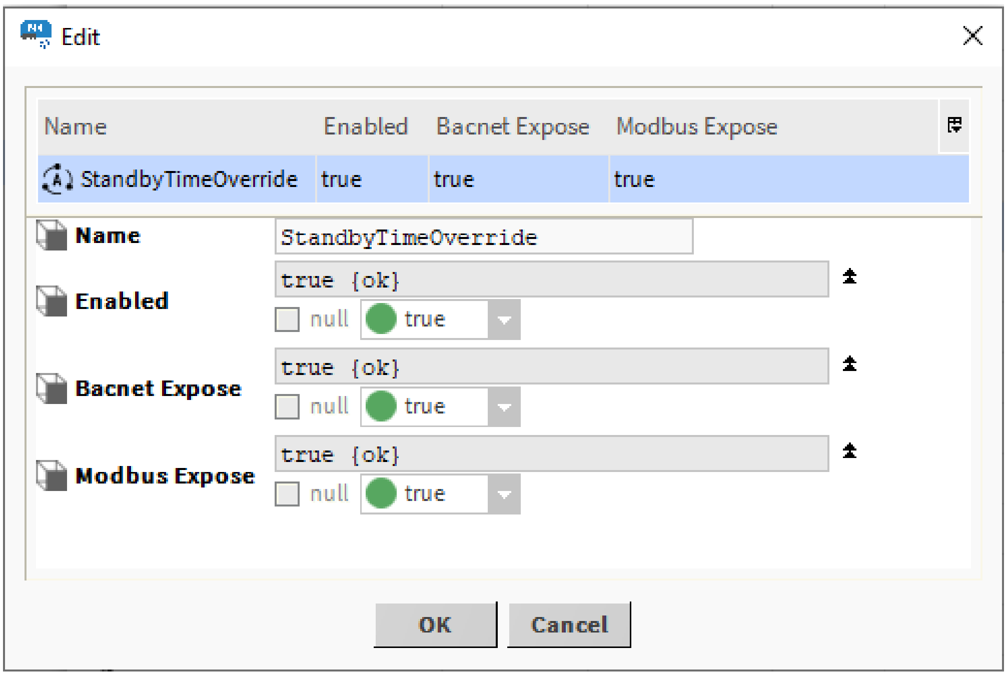


Data Point Manager — 6 objects

Name	Description	Out	Enabled	Bacnet Expose	Bacnet Object Id	Modbus Expose	Modbus Address
AnalogDataPoint		0,00	true	true	27	true	0
AnalogDataPoint1		0,00	true	true	31	true	4
AnalogDataPoint2		0,00	true	true	42	true	5
AnalogDataPoint3		0,00	true	true	43	true	6
AnalogDataPoint4		0,00	true	true	44	true	7
AnalogDataPoint5		0,00	true	true	45	true	8

Figure 103. Adding new Data Point

- edit the Data Point's name and BACnet/Modbus exposition and enable/disable the component:



Edit

Name	Enabled	Bacnet Expose	Modbus Expose
StandbyTimeOverride	true	true	true

Name: StandbyTimeOverride

Enabled: true {ok} — □ null ● true

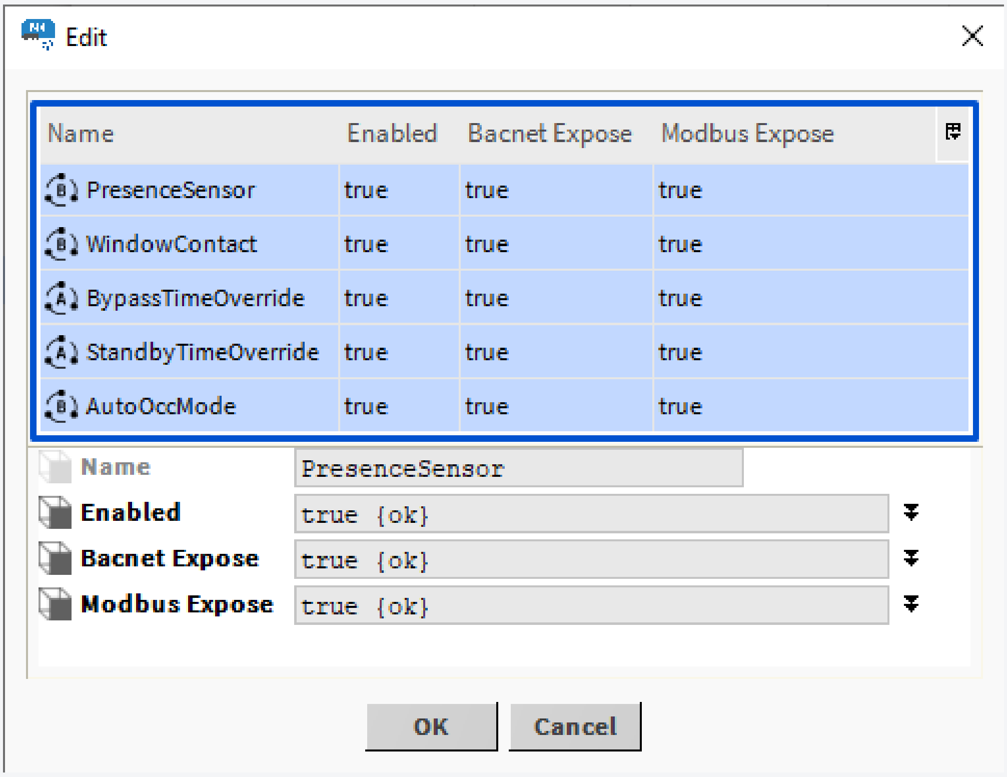
Bacnet Expose: true {ok} — □ null ● true

Modbus Expose: true {ok} — □ null ● true

Figure 104. Edit pop-up

Note

Editing is possible for more than one Data Point at a time. If multiple Data Points are edited, the same new value is written to common slots, so individual slots, such as Name, cannot be edited in this manner.



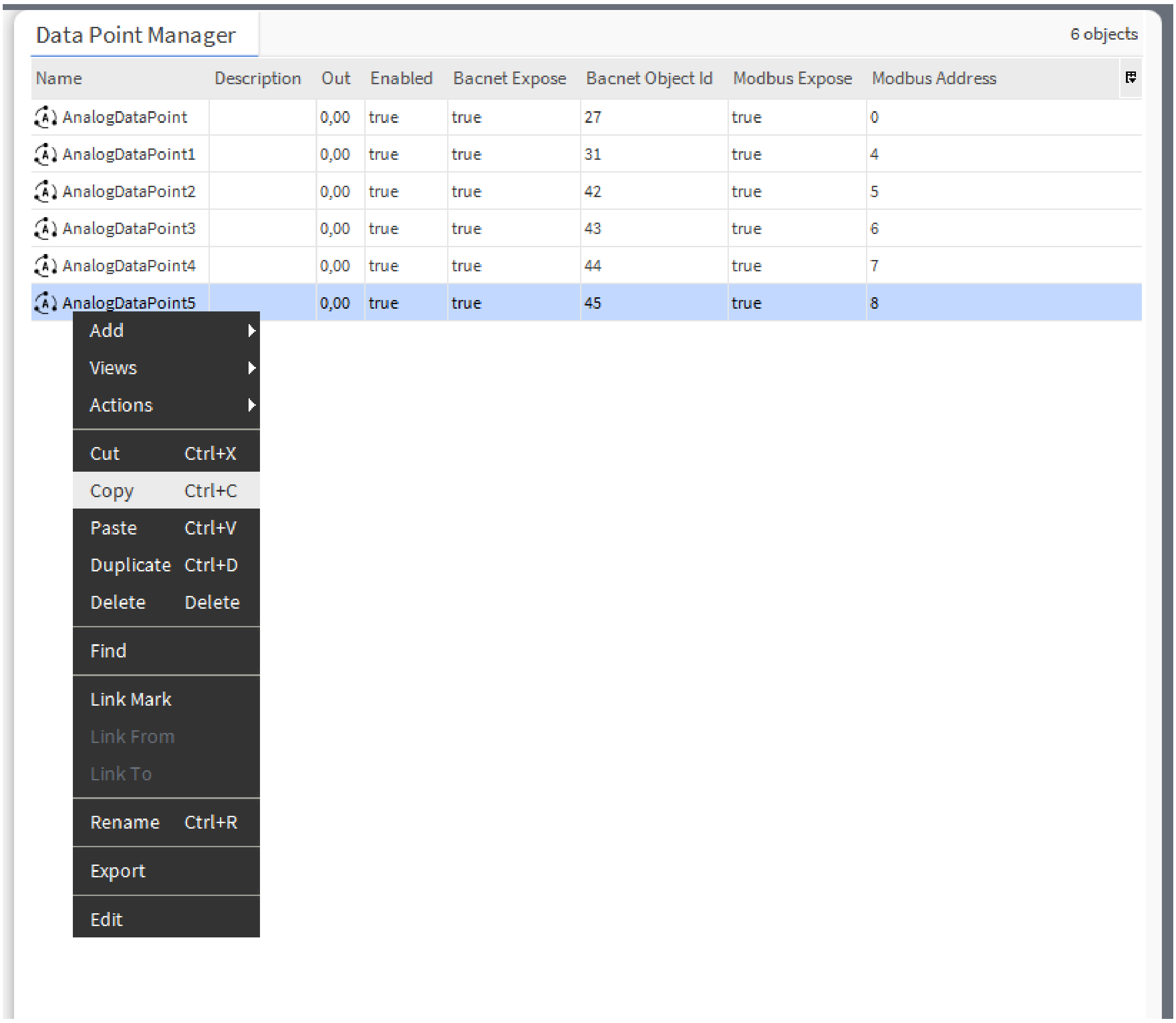
Edit

Name	Enabled	Bacnet Expose	Modbus Expose
PresenceSensor	true	true	true
WindowContact	true	true	true
BypassTimeOverride	true	true	true
StandbyTimeOverride	true	true	true
AutoOccMode	true	true	true

Name	PresenceSensor
Enabled	true {ok}
Bacnet Expose	true {ok}
Modbus Expose	true {ok}

Figure 105. Editing of multiple Data Points

- copy/cut/duplicate/remove Data Point components:



Data Point Manager

6 objects

Name	Description	Out	Enabled	Bacnet Expose	Bacnet Object Id	Modbus Expose	Modbus Address
AnalogDataPoint		0,00	true	true	27	true	0
AnalogDataPoint1		0,00	true	true	31	true	4
AnalogDataPoint2		0,00	true	true	42	true	5
AnalogDataPoint3		0,00	true	true	43	true	6
AnalogDataPoint4		0,00	true	true	44	true	7
AnalogDataPoint5		0,00	true	true	45	true	8

Figure 106. Context menu options for the Data Point

Opening the Data Point Manager

The Data Point Manager view is accessible from two locations:

- in the context menu of the Applications container;
- in the context menu of the Application component;
- in the context menu of the Equipment container.

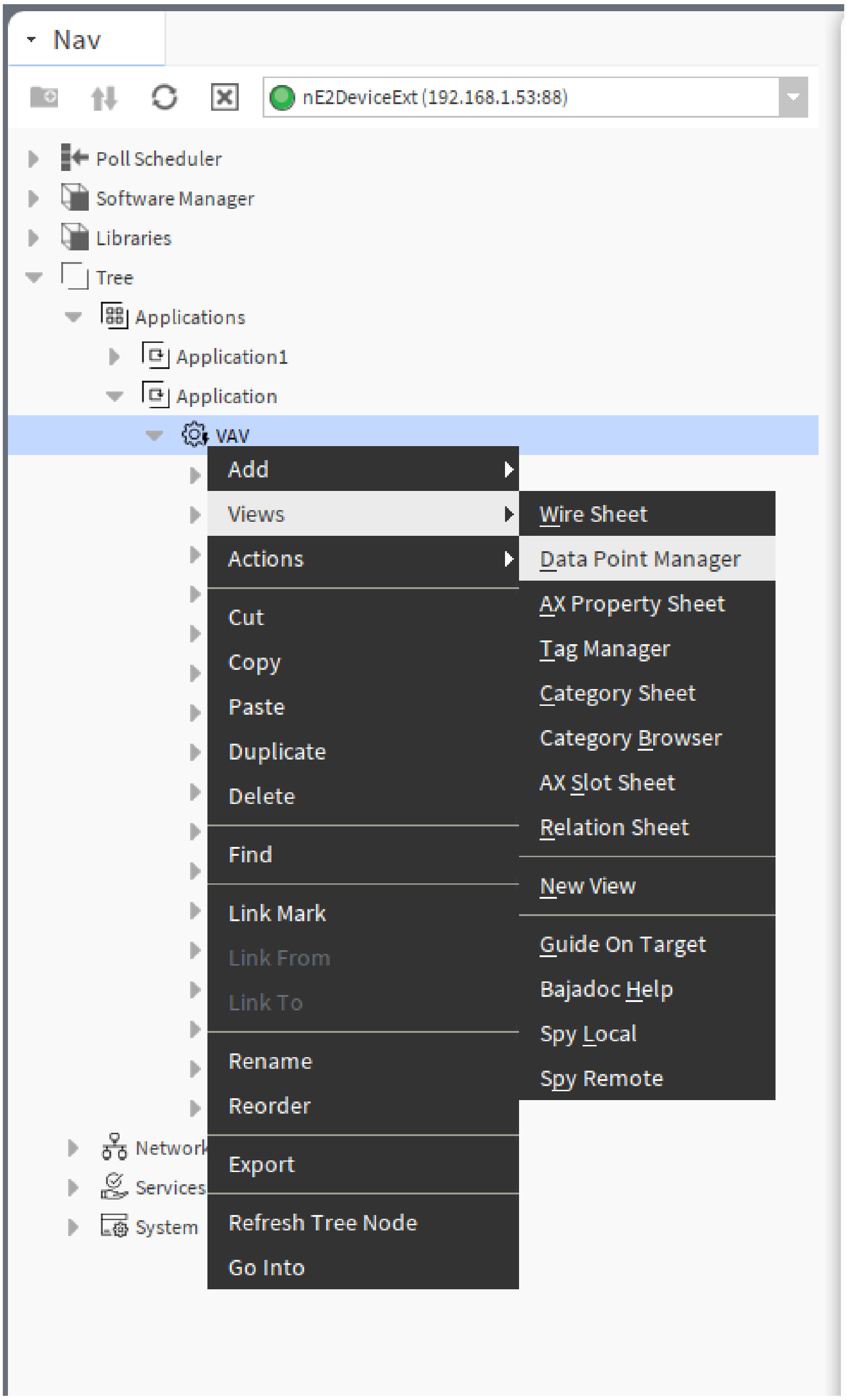


Figure 107. Accessing the Data Point Manager in the context menu

Licensing

The license for the new generation of iSMA CONTROLLI controllers driven by the nano EDGE ENGINE is constructed against the number of Data Points: each device based on the nano EDGE ENGINE is granted a specified number of license points (Data Points in this case), which can be used within applications. Therefore, the licensing system is only of quantitative, not functional, character–only the real number of Data Points in applications is taken into account, regardless of how many communication protocols are used to expose them, or how many network points are controlled. With the nano EDGE

ENGINE-generation devices it is possible to create as big an application (or applications) as the number of licensed Data Points. No elements in the Networks, Services, or System containers are subject to license limitations, other than Data Points in the Applications container.

Note: In order to check the number of license points, please refer to the License in the device.

4.5 Services

The Services provide a space for additional services developed to enhance the device's functionalities. Services may be added to the device and then used within applications. They are designed to provide additional functionalities to the basic algorithms included in applications, allowing the device to communicate with systems superior to building automation systems.

- Configuration Data Service

4.5.1 Configuration Data Service

The Configuration Data is a service designed to save configuration settings of Data Points for the purpose of restoring them if changed or lost. The service is executed by adding the Configuration Data extension to Data Points:

- AnalogDataPoint;
- BinaryDataPoint;
- MultistateDataPoint.

The service functions as a backup mechanism for device-specific configurations – it can bring back saved values of Data Points within a single device. To transfer applications between devices, use Backups.

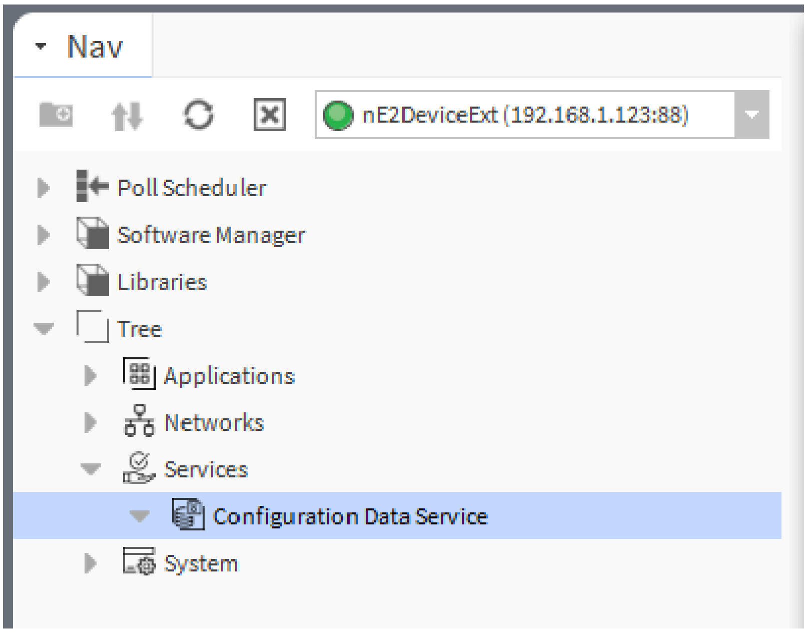
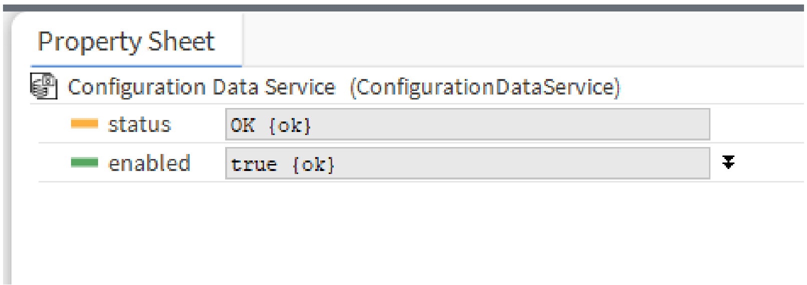


Figure 108. Configuration Data service in the nav tree



Property Sheet

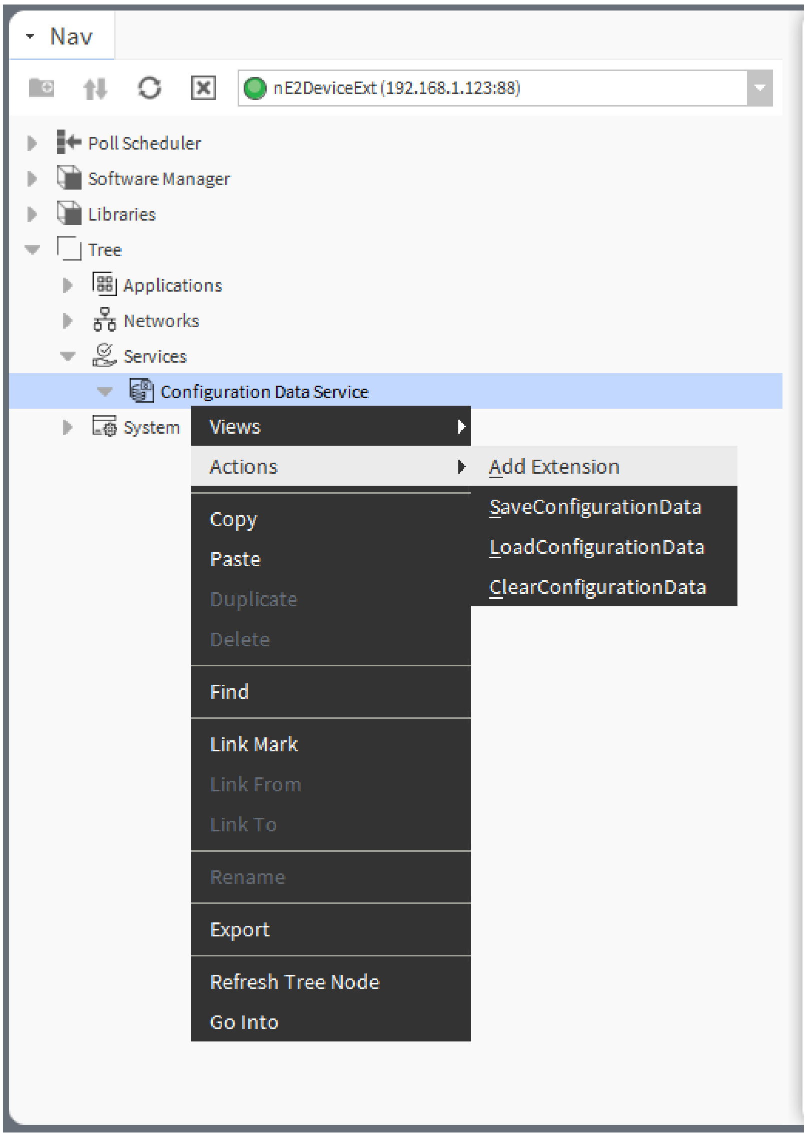
Configuration Data Service (ConfigurationDataService)

status	OK {ok}
enabled	true {ok}

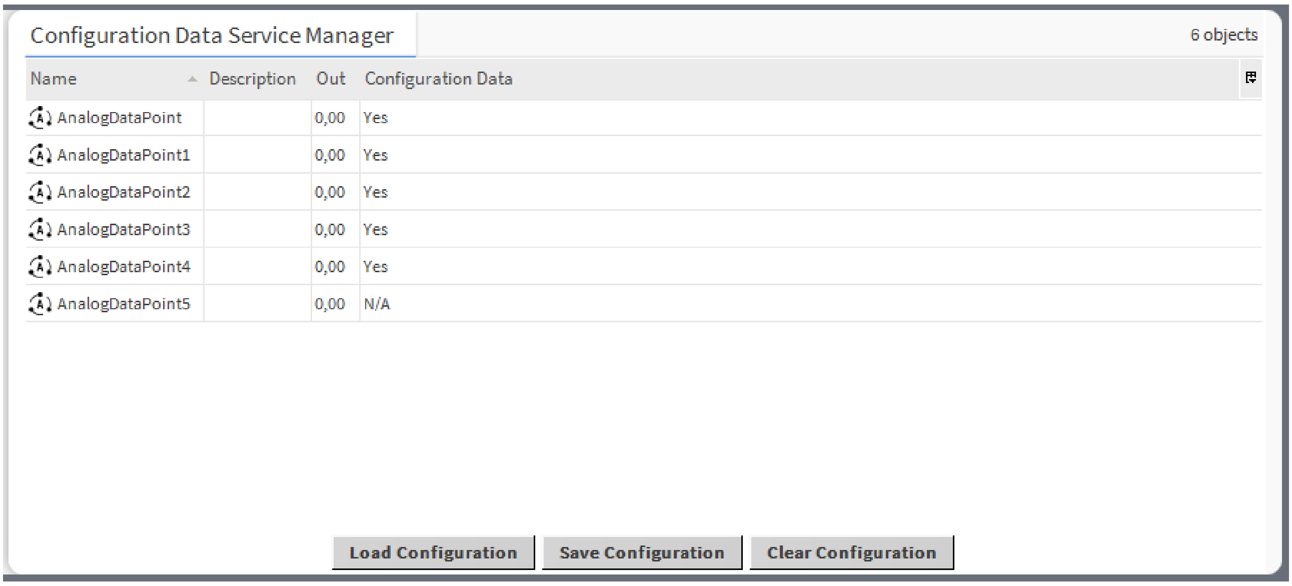
Figure 109. Configuration data service slots

The Configuration Data service has the following slots:

- **Status:** indicates the current status of the component. If the component works properly, its status is OK; however, it changes accordingly when values in other slots are adjusted.
    - Available information: disabled (the Enabled slot is set to false), OK;
- **Enabled:** change of the slot's value enables or disables the component.



Configuration Data Service Manager



Configuration Data Service Manager

6 objects

Name	Description	Out	Configuration Data
AnalogDataPoint		0,00	Yes
AnalogDataPoint1		0,00	Yes
AnalogDataPoint2		0,00	Yes
AnalogDataPoint3		0,00	Yes
AnalogDataPoint4		0,00	Yes
AnalogDataPoint5		0,00	N/A

Figure 110. Configuration Data service manager

The Configuration Data service view is a simple table view showing which Data Points have the Configuration Data extension added, along with their Description and Out slots.

The Data Points marked N/A in the view are Data Points added to applications but without the Configuration Data extensions, as the service collects data only from Data Points with added extension. The view shows Data Points from all applications executed in the Applications container (if gathered under the Equipment component, double-click it to show Data Points). Additionally, it allows to export the gathered data with the Export option in the context menu.

The Configuration Data service has the following actions:

Note

Actions are executed for all applicable Data Points at once.

- Save Configuration Data: saves the slots values of Data Points with added Configuration Data extension to the controller’s memory;
- Load Configuration Data: uploads the saved slots values to Data Points with added Configuration Data extension;

Note: The data can be loaded only to Data Points, which had the extension added at the point of saving the values.

- Clear Configuration Data: erases the saved slots values of Data Points with added Configuration Data extension.

Warning!

Remember that restoring default settings on the controller by the 6th DIP switch clears the values saved in the Configuration Data service too.

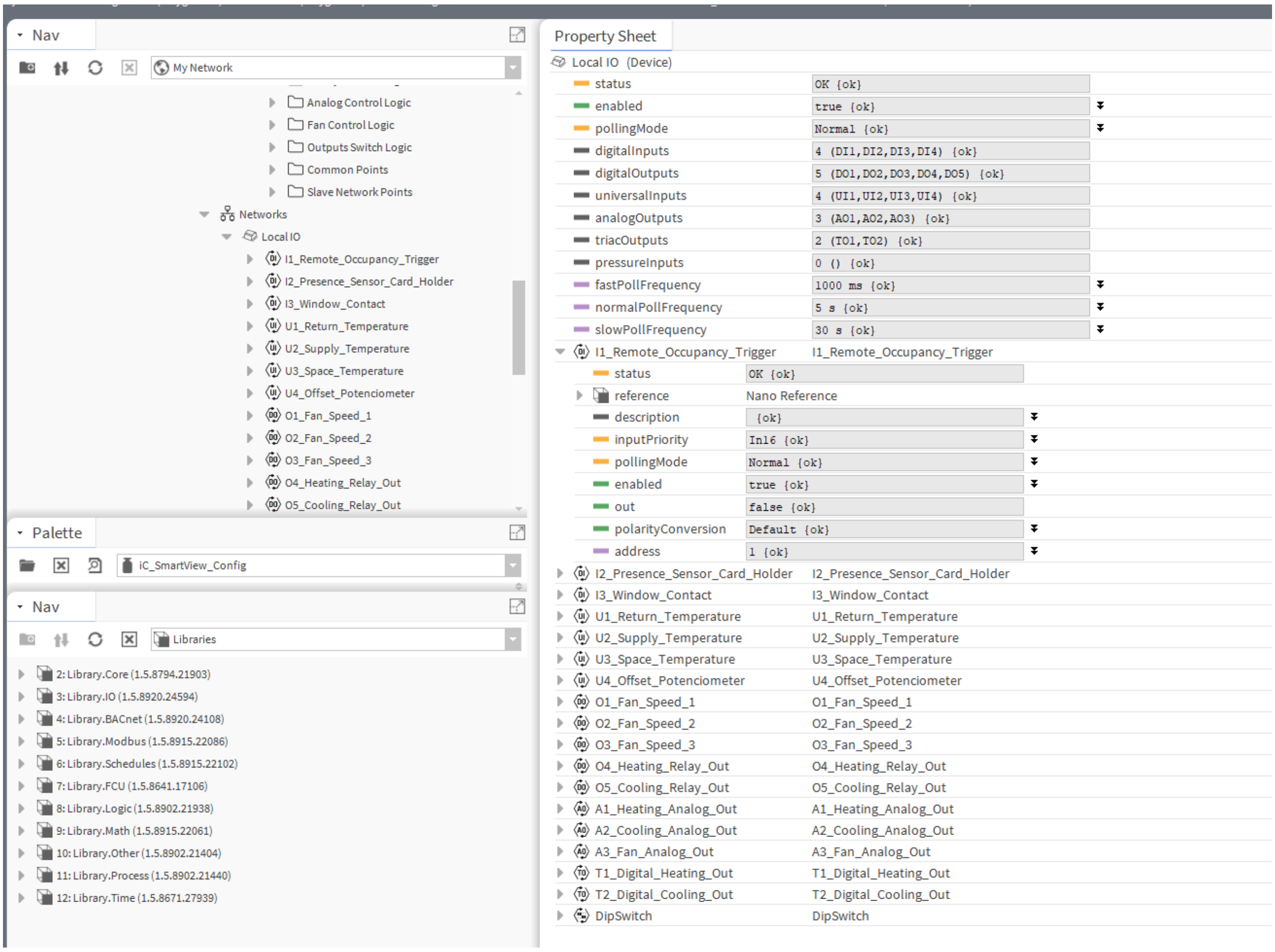
Configuration Data Extension

The Configuration Data extension has no slots. Its functionality is fully achieved by adding it to the Data Point. It is automatically enabled and allows the Configuration Data service to save and upload slots values of the Data Point.

4.6 Local IO

4.6.1 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.



Nav — My Network

- Analog Control Logic
- Fan Control Logic
- Outputs Switch Logic
- Common Points
- Slave Network Points
- Networks
  - Local IO
    - I1_Remote_Occupancy_Trigger
    - I2_Presence_Sensor_Card_Holder
    - I3_Window_Contact
    - U1_Return_Temperature
    - U2_Supply_Temperature
    - U3_Space_Temperature
    - U4_Offset_Potenciometer
    - O1_Fan_Speed_1
    - O2_Fan_Speed_2
    - O3_Fan_Speed_3
    - O4_Heating_Relay_Out
    - O5_Cooling_Relay_Out

Palette — iC_SmartView_Config

Nav — Libraries

- 2: Library.Core (1.5.8794.21903)
- 3: Library.IO (1.5.8920.24594)
- 4: Library.BACnet (1.5.8920.24108)
- 5: Library.Modbus (1.5.8915.22086)
- 6: Library.Schedules (1.5.8915.22102)
- 7: Library.FCU (1.5.8641.17106)
- 8: Library.Logic (1.5.8902.21938)
- 9: Library.Math (1.5.8915.22061)
- 10: Library.Other (1.5.8902.21404)
- 11: Library.Process (1.5.8902.21440)
- 12: Library.Time (1.5.8671.27939)

Property Sheet

Local IO (Device)

status	OK {ok}
enabled	true {ok}
pollingMode	Normal {ok}
digitalInputs	4 (DI1,DI2,DI3,DI4) {ok}
digitalOutputs	5 (DO1,DO2,DO3,DO4,DO5) {ok}
universalInputs	4 (UI1,UI2,UI3,UI4) {ok}
analogOutputs	3 (AO1,AO2,AO3) {ok}
triacOutputs	2 (TO1,TO2) {ok}
pressureInputs	0 () {ok}
fastPollFrequency	1000 ms {ok}
normalPollFrequency	5 s {ok}
slowPollFrequency	30 s {ok}
I1_Remote_Occupancy_Trigger	I1_Remote_Occupancy_Trigger
status	OK {ok}
reference	Nano Reference
description	{ok}
inputPriority	In16 {ok}
pollingMode	Normal {ok}
enabled	true {ok}
out	false {ok}
polarityConversion	Default {ok}
address	1 {ok}
I2_Presence_Sensor_Card_Holder	I2_Presence_Sensor_Card_Holder
I3_Window_Contact	I3_Window_Contact
U1_Return_Temperature	U1_Return_Temperature
U2_Supply_Temperature	U2_Supply_Temperature
U3_Space_Temperature	U3_Space_Temperature
U4_Offset_Potenciometer	U4_Offset_Potenciometer
O1_Fan_Speed_1	O1_Fan_Speed_1
O2_Fan_Speed_2	O2_Fan_Speed_2
O3_Fan_Speed_3	O3_Fan_Speed_3
O4_Heating_Relay_Out	O4_Heating_Relay_Out
O5_Cooling_Relay_Out	O5_Cooling_Relay_Out
A1_Heating_Analog_Out	A1_Heating_Analog_Out
A2_Cooling_Analog_Out	A2_Cooling_Analog_Out
A3_Fan_Analog_Out	A3_Fan_Analog_Out
T1_Digital_Heating_Out	T1_Digital_Heating_Out
T2_Digital_Cooling_Out	T2_Digital_Cooling_Out
DipSwitch	DipSwitch

Figure 111. 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.

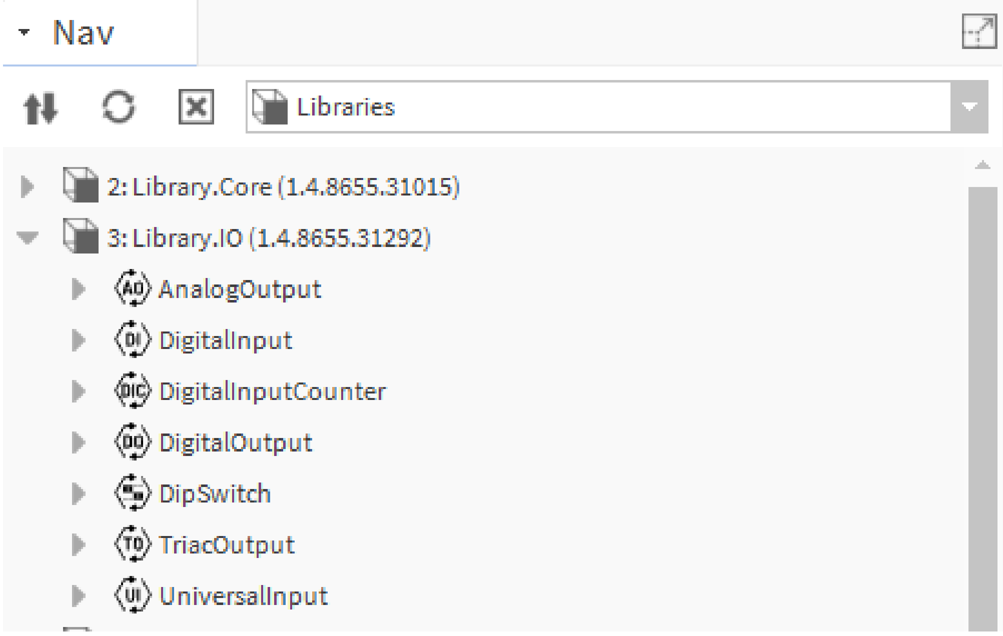


Figure 112. Library.IO

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

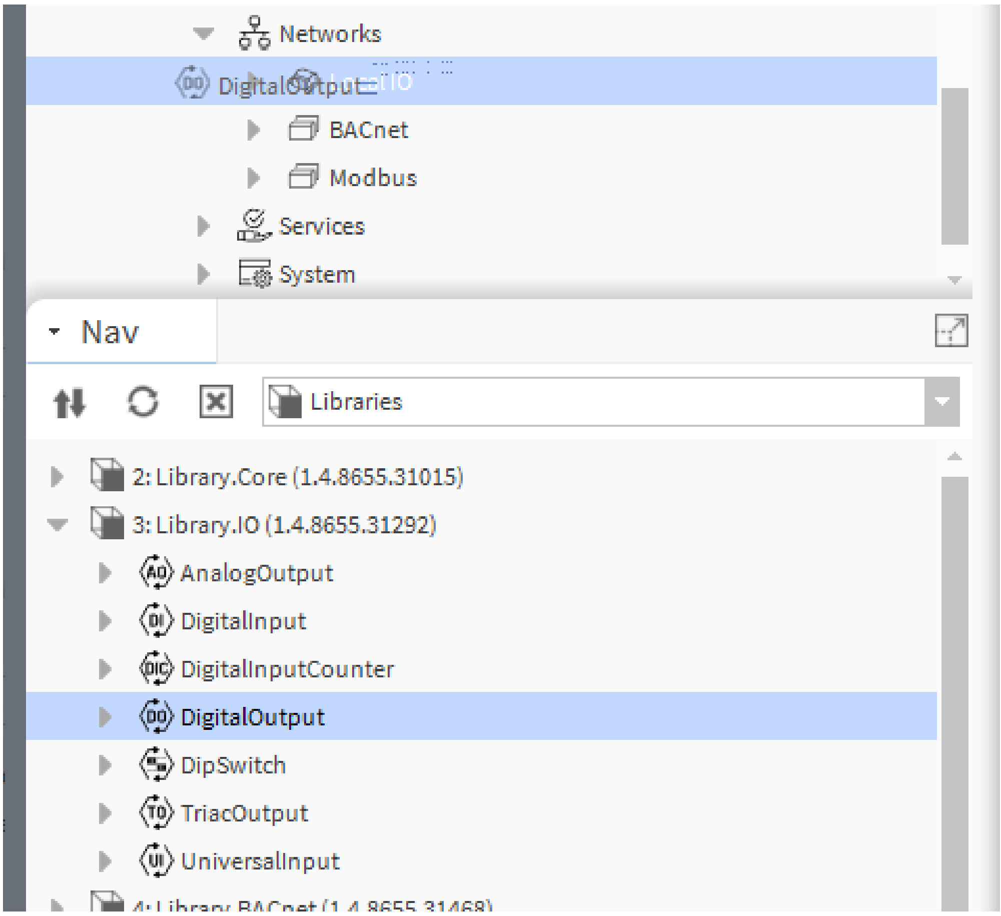
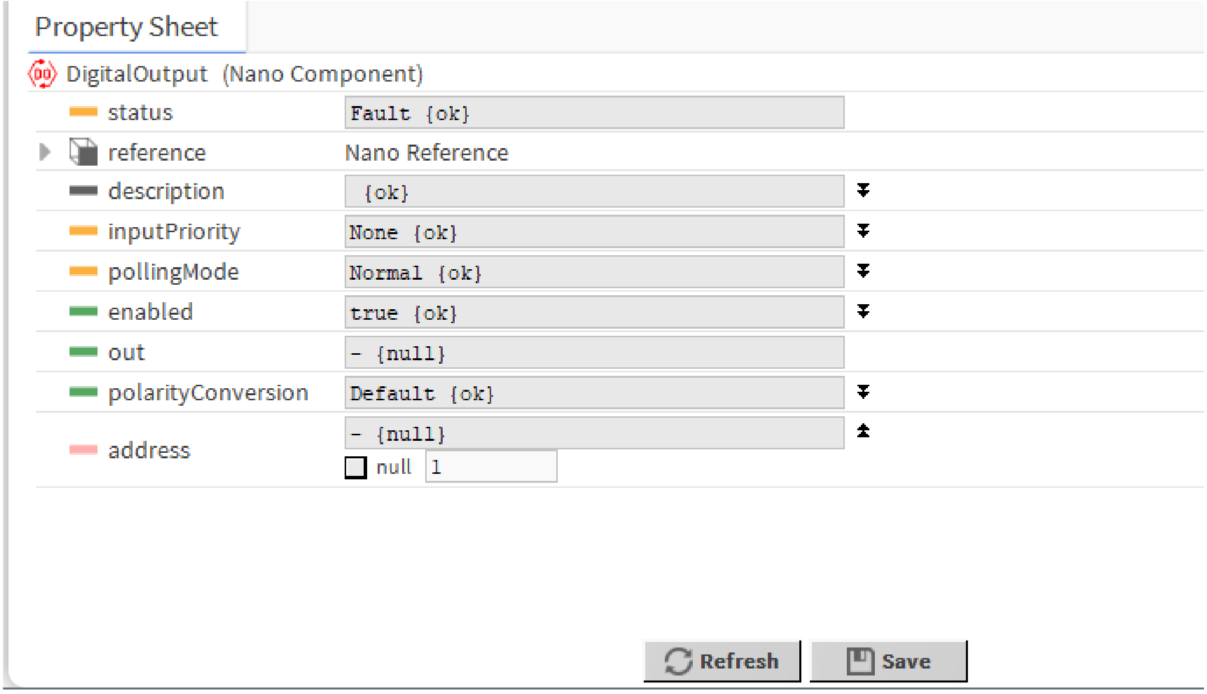


Figure 113. Adding DigitalOutput to the Local IO network

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.



Property Sheet

DigitalOutput (Nano Component)

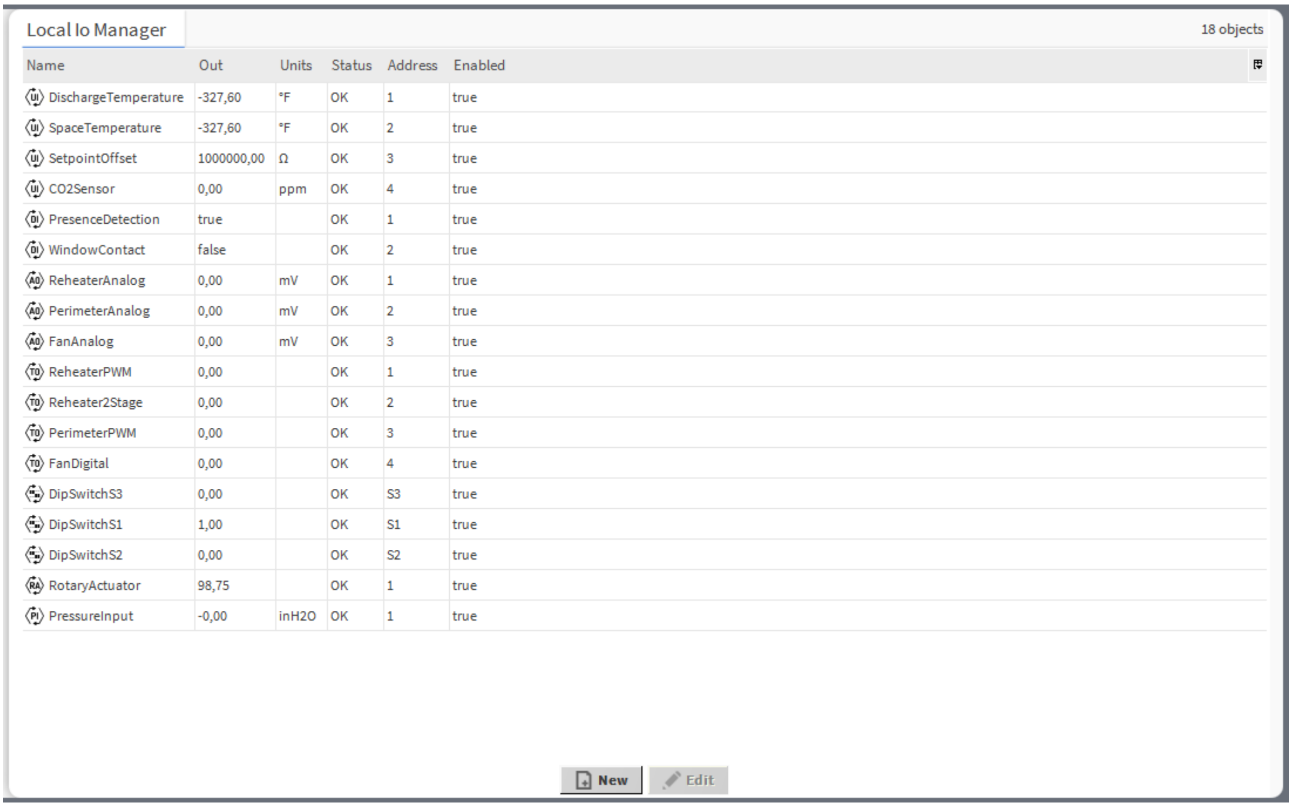
status	Fault {ok}
reference	Nano Reference
description	{ok}
inputPriority	None {ok}
pollingMode	Normal {ok}
enabled	true {ok}
out	- {null}
polarityConversion	Default {ok}
address	- {null} □ null 1

Figure 114. Setting the IO point address

4.6.2 LocalIO Manager

The LocalIO Manager view is available for the LocalIO component. It lists all I/O points added to the LocalIO component, and shows their:

- name;
- Out slot value;
- unit (for analog values);
- status;
- number;
- enabled or disabled state.



Local Io Manager

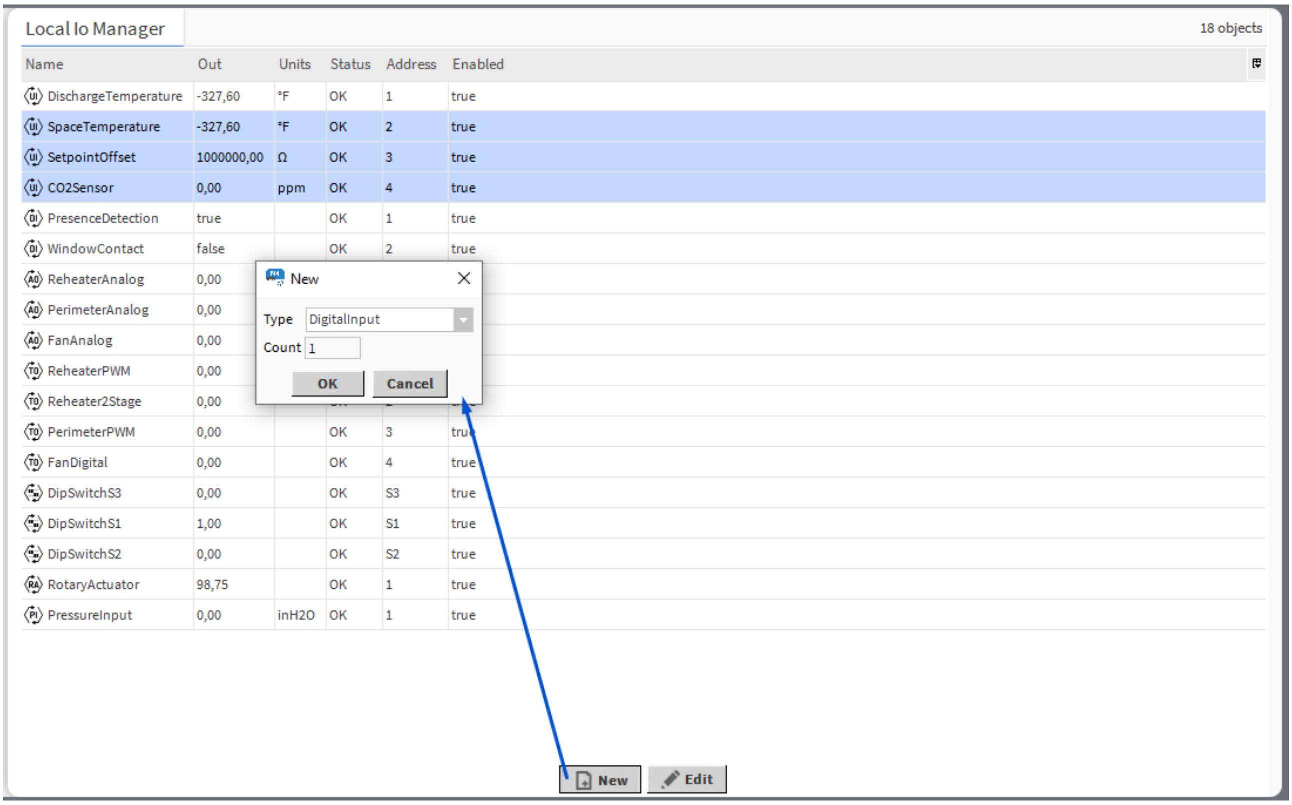
18 objects

Name	Out	Units	Status	Address	Enabled
DischargeTemperature	-327,60	°F	OK	1	true
SpaceTemperature	-327,60	°F	OK	2	true
SetpointOffset	1000000,00	Ω	OK	3	true
CO2Sensor	0,00	ppm	OK	4	true
PresenceDetection	true		OK	1	true
WindowContact	false		OK	2	true
ReheaterAnalog	0,00	mV	OK	1	true
PerimeterAnalog	0,00	mV	OK	2	true
FanAnalog	0,00	mV	OK	3	true
ReheaterPWM	0,00		OK	1	true
Reheater2Stage	0,00		OK	2	true
PerimeterPWM	0,00		OK	3	true
FanDigital	0,00		OK	4	true
DipSwitchS3	0,00		OK	S3	true
DipSwitchS1	1,00		OK	S1	true
DipSwitchS2	0,00		OK	S2	true
RotaryActuator	98,75		OK	1	true
PressureInput	-0,00	inH2O	OK	1	true

Figure 115. LocalIO Manager

In the LocalIO Manager, it is possible to:

- add local I/O components:



Local Io Manager

18 objects

Name	Out	Units	Status	Address	Enabled
DischargeTemperature	-327,60	°F	OK	1	true
SpaceTemperature	-327,60	°F	OK	2	true
SetpointOffset	1000000,00	Ω	OK	3	true
CO2Sensor	0,00	ppm	OK	4	true
PresenceDetection	true		OK	1	true
WindowContact	false		OK	2	true
ReheaterAnalog	0,00				
PerimeterAnalog	0,00				
FanAnalog	0,00				
ReheaterPWM	0,00				
Reheater2Stage	0,00				
PerimeterPWM	0,00		OK	3	true
FanDigital	0,00		OK	4	true
DipSwitchS3	0,00		OK	S3	true
DipSwitchS1	1,00		OK	S1	true
DipSwitchS2	0,00		OK	S2	true
RotaryActuator	98,75		OK	1	true
PressureInput	0,00	inH2O	OK	1	true

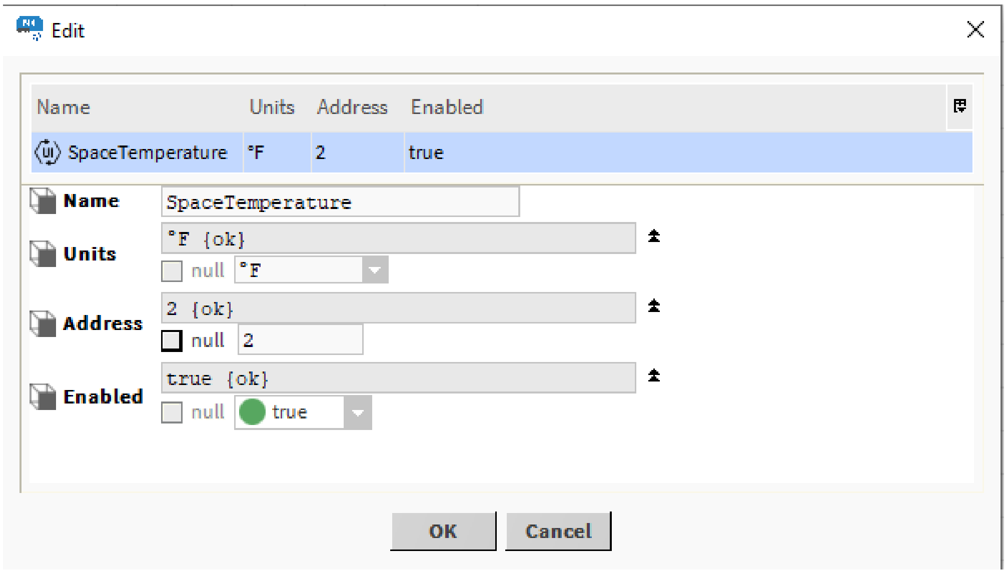
New

Type: DigitalInput

Count: 1

Figure 116. Adding I/O points in the LocalIO Manager

- edit the I/O's name, units, address and enable/disable the component:



Edit

Name	Units	Address	Enabled
SpaceTemperature	°F	2	true

Name: SpaceTemperature

Units: °F {ok}
□ null °F

Address: 2 {ok}
□ null 2

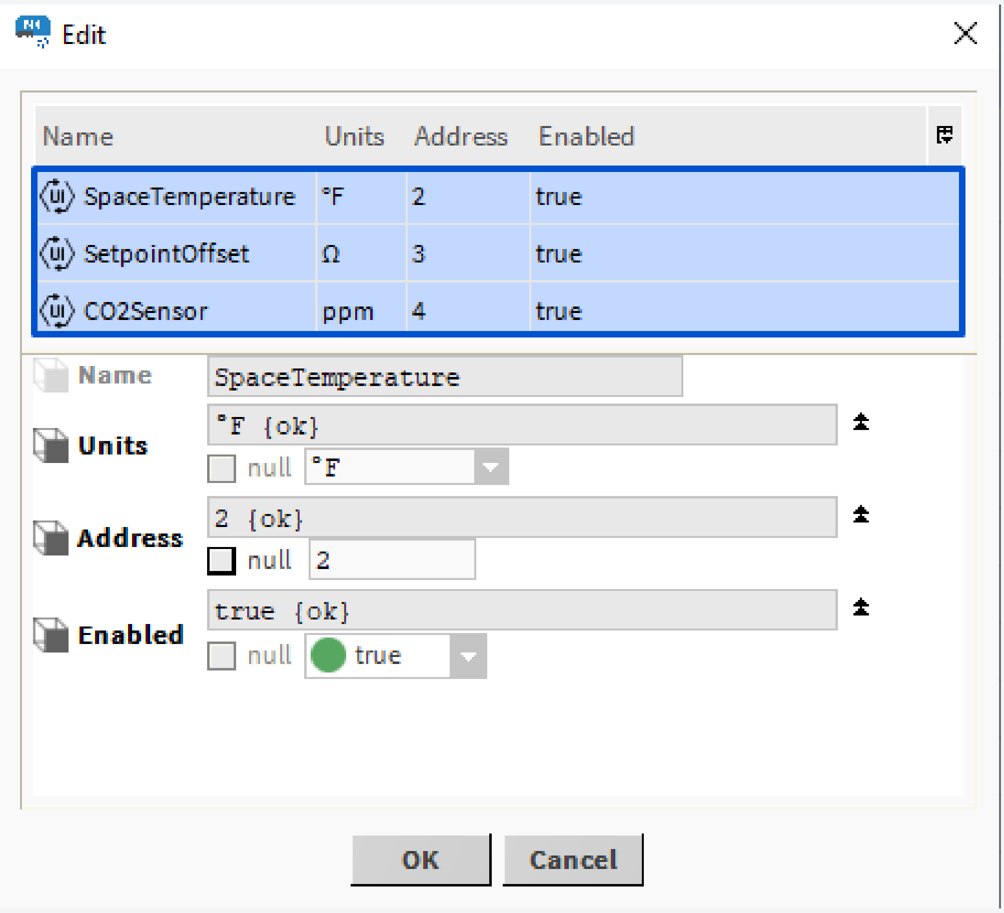
Enabled: true {ok}
□ null ● true

OK Cancel

Figure 117. Editing pop-up

Note

Editing is possible for more than one I/O point at a time. If multiple points are edited, the same new value is written to common slots, so individual slots, such as Name, cannot be edited in this manner.



Edit

Name	Units	Address	Enabled
SpaceTemperature	°F	2	true
SetpointOffset	Ω	3	true
CO2Sensor	ppm	4	true

Name: SpaceTemperature

Units: °F {ok}
□ null °F

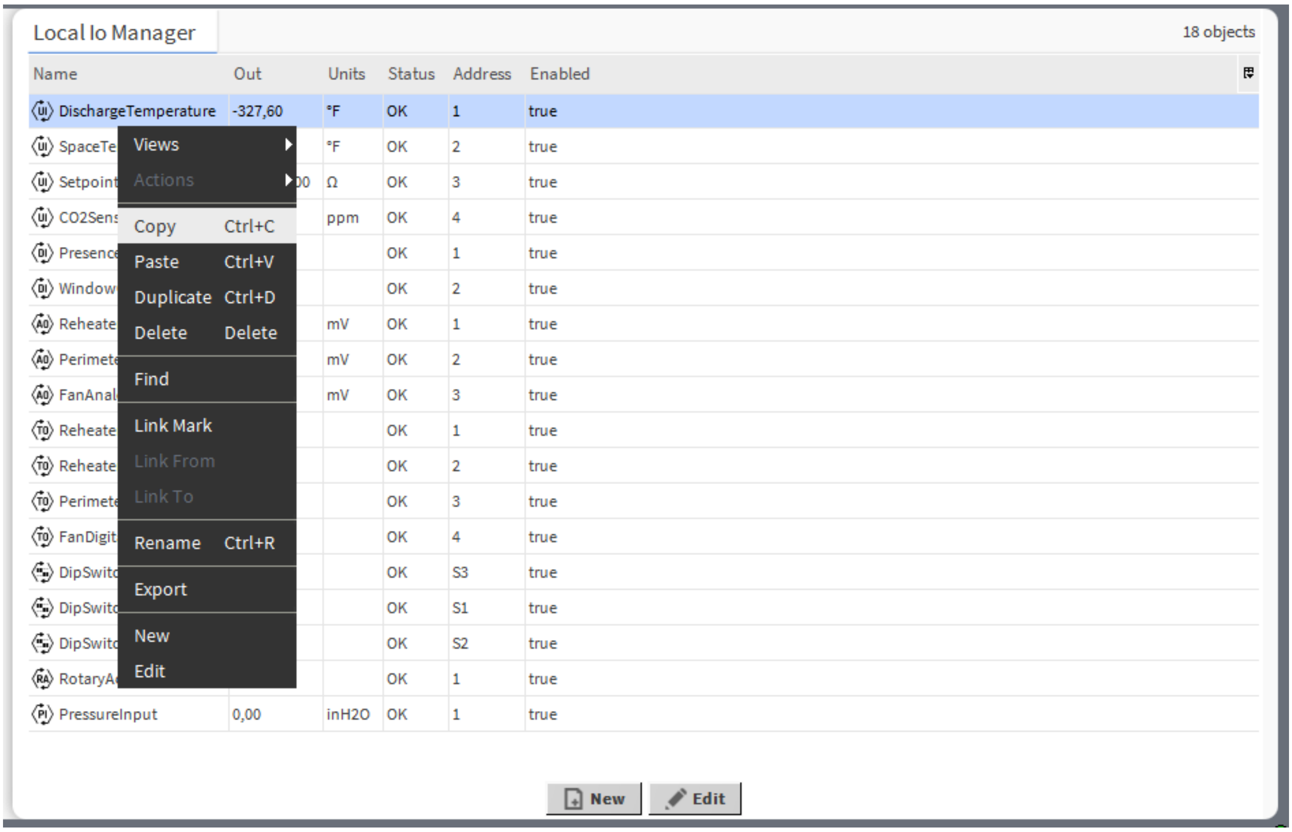
Address: 2 {ok}
□ null 2

Enabled: true {ok}
□ null ● true

OK Cancel

Figure 118. Editing of multiple I/O points

- copy/duplicate/remove I/O components:



Local Io Manager

18 objects

Name	Out	Units	Status	Address	Enabled
DischargeTemperature	-327,60	°F	OK	1	true
SpaceTe		°F	OK	2	true
Setpoint	00	Ω	OK	3	true
CO2Sens		ppm	OK	4	true
Presence			OK	1	true
Window			OK	2	true
Reheate		mV	OK	1	true
Perimete		mV	OK	2	true
FanAnal		mV	OK	3	true
Reheate			OK	1	true
Reheate			OK	2	true
Perimete			OK	3	true
FanDigit			OK	4	true
DipSwitc			OK	S3	true
DipSwitc			OK	S1	true
DipSwitc			OK	S2	true
RotaryA			OK	1	true
PressureInput	0,00	inH2O	OK	1	true

Figure 119. Context menu options for local I/Os

Opening LocalIO Manager

The LocalIO Manager view is accessible from the context menu of the LocalIO component. It is also automatically opened if the LocalIO component is double-clicked in the nav tree window.

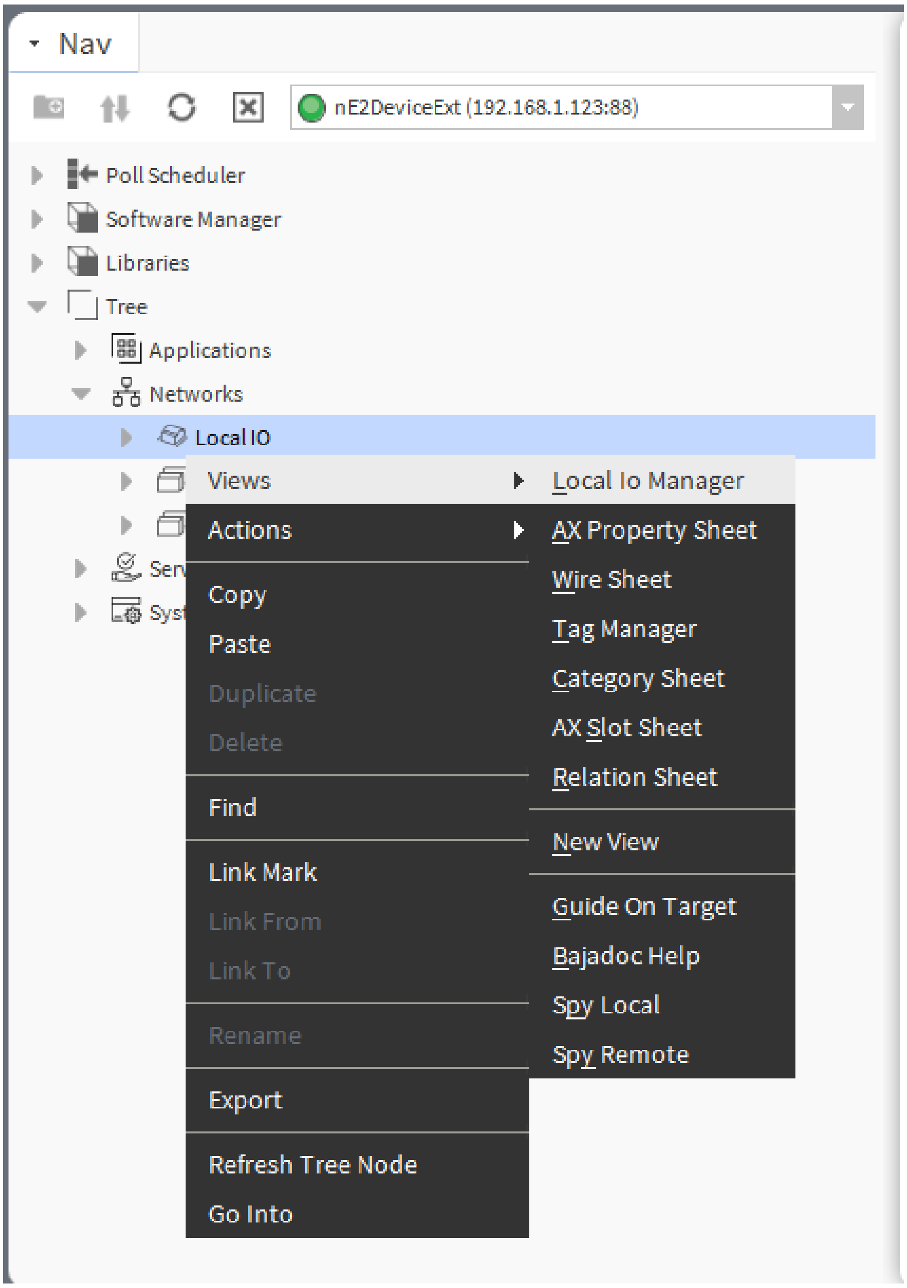


Figure 120. Accessing the LocalIO Manager from the context menu

4.7 Linking

In nE2DeviceExt, it is possible to link nano EDGE ENGINE components by dragging a wire from one component to another.

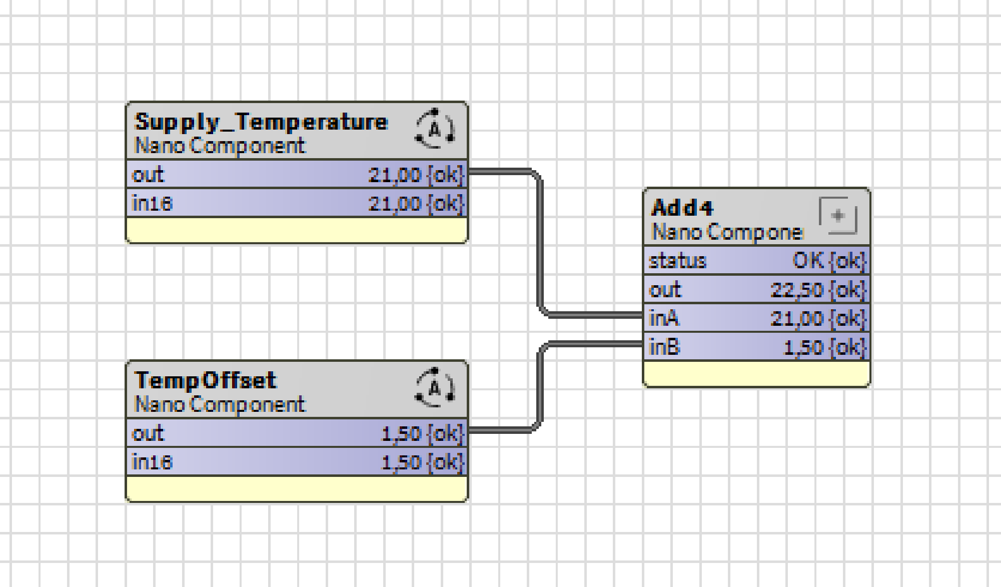


Figure 121. Linked components

Warning!

Linking in nE2DeviceExt works only between nano EDGE ENGINE components. Do not link Niagara components from other modules/drivers with nano EDGE ENGINE components.

4.7.1 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.

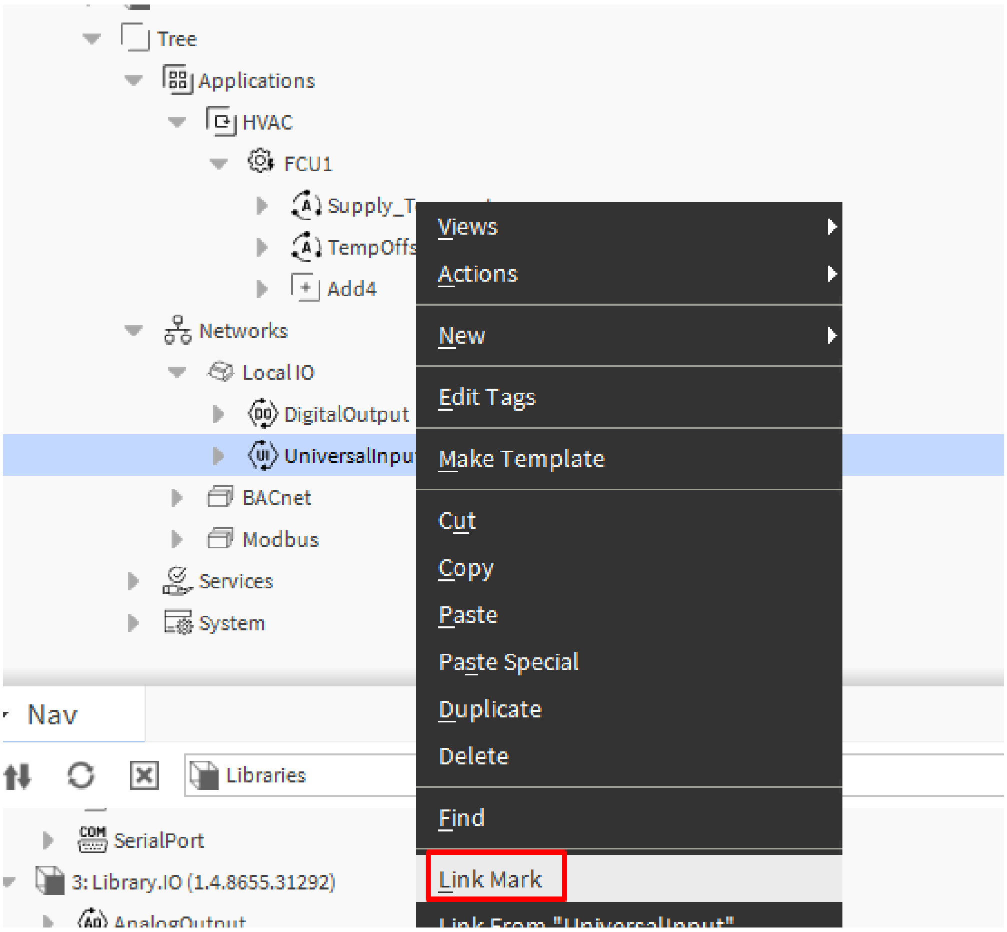


Figure 122. Link Mark option in the network point - UniversalInput

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

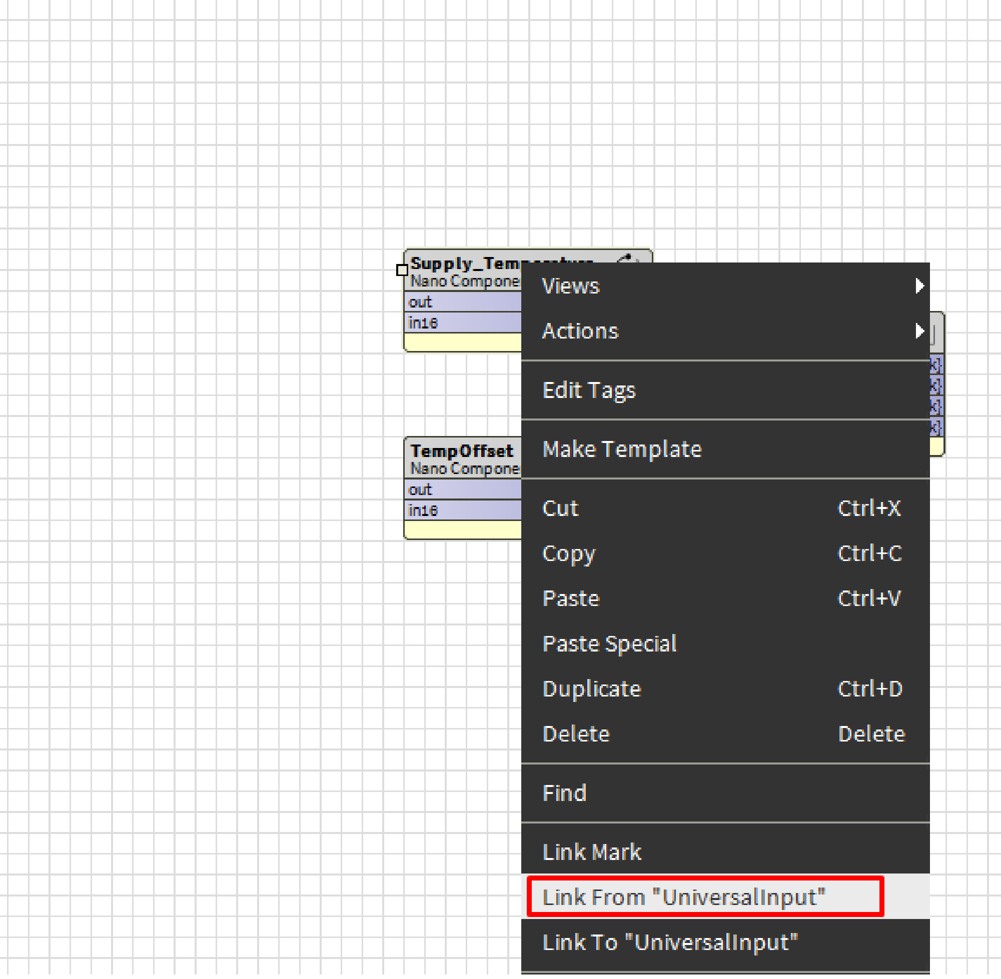
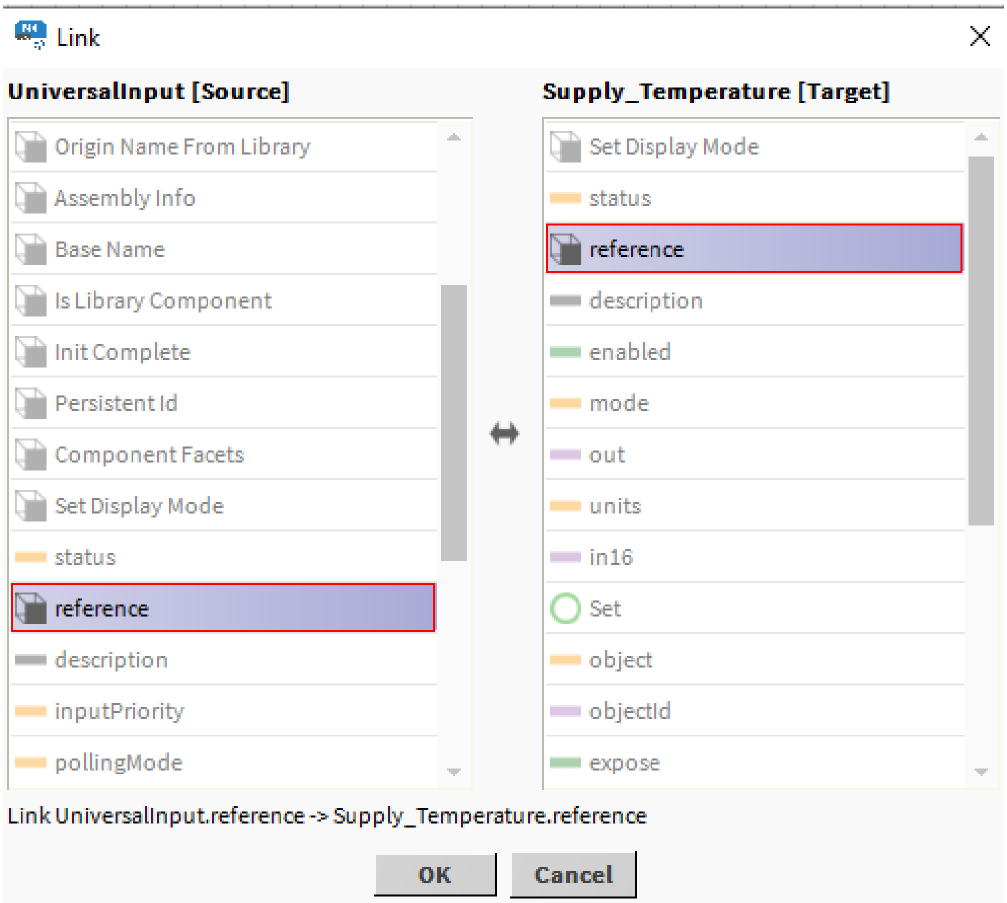


Figure 123. Link From option

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



Link

UniversalInput [Source]

- Origin Name From Library
- Assembly Info
- Base Name
- Is Library Component
- Init Complete
- Persistent Id
- Component Facets
- Set Display Mode
- status
- reference
- description
- inputPriority
- pollingMode

Supply_Temperature [Target]

- Set Display Mode
- status
- reference
- description
- enabled
- mode
- out
- units
- in16
- Set
- object
- objectId
- expose

Link UniversalInput.reference -> Supply_Temperature.reference

OK | Cancel

Figure 124. Creating reference between points

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

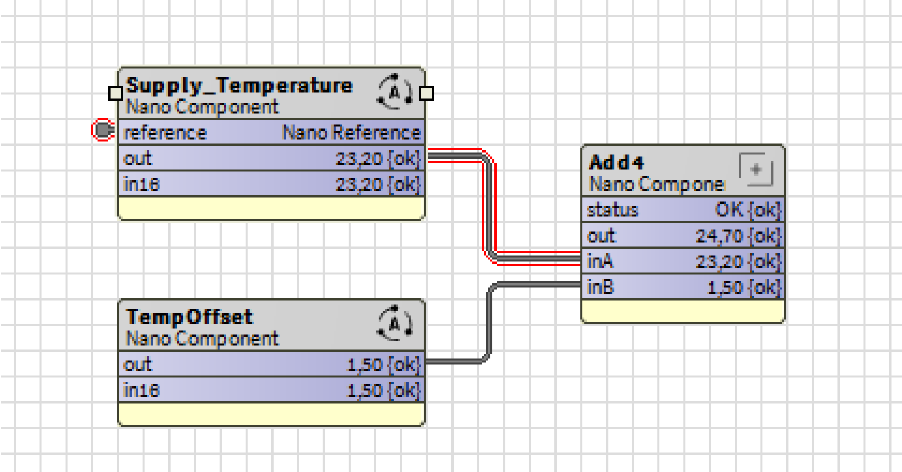


Figure 125. Data Point with a reference

4.8 Saving Logic to Niagara Palette

Once the logic has been created in one or more Application components, it is possible to save the logic or its parts for future reuse. There are 3 major steps here:

- Creating a Custom Palette
- Saving Components
- Using Components from the Palette

4.8.1 Creating a Custom Palette

First, it is required to create a dedicated user palette (or palettes):

- navigate to the desired location in the User File System;
- right-click on the chosen location to open the context menu;
- select New → PaletteFile.palette to create a new palette;
- name the palette (e.g., "CustomComponents") and confirm.

4.8.2 Saving Components

To save the logic or parts of the logic, follow these steps:

- locate the components to be saved;

> **Note**
>
> It is recommended to save components under the level of the Application component in the tree. Depending on the application's structure, it will be components located in the Equipment or Folder components, or other components located directly under the Application component.

- save the selected components to the created palette:
  - mark the components in the application tree and drag and drop them into the custom palette,
  - mark the components in the application tree, copy them and then paste into the custom palette;
- save the palette with new components using the Save option in the palette workspace.

4.8.3 Using Components from the Palette

To use components saved to the palette:

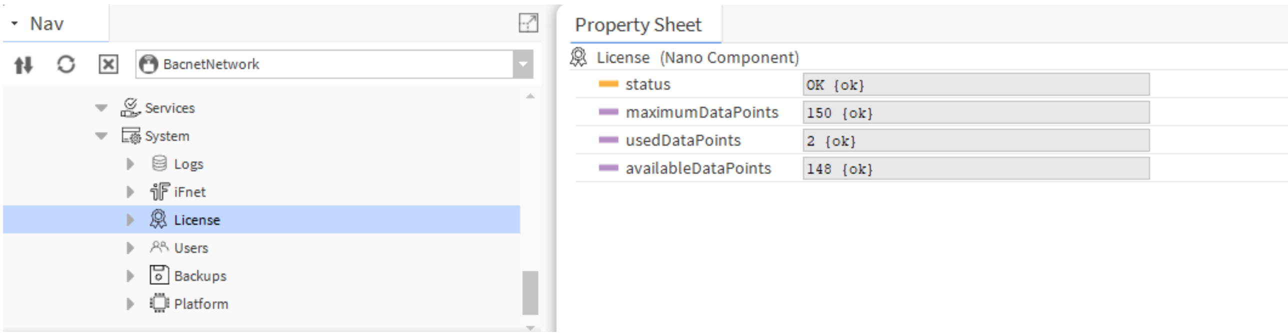
- open the target station;
- open the palette workspace and click Open Palette;
- reuse components from palette:
  - drag the component(s) from the palette into the application tree in the target station and drop them in the Applications container under the Application component.
  - copy the component(s) from the palette and paste them into the application tree in the target station (in the Applications container under the Application component).

5 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.



License (Nano Component)

status	OK {ok}
maximumDataPoints	150 {ok}
usedDataPoints	2 {ok}
availableDataPoints	148 {ok}

Figure 126. 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.

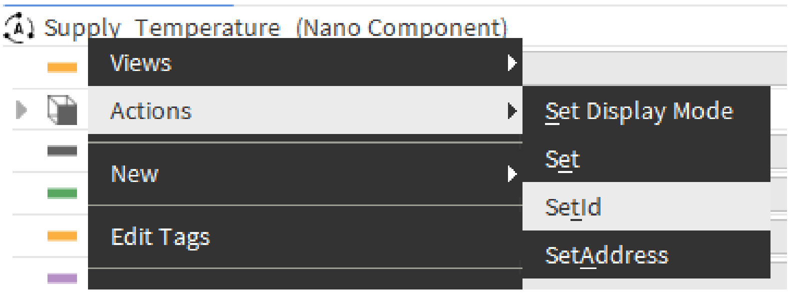
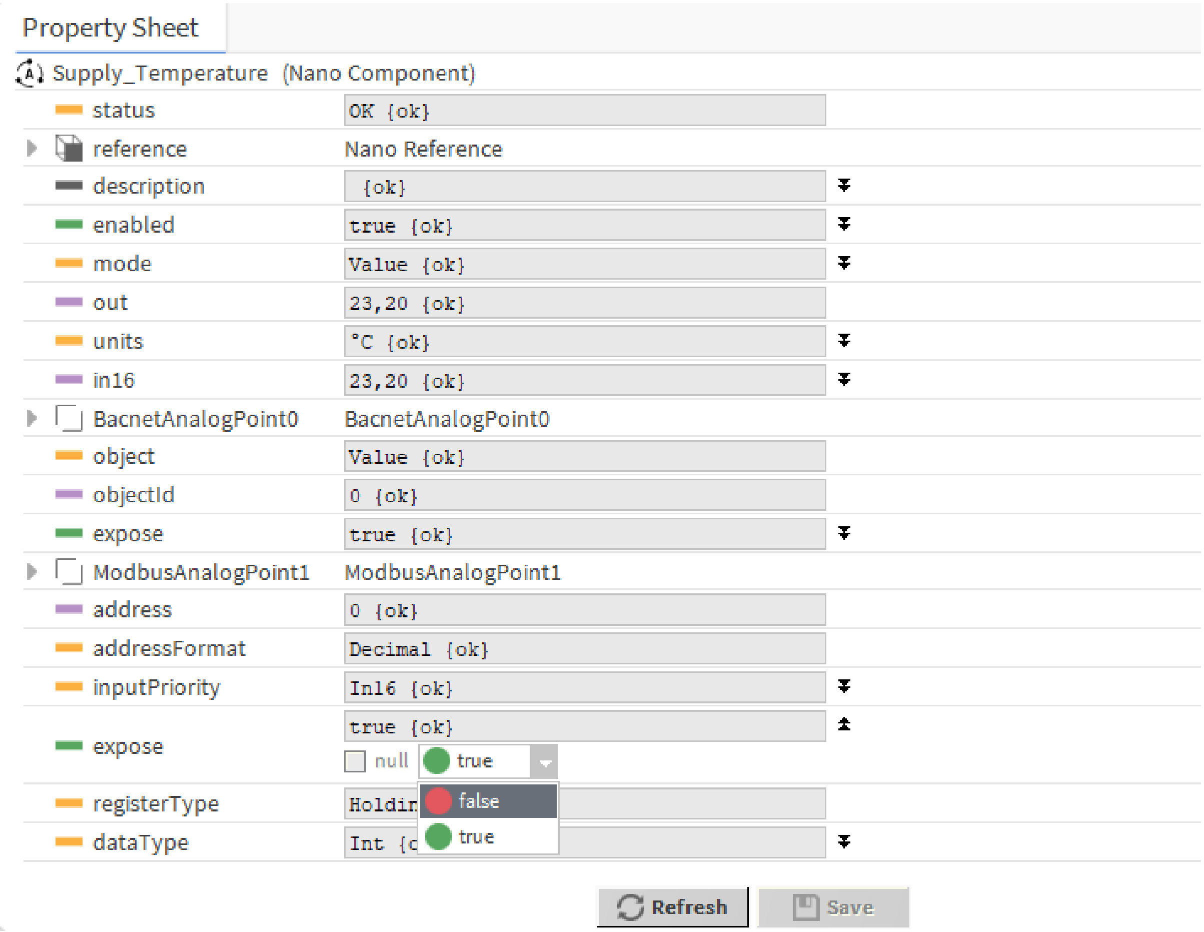


Figure 127. Setting ObjectID to the Data Point

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.



Property Sheet

Supply_Temperature (Nano Component)

status	OK {ok}
reference	Nano Reference
description	{ok}
enabled	true {ok}
mode	Value {ok}
out	23,20 {ok}
units	°C {ok}
in16	23,20 {ok}
BacnetAnalogPoint0	BacnetAnalogPoint0
object	Value {ok}
objectId	0 {ok}
expose	true {ok}
ModbusAnalogPoint1	ModbusAnalogPoint1
address	0 {ok}
addressFormat	Decimal {ok}
inputPriority	In16 {ok}
expose	true {ok} □ null ● true false true
registerType	Holdir
dataType	Int {c

Figure 128. 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.

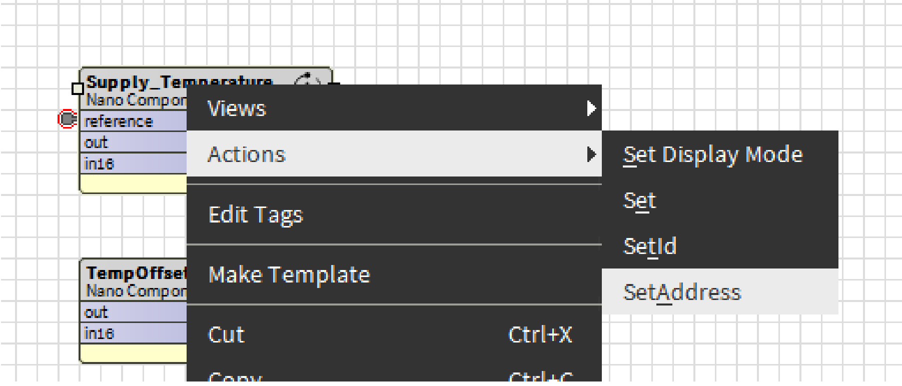
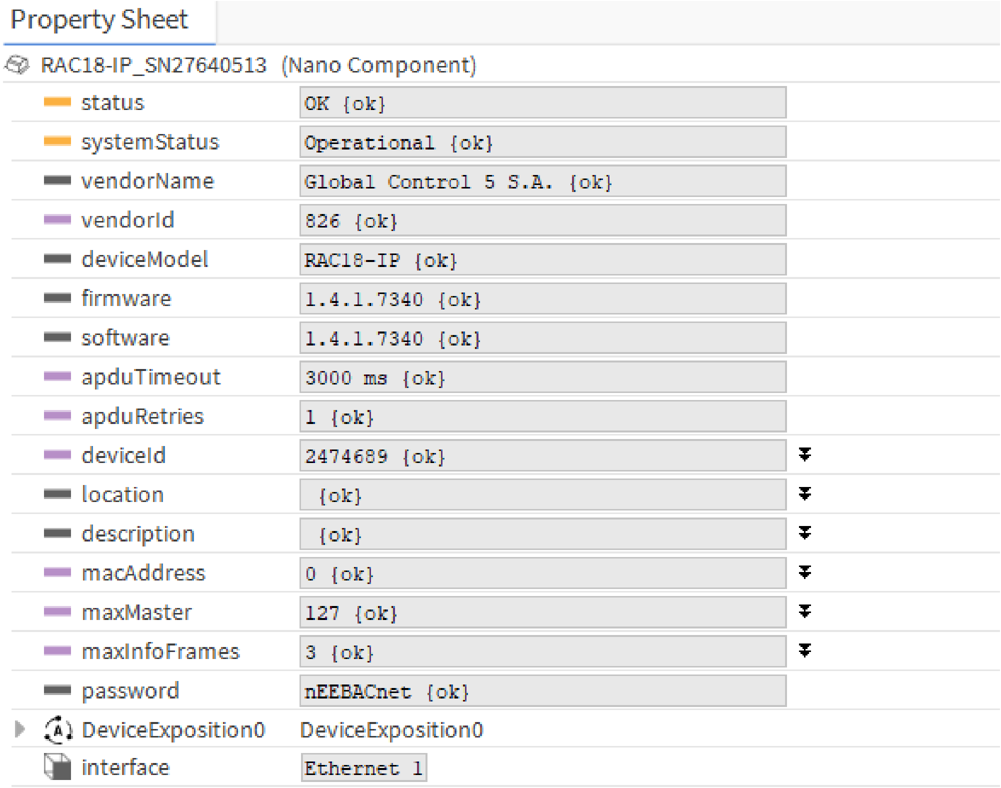


Figure 129. The SetAddress action

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.



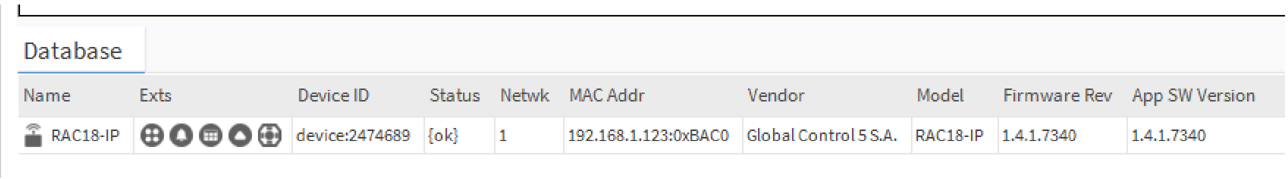
Property Sheet

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 130. 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.

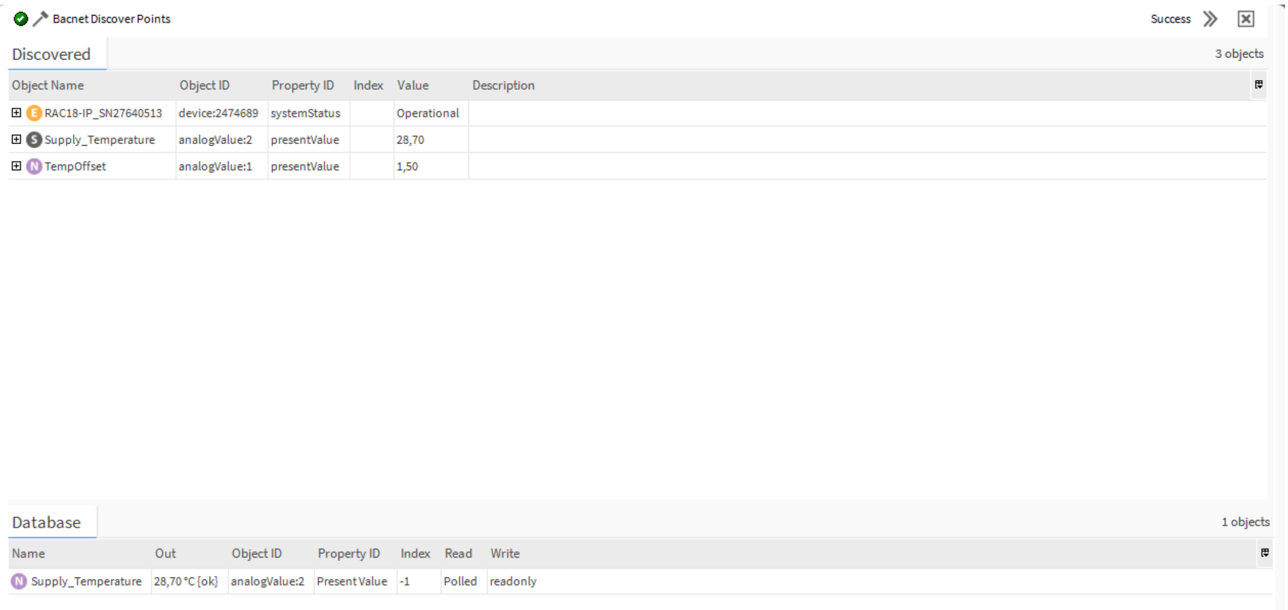


Database

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 131. 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

Discovered

3 objects

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

Database

1 objects

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

Figure 132. Points added to the Niagara BACnet database

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

6 Supported Workbench Views

Workbench offers a variety of views, which enable efficient management of devices, logic, and networks. With nE2 Link, the following Workbench views are supported for nano EDGE ENGINE devices:

6.1 Wire Sheet

(supporting the nano EDGE ENGINE context menu):

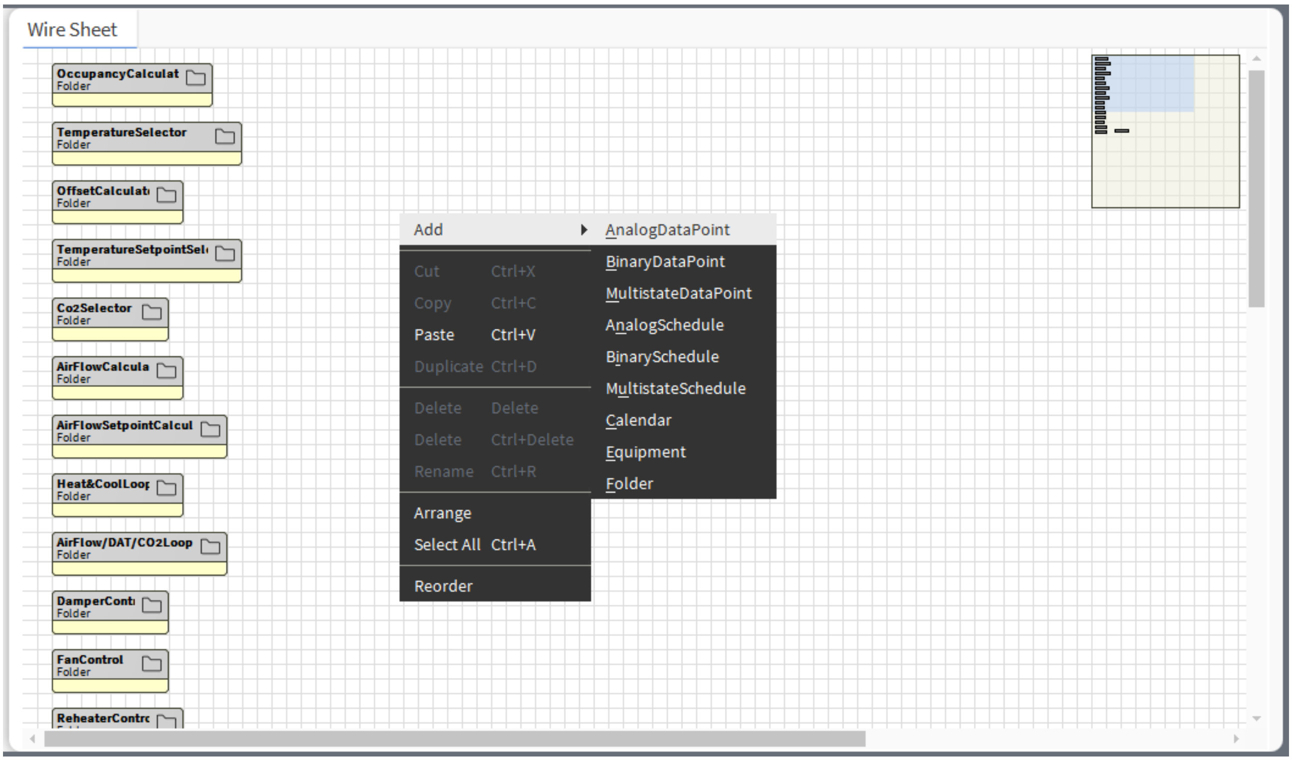
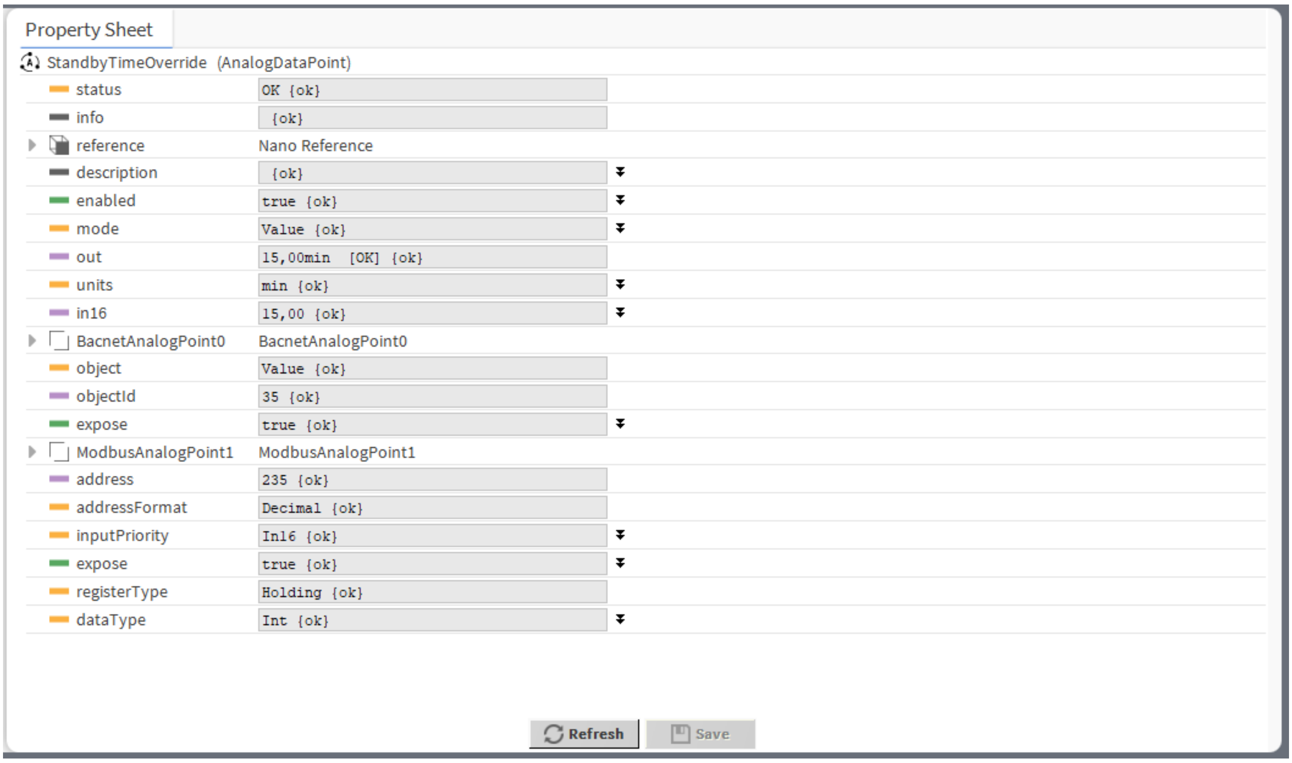


Figure 133. Wire sheet with the nano EDGE ENGINE context menu

6.2 AX Property Sheet



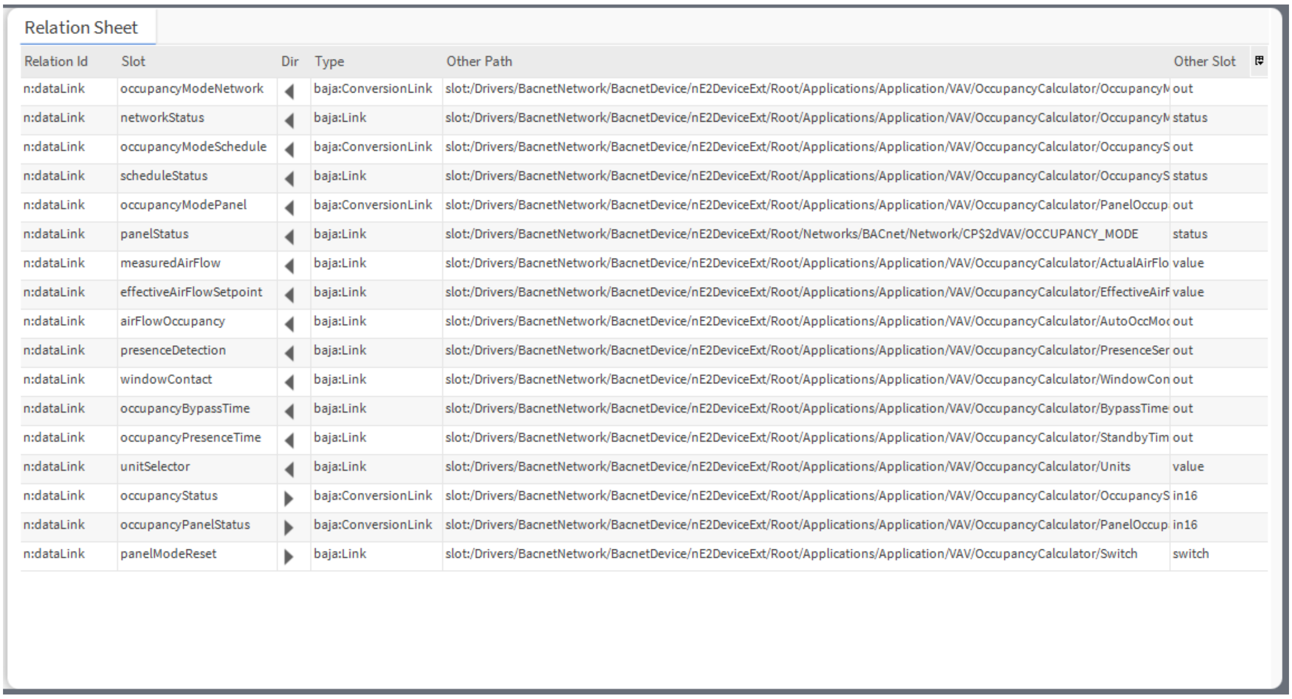
Property Sheet

StandbyTimeOverride (AnalogDataPoint)

status	OK {ok}
info	{ok}
reference	Nano Reference
description	{ok}
enabled	true {ok}
mode	Value {ok}
out	15,00min [OK] {ok}
units	min {ok}
in16	15,00 {ok}
BacnetAnalogPoint0	BacnetAnalogPoint0
object	Value {ok}
objectId	35 {ok}
expose	true {ok}
ModbusAnalogPoint1	ModbusAnalogPoint1
address	235 {ok}
addressFormat	Decimal {ok}
inputPriority	In16 {ok}
expose	true {ok}
registerType	Holding {ok}
dataType	Int {ok}

Figure 134. Property sheet view for the AnalogDataPoint

6.3 Relation Sheet



Relation Sheet

Relation Id	Slot	Dir	Type	Other Path	Other Slot
n:dataLink	occupancyModeNetwork	◀	baja:ConversionLink	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/OccupancyM	out
n:dataLink	networkStatus	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/OccupancyM	status
n:dataLink	occupancyModeSchedule	◀	baja:ConversionLink	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/OccupancyS	out
n:dataLink	scheduleStatus	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/OccupancyS	status
n:dataLink	occupancyModePanel	◀	baja:ConversionLink	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/PanelOccup	out
n:dataLink	panelStatus	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Networks/BACnet/Network/CP$2dVAV/OCCUPANCY_MODE	status
n:dataLink	measuredAirFlow	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/ActualAirFlo	value
n:dataLink	effectiveAirFlowSetpoint	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/EffectiveAirF	value
n:dataLink	airFlowOccupancy	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/AutoOccMo	out
n:dataLink	presenceDetection	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/PresenceSer	out
n:dataLink	windowContact	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/WindowCon	out
n:dataLink	occupancyBypassTime	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/BypassTime	out
n:dataLink	occupancyPresenceTime	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/StandbyTim	out
n:dataLink	unitSelector	◀	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/Units	value
n:dataLink	occupancyStatus	▶	baja:ConversionLink	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/OccupancyS	in16
n:dataLink	occupancyPanelStatus	▶	baja:ConversionLink	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/PanelOccup	in16
n:dataLink	panelModeReset	▶	baja:Link	slot:/Drivers/BacnetNetwork/BacnetDevice/nE2DeviceExt/Root/Applications/Application/VAV/OccupancyCalculator/Switch	switch

Figure 135. Relation sheet listing all incoming and outgoing links of the component

Note

As of the nE2 Link V1.1, the web views are not supported.

7 Workbench with nano EDGE ENGINE

Being as advanced a tool as the Workbench is, the nE2 Link primarily supports functions native to the nano EDGE ENGINE, and so the Workbench options may occasionally differ from the ones native to the Niagara environment. This section describes new functions deriving from the nano EDGE ENGINE and existing native Niagara functionalities that were confirmed to work by iSMA CONTROLLI.

7.1 Basic Context Menu Options

Context menu options normally differ between components, for example, in terms of available views or actions. However, there is a set of basic options, which are supported regardless of the type of component the context menu is invoked on.

- Views: allows to display component's data in one of the defined standard views (Wire Sheet, Property Sheet), or in other views if they are available for a particular component (more on Views below);
- Actions: shows a list of actions that may be invoked for the given component;
- Cut: (shortcut Ctrl+X) removes a selected component from an original location and allows it to paste in a new location (applicable only within the Applications container);
- Copy: (shortcut Ctrl+C) remembers and copies a selected component along with all its properties, settings, and links information;
- Paste: (shortcut Ctrl+V) pastes a previously remembered component into a specific place and possibly recreates internal links;
- Duplicate: (shortcut Ctrl+D) duplicates the selected components in the same location;

Copying

Copying of components includes all links created between the copied components, except for external links (links to components placed under a different parent/superior component, for example, reference links between network points in the Networks container and Data Points in the Applications container). If only one component is copied, its links will be neglected in the process.

Cutting

Cutting of components allows to move them to another location while removing them from the original one. The mechanism allows to move one or more components at a time, however, they must be moved within the same container (the option is available only within the Applications container).

Pasting

Copied or cut components may be pasted into a chosen place in the Wire Sheet or Property Sheet views or in the tree, by indicating the pasting place and pressing Ctrl+V, or using the Paste option from the context menu. Pasting copied components creates new components along with their children components and slot settings effective at the moment of copying. The pasted slot values are sourced from the copied component. Pasting cut components moves them from the original location to the new one along with their values and links.

Duplicating

Duplication is a method is used for a quick replication of a selected component along with its values. The slot values for the duplicated component are rewritten from the source component.

- Delete: (shortcut Del) removes the selected components;
- Link Mark: allows to define the component from which a link will be led (used along with the Link From option) or to which a link will be led (used along with the Link To option);
- Link From: allows to create a link from the marked component to the selected component;
- Link To: allows to create a link from the selected component to the marked component;
- Reorder: allows to reorder components in the tree;

Reordering

Reordering helps organize the contents of the application (the option is available only within the Applications container). It is invoked from the context menu on the tree, wire sheet, or property sheet and is executed in a pop-up:

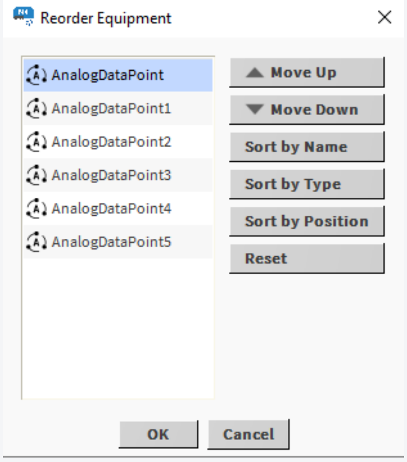


Figure 136. Reordering pop-up always lists children components of the one the option was invoked on

- Rename: allows to change a component's name (can be applied to one or more components);
- Export: allows to initialize the Workbench export to a file;
- Refresh Tree Node: allows to update the tree;
- Go Into: allows to simplify the view in the nav section by making the item, on which the the action is invoked, the top level of visibility.

Go Into

Using the nE2 Link in the station requires adding the device in the BACnet network, which results in a complex structure of the tree when unfolding elements to reach the nE2DeviceExt. Go Into function allows to simplify the view and display only the contents of the extension:

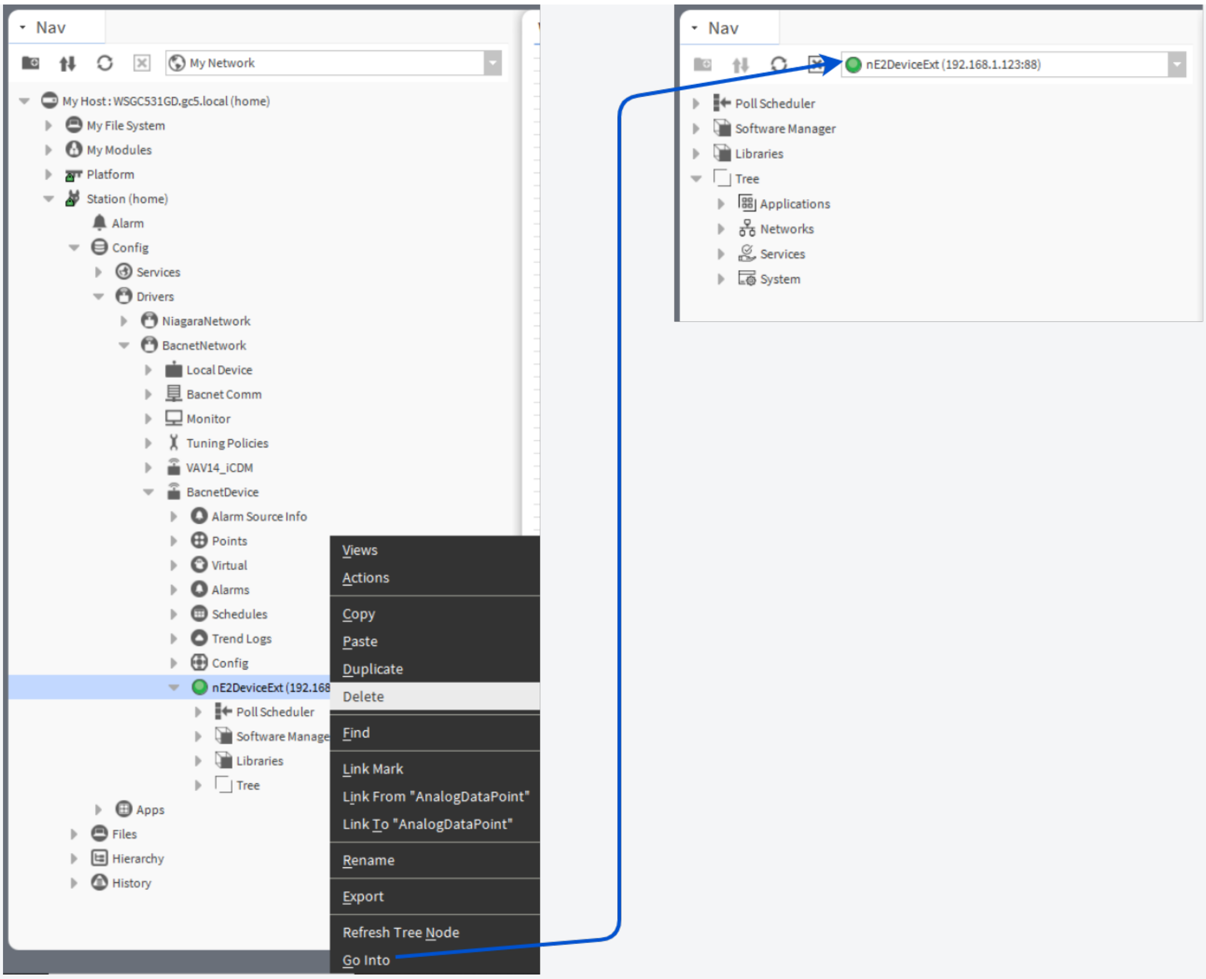


Figure 137. Using the Go Into option to simplify the tree structure

7.2 Specific Context Menu Options

- Add: the function offers an expedited way of adding certain type of components to the application.

Add

Using the Add option from the context menu is available only in the Application container and refers to the following components:

- AnalogDataPoint
- BinaryDataPoint
- MultistateDataPoint
- AnalogSchedule
- BinarySchedule
- MultistateSchedule
- Calendar
- Equipment
- Folder

8 Logs

The Logs component runs an adjustable register of all events happening in the connected device. Such register becomes crucial when troubleshooting; it enables checking records, comparing recent ones with historical feeds, and, if needed, sharing them with the iSMA CONTROLLI Support Team for further diagnostics.

The records in the Logs register are grouped by their genre; they are categorized depending on the area they originated–firmware, core, BACnet, app, etc. Each group may have its individual log level defining priorities of data to be recorded, according to the users needs. These priorities are differentiated from Debug (each event happening is registered) to Critical (only few events that result in the system error are registered).

The Logs register is written to a file and saved on the SD card in the device. If needed, it may be copied from the SD card and shared with the iSMA CONTROLLI Support Team for troubleshooting.

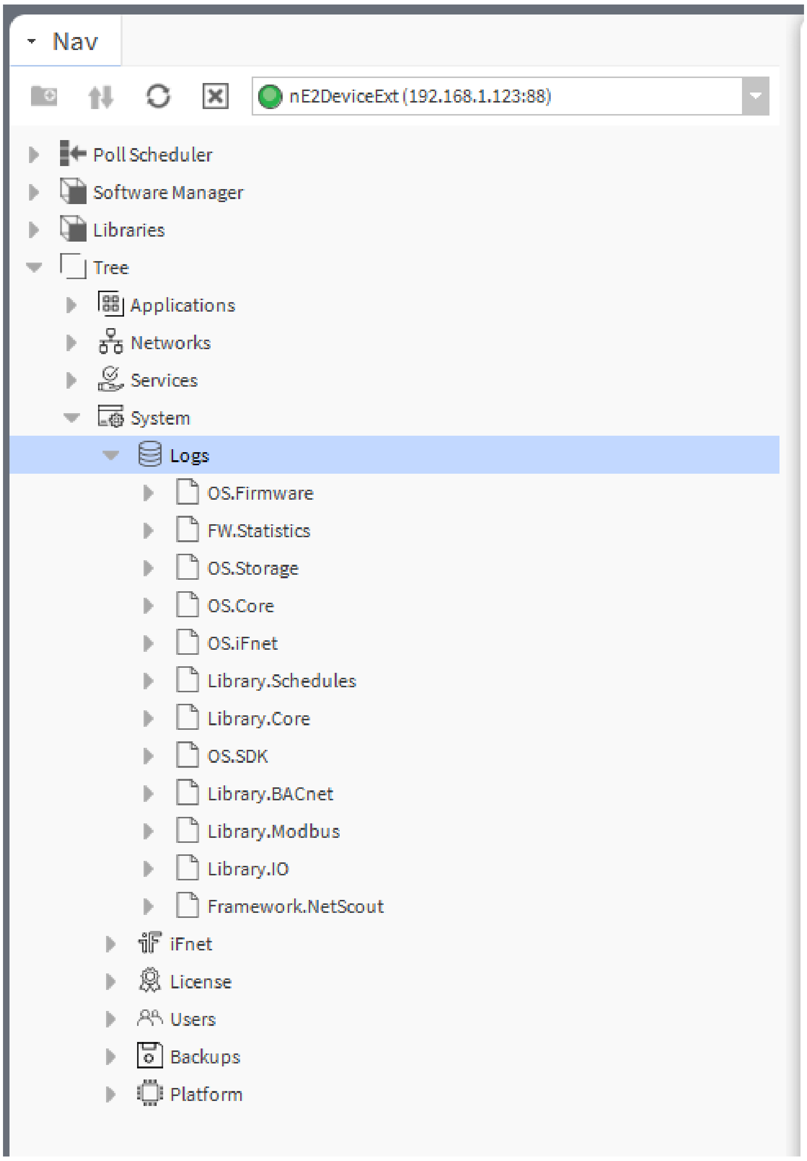


Figure 138. Logs

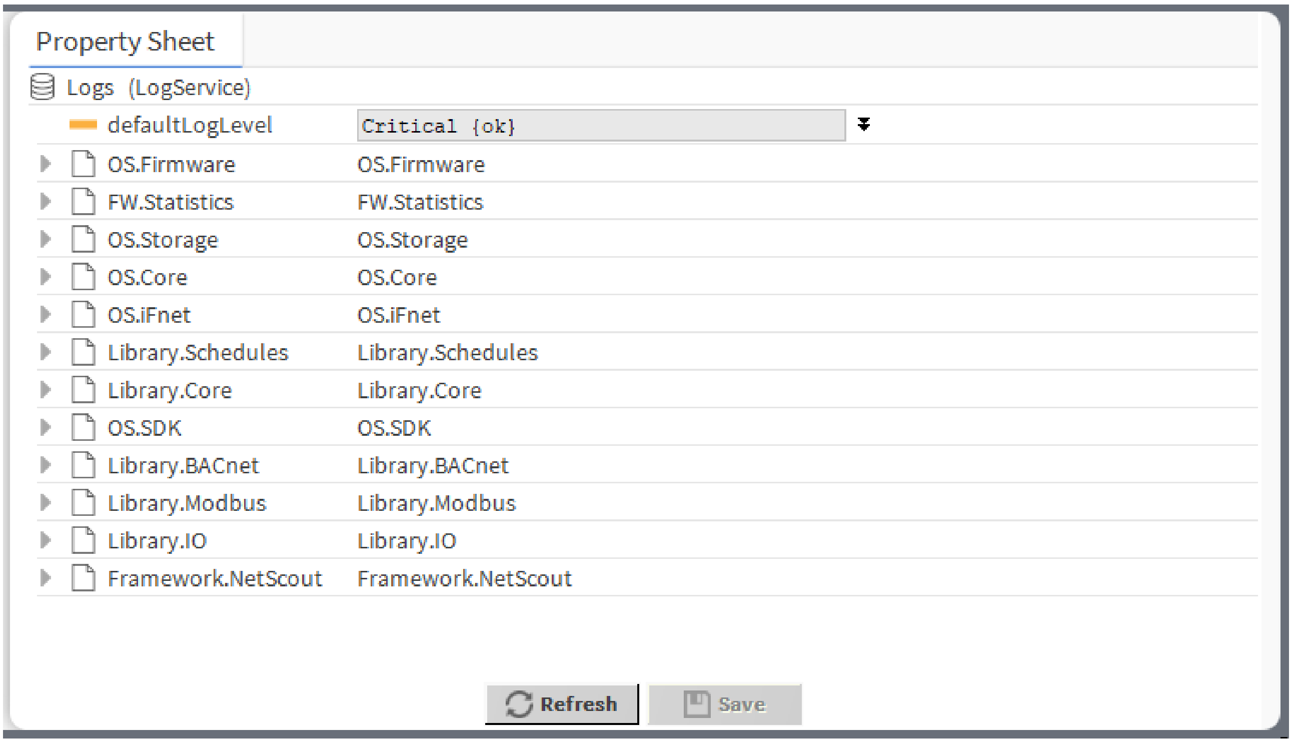
The Logs component has one slot:

- Default Log Level: assigns the importance of logs to be registered. Log levels are listed by level of details (Debug - most detailed, Critical - least detailed). If the default log level is set, for example, to Important, saved logs will include records from the Important level and the less detailed levels, in this case, the Error and Critical levels;

- Available settings:
    - Debug: logs used for debugging purposes (e.g., information about sent iFNet requests or elements saved to storage),
    - Normal: logs informing about typical actions in the device, which are characteristic for a device's normal operation (e.g., information about free managed memory, added BACnet objects, steps of creating or restoring backup, etc.),
    - Warning: logs informing about a wrong configuration or issued action not working as expected (e.g., issuing the action while the parent service is disabled or initializing the component more than once) – keep in mind that in a properly configured and properly working application these logs may not appear at all,
    - Important: logs containing information crucial for device identification (e.g., iFnet IP address and port, firmware version, hardware version, core version), device readiness (e.g., system started, loaded services, BACnet/Modbus ports, loaded libraries, etc.), and important actions (e.g., detected DIP switch reset, factory reset, successful restore, etc.),
    - Error: logs informing about errors in applications (i.e., bad link, wrongly configured IO, unable to delete folder, errors in creating or restoring backup, etc.),
    - Critical: logs informing about issues that were not handled properly and need to be fixed as soon as possible, (e.g., entering the emergency mode, occurrence of hard fault of the device, stack overflow, or watchdog reset, etc.).

Note

The default log level is Critical.
Please note that logs have a built-in automatic mechanism, which switches the log level back to the Critical level after 24 hours for any change.



Property Sheet

Logs (LogService)

defaultLogLevel	Critical {ok}
OS.Firmware	OS.Firmware
FW.Statistics	FW.Statistics
OS.Storage	OS.Storage
OS.Core	OS.Core
OS.iFnet	OS.iFnet
Library.Schedules	Library.Schedules
Library.Core	Library.Core
OS.SDK	OS.SDK
Library.BACnet	Library.BACnet
Library.Modbus	Library.Modbus
Library.IO	Library.IO
Framework.NetScout	Framework.NetScout

Figure 139. Logs' slot defaultLogLevel

Note

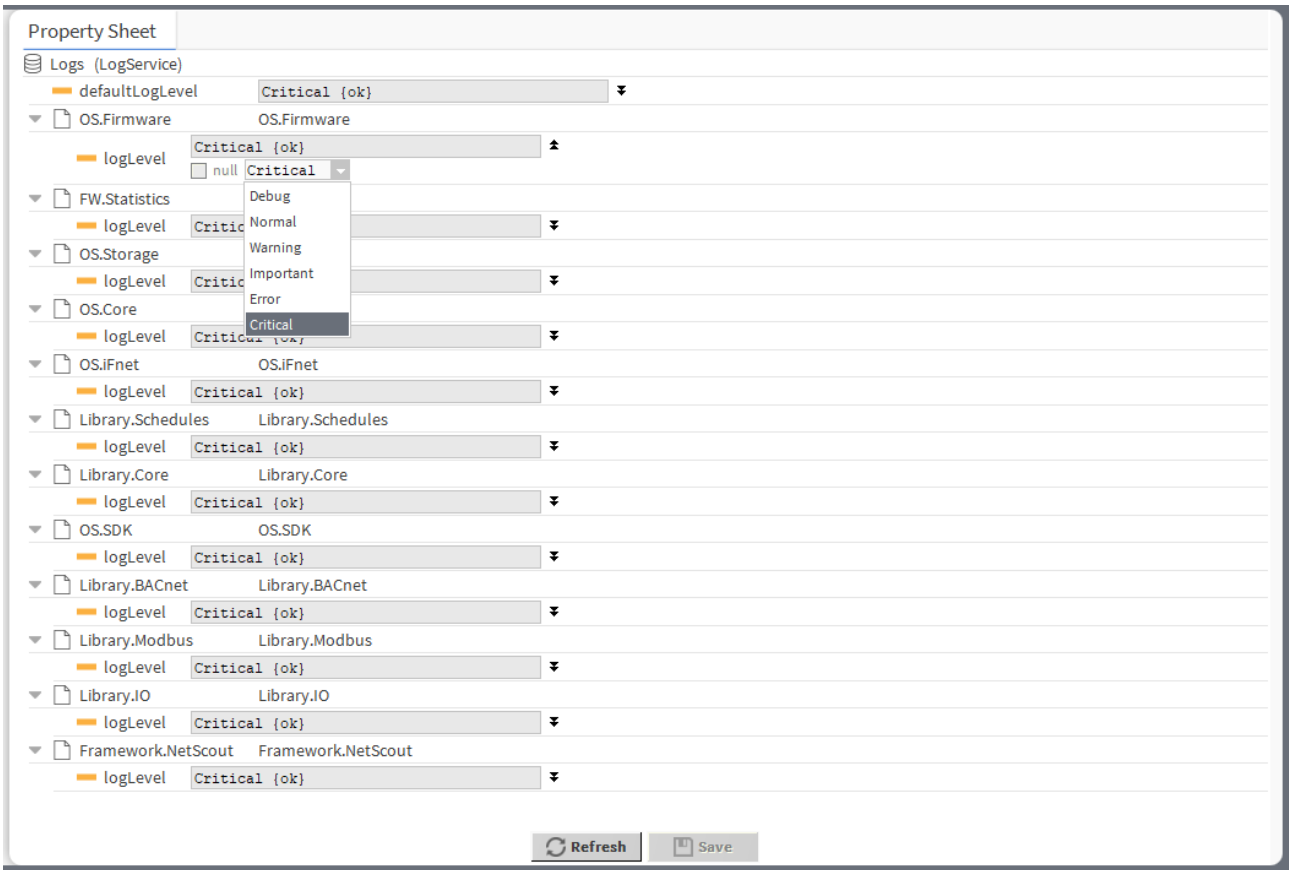
Logs register information about network configuration (IP address, default gateway, mask) providing a convenient way to retrieve such data if lost.

8.1 Extensions

The Logs component has also available the component's extensions for each of groups defined for register:

- OS.Firmware,
- FW.Statistics,
- OS.Storage,
- OS.Core (system elements),
- OS.iFnet,
- Library.Schedules,
- Library.Core (library including Data Points, folders, etc.),
- OS.SDK,
- Library.BACnet,
- Library.Modbus,
- Library.io,
- Framework.NetScout.

Each of the above has a logLevel slot, which allows to individually set the importance of logs to be registered.



Property Sheet

Logs (LogService)

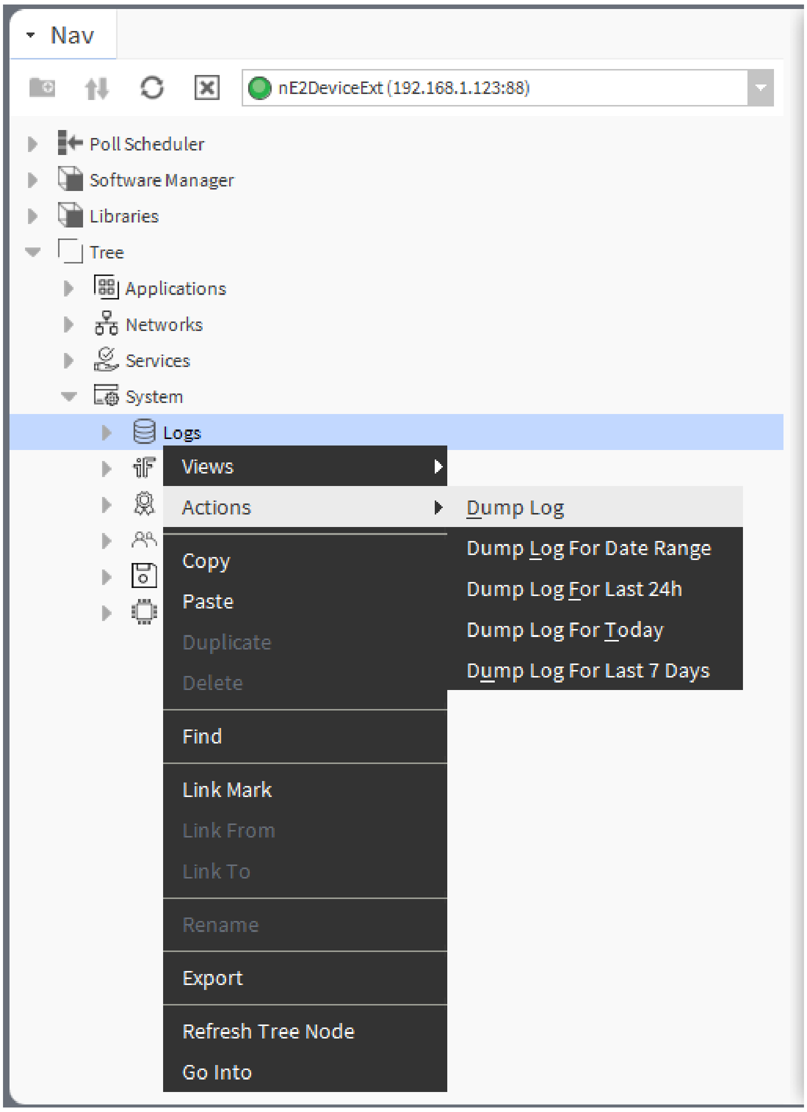
defaultLogLevel	Critical {ok}
OS.Firmware	OS.Firmware
logLevel	Critical {ok} □ null Critical
FW.Statistics	
logLevel	Critic
OS.Storage	
logLevel	Critic
OS.Core	
logLevel	Critical {ok}
OS.iFnet	OS.iFnet
logLevel	Critical {ok}
Library.Schedules	Library.Schedules
logLevel	Critical {ok}
Library.Core	Library.Core
logLevel	Critical {ok}
OS.SDK	OS.SDK
logLevel	Critical {ok}
Library.BACnet	Library.BACnet
logLevel	Critical {ok}
Library.Modbus	Library.Modbus
logLevel	Critical {ok}
Library.IO	Library.IO
logLevel	Critical {ok}
Framework.NetScout	Framework.NetScout
logLevel	Critical {ok}

Figure 140. logLevel slots

8.2 Accessing Logs

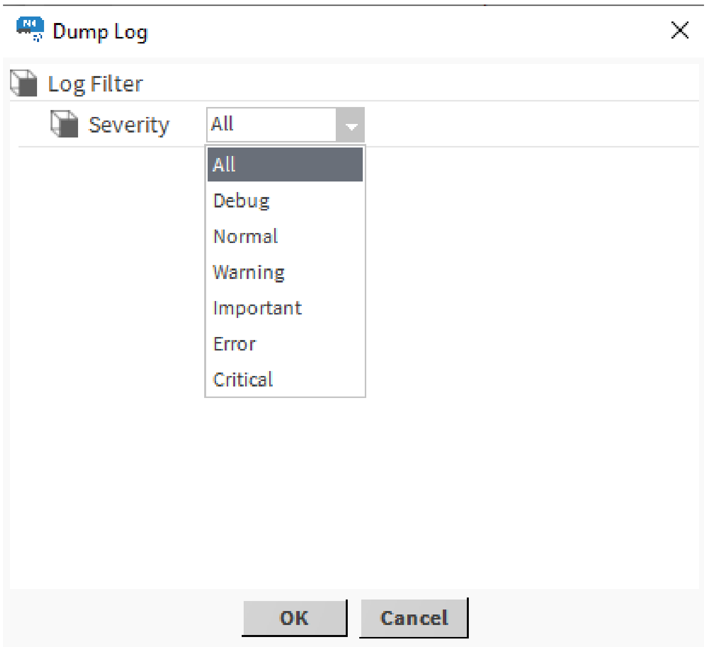
Logs are accessible from the Nav Tree under the System → Logs.

To save logs, right-click on Logs and select Actions → Dump Log from the context menu.



The following actions are available:

- **Dump Log:** saves all registered logs to a .txt file,



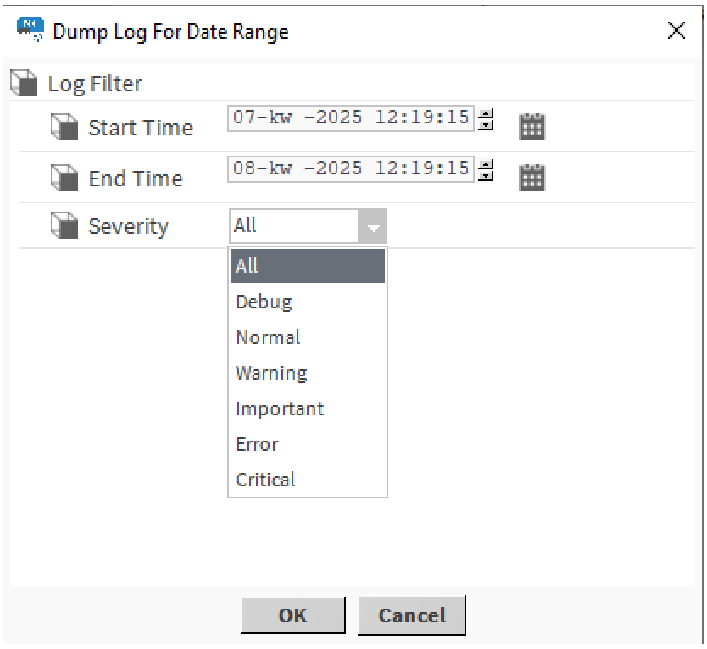
Dump Log

Log Filter

Severity: All

Figure 141. Dump Log action

- **Dump Log for Date Range:** saves logs from a selected date range to a .txt file,



Dump Log For Date Range

Log Filter

Start Time: 07-kw -2025 12:19:15

End Time: 08-kw -2025 12:19:15

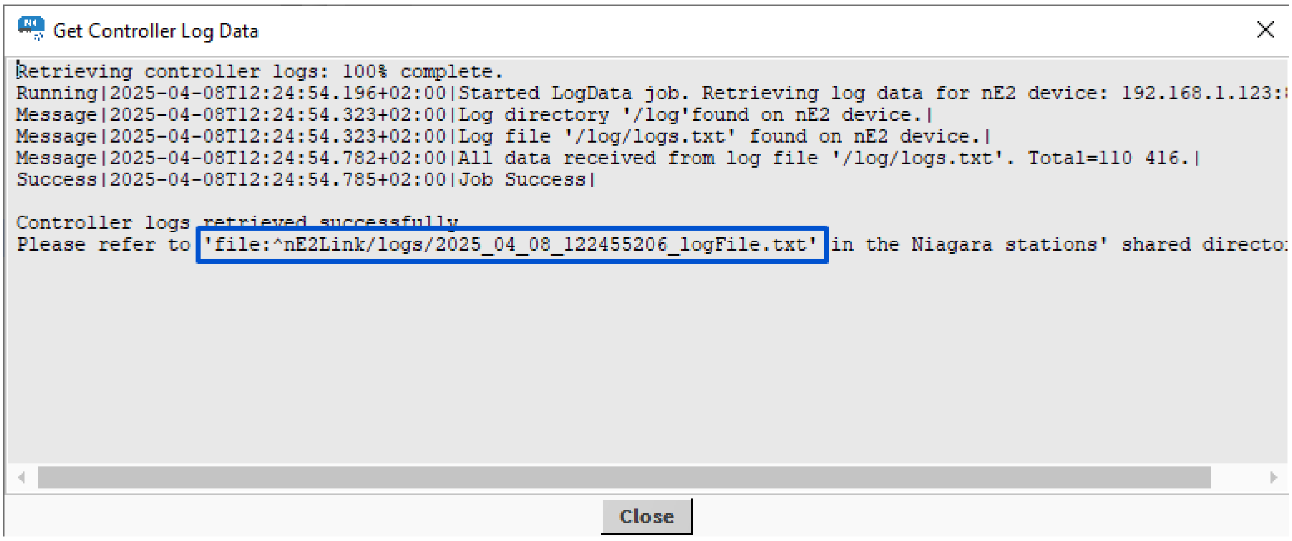
Severity: All

Figure 142. Dump Log for Date Range action

- **Dump Log for Last 24 Hours:** saves logs from lat 24 hours to a .txt file,
- **Dump Log for Today:** saves logs from today to a .txt file,
- **Dump Log for Last 7 Days:** saves logs from last 7 days to a .txt file.

After selecting an action, a Dump Log window pop-up, where it is possible to specify the level of log filtering.

In the final step, a confirmation window is displayed with the status of the task and indication of the location of the saved log file.



```
Retrieving controller logs: 100% complete.
Running|2025-04-08T12:24:54.196+02:00|Started LogData job. Retrieving log data for nE2 device: 192.168.1.123:
Message|2025-04-08T12:24:54.323+02:00|Log directory '/log'found on nE2 device.|
Message|2025-04-08T12:24:54.323+02:00|Log file '/log/logs.txt' found on nE2 device.|
Message|2025-04-08T12:24:54.782+02:00|All data received from log file '/log/logs.txt'. Total=110 416.|
Success|2025-04-08T12:24:54.785+02:00|Job Success|

Controller logs retrieved successfully
Please refer to 'file:^nE2Link/logs/2025_04_08_122455206_logFile.txt' in the Niagara stations' shared directo
```

Figure 143. Saving logs confirmation pop-up

The file can then be accessed in the tree under Files:

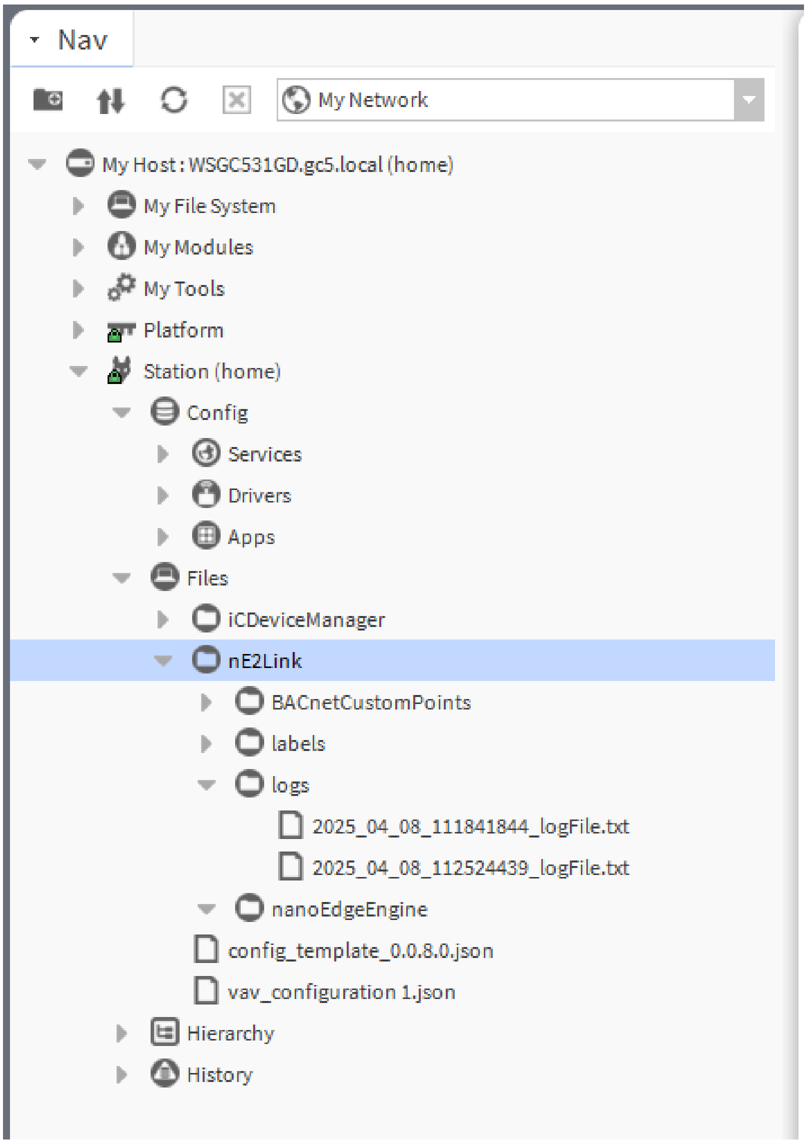
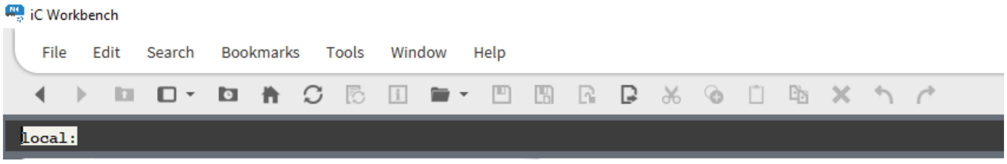


Figure 144. Logs file location

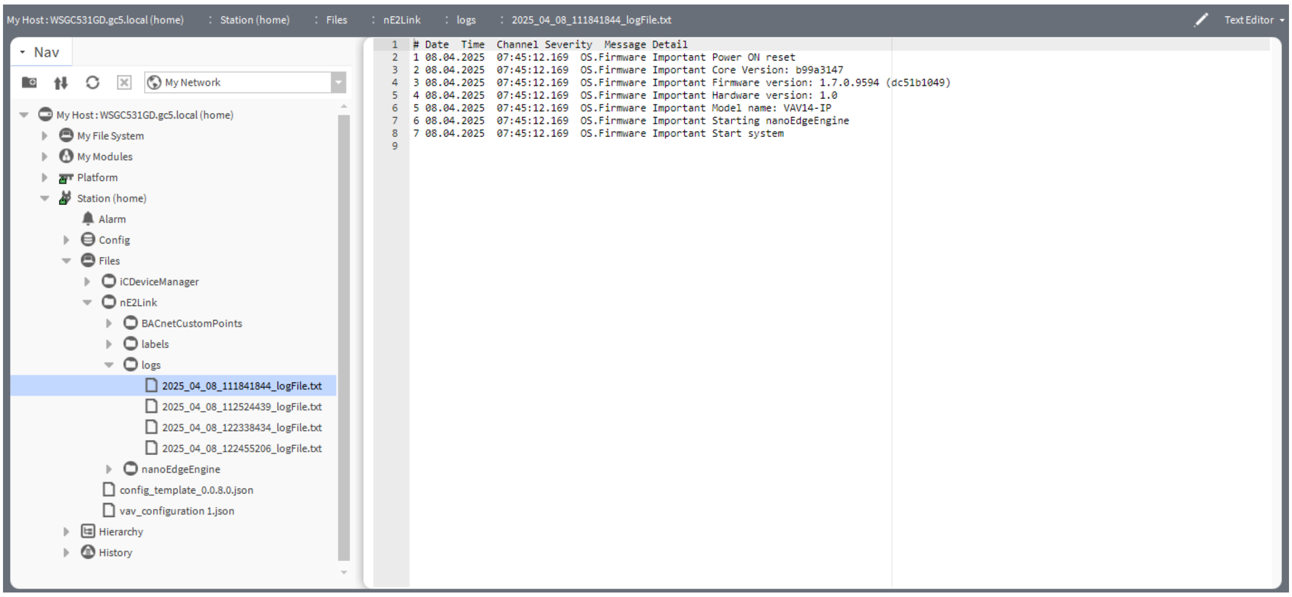
To access the logs, either double-click on the .txt file in the tree or copy the file's path from the confirmation pop-up and paste it to the editable path in Workbench.



```
local:
```

Figure 145. The Workbench bar with files' path becomes editable upon clicking

The file will be opened in the Workbench text editor view.


My Host : WSGC531GD.gc5.local (home)
: Station (home)
: Files
: nE2Link
: logs
: 2025_04_08_111841844_logFile.txt
Text Editor
Nav
My Network
My Host : WSGC531GD.gc5.local (home)
My File System
My Modules
Platform
Station (home)
Alarm
Config
Files
iCDeviceManager
nE2Link
BACnetCustomPoints
labels
logs
2025_04_08_111841844_logFile.txt
2025_04_08_112524439_logFile.txt
2025_04_08_122338434_logFile.txt
2025_04_08_122455206_logFile.txt
nanoEdgeEngine
config_template_0.0.8.0.json
vav_configuration 1.json
Hierarchy
History

```
# Date  Time  Channel Severity  Message Detail
1 08.04.2025  07:45:12.169  OS.Firmware Important Power ON reset
2 08.04.2025  07:45:12.169  OS.Firmware Important Core Version: b99a3147
3 08.04.2025  07:45:12.169  OS.Firmware Important Firmware version: 1.7.0.9594 (dc51b1049)
4 08.04.2025  07:45:12.169  OS.Firmware Important Hardware version: 1.0
5 08.04.2025  07:45:12.169  OS.Firmware Important Model name: VAV14-IP
6 08.04.2025  07:45:12.169  OS.Firmware Important Starting nanoEdgeEngine
7 08.04.2025  07:45:12.169  OS.Firmware Important Start system
```

Figure 146. Logs presented in text editor