



oasBACnetUtilities

Application Manual

Service based on the Niagara firmware

This service is based on the Niagara firmware and ensures that the data point information can be exchanged between the BACnet and the CBUS protocols.

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IoT Solutions and Services
for Smart Automation



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List of Terms and Abbreviations

Term	Definition
BACnet	Building Automation and Control Networks.
C-Bus	Communication Bus protocol using the RS-485. Supports multiple masters using a token-passing mechanism.

1 Introduction

Customer installations may require new additional functionalities that were not available at the time the systems were installed, such as nice Graphical User Interfaces and Web access to the system. We are thus faced with a fundamental problem, either replacing with up-to-date functional solutions which are long-term investments and very expensive or adapting and extending the installed control systems without having to completely replace them.

This is a service based on the Niagara firmware to ensure that the data point information can be exchanged between the BACnet and other bus protocols.

1.1 Assumptions

It is assumed that the person who wants to operate the **oasBACnetUtilities** via the Niagara Workbench has at least basic knowledge about the Niagara Framework.

It is assumed that the person who wants to operate the **oasBACnetUtilities** has basic knowledge about the bus protocol to be integrated.

1.2 Software-Requirements

The **oasBACnetUtilities** service requires at least Niagara 4.10 and a valid license specifically for this service.

2 Description of the Product

2.1 Purpose of the Product

The **oasBACnetUtilities** is a service developed by OAS to have the possibility to integrate bus communication systems under the Niagara Platform.

The **oasBACnetUtilities** has been proven in the configuration/maintenance of diverse projects using many Honeywell C-Bus controllers (e.g. Brenner's Hotel...).

The **oasBACnetUtilities** service is:

1. A service integrated under Niagara framework.
2. Simple and easy to use/integrate.
3. Helpful to detect and to use the C-Bus parameters as Datapoints by a third-party software like Kepware, OPC servers....
4. Ensuring that the data point information can be exchanged between the BACnet and another bus system, and so we can gain web access to all essential functions, such as schedule and point access, trending, alerting, graphics, parameters, etc.

2.2 Licensing

To access all the service's features, you must have a valid license of **oasBACnetUtilities**. Please, contact the **OAS Open Automation Systems GmbH** to have a valid license.

2.3 Product Elements

2.3.1 BACnet mapping Export rules

The oasBacnetUtilities service provides us with:

1. the mapping table for exporting datapoint types:

Control Point Type	Destination BACnet type	Prefix	BACnet Writable/Priorities
BooleanPoint	BBacnetBinaryInputDescriptor	C12_	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 clr all
BooleanWritable	BBacnetBinaryOutputDescriptor	C12_	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☒ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 clr all
EnumPoint	BBacnetMultiStateInputDescriptor	C12_	☐ 1 ☐ 2 ☐ 3 ☒ 4 ☒ 5 ☒ 6 ☒ 7 ☒ 8 ☒ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 clr all
EnumWritable	BBacnetMultiStateValuePrioritizedDescriptor	C12_	☒ 1 ☒ 2 ☒ 3 ☒ 4 ☒ 5 ☒ 6 ☒ 7 ☒ 8 ☒ 9 ☒ 10 ☒ 11 ☒ 12 ☒ 13 ☒ 14 ☒ 15 ☒ 16 clr all
NumericPoint	BBacnetAnalogInputDescriptor	C12_	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 clr all
NumericWritable	BBacnetAnalogOutputDescriptor	C12_	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☒ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 clr all
CBusParameterPoint	BBacnetAnalogValuePrioritizedDescriptor	C12_	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☒ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 clr all

Figure 1: Mapping Table for Exporting Datapoint Types

The rules allow us to configure the destination types of BACnet datapoints according to the datapoint source type.

For writable types, an array of checkboxes lets us select the specific priority levels externally exposed to BACnet to accept writes.

Note: This rule table is limited to the most common control data point types.

2. the prefix to add it to the Object name of the exported Datapoint.
3. the path from where to import the Description of the bus datapoint.

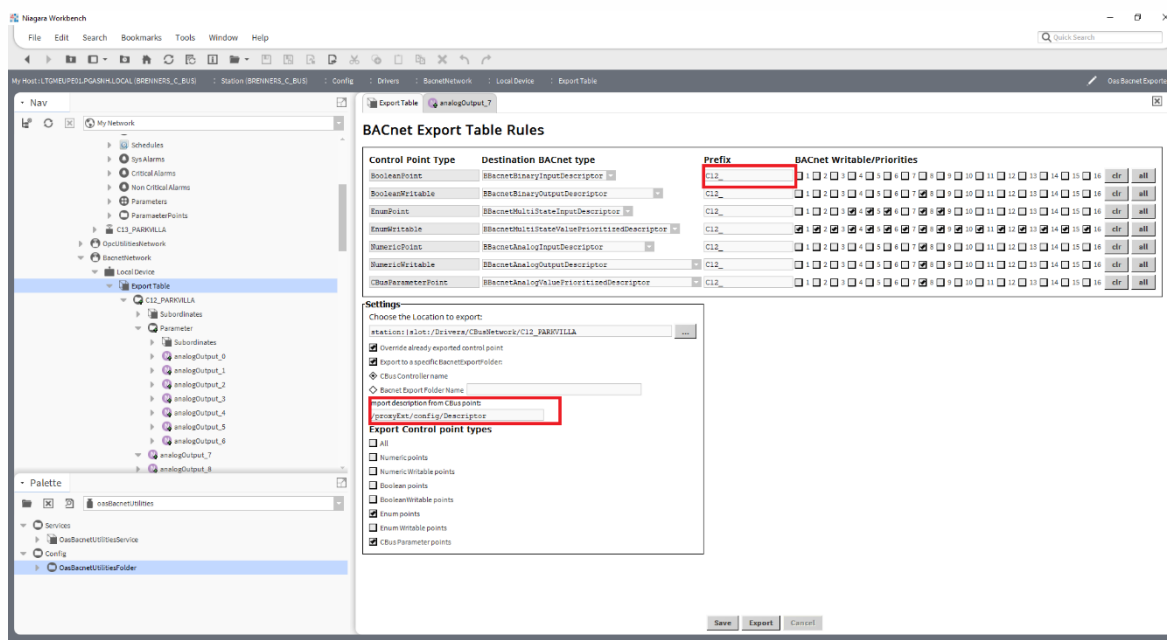


Figure 2: Import Path for Description for example of C-Bus Datapoints

2.4 Exemplary application for the Honeywell C-bus

2.4.1 C-Bus Enum Data Point Conversion

BACnet protocol does not accept enumerations starting at 0. Therefore, the value +1 must be adjusted from C-Bus Enum data point to BACnet and the value -1 from BACnet to C-Bus.

For example:

C-Bus Enum data point		BACnet Enum Data point	
Ordinal	Tag	Ordinal	Tag
0	Error	1	Error
1	Internal Failure	2	Internal Failure
2	Unknown	3	Unknown

Table 1: Example C-Bus versus BACnet

To solve this problem, the oasBACnetUtilities service includes a conversion called "**Cbus Enum To BACnet**". The Integrator/System Administrator does not have to worry about changing the facets, he only must change the "Conversion" of the C-bus Enum Data points and the values will be automatically adjusted.

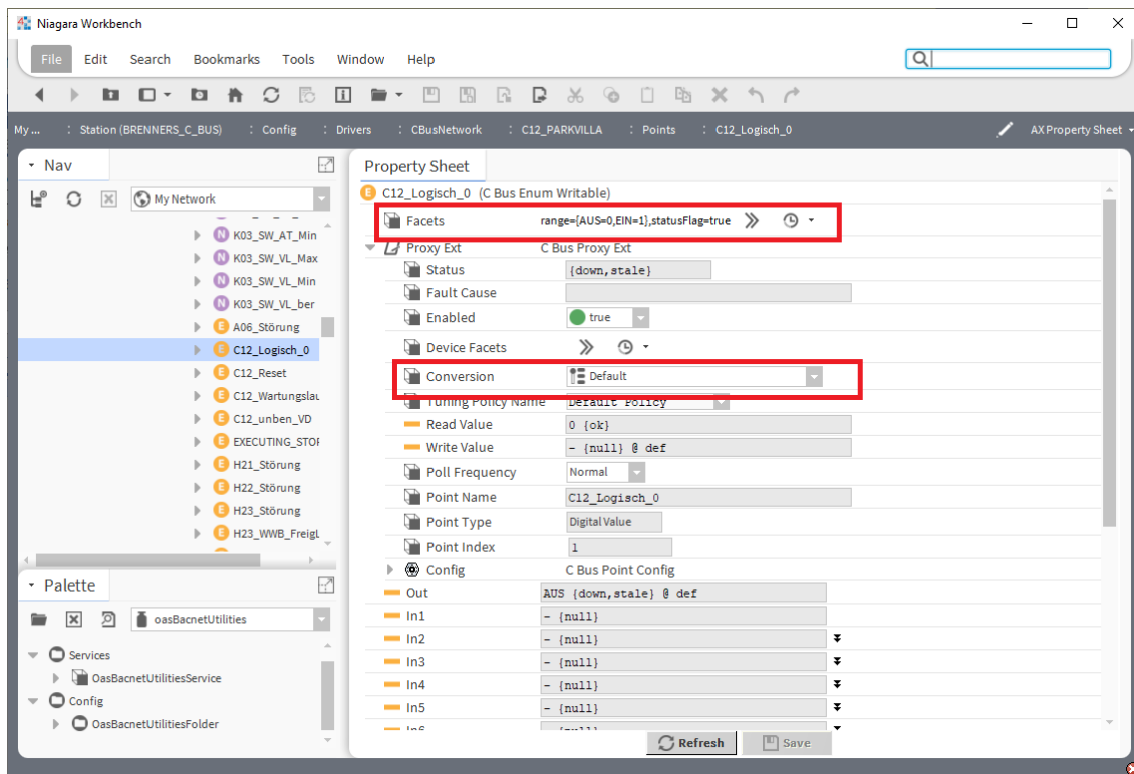


Figure 3: C-Bus Enum datapoint without conversion

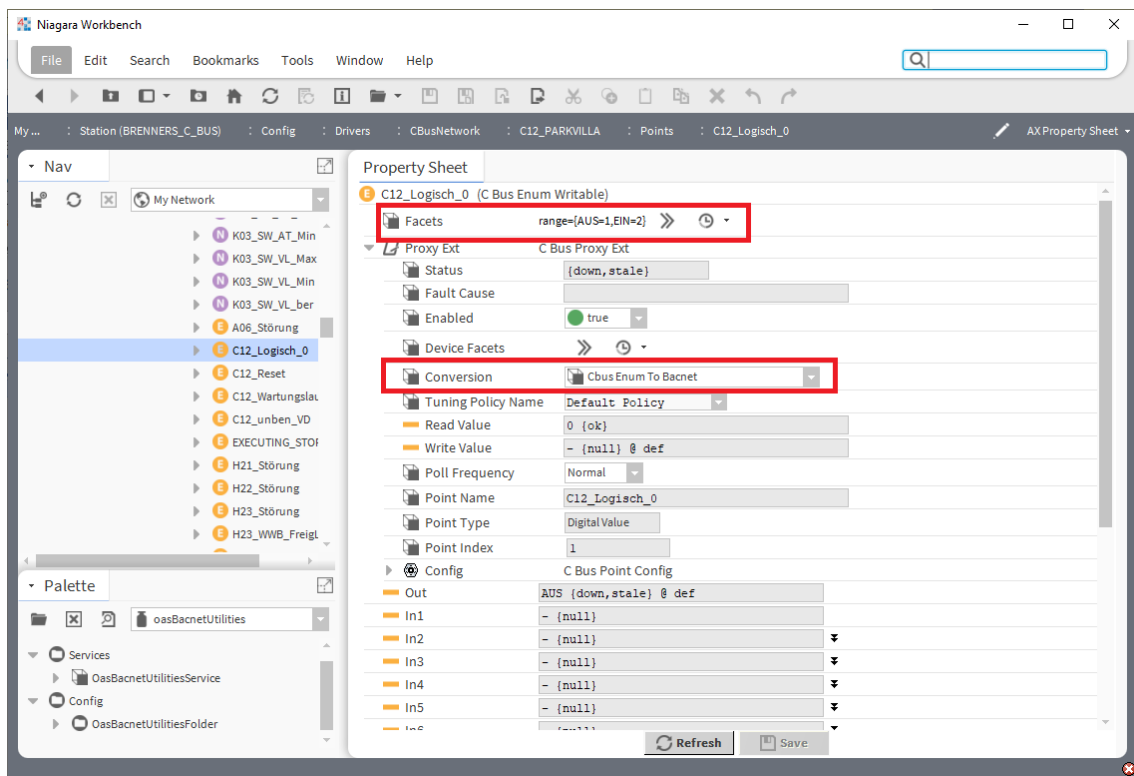


Figure 4: C-Bus Enum datapoint with conversion

2.4.2 C-bus parameters

The C-Bus parameters are not seen as data points, so exporting and using them as a data point on the BACnet side is not possible.

To interact on these C-Bus parameters on the BACnet side requires the creation of an intermediary datapoint named **“oasBacnetParameterPoint”**.

All the oasBacnetParameterPoints are linked to the C-Bus parameters.

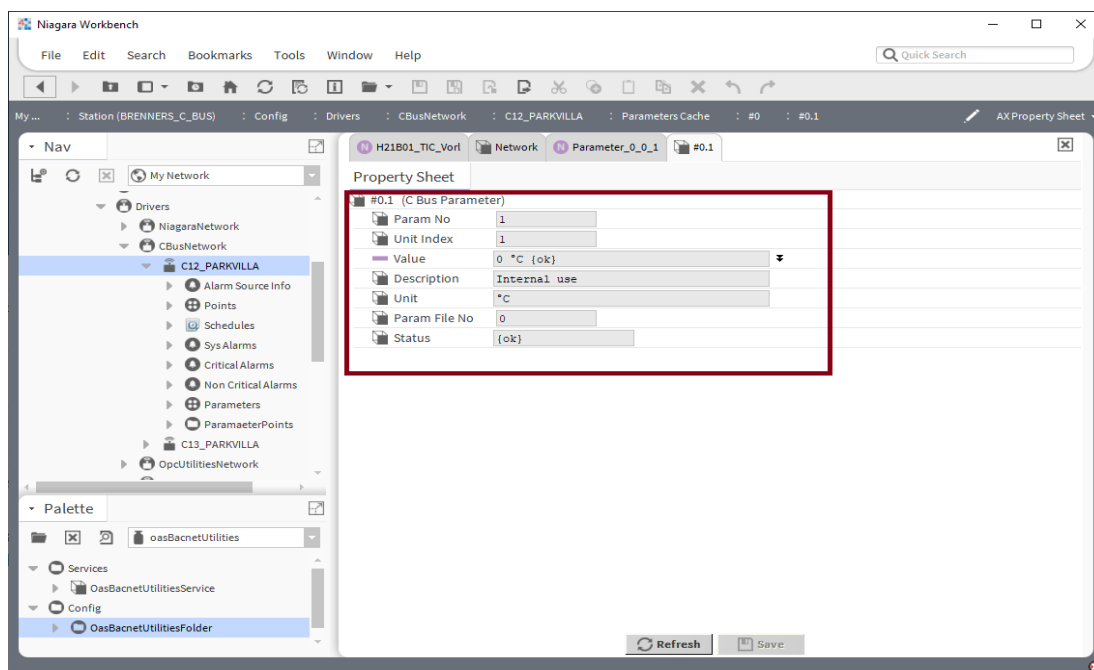


Figure 5: C-Bus Parameter Information

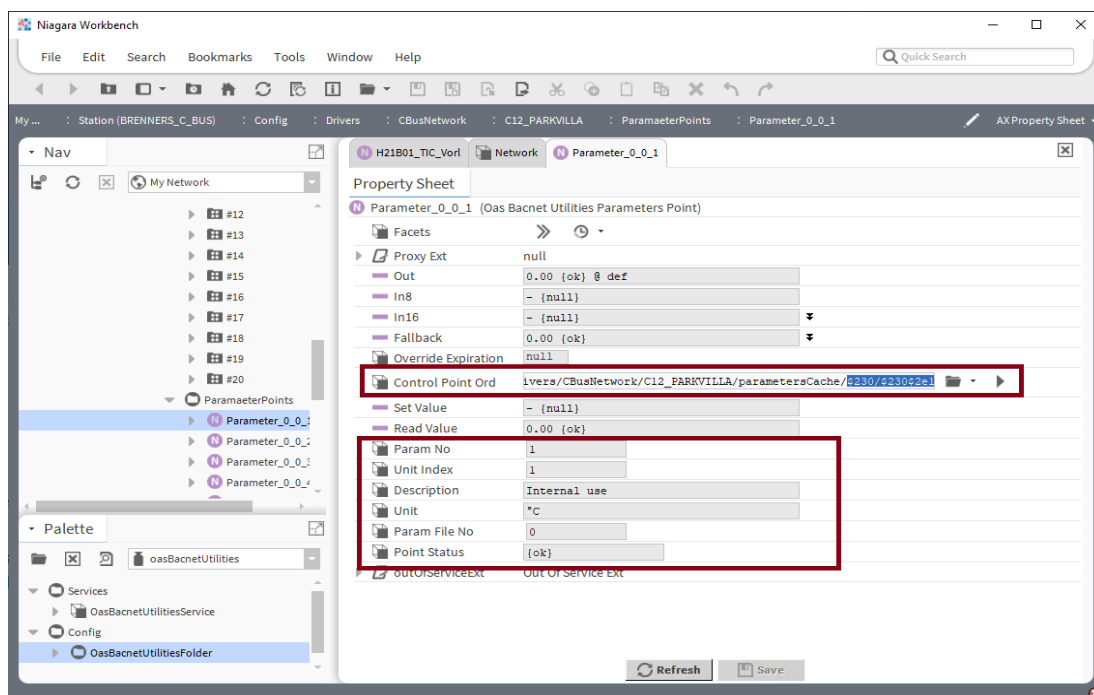


Figure 6: oasBacnetParameterPoint linked to C-Bus parameter

With the "**oasBacnetUtilitiesFolder**" component and its graphical utility, you can discover all the C-Bus parameters and export them to datapoints.

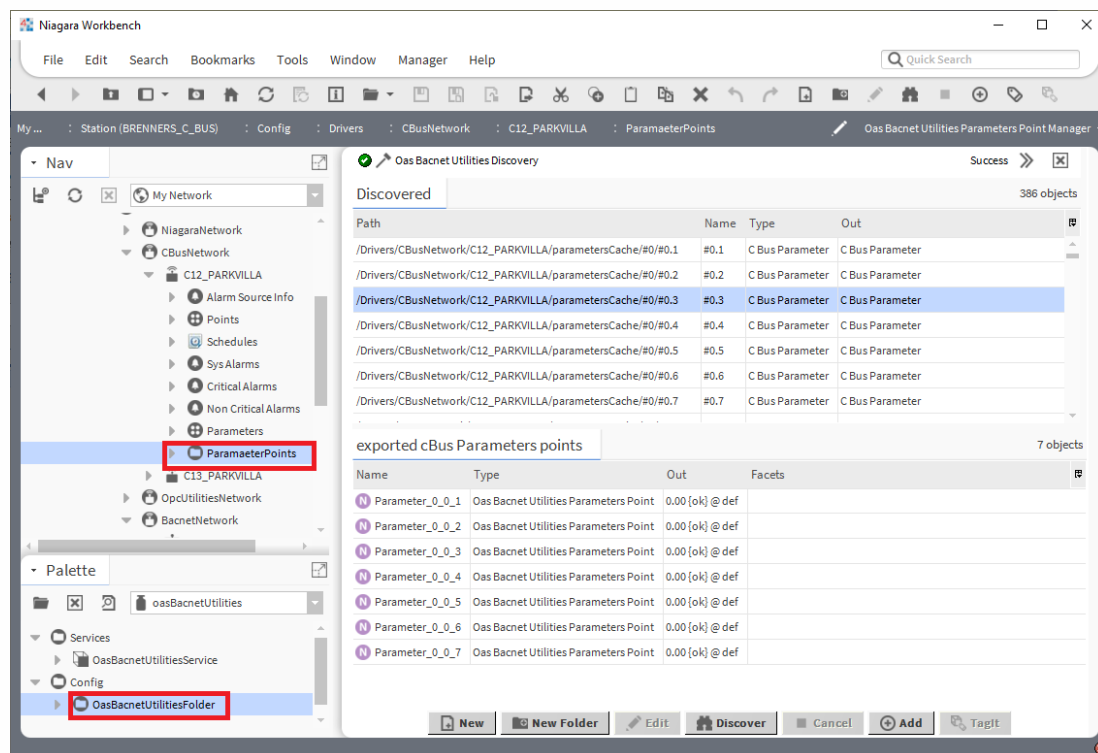


Figure 7: C-Bus Parameter Discovery

2.4.3 User case of Exporting a C-Bus Numeric Datapoint

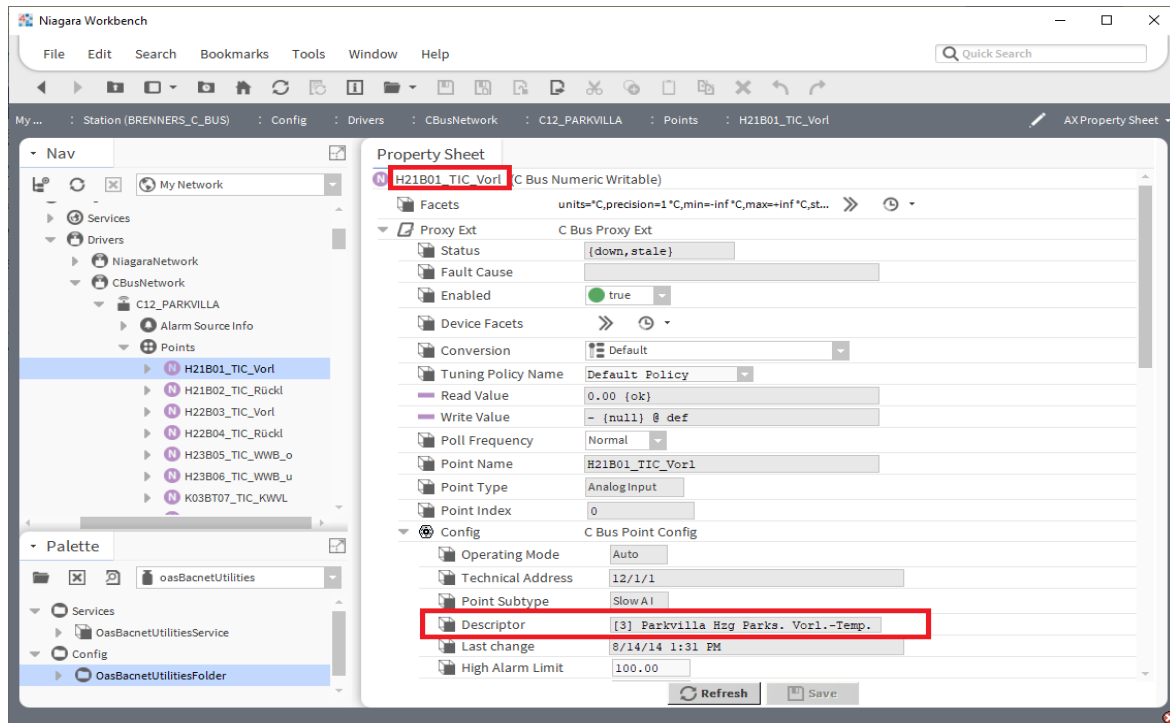


Figure 8: Original C-Bus Point

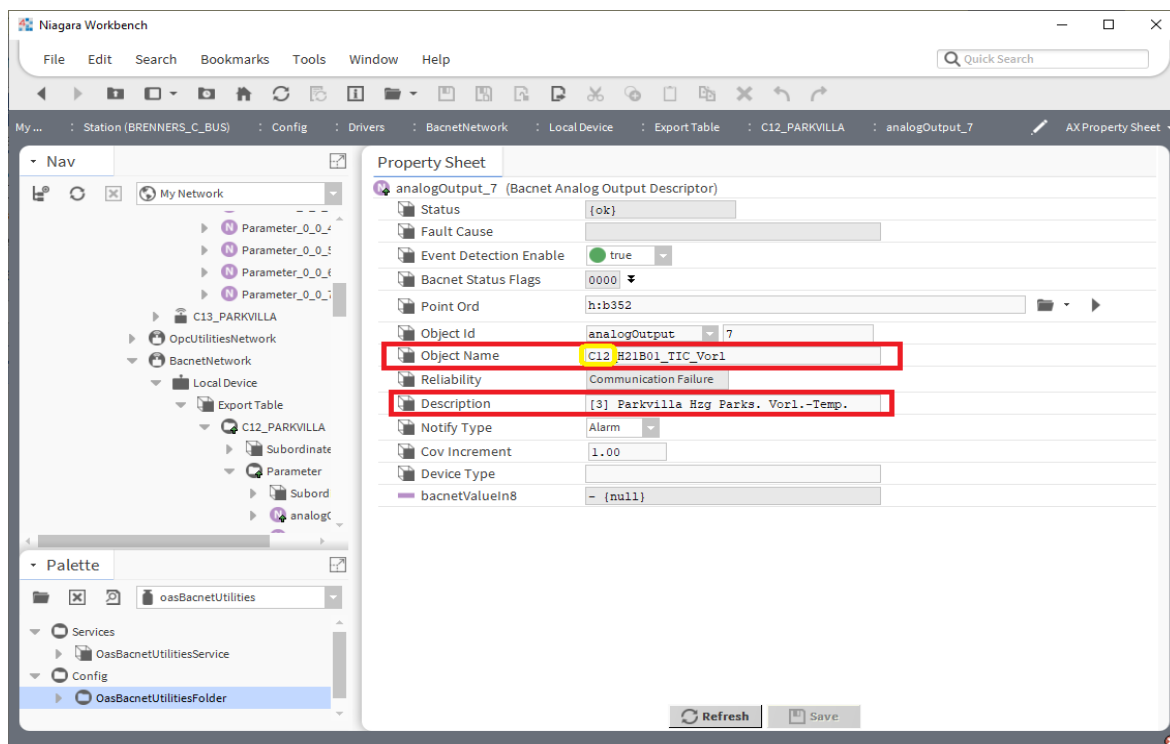


Figure 9: BACnet Exported Descriptor

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