

# Belimo Digital Ecosystem Widget

#### The Niagara Widget to boost the development of user interface

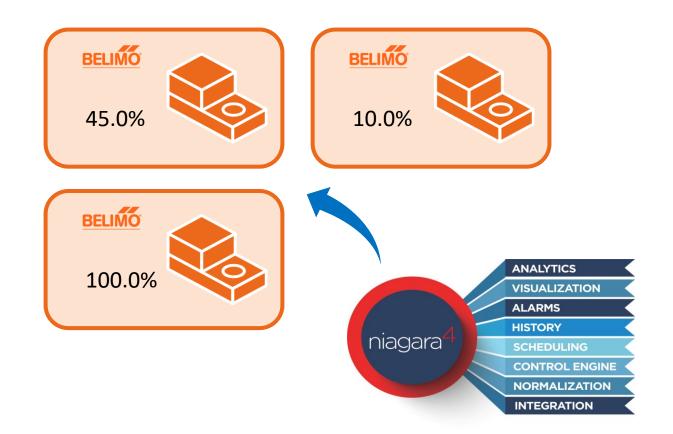
# Contents

This is a guided demonstration about installation, activation and use of Belimo widget for Niagara framework.



### The Widget

The Belimo Widget for Niagara framework allows N4 supervisor or Jace 8000 to display your Belimo Energy valve data on px pages.





## Requirements

- Basic knowledge of Niagara 4 framework
- A Workbench PC installation
- A supervisor licensed installation
- A network of BACNet Belimo devices



# Installation

Next steps are about installation of the widget before its use

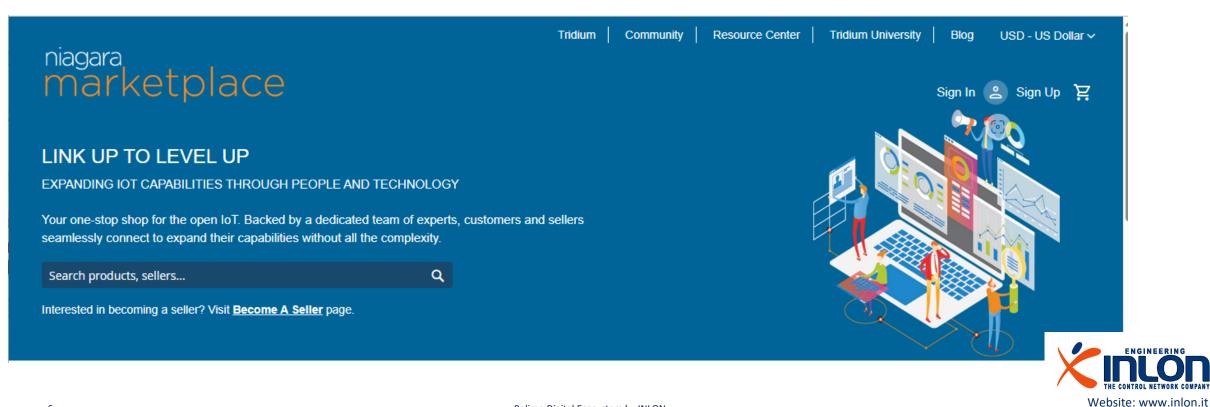


### The jar module

The widget is distributed by INLON for free in basic version. The module and documentation can be downloaded from

Email: info@inlon.it

Niagara Marketplace



Belimo Digital Ecosystem by INLON

# Copy into Workbench PC

When receiving updated or new module jar files, you have to copy them to your Workbench PC, as follows.

- Close the Workbench application.
- Copy directly into your !/modules directory. This makes the module(s) available in your Workbench environment, and also available to install in other remote platforms (when the installer runs, the module(s) are also copied into your software database, available for installation).



### The Niagara modules folder

Take care to copy the modules into the right current running version of Niagara platform.

📙   🛃 📑 =   modules				
File Home Share	View			
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	Name	Date modified	Туре	Size
📌 Quick access	🛓 belimoiot-rt.jar	10/03/2023 16:12	Executable Jar File	430 KB
📃 Desktop 🛛 🖈	🕌 belimoiot-wb.jar	10/03/2023 16:12	Executable Jar File	20 KB
👆 Downloads 🛛 🖈	🛓 belimowdg-rt.jar	06/03/2023 18:48	Executable Jar File	41 KB
🛱 Documents 🖈	🛓 belimowdg-se.jar	06/03/2023 18:48	Executable Jar File	8 KB
Pictures 💉	🛓 belimowdg-ux.jar	06/03/2023 18:48	Executable Jar File	360 KB
	🕌 belimowdg-wb.jar	06/03/2023 18:48	Executable Jar File	8 KB
EC-Net4-4.11.0.1 🖈	🛓 boxAnalyzer-rt.jar	20/12/2021 16:54	Executable Jar File	16 KB



# Check the presence of module

Open the Workbench application and search for belimowdg-rt, belimowdg-se, belimowdg-ux and belimowdg-wb modules into system module folder.

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< > E	0.		6	. 🖿 🔹	•	R	€ %	6 Ê	ъ х	50
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# Module signing advice

- In Niagara 4.8 and later, there is added support for the signing and verification of third-party modules. Third-party module signing is still optional in most cases, but this will gradually shift to a requirement over the course of the next releases.
- In Niagara 4.8 and later, there are added Workbench tools to support module signing.
- The Jar Signer Tool is useful for non-developers or anyone using an unsigned legacy module. The Jar Signer allows you to "sign" an unsigned \*.jar file using a code signing certificate.

Please you can read about module signing here: https://docs.Niagara-community.com/bundle/ModuleSigning/page/ExampleConcept-41FE0D3F.html



## Check Workbench module signing level

Open the system.properties file of Niagara current version and check what module verification mode is set. Low option is used for development and debugging purposes. Medium level requires external module to be signed.

📔 C:\	Niagara\EC-Net4-4.11.0.142\defaults\system.properties - Notepad++	_		>	ĸ
File E	dit Search View Encoding Language Settings Tools Macro Run Plugins Window ?		+	•	×
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409					^
410	# Disable ProcessBuilder/Runtime.exec restrictions described in				
411	<pre># https://www.oracle.com/technetwork/java/javase/13-0-1-relnotes-5592797.html#JDK-82218</pre>	58.			
412	# Core usage of ProcessBuilder/Runtime.exec are not vulnerable to command injection.				
413	# Third party usage of ProgramRuntime must continue to validate any user input used				
414	# as command arguments to protect against command injection.				
415	jdk.lang.Process.allowAmbiguousCommands=true				
416					
417	# Overrides the default module verification mode if necessary to adjust module				
418	# signature verification requirements. Valid values are				
419	# low: Warnings only. Option will be removed in a future release.				
420	<pre># medium (current default): Requires modules to be signed by a valid, trusted certific</pre>				
421	# high: Requires modules to be signed by a valid, trusted, CA issued certificate. Into	ernal CA	s are a	ccep	6
422	<pre>#niagara.moduleVerificationMode=low</pre>				
423	niagara.moduleVerificationMode=medium				
424					
425	# Overrides the default program object code signing requirements. Current default				
426	<pre># is false, allowing unsigned program objects. Setting to true will require all</pre>				
427	<pre># program objects to be signed with a valid, trusted certificate.</pre>				
428	<pre>#program.requireSigning=false</pre>				
429 430	This was a second to want to be defined at the second of the second				
430	<pre># This system property is used to override the default data type of the index column (I) # while creating the history tables in the database. If set to false or not overridden,</pre>		1+ d-		
432	<pre># while creating the history tables in the database. If set to faise of hot overridden, # with a range of 2,147,483,647 values (using 4 bit). If set to true, the data type is :</pre>				
433	<pre># of 9,223,372,036,854,775,807 values (using 8 bit). It does not alter an existing table</pre>			1 CH	1
434	<pre># of 9,223,572,000,004,773,007 values (using 0 bit). It does not after an existing table #niagara.rdb.useBigintDataTypeForIdColumn=true</pre>	E COLUMN	cype.		
435	inagara.rub.ubcbigintbacaryperorideorami erac				
436	# Rdb history export is done in batches to optimize the performance. Starting in				
437	<pre># Niagara 4.11, you can override this system property to set the size of the batch</pre>				
438	<pre># highly highly be our overlage only system property to set the size of the bacon # before execution. A larger value may improve performance but a value too large</pre>				¥
<				>	
, Properti	es file length : 26,274 lines : 540 Ln : 423 Col : 38 Pos : 20,066 Unix (LF)	UTF-8		INS	



## Check module sign

Open the module info tool and according to sign status of belimowdg-xx perform the next operations.

Options 📈	🙆 🗋 🗞 🗙	50
Alarm Portal		
Bacnet EDE		
Certificate Management	Modules	
Certificate Signer Multiple Selection Tool Certificate Signer Tool		
Driver Upgrade Tool	Name	Version
Embedded Device Font Tool	bcsv3-ux	Distech Controls 4.12.220
Jar Signer Tool	bcsv3-wb	Distech Controls 4.12.220
KNX Import Service	bcsv3AwsOws-rt	Distech Controls 4.10.201
Kerberos Configuration Tool	bcsv3AwsOws-wb	Distech Controls 4.10.201
_exicon Tool	belimoiot-rt	Belimo 1.1
Local License Database		•
Logger Configuration Lon Xml Tool	belimoiot-wb	🔀 Belimo 1.0
Lon Xmi Tool Manage Credentials	belimowdg-rt	🔀 Belimo 1.0
Module Info	belimowdg-se	🔀 Belimo 1.0
NDIO to NRIO Conversion Tool	belimowdg-ux	🔀 Belimo 1.0
New ACE App	belimowdg-wb	R Belimo 1.0
New Driver	box-rt	Tridium 4.11.0.142
New Module		•
New Station	boxAnalyzer-rt	V Tridium 4.11.0.142
Request License	boxAnalyzer-wb	🦁 Tridium 4.11.0.142
Resource Estimator Time Zone Database Tool	bql-rt	🦁 Tridium 4.11.0.142
Todo List	bql-ux	🏹 Tridium 4.11.0.142
Workbench Job Service	ccn-rt	V Tridium 4.11.0.142
Norkbench Service Manager	ccn-wb	Tridium 4.11.0.142
	chart-rt	Tridium 4.11.0.142
	chart-wb	Tridium 4.11.0.142
		•
	clientCertAuth-rt	🦁 Tridium 4.11.0.142
	clientCertAuth-ux	🏹 Tridium 4.11.0.142
	clientCertAuth-wb	🍼 Tridium 4.11.0.142
	doud Padrup, rt	Tridium (110.9)



## Module sign

If red sign is displayed, module cannot be used. The sign operation requires the to import the certificate locally. Ask for ".pem" file to INLON support.

- X There are errors that are not acceptable for the current module verification mode.
  - There are warnings, but they are acceptable for the current module verification mode.
  - Indicates that the module is signed with a Certificate Authority (CA).



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### Import certificate to Workbench

Confirm the certificate data clicking ok button.

File Edit Search Bookmarks Tools Windo	w Help		
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• Palette	Signature Algorithm	SHA256WITHRSA	
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ExampleLinearGauge		OK Cancel	



# Check module sign again

Open the module info tool and now the belimowdg-xx is signed and can be used.

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Options	🖌 🙆 🗋 🐴	x h d
Alarm Portal		
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Certificate Management	ou Modules	
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Jar Signer Tool	bcsip-wb	Distech Controls 4.12.22078.1
KNX Import Service	bcsv3-rt	Distech Controls 4.12.22078.1
Kerberos Configuration Tool _exicon Tool	bcsv3-ux	Distech Controls 4.12.22078.1
ocal License Database	bcsv3-wb	Jistech Controls 4.12.22078.1
ogger Configuration	bcsv3AwsOws-rt	Distech Controls 4.10.20155.1
₋on Xmi Tool	bcsv3AwsOws-wb	Distech Controls 4.10.20155.1
Manage Credentials	belimoiot-rt	Belimo 1.1
Module Info		
NDIO to NRIO Conversion Tool	belimoiot-wb	🤃 Belimo 1.0
New ACE App	belimowdg-rt	🤃 Belimo 1.0
New Driver New Module	belimowdg-se	\rm [] Belimo 1.0
New Station	belimowdg-ux	Belimo 1.0
Request License	belimowdg-wb	Belimo 1.0
Resource Estimator	box-rt	Tridium 4.11.0.142
⊺ime Zone Database Tool Fodo List	boxAnalyzer-rt	V Tridium 4.11.0.142
Vorkbench Job Service	boxAnalyzer-wb	Tridium 4.11.0.142
Vorkbench Service Manager	bql-rt	Tridium 4.11.0.142



### Import certificate to Platform

The certificate should be installed on stations too. Select the Platform station Certificate Management and perform same operation like for workbench. The Niagara Help describes deeply all the operations.

File Edit Search Bookmarks Tools Window Help     1002115 (Belimolot_00) Platform     Nav     Image: Certificate Management        Image: Certificate Management        Image: Certificate Management        Image: Certificate Management        Image: Certificate Management <b>Output Delete Delete Delete Delete Delete Delete Delete Delete Delete</b> <th>In Distech Controls EC-Net 4 Pro</th> <th></th> <th></th>	In Distech Controls EC-Net 4 Pro		
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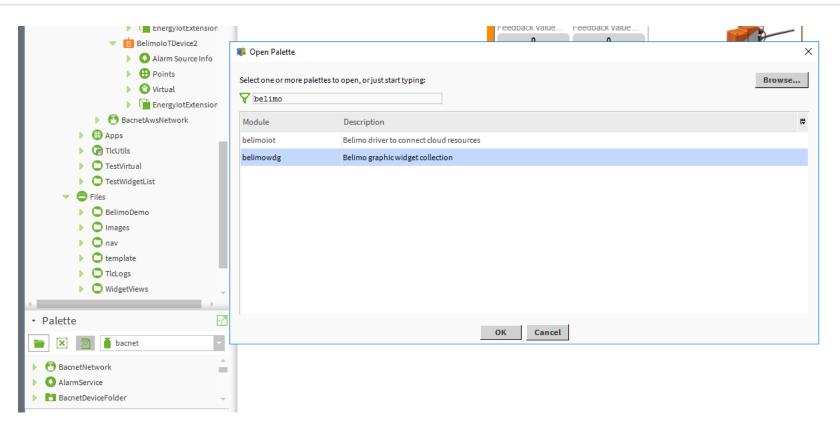
# Using the module

Next steps require a running station



### Load the palette

Open the palette view and select the belimowdg item.





### Load the palette

#### Open the palette view and select the belimowdg one.

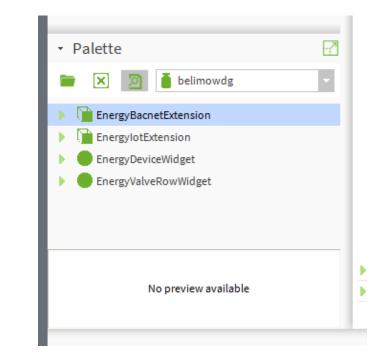
		🧊 Open Palette		×
		Select one or more pale	ettes to open, or just start typing:	Browse
		Module	Description	₽
		baja	Niagara Framework	•
	_	bajaui	Niagara User Interface Framework	_
<ul> <li>Palette</li> </ul>	-7	batchJob	Batch Jobs	
늘 🗙 🙍 🎽 belimowdg		belimoiot	Belimo driver to connect cloud resources	
		belimowdg	Belimo graphic widget collection	
Carry BacnetExtension		box	Building Object eXchange Protocol	
EnergylotExtension     EnergyValveWidget		boxAnalyzer	Building Object eXchange Analyzer	
EnergyDeviceWidget		ccn	CCN Driver	
EnergyValveRowWidget		chart	Chart API	
		clientCertAuth	Client Certificate Authentication Module	
		-level De alore		<b>*</b>
			OK Cancel	



# The Belimo Widget palette

These are the items in the palette:

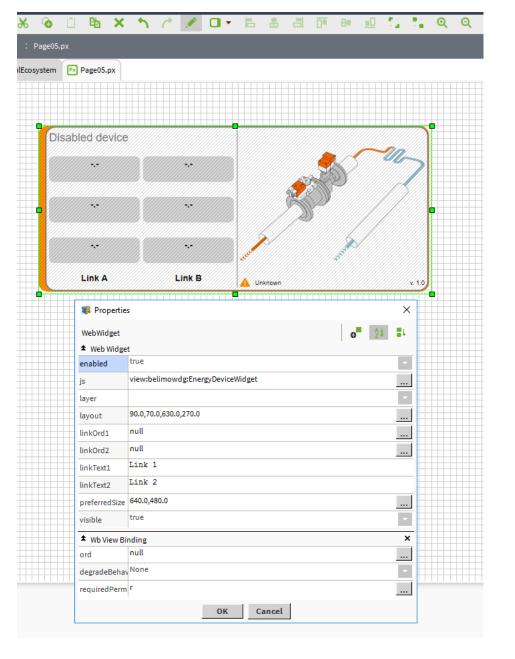
- EnergyBacnetExtension: it should be used with Bacnet devices.
- EnergylotExtension: it should be used with IoT devices of Belimo Cloud service.
- EnergyDeviceWidget: it is the widget to show device information.
- EnergyValveRowWidget: it is still a beta version of a widget to show summary information about devices.





### The widget

Drag and drop the widget on a px page then edit properties: select 'ord' properties to bind the widget to a compatible extension object (EnergyBacnetExtension or EnergyIotExtension). Next slides explain you how to manage extension objects.





# Extension for IoT devices

Drag and drop the EnergylotExtension to an IoT device then edit AX Properties of extension. The extension starts to show the device data if it is enabled. The first operation is writing in the Config field the name of points you would like to show. Names should be separated with commas. You get names from the list of virtual points.

Nav 📝	Application Director B BelimoDi	igitalEcosystem
📢 🖸 🔀 My Network 🔻	Property Sheet	
EnergylotExtension     EnergylotExtension	Point Unit _03	u.m.
Q Alarm Source Info     B Points	Point Enable _04	false
CO Virtual     Control     EnergylotExtension	Point Unit _04	u.m. 🛑 false
BelimoloTDevice2     Alarm Source Info     Beinolotte	Point Value _05	
<ul> <li>O Virtual</li> <li>C EnergylotExtension</li> </ul>	Point Unit _05	u.m. false
BacnetAwsNetwork     BacnetAwsNetwork     Apps     TlcUtils     TestVirtual     TestWidgetList	Point Value _06	u.m.
	Point Numeric Format _01	÷.++
Files	Point Numeric Format _03	\$.\$\$
Palette     Image: Constraint of the second se	Point Numeric Format _05	
Compare EnergyBacnetExtension     Compare EnergyIotExtension	Device Id	22118-40002-022-182 22118-40002-022-182
EnergyDeviceWidget	Column Text _02	State timeout occurred.
	Last Fail Time	08-May-2023 01:22:10 PM UTC 08-May-2023 05:19 PM CEST
	C Update Time	+0000h 00m 01s 🚽 STATE_WAIT_VALUES



### IoT Virtual Points

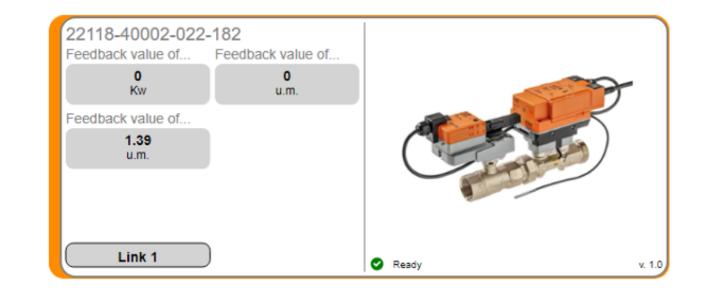
IoT Belimo Driver supports Virtual Points feature, their use allows to save license credit points.

iost : CH1NIAGARA1 (BelimoTest_01) : Station (Be	limoTest_01) : Config : Drivers : BelimoDigitalEcosystem : BelimoIoTDevice	e2 : Virtual
Nav	Application Director B BelimoDigitalEcosystem	
🕴 🖸 🔀 🚫 My Network	Property Sheet	ENDICOLOGICAL
EnergylotExtension	SetIpMode	SetIpMode
BelimoloTDevice1	SetGlycolConcentrationValue	SetGlycolConcentrationValue
Alarm Source Info	BacnetAlive	BacnetAlive
Points	CoolingEnergyMeterReading	CoolingEnergyMeterReading
Virtual	SelectBuildingType	SelectBuildingType
EnergylotExtension	InferentialTemperatureManagerDisabledHours	DifferentialTemperatureManagerDisable
B BelimoloTDevice2	RelativeWaterFlow	RelativeWaterFlow
Alarm Source Info	SetU5AnalogOutputSignalMinimumTemperatureValue	SetU5AnalogOutputSignalMinimumTem
Points	SetWaterDeviceInstallationPosition	SetWaterDeviceInstallationPosition
G Virtual	SetMaximumWaterFlow	SetMaximumWaterFlow
	▶ 🕞 Y3AnalogInputRelativeValue	Y3AnalogInputRelativeValue
Construction     Construction     Construction     Construction     Construction	WaterFlowVolumeLifetime	WaterFlowVolumeLifetime
	SetU5AnalogOutputSignalMaximumDifferentialTemperatureValue	SetU5AnalogOutputSignalMaximumDiffe
Apps	HeatingEnergy	HeatingEnergy
<ul> <li>IcUtils</li> <li>TestVirtual</li> </ul>	📔 Facets initialized=false 📎 🕓 👻	
TestWidgetList	Description: Provide the second se	
	Image: Second	
Thes	Description Feedback value of the accumulated heat	
Palette		
	isNumeric true {ok}	
🖿 🗙 🙍 🧯 belimowdg	DepointId HeatingEnergy {ok}	
EnergyBacnetExtension	Image: Second	
EnergylotExtension	▶ 🙀 canWrite false {ok}	
EnergyDeviceWidget	▶ 🕞 isEnum false {ok}	
EnergyValveRowWidget	▶ 🕞 isBoolean false {ok}	
- chergy tarvento willinget	▶ 🕞 isString false {ok}	
	Image: The second	
	SetHeatingCoolingRegisterThresholdTemperature	SetHeatingCoolingRegisterThresholdTer
	RelativePower	RelativePower
	SetY3AnalogInputMaximumVoltageValue	SetY3AnalogInputMaximumVoltageValue
	SatAddrassCity	SotAddroceCity



#### Widget Bind

Now you can bind the widget with the extension and data. Unit measure, numbers format and image can be selected with extension writable properties. The buttons link are used for navigation purposes, they can be configured with widget properties.





# Extension for Bacnet devices

Drag and drop the EnergyBacnetExtension to an Bacnet device then edit AX Properties of extension. The extension starts to show the device data if it is enabled. The first operation is writing in the Config field the points you would like to show. Point are identified by type and number. You can get information from the list of virtual points.

AV: analog value

AI: analog input

AO: analog output

BI: binary input

BO: binary output

N: not used, point number can be 0.

Nav	Application Director     B BelimoDigitalEcosystem     EnergyBacnetExtension     Property Sheet	Page
	<ul> <li>Property Sheet</li> </ul>	
EnergyBacnetE	Troperty Sheet	
<ul> <li>E-Valve 52</li> <li>E-Volve 52</li> <li>EV050R2 MID</li> <li>Alarm Source Ir</li> <li>Points</li> <li>Virtual</li> <li>Alarms</li> <li>Schedules</li> <li>Trend Logs</li> <li>Trend Logs</li> <li>Config</li> <li>Trend Logs</li> <li>Config</li> <li>TestVirtual</li> <li>TestVirtual</li> <li>TestVirtual</li> <li>TestWidgetList</li> <li>Files</li> <li>Files</li> <li>BelimoDemo</li> </ul> Palette <ul> <li>Palette</li> <li>EnergyBacnetExtension</li> <li>EnergyDeviceWidget</li> <li>EnergyDeviceWidget</li> <li>EnergyValveRowWidget</li> </ul>	Image: Point Enable _04       true         Image: Point Value _04          Image: Point Value _04       Point 4         Image: Point Description _04       Point 4         Image: Point Unit _04       u.m.         Image: Point Value _05       Image: Point Value _05         Image: Point Description _05       Point 5         Image: Point Unit _05       u.m.         Image: Point Enable _06       True         Image: Point Value _06       Image: Point Value _06	



### **Bacnet Virtual Points**

Bacnet Driver supports Virtual Points feature, their use allows to save license credit points.

	□ ■ - □ □ □ □ □ □ □ □ ■ × ^ /
My Host : CH1NIAGARA1 (BelimoTest_01) : Station (Be	imoTest_01) : Config : Drivers : BacnetAwsNetwork : EV050R2 MID : Virtua
• Nav	🖀 Application Director 🛛 B BelimoDigitalEcosystem 🕞 Virtual 💽 Page05.px
1 O X My Network	Property Sheet
Image: Second system         Image: Second system	Property Sheet         Virtual (Virtual Component) <ul> <li>device_130120</li> <li>device:130120</li> <li>analogInput_1</li> <li>analogInput:1</li> <li>analogValue_2</li> <li>analogValue:2</li> <li>analogInput_6</li> <li>analogValue:200</li> <li>multiStateValue:200</li> <li>multiStateValue:200</li> <li>analogValue_10</li> <li>analogValue:10</li> <li>analogValue_117</li> <li>analogValue:17</li> <li>analogValue_19</li> <li>analogValue:19</li> <li>analogValue:19</li> <li>Facets</li> <li>write Priority</li> <li>modified Point</li> <li>false</li> <li>objectIdentifier</li> <li>analogValue:19 {ok}</li> <li>objectType</li> <li>Analog Value {ok}</li> <li>objectName</li> <li>AbsFlow_UnitSel {ok}</li> <li>opjectyList</li> <li>presentValue</li> <li>trist (Present Value,Description,Status Flags,E</li> <li>objection</li> <li>Absolute Flow in selected unit {ok}</li> </ul>
belimowdg	
EnergyBacnetExtension	Image: block in the image: bl
EnergyDeviceWidget	Interest of the second {ok}
EnergyValveRowWidget	In covincrement 1.00 L/s {ok}
	ImalogValue_20     analogValue:20
	Image: https://www.analoginput.20         analoginput.20
	In analoginput_21     analoginput:21
	Image: mail of the second se
No preview available	Imaloginput_22     analoginput:22       Imaloginput 23     analoginput:23



The widget has been developed by: Inlon Engineering S.r.l. Via Zara, 2 19123 La Spezia (ITALY)

Web site: www.inlon.it

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Technical support: mraymondi@inlon.it

Thanks to: BELIMO Automation AG

