

Quick Guide

LoRa-2-BMS

Introduction

With the MCS LoRa-2-BMS Gateway you have an all-in-one Gateway to connect your building management system with wireless LoRa sensors via BACnet IP. The LoRa-2-BMS Gateway is in fact a combination of various techniques in one gateway

- LoRa Base station with internal LoRaWan server so that you can set up a Private LoRa network. So you do not need a public LoRa or external LoRaWan server and therefore you do not have these monthly costs.
- Payload conversion of the LoRa sensors is done by the gateway; no external payload conversion server is therefore needed. This also avoids costs.
- Bacnet IP protocol and other protocols (such as Modbus, MBus, P1) are integrated and used to communicate with your building management system.
- MQTT or other protocols communicate with your application server.
- Optionally, we can provide a Secure VPN so you can remote access the Gateway

1. Step 1: Connecting LoRa-2-BMS to the internet

This is the first step in setting up your LoRa-2-BMS. Please follow the instructions below carefully.

1. Connect the LoRa-2-BMS to your computer via ethernet cable.
Make sure to use the **LAN** ethernet port to connect the LoRa-2-BMS to your computer.
2. Connect the LoRa-2-BMS to the internet using an ethernet cable.
Make sure to use the **WAN** ethernet port on the LoRa-2-BMS.

In case you want to connect the LoRa-2-BMS to the internet using the Mobile network (i.e. 4G/LTE,...), you can skip this step.

3. Power on the LoRa-2-BMS by plugging in the power supply.

Please note! It takes about 3minutes to perform a cold boot!

4. Open your web browser and browse to 192.168.1.1.
5. Log in using "Admin123!" as default username and "admin" as default password.

It is highly recommended to change the username and password! This can be done in the "System" tab in the "Username & Password" section.

6. Next, click on the "Summary" page to check if the LoRa-2-BMS is connected to the internet. In the example below, the LoRa-2-BMS is connected via the WAN Ethernet connection.

CloudGate

Connecting THINGS to the cloud

Log out **OPTION**

Home Main Menu
Summary
Interfaces
Firewall
Connection Persistence
Provisioning
System
VPN

Connection status >

Settings >

LAN interfaces >

VPN Tunnels >

System Information >

Licenses >

Warning: You have not changed the default administration user password. We strongly recommend that the administration user password not be left in its default setting on deployed gateways. [Change now](#)

Summary

On this page you can view a summary of the settings of the gateway

Connection status

Connection status

Connected

You are connected to the Internet through the interface **Main Ethernet - WAN**

Settings

Internet connection enabled Yes No

Connection strategy Manual Priority-based

#	Interface	Connection status	IP	Move up/down
1	Main Ethernet - WAN	Connected	192.168.1.202	↓
2	LTE Connection			↑

7. In case you are connecting the LoRa-2-BMS to the internet using the Mobile Network, please proceed to the "Interfaces" tab and click on "LTE Connection".
8. Enter the APN of your Mobile Network Operator in the designated field, together with the preferred authentication method.

Network settings

APN

Authentication method Automatic PAP CHAP None

Username

Password

Network selection method Automatic Manual

9. Make sure to press the "Save changes" button after completion.
10. Click on the "Summary" page to check if the LoRa-2-BMS is connected to the internet. In the example below, the LoRa-2-BMS is connected via the LTE connection.

Settings

Internet connection enabled Yes No

Connection strategy Manual Priority-based

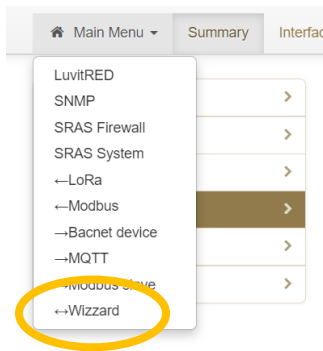
#	Interface	Connection status	IP	Move up/down
1	LTE Connection	Connected	37.62.4.92	

Please note! If your computer is connected to the LAN port of the LoRa-2-BMS, it will get internet access through this interface. In case the LoRa-2-BMS is connected over the Mobile Network (4G/LTE) any data your computer generates will go over this Mobile connection!

2. Step 2: Configuring the Sensor Input

This is the second step in setting up your LoRa-2-BMS.

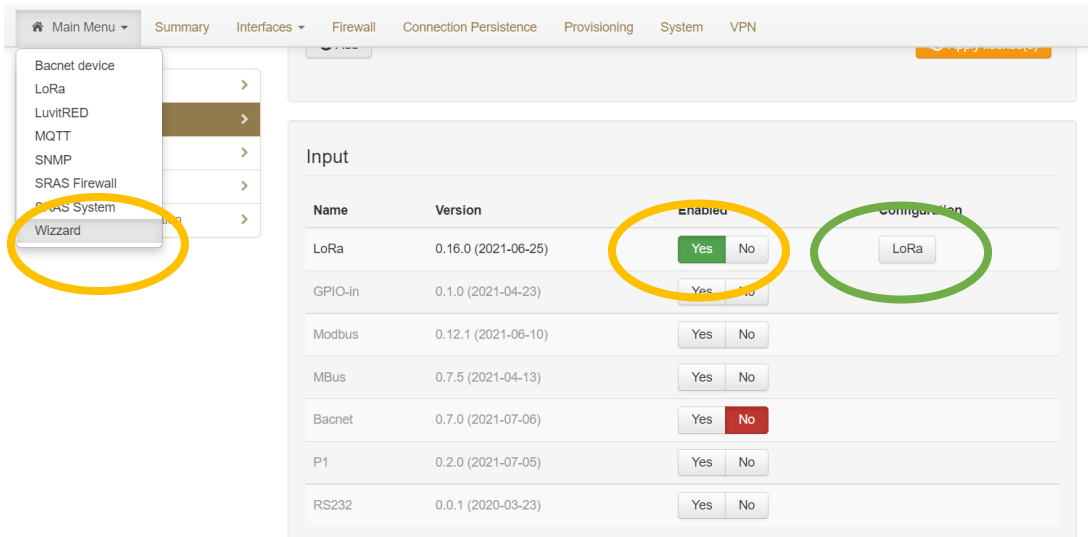
The Wizzard application is configured by MCS, and can be found under "Main menu".



The LoRa-2-BMS Wizzard can be used to connect sensors and devices of different interfaces and/or protocols. The list below gives an overview of the currently supported Input interfaces and/or protocols:

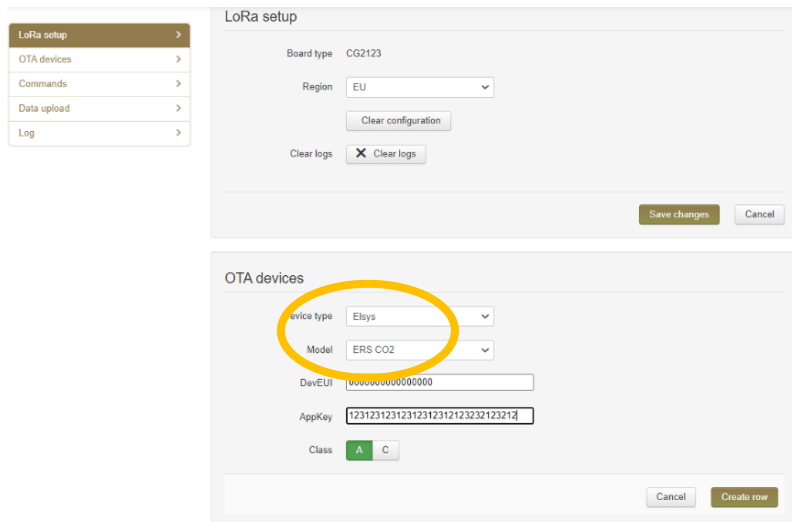
Input				
Name	Version	Enabled		Configuration
RS232	0.0.1 (2020-03-23)	Yes	No	
Modbus	0.12.0 (2021-02-03)	Yes	No	
LoRa	0.12.4 (2021-03-05)	Yes	No	
MBus	0.7.4 (2021-02-11)	Yes	No	
GPIO	0.0.1 (2020-03-23)	Yes	No	
Bacnet	0.6.2 (2021-03-03)	Yes	No	

For the first step we define LoRa as Input in the Wizzard application:



When we click enable "YES" a LoRa configuration button appears.

When adding LoRa Sensors, we can choose from an extensive library of embedded payload decoders.



Now the device is registered in our OTA devices list.

After the join we can see the details of the device by clicking on the search icon.

OTA devices

#	Device type	Model	DevEUI	Enabled	My Device ID	Joined
<input type="text" value="q"/>	Elsys	ERS CO2	A81758FFFE062071	<input checked="" type="checkbox"/>	lora-ota-A81758FFFE062071	true
<input type="text" value="+"/>	<input type="text" value="Filter..."/>	<input type="text" value="Filter..."/>	<input type="text" value="Filter..."/>	<input type="text" value="Filter..."/>	<input type="text" value="Filter..."/>	<input type="text" value="Filter..."/>

Records 1-1 out of 1

It is important that enabled is set to YES, and that you fill in Custom properties, e.g. with *bacnet.id=123*

OTA devices

Device type: Elsys

Model: ERS CO2

DevEUI: A81758FFFE062071

AppKey:

Class: A C

Description: A81758FFFE062071

Enabled: Yes No

My Device ID: lora-ota-A81758FFFE062071

Custom properties:

Joined: true

FCnt (up/down): 585 / 69

NetID: 000000

#Std obj: 3 / 6

By scrolling down we come across the available objects that come from the payload of the LoRa device.

Objects (standard)	#	Object	Enabled	My Object ID	Value	Unit
<input type="checkbox"/>		co2	✓	co2	454	ppm
<input type="checkbox"/>		humidity	✓	humidity	57	%
<input type="checkbox"/>		light	–	light	205	Lux
<input type="checkbox"/>		motion	–	motion	2	
<input type="checkbox"/>		temperature	✓	temperature	23.7	°C
<input type="checkbox"/>		vdd	–	vdd	3592	mV

Records 1-6 out of 6

By clicking on the object (search icon) we can enable the object as output object. After clicking YES you can save the settings.

Objects (standard)

Object:

Enabled: Yes No

My Object ID ?:

Value:

Unit:

Time: 2021-07-15 15:58:26

The last step is to enable the Data upload and press save.

- OTA devices >
- Commands >
- Data upload >
- Log >

Data upload

Enable: Yes No

For each input interface/protocol, there is a guide that can be followed. Click on each of the links below to go to the corresponding tutorial.

Input RS-232: <https://support.option.com/support/solutions/articles/36000275059>

Input Modbus: <https://support.option.com/support/solutions/articles/36000275073>

Input LoRa: <https://support.option.com/support/solutions/articles/36000274542>

Input Mbus: <https://support.option.com/support/solutions/articles/36000275065>

Input GPIO: <https://support.option.com/support/solutions/articles/36000275061>

3. Step 3: Configuring the Cloud Output

The LoRa-2-BMS Wizzard can be used to connect the CloudGate to the major Cloud Platform providers through a range of protocols. The list below gives an overview of the currently supported Output protocols:

Output			
Name	Version	Enabled	Configuration
Bacnet device	0.3.0 (2021-08-24)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="button" value="→Bacnet device"/>
MQTT	0.9.0 (2021-04-13)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="button" value="→MQTT"/>
Azure IoT Hub	0.0.4 (2021-09-06)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
AmazonAWS-MQTT	0.0.6 (2021-04-13)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Opinum	0.9.0 (2021-06-25)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Modbus slave	0.1.1 (2021-08-23)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="button" value="→Modbus slave"/>

For each cloud output protocol, there is a guide that can be followed. Click on each of the links below to go to the corresponding tutorial.

- Output MQTT : <https://support.option.com/support/solutions/articles/36000274543>
- Output Azure: <https://support.option.com/support/solutions/articles/36000274545>
- Output AWS: <https://support.option.com/support/solutions/articles/36000286790>

4. Step 4: Configuring Output to the BMS

4.1 BACnet

For the first step we define BACnet as Output in the Wizzard application:

Output

Name	Version	Enabled	Configuration
Azure IoT Hub	0.0.3 (2021-04-13)	Yes No	
AmazonAWS-MQTT	0.0.6 (2021-04-13)	Yes No	
MQTT	0.9.0 (2021-04-13)	Yes No	
Opinum	0.9.0 (2021-06-25)	Yes No	
Bacnet device	0.2.1 (2021-03-05)	Yes No	Bacnet device

When we click on enable "YES" a BACnet device configuration button appears. Clicking on this button takes you to the BACnet settings page.

Then on this page enable the settings and click save. Don't forget to set, or discover the Device ID into your BMS environment.

Bacnet settings

Device ID

Name

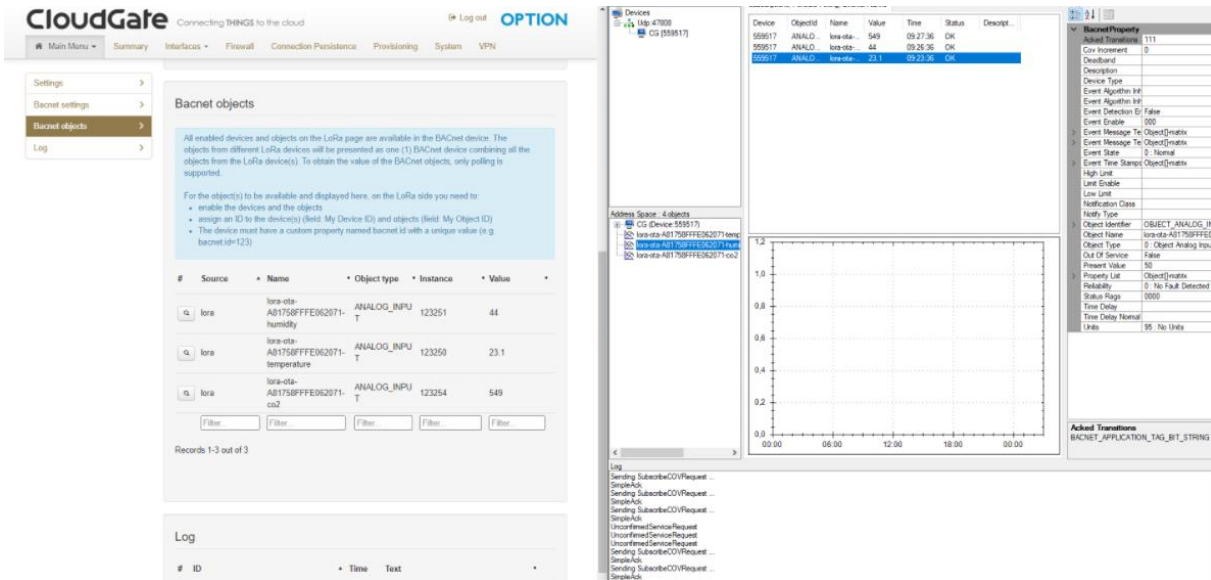
Description

Location

Lan Net ID

Enabled Yes No

When we scroll down we get to the BACnet objects. Here we see the predefined LoRa objects converted to BACnet objects. The objects are now ready to be called by the BMS.



4.2 Modbus slave

For the first step we define Modbus as Output in the Wizard application:



Second step is to set the port on 502 for modbus slave communication.

Modbus slave

Settings

Default configuration

Modbus settings

Port 502

After doing this last step, we can now see the registers appearing in our objects.

#	Source	Device	Object	Reg type	Address	Length (Registers)	Value
<input type="button" value="Q"/>	lora	lora-ota-A81758FFFE0482A2	TEMP_ELSYS	holding	0	2	23.2
<input type="button" value="Q"/>	lora	lora-ota-A81758FFFE0482A2	humidity	holding	2	1	46

Records 1-2 out of 2

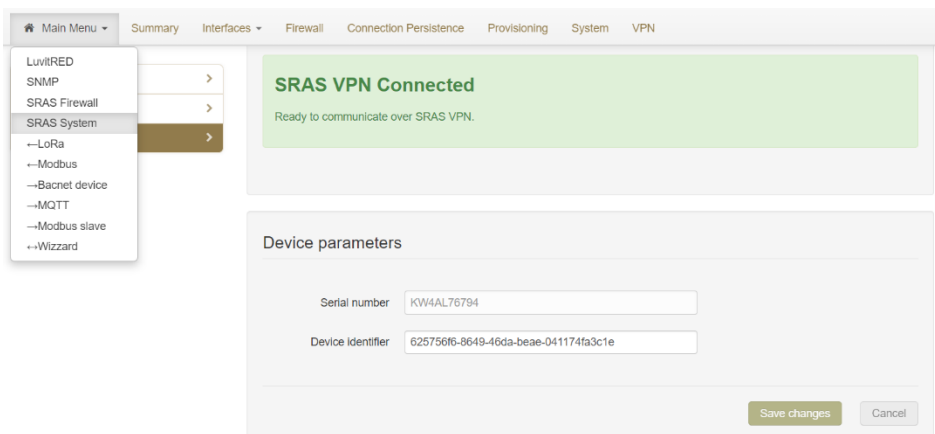
The registers are "03 registers" (read holding registers)16 bits.

5. Secure Remote Access Service (SRAS)

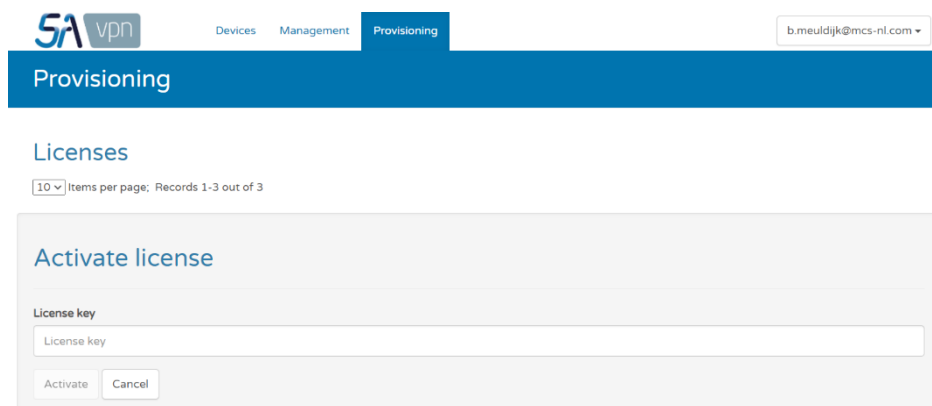
Step 1: Configure your CloudGate Gateway (Optional services)

1. Register your CloudGate Gateway to the 5AVPN server via your MCS Point of Contact or you can send an E-mail to verkoop@mcs-nl.com. You get an invitation to create an account on the 5AVPN portal.
2. Ensure your CloudGate Gateway has a recent firmware version installed. (available for download on CloudGate Universe (www.cloudgateuniverse.com/))
3. Ensure your CloudGate Gateway has 'SRAS – Secure Remote Access Service' application installed. The SRAS comes mandatory (www.cloudgateuniverse.com/)
4. Enter the personal device identifier (obtained via verkoop@mcs-nl.com) on the CloudGate Gateway webGUI

Go to the WebGUI -> plugin -> SRAS system and enter the device identifier.



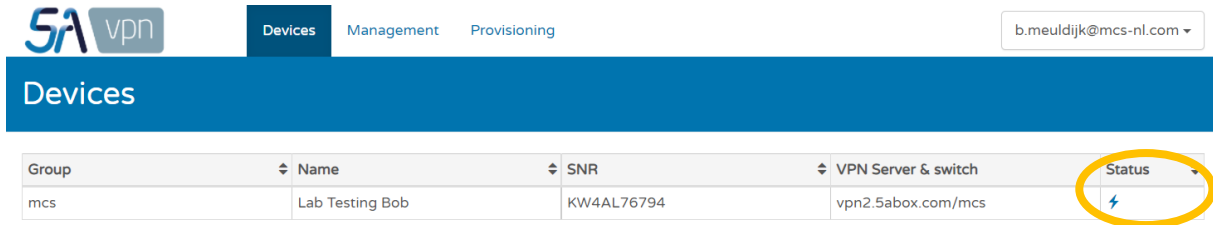
LoRa-2-BMS WebGUI



5AVPN portal

Step 2: Intalling your client side.

After we have entered the license key in the LoRa-2-BMS gateway, and also in the provisioning tab of the 5AVPN platform, we see that the LoRa-2-BMS gateway is online.



The LoRa-2-BMS gateway is now registered into a virtual switch.

To make a connection to this virtual switch, you can click on the "click here for instructions" button on the device page. Here you must download the user client file and follow the instruction.

Lab Testing Bob (KW4AL76794)

SNR: KW4AL76794

Status: **Reachable** since 16/11 10:35

Name: Lab Testing Bob

Description: [Edit](#)

VPN: Enabled Disabled

IP: 192.168.84.185

URL: http://KW4AL76794.mcs.vpn

You need to establish a VPN tunnel to the server `vpn2.5abox.com`, virtual switch `mcs` for the IP or URL to work.
[Click here for instructions](#)

To connect to this virtual switch:

For windows 7, 8, 8.1 and 10:

- Download the following file and save it: `mcs.pbk`
- Double-click on the file
- Click on "properties"
- In the security tab click on advanced settings and enter the shared secret 'vpn' and click the 'OK' button
- Now click the 'connect' button
- Your login is a combination of the username and the virtual switch: `b.meuldijk@mcs-nl.com@mcs`
- Fill out your password and click the 'connect' button

For MAC OS

- Download the following instructions

For IOS

- Download the following instructions

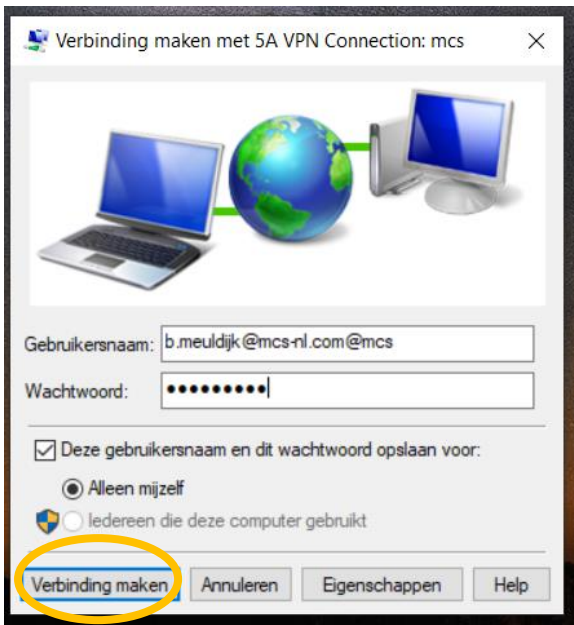
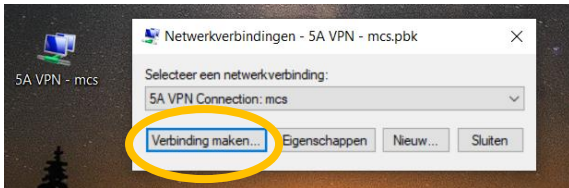
For Android

- Download the following instructions

Port forwarding: No port forwarding rules are configured. You can configure them via the CloudGate's web interface (the URL above)

Step 3: Connecting tot he LoRa-2-BMS gateway

After installing the client on your computer we can now make the connection to the virtual switch. By starting the client and login in with your credentials we have built the connection to the virtual switch.



When we go back to the 5AVPN portal we can now see that we are connected to the virtual switch.

5A vpn | Devices | Management | Provisioning | b.meuldijk@mcs-nl.com

Lab Testing Bob (KW4AL76794)

SNR: KW4AL76794
 Status: Reachable since 16/11 10:55

Name: Lab Testing Bob
 Description: [Edit]

VPN: **Enabled** Disabled

IP: 192.168.84.185
 URL: <http://192.168.84.185.mcs.vpn>

You are connected to this virtual switch

Port forwarding: No port forwarding rules are configured. You can configure them via the CloudGate's web interface (the URL above)

By clicking on the URL, or going to the IP address we come into the login screen of the LoRa-2-BMS gateway and have made our connection.

VPN: **Enabled** Disabled

IP: 192.168.84.185

URL: <http://KW4AL76794.mcs.vpn>

Niet bevestigd | 192.168.84.185

Please login

Username:

Password:

Do you need further assistance? Please contact helpdesk@mcs-nl.com or go to:
<https://support.option.com/support/solutions/articles/36000266198-cloudwizzard-getting-started-guide>