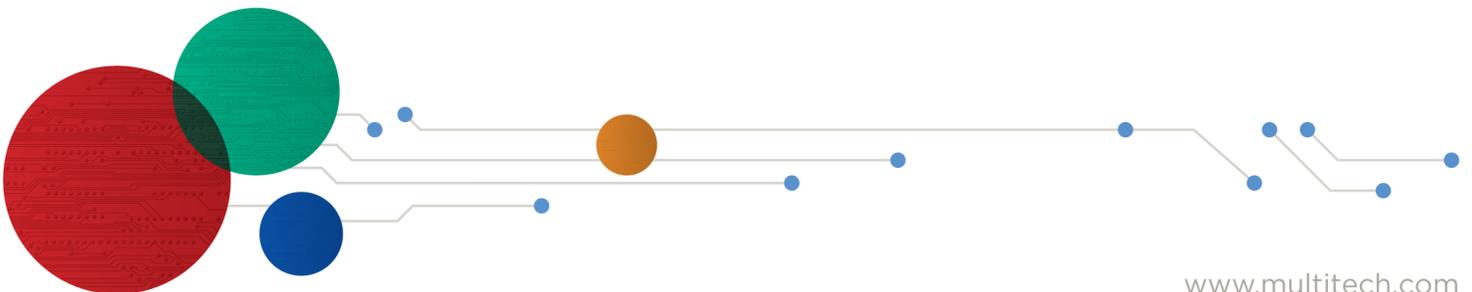


Integrating a LoRaWAN Sensor to BACnet

Reference Guide



Integrating a LoRaWAN Sensor to BACnet

Part Number: S000824 Rev. 1.0

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1 – Integrating a LoRaWAN Sensor to BACnet

Introduction

MultiTech conduit can decode LoRaWAN sensor data and map that sensor data into BACnet objects which can be integrated into BMS systems and BACnet devices.

Requirements

- MultiTech Conduit gateway running mPower OS 6.3.2 and higher with LoRaWAN BACnet Connector Payload Management License enabled
- LoRaWAN sensor
- BACnet client (Yet Another BACnet Explorer (YABE) is used for this document)

Configuring the LoRaWAN Network and Adding a Sensor

To configure the LoRaWAN Network and add a sensor:

1. Select **LoRaWAN > Network Settings**.
2. Set LoRaWAN Mode to **Network Server**.
3. Under Key Management, change the location to **Local Join Server**.
4. Click **Add New**.
5. Find your LoRaWAN sensor Extended Unique Identifier (EUI) and Key information and complete the ADD END-DEVICE KEY fields. Click **OK** when finished.

ADD END-DEVICE KEY

Dev EUI

App EUI

App Key

Class
A

Device Profile
LW102-OTA-US915

Network Profile
DEFAULT-CLASS-A

6. Check to see if the gateway is receiving packets under **LoRaWAN > Packets**.

PACKETS ? Refresh

⌵ Packets JSON

DEVICE EUI	FREQ	DATARATE	SNR	RSSI	SIZE	FCNT	TYPE	TX/RX TIME	DETAILS
70-b3-d5-2d-d8-00-00-e6	868.100	SF7BW125	-	-121	24	00000126	UpUnc	11:03:29	👁
70-b3-d5-2d-d8-00-00-e6	867.300	SF7BW125	-	-118	24	00000125	UpUnc	10:53:16	👁

7. Complete the steps under [Configuring BACnet](#).

Configuring BACnet

To configure BACnet:

1. Select **Payload Management > BACnet Configuration**.
2. Enable BACnet and choose your BACnet device settings:
 - Port
 - Device object identifier
 - Object name
 - Device description
3. Click **Save and Apply**.

The screenshot shows the configuration page for a LoRaWAN device (Model Number: MTCOT-L4N1-247A, Firmware: 6.3.2). The left sidebar is expanded to 'Payload Management' > 'BACnet Configuration'. The main content area is divided into three sections: WAN, LAN, and Ethernet.

WAN Settings:

- Cellular (ppp0):** State: Disabled, Signal: 85 dBm
- Wi-Fi (wlan0):** State: Connected, Mode: DHCP Client, MAC Address: 88:DA:1A:5F:42:B4, IPv4 Address: 192.168.0.180, Mask: 255.255.255.0, Gateway: 192.168.0.1, DNS: 192.168.0.1, SSID: Russminnie

LAN Settings:

- Bridge (br0):** State: Enabled, MAC Address: 00:08:00:4A:FD:8D, IPv4 Address: 192.168.2.1, Mask: 255.255.255.0, DHCP State: Enabled, Lease Range: 192.168.2.100-192.168.2.254, Interfaces: eth0, wlan1
- Ethernet (eth0):** State: Enabled, Bridge: br0, MAC Address: 00:08:00:4A:FD:8D
- Wi-Fi Access Point (wlan1):** State: Disabled
- Bluetooth Classic:** State: Disabled

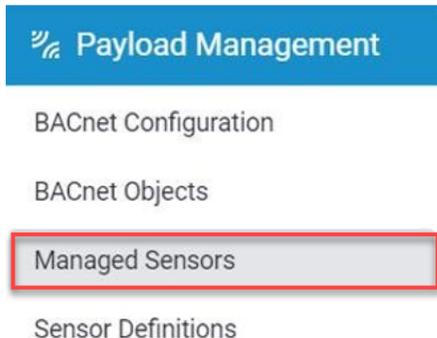
System Information:

- Serial Number: 20958359
- IMEI: 354328092054961
- UUID: 44644f46-bf1b-f4be-fa22-6ac4e635814b
- Firmware: 6.3.2
- Current Time: 3/28/2024, 4:14:14 PM
- Up Time: 48 days 00:02:37
- WAN Transport: Wi-Fi
- Current DNS: 192.168.0.1
- GeoPosition: Not Acquired

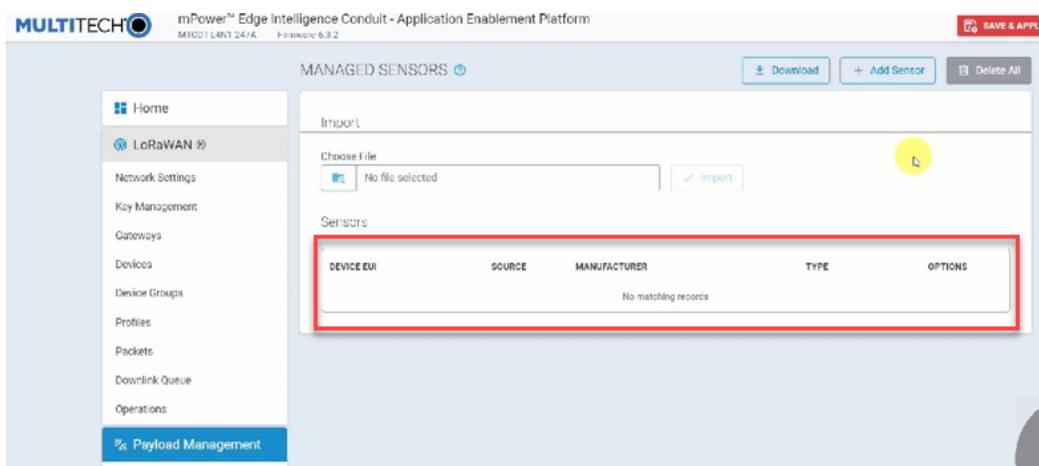
Adding Sensors to BACnet

Note: Before adding sensors to the payload management feature, if you are using an Adenuis, Elysys, or Radio Bridge, you can begin with step 1. For all other sensor manufacturers go to before you begin step 1.

1. Select **Payload Management > Managed Sensors**.



2. Click **Add Sensor**.
3. Enter the Device EUI and choose the Device Manufacturer and Model from the drop-down menu.



Add BACnet Objects

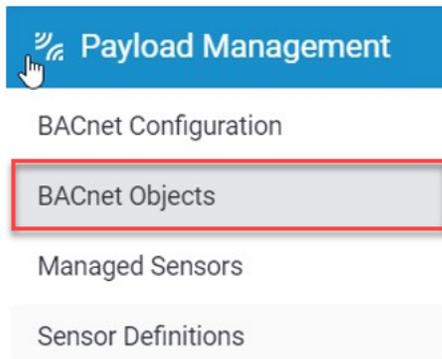
There are two ways to add BACnet objects:

- Add objects individually.
- Automatically add all sensor object definitions using the [BACnet Objects App](#) (must download the BACnet Objects App first).

Adding Objects Individually

To add objects individually:

1. Select **Payload Management > BACnet Objects**.

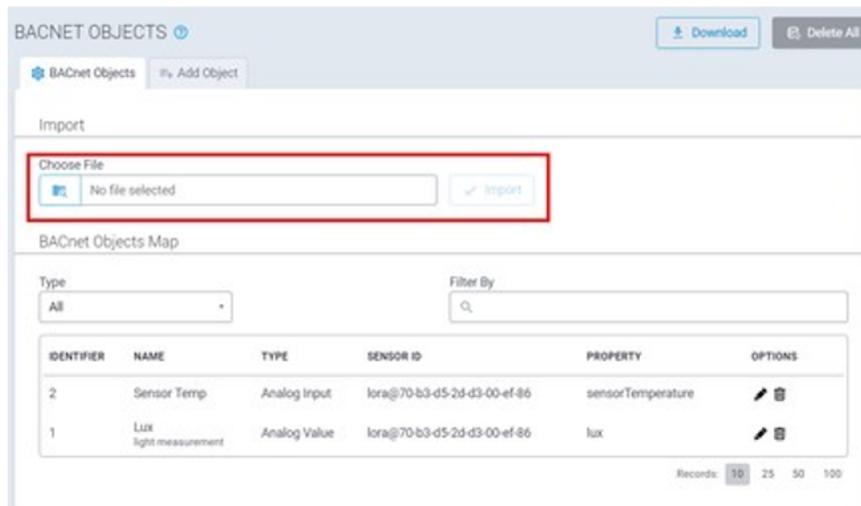


2. Go to the **Add Object** tab and complete the following settings:
 - a. **Device EUI:** Select the EUI from the drop-down menu. These include previously-added sensors.
 - b. **Property:** Select the value from the sensor definitions.
 - c. **BACnet Object Name:** Give the object a name.
 - d. **BACnet Object Type:** Select the BACnet data type.
 - e. **BACnet Object Description:** Description of the data, *optional*.

 A screenshot of the "ADD BACNET OBJECT" form in a web application. The form is titled "ADD BACNET OBJECT" and has a navigation bar with "BACnet Objects" and "Add Object" (highlighted with a red box). The form is divided into two sections: "Managed Sensor" and "BACnet Object". In the "Managed Sensor" section, there are two dropdown menus: "Source" (set to "lora") and "Device EUI" (set to "70-b3-d5-2d-d3-00-ef-86"). In the "BACnet Object" section, there are four fields: "Property" (dropdown set to "OVAC (int16)"), "Type" (dropdown set to "Analog input"), "Identifier" (text input set to "0"), "Name" (empty text input), and "Description" (empty text input). At the bottom of the form, there are two buttons: "Submit" and "Submit and Add New Object".

3. Click **Submit** or **Submit and Add New Object**.

The objects appear in the BACnet Objects tab:



4. Click **Save** and **Apply**.

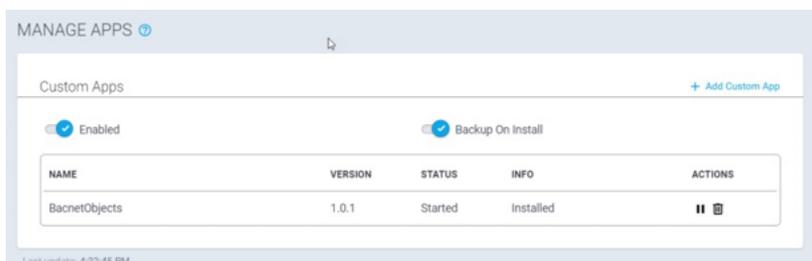
Using the BACnet Objects App

To have all objects from the sensor definitions added automatically, first download the [BACnet Objects app](#). This application automatically adds all available BACnet objects from the sensor definitions file when the sensor is added to the Managed Sensors page.

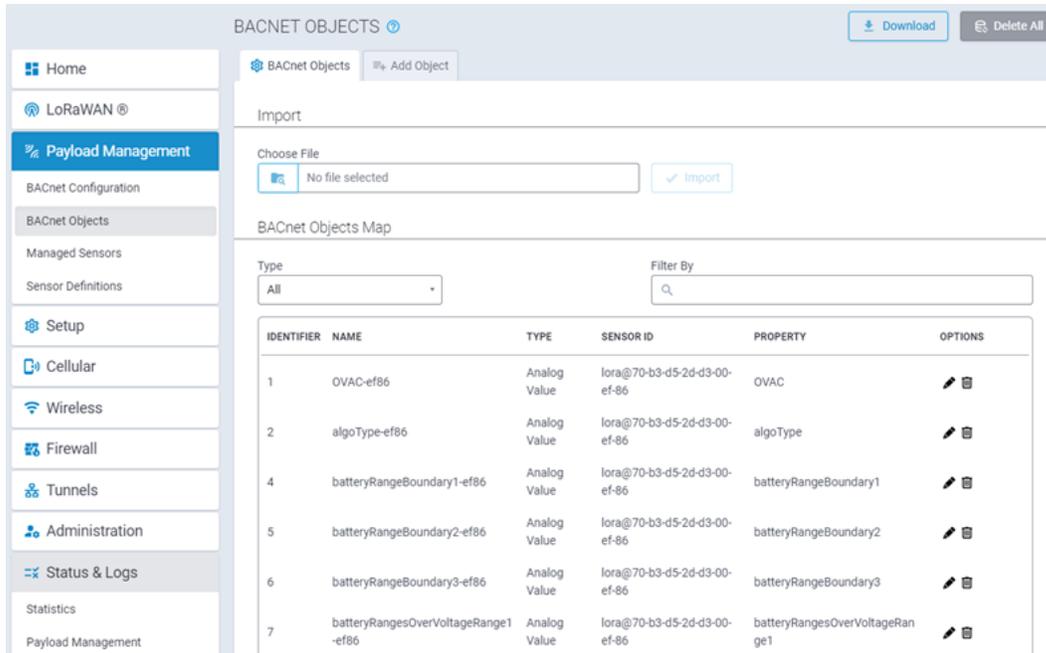
To use the BACnet Objects app:

1. Upload the BACnet Objects app to the UI:
 - a. Choose a numerical App ID.
 - b. Name the application **BACnetObjects**.
 - c. Choose the file on your machine.
 - d. Wait for the application to finish uploading.

Once the application is finished uploading it appears as this image shows:



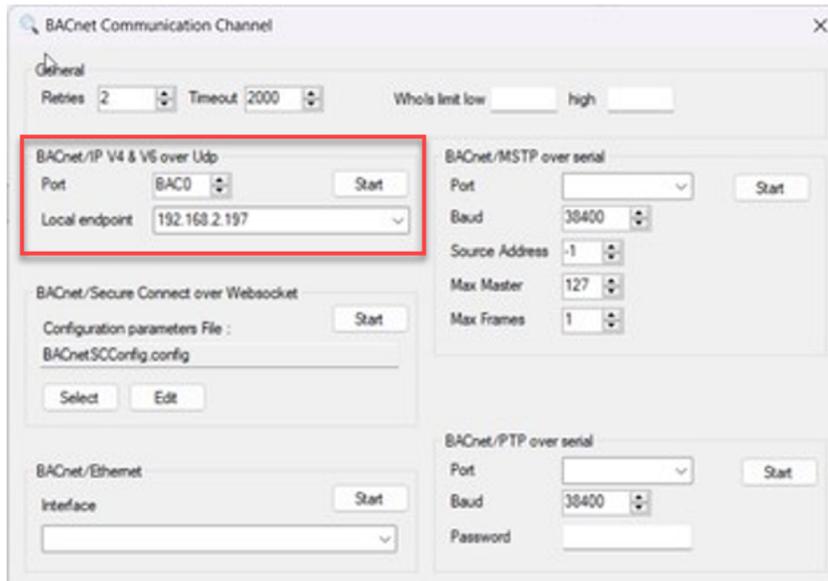
2. With the app installed, all properties populate every time you add a new BACnet sensor.



Checking the BACnet Client

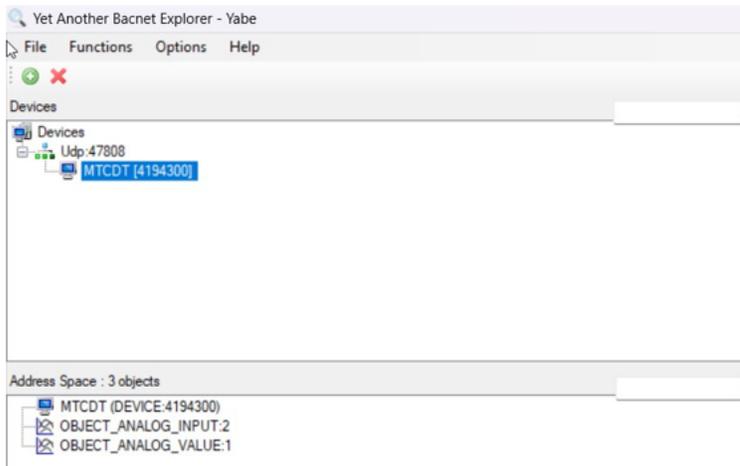
To check the BACnet client:

1. Open a YABE BACnet client tool.
2. Click **Add Device**.
3. Since this example uses Ethernet, under BACnet/IP V4 & V6 over Udp choose the Ethernet port IP address and click **Start**.



4. (Optional) If using Windows, a screen may pop up asking you to allow access to YABE. Click all checkboxes and accept.

The Conduit appears with the objects previously entered:



5. Click the name of the object.

The decoded values appear under **Present Value** in the dialog box on the right.

The screenshot shows the 'Subscriptions, Periodic Polling, Events/Alarms' dialog box and the 'Properties' pane. The dialog box has a table with the following data:

Show	Device	ObjectId	Name	Value	Time	Status	Descript...
<input checked="" type="checkbox"/>	4194300	AV:1	Sensor ...	27.5	14:22:23	OK	

Below the table are controls for 'Export Setup', 'Pause Plotter', 'COV', 'Poll (ms)' (set to 1000), and 'Clear Plotter'. A plot shows a horizontal line at 27.5 on the y-axis (ranging from 26.0 to 29.0) over time on the x-axis (ranging from 22:20 to 22:25). The 'Properties' pane on the right shows the following data:

BacnetProperty	
Object Identifier	OBJECT_ANALOG_VALUE:1
Object Name	Sensor Temperature
Object Type	2 - Object Analog Value
Present Value	27.5
Status Flags	0000
Property List	Object[] Array
Event State	0 : Normal
Out Of Service	False
Units	95 : No Units
Description	0 : No Fault Detected
Reliability	0 : No Fault Detected
Cov Increment	1

At the bottom of the 'Properties' pane, the 'Object Identifier' is listed as 'BACNET_APPLICATION_TAG_OBJECT_ID'.

2 – Revision History

Revision Number	Description
1.0	Initial release. June 2024