

# How to store data on Mindsphere cloud

We will use a Mindconnect Node-RED node to store data on Mindsphere

As documented here

[node-red-contrib-mindconnect \(node\) - Node-RED \(nodered.org\)](#)

First you have to create some data on mindsphere

Assets, aspects and variables

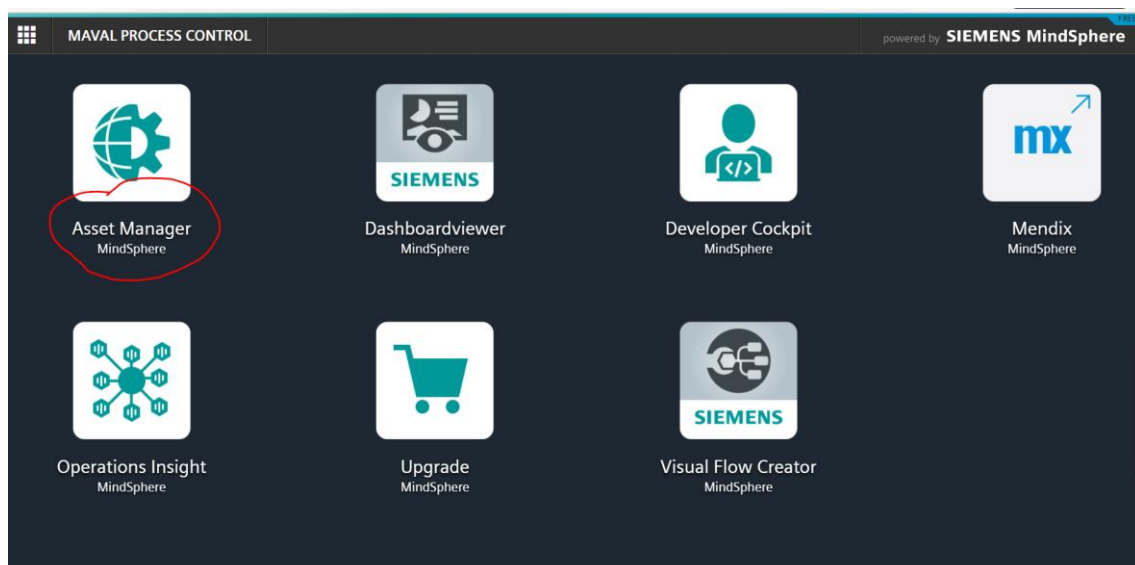
As explained here

[MindSphere – Como conectar um Raspberry PI ao MindSphere - YouTube](#)

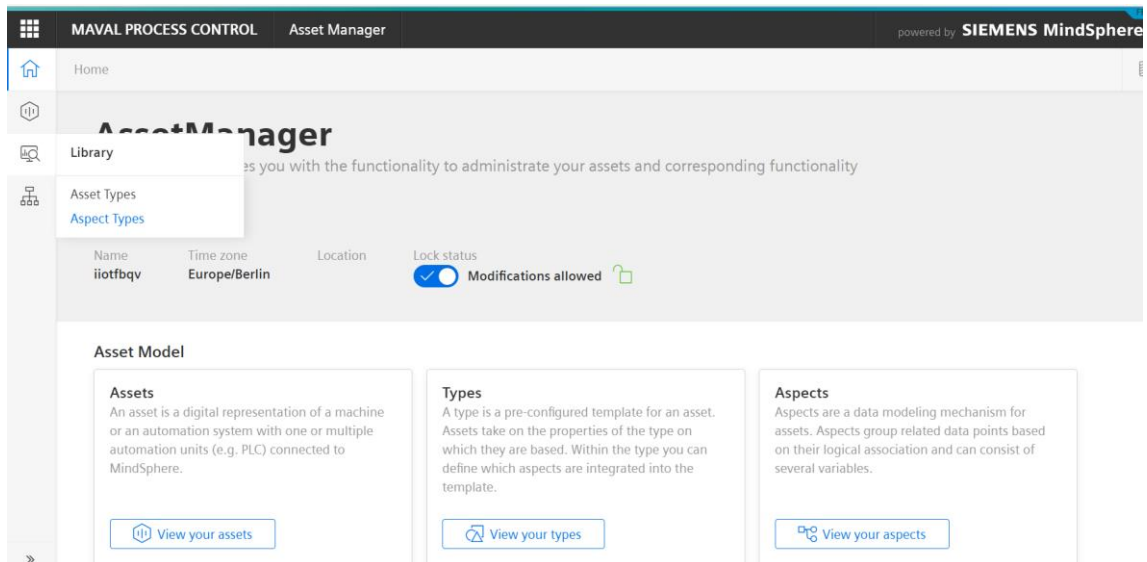
And here you see how to inject to Mindsphere

[MindSphere – Como utilizar o Visual Flow Creator \(NODE-Red\) no MindSphere - YouTube](#)

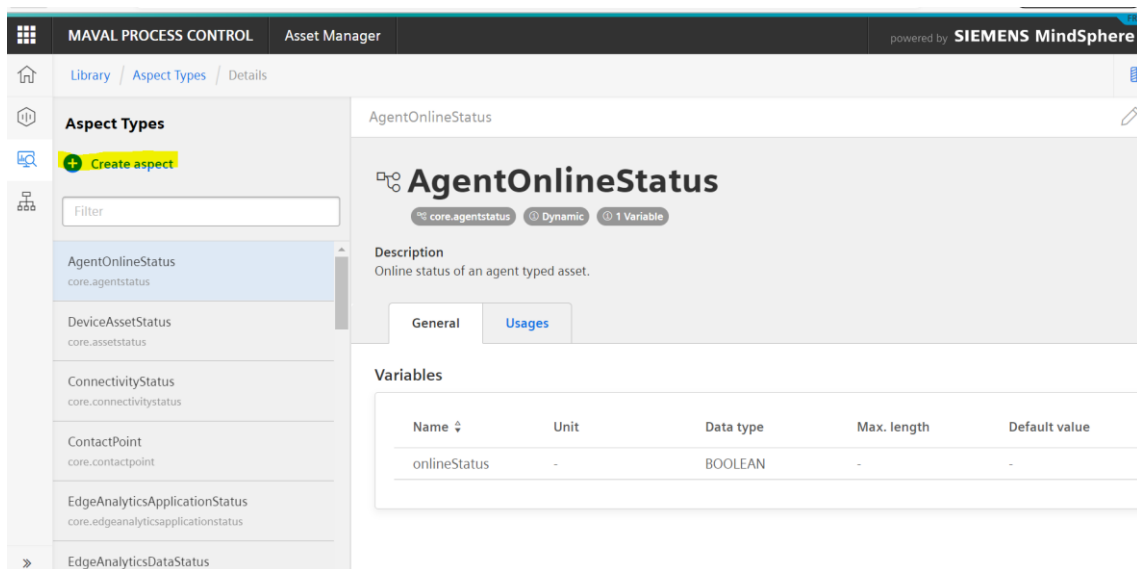
So let's create an Asset from Asset Manager



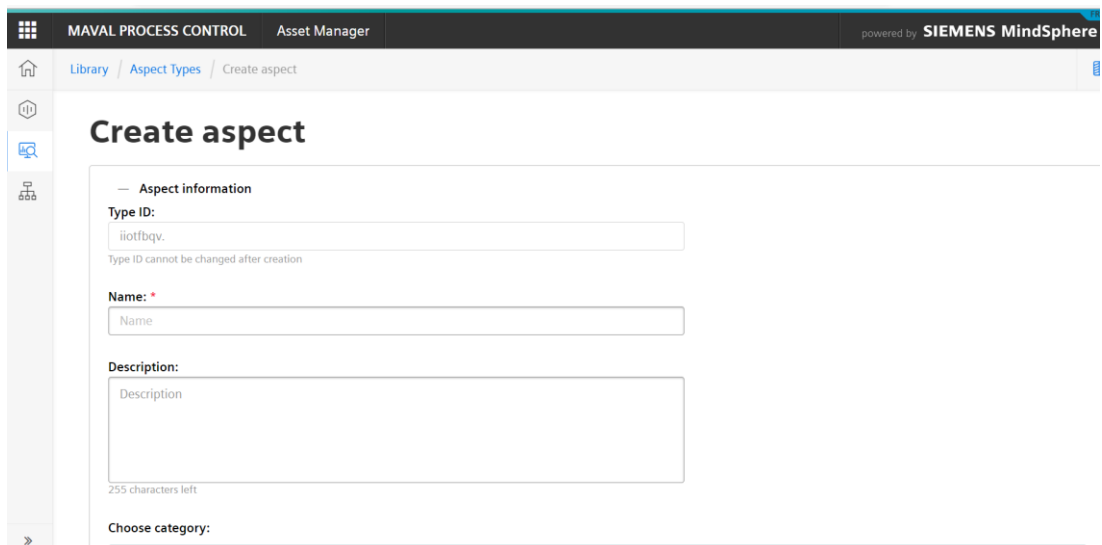
Let's create an Aspect (A set of variables) so the Asset will be a type of Aspect, so you can have several assets (for instance Edge machines) of same type, so you do not have to create a new one each time.



Let's create an Aspect



In this case called LoRaWAN\_test



MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere

Library / Aspect Types / Create aspect

## Create aspect

— Aspect information

Type ID:  
  
Type ID cannot be changed after creation

Name: \*

Description:  
  
255 characters left

Choose category:

Scroll down and add a variable


MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere


Library / Aspect Types / Create aspect

☒ Dynamic  
The aspect is used for time-series data

☐ Static  
The aspect is used for static data

— Variables

 Please add at least one variable!




No variables entered yet  
 Add your first variable to your aspect

[+ Add variable](#)

MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere


Library / Aspect Types / Create aspect

 The category of an aspect cannot be changed afterwards.


☒ Dynamic  
The aspect is used for time-series data

☐ Static  
The aspect is used for static data

— Variables

 Variable names must be unique inside an aspect.  
 The data type BIG\_STRING is only available for a dynamic aspect.

[+ Add variable](#) [↕ Import variables](#) [↓ Download template](#) [↓ Export variables](#) [🗑 Delete all new](#)

Name	Unit	Data type	Max. length	
<input type="text" value="Name"/>	<input type="text" value="Unit"/>	<input type="text" value="Select..."/>	<input type="text" value="Max. length"/>	Defined 

[Save](#) [Cancel](#)

Fill in (add more variables like humidity, pressure, etc) and click save

MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere

Library / Aspect Types / Create aspect

The category of an aspect cannot be changed afterwards.

☒ Dynamic  
 The aspect is used for time-series data

☐ Static  
 The aspect is used for static data

— Variables

• Variable names must be unique inside an aspect.  
 • The data type BIG\_STRING is only available for a dynamic aspect.

+ Add variable   ↑ Import variables   ↓ Download template   ↓ Export variables   🗑 Delete all new

Name	Unit	Data type	Max. length	
Temperatura_nevera	°C	DOUBLE	Max. length	Defined

If you scroll down you will see the just created Aspect type: LoRaWAN\_test

MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere

Library / Aspect Types / Details

Aspect Types

+ Create aspect

Filter

- sinumerikBasicMachineModel  
core.sinumerikbasicmachinemodel
- SinumerikBasicMachineStatus  
core.sinumerikbasicmachinestatus
- SinumerikBasicStartup  
core.sinumerikbasicstartup
- acceleration  
iiotfbqv.acceleration
- aspectDemoPumpData  
iiotfbqv.aspectDemoPumpData
- LoRaWAN\_test**  
iiotfbqv.LoRaWAN\_test

AgentOnlineStatus

**AgentOnlineStatus**

core.agentstatus   Dynamic   1 Variable

Description  
Online status of an agent typed asset.

General   Usages

Variables

Name	Unit	Data type	Max. length	Default value
onlineStatus	-	BOOLEAN	-	-

Now you need to create an Asset Type, it will be an instance of predefined Aspect type

Let's select Asset Types

MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere

Library / Aspect Types / Details

Aspect Types

Library

Asset Types

Aspect Types

- sinumerikBasicMachineModel  
core.sinumerikbasicmachinemodel
- SinumerikBasicMachineStatus  
core.sinumerikbasicmachinestatus
- SinumerikBasicStartup  
core.sinumerikbasicstartup
- acceleration  
iiotfbqv.acceleration
- aspectDemoPumpData  
iiotfbqv.aspectDemoPumpData
- LoRaWAN\_test**  
iiotfbqv.LoRaWAN\_test

AgentOnlineStatus

**AgentOnlineStatus**

core.agentstatus   Dynamic   1 Variable

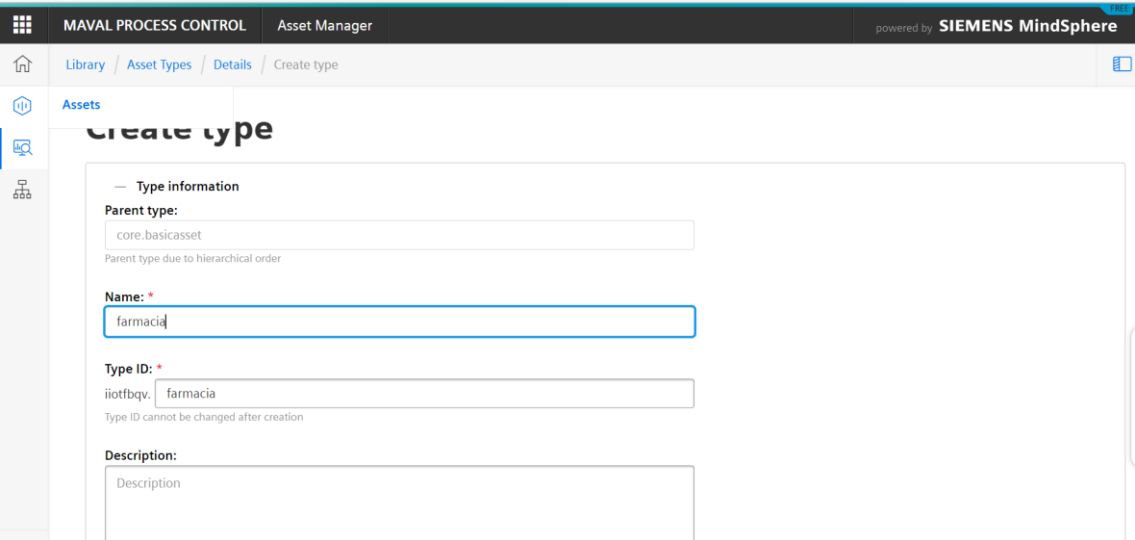
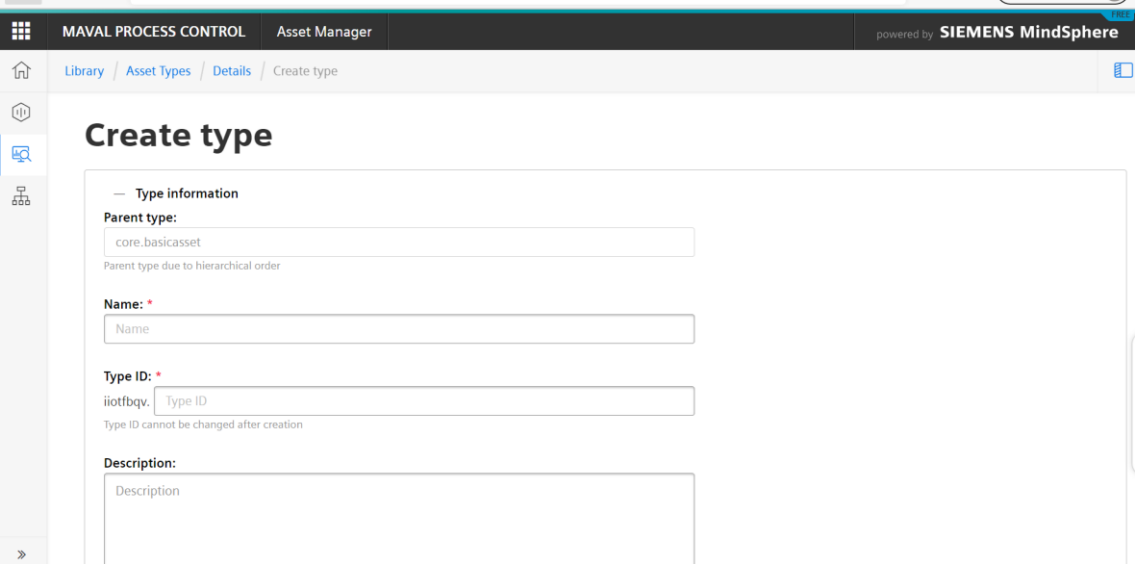
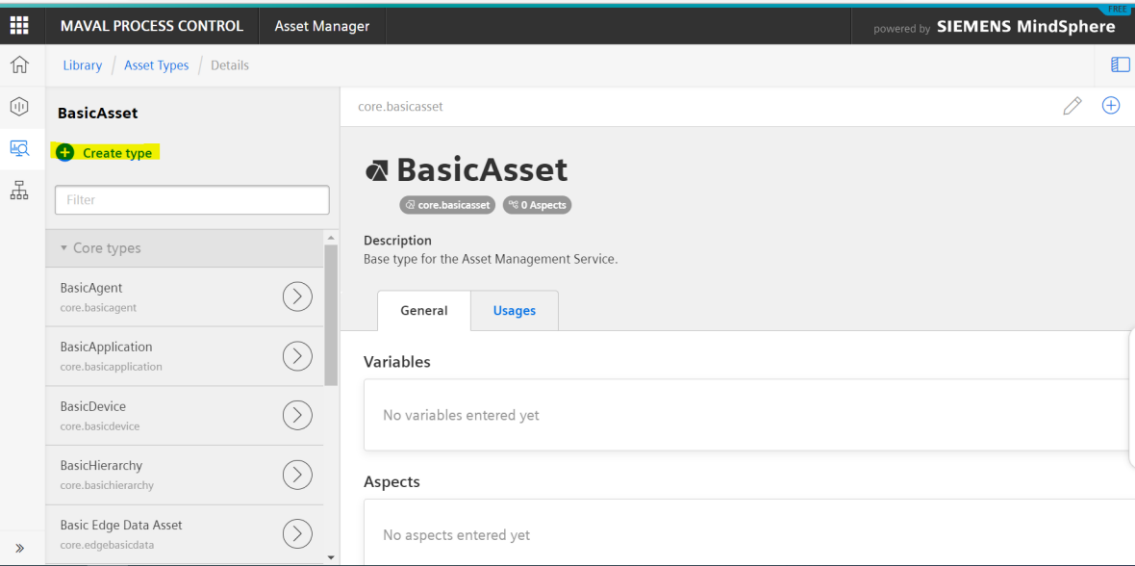
Description  
Online status of an agent typed asset.

General   Usages

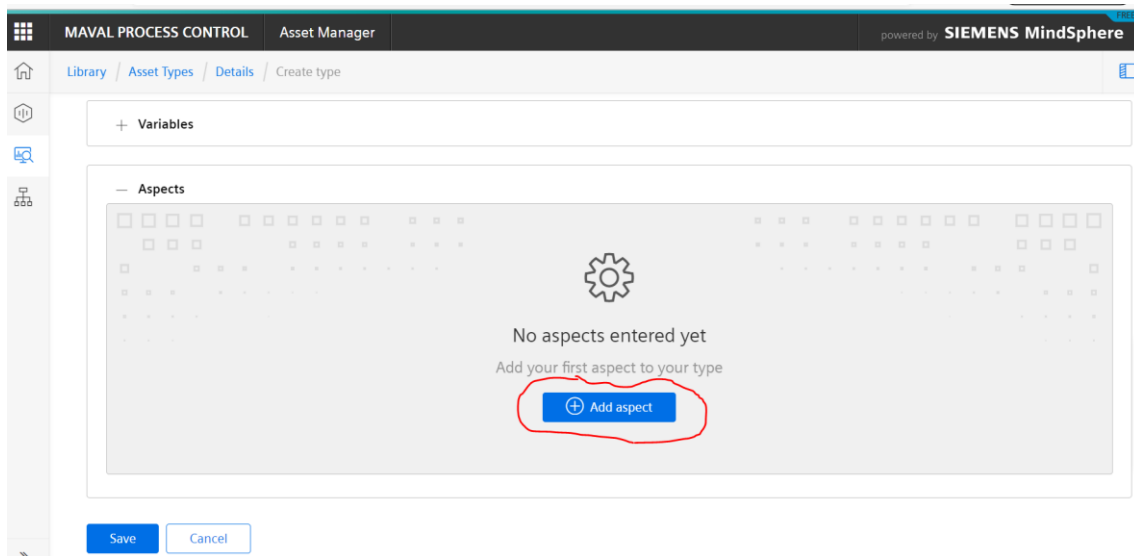
Variables

Name	Unit	Data type	Max. length	Default value
onlineStatus	-	BOOLEAN	-	-

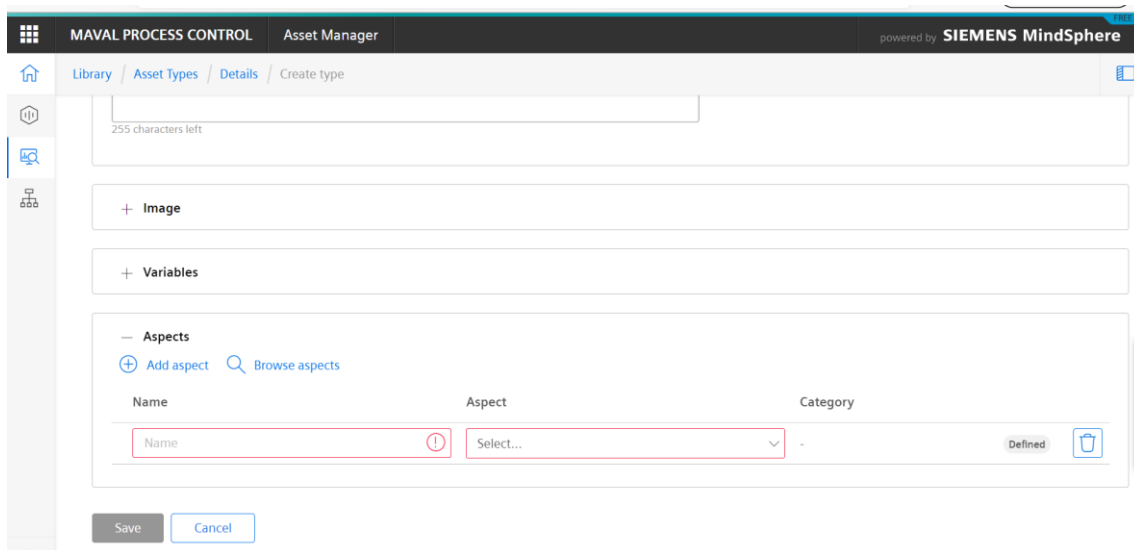
And create Type



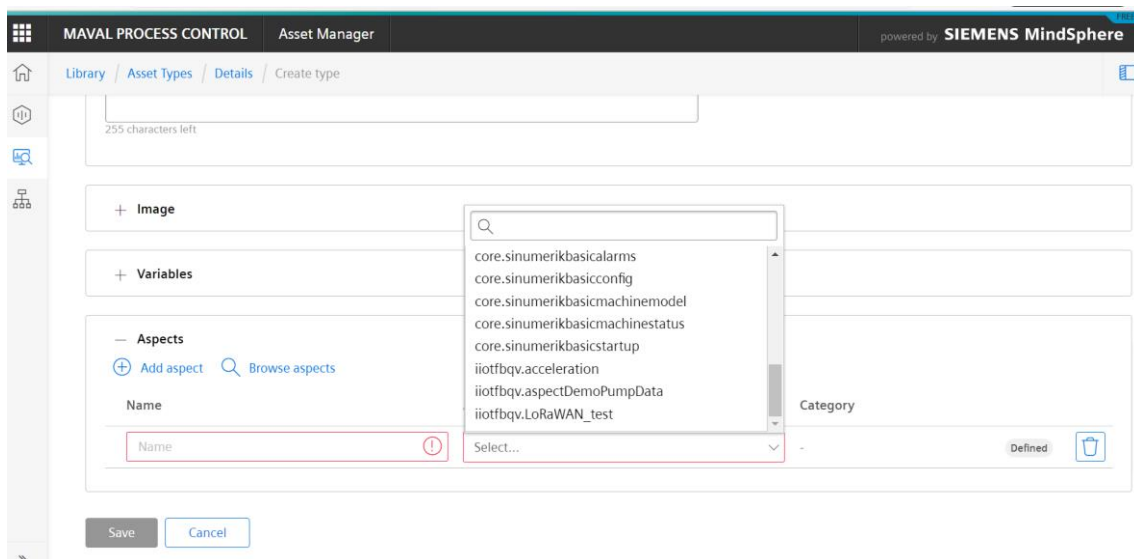
Then you have to scroll down and click on + aspect



And select one of the created Aspects



Give a name and select an Aspect



MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere

Library / Asset Types / Details / Create type

255 characters left

+ Image

+ Variables

— Aspects

+ Add aspect Browse aspects

Name	Aspect	Category	
> LoRaWAN_test	iiotfbqv.LoRaWAN_test	Dynamic	Defined

Save Cancel

Once created you will see it on the list

MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere

Library / Asset Types / Details

**BasicAsset**

+ Create type

Filter

- MindConnectIoTExtension core.mindconnectiotionextension
- OPCUADataModel core.opcuadatamodel
- OPCUADataType core.opcuadatatype
- OPCUAHierarchyDataType core.opcuahierarchydatatype
- Own types
- farmacia** iiotfbqv.farmacia

core.basicasset

## BasicAsset

core.basicasset 0 Aspects

Description  
Base type for the Asset Management Service.

General Usages

Variables

No variables entered yet

Aspects

No aspects entered yet

If you click on “farmacia” you will see this

MAVAL PROCESS CONTROL Asset Manager powered by SIEMENS MindSphere

Library / Asset Types / Details

**BasicAsset**

+ Create type

Filter

- MindConnectIoTExtension core.mindconnectiotionextension
- OPCUADataModel core.opcuadatamodel
- OPCUADataType core.opcuadatatype
- OPCUAHierarchyDataType core.opcuahierarchydatatype
- Own types
- farmacia** iiotfbqv.farmacia

core.basicasset / iiotfbqv.farmacia

Description  
File to store data

General Usages

Variables

No variables entered yet

Aspects

Name	Aspect	Category	
> <b>LoRaWAN_test</b>	iiotfbqv.LoRaWAN_test	Dynamic	Defined

Now we have to make two actions:

- 1 Talk to mindsphere (send data to mindsphere but this data will be lost) (we will name it as data\_connection)
- 2 Store data to mindsphere (to make this data permanent) ( we will name it as data\_storage)

So click on Assets

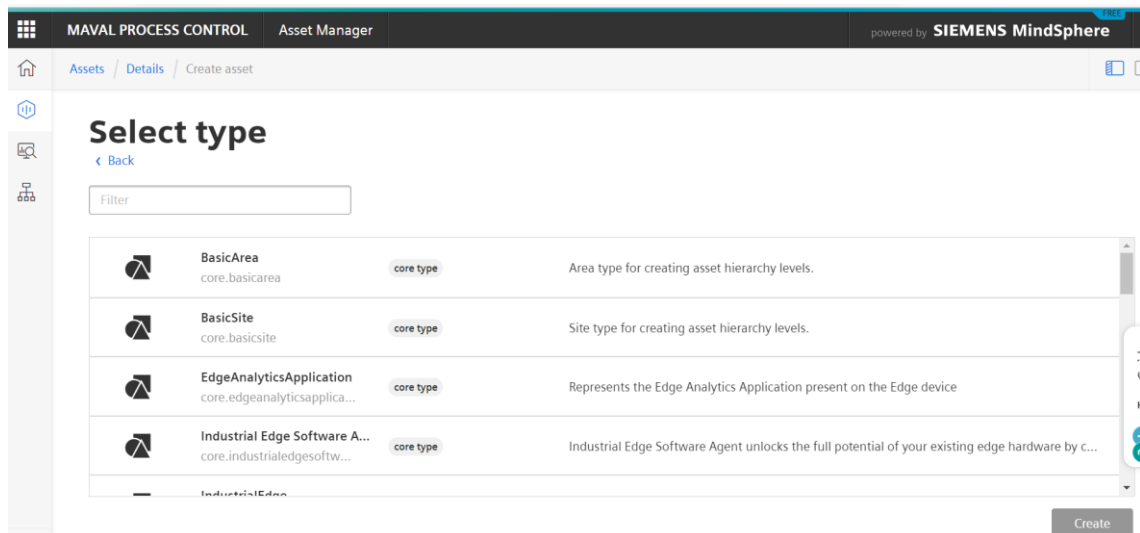
The screenshot shows the 'Assets' section of the MAVAL PROCESS CONTROL Asset Manager. The left sidebar lists various asset types, including 'farmacia' (iiotfbqv.farmacia). The main panel shows the details for 'core.basicasset / iiotfbqv.farmacia', including a description 'File to store data', tabs for 'General' and 'Usages', a 'Variables' section with 'No variables entered yet', and an 'Aspects' table.

Name	Aspect	Category
LoRaWAN_test	iiotfbqv.LoRaWAN_test	Dynamic

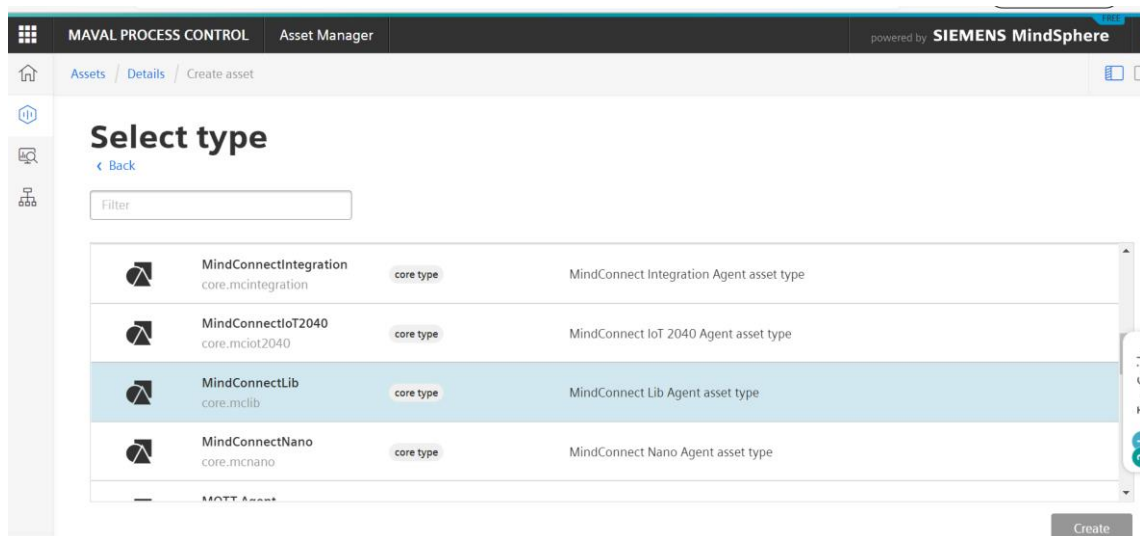
And create Asset

The screenshot shows the 'Assets' section of the MAVAL PROCESS CONTROL Asset Manager. The left sidebar lists various asset types, including 'data\_connection', 'data\_storage', 'DemoPump', 'MobilePhone', and 'RPI Device'. The main panel shows the details for 'iiotfbqv', including a description 'Root Asset for iiotfbqv tenant', a location 'No location available', and an 'Events' section with 'No events in the last 24 hours' and a 'Refresh' button.

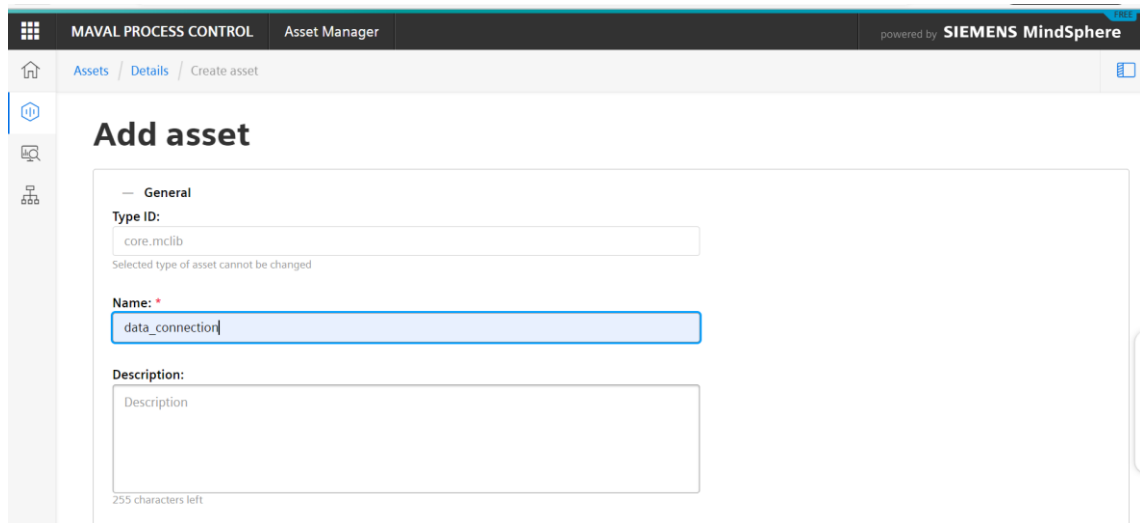




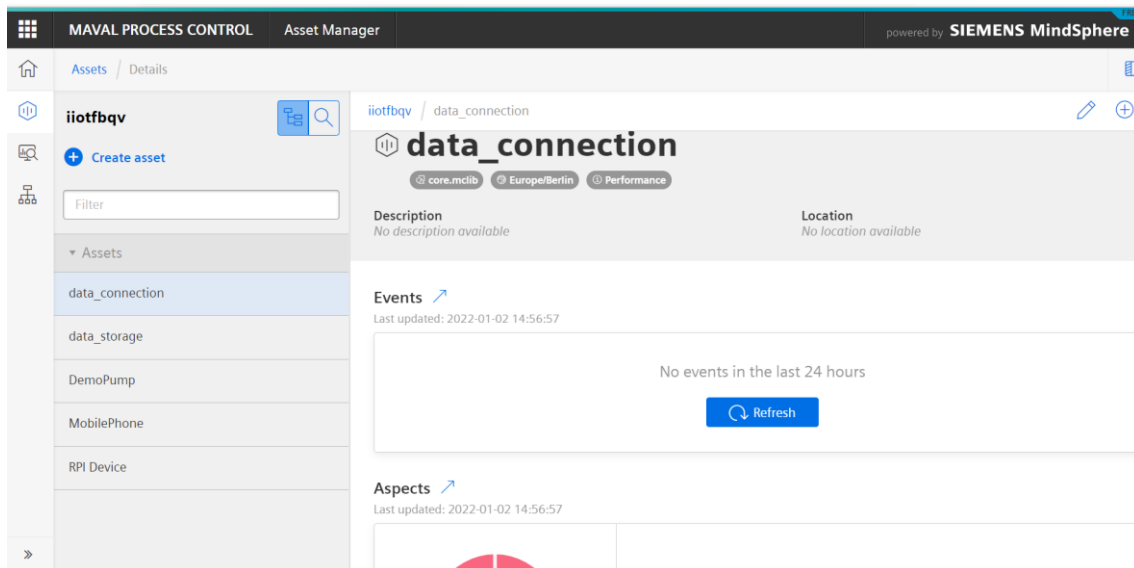
And we select MindconnectLib



And give a name

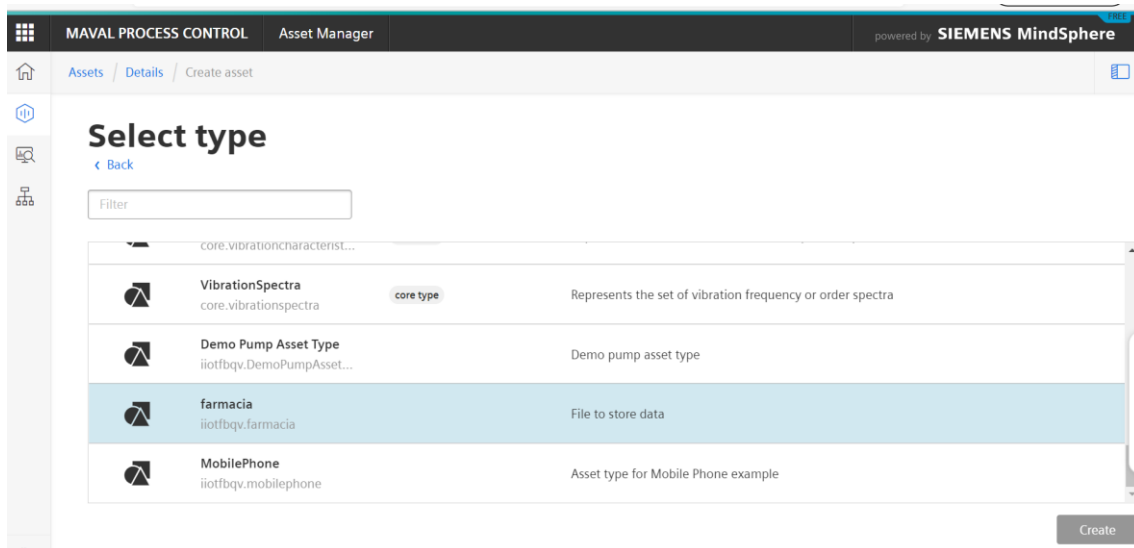


You will see this



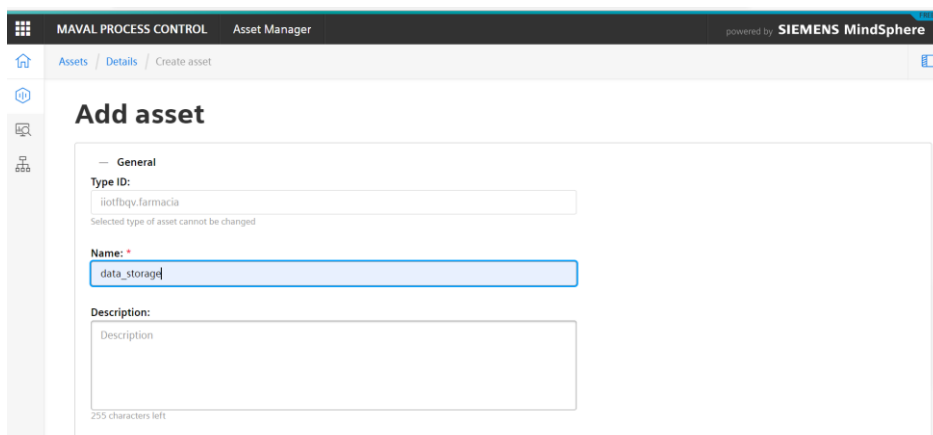
Now we create a storage asset same type than we have created before (farmacia)

We create new asset

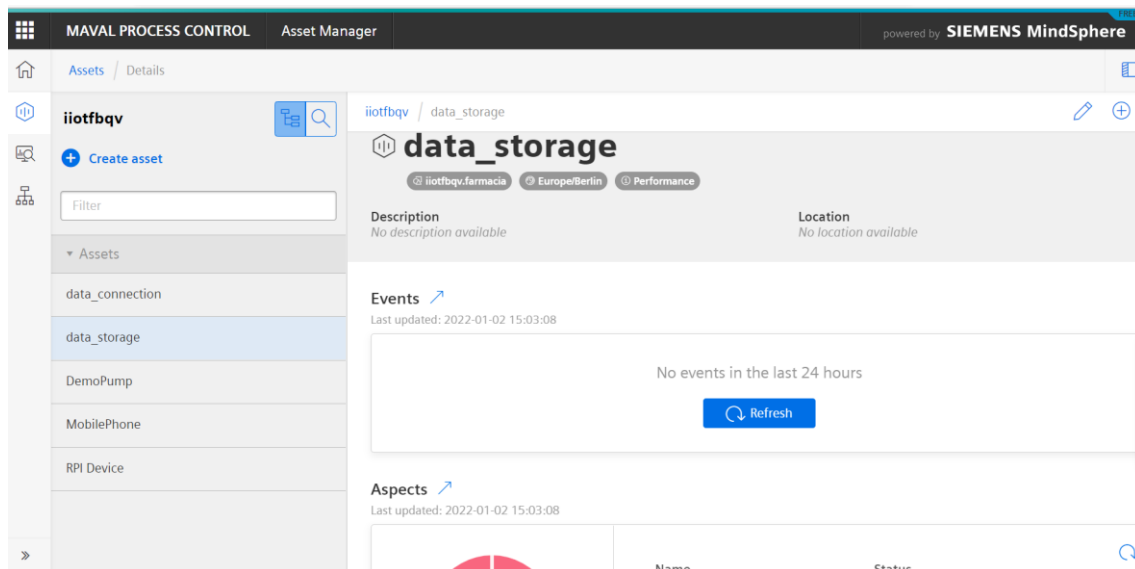


Select previously created asset (farmacia)

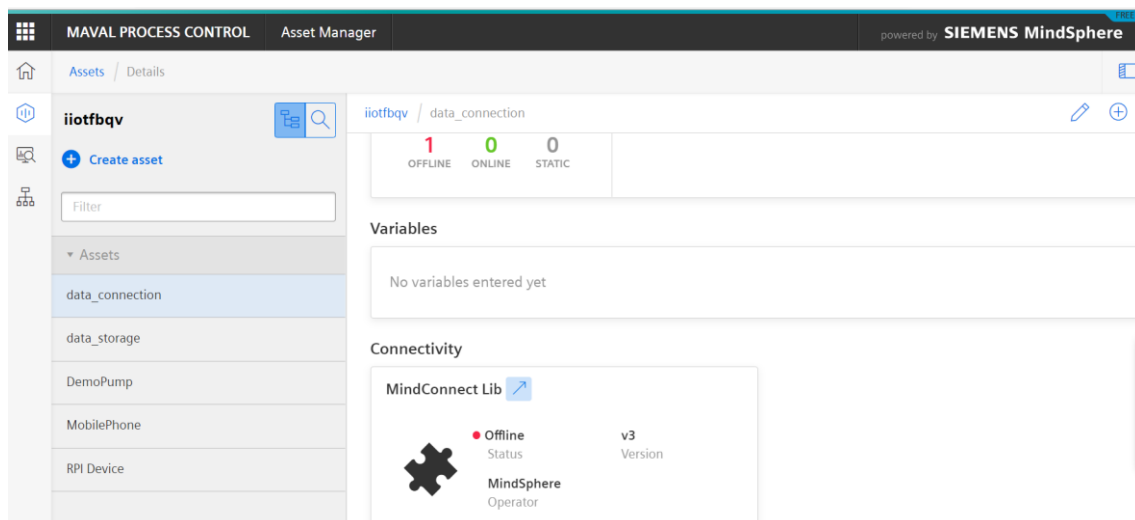
And click on create



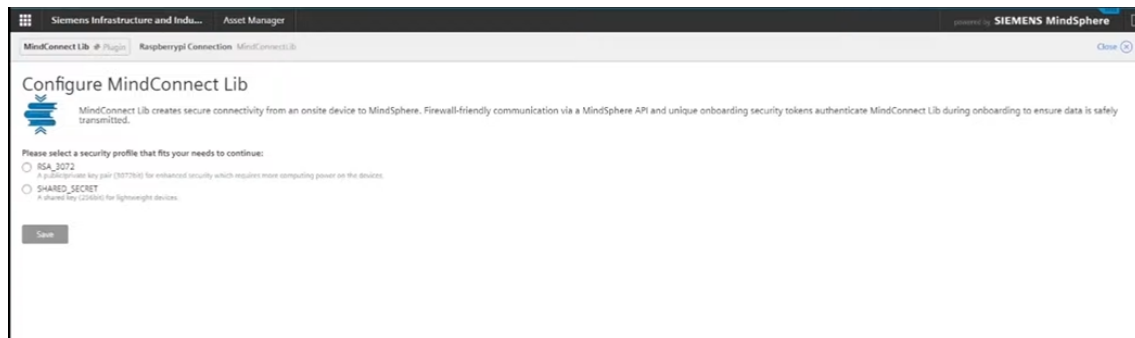
Click on save and you will see this



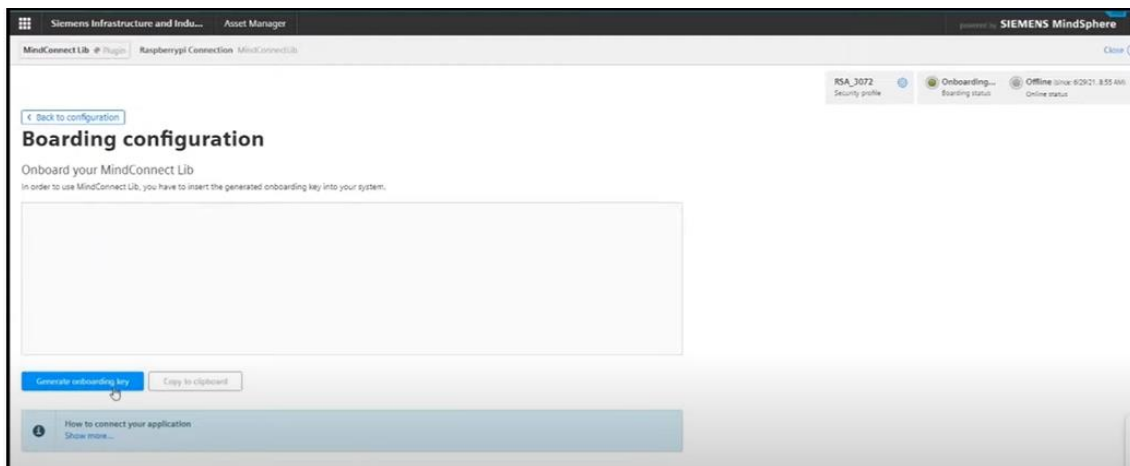
Now we have to go to data\_connect asset created and click on the blue arrow close to MindConnect Lib to generate a security Key



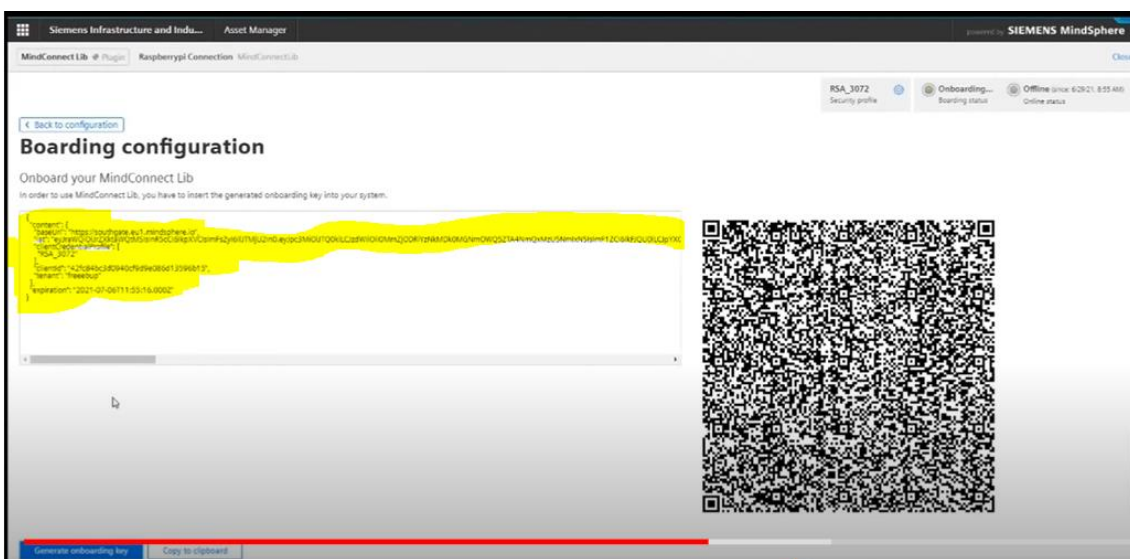
Let's select SHARED SECRET



And click on save

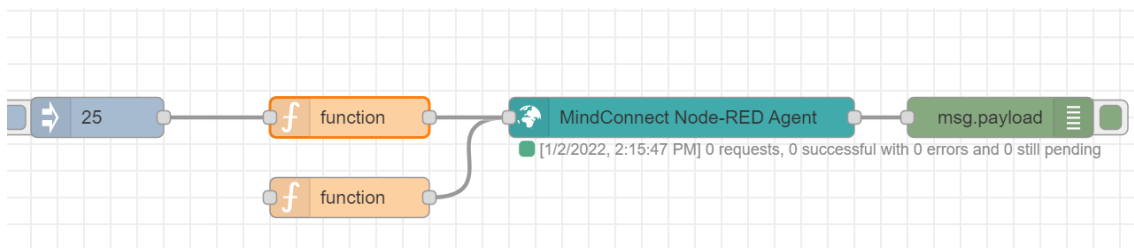


And click on “generate onboarding key”



You will see a key JSON text, copy it and save on a plain text file. You will need it later.

Now we can go to the IBM node RED or any Edge machine we will use



You must use a function like this one, with same name of variable you have created as Datapoint starting with DP-

**Edit function node**

Delete Cancel Done

**Properties**

Name

Setup On Start **On Message** On Stop

```

1 var newmsg = msg.payload;
2 const values = [{
3   "dataPointId": "DP-Temperatura_nevera",
4   "qualityCode": "0",
5   "value": `${newmsg}`
6   // "value": "25"
7 },
8 ],
9 ]
10 msg.time = new Date();
11 msg.payload = values;
12 return msg;

```

And on the Mindconnect node, just copy the JSON credentials you have saved to a file before

**Edit mindconnect node**

Delete Cancel Done

**Properties**

Profile

Retries

Async requests

Async duration  (in seconds)

Agent Configuration Agent Information

```

{
  "content": {
    "baseUrl": "https://southgate.eu1.mindsphere.io",
    "iat":
"eyJraWQiOiJrZXktaWQtMSIsInR5cCI6IkpXVCIsImFsZyI6IjU2In0.eyJpc3MiOiJkaWQ0kiLCJzdzWiiOiI2YzZwMGxZWZmMDk0NGQ5OGUwOGFmOTMxM2NiY2EzZiIsImF1ZCI6IkpXVCJpYXQiOiE

```

Then you have to activate this connection by clicking on

Edit mindconnect node

Delete

Cancel

Done

⚙️ Properties

⚙️

📄

🖨️

🏷️ Name

Name

🔒 Profile

SHARED\_SECRET

▼

🔄 Retries

3

▲▼

⬆️ Async requests

1

▲▼

⬇️ Async duration

10

▲▼

(in seconds)

⚙️ Agent Configuration

📄 Agent Information

🔧

🔄

🗑️

```
{
  "content": {
    "baseUrl": "https://southgate.eu1.mindsphere.io",
    "iat":
```

You will see this

Agent Configuration

✕

⚙️ Automatic Data Source Configuration (Node Id: b52886e52bc45d23):

The data source configuration will automatically create the data source and data mappings for selected asset. If you want to use a more complex configuration (e.g. if you want to map the agent to multiple assets and/or aspects) please use the [MindSphere Configuration Dialog](#) instead.

📄 The automatic data source configuration will delete all previously configured data sources and mappings.

📄 Asset List: 

Filter Assets

Showing all assets except core.\* assets (like areas, sites, agents etc.)

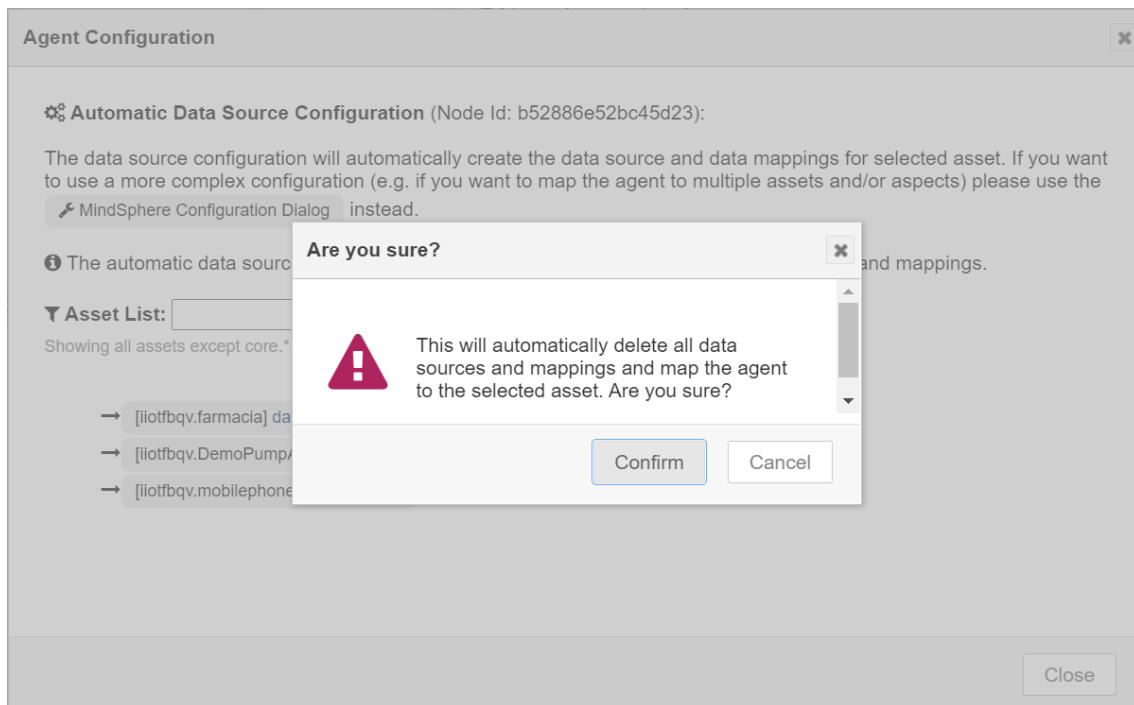
→ [iloftbqv.farmacia] data\_storage

→ [iloftbqv.DemoPumpAssetType] DemoPump

→ [iloftbqv.mobilephone] MobilePhone

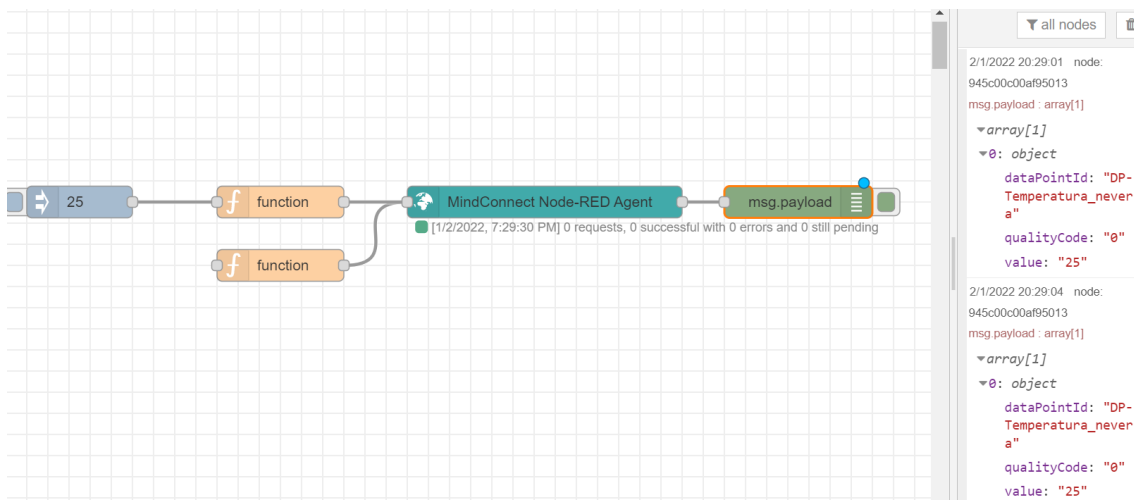
Close

Select our data\_storage



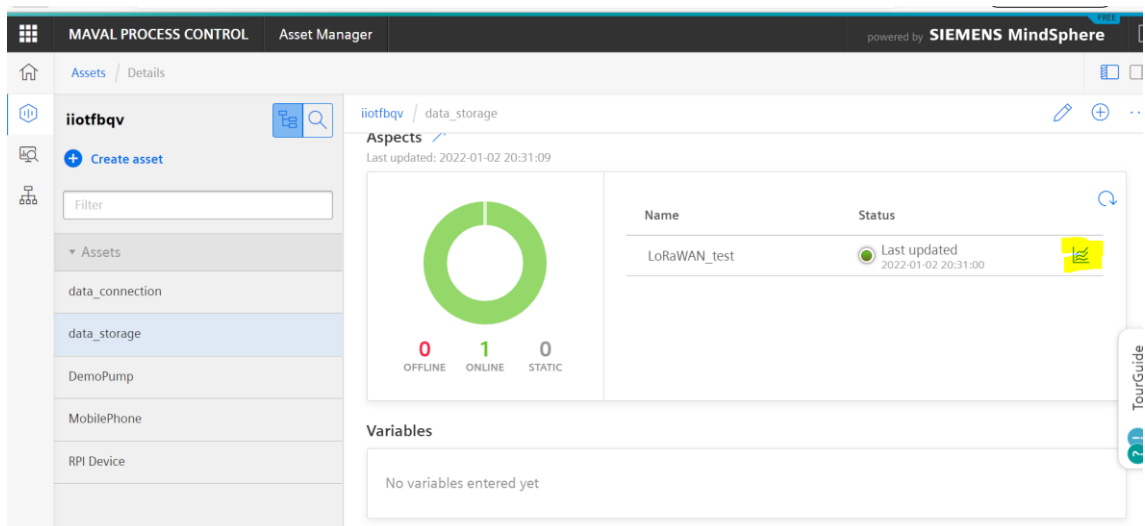
You will see data\_connection in green color

We can test the IBM node-RED Flow

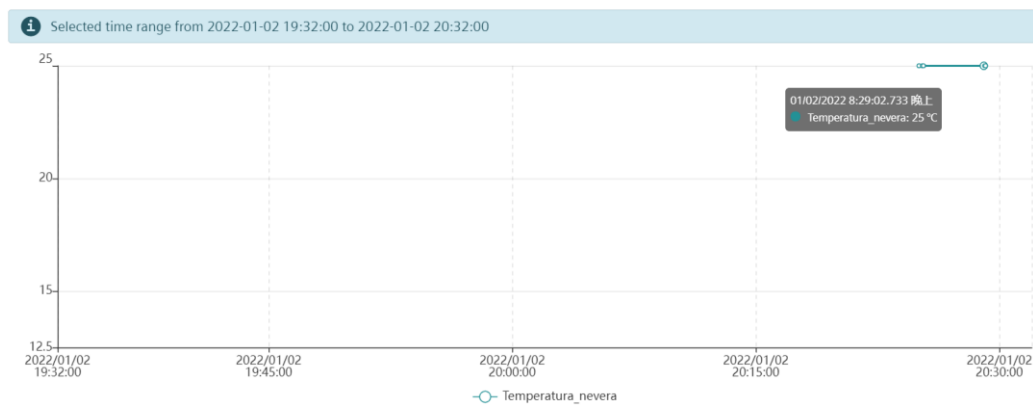


Now we can go to Asset Manager on Mindsphere

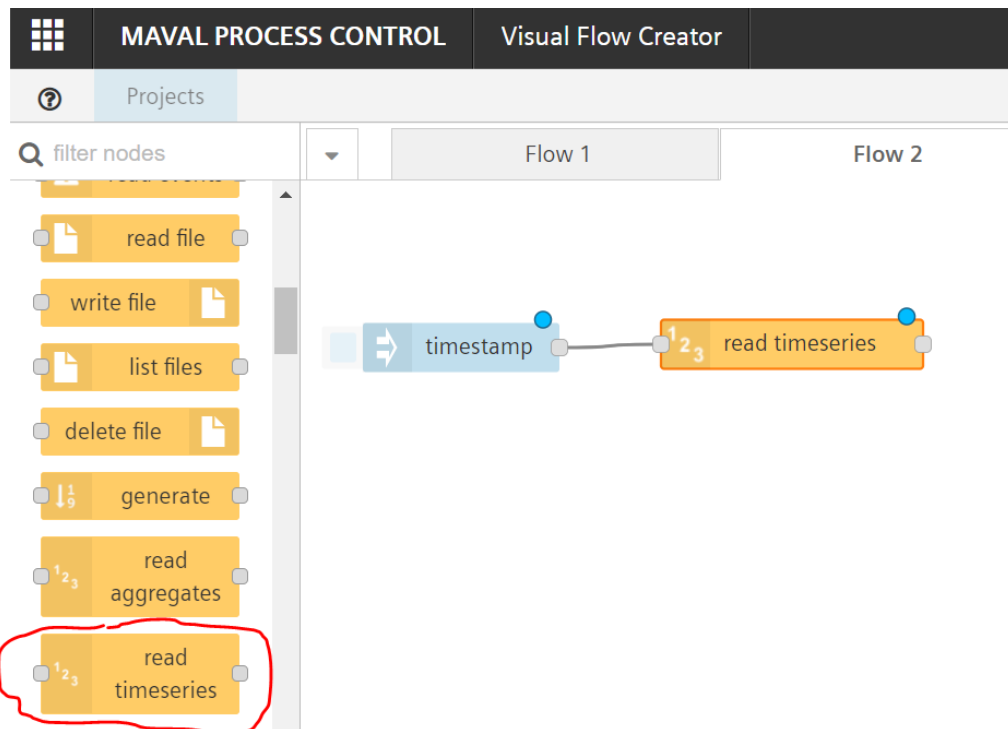
Assets / data\_storage and click on the trend graph icon



Time series data for: LoRaWAN\_test



Now we can go to the Visual Flow creator from Mindsphere and see wether there is data:





Edit read timeseries node

Delete

Cancel

Done

node properties

Name

Name

Topic

Topic

...

Topic Summary

No asset selected

Mode

Period

Period

1 hour

Offset

no offset

TourGuide

?

!

Assets

Aspects

Variables

Search ...

6 / 6

data\_connecti...

core.mclib

-

data\_storage

iiotfbqv.farmacia

-

DemoPump

iiotfbqv.DemoPum...

Please do not mo...

iiotfbqv

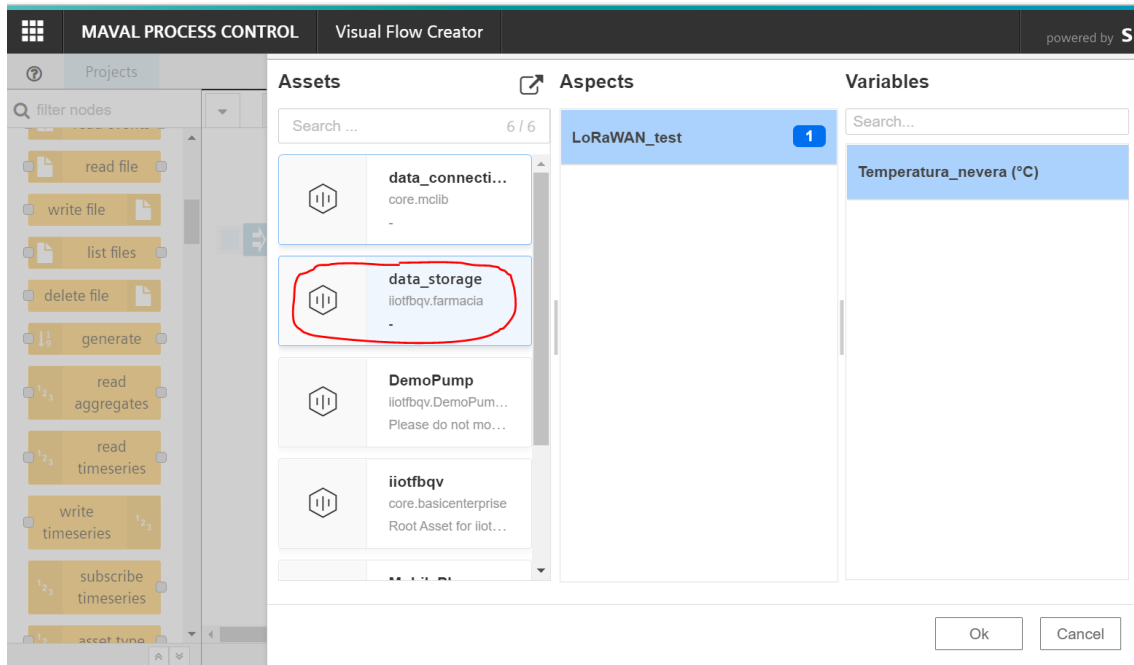
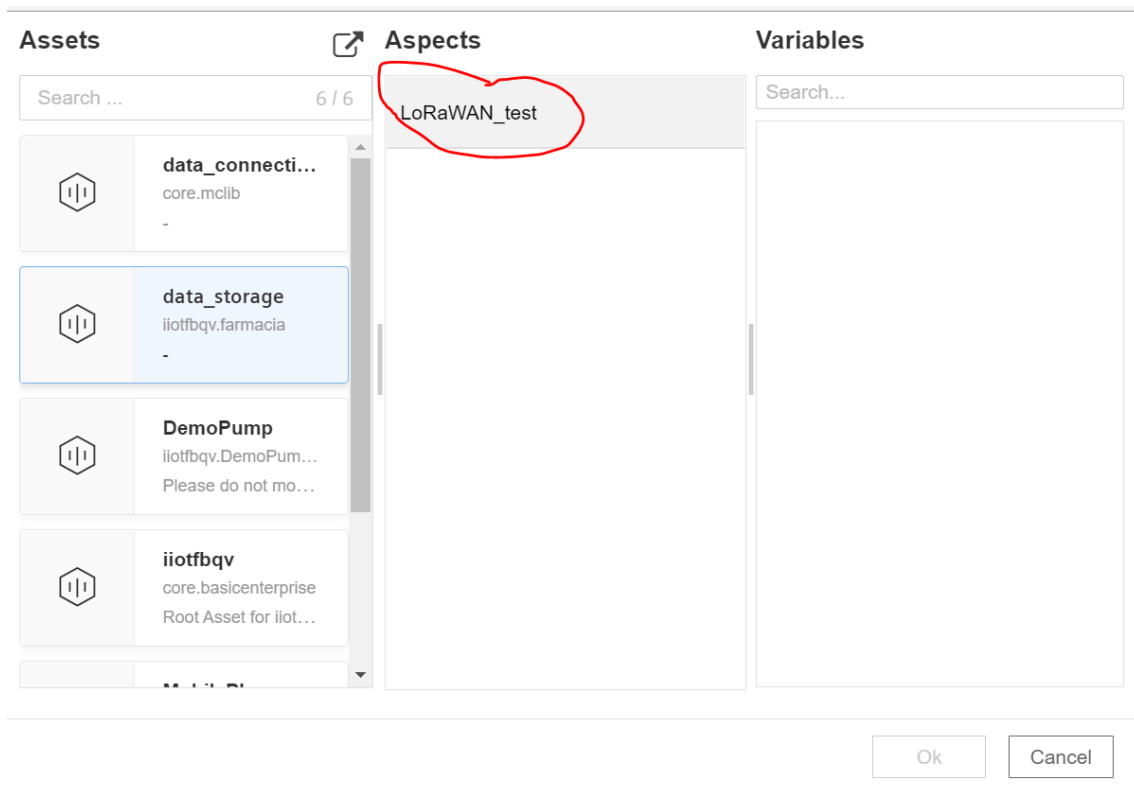
core.basicenterprise

Root Asset for iiot...

Search...

Ok

Cancel



You will get these values

**Edit read timeseries node**

Delete

node properties

Name:

Topic:  ...

Topic Summary:

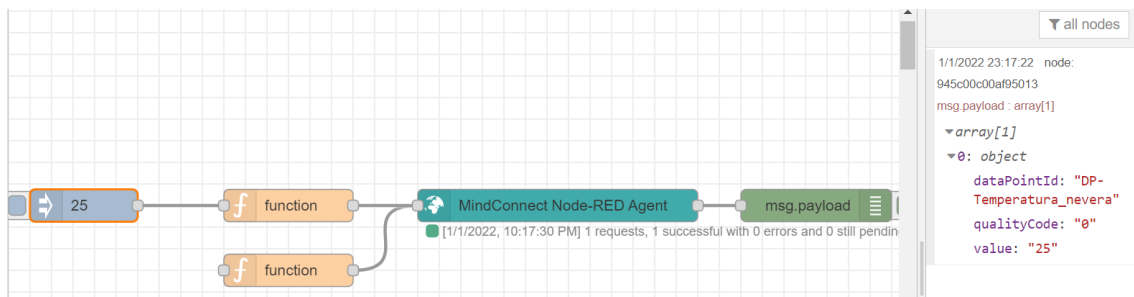
Mode:

Period:

timestamp → <sup>1</sup>2<sub>3</sub> read timeseries data\_storage/LoRaWAN\_test/Temperatura\_nevera → msg.payload

Let's test the flow

First let's inject data from IBM cloud to mindsphere



Attention, you have to insert DP- in front of your data name

**Edit function node**

Delete Cancel Done

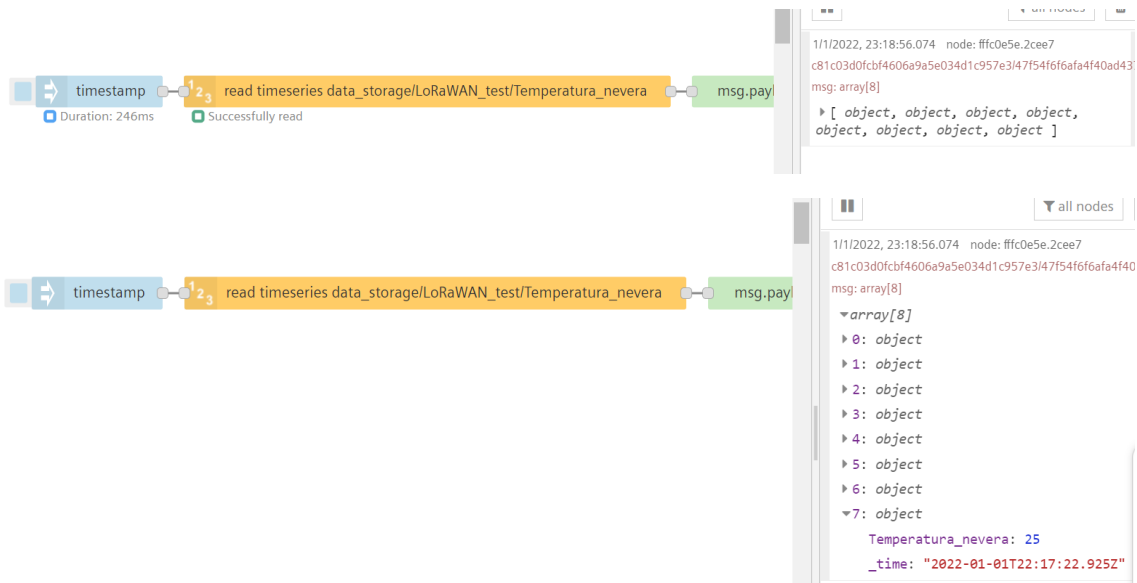
Properties

Name:

Setup On Start On Message On Stop

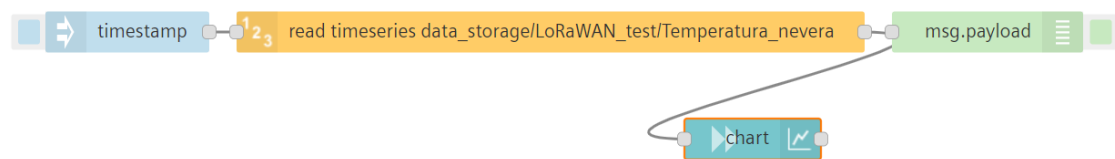
```

1 var newmsg = msg.payload;
2 const values = [{
3   "dataPointId": "DP-Temperatura_nevera",
4   "qualityCode": "0",
5   "value": `${newmsg}`,
6   // "value": "25"
7 },
8 ];
9
10 msg.time = new Date();
11 msg.payload = values;
12 return msg;
  
```



So it works!

Let's add a chart



Delete
Cancel
Done

node properties

Group
Temperatura\_nevera [Temperatura ne

Size
auto

Label
chart

Type
Line chart
enlarge points

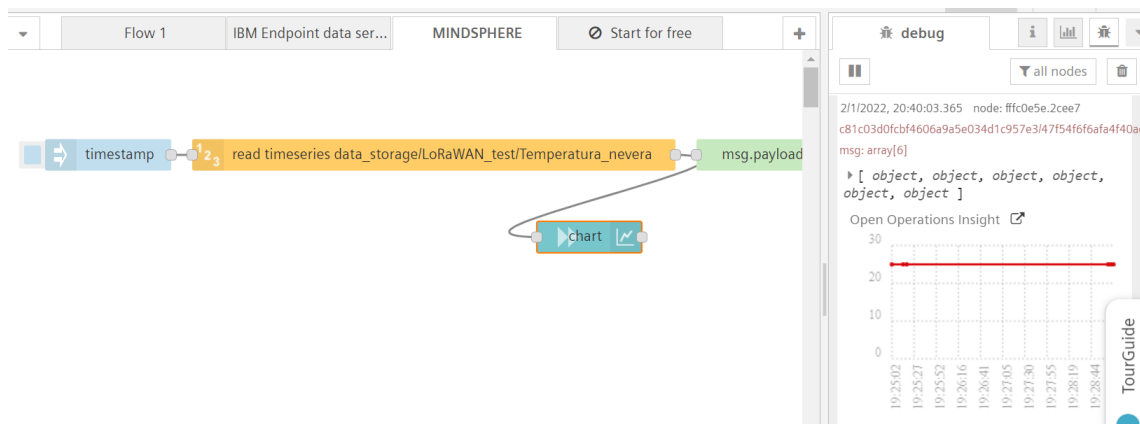
X-axis
last 1 hours OR 1000 points

X-axis Label
HH:mm:ss

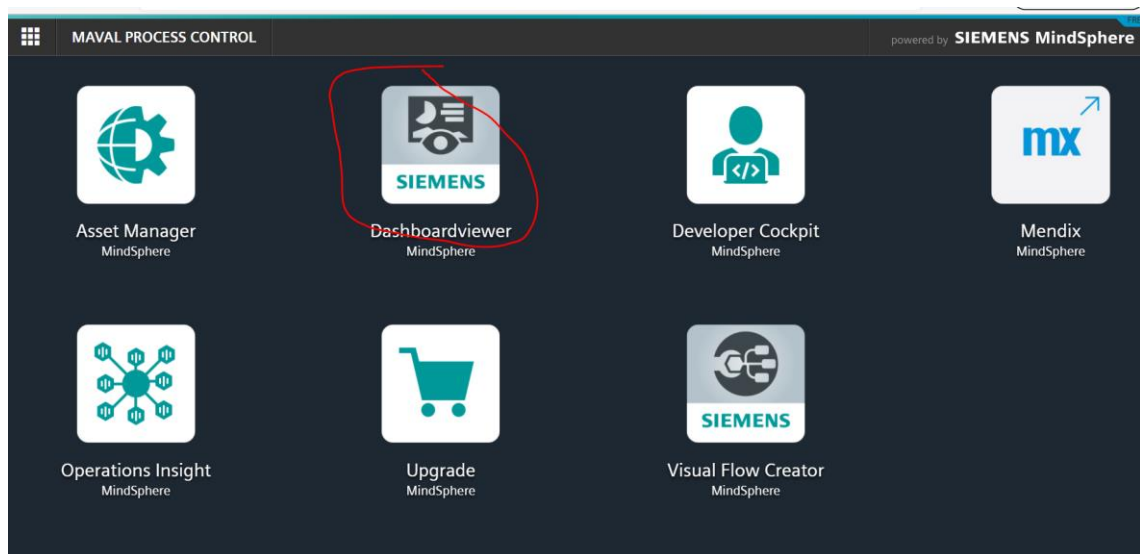
Y-axis
min 0 max 1641075307

port labels

And let's inject again



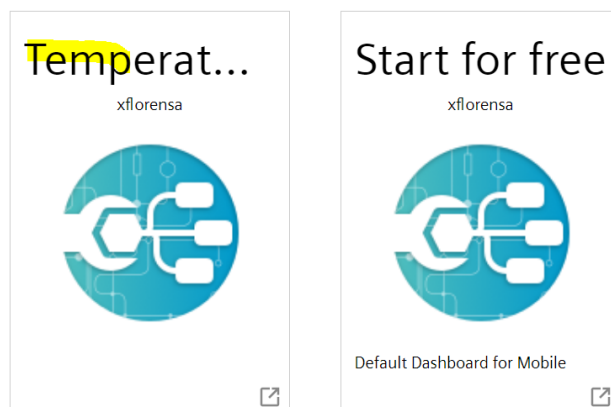
Now let's see the dashboard

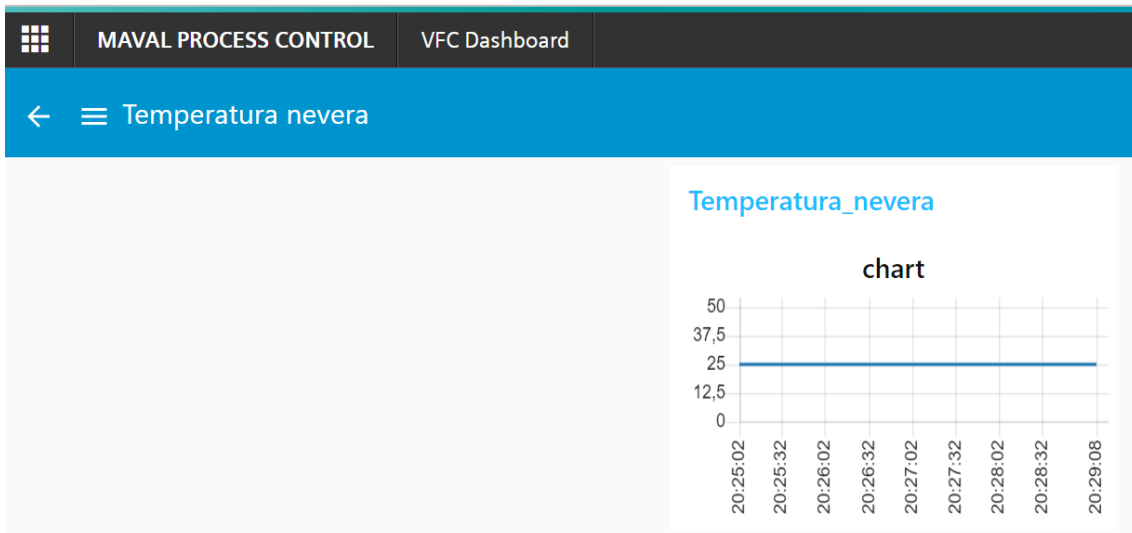


## Dashboards Overview

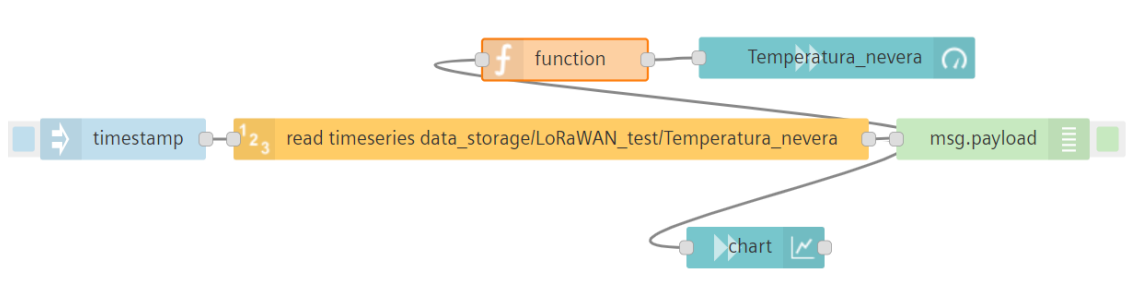
Here you can view all of the Dashboards available to you.

Search for a Dashboard:





We may add a Gauge to see last value



Edit function node

Delete Cancel Done

node properties

Name

Code

```
1 msg.payload=msg.payload[msg.payload.length-1].Temperatura_nevera;  
2 return msg;
```

Outputs 1

See the Info tab for help writing functions.

port labels

### Edit gauge node

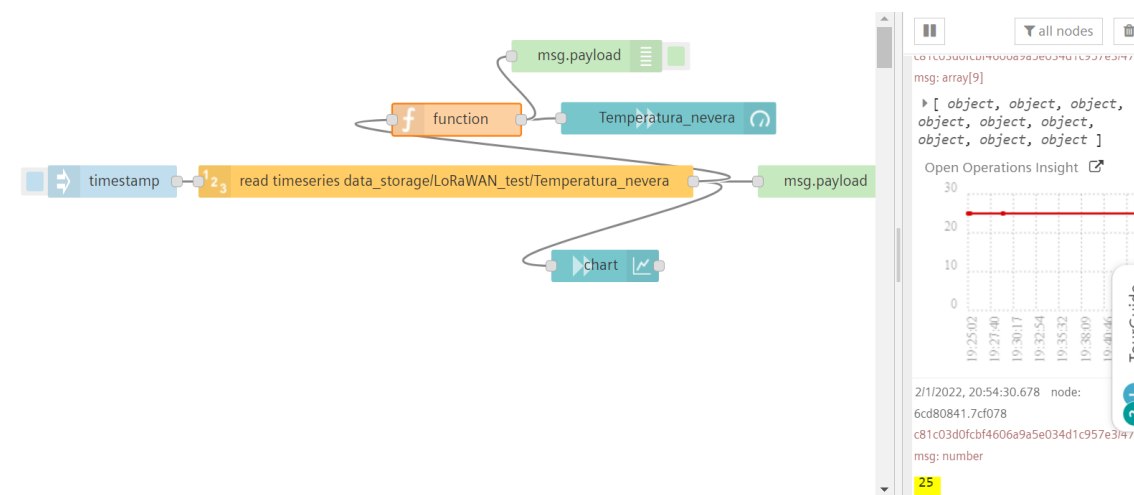
Delete
Cancel
Done

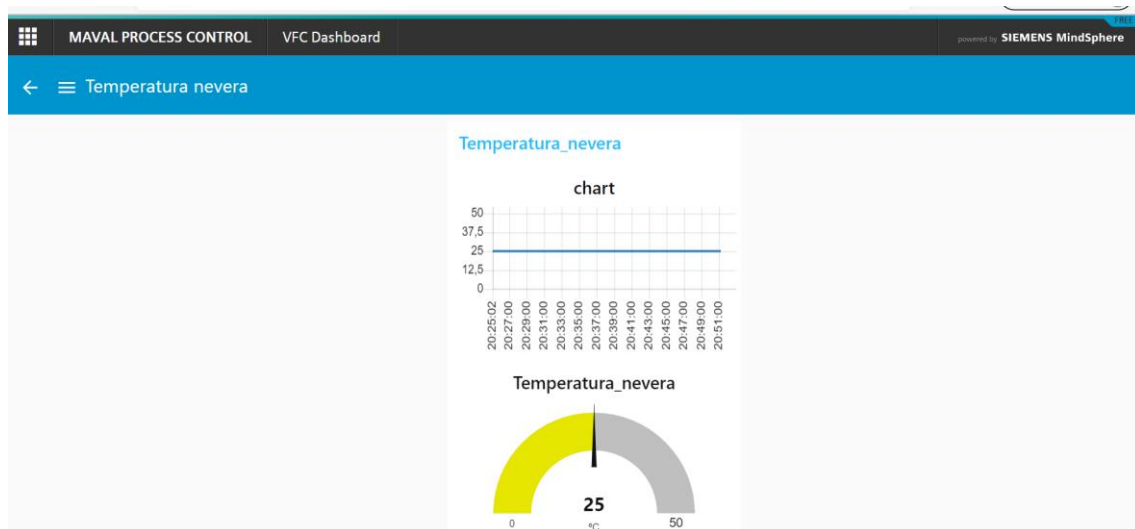
▼ node properties

Group	Temperatura_nevera [Temperatura ne ▼]	
Size	auto	
Type	Gauge ▼	
Label	Temperatura_nevera	
Value format	{{value}}	
Units	°C	
Range	min 0 max 50	

> port labels

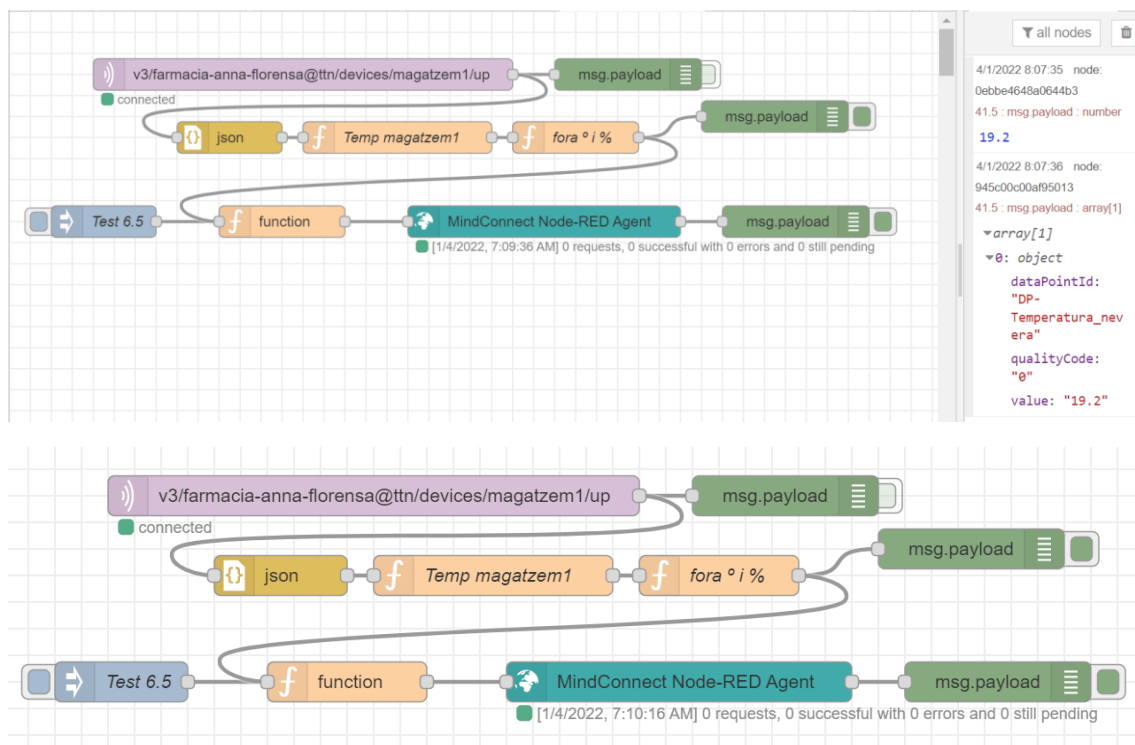
Let's inject again on both IBM and Mindsphere Node-RED





Next step is to inject real LoRaWAN data

Lert's prepare the MQTTin node on IBM cloud



Yes, as soon as the data arrives to TTN console it is sent to Mindsphere



Overview
Applications
Gateways
Organizations

EU1 Community  
No SLA applicable

farmacia-anna-florensa

Overview
End devices
Live data
Payload formatters
Integrations
Collaborators

Applications > farmacia-anna-florensa > End devices > magatzem1 > Live data

**magatzem1**  
ID: magatzem1

83 64 Last activity 2 minutes ago

Overview
Live data
Messaging
Location
Payload formatters
Claiming
General settings

Time Type Data preview Verbose stream ☐ Pause Clear

08:07:35 Schedule data downlink for... Rx1 Delay: 5

08:07:35 Forward uplink data message 26.83Ko, humidity: "41.58RH", temperature: 19.2 08 02 01 6D 07 68 53 06 ... FPort: 8 Data

08:07:35 Successfully processed dat... DevAddr: 26 08 8F 18 FCnt: 83 FPort: 8 Data rate: SF7BW125 SNR: 3.8 RSSI: -102

all nodes

4/1/2022 8:07:35 node:  
0ebbe4648a0644b3  
41.5 : msg.payload : number  
19.2

4/1/2022 8:07:36 node:  
945c00c00af95013  
41.5 : msg.payload : array[1]

▼ array[1]

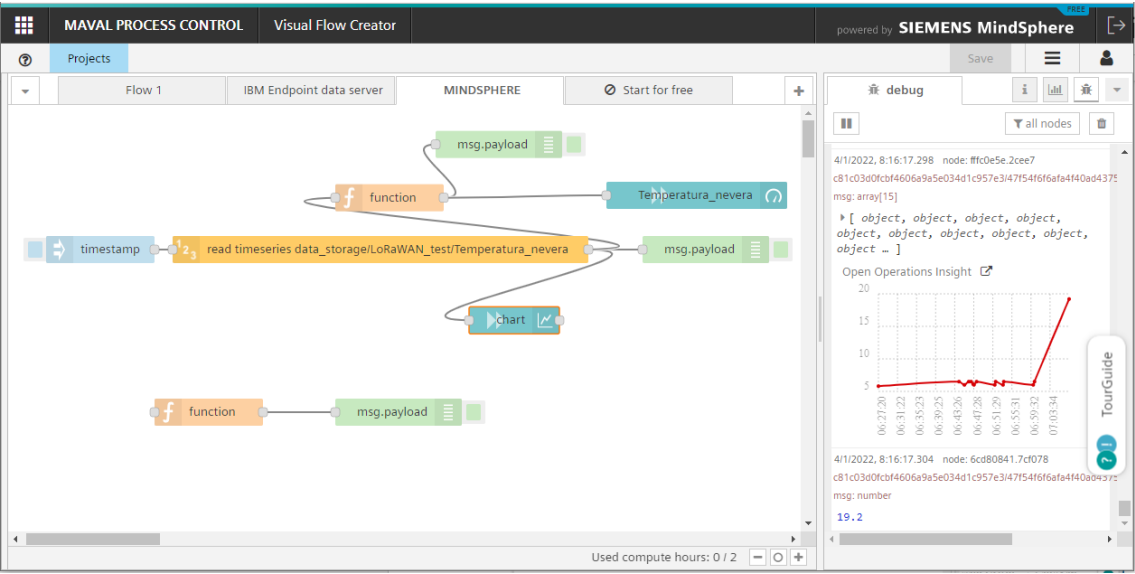
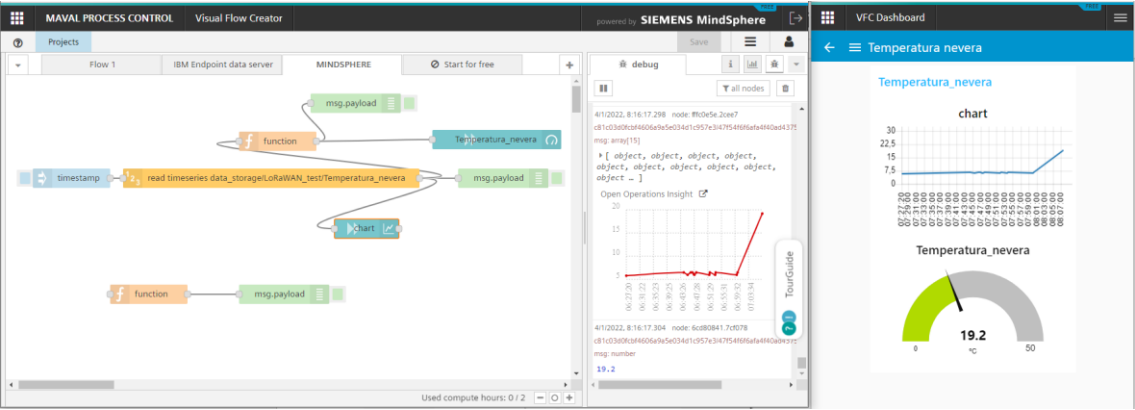
▼ 0: object

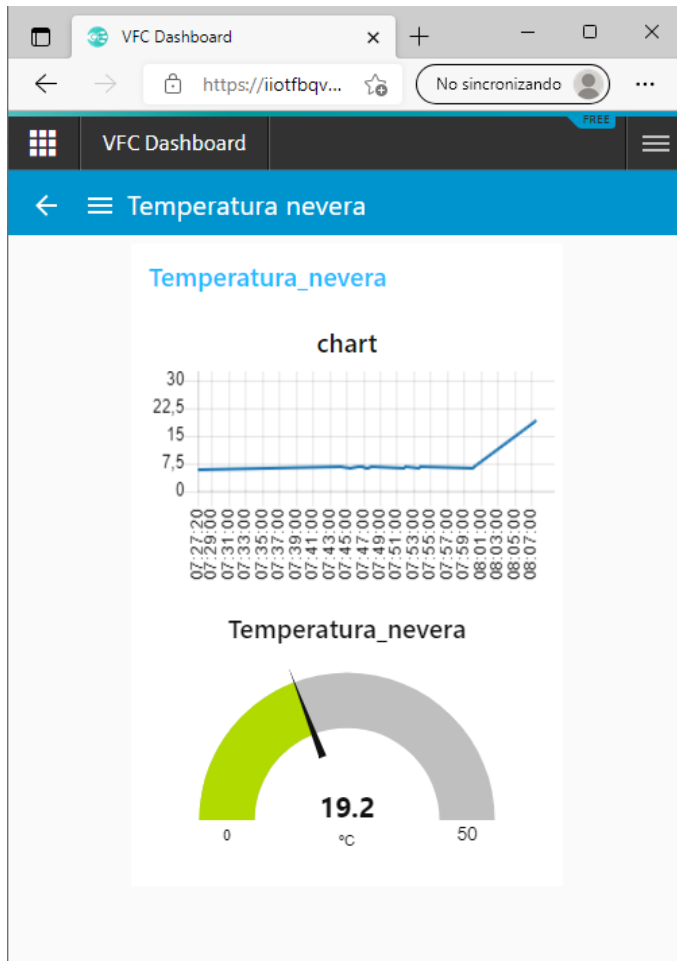
dataPointId:  
"DP-  
Temperatura\_nev  
era"

qualityCode:  
"0"

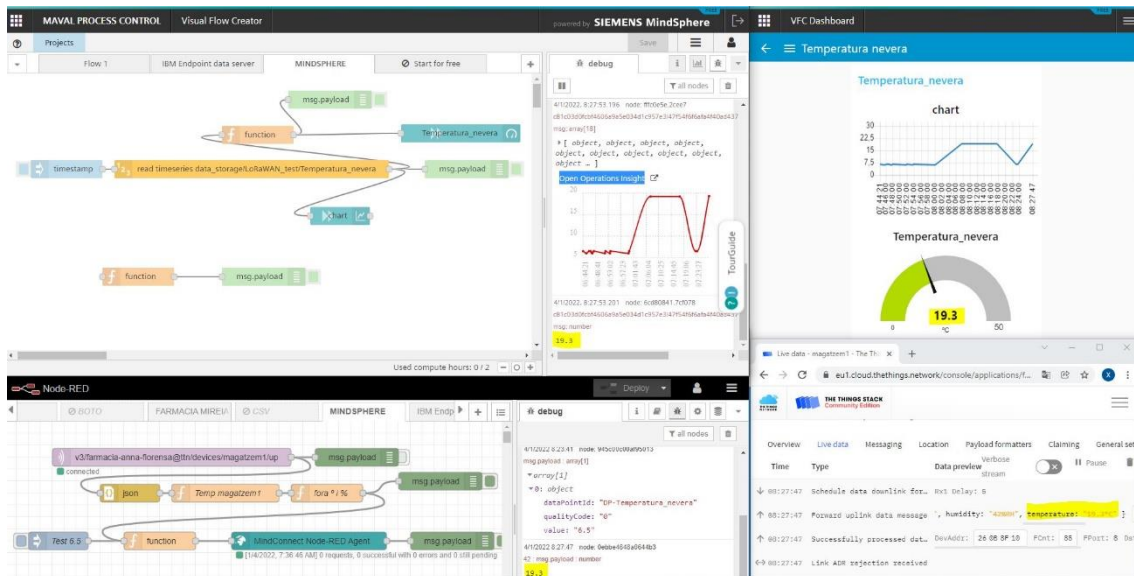
value: "19.2"

If we take a look on Mindsphere Visual Flow editor, we see the transmitted data





Here is the complete figure



You can find the code here:

<https://github.com/xavierflorensa/LoRaWAN-to-SIEMENS-Mindsphere-cloud>