PREVIDIA

ASHRAE BACnet

Configure Bacnet in Previdia MAX

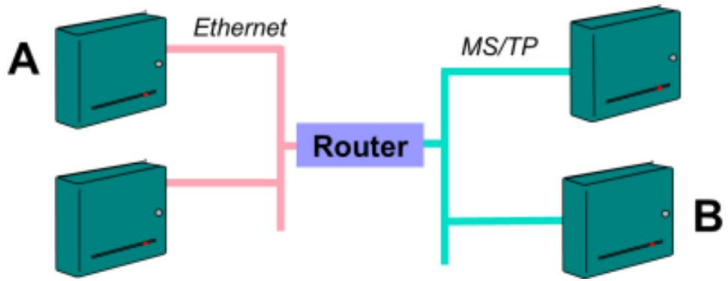
inim ELECTRONICS

Some key points:

BACnet is a standard data communication protocol that enables interoperability between different building systems and devices in building automation and control applications.
Originally, It was designed by the ASHRAE association (*American Society of Heating, Refrigerating and Air-Conditioning Engineers*) for the HVAC systems (Heating, ventilation, and air conditioning), but nowadays It's used for a wide range of systems, such as fire systems, lighting systems, etc… .

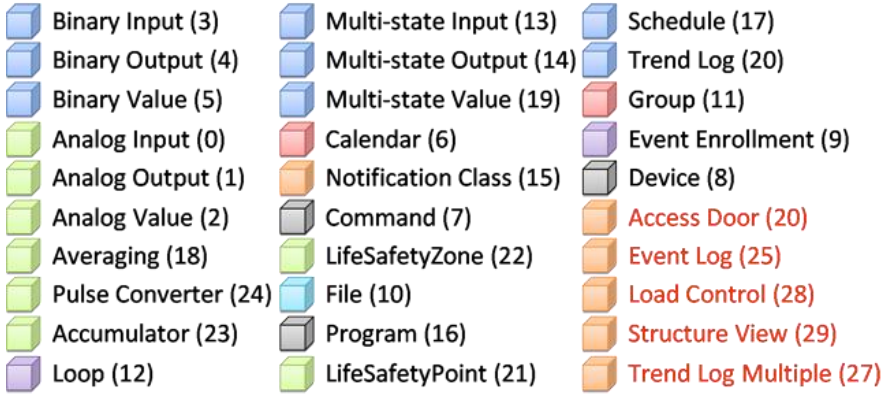
Interoperability between different infrastructures

Bacnet communication protocol can be implemented in different hardware infrastructures (tcp/lan, rs485, Bacnet MS/TP).
More important this infrastructures can be mixed via routers. This mean, that an object in a MS/TP network can communicate with another object in an IP network.



Bacnet Objects

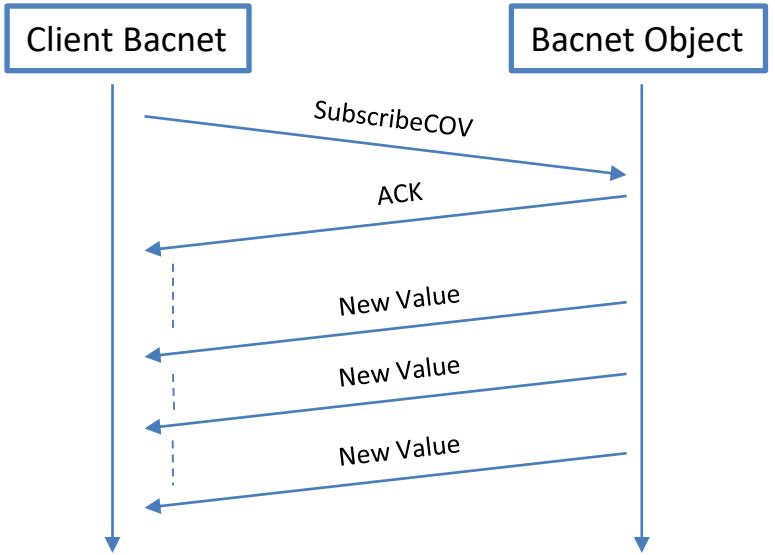
All information within an interoperable BACnet device is modelled in terms of one or more information **objects**. Each object represents some important component of the device, or some collection of information that may be of interest to other BACnet devices.
For example we can use a “Binary Output” object to verify (via a software) the status of an output in our Previdia Panel and, via a specific software, we can also send the command for activate/deactivate this output.



List of the existing Bacnet objects

Subscribe Change Of Value Porcedure

Per each object, a Bacnet Device (or a Client software) can send a “subscribe Change Of Value” Request (SubscribeCOV). In this way the client is asking the device to inform it when an object change value. So the Client will no more need to probe the status of that object in real time.



Reference:

For a better explanation you can read this document of 22 pages.
https://www.ccontrols.com/pdf/BACnetIntroduction.pdf

In our case we implemented only the objects suitable for our panel, they are:

- Binary Output
- Binary Input
- Life Safety Point
- Life Safety Zone

You can use these 4 object types for manage different parts of our Panel

The objects are designed to be managed by a BMS software, so we decide to create also some “pseudo-objects” to have the status of the panel (for example a binary input that let me know if the panel is in alarm) or to manage the activation of some panel commands (such as a binary output to send the command “reset the panel”)

Let see our objects in detail

Binary Output

You can create a binary output that permit to activate and see the status of:

- A NAC terminal: such as a IFM4IO/IFM16IO/IFM24160 terminal on Previdia Max or a “On Board” Previdia Compact Terminal
- The status of a Relay, such as a IFM4R terminal or a “on Board Relay” Previdia Compact Relay

Moreover you can create some “pseudo-BO” to create commands.
These are:

- Silence Sirens
- Reset Panel
- Put the panel in Investigate mode

So if you create these pseudo-BO, you can use a Bacnet monitoring software to send this commands

Binary Input

You can create several “Pseudo-BI” to check the status of the panel, in other words each binary input represent a flag status of the panel.

These are:

- Alarm
- PreAlarm
- Fault
- Bypassed
- Night Mode
- Silenced
- Investigate

Life Safety Point and Life Safety Zone

LSP and LSZ are two special objects created in a second moment by the ASHRAE specifically to manage Fire Alarm systems. With only one object you have two different variables that provide you two different information: the *Status* and the *Mode.*

You can create a LSP basing on the status of:

- A loop point
- A terminal (Previdia compact Nac on board, IFM4IO or IFM16IO)
- An extinction channel (a specific IFMEXT or the Previdia Compact extinction on board)

You can create a LSZ only basing on a Zone

LSP & LSZ – Status

The status is a numeric value that provide you information if the point/zone is in alarm or in fault and so on. Their value can be:

- Status = 0 (LIFE_SAFETY_STATE_QUIET). If the point/zone is “ready” or bypassed
- Status = 1 (LIFE_SAFETY_STATE_PRE_ALARM): If the point/zone is in pre-alarm
- Status = 2 (LIFE_SAFETY_STATE_ALARM): If the point/zone is in alarm
- Status = 3 (LIFE_SAFETY_STATE_FAULT): If the point/zone is in fault
- Status = 4 (LIFE_SAFETY_STATE_FAULT_PRE_ALARM): If the point/zone is both in fault and pre-alarm
- Status = 5 (LIFE_SAFETY_STATE_FAULT_ALARM): If the point/zone is both in fault and alarm

If you use a Client Bacnet Software (such as Yabe), it will give you directly a human readable label of the status such as “fault status” or “prealarm status”

LSP & LSZ – Status in the Extinction Channel

If you are creating an extinction channel the status parameter can be:

- Status = 0 (LIFE_SAFETY_STATE_QUIET). If the channel is “ready” or bypassed
- Status = 1 (LIFE_SAFETY_STATE_PRE_ALARM): If the channel is in pre-extinguish timeout
- Status = 2 (LIFE_SAFETY_STATE_ALARM): If the channel is in “extinguish released”
- Status = 3 (LIFE_SAFETY_STATE_FAULT): If the channel is in fault
- Status = 4 (LIFE_SAFETY_STATE_FAULT_PRE_ALARM): If the channel is both in fault and pre-extinguish timeout
- Status = 5 (LIFE_SAFETY_STATE_FAULT_ALARM): If the channel is both in fault and “extinguish released”

If you use a Client Bacnet Software (such as Yabe), it will give you directly a human readable label of the status such as “fault status” or “prealarm status”

LSP & LSZ – Mode

The Mode is a numeric value that let you know if the point/zone is bypassed or not. Their value can be:

- Mode = 1 (*LIFE_SAFETY_MODE_ON*): If the point/zone is NOT bypassed
- Mode = 12 (*LIFE_SAFETY_MODE_DISABLED*): If the point/zone IS bypassed

If you use a Client Bacnet Software (such as Yabe), it will give you directly a human readable label of the status such as “fault status” or “prealarm status”

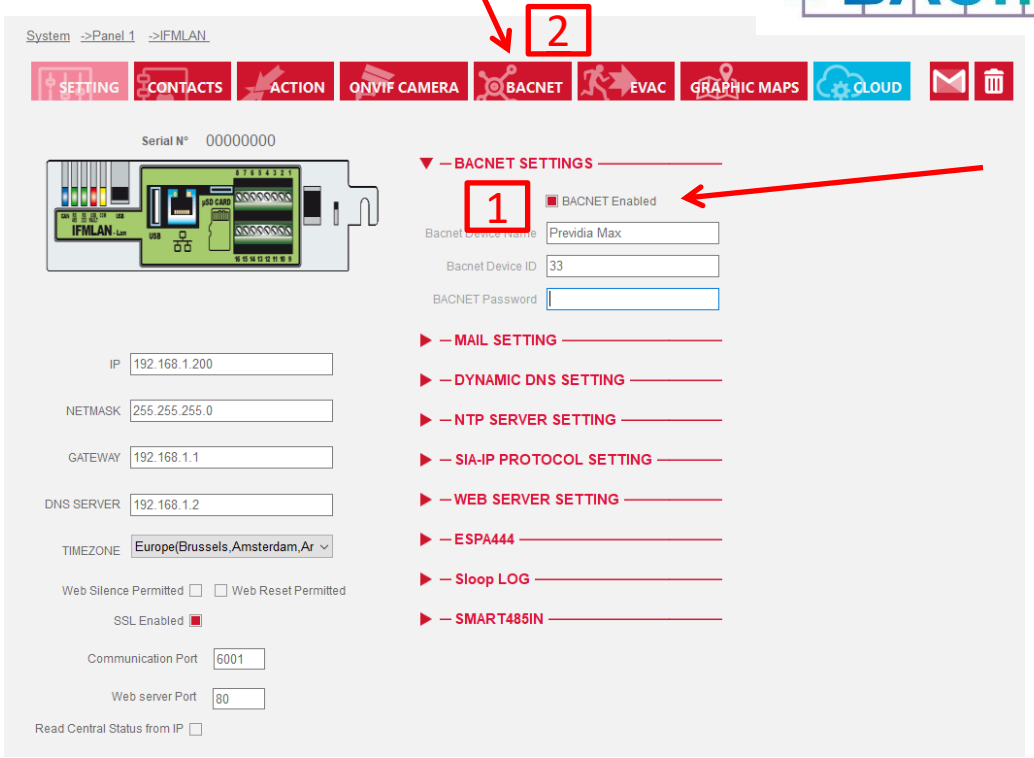
LSP & LSZ – Mode in the Extinction Channel

If you are creating an extinction channel you can have the following values:

- Mode = 1 (*LIFE_SAFETY_MODE_ON*): If the extinction is NOT bypassed
- Mode = 12 (*LIFE_SAFETY_MODE_DISABLED*): If the channel is *disabled* or *manually disabled*
- Mode = 13 (LIFE_SAFETY_MODE_AUTOMATIC_RELEASE_DISABLED): If only the *automatic extinction* of the channel is *disabled*

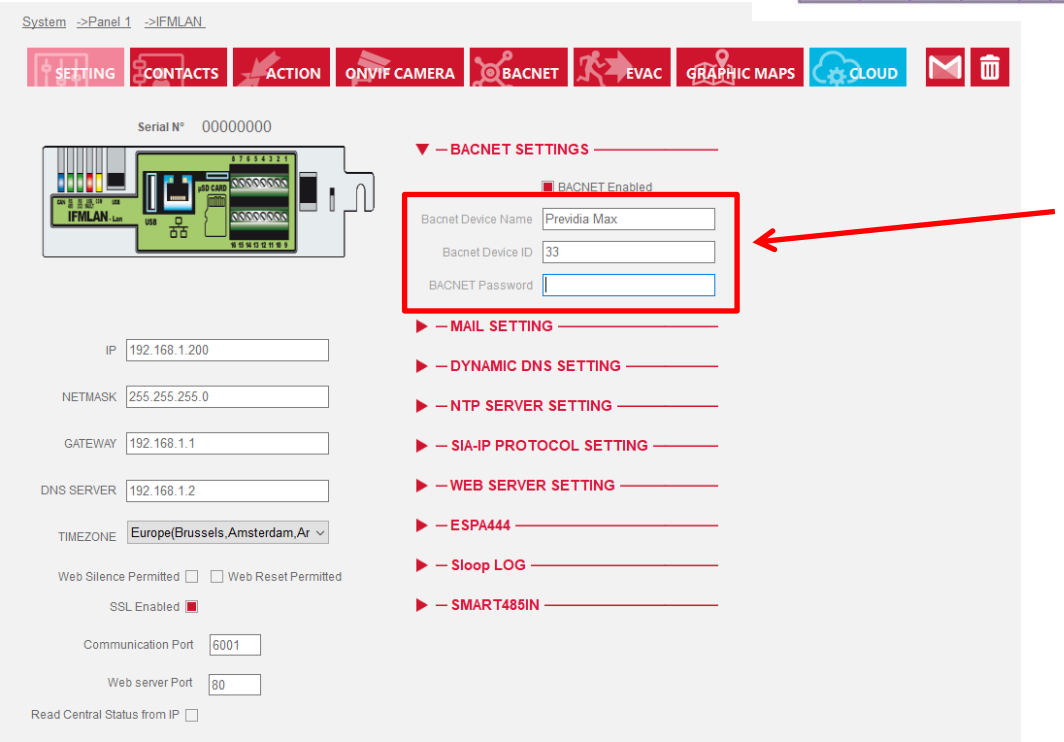
Programming on Previdia MAX:

Under the IFMLAN settings, under the Bacnet section, You have to enable the Bacnet Checkbox (1).
It will appear the Bacnet Tab on top (2).



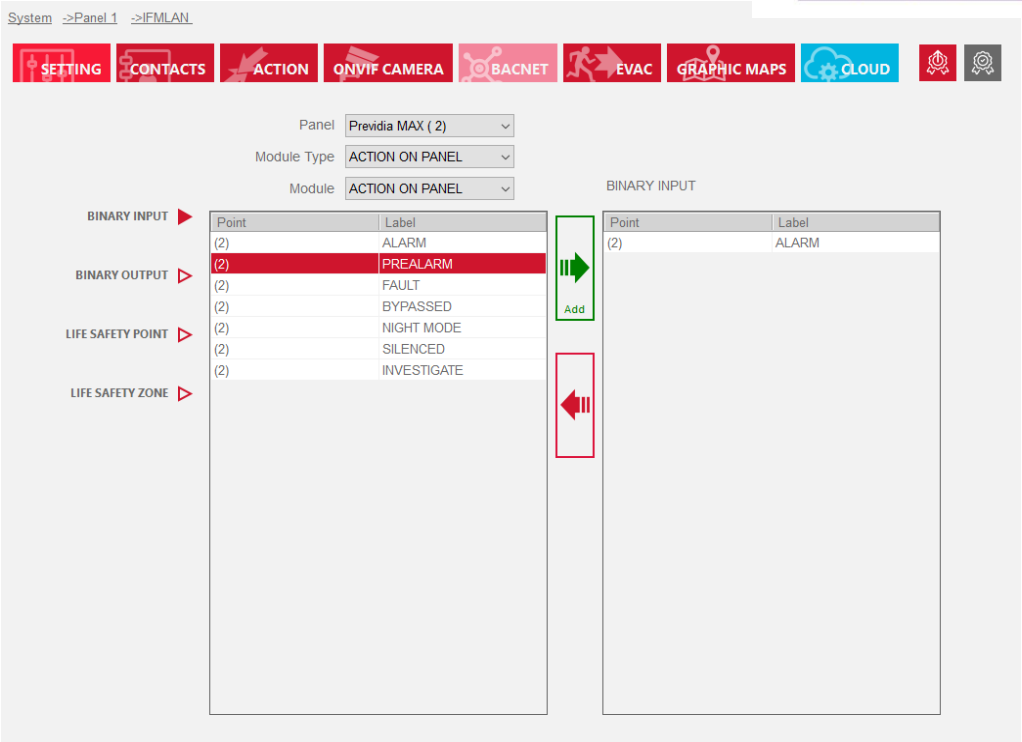
Programming on Previdia MAX:

Additionally You will be able to add a name to the Panel on the Bacnet Network, a Bacnet Device ID and an optional Password



Create Objects:

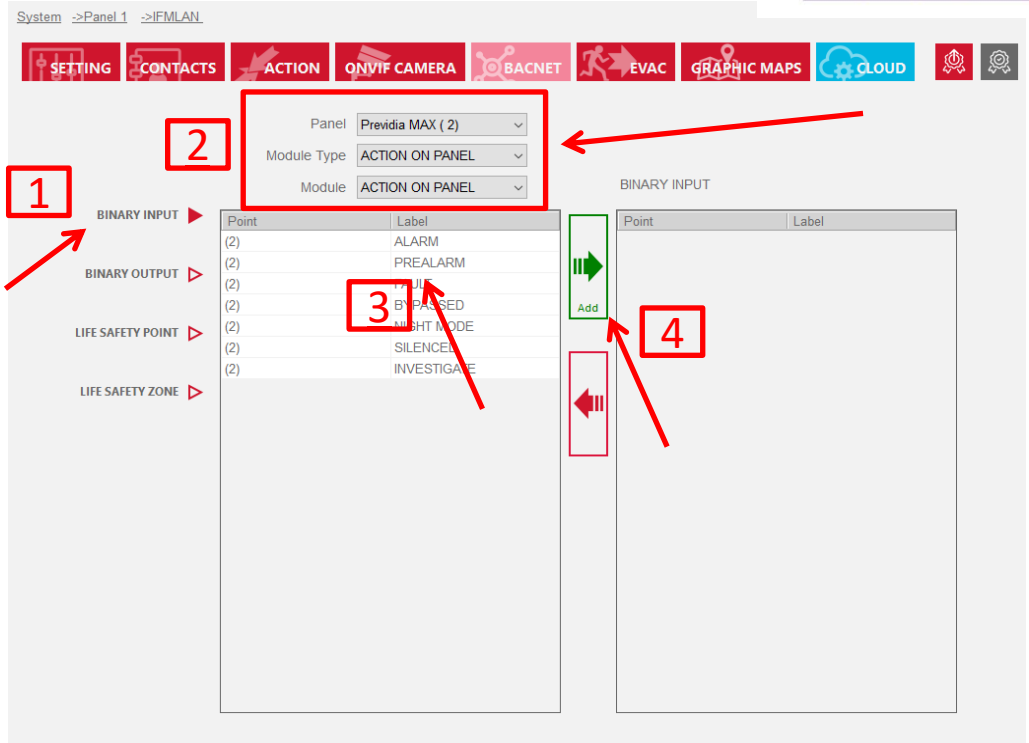
On Bacnet Tab, You will be able to create the objects.



Create Objects: Binary Input

To create “Binary Input” you have to:

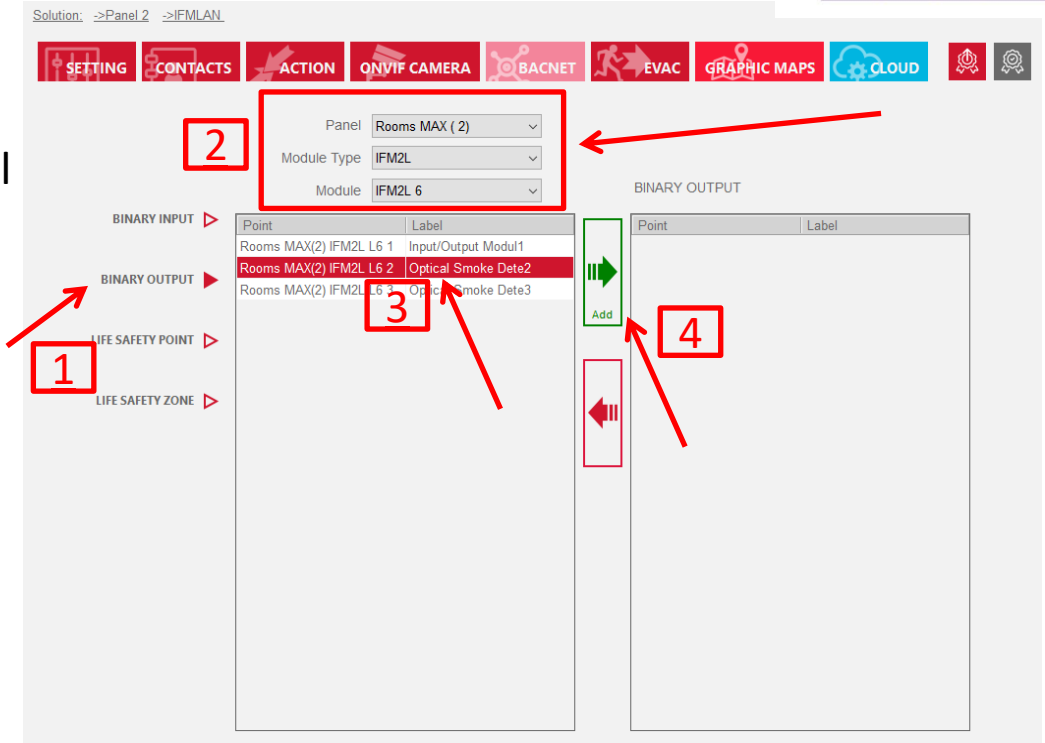
- Click the corresponding label (1)
- Filter the type of objects, in this case only “Action on Panel is available” (in this case you have only “Status on Panel”) (2)
- Click on a specific status on the table below (3)
- Click the “Add” button. The new object will appear on the right table



Create Objects: Binary Output

To create “Binary Output” you have to:

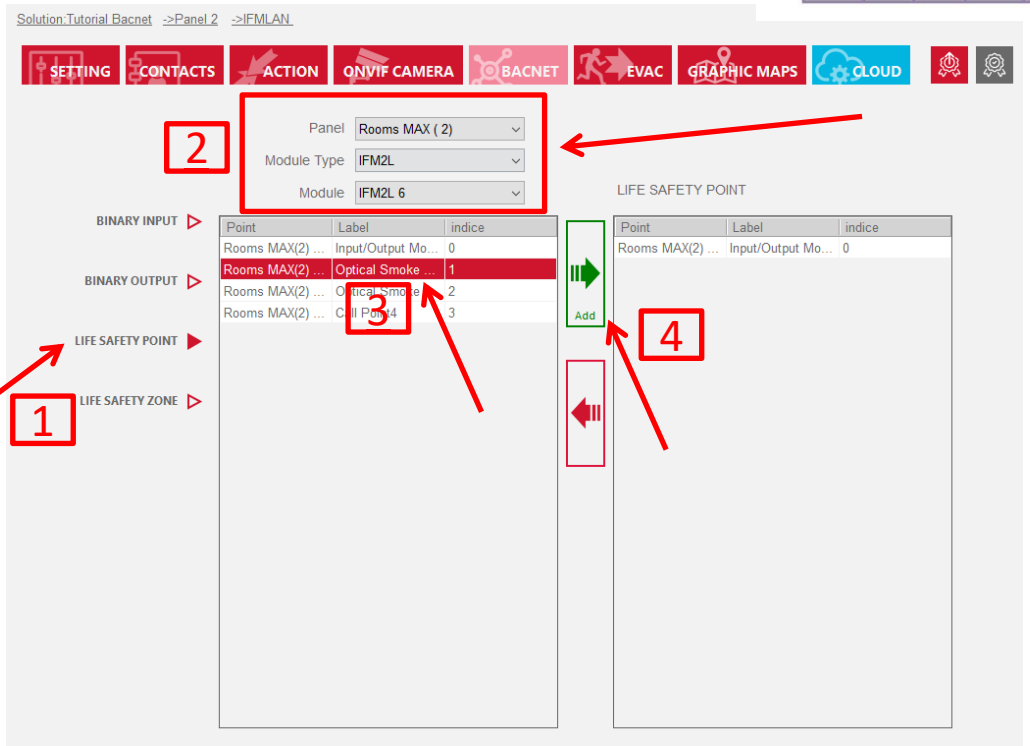
- Click the corresponding label (1)
- Filter the type of object(2)
- Click on a specific point on the table below (3)
- Click the “Add” button. The new object will appear on the right table



Create Objects: Life Safety Point

To create a “LSP” you have to:

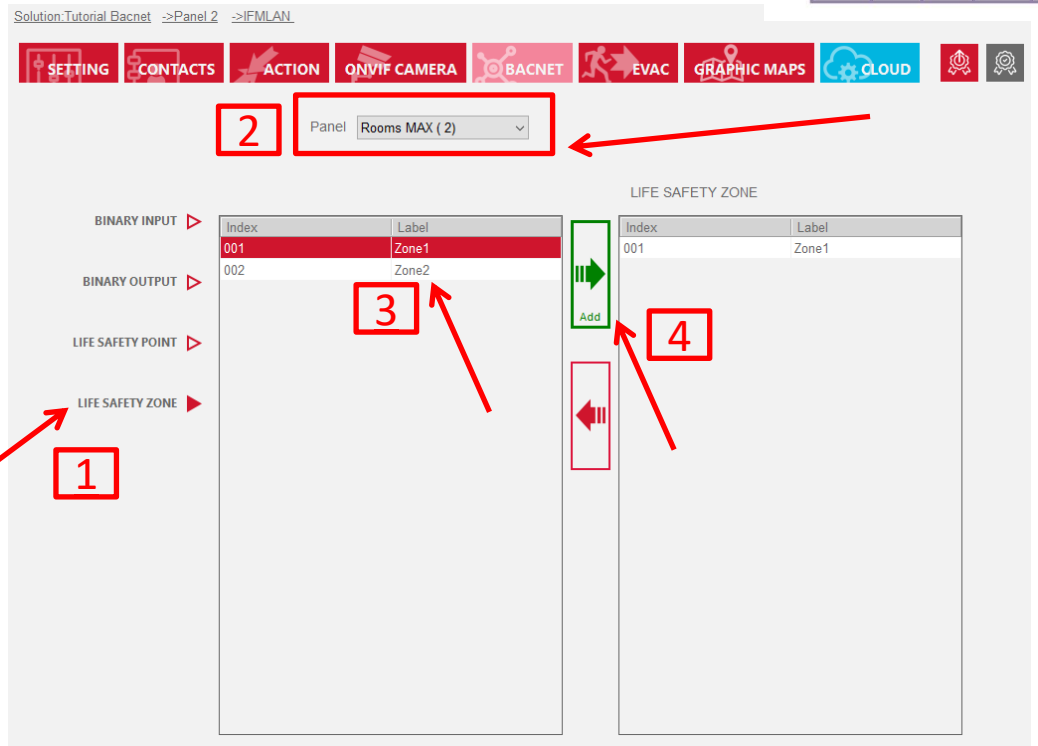
- Click the corresponding label (1)
- Filter the type of object(2)
- Click on a specific point on the table below (3)
- Click the “Add” button. The new object will appear on the right table



Create Objects: Life Safety Zone

To create a “LSZ” you have to:

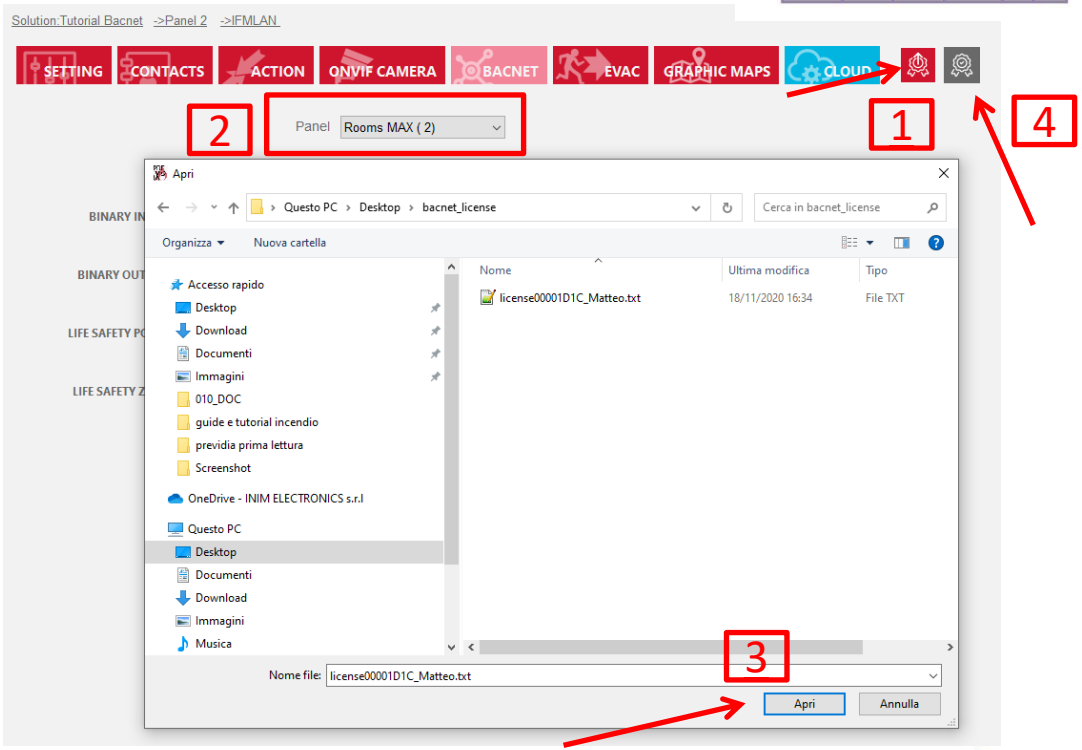
- Click the corresponding label (1)
- Filter the panel on your hornet network(2)
- Click on a specific zone on the table below (3)
- Click the “Add” button. The new object will appear on the right table



Send the License to the IFMLAN

To send the licence to the IFMLAN:

- Click the “Load License File” Button (1)
- Select The file on your computer (2 and 3) in this way the “License Activation” button will become red
- Click the “License Activation” button (4), it will send the license to the IFMLAN.



Pay attention

The sending of the license doesn’t implicate the sending of the points programming.
They are two different writing and have to do both.
No matter the order, you can send before the programming and after the license or vice versa.

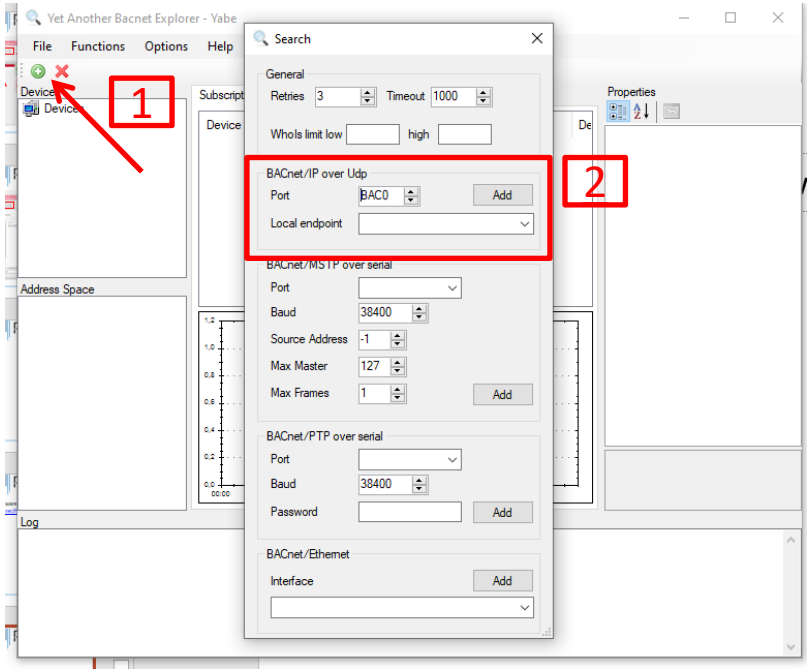
Test The Bacnet

To quick test the programming You can use the YABE software.
https://sourceforge.net/projects/yetanotherbacnetexplorer/files/latest/download

Test The Bacnet

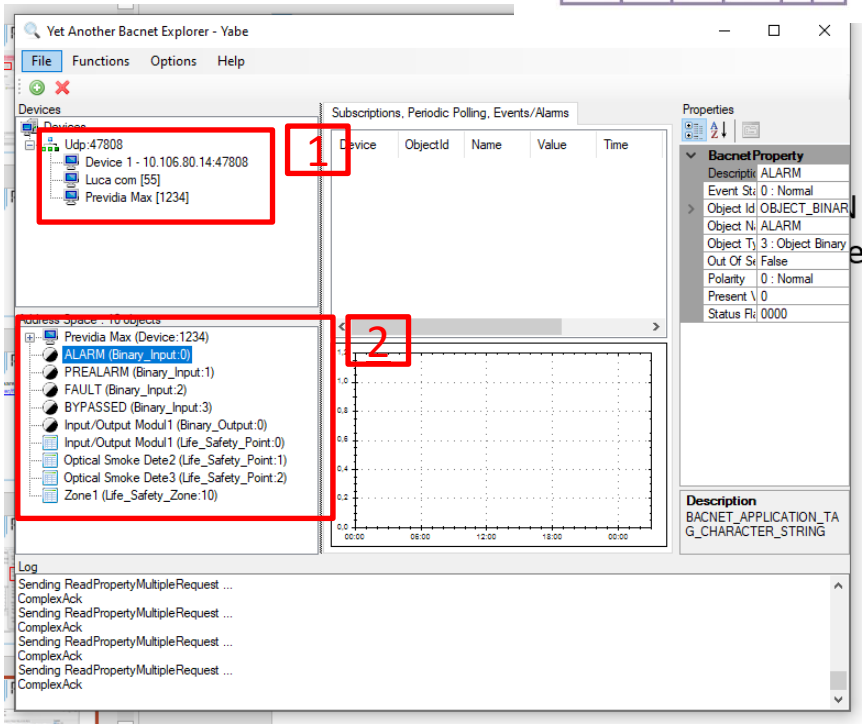
When you open the software:

- Click the “plus” button (1), it will appear a popup to select a specific Bacnet protocol communication channel
- In The Bacnet/IP section (2), from Local Endpoint dropdown menu, select the ip in the same netmask of the IFMLAN network and then click “Add” button



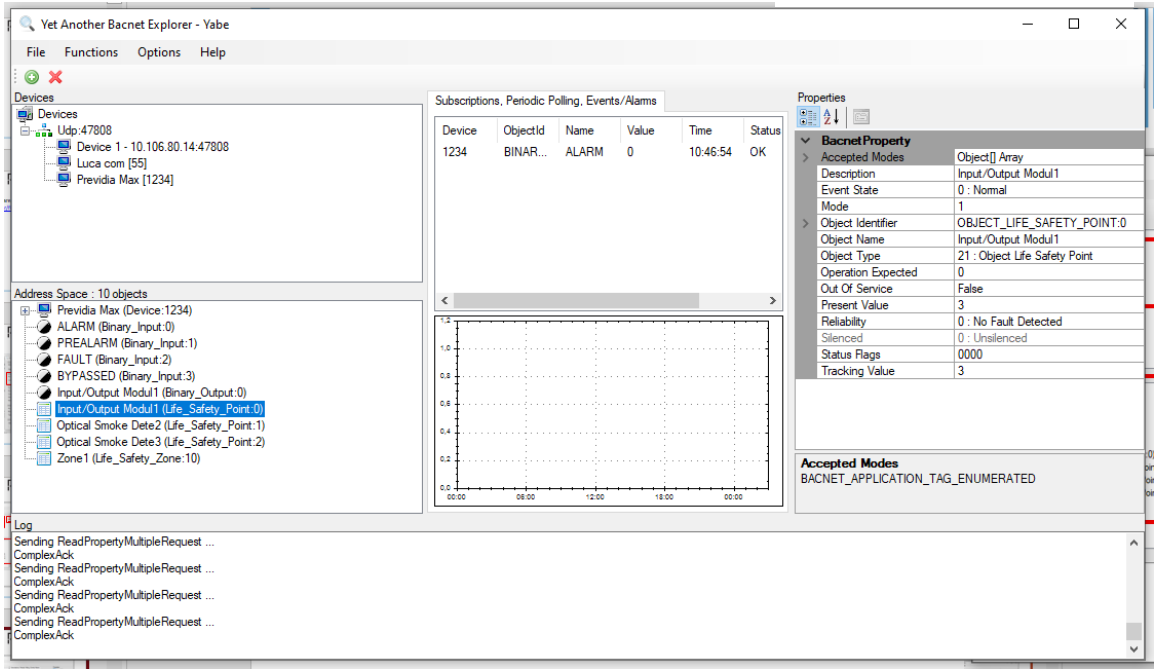
Test The Bacnet

The software will probe your LAN network and will find all the Bacnet Devices (1) and per each device you can see all the objects (2).



Test The Bacnet

On the right you can see the values for an object, for example in this LSP you have MODE = 1 (*LIFE_SAFETY_MODE_ON*) and VALUE (PRESENT VALUE) = 3 (LIFE_SAFETY_STATE_FAULT)



Test The Bacnet – SubscriveCOV

You can also use the bacnet function «subscriveCOV» (subscribe change of value). Right Click on a specific object and click subscribe button. From this moment will be the Panel to inform automatically the software of a «Change of Value» for that specific object.