

PREVIDIA



Configure Bacnet in Previdia MAX

Some key points:



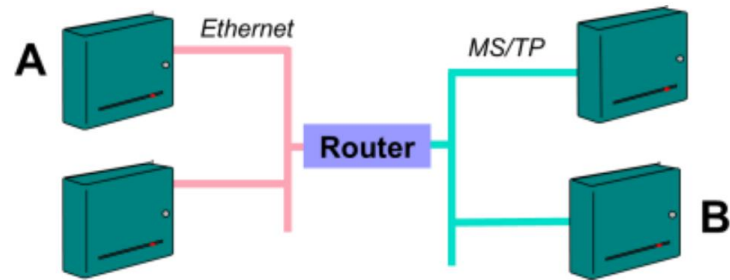
BACnet is a standard data communication protocol that enables interoperability between different building systems and devices in building automation and control applications.

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.

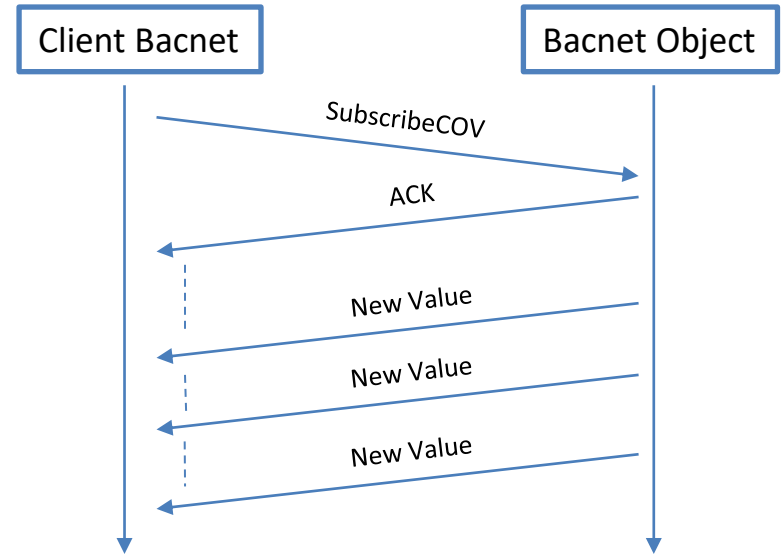


 Binary Input (3)	 Multi-state Input (13)	 Schedule (17)
 Binary Output (4)	 Multi-state Output (14)	 Trend Log (20)
 Binary Value (5)	 Multi-state Value (19)	 Group (11)
 Analog Input (0)	 Calendar (6)	 Event Enrollment (9)
 Analog Output (1)	 Notification Class (15)	 Device (8)
 Analog Value (2)	 Command (7)	 Access Door (20)
 Averaging (18)	 LifeSafetyZone (22)	 Event Log (25)
 Pulse Converter (24)	 File (10)	 Load Control (28)
 Accumulator (23)	 Program (16)	 Structure View (29)
 Loop (12)	 LifeSafetyPoint (21)	 Trend Log Multiple (27)

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

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

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

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

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”

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”

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”

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).

System -> Panel 1 -> IFMLAN

Serial N° 00000000

IFMLAN Lin

IP: 192.168.1.200

NETMASK: 255.255.255.0

GATEWAY: 192.168.1.1

DNS SERVER: 192.168.1.2

TIMEZONE: Europe(Brussels, Amsterdam, Ar)

Web Silence Permitted Web Reset Permitted

SSL Enabled

Communication Port: 6001

Web server Port: 80

Read Central Status from IP

Navigation tabs: SETTING, CONTACTS, ACTION, QN/VIF CAMERA, BACNET, EVAC, GRAPHIC MAPS, CLOUD, Mail, Trash

Section: BACNET SETTINGS

BACNET Enabled

Bacnet Device Name: Previdia Max

Bacnet Device ID: 33

BACNET Password: []

Other settings: MAIL SETTING, DYNAMIC DNS SETTING, NTP SERVER SETTING, SIA-IP PROTOCOL SETTING, WEB SERVER SETTING, ESPA444, Sloop LOG, SMART485IN

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

The screenshot shows the web interface for programming a Previdia MAX device. At the top, there is a navigation bar with icons for SETTING, CONTACTS, ACTION, QN/VIF CAMERA, BACNET, EVAC, GRAPHIC MAPS, CLOUD, and a trash icon. Below the navigation bar, the system path is shown as 'System -> Panel 1 -> IFMLAN'. The main content area is divided into two columns. The left column shows a physical device with a serial number '00000000' and various ports (IFMLAN, USB, RS485). The right column contains the configuration settings. The 'BACNET SETTINGS' section is expanded, showing a checkbox for 'BACNET Enabled' which is checked. Below this are three input fields: 'Bacnet Device Name' with the value 'Previdia Max', 'Bacnet Device ID' with the value '33', and 'BACNET Password' which is empty. A red arrow points to the 'Bacnet Device Name' field. Below the BACNET settings are several other sections, each with a red arrow pointing to the right: 'MAIL SETTING', 'DYNAMIC DNS SETTING', 'NTP SERVER SETTING', 'SIA-IP PROTOCOL SETTING', 'WEB SERVER SETTING', 'ESPA444', 'Sloop LOG', and 'SMART485IN'. The left column also contains several input fields for network settings: IP (192.168.1.200), NETMASK (255.255.255.0), GATEWAY (192.168.1.1), DNS SERVER (192.168.1.2), and TIMEZONE (Europe(Brussels, Amsterdam, Ar)). There are also checkboxes for 'Web Silence Permitted', 'Web Reset Permitted', and 'Read Central Status from IP'. The 'SSL Enabled' checkbox is checked.

Create Objects:

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

System -> Panel 1 -> IFMLAN

SETTING CONTACTS ACTION ONVIF CAMERA BACNET EVAC GRAPHIC MAPS CLOUD

Panel: Previdia MAX (2)
Module Type: ACTION ON PANEL
Module: ACTION ON PANEL

BINARY INPUT

Point	Label
(2)	ALARM
(2)	PREALARM
(2)	FAULT
(2)	BYPASSED
(2)	NIGHT MODE
(2)	SILENCED
(2)	INVESTIGATE

BINARY OUTPUT

LIFE SAFETY POINT

LIFE SAFETY ZONE

BINARY INPUT

Point	Label
(2)	ALARM

Add

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”)
- Click on a specific status on the table below
- Click the “Add” button. The new object will appear on the right table

System -> Panel 1 -> IFMLAN

SETTING CONTACTS ACTION ONVIF CAMERA BACNET EVAC GRAPHIC MAPS CLOUD

Panel: Previdia MAX (2)
Module Type: ACTION ON PANEL
Module: ACTION ON PANEL

Point	Label
(2)	ALARM
(2)	PREALARM
(2)	BYPASSED
(2)	NIGHT MODE
(2)	SILENCE
(2)	INVESTIGATE

BINARY INPUT
BINARY OUTPUT
LIFE SAFETY POINT
LIFE SAFETY ZONE

Point Label
Add

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

Solution: ->Panel 2 ->IFMLAN

SETTING CONTACTS ACTION QN/VIF CAMERA BACNET EVAC GRAPHIC MAPS CLOUD

Panel: Rooms MAX (2)
Module Type: IFM2L
Module: IFM2L 6

BINARY INPUT

Point	Label
Rooms MAX(2) IFM2L L6 1	Input/Output Modul1
Rooms MAX(2) IFM2L L6 2	Optical Smoke Dete2
Rooms MAX(2) IFM2L L6 3	Optical Smoke Dete3

BINARY OUTPUT

Point	Label
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Add

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

Solution: Tutorial Bacnet -> Panel 2 -> IFMLAN

SETTING CONTACTS ACTION ONVIF CAMERA BACNET EVAC GRAPHIC MAPS CLOUD

Panel: Rooms MAX (2)
Module Type: IFM2L
Module: IFM2L 6

LIFE SAFETY POINT

Point	Label	indice
Rooms MAX(2) ...	Input/Output Mo...	0
Rooms MAX(2) ...	Optical Smoke ...	1
Rooms MAX(2) ...	Optical smoke ...	2
Rooms MAX(2) ...	Call Point 4	3

Add

LIFE SAFETY POINT

Point	Label	indice
Rooms MAX(2) ...	Input/Output Mo...	0

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

Solution: Tutorial Bacnet -> Panel 2 -> IFMLAN

SETTING CONTACTS ACTION QNVIF CAMERA BACNET EVAC GRAPHIC MAPS CLOUD

Panel Rooms MAX (2)

LIFE SAFETY ZONE

Index	Label
001	Zone1
002	Zone2

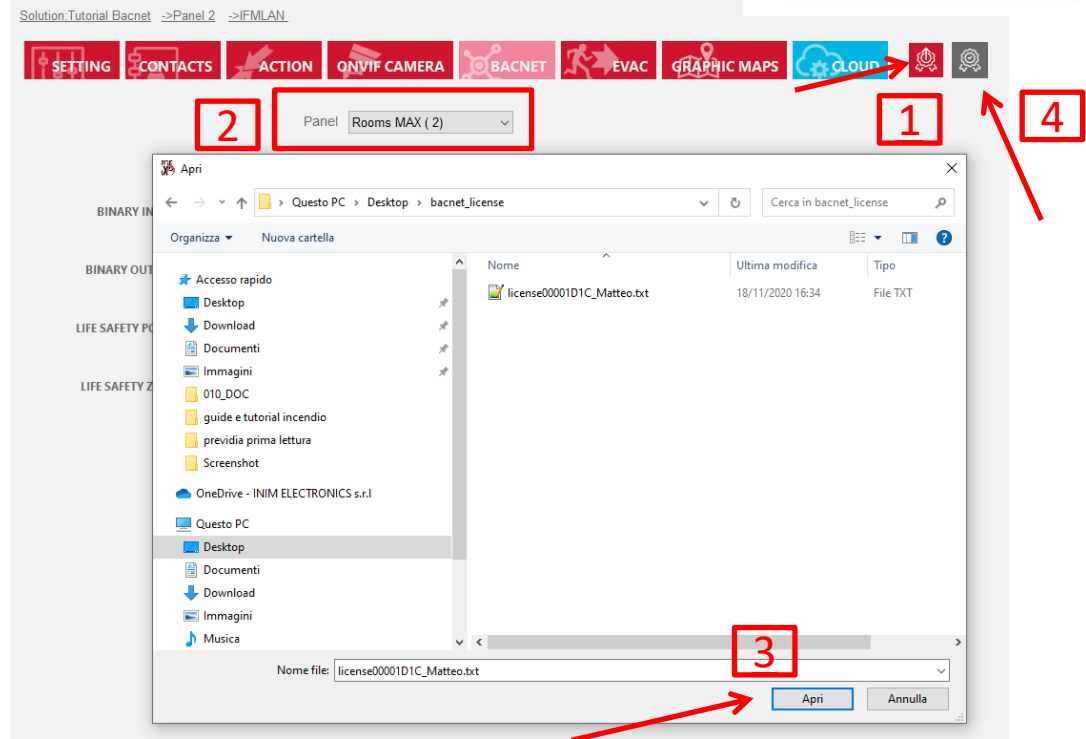
Add

Index	Label
001	Zone1

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



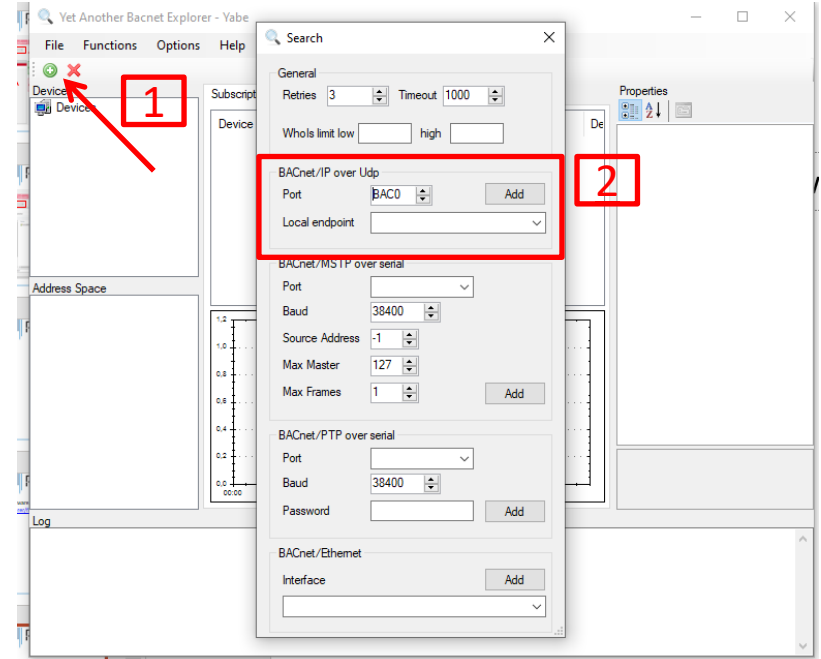
To quick test the programming You can use the YABE software.

<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).

The screenshot shows the 'Yet Another Bacnet Explorer' application interface. The 'Devices' pane on the left lists discovered devices, with a red box labeled '1' highlighting the list: 'Udo:47808', 'Device 1 - 10.106.80.14:47808', 'Luca com [55]', and 'Previdia Max [1234]'. The 'Address Space' pane below it shows the object list for 'Previdia Max (Device:1234)', with a red box labeled '2' highlighting the objects: 'ALARM (Binary_Input:0)', 'PREALARM (Binary_Input:1)', 'FAULT (Binary_Input:2)', 'BYPASSED (Binary_Input:3)', 'Input/Output Modul1 (Binary_Output:0)', 'Input/Output Modul1 (Life_Safety_Point:0)', 'Optical Smoke Dete2 (Life_Safety_Point:1)', 'Optical Smoke Dete3 (Life_Safety_Point:2)', and 'Zone1 (Life_Safety_Zone:10)'. The right pane shows the 'Properties' for the selected 'ALARM' object, including details like 'Event Str: 0: Normal', 'Object Id: OBJECT_BINARY', and 'Status Fl: 0000'. The bottom pane shows a 'Log' of network messages such as 'Sending ReadPropertyMultipleRequest ...' and 'ComplexAck'.

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**)

The screenshot shows the 'Yet Another Bacnet Explorer' interface. The 'Devices' tree on the left lists 'Previdia Max [1234]' with several objects. The 'Address Space' pane shows the selected object 'Input/Output Modu1 (Life_Safety_Point:0)'. The 'Subscriptions, Periodic Polling, Events/Alarms' table shows a single entry for Device 1234, ObjectID BINAR..., Name ALARM, Value 0, Time 10:46:54, and Status OK. The 'Properties' pane on the right displays the following data:

Property	Value
Accepted Modes	Object[] Array
Description	Input/Output Modu1
Event State	0 : Normal
Mode	1
Object Identifier	OBJECT_LIFE_SAFETY_POINT:0
Object Name	Input/Output Modu1
Object Type	21 : Object Life Safety Point
Operation Expected	0
Out Of Service	False
Present Value	3
Reliability	0 : No Fault Detected
Silenced	0 : Unsilenced
Status Flags	0000
Tracking Value	3

The 'Accepted Modes' section at the bottom of the properties pane shows 'BACNET_APPLICATION_TAG_ENUMERATED'. The 'Log' pane at the bottom shows a sequence of 'Sending ReadPropertyMultipleRequest' and 'ComplexAck' messages.

Test The Bacnet – SubscribeCOV

You can also use the bacnet function «subscribeCOV» (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.

