EVOLUTION
BMS

Product description

Rev1. Updated: 19-09-2023

Content

1. Description

The EVOLUTION BMS is a multi-protocol (BACnet / MODBUS / KNX / OPC) SCADA / BMS system that monitors, visualises and controls the building's mechanical and electrical equipment, such as HVAC, lighting, blinds, technical alarms, hydraulic systems, security systems, energy, etc.

It has a graphic interface RENEWED IN HTML5 and fully responsive, customisable, accessible via web and compatible with mobile devices (tablets, smartphones, etc.).

It is pre-installed on a Linux 22.04 LTS version operating system with many advanced modules such as SQL queries, database management, advanced logic, logs, etc. Including new responsive and HTML5-optimised modules such as Smart Metering, schedules, scenes, graphs, alarms, etc. All of them with very intuitive graphical user interfaces..

Its visualisation is one of the most customisable, multi-user / multi-project, multi-lingual and user-friendly on the market. Navigation is based on menus, windows, pages and gadgets. This allows a high level of customisation as well as the creation of the right environment for each circumstance.

Available in different industrial embedded PC versions (also available as a virtual machine for a PC or dedicated server and a special version for cluster servers / private cloud) to meet the requirements of the most complex installations.

Evolution BMS is a professional BMS system and the "Evolution BMS-Unlimited" has no data point limits. Therefore, it can control huge and complex installations such as industrial buildings, airports, hotels, etc.

"Evolution BMS-1500 can now also fit into the budget of smaller projects. Apart from the data point limit, this version does not differ from the "Evolution BMS Unlimited" version. In addition, the "Evolution BMS-1500" can also be upgraded to the unlimited data point version if required later on, with the corresponding licence extension.

Included by default on all servers:

- HTML visualisation interface and local editor.
- 5 x KNXnet / IP gateways
- 1 x DALI e64 IPAS gateways
- 5 x ModBus devices
- 1 x BACnet device
- 5 x Smart Metetering Devices
- 5 x Simultaneous users (Visu / Smartvisu)
- 1 x Multi-project (Permissions for advanced modules)
- 1 x Database Manager (automated backup and export of recorded data)
- 1 x Reporting tool for individual project costing
*- 1 x Template **: Design a page and reuse it many times with different data points.*

* Allows the configuration of an additional, independent project in Evolution BMS Server. Users and displays can be assigned individual categories, scenes, schedules, alarms, etc. For example, a development with 100 homes acquires an Evolution BMS licence and 100 additional users from multiple projects, thus controlling 100 homes with a single evolution.

** Page template with virtual process points and multiple links, each with different data points. (For example, Hotel with 100 equal rooms. Create a single room with virtual process points / template and create a floor plan with 100 links, one for each room. Data points are assigned to the links for each room.)

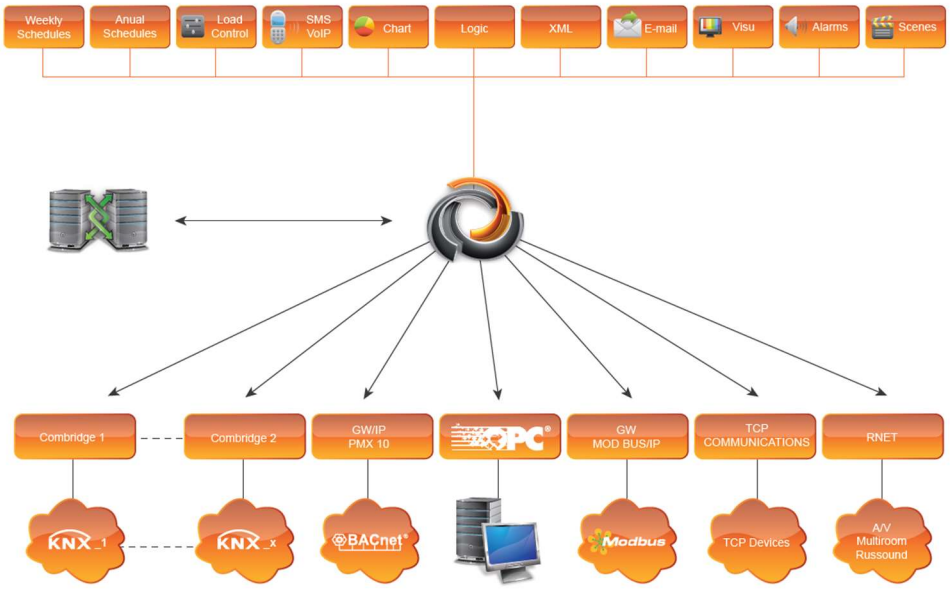
Additional licence extensions available:

Código web	Nº pedido.	Nombre
27467	63102-32-38	Additional multi-project users *
10616	63102-32-50	Additional users (5 x users)
10382	63102-32-52	Smart Metering - licence extension (5 x devices)
13770	63102-32-55	BACnet - licence extension (5 x devices)
10693	63102-32-51	KNXnet / IP Gateway - licence extension (5 x gateways)
15790	63102-32-54	Modbus - licence extension (5 x devices)
15793	63102-32-53	DALI management - licence extension (5 x gateways)

Evolution BMS is designed to log any KNX value for future queries and analysis.

Thanks to its possibilities in terms of user rights and permissions, different environments can be created for each user. In addition, each user can be assigned different elements and advanced controls for monitoring and/or control.

By means of the database module, Evolution BMS and its KNX data can be integrated with external systems in a simple and flexible way.



Evolution BMS is prepared to support integration with other systems, such as Modbus IP, Bacnet, etc., frequently used in building management systems..

2. 2. System requirements

Evolution BMS works as a web server; it is part of the application network and can be accessed via its network address (IP address).

The network address is the URL that opens the display login screen in a standard system-independent browser (Microsoft Edge, FireFox, Chrome, Safari...).

Evolution Editor is an Adobe Air application that can be installed on Windows 10 and 11 operating system.

Fig. 1: EVOLUTION BMS Server

Figure 1 shows an example of an Evolution BMS Server. The Evolution BMS Server can be operated remotely through its network interface via IP connection..

Depending on performance requirements, it is offered on different HW platforms or as software in virtual machine format. Up-to-date information on all options can be found at https://www.futurasmus-knxgroup.com/evolution.php.

Figure 2 shows a typical system structure: The Evolution BMS server is connected via the network to a KNXnet / IP interface, which establishes the connection to the KNX system. Access to the Evolution BMS web server requires the use of a standard browser, so that the user can log into the application with the corresponding authorisations.

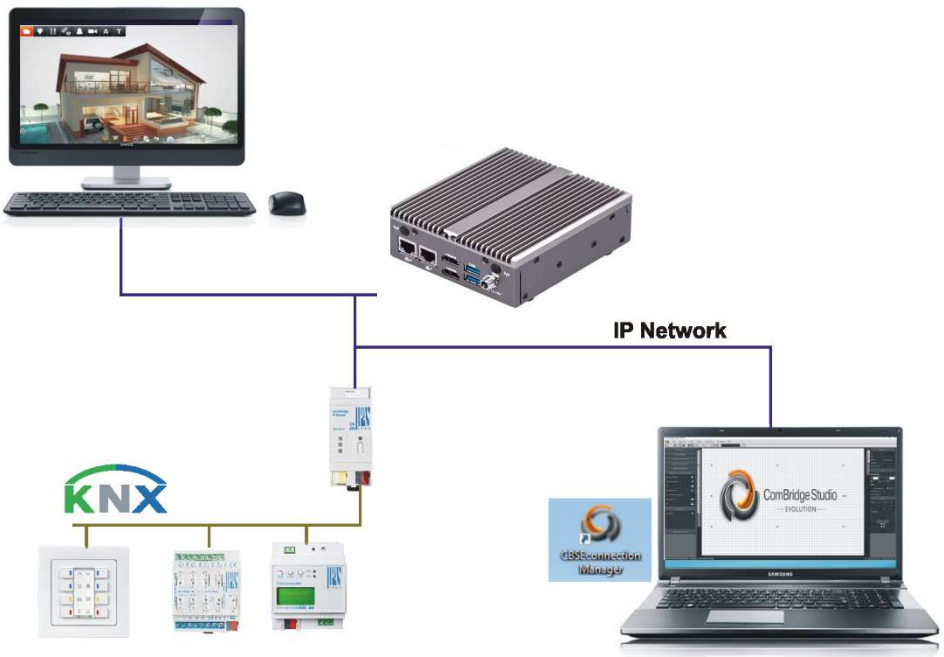


Fig. 2: Fig. 2: Estructura del sistema Evolution BMS

To start and configure the application, a PC where the Evolution BMS Connection Manager has been installed locally is required. The Evolution BMS Connection Manager starts the Evolution BMS Editor and establishes the connection to the server. With the Editor, the integrator creates websites that can be accessed using various navigation strategies:

- Users with different rights to manage the display
- Weekly and yearly schedules
- Scenarios
- Alarms
- Smart Metering
- Templates and much more.

Thanks to the available licenses, we can extend the variety of applications, such as allowing to add KNX lines to the project or to extend the number of users.
By default, the basic licence allows simultaneous access for 5 users.

3. 3. Available formats

Evolution BMS Server

HARDWARE OPTION 1 / 5 – "ENTRY-LEVEL"

HW details:

- PC Industrial
- Consumo de energía inactivo 5W
- Condiciones ambientales 0º hasta + 50ºC
- Refrigeración pasiva
- CPU: Intel® E3940 4 x 1.6 GHz (max. 1.8 GHz)
- Dual LAN
- Dimensiones (An x Pr x Al): 165 x 109 x 40 mm
- 4096 MB DDR3
- 256 GB Solid State Disk M.2

* Adecuado para instalaciones de tamaño pequeño a mediano o incluso grandes instalaciones donde la tasa de datos (telegramas / segundo) y la velocidad / cantidad de datos que se registran en la base de datos no es demasiado alta.

Evolution BMS Server ADVANCED

OPCIÓN DE HARDWARE 2/5 - "NIVEL AVANZADO"

Detalles HW:

- PC Industrial
- Consumo de energía inactivo 30W
- Consumo de energía inactivo 30W
- Refrigeración pasiva
- CPU: Intel® Core i5-7400U 2 x 2.5 GHz (max. 3.1 GHz)
- Dual LAN
- Dimensiones (An x Pr x Al): 285 x 196 x 30 mm
- 8192 MB DDR4
- 256 GB Solid State Disk SATA

Evolution BMS Server 19-Inch Rack

OPCIÓN DE HARDWARE 3/5 - "NIVEL PROFESIONAL"

Detalles HW:

- PC Industrial
- Consumo de energía inactivo 35W
- Condiciones ambientales 0º hasta + 40ºC
- Refrigeración pasiva
- CPU: Intel® i5-9400 6 x 2.9 GHz (max. 4.1 GHz)
- Dual LAN

Hardware option 4 / 5 – "Virtual Machine – HW-bound"

INSTALLATION ON ANY SERVER / PC

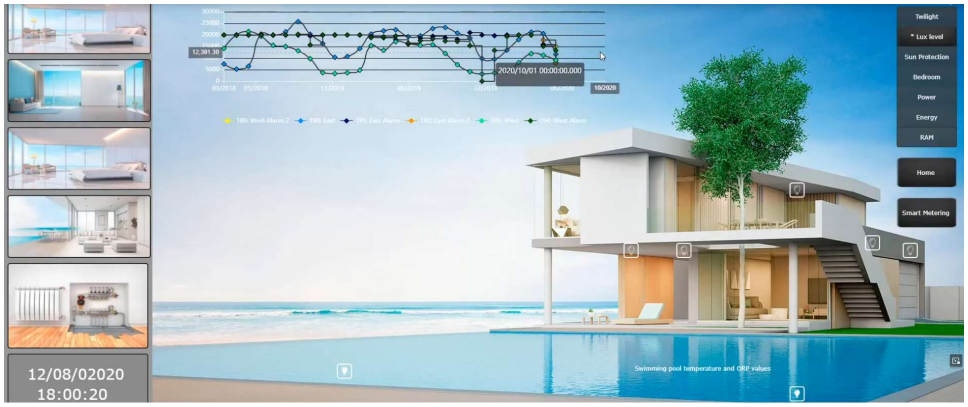
- ¡Utilice el HW de su elección e instale Evolution!
- Tu Evolution siempre estará ligada a ese HW.

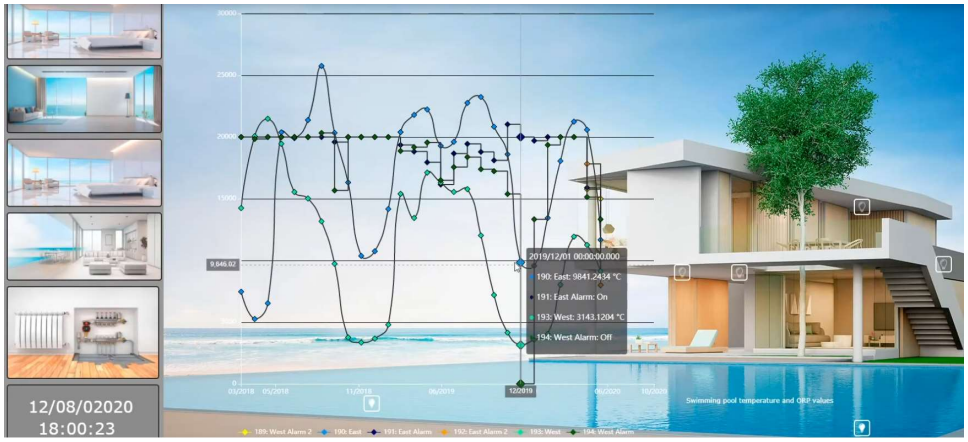
Hardware option 5 / 5 – "Virtual Machine - Private Cluster / Cloud"

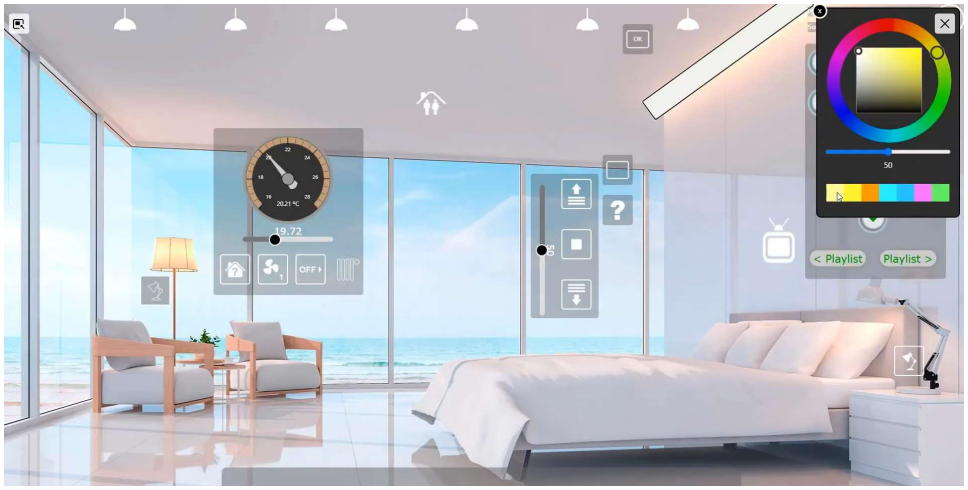
INSTALACIÓN EN SERVIDOR DE CLÚSTER O NUBE PRIVADA

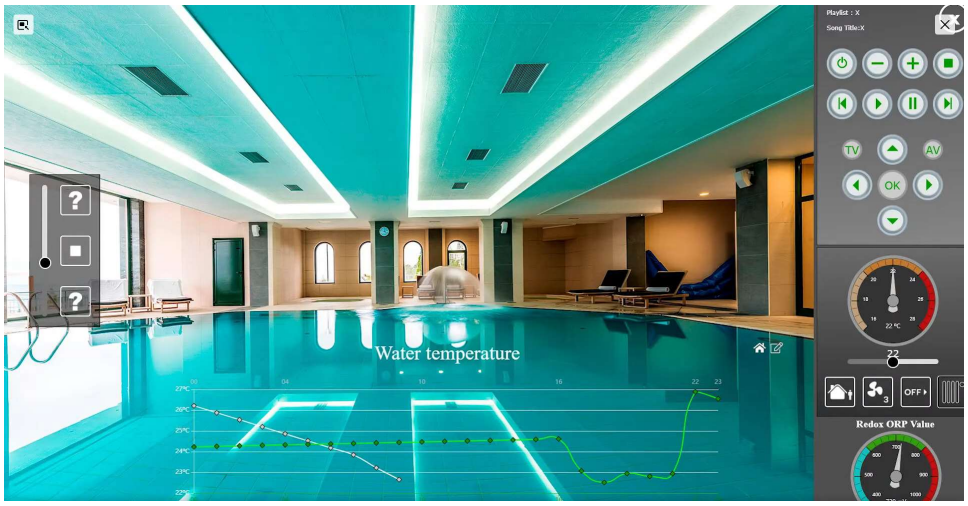
- ¡Hágase independiente de HW!
- Tu Evolución no está vinculada a un HW específico.
- Se vende exclusivamente con un "acuerdo de uso"

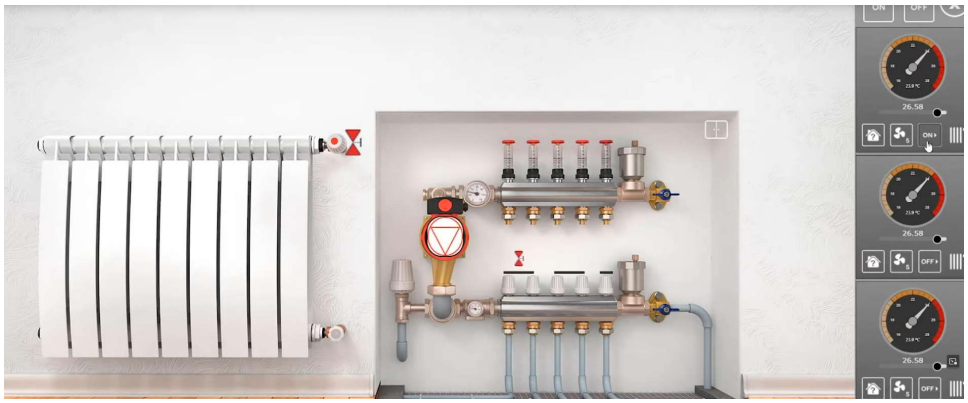
4. 4. HTML display

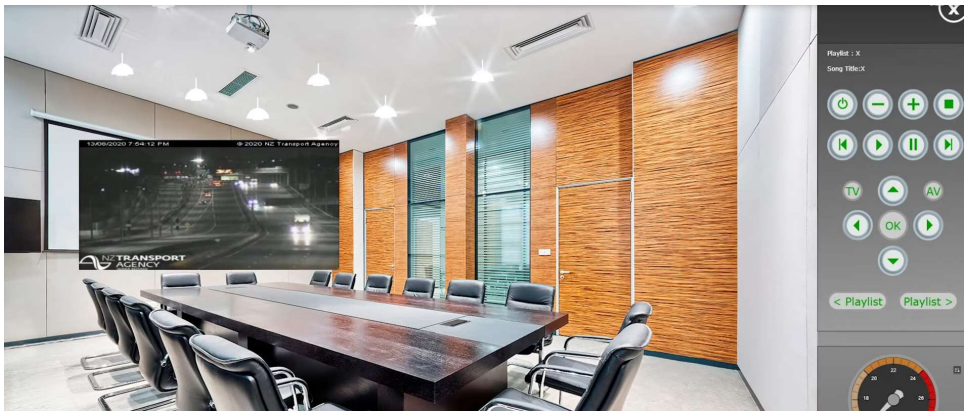


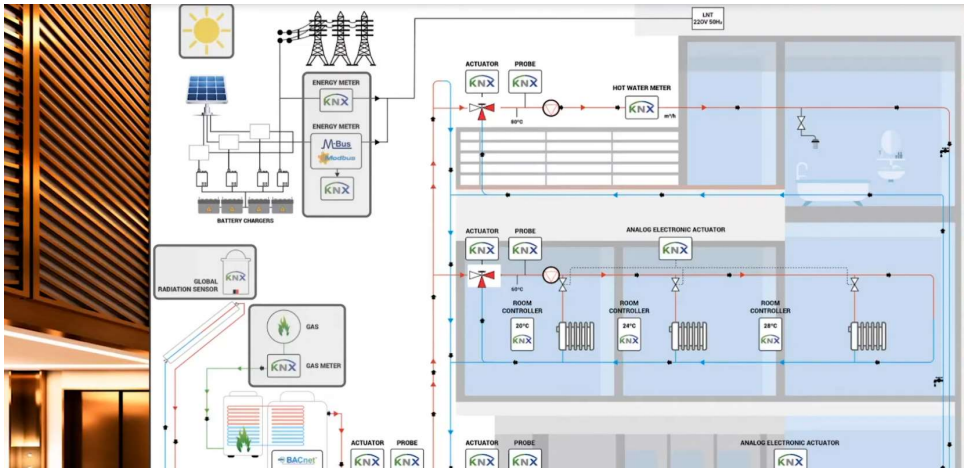


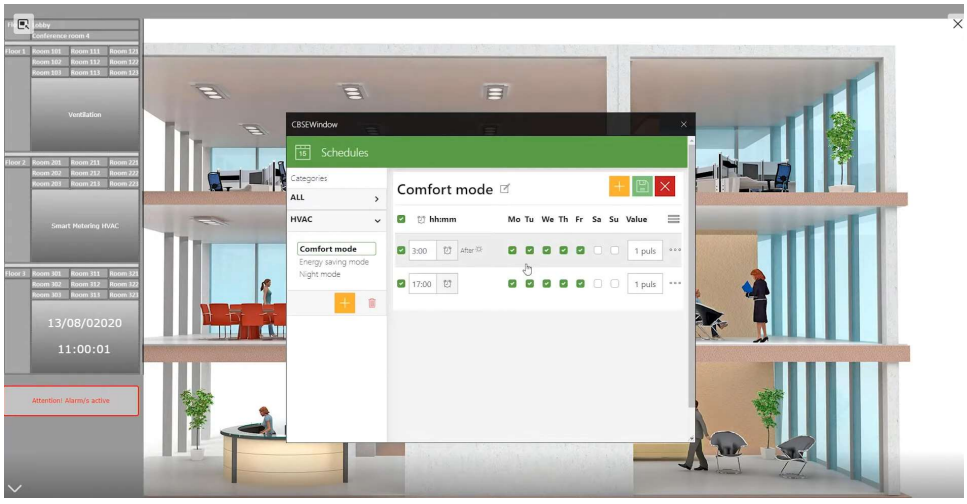







Playlist : x
Song Title:x
TV
AV
OK
< Playlist
Playlist >


ENERGY METER
ENERGY METER
BATTERY CHARGERS
ACTUATOR
PROBE
HOT WATER METER
ANALOG ELECTRONIC ACTUATOR
ROOM CONTROLLER
GLOBAL RADIATION SENSOR
GAS
GAS METER
BACnet


CBSEWindow
Schedules
Comfort mode
Categories
ALL
HVAC
Comfort mode
Energy saving mode
Night mode
Mo Tu We Th Fr Sa Su Value
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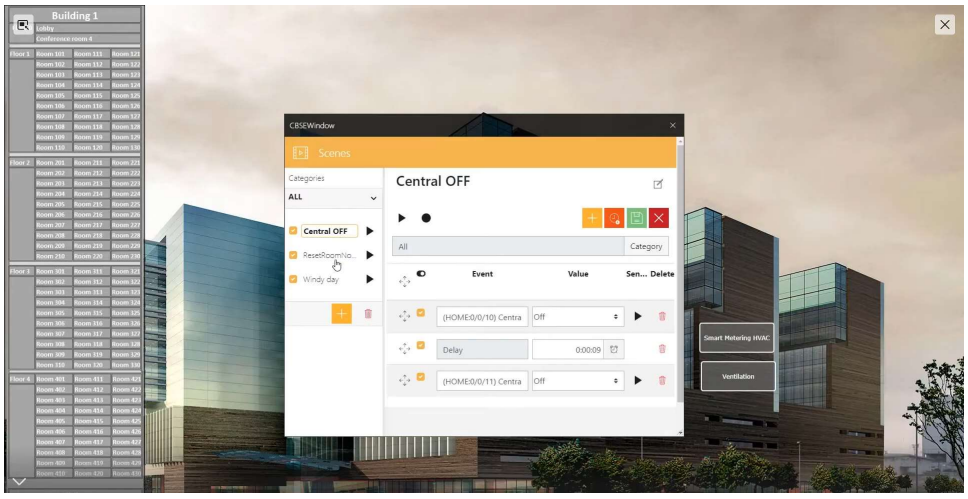
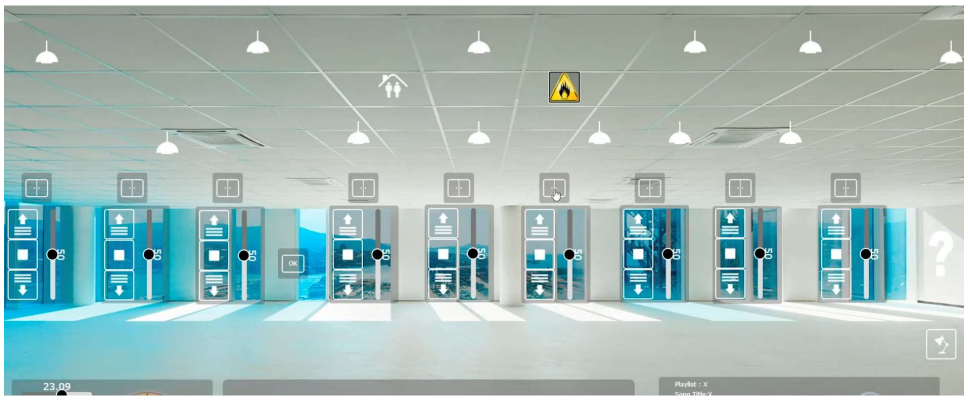
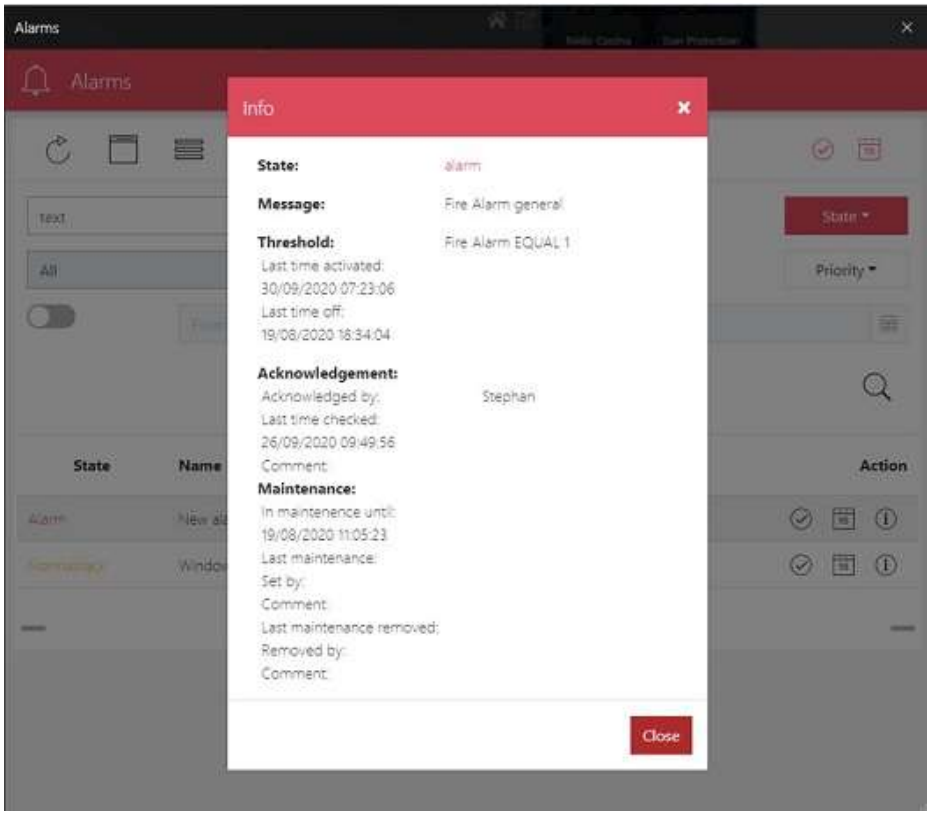
11:00:01





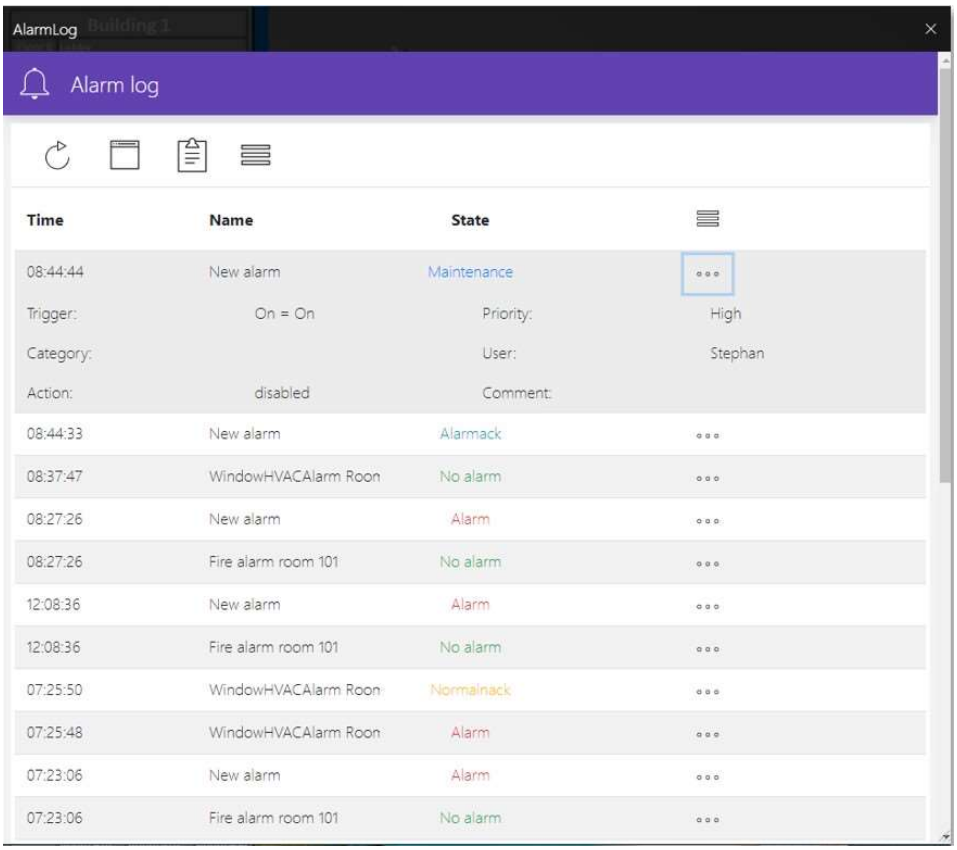
5. 5. Advanced modules

5.1. Alarms



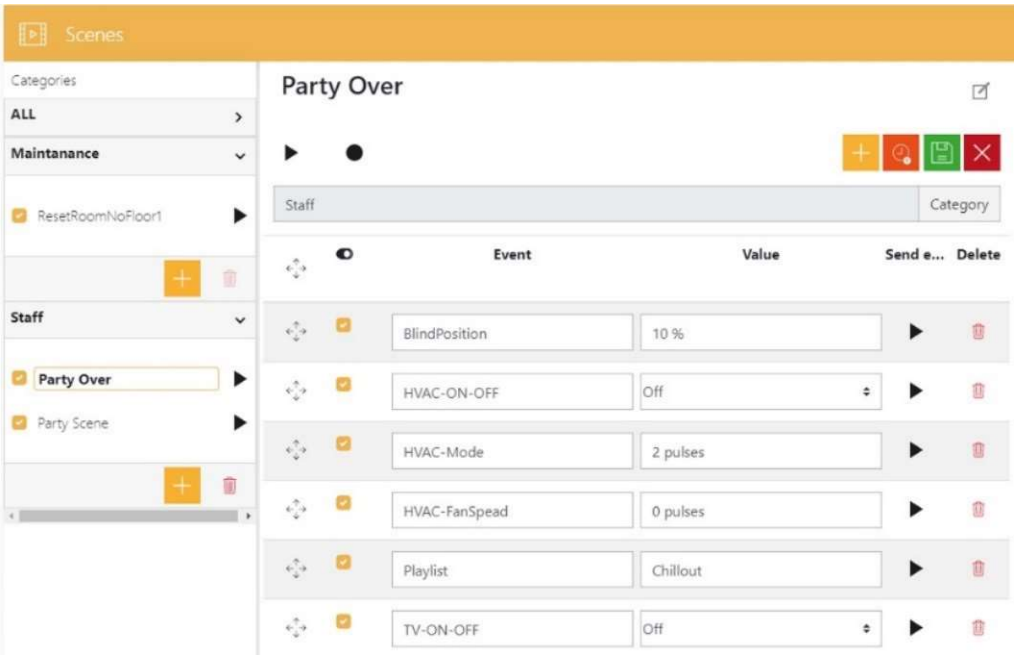
- Configure user information
- Edit message to be displayed on screen, email or Push Notification in IOS/Android App
- Alarm status machine complete:
  - Alarm activated / acknowledged / set to maintenance date.
  - Date and time of the alarm (including "Acknowledged by...")
  - Alarm reset

5.2. Alarm log



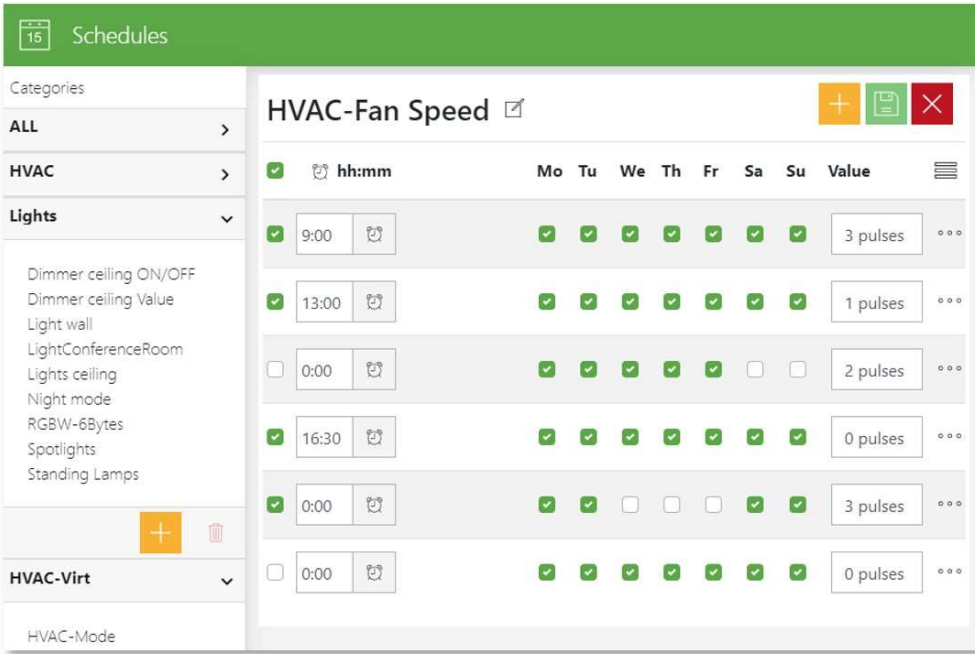
- View complete history of past alarms
- Alarm overview: date, time, name, status, user interaction
- Powerful filtering by multiple options

5.3. Scenes



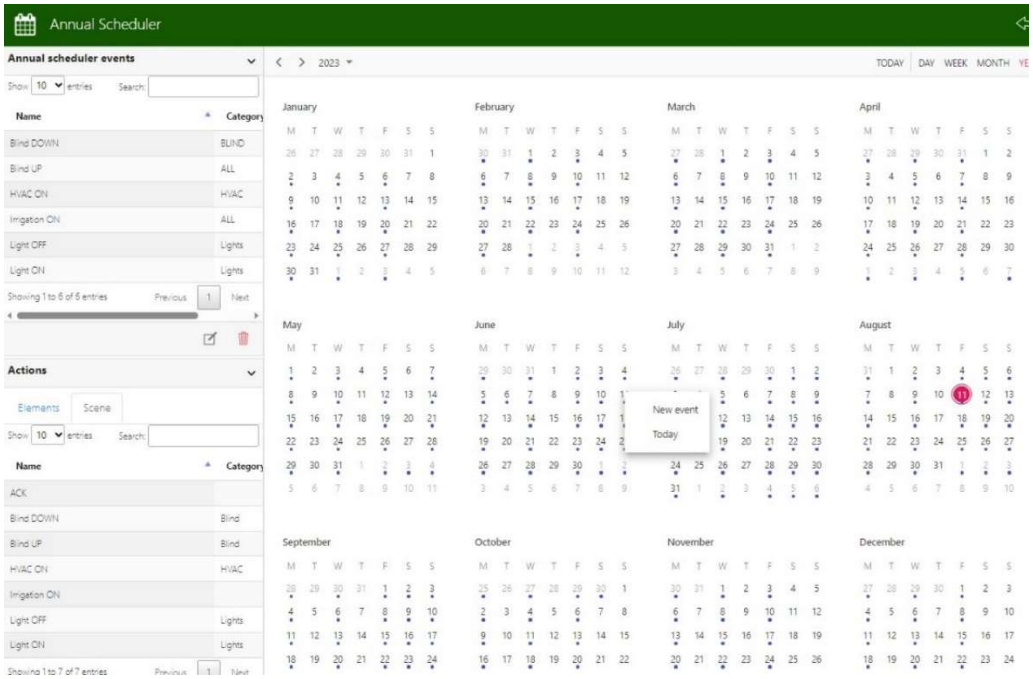
- Very user-friendly interface for the end customer to:
  - Create new scenes with new events and delays between events.
  - Configuration of scene triggers
- Configuration of the visibility of the process point for users when creating new scenes with descriptive texts.
- Pre-defined scenes can be easily modified
- Recording and executing scenes
- Sorting by categories

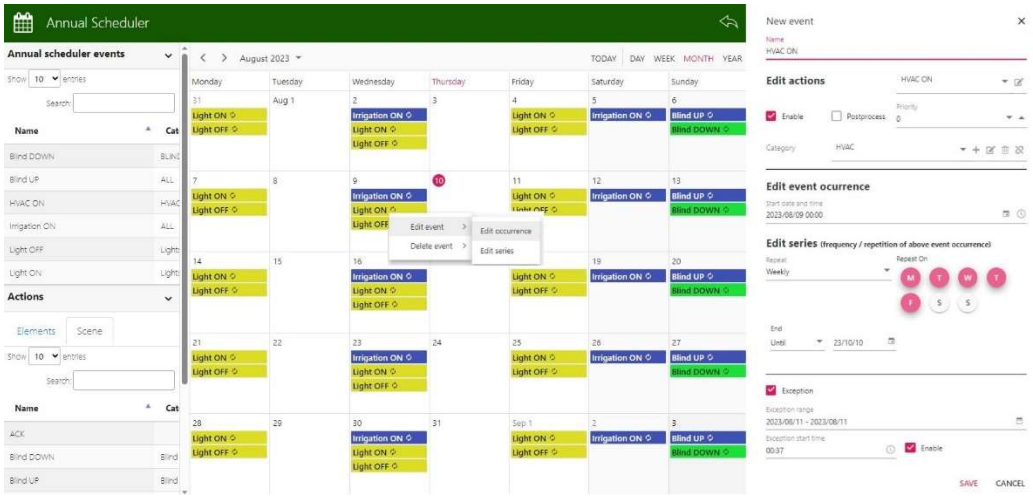
5.4. Weekly scheduler



- Very user-friendly interface for the end customer to:
  - Create new time schedules
  - Change / add new events
  - Set days and time for events
  - Set the value to send
- Very easy overview of scheduled events
- Sorted by categories

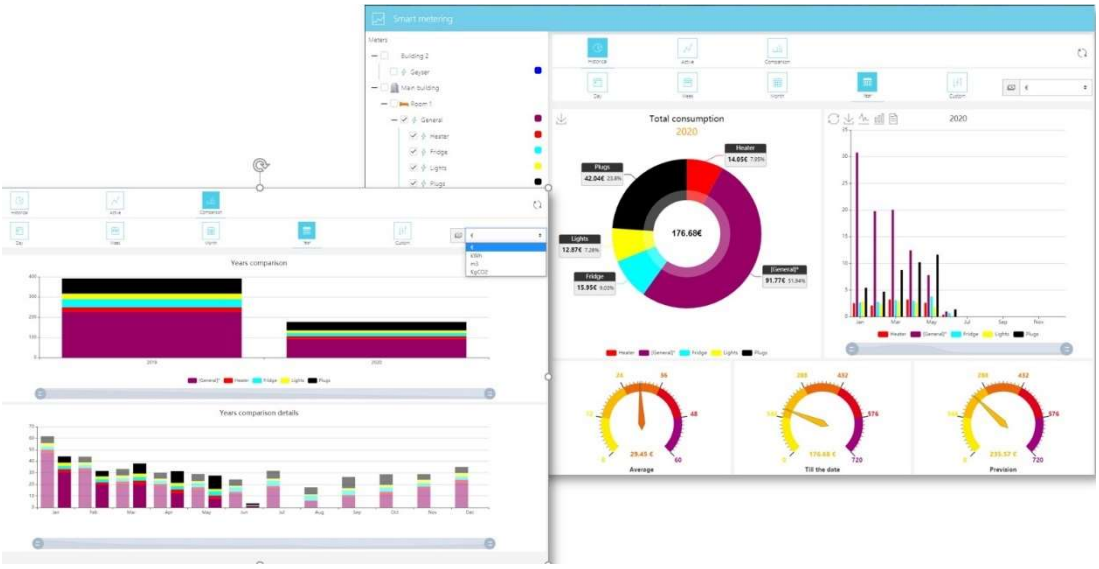
5.5. Annual calendar





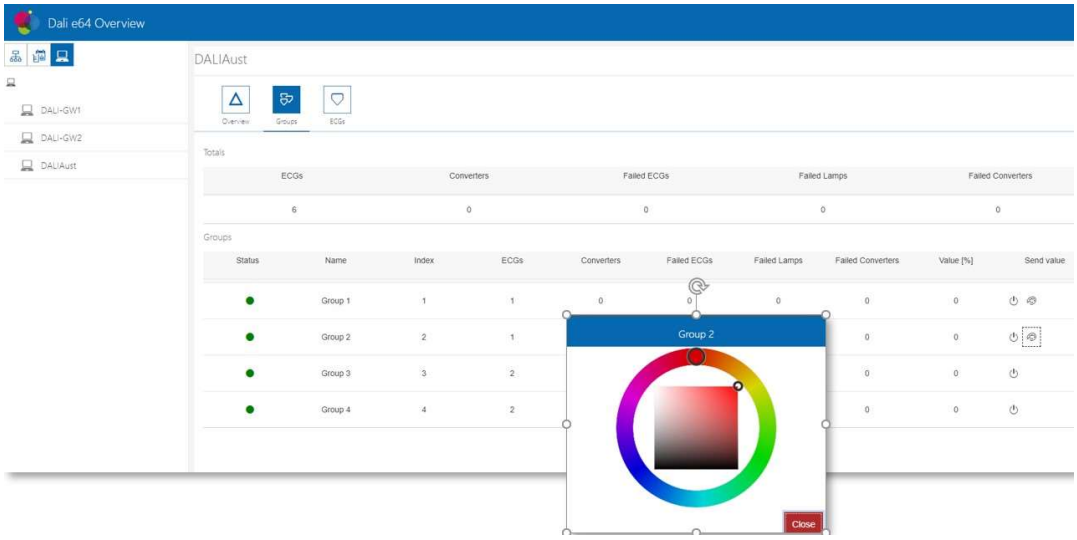
- Very user-friendly and simple **Google Calendar style view**, with day, week, month or year view.
- Add, **modify** or **delete** individual events, events in a series or a whole series.
- Add exceptions and execution **periods**
- Assign colours by category for easy representation
- Create scenes as a list of events to schedule actions in the calendar
- Use scenes already created in the Scenes Module to schedule your actions

5.6. Smart Metering



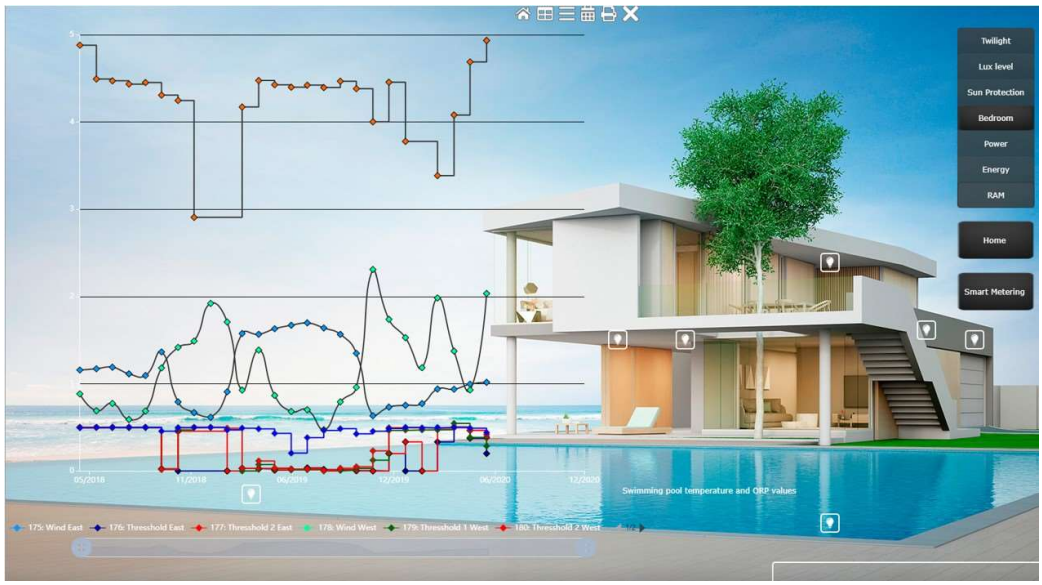
- Create different types of meters:
  - Energy: add process points for active power and active energy.
  - Liquid / Gas: add process points for flow rate and total flow rate
- Add unit price and price increase/decrease
- Custom design
- Great feature to save money with smart metering
- Main counters / sub counters
- Select time range
- Compare different periods
- Displays expenditure in €,$ or unit of measure.

5.7. DALI



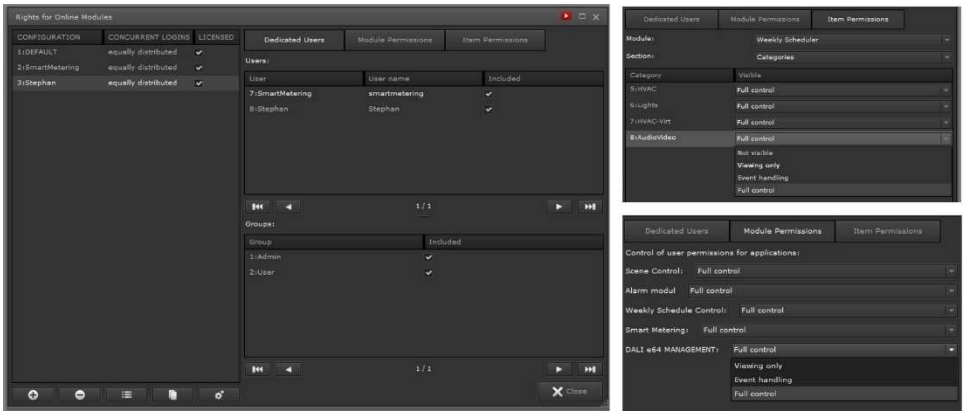
- Automatically created visualisation - saving many hours of work!
- Just configure the IP address and port of the e64 IPAS Dali Gateway and get the complete DALI Configuration in seconds.
- Create the building structure and link the Gateways, groups or ECGs
- Monitor and control all DALI groups and ECGs

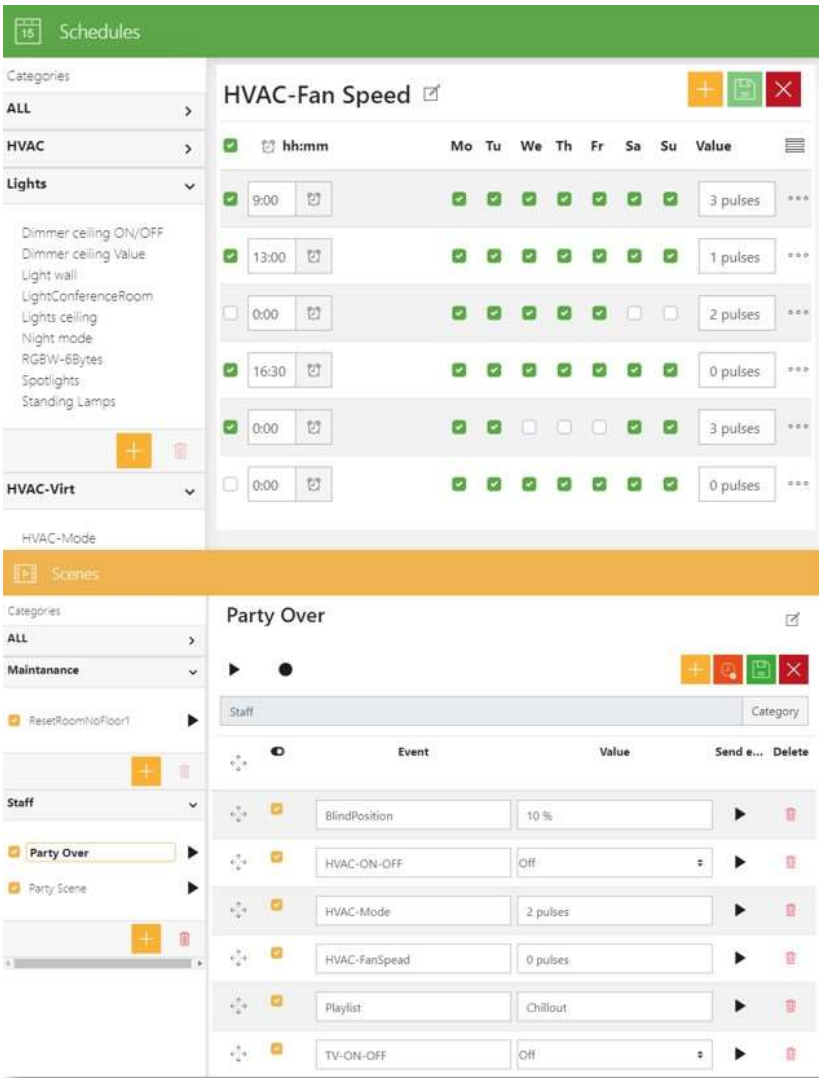
5.8. Charts



- Comprehensive tool to display historical data easily
- Aggregate multiple series on the same chart
- 100% configurable user interface design
  - Lines, marks, background, axes, tooltips, range, series, offset, etc.
- Excellent tool for users to control useful data
- Easily navigate and zoom in/out by clicking on the series

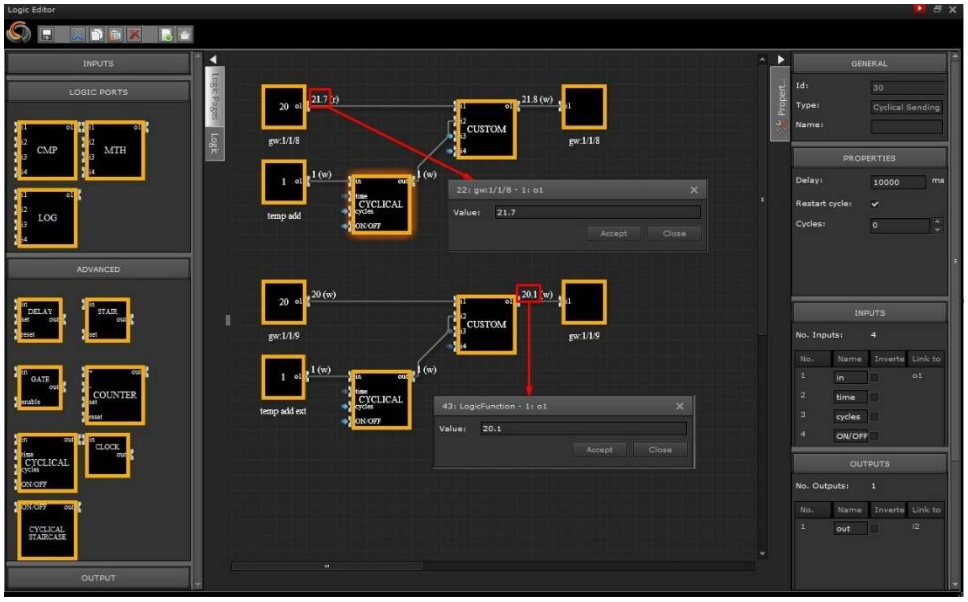
5.9. User permissions

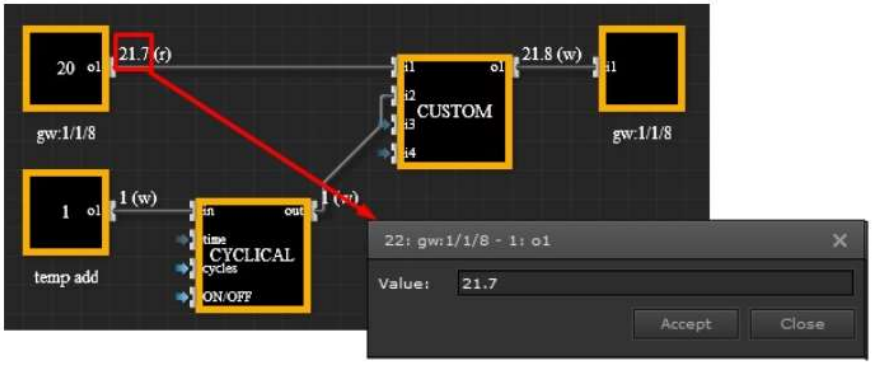


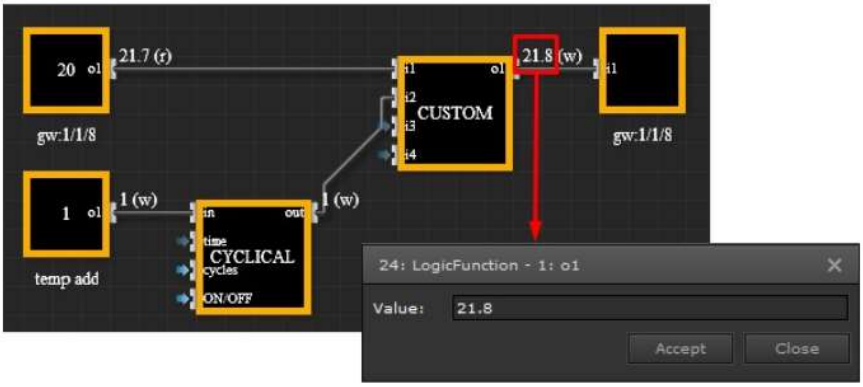


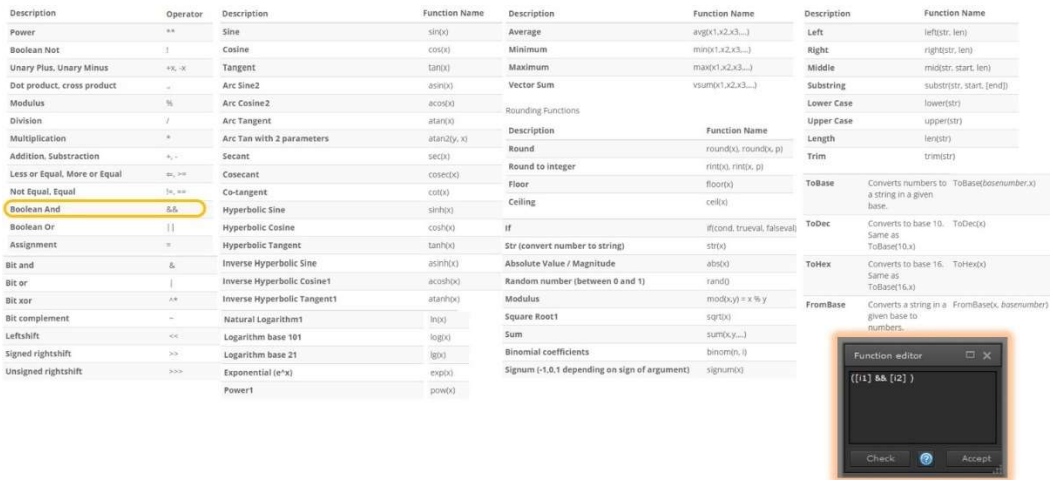
- Assign users / user groups to rights settings
- Configure module and article permissions (categories)
    - Scene control
    - Alarm module
    - Scheduler
    - Smart metering
    - DALI e64 administration
- Different rights depending on the user
    - Display only
    - Event management
    - Full control

5.10. Logic









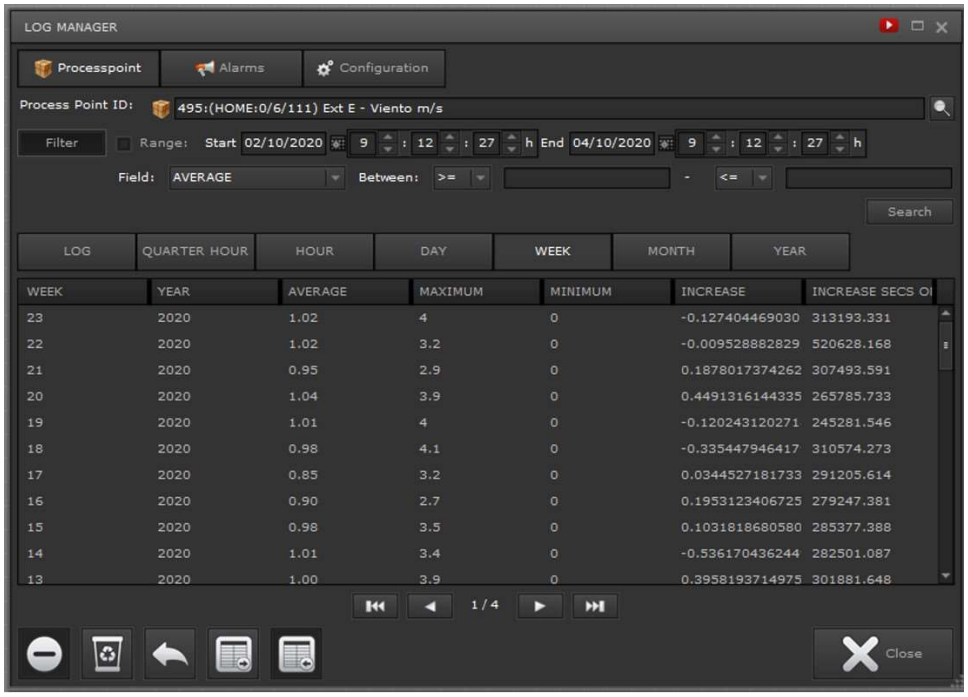
5.10.1. Graphic editor

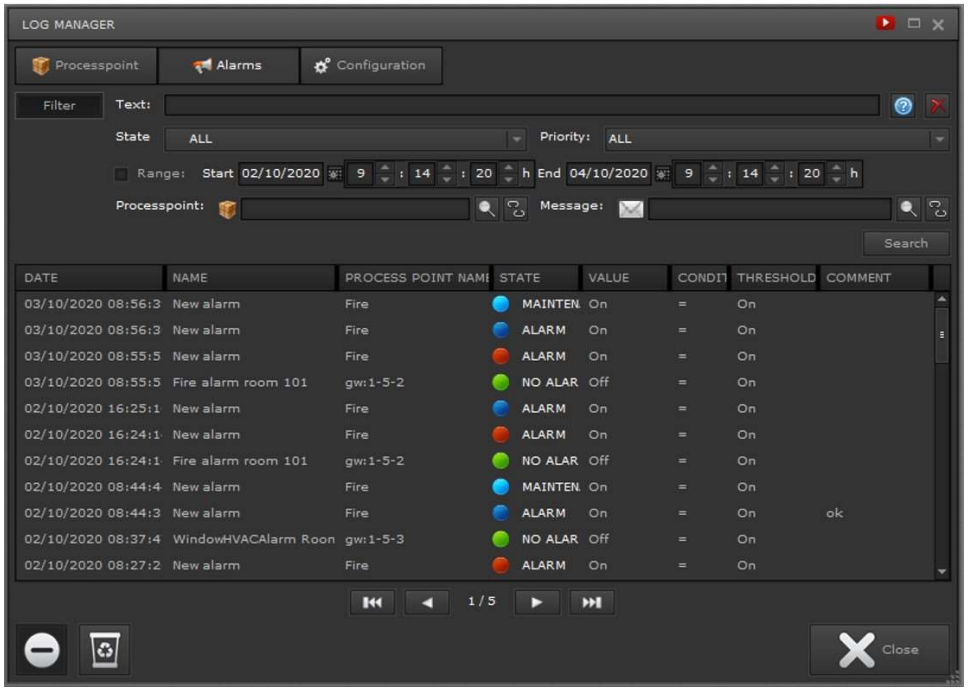
- Create logic pages in the folder structure, copy/paste logic pages between projects, drag and drop logic blocks onto pages, drag and drop links between inputs, outputs and logic blocks.
- Most common logic functions: Boolean logic, mathematical logic, comparators, gates, etc.
- Advanced timers: delay, counter, staircase, clock, cyclic, etc.
- Use any logic block and change it using a scripting language (see next page).

5.10.2. Online diagnostics

- Real-time diagnostics by displaying the values received and sent by each logic block.
- Modify any existing value, propagating the calculated values across the entire logic map, even offline!
- Sending to fieldbuses (KNX, Modbus, BACnet) the calculated values as a result of received telegrams or manual modifications.

5.11. Log manager

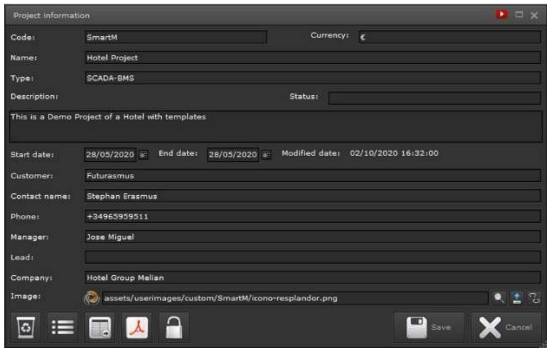


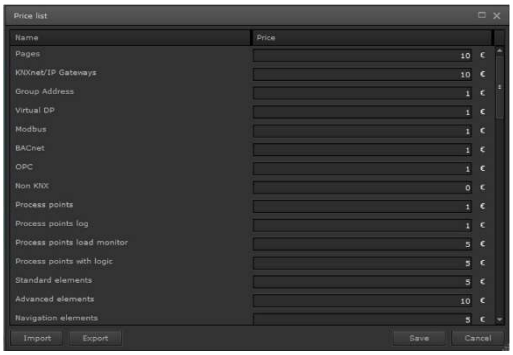


- - Export / import process points to / from a CSV file
- - Apply import / export filters
  - Date range
  - Max, Min, Average, Increment, Increment sec in values
  - Data between 2 values (operators: <, <=, =,>,>,> =)
- - Delete log data of process points within a date range
- - Send alarm log to a pre-configured alarm
- - Apply import / export filters Intervalo de fechas
- - Alarm status and priority

- Deleting alarm log data within a date range

5.12. Project information





Detailed item prices

HTML-page 1 Sat Oct 3 2020

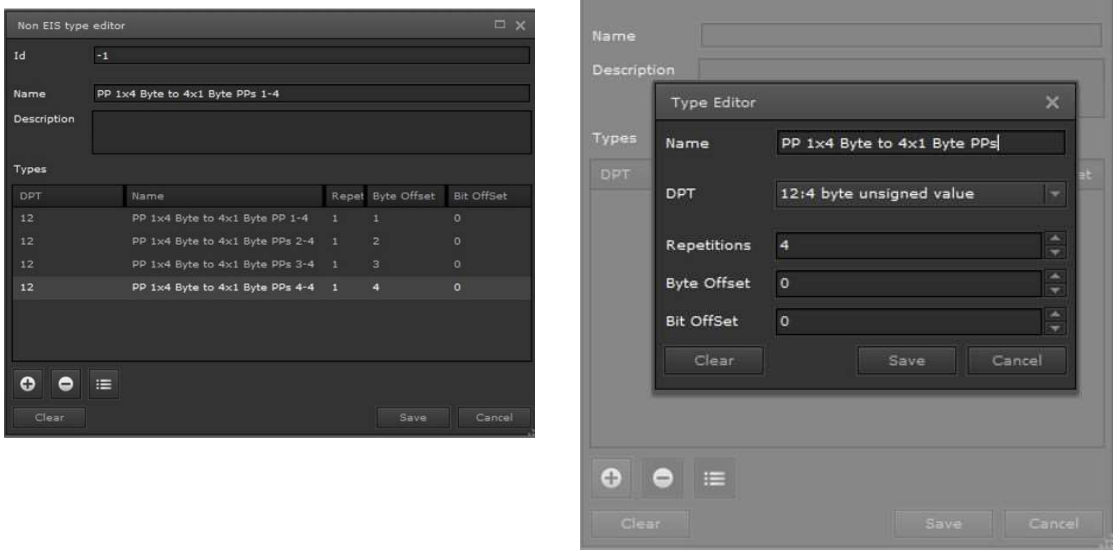
Price list

Project name: Hotel Project
Project type: SCADA-BMS
Status:
Start date: 2020-05-28 16:42:07
End date: 2020-05-28 16:42:07
Customer: Futurasmus
Contact name: Stephan Erasmus
Phone: +34965959511
Manager: Jose Miguel
Lead:
Company: Hotel Group Melian

Item	Unit price	Amount	Total
Pages	10 €	44	440 €
KNXnet/IP Gateways	10 €	2	20 €
Group Address	1 €	611	611 €
Virtual DP	1 €	4497	4497 €
Modbus	1 €	0	0 €
BACnet	1 €	0	0 €
OPC	1 €	0	0 €
Non KNX	0 €	0	0 €
Process points	1 €	4850	4850 €
Process points log	1 €	278	278 €
Process points load monitor	5 €	4	20 €
Process points with logic	5 €	28	140 €

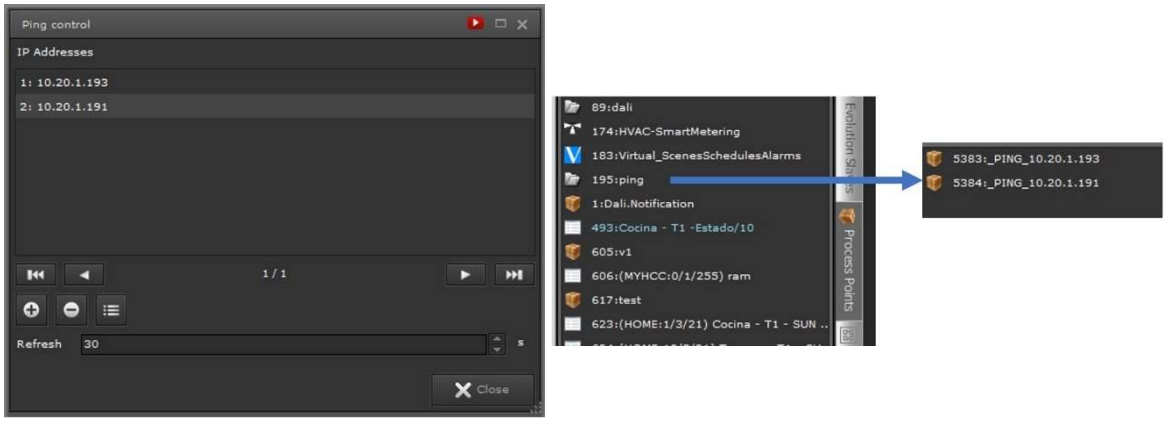
- Tool to automatically create cost estimate of the work done on the Evolution project
- Project information
- Customer information
- Detailed item pricing

5.13. Non EIS



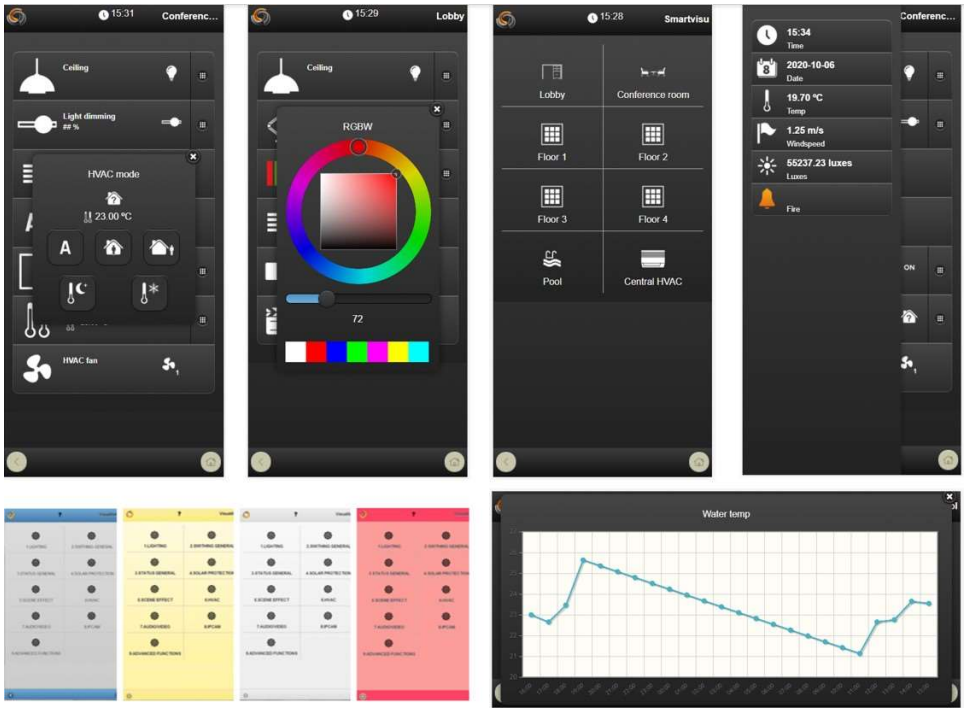
- Converting non-standard telegrams into standard process points
  - Data point type
  - Repetitions
  - Byte and bit offsets

5.14. Ping control



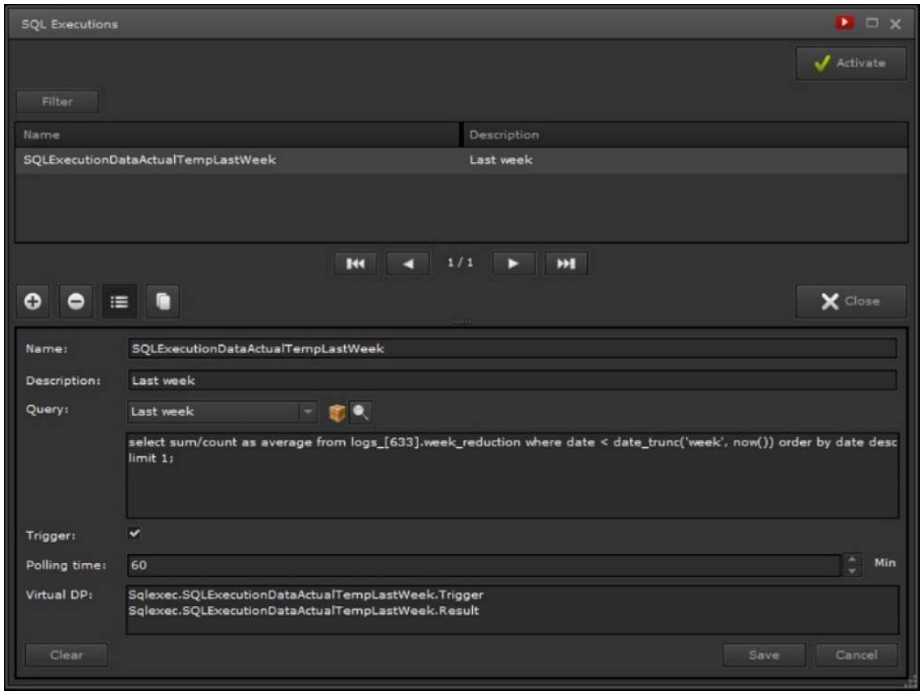
- Add the IP address of the device to monitor
- Select the ping frequency
- When the pinged device does not respond, these process points will be set to "1".

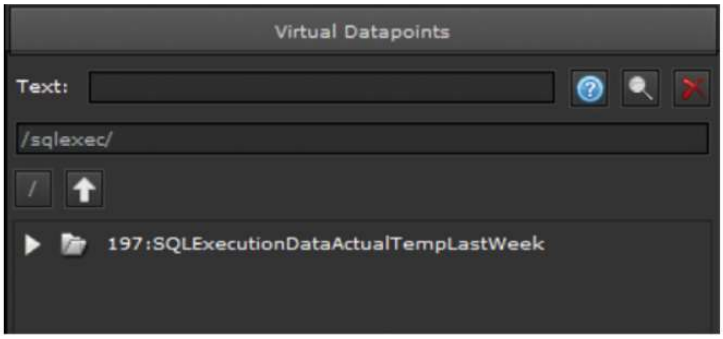
5.15. Smart Visu

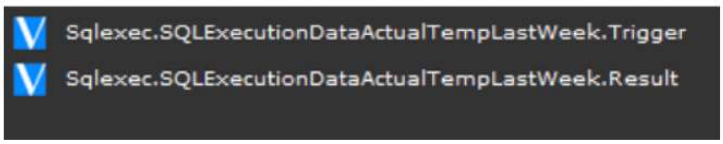


- Creates a building structure
- Link process points to defined controls: only linked functions will be displayed in the GUI
- Assign user to open Smart Visu by default
- Pre-designed responsive elements
- Easy to use

5.16. SQLExec

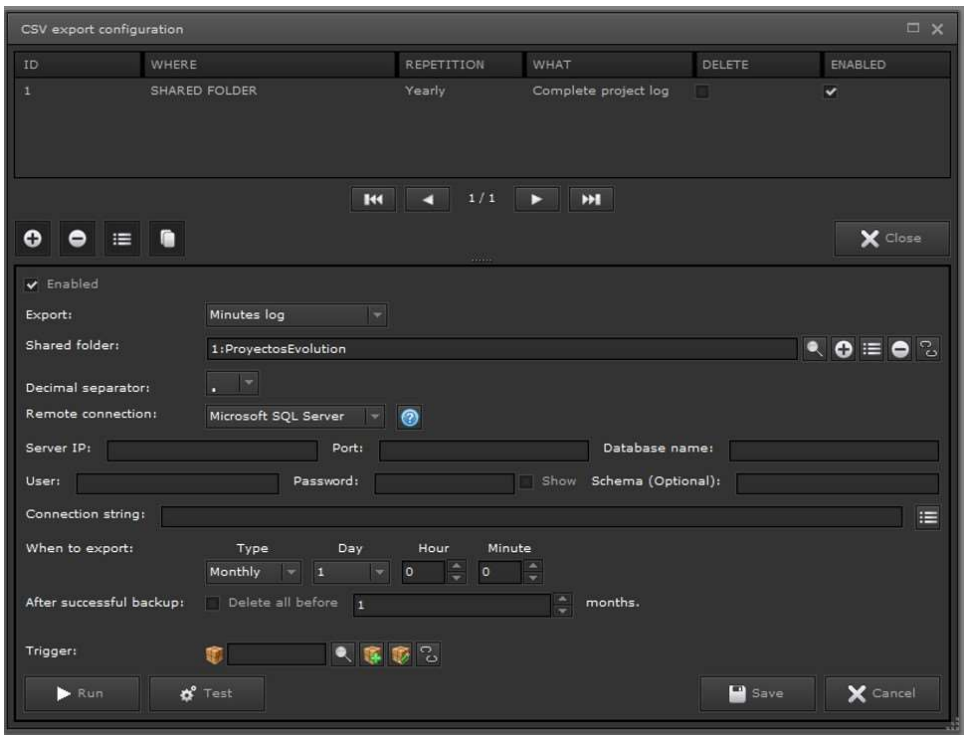




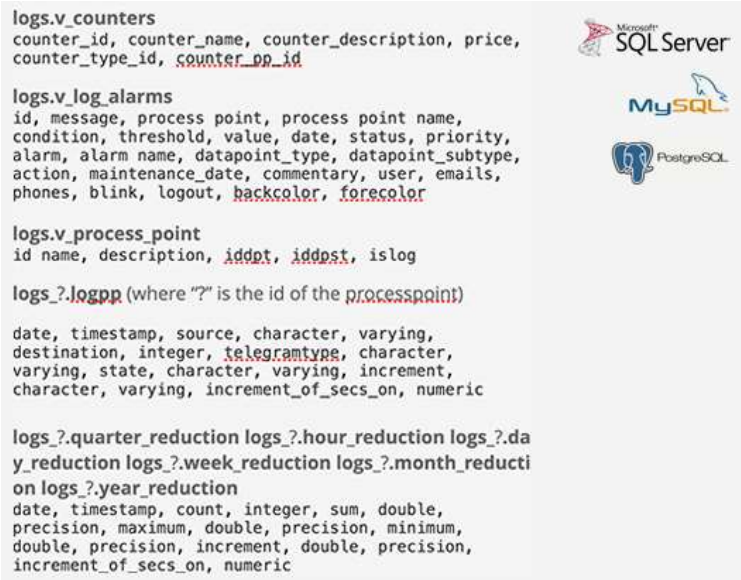


- Process point data, stored in the database, can be extracted to the resulting process points.
- Automatically created data points
- This is done through SQL queries. That is to say. Sum / total as average of:
    - Last quarter hour, current quarter hour, last hour, current time and yesterday.
    - Trigger interval
- Trigger data point for executing a SQL query
- Data point with query result

5.17. CSV export & connection to the SQL database



- Export minute and alarm log to an external database server



- Database servers: Microsoft SQL Server, MySQL Server, Postgre SQL server

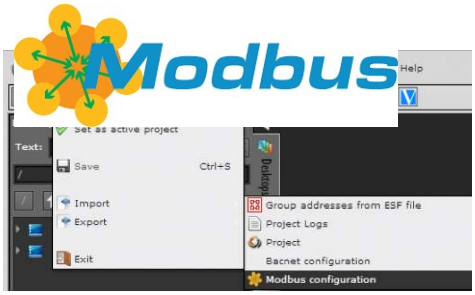
5.18. BACnet (Client & Server)

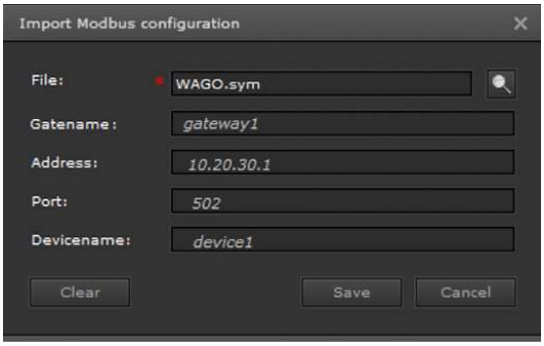
BACnet Client: BACnet object is a value-Object (analogue-value, binary-value, multistate-value)			
Direction	OUT	IN	INOUT
BACnet client will SubscribeCOV?	NO	YES - SubscribeCOV	YES - SubscribeCOV
Communication	Unidirectional	Unidirectional	Bidirectional
Direction	BACnet client (i.e. Evoution Visu) --> BACnet server	BACnet server --> BACnet client	BACnet server <--> BACnet client
How updated?	Evoution Visu sends -> to BACnet server via WriteProperty	Propagated: All notification from BACnet server	Propagated: All notification from BACnet server & Evolution Visu sends -> to BACnet server via WriteProperty

Import of configuration in XML file:

- Protocol Implementation Conformance Statement (PICS)
- Application Service - Conformance Class 3 (start and run)
- Subscribe VOC, Unconfirmed VOC Notification, Read Property, Read Conditional Property, Read Multiple Property, Write Property, Write Multiple Property, Who-Has, I-Have, Who-Is, I-Am
- - Supported object types (current value, status)
    - Analogue input
    - Analogue output
    - Analogue value
    - Binary input
    - Binary output
    - Binary value
    - Multistate input
    - Multistate output and Multistate value

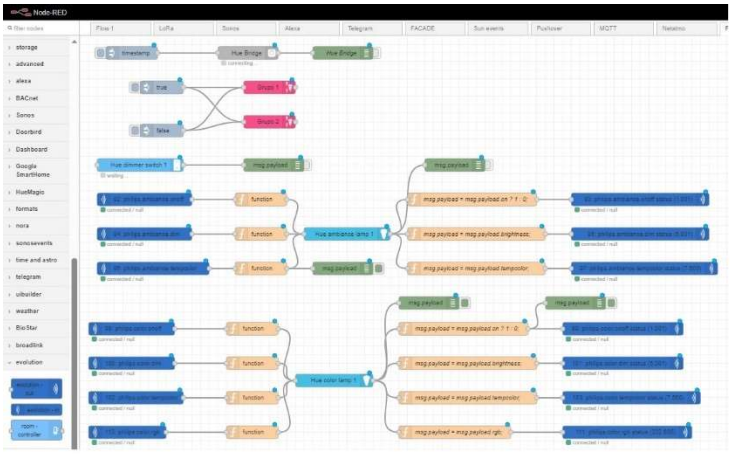
5.19. Modbus

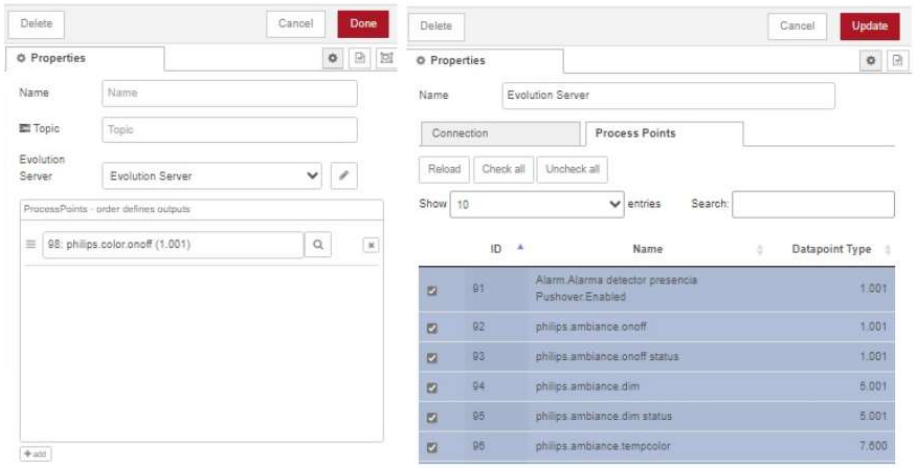




- Configure XML file with the main variables:
    - IP Address of Modbus Slave,
    - Slave ID
    - Modbus variables (Address, Coil Status, Input Status, Holding Register, Input Register, etc.)
- Modbus Import - XML file
- Import WAGO ".sym" files
- Automatically created data points and process points

5.20. Node-RED

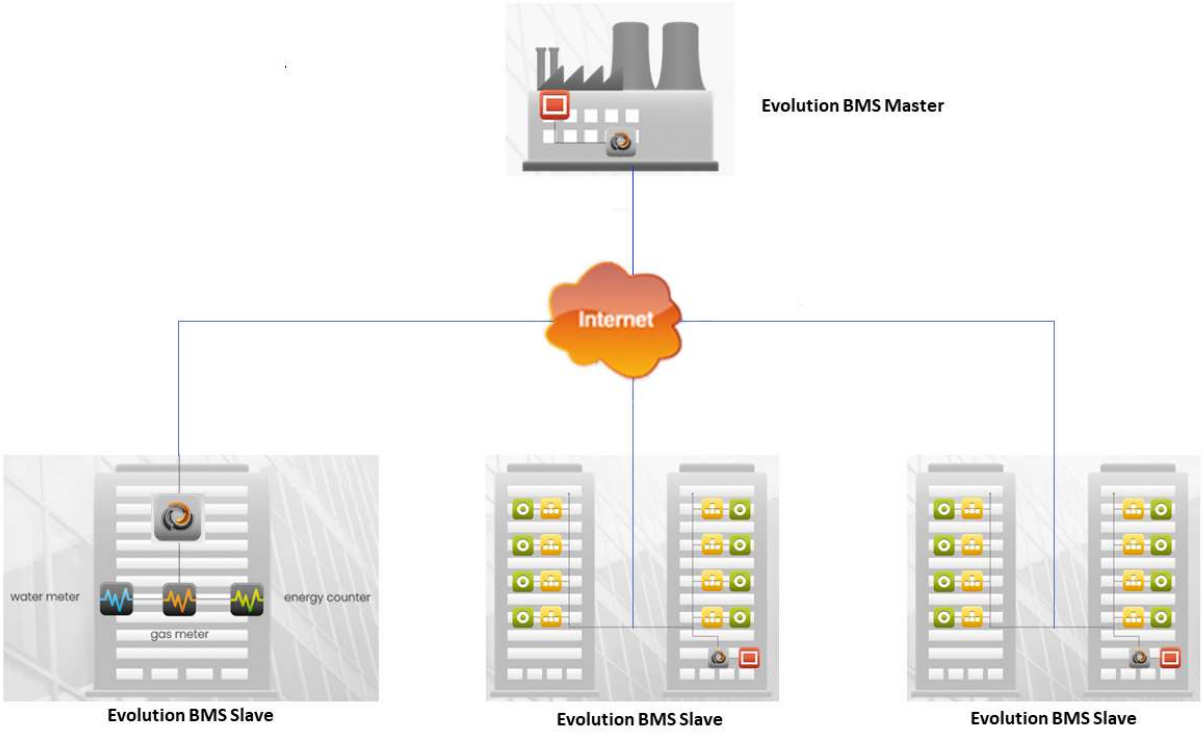




- Powerful visual programming environment to connect devices, APIs and online services in the **IoT ecosystem** in a very simple way.
- Easily connect KNX, Modbus, Bacnet, etc. to any IoT device or service with **Evolution Nodes**
- Integrations with protocols **like MQTT, REST, Websocket, SQL, HTTP**, etc.
- Integrations with third-party APIs such as **Telegram, PushOver, Sonos, Doorbird, NetAmo, Philips HUE, Google Voice Assistant, NGSI-LD**, etc.
- Optimised to handle multiple concurrent connections in real time.
- **World's largest open-source ecosystem (over 4500 nodes available)**
- Open-source standard for data management and data processing
- Possibility of easy development of new Node-network connectors for integration with third-party APIs.

5.21. Master/Slave Architecture

- Multi-level topology for Master/Slave configuration
- Different Evolution Slaves can report to one or several Masters at the same or different hierarchical levels.
- An Evolution Master can also have Slave functions and report to another Evolution Master.
- The connection to the different fieldbuses (KNX, BACnet, Modbus, etc.) is done in the Evolution Slaves.
- The values of the data points shared in the Evolution Slaves are reported to the Evolution Master via IP connection, avoiding connecting the master to the fieldbuses.
- The Evolution Master has the process points shared by each Slave and can be freely processed in any module (database records, graphs, logic, annual calendar, etc.).
- The Evolution Master is ideal for customised visualisations of the most relevant data of the Evolution Slaves.
- No limit to the number of Evolution Slaves or Evolution Master.



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C/ Nit 1 Bloque 7, Local 1 (Urb. Las Torres de Bonalba) · 03110 · Mutxamel (España)
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