





# NETx BMS Server 2.0

Home and building automation systems are becoming increasingly complex and diverse. Often a variety of systems and technologies are used simultaneously. The NETx BMS Server is a reliable, flexible, and scalable solution to deal with this heterogeneity. As a server solution, the NETx BMS Server collects datapoint values from various systems (e.g. KNX, BACnet, LonWorks, Modbus, Micros/Fidelio, ...) and provides them to clients for building management systems (e.g. energy management, systems for data collection and trending, visualization, ...). In addition, the server includes a central database for archiving historical data and a web server for providing web based visualizations.

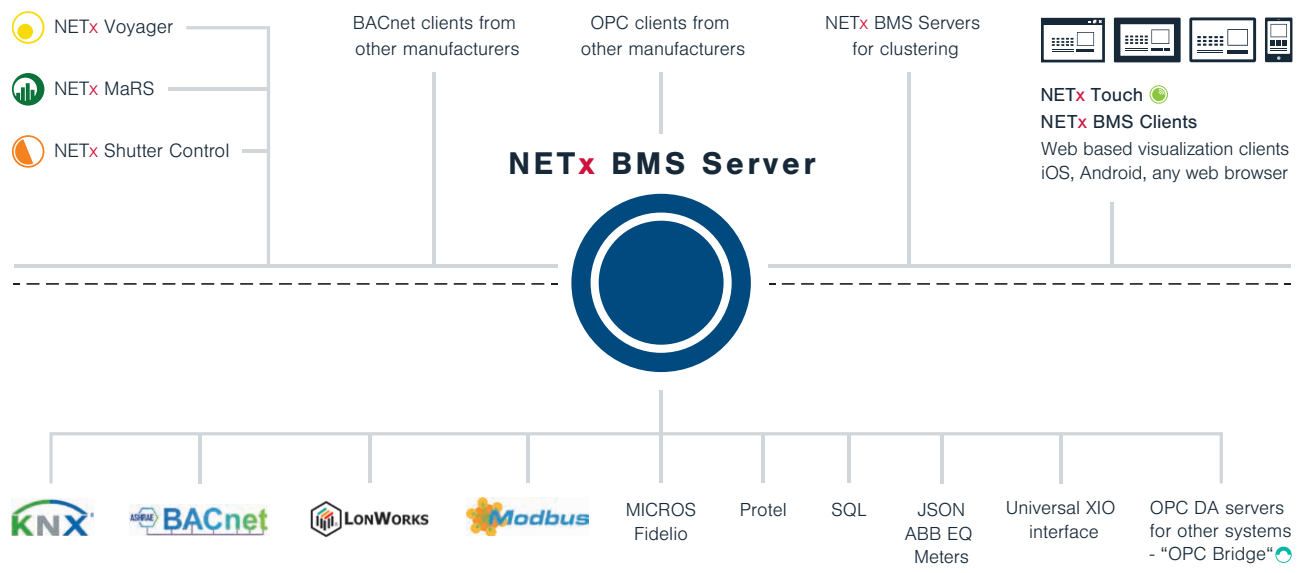






# MANY SYSTEMS - ONE SOLUTION - NETx BMS Server 2.0

Lighting Shading Smart metering Trending Climate Heating Ventilation Access control Time attendance system



The NETx BMS Server is the core component for solutions within the building management domain. As a server application it is responsible for collecting and processing datapoint values from any building automation system. The datapoints themselves can originate from a variety of systems and technologies. The NETx BMS Server 2.0 offers the possibility to integrate datapoints from KNX, BACnet, LonWorks or Modbus. In addition, interfacing to other systems is possible too.

The processed datapoints are then provided to management clients via open interfaces. In addition to providing web based visualizations via the embedded web server, it can serve any amount of NETx clients (e.g. NETx Voyager, NETx MaRS or NETx Shutter Control). Thanks to the open OPC interfaces, an integration of third-party OPC clients is possible. Using the included BACnet/IP server interface, third-party BACnet/IP clients can access the NETx BMS Server too.

## OPC Server

All functionality of the NETx KNX OPC Server is included in the NETx BMS Server.

## Main/backup

For high reliability, the NETx BMS Server can be deployed as a main/backup solution.

## Gateway functionality

Any information can be exchanged and forwarded between technologies and systems that are integrated via the NETx BMS Server.

## Integration

The NETx BMS Server allows the integration of different protocols and technologies. In addition to KNX, BACnet, LonWorks, and Modbus, interfaces to other systems (e.g. Micros Fidelio) can be included. Furthermore, datapoints from existing OPC servers can be integrated, too.

## Historical data storage

Using the included database, historical values of any datapoint can be stored for further usage. Interaction of all users, clients or sub systems can be logged, too.

## Management clients

The NETx BMS Server provides interfaces to OPC, BACnet/IP, and VNET in order to integrate NETx clients or other third-party management applications.

## Web based visualization

An integrated web server offers access to sophisticated, web based visualizations that can be created with the NETx BMS Client Editor. Administration, analysis and updating of all visualization clients can be done centrally.

## Adding control functionality

Using server tasks, timers, virtual links, and/or LUA scripts, missing control functionality can be implemented within the NETx BMS Server.



## Universal solution with wide field of application

While the application fields of traditional building automation systems were limited to lighting, shading and heating, ventilation, air conditioning (HVAC) systems, a desire to integrate applications from other domains (e.g. energy management, alarm systems, access control, systems from the IT world, ...) into a single all-in-one solution can be observed.

To fulfill the requirements of all used application domains, different technologies have to be used. However, each technology has its own way to represent datapoints and provides its own mechanism to access them. To realize central management functions (e.g. visualization, remote access, maintenance, archiving

of data changes) within such a heterogeneous environment, the application that provides this central management function has to consider all the characteristics and specifics of the underlying systems. The NETx BMS Server provides a sophisticated solution to solve the problem of heterogeneous building automation systems. As a server solution, the NETx BMS Server maps the datapoints from different application domains and technologies into a generic and technology-independent view. Using this uniform data view, management clients can access the datapoints in a transparent way - independent of the underlying technology. Thus, the NETx BMS Server can be used to realize any management function from any application domain.





## NETx BMS Server 2.0

### Interfaces to the management level

The standard management level interfaces of the NETx BMS Server are OPC and BACnet/IP. Therefore, any management client that supports OPC or BACnet can be integrated. For connecting other NETx clients (e.g. NETx Voyager), the VNET protocol is available, too.

### Gateway functionality

The NETx BMS Server can also be used as a multi-protocol gateway. The built-in interfaces provide the possibility to exchange and forward values between different protocols and technologies. Dedicated hardware gateways are not needed anymore.

### Reliability

Reliability and availability are of utmost importance within the building automation domain. Therefore, the NETx BMS Server can be used within a main/backup environment. If the main server is not online anymore, the backup server takes over the control without affecting the functionality of the connected clients.

### Virtual datapoints

In addition to physical datapoints, so-called virtual datapoints can be created within the NETx BMS Server. These virtual datapoints are used like ordinary datapoints - however they exist only virtually within the server. Using this concept, user-specific virtual data structures can be defined.

### Interfaces to the field level

The NETx BMS Server offers a modular and extensible interface to the field and automation level. In addition to KNX, BACnet, LonWorks, and Modbus, interfaces to other systems like Fidelio/Opera, Protel and JSON are available too. Further interfaces can be integrated on request.

### Web server

The NETx BMS Server is delivered with an integrated web server. It provides the opportunity to directly develop web based visualizations without the need for any additional software. Since the web server uses standard HTML and JavaScript, clients only require a standard web browser - additional plugins or add-ons are not needed.

### Cluster module

Using the built-in cluster module, datapoints from other OPC servers can be integrated. Furthermore, different NETx BMS Servers can be interconnected to each other. Using this concept, a hierarchy of NETx BMS Servers can be built.

### BMS Studio

The NETx BMS Studio serves as a graphical user interface for configuring and maintaining the NETx BMS Server. In addition to managing the used devices and datapoints, a variety of other management tasks can be performed too.



# NETx BMS Server 2.0

## Scalability

Due to the flexible and modular design, the NETx BMS Server can be used in projects of all sizes and types – from small up to large building automation projects. Thanks to the well-proven NETx KNX OPC Server core, which is used in the largest KNX projects in the world, the NETx BMS Server is the ideal solution for projects with more than 100,000 datapoints.

## Online check

The connection state of all interface devices (Modbus controllers, BACnet routers and controllers, KNXnet/IP routers and interfaces) as well as the status of the server itself (online/simulation, main/backup, active/standby) are monitored and available as datapoints, too. This additional information can be used by, e.g., a visualization like any other datapoint.

## Adding control functionality

If the available control functionality provided by the field and automation level is not sufficient, missing functionality can be implemented within the NETx BMS Server using server tasks, timers, and/or virtual links. Furthermore, a script engine based on LUA scripts for implementing any required functionality is available, too.

## NETx BMS Clients for visualization

The embedded web server of the NETx BMS Server provides a high-performance interface for web based visualization clients. As client platform, any device with integrated standard web browser can be used. In addition, dedicated apps for iOS and Android that simplify the integration and configuration are provided.

## Database

The NETx BMS Server 2.0 includes an SQL database by default. This database provides the possibility to archive all data changes of selected datapoints. These historical data values can be used for trending analysis and reporting tasks.

## Metering module

Using the so-called metering module, smart meters that measure the consumption values of arbitrary resources can be integrated. The measured metering data can be visualized within the web based NETx BMS Client or within the NETx Voyager.

## Configuration import

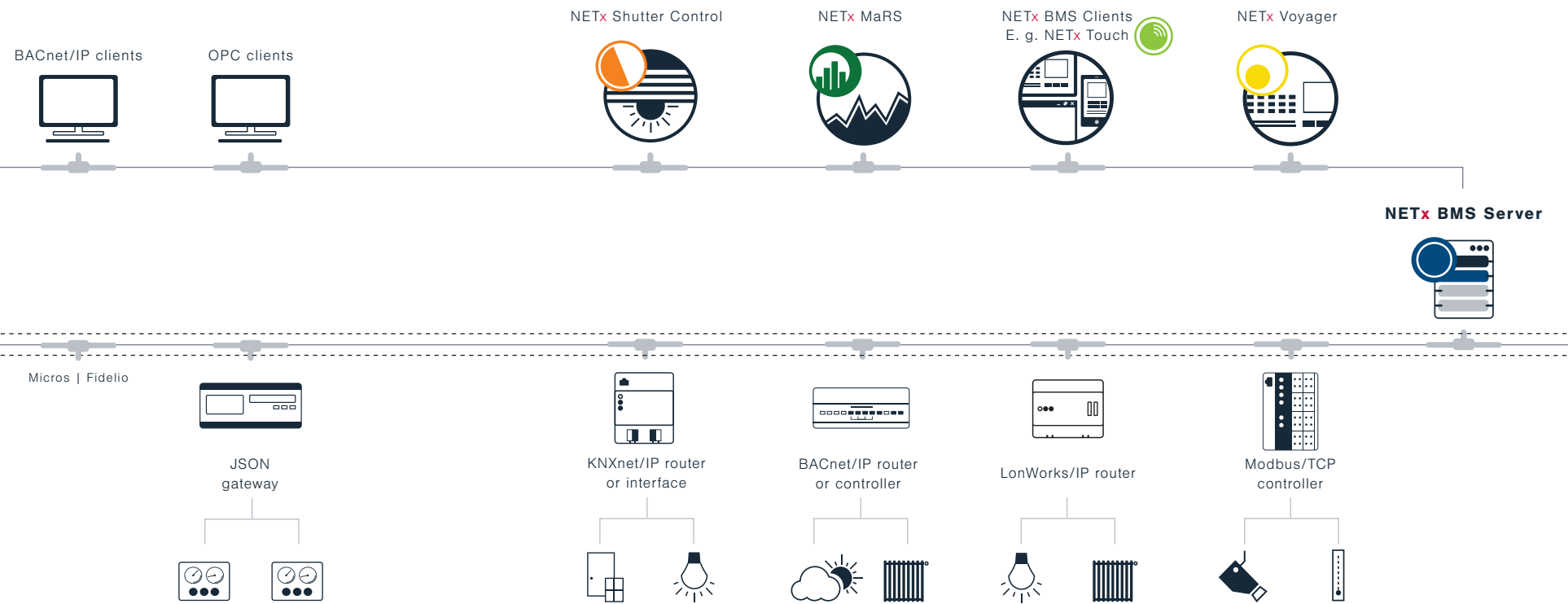
In order to use the datapoints from the field and automation level, the corresponding configuration has to be imported. To ease this import, automatic tools to import KNX, BACnet, and/or OPC datapoints are included.

## Simulation mode

This mode is used for testing the configuration of the server without being connected to the physical network. Using the simulation mode, the functionality of connected management clients can be tested too.



# Interfaces overview



Management level

Field-/automation level





## Interfaces

The main task of the NETx BMS Server is to provide a system- and technology-independent view of datapoints from the field and automation level to management clients. This approach has the advantage of management clients not needing to consider the details and characteristics of the underlying systems. Thanks to the common view, all datapoints are represented in the same way. In order to accomplish this, interfaces to the field and automation level are key elements. For this reason, it is possible to integrate so-called XIO (Extended Input Output) interfaces into the NETx BMS Server. An XIO interface is a driver implementation that provides all necessary functionality, enabling the NETx BMS Server to communicate with technologies of the field and automation level.

If datapoints from the field and automation level are mapped into the NETx BMS Server, management clients can access them using different management client interfaces.

One of the most important advantages of the NETx BMS Server is the flexibility of the provided interfaces. The modular design of the XIO and management interfaces allows a fast and easy integration of additional systems and technologies. If a technology is available within an existing project that is not yet supported, customer- and project-specific solutions can be provided. No matter what technology is available in the building automation system, the NETx BMS Server provides a possibility to integrate it.



#### Interfaces to the field-/automation level

In the current version, NETx BMS Server provides the following XIO interfaces:

##### **KNX**

In order to include KNX datapoints, the KNXnet/IP tunneling protocol is used. Therefore, any KNXnet/IP router and/or interface can be used to integrate KNX networks and their datapoints.

##### **BACnet**

In order to integrate BACnet datapoints, the NETx BMS Server implements the BACnet/IP client protocol. Using this interface, a connection to any BACnet/IP device is possible. Via corresponding BACnet/IP routers, other BACnet media (e.g. BACnet MS/TP devices) can be integrated too.

##### **LonWorks**

The NETx BMS Server provides the opportunity to integrate LonWorks datapoints. The connection to the LonWorks network is done via LonWorks/IP routers.

##### **Modbus**

The NETx BMS Server also implements the Modbus/TCP interface. This interface can be used to integrate standard Modbus datapoints (Coils, Discrete Inputs, Holding Registers, Input Registers) into the NETx BMS Server.

##### **OPC**

The so called cluster module provides the opportunity to integrate datapoints from foreign OPC servers. Using this functionality it is possible to aggregate data from different sub servers into the NETx BMS Server that acts as main server for the overall system.

##### **JSON**

JavaScript Object Notation - JSON - is a lean data exchange format that is also supported by the NETx BMS Server. Systems and their devices that exchange data via JSON objects can be integrated via the JSON interface. Within the current version, the metering data of ABB EQ meters can be collected.

##### **Interfaces to hotel management systems**

Hotel management systems often use their own protocols for communication. Therefore, the NETx BMS Server offers optional interfaces for Fidelio/Opera and Protel systems.

##### **Additional XIO interfaces**

Thanks to the modular design of the NETx BMS Server the provided XIO interfaces can be extended. Depending on the project requirements, customized XIO interfaces can be offered on demand that provide the integration of additional devices and systems.





# MANAGEMENT CLIENTS

## Interfaces to the management level

The NETx BMS Server currently offers the following management interfaces:

### OPC Data Access 2.0 and OPC Unified Architecture

Using the OPC DA 2.0 server interface, any OPC DA 2.0 client can access the uniform datapoint view. This includes the clients NETx Voyager, NETx MaRS and NETx shutter control as well as any third-party OPC client application. In addition, the NETx BMS Server supports an OPC UA interface for the integration of any OPC UA client.

### BACnet/IP server interface

The NETx BMS Server provides a BACnet/IP server interface that provides the opportunity to create new BACnet objects and map any datapoint within the server to these objects. Using this approach existing BACnet/IP clients can access all datapoints within the NETx BMS Server.

### Web interface

The embedded web server provides an HTTP interface for web based visualizations. Since this interface is based on HTML and JavaScript only, any standard web browser can be used to display a web based visualization.

### VNET

For all NETx clients, the VNET interface can be used as an alternative to OPC DA 2.0. VNET is based on the TCP/IP protocol. Compared to OPC DA 2.0, it is more flexible and easier to use.



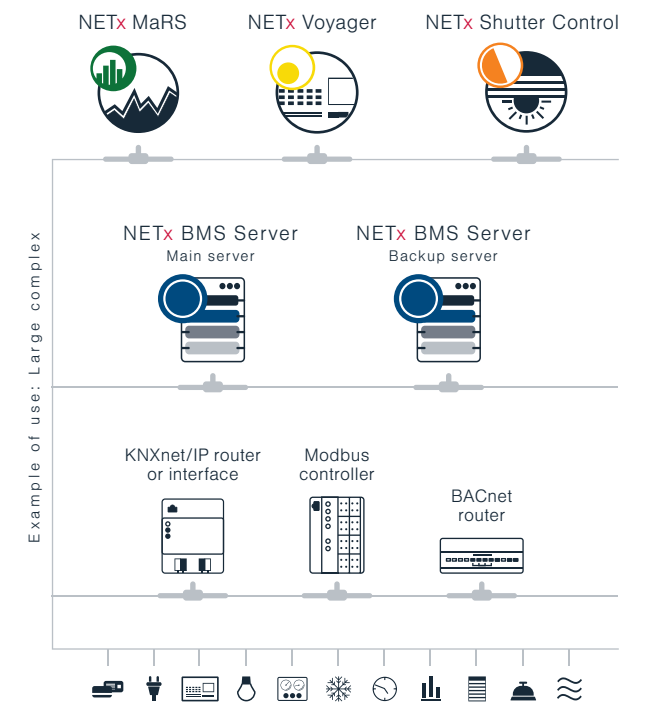


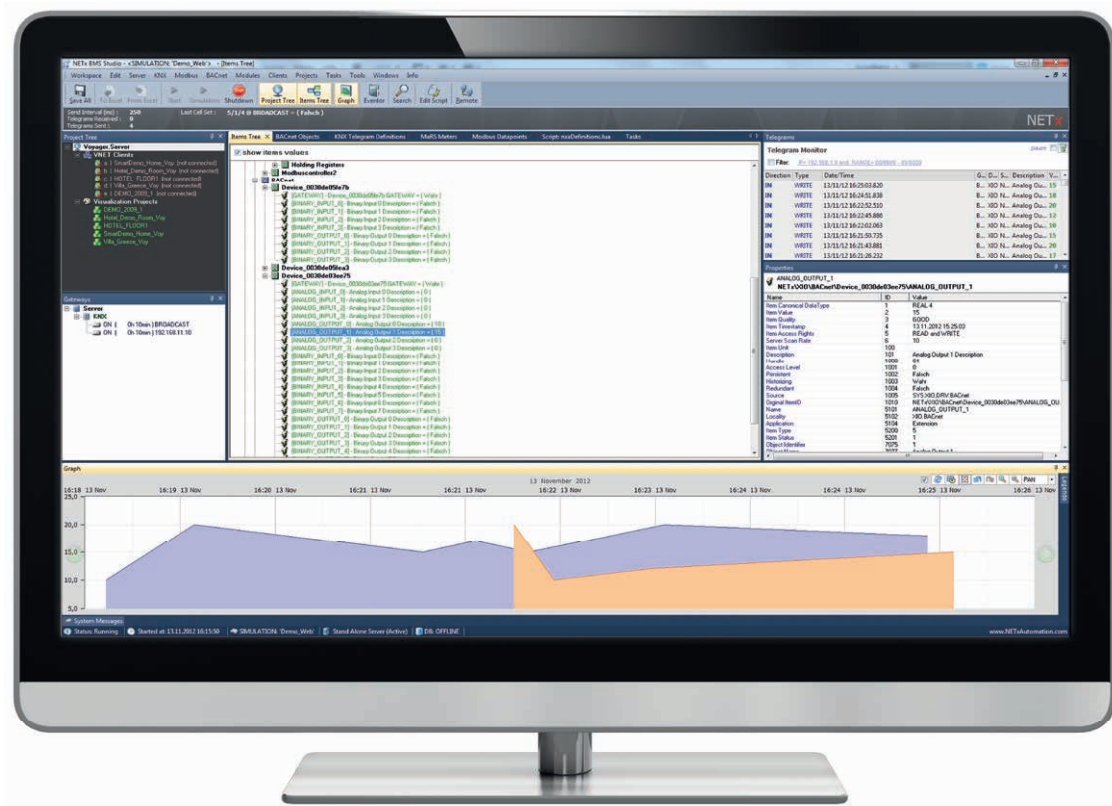
## Field of application

A major advantage of the NETx BMS Server is its scalability. Due to the reliable server engine and the modular design of the interfaces, the NETx BMS Server can be used in small, medium, and large-scaled projects - from smart homes to the largest hotel projects and commercial buildings in the world.

As a central server within the building management, the NETx BMS Server acts as a central point for administration. Thanks to the performance of the server engine, the NETx BMS Server can be combined with an almost unlimited amount of management clients. Depending on the project size, the functionality of the building automation system can be distributed to different management clients. The datapoints of interest are centrally collected by the NETx BMS Server and then provided to the clients.

To increase the availability, the realization as a redundant main/backup solution is possible.





## NETx BMS Studio

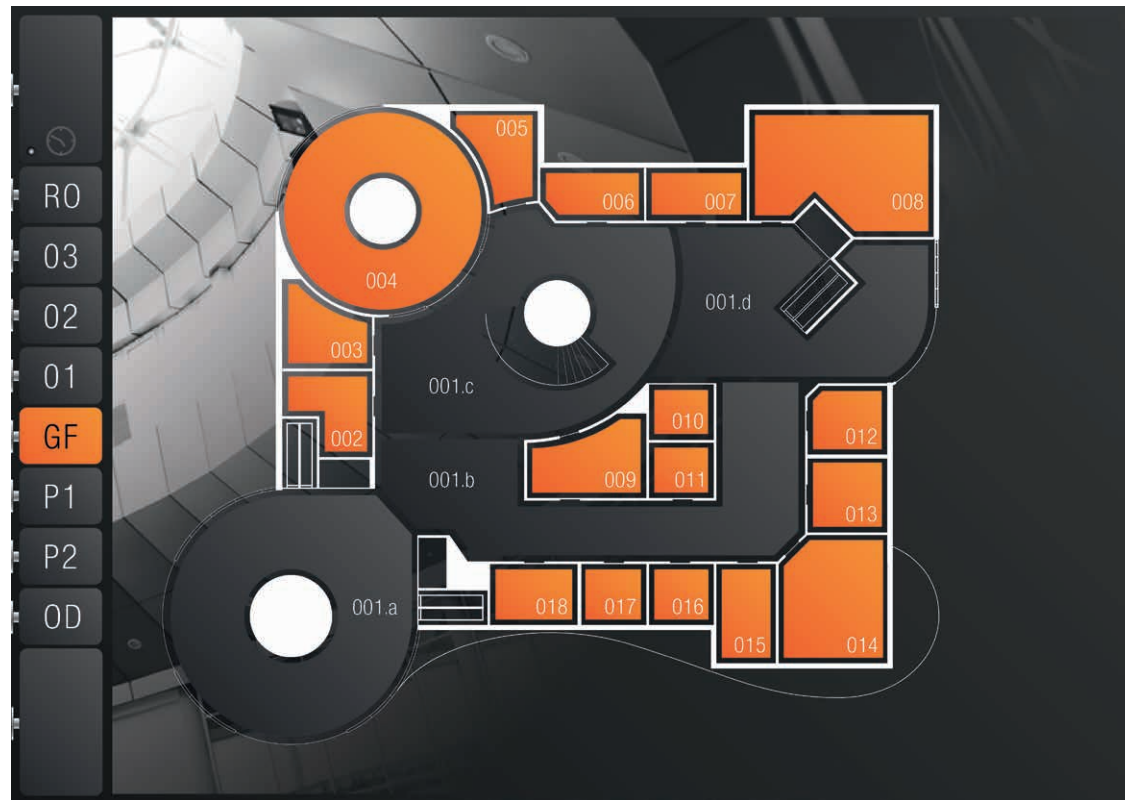
The NETx BMS Server is an application that runs as a Windows service or as a Windows server. Configuration and maintenance of the server application is done with the NETx BMS Studio.

The NETx BMS Studio is a graphical user interface to perform various management tasks. In addition, the NETx BMS Studio includes various tools. Using the NETx KNX ETS Converter, ETS projects can be imported in a simple way. The BACnet Explorer allows an automatic discovery of BACnet devices and their BACnet objects that can be imported directly. Finally, the Cluster Explorer provides the opportunity to search for datapoints within foreign OPC servers.

Furthermore, the NETx BMS Studio itself acts as a management client application. In a tree view ("Server Item Tree"), the datapoints as well as their values and properties can be displayed and changed during runtime. This view of datapoints is identical to the one that is provided to a management client.

### Universal configuration and maintenance

- Management of NETx BMS workspaces
- Configuration of the used devices and their datapoints
- Automatic tools for importing and discovering datapoints
- Change of server parameters and server settings
- Configuration of the XIO interfaces
- Configuration of interfaces to the management clients
- Adding and managing server-side events, tasks, timers, and virtual links
- Display of historical data values using the built-in graph
- Evaluation of logging information
- Management of NETx BMS Clients and their visualization projects
- Development of LUA scripts via built-in LUA script editor



## Server-based visualization at the highest level

The NETx BMS Server is more than just a data server. Thanks to the embedded web server, the NETx BMS Server provides a flexible platform for web based visualizations. Both for creating and for its representation, no additional software is necessary - all necessary software components are already included in the NETx BMS Server.

Web based visualization projects are displayed on so-called NETx BMS Clients. Since the developed web engine uses HTML and JavaScript only, any device equipped with a standard web browser can be used - additional plug-ins or software components are not necessary. Thus, web based visualizations are not limited to PC-based systems - smart phones, tablets, touch panels or other embedded devices can be used too. The centralized management of visualization projects and clients is also done within the NETx BMS

Studio. The NETx BMS Studio can define a nearly unlimited amount of visualization projects. The creation of visualization projects is done using the NETx BMS Client Editor which is also integrated in the NETx BMS Server as a software component.

In order to use the created visualization projects at a device, a NETx BMS Client definition has to be specified for each client device. In addition to defining a user name and password, each NETx BMS Client definition is assigned to a visualization project. This assignment can be modified dynamically and can be changed at any time during operation.

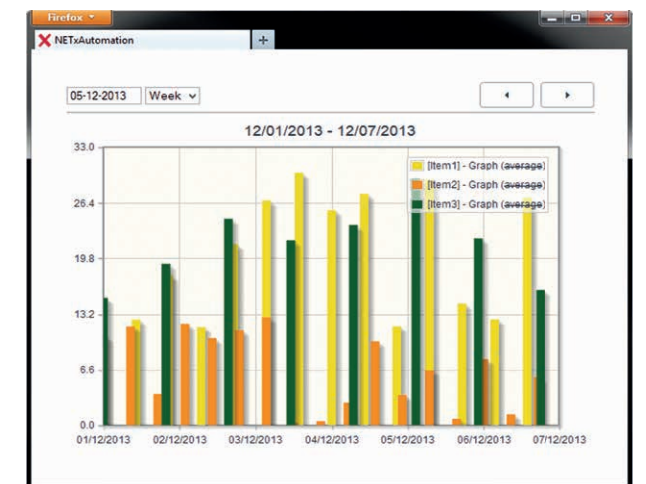
It is also possible to use a visualization project for several NETx BMS Clients. This dynamic approach of assigning visualization projects to the corresponding NETx BMS Clients allows a flexible and manifold realization of visualization projects.

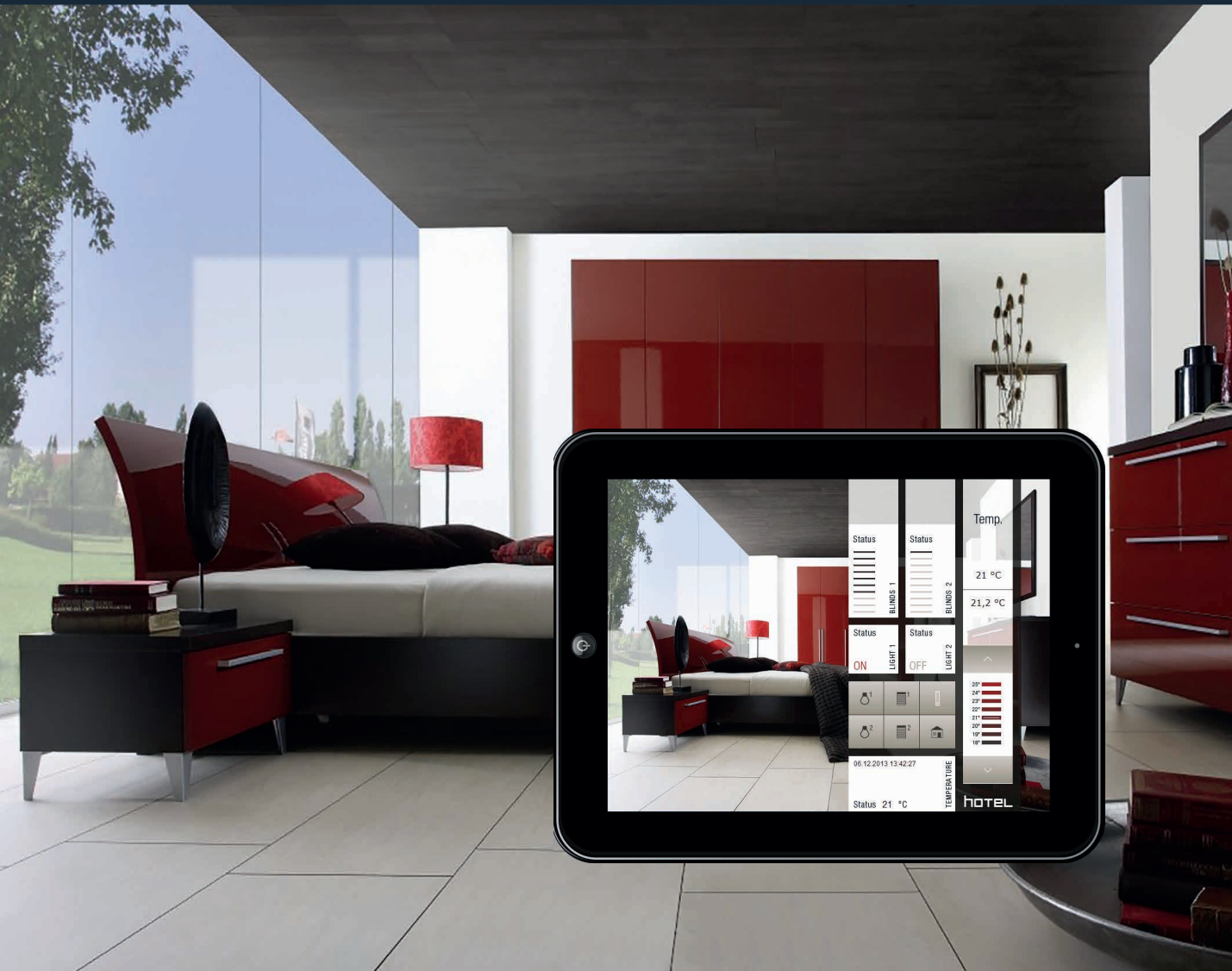




## Advanced controls in web based visualizations

Although the visualization is completely web based, enhanced and sophisticated visualizations can be created. In addition to standard graphical elements like buttons, sliders and images, advanced controls are available too. Using the historical data chart, past value changes of any datapoint within the NETx BMS Server can be shown. This also includes consumption values of smart meters. Furthermore, a server based calendar is available that provides to end users the opportunity to define timers and events. In principle, a standard web browser is sufficient for displaying web based visualizations - the installation of additional software components is not required. For the platforms iOS and Android, dedicated apps called NETx Touch are offered.





## NETx Touch



Visualization, control and operation of a building with a touch screen

- Location-independent operation
- Easy configuration
- Automatic client discovery
- Password protection for configuration pages
- Integration into NETx main/backup environment possible



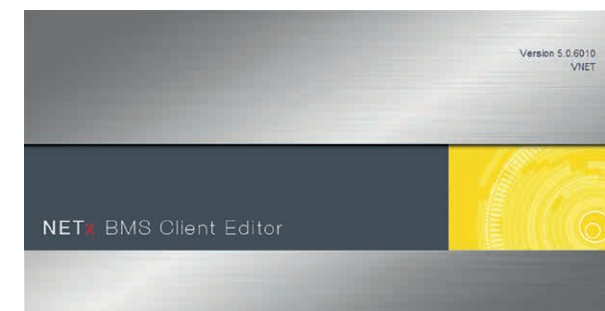
NETx Touch allows the visualization and control of a building on mobile devices with touch screens. NETx Touch is free of charge and offers enhanced functionality that cannot be provided by a standard web browser. In addition, web based visualizations can be integrated into a main/backup solution – if the main server is no longer available, the web based visualization will automatically switch to the backup server.

NETx Touch also provides the opportunity to change the settings for the connection (address of the main and backup server, the name of the NETx BMS Client definition, user name and password) and to save it permanently protected from being changed by the end user. Furthermore, an automatic client discovery service simplifies the configuration. For iOS and Android.





## NETx BMS Client Editor

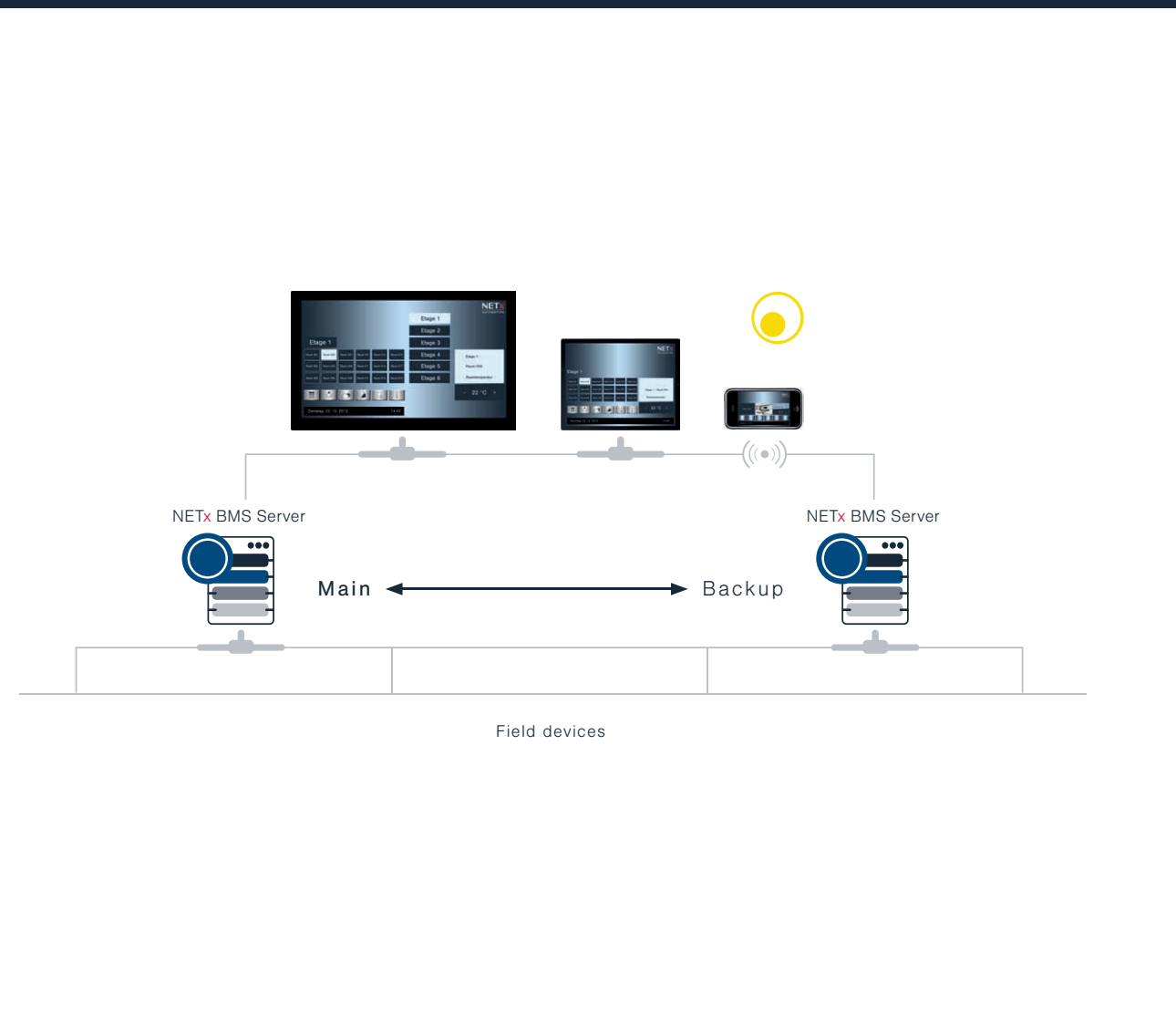


Independent of the project type, each visualization project is created with the NETx BMS Client Editor. It offers highest usability by using drag and drop functionality. Libraries and templates are included and can be extended. User specific buttons can be created using the built-in NETx Button Editor.

## NETx BMS Client for web clients

In addition to the apps mentioned before, any standard web browser can be used for visualization. This platform-independent access to the visualization does not require any additional software installation.

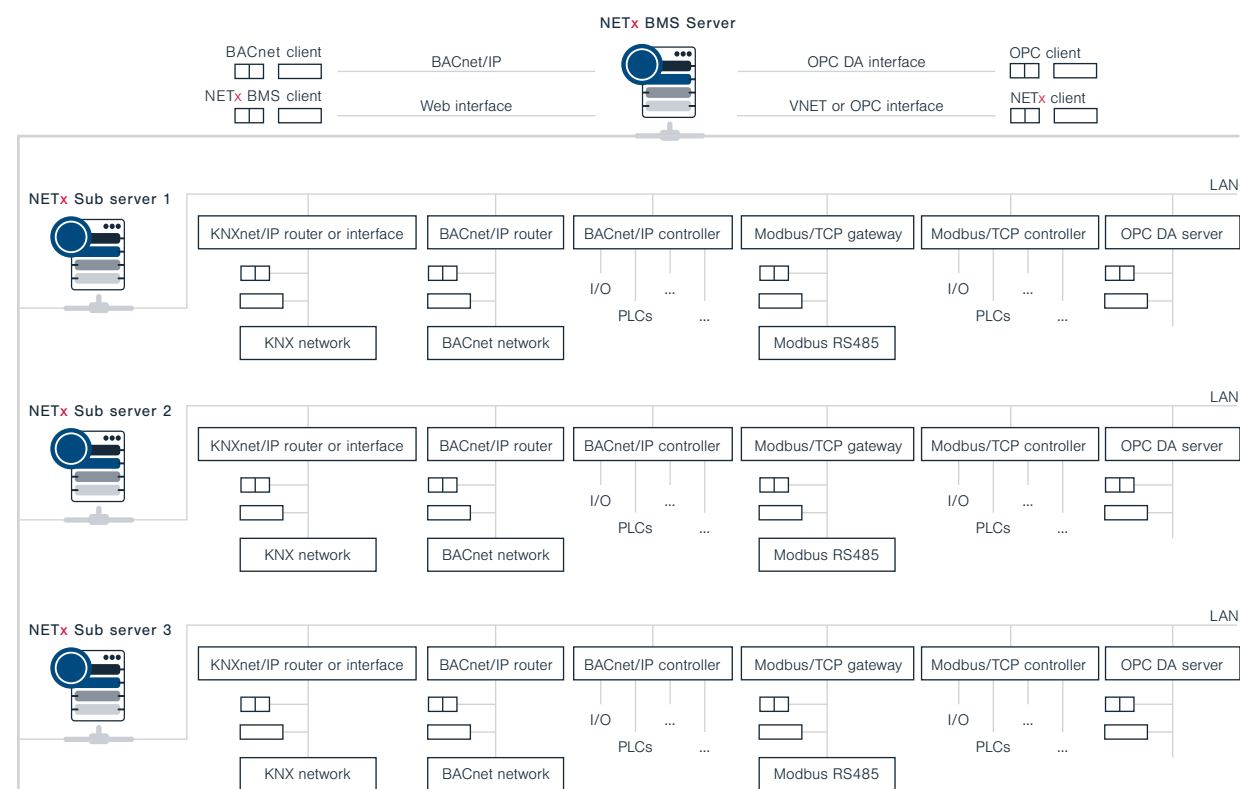




## Main/backup solution

### Reliability through main/backup solution

Reliability is one of the most important requirements in the field of building automation. Therefore, it is possible to integrate the NETx BMS Server as a NETx main/backup solution. Management clients are able to communicate to the main and backup server. If the communication to the main server is interrupted, the connection to the backup server becomes active immediately and the client can continue to receive data from the building automation system. Switching between main and backup server is done in an automatic way - without affecting the application (e.g. visualization) used by the end user. A main/backup solution not only increases the reliability of the system, but also simplifies maintenance. Whenever the configuration of the building automation system has to be changed during operation, the main server has to be switched offline in order to be able to change the configuration. During this configuration procedure, the backup server will remain online and the end user can use the management client without any interruption. Again, the switching is fully autonomous, without user intervention.



## Clustering

### Load distribution using clustering

The cluster module of the NETx BMS Server allows the integration of datapoints from other NETx BMS Servers. This so called clustering provides the opportunity to exchange datapoint values and to distribute the load between different NETx BMS Servers.

Using this concept, a hierarchy of NETx BMS Servers can be defined. A typical use case would be a project with several buildings that are interconnected via a wide area network. Each building has its own NETx BMS Server which acts as sub server for the whole building. To get a global view of all buildings (e.g. within a master visualization), these sub servers can be connected via a central main NETx BMS Server. The advantage is that the sub servers are able to operate in an independent way while the main server is able to aggregate the information of all buildings. Due to the reliable connection between the main and sub servers, the server can be located on different geographical positions. This clustering can also be combined with a main/backup solution in order to get highest reliability.

**System requirements**

**Hardware:**

PC - Intel oder AMD - 1.6 GHz (Multicore recommended)  
 RAM: 2048 MB  
 Hard disk: 4 GB (8 GB recommended)  
 Ethernet interface: 100 MBit/s  
 Screen resolution: 1280 x 1024

**Supported operating systems:**

Windows XP Professional (32 bit) SP 3  
 Windows 7 (32 bit | 64 bit)  
 Windows 8 (64 bit) | Windows 8.1 (64 bit)  
 Windows Server 2008 | 2008 R2 (32 bit | 64 bit)  
 Windows Server 2012 | 2012 R2 (64 bit)

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KNX Association | OPC Foundation  
 BACnet Interest Group Europe



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Software	Maximum datapoints	Included NETx BMS Client licenses	Product-ID
BMS Server STARTER	250	1	S06.02.0.00.01
BMS Server HOME	1,000	3	S06.02.0.00.02
BMS Server BASIC	2,500	5	S06.02.0.00.03
BMS Server PROFESSIONAL	10,000	10	S06.02.0.00.04
BMS Server ENTERPRISE	25,000	10	S06.02.0.00.05
BMS Server CUSTOMIZED	> 25,000	> 10	S06.02.0.00.06
Additional BMS Client			S08.01.0.01.01
		<b>USB-Dongle</b>	Free USB port required
			H00.00.0.00.04

Order number

**Licensed datapoints:**

Number of KNX telegram definitions, KNX device definitions, KNX gateway definitions, BACnet objects, Lon-Works and Modbus datapoints.

For a central high-end visualization, the NETx Voyager is recommended.

All versions are available with:

- **Softlock** (license code)
- **Hardlock** (USB-Dongle)

**It is recommended** to use the **Hardlock version**, since no additional licensing is necessary if the hardware or the operating system is changed.



