

# NETx BMS Platform

## **OPC DA, OPC UA, BACnet IP Server**

Modern building automation systems are distributed systems where the control functionality is spread across a network. Due to the differing requirements of these systems, there is no single technology that can be used to satisfy all needs. As a result, building automation systems are extremely heterogeneous where many different network technologies and communication standards are used.

The aim of the NETx BMS Platform is to solve the problem that arises when heterogeneous building automation systems are used. Located at the management level, the NETx BMS Platform can collect data and information from the building automation system using different technologies, protocols and systems.

## **Multiple standard interfaces to the management level**

## **Bi-directional Multi-Protocol Gateway to field protocols and technologies**

## **Visualization on PC, in Web-browser or on tablet (iOS or Android)**

## **Web Manager for BMS Functions (Alarm management, Trending, Scheduler, Reporting)**

## **Logic engine for complex control functions**

## **SQL database for historical data point values and alarm logs**

## Functions

### Multi-protocol gateway (Integration of different protocols and technologies)

### Interfaces to the management level

#### OPC

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- OPC DA and OPC UA interface for connection to any clients for management and visualization tasks
- Access of the clients to homogeneous data point view of the NETx BMS Server

#### BACnet

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- BACnet/IP interface for creating BACnet objects (NETx BMS Platform acts as BACnet device)
- Access of (third party) BACnet/IP clients to data points (e.g. KNX, Modbus, ...) of the NETx BMS Platform
- Transfer of data point values to third party vendor BMS systems
- COV subscription is supported
- Automatic or manual selection of objects possible

#### oBIX and other Web Service Interfaces for IoT

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- Standardized, open web service interface for home and building automation
- RESTful web service based on http and XML
- Connection to third party systems
- oBIX 1.1 interface supporting HTTP binding and XML encoding
- Supports HTTPS (TLS 1.2) and HTTP basic authentication
- Support for oBIX watches
- Conform to KNX Web Services which provide the possibility to use the NETx BMS Server as a standard conform KNX Web Service gateway

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

- Bi-directional data exchange between different protocols and technologies
- Integration of open protocols like KNX, BACnet, Modbus, OPC, SNMP, MQTT
- Integration of application-specific systems like Oracle Fidelio/Opera, Protel, Infor, Mews, VingCard, Kaba or Salto
- Other interfaces via embedded script engine or .NET API possible
- Automatic conversion for different data types
- Manual conversion via integrated Xlogic engine

### **KNX**

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- Integration of KNX data points over KNXnet/IP tunneling protocol
- Integration of KNX networks using any KNXnet/IP routers and interfaces
- All KNX DPTs are supported
- Easy import from ETS using the NETx BMS
- ESF-import-export for older ETS projects

### **BACnet**

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- Integration of BACnet data points over BACnet/IP client protocol
- Integration of other BACnet media (e.g. BACnet MS/TP devices) over BACnet/IP router possible
- Automatic discovery of BACnet devices via BACnet Explorer
- Besides standard functions COV, BBMD and proprietary BACnet object types are supported
- More details – **BACnet PIC at [www.netxautomation.com](http://www.netxautomation.com)**

### **Modbus**

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- Integration of Modbus data points (coils, discrete inputs, holding registers, input registers) over Modbus/TCP client interface
- Additionally, native Modbus/RTU over TCP and UDP is supported
- Connection to Modbus RTU devices with IP network over IP-to-RS485 converters possible

### **SNMP**

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- Support of SNMP V1, V2 and V3
- Cyclic polling over OID
- Support of SNMP Traps
- Writing of SNMP objects and SNMP device monitoring
- Monitoring hardware (e.g. printer and servers) in offices or computing centers

## OPC DA

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- Integration of data points of third party OPC servers (e.g. fire detection)
- Explorer for simple data import available
- Data exchange with different systems possible

## Data import

### KNX data import from ETS project

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#### NETx BMS App Secure

Import of the whole KNX project incl. all meta information with NETx BMS App Secure KNX group addresses, KNXnet/IP router and interfaces, Security information for secure KNXnet/IP routers and interfaces, ETS project structure incl. network topology (areas, lines, devices and communication objects), building and trade view, export of all KNX data point types (KNX DPTs), export of the configuration of KNX/DALI gateways for NETx LaMPS Module

- NETx BMS App Secure recognizes the configured IP addresses of the KNXnet/IP routers and interfaces
- Automatic assignment of KNX group addresses to KNXnet/IP routers and interfaces
- Integration of multiple ETS projects in one project possible
- Multiple use of the same group addresses is supported (extension of the group address by the IP address of the KNXnet/IP router or interface)
- Available for ETS
- The NETx BMS App Secure can be downloaded separately (<http://www.netxautomation.com/netx/en/products/tools>)

### Import data points (BACnet Objects) from connected BACnet devices

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- The BACnet Explorer is an online discovery tool for discovering BACnet devices and their objects
- Easy import of BACnet configuration data
- The BACnet Explorer is included in the NETx BMS Server by default

### Import of OPC data

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- Import of OPC data with integrated Cluster Explorer from other OPC servers or other NETx BMS Servers
- Data point synchronization per mouse click without deeper understanding of the internal data structure of the server

## **Monitoring and Analysis**

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- NETx Core Server runs as Windows service
- Configuration and maintenance within NETx Core Studio
- Displaying data points (incl. values and properties) as item tree
- Changing data points during run-time possible
- Telegram monitor for monitoring field devices and for analyzing network traffic

## **Adding extended control functionality**

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- Adding new functionalities with graphical function block programming (XLogic Editor) or embedded LUA Script engine
- Access to functions of the NETx BMS Server as well as further processing of the data from the server e.g.
  - Reading and writing values of data points
  - Performing mathematical operations and calculations
  - Sending e-mails
  - Retrieving the server status
- Ready for use control logics included
- Creating virtual data points and specific data structure possible

## **Clustering**

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- Defining a NETx BMS Platform hierarchy
- Exchange of data points between sub servers via Wide Area Network (WAN) possible
- Integration of sub data points in a central main server is supported

## Visualization

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All components for creating and showing visualizations are included in the NETx BMS Platform. The Web Manager of the NETx BMS Platform is used to manage the visualization projects, the users and client connections. It also embeds a web server that provides the web-based visualizations to the web clients. The web engine only uses HTML and JavaScript for the visualization. So, each device with standard web browser can serve as a visualization client.

The BMS Visualization software is a Windows based software. It is used as an editor to create the visualization projects. In addition, it is also used as runtime for PC based visualization clients. The BMS Visualization software uses a TLS secured network connection to communicate with the Core Server of the NETx BMS Platform. Therefore, the BMS Visualization software can be installed and run on any PC with a network connection.

For the platforms iOS and Android, a special app (NETx Vision) is available free of charge. NETx Vision allows the visualization and control of a building via mobile devices with touchscreens.

- Unlimited number of used graphical control elements and pages for each visualization client
- Concept of VARIABLES and TEMPLATES allows fast creation of many pages
- Free designable look and level of details in your visualization project
- Auto scaling, Vector graphics, large library with control elements

## User administration

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The user access rights can be restricted. In addition to the administrator, users with limited rights can be defined. Certain areas of the visualization can be shown individually or hidden for different users.

## Control elements

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For providing a visualization, you can use many different graphical control elements. In addition to labels, buttons, sliders and images, extended elements like analog instruments, Link Area, Multi-Picture, Multi-Internet and RGB Controls can be used.

## **Usability**

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By drag & drop, data points can easily be linked with control elements. Within short time, you can generate and modify professional visualizations. Using self-created components and master pages, customer-specific layouts can be defined in order to define a customized look & feel. User-defined control elements can be grouped and saved as components in libraries. Using this concept, you can use these components again in other projects. Furthermore, the language of the editor can be changed.

## **Multiple views**

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The visualization supports the use of multiple views. These views help to present the visualization to the end user in a clear and structured way. Views can be shown in separated Window dialogs or browser tabs. The use of multiple screens is possible too. Views are available within web based and PC based visualizations.

## **Auto scaling**

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As every Windows PC and device with standard web browser is usable as a visualization client, the screen resolution may vary. Therefore, the PC and web-based visualization supports auto scaling. You do not have to worry about the required resolution before creating your visualization. Your visualization is dynamically adjusted to the resolution of the utilized hardware.

## **Vector graphic**

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Within the visualization, vector graphic like SVG files can be included as background or images for defining the button appearance. In addition, AutoCAD files can be imported. Vector graphic elements have the advantage that they are scaling within showing graphical artifacts.

## **Web Manager for BMS functions and remote Diagnosis**

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The NETx BMS Platform provides a sophisticated web-based user interface for managing the BMS functions. The Web Manager can be accessed by any client with a web browser. To avoid a malicious use of this web interface TLS secured https and user authentication is available. After entering username and password, the Web Manager provides multiple so-called Web Manager Apps.

### **Visualization Manager**

Within this app, the visualization projects are managed, the available devices are configured, the current connections can be monitored, and the available visualization users can be managed. In addition, visualization configurations can be defined. A configuration contains dedicated parameters that influence the behaviour of the visualization runtime (e.g. how alarm notifications are handled) and the user access rights.

### **Alarms**

Within the alarm app, alarms as well as their conditions and actions can be created and managed. To get an overview of alarm states, all currently configured alarms can be visualized within an alarm list. The alarm list is divided into the new list, old list and the history. The presentation of these lists follows the standard VDI/VDE 3699.

### **Schedule**

Within the scheduler, time based as well as so called conditional events can be defined. A time-based event can be a simple timer, a start-stop event or a cyclic event. A condition event triggers an action whenever a dedicated condition is fulfilled. All events can be presented in a list view called event program. Time based events can also be visualized within a calendar view.

### **Trending**

A trend has the aim to store past values of a data point. The NETx BMS Platform stores these historical values within the SQL database. The trending app is responsible for creating and managing these trends. In addition to storing all data point changes, other storing schemes like change of value (COV), sampling, ... are possible too. To analyse these historical values and to present them to the user, trending charts and tables are available. For a deeper analysis, different trends can be combined within a single chart. Comparing values of the same trend for different time periods is also possible.



## **Metering**

The metering module is used to monitor, analyse and process data from smart meters. It is neither restricted to specific sources nor to specific meter types. Any smart meter (KNX, BACnet, Modbus, M-Bus, ...) for integrating data from any resource (electricity, water, air, heating, ...) can be used. All calculated consumption values (hourly, daily, weekly, monthly, yearly) are provided as normal data points. These data points can be used within our visualization or can be forwarded to other management clients via standard interfaces. The metering module collects consumption values from smart meters and save them in an SQL database. Hourly, daily, weekly, monthly or annual consumption values can be shown and exported as a table or chart. The results of the consumption calculations can be exported in different formats (PDF, MS Excel,...). In addition, the values from different meters and/or from different time periods can be compared. The integrated meters can be structured hierarchically using so called cost centers. The assignment of the meters to the cost centers can be made on a percentage base. Based on the selected cost center and the assigned meters, consumption calculations can be carried out.

## **Reporting**

Using the reporting app, reports that show trending and historical data point values are managed. Based on predefined report templates, alarm and trending reports as well as reports for showing DALI testing results can be generated. In addition, so called report instances can be configured that can be triggered by the Scheduler to generate reports in a periodical interval. A sophisticated report designer is also included for generating your own report designs and templates.

## **Diagnosis**

Monitoring the current state of your system is of utmost importance. Therefore, the Web Manager includes a Diagnosis app which can be used to check and observe the system behaviour. The gateway manager shows the connection state of all routers and interfaces used to access the building automation system. The embedded Item Tree can be used to take look at the current data point values and their properties. For analysing problematic and unexpected behaviour, the log files for the Core Server and other system components can be displayed and downloaded.

## **Templates**

Implementing BMS functions for large building automation projects with lots of data points can be a time-consuming task. To speed up the integration process, templates can be used. A template is a generic definition which contains variables. A template does not provide a dedicated function, but it can be used to generate several instances in an automatic way. During the instantiation of a template, an Excel list that contains the values for the template variables must be provided. For each list entry, a definition is created where the variable values are substituted. Using this concept, it is possible to create hundreds or even thousands of alarms, time-based events, trends, ... with just a few clicks.

# Minimum System requirements

## Hardware

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Depending on project size. At least:

- PC: Intel or AMD - 1.8 GHz (multi-core recommended)
- RAM: 16 GB
- Hard disk: 100GB

## Supported operating systems

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- Windows 10
- Windows 11
- Windows Server 2016 (64 bit)
- Windows Server 2019 (64 bit)
- Windows Server 2022 (64 bit)

## Licensing

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Software	Product ID	Data points	Incl. number of NETx visualization clients (PC- or web visualization)
HOME	S12.04.0.00.0001	500	2
BASIC	S12.04.0.00.0002	2.000	2
STANDARD	S12.04.0.00.0003	5.000	2
PROFESSIONAL	S12.04.0.00.0004	10.000	3
ENTERPRISE	S12.04.0.00.0005	20.000	3
BASIC-CUSTOMIZED	S12.04.0.00.0006	on request	on request

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