NETx BMS Server 2.0

Specification

Software solution for a Building Management System (BMS) server that is able to integrate and visualize data points from heterogeneous building automation systems. The software consists of a central server component that collects, process, and changes data point values and a web server used for web-based and platform-independent visualizations.

The server component uses an IP network to get access to the field devices that provide the data point values. To the field/automation level of the building automation system, the following technologies are supported:

- KNX
- BACnet
- Modbus
- SNMP
- OPC Data Access (OPC DA)
- MICROS Fidelio/Opera
- Protel
- VingCard
- Gira HomeServer/FacilityServer
- Integration of other protocols are possible on request.

The KNX interface is using KNXnet/IP tunneling to connect to the KNX network via one or more KNXnet/IP interfaces and/or routers. All official KNX data point types (KNX DPTs) are supported. In addition, proprietary KNX DPTs can be specified on request. The KNX configuration can be imported from ETS using the OPC export function of the ETS or using an ETS App. It is also possible to integrate several ETS project into one single BMS server. If the ETS app is used, the whole ETS project is available within the BMS server (group addresses, KNX communication objects, KNX devices, topology view, building view, trade view). KNX devices can be monitored using a heartbeat mechanism.

The BACnet interface is using BACnet/IP to communicate with BACnet devices and their BACnet objects. Using BACnet/IP routers, any BACnet device from any BACnet media (MS/TP, …) can be integrated. An online discovery tool is provided that can be used to search for BACnet devices and their objects. In addition, the BMS server provides a BACnet server interface that can be used to create BACnet objects. Using this interface any data point (also non BACnet data points) can be mapped to BACnet objects which can be access by other third-party BACnet clients.

The Modbus interface uses Modbus/TCP to access Modbus devices and their data points. Using Modbus TCP gateways, Modbus/RTU devices can be integrated, too. Configuration of vendor specific Modbus implementations (memory layout, register types, Modbus services types to use,

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…) is possible. In addition, the Modbus interface supports native Modbus RTU over TPC/IP or UDP/IP using standard IP-to-RS485 converters.

The SNMP interface supports SNMP version 1, 2, and 3. SNMP data points can be polled on a defined time interval. In addition, processing SNMP traps is also possible.

The MICROS Fidelio/Opera and Protel interface is using the FIAS protocol to include hotel management system. Via this interface, information about the hotel rooms (booking status, rooms status, …) and hotel guests can be retrieved. Information like the room status and message can also be exchanged bidirectional. The MICROS Fidelio/Opera interface is certified by MICROS.

The VingCard interface provides the possibility integrate door looks. Via this interface, door events (guest entrance, staff entrance, door open, door closed, deadbolt thrown) are retrieved.

A bidirectional data change to one or more Gira HomeServers/FacilityServers is possible, too. Using this interface, it is possible to forward information from any supported technology to the Gira HomeServer/FacilityServer.

In addition to this native interface, other protocols like DALI, DMX, EnOcean and M-Bus can be integrated via hardware gateways.

The modular design of the server allows to extend the existing interface with new ones. This can be done using LUA scripting or C# using a .NET API.

All integrated data points can further be processed within the server. It is possible to link data points to each other including automatic data type conversion. In addition, control functionality can be added in order to read, process and change data points independent of the underlying technology. Within a user-defined hierarchy, it is possible to define virtual data points as well as aliases to existing data points. The implementation of this logic can be done via a graphical function block designer or using a built-in LUA script engine.

The processed data points can be provided to management clients via open interfaces. The following management interfaces are supported:

- OPC DA
- BACnet/IP
- Proprietary TCP/IP Interface

Via these interfaces any desired number of management clients can be connected.

The included NETx BMS Studio provides a configuration and maintenance interface for the server. The embedded gateway manager can be used for monitoring the connected gateways and interface devices to the field/automation level. In addition, a telegram monitor provides the opportunity to observe the network traffic in real time. On overview of the online status of the web based visualization clients is also provided. To ease the development and to provide a testing environment, the server can also be started in simulation mode.

The embedded trending module allows to store historical data of selected data points in a Microsoft SQL database. In addition to the value of the data point, important meta-information like the timestamp and the origin of the data change (device address, visualization user, client IP) is also archived.

The included server calendar module can be used as a scheduler. It is possible to define time based events. According to start- and end time of an event, data points are changed and time based actions are triggered - independent of the technology. In addition, the calendar function allows to define recurrences.

A dedicated metering module allows the integration of smart meters. In dependent of the monitored resource (energy, water, heat, …) consumption values are retrieved, recalculated and store in the SQL database. This information can be used by visualization clients to show consumption values on a per day, month or year basis. The use of increasing meters, pulse meters and meters that directly provide delta values is supported.

For large projects with different building parts and projects which multiple buildings are spread across a wide area, multiple servers can be connected via a wide area network (WAN). Using clustering the data and information can be exchanged between these servers bidirectional. It is also possible to create a hierarchy of servers where main servers are able to aggregate data points from different sub servers.

In order to increase data redundancy and reliability, the server can be realized as a hot standby main/backup solution.

Web based visualization

The server also includes a web server which can be used to provide web based visualizations. The web engine is based on pure HTML5 and JavaScript. Therefore, any device with embedded web browser (Windows PCs, Linux PCs, MAC PCs, touch panels, smart phones, ...) can be used as client platform. For Android and iOS devices a dedicated app is available.

The management of the visualization projects and the different visualization clients is done in the BMS studio centrally. Using this way any number of web based visualization clients can be controlled, configured and changed in an easy and effective manner.

The web server supports TLS/SSL in combination with user name/password authentication to secure the communication and access to the different visualization clients.

The web based visualization supports auto scaling. The web server is retrieving the screen resolution of the client devices and recalculates the visualization for each visualization client individually.

The included editor software is used to design the web based visualization projects. Since the visualizations are freely designable, a personal, project-specific look and feel can be created. It

is possible to specify own buttons and control elements which can be stored in libraries for a later reuse in other projects. Using the concept of master pages, templates can be created which contain elements that are common to multiple visualization pages. The included layer management provides the possibility to change different properties (visible/hidden, enabled/disabled) of multiple elements simultaneously. In addition, pop-up windows are available which can be used to show/hide groups of elements as an overlay. Furthermore, an online mode is available in order to test the visualization during the design phase.

In addition to standard elements like labels, buttons, sliders and images, extended elements like Link Areas, Multi-Picture, Multi-Internet and RGB controls are available too. For images, common file formats like jpeg, gif and png with transparency are supported. The historical data chart can be used to display historical data within the web based visualization. In addition to different chart types (lines, splines, bars, areas, …), the user can choose the time interval (daily, weekly, monthly, yearly, user defined) directly within the visualization. The metering chart is an additional control element which displays the consumption values of smart meters that are recorded by the metering module of the server. A graphical element that is used to access the scheduler/calendar of the server is also included. Using this element, time based events can be created and changed directly within the web based visualization.

The included user management provides the possibility to define multiple users with different access rights to the layers of the visualization. In addition, limiting the access to specific modules is possible too.

In combination with the iOS or Android app, support for a main/backup server solution is also provided.

Supplier:

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Product:

NETx BMS Server 2.0

Version: …………

Software protection: …………

Product ID: S06.02.0.00….

Definition of product version:

Number of data points and number of NETx BMS clients

Licensed data points:

Number of KNX group addresses, BACnet objects, Modbus data points, SNMP data points

Software protection:

Hardlock (USB dongle) or softlock (hardware-dependent software code)

Optional:

Backup system

Interface MICROS Fidelio/Opera

Interface Protel

Interface VingCard

Services:

Acquisition data from the engineering tools (e.g. ETS)

Configuration server

Creation of ..... web based visualizations for specified clients, each ..... pages with .... elements on the basis of defined ground planes

Developing functions in logic editor or LUA scripting language

Changes of a ground plan in the visualization

Changes of graphical elements in the visualization

Development of project-specific drivers, interfaces and modules

System requirements:

The following operating systems are currently supported:

- Microsoft Windows 2008 R2 Server 64bit
- Microsoft Windows 2012 Server 64 bit
- Microsoft Windows 2012 R2 Server 64 bit
- Windows 7 32/64 bit
- Windows 8 64 bit
- Windows 8.1 64 bit
- Windows 10

Additional requirements:

.NET Framework: 3.5

.NET Framework 4.0 or higher

Hardware:

Processor: Intel or AMD 1.8 GHz (Multicore recommended)

Ram: 4 GB or more

Harddisk space: 16GB (32 GB recommended)

Ethernet card 100 MBit

The following license types are available:

Software	Product ID	Max. data points	NETx BMS Client licenses included*
STARTER	S06.02.0.00.01	250	1
HOME	S06.02.0.00.02	1,000	3
BASIC	S06.02.0.00.03	2,500	5
PROFESSIONAL	S06.02.0.00.04	10,000	10
ENTERPRISE	S06.02.0.00.05	25,000	10

Larger licenses on request

* additional NETx BMS Client licenses can be ordered with the product ID S08.01.0.01.01.