

Enterprise Server

EcoStruxure Building Operation

EcoStruxure™ Building



Introduction

An EcoStruxure BMS server is the core of the system and performs key functionality, such as control logic, trend logging, and alarm supervision. The Enterprise Server collects site-wide data for aggregation and archiving, and serves as a single point of administration through WorkStation or WebStation for the EcoStruxure BMS, Schneider Electric's Intelligent Building Management System.

Features

The Enterprise Server is a central point in the EcoStruxure BMS architecture from which users can configure, control, and monitor the system.

Semantics

Enterprise Server and Enterprise Central come with built-in support for modelling of the “digital twin” of the building, site, campus, and region using Brick Schema. WorkStation and WebStation provide enhanced human understandability through the additional context that is given to alarms and points through the “digital twin”. The required graph database is included in the installation packages. WorkStation can be used to create the model, or it can be imported using the graph database user interface.

Networking powerhouse

The Enterprise Server can run multiple control programs using a variety of protocols. It can manage alarms, users, schedules, and trend logs. Data from the Enterprise Server can be delivered

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directly to the user or to other EcoStruxure BMS servers and field devices throughout the site or enterprise.

Global view of the system

The entire site, including all of the field servers and their associated devices, can be accessed and configured through the Enterprise Server.

This overview of the site provides easier mass change engineering and data analysis. The Enterprise Server also aggregates the event and alarm data from all its associated field servers. Trend logs can be aggregated through the use of extended trend logs.

Text and graphics-based programming tools

Unique to the industry, the EcoStruxure BMS servers have both Script and Function Block programming options. This flexibility helps assure that a suitable programming method can be selected for the application.

Centralized alarms and data management

Alarms from multiple devices throughout the site, including field servers, are collected by the Enterprise Server for centralized logging, display, and management. Users can also view event logs and trend logs from multiple servers.

The Enterprise Server hosts the historical and configuration databases. These databases store current information, including trends, alarms, user activity, and property information. Alarms can trigger email, SNMP, file, or client notifications, which can include alarm, point value, or trend log data. Notifications can also be triggered periodically by schedules or other binary values.

EcoStruxure BMS servers can be configured to automatically store all historical data, trend log data, event log and audit trail data, in an external database. If data needs to be available for longer periods of time, an external log storage can be incorporated into the EcoStruxure BMS without the need for extensive engineering work. The supported databases are TimescaleDB, which is built on PostgreSQL, and Microsoft SQL Server. The data in the external log storage is available natively to the viewers built into the EcoStruxure BMS clients and to the built-in reporting functionality.

You can use the powerful Log Processor functionality for custom processing of trend data for viewing in charts, dashboards and for inclusion in reports. The Log Processor enables advanced calculations on one or multiple trend logs and point values.

Examples of advanced calculations:

- Energy usage normalization
- Virtual submeters and summaries
- Calculation of Mean Kinetic Temperature

- Unit conversions
- Average, maximum, and minimum over custom periods

The output of the Log Processor can be saved in the database, including the External Log Storage or calculated automatically on demand.

AVEVA PI System support

Selected trend logs and the event log can be sent to AVEVA PI System directly without the need for intermediate storage or specialized PI System connectors. The EcoStruxure BMS server can also be the front-end client to AVEVA PI System and obtain data from the PI System that can be included in reports, graphics, and dashboards.

Meter management

With the meter management functionality, EcoStruxure Building Operation offers improved methods to ensure data is accurate and meter changes are automatically detected. In addition, purpose-built functions enable easier handling of the following concepts:

- Aggregations
- Virtual metering
- Apportioned metering
- Unit conversions

Meter hierarchies enable powerful visualization of sub-meter structures or categorizations. A web-based editor with intelligent help functions enables efficient construction of meter hierarchies.

Normalization and signatures

The normalization functions help with benchmarking, and the signature function enables automation and/or alerting when resource usage is too high or low. This enables early detection of faulty equipment and misused building functions, resulting in energy savings and higher occupant satisfaction.

The system includes easy-to-use tools for regression analysis and powerful methods for time-period classification, that is, differentiation of workdays versus holidays.

Change control

Using the built-in security features within the EcoStruxure BMS software, you can comply with regulations related to restricting access to authorized and qualified individuals and with full audit trail. In addition, the built-in access and security settings can be enhanced by applying further restrictions and limit access by time-of-day or geographic location.

The change control features extend the basic activity logging provided by the EcoStruxure BMS software by enhancing the

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functionality of the standard log, enabling efficient and fully configurable change control with the following features:

- Single or dual electronic signature application
- Change control that can be restricted only to specific objects in the system
- Change control that can easily be applied to all objects
- Every associated action is logged with the parameter that was changed
- Before and after parameter values including meta data

For each signature event, the change control signatures contain:

- The unique identifier of the person executing the signature
- The full name of the user who performed the action
- The geographical date and time stamp
- The meaning of the signature, such as approval, review, responsibility, and authorship

Reporting

The EcoStruxure BMS servers provide built-in functionality for basic reporting that can deliver reports in any text format and XLSX, without any dependencies to other external software. Reports for XLSX can be enriched by using advanced functionality such as formulas, conditional formatting, charts and sparklines.

Reports can be generated on schedule, on an alarm event or other custom conditions, and you can get the output delivered via email or written to file.

Using Enterprise Server and Enterprise Central, reports can be converted to PDF, and you can elevate the data security and traceability even further by automatically signing PDF reports with a digital certificate upon generation. This validates that the content has not been altered after the report was generated.

Authentication and permissions

An EcoStruxure BMS provides a powerful permission system that is easy to manage, flexible, and adapts to all kinds of system sizes. The permission system provides a high standard of authentication. Authentication is done against the built-in user account management system, against Windows Active Directory Domains, or via SAML 2.0 single sign-on. The built-in account management system allows an administrator to establish password policies that meet stringent cybersecurity guidelines. In addition, multi-factor authentication (MFA) according to RFC 6238 is supported and enforceable. Applications such as Google Authenticator and Microsoft Authenticator can be used as part of the user authentication. When Windows Active Directory or SAML 2.0 authentication is used, the administration costs are lower because users do not have to be managed in multiple directories.

Windows Active Directory authentication is only available in Enterprise Server for Windows. Enterprise Server for Linux supports authentication via the built-in account management system and SAML 2.0.

Advanced activity log

It is important to log more than basic activity. In an EcoStruxure BMS, every action is logged with a timestamp, the user who performed the action, and the values that were changed.

WorkStation/WebStation interface

Through any client, the user experience is similar regardless of which EcoStruxure BMS server the user is logged on to. The user can log directly on to an Enterprise Server to engineer, commission, supervise, and monitor the field servers with their attached Central IO modules, field controllers, and other field devices. For more information, see the WorkStation and WebStation specification sheets.

Open building protocol support

One of the cornerstones of the EcoStruxure BMS is support for open standards. The Enterprise Server can natively communicate with some of the most popular standards for buildings: BACnet (including BACnet/SC), OPC UA Client, LonWorks, and Modbus.

Native BTL-listed BACnet support

The Enterprise Server communicates directly to BACnet/IP networks. The Enterprise Server is BTL-listed as a BACnet Building Controller (B-BC), the most advanced BACnet device profile, and as a BACnet Operator Workstation (B-OWS). This capability provides access to the full range of BACnet devices from Schneider Electric and other vendors. See the BTL Product Catalog for up-to-date details on BTL listed software revisions on BACnet International's home page. The Enterprise Server can also serve as a BACnet Broadcast Management Device (BBMD) to facilitate BACnet systems that span multiple IP subnets.

BACnet/SC (Secure Connect) support

The Enterprise Server and field servers support BACnet/SC applications as a BACnet/SC node, hub, and router. This allows the Enterprise Server and field servers to be in BACnet/SC networks and support applications that connect BACnet/IP or MS/TP networks with BACnet/SC networks. A major benefit of BACnet/SC is that it allows more secure transport of BACnet traffic and information between BACnet/SC devices over private and public networks without the need for BBMDs, VLANs, and VPNs, because the BACnet/SC protocol uses WebSocket technology and TLS 1.3 encryption. In addition, BACnet/SC uses certificate management to help ensure only those devices authorized to be on a BACnet/SC network can operate on that network.

Native OPC UA Client support

OPC UA Client functionality is natively supported in Enterprise Server and field servers, enabling powerful and high-capacity

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integration of devices or systems that have OPC UA Server capability. OPC Unified Architecture (OPC UA) is a standard originating from industrial automation and process control that provides methods intended to provide improved security, performance, and engineering efficiency. With OPC UA Client support, the EcoStruxure BMS software can monitor and control a wide variety of devices or systems, from Schneider Electric as well as from other companies.

Native LonWorks support

The Enterprise Server works with a range of LonTalk adapters to communicate to TP/FT-10 LonWorks networks. Integrated LonWorks functionality enables access to LonWorks devices from Schneider Electric and other vendors. LonWorks networks can be commissioned, bound, and configured from the Enterprise Server using the built-in LonWorks Network Management Tool. No third-party tools are needed. To increase ease of use, LNS device plug-ins are supported. This allows for easier engineering and maintenance of LonWorks devices from Schneider Electric and other vendors. There are some limitations on how LNS device plug-ins can be used.

Native Modbus support

The Enterprise Server and field servers natively integrate Modbus RS-485 client and server configurations, as well as Modbus TCP client and server. This allows full access to third-party products and the range of Schneider Electric products that communicate on the Modbus protocol, such as power meters, UPS, circuit breakers, lighting controllers, and emergency lighting.

Modbus device types are pre-configured Modbus applications for quick and easy Modbus device integration in EcoStruxure BMS solutions.

Web Services support

The Enterprise Server supports the use of Web Services based on open standards, such as SOAP and REST, to consume data into the EcoStruxure BMS. Use incoming third-party data (temperature forecast, energy cost) over the Web to determine site modes, scheduling, and programming.

EcoStruxure Web Services support

EcoStruxure Web Services, Schneider Electric's Web Services standard, is natively supported in the EcoStruxure BMS servers. EcoStruxure Web Services offers extra features between compliant systems whether within Schneider Electric or other authorized systems. These features include access to semantic model, system directory browsing, read/write of current values, alarm receipt and acknowledgement, and historical trend log data. EcoStruxure Web Services requires user name and password to log on to the system.

MQTT IoT protocol support

The Enterprise Server and field servers support MQTT as an option for publishing data to, and receiving updates from, other

systems. MQTT is a messaging transport protocol that with its small footprint, light bandwidth utilization, and simplicity, is ideal for M2M and IoT communication. The MQTT capability supports communication with any MQTT broker, for example, Amazon, Microsoft, Google or IBM.

IT friendly

The EcoStruxure BMS servers communicate using the networking standards. This makes installations easy, management simple, and transactions more secure.

Supported Protocols

- IP addressing
- TCP communications
- DHCP for easy network configuration
- DNS for simple lookup of addresses
- HTTP/HTTPS for internet access through firewalls, which enables remote monitoring and control
- NTP (Network Time Protocol) for time synchronization throughout the system
- SMTP or SMTPS with support for SSL/TLS based authentication, enables sending email messages triggered by schedule or alarm
- SNMP enables reception of application alarms in designated network management tools
- WebSocket Secure (WSS) and TLS 1.3 encryption (BACnet/SC applications)

TLS support

Communication between clients and the EcoStruxure BMS servers, and between EcoStruxure BMS servers, can be encrypted using Transport Layer Security (TLS). The servers are delivered with a default self-signed certificate. Commercial Certification Authority (CA) server certificates are supported to lower the risk of malicious information technology attacks. Use of encrypted communication can be enforced for both WorkStation and WebStation access.

Software Licensing Model

EcoStruxure BMS software version 7.0 offers a simplified and centralized licensing model which allows for one-time, single-step activation of a system license deployed at the top level server of the system, thus removing the need for license engineering on each server in the system. This provides considerable time savings during the initial commissioning as well as during any future upgrade of the system.

System capabilities are available in a three-tier model: Essential, Advanced, and Advanced Plus. Select the tier that matches your business needs, and everything will then be bundled into the centralized system license and inherited across all servers in

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your system architecture, including Enterprise Central, Enterprise Server, and field servers.

The centralized licensing model combined with the three-tier capability model provides a uniquely easy-to-manage system throughout the lifecycle. Among other benefits, this gives the ability to remotely manage the capability tier as business needs evolve and to facilitate expansion as the system grows with added servers and connected devices.

Configuration of software licenses is done through EcoStruxure Power & Building Software Companion, accessible by EcoXpert™ partners and Schneider Electric representatives. It provides the ability to select architecture and tier options as well as manage license evolutions throughout the lifecycle of the system.

For more information on the three-tier system capabilities, see the Schneider Electric website, www.se.com.

Specifications

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Hardware requirements

Processor power, memory, and storage capacity should be scaled upwards to accommodate targeted system size as impacted by the total quantity of automation servers and expected historical archiving. Enterprise Server is tested on many different servers with varying configurations. The typical configuration is an 8-core 3.6 GHz processor, 32 GB of memory, and SSD storage capacity of 1 TB.

Processor	Minimum: Intel Core i5 @ 2.0 GHz or equivalent Recommended: Intel Core i5 @ 3.0 GHz or better
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Memory	Minimum: 8 GB Recommended: 16 GB or higher
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Storage capacity	Minimum: 100 GB Recommended: 1 TB
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Storage device	Recommended: Enterprise Solid State Drive (SSD)
An Enterprise SSD is recommended to maintain the necessary speed and stability. The database and the binaries should both be installed on the Enterprise SSD.	

Other devices	Microsoft mouse or compatible pointing device is required.
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Software requirements

Operating systems – Enterprise Server for Windows	Microsoft Windows 10 (64-bit) ^a Microsoft Windows 11 Microsoft Windows Server 2016 Microsoft Windows Server 2019 (not supported for I/NET integrated system) Microsoft Windows Server 2022 (not supported for I/NET integrated system) Microsoft Windows Server 2025 (not supported for I/NET integrated system)
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a) Tested with version 7.0.2 and earlier of the EcoStruxure Building Operation software.

The following Microsoft Windows 10 editions are supported: Pro and Enterprise.

The following Microsoft Windows 11 editions are supported: Pro and Enterprise.

The following Microsoft Windows Server 2016 editions are supported: Datacenter, Standard, and Essentials.

The following Microsoft Windows Server 2019 editions are supported (not supported for I/NET integrated system): Datacenter, Standard, and Essentials.

The following Microsoft Windows Server 2022 editions are supported (not supported for I/NET integrated system): Datacenter, Standard, and Essentials.

The following Microsoft Windows Server 2025 editions are supported (not supported for I/NET integrated system): Datacenter, Standard, and Essentials.

Operating systems – Enterprise Server for Linux	OCI compliant container runtime on Linux x86-64
Quality assurance testing has been performed on, and support is provided with, Ubuntu 20.04 and 22.04 with Docker Engine. Other deployment scenarios have not been tested by Schneider Electric. Product Support Services may require that potential issues can be reproduced in tested and supported environment for full support.	

Required additional software – Enterprise Server for Windows	Microsoft .NET Framework 4.7.2 and later
The Microsoft .NET Framework is required by Software Administrator.	

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External log storage PostgreSQL option

Supported versions of PostgreSQL (www.postgresql.org) with matching version of TimescaleDB extension (www.timescale.com).
Note: To use compression for trend data, TimescaleDB 2.11 or later is required.

Quality assurance testing has been performed by Schneider Electric with TimescaleDB and PostgreSQL installed natively in Windows 10, Windows Server 2012, 2016, and 2019. Other deployment scenarios have not been tested by Schneider Electric.

External log storage Microsoft SQL option

Microsoft SQL Server versions under full support by Microsoft (www.microsoft.com).

The following Microsoft SQL Server editions are supported: Enterprise, Standard, and Express.

External log storage AVEVA PI System option

PI Web API 2021 SP3 and database compatible with that version

Quality assurance testing has been performed by Schneider Electric with PI Web API 2021 SP3, and database compatible with that version, installed on Windows Server 2019. Other deployment scenarios have not been tested by Schneider Electric.

Communication

TCP Binary, port fixed, 4444

HTTP Non-binary, port configurable, default 80

HTTPS Encrypted supporting TLS 1.3, 1.2, 1.1^a, and 1.0^a, port configurable default 443

a) Disabled by default.

WSS^a Encrypted supporting TLS 1.3, port configurable

a) BACnet/SC applications

SMTP Email sending, port configurable, default 25

SMTPS Email sending, port configurable, default 587

SNMP version 3
Application alarm distribution using trap

NTP Time synchronization

BACnet BACnet/IP, port configurable, default 47808
BACnet/SC, port configurable, no default port
BTL B-BC (BACnet Building Controller)^a
BTL B-SCHUB (BACnet Secure Connect Hub)^a
BTL B-OWS (BACnet Operator Workstation)^a

a) See the BTL Product Catalog for up-to-date details on BTL listed firmware revisions on BACnet International's home page.

OPC UA Client

Profile group UACore 1.03 Core Client Facet, Base Client Behaviour Facet^a, AddressSpace Lookup Client Facet, Attribute Read Client Facet^a, Attribute Write Client Facet^a, DataChange Subscriber Client Facet^a, Method Client Facet, UA-TCP UA-SC UA-Binary, SecurityPolicy – Basic256, SecurityPolicy – Basic256Sha256, User Token – Anonymous Facet, User Token – User Name Password Client Facet, DataAccess Client Facet, Base Event Processing Client Facet, Historical Access Client Facet, A & C Alarm Client Facet, and A & C Address Space Instance Client Facet.

a) Partly supported. See technical literature for more information.

Modbus

Modbus TCP, client and server
Modbus RTU and ASCII, RS-485, client and server^a

a) Enterprise Server for Linux supports Modbus TCP but not Modbus RTU or Modbus ASCII.

MQTT

MQTT over TLS, port configurable, default 8883
MQTT over TCP, port configurable, default 1883
MQTT over WebSocket Secure (WSS), port configurable, default 443
MQTT over WebSocket (WS), port configurable, default 80

Supports the following LonTalk adapters:

NIC709-PCI
NIC709-USB
NIC709-USB100
NIC709-IP
NIC852

Other protocols may be used for particular additional functionality. See Technical Documentation.

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LNS

LNS version

OpenLNS

Installed on WorkStation PC

LonMark

Resource files version

14.00

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