Lutron/Schneider Electric® BACnet Integration

Schneider Electric

Quantum System Overview

Tablet with
Q-Control+ App

GreenGlance client

Personna PC
web-based software

Corporate
Building
Network

Quantum server

Quantum Vue
client

StruxureWare™
Automation Server

Lighting management hub
(floor 2)

Lighting management hub
(floor 1)

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ASHRAE does not endorse, approve or
test products for compliance with ASHRAE
standards. Compliance of listed products to
the requirements of ASHRAE Standard 135 is
the responsibility of BACnet International (BI).
BTL is a registered trademark of BI.

The Lutron Quantum system is the total light management system that incorporates lighting controls, motorized window shades, digital ballasts and LED drivers, centralized dimming and switching panels, and sensors together under one system/software umbrella. It is a processor-based system and the processor(s) reside in the hubs shown in the diagram above. In a typical building, you will typically have at least one hub per floor connected over the building network or a dedicated network for the lighting system.

The Quantum system can seamlessly and reliably integrate with other building systems. The BACnet/IP protocol is the primary means of integration. BACnet is embedded or native in the Quantum processors, which means no external interfaces or gateways are required in order to communicate with other systems. Only a single point of connection is needed on the Quantum network for total and complete communication to the entire system. The diagram above shows a Quantum server. The server is used for historical data logging for the reports used in the Quantum software. It is NOT required for BACnet integration. Only a Lighting Management Hub is required.
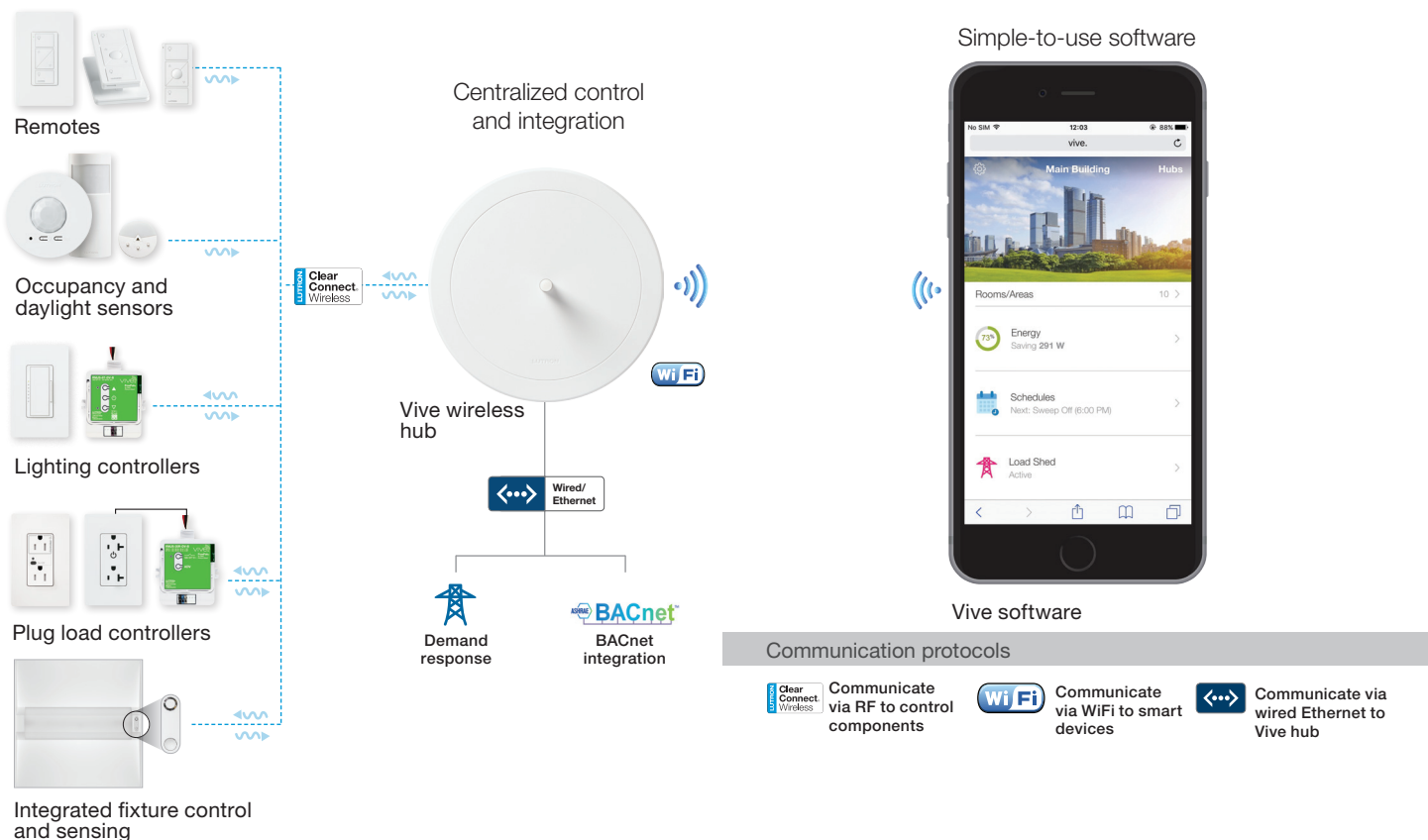
Additionally, the Quantum system has been tested by BACnet Testing Laboratories (BTL) and is certified to comply with ASHRAE Standard 135.

For more information on the Lutron Quantum system, please refer to the Quantum brochure: www.lutron.com/TechnicalDocumentLibrary/367-1321_Quantum_Brochure.pdf. For more detailed technical information on the Lutron Quantum system, please refer to the Quantum section of the Lutron Residential and Commercial System Rules: www.lutron.com/TechnicalDocumentLibrary/369821_Lutron_Residential_and_Comerical_System_Rules.pdf

Vive System Overview

Wireless controls and sensors

Remotes

Occupancy and daylight sensors

Lighting controllers

Plug load controllers

Integrated fixture control and sensing

Centralized control and integration

Clear Connect Wireless

Vive wireless hub

Wi Fi

Wired/Ethernet

Demand response

BACnet integration

Simple-to-use software

Vive software

Communication protocols

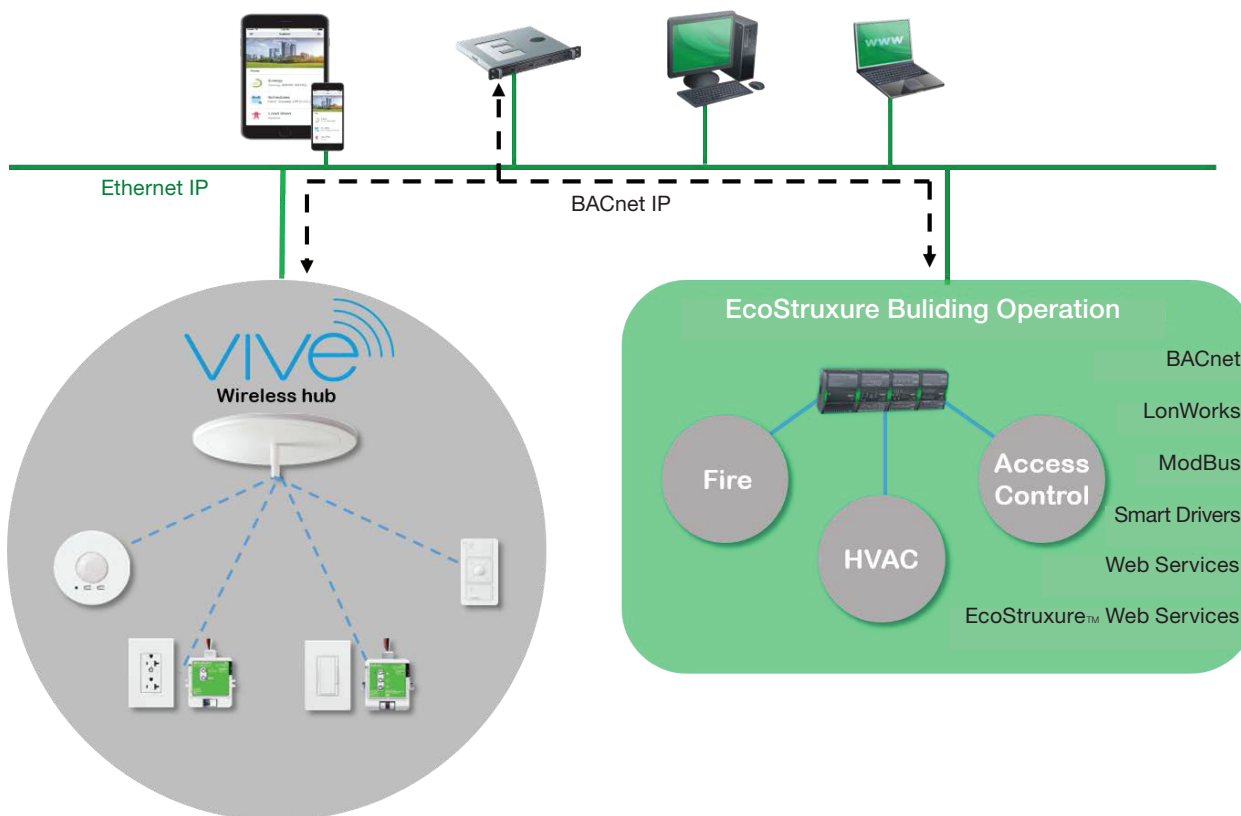|		
Clear Connect Wireless	Communicate via RF to control components	
Wi Fi	Communicate via WiFi to smart devices	
‹•••›	Communicate via wired Ethernet to Vive hub	

The Lutron Vive system is the premier simple and scalable retrofit lighting control solution for commercial office buildings. The system consists of: a centralized main controller called the Vive wireless hub; wireless load controllers for lighting loads throughout the space; wireless wall controls, occupancy sensors, and daylight sensors; and intuitive programming and monitoring software to tie the solution together. The individual load controllers communicate directly with their controlling remotes and sensors, but also communicate back to the Vive wireless hub via Lutron ClearConnect wireless technology. This allows for energy monitoring, timeclock events, and demand response functionality. In a typical building, you will have at least one Vive wireless hub per floor (or more depending on size and coverage requirements) connected over the building network.

The Vive system can seamlessly integrate with other systems in the building via BACnet/IP protocol. BACnet is embedded or native in the Vive wireless hub. Connection is required to each of the Vive wireless hub(s) for control of the Vive system.

For more information on the Lutron Vive system, please refer to the Vive brochure: www.lutron.com/TechnicalDocumentLibrary/367-2597_Vive_Design_Guide.pdf. For more detailed technical information on the Lutron Vive system, please refer to the Vive section of the Lutron Residential and Commercial System Rules: www.lutron.com/TechnicalDocumentLibrary/369821_Lutron_Residential_and_Commerical_System_Rules.pdf

Schneider Electric® SmartStruxure™ System Overview

The SmartStruxure™ solution enables monitoring, measuring, and optimization of the building's performance throughout its life cycle — saving energy while saving money. SmartStruxure™ integrated building management system solution facilitates the exchange and analysis of data from energy, lighting, fire safety, and HVAC. SmartStruxure™ solution provides native support for LON, BACnet, Modbus, Web Services, and Schneider Electric® EcoStruxure™ Web Services for seamless integration with existing and emerging technologies.

StruxureWare™ Building Operation, the software that powers SmartStruxure™ solution, provides integrated monitoring, control, and management of all connected systems. It is a centralized system with distributed intelligence that optimizes facility performance. It is easy-to-use with robust functionality that leverages prior investments with Schneider Electric.

The Enterprise Server is the Windows® application version of a StruxureWare™ Building Operation Server that collects site-wide data for aggregation and archiving, yet is flexible enough to run stand-alone applications. The Enterprise Server also serves as a single point of administration through WorkStation, WebStation and Mobile Application. Reports Server software is included with the Enterprise Server and enables advanced reporting capabilities.

WorkStation is the interface where users and engineers access their Automation Servers and Enterprise Servers. You can view and manage graphics, alarms, scheduling, trend logs, and reports. Engineers can configure and maintain all aspects of the StruxureWare™ Building Operation software.

WebStation provides a portable, fully functioning user interface to access the Automation and Enterprise Servers using a web browser. Users can view and manage graphics, alarms, schedules, trend logs, and reports. User accounts can be created, edited, or removed. WebStation is built in with every Automation Server and Enterprise Server.

The Technician Tool Mobile Application is a user interface for day-to-day operation of StruxureWare™ Building Operation software. Technician Tool can connect to Automation Servers and Enterprise Servers, and provides easy access to the system from anywhere in the world. Users can view and manage values, alarms, schedules, and trend logs lists.
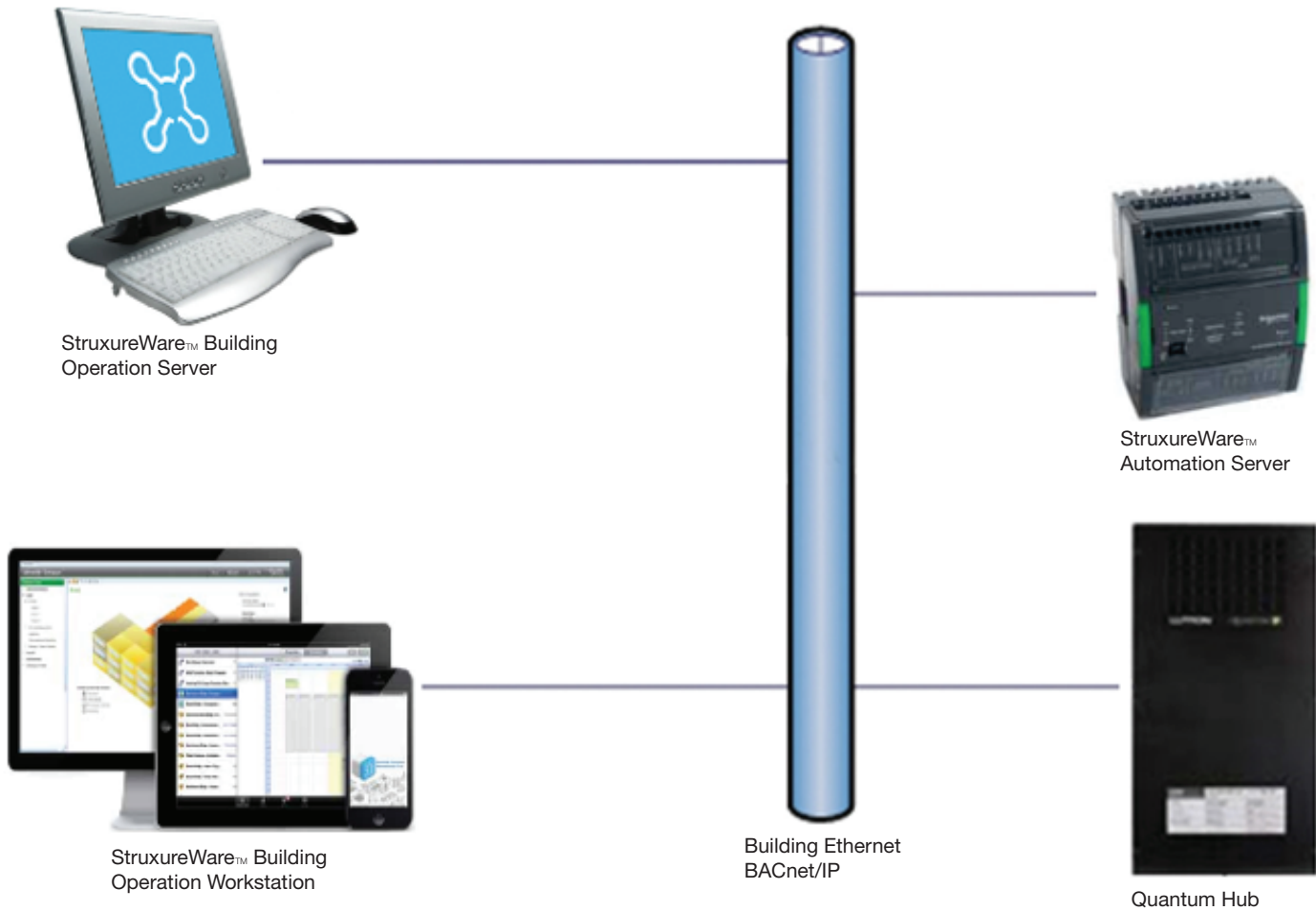
Web Services enable systems to easily connect with one another and share information securely across the internet using standard HTTP and XML-based protocols. Examples: weather forecasts and utility prices.

EcoStruxure™ Web Services provide common and easy integration between Schneider Electric® products. It has additional functionality, including browsing the other system's exposed objects, Read/Write real time values, receive and acknowledge active alarms, read historical (trend log) data. They can be used with third parties if the standards are implemented.

Integration Overview

The Schneider Electric® SmartStruxure™ solution can be used to monitor and control the Lutron Quantum or Vive system using the BACnet protocol. The BACnet protocol is a non-proprietary open communication software standard published by ASHRAE.

Quantum Topology

StruxureWare™ Building
Operation Server

StruxureWare™
Automation Server

StruxureWare™ Building
Operation Workstation

Building Ethernet
BACnet/IP

Quantum Hub

Communication Protocol

- Communication between Schneider Electric® SmartStruxure™ and Lutron is BACnet/IP
- BACnet/IP uses Broadcast UDP and Peer-to-Peer UDP on any standard Ethernet network
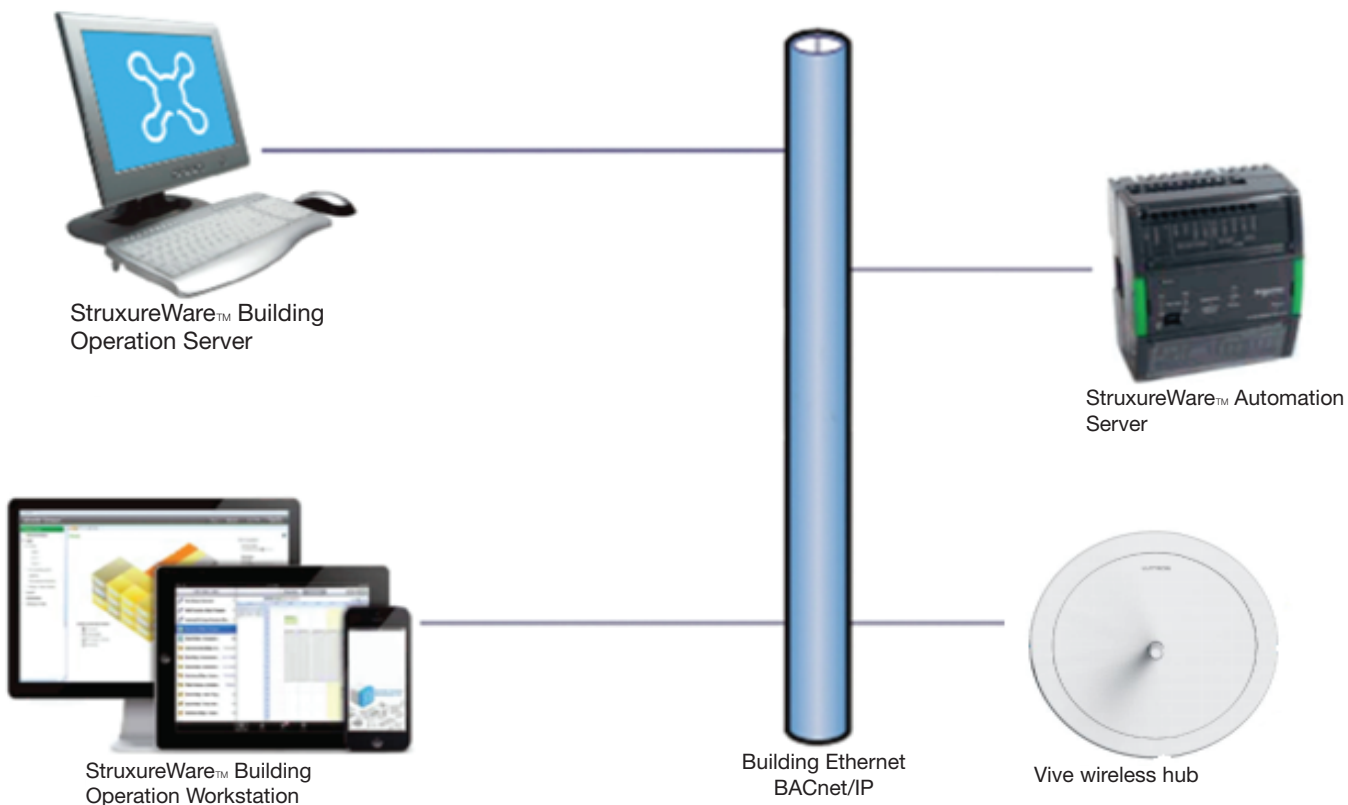
BACnet Testing Laboratories Listing

Schneider Electric and Lutron devices are BTL Listed:

- Schneider Electric servers are BTL-Listed as B-BC and B-OWS
- Lutron Quantum Lighting Control Processor is BTL Listed as B-ASC

Vive Topology

StruxureWare™ Building
Operation Server

StruxureWare™ Automation
Server

StruxureWare™ Building
Operation Workstation

Building Ethernet
BACnet/IP

Vive wireless hub

Communication Protocol

- Communication between Schneider Electric® SmartStruxure™ and Lutron is BACnet/IP
- BACnet/IP uses Broadcast UDP and Peer-to-Peer UDP on any standard Ethernet network

BACnet Testing Laboratories Listing

Schneider Electric devices are BTL Listed:

- Schneider Electric servers are BTL-Listed as B-BC and B-OWS
- BTL listing for Vive hub is currently pending. Please see the Vive hub spec submittal (P/N 369902) at www.lutron.com for the latest information.

How to Set Up Integration:

What needs to be done in the Lutron Quantum system

1. BACnet is native to the Quantum processor. However, in order to enable this capability, a BACnet software license must be purchased for the job.

2. With the BACnet software license, the Lutron service representative will turn on the BACnet capability during setup. Only one processor per subsystem (e.g. floor) will be enabled. This processor will act as the master for all BACnet communications for the subsystem. Multiple subsystems will often be present in a single system.

3. If the Quantum processor and Schneider Electric® systems are not on the same subnet, a BACnet Broadcast Management Device (BBMD) is required by the integrator. The Quantum processor supports foreign device registration of BBMD. The IP address and port of the BBMD should be given to the Lutron field service representative during setup (if required). The Schneider Electric® SmartStruxure™ servers support BBMD.

4. The Lutron BACnet virtual network, which represents the areas in the Quantum system, must be set to a different BACnet network number than the BACnet/IP network the Schneider Electric and Lutron systems are connected to, so that location of a specific instance is possible on an internetwork. Coordinate with the Schneider Electric representative on-site.

5. The Lutron Quantum system's device instance numbers must be set uniquely on the network. Coordinate with the Schneider Electric representative on-site.

What needs to be done in the Lutron Vive system

1. BACnet is native to the Premium Vive wireless hub (HJS-2) only. This part must be onsite for BACnet integration.

2. BACnet is disabled by default, and must be enabled. The BACnet programming menu can be accessed from main Vive Vue Dashboard > Gear Icon > Hub Details > BACnet Programming.

3. If the Vive and Schneider Electric systems are not on the same subnet, a BACnet Broadcast Management Device (BBMD) is required by the integrator. The Vive wireless hub supports foreign device registration of BBMD. The IP address and port of the BBMD should be given to the Vive programmer during setup (if required). The Schneider Electric SmartStruxure Servers support BBMD.

4. The Lutron BACnet virtual network, which represents the areas in the Vive system, will need to be set to a different BACnet network number than the BACnet/IP network the Schneider Electric and Lutron systems are connected to. The "Network number" in the "BACnet Programming" screen in the Vive Vue software is the virtual network number and can be modified here. Coordinate with the Schneider Electric representative on-site.

5. The Lutron Vive system's device instance numbers must be set uniquely on the network. Coordinate with the Schneider Electric representative on-site.

What needs to be done in the Schneider Electric® SmartStruxure™ system

1. StruxureWare™ Building Operation Workstation should be used to configure BACnet communication in the ES or AS (license required).

2. Enable BACnet/IP communication in the Enterprise or Automation Server. Create a BACnet/IP interface.

3. Discover and host the intended Lutron equipment in the Enterprise or Automation Server database. Enable BBMD capability, if needed.

4. Use the native BACnet applications to create Schedules, Trend Logs, Alarms, and data sharing relationships, to control and monitor the Lutron equipment. Refer to relevant StruxureWare™ for Building Operation online help topics as necessary.

What to Integrate:

Data sharing

Lutron exposes lighting objects as Analog values, Binary values and Multi-State values. This allows StruxureWare™ applications to use BACnet services to monitor and command the lighting objects.

Most devices and objects from the Lutron system are virtual BACnet objects. Virtual devices are area-based so they correspond to a geographical area of the building (e.g., conference room, private office, etc.). Virtual device names are job specific and created at the time of programming. To simplify the integration process, it is recommended that the integrator and Lutron representative coordinate on area naming conventions. For a summary of Lutron BACnet objects, naming conventions, and functionality, reference the additional tables located in the Lutron BACnet PICS statement.

To get the latest PIC statement with object list that corresponds to the Quantum software version you are running, go to the Product Specification Submittals page at www.lutron.com and look under the "Programming and Software" section. To get the latest PICS statement for Vive, go to the Vive Documents page at www.lutron.com and look under the "Product Specification Submittals" section.

BACnet Scheduling

Lutron does not currently support the BACnet Schedule Object. There are two approaches that can be employed for scheduling the lighting system.

Approach 1: The Schneider Electric® StruxureWare™ System supports the Schedule object which can be used to directly command the Lutron lighting objects. The Schedule can be viewed and modified using the Schneider Electric® StruxureWare™ System.

Approach 2: The Lutron Quantum system can support the schedule and the Quantum Vue software can be used to view and modify events. The Schneider Electric® StruxureWare™ System can be used to enable/disable entire timeclocks and/or specific events (per subsystem) through BACnet binary and multistate values, or modify the time the event is scheduled to trigger through BACnet analog values.

Note: The Lutron Vive system supports the setup of schedules via the Vive Vue software as well, but they are not accessible via BACnet objects. Approach 1 should be taken if BACnet Scheduling is required for the project.

BACnet Trend Log

Lutron does not support the BACnet Trend Log object. However, the Lutron system does share information (power usage, occupancy, etc.) through Binary, Analog, and Multi-State values, which can be used for trending. The Schneider Electric® StruxureWare™ System supports the Trend Log object which can trend the Lutron lighting objects. The Trend Log object data can be archived with the StruxureWare™ System. The reporting tile within the Quantum Vue software, and the Energy tab in the Vive Vue software, can also be used to view historical trends or instantaneous values, of these objects.

BACnet Alarming

Lutron does not support the BACnet alarm convention described in clause 13, Alarm and Event Services of the standard. However, the Lutron Quantum system does share asset and maintenance data appropriate for alarms (lamp failure, ballast failures, low battery failures on wireless devices, etc.) through Binary, Analog, and Multi-State values. To create alarms in the StruxureWare™ system, create BACnet objects in the Building Operation WorkStation and then reference them to Lutron objects. These BACnet objects will be used to alarm the Lutron lighting objects to display in the Alarm Status or Graphics application. The alerts module within the Lutron Quantum Vue software can also be used to configure and view alerts.

Note: The Lutron Vive system does not currently provide asset and maintenance data appropriate for alarms.

Common Integration Examples

- A BMS system can trigger load-shed events in the Quantum or Vive system.
- Occupancy sensor status can be shared with the HVAC system to set back temperatures when areas become unoccupied.
- Energy usage information can be shared with the BMS to eliminate the need to add costly energy meters.

Important Integration Notes:

- BACnet/IP is the primary means of integration for the Quantum and Vive systems.
- To simplify the integration process, it is recommended that the integrator and the Lutron programmer or project manager assigned to the job (when applicable) coordinate on area/point naming conventions when designing the job, not during installation.
- Coordinate with Lutron to disable the Lutron schedule if BACnet schedules are to be used.
- Lutron subsystem sizes should be kept to under 50 BACnet enabled areas. More than 50 areas may lead to replies which are possibly outside the expected timeout value (APDU timeout) of the StruxureWare™ system.

Key contacts if you need assistance on a job:

Lutron:
Pre-Sale Support: systemsalesengineers@lutron.com
Post-Sale Support: 1.844.588.7661; systemsupport@lutron.com

Schneider Electric®:
Contact the local Schneider Electric® Sales Office.
Go to www.schneider-electric.com to find your local sales office.

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