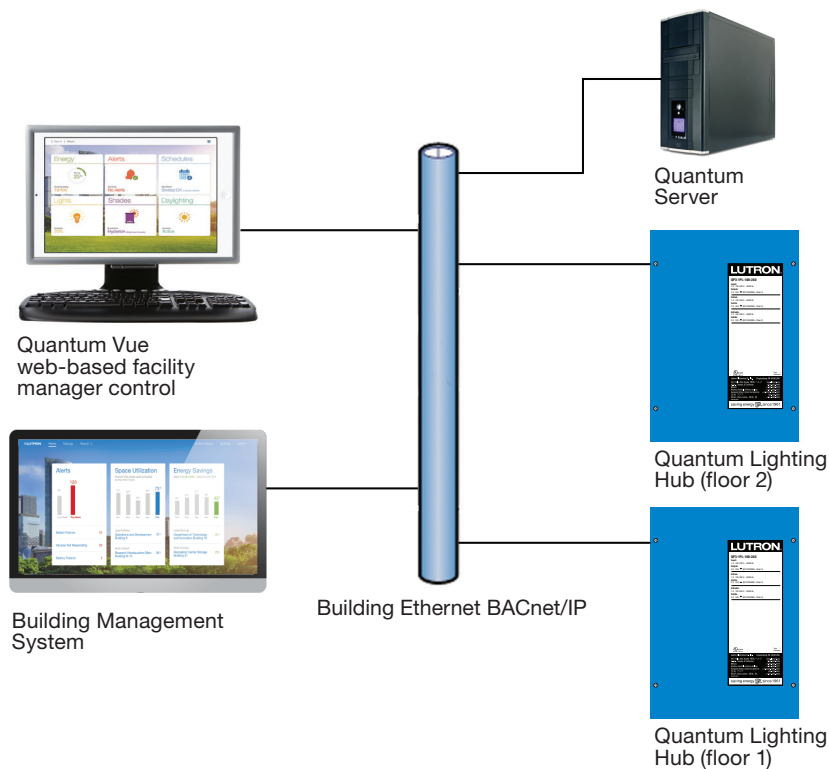


Lutron / Automated Logic® BACnet Integration



Quantum Integration



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The Lutron Quantum lighting control system is a total light management system that incorporates digital LED drivers and fluorescent ballast controllers, analog dimming and switching lighting controllers, motorized window treatments, keypads, occupancy sensors, light level sensors and web browser based control software, all under one programmable software system.

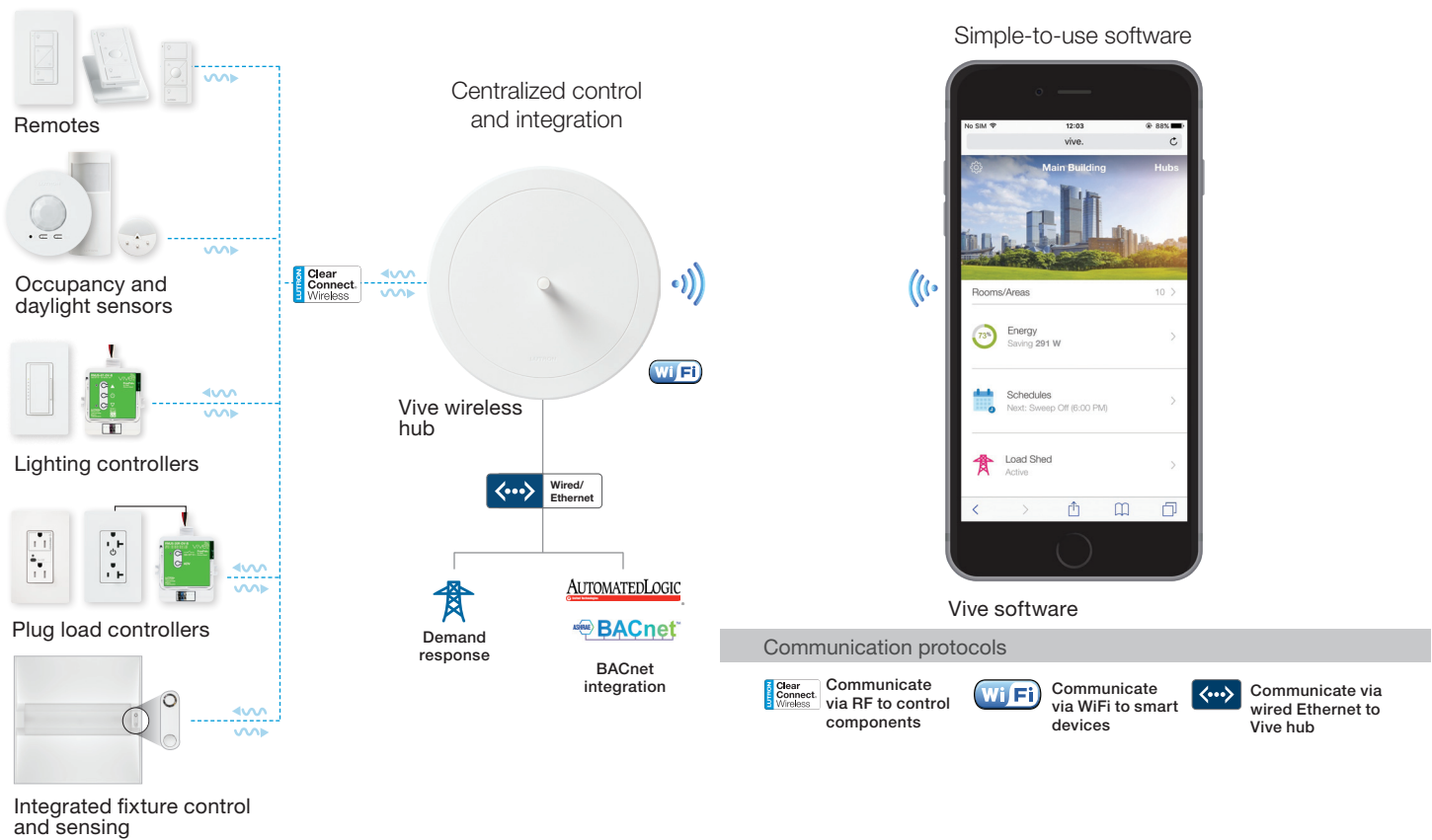
A typical building will contain at least one Quantum Lighting Hub per floor which are connected together as a system over an Ethernet network. The Quantum system can seamlessly and reliably integrate with other building management systems over the Ethernet network using an industry standard protocol known as BACnet/IP.

The BACnet/IP protocol is embedded in the Quantum Lighting Hubs, which means that no external interfaces or gateways are required for integration. The diagram above shows an optional Quantum server which is used to provide a central software user interface for the Quantum system and for historical data logging and reporting.

The Quantum system has been tested by BACnet Testing Laboratories (BTL) and is certified to comply with all of their necessary interoperability requirements.

Vive Integration Overview

Wireless controls and sensors

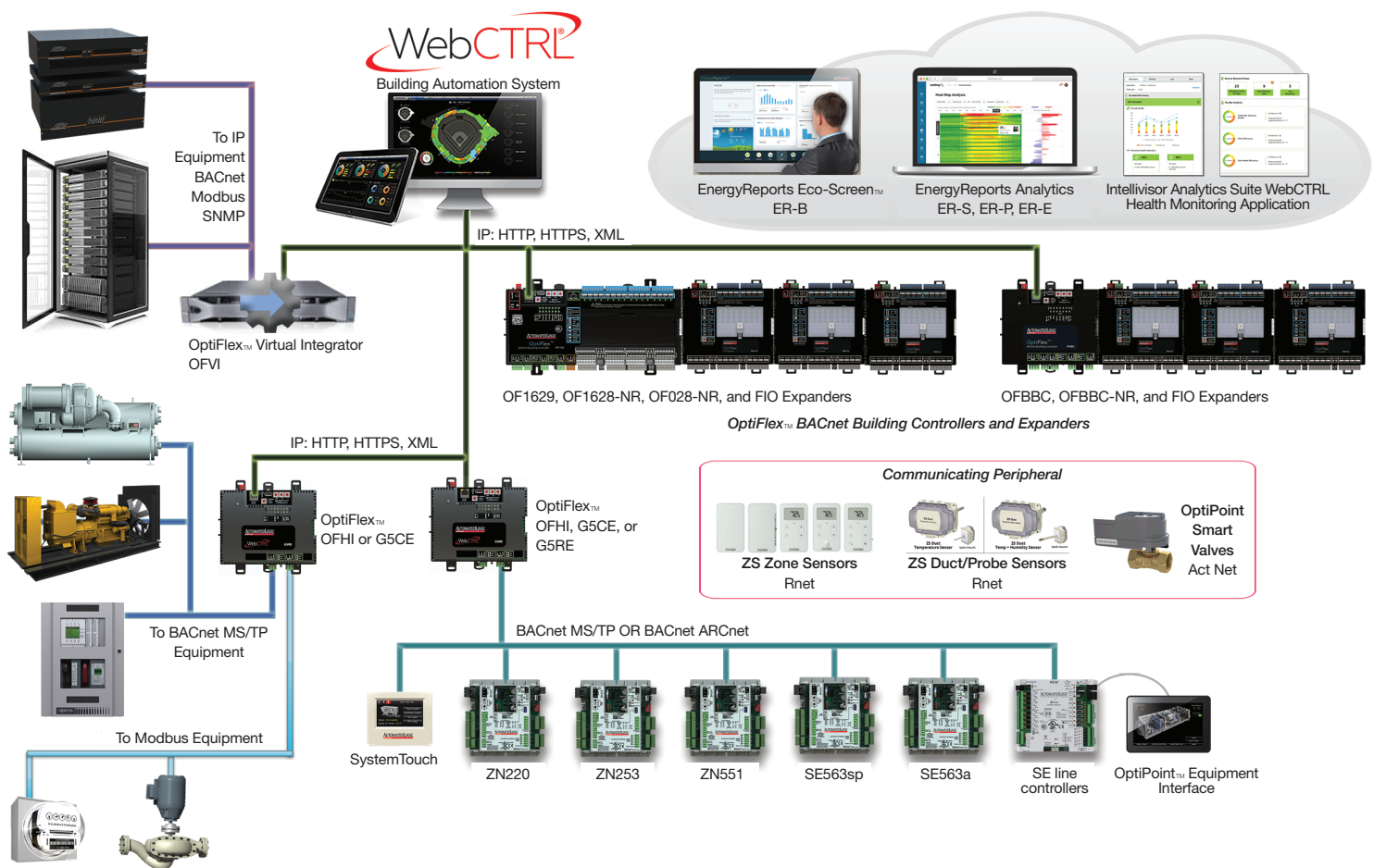


The Lutron Vive system is the premier simple and scalable retrofit lighting control solution for commercial buildings. The system consists of: a centralized main controller called the Vive wireless hub; wireless load controllers for lighting loads throughout the space; wireless wall controls, occupancy sensors, and daylight sensors; and intuitive programming and monitoring software to tie the solution together. The individual load controllers communicate directly with remotes and sensors, but also communicate back to the Vive wireless hub via Lutron Clear Connect 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. The 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.

The Vive system has been tested by BACnet Testing Laboratories (BTL) and is certified to comply with all of their necessary interoperability requirements.

Automated Logic® WebCTRL® System Overview



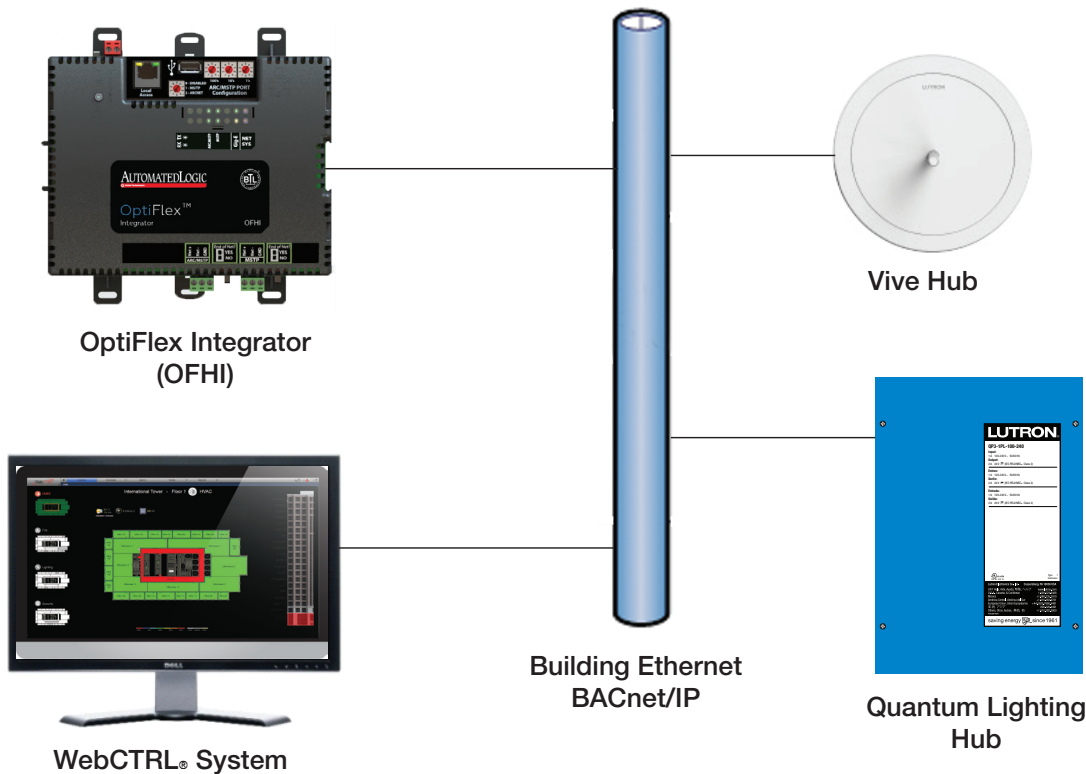
The WebCTRL® system's open standards with BACnet native architecture makes integration with other mechanical and electrical building systems simple. BACnet is the global standard for open interoperability. The BACnet protocol is available as an American National Standard, a European standard, and global ISO Standard 16484-6:2014.

The WebCTRL® system is also capable of supporting multiple protocols over a TCP/IP network, allowing for a variety of equipment to be connected directly to the WebCTRL® system backbone; as well as, seamless interconnection to equipment on TCP/IP, EIA-485, or EIA-232 networks.

Automated Logic® continually develops innovative third-party integration solutions to add to their integration resumé. Please contact your local Automated Logic® dealer for a current listing of all integration applications or to discuss your integration requirements.

Lutron and Automated Logic® Integration Overview

An Automated Logic® WebCTRL® server and an OptiFlex™ Integrator (Part #OFHI) are used to monitor and control the Lutron lighting system using the BACnet protocol.



Communication Protocol

- Communication between Automated Logic® and Lutron is BACnet over IP
- BACnet over IP uses Broadcast UDP and Peer-to-Peer UDP on any standard Ethernet network

BACnet Testing Laboratories Listing

- Automated Logic and Lutron devices are BTL Listed.
- Automated Logic WebCTRL® Server is BTL-Listed as a BACnet Advanced Operator Workstation (B-AWS)
- Automated Logic OptiFlex Integrator is BTL-Listed as a BACnet Building Controller (B-BC), BACnet Router (B-RTR), and BACnet Broadcast Management Device (B-BBMD)
- Lutron Quantum and Vive Lighting Control systems are BTL-Listed as a BACnet Application Specific Controller (B-ASC)



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 each processor in the system.
2. With the BACnet software license, the Lutron service representative must enable BACnet and set the Device IDs and BACnet network IDs.
3. If the Quantum processor and Automated Logic® systems are not on the same subnet, a BACnet Broadcast Management Device (BBMD) is required by the integrator. Quantum processor supports foreign device registration to a BBMD. IP address of the BBMD should be given to the Lutron Field service representative at setup if required. BBMD functionality should only be enabled if the BBMD exists on a different subnet than the Quantum processors.
4. Limit the design so that each Quantum subsystem should be limited to a maximum of 50 areas per subsystem. Each area in the Quantum system equates to one BACnet virtual device. The more areas per Quantum subsystem, the longer it will take for the Quantum system to respond to the Automated Logic® system.
5. Ensure that COV is enabled on all Lutron systems before integrating to Automated Logic®. If the integration to Automated Logic® occurs before enabling COV, the Automated Logic® processors need to be reset in order to enable.
6. Use the most lightly loaded Quantum processor as the BACnet processor that will communicate for the subsystem. This would be the processor with the least number of links used and the least amount of devices per link in each subsystem.
7. Before integrating, have an agreed plan with the integrator of what BACnet Device IDs and BACnet network IDs the Lutron system should use to ensure that all IDs are unique for all devices and routers.

What needs to be done in the Lutron Vive system

1. BACnet is native to the Premium Vive wireless hub (model HJS-2) and can be enabled on other hubs (model HJS-0 and HJS-1) by purchasing a BACnet license.
2. BACnet is disabled by default in the Vive hub, and must be enabled and configured. The BACnet programming menu can be accessed from the main Vive Vue Dashboard > Gear Icon > Hub Details > BACnet Programming.
3. If the Vive and Automated Logic 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 Automated Logic system supports BBMD functionality.
4. The Lutron Vive system's device instance numbers must be set uniquely on the network. The IDs must be unique across all Vive hubs as well as across all BACnet devices on the network. Coordinate with the Automated Logic representative on-site. They will typically assign a range of device IDs to each manufacturer on the network.

What needs to be done in the WebCTRL® system

1. BACnet is also native to the WebCTRL® system but no additional license is required as all necessary licenses are included with each copy of the WebCTRL® system.
2. In order to interface with a Lutron system, an Automated Logic® engineer would:
 - Gather lighting monitoring, control and trending requirements from the Lutron representative.
 - Create a Logicbuilder program that reflects those requirements.
 - Download the program into an Automated Logic® controller.
 - Address each network interface point with the appropriate Lutron BACnet address.
 - Link each BACnet point to the Lutron hub and test operation.
3. The Automated Logic® engineer will likely need to make BACnet adjustments based on system size. Details of such adjustments are in the “Lutron Lighting Integration Guide” published by Automated Logic®.
4. Much of the Lutron system information can also be displayed graphically in the WebCTRL® front end. The Automated Logic® engineer can collaborate with the local Lutron representative to create such graphics.

What to Integrate:

Data Sharing

Lutron exposes objects as Analog objects, Binary objects and Multi-State objects. This allows Automated Logic® applications like WebCTRL® Graphics to use BACnet services to monitor and command the objects.

Most devices in the Lutron system are virtual BACnet devices. 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 Lutron database creation, which is done in-house at Lutron just prior to startup (Quantum) or on site during programming (Vive). To simplify the integration process, it is recommended that the integrator and Lutron field service 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 PIC statement. To get the latest PICS statement that corresponds to the Quantum software version you are running, contact any Lutron representative or find them at www.lutron.com/quantum or www.lutron.com/vive 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 Quantum system.

Approach 1: The Automated Logic® WebCTRL® supports the Schedule which can be used to directly command the Lutron objects. The Schedule can be viewed and modified using WebCTRL® Scheduler application.

Approach 2: The Lutron system can support the schedule and the Quantum or Vive software can be used to view and modify events. The Automated Logic® system can enable/disable an entire timeclocks, per subsystem, through BACnet binary objects (Quantum only).

BACnet Trending

Lutron does not support the BACnet Trend Log object. However, Lutron’s system does share live time information (e.g., power usage, occupancy, etc.) through binary, analog, and multi-state objects, which can be used for trending. The LGR supports the Trend Log object which can trend the Lutron lighting objects. The Trend Log object data is archived by the WebCTRL® system. The reporting module within Lutron Quantum or Vive Vue software can also be used to view historical trends of these objects.

BACnet Alarming

Lutron does not support the alarming object. However, the Lutron system does share asset and maintenance data appropriate for alarms (e.g., lamp failure, ballast failures, low battery failures on wireless devices, etc.) through binary, analog, and multi-state objects (Quantum only). The OFHI supports the Event Enrollment object which can be used to alarm the Lutron objects to display in the Alarm Status or Graphics application at WebCTRL®. The alerts module within Lutron Quantum Vue software can also be used to configure and view alerts.

Common Integration Examples

- A BMS system can trigger load shed events in the Quantum or Vive system. In particular, WebCTRL® supports the OpenADR protocol through an add-on program which can be used to communicate with utility companies and participate in automated demand reduction events. The fact that WebCTRL® can now manage the lighting load as well as the HVAC load may enable the customer to negotiate better utility rates.
- Occupancy sensor status can be shared with the HVAC system to set back temperatures and minimize ventilation 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:

- Use BACnet /IP to integrate to Lutron. Do not use BACnet MS/TP.
- To simplify the integration process, it is recommended that the integrator and Lutron field service representative or project manager assigned to the job coordinate on area/point naming conventions when designing the job. This will make it easier to align the Lutron lighting zones with the WebCTRL® GEO tree and to integrate lighting and HVAC control, but it cannot be done if this coordination is postponed until installation.
- Coordinate with Lutron to disable Lutron schedule if BACnet schedules are used.
- “Who-Is” requests should be separated by a minimum of 10 seconds. More frequent requests may cause communication issues due to the number of points available in the Lutron system through a single IP address.

Key contacts if you need assistance on a job:

Lutron:

Pre-Sale Support: systemsalesengineers@lutron.com

Post-Sale Support: 1.800.523.9466; systemsupport@lutron.com

Automated Logic®:

Your local Automated Logic® representative.

A list can be found on: <http://www.automatedlogic.com/locations/>

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