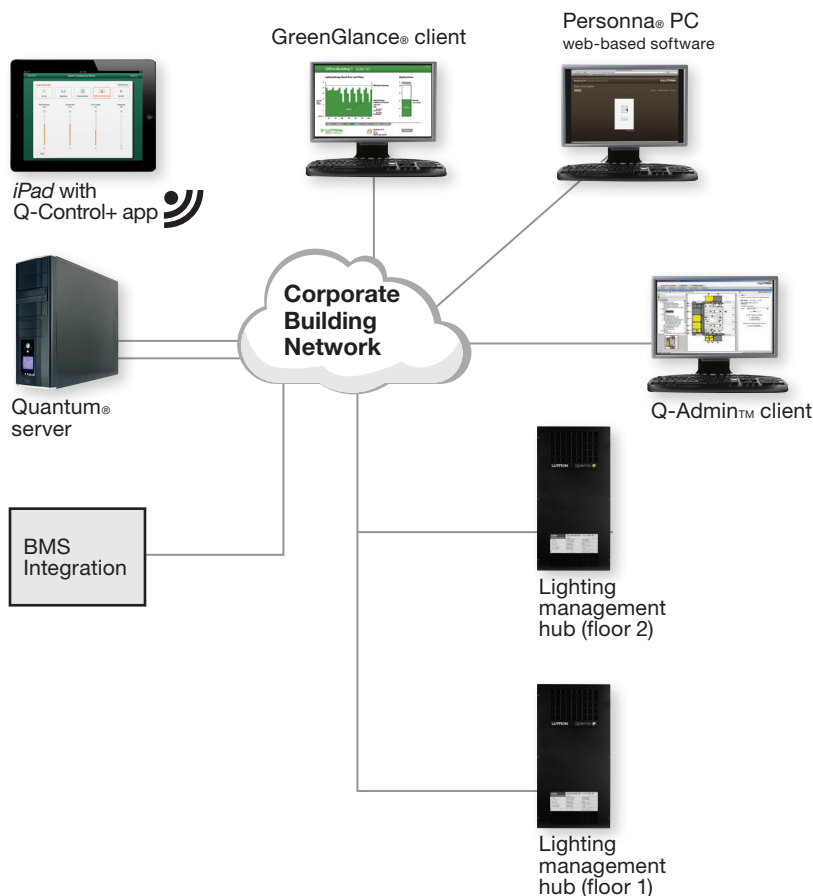


Lutron®/Trane® BACnet® Integration



Quantum® Overview



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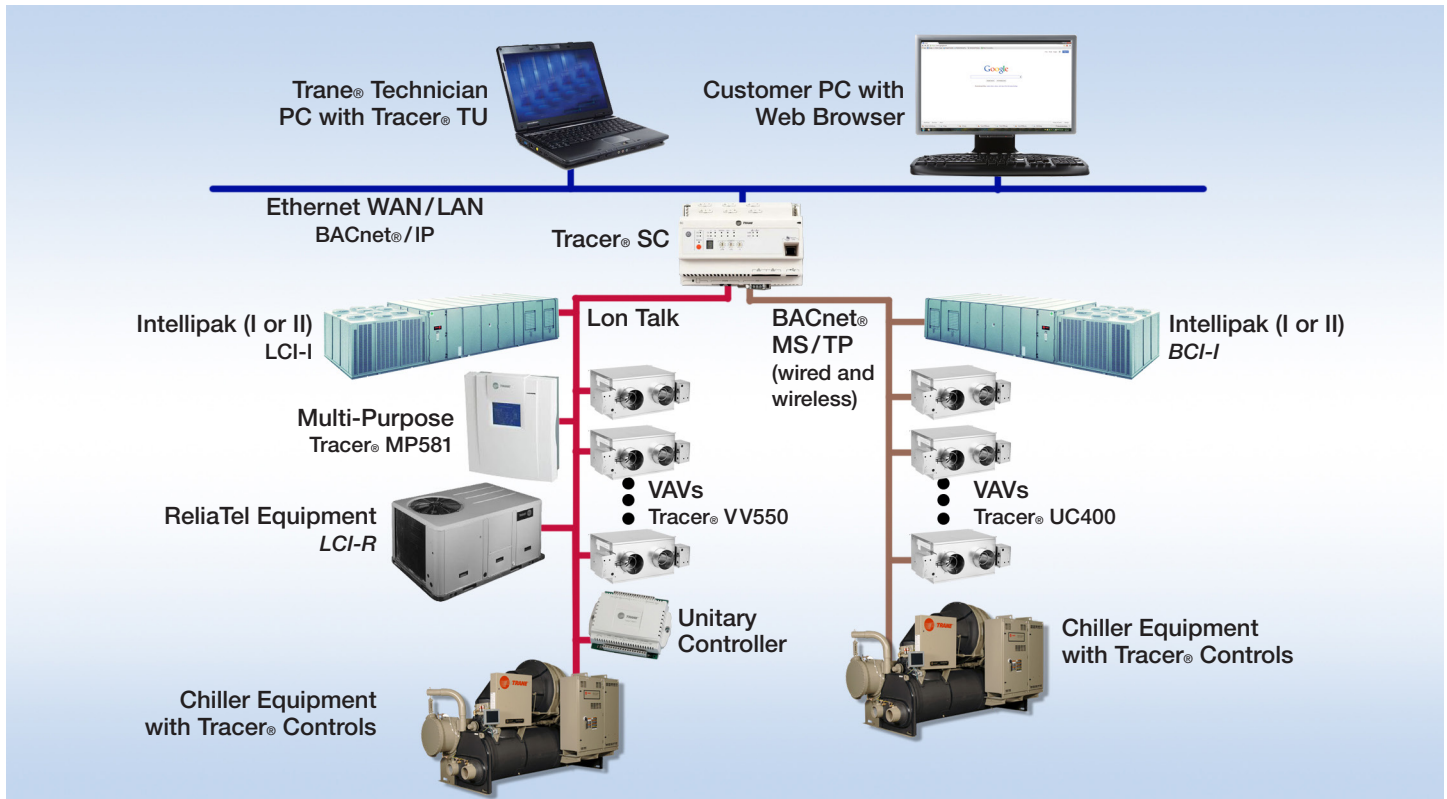
The Lutron® Quantum® system is the total light management system that incorporates lighting controls, motorized window shades, digital ballasts and LED drivers, centralized dimming and switching panels, and sensors together under one system/software umbrella. It is a processor-based system and the processor(s) reside in the hubs shown in the diagram above. In a typical building, you will typically have at least 1 hub per floor connected over the building network or a dedicated network for the lighting system.

Quantum® 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 all of their necessary interoperability requirements.

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Tracer® System Overview



Tracer® SC

Tracer® SC system controller is a powerful, scalable, web-enabled building controller built on open, standard protocols. Tracer® SC features Trane® EarthWise® applications and interfaces for air and water systems to ensure optimal system performance from job to job.

The flexible and scalable capacity of Tracer® SC allows it to be applied in a variety of facility types and sizes. The embedded web server provides an easy to use interface for basic and advanced users of the system. Most LonTalk® and BACnet® unit controllers and system controllers are compatible with Tracer® SC, including all Trane® unit controllers that support these protocols.

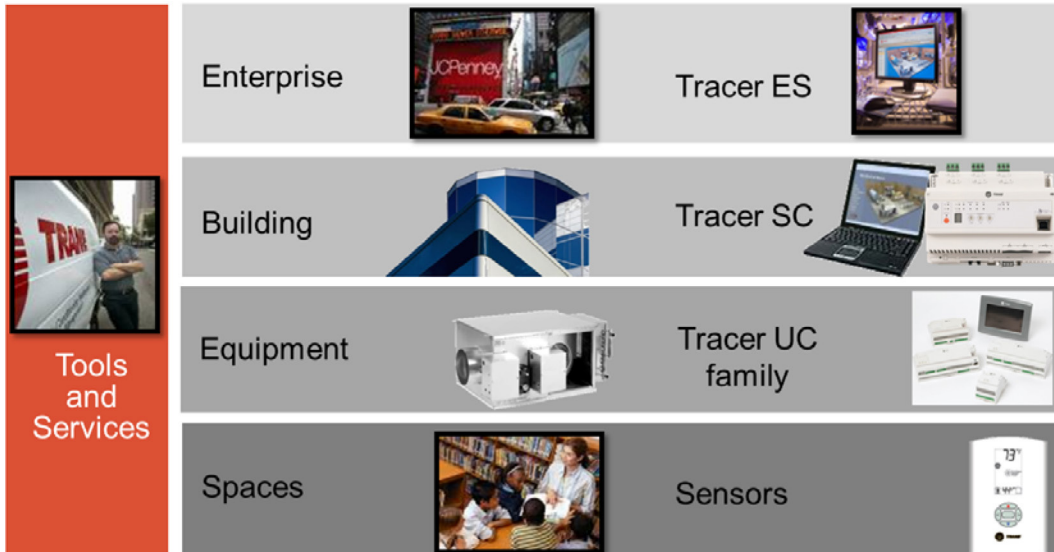
Tracer® SC allows you to streamline facility management without reinventing the entire system. Adding Tracer® SC to your system provides a flexible, cost effective solution for building automation, and managing the facility climate that can extend to lighting and energy consumption.

Accessible from most PCs, tablets and smart phones, Tracer® SC eliminates the need for a dedicated computer and monitor so you can manage system performance whenever and wherever it is convenient. Tracer® SC controller's simplified, Web-based management tool reduces scheduling, reporting and system application chores to simple "point and click" tasks. The intuitive online tools provide improved efficiencies, increased tenant comfort and reduced energy costs, which result in operational cost-savings and a better bottom line.

Tracer® ES

Tracer® ES is a web-based building automation system (BAS) that dramatically simplifies the complex requirements of managing and operating multiple facilities. Accessible from most PCs, tablets, and smart phones, Tracer® ES provides immediate access to your building systems from virtually any location, allowing you to maintain comfortable, healthy conditions and satisfied occupants.

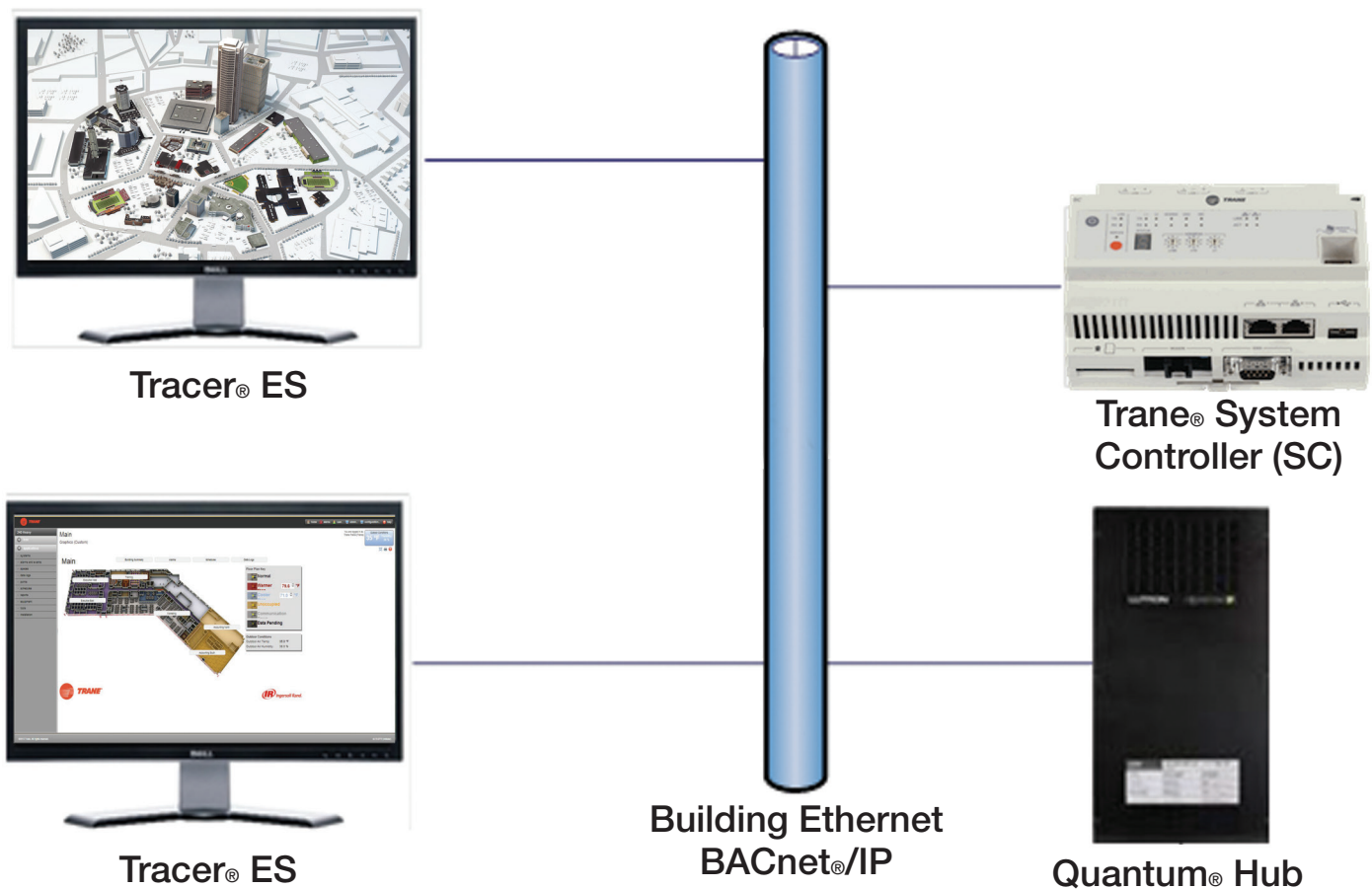
Tracer® ES simplifies the management of building systems within multiple facilities for owners, managers, and daily operators. Tracer® ES provides centralized management of scheduling and alarms, supports long-term data storage to document and monitor performance, enables remote troubleshooting, and brings disparate systems together for upgrade flexibility. Because Tracer® ES offers full browser support, you can access your facility from wherever you are from your PC, tablet, or smart phone.



Integration Overview

Trane® Tracer® System Insight and Trane® Tracer® System BACnet® Field Panels can be used to monitor and control the Lutron® Quantum® system using the BACnet® protocol. The BACnet® protocol is a non-proprietary open communication software standard published by ASHRAE.

Topology



Communication Protocol

- Communication between Trane® Tracer® System and Lutron is BACnet®/IP
- BACnet®/IP uses Broadcast UDP and Peer-to-Peer UDP on any standard Ethernet network

BACnet® Testing Laboratories Listing

Trane® and Lutron® devices are BTL Listed:

- Trane® System Controllers (SC) are BTL-Listed as B-BC
- Lutron® Quantum® Lighting Control System is BTL-Listed as 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 the job.
2. With the BACnet® software license, the Lutron® service representative will turn on the BACnet® capability using the DeviceIP setup software tool. Only one processor per subsystem will be enabled. This processor will act as the master for all BACnet® communications for the subsystem.
3. Each area cannot exceed 400 Virtual objects.
4. If the Quantum® processor and Trane® Tracer® System 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 of the BBMD should be given to the Lutron® field service representative during setup (if required). The Tracer® SC System Controller supports BBMD.
4. The Lutron® BACnet® virtual network will need to be set to a different BACnet® network number than the BACnet® / IP network the Trane® and Lutron® systems are connected to. Coordinate with the Trane® representative on-site.

What needs to be done in the Trane® Tracer® system

1. Virtual devices within the Trane® system can have a maximum object count of 400.
2. A Tracer® SC should be purchased for Scheduling, Trending, and Alarming functionality.

What to Integrate:

Data sharing:

Lutron exposes lighting objects as Analog objects, Binary objects and Multi-State objects. This allows Trane® applications like Trane® Tracer® ES System Graphics and Trane® Tracer® SC System 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 Lutron® database creation, which is done in-house at Lutron® Headquarters just prior to startup. 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® PICS 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 under the “Product Specification Submittals” section and go to 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 Trane® Tracer® System supports the Schedule which can be used to directly command the Lutron® lighting objects. The Schedule can be viewed and modified using Trane® Tracer® System Scheduler application.

Approach 2: The Lutron® Quantum® system can support the schedule and the Quantum® Q-Admin™ software can be used to view and modify events. The Trane® Tracer® System can enable/disable an entire timeclocks, per subsystem, through BACnet® binary objects.

BACnet® Trending

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 objects, which can be used for trending. The Trane® Tracer® system supports the Trend Log object which can trend the Lutron® lighting objects. The Trend Log object data can be archived with the Tracer® ES. The reporting module within the Lutron® Q-Admin™ software can also be used to view historical trends 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® 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 objects. To create alarms in the Tracer® system, create BACnet® objects in Tracer® SC and then reference them to Lutron® objects. These Tracer® SC BACnet® objects will be used to alarm the Lutron® lighting objects to display in the Alarm Status or Graphics application at Trane® Tracer® System. The alerts module within the Lutron® Q-Admin™ software can also be used to configure and view alerts.

Common Integration Examples

- A BMS system can trigger load-shed events in the Quantum® system.
- Occupancy sensor status can be shared with the HVAC system to set back temperatures when areas become unoccupied.
- Quantum® 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 Quantum®.
- 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 job, not during 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

Trane®:

Technical Support:

Contact the local Trane® Sales Office.

Go to www.trane.com to find your local sales office.

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BACnet is a registered trademark of ASHRAE.

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LonTalk is a registered trademark of Echelon Corporation.

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