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A SMART STANDARD FOR SMART LIGHTING

A new standard is providing opportunities to optimize the implementation of wireless lighting controls in facilities / **BY TODD HUGHES**

When it comes to wireless lighting control systems, a multitude of protocols exist, but with greater choice comes greater confusion. Without the materialization of a single prevailing controls standard that has achieved widespread deployment, many professionals remain unwilling to move forward for risk of committing to the wrong platform.

Although the myriad of integration strategies and innovative LED products have gone some way to overcome this challenge, many wireless lighting protocols can put organizations at a disadvantage by tying them to proprietary, single-vendor solutions. Every so often, however, a technology comes along that captures the attention of electrical professionals.

Bluetooth® mesh is one such platform, and one which is swiftly gaining momentum as a standard that can handle lighting control

The power of wireless lighting controls lies in the technology standards in which they are rooted.

and other data, with a throng of manufacturers beginning to add Bluetooth mesh capabilities to their LED luminaires. But what separates Bluetooth from similar systems on the market? And why is it becoming such an attractive proposition for the industry?

Bluetooth mesh connectivity

The open and secure nature of the Bluetooth mesh standard provides a reliable alternative to single-vendor systems. A well-defined and thoroughly documented standard that offers a comprehensive solution, Bluetooth eliminates many of the issues posed by contesting wireless protocols. This includes out-of-the-box interoperability with a wide range of Bluetooth enabled, solid-state-lighting (SSL) technologies from multiple manufacturers, including LED luminaires and sensors.

Bluetooth mesh provides organizations with a multipoint,



wireless communications architecture that enables luminaires to be connected to a robust, site-wide network. Enabled devices can be added or removed easily, without expensive installation, downtime or the need to re-program, thus delivering unmatched scalability. Should there be a device failure or a signal blockage, the ‘self-healing’ Bluetooth mesh, with its fast, reliable performance, is able to re-route the data, ensuring continuity in lighting and enabling operations to carry on without disruption.

The “flood network” structure of the protocol delivers simultaneous, many-to-many communications with all devices connected with a network in the vicinity. This two-way communication means the same wireless mesh network can not only be used to commission new luminaires and upgrade firmware, but also monitor luminaire conditions and performance. This, in turn, can pave the way for smart lighting functionality and enable electrical contractors and their clients to see wireless connectivity in a new light.

From a lighting standpoint, this could mean utilizing the robust network to measure ambient light levels, sending data to a specific luminaire, which, in



The analysis of monitoring data also offers valuable insights that can help increase energy efficiency. Two-way communications and sensors, for example, could be used to measure ambient light, enabling the system to adjust luminaire brightness to optimum lighting levels at all times, or enable color tuning, which allows color temperature and intensity to be adjusted to correspond to the body's natural circadian rhythms. Additionally, sensors can be installed to detect the presence or absence of people, so that the lighting, heating and other services are only used when needed, thus delivering further energy savings.

A significant advantage of a Bluetooth mesh network is the level of built-in encryption and authentication they provide. All communications are encrypted with at least two decryption keys: a network key that is specific to the network; and a secondary application key that is specific to a function, such as activating a luminaire as opposed to programming a luminaire, providing additional layers of security.

The result is a highly advanced network that is practically impossible to hack. A Bluetooth mesh control grid has an architecture designed to defend itself from malicious data repeats and delays, stolen device credentials, and other threats.



A connected future

More stringent energy efficiency requirements, accelerated progress toward sustainability targets, and increasingly strict building codes mean intelligent lighting controls continue to gain significant traction across a broad range of sectors from industrial environments to commercial buildings, and everything in between. In fact, Gartner, Inc. expects smart lighting installations to increase from 46 million units in 2015 to 2.54 billion units by 2020.

Although hardware has a fundamental role to play in any lighting network, the true power of wireless lighting controls lies in the technology standards in which they are rooted, meaning for those striving for better performance, connectivity and dependability, selecting the most appropriate protocol can be critical. **EB**

turn, will get brighter or dimmer dependent on the ambient light level requirements. Beyond lighting, a mesh network can even be used to connect other Bluetooth enabled systems including security, HVAC, and building automation systems (BAS), among others. What's more, once the luminaire sensors have been installed, the same network can be employed to monitor and report the site's temperature, humidity and occupancy, thus providing exceptional levels of building control and making the site safer and easier to manage.

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**2.54
BILLION
UNITS**

A secure wireless control network

Of course, when it comes to implementing a wireless lighting control system, network security remains a significant concern. Although questions have been raised about how two-way wireless lighting control, deployed as part of a building management infrastructure, could potentially grant hackers access to systems such as building security, as well as sensitive data on connected business networks, the latest generation of protocols have gone some way to address this.

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