TECHNOLOGY

How to introduce intelligent lighting into construction projects with IP/Power over Ethernet

The right plan, the right people, and the right technology can come together to produce an intelligent lighting system.

By Craig Getchell, Molex

Due to ongoing disruptive technologies driven by Internet of Things (IoT) innovations, commercial property owners and property management companies have more opportunities to differentiate their buildings, office complexes, campuses, and technology centers. Owners and managers can create flexible and extensible environments that increase worker productivity. At the same time, these improvements can lower cost, strengthen security and improve speed of sale or lease.

The key to achieving the above is to understand that you need to divert from the product-selection methodology that works for assembling steel, concrete, glass, wood, and wire but makes technology adoption difficult, inefficient and expensive.

Regardless of whether you're building new, doing a deep renovation or migrating an existing facility to an IoT architecture, step one is to move from current organic processes that impede technology adoption in a new build or "replace-in-kind" refresh. Only then will you be able to recognize the opportunities within your specific project.

As the industry moves forward with IP/PoE installations, it is learning that the cost of installing an IP/PoE fixture can be reduced by $30 or more. These savings will increase as the efficacy of power distribution and LED fixtures improves.

IP/POE LIGHTING IS KEY

The key catalyst (disruptive technology) enabling this move to a lower-cost, more-functional IoT architecture is Internet Protocol/Power over Ethernet (IP/PoE) lighting. Today, several providers have open architecture solutions that allow you to install versatile fixtures from hundreds of manufacturers. Most IP/PoE lighting providers work with any LED fixture that operates within the current 60W PoE standards. This means that approximately 95 percent of all available LED lights can be used, including new higher-wattage and larger interior and exterior LED fixtures.

As the industry moves forward with IP/PoE installations, it's learning that cost of installing an IP/PoE fixture can be reduced by 10, 20, 30 dollars or even more, with each light being controlled, versus an uncontrolled high-voltage (HV) LED system install. This savings is only going to increase as the efficacy of power distribution and LED fixtures improves.

The impact of the initial cost savings is twofold. First, all standalone control systems, wired and wireless, become obsolete, as they simply do not create the granularity of data or offer the performance, and they are always a cost-plus effort. Second, core components (core switches, enterprise security, structured cabling, power support) can be paid for while lowering the overall project cost. The immediate impact of this is the more base-building systems put on the lighting IoT base-building network, the more cost is driven out of the project. This approach is much more cost-effective than building a disparate collection of base-building systems, which is what happens organically today.

HOW DO YOU GET THERE? A DIFFERENT PLAN

First, you need to adopt a different plan—a technology adoption plan—that changes how you leverage and exploit technology to gain that competitive advantage. And just as importantly, this plan must not impact how steel, concrete, glass, wood and wire are procured.

A proven approach that limits overall project disruption is to work within the current construction processes. Architects, engineers and property management teams lean heavily on outside consultants and vendors who are financially motivated to keep the status quo. The result is that they continue to accidentally "bid and build" or "replace in kind" a disparate collection of smart systems that are easy to acquire but expensive to build and operate.

You shouldn't place any additional burden on the traditional team. Rather, the goal is to create a methodology to help the team execute the exact same way as always, but to "accidentally" acquire a consolidated IoT architecture instead. To do so, you should pull all the technology-focused areas out, modify the content and put it all back. In this way, you can procure everything through the normal bid process and get it built through the normal build processes, while using as much traditional labor as possible. Focus on identifying opportunities and modifying specifications and drawings. By fitting into the current build/migration process, you can eliminate uncertainty with designers.

You need critical content like optimal architecture diagrams, technology series drawings and integration, architecture and security guidelines. Instead of trying to create new biddable documents, try creating content to be absorbed into existing documents, resulting in enhanced specifications and drawings. By understanding the design, bid and build process, you can insert your efforts at the appropriate times, allowing architects, mechanical, electrical and plumbing (MEP) engineers and lighting and specialty consultants to continue to do what they do best.

Working within current construction processes is a proven approach that limits overall project disruption. If you are working with lighting consultants, explain that you are simply changing how lights are powered and controlled. Limit your suggestions on fixtures to efficacy and performance. The lighting consultants should continue to do their job, determining things like fixture type, aesthetic considerations, and light levels. They should develop the reflected ceiling plan, but instead of handing it to the electrical engineer to place high voltage behind it, you should work with them to build an IoT platform to support it. By adopting a solution that is not fixture-specific, you can enable lighting consultants to design as they always have, but to use IP/PoE lighting. Never battle over fixture selection. In that way, you remove the main obstacle to technology adoption that keeps a better solution out of the design. This type of opportunity exists within any base-building system.

Industry experts have learned that taking the time to invest in designing for a consolidated IoT platform will return 3, 4, 5, or even 10 times in first cost versus the current inefficient method of adopting technology.

RIGHT PEOPLE, RIGHT SKILLS, RIGHT MOTIVATION

The ability to adopt a better technology with the right approach requires the right skillsets and motivation to discover the possibilities. Understanding that skillsets for technology adoption need to be inserted in design, bidding, building, commissioning, and planning for ongoing operations is key.

Finding the right people with the right skills and the right motivation may be the biggest bottleneck to this process today. They are out there, and they are gaining more and more experience every day. They are well worth seeking out. Having the right skillsets in all phases of a project—from design to commissioning—is vital.

You need to remove process, content, and culture barriers in order to succeed. You must recognize where the current processes have inappropriate content or lack of structure for needed content. You need to have a plan for dealing with these obstacles.

Typically, you can alleviate most of the active and passive resistance from electrical contractors and unions during the bid/build process by simply committing to the design. For example, working with electrical engineers during design, you can lower energy density by removing the light load from high-voltage build. If done traditionally, the entire electrical spend may be $10 million, with a $500,000 low-voltage spend for enterprise communications. Instead, you can lower the overall electrical spend to $9 million and raise the low-voltage spend to $1 million, for a total savings of $500,000. One industry expert did just that.

All too often, the traditional specification and drawings go out to bid with the IP/PoE lighting as the "alternate," i.e., by not committing to the design. This can result in electrical contractors bidding the traditional option and either excluding or skewing the alternate. This happens because the traditional players are unwilling or unable to change. It also can create the scenario that the electrician who is selected to install the alternate knows he lost out on $500,000 of project share.

THE ELEMENTS OF SUCCESS

The most successful projects commit to a consolidated architecture and use enhanced specifications and drawings that clearly define materials, roles and responsibilities. They also leverage combined project-management and administration for larger profits on the project.

A desire for a better result, investing in the right people and methodology, knowing what to put in and take out, developing a project-specific plan and committing to the plan from design to operation is what you need to succeed.

So how could you fail? There is only one way—by doing nothing, by allowing the organic process to keep you building a disparate collection of smart systems and by integrating them after the fact, which will always be a complicated cost-plus effort.

DESTROYING THE MYTHS

Don't believe the myths that smart buildings are too costly, connected buildings are unsecured and that IoT technology is too new. The reality is that a consolidated IoT platform is simpler and the architecture requires less material and labor. A single integrated architecture is cost-effective and provides enterprise security, whereas a disparate collection of smart systems leaves holes because no one invests in enterprise security for all of them. IP/PoE for all building systems such as: lighting, automated window shades, temperature, security access, A/V equipment, and bathroom conveniences is where the real return-on-investment can be realized.

It will be the property management teams and their respective owners with a vision and inner passion for the realization of the future-state of their commercial properties who will lead the path to the next generation of buildings by embracing disruptive technologies.

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