



PHILIPS

InterAct Office

PoE technology

The smart
connected lighting
system for offices

Why smart buildings?

Reinventing the workplace

In today's highly competitive and fast-paced markets, it takes more than having a great product or service for a company to survive and thrive. Developing a competitive advantage in all areas of business is essential and companies are looking to digital technology and its integration with the Internet of Things (IoT) to deliver this. Smart buildings can play a part of this drive towards lower operation costs, increased efficiency, and the creation of new value for the business.

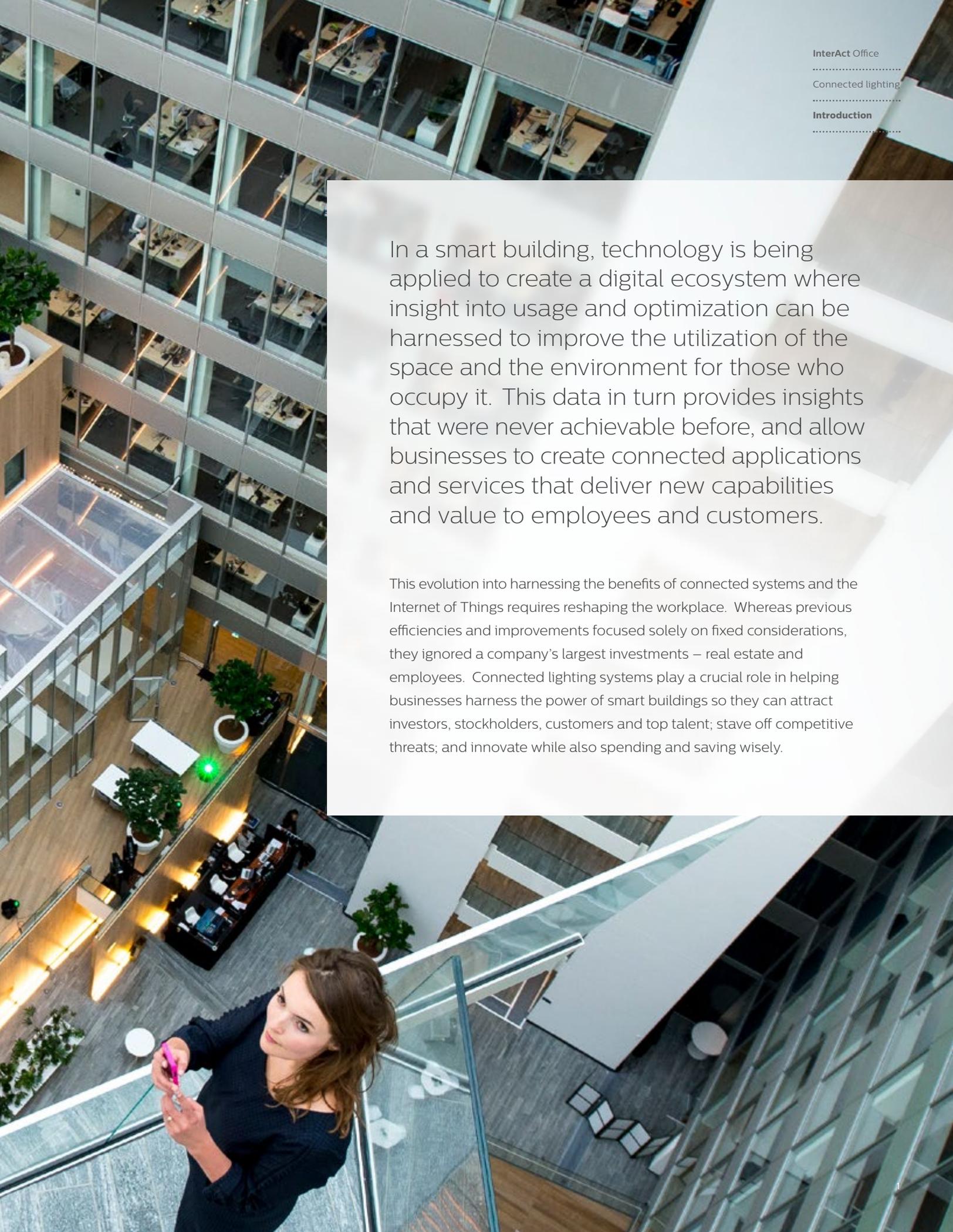


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In a smart building, technology is being applied to create a digital ecosystem where insight into usage and optimization can be harnessed to improve the utilization of the space and the environment for those who occupy it. This data in turn provides insights that were never achievable before, and allow businesses to create connected applications and services that deliver new capabilities and value to employees and customers.

This evolution into harnessing the benefits of connected systems and the Internet of Things requires reshaping the workplace. Whereas previous efficiencies and improvements focused solely on fixed considerations, they ignored a company's largest investments – real estate and employees. Connected lighting systems play a crucial role in helping businesses harness the power of smart buildings so they can attract investors, stockholders, customers and top talent; stave off competitive threats; and innovate while also spending and saving wisely.



How does lighting fit into a smart building?

Savings, data-based decisions, influence



The digital nature of LED technology brings illumination and IT together, allowing lighting systems to participate in the Internet of Things. Accordingly, integrating a Philips connected lighting system like InterAct Office into the IoT is an ideal way to support efficiencies across a smart building according to the 3-30-300SM Principle.



Utilities
\$3
per sq. ft.



Rent
\$30
per sq. ft.



Salary
\$300
per sq. ft.

A new, holistic approach to building strategies

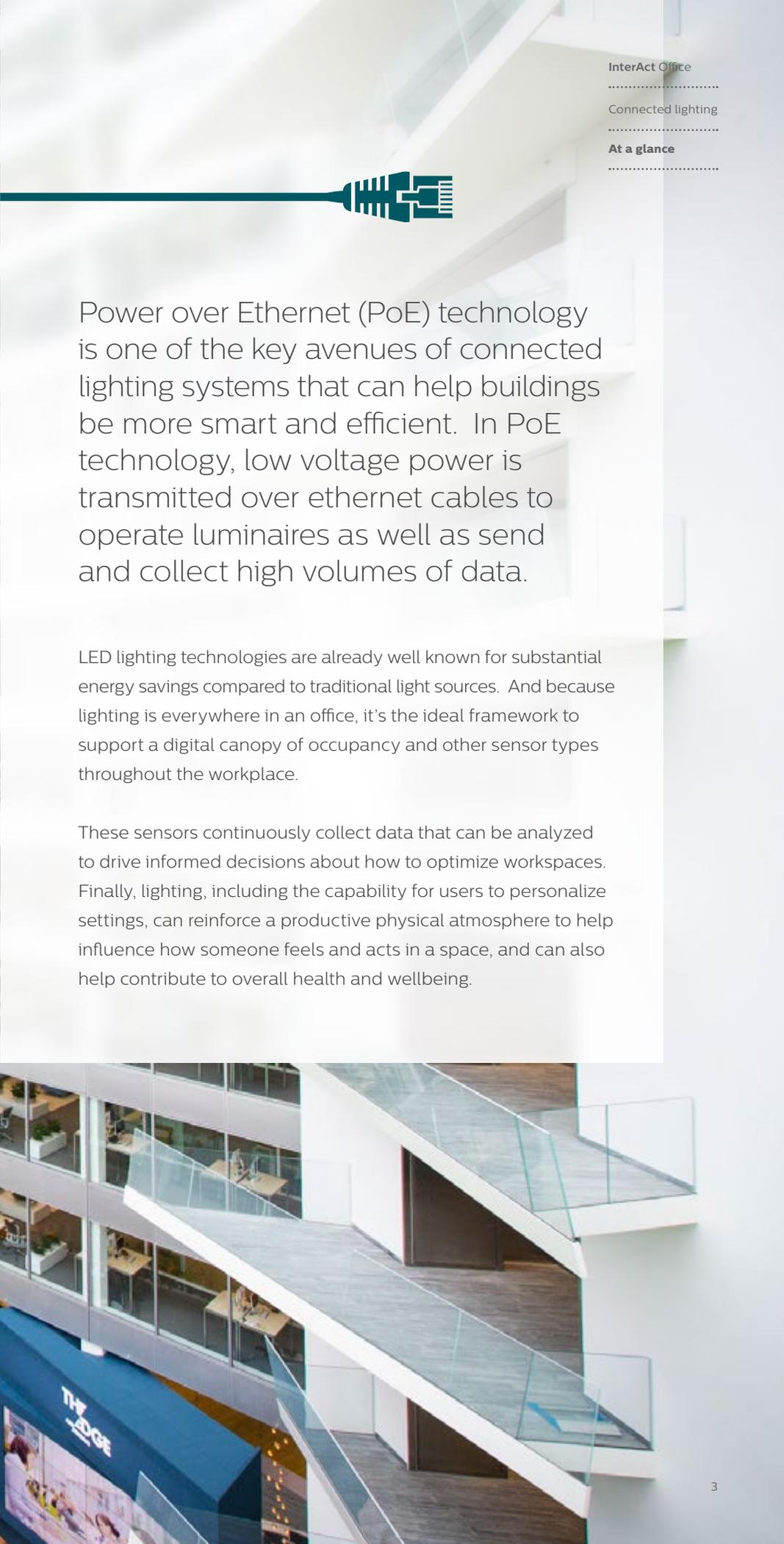
The 3-30-300SM Principle*, from commercial real estate services firm Jones Lang LaSalle (JLL), takes into account tangible factors, such as utilities and rent and intangible factors such as employee well-being and productivity. This Principle compares the relative amounts of money that organizations typically spend on utilities, rent, and payroll. Even with a realized maximum energy savings of 100%, organizations can expect to save only \$3/sq. ft. In comparison, a small percentage improvement in space optimization and employee productivity can help surpass that with potential for much more.



Power over Ethernet (PoE) technology is one of the key avenues of connected lighting systems that can help buildings be more smart and efficient. In PoE technology, low voltage power is transmitted over ethernet cables to operate luminaires as well as send and collect high volumes of data.

LED lighting technologies are already well known for substantial energy savings compared to traditional light sources. And because lighting is everywhere in an office, it's the ideal framework to support a digital canopy of occupancy and other sensor types throughout the workplace.

These sensors continuously collect data that can be analyzed to drive informed decisions about how to optimize workspaces. Finally, lighting, including the capability for users to personalize settings, can reinforce a productive physical atmosphere to help influence how someone feels and acts in a space, and can also help contribute to overall health and wellbeing.



Positively impact

Buildings

Challenges

11% of all energy is consumed by lighting
Source: <http://bit.ly/19percentenergy>.

Frequent maintenance of traditional lighting technologies throughout the facility

less than 50% of average office space is utilized
Source: CBRE research data, 2014.

\$10k average cost per desk / per year
Source: New Flexible Working Legislation – A Business Edge? New Statesman, Oct 2014.

Inefficient flat-fee maintenance and cleaning contracts

Silo approach for each sub system
Integration limitations and redundant information collection

Solutions

up to 80% energy savings from LED lighting, integrated sensor and HVAC integration¹

Prescriptive maintenance get real time and historical performance data on compatible installed devices

Utilization information occupancy and space data provided for optimized corporate use of space

\$5/ft² yearly rental space savings²

\$8/100 ft² Yearly cost reduction in condition-based maintenance and cleaning contracts³

Open API and industry standard
Achieves flexibility and numerous integration possibilities



1. Combined savings from LED lighting, occupancy sensor, daylight harvesting, personal controls and control of Variable-Air-Volume (VAV) HVAC installations (Source: J. Zhang, R.G. Lutes, G. Liu, M.R. Brambley. Energy Savings for Occupancy-Based Control (OBC) of VAV Systems, January 2013).

2. Percentage range of savings: 11-67%; average rent price of \$48.62/ft²/year based on Q3 2015 office market outlook by Colliers International.

3. Source: International Facility Management Association, Benchmarks V report #30, 2008; based on \$1.62/ft² inflation adjusted cleaning cost.

Positively impact

Productivity

Challenges

33% of meetings are unplanned¹

20% of reserved meeting rooms are unused²

Encourage participation from personnel

Attract top talent

Brand perceptions from stockholders, visitors, outsiders

Solutions

Wayfinding
locate and quickly navigate to desired spaces via Philips indoor positioning smart algorithms

Intelligent spaces
integration with corporate calendar to reserve spaces or automatically cancel/maintain reservations based on real time occupancy analytics

Agile workspaces
increase collaboration and interaction

Personalized lighting
customize lighting levels to personal preference

Cutting-edge
smart building technology with building wide system integration possibilities



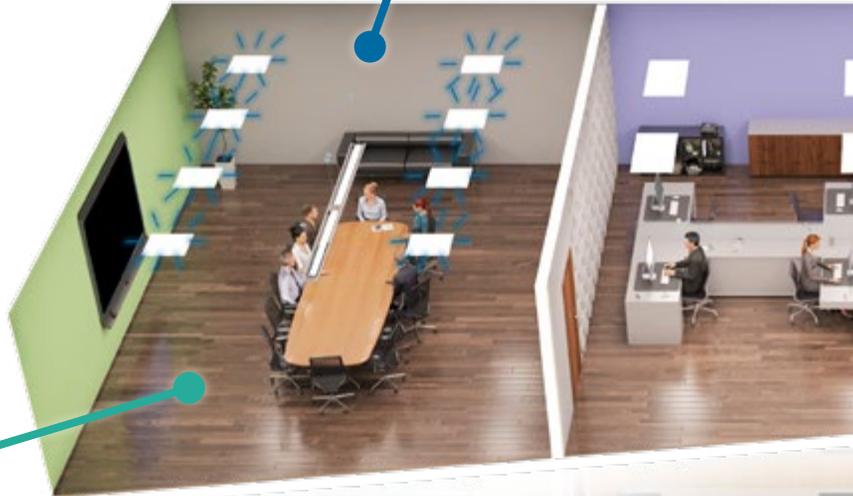
1. Source: <http://bit.ly/ConfBooking>.
2. Source: <http://bit.ly/20percentmtgrooms>.

Day in the Life of an Office worker

What would a day be like for an office worker with InterAct Office installed in your building?

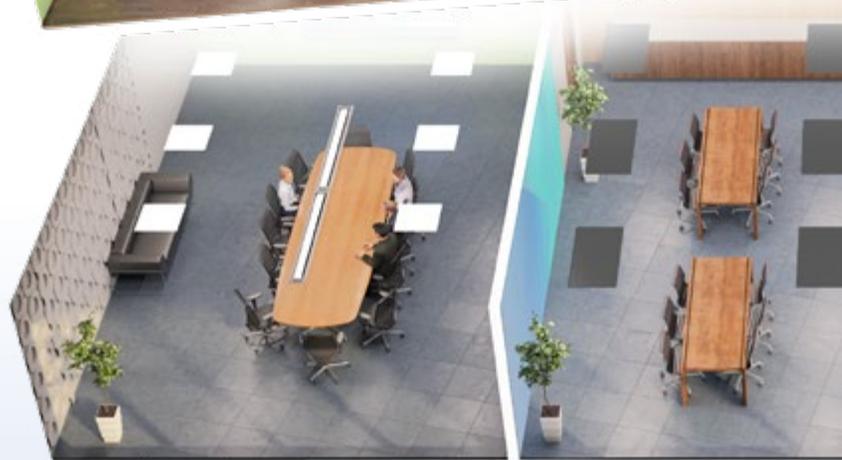
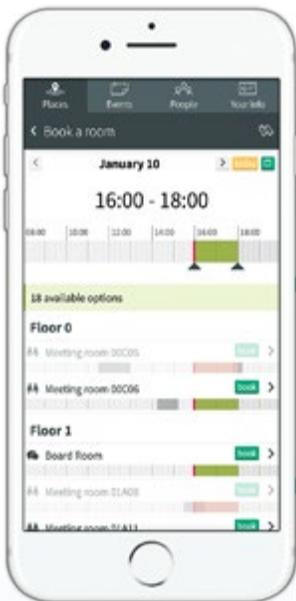
11:50am

Lights flash as a visual cue that the scheduled time is coming to an end.



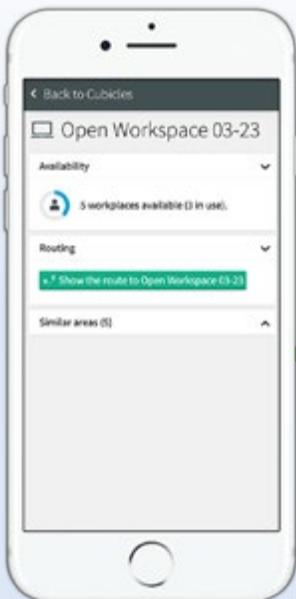
11:00am

Through corporate calendar, reserve the nearest meeting room and use wayfinding to navigate.



8:00am

Location based services and wayfinding show the nearest available desk.



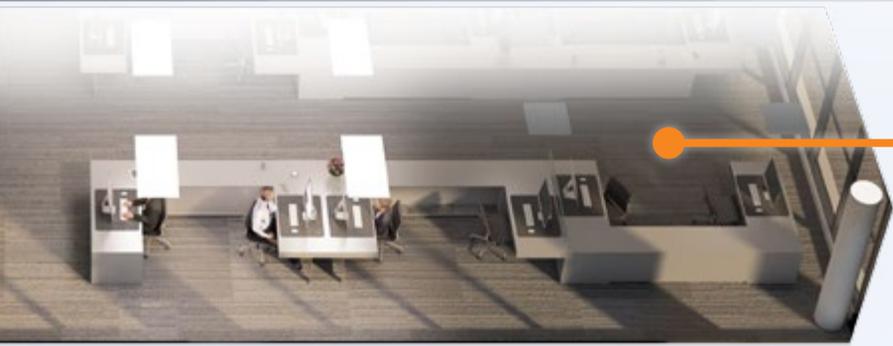
12:15pm
Location based services help find colleagues for lunch.



2:30pm
Adjust the color temperature and light levels from a smart phone.



5:00pm
When leaving the office, lights dim to background level and turn off when the entire space is vacant.



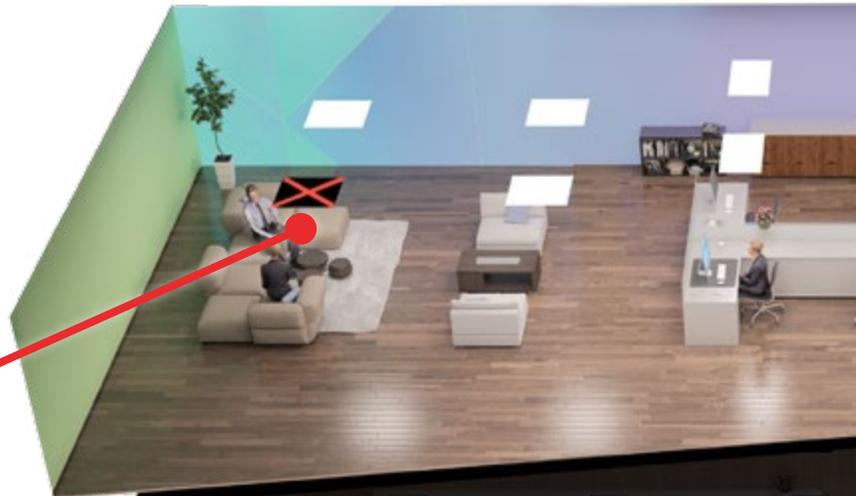
Day in the Life of a Facilities manager

Empower your facilities manager
to run your building more efficiently.



10:12am

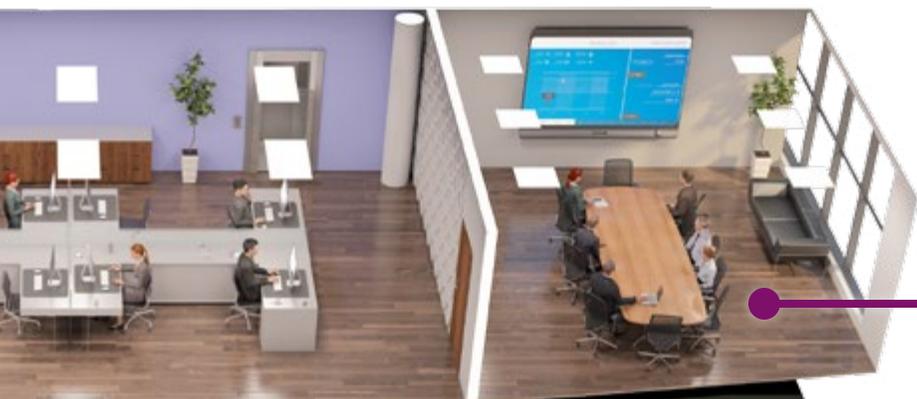
Real time fault
notification with
wayfinding to track
location.



6:00am

Based on historical
occupancy data, floor
is shut down and
locked out to save
energy.





2:30pm
Meet with Corporate Real Estate team to review space optimization.



5:00pm
Facility manager advises cleaning crew which areas need cleaning based on day's occupancy.



“ The Edge is now the cheapest office in the world for Deloitte. They have added nearly 1,000 workers to the space and have four times more applicants than before.”

Erik Ubels, Chief Technology Officer at OVG

The Edge

Amsterdam, the Netherlands

A comfortable, productive and sustainable environment

The Edge is an innovative, multi-tenant office building in Amsterdam, developed by OVG Real Estate. Upon opening in 2015, it received an outstanding sustainability score of 98.36% – the highest ever awarded – from BREEAM, the world’s leading design and assessment method for sustainable buildings. A key aspect of the sustainable design is the Philips connected lighting system, InterAct Office, that enables employees to personalize the lighting and temperature at their workspaces via a smartphone app. The system also provides real-time data on activities in the workspace that helps to maximize operational efficiency and further reduce the CO₂ footprint. The system demonstrates worldwide leadership in sustainable practices and responsive, human-centric working environments.



6,500

PoE luminaires over 15 floors, 3,000 with integrated sensors



\$4.2M

Savings per year in space optimization compared to previous location



4x

More applicants than before for Deloitte



\$115k

Expected savings in energy costs per year

As a principal tenant, Deloitte has seen exceptional savings with the smart system. In addition they have seen a four fold increase in the number of applicants for The Edge.

“ This is the Internet of Everything at work. It can't get any better than this. The system of things works to connect people with processes and data — data that we would otherwise not have access.”

Dr. Rick Huijbregts, 'Americas Industry Transformation Lead for Cisco'

CISCO

Canadian headquarters, Toronto, Ontario

A cutting-edge workspace

Philips Lighting and Cisco entered into a global strategic alliance that combines Cisco's highly secure and proven network infrastructure with Philips Lighting's unbeatable expertise in illumination experiences and connected lighting systems. Businesses are able to fully realize the promise of the IoT. To demonstrate this, a state of the art connected lighting system from Philips Lighting, InterAct Office, was installed using Cisco switches at Cisco's Canadian headquarters located within RBC Waterpark Place III in Toronto, Ontario. Owned by Oxford Development Company and built by EllisDon Corporation, the 30-story building is one of the city's first LEED Platinum office and retail developments, with many design aspects focused on efficiency and sustainability.



600
 PoE luminaires
 in a 110,000 ft²
 office space



UP TO 80%
 Expected cost
 savings including
 a 10% CapEx savings



1ST
 LEED Platinum
 office and retail
 developed in Toronto



\$600k
 Annual savings
 by converging five
 networks into one*

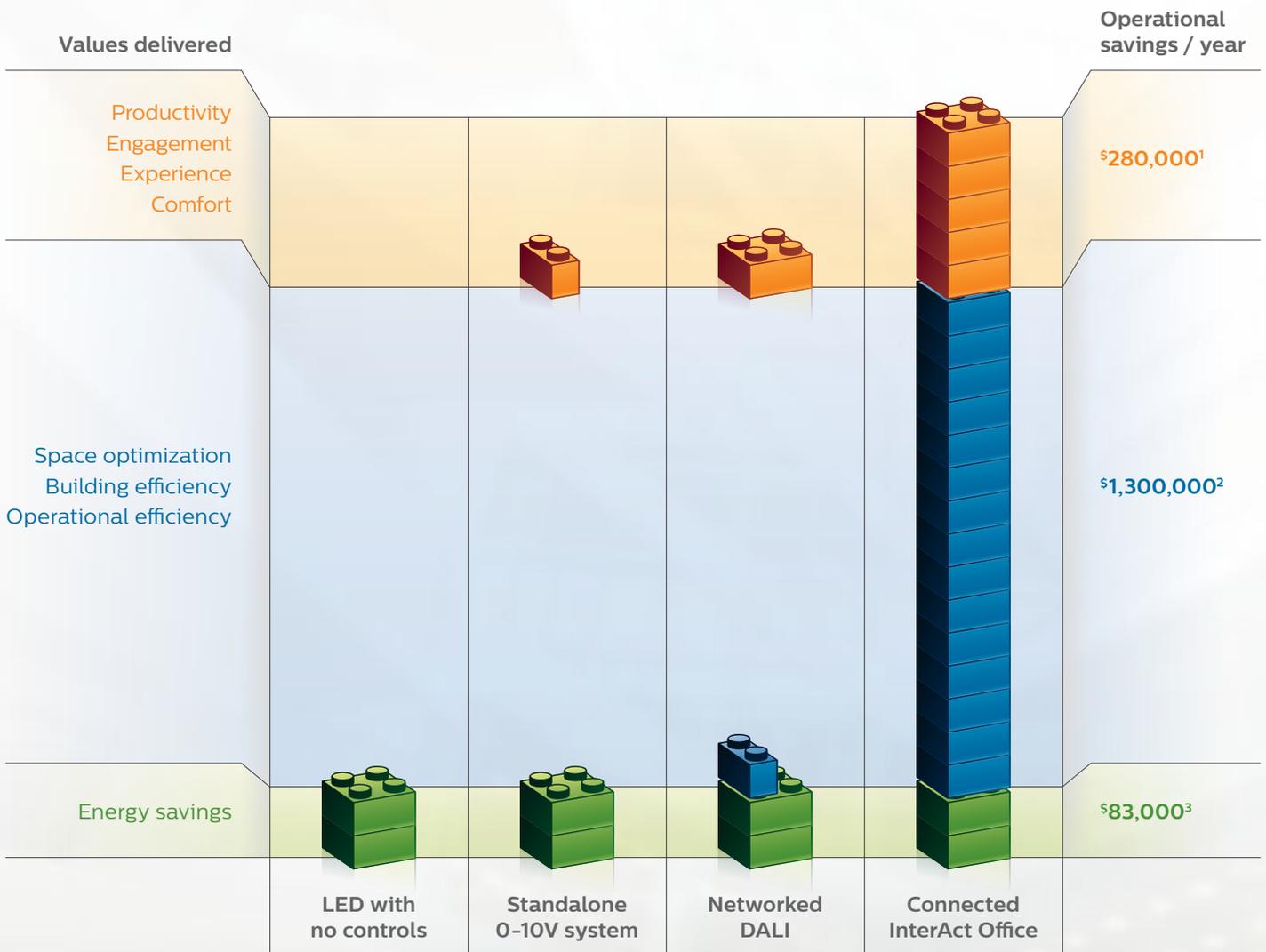
The future of workspaces is looking bright. With lighting that can inform owners of maintenance requests, occupancy trends, temperature control, and more, offices will become more efficient, more sustainable, and more comfortable.

* Lighting, Metering, Access, HVAC and CCTV.

What is the value of connected lighting?

Building a better solution

Total value of ownership of InterAct Office compared to other lighting control systems. Example based on San Francisco location (100,000 sq ft installation) Class A Office building type.



1. **Productivity savings based on:** 1% productivity increase; average for different job types and median salaries in San Francisco.

2. **Operational savings based on:** Assumed 10 minute savings / day on failure identification, system health check & functionality status. Cleaning savings of \$9.35/100 sq ft and \$73.44 / ft² / year rental cost in San Francisco. Current average 50% utilization with target of 80%. Source: <http://bit.ly/2y4h5B4>.

3. **Energy savings based on:** Savings from LEDs and sensors. Assumed \$0.15 / kWh avg utility cost. Source: <http://bit.ly/2y4lgeZ>.

Benefits and features of InterAct Office compared to other lighting control systems.

Who benefits	Values delivered	LED with no controls	Standalone 0-10V system	Networked DALI system	InterAct Office
Employers, Employees	Productivity	—	—	—	<ul style="list-style-type: none"> Way finding Meeting room scheduling Many more features coming soon
	Engagement & Experience	—	—	<ul style="list-style-type: none"> Dynamic lighting 	<ul style="list-style-type: none"> Dynamic lighting Personal control Branding Location based services
	Comfort	—	<ul style="list-style-type: none"> Quality of light Background level dimming Dwell time 	<ul style="list-style-type: none"> Quality of light Background level dimming Tunable White Dwell time 	<ul style="list-style-type: none"> Quality of light Background level dimming Dwell time
Employers, Building owners, Developers, Investors, Facility Managers	Space optimization & Building efficiency	—	—	—	<ul style="list-style-type: none"> Desk level accuracy People counting Occupancy heat map
	Operational efficiency	—	—	<ul style="list-style-type: none"> BMS and other building integration Monitor, manage, control, maintain 	<ul style="list-style-type: none"> BMS and other building integration with open API Monitor, manage, control, maintain Real time and historic data Pay for maintenance as needed (eg. cleaning) Prescriptive maintenance with granular fixture level data
	Energy savings (see energy savings footnote on page 12 for more details)	<ul style="list-style-type: none"> On, Off 	<ul style="list-style-type: none"> On, Off, Dimming Scheduling Zoning Occupancy sensing Daylight harvesting 	<ul style="list-style-type: none"> On, Off, Dimming Scheduling Zoning Occupancy sensing Daylight harvesting 	<ul style="list-style-type: none"> On, Off, Dimming Scheduling Zoning Occupancy sensing Daylight harvesting
Total operational savings potential	Total savings (see chart on page 12 for details on savings)	\$0 \$0 \$73,000	\$0 \$0 \$78,000	\$0 \$2,000 \$73,000	\$280,000 \$1,300,000 \$83,000
	Payback*	5 - 6 years	3 - 4 years	5 - 6 years	2 - 3 years

This example is only for reference purposes and is based on certain assumptions & luminaire choices in a typical project. Contact your Philips representative for a free evaluation of your project and to find out which is the right solution for you.

* Payback calculation based on equipment & Software only, excludes installation and rebates for a typical office scenario listed on page 12.

Philips Lighting connected lighting system

How InterAct Office works

InterAct Office with PoE technology is a connected lighting solution comprised of connected luminaires and a web-based centrally hosted software dashboard that can be integrated into building management systems.

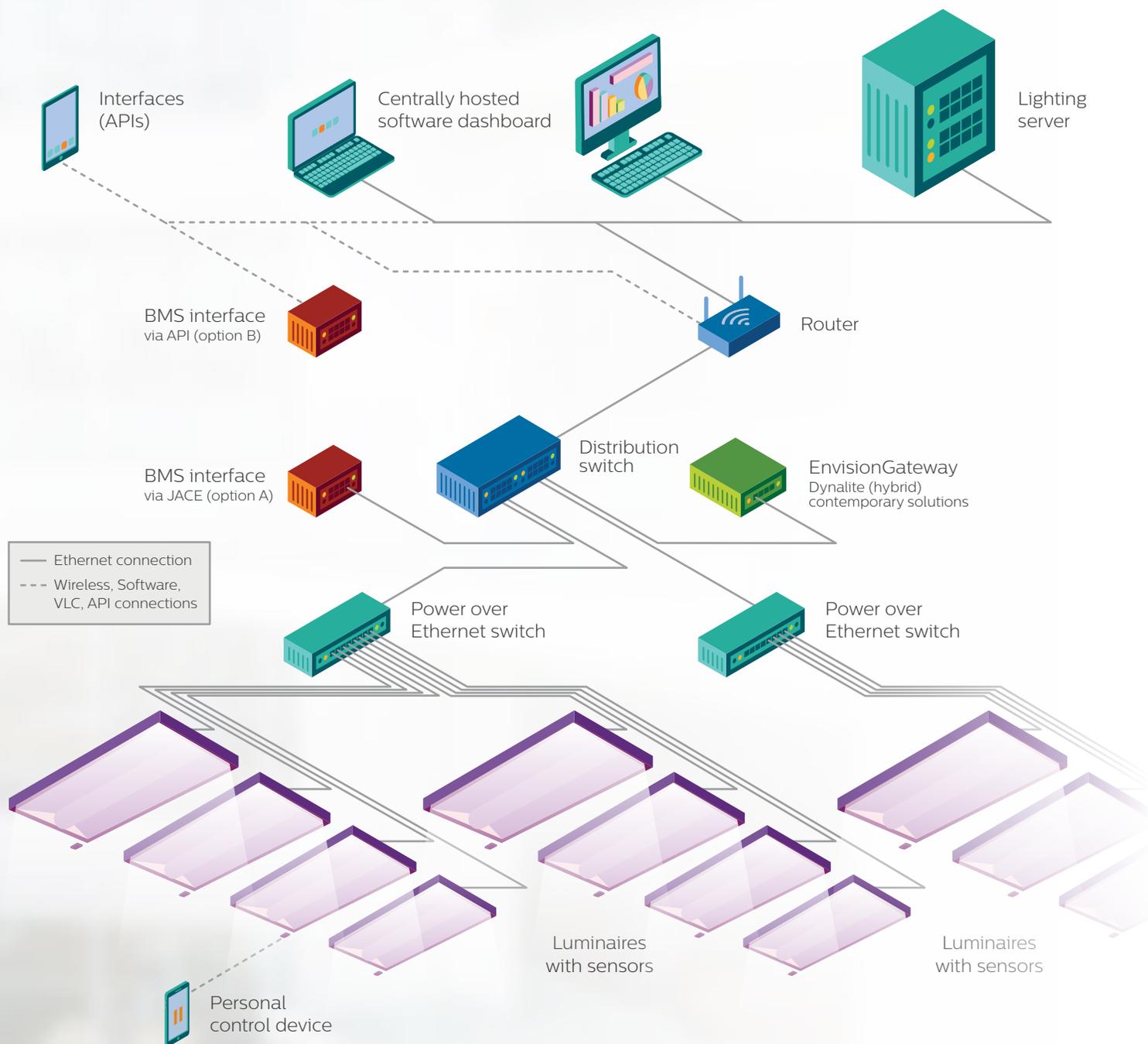
InterAct Office enabled luminaires utilize standard Ethernet cables to draw power from switches and to communicate data, thus eliminating the need for separate electrical wires. Each luminaire is assigned a unique IP address for two-way communication with the building's IT network.

Onboard sensors in the luminaires create points of intelligence (or a digital canopy) that gather and transmit data relevant to the illuminated space; such as occupancy, activity, temperature, and light levels, or relative to a luminaire's performance. This data can be analyzed and combined with other non-lighting related operational data from the site, or enterprise-wide. Once compiled the data can be used for actionable insights on space optimization and building operation efficiency that ultimately lead to improved productivity as well as reduced energy and maintenance costs.

Additionally, integrated visible light communications (VLC) technology can be used to deliver personalized location-based services, including wayfinding, and in-context information to people in the space via an app-enabled personal device. This supports convenience for those in the space to help boost productivity. Philips PoE also receives information to allow remote monitoring, emergency testing, scene-setting and advanced scheduling.



System architecture for InterAct Office with PoE technology





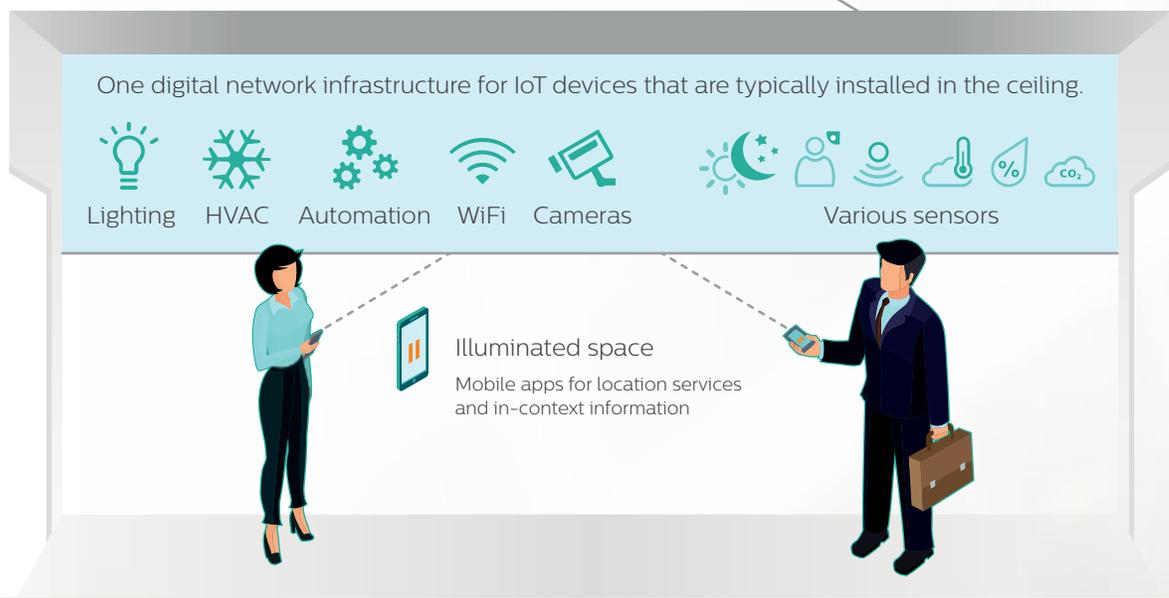
Simplified building network architecture



Management, monitoring and analytics

Network infrastructure

- Lighting controllers
- Ethernet switches
- PoE switches
- IP network convergence
- Security systems



One digital network infrastructure for IoT devices that are typically installed in the ceiling.

- Lighting
- HVAC
- Automation
- WiFi
- Cameras
- Various sensors

Digital canopy

- Lighting
- HVAC
- Building automation
- WiFi access points
- IP surveillance cameras
- Various sensors
 - light
 - occupancy
 - motion
 - heat
 - humidity
 - CO₂

Illuminated space
Mobile apps for location services and in-context information



Centralized

- Home run on all Ethernet cabling
- Active cooling of all heat load in one spot
- Easy to physically secure
- Large closet size
- Familiarity with the IT approach
 - easy to maintain and manage
- Potential voltage loss with longer cable runs



Distributed

- Take advantage of power in the ceiling
- Less home runs to IDF/EC
- Small closet size
- Passive cooling of heat load
- Difficult to physically secure
- Reduced risk of voltage loss with shorter cable runs (dependent on run distance and cable gauge)

Connected components

Building blocks for a connected landscape

Ethernet Gateway connects luminaires and the Antumbra control panels. A centrally hosted software dashboard acts as an interface interlinking InterAct Office luminaires as well as standard luminaires like 0-10V and DALI with the building management system.



A centrally hosted software dashboard, with a graphic user interface captures all data from the luminaires to provide a performance report card that can support informed business decisions.



Ethernet Gateway provides a multipurpose Ethernet connection to a lighting control system. It supports access to the connected lighting via an app and web interface.



Power over Ethernet switch provides electricity to the luminaires and also routes sensor data within the connected lighting system.



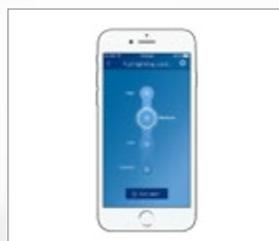
Connected lighting server collects, stores and processes all information about the connected lighting system.



Antumbra control panels are wall-mounted user interfaces that allow lights to be turned on/off and dimmed, or light scenes to be activated.



Connected luminaires provide illumination and enable the digital canopy. Sensors may be integrated to measure occupancy rates, daylight levels and temperature.



Personal control app activated on a mobile device (phone or tablet) allows users to control the lighting in the space.

InterAct Office with PoE technology enabled luminaires

Lighting the path to smart buildings

Philips Lightolier
Calculite
generation 3 downlights



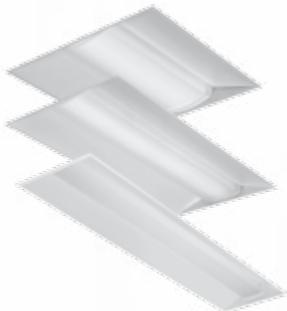
Philips Ledalite
FloatPlane
LED suspended luminaires



Philips Day-Brite/CFI
FluxGrid
LED recessed luminaires



Philips Day-Brite/CFI
EvoGrid
LED recessed architectural luminaires



Philips Day-Brite/CFI
FluxStream
LED linear strip, industrial and wraparound luminaires



Standard portfolio with 4-6 weeks lead time: Calculite, FloatPlane, FluxGrid, EvoGrid, and FluxStream.
Consult factory for other luminaire types such as: TruGroove, BoldPlay, ChopStick, and VersaForm.
Don't see the product you're looking for? Contact enterprise@philips.com to discuss your project needs.

Why choose Philips?

Revolutionary technology creates a bright future with unlimited possibilities

With over 125 years of lighting expertise, and as the world's largest lighting provider, you can trust Philips Lighting to provide lasting value beyond illumination. We are uniquely positioned to offer convenience, expertise and solutions for your connected lighting system that no other manufacturer can match, including:

1

Technology partnerships

We continually partner with software experts for API development and integration. This allows you to collect and build more data from your buildings, including: insights for space management, space

optimization and visualization, wayfinding through smart lighting technology, people counting, meeting room scheduling and remote monitoring.

2

Choice of centralized or distributed architecture

For extra, smart convenience, Philips connected lighting systems are available in centralized or distributed architectures, allowing

the flexibility to either mount the switches in the ceiling or in an IDF / electrical closet.

3

PoE & non-PoE technology enabled luminaires in one integrated lighting system

We understand that every company's needs and goals will vary, so our extensive collection of non-PoE technology (0-10V or DALI) luminaires can be integrated into a lighting system with our PoE enabled luminaires. The entire system is conveniently and cost-effectively managed by a centrally hosted software dashboard.

Customers can still take advantage of the extra cost savings, productivity boost and data harvesting of PoE luminaires in highly trafficked areas such as meeting rooms and work spaces, while incorporating non-PoE luminaires in less frequently used areas such as bathrooms and stairwells.

4

PoE technology enabled emergency battery packs & drivers

Achieve UL924 compliance and create a lighting system with emergency functionality that is completely "Powered over Ethernet". Schedule

and drive remote emergency testing as part of an Enterprise PoE system and automatically report all the test results on the dashboard.

Philips Lighting connected lighting system

Act today for a smart, successful tomorrow

Take the next step towards realizing the full potential of smart buildings. Contact your local Philips Lighting sales representative to arrange a personalized demonstration of InterAct Office, the connected lighting system from Philips Lighting, at the Philips Lighting U.S. Headquarters email enterprise@philips.com or visit philips.com/connectedofficelighting for more info.

About Philips Lighting

We are a global leader in lighting products, systems and services; delivering innovations to unlock business value and provide rich user experiences that help improve lives. Serving professional and consumer markets, we are an industry leader in leveraging the Internet of Things (IoT) to transform homes, buildings and urban spaces. With 2016 sales of EUR 7.1 billion, we employ approximately 34,000 people in over 70 countries.

We invest approximately 5% of our sales revenue in R&D to ensure and remain at the forefront of lighting technology developments. Innovation is at the heart of our business and at the core of our 125-year legacy is the commitment to meet our customers' needs. Philips Lighting has more lighting and lighting controls patents than any other lighting company (approximately 90% are LED and digital lighting related).

News from Philips Lighting is located at:

- Newsroom via <http://www.newsroom.lighting.philips.com>
- Twitter via [@Lighting_Press](https://twitter.com/Lighting_Press)
- LinkedIn via <https://www.linkedin.com/showcase/18082655/>
- Information for investors can be found on our Investor Relations page via <http://www.lighting.philips.com/main/investor>





InterAct Office
.....
Connected lighting
.....
Which do you prefer
.....



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