

# **Catching Up with Bluetooth® Technology and DALI:** Advances in Interoperability, Technology and Applications

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## LEDUCATION 2024

### PRESENTATION TITLE & ABSTRACT

#### Catching Up with Bluetooth® Technology and DALI: Advances in Interoperability, Technology and Applications

Bluetooth® technology and DALI both offer evolving capabilities for wireless, intelligent lighting control infrastructures to meet current and upcoming needs. Since Bluetooth technology introduced its mesh network standard in 2017, there has been continued development including the introduction of a standard Bluetooth mesh interface for D4i intelligent luminaires and most recently, the introduction of Bluetooth® NLC.

Session presenters will share these developments in detail with attendees as well as how field projects using interoperable capabilities of both Bluetooth technology and DALI continue to evolve. The session will be highly interactive to allow sharing of lessons learned and attendee Q&A.



## LEARNING OBJECTIVES

**At the end of this course, participants will be able to:**

### Learning Objective #

Attendees will be able to describe the differences between Bluetooth LE, Bluetooth mesh, and DALI protocols, and how they relate to lighting controls.

### Learning Objective #2

Attendees will learn how the latest advances in interoperability between Bluetooth and DALI technology adds value and extends use cases.

### Learning Objective #3

Attendees will learn about recent demonstration projects using the latest Bluetooth capabilities, such as extended range for outdoor and interoperability with DALI protocols.

### Learning Objective #4

Presenters will share what's next for Bluetooth and DALI technology including the new Bluetooth NLC.



# DALI-2, D4i, DALI+



## A Story of Forests and Trees

An expression used to describe someone who is too involved in the details of a problem to look at the situation as a whole.



"I can't see the forest for the trees,  
Henderson. Have the trees cut down."

# VOC across buildings ecosystem

*Digital use cases vary by persona*

BUILDINGS		LIGHTING	NA REGION	PERSONAS
Owners & Asset Managers	GCs, ESCOs, Integrators	Ltg Designers, Electrical Engineers	Utility Programs & Implementers	<ul style="list-style-type: none"> <li>Responsibilities</li> <li>Beliefs</li> <li>Mission &amp; Motivation</li> <li>Drivers and Influencers</li> <li>Pain points</li> </ul>
Sustainability & Decarbonization Officers	Facility & Property Managers	Luminaire & Controls Manufacturers	Building Performance Standards	
Architects, Owners Reps	Tenants	Lighting Reps, Distributors	Green Groups, Voluntary Programs	
Interiors & Space Designers		Electrical Contractors, CxA	Legislation (e.g., IRA + Infrastructure)	

VOC= Voice of the Customer; IT= Information Technology; OT=Operational Technology; GCs=General Contractors; ESCO= Energy Services Company; CxA= Commissioning Agent; IRA= Inflation Reduction Act



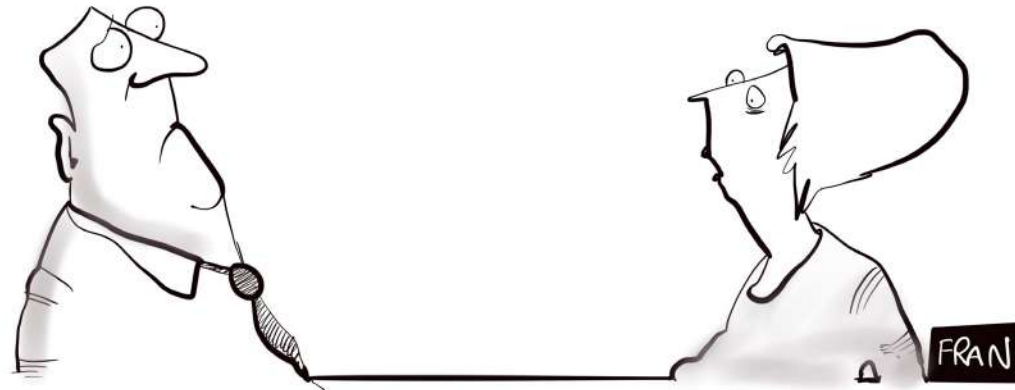
## Conversations with major real estate owners and managers

- Brookfield Properties
- Vornado Realty Trust
- The Durst Organization
- US GSA
- Tishman Speyer
- JLL
- Johnson Controls,
- Schneider Electric

*"We are done with lighting."*

- ▶ CREtech Panel member, Real Estate Executive for large property portfolio

Owners & Operators represented > 5.6 Billion SF



The GOOD news is that customers complaints are down, the BAD news is that we've got no customers.

CartoonStock.com

## LESSONS LEARNED

1. Market "push" is not enough in North America
2. Consideration of ALL personas– motivations, drivers, pains & gains– should drive strategy and will leverage change
3. Market pull + market push is a stronger strategy





- The elephant in the room:  
we are on the outside looking in.



## Digitizing Lighting in the Era of Decarbonization

*We (lighting) are  
disconnected &  
increasingly  
irrelevant.*

*So, what are we  
going to do about  
it?*

*Interoperability,  
standardized,  
digital.*

designing lighting *Magazine*, by Carol Jones, October 2023

**“Elephant in the room”** An embarrassingly huge, obvious problem everyone is acutely aware of, but which is being ignored because no one wants to talk about it, hear about it or deal with it.

**LinkedIn**



**Carol Jones** · You  
Lighting & Buildings Industry Leader | Digital lighting & sensor tech | ...  
2mo · 🌐

I've gone to multiple conferences recently with the specific intention of reaching beyond our lighting community. My goal was to learn more about macro trends and priorities of building owners and managers, and to see how lighting does or doesn't fit into their goals. My findings were consistent and troubling. It's time to have courageous conversations and talk about the elephant in the room: the lack of digital alignment and interoperability in the lighting industry puts us at risk of irrelevance in the decarbonization era. I know there are barriers, but truthfully it still comes to this-- we can make it so if we want to. Do we want to be in the room with others that are committed to Net Zero, grid-interactive buildings, and operational decarbonization? Read my article in 'designing lighting' magazine to learn more.

[https://issuu.com/designinglighting/docs/digital\\_october\\_2023\\_v2/16](https://issuu.com/designinglighting/docs/digital_october_2023_v2/16)

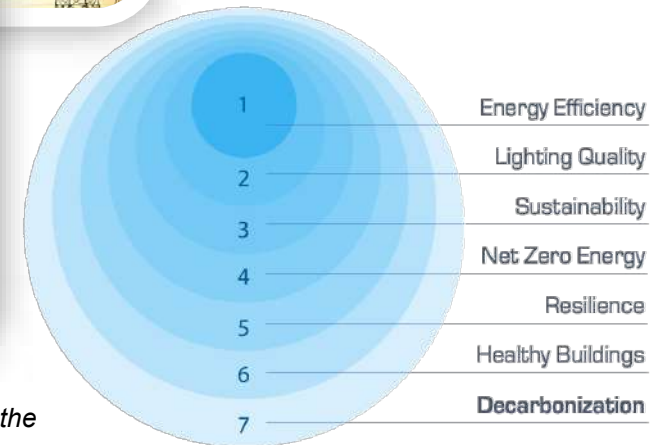
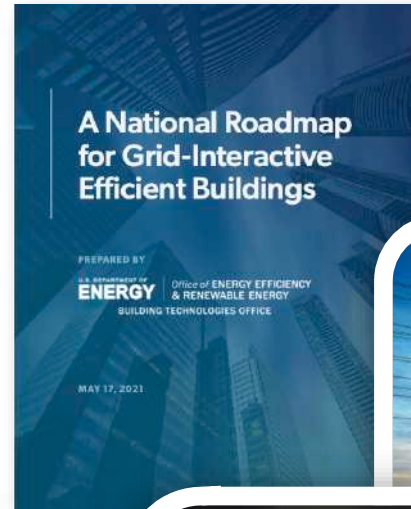


**Macro Trends & Drivers**

- Electrification, electric vehicle charging, grid capacity issues, renewables
- Decarbonization is a top-level priority for the majority of large owners and operators
- Digitization is happening everywhere, **except lighting**
- Lighting contributes significantly to operational decarbonization (50/50? 70/30?) vs. embedded decarbonization
- ROI numbers have changed (e.g., Schneider study, medium level is 8-15 years)

*"If we don't decarbonize our long-term assets now, we are going to lose serious money."*

▶ CREtech panel presenter



Mike Kazmierczak, Schneider Electric, Vice President of the Digital Energy Decarbonization Office

## Macro Trends & Drivers, continued

- Building Performance Standards (e.g., Local Law 97 in NYC, ~40 so far in U.S.)
- CSI Division 25, Master System Integrators (MSI's)
- Healthy buildings still a priority
- Hybrid / flextime workspaces
- New Construction/Major renovation, vs. retrofit are entirely different
- Cost sensitivity in EB: inflation, legislation (e.g.: IRA tax credits), provider competencies
- Market & persona alignment: NC, early adopters

National Building Performance Standards Coalition  
August 2023



## Initial IOT Lighting options:

- ◆ comprehensive offerings by manufacturers
- ◆ including hardware, firmware, sensor, radio, gateway
- ◆ analytics and software with dashboards



To the cloud

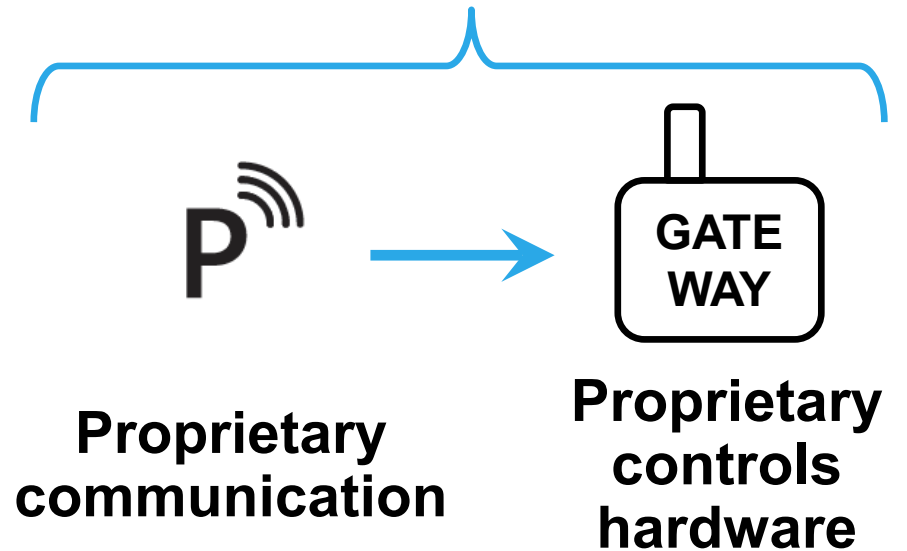
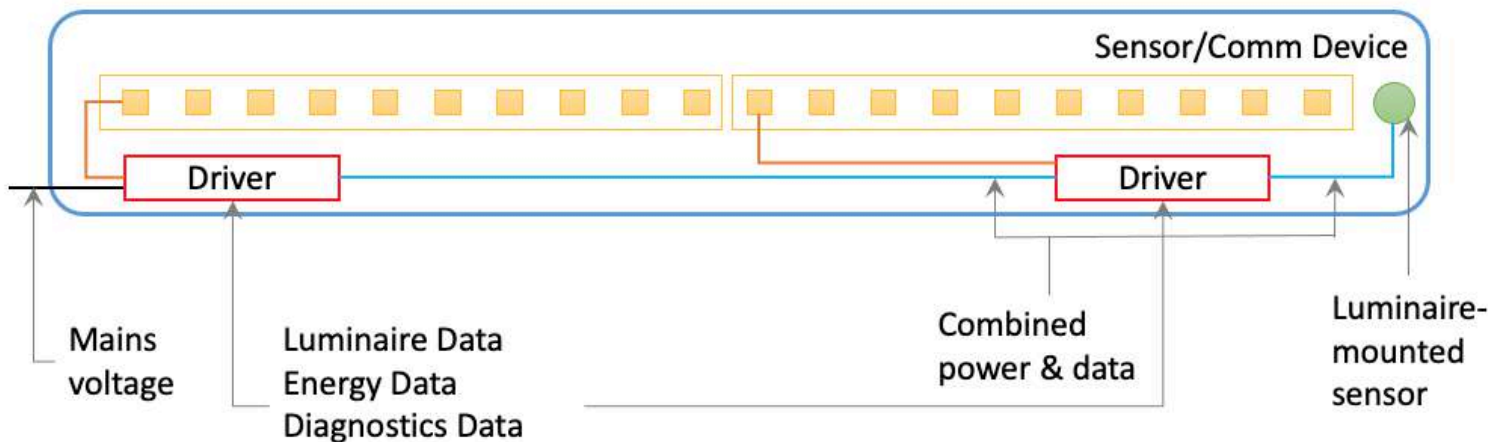


Analytics

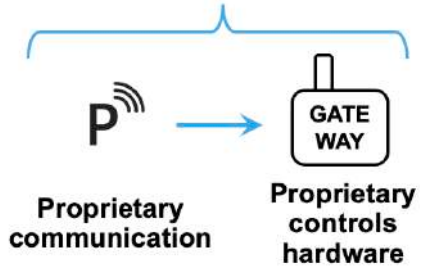


Subscriptions

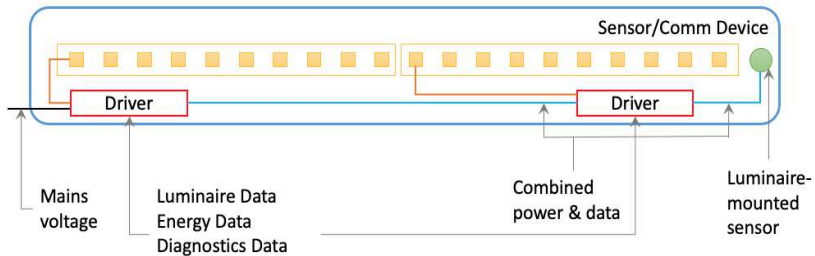
## Proprietary IOT Luminaire



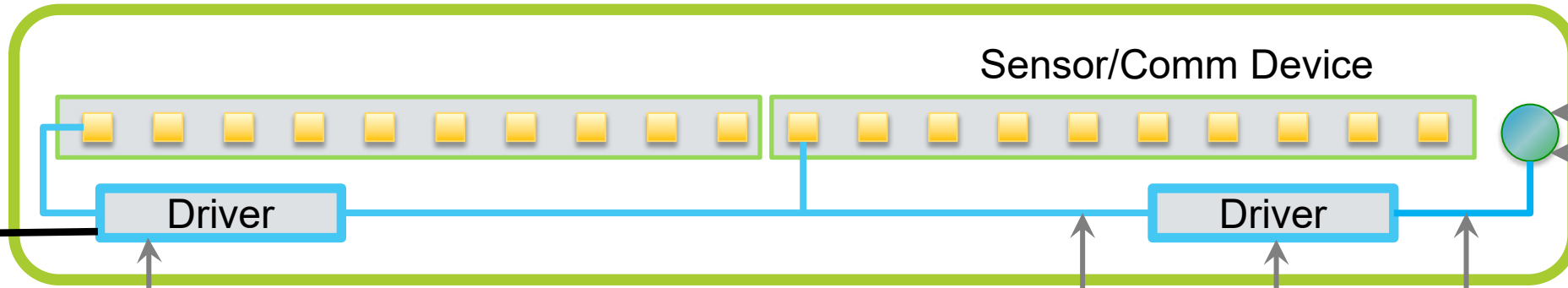




### Proprietary IOT Luminaire



## DALI Alliance D4i + Zhaga Book 20 Certified Luminaire



- DALI Part 250** Integrated bus power
- DALI Part 251** Luminaire Data
- DALI Part 252** Energy Data
- DALI Part 253** Diagnostics Data
- DALI Part 150** Aux Power Supply

**DALI Part 250**  
Intra-luminaire  
DALI bus

**DALI Part 351**  
Luminaire-  
mounted  
control device

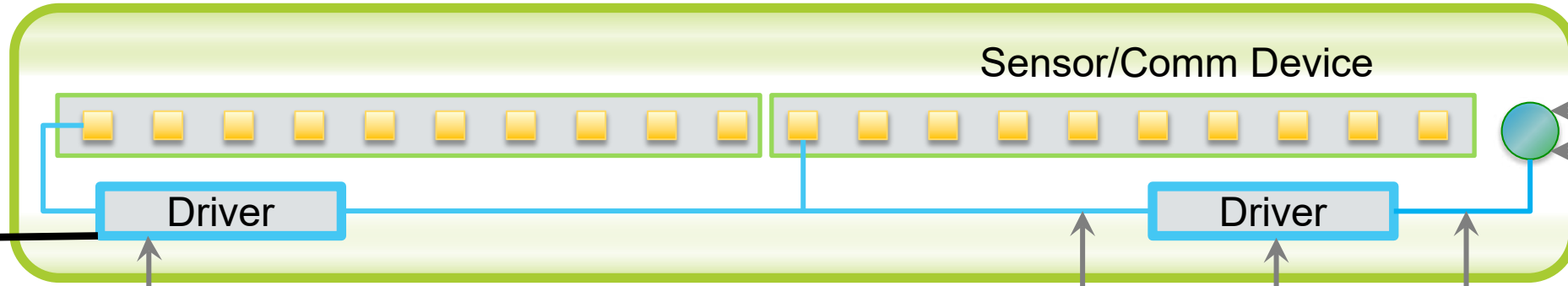
**Zhaga Book 20**  
Sensor interface  
with mechanical  
interfaces, electrical  
connectors,  
references to D4i  
specs for power and  
control, and  
luminaire tests

+

**NEMA LS 20000-  
2021**  
Physical interface  
only, well-aligned  
with Zhaga Book 20

Mains voltage

**DALI Alliance D4i + Zhaga Book 20 Certified Luminaire**



- DALI Part 250** Integrated bus power
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Mains voltage

## The DALI Alliance



The global industry organization for **DALI**<sup>®</sup>, the **internationally-standardized protocol for digital communication between lighting-control devices.**

**DALI is the language of lighting control:**  
State-of-the-art, global, digital, standardized, specialized for lighting, data-rich

### Product certification programs:

Compliance with international standards, supporting cross-vendor interoperability



Lighting control in  
wired networks



Luminaire-level  
lighting control



Lighting control in  
wireless & IP networks

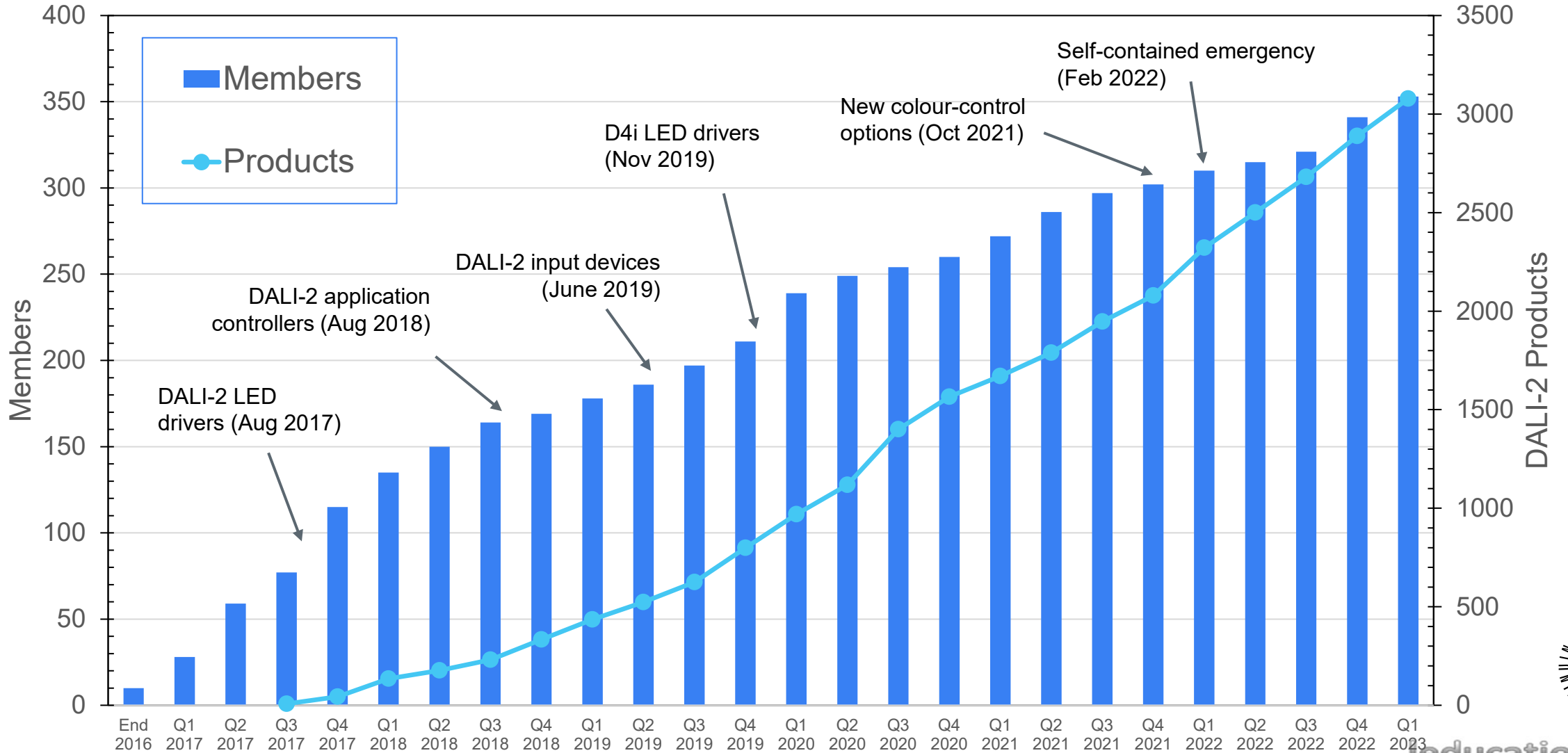
All using the DALI protocol



## The DALI Alliance

- Members are industry leaders in lighting and control, full list on our [website](#)
- Certification, logos and trademarks: DALI, DALI-2, D4i and DALI+
- Around **3,500 DALI-2 certified** products
- More than 5,000 products in total





- **Jan 2023:** DALI Lighting Awards 2022 entry deadline
- **Dec 2022:** 11<sup>th</sup> test house accredited
- **Oct 2022:** Major presence at Light & Building (Frankfurt)
- **Aug 2022:** 3<sup>rd</sup> DALI China Summit
- **May 2022:** DALI-2 certification supports interoperability and sustainable lighting
- **Feb 2022:** First DALI-2 certification of self-contained emergency devices
- **Jan 2022:** DALI Lighting Awards 2021 winners revealed
- **Nov 2021:** 2,000 DALI-2 certified products and 300 members
- **Oct 2021:** Technical Guides published on DALI+ and wireless gateways
- **Oct 2021:** Colour-control options (RGBWAF and xy) added to DALI-2
- **Sept 2021:** Launch of DALI-2 Emergency
- **May 2021:** First Zhaga-D4i control device earns certification
- **May 2021:** Thread Group and DALI Alliance cooperate on DALI+ with Thread
- **Apr 2021:** DALI China Summit held in Beijing
- **Apr 2021:** DALI Alliance issues specifications for Wireless to DALI Gateways



## **DALI is built to enable smart, data-rich networks**

- Feedback & exchange of data is enabled by two-way communication
  - Control gear provide data on output level, lamp failure, emergency test data and more
- DALI-2 sensors and other input devices
  - Environmental information and user inputs
- DiiA Specifications for data storage and reporting
  - Data for enhanced asset management, performance monitoring & diagnostics, real-time energy usage
  - Data for luminaires, control gear & light sources







## DALI Part 250

### *Integrated Bus Power Supply*

Uses the same DALI wire for power and data  
[inside the driver]

2-wire system, reduces production and installation complexity, no worry about polarity, standardized. Individual addresses on same circuit.



## DALI Part 251

### *Luminaire Data*

Luminaire identifiers, CCT, CRI, Light Output  
[inside the driver]

Within a project, seeing these distinctions is important for lighting quality, maintenance, management of the system etc.



## DALI Part 252

### *Energy Data*

Real-time power and energy usage for control gear (driver and sensor)  
[inside the driver]

Energy savings goals, accuracy of real time data, utility rebates, tax incentives



## DALI Part 253

### *Diagnostics*

Operating data for control gear and light source, including failure conditions, run-time data.  
[inside the driver]

Enables fault diagnostics, predictive maintenance and end of life management (e.g., lumen depreciation)



## DALI Part 351

### *Luminaire – mounted Control Devices*

Integral sensor protocol for motion sensing, light levels. Multi-sensor data.

Enables granular control and data collection, Real Time Location Services when mapped, interchangeability, upgradability.



## DALI Part 150

### *AUX Power Supply*

Allows communication with 0-10v drivers, and dim to off. Non-digital interface, but necessary for market transition, options.

Realistic market acceptance and transition, cost, supply, retrofit/ existing buildings.



## DALI Part 209, DT8 (Tc)

### *Color Control*

Commands for CCT (Tc), xy color control, RGBW

Critical for color constancy between luminaires, quality control and calibration in production.



## DALI Part 202

### *Emergency*

Enables illumination and emergency lighting on same network. Includes self-contained.

Supports testing and results. Function test: battery, charging circuit, driver/ relay & source. Data for failures, charge levels, operating hours.



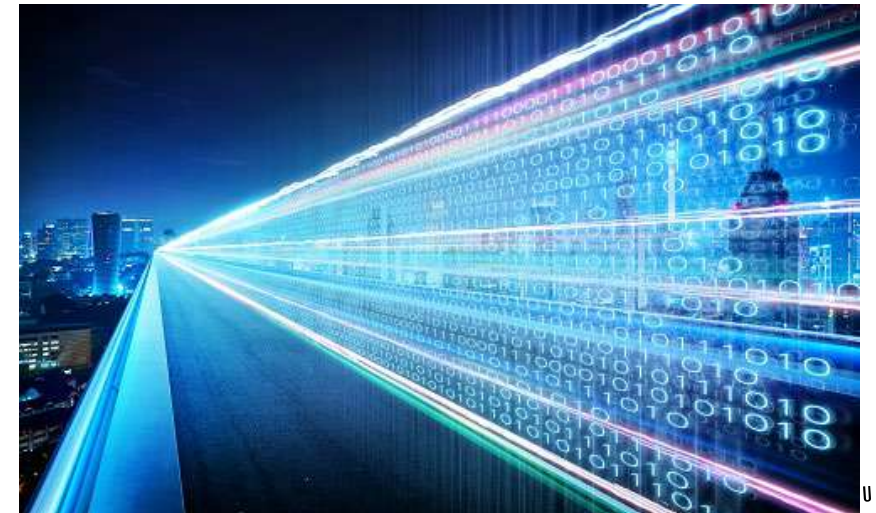
Published DALI Alliance Specifications:  
[www.dali2.org/specifications/download.html](http://www.dali2.org/specifications/download.html)

Category	Name	Published	DALI-2*	D4i*
Power Supply Specifications	<b>DALI Part 150</b> – AUX Power Supply	v1.1, Oct 2019	✓	✓
	<b>DALI Part 250</b> – Integrated Bus Power Supply	v1.1, Oct 2019	✓	✓
Data Specifications for LED Drivers	<b>DALI Part 251</b> – Memory Bank 1 Extension (luminaire data)	v1.1, Oct 2019	✓	✓
	<b>DALI Part 252</b> – Energy Reporting (energy data)	v1.1, Oct 2019	✓	✓
	<b>DALI Part 253</b> – Diagnostics & Maintenance (diagnostics data)	v1.1, Oct 2019	✓	✓
Specifications for Control Devices	<b>DALI Part 351</b> – Luminaire-mounted Control Devices	v1.0, Oct 2019	✓	✓
Connectivity Specifications	<b>Part 104</b> Changes & Additions	v1.01, April 2021	n/a	n/a
	<b>Part 341</b> – Bluetooth Mesh to DALI Gateway	v1.01, April 2021	**	n/a
	<b>Part 342</b> – Zigbee to DALI Gateway	v1.01, April 2021	**	n/a

\* Availability of DALI-2 and D4i certification    \*\* In progress



- D4i is an extension of DALI-2 certification
- D4i components have a compulsory set of features
  - Based on power-supply and data specifications from DiiA
- All D4i LED drivers provide luminaire, energy & diagnostics data
- D4i enables DALI inside intelligent, IoT-ready luminaires
  - Other D4i implementations are also permitted
- D4i simplifies addition of sensors and communication devices to luminaires
- D4i enables plug-and-play interoperability when combined with a connector system
  - e.g. Zhaga Books 18 & 20, or NEMA/ANSI



## A joint certification program based on complementary specifications

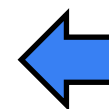
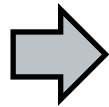


**Specifications from DiiA  
enabling D4i certification**

**Book 18 & Book 20  
specifications from Zhaga**



**DALI Part 250:** Integrated bus power supply  
**DALI Part 251:** Luminaire data  
**DALI Part 252:** Energy data  
**DALI Part 253:** Diagnostics data  
**DALI Part 351:** Luminaire-mounted control devices  
**DALI Part 150:** AUX power supply



**Book 18 for outdoor:  
Book 20 for indoor:**

- Mechanical interfaces
- Electrical pin assignment (Book 18)
- Electrical connectors (Book 20)
- References to D4i specs for power & control, and luminaire tests





- DALI-2 certification indicates **multi-vendor product interoperability**
- **Rigorous and detailed testing**, followed by **verification** of test results
- Allows **trademark use**
- Products are **traceable** in the Product Database
  - [www.dali-alliance.org/products](http://www.dali-alliance.org/products)
- DALI Alliance drives DALI-2 certification
  - First DALI-2 products (LED drivers) certified in September 2017
  - Ongoing addition of new features and new products types
- DALI Alliance creates DALI-2 Test Procedures
  - Test Sequence software is provided to members
  - Members can perform testing, or use accredited test houses



Based on open,  
global standards



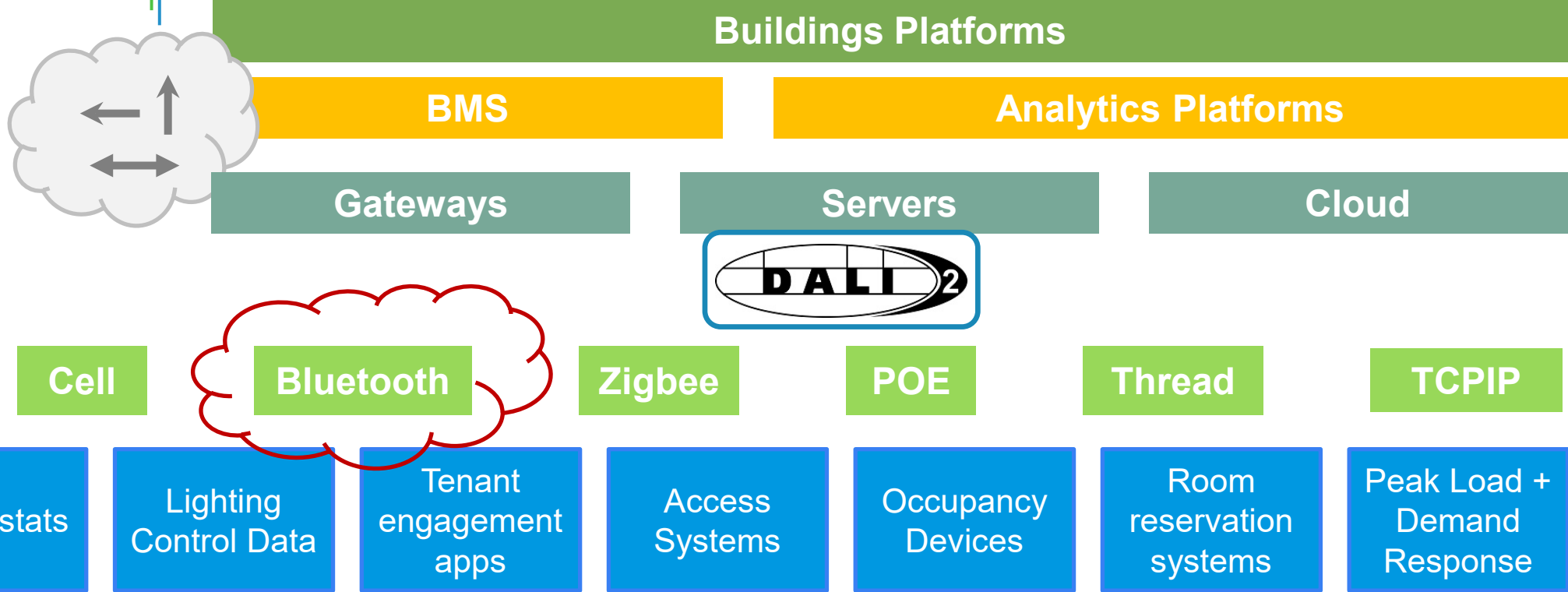
Rigorous testing  
+ verification



Cross-vendor  
compatibility



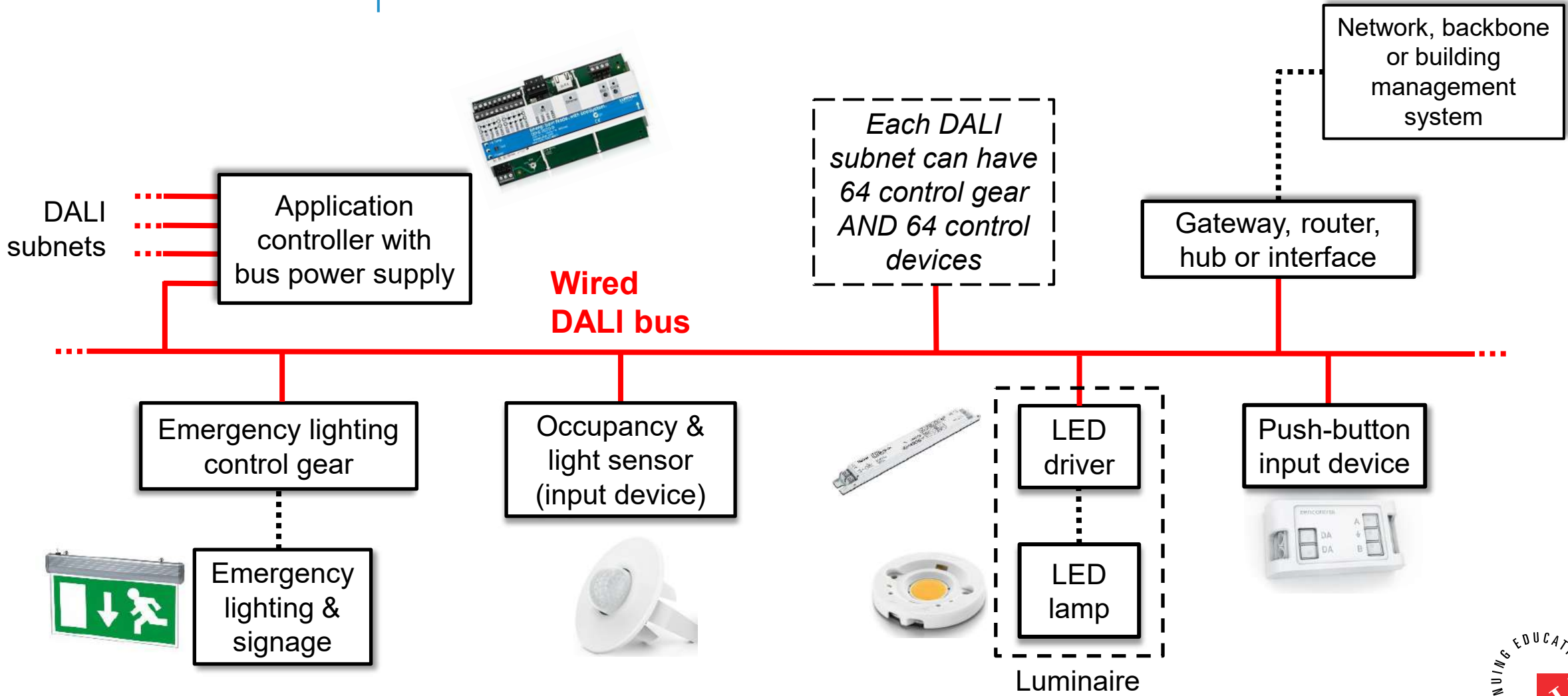
# 30,000 feet view



Solution Type	Examples
Master Platform	MS Azure
Occupancy Intelligence	VergeSense
Integrated Workplace Management System	Planon
AI for Buildings	Prescriptive Data
Grid-Efficient Buildings	ADR + ??



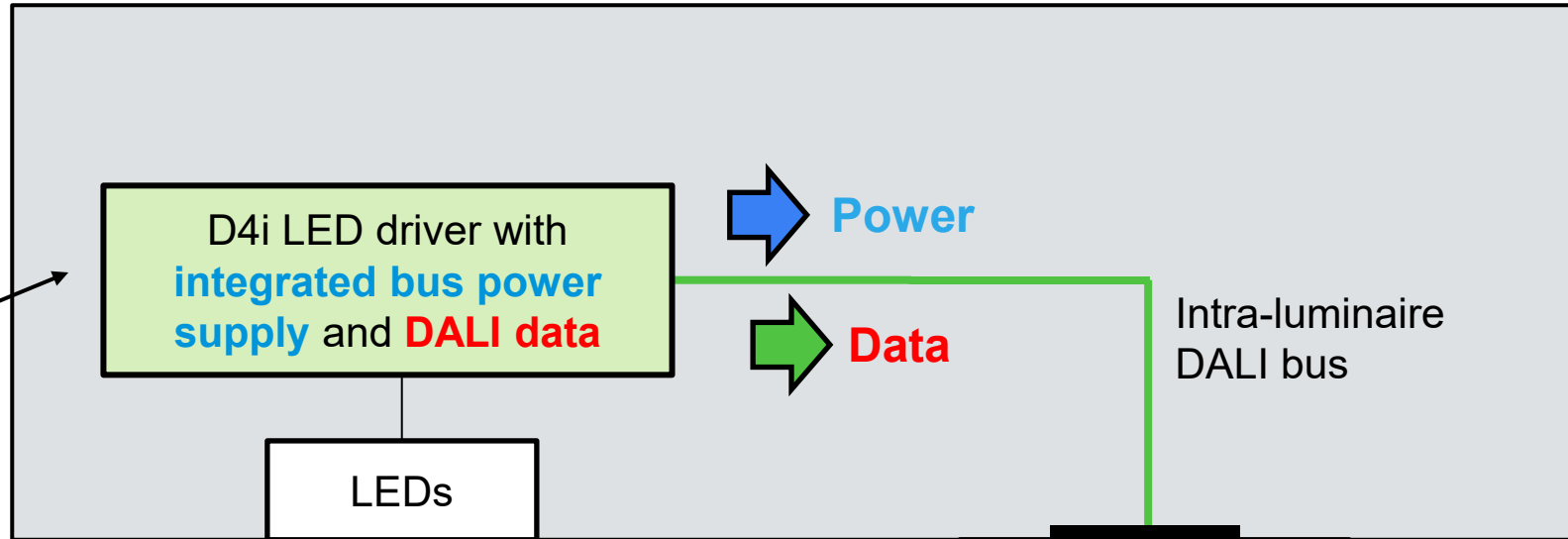
# Wired DALI lighting-control system example





**DALI Part 250**  
(integrated bus power)

**DALI Parts 251-3**  
(luminaire, energy & diagnostics data)



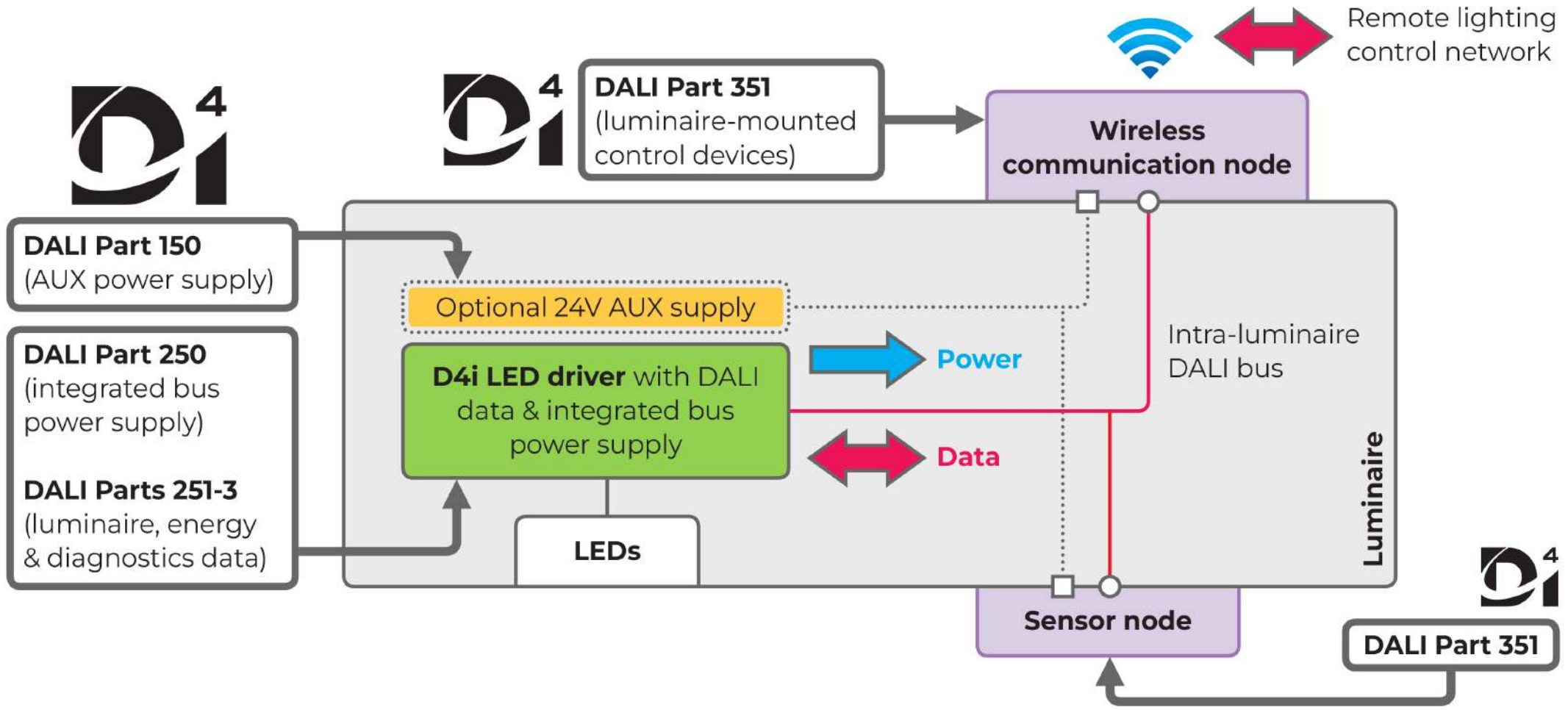
Luminaire



**DALI Part 351**  
(luminaire-mounted control devices)

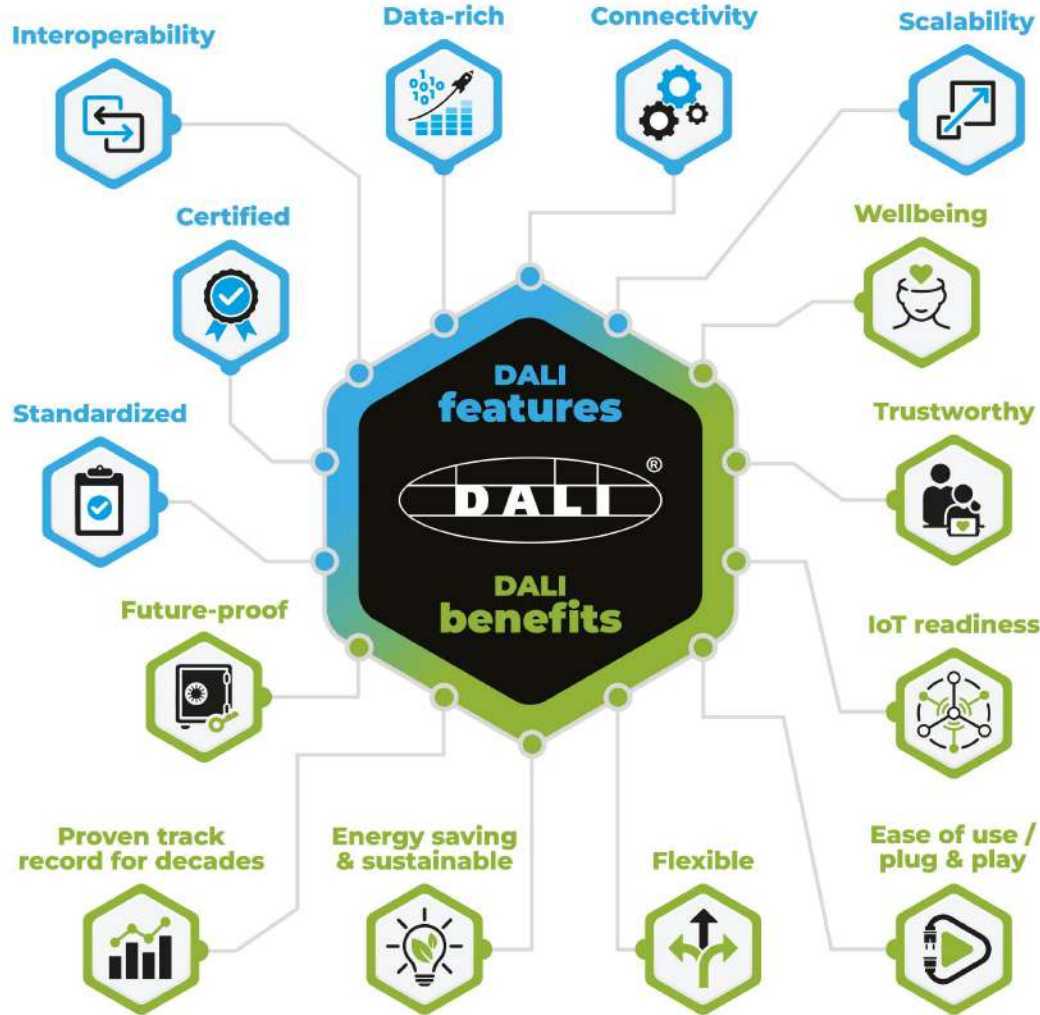


# D4i example: Two-node outdoor luminaire



## FEATURES

- *Standardized*
- *Certified*
- *Interoperable*
- *Data-rich*
- *Connectivity*
- *Scalability*



## BENEFITS

- *Wellbeing*
- *Trustworthy*
- *IOT readiness*
- *Ease of use/ plug & play*
- *Flexible*
- *Energy Saving & Sustainable*
- *Proven track record-decades*
- *Future-proof*



# Bluetooth® NLC



# Bluetooth<sup>®</sup> NLC (Networked Lighting Control)

Henry Wong

Senior Manager, Market Development | Bluetooth SIG, Inc.



- Oversees Bluetooth® technology and associated trademarks
- Not-for-profit membership organization formed in 1998



Standards Development  
Organization

**50+**

Average number of  
enhancement projects  
underway at any given time



Product Certification  
Body

**70K+**

new products completed  
the Bluetooth Qualification  
Process in 2022 alone



Patent and Trademark  
License Administrator

**40K+**

companies party to the  
Bluetooth® technology  
cross license



Industry Trade  
Association

**5B+**

Bluetooth® enabled  
products ship each year





## Audio Streaming

Wireless Headsets  
Wireless Speakers  
In-Car Systems

**1.84**  
**billion**

Annual device shipments



## Data Transfer

Sports & Fitness  
PC Peripherals & Accessories  
Health & Wellness

**1.87**  
**billion**

Annual device shipments



## Location Services

Asset Tracking  
Indoor Navigation  
Digital Key  
Personal Item Finding

**515**  
**million**

Annual device shipments



## Device Network

Networked Lighting Control  
Monitoring Systems  
Electronic Shelf Labels

**1.63**  
**billion**

Annual device shipments

2027



- Bluetooth NLC (Networked Lighting Control) is experiencing mainstream traction and significant growth
- Significant growth is expected over the next five years
- Solutions to meet market requirements
  - Demand for LEDs
  - Greater energy efficiency
  - Faster deployment
  - Better occupant experience

**115%**  
CAGR

of Bluetooth® networked lighting control devices over the next five years

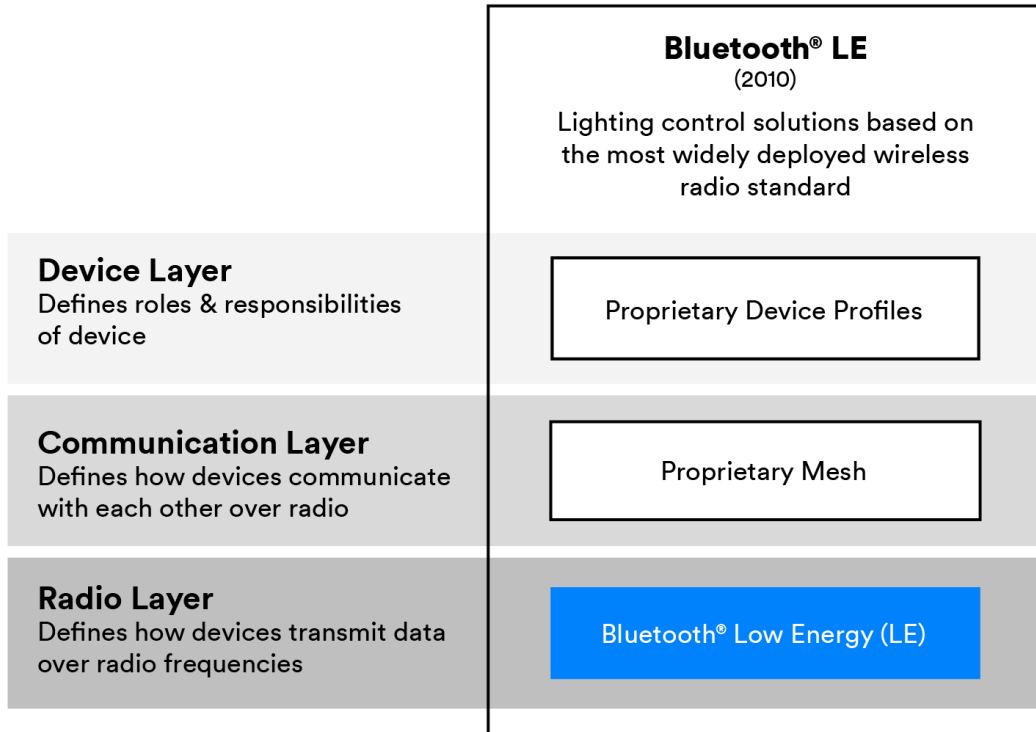
 | Data Source: ABI Research, 2023

Improving Building Operations



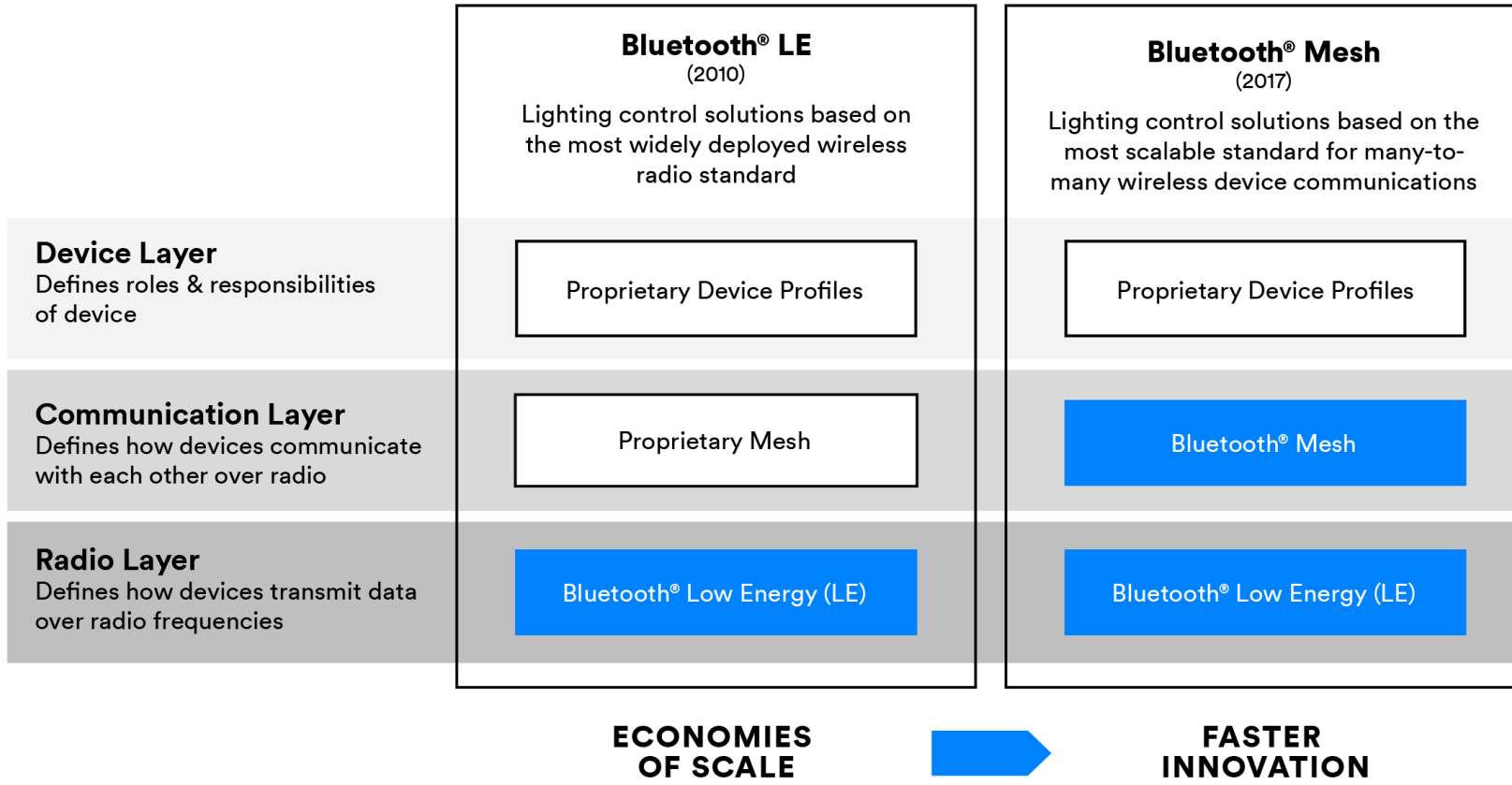
- Bluetooth NLC is the only full-stack standard for wireless lighting control
- Bluetooth NLC is specifically designed to meet the scale, reliability and security demands in a commercial setting
- Standardization from the radio through the device layer, will enable mass adoption of wireless lighting control





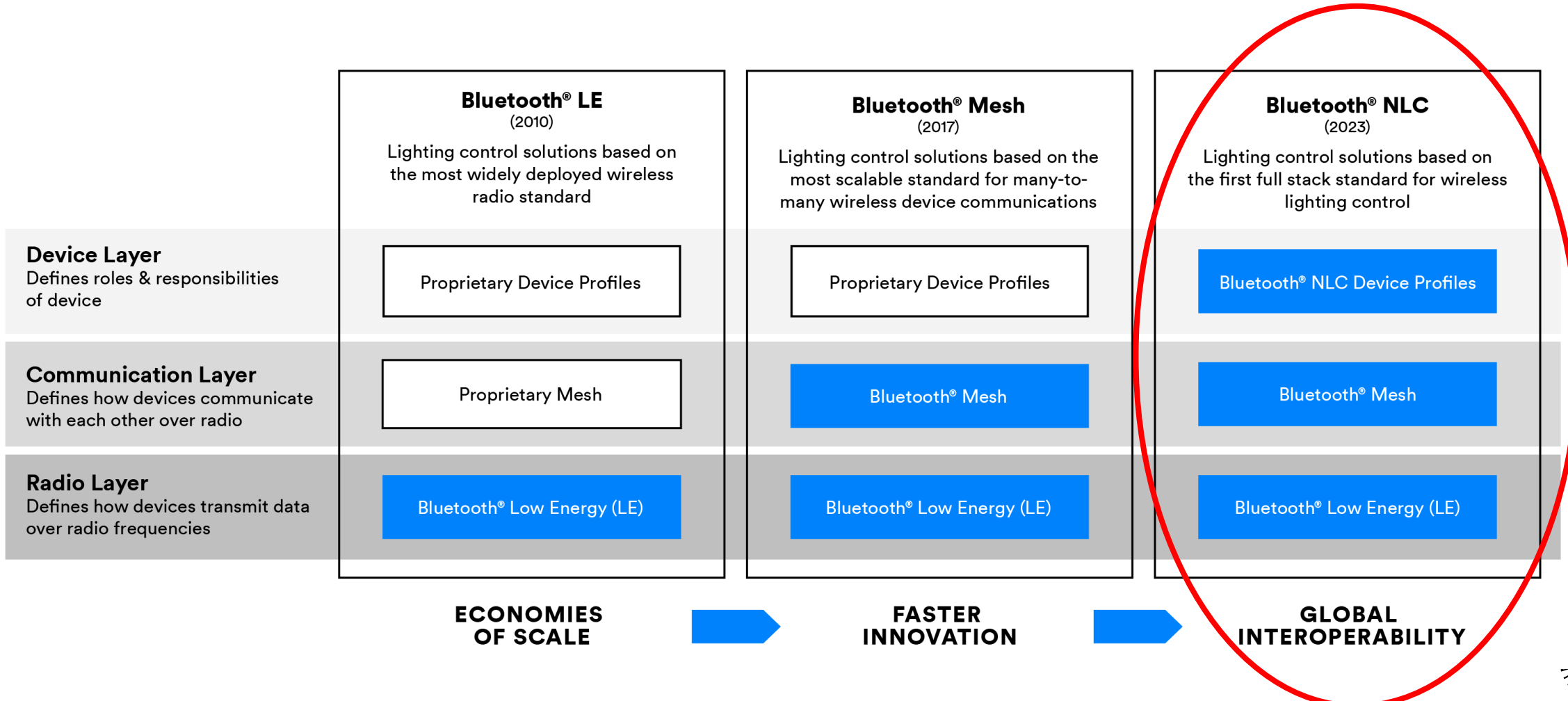
**ECONOMIES OF SCALE**





- Lack of market guidance for building end-product “interoperability” with Bluetooth® Mesh specifications
- No standard means of identifying devices that implement Bluetooth® Mesh in the NLC market
  - “Bluetooth”, “LE”, and “mesh” are used interchangeably in proprietary, closed, or vendor-specific scenarios
  - There are products which are “Bluetooth” and “mesh” but not “Bluetooth® Mesh”
  - Non-Bluetooth solutions using Bluetooth to configure devices only

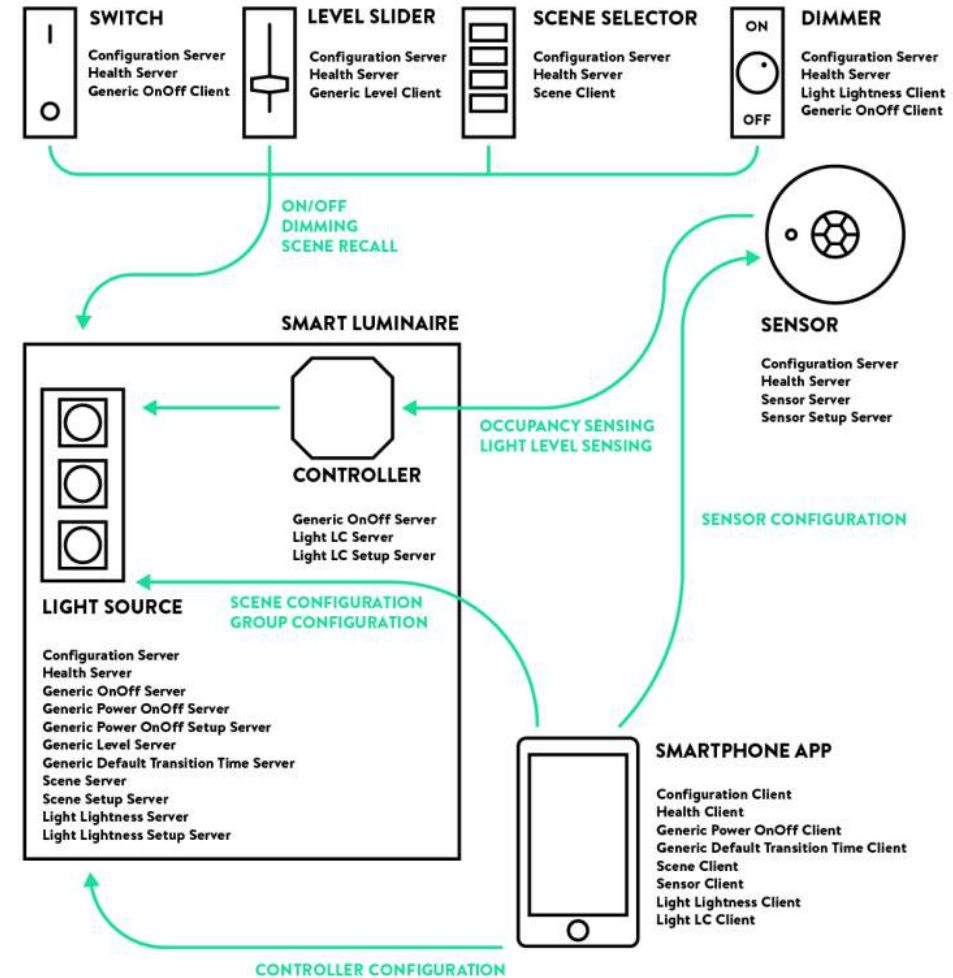


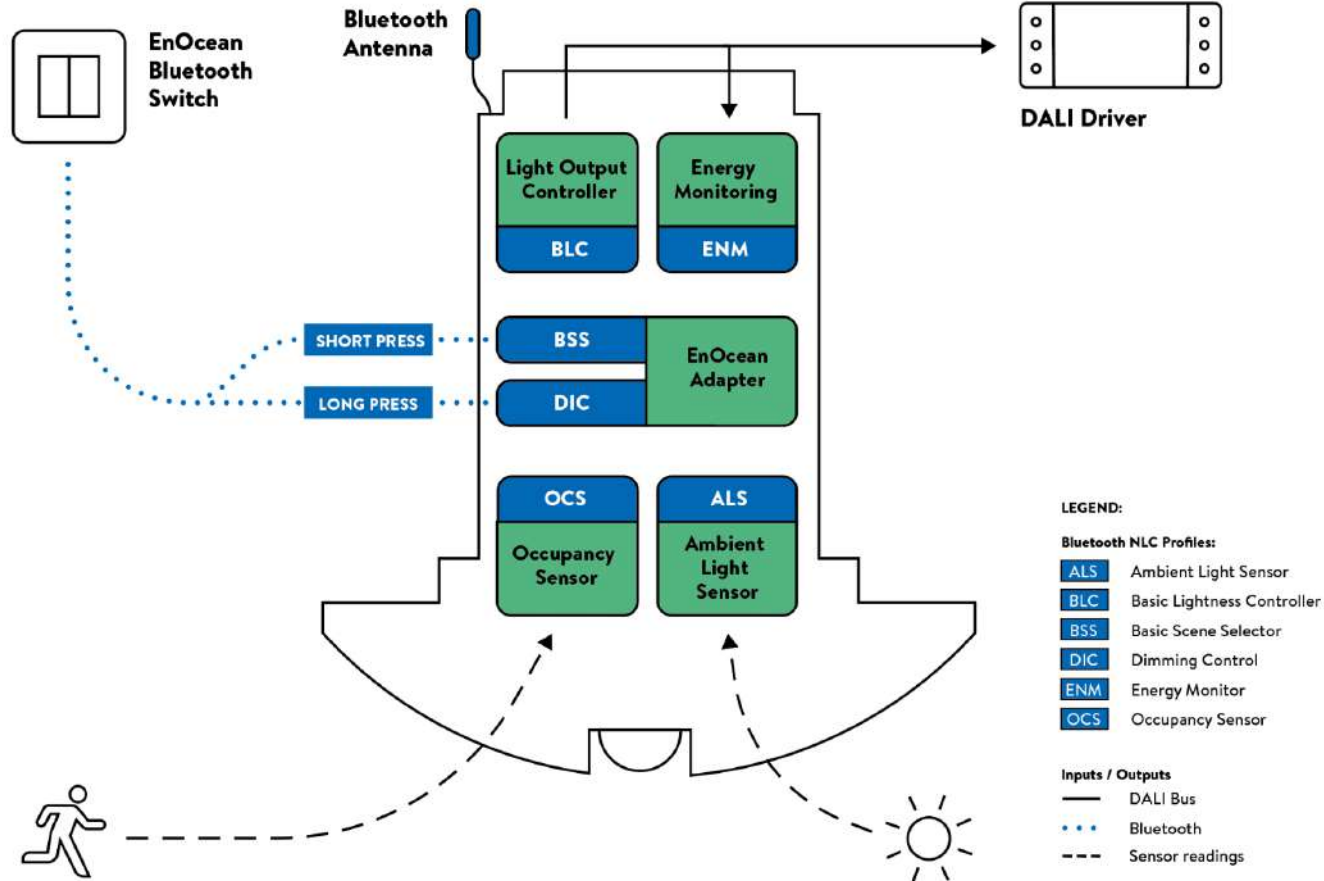




■ **Drive and enforce interoperability at a device level**

- Occupancy Sensor NLC Profile 1.0
- Ambient Light Sensor NLC Profile 1.0
- Energy Monitor NLC Profile 1.0
- Dimming Control NLC Profile 1.0
- Basic Scene Selector NLC Profile 1.0
- Basic Lightness Controller NLC Profile 1.0





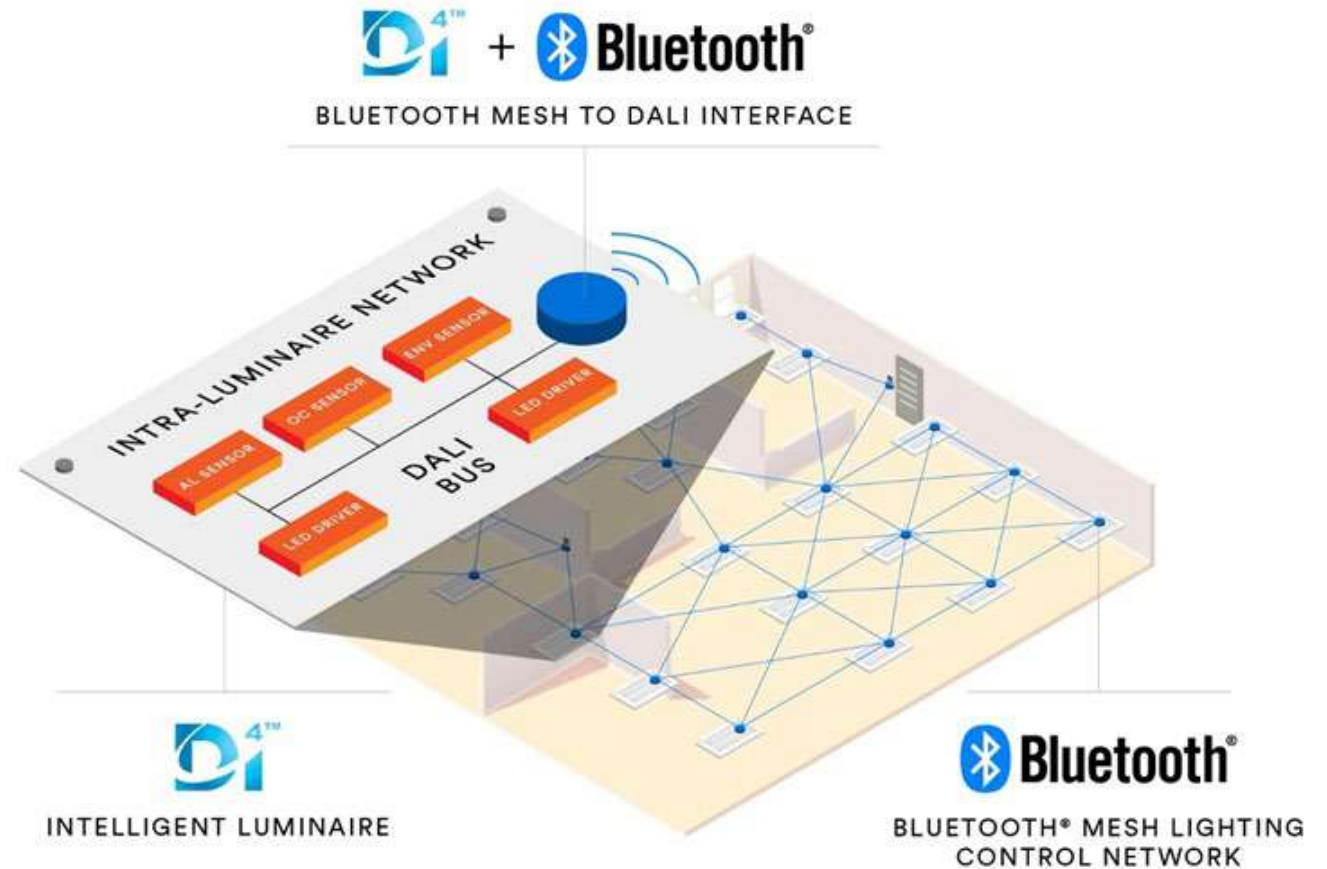
- Bluetooth NLC Device Profiles address the cross-vendor interoperability program for devices
  - Enforce as mandatory many features which had been optional
  - Make it clear for device vendors which features to include and support
  - Support NLC products development by a powerful test / qualification system
  - A Bluetooth NLC device must pass from 700 to >1000 compliance tests
  - Strict and extensive testing ensures true global interoperability



- **Performance** / scalability
  - Most scalable, fully open low power IoT network standard
  - Thousands of nodes in a single network, hundreds of messages per second
  - Ultra low latency
- **Security** / open interoperability
  - Proven the most secure low power IoT network standard
  - Fully documented and published architecture; independently validated security
  - Standardized by multiple vendors
- **Reliability** / distributed topology
  - Publish and subscribe architecture provides no-point-of-failure topology
  - Control logic distributed across all network nodes (no central controller/hub needed)



- Enable DALI luminaires to communication and connect wireless onto a Bluetooth Mesh network
- A simple way to add standardized wireless mesh capability to luminaires
- Global cross-vendor interoperability between lighting components, wireless control systems, and intelligent luminaires
- Further accelerate the adoption of advanced IoT-enabled intelligent lighting systems
- DALI spec Part 341







# Benefits for Suppliers

Lower cost and faster innovation





# Benefits for Suppliers

Lower cost and faster innovation

Increased market opportunity



# Benefits for Suppliers

Lower cost and faster innovation

Increased market opportunity

Additional revenue models





# Benefits for Buyers

True, multi-vendor interoperability



# Benefits for Buyers

True, multi-vendor interoperability

Ease of deployment



# Benefits for Buyers

True, multi-vendor interoperability

Ease of deployment

Greater scalability

- **Bluetooth® NLC** is the only full-stack standard for wireless lighting control. It offers standardization from the radio through the device layer, enabling true multi-vendor interoperability and mass adoption for wireless lighting control





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If you want to go fast, go alone, if you want to go far, go together





Thank you!

For more info on Bluetooth® NLC, please visit  
[www.bluetooth.com/learn-about-bluetooth/use-cases/lighting-control](http://www.bluetooth.com/learn-about-bluetooth/use-cases/lighting-control)

# Bluetooth® NLC + DALI Wireless Lighting Control System and its Application

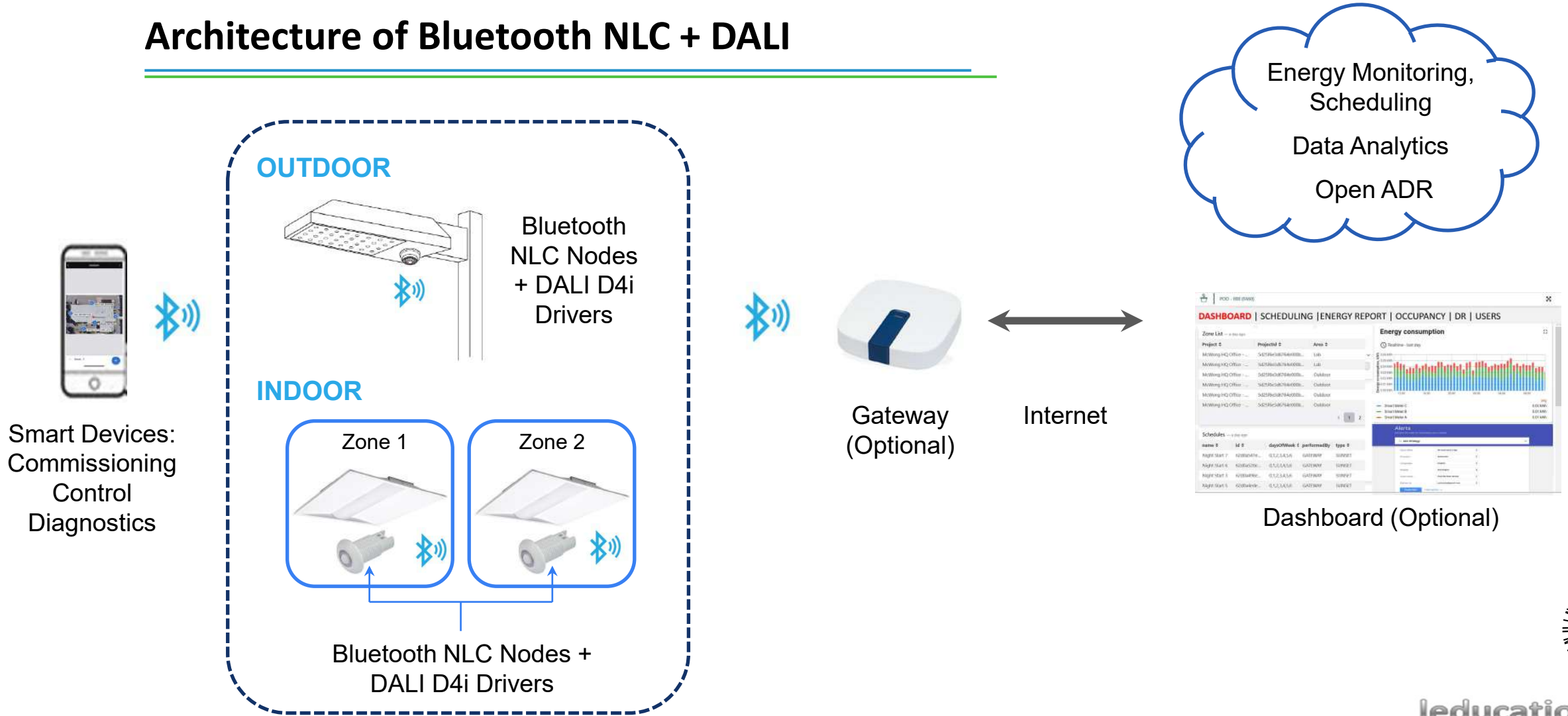
### Bluetooth NLC + DALI Wireless Lighting Control System and its Application

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- Understand the application of Bluetooth® NLC+ DALI
  - Architecture of Bluetooth NLC + DALI
  - Bluetooth NLC: Wireless Network Lighting Control
- DALI: Intra-luminaire Wired Digital Communication
- Bluetooth NLC + DALI: the implication for manufacturers
- Implementation in real world
- Where to find the qualified products



## Architecture of Bluetooth NLC + DALI



## Application of Bluetooth® NLC + DALI

### Bluetooth NLC: Wireless Network Lighting Control

- Wireless: circuits independent
- Mesh: ideal for small and large indoor and outdoor areas
- Bluetooth® technology: direct access from smart devices
- Bluetooth NLC: Standard backed up with certification for guaranteed interoperability



Bluetooth NLC: Wireless  
Network Lighting Control

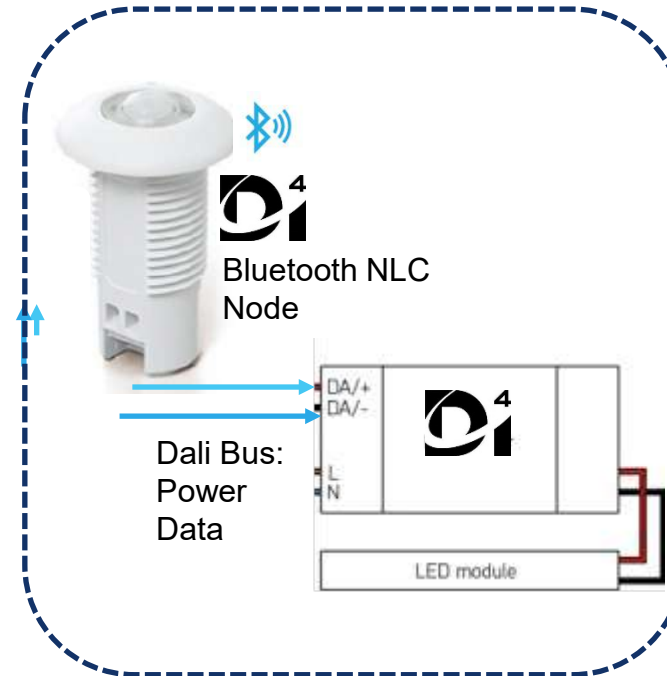




## Application of Bluetooth® NLC + DALI

### DALI: Intra-luminaire Wired Digital Communication

- Wired within luminaire between drivers and Bluetooth NLC node for indoor and outdoor application
- Two ways digital communication
- Precise dimming: single channel, two channels (white tuning), RGBW
- Data Rich (D4i): Asset, Energy, Fault Condition Report



DALI details	
DALI address	A0
DALI status	04, ON ✓
GTIN	781087158043
Serial	7448681585996202720
Device manufacturer	Signify
Device model	Xitanium 40W 0.1-1.1A 54V IN...
Device type	6:50:51:52
FW Version	1.0
HW Version	1.0
Manufacture Time	-
Last update (energy)	2021-04-13 13:15:39 ✓
Energy Total	0.18 kWh ✓
Active Power	30.5 W ✓
System Starts	88 ✓
Operating Time	332:39 hours ✓
Lamp On Time	3:21 hours ✓
Operating Temperature, C°	36 C° ✓
Power Factor (%)	-
Output Current	1094 mA ✓
Output Voltage	24.0 V ✓
Lamp Starts	147 ✓
Gear Failure Counter	10 ✓
Gear Status TS:TD:PL:OV:UV:GF	000000 ✓
Lamp Failure Counter	12 ✓
Lamp Status TS:TD:OC:SC:LF	00000 ✓
Input Voltage	116.0 V ✓

## Bluetooth® NLC + DALI: the implication for manufacturers

- Lighting Control Manufacturers
  - Lower development cost: standard profiles
  - Worldwide market: global standards, same wireless frequency worldwide
  - Specialization: allow manufacturers to specialize in products just meet one profile, such as switches, instead of developing a whole control eco system



## Bluetooth® NLC + DALI: the implication for manufacturers

- Luminaires Manufacturers
  - Worldwide market: Global standard
  - Luminaire as a “base station” for sensing, data and intelligence: can attached different sensors, wireless modules and accessory devices using the DALI bus or aux power
  - Warranty & Maintenance: provide true warranty based on operating data of sensors and modules
  - Lighting as a service: rich data from D4i drivers provide asset, energy and maintenance data



## Real world implementation

### Bluetooth® Mesh

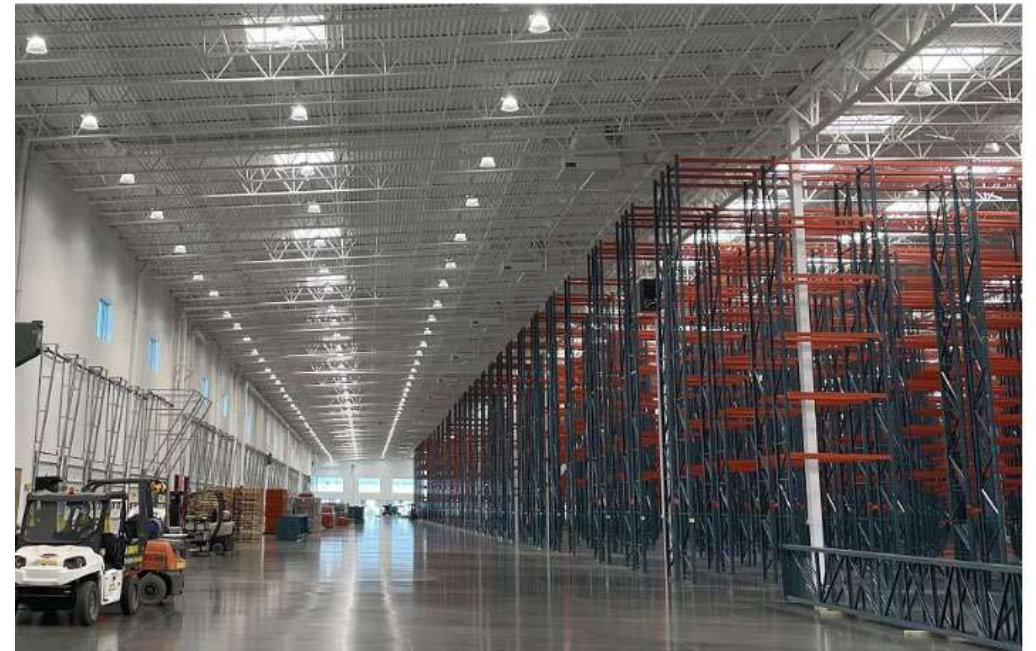
- 2022 Integrated Lighting Campaign Recognition
- 133-acre business & research park
- 10+ parking lots + 2-mile ring road
- Four areas, 40 zones, 200 devices
- Scheduling, motion sensor and dimming
- Long range controller won 2022 Lightfair Technical innovation Award





## Implementation in real world

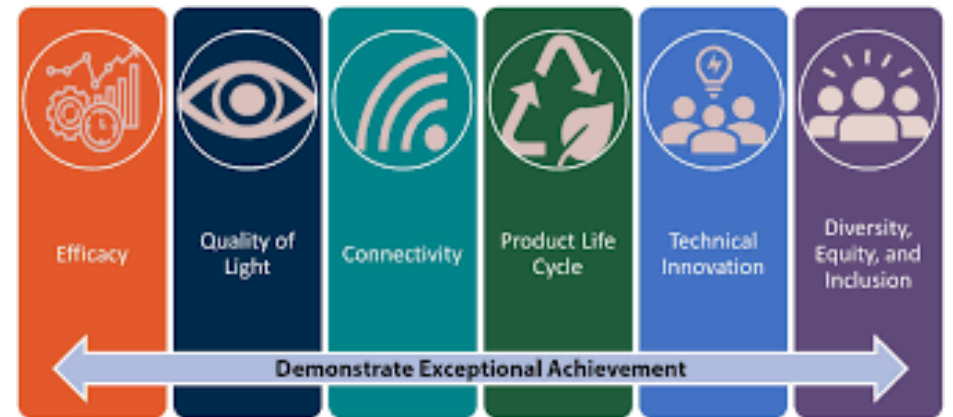
- 2022 DALI Light Award – Industrial Category
- One million square feet warehouse
- 4000 luminaires with D4i drivers
- Drivers connected to wireless nodes
- Power metering, asset data and diagnostics



## Implementation in real world

### Bluetooth® Mesh + DALI

- 2023 DOE L-Prize Winner
- Standard Base: Bluetooth Mesh + DALI
- DALI D4i Drivers and D4i Wireless Sensor in each luminaire
- Power metering and diagnostics data
- Grid interaction with demand response





## Where to find the products

### Bluetooth® Mesh and Bluetooth® NLC

- <https://www.bluetooth.com/le-mesh/mesh-qualified/>
- Bluetooth NLC Certification: starting 2024

### DALI: DALI Alliance Website

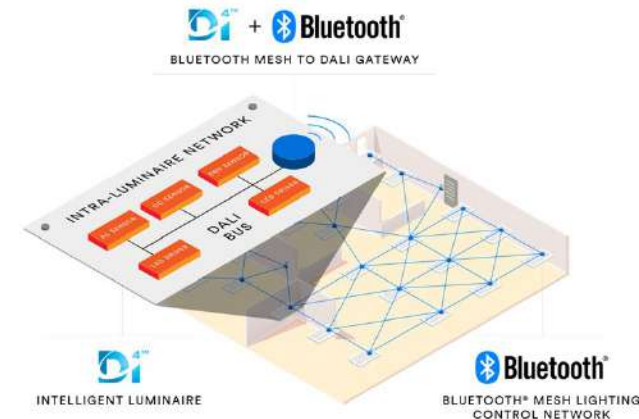
- <https://www.dali-alliance.org/products>
- Driver: Control Gear
- Wireless Node: Control Device

### Bluetooth NLC + DALI

- DALI + Bluetooth Gateway: upcoming



Product Database



**Thank you for joining us!**

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This concludes The American Institute of Architects  
Continuing Education Systems Course



# ANY QUESTIONS??

## **Catching Up with Bluetooth® Technology and DALI:** Advances in Interoperability, Technology and Applications

### **Carol Jones**

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DALI Alliance

### **Stephen Zhou**

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### **Henry Wong**

Sr Manager, Market Development  
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