IoT: Lighting the Way
The Role of Lighting in the Adoption of IoT

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IoT = Connectivity

- "Everything that can be connected, will be connected."
- 20 billion objects to be connected by 2020

  - Medical monitoring
  - Point-of-sale product information
  - Customer data mining
  - Traffic monitoring
  - Appliance maintenance
  - Vehicle-to-vehicle communication
  - Campus navigation
  - Security monitoring

Lighting: Conduit to Connectivity

- Provides a connectivity distribution means
- No new carrier infrastructure required
- Power source at each luminaire
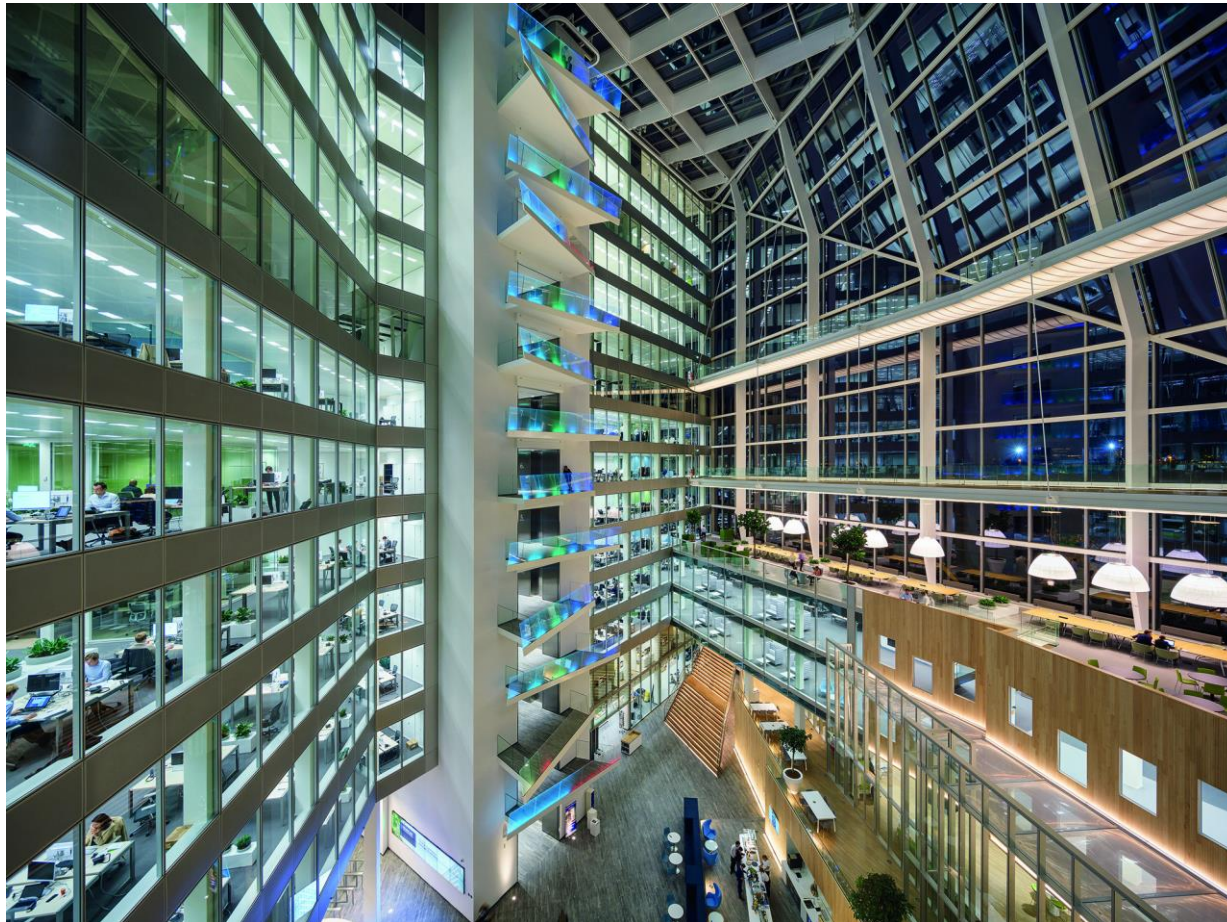
Retail

Hospitals

Offices

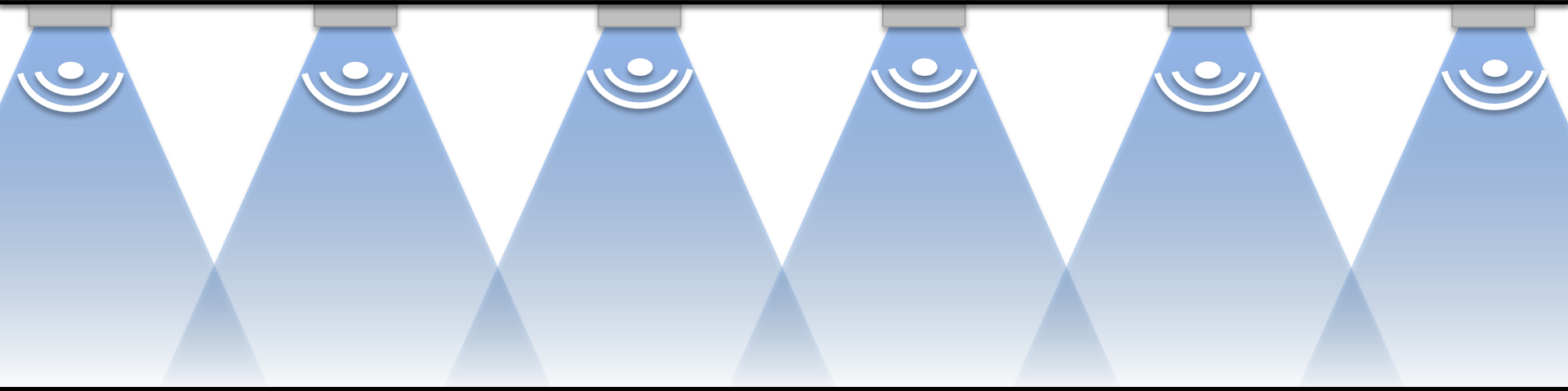Fulfillment Centers

Campuses

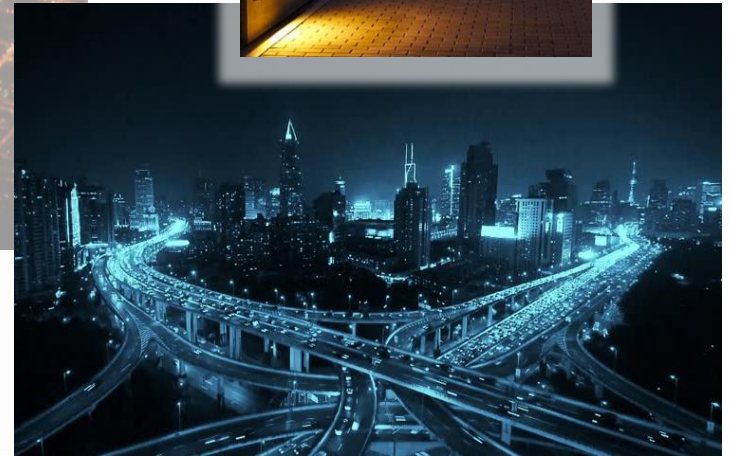Schools

Ubiquitous Interior Lighting

Uniform Connectivity

- Embedded WiFi, Controls

Exterior Lighting: Tying it Together

LED Lighting

- Solid State devices
- Switchable, dimmable without degradation
- Low energy draw
- Low Voltage DC (transformed from AC)

Connected Lighting: NLC & LLC

- Each luminaire is a control node

- Data extracted to cloud or to server

- GUI with extractable reports

- Power independent of layout

- Re-assignable control

- Coordination with BMS

- Security enhancement

- Maintenance diagnosis

- **24% of future energy savings**

- **Eventual DSM potential**

- **Future-proofing**

Luminaire Level Control Simplification

- LED luminaire, dimming driver, occupancy and daylight sensors, field wired installation

2015

Tedious commissioning

- LED luminaire with integrated occupancy / daylight sensing and dimming driver – plug & play

Now

Simple commissioning

Exterior Mesh Network

- NEMA 7-pin connector
- Twist-lock wireless GPS/controller/sensor/repeater

- LED luminaire 'futureproofed' with NEMA 7-pin connector installed, ready for technology adaptation

POE: Power Over Ethernet

- Power & data supplied over same Cat 5 cable
- Low Voltage DC power, up to 60W per cable
- Modularity without electricians

LiFi: White Light Communication

- Bi-directional communication
- Unlimited bandwidth
- High speed, 100x WiFi
- Digital, high freq light pulse signal
- No EMI
- Line-of-sight, won't penetrate walls
- Hacking resistant

- **Visible light spectrum communication**

Lighting Application Challenges

- Following 111 years of recommended practices
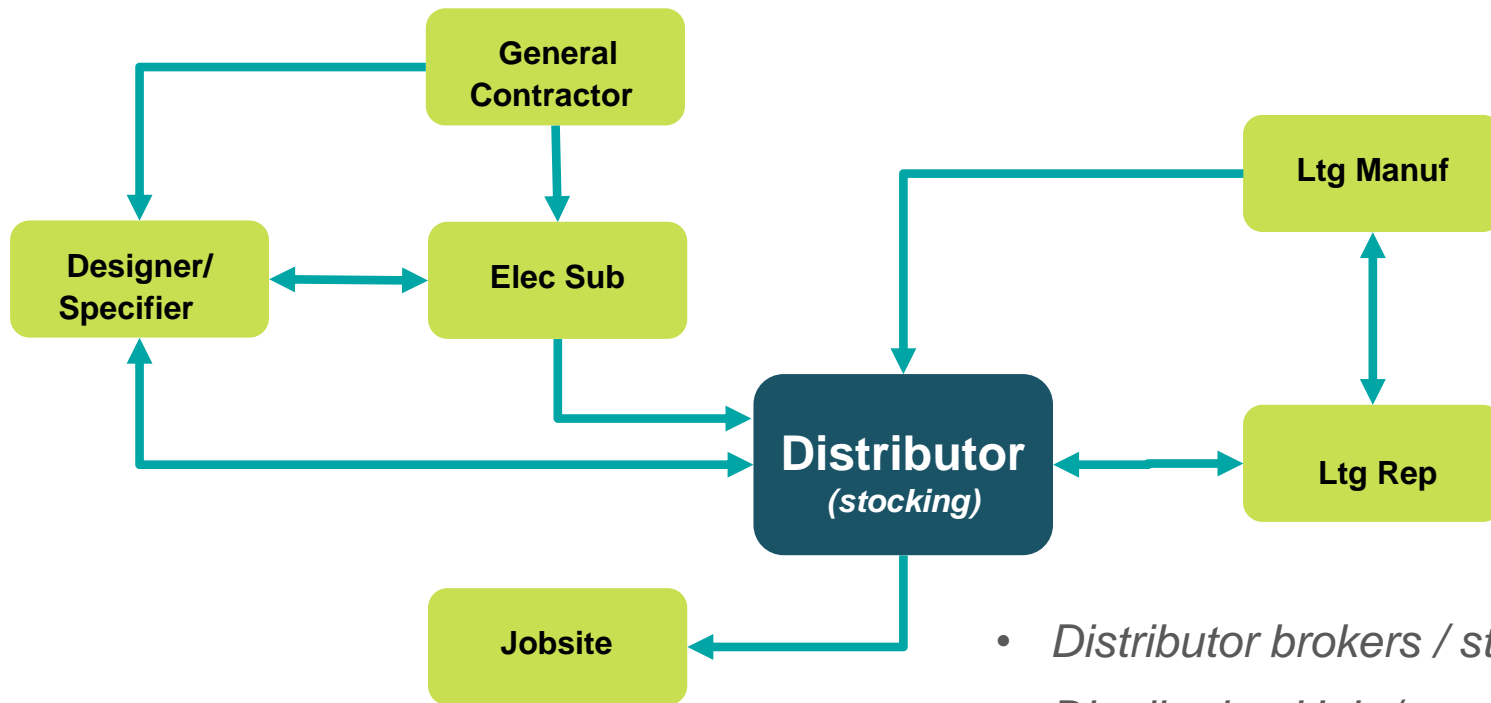
- Lighting Design vs IT needs

Lighting Market Challenges

- Cost of integrating components
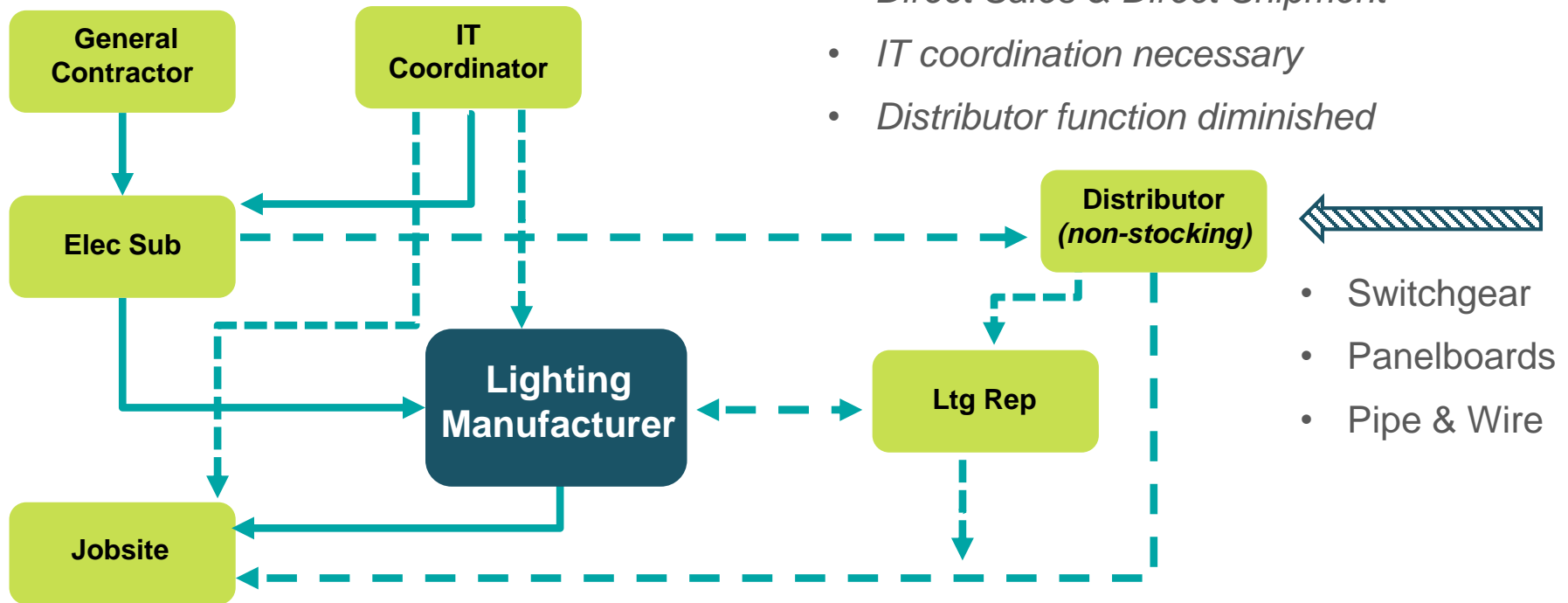- Futureproofing
- Stocking / shipping

Traditional Lighting Channel

- *Distributor brokers / stocks material*
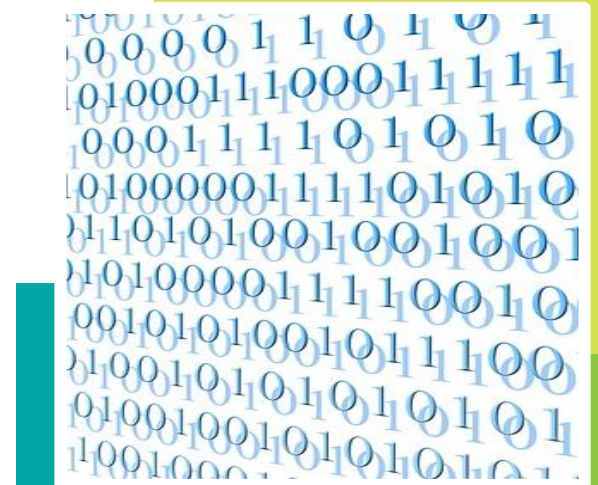- *Distribution Hub / supplies Jobsite*

New Lighting Channel

General Contractor

IT Coordinator

Elec Sub

Distributor *(non-stocking)*

Lighting Manufacturer

Ltg Rep

Jobsite

- *Direct Sales & Direct Shipment*
- *IT coordination necessary*
- *Distributor function diminished*

- Switchgear
- Panelboards
- Pipe & Wire

Lighting Future – 2017 Onward

- Lighting = information
- Connectivity: IoT, POE, LiFi
- Data mining & marketing
- Impending code aggressiveness
- Demand response
- Controls, tunable white
- New forms, new markets

Thank You!

- Questions?

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