

# IoT Smart & Connected Facilities 2017

Raymond Poon

CSA, IoT

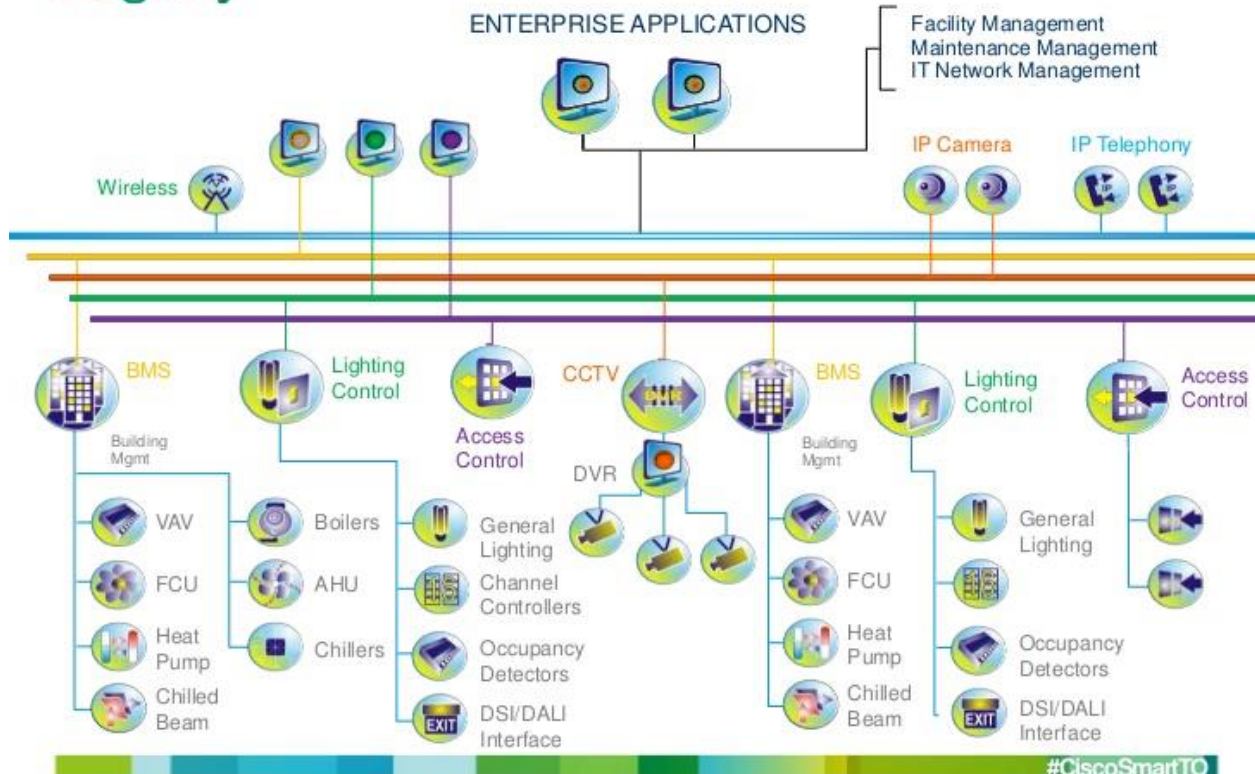
Feb 2017

Cisco *live!*



# Cisco Connected Real Estate Solutions 2006

## Legacy

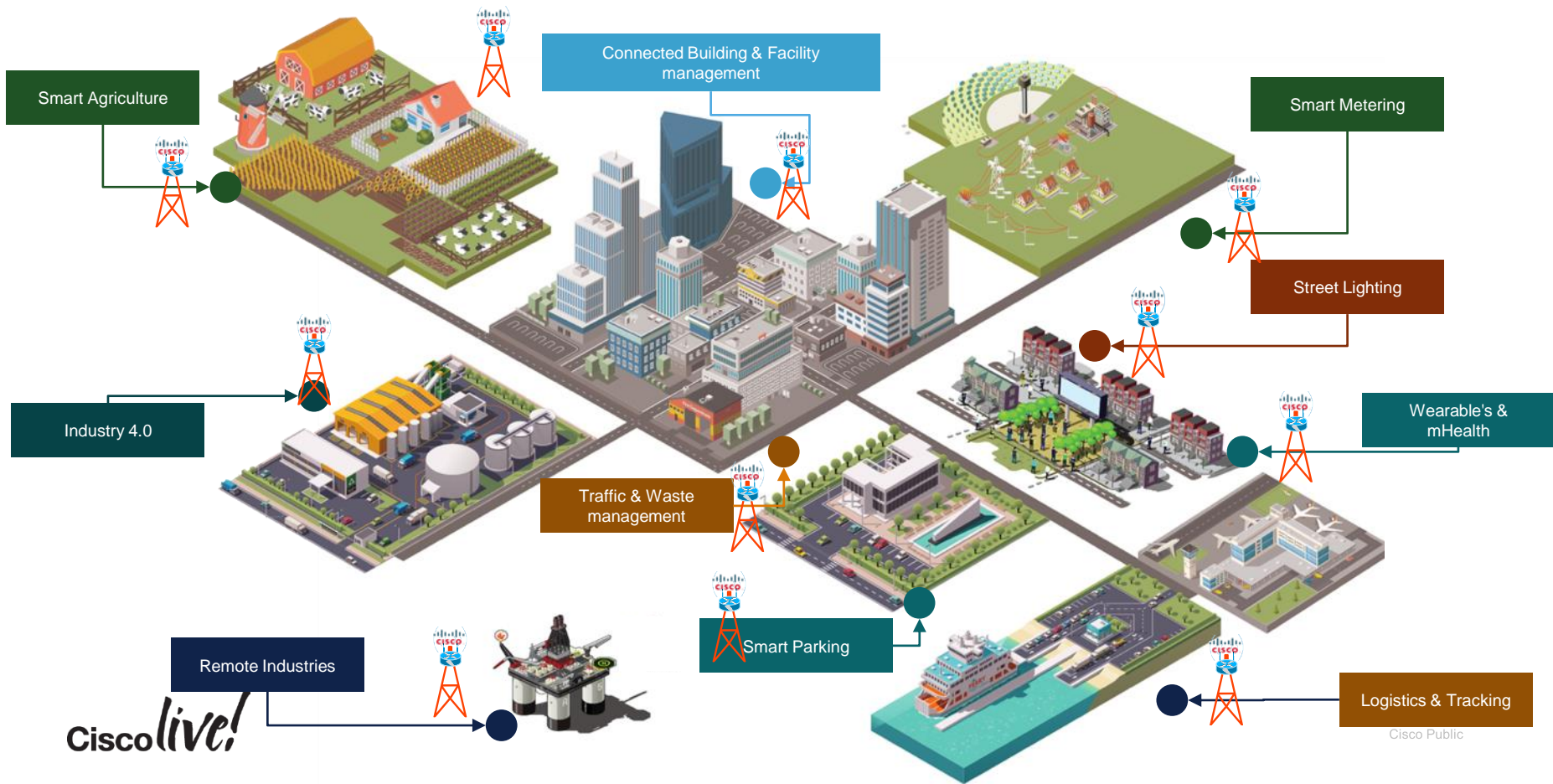


Cisco*live!*

# The World is Converging..

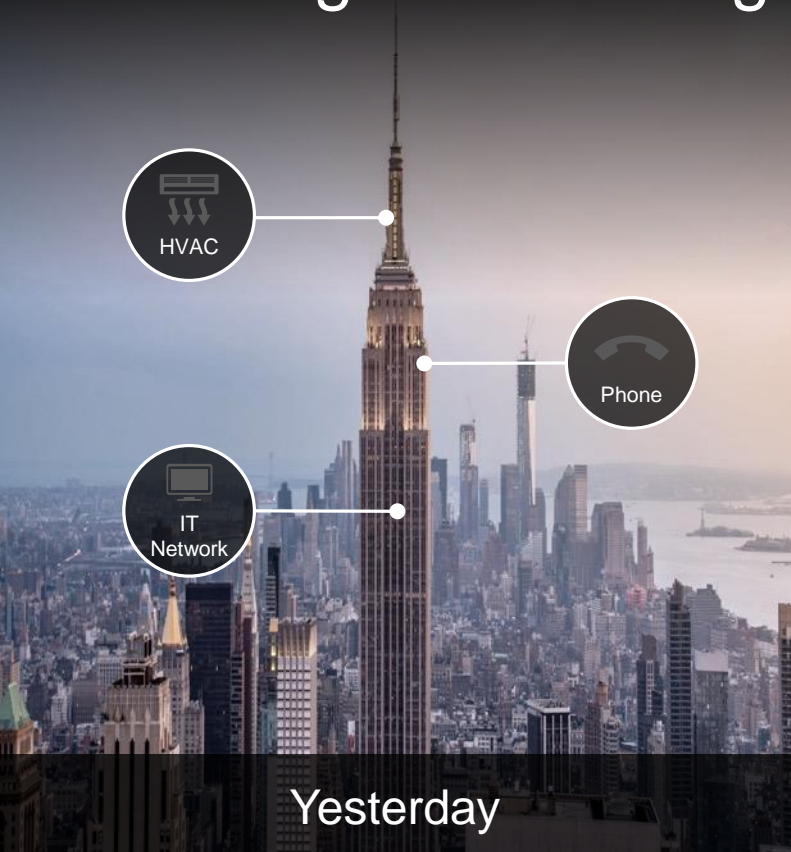
(We said this since 2006)

# The Connected World Use Cases





# Buildings Are Getting Increasingly Complex



Silo'd Building Networks Creates Problems

# Key Challenges for a Facilities Manager due to Silo'd Building Networks



Can I bring in enterprise class security?

Can I resolve all the trouble tickets?



How do I manage complexity across multiple silo-ed networks?

Can any OT guy install it easily?

Complexity



Will my cost escalate exponentially?

How do I get the most optimized system for smooth operations?

**Facilities Manager**

A Converged, **Open** and Digitized solution Is The Key...



## IT Services and Technologies IP Based

High-speed Internet

Wireless

VPN

IP telephony

Audio and video  
conferencing

Visitor management

Interactive media

Digital signage

IT

OT

## Building Services and Technologies Non-IP

Lighting

Elevators

Continual monitoring

HVAC sensors

Video surveillance

Access

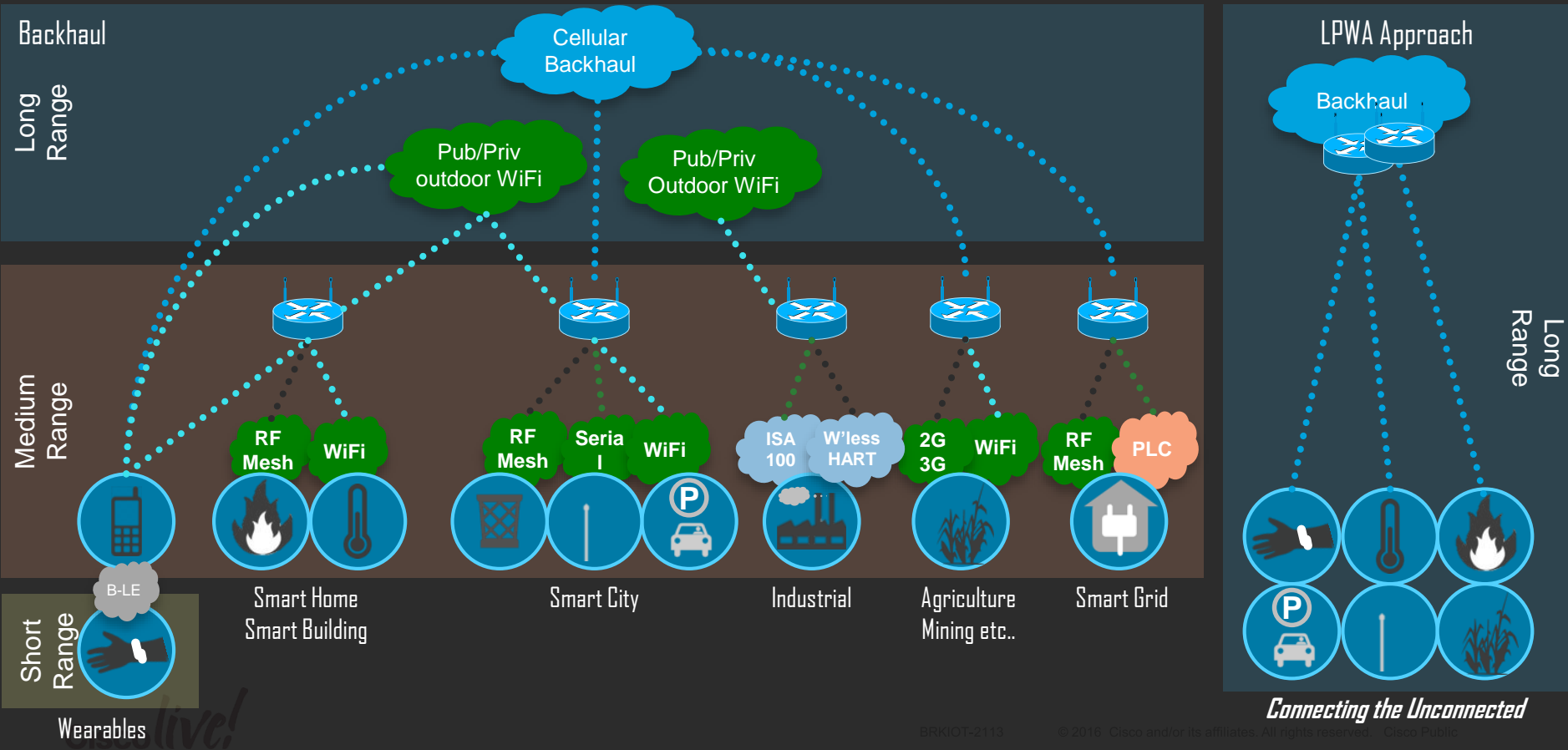
Energy

A Converged, between IT and OT...

What is the main difference now vs 2006?



# Various Different Wireless Sensors Technologies

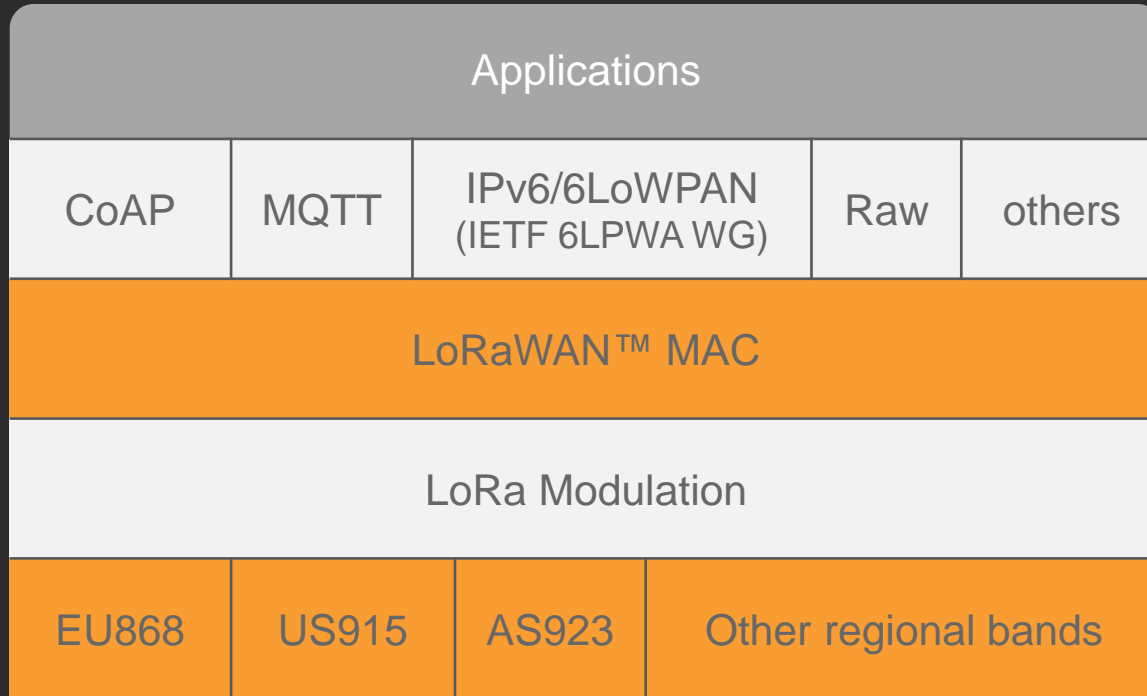


*Connecting the Unconnected*

# Low Power WAN Characteristics

Characteristic	Order of magnitude	Typical value
Spectrum	Licensed (3GPP) vs Unlicensed	Sub-GHz, 2.4GHz
Range	Long in star topology	From 1 to +10 kms (urban/rural)
Objects	Many	Many thousands
Data volume	Small (upstream vs downstream)	Few kBytes per day (mostly upstream) <sup>10</sup>
Data rate	Low (upstream vs downstream)	From 60bs to few 100kbs
Data payload	Small	From 10 to few 100 bytes
Latency	Low to high	Up to minutes
Battery life	Long	From months to +20 years
Module cost	Low	<\$5
Service cost	Low	<\$10 per year

# LoRaWAN™ Layered Architecture



LoRa Alliance Specifications

Semtech modulation

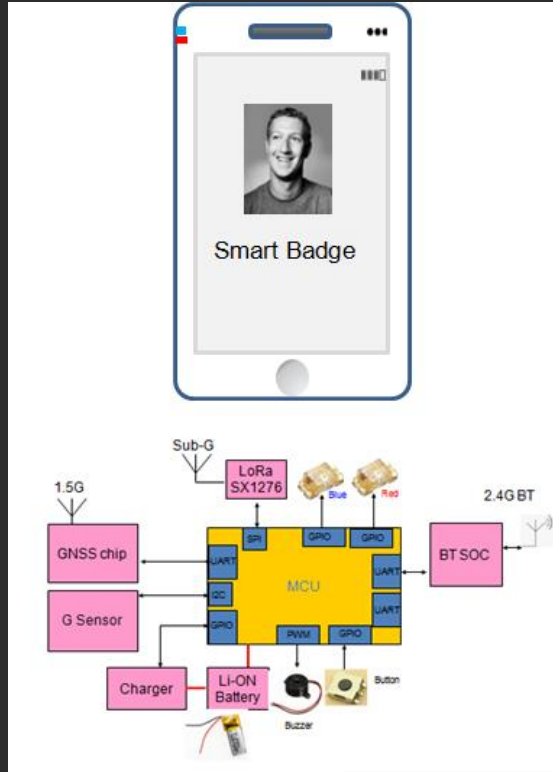
LoRa Alliance Regional Profiles



# Sensitivity at over -137dBm

Spreading Factor	Data Rate (bit/s)	Time on Air (ms)	Maximum Payload Size	End-device sensitivity (dBm)
SF12	250	1400	59 bytes	-137
SF11	440	740	59 bytes	-135
SF10	980	370	59 bytes	-133
SF9	1760	200	123 bytes	-130
SF8	3125	100	250 bytes	-127
SF7	5470	28	250 bytes	-124

# Smart Wearable with LoRa Example



Item	Specification
Wireless Connectivity	LoRa (902MHz~928MHz Tx:20 dBm Rx:-136 dBm) BT/BLE (2.4 GHz)
Localization	Indoor Localization: BLE Outdoor localization: GPS/LoRa
Alarm	Buzzer
Gyro Sensor	3 Axis G-Sensor
Button	Button to exchange information
LED indication	System status and alarm
Battery capacity	1020 mAh
Charger	Micro USB
Dimension	120x62.5x8.9 mm
Weight	50 gram.

# Flood Monitoring & Detection

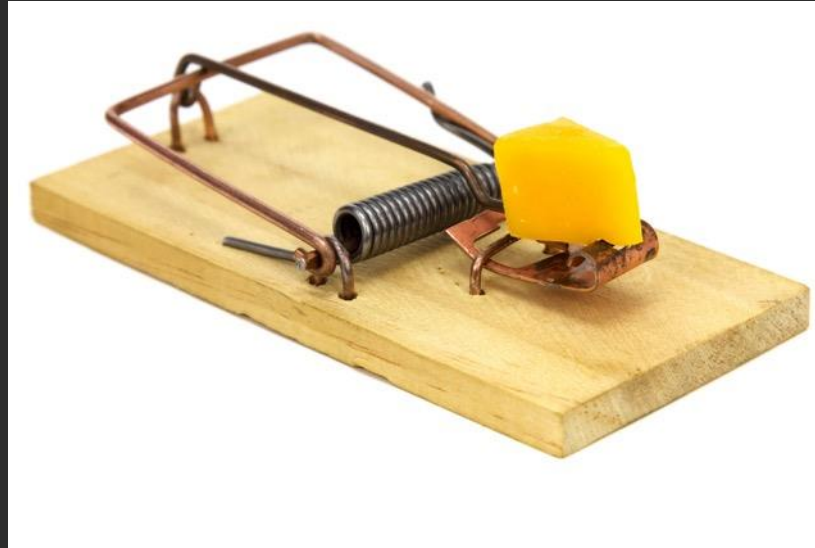




# Connected Button



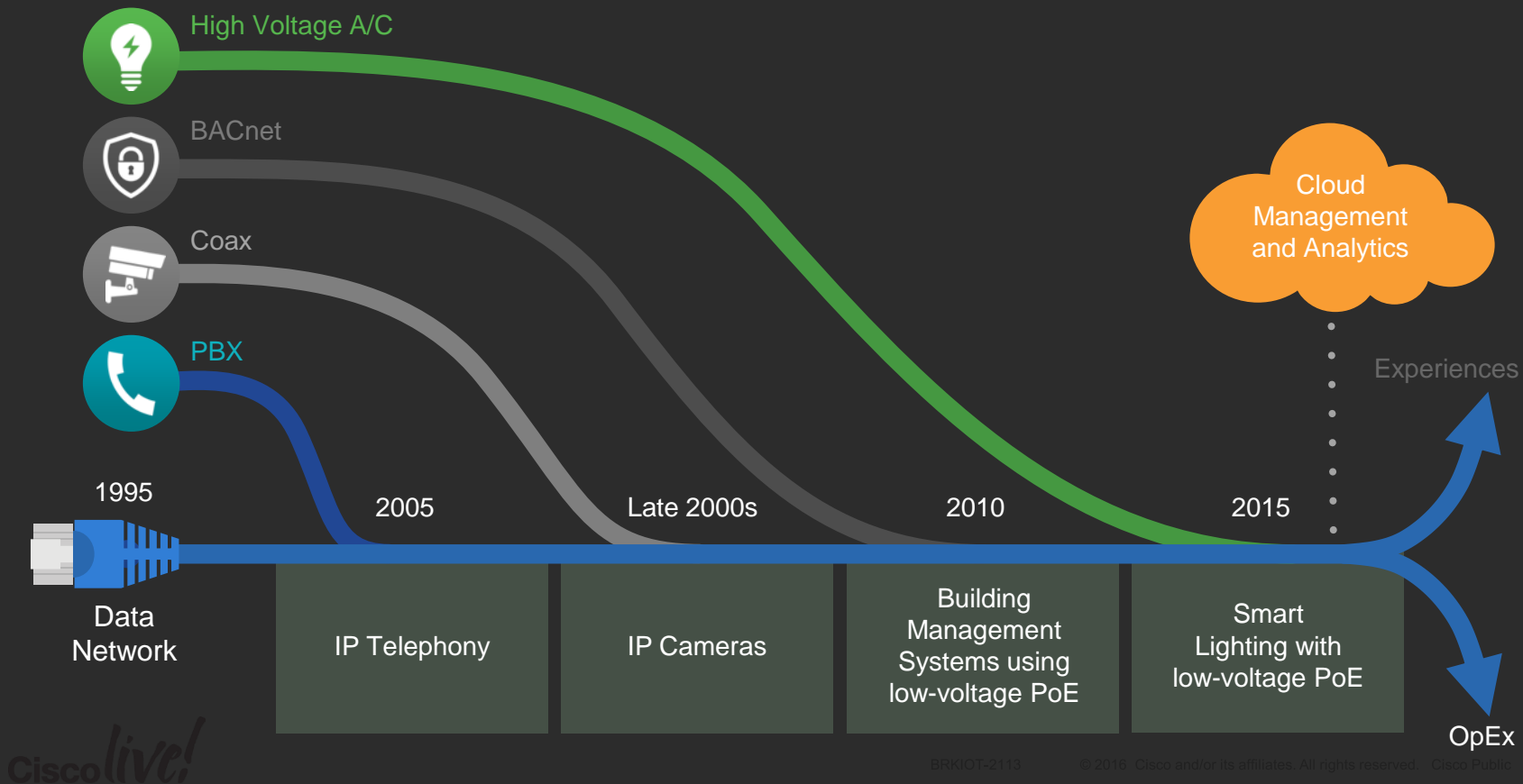
# Facility Management : The Connected Mouse Trap



What's more?



# Converge on the Wire Network



# PoE slashes cabling cost for new construction

## AC conduit



- Electrician wage rates
- Bending conduit
- Electrical code

## Structured cabling



- Structured cabling cost structure
- Pull bundles
- Low-voltage

# Connectivity Drives Lighting Evolution



» Color beacons create pathway lighting or indicate room status

Any light can be backed up with a UPS



» Integrated BTLE for nearby devices



Integrated CO2 and other gas or particle sensors



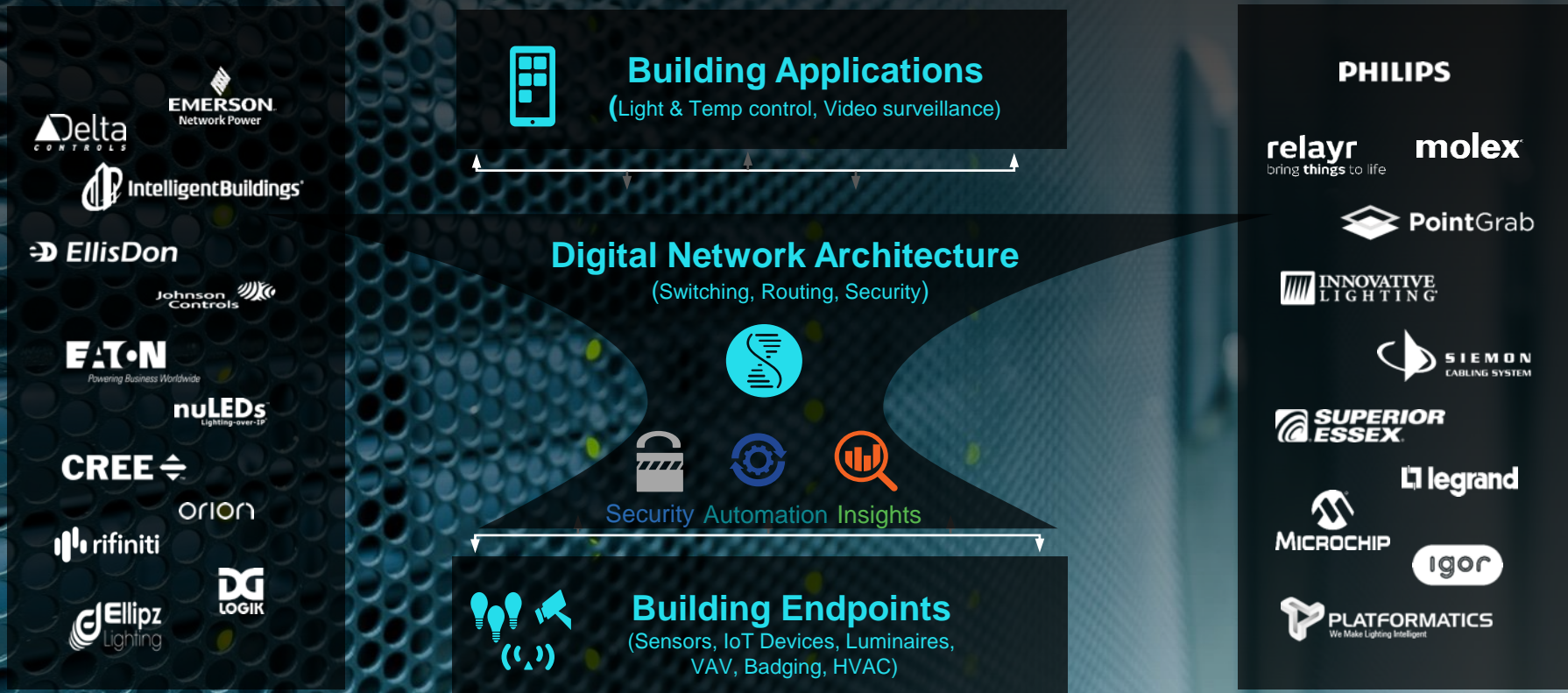
» Integrated Speaker modules

LiFi to data streaming applications



Network Power Creates a Secure and Scalable Path for Applications;  
Connectivity Drives New Functionality in Light fixtures

# Cisco Digital Building Blueprint - A Converged Ecosystem



Introducing Network Innovation for Digital Buildings



# New Breed of Switches Changing Wire Network for Buildings forever...



**Simple**

Easy Installation  
& management



**Secure**

Automated policy  
& segmentation



**Savings**

Energy efficiency  
& control

Optimized and purpose-built for Low Voltage Building Deployments

# Innovation That Will Accelerate The Digital Transformation In Buildings



## Convergence

Converge disparate building systems with CoAP (1<sup>st</sup> ever) to drive Analytics



## Extending DNA to Digital Buildings

DNA Ready for automation, security and segmentation



## Perpetual UPOE

2 x power scale and Fast/Perpetual UPOE for fast start-up and non-stop power (1<sup>st</sup> ever) Bigger Brighter Lighting fixtures



## Smart Installation

Bluetooth enabled Mobile app (1<sup>st</sup> ever) Network PnP with APIC-EM Even OT personnel can install it



## Fanless Design

Enables noise-free ceiling mounting Plenum rated (1<sup>st</sup> ever) Have a Seamless Customer experience





Finally, do you believe it's coming?  
This Time..

# Thank You!



We're ready. Are you?

# LoRa Alliance Members, +420 players (01/2017)

Sponsor



# Contributors



## Adopters



RKIOT-21

Public