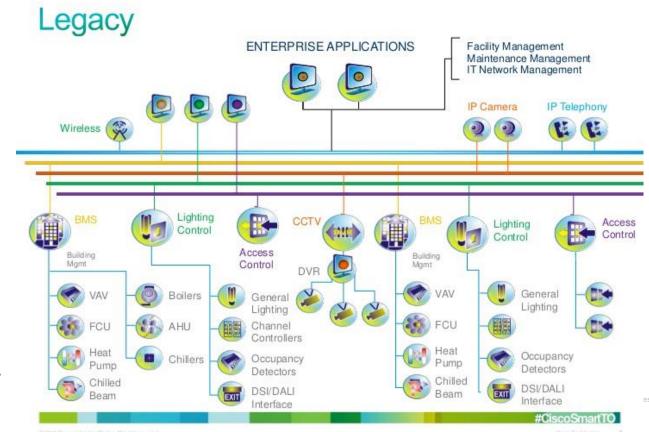
IoT Smart & Connected Facilities 2017

Raymond Poon CSA, IoT Feb 2017





Cisco Connected Real Estate Solutions 2006



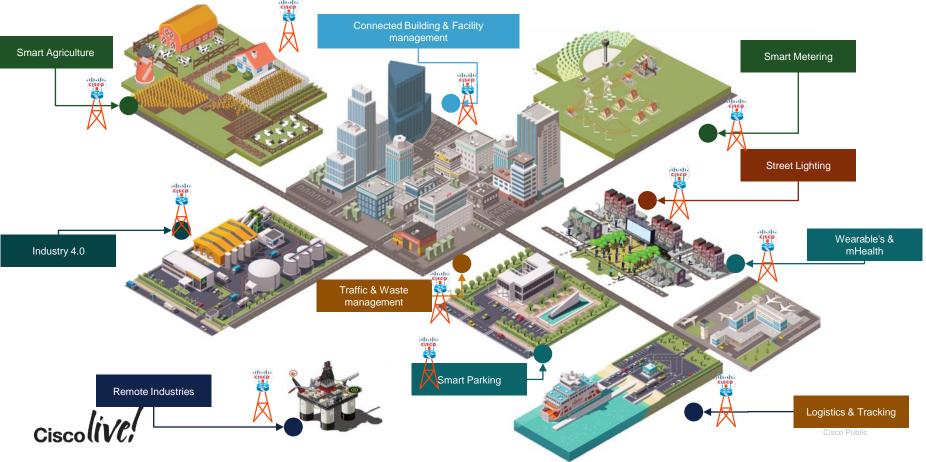
Ciscolive!

eserved. Cisco Public

The World is Converging.. (We said this since 2006)

Ciscolin/el

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

Paid by a large retai **Rris k**iVAC breach

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

Can any OT guy install it easily?

25% Retrofit projects fail

Deloitte.

Can I bring in enterprise class security? Can I resolve all the trouble tickets?

> ~50% Energy waste can be eliminated!

WI my cost escalate exconentially?

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

Building Services and Technologies Non-IP

Ve all the trouble tickets Lighting

Elevators

Continual monitoring

HVAC sensors

Video surveillance

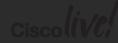
Access

Energy

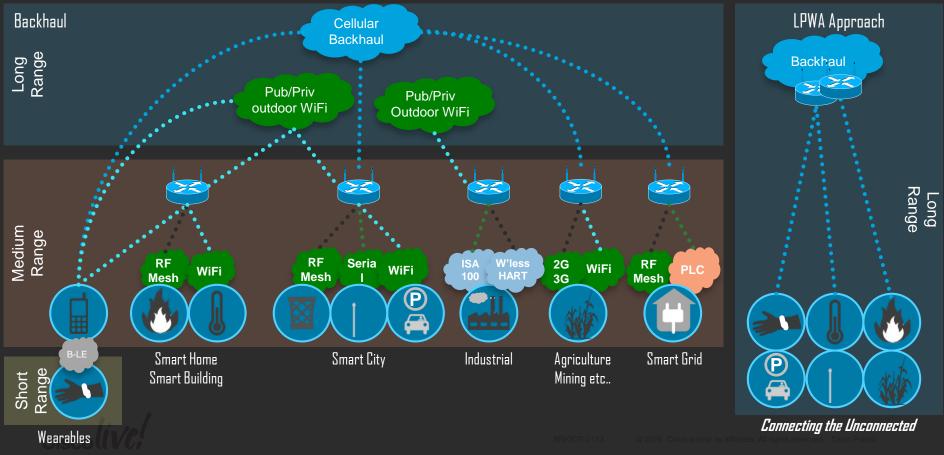
A Converged, between IT and OT...

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What is the main difference now vs 2006?



Various Different Wireless Sensors Technologies

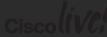


Low Power WAN Characteristics

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)
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

MQTT			Raw	others	
Lo	LoRa Alliance Specifications				
L	Semtech modulation				
US915	AS923	Other	regiona	l bands	LoRa Alliance Regional Profiles
	L	IETF 6LPV LoRaWAN™ LoRa Modu	(IETF 6LPWA WG) LoRaWAN™ MAC LoRa Modulation	ICRAWAN™ MAC	INQTT (IETF 6LPWA WG) Raw others LoRaWAN™ MAC LoRa Modulation

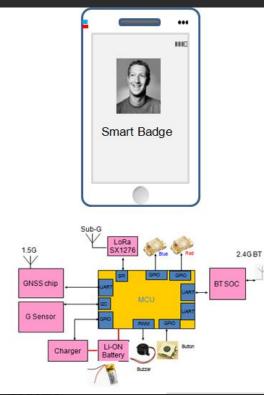


Sensitivity at over -137dBm

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

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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 <u>mAh</u>
Charger	Micro USB
Dimension	120x62.5x8.9 mm
Weight	50 gram.

Ciscoll*VU*

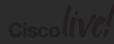
Flood Monitoring & Detection





Connected Button

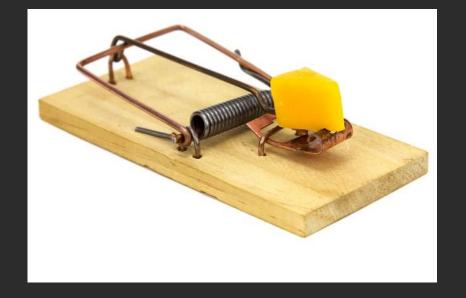


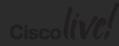




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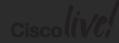
Facility Management : The Connected Mouse Trap



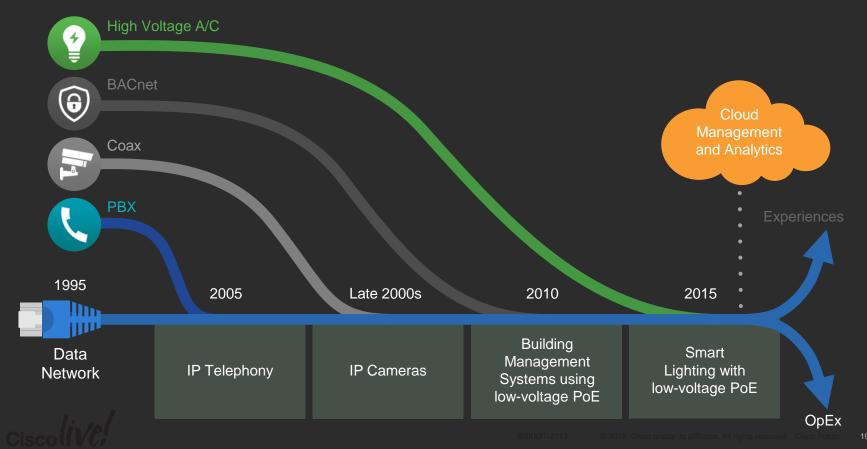


Copyright Actility - Confidential

What's more?



Converge on the Wire Network



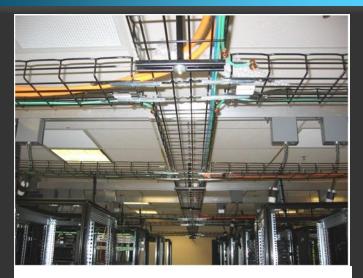
PoE slashes cabling cost for new construction

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





Bluetooth Integrate

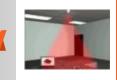
Integrated BTLE for nearby devices



Integrated CO2 and other gas or particle sensors



LiFi to data streaming applications

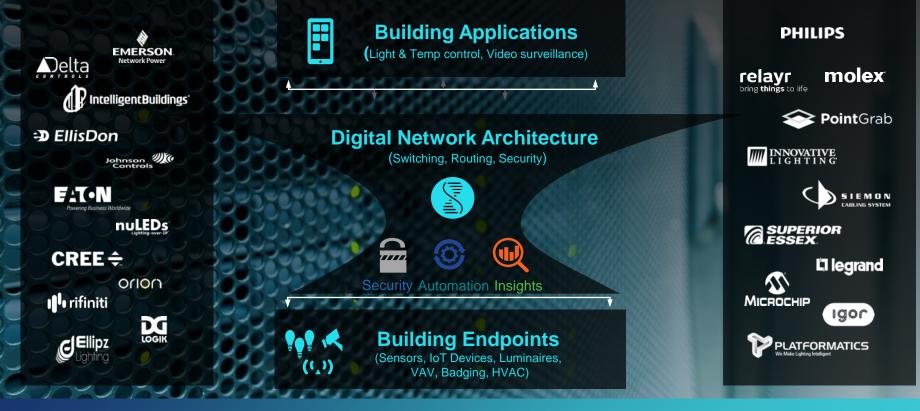


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Integrated Speaker modules

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...



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 (1st ever) to drive Analytics

Extending DNA to Digital Buildings

DNA Ready for automation, security and segmentation

Perpetual UPOE

uuuu

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

Smart Installation

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

Fanless Design

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

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

Cisco IV/P

Thank You!

Ciscolive!

CISCO We're ready. Are you?

LoRa Alliance Members, +420 players (01/2017)									7)					
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