

ZigBee: le standard pour l'éclairage connecté

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Version 01

Agenda

- > Smart lighting: expectations and requirements on connectivity
- > Environment: IoT trend
- > Looking for a connectivity standard for Lighting?
- > Technical insight
- > Summary

Smart lighting: expectations in 2015

- > Go beyond on-off switch
- > Creating ambiance thanks to LEDs
 - > At work
 - > At home
- > Green
 - > Getting rid of bad substances
 - > Energy efficient
- > Controllable
 - > From the smart phone
 - > From a scenario
 - > Local and remote
- > Enable in existing buildings (retrofit)



Smart lighting: requirements on connectivity

> Need for **wireless** (retrofit, flexibility, low cost...)

> **Low power**

- > No compromise with comfort
- > Connectivity consumption must be marginal

> **Scalable**

- > From a 20m² studio to 20.000m² office building

> Based on a **global open standard**

- > Consumer choice of products
- > Foster product competition
- > Foster supplier competition



IoT trend

- Everything is connected
- Lighting is part of the Smart home / Smart Building
 - > Contributes to energy efficiency
 - > While providing better comfort
- IoT brings innovation by combining things and functions
 - > Luminaries integrating sensors
 - > Lighting for elders at home
 - > Indication of alarms
 - > ...



Connectivity enables Lighting be part of the IoT landscape

Looking for a connectivity standard for lighting?

ZigBee 3.0: the answer



- > ZigBee 3.0 is the unification of ZigBee standards
- > Adresses the IoT space

ZigBee: solution supported by > 400 members

Promoter Companies




Participant Companies



ZigBee endorsed by "The Connected Lighting Alliance"

Ecosystem

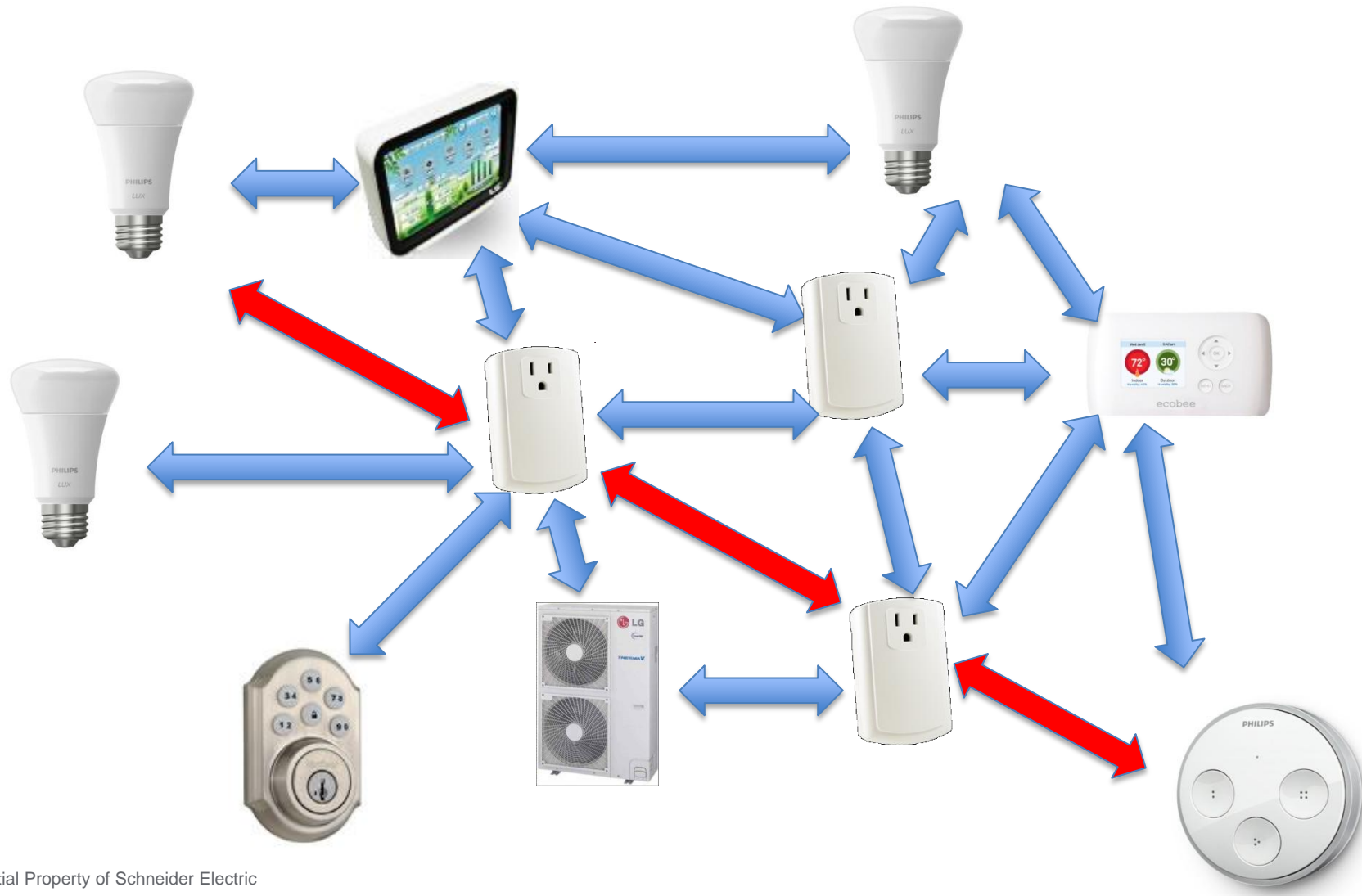


Silicon (10 out of top 20 largest)	Certified Platforms >25	Modules	Tools & Service	OEMs
				Certified End Products
Analog Devices Atmel Freescale Greenpeak Intel Marvell Technology NEC NXP Oki Renesas Samsung ST Micro Silicon Labs Texas Instruments <i>+more</i>	Accent Amicom Atmel Freescale GreenPeak Lapis Marvell Technology Microchip NXP Radiopulse Renesas Silicon Labs Skyley STMicroelectronics Texas Instruments <i>+more</i>	Atmel CEL Digi Dresden Elekt Jabil LS Research NEC Engineering NXP Radiocrafts AS RFM Telegesis Tokyo Cosmos <i>+more</i>	4-Noks Ad Sol Nissin Digi eInfochips Exegin Korwin LS Research Luxoft MMB Research Mindteck NEC Engineering San Juan SW Tendril NW Ubilogix <i>+more</i>	AlertMe Belkin Busch-Jaeger Comcast Deutsche Telekom Emerson Electric General Electric Honeywell Huawei iControl Jasco LG Nest Osram Philips Schneider Electric <i>+more</i>

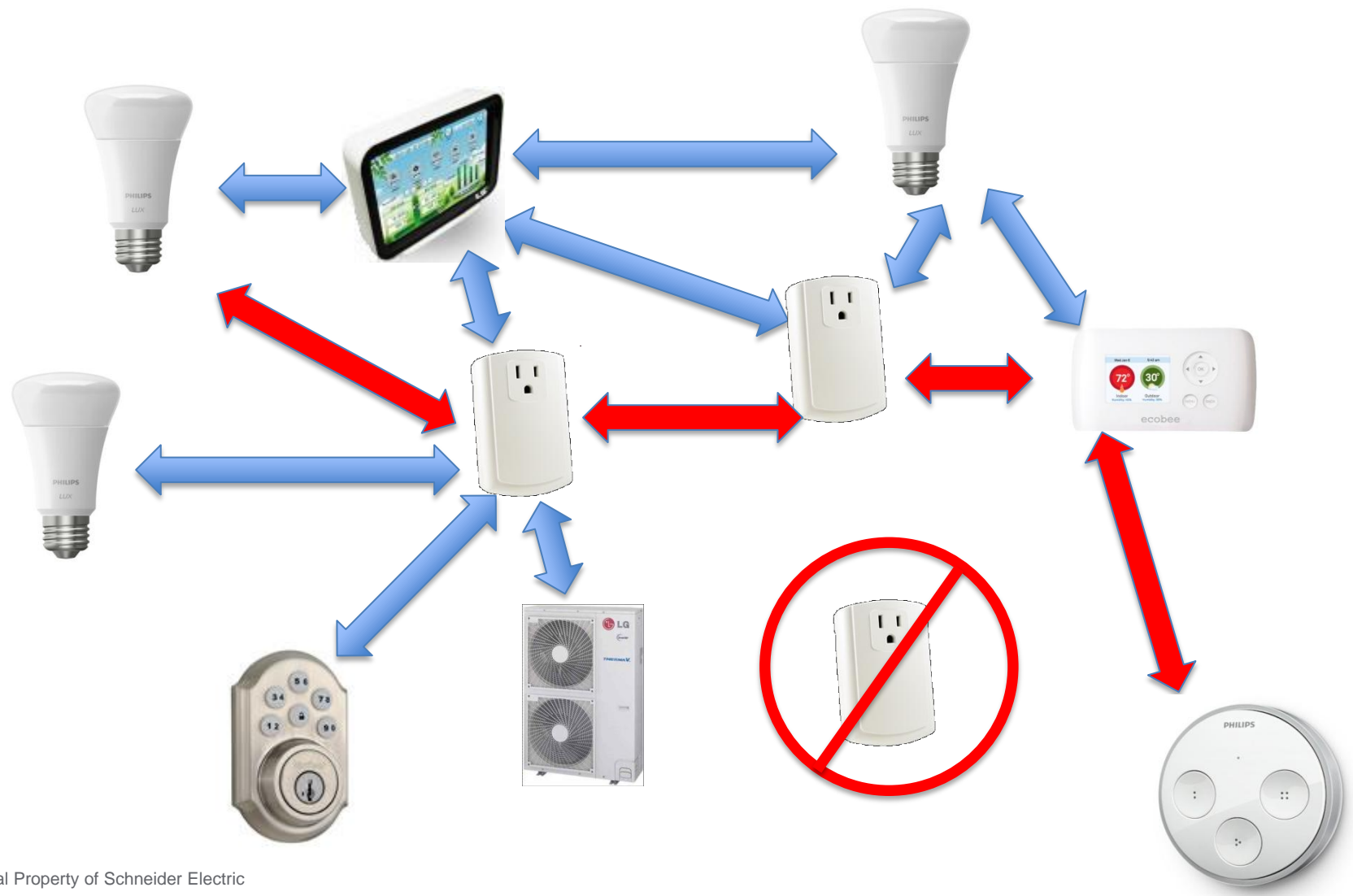
Technical Insight

Why ZigBee 3.0 is the good answer to Lighting Connectivity

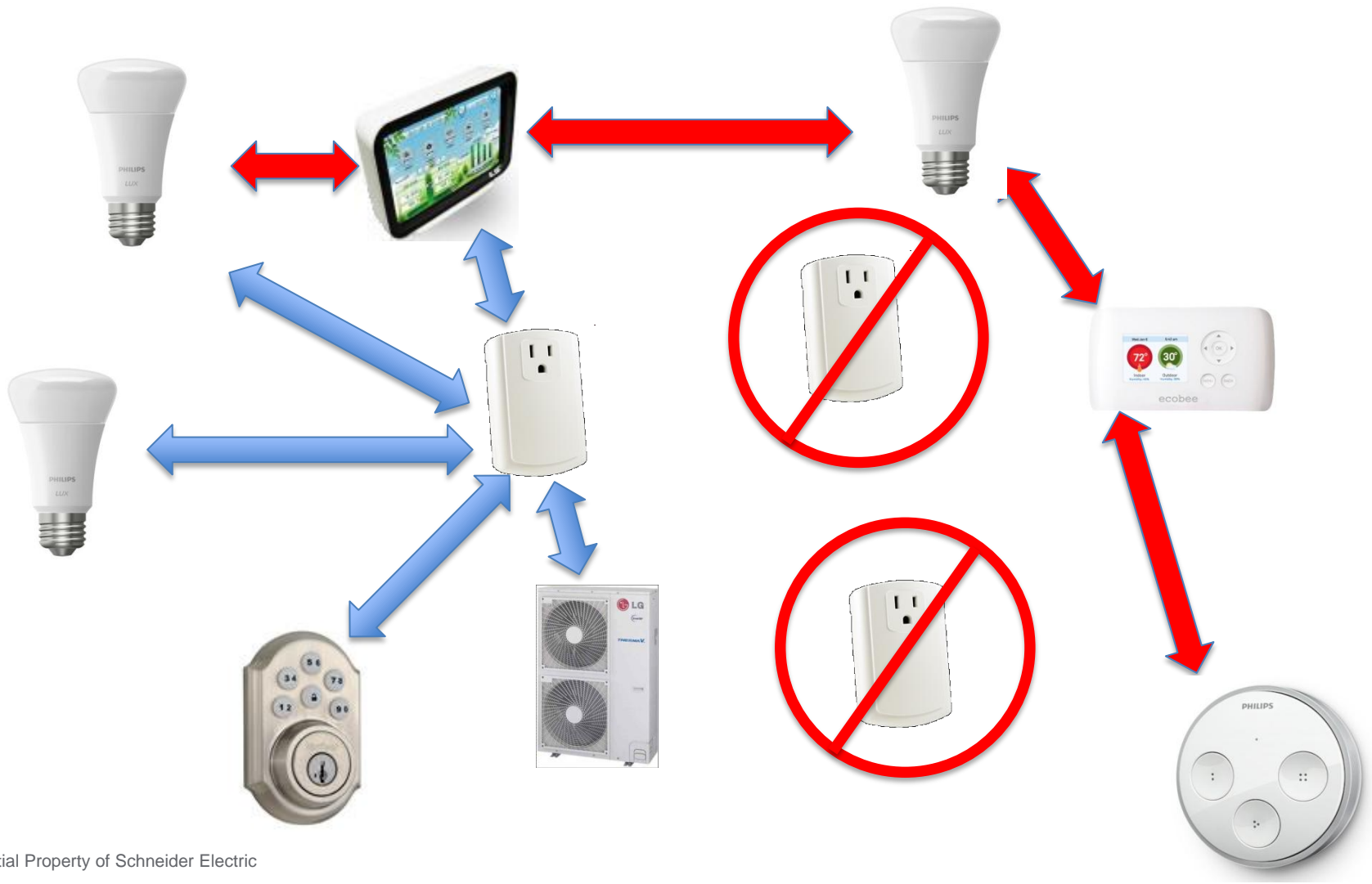
Meshing technology: self healing



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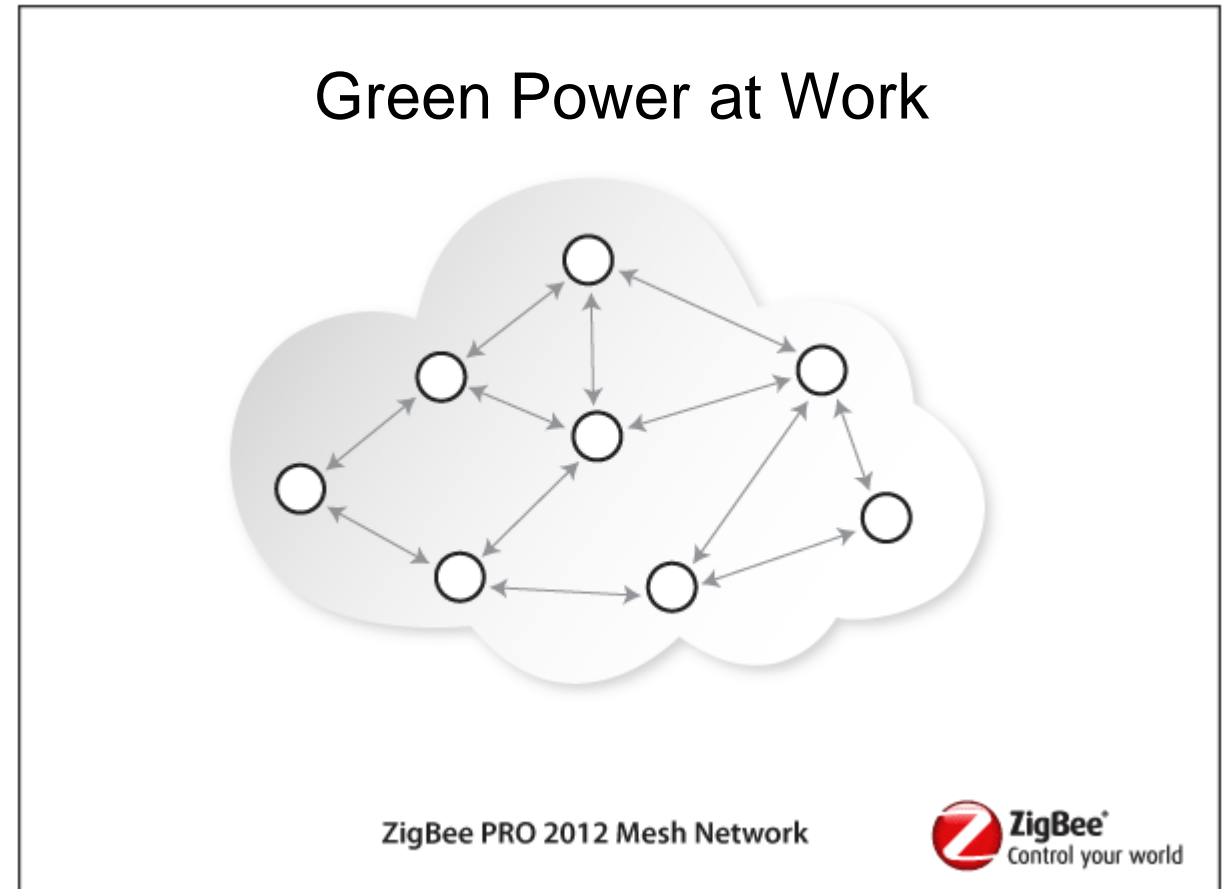
Scalable from 2 devices network up to thousands of nodes



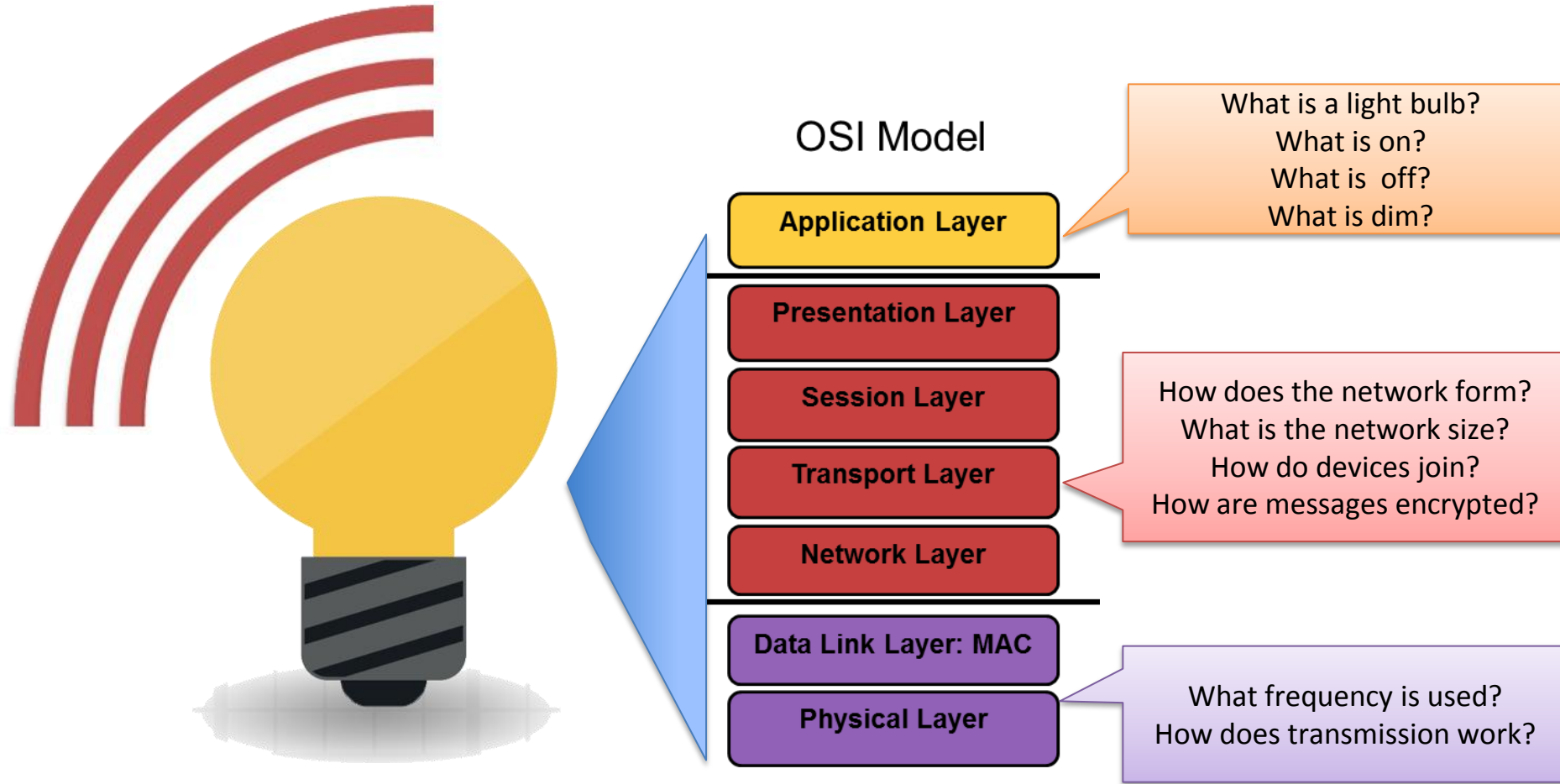
GM Spring Hill Plant: 28,773
connected lights, 20 million
square feet

Very low power

- IEEE 802.15.4 2.4GHz radio
 - State of the art <10mA @3V (RX / TX), <1µA standby mode
- Enables battery powered devices with >10years battery life
 - Short messages
 - Sleepy devices management
- Green Power feature for Energy Harvested devices



Standardized at all layers



Device types

> ZigBee Green Power Devices

> Energy harvesting of life-long batteries

> ZigBee End-Devices

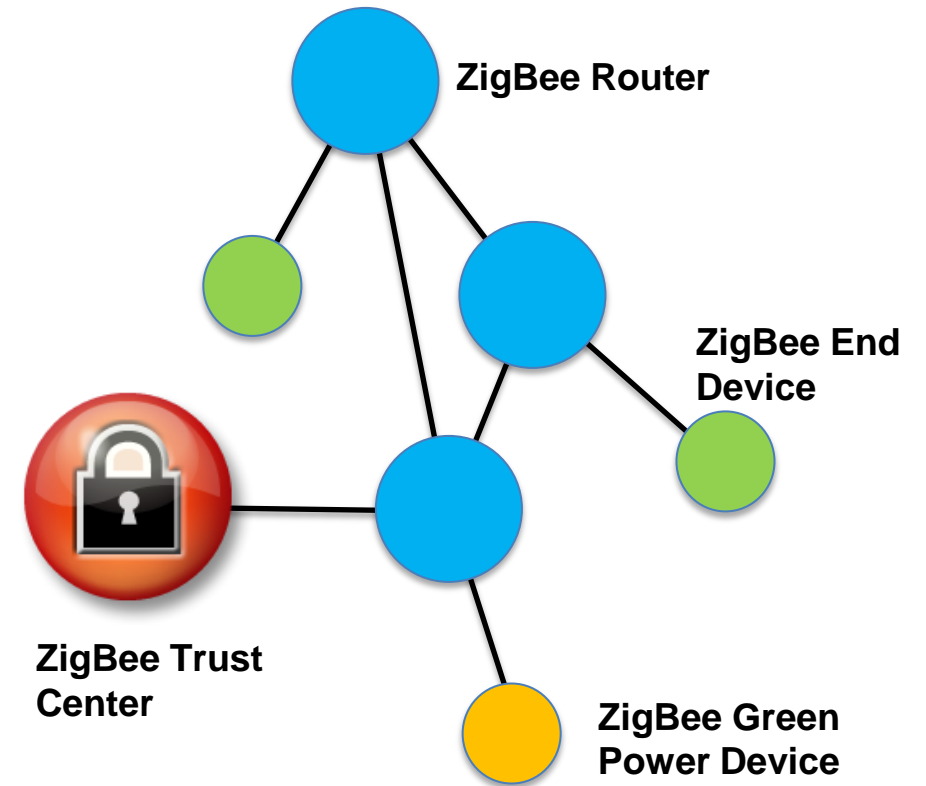
> Sleepy (battery powered)

> ZigBee Routers

> Mains powered

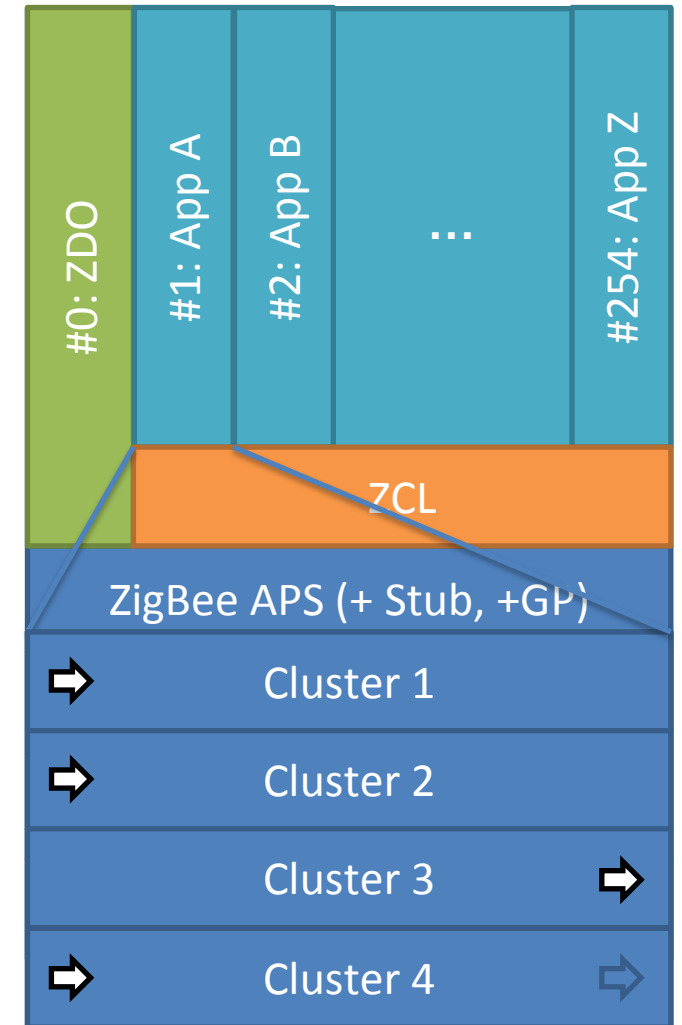
> ZigBee Trust Center

> Router dedicated to managing security credentials if centralized security network



Inside a device

- > A device has application end points
- > Application end point
 - > Source & destination of ZCL frames
 - > Individually addressable
 - > Can be member of a multicast group
 - > Can be bound to target devices
 - > Host clusters
- > Cluster
 - > Directional (inbound = “server”, outbound = “client”)



Clusters and Cluster Library

> Cluster

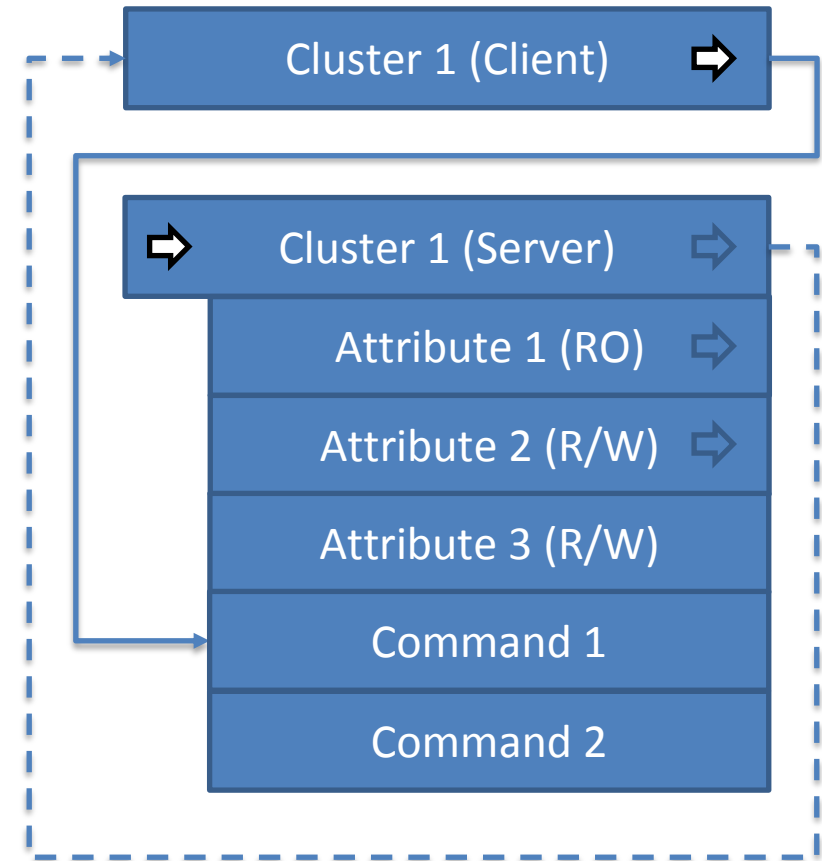
- > Interface for features
- > Framework for commands and attributes
- > Smallest interoperable units in ZigBee

> ZigBee Cluster Library

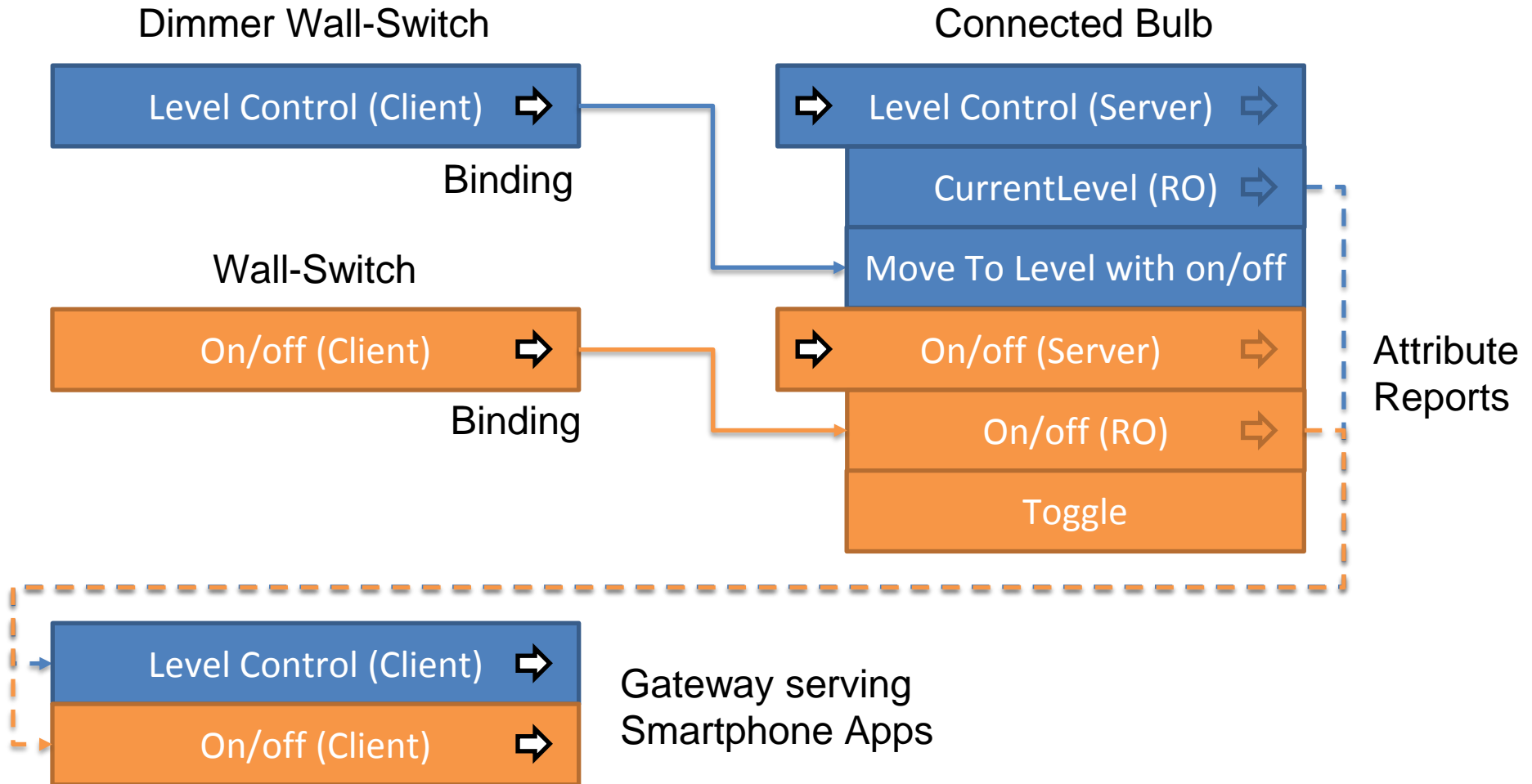
- > Collection of standard clusters
- > Toolbox with building blocks for complex applications

> Example

- > On/off, level control, color control, groups, scenes, occupancy sensing...etc



Lighting example



ZigBee 3.0 Standard Documents

•Base Device Behavior

- Provides consistent behavior for all devices connecting to a ZigBee network
- Common set of mechanisms for commissioning
- Network security

•Cluster library

- Collection of standard clusters with attributes, commands, reporting, discovery...
- Client/server clusters are interoperable right “out of the box”

ZigBee PRO
Specification

Device networking

ZigBee 3.0 Base
Device Behavior
Specification

*How devices join and
form a network*

ZigBee 3.0
Application
Architecture

*Implementation
guidance*

ZigBee 3.0 Cluster
Library

*Defines application level
functionality*

Certification program

- > ZigBee Certified program
 - > Ensure interoperability at device level
 - > ZigBee 3.0 demonstrated at CES 2015 tradeshow
- > 2 level conformance
 - > ZigBee compliant platform
 - > ZigBee Certified product
 - Enables to wear the “ZigBee Certified product logo”
- > Performed by authorized test service providers
 - > Independent laboratories
 - CESI, NTS, TraC Global, TÜV Rheinland



Summary

Summary

ZigBee 3.0 is:

- > A **Global Open Standard**, widely adopted, endorsed by the Connected Lighting Alliance
- > **Wireless**, making retrofit easy
- > **Low Power**, enabling even battery-less devices
- > **Scalable** up to very large network
- > **Field proven** with ten's of Millions of deployed products
- > **Certification program** for true interoperability between products

ZigBee 3.0 is a perfect solution for connecting lights in smart homes and smart buildings

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Thank you!