connectivity standards alliance

matter

Zigbee Direct

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zigbee

Zigbee Direct

About Leo Rozendaal

- Member of Matter Steering Committee
- Alternate Director on CSA's Board of Directors
- Core contributor and reviewer of Matter architecture, specification and test plans
- 33 years at Philips/Signify Research
  - consumer electronics domain (TV, IoT)
  - system architect (for connectivity topics)
  - lead of Signify's Matter standardization team

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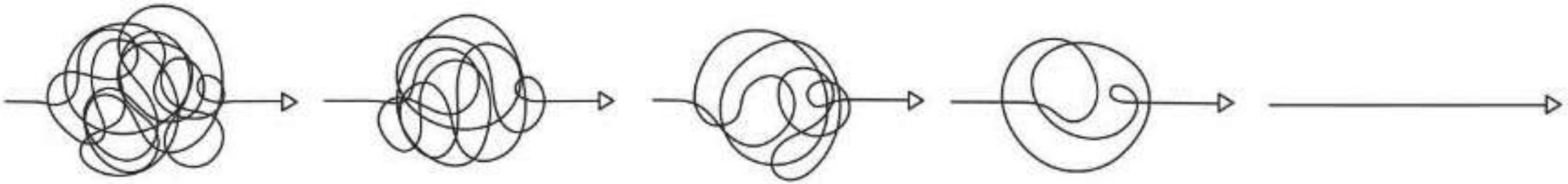
About Sander Raaijmakers

- Chair of the Zigbee Direct Balloting Group at the CSA
- Lead development engineer at Signify
- 15+ years of experience in the consumer electronics domain
- LinkedIn : in/sanderraaijmakers

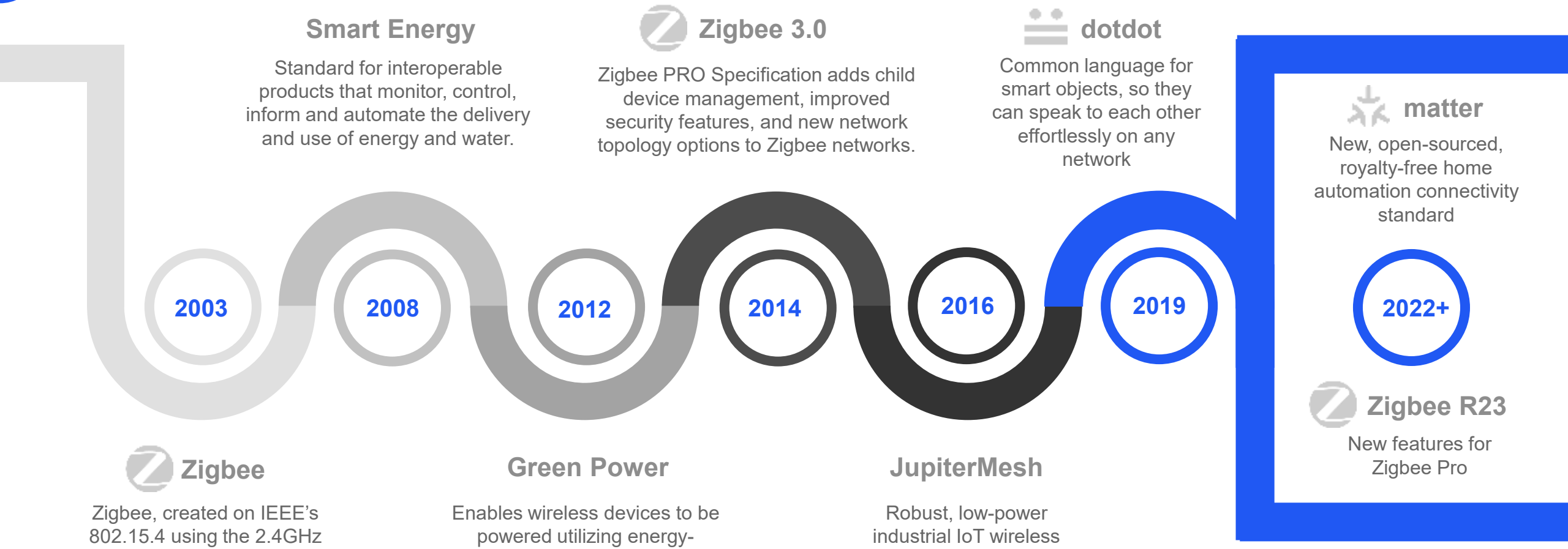
IoT should positively transform the way we live, work, and play. But, complexity, closed ecosystems and challenges of accessibility, security and trust have held back progress.



connectivity standards alliance

Since 2002 we have been dedicated to unraveling these challenges. Our goals are to **simplify** the complex, create an open path to **IoT adoption** and innovation, and promote **universal open standards**, enabling all objects to securely connect & interact.

History of Our Technology Expansion



2003 — Zigbee

Zigbee, created on IEEE's 802.15.4 using the 2.4GHz band and a self-healing true mesh network, standardized.

2008 — Smart Energy

Standard for interoperable products that monitor, control, inform and automate the delivery and use of energy and water.

2012 — Green Power

Enables wireless devices to be powered utilizing energy-harvesting methods with limited or no batteries.

2014 — Zigbee 3.0

Zigbee PRO Specification adds child device management, improved security features, and new network topology options to Zigbee networks.

2016 — JupiterMesh

Robust, low-power industrial IoT wireless mesh network with flexible data rates

2019 — dotdot

Common language for smart objects, so they can speak to each other effortlessly on any network

2022+ — matter

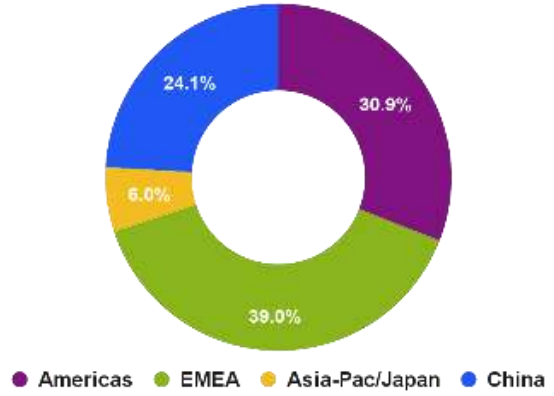
New, open-sourced, royalty-free home automation connectivity standard

2022+ — Zigbee R23

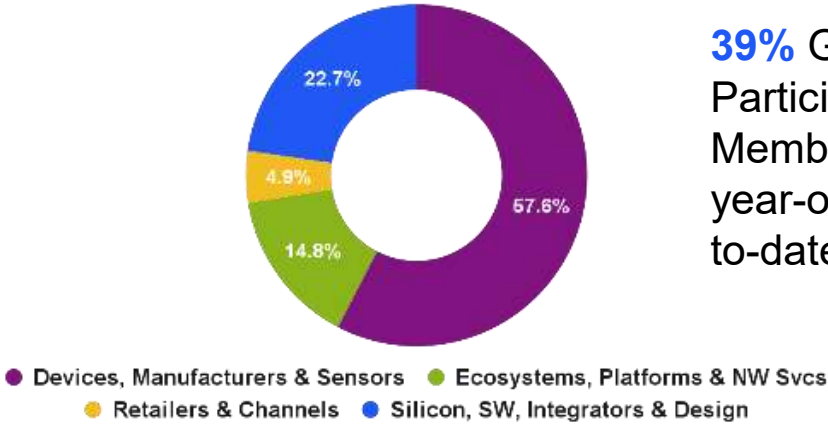
New features for Zigbee Pro

Building the Foundation & Future of the IoT

585 Engaged Companies, with over **5,500** member individuals participating from **43** countries. Added **143** Members in 2022



Membership by Industry



39% Growth in Participants Level Member Companies year-over-year, year-to-date

Global Leadership

Global Collaboration

Since 2002, **Connectivity Standards Alliance** has been dedicated to **simplifying** the complex, creating an **open path** to IoT adoption and innovation, and promoting **universal open standards**, enabling all objects to securely connect & interact.

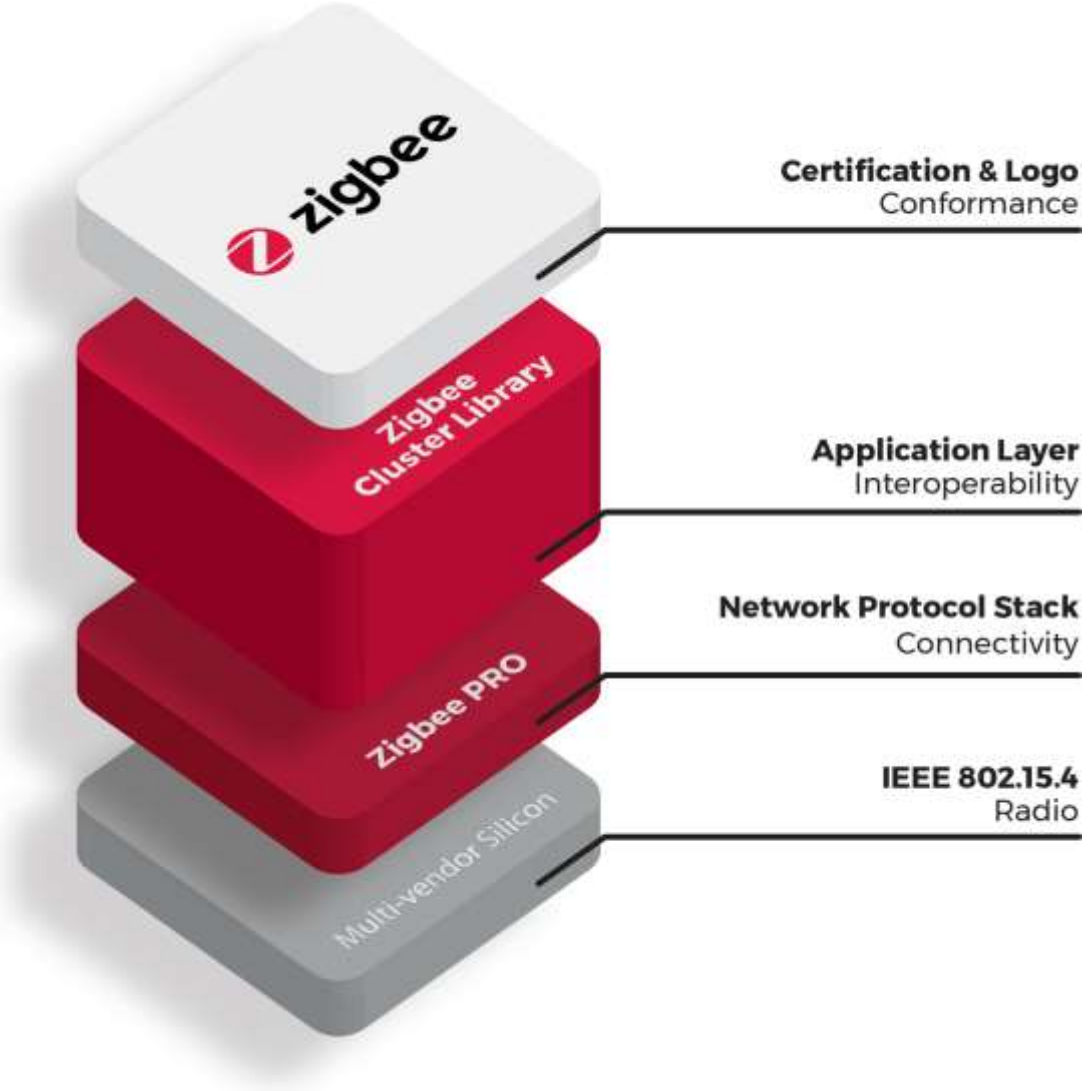
We are a multi-standards group **enabling collaboration** across IoT players, **accelerating market growth** and **delivering value** to our members & the industry.

What we do:

- Standards Development
- Testing and Certification
- Market Reach and Influence

Zigbee is the only complete IoT solution — from mesh network to the universal language that allows smart objects to work together.

Zigbee increases choice and flexibility for users and developers, and delivers the confidence that products and services will work together through standardization and testing of all layers of the stack.



zigbee

Over ½ Billion Zigbee chipsets sold and nearly 4 billion are expected to ship by 2023

Zigbee device Certifications are growing year over year

New feature development continues

Residential

Commercial

Utility/Energy

Globally Adopted

Interoperable

Reliable and Low-Power

Proven, Self-Healing Mesh

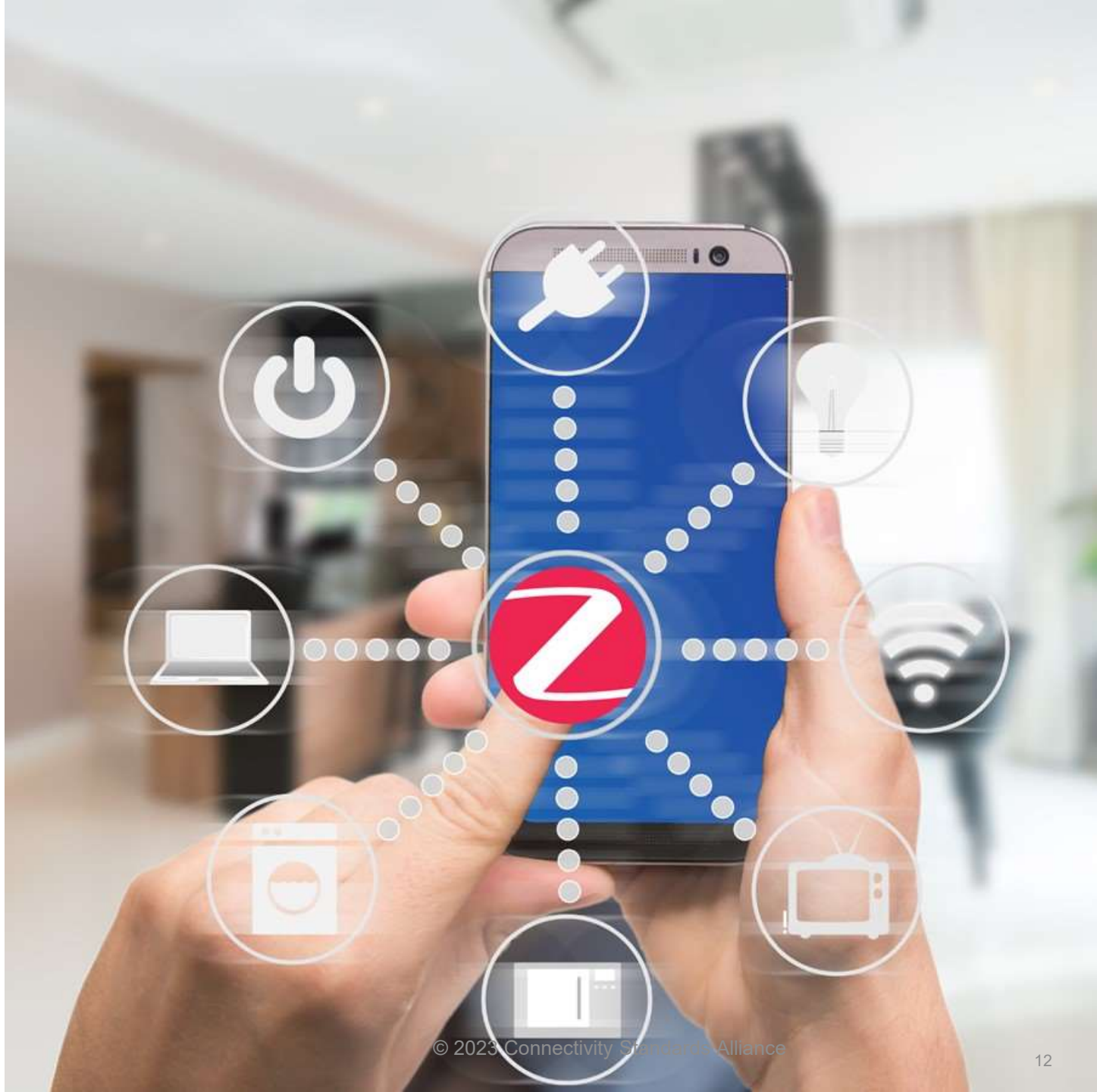
Secure by Design

Unified Data Model

2.4 and Sub-GHz PHY Support

What is Zigbee Direct ?

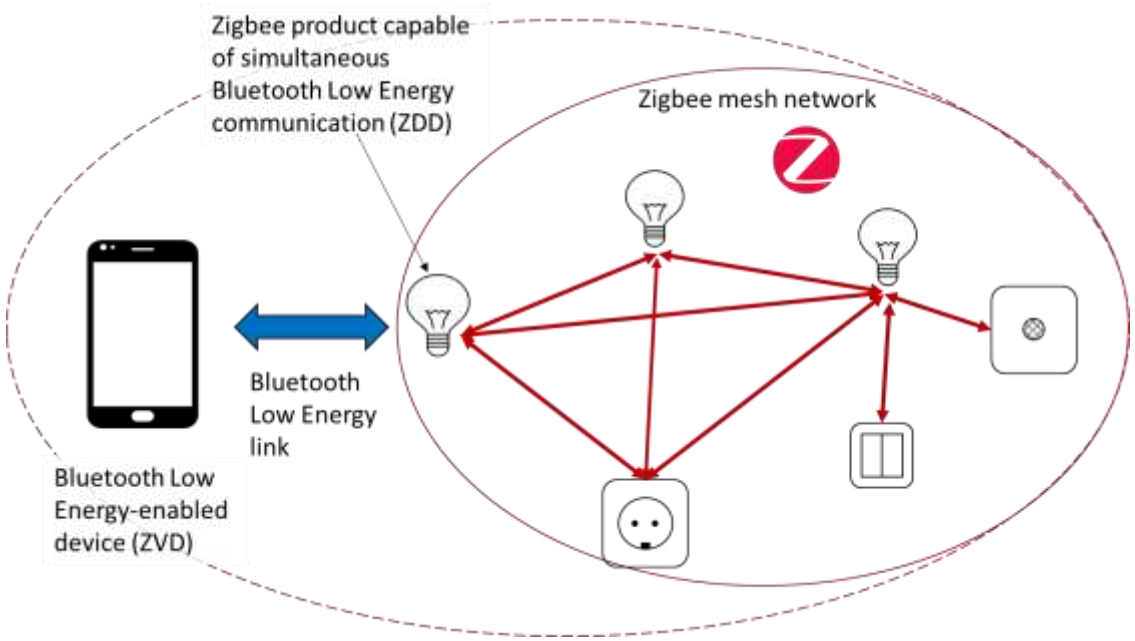
- *Let users seamlessly interact with their Zigbee networks using a smart phone, or other Bluetooth Low Energy ("LE") device*
- Offers a number of key use cases:
  - **Commissioning** – set up Zigbee network/device using Bluetooth LE
  - **Control** – send/receive Zigbee data using Bluetooth LE



Why do I need it ?

- Majority of devices do not have Zigbee radio
- Many System-on-Chip (SoC) offer a combination of Zigbee and Bluetooth LE
- Consumer devices such as phones and smart speakers typically have Bluetooth LE

Overview / Terminology



Zigbee Direct Device ("ZDD")

- Zigbee device / Bluetooth LE combination
- Examples: light bulb or air conditioner

Zigbee Virtual Device ("ZVD")

- Bluetooth LE, no Zigbee radio
- Typically a phone or smart speaker

Security

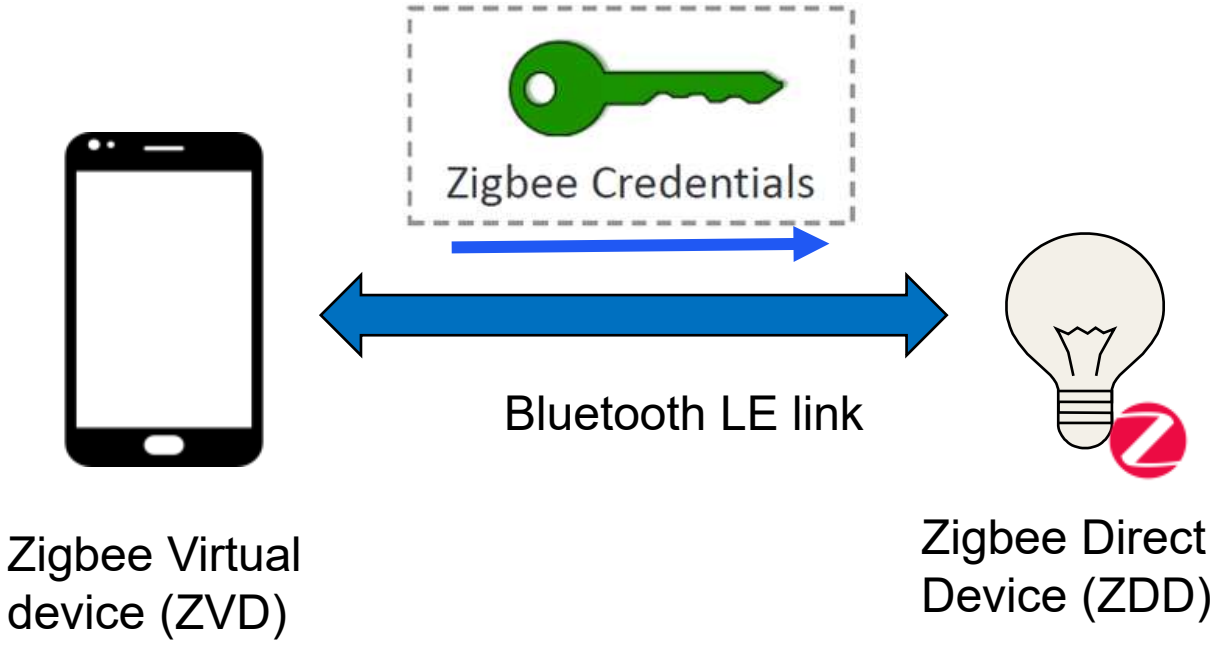
Application layer security

- Point to point over Bluetooth LE
- End to end security in Zigbee

Aligned with the latest Zigbee security (R23)

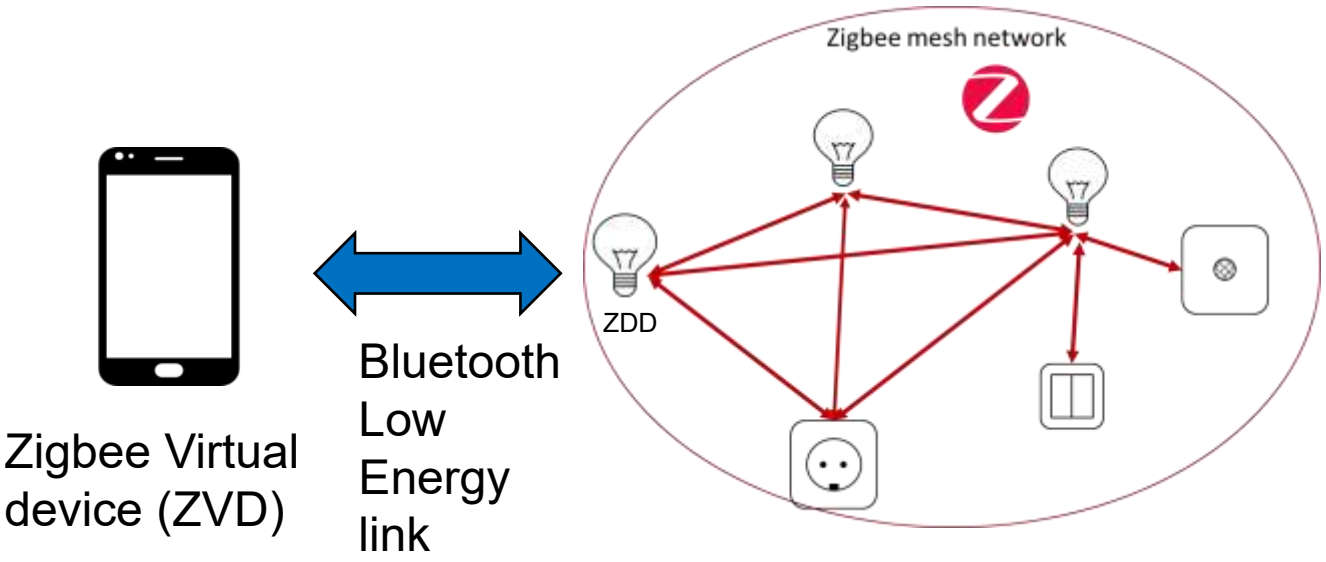
Commissioning Use Case

- Out-of-band: Push all Zigbee network parameters through the Bluetooth LE connection
- Trigger regular Zigbee commissioning



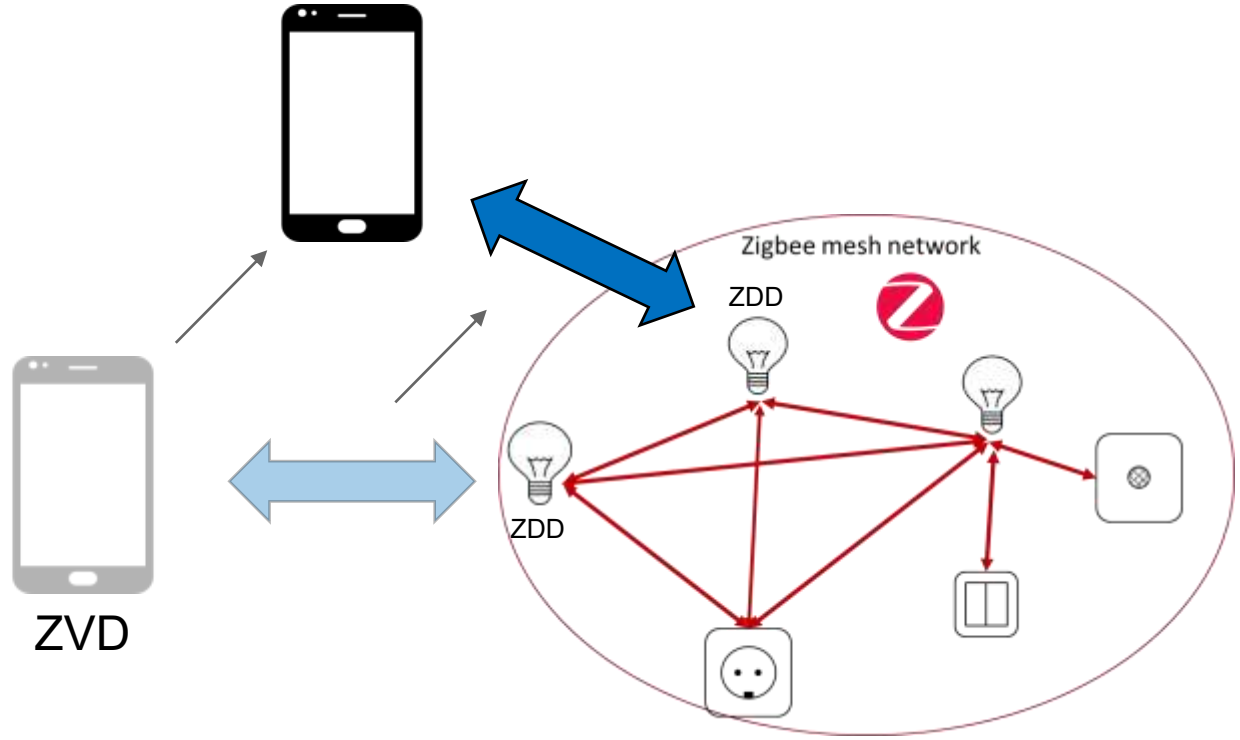
Control Use Case

- Control Zigbee network from the phone / smart speaker remotely
  - Tunnel data to the Zigbee Network
- Optionally benefit from the higher security without the need of a permanently placed hub



Additional Features

- The phone can discover Zigbee Direct Devices in the vicinity
- Once authorized, ZVD can connect to any ZDD in the same Zigbee network



Timing

- Zigbee Direct specification was released December 2022, certification program opened
- Manufacturers can create and certify their Zigbee Direct devices
- Market release of products depends on each manufacturer

Ongoing Effort

50+ Member companies are contributing to Zigbee Direct

More information:

https://csa-iot.org/all-solutions/zigbee/zigbee-direct/

https://www.youtube.com/watch?v=py2O0OJwick

Amazon
Assa Abloy AB
ATLANTIC Group
BEGA Gantenbrink-Leuchten KG
BOE Technology Group Co Ltd
Comcast Cable Communications Management
Danfoss A S
DEKRA
DSR Corporation
EDF RD
Element Materials Technology Ltd
EnOcean GmbH
Exegin Technologies Ltd
Facebook Inc
Huawei Technologies Co Ltd
IKEA of Sweden
Infineon Technologies
Inspur Software Technology Co Ltd
JiangXi Innotech Technology
Landis Gyr AG
Leedarson Lighting Co Ltd
LEGRAND
Lumi United Technology Co Ltd
Microchip Technology
MMB Networks
NodOn
Nordic Semiconductor ASA
NXP Semiconductors Netherlands BV
ON Semiconductor
OPPO
PanKore Integrated Circuit Technology Co Ltd
PROFALUX
Qorvo
Resideo Technologies
Salto Systems
Samsung Electronics Co Ltd
Schlage Lock Company LLC
Schneider Electric
Secure Meters UK Ltd
Shenzhen FEIBIT Electronic Technology Co LTD
Signify Netherlands B V
Silicon Labs
Smart DCC Ltd
Somfy
STMicroelectronics SAS
System Level Solutions Inc
Texas Instruments
TUV Rheinland of North America
Ubilogix
ubisys technologies GmbH
Underwriters Laboratories
Universal Electronics
Wistron NeWeb Corporation
Xylem Inc

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The problem: Consumer IoT device today* needs to speak many languages

- Each ecosystem has their own "language" (data representation + encoding)
- Device needs to understand all of those

- Consumers are confused whether a certain device will work with a certain ecosystem
- Consumers may be confronted with devices which work with their current ecosystem, but not another one they'd like to add (lock in)

* before Matter

works with Google Assistant

Works with Apple HomeKit

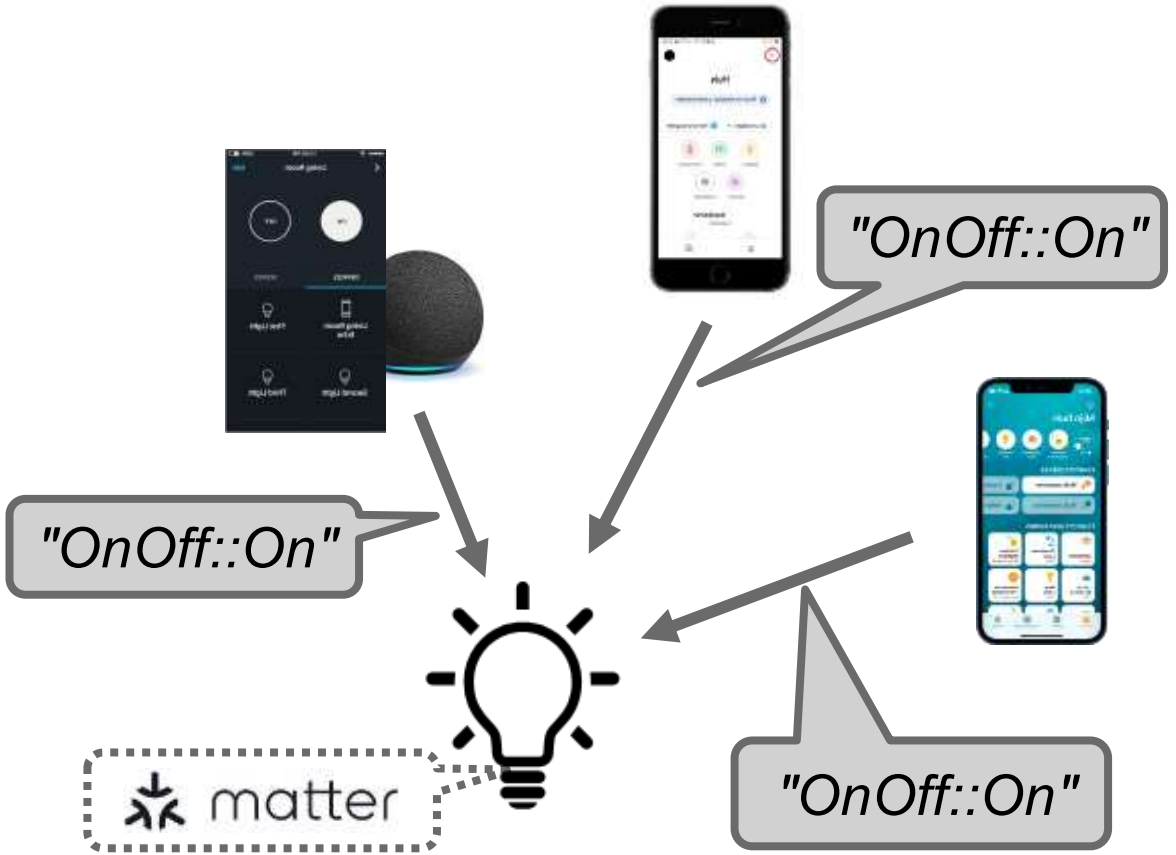
WORKS WITH alexa

The solution:

matter

Common data representation, encoding

Common commissioning flow



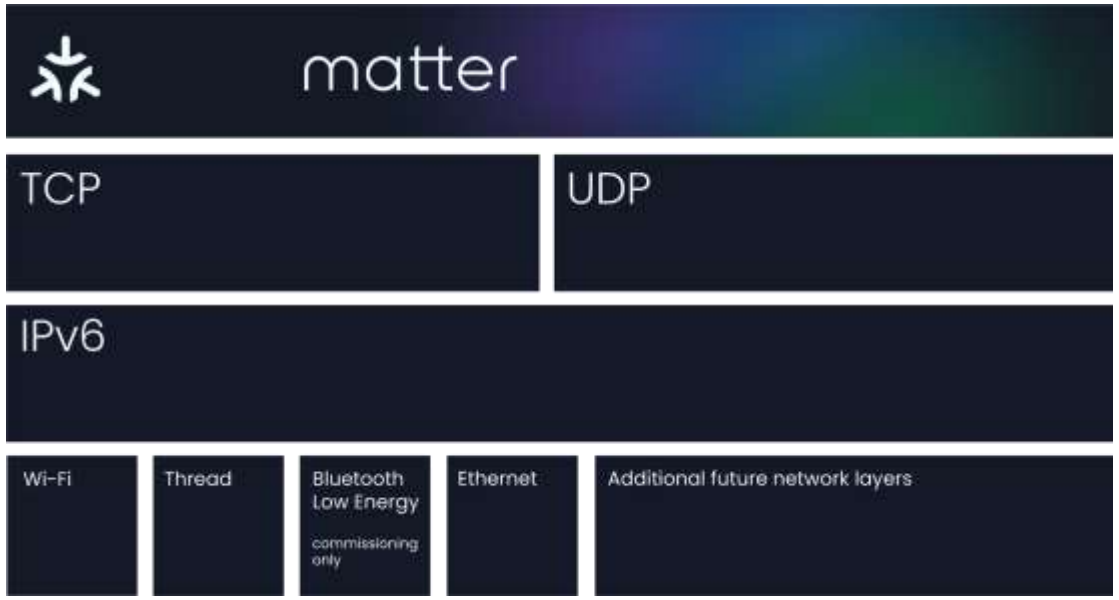
The solution:

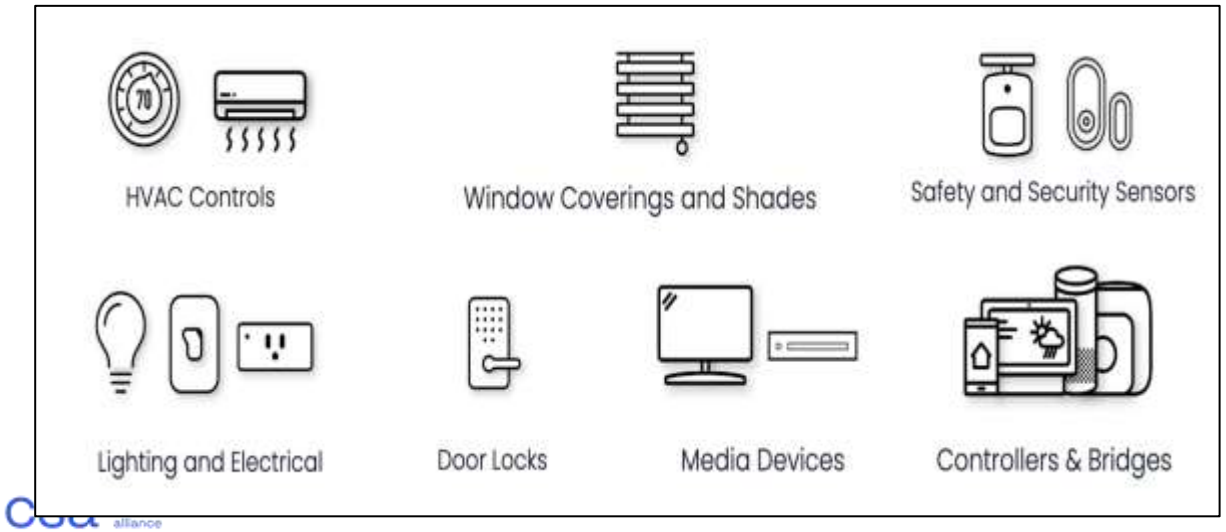
matter

- Common data representation, encoding, commissioning
  - created by active participation from many parties
- Transport: IPv6, over Thread, Wi-Fi and Ethernet
  - uses Bluetooth LE for commissioning phase

- A seal of approval that devices will work seamlessly together today and tomorrow
- Simplifying development for manufacturers
- Increasing compatibility and choice for consumers

How Matter Stacks Up





Common application layer + data model
- Interoperability, simplified setup & control

IP-based (IPv6)
- Convergence layer across all compatible networks

Focus on security
- Comprehensive, Easy, Resilient, Agile
- AES-128-CCM encryption with 128-bit AES-CBC

Open-source development approach
- Based on market-proven technologies
https://github.com/project-chip/connectedhomeip

Common protocol across device and mobile
- Extendible to cloud

Common data model
- Core operational functions, multiple device types

Low overhead
- MCU-class compute, <128KB RAM, <1MB Flash

Matter: Focus on Security

Comprehensive

• Layered approach with authentication & attestation for commissioning
• Every message protected
• Secure over-the-air firmware updates

Strong

• Single strong cryptographic suite based on well-established standards
• Passcodes and certificates used to setup secure sessions
• Device attestation to ensure authenticity

Easy

• Designed to make smart devices easier to implement and use

Resilient

• Designed to protect, detect and recover
• Distributed Compliance Ledger to enhance resiliency and scale

Agile

• Crypto-flexibility to address new developments and threats

Introduction on existing devices

Customers have already invested in IoT devices (e.g. Zigbee, Z-Wave), and are happily using them

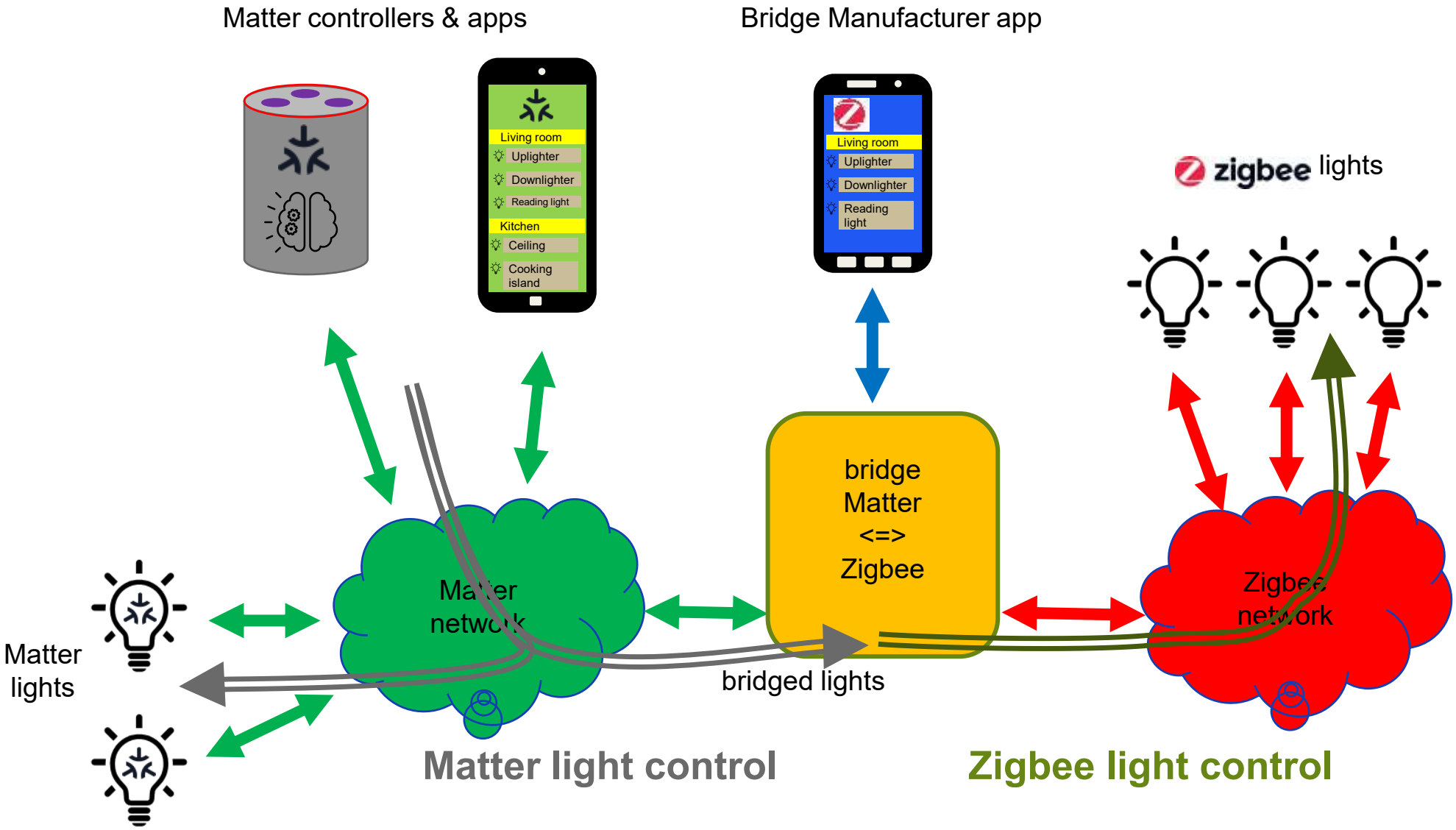
New devices will come on the market using Matter

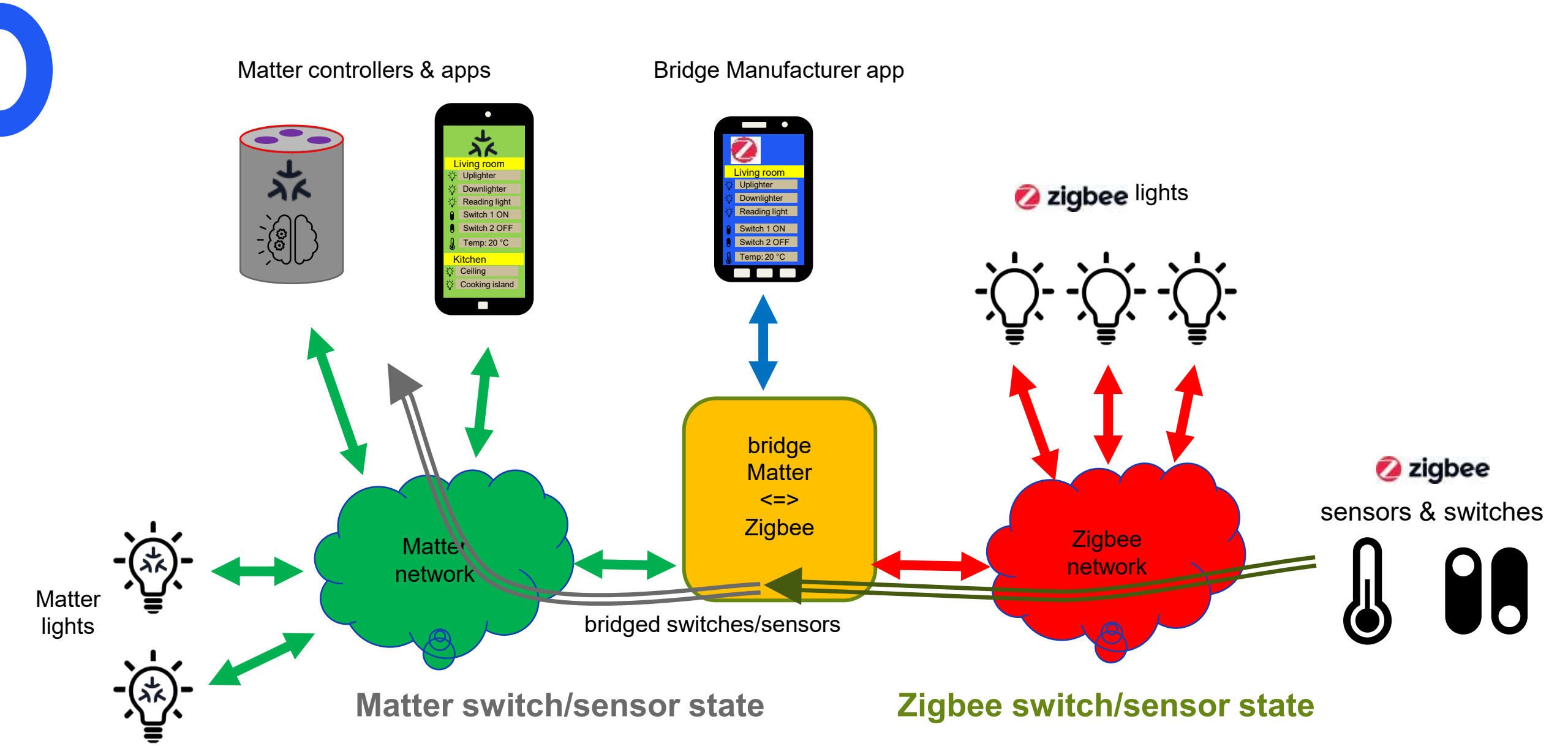
Matter should not force the customers to rebuy all their equipment

- finance, ecological footprint
- trust in “stability” for IoT offerings

Solutions

1) in-field upgrade to Matter
2) bridge existing devices into the Matter network





Creating Experiences that Matter

Consumers

- More consistent set up experience
- Multi-Admin works across & with multiple ecosystems

Developers

- Develop once / deploy everywhere
- Secure-by-design approach
- Community of support

Retailers

- Simplified purchasing experience
- Minimized returns

Commercial / Builders

- Future proofed ecosystem compatibility
- Flexibility for users

Matter: Setting the Standard for Smart Home

Simple | Interoperable | Reliable | Secure

- Complete Specification
- Toolkit: Open-source SDK, Test Scripts, and Tools
- Certification Program
- Alliance Developer Community as force multiplier

300+ Companies | 4,000+ Individuals

*Sample of companies who have announced support of Matter

Evolving and Extending Our Reach

Ongoing Release Planning

- Biannual Releases – Spring / Fall
- Devices
- Functional Updates
- Continuous Improvement

Active Use Case Teams

- Appliances (White goods)
- Robot vacuum cleaners
- Closure Sensors
- Environmental Sensing / Controls
- Smoke & CO Detectors
- Energy management (EV Charging +)
- Access points, Border Routers
- Ambient motion / presence sensing
- Doorbells & Cameras

Try it out yourself… Hands-on with Matter

- Use an existing ecosystem controller (e.g. Apple, Google, Home Assistant and many more)
  - or make your own (chip_tool on Raspberry Pi / Linux)
- Use existing devices
  - e.g. Philips Hue bridge (https://developers.meethue.com/matter/)
  - or make your own (dev-boards from various silicon providers)
- For the “make your own” paths: Get the SDK
  - https://github.com/project-chip/connectedhomeip
- Optional: read the spec (1350 pages, or parts thereof…)
  - https://csa-iot.org/developer-resource/specifications-download-request/

connectivity standards alliance

The Connectivity Standards Alliance is the foundation and future of the Internet of Things. With its Members' diverse expertise, robust certification programs, and a full suite of open IoT solutions the Alliance is leading the movement toward transforming the way we live, work and play.

Visit us at:
csa-iot.org and @csaiot