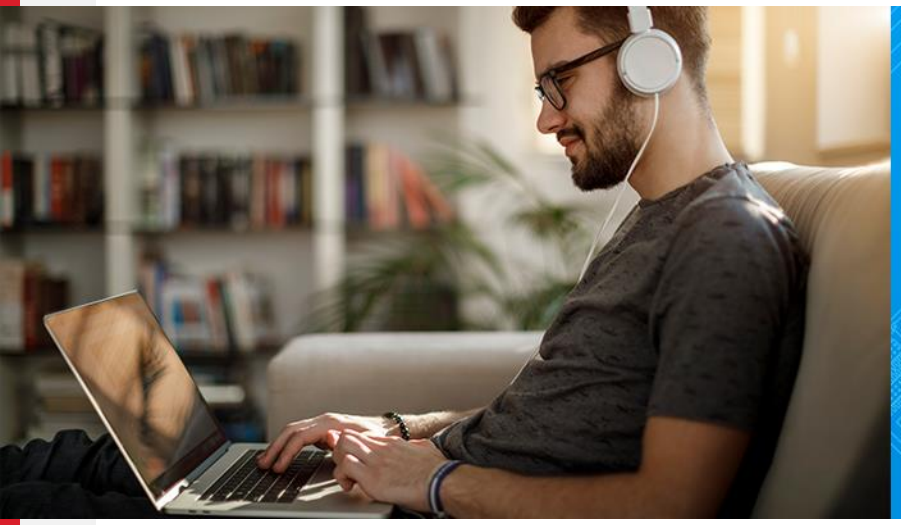
WELCOME



APAC Tech Talks LIVE - Korean

Topic	Date
Bluetooth AoX Solutions	10a.m., Tuesday, May 26
Connected Home Over IP (CHIP) for Beginners	10a.m., Thursday, May 28
Evolution of Bluetooth 5, 5.1, & 5.2	10a.m., Tuesday, June 2
Device & Network Security for the IoT	10a.m., Thursday, June 11

Speaker

Young Noh

Sr. Staff FAE, Silicon Labs Korea

Young works as Sr. Staff FAE in Silicon Labs Korea, focusing on 802.15.4-based Mesh Networking solutions and Bluetooth Low Energy products to provid technical support to Customers.

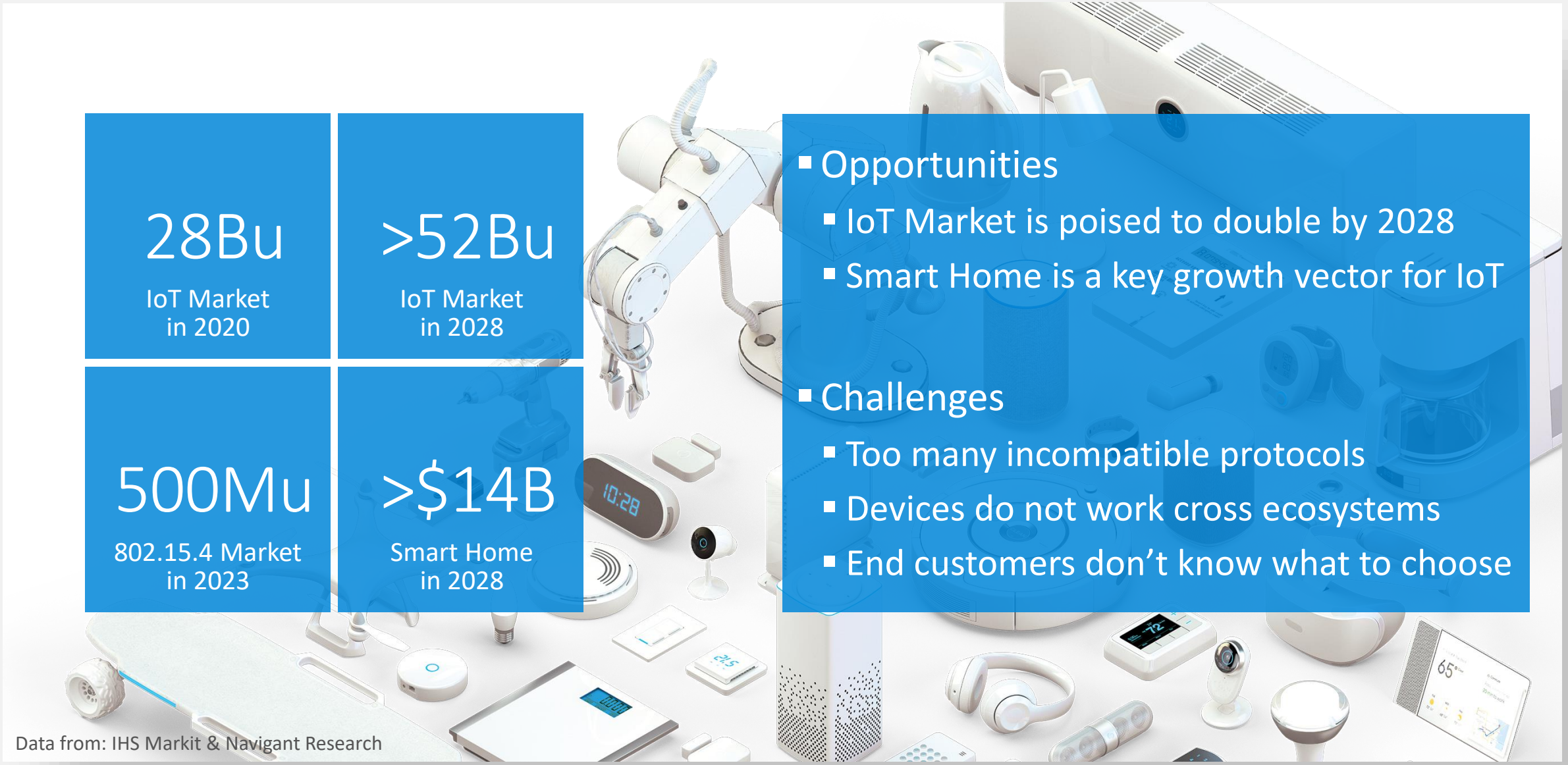
Connected Home Over IP (CHIP) for Beginners

MAY 2020

*As of 5/11/2021 Project Connected Home over IP is now Matter. Learn more about Matter.

IoT Market Opportunity & Challenges

28Bu IoT Market in 2020	>52Bu IoT Market in 2028
500Mu 802.15.4 Market in 2023	>$14B Smart Home in 2028



- Opportunities
  - IoT Market is poised to double by 2028
  - Smart Home is a key growth vector for IoT
- Challenges
  - Too many incompatible protocols
  - Devices do not work cross ecosystems
  - End customers don’t know what to choose

Data from: IHS Markit & Navigant Research

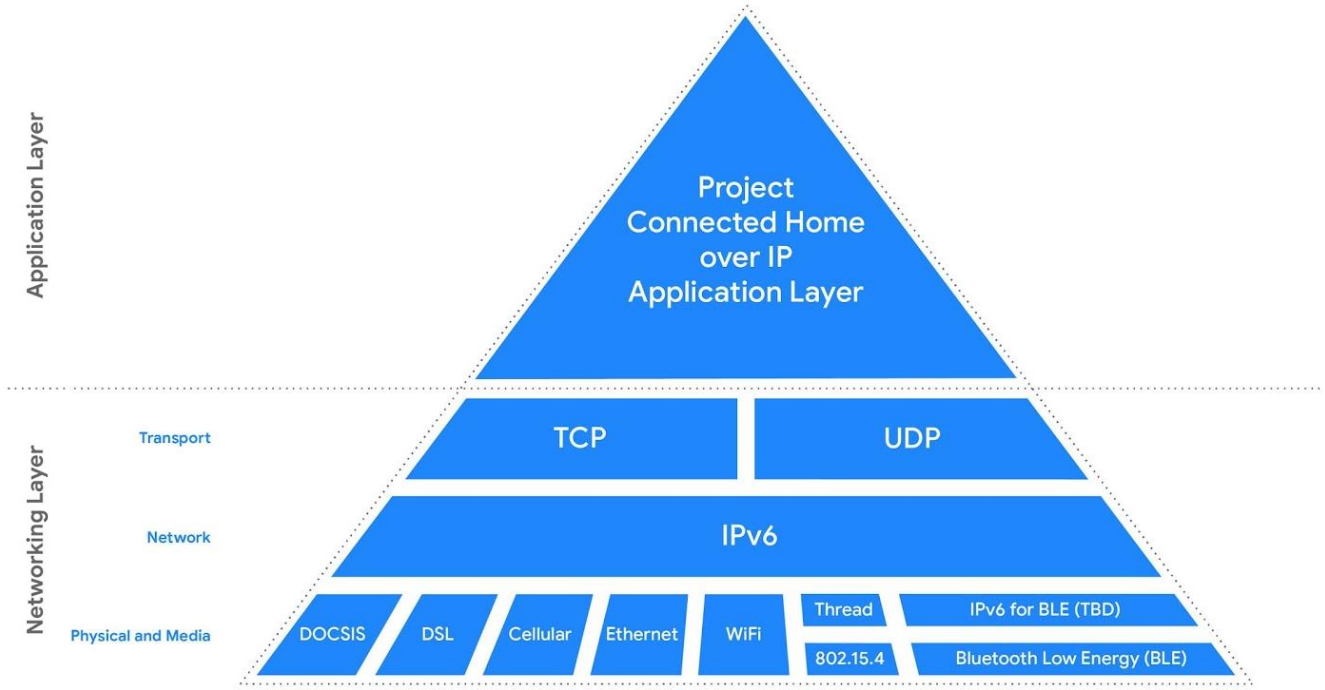

Imagine what can happen
if we make the IoT simpler.
We will transform the
industry and the world.

What Does the IoT Market Need to Grow?

Market expectations:

- **Simple** – Simplicity for end customers, developers and manufacturers
- **Secure** – Robust security from end devices to the cloud is essential
- **Inclusive and Open** – Products to work together and across ecosystems

Project Connected Home Over IP - Introduction



zigbee Zigbee Alliance Dotdot Data Models

WEAVE Google Weave

Apple HomeKit

Amazon Alexa's Smart Home

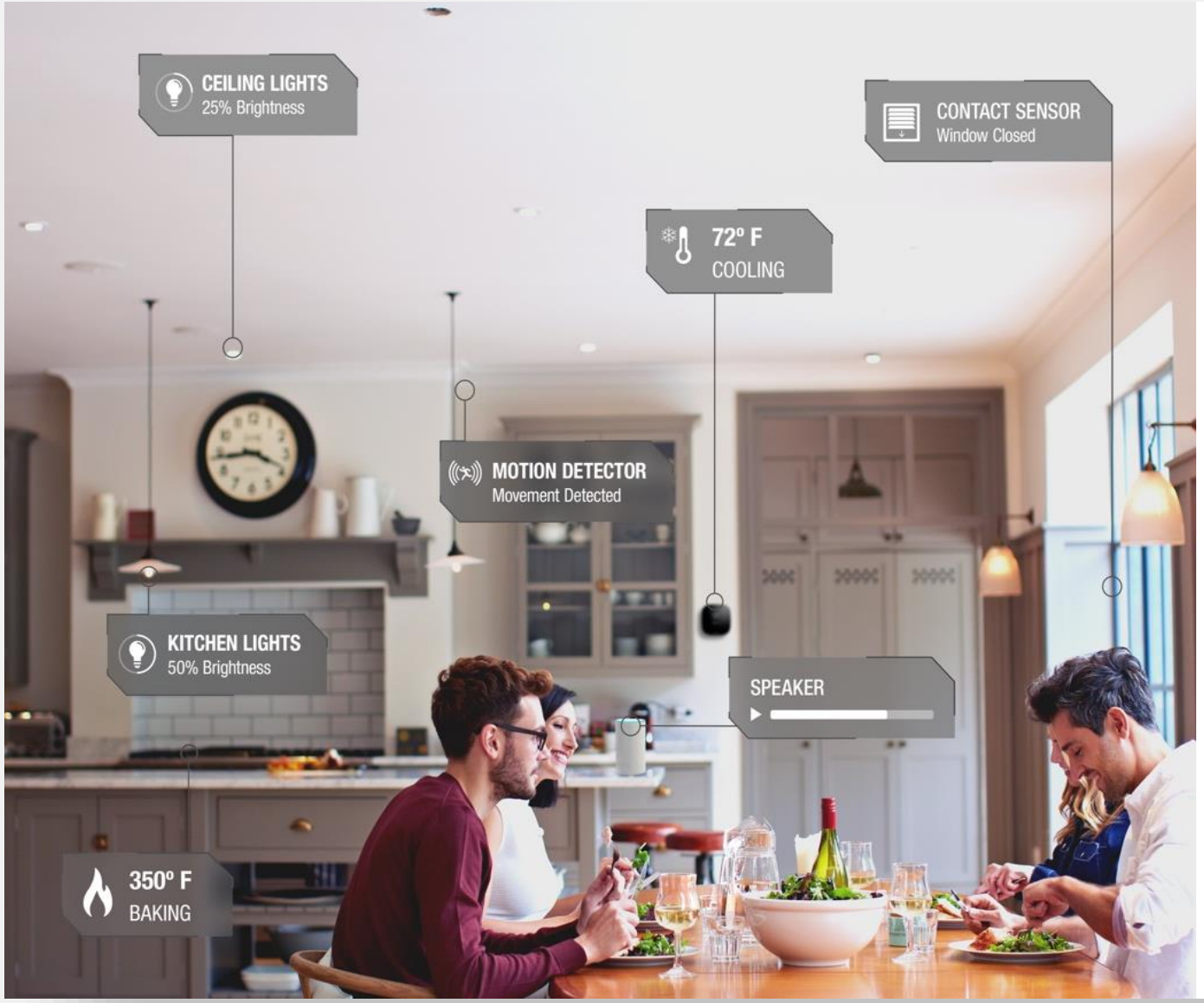
- Project Connected Home over IP is a Working Group within the Zigbee Alliance that plans to develop and promote the adoption of a new, royalty-free connectivity standard to increase compatibility among smart home products, with security as a fundamental design tenet.
- Amazon, Apple, Google, and the Zigbee Alliance joined together to promote the formation of the Working Group. Silicon Labs is fully endorsing this project and actively engaged
- Goals
  - Simplify development for manufacturers and increase compatibility for consumers
  - Enable communication across smart home devices, mobile apps, and cloud services

Connected Home Over IP – Participating Companies

https://www.connectedhomeip.com

Note: More than 90 Companies joined the project since announcement

Project Connected Home Over IP – Key Takeaways

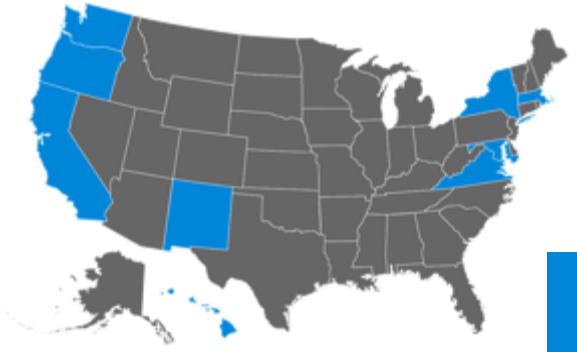


- New application layer based on market-tested technologies running on multiple network protocols like Wi-Fi, Bluetooth and 802.15.4
- Aims to improve customer experience by creating a protocol widely adopted across ecosystems and assistants
- Initial emphasis in the Smart Home which could be later expanded to other applications areas
- Removes barriers for Smart Home Ecosystems Providers and IoT Product Manufacturers
- Rapid pace development based on open source

Futureproof Your Design and Start Building Products Today

- **Question:**
  - I'm developing new products today. How does the Project affect my development path?
- **Answer:**
  - The new application protocol will complement existing technologies
  - Start building products today using existing technologies like Zigbee or Thread
  - Update your product in the future using secure over the air updates
  - Use larger memory variant ICs and Modules since memory requirements are not fully defined today
  - Join project Connected Home Over IP in Zigbee Alliance

IoT Security legislation is happening



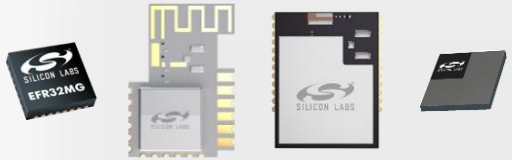
Already accounts for ~30% US population

- **California** Consumer Privacy Act (§ SB-327)
  - Approved Sept 28th, 2018
  - Effective Jan 1st, 2020
- Requires **'reasonable security features'**
  - appropriate to the nature and function of the device
  - appropriate to the information it may collect, contain, or transmit
  - designed to protect the device and any information contained therein from unauthorized access, destruction, use, modification, or disclosure
- Multiple US states have already introduced other bills that resemble California's example

- **European Regulation**
  - European Standard EN 303 645
  - Technical Specification TS 103 645
- Cyber Security for Consumer Internet of Things
  - No universal default passwords
  - Securely store credentials and security-sensitive data
  - Implement a means to manage reports of vulnerabilities
  - Keep software updated
  - Communicate securely
  - Minimize exposed attack surfaces
  - Ensure software integrity
  - Ensure that personal data is protected
  - Make it easy for consumers to delete personal data
  - Make installation and maintenance of devices easy
  - Etc…

Why Silicon Labs?

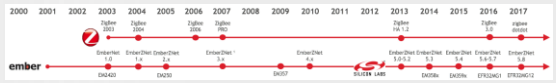
COMPREHENSIVE WIRELESS PORTFOLIO



- 80+ active OPNs for ICs and Modules
- +20dBm PA and best in class RF sensitivity
- Low power, Secure Element, Vault™
- Innovative SiP technology for modules

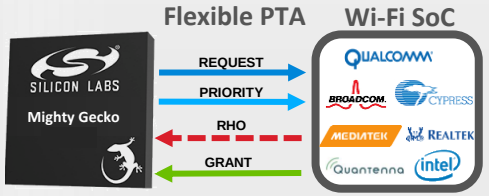
EXTENSIVE EXPERIENCE IN MESH NETWORKS

zigbee THREAD Bluetooth™ Z-WAVE



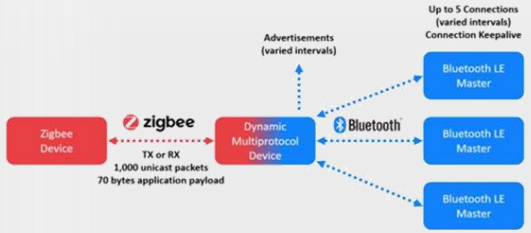
- Zigbee/Thread BoD seats and WG Chairs
- Main Zigbee/Thread spec developers
- Leading Bluetooth Mesh implementers
- Z-Wave Alliance and specification drivers

PROVEN COEXISTENCE WITH OTHER SHORT-RANGE RF



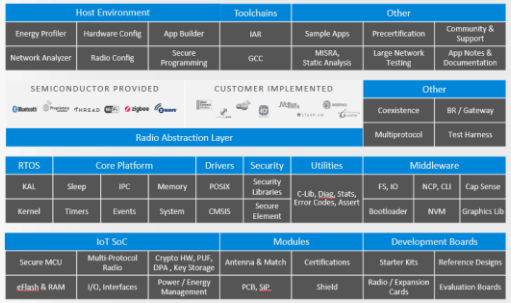
- Flexible PTA Interface for managed CoEX
- Multi-vendor Wi-Fi support
- Application optimized performance
- Best in class unmanaged coexistence

MULTIPROTOCOL SUPPORT



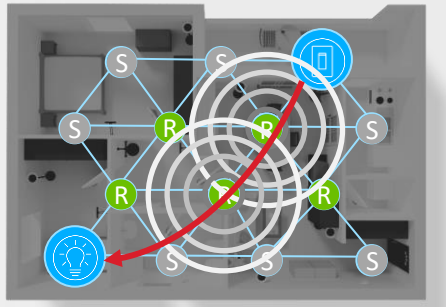
- Run simultaneously multiple protocols
- Increase functionality by adding BLE
- Lower product cost, lower design cost
- Proven customer products available today

PLATFORM SCALABILITY FOR SW AND SECURITY



- Same software components and drivers for each wireless stack
- Easy migration across hardware portfolio
- Faster time to market

BEST IN CLASS MESH STACKS

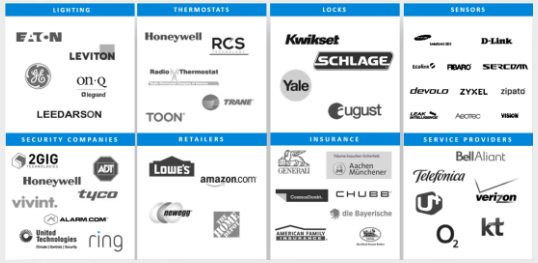


- 500+ nodes test network for SQA
- Large network performance benchmarks
- Interoperability testing for each release
- Comprehensive RF performance testing

ESSENTIAL TOOLS

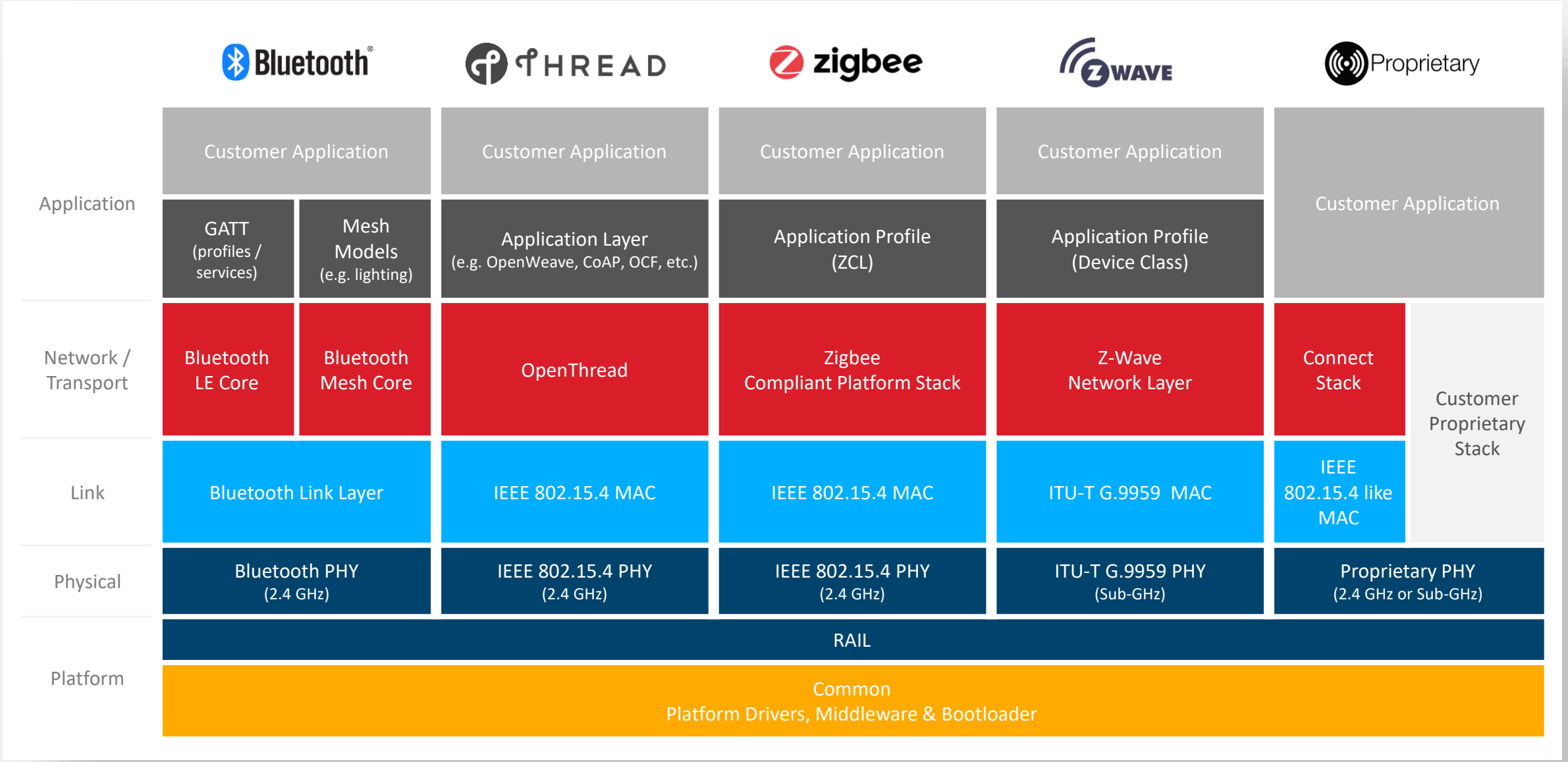
- Packet Trace Interface (PTI)
- Timestamp synchronized Network Analyzer
- Energy Profiler for battery life calculations
- App builder for easy project configuration

TRUSTED ECOSYSTEM PARTNER



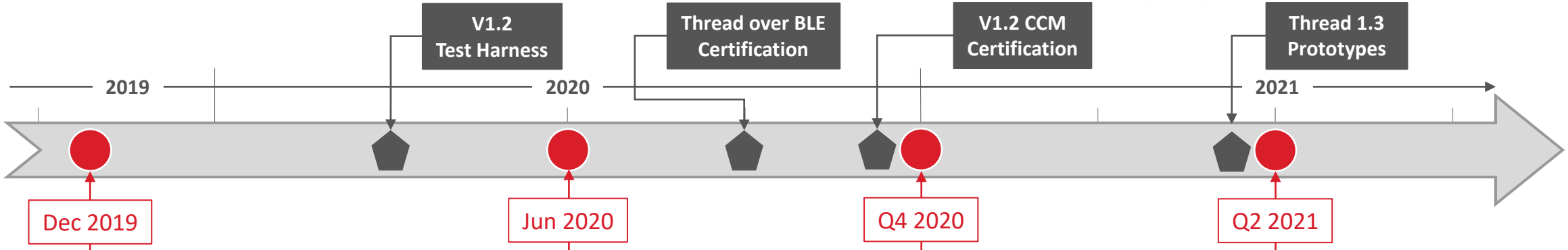
- Trusted by leading platforms
- Deep ecosystem relationships
- Leading Market Share
- Over 250M 802.15.4 devices shipped

Silicon - Labs Mesh Networks Portfolio



Silicon Labs OpenThread Roadmap

- **OpenThread Support**
  - GitHub: EFR32MG12, EFR32MG13, EFR32MG21
  - Gecko SDK & Simplicity Studio integration (Jun 2020)
- **OpenWeave GitHub Door Lock Sample App**
  - Control via Thread and BLE
  - Easily integrate into Google ecosystem
- **Dynamic Multi-Protocol (DMP) Thread and Bluetooth**
  - Develop devices that work simultaneously over BLE and Thread
- **Certification (MG12, MG13, MG21)**
  - Thread 1.1 certification on EFR32 running OpenThread
- **NCP & RCP Support**
  - Develop a border router application using a Raspberry Pi
  - Functional with the Thread commissioning app
- **Wi-Fi Coexistence (Roadmap)**
  - Managed coexistence with PTA interface
  - Un-managed coexistence with great blocking performance



GitHub Release
- OpenThread GitHub
- OpenWeave GitHub

Release 3.0.0
- OpenThread GSDK
- DMP OpenWeave GitHub

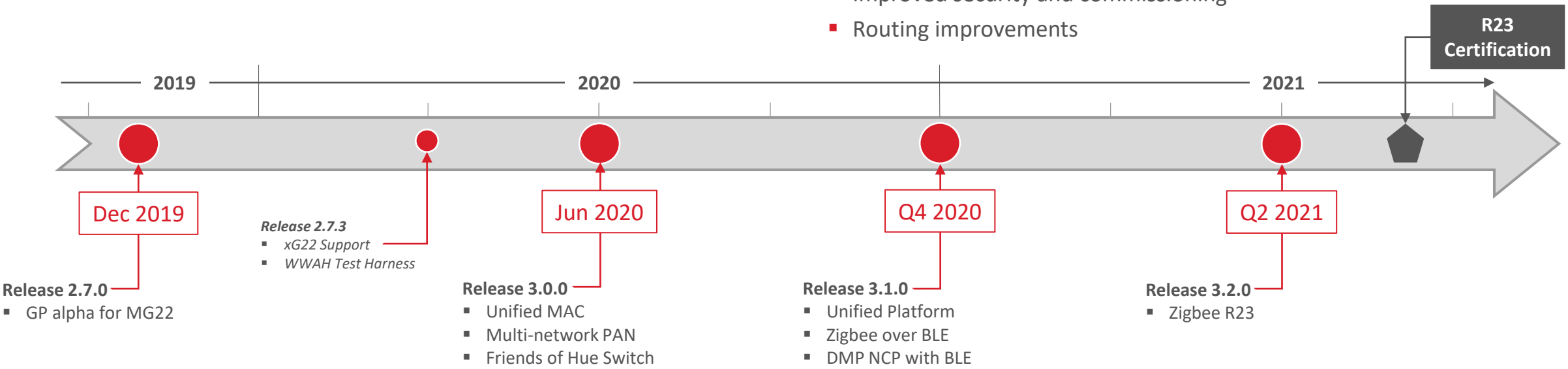
Release 3.1.0
- Managed Wi-Fi Coex
- Large Network Testing
- DMP OpenWeave GSDK

Release 3.2.0
- OpenThread 1.2 / 1.3
- CMP OpenThread + Zigbee

Thread Group Milestones
Silicon Labs Milestones

Silicon Labs Zigbee 3.0 (EmberZNet) Roadmap

- **Dynamic Multiprotocol Zigbee and Bluetooth**
  - Develop devices that work simultaneously over BLE and Zigbee
  - Fully integrated GATT configurator
- **Zigbee Green Power (GPD, Sink, GPPB)**
  - Proxy functionality required for Zigbee 3.0
  - Expand energy savings of Zigbee Pro by 5x
- **Works With All Hubs**
  - Easily integrate into Amazon ecosystem
  - Test harness provided by Silicon Labs running on EFR32
- **Friends of Hue**
  - Easily integrate into Philips Hue ecosystem
  - Sample applications for battery powered switches
- **Low Power Support**
  - EM2 & EM4 to support long-lasting battery powered sensors
- **Wi-Fi Coexistence**
  - Managed coexistence with PTA interface
  - Un-managed coexistence with great blocking performance
- **Upcoming Zigbee R23 (Roadmap)**
  - Improved security and commissioning
  - Routing improvements



Mesh SoC Portfolio Highlights

	Series 1 - MG12	Series 2 – MG21
Target applications	Mesh Routers and End Devices	Mesh Routers and End Devices
Availability	Now	Now
Protocols features	Zigbee 3.0, Green Power, OpenThread, OpenWeave, Bluetooth LE, Bluetooth Mesh Multiprotocol (Zigbee/OpenThread/BLE)	Zigbee 3.0, Green Power, OpenThread, OpenWeave, Bluetooth LE, Bluetooth Mesh Multiprotocol (Zigbee/OpenThread/BLE)
Proprietary 2.4G	2/4(G)FSK, OQPSK/(G)MSK, DSSS, BPSK/DBPSK TX, OOK/ASK	N/A
TX / RX (802.15.4)	+19 dBm / -102.7 dBm	+20 dBm / -104.5 dBm
TX Current	9.5 mA (@ 0 dBm)	9.3 mA (@ 0 dBm)
RX Current (802.15.4)	11.9 mA	9.4 mA
CPU / Clock Speed	Cortex M4 (38.4 MHz)	Cortex M33 (80Mhz)
Flash (kB)	1024	Up to 1024
RAM (kB)	256	Up to 96
Sleep Current (EM2)	1.3µA (16kB RAM)	4.5 µA (96 RAM)
Active Current (EM0)	70 µA/MHz	51 µA/MHz
Security	2x AES-128/256, ECC, SHA-1/224/256, TRNG	AES-128/256, SHA-1/2, ECC, ECDSA and TRNG DPA countermeasures Secure boot with RTSL Secure OTA and secure debug unlock + Secure Enclave (MG21B)
Operating Voltage	1.8V – 3.6V	1.71V – 3.8V
Packages (mm)	7x7 QFN48	4x4 QFN32

Note:

- Project Connected Home Over IP Memory requirements and exact configurations are not fully defined today
- For more information join project Connected Home Over IP in Zigbee Alliance

Mesh Module Portfolio

	MGM12P	MGM210P	MGM210L
Protocols	Bluetooth 5.0 & mesh Zigbee or Thread	Bluetooth 5.1 & mesh Zigbee or Thread	Bluetooth 5.1 & mesh Zigbee or Thread
Status	Production	Production	Production
EFR32 SoC	xG12	xG21	xG21
Antenna	Chip or U.FL	Chip or RF pin	PCB trace antenna
Max TX power	+8 / +19 dBm	+10 / +20 dBm	+12.5 dBm
(250 kbps O-QPSK)	-95 dBm	-104.5 dBm	-104.5 dBm
TX (125 kbps GFSK)	N/A	-105 dBm	-105 dBm
(1Mbps GFSK)	-95 dBm	-97 dBm	-97 dBm
Flash / RAM	1024 / 256 kB	1024 / 96 kB	1024 / 96 kB
GPIO	25	20	12
Operating Voltage	1.8 to 3.6 V	1.71 to 3.8 V	1.8 to 3.8 V
Operating Temperature	-40°C to +85°C	-40°C to +125°C	-40°C to +125°C
Dimensions W x L x H (mm)	12.9 x 15 x 2.2	12.9 x 15 x 2.2	15.5 x 22.5 x 2.3
Certifications	BT, CE, FCC, ISED, Japan, S-Korea and Taiwan	BT, CE, FCC, ISED, Japan & S-Korea	BT, CE, FCC, ISED, Japan & S-Korea
Other	Options with LNA available	No LF XTAL	No LF XTAL

Note:

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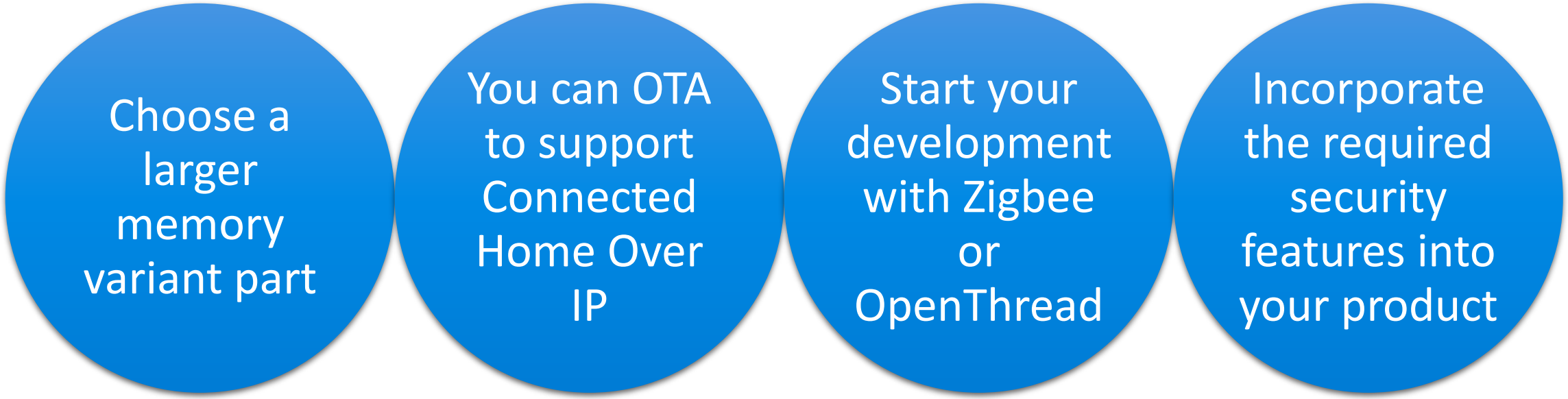
Key Takeaways to Futureproof for the Project



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Thank You | Questions

Any query, please contact us or email to KT.Ahn@silabs.com

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