How to make your home security system more connected and less complicated

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Systems Marketing Engineer- Connected MCU

Setting The Scene

- Security systems are booming

- No single connectivity technology that dominates security systems

- Wi-Fi, Bluetooth Low Energy, Zigbee, Z-WAVE, Thread, Proprietary, and more

- More than one connectivity in modern security systems

- New trends like wireless MCUs and multi-protocol devices make it easy to design security products that use different wireless technologies
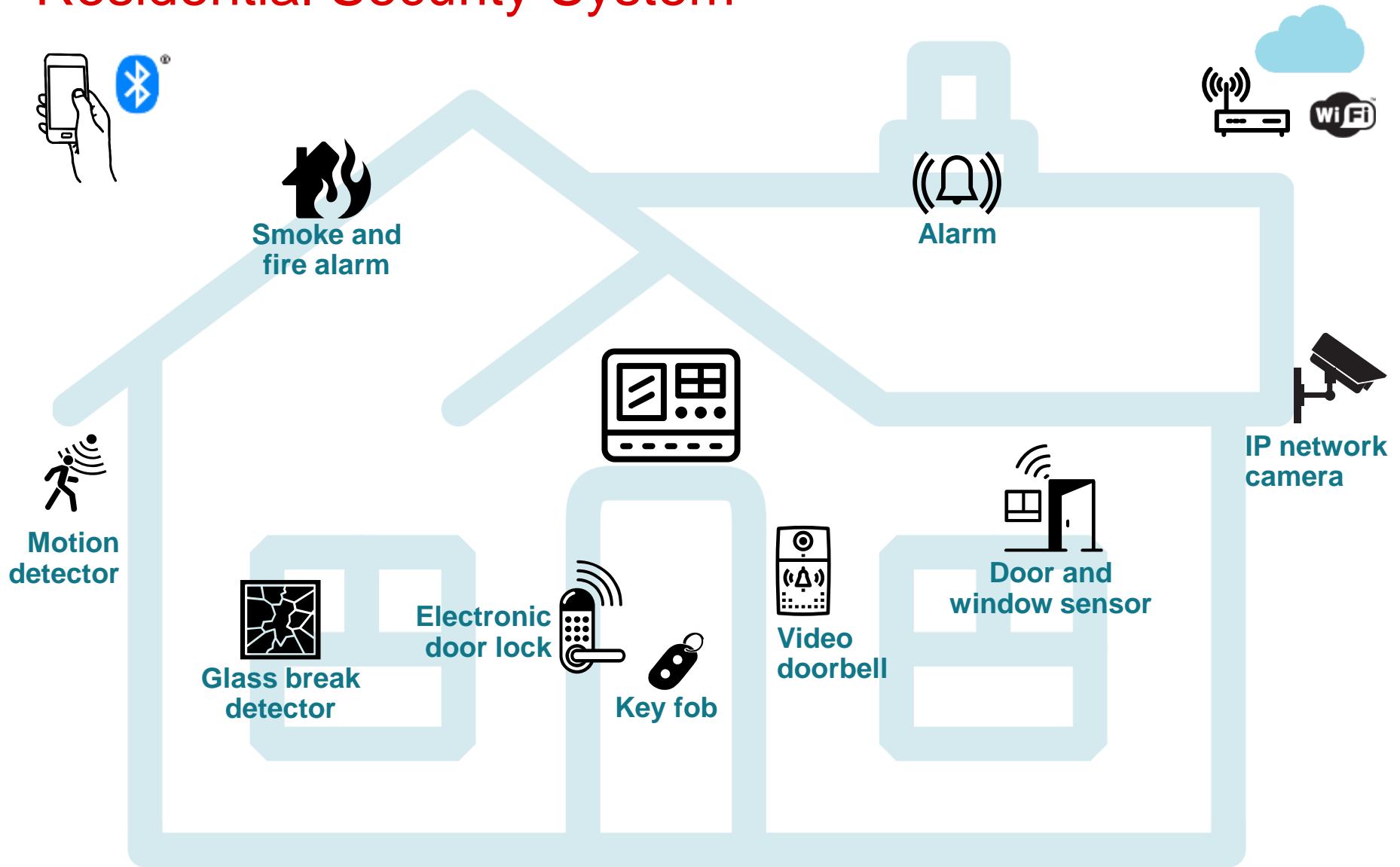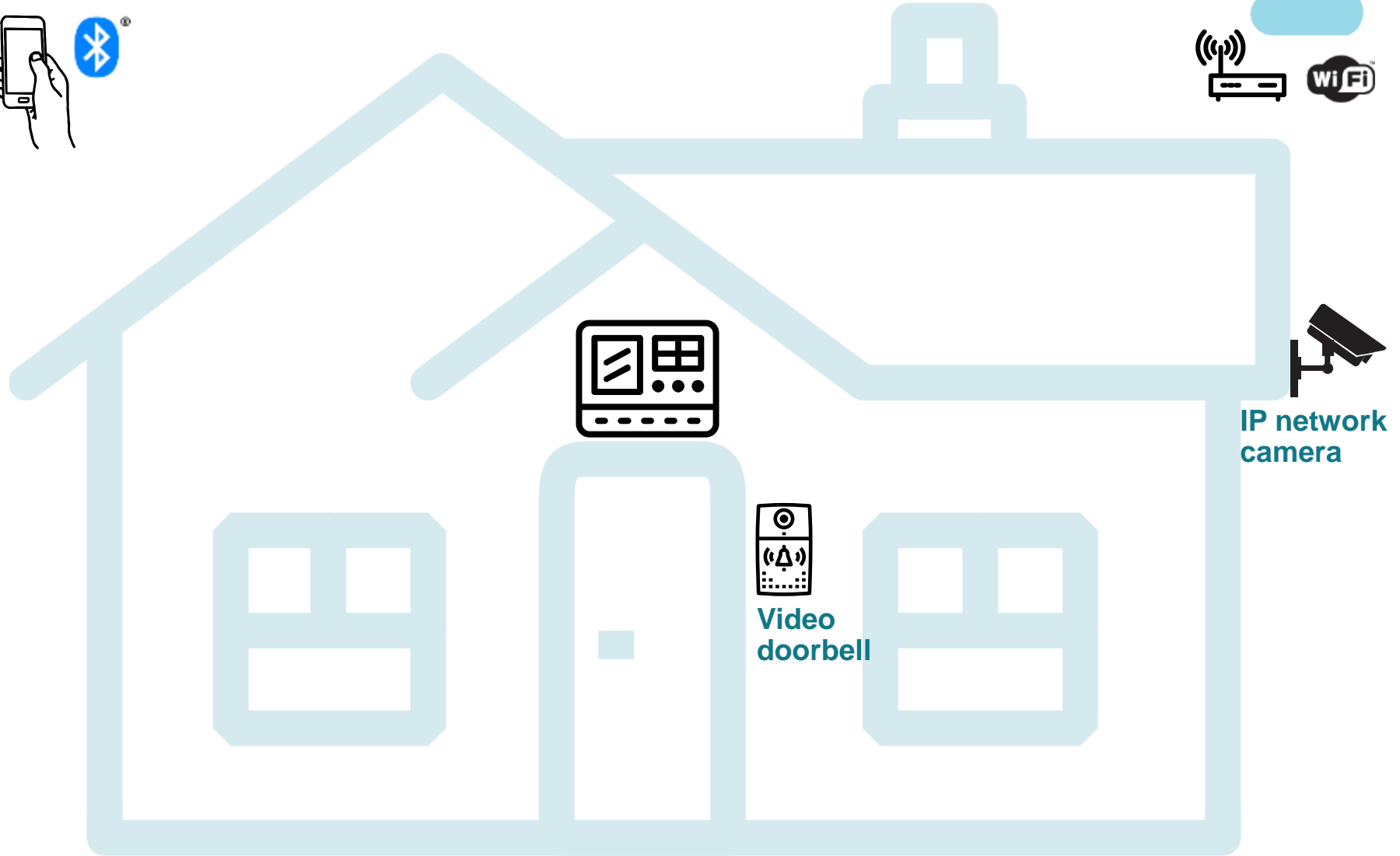
Abstract

What you'll learn:

- Common connectivity technologies used by security systems and their trade-offs

- Why a single technology is not enough for a security system?

- What are multi-protocol connectivity devices and how can they be leveraged in security systems?

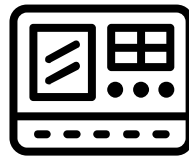- How you can use TI SimpleLink® MCU platform to boost your security system design?

TEXAS INSTRUMENTS

Residential Security System

Smoke and fire alarm

Alarm

WiFi

Motion detector

IP network camera

Glass break detector

Electronic door lock

Key fob

Video doorbell

Door and window sensor

Residential Security System

IP network camera

Video doorbell

TEXAS INSTRUMENTS

Residential Security System

- High Throughput
- Low latency
  VOD mode
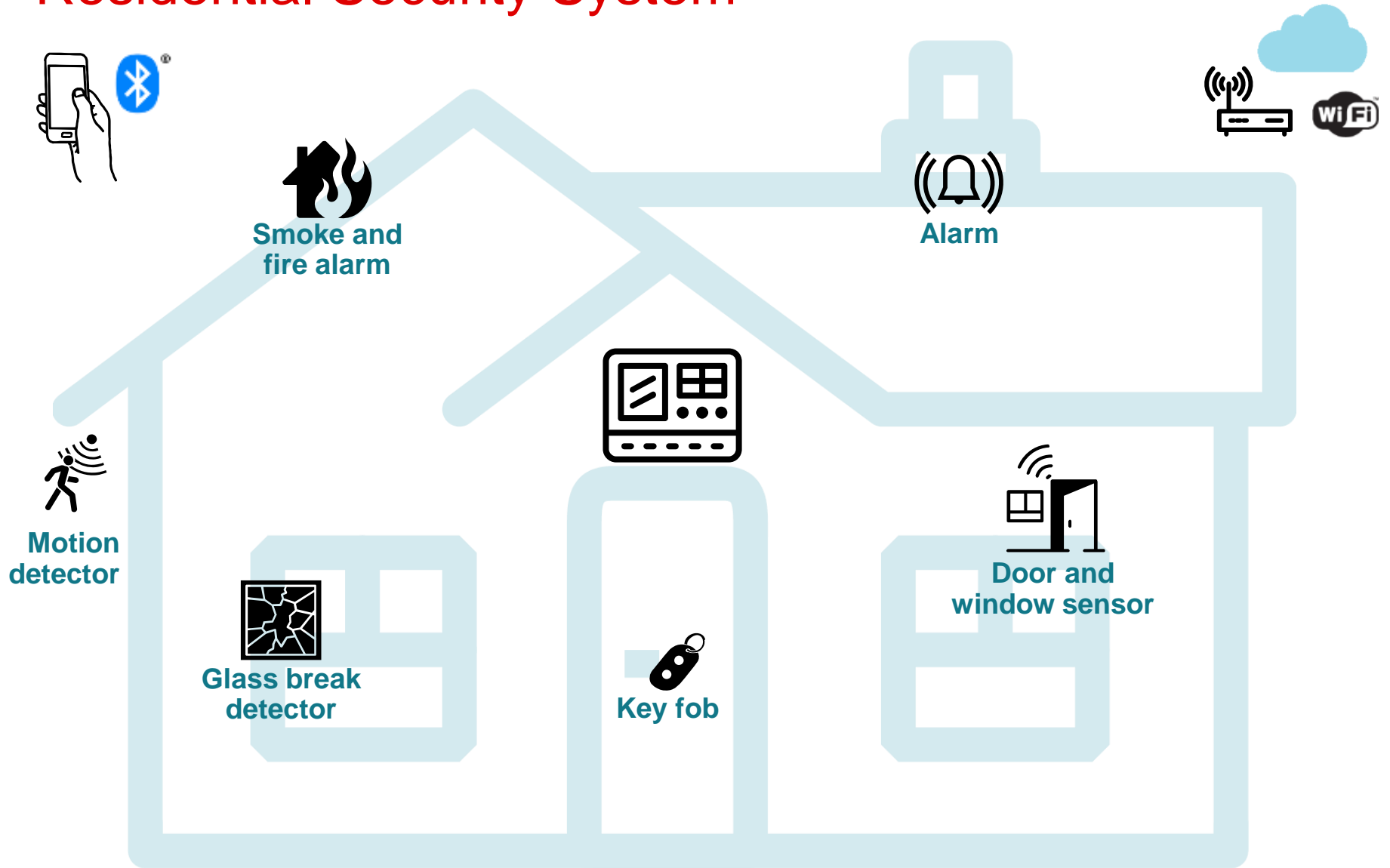
IP network camera

Video doorbell

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Key fob
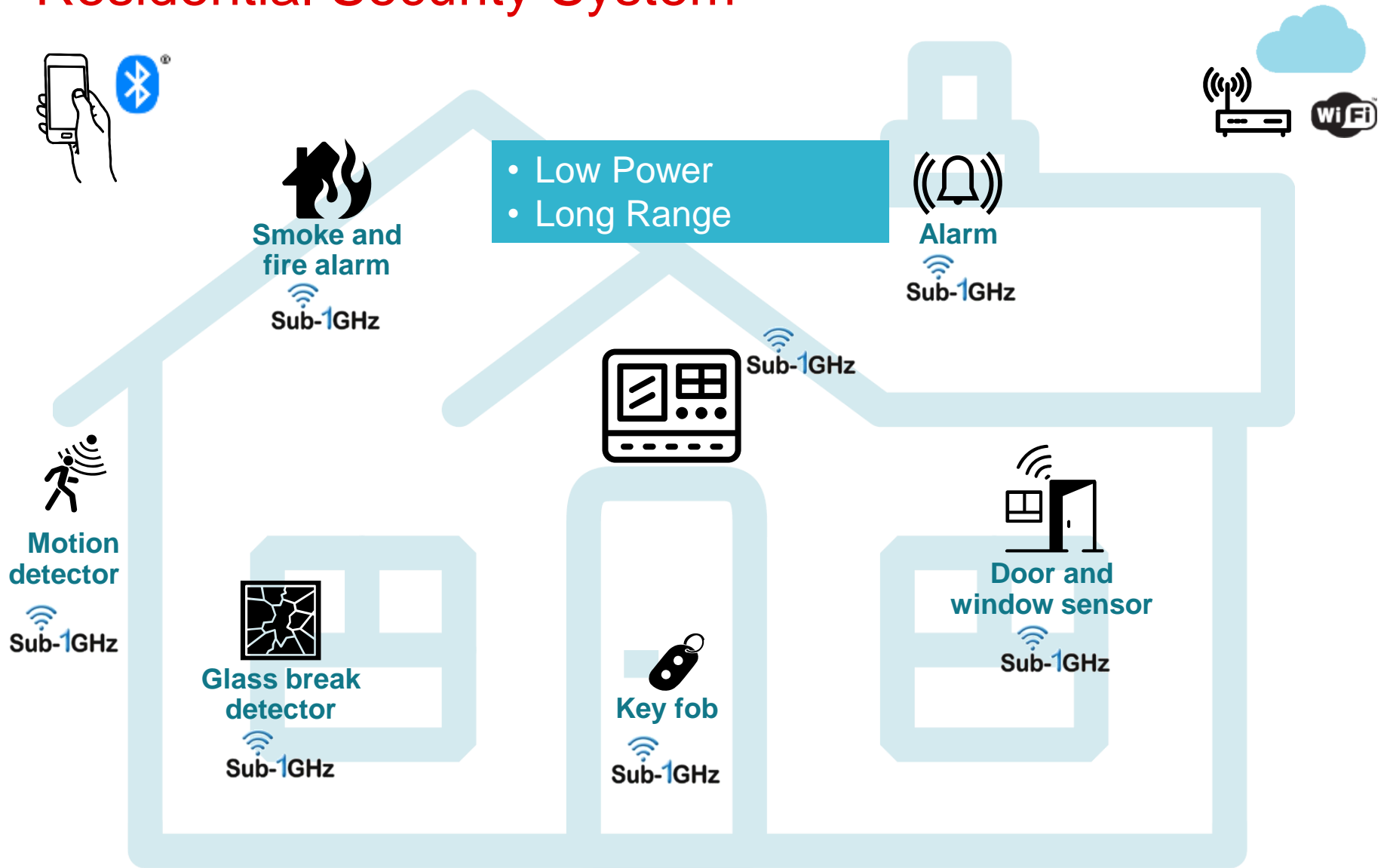
Door and window sensor

Residential Security System

Smoke and fire alarm
Sub-1GHz

- Low Power
- Long Range

Alarm
Sub-1GHz

Sub-1GHz

Motion detector
Sub-1GHz

Glass break detector
Sub-1GHz

Key fob
Sub-1GHz

Door and window sensor
Sub-1GHz

WiFi

TEXAS INSTRUMENTS

Residential Security System

- Low Power
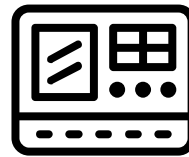- Long Range

Smoke and fire alarm
Sub-1GHz
zigbee

Alarm
Sub-1GHz

zigbee
Sub-1GHz

Motion detector
Sub-1GHz
zigbee

Glass break detector
Sub-1GHz
zigbee

Key fob
Sub-1GHz
zigbee

Door and window sensor
Sub-1GHz
zigbee

TEXAS INSTRUMENTS

Residential Security System

- Low Power
- Long Range
- Internet connectivity

Smoke and fire alarm
Sub-1GHz
zigbee

Alarm
Sub-1GHz

zigbee
Sub-1GHz
WiFi

Motion detector
Sub-1GHz
zigbee

Glass break detector
Sub-1GHz
zigbee

Key fob
Sub-1GHz
zigbee

Door and window sensor
Sub-1GHz
zigbee

WiFi

TEXAS INSTRUMENTS

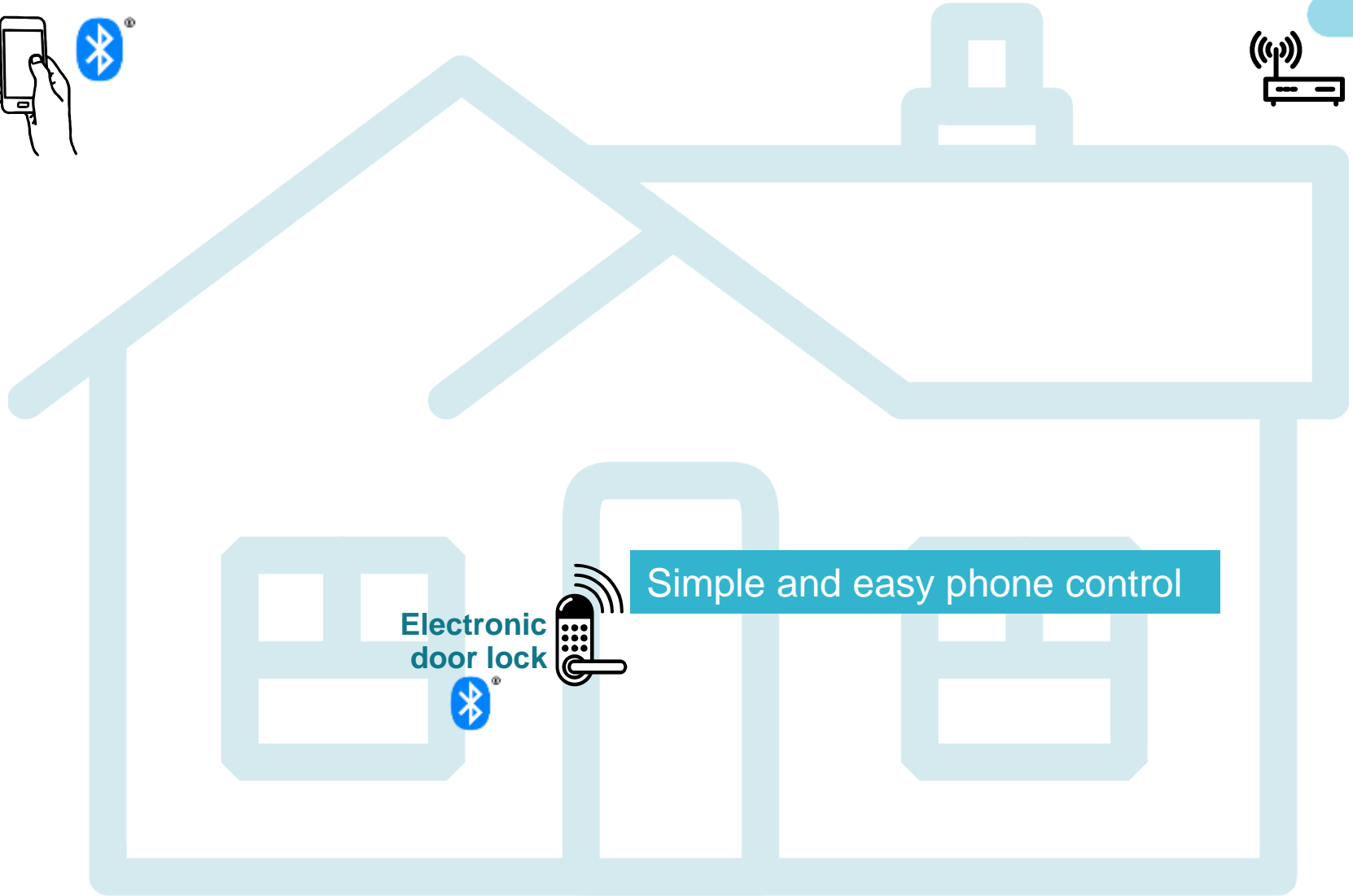# Residential Security System
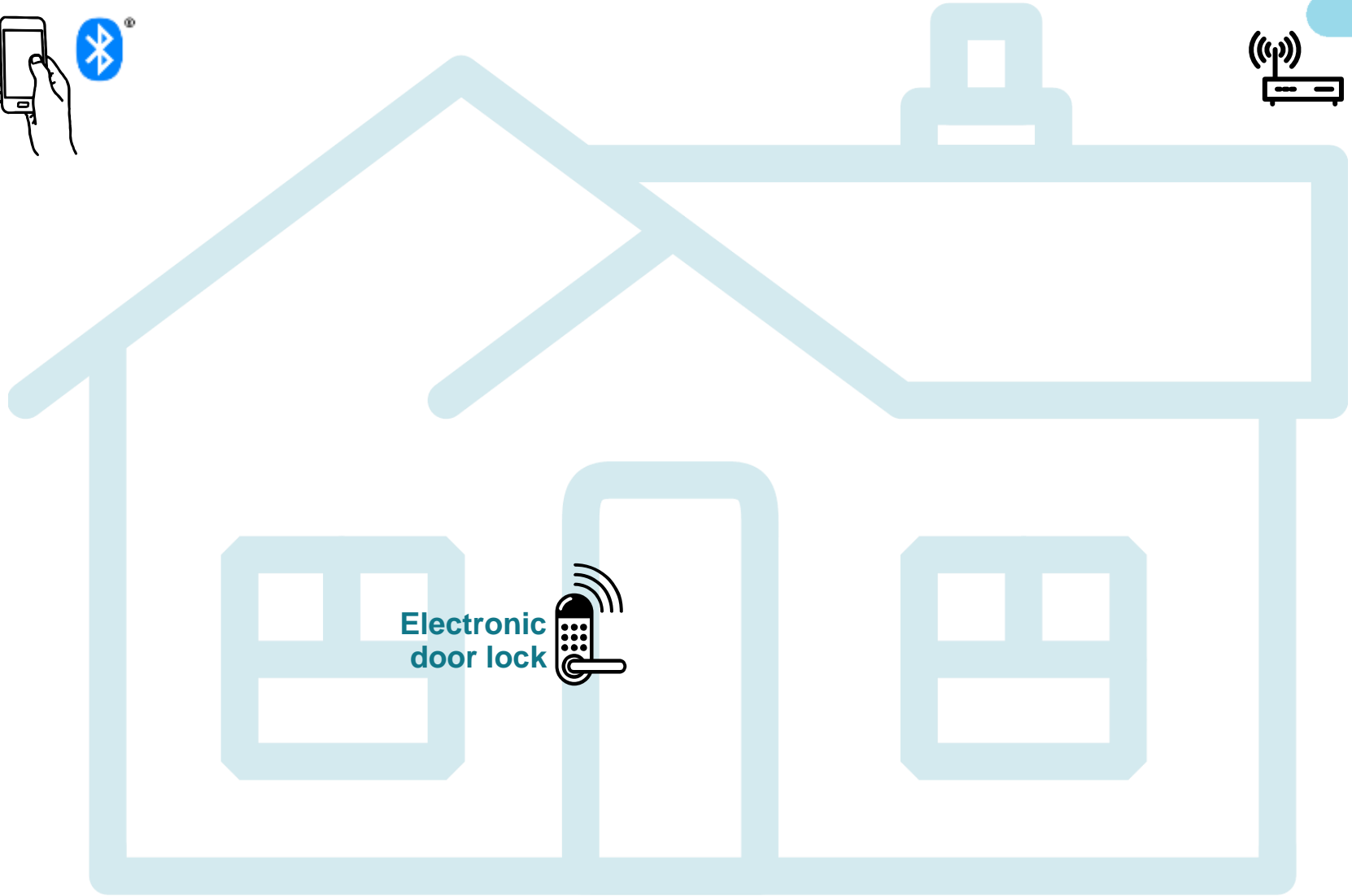
Electronic door lock

Residential Security System
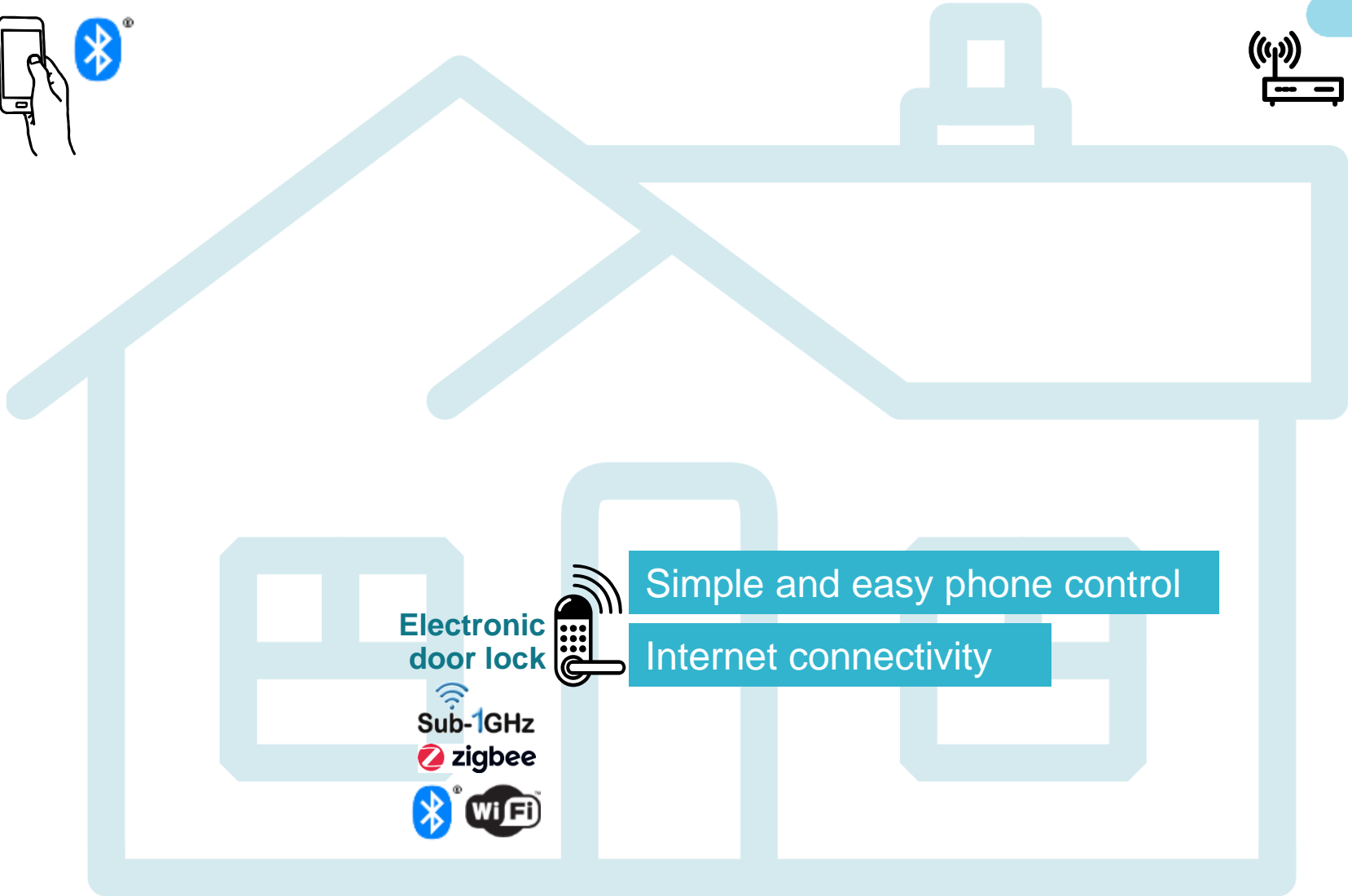
Electronic door lock

Simple and easy phone control

TEXAS INSTRUMENTS

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Electronic door lock

Sub-1GHz

zigbee

Simple and easy phone control

Internet connectivity

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Key fob
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Video doorbell
WiFi
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Door and window sensor
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IP network camera
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WiFi

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Sub-1GHz
zigbee

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Multi-protocol use-case

Adding BLE to sensor networks as secondary link

- Network commissioning
- Authentication
- Over the air FW upgrade
- Sensor configuration
- Diagnostic

Adding BLE to actuators as remote control

- Control smart devices directly from the phone
- Examples are light switch, fan, shades

BLE beacons for connectionless communication

- Receive notifications from the sensor to the node
- Track location

Multi-protocol use-case

Additional benefits

Supporting multiple eco-systems –
Designing a single product or platform that can work with different eco-systems

Supporting different geography –
Designing a single product or platform that can operate in different regions where different connectivity restrictions apply

Future proof for new market trends

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What are multi-protocol devices?

- Devices that support more than one wireless protocol.
  For ex: Zigbee and BLE

- Dual-band devices can operate at two different bands.
  In this case, 2.4GHz band and Sub-1 GHz band

Switching multi-protocol

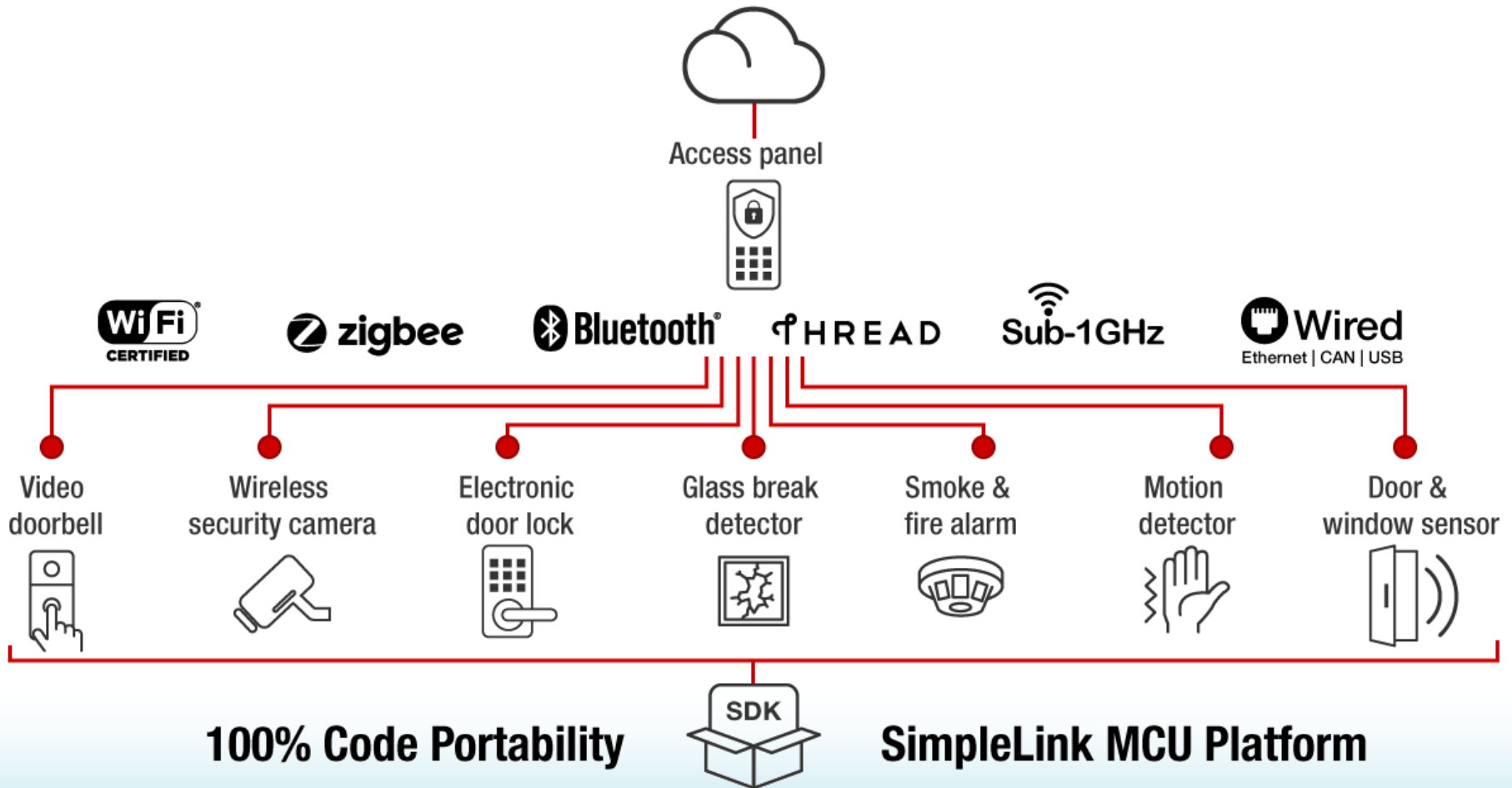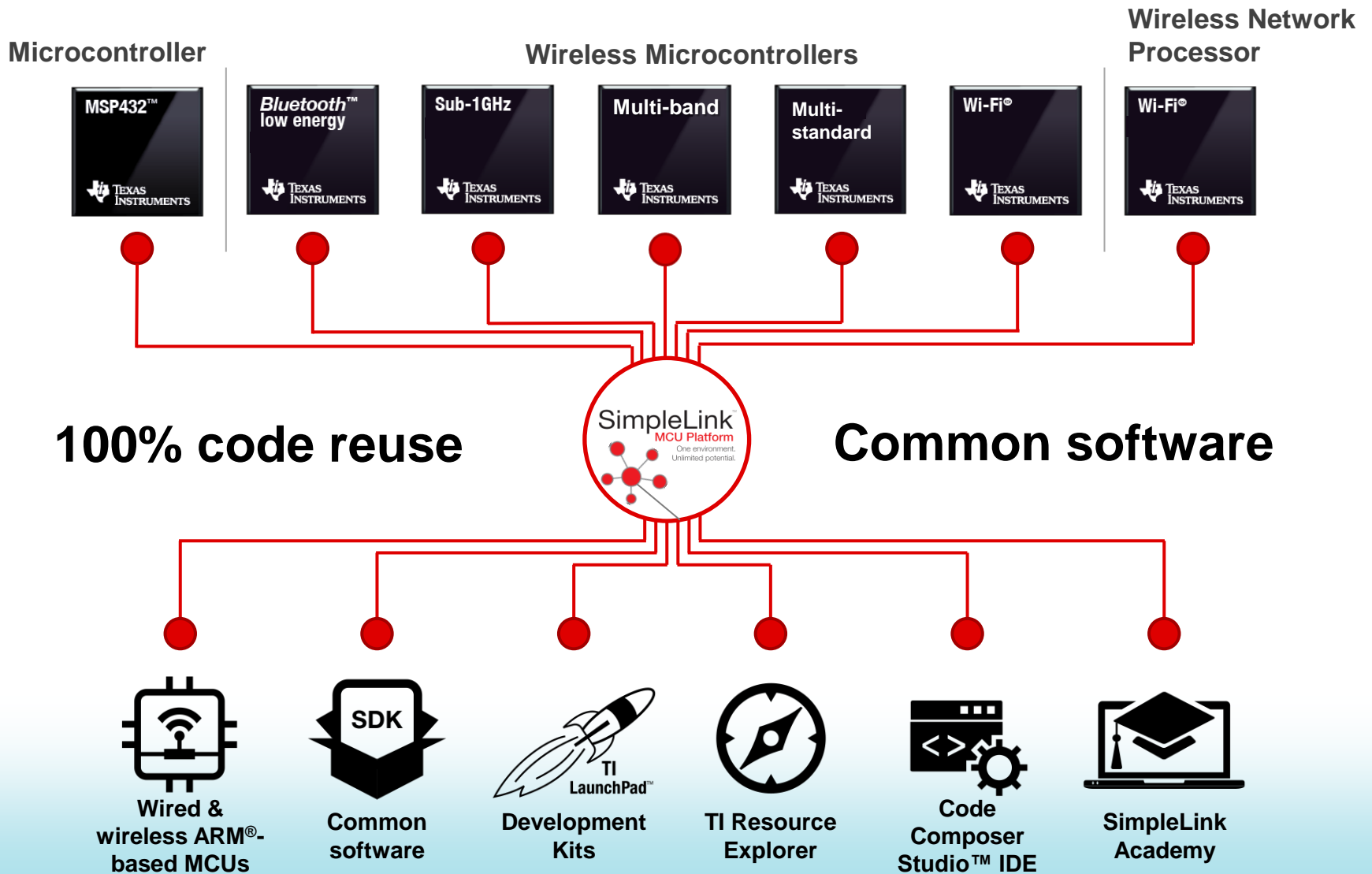- Device can operate in either protocol but not at the same time

Concurrent multi-protocol

- Device can run two protocol stacks at the same time

- Enabled by software defined radios that can time multiplex on single radio.
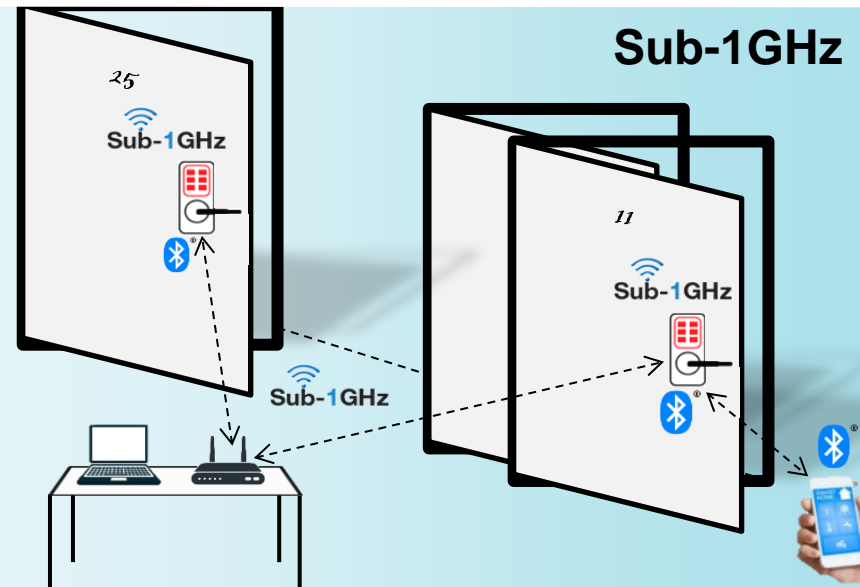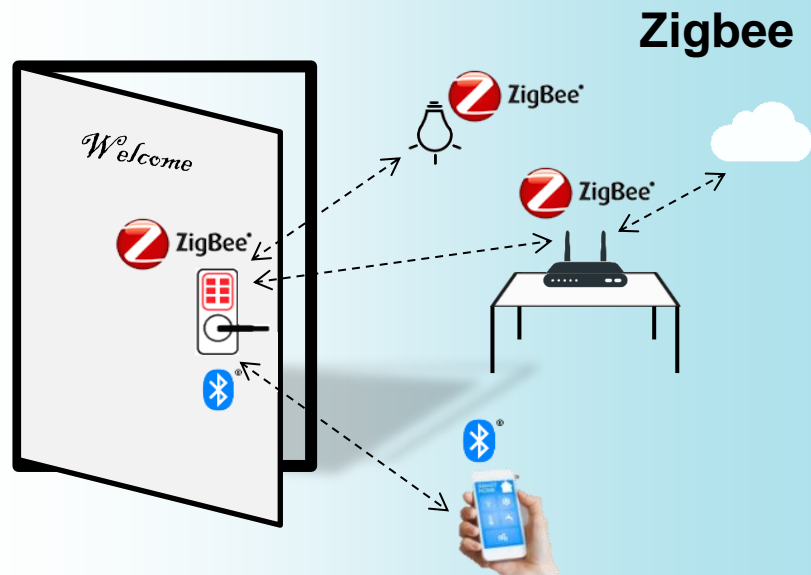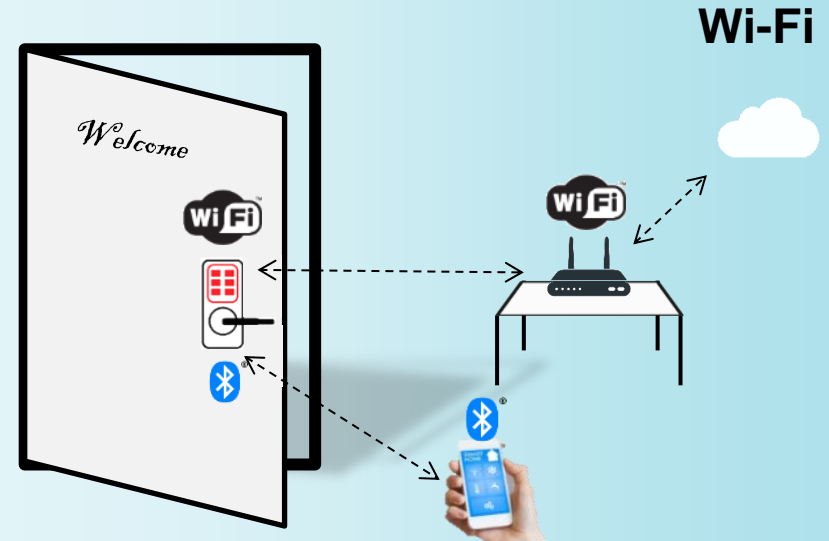
Concurrent multi-protocol

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TI SimpleLink Platform

Access panel

WiFi CERTIFIED zigbee Bluetooth THREAD Sub-1GHz Wired Ethernet | CAN | USB

Video doorbell | Wireless security camera | Electronic door lock | Glass break detector | Smoke & fire alarm | Motion detector | Door & window sensor

100% Code Portability SDK **SimpleLink MCU Platform**

TI SimpleLink Platform

Microcontroller

Wireless Microcontrollers

Wireless Network Processor

MSP432™

Bluetooth™ low energy

Sub-1GHz

Multi-band

Multi-standard

Wi-Fi®

Wi-Fi®

SimpleLink MCU Platform
One environment.
Unlimited potential.

100% code reuse   Common software

Wired & wireless ARM®-based MCUs

Common software

TI LaunchPad™ Development Kits

TI Resource Explorer

Code Composer Studio™ IDE

SimpleLink Academy

TEXAS INSTRUMENTS

Smart Door Lock Example

Smart Door Lock Example

	Cloud Connectivity HUB	Range	Battery Lifetime	Throughput
Bluetooth	NA	Short (Personal Area Network)	> 5 years	Low <2mbps
Wi-Fi	Wi-Fi access point	Medium (Local Area network)	0.5 - 2 years * Varies depending on device and use-case	High > 72 mbps
zigbee	Smart HUB	Medium (Mesh network)	> 5 years	Low 250kbps
Sub-1GHz	Proprietary gateway	Long (Wide Area Network)	> 5 years	Low Varies, typically <1mbps

Eager to learn more?

Take a look at all SimpleLink MCU applications

Start designing today with our EVM development kits and software

Additional Resources

- Look at our full portfolio of SimpleLink products
- SimpleLink MCU Multi-standard and multi-band portfolio:
  - CC1352r
  - CC2652r
  - CC1350
- Smart electronic door lock example
- Building a seamless and secure smart home network blog
- Battery-powered smart-lock reference design using SimpleLink Wi-Fi®

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Q & A