

CK

Lu

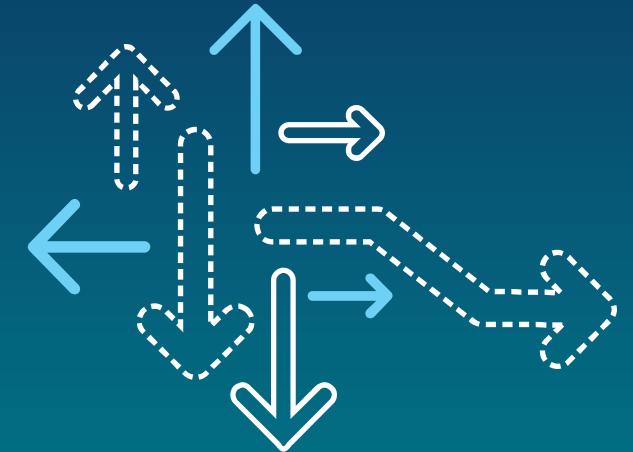
Senior Staff Engineer

QUALCOMM Wireless Semi Conductor Technologies Limited

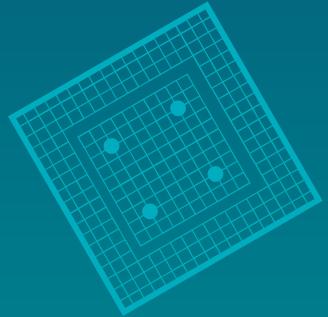
QCA4010 Wi-Fi System on Chip (SoC) Qualcomm® IoThing™ Product Overview



Wi-Fi Platform for the IoT QCA4010



Qualcomm Wi-Fi: Proven Track Record



A leader in Low Power Wi-Fi for IoE

35M+ units
shipped annually



A Global Leader in Wi-Fi for handsets

600M+ units
shipped annually



Success stories in multiple ecosystems

Cameras
E-readers
Gaming console
Smart TV
Home networking

Industry Leading IoT SOCs

Silicon products from low end to high end for IoT

Qualcomm® Snapdragon™	Linux, Graphics, Video	1 GHz
QCA4531	Linux based SOC, IOE hub	600 MHz
QCA4010	Hostless (1.5MB RAM)	130 MHz
QCA4004	Hostless (small amount RAM)	130 MHz
QCA4002	Hosted (external MCU)	130 MHz



QCA401x

Leading Wi-Fi SOC for IOT applications

Dual-band Wi-Fi

2.4 GHz / 5 GHz

Leading RF performance

Hostless Architecture

1.5 MB RAM

130 MHz app processor

Secure IC

Secure boot

Cryptographic algorithms

Wide range of peripherals

SPI, GPIO, I2C, I2S, UART, PWM

8-channel ADC

Proven Track Record

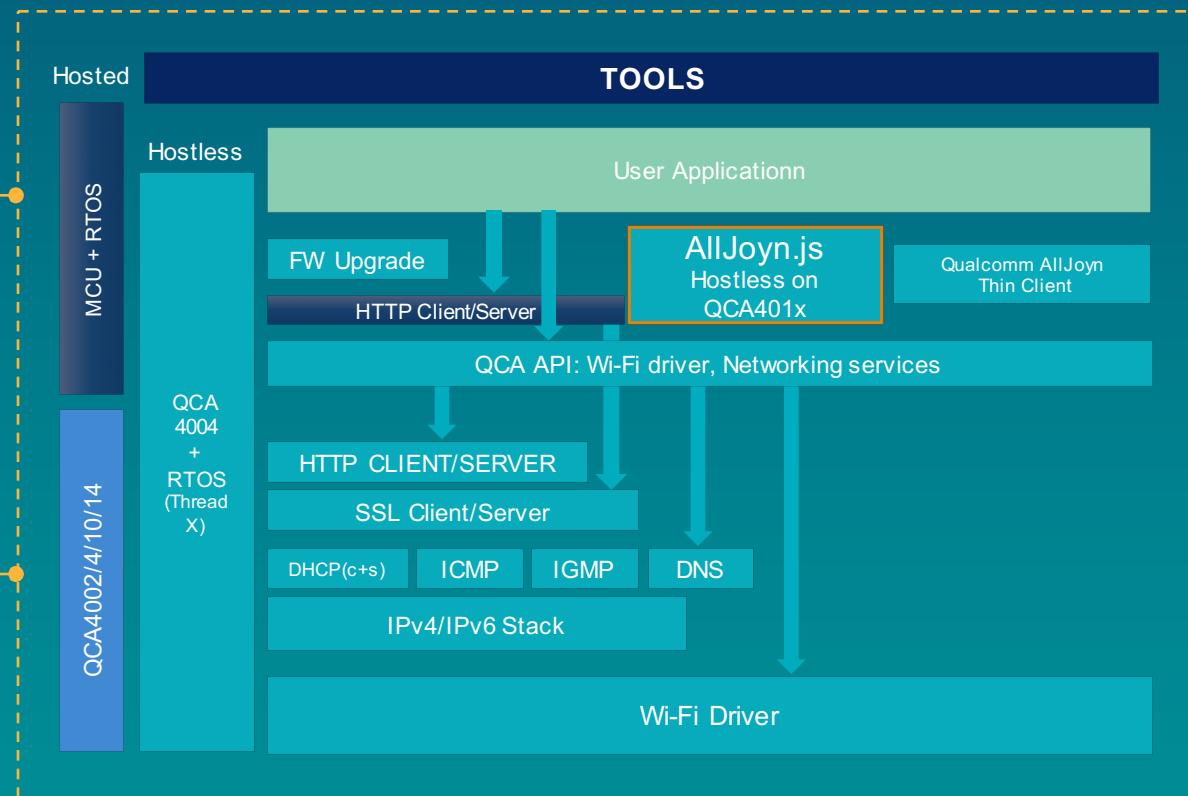
Diverse Roadmap

Leading Wi-Fi Solution



Comprehensive Software

Advanced Wi-Fi and applications



Advanced Wi-Fi Features

- Antenna Diversity
- Wi-Fi Modes
- Low Power
- Security

Multi-Protocol support

Full Networking Stack

- Antenna Diversity
- Wi-Fi Modes
- Low Power
- Security

Applications & Utilities

- Demos
- OTA Firmware Upgrade
- Manufacturing

QCA4010 – Wide Range of Peripherals

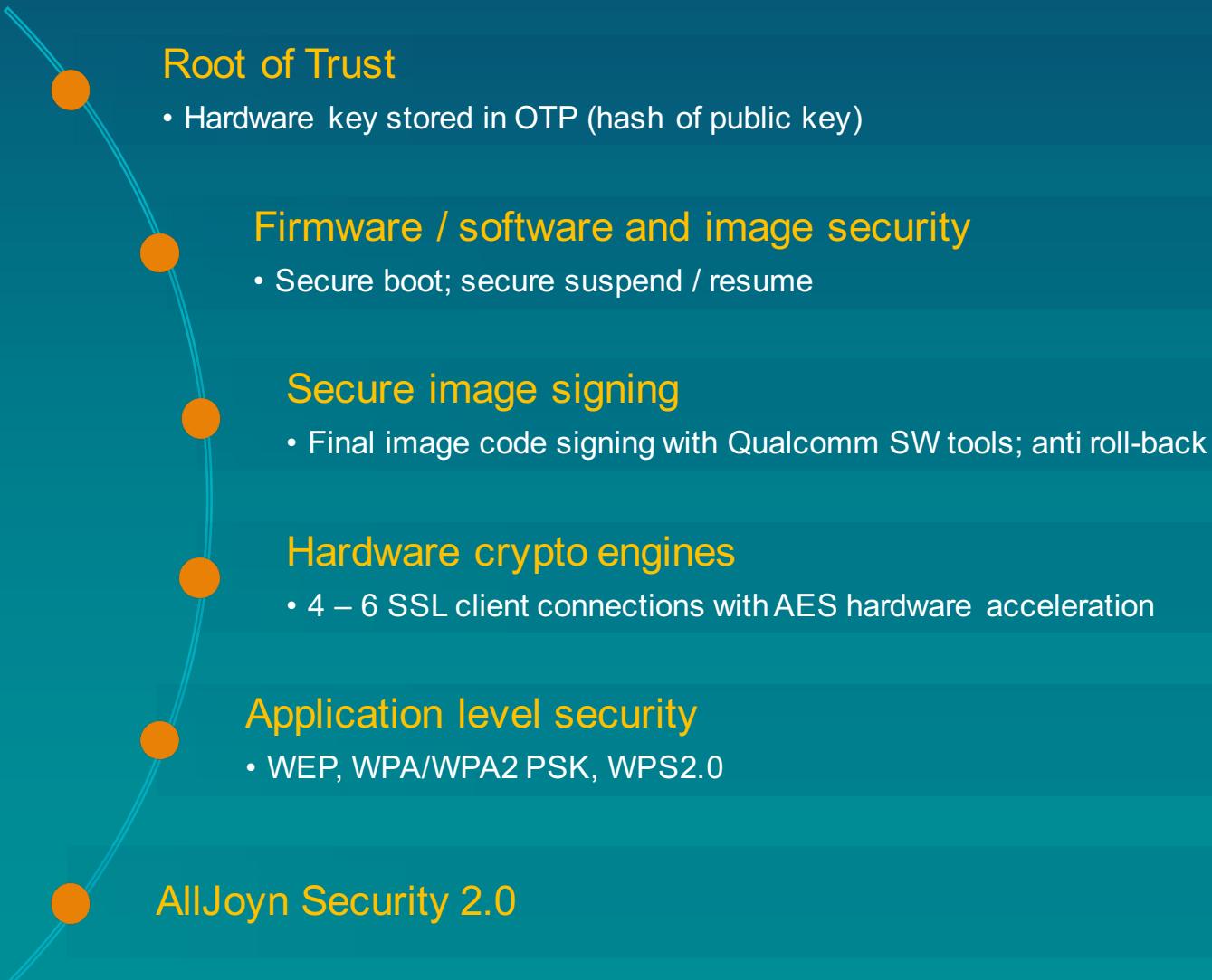
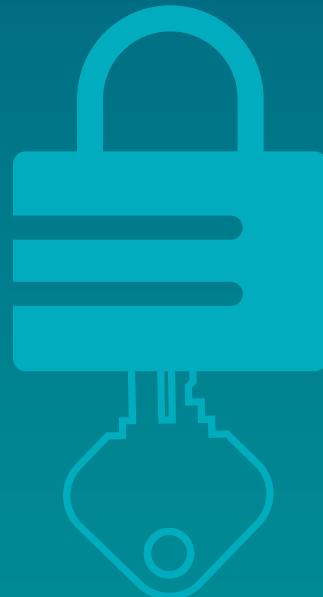


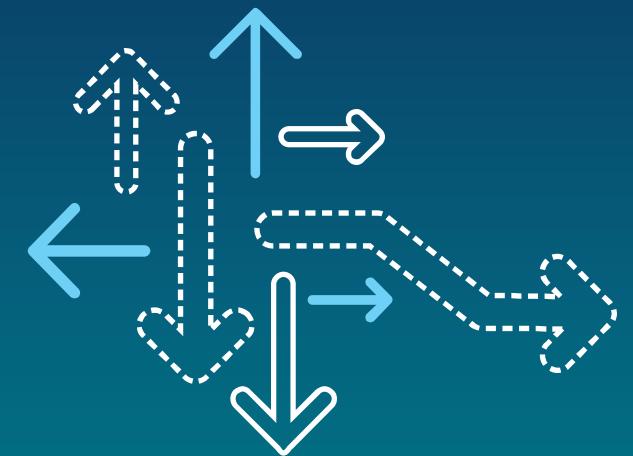
QCA4010

SPI	2x SPI Master (36 MHz) + SPI host interface DMA transfer mode
UART	HS UART (3 Mbps) 2x low speed UART
SDIO	SDIO 2.0 slave interface
I ² C	10 Mbps data rate SPI Master/slave modes; DMA transfer
I ² S	2x I ² S master / slave for audio / voice applications
ADC	8-channel ADC with 1Msps
PWM	8x independent HW PWM for motor control, lighting

401x Security

Highly secure IC for IoT applications





Qualcomm® IoThing™

Sensor Integrated Reference Platform for QCA4010



Qualcomm® IoThing™

Development Platform from Qualcomm Atheros, Inc.

An advanced development platform incorporating just about everything you need to develop and prototype your IoT device. Packed with connectivity solutions including all the sensors, interfaces and associated software needed to allow immediate development and prototyping for nearly any type of IoT product you can dream up.



Qualcomm® IoThing™

QCA4010 – Qualcomm Atheros' Leading Wi-Fi connectivity platform for the IoT

- Full Featured 802.11b/g/n (1x1) 1-stream solution
- Single-Band 2.4GHz support
- Low power performance
- Integrated CPU up to 800 KB of on-chip memory
- Supports the AllJoyn® and HomeKit (iOS8 profiles) connectivity frameworks and services
- Advanced security features
- Expansive hardware interfaces
- Integrated networking (IPv4/IPv6)



55mm x 55mm x 15.5mm

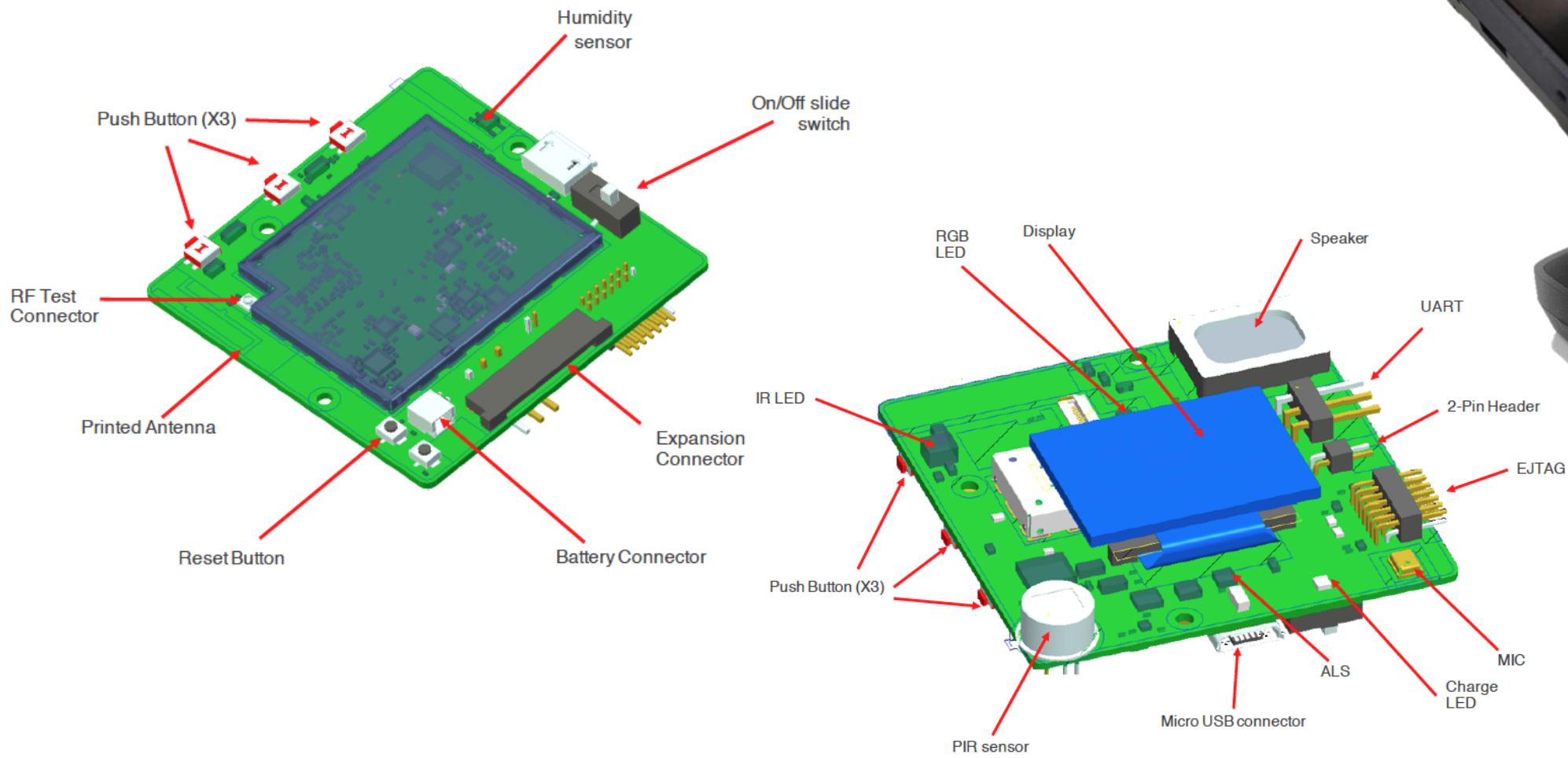
Features

- External microphone
- OLED indicator display
- Speaker
- Humidity sensor
- Pressure sensor
- Temperature sensor
- Shock sensor
- Ambient light motion/pассивные IR sensors
- Accelerometer
- Compass/magnetometer
- 3 LED indicators, 3 external buttons
- UART and JTAG interfaces
- USB for charging and manufacturing interface



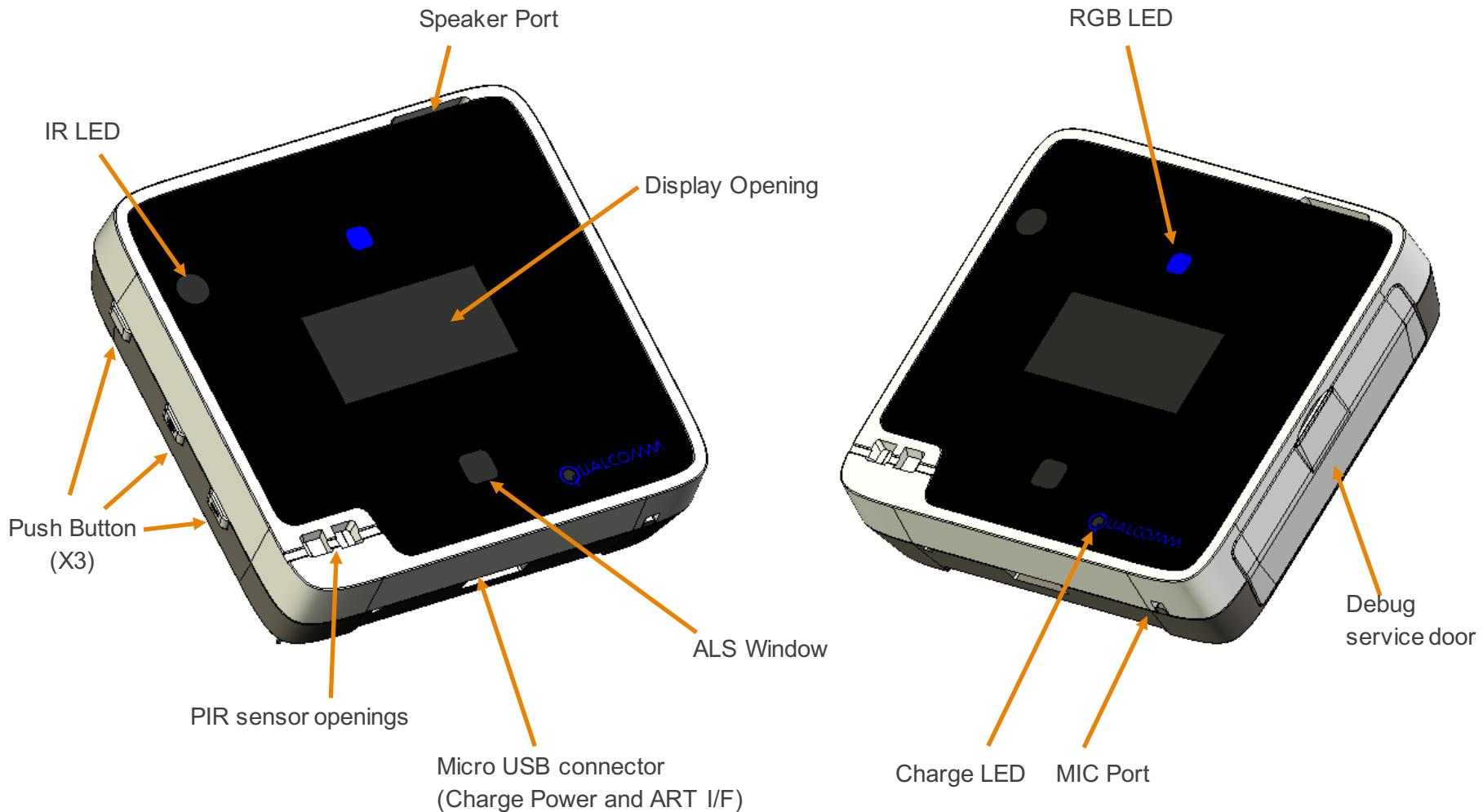
IoThing Hardware Overview

IoThing is centered on the QCA4010 connectivity solution

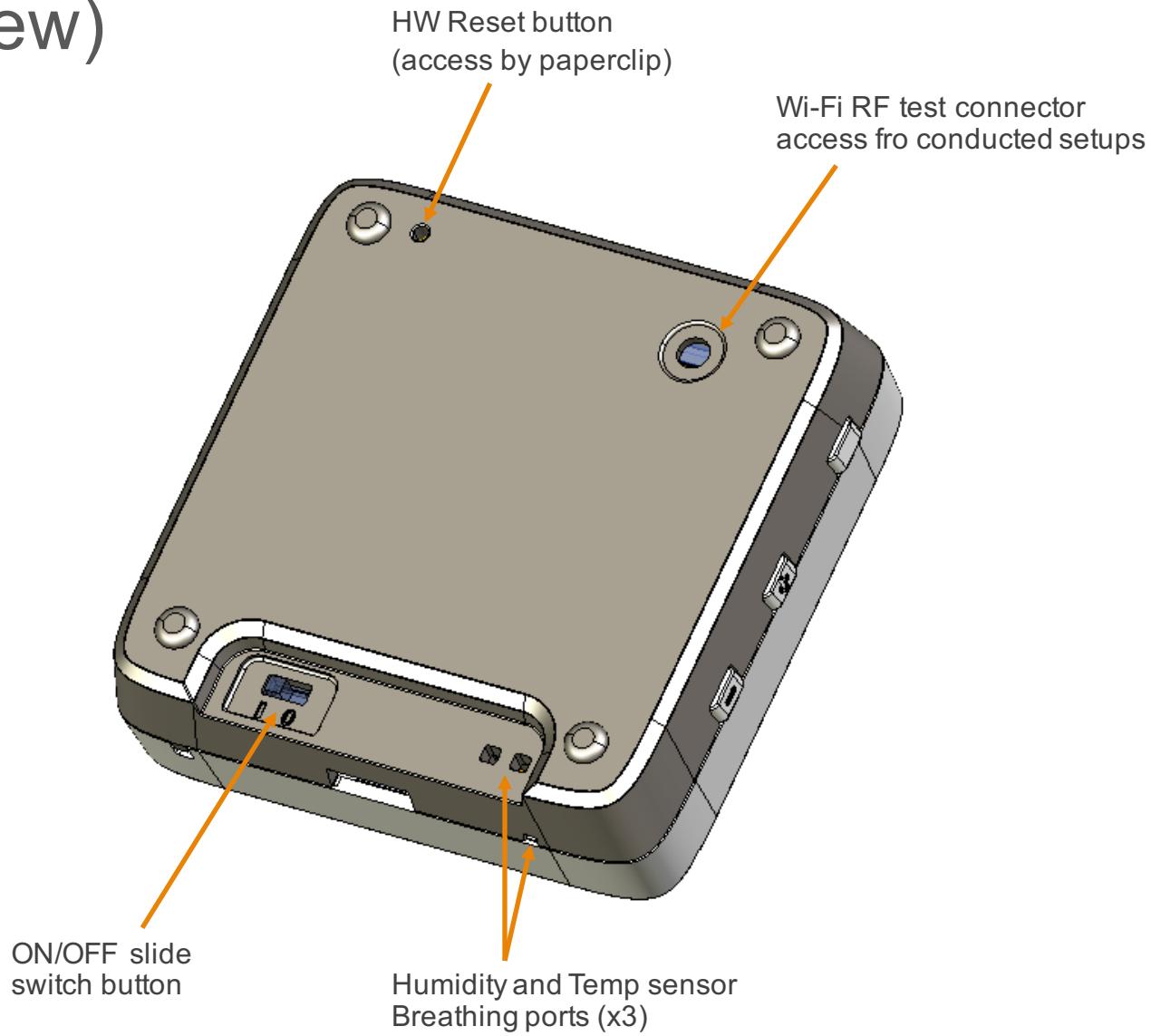


IoThing (Front View)

Dimension - 55mm * 55mm * 15mm



IoThing (Rear View)

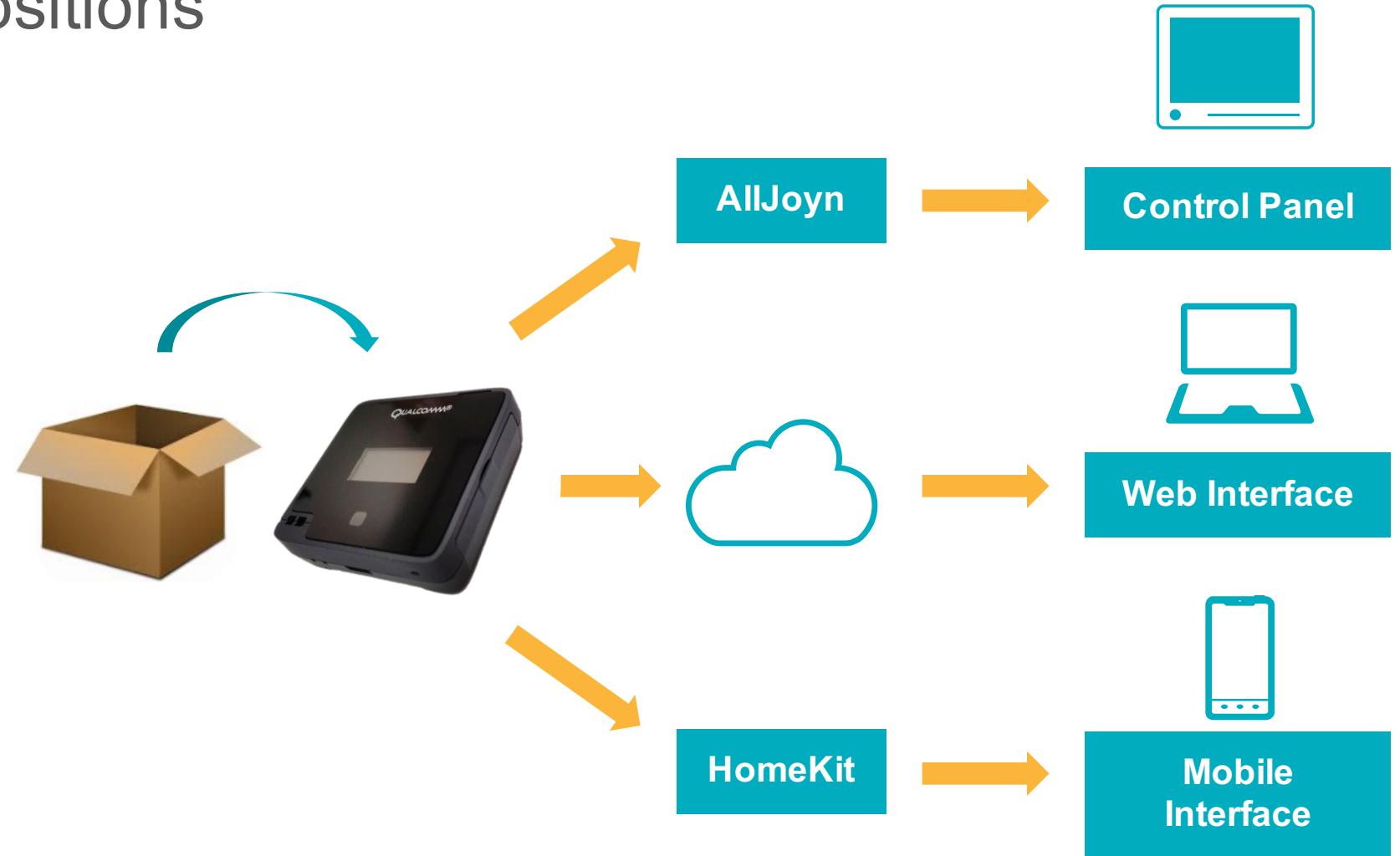


IoThing Value Propositions

Quick-Start Evaluation

Platform:

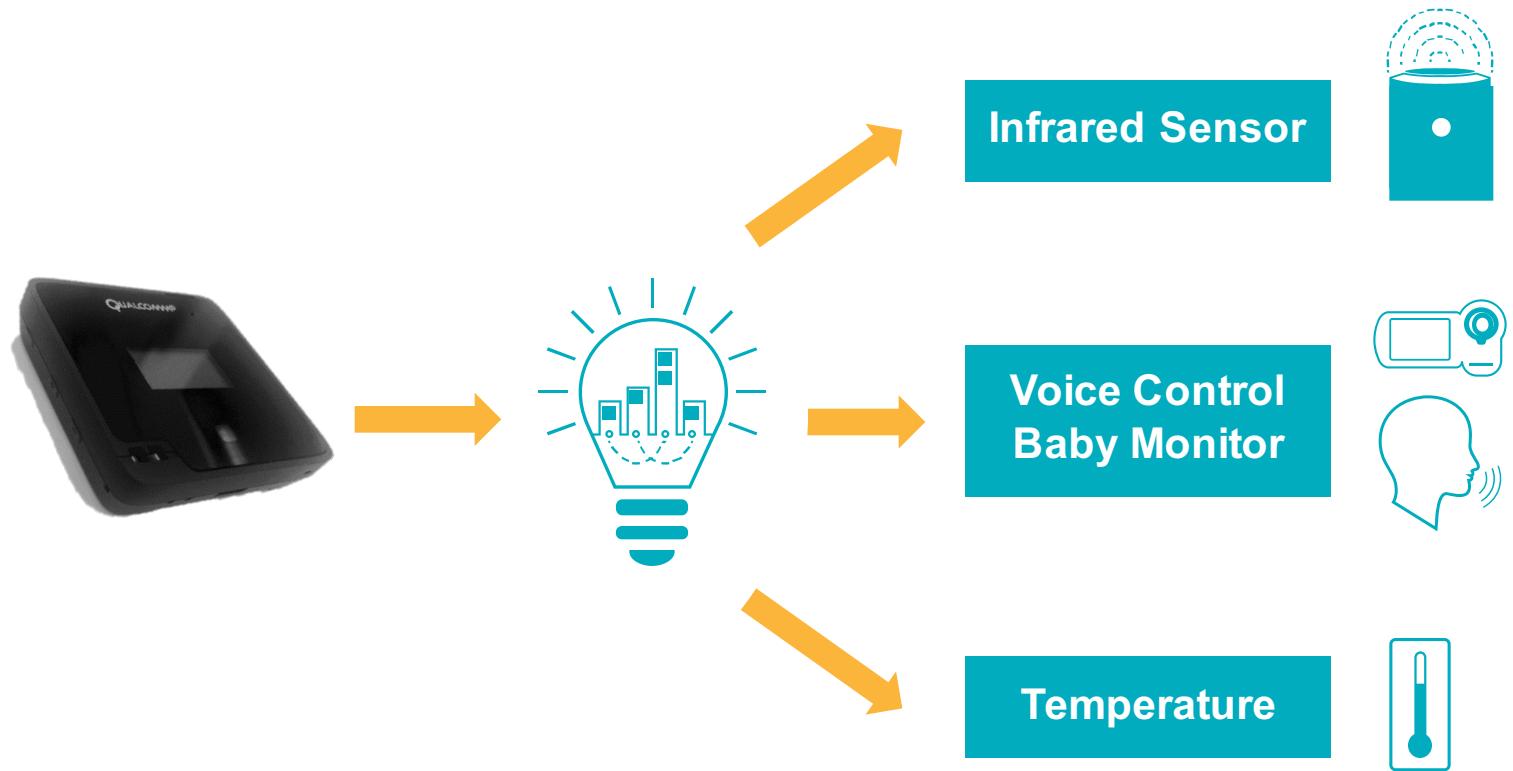
- Pre-loaded application is integrated with AllJoyn and cloud connect agent. Within minutes, the sensor data and device controls will be available on mobile devices and cloud.



IoThing QCA4010 Value Propositions

For Mobile/Cloud App Developer

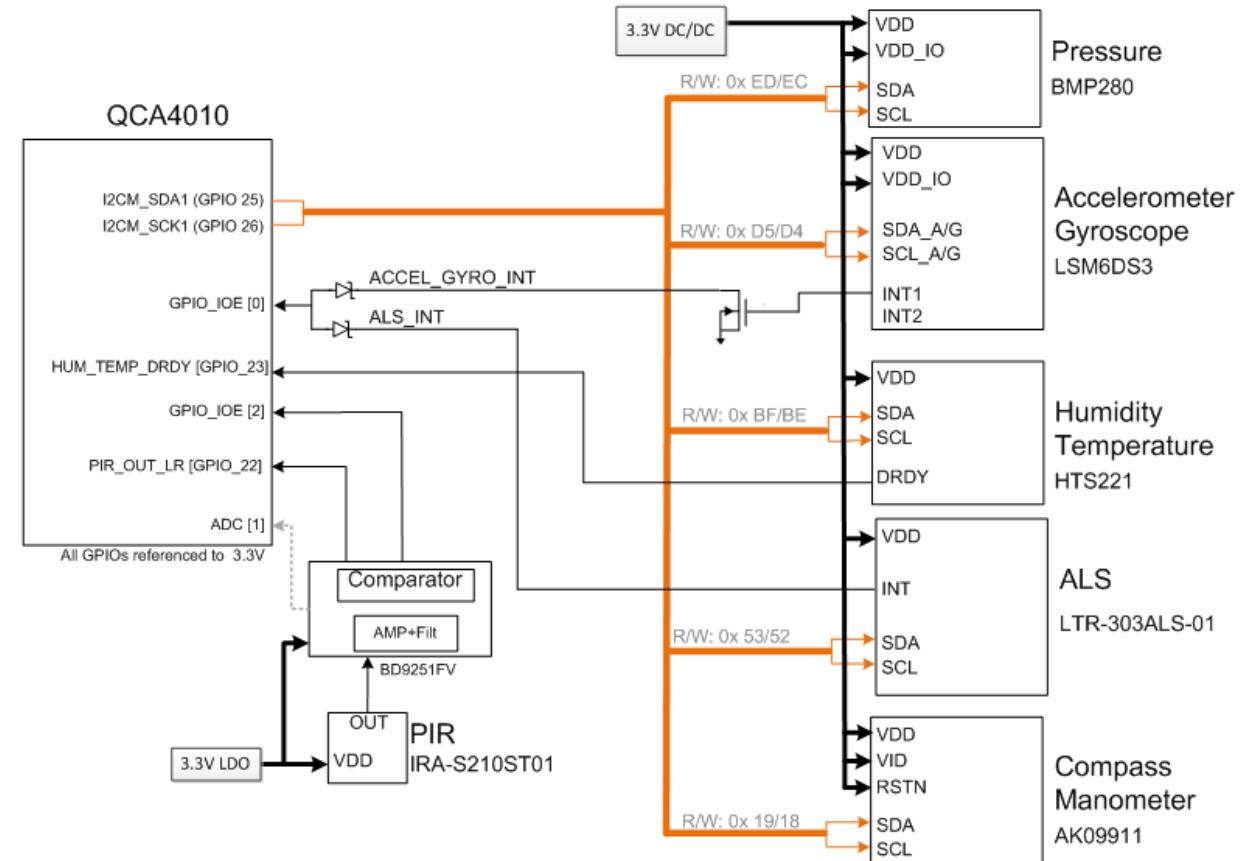
- A platform ready for app development.
- The sensor data/control are readily available through AllJoyn or cloud agent
- The app developer can focus on building creative applications that integrates sensors and controls



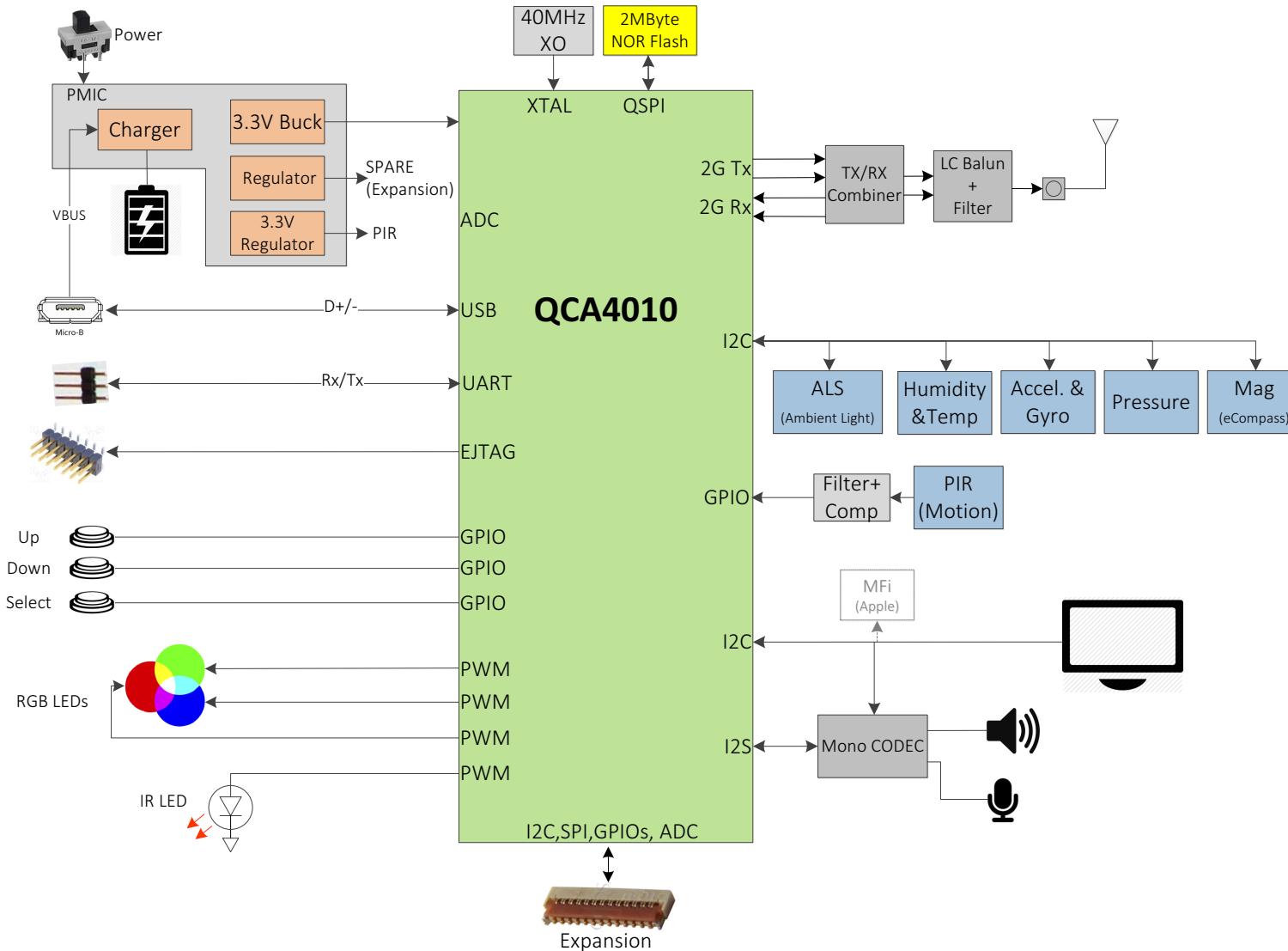
IoThing Value Propositions

For Embedded Application and Hardware developer

- Demo application and driver source in SDK allows embedded developer to use IoThing as a ready-to-use prototyping platform
- Hardware design files in SDK demonstrates the integration with 14 common sensors and control devices.



High Level Block Diagram



IoThing Feature Summary

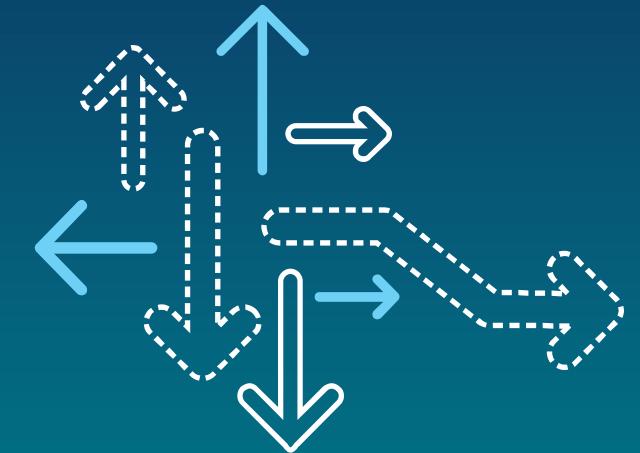
Domain	Feature	Specifications
Product	Features to demo	Hostless with large memory size, integrated PWM and ADC capability
	Target Chipset	QCA4010-2 Single Band, C-temp, 1.5Mbyte RAM
	Supported OS	ThreadX RTOS
Display	Display for simple message	Yes, 4 lines, character /segmented display (not colored) driven by I2C, low power
Form Factor	Industrial Design	Device size: 55mm * 55mm * 15mm
Memory	flash	Yes, external 2Mbyte SPI-flash for firmware storage
Power	Battery power	Li-Io/Pol battery pack 400- 500 mAh
	Charging	Allow charging via USB port
	Lifetime	5 hr active operations, 2~4weeks standby without external power
Radio	WLAN	802.11a/b/g/n 2.4GHz and 5GHz, 1x1
Certification	Regulatory certifications	FCC

IoThing Feature Summary (cont.)

Domain	Feature	Specifications
Audio	Codec	Yes , Mono, required to support mic and speaker, I2S interface
	Microphone	Yes
	Speaker	Yes, One, Min 0.5W
LED	Indicator LED's	Yes, One colored LED or 4 single color LEDs (white, R/Y/B) driven by PWMs
Sensors	Accelerometer	Yes , 3 Axis
	Ambientlight	Yes
	Compass/Magnetometer	Yes , 3 Axis
	Gyroscope	Yes , 3 Axis
	Humidity	Yes
	PIR motion	1-2m Distance
	Pressure	Yes
	Temperature	Yes
Input/Outputs	Expansion	Yes, via a low cost/ low profile connector to allow adding more future sensors
	IR LED (remote)	940nm 50-100mAIR LED driven by PWM output
	JTAG	JTAG should be available for debugging and SW download
	UART	UART debug should available for developer
	USB	Yes
	Keys	Yes, 3 buttons

Qualcomm® IoTing™
Sensor Integrated Reference
Platform for QCA4010

SW development environment overview



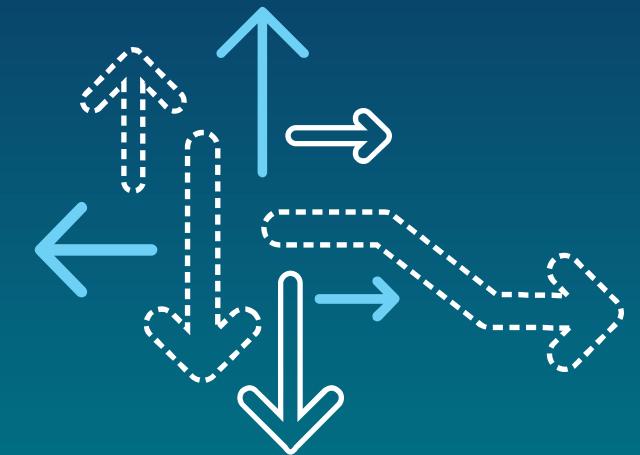
IoThing Demo Contents

- Network Topology
- Demo Use Cases
- Software Development Environment

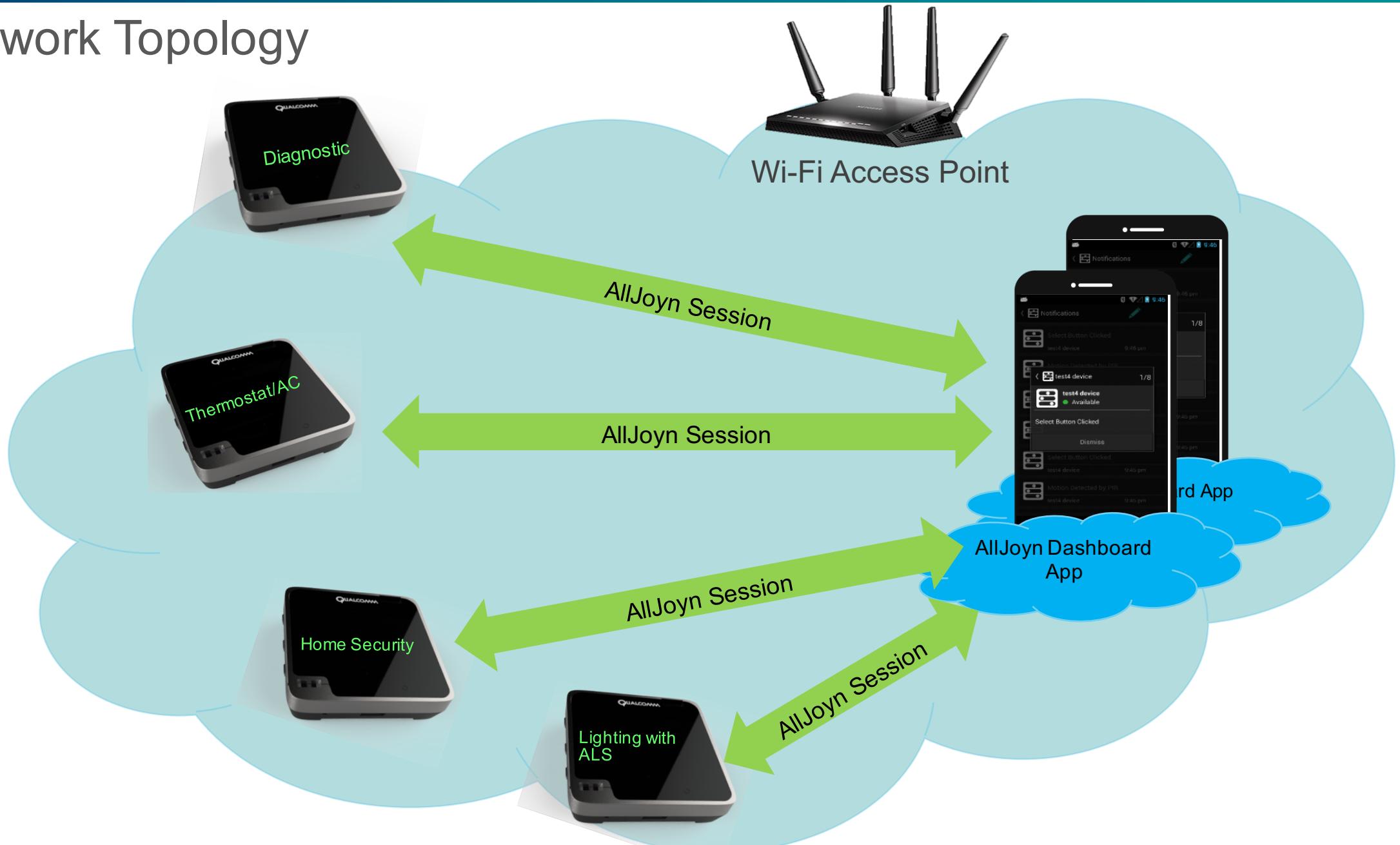


Qualcomm® IoTing™
Sensor Integrated Reference
Platform for QCA4010

AllJoyn network topology



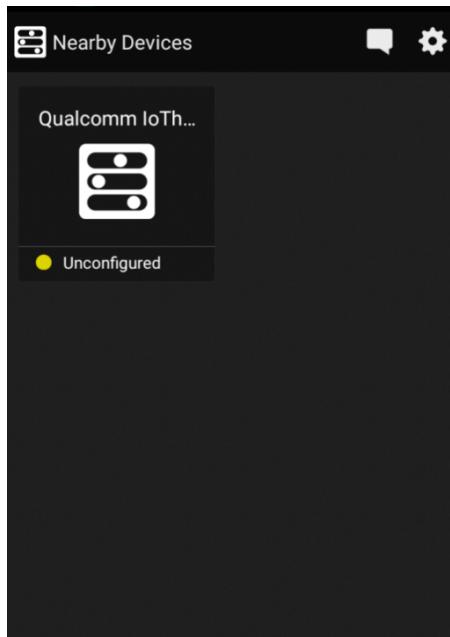
Network Topology



IoThing Onboarding process in AllJoyn

- The **Onboarding** process allows the user to set the Wi-Fi network your IoThing device will connect to, and an option to name your device

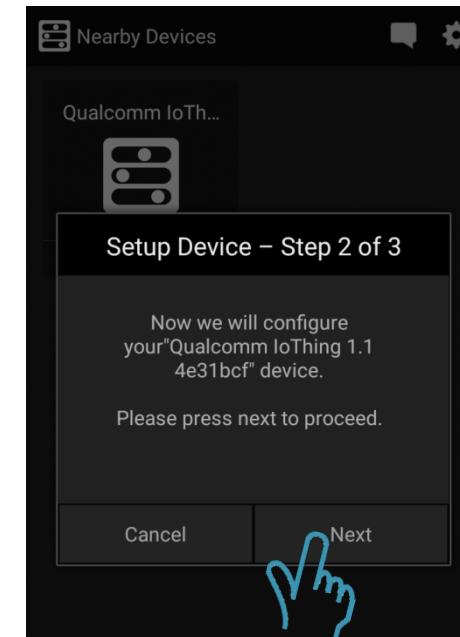
Select your device.
It should show as
"Unconfigured" after
FW flashing



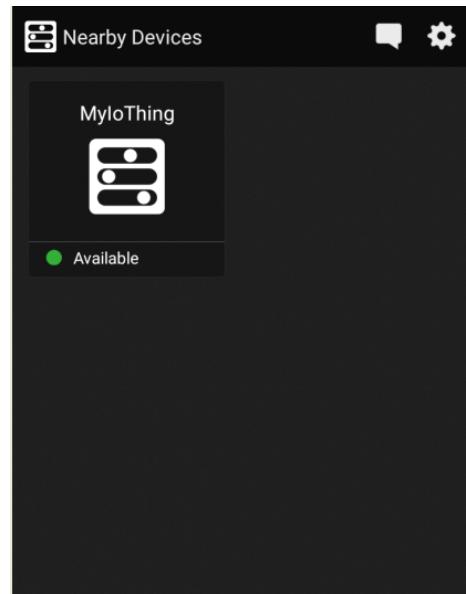
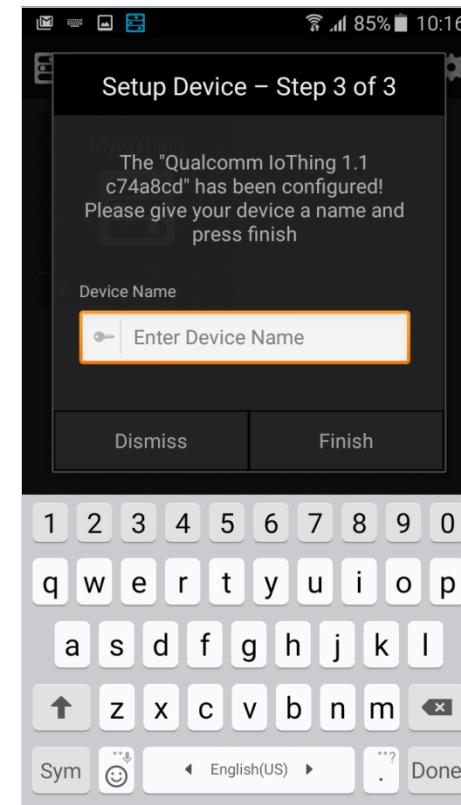
The IoThing device will be configured to work on the same WiFi network as your mobile device



You can change the Name of your IoThing device (Default is "MyIoThing")

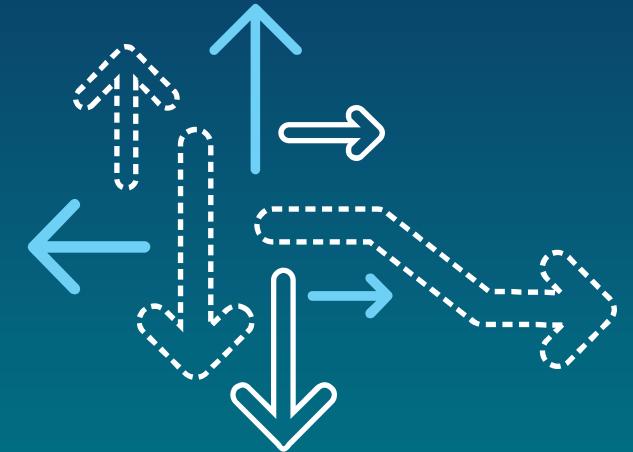


When Onboarding is complete you will see your device shown as "**Available**"



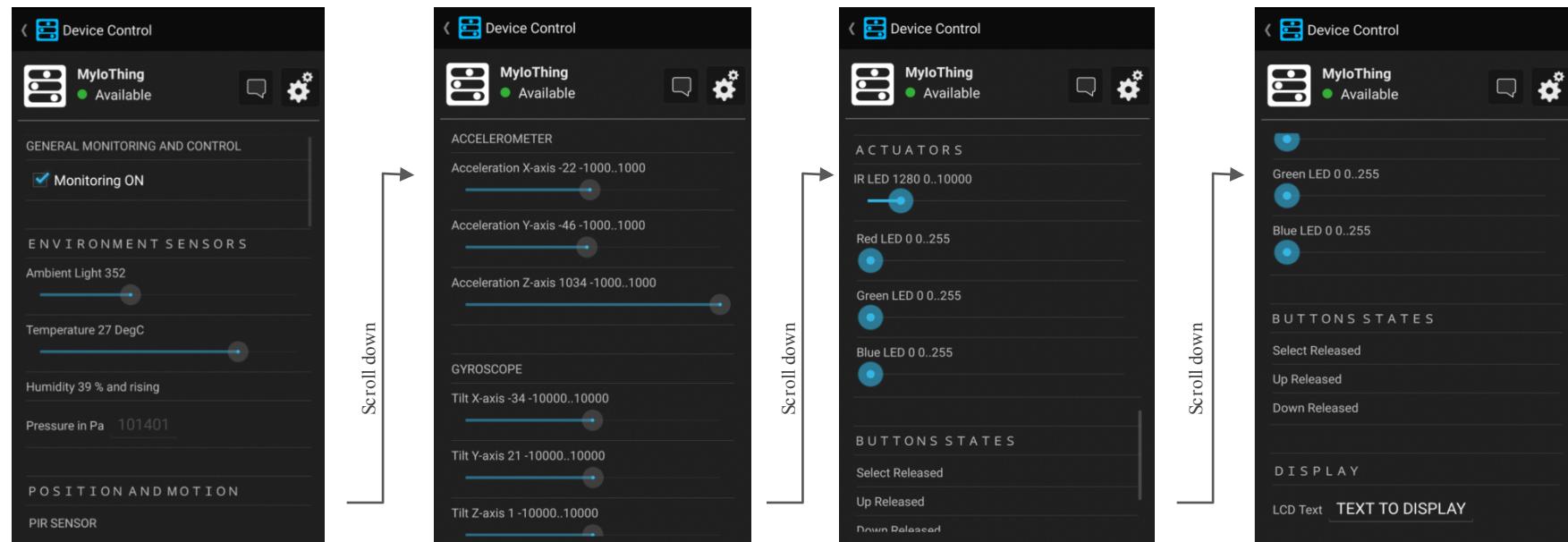
Qualcomm® IoThing™ Sensor Integrated Reference Platform for QCA4010

Demo use cases



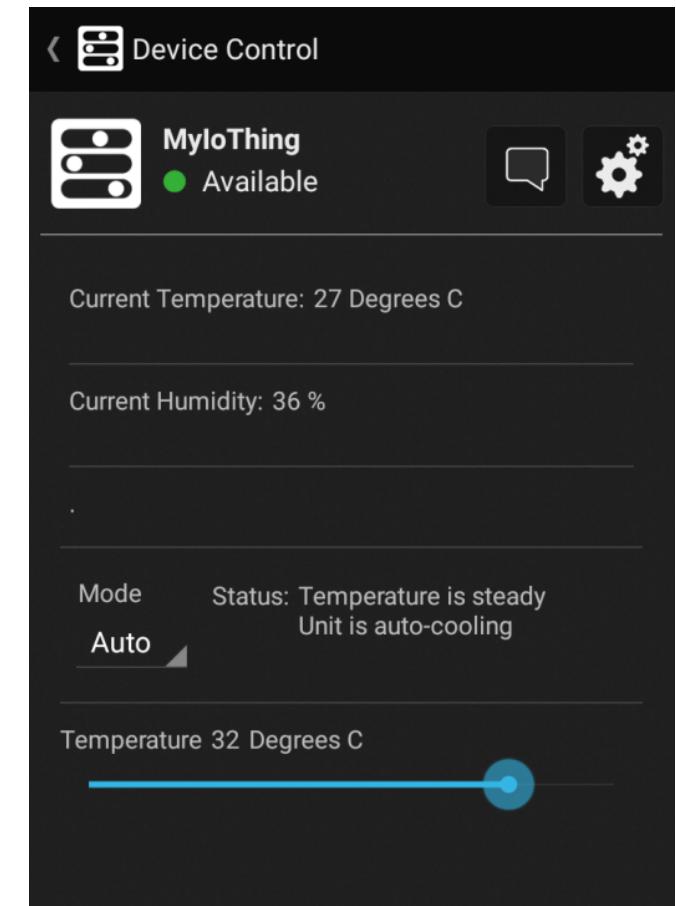
Monitor & Control (Diagnostic) Manager - *MyoThingy_General.*

- Allow remote monitoring (reading values from) of ALL IoTing sensors and input devices
 - Ambient Light (ALS), Temperature, Humidity, Pressure, PIR (motion), Accelerometer, Gyro
 - 3 pushbutton states
- Provide control (writing values) to ALL IoTing actuators
 - IR and RGB LEDs (variable PWM)
- Control the text presented on the IoTing OLED display (insert text via smartphone keyboard input)



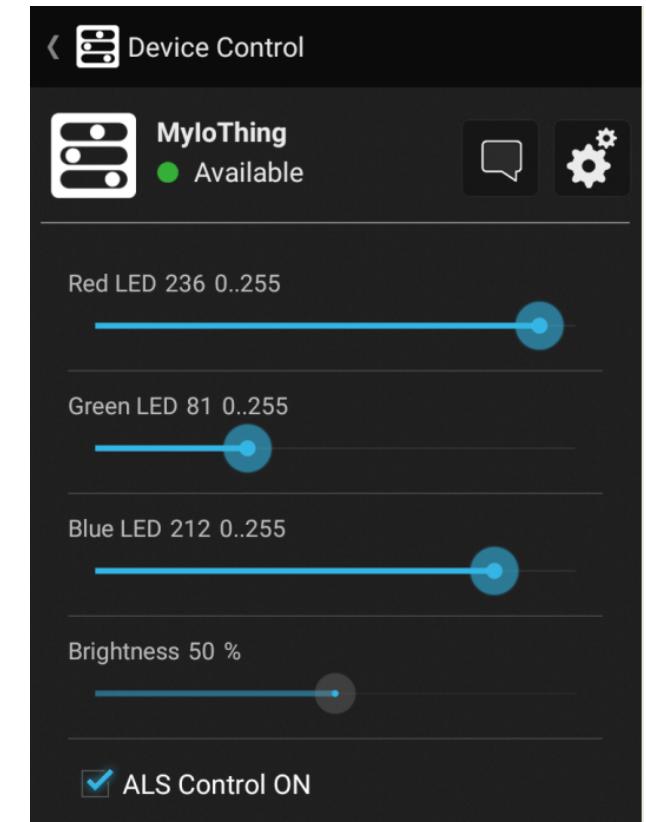
A/C Controller Unit with Thermostat - *MyloThingy_Thermostat.*

- A smart A/C Controller which monitors measurements of client sensors (temperature and humidity)
- Control A/C via smartphone application (Off, Heat, Cool and Auto modes)
- When in Auto mode, allows setting desired temperature to acts as a thermostat
- Display A/C status and readings on IoTing OLED display
- Use RGB LEDs to emulate A/C operational state
 - Red=heating, Blue=cooling, Green=idle (reached desired temp)
- Use a GPIO on Expansion header to emulate fan ON/OFF operation



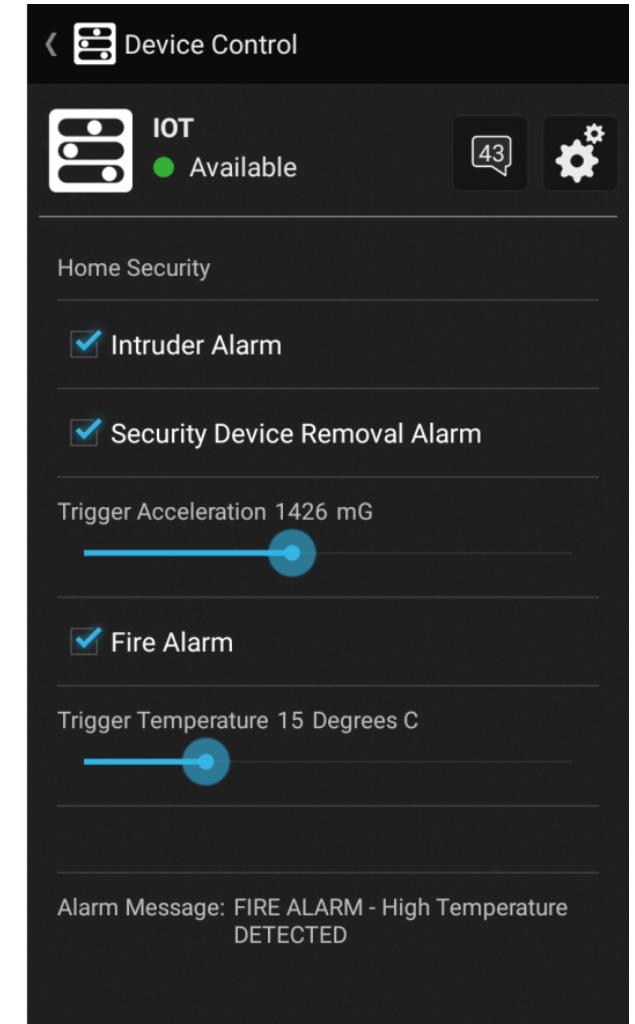
LED Lighting with ALS - *MyIoThingy_Lighting*

- Control the intensity of each of the IoThing RGB LEDs
 - Using PWM control (256 levels)
- Manual control of RGB brightness
 - Maintaining color mixing
- Automatic control of RGB brightness
 - According to ambient light level measured by the IoThing ALS
 - Energy saving - Dims when environment becomes brighter and vice versa

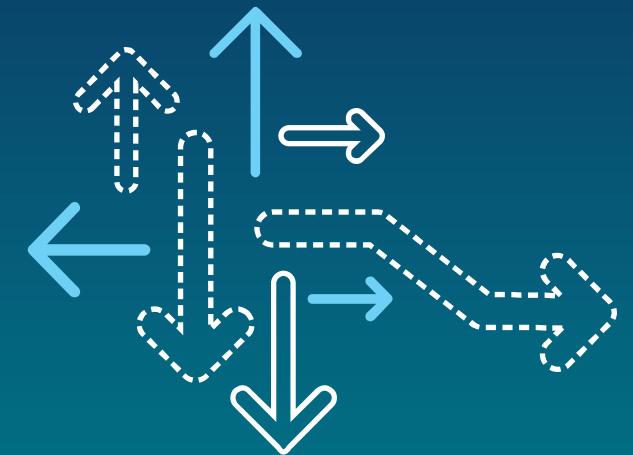


Home Security - *MyIoThingy_HomeSecurity*

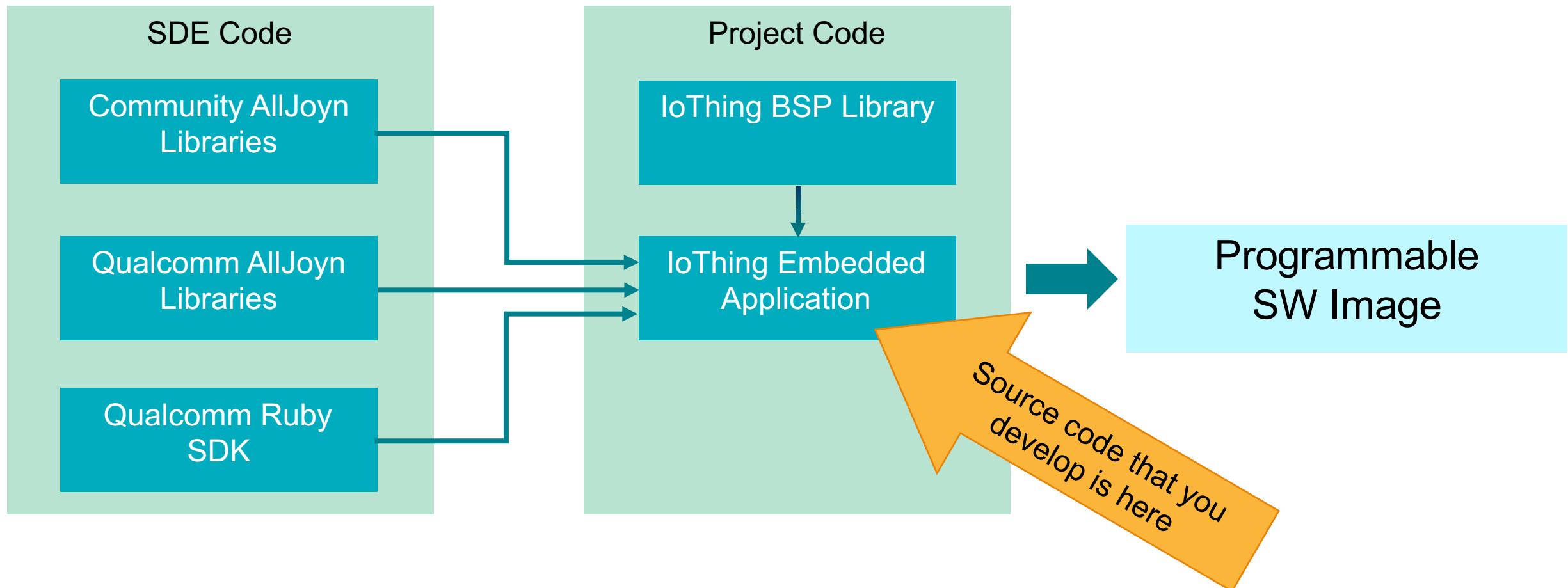
- Emulate a versatile alarm system, with 3 optional triggers
 - PIR motion sensing (home security)
 - Accelerometer (device protection)
 - Heat detection (fire alarm)
- Each alarm event is:
 - Broadcasted as a Notification shown on the remote Dashboard App
 - Displayed in the control panel on the remote Dashboard App
 - Displayed on the device's OLED display
 - Plays a sound message via IoThing speaker



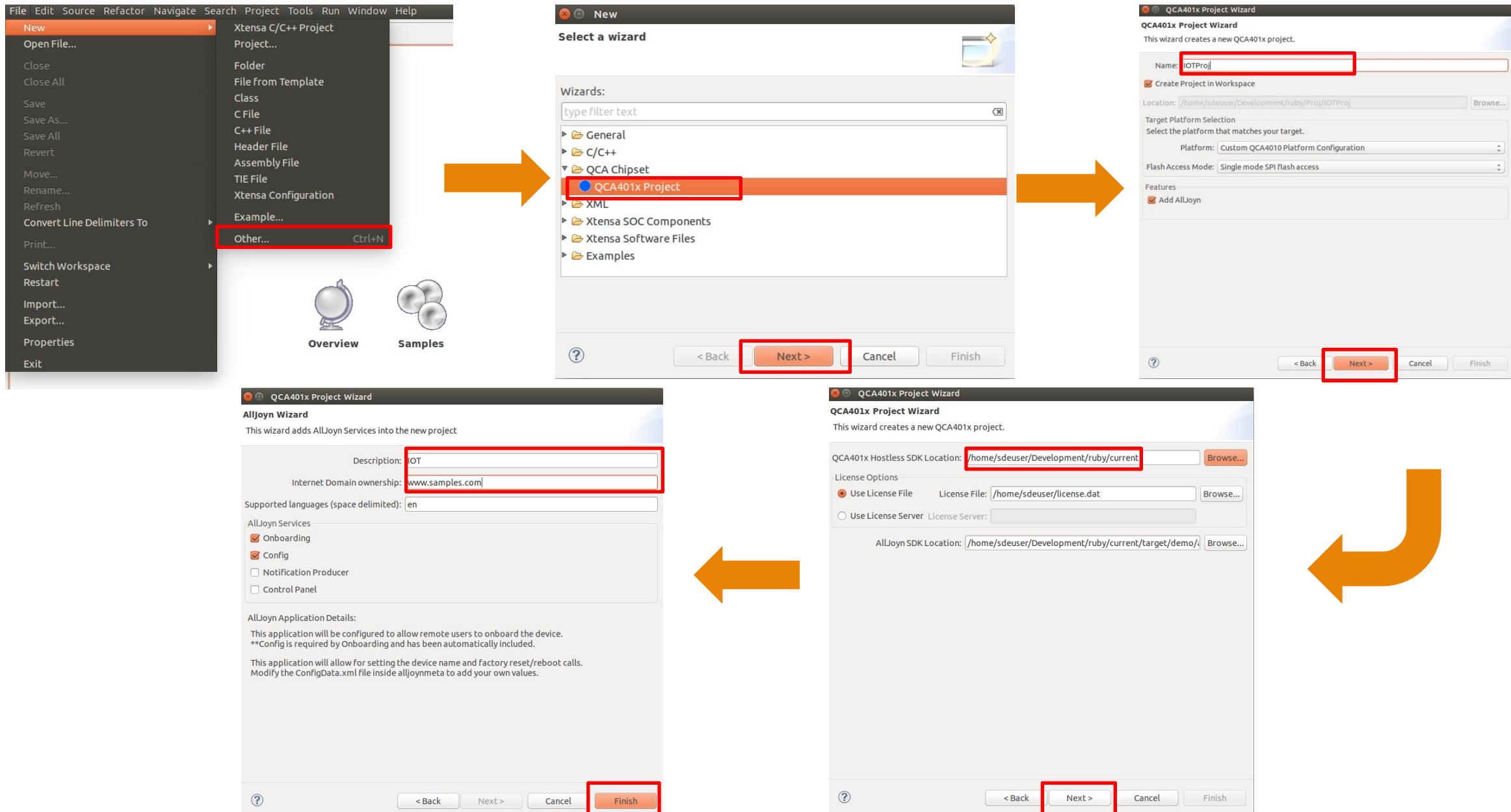
Software development environment



Projects Hierarchy

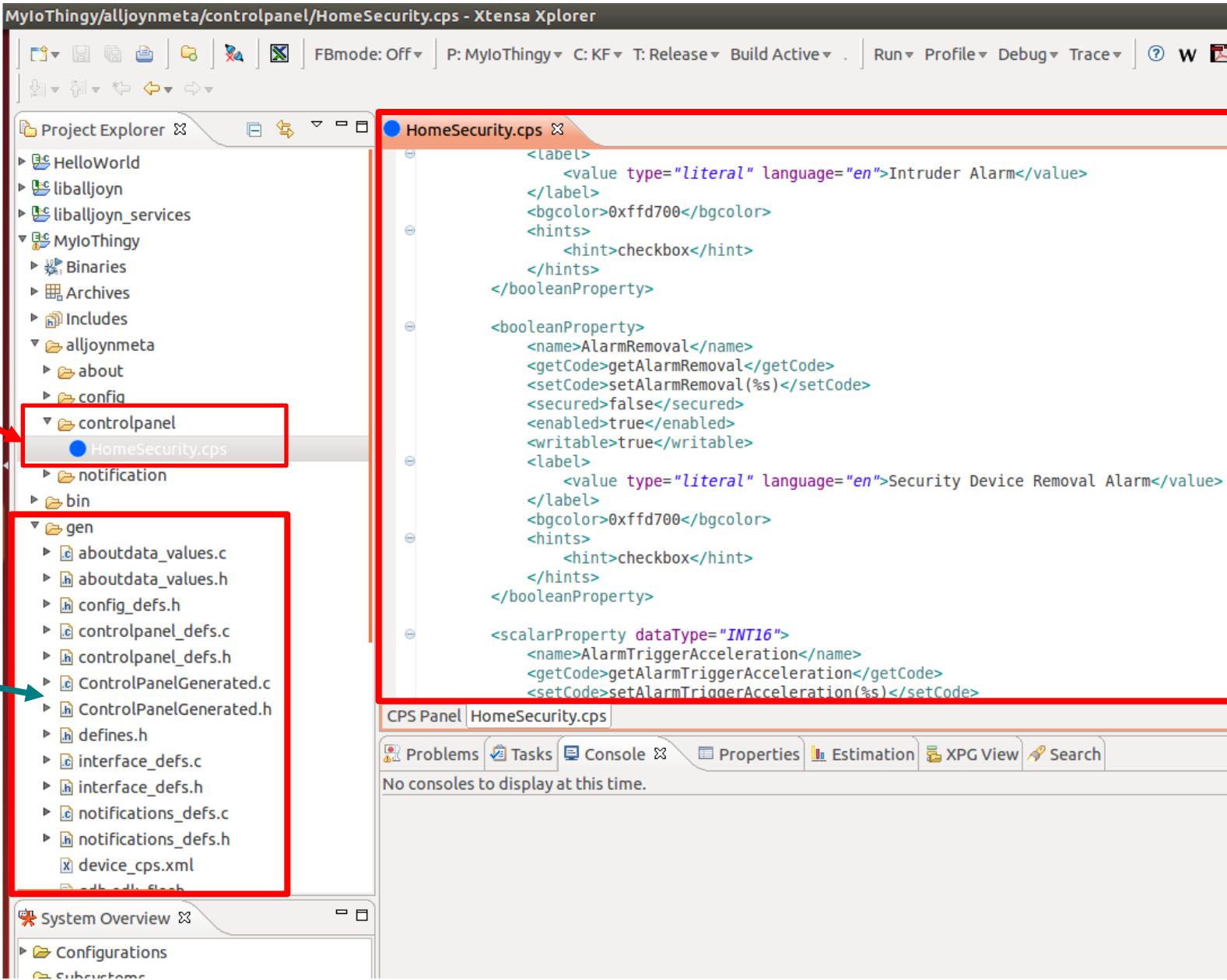


Project Creation



Code Generation

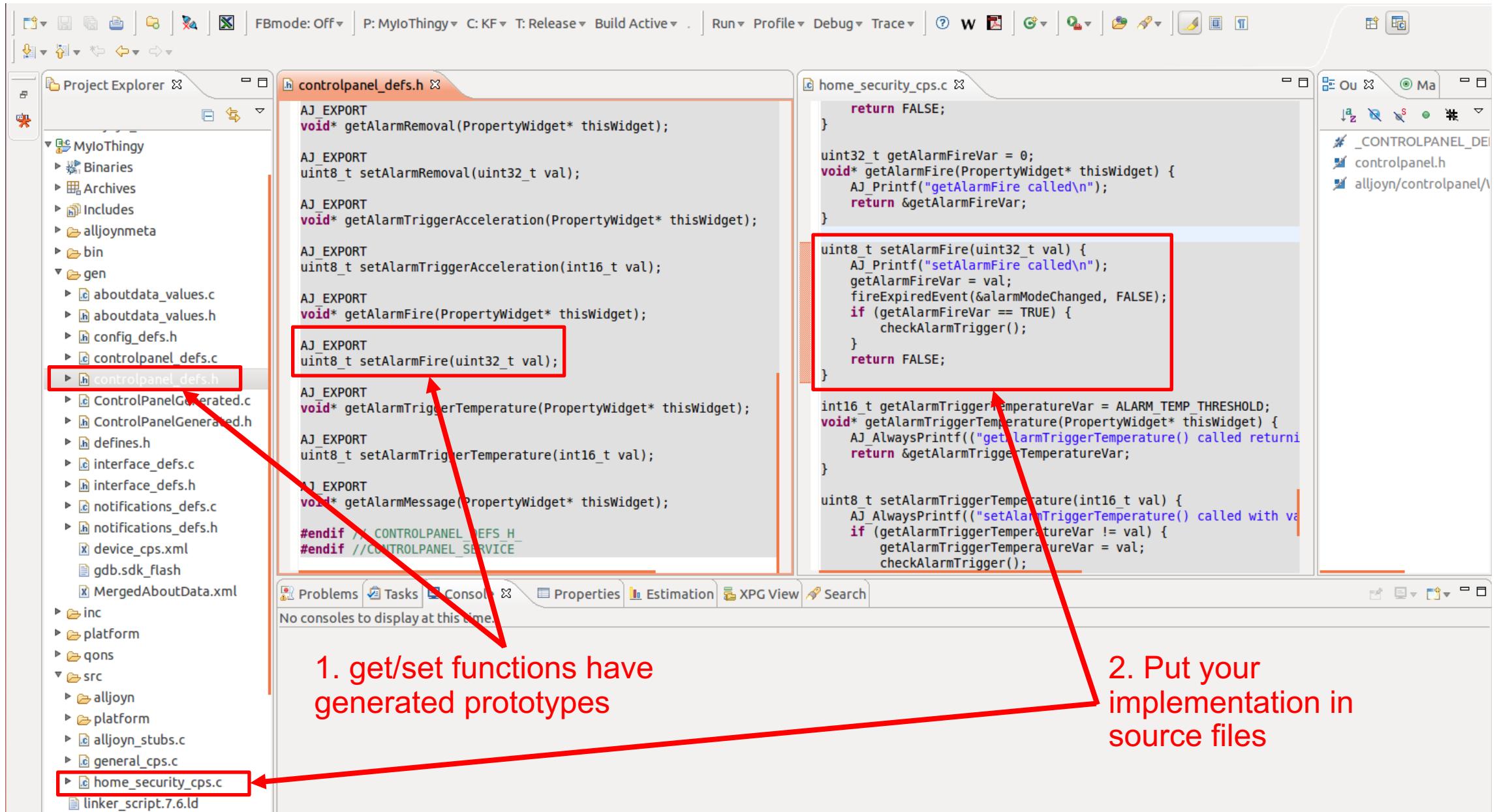
1. Create or access .cps file



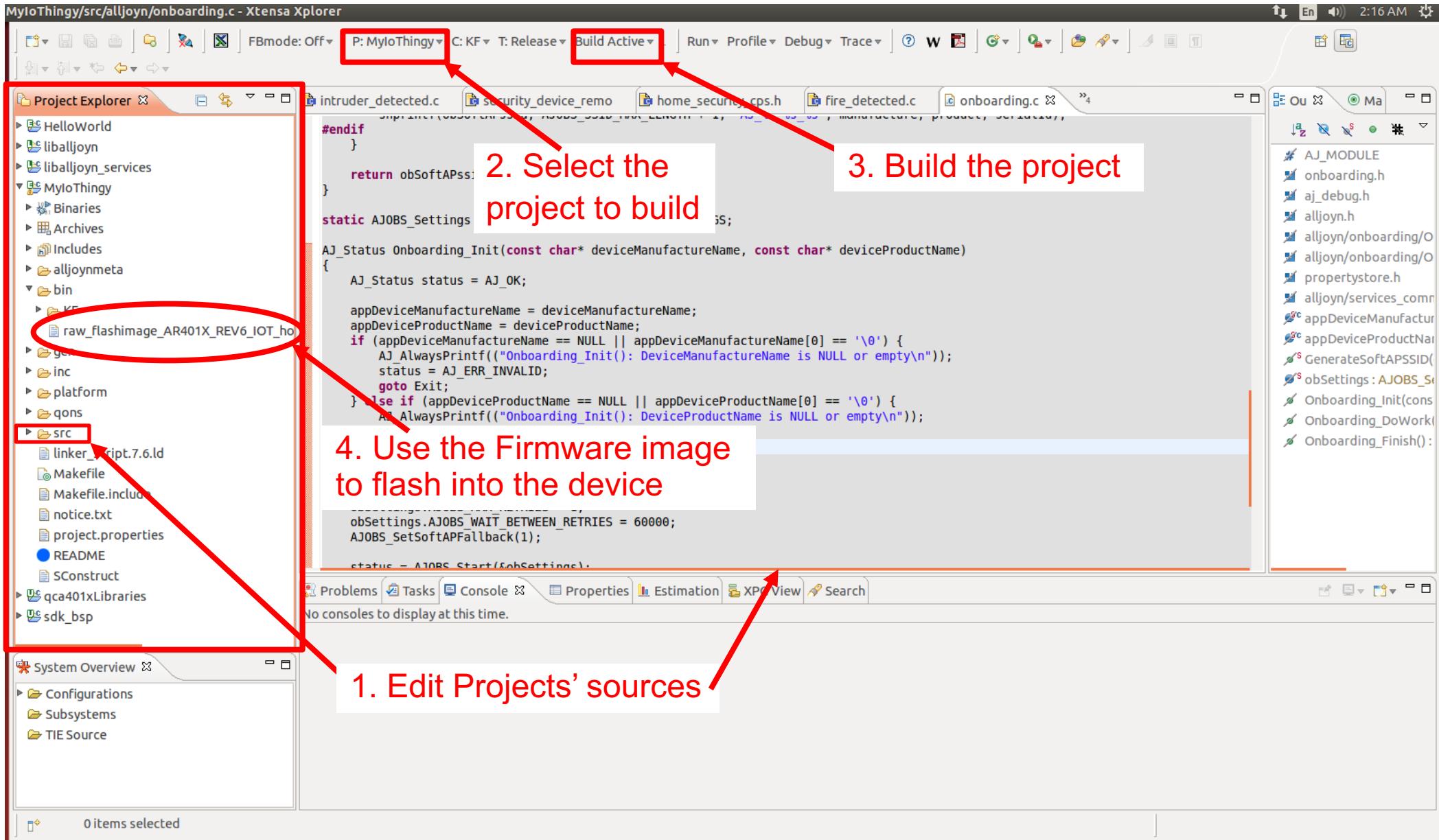
2. Edit the xml code, and save it

3. Use the generated code for UI

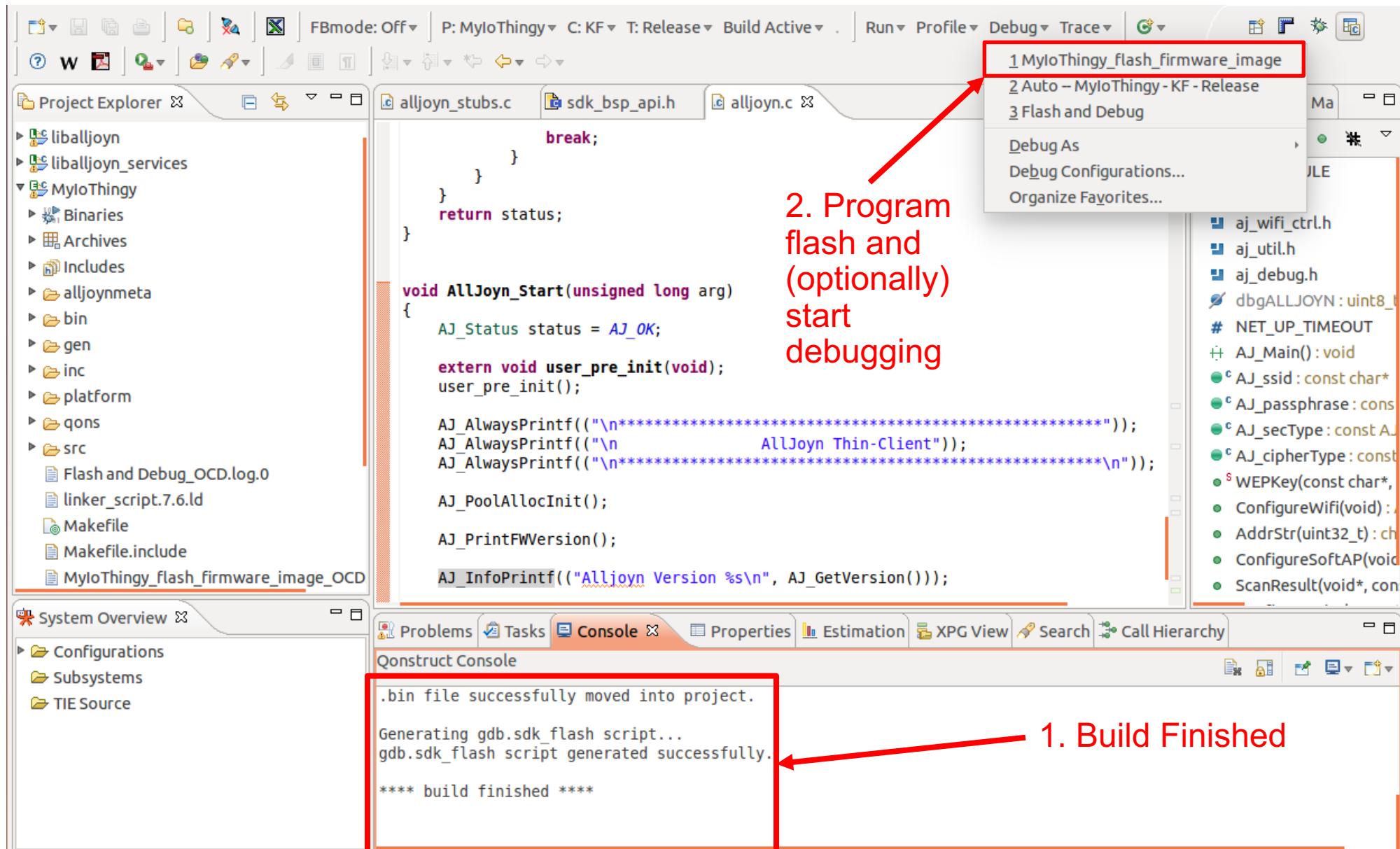
Code Generation – Implement stub functions



Build Process



Debug



2. Program
flash and
(optionally)
start
debugging

1. Build Finished

Thank you

For more information, visit us at:
www.qualcomm.com & www.qualcomm.com/blog

© 2013-2015 Qualcomm Incorporated and/or its subsidiaries. All Rights Reserved.

Qualcomm is a trademark of Qualcomm Incorporated, registered in the United States and other countries. Other products and brand names may be trademarks or registered trademarks of their respective owners.

References in this presentation to Qualcomm may mean Qualcomm Incorporated, Qualcomm Technologies, Inc., and/or other subsidiaries or business units within the Qualcomm corporate structure, as applicable.

Qualcomm Incorporated includes Qualcomm's licensing business, QTL, and the vast majority of its patent portfolio. Qualcomm Technologies, Inc., a wholly-owned subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of Qualcomm's engineering, research and development functions, and substantially all of its product and services businesses, including its semiconductor business, QCT.

