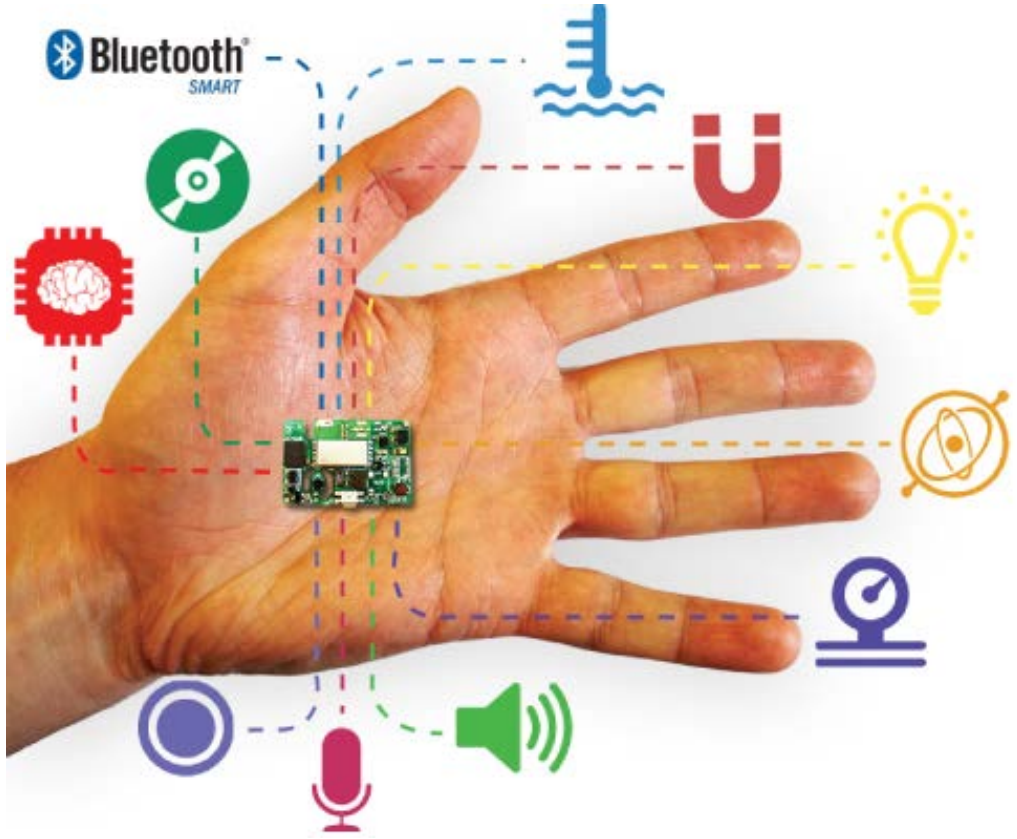
*Sensi*BLE Getting Started



Your Idea - Worth come true

Milan Yudkovich

Diolan

From Idea to Form Factor Device

The building blocks | Your need | Prototype | Form Factor

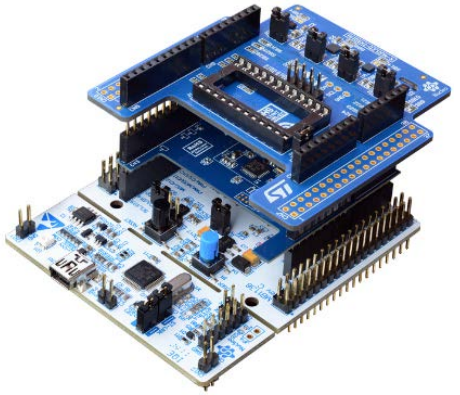
- Sensors
- Connectivity
- Audio
- Actuators
- Power
- Processing
- Software

- Motion & Environ. Sensors
- Bluetooth Low Energy
- Wi-Fi
- Sub-GHZ
- NFC
- Microphone
- Motor control
- Microcontroller

Integrated Development Environment and Middleware

Processor Boards
Expansion Boards

STM32 Open Development Environment



*Sensi*BLE

Every Idea
Worth Come True

www.st.com/stm32ode

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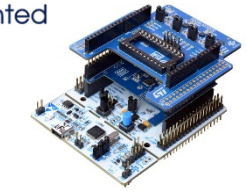
From Prototype to Final Product

ST Partnership with Diolan - Form factor devices and customization

life.augmented



Modular Blocks
Prototyping

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Diolan
Scale Down
life.augmented

Form Factor
Field testing

Diolan
Scale Down
life.augmented

Optimized Design
Volume Production

Final
Device

STMicroelectronics Partnership with Diolan
Form factor devices and customization

- Easy Porting of developed software to final product
- HW/SW optimization and support for production
- Small series Production

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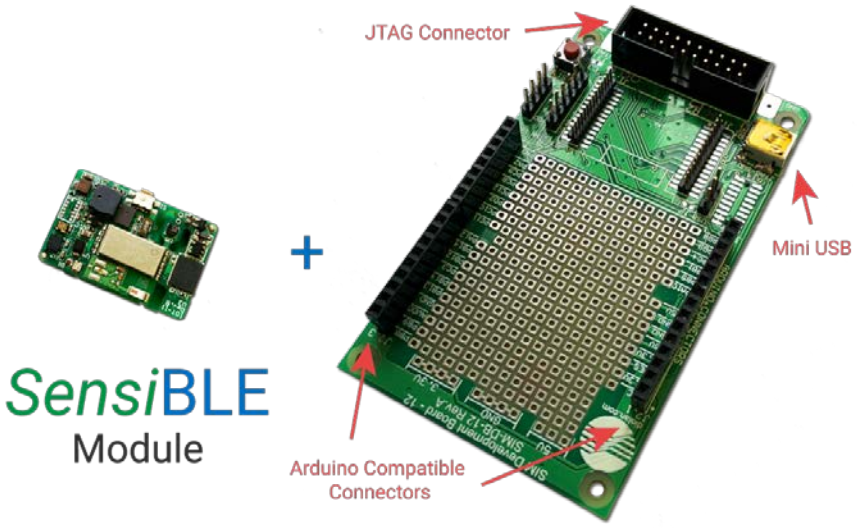
Setup *Sensi*BLE HW & SW

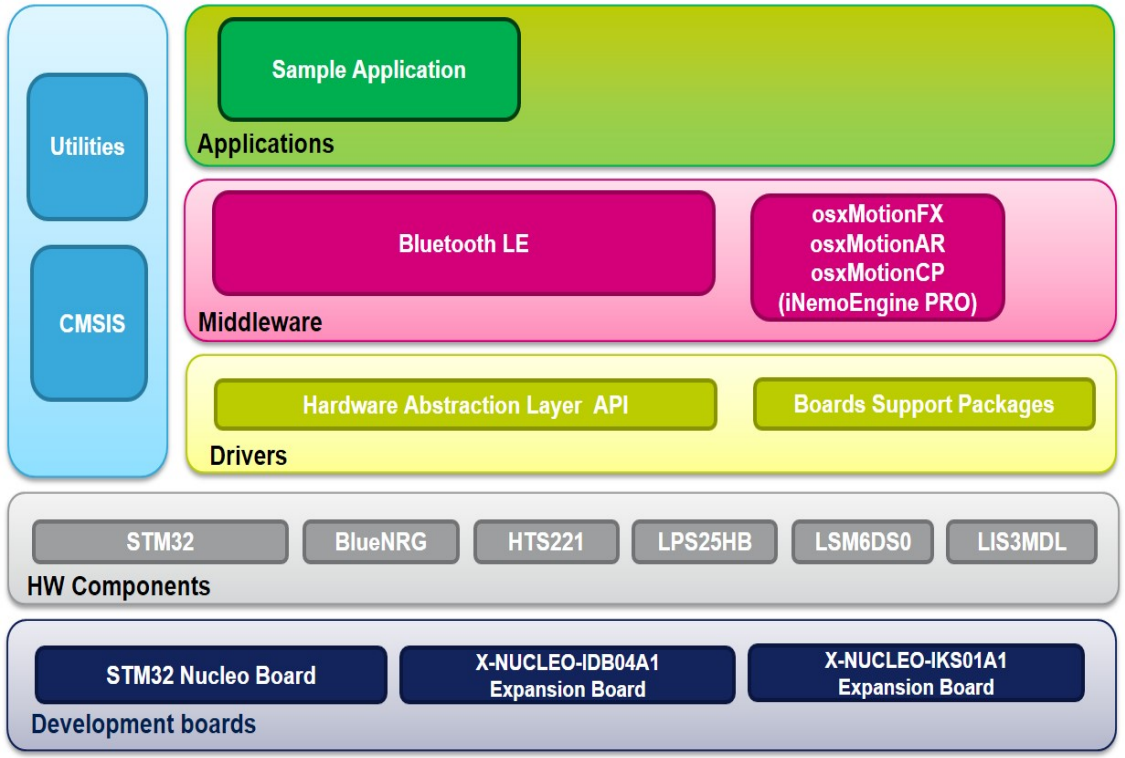
Hardware

*Sensi*BLE Development Kit



Software

BlueMicrosystem1



*Sensi*BLE Bluetooth Low Energy and Sensors

X-NUCLEO-IDB05A1

Bluetooth® SMART Bluetooth LE

STM32 Nucleo

NUCLEO-L476RG

STM32Nucleo
(ARM M4 Core)

X-NUCLEO-IKS01A1

- 3D accelerometer & 3D gyroscope
- Temperature & Humidity
- Pressure
- Magnetic

X-NUCLEO-CCA02M1

- Digital Microphone

STM32 Cube

- Data Logger
- Light & Color Detection
- Buzzer

*Sensi*BLE
IoT Module

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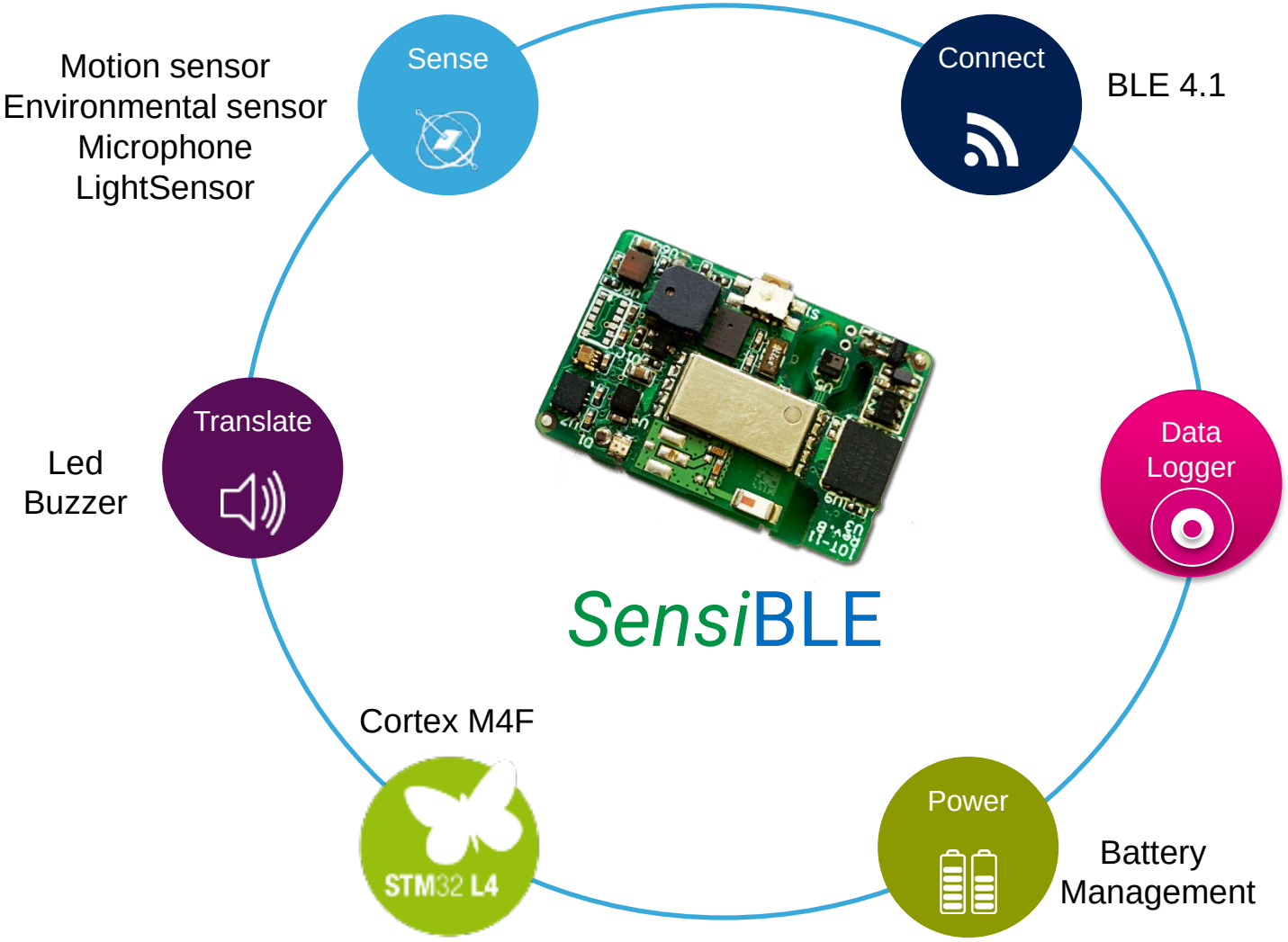
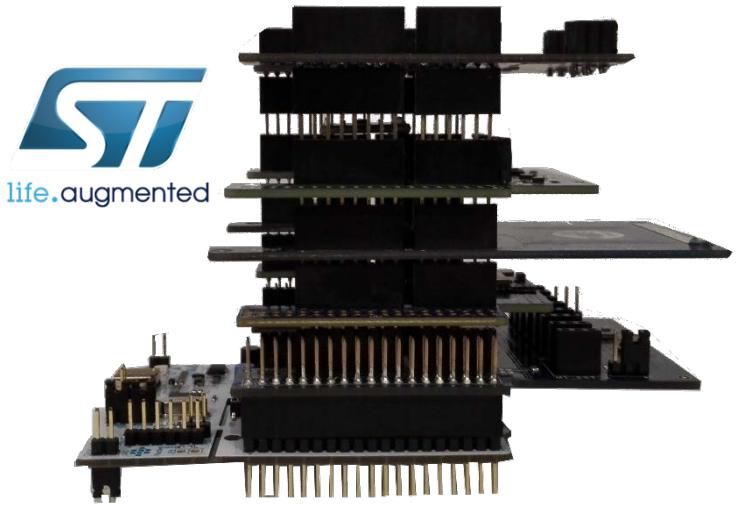
What is inside?



Honey, I Shrunk the Prototype!



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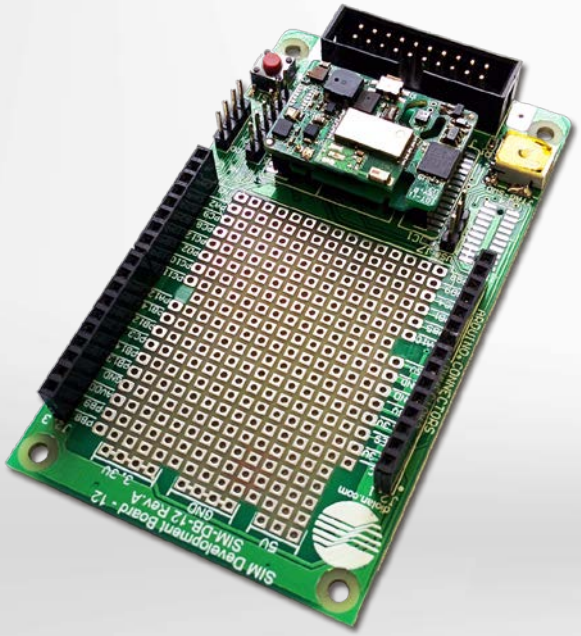
*Sensi*BLE

Final Device

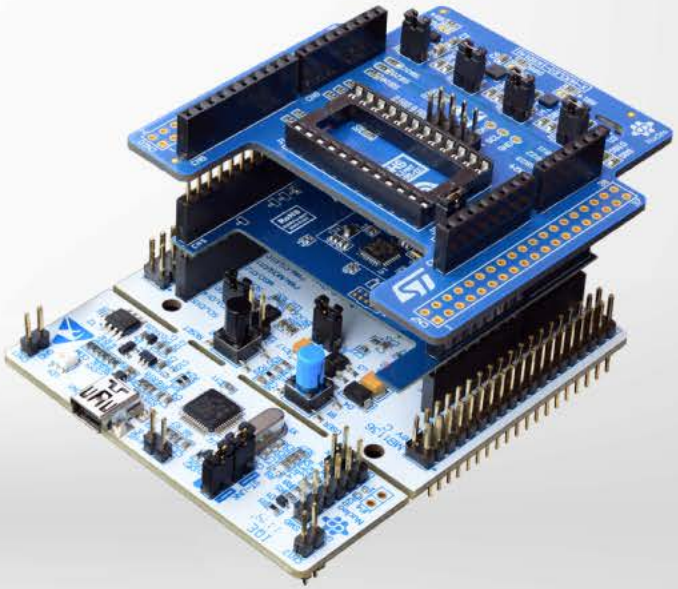
Customize the HW and reuse the same SW!!!



STM32 Open Development Environment

Jump start your project

Develop and prototype innovative devices



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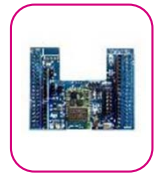
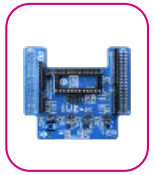
STM32 Open Development Environment

Fast, affordable Prototyping and Development

STM32 Nucleo development boards

STM32 Open Development Environment

STM32 Nucleo expansion boards

STM32Cube software

STM32Cube expansion software

Function Packs

Set of function examples for some of the most common application cases

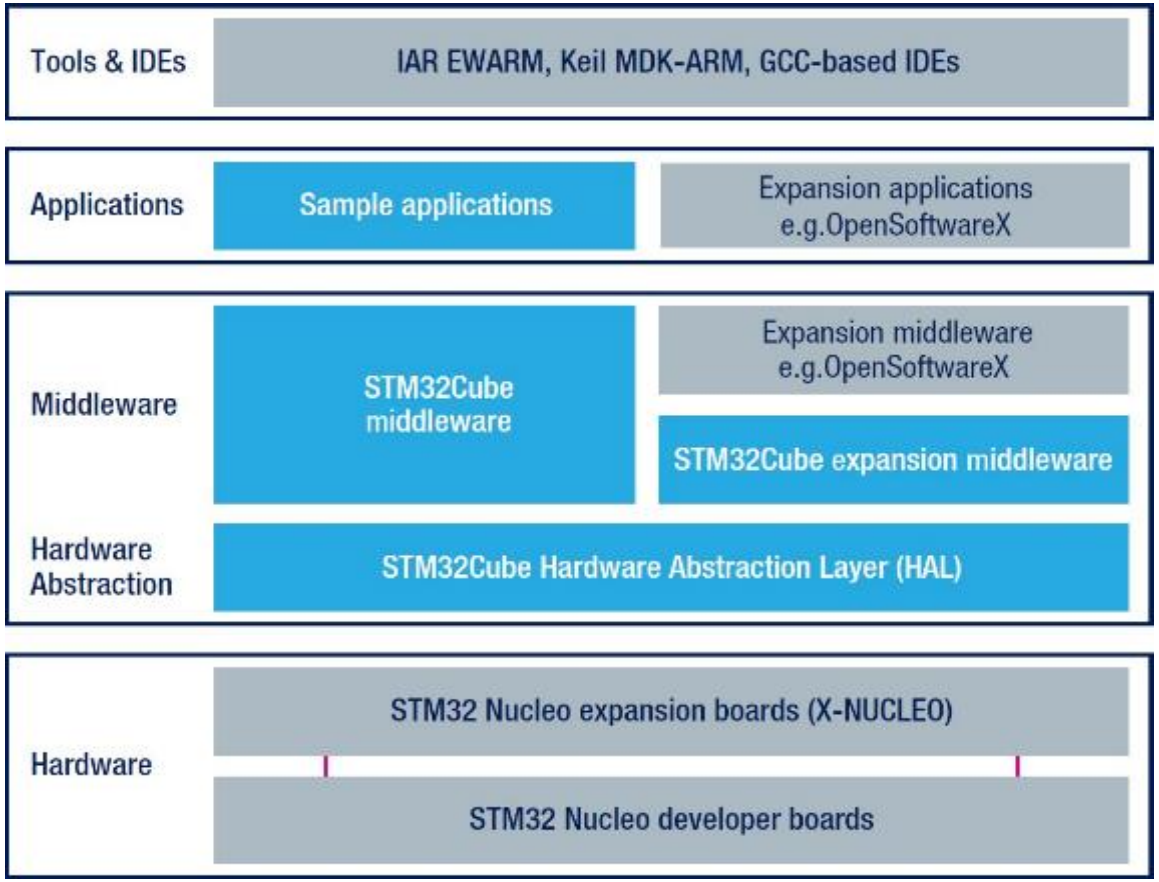
Developer community and support

Compatibility with free & commercial Development Environments

www.st.com/stm32ode

STM32Cube & Expansion SW

Each STM32 Nucleo expansion board leverages STM32Cube expansion SW enabling users to start coding their application from day one



- STM32Cube HAL pre-integrated drivers
- Specific middleware libraries
- Relevant sample application, with ready-made IDE projects
- Pre-packaged applications integrating functionality from several expansion boards/SW
- Released in source code with permissive licenses
- OpenSoftwareX with easy evaluation license included

Program *Sensi*BLE with BlueMicrosystem

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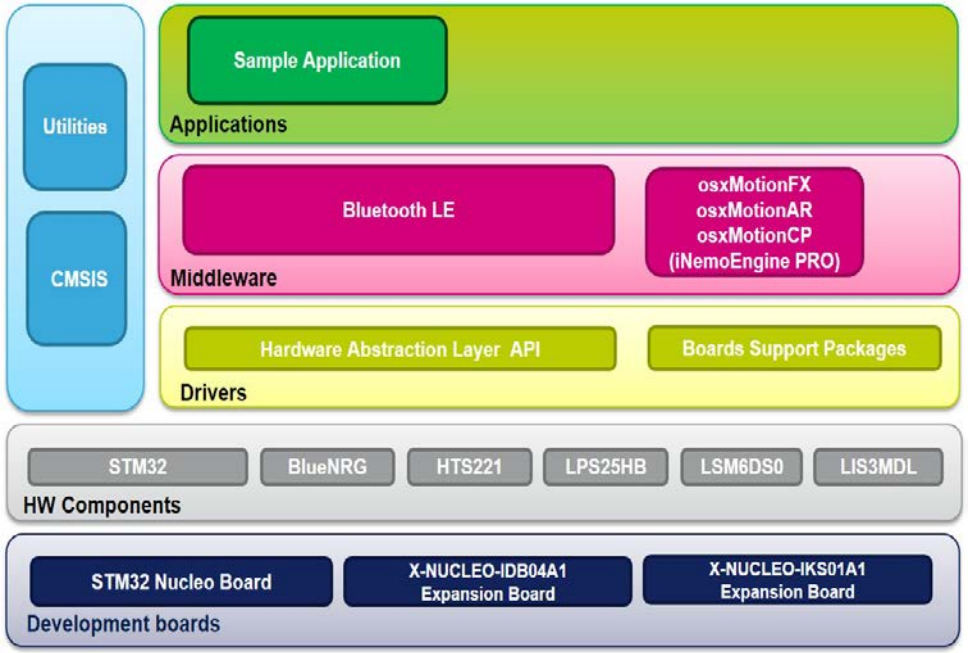
BLUEMICROSYSTEM1

Bluetooth Low Energy and Sensors Software expansion for STM32Cube

Key features

- Complete middleware to build applications using temperature and humidity sensors (HTS221), pressure sensor (LPS25HB) and motion sensors (LIS3MDL and LSM6DS0). The package is compatible with the motion sensor LSM6DS3 DIL24 expansion component
- Very low power Bluetooth Low Energy (BlueNRG) single-mode network processor, compliant with Bluetooth specifications core 4.0 for transmitting information to one client
- osxMotionFX (iNEMOEngine PRO) real-time motion sensor data fusion (under OPEN.MEMS license) to combine the output from multiple MEMS sensors
- Gyroscope bias and magnetometer calibration routine
- osxMotionCP (iNEMOEngine PRO) activity-recognition algorithm (under OPEN.MEMS license) based only on accelerometer data
- osxMotionAR (iNEMOEngine PRO) real-time activity-recognition algorithm (under OPEN.MEMS license) based only on accelerometer data
- Easy portability across different MCU families, thanks to STM32Cube
- Compatible with BlueMS application for Android/iOS (Version >2.0.0) available on respective online markets (playstore/itunes)
- Free, user-friendly license terms
- Sample implementation available on an X-NUCLEO-IKS01A1 plus X-NUCLEO-IDB04A1 or X-NUCLEO-IDB05A1 assembly connected to a NUCLEO-F401RE or NUCLEO-L476RG board

Overall Software Architecture



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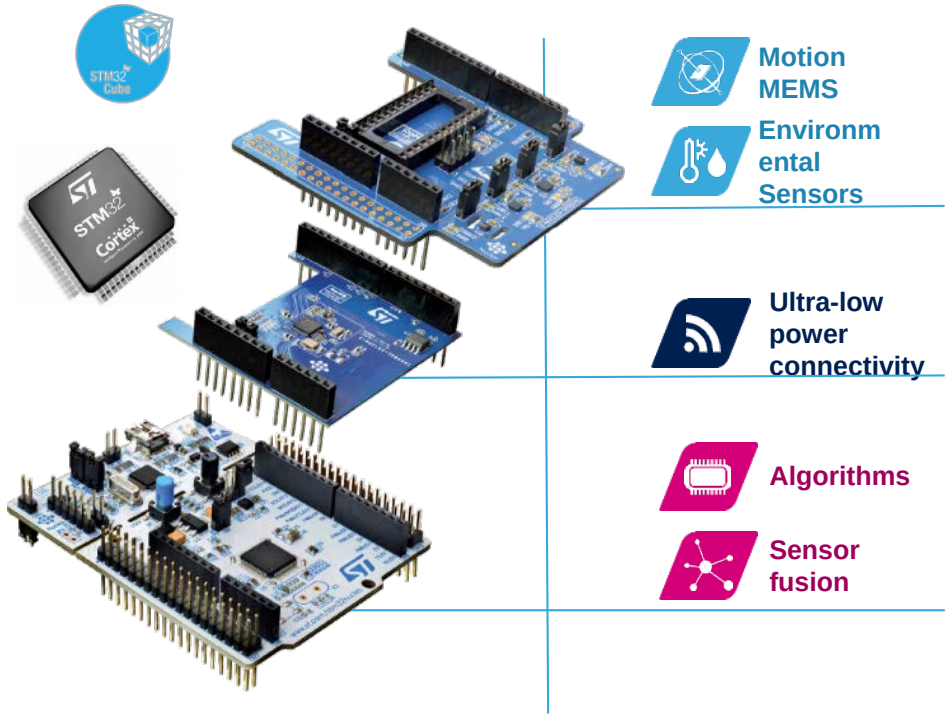
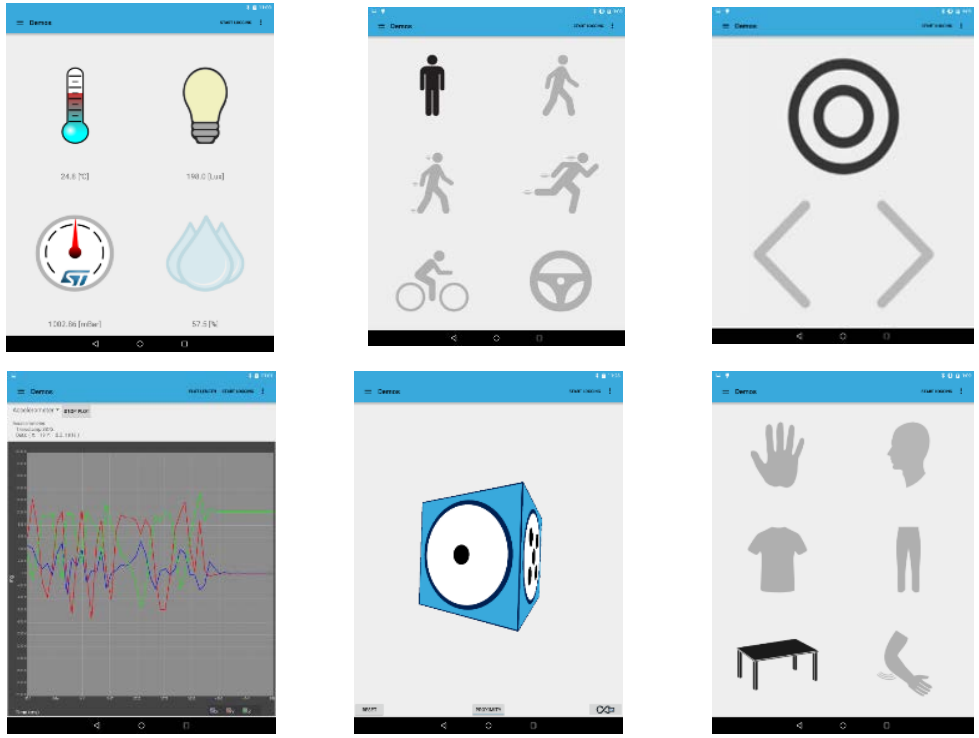
BLUEMICROSYSTEM

Simplified development of BLE applications for smartphones





Simplified development of BLE applications for smartphones

- Very low power Bluetooth Low Energy (BlueNRG) single-mode network processor
- Embedded software for real-time motion sensor data fusion, activity and gesture recognition, free fall detection
- Companion App freely available in source code for iOS and Android

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Getting Started (1/4)

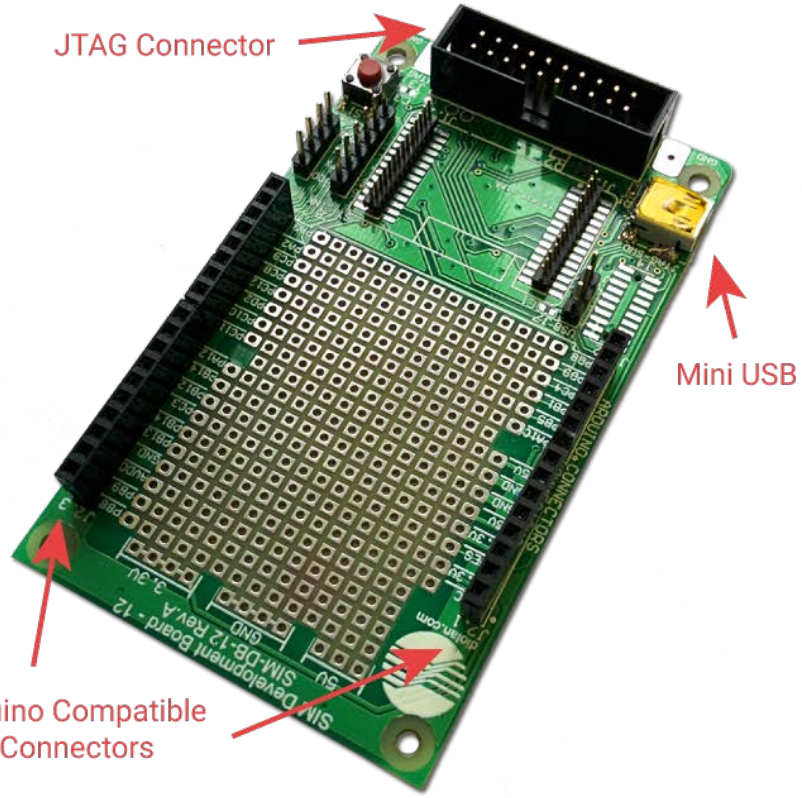
- Hardware Setup
- OpenSoftwareX OSX Download & Install
- OpenSoftwareX OSX License
- ST BLUEMS App Installation

Hardware Setup (1/4) – Step by Step

*Sensi*BLE Development Kit

*Sensi*BLE
Module

+



SIM Development Board

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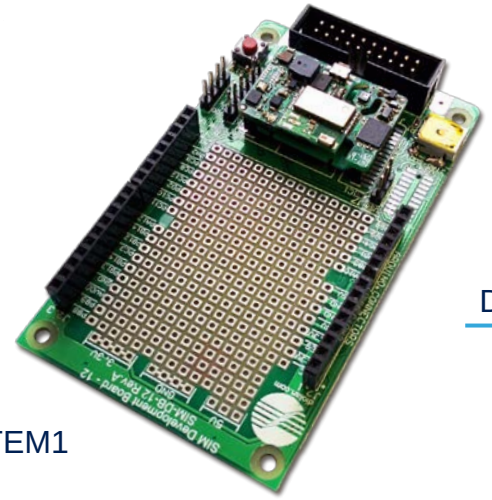
OpenSoftwareX OSX Download & Install (2/4)

1 st.com/bluemicrosystem

life.augmented

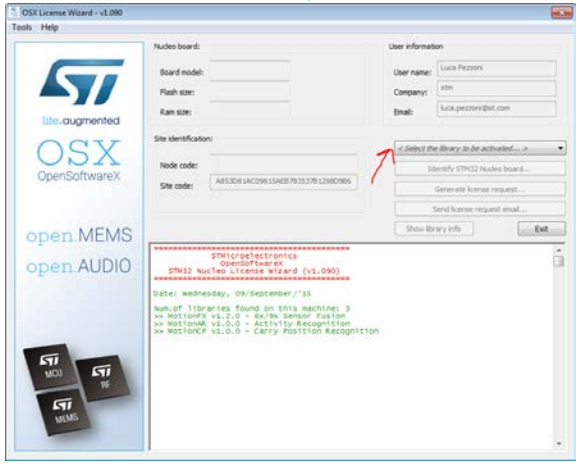
www.st.com



2 Select BLUEMICROSYSTEM1

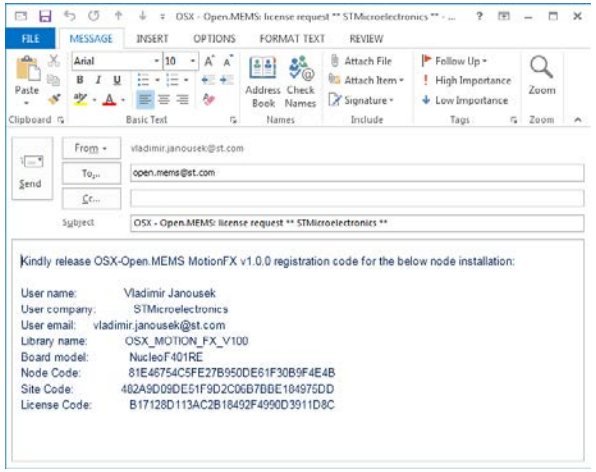
3 Download & Install

4 Licenses Request (For each license)



- Select one osxMotionFX/osxMotionAR/osxMotionCP license
- Click: Identify STM32Nucleo board
- Click: Generate License Request

5 License Activation (For each License)



Click: Send License request email

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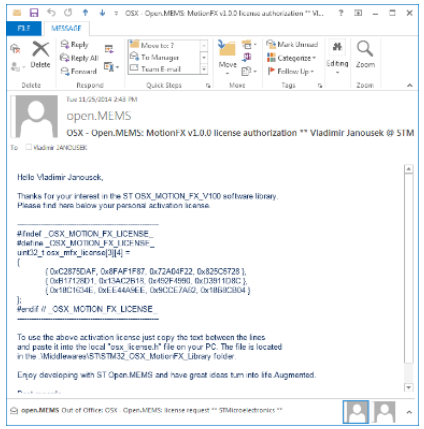
OpenSoftwareX OSX License (3/4) – Step by Step

Example for osxMotionFX for *Sensi*BLE Development Kit

License activation email received

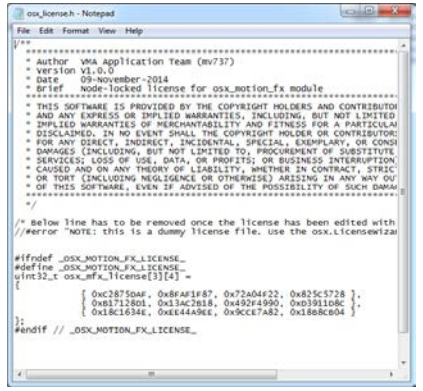


6

License Activation (For each License)

7 Copy the license key in osx_license.h located in

.\OSX BlueMicrosystem\Middlewares\ST\STM32_OSX_MotionFX_Library



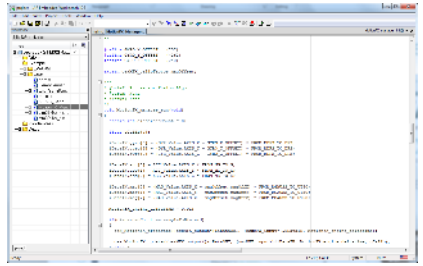
8 When you have requested and activated ALL the osxMotion licenses Open IAR project from

. \OSX BlueMicrosystem\Projects\Multi\Applications\BlueMicrosystem1\EWARM\STM32L476RG-Nucleo

IAR SYSTEMS

Compile/Flash and Run the project

9



Start developing
(example project included)

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ST BLUEMS App Installation (4/4) – Step by Step

Download App

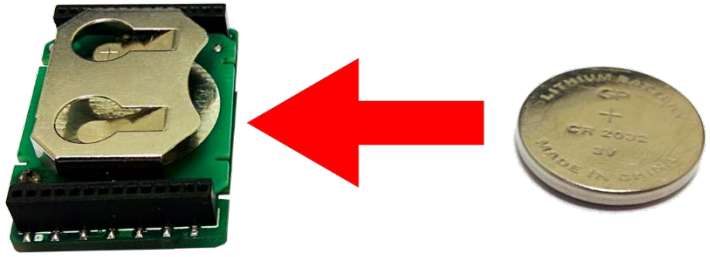
ANDROID APP ON Google play

Available on the App Store

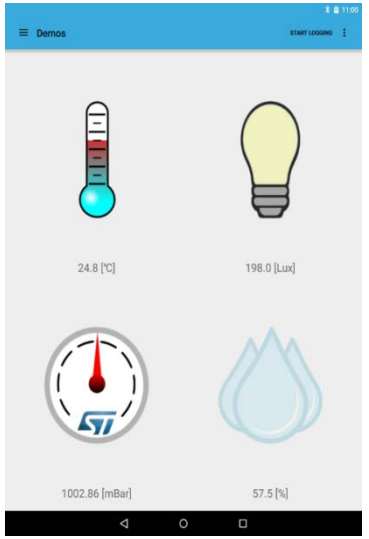
Download the ST BLUEMS app from the Apple App Store or Google Play, and start the app on you smartphone/tablet

Insert Battery

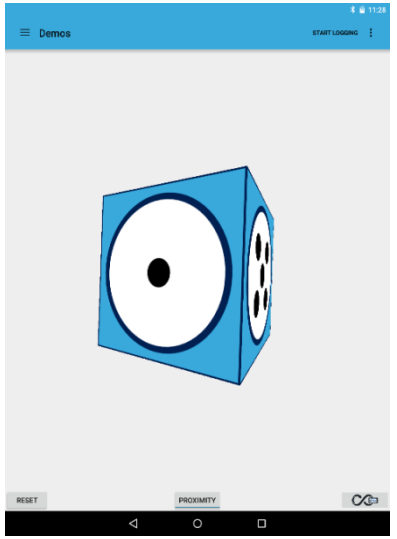
*Sensi*BLE



Explore ST BLUEMS App



Environmental Page



Sensor Fusion

Start Scanning. Select your SensiBLE from the device list. Choose sensor view page to see the sensor reading

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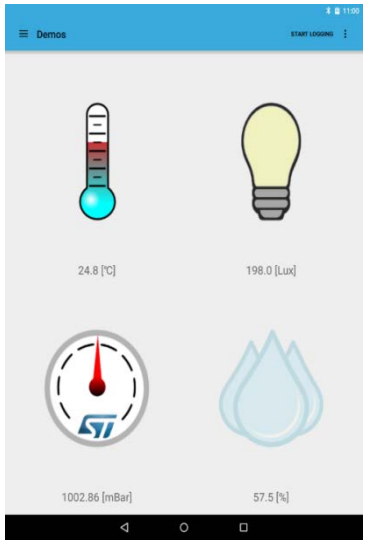
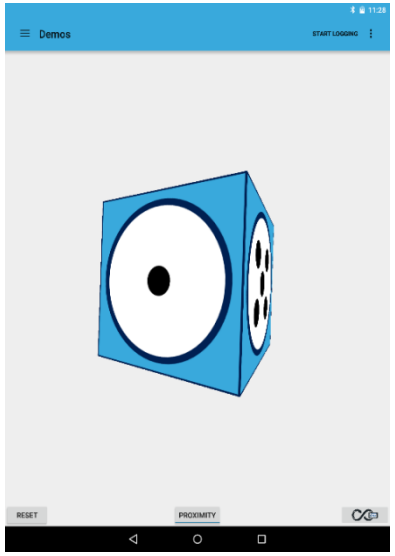
BLUEMICROSYSTEM1

BlueMS Application for for **Android/iOS**

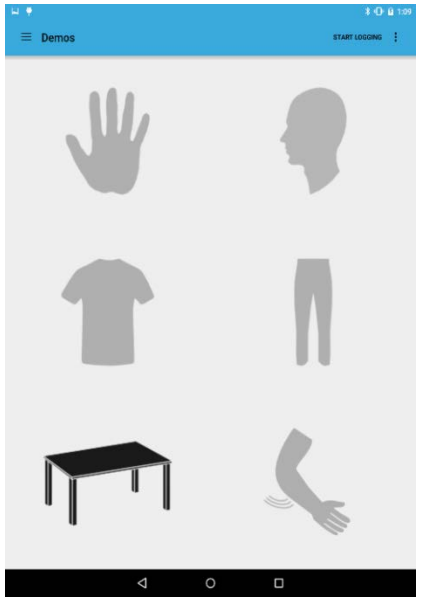
Environmental Page



Sensor Fusion

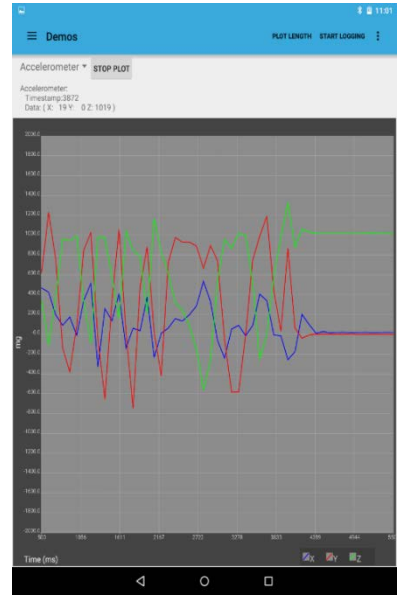


Carry Position



Activity Recognition

Plot Capability



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For more information about

*Sensi*BLE

Contact : Milan@diolan.com