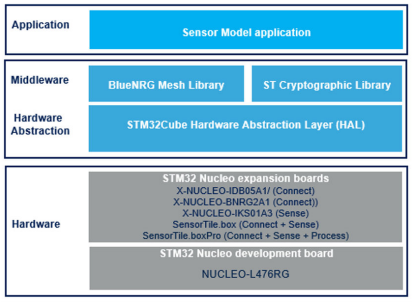
FP-SNS-BLEMESH1

Data brief

STM32Cube function pack for IoT node with BLE Mesh connectivity and sensor model



STM32 Open Development Environment

Features

- Complete software to build Mesh network with Bluetooth low energy (BLE) nodes supporting the BLE Mesh sensor model, defined in BLE Mesh specification V1.0
- Environmental and motion sensors values read by the MCU on the STM32 Nucleo board can be sent to virtual communication port when the board is connected to a computer. The values can be read through the BlueNRG-Mesh Android and iOS app using sensor model.
- Compatible with BLE enabled smartphones to monitor and control multiple BLE nodes, using proxy protocol and legacy BLE GATT connectivity
- Two-layer security, thanks to 128-bit AES CCM encryption and 256-bit ECDH protocol, ensuring protection from multiple attacks, including Replay, Bit-Flipping, Eavesdropping, Man-in-the-Middle and Trashcan
- Sample implementation available on:
  - X-NUCLEO-IDB05A1 board and X-NUCLEO-IKS01A3 connected to a NUCLEO-L476RG development board
  - X-NUCLEO-BNRG2A1 and X-NUCLEO-IKS01A3 connected to a NUCLEO-L476RG development board
  - SensorTile.box
  - SensorTile.box PRO
- Easy portability across different MCU families, thanks to STM32Cube
- Free, user-friendly license terms

Description

FP-SNS-BLEMESH1 is an STM32Cube function pack which lets you connect BLE nodes to a smartphone via BLE, through a suitable Android™ or iOS™ application, to view real-time environmental and motion sensor data using the BLE Mesh sensor model.

The software lets you easily create your own application for extending BLE Mesh networks (by offering a ready-to-use Mesh core library), a complete set of compatible APIs, and a sensor demo application running on the X-NUCLEO-IDB05A1 and X-NUCLEO-IKS01A3 expansion boards connected to a NUCLEO-L476RG development board, on the X-NUCLEO-BNRG2A1 and X-NUCLEO-IKS01A3 connected to a NUCLEO-L476RG development board, and on SensorTile.box and SensorTile.box PRO.

The software runs on the STM32 microcontroller and includes all the necessary drivers to recognize the devices on the STM32 Nucleo development board and expansion boards.

Product summary	
STM32Cube function pack for IoT node with BLE Mesh connectivity and sensor model	FP-SNS-BLEMESH1
Bluetooth low energy expansion boards based on the BlueNRG-M0A/ BlueNRG-M2SP modules for STM32 Nucleo	X-NUCLEO-IDB05A1/X-NUCLEO-BNRG2A1
Motion MEMS and environmental sensor expansion board	X-NUCLEO-IKS01A3
SensorTile.box wireless multi sensor development kit	STEVAL-MKSBOX1V1
SensorTile.box PRO with multi-sensors and wireless connectivity for any intelligent IoT node	STEVAL-MKBOXPRO
STM32 Nucleo-64 development board with STM32L476RG MCU	NUCLEO-L476RG
Applications	Cloud Connectivity Industrial Tools Wireless Connectivity

1 Detailed description

1.1 What can you do with STM32Cube function packs?

STM32Cube function packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards together with STM32Cube and X-CUBE software to create function examples for some of the most common use cases of different application technologies.

These software function packs are designed to exploit the underlying STM32 ODE hardware and software components as much as possible to best satisfy the requirements of final user applications.

Moreover, function packs may include additional libraries and frameworks that are not present in the original X-CUBE packages, thus enabling new functionalities allowing real and usable system for developers.

1.2 What is STM32Cube?

STM32Cube is a combination of a full set of PC software tools and embedded software blocks running on STM32 microcontrollers and microprocessors:

- STM32CubeMX configuration tool for any STM32 device; it generates initialization C code for Cortex-M cores and the Linux device tree source for Cortex-A cores
- STM32CubeIDE integrated development environment based on open-source solutions like Eclipse or the GNU C/C++ toolchain, including compilation reporting features and advanced debug features
- STM32CubeProgrammer programming tool that provides an easy-to-use and efficient environment for reading, writing and verifying devices and external memories via a wide variety of available communication media (JTAG, SWD, UART, USB DFU, I2C, SPI, CAN, etc.)
- STM32CubeMonitor family of tools (STM32CubeMonRF, STM32CubeMonUCPD, STM32CubeMonPwr) to help developers customize their applications in real-time
- STM32Cube MCU and MPU packages specific to each STM32 series with drivers (HAL, low-layer, etc.), middleware, and lots of example code used in a wide variety of real-world use cases
- STM32Cube expansion packages for application-oriented solutions.

1.3 How does this STM32Cube function pack complement STM32Cube?

The proposed software is based on the STM32CubeHAL, the hardware abstraction layer for the STM32 microcontroller. The package extends STM32Cube by providing a BLE Mesh library.

The package also includes a sample sensor model application that the developer can use to start experimenting with the Mesh library code.

BlueNRG-Mesh app lets you provision, un-provision, create groups and view the sensor values of the connected node using the sensor model.

Revision history

Table 1. Document revision history

Date	Version	Changes
09-Jan-2019	1	Initial release.
25-Sep-2019	2	Updated cover page product summary table and description. Updated Section 1.2 What is STM32Cube?.
02-Nov-2020	3	Updated cover page image and product summary table. Added references to X-NUCLEO-IDB05A2, X-NUCLEO-IKS01A3 and Sensortile.box.
01-Sep-2023	4	Updated image in cover page and product summary table. Added reference to SensorTile.box PRO. X-NUCLEO-IDB05A2 changed to X-NUCLEO-IDB05A1.