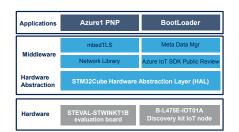# STM32Cube function pack for IoT sensor node with telemetry and device management applications for Microsoft Azure cloud

Applications	Azure1 PNP	BootLoader
Middleware	mbedTLS	Meta Data Mgr
	Network Library	Azure IoT SDK Public Review
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)	
Hardware	STEVAL-STWINKT1B evaluation board	B-L475E-IOT01A Discovery kit IoT node

STM32 Open Development Environment

STM32 Cube

Features

- Complete firmware to safely connect a node with sensors to Microsoft Azure IoT using Wi-Fi communication technology
- A sample application for data telemetry/device management to be connected to Azure IoT Central PnP application
- Middleware libraries featuring Microsoft Azure IoT software development, transport-level security (mbedTLS) and meta-data management
- Ready-to-use binaries to connect the node to Azure IoT Central PnP application for sensor data visualization and device management (FOTA)
- Sample implementations available for STM32L4 Discovery Kit for IoT node (B-L475E-IOT01A) and for STWIN SensorTile Wireless Industrial Node development kit (STEVAL-STWINKT1B)
- Easy portability across different MCU families, thanks to STM32Cube
- Free, user-friendly license terms

Description

FP-CLD-AZURE1 is an STM32Cube function pack which lets you safely connect a B-L475E-IOT01A or STEVAL-STWINKT1B node to Microsoft Azure IoT, transmit sensor data and receive commands from Azure IoT Central PnP.

It fully supports Azure device management primitives and includes a sample implementation for firmware update over the air (FOTA).

The package also contains a sample application for data telemetry/device management and firmware update to be connected to Azure IoT Central PnP application.

This software, together with the suggested combination of STM32 and ST devices, can be used, for example, to develop sensor-to-cloud applications for a broad range of use cases, such as smart home or smart industry.

The software runs on the STM32 microcontroller and includes drivers for the Wi-Fi connectivity, and motion and environmental sensors.

Product summary	
STM32Cube function pack for IoT sensor node with telemetry and device management applications for Microsoft Azure cloud	FP-CLD-AZURE1
STM32L4 Discovery kit IoT node	B-L475E-IOT01A
STWIN SensorTile Wireless Industrial Node development kit and reference design for industrial IoT applications	STEVAL-STWINKT1B
Applications	Cloud Connectivity
	Factory Automation
	Sensing
	Wireless Connectivity

DB2891 - Rev 10 - March 2021
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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?

This software is based on the STM32CubeHAL hardware abstraction layer for the STM32 microcontroller. The package extends STM32Cube by providing a board support package (BSP) for Wi-Fi and sensors.

The package integrates the Azure IoT device SDK middleware with APIs to simplify interaction between B-L475E-IOT01A Discovery Kit for IoT node or STEVAL-STWINKT1B SensorTile Wireless Industrial Node development kit and the Microsoft Azure IoT services.

A web dashboard based on Microsoft Azure is also provided free of charge to facilitate the evaluation of the function pack.

It is possible to use the package with a personal subscription to Azure IoT Central PnP application using the link in the documentation included in the FP-CLD-AZURE1 code.

For Azure license terms, visit https://azure.microsoft.com.

Revision history

Table 1. Document revision history

Date	Version	Changes
23-Mar-2016	1	Initial release.
29-Apr-2016	2	Minor text edits.
13-Dec-2016	3	Updated for v2.0 firmware. Added companion web application information. Added X-NUCLEO-IKS01A2 support information.
22-May-2017	4	Updated all content to reflect v3.0 firmware.
19-Oct-2017	5	Updated all content to reflect v3.2 firmware. Added references to STM32L4 Discovery Kit.
07-May-2018	6	Updated all content to reflect v3.3 firmware version.
09-Jan-2019	7	Updated all content to reflect v4.0 firmware version.
01-Apr-2020	8	Updated cover page image, product summary table, features and description. Updated Section 1.2 What is STM32Cube? and Section 1.3 How does this STM32Cube function pack complement STM32Cube?. Added STEVAL-STWINKT1 wireless industrial node development kit compatibility information.
02-Dec-2020	9	Added STEVAL-STWINKT1B wireless industrial node development kit compatibility information.
11-Mar-2021	10	Updated cover page image, features and description.

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