

## STM32Cube function pack for IoT sensor node with telemetry and device control applications for Amazon AWS Cloud

Applications	FP-CLD-AWS1		
Middleware	AWS IoT SDK	mbedtls	LwIP
	Wi-Fi	Cellular	FreeRTOS
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)		
Hardware	B-L475E-IOT01A Discovery kit IoT node		Cellular expansion board Quectel BG96 Modem
			STM32 Nucleo expansion board X-NUCLEO-IKS01A3 (Sense)
			P-L496G-CELL02 LTE Cellular to Cloud Pack



### Features

- Complete firmware to safely connect an IoT node with sensors to Amazon AWS IoT using Wi-Fi or cellular communication technology
- Middleware libraries featuring the Amazon AWS IoT software development kit, Wi-Fi, cellular and transport-level security (mbedtls)
- Ready-to-use binaries to connect the IoT node to a web dashboard running on Amazon AWS services for sensor data visualization and device control
- Sample implementation available for STM32L4 Discovery Kit for IoT node (B-L475E-IOT01A) or for X-NUCLEO-IKS01A3 sensors expansion board connected to P-L496G-CELL02 LTE Cellular to Cloud Pack
- Easy portability across different MCU families, thanks to STM32Cube
- Free, user-friendly license terms

### Description

FP-CLD-AWS1 STM32Cube function pack lets you safely connect your IoT node to Amazon AWS IoT service, and transmit sensor data and receive commands from AWS-based cloud applications.

It fully supports security and protocol requirements to interface with AWS cloud thanks to the integrated Amazon AWS IoT SDK.

A companion AWS-based web dashboard is available to quickly evaluate the firmware package functions for an easy sensor data visualization and device control.

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, cellular modem and motion and environmental sensors.

Product summary	
STM32Cube function pack for IoT node with Wi-Fi and sensors, connected to Amazon AWS IoT cloud	FP-CLD-AWS1
STM32L4 Discovery kit IoT node	B-L475E-IOT01A
LTE Cellular to Cloud Pack with STM32L496AG MCU	P-L496G-CELL02
Motion MEMS and environmental sensor expansion board for STM32 Nucleo	X-NUCLEO-IKS01A3

## 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 Detailed description

The proposed 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 the Wi-Fi and the sensor expansion boards. The drivers abstract low-level details of the hardware and allow the middleware components and applications to access and control sensor data and Wi-Fi communication interface in a hardware-independent manner.

The package includes the Amazon AWS IoT SDK with APIs for easy interaction of the Discovery Kit for IoT node with Amazon web services (AWS). You can use it to prototype end-to-end IoT applications by registering your board with the AWS IoT cloud platform and easily start to transmit and receive sensor data and commands in real time. A web dashboard based on Amazon AWS is also provided free of charge to facilitate the evaluation of the function pack.

## Revision history

**Table 1. Document revision history**

Date	Version	Changes
27-Mar-2017	1	Initial release.
08-Oct-2018	2	Updated all content to reflect FP-CLD-AWS1 package 2.0.0 release.
01-Mar-2019	3	Updated cover page image, features and product summary table.
30-Jul-2019	4	Added P-L496G-CELL02 and X-NUCLEO-IKS01A3 compatibility information. Updated <a href="#">Section 1.2 What is STM32Cube?</a> .

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to [www.st.com/trademarks](http://www.st.com/trademarks). All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2019 STMicroelectronics – All rights reserved