

# STM32Cube function pack for connecting 6LoWPAN IoT nodes to the Internet through a Wi-Fi Network

Application	FP-NET-6LPWIFI1	
Middleware	6LoWPAN	Wi-Fi
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)	
Hardware	STM32 Nucleo expansion boards X-NUCLEO-IDS01A4/X-NUCLEO-IDS01A5 (Connect) X-NUCLEO-IDW01M1 (Connect)	STM32 Nucleo expansion boards X-NUCLEO-S2868A1 (Connect)
	STM32 Nucleo development board	B-L475E-IOT01A Discovery kit IoT node



## Features

- Complete firmware to connect 6LoWPAN and Wi-Fi networks
- Middleware libraries to support Contiki OS and Contiki 6LoWPAN protocol stack 3.x, MQTT protocol and Wi-Fi connectivity
- Support for mesh networking technology via the standard RPL protocol
- Sample applications to connect a 6LoWPAN network node to a remote server with the OMA Lightweight M2M (LWM2M) protocol or to Watson IoT cloud services provided by IBM
- Sample implementation available for [X-NUCLEO-IDS01A4](#) or [X-NUCLEO-IDS01A5](#) and [X-NUCLEO-IDW01M1](#) boards connected to a [NUCLEO-F401RE](#) board, or an [X-NUCLEO-S2868A1](#) board connected to a [B-L475E-IOT01A](#) Discovery board
- Easy portability across different MCU families, thanks to [STM32Cube](#)
- Free, user-friendly license terms

## Description

[FP-NET-6LPWIFI1](#) is an [STM32Cube](#) function pack which lets you connect your IoT node in a 6LoWPAN wireless sensor network to the Internet via a Wi-Fi network.

The software, together with the suggested combination of STM32 and ST devices, can be used, for example, to develop smart home, building, lighting or remote monitoring applications.

The package contains sample applications to manage the 6LoWPAN devices through the OMA Lightweight M2M (LWM2M) protocol and to connect the devices to the IBM Watson IoT cloud services via the MQTT protocol.

The software runs on the STM32 microcontroller and includes drivers for the Wi-Fi module (SPWF01SA), for the [S2-LP](#) sub-1GHz RF transceiver and [SPIRIT1](#)-based sub-1GHz RF communication modules ([SPSGRF-868](#) or [SPSGRF-915](#)); the software also comes with ready-to-use binary firmware for wireless sensor nodes.

The software is based on STM32Cube technology and expands STM32Cube-based packages.

Product summary	
STM32Cube function pack for connecting 6LoWPAN IoT nodes to the Internet through a Wi-Fi network	<a href="#">FP-NET-6LPWIFI1</a>
Sub-1 GHz RF expansion board based on the <a href="#">SPSGRF-868</a> module for STM32 Nucleo	<a href="#">X-NUCLEO-IDS01A4</a>
Sub-1 GHz RF expansion board based on the <a href="#">SPSGRF-915</a> module for STM32 Nucleo	<a href="#">X-NUCLEO-IDS01A5</a>
Sub-1 GHz 868 MHz RF expansion board based on <a href="#">S2-LP</a> radio for STM32 Nucleo	<a href="#">X-NUCLEO-S2868A1</a>
STM32L4 Discovery kit IoT node	<a href="#">B-L475E-IOT01A</a>

## 1 Detailed description

### 1.1 What can you do with STM32Cube function packs?

The [STM32Cube](#) function packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards, and STM32Cube and X-CUBE software, to create function examples, embodying some of the most common use cases, for each application area.

These software function packs are designed to exploit as much as possible the underlying [STM32 ODE](#) hardware and software components to best fit the requirements of final users' applications.

Moreover, function packs may include additional libraries and frameworks which do not present the original X-CUBE packages, thus enabling new functionalities and creating a real and usable system for developers.

### 1.2 What is STM32Cube?

[STM32Cube™](#) is an STMicroelectronics initiative that helps you reduce development effort, time and cost. STM32Cube covers the STM32 portfolio.

STM32Cube version 1.x includes:

- STM32CubeMX, a graphical software configuration tool that allows the generation of C initialization code using graphical wizards.
- A comprehensive embedded software platform specific to each series (such as the STM32CubeF4 for the STM32F4 series), which includes:
  - the STM32Cube HAL embedded abstraction-layer software, ensuring maximized portability across the STM32 portfolio
  - a consistent set of middleware components such as RTOS, USB, TCP/IP and graphics
  - all embedded software utilities with a full set of examples

### 1.3 How does this software 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 the Wi-Fi and the sub-1GHz RF communication expansion boards.

The drivers abstract low-level details of the hardware and allow the middleware components and applications to access sensor data in a hardware-independent manner to access and control the Wi-Fi module (SPWF01SA), [S2-LP](#) sub-1GHz RF transceiver and [SPIRIT1](#)-based sub-1GHz RF communication modules ([SPSGRF-868](#) or [SPSGRF-915](#)).

The package includes some middleware libraries to support Wi-Fi and 6LoWPAN stacks, along with a sample application accessing sensors and actuators on the 6LoWPAN nodes using standard protocols such as LWM2M and CoAP over UDP, and another sample application to connect the LWM2M devices to the Watson IoT cloud. Developers can use it to prototype end-to-end IoT applications.

## Revision history

**Table 1. Document revision history**

Date	Version	Changes
16-Jun-2016	1	Initial release.
14-Apr-2017	2	Updated cover page features and description.
04-Sep-2017	3	Updated cover page image, features and description.
03-Aug-2018	4	Updated cover image. Added X-NUCLEO-S2868A1 and S2-LP compatibility information.

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