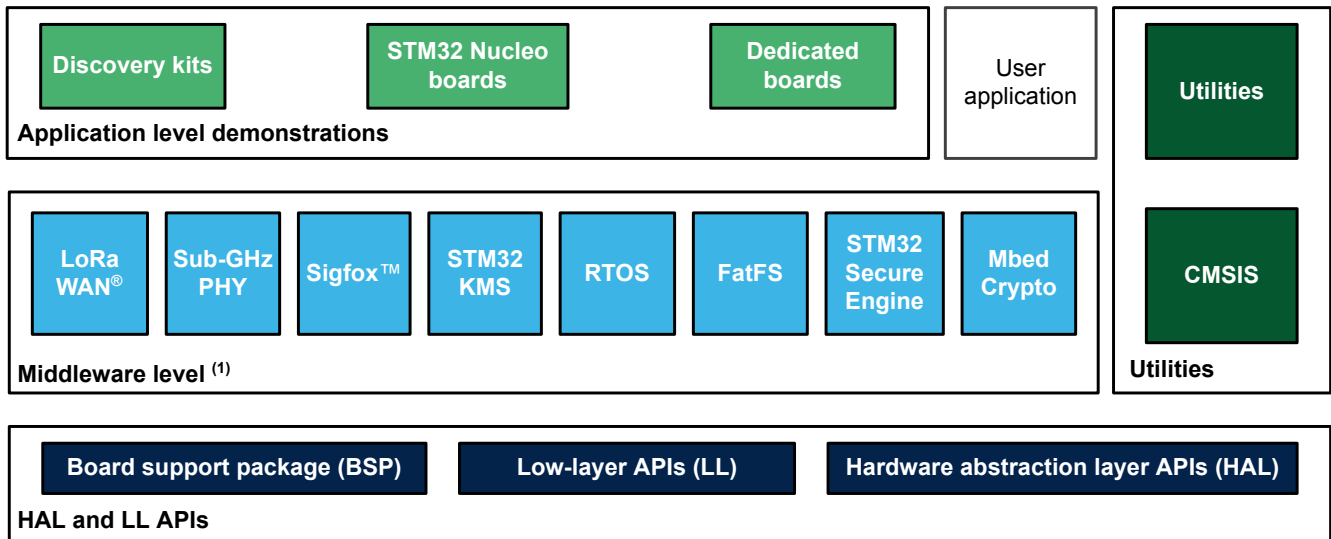


STM32Cube embedded software for STM32WL Series including LL and HAL drivers, LoRaWAN<sup>®</sup> and Sigfox<sup>™</sup> stacks, KMS, STM32 Secure Engine, sub-GHz PHY, FatFS and FreeRTOS<sup>™</sup>



(1) The set of middleware components depends on the product Series.

Product status link

[STM32CubeWL](#)



## Features

- Consistent and complete embedded software offer that frees the user from dependency issues
- Maximized portability between all STM32 series supported by [STM32Cube](#)
- Application and peripheral examples for easy understanding
- High-quality hardware abstraction layer (HAL) using CodeSonar<sup>®</sup> static analysis tool and compliant with MISRA C<sup>®</sup>:2012
- High-quality low-layer APIs (LL) using CodeSonar<sup>®</sup> static analysis tool and compliant with MISRA C<sup>®</sup>:2012
- FreeRTOS<sup>™</sup>, FatFS, mbed Crypto
- STM32WL-specific middleware components: LoRaWAN<sup>®</sup> and Sigfox<sup>™</sup> stacks, sub-GHz physical layer
- Security middleware components: STM32 Secure Engine, STM32 key management services (KMS)
- Free-of-charge, user-friendly license terms
- Automatic update mechanism with new release notification through [STM32CubeMX](#) updater feature

## 1 Description

STM32Cube is an STMicroelectronics original initiative to significantly improve developer productivity by reducing development effort, time and cost. STM32Cube covers the whole STM32 portfolio.

STM32Cube includes STM32CubeMX, a graphical software configuration tool for pinout and clock tree.

It also comprises the STM32CubeWL MCU Package composed of the STM32Cube hardware abstraction layer (HAL) and the low-layer (LL) APIs, plus a consistent set of middleware components such as FatFS, STM32 Secure Engine, KMS, mbed Crypto and FreeRTOS™, plus LoRaWAN® and Sigfox™ stacks, and sub-GHz PHY connectivity services. All embedded software components are delivered with a full set of examples running on STMicroelectronics boards.

The STM32Cube HAL is an STM32 embedded software layer that ensures maximized portability across the STM32 portfolio, while the LL APIs make up a fast, light-weight, expert-oriented layer which is closer to the hardware than the HAL. HAL and LL APIs can be used simultaneously with a few restrictions.

Both the HAL and LL APIs are production-ready and have been developed in compliance with CodeSonar®, MISRA C®:2012 guidelines and ISO/TS 16949. Furthermore, STMicroelectronics specific validation processes add a deeper-level qualification.

STM32CubeWL gathers in one single package all the generic embedded software components required to develop an application on STM32WL Series microcontrollers. Following STM32Cube initiative, this set of components is highly portable, not only within the STM32WL Series but also to other STM32 Series. In addition, the low-layer APIs provide an alternative, high-performance, low-footprint solution to the STM32CubeWL HAL at the cost of portability and simplicity.

HAL and LL APIs are available in open-source BSD license for user convenience.

## 2 License

STM32CubeWL is delivered under the *Mix Ultimate Liberty+OSS+3rd-party V1* software license agreement (SLA0048).

The software components provided in this package come with different license schemes as shown in Table 1.

A set of application projects implementing all the middleware components is also provided in the STM32CubeWL MCU Package.

**Table 1. Software component license agreements**

Software component	Owner	License
BSP board drivers	STMicroelectronics	BSD-3-Clause
BSP component drivers	STMicroelectronics	BSD-3-Clause
Cortex®-M CMSIS Core	Arm Limited	Apache License 2.0
Cortex®-M CMSIS Device	STMicroelectronics	Apache License 2.0
STM32WL HAL/LL APIs	STMicroelectronics	BSD-3-Clause
FatFS	ChaN, STMicroelectronics	BSD-3-Clause
FreeRTOS™	Copyright (C) 2017 Amazon.com, Inc. or its affiliates	The MIT License
Sub-GHz physical layer middleware	STMicroelectronics	BSD-3-Clause
LoRaWAN®	Semtech, STMicroelectronics	BSD-3-Clause
Application projects	STMicroelectronics	Proprietary
Example projects	STMicroelectronics	BSD-3-Clause
Utilities	STMicroelectronics	BSD-3-Clause
STM32 KMS	STMicroelectronics	Proprietary
Sigfox™	STMicroelectronics and Sigfox	Proprietary Sigfox specific terms
mbed Crypto	Arm Limited	Apache License 2.0
STM32 Secure Engine	STMicroelectronics	Proprietary

*Note:* Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.

## Revision history

**Table 2. Document revision history**

Date	Version	Changes
11-Oct-2019	1	Initial release.
19-Dec-2019	2	Changed classification to public. Removed support for Sigfox, STM32 key management services (KMS) and mbedTLS. Updated <a href="#">Section 2 License</a> .
04-Nov-2020	3	Reintroduced Sigfox™, STM32 key management services (KMS), and added SBFSU and MbedCrypto.

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