#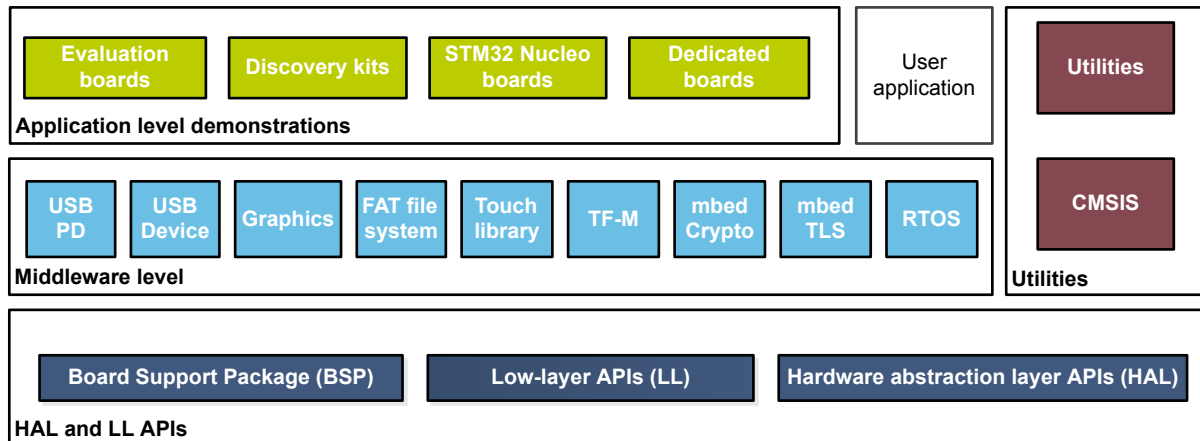 STM32Cube embedded software for STM32L5 Series including LL and HAL drivers, USB, TLS, Crypto, touch library, FatFS, RTOS and TF-M

Application level demonstrations				User application		Utilities	
Evaluation boards	Discovery kits	STM32 Nucleo boards	Dedicated boards			Utilities	
Middleware level						CMSIS	
USB PD	USB Device	Graphics	FAT file system	Touch library	TF-M	mbed Crypto	mbed TLS	RTOS
HAL and LL APIs						**Utilities**	
Board Support Package (BSP)		Low-layer APIs (LL)		Hardware abstraction layer APIs (HAL)			

Features

- Consistent and complete embedded software that provides hardware abstraction to easily develop end-user firmware
- Maximized portability between all STM32 series supported by STM32Cube
- More than 300 examples and applications for easy understanding, all compatible with STM32CubeMX to facilitate the configuration through a graphical tool.
- Production–ready HAL and LL API drivers, checked with CodeSonar® static analysis tool and developed in compliance with MISRA C® guidelines and ISO/TS 16949 standard for automotive quality management
- CMSIS CORE, DSP and RTOS software components
- STM32L5 dedicated middleware including USB Device, USB Power Delivery, mbedTLS, mbed Crypto, touch library, FAT file system, RTOS and TF-M
- Free-of-charge, user-friendly license terms
- Update mechanism with new-release notification capability

DB4026 - Rev 2 - January 2020
For further information contact your local STMicroelectronics sales office.

www.st.com

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 that allows the generation of C initialization code using graphical wizards.

It also comprises the STM32CubeL5 MCU Package composed of the STM32Cube hardware abstraction layer (HAL) and the low-layer (LL) APIs, plus a consistent set of middleware components (USB Device, USB Power Delivery, mbedTLS, mbed Crypto, touch library, FAT file system, RTOS and TF-M). All embedded software utilities 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. Reports are available on demand.

STM32CubeL5 gathers in one single package all the generic embedded software components required to develop an application on STM32L5 microcontrollers. Following STM32Cube initiative, this set of components is highly portable to other STM32 Series. In addition, the low-layer APIs provide an alternative, high-performance, low-footprint solution to the STM32CubeL5 HAL at the cost of portability and simplicity.

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

STM32L5 devices support Arm® PSA security model. A Trusted Firmware M (TF-M) reference code is provided within STM32Cube to implement the following security functions: Secure Boot, Secure Firmware Update, secure storage, resource isolation, secure execution, cryptographic engine and software IP protection.

2   License

STM32CubeL5 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. Software component license agreements.

A set of application projects implementing all the middleware components is also provided in the STM32CubeL5 MCU Package.

Table 1. Software component license agreements

Software component	Owner	License
Cortex®-M CMSIS v5.4.0	Arm Limited	Apache License 2.0
STM32L5 HAL/LL APIs	STMicroelectronics	BSD-3-Clause
Board Support Package (BSP)	STMicroelectronics	BSD-3-Clause
Utilities (Fonts)	STMicroelectronics	BSD-3-Clause
USB Device library	STMicroelectronics	Ultimate Liberty (SLA0044)
USB Power Delivery Core library	STMicroelectronics	Ultimate Liberty (SLA0044)
Touch sensing library	STMicroelectronics	Ultimate Liberty (SLA0044)
FatFS	Portions ST	Ultimate Liberty (SLA0044)
	Portion ChaN	FatFS License[1]
FreeRTOS™	Copyright (C) 2017 Amazon.com, Inc. or its affiliates	The MIT License
TF-M	Arm Limited	BSD-3-Clause
mbedTLS	Arm Limited	Apache License 2.0
mbed-crypto	Arm Limited	BSD-3-Clause
Application projects	STMicroelectronics	Ultimate Liberty (SLA0044)
Example projects	STMicroelectronics	BSD-3-Clause
Demonstration projects	STMicroelectronics	Ultimate Liberty (SLA0044)

1.   *The FatFS License is a business friendly and permissive open source license.*

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

arm

3   Ordering information

The STM32CubeL5 is available for free download from *www.st.com*.

Revision history

Table 2. Document revision history

Date	Version	Changes
16-Dec-2019	1	Initial release.
09-Jan-2020	2	Changed document classiication to public.

IMPORTANT NOTICE – PLEASE READ CAREFULLY