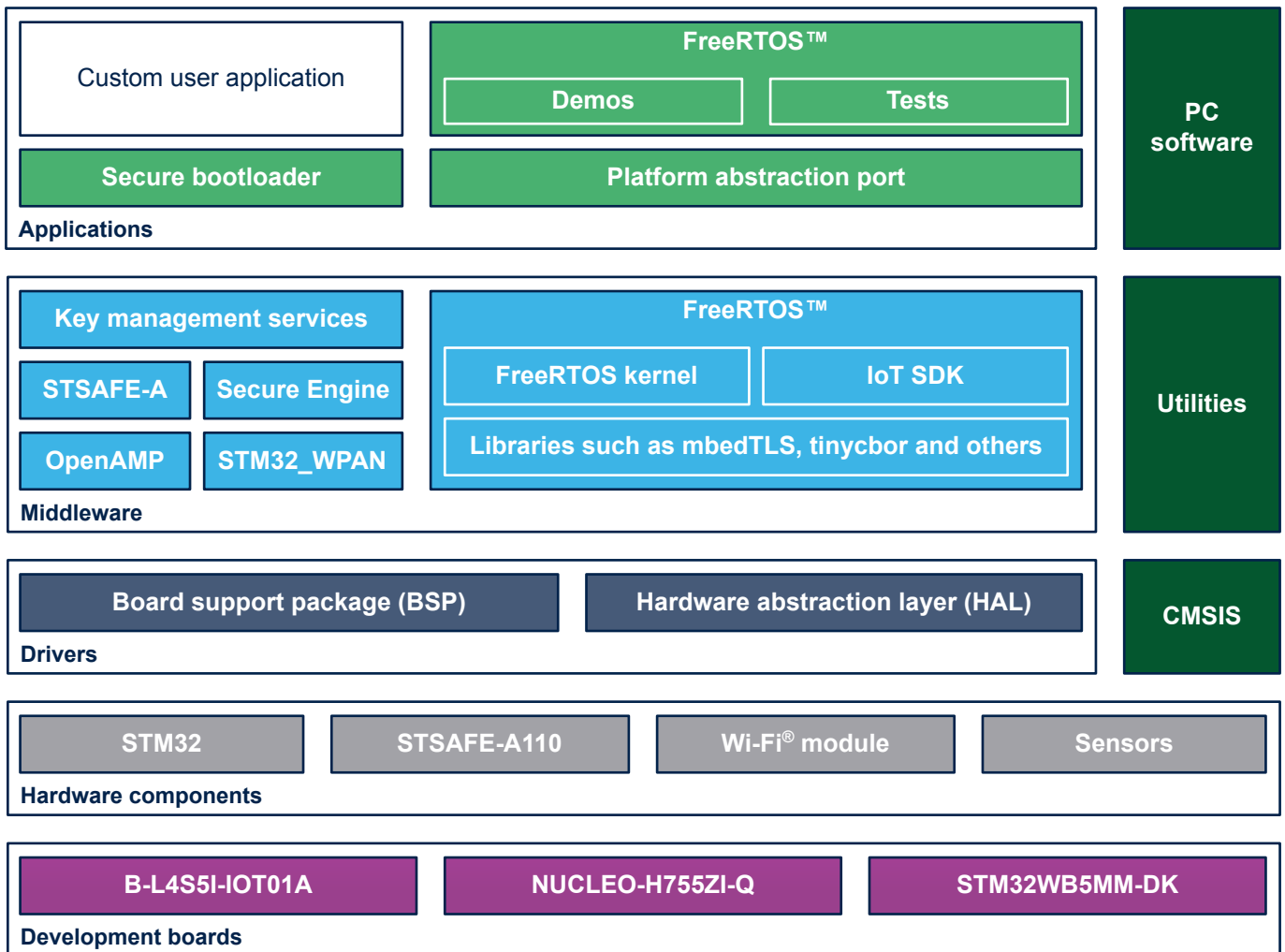


STM32 Amazon Web Services® IoT software expansion for STM32Cube



Product status link

[X-CUBE-AWS](#)



Features

- FreeRTOS™ port to the B-L4S5I-IOT01A, NUCLEO-H755ZI-Q and STM32WB5MM-DK boards
- Wi-Fi®
- Ethernet
- Bluetooth® Low Energy
- Hardware Secure Element
- Secure Boot and Secure Firmware Update
- TLS encryption
- Dual-core application example
- AWS IoT Core™ Multi-Account Registration
- AWS IoT Core™ connection, subscribe and publish, jobs
- AWS IoT Core™ over-the-air firmware update

Description

The X-CUBE-AWS Expansion Package consists of a set of libraries and application examples for STM32L4 Series, STM32H7 Series and STM32WB Series microcontrollers acting as end devices.

X-CUBE-AWS provides a port of FreeRTOS™ to the supported boards (refer to the *User Guide* and *FreeRTOS Qualification Guide* sections on the AWS website at docs.aws.amazon.com/freertos for details). It optionally offloads – wherever available – the security-critical operations to the on-board STSAFE-A110 Secure Element during the MCU boot process, during the TLS device authentication towards the AWS IoT Core™ server, and during the verification of the over-the-air (OTA) update firmware image integrity and authenticity. In such a case, it leverages the Secure Element provisioned certificate with the AWS IoT Core *Multi-Account Registration* feature. B-L4S5I-IOT01A has passed the FreeRTOS™ qualification process.

X-CUBE-AWS runs on the B-L4S5I-IOT01A Discovery kit, which supports Wi-Fi® connectivity with an on-board Inventek module, and features an STSAFE-A110 Secure Element.

X-CUBE-AWS runs also on the NUCLEO-H755ZI-Q STM32 Nucleo-144 board, which supports Ethernet connectivity and dual-core computing.

X-CUBE-AWS runs as well on the STM32WB5MM-DK Discovery kit, which supports Bluetooth® Low Energy connectivity. In this case, a smartphone with Bluetooth® Low Energy connectivity is required as a gateway between the board and AWS cloud.

Both the *aws_demos* and *aws_tests* reference applications of FreeRTOS™ are provided. *aws_demos* is configured to illustrate the usage of the FreeRTOS™ *OTA Update Manager* service. *aws_tests* is the test application of the *AWS Qualification Program for FreeRTOS™*. It is provided as a possible comparison point for the users who plan to get their product go through the qualification process.

The Secure Boot and Secure Firmware Update implementations are based on a bootloader derived from the X-CUBE-SBSFU Expansion Package.

1 General information

The X-CUBE-AWS Expansion Package runs on STM32 microcontrollers based on Arm® cores.

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



1.1 Ordering information

X-CUBE-AWS is available for free download from the www.st.com website.

1.2 What is STM32Cube?

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

STM32Cube includes:

- A set of user-friendly software development tools to cover project development from conception to realization, among which are:
 - STM32CubeMX, a graphical software configuration tool that allows the automatic generation of C initialization code using graphical wizards
 - STM32CubeIDE, an all-in-one development tool with peripheral configuration, code generation, code compilation, and debug features
 - STM32CubeProgrammer (STM32CubeProg), a programming tool available in graphical and command-line versions
 - STM32CubeMonitor (STM32CubeMonitor, STM32CubeMonPwr, STM32CubeMonRF, STM32CubeMonUCPD) powerful monitoring tools to fine-tune the behavior and performance of STM32 applications in real-time
- STM32Cube MCU and MPU Packages, comprehensive embedded-software platforms specific to each microcontroller and microprocessor series (such as STM32CubeL4 for the STM32L4 Series), which include:
 - STM32Cube hardware abstraction layer (HAL), ensuring maximized portability across the STM32 portfolio
 - STM32Cube low-layer APIs, ensuring the best performance and footprints with a high degree of user control over hardware
 - A consistent set of middleware components such as FAT file system, RTOS, USB Host and Device, TCP/IP, Touch library, and Graphics
 - All embedded software utilities with full sets of peripheral and applicative examples
- STM32Cube Expansion Packages, which contain embedded software components that complement the functionalities of the STM32Cube MCU and MPU Packages with:
 - Middleware extensions and applicative layers
 - Examples running on some specific STMicroelectronics development boards

2 License

X-CUBE-AWS 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.

Table 1. Software component license agreements

Software component	Copyright	License
Board support package (BSP)	STMicroelectronics	BSD-3-Clause
Cortex [®] -M CMSIS	Arm Limited	Apache License 2.0
FreeRTOS [™]	Amazon.com, Inc. or its affiliates	MIT, BSD-2-Clause
FreeRTOS kernel	Amazon.com, Inc. or its affiliates	MIT
FreeRTOS third-party libraries	Miscellaneous	MIT Apache License 2.0 BSD-2-Clause
Trace Recorder Library	Percepio AB SEGGER Microcontroller GmbH & Co. KG	Percepio ⁽¹⁾ Segger ⁽²⁾
HAL STM32 H7	STMicroelectronics	BSD-3-Clause
HAL STM32 L4	STMicroelectronics	BSD-3-Clause
HAL STM32 WB	STMicroelectronics	BSD-3-Clause
Inventek driver	STMicroelectronics	BSD-3-Clause
mbedTLS	Arm Limited	Apache License 2.0
mbed-crypto	Arm Limited	Apache License 2.0
OpenAMP	Mentor Graphics Corporation Xilinx, Inc. Freescale Semiconductor, Inc.	BSD-3-Clause, BSD-2-Clause
STM32_Secure_Engine	STMicroelectronics	Proprietary
STM32_Key_Management_Services	STMicroelectronics	Proprietary
STSAFE_A1xx middleware	STMicroelectronics	SLA0088
STM32_WPAN	STMicroelectronics	Proprietary
Project examples	STMicroelectronics	Proprietary

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2. Refer to *SEGGER terms of use*.

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Revision history

Table 2. Document revision history

Date	Revision	Changes
29-Mar-2017	1	Initial release.
16-Oct-2017	2	Updated B-L475E-IOT01 item in <i>Features</i> . Updated <i>Description</i> . Updated <i>License</i> .
2-Jul-2019	3	Updated the entire document for the addition of AWS job support, dedicated online dashboard, cellular connectivity, and Secure Boot and Secure Firmware Update. Added <i>What is STM32Cube?</i>
13-Jul-2020	4	Scope changed to the FreeRTOS™ port on B-L4S5I-IOT01A: updated the cover page, <i>Features</i> , <i>Description</i> and <i>License</i> .
24-Sep-2020	5	Updated the figure on the cover page.
19-Apr-2021	6	Added the NUCLEO-H755ZI-Q target: updated <i>Features</i> , <i>Description</i> , <i>License</i> , and the cover picture.
7-Jun-2021	7	Added the STM32WB5MM-DK target: updated <i>Features</i> , <i>Description</i> , <i>License</i> and the cover picture.

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