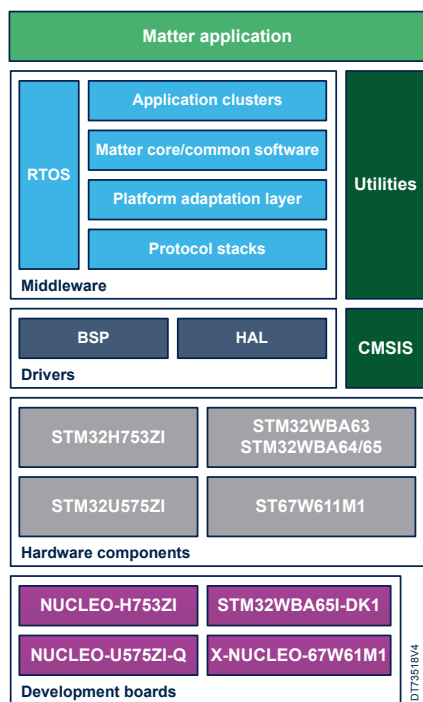


Matter software expansion for STM32Cube



| Product status |
|----------------|
| X-CUBE-MATTER |



Features

- Integration of Matter on compatible STM32 microcontrollers with examples of application for end-device and bridge Matter accessories
- Support for Matter SDK 1.4.2
- Support for Bluetooth® LE protocol stack for device commissioning
- Support for the Thread operational network
- Support for the Wi-Fi® operational network
- Support for Ethernet as the bridge link to the access point or router
- Certified Bluetooth® LE protocol stack
- Precertified Thread 1.3 protocol stack
- Certified Wi-Fi® protocol stack
- Support for the LwIP TCP/IP protocol stack
- Concurrent operational mode with Thread and Bluetooth® LE
- Concurrent operational mode with Wi-Fi® and Bluetooth® LE
- FreeRTOS™ kernel
- Ready for CSA certification
- Support for on-demand provisioning service to install factory data including device attestation certificate (DAC)
 - During Matter device manufacturing
 - On the field
- Low power capable
- Security component (cryptographic library)
- Secure Boot and Secure Firmware Update over-the-air (OTA)
- Secure OTA with OEMiROT using internal and external flash memory on STM32WBA6xxx wireless microcontrollers
- Secure storage with Arm® TrustZone® enabled and TFM on STM32WBA6xxx wireless microcontrollers
- Drivers and libraries
- Project binary files provided for immediate demonstration

Description

The X-CUBE-MATTER Expansion Package features Matter support preintegrated on compatible STM32 microcontrollers. It is a reference implementation for the demonstration of Matter on STM32. It is ready for prototyping a Matter end-device or Matter bridge on a reference development platform. Refer to STMicroelectronics Matter wiki articles at wiki.st.com/stm32mcu for the supported STM32 platforms. X-CUBE-MATTER is Matter precertified with the default dimmable light device type. However, it also provides other device types.

The Matter application project stores the device credentials and keys in the STM32 embedded flash memory, or in an external flash memory for which X-CUBE-MATTER provides a driver. Once provisioned, the security-sensitive data and operations remain in a secure partition, where they are not exposed to the user application. The Secure Boot process acts as a Root of Trust for the application before launching it. It takes care of the Secure Firmware Update once the user application has downloaded a new image.

The X-CUBE-MATTER Expansion Package embeds different sorts of open-source components:

- Matter SDK from the CSA
- Some other third-party components selected by STMicroelectronics (such as FreeRTOS™ kernel, Mbed TLS, and LwIP) are reintegrated
- Some components implemented by STMicroelectronics (such as the Bluetooth® LE, OpenThread, and Wi-Fi® platform adaptation layers)

The OpenThread, Bluetooth® LE, and Wi-Fi® stacks can be located on the application microcontroller in the case of a chipset solution. They can also be located on the coprocessor dedicated to the wireless stack. Refer to STMicroelectronics Matter wiki articles at wiki.st.com/stm32mcu for the software partitioning of each target platform.

The delivered application examples are part of the project. They are available as precompiled binaries for an out-of-the-box experience. The source codes are also available. They can be compiled with the supported IDEs. Refer to the wiki site for the detailed list of supported applications.

1 General information

- The STM32H753xL microcontrollers are based on the Arm® Cortex®-M7 processor.
- The STM32U575xx microcontrollers are based on the Arm® Cortex®-M33 processor with Arm® TrustZone®.
- The STM32WBA microcontrollers are based on the Arm® Cortex®-M33 processor with Arm® TrustZone®.

Note: Arm and TrustZone are registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



1.1 Ordering information

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

1.2 What is STM32Cube?

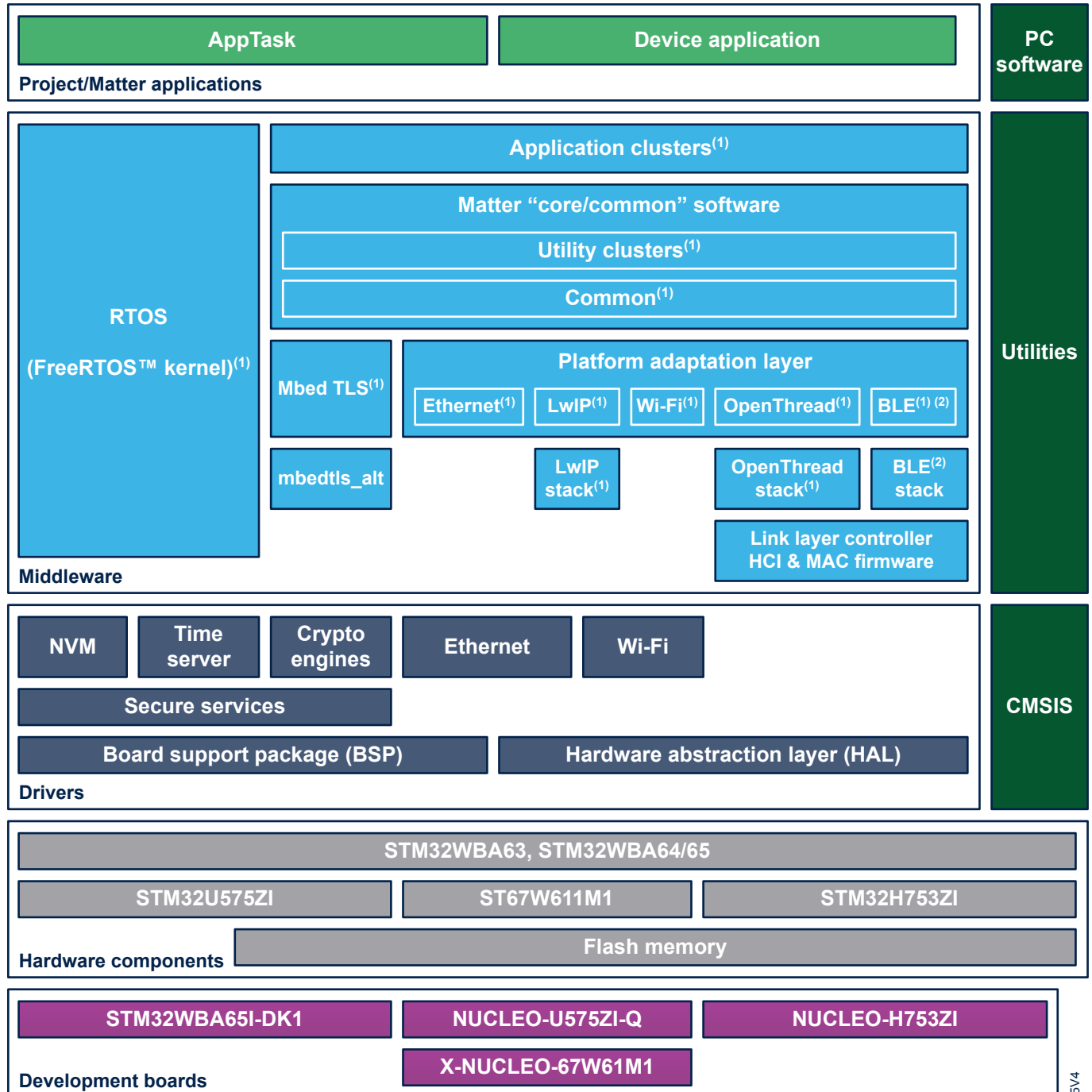
STM32Cube is an STMicroelectronics original initiative to improve designer productivity significantly by reducing development effort, time, and cost. STM32Cube covers the whole STM32 portfolio.

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 Eclipse®-based IDE, providing code edition, compilation, programming, and debugging capabilities
 - STM32CubeCLT, an all-in-one command-line development toolset with code compilation, board programming, and debug features
 - STM32CubeIDE for Visual Studio Code (STM32VSCode), a complete IDE based on VS Code® platform
 - 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
 - STM32CubeWiSE (STM32CubeWiSEcg, STM32CubeWiSEre), graphical tools designed to evaluate and test the capabilities of sub-GHz radios and protocols
- STM32Cube MCU and MPU Packages, comprehensive embedded-software platforms specific to each microcontroller and microprocessor series (such as STM32CubeWBA for the STM32WBA 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 ThreadX, FileX, LevelX, NetX Duo, FreeRTOS™, USBX, touch library, mbed-crypto, TFM, MCUboot, OpenBL, and STM32_WPAN (including Bluetooth® LE profiles and services, Mesh, Zigbee®, OpenThread, Matter, and 802.15.4 MAC layer)
 - 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 Software architecture

Figure 1. X-CUBE-MATTER architecture view



(1) Open-source component.

(2) BLE stands for Bluetooth® LE.

Note: For the STM32U575ZI device, the Wi-Fi® stack and Bluetooth® LE stack run in a dedicated coprocessor (the ST67W611M1 network coprocessor module). The X-NUCLEO-67W61M1 is only used by the NUCLEO-U575ZI-Q.

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3 License

X-CUBE-MATTER is delivered under the [SLA0048](#) software license agreement and its Additional License Terms.

Acknowledgments

- Matter is a protocol of the Connectivity Standards Alliance.
- Thread is a protocol of the Thread Group Alliance.
- Wi-Fi® is a protocol of the Wi-Fi Alliance.
- The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc.



matter

THREAD



 **Bluetooth®**

Revision history

Table 1. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 14-Feb-2024 | 1 | Initial release. |
| 20-Mar-2025 | 2 | Extended the supported platforms to STM32WBA65I-DK1: <ul style="list-style-type: none"> Updated the cover picture Updated <i>Features</i> and <i>Description</i> Updated <i>General information</i>, <i>Ordering information</i>, and <i>What is STM32Cube?</i> Updated <i>X-CUBE-MATTER architecture view</i> Updated <i>License</i> |
| 20-May-2025 | 3 | Added Ethernet support for Matter bridge and NUCLEO-H753ZI platform support, updated secure OTA features, and extended compatible hardware components: <ul style="list-style-type: none"> Updated the cover picture Updated <i>Features</i> and <i>Description</i> Updated <i>General information</i> Updated <i>X-CUBE-MATTER architecture view</i> |
| 04-Dec-2025 | 4 | Added Wi-Fi® support with the ST67W611M1 network coprocessor and extended compatible hardware platforms accordingly. Removed the support for STM32WB55xx and STM32WB5MMG devices: <ul style="list-style-type: none"> Updated the cover picture Updated Features and Description Updated General information and License Updated <i>X-CUBE-MATTER architecture view</i> |

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