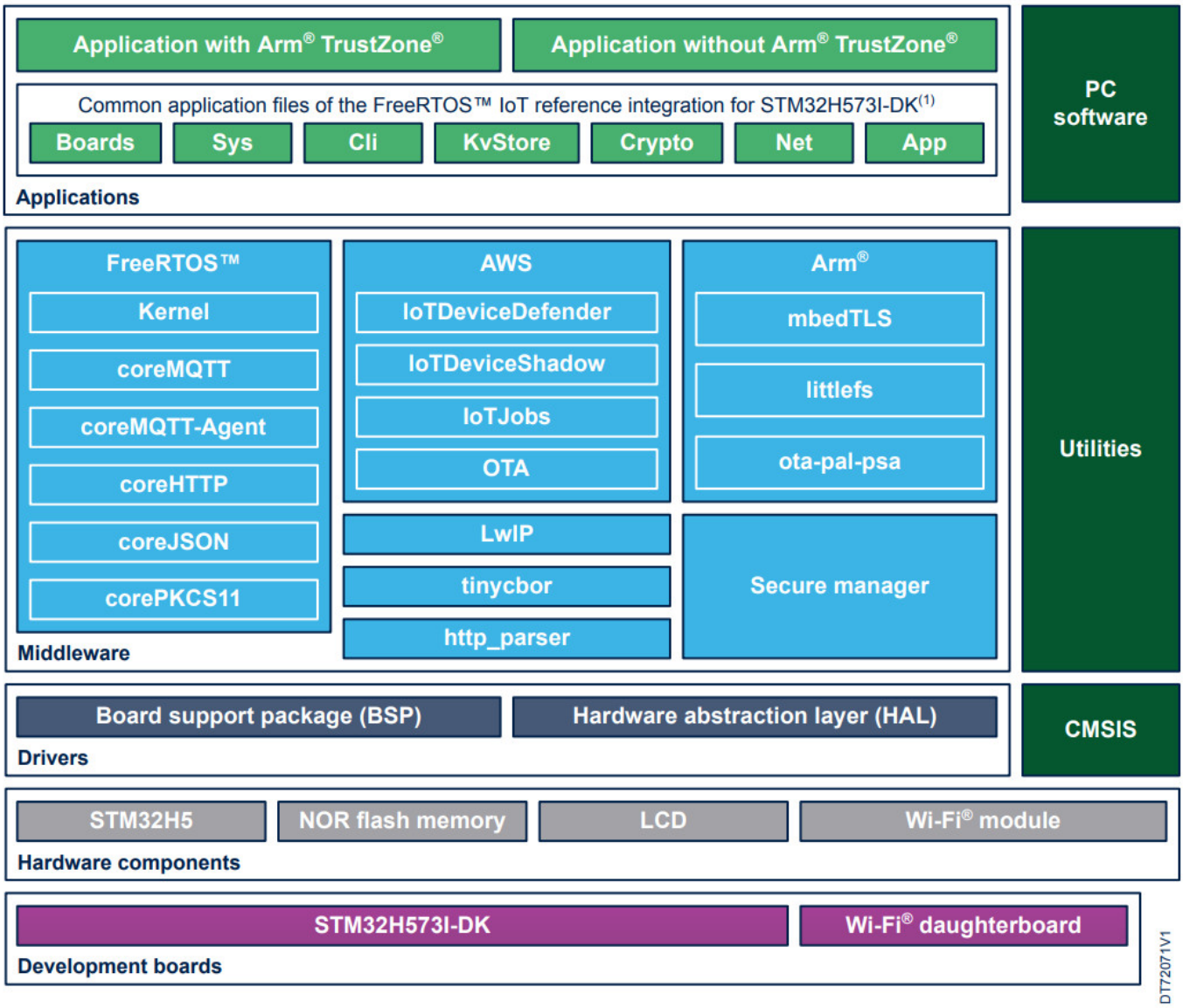
Manuals+ — User Manuals Simplified.

STM32H5 Amazon Web Services IoT Software User Guide

X-CUBE-AWS-H5
Data brief
STM32H5 Amazon Web Services®
IoT software expansion for STM32Cube

Contents

STM32H5 Amazon Web Services IoT Software



(1) Files common to the FreeRTOS™ IoT reference integration for B-U585I-IOT02A in the X-CUBE-AWS Expansion Package with STM32U5.

Product status link
X-CUBE-AWS-H5

Features

- Ready-to-run firmware example using Ethernet or Wi-Fi® connectivity to support the quick evaluation and development of Amazon Web Services® cloud-connected applications based on STM32H5 series microcontrollers
- Amazon Free RTOS™ IoT reference integration for the STM32H573I-DK Discovery kit
- Ethernet
- Wi-Fi® MXCHIP EMW3080B module over SPI through the STMod + connector of the Discovery kit

- Configurable TCP/IP stack
- TLS encryption
- Firmware update
- AWS IoT Core™ multi-account registration
- AWS IoT Core™ just-in-time registration
- AWS IoT Core™ connection, device shadow, jobs, defender
- AWS IoT Core™ OTA firmware update
- Telemetry
- Command-line interface:
  – Device provisioning
  – Configuration saving to NVM
  – Monitoring of the Free RTOS™ kernel tasks and their memory usage
- Easy step-in project, without Arm® Trust Zone®
- STMicroelectronics secure manager enabled project:
  – Arm® Trust Zone®
  – Secure boot
  – Unique device authentication initially provisioned by STMicroelectronics at manufacturing time: device key pair and X.509 certificate
  – Secure storage of private key and user secrets
  – Sensitive operations executed in an isolated environment

Description

The X-CUBE-AWS-H5 Expansion Package consists of an adaptation of the Amazon Free RTOS™ STM32U5 IoT reference integration ported to an STM32H573I-DK Discovery kit as an end device.
X-CUBE-AWS-H5 proposes four projects that expose the same functionalities to the user: telemetry, shadows, device defender, jobs, and over-the-air firmware update. The telemetry data consists in the count of the IP packets going in and out of the network interface.
The easy step-in projects, aws_eth and aws_ri (no-Trust Zone®), save the device credentials and settings in the external NOR flash memory of the STM32H573I-DK Discovery kit. They provide Ethernet and Wi-Fi® connectivity, respectively.
The reference projects, aws_eth_tz aws_ri_tz (Arm®
Trust Zone® and STMicroelectronics secure manager), keep the device credentials and settings encrypted in the MCU secure storage. 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 a new image has been downloaded by the user application. In addition, at MCU manufacturing time, STMicroelectronics provisions a unique identity in the chip. It consists of an ECDSA key pair and an X.509 certificate signed by STMicroelectronics. This project uses this certificate for connecting to AWS IoT Core™.
Before running aws_eth_tz or aws_ri_tz, the user must install the secure manager on the STM32H573I-DK target. The secure manager access kit is available as X-CUBE-SEC-M-H5 from the STM32TRUSTEE-SM STMicroelectronics secure manager web page.
The STM32H573I-DK Discovery kit, which natively supports Ethernet connectivity, targets both the AWS IoT Core™ and the™ Free RTOS qualification.

General information

The X-CUBE-AWS-H5 Expansion Package is demonstrated on an STM32H5 32-bit microcontroller based on the Arm® Cortex® -M33 processor with Arm® Trust Zone®.
Note:

Arm and Trust Zone are registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere.

1.1 Ordering information

X-CUBE-AWS-H5 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 all-in-one development tool with peripheral configuration, code generation, code compilation, and debug features

  – STM32CubeCLT, an all-in-one command-line development toolset with code compilation, board programming, 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 STM32CubeH5 for the STM32H5 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, USBX, USB-PD, mbed-crypto, secure manager API, MCUboot, and OpenBL

  – 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:

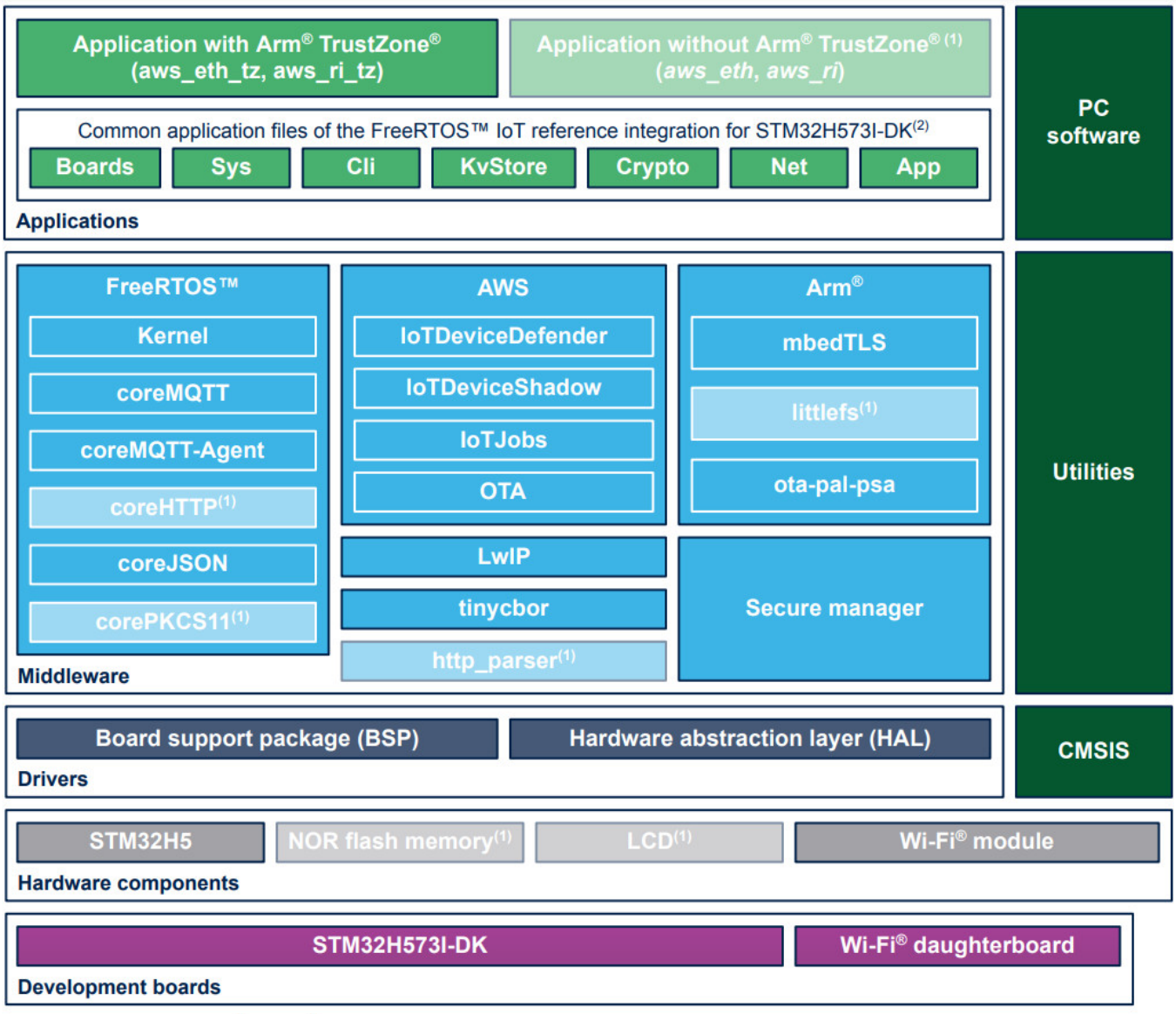
  – Middleware extensions and applicative layers

  – Examples running on some specific STMicroelectronics development boards

Software architecture examples

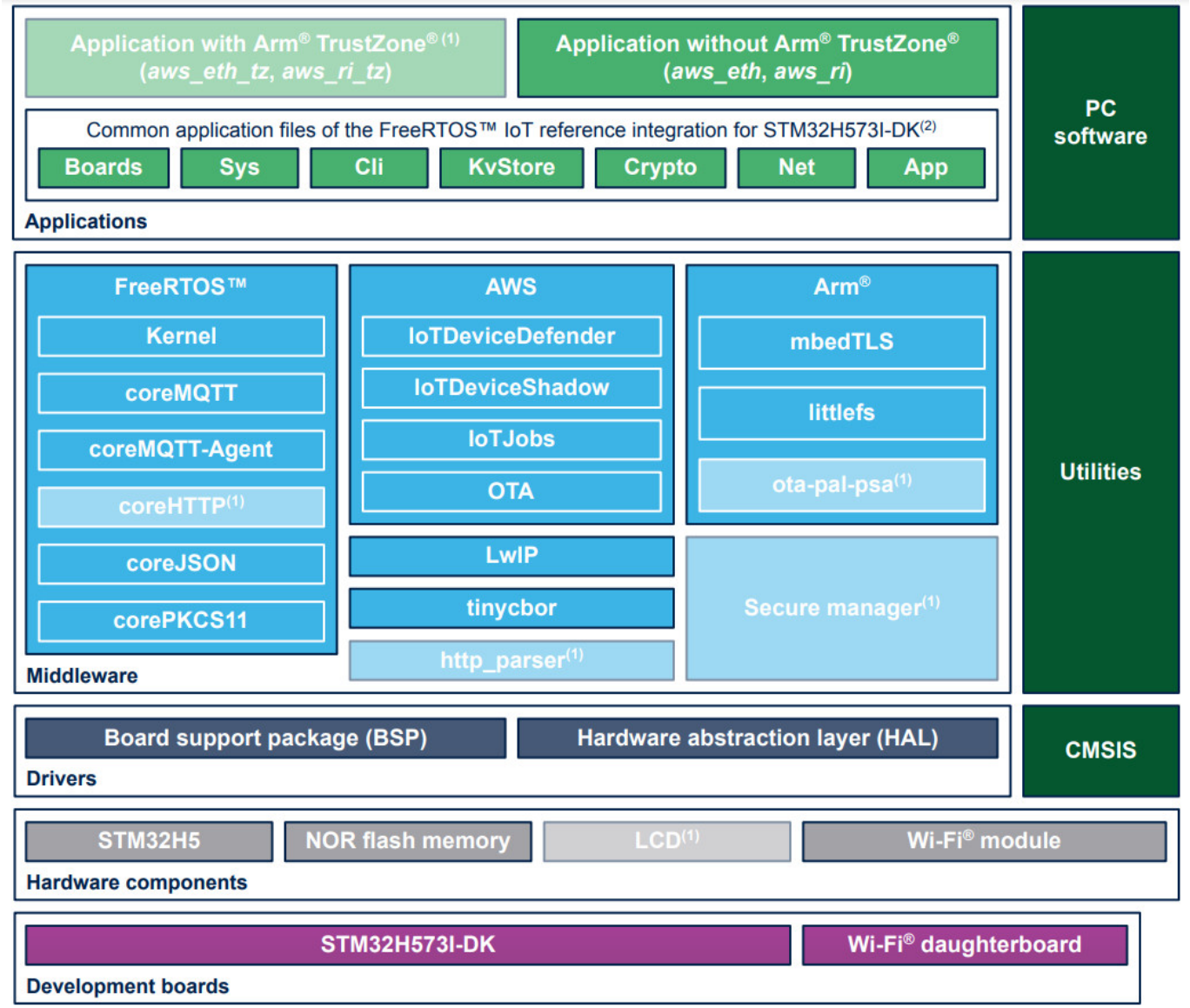
Figure 1 presents the active software blocks for the application examples that are using Arm® Trust Zone®. The other blocks are grayed out.

Figure 1. Application examples using Arm® Trust Zone®



1. Not used in the examples with Arm® Trust Zone®
2. Files common to the Free RTOS™ IoT reference integration for B-U585I-IOT02A in the X-CUBE-AWS Expansion Package with STM32U5.

Figure 2 presents the active software blocks for the application examples that are not using Arm®.
The other blocks are grayed out.
Trust Zone®
Figure 2. Application examples not using Arm® Trust Zone®



License

X-CUBE-AWS-H5 is delivered under the SLA0048 software license agreement and its Additional License Terms.

Revision history

Table 1. Document revision history

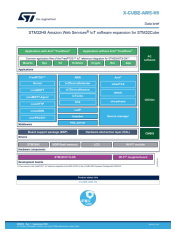
Date	Revision	Changes
4-Sep-23	1	Initial release.

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgment.
Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers’ products.
No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.
ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.
Information in this document supersedes and replaces information previously supplied in any prior versions of this document.
© 2023 STMicroelectronics – All rights reserved

Documents / Resources

	ST STM32H5 Amazon Web Services IoT Software [pdf] User Guide STM32H5 Amazon Web Services IoT Software, STM32H5, Amazon Web Services IoT Softwar e, Web Services IoT Software, Services IoT Software, IoT Software, Software

References

- STMicroelectronics: Our technology starts with you
- STMicroelectronics Trademark List - STMicroelectronics
- STMicroelectronics: Our technology starts with you
- STM32Cube Expansion Packages - STMicroelectronics
- STM32Cube MCU & MPU Packages - STMicroelectronics
- STM32H5 Series - STMicroelectronics
- STM32CubeCLT - STM32CubeCLT is a toolset for third-party integrated development environment (IDE) providers, allowing the use of STMicroelectronics proprietary tools within their own IDE frameworks. - STMicroelectronics
- STM32CubeMonitor - Monitoring tool to test STM32 applications at run-time - STMicroelectronics
- STM32CubeMonPwr - Graphical tool displaying on PC power data coming from STLink-V3PWR - STMicroelectronics
- STM32CubeMonRF - Software tool to test the RF performance of STM32-based hardware devices - STMicroelectronics
- STM32CubeMonUCPD - Monitoring and configuration software tool for STM32 USB-C and Power Delivery 3.0 applications - STMicroelectronics
- STM32CubeProg - STM32CubeProgrammer software for all STM32 - STMicroelectronics
- STM32H573I-DK - Discovery kit with STM32H573IIK3Q MCU - STMicroelectronics
- STM32TRUSTEE-SM - Secure manager embedded software for STM32Cube - STMicroelectronics
- X-CUBE-AWS-H5 - AWS IoT software expansion for STM32Cube targeting STM32H573I-DK -

STMicroelectronics

- st.com/sla0048
- STM32Cube - Discover the STM32Cube Ecosystem - STMicroelectronics

Manuals+.