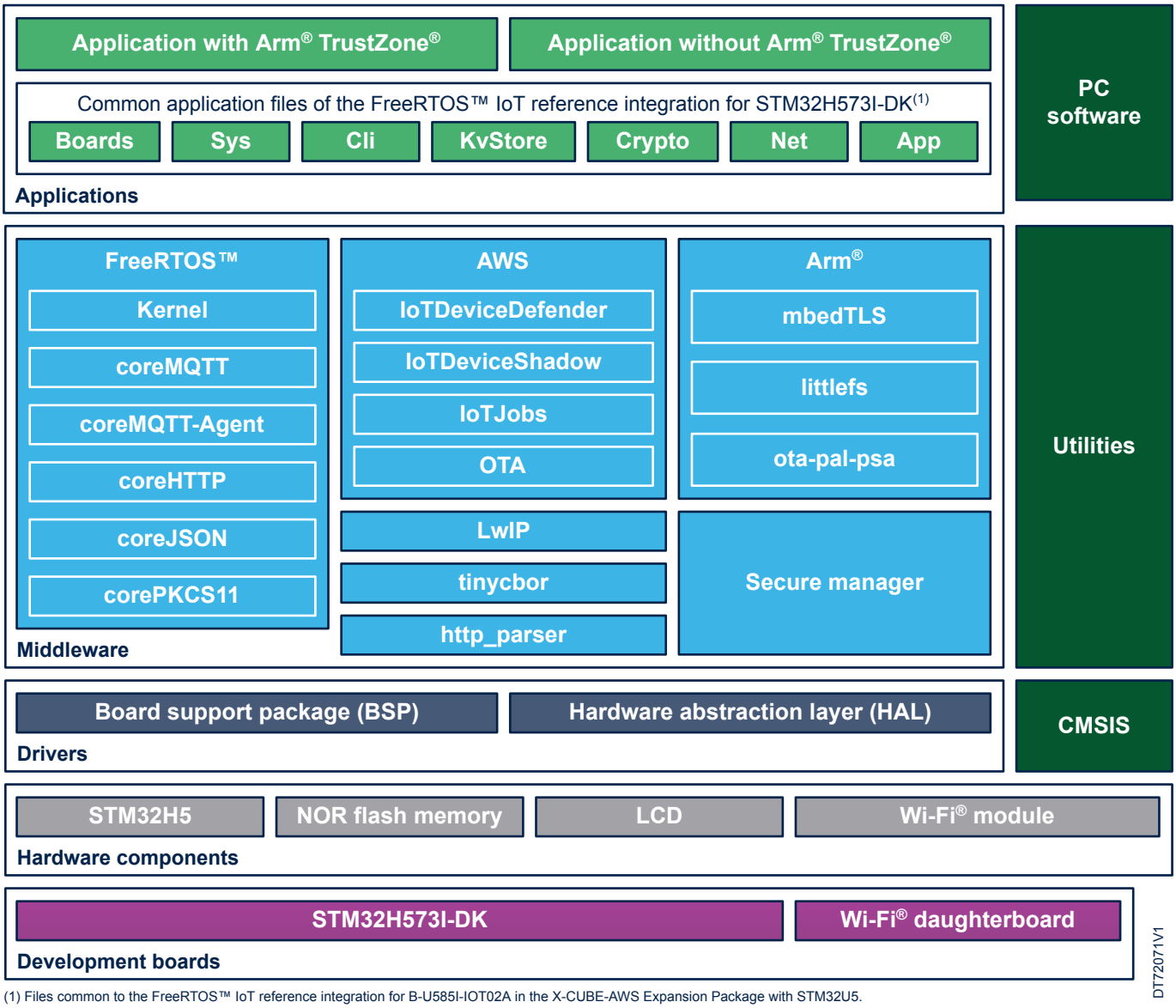
X-CUBE-AWS-H5

Data brief

STM32H5 Amazon Web Services® IoT software expansion for STM32Cube



(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 FreeRTOS™ 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 FreeRTOS™ kernel tasks and their memory usage
- Easy step-in project, without Arm® TrustZone®
- STMicroelectronics secure manager enabled project:
  - Arm® TrustZone®
  - 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 FreeRTOS™ 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-TrustZone®), 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® TrustZone® 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 FreeRTOS™ qualification.

1 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® TrustZone®.

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

arm

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.

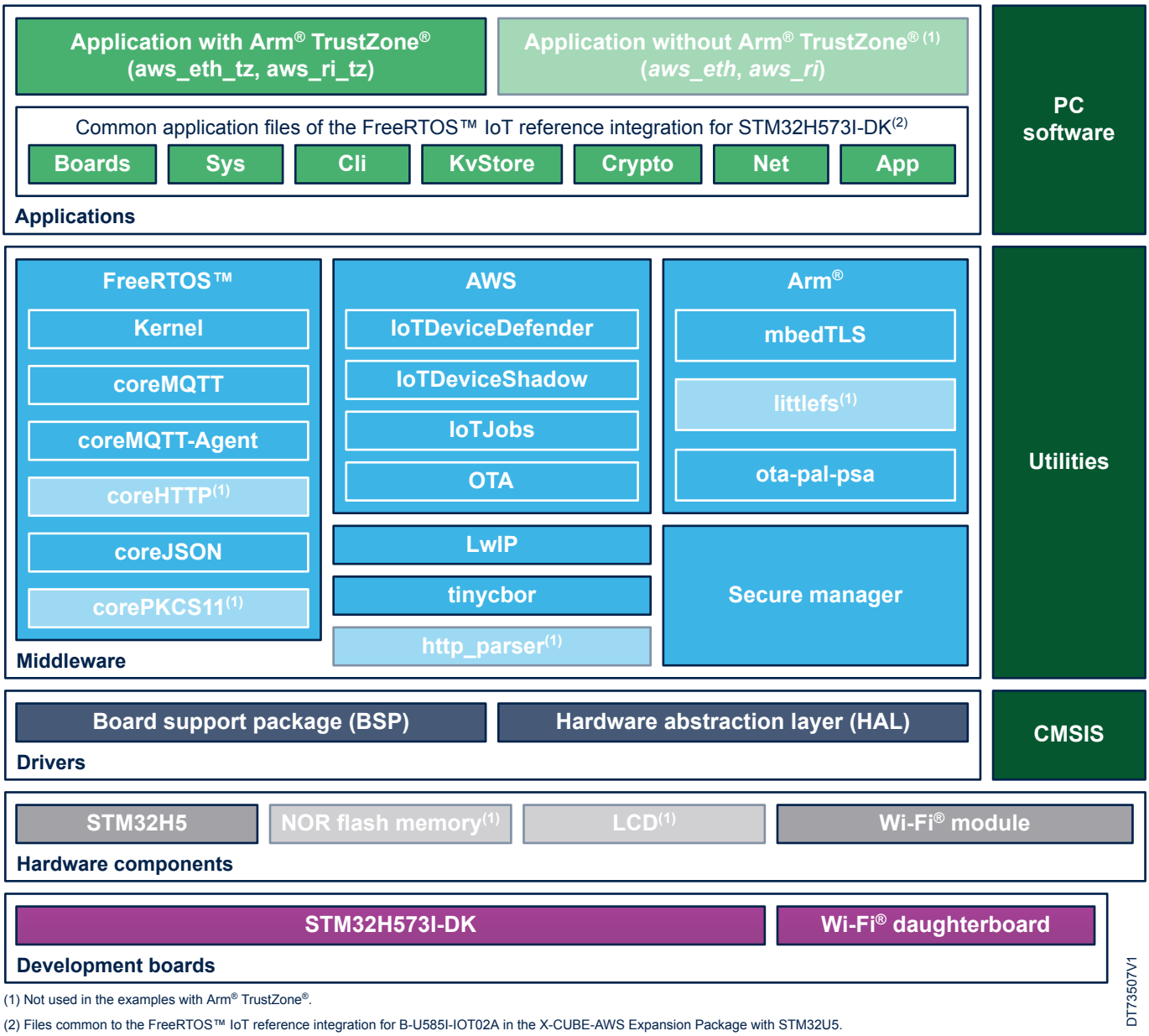
STM32Cube includes:

- 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

2 Software architecture examples

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

Figure 1. Application examples using Arm® TrustZone®



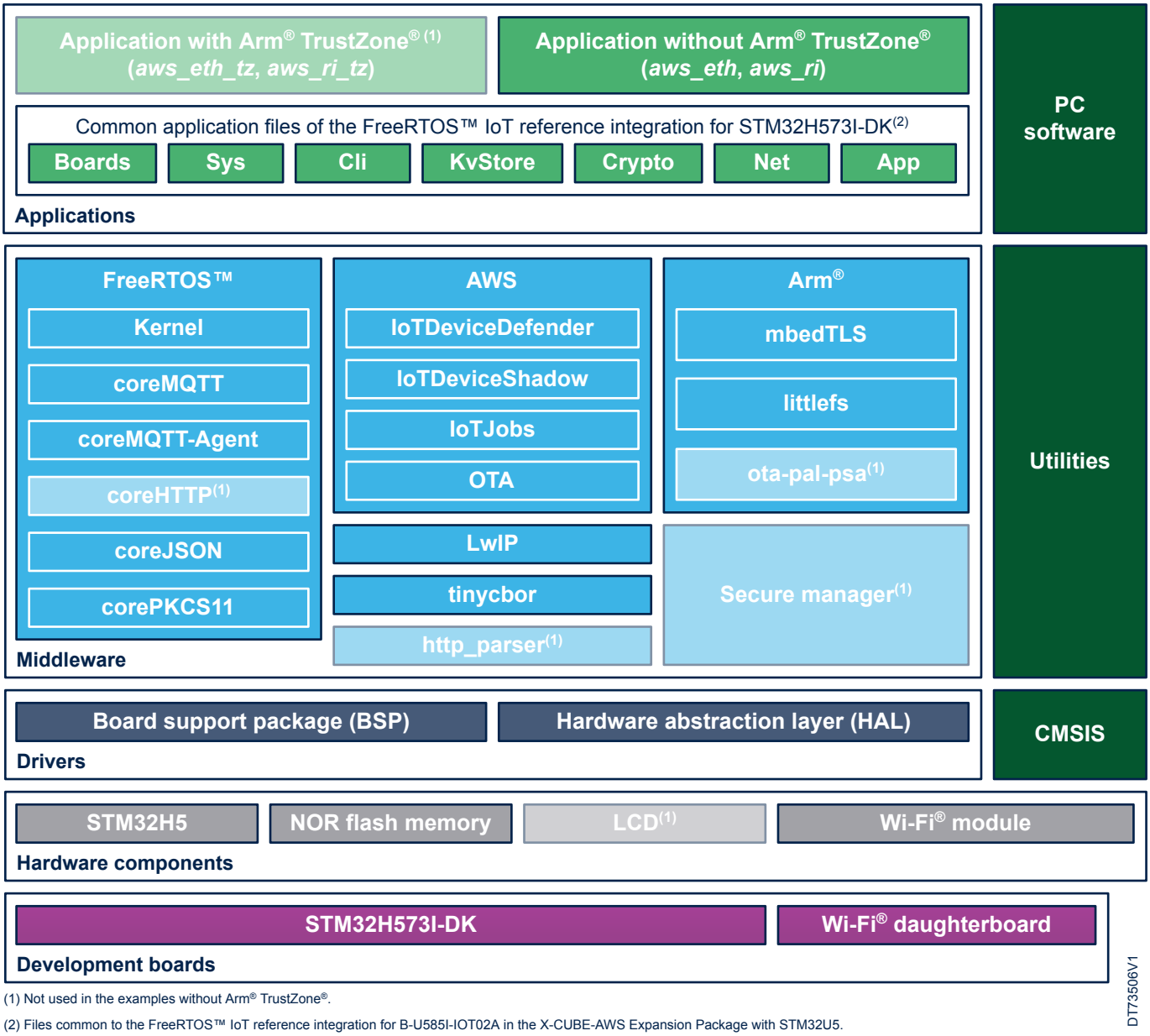
DT73507V1

(1) Not used in the examples with Arm® TrustZone®.

(2) Files common to the FreeRTOS™ 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® TrustZone®. The other blocks are grayed out.

Figure 2. Application examples not using Arm® TrustZone®



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3 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-2023	1	Initial release.