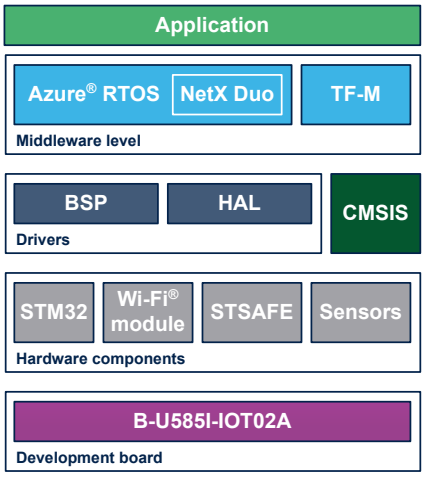
X-CUBE-AZURE

Data brief

Microsoft® Azure® IoT software expansion for STM32Cube



Features

- Ready-to-run firmware example using Wi-Fi® connectivity to support quick evaluation and development of Microsoft® Azure® cloud-connected applications
- Azure® RTOS port to the B-U585I-IOT02A board
- Azure® RTOS NetX Duo network stack support for the MXCHIP Wi-Fi® module on B-U585I-IOT02A
- TLS encryption
- Azure® IoT add-on support
- Azure® IoT Central
- Azure® Device Provisioning Service (DPS)
- Azure® plug and play
- Azure® X.509 certificate attestation
- TF-M 1.3 with STSAFE integration
- Arm® TrustZone®
- Wi-Fi® and Azure® connection credentials stored in TF-M protected storage
- B-U585I-IOT02A sensor data published and displayed in the Azure® cloud
- Prebuilt binaries for quick connect

Product status link
X-CUBE-AZURE

Description

The X-CUBE-AZURE Expansion Package consists of a set of libraries and application examples for STM32U5 Series microcontrollers acting as end devices.

X-CUBE-AZURE provides a port of Azure® RTOS to the supported boards.

X-CUBE-AZURE runs on the B-U585I-IOT02A board, which supports Wi-Fi® connectivity with an on-board MXCHIP module, and features the STSAFE-A110 secure element.

A sample application configures the network connectivity parameters, and illustrates the various ways for a device to interact with the Microsoft® Azure® IoT Hub. The application shows how a client application connects to the Azure® IoT Hub to publish device state and telemetry data, and receive device configuration from the cloud. The application handles Azure® messages, methods, and twin update commands. This allows, from Azure® IoT Central, the reception of telemetry data, the start-and-stop of telemetry data emission, the remote control of the user LED state, and the change of the telemetry interval. The B-U585I-IOT02A board reports telemetry data such as the measurements of humidity, temperature, and atmospheric pressure. It also reports gyroscope, accelerometer, and magnetometer measurements.

The device certificate with its unique identifier is provided by the STSAFE.

Trusted Firmware-M is used for the storage of secure parameters.

1 General information

The X-CUBE-AZURE Expansion Package runs on STM32 32-bit microcontrollers based on Arm® Cortex®-M processors 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-AZURE 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
  - 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 STM32CubeU5 for the STM32U5 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, touch library, network library, mbed-crypto, TFM, 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 License

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

Revision history

Table 1. Document revision history

Date	Revision	Changes
06-Jul-2017	1	Initial release.
18-Oct-2017	2	Updated *License*.
12-Sep-2019	3	Updated the entire document for the addition of cellular connectivity, Device Provisioning Service, Secure Boot and Secure Firmware Update, and ST-AZURE-Dashboard. Added *What is STM32Cube?*
13-Jan-2022	4	Removed the references to ST-AZURE-Dashboard: updated *Features* and *Description*. Removed the connection to an Azure® IoT central demonstration from *Features*. Updated *License* and *What is STM32Cube?*
16-Jun-2022	5	Focused X-CUBE-AZURE on an STM32U5-based target with Azure® RTOS middleware, Arm® TrustZone®, STSAFE secure element, and Wi-Fi® connectivity: • Updated the cover picture • Updated Features and Description • Updated What is STM32Cube? • Updated License