



Cloud Solutions

Sensor to Cloud IoT reference solution



STM32U5 - ST's Secure, Ultra Low Power Microcontroller



Integration of Azure IoT on STM32U5



FreeRTOS and AWS IoT Services for STM32U5



NFC Secure Access to the Cloud





MORE INFO

Sensor to Cloud IoT reference solution



Secure, Ultra Low Power, Sensor to Cloud “go-to-market” reference solution



Seamless integration with Cloud providers IoT SDK & STM32Cube Eco-system
































Comprehensive solution including Sensors, Connectivity and expandability options





ST's Complete Eco-system Offering

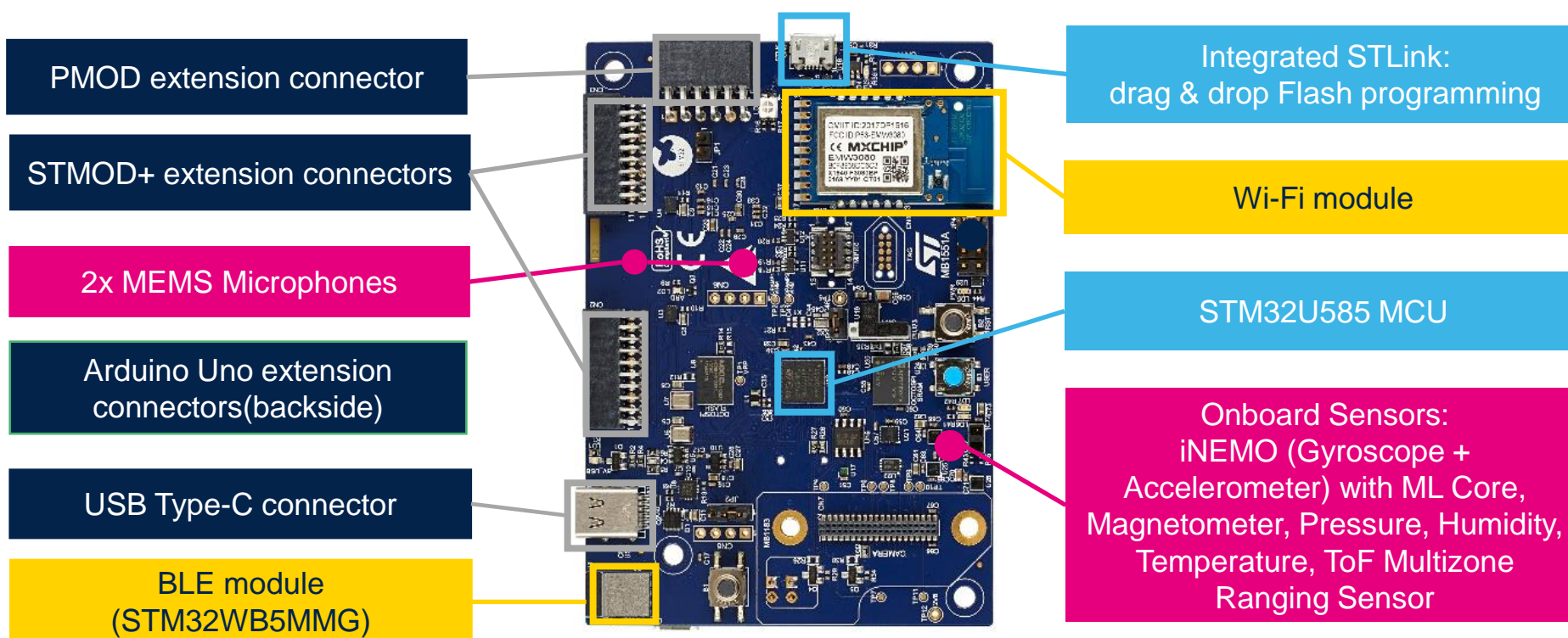
| All building blocks for IoT devices | | Pre-integrated Hardware | Pre-integrated Software | Cloud Integration |
|--|--|---|--|--|
| <div>Microcontrollers</div> <div>Secure solutions</div> <div>Sensors & actuators</div> <div>Connectivity solutions</div> <div>Power management</div> <div>Motor control</div> <div>Analog components</div> <div> life.augmented</div> | | <div>Stackable boards & modular SW</div> <div></div> <div>STM32 Nucleo Development & Expansion Boards</div> | <div>Vertical applications</div> <div> Smart Things</div> <div> Smart Home & City</div> <div> Smart Industry</div> | <div>Cloud Integration</div> <div> </div> |
| | | <div>Form-factor boards</div> <div> Discovery Kit IoT Node</div> <div> SensorTile Wireless Industrial Node</div> <div> NFC Dynamic Tag Sensor Node</div> <div> SensorTile.box</div> | <div>Development ecosystem</div> <div> Code generators</div> <div> Prototyping software</div> <div> Development environments</div> <div> Artificial Intelligence toolbox</div> <div> Debug solutions</div> <div> Simulation and analysis tools</div> <div> On-line design tools</div> | <div>Partners and ST community</div> <div> </div> <div> </div> |





Discovery kit for IoT node with STM32U5 series

Multi-link communication, multiway sensing and direct connection to cloud services



B-U585I-IOT02A





MORE INFO

STM32U5 - ST's Secure, Ultra Low Power Microcontroller

2021



STM32U5

First ultra-low-power STM32
with **40 nm technology**



| | | |
|------|--|---|
| 2020 | 2 billion ultra-low-power STM32s shipped | |
| 2019 | STM32L5 | Introduction of M33 , excellence in ultra-low-power with certified security |
| 2017 | STM32L4+ | Ultra-low-power excellence with more performance |
| 2015 | STM32L4 | Leadership ultra-low-power Cortex-M4 (#1 ULP 447 ULPBench™) MCUs |
| 2014 | STM32L0 | Entry cost ultra-low-power MCU |
| 2009 | STM32L1 | World 1st Cortex-M ultra-low-power MCU |



Enabling key new features for embedded developers



STM32U5

Lower power consumption

New power management
LPBAM*, DMA and IP autonomous in LP mode

Higher security

AES and PKA, side attack resistant

Higher level of safety

ECC on Flash and SRAM

Improved data storage

100 kcycles for 512 kB of Flash

Better accuracy

ADC 14-bit

* Low Power Background Autonomous Mode



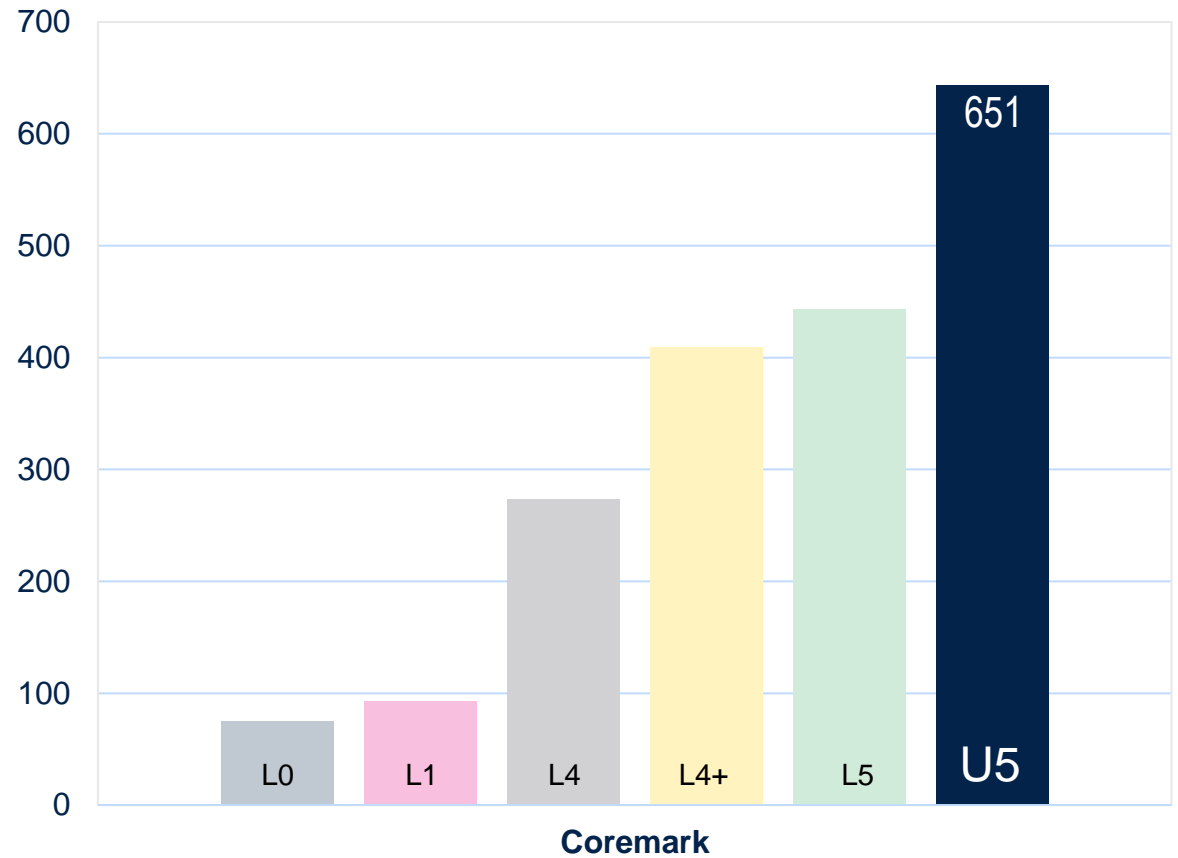
Unparalleled performance for an ULP MCU

Low Power Consumption

STM32U5

- Arm® Cortex®-M33 at **160 MHz**
240 DMIPS or **651 Coremark**
- Mathematics accelerators:
FMAC and **Cordic**
- Cache for execution and **data** for internal and external memory (ART Accelerator)



STM32 ULP





Enhanced security

Extensive functionality to protect your assets

| Isolation | Cryptography | Security assurance level | 1 st STM32 MCU to reach Level 3 |
|--|---|---|--|
| TrustZone® Secure Peripherals Secure DMA | SCA Proof AES, PKA Additional AES, PKA, SHA, TRNG CAVP certified CryptoLib |  L3  L3 | |
| Lifecycle | Memory protections | Active tamper | Trust anchor |
| RDP: 4 protection level states Password based regression | OTP, HDP, WRP, RDP, MPU Ext. Flash encryption OTFDec Secure Debug | 4x active pair of tamper pins. Volt. & Temp. monitoring (Vbat) Total tamper I/Os: 8 | TF-M, Secure Boot, Secure Firmware Install Hardware Unique Keys |



STM3U5 – High level of integration

Parallel Interface

FSMC 8-/16-bit
(TFT-LCD, SRAM, NOR,
NAND)

Timers

19 timers including:
2 x 16-bit advanced motor
control timers
4 x ULP timers
5 x 16-bit-timers
4 x 32-bit timers

I/Os

Touch-sensing controller
Camera Interface

Arm®
Cortex®-M33
CPU
160 MHz FPU
MPU
TrustZone®
ETM

LPDMA

FMAC

CORDIC

ART
Accelerator™

Chrom-ART
Accelerator™

Up to
2-Mbyte Flash
Dual Bank

786 KB RAM

Connectivity

USB OTG +PD,
2x SD/SDIO/MMC, 3 x SPI,
4 x I2C, 1x CAN FD,
2 x Octo SPI,
5 x USART + 1 x ULP UART,
1 x SWP

Digital

AES (256-bit), SHA-1, SHA-
256, TRNG, PKA, 2 x SAI,
MDF, ADF

Analog

1x 14-bit ADC 2MSPS,
1x 12-bit ADC 2MSPS
2 x DAC,
2 x comparators, 2 x op amps
1 x temperature sensor

Numerous integrated peripherals

Advanced accelerators

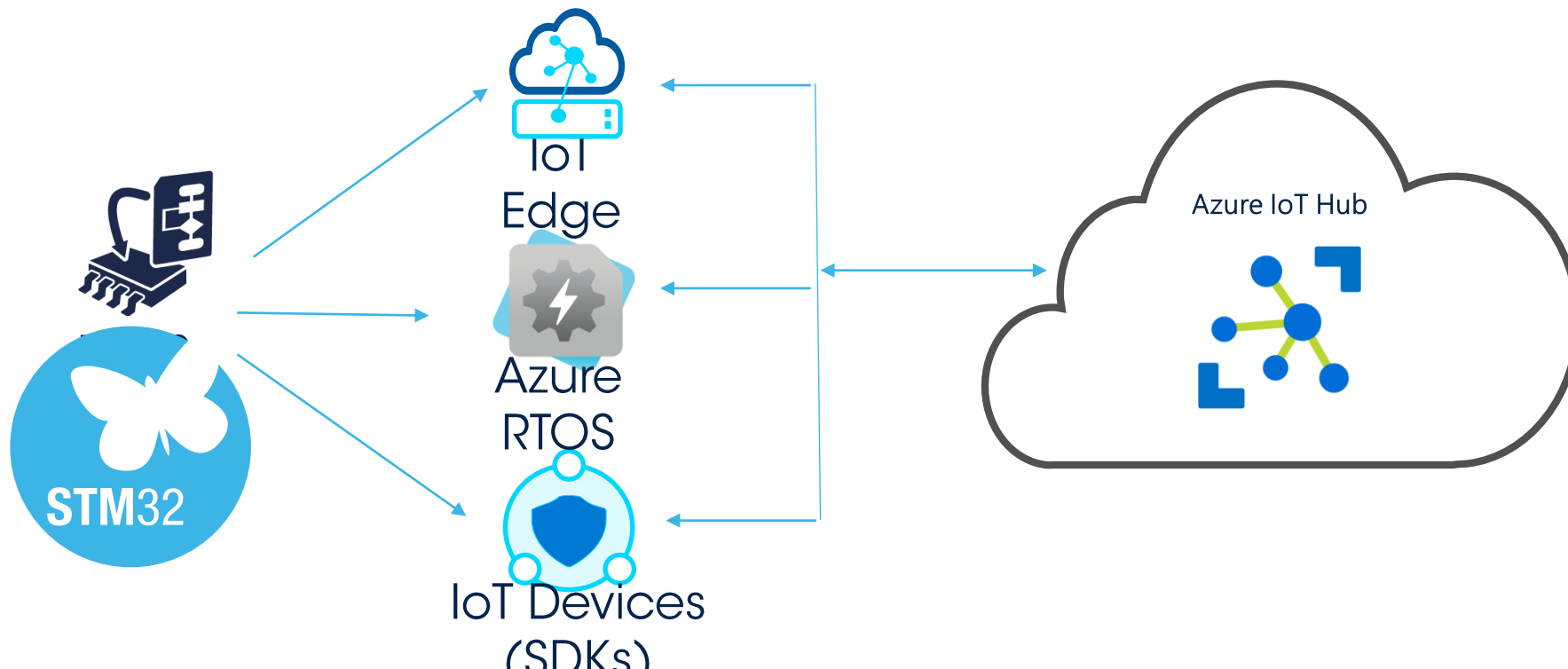
Large embedded memory





Microsoft and ST Partnership – IoT Solutions

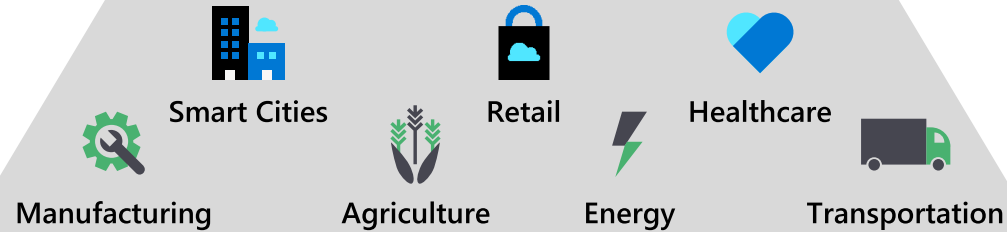
STM32 IoT and cloud connection solutions partner





Microsoft IoT delivers the broadest portfolio of edge offerings

Industry solutions



IoT core services



IoT app services



IoT edge offerings



Microsoft Azure IoT Powered on STM32



Azure IoT Platform certified for Azure IoT Plug and Play

Build end-to-end IoT solution with discovery kit for IoT node

Microsoft
Azure

Certified



[B-U585I-IOT02A](#)



Supports Azure IoT and App Services

Azure IoT Hub (Device Provisioning Service)
Azure IoT Central
Azure IoT Middleware (Azure Device SDK)
IoT Plug and Play
Azure Defender for IoT

Visualization of real sensor data

State-of-the-art security based on TF-M

Based on Azure RTOS software components

Wi-Fi connectivity, Device management, OTA, gather insights,
intelligent cloud and edge





AWS and ST Partnership – IoT Solutions

STM32 IoT and cloud connection solutions partner



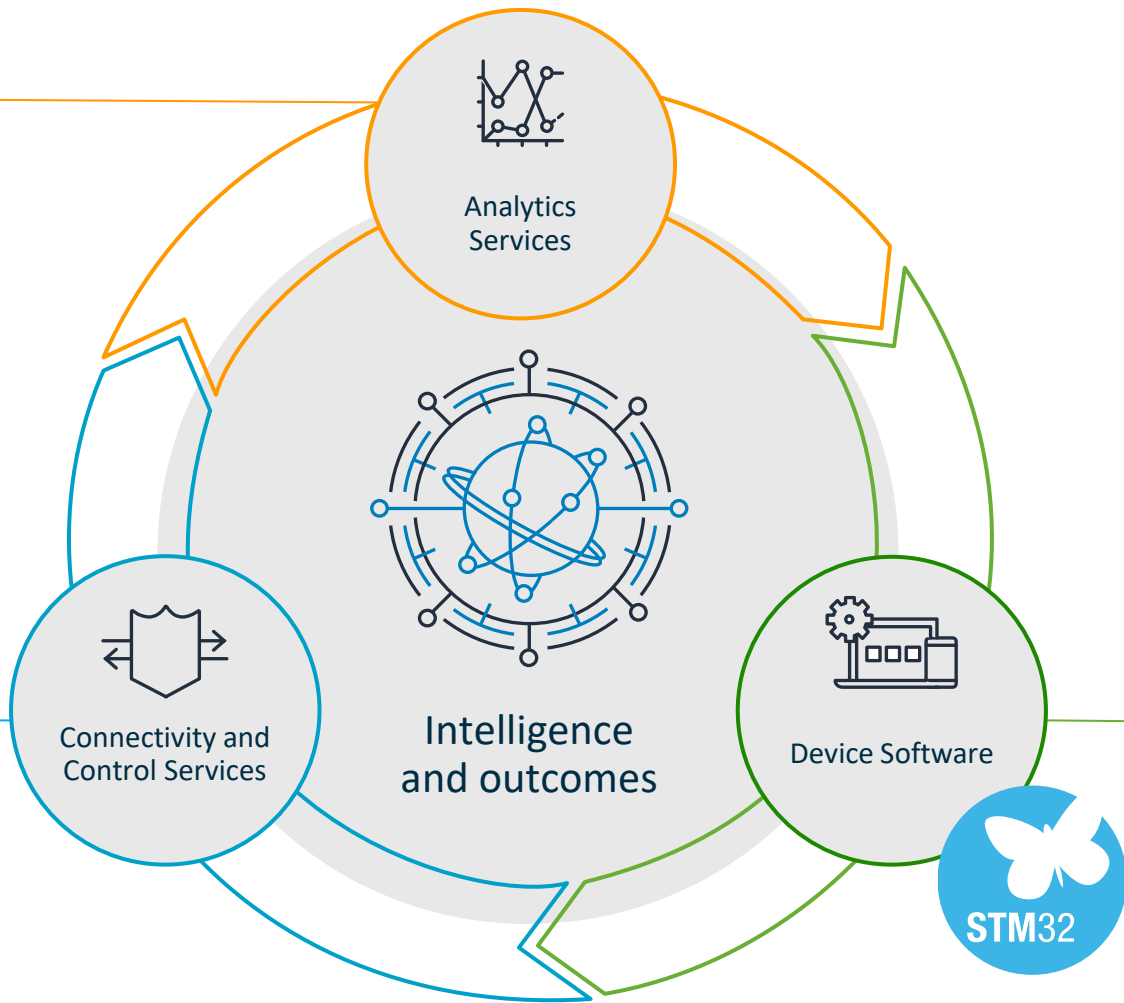


MORE INFO

Easily build secure connected products and solutions at scale with AWS IoT

AWS IoT SiteWise
AWS IoT Events
AWS IoT Analytics
AWS IoT Things Graph

AWS IoT Core
AWS IoT Device Defender
AWS IoT Device Management

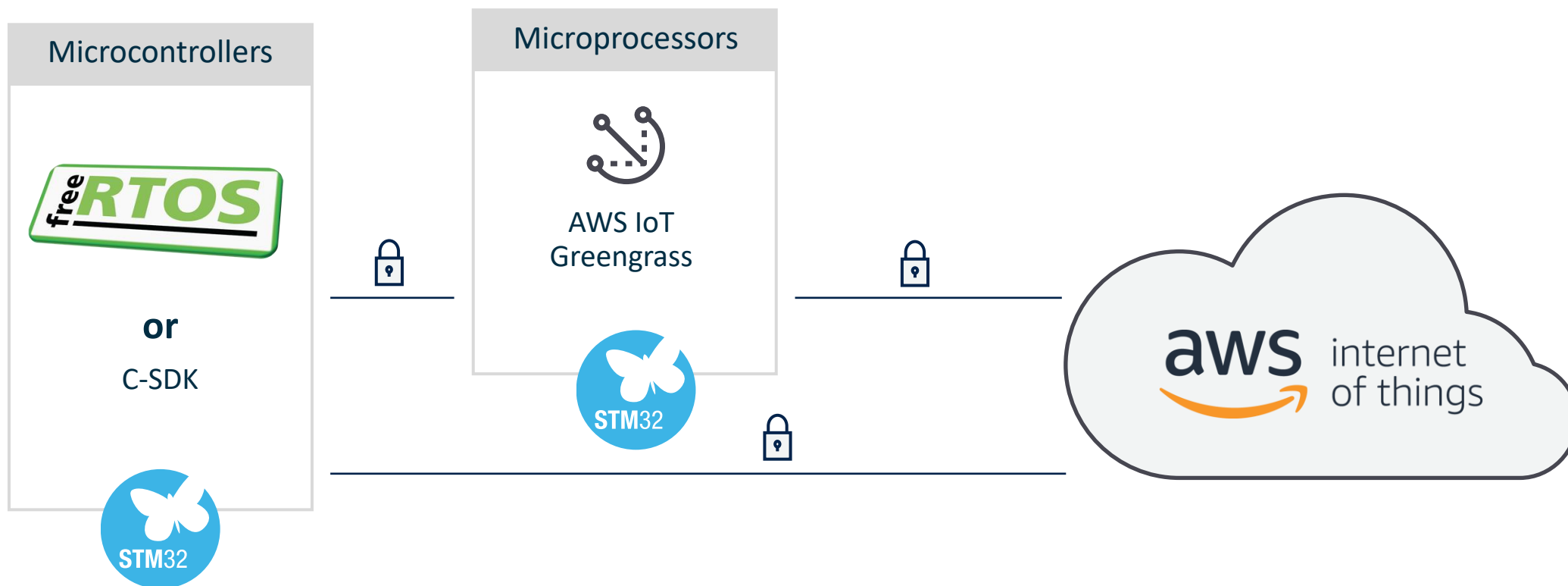


FreeRTOS
AWS IoT Device SDK
AWS IoT Greengrass
AWS IoT Device Tester



MORE INFO

Microcontrollers and microprocessors are powering billions of IoT devices

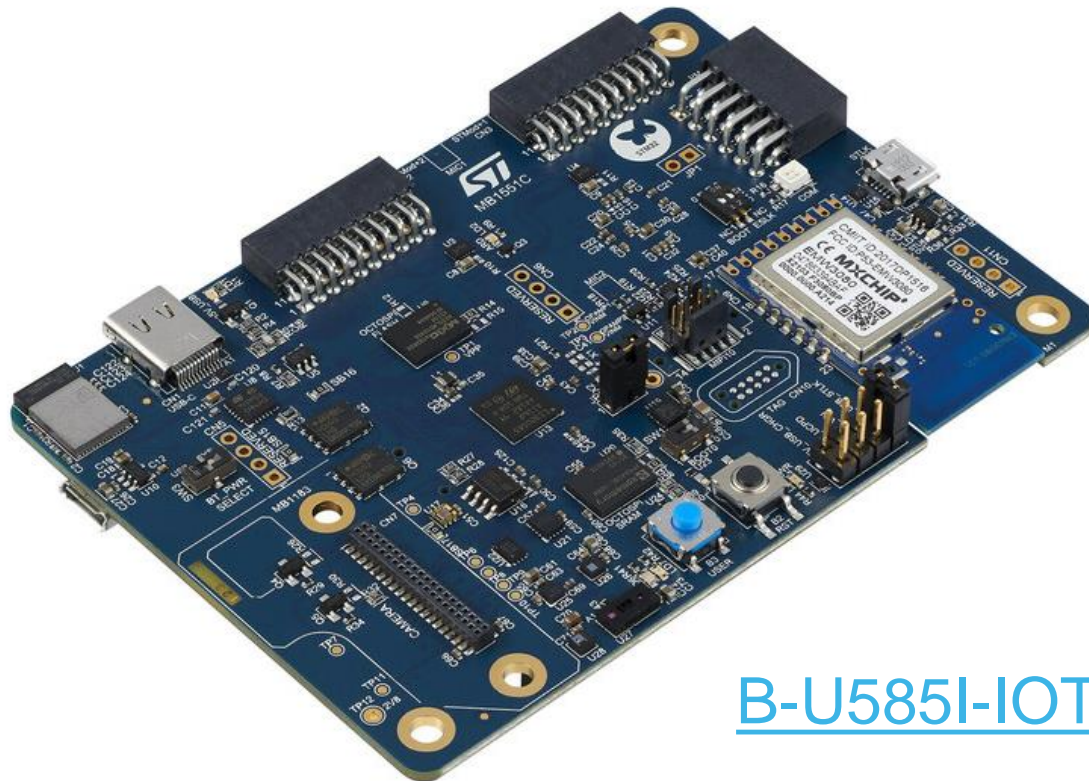


Device
software



A reference board for AWS IoT

STM32U5, recognized for IoT and cloud connection solutions



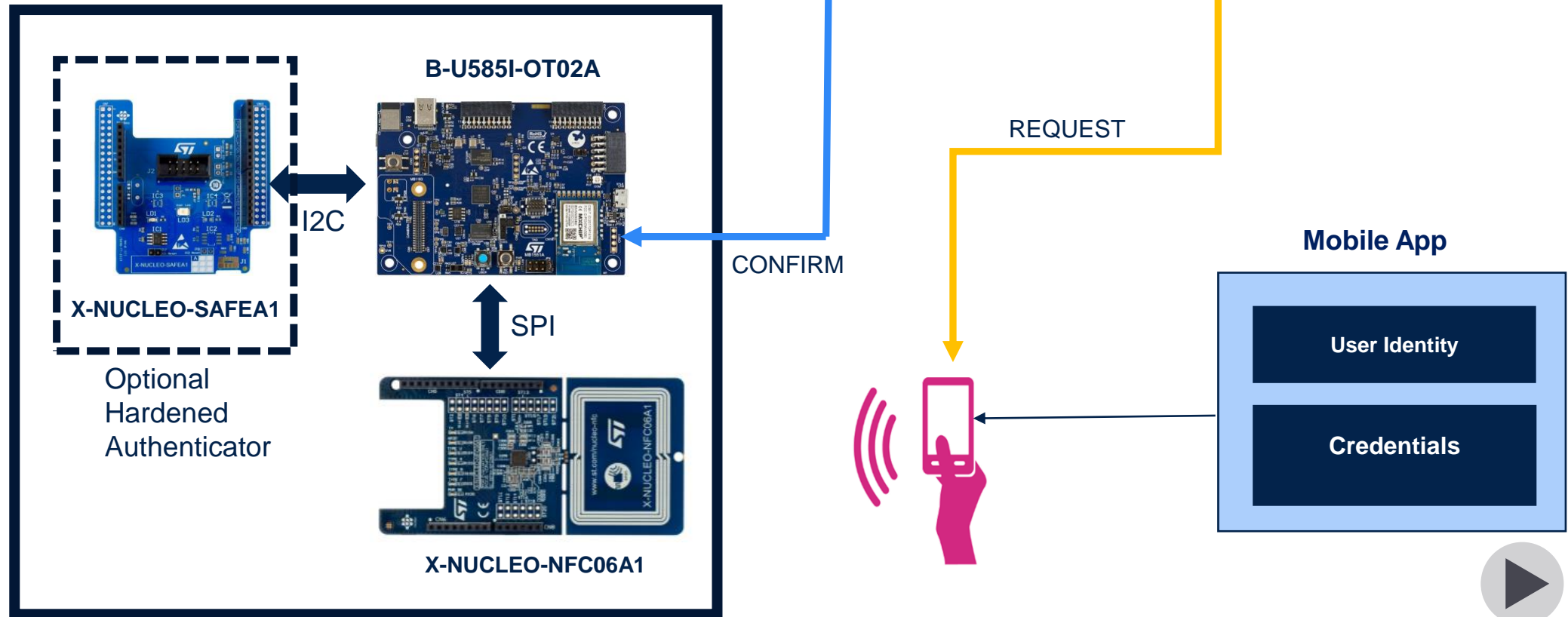
B-U585I-IOT02A discovery kit
selected as reference board for
Amazon “Qualified for FreeRTOS”
program ¹

(1) Development and qualification in progress

[B-U585I-IOT02A](#)



Cloud based physical and logical access control with Near Field Communication





Use cases & benefits

Secure IoT Node Configuration NFC



- Secure system firmware update
- Parameter settings adjustment in the field even if device is powered off

Servicing & Management NFC



- Extended wireless pairing (BLE / Wifi)
- ID activation
- Contactless access to sensor data and control

Physical Access NFC



- Cloud managed authentications and data access.
- Use NFC enabled phone to deliver token.
- Ease of use



Tokens delivery via NFC

Take advantage of M33 Secure Core with TrustZone

Simple and flexible

Ultra-low Power MCU with ST enhanced cryptographic features

