



life.augmented

Introducing STM32U5, the flagship of ultra-low-power MCUs





“ **If only** my smart watch
could last longer when I’m active

This is where we come in

STM32U5 increases battery
lifetime without impacting
performance



So many applications require more performance and longer lasting batteries



Industrial



Home appliances



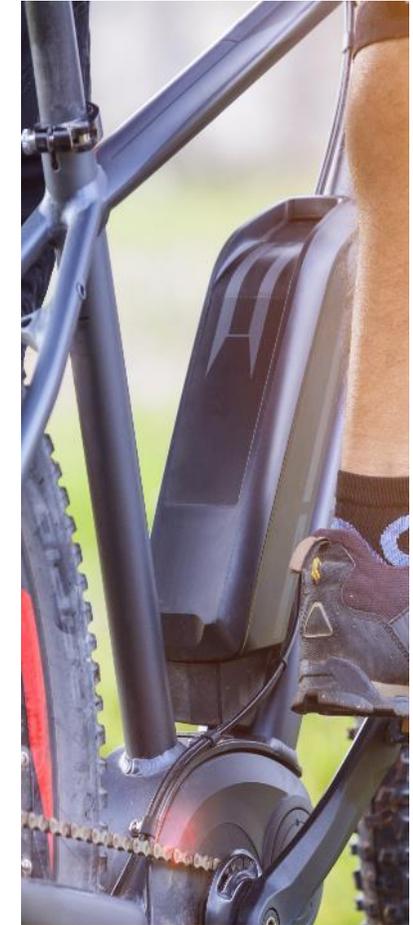
Point of sales



Wearable



Smart homes



e-bikes



STM32 MCU and MPU portfolio



 MPU

STM32MP1
4158 CoreMark
Up to 800 MHz Cortex-A7
209 MHz Cortex-M4

 High Perf MCUs

STM32F2
Up to 398 CoreMark
120 MHz Cortex-M3

STM32F4
Up to 608 CoreMark
180 MHz Cortex-M4

STM32F7
1082 CoreMark
216 MHz Cortex-M7

STM32H7
Up to 3224 CoreMark
Up to 550 MHz Cortex -M7
240 MHz Cortex -M4

 Mainstream MCUs

STM32F3
245 CoreMark
72 MHz Cortex-M4

STM32G4
569 CoreMark
170 MHz Cortex-M4

Mixed-signal MCUs

STM32C0
114 CoreMark
48MHzCortex M0+

STM32F0
106 CoreMark
48 MHz Cortex-M0

STM32G0
142 CoreMark
64 MHz Cortex-M0+

STM32F1
177 CoreMark
72 MHz Cortex-M3

 Ultra-low Power MCUs

STM32L0
75 CoreMark
32 MHz Cortex-M0+

STM32L1
93 CoreMark
32 MHz Cortex-M3

STM32L4
273 CoreMark
80 MHz Cortex-M4

STM32L4+
409 CoreMark
120 MHz Cortex-M4

STM32L5
443 CoreMark
110 MHz Cortex-M33

STM32U5
651 CoreMark
160 MHz Cortex-M33

 Wireless MCUs

STM32WL
162 CoreMark
48 MHz Cortex-M4
48 MHz Cortex-M0+

STM32WB
216 CoreMark
64 MHz Cortex-M4
32 MHz Cortex-M0+ 



 Latest product generation

 Radio coprocessor only

More than **60,000** customers
Over **10 billion** STM32 shipped since 2007

Enabling key new features for embedded developers



High energy efficiency

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

High integration

Up to 4Mbytes internal flash memory
Up to 2.5Mbytes RAM
USB HS with integrated PHY

Higher security and safety

AES and PKA, side attack resistant
ECC on flash memory and SRAM

Graphics advanced capacity

First STM32 with advanced graphics accelerators
and NeoChrom GPU

Improved data storage

100 Kcycles for 512Kbytes of Flash



STM32U5 efficiency proven by benchmarks

Best performances among 32-bit MCUs available on the market

ULPBENCH™
An EEMBC Benchmark

464 ULPMark-CP

True energy cost of deep-sleep modes

ULPBENCH™
An EEMBC Benchmark

125 ULPMark-PP

Common peripherals' energy impact on deep-sleep

ULPBENCH™
An EEMBC Benchmark

54 ULPMark-CM

Active power, using CoreMark as the workload

ULPBENCH™
An EEMBC Benchmark

137000 SecureMark-TLS

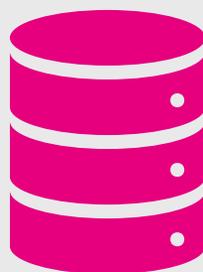
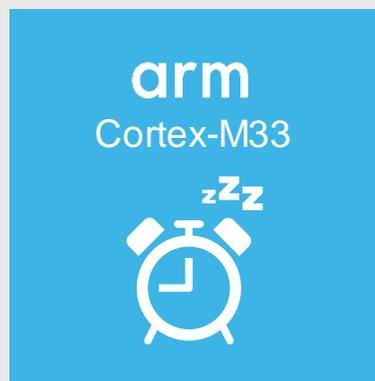
Efficiency of cryptographic processing solutions



Cut MCU power consumption by 90%*

Low Power Background Autonomous Mode (LPBAM)

STM32U5



SRAM



DMA



PERIPHERALS



Peripherals:

- I2C master or slave
- SPI / UART reception or transmission
- ADC / DAC
- Voice Activity Detection
- LPTIM
- I/O

trigger



Low-power
TIMER

wake-on-complete

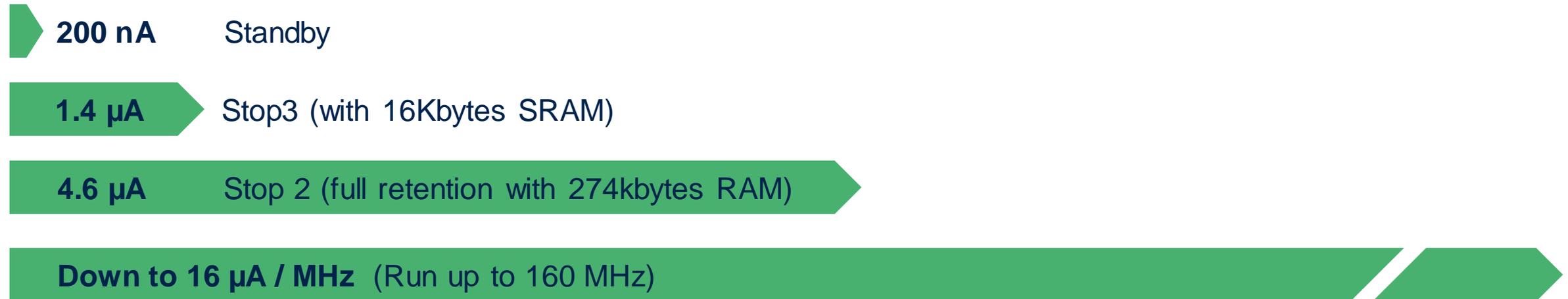


Extends battery life

Improved flexibility versus existing STM32L series

- The STM32U5 provides a **large choice of low power modes** with fast wake-up times

See below some examples to illustrate the best-in class power consumption:



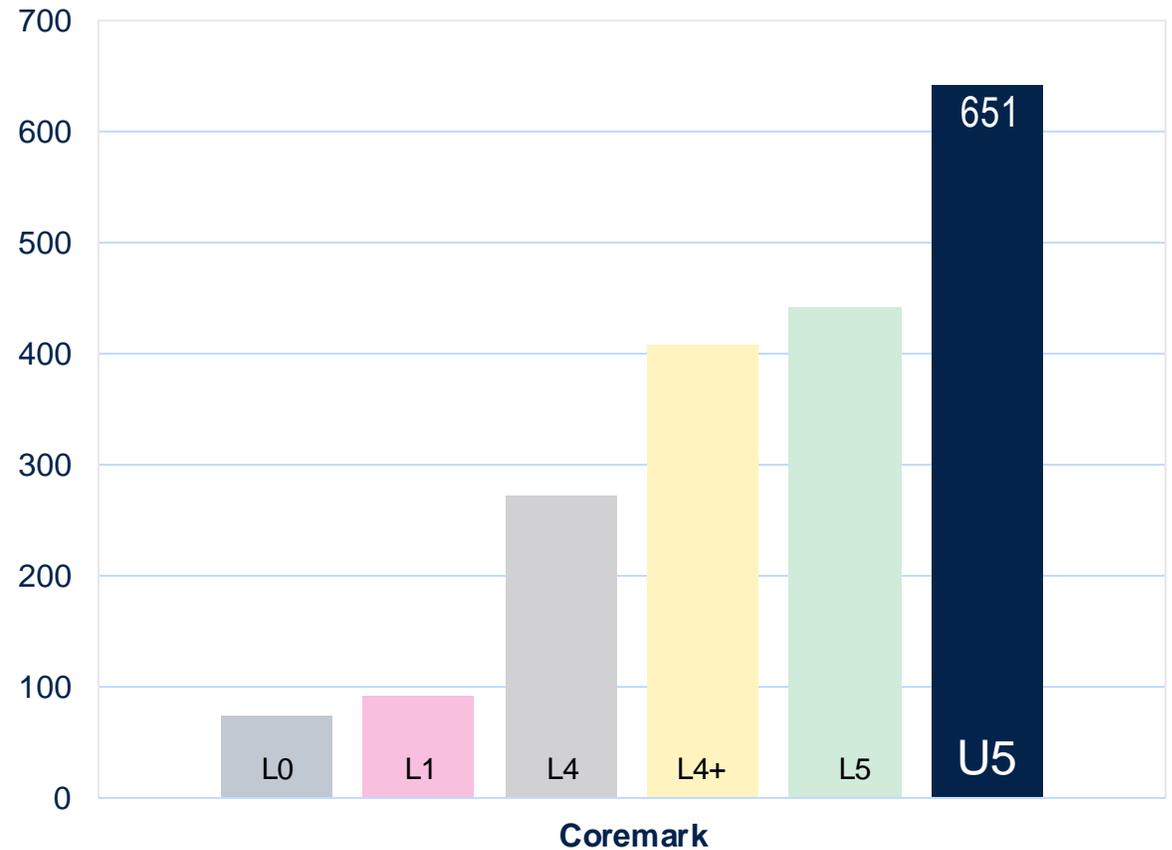


Unparalleled performance for an ULP MCU

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)

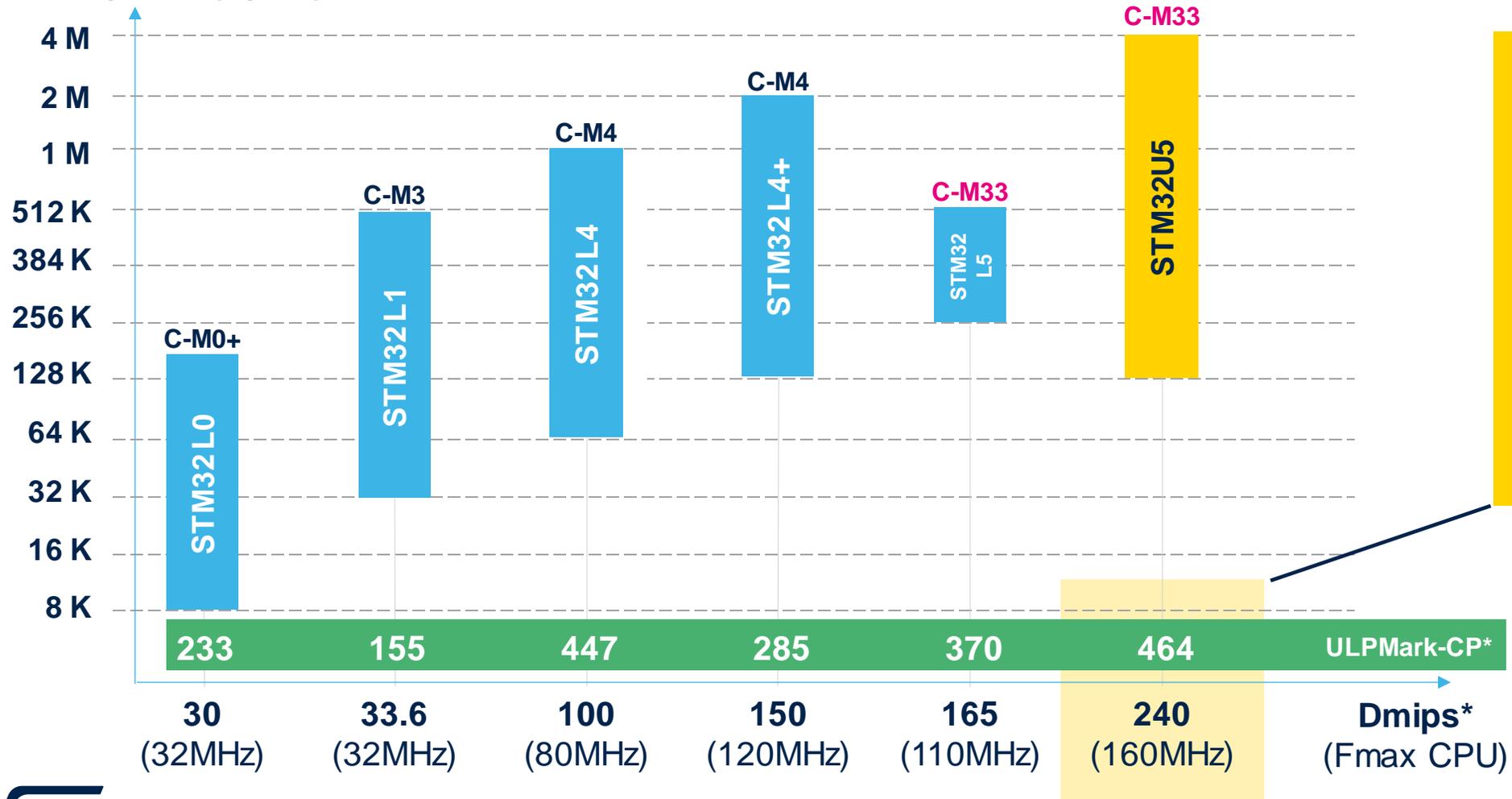
STM32 ULP





STM32U5, the flagship of STM32 ULP series

Memory size (Bytes)



STM32U5

Highest DMIPS
Best ULP

**the higher the better*



Enhanced security

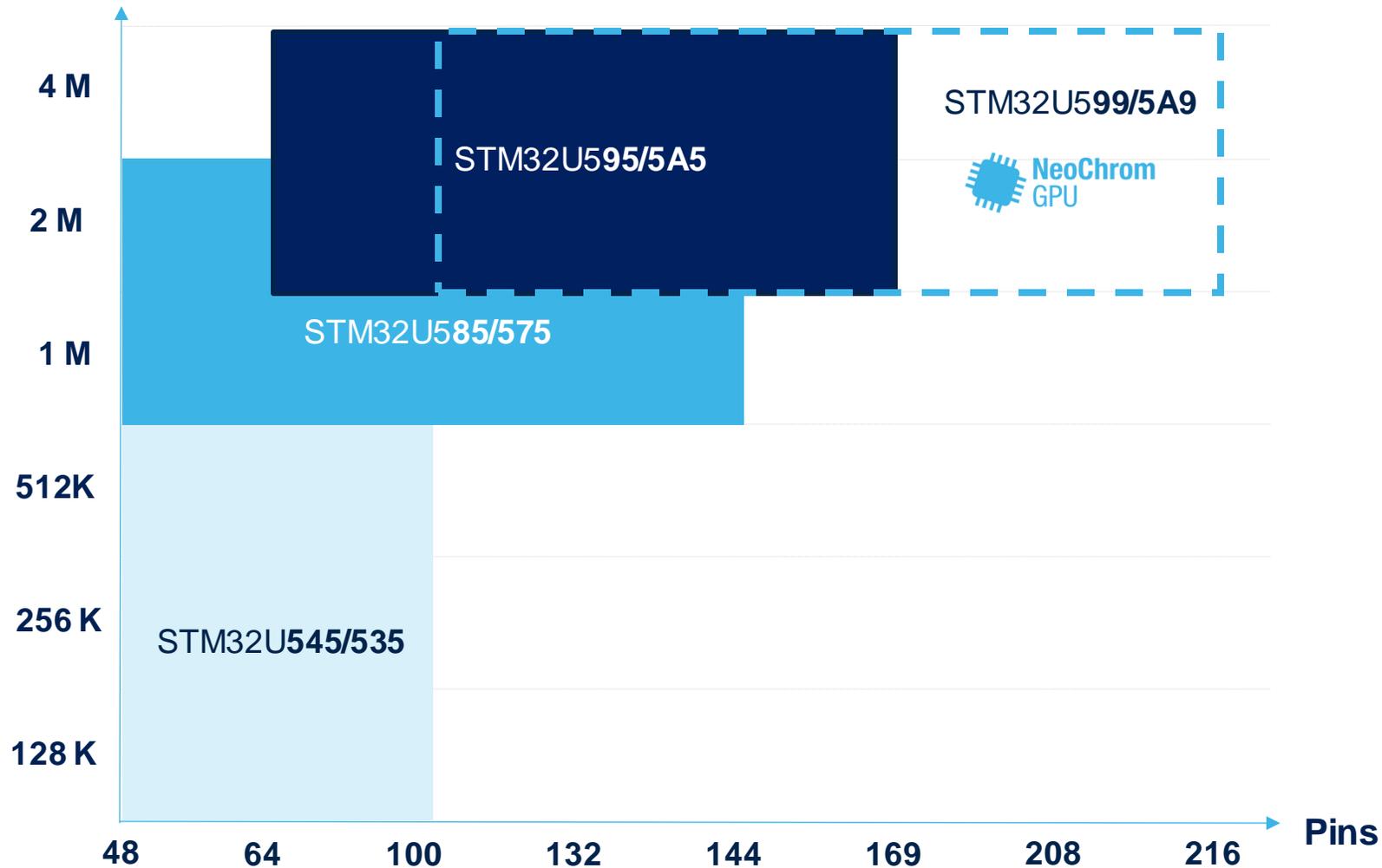
Extensive functionality to protect your assets

Isolation	Cryptography	Security assurance level	
TrustZone® Secure Peripherals Secure DMA	Side channel AES, PKA Additional AES, PKA, SHA, TRNG CAVP certified CryptoLib	 psacertified™ level three  SESIP3	1st STM32 MCU to reach Level 3
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



STM32U5 portfolio

Flash size (bytes)



Run an MPU-like GUI on a simple microcontroller

STM32U599/5A9 lets you design smartphone-like UIs using an MCU

- Keep **two frame buffers** inside the MCU (2.5 Mbytes of SRAM)
- Address **small applications** thanks to 100- to 216-pin packages (LQFP 100, LQFP 144, BGA144 and more)
- High level of integration reduces the need for external components

Software tools

TouchGFX graphic framework to offer an outstanding UX



TouchGFX

Development tools for graphics

STM32U5A9J-DK1



 Watch the video

Smoother & richer graphics with NeoChrom GPU

Introducing NeoChrom GPU

NeoChrom GPU offloads the CPU from the graphic computations, freeing up the memory and boosting performance. Fully supported in the X-CUBE-TOUCHGFX

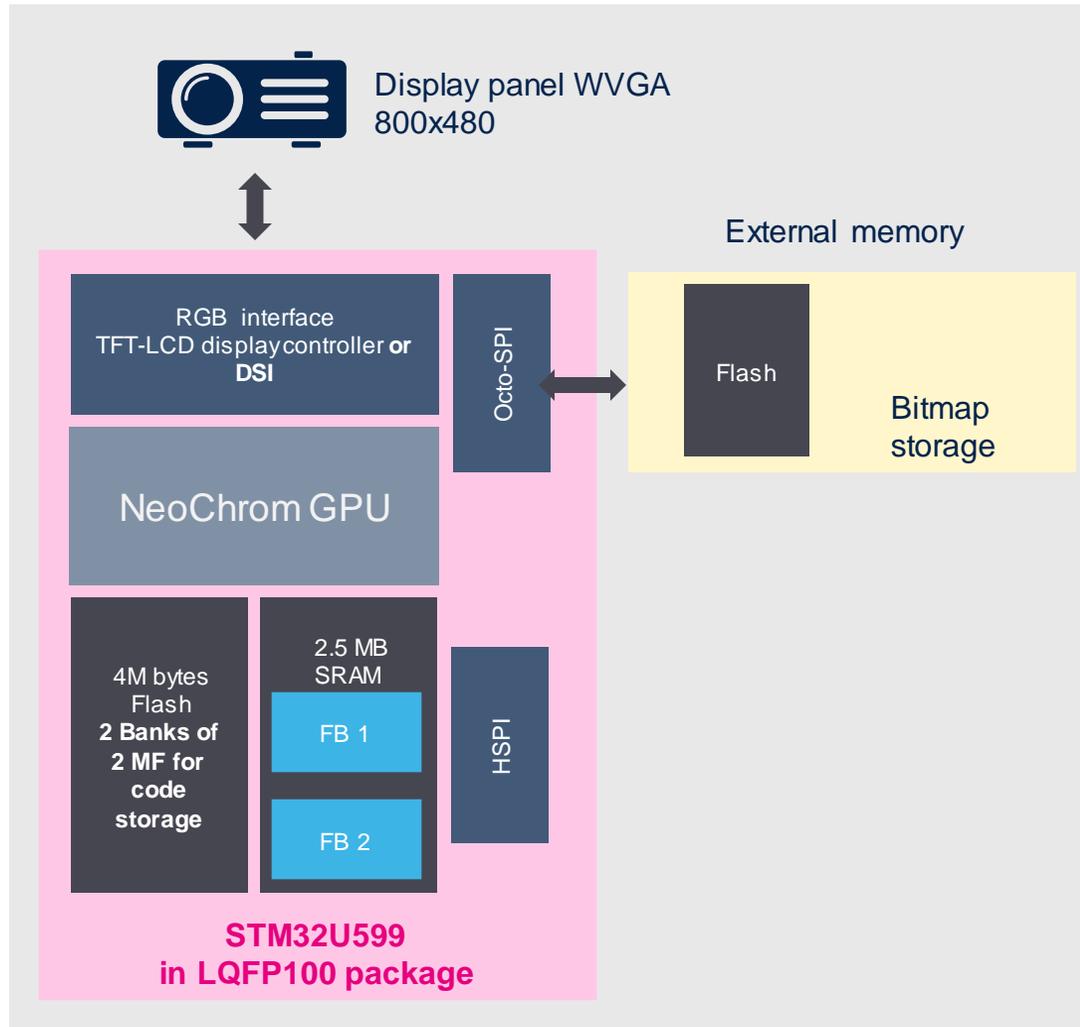
Enabling outstanding graphics on STM32, including:

- Simple & advanced drawing
- 2D Copy
- Alpha blending
- Color format conversion
- Scaling, Rotation
- Perspective correct texture mapping
- Image format compression

 [Watch the video](#)



High integration for lower BOM costs



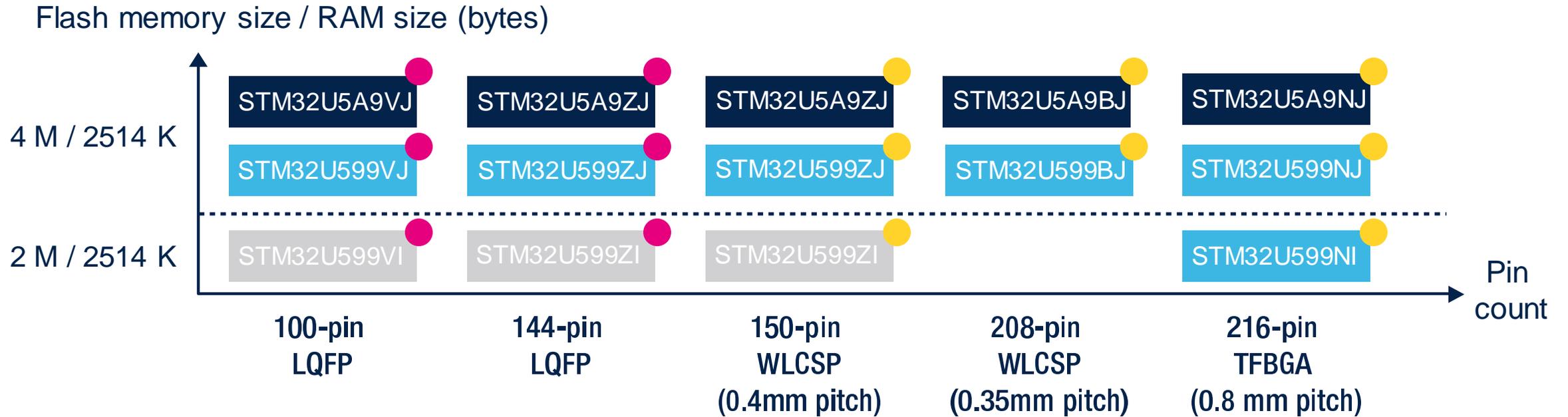
Save BOM costs

No need for additional external memory to manage graphic computations

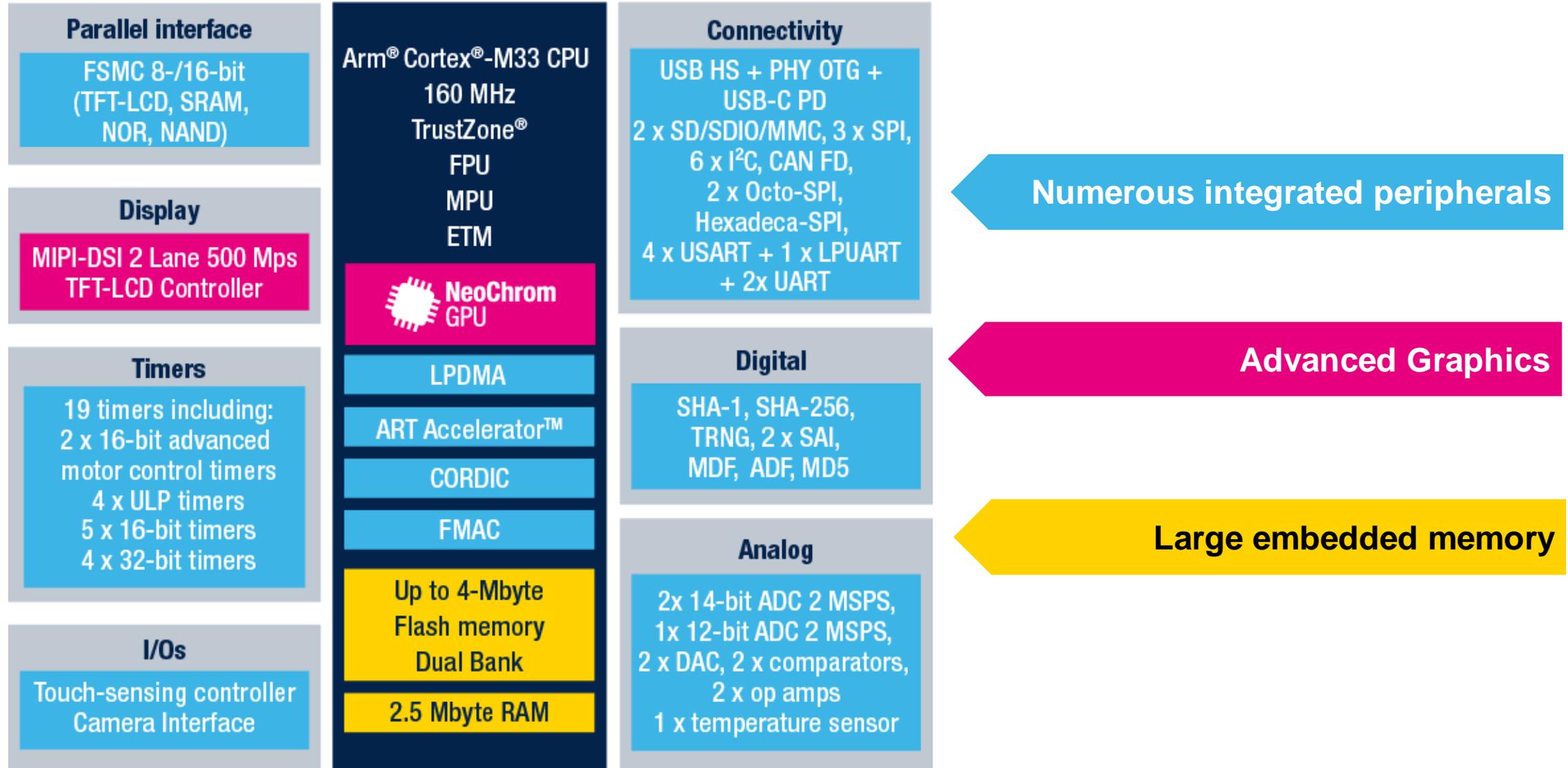
Cost-effective LQFP100 package



STM32U5 graphic portfolio



STM32U5 offers high integration





STM32 development tools

Speed up evaluation, prototyping, and design with hardware tools



*\$348



*\$65



*\$89



*\$23

Evaluation boards

STM32U5 full feature evaluation
STM32U575I-EV

Discovery kit
for IoT node

**Direct connection to
cloud services**
B-U585I-IOT02A

Discovery kit
for graphics

STM32U5A9J-DK

STM32 Nucleo

**Affordable and quick
prototyping**
NUCLEO-U575ZI-Q
NUCLEO-U5A5ZJ-Q
NUCLEO-U545RE-Q



STM32Cube framework

Helping developers release their creativity

Comprehensive offer helping you accelerate your development

Focus on quality, compatibility and stability

Documentations, trainings and worldwide support channels



Applicative reference implementations

Extension libraries and AI toolkit

 Hardware	 Embedded SDK	 Development tool kit	 Development resources
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STM32Cube framework

Tools and software supporting you during all your design steps

MCU, boards
and SW
selection

HW and SW
Configuration

Application Development and debug

Code and HW
options
programming

Run-time
application
monitoring



STM32
Finder



STM32
CubeMX



STM32
CubeMCU Packages



STM32
CubeExpansion



STM32
CubeIDE



STM32
CubeProgrammer



STM32
CubeMonitor

Verticals and
Partners solutions

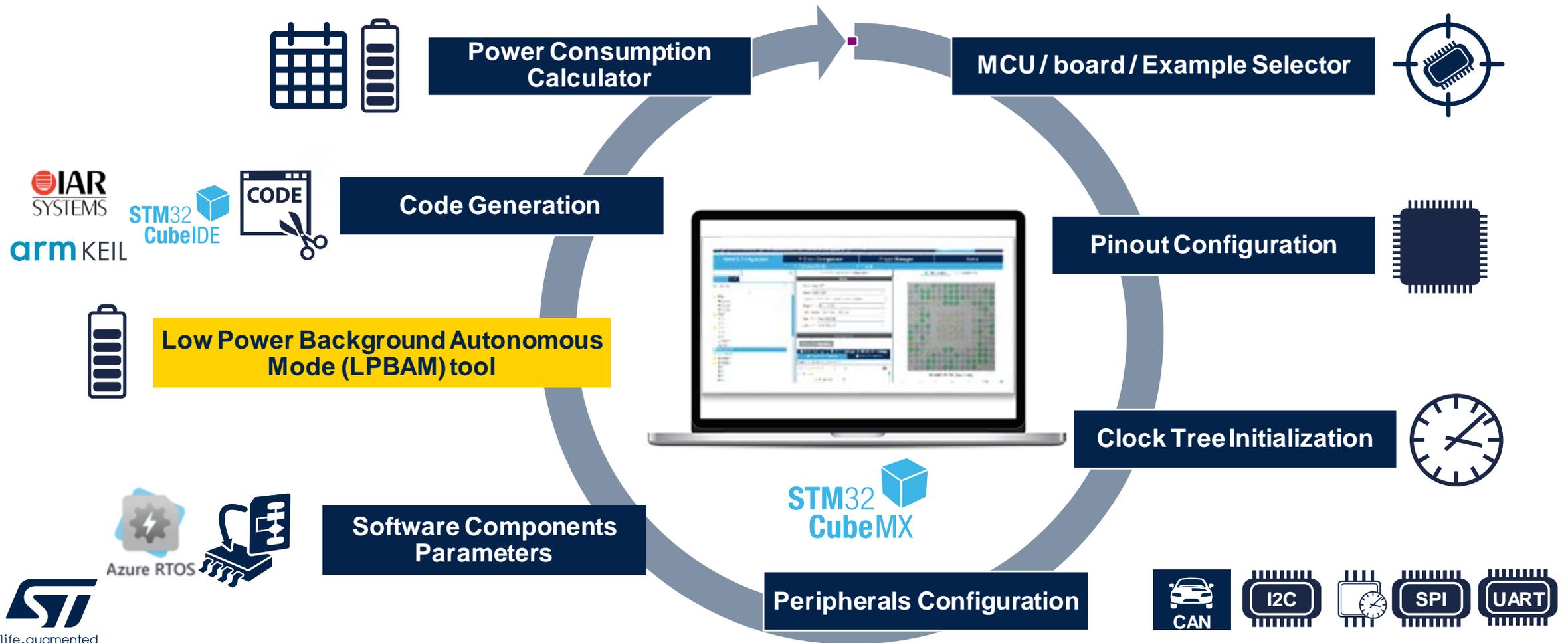
IDEs from Partners

Programmiers from Partners

Worldwide support channels



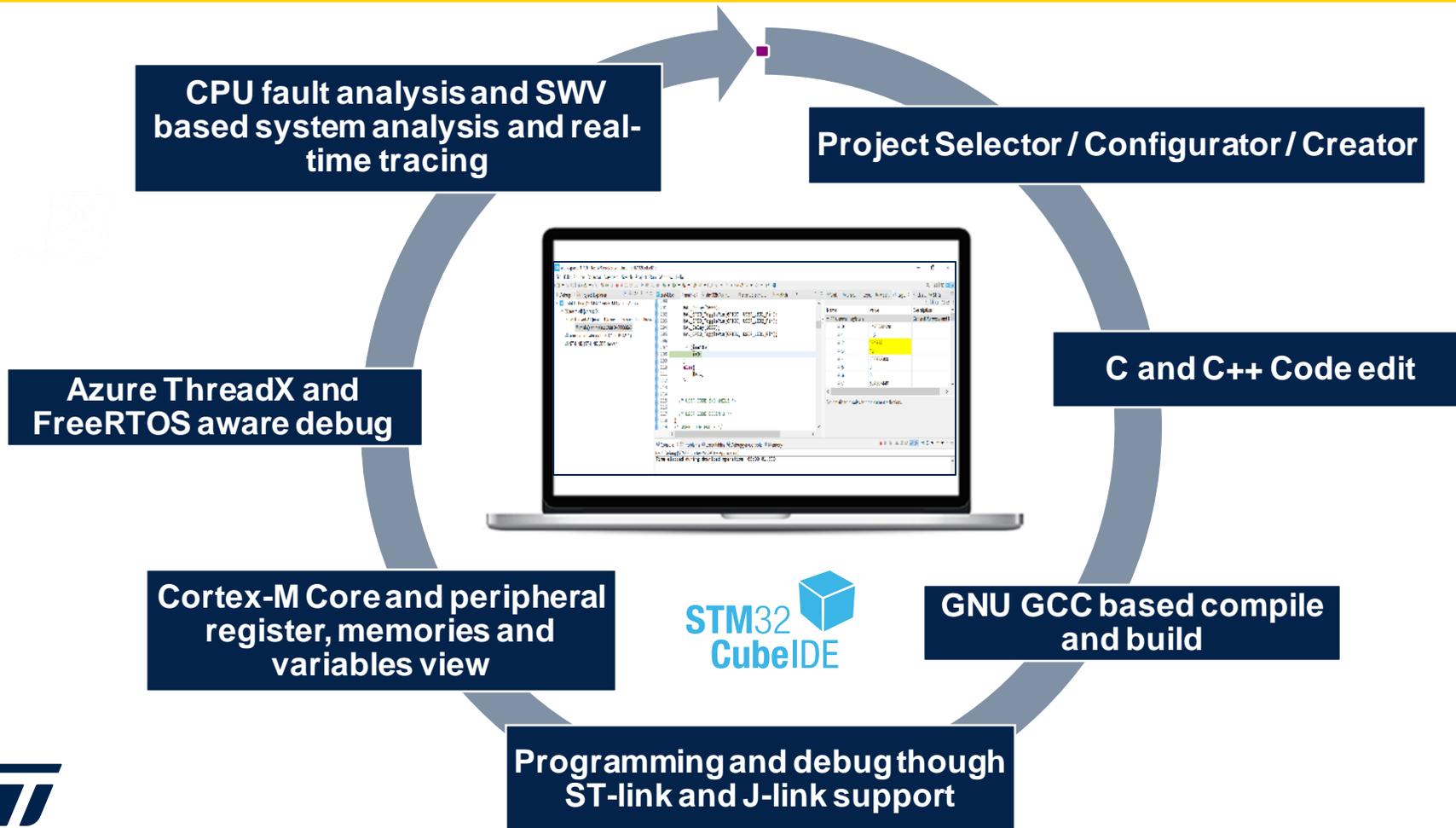
Easily and quickly create and initialize your project





STM32CubeIDE and third-party IDEs

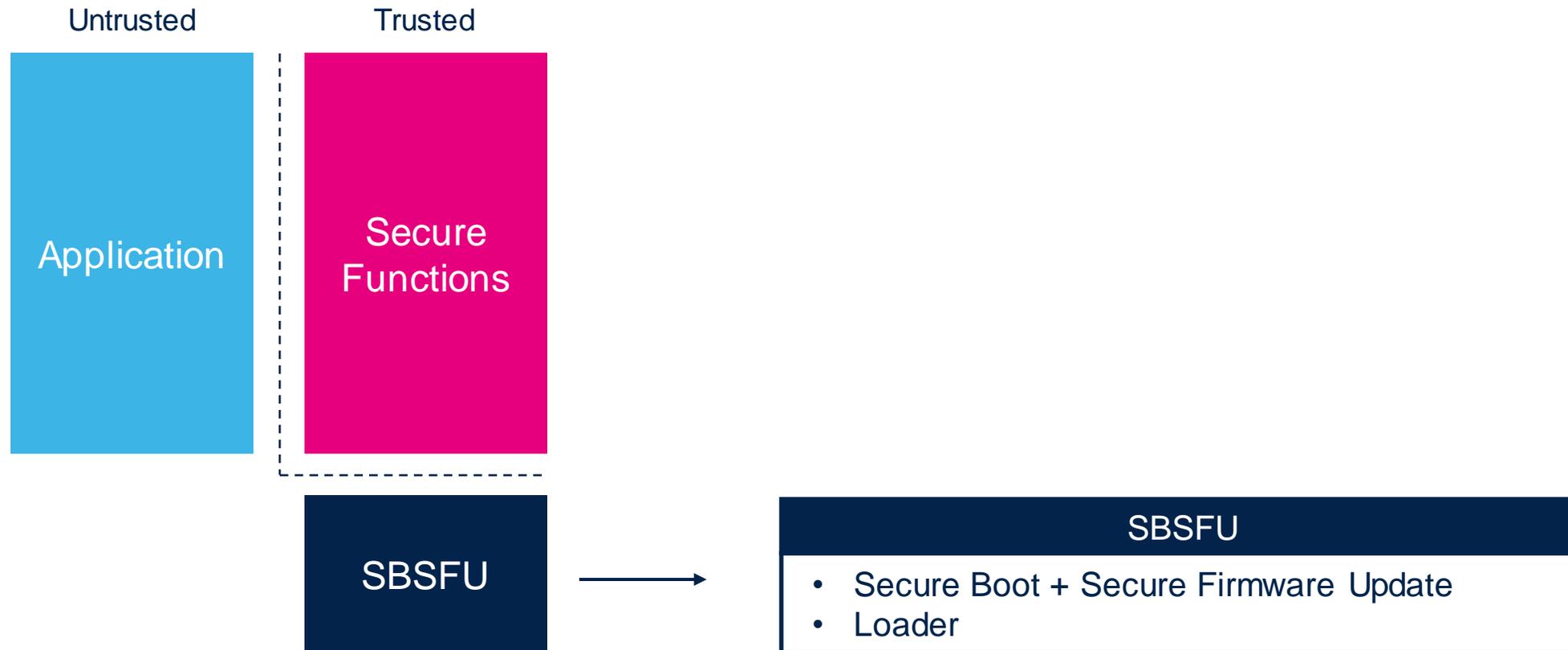
Simplify and accelerate your application development



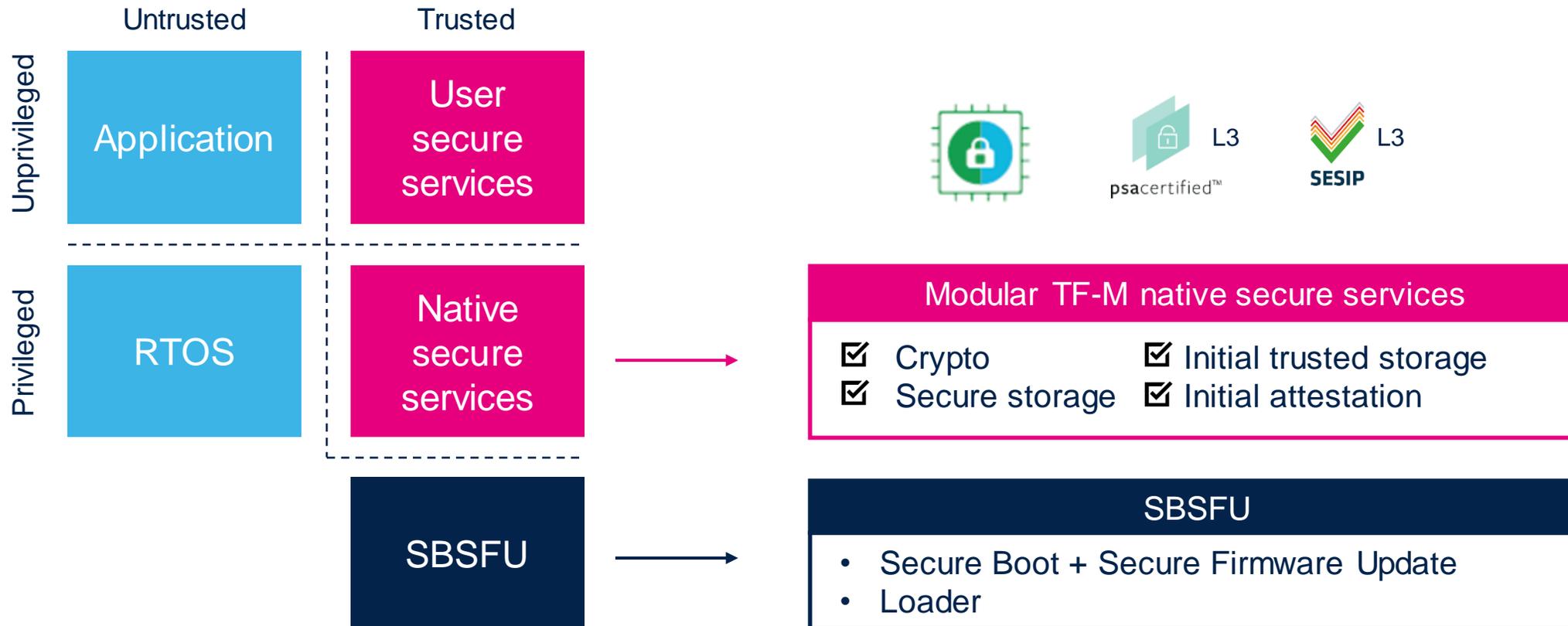
Third-party IDEs



Reference code for PSA immutable Root of Trust

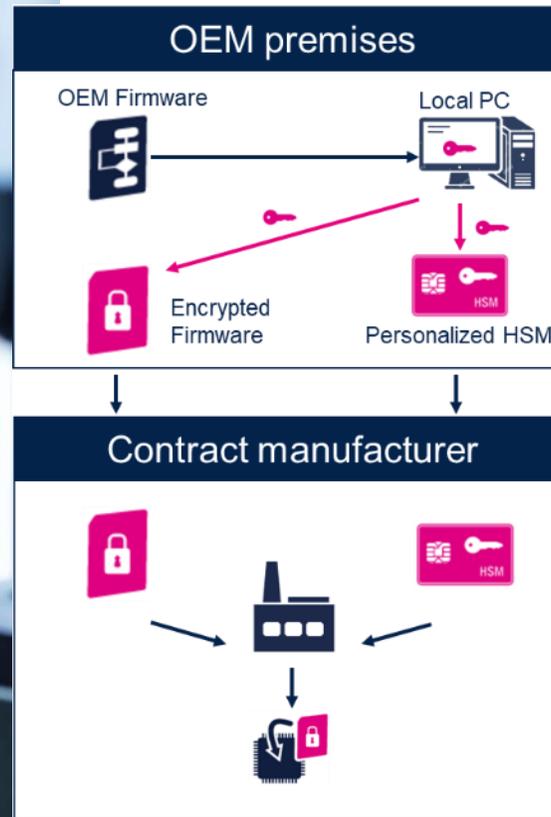


Scalable reference code framework leveraging STM32U5 security features



Secure your production flow with Secure Firmware Install (SFI)

Protect application firmware at the contract manufacturer



End-to-End security programming

Complete toolset to encrypt OEM binaries with the [STM32 Trusted Package Creator](#) software

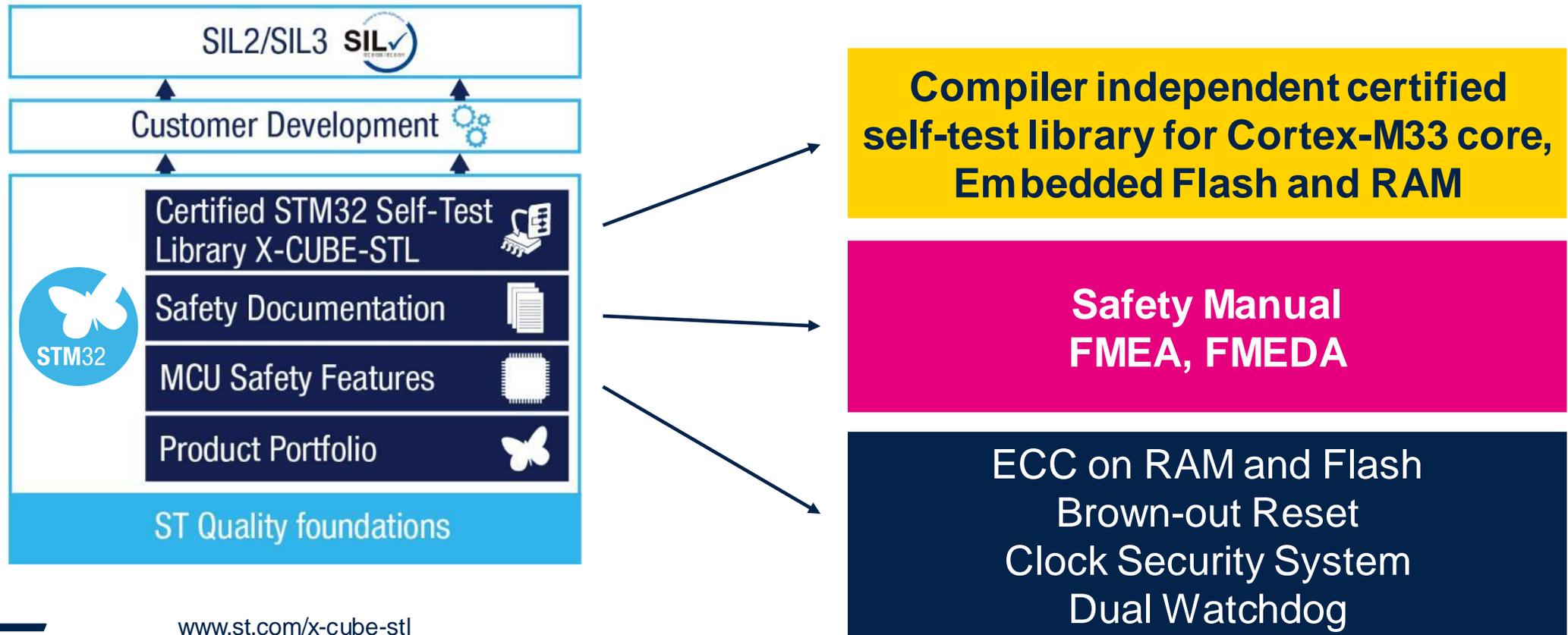
Securely flash the STM32 with licenses from a [STM32HSM](#) at the programming partner location

Control the [number of devices](#) programmed with the firmware



SIL functional safety package for STM32

Reduce time and cost of your IEC 61508 certified system

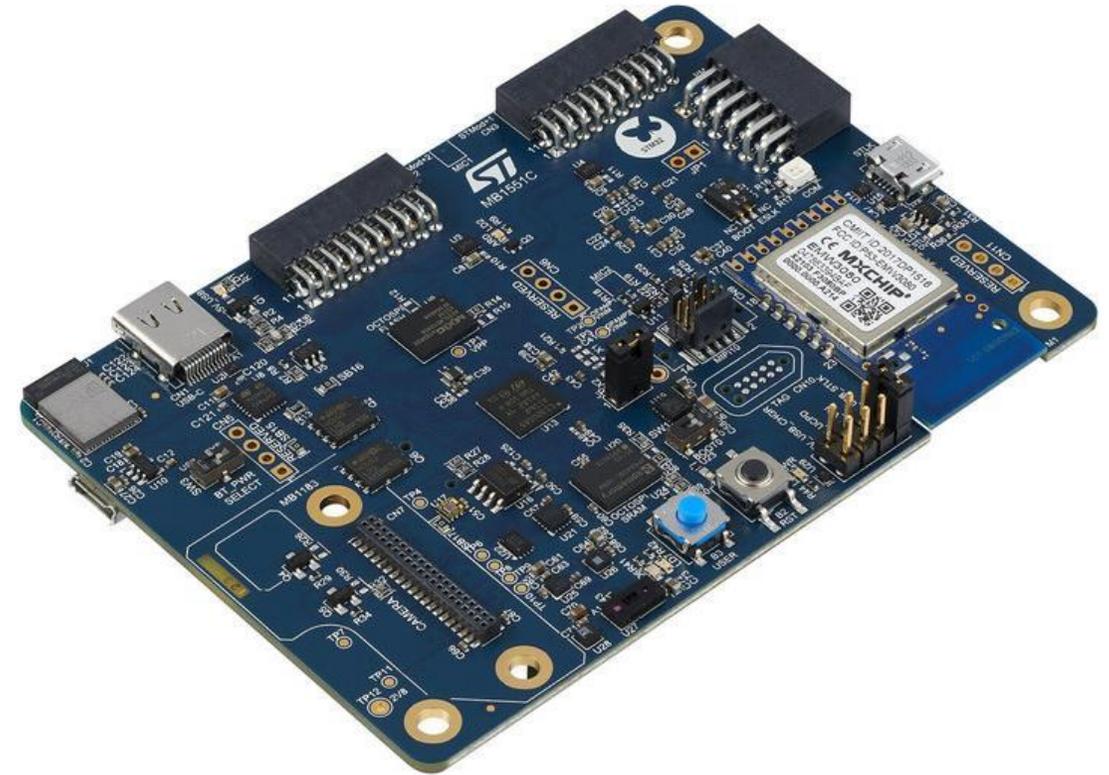




STM32U5 in open-source frameworks

STM32U5 is ready for communities' contribution

arm
MBED





Azure IoT Platform certified for Azure IoT Plug and Play

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



B-U585HOT02A

STM32
CubeExpansion

X-CUBE-Azure

Visualization of real sensor data

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

Based on Azure RTOS software components

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



AWS IoT Platform Qualified for AWS IoT Core

Reference implementation supporting AWS IoT Services



B-U585HOTO2A



AWS-Qualified FreeRTOS reference integration

Leveraging ARM Trusted Firmware-M (TF-M)

FreeRTOS LTS open-source middleware

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

Releasing your creativity



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[wiki.st.com/stm32mcu](#)



[github.com/stm32-hotspot](#)



[STM32U5 blog articles](#)



[STM32 MCU Developer Zone](#)



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Our technology starts with You



Find out more at www.st.com/STM32U5

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