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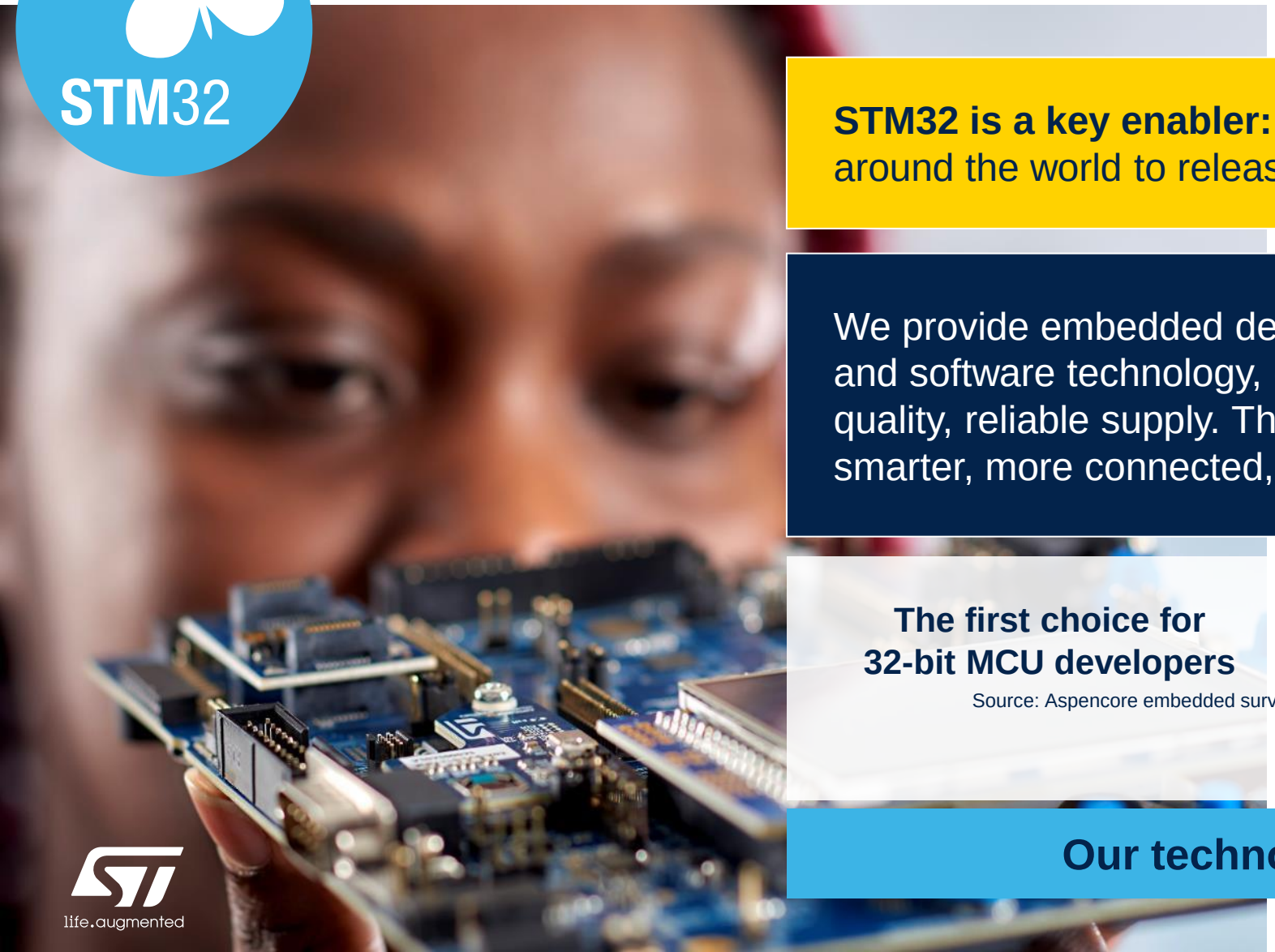
Releasing your creativity

Discover the STM32 family of microcontrollers & microprocessors

STM32

STM32: a developer-first strategy since 2007



STM32 is a key enabler: empowering embedded developers around the world to release their creativity.

We provide embedded developers with cutting-edge hardware and software technology, comprehensive support, and high-quality, reliable supply. This helps them build designs that are smarter, more connected, and more secure.

The first choice for 32-bit MCU developers

Source: Aspencore embedded survey, 2022

#1 GP MCU Worldwide

Source: OMDIA CLT, 2022,2023

100,000+ customers

Our technology starts with You

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Supporting developers' needs

STM32

More wireless connectivity

More advanced security

STM32 Trust

More autonomous decisions embedding AI

More application specific added value IP

More wired connectivity

Lower power

More computing power
32-bit CPU
Arm® Cortex® based
Real-time OS
(up to two cores)

Flexible memory interfaces

More embedded flash — Optional

What the STM32 family offers

Real-time performance

- Powerful Cortex® cores
- Multicore performance
- Fast interfaces
- Hardware accelerators

Outstanding power efficiency

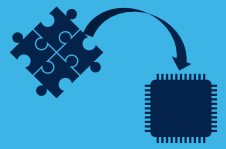
- Ultra-low dynamic power consumption
- Long lifetime, small battery
- Sustainable technology

Advanced, innovative peripherals

- Graphic acceleration
- Digital & analog peripherals
- USB Type-C®
- Peripherals for wireless and edge AI solutions

Optimized integration

- Best fit for application requirements (package size, cost, performance)
- Safety & security features



Extensive ecosystem

- Comprehensive development tools
- Wide range of partners
- Community support

3,300+ part numbers

Rolling 10-year longevity commitment for continuous supply

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The STM32 portfolio

Five product categories

- **Wireless MCU** — Short- and long-range connectivity
- **Ultra-low-power MCU**
- **Mainstream MCU**
- **High-performance MCU**

  32-bit general-purpose microcontrollers: from 75 to 3,224 CoreMark score
- **Embedded MPU** — 32- and 64-bit microprocessors





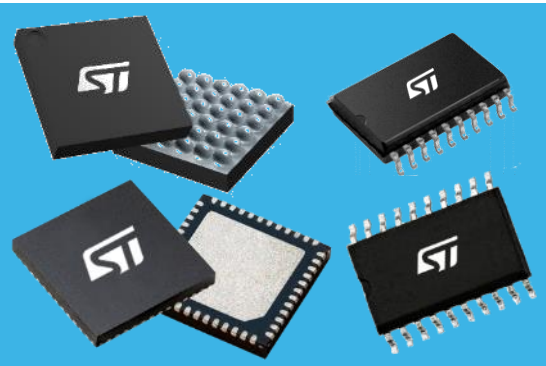
Enabling edge AI solutions

Scalable security

MPU portfolio

MCU portfolio

Addressing entry-level to high-performance applications



90+ package types
from 5 to 784 mm²

20- to 68-pin QFN
18- to 208-pin WLCSP
20-pin TSSOP
8-pin SO
32- to 208-pin LQFP
64- to 240-pin(+25) BGA

3,300+ part numbers

Multiple memory options

From 8 Kbytes to 4 Mbytes flash memory
From 2 Kbytes to 2 Mbytes RAM

STM32C0

8 pins
16 Kbytes flash memory
32 MHz

XXS

XXL

STM32H7

240 pins
2 Mbytes flash memory
550 MHz

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STM32 portfolio

LONGEVITY 10 YEARS COMMITMENT

MPU

STM32MP1
Up to 1 GHz Cortex-A7
209 MHz Cortex-M4

STM32MP2
Dual 1.5 GHz Cortex-A35
400 MHz Cortex-M33

High-performance MCUs

STM32F7
1082 CoreMark
216 MHz Cortex-M7

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

STM32N6
MCU with neural processing unit

STM32F2
Up to 398 CoreMark
120 MHz Cortex-M3

STM32F4
Up to 608 CoreMark
180 MHz Cortex-M4

STM32H5
Up to 1023 CoreMark
250 MHz Cortex-M33

Mainstream MCUs

Mixed-signal MCUs

STM32F3
245 CoreMark
72 MHz Cortex-M4

STM32G4
569 CoreMark
170 MHz Cortex-M4

STM32C0
114 CoreMark
48 MHz Cortex 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+

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+

STM32WB0
64 MHz Cortex-M0+

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

STM32WBA
407 CoreMark
100 MHz Cortex-M33

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Latest product generation ● Radio co-processor only New series introduced in 2023 Pre-announcement

STM32 high-performance MCUs

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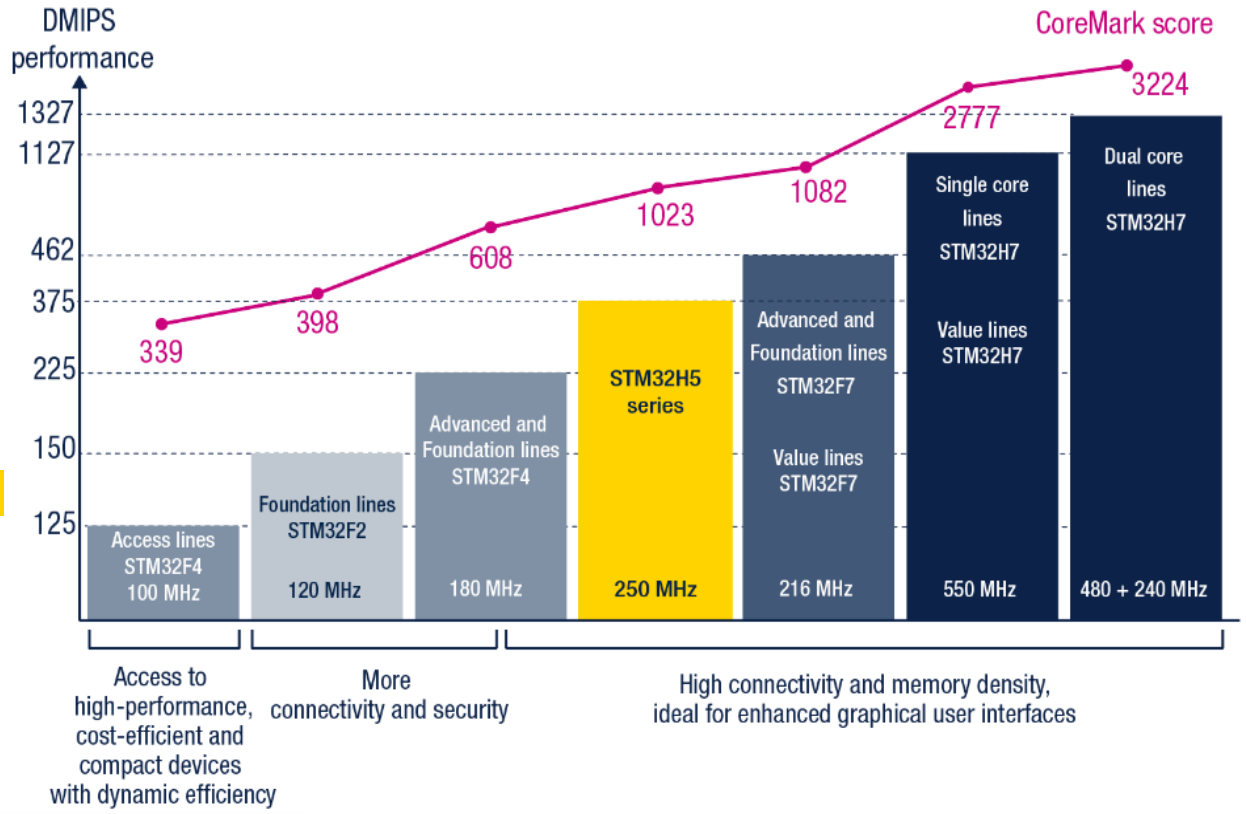
STM32 high-performance MCUs

Up to 3224 CoreMark and a rich set of peripherals

STM32**H7**	• Dual Arm® Cortex®-M7 + Cortex®-M4 FPU at 480 MHz • 1327 DMIPS and up to 550 MHZ. 1177 DMIPS on single core Arm® Cortex®-M7 • From 512 Kbytes to 2 Mbytes of flash memory • Very high performance with embedded flash & external memories
STM32**F7**	• Arm® Cortex®-M7 + FPU at 216 MHz – 462 DMIPS • From 256 Kbytes to 2 Mbytes of flash memory • Very high performance with embedded flash & external memories
STM32**H5**	• Most powerful Arm® Cortex®-M33 MCU yet – 375 DMIPS • From 128 Kbytes to 2 Mbytes of flash memory • Industry 4.0 and smart homes **LATEST GENERATION**
STM32**F4**	• Arm® Cortex®-M4 + FPU up to 180 MHz – 225 DMIPS • From 64 Kbytes to 2 Mbytes of flash memory
STM32**F2**	• Arm® Cortex®-M3 at 120 MHz – 150 DMIPS • From 128 Kbytes to 1 Mbyte of flash memory • Foundation lines for performance and connectivity



STM32N6 preannouncement: more information coming soon.

STM32H5 MCU series for high performance designs

Most powerful Arm® Cortex®-M33 MCU

Industry-first 32-bit MCU with Arm® Cortex®-M33 core running as high as 250 MHz.

Scalable security to address every need

From the most essential security building blocks to fully certified services maintained by ST. First STM32 with TEE.

Optimized cost/performance trade-off

Based on ST's optimized 40 nm process technology.

Large choice of memory, peripherals, and package options.

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STM32 mainstream MCUs

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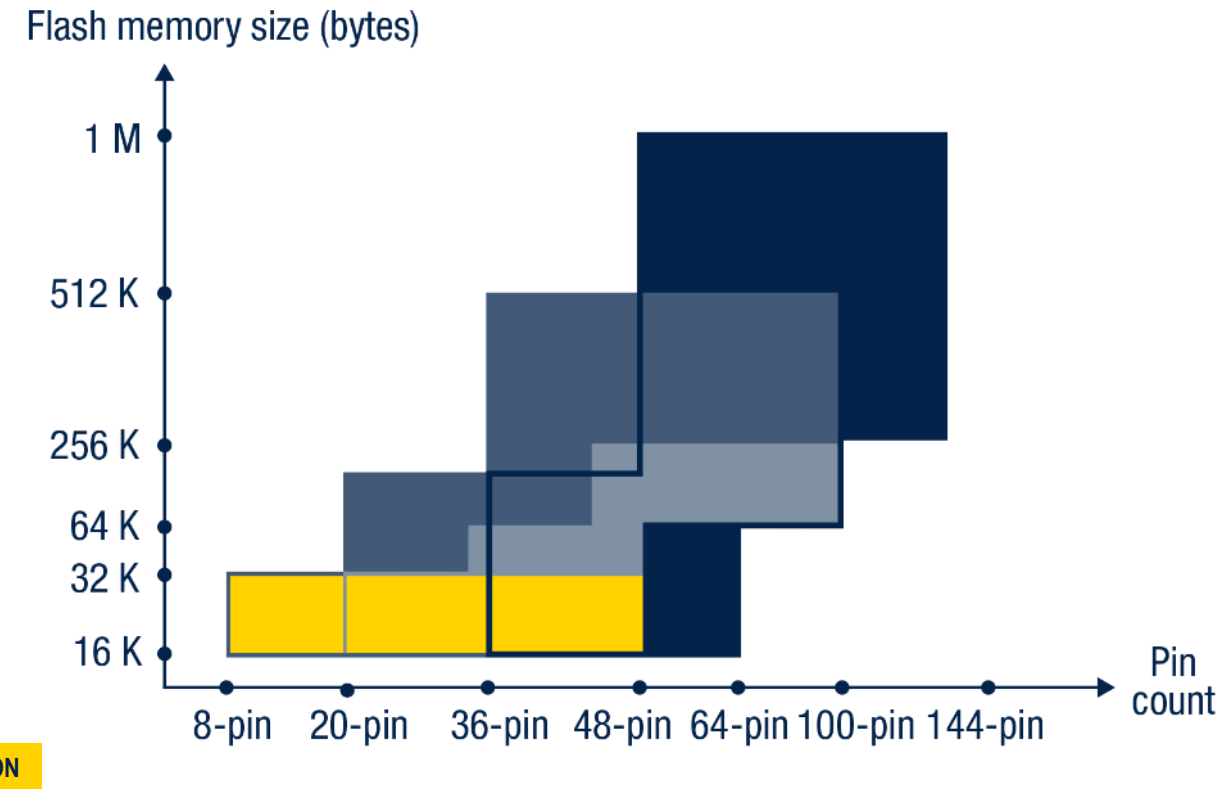
STM32 mainstream MCUs

Addressing a large variety of general-purpose applications

STM32**F1**	• Arm® Cortex®-M3 72 MHz – 61 DMIPS • Performance and peripherals, user-friendly tools
STM32**G0**	• Arm® Cortex®-M0+ at 64 MHz – 59 DMIPS • Maximum IO count per package • Advanced function: analog, low-power, control
STM32**F0**	• Entry-level MCU for cost-sensitive operations • Arm® Cortex®-M0 at 48 MHz – 38 DMIPS
STM32**C0**	• Arm® Cortex®-M0+ FPU at 48 MHz – 44 DMIPS • Most affordable 32-bit MCU LATEST GENERATION



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STM32C0 MCU series
Your next 8-bit MCU is a 32-bit!

Streamline costs without compromising performance with ST's most affordable 32-bit MCU.

Affordability
Helps you reduce costs thanks to an attractive price point and an optimized BOM.

Reliability
Benefits from proven STM32 quality & reliability.

Continuity
Consistent pinout with STM32G0 & shares same technological platform.

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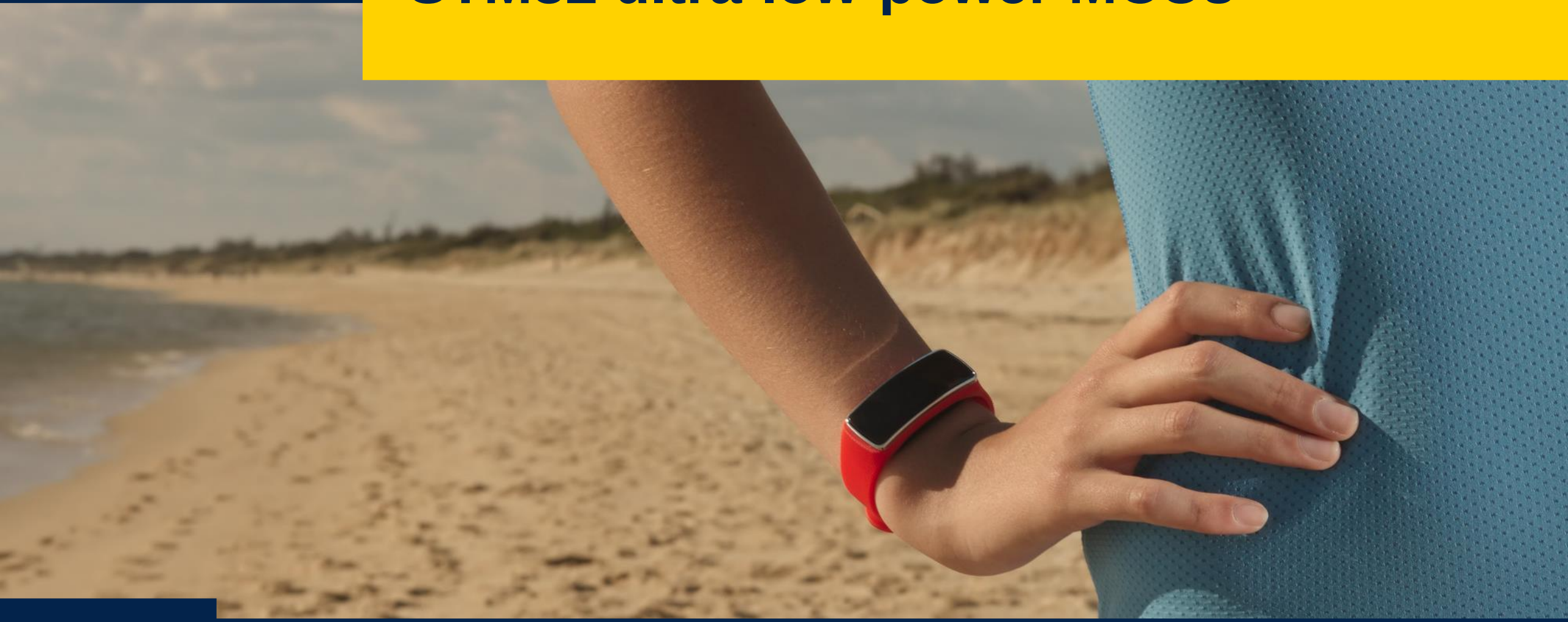
STM32 ultra-low-power MCUs



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STM32 ultra-low-power MCUs

Ultra-low-power, market-proven solutions
150 DMIPS performance

STM32U5
- Arm® Cortex®-M33 + FPU at 160 MHz
- From 128 Kbytes to 4 Mbytes of flash memory
- Lowest power mode + RAM + RTC: 0.35 µA
- For IoT nodes and graphics

NeoChrom GPU

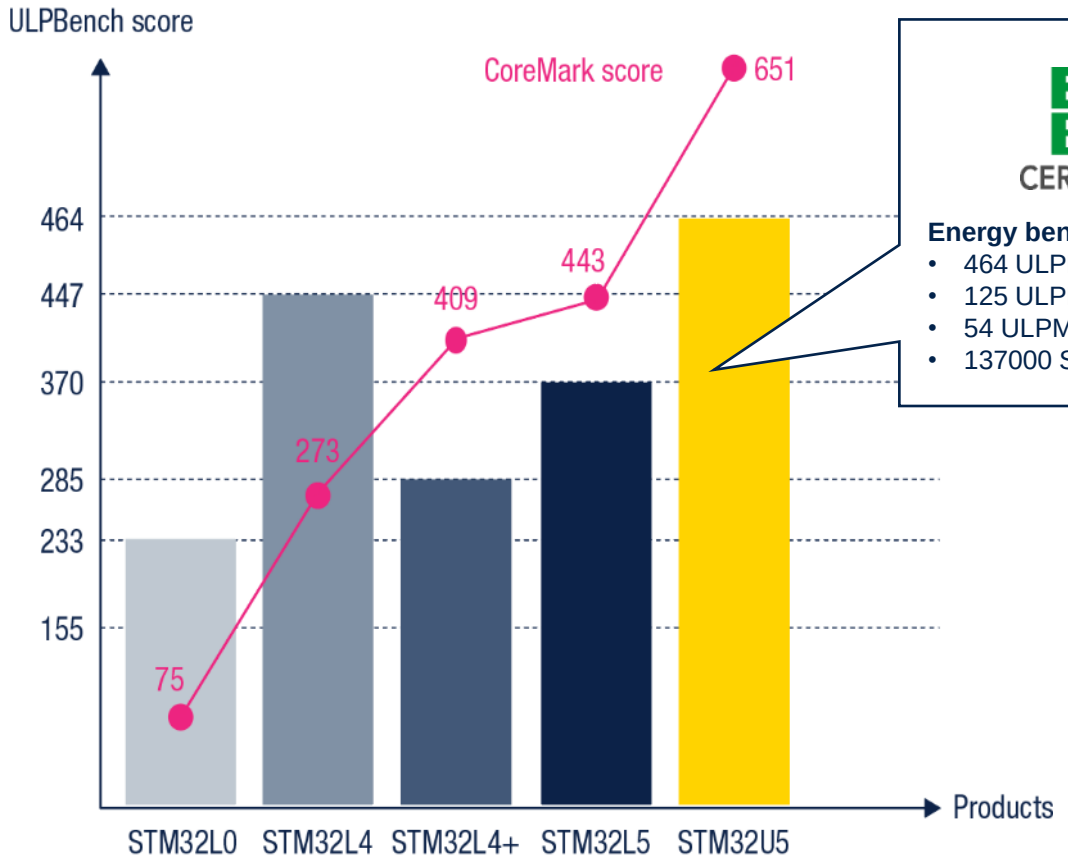
LATEST GENERATION

STM32L5
- Arm® Cortex®-M33 + FPU at 110 MHz
- From 256 to 512 Kbytes of flash memory
- Lowest power mode + RAM + RTC: 0.35 µA

STM32L4+
- Arm® Cortex®-M4 + FPU at 120 MHz
- From 512 Kbytes to 2 Mbytes of flash memory
- Lowest power mode + RAM + RTC: 0.39 µA

STM32L4
- Arm® Cortex®-M4 + FPU at 80 MHz
- From 64 Kbytes to 1 Mbyte of flash memory
- Lowest power mode + RAM + RTC: 0.34 µA

STM32L0
- Arm® Cortex®-M0 at 32 MHz
- From 8 to 192 Kbytes of flash memory
- Lowest power mode + RAM + RTC: 0.67 µA



EEMBC CERTIFIED

Energy benchmark
- 464 ULPMark-CP
- 125 ULPMark-PP
- 54 ULPMark-CM
- 137000 SecureMark TLS

STM32U5 MCU series
the flagship of ultra-low-power MCUs

For IoT & embedded applications.
Up to 4 Mbytes of flash memory.

1st MCU certified by the NIST*

High energy efficiency/integration

Innovative power management features. Low Power Background. Autonomous Mode (LPBAM), DMA, and IP autonomous in LP mode.

High security & safety

AES and PKA, side attack resistant. PSA/SESIP level 3 certified. ECC on flash memory and SRAM.

Enhanced graphic performance

First STM32 with advanced graphics accelerators (ART Accelerator) & NeoChrom GPU based on Arm® Cortex® -M33 running at 160 MHz.

**** the National Institute of Standards and Technology*** promotes U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

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STM32 wireless MCUs

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STM32 wireless MCUs

The ideal fit for RF designers looking for more than just a radio device

STM32**WBA**

- Arm® Cortex®-M33 w/ **TrustZone®** @ 100 MHz
- **1 Mbyte of** flash memory / **128 Kbytes** RAM
- Bluetooth® Low Energy 5.3 (long-range, 2 Mbps, adverting extension)
- Up to **+10 dBm** output power
- Enhanced security

Bluetooth 5

LATEST GENERATION

STM32**WB**

- **Dual core** & security (Arm® Cortex®-M4 /-M0+)
- Up to **1 Mbyte flash- memory/ 256 Kbytes RAM**
- Bluetooth® Low Energy 5.4, Zigbee R22 & Thread, proprietary, Matter Q4'23

OPENTHREAD released by Google · matter · Bluetooth 5 · Zigbee 3.0

STM32**WB0**

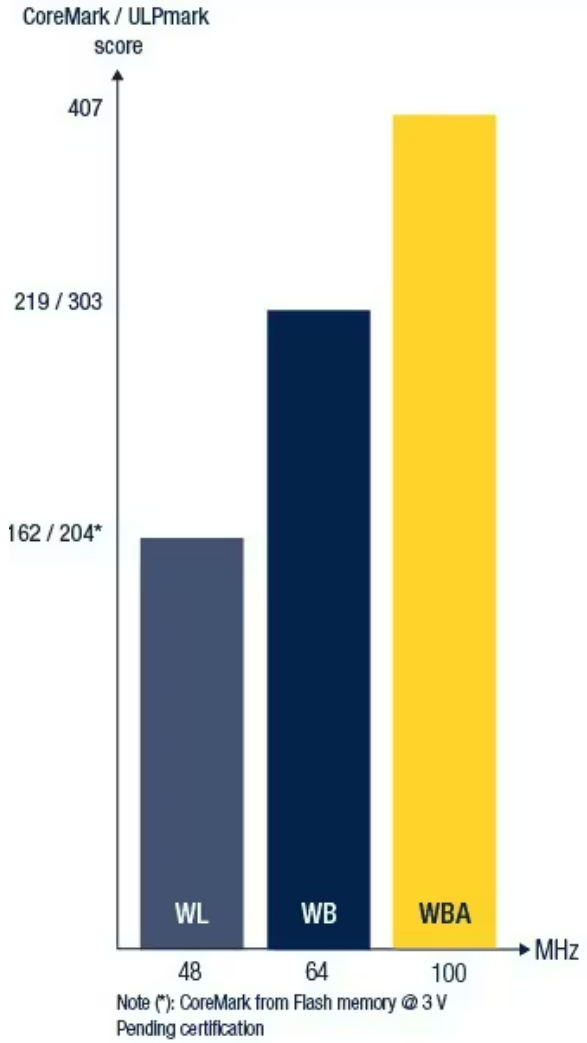
- Arm® Cortex®--M0+ at 64 MHz
- Up to **512 Kbytes of flash memory / 64 Kbytes RAM**
- Transceiver frequency: 2.4 GHz
- Power outputs: up to 8 dBm
- Bluetooth® Low Energy 5.3

Bluetooth 5

STM32**WL**

- World 1st MCU enabling **LoRa®, (G)FSK, (G)MSK, BPSK**
- Arm® Cortex®-M4 and -M0+ at 48 MHz supporting RF – 60 DMIPS
- Up to **256 Kbytes of flash memory / 64 Kbytes RAM**
- Transceiver frequency: 150 to 960 MHz
- Dual-power outputs: up to 22 dBm and up to 15 dBm (Embedded PAs)

LoRaWAN · Wireless M-Bus · sigfox · mioty



STM32WBA MCU series: performance, efficiency, and security for the IoT

Long-range wireless MCU, 2 Mbps, adverting extension +10 dBm, high security level

Certified for Bluetooth® Low Energy 5.3

Long range, 2 Msps, advertising extension.
With +10 dBm of output power for better robustness.

Arm® Cortex®-M33 running up to 100 MHz

407 CoreMark score.
100 K cycles for 256 Kbytes of flash memory.

Certified security for faster time to market

Featuring TrustZone® technology.
SESIP level 3 target certification.

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STM32WB0 MCU series: performance, efficiency, and security for the IoT

Short-range wireless MCU, 2 Mbps, adverting extension
+8 dBm, isochronous channel, high security level

Certified for Bluetooth® Low Energy 5.3

Upgradable, highly modular and robust Bluetooth® Low Energy stack, developed and maintained by ST.

High wireless performance

System performance: Arm® Cortex® -M0+ core at 64 MHz
Best-in-class radio enabling robust and stable connectivity

Longer battery life for IoT devices

High efficiency: 15.5 µA/MHz from Cortex-M0+ and
3.9 mA radio peak Tx current / 3.2 mA radio peak Rx current

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STM32 microprocessors

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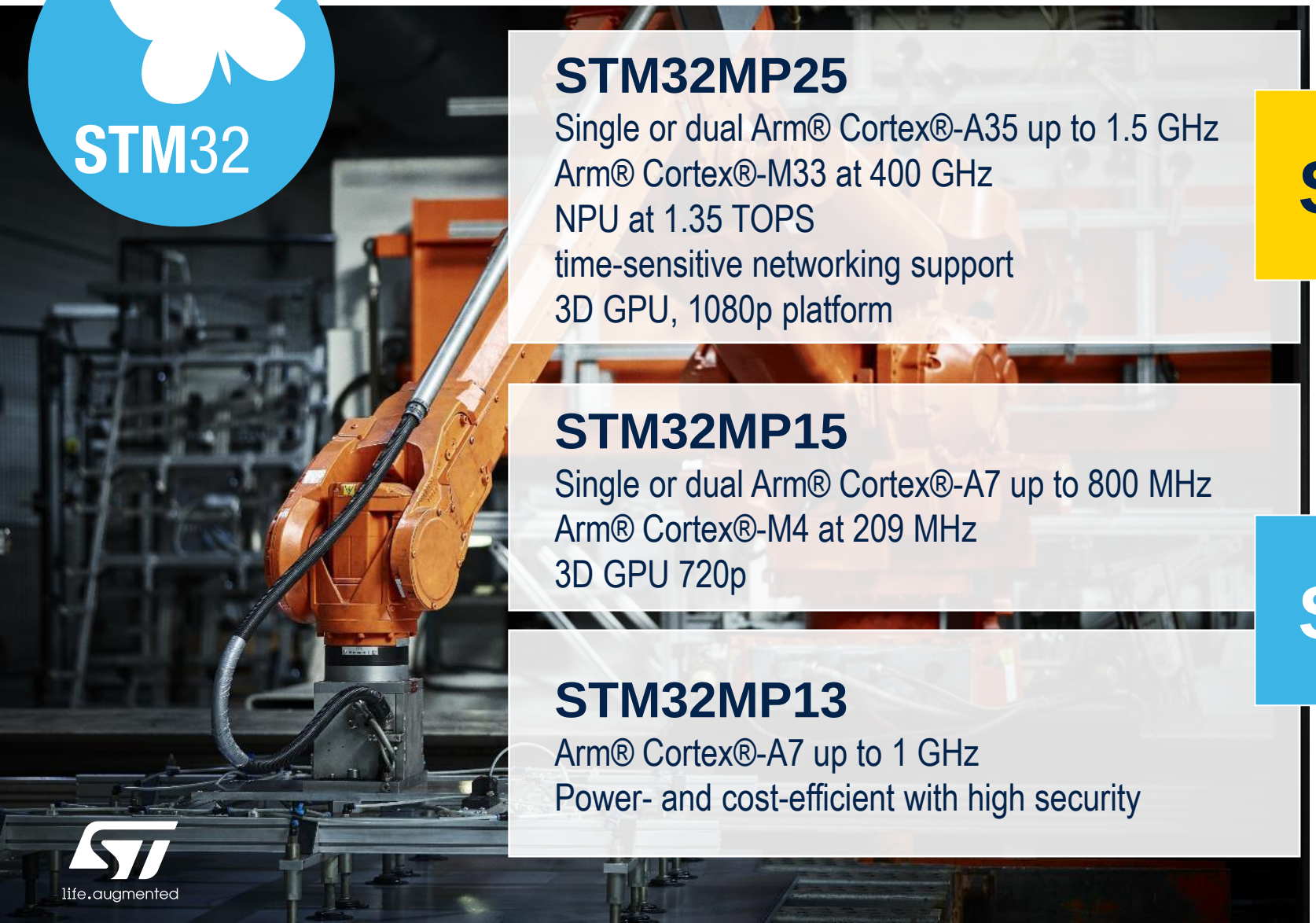
STM32 microprocessors
Making your industrial applications future-proof



STM32MP25
Single or dual Arm® Cortex®-A35 up to 1.5 GHz
Arm® Cortex®-M33 at 400 GHz
NPU at 1.35 TOPS
time-sensitive networking support
3D GPU, 1080p platform

STM32MP15
Single or dual Arm® Cortex®-A7 up to 800 MHz
Arm® Cortex®-M4 at 209 MHz
3D GPU 720p

STM32MP13
Arm® Cortex®-A7 up to 1 GHz
Power- and cost-efficient with high security

STM32MP2 series

Sampling at OEMs

STM32MP1 series

Mass market availability

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STM32MP13 MPU lines

Cost-efficient MPUs for industrial and secure applications

Power efficiency

- Best-in-class consumption in low power modes
- Over 90% energy savings in standby and VBAT modes

Certified security services for faster time to market

- SESIP L3 and PSA certified
- PCI ready

Accessible

- Strong, user-friendly ecosystem (OpenSTLinux, Linux-RT, RTOS)
- PCB layout reference designs

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STM32MP2 MPU series
a step up in performance

Next-gen STM32 MPUs for Industry 4.0 and edge AI solutions

Microprocessors for advanced edge computing

- 64-bit MPU with neural processing unit (NPU)
- 1.35 TOPS (tera operations per second)

Extended connectivity

- Time-sensitive networking (TSN)
- Up to 3 gigabit Ethernet ports (2-port switch)

Advanced multimedia

- 1080p graphics capabilities (3D GPU, H.264 hardware video Codec)
- RGB, MIPI DSI and LVDS displays

Sampling Q4 2023 / Production Q2 2024

Developer-first strategy: STM32Cube

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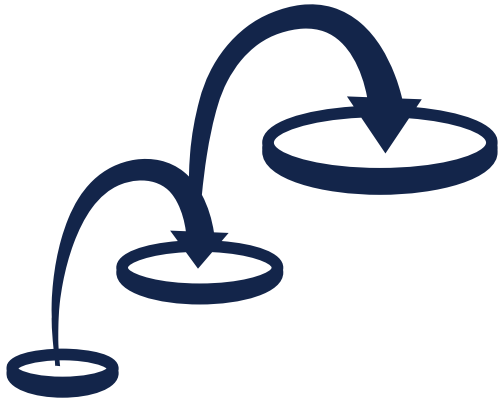
STM32Cube design ecosystem

Hardware tools and software helping you every step of your design journey



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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

MCU, boards & software selection

Hardware and software configuration

Application development and debugging

Code & hardware programming

Runtime application monitoring

STM32 Finder

STM32 CubeMX

STM32 CubeMCU Packages

STM32 CubeExpansion

STM32 CubeIDE

STM32 CubeProgrammer

STM32 CubeMonitor

Verticals and partners solutions

IDEs from Partners

Programmers from Partners

Worldwide support channels

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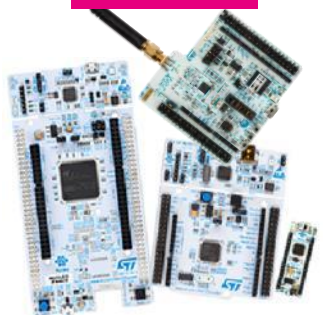
STM32 hardware evaluation tools

Easy prototyping, accurate evaluation, and board design references

$10 → $30*



STM32 Nucleo boards

Flexible prototyping

70+ references

$10 → $100*

Discovery kits

Evaluating key features

40+ references

$100 → $500*

Evaluation boards

Full feature evaluation

25+ references

Expansion boards | **Accessories**

Add-on functionalities

100+ references

Partner boards

From full evaluation to open hardware

20+ references

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**recommended resell price (RRP)*

STM32CubeMCU Packages

Efficient and flexible access to the MCU features

LL drivers	HAL drivers
Lower abstraction level	Higher abstraction level
Lower code size	Higher portability and reuse

MISRA C compliant, statically analyzed, rigorously tested

Large set of production-ready examples

Available from st.com, GitHub, or STM32Cube tools

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STM32CubeMCU Packages

Faster development with an optimized and ported selection of market-reference middleware stacks

Middleware	Expansions
AzureRTOS ThreadX and FreeRTOS™ **AzureRTOS USBX** With support of audio, CDC, HID, DFU, PIMA, Printer, and storage host and device classes **AzureRTOS NetXDuo** With support of TCP, UDP, IPv4, IPv6, http, MQTT, LWM2M, FTP, PPP, SMTP, and telnet **FileX and levelX** **USB PD and open bootloader** **Secure boot, Secure Manager API**	**TouchGFX graphics solution,** **Motor control,** **Artificial intelligence** **MEMS and sensors** **Secure cloud connectors** **Functional Safety self-test library**

A large set of applicative examples

Available from st.com, GitHub, or STM32Cube tools

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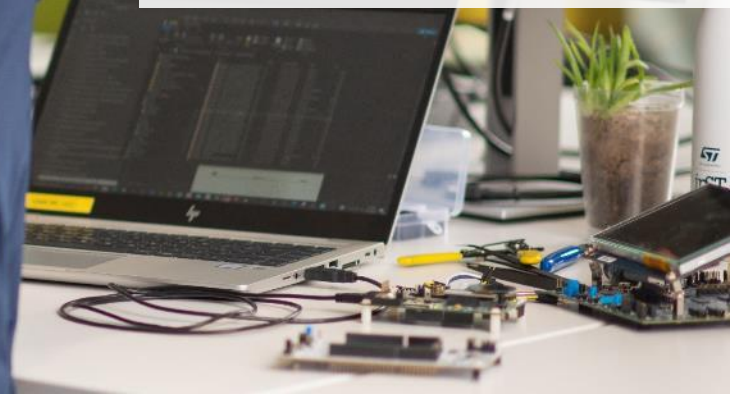
STM32 Developer Zone for MCUs & MPUs

Everything for STM32 MCU developers, in one place

A user-friendly environment to help developers every step of their design journey

Direct access to products, hardware and software tools, embedded software, developer resources



STM32 MCU Developer Zone

STM32 MPU Developer Zone

Watch the short video

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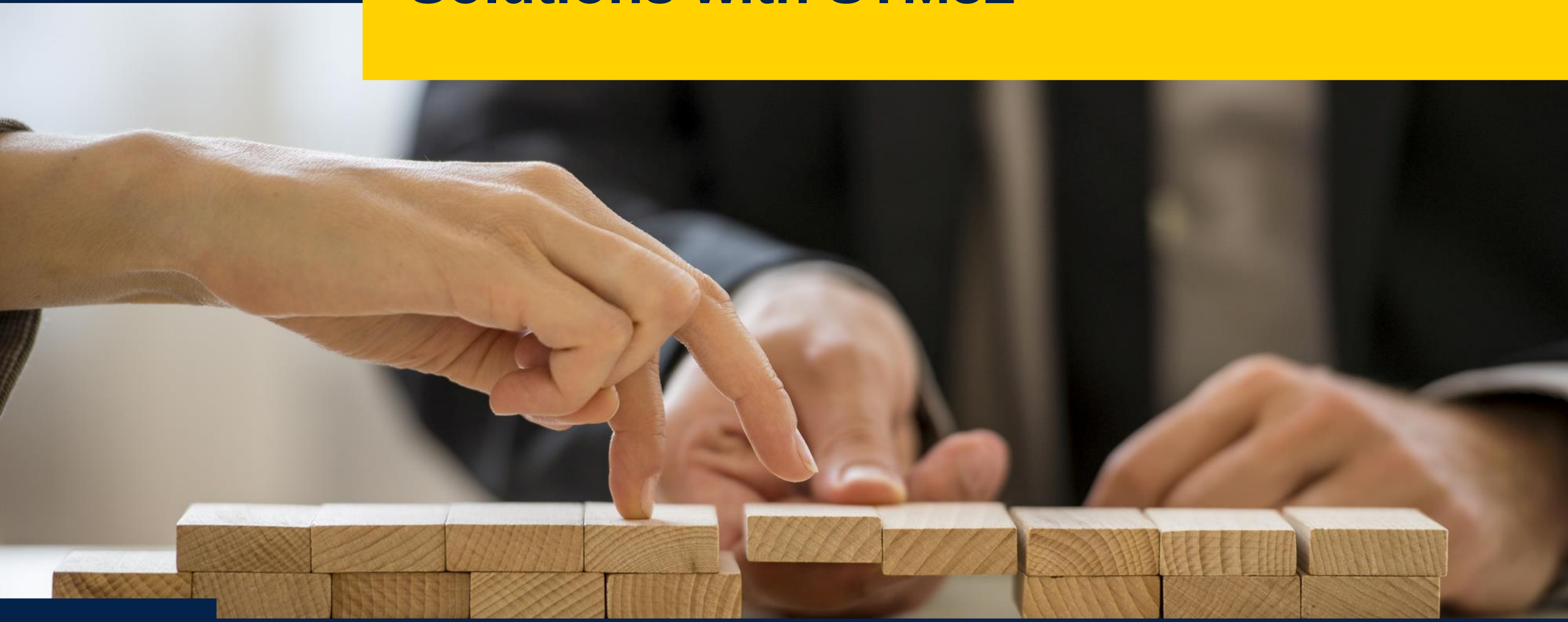
A growing base of partners addressing customer challenges

- Software development tools
- Training
- Hardware development tools
- Engineering services
- Embedded software
- Design houses
- Evaluation boards
- Global services
- Development boards
- Companion devices
- Hardware integrated devices

Click to discover our partners

Solutions with STM32



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Helping you build advanced HMIs with a comprehensive STM32 graphics offering

STM32 hardware

TouchGFX

STM32 software

GUI development tools, GUI code Examples, library of graphical assets

Extensive Ecosystem

NeoChrom GPU

Introducing NeoChrom GPU

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

Watch demos, tutorials and more

Making edge AI more accessible with STM32 solutions

- 3 products for embedded developers and data scientists

AD + LOD
SENSING

NANOEDGE AI STUDIO

User-friendly Auto-ML tool for STM32 MCUs

SENSING
AUDIO
VISION

STM32 Cube.AI

AI model optimizer and code generator for STM32 MCUs

SENSING
AUDIO
VISION

X-LINUX-AI

A complete AI framework for STM32 MPUs

- Covering a broad variety of applications

ANOMALY DETEC. + L.O.D.

- Anomaly detection
- Predictive maintenance
- Learning on device

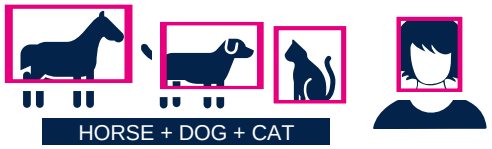
SENSING

- Sensor analysis
- Activity recognition (motion sensors)
- Stress analysis or attention analysis

AUDIO

- Audio (key word, scene detection)
- Speech (sentences) recognition
- Speech synthesis

VISION



- Multiple object detection
- Face/object analysis (face detection)

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stm32ai.st.com

Fast-track your certification journey to meet functional safety standards with STM32

ST provides certified **functional safety packages** and documentation based on robust built-in MCU/MPU safety features.

- **SIL functional safety package**
  for industrial IEC 61508 (STM32)
- **ASIL functional safety package**
  for automotive ISO 26262 (STM8A)
- **Class B functional safety package**
  for household electrical appliances
  IEC 60335-1/60730-1 (STM32 & STM8)

SIL Ready

ASIL Ready

ClassB Ready

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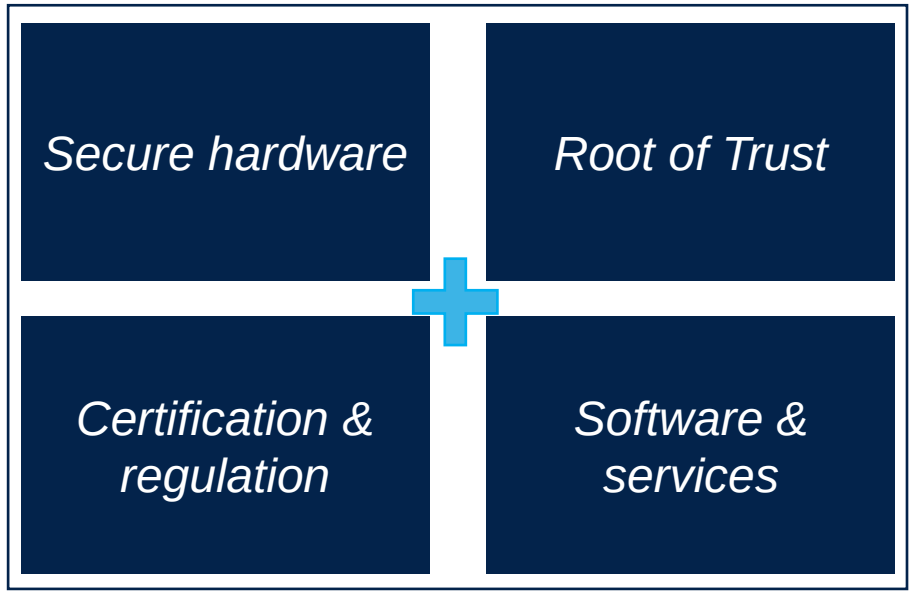
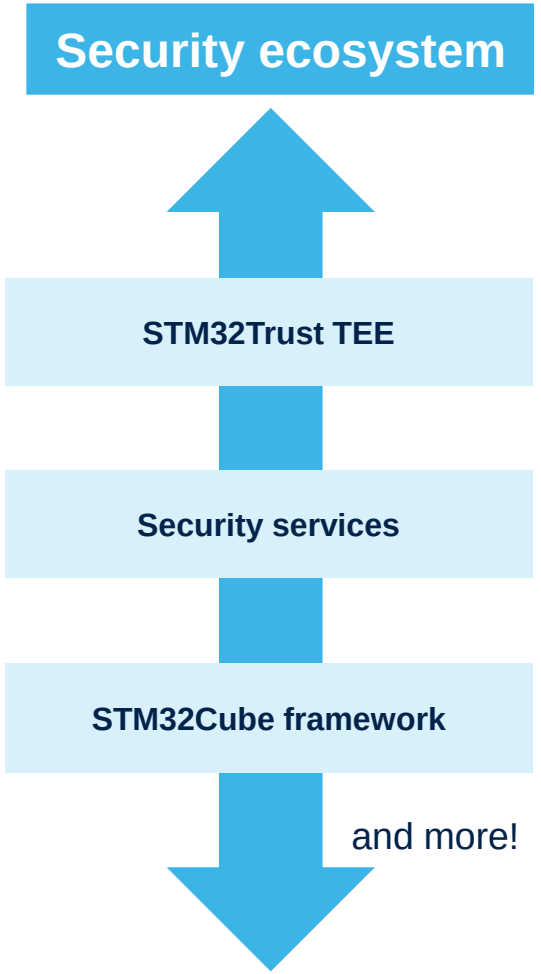
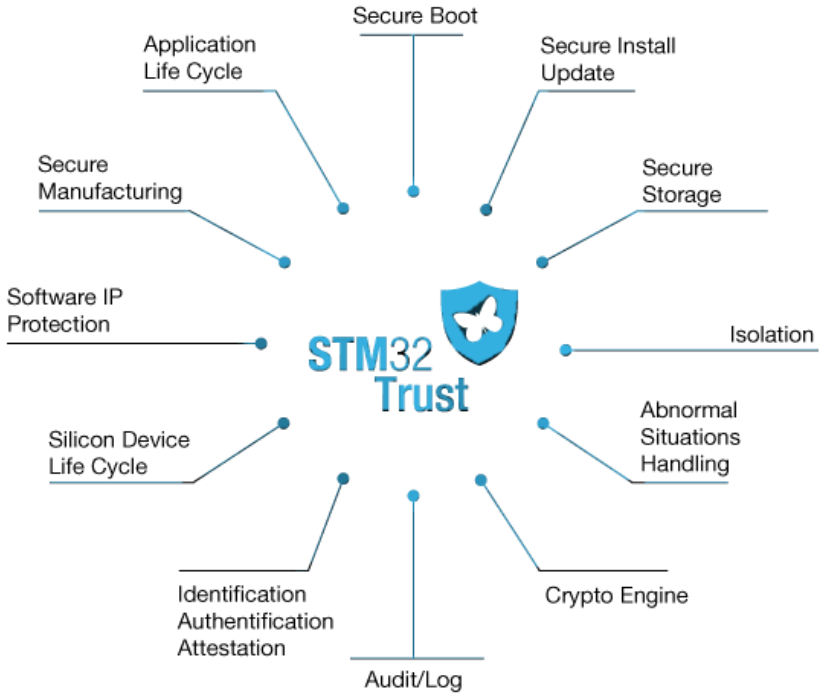
Security in STM32

Building trust in embedded systems: the pillars of STM32Trust



psacertified™ SESIP™





Provide the right levels of security assurance thanks to the STM32Trust security functions

www.st.com/STM32Trust

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STM32Trust – target certifications

MPU		PSAL1 STM32**MP15**	PSAL1 SESIPL3 STM32**MP13**
High-performance MCUs		PSAL1 STM32**H7**	PSAL3 SESIPL3 STM32**H5**
Mainstream MCUs	PSAL1 STM32**G0**	PSAL1 STM32**G4**	PSAL1 STM32**C0**
Ultra-low-power MCUs	PSAL1 STM32**L4/L4+**	PSAL1 SESIPL3 STM32**L5**	PSAL3 SESIPL3 STM32**U5**
Wireless MCUs			PSAL3 SESIPL3 STM32**WBA52**

SESIP™

psacertified™

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Motor control with STM32

Ease STM32 adoption for motor control

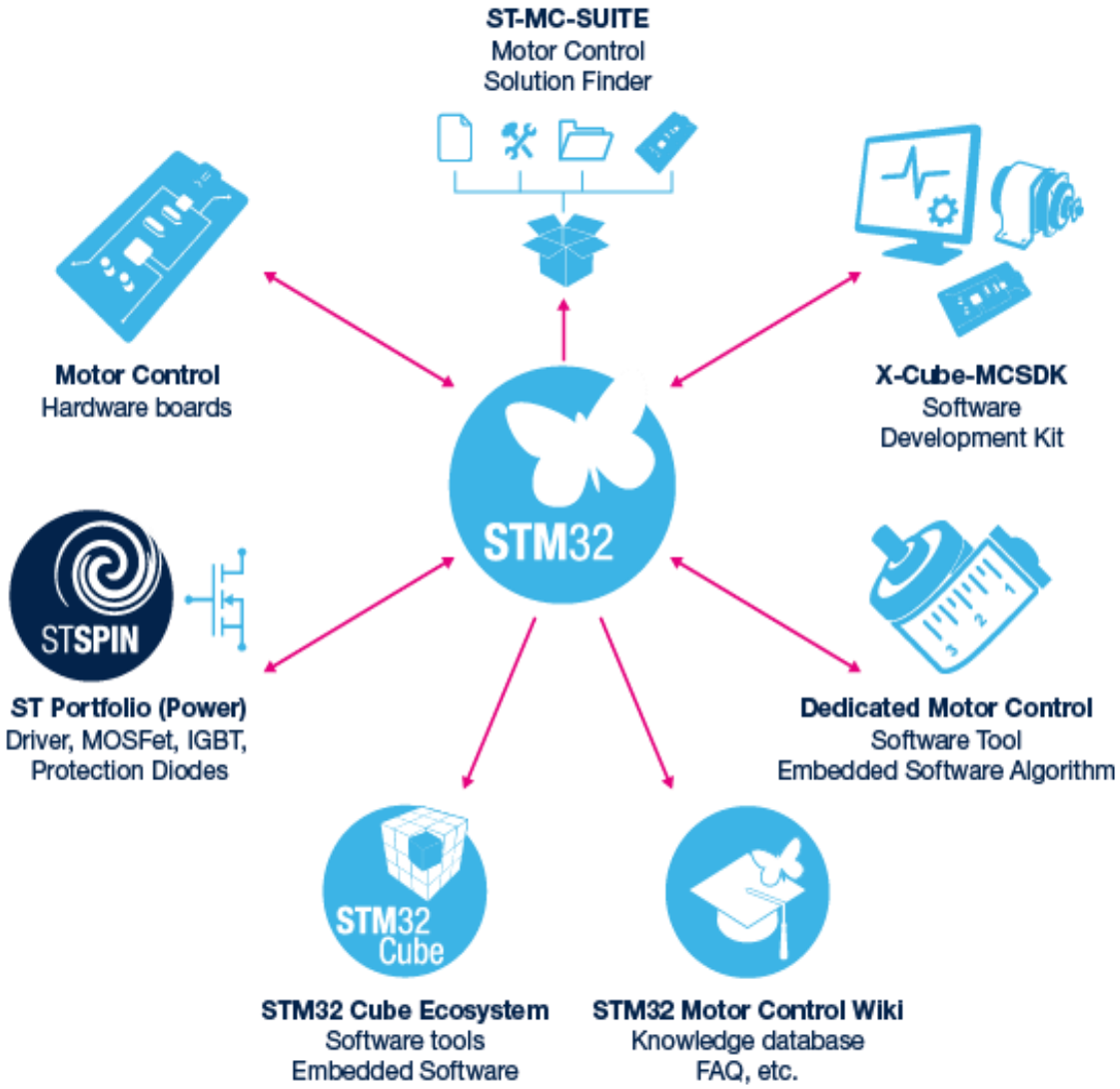
Providing development platform: MC-SDK (firmware library + workbench), MC pilot, MC profiler, hardware boards, documentation.

Innovative products/peripherals and software algorithms

- Advanced motor control timer
- Rich and advanced analog peripherals embedded in the STM32
- Motor profiler

Leverage ST portfolio

Large choice of power components and STM32 to create end-to-end motor control solutions.



Digital power with STM32

Ease STM32 adoption for digital power converters

Development platforms:
DP SDK (PFC and PSU topology examples generator, firmware lib), hardware boards, docs, development tools.

Innovative products/peripherals and software algorithms

- High-resolution timer supporting numerous digital power topologies
- Rich and advanced analog peripherals embedded in STM32
- Hardware coprocessor usage
- Biricha method implementation (ST Authorized Partner)

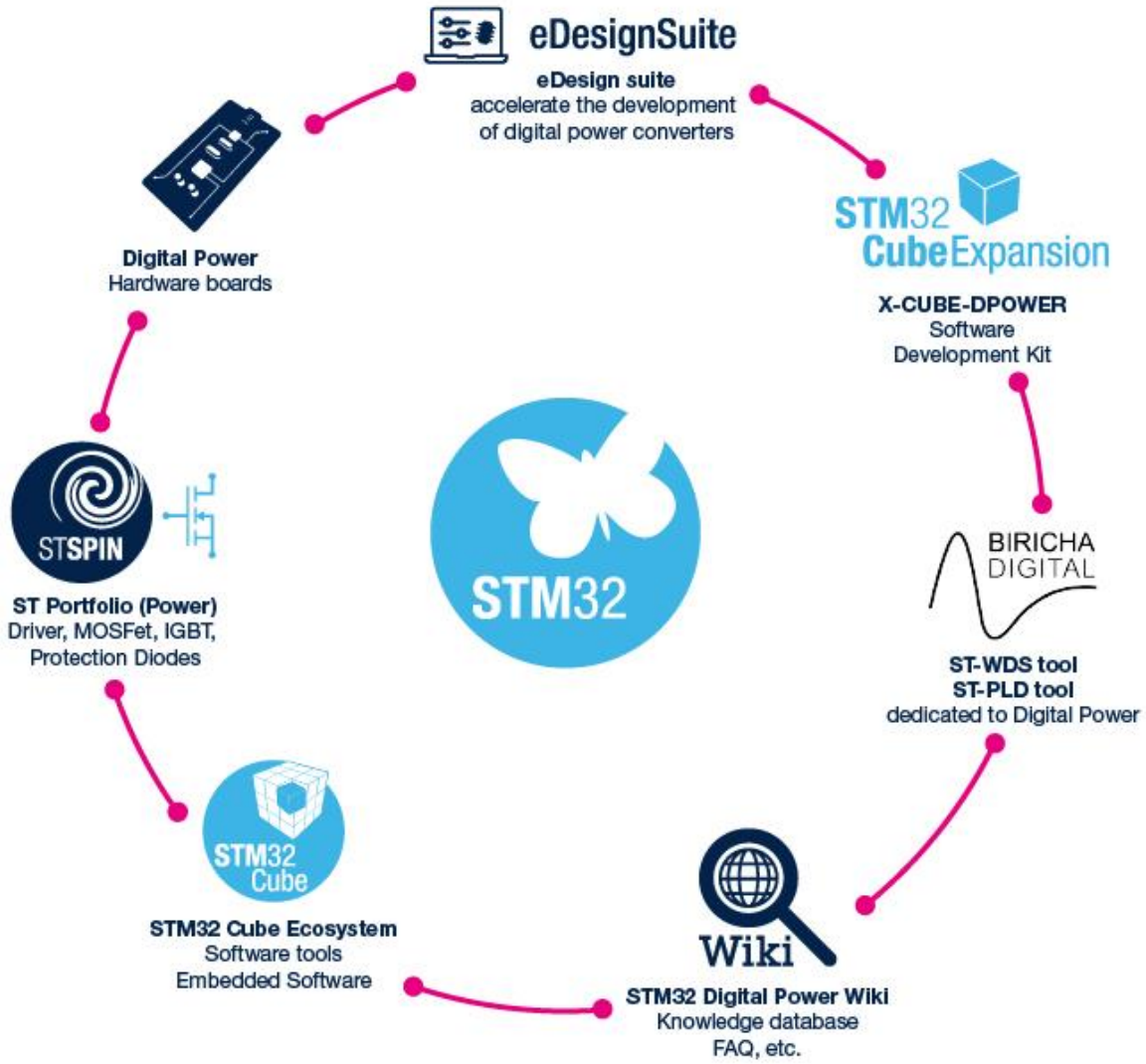
Leverage ST portfolio

Large choice of power components and STM32 to create end-to-end digital power solutions.

PFC and PSU within STM32CubeMX

Firmware pack importation with PFC and PSU topologies implementation in voltage or in current mode running on ST boards.

LATEST NEWS



STM32 for digital power

USB-C® and power delivery with STM32

More than 560 STM32 MCUs feature a certified USB Type-C® and PD3.1 controller

STM32 supports the latest USB-C® and PD3.1 standards

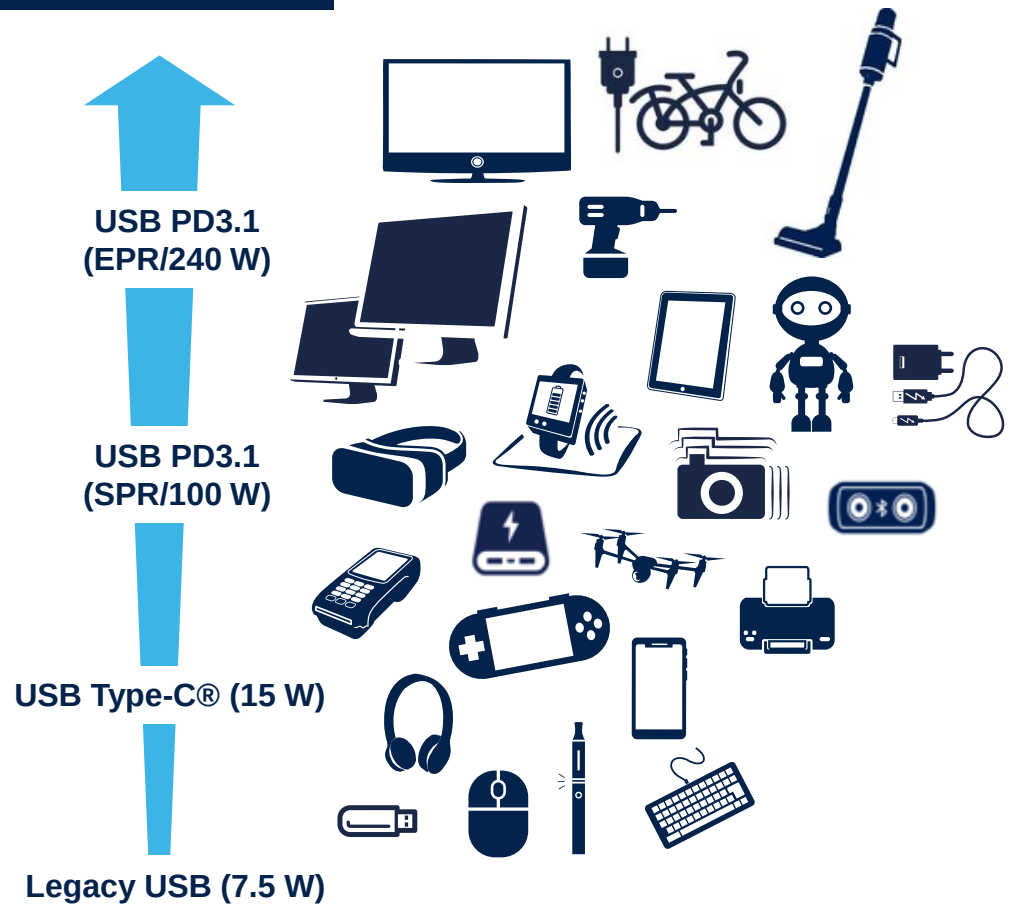
- SPR and EPR power range up to 240 W, PPS ready
- Sink, source, dual-role power and data roles

Optimize bill of material and safety

- CC logic, PD transceiver PHY, USB2 device/host interface
- Companion type-c port protection devices (TCPP0x)

Flexible solution and fast prototyping

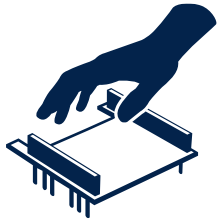
- Ready-to-use hardware and firmware examples
- Easy debug with STM32CubeMonUCPD software tool



www.st.com/STM32usbc

Resources to move forward with your design

Hundreds of thousands of developers are using STM32!
Join them, share insights, and accelerate your design.



FIND INSIGHTS

- Visit the STM32 Community
- STM32 MPU Wiki
- STM32 MCU Wiki
- GitHub–STMicroelectronics
- GitHub – STM32 hotspot

LEARN & PRACTICE NEW SKILLS

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