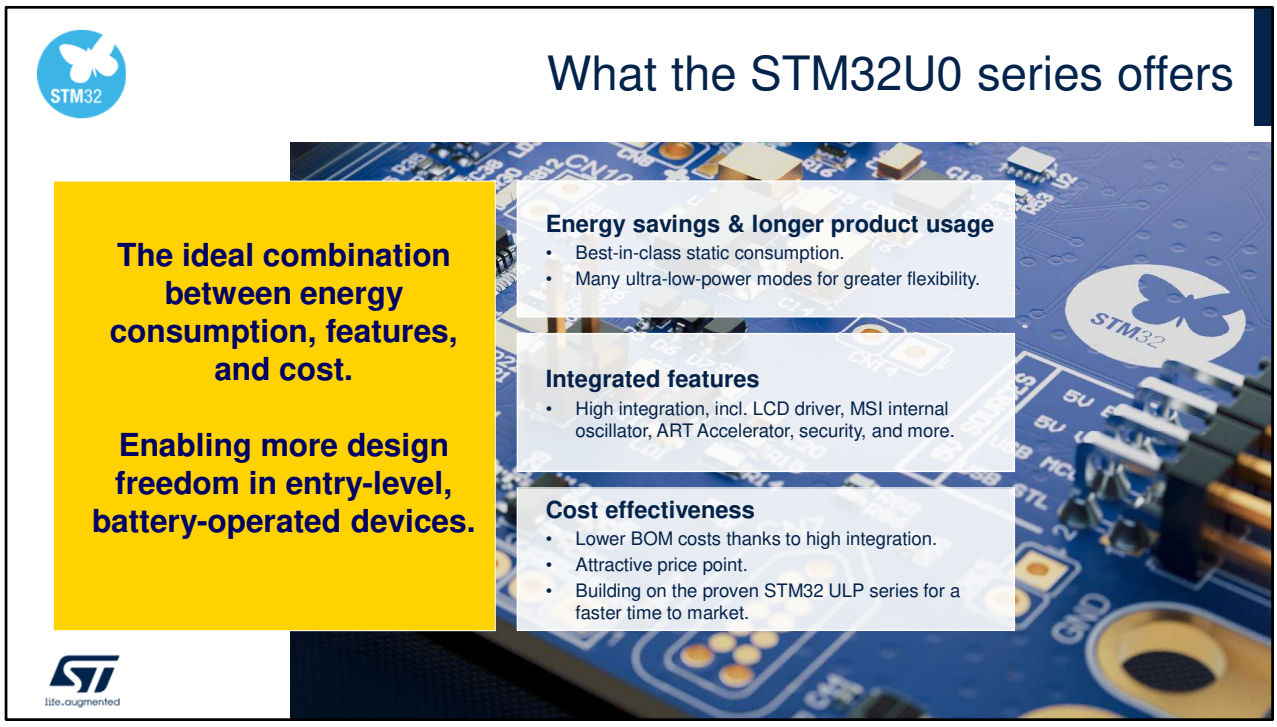
Hello, and welcome to this STM32U0 training session.

The STM32 family of 32-bit microcontrollers based on the Arm Cortex®-M processor is designed to offer new degrees of freedom to MCU users.
It offers products combining very high performance, real-time capabilities, digital signal processing, low-power / low-voltage operation, and connectivity, while maintaining full integration and ease of development.
The unparalleled range of STM32 microcontrollers, based on an industry-standard core, comes with a vast choice of tools and software to support project development, making this family of products ideal for both small projects and end-to-end platforms.
The STM32 family is split into five categories:

- Wireless MCUs,
- Ultra Low-Power MCUs, that include the STM32U0,

- Mainstream MCUs,
- High-performance MCUs,
- Embedded MPUs.



By incorporating best-in-class static consumption and multiple ultra-low-power modes, the STM32U0 series offers significant energy savings and a longer usage life.
A non exhaustive list of features supported by the STM32U0 includes:

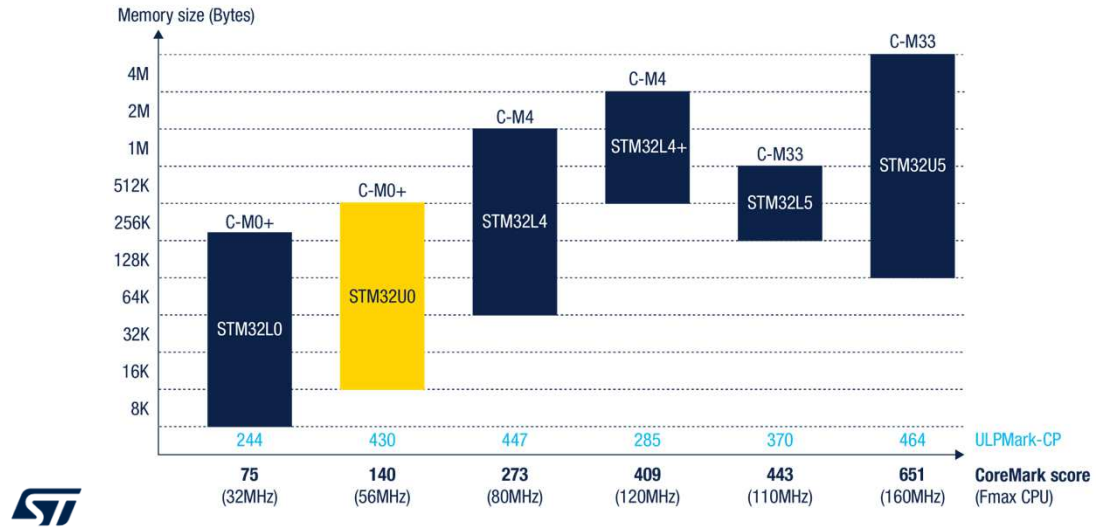
- LCD driver
- MSI internal oscillator
- Adaptive Real-Time (ART) accelerator block, that speeds up instruction fetch accesses of the Cortex-M0+ core
- Security features.

ART optimization further helps save energy by enabling more instructions per clock cycle.
This high level of integration minimizes the BOM costs, leading to attractive price point.

STM32U0 unlocks design freedom in entry-level, battery-operated device.
The domains for which the STM32U0 features fit perfectly are

- Industrial
- Medical
- Smart metering
- Consumer.

STM32U0: the latest generation of entry-level, ultra-low-power MCU



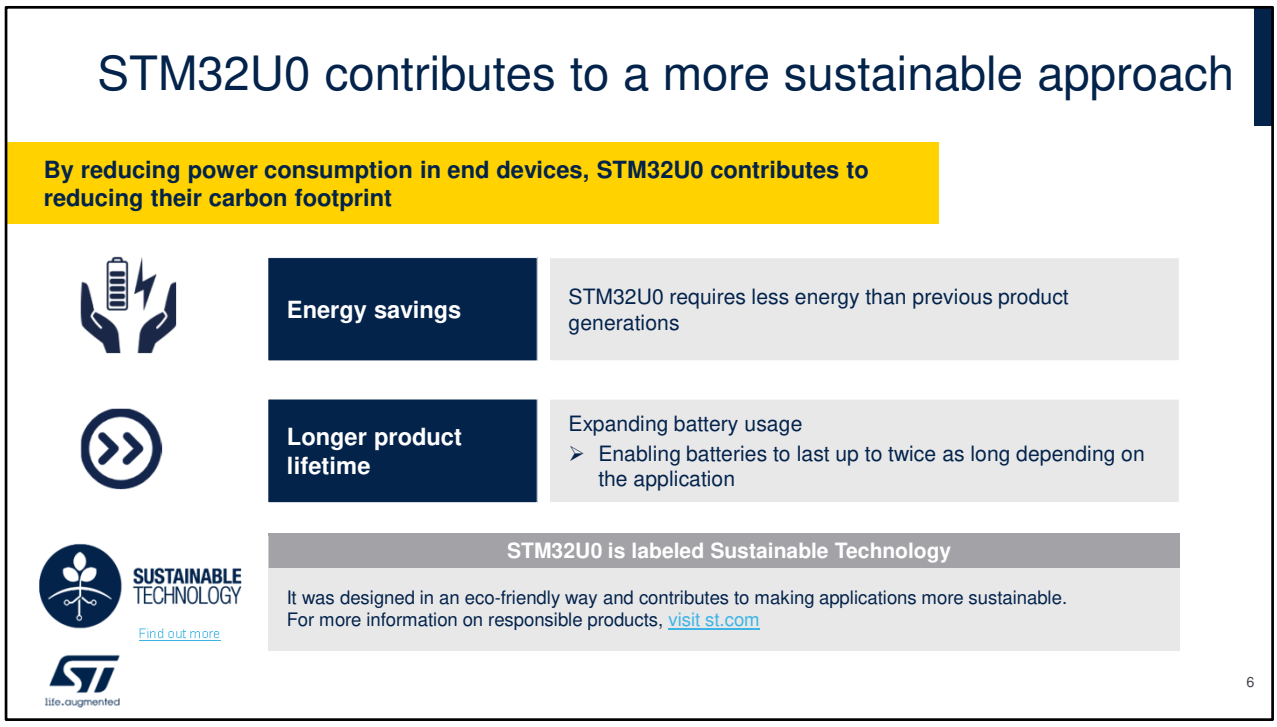
The STM32U0 belongs to the Ultra Low Power MCU family.

This is a complete and consistent ultra-low power family, featuring:

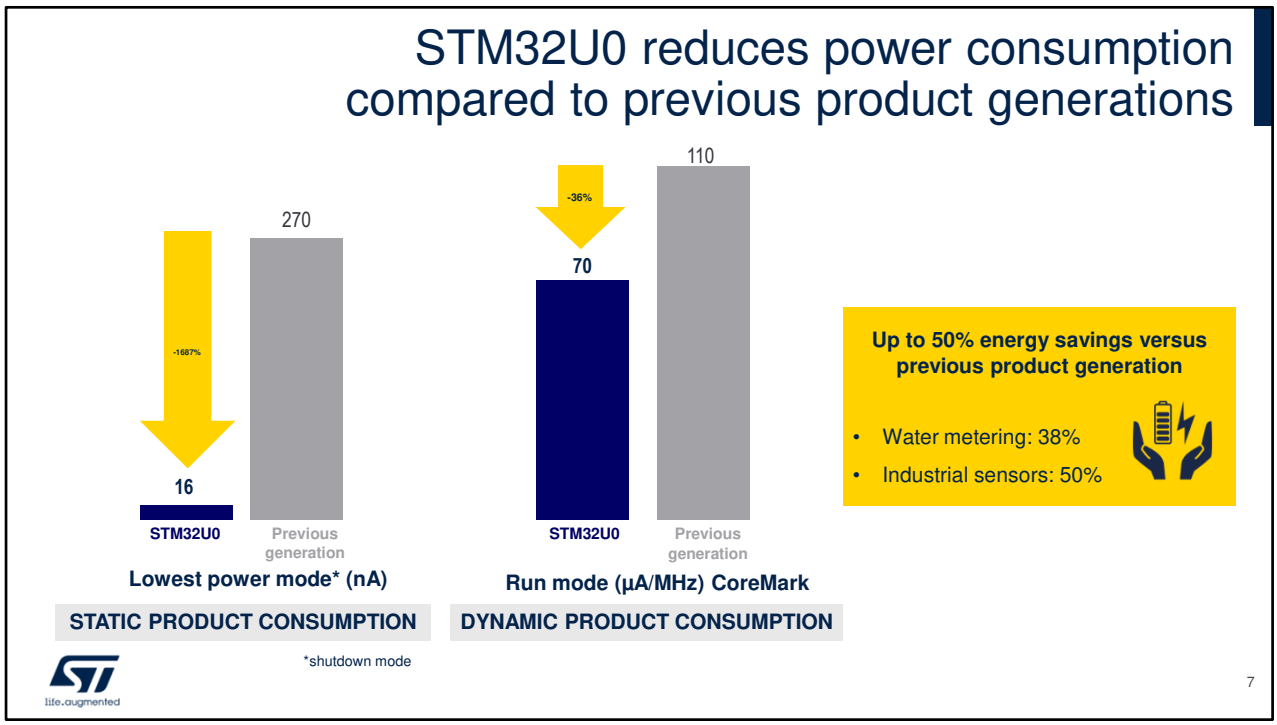
- From entry-level range to advanced range
- From 8 KB to 4 MB of flash memory
- From Cortex®-M0+ up to Cortex®-M33
- Pin-to-pin compatible family
- Extended temperature range

It supports high energy efficiency Innovative power management features:

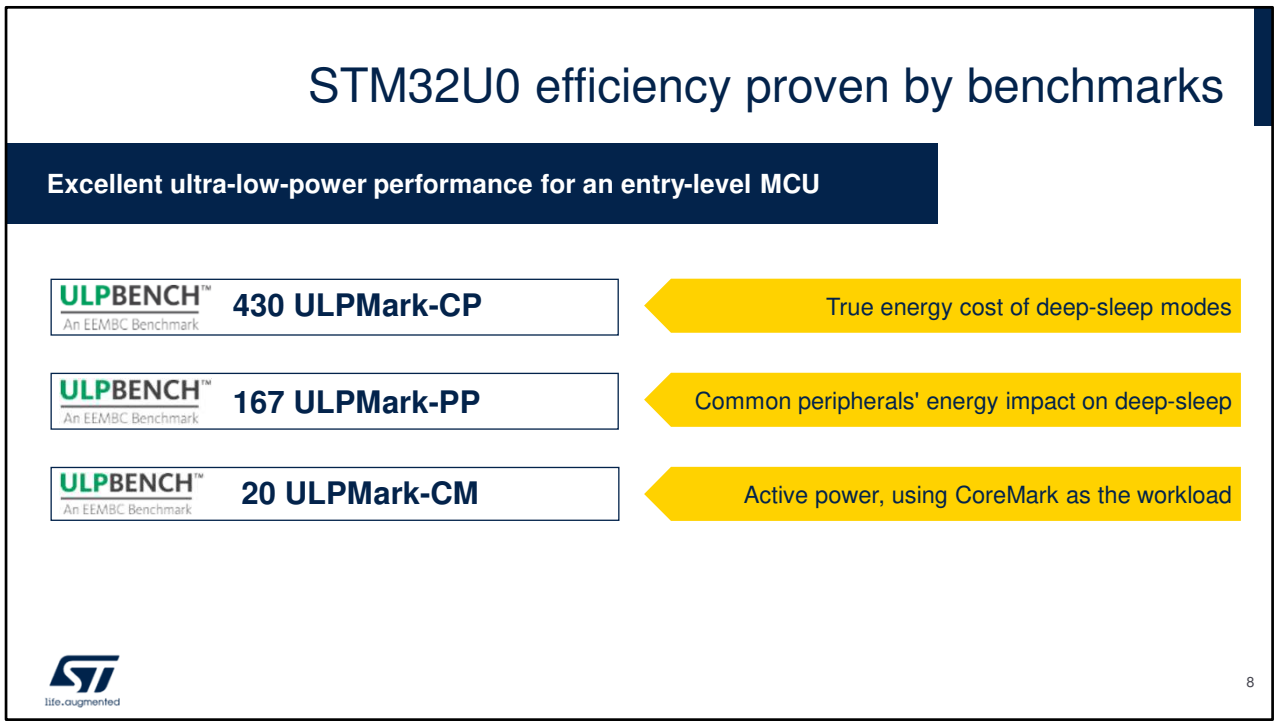
- Various low-power modes
- Very efficient dynamic run mode.



The STM32U0 comes with many low-power modes, granting developers more flexibility.
For instance, STOP2 with RTC needs 630 nA, while supporting full memory retention.
STM32U0 requires less energy than previous product generations.
It enables batteries to last up to twice as long depending on the application.
Thus, STM32U0 contributes to a more sustainable approach.

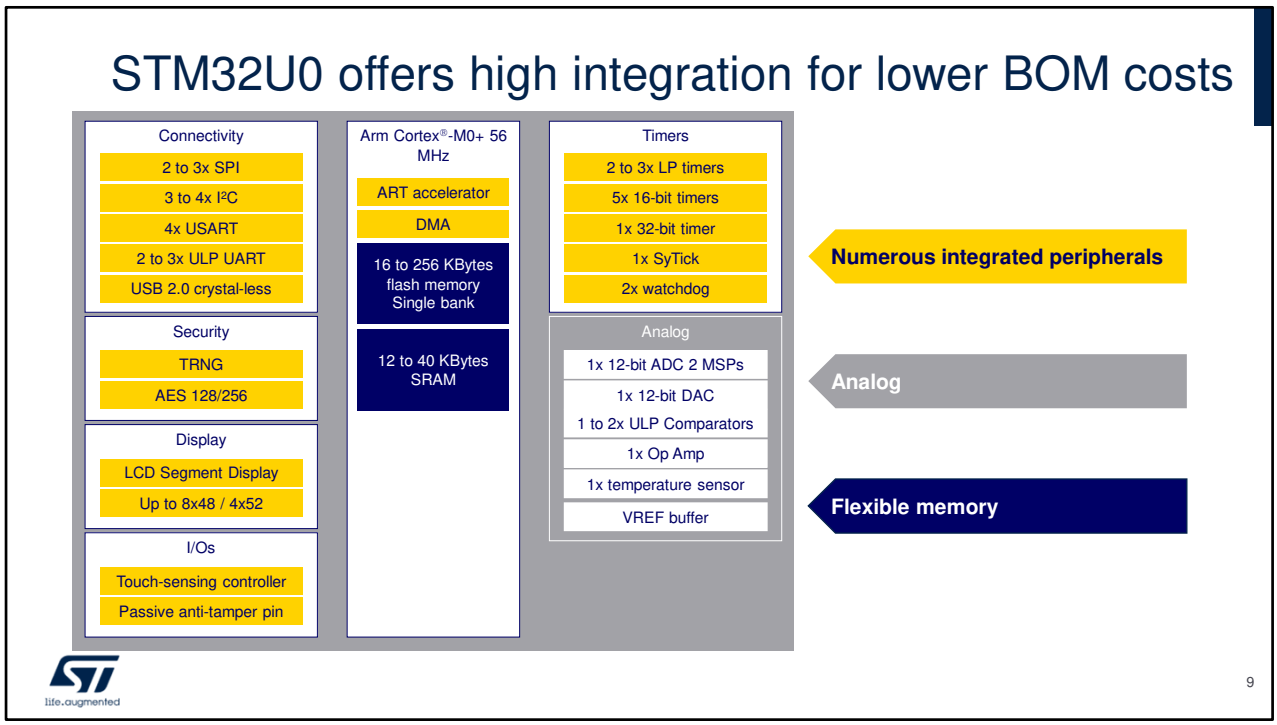


STM32U0 MCUs enable a great leap in energy efficiency through a combination of state-of-the-art design techniques and advanced manufacturing process.
These include extremely low static power consumption in standby mode and superior wake-up performance, enabling the MCU to spend more time in power-saving sleep modes to minimize average energy demand.
Both static and dynamic consumptions are drastically reduced compared to previous generation's MCUs.



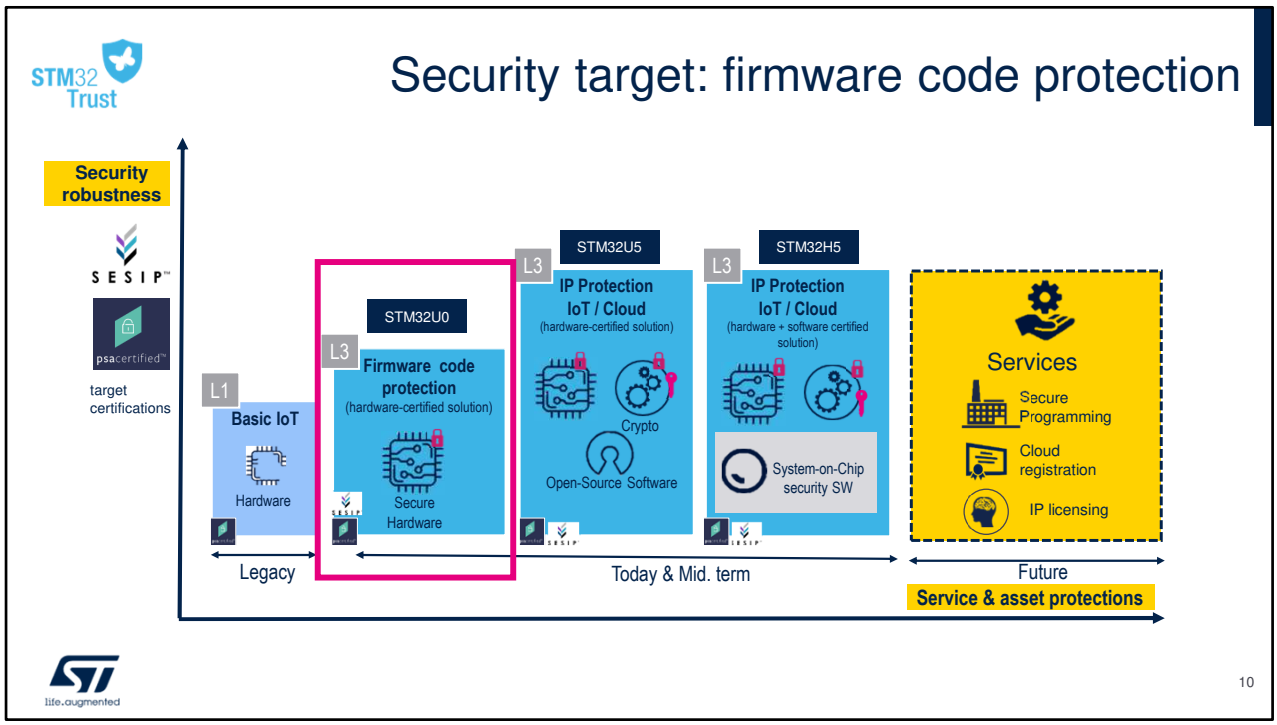
The EEMBC ULPMark benchmark quantifies the many aspects of ultra-low power MCUs. By defining a concise methodology, ULPMark reliably and equitably measures the multiple aspects of MCU energy efficiency.
The STM32U0 obtains excellent results:

- 430 ULPMark-Core Profile (CP), that measures true energy cost of deep-sleep
- 167 ULPMark-Peripheral Profile (PP), that measures common peripherals' energy impact on deep-sleep
- 20 ULPMark-CoreMark, that measures active power, using CoreMark as the workload.



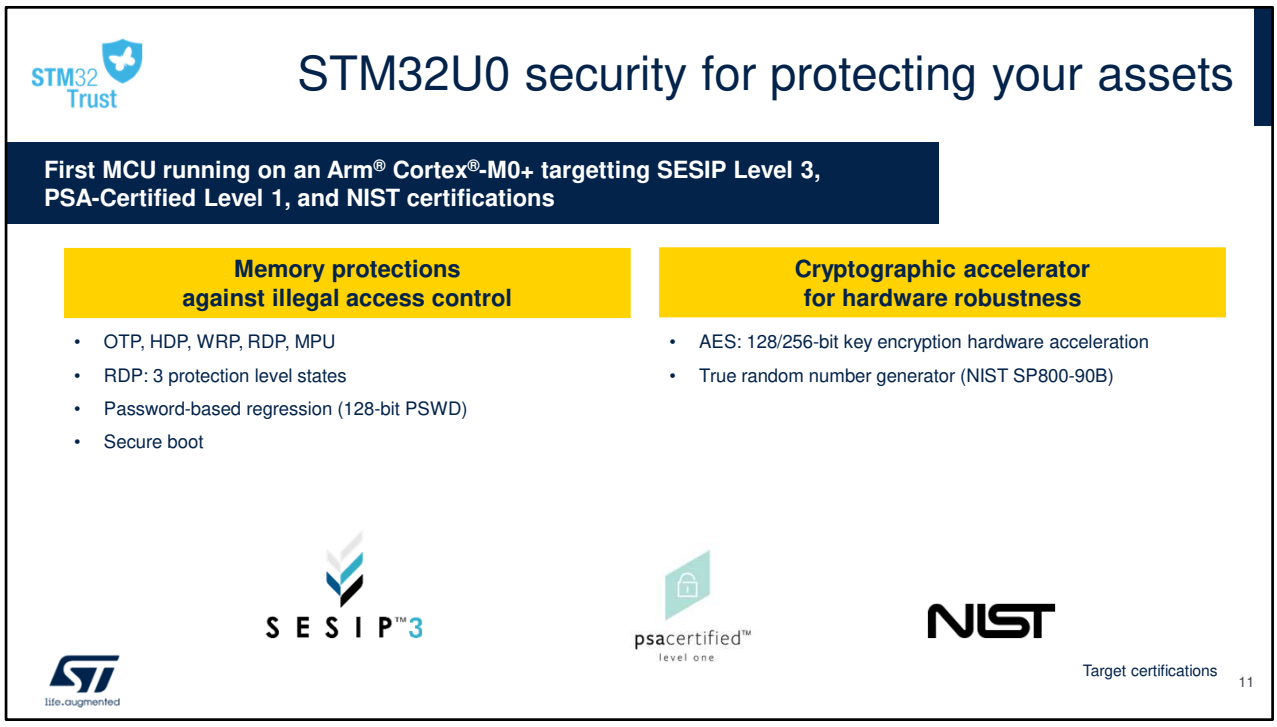
To make this entry-level microcontroller even more compelling, ST maximized the number of integrated peripherals, such as segment display controller, digital-to-analog and analog-to-digital converters, an operational amplifier, and an ultra-low power comparator.
Consequently, developers can provide new features to their users that they were not originally going to offer, or they can ship the same features at a lower price, making their product more accessible.
The STM32U0 also includes five 16-bit timers, one 32-bit timer, three ultra-low-power timers, up to three ultra-low-power UART interfaces, and up to two ultra-low-power comparators.
Its touch-sensing controller also makes it easy to add a basic button to improve user interactions.

The STM32U0 with 256 KB of flash also includes a USB device crystal-less solution, meaning that the controller is included on the die and doesn’t require an external oscillator to work.



Security target: firmware code protection

The STM32U0 is the first MCUs with an Arm® Cortex®-M0+ targeting SESIP Level 3 and PSA level 1 focusing on firmware code protection.
Certification provides independent assurance of the device's security capabilities.
Furthermore, the STM32U0 offers a true random number generator and an AES 128/256 accelerator.
This strong focus on security on an entry-level device, reflects a desire to make secure embedded systems more accessible to all designs by ensuring that even cost-effective systems can enjoy them.



The STM32U0 is based on the Arm Cortex®-M0+ core and targets SESIP Level 3, PSA-Certified Level 1, and NIST certifications.
Memory protections have been designed for different purposes:

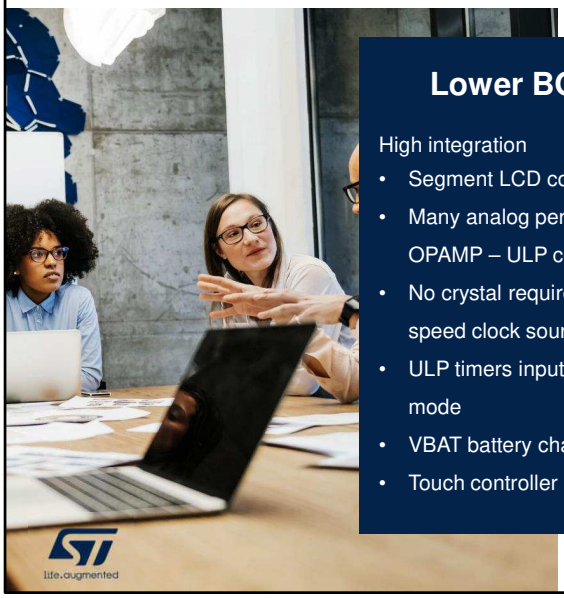
- A read protection, for example, will prevent the dumping of embedded software code through an external access and will protect the developer's intellectual property.
- A write protection will prevent certain flash sectors from being accidentally erased by a load overflow in a software or data update procedure.

On STM32U0, the implementation of the root of trust is based on boot lock and Hide Protection (HDP) features allowing to design robust secure boot solutions.
Hardware accelerators improve both the performance and

the robustness, these are:

- AES: 128/256-bit key encryption hardware acceleration
- True random number generator, compliant with NIST SP800-90B.

STM32U0 helps cuts down costs



Lower BOM costs

High integration

- Segment LCD controller
- Many analog peripherals: DAC/ ADC - OPAMP – ULP comparator
- No crystal required for USB and high-speed clock source
- ULP timers input capture in stop mode
- VBAT battery charging
- Touch controller

Proven technology for faster time to market

Leveraging several features already embedded in STM32L0, STM32L4, and STM32U5. Pin-to-pin compatibility with STM32L0, STM32L4 series.

Attractive price point

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The STM32U0 offers significant energy savings, thus extending the product life cycle and enabling customers to use and a smaller and more cost-effective battery without sacrificing battery life.
Additionally, integrators get many integrated peripherals that are responsible for lowering the overall BOM.
The STM32U0s are pin-to-pin compatible with the STM32L0s, L1s, and L4s.
Hence, it is possible to more easily port code written for an STM32L MCU to the new STM32U0, which vastly saves on development costs and reduces the time to market.

Thanks for attending this presentation.