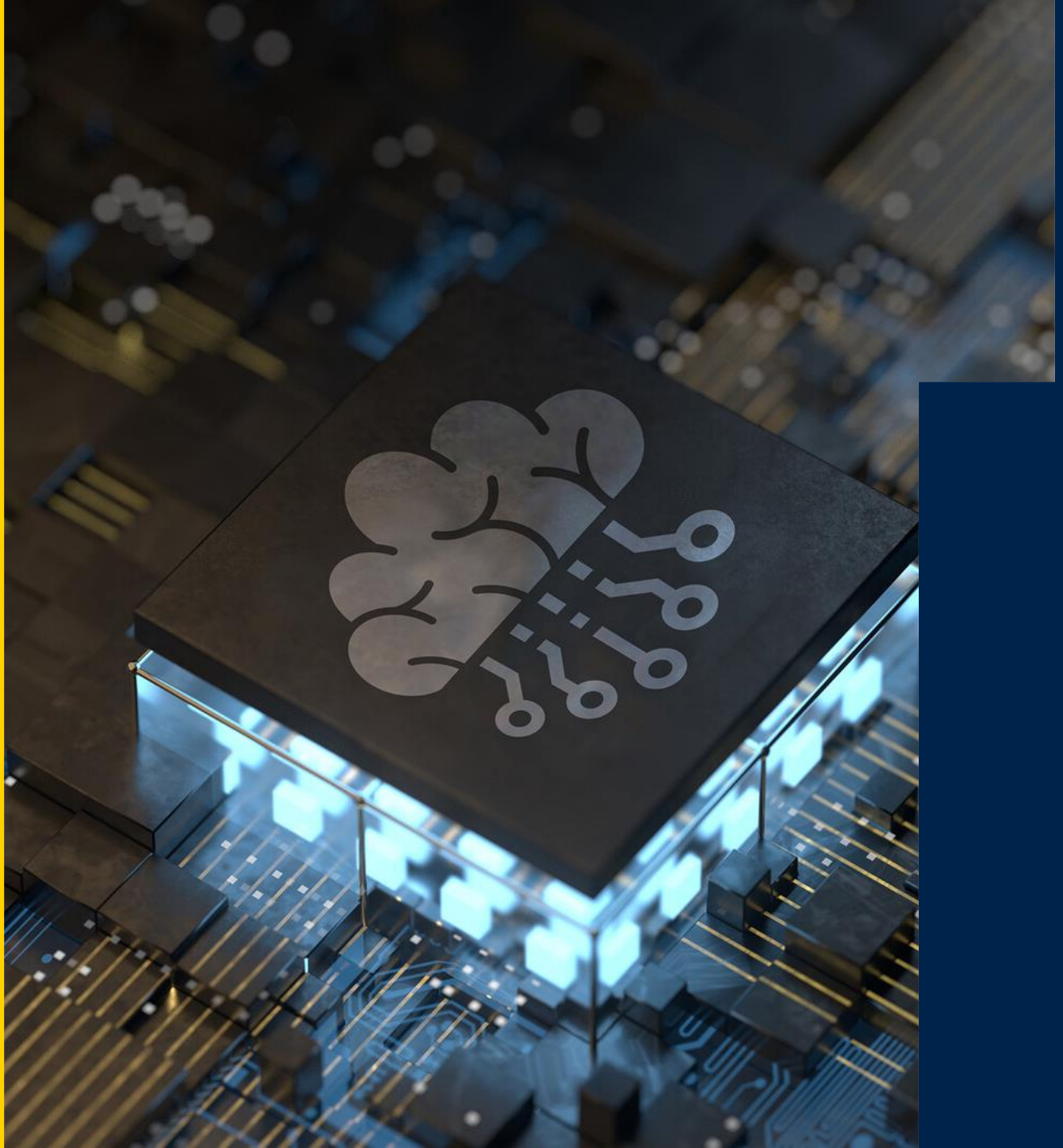

Techday
Taiwan | 2023
OUR TECHNOLOGY STARTS WITH YOU



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OUR TECHNOLOGY STARTS WITH YOU

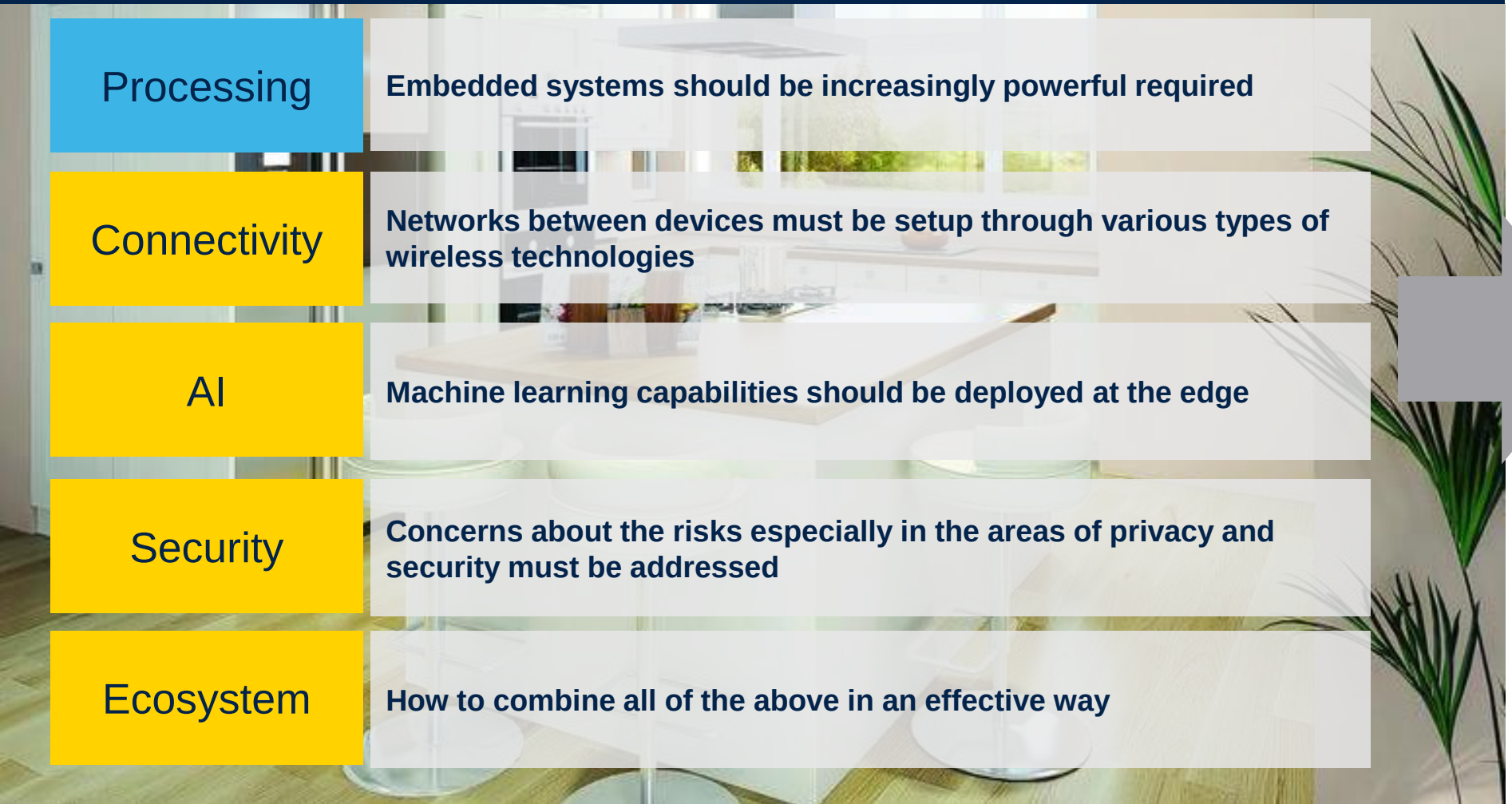
IoT & Connectivity

Paolo OTERI

Director, Microcontrollers & Digital ICs Group,
APeC, STMicroelectronics

The building blocks to develop IoT solutions

The Internet of Things (IoT) describes devices that connect and exchange data with other devices



Processing	**Embedded systems should be increasingly powerful required**
Connectivity	**Networks between devices must be setup through various types of wireless technologies**
AI	**Machine learning capabilities should be deployed at the edge**
Security	**Concerns about the risks especially in the areas of privacy and security must be addressed**
Ecosystem	**How to combine all of the above in an effective way**

ST brings all the necessary blocks to easily build IoT devices

What the STM32 family offers

Real-time performance

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

Outstanding power efficiency

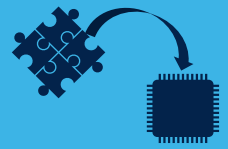
- Ultra-low dynamic power consumption
- Long lifetime, small battery
- Sustainable technology

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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STM32 high-performance MCUs

Up to 3224 CoreMark and a rich set of peripherals

STM32H7
- 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

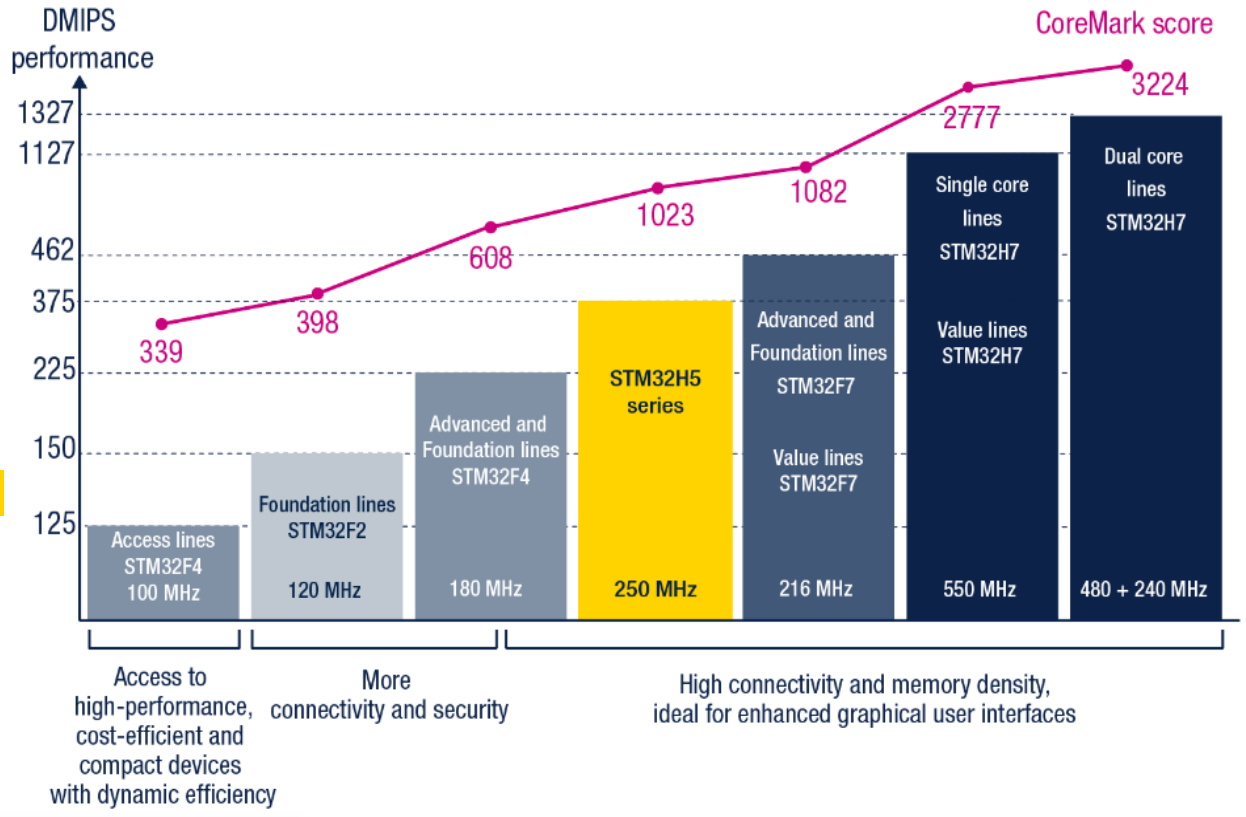
STM32F7
- Arm® Cortex®-M7 + FPU at 216 MHz – 462 DMIPS
- From 256 Kbytes to 2 Mbytes of flash memory
- Very high performance with embedded flash & external memories

STM32H5
- 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

STM32F4
- Arm® Cortex®-M4 + FPU up to 180 MHz – 225 DMIPS
- From 64 Kbytes to 2 Mbytes of flash memory

STM32F2
- Arm® Cortex®-M3 at 120 MHz – 150 DMIPS
- From 128 Kbytes to 1 Mbyte of flash memory
- Foundation lines for performance and connectivity



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

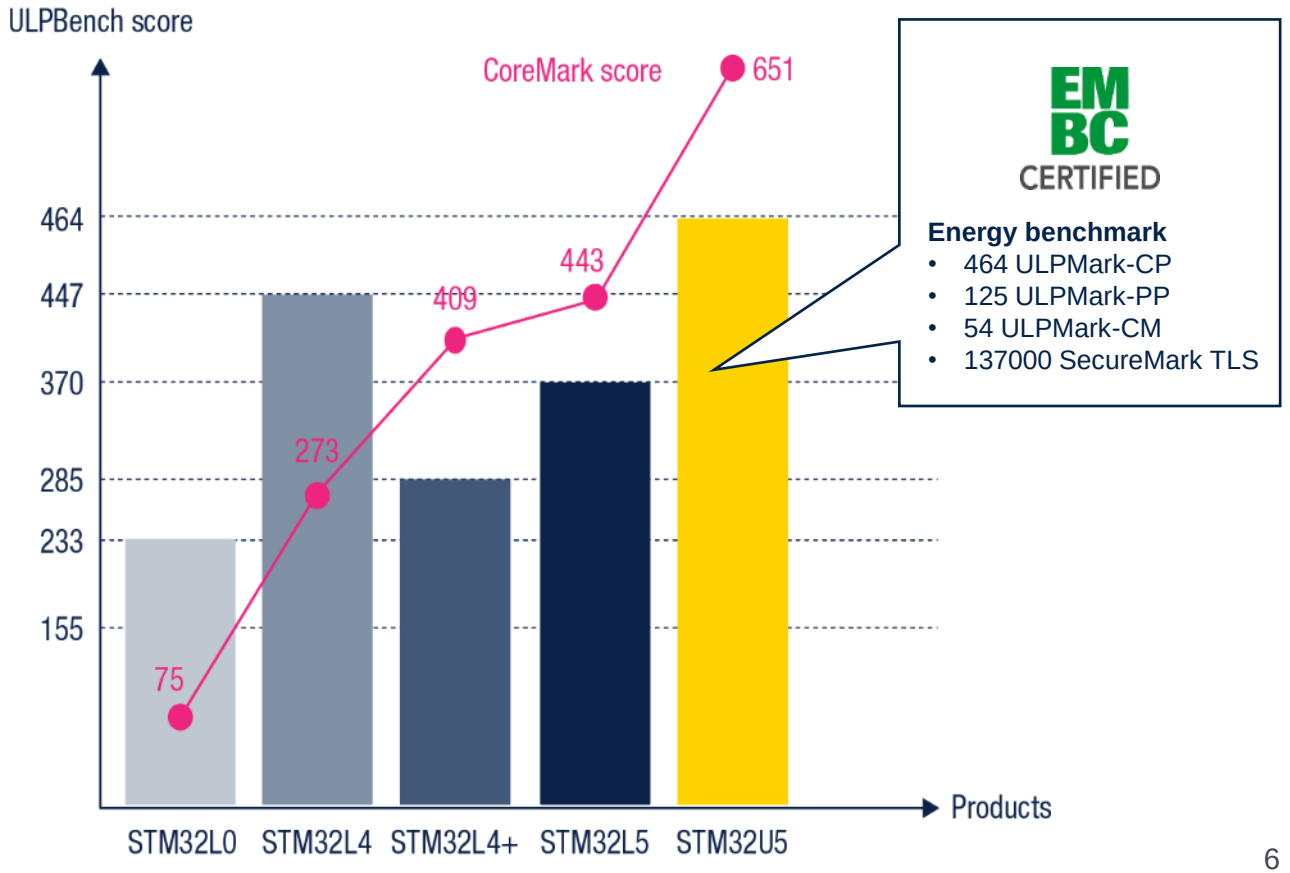
LATEST GENERATION

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



STM32 microprocessors making your industrial IoT applications future-proof

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

NEW

STM32MP2 series

Sampling at OEMs

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

STM32MP1 series

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

Mass market availability

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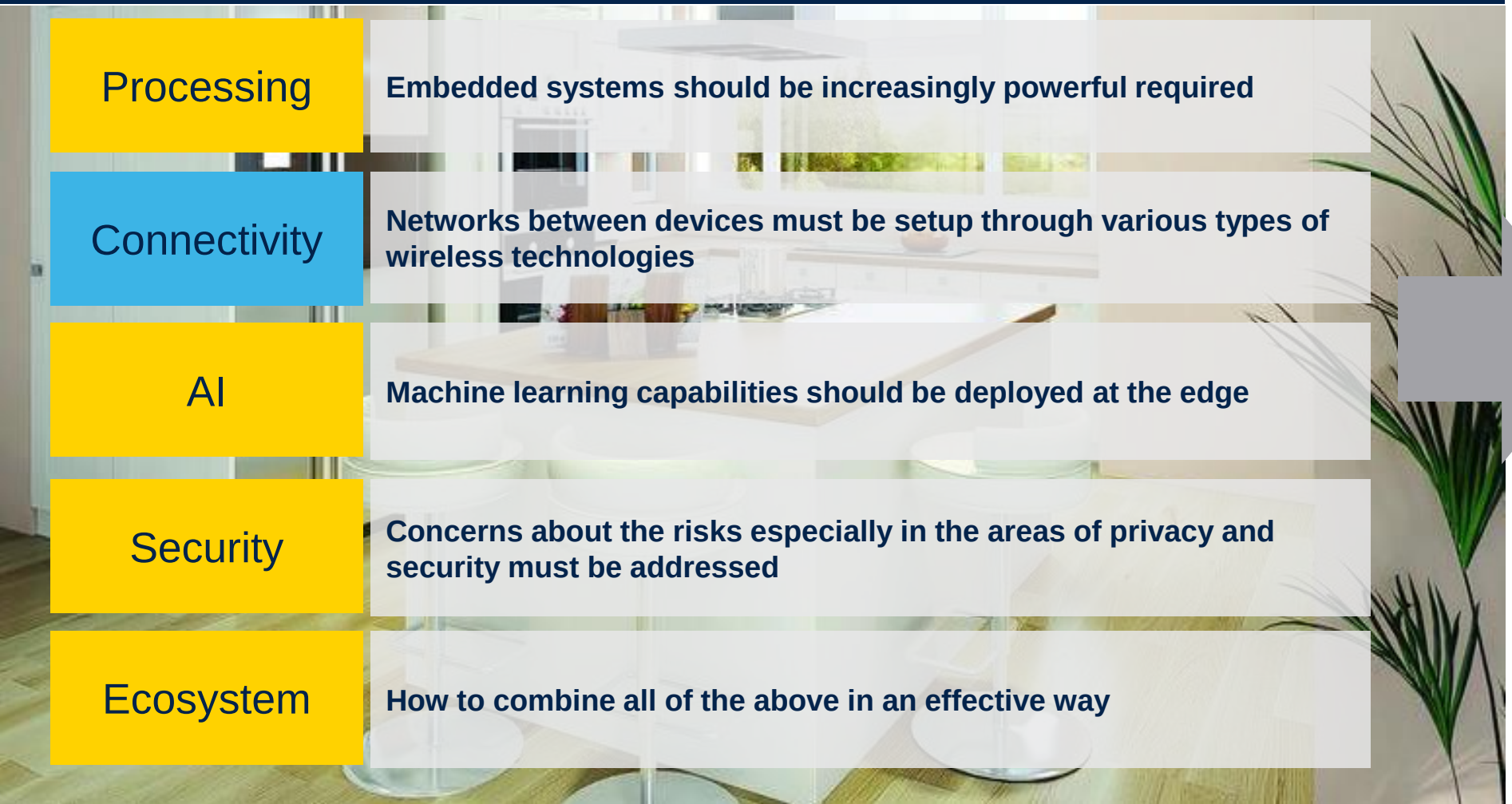

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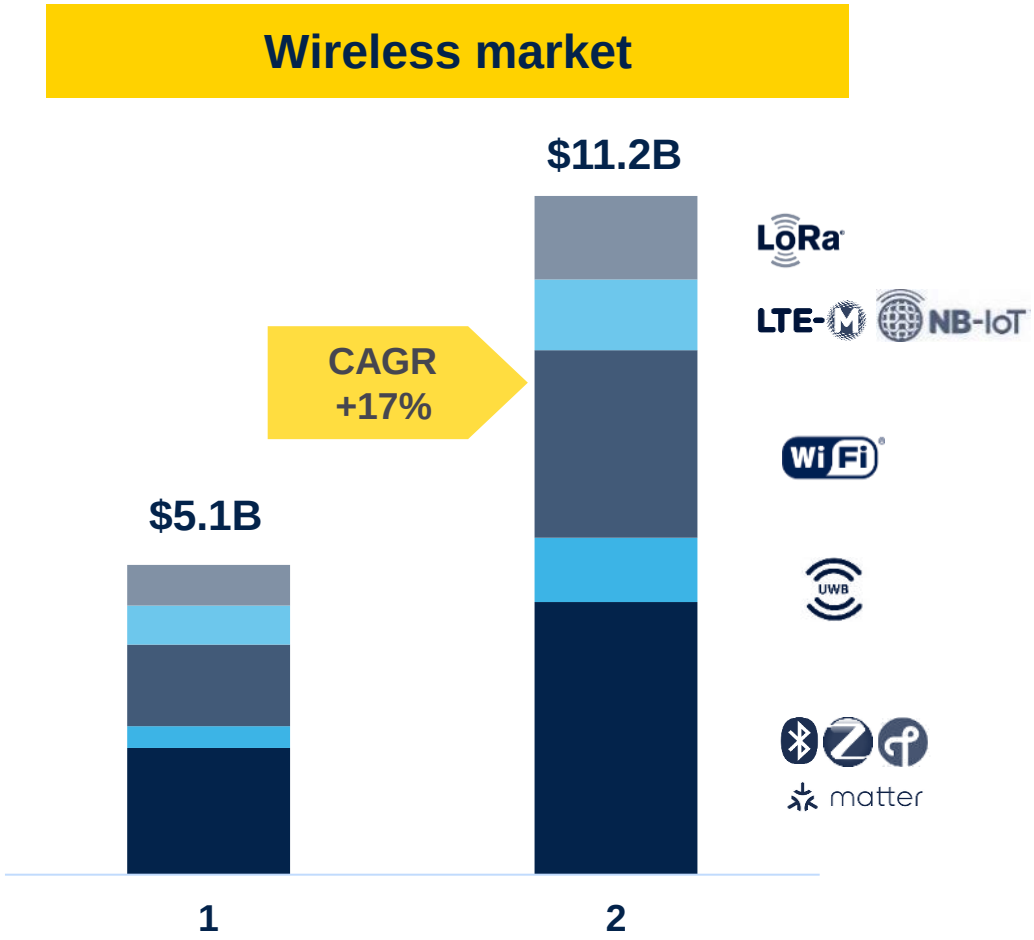
Pervasive wireless communications



Source: ABI

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**

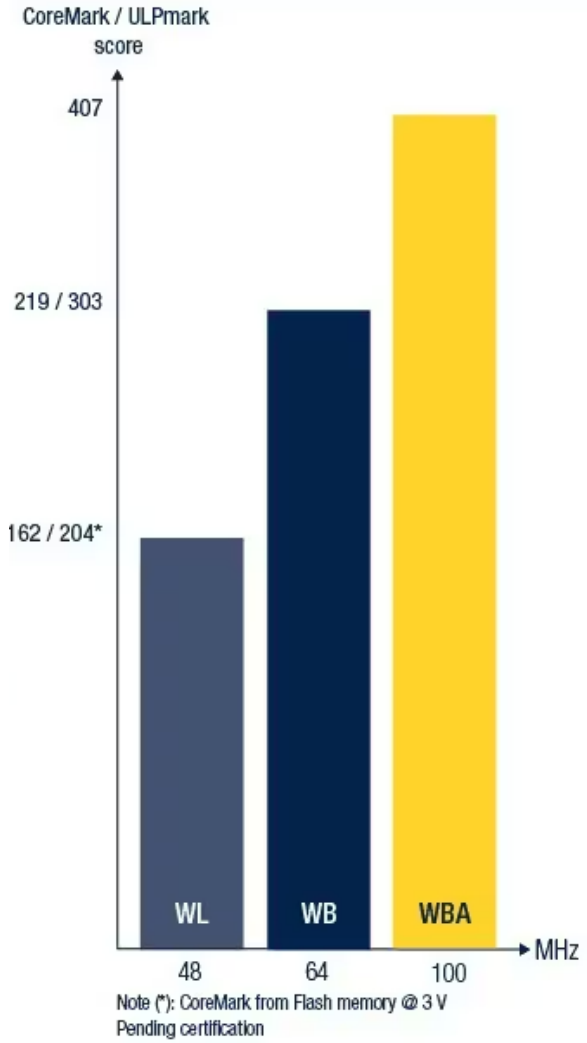
- World 1st MCU enabling **LoRa®, (G)FSK, (G)MSK, BPSK**
- Arm® Cortex®-M4 and -M0+ at 48 MHz supporting RF – 60 DMIPS
- Up to **256 Kbytes of flash memory / 64 Kbytes RAM**
- Transceiver frequency: 150 to 960 MHz
- Dual-power outputs: up to 22 dBm and up to 15 dBm (Embedded PAs)

LoRaWAN

M-Bus wireless

sigfox

mioty



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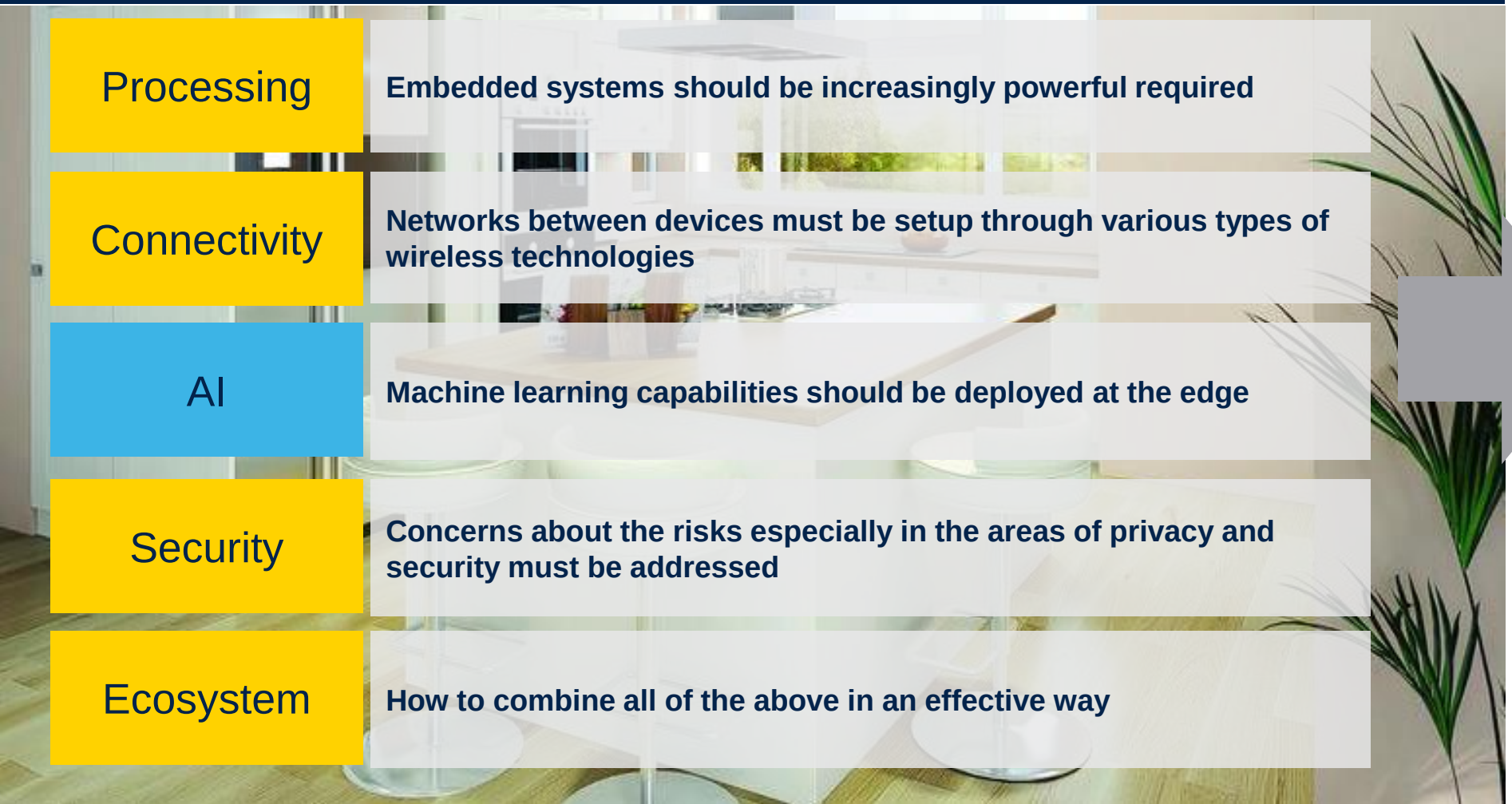

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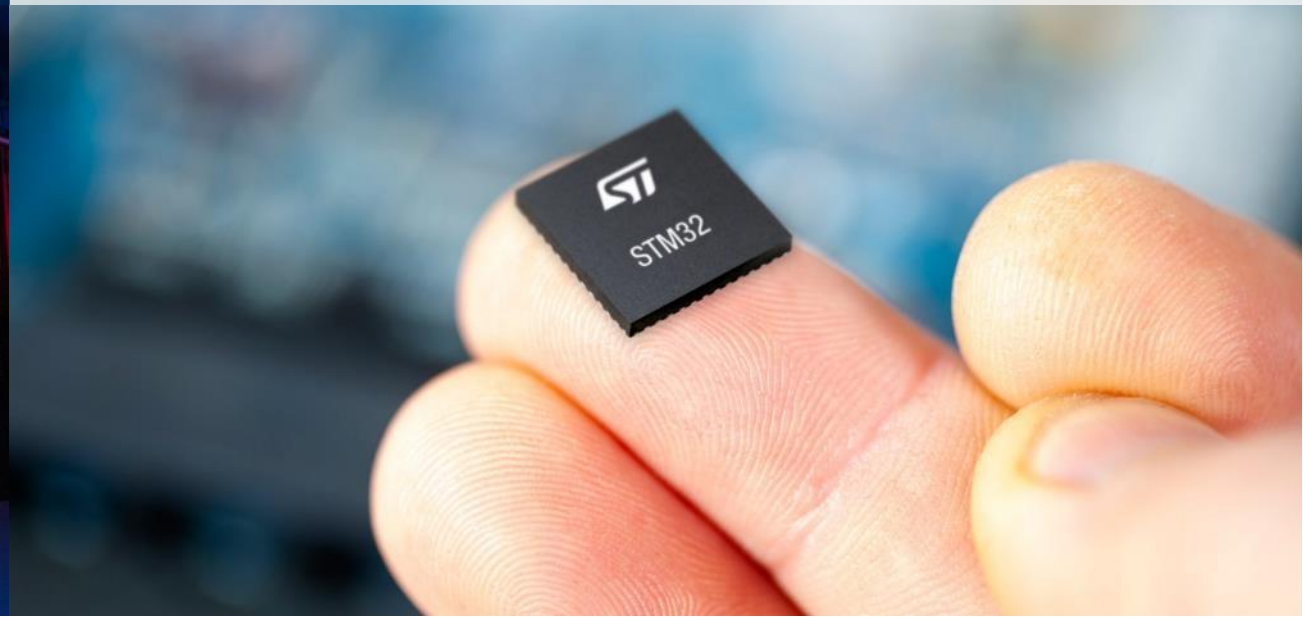
AI is everywhere, however the AI that matters to your products is enabled by a different category of software and hardware

This enables AI

This enables edge AI



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STM32N6: a general-purpose MCU optimized for demanding applications

Machine vision pipeline & Neural Processing Unit

Advanced Graphics & Multimedia accelerators

STM32 Trust

Advanced security features

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Benefits of edge AI

Ultra-low latency
Real-time applications

Reduced data transmission
Generate meaningful information

Enhanced privacy and security
No data sharing in the cloud

Sustainable on energy
Low data, Low power

Lower cost of inference to enable a new class of operations

Benefits for the end application

- Energy savings
- Higher reliability and longer equipment lifetime
- Safer
- More privacy
- Innovation in functionality

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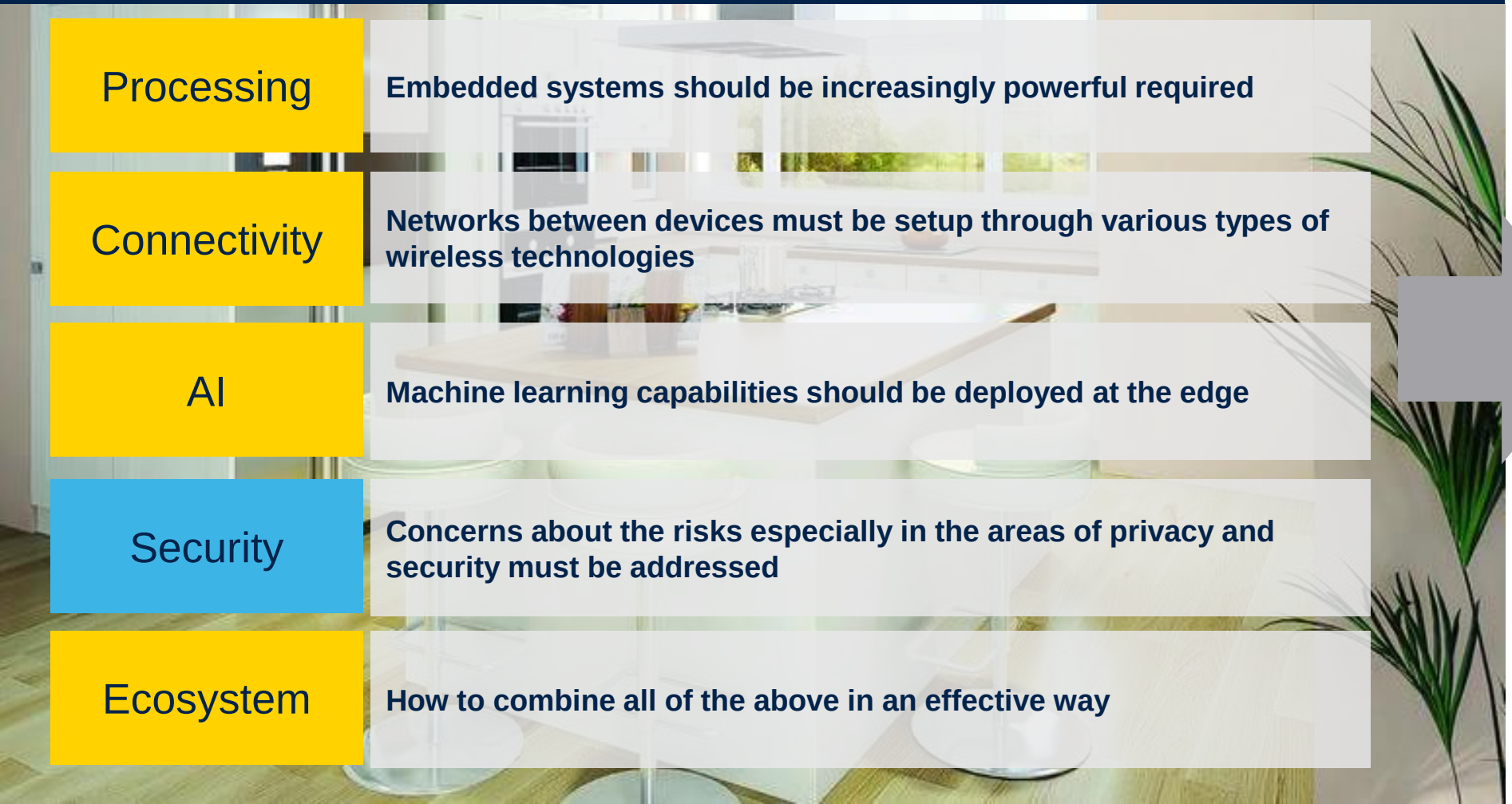

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Addressing the security challenges & gaps

Security challenges for our customers

- Complex
- Evolving fast
- Time to market

Missing link

Scalability, certification, maintenance
core security hardware and services

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STM32Trust: A scalable approach to security

STSAFE Secure element

Protect code

Secure Hardware

STSAFE Secure element

Protect IP & IoT / Cloud

Crypto

STM32 Trust TEE

Secure Hardware + Open-Source Software

STSAFE Secure element

Simplify customer journey

STM32 Trust TEE

Secure Hardware + SoC Security Software

Secure Manager

Brand + Trust + Resilience

VALUE

IoT security certifications & regulations

Security across multiple devices

Robust hardware

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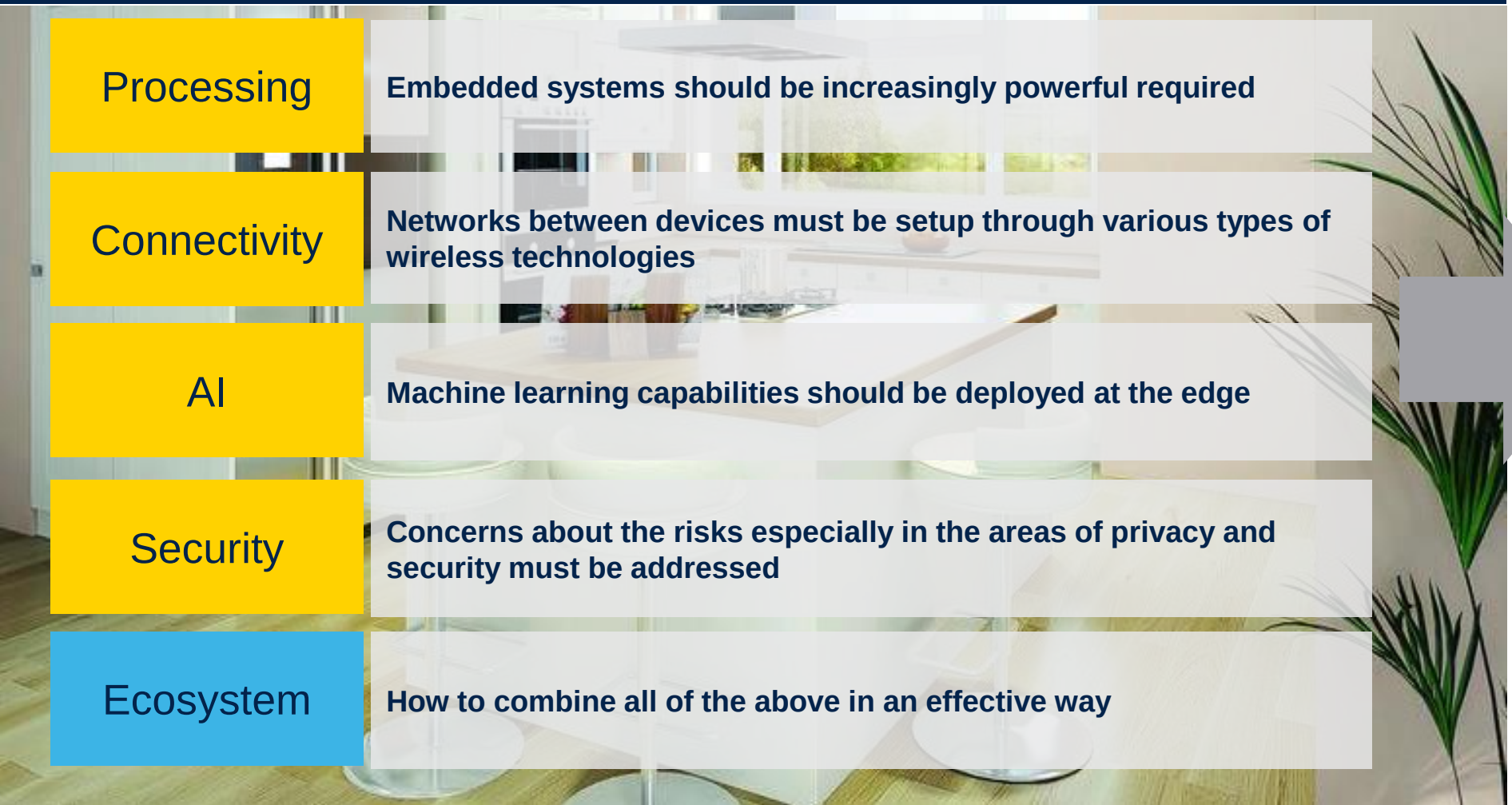

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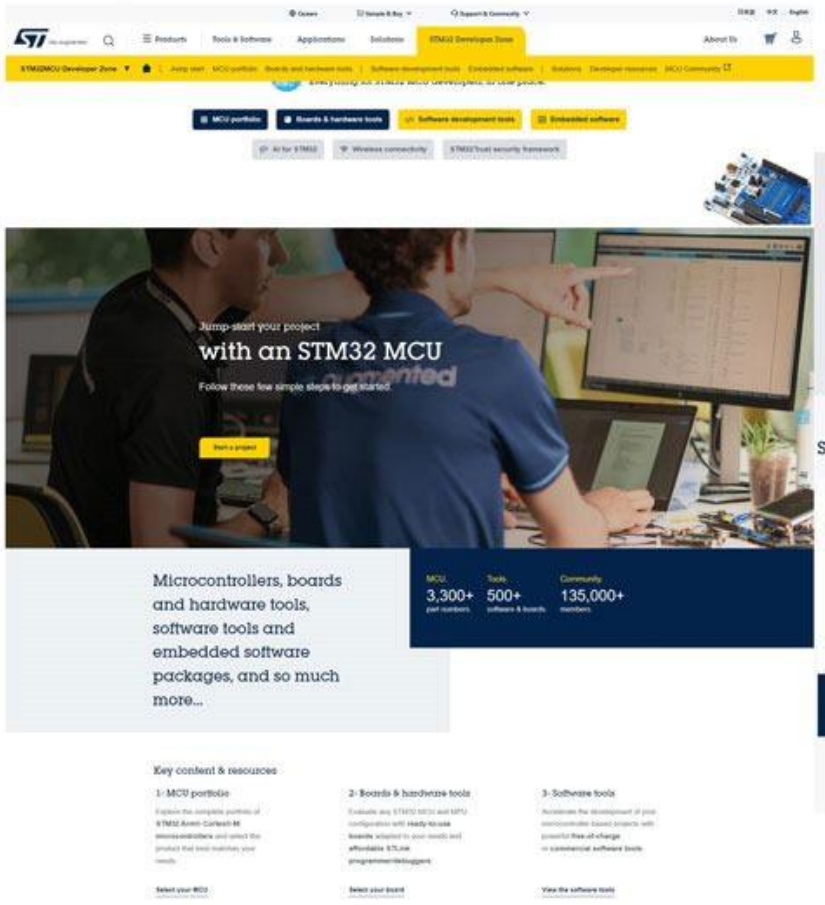
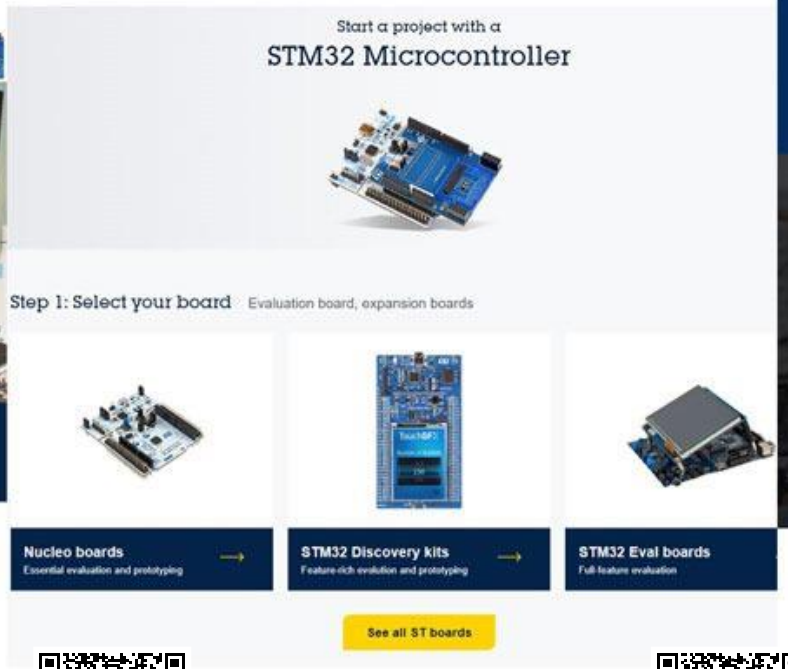
The STM32 Developer Zone
Everything for STM32 developers in one place





STM32 MPU
Developer Zone

STM32 MCU
Developer Zone

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All this technology contributes to a more sustainable environment

Residential & commercial lighting, HVAC and appliances use >50% of total electricity consumption

>40% Energy Saving	**Washing machine** From Class D to Class A++
>30% Energy Saving	**Air conditioning/Climate control** From analog to digital From AC to BLDC control
>70% Energy Saving	**Digital consumer power supply** Efficiency > 98% in run mode Stand-by power < 1mW
>80% Energy Saving	**Electronic lighting** From incandescent bulbs to LED lighting

Adding **more intelligence** to bring the next step in energy savings

Source: IEA,EPA

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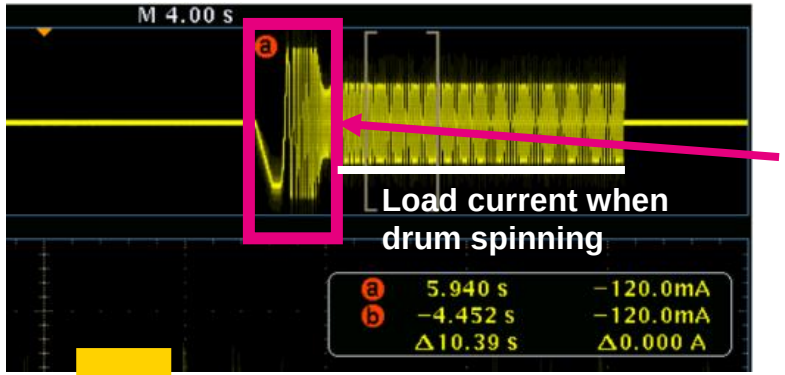
Adding intelligence to save energy & resources

Combination of **Edge AI clothes** and **advanced Motor control algorithms to load weight measurement** reduces the amount of water and detergent used and significantly lowers start-up current

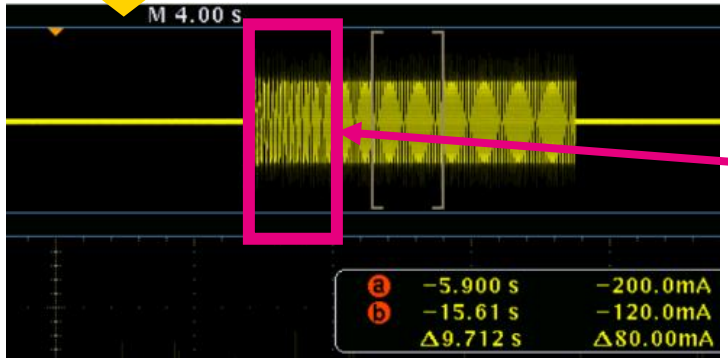
Energy savings per wash cycle

~ 15-40%

Standard (open loop) sensorless startup



High peak current



No high peak current
Shorter start-up

Zero Speed Full Torque (ZeST) sensorless start-up

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Our technology starts with You

Find out more at www.st.com

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