Multi-protocol wireless STM32WB microcontrollers

- Sensors in IoT
- STM32WB overview
- Radio stacks and security
- STM32WB ecosystem

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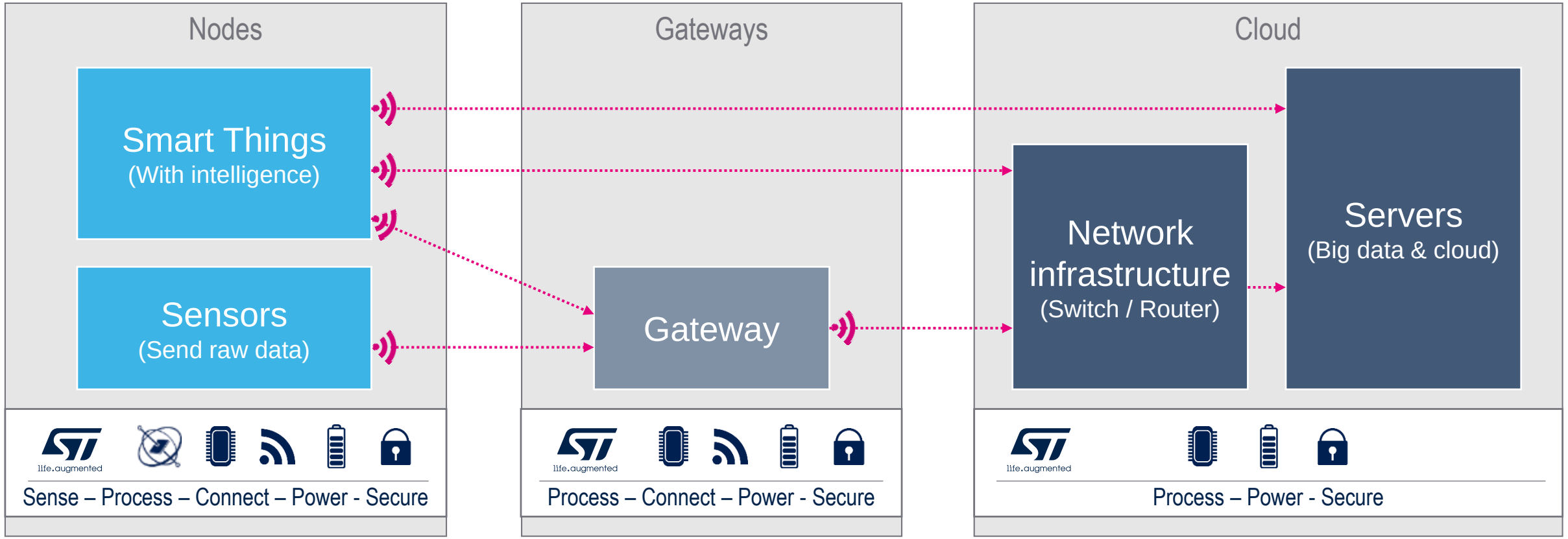
The IoT movement

IoT is a movement where any system is able to leverage the Internet and its ecosystem



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Connected objects in the 2.4 GHz band

Bluetooth Smart
Point-to-point communication with smartphones and other wireless devices

BLE Mesh / 802.15.4
Home automation with Mesh network need

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Make the choice of STM32WB series the 7 keys points to make the difference

Bluetooth 5

OPENTHREAD released by Google

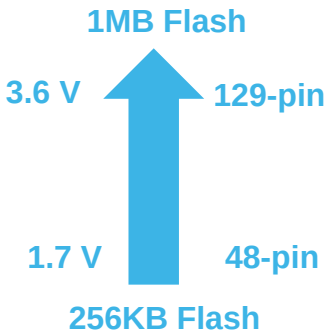
Zigbee 3.0

Open 2.4 GHz radio
Multi-protocol

Dual-core / Full control
Ultra-low-power

IoT Protection ready

Massive integration
Cost saving



A large offer

STM32 Cube

STM32 CubeMonitor-RF

Advanced RF tool, Energy control with C code generation

LONGEVITY 10 YEARS COMMITMENT

No matter what!

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About the STM32WB

KEY FEATURES

2 independent cores for real time execution

Ultra-low-power consumption

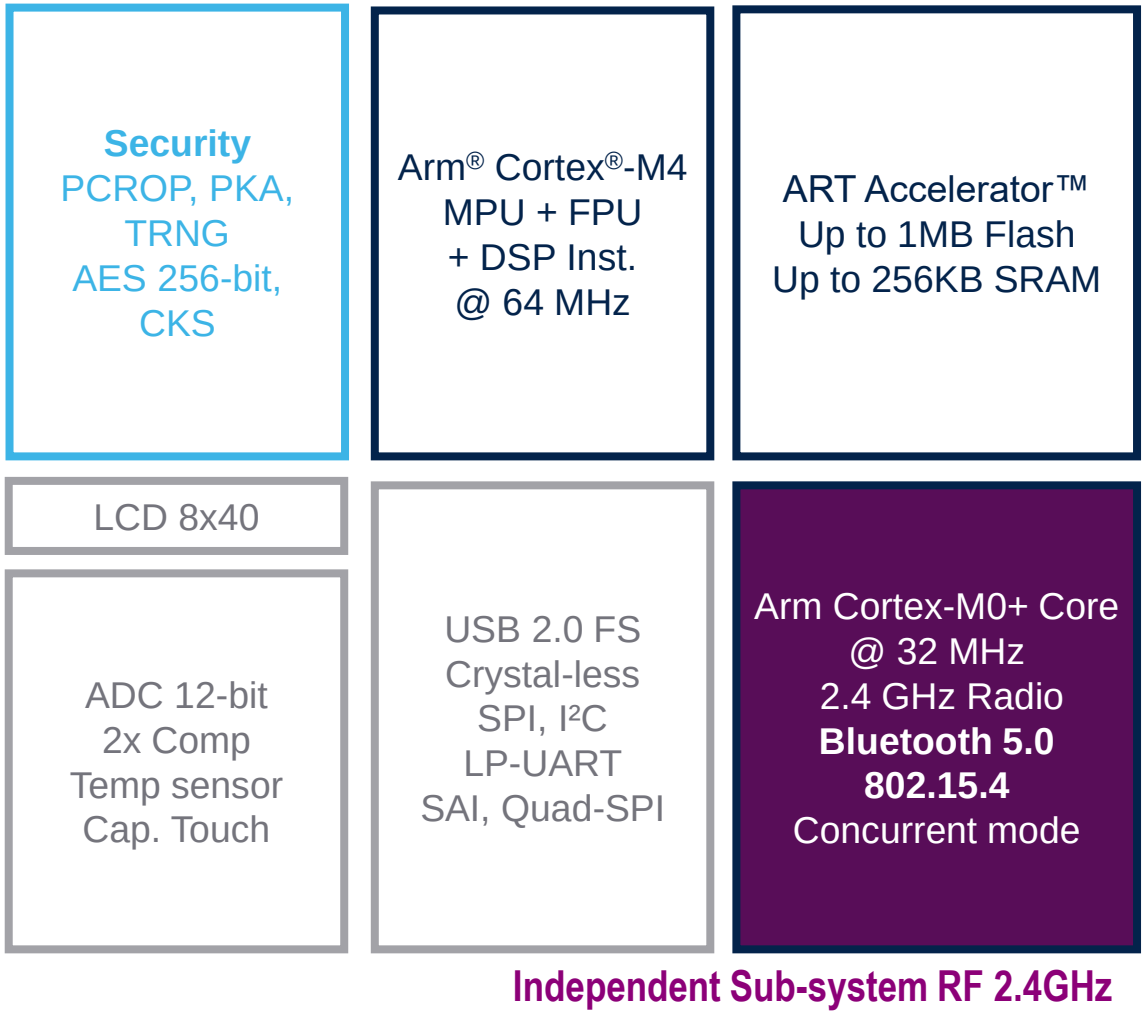
- 50 µA/MHz Active mode (at 3.0V)
- 2.1 µA Stop mode (Radio in standby + 256KB RAM)
- < 50 nA Shutdown mode

Peripherals

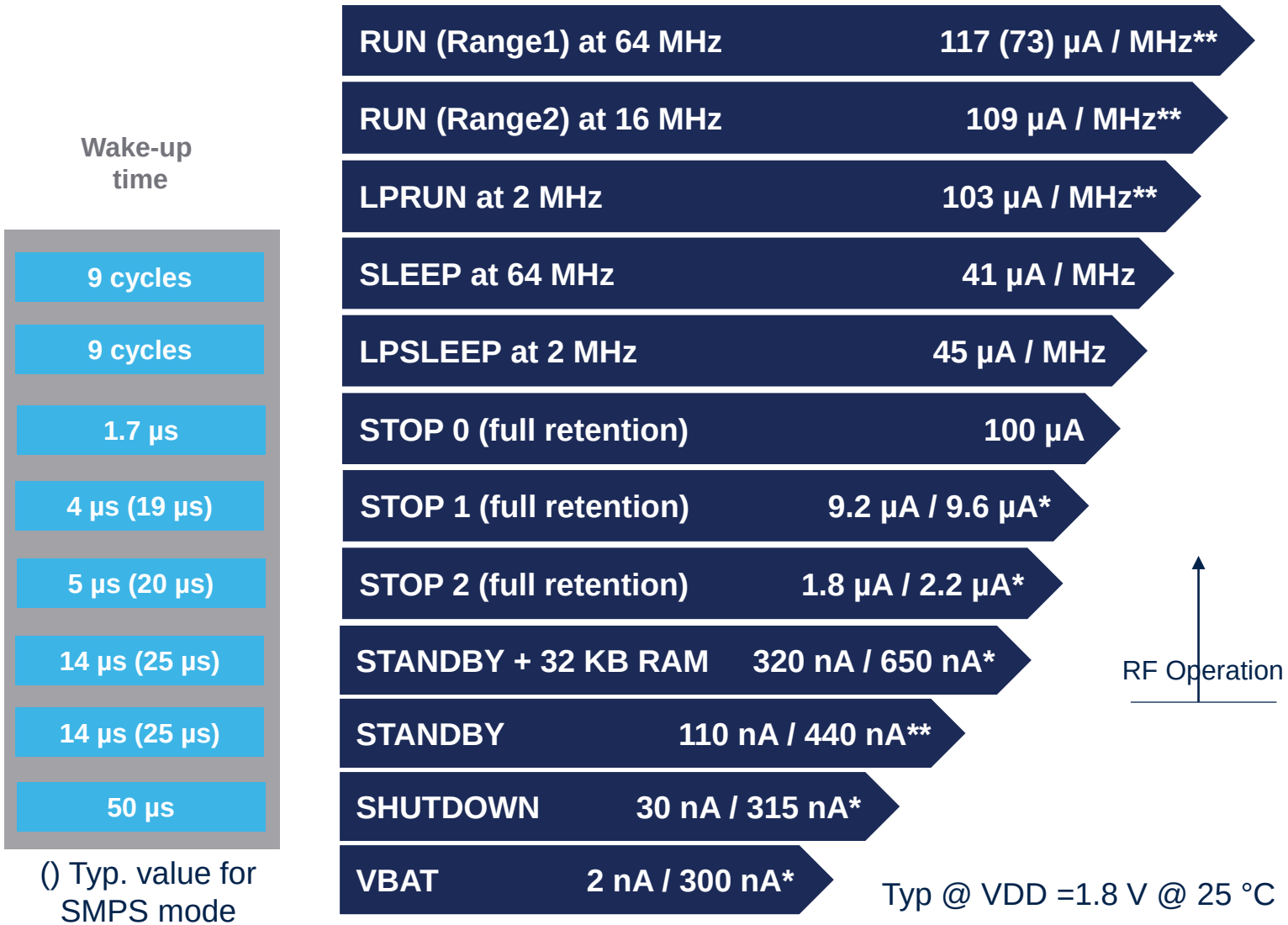
- 2xI²C, 1xUSART, 1xLP-UART, 2xSPI, 1x USB 2.0 FS device supporting Battery Charging Detection, 1xSAI, Quad-SPI (XIP), 6x 16-bit timer (including LPWM and low-power one)

1.7 to 3.6V voltage range (DC/DC, LDO)

-40°C to +105°C temperature range



Power efficiency



FlexPowerControl

- Efficient running
- 8 low-power modes, several sub-modes
- High flexibility

Application benefits

High performance
➔ CoreMark score = 219

Outstanding power efficiency
➔ ULPBbench score = 303

With RF and SMPS on
➔ 53µA/MHz from M4

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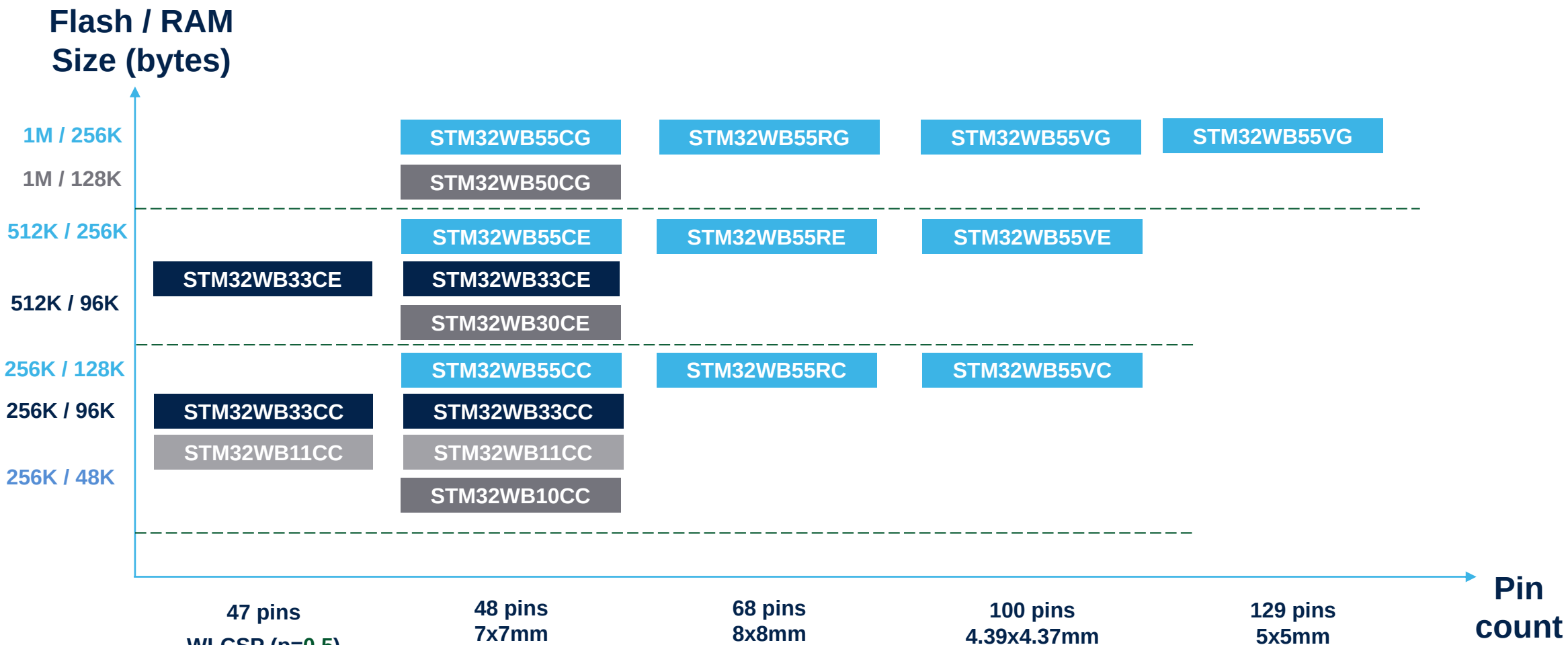
STM32WB portfolio



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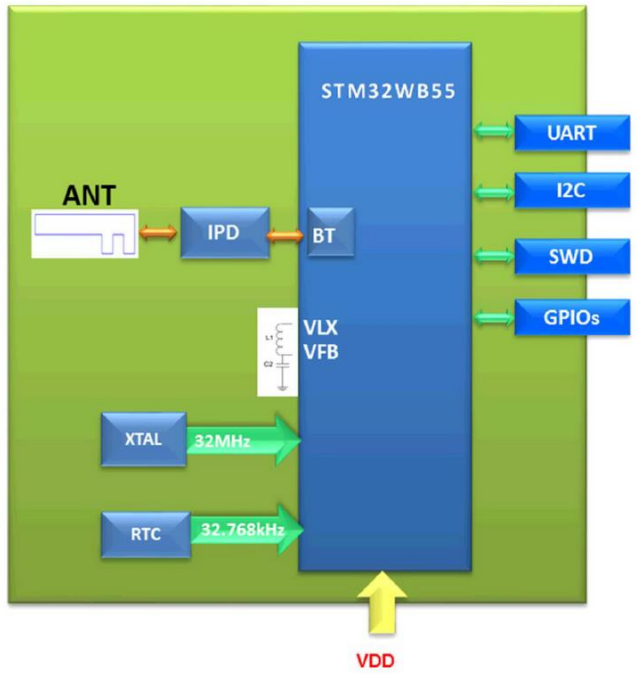
MODULE available

➔ Easy to integrate, small form factor

➔ Already certified for customer

Architecture

- WLCSP100 package integrated, 1MB Flash
- IPD integrated
- Crystals integrated
- Maximum of features & GPIOs exposed
- Low cost PCB for the mother board



➔ Production: Q4 2020

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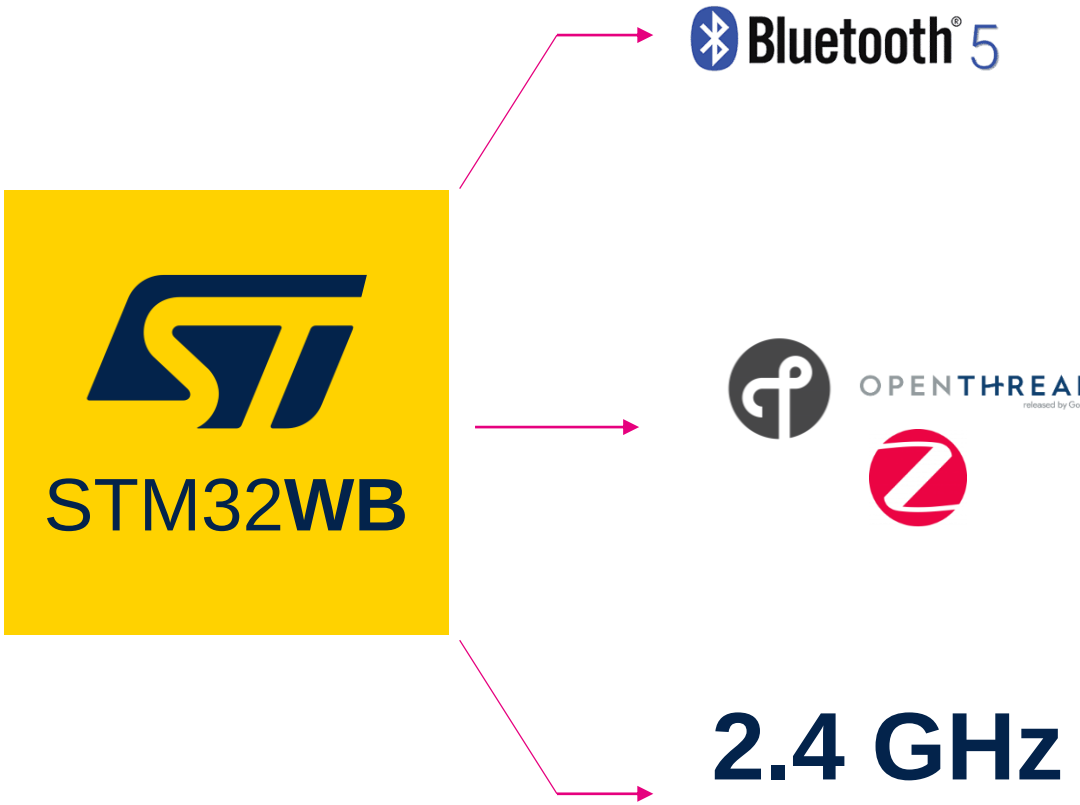
Multiprotocol and open radio

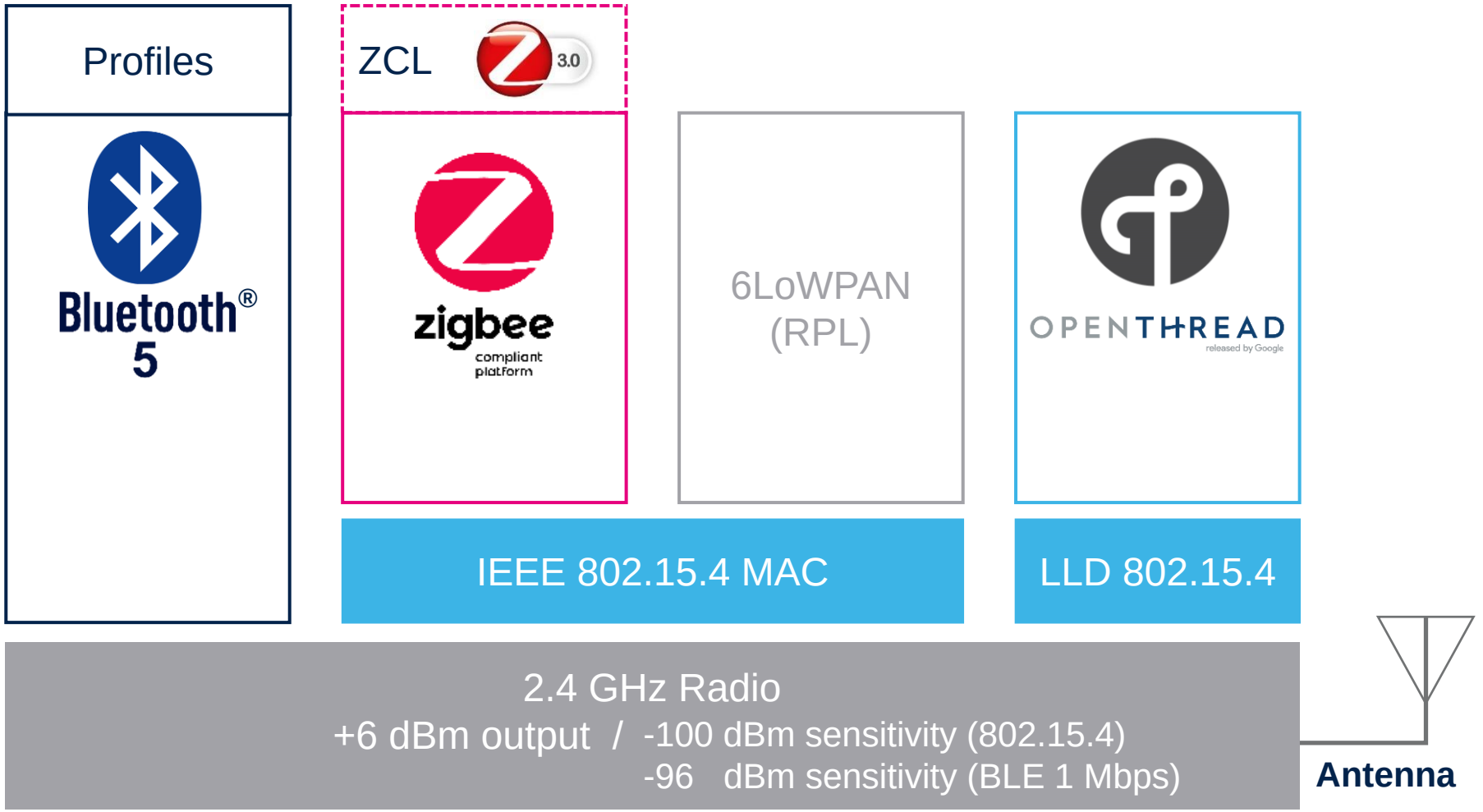


- Fully certified Bluetooth® 5.0 radio
- 2x faster speed with 2Mbps capable mode
- Extend network coverage with BLE Mesh

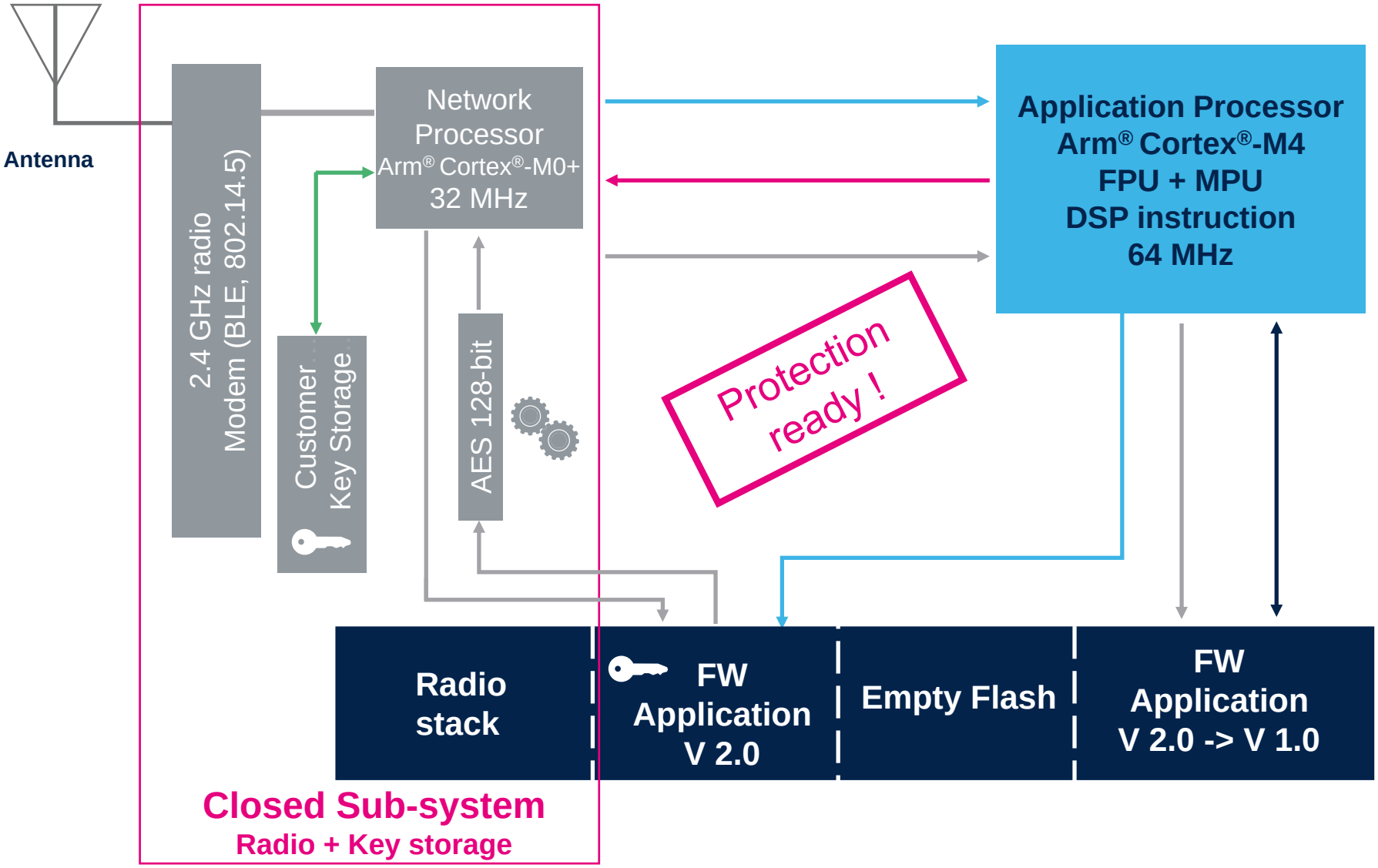
- Last IEEE 802.15.4 standard ready
- OpenThread, Zigbee PRO / Zigbee 3.0
- Bluetooth 5.0 and 802.15.4 protocols in Static and Dynamic concurrent mode

- Proprietary protocol capable (Bluetooth Low Energy like or 802.15.4)
- Best-in-class RF with up to +6dBm output power and 102 dB link budget
- Energy sensitive application with only 4.5mA in RX and 5.2mA in TX (@ 0dBm)
- BOM cost reduction thanks to Integrated balun

Make it yours



IoT protection ready (1/2)
radio stack and/or application FW update



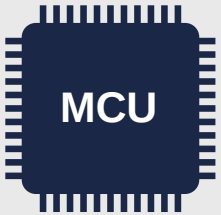
1. New FW package received
2. New FW detected
   Update is launched
3. App Processor send New FW package signature and encryption key for authentication
4. Authentication signature matches preprogrammed key
   Case not, the process is aborted and device resets
5. New FW package is decrypted with proprietary Key. Device upload on going.

IoT protection ready (2/2)
STM32WB counter measure against attacks

Advanced

Basic

Attacks	Attacks description	STM32WB Countermeasures

Non Invasive Attacks 	• Environment modification
	  • Temperature
	  • Voltage
	  • Clock ….
	• Fault injection (glitches….)
	• Exploit debug features
	• Side channel, power Analysis, …
		• Temperature sensor
		• Power supply integrity monitor
		• Clock security system
		• Tamper pads
		• Memory ECC, Parity check
		• RTC alarm, registers, SRAM mass erase
		• JTAG Read out protection
		• BOOT from Flash only

Software Attacks 	• Low Authentication / Encryption • Extract keys • Exploitation of applicative test features • Malware / Virus • Replay, privilege escalation	• Customer Key Storage (CKS) • RNG, Crypto accelerator, CRC • Write memory protection • Read Out memory protection • Memory Protection Unit (MPU) • Firmware Upgrade Service (FUS) • Secure Firmware Update (SFU) • Proprietary Code Read-Out Protection (PCROP) • 96-bit ID

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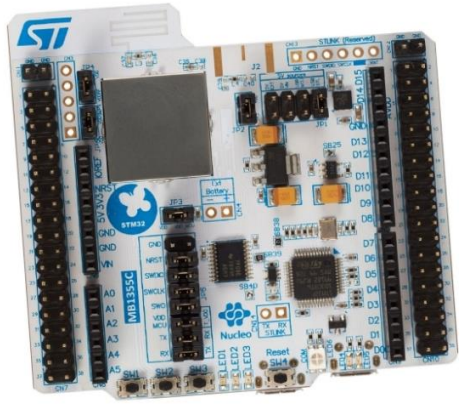
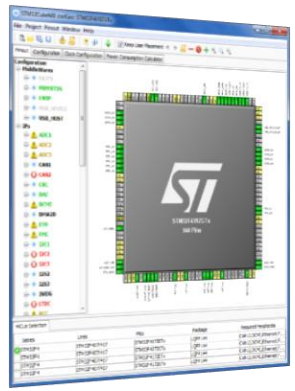
Prototyping made as easy as 1,2,3

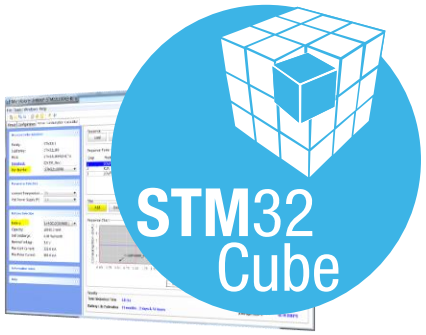


arm MBED Enabled

Hardware
Evaluation Pack

STM32**WB**



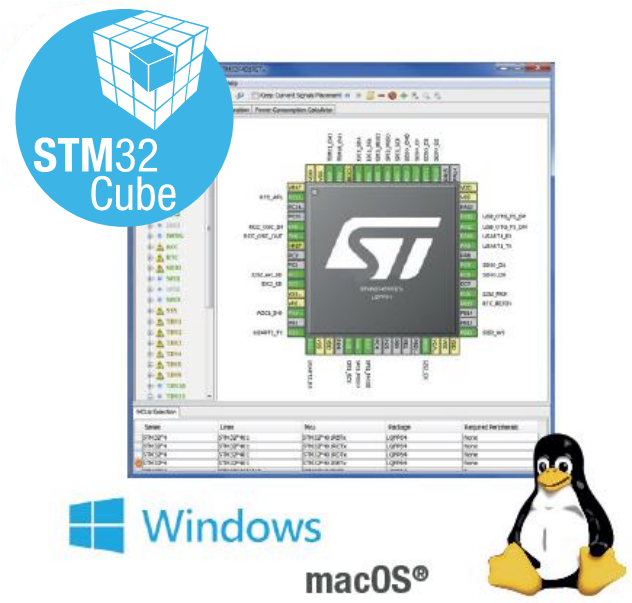


STM32
CubeMonitor-RF

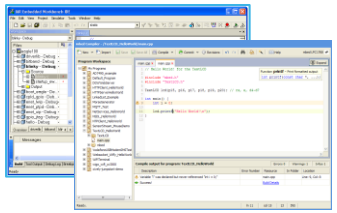
STM32CubeMX
STM32CubeWB
Code generation
Power calculation
STM32CubeMonRF

Software development tools

A complete flow, from configuration up to monitoring



FREE IDE's



IAR SYSTEMS

arm KEIL

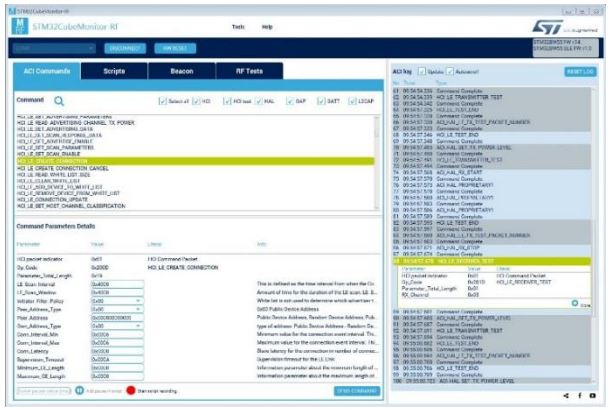
arm MBED

STM32 CubeIDE

More to come after mass market launch

STM32 CubeMonitor-RF

STM32 CubeProgrammer



STM32CubeMX
Configure & Generate Code

Partners IDEs
Compile and Debug

STM32CubeMonRF
STM32CubeProg

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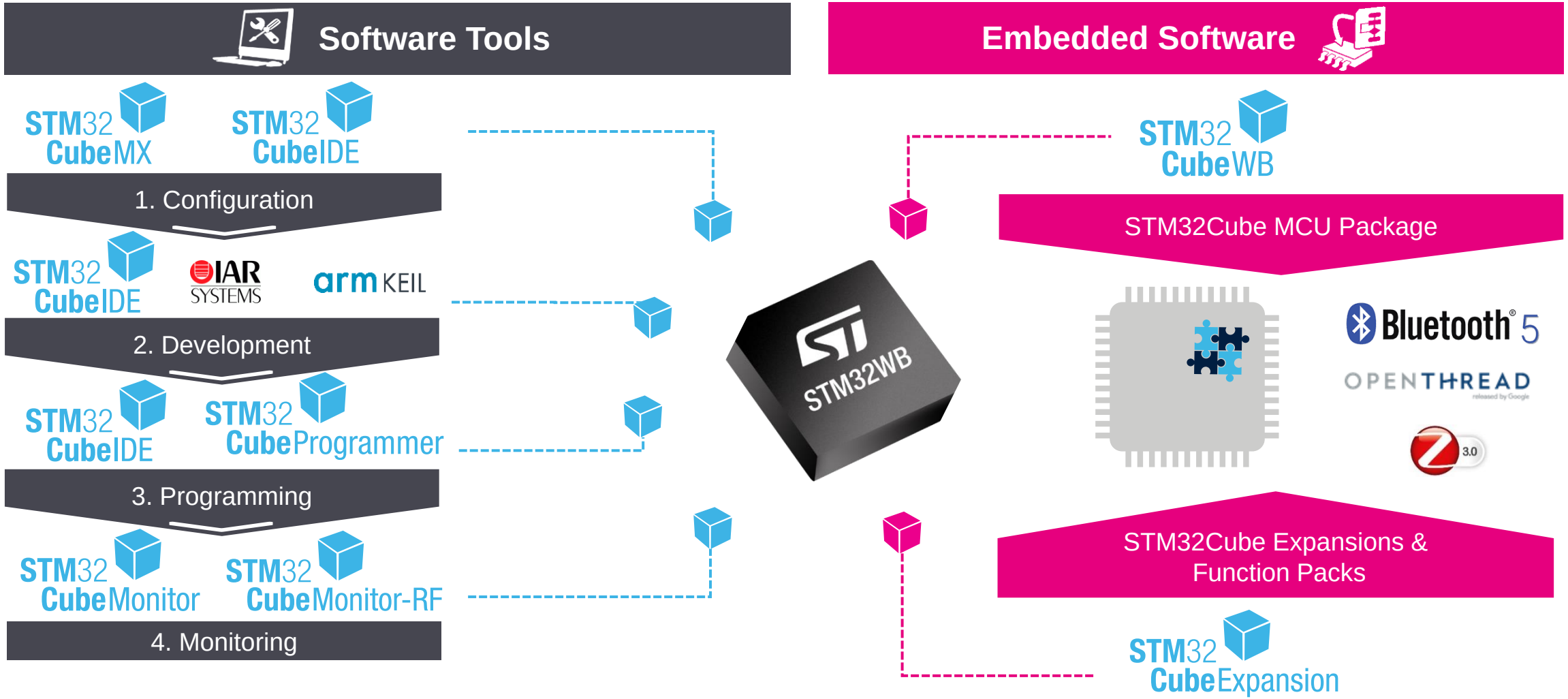
End-to-End Ecosystem



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