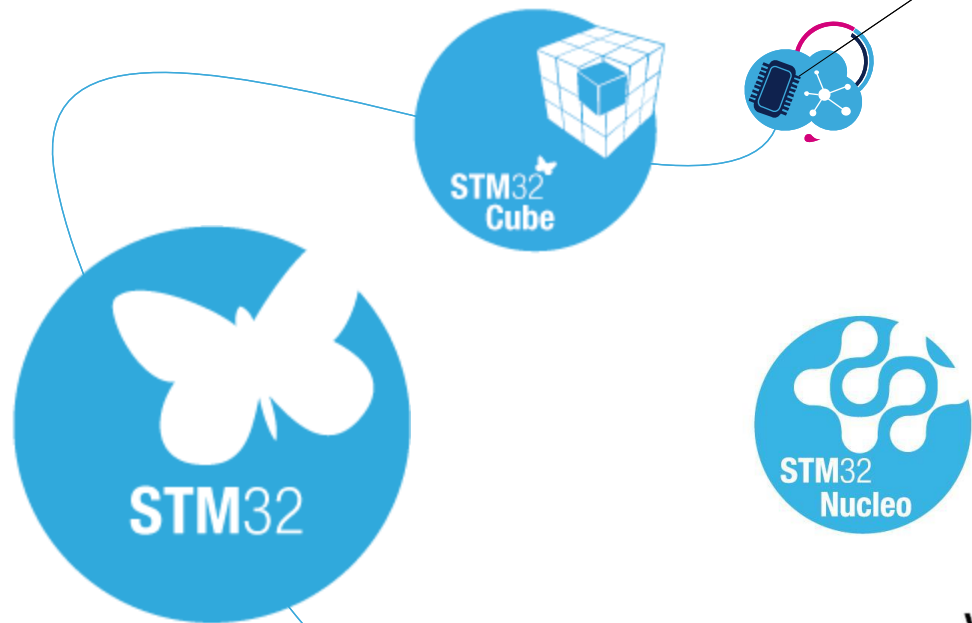


STM32 F7 Training

Product Marketing part

October 2015





STM32 history – back in 2007

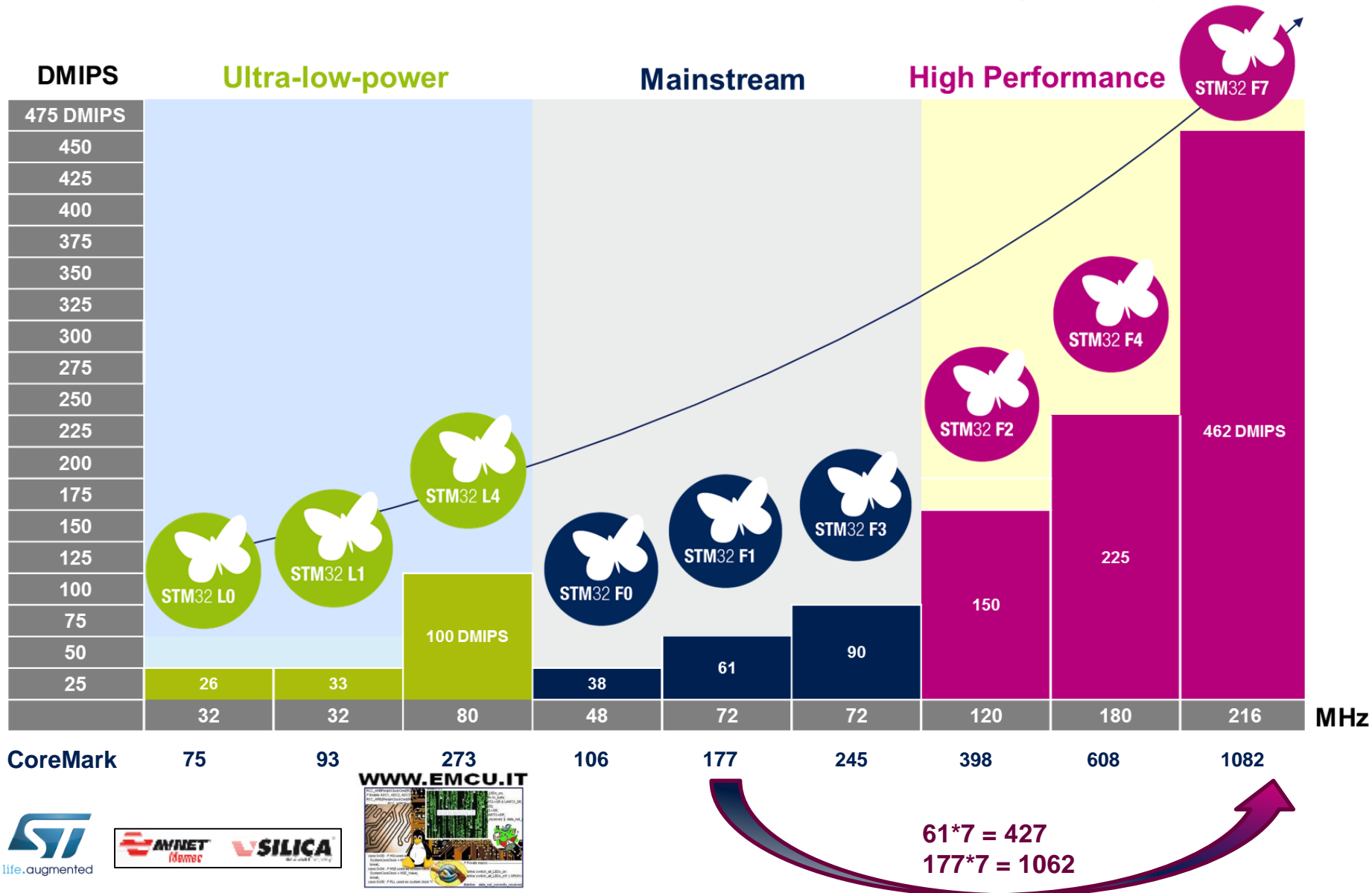
2

- ST to initiate a market revolution
- First company to understand and drive Cortex-M base MCU's
 - Bye bye to specific proprietary architectures
- Outstanding features
- Platform effect
- Affordable 32 bit
- What else?
- 7 Years later....



STM32F7 delivers 7x more performance than STM32F1

3



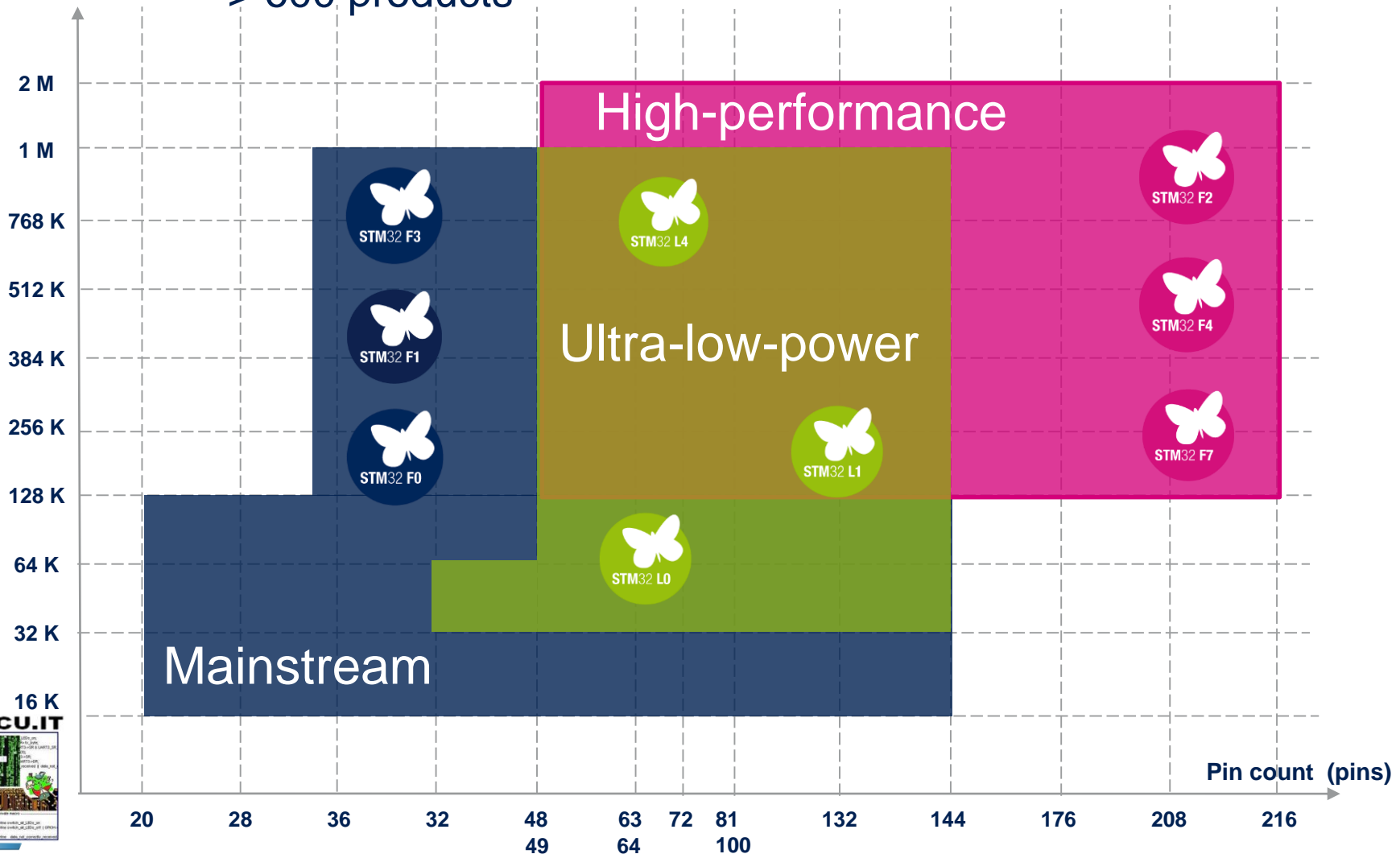


STM32 today – platform effect

4

Select your fit product inside a wide, compatible portfolio
> 600 products

Flash size (bytes)



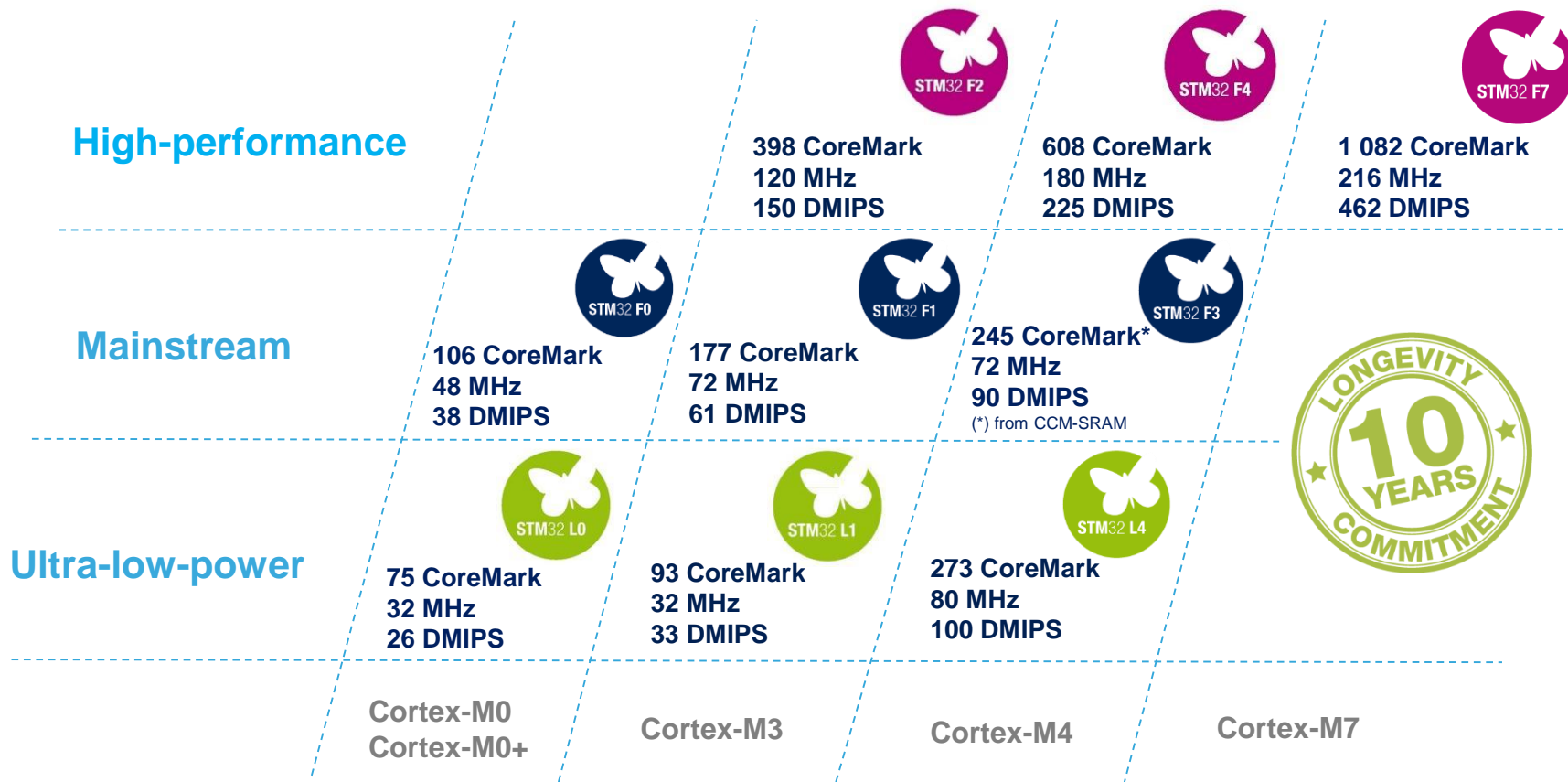
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Today - STM32 portfolio positioning

5

More than 30 product lines



5 reasons to choose an STM32

6

Real-time performance



STM32 Dynamic Efficiency™, ART Accelerator™, Chrom-ART Accelerator™, CCM-SRAM, L1-Cache, Multi-AHB bus matrix, Excellent real-time up to 200 MHz/428 DMIPS, Zero-wait state execution performance from Flash

Outstanding power efficiency



< 1 μA RTC in V_{BAT} mode, ultra-low dynamic power consumption 90 $\mu\text{A}/\text{MHz}$, with lowest dynamic consumption. 1.65 to 3.6 V V_{DD} , 0.45 μA Stop mode and 0.3 μA Standby mode

Superior and innovative peripherals



USB-OTG High speed, Ethernet, CAN, DFSDM, HR timer, LCD-TFT controller, SRAM interface, crypto/hash processor, true RNG*, PGA, 16-bit $\Sigma\Delta$ ADC and 12-bit ADC (up to 5 MSPS), external memory interface, CEC, SAI, BAM

Maximum integration



Reset circuitry, voltage regulator, internal RC oscillator, PLL, WLCSP packages

Extensive ecosystem



ARM + ST ecosystem (eval. boards, discovery kits, STM32 Nucleo evaluation board (mbed enabled), STM32Cube™ and software libraries, RTOS)

More than **600 compatible devices**
Releasing your creativity

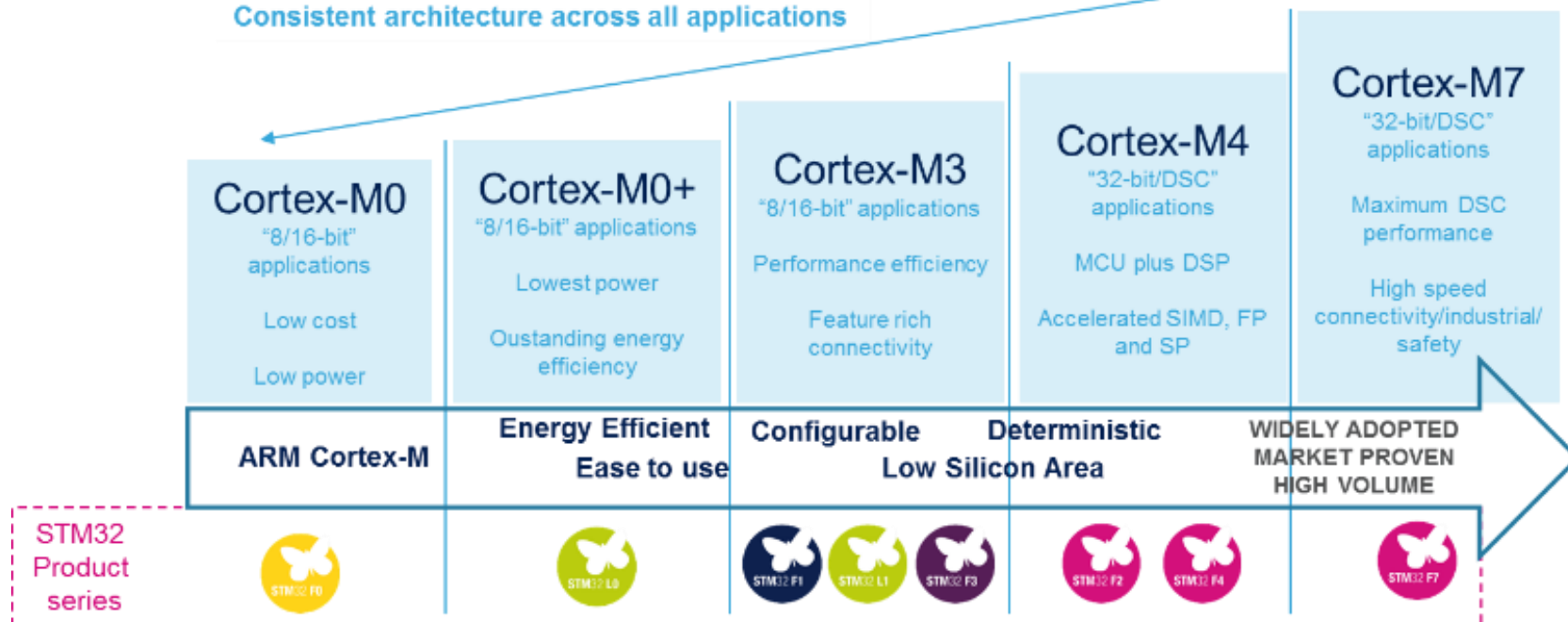
Note: *random number generator

Cortex-M7 Microcontroller positioning

7

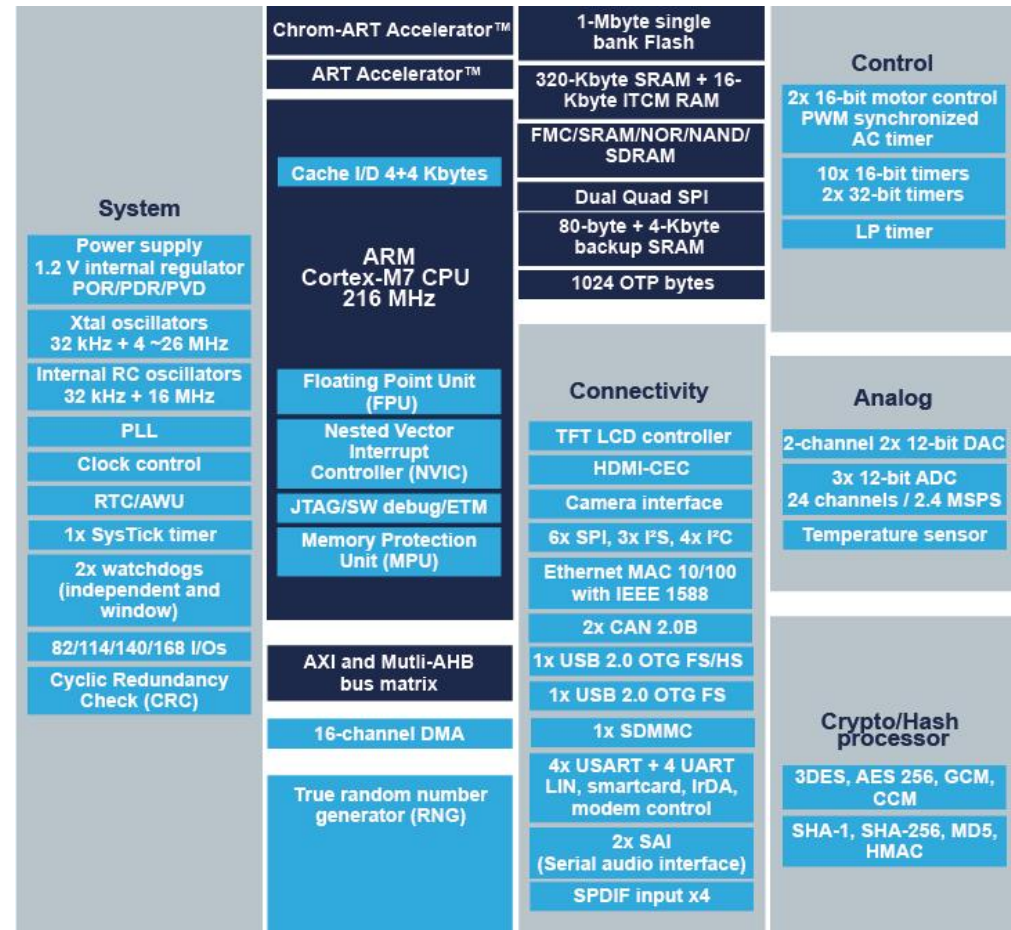


Consistent architecture across all applications

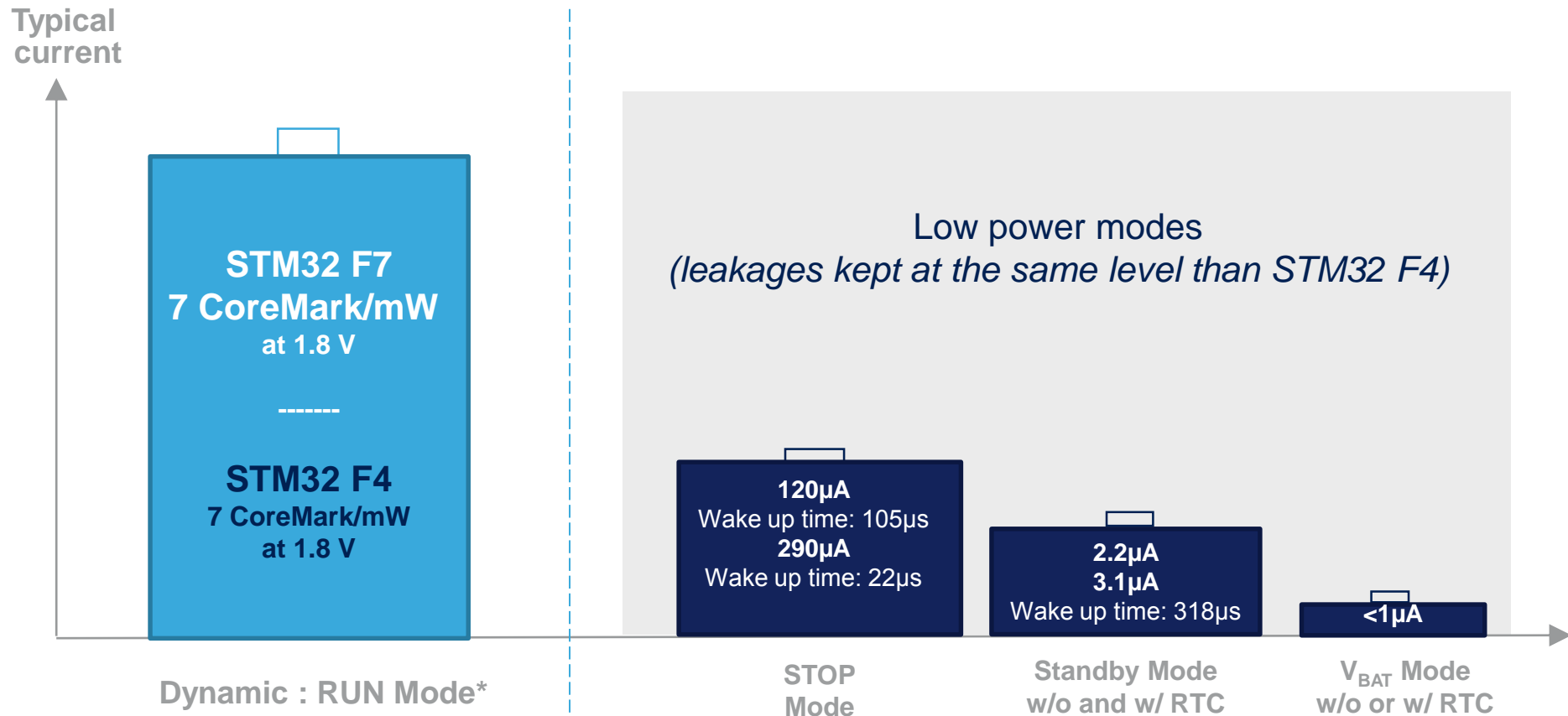


STM32 F756 block diagram 8

- NEW core: ARM Cortex-M7
- Up to 216 MHz, 462 DMIPS/1082 CoreMark
- Twice more DSP performance vs Cortex-M4 core
- New generation of Peripherals
- 2xSAI, 3xI2S half duplex, USB dedicated supply for 1.8 V operation, CEC, Quad SPI, SPDIF input, 4xI2C.
- Same packages as F429
 - WLCSP143
 - LQFP100,144,176,208
 - BGA 176, 216



STM32 F7 power efficiency = STM32 F4 power efficiency
STM32 F7 Boosts performance, but does not compromise on power efficiency



Legend: Measurements conditions depend on Room temperature
 *Run mode Conditions: CoreMark executed from Flash, peripherals OFF

STM32F756xx pin to pin compatible with STM32F4 Family

10



LQFP144
LQFP176
LQFP208



TFBGA216
UFBGA176



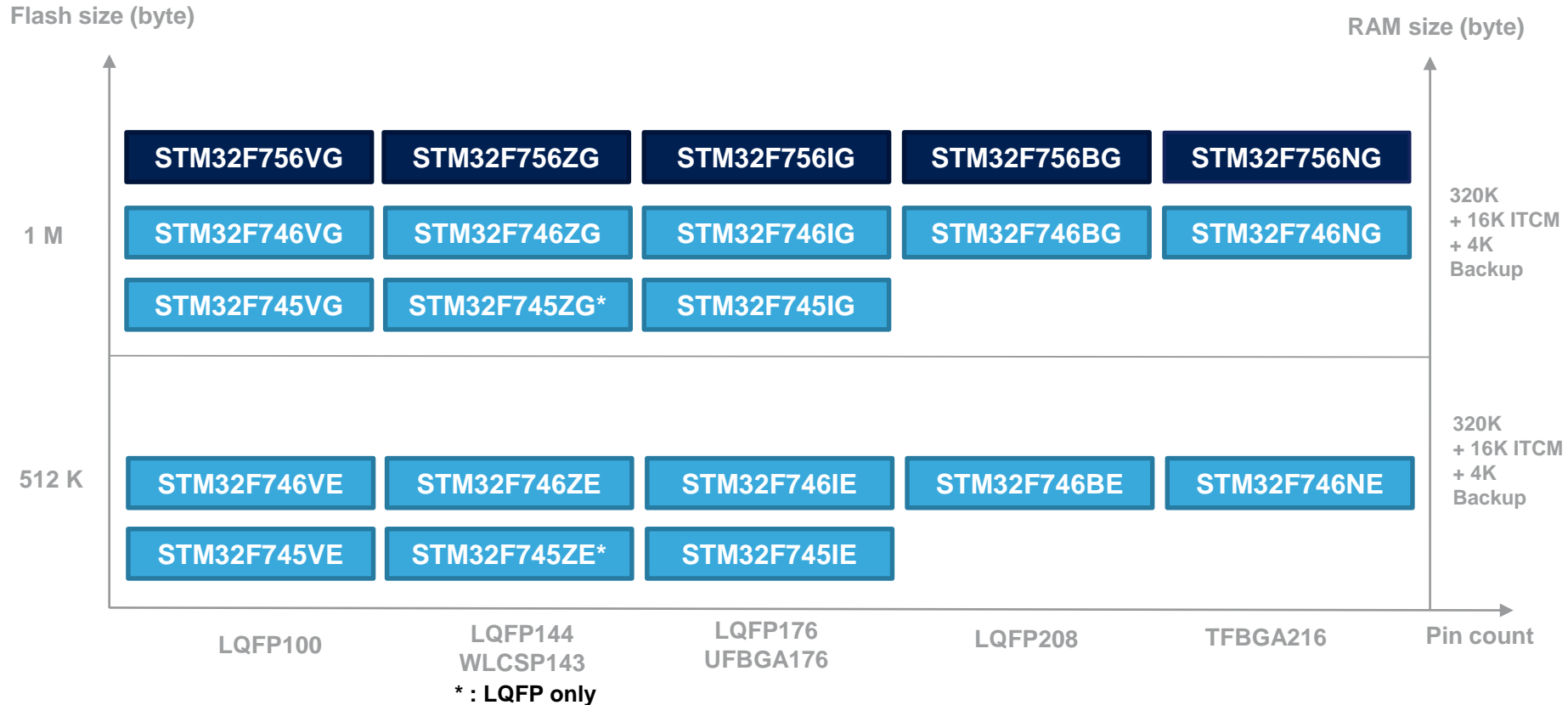
WLCSP143

Pin to pin Compatible



STM32 F74x-F75x portfolio

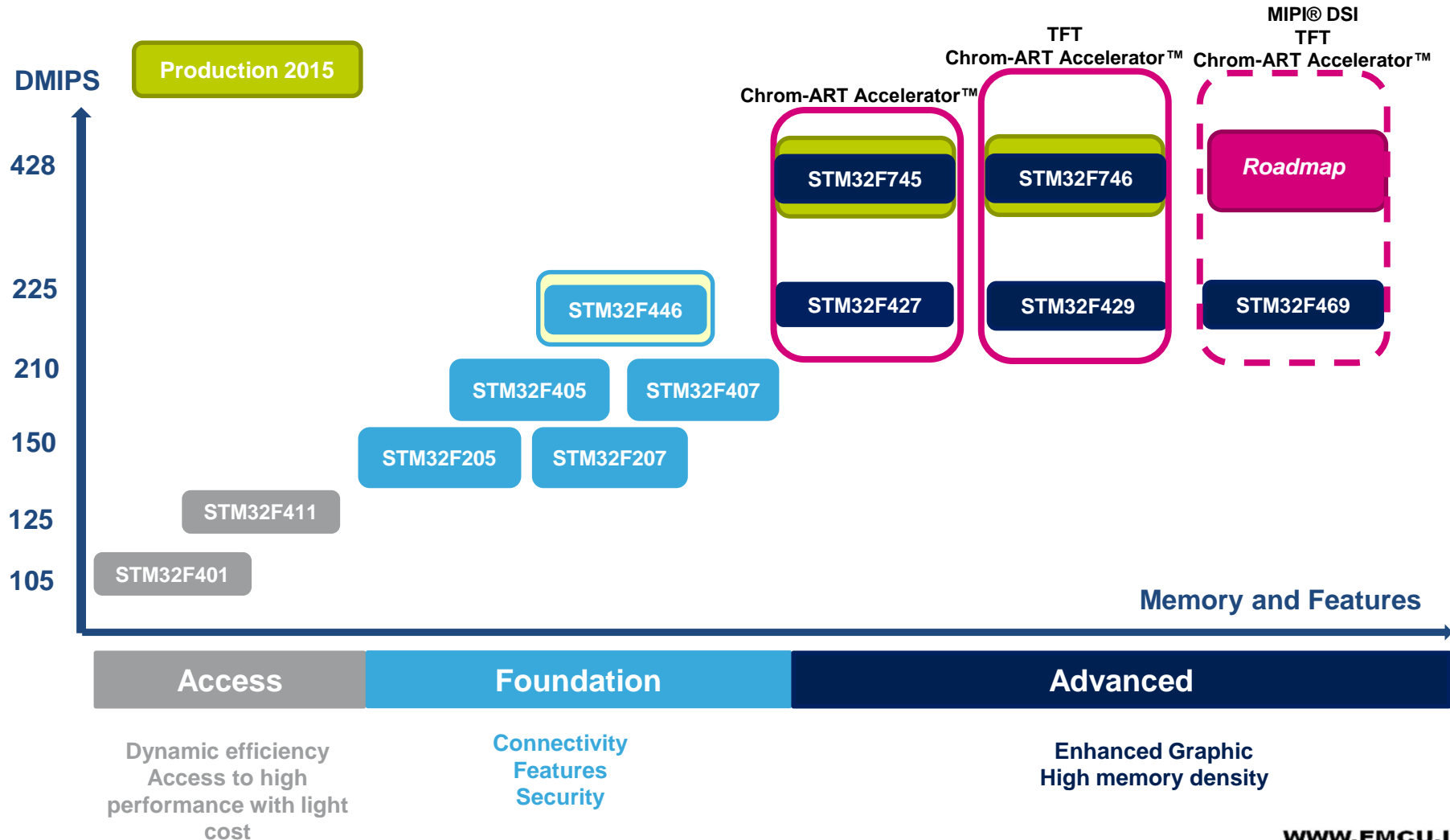
16



Legend: without HW crypto/Hash coprocessor with HW crypto/Hash coprocessor

STM32 - High-performance platform

10



STM32 Ecosystem

13

Open source

Partners

ST-designed

Documentation

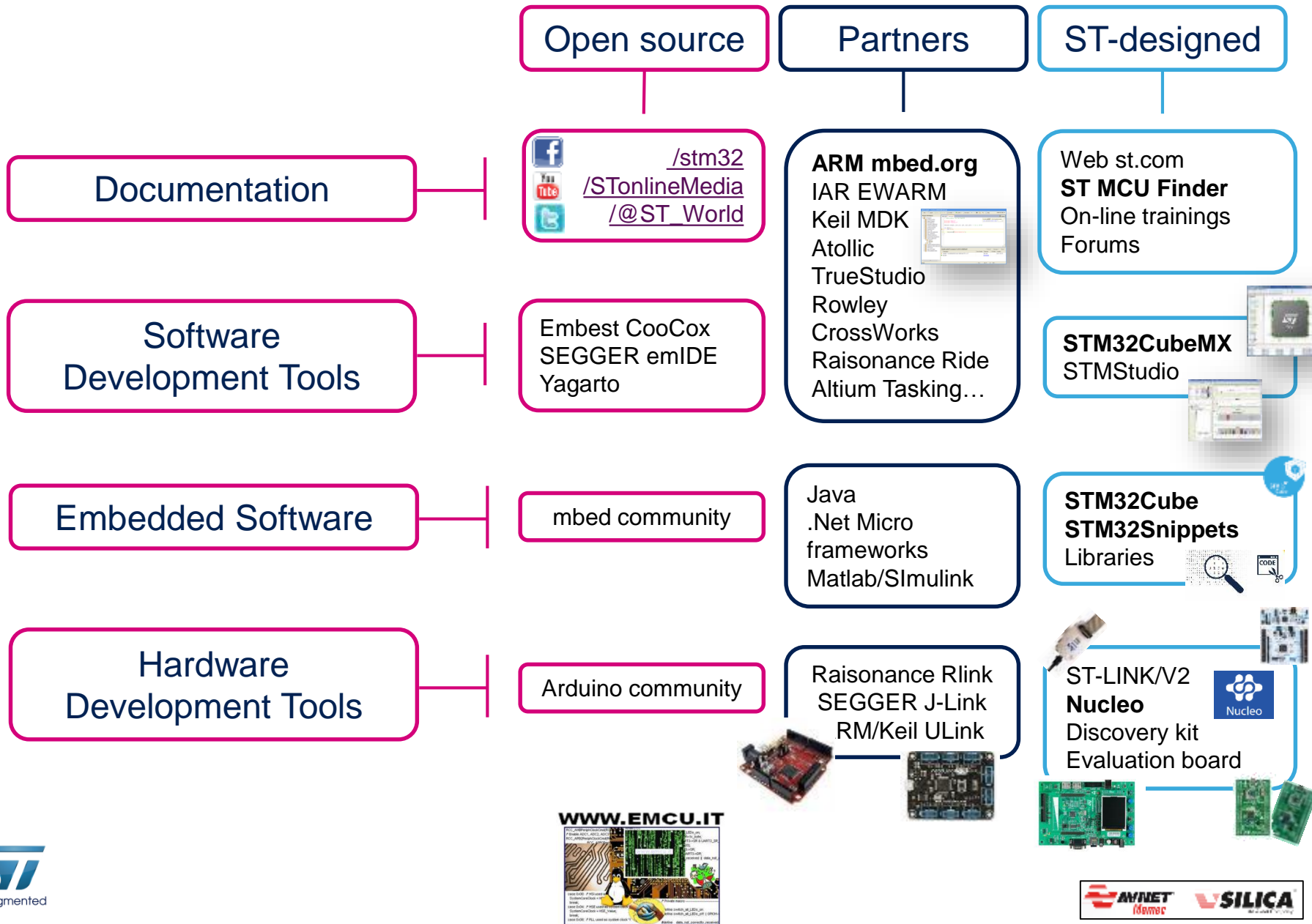
Software
Development Tools

Embedded Software

Hardware
Development Tools

A large community of partners





STM32 Ecosystem

15

Open source

Partners

ST-designed

Documentation

Software
Development Tools

Embedded Software

Hardware
Development Tools



EVALUATION Boards

\$199 – \$600

Available

STM32746G-EVAL2



DISCOVERY Boards

\$8.90 - \$30

Available w25

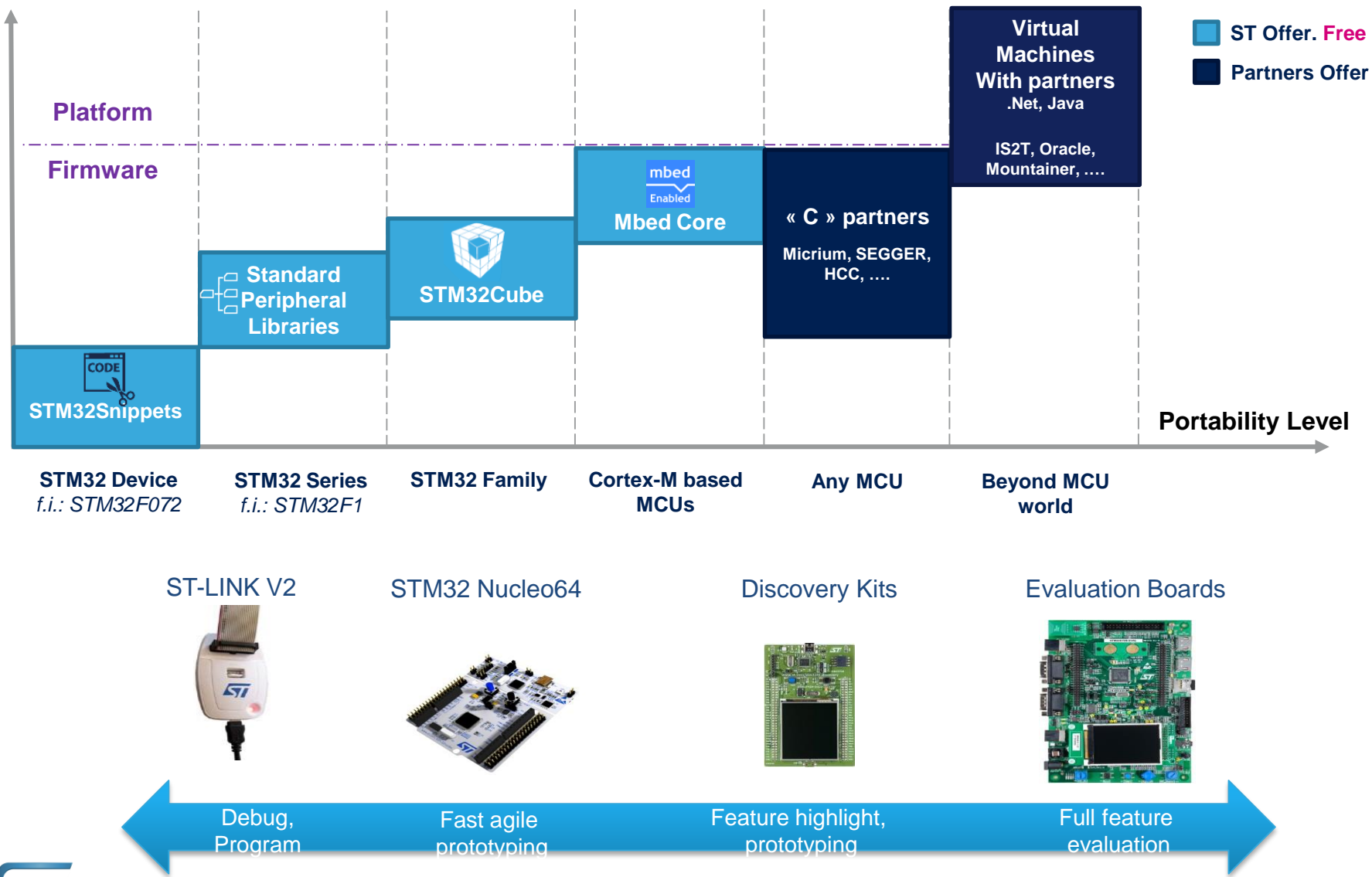
STM32F746G-DISCO



NUCLEO Boards

\$10.32

Available Sept 2015

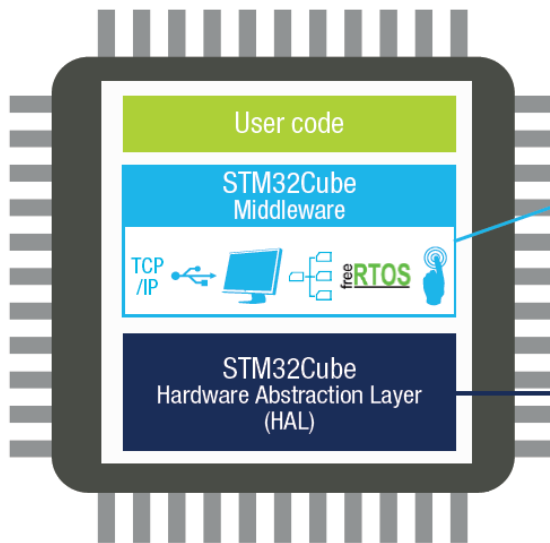


STM32Cube

Supporting all STM32 MCUs

17

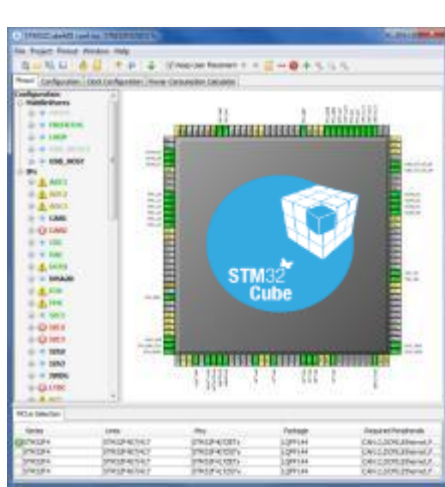
- Get configuration code generated* from a tool with STM32Cube and focus on your added-value software !
 - 4 configuration wizards: pinout, clock, peripherals & middleware, power consumption
 - Portable Hardware Abstraction layer, from series to others
 - Middleware with RTOS, USB, TCP/IP, File System, Graphics , Touch sensing...



- Open-source TCP/IP stack (lwIP)
- USB Host and Device library from ST
- STemWin graphical stack library from ST and SEGGER
- Open-source FAT file system (FatFs)
- Open-source real-time OS (FreeRTOS)
- Dozens of examples

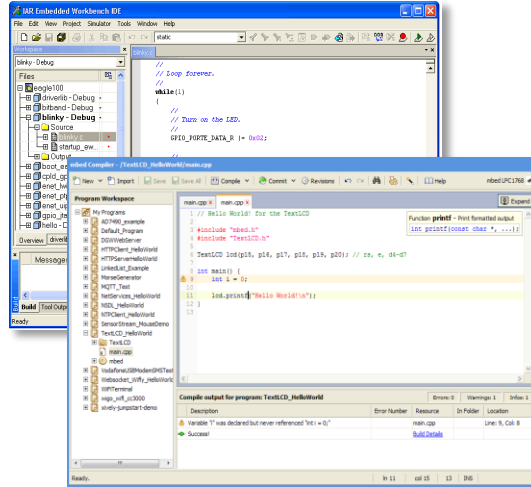
- Abstraction of STM32 MCU through portable APIs
- High coverage for most STM32 peripherals
- Production-ready using CodeSonar® static analysis tool
- Hundreds of examples
- Open-source BSD license

... with comprehensive choice of free IDEs



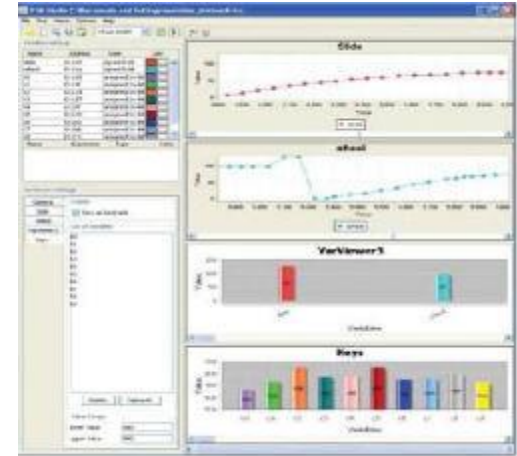
STM32
CubeMX

Generate Code



Partners IDEs

Compile & Debug



STMStudio

Monitor



FREE
IDE's

STM32 at the Heart of...

19



Connected Watch
Integration & low
dynamic power
performance,
graphic
Acceleration,



Fitness & wearables
Ultra-low-power with High memory density



Samsung
GALAXY
Note III

**Integration, performance, Dynamic
Efficiency**



Cost sensitive
F0 used in
Wireless Car toys
Driven by smart
phone



STM32 in personal home weather station
Air quality sensing

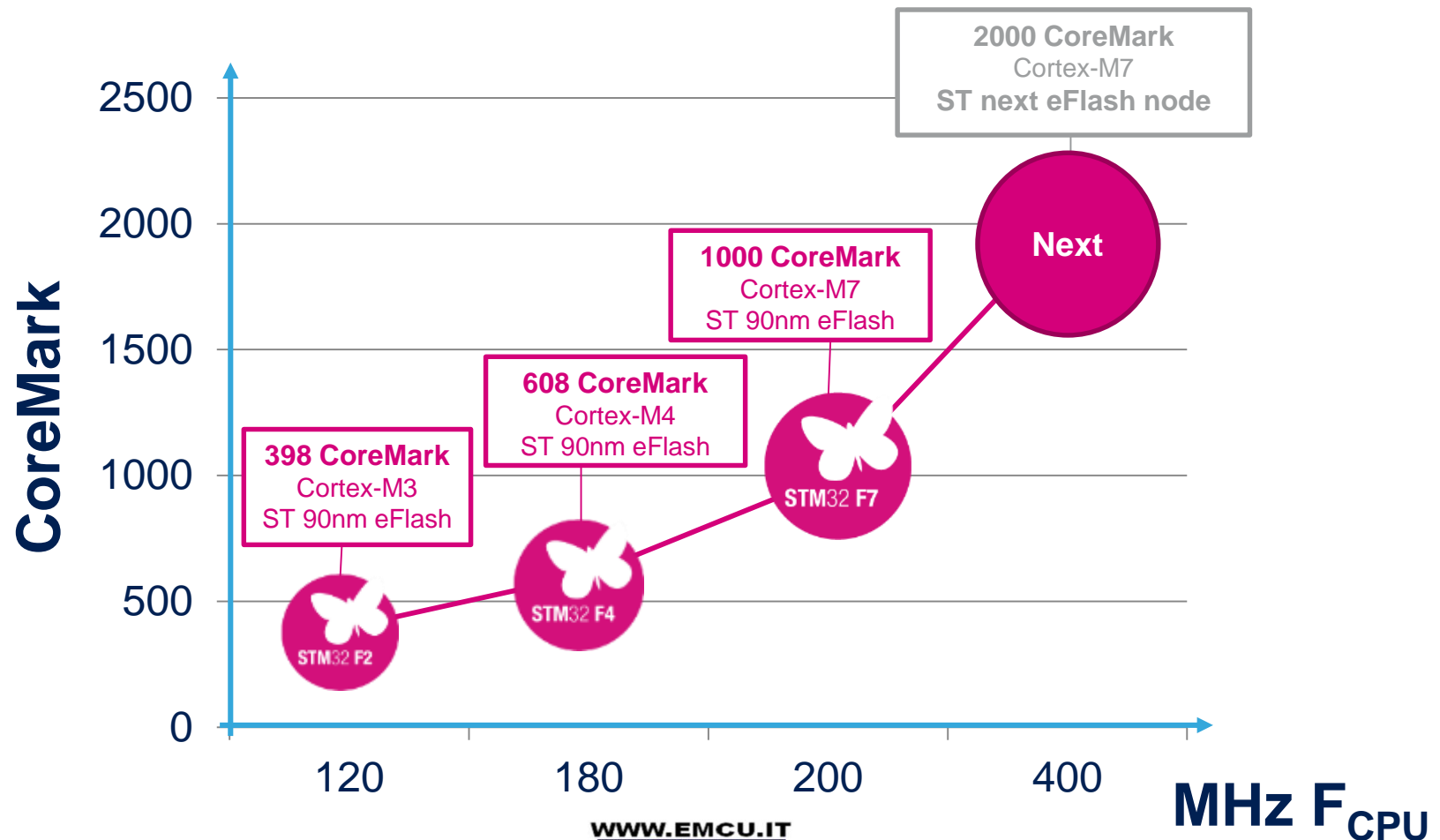


Java in User
User
Interfaces ,
Connected
Electricity
Meters

It wont take us 14 years to X14!

20

Fully compatible with the STM32 F4 and fully reuses STM32 Ecosystem
Our next step will go for the 2000 Core Mark on the next technology node



WWW.EMCU.IT



STM32F4/7 real life applications

21



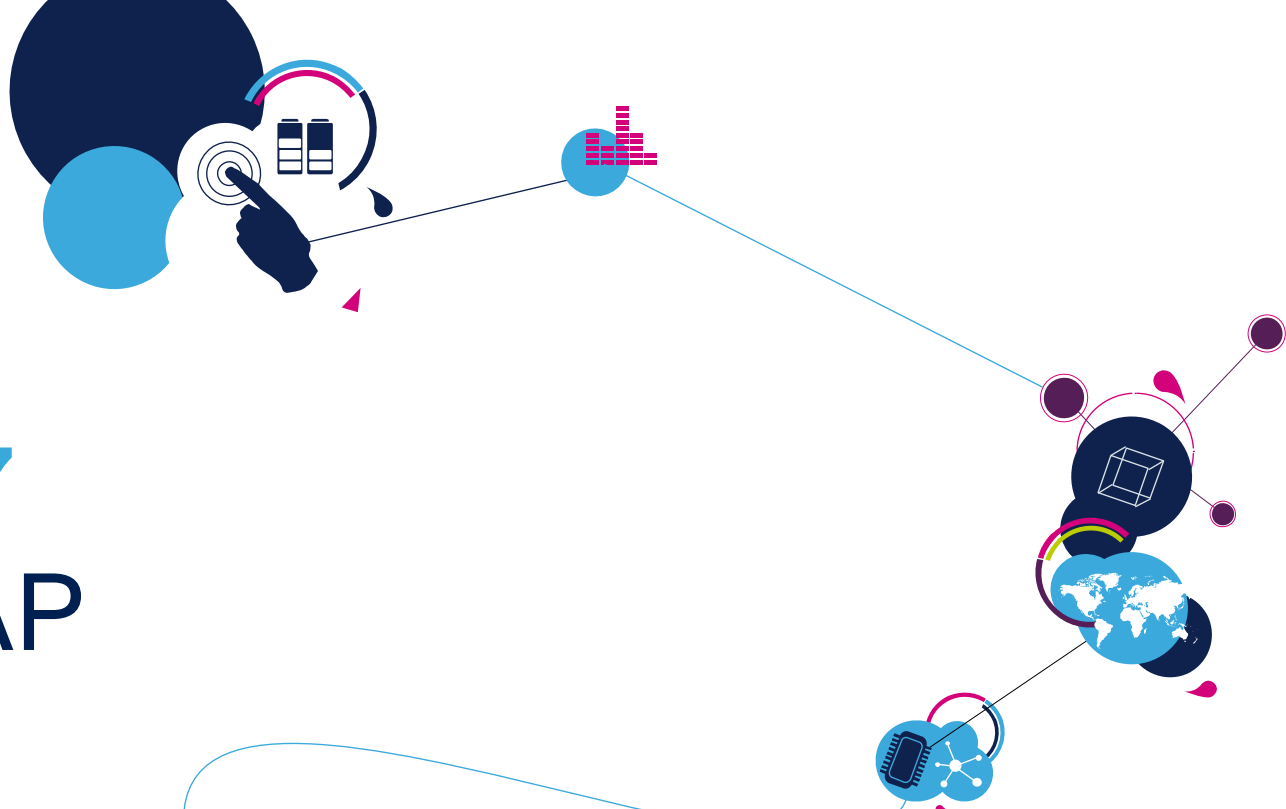
Smart watch:
Main application controller or sensor hub

Smart phone, tablets and monitor
sensor hub for MEMS and optical touch

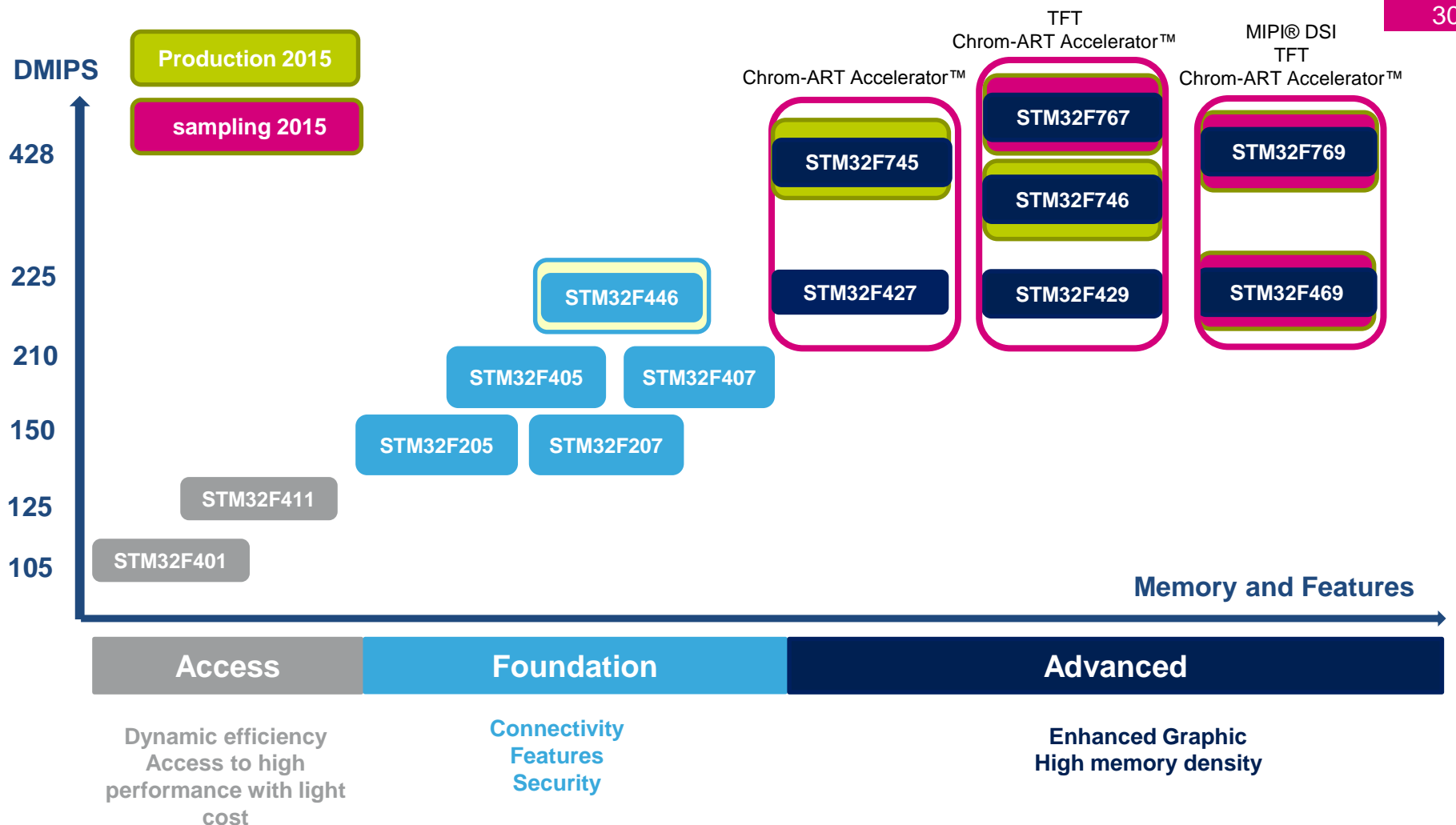


Industrial/home automation panel:
Main application controller

STM32F7 ROADMAP



High-performance platform

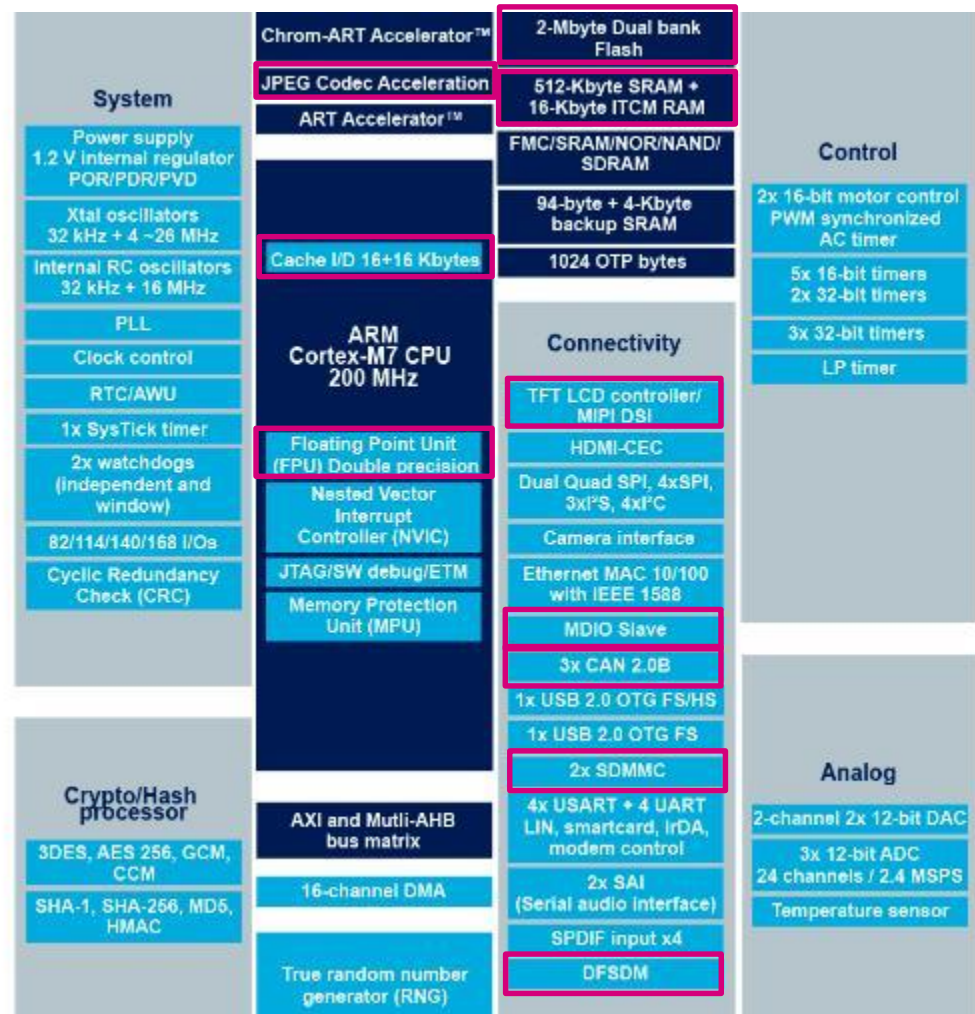


→ The STM32F7-2M series extends the high performance lines to the Graphic but also to the GP market, while keeping the compatibility with the STM32F7-1M and STM32F4 series

STM32F76x - 2M block diagram

32

- NEW core: ARM Cortex-M7 with double precision FPU
- Up to 200 MHz, 428 DMIPS/ 1000 CoreMark
- 2MB Flash / 512KB SRAM
- Twice more DSP performance vs Cortex-M4 core
- New generation of peripherals
- 2xSAI, 3xI2S half duplex, Dedicated supply for 1.8 V operation for USB and SDMMC, CEC, Dual Quad SPI, SPDIF input, 4xI2C, 2 SDIO I/F, 3 CAN, MIPI DSI, JPEG H/W codec, MDIO slave
- Same packages as F429
 - WLCSP168 pitch 0,4mm
 - LQFP100,144,176,208
 - BGA176, 216





STM32 F7 product lines

31

Cortex®-M7 – 200 MHz	<div>Acceleration</div> <ul style="list-style-type: none">ART Accelerator™L1 cache: data and instruction cacheChrom-ART Accelerator™Floating Point Unit <div>Connectivity</div> <ul style="list-style-type: none">2 x USB2.0 OTG FS/HSSDIO (x2 on F76x & F779)USART, UART, SPI, I²CCAN2.0HDMI-CECEthernet IEEE 1588FMCMDIO slave (on F76x and F77x)Camera I/F <div>Audio</div> <ul style="list-style-type: none">I²S + audio PLL2 x SAI2 x 12-bit DACSPDIF-RX <div>Others</div> <ul style="list-style-type: none">16 and 32-bit timers3 x 12-bit ADC (2.4Msps)Low voltage 1.7 to 3.6V85°C and 105°C range	Product line	FCPU (MHz)	L1 cache (I/D)	FPU	FLASH (bytes)	RAM (KB)	Hardware Crypto / hash	Quad -SPI	JPEG codec	CAN	DFSDM	TFT controller	MIPI® DSI
		STM32F779	200	16K+16K	Double Precision	1M to 2M	512K (incl.64K DTCM) + 16K ITCM + 4K backup	●	Dual	●	3	●	●	●
		STM32F769	200	16K+16K	Double Precision	1M to 2M	512K (incl.64K DTCM) + 16K ITCM + 4K backup		Dual	●	3	●	●	●
		STM32F777	200	16K+16K	Double Precision	1M to 2M	512K (incl.64K DTCM) + 16K ITCM + 4K backup	●	Dual	●	3	●	●	
		STM32F767	200	16K+16K	Double Precision	1M to 2M	512K (incl.64K DTCM) + 16K ITCM + 4K backup		Dual	●	3	●	●	
		STM32F756	200	4K+4K	Single Precision	512K to 1M	320K (incl.64K DTCM) + 16K ITCM + 4K backup	●	Single		2		●	
		STM32F746	200	4K+4K	Single Precision	512K to 1M	320K (incl.64K DTCM) + 16K ITCM + 4K backup		Single		2		●	
		STM32F745	200	4K+4K	Single Precision	512K to 1M	320K (incl.64K DTCM) + 16K ITCM + 4K backup		Single		2			

Need more info ?

26

For more info contact:

enrico.marinoni@avnet.eu

(Digital FAE for STM - MCU, WireLess (IoT), MEMS, PLM, etc)

roberto.rossetti@avnet.eu

(B.D.M.)



Thank you

27



www.st.com/stm32