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Getting started with new Azure RTOS for STM32

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Agenda

1. STM32Cube ecosystem overview
2. Azure RTOS overview
3. Azure RTOS integration for STM32
4. Practical demonstration
5. Q&A

STM32Cube ecosystem overview

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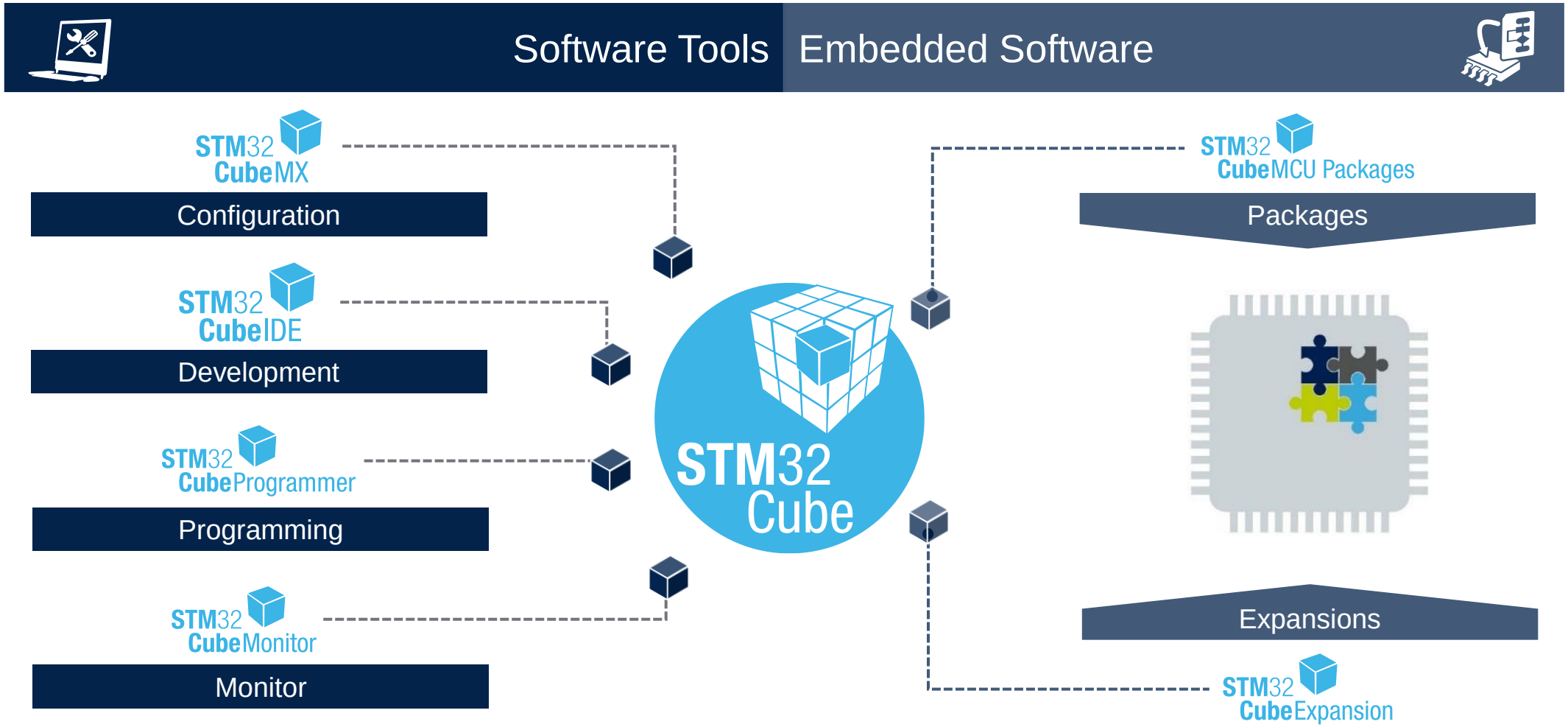
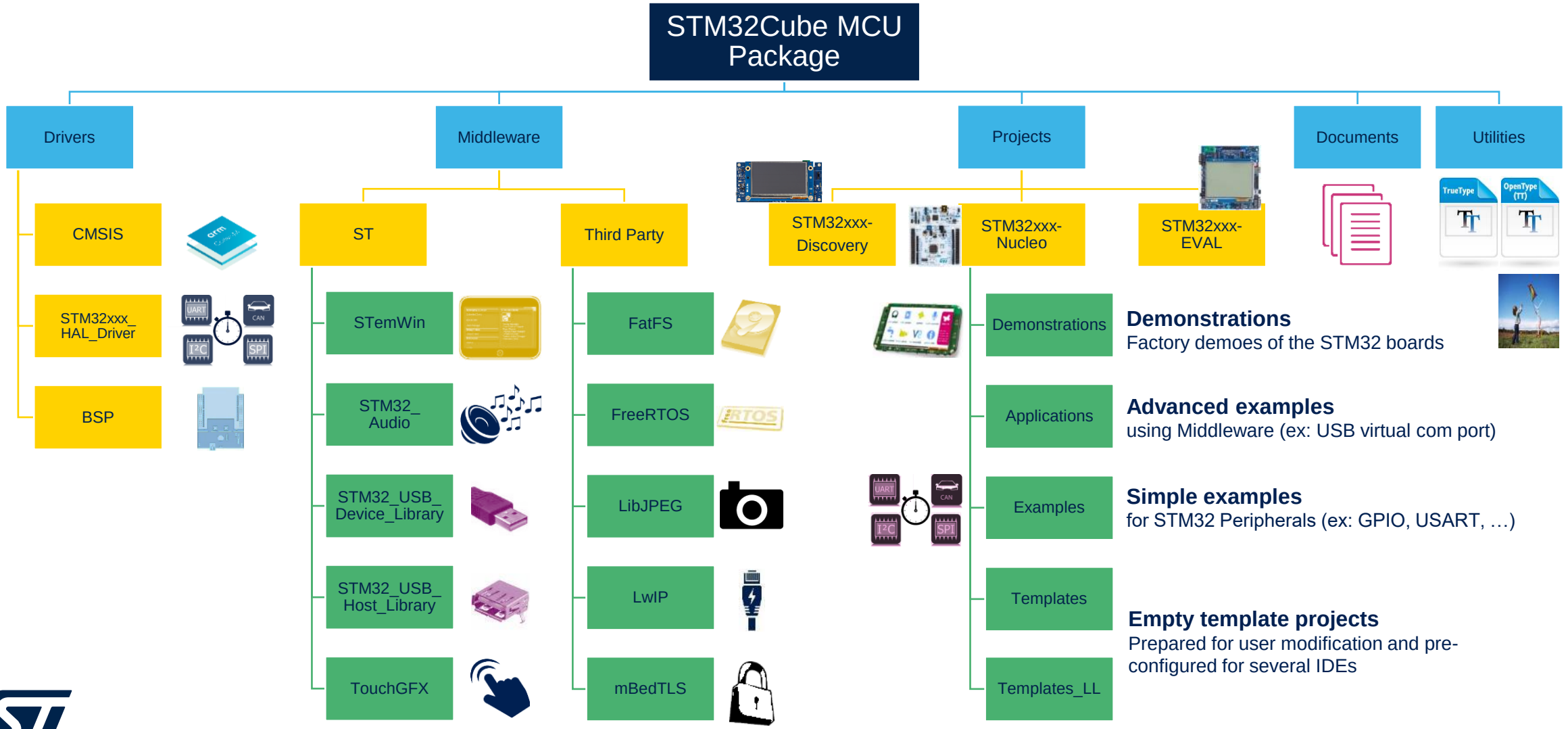
Inside the STM32Cube ecosystem



STM32 CubeMCU Packages

Detailed content and organization



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Microsoft Azure RTOS overview

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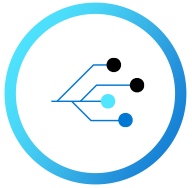

Azure RTOS ThreadX
Real-time operating system

Azure RTOS ThreadX Real-Time Operating System

- Small: 2 Kbytes Minimal Footprint
- Fast: Sub microsecond context switch
- Safe: SIL 4, ASIL D, Medical Class C
- Security: Extensive Pen Testing, Part of EAL 4+, FIPS 140-2
- Advanced: Preemption-threshold, Event Chaining, Auto Scaling
- Easy: Consistent API, Extensive out-of-box examples, FreeRTOS middleware layer

ThreadX	
Azure RTOS ThreadX API	
Thread Services	Messaging Queues
Counting Semaphores	Mutexes
Event Flags	Block Memory Pools
Byte Memory Pools	Application Timers
Azure RTOS ThreadX Core Scheduler	

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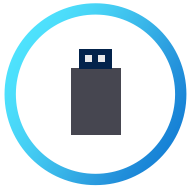

Azure RTOS USBX
USB stack, host and device

Azure RTOS USBX USB Host and Device stack

- Small: ~8.5 Kbytes Device, ~12Kbytes Host
- Fast: Leverages DMA, Minimal Function Call Layering
- Safe: SIL 4, ASIL D, Medical Class C
- Advanced: Comprehensive class support
- Easy: Consistent API, Extensive out-of-box examples and device/host controller integration

<table>
<tr><th colspan="3">USBX</th></tr>
<tr><td colspan="2">USB X Host API</td><td>USB Device API</td></tr>
<tr><td>ASIX</td><td>HUB</td><td>CDC/ACM</td></tr>
<tr><td>AUDIO</td><td>PIMA</td><td>CDC/ECM</td></tr>
<tr><td>CDC/ACM</td><td>PRINTER</td><td>DFU</td></tr>
<tr><td>GSER</td><td>PROFILIC</td><td>HID</td></tr>
<tr><td>HID</td><td rowspan="2">STORAGE</td><td>PIMA</td></tr>
<tr><td>CDC/ECM</td><td>STORAGE</td></tr>
<tr><td colspan="2"></td><td>RNDIS</td></tr>
<tr><td colspan="2">USBX Host Stack</td><td>USBX Device Stack</td></tr>
</table>

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Azure RTOS NetX/NetX Duo
TCP/IP stacks

Azure RTOS NetX Duo TCP/IP stack

- Small: 50 Kbytes Device-to-Cloud
- Fast: Near Wire Speed, Minimal CPU usage
- Safe: SIL 4, ASIL D, Medical Class C
- Security: Extensive Pen Testing, EAL4+, FIPS 140-2
- Advanced: Extensive Components, Zero Copy, Auto Scaling
- Easy: Consistent API

NetX duo		
Azure RTOS NetX Duo application		
MQTT	CoAP	LwM2M
Auto IP	HTTP/HTTPS	SMTP
DHCP	NAT	SNMP
DNS, mDNS, DNS-SD	POP3	Telnet
FTP, TFTP	PPP, PPPoE	PTP, SNTP
Azure RTOS NetX Duo API		
IGMP	NetX Secure TLS	NetX Secure DTLS
ICMP	IPV4 & IPV6	Azure RTOS NetX Secure Ipsec
ARP/RARP	UDP	
	6LowPAN	TCP
Ethernet, Wi-Fi, Bluetooth LE, 15.4, custom		

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Azure RTOS FileX
FAT file system, fault tolerant

Azure RTOS FileX
Fault tolerant FAT file system

- Small: 9 Kbytes Minimal Footprint
- Fast: Direct Data Write, Cache optimized for speed
- Safe: SIL 4, ASIL D, Medical Class C
- Advanced: Fault tolerant, FAT 12/16/32/exFAT, Extensive Cache Support, NAND/NOR Wear Leveling, Auto Scaling
- Easy: Consistent API, Extensive out-of-box examples

<table>
<tr><td colspan="3">FileX</td></tr>
<tr><td colspan="3">Azure RTOS FileX API</td></tr>
<tr><td>Media services</td><td>Directory Services</td><td>File Services</td></tr>
<tr><td colspan="3">LevelX (NOR/NAND), RAM Disk, USB X, SD CARD, Custom</td></tr>
</table>

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Azure RTOS integration for STM32

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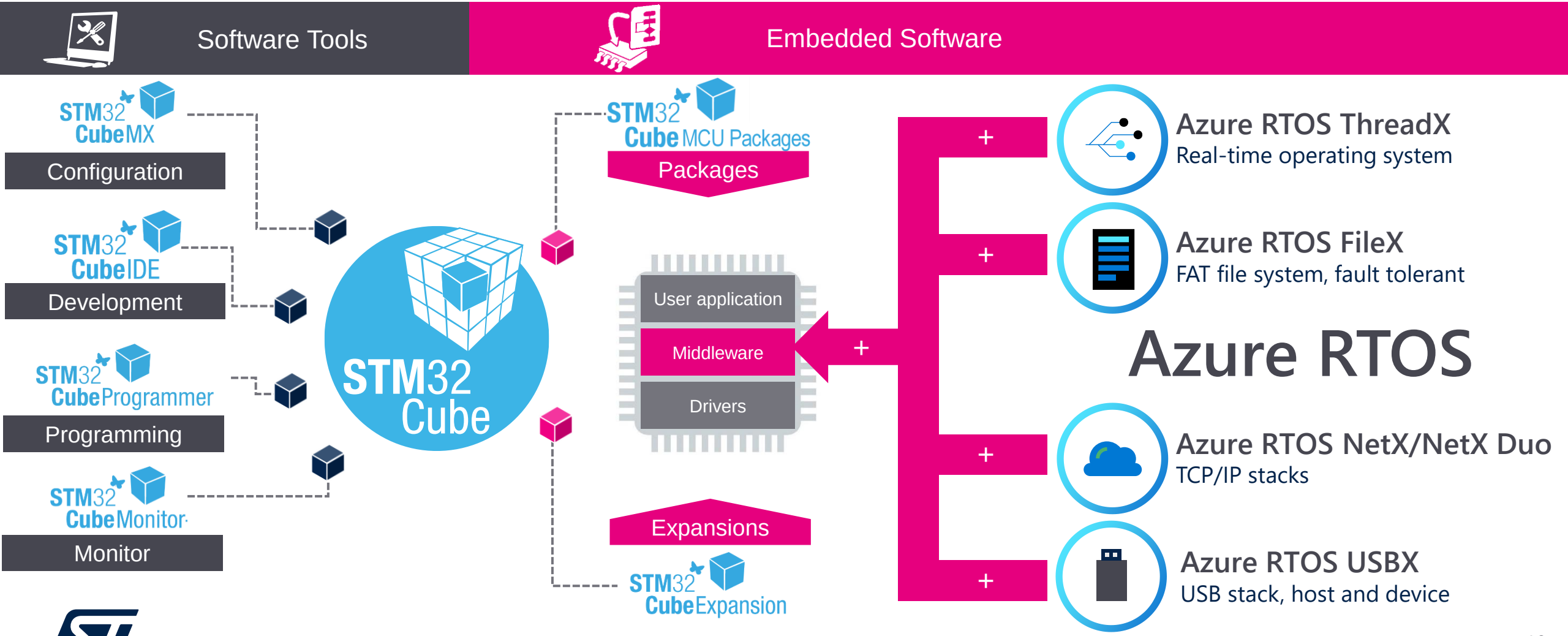
STM32Cube Software Suite Complemented with Microsoft Azure RTOS



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STM32Cube Software Suite

Microsoft Azure RTOS will bring additional key benefits to STM32Cube software suite in 2021

+ Azure RTOS

Faster & Easier Development		Fast performance
Business-friendly terms	+	Complete consistent solution
Better Quality		Industry certifications

Full integration in STM32Cube ecosystem
Free of charge for STM32 customers

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Azure RTOS deployment within STM32 and STM32Cube portfolio

Azure RTOS is available for all STM32 series starting today

Free of charge

Available as expansion package for existing product series

STM32 CubeExpansion

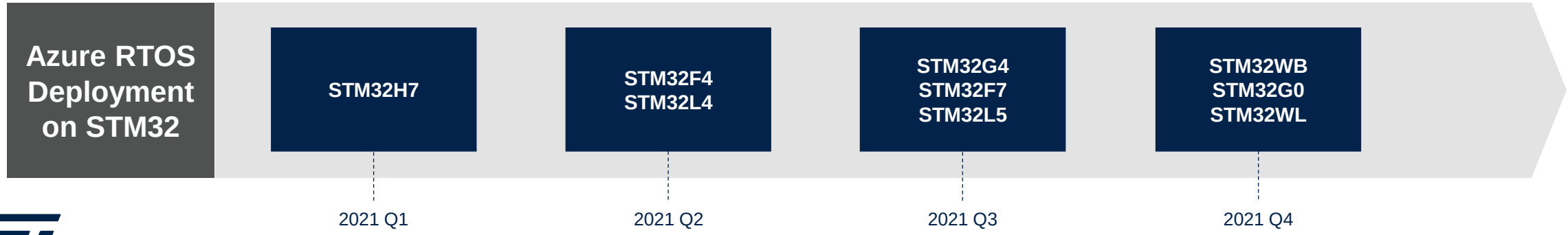
Available in STM32Cube MCU FW package for new product series

STM32 CubeMCU Packages

Full graphical configuration in STM32CubeMX

STM32 CubeMX

Extensive list of examples for all middleware and toolchains



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Getting started with Azure RTOS STM32H7 examples for early birds

Early beta package for STM32 now available on Github

- First examples for STM32H7 series
- Supported boards STM32H735G-DK and NUCLEO-H723G
- STM32CubeIDE and IAR projects
- Available starting Friday December 18th on ST Github account for feedback from STM32 community

Access here

Practical demonstration

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Thank you

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