

Infineon XMC4800 IoT Amazon FreeRTOS Connectivity kit WiFi



Enabling IoT solutions for Industry 4.0



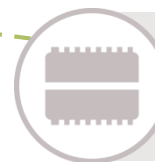
Security
Encrypting the data transfer and protecting intellectual property



Sensing
Collecting and generating the data for IoT



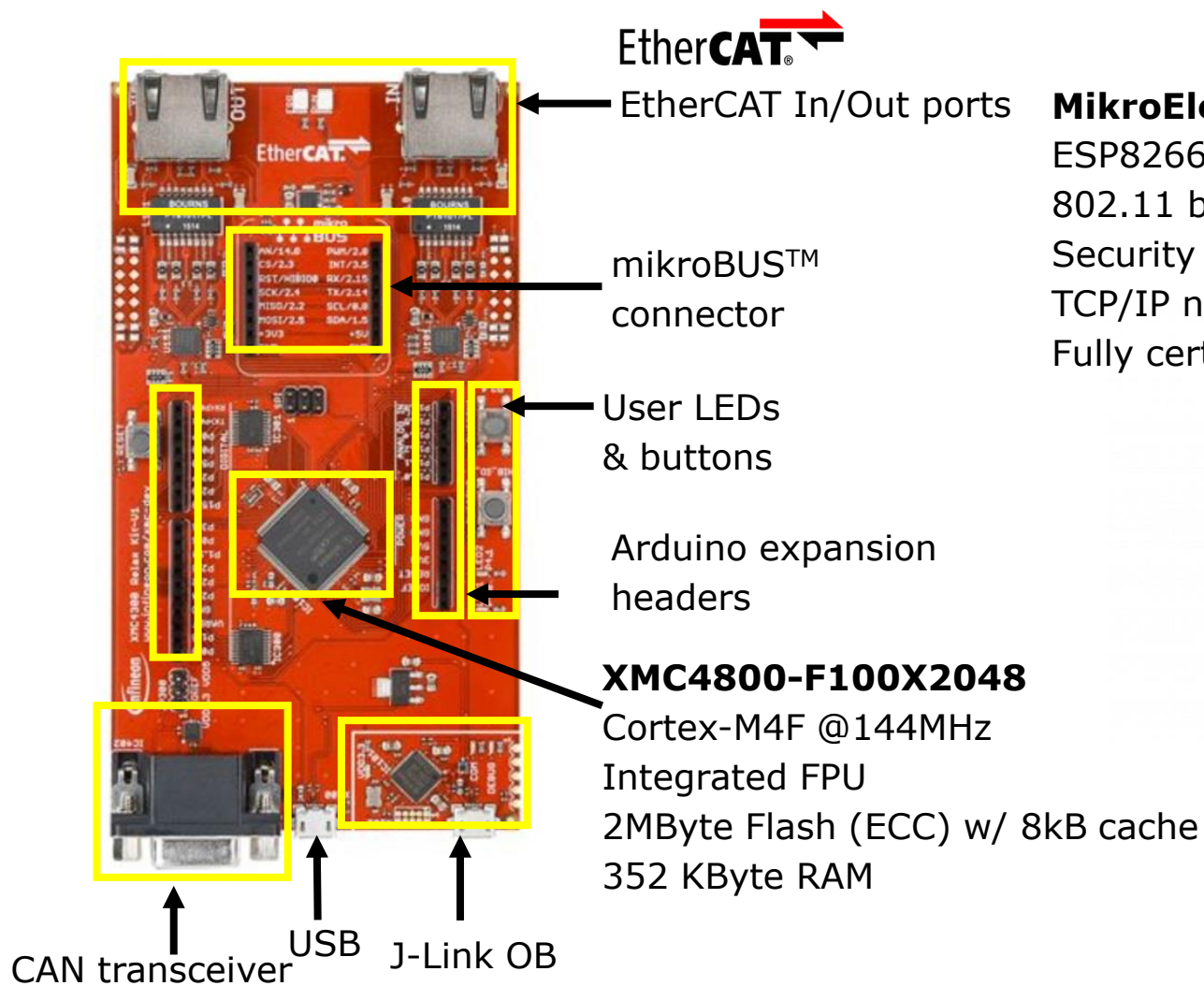
Control
Interpreting the data and processing them



Power
Smart actuating of devices



Infineon XMC4800 IoT Connectivity Kit Hardware Overview



MikroElektronika WiFi ESP
ESP8266EX
802.11 b/g/n
Security WPA/WPA2
TCP/IP network stack
Fully certified



qualified
device
Amazon FreeRTOS

More info: www.infineon.com/connectivitykit

Infineon XMC4800 IoT Connectivity Kit Hardware Overview



SYSTEM PERFORMANCE

ARM® Cortex®-M4 @144MHz	FPU	Programmable Interconnect Matrix	RTC
	DMA 12ch	SysTick	CRC Engine
	FLASH (ECC) up to 2MB	RAM up to 352kB	CACHE 8kB

Timers / PWM

4x PWM Timers (CCU4) 16-64Bit 4ch	2x PWM Timers (CCU8) 16-64Bit 8ch + Dead-Time	2x POSIF (Position Interface)
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Communication

6x CAN 256 MO	USIC 6ch [SPI/Dual SPI/Quad SPI, SCI/UART, I²C, I²S]	EtherCAT®
10/100 Ethernet MAC (/w IEEE 1588)	USB (FS OTG)	SDIO/SD/MMC Interface
External Memory Interface (EBU)		

Analog

4x 8ch-12bit ADC / 4Msps	2x 12Bit DAC	4x $\Delta\Sigma$ Demodulator
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Description

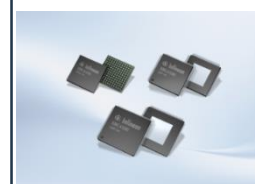
Application / Target Markets

- Medium to higher-end industrial control
- Industrial communication
- Transportation

Application / Target Markets

- **ARM® Cortex®-M4 at 144MHz**
- **EtherCAT®**
- Large on-chip memories **2MB Flash, 352kB RAM**
- **6 CAN nodes with 256 message objects**
- Rich industrial and external media connectivity
- **Safety package supporting SIL-2/3**
- **125°C** extended temperature range
- Long-term availability with >15 years
- IEC 60730 class B compliant LIB
- Free DAVE™ IDE and DAVE™ Apps

Package



LQFP100
LQFP144
LFBGA196



...get more information...

Infineon XMC4800 IoT Connectivity Kit

Sensing the real world



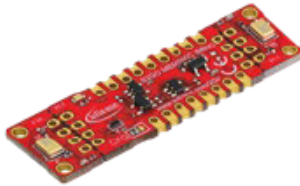
DPS310 Pressure Shield2Go
Featured product: XENSIV™
pressure sensor DPS310
OPN: S2GOPRESSUREDPS310TOBO1

Interfaces:



TLV493D 3DSense Shield2Go
Featured product: XENSIV™ magnetic
position sensor TLV493D-A1B6
OPN: S2GO3DSENSETLV493DTOBO1

Interfaces:



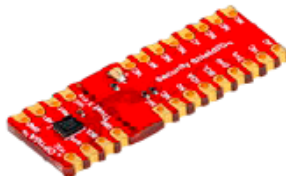
IM69D130 Microphone Shield2Go
Featured product: XENSIV™ MEMS
microphone IM69D130
OPN: S2GOMEMSMICIM69DTOBO1

Interfaces:



TLI4970 Current Sense Shield2Go
Featured product: XENSIV™ magnetic
current sensor TLI4970-D050T4
OPN: S2GOCURSENSETLI4970TOBO1

Interfaces:



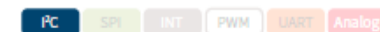
OPTIGA™ Trust X Security Shield2Go
Featured product: OPTIGA™ Trust X SLS 32A1A
OPN: S2GOSECURITYOPTIGAXTOBO1

Interfaces:



OPTIGA™ Trust E Security Shield2Go
Featured product: OPTIGA™ Trust E SLS 32A1A
OPN: S2GOSECURITYOPTIGAETOBO1

Interfaces:



Infineon for Makers

KIT_XMC48_IOT_AWS_WIFI

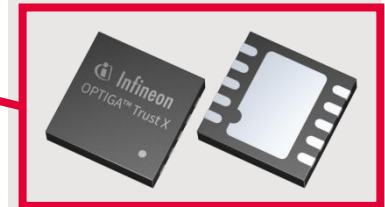
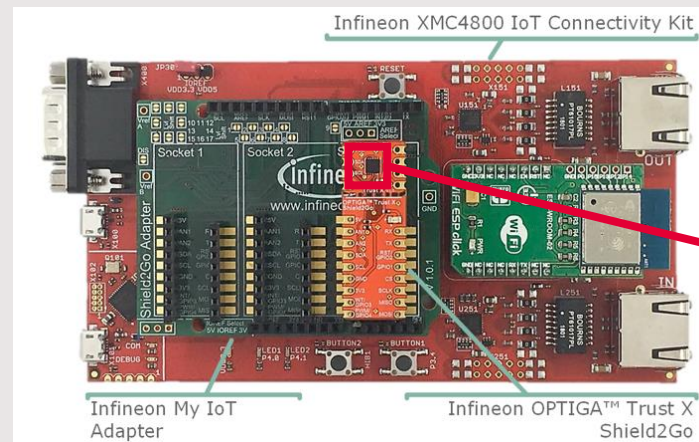
Adding Hardware Security

Innovative solution provided by Infineon's OPTIGA™ Trust X

- › Ease of integration
- › Zero Touch device onboarding (Keys, Certificates)
- › Enhanced performance
- › Increased security by Infineon Hardware

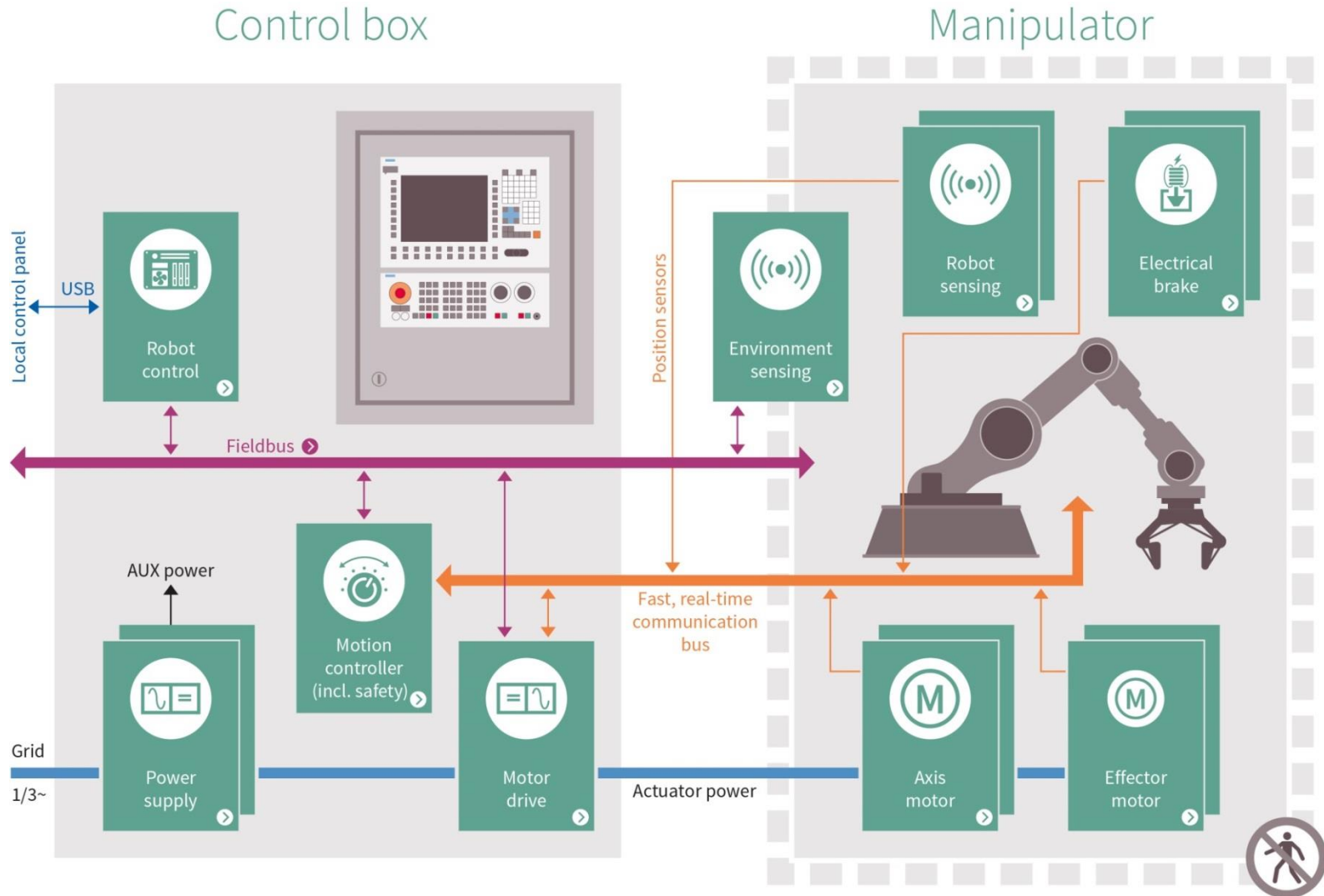
OPTIGA™ Trust X development platform integration

- › KIT_XMC48_IOT_AWS_WIFI
- › My IoT Adapter
- › OPTIGA™ Trust X Shield2Go



<https://github.com/Infineon>

Infineon XMC4800 IoT Connectivity Kit Predictive Maintenance



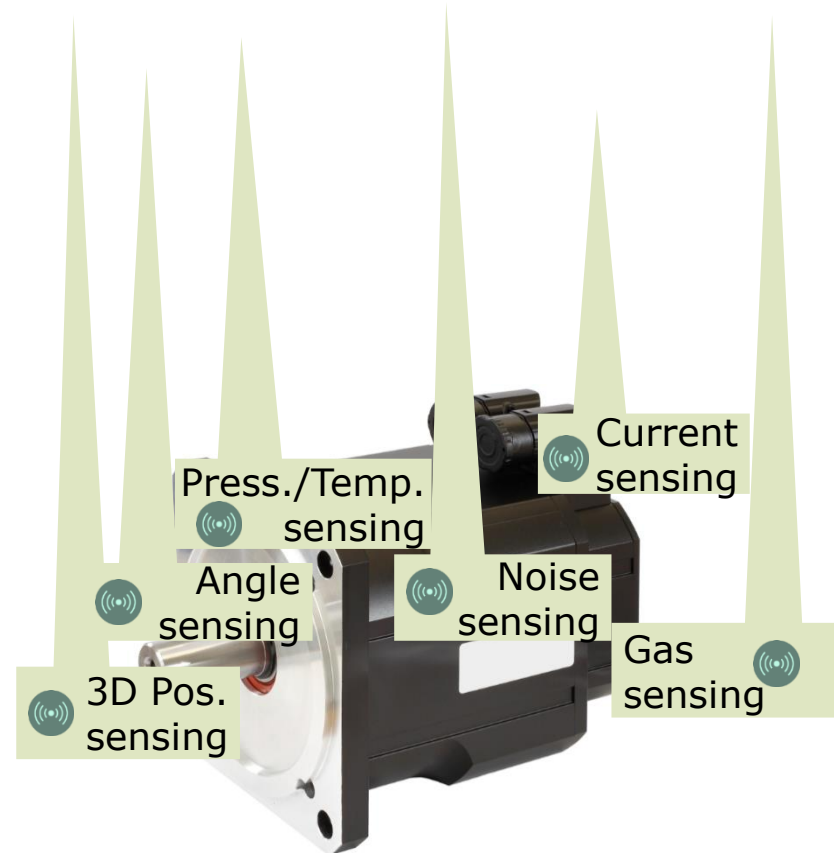
Infineon XMC4800 IoT Connectivity Kit

Predictive Maintenance

Condition monitoring examples in an servo drive

- › Noise
 - Bearings failing due to e.g. common mode effects?
- › Current
 - Bearings/coils at risk, shaft blocked, overload?
- › Angle/3D-Position
 - Vibrations?
- › Temperature
 - Overload situation?
- › Pressure
 - Partial discharges due to high swithcing frequencies?
- › Gas
 - Evaporation of isolation material during thermal stress?

Sensor data processing for stress estimation and failure pattern recognition



Infineon and Amazon Web Services

What is AWS IoT core?

 = Amazon Web Services / AWS IoT Core

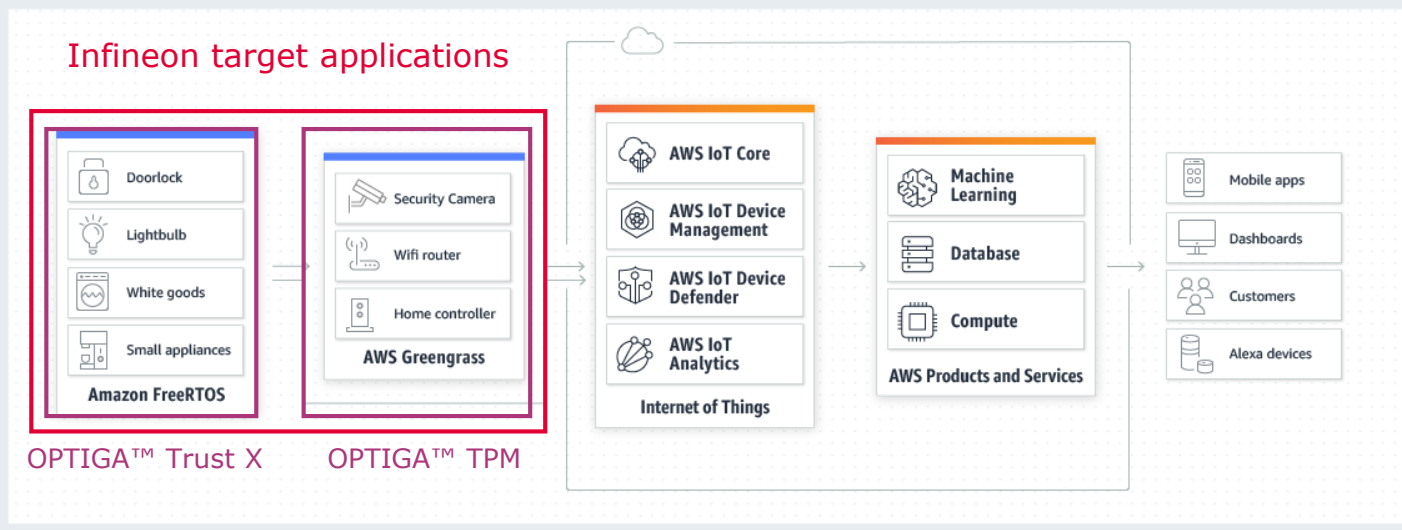


- › AWS IoT Core is a managed cloud service that lets connected devices easily and **securely interact** with cloud applications and other devices.
- › AWS IoT Core provides secure communication and data processing across different kinds of connected devices and locations so you can easily build IoT applications such as **industrial solutions** and **connected home** solutions.

Use Case: Connected Home

Home

- › Automation
- › Security & Monitoring
- › Network Management

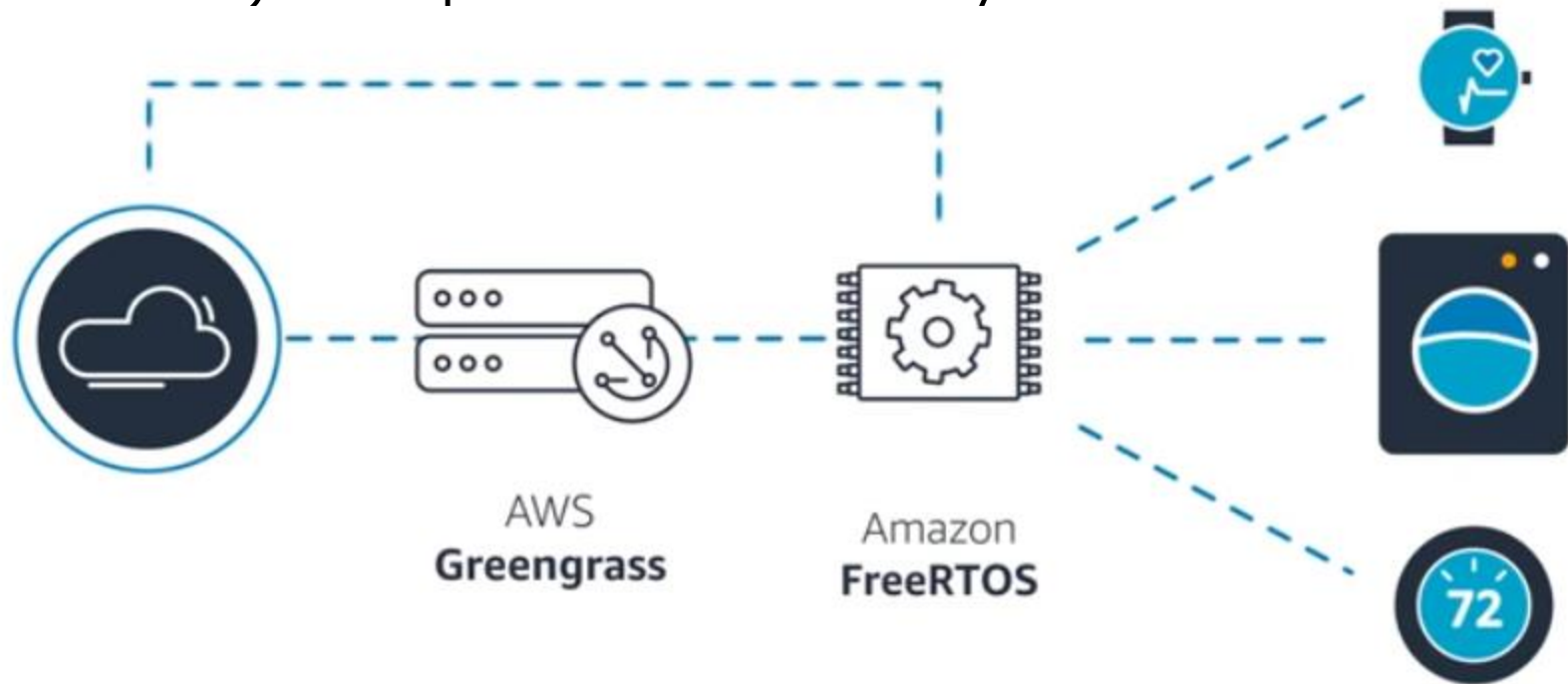


Infineon XMC4800 IoT Connectivity Kit

Amazon FreeRTOS

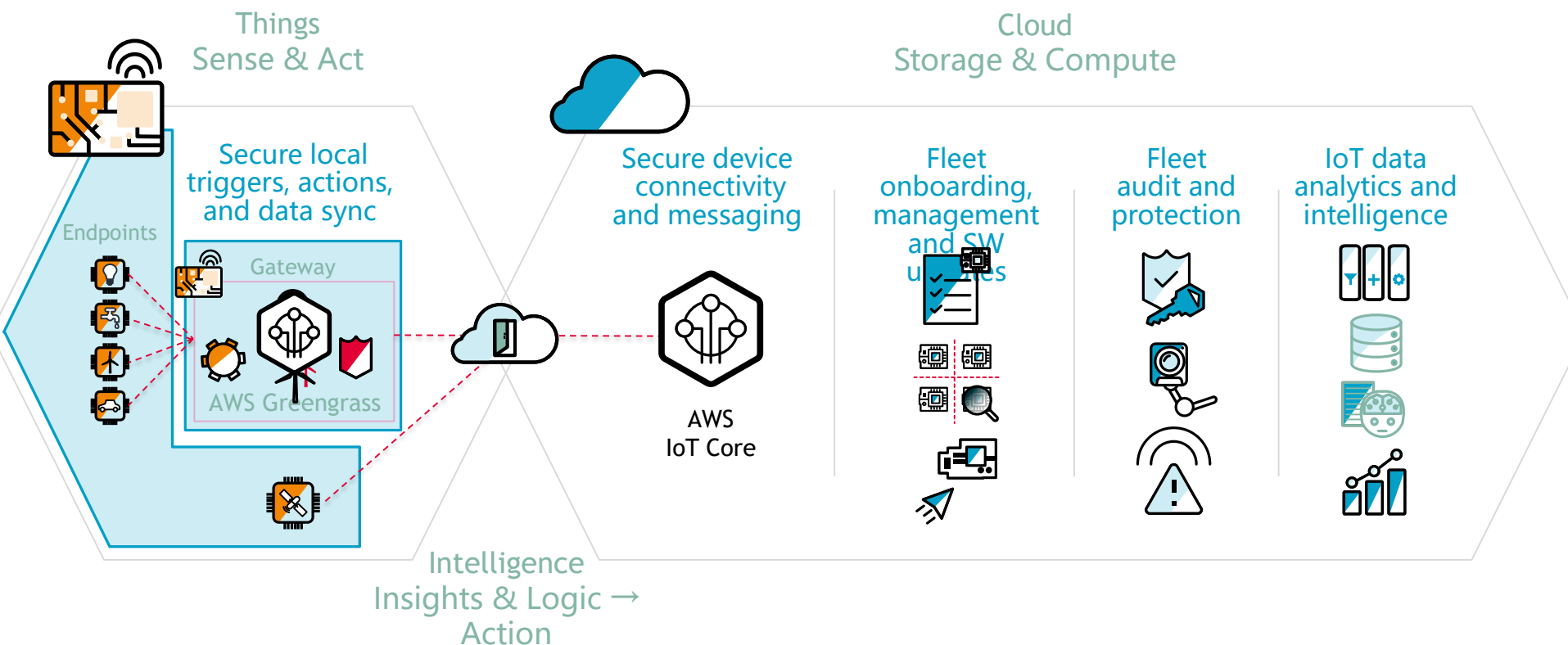


Amazon FreeRTOS extends the FreeRTOS kernel with software libraries that can be used to securely connect devices (locally and to the cloud) and update them remotely.

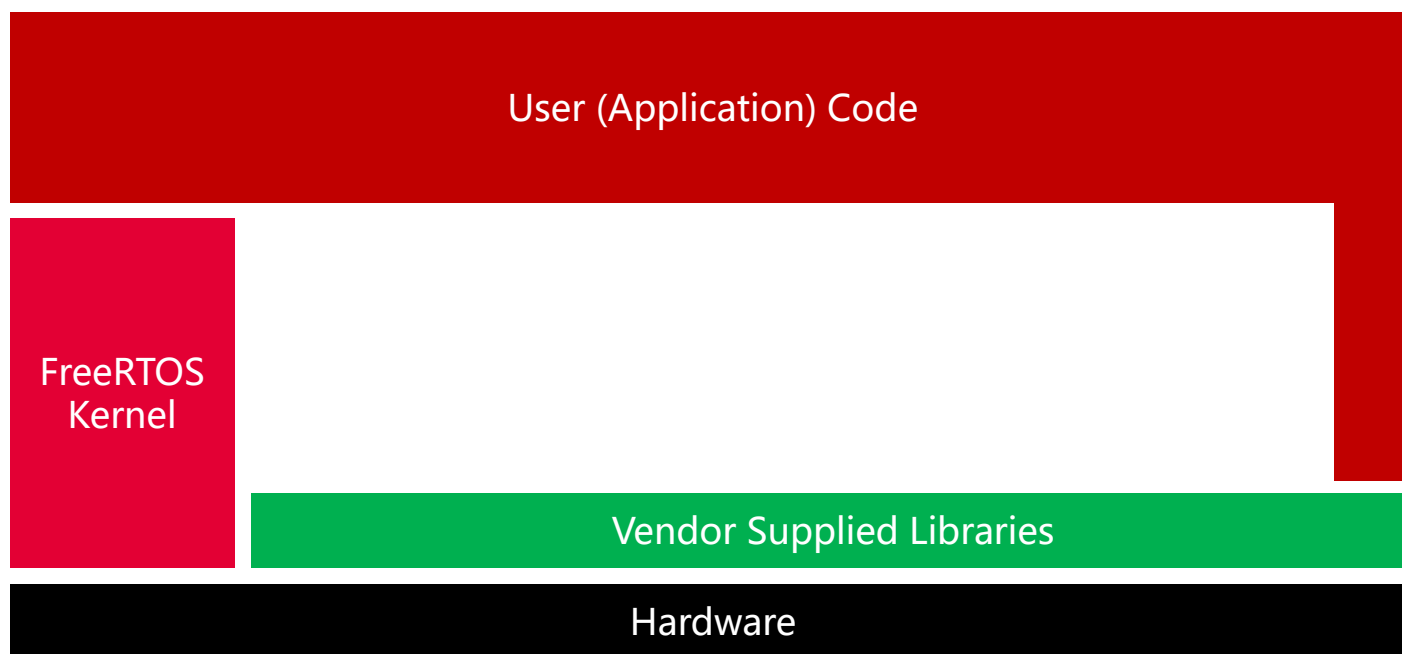


[What is Amazon FreeRTOS?](#)

AWS IoT Architecture



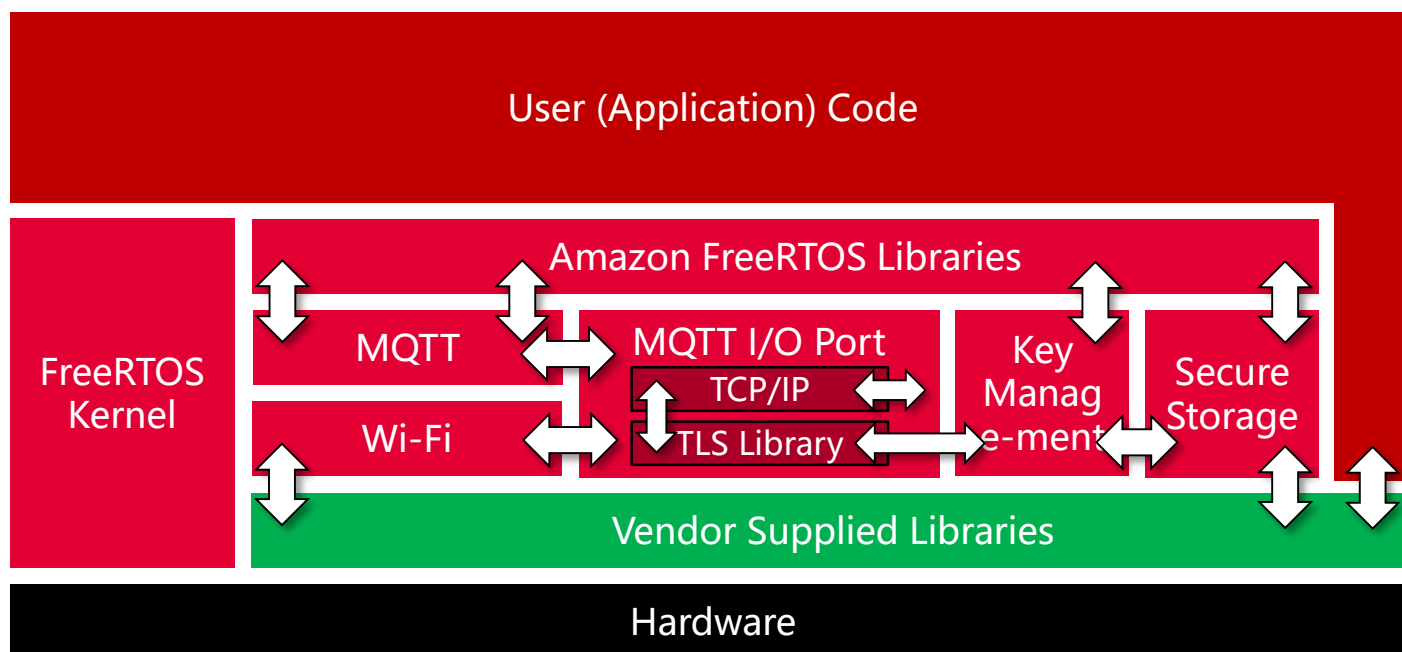
The FreeRTOS Kernel



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Amazon FreeRTOS – Kernel and Libraries

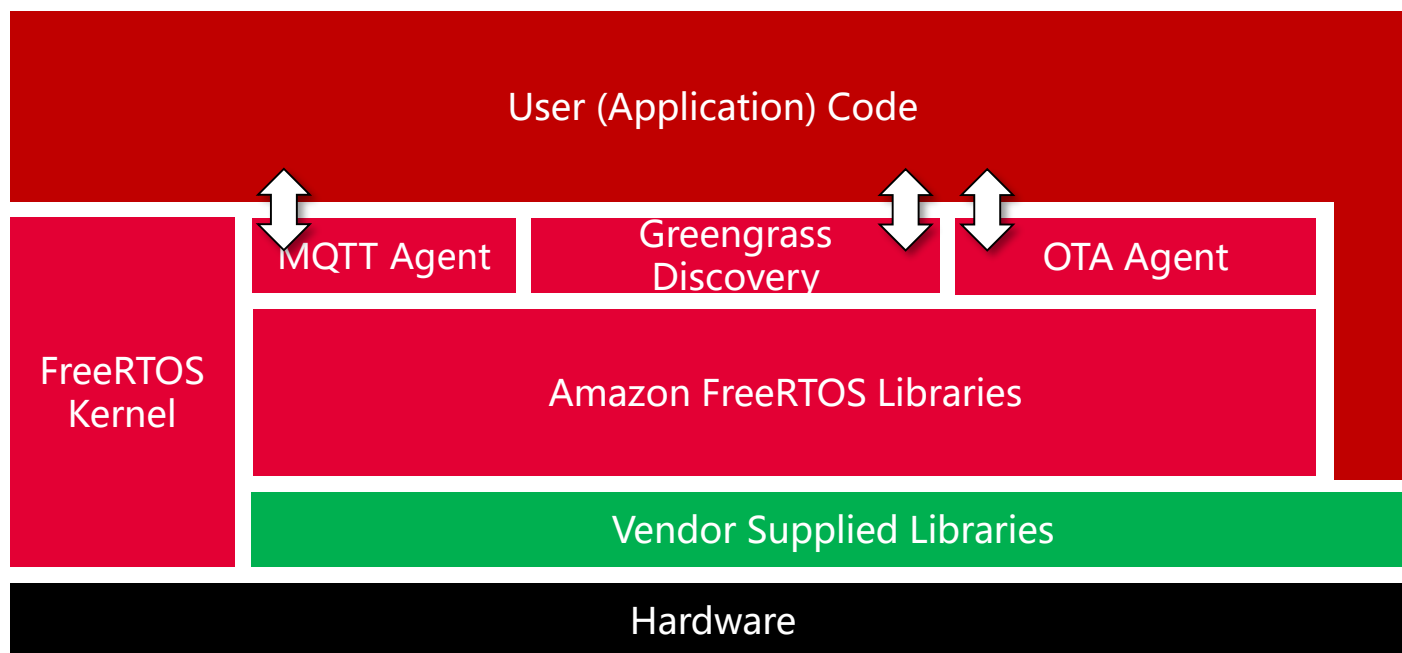
Library Porting View



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Amazon FreeRTOS – Kernel and Libraries

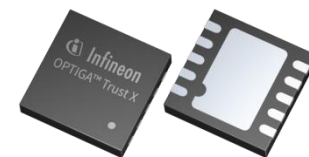
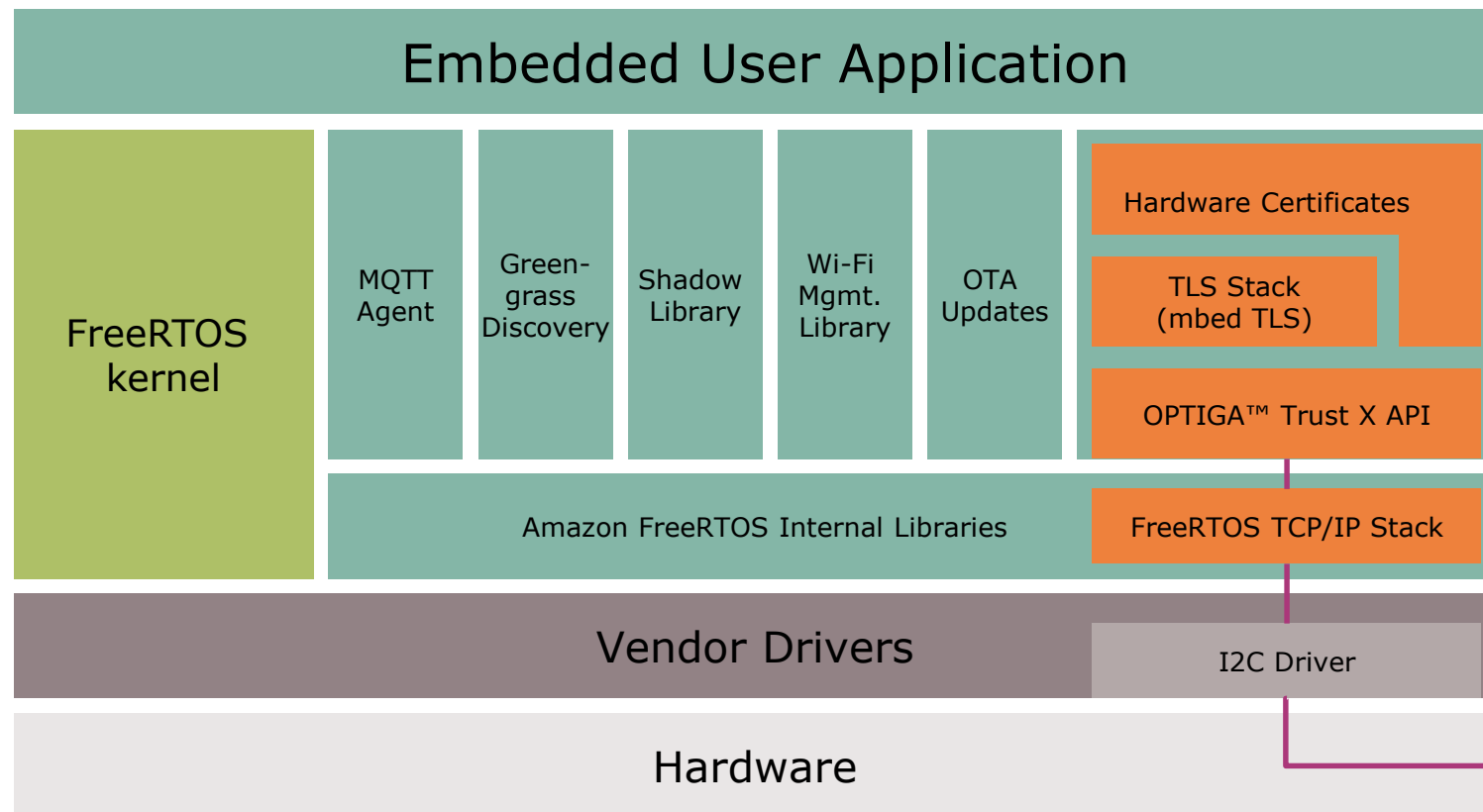
Application Writer's View



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Software integration provided from Infineon

› Amazon FreeRTOS: Device Software Architecture



Infineon OPTIGA™ Trust X

AWS IoT with OPTIGA™ Trust X



No key handling/Public Key Infrastructure required at Customer site

- >reduces complexity within development and production
- > faster time to market



Trust X enables zero touch device onboarding



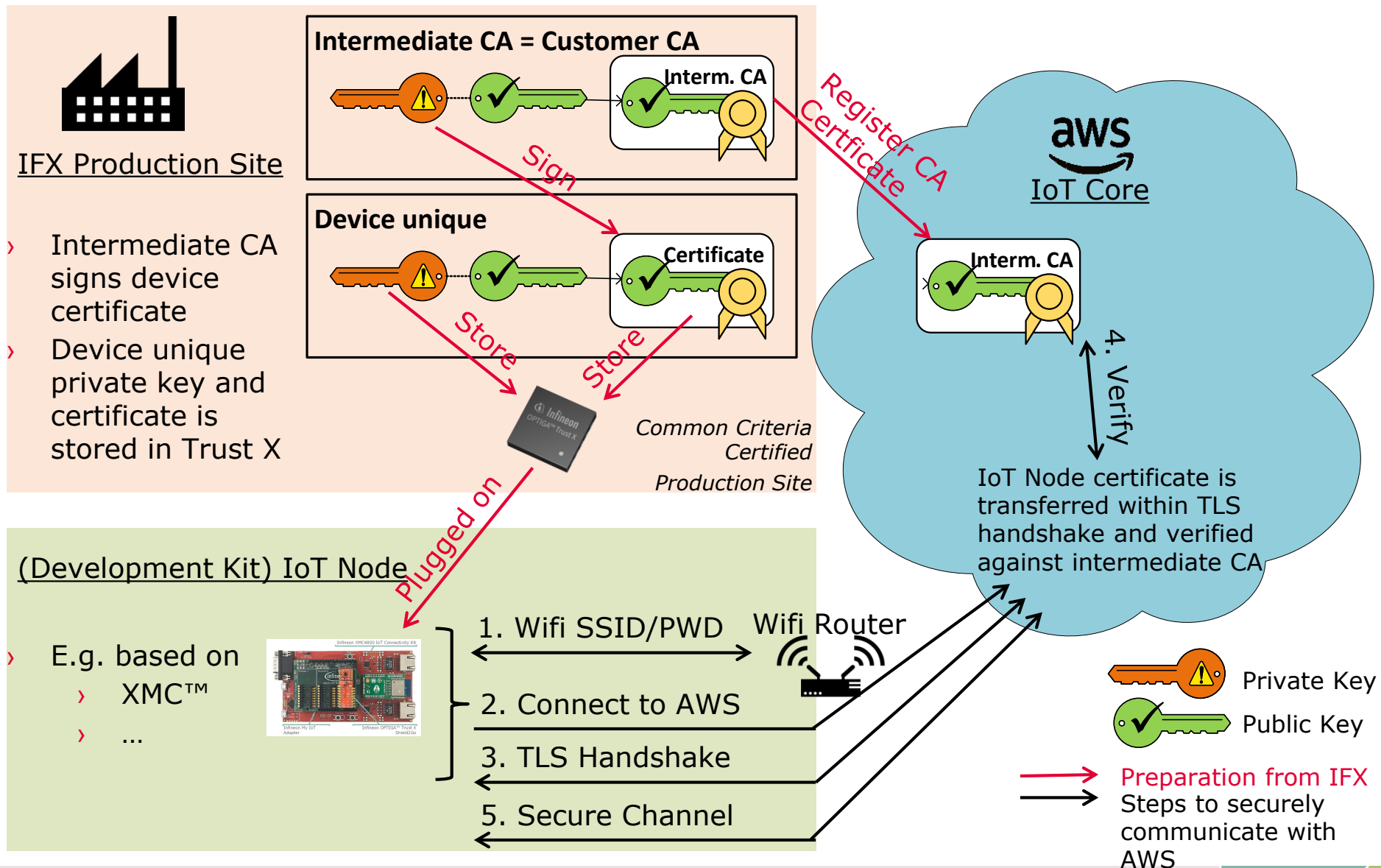
Seamless integration with Amazon FreeRTOS and mbedTLS



Crypto operations accelerated up to factor 10

Keys and Certificates

OPTIGA™ Trust X



More info:

www.infineon.com/connectivitykit

www.infineon.com/makers

<https://github.com/Infineon/amazon-freertos-optiga-trust-x>

www.infineon.com/XMC™

https://docs.aws.amazon.com/freertos/latest/userguide/getting_started_infineon.html

EtherCAT®



qualified
device

Amazon FreeRTOS



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