FTF 2016
TECHNOLOGY FORUM

HANDS-ON WORKSHOP: ARM® mbed™ OS

TOWARDS SECURE, SCALABLE, EFFICIENT IoT OF SCALE

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MCU SOFTWARE AND TOOLS PRODUCTS

SAM GROVE (ARM)
ARM MBED APPLICATIONS

FTF-DES-N1954
MAY 19, 2016

AGENDA

- mbed OS overview
- Hardware overview
- Hands-on labs

ARM mbed Objectives

Managing IoT devices

Connectivity

Addressing the complexity of reliably connecting high volumes of diverse devices across different networks

Management

Enabling scalability through interoperability, provisioning and update across the supply chain

Productivity

Framework that allows your organization to fast track ROI from IoT data

Developing IoT devices

Efficiency

OS and Software purpose built to leverage the world-class efficiency and features of ARM Cortex Architecture

Security

Trust through end-to-end security, from on-chip hardware protection to secure connectivity and management

Productivity

Partner ecosystem and developer community driving shared investment in open source components, tools and workflows

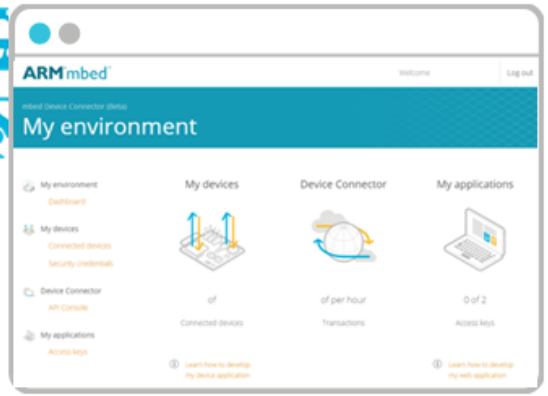
ARMmbed

IoT Device Platform

mbed OS

ARM Cortex-M Architecture

mbed Device Connector



mbed Cloud Partnership

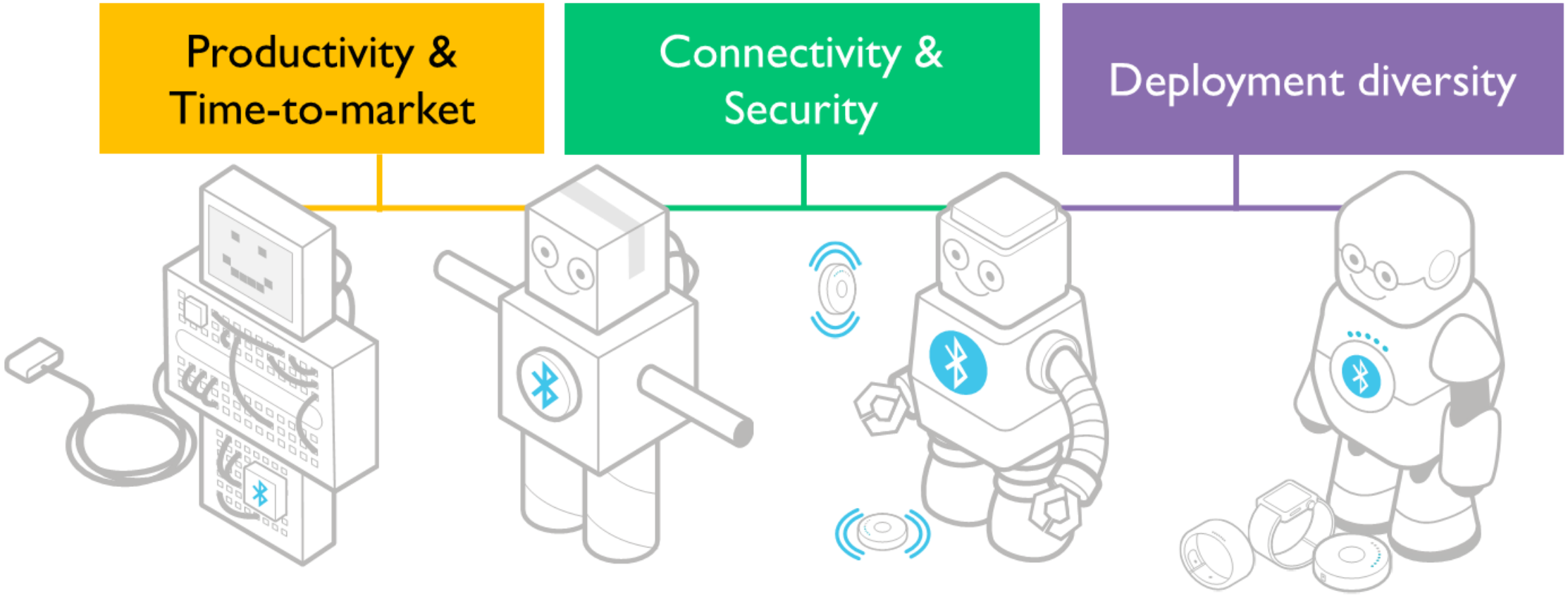
mbed Silicon Partnership

Collaboration and contributions from over 55 partners

mbed Enabled

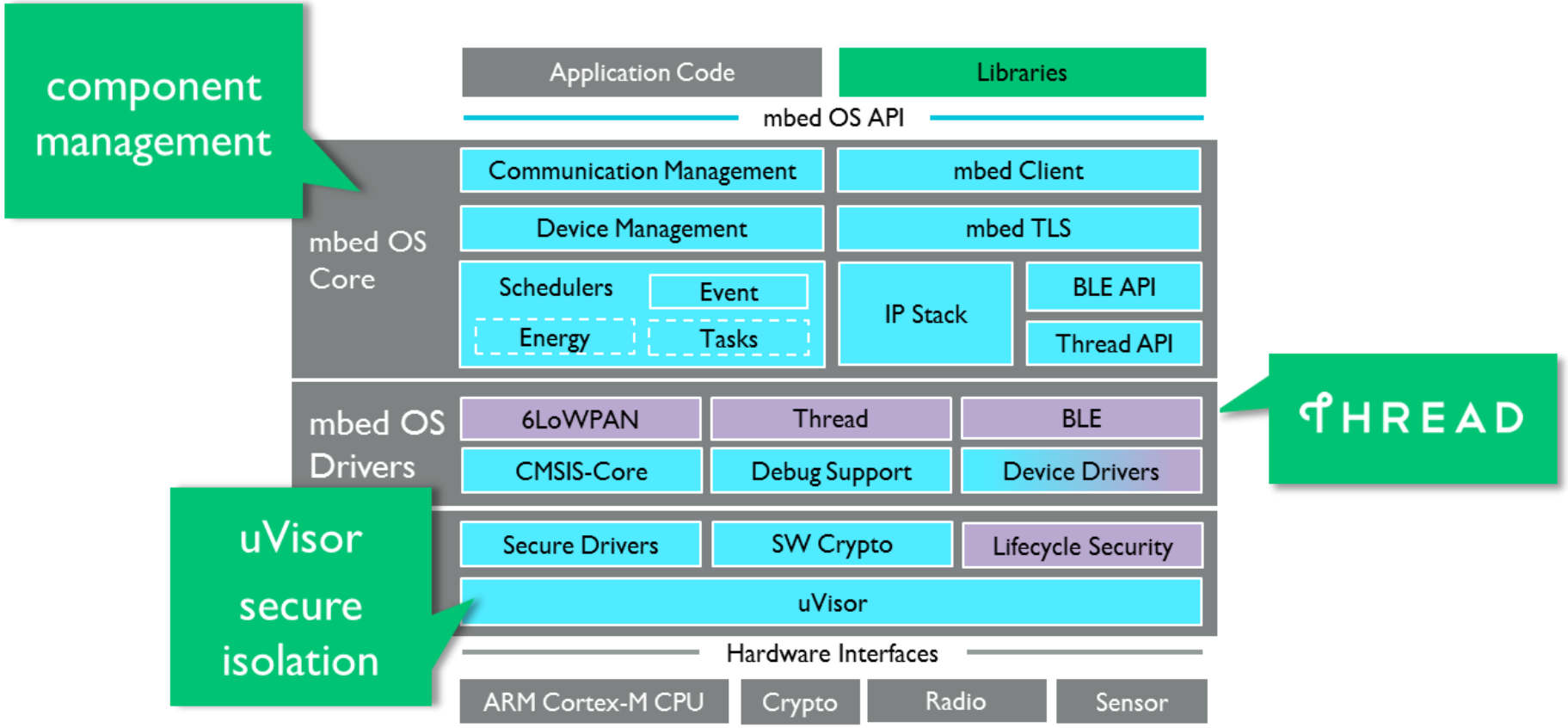
Over 100 boards available for developers to get started

Taking IoT to Scale



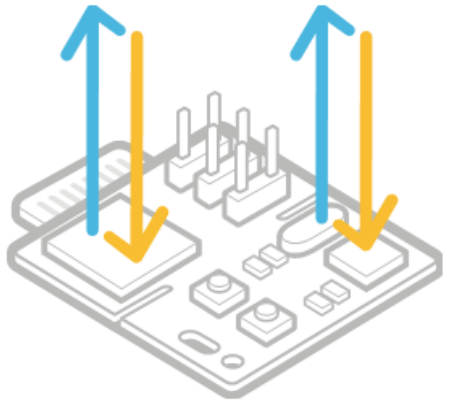
mbed OS

- mbed OS is the modular, efficient, secure, open source OS for IoT

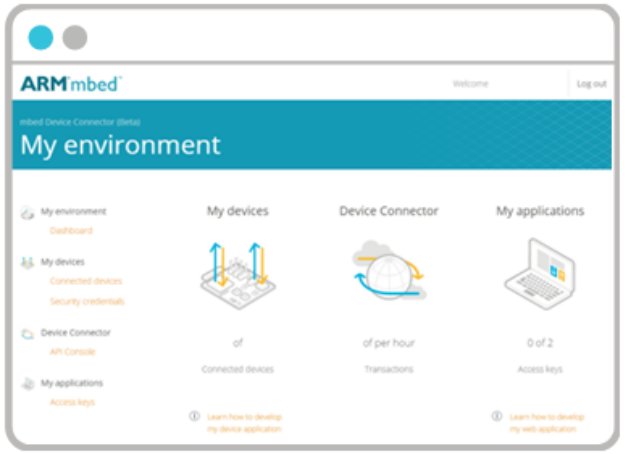


mbed Device Connector: Making IoT Scale

- mbed Device Connector eases development, management and scaling of IoT
- Available at connector.mbed.com. Easy Transition to commercial service providers



Build IoT Device



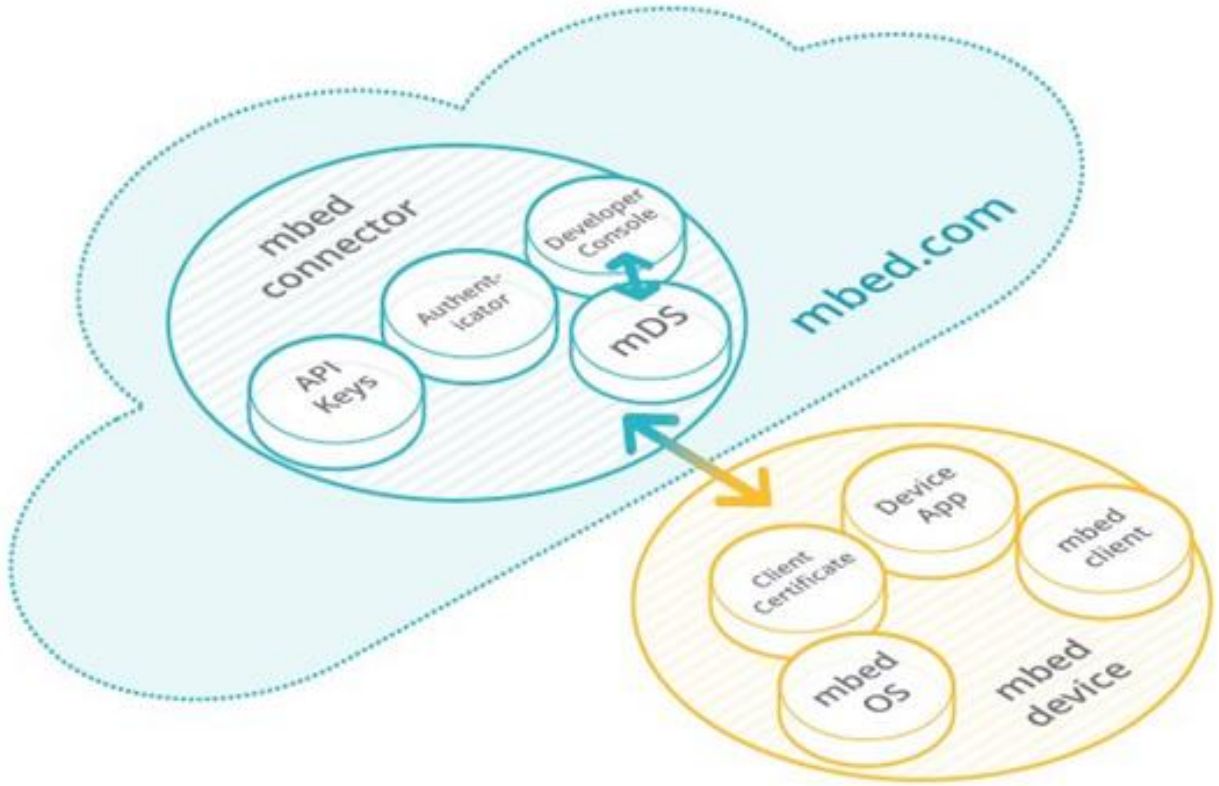
Connect your devices

Build application with example code

Utilize cloud solutions

Device Connectivity Fast Track with mbed Device Connector

- Free for development purposes
- **100 devices, 10,000 events per hour**
- Caching and subscription aggregation



- Strong end-to-end trust and security
- Based on industry standard protocols for energy-efficient data communication

- REST APIs for easy integration with existing systems
- Full integration with and web tools on mbed.com

NXP MCUs – *Aligned to the needs of a connected world*

Low Power

Ultra efficient **dynamic power**

Ultra **low static power** with full retention

Low power peripherals

Optimized Architecture Focused on Low Power

Security

Multiple Levels of **Scalable Security** options for **ultimate flexibility and protection**

Ensuring your **communication**, **software** and **physical system** is protected from threats.

Connected

RF transceivers supporting:

ZigBee, BLE 4.2

802.15.4, Thread

Wi-Fi Partners

Easy to Use

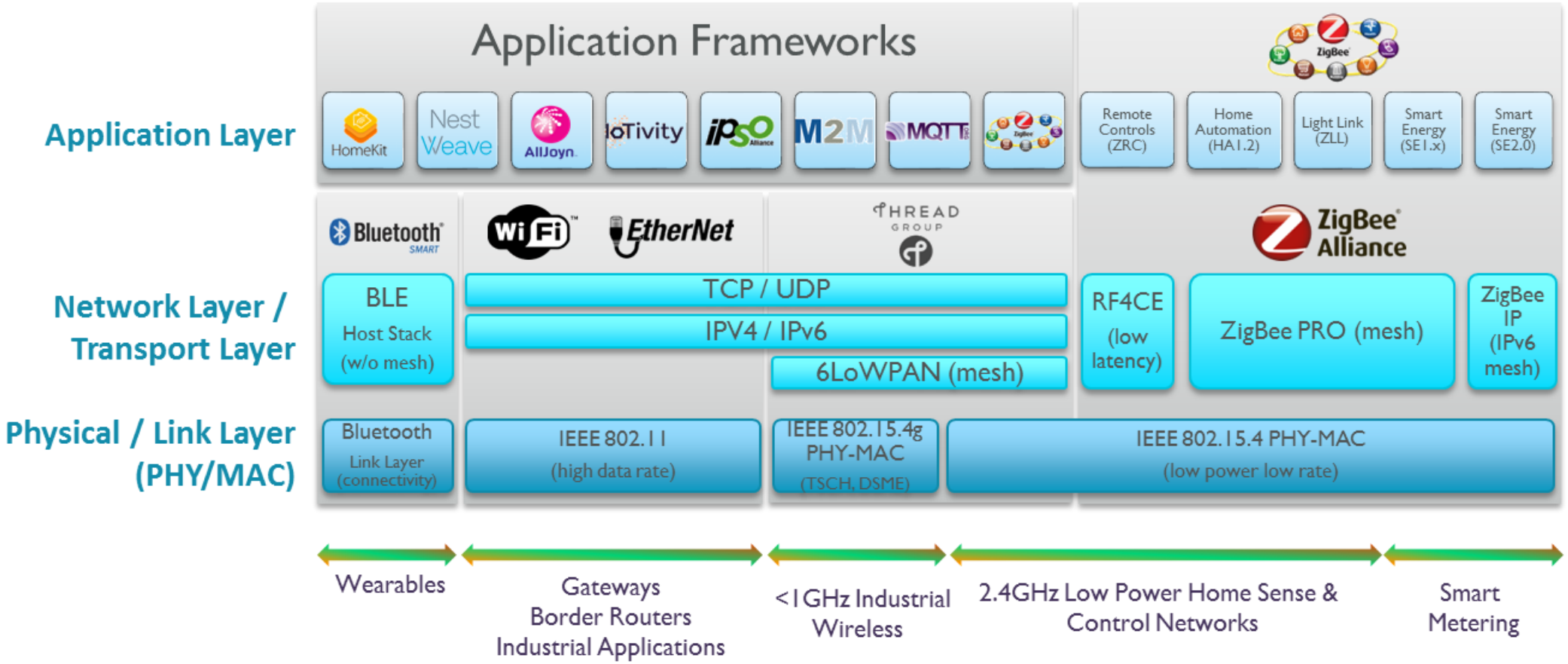
Tools for Software and Hardware Development and Low Power Design.

SDKs, Hardware Kits, Reference Designs, and Walk-throughs

Leveraging **Low Power** design, plus **Wireless Connectivity**, and decades of **Security** expertise…all with a focus on customers **Ease of Use**

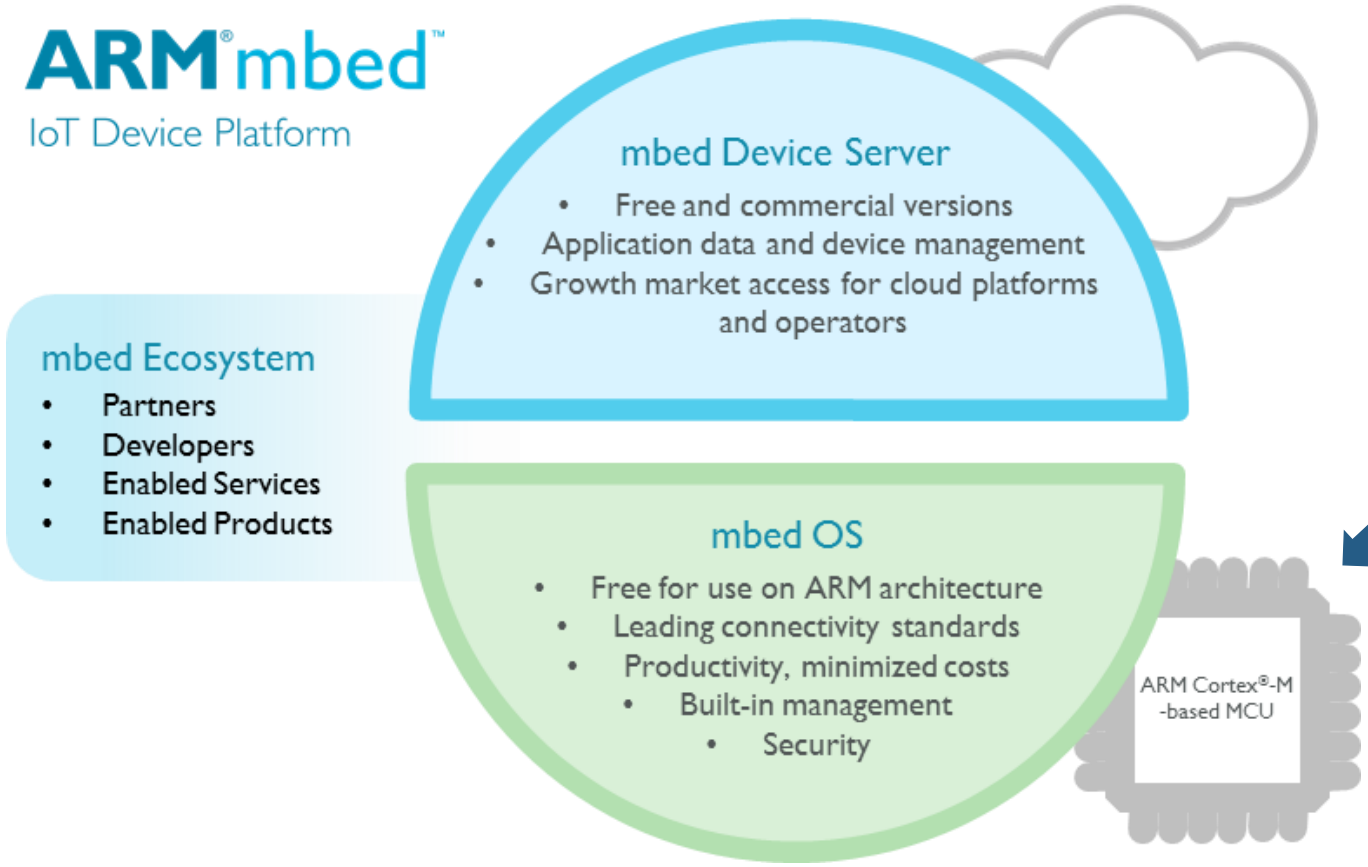
All on a common technology platform for maximum **re-use of Software and Hardware** designs

IoT Connectivity Landscape



- A very complex space today that needs vision and dedication
- ARM mbed OS can help bridge the gap and standardize IoT implementations

Enabling IoT Development with NXP MCUs and ARM mbed



Software

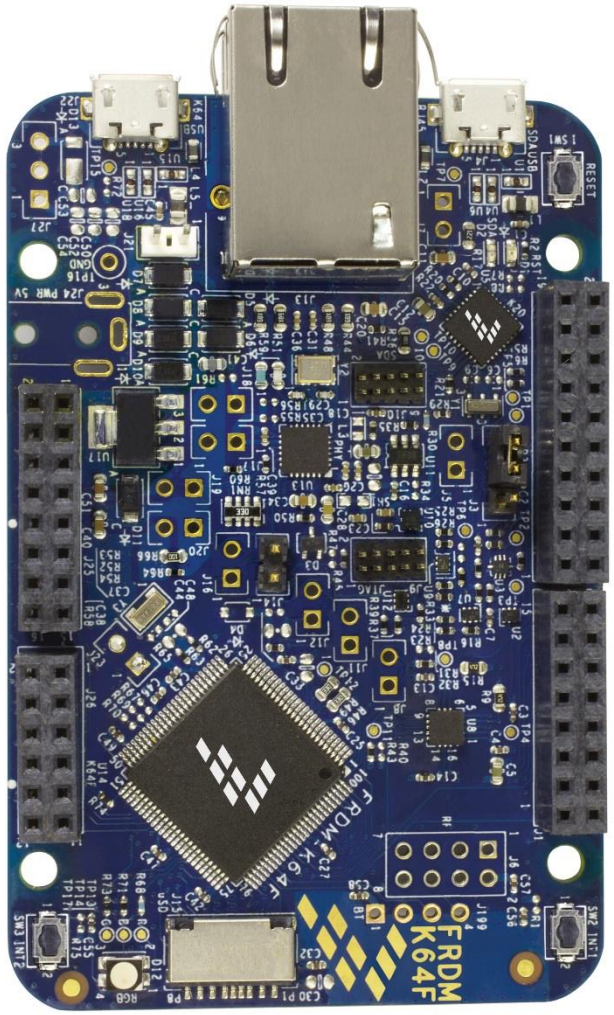
- CMSIS-CORE
- Peripheral Drivers
- Hardware Accelerator Drivers
- Power management
- Software components (e.g. FNET)
- mbed Sample Applications

Hardware

- Broad NXP MCU Portfolio
- mbed-enabled eval kits
- IoT Reference Designs

Kinetis K6x and FRDM-K64F Overview

- **Kinetis K6x MCUs**
  - ARM® Cortex™-M4 core, up to 180MHz
  - 256KB to 2MB Flash, 128 to 256KB SRAM
  - Sophisticated power mode controller
  - Ethernet MAC (w/ IEEE1588 real-time support)
  - 6-bit ADCs and 12-bit DACs
  - Hardware Encryption (3DES, AES, etc.)
  - 32-bit Random Number Generator
  - USB, CAN, SPI, I2C, UART, etc.
  - Secure Digital (SD) Host Controller



- **FRDM-K64F**
  - Cortex-M4, 120MHz, 1MB Flash, 256KB SRAM
  - 3-axis accelerometer/3-axis magnetometer
  - RGB LED
  - Add-on Bluetooth Module
  - Built-in Ethernet w/ add-on Wireless Module
  - Micro SD card slot
  - Arduino shield compatible
- **ARM mbed Examples**
  - mbedOS:
    - example-mbedos-blinky
  - Security:
    - uvisor-helloworld
  - Connectivity:
    - mbed-client-examples
    - mbed-example-network (TCP)
    - mbed-example-network (UDP)
  - Thread:
    - mbed-client-example-6lowpan

www.freescale.com/FRDM-K64F/startnow

HANDS-ON MAKING MUSIC ON A MICROCONTROLLER

GO TO http://developer.mbed.org AND SIGN IN

SECURE CONNECTIONS
FOR A SMARTER WORLD

ATTRIBUTION STATEMENT