

Qorvo: Solving the Challenge of Many Devices with Multiple Standards in the Connected Home

Introduction

The number of connected devices within our homes continues to rise as consumers increasingly rely on them for convenience, comfort, health and safety. Some are inside our homes; some are outside. And while these devices are designed to be part of a network, they often communicate via different standards – languages, if you will – depending on the application.

Most of us are familiar with the Wi-Fi standard, which enables content sharing and internet access in the home. But there are a number of Internet of Things (IoT) technologies other than Wi-Fi, such as Bluetooth® Low Energy (LE), Zigbee® and Thread®. These low-power, low-data-rate wireless standards are commonly used in IoT-connected products such as door locks, LED lighting and appliances. The challenge that these multiple and different technologies pose is that vendors must decide in advance what kind of technology they are selecting for their device. For example, in selecting either Zigbee or Bluetooth LE – or both – each choice has its own impact in terms of product design.

Looking forward, there are other technologies coming that are targeting similar smart home use cases, such as **Matter**, guided by the **Connectivity Standards Alliance** (formerly Zigbee Alliance), which combines multiple technologies (802.15.4 and Bluetooth LE) into a single standard. This can make the choice between technologies and future-proof solutions even more challenging.

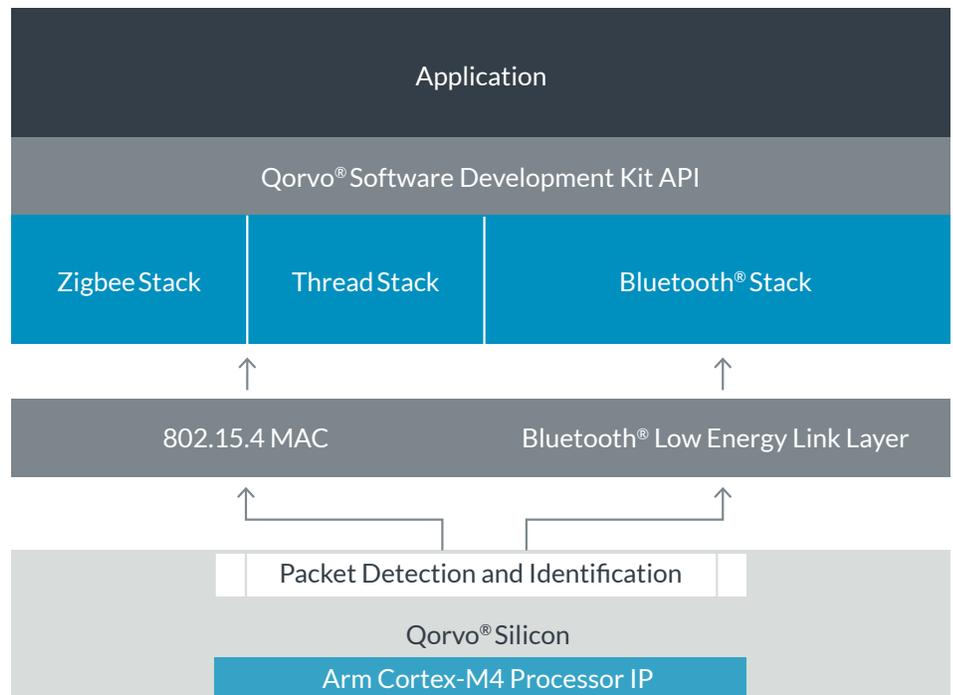
While today's communications devices have some form of dynamic multi-protocol (DMP) support, this approach requires different types of tradeoffs. DMP alone is not sufficient to realize the full benefits of the connected home. Truly seamless connectivity can only be achieved by the ability to listen to and hear all devices on the network simultaneously, not just a few.

ConcurrentConnect™ Technology as a Solution

Today, customers have the benefit of not having to choose or compromise. The next major leap in multi-standard capabilities – ConcurrentConnect technology, a unique capability from **Qorvo** – fluently and continuously services two or multiple networks using different protocols, whether Zigbee + Matter or Zigbee + Bluetooth LE to a smartphone or Matter + Bluetooth LE Mesh, or other multi-network protocol use cases. The ConcurrentConnect technology will deliver the unique experience of seamless operation of devices in the home that are connected via different networks without performance loss.

To illustrate, let's look at a real-world network situation combining Zigbee or Thread and Bluetooth LE devices using a standard node without ConcurrentConnect support. Since the node does not have concurrent connection/listening abilities, it switches back and forth between these standards and has to communicate with one standard at a time. In addition to the obvious inefficiency, this switching can result in dropped communications and latency, as only one standard is communicated while the other is blocked until the medium becomes free again. Thus, in a set timeframe the amount of communication is challenged.

With a node that utilizes ConcurrentConnect technology, concurrent listening is achieved, which in turn allows near-instantaneous switching from Bluetooth LE to Zigbee or Thread with little or no dropped communications. Thus, the communications between devices are faster, more efficient, more scalable and able to receive more data packets. This enables unprecedented single-device concurrency capabilities between these protocols.



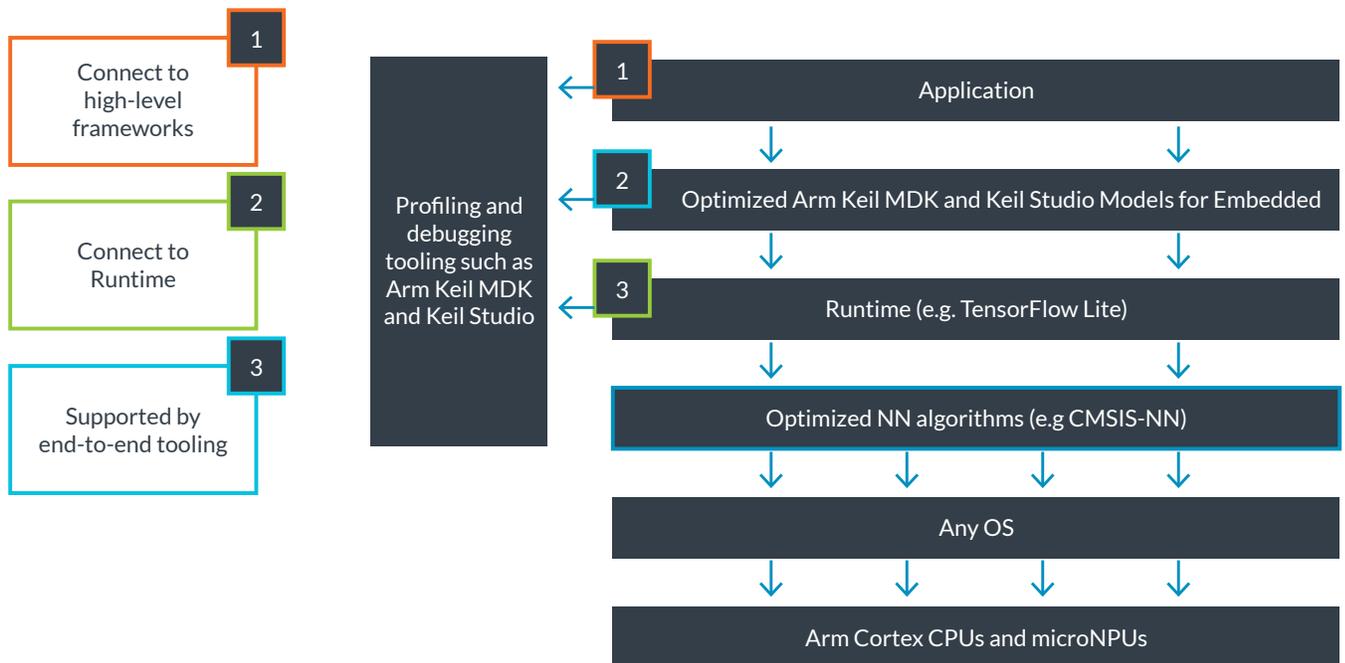
Qorvo's unique single-chip, single-radio solution, combined with a powerful software development kit, can manage data traffic from multiple standards or protocols at the same time and with no detectable latency. Plus, designers can reduce part content, resulting in smaller, sleeker form factors and lower product costs that are easier to support. With ConcurrentConnect support, the options for customers to develop innovative use cases are virtually unlimited, as they have greater flexibility in standards support.

Why Arm?

Connectivity is the necessary means to the desired home automation application. Given current trends in the market, all home devices will soon be running some sort of machine learning (ML). The Cortex-M4 32-bit processor is widely supported in the tinyML community and Arm is a strong proponent of tinyML because our microcontroller architectures are so central to the IoT, and because we see the potential of on-device inference.

Arm's collaboration with Google is making it even easier for developers to deploy endpoint machine learning in power-conscious environments. The combination of Arm CMSIS-NN libraries with Google's TensorFlow Lite Micro (TFLu) framework, allows software developers to take advantage of Arm's hardware optimizations and **achieve accelerated performance** without needing to become experts in embedded programming. On top of this, Arm is investing in new tools to accelerate ML and IoT development. **Keil Studio Cloud** is a new browser-based IDE with direct Git integration for enabling distributed teams, collaborative development and modern CI workflows for rapid IoT and AI device development.

Learn more about how tinyML **enables the smallest AI devices**.



Summary

Standards are scattered and devices are developing quickly. Qorvo's unique ConcurrentConnect technology is the next step beyond dynamic multi-protocol support. It brings to the IoT market a very high degree of efficiency that is enabling a new level of concurrence and allowing designers and consumers to keep their options open across multiple protocols and standards. It is no longer necessary for them to choose or compromise as almost any use case becomes possible.

By selecting the Cortex-M4 as the host processor, the Qorvo solution opens the door for OEMs to easily and quickly deploy tinyML enabled home automation gadgets across multiple radio networks used in the home.

More information

Qorvo
www.qorvo.com

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