



QorIQ™ Communications Platforms

A new era of networking requires a new way of thinking.

In June 2008, Freescale launched a new line of communications platforms under the QorIQ™ brand name. The brand name reflects the melding of a foundational technology (core) with an intelligent approach to multicore (IQ). The new brand and technology innovations offer a smarter approach to multicore and can help address your needs for the ever-evolving, converging, collaborative network.

With the advanced QorIQ communications platforms, Freescale is affirming our significant commitment to the embedded communications space and to your success. Our goal is to empower you to harness superior performance, power efficiency and programmability for your various applications and enable you to more easily migrate to multicore when and where you need it.

The QorIQ platforms encompass a new level of performance and low power for Freescale's networking product portfolio. They span the market with a broad range of solutions from single- to dual- to multicore devices. These products are all based on our e500 Power Architecture® cores and start out on 45 nm process technology, with a roadmap to 32 nm and beyond. We wanted this new roadmap to be housed under a single brand to reflect the breadth and compatibility of our products for generations to come.

QorIQ platforms are PowerQUICC® evolved, meaning Freescale is leveraging our embedded processing heritage as we move forward in this new era of networking. To date, Freescale has shipped 250 million communications processors, and we will bring forward much of our tried and true PowerQUICC IP, as well as new innovations, into the QorIQ platforms. We expect that the PowerQUICC and QorIQ product lines will coexist in the marketplace for a long time, offering a cohesive roadmap to the future.

With the launch of our QorIQ platforms, Freescale remains your long-term partner for embedded communications. We have the level of expertise and ecosystem engagement needed to help make your next-generation products a success. Please read on for an overview of our QorIQ communications platforms.

Performance

"Intelligence is the ability to avoid doing work, yet getting the work done."—Linus Torvalds

When gauging multicore performance levels, it's important to not only consider the total aggregate frequency of the cores, but also the full system-on-chip (SoC) architecture. Freescale's QorIQ architecture excels on both counts. Two highlights from the architecture are our Power Architecture cores and the Datapath Acceleration Architecture—both advancing performance while lowering the complexity of the software environment.

High-performance e500 Power Architecture cores: Do more with fewer cores

The QorIQ platforms consolidate on Freescale's e500 Power Architecture cores for scalability and compatibility. The P4 platform's e500mc cores operate at frequencies up to 1.5 GHz with private L2 cache and embedded hypervisor technology. These are the most advanced cores available in an embedded multicore architecture today. Who needs 16 when you can do it on eight?

Datapath Acceleration Architecture: Third-generation datapath architecture

We've been integrating datapath processing for more than ten years. However, the bandwidth intensive multimedia and mobile traffic affected by social patterns and new services creation (for example, social networking and video conferencing) are driving new demands for network architecture responsiveness. By working in concert with the cores, Freescale's Datapath Acceleration Architecture enables very high networking performance (processing 18 Mpps) while executing dynamic network functions: parse and classify, load-steering, network acceleration and multi-level prioritized queuing.

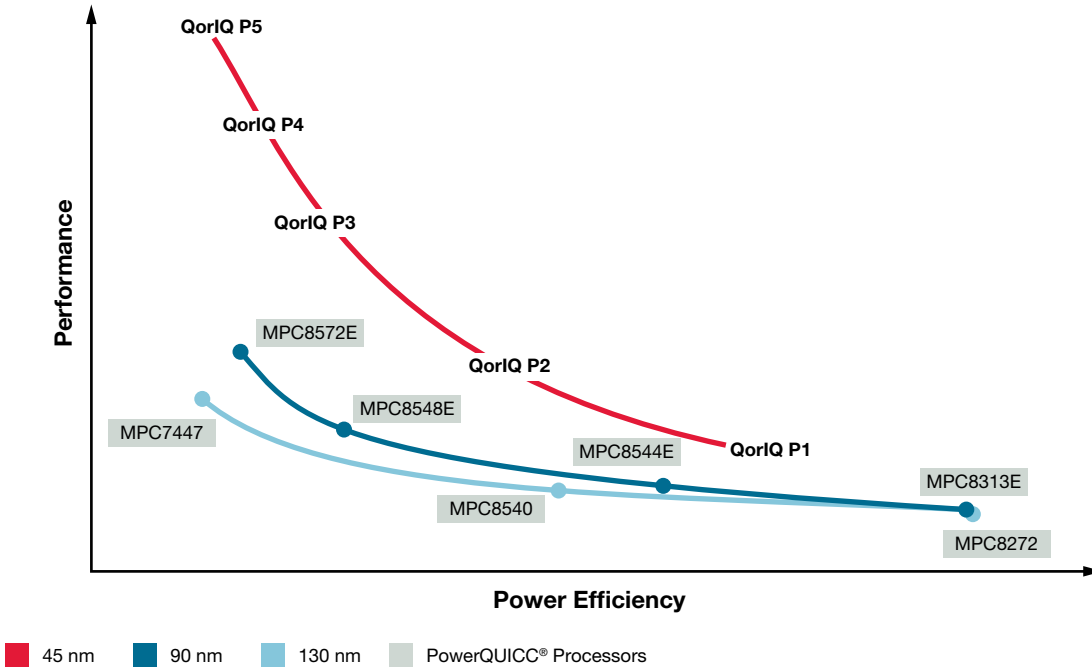


Power Efficiency

"It is not enough to have a good mind; the main thing is to use it well." —René Descartes

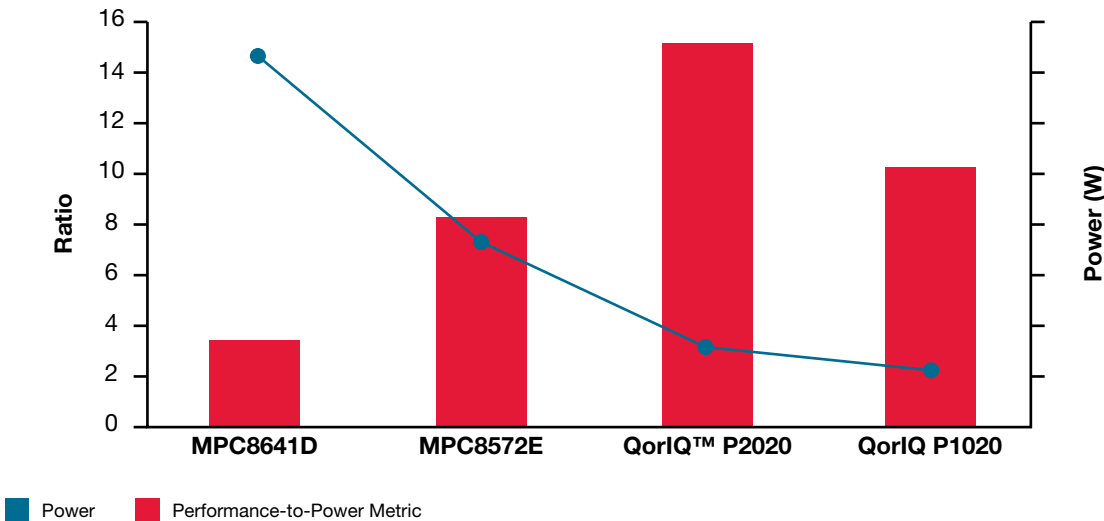
To offer the level of performance needed within embedded power budgets, Freescale understood that we had to make a significant step forward in process technology. QorIQ platforms P1 through P5 are all designed for 45 nm to reduce power and increase integration.

Fig 1: QorIQ™ Platforms Power and Performance



QorIQ platforms are 80 percent lower power than non-embedded multicore platforms and as much as 60 percent lower power than other embedded multicore solutions. QorIQ P1 and P2 dual-core processors continue to drive the industry's best performance-to-power ratio. The QorIQ P4 platform enables advanced frequency and voltage management under control of the system developer.

Fig 2: Dual-Core Performance-to-Power Ratio





Programmability

"Talent wins games, but teamwork and intelligence wins championships."—Michael Jordan

Freescale understood from the outset that our multicore implementation could not just be about great hardware—it had to focus on the software—and the developer's experience. We responded by embedding extensive visibility and access into our QorIQ P4080 processor so that the developer can fully utilize the cores and resources, as well as debug the complex on-chip interactions. We also acquired Intoto, Inc., a leading provider of software platform products for networking and communications equipment manufacturers, to provide in-depth software application solutions that complement our customers' offerings and help ease multicore software development. And we continue to collaborate closely with the leading software and tools companies in the embedded industry to ensure comprehensive solutions that fully take advantage of the QorIQ architecture.

Freescale has the long-term, deep ecosystem engagements necessary for streamlining the migration to multicore architectures. Our ecosystem partners, such as Green Hills®, MontaVista™, Virtutech™ and Wind River®, have already extensively tuned their tools and software to be multicore savvy.

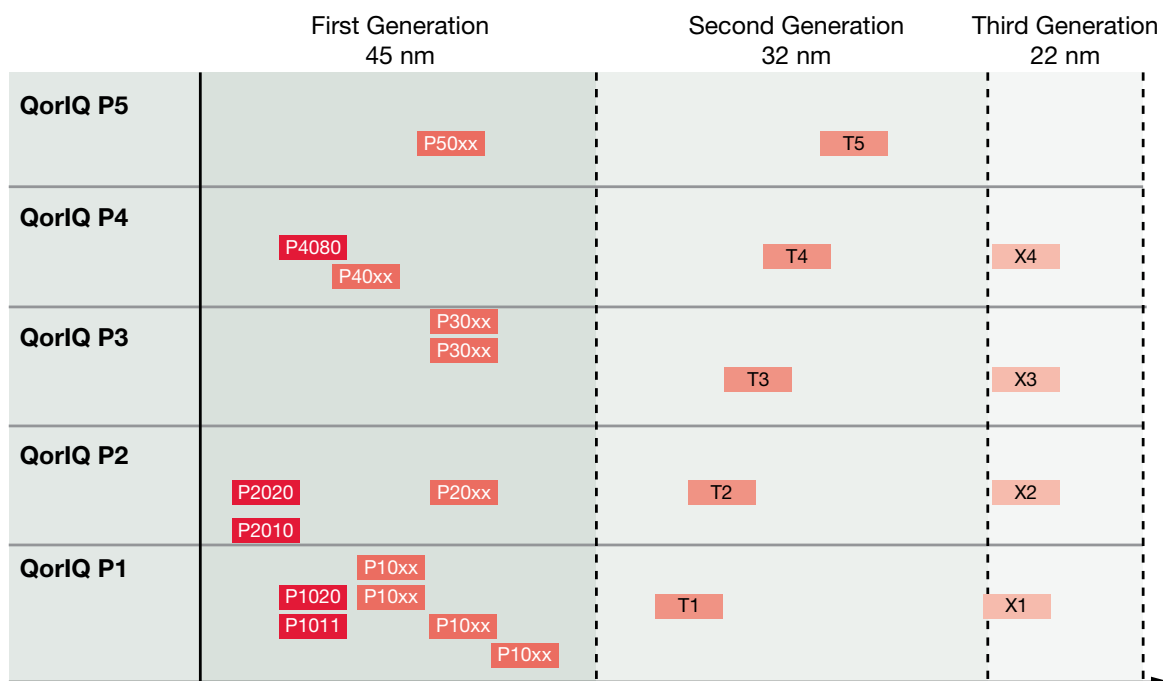
Freescale has collaborated with the virtualized software development experts at Virtutech to deliver a hybrid simulation environment for our QorIQ P4080 processor. The hybrid environment enables rapid exploration of multicore software architectures, allows integration of your preferred tool chain and captures your true application performance. Our partners have leveraged the hybrid simulation environment to create their advanced development solutions for the QorIQ P4080 processor.

Platforms

The QorIQ platforms enable you to easily move to multicore starting with pin- and software-compatible P1 and P2 platforms that offer single- and dual-core products. Applications at this level demand performance and extensive integration at very low power and cost. Together, the two QorIQ platforms deliver an impressive 4.5x aggregate frequency range, scaling from a single core starting at 533 MHz (P1011) to a dual core at 1.2 GHz (P2020).

Freescale also offers the revolutionary QorIQ P4 platform that includes the eight-core P4080 processor. This device has a performance-boosting architecture with its high-performance 1.5 GHz Power Architecture cores, tri-level cache hierarchy and advanced Datapath Acceleration Architecture. Thanks to the high-speed CoreNet™ fabric, there's no contention for resources in this platform. In addition, each core is able to operate fully independent of the other cores. Accesses to memories, datapath accelerators and network interfaces are completely contained; safe and autonomous operation of multiple individual operating systems is ensured.

Fig 3: QorIQ™ Communications Platforms Roadmap



Freescale is providing a comprehensive roadmap with the necessary stepping stones that enable you to access the level of performance and capabilities needed for your next-generation applications. Join us on the path to multicore today. Visit www.freescale.com/QorIQ to learn more about QorIQ platforms.

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