



RISC-V at Scale: From Embedded Dominance to Application Processor Opportunities

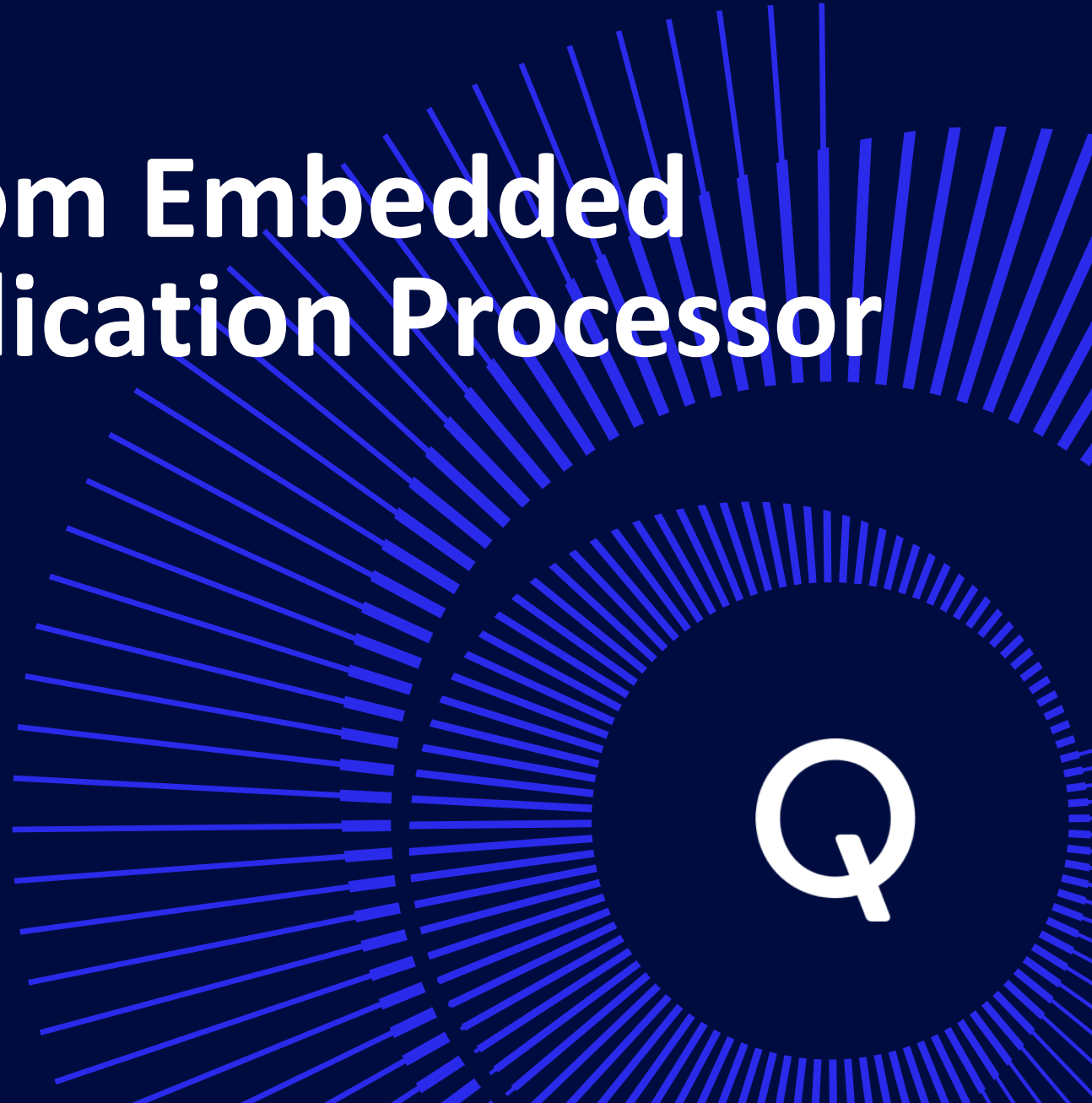
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Abstract

- RISC V has emerged as one of the most important new architectures in decades, achieving widespread adoption in embedded systems and shipping at massive scale. But as the industry looks beyond embedded into application processors, a new set of challenges—and opportunities—comes into focus.
- This talk explores where RISC V stands today, what makes its next phase of growth fundamentally different, and why its future is likely to unfold unevenly across markets. It highlights key inflection points that will shape adoption and outlines where RISC V is poised to gain traction next.

Author's Bio

John Holland is Senior Director of Engineering and Engineering Lead for the QT Technologies Ireland Limited (Qualcomm Ireland) Infra, Sensor Technology & RISC-V Organizations.



John joined Qualcomm in November 2015 as part of the initial Qualcomm Ireland GSOC Engineering Team located in Cork, Ireland. He has 30+ Years in the Electronics Industry and previously worked for: Cypress Semi, Cognex, Ceva, PMC-Sierra, S3 (Philips), Analog Devices with roles as IP Lead, Design Manager, Front End Engineer, Back End Engineer and Fabrication Process Engineer.

His organisation includes numerous teams across several key skills sets delivering to all SoCs within the Global SoC portfolio while driving innovation in Qualcomm Snapdragon devices

John holds a Bachelor's degree in Electronics from the University of Limerick, Ireland & MBA from Open University.

RISC-V Embedded Dominance and Scale

Shipment Scale and Industry Proof Points

RISC-V Shipment Scale

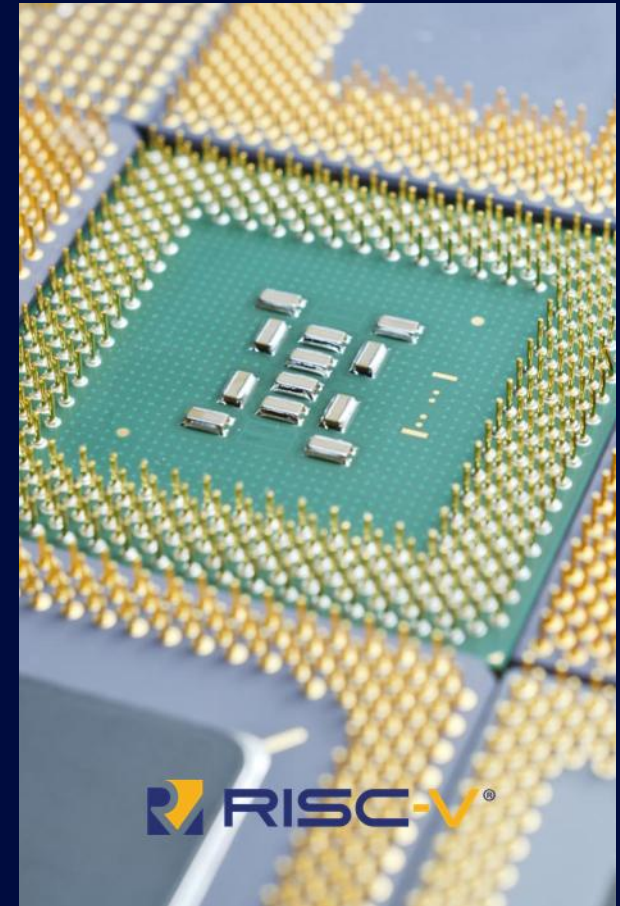
Over ten billion RISC-V cores shipped by early 2020s, primarily for embedded applications in modern electronics.

From Venture Capital to Industry Adoption

Total venture investment has grown into multiple billions, with SiFive securing a \$400 million Series G round in April '26. Major semiconductor vendors have confirmed production-hardened RISC-V shipments, proving reliability and manufacturability.

Economic and Ecosystem Validation

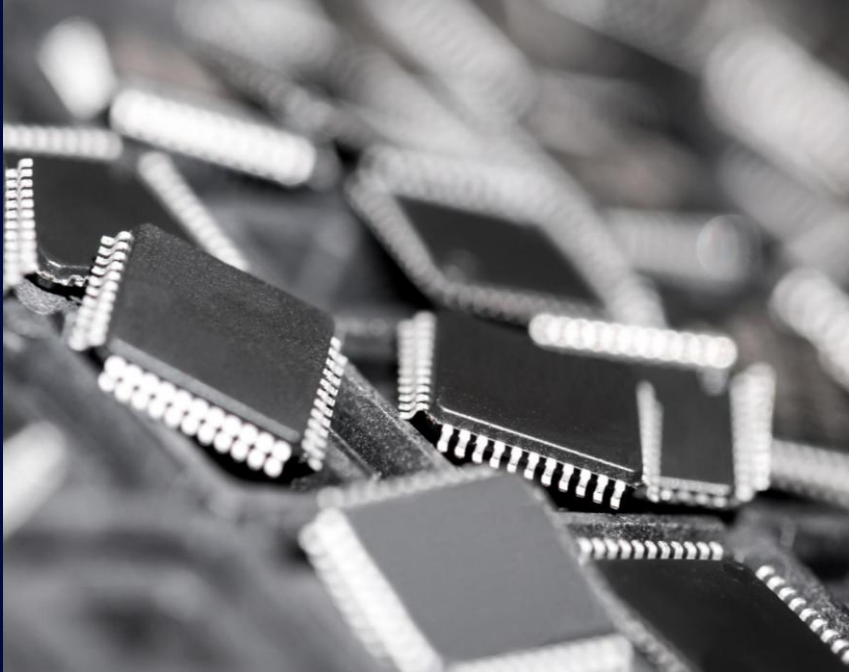
Open ISA model supports high-volume markets without sacrificing quality or ecosystem stability.





Qualcomm Technologies Inc. has
shipped more **2 billion** RISC-V cores
since 2019

Why RISC-V Won in Embedded First



Embedded Systems Alignment

RISC-V fits embedded systems well due to small software stacks and limited dependency requirements.

Customization and Cost Efficiency

Open ISA allows tailored cores for power, area, and workload without licensing fees, reducing costs.

Controlled Software Environment

Embedded markets avoid fragmentation with controlled software and known deployment targets.

Embedded vs Application Markets

Embedded success driven by small footprints and controlled environments differs from complex application processor markets.

Application Processors and Software Ecosystem Challenges

Software Ecosystem Size by Market Segment

Small Ecosystems in IoT and Wearables

IoT, industrial, and wearable devices have small, tightly controlled software ecosystems with vendor-specific applications and limited external dependencies.

Automotive Ecosystem Complexity

Automotive systems feature moderate ecosystem size integrating multiple suppliers' software with strict safety and certification requirements.

Large Ecosystems in Mobile and PC

Mobile and PC platforms have massive, diverse software ecosystems with extensive legacy applications and high compatibility expectations.

Datacenter Ecosystem Characteristics

Datacenter software ecosystems are complex but modular, based on open-source and cloud-native technologies, enabling flexible deployment.



Porting, Compatibility, and Stack Complexity

Stack Complexity Growth & Ecosystem Scale Challenges

Software stack complexity increases up the compute hierarchy, with gaps in middleware and driver maturity. Large markets also have millions of applications with legacy code and optimizations, posing high validation and compatibility costs.



Spectrum of Porting Effort & Compatibility Expectations

Porting software involves varied effort depending on application count, dependencies, and validation needs. High compatibility demands require seamless software function across hardware without user awareness.

Open vs Closed Source Challenges

Open-source software is easier to recompile due to full stack control by operators; closed-source and proprietary code pose greater porting challenges.

Importance of Ecosystem Maturity

Mainline OS support, stable ABIs, toolchains, and optimized libraries are critical for application processor adoption.

Adoption Trajectory and Near-Term Opportunities

Uneven Adoption Trajectory Across Segments

Mature Embedded Market

Embedded systems have reached maturity with widespread adoption, while opportunities still exist in newer IoT and wearable subsegments.

Emerging Datacenter Growth

Datacenter platforms are growing steadily, fueled by custom silicon and open software, enabling greater control and flexibility.

Long-term Mobile and PC Potential

Mobile and PC markets have slow adoption due to ecosystem inertia and required investments but represent significant future opportunities.

Multi-phase Adoption Pattern

RISC-V adoption follows a multi-phase trajectory, starting in specialized areas and gradually expanding into mass markets.



Strategic Takeaways and Opportunity Focus



Software Ecosystem Importance

RISC-V's success depends more on software ecosystem dynamics than hardware capabilities.

Near-Term Market Opportunities

Opportunities lie at market extremes: IoT and wearable devices at the low end, datacenter platforms at the high end.

Long-Term Mobile and PC Focus

Mobile and PC markets require longer-term ecosystem maturity and sustained developer investment.

Growth Through Gradual Expansion

RISC-V's path mirrors other open standards: early wins in simple environments followed by complex market expansion.

Everything Everywhere All at Once

