



It just keeps getting better: **RISC-V Performance**

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SiFive Inc.

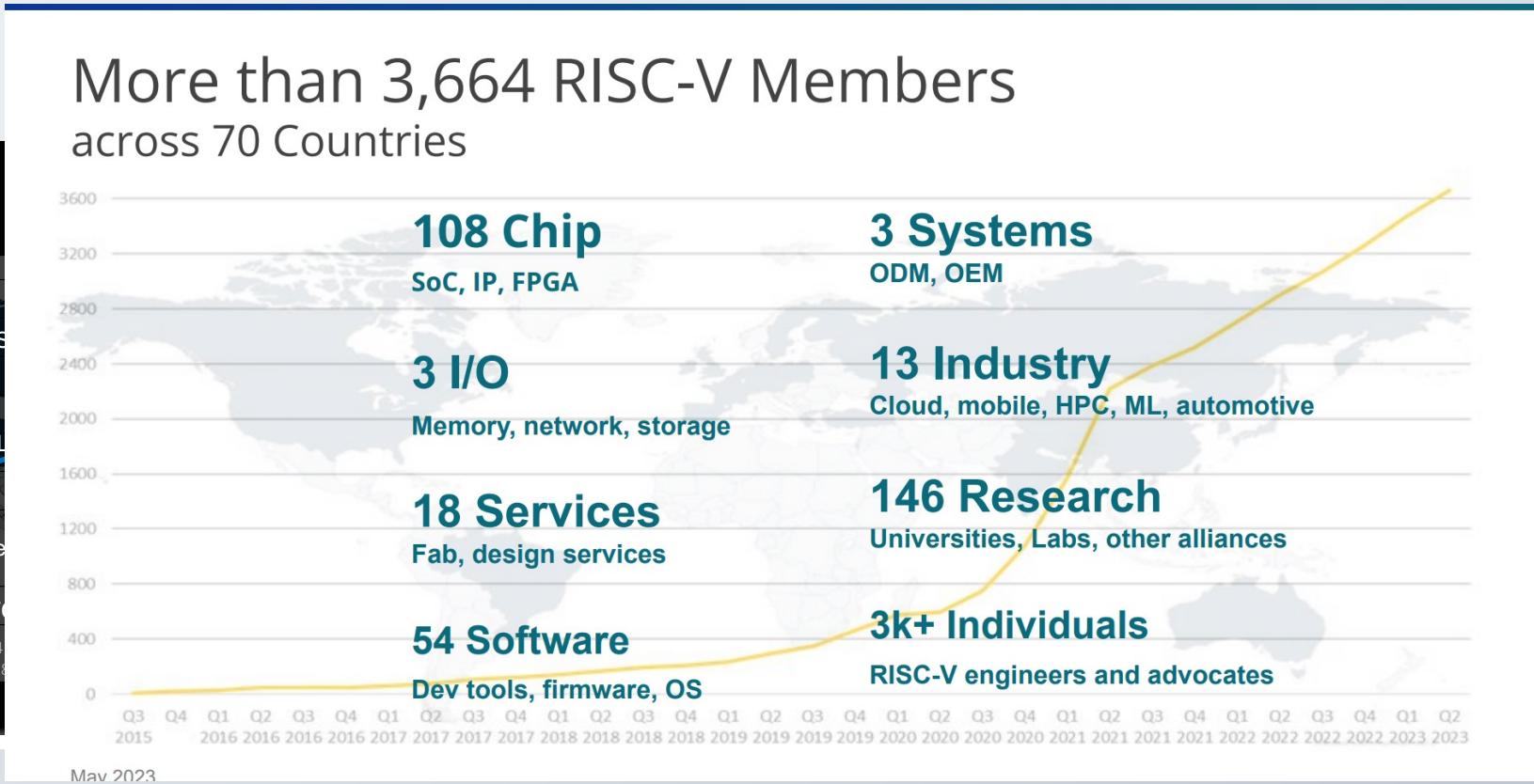
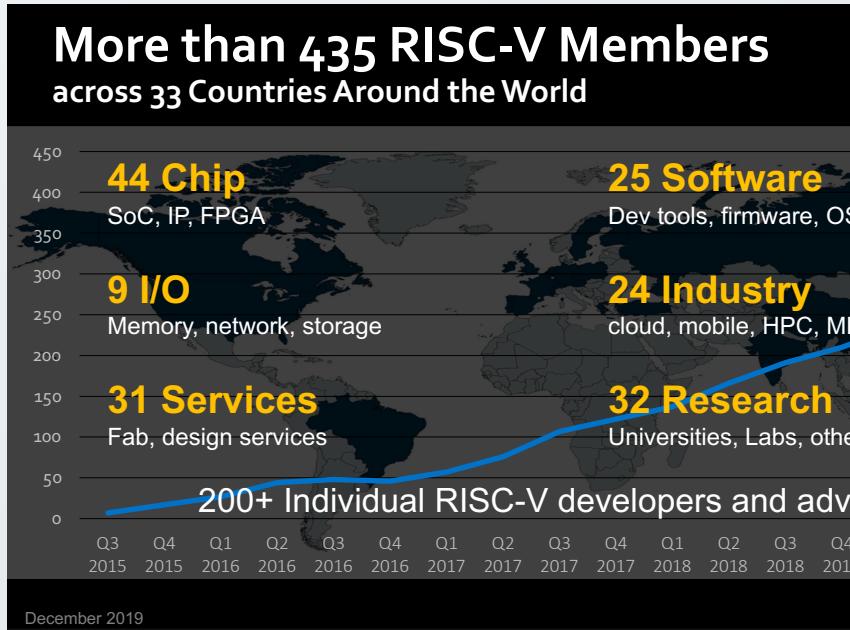
August, 2023



It's been **3+** years

Since we've been in China

A lot changes in 3+ years



Dec 2019

3.5 years

Now

RISC-V Summit China

August 23-25, 2023 in Beijing at the Shangri-La

(Co-located events: Aug 21 - 27)

- Prediction/Goal: ≥ 1200 in-person/day
 - 3000+ in-person attendees over 3 days
 - 50k+ watch online during the summit
 - ~~≥ 15 co-located events this year, distributed in more than 5 cities in 1 week~~
 - ≥ 150 companies, universities, research institutes, NGOs involved
- Venue: Shangri-La Hotel in Beijing
- Host (in China): BOSC; Organizer: IISG (same as last year)
 - Coordinate: RVI China Contact: Wei Wu



CHINA

MORE THAN 200 MEMBERS HAVE JOINED THE CRVA AND CRVIC ASSOCIATIONS AS WELL AS 33 MEMBERS IN THE GLOBAL RISC-V FOUNDATION. ACROSS 2019 WE'VE LED DISCUSSIONS IN 6 CITIES AS WELL AS HOSTED A DAY OF TALKS AT THE WORLD INTERNET CONFERENCE. IN NOVEMBER, WE HOSTED 500 ATTENDEES AT THE CHINA RISC-V FORUM.



Dec 2019

3.5 years

Now

RISC-V Performance & Ecosystem



3 Years Ago	Now
Mostly Embedded Cores	Application cores outperform Arm Complete feature set 32+ core systems Multi-core, multi-cluster
An Open Standard	The fastest growing ecosystem Inevitable future
A Promising Roadmaps	Customer silicon shipments
A Community Project	A commercial success



Dec 2019

3.5 years

Now

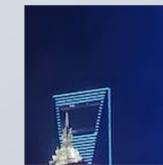
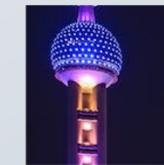
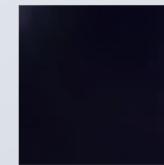
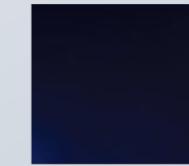
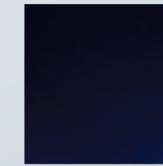
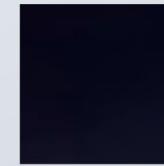
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China is vital to the inevitable RISC-V future

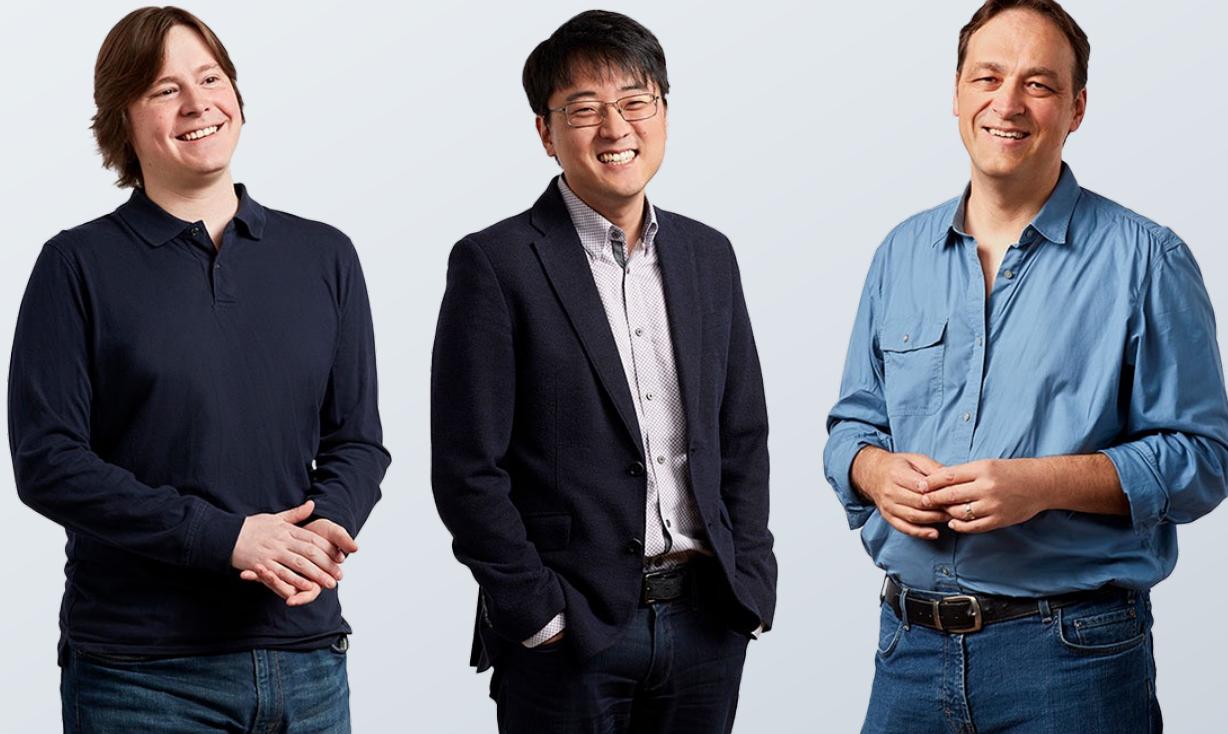


SiFive is expanding in China

- Shanghai headquarters
- Local team
- Local ecosystems & partnership



Founded by the inventors of RISC-V



- SiFive is the RISC-V founder & brand standard
- Leading the commercialization effort since 2010
- World's largest technology work with SiFive to adopt RISC-V
- Largest team & investment

We invest 100% on developing RISC-V solutions

- The largest RISC-V CPU IP Portfolio
- Highest performance RISC-V cores
 - For licensing
 - Silicon proven
 - On our roadmap
- Most advanced technology
 - Multi-core, Multi-cluster
 - NoC and Uncore
- Advanced software team (Compiler, Vectors, Performance, Debug, Kernels, BSPs,...)
- World-class customer support

New products in the last 3 years

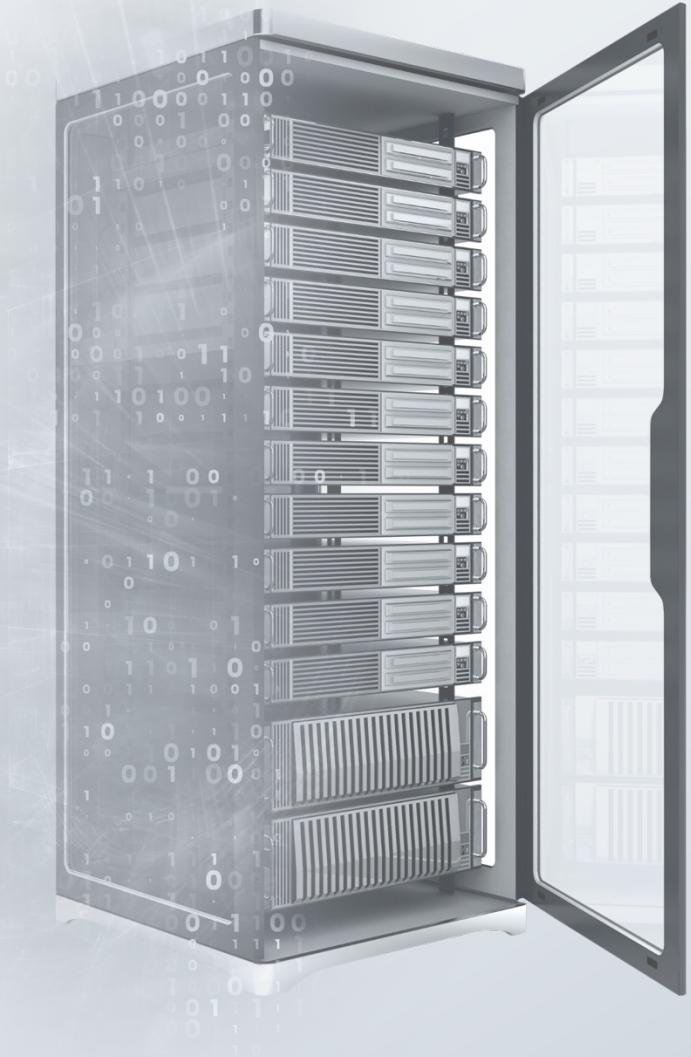


3 completely new families: Automotive, Intelligence, Performance

Automotive		Intelligence		Performance			
64-bit high-performance feature-rich OS capable application processors	X280-A AI acceleration instructions 512b vector length ASIL B	X200-Series AI processor for Edge and Data Center ML applications AI acceleration instructions 512b vector length	P200-Series >4.6 SpecINT2k6/GHz 2-wide in-order core 256b vector length WorldGuard RVA20	P400-Series >8.6 SpecINT2k6/GHz 3-wide OoO core 128b vector length Hypervisor ext. Vector crypto IOMMU & AIA WorldGuard RVA22	P500-Series >8.6 SpecINT2k6/GHz 3-wide OoO core Hypervisor ext. WorldGuard RVA20	P600-Series >13.1 SpecINT2k6/GHz 4-wide OoO core 128b vector length Hypervisor ext. Vector crypto IOMMU & AIA WorldGuard RVA22	
32/64-bit real-time scalable performance deeply embedded processors	S7-A 64-bit, high performance embedded ASIL D	S2-Series 64-bit, Area optimized	S6-Series 64-bit, power efficiency	U6-Series 64-bit, high performance	U7-Series 64-bit, superscalar performance	S7-Series 64-bit, high performance, embedded	
		E2-Series Smallest, most efficient	E6-Series Balanced performance and efficiency			E7-Series 32-bit, optimized performance	
Essential							

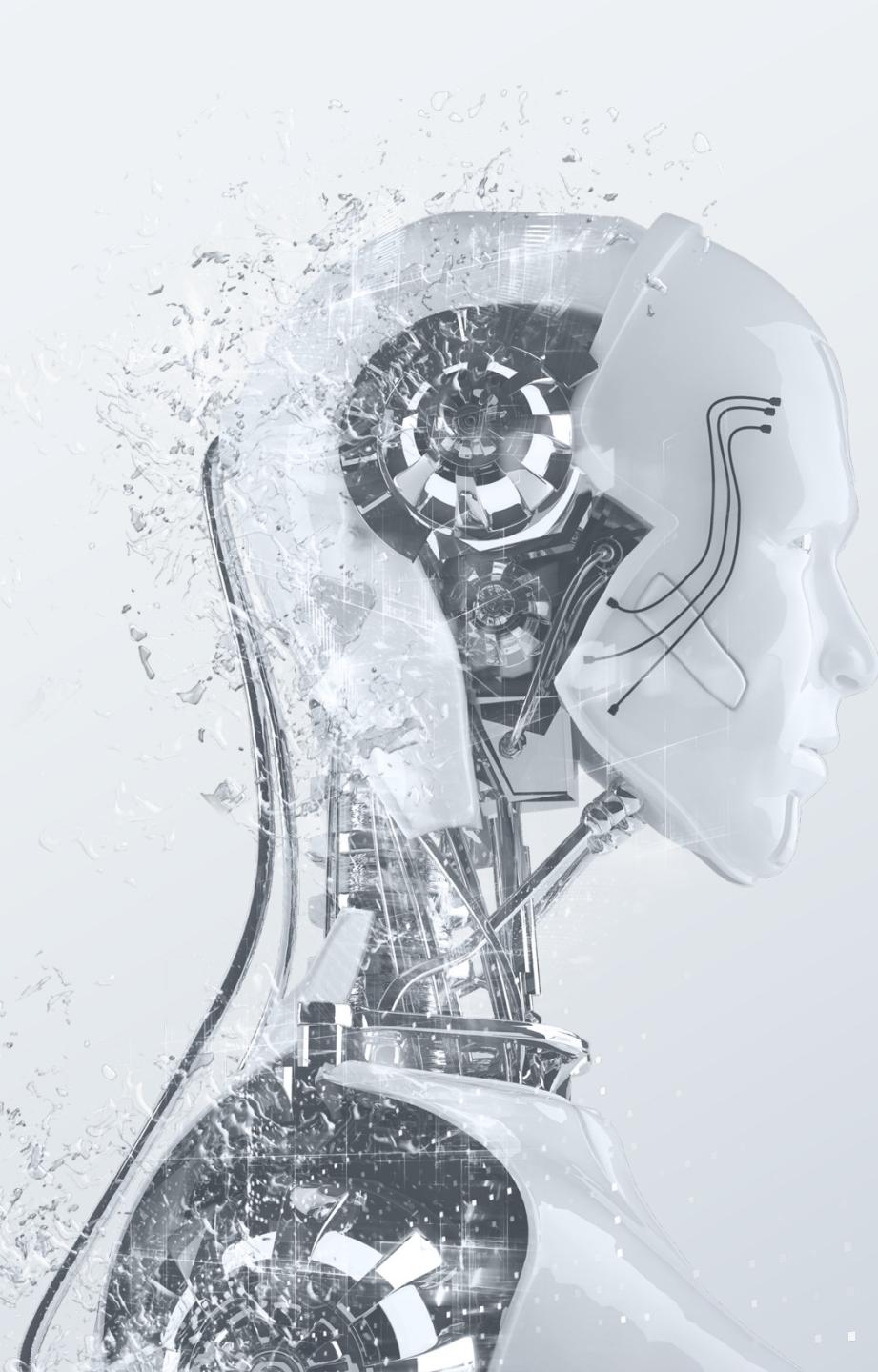
Enabling next-generation Automotive

- Electric vehicles & Autonomous driving is disrupting the Automotive industry
- Massive opportunity for new market ecosystem
- SiFive has complete automotive-certified solutions: Application Cores, Safety Island, Real-time Processor, and AI Intelligence Processors



Highest performance RISC-V for Infrastructure

- SiFive delivered highest performance CPUs
- SiFive solutions are scalable to many cores
- Complete solutions for IP, SoC, and Chiplets
- RISC-V Compute + RISC-V AI



AI from the edge to the cloud

- Generative AI and LLM workloads prove need for programmability
- Low power and low latency to the edge, and new programming capabilities to the cloud
- SiFive Intelligence and Vector solutions enable AI across all markets

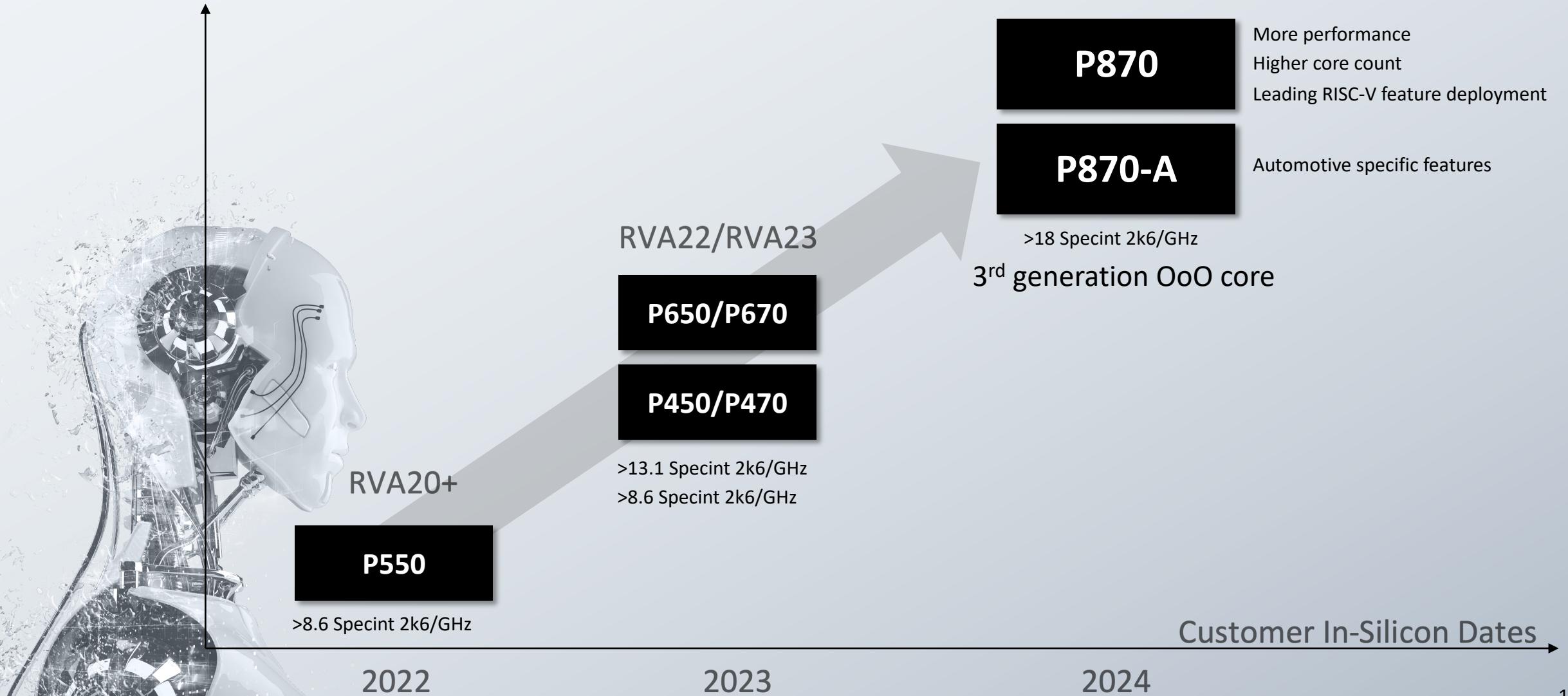


Power efficiency matters in Consumer and Mobile

- 30-40% better power efficiency than Arm
- Google porting Android, as leading mobile suppliers adopting RISC-V
- Mix and Match Big, Medium, Little size cores



SiFive Performance family relentless innovation





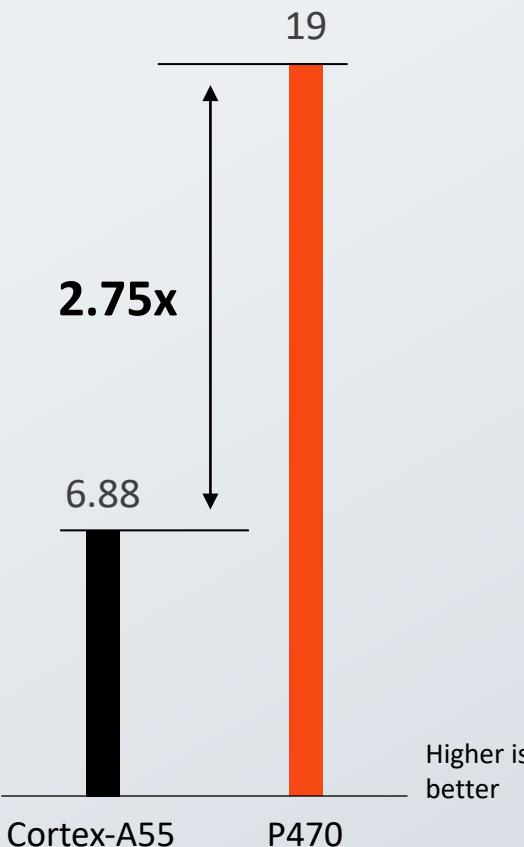
SiFive Performance P400-Series and P600-Series

Highest Performance	Balanced PPA	Vector Extensions	Feature Rich	RISC-V Compliant
Best-in-class performance	Optimized performance within constrained area and power envelope	Acceleration for media, crypto and data processing	Virtualization, IOMMU, AIA, debug & trace, security	Compliant with RVA22/RVA23 profile, with support for Vector and Vector crypto extensions

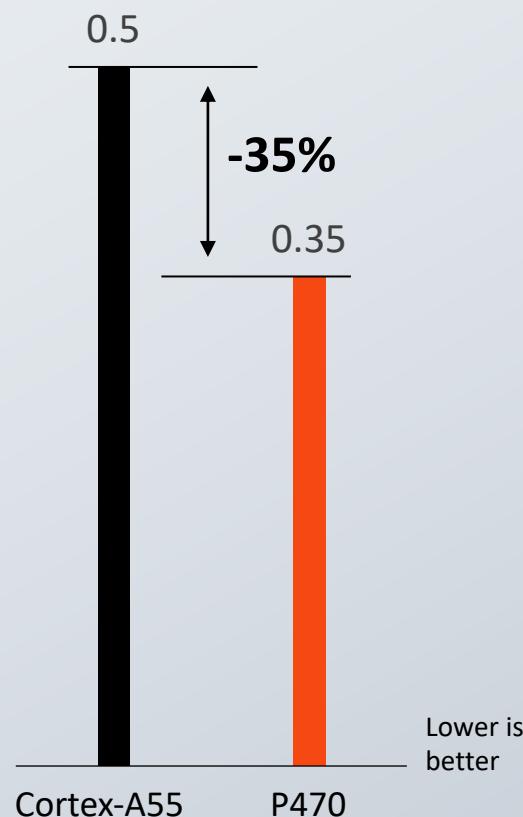
P470 Performance and efficiency



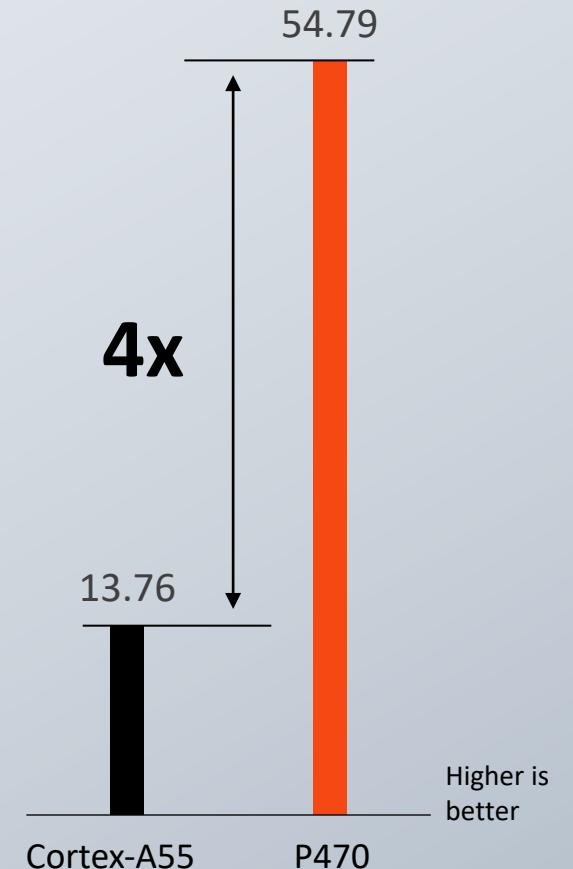
Peak Single-Thread
Performance
(SpecINT2k6)



Area with private
caches (mm^2)



Compute Density
(SpecINT2k6/ mm^2)

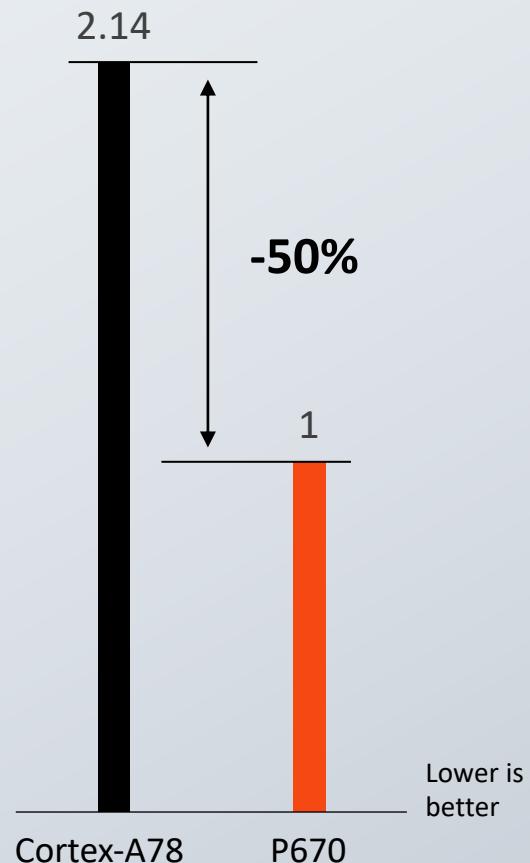


P670 Performance and efficiency

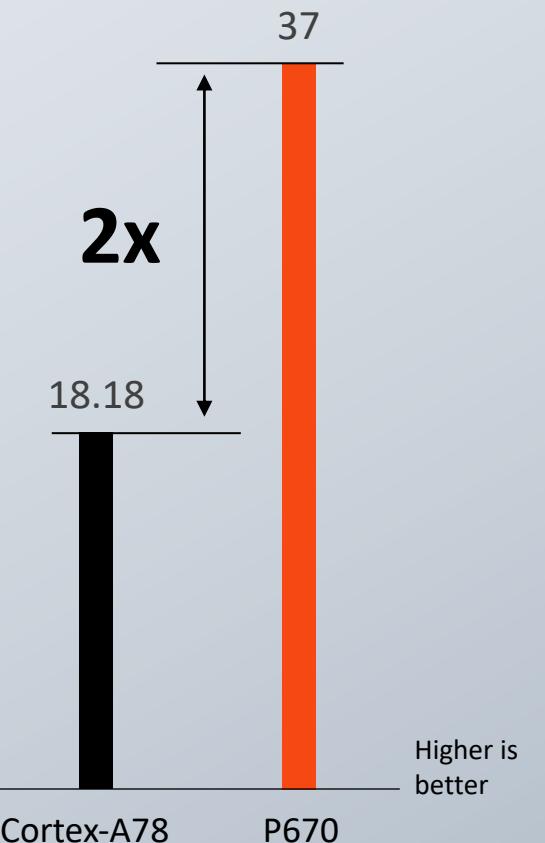
Peak Single-Thread
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Area with private
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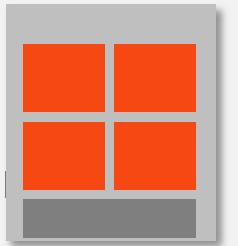


SiFive Provides Complete & Scalable Solutions

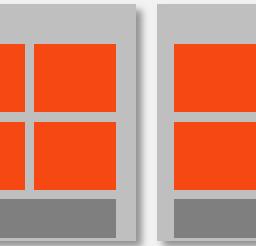


SiFive IP Complex

CPU Clusters



SiFive Cores



Advanced Power Management

Scalable Coherent Interconnect

Multi Cluster Interconnect

Shared L3 Cache

QoS

Up to 8 memory ports (CHI, AXI)

Non-Coherent I/O (AXI)

Advanced Interrupt Controller

SiFive Insight Debug & Trace

IO MMU

SiFive WorldGuard Security

Scalable High-Performance & High-Efficiency
Cores: P870, P670, & P470 (with selected Mix+Match)

Shared Cluster L2 Cache

System IP to Enable Complete RISC-V SoC solutions



RISC-V is here, time is now
一万年太久，只争朝夕

SiFive is here to help





Empowering innovators

www.sifive.com