

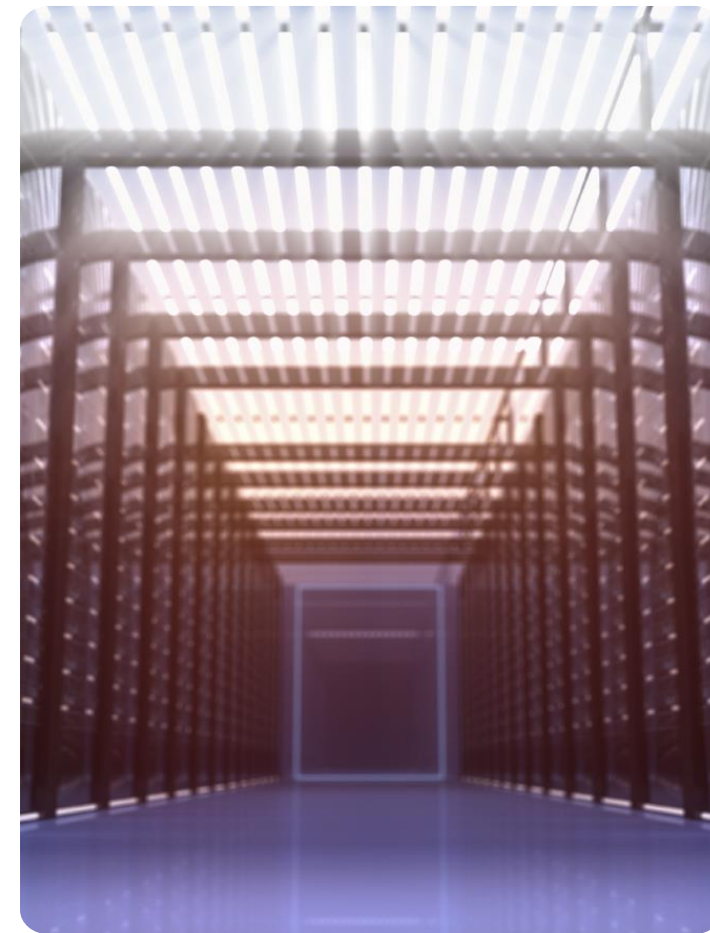


SiFive RISC-V cores for SSD Controllers



Key CPU Features Required for Storage Market

- **Coherent Heterogeneous Cores (RT, Emb., App.)**
- **64-bit real-time addressability for BIG DATA applications**
- **Real time applications for FAST DATA require**
 - Fast Deterministic Operations with flexible and tightly integrated memory system & branch predictor & Cache lock
- **Tightly integrated low latency accelerator interface, ability to add custom instructions**
- **Remove FPU for applications which don't need it**
- **Storage, ML, Cryptography specific custom instructions**





Overview of SiFive Cores for Storage Market

- **SiFive RISC-V IP Cores are well-suited for the Storage Market**
- **Entire product line of IP designed for Storage (HDD/SSD) Markets**
 - Silicon-proven and production-ready E31/E51 cores are direct replacements for ARM Cortex-R4 and Cortex-R5
 - Continued investment in this market with higher-performance E7/S7 series with advanced memory subsystems and features
- **64-bit cores available now to address large address requirements**
 - 64-bit RISC-V offers significant code density advantage compared to 64-bit ARM due to RISC-V design and Compressed Mode
 - 64-bit requirement is a natural opportunity for RISC-V transition due to other required software changes
- **Advanced Features for new use cases: In-storage Compute, Converged Storage**
 - Coherent multi-core support; customize and build complex multi-core configurations
 - Linux-capable cores with real time features; or combine real-time embedded cores with application cores in single subsystem
 - Custom instructions via SiFive Custom Instruction Extension (SCIE)
- **Proven Cores from SiFive**
 - Silicon Proven
 - Full-featured cores with debug, trace, advanced interrupt controllers, multiple bus interfaces, privileged modes, memory protection.
 - Used by all RISC-V Ecosystem Tool Vendors to validate and bring up their tools

SiFive Core IP 7 series:

The **highest performance**
commercial **RISC-V**
processor IP

 E7 Series

32-bit Embedded
Processors

 S7 Series

64-bit Embedded
Processors

 U7 Series

64-bit Application
Processors

Common Feature sets
Hard Real-time capabilities
Unprecedented scalability

~60% increase in
CoreMarks/MHz*

~40% increase in
DMIPS/MHz*

10% increase in
Fmax*



Why Customers Are Using SiFive RISC-V cores for SSD Controllers



“SiFive’s RISC-V Core IP was 1/3 the power and 1/3 the area of competing solutions, and gave FADU the flexibility we needed in optimizing our architecture to achieve these groundbreaking products.”

- Jihyo Lee, FADU CEO

“We chose to partner with SiFive on this SSD platform solution as their cores offer the lowest area and highest power efficiency of any similar cores in the market.”



- Ravi Thummarukudy, Mobiveil CEO



“RISC-V delivers a platform for innovation unshackled from the proprietary interface of the past. This freedom allows us to bring compute closer to data to optimize special-purpose compute capabilities targeted at Big Data and Fast Data applications.”

- Martin Fink, Western Digital CTO