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Analyze the Future

IDC White Paper:
Creating World Leading Systems Using a Common Processor Microarchitecture: Combining the Best from Mainframes, UNIX Servers, and HPC

A Common Microarchitecture

- Fujitsu centers its processor development on the use of a common microarchitecture that allows designers to continually develop and improve a standard base processor design that then can be readily customized to meet the unique computational requirements of different system design requirements.

- Fujitsu is the only vendor in the world that currently employs a powerful common microarchitecture design philosophy to help drive their processor development, allowing the firm to continuously roll out an impressive array of computing products, each uniquely designed to address key and often distinct user requirements.

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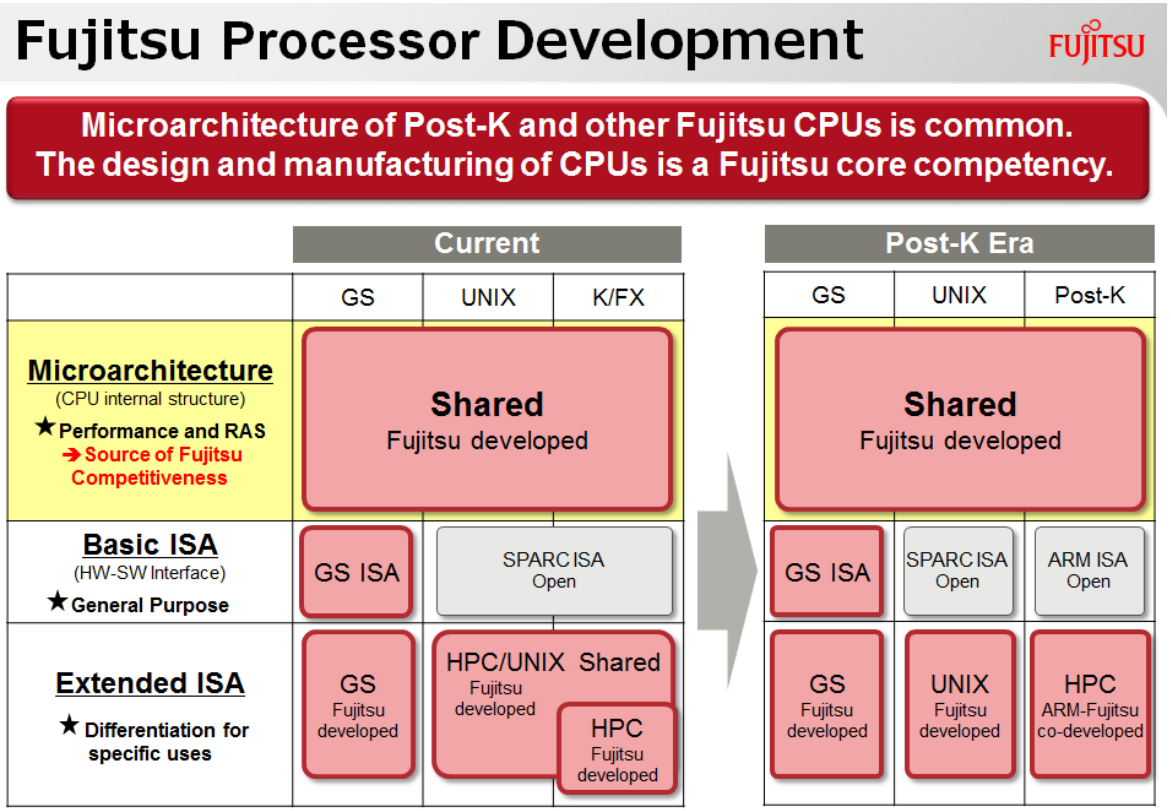
A Common Microarchitecture: Providing the Best Features and Capabilities to All Types of Systems



Fujitsu's road maps make it clear that they will continue to use their industry-unique common microarchitecture capabilities to design a wide range of systems that can server both the business and technical communities with specialized high performance and reliable processors.

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Supporting Three World Class Product Families

Fujitsu common microarchitecture provides the best features in each area:

- **Fujitsu's mainframe product line targets infrastructure and mission-critical enterprise systems that need to run reliably 24x7**
  - Increases processing performance by as much as 40%
  - Slashes power consumption by up to 50%
  - Reduces required floor space by approximately 70%
- **The Fujitsu M10 line of UNIX servers targets business applications**
  - Employs the Fujitsu SPARC64™ X and SPARC64™ X+ processors
  - Features powerful Software on Chip (SWoC) functionality in the areas of SIMD vector processing, extended floating-point registers, decimal floating point processing, and cryptographic processing
  - Provides flexible processor core and main memory expansion
- **Fujitsu's supercomputer product line for leadership-class HPC**
  - Based on the Fujitsu SPARC64™ XIfx processor

The recent announcement by Fujitsu to adopt an ARMv8 Instruction Set Architecture for the planned Post-K supercomputer does not signal a flagging interest in SPARC, but instead serves as the most recent example of the ability of the Fujitsu common microarchitecture model to adapt to changing technical requirements as well as new demands from the marketplace for new options in high performance computing.

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Customer Requirements

IDC expects that customer spending on server systems will be significantly influenced by form factors, energy specifications, consolidation, and virtualization technologies.

The growth of density-optimized servers will result in power and cooling system requirements becoming just as important as performance and price in terms of purchasing criteria.

Buyers are looking for compute solutions that provide improved performance with greater availability and ease-of-use, all at a lower price.

In addition, key requirements include:

- Ease of migrating applications to new platforms
- Improved price/performance and lower TCO
- Reduced power consumption
- Scalability without pain
- Higher reliability
- Strong support services
- Reduced operation costs by improving CPU performance
- Long-term support for key applications and software

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How Fujitsu Addresses These Requirements: A Common Microarchitecture

Fujitsu Microarchitecture: Leveraging Key Technology Advances across Multiple Systems Lines

- Fujitsu is a global technology leader in the development of advanced processor technologies used to support the mainframe, UNIX server, and supercomputer product lines.
- These product lines form the heart of Fujitsu's high-end offerings for the most advanced enterprise business, scientific, and advanced analytics applications.
- A Post-K supercomputer is planned and will harness much of the same Fujitsu SPARC processor expertise and capabilities, but will operate with an ARM instruction set architecture.

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Customer Experiences:
Dai Nippon Printing Co., Ltd.

Customer requirements included availability and improved system performance as well as a solution that could:

- Reduce TCO
- Provide consolidated support
- Optimize middleware licenses and reduce operation costs by improving CPU performance
- Maintain high reliability and high availability
- Long-term support for Oracle Solaris

Fujitsu provided a complete solution by installing Fujitsu M10 servers that deliver uninterrupted service during user expansion and data volume increases.

Dai Nippon reported significant performance improvement from the Fujitsu solution, plus much higher availability, and reduced operational costs.

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Customer Experiences: Frontier Science

The research Foundation is engaged in large-scale international clinical trials, many of which have had direct impact on the treatment of patients with various diseases, particularly AIDS and cancer. In addition to the 250 Frontier Science staff, the Foundation is also connected to 6,000 researchers globally, all of whom need to upload vital data on a daily basis.

Their legacy servers were not keeping up with the daily demands of ever-increasing workloads, and the cost of outsourcing was simply too expensive for the foundation.

- Frontier Science installed multiple Fujitsu M10-4 and M10-1 servers and Fujitsu ETERNUS DX200 storage solutions at several sites. A key consideration was the 16-core SPARC64™ X processor that delivers optimal performance, mainframe-class reliability, availability and maximum scalability to handle mission critical workloads.

- *"We initially purchased one Fujitsu M10-4 for testing and benchmarking purposes and determined that it provided 50-70 percent greater throughput, and we could run more routines simultaneously." — Frontier Science official*

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Conclusions: The Future of Fujitsu's Common Microarchitecture

Dating back to 1995 with its first SPARC processor, Fujitsu has a long history of SPARC processor development.
IDC expects that Fujitsu will continue and expand their processor development in the future.

- IDC experts that the Fujitsu common microarchitecture will not only power future mainframe, UNIX server, and supercomputer product lines, but that it will also be expanded to meet new challenges in next-generation IT domains such as Internet of Things, cognitive analytics and other coming arenas.

Because Fujitsu offers processor variants in at least three high-end product lines, the firm can readily take advantage of the design and manufacturing economies of scale normally associated with high volume processor suppliers.

- The use of a common microarchitecture enables Fujitsu to pursue the development of new, innovative, and aggressive processor designs knowing that development costs and resources expenditures can be spread across a wide base of its product lines.

In addition, with its common microarchitecture, Fujitsu is better positioned than most traditional processors suppliers to respond with a newly designed processor for rapidly changing market demands.

- Because the common microarchitecture allows for flexibility in the processor's instruction decoding hardware without having to change any other part of the processor design, Fujitsu is able to offer products that can work with any ISA it chooses.

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