FUJITSU-MONAKA series: Fujitsu's Next Arm-based Processor and Its Approach to HPC and AI

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Technology Cultivated Through the Development of World-Class Supercomputers

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Next-Generation arm v9-base CPU

FUJITSU-MONAKA

FUJITSU Processor roadmap

2020
A64FX
・Adopted in the supercomputer Fugaku
・First implementation of Arm SVE

7nm

2027
FUJITSU-MONAKA
・Realization of high-speed data processing platform
・Achieves both high energy efficiency and performance
・Provides a highly reliable and secure environment

2nm

2029
FUJITSU-MONAKA-X
・Applies next-generation process node
・Further evolution of AI functionality
・Adopted in FugakuNEXT

1.4nm

FUJITSU-MONAKA : Beyond Specific Use Cases

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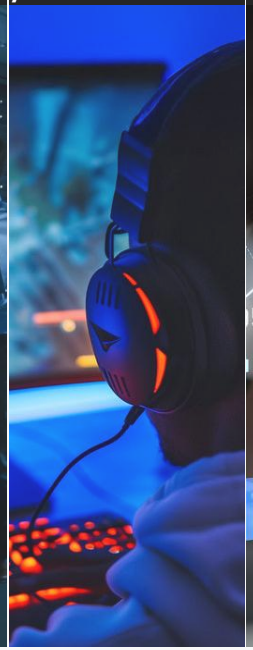
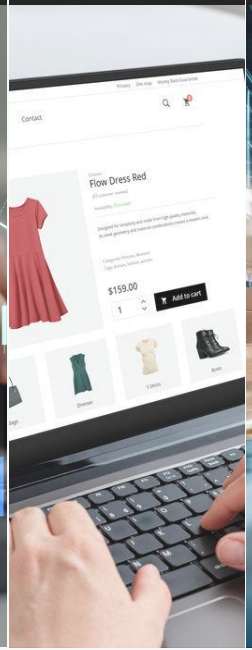
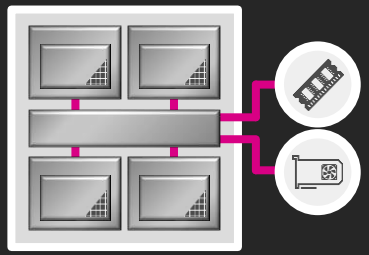
AI/IT Service	Data Center	Gaming /Entertainment	Finance	E-Commerce	Logistics /Mobility	Automotive	Construction
							
Log Analysis	Database Platforms	Software Development	Transaction Processing	Customer & Inventory Forecasting		CAE /Surrogate	Digital Twin
AI Inference							

FUJITSU-MONAKA Processor Overview

FUJITSU-MONAKA



- Armv9-A Architecture
- 3D chiplet
  - Core die 2nm
  - SRAM die/IO die 5nm
- Ultra low voltage for energy-efficiency
- DDR5 12 channels
- Liquid / Air-cooling
- Arm SVE2-256bit for AI and HPC
- 144 cores x 2 sockets (288 cores per node)
- Confidential Computing for security
- PCI Express 6.0 (CXL3.0)

subject to change without notice

To be shipped in 2027

FUJITSU-MONAKA

High-Performance and Energy-Efficient CPU for a Carbon-Neutral Digital Society

High-Performance

Achieving high-speed computing centered on AI workloads (2×competitors CPUs).

Power-Efficiency

Reducing CO_2 emissions and electricity costs (2×competitor CPUs).

Safety & Security

Leveraging mainframe RAS technologies.

Ease of Use

Leveraging armv9 Software ecosystem.

Ease of use: FUJITSU-MONAKA software stack

Support for Standard OSS / ISVs per Domain

- Customers can adopt FUJITSU-MONAKA seamlessly, and enjoy its high performance & energy efficiency, reducing TCO.

Application	Molecular Dynamic, Structural Analysis, CFD, Speech Recognition, Surrogate Model, Generative AI
Frameworks & Inference Engines	PyTorch/TensorFlow, scikit-learn, vLLM, Llama.cpp, ONNX Runtime
Library & Toolchains	OpenBLAS, NumPy/SciPy, oneDNN, OpenVINO, GCC/LLVM, OpenMPI
OS & Middleware	Linux, Slurm, Kubernetes, OpenStack, Ceph, Lustre
Firmware / Hardware	Arm Processor Utilization & FUJITSU-MONAKA System Development Many Core, High-Capacity Memory, Low Power, Low Cost, Security

Remark: Here shows part of software lists due to the space limitation. The lists may be subject to change without notice.

Efforts to Expand AI & HPC Adoption in the Arm Ecosystem

- Driving AI & HPC performance improvement & quality enhancement of OSS by leveraging our HPC expertise
- R&D of Surrogate Models for Advanced Industrial AI

Ease of use : Adapting Server standard

- Redfish
  - FUJITSU-MONAKA compliance version
    - Redfish ver. 1.18
    - Redfish Schema Bundle ver. 2023.1
- IPMI
  - FUJITSU-MONAKA compliance version
    - IPMI Specification Second Generation V2.0
- Arm System Ready SR
  - Compliance work is on progress

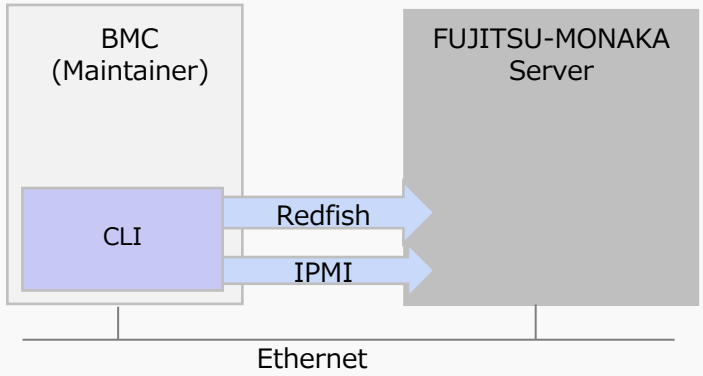
- Regardless Server factor, easy of use for system maintenance

Air-Cooling Server

(2U1N)

Liquid-Cooling Server

(2U4N)



- Redfish and IPMI Function overview

Redfish	Redfish	IPMI
Power On/Off	○	○
Inventory information(system config)	○	○
Power and thermal monitoring	○	○
Failure monitoring	○	○
Operation log collection	○	○
Power management	○	—
Mode configuration(Boot option, etc)	○	○
Firmware update(BIOS/BMC)	○	—

Ease of use : Value of SVE2 in HPC applications

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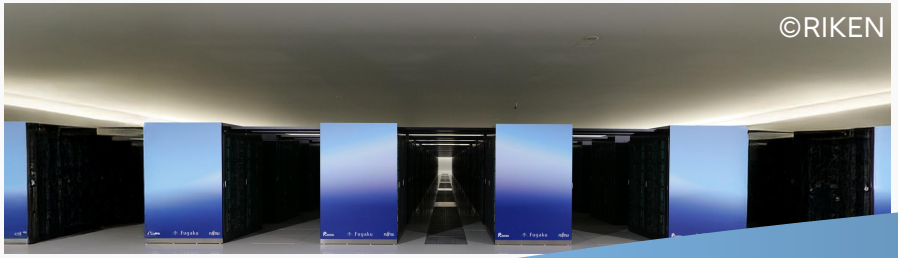
- Traditional HPC was defined by FP64 performance and parallel scalability.
- Fugaku HPC evolved HPC market by integrating aarch64 and expanding the OSS ecosystem beyond FP64.
- FUJITSU-MONAKA advances this evolution, with SVE2 enabling broader and more efficient HPC applications



FP64 parallelization

SVE & arm ecosystem in HPC

FUJITSU-MONAKA for HPC applications

Summary

Two types of servers to meet customer needs, available from 2027

*PoC with demo systems start in 2026

Air-Cooling Server

2U1N

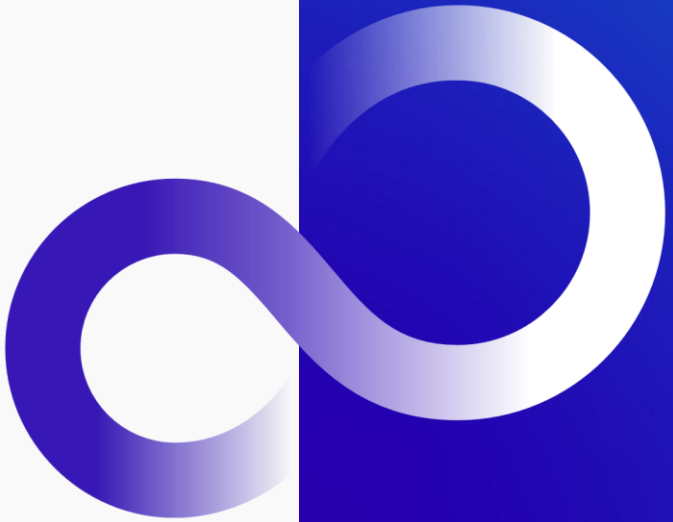
High-performance air-cooled server with excellent installation and scalability.

Liquid-Cooling Server

2U4N

High-density liquid-cooled server designed for heavy-load processing.

Thank you



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