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The K computer


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K computer
World's No.1 on TOP500
4 HPCC class1 awards
Gordon Bell Prize (High perf.)

Project Overview

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Project Overview

- Fujitsu and RIKEN are jointly developing the Next-Generation Supercomputer under an initiative by MEXT (Ministry of Education, Culture, Sport and Science)
- System architecture: Scalar Parallel
- Linpack Performance: 10.51 petaflops
- Slated for completion in 2012

Schedule of the project

2006	2007	2008	2009	2010	2011	2012
Conceptual design	Detailed design		Prototype, evaluation	Production, installation and adjustment		Tuning and improvement

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Project Overview

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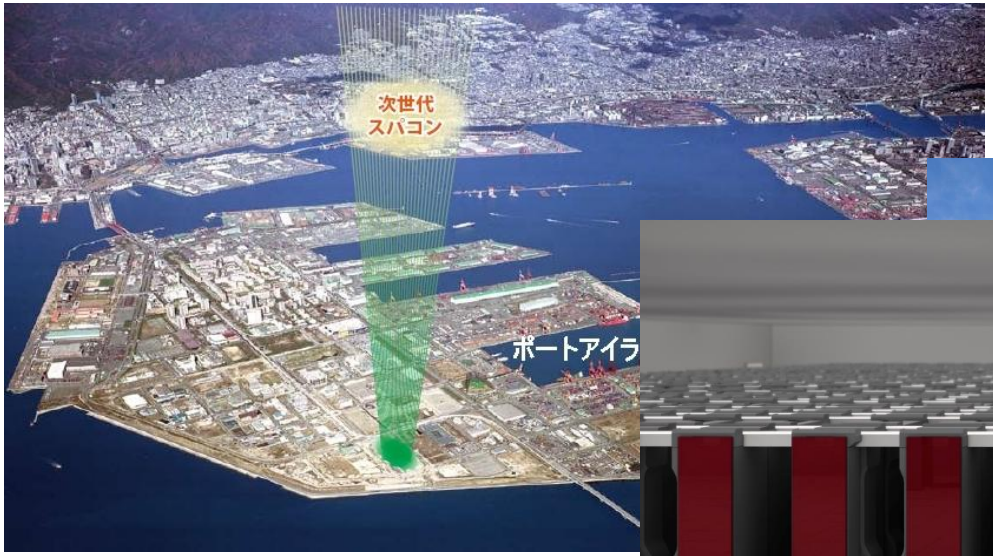
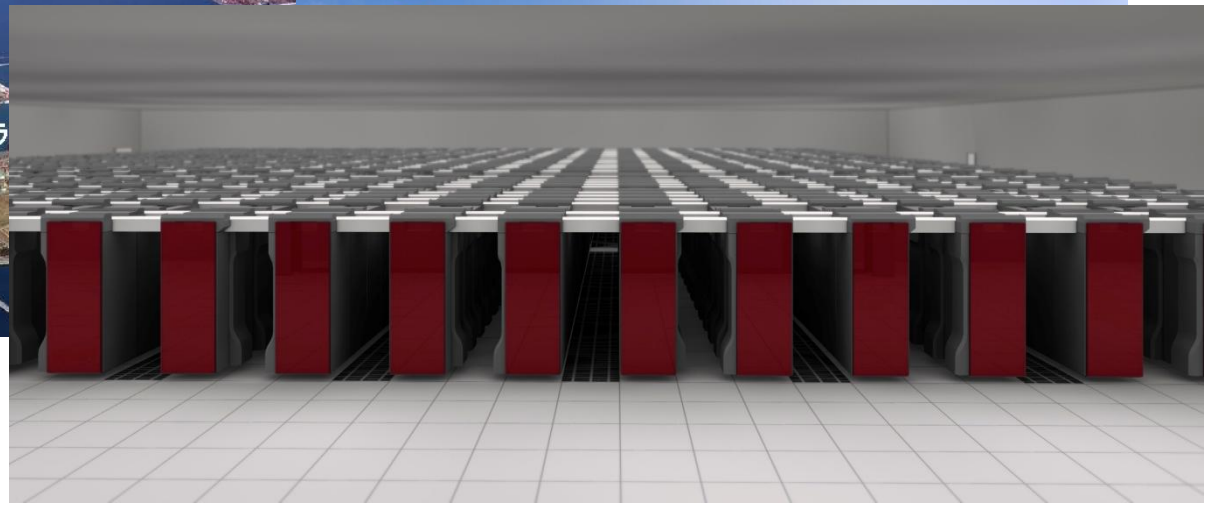
- Located at Port Island in Kobe City



京
K computer

The “K computer” Facility
Advanced Institute for Computational Science



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System Overview

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System Overview

- Ultra-large scale system powered by 88,128 processors
- Fujitsu has brought together cutting-edge technologies including SPARC64 VIIIfx, high-performance, highly-reliable and low power consumption processor

System	Linpack performance : 10.51 petaflops # of CPUs : 88,128 CPUs Total memory : 1.3 petabyte
CPU	SPARC64 VIIIfx (8cores, 128 gigaflops)
Interconnect	6-dimensional Mesh/Torus topology

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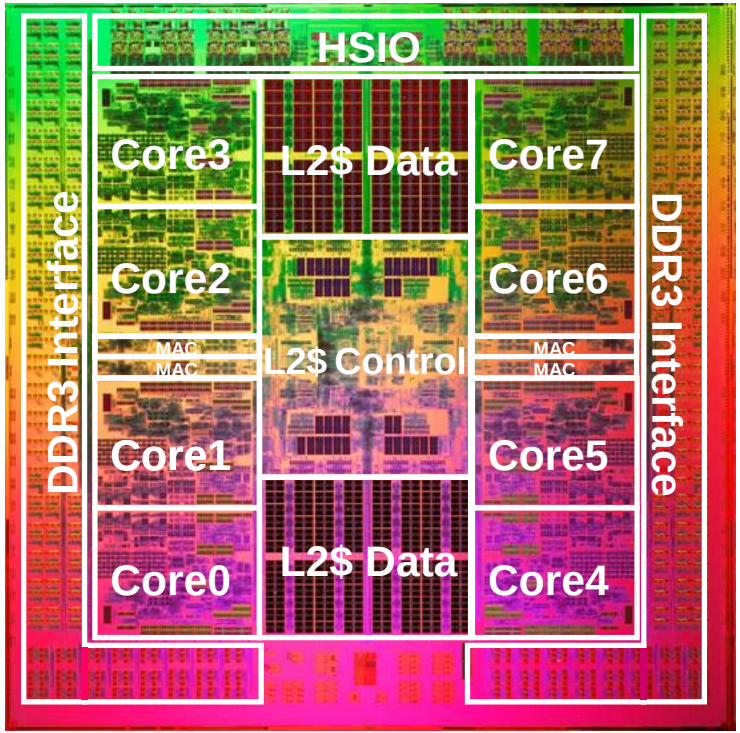
Processor: SPARC64 VIIIfx

- High-performance and highly reliable, plus low power consumption necessary for ultra-large scale system
  - Integrated cores, cache and memory I/F

Number of cores		8 cores
Clock		2 GHz
Cache	L1	I: 32KB/core, D: 32KB/core
	L2	6MB (Shared cache)
Peak Performance		128 gigaflops
Power consumption		58W (typical)
Process		45 nm



SPARC64 VIIIfx Chip Layout

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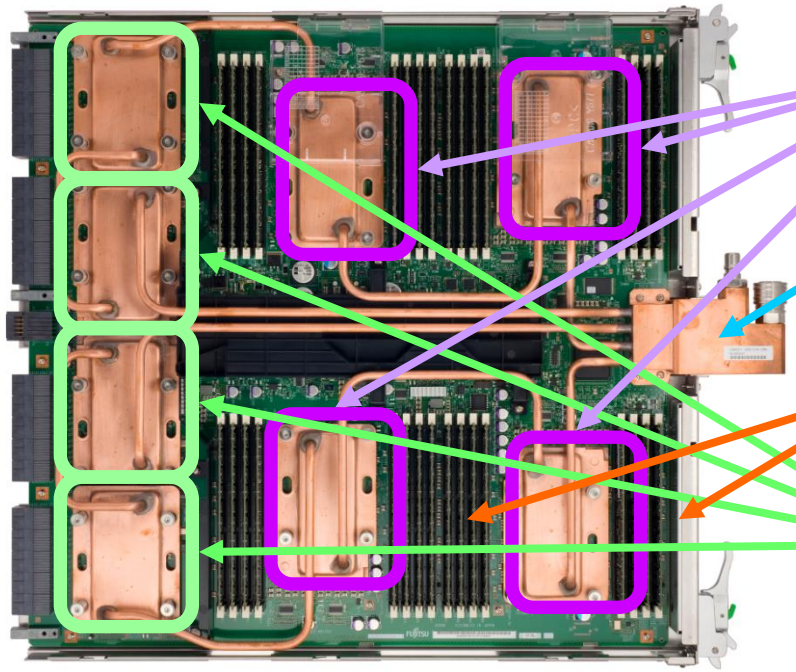
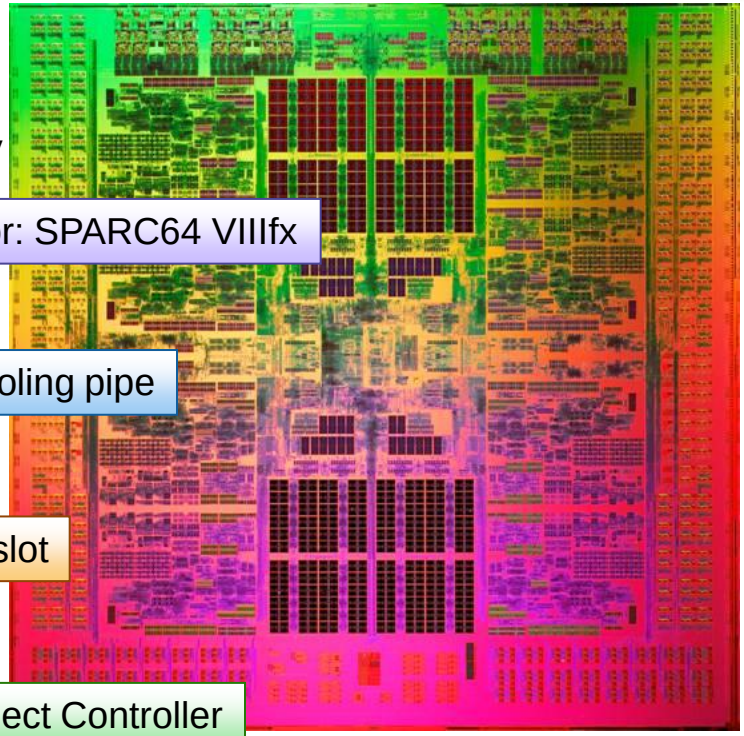
System Board

- Water-cooling for CPU and major parts
  - Low temperature cut power, improve reliability





Processor: SPARC64 VIIIfx

Water-cooling pipe

Memory slot

Interconnect Controller

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System Rack

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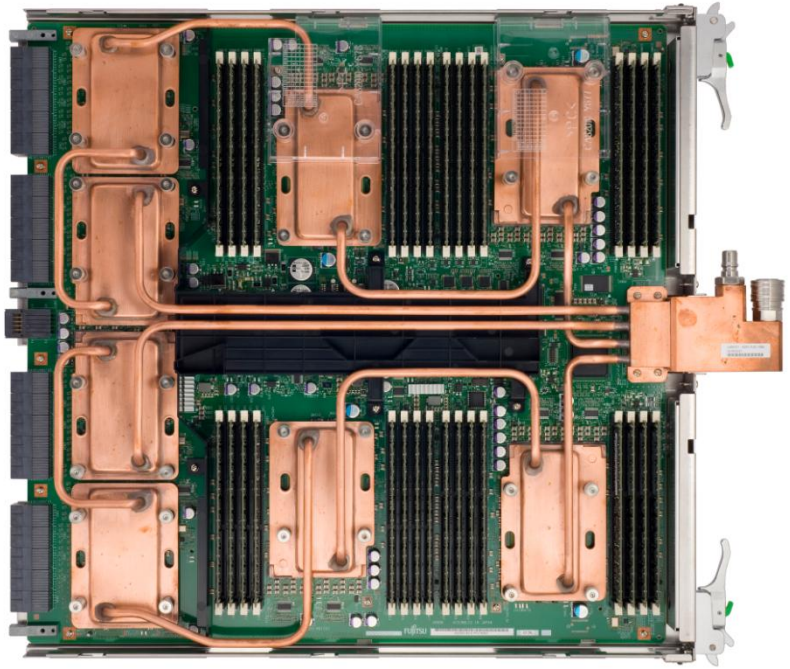
- 102 processors in 1 system rack
  - 3 cabinets comparable to the original Earth Simulator (320 cabinets)



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Installation Image

- Ultra-large system with 88,128 processors
  - Innovative 6 dimensional mesh/torus interconnect
  - System software also provided by Fujitsu

First installation of 8 racks

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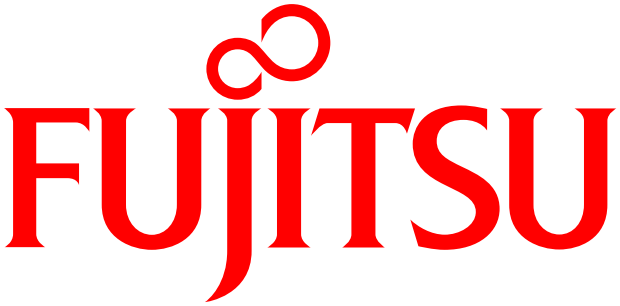

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