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# Fujitsu's Approach for Exascale

Toshiyuki Shimizu

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# Roadmap and Research for Exascale

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| 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|

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K computer

**PRIMEHPC FX10**

- 1.85 x CPU performance
- Easier installation

**Post-FX10 system**

- Improved CPU & network performance
- High-density packaging & low power consumption

Japan's national projects

Development

Operation of K computer

HPCI strategic applications program

App. review

FS projects

Exascale supercomputer development project

## K computer and PRIMEHPC FX10 in operation

- Many applications running and being developed for science and industries

## Post-FX10 is coming soon

- CPU and interconnect will inherit K computer architectural concept

## R&D for Exascale

- Higher performance and lower power consumption technologies for hardware and software
- Participated in national projects, App. Review and FS, proactively
- Riken is reviewing the plan to drive the Exascale supercomputer development project, referring to the results of FS

# Feature and Configuration of Post-FX10

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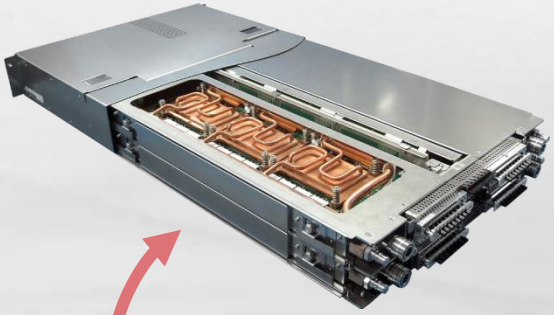
## *Fujitsu designed SPARC64™ XIfx*

- 1TF~(DP)/2TF~(SP)
- 32 + 2 core CPU
- HPC-ACE2 support
- Tofu2 integrated

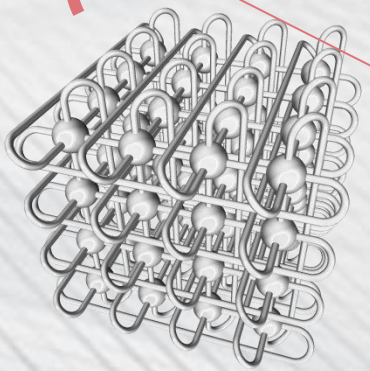

## *Chassis*

- 1 CPU/1 node
- 12 nodes/2U Chassis
- Water cooled



## *Cabinet*

- 200~ nodes/cabinet High-density
- 100% water cooled with EXCU (option)



## *Tofu Interconnect 2*

- 12.5 GB/s×2(in/out)/link
- 10 links/node
- Optical technology

## *CPU Memory Board*

- Three CPUs
- 3 x 8 Micron's HMCs
- 8 Finisar's opt modules, BOA, for inter-chassis connections

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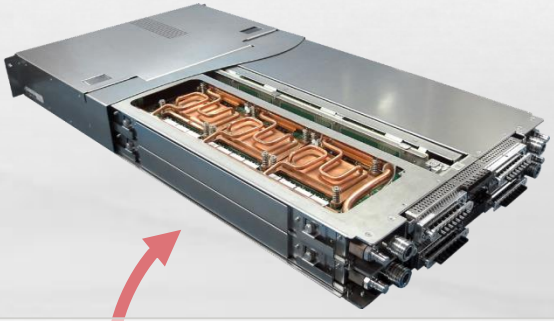
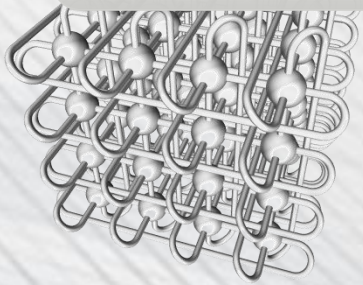


## Same application view as FX10 & K computer



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# K computer and Fujitsu PRIMEHPC series

FUJITSU

- Single CPU/node architecture for multicore
  - Good Bytes/flop and scalability
- Key technologies for massively parallel supercomputers
  - Original CPU and interconnect
  - Support for tens of millions of cores (VISIMPACT*, Collective comm. HW)

**PRIMEHPC Series**

## FX1

VISIMPACT
Collective comm. HW

*CY2008~*
40GF, 4-core/CPU

## K computer

SIMD extension HPC-ACE
Direct network Tofu


*CY2010~*
128GF, 8-core/CPU

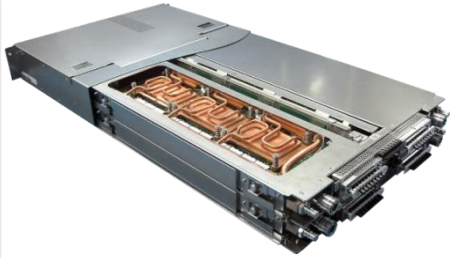
## FX10

HPC-ACE
Direct network Tofu

*CY2012~*
236.5GF, 16-core/CPU

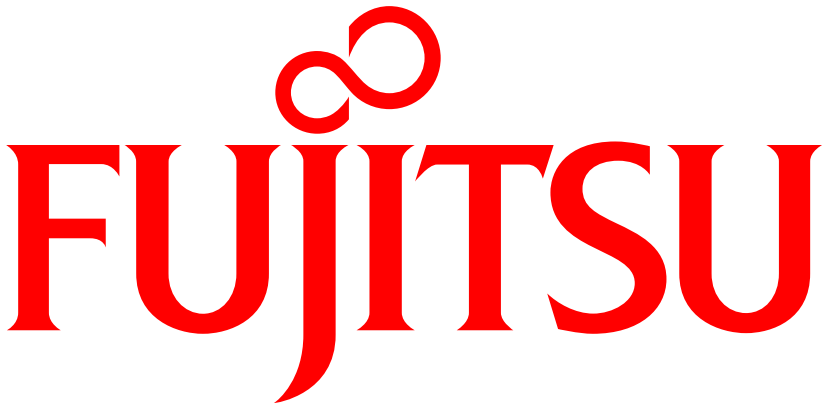
## Post-FX10

HPC-ACE2
Tofu interconnect 2
HMC & Optical connections



*Coming soon*
1TF~, 32-core/CPU

* VISIMPACT: Virtual Single Processor by Integrated Multi-core Parallel Architecture

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