

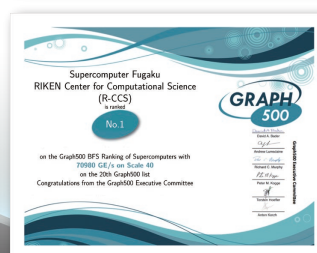
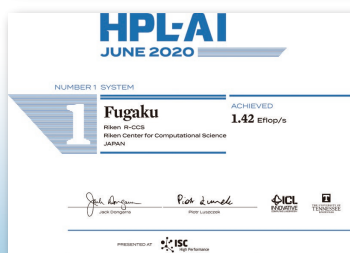
# Supercomputer Fugaku



The supercomputer Fugaku was developed with the aim of contributing to Japan's growth by solving social and scientific issues, and producing world-leading results. As a supercomputer with the world's highest level of comprehensive performance in terms of power efficiency, computational performance, user convenience, ease of use, groundbreaking results, and acceleration functions for big data and AI (artificial intelligence), it is being used in HPC infrastructure to realize Japan's vision of Society 5.0.

## Development History

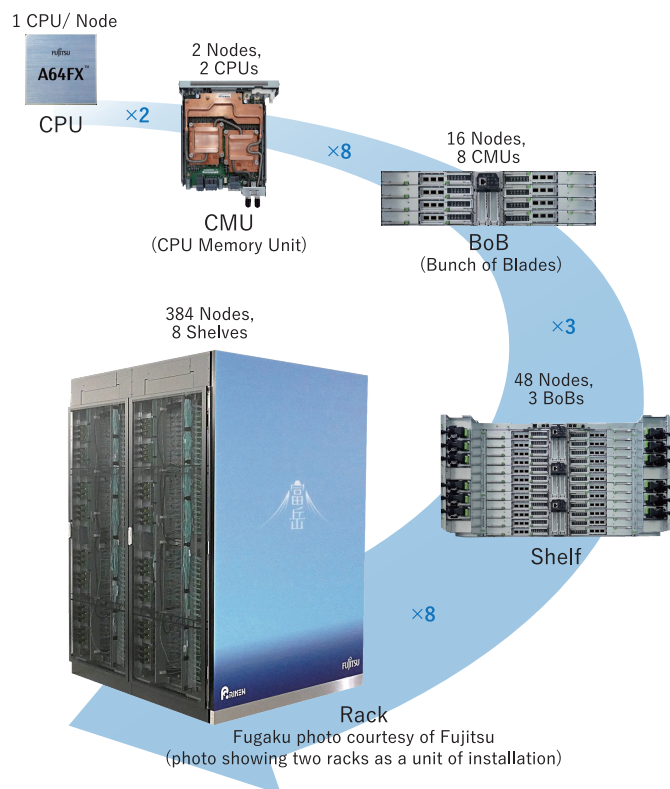
- April 2014 Launched the FLAGSHIP 2020 project to develop the successor to the K computer
- March 2019 Started manufacturing
- May Determined the name of the successor to the K computer to be the supercomputer "Fugaku"
- December Started the installation of Fugaku
- April 2020 Started use of the Program for Promoting Research on the Supercomputer Fugaku, Ministry of Education, Culture, Sports, Science and Technology
- Used Fugaku partially for countermeasures against COVID-19
- May Completed the installation of Fugaku
- June Achieved the world's top ranking in four benchmark test categories (First time ever to be the best in four categories simultaneously)
- March 2021 Started shared use



## Total Number of Nodes

The total number of nodes\* in Fugaku is 158,976 (432 racks).

\*In high performance computing, a management unit is often called a node. For example, a node can be a cluster of CPUs and memory that runs a single operating system.



## Performance

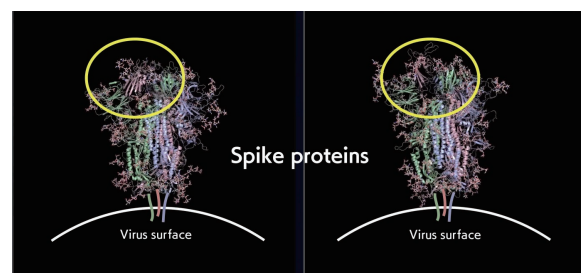
Fugaku can be run in a normal mode (CPU clock speed of 2 GHz) and a boost mode (CPU clock speed of 2.2 GHz), and the peak theoretical performance in each mode is summarized in the table below.

The high memory bandwidth is also one of the features of Fugaku.

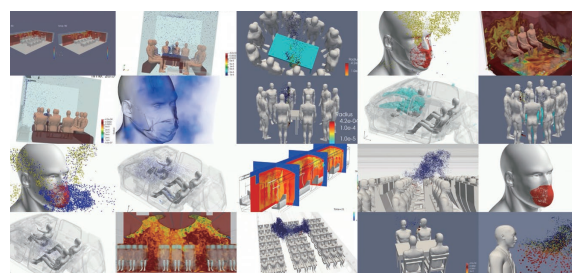
Peak Theoretical Performance	Normal mode (CPU clock speed: 2 GHz)	Theoretical peak double precision performance (64 bit) 488 PFLOPS Theoretical peak single precision performance (32 bit) 977 PFLOPS Theoretical peak half precision (AI learning) performance (16 bit) 1.95 Exa ops Theoretical peak integer (AI inference) performance (8 bit) 3.90 Exa ops
	Boost mode (CPU clock speed: 2.2 GHz)	Theoretical peak double precision performance (64 bit) 537 PFLOPS Theoretical peak single precision performance (32 bit) 1.07 Exa ops Theoretical peak half precision (AI learning) performance (16 bit) 2.15 Exa ops Theoretical peak integer (AI inference) performance (8bit) 4.30 Exa ops
Total memory		4.85 PiB
Total memory bandwidth		163 PB/s
Interconnect		Tofu Interconnect D (28 Gbps x 2 lane x 10 port)
Storage		1st Layer LLIO (Lightweight Layered IO-Accelerator) •Node Temporary Area •Shared Temporary Area •Cache Area of 2nd Layer Storage 2nd Layer FEFS (Fujitsu Exabyte File System) 3rd Layer Commercial cloud storage services

## Research Using Fugaku

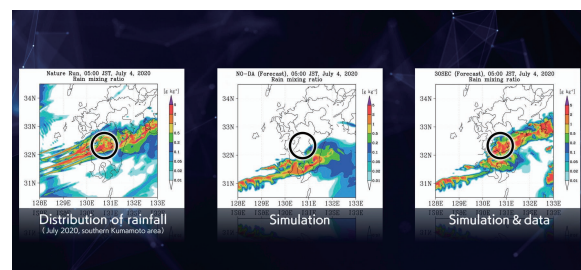
Examples of research using Fugaku are showcased in articles and videos. Be sure to take a look.



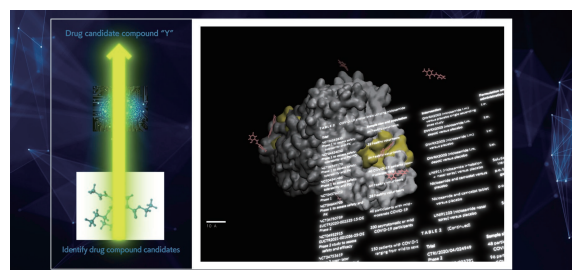
Understanding How Molecules Move Inside the Cell



Studying How Droplets & Aerosols can Transmit Viruses



Making "Storm Cloud Train" Forecasting More Accurate



Creating a New Platform for Drug Discovery

See more!



Video Gallery



Press Releases



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