RIKEN Center for Computational Science

RIKEN Center for
Computational Science

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https://www.r-ccs.riken.jp/en/

April 2023

RIKEN 2023-026

Director's Message

Satoshi Matsuoka
Director, RIKEN Center for Computational Science

The objectives of the RIKEN Center for Computational Science (R-CCS) are threefold, centered around supercomputing: one is to target high performance computation itself as a scientific objective, or namely, the "Science of Computing"; another is to apply the enormous computational power thus obtained to solve difficult scientific problems, or namely the "Science by Computing"; finally, to collaborate with other scientific disciplines that contribute to advances in both sciences, or namely, the "Science for Computing." Our goal is to be recognized as one of the global leadership research centers to advance high-end computational science in this regard.

Computational science employs multitudes of methodologies to essentially recreate various phenomena as computational activities inside machines, thereby allowing to challenge difficult problems encountered by mankind. For example, we could model a phenomenon by a set of physical/mathematical formulas, and the machine-driven solution to the formulas will result in direct "simulation" of the phenomenon; alternatively, we could analyze the massive data measured on a phenomenon by scientific instruments, and further extrapolate future trends, or so-called "data science" methodology; furthermore, we could train our "artificial intelligence" to attain higher-level insights on the data, both simulated and/or analyzed. Here supercomputers will accelerate all such methodologies by many orders of magnitude, allowing synthesis of innovations to tackle the most difficult problems that are of interest to the greater society, and R-CCS intends to be at the forefront of such activities.

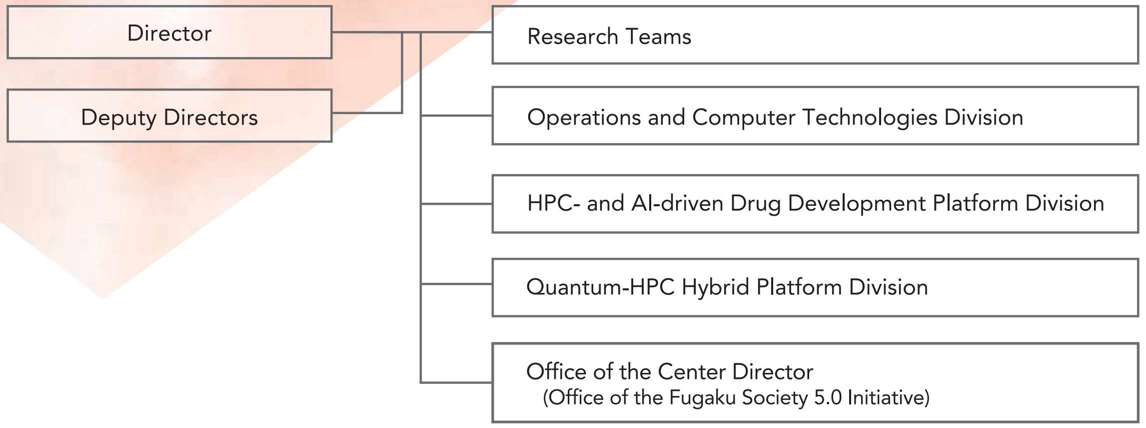
Moreover, innovative Information Technologies (IT) researched and developed to advance supercomputing is not only applicable to itself, but rather are the bleeding-edge technologies to advance the entire IT as a whole, from Cloud to the Edge, and thus will contribute to the massive improvement of the economy and our daily lives that are now heavily reliant on IT. We intend to collaborate with other leadership centers of the world to play a central role in advancing IT for the society at large.

The supercomputer "Fugaku" we have developed is the fruition of our research activities, and in June 2020, it became the world's first supercomputer to be crowned world number one in four supercomputer rankings, an unprecedented feat. Moreover, it has been deployed a year in advance to combat the new coronavirus, resulting in groundbreaking results in both treatment and mitigation of the transmission of the virus. We will continue our efforts to advance and achieve widespread use of Fugaku and its technology, and to promote research for the next generation of Science of, by, and for Computing.

Research Teams and Units at R-CCS

Organizational Chart

As of April 2023



Research Teams

- Programming Environment Research Team
- Processor Research Team
- Large-scale Parallel Numerical Computing Technology Research Team
- Field Theory Research Team
- Discrete Event Simulation Research Team
- Computational Molecular Science Research Team
- Computational Materials Science Research Team
- Computational Biophysics Research Team
- Computational Climate Science Research Team
- Complex Phenomena Unified Simulation Research Team
- Next Generation High Performance Architecture Research Team
- High Performance Big Data Research Team
- Data Assimilation Research Team
- Computational Structural Biology Research Team
- High Performance Artificial Intelligence Systems Research Team
- Supercomputing Performance Research Team
- Computational Disaster Mitigation and Reduction Research Team

https://www.r-ccs.riken.jp/en/research/labs/

Operations and Computer Technologies Division

- Facility Operations and Development Unit
- System Operations and Development Unit
- Software Development Technology Unit
- HPC Usability Development Unit
- Advanced Operation Technologies Unit

https://www.r-ccs.riken.jp/en/research/octd/

HPC- and AI-driven Drug Development Platform Division

- Biomedical Computational Intelligence Unit
- Medicinal Chemistry Applied AI Unit
- Molecular Design Computational Intelligence Unit
- AI-driven Drug Discovery Collaborative Unit

https://www.r-ccs.riken.jp/en/research/ddpd/

Quantum-HPC Hybrid Platform Division

- Quantum-HPC Hybrid Software Environment Unit
- Quantum Computing Simulation Unit
- Quantum-HPC Hybrid Platform Operations Unit

https://www.r-ccs.riken.jp/en/research/q-hpc/

Our Mission

Cultivating the Future through High Performance Computing: "The Science of computing, by computing, and for computing"

Implementing the newest research that integrates "simulation," "big data analysis," and "AI" through high performance computing (HPC) to solve scientific and social issues and to bring about revolutionary development of our society. This is the mission of R-CCS.

Aiming to Solve Issues for Our Complex, Advanced Modern Society

While scientific and technical development along with globalization have brought tremendous benefits to mankind, their rapid progress has also created complex and challenging issues in science and our society. The main direction of SDGs* was thus taken within the global framework so as to resolve these interlinked and interacting issues. This is a universal goal not only for developing countries but also for developed ones, and various scenarios are drawn in various perspectives (government, industry, academia, local communities, etc.) as the efforts and solutions for the issues.

In Japan, the government and many economic organizations are also playing a leading role to accelerate the development for a sustainable society with solutions to the issues and creation of new values through digital innovation along with diversified imagination and creativity.

*SDGs, Sustainable Development Goals- set in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030 as in the "2030 SDG Agenda." It consists of 17 goals and 169 targets as quoted in its official pledge - "leaving no one behind."

For the Integration of Computational Science, Data Science, and AI

Up to this moment, the development of our human society is based on solution of various issues with the power of "theoretical science with hypotheses and theories" and "experimental science to prove hypotheses in experiments and observations. " Yet, with the power of computers that have developed rapidly in recent decades, a third scientific method, that is, "computational science with simulation and analysis based on models" has emerged to solve larger and more complex issues that are difficult to observe and verify by conventional methods. Moreover, because of the explosive increase in the amount of data flow and the evolution of machine learning, "data science" that targets big data analysis and AI inference has become the fourth scientific method that follows "computational science" with an overwhelming sense of presence.

	Real World	Cyber World
Deductive Methodology (Model-driven)	Theoretical Science	(Third Scientific Methodology) Computational Science
Inductive Methodology (Data-driven)	Experimental Science	(Fourth Scientific Methodology) Data Science
	Researchers	Computers

Four Scientific Methodologies
Modified from Genshiro Kitagawa (2018) Oukan Vol. 2: 85-88.

As science and society have changed due to the evolution of computers, the demands of the changed science and society have become more challenging that computers and related scientific methods also developed tremendously.

Our things, spaces, functions, and services are becoming smarter, and the interconnected complex world is steadily becoming truer. One of the solutions to such interlinked issues in our society is "cross-divisional cooperation and optimization of various social systems." To make it a reality, it is crucial to connect the virtual society generated in computers and the real world with a huge amount of data, and to conduct continuous simulation, big data analysis, and AI prediction so as to verify the solution. Its foundation is in turn the role of HPC (High Performance Computing), which is getting more and more important.

In such an era, R-CCS aims to establish a fifth scientific method by HPC with an eye on the changes in science technology and society by integrating computational science, data science, and AI.

Cultivate the Future through "Science of computing, by computing, and for computing"

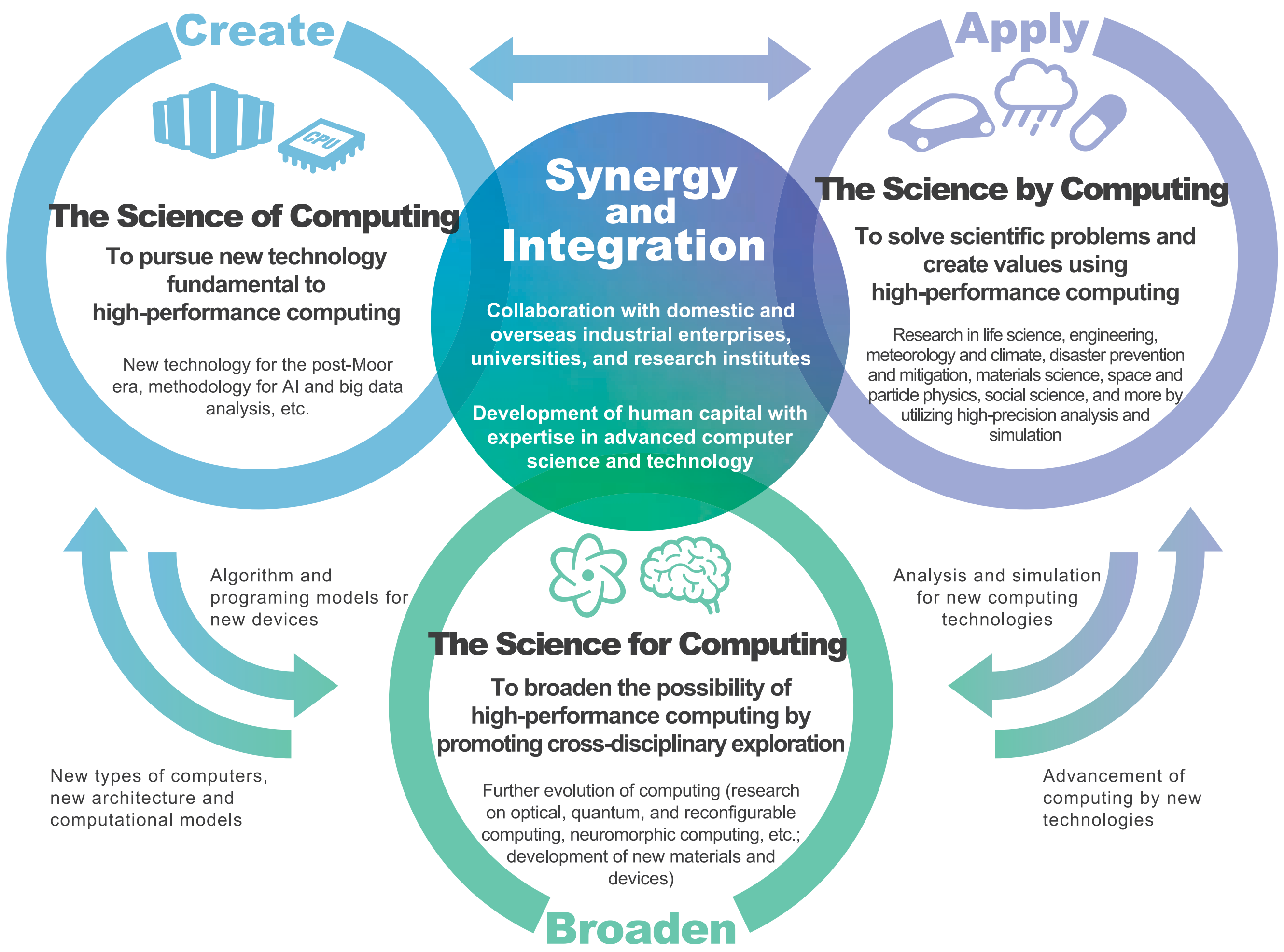
The development process to a future society in which all of us can feel fulfilled, as envisioned in the SDGs, relies on HPC. R-CCS is the world's top-level research center for HPC and the core research center in Japan upholding "science of computing, by computing, and for computing." With collaboration with various international and domestic institutes, we develop pioneering supercomputers, integrate advanced simulation, big data analysis, and AI, and then contribute the results back to various scientific fields and our society.

We also conduct research to pursue the essence of HPC and its potential to solve unforeseen issues in the future and to bring scientific breakthroughs beyond people's imagination.

To pursue the essence of HPC is, after all, to open the gateway to the future of mankind.

"The Science of Computing, by Computing, and for Computing"

Striving for excellence in science and becoming the cornerstone of Society 5.0



The Supercomputer Fugaku is the Fruit of R-CCS' Research Effort

R-CCS had been implementing the operation of the K computer in an extremely stable manner from 2012 to 2019 to produce internationally acclaimed results in various fields and to develop the potentials of simulations through the use by research institutes, universities, as well as by the industrial sector. The development of the supercomputer Fugaku, the successor of the K, started in 2014 and its full operation began in March 2021. Fugaku is the fruit of R-CCS' HPC research effort, with which we will contribute to solve challenges in science and society in coming years.

About Fugaku

At the Pinnacle of the Supercomputing World, Fugaku Is both a "General-Purpose" and "High-Performance" Machine

From K to Fugaku

Thanks to advances in science and technology, our lives are becoming ever more comfortable and convenient, but we are also facing increasingly complex and intertwined social issues, such as aging populations, climate change, and increasing disparities. We are now in an age where computer simulations and other information technology are vital to solving these issues.

In this context, the K computer contributed tremendously to academic research and technological development in industry starting from its launch in 2012 as Japan's flagship supercomputer, and it became a world leader in the field of computer science. The development of the K computer's successor, Fugaku, began in 2014, and it is currently in the final stage of optimization in preparation for the launch of full operations in 2021.

Fugaku, an Essential Foundation for Building Society 5.0

Fugaku was developed both to contribute to Japan's development by solving various scientific and social issues and to take a place among the world's top supercomputers. Fugaku will create new value for society by performing simulations of hypothetical solutions to real-world problems in a virtual society modeled in cyberspace. By doing this, it will play a role of validating implementation in the real world. This concept is in line with the idea of Society 5.0*1 (a cyber-physical society), proposed in 2016 by the Japanese Cabinet Office, and the Priority Issues selected during the development of Fugaku closely overlap with the social issues to be addressed in Society 5.0. In other words, Fugaku is a key HPC infrastructure for achieving the national goal of Society 5.0.

*1 One definition is "a human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space." https://www8.cao.go.jp/cstp/english/society5_0/index.html Society 5.0 was proposed in the 5th Science and Technology Basic Plan (adopted by a Cabinet Decision in 2016).

Co-designed to Achieve the Highest Quality Performance in the World

Supercomputer developers tend to focus on the competitiveness of the hardware specifications. The developers of Fugaku, however, decided to pay close attention to both the computing capability and ease of use, with the goal of producing the highest quality performance in the world. To achieve both high performance and ease of use, an approach called "Co-design" was adopted, in which the development teams for the computer system and applications collaborated closely in the design process based on a deep understanding of each other's needs and challenges.

Specifically, the developers first selected representative "target applications" for the priority issues that were to be addressed using Fugaku. Then the hardware system was designed to best suit the features of the applications. The applications were, in turn, optimized for the hardware system from the viewpoint of the users in each field. Thus, the design and development process can be said to be "application first," and as a result, Fugaku has achieved the best ease of use and highest quality performance in the world.

Fugaku is Both a "General-Purpose" and "High-Performance" Computer

An important feature of Fugaku is that it is a general-purpose machine. "General-purpose" means that publicly available software can be run without modification. It is designed to produce the best performance over a wide range of applications in simulation, big data analysis, AI, etc. Also, Fugaku runs on a CPU*2 with the instruction set developed by Arm, which is widely used in smartphones and gaming devices all over the world. Thus, even software for those devices can be run on Fugaku, only at a blistering speed. It is our hope that both the technology developed for Fugaku and the results it produces will spread throughout the world and be put to use in various ways.
Meanwhile, Fugaku's application performance is over 100 times higher than that of the K computer, with a computing speed of 415.53 x 1015 operations per second. On all the major benchmark performances, it achieved scores overwhelmingly greater than other competing machines*3. The output of only two to three Fugakus is equivalent to the IT of all smartphones and servers sold in Japan in one year. Thus, Fugaku is a super-fast and powerful machine.

As we have seen, Fugaku is a "general-purpose and high-performance" machine. A specialized high-performance machine that cannot run common software would not be useful as infrastructure for society. Fugaku is providing its outstanding performance to a wide range of "general-purpose" applications for all users. This is why Fugaku can be the core of the HPC infrastructure for achieving Society 5.0.

*2 Central Processing Unit. The brain of a computer that processes and executes instructions. The performance of a computer largely depends on the CPU. Fugaku is equipped with a CPU called A64FX, developed by Arm, that has the same instruction set as the CPUs used in smartphones and other consumer devices. It is the first Arm-based CPU in the world designed for HPC systems.

*3 In June and November 2020, Fugaku took the top ranking in four international benchmark rankings of supercomputers: TOP500 for computing speed, HPCG for performance on practical applications, HPL-AI for performance on AI-related application, and Graph500 for big data analysis. Winning the top spot in all four rankings was proof of the all-round excellence of Fugaku. It attests that Fugaku can be an essential part of the HPC infrastructure necessary for achieving the national goal of building a super-smart society—Society 5.0—that creates new value. Fugaku will offer unparalleled computational resources for solving social issues through simulations and for accelerating the development of AI and other technology for the flow and processing of information.

The Name Fugaku

The name Fugaku is actually another name for Mt. Fuji, the tallest mountain in Japan. The name was chosen to symbolize the power of the successor to the K computer and also to show the wide horizon that the new supercomputer will provide for its users.

Thoughts behind the name "Fugaku"

The height and the wide base of Mt. Fuji symbolize the power of the supercomputer and the wide horizon that it will provide for its users.

World of Society 5.0

A society in which each and every person can benefit from latest technologies and lead an active and enjoyable life regardless of age and place of residence.

What Fugaku Can Do

Predicting the future world to help find solutions to problems and create values in Society 5.0

At the pinnacle of the HPC infrastructure in the world, Fugaku will be a powerful tool in determining the feasibility of creating Society 5.0, by integrating simulation, big data analysis, and AI.

In the cyber-physical system, vast amounts of data generated by IoT devices in the world will be used for continuous simulations in the cyber space to seek optimal solutions to create a better society, which are then automatically returned to the real world. Supercomputers will play a pivotal role in realizing this paradigm of Society 5.0. Fugaku is one such machine that has the capability to determine the feasibility of Society 5.0 with the huge computational power and the versatility in both hardware and software systems. As a high-performance computing (HPC) infrastructure, Fugaku will be used to integrate simulations, big data analysis, and AI to determine the feasibility of creating various aspects of Society 5.0.
For example, Fugaku will be put to use in the following tasks in the cyber space to find optimal solutions in the real world:

Healthcare
Utilizing physiological data to promote health and efficient drug development

Smart City
Helping to build society that is enjoyable for all, by creating comprehensive simulation of smart city

Manufacturing
Strengthening the global industrial competitiveness by building optimal economic models and supply chains

Materials
Exploring novel materials that are valuable to the society by simulations of atoms and electrons

Disaster Mitigation
Improving the capability of disaster mitigation by accurate prediction, precise evacuation orders, and automated delivery of aid materials

Energy
Creating energy/environmental technology innovation at multiple levels, from novel batteries to nuclear fusion

Fugaku will help create Society 5.0, in which each and every person can lead an active and enjoyable life, find solutions to societal problems and create values, and live harmoniously and sustainably with nature.

Cyber-Physical System
Large volumes of data are collected by sensors in the real (physical) world to be analyzed in the cyber world. Optimal solutions are then returned to the real world.

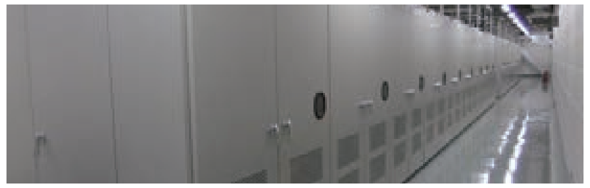
Supporting Facilities

To operate a supercomputer, electricity is surely a necessity, while a cooling system is also needed to remove the heat generated by computing.

Some of the supporting facilities and equipment of the K computer is reused in the support of Fugaku. Since power consumption and thus heat increased when compared with those of the K computer, the cooling system and power equipment needed to be strengthened. The existing cogeneration power plant and high voltage power substation were adopted for Fugaku.

Electrical equipment

Since Fugaku has an excellent energy efficiency, its power consumption is only twice that of the K computer, while delivering computing power 40 times faster than the K. Yet, it's still over the capacity of the facilities of the K computer so the electrical equipment was expanded.



Cooling system

Since the amount of heat generated per computer rack of Fugaku reaches several times larger than that of the K computer, the cooling system was expanded accordingly. The ratio of water cooling to air cooling is 9:1 for Fugaku, while it's 2:1 for the K computer. Hence, while some A/C units are not in use, the freezers, heat exchangers, pumps, and other equipment were expanded to produce sufficient cooling water.

Seismic isolation structure

The seismic isolation structure with laminated rubber and dampers installed at various spots ensure protection of the facilities during a major earthquake with a Japanese Meteorological Agency seismic intensity scale (shindo) of 6 or higher.

Take a tour of the virtual Fugaku!

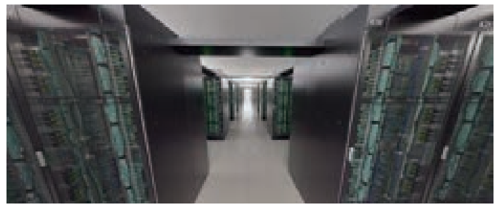
Attention!

Explore the restricted areas of the facilities!

Please browse in the virtual 3D models of Fugaku, the electrical/cooling facilities, and the underground seismic isolation structure and take a closer look at these restricted areas.

Second and third floors of the Computer Building

The second floor is the electrical & cooling facility, and the third floor is the computer room, where Fugaku is housed.
https://my.matterport.com/show/?m=2TLoTcWigBf



Underground

See the seismic isolation structure.
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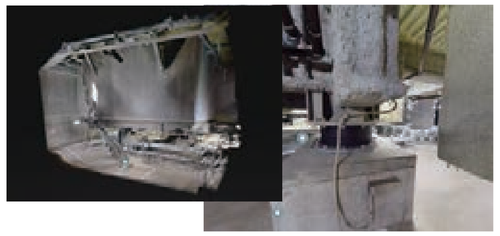


Cooling facility and power plant

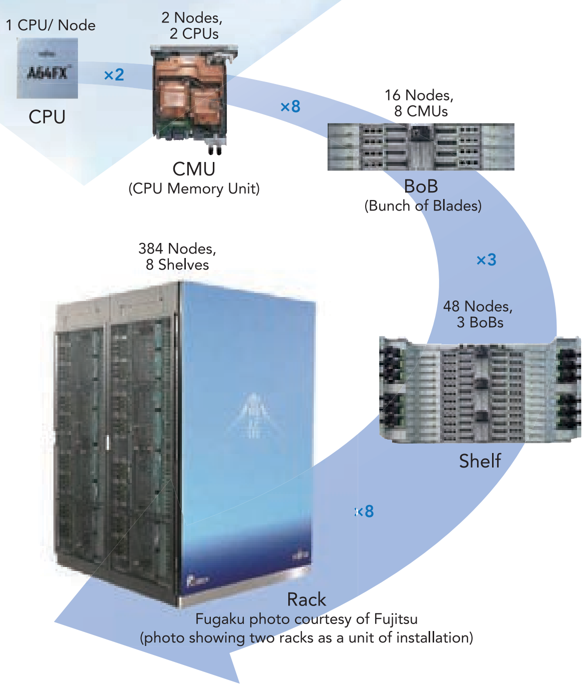
https://my.matterport.com/show/?m=JLob7VDyDof

System Configuration of Fugaku

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.



Fugaku photo courtesy of Fujitsu
(photo showing two racks as a unit of installation)

Peak Theoretical Performance

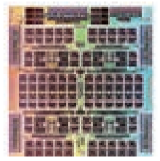
Fugaku can be run in a normal mode (CPU clock speed of 2 GHz) and a boost mode (CPU clock speed of 2.2 GHz), and the peak theoretical performance in each mode is summarized in the table below.

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

Single node performance

The single node performance is summarized below. The unique chip is based on the Arm instruction set architecture.


CPU-Die (Image courtesy of Fujitsu)

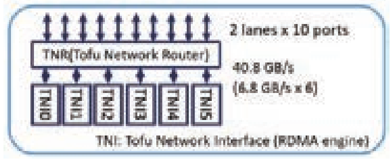
Instruction set architecture		Armv8.2-A SVE 512 bit Fujitsu extension: hardware barrier, sector cache, prefetch
Number of core		48 + 2 assistant cores 4 CMG (Core Memory Group, NUMA node)
Performance	Normal mode (CPU clock speed: 2 GHz)	Double precision: 3.072 TF; single precision: 6.144 TF; half-precision: 12.288 TF
	Boost mode (CPU clock speed: 2.2 GHz)	Double precision: 3.3792 TF; single precision: 6.7584 TF; half-precision: 13.5168 TF
Cache *		L1D/core: 64 KiB, 4way, 256 GB/s (load), 128 GB/s (store)
		L2/CMG: 8 MiB, 16way L2/node: 4 TB/s (load), 2 TB/s (store) L2/core: 128 GB/s (load), 64 GB/s (store)
Memory		HBM2 32 GiB, 1024 GB/s
Interconnect		Tofu Interconnect D (28 Gbps x 2 lane x 10 port)
I/O		PCIe Gen3 x16
Technology		7 nm FinFET

* Cache performance is with the CPU clock speed of 2 GHz

Tofu Interconnect D

The 6D mesh/torus interconnect is used for communication between nodes. Low latency and high throughput are achieved by Remote Direct Memory Access (RDMA).

- Latency with 8 B input: 0.49 - 0.54 micro-sec
- Throughput with 1 MiB input: 6.35 GB/s



TofuD Interconnect Structure

Six Tofu Network Interfaces (TNIs, each performs at 6.8 GB/s), 40.8 GB/s in total, are connected to the Tofu network router with 10 ports with 2 lanes each (20 lanes in total).

Storage

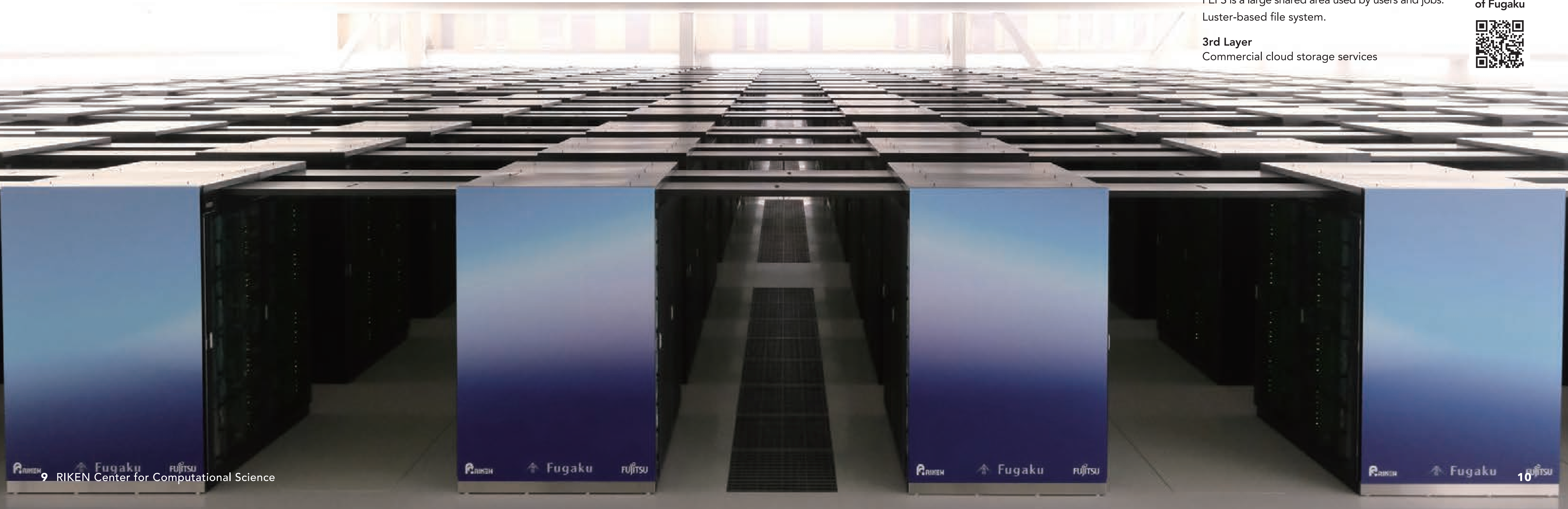
1st Layer
LLIO (Lightweight Layered IO-Accelerator)
LLIO is a file system dedicated to the job execution area.
Providing the following three types of areas to the job.

- Node Temporary Area
- Shared Temporary Area
- Cache Area of 2nd Layer Storage

2nd Layer
FEFS (Fujitsu Exabyte File System)
FEFS is a large shared area used by users and jobs.
Luster-based file system.

3rd Layer
Commercial cloud storage services

System Configuration of Fugaku



Career Development

RIKEN Center for Computational Science (R-CCS) plays a central role in the development of computational science and technology in Japan. R-CCS also actively utilizes the advanced technologies and knowledge accumulated through these activities and cooperates with related institutions to develop the personnel who will support computational science and technology.

R-CCS conducts training for graduate students, young researchers and corporate engineers, aiming to develop:
- Human capital who can coordinate and integrate computational and computer sciences
- Human capital with advanced computational science technology skills
- Human capital who will contribute to the promotion of the use of advanced computational science technologies in industry

R-CCS Internship Programs

R-CCS accepts interns for the purpose of fostering the young researchers who will be the future leaders of HPC technologies and computational science. Through practical training and experience gained by working in R-CCS research teams, the trainees deepen their understanding of computer science technology and gain the ability to conduct state-of-the-art computational science research and development.
(Application and program periods in parentheses are a general guide; see Future Events for specific information about the programs for each year.)

https://www.r-ccs.riken.jp/en/about/careers/internship/

R-CCS Schools & Workshops

R-CCS offers school programs in computer programming and other subjects that include practical training, as well as workshops that are designed to encourage interchange among diverse research fields related to computational and computer sciences and international exchanges. These programs and workshops are held for students, young researchers and other trainees.
(Application and program periods in parentheses are a general guide; see Future Events for specific information about the programs for each year.)

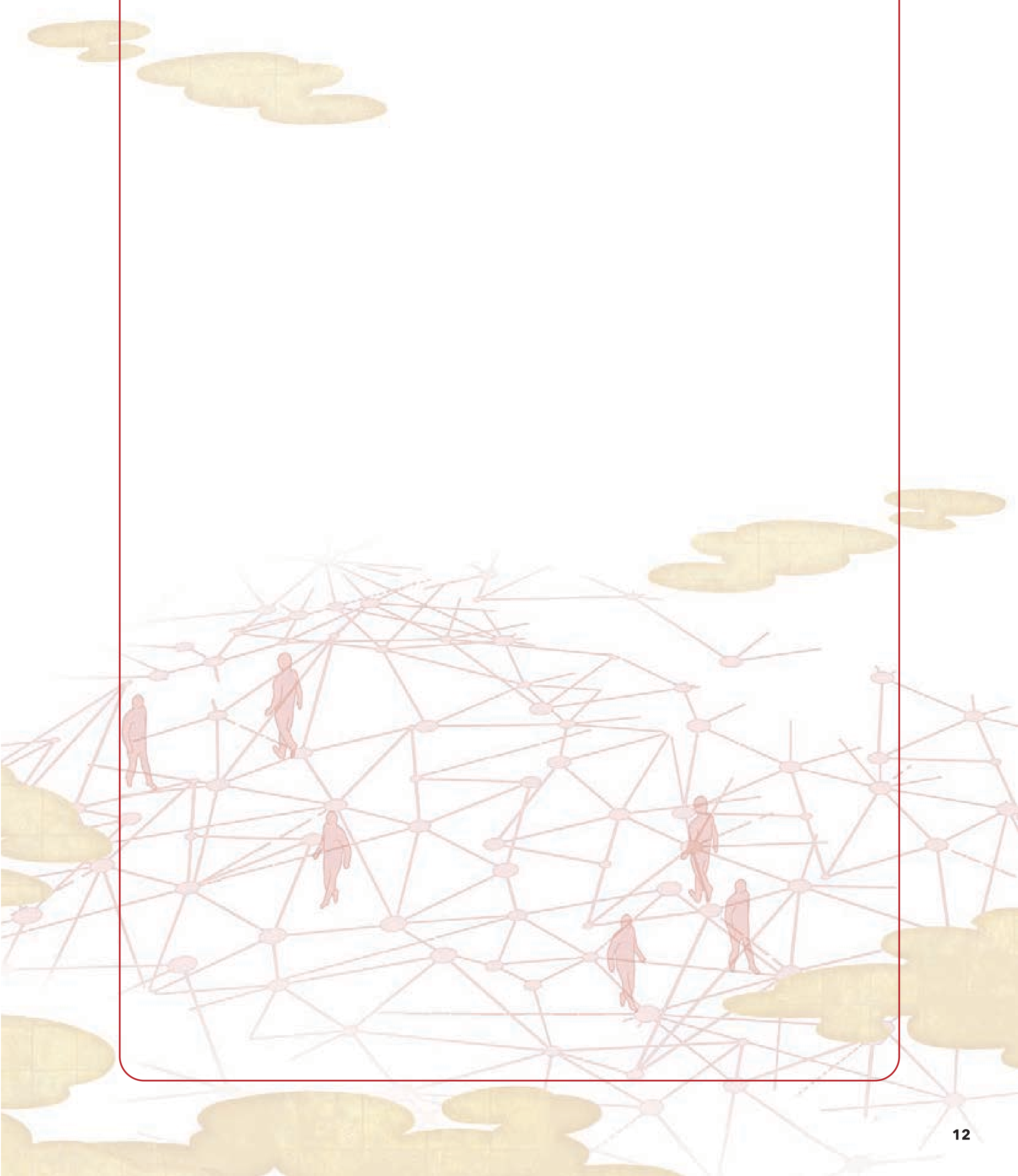
https://www.r-ccs.riken.jp/en/about/careers/workshops/

Joint Graduate School Program

The Joint Graduate School Program is a collaboration between RIKEN and universities in which RIKEN researchers provide academic supports such as research instructions and thesis evaluation for graduate school students (master & doctoral program) as guest professors and associate professors.
R-CCS provides collaborative seminars and students instructions at Kobe University and Tohoku University.
Please refer to the respective websites of the programs for their curriculum and enrollment details.

https://www.r-ccs.riken.jp/en/about/careers/joint-grad/

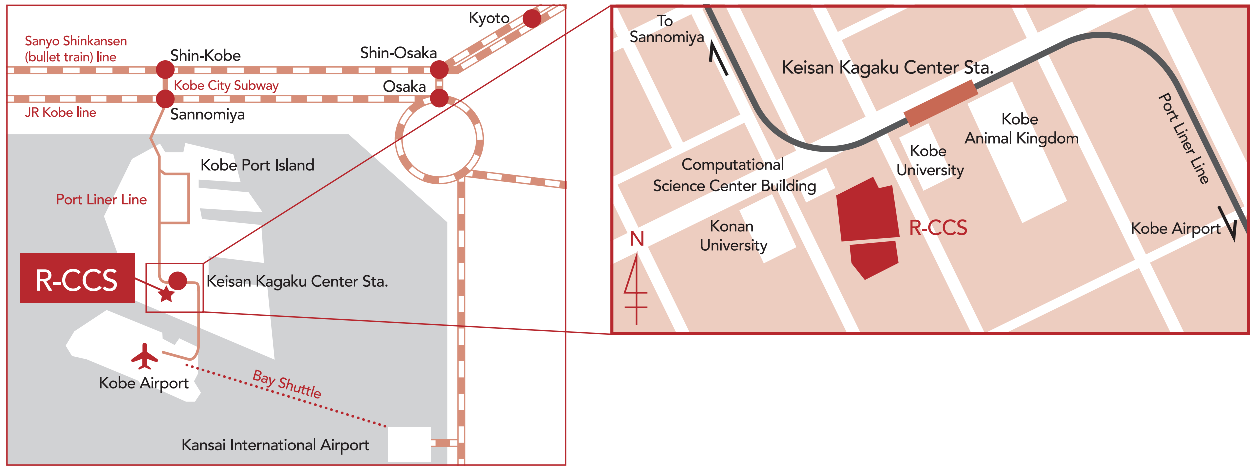
Notes



Directions

R-CCS Kobe (Supercomputer Fugaku)

7-1-26 Minatojima-minami-machi, Chuo-ku, Kobe, Hyogo 650-0047, Japan



From the nearest Port Liner station (Keisan Kagaku Center Station)

3 min. walk from Keisan Kagaku Center Station on the Port Liner train. Come out of the gate and proceed to the right. Take the escalator to the ground level, and go straight. The R-CCS buildings will be on your left front.

To the nearest Port Liner station (Keisan Kagaku Center Station)

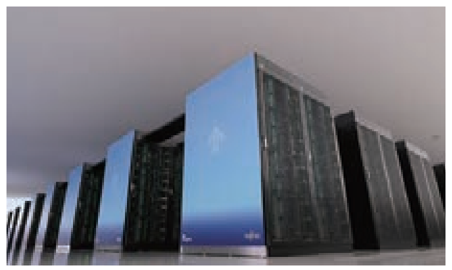
[From the bullet train (JR Shinkansen) station]

Get off the bullet train (JR Shinkansen) at Shin-Kobe Station, and transfer to the Kobe City Subway. At the first stop, Sannomiya, transfer to Port Liner bound for Kobe Airport. Ride the Port Liner for approximately 14 minutes and get off at Keisan Kagaku Center Station.

[From Kobe Airport (UKB)]

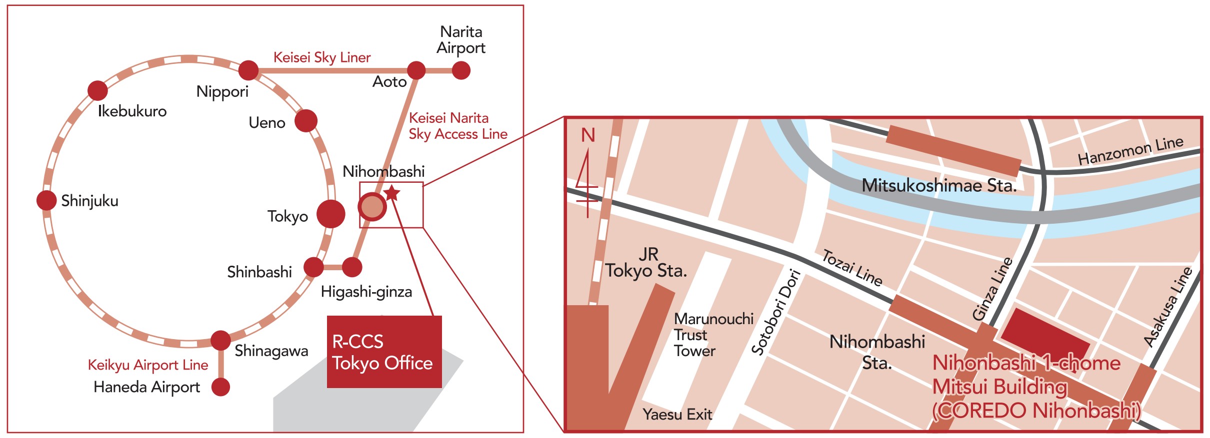
UKB - (Port-Liner) - Keisan Kagaku Center Station (5 minutes)

There is no visitor parking at thei location. Please use public transportation. Please contact us for special needs for a large group or handicapped persons.



R-CCS Tokyo Office (Office of the Fugaku Society 5.0 Initiative)

Nihonbashi 1-chome Mitsui Building, 15th floor, 1-4-1 Nihonbashi, Chuo-ku, Tokyo 103-0027, Japan



By Public Transportation

Directions from the Nearest Stations

[From Nihombashi Station]

Directly connected via the B12 and C1 exits from the Tokyo Metro Tozai Line(T10), Ginza Line(G11), Toei Asakusa Line(A13).

[From Tokyo Station]

6 min. walk from the Yaesu Central gate of the JR Line and Tokyo Metro Marunouchi Line.

1 min. walk from the "Subway Nihombashi Station" stop of the Metro Link Nihonbashi loop-line bus. (free bus service)

Directions from the Airport

[By train]

Narita Airport Terminal 1 Station/Narita Airport Terminal 2-3 Station to Nihombashi station

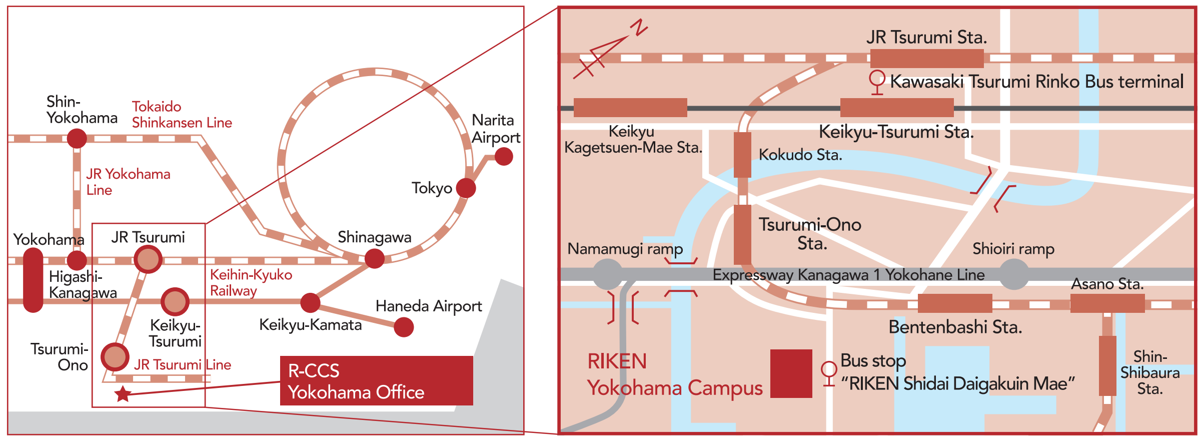
Approximately 60 min. by "Access Express" on the Keisei Narita Sky Access Line.

Haneda Airport International Terminal / Haneda Airport Domestic Terminal Station to Nihombashi Station

Approximately 30 min. by Limited Express or Airport Limited Express on the Keikyu Airport Line.

R-CCS Yokohama office

1-7-22 Suehiro-cho, Tsurumi-ku, Yokohama City, Kanagawa, 230-0045, Japan



By Public Transportation

Directions from the Nearest Stations

[By Bus]

Take the #08 bus from Platform 8 at the East Exit of Tsurumi Station (also accessible from the West Exit of Keikyu Tsurumi Station) and get off at the RIKEN Shidai Daigakuin Mae bus stop. The institute is across the street. All buses from this platform are bound for Fureyu.

[By Train]

A 15-minute walk from JR Tsurumi-Ono Station (JR Tsurumi Line), which is directly accessible by transfer from JR Tsurumi Station.

[By Taxi]

Use the taxi stand at the East Exit of JR Tsurumi Station or the West Exit of Keikyu Tsurumi Station. The trip takes about 10 minutes.

Directions from Airports

[From Narita Airport]

From Narita Airport station take the JR Narita Express to JR Shinagawa station. From JR Shinagawa station take the JR Keihin Tohoku Line (bound for Yokohama) to JR Tsurumi Station (18 min).

[From Haneda Airport]

From Keikyu Haneda station take express train to Keikyu Kamata station. Transfer to the Keikyu Main Line and take a local train to Keikyu Tsurumi station (20 min).