



Joint Usage/Research Center for Interdisciplinary Large-scale Information Infrastructures

<https://jhpcn-kyoten.itc.u-tokyo.ac.jp/en/>

Network of 8 centers

Contributing to international academic research

An Introduction to the network-type Joint Usage/Research Center for Interdisciplinary Large-scale Information Infrastructures

The Joint Usage/Research Center for interdisciplinary Large-scale Information Infrastructures consists of eight centers equipped with supercomputers in Japan. These centers are the Information Initiative Center of Hokkaido University, the Cyberscience Center of Tohoku University, the Information Technology Center of the University of Tokyo, the Global Scientific Information and Computing Center of the Tokyo Institute of Technology, the Information Technology Center of Nagoya University, the Academic Center for Computing and Media Studies of Kyoto University, the Cybermedia Center of Osaka University, and the Research Institute for Information Technology Center of Kyushu University. This is a network-type joint usage and collaborative research center, and its core institution is the Information Technology Center of the University of Tokyo. The Center began as a program of the Japanese Ministry of Education, Culture, Sports, Science & Technology (MEXT) in April 2010.

The formal title of this program is "Joint Usage/Research Center for Interdisciplinary Large-scale Information Infrastructures," but it is also known as

"Japan High Performance Computing and Networking plus Large-scale Data Analyzing and Information Systems (JHPCN)." This alternative name indicates that research here is carried out in four areas: very large-scale numerical computation, very large-scale data processing, very large capacity network technology, and very large-scale information systems.

The objective of the program is to promote the continuous progress of academic research and to lay the groundwork for interdisciplinary collaborative research in Japan. The program strives to tackle highly challenging problems, previously thought extremely difficult to solve, by using information infrastructures such as very large-scale numerical computation, very large-scale data processing, and very large capacity network technology. Areas of the program include but not limited to global environmental science, energy science and technology, material science and technology, life science, astronomy and space science, informatics, and economics. In FY 2019, 100 research projects, including 42 exploratory ones (as of April), have been accepted.

Network-type Center structure offers close collaboration opportunities and synergistic advantages

The research topics are shared with other centers in the network that can offer their research potential to help solve problems. This means that highly complex problems being considered at one center can be solved more effectively with other centers.

This kind of synergistic advantage can result in more effective collaborative research, through the flexible integration of the facilities available across the network.

From 2013 onwards, the JHPCN's centers are responsible for the joint research resources named the HPCI-JHPCN system as part of the High Performance Computer Infrastructure (HPCI).

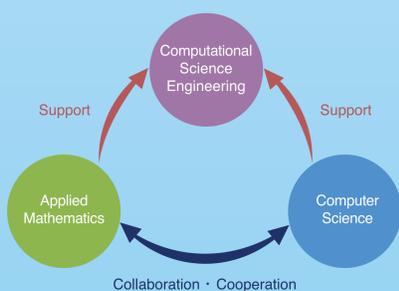
In addition, from 2016, JHPCN accepts three new kinds of joint research projects that are international, industrial, and exploratory joint research projects, to promote a wider range of joint research activities.



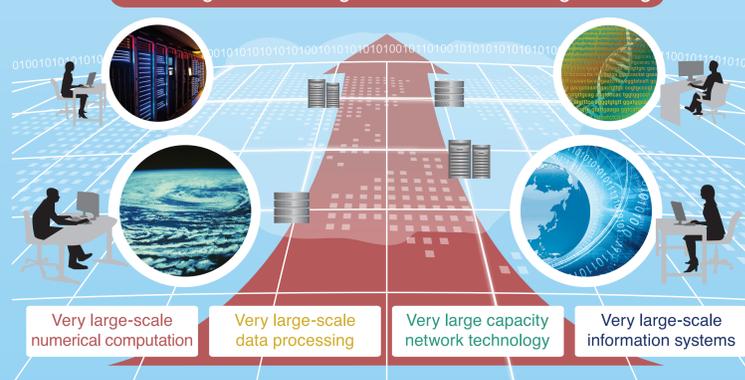
Interdisciplinary research to explore infinite possibilities

Toward grand challenges in science and engineering

The target research areas of this network-type Center are: very large-scale numerical computation, very large-scale data processing, very large capacity network technology that allows very large volume data sharing, as well as very large-scale information systems that integrate the aforementioned three areas. The Center facilitates and supports interdisciplinary research on problems in computational science and engineering, conducted based on the fundamental knowledge of computer science and applied mathematics.



Toward grand challenges in science and engineering



Toward grand challenges in science and engineering

Our 8 centers all have huge computing infrastructures which are rare in terms of their scale. These are available for joint usage and collaborative research by multiple researchers working in the aforementioned four areas. The research activities carried out at this network-type Center therefore account for the majority of highly challenging research projects in these areas in Japan. Our knowledge and technology in very large-scale numerical computation, very large-scale data processing, very large capacity network technology, and very large-scale information systems are of key importance for the facilitation of significant progress in science and technology. This means they also play a critical role in sustaining economic prosperity in Japan.

Challenge to new research

Call for proposal for international joint research project

From FY2016, JHPCN started accepting international joint research projects. International joint research projects are conducted in conjunction with researchers outside Japan and within Japan. Research projects with the 8 center's four specialist areas of very large-scale numerical computation, very large-scale data processing, very large capacity network technology, and very large-scale information systems can be carried out more effectively by taking advantage of the infrastructures at all eight centers and collaborating on each center's research topic too. Furthermore, considering the impressive scale of the combination of the 8 centers' supercomputer resources and the collaboration among their researchers, the program is expected to contribute significantly to science. The annual call for proposal is issued in November.



Information Initiative Center
Hokkaido University
Large-scale application, Program development technology, Intercloud, Next-generation academic information environment solutions
Booth 2158



Information Technology Center
Nagoya University
Auto-tuning, Middleware for high performance numerical computing, Numerical simulation for large-scale data and its visualization
Booth 1787



Cyberscience Center
Tohoku University
Computer architecture for vector and parallel processing, System software technology for high-performance computing, Large-scale visualization technology
Booth 2025



Academic Center for Computing and Media Studies
Kyoto University
High-performance computational programming, Architecture and foundational software for supercomputers, Academic content and archive creation technology, Network architecture technology for regional universities
Booth 2237



Information Technology Center
The University of Tokyo
Large-scale system management technology, Statistical machinery learning, Information retrieval via Web, Advanced networking technology, Parallel numerical simulation, Performance tuning
Booth 1814



Cybermedia Center
Osaka University
Optimization of vector and scalar hybrid computing, Management technology for vector and scalar hybrid computers, Large-scale data visualization technology, Inter-cloud technology, Advanced structure-preserving numerical methods, Machine Learning
Booth 1843



Global Scientific Information and Computing Center
Tokyo Institute of Technology
GPU computing and large-scale HPC applications, Design and management of new-generation supercomputer, Big data and data science, Artificial intelligence (AI), Deep learning
Booth 313



Research Institute for Information Technology
Kyushu University
Large-scale simulation, Massively parallel algorithms, Foundational software development, Analysis and visualization of large-scale dataset in distributed parallel environment, Industry-Promoting Applications
Booth 2125

We have also established a human network, comprising a working group of staff from the eight centers, in order to drive forward program activities.

