

# Supercomputer System Operation Procedure

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Information Systems Division

## Chapter 1 Objective

This document sets the operation procedure for the supercomputer system (“System” hereinafter) maintained and operated by the RIKEN Information System Division (ISD), based on Article 4 of the Supercomputer System Usage Agreement (“Agreement” hereinafter). In particular, the system configuration and projects that are necessary for users to use the system shall be defined, and the system shall be operated according to these procedures.

## Chapter 2 System Configuration

The system name is HOKUSAI BigWaterfall2 (HBW2), and the computational resources are as follows.

### Section 1 Computational resources

#### 1. Massively Parallel Computers (MPC)

- 312 nodes (34,944 cores)
- CPU: Intel Xeon Max 9480 1.9 GHz, 112 cores/node, 128 GiB/node

### Section 2 Storage

#### 1. Online Storage System (9.8 PB)

### Section 3 Subsystem

#### 1. Wako Large Memory Server (WLMS)

- 2 nodes (192 cores)
- CPU: Intel Xeon Gold 6418H 2.1 GHz, 96 cores/node, 3 TiB/node

#### 2. GPU Server (GPUS)

- 4 nodes (448 cores)
- CPU: Intel Xeon Platinum-8480+ 2.0 GHz, 112 cores/node, 512 GiB/node
- GPU: NVIDIA H100 (SXM5), 4 GPUs/node

#### 3. FPGA Server (FPGAS)

- 2 nodes (160 cores)

- CPU: Intel Xeon Platinum-8380 2.3 GHz, 80 cores/node, 512 GiB/node
  - FPGA: IA-840F (Intel Agilex AGF027), 2 FPGA /node
4. Kobe Large Memory Server (KLMS)/Yokohama Large Memory Server (YLMS)
- 1 node (96 cores) / 1 node (96 cores)
  - CPU: Intel Xeon Gold-6818H 2.1 GHz, 96 cores/node, 8 TiB/node
  - Attached storage (100 TB)

## Chapter 3 User and Management of Project

### Section 1 RIKEN project and HPCI project

There are two types of projects: RIKEN project and HPCI project. RIKEN projects are available to qualified users as defined in other than Article 3(5) of the Agreement, while HPCI projects are available to HPCI project users as defined in Article 3(5) of the Agreement. Unless otherwise specified, this procedure describes RIKEN projects, and the differences between HPCI and RIKEN projects are described in Section 10.

### Section 2 Project representative and assistant project representative

The project representative in accordance with Article 6 of the Agreement is responsible for the overall management of the project and must manage the members of the project. In addition, assistant project representatives can be registered as having the same privileges as the project representative.

### Section 3 Project member

The system allows only those members who have the eligibility to use the system as stipulated in Article 3 of the Agreement to register as project members. In addition, the following two types of members can be registered as project members: those who actually log in to the system and directly operate programs and jobs, and those who manage the usage status in the project ("observer" hereinafter).

### Section 4 Security export control

If project members are non-residents or otherwise subject to the RIKEN's security export control review, a review form must be drafted and approved in advance by the Research Integrity and Economic Security Division.

### Section 5 Ethical regulations

For research that is subject to review by affiliated organizations, such as the conduct of life science/medical research involving human subjects, comply with the ethics regulations, etc., of the affiliated organization. Prior permission for the use of the System must be obtained through an ethics review or other process.

## Chapter 4 Usage Fees

In accordance with Article 5 of the Agreement, usage fees are set for computational resources and online storage usage.

### Section 1 Usage fees for computational resources

Computing time for MPC is subject to the usage fees. The right to computing time is valid until the end of the fiscal year, and no refunds will be made for unused computing time.

### Section 2 Usage fees for storage

The data areas in Chapter 8, Section 2 is subject to the usage fees. Users can apply the capacity to use for the project. The application period, in principle, is until the end of the fiscal year.

### Section 3 Application and payment representative

The payment representative should be a supervisor (in a managerial position of Chief Scientist, Team Leader, Unit Leader or higher).

## Chapter 5 Project Application and Approval

### Section 1 HBW2 portal

Project applications should be submitted via the HBW2 portal. Those that cannot be handled by the HBW2 Portal may be submitted by e-mail.

### Section 2 HBW2 portal user registration

HBW2 portal user registration is available when you log in to the HBW2 portal for the first time. For users who do not belong to RIKEN, the HBW2 portal user registration will be performed by the ISD operations team.

### Section 3 Creating a new project

Those who wish to use a new project should apply for the creation of a new project. When applying for a new project, fill in the project representative information and usage details, and register the project members.

### Section 4 Application for project

Follow the instructions to apply such as adding or changing project members or applying for services that are subject to the usage fees.

### Section 5 Continuation of project

If you request a continuation at the end of the fiscal year, you can continue your project in the next fiscal year and you can continue to use the storage space you have used.

## Chapter 6 Computational Resource Usage

### Section 1 Calculation of computing time

“Computational resources” is calculated by [the number of all cores] x [time that the System can provide in a fiscal year]. “CPU core computing time” is calculated by the total of [the number of used cores] x [elapsed time] for all jobs

$\sum_{i=1}^{all\ jobs} (the\ number\ of\ used\ cores \times elapsed\ time)$ . In use of large memory space,

memory space will be converted to the number of CPU core and counted as a computing time. For example, when a user’s job use the total amount of memory available in an MPC node, one node (112 cores) is assumed to be used even if only one core is used.

### Section 2 Free quota of computing time

Each project may use up to 1% of the MPC computing time free of charge

### Section 3 Addition of computing time

If a project exceeds the maximum MPC computing time available at free of charge, it may be added for a fee by applying through the HBW2 portal.

### Section 4 Job execution at lower priority

For efficient use of the system, MPC computing time are added to project that have exhausted their allocated computing time, with a much lower priority. Users are not required to submit an application.

### Section 5 Subsystem computational resources

Each project can use 1% of the total annual computational resources of subsystem. Each project can apply for additional core computing time as needed and can use up to 20% of the total annual computational resources. However, for some servers, the method of use shall be determined separately. In addition, the operation method of the subsystem shall be changed flexibly depending on the situation

## Chapter 7 Job Operation and Priority Control

A system of priority control will be employed in order to allocate the computational resources fairly among the job operations of projects.

### Section 1 Priority control method

The priority of each project is set appropriately by the ISD operations team to adjust the ratio of computing time consumed by each project. Settings also are made to ensure that computing time are used as fairly as possible within a project. If computing time is added for the usage

fees, the priority is adjusted so that computing time is used up as long as it is planned to be used throughout the usage period.

#### Section 2 System occupancy and emergency execution

When job operation requires exclusive use of the System, the ISD operation team will take necessary measures based on discussion between the users and ISD.

Priority control may be adjusted by the operations team, taking into consideration the job operation status of the entire System, when a special request is made to the ISD operation team by a project representative stating that computational resources are required urgently.

### Chapter 8 Storage Usage

#### Section 1 Home area

Each account will be granted 4 TB of online storage as the home area. If a user belongs to multiple projects, the account and the 4 TB of home area will remain the same.

#### Section 2 Data area

The data area is an online storage area that can be used on a project basis, and user may apply for the required amount of space in TB units. If the amount of space is too large, it may be coordinated with other projects.

#### Section 3 Storage management

Usage of storage will be calculated in a timely manner. Users of projects using less than the amount for which they applied will be asked about their usage plans, and unneeded capacity will be appropriated. However, users whose allocations have been appropriated may reapply to have their storage capacity increased, if needed.

Any data belonging to users whose project numbers have expired will be deleted from the System six months after the expiration of the project number. However, the area of storage subject to the usage fee does not guarantee the storage of data after use unless the user indicates an intention to continue using it.

When there is a need to transfer the data belonging to the user (for reconfiguring the System, for instance), ISD will make a request to users and their project representatives to delete, compress or consolidate their data. However, if the user and the project representative do not reply to repeated requests by email, ISD will delete and reprocess the data on its own accord.

### Chapter 9 Report

The project representative must submit a usage report, as stipulated in Article 16 of the Agreement.

## Section 1 Usage Report

The report is due at the end of the fiscal year or at the end of the project. The usage report must contain the content of the calculations/research, a summary of the knowledge gained, comments and the like, with attachments including a *research output list* and *reprints and other material*.

The research output list is to consist of the authors, paper titles, journal titles, publication dates, etc. of publications and oral presentations involving the research carried out using the System. Reprints and other material are to consist of reprints of the publications, presentation materials, conference proceeding and the like for those items given in the research output list.

## Chapter 10 HPCI Project

The procedures for HPCI projects are the same as for RIKEN projects, with the following differences.

### Section 1 User management for HPCI project

User management for HPCI projects shall be conducted in accordance with the method specified by the Research Organization for Information Science and Technology ("RIST" hereinafter) in Article 3 (5) of the Agreement. Registration of assistant project representatives and observer is not possible. The project representative will be notified about the security export control procedures separately.

### Section 2 HPCI project application and management

Applications and submission of reports for HPCI projects should be conducted according to the method indicated by RIST. For projects that have been accepted as HPCI projects, the project and user registration will be made on the HBW2 portal by the ISD operation team.

### Section 3 Computing time for HPCI project

If the computing time applied for an HPCI project is not divisible by 720 core hours, the computing time shall be rounded up to the nearest 720 core hours. The free quota and addition of computing time and low-priority execution are excluded, and computational resources other than MPCs are not eligible for use.

### Section 4 Priority control and HPCI project

Priority will be adjusted so that the computing time allocated for HPCI projects will be used up as long as it is used in a planned manner throughout the usage period.

### Section 5 Storage for HPCI project

If a user belongs to a RIKEN project or another HPCI project, the account and the 4 TB of home area will remain the same. In the case of an HPCI project where the data area applied for is not divisible by the TB unit, the data space will be rounded up to the nearest TB unit.

Data storage after the end of use will be in accordance with the rules and regulations provided by RIST.

Section 6 Report on HPCI project

A usage report shall be submitted according to the method indicated by RIST.

Section 7 Others

HPCI project users shall comply with the rules and regulations for HPCI projects provided by RIST. If any adjustments to the Agreement or the Procedures are necessary, users should consult with the ISD and RIST

Chapter 11 Others

In addition to these guidelines, other materials necessary for the use and operation of the system will be provided separately by the ISD Director.