Data Science Infrastructure System Operation Procedure

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Information Systems Division

Chapter 1　Objective

This document sets forth matters related to the system configuration, project categories, project reviews and the like for the supercomputer system ("System" hereafter) maintained and operated by the RIKEN Information System Division (ISD), based on Article 4 of the Supercomputer System Usage Policy ("Policy" hereafter).

Chapter 2　System Configuration

The system name is HOKUSAI SailingShip (SS), and the computational resources are as follows. Users build and use tenants through virtualization infrastructure.

Section 1　Computational Resources (CPU farm)

- 440 node (21,120 core)
- CPU: Intel Xeon Platinum 8260 2.4 GHz、48 core/node、384 GB/node
  - ➢ Hyper-threading is turned on, so there are 2 vCPUs (virtual CPUs) on each core.
  - ➢ Two cores per node are used for management purposes, so users can use up to 92 v CPUs (46 cores) per node.
- Memory: 384 GB/node
- Local disk (SSD): 1.92 TB/node

Section 2　Storage (data farm)

- 30PB (Lustre file system)
  - ➢ Used as shared storage.
  - ➢ Various protocols are supported.
    - ✧ CIFS: To be provided by the Research Information Management Service.
    - ✧ s3: To be provided by the Research Information Management Service.

Section 3　Virtualization Infrastructure

- Mirantis Cloud Platform（MCP）
  - A private cloud infrastructure with OpenStack technology at its core.
    - Provide a VM environment.
  - Virtualize CPU farms, data farms, and networks to provide users with a system infrastructure as a tenant.

Chapter 3 Project

In accordance with Article 3 of the Policy, users must designate a project and a payment representative to use the system. Projects are valid until the end of the fiscal year.

Section 1 CPU Farm Cluster Configuration and Usage

The CPU farm is divided into two clusters of 220 nodes, hssa and hssb. The hssa cluster is pool type in which computational resources are reserved by users at all times, and the hssb cluster is on-demand type in which computational resources are used only when they are available to users.

Section 2 Types of Projects

When users apply for a new project, users must choose between pool and on-demand types. Note that shared storage can be used for both types.

Section 3 Types and Authority of Project Members

Project members have the following authority.

- Payment representative: Project application and approval, tenant management
- Assistant: Same authority as payment representative
- Tenant manager: project application, tenant management
- Sub manager: partial management of tenant (e.g. start/stop VMs)

Chapter 4 Tenant Usage

Tenants can be managed through the OpenStack Management Console.

Section 1 OS Image for VM (Instance) Booting

We provide the default images published by OpenStack officials for CentOS and Ubuntu as OS images available on the system. We also provide an image with various configurations to use the shared storage. In this case, the shared storage will be mounted and used as a home area (/home).

Section 2 Flavor

The CPU farm is used by choosing from the flavors available with a minimum of 2 vCPU and a maximum of 92 vCPU. In this case, memory and local disk are allocated in proportion to the

amount of vCPU (memory: 4 GB/vCPU, local disk 20 GB/vCPU). Therefore, if you need a large amount of memory or local disk, you need to select a flavor with large number of vCPUs.

Chapter 5 Storage Usage

Local disk and shared storage are available for storage.

Section 1 Local storage

Local disk is available as local storage for each VM and the capacity is determined by the flavor. For images that do not use shared storage, the home area (/home) is included in the local storage.

Section 2 Shared Storage

Shared storage is an online storage area that can be used on a project basis. In the image of using shared storage, the home area (/home) becomes the shared storage, and the application area (/APL, read only) of the shared storage is also mounted. The home area is subject to a usage fee, and users can apply for the capacity you want to reserve through the Online Submission System.

Section 3 Other Storage

The data farm also stores images and snapshots. This area is separate from the capacity reserved for shared storage, is not subject to usage fees, and is not required an application for use.

Section 4 Managing Storage

The data in the shared storage does not guarantee the preservation 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 6 Network Usage

There are four types of networks available within a tenant. There are two internal networks and two floating IPs (FIPs) for access from outside the tenant.

Section 1 Project Network

It is necessary to set the project IP address to the VM when communicating within the tenant. It is also necessary to be able to access outside of RIKEN and set up FIP. If you need additional IP addresses, you can add them by sending an email.

Section 2 Storage Network

This is a network for accessing shared storage. If you want to use shared storage, you need to set a storage IP address. If you need additional IP addresses, you can add them by sending an email.

Section 3 RIKEN Private Network

A network that can be accessed from inside RIKEN. You need to set up a RIKEN private FIP address to access the VMs from inside RIKEN. If you need more FIPs, you can add more quotas if you have a good reason to do so.

Section 4 RIKEN Global Network

This network can be accessed from outside of RIKEN. If you want to access the VM from outside of RIKEN, you need to set up a RIKEN global FIP address. If you want to use this network, you can add an additional FIP address if you have a good reason to do so.

However, to access a VM from outside of RIKEN, users must first set up a RIKEN global FIP address to the VM, and then apply for and pass a security audit in the same way as normal applications for a RIKEN global IP address.

Chapter 7 User Management and Security Measures

Eligibility is defined by Article 4 of the Policy and users are divided into project members and VM users.

Section 1 Registration and Management of Project

To become a project member, you must apply through the Online Submission System and be approved by the payment representative. The ss account names of the project members are required at the time of application, but each project member must obtain a ss account in the Online Submission System in advance.

Section 2 Management of VM users

VM users are created an account for the VMs in the tenant and use the VMs. VM users must be managed by the payment representative and do not have to be delivered to the Information Systems Division.

Section 3 Security Export Control Policy

All users who are subject to Security Export Control Policies of the Japanese foreign exchange law have to be screened before usage.

Section 4 Security Measure

Tenant management is the responsibility of the payment representative. In particular, FIP configured VMs can be accessed from inside and outside of RIKEN, so appropriate security measures need to be taken.

Chapter 8 Usage Fees

In accordance with Article 6 of the Policy, usage fees are set for system usage.

Section 1 Services and Fees that are Subject to Usage Fees

The services and usage fees that are subject to usage fees are defined in the Handling of Usage Fees for Information System Services Provided by the Head Office for Information Systems and Cybersecurity.

Section 2 Application and Point

When using services with a usage fee, users must apply through the online application system. Specifically, users first purchase points and then convert the points into service content. The points are valid until the end of the fiscal year and cannot be returned. Also, once the points are converted to service content, they cannot be converted back to points.

Section 3 Pool type of Computational Resources

Users will apply for the number of vCPUs to be reserved and reserve them until the end of the fiscal year. The fee for the use of vCPUs is monthly, and no discount will be given for the use of vCPUs from the middle of the month.

Priority execution in Chapter 5, Section 2 is subject to the usage fees. Unused computation resources allocated to project is subject to priority execution. The right to perform priority execution is valid until the end of the fiscal year, and no refunds will be made for unused computation resources.

Section 4 On-demand type of Computational Resources

Users apply for the product of the number of vCPUs and the amount of time they plan to use. When a user reserves a computing resource, it can be used if there is space available. The applied computing resources are valid until the end of the fiscal year.

Section 5 Shared Storage Usage

Users must apply for the capacity they need in TB units and reserve it by the end of the fiscal year. The usage fee is calculated on a monthly basis, and no discounts will be offered even if you start using the service in the middle of the month.

Section 6 Budget Numbers and Transfer Procedures

Points can only be purchased from the budget with a RIKEN budget number on it, and payment will be made by budget transfer. External funds should be checked with the External Fund Office to see if they can be paid in advance. When points are purchased, a transfer will be made to the budget number specified at the time of point purchase.

Chapter 9 Project Application and Approval

Project applications and approvals will be made through the online application system. However, some applications and approvals to be specified separately will be made via email.

Section 1 New Project

If users want to use a new project, users can apply to create a new project. When users apply, users will enter the information of the payment representative, the budget number and its name, the content of the use, select the type of use, and, if necessary, register the project members. After that, if the application is approved by the payment representative, the project application is completed. In addition, after the approval of the payment representative, points can be purchased, but only a certain amount of computing resources can be used in the unapproved stage.

Section 2 Application in Project

Project members, other than sub-administrators, can submit requests for project information, point purchases and resource purchases at any time. Resource purchases do not require approval and will be reflected in the system immediately, but all other requests will be effective as soon as the payment representative's approval is completed.

Section 3 Continuation of Project

At the end of the fiscal year, the user is asked to confirm whether the project is to be continued or terminated, and if the user chooses to continue the project, the project will be continued in the following fiscal year.

Chapter 10 Service Level

Section 1 Availability

We aim to provide at least 97% of the annual service hours.

In the event of a planned outage in the Wako area, which is usually held on a consecutive holiday in October, the system will be shutdown/activated on the weekdays before and after the planned outage. In addition, scheduled maintenance may be performed for a few days before or after a scheduled outage or at the end of the fiscal year. In the event of a planned outage, users will be notified one month in advance. Sudden power outages, momentary voltage drops, system problems, etc. may cause the system to stop suddenly. In this case, we will contact the user immediately and explain the cause and the recovery process after the problem is solved.

Section 2 Performance of VM

We strive to provide the performance that VMs are inherently capable of.

Section 3 Capacity and Data Preservation

The storage device is located in the RIKEN Wako area, and the data is stored with redundancy (equivalent to RAID 6), and all the controllers and communication paths of the storage devices are redundant. The storage is also connected to an uninterruptible power supply (UPS) in case of power-related problems; however, since there is no emergency generator connected, the storage device is shut down in the event of a power failure to ensure data reliability. However, the integrity and availability of data at any time cannot be guaranteed.

Section 4 System Operation Period and Transition

The SS is scheduled to be in operation from June 2020 to the end of May 2026. It is assumed that the SS will be continued to the next system, but this has not yet been determined. We will give as much consideration as possible for the transition to another system at the end of the operation.

Section 5 Scope of Support

Basically, each project is responsible for managing its own internal tenants. However, we provide technical support for managing project members and starting up VMs (instances) using images provided by us, as well as technical support for using ISVs in application area using images provided by us.

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.