HOKUSAI Users Meeting in May 2017

Information Systems Division, RIKEN
23 May. 2017
Outline

• Overview of HOKUSAII system
  • Operation concept
  • Computing resources in FY2017
  • HOKUSAII BigWaterfall system
    • Operation plan of HOKUSAII BigWaterfall system

• Operation status in FY 2016 (Apr – Mar)
  • Summary of application projects
  • Utilization rate of CPU resources
Operation concept of HOKUSAI system

- We have operated HOKUSAI GreatWave (GW) system since 1\textsuperscript{st} Apr 2015.
- HOKUSAI BigWaterfall (BW) system will be launched Oct 2017.
  - HOKUSAI GW and BW systems will share the same storage system.
  - HOKUSAI BW system will be decided by Mar 2017. We will inform you as soon as possible. \textit{-> This meeting}
    - The system will be Intel Architecture (IA) compatible.

The operation will start Oct 2017.
Computing Resources in FY 2017 (Mar to Sep)

HOKUSAI-GreatWave

GW-MPC: 1PFLOPS
GW-ACSG (30nodes)
GW-ACSL (2nodes)

GW-OFS(2PB)
GW-HSM(8PB)

Part of RICC (until Jun 2017)

FrontEnd
Gateway

HOKUSAI High Performance Network

MPC 1/2(50TFLOPS)
UPC(10TFLOPS)

SSC
Computing Resources in FY 2017 (Oct to Mar)

HOKUSAI-GreatWave
- GW-MPC: 1 PFLOPS
- GW-ACSG (30 nodes)
- GW-ACSL (2 nodes)
- GW-OFS (2 PB)
- GW-HSM (8 PB)

HOKUSAI-BigWaterfall
- HOKUSAI High Performance Network
- HOKUSAI High Performance Network
- BW-MPC (about 2.5 PFLOPS)
- BW-OFS (about 5 PB)
Specifications of HOKUSAI BigWaterfall system

Massively parallel supercomputer (BW-MPC)
- 840 nodes
- CPU: Intel Xeon (Skylake, 2.4 GHz, 2 CPUs/node, 40 cores/node)
- Peak performance (64bit floating point): 2.58 PFLOPS
- Memory: DDR4-2666 96GB/node
- BW: 255 GB/s
- Interconnect: InfiniBand EDR (12.6 GB/s)

Update GW-ACSL
- 2 nodes
- CPU: Intel Xeon E7-4880v2 (4 CPUs/node, 60 cores/node)
- Memory: DDR3-16000 1 TB/node -> 1.5 TB/node

Storage system
- Online(Disk) storage: 5 PB
Startup schedule of HOKUSAI BigWaterfall system (Jun 2017 – Oct 2017) (tentative)

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- **GW/BW**
  - ★User meeting
  - Application for General Use projects in the latter half of FY2017

- **Regular operation**
- **Trial operation**
- **Existing projects (without application)**

4/Mar/2015

ACCC, RIKEN © 2015
(Apr 2016 – Mar 2017)
Allocation policy for the CPU resources on HOKUSAI system

• Allocation policy has been changed since FY2016.
  • To improve the inconvenience of usage of HOKUSAI system in FY2015
• All allocated CPU resources of General Use projects are limited to 130% of the total CPU resources on the system.
• The upper limit of CPU resources in 1 project (and 1 user) is 20% of the total CPU resources.
• Review process
  • General Use projects are classified into large-scale projects (more than about 10% of a total CPU resources) and middle-scale projects.
  • Large-scale project is reviewed by all reviewers and may assign external reviewer.
  • Requested CPU resources of rank B projects are reduced by half if requested CPU resources of systems are more than 130%.
Summary of application projects for HOKUSAI system in FY2016

• General Use
  • Accepted 36 projects (until 1st Oct. 2016)
    • Large-scale projects: accepted 3 projects and rejected 2 projects
    • Middle-scale projects: accepted all 33 projects
  • After review process, requested CPU resources on every system are less than 130%.
    • Requested CPU resources of rank B projects are not reduced by half.

• Requested CPU resources in 1st (Mar) applications
  • GW-MPC: 129%
  • GW-ACSG: 109%, GW-ACSL: 111%
  • RICC: 111%

• Requested CPU resources in 1st (Mar) and 2nd (Sep) applications
  • GW-MPC: 129%
  • GW-ACSG: 130%, GW-ACGL: 119%
  • GW-RICC: 116%
Used CPU resources in each field

- Physics - particle and nuclear physics: 33.56%
- Physics - condensed matter physics: 21.45%
- Life science - biophysics: 17.81%
- Life science - biochemistry, molecular biology: 5.11%
- Physics - high energy physics: 5.11%
- Physics - astronomy, cosmology: 6.60%
- Chemistry - physical chemistry: 6.64%
- Chemistry - organic chemistry: 1.79%
Utilization rates of CPU resources on GW-MPC system

- 32 cores
- 512 cores
- 8192 cores
Utilization rates of CPU resources on GW-ACSG/L system

ACSG

ACSL

24 cores

15 cores

64 cores
Utilization rates of CPU resources on RICC-MPC system

超並列PCクラスタcore稼働率

core稼働率(%) = 総core使用時間 / 総運用core時間（稼働日数 x 24 x core数 - 保守core時間 - 運用停止時間 - 障害core時間）x 100

257-1024cores

33-128cores

23 Mar. 2017
HOKUSAI Users Meeting in Oct 2016
Utilization rates for each CPU resource

• The utilization rate of CPU resources have been high from the beginning of FY2016.

• MPC
  • Utilization rate is more than 90%.
  • More than 50% of CPU resources are used by large-scale jobs (use more than 512cores).

• ACSG
  • Utilization rate is around 85%.
  • 70-80% of CPU resources are used by within 1 node.

• ACSL
  • Utilization rate is around 50 - 90%.
  • Many jobs use only less than 10% of memory.

• RICC(-MPC&UPC)
  • Utilization rate is more than 90%.
  • More than 50% of CPU resources are used by small- and mid-scale jobs (use 1-128cores)
Usage rates of allocated CPU resources (GW-MPC)

Constant usage of GW-MPC throughout the year

More than the allocated CPU resources -> Next slide
Apologize for wrong calculation of consumed CPU resources

• There was mistake in the calculation of consumed core time of users.
  • General use project: consumed core time is 0.8 times.
  • Quick use project: consumed core time is 1.2 times.
  • The mistake had been made since RSCC.
  • The mistake is fixed from Apr 2017.

• Influence to Users
  • For General Use project: some projects were used more than the allocated CPU resources.
  • For Quick Use project: Only 0.83 % of total CPU resources is available instead of 1% of that.

We are really sorry for a confused status by setting error.
Summary and schedule

• Computing Resources in FY2017
  • The former half of FY2017
    • HOKUSAI-GW system and RICC system
      • Operation of RICC system is until Jun 2017
  • The latter half of FY2017
    • HOKUSAI-GW system and HOKUSAI-BW system

• User Event Schedule
  • Around Aug of 2017
    • Next meeting about information of HOKUSAI-BW system
    • Application for general use of HOKUSAI-GW/BW system in the latter half of FY2017