CCJ operations in 2015

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1 Overview

The RIKEN Computing Center in Japan (CCJ)[1] commenced operations in June 2000 as the largest off-site computing center for the PHENIX[2] experiment being conducted at the RHIC.Since then, the CCJ has been providing numerous services as a regional computing center in Asia. We have transferred several hundred TBs of raw data files and nDST [a] files from the RHIC Computing Facility (RCF)[3] to the CCJ. A joint operation of the CCJ with the RIKEN Integrated Cluster of Clusters (RICC)x has been continuing since July 2009. In April 2015, a new system "HOKUSAI Greatwave" was launched by RIKEN ACCC[4] and the joint operation is successful. New hierarchical archive system and dedicated PC nodes are provided to CCJ by them. The number of dedicated PC nodes is reduced from 20 to 10 in this April.

Many analysis and simulation projects are being carried out at the CCJ, and these projects are listed on the web page `http://ccjsun.riken.go.jp/ccj/proposals/`. As of December 2015, CCJ has contributed 31 published papers and 41 doctoral theses.

2 Computing hardware and software

In 2015, computing hardware (nodes and RAIDs) and software (OS, batch queuing systems, database engine, and so on) were changed slightly from those described in the previous APR.[1] In summary, we have 28 computing nodes, two login servers, one main server (users home directory, NIS, DNS, NTP), two disk servers, and 10 computing nodes in the ACCC computing room. In total, $422 (= 384 + 72)$ jobs can be processed simultaneously by these computing nodes.

Table 1 lists the numbers of malfunctioning SATA or SAS disks in the HP servers, namely, computing nodes and NFS/AFS servers.

Table 1. Number of malfunctioning HDDs in 2011-2015

Type	Size	Total	2015	14	13	12	11
SATA	1 TB	192	14	11	16	20	9
	2 TB	120	10	0	2	5	4
SAS	146 GB	38	3	2	0	1	1
	300 GB	24	1	1	0	0	1

One database (postgreSQL[5]) server and one AFS[6] server are operated in order to share the PHENIX computing environment. Now only the SL5[7] environment is shared by the computing nodes, which have approx-

imately 0.9 TB of library files. We have two data-transfer servers on which the grid environment[9] is installed for the data transfer to/from RCF. Two other servers were retired in Jan. 2015 and reserved.

New NFS server HP DL380eGen8 and Infortrend 16TB SAS RAID, which serve user home areas were purchased in Mar. and Apr. 2015, respectively, and deployed in Oct. 2015, in place of SUN M4000. The xfs[8] is used as the home and work area served by the server.
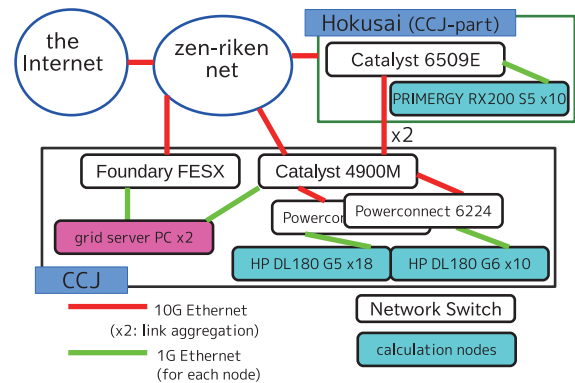

Fig. 1. Schematic view of the network configuration as of December 2015.

The High Performance Storage System (HPSS)[10] that had been in use for 15 years, was retired in Aug. 2015 and 863 TB (785 TiB) of data accounting for 1.66 million files were migrated to the new archive system in HOKUSAI. At the same time, network connection was changed. Between CCJ main switch and HOKUSAI, two 10G Ethernet are used. Toward outside RIKEN, one 10G is used between the main switch and the zen-riken net. Another 10G line of our grid server for the data transfer between RCF has also been retained.

Batteries of three 10KVA UPS were replaced in Mar. 2016. The main network switch will also be replaced in Jun. 2016.

References
1) S. Yokkaichi et al.: RIKEN Accel. Prog. Rep. **48**, 248 (2015).
2) `http://www.phenix.bnl.gov/`
3) `https://www.racf.bnl.gov/`
4) `http://accc.riken.jp/`
5) `http://www.postgresql.org/`
6) `http://www.openafs.org/`
7) `http://www.scientificlinux.org/`
8) `http://xfs.org/`
9) `http://www.globus.org/toolkit/docs/latest-stable/gridftp/`
10) `http://www.hpss-collaboration.org/`

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a) term for a type of summary data files in PHENIX