PHENIX Computing Center in Japan (CC-J)

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The RHIC experiment is scheduled to start early in 2000. To produce the physics output promptly, we have been planning to construct the PHENIX Computing Center in Japan (CC-J)[1,2]. R&D for the CC-J started in 1998 at the RIKEN BNL Research Center (RBRC). The construction of the CC-J started at the RIKEN Wako campus over a three year period, beginning in April 1999. CC-J is intended as the principle site of computing for PHENIX simulation, a regional PHENIX Asian computing center, and as a center for the analysis of RHIC spin physics. The planned computing capacity will be sufficient to meet the bulk of the simulation needs of PHENIX. By providing a vital source of regional computing, the CC-J will also encourage collaborators from China, Korea, India and Japan to be actively involved in analysis of PHENIX physics data. These capabilities of the CC-J are in concert with the research plans of RIKEN and RBRC, which initiated the RHIC spin program and which plan to expand their involvement in the entire PHENIX program.

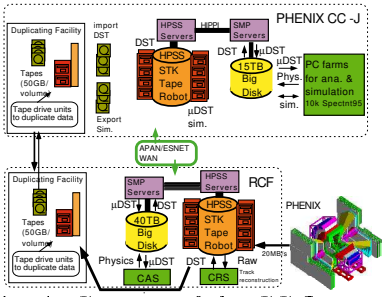

Fig. 1. Concept of the CC-J system.

Figure 1 shows the concept of the CC-J system. During the RHIC experiment, data acquisition, raw data recording and monitoring will be performed at the RHIC Computing Facility (RCF) located at the BNL. After the tack reconstruction, the data summary tapes (DST) will be produced, duplicated and exported to the CC-J. Data mining will be carried out at CC-J as well as RCF from the DST to produce the micro-DST, filtered by the physics motivation. Simulation for the PHENIX experiments will be produced at CC-J and this output will be exported to RCF. The following table shows the planned size of the CC-J.

	Dec.1999	Dec.2000	Dec.200
CPU (SPECint95)	2400	5900	10700
Tape Storage (TB)	100	100	100
Disk Storage (TB)	1.6	10	15
Tape I/O (MB/s)	45	90	112

Figure 2 shows the configuration of the current CC-J system. High Performance Storage System (HPSS) was installed early in 1999 for a hierarchical storage.

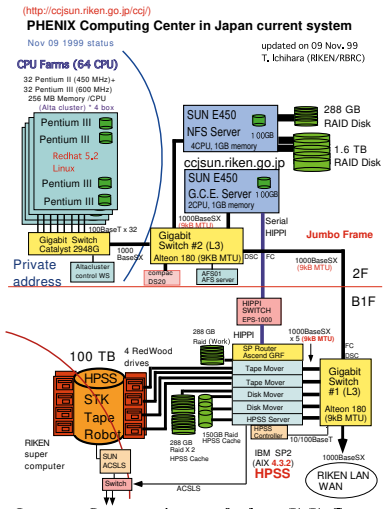

Fig. 2. configuration of the CC-J system.

The HPSS consists of five nodes of RS-6000/SP2 server, a cache disk of 720 GB, four RedWood tape drivers, and a tape robotic storage of 100 TB. More than 50 MB/s transfer rate has been obtained by parallel ftp (pftp) between HPSS clients and HPSS servers over the Gigabit Ethernet. The test of exchanging date between CC-J and RCF using the SD3 tape cartridge has been carried out successfully .

Linux pc's with Intel Pentium II/III are used for the CPU farms. Each node is equipped with dual CPU, 512 MB memory and 14-18 GB local disk. Portable Batch System (PBS) are used for the batch queueing. The Multi Router Traffic Grapher (MRTG) is used for monitoring the network traffic and CPU loads etc. The wide network bandwidth between CC-J and RCF has been achieved by the Asia-Pacific Advanced Network (APAN). The file transfer performance of 600 kB/s has been obtained with the large TCP window-size of 256 kB. This enables us to synchronize the Data Base between CC-J and RCF.

Stress tests for the entire system have been carried out successfully in May, July and December in 1999. During the test, the physics simulation output have been by-produced. We plan to start the operation of the the CC-J in April 2000.

References

1) http://ccjsun.riken.go.jp/ccj
2) Y. Watanabe and T. Ichihara : RIKEN Accel. Prog. Rep. 32 (1999) 53.