§32. Plasma Simulator (until December 2008)

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Plasma Simulator is a high-performance computer system to support the studies in confinement physics of fusion plasmas and the theoretical systematization of the studies, the exploration of science of complexity as the basic research, and other collaborative researches to advance and establish simulation science.

NEC SX-7/160M5 was the main system of the Plasma Simulator for 6 years. The operation of SX-7/160M5 was finished in December 2008 as scheduled. In March 2009, the new Plasma Simulator Hitachi SR16000 was installed. Until December 2008, the main system of the Plasma Simulator, NEC SX-7/160M5 consisted of 5 nodes and 160 CPUs. Table 1 presents the performances of SX-7/160M5. The amount of the memory and processing speed are 1280GB and 1412GFLOPS, respectively.

Properties of SX-7/160M5	
Total Main Memory	1280GB
Total Peak Performance	1412GFLOPS
Number of Nodes	5
Number of CPUs / node	32
Main Memory / node	256GB
Peak Performance / CPU	8.8GFLOPS
Inter-node Data speed	8GB/s

Table1: Properties of SX-7/160M5

The 9 kinds of job classes from a class of 64GB memory, 1 hour elapsed time, and 8 CPUs up to a class of 1280 GB memory, 12 hours elapsed time, and 160 CPUs were available. Figure 1 shows a schematic view of the computer system. The CPU server connected by Fiber Channel to the Mass Data Processing System (MDPS) with 100TB storage. Gateway Servers as the front-end processor are provided so that the users can submit their batch jobs using NQSII through the NIFS-LAN from all over the world. The Data Process Server is also provided for the analyses of the simulation results. The local manual for Plasma Simulator, FAQ, and any other information associated with the system were presented on Web (http://www.dss.nifs.ac.jp/workgr/).

The monthly used CPU time from April 2008 to December 2008 is displayed in Figure 2. The CPU time of the jobs that are run with the total 5 nodes constitutes more than 55 % of all CPU time. The total operation time, the total used CPU time, the ratio of CPU time to the operation time, and the numbers of the executed jobs for the same period as Figure 2 are summarized in Table 2. The averaged ratio of the CPU time to the operation time is 92.0%, which is the highest value for 6 years.

The numbers of the collaboration projects and the registered users of the fiscal year 2008 were 39 and 86, respectively.
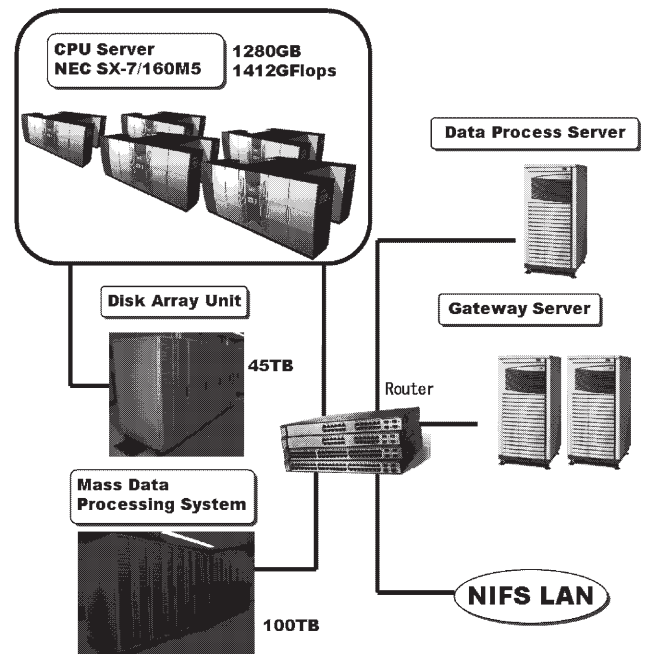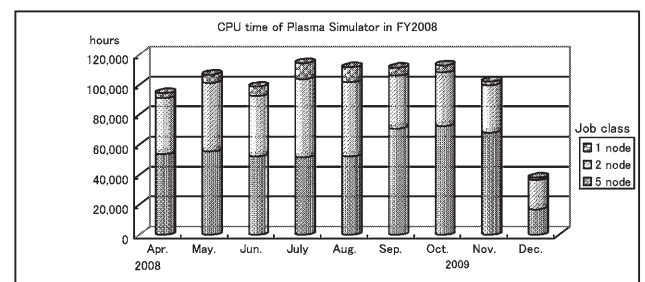

Fig. 1: Schematic View of Plasma Simulator (SX-7)

Fig.2 : Operation Overview of SX-7/160M5 in FY 2008

A: operation time (hour)	B: CPU time (hour)	Ratio: B/A	Number of jobs
967,765.3	890,544.9	92.0%	9,366

Table 2 : Summary of SX-7/160M5 Operation in FY 2008