

§2. LHD Numerical Analysis System and LHD Numerical Analysis Server

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LHD Numerical Analysis System and LHD Numerical Analysis Server are used mainly for the LHD Experiment Project and its related simulation projects, and the research collaboration with the universities and the institutes. The LHD Numerical Analysis System (NEC SX-8) was shutdown at the end of the lease period, December 2010. The operation of the LHD Numerical Analysis Server (HITACHI SR16000) started on February 1, 2011.

The LHD Numerical Analysis System (SX-8) consisted of 5 nodes which works cooperatively. Each node has eight vector processing elements, and the amount of the memory and processing speed of each node are 128GB and 128GFlops, respectively. Distributed parallelized computations using multiple nodes were possible as well as auto-parallelized computations in one node at this system. This architecture provided a variety of job classes: 15 kinds of classes, from a class of 4GB and 1 CPU up to a class of 512GB and 32 CPUs using 4 nodes, were available. The properties of the SX-8 system are shown in Table 1.

CPU Server	SX-8/32M4: 512GF, 32CPU, 512GB Memory SX-8/8M1: 128GF, 8CPU, 128GB Memory Inter-node connection: 16GB/s one direction
High Speed Disk Device	10TB
Large Volume Disk Device	10TB

Table1: Properties of the LHD Numerical Analysis System (SX-8)

The CPU server was connected by Fibre Channel to the high-speed magnetic disk system. The two gateways were provided so that the users can submit their batch jobs using NQSII through the NIFS-LAN. The two application servers and the LHD Experiment data file server were also provided for the analyses of simulation results and for data processing of the LHD experiment, respectively. The local

manual for the computer system, FAQ, and any other information associated with the system were presented on the web.

The monthly used CPU time of the SX-8 system from April 2010 to December 2010 is shown in Figure 1. The total operation time, the total used CPU time, the ratio of CPU time to the operation time, and the number of executed jobs for the same period as Figure 1 are summarized in Table 2. The averaged ratio of CPU time to the operation time is 74.7% in 2010 FY. The numbers of the collaboration projects and the registered users of the fiscal year 2010 were 48 and 125, respectively.

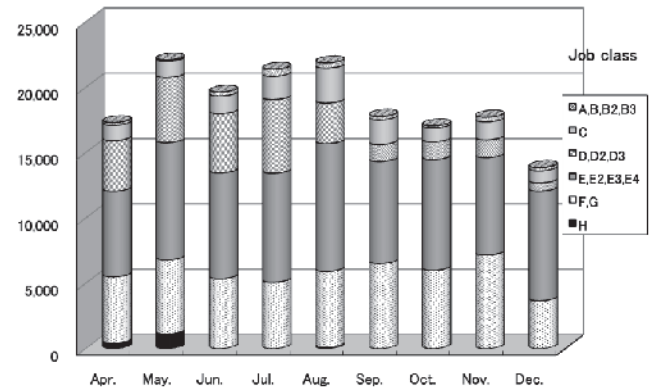


Fig. 1: Operation Overview of SX-8 in FY 2010

A: operation time (hour)	B: CPU time (hour)	Ratio: B/A	Number of jobs
225,770:10	168,559:36	74.7%	38,438

Table 2: Summary of SX-8 Operation in FY 2010

The LHD Numerical Analysis Server consists of the computation server and the front-end server. Both the servers are HITACHI SR16000 model XM1. Each server is equipped with 32 cores of POWER7 processor (3.3GHz) and 128GB memory. They are connected by Fibre Channel to the 67.3 TB external storage system. The LHD Numerical Analysis Server is connected inside the Plasma Simulator network. The manual for the LHD Numerical Analysis Server is presented on the web (<http://www.ps.nifs.ac.jp/>).