§34. LHD Numerical Analysis System

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LHD numerical analysis system serves mainly for the LHD Experiment Project and its related simulation projects, and the research collaboration with worldwide universities and institutes.

The CPU server consisting of 5 nodes are working cooperatively as the main part of the system. 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 are possible as well as auto-parallelized computations in one node at this system. This architecture can provide 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, are available. The schematic view and the properties of the system are shown in Fig. 1 and Table 1, respectively.

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

The CPU server is connected by Fiber Channel to the high-speed magnetic disk system. Two gateways as the front-end servers are provided so that the users can submit their batch jobs using NQSII through the NIFS-LAN from all over the world. Two application servers and the LHD Experiment data file server are also provided for the analyses of the simulation results and for the data processing of LHD experiment, respectively. The local manual for the present computer system, FAQ, and any other information associated with the system are presented on Web (http://www.dss.nifs.ac.jp/nifscc/lhd.html).

The monthly used CPU time from April 2008 to March 2009 is shown in Figure 2. 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 with Figure 2 are summarized in Table 2. The averaged ratio of CPU time to the operation time is 78.7% in 2008 FY, which is larger than that of the previous year.

The numbers of the collaboration projects and the registered users of the fiscal year 2008 were 63 and 164, respectively.

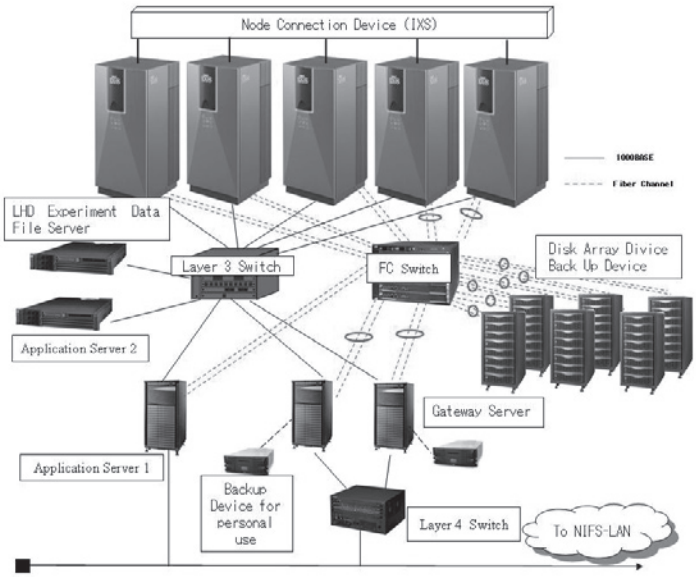

Fig. 1: Schematic View of LHD Numerical Analysis System

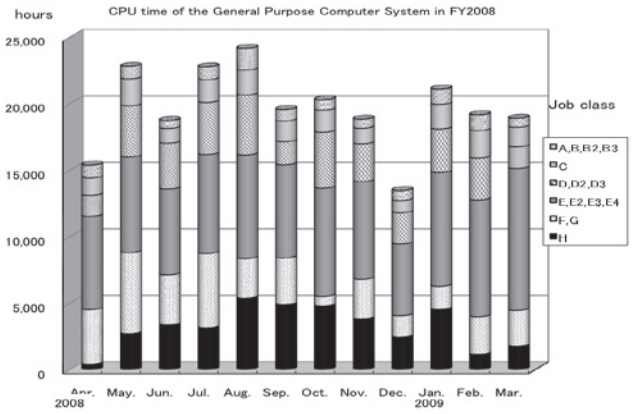

Fig. 2: Operation Overview of SX-8 in FY 2008

A: operation time (hour)	B: CPU time (hour)	Ratio: B/A	Number of jobs
299,209:08	235,368:38	78.7%	119,303

Table 2: Summary of SX-8 Operation in FY 2008