§33. 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 the universities and the 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. The two gateways are 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 are also provided for the analyses of simulation results and for data processing of the LHD experiment, respectively. The local manual for the present computer system, FAQ, and any other information associated with the system are presented on the web (http://www.dss.nifs.ac.jp/nifscc/lhd.html).

The monthly used CPU time from April 2009 to March 2010 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 73.4% in 2009 FY.

The numbers of the collaboration projects and the registered users of the fiscal year 2009 were 58 and 133, respectively.
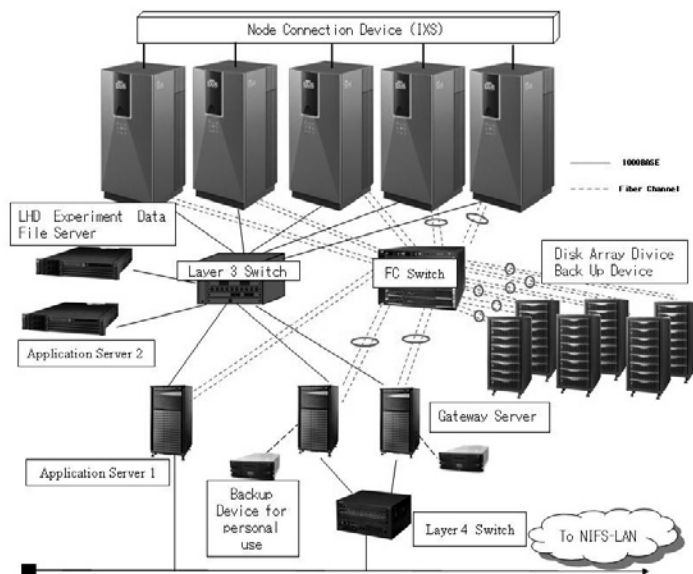

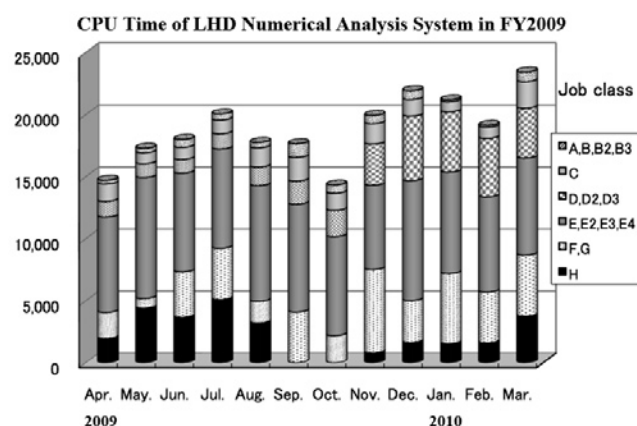Fig. 1: Schematic View of LHD Numerical Analysis System

Fig. 2: Operation Overview of SX-8 in FY 2009

A: operation time (hour)	B: CPU time (hour)	Ratio: B/A	Number of jobs
307,107:20	225,471:32	73.4%	86,817

Table 2: Summary of SX-8 Operation in FY 2009