§2. LHD Numerical Analysis Server

Miura, H., Sato, M., Suzuki, Y., Inoue, N., Computer Working Group

LHD Numerical Analysis Server is used primarily for the LHD Experiment Project and its related simulation projects, and the research collaboration with the universities and the institutes. The operation of the current LHD Numerical Analysis Server, FUJITSU FX100, started on June 1, 2015. The LHD Numerical Analysis Server consists of 144 computational nodes. One node has one SPARC 64XIfx processor (32 cpu cores) and clock speed 1.95GHz. The peak performance of a single node is 1.01TFlops. They are connected by InfiniBand network to the 10PB external storage system, which is shared with the Plasma Simulator (FX100) system. The LHD Numerical Analysis Server is connected inside the Plasma Simulator network. The specifications are listed in Table 1. The manual for LHD Numerical Analysis Server is presented on the web (https://www.ps.nifs.ac.jp/).

Computer and CPU	PRIMEHPC FX100, SPARC64 Xlfx
Main Memory	32GB/node
Number of nodes	144
Peak Performance	1.01Tflops/node
Number of CPU cores	32/node
Storage	10PB

Table 1. Specifications of LHD Numerical Analysis Server.

Three job classes listed in Table 2 are available. In the all job classes 4608 logical CPU are available. The FQ and F5 jobs are run on a single node, while a FX job can use 24 nodes in maximum. In Table 2, one physical CPU core is counted for four logical CPU. Then each server provides 4608 logical CPU.

Class	Allocated	Logical	Elapse	Number
	logical	CPU per	time limit	of jobs
	CPU	job		per user
FQ	4608	<=32	15 min	2
F5	4608	<=32	5 hrs	16
X24	4608	<=768	24 hrs	16

Table 2. Job classes on LHD Numerical Analysis Server.

The CPU time used for each month from June 2015 to March 2016 is shown in Fig. 1. The number of executed jobs and CPU time used for each job class is summarized in Table 3. In Fig. 1 and Table 3, the CPU time denotes the sum of the time each physical CPU core worked. The numbers of the collaboration projects and the registered users of the fiscal year 2015 were 32 and 87, respectively.



Fig. 1. CPU time (hours) used for each month in FY 2014.

Class	Number of jobs	CPU time (hours)
FQ	2,907	207
F5	4,665	1,987
X24	17,345	242,422
Total	24,917	244,616

Table 3. Number of jobs and CPU time used for each class in FY 2014.