

## §2. LHD Numerical Analysis Server

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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 LHD Numerical Analysis Server (HITACHI SR16000 model XM1) started on February 1, 2011. At the beginning of the operation, the LHD Numerical Analysis Server consisted of the Computation Server and the Front-end Server. On October 14, 2011, two additional nodes, the Computation Server II and the Data Processing Server were installed. Each server is equipped with 32 cores of POWER7 processor (3.3GHz) and 128GB memory. The peak performance of each server is 844.8Gflops. They are connected by Fibre Channel to the 102.3TB external storage 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 (<http://www.ps.nifs.ac.jp/>).

Computer and CPU	SR16000 model XM1, POWER7
Main Memory	128GB/node
Number of nodes	4
Peak Performance	844.8Gflops/node
Number of CPU cores	32/node
Storage	102.3TB

Table 1. Specifications of LHD Numerical Analysis Server.

Seven job classes listed in Table 2 are available. The largest classes that run to 128 logical CPU are X1 and X5. The X1 and X5 class jobs are run on the Computation Server. All the jobs are run on a single node. In Table 2, one physical CPU core is counted for four logical CPU. Then each server provides 128 logical CPU with an exception for the Front-end Server that provides 96 logical CPU for batch jobs.

Class	Allocated logical CPU	Logical CPU per job	Elastice time limit	Number of jobs per user
FQ	32	$\leq 32$	15 min	1
P5	32	$\leq 8$	5 hrs	4
F1	32	$\leq 32$	1 hr	4
F5	224	$\leq 32$	5 hrs	7
F24	32	$\leq 32$	24 hrs	1
X1	128	$\geq 32$	1 hr	4
X5	128	$\geq 32$	5 hrs	2

Table 2. Job classes on LHD Numerical Analysis Server.

The CPU time used for each month from April 2012 to March 2013 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, CPU time is the sum of the time each physical CPU core worked. The numbers of the collaboration projects and the registered users of the fiscal year 2012 were 40 and 122, respectively.

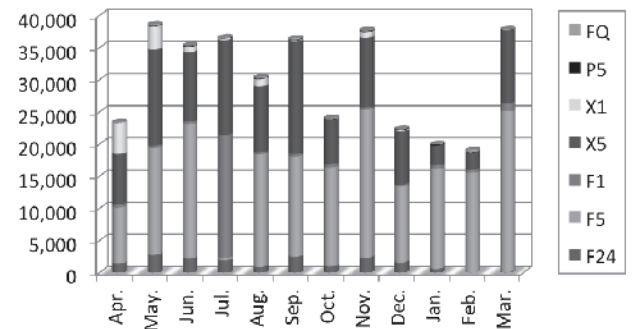


Fig. 1. CPU time (hours) used for each month in FY 2012.

Class	Number of jobs	CPU time (hours)
FQ	7,250	1,891
P5	10,132	1,073
F1	7,561	24,306
F5	17,420	186,268
F24	300	17,314
X1	1,304	11,706
X5	2,424	119,318
Total	46,391	361,875

Table 3. Number of jobs and CPU time used for each class in FY 2012.