

§33. Plasma Simulator (from March 2009)

Todo, Y., Usami, S., Ito, A., Nunami, M., Kato, S., Den, M. (National Inst. Information Comm. Technology),
Computer Working Group

Plasma Simulator is a high-performance computer system to support the studies in confinement physics of fusion plasmas and the theoretical systematization of the studies, the exploration of science of complexity as the basic research, and other collaborative researches to advance and establish simulation science.

The operation of the new Plasma Simulator started on March 3, 2009. The system constitution is shown in Fig. 1. The main system of the new Plasma Simulator is the Large-Scale, parallel-type Processing Server. The properties of the main system are presented in Table 1. The main system will be upgraded to total peak performance 315TFlops and total main memory 32TB with 2.0PB storage in October 2012. The sub system of the new Plasma Simulator consists of the Program Development Support Server, the Front System, the Data Analysis Server, the Visualization server, the File server, the Gateway, and the network devices. The Program Development Support Server is composed of one node of SR16000 VL1 and two

nodes of SR16000 L2. The model VL1 has 64 CPU cores and 1TB memory. Each of the two nodes of model L2 has 32 CPU cores and 256GB memory. The Program Development Support Server is equipped with the storage system of 0.2PB. The program languages, Fortran 90, C/C++, OpenMP, and MPI are supported. The visualization software AVS/Express and IDL are installed on the visualization server. The manuals for the Plasma Simulator, FAQ, and any other information associated with the system are presented on Web (<http://www.ps.nifs.ac.jp/>).

The new Plasma Simulator appears on the TOP500 List (<http://www.top500.org/list/2009/06/100>) of the high-performance computer ranking in the world. The new Plasma Simulator has the number 7 ranking in Japan and is ranked as the 65th in the world.

Large-Scale, parallel type Processing Server Hitachi SR16000 model L2	
Total Peak Performance	77TFlops
Total Main Memory	16TB
Number of Nodes	128
Number of cores / node	32
Peak Performance / node	601.6GFlops
Main Memory / node	128GB
Inter-node Network Speed (bi-direction)	32GB/s
Capacity of Storage System	0.5PB

Table 1: Properties of Large-Scale, parallel type Processing Server (March 2009-August 2012)

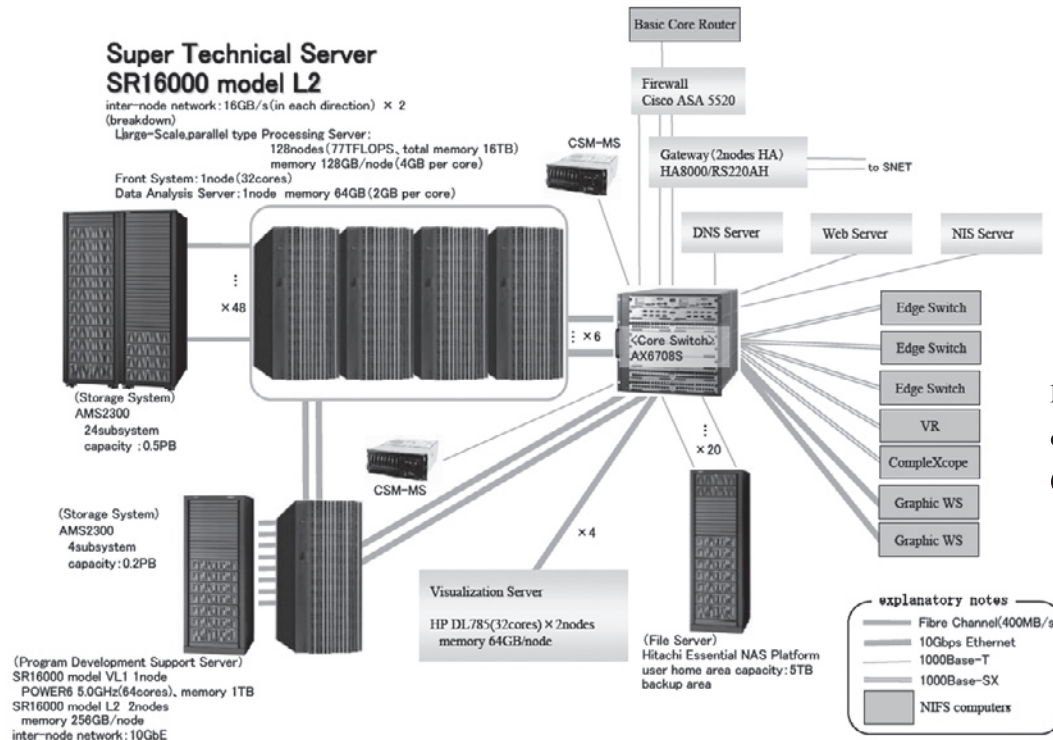


Fig. 1: Schematic View of Plasma Simulator (SR16000)