§1. Data Transfer and Direct Data Acquisition from GAMMA 10 to LHD Virtual Laboratory via SNET

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We started to exhibit the total collection data in GAMAM10 on Plasma Research Center, University of Tsukuba with the collaboration of LABCOM group since 2008. In GAMMA 10, base data acquisition is performed by using a CAMAC system by using Windows PC. These data is collected on the Soralis10 data server system with 4TB RAID system. In addition, we have many stand alone PC data collection systems for many diagnostics. We constructed the Linux (CentOS) data collection server system with 24TB RAID, in order to collect total collection data in GAMMA 10, such as CAMAC collection data and many other diagnostic data. We have connected the NIFS LABCOM/X system under the new framework of "Fusion Virtual Laboratory" where users can access the data equivalently regardless of their whereabouts. Such the activity is named "SNET", which is based on a closed VPN on Japanese academic internet backbone SINET3 and covers multiple experimental remote devises.

In 2010, we started Thomson scattering measurement for electron temperature

and succeeded. In tabel 1, we show the total transfer data names and sizes. Total file size of transfer data is about 1.2 TB/year.

The essential information of experiment operation, the sequence timings and the shot number, are given by the GAMMA10 experiment control system through the hard wires and the http network communication, respectively.

In addition to share the already acquired data, a remote DAQ node was installed at GAMMA10 to measure eight channels of microwave interferometer signals in the central cell plasma.

Diagnostics	data name	Size [kB]
GNBP	bpcc	31,224,136
	bpcc2	6,041,764
ICRF	rf-eprobe	7,334,724
	rf-mach2probe	16,089,776
	rf-machprobe	26,938,108
	rf-mprobe	319,815,984
	rf-probe	1,271,168
NBI	nb-hs-camera	55,574,040
	nb-hs-camera2	595,215,952
	nb-ms-camera2	8,478,172
	nb-ms-camera3	14,822,216
Spectroscopy	sp-usb1	283,584
	sp-usb2	269,552
	sp-ct100c	17,810,440
Thomson	Thomson-osc1	47,258,672
PRC	g10-camac	36,300,568
	Total size	1,184,728,856

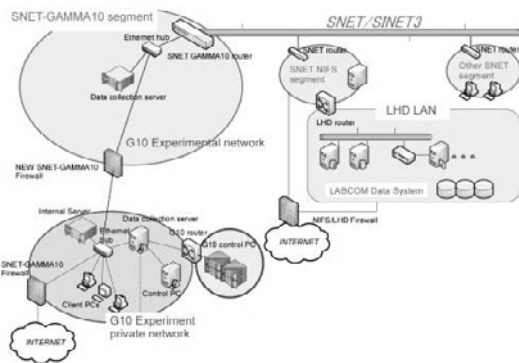Table. 1. Total transfer files.

Fig. 1. SNET formation between GAMMA 10 local network and NIFS server segment.

measurement and microwave reflectmeter for density fluctuation analysis. Moreover, we added the middle speed camera for plasma image analysis. We send the GAMMA 10 total collection data from the GAMMA 10 data collection server to the NIFS LABCOM/X system,