

## §27. Research on Large Scale and Real Time Data Acquisition and Processing System in Distributed Environment

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In this joint research study, a high speed and low cost data acquisition, analysis and control system which was specially designed to the experiments on the Large Helical Device is developed. A computer cluster is made of PC7s and EWS's on the distributed network environment. The real target of this system is to make it clear the ideal image of the data managing system for the large scale scientific research. This system was already used in the real experiments on the LHD. There are several computer systems in NIFS for the data management of the LHD experiments. In the next stage of the study, it is necessary to develop the system to combine these systems.

This year, following projects were accomplished.

1. Evaluation of the Mass Storage System which was introduced in 2000<sup>th</sup>. Compare the trend of tape library and the hard disk drive. In the present state, the hard disk drive is developing more rapidly than the Moore's law.
2. Combine the Video On Demand system of the image data to the data server of the instrumentation system. The plasma image data distribution system was built inside of NIFS on the Web Base.
3. A system displaying real-time data of one hundred sensor signals simultaneously on the 3D image of LHD was developed. Image distribution service in the NIFS started in this year.

4. A total analyzed data management system is completed. Analyzed data in the text format are available from the ftp data server. These analyzed data are compressed by ZIP. FTP servers can multiply distributed on the network. The experimental configuration data are stored on the PostgreSQL relational database server. Data on this database are automatically stored by means of the Java based daemon watching LMS database. Shot numbers of the suitable analyzed data are provided by this database.

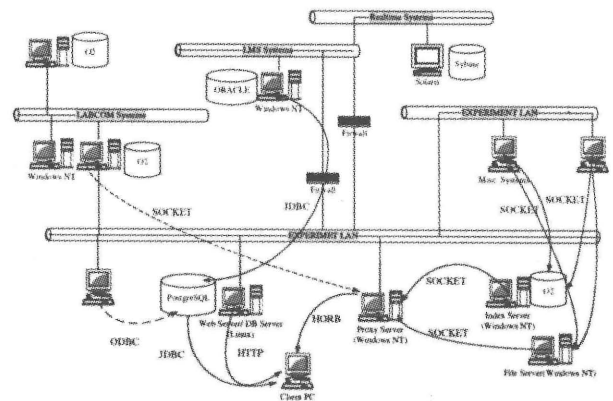


Fig. 1. System Overview: The area drawn by gray is the new system. The arrows in the figure represent the dataflow, the solid lines indicate that the proto type of the communication has been built, and the dashed lines indicate that these are planned.

### Reference

- 1) Emoto, M. et al, "A PROXY server for a real-time monitoring system", PCaPAC2000, Hamburg, Oct., 2000.
- 2) Shoji M. et al, "Video on Demand System for Acquiring and Distributing Plasma Image Data in Large Helical Device. PCaPAC2000, Hamburg, Oct., 2000.
- 3) Emoto M. et al, "3D Real-time Monitoring System for LHD Plasma Heating experiment" submitted to Fusion Eng. Des.
- 4) Emoto M. et al, "A Trial to Combine Heterogeneous Computer System in NIFS", Fusion Eng. Des. Vol.48, pp.83-89, 2000.