§40. LAN (Local Area Network) for LHD Operation

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The operation and control system for LHD is now under design and LHD operation LAN is under construction in order to exchange LHD experimental information and control the devices which are components of LHD.

LHD operation LAN is one component of LHD experimental LAN, on which the information of LHD experiment is transmitted. LHD experimental LAN consists of three sub-network (CLUSTER), we call operation, analysis and plasma data acquisition cluster (see Fig.1). LHD experimental LAN is designed based on a concept that the data with different purpose is transmitted on different cluster in order to transmit the network data reliably and safely, and to control the network traffic.

LHD operation cluster consists of operational information LAN, torus device and peripheral devices control LANs. Management computer of LHD experiment and its terminal, database server computer and its client for the devices' typical status information, we call LMS (LHD Man-machine interface System), are connected through operational information LAN. By using this LAN, we can exchange information for experiment and discharge condition, manage the sequence of experiment and plasma discharge. Moreover we can see LHD devices' typical status information. Data server with detail status information for each device exist on torus device and peripheral devices operation LANs. These LANs are applied in order to acquisition and store the device status data as digital data. We will analyze degitalized device's data by computer, and have posibility that we can apply the more flexible and more inteligent control to the devices based on huge data, which will leads to the better efficiency of LHD operation.

In 1995 fiscal year, a backbone part of LHD operation cluster LAN has been constructed in LHD main building and buildings to support LHD experiment except for LHD control building, in which LAN consists of FDDI, FDDI-switch, CDDI, Ethernet and Ethernet-switch system (see Fig.2).

As concerns the protocol routing and packet bridging, routers in torus device and peripheral devices operation LANs make only TCP/IP routing and pass no other protocol packets in order to keep the reliability and security of network. On the other hand, in the operational information LAN, various network terminals comparing with the devices operation LANs exist. Then, NetBEUI and AppleTalk protocol in addtion to TCP/IP are applied in the network. However, in order to keep the security of the whole LHD operation LAN cluster, we will introduce the Firewall system on the upper network stream side. By using the firewall system, we can make the fine control of security in the level of network application software.

We will make the test run of these network system from view point of keeping security and traffic control. The rest of LHD operation LAN will complete within 1 year. Because LHD control building will be completed in 1996 fiscal year.

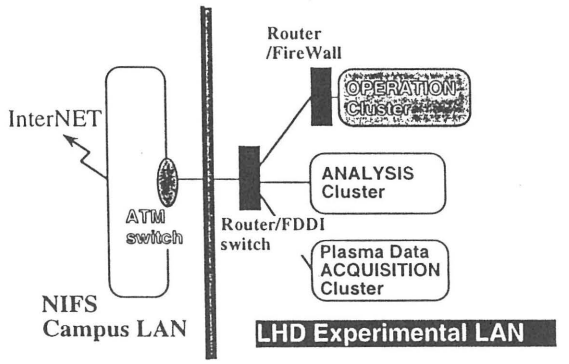

Fig.1 LHD experimental LAN

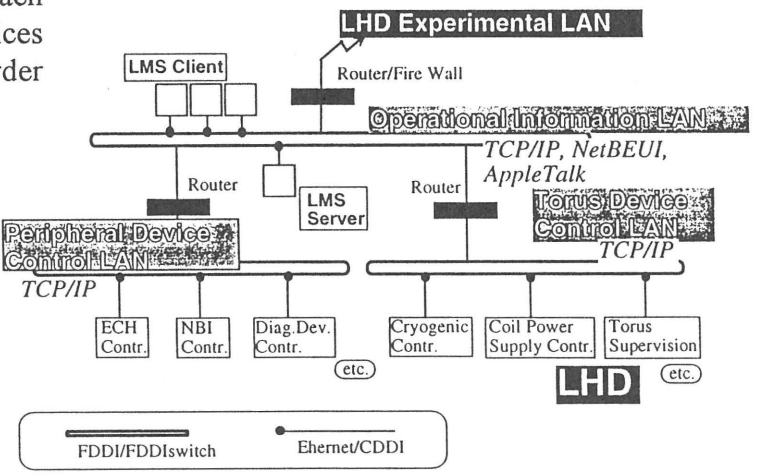

Fig. 2 LHD operation LAN cluster