§45. Relational Data Base for LHD Monitoring System

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We are constructing the LHD monitoring system to watch the status of the operation. The channel number of this system is over 500, and therefore, the number of 10000 parts are used in the system, which include the isolation-amplifiers, its power supplies, ADCs, workstations, cables and their components system. They must be managed and controlled efficiently. Moreover, since this is one of the data gathering system, the data are accumulated and the number of data are increasing with the operation. This situation needs to use the relational data base (RDB).

In order to design the RDB, we must consider the response time, the relation of data, the structure of data, kind of data and types of data. There are three types of data in the system, one is the texts (ex; products' specifications submitted by manufacturers), others are images (ex; the partial drawings of the coils used in the experiments) and meta-data (ex; the numeric data measured in the experiments). Since the experimental data are the time sequential data and it is not suitable to store in RDB directly because of the time response of the system, the experimental data are stored in the different disk. The image data also need large stored area, and RDB engine only indicates the position of the data in the system. The structure of the system is shown in Fig. 1.

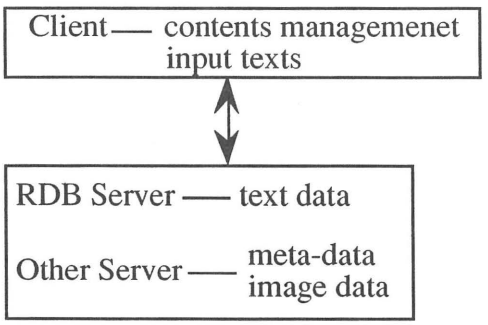

Fig. 1: Structure of RDB system.

The problem at this moment is how to design the database in dealing with the unstructured data management. After the start of the experiment, some change is needed to improve the RDB. RDB must be easy to access by many users, and the technique of WWW is the key for the different kinds of the client computers. In the future operations, we suspect that there should be a great deal of access in the use of WEB interface. At this stage, it's necessary tothink twice about the index system and the buffer function.

In this year, we develop the monitoring system for the IV-Coil experiment. The experimental comments can be written in Web server, and are able to share with many users. These comments are one of data to keep in the system, and the key-word searching system are must the part of RDB system.

Some problems in the database planning are the technical innovation in the relational database is being accomplished to some extent. But it's still not clear how unstructured data should be managed, and how efficiently it should be done. Therefore, the text management in the relational data model or the other kinds of multimedia data are to be dealt with by the pointer-management. The data themselves are to be under the control of the UNIX file system. See the table of an ERD-chart in Fig. 2.

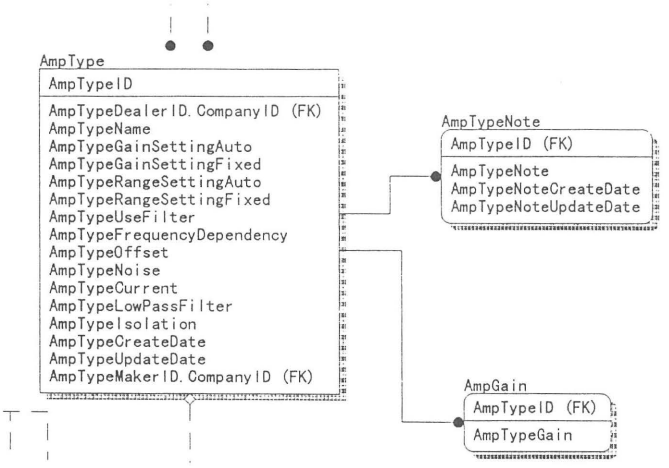

Fig. 2: Table for Amplifier in ERD-chart.

The isolation-amplifiers are used in the system, and there are several types of amplifiers. The gain of the amplifier are set for each sensors and operation parameters. The purchase date and person, the maker company are also managed by RDB.

The future subjects In the computing server, large-scale operations show greater efficiency than a mass of small-scale operations. As for the capacity of the server, in terms of the easiest access, a large-scale single datum is preferable to a mass of small divisions of data. As for the solution to the relational-type, in some cases the better performance can be gotten as the volume is getting bigger. Now the biggest problem is how much response can be realized by operating this experimental system.