§14. Enhancement of the Experimental Database

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The Kaiseki Server System serves the researchers the unified retrieving methods for various kinds of the experimental data, and it have helped the researchers get data easier than before. Since the system began to work, more than 1,000,000 physical data (Kaiseki Data) have been registered. However, because more than 50,000 discharge experiments have been done since the LHD experiment began, it is difficult for the look for the interest experiment. In order to look for the experiment easier, the authors have developed the experimental database.

The database provides two kinds of information for each discharge experiment. One of them is basic information of the experimental condition, such as, magnetic axis, coil current, injected gas, etc. Another one is summarized physical quantity of each discharge experiment, such as, stored energy, pulse width, electron density, and the like.

The experimental condition is maintained mainly by the LMS database that stores the status of devices attached to the LHD. A daemon[1] program checks the LMS database every one minutes, and if it is updated, the program copies updated records into the Kaiseki Database. There are other information that aren't maintained by the LMS database, for example, gas puff timing, LID current, pellet timing, and so on. These data are managed by different groups. The information is recorded into text files, and another daemon program copies the contents into the database in every three minutes.

The summarized physical quantities are calculated from the Kaiseki Data. When a new Kaiseki Data is registered into the database, its information is added to a queue. At every night, a batch program sees the queue, and checks if the summarized quantities should be updated. If it is necessary to update the quantities, it recalculates the values.

The users can use the database directly from their programs. However, in order to use the database, they have to use SQL language. To make it easier, the authors developed the GUI interface to use the database. Fig.2 shows the WEB interface of the system. The program itself is written by PHP, but from the client side, it looks just like a normal web page, and the standard web browser can use the program. The user can enter the search condition on the upper part of the page, for example, pulse width >= 1.0 sec, magnetic axis = 3.6, etc. Therefore, they can look for the information without using SQL. The results are shown on the down part of the page. From this region, the user can get the PDF files. These PDF files are shot summary graph of each discharge experiment. As this figure, the default result output is shown as a webpage, but the results can be obtained as a CSV file. This format is convenient to use from other programs.

[1] The daemon is a program that runs at background and usually doesn't have an interface to users. A typical daemon is a WEB server.

server can be used basically by any person, but it needs registrations. The public server is located on DMS (De Military Zone). This is the subnet where the user cannot access to the computers in other LANs except for connecting to the Kaiseki Database.

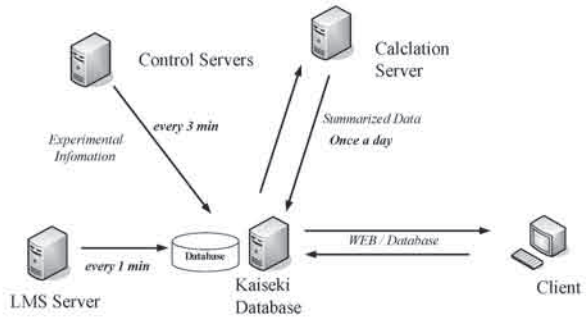

Fig. 1 System Overview

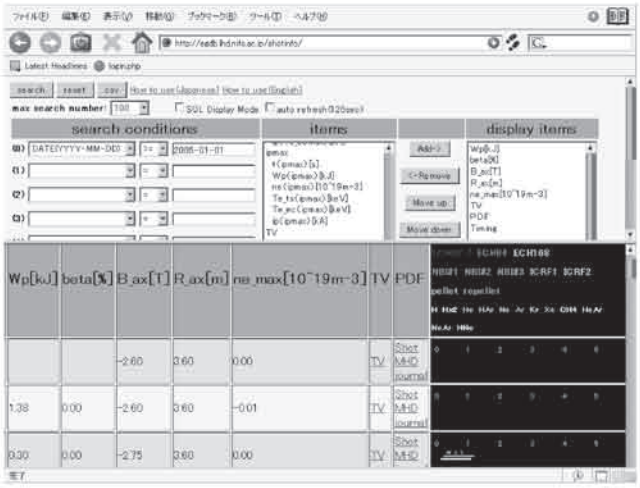

Fig.2 WEB Interface for the Experiment Database

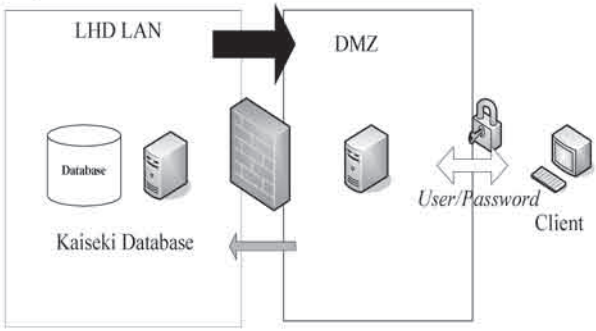

Fig.3 Public Server

Reference

1) Emoto, M., et. al., IAEA TCM on Control, Data Acquisition, and Remote Participation for Fusion Research Budapest, 2005