§10. Plasma Summary Database

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Introduction

LHD project has been operating for three years, and there are more than 26,000 plasma discharge experiments. During four campaigns, the total number of the analyzed data stored in the Analyzed Data Server reached 330,000. However, because the experiments that a researcher is interested in are not so many, an efficient method is required to look for these experiments. For this purpose, the plasma summary database has been developed. This database provides typical plasma characteristics of each plasma discharge, for example, the stored energy, and the highest electron temperature, and so on. Because these data are provided by a relational database PostgreSQL, the user can access data by their own programs easily.

System Overview

The available shot summary is shown in table 1. These data are created from the analyzed data in the Analyzed Data Server. These data are created by the batch jobs every night. Therefore, the plasma summary cannot be available until at least one day after the experiment. Figure 1 shows the data flow of the system. When a new analyzed data is stored or the existing data is updated, the shot number of the analyzed data is added to the list. The plasma summary update program is invoked every night by UNIX's cron daemon, and it checks the list if there is an entry. If there is any, the program creates or updates the summary data from the analyzed data.

There is another database which describes the experimental conditions; when discharge is started, which gas is used, how experiment coordinator commented on, and the like. Because these two kinds of data are stored in PostgreSQL 7.1, an open source RDB (Relational DataBase), two databases can be joined and more complex conditional search is available. We provide the EXPLOG view for this purpose, which combines plasma summary and experimental conditions.

These data can be available from WEB brewers by Java Applet [1] and CGI [2], and from the native application. Because there are many interfaces to use PostgreSQL, the researchers easily look for the experiment from their own programs. The sample codes of PV-Wave, C++, Perl, Ruby, Java, and FORTRAN are listed in our Web page[3].

Because of a security reason, this database cannot be accessed from the outside of NIFS. For the researchers from other institutes, we provide Windows Terminal servers and a mirror server. In order to use these servers, they have to be registered.

NAME	DESCRIPTION
wp_max	the largest wp (stored energy measured by DIAMAG)
time_wpmax	time when wp is max
nl_max	the highest density of FIR
time_nlmax	time when the density is max
tets_max	the highest electron temperature by Thomson scattering
time_tetsmax	time when the temperature is max
Ip_max	the largest plasma current by Rogoski coil
time_Ipmax	time when the current is max
nbi1_pow	the max port through power of NBI 1
nbi2_pow	the max port through power of NBI 2
time_dis	the discharge time
Ip_wpmax	plasma current when wp is max
nl_wpmax	plasma density when wp is max
te0ts_wpmax	the central electron temperature by Thomson scattering
radpow_wpmax	radiation power when wp is max
C3_wpmax	C_{III} luminescence when wp is max
C5_wpmax	O_V luminescence when wp is max
nbipow_wpmax	total port through NBI power
nbipowst_wpmax	total shine through NBI power

Table 1: Available plasma summary data; the column names of EXPLOG view, and their definitions.

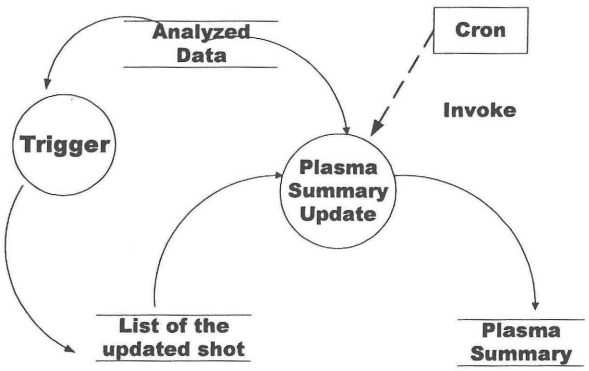

Fig. 1. Data flow of Plasma Summary.

[1] http://egdb.lhd.nifs.ac.jp/index.html
[2] http://egdb.lhd.nifs.ac.jp/explog/index.cgi
[3] http://dgegw3.nifs.ac.jp/Software/shotsummary/index.html