

Data Extraction and Analysis Support System Based on Client/Server System*

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1 Introduction

At Kawasaki Steel Corp., a variety of EUC support systems has been constructed on mainframe computers in order to collect data produced by the wide range of application systems used in planning, operation, and control, and to enable the direct use of such data by business staff, realizing major benefits.

On the other hand, a great number of high-level HMI (human-machine interface) technologies, which facilitate the dialogue between computers and users, and systems aimed at the visual representation of large volumes of data have been developed in recent years using PCs and the EWS (engineering workstation). Downsizing is also being promoted using an organic combination of the mainframe computer with UNIX machines or with UNIX machines and PCs.

In line with these trends, Kawasaki Steel Systems R&D Corp. developed a client/server system for data extraction and analysis support by linking PCs to a mainframe computer and UNIX machines to form a general-purpose system which provides efficient support for both regular and non-regular data analysis work.

2 Functional Features

As one data active-use mode, we are aiming at client support using high-level HMI, under the three-level decentralized environment using the mainframe (information common to business offices of the company) to department server (information of departments) to PC (information in individuals), and this system is regarded as its nucleus.

The main function which this system should have is the non-regular data analysis support function, and its major functions are as shown below.

(1) Data Base Navigation Function

As a central function of this system, data-base navigation makes it possible to search only the necessary data by not providing the user with items such as the data location (storage address, storage format) which by nature are not necessary. Fundamental data-organization functions, such as sort/merge of searched data, are also incorporated in this function.

Further, when data is to be actually used, it is important to know its meaning (origin and definition). In order to support this, the system has the functions of offering the information on the file of the data, information on the record, and the information on the item.

Furthermore, in the present function, an interactive use mode is assumed, but it also has the system of preserving work by making a script of the operation on the basis of the accumulated data of work which has been carried out interactively, and re-use the script.

(2) Analysis Function

The analysis functions includes analysis functions (selection, stratification, computation and statistical analysis) and a data base navigation function (retrieval of data). The procedure for the analysis including the logic can be preserved as a script, in the same way as the aforesaid (1).

(3) Presentation Function

This is a function for preparing graphs and reports based on the results of data retrieval and analysis. The procedure for the above preservation is possible as a script in the same way as the aforementioned (1).

(4) Fixed Type Business Support Function

This is a function for carrying out the automatic execution of standard procedures and for offering a pattern for preparing the regular processing procedures.

* Originally published in *Kawasaki Steel Giho*, 27(1995)2, 128-129

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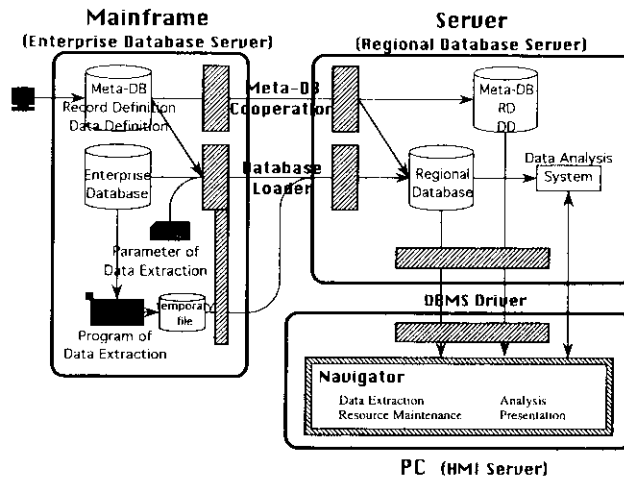


Fig. 1 Overview of system configuration

3 System Outline

3.1 System Composition

The object of the present system is computers of the three hierarchical layers (Fig. 1), consisting of the mainframe (enterprise data base server), departmental server (regional data base server) and PC (HMI server), which respectively play the following roles:

- (1) Mainframe (Enterprise Data Base Server)
 - Storage of data, which is generated from the fundamental system
 - Retrieval and work processing of enterprise data base
 - Control of data base/file/data definition/record definition information
 - Relations with departmental server
- (2) Department Server (Regional Data Base Server)
 - Storage of data for department
 - Retrieval and work processing of regional data base
 - Relation with mainframe/other department server/PC
- (3) PC (HMI Server)
 - Offering of HMI which supervises the dialog with the client
 - Client of regional data base retrieval
 - Mainframe terminal function
 - Execution of various kinds of applications

3.2 Composition Elements and System

The present system has the following four sub-systems as internal systems for organically connecting computers in the three hierarchical levels.

3.2.1 Navigator (operates on PC and department server)

Navigator is a nucleus element of the present system. It consists of (1) HMI, which becomes a mediator

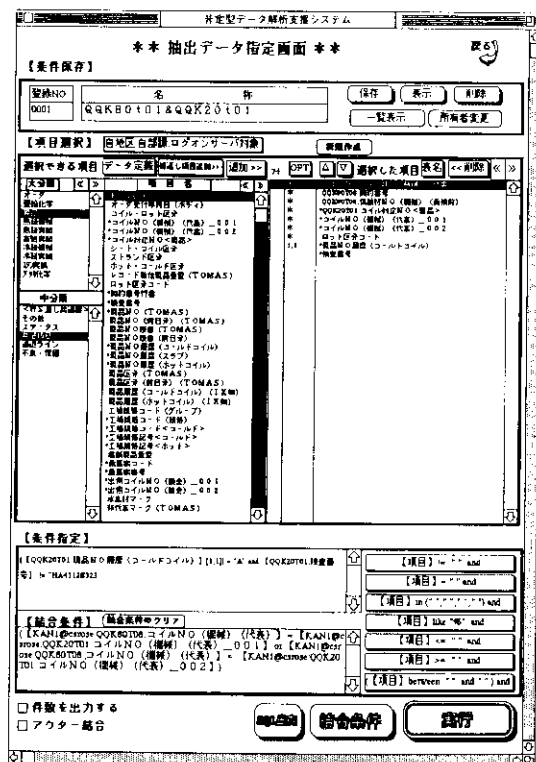


Fig. 2 An example of data extraction menu

to the following various functions through the HMI server, (2) retrieval for driving the DBMS, (3) analysis and working part, which is responsible for work processing of the retrieved data, and (4) presentation, which supports the report-making operation of the data after working.

The present system also has the function of controlling resources such as the user's script, and the function of supporting visually the use by the user. Figure 2 shows an example of the data extraction screen.

3.2.2 DBMS driver (operates on department server)

This driver has the functions of retrieving data on the basis of the retrieval instructions of the data base given by Navigator, and also has the function of transferring the obtained data to Navigator. This driver has the function of preparing the procedure to be used for retrieval, using the meta-data-base, depending upon the physical-existence locations of the respective data bases and controlling tools, and also has a function of executing retrieval processing at distributed data bases.

3.2.3 Relation to meta-data-base (operates on mainframe and on department server)

This function makes usable at the department server such information as the data items and records which are controlled on the mainframe, and the function of defining the data base on department server from the mainframe. Further, it has roles of unified control of this information on the mainframe and offering various types of necessary information for execution of other functions.

3.2.4 Data base loader (operates on mainframe and department server)

This function transfers regional data extracted from the enterprise data base server to the department server after data exchange, thereby carrying out data base development.

4 Working Environment

This system is operated in the following environments, and we are gradually expanding the operating platform and DBMS.

Mainframe: M series of Fujitsu

Department Server: UNIX machines with informix, which is the RDBMS of informix Corp. U.S.A.

PC: Macintosh and Windows

5 Concluding Remarks

In the operation of this system, the data preparation condition in the mainframe, UNIX machines and PC, and various system-engineering environmental conditions will have important effects. Therefore, this is not a system such as package software, which can be used immediately after installation, but rather it is indispensable that each customer use the system according to his respective data control condition by matching with the EUC environment, and customize the system in accordance with the method of use of the system. Even in such a cases, we believe that we will be able to construct non-regular data analysis supports systems matched to customers' individual needs by using the know-how in data control and in the creation of methods of using it which we have cultivated so far.

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