



Development of the Web Interface for Analyzing Program



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Abstract

There are many programming codes developed to analyze plasma physics. However, most of them are developed to run in supercomputers. Therefore, it is not easy to use them for those who usually use personal computers. In order to make these program widely used, user friendly interface is necessary. The authors propose the Web interface to these programs. To demonstrate the usefulness of this approach, the authors developed Web interface of two analysis programs.

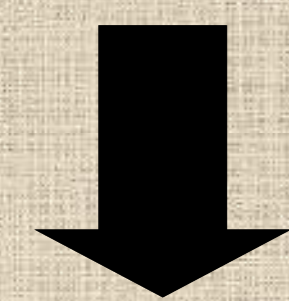
One of them is FIT code developed Murakami. This is a program to analyze NBI heat distribution and so on. Because this program requires parameter file contains the profile of electron density, electron temperature, and ion temperatures as polynomial expressions, it is difficult to use for those who are not familiar with the experiments especially visitors from other institutes.

The other one is a program to visualize lines of force in the LHD (LHD Helical Device) developed by Watanabe. This program is to analyze interference of lines of force with various structures installed in the vacuum vessel of the LHD. This program is run on personal computers; however, it is required to edit necessary parameters by hand.

Using the web interface, the user can run these programs interactively.

Necessity of GUI interface

To analyze various aspects of plasma physics, many analyzing codes such as VMEC, HINT, and TASK, are developed. Most of them are written in FORTRAN and run on super computers. Therefore, it is not easy to use these codes for many researchers who usually use personal computers. For example, these programs are usually command line applications that have to be invoked from the terminal emulators, while PC users usually use GUI based programs with mouse operations. Furthermore, the necessary parameters are usually written in text files, and the user has to write them by hand, and the procedure often makes mistakes. In order to make the existing code widely used by researchers, the user friendly interface is necessary.



Demonstration of the usefulness of Web Interface

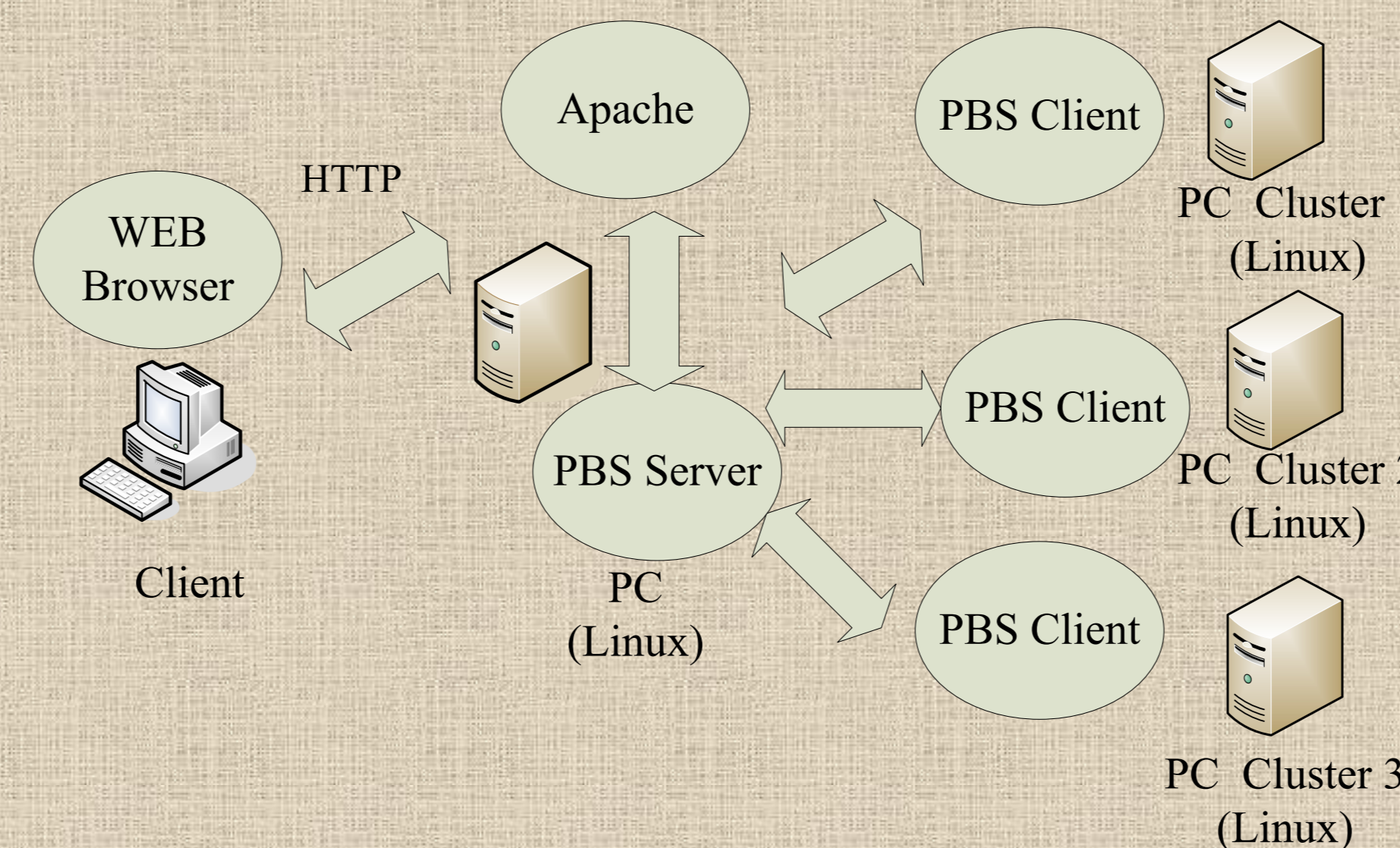
Therefore, the authors have been developing the Web interfaces to these programs. With this interface, the researchers can give the parameters interactively to the programs by their familiar Web browsers. To demonstrate the utilization of this approach, the authors have developed two systems.

1) Visualization of the Lines of Forces in the LHD

2) FIT CODE

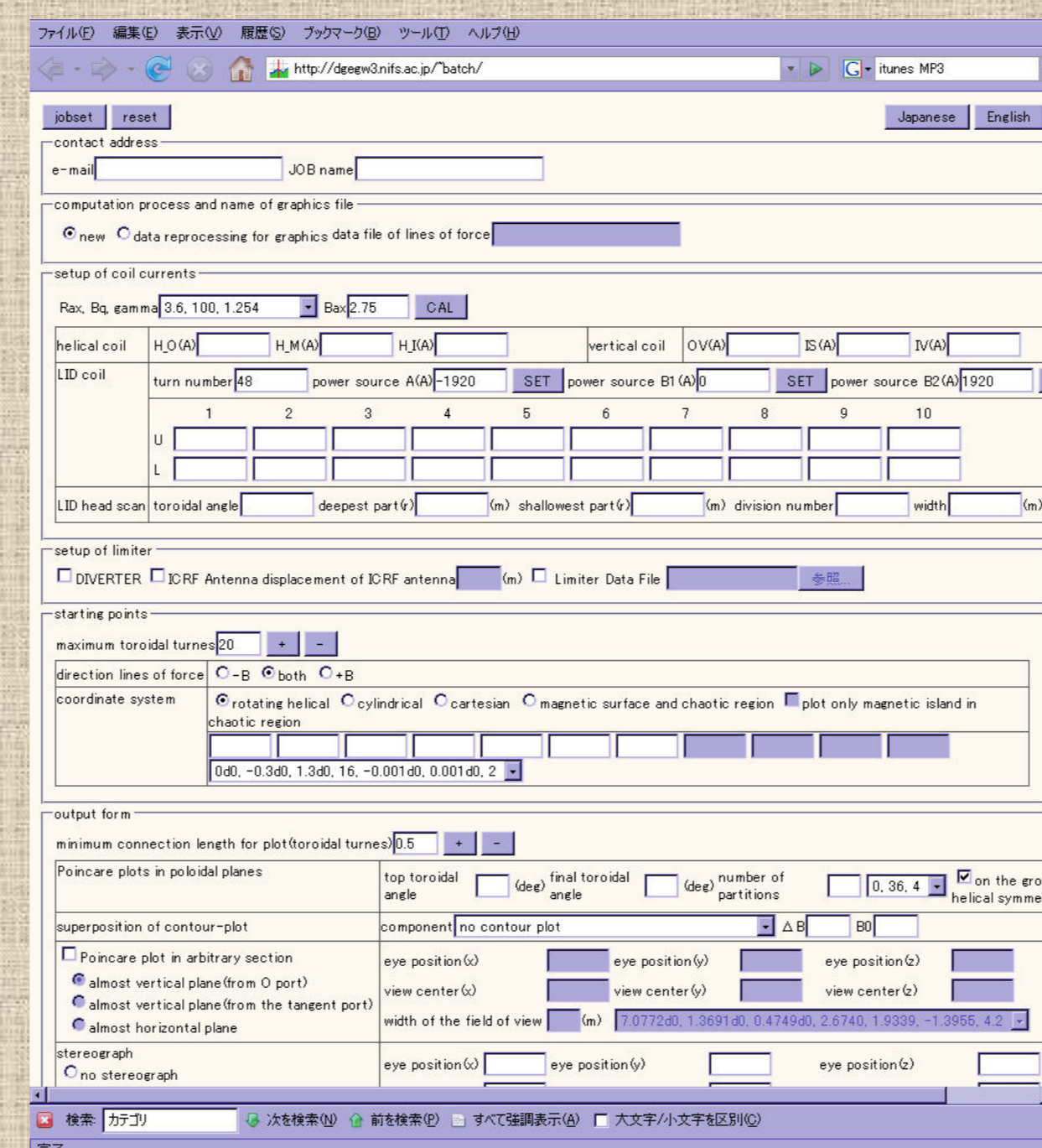
1) Visualization of the Lines of Forces in the LHD

This program is developed by Watanabe to analyze interference of lines of force with various structures installed in the vacuum vessel of the LHD. This program runs on the PC, but the parameters must be given as a text file. Furthermore, it uses a lot of computer resources and it takes time to calculate depending on the condition. Therefore, a user-friendly interface and a batch system is required to allocate appropriate computer resources to run the program.



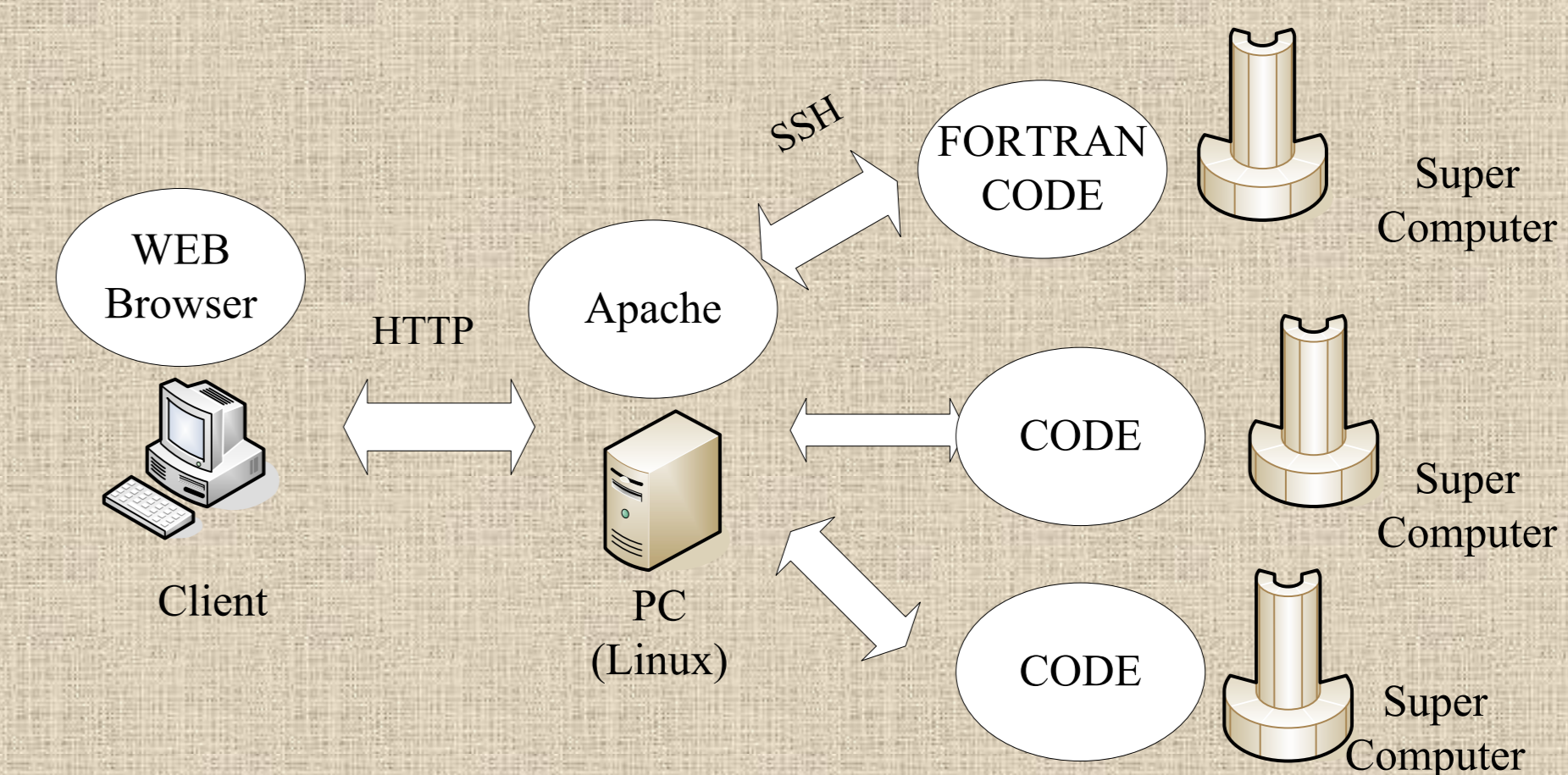
System Overview

The necessary parameters are given from the web browsers interactive. The calculation is done as a batch job using PBS (Portable Batch System). When the calculation is done, the system sends an Email to notify the user.



2) FIT CODE

This program is developed by Murakami to analyze NBI heat distributions, and it runs in the supercomputer. This program requires a text file contains distributions of electron temperature, density, and the ion temperatures as polynomial expressions of normalized plasma radius. It is difficult for those who usually use personal computers, and the researchers who don't join the project don't know where the data stores or how to read them. Therefore, for those users, more user-friendly interface is required to run the program.



System Overview

The necessary parameters are given from the Web. It uses AJAX (Asynchronous JavaScript + XML) to make establish smooth user interface. The actual program is run in the supercomputer. These programs run as a batch jobs. The server PC communicates with the supercomputer using SSH to manage jobs.

