ELECTRONIC LOGBOOK BY USING THE HYPERTEXT PREPROCESSOR

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ABSTRACT

The electronic logbook (ELOG) is widely used in modern accelerator and experimental physics facilities. Convert paper notebook to electronic logbook will benefit form system management, operation efficient, improve communication, and many advantage. All users can use it to record experiment data, machine status and events. Retrieve the record information can be done via internet without physical limit. This ELOG website browser is designed by the hypertext pre-processor script language (PHP). The PHP is a widely-used general-purpose scripting language that is especially suited for web development and can be embedded into HTML. This system can be integrated with any kind control system and general purpose Windows' PC. The system structure and preliminary test results will presented in this report.

INTRODUCTION

Typical ELOG in this case for an accelerator should have following features:

- Public read access.
- Write access only for registered users.
- Typical attributes for shift logbook.
- Author and author email get automatically filled in.
- No email notification.
- Its simplicity of use: you don't need to be a seasoned server operator and/or an experimented database administrator to run ELOG ; one executable file (under Unix or Windows), a simple configuration text file, and it works. No Web server or relational database required. It is also easy to translate the interface to the appropriate language for your users.
- Web access, uses database storage (easy for searching).
- Entries by logbook type, equipment category.
- Viewable chronologically, or by thread.
- Document attachment capability.
- Stay abreast of progress remotely, partner lab access.

The purpose of **ELOG** is to make it easy for people to put information online in a chronological fashion, in the form of short, time-stamped text messages ("entries") with optional HTML markup for presentation, and optional file attachments (images, archives, etc.) and to make it easy for other people to access this information through a Web interface, browse entries, search, download files, and optionally add, update, delete or comment on entries.

THE EXISTENT E-LOGBOOK TECHNOLOGY

The java technology is used for the e-Logbook follows the classical client-server architecture (see figure 1).

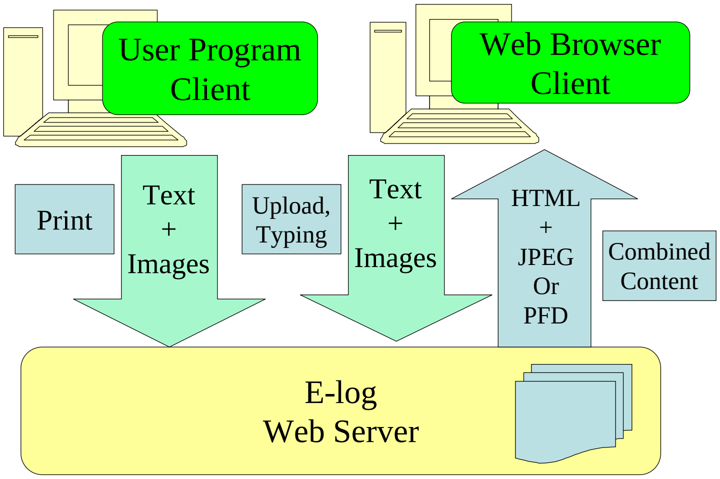

Figure 1: Basic architecture of the e-Logbook

There are two ways to store data in the e-Logbook, which functions in this view as a kind of database. One way is mostly used for the input of graphical data and is realized by a simple low level Postscript (PS) print service. This input channel can easily be realized on any standard UNIX system that provides the so called pipe mechanism. Any user program that is capable of printing to a standard postscript printer is able to write graphical and textual data into the e-Logbook via this channel. The second input channel is mainly meant for input of ASCII text data but we now also provide the common file upload functionality. A plain HTML "forms" page as front end in the browser is provided to directly type in comments to the graphical data and also to place text-only entries.

The core functionality provided by the e-Logbook is based on the internal data handling and storing by using the extensible mark-up language (XML). The XML file is a specified format of the contents. Figure 2 shows a more detailed view of the dataflow that will be invoked by an input of graphical data (green arrows) and the request for certain period of time (blue arrows) by a client.

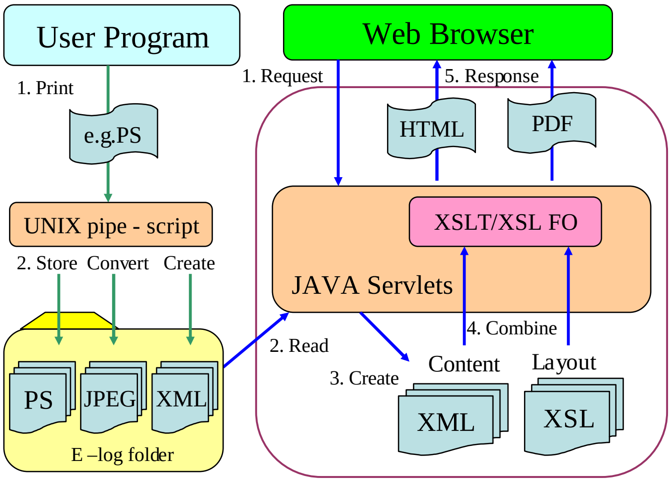

Figure 2: Data flow for graphic input and for a request of a certain period of time.

Data input

In the case of input of graphical data a program (realized by a shell script) is "listening" at the already mentioned pipe which is connected to a printer port. If PS data is send to this printer port, the program saves the original PS data and creates a JPEG version (for display by the web browser) and a template XML file. This XML file provides the linkage information that uniquely connects the above mentioned files.

Data output

If a request is send to a JAVA servlet running on the web server, the servlet reads the appropriate data and creates a temporary XML file holding all requested entries.

The servlet triggers an XML parser to read and pass the data to an XSLT (XML *stylesheet language transformation*) processor in case of HTML output or to an XSLFO (XML *stylesheet language formatting objects*) processor for creation of PDF output now. In the same time, it redirects this output stream to the requesting web browser and the request is fully processed. The data flow is sown on the figure 3.

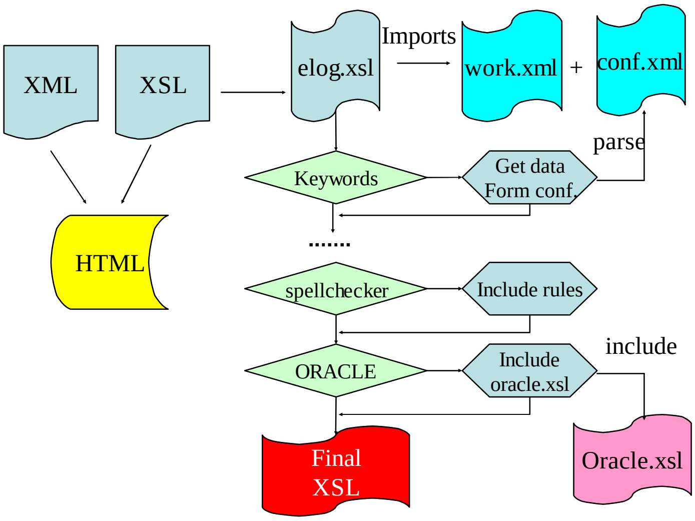

Figure 3: Sketch of the modular XSL architecture.

We have implemented JDBC (JAVA database connectivity) support to allow direct storing of main machine parameters and standard shift settings (like names of the shift crew, goals, achievements etc.). This allows the operators to do most of the standard documentation from within the e-Logbook environment.

Further we now gathered first experience with an authentication and authorization schema. We are using the Apache httpd mod_ssl to provide a secure http (https) connection to authenticate the user via Apache Tomcat by use of JAAS (JAVA authentication authorization schema). This will not only allow to fine grade control the accessibility of certain resources on a per user basis but also allow personalizing the user’s special desires.

THE PHP TGECHNOLOGY FOR PROTOTYPE E-LOGBOOK IMPLEMENTATION

Beside DESY’s version ELOG which already applied in the NSRRC, we try to implement a prototype ELOG with another technology. The features of this prototype implement are:

1. The java runtime engine isn’t normally included in the popular operation system now. We must download java engine and install it. There is no this privilege for general user when you find the computer is no java engine.
2. User management, security management, information display, alarm log and search engine build up.
3. Discussion and printout typesetting.
4. Maintenance request.

The PHP technology is applied for this prototype ELOG system implementation. PHP, which stands for "PHP: Hypertext Preprocessor" is a widely-used Open Source general-purpose scripting language that is especially suited for Web development and can be embedded into HTML. Its syntax draws upon C, Java, and Perl. The main goal of the language is to allow web developers to write dynamically generated web pages quickly, but you can do much more with PHP. PHP is mainly focused on server-side scripting, so you can do anything any other CGI program can do, such as collect form data, generate dynamic page content, or send and receive cookies.

There are three main areas where PHP scripts are used.

- Server-side scripting. This is the most traditional and main target field for PHP. You need three things to make this work. The PHP parser (CGI or server module), a web server and a web browser. You need to run the web server, with a connected PHP installation. You can access the PHP program output with a web browser, viewing the PHP page through the server. All these can run on your home machine if you are just experimenting with PHP programming.
- Command line scripting. You can make a PHP script to run it without any server or browser. You only need the PHP parser to use it this way. This type of usage is ideal for scripts regularly executed using cron (on Unix or Linux) or Task Scheduler (on Windows). These scripts can also be used for simple text processing tasks.
- Writing desktop applications. PHP is probably not the very best language to create a desktop application with a graphical user interface, but if you know PHP very well, and would like to use some advanced PHP features in your client-side applications.

PHP can be used on all major operating systems, including Linux, many Unix variants (including HP-UX, Solaris and OpenBSD), Microsoft Windows, Mac OS X, RISC OS, and probably others. PHP has also support for most of the web servers today. This includes Apache, Microsoft Internet Information Server, Personal Web Server, Netscape and iPlanet servers, Oreilly Website Pro server, Caudium, Xitami, OmniHTTPd, and many others. For the majority of the servers PHP has a module, for the others supporting the CGI standard, PHP can work as a CGI processor.

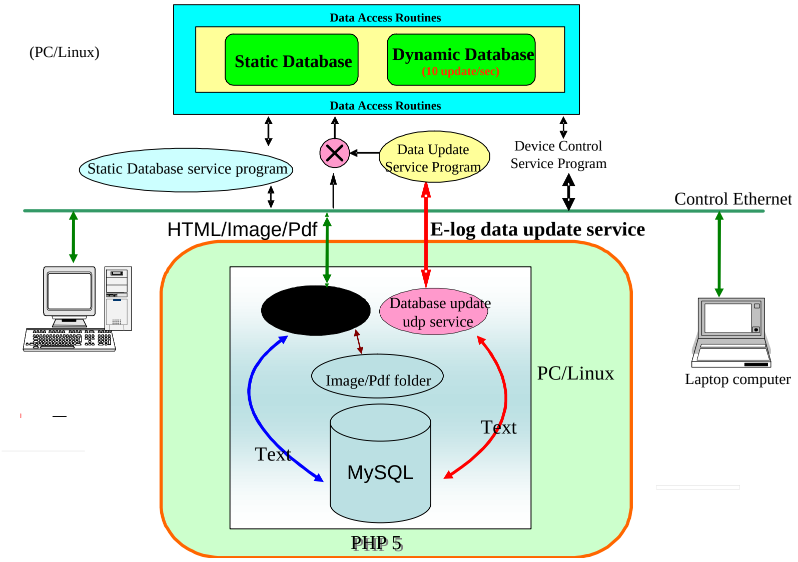

Figure 4: ELOG data access structure by the PHP.

So with PHP, you have the freedom of choosing an operating system and a web server. Furthermore, you also have the choice of using procedural programming or object oriented programming, or a mixture of them. Although not every standard OOP feature is implemented in PHP 4, many code libraries and large applications (including the PEAR library) are written only using OOP code. PHP 5 fixes the OOP related weaknesses of PHP 4, and introduces a complete object model.

In the ELOG application by the PHP, the database update UDP service program supports accelerator information access that is from control database, and writes it to MySQL database. The MySQL database is belonging to ELOG server. All data search is based on this database. The PHP server generates html script to the client browser when users send html request to this apache web server. These includes of static html, a part of dynamic html. The static html is used in the most of board. The accelerator real time information is automatically from PHP access in the static html browser of user with TCP connection. The news update is by the browser sends the request in each period time to get the fresh html file and update display page in the dynamic html. The data access structure is shown in the figure 4. The function block of PHP server is shown in the figure 5.

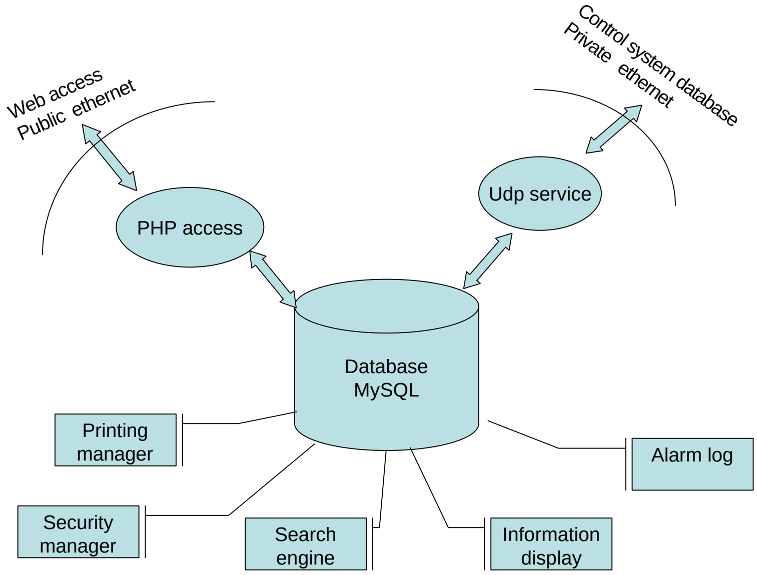

Figure 5: The function block diagram of PHP server.

The ELOG function of PHP server includes of printing manager, security manager, information display, search engine and alarm log. The printing manager is for daily printing request to be an official form. The security manager is limit access for different user group. The search engine is to look for history information by keyword, time, subject, author and general search. The information display is a horseback display for news. The alarm log is an event display to show machine alarm information.

From e-logbook operation experience in this field, the implementation follows the, in the area of web services widely used, client-server concept. On the client side every standard web browser can be used as user interface for input of text and retrieval of information. Graphical data can be inserted by use of low level postscript print services to offer a platform and program independent input interface. The ELOG application web page is shown in the figure 6.

CONCLUSIONS

During the past two years we have seen that the acceptance for electronic logbook porting form TTF e-Logbook version with Chinese features in the NSRRC [4]. There are several e-logs already for daily usage. In this report, we demonstrate to adopt hypertext technology, PHP, as an implement of prototype e-log. The prototype shows the plenty features of PHP for e-logbook application.

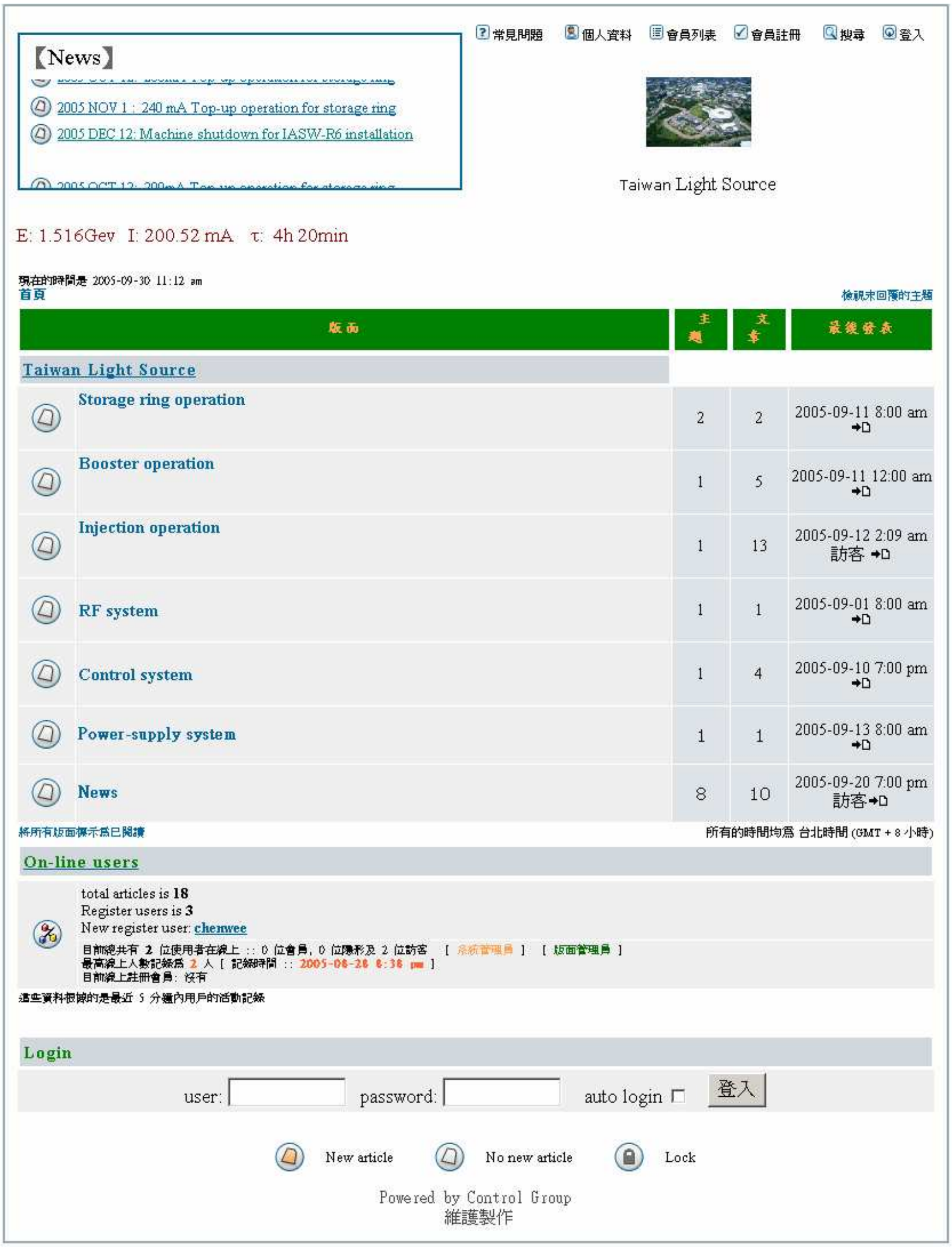

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Figure 6: ELOG web page by PHP

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