

PROPOSAL FOR A NEW FERMILAB ACCELERATOR DIVISION ELECTRONIC LOGBOOK

Kyle J. Hazelwood September 20, 2011

Abstract

The Fermilab Accelerator Division Operations department and machine departments have been using the same electronic logbook (elog) product for 13 years. The current elog, while sufficient in many ways, is dated and lacks many features and capabilities expected from a modern product. Each machine department is given their own dedicated elog instance making it cumbersome to get an overall picture of events in the division.

I propose a new Accelerator division elog that incorporates all departments into one elog instance and makes use of modern security, GUI, and data storage practices and technologies.

THE CURRENT ELECTRONIC LOGBOOKS

The Fermilab Accelerator Division Operations department first adopted the elog they have now on March 10th, 1998. Most machine departments adopted it soon after Operations did. The current logbook is an altered version of the Electronic Notebook Project created at Oakridge National Laboratory (ORNL) in the mid-1990s.

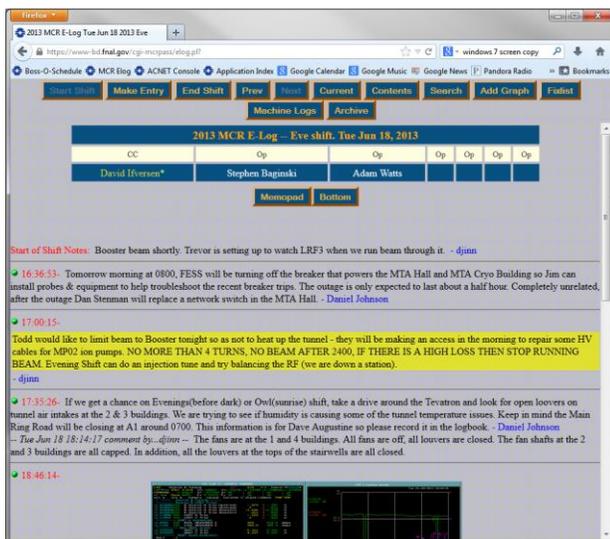


Figure 1: Current electronic logbook

The current elog uses Perl CGI scripts. The elog is broken up into “shifts” or “studies” that are merely html documents. When users submit new entries or comments the formatted html representing the submission is appended to the document. Files attached to entries and comments are saved on the server hard disk. There is no separation of html formatting and the data. There are limitations to the current elog:

- Only basic search capabilities; mostly substring text search, and it is slow
- Each elog requires yearly archiving to maintain reasonable search capability
- Does not require authentication of users for write access
- Offsite read access is achieved through a .htaccess scheme using a generic user password
- There is very limited offsite write capabilities
- The graphical user interface is very dated and cumbersome to add entries, comments and files
- Users do not have the ability to edit their entries or comments after submission
- Poorly formatted html “breaks” the elog

There are some features of the current elog I believe are so well liked that they must exist in any future elog:

- Commenting of entries
- Html markup of entry and comment text
- File uploads

DESIRED ELECTRONIC LOGBOOK CAPABILITIES

The most fundamental change desired for any new elog product would be the incorporation of all division elog instances into one. This new whole division scope would help

cross department operational understanding and collaboration. In addition to changing the scope of the elog there are many technical changes desired:

- Faster, more elaborate searching of entries
- More sustainable architecture
- More efficient image/file uploading
- Greater sorting/filtering abilities
- Offsite write access
- User authentication for write access and offsite read access
- Tiered admin privileges to manage the elog and elog users
- Entry and comment author editing privileges
- Entry categorization
- More modern graphical user interface
- File tagging

THE PROPOSED ELECTRONIC LOGBOOK

The elog I propose to replace the existing elog with will take advantage of many practices and technologies not used or not available at the time the current elog was adopted.

The most fundamental architecture change from the current elog would be the use of a relational database. The proposed elog would use a PostgreSQL database. The elog data would no longer be tied to the visual appearance of the elog client. Using a database makes many features possible:

- Log tags
 - Gives the elog the appearance of many logbooks while allowing viewing the entire divisions entries at once
- Category tags
 - Allows the categorization of entries for easier searching
- Faster and more elaborate searching

- Based on user, log, category, text, dates and more
- Sorting and filtering of entries
 - Based on creation date, modification date, log, user and more
- Per user log permissions
- Tiered admin permissions
- Editing of entries and comments authors and administrators
 - Maintain record of original entry while showing edited content
- File tagging
 - Allows tags (captions) to be added to files for later searching

Relational database tables when properly designed are capable of handling millions of entries with ease. The current elog handles on average 25 thousand entries a year. The database should alleviate the need for archiving for many years to come.

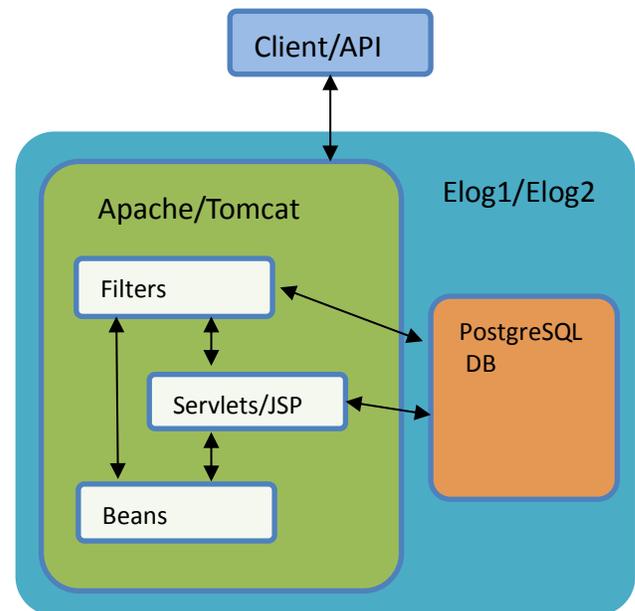


Figure 2: Proposed electronic logbook architecture

The proposed elog would be based on the model view controller concept. Java servlets and JSP pages would provide the user

interface. The servlets and servlet filters would route requests and intercept or redirect requests when appropriate.

Network security is a large concern for web enabled systems. The proposed elog will require that users authenticate themselves before they can add content. Authentication will also be needed for offsite read/write access. Https (SSL encryption) will be used to protect users' credentials. The proposed elog would use the already in place Fermilab services account system to allow users to log in. No user login information will be stored on the elog server itself.

Being that our accelerators run 24/7, 365 days a week, data integrity and operational rigidity are musts. The proposed elog will be designed and coded in-house and will be fully integrated into the divisions software control repository and build system. This allows anyone to review and maintain the elog code. Also, the proposed elog will have a "hot" spare. All data will be replicated real-time on an operational spare. This assures there is a constant backup of the elog data as well as a fast recovery from any elog server hardware failure.

CONCLUSION

The proposed elog would implement features users today expect from a modern web product. This elog being built atop of a relational database assures our data is safe and easily searchable while allowing content to be removed from the visual formatting. The web security features of this elog would allow expanded use of the elog to more places while assuring data integrity without users having to remember another password. Incorporating the elog product into our software development infrastructure assures the elog can be maintained for years to come and further built upon.