SNS LOGBOOK*

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Abstract

An electronic logbook has been developed for the Spallation Neutron Source (SNS) [1] at Oak Ridge National Lab. This logbook serves as a means of chronologically recording daily operations activities and experiences and communicating them to appropriate groups. The logbook is database driven and integrates into our existing database schema. The interface to the logbook is web based and works with most modern web browsers on the major platforms. Additionally, a Java package provides a simple mechanism to post entries from within our XAL [2] applications.

INTRODUCTION

The SNS Logbook is the official electronic logbook for the Spallation Neutron Source. It has a web interface compatible with modern web browsers and is backed by a database. While the SNS Logbook has been presented at other meetings [3, 4], there have not been any papers describing it.

In spring 2002, before the start of commissioning the linear accelerator, the operations group realized the need for maintaining an electronic log of operations activities. We performed a search for electronic logbooks at use at other laboratories to determine whether we could use an existing one. Then, we could not find any logbooks that were backed by a database for all of their data. Some were either entirely file driven while others were a hybrid of file and database backing. We found it desirable not only to have a logbook that was completely database backed, but to have one that was integrated into our existing database schema. Other common problems with existing logbooks were their complexity for both the end user and the administrator.

In May 2002, the operations group decided that it would be ideal to build our own electronic logbook that could satisfy our requirements. We deployed the first version in October 2002 and have continued to make improvements over the years including adding new features as well as significant enhancements to the user interface. Today, the logbook is at version 3.5, has over 300 users and over 149,000 entries. The SNS Logbook is the official repository of operations at SNS. Current work focuses on continued streamlining of the user interface to take advantage of modern web technologies and extending integration with other systems.

TECHNICAL

Development Tools

The logbook was developed on a Macintosh® using Apple WebObjects® 5.3.3 [5] due to its mature state, rapid development environment, powerful object oriented database abstraction and support for open standards. Java (version 1.5) is the language for the server side code. JavaScript (version 1.5) is used to handle client side scripting. The application generates standards based output conforming to Hypertext Markup Language (HTML) 4.0, Cascading Style Sheet (CSS) 2.0 and Document Object Model level II (DOM-2).

Web browsers are the main clients for the logbook, but because the entries are recorded in a database, it is easy for other client applications to make and read logbook entries, too. For example, XAL includes a package for making logbook entries. This is primarily used for generating automated entries from applications.

Deployment

We deploy the logbook as a standard Java Enterprise Edition (J2EE) servlet on a two node Sun Solaris® server with load balancing. Oracle 10g® is used for our database and Oracle OC4J® is used as the J2EE application server. Secure Hypertext Transport Protocol (HTTPS) is used to provide security for the user session from login until the user logs out or their session expires.

ARCHIVE FEATURES

The database schema is too complex to discuss in its entirety, here. Instead, we will focus on the main entities and their primary properties and relationships from an object oriented perspective.

The SNS Logbook is really a collection of logbooks each of which is an archive of entries and associated with a major function. For example, we have a logbook for accelerator operations (primary logbook), target, electrical work, physics, controls, beam instrumentation and several others. Each logbook is associated with a set of groups (e.g. Electrical, Software, Magnets) representing stake holders. An entry is the primary entity. An entry consists of a title, an author, a message, images (PNG, GIF, JPEG), attachments (PDF, HTML, XLS, ZIP), groups, entry type (e.g. problem report, repair, status, shift summary, daily order, required reading), an event time stamp, a publish time stamp and a priority. For

Operational Tools

conformance with laboratory standards, an entry is immutable meaning that it cannot be edited once it is committed by its author. However, an entry can belong to a thread, and this can be used as a mechanism to clarify or correct an earlier entry.

Users are represented in the database so that when a user logs into the logbook they enter a session customized for them. For example, users may bookmark entries and browse those entries from anywhere (not just the computer on which they bookmarked the entries). The logbook also applies the user identification to determine the user's roles (e.g. operations management) for enabling certain features.

Entries may be marked for email notification to members of the groups assigned to an entry. When such an entry is published, each member of the entry's groups receives an email notification along with a link to the entry. Users may review their email notifications at any time from within the logbook, and they can clear the notifications at their convenience. Entries marked as *Daily Orders* or *Required Readings* also result in email notification. Additionally, they require the user to acknowledge the entry, and notifications may reappear periodically until the entry is marked as invalid by a member of management.

WEB BROWSER USER EXPERIENCE

The web browser is the primary client for the logbook and has the richest set of features. Efforts have been made to provide a consistent look and consistent behaviors throughout the application. This approach provides the user with a comfortable and efficient user experience and lowers the learning curve.

Layout and Browsing

A convenient and familiar three pane layout common in e-mail clients provides an efficient user experience. In the left pane, users select the context for what is displayed in the right pane. For example, the user may select the logbook from the list of available logbooks that the user may view. Icon buttons allow the user to select among the several available operations such as browsing by day, email notifications, subscriptions, bookmarks, search, composing and help. Upon selecting an action (except for help), the resulting content (typically a list of entries) is displayed in the upper right pane. Only help opens in a new window so the user can view the help while working freely with the logbook. The lower right pane displays an entry which was selected from a list in the upper right pane.

When browsing daily entries, the upper right pane displays a navigation bar followed by a list of entries

ordered by time. The user may select an entry to view it in the pane below. The navigation bar allows the user to navigate to the desired day.
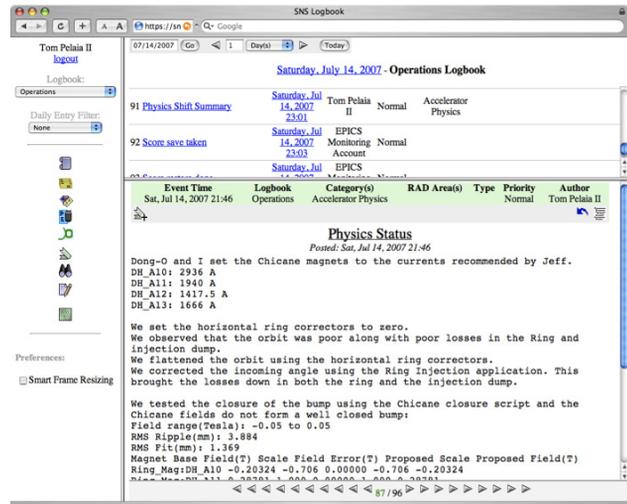

Figure 1: Three Pane Layout

The lower right pane contains an entry view with a navigation bar at the bottom for conveniently navigating to entries in proximity (based on the list of entries in the top right pane) to the current one. The standard entry view displays a header of the entry followed by the title, a link to the parent entry if any, time stamp entry body, attachments, images and links to child threads.
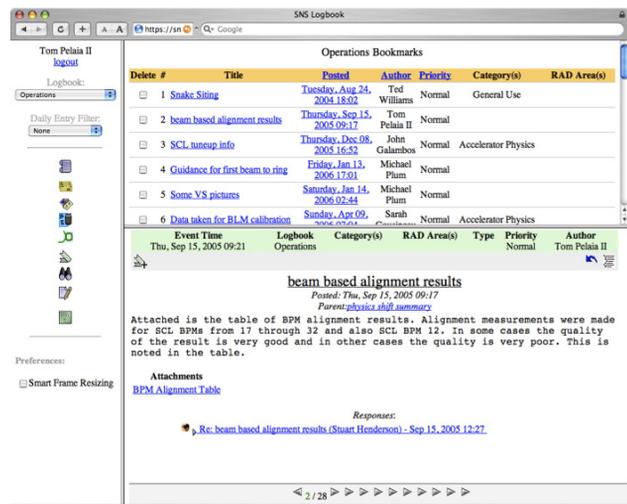
Figure 2: Entry View

An entry's images are displayed as thumbnails within the entry view. When the user selects an image it is displayed within a separate slide show window along with a thumbnail image selector at the top of that page.

Operational Tools
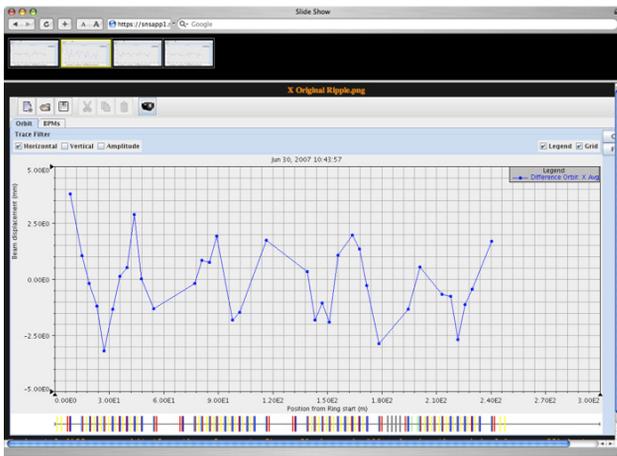
Figure 3: Image Slide Show Window

Searching

A search feature allows users to search for entries with a variety of criteria. If any criteria is not specified, it will simply not be considered in the search. The search panel appears in the upper right pane and when the user submits the search the results tab reveals a list of matching entries.

Figure 4: Search Panel

Composing Entries

When the user selects the compose button, a compose view appears in the right pane.
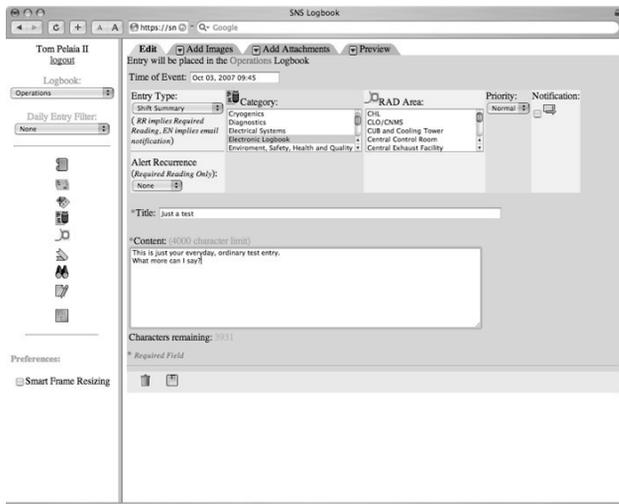
Figure 5: Composing an Entry

The logbook assigned to the new entry is the logbook that the user had selected in the left pane before composing the entry. The main edit tab allows the user to enter the basic entry data such as entry type, groups, priority, title and entry text. Tabs for images and attachments allow the user to add, delete and arrange images and attachments along with additional text. The preview tab displays a preview of how the entry will appear once published.

XAL LAB BOOK

Lab Book is a XAL application which provides a convenient way to compose and post entries to the logbook during a physics shift. The main advantage of this application is that it provides a convenient way to collect images and attachments from directories commonly used during a shift. There isn't enough space in this paper to go into detail about this application.
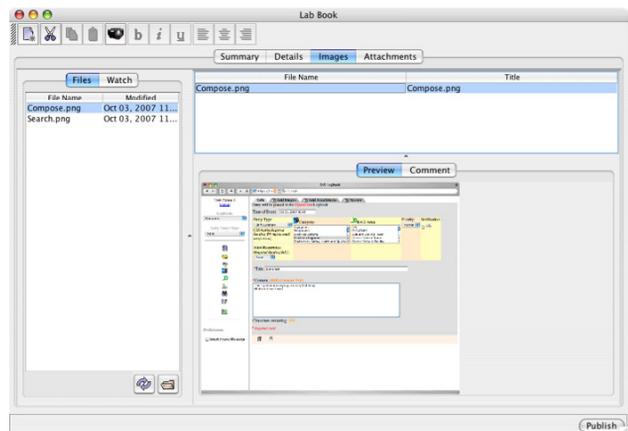
Figure 6: Lab Book (Adding Images)

REFERENCES

[1] *SNS*, http://neutrons.ornl.gov/

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[5] *WebObjects*, http://www.apple.com/webobjects/

Operational Tools