Compact Electronic Logbook System

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Introduction

Clog is a web-based electronic logbook system, which is developed using Java EE framework, Primefaces component library, MySQL relational database and RESTful web service technologies.
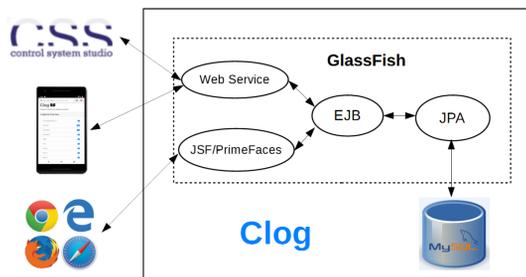

Figure 1: Architecture of Clog.

Backend Implementation

Database Design

Clog has five tables in the database, they are entry, log, logbook, log_logbook and sysuser.
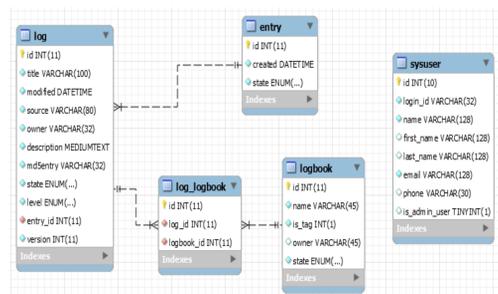

Figure 2: Clog database schema.

Core Logic Implementation

The core logic, implemented as multiple stateless EJBs, provides log submission, log query as well as logbook, tag and user management functionalities. The EJBs implemented are logEJB, logbookEJB, tagEJB, attachmentEJB and userEJB.

Attachment Storage

Attachments are stored in the file system with the hierarchy of "year", "month", "day" and "logId". The additional "Thumbnail" directory stores the corresponding thumbnails for image files.
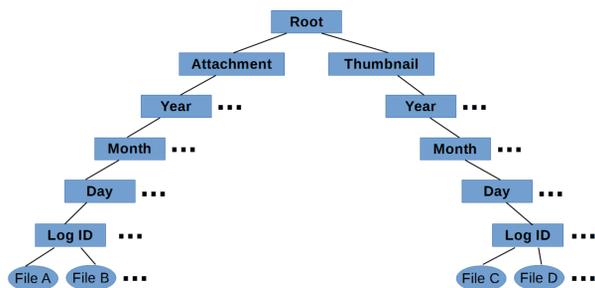

Figure 3: Attachment directory hierarchy.

Frontend Implementation

Home Page

The home page lists all the available logbooks, including the logbook name, number of logs in the logbook, the last submission time and user.

Figure 4: Clog home page.

Log Overview Page

The log overview page, is composed of function buttons, search buttons and a log summary table.

Figure 5: Log overview page.

Log Submission Page

The log submission page is used for creating a new log entry in the current logbook. The log information that needs to be filled out includes tag, level, subject, description and attachment.

Figure 6: Log submission page.

Log Detail Page

The log detail page displays all the information of a log entry, which includes creation time, author name, author email, level, tag, subject, description and attachment overview.

Figure 7: Log detail page.

Web Service Implementation

The Clog web service provides RESTful API to communicate with other frontend client, the available resources are log, logbook, tag and attachment.

The following data types are supported:
- XML: Implemented with JAXB (Java Architecture for XML Binding) package to communicate with CS-Studio.
- JSON: Implemented with FasterXML/Jackson package to communicate with mobile web UI.

CS-Studio Interface

The SNS fork of CS-Studio is used to interface with Clog. However, in CS-Studio version 4, there is no subject field in the log entry. Therefore, the CS-Studio source code need to be refactored to support the subject field.

After refactoring, the subject input widget is provided in the log submission UI, the subject text is wrapped in the XML data to be sent to Clog web service, and a new log with subject field can be created via CS-Studio successfully.

Figure 8: CS-Studio log submission UI.

Mobile Web UI

In addition to the JSF web UI, Clog also provides mobile web UI with read-only permission for users to conveniently view logs on cell phones. The mobile UI is developed with Vue.js JavaScript framework and Bootstrap responsive CSS library.
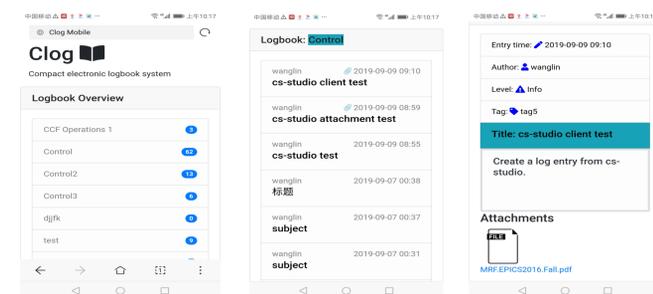

Figure 9: Mobile web page: (a) Home page. (b) Log overview page. (c) Log detail page.

Conclusion

By now, the development of Clog, including database, backend core logic, web service, JSF web UI, mobile web UI and CS-Studio interface, has been finished. It implements the complete functionalities of electronic logbook and provides multiple user interfaces to improve the user experience, which could meet the requirement of new accelerator facilities.

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SNS China Spallation Neutron Source