

Planning for a new SLAC ELOG

June 22, 2023

T. Summers, on behalf of:

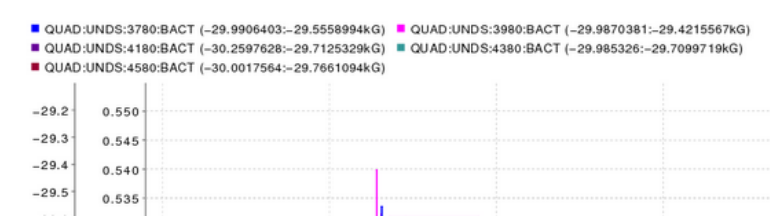
- C. Bisegni and D. Soni who worked on a new ELOG proof of concept
- M. Gibbs and M. Shankar who drafted requirements for an ELOG replacement
- J. Shtalenkova and R. Rahman who conducted & summarized a recent ELOG user survey

What does SLAC currently have for logbooks?

MCC ELOG – used by ACR, SPEAR, Cryoplat, EED, etc...

- Data is stored in the mcc0 Oracle database
- Website built on PHP
- Originally from JLAB, heavily modified here
- <https://mccelog.slac.stanford.edu/elog/wbin/elog.php>
- Nice features
 - Select multiple logbooks to view or make entries
 - Can refer to previous entries to follow issues
 - Access to a 'print queue' for attaching images
 - Entries have unique URLs for sharing
 - Auto-refreshes so new entries just show up
 - Good API for programmatic access

The screenshot shows the SLAC E-LOG MCC interface. At the top, there are navigation buttons like 'New Entry', 'Quick Entry', 'Login', etc. Below that, there are date and time selection fields. A 'Logbook:' section contains a grid of checkboxes for various logbook categories, with 'MCC' selected. Below this are 'Options:' for filtering by area, entry type, and source, and a search bar. The main content area shows a list of logbook entries. The selected entry is: '16:03 * Re: UNDS quads 36-47 should be standardized' by A_Le, with event ID 1204167. Below the entry, there is a text block: 'Standardize functionality verified. When the slider is moved in the opposite direction of standardize, STDZOK changes to NO as expected.' and a small image labeled 'Figure 1'.



What does SLAC currently have for logbooks?

Physics ELOG – used by LCLS and LCLS2 physicists (but not FACET?)

- Data is stored in XML files on filesystem
- Website built in Java using Tomcat
- <http://physics-elog.slac.stanford.edu/lcls2elog/index.jsp>
- Originally from DESY, not modified much because “we don’t have the source code” – M. Gibbs
- Nice features
 - ...?

The screenshot displays the LCLS-II SC Linac Physics Log website. At the top, it shows the LCLS-II logo and navigation links for Status 2 through Status 6, with Status 2 selected. A 'News' section contains a 'test' link. The main content area is titled 'lcls2elog e-Logbook' and features a sidebar with a file tree for the year 2023, listing folders for months 05 through 12 and specific dates. The main log entry is for '05/19/2023 23:59' by 'Colocho, Vecchione, Zimmer' and is titled 'Injector Commissioning Swing Shift Summary'. It includes a 'Summary of Activities' section with bullet points: 'Beam in early injector only (no beam through CM01)', 'Phased laser, automated measurement worked well', 'Phased buncher, automated measurement worked well', 'Took photocathode QE map', and 'Turned off Gun and Buncher (~10:20 PM)'. An 'Issues' section follows, listing: 'Cannot see laser beam on VCC when electron beam is on, laser can only be viewed when the MPS permit is revoked', 'Still seeing timing dropouts where the beam rate goes to 0 for no clear reason (no MPS/BCS fault), and re-requesting rate brings the beam back', and 'While Correlation Plot is running, the axes on the results plot in the bottom right don't update correctly and seem to default to excessively large ranges'. Below the log entry is another entry for '05/19/2023 22:18' by 'Matlab' titled 'Profile Monitor CAMR:LGUN:950', which includes a small heatmap image. The bottom left of the page has navigation links for 'View Current', 'Logbook Search', 'Logbook Help', and 'Your Feedback', along with a printer icon and the DOCS eLogBook logo.

Why are we talking about making a new ELOG?

These logbooks are old and perceived as antiquated and clunky

- Overall goal is to build a new application to replace the two separate logbooks
- Use a modern architecture, using industry standard products and methods for deployment
- Provide users with an overall better experience, keeping the features they like/need while improving on others
- Maintain operational requirements for availability, integrity, and security

Proof of Concept development

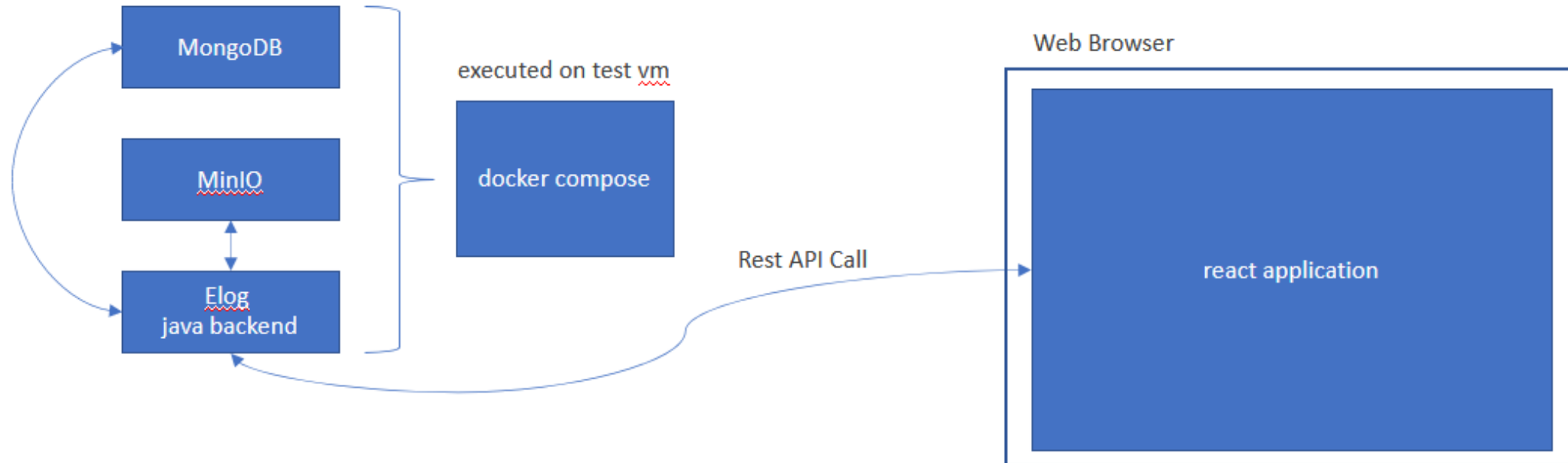
Developed by Claudio Bisegni and Dev Soni, will continue this summer with an intern

- **Proof of Concept Goals:**
 - Merge the data from MCC and Physics ELOGs into a single database (MongoDB)
 - Create a new modern ELOG web application
- **Progress so far**
 - MCC and Physics Log import procedure (only 01/2023 data)
 - View log with pagination
 - Data and logbook filtering
 - Image visualization
- **Data structure summary**
 - The use of MongoDB simplifies the management of documents with heterogeneous set of key/value elements
 - Oracle records converted to JSON before getting pushed to MongoDB
 - The MCC ELOG data structure has defined the structure of the imported Physics ELOG data
- **What's next**
 - Intern project to prototype the web application using REACT

Proof of Concept development

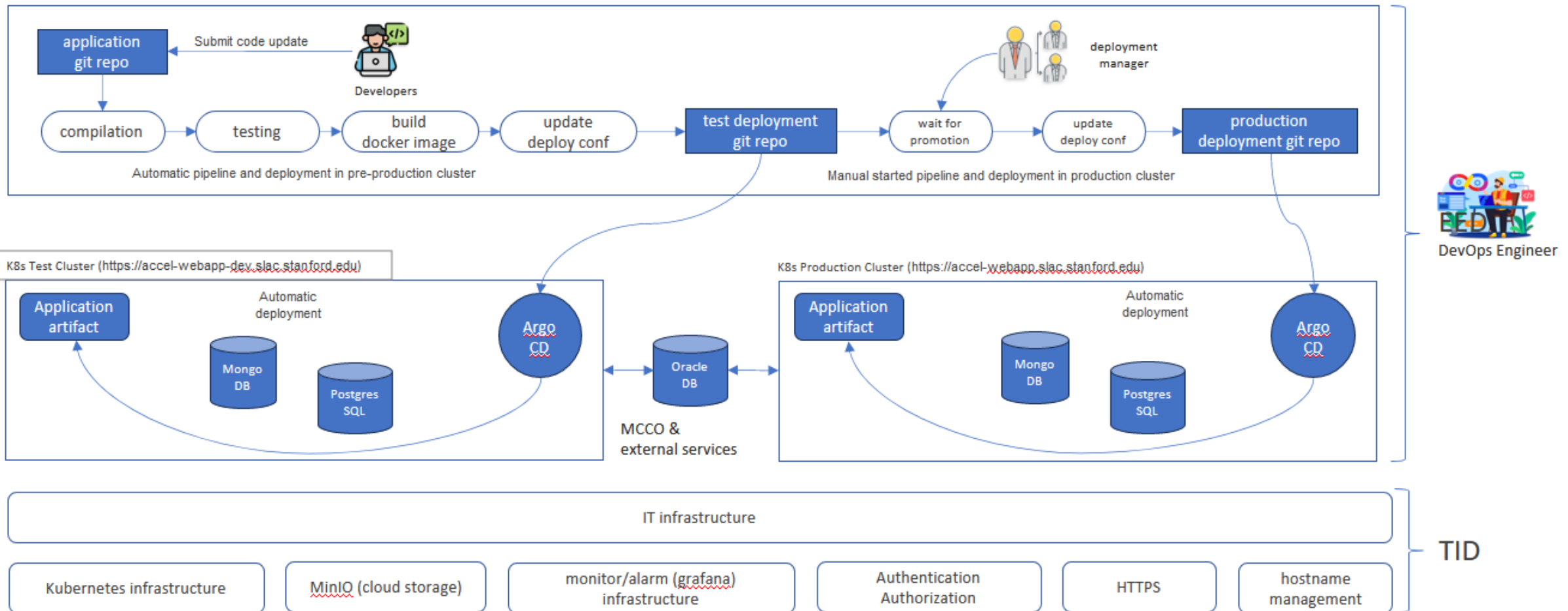
Key features :

- mongodb permit to save data with different structure in the same collection using BSON (Binary JSON - <https://bsonspec.org>)
- MinIO, S3 compatible storage (<https://min.io>) used for the physics log images
- Java backend that expose REST API for search and manages the data
- React UI, use REST API of the backend for present the data to the user



Proof of Concept – Kubernetes architecture

The Big Picture (link to Claudio's full presentation will go here)



Requirements – log entry essentials

Drafted by M. Shankar (March 2022) and M. Gibbs (Feb 2023)

| # | Requirement |
|---|--|
| 1 | Ability to post entries <i>Each entry has a title, text description, author (who's logged in), posted time, relevance time (default posted time), optional tags, any number of attachments</i> |
| 2 | Entries can never be deleted |
| 3 | Ability to hide an entry - not shown by default, but can optionally be shown by the UI |
| 4 | Ability to 'follow-up' an entry - make a new entry with a reference to another entry. <i>The reference can be used in the UI to make it easier to follow 'threads' of follow-ups.</i> |
| 5 | Ability to edit an entry <i>An edit is basically a follow-up, used in conjunction hiding the original entry. When editing, the original entry's fields (title, author, etc.) are all copied to the new entry, where they can be adjusted by the user. Attachments must be copied in the new entry - the original entry's files must be preserved.</i> |
| 6 | Ability to post HTML formatted entries with separate title field |

Requirements – attachments and searching

Drafted by M. Shankar (March 2022) and M. Gibbs (Feb 2023)

| # | Requirement |
|----|--|
| 7 | Attachments can be any mime type |
| 8 | Attachments must be unaltered <i>Using a generated thumbnail for performance purposes is ok but the original attachment must be stored without modifications. A reasonable upper size limit should be enforced.</i> |
| 9 | Ability to search / filter entries <i>Search by various fields, most importantly by tags and authors but including full text search</i> |
| 10 | Entries are optionally associated with shifts <i>A shift needs to be configurable by each logbook as different facilities have different schedules</i> |
| 11 | Entries must be retrievable by unique URL |
| 12 | Ability to subscribe by email to an ELOG |
| 13 | Ability to send ELOG entries to a Slack channel |

Requirements – authentication and API

Drafted by M. Shankar (March 2022) and M. Gibbs (Feb 2023)

| # | Requirement |
|----|---|
| 14 | Integration with SLAC LDAP / ACS for authentication |
| 15 | Inbuilt authorization with support for read-only, post-only, and editable access |
| 16 | Separate logbooks for different facilities (LCLS, FACET, SPEAR, CRYO, etc.) <i>Each of these will have different authorization</i> |
| 17 | Ability to cross-post an entry to other logbooks |
| 18 | Web-based API easily usable from within Python and other ACR software |
| 19 | Web-based API accessible over Kerberos |
| 20 | Web-based API accessible using operator accounts / tokens |

User Survey from this April

Section 1 – Highlights from questions about **documenting** information in the log

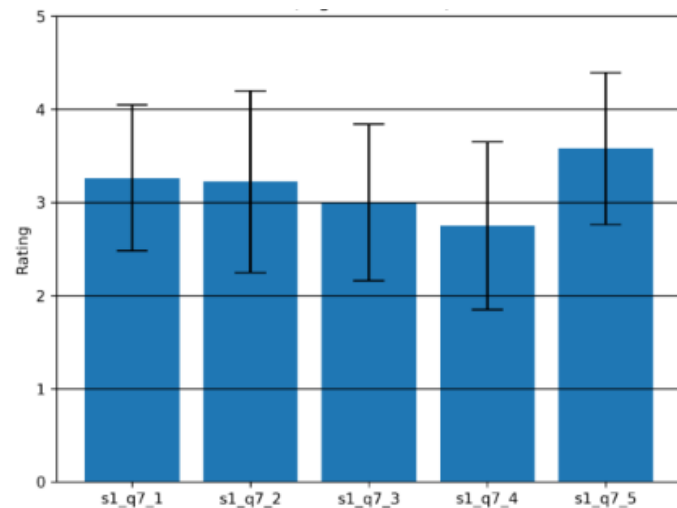
- Biggest challenges
 - Attaching images (quality reduced, can't reorder)
 - Accessing logs remotely (SLAC network only)
 - Timeouts while making an entry
 - Defaults back to different accelerator / logbook
 - Needing to enter details by hand
 - Interfacing to elog from other software
- Requests to automatically log information
 - Experiment specifications
 - Parameter values
 - Plots/figures
 - System snapshots
 - PPS zone state changes
 - Software changes
 - Some measurement results or PV value changes
- Suggestions for improvement
 - Sending/Emailing/Saving images x4
 - Requirement of VPN again mentioned as a hassle
 - One Elog for all purposes
 - A text buffer (i) to increase timeout and (ii) accidental clicks away from the interface
 - Better interfacing with smartphones [Generally, people seem uncertain of/confused about the existing ways to do so.]
 - Better searchability

User Survey from this April

Section 1 – Highlights from questions about **documenting** information in the log

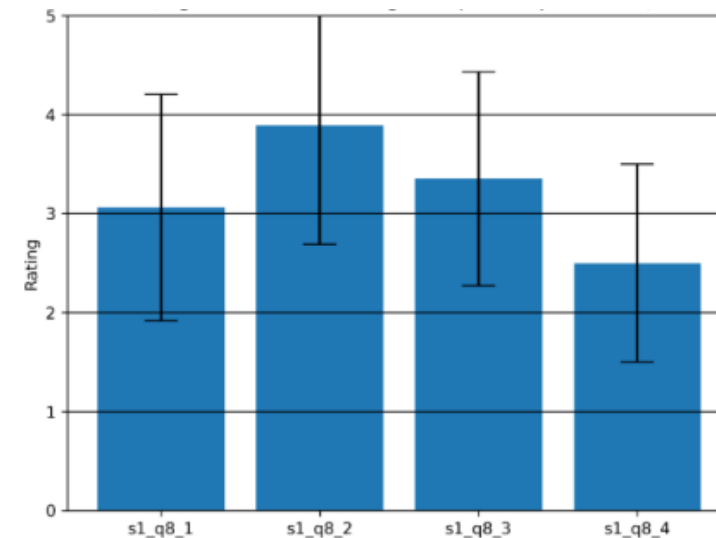
Perceived capabilities (rated from 1-5)

- Q1 Text formatting
- Q2 Saving information from diagnostic tools
- Q3 Logging machine parameters
- Q4 Generating reports
- Q5 Overall saving information



Usefulness of potential improvements

- Q1 Data logging templates
- Q2 Adding tags/hashtags to entries for searching
- Q3 Links to relevant wiki/web pages
- Q4 Text suggestions based on similar entries



User Survey from this April

Section 2 – Highlights from questions about **searching** information in the log

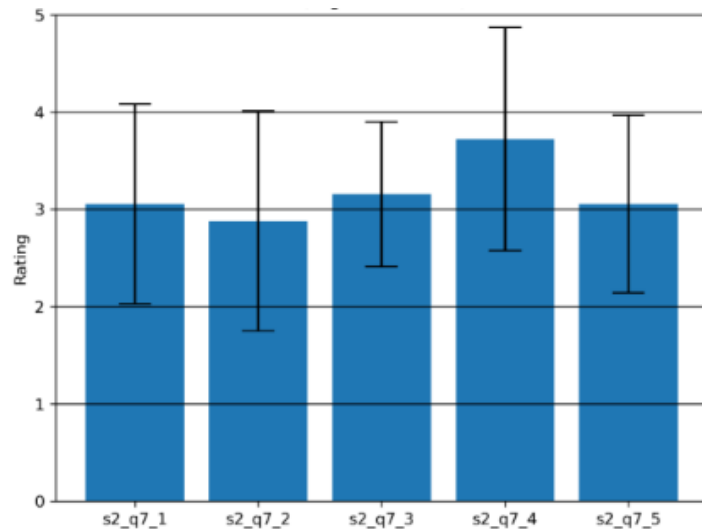
- What are you searching for?
 - Past history of equipment
 - Similar entries
 - Time accounting
 - How-to instructions
 - Entries by area/subsystem or by author
- When do you search?
 - When looking for entries that solve a similar problem
 - When troubleshooting system failures, to look at history of equipment and what was done to resolve issues
- Suggestions for improvement
 - Adding Tags/Flags
 - Filter for attachments
 - Filter on regular expressions, by multiple authors
 - Contains or does not contain strings
 - Remove VPN requirement
 - Fuzzy match to account for mistakes in search phrase

User Survey from this April

Section 2 – Highlights from questions about searching information in the log

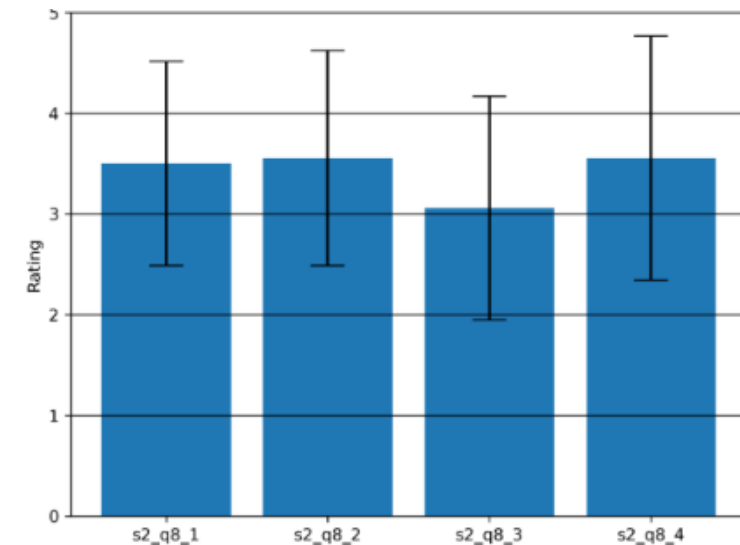
Perceived capabilities (rated from 1-5)

- Q1 Keyword search
- Q2 Multi-level parameter filtering
- Q3 Presentation and organization of results
- Q4 Search result loading time
- Q5 Overall interface



Usefulness of potential improvements


- Q1 Save search queries to account
- Q2 Sort search results
- Q3 Autogenerate reposts based on search
- Q4 Additional filters




My own thoughts as a user searching for a good ELOG

I've used paper logbooks, home-built logbooks, social-media-style paginating logbooks, text- and database-based logbooks, personalized logbooks, legal-document type logbooks and chatty slack-style logbooks.

- Things that bug me
 - Never-ending scrolling logbooks without obvious day or shift breaks
 - Requiring users to use features and fields that don't always add value (tags!)
- Things I really like
 - Applications that gave me a nice logbook entry dialog with pre-populated information (req: good API)
 - Easy sharing and replying to entries – the conversation threads are important
 - Nice little image thumbnails that go full size on mouse hover
 - Being able to read the logbooks without a million layers of authentication (reading the @logbot summaries on my phone wins over trying to log in)
- Bottom line – logbooks serve a broad user base with different needs

 **logbot** APP 8:10 PM
Disabled CyBoxes, PPS Ignition remain Disable Enabled.

Posted today at 8:10:30 PM by thduong2

 **logbot** APP 8:19 PM
SWING SHIFT SUMMARY

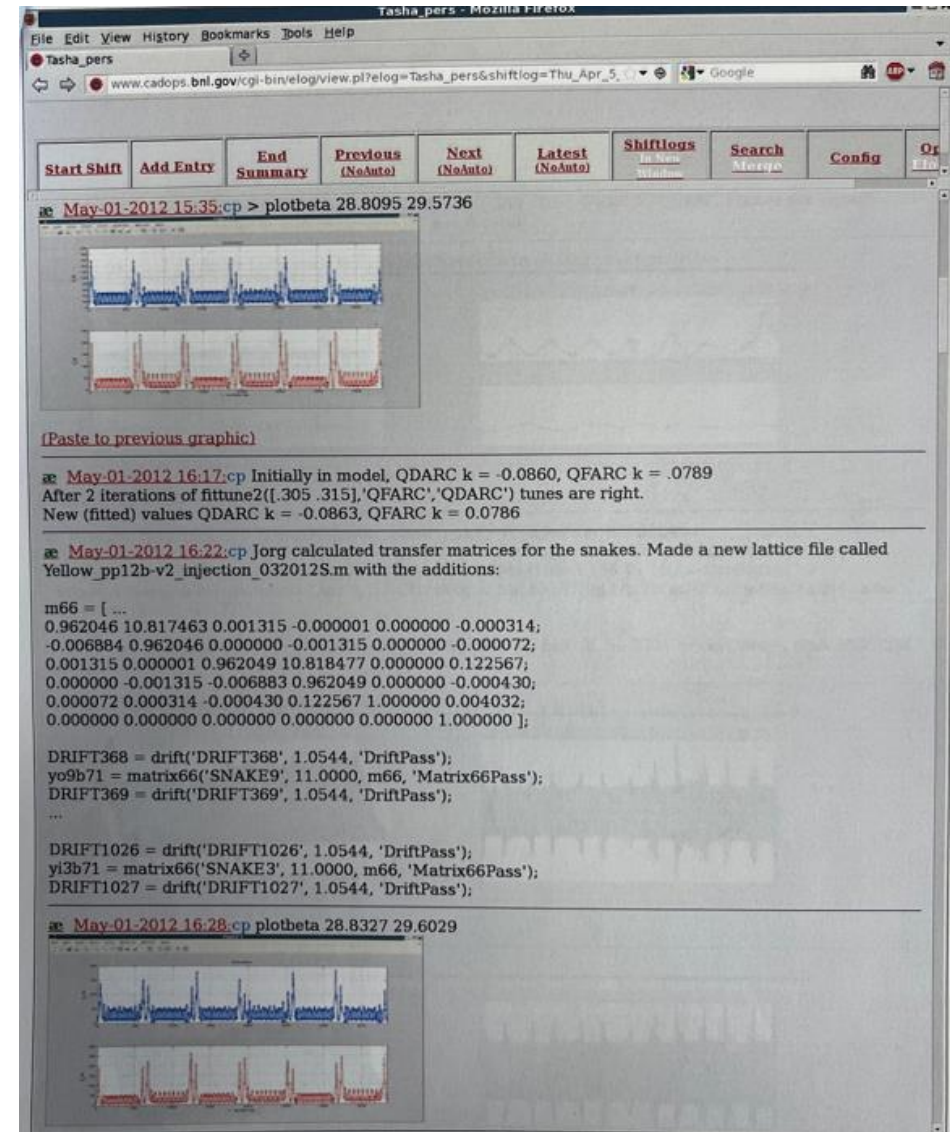
Posted today at 11:59:59 PM by thduong2

```
<table CellPadding="5" BORDER=1>
<tr>
<th>Comment #</th>
<th>Comment</th>
</tr><tr><td><center>1</center></td><td>K1<
maintenance outage continues.</td></tr>
<tr><td><center>2</center></td><td>Operatio
</tr>
</table><br>
<br><table CellPadding="5" BORDER=1><tr>
<th>Program</th>
<th>Delivered</th>
<th>User Off</th>
<th>Tuning</th>
<th>Config &Delta;s</th>
<th>Accl. Down</th>
<th>Sched. Off</th>
</tr><tr><td>FACET-II_MD</td><td><center>C
```

The old RHIC logbook from Brookhaven circa 2005-ish?

In addition to the 'official' logbooks we could have our own which was neat.

- Liked the way images were handled
- Had good reply-to entry features
- Had a common header
- Looked very retro :)



CS-Studio's 'Olog' circa 2010

View on webpage or phone...

The screenshot shows a web browser displaying the Olog interface. The address bar shows the URL <https://logbook.nsls2.bnl.gov/logbook/#739>. The interface includes a navigation menu on the left with categories like LOGBOOKS, TAGS, and CREATED FROM. The main content area displays a log entry from 'mdavidsaver' dated April 10th 2012, 7:16 pm. The entry text describes a mod 1 shutdown and includes several attachments: a text dump of the modulator's internal event log, a plot showing a spike in vacuum pressure, and another plot of modulator voltages and currents. The plot shows pressure on the y-axis (ranging from 1E-11 to 1E-6) and time on the x-axis (ranging from 27:44:00 to 27:54:00). The plot shows a sharp spike in pressure at approximately 27:48:00.

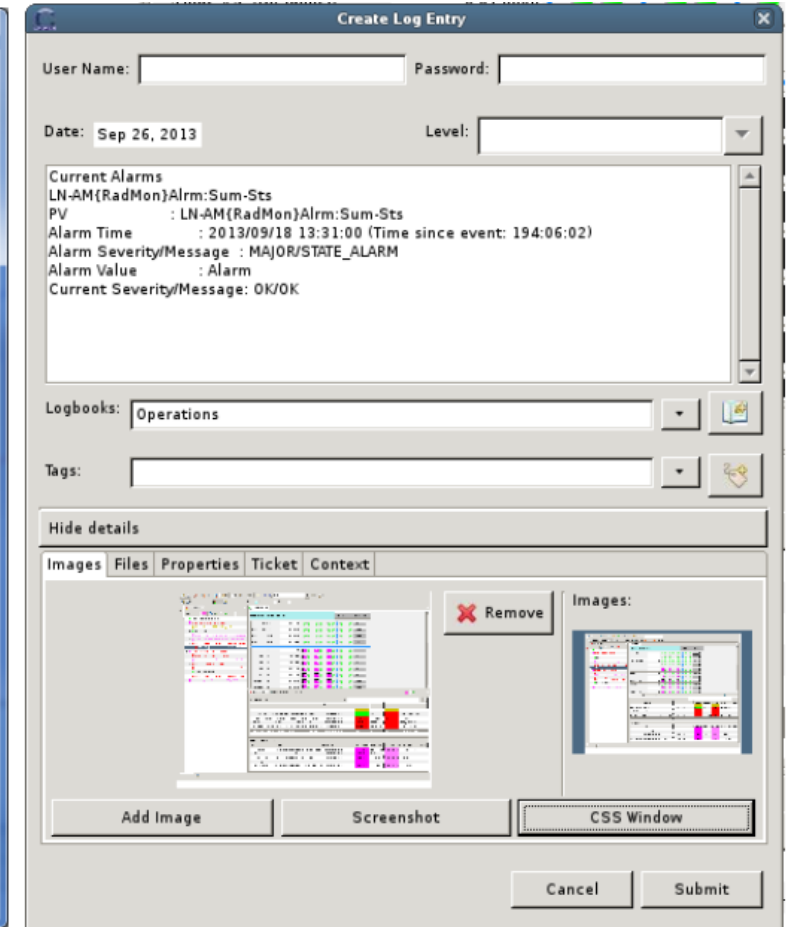
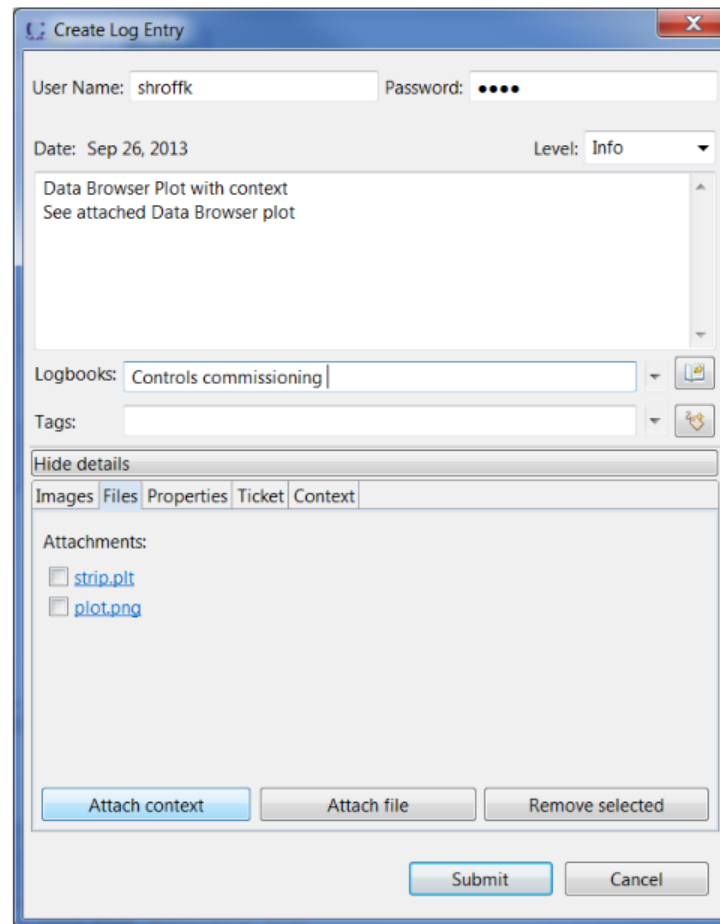
The screenshot shows a mobile phone interface with the AT&T logo and various status icons at the top. The time is 11:59. Below the status bar, there is a link that says "Load more Log entries ...".

The screenshot shows a mobile phone interface displaying a log entry detail. The entry is titled "nash, October 1st 2013, 2:42 pm" and has a "Hide details" link. The entry text describes a problem with a vacuum station, mentioning a cold cathode reading of 2E-03 Torr and a turbo pump that was unplugged. The entry includes several tags: "RE Maintenance", "Vacuum", and "Problem". The entry also includes a timestamp "October 1st 2013, 2:43 pm". Below the text, there is an "Attachments" section with a thumbnail image of a control panel.

CS-Studio's 'Olog' circa 2010

Create entries with pre-populated data

- From alarm handler context menu, an entry would contain the alar data
- From a data browser plot it would attach an image and the plot file to go back and interact with the data
- Could also attach images from file, screenshot, or current window, random files, issue ticket information, and more



What's Next

Requirements Document and Web Application Prototype

- I'll be working on consolidating this information into a formal requirements document
 - Approvers will be representatives from Operations, Physics, Engineering and Technical staff
- Claudio will be mentoring an intern on the web application this summer!