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Traveler @ FRIB

Dong Liu (liud@frib.msu.edu)
Software Engineer
Traveler workflow

create a form
A traveler user
• creates a new form from scratch, or an existing form previously created by her or him or shared with her or him by other users;
• redesigns an owned form;
• shares an owned form with other users to read or write;
• redesigns a shared form with write permission.

create a traveler
A form owner
• creates a traveler based on an owned form by assign a device or something else to it;
• shares a traveler with other users to read or write.

work on a traveler
A traveler owner
• updates the traveler data;
• completes a traveler;
• freezes a traveler.
A completed or frozen traveler's data cannot be updated any more.

A user with write permission
• updates the traveler data;
• completes a traveler.

http://prezi.com/x_dsx1fpzboy/?utm_campaign=share&utm_medium=copy&rc=ex0share
Application architecture
Technology stack

- Node.js (https://nodejs.org/)
- Express.js (http://expressjs.com/ 3.1.0 needs upgrade)
- bootstrap (http://getbootstrap.com/ 2.3 needs upgrade)
  - Jade (http://jade-lang.com/) for template
- jQuery (https://jquery.com/ 1.9)
- Datatables (https://www.datatables.net/ 1.9.4 needs upgrade)
- Twitter typeahead (http://twitter.github.io/typeahead.js/)
- Form binder (https://github.com/dongliu/formbinder)
- Form builder
  - Rivets.js (http://www.rivetsjs.com/)
- CAS for authentication (https://github.com/rubycas/rubycas-server)
node + mongo

- JSON from DB to application to client
  - No ORM (++)
  - Hard to support other format (-)

- No threading and synchronized/concurrent.
  - Almost no chance for racing/deadlock (+++)
  - Callback hell (--) 

- Flexible data structure
  - Support array of anything (++)
  - Easy schema change and back compatible (+++)
  - Loose validation(--+)
  - Duplication and inconsistency (--+)
Paradigm shifts

- desktop app -> network and mobile app (client/server)
- local library -> network API
- local call -> RPC -> messaging, event-driven, REST
- synchronous -> asynchronous
- purely object-oriented -> functional
- basic client -> rich client
- heavy static framework -> light dynamic framework/language
- relational -> unstructured
- one-size-fits-all -> diversity
Design and development process

- **Resources**
  - Interface first for testing
  - View -> Model -> Controller
    » HTML/CSS -> test -> DOM/JavaScript -> test -> XHR -> test -> GET /model -> test
      -> POST/PUT /model -> test -> DELETE /model -> test
  - Most resource loaded via JSON/HTTP -> API

- **Responsive design**
  - Better user experience on different screens
  - Mobile client friendly

- **Reactive design**
  - Render only partial page when possible
  - Lightweight model view viewmodel (MVVM)
  - Push lightweight processing tasks to the client
Restructure the application for reporting feature
  - User defined traveler groups for tracking and reporting
  - User interfaces for form/traveler/report
Traveler resources

- **Source**
  - [https://github.com/dongliu/traveler](https://github.com/dongliu/traveler)

- **Design documents**
  - [https://drive.google.com/file/d/0B39LbIQQJq1dreEJSaVJ2TGRCMzA](https://drive.google.com/file/d/0B39LbIQQJq1dreEJSaVJ2TGRCMzA)
  - [https://drive.google.com/file/d/0B39LbIQQJq1drRkE4YV9mVl84Wjg](https://drive.google.com/file/d/0B39LbIQQJq1drRkE4YV9mVl84Wjg)
  - [https://docs.google.com/document/d/12p4eO0b-Bv3jGVLsbYzMU0leYa-xHX6r9DYDpn2Ud/edits?usp=sharing](https://docs.google.com/document/d/12p4eO0b-Bv3jGVLsbYzMU0leYa-xHX6r9DYDpn2Ud/edits?usp=sharing)

- **Manuals**
  - [https://docs.google.com/document/d/1I9YY2_czQ193zDv8mlhRMFYIpaMcGyHr23EwrJ2FLM/pub](https://docs.google.com/document/d/1I9YY2_czQ193zDv8mlhRMFYIpaMcGyHr23EwrJ2FLM/pub)
Form builder

What you see is what you get

Edit/copy/delete

Rich editor: Link, image, special characters …
Main user interface

<table>
<thead>
<tr>
<th>Title</th>
<th>Status</th>
<th>Devices</th>
<th>Shared with</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIN-CMA553-CAV/H-ASSY</td>
<td>active</td>
<td>S53002</td>
<td></td>
</tr>
<tr>
<td>SRF Facility Weekly Maintenance</td>
<td>active</td>
<td>S53-002</td>
<td>Whalley, Joseph, Clark, Alex, Whetstone, Caleb, Metzgar, Elhan, Victory, Daniel, Malloch, Ian, Barker, Brian, Popielarski, Laura, Ignatows, Ignatows, Dandt, Oja, Byron, Elliott, Kyle, Dobrzynski, Alyssa, Brink, Ryan</td>
</tr>
<tr>
<td>LIN-CMA553-CAV/H-PR</td>
<td>active</td>
<td>S53-002</td>
<td></td>
</tr>
<tr>
<td>LIN-CMA53-CAV/BATCH</td>
<td>active</td>
<td>S53-002</td>
<td></td>
</tr>
<tr>
<td>LIN-CMA58.085-CAV/ASSY</td>
<td>active</td>
<td>S85-004</td>
<td></td>
</tr>
<tr>
<td>LIN-CMA553-CAV/H-PR</td>
<td>active</td>
<td>S53-002</td>
<td></td>
</tr>
<tr>
<td>Beta = 641 Manufacturing Router</td>
<td>active</td>
<td>S41-015</td>
<td></td>
</tr>
<tr>
<td>LIN-CMA58.085-CAV/CR PREP INSPECT</td>
<td>active</td>
<td>S85-003</td>
<td></td>
</tr>
<tr>
<td>Beta = 641 Manufacturing Router</td>
<td>active</td>
<td>S41-013</td>
<td></td>
</tr>
</tbody>
</table>

Showing 1 to 10 of 79 entries
Traveler share

Shared user list for Traveler demo traveler

<table>
<thead>
<tr>
<th>User id</th>
<th>Full name</th>
<th>Privilege</th>
</tr>
</thead>
<tbody>
<tr>
<td>elliott</td>
<td>Elliott, Kyle</td>
<td>write</td>
</tr>
<tr>
<td>compton</td>
<td>Compton, Chris</td>
<td>read</td>
</tr>
</tbody>
</table>

Showing 1 to 2 of 2 entries

Shared group list for Traveler demo traveler

<table>
<thead>
<tr>
<th>Group name</th>
<th>Privilege</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Showing 0 to 0 of 0 entries
Traveler page

- Side Nav
- Summary with validation code
- History
- Notes

Message
### Cable main interface

![Cable main interface screenshot]

**Table:**

<table>
<thead>
<tr>
<th>Submitted</th>
<th>Submitted by</th>
<th>Category</th>
<th>Tray section</th>
<th>Cable type</th>
<th>Engineer</th>
<th>Function</th>
<th>Tags</th>
<th>Quantity</th>
<th>From rack</th>
<th>Termination type</th>
<th>Wiring drawing</th>
<th>To rack</th>
<th>Termination device</th>
<th>Conduit</th>
<th>Length [ft]</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 days ago</td>
<td>barnesb</td>
<td>HVDC</td>
<td>2C_RS-55_Coor_035</td>
<td>Paul Gibson</td>
<td>ION PUMP CTRL</td>
<td>1</td>
<td>C68B_VAC_CAB_N1510</td>
<td>FS1_BTS_IP_D2443</td>
<td></td>
<td>F51-BTS_D2443</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 days ago</td>
<td>barnesb</td>
<td>HVDC</td>
<td>2C_RS-55_Coor_035</td>
<td>Paul Gibson</td>
<td>ION PUMP CTRL</td>
<td>1</td>
<td>C68B_VAC_CAB_N1510</td>
<td>FS1_BTS_IP_D2474</td>
<td></td>
<td>F51_BTS_D2474</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
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<td>F51_BTS_D2443</td>
<td>100</td>
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<td></td>
</tr>
</tbody>
</table>

**FRIB**

**Facility for Rare Isotope Beams**

**U.S. Department of Energy Office of Science**

**Michigan State University**

D. Liu -- EPICS Collaboration, May 2015, Slide 14
Plot a bar chart for all items in the table
User management