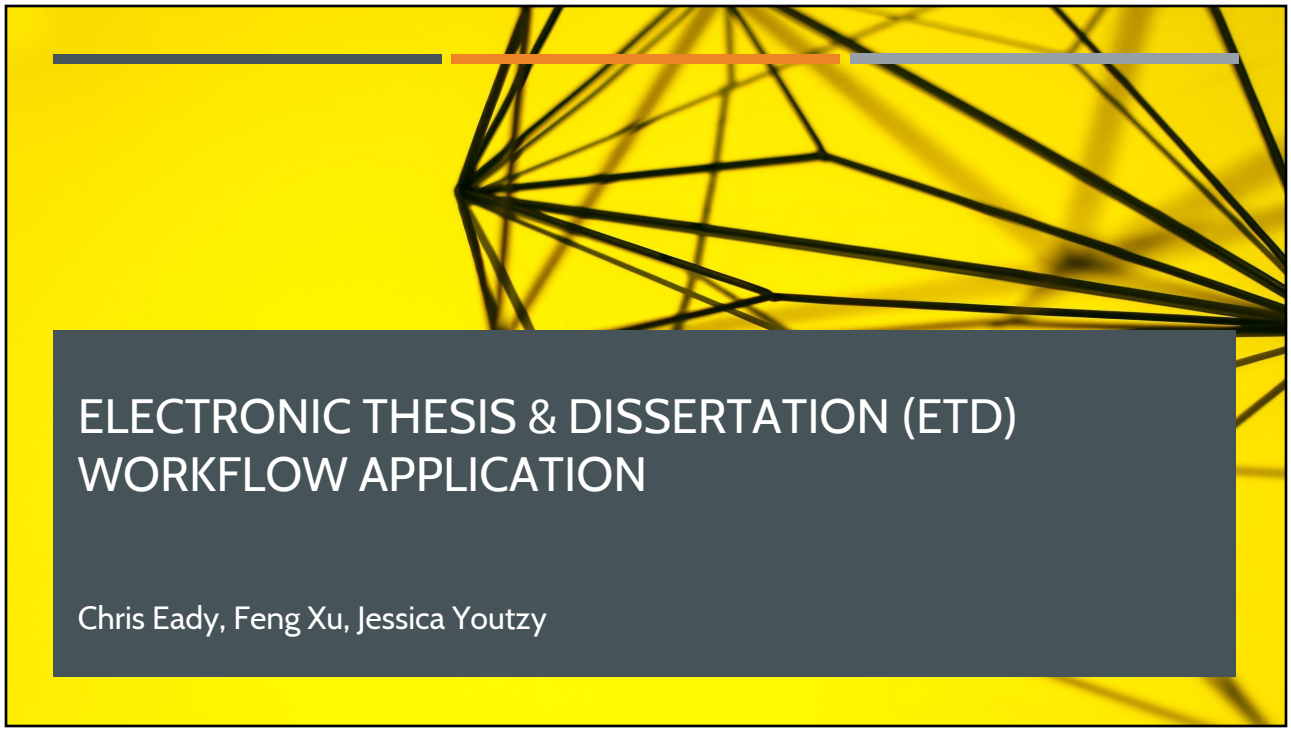


ELECTRONIC THESIS & DISSERTATION (ETD) WORKFLOW APPLICATION

Chris Eady, Feng Xu, Jessica Youtzy

INTRODUCTION

The system in use by the Mitchell Memorial Library (MML) is a system providing a workflow for electronic thesis and dissertation submission. The current application has become unsupported by the development team. Alternative software solutions on the market are either too expensive for the MML budget, or they do not fit the needs and workflow of the department.

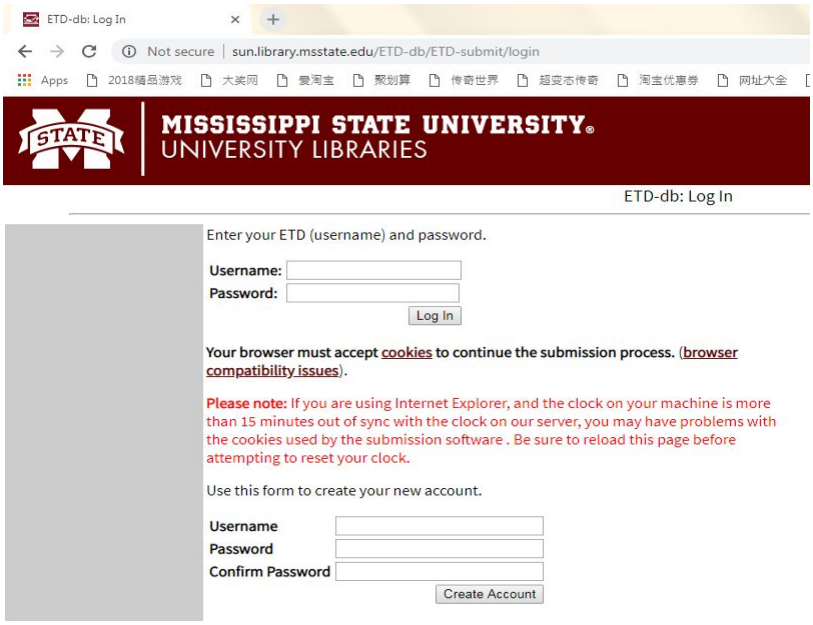
This project aims to develop a new system to satisfy the demands for electronic thesis and dissertation submission.

PROJECT OVERVIEW

- **Client Needs**
  - The new system is expected to provide a means of communication between graduate student users and library staff, provide a means for Mitchell Memorial Library (MML) staff and other administrative users to export submission documents and metadata to external systems, and provide a means of statistical analysis of submission and workflow data acquired over time.
- **Reports**

CURRENT SYSTEM - SHORTCOMINGS

- Related files cannot be uploaded, and must be submitted via email.
- Students and library staff are forced to communicate outside the system. There is no internal messaging or alert process.
- Tedious.
- Missing features:
  - Review process.
  - Multiple submissions per user account.
  - Automated deadline alerts (via email and internal messages).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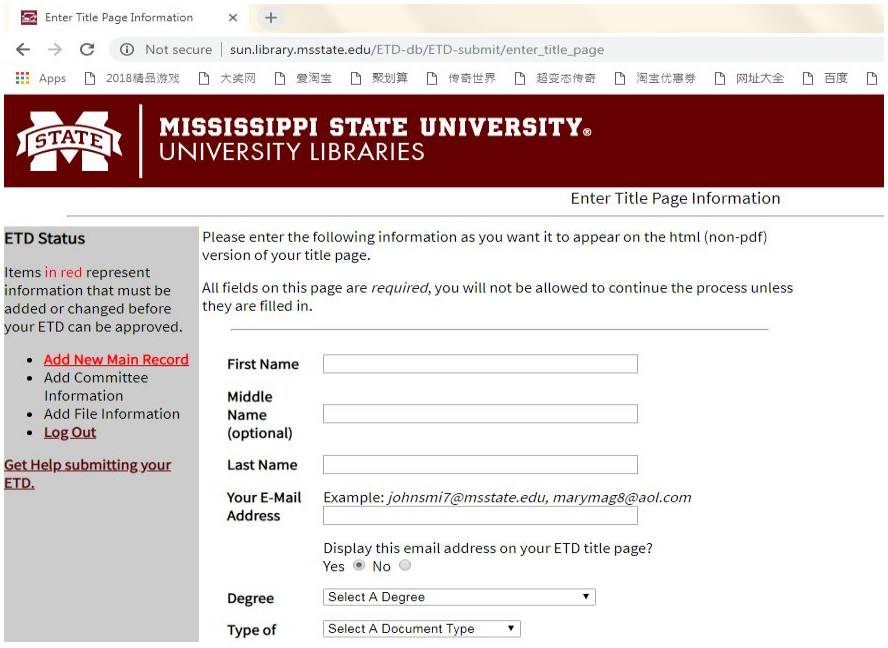
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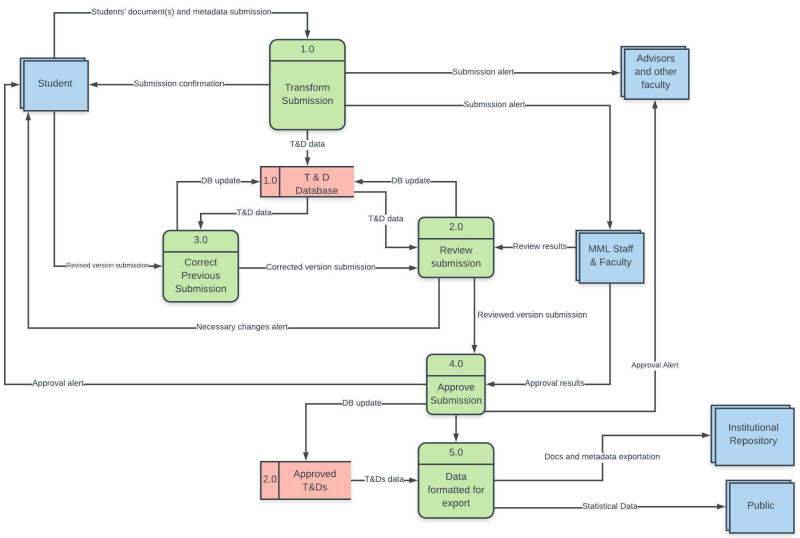
DESIRED SYSTEM—PRIMARY FUNCTIONS

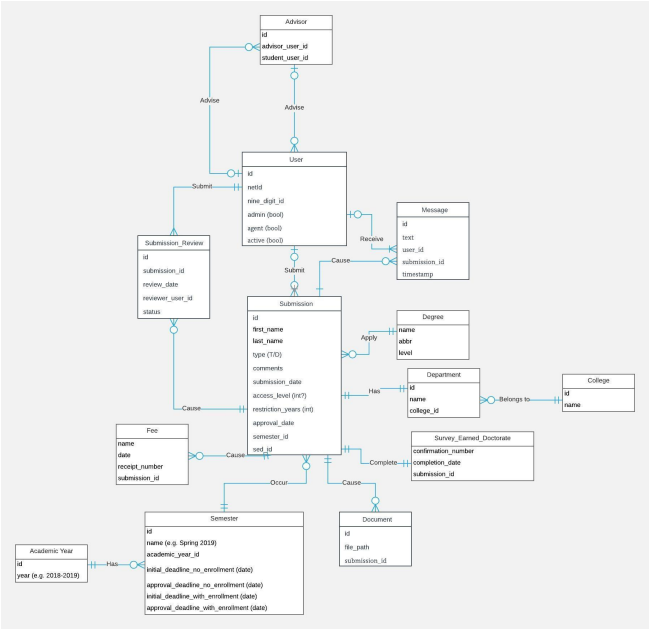
- Graduate students can create accounts (linked to MSU accounts).
- Information is gathered and stored within the system.
- Documents are stored and associated with specific submissions.
- Automatic alerts (email and internal alert messages).
- Administrators should be able to approve submissions, or send them back to students with required changes defined.
- Upgradable/scalable.

DESIRED SYSTEM—BONUS FEATURES

- Statistical information created in easy to understand formats for public use.
- Embargo option.
- Available for other universities.

ETD - Data Flow Diagram





Entity Relationship Diagram

USERS OF THE SYSTEM

- Graduate students
- MML staff
- Advisors and other staff & faculty
- Public

STUDENT USER INTERACTION

- Student creates account
- Fills out forms
- Check status

MML STAFF USER INTERACTION

- Administrators create account
- Reviews unassigned submissions
- Select submissions to review
- Make corrections
- Approve submissions

ADVISORS & OTHER STAFF & FACULTY USER INTERACTION

- Administrators create account
- View submissions
- Generate reports for Admissions department

PUBLIC USER INTERACTION

- Limited access to the ETD system
  - No access to user data
  - Access to metadata only if the approved submission was marked for World-Wide Availability
- View statistical information

User Interface

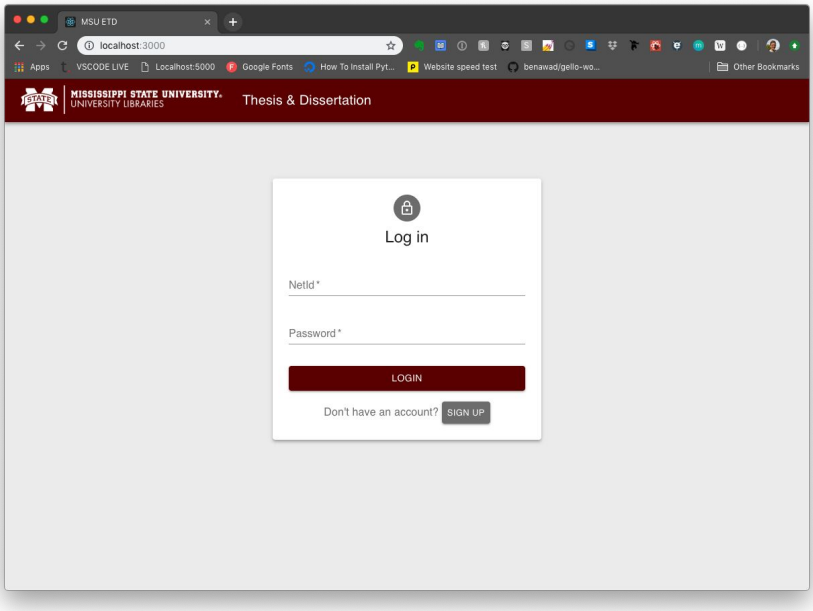
Student User

Considerations

- **Familiar design style**
  - Material UI (based on Google's "material design" methodology).
- **Reactive**
  - The interface should give visual feedback to the user when they make an action on the page.
- **Sense of direction and location within the app.**
  - The user should not have to guess where they are in the app or what they need to do next.

Considerations Cont.

- **Easy to use (and visually appealing) components**
  - Date pickers
  - File upload fields
  - Etc.
- **Accessibility**
  - Appropriately use HTML tags -- headings, form tags, buttons, etc.
  - NOTE: More attention needs to be given here considering the use case of the application.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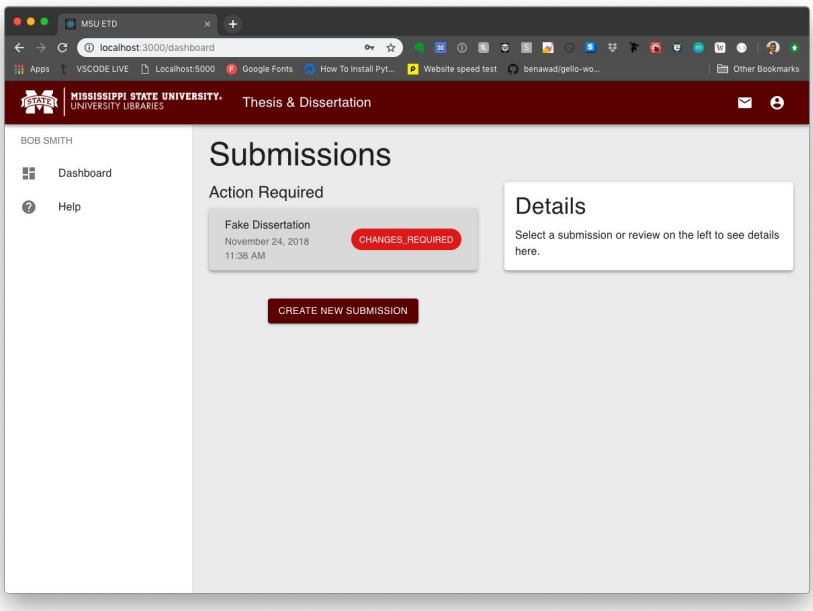
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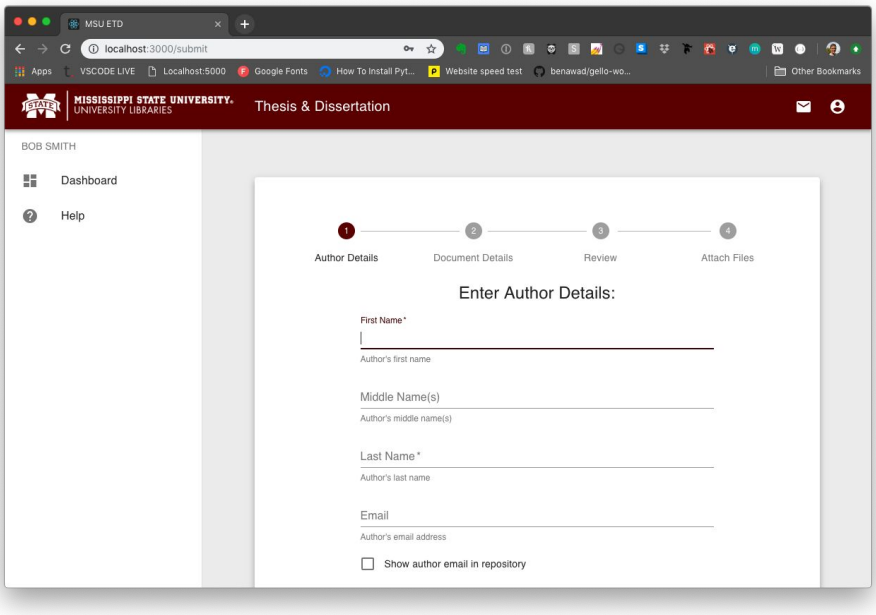
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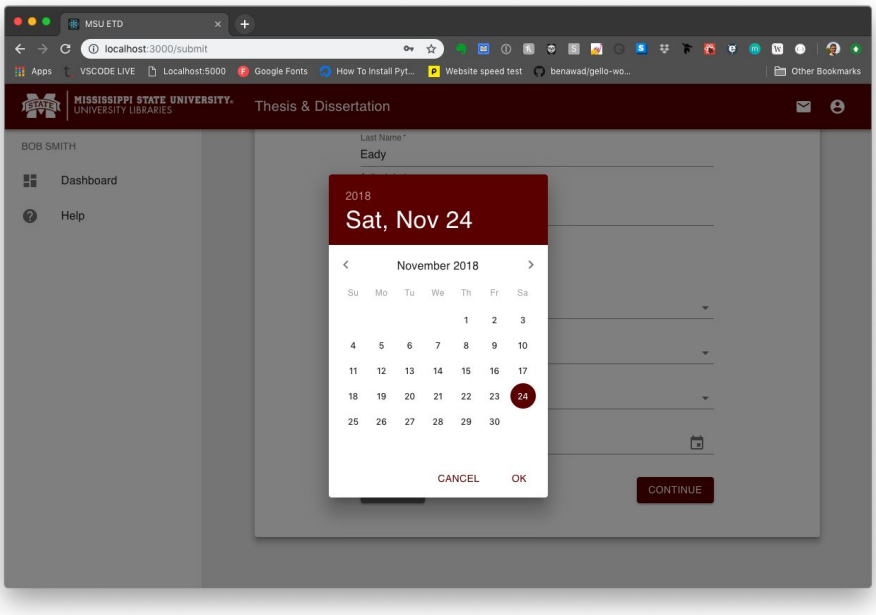
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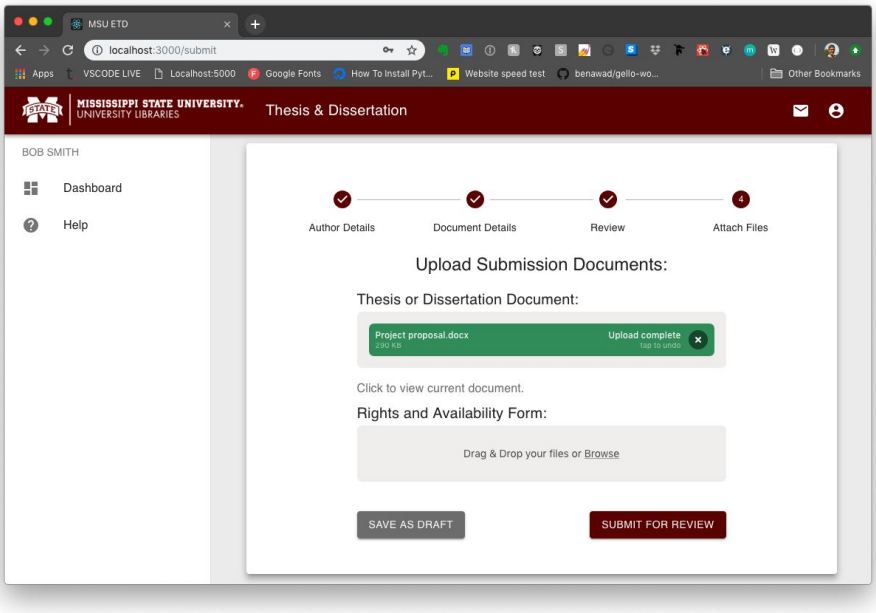
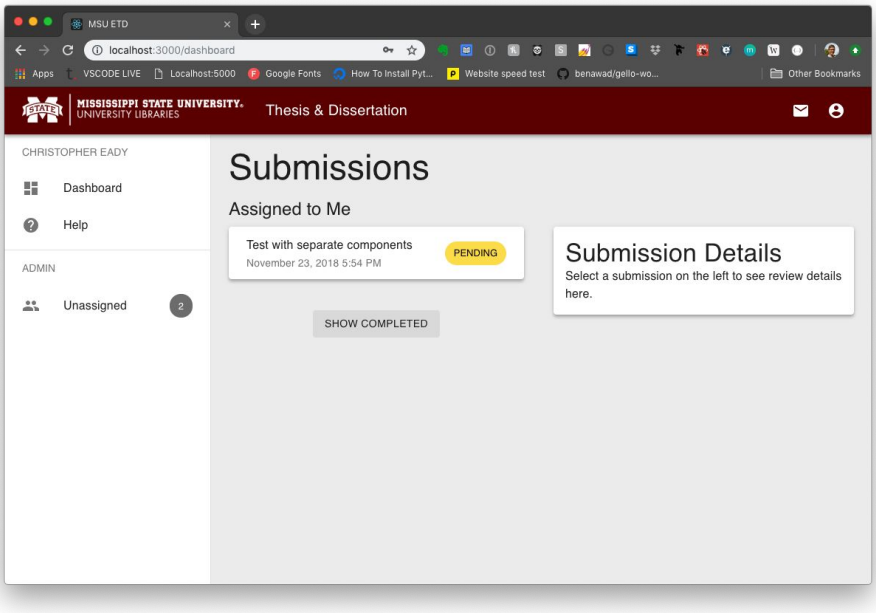


User Interface

Administrative User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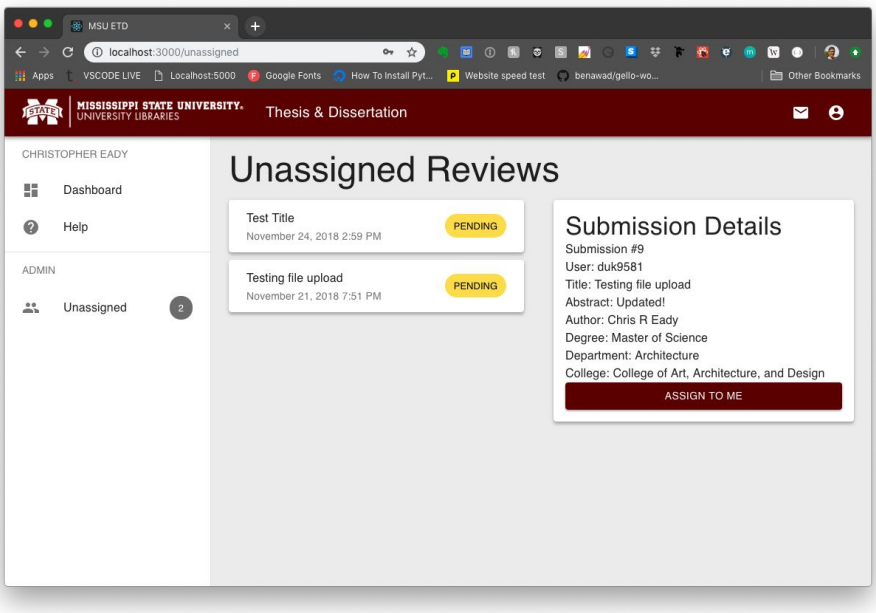
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Author: Chris R Eady
Degree: Master of Science
Department: Architecture
College: College of Art, Architecture, and Design
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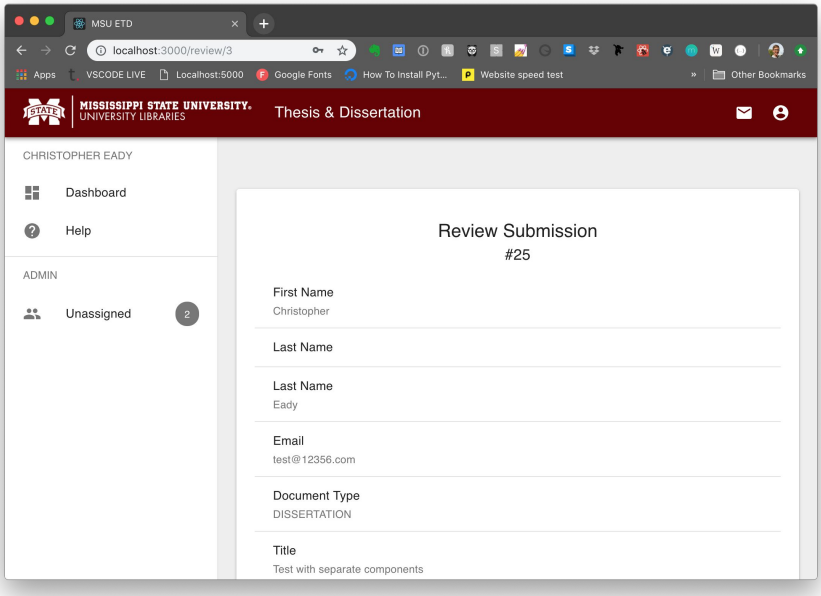
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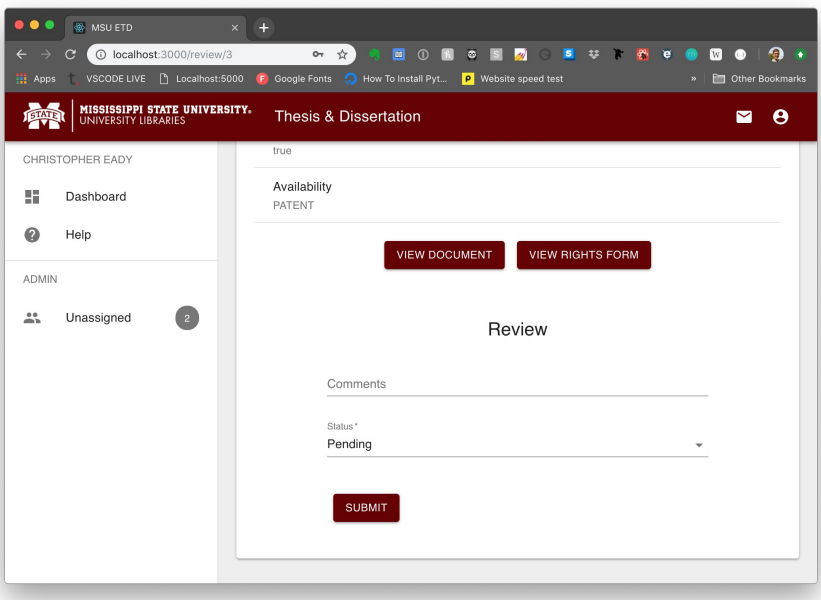
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Demo

Electronic Thesis & Dissertation Application

Security

Authentication & Authorization

AUTHENTICATION

“Are you who you say you are?”

Currently using JSON web tokens (JWTs).

Sessions/cookies for final product?

CAS integration for verifying MSU affiliation.

Advantages:

- Stateless (like HTTP).
- Tokens can store additional information to save requests to the server.

Disadvantages:

- Can become “out of sync” with the server/database.
- Must be careful not to store sensitive data (e.g. user password) in the token since they are easily readable if stolen.

AUTHORIZATION

“Do you have the rights to access _____?”

There is some basic authorization setup on the server side of the application.

Admins can…

- deactivate other users,
- make other users admins,
- review and approve submissions, and
- add new values in tables, e.g. colleges, departments, semesters, etc.

Standard users can…

- access and edit their own submissions,
- submit them for review.

Standard users can see no one’s related information (submissions, reviews, etc.) except their own.

The code definitely needs some reviewing to make sure authorization is completely and accurately covered.

Technology Stack

And why it's a good choice.

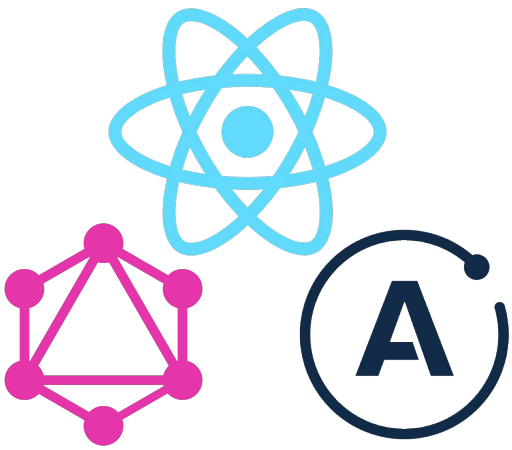
CLIENT

React JS

- A Javascript view library developed and maintained by Facebook.
- Large community of users and developers.

Apollo GraphQL Client

- Request and consume data from the GraphQL server backend.



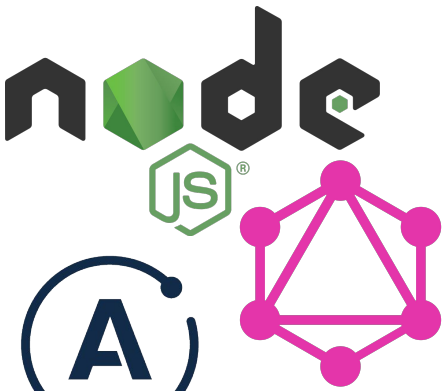
SERVER

Node JS

- A Javascript runtime environment for the server.
- Pairs really well with React and other Javascript libraries frameworks.
- Makes it easy to write the same programming language on both the server and the client.

Apollo GraphQL Server

- Map your data relationally.
- Only query the data you want.
- Replacing REST APIs in the near future?



Playground

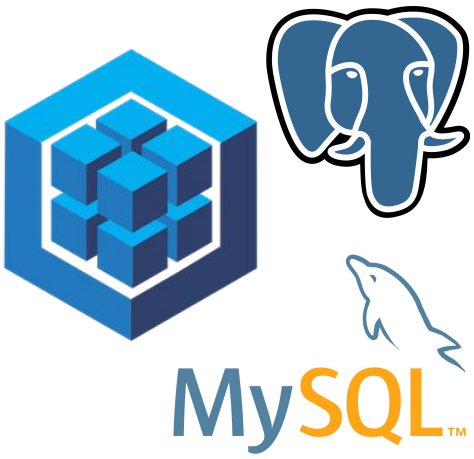
DATABASE

Current: MySQL

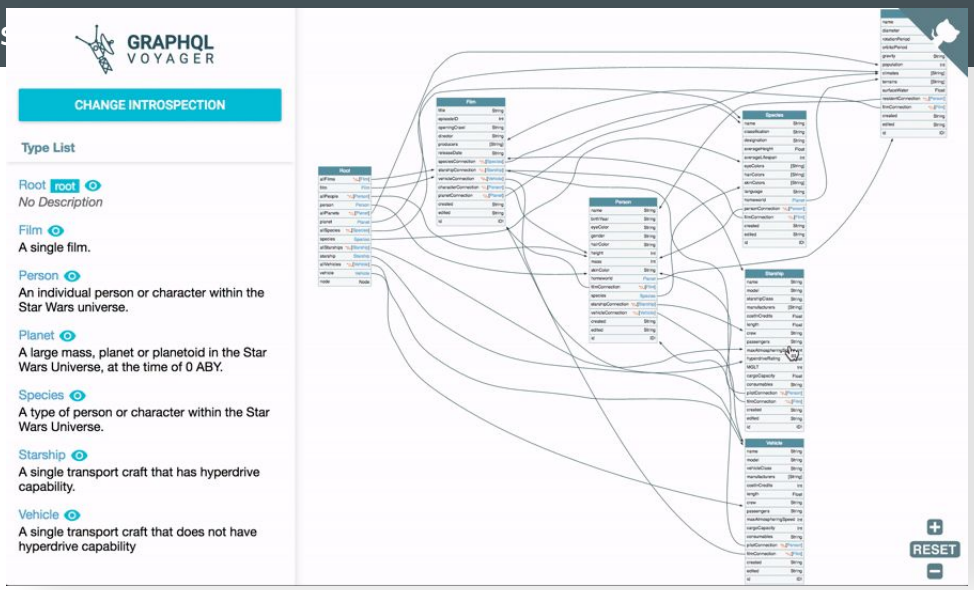
Final Product: PostgresQL (likely)

Sequelize

“Sequelize is a promise-based Object Relational Mapper (ORM) for Node.js v4 and up. It supports the dialects PostgreSQL, MySQL, SQLite and MSSQL and features solid transaction support, relations, read replication and more.” (source)



Bonus



Next Steps

Features & Enhancements

Features

- Add remaining fields for submission metadata.
- Add rubric fields for reviewing a submission. (Document)
- Add admin view for adding new values to tables such as “Colleges,” “Departments,” “Semesters,” etc.
- Add a query view for pulling dynamic reports of data, such as “Submissions by college for a given academic year.” (exported as .CSV file)
- Add links for necessary forms.
- Generate PDF versions of forms via a library such as PDFkit or PDFmake.
- Add remaining user interaction access

Enhancements

- Widgets for departments to display stats & charts on their own webpages.
- Potential libraries for generating charts from data:
  - Apex Charts
  - ChartJS

CONCLUSION

- The new system provides new features and satisfies the clients' demands.
- Administrators can review submitted dissertations and export submission documents and metadata to external systems.
- It also provides further statistical analysis of submission and workflow data.
- The system is also modifiable and scalable, so it can be changed as future needs change.