



CyClass



sdmay23-40
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 Frontend: Adam Walters, Jaden Ciesielski, Brandon Burt
 Advisor/Client: Maruf Ahmed
 Website: <https://cyclass.ece.iastate.edu>

Overview

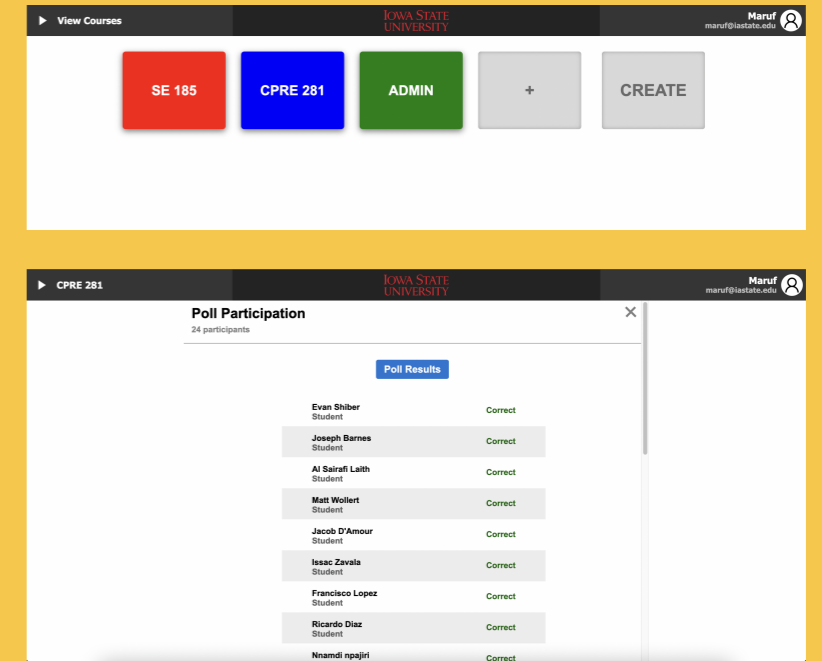
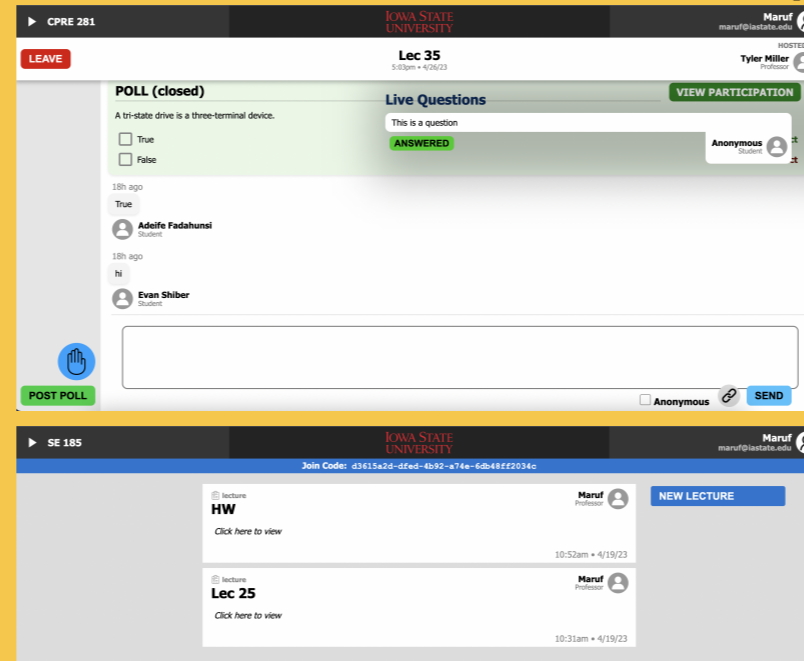
Problem:

In large classrooms, it is difficult for students to communicate with professors. Asking questions in front of a large audience can be intimidating and it can be difficult for professors to hear students who are far away. It can also be quite tough for professors to gauge how involved students are in the classroom.

Solution:

Build an interactive learning tool as a web application geared toward professors to help engage and interact with their students during and outside of class. Our solution will include many features such as chat rooms classified as 'lectures' led by professors, poll creation to gauge student involvement during class, raise hand feature for students to ask questions, and others!

Our Application



Implementation

Summary of Methodology and Implementation:

Originally this was phase two to a previous project called 'HandRaise' but we chose to scrap it and start from scratch as the previous solution was not conducive to our team and clients intended vision for use. So we chose an implementation that is built on JavaScript from end to end, leveraging React for the front end and Node.js for the back end. Thus creating a much more uniform and maintainable application and simplifies testing and the CI/CD.

Frontend:

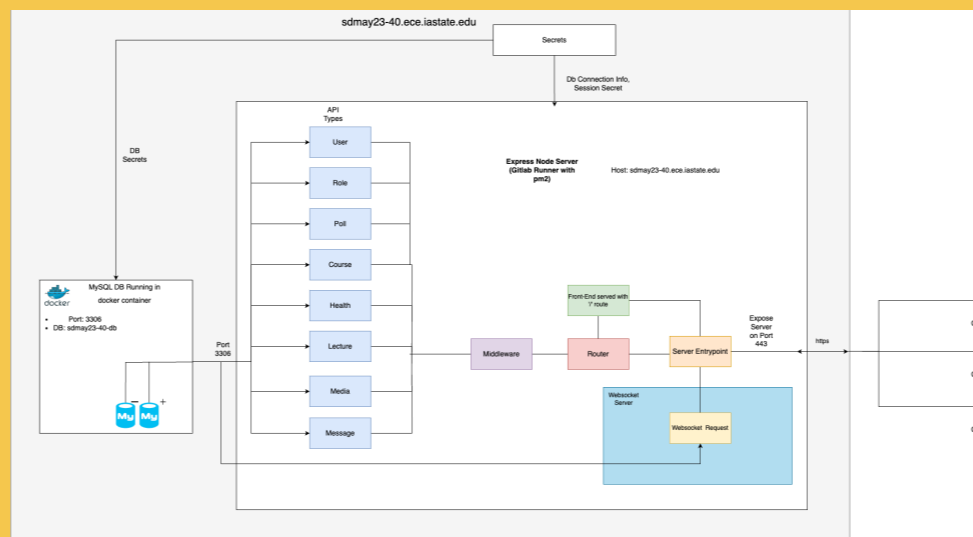
- React
- React Router
- Babel
 - For processing JSX
 - Improving capability
- Webpack
- Cypress
 - For testing
- Important utilities:
 - Axios
 - Redux

Backend:

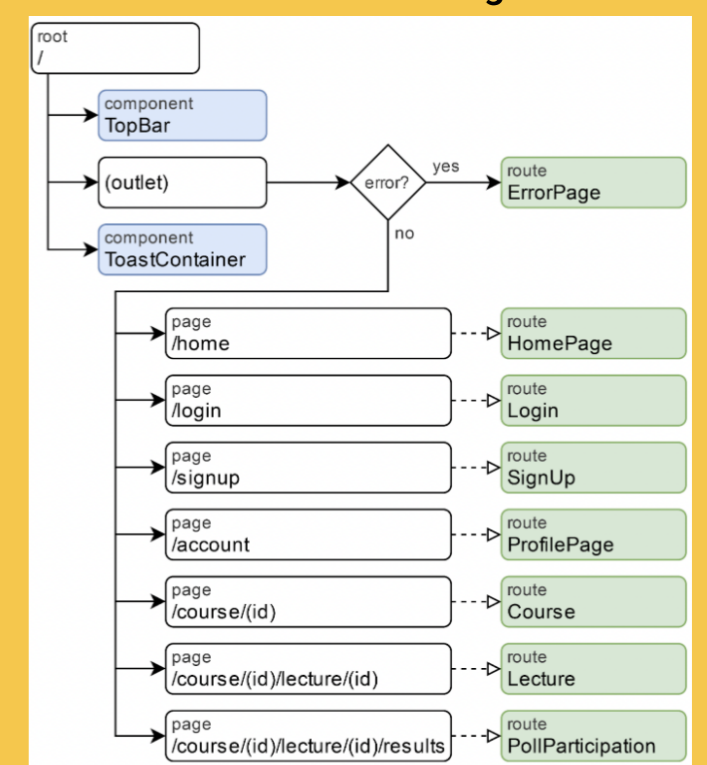
- Node
- Express.js
 - REST API's
 - Websockets
- SSL
- MySQL
 - Docker
- Gitlab Runner
 - For pipeline
- Ubuntu Server
 - sdmay23-40.ece.iastate.edu

Implementation Architecture

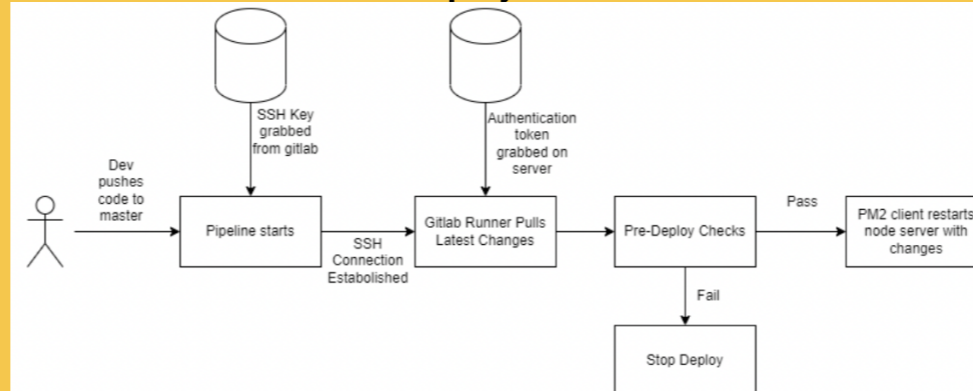
Backend Architecture



Frontend Routing



Deployment



Security/Testing Implementation

Application Security:

- Bcrypt hashing
- Permission checks with use of roles and join codes

Network Security:

- Private network inside ISU's network
- SSL certificate ensuring encrypted connections over HTTPS and WSS

Frontend Testing:

- E2E Testing using Cypress

Backend Testing:

- Unit tests using Jest for controllers, services, and utilities
- Integration tests using Postman for API calls and websocket connections

Conclusion

Results

- Our solution is fully implemented and tested within a classroom environment for practical usage
- Our client was very pleased with our work, has already rewarded points to students during in class use, and plans to also use the application in his future courses

Takeaways/Significance

- Since our team has developed a high quality solution that has demonstrated real usage in a classroom setting, we believe that this application can be further improved upon by others to make the application more appealing to other professors here at Iowa State University.

Demonstrations

1st Demo



2nd Demo



Impact

Since we have designed a unique application that will allow educators to engage and interact with their students during class, it can create effective teaching and learning. By enabling more effective teaching and learning, our applications potential impact includes increasing student engagement, promoting active learning, and helps educators assess student understanding. Not only that but it's a free and easy to use application and we hope for widespread adoption for any educator who would like their students be more educated and engaged in the classroom.