Booster-PAC for CS Admin Discord

Justin Choquette, Lauren Kennelly, Sriyam Rimal, Aidan Small, Jonathan Wang

Computer Science/Information Technology, University of New Hampshire, Durham, NH 03824

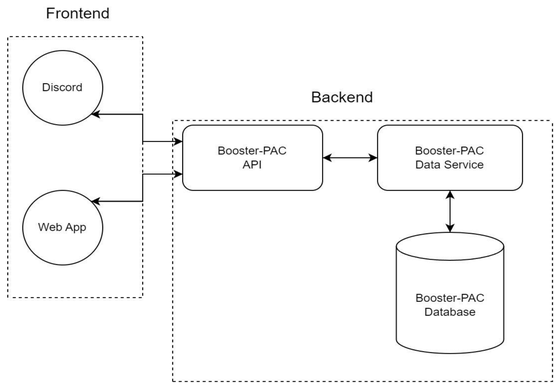
Introduction

The Programming Assistance Center is for providing help to students in programming classes. Other than a paper sign in sheet, there was no system to track the students within the center.

Our Booster PAC created a system with a Discord bot to check in students as well as submit questions, and a webapp to track both live and historical analytics for PAC employees.

We implemented the system by adopting a microservice architecture to ensure adaptability and easy maintenance for future administrators. Within the existing Discord server hosted by the CS Department at UNH, the bot will be accessible to all students. When a question is submitted, it will be added to the queue of questions for PAC Consultants to assist students in a more efficient way.

System Architecture



Component	Language	Framework
Discord Bot	JavaScript	Discord.js
API	JavaScript	Express
Backend	JavaScript, PostgreSQL	SQL-Client
Web App	Python	Flask

Testing and Results

Implementation

The backend and API components rely on unit testing to validate system behavior. Tests were written in the Jest framework with support from the *Supertest* library for running asynchronous tests.

Manual testing was performed for UI components.

Criteria

Backend tests ensure correctness of database operations

API tests ensure proper HTTP response codes and data for both valid and invalid requests.

Discord Bot Testing checks for proper error handling.

Functional Requirements

A discord bot, for students to request help

The discord bot will allow students to check into the PAC and request help by entering a queue by asking questions.

The discord bot will be able to automatically pair PAC consultants to students based on their expertise, informing both parties and specifying contextual information (course, question, where the student is, who the consultant is).

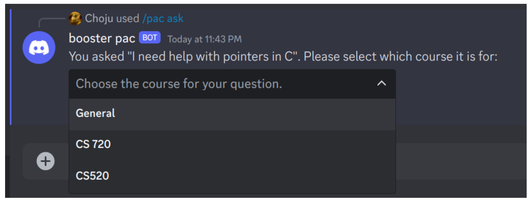
A web app, for PAC staff to be able to access PAC records

The web app will be able to display relevant information, including -

- The current queue of help requests
- How many questions are asked for each course
- How many questions are asked during any time frame

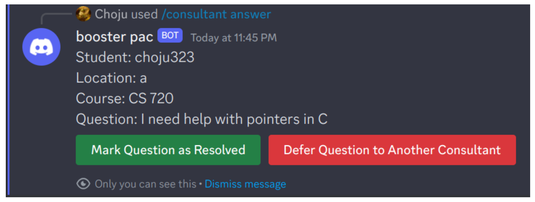
Discord Interface

Student View



Students can easily check into the PAC and submit a help request using the Discord slash commands.

Consultant View



Consultants can use slash commands to view the next question in the queue, including all relevant information regarding the help request.

Conclusions

This project needs to provide the PAC director with live analytics about PAC usage to be successful. This includes the number of students and consultants in the PAC at any given time and the list of questions currently waiting to be answered in the queue.

This project also needs to provide historical data, such as the average response time for help requests, instantly upon request. This needs to be delivered by May of 2024 while fulfilling all functional and nonfunctional requirements.

The final product must have adequate documentation so it may be maintained by another team in the future.

Non-Functional Requirements

Usability

- The overall system will be simple for PAC-goers to use, so that it will enhance the PAC experience.

Flexibility

- The system will be flexible, if the CS department moves away from Discord, it will be able to be adapted simply.

Maintainability

- The system will not be complex, so that when this iteration the project finishes, it can be maintained by the UNH CS system administrators and other future developers.

Security

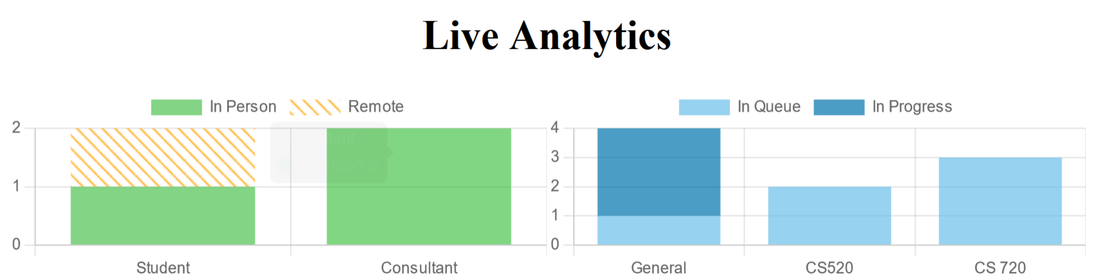
- The system will carry standard protections against common attacks such as denial of service attacks and SQL injection.
- Data security will be handled by exterior systems, including the existing UNH CS Discord service as well as Discord itself.

Dashboard Design

UNH Programming Assistance Center

STUDENT	COURSE	QUESTION	CONSULTANT
jfc1036	CS420	How do I use malloc() in C?	as7762
zhk3022	CS416	My java code is throwing an exception. How do I handle this?	None
bsm1172	CS515	Can someone explain the difference between a queue and a stack?	None

Live view of the help queue that will be displayed within the PAC during operating hours.



Live analytics that will be available to the PAC Director at any given time during operating hours.

Deliverables

- Discord Bot Interface
- Backend Queue Manager
- Analytics Database
- Web Application

Acknowledgements

Thank you to:

Professor Plumlee – PAC Director and Sponsor
Professor Benedetto – Capstone Advisor
Scott Kitterman – Server Hosting and Support
Jayme Brannan – UNH CS Discord Support