Forks n' Filters Final Project

Where recipes meet simplicity and taste

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CS 5287-50 Principles of Cloud Computing

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Abstract

The Forks n' Filters final cloud project, is a fusion of modern cloud-based technologies and a passion for healthy living, provides a practical solution for discovering and managing nutritious recipes. Developed as a solo effort under challenging circumstances, the project leverages Flask, React, and Google Cloud Run to deliver a polished, scalable, and user-friendly application. Forks n' Filters was developed on a platform with robust performance that ensures the balance between time-efficiency and quality experience. This report delves into the motivation, the architecture and implementation of the project, as well as challenges along the way. Keep reading and you'll find my reflections, emphasizing the practical relevance of the project and making the audience feel that the project is beneficial and worth their attention.

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1. Introduction

Forks n' Filters was conceived as a personal and practical solution to a problem faced by many: finding healthy, personalized recipes quickly and efficiently. As an Ayurvedic nutritionist, a full-time student, and a dog mom, I understand the struggle to balance time, wellness, and the demands of daily life. This project embodies my vision of combining technical innovation with personal passion to create an application that simplifies meal planning while promoting a healthy lifestyle.

The project required the integration of modern web technologies, cloud platforms, and external APIs to ensure a pleasant and seamless user experience. By blending functionality with aesthetics, Forks n' Filters stands as a testament to the potential of cloud computing and user-centered design.

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2. Design and Architecture

The application architecture is designed to ensure scalability, efficiency, reliability, and of course, a great user experience! The core components of my architecture include:

- Frontend: Developed using React to provide an interactive and polished user interface, enabling intuitive recipe discovery and filtering.
- Backend: Built with Flask, the backend handles API calls, manages user requests, and communicates with external services like the Spoonacular API.
- Deployment: Initially deployed using AWS Elastic Beanstalk, the project faced persistent challenges, leading to a transition to Google Cloud Run. This pivot provided greater ease of deployment, scaling, and monitoring.
- Dockerization: Both the frontend and backend were encapsulated in Docker containers, ensuring consistent environments across local development and cloud deployment.
- External API Integration: The Spoonacular API was utilized to source comprehensive recipe data, enhancing the application's value proposition.

The choice of Google Cloud Run was pivotal and amazing! Google Cloud Run provided automatic scaling and robust monitoring features that perfectly aligned with the project's requirements. I was genuinely impressed by its power and efficiency, finding it not only faster but also more user-friendly compared to Docker alone. The ability to access detailed logs and metrics in such an intuitive interface made the deployment and monitoring process seamless and highly effective.

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3. Implementation

With a strong foundation in frontend development, creating systems that prioritize a seamless and intuitive user experience was not just essential but central to my vision of the project. Every decision, from the technologies chosen to the structure of the implementation, was guided by the goal of delivering a polished, user-friendly application. Every detail from the colors chose and web design was meticulously crafted. The implementation process included:

- Frontend Development: React components were designed with user engagement in mind, incorporating features like recipe filtering by cuisine, dietary preferences, and cooking time.
- The Web Page layout with carefully planned color scheme, logo, and ease of use in mind. I dusted off some CSS magic and utilized Bootstrap for streamlining the design.
- Backend Logic: Flask APIs were implemented to handle user queries, communicate with the Spoonacular API, and manage data flow between the frontend and backend.
- Cloud Deployment: Dockerized containers were deployed to Google Cloud Run, ensuring the application could handle varying workloads efficiently.
- Performance Monitoring: Google Cloud tools were leveraged to track key metrics such as latency, CPU utilization, and memory usage, ensuring optimal performance.

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4. Challenges and Adaptive Solutions

Thriving under pressure is an understatement. While the challenge of racing against the clock and having only a few days to complete an entire project and presentation was far from ideal, I am incredibly proud of what I've accomplished with ***Forks n' Filters***. From wireframe to deployment, this final project is one I am truly proud to put my name on. The project's journey was marked by several challenges:

- Solo effort/Collaboration: The assigned team was unresponsive during a previous assignment, thus necessitating a solo effort for a solo final project.

While this added to the workload, it also provided an opportunity to demonstrate individual capability and resilience.

- Deployment Issues with AWS: Persistent errors during the AWS setup prompted a shift to Google Cloud Run. This transition required rapid learning and adaptation but ultimately resulted in a more streamlined deployment process.
- Balancing Aesthetics and Functionality: Ensuring a visually appealing design while maintaining robust functionality was a continuous focus. This is always my favorite part of any build!

These challenges, while demanding, provided invaluable learning opportunities and ultimately shaped the project into its final form. In hindsight, I'm grateful that AWS didn't work out, as it gave me firsthand experience troubleshooting deployment issues and navigating a new platform. While it was overwhelming at times, the shift to Google Cloud allowed me to explore its capabilities and appreciate all it has to offer.

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5. Evaluation

Performance metrics gathered during testing demonstrated the application's reliability and efficiency:

- Latency: Achieved fast response times, ensuring a smooth user experience.
- Resource Utilization: Monitored CPU and memory usage confirmed the platform's efficiency under varying workloads.
- Scalability: Google Cloud Run's automatic scaling effectively managed concurrent requests.

Additionally, logs from Google Cloud Run provided insights into user interaction patterns and areas for potential optimization, confirming the robustness of the application.

6. Reflections and Learnings

Developing ***Forks n' Filters*** as a solo effort was both challenging and rewarding. It reinforced my ability to adapt to unforeseen circumstances, learn new technologies quickly, and manage all aspects of development. Here are some of my key take aways:

- The importance of flexibility when technical challenges arise.
- The value of resilience and resourcefulness in the face of team dynamics.
- A deepened appreciation for integrating aesthetics and functionality in application design.
- AWS set up to be a more hand on and in control approach cloud development where Google Cloud handles more aspects such as containerizing.

Beyond the technical aspects, this project underscored the importance of perseverance and self-reliance in achieving success under challenging conditions and time constraints. ***Forks n' Filters*** is a personal achievement that reflects both technical acumen and a commitment to enhancing user experience. The lessons I have learned will inform future projects and professional endeavors.

7. Conclusion

Forks n' Filters exemplifies the potential of modern cloud technologies to address real-world challenges. By combining technical expertise with a user-centered approach, the project delivers a solution that is both impactful and practical. Future work could include expanding features such as personalized user accounts, meal planning tools, and integration with additional APIs for broader recipe databases. The project's source code and documentation are available on GitHub.

GitHub Repository: https://github.com/ElleLynn08/forks-n-filters.git

This project stands as a testament to the intersection of personal passion and technical skill, offering a meaningful contribution to the domain of healthy living and cloud-based application development!

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