

8-3-2022

React E-Commerce Application & Google Cloud DevOps

Hemanth Panditi
Grand Valley State University

Follow this and additional works at: <https://scholarworks.gvsu.edu/gradprojects>



Part of the [Databases and Information Systems Commons](#)

ScholarWorks Citation

Panditi, Hemanth, "React E-Commerce Application & Google Cloud DevOps" (2022). *Culminating Experience Projects*. 235.

<https://scholarworks.gvsu.edu/gradprojects/235>

This Project is brought to you for free and open access by the Graduate Research and Creative Practice at ScholarWorks@GVSU. It has been accepted for inclusion in Culminating Experience Projects by an authorized administrator of ScholarWorks@GVSU. For more information, please contact scholarworks@gvsu.edu.

Hemanth Panditi

Dr. Erik Fredericks

CIS 693

3 August 2022

React E-Commerce Application & Google Cloud DevOps

1. Introduction

The “CIS 693” project consists of an electronic commerce React application and a developmental operations pipeline that was built in Google Cloud. Over the duration of the applied computer science program and popular trends in technology, there has been an emphasis on cloud computing, serverless technology/microservice architecture, containerization, and distributed computing in general. The cloud is an important and necessary platform to work from because it provides a central location with access to these tools, useful documentation, and informative demonstrations. The projects for previous classes revolved around similar topics as it is relevant in today’s context. The courses offered a great foundation of software development, system analysis and design, networking, and cloud computing. Furthermore, an interest in developmental operations and software development led to the concept for the project.

2. Background

The Covid-19 pandemic has strongly encouraged the usage of these types of systems as a work from home model became more popular and businesses migrated their infrastructure from on-premises to a public cloud provider. The pandemic also emphasized the importance of an online presence as an important aspect to sustain businesses (Borcherding 1). This has led to

the inquiry about modern day commerce, and a general curiosity about the technology supporting it. Over the duration of the applied computer science program, e-commerce and trending topics in technology have inspired an interest in the development of efficient cloud native applications.

3. Approach

The project consists of a cloud native electronic commerce application supported by a responsive pipeline in the Google Cloud environment. The main theme/products that is being offered on the website is coffee. The framework React was used for the creation of this application. This is a popular open-source framework that was developed by Meta. Its popularity, useful documentation, extensive online courses, and tutorials have made it the framework of choice for the project ("Getting Started"). The most recent version of the framework is React 18 and was released in March 2022. This framework was introduced in the web architecture course and the new release added updates and features to make it more useful. The framework is very responsive and shares with the developer bugs and errors in an efficient and clear manner. Furthermore, a feature known as react-router was also necessary for the configuration of the website in relation to the different pages. The most recent version, version 6, had to be installed for the application to function well. The code was added by the developer and tested in a local environment. The front-end of the application is designed based on the structure of common e-commerce websites. The website consists of the following pages: home, about, blog, items, cart, checkout, thank you, and contact. The home page consists of a general introduction and welcome. The about page consists of background information and inspiration behind the creation of the business. The blog page consists of space for articles that

are intended to share information about the history, culture, and use of products. The items page consists of pictures of different types of coffee roasts that are offered by the company, its price, and a button to learn more about the product. The cart page shows images of the items, option to add to a cart, and a display of the item, tax, and total price. These aspects form the components of the website.



Fig. 1 Home Page of website

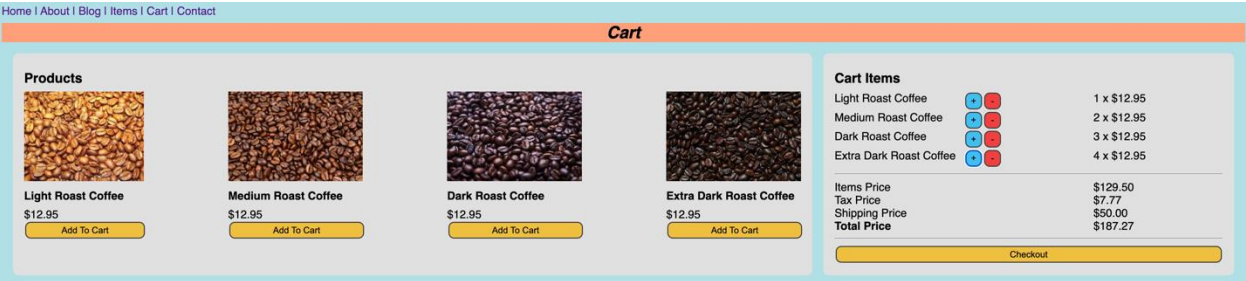


Fig 2. Full Cart page

The second main portion of the application is the developmental operations pipeline. The cloud provider that was used is Google Cloud. First, the application was packaged using node and the code was pushed to GitHub. A repository was made on GitHub and connected to the IDE using GitHub Desktop. Next, a project was created in Google Cloud to create the pipeline. The main services used are app engine and cloud build. An application was built on

App Engine and the repository was cloned to the local machine (“App Engine Documentation”). An `app.yaml` file was added to the directory and deployed. This file contains information for running a `nodejs16` application. Following this, a `cloudbuild.yaml` file was added and this file contains steps for a containerized image and build trigger. The purpose of this file is to build, package, and push Docker images. A trigger was made using Cloud Build and is associated with the GitHub repository. Here, a change and/or addition in code is made and pushed to the GitHub repository. This then triggers a build, and the updated code is reflected on the website. The code was first developed and tested on the local machine prior to being uploaded into GitHub and the cloud environment.

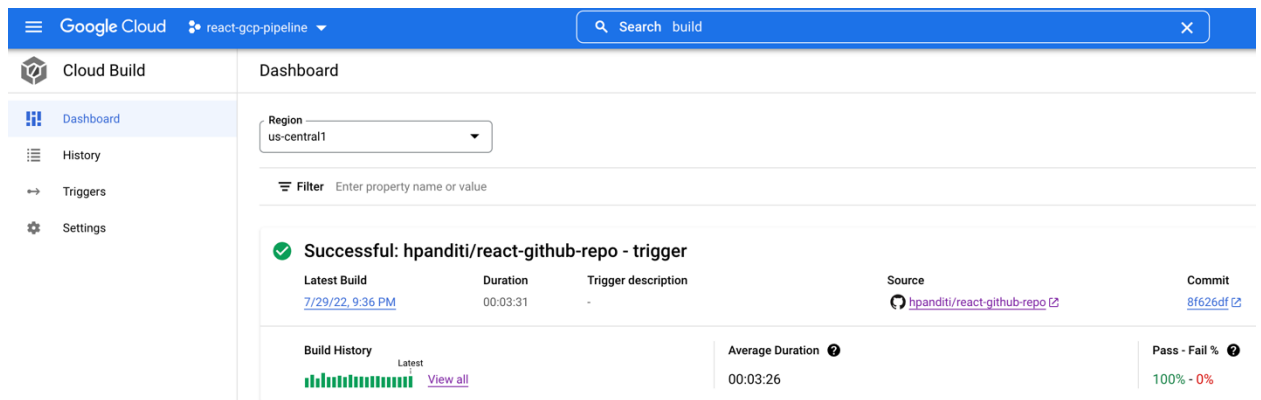


Fig 3. Cloud Build Dashboard

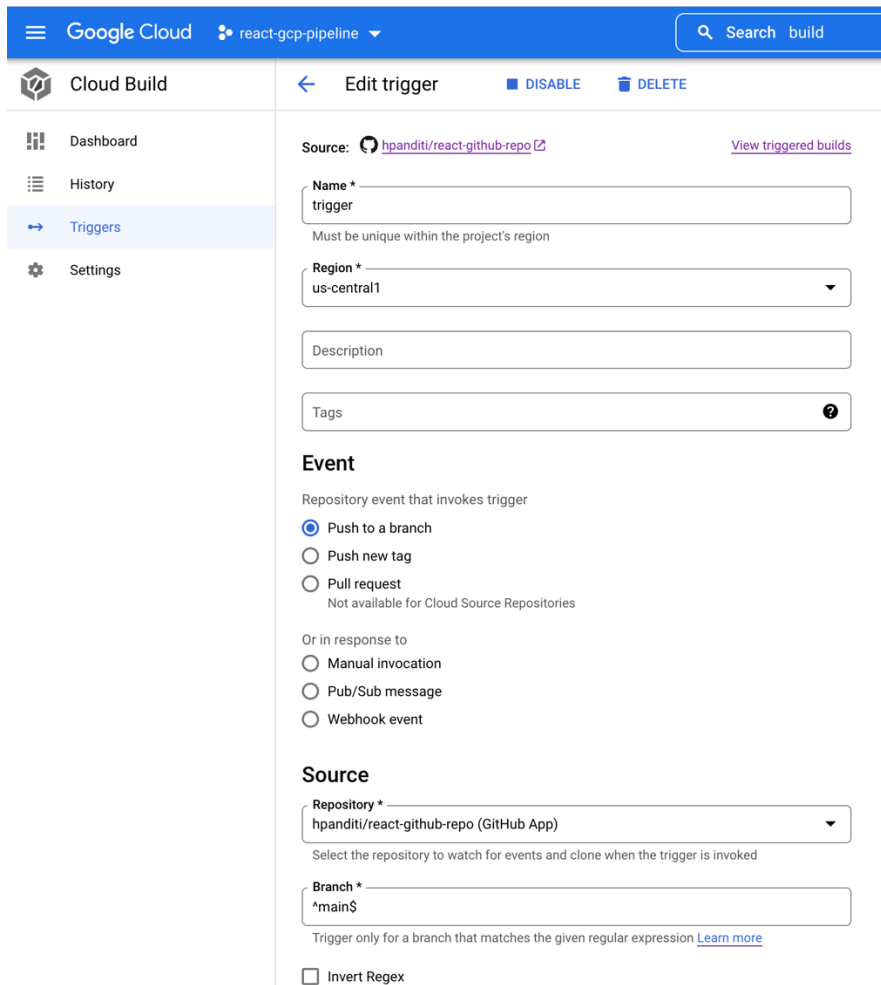


Fig 4. Cloud Build Trigger

There are several additional features would have been beneficial and alternative options to consider in designing a greater website. One aspect that may be beneficial is to incorporate greater application programming interfaces (APIs). Essentially, these are buttons and features that connect to complicated services in the back end of the application, making tasks such as retrieving information easier. One example of a useful API is a YouTube API that provides links and information on the process of roasting coffee. Additional APIs that would be useful are related to sharing more information about the product and purchasing the items. A different aspect that may be beneficial is to use a CSS framework such as “Bootstrap” or “Tailwind.”

These are popular frame works that would aid in creating a more aesthetically pleasing website. In addition, it would be compatible for both mobile use and personal computer use. There are alternative options in the Google Cloud environment that may have been utilized. One option is Cloud Run, a serverless platform to deploy the application. The other option is Google Kubernetes Engine (GKE) which utilizes Kubernetes, a container orchestration tool. In a broader sense, the application may have been deployed on a separate cloud provider such as Amazon Web Services or Microsoft Azure.

4. Conclusion

In essence, this is a modern e-commerce application that was built and hosted by the most recently available technology. The concepts and practice of decoupled services, serverless infrastructure, containerization, and continuous integration/delivery are present day approaches as opposed to monolithic approaches. However, it is important to stay informed about current trends to keep oneself informed and in tune with present day processes.

Furthermore, there are additional features and software that could have made this application more efficient if front-end frameworks and container orchestration was utilized. This project was meant to serve as a representation of the culmination of the courses in the master's program, illustrates several concepts, and can be designed to operate in a greater fashion.

Link to GitHub repository:

<https://github.com/hpanditi/react-github-repo>

Bibliography:

“App Engine.” Google Cloud, <https://cloud.google.com/appengine/docs>.

Borcherding, Brooks. “The Future Of Cloud In A Post-Pandemic World.” *Forbes*, 27 Apr. 2021, <https://www.forbes.com/sites/forbestechcouncil/2021/04/27/the-future-of-cloud-in-a-post-pandemic-world/?sh=22bdaae9582e>.

“Getting Started.” *React*, <https://reactjs.org/docs/getting-started.html#learn-react>.

“App Engine.” Google Cloud, <https://cloud.google.com/appengine/docs>.