Project Documentation

Group: 3

Library Management System

by

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Abstract

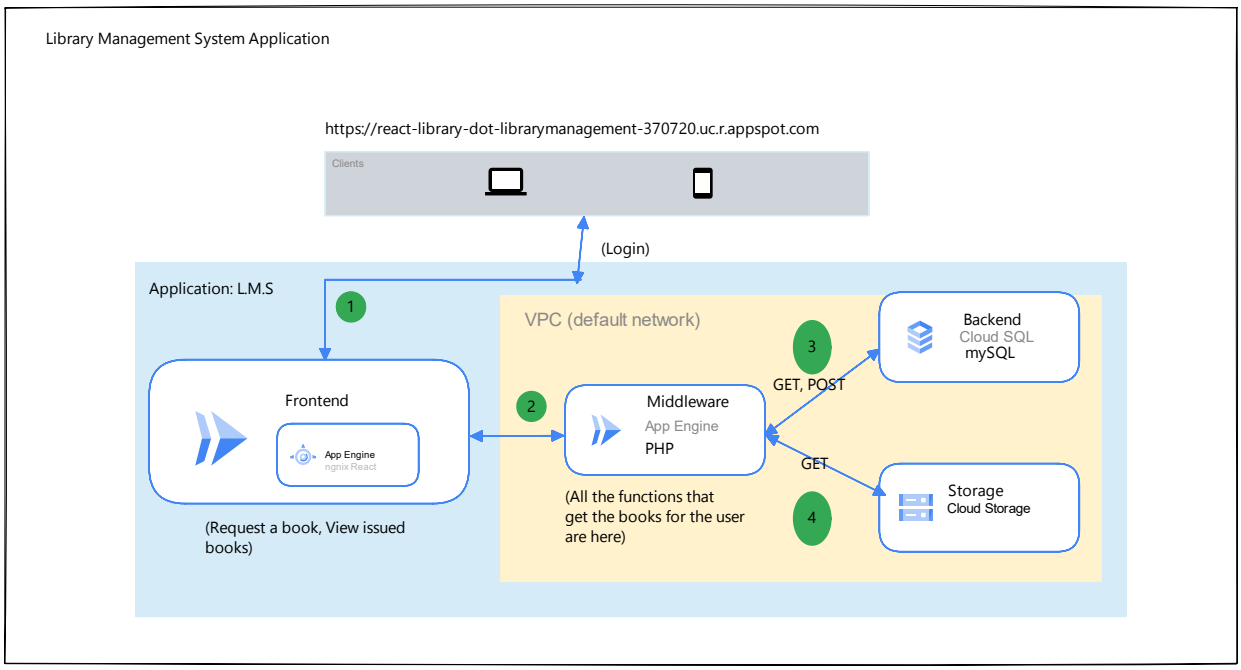
The Library Management System Website is an online system designed to help library staff manage their library's collections and patrons. It allows users to search for library materials, check out materials, and perform various other library-related tasks. The website provides access to an extensive catalog of library materials, including books, magazines and more. It also allows staff to manage patron accounts and track library usage. The website also enables librarians to add/remove books and issue a book if requested. The website used Google Cloud Components such as Google Cloud SQL, Google App Engine and Google Cloud Storage to store and manage the data. The website also used HTML, CSS, JavaScript, ReactJS and PHP to create the user interface and to interact with the database.

Features

The features of our application are as follows:

- Users, typically students and faculty alike can login/create accounts.
- Users can access the list of books available.
- Users can issue books from the library.
- Admin/Librarian can issue books to students who requested the book.

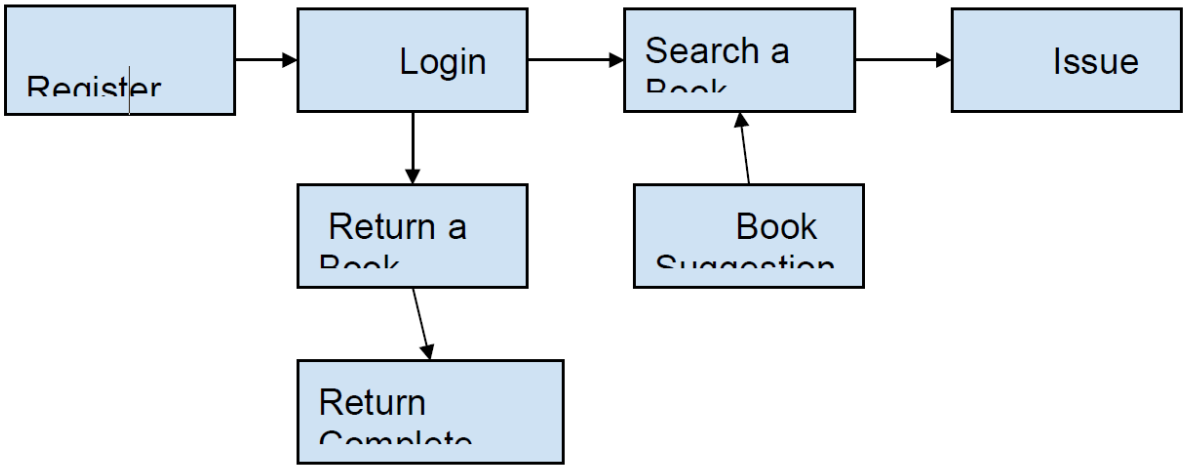
System Architecture



This app can be used from anywhere, the desktop or the mobile as it was designed for dynamic use. We used Google App Engine to run the PHP as well as the React Web Application. We used Google Cloud Storage as storage unit. Finally, we used Google Cloud SQL for a mySQL queries onto the database.

Workflow

1. The user goes to the website, and logins as an admin/user and will be redirected to the respective homepages.
2. The user can be able to view the books that are available or can search for books he wants. He can then request the book he needs; He can also view what all books he currently issued.
3. The admin will be able to view what books are requested by what user and depending on the user, he issues or rejects the request.



Technologies

- Google Cloud
- Git
- ReactJS
- PHP

Google Cloud Components

The components used for this application are:

- Google App Engine
- Google Cloud SQL
- Google Cloud Storage

Google App Engine:

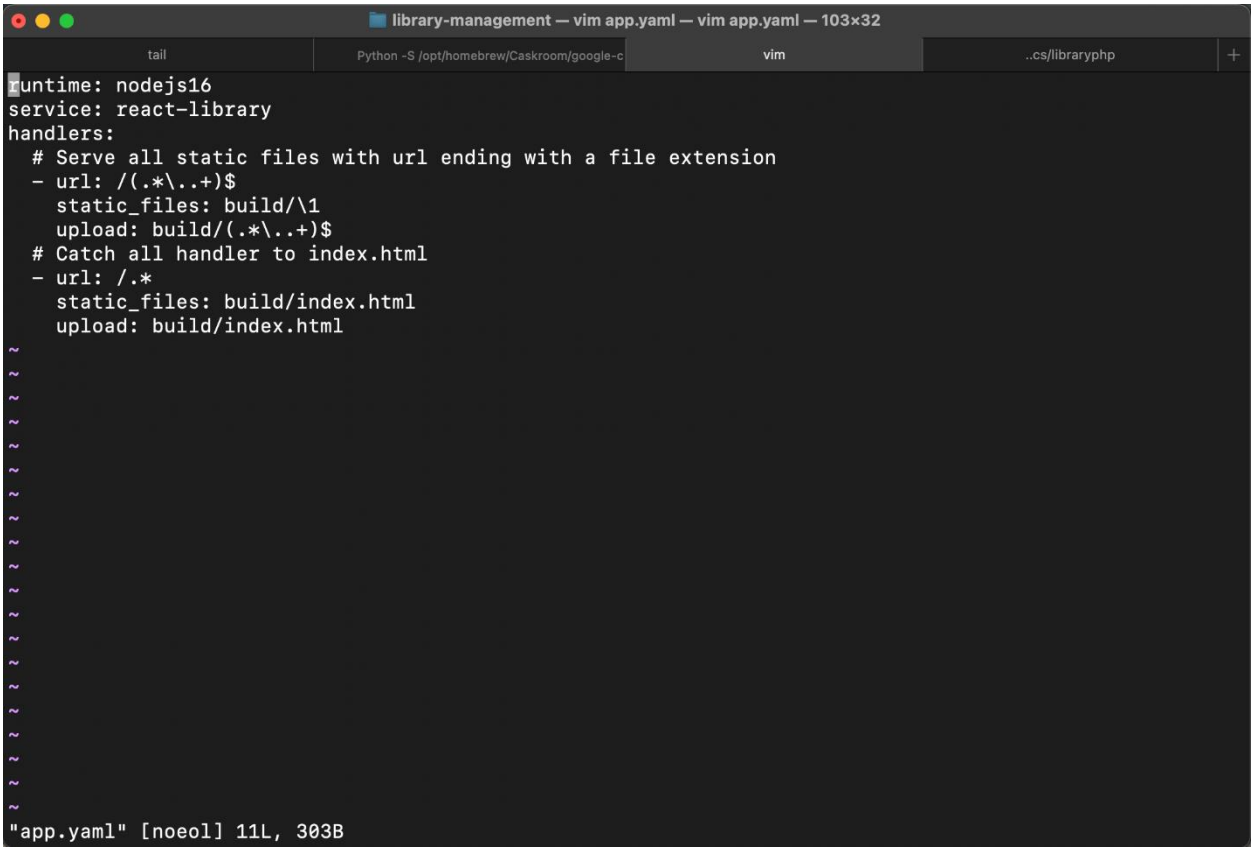
Google App Engine is a powerful platform for building scalable and reliable web applications and mobile backends. It is a fully managed service that makes it easy to build, deploy, and maintain applications on Google's infrastructure.

Google App Engine should be used because it provides an easy to use, powerful and reliable environment for developing, hosting, and managing web-based applications with minimal effort. It also offers cost effective scalability, high availability, and robust security. Additionally, it enables developers to quickly and easily build applications on the same infrastructure used by Google's own products such as Gmail, YouTube, and more. Finally, Google App Engine is integrated with Google Cloud Platform services, giving developers access to a variety of services and tools, allowing them to create applications that are tailored to their specific needs.

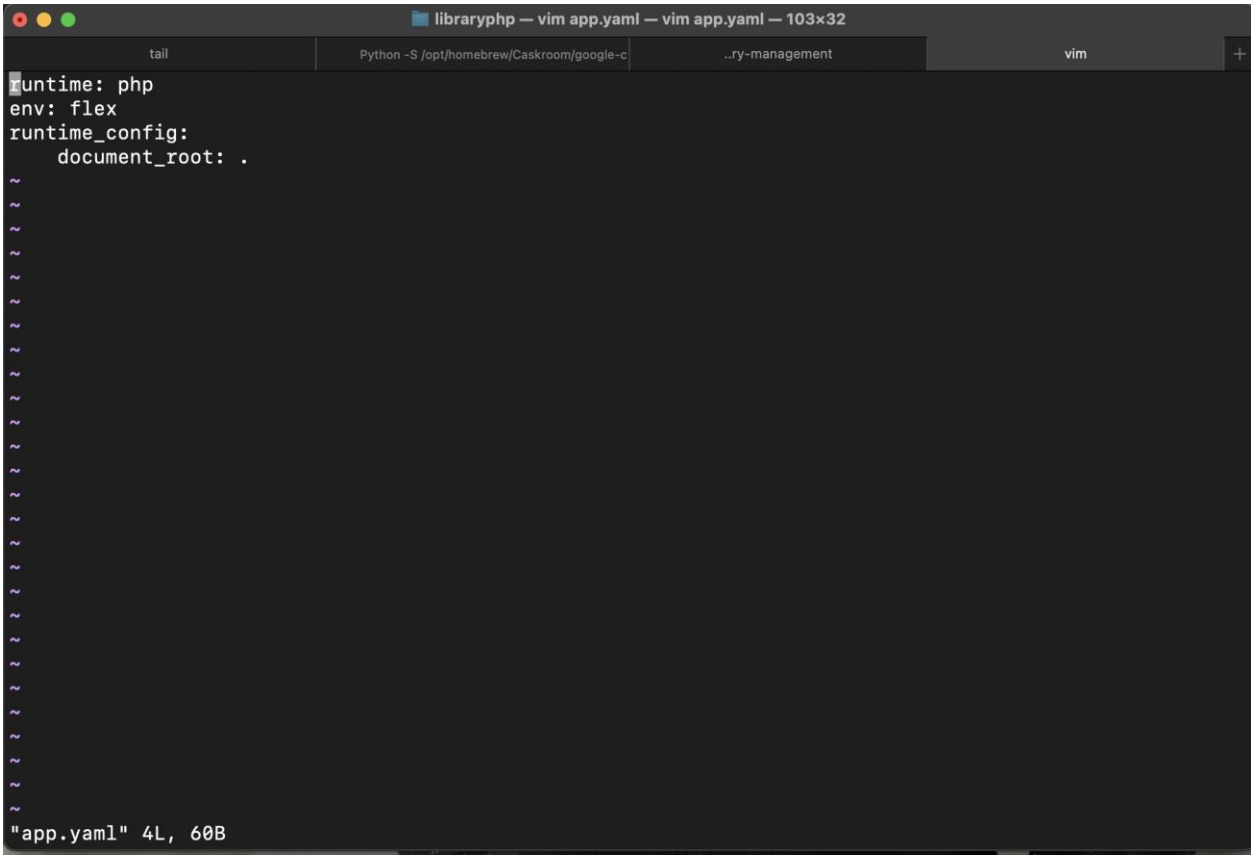
We deployed our PHP and ReactJS project code on the Google App Engine by creating an 'app.yaml' file.

The app.yaml file stores configuration information for an application running on Google App Engine. This file defines how the application is deployed on the platform and how the App Engine should manage its resources. The file contains important configuration settings such as the application's service name, the version of the runtime environment to use, the instance class to be used, and more. Without the app.yaml file, applications cannot be deployed on Google App Engine.

Below are attached screenshots of our app.yaml files for Frontend and Middleware:



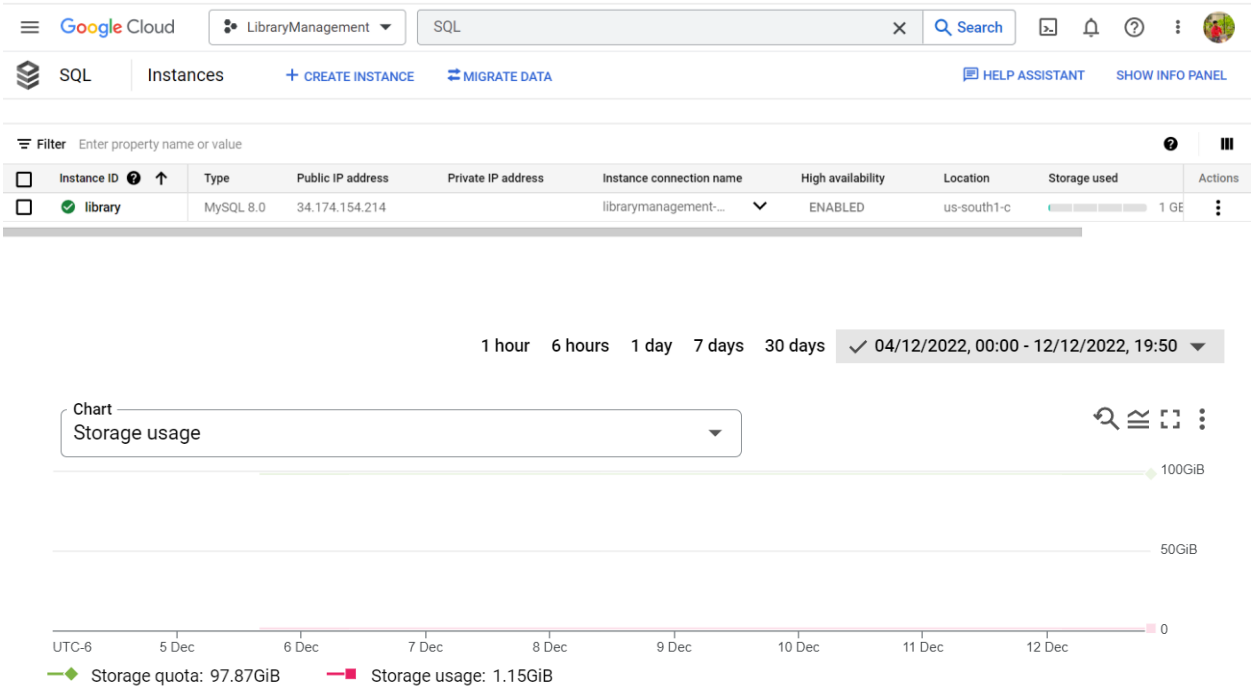
This is for the ReactJS application.

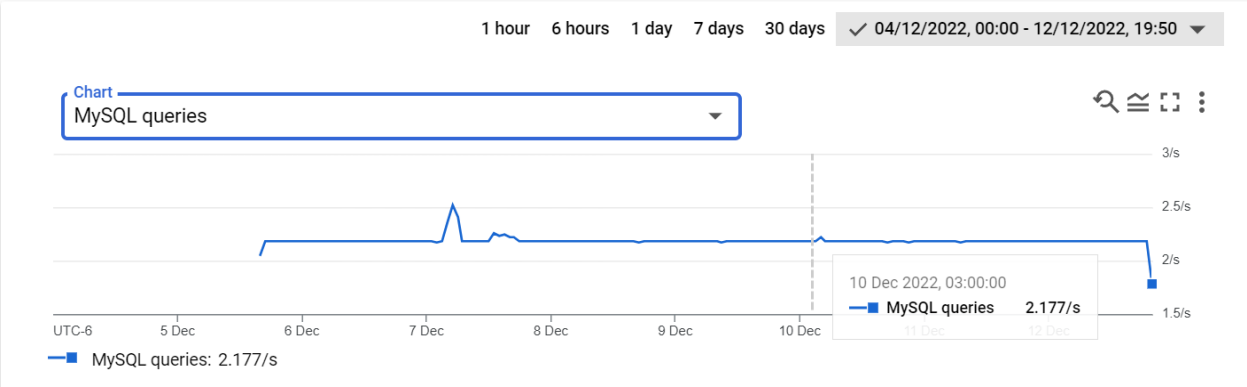


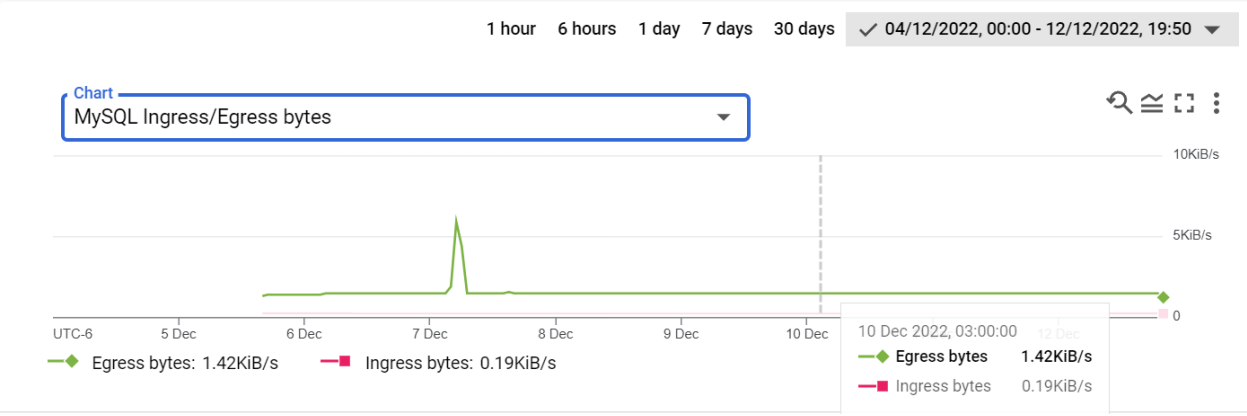
This is for the PHP Application

Google Cloud SQL:

Google Cloud SQL is an ideal choice for small application deployments because of its scalability, cost-efficiency, and ease of use. The Cloud SQL platform offers an easy-to-use web interface for quickly and easily setting up databases, as well as advanced features such as automatic backups, high-availability, and access control. Furthermore, the platform is designed to scale up or down depending on your application's needs, helping to keep costs low. Google Cloud SQL also provides a secure and reliable environment for hosting your data and applications, ensuring that any sensitive information is securely stored and managed.




1 hour
6 hours
1 day
7 days
30 days
04/12/2022, 00:00 - 12/12/2022, 19:50
Chart
MySQL queries
3/s
2.5/s
2/s
1.5/s
10 Dec 2022, 03:00:00
MySQL queries 2.177/s
UTC-6
5 Dec
6 Dec
7 Dec
8 Dec
9 Dec
10 Dec
MySQL queries: 2.177/s

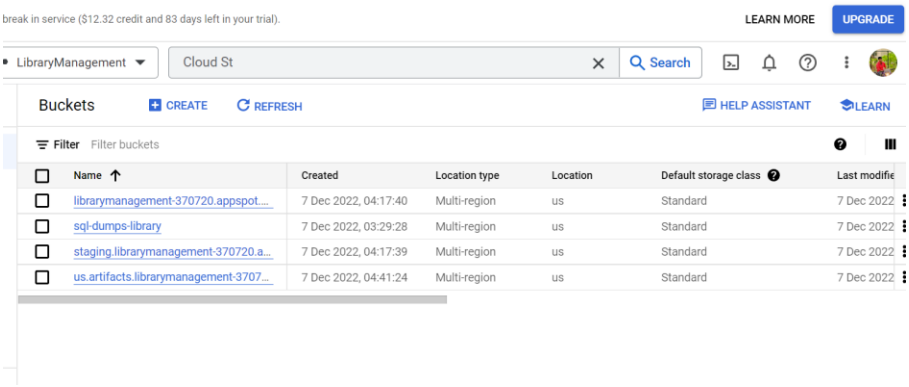

1 hour
6 hours
1 day
7 days
30 days
04/12/2022, 00:00 - 12/12/2022, 19:50
Chart
MySQL Ingress/Egress bytes
10KiB/s
5KiB/s
0
10 Dec 2022, 03:00:00
Egress bytes 1.42KiB/s
Ingress bytes 0.19KiB/s
UTC-6
5 Dec
6 Dec
7 Dec
8 Dec
9 Dec
10 Dec
Egress bytes: 1.42KiB/s
Ingress bytes: 0.19KiB/s

Google Cloud Storage:

Google Cloud Storage is an effective, reliable, and secure cloud storage service offered by Google. It enables businesses and individuals to store and access data in the cloud. Google Cloud Storage offers a wide range of features and benefits that make it an attractive option for data storage.

One of the primary benefits of Google Cloud Storage is its scalability. With its flexible pricing plans, businesses can scale their storage capacity and usage up or down, depending on their needs. This means that businesses can purchase and use only the storage capacity they need and can easily scale up or down as their storage requirements change. Additionally, Google Cloud Storage is highly reliable and secure, ensuring that all stored data remains safe and secure. It also comes with a wide range of advanced security features, such as encryption, data backups, and access control, which help protect against data loss and unauthorized access.

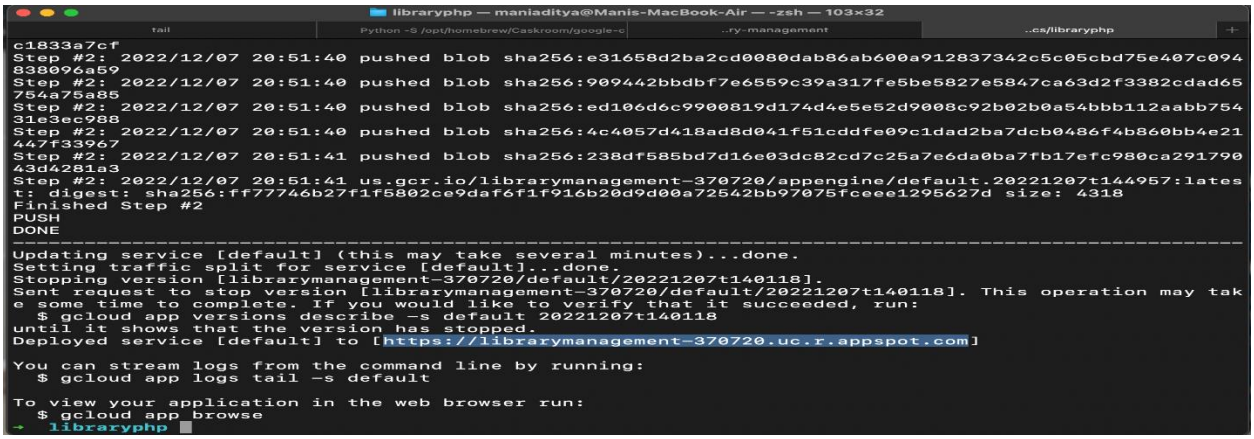
Google Cloud Storage also offers a range of features that make it a powerful and cost-effective cloud storage solution. For example, its powerful API allows developers to quickly and easily integrate their applications with the Google Cloud Storage platform. Additionally, its pricing plans are designed to provide businesses with cost-effective storage solutions that meet their specific budget and needs. Finally, Google Cloud Storage is simple to use.



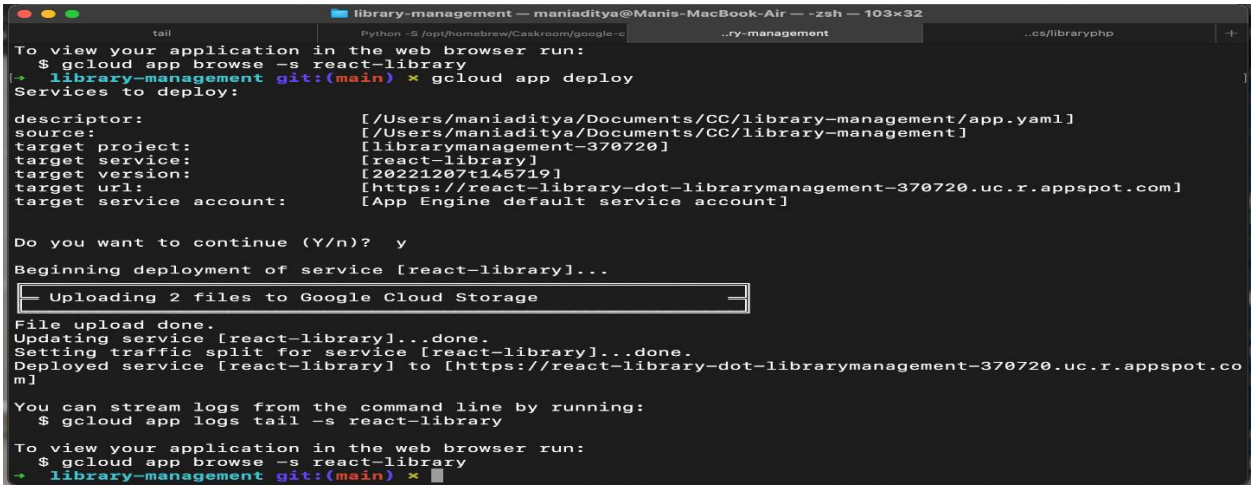
Deployment

The deployment is done in two phases:

1. Deployment of PHP



2. Deployment of ReactJS Application



gcloud app deploy:

The ‘gcloud app deploy’ command is a powerful tool used to deploy applications to the Google App Engine. This command allows developers to easily deploy their applications to Google's cloud platform in a matter of minutes. This command takes the application code and configuration files, packages them in the appropriate format, and then deploys them to the App Engine. It is a great way for developers to quickly and easily deploy their applications to the Google App Engine. This command allows developers to easily customize their applications and configure them for the App Engine. This command also allows developers to take advantage of advanced features like scalability, performance optimization, and automatic scaling. With this command, developers can quickly and easily deploy applications to the App Engine without needing to manually configure and deploy the application.

Final Application

The PHP file is on the App Engine which handles all the user request and is a bridge between the front end of the application created using ReactJS framework and the Google Cloud SQL and Google Cloud Storage.

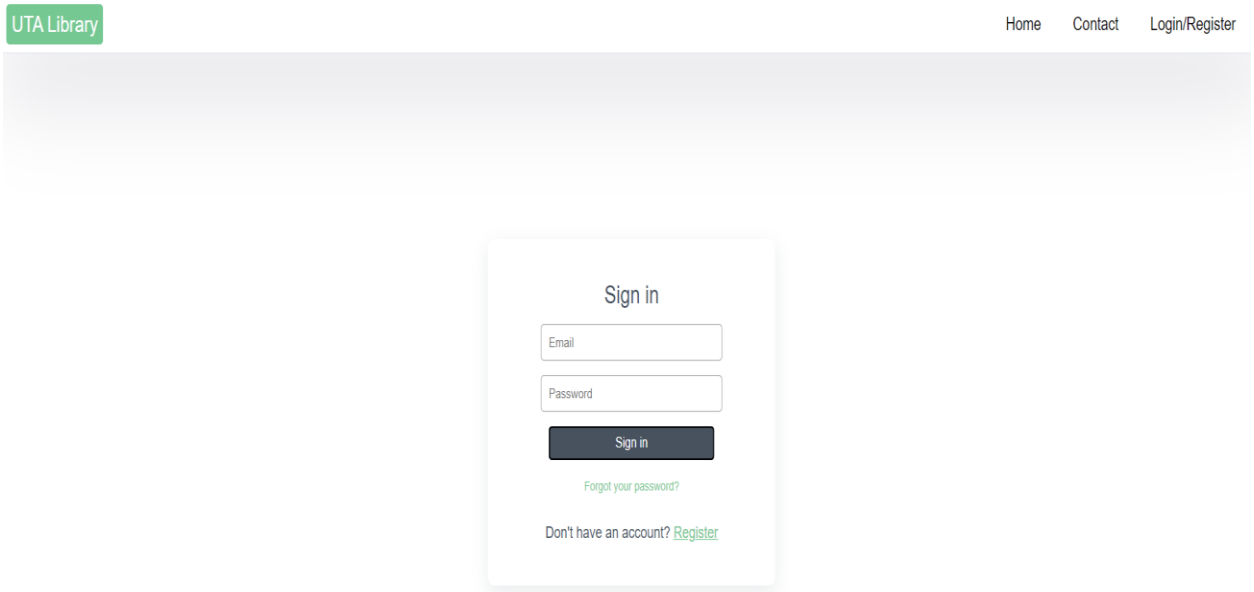
To access the website, click on the below link:

Library Management System

The following are the screen shots of our project.

Home Page:

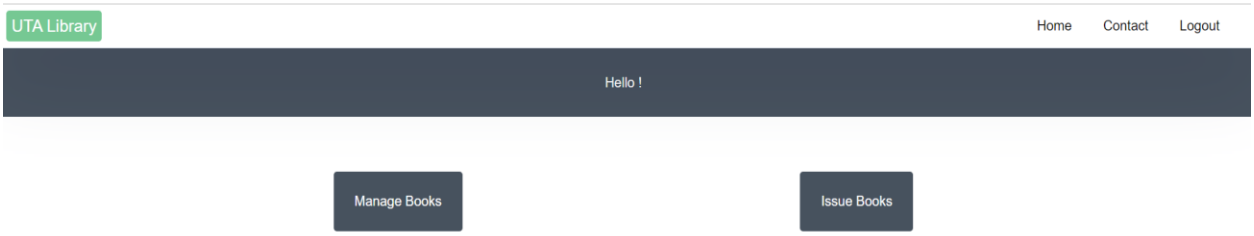
This is the default page everyone comes to when clicked on the website link. If you already have an account, you can login or else, we can click register and register yourself.



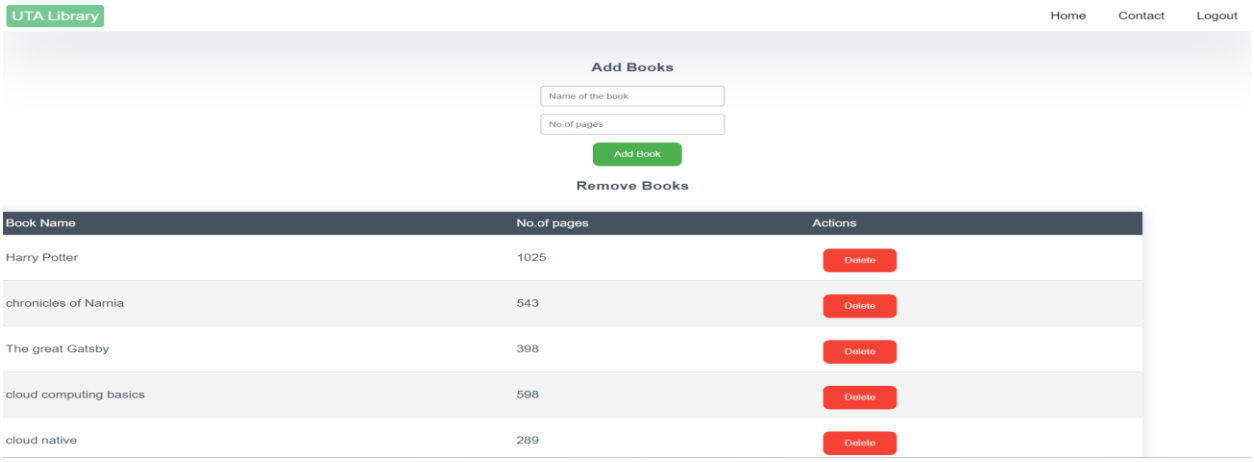
Admin page:

This is the page the admin is redirected to when he logs in. He will have two options:

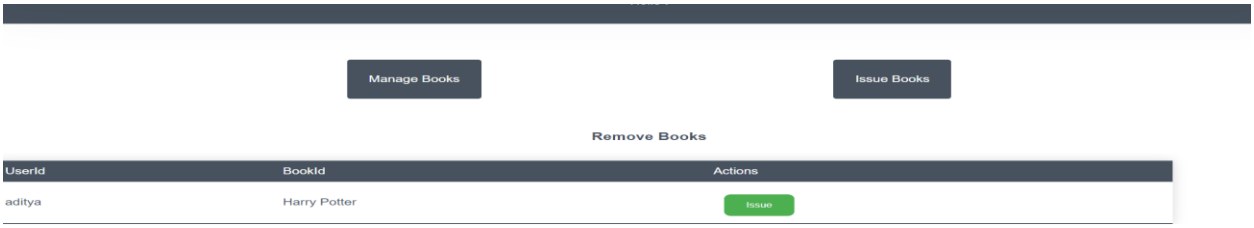
- Manage Books
- Issue Books



Manage Books:



Issue Books:



User Home Page:

This is the homepage for any user, be it student or faculty. They can do one of two things:

- See a list of books already issued
- Request New Books

Future Scope

We want to predict when the book would be available making space for more availability of the service provided.

Links

Cloud Project Demo Screen Recording

Github Code Repository

Teammate Evaluation

Manikanta Aditya worked on the ReactJS and PHP part of the project and made sure that the project was completely running on the local server. He was very dedicated to his work and was always available to help the team whenever needed. He was very knowledgeable and was able to answer all the queries related to ReactJS and PHP.

Radha Yashwanth worked on the google cloud deployment of the project and made sure that the project was completely deployed on the cloud. He was also very dedicated to his work and was always available to help the team whenever needed. He was knowledgeable and was able to answer all the queries related to Google Cloud deployment.

The project was completed on time and all the features were implemented as per the requirements. The team worked together to ensure that the project was completed with the highest quality and within the given timeline. The team also worked together to ensure that the project was tested thoroughly, and all the bugs were fixed before the final release.

Overall, the teamwork was great, and everyone was able to contribute to the project in their own way. The project was a success, and it was a great learning experience for all the team members.