

ASSIGNMENT 2 FRONT SHEET

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Student declaration <p>I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.</p>			
		Student's signature	<i>Linh</i>

Grading grid

P5	P6	P7	P8	M3	M4	D2	D3

☐ **Summative Feedback:**☐ **Resubmission Feedback:****Grade:****Assessor Signature:****Date:****Internal Verifier's Comments:****Signature & Date:**

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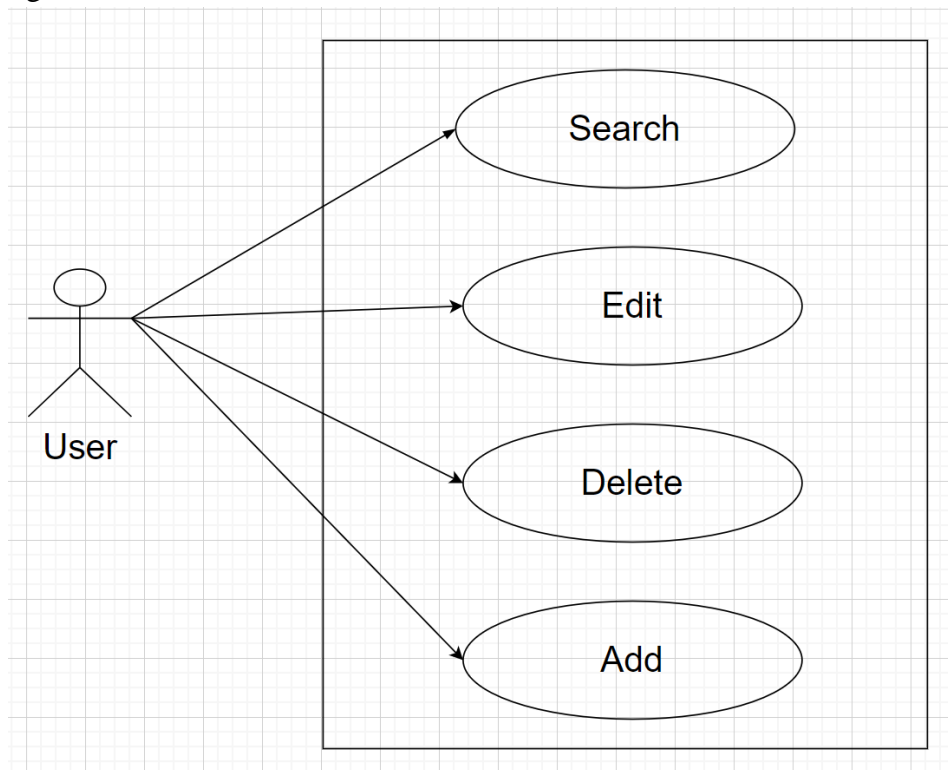
Introduction

In the previous report, we discussed some fundamental concepts of cloud computing. Today, we will implement a web application in the cloud based on the solution I provided in my previous report. MongoDB serves as the database for my Node.js web application. Render will be used to deploy these projects on the internet.

Task 1: Design

I. Overview Function

1. Use-case diagram



Web Application has the several function that are: Search – Edit - Add - Delete

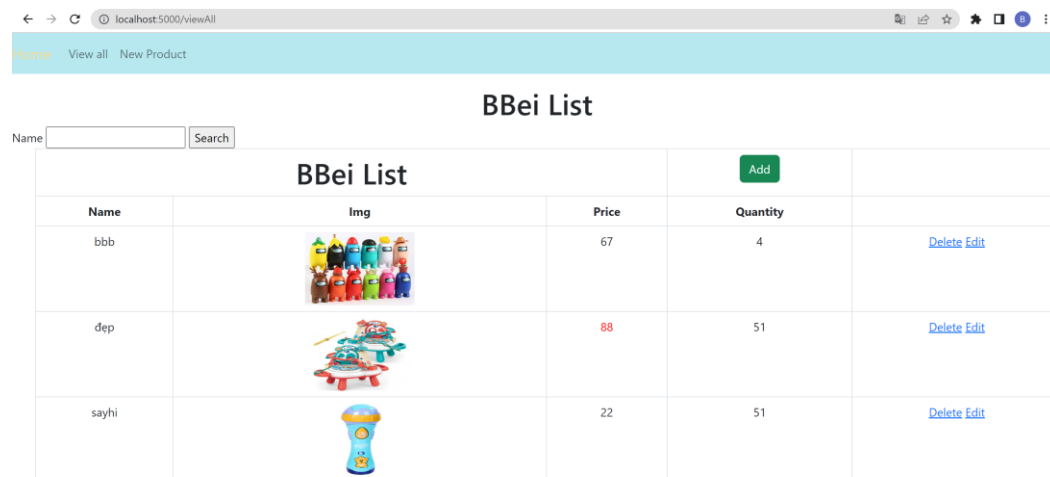
2. Website screen shots

2.1. Home page



This is the first interface when using the website. It will show a navbar for menu list of function that includes store name, View all and New product.

2.2.View all



In this page I still have enough 3 interfaces: Home, View all, New product. At the main interface of this page, there is a table of 4 columns displaying full product information including: Name, Img, Price, Quantity and product search bar and 3 function buttons: Add, Edit, Delete.

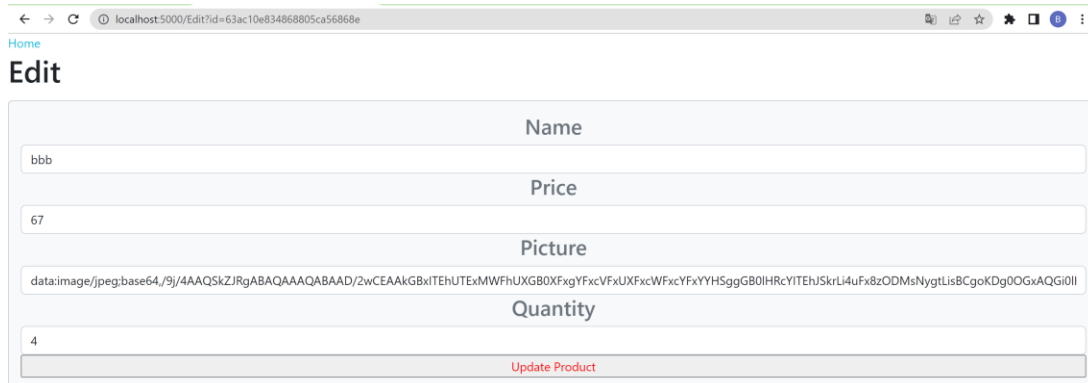
2.3. Add new product



localhost:5000/new

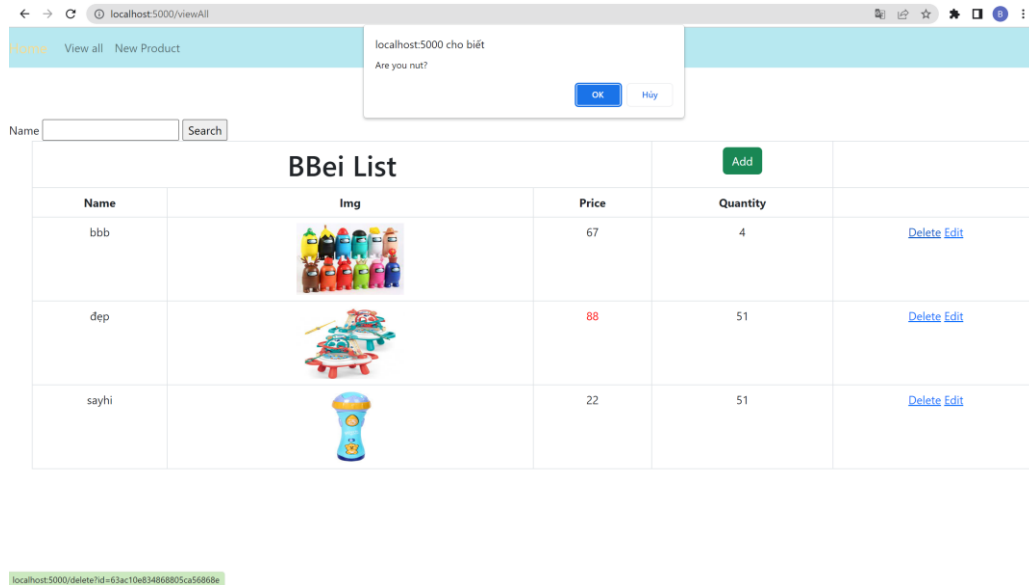
This page contains six new product information fields. You must complete all the information, if you do not fill in all the information, the "Please fill in this field" line will appear.

2.4. Edit product



This view will appear when you click 'Edit' in the table under 'View all'. At this interface will display product information and users can update to suit their needs.

2.5. Delete product



By clicking the erase button, you are asked to remove this product from the website. If you select "Ok," the item will be removed.

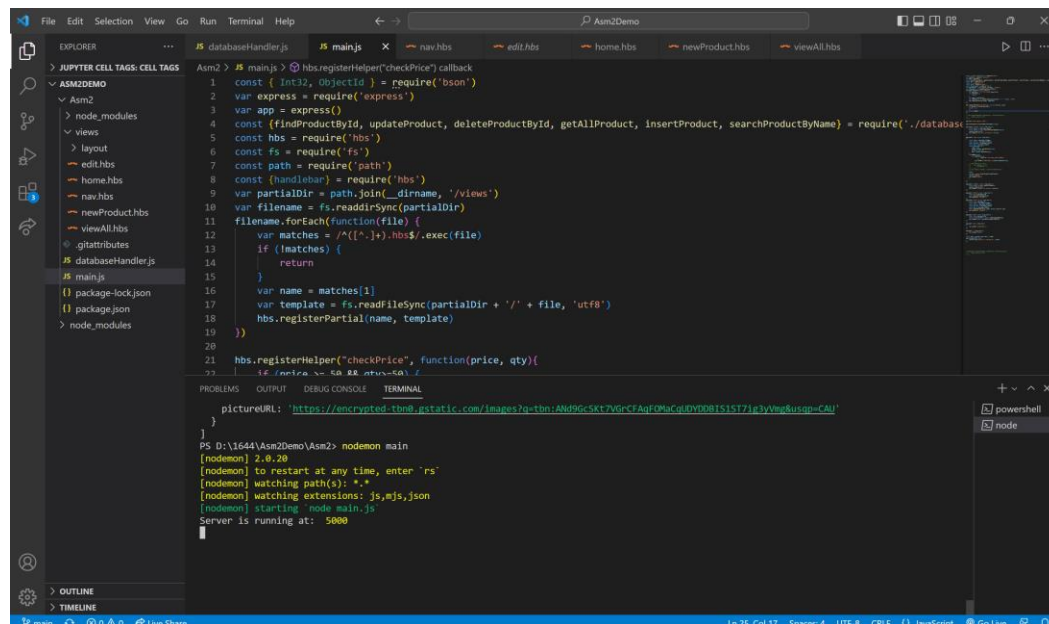
II. Code implement and deploy process

1. Tools and framework

1.1. IDE

The advantages of using Visual Studio Code for this project are as follows: Starting is very simple and takes very little time. Many different programming languages, as well as numerous extensions, are supported. Visual Studio supports Git CLI terminal commands.

Code:

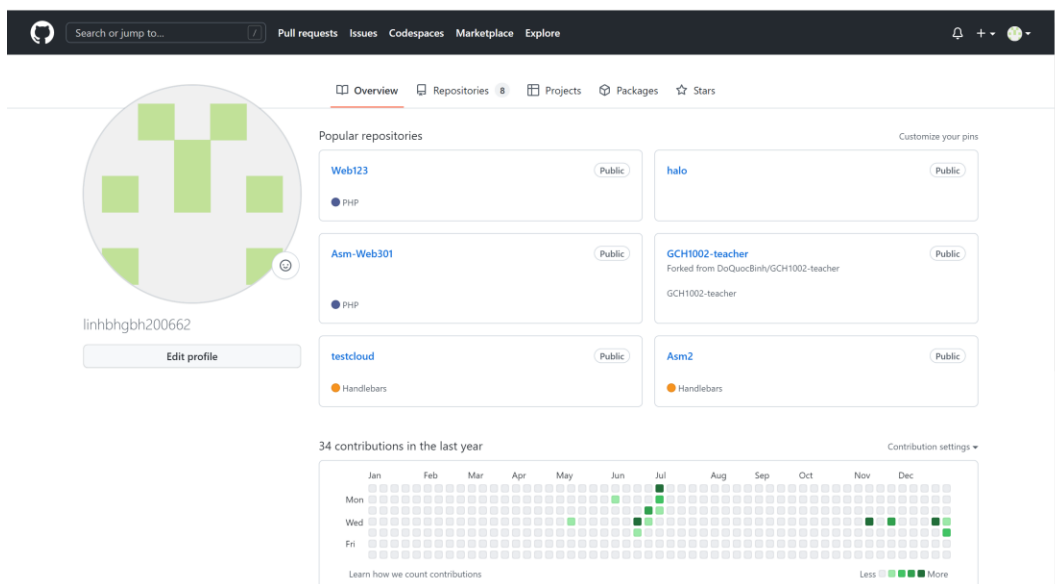


1.2. Framework

This project makes use of the Express framework. The name Express refers to a NodeJS framework. Its numerous powerful features can be used by both web platforms and mobile applications. Express supports middleware and HTTP technologies, resulting in a highly dependable and user-friendly API. The following list summarizes Express's key components. Create an intermediate-level class that can respond to HTTP requests. Describes routers that can be used for a variety of HTTP and URL-based tasks. An HTML page may be returned based on your input.

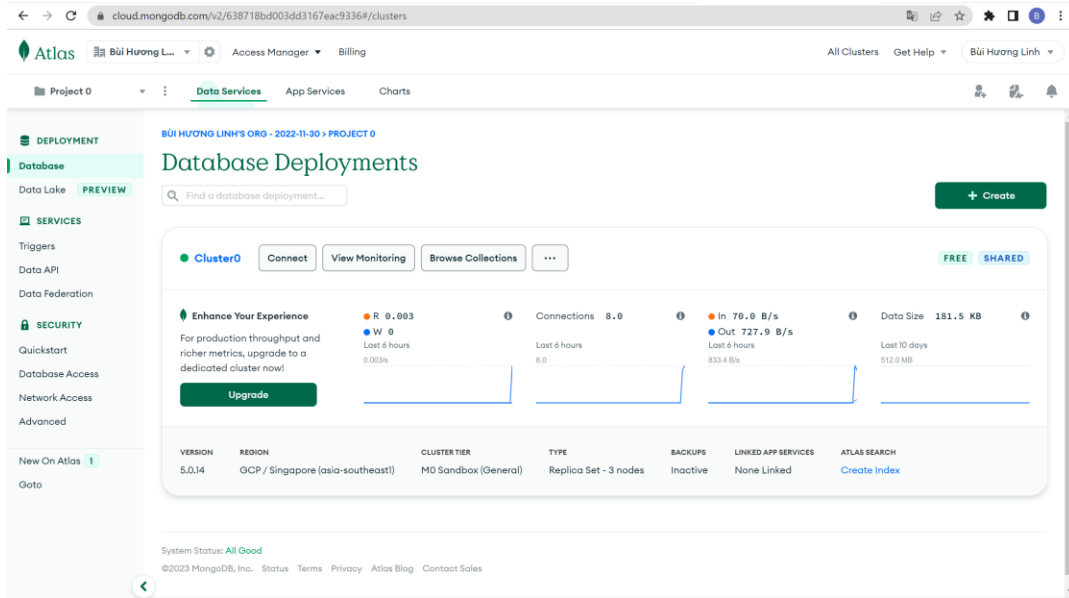
1.3. Source code manager

Using GitHub will allow me to manage and communicate source code with other project team members more easily. It also makes backup and storage of source code easier.



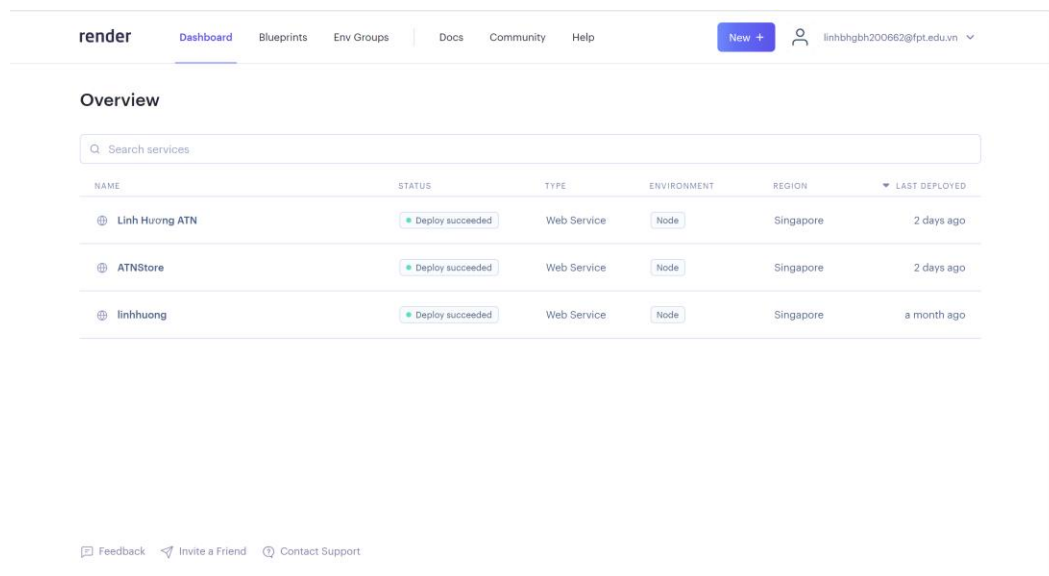
1.4. Database server

Because it allows online databases and only requires a MongoDB account and mongo settings, I chose mongodb as the database for the Atlas project to obtain a connection link. Documents are retained in document-oriented storage with high security and are stored as JSON-formatted files. It's noSQL database.



1.5. Cloud computing module

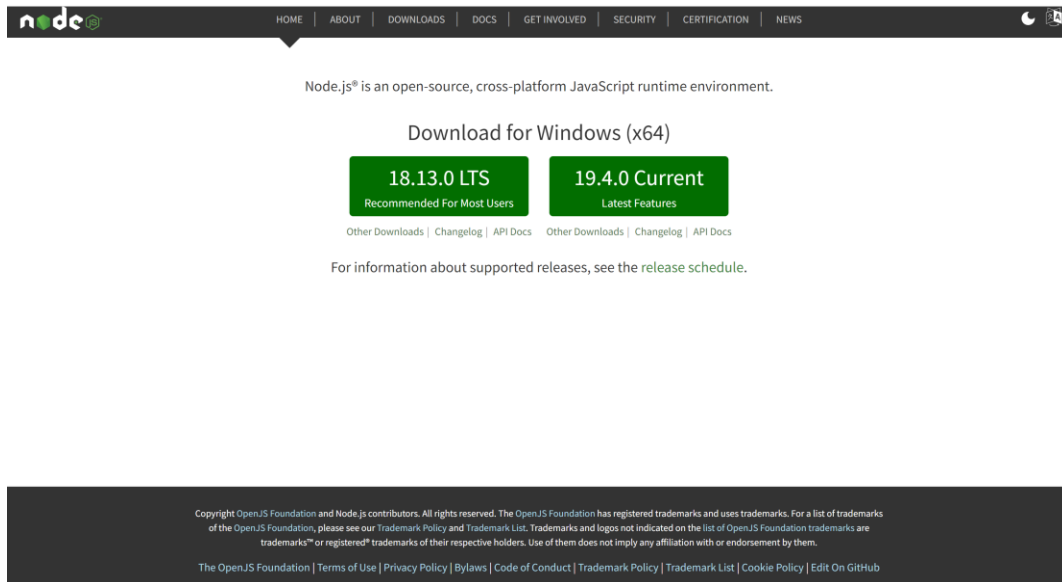
In the final stage, the app will be published to the internet via render. It has a wide range of applications and is appropriate for small to very large businesses. Render provides a capable technical team that is available 24/7 and adheres to a variety of security guidelines.



2. Deploy

2.1. Config the framework on the env

Because Express is a nodejs framework, the first thing we need to do is download and install nodejs.



When the first stage is completed, create a project and use a terminal command to install express using the Node package manager: `npm install express`.

```
PS D:\1644\Demmo> npm install express

added 57 packages, and audited 58 packages in 4s

7 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
PS D:\1644\Demmo> █
```

2.2. Config and connect to MongoDB

The next step is to connect to the database. We will use mongodb at the end of the project because it is more appropriate for the project than installing it locally. As a result, we must create a mongodb atlas account.

Create new cluster:

CLUSTERS > CREATE NEW CLUSTER

Create New Cluster

Serverless
Dedicated
Shared

Global Cluster Configuration

Cloud Provider & Region

GCP, Hong Kong (asia-east2)

Multi-Cloud, Multi-Region & Workload Isolation (M10+ clusters)
Distribute data across clouds or regions for improved availability and local read performance, or introduce read-only and analytics nodes. [Learn more](#)

\$0.61/hour
Pay-as-you-go! You will be billed hourly and can terminate your cluster anytime. Excludes variable data transfer, backup, and taxes.

Cancel
Create Cluster

Add IP address:

Add IP Access List Entry

Atlas only allows client connections to a cluster from entries in the project's IP Access List. Each entry should either be a single IP address or a CIDR-notated range of addresses. [Learn more](#).

ADD CURRENT IP ADDRESS

Access List Entry:

Enter IP Address or CIDR Notation

Comment:

Optional comment describing this entry



This entry is temporary and will be deleted in

6 hours

Cancel

Confirm

Create database:

Add New Database User



Create a database user to grant an application or user, access to databases and collections in your clusters in this Atlas project. Granular access control can be configured with default privileges or custom roles. You can grant access to an Atlas project or organization using the corresponding [Access Manager](#)

Authentication Method

Password	Certificate	AWS IAM (MongoDB 4.4 and up)
-----------------	--------------------	----------------------------------------

MongoDB uses [SCRAM](#) as its default authentication method.

Password Authentication

e.g. new-user_31	
Enter password	SHOW
 Autogenerate Secure Password	 Copy

Database User Privileges

Configure role based access control by assigning database users a mix of one built-in role, multiple custom roles, and multiple specific privileges. A user will gain access to all actions within the roles assigned to them, not just the actions those roles share in common. **You must choose at least one role or privilege.** [Learn more about roles.](#)

Built-in Role

Select one [built-in role](#) for this user.

0 SELECTED ^

Add Built In Role

Custom Roles



Get connect strings:

Connect to Cluster0

✓ Setup connection security

✓ Choose a connection method

Connect

I do not have MongoDB Compass

I have MongoDB Compass

- Choose your version of Compass:**

1.12 or later

See your Compass version in "About Compass"
- Copy the connection string, then open MongoDB Compass.**

mongodb+srv://<username>:<password>@cluster0.ftvbjpb.mongodb.net/test

You will be prompted for the password for the <username> user's (Database User) username. When entering your password, make sure that any special characters are [URL encoded](#).

Having trouble connecting? [View our troubleshooting documentation](#)

Go Back

Close

2.3. Config git and upload file to GitHub

While developing a web application, I must use Github to manage the source code, then push it to render for testing. I will build one repository to handle one repository for each project.

Search or jump to...

Pull requests Issues Codespaces Marketplace Explore

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Owner *

Repository name *

linhbgbh200662 /

Great repository names are short and memorable. Need inspiration? How about turbo-octo-winner?

Description (optional)

Public

Anyone on the internet can see this repository. You choose who can commit.

Private

You choose who can see and commit to this repository.

Initialize this repository with:

Skip this step if you're importing an existing repository.

Add a README file

This is where you can write a long description for your project. [Learn more.](#)

Add .gitignore

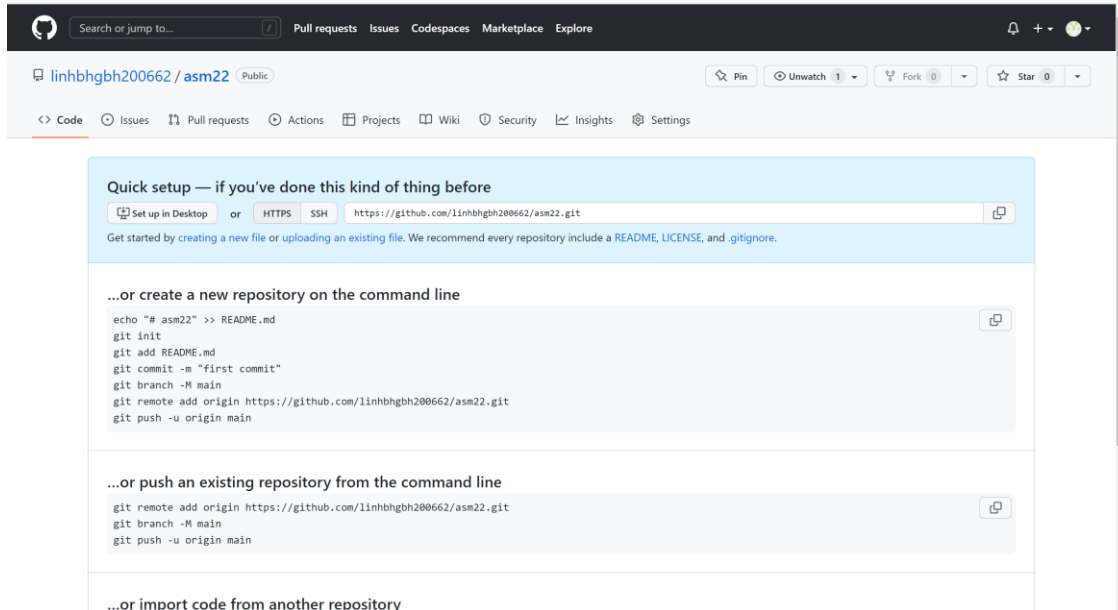
Choose which files not to track from a list of templates. [Learn more.](#)

.gitignore template: None

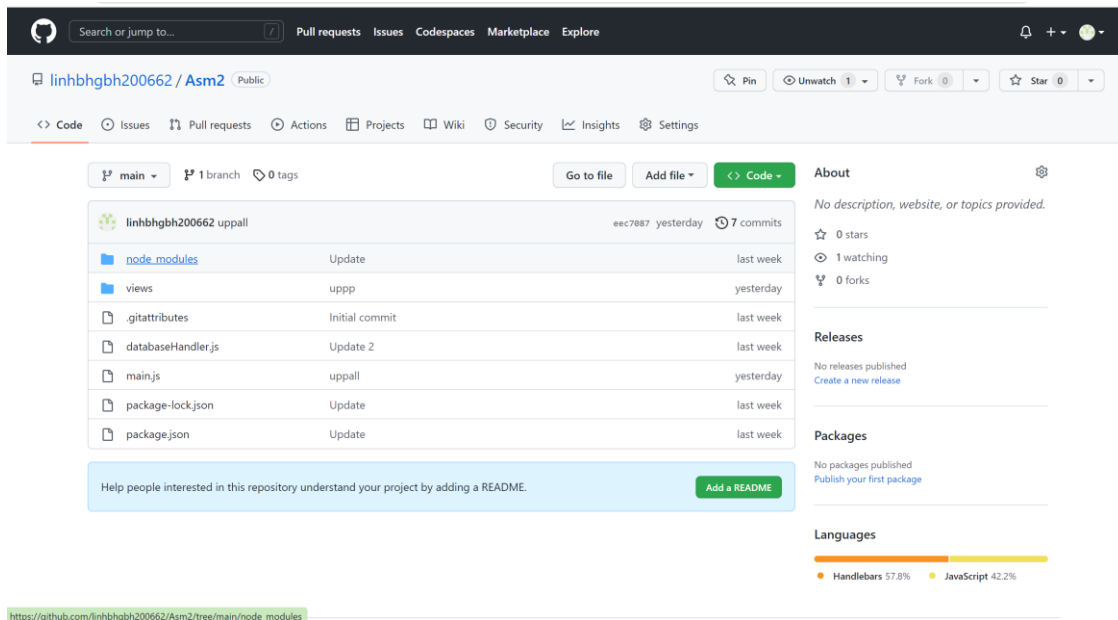
Choose a license

A license tells others what they can and can't do with your code. [Learn more.](#)

I'll start the command line after creating a repository so that we can run the program with git.

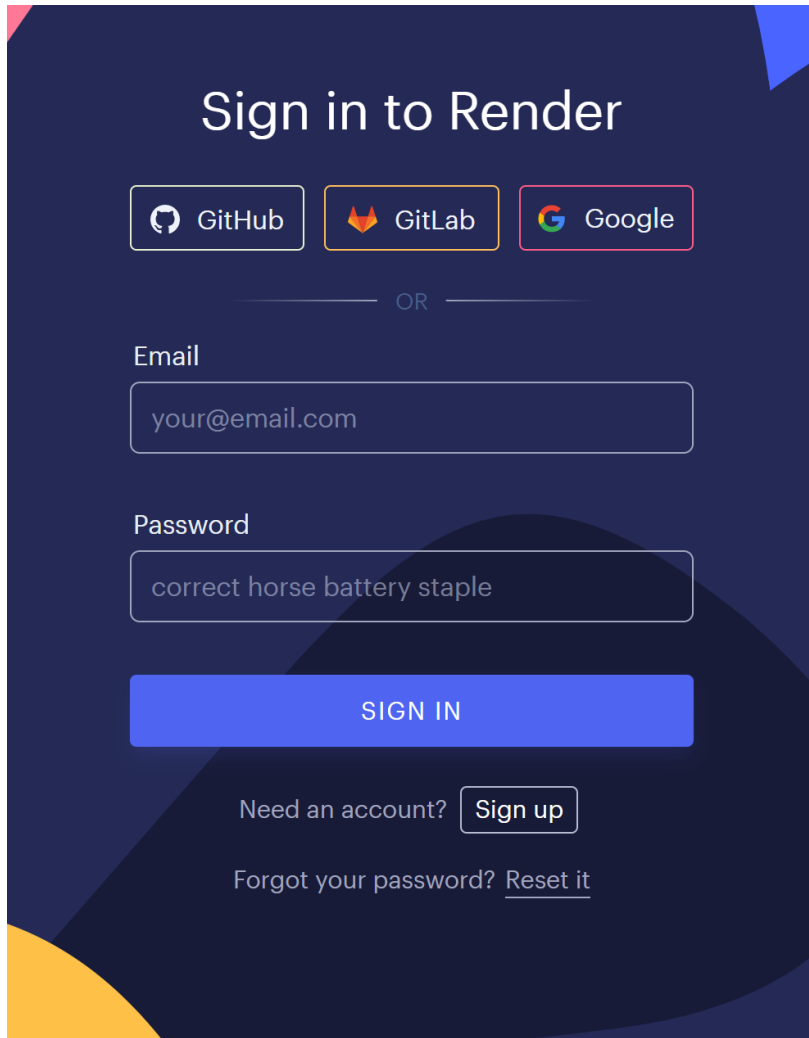


If the upload was successful, you can find the source code in your github repository.






2.4. Deploy code on render server

First, we'll log in to render with our github account.



The image shows a dark-themed sign-in page for Render. At the top, it says "Sign in to Render". Below this are three buttons for social login: GitHub, GitLab, and Google. A horizontal line with the word "OR" in the center separates these from the email/password fields. The "Email" field contains the placeholder text "your@email.com". The "Password" field contains the placeholder text "correct horse battery staple". Below the password field is a large blue "SIGN IN" button. At the bottom, there is a link "Need an account?" followed by a "Sign up" button, and another link "Forgot your password?" followed by a "Reset it" link.

Sign in to Render

 GitHub  GitLab  Google

OR

Email

your@email.com

Password

correct horse battery staple

SIGN IN

Need an account? [Sign up](#)

Forgot your password? [Reset it](#)

After logging in, the render's Homepage will look like this.

render **Dashboard** Blueprints Env Groups Docs Community Help New + linhbhgbh200662@fpt.edu.vn

Overview

Search services

NAME	STATUS	TYPE	ENVIRONMENT	REGION	LAST DEPLOYED
Linh Huong ATN	Deploy succeeded	Web Service	Node	Singapore	2 days ago
ATNStore	Deploy succeeded	Web Service	Node	Singapore	2 days ago
linhhuong	Deploy succeeded	Web Service	Node	Singapore	a month ago

Feedback Invite a Friend Contact Support

Then, to create a new website, click on new.

render **Dashboard** Blueprints Env Groups Docs Community Help New + linhbhgbh200662@fpt.edu.vn

Overview

Search services

NAME	STATUS	TYPE	ENVIRONMENT	REGION	LAST DEPLOYED
Linh Huong ATN	Deploy succeeded	Web Service	Node	Singapore	2 days ago
ATNStore	Deploy succeeded	Web Service	Node	Singapore	2 days ago
linhhuong	Deploy succeeded	Web Service	Node	Singapore	a month ago

Web Service

Web services are kept up and running at all times, with native SSL and HTTP/2 support. Add a persistent disk or custom domain. Scale up and down with ease. [Learn more.](#)

- Static Site
- Web Service**
- Private Service
- Background Worker
- Cron Job
- PostgreSQL
- Redis
- Blueprint

Feedback Invite a Friend Contact Support

<https://dashboard.render.com/select-repo?type=web>

Then connect to the repositories listed above in github.

Create a new Web Service

Connect your Git repository or use an existing public repository URL.

Connect a repository

- linhbhgbh200662 / asm2 • 5 minutes ago [Connect](#)
- linhbhgbh200662 / Asm2 • 5 minutes ago [Connect](#)
- linhbhgbh200662 / Asm2 • 2 days ago [Connect](#)
- linhbhgbh200662 / testcloud • a month ago [Connect](#)
- linhbhgbh200662 / GCH002-teacher • 2 months ago [Connect](#)
- linhbhgbh200662 / GCH002-Linh • 2 months ago [Connect](#)

GitHub

@linhbhgbh200662 • 10 repos

[Configure account](#)

GitLab

[Connect account](#)

Then I'll name the site and change the region to Singapore, and the start command will enter the node plus the section where you'll run the program in Visual Studio Code.

render [Dashboard](#) [Blueprints](#) [Env Groups](#) [Docs](#) [Community](#) [Help](#) [New +](#) [linhbhgbh200662@fpt.edu.vn](#)

You are deploying a web service for [linhbhgbh200662/Asm2](#).

Name

A unique name for your web service.

Region

The [region](#) where your web service runs. Services must be in the same region to communicate privately and you currently have services running in [Singapore](#).

Branch

The repository branch used for your web service.

Root Directory Optional

Defaults to repository root. When you specify a [root directory](#) that is different from your repository root, Render runs all your commands in the [specified directory](#) and ignores changes outside the directory.

Environment

The runtime environment for your web service.

Build Command

This command runs in the root directory of your repository when a new version of your code is pushed, or when you deploy manually. It is typically a script that installs libraries, runs migrations, or compiles resources needed by your app.

Start Command

This command runs in the root directory of your app and is responsible for starting its processes. It is typically used to start a webserver for your app. It can access environment variables defined by you in Render.

Please [enter your payment information](#) to select an instance type with higher limits.

Advanced ▾

Create Web Service

Feedback Invite a Friend Contact Support

It will display a success screen with the words "Server is up" after it has finished running.




```
Jan 5 11:59:56 PM [3/4] Linking dependencies...
Jan 5 11:59:58 PM [4/4] Building fresh packages...
Jan 5 11:59:58 PM success Saved lockfile.
Jan 5 11:59:58 PM Done in 13.31s.
Jan 5 11:59:58 PM ==> Generating container image from build. This may take a few minutes...
Jan 6 12:01:13 AM ==> Uploading build...
Jan 6 12:01:39 AM ==> Build uploaded in 21s
Jan 6 12:01:39 AM ==> Build successful 🎉
Jan 6 12:01:39 AM ==> Deploying...
Jan 6 12:01:57 AM ==> Starting service with 'node main.js'
Jan 6 12:02:01 AM Server is running at: 10000
```

linh-huong-atn.onrender.com/viewAll

Home View all New Product

BBei List

Name Search

BBei List				Add
Name	Img	Price	Quantity	
bbb		67	4	Delete Edit
dep		88	51	Delete Edit
sayhi		22	51	Delete Edit

3. Source code and website

Source code: <https://github.com/linhbhgbh200662/Asm2.git>

Website: <https://linh-huong-atn.onrender.com>

Task 2: Security

- I. Analyze the most common problems which arise in a Cloud Computing platform and discuss appropriate solutions to these problems
 1. Public cloud

Command Error This is not applicable when offloading to the public cloud. Outside of day-to-day operations, all configuration and other IT administration tasks are delegated to groups. Security is on the low side. Because data frequently shares a common location, it is not as secure as other cloud models. (Nayyar, 2019)

Solution: Choose reputable providers with a clear policy and a commitment to protecting your information and interests.
 2. Private cloud

If your company's employees work away from the office, they may have trouble connecting to their private cloud and cannot securely access the programs, data, or files they need from the company's servers. Private clouds are subject to strict access controls. (Nayyar, 2019)

Solution:

Use a VPN. A VPN has two main advantages in this case:

 - Enable your employees to securely connect to your company's cloud- and data center-based applications and data wherever they are.
 - Authenticate customers and offer comprehensive, steady protection with out shopping luxurious hardware and community device or including IT complexity.
 3. Hybrid cloud

Create a hybrid cloud by combining public and private clouds. As a result, every cloud has two issues. Aspects of technology and optimization should also be carefully considered. (Nayyar, 2019)

Solution: Developing a suitable model requires careful analysis of system size and usage. Depending on the size and scope of the system, the security and technical aspects of the system should be calculated to avoid technical errors and security glitches.
- II. Access the most common security issues in cloud environments
 1. Organizational security risk

The risk that can affect the operations and structure of the entire organization is referred to as organizational risk. Due to changes in service level agreements (SLAs), a CSP customer may be forced to switch to a CSP that better meets their needs. Damaged if CSP is closed or acquired by another company. Furthermore, your company may be vulnerable to malicious insiders who could use the data provided by CSC to harm you.

Solution: Malicious individuals are barred from joining the CSP team due to strict legal standards in employment contracts. This can be mitigated in part by obtaining a third-party evaluation of her CSP and establishing a trusted process for notifying users of security breaches.

(Aslan, 2012)
 2. Physical security risk

An unauthorized person following an authorized person into a secure area is called tailgating. This inevitably happens when many people go through the door and only the first person is required to present an ID card or magnetic card. Easy to break into.

Worse.

Solution: Employee physical security training is one method of reducing tracking. This is less reliable, but much less expensive. Employee education and strict physical security policies must be implemented. B. Do not let strangers into your home. Employees should also be encouraged to notify security personnel as soon as they notice any changes.

(Aslan, 2012)

3. Data security risk

Social engineering techniques are frequently used by attackers to obtain personally identifiable information. Coercing or misleading anyone into disclosing personal information or providing access to a password-protected account is an example of this. One of these is phishing. Social engineering methods. This includes sending messages that appear to be from a legitimate source but were actually sent by an attacker. Malicious if the victim responds by providing personal information. These connections enable the attacker to infect the victim's device or gain access to the corporate network.

Solution: Identity-based Cloud Computing Layered Model (IBHMCC) and SSH Authentication Protocol are two authentication methods (SAP). This is done primarily for data security and confidentiality. IAM monitors three key aspects of security to ensure regulatory compliance: authentication, automated provisioning, and authorization services. OpenID, OAuth, SAML, and XACML are other technologies that support authentication, authorization, and access control services. TCG's IF-MAP standard employs authorized users and addresses other security concerns between cloud service providers and their customers.

(Tunggal, 2022)

Conclusion

This journal will help you advance your knowledge of cloud computing, including basic ideas such as agility, networking, and cloud architecture. It also uses modern tools like express-nodejs and mongodb. Final products published on rendering platforms using PAAS models also use cloud computing. This article also discusses security issues that arise while building a cloud.

References

Aslan, T., 2012. *Cloud physical security considerations*. [Online]

Available at: <https://www.ibm.com/blogs/cloud-computing/2012/02/22/cloud-physical-security-considerations/>

Nayyar, 2019. *Handbook of Cloud Computing*. [Online]

Available at:

http://hero.lecturer.pens.ac.id/datahero/kuliah/cloud_computing/Handbook_of_Cloud_Computing.pdf

Tunggal, A. T., 2022. *What Are Cloud Leaks?*. [Online]

Available at: <https://www.upguard.com/blog/what-are-cloud-leaks>