DevOps Internship Assignment - Documentation

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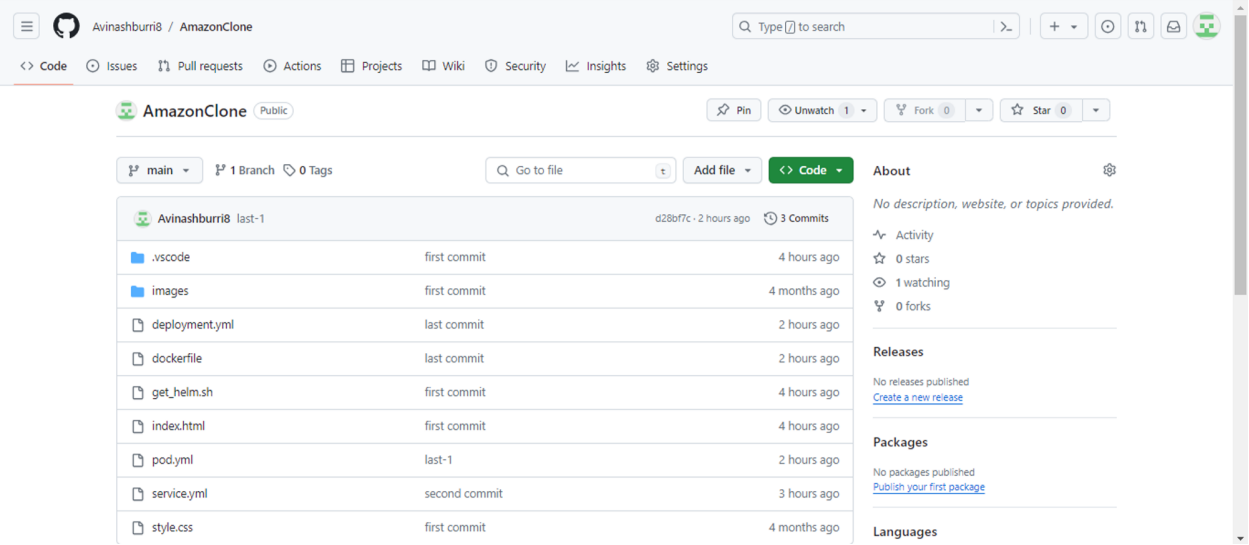
Task 1: Setup and Configuration

1.1 Created a GitRepository

- Created a GitHub repository to host the source code of the web application.



- First, we initialize Minikube using Minikube start, then we created a cluster called mycluster which consisted of a master node and a slave node.

```
minikube start
```

```
Command Prompt - minikube

Microsoft Windows [Version 10.0.22631.3447]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Avina>minikube start
W0509 15:01:09.217939   16728 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:
\Users\Avina\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path speci
fied.
* minikube v1.33.0 on Microsoft Windows 11 Home 10.0.22631.3447 Build 22631.3447
* Using the docker driver based on existing profile
* Starting "minikube" primary control-plane node in "minikube" cluster
* Pulling base image v0.0.43 ...
* Restarting existing docker container for "minikube" ...
* Preparing Kubernetes v1.30.0 on Docker 26.0.1 ...
* Verifying Kubernetes components...
  - Using image gcr.io/k8s-minikube/storage-provisioner:v5
* Enabled addons: storage-provisioner, default-storageclass
* kubectl not found. If you need it, try: 'minikube kubectl -- get pods -A'
* Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default

C:\Users\Avina>minikube kubectl -- get pods -A
W0509 15:02:27.675829   38768 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:
\Users\Avina\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path speci
fied.
NAMESPACE       NAME                                          READY   STATUS             RESTARTS      AGE
argo-rollouts   argo-rollouts-6d97f95df9-xh8mj                0/1     Error              0             16h
argocd          argocd-application-controller-0               0/1     Error              0             17h
argocd          argocd-applicationset-controller-c4fd6dcdb-9vgxc  0/1     Error              0             17h
argocd          argocd-dex-server-869bdc7dcb-lvjqx            0/1     Error              0             17h
argocd          argocd-notifications-controller-6bbd5dd8d-sbzdx   0/1     Error              0             17h
argocd          argocd-redis-79c9bd545b-wbm25                 1/1     Running            1 (69s ago)   17h
argocd          argocd-repo-server-f965fdfcf-vlphv            0/1     Error              0             17h
argocd          argocd-server-94c995fcb-pt626                 0/1     Error              0             17h
kube-system     coredns-7db6d8ff4d-jrnpt                      1/1     Running            3 (69s ago)   18h
kube-system     etcd-minikube                                 1/1     Running            3 (69s ago)   18h
kube-system     kube-apiserver-minikube                       1/1     Running            3 (69s ago)   18h
kube-system     kube-controller-manager-minikube              1/1     Running            3 (69s ago)   18h
kube-system     kube-proxy-9cxx6                              1/1     Running            3 (69s ago)   18h
kube-system     kube-scheduler-minikube                       1/1     Running            3 (69s ago)   18h
kube-system     storage-provisioner                           0/1     CrashLoopBackOff   5 (20s ago)   18h
```

```
minikube start --nodes 2 -p mycluster
```

```
Command Prompt

C:\Users\Avina>minikube start --nodes 2 -p mycluster
W0509 15:07:37.644981   51360 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not
 found: open C:\Users\Avina\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The sys
tem cannot find the path specified.
* [mycluster] minikube v1.33.0 on Microsoft Windows 11 Home 10.0.22631.3447 Build 22631.3447
* Automatically selected the docker driver. Other choices: virtualbox, ssh
* Using Docker Desktop driver with root privileges
* Starting "mycluster" primary control-plane node in "mycluster" cluster
* Pulling base image v0.0.43 ...
* Creating docker container (CPUs=2, Memory=2200MB) ...
* Preparing Kubernetes v1.30.0 on Docker 26.0.1 ...
  - Generating certificates and keys ...
  - Booting up control plane ...
  - Configuring RBAC rules ...
* Configuring CNI (Container Networking Interface) ...
* Verifying Kubernetes components...
  - Using image gcr.io/k8s-minikube/storage-provisioner:v5
* Enabled addons: storage-provisioner, default-storageclass

* Starting "mycluster-m02" worker node in "mycluster" cluster
* Pulling base image v0.0.43 ...
* Creating docker container (CPUs=2, Memory=2200MB) ...
* Found network options:
  - NO_PROXY=192.168.58.2
  - NO_PROXY=192.168.58.2
* Preparing Kubernetes v1.30.0 on Docker 26.0.1 ...
  - env NO_PROXY=192.168.58.2
* Verifying Kubernetes components...
* kubectl not found. If you need it, try: 'minikube kubectl -- get pods -A'
* Done! kubectl is now configured to use "mycluster" cluster and "default" namespace by default
```

- After the configuration of mycluster, we checked the status of the cluster

```
minikube status -p mycluster
```

```
C:\Users\Avina>minikube status -p mycluster
W0509 15:09:38.589031   35664 main.go:291] Unable to resolve the current Docker CLI context "default":
 context "default": context not found: open C:\Users\Avina\.docker\contexts\meta\37a8eec1ce19687d132fe
29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
mycluster
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured

mycluster-m02
type: Worker
host: Running
kubelet: Running
```

- After the creation of the cluster we used a manifest file for creating pods in the Kubernetes cluster.

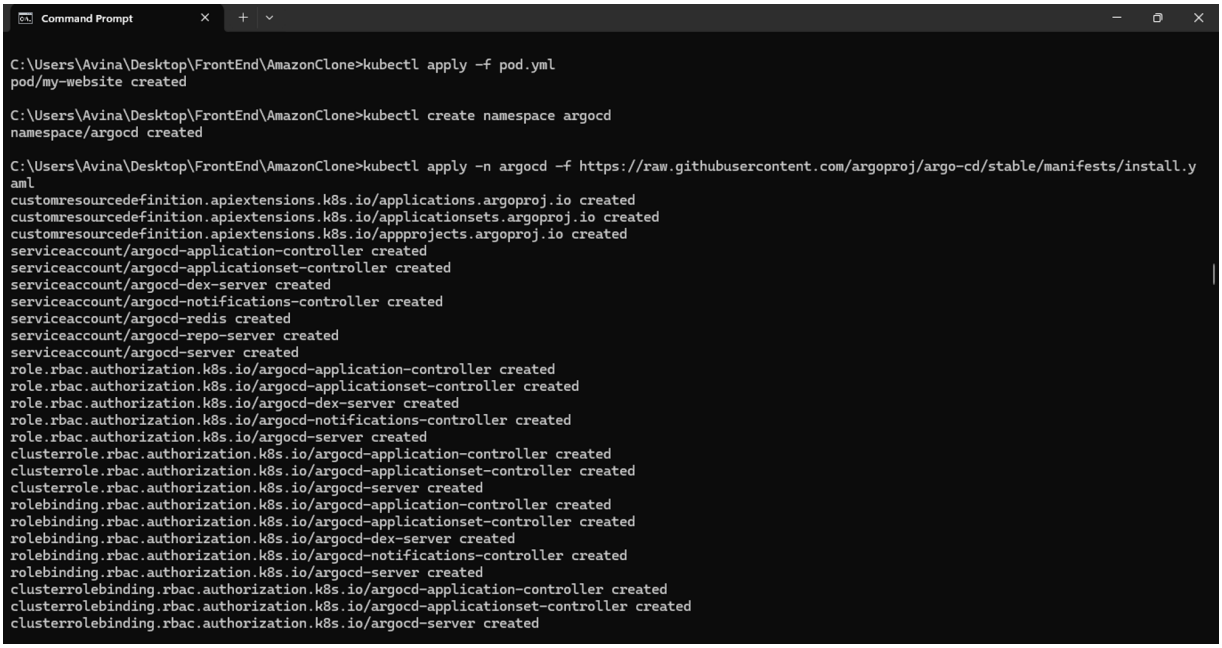
```
apiVersion: v1
kind: Pod
metadata:
  name: my-website
spec:
  containers:
    - name: website
      image: avinashburri/website:latest
```

```
    ports:
      - containerPort: 80
```

1.2 Initialized Argo CD in Kubernetes(Minikube)

- After the creation of manifest(pod.yml), we initialize it for the creation of my-website pod.
- Then, according to argocd documentation, we will create a new namespace, argocd, where Argo CD services and application resources will live.

```
kubectl apply -f pod.yml
kubectl create namespace argocd
kubectl apply -n argocd -f https://raw.githubusercontent.com/arg
```



Task 2: Creating the GitOps Pipeline

2.1 Dockerized the Application

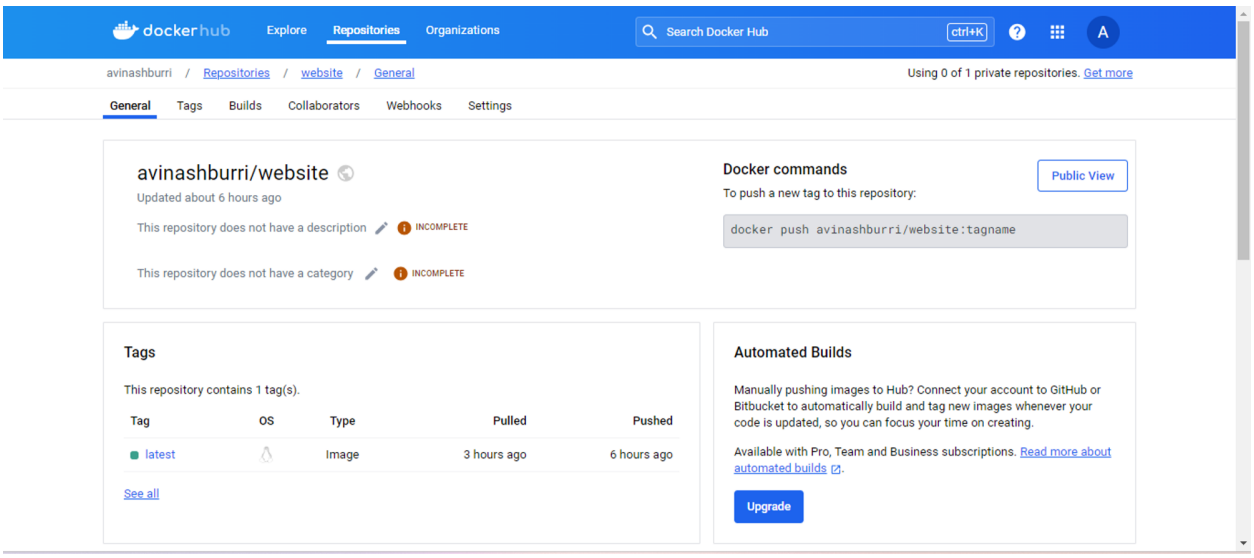
- Created a Docker file for containerization of the static web application by utilizing nginx.

```
FROM centos:7

# Update and install nginx section
RUN yum update -y && \
    yum install -y epel-release && \
    yum install -y nginx vim

# Create path and add index.html
WORKDIR /usr/share/nginx/html

# Copy app.css into the directory
COPY app.css .

EXPOSE 80/tcp

CMD ["nginx", "-g", "daemon off;"]
```

- Built a Docker image for the web application and pushed it to a public container registry(Docker Hub)

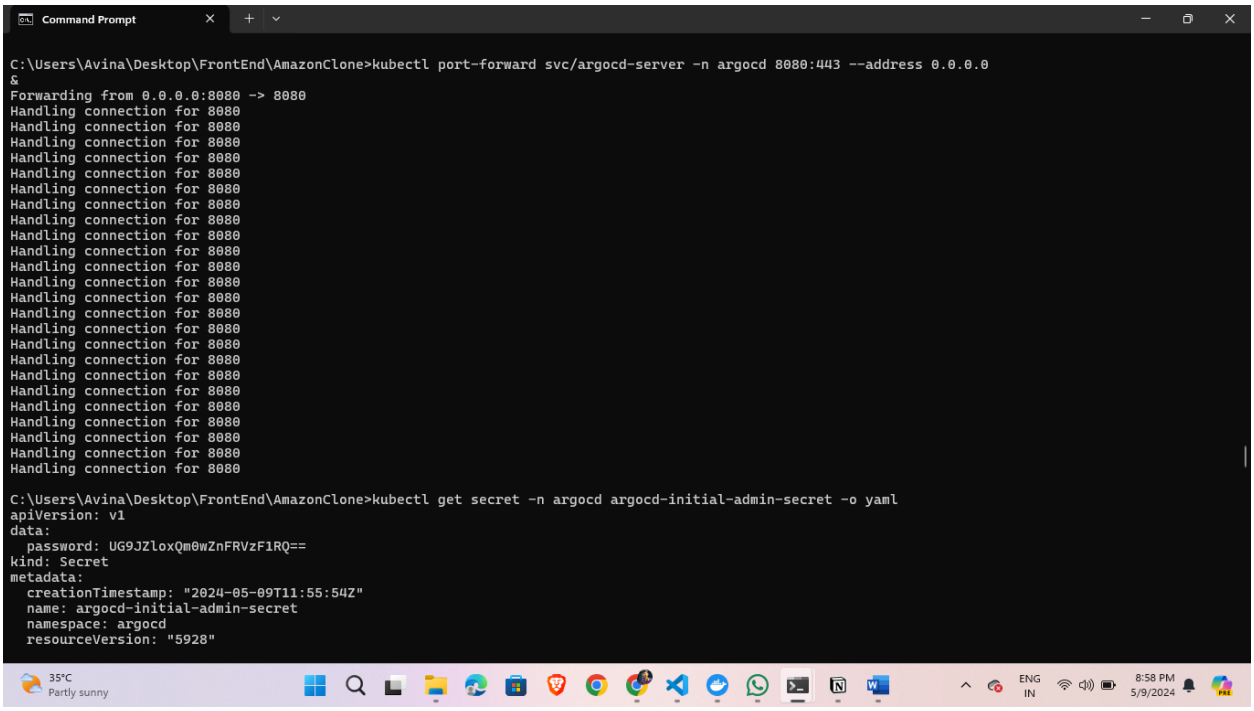
```
$ docker build -t website .
$ docker tag website avinashburri/website:latest
$ docker push avinashburri/website:latest
```

- Pushed the docker image to public container registry(Docker Hub)



- We used Kubectl port-forwarding to connect to the API server of argocd.

```
kubectl port-forward svc/argocd-server -n argocd 8080:443 --addr
```

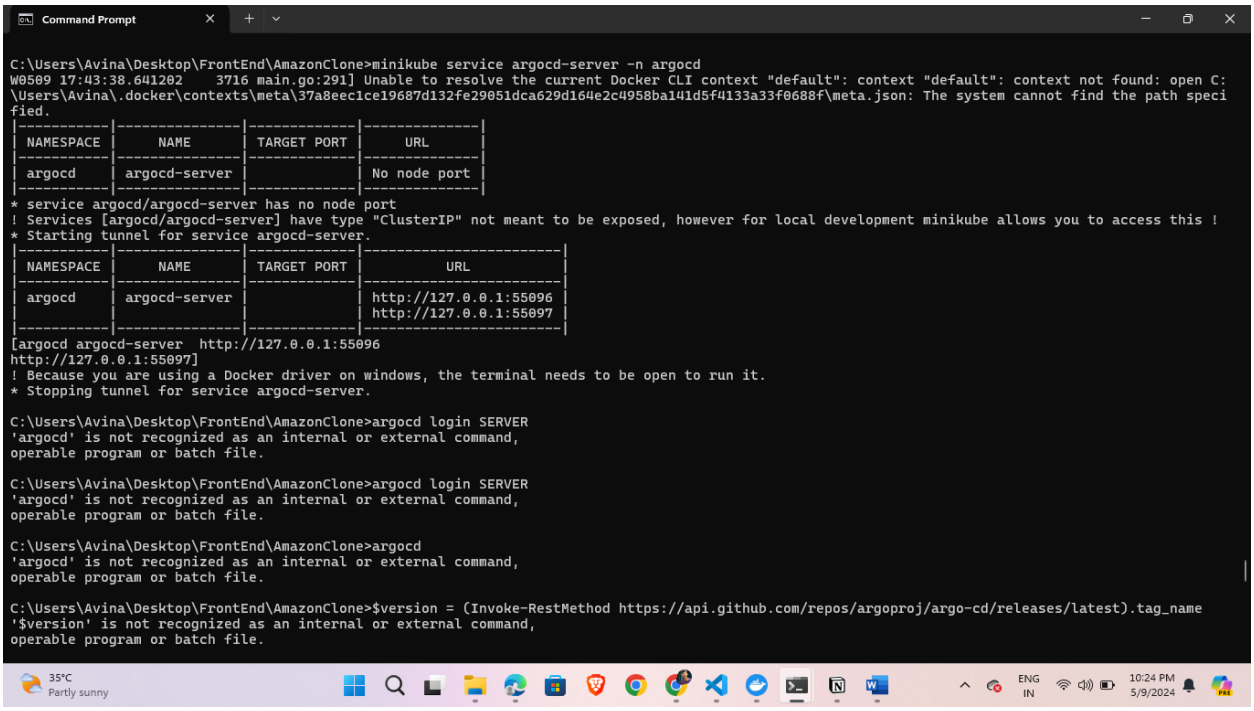


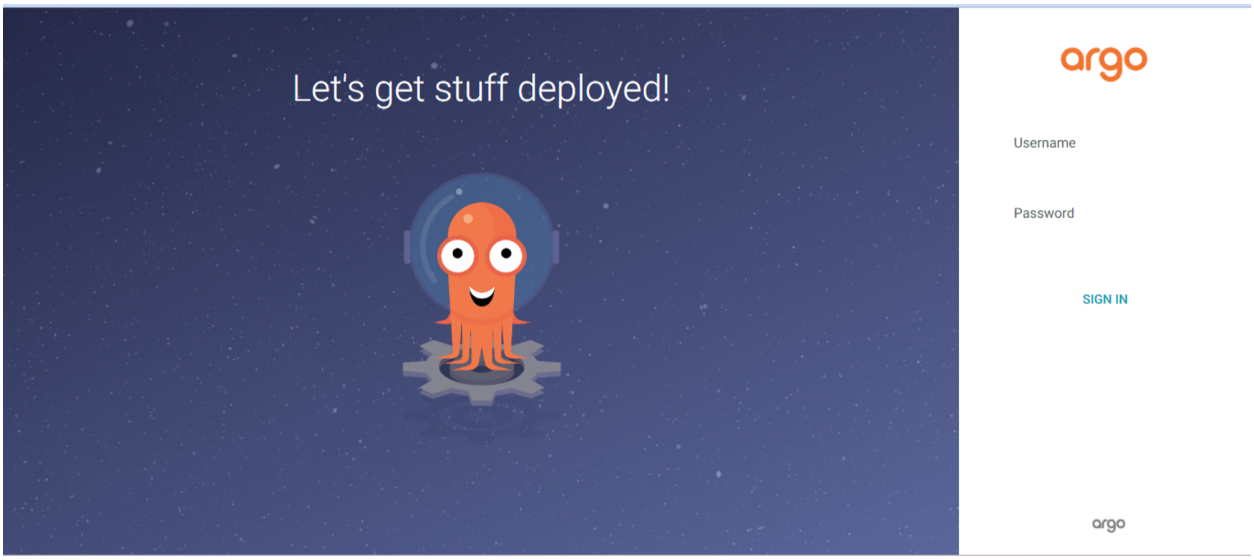

```
kubectl get secret -n argocd argocd-initial-admin-secret -o yaml
```

- We utilize the above code for retrieving the password for admin account of the argocd.

- We created a argocd service

```
minikube service argocd-server -n argocd
```





- "YAML configuration defining a Kubernetes deployment for 'my-website' with a single replica running a container named 'website' using the 'avinashburri/website: latest' Docker image, exposing port 80.”

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-website
spec:
  replicas: 1
  selector:
    matchLabels:
      app: my-website
  template:
    metadata:
      labels:
        app: my-website
    spec:
      containers:
        - name: website
          image: avinashburri/website:latest # Replace with your
          ports:
            - containerPort: 80
```

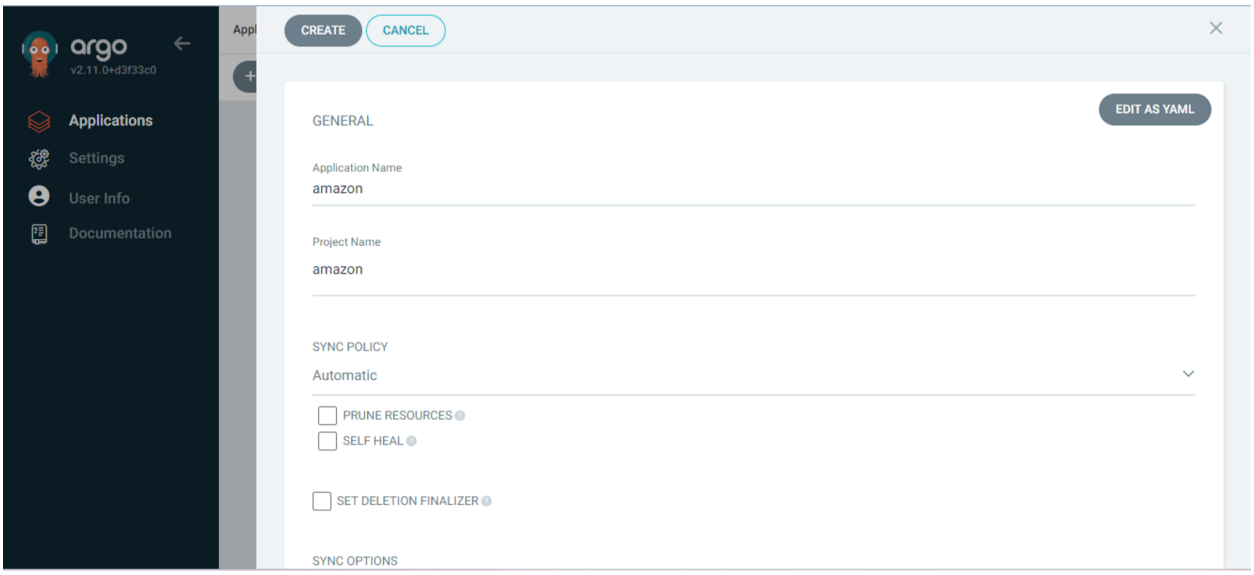
- "YAML configuration defining a Kubernetes service named 'my-website' that routes traffic to pods with the label 'app: my-website' on port 80, configured as a Load Balancer."

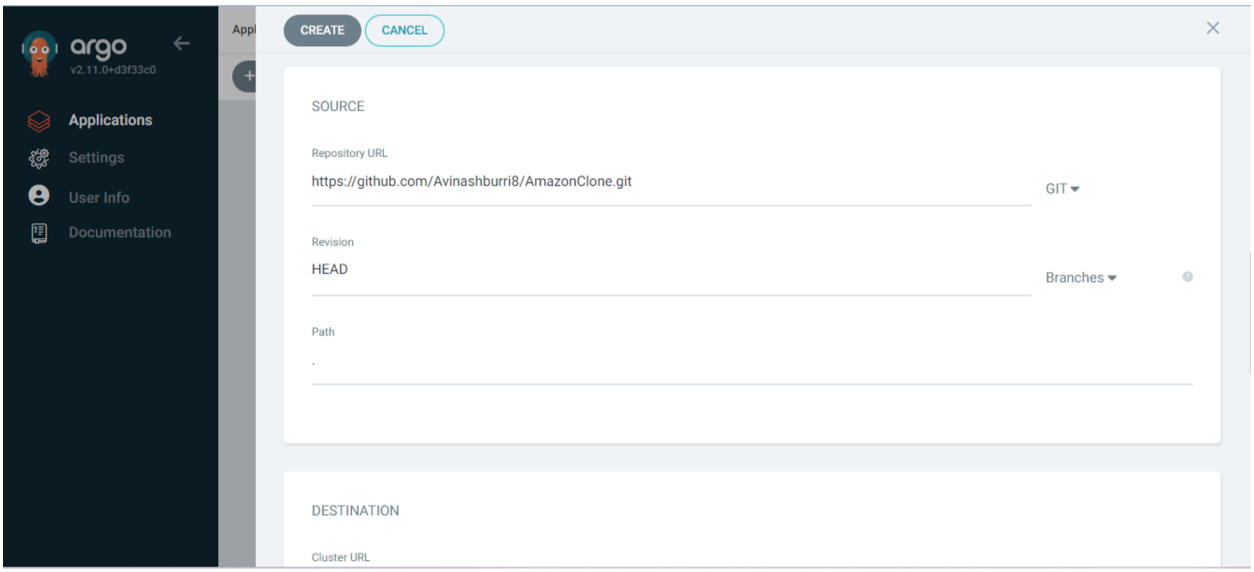
```
# service.yaml
apiVersion: v1
kind: Service
metadata:
  name: my-website
spec:
  selector:
    app: my-website
  ports:
```

```
    - protocol: TCP
      port: 80
      targetPort: 80
  type: LoadBalancer
```

2.2 Deployed the Application Using Argo CD

- Modified the Kubernetes manifests in the repository to use the Docker image.
- Set up Argo CD to monitor the repository and automatically deploy changes to the Kubernetes cluster.

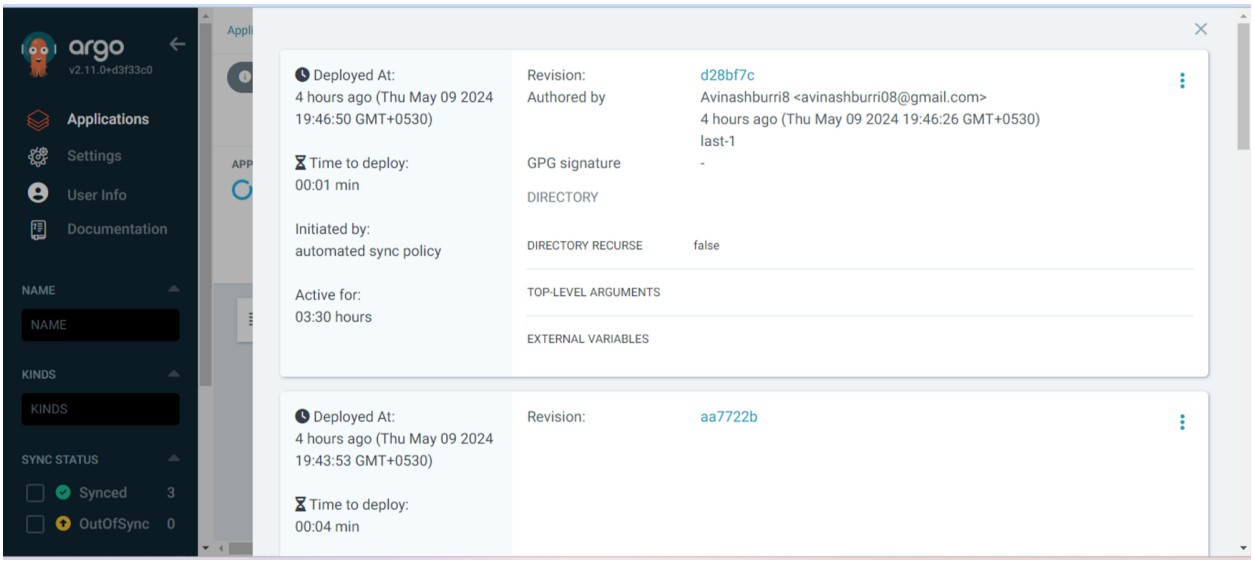




Task 3: Implemented a Canary Release with Argo Rollouts

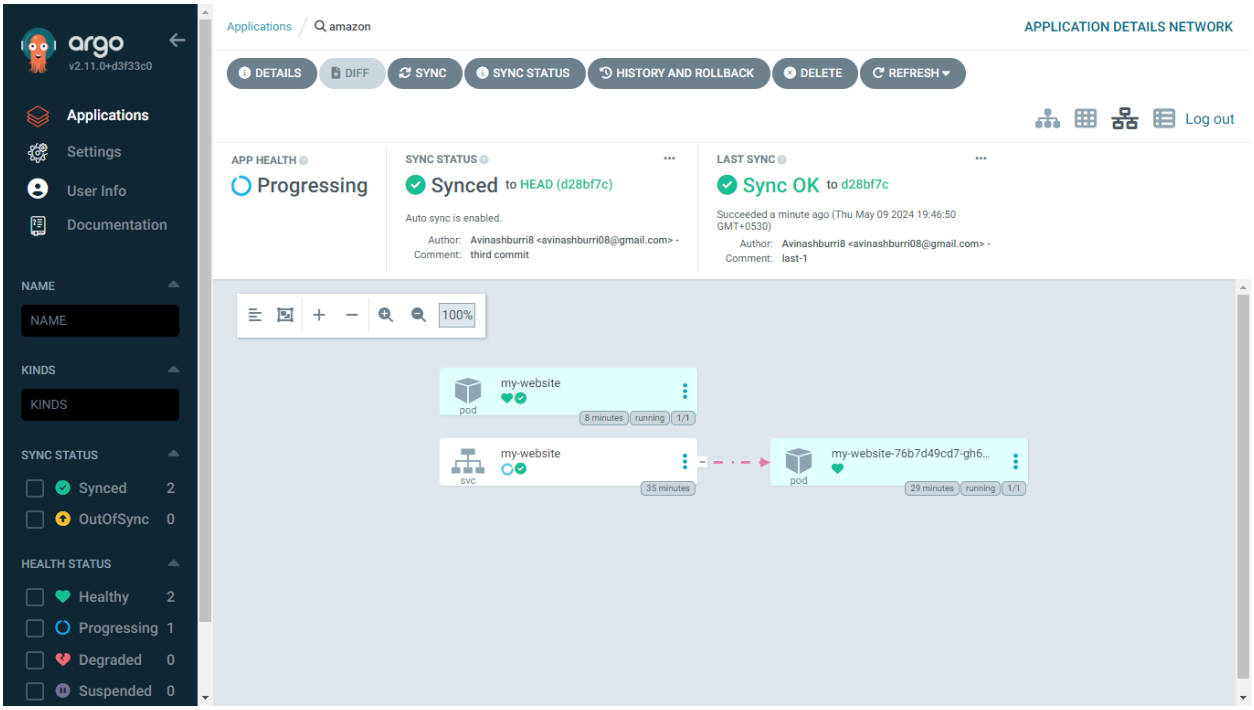
3.1 Triggered a Rollout

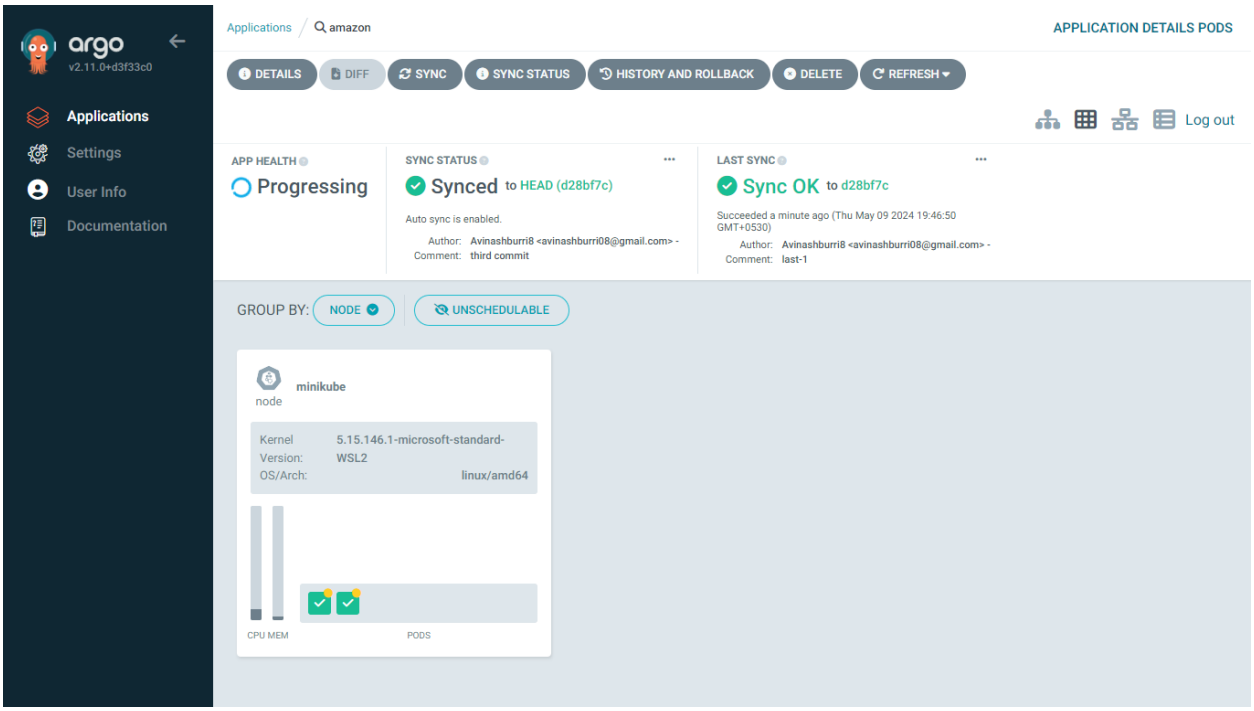
- Made a change to the application, updated the Docker image, pushed the new version to the registry, and updated the rollout definition.

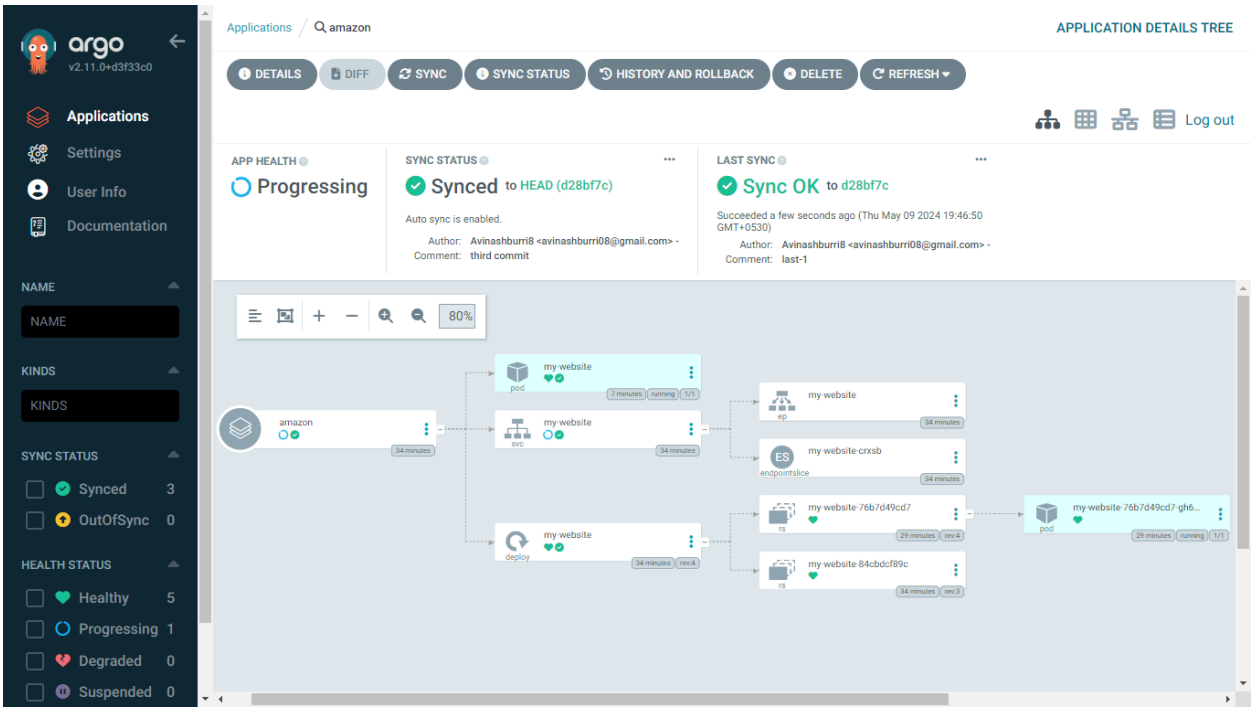


3.2 Monitored the Rollout

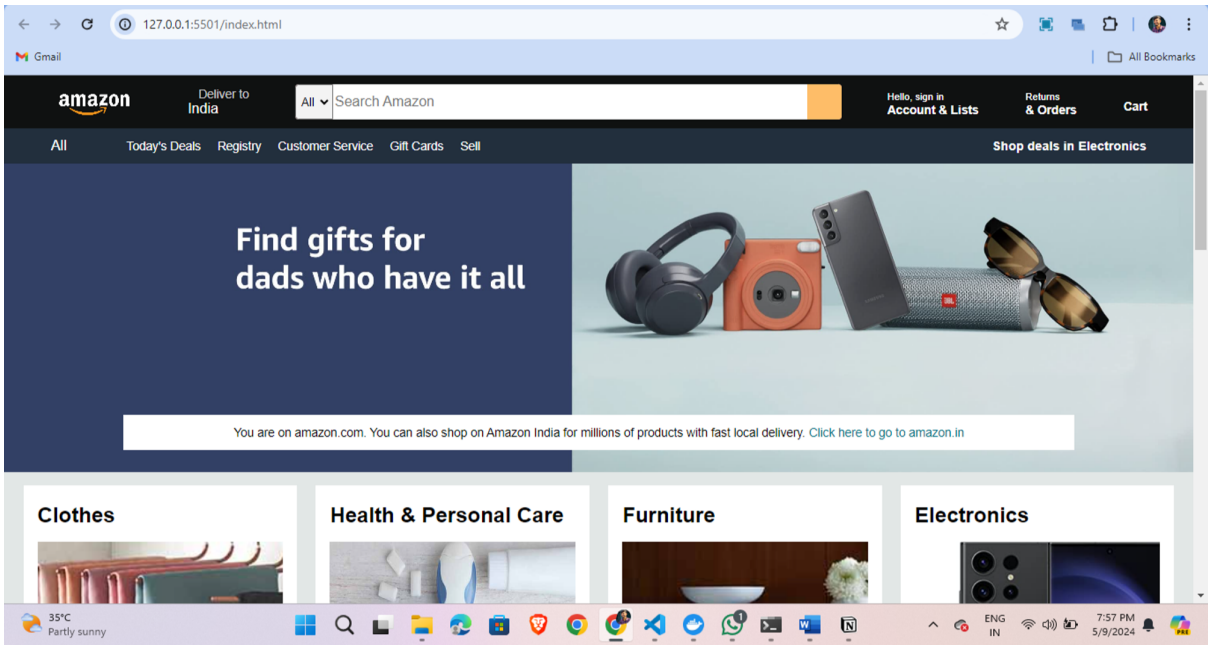
- Used Argo Rollouts to monitor the deployment of the new version, ensuring the canary release successfully completed.

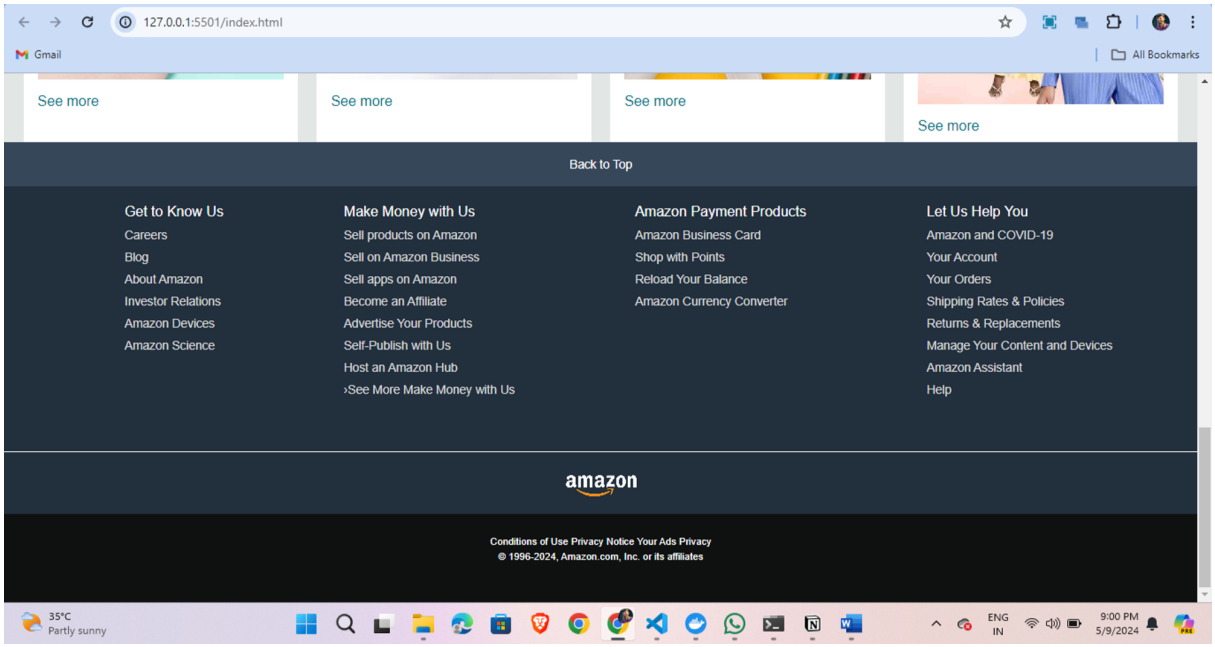






Hosted Web Application


127.0.0.1:5501/index.html
Gmail
All Bookmarks
amazon
Deliver to India
All
Search Amazon
Hello, sign in Account & Lists
Returns & Orders
Cart
All
Today's Deals
Registry
Customer Service
Gift Cards
Sell
Shop deals in Electronics
Find gifts for dads who have it all
You are on amazon.com. You can also shop on Amazon India for millions of products with fast local delivery. Click here to go to amazon.in
Clothes
Health & Personal Care
Furniture
Electronics
35°C Partly sunny
ENG IN
7:57 PM 5/9/2024


127.0.0.1:5501/index.html
Gmail
All Bookmarks
See more
See more
See more
See more
Back to Top
Get to Know Us
Careers
Blog
About Amazon
Investor Relations
Amazon Devices
Amazon Science
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Sell products on Amazon
Sell on Amazon Business
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Amazon and COVID-19
Your Account
Your Orders
Shipping Rates & Policies
Returns & Replacements
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35°C Partly sunny
ENG IN
9:00 PM 5/9/2024