

Cloud Computing and Big Data Systems - Fall 2023 Assignment 2

Part 2: Containerizing the Application on Docker:

```
! flask-app-service.yaml
! mongo-pod.yaml
! prometheus-rules.yaml
requirements.txt
values.yaml

> OUTLINE
> TIMELINE
```

(venv) abhinavsvivanandhan@Abhinav-MBP app % docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
abhinav2000/flask-app	1.0	70bc734f5024	2 days ago	196MB
flask-app-trial3	latest	26bd0c85e4f3	2 days ago	196MB
abhinav2000/assignment2	latest	26bd0c85e4f3	2 days ago	196MB
abhinav2000/flask-img	1.0	5469ad654552	5 days ago	1.05GB
flask-app	latest	5469ad654552	5 days ago	1.05GB
abhinav2000/assignment2	<none>	3d393dfb4744	5 days ago	1.05GB
app-flask-app	latest	b57e9386dcf7	5 days ago	1.05GB
abhinav2000/mongo-img	latest	8b10e7ef0208	4 weeks ago	712MB
mongo	latest	8b10e7ef0208	4 weeks ago	712MB
gcr.io/k8s-minikube/kicbase	v0.0.40	f52519afe5f6	4 months ago	1.1GB

(venv) abhinavsvivanandhan@Abhinav-MBP app %

```
! flask-app-replicatio...
! flask-app-service.yaml
! mongo-pod.yaml
! prometheus-rules.yaml
requirements.txt
values.yaml

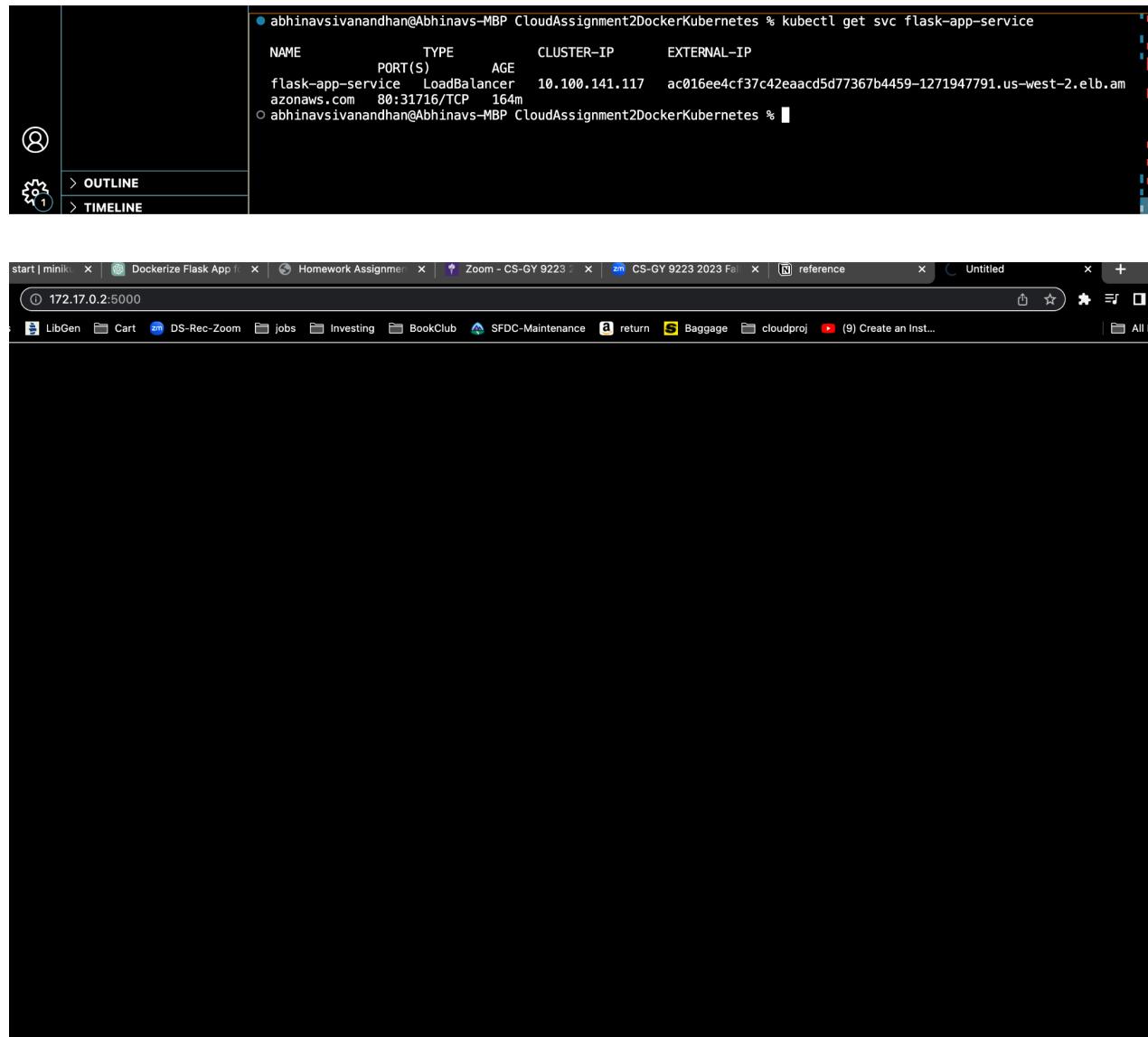
> OUTLINE
> TIMELINE
```

(venv) abhinavsvivanandhan@Abhinav-MBP app % docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
c1b424d5f1b8	abhinav2000/flask-app:1.0	"flask run"	2 days ago	Up 2 days	0.0.0.0:8000->5000/tcp
a95eb1d072fb	flask-app-container				
7017->27017/tcp	mongo:latest	"docker-entrypoint.s..."	2 days ago	Up 2 days	0.0.0.0:27017->27017/tcp
c0d9da06f935	mongo-container				
	gcr.io/k8s-minikube/kicbase:v0.0.40	"./usr/local/bin/entr -c 'mongod --port 27017 --bind_ip_all & sleep infinity'"	5 days ago	Up 5 days	127.0.0.1:58538->22/tcp, 127.0.0.1:58539->2376/tcp, 127.0.0.1:58541->5000/tcp, 127.0.0.1:58537->8443/tcp, 127.0.0.1:58540->32443/tcp minikube

(venv) abhinavsvivanandhan@Abhinav-MBP app %

Part 3: Deploying the Application on Minikube:



The terminal window displays the command `kubectl get svc flask-app-service` and its output, which shows a LoadBalancer service named `flask-app-service` with an external IP of `ac016ee4cf37c42eaacd5d77367b4459-1271947791.us-west-2.elb.amazonaws.com`. The browser window shows a blank white page at the URL `172.17.0.2:5000`.

```
abhinavsvivanandhan@Abhinavsvivanandhan-MBP CloudAssignment2DockerKubernetes % kubectl get svc flask-app-service
NAME           TYPE      CLUSTER-IP      EXTERNAL-IP
flask-app-service   LoadBalancer   10.100.141.117  ac016ee4cf37c42eaacd5d77367b4459-1271947791.us-west-2.elb.amazonaws.com
azonaws.com  80:31716/TCP  164m
abhinavsvivanandhan@Abhinavsvivanandhan-MBP CloudAssignment2DockerKubernetes %
```

Part 4: Deploying the Application on AWS EK

Amazon Elastic Kubernetes Service

Clusters New

- Amazon EKS Anywhere
- Enterprise Subscriptions New

Related services

- Amazon ECR
- AWS Batch

Documentation ▾

Submit feedback

Nodes (3) Info

Node name	Instance type	Node group	Created	Status
ip-192-168-1-98.us-east-2.compute.internal	t2.large	ng-258dfa2e	Created 18 hours ago	Ready
ip-192-168-46-25.us-east-2.compute.internal	t2.large	ng-258dfa2e	Created 18 hours ago	Ready
ip-192-168-66-153.us-east-2.compute.internal	t2.large	ng-258dfa2e	Created 18 hours ago	Ready

Node groups (1) Info

Group name	Desired size	AMI release version	Launch template	Status
ng-258dfa2e	3	1.27.7-20231106	eksctl-eks-todo-nodegroup-ng-258dfa2e (1)	Active

Fargate profiles (0) Info

Profile name	Namespaces	Status
No Fargate profiles		

Conditions:

```

Type      Status   Reason
Available  True    MinimumReplicasAvailable
Progressing True   NewReplicaSetAvailable
OldReplicaSets: <none>
NewReplicaSet: flask-deployment-65854756b6 (1/1 replicas created)
Events:
Type  Reason  Age   From           Message
Normal  ScalingReplicaSet  2m   deployment-controller  Scaled up replica set flask-deployment-65854756b6 to 1
abhinavsvivanandhan@Abhinavs-MacBook-Pro app % kubectl apply -f flask-app-deployment.yaml
persistentvolumeclaim/mongo-pvc unchanged
deployment.apps/flask-deployment unchanged
deployment.apps/mongo-db-deployment unchanged
service/mongodb-svc unchanged
service/todo-svc unchanged
abhinavsvivanandhan@Abhinavs-MacBook-Pro app % kubectl get svc
NAME          TYPE        CLUSTER-IP      EXTERNAL-IP
kubernetes    ClusterIP  10.100.0.1    <none>
mongodb-svc  ClusterIP  10.100.62.109  <none>
todo-svc     LoadBalancer 10.100.236.132 a848b532802a8455d82624af83597d4d-570204503.us-east-2.elb.amazonaws.com  80:32738/TCP  2m41s

```

```

zsh: Command not found: kubectl
abhinavsvivanandhan@Abhinavs-MacBook-Pro app % kubectl get all
NAME                           READY   STATUS    RESTARTS   AGE
pod/flask-deployment-65854756b6-hm5pj   1/1    Running   0          91s
pod/mongo-db-deployment-74c7f4ff7-x47wm  1/1    Running   0          91s

NAME          TYPE        CLUSTER-IP      EXTERNAL-IP
service/kubernetes  ClusterIP  10.100.0.1    <none>
service/mongodb-svc  ClusterIP  10.100.62.109  <none>
service/todo-svc     LoadBalancer 10.100.236.132 a848b532802a8455d82624af83597d4d-570204503.us-east-2.elb.amazonaws.com  80:32738/TCP  91s

NAME          READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/flask-deployment  1/1     1           1           91s
deployment.apps/mongo-db-deployment 1/1     1           1           91s

NAME          DESIRED  CURRENT  READY   AGE
replicaset.apps/flask-deployment-65854756b6  1       1       1       91s
replicaset.apps/mongo-db-deployment-74c7f4ff7  1       1       1       91s
abhinavsvivanandhan@Abhinavs-MacBook-Pro app % kubectl describe deployment flask-deployment
Name:           flask-deployment
Namespace:      default
CreationTimestamp: Mon, 13 Nov 2023 16:55:16 -0500
Labels:          <none>
Annotations:    deployment.kubernetes.io/revision: 1
Selector:        app=flask-app
Replicas:        1 desired | 1 updated | 1 total | 1 available | 0 unavailable
StrategyType:   RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 1 max unavailable, 25% max surge

```

Part 5: Replication controller feature:

Part 6: Rolling update strategy:

```

1  Flask==2.1.3
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS zsh - app + ⌂ ⌂ ...
prometheus-kube-state-metrics      1/1   1     1     60m
prometheus-prometheus-pushgateway 1/1   1     1     60m
prometheus-server                 0/1   1     0     60m
● (venv) abhinavsvivanandhan@Abhinav-MBP app % kubectl get replicaset
NAME                               DESIRED  CURRENT  READY  AGE
flask-app-deployment-5cf88c6c96    2        2       0      136m
prometheus-example-kube-state-metrics-66f96759  1        1       1      56m
prometheus-example-prometheus-pushgateway-96b9d9694  1        1       1      56m
prometheus-example-server-74894d764c    1        1       0      56m
prometheus-kube-state-metrics-6b464f5b88  1        1       1      60m
prometheus-prometheus-pushgateway-7857c44f49  1        1       1      60m
prometheus-server-58944f5698    1        1       0      60m
● (venv) abhinavsvivanandhan@Abhinav-MBP app % kubectl rollout history deployment flask-app-deployment
deployment.apps/flask-app-deployment
REVISION  CHANGE-CAUSE
1          <none>
! eks-flask-app-serv... https://prometheus.io/
● (venv) abhinavsvivanandhan@Abhinav-MBP app % kubectl cluster-info
Kubernetes control plane is running at https://454B4F3A967B990A842CF63F5FDB1940.gr7.us-west-2.eks.amazonaws.com
CoreDNS is running at https://454B4F3A967B990A842CF63F5FDB1940.gr7.us-west-2.eks.amazonaws.com/api/v1/namespaces/kube-system/services/kube-dns:dns/proxy

```

```

> templates
> venv
app.py
aws-iam-authentic...
docker-compose.yml
Dockerfile
eks-cluster-role-tr...
eks-flask-app-depl...
eks-flask-app-serv...
eks-flask-app-serv...
flask-app-deplom...
flask-app-pod.yaml
flask-app-relicati...
eks-flask-app-serv...
eks-flask-app-serv...
flask-app-deplom...
flask-app-pod.yaml
flask-app-relicati...
flask-app-service.y...
mongo-pod.yaml
prometheus-rules....
requirements.txt
values.yaml
Cloud - Assignment ...
OUTLINE
TIMELINE
● (venv) abhinavsvivanandhan@Abhinav-MBP app % kubectl describe deployment flask-app-deployment
Name:                  flask-app-deployment
Namespace:             default
CreationTimestamp:     Sun, 12 Nov 2023 21:45:25 -0500
Labels:                <none>
Annotations:           deployment.kubernetes.io/revision: 1
Selector:              app=flask-app
Replicas:              2 desired | 2 updated | 2 total | 0 available | 2 unavailable
StrategyType:          RollingUpdate
MinReadySeconds:       0
RollingUpdateStrategy: 1 max unavailable, 25% max surge
Pod Template:
  Labels:  app=flask-app
  Containers:
    flask-app-container:
      Image:  abhinavsvivanandhan@Abhinav-MBP:~/Documents/Cloud - Assignment .../flask-app-deployment$ kubectl get pods -l app=flask-app
      Port:   5000/TCP
      Host Port:  0/TCP
      Liveness: http-get http://:5000/healthz delay=10s timeout=1s period=10s #success=1 #failure=3
      Readiness: http-get http://:5000/healthz delay=5s timeout=1s period=5s #success=1 #failure=3
      Environment: <none>
      Mounts:  <none>
      Volumes: <none>
  Conditions:
    Type        Status  Reason
    ----        ----  -----
    Available   False   MinimumReplicasUnavailable
    Progressing False   ProgressDeadlineExceeded
    OldReplicaSets: <none>
    NewReplicaSet: flask-app-deployment-5cf88c6c96 (2/2 replicas created)
    Events:      <none>
○ (venv) abhinavsvivanandhan@Abhinav-MBP app %

```

Part 7: Health monitoring:

The terminal window shows deployment logs for a task named 'simpleDotsScrollin...' with a progress deadline exceeded message. The browser window displays a JSON object with a 'paths' key containing a large list of Kubernetes API endpoints.

```
"simpleDotsScrollin... error: deployment \"task\" app deployment exceeded its progress deadline
(venv) abhinavsvivanandhan@abhinavsvivanandhan-MBP app % kubectl proxy
Starting to serve on 127.0.0.1:8001
C 127.0.0.1:8001
{
  "paths": [
    ".well-known/openid-configuration",
    "/api",
    "/api/v1",
    "/apis",
    "/apis/",
    "/apis/admissionregistration.k8s.io",
    "/apis/admissionregistration.k8s.io/v1",
    "/apis/apiextensions.k8s.io",
    "/apis/apiextensions.k8s.io/v1",
    "/apis/apiregistration.k8s.io",
    "/apis/apiregistration.k8s.io/v1",
    "/apis/apps",
    "/apis/apps/v1",
    "/apis/authentication.k8s.io",
    "/apis/authentication.k8s.io/v1",
    "/apis/authorization.k8s.io",
    "/apis/authorization.k8s.io/v1",
    "/apis/autoscaling",
    "/apis/autoscaling/v1",
    "/apis/batch",
    "/apis/batch/v1",
    "/apis/certificates.k8s.io",
    "/apis/certificates.k8s.io/v1",
    "/apis/coordination.k8s.io",
    "/apis/coordination.k8s.io/v1",
    "/apis/crd.k8s.amazonaws.com",
    "/apis/crd.k8s.amazonaws.com/v1alpha1",
    "/apis/discovery.k8s.io",
    "/apis/discovery.k8s.io/v1",
    "/apis/events.k8s.io",
    "/apis/events.k8s.io/v1",
    "/apis/flowcontrol.apiserver.k8s.io",
    "/apis/flowcontrol.apiserver.k8s.io/v1beta2",
    "/apis/flowcontrol.apiserver.k8s.io/v1beta3",
    "/apis/networking.k8s.aws",
    "/apis/networking.k8s.aws/v1alpha1",
    "/apis/networking.k8s.io",
    "/apis/networking.k8s.io/v1",
    "/apis/node.k8s.io",
    "/apis/node.k8s.io/v1",
    "/apis/policy",
    "/apis/policy/v1",
    "/apis/bac.authorization.k8s.io",
    "/apis/bac.authorization.k8s.io/v1",
    "/apis/scheduling.k8s.io",
    "/apis/scheduling.k8s.io/v1",
    "/apis/storage.k8s.io"
  ]
}
```

Step 8: Alerting (Extra Credit 20 Points):

The application interface includes a navigation bar with links like Resources, LibGen, Cart, DS-Rec-Zoom, jobs, Investing, BookClub, SFDC-Maintenance, return, Baggage, cloudbproj, Create an Inst..., and All Bookmarks. Below the navigation is a 'ToDo Reminder' section with tabs for ALL, Uncompleted, and Completed. A search bar at the top right includes fields for Search Reference, Unique ID, Search Task, and a Search button. The main area displays a 'To-DO LIST' table with columns for Status, Task Name, Description Name, Date, Priority, Remove, and Modify. There are four entries in the table. At the bottom, there is a 'Add a Task' form with fields for Taskname, Description, Date (mm/dd/yyyy), Priority, and a Create button.

To-DO LIST :						
Status	Task Name	Description Name	Date	Priority	Remove	Modify
X	heyo	west philadelphia	2023-11-03	Medium !!		
X	hiya	detroit delaware	2023-11-09	Low !		
X	hey	hi	2023-11-15	Medium !!		
X	ha	midtown		Low !		

Add a Task

Taskname

Enter Description here...

mm/dd/yyyy

Priority

Submission Requirements

- Dockerfile for the application - this is the file that defines the Docker image for the application.
- Kubernetes configuration files for the application deployment and service - these files specify how the application should be deployed and made available on Kubernetes.

- Document explaining the steps followed to complete the assignment - this should include screenshots of the application running on Minikube and AWS EKS

