Cloud Computing
CAT-2 Project

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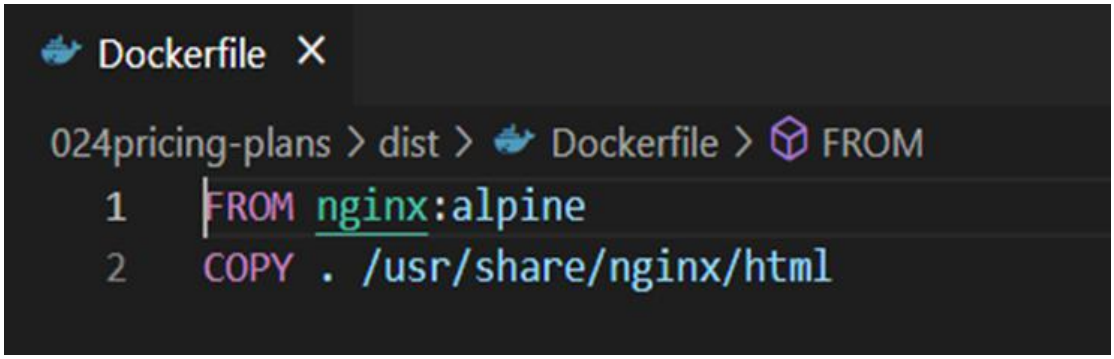
Problem Statement:

The motive it to play music player efficiently and with some of the functions efficiently so that the music webpage were created with some front end design through that music and some images respectively.

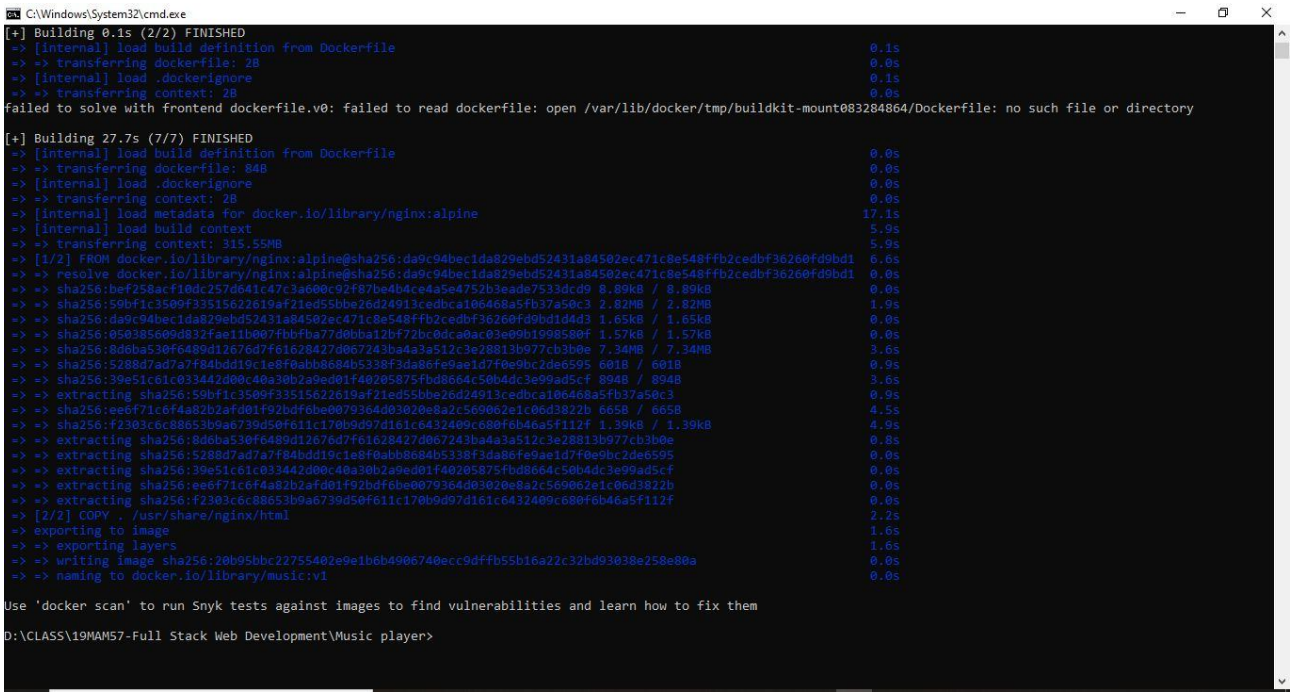
Problem Solution:

Our attempt to move this music player for some users who likes and it used to travel long with the help of Docker container and Kubernets.

DOCKER FILE:



BUILDING DOCKER IMAGE:

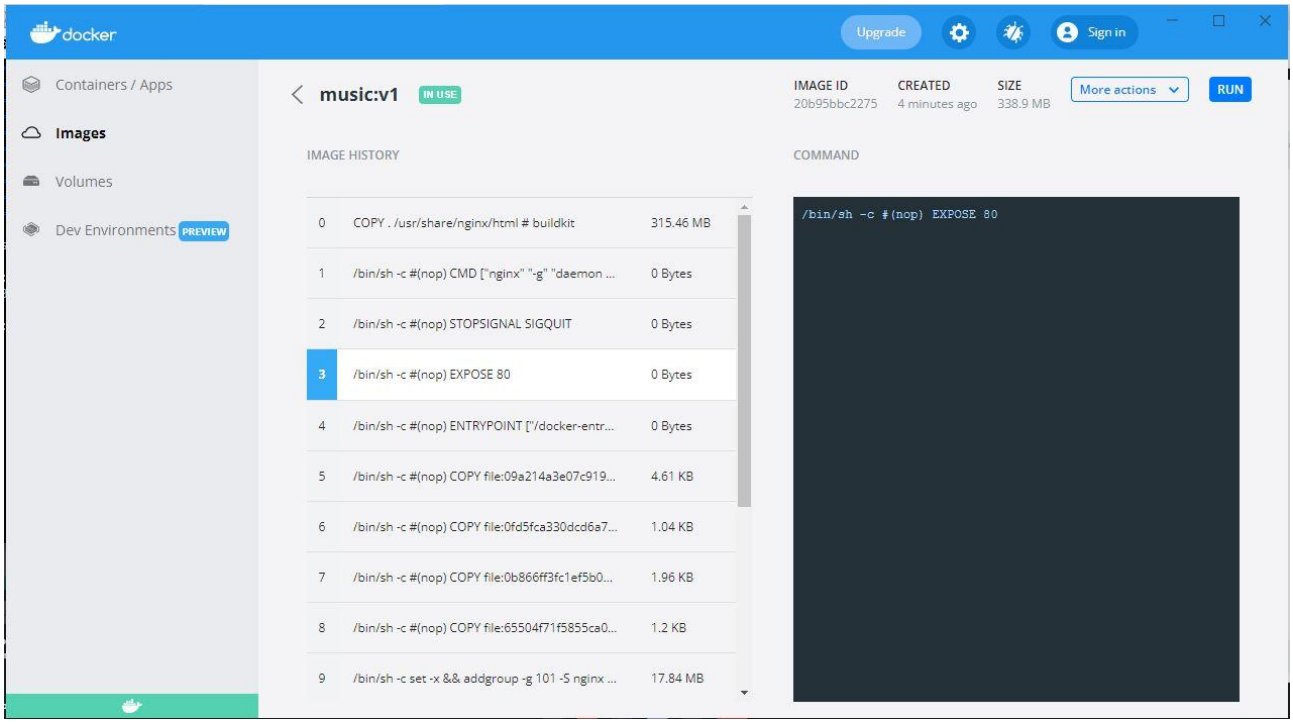


RUNNING TIME:

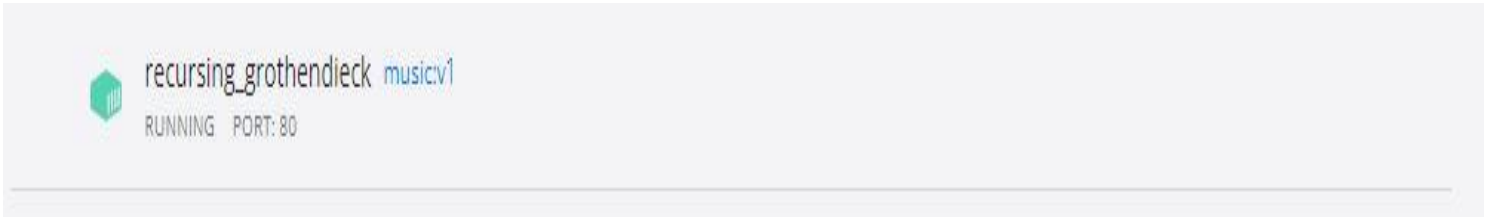
```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>docker run -d -p 80:80 music:v1
d3fbb8463fb396e01fa74c83abd86a1a8d815a34884d89a7e39da21b0a8314a6
```

IMAGE CACHING:

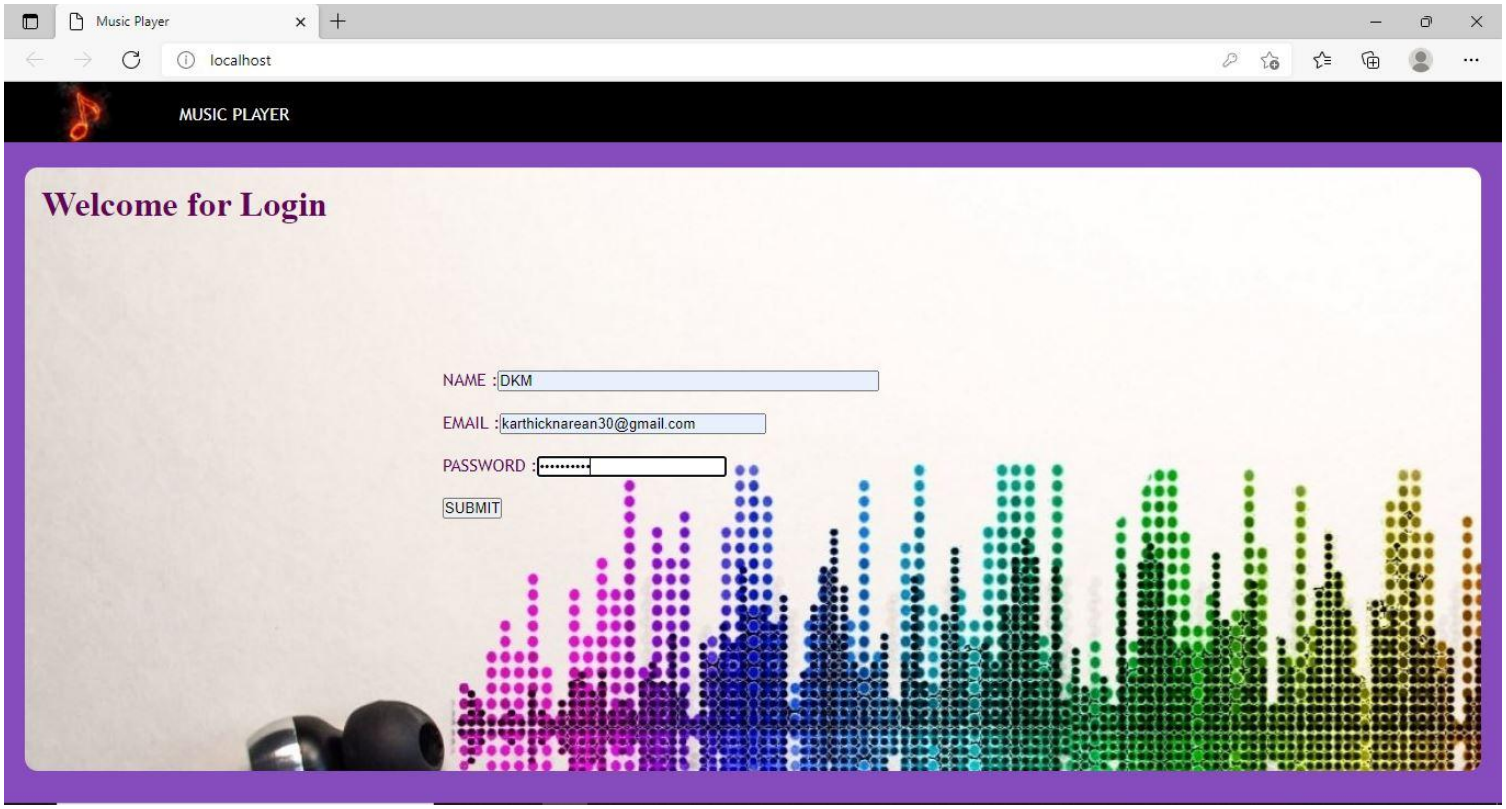
LAYER CACHING:



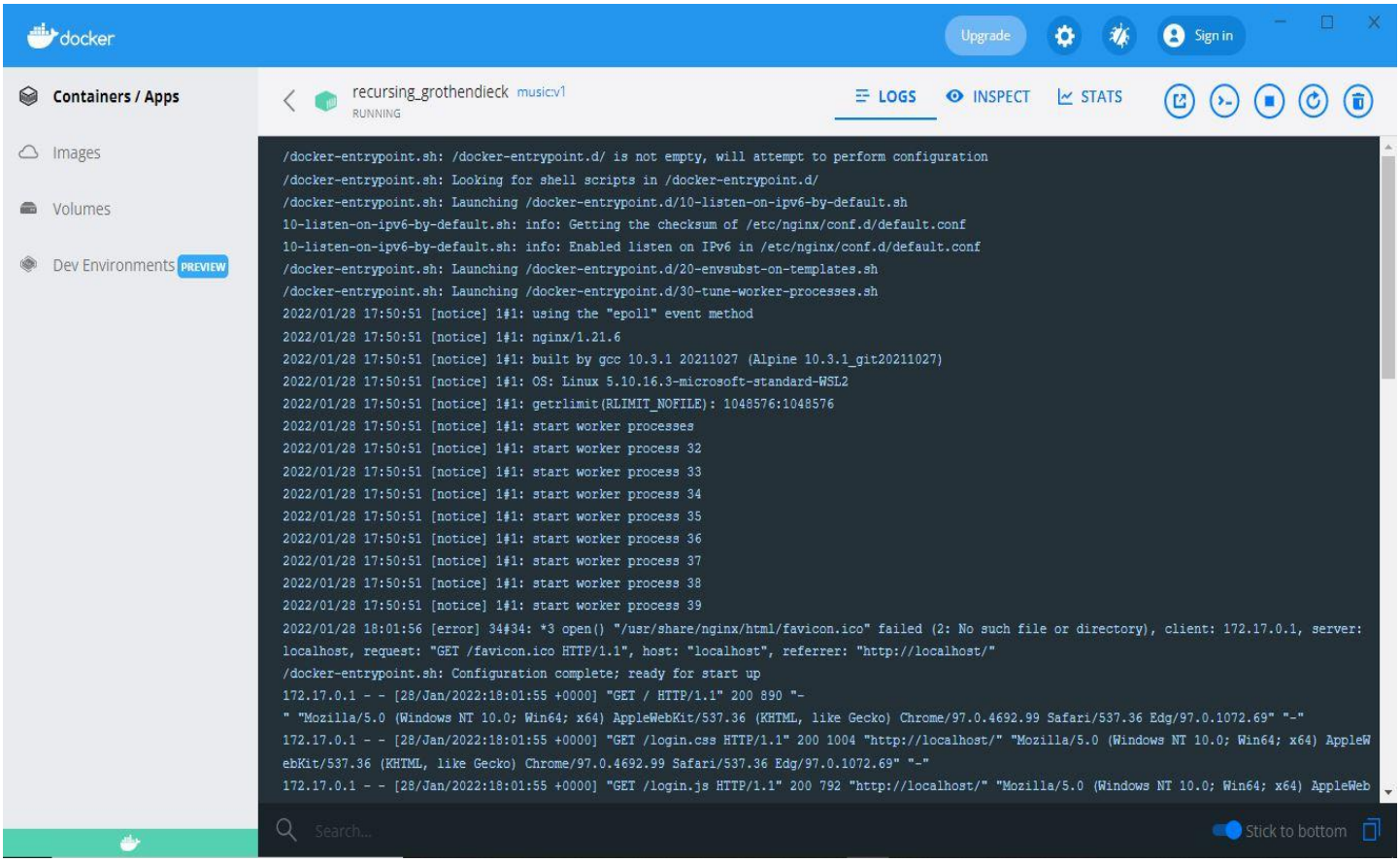
CONTAINER:

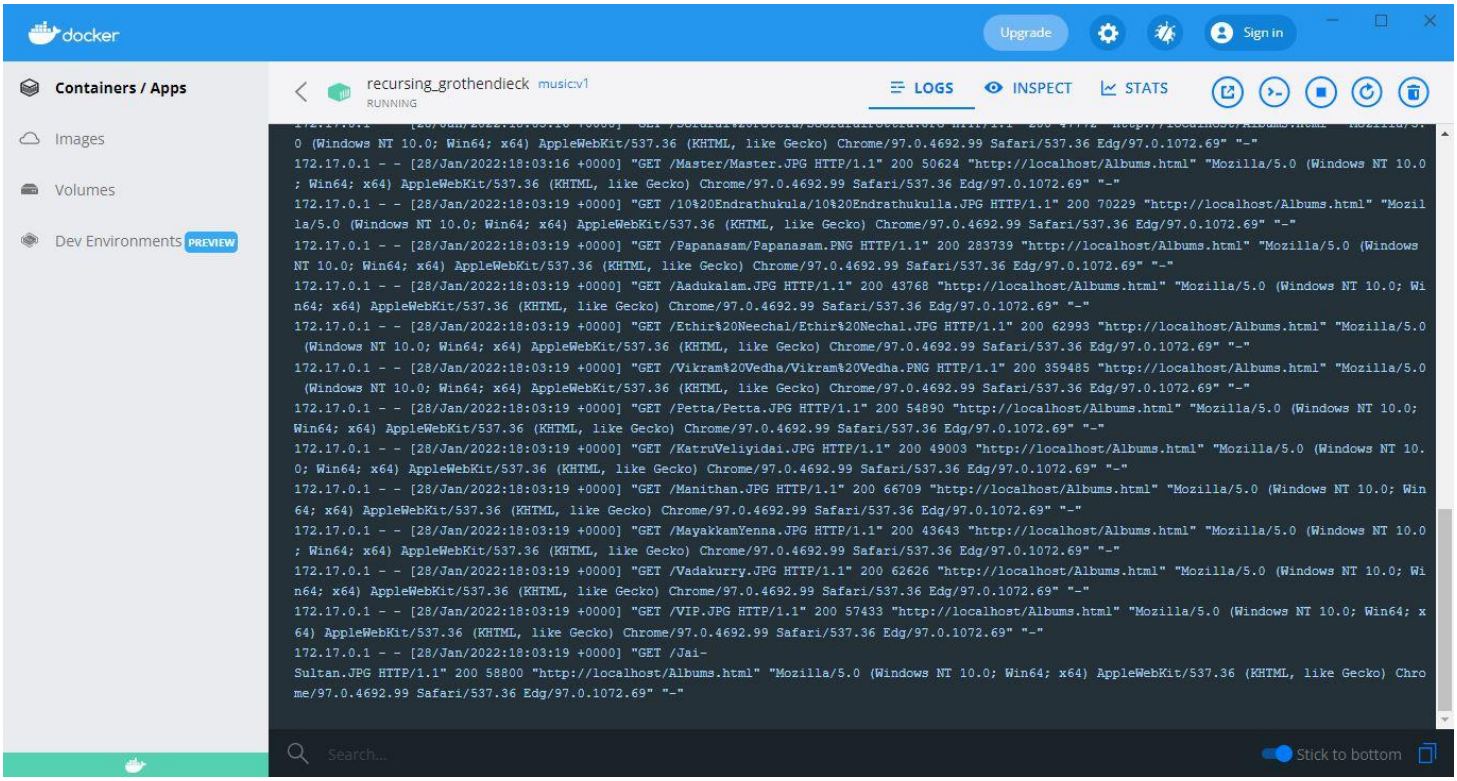


CONTAINER SERVICE EXPOSURE:



DOCKER LOGS:


docker
Upgrade
Sign in
Containers / Apps
Images
Volumes
Dev Environments PREVIEW
recursing_grothendieck music:v1
RUNNING
LOGS
INSPECT
STATS
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
2022/01/28 17:50:51 [notice] 1#1: using the "epoll" event method
2022/01/28 17:50:51 [notice] 1#1: nginx/1.21.6
2022/01/28 17:50:51 [notice] 1#1: built by gcc 10.3.1 20211027 (Alpine 10.3.1_git20211027)
2022/01/28 17:50:51 [notice] 1#1: OS: Linux 5.10.16.3-microsoft-standard-WSL2
2022/01/28 17:50:51 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2022/01/28 17:50:51 [notice] 1#1: start worker processes
2022/01/28 17:50:51 [notice] 1#1: start worker process 32
2022/01/28 17:50:51 [notice] 1#1: start worker process 33
2022/01/28 17:50:51 [notice] 1#1: start worker process 34
2022/01/28 17:50:51 [notice] 1#1: start worker process 35
2022/01/28 17:50:51 [notice] 1#1: start worker process 36
2022/01/28 17:50:51 [notice] 1#1: start worker process 37
2022/01/28 17:50:51 [notice] 1#1: start worker process 38
2022/01/28 17:50:51 [notice] 1#1: start worker process 39
2022/01/28 18:01:56 [error] 34#34: *3 open() "/usr/share/nginx/html/favicon.ico" failed (2: No such file or directory), client: 172.17.0.1, server: localhost, request: "GET /favicon.ico HTTP/1.1", host: "localhost", referrer: "http://localhost/"
/docker-entrypoint.sh: Configuration complete; ready for start up
172.17.0.1 - - [28/Jan/2022:18:01:55 +0000] "GET / HTTP/1.1" 200 890 "-
" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:01:55 +0000] "GET /login.css HTTP/1.1" 200 1004 "http://localhost/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:01:55 +0000] "GET /login.js HTTP/1.1" 200 792 "http://localhost/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWeb
Search...
Stick to bottom


docker
Upgrade
Sign in
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Dev Environments PREVIEW
recursing_grothendieck music:v1
RUNNING
LOGS
INSPECT
STATS
0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:16 +0000] "GET /Master/Master.JPG HTTP/1.1" 200 50624 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /10%20Endrathukula/10%20Endrathukulla.JPG HTTP/1.1" 200 70229 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /Papanasam/Papanasam.PNG HTTP/1.1" 200 283739 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /Aadukalam.JPG HTTP/1.1" 200 43768 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /Ethir%20Neechal/Ethir%20Nechal.JPG HTTP/1.1" 200 62993 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /Vikram%20Vedha/Vikram%20Vedha.PNG HTTP/1.1" 200 359485 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /Petta/Petta.JPG HTTP/1.1" 200 54890 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /KatruVeliyidai.JPG HTTP/1.1" 200 49003 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /Manithan.JPG HTTP/1.1" 200 66709 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /MayakkamYenna.JPG HTTP/1.1" 200 43643 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /Vadakurry.JPG HTTP/1.1" 200 62626 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /VIP.JPG HTTP/1.1" 200 57433 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
172.17.0.1 - - [28/Jan/2022:18:03:19 +0000] "GET /Jai-
Sultan.JPG HTTP/1.1" 200 58800 "http://localhost/Albums.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36 Edg/97.0.1072.69" "-"
Search...
Stick to bottom

EXECUTING INTO THE CONTAINER:

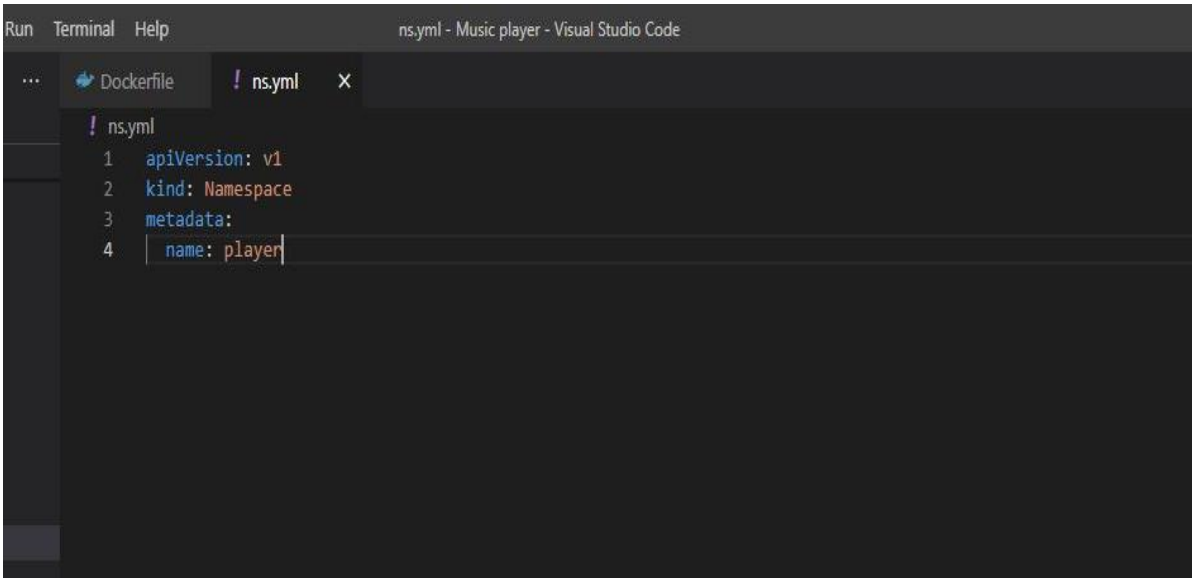
```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>docker exec -it recursing_grothendieck sh
/ # ls
bin                  docker-entrypoint.sh  lib                  opt                  run                  sys                  var
dev                  etc                   media                proc                 sbin                 tmp
docker-entrypoint.d  home                  mnt                  root                 srv                  usr
/ # exit
```

KUBERNETS:

STARTING MINI-CUBE:

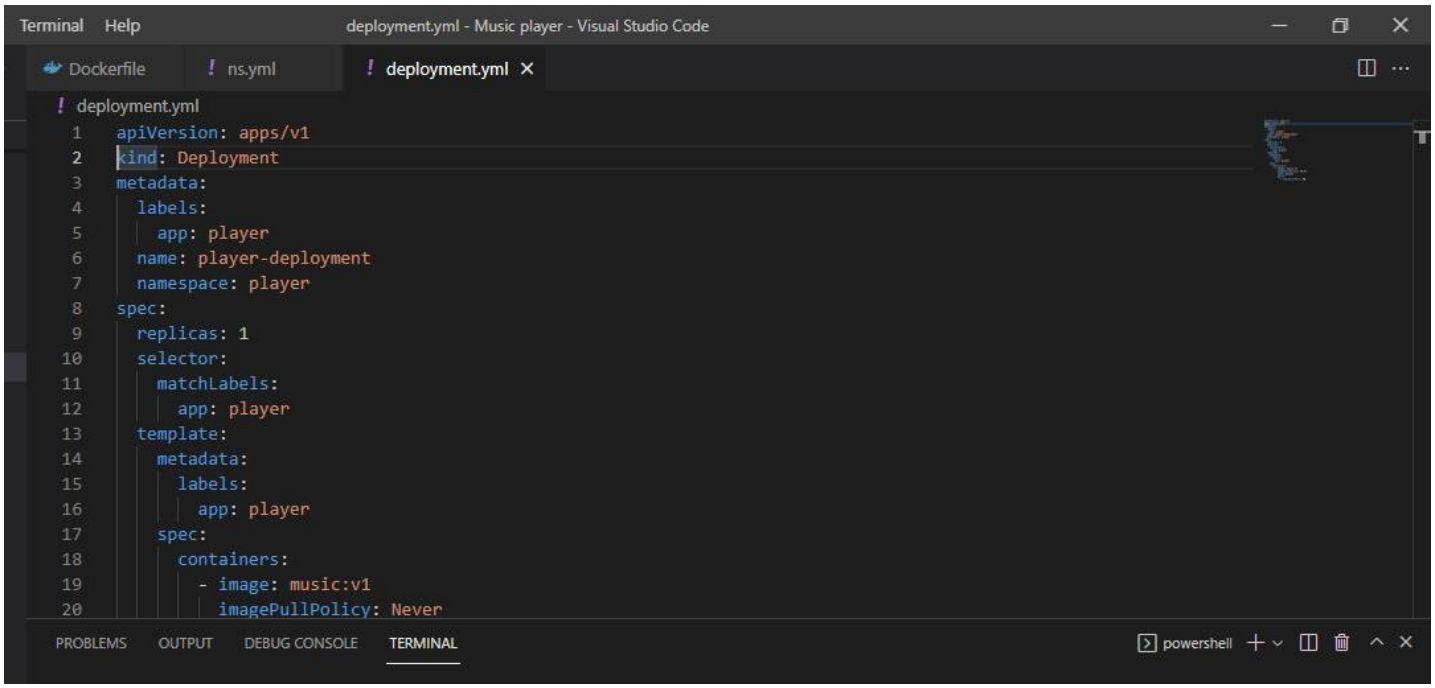
CREATING NAMESPACE:

```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get namespaces
NAME              STATUS   AGE
default           Active   46m
kube-node-lease   Active   46m
kube-public       Active   46m
kube-system       Active   46m

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl apply -f ns.yml
namespace/player created

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get namespaces
NAME              STATUS   AGE
default           Active   48m
kube-node-lease   Active   48m
kube-public       Active   48m
kube-system       Active   48m
player            Active   27s
```



CREATING POD:

```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl apply -f deployment.yml
deployment.apps/player-deployment created
```



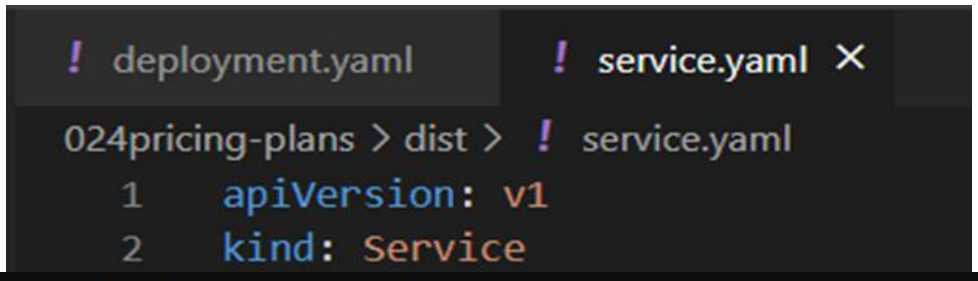
POD DEPLOYMENT:

```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl apply -f deployment.yml
deployment.apps/player-deployment created

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get deployments -n player
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
player-deployment   1/1     1            1           5m6s

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get pods -n player
NAME                                 READY   STATUS    RESTARTS   AGE
player-deployment-868d6684d6-bx4pr   1/1     Running   0          5m29s
```

CONFIGURING DEPLOY POD WITH 2 REPLICAS:

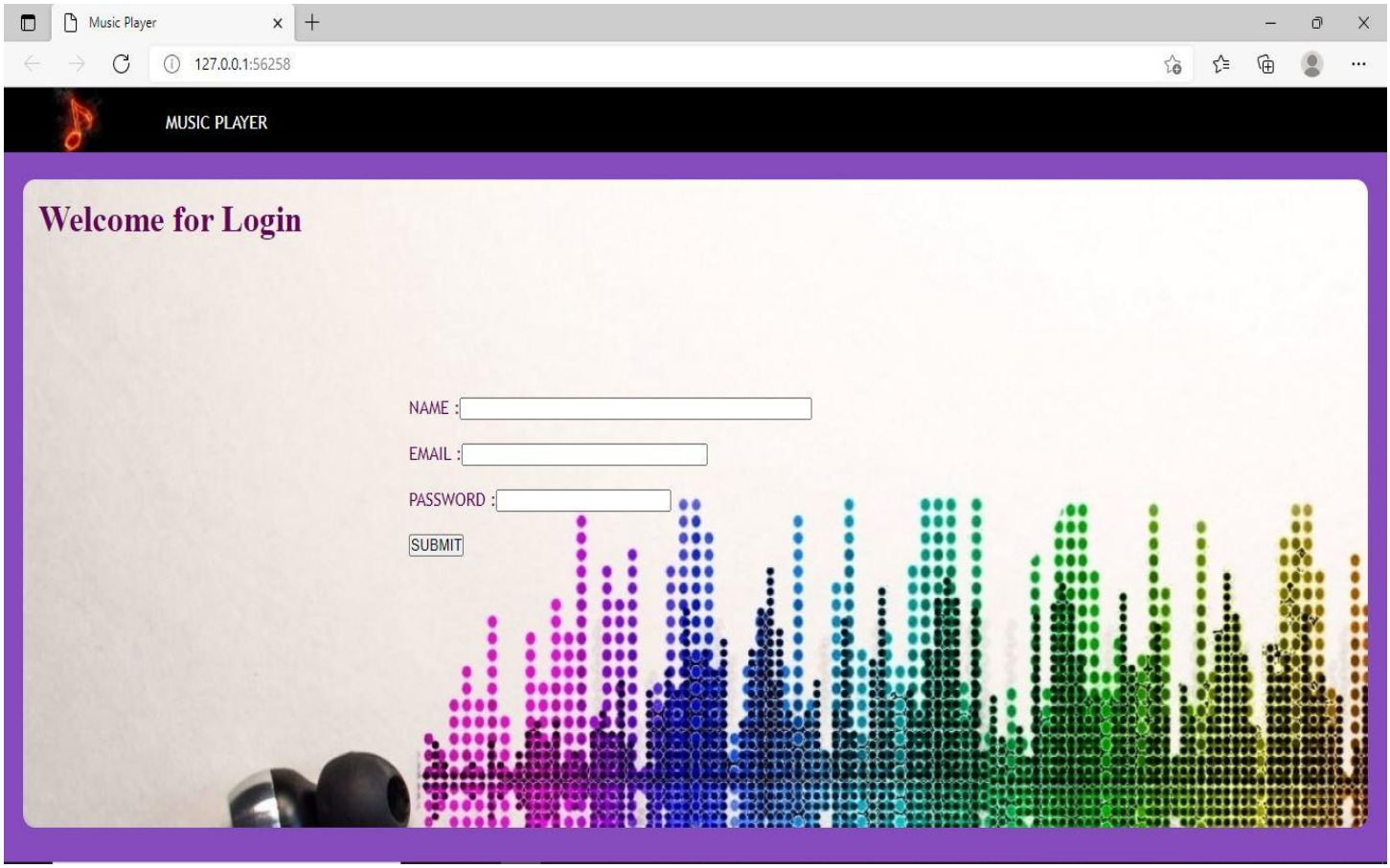
```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl apply -f deployment.yml
deployment.apps/player-deployment configured

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get deployments -n player
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
player-deployment   2/2     2            2           16m

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get pods -n player
NAME                                 READY   STATUS    RESTARTS   AGE
player-deployment-868d6684d6-bx4pr   1/1     Running   0          16m
player-deployment-868d6684d6-qwcjl   1/1     Running   0          34s
```

SERVICE EXPOSURE:




```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get service
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
kubernetes   ClusterIP   10.96.0.1    <none>        443/TCP   79m

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl apply -f service.yml
service/player-service created

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get service -n player
NAME             TYPE           CLUSTER-IP    EXTERNAL-IP   PORT(S)          AGE
player-service   LoadBalancer   10.105.0.5    <pending>     8080:30000/TCP   28s

D:\CLASS\19MAM57-Full Stack Web Development\Music player>minikube service player-service -n player
! Executing "docker container inspect minikube --format={{.State.Status}}" took an unusually long time: 2.6813496s
* Restarting the docker service may improve performance.
|-----------|----------------|-------------|-------------------------|
| NAMESPACE |      NAME      | TARGET PORT |           URL           |
|-----------|----------------|-------------|-------------------------|
| player    | player-service |        8080 | http://192.168.49.2:30000 |
|-----------|----------------|-------------|-------------------------|
* Starting tunnel for service player-service.
|-----------|----------------|-------------|------------------------|
| NAMESPACE |      NAME      | TARGET PORT |          URL           |
|-----------|----------------|-------------|------------------------|
| player    | player-service |             | http://127.0.0.1:56258 |
|-----------|----------------|-------------|------------------------|
* Opening service player/player-service in default browser...
! Because you are using a Docker driver on windows, the terminal needs to be open to run it.
```

HOSTED WEBPAGE:



RESOURCE LIMITATION:

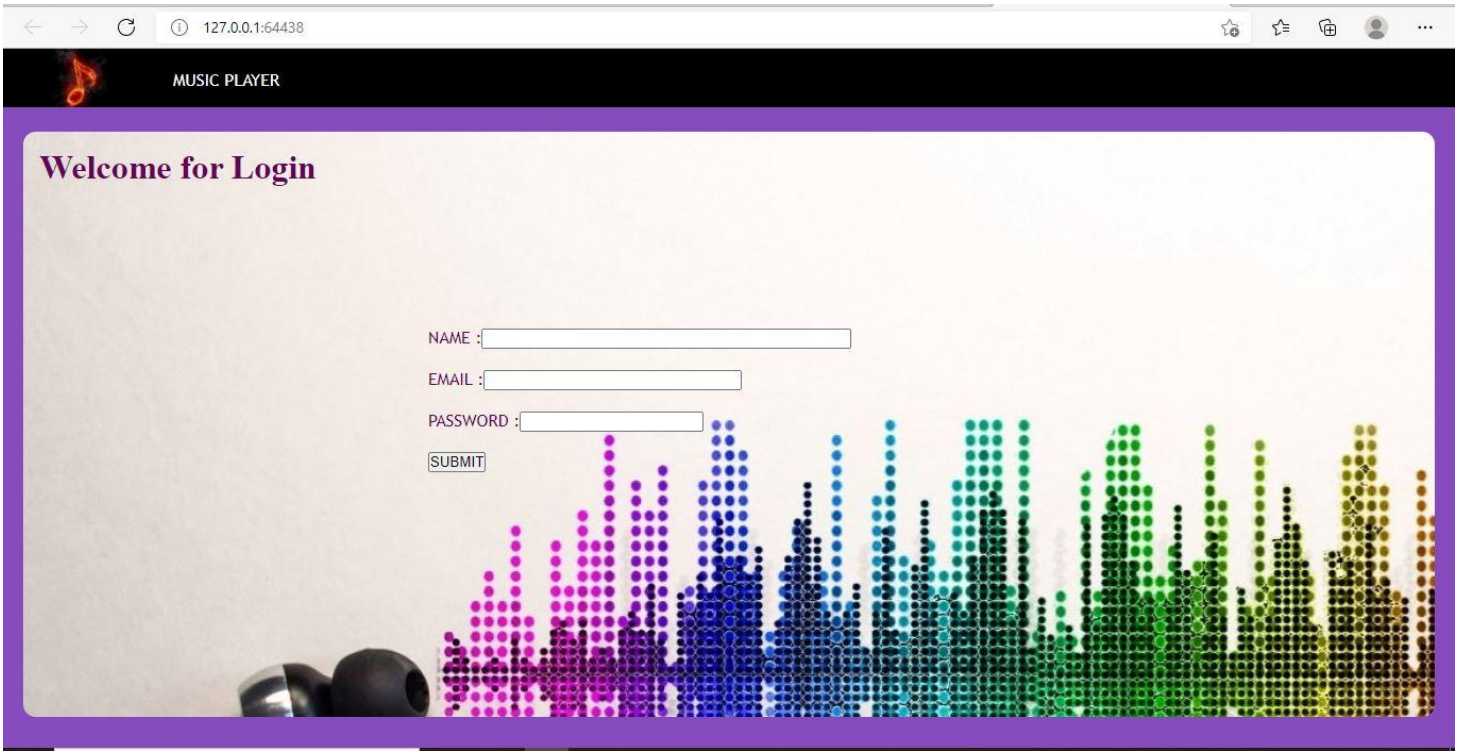
```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl describe pod player-deployment-dd568946-527vk -n player
Name:           player-deployment-dd568946-527vk
Namespace:      player
Priority:       0
Node:           minikube/192.168.49.2
Start Time:     Sat, 29 Jan 2022 00:32:56 +0530
Labels:         app=player
                pod-template-hash=dd568946
Annotations:    <none>
Status:         Pending
IP:
IPs:            <none>
Controlled By:  ReplicaSet/player-deployment-dd568946
Containers:
  player:
    Container ID:
    Image:          music:v1
    Image ID:
    Port:           80/TCP
    Host Port:      0/TCP
    State:          Waiting
      Reason:       ContainerCreating
    Ready:          False
    Restart Count:  0
    Limits:
      cpu:     100m
      memory:  1Mi
    Requests:
      cpu:        100m
      memory:     1Mi
    Environment:  <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-wfq9k (ro)
Conditions:
  Type              Status
  Initialized       True
  Ready             False
  ContainersReady   False
  PodScheduled      True
Volumes:
  kube-api-access-wfq9k:
    Type:                    Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds:  3607
```

```
Volumes:
  kube-api-access-wfq9k:
    Type:                    Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds:  3607
    ConfigMapName:           kube-root-ca.crt
    ConfigMapOptional:       <nil>
    DownwardAPI:             true
QoS Class:                   Guaranteed
Node-Selectors:              <none>
Tolerations:                 node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                             node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type     Reason                  Age    From               Message
  ----     ------                  ----   ----               -------
  Normal   Scheduled               3m35s  default-scheduler  Successfully assigned player/player-deployment-dd568946-527vk to minikube
  Warning  FailedCreatePodSandBox  94s    kubelet            Failed to create pod sandbox: rpc error: code = Unknown desc = failed to start sandbox container for pod "p
layer-deployment-dd568946-527vk": operation timeout: context deadline exceeded
  Normal   SandboxChanged          36s    kubelet            Pod sandbox changed, it will be killed and re-created.

D:\CLASS\19MAM57-Full Stack Web Development\Music player>
```

ROLLBACK STRATEGY:

VERSION-01

```
 => [internal] load build context                                                                          0.1s
 => => transferring context: 5.65kB                                                                        0.1s
 => CACHED [1/2] FROM docker.io/library/nginx:alpine@sha256:da9c94bec1da829ebd52431a84502ec471c8e548ffb2cedbf3626  0.0s
 => [2/2] COPY . /usr/share/nginx/html                                                                    31.6s
 => exporting to image                                                                                     2.1s
 => => exporting layers                                                                                    1.6s
 => => writing image sha256:0f1288e07e9de9296cad430a68c0fb7f716293cb30c3e4f50ca4445ceb44bd74               0.0s
 => => naming to docker.io/library/music:v2                                                                0.4s

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl apply -f deployment.yml
deployment.apps/player-deployment configured

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl get deployments -n player
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
player-deployment   2/2     1            2           51m

D:\CLASS\19MAM57-Full Stack Web Development\Music player>minikube service player-service -n player
! Executing "docker container inspect minikube --format={{.State.Status}}" took an unusually long time: 2.9960355s
* Restarting the docker service may improve performance.
|-----------|----------------|-------------|--------------------------|
| NAMESPACE |      NAME      | TARGET PORT |            URL           |
|-----------|----------------|-------------|--------------------------|
| player    | player-service |        8080 | http://192.168.49.2:30000 |
|-----------|----------------|-------------|--------------------------|
* Starting tunnel for service player-service.
|-----------|----------------|-------------|------------------------|
| NAMESPACE |      NAME      | TARGET PORT |          URL           |
|-----------|----------------|-------------|------------------------|
| player    | player-service |             | http://127.0.0.1:64407 |
|-----------|----------------|-------------|------------------------|
* Opening service player/player-service in default browser...
! Because you are using a Docker driver on windows, the terminal needs to be open to run it.
* Stopping tunnel for service player-service.

D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl rollout history deploy player-deployment -n player
deployment.apps/player-deployment
REVISION  CHANGE-CAUSE
1         <none>
2         <none>
3         <none>
```



VERSION-02

```
D:\CLASS\19MAM57-Full Stack Web Development\Music player>kubectl rollout undo deploy player-deployment --to-revision=1 -n player
deployment.apps/player-deployment rolled back

D:\CLASS\19MAM57-Full Stack Web Development\Music player>minikube service player-service -n player
! Executing "docker container inspect minikube --format={{.State.Status}}" took an unusually long time: 2.4698524s
* Restarting the docker service may improve performance.
|-----------|----------------|-------------|--------------------------|
| NAMESPACE |      NAME      | TARGET PORT |            URL           |
|-----------|----------------|-------------|--------------------------|
| player    | player-service |        8080 | http://192.168.49.2:30000 |
|-----------|----------------|-------------|--------------------------|
* Starting tunnel for service player-service.
|-----------|----------------|-------------|------------------------|
| NAMESPACE |      NAME      | TARGET PORT |          URL           |
|-----------|----------------|-------------|------------------------|
| player    | player-service |             | http://127.0.0.1:64438 |
|-----------|----------------|-------------|------------------------|
* Opening service player/player-service in default browser...
! Because you are using a Docker driver on windows, the terminal needs to be open to run it.
```