云原生 第二次作业

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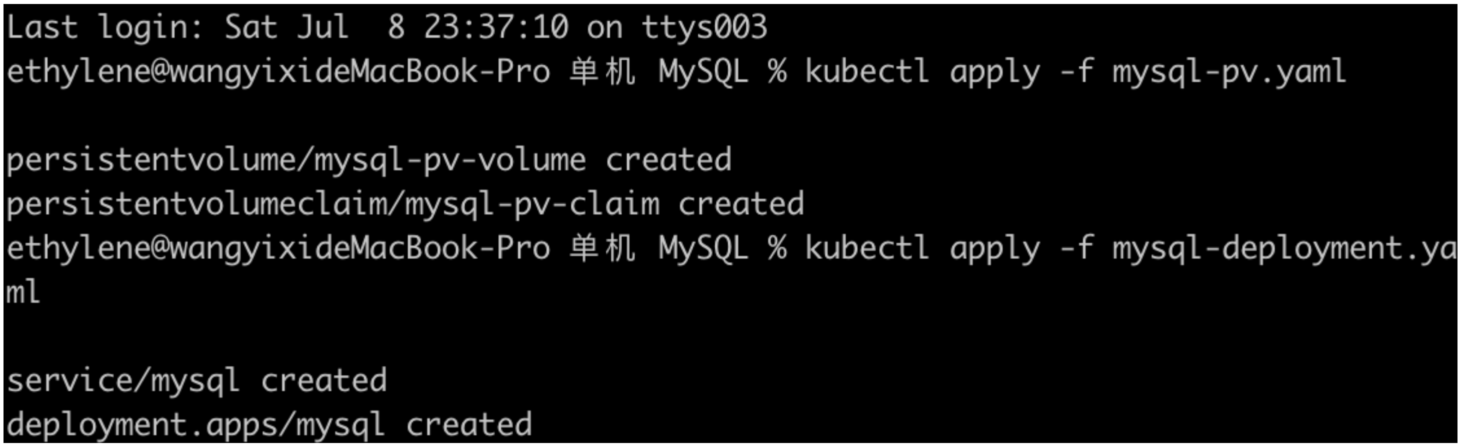
一.两个微服务启动时都注册到 Eureka 服务

1. 先配置数据库，更改 `mysql-pv.yaml` 中的hostPath，然后运行客户端
   2.使用 `mysql-pv.yaml` 文件中定义的配置来创建一个 Kubernetes 持久卷

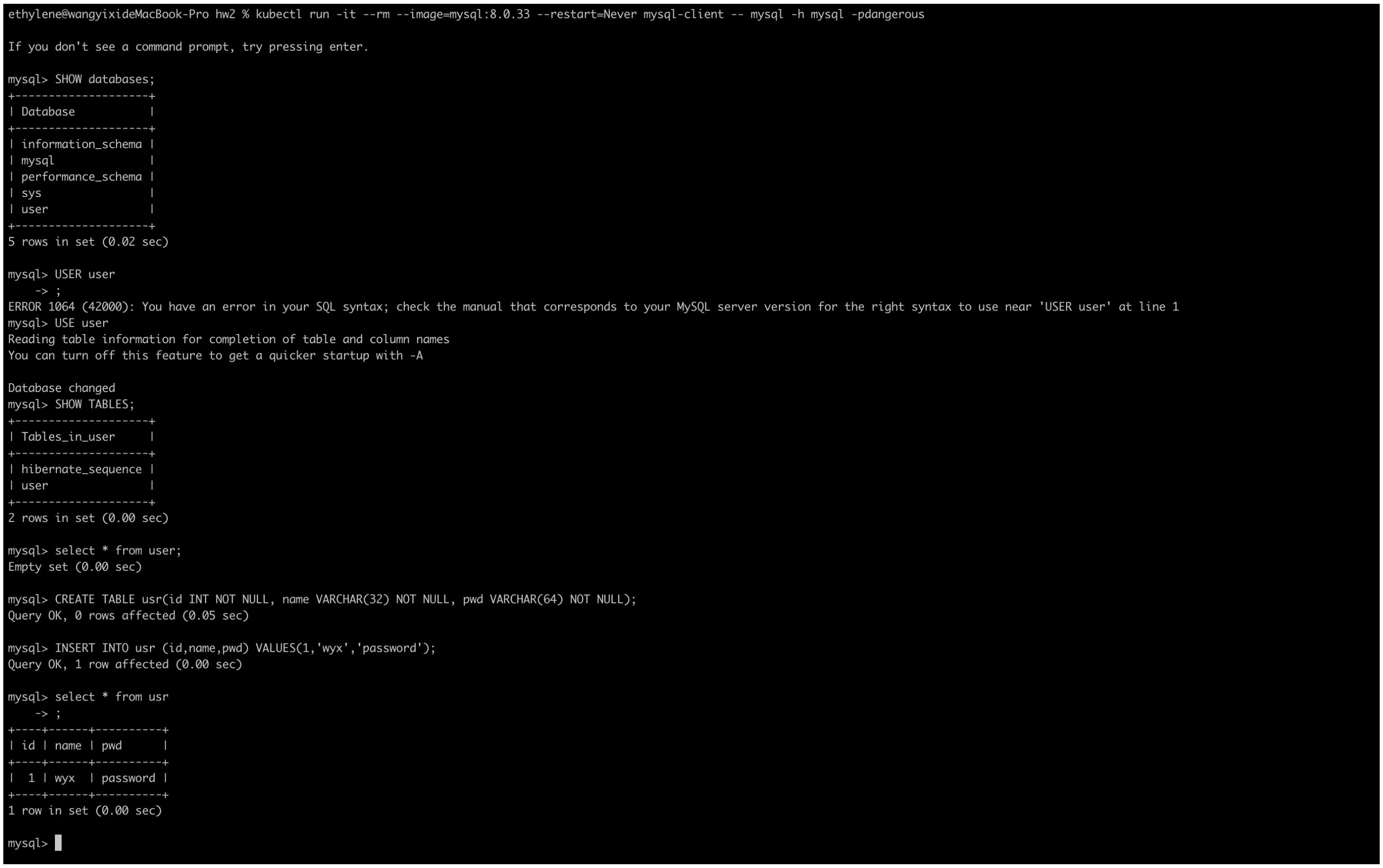
部署 MySQL,然后运行客户端

```
kubectl apply -f mysql-pv.yaml
kubectl apply -f mysql-deployment.yaml
kubectl run -it --rm --image=mysql:8.0.33 --restart=Never mysql-client -- mysql -h mysql -pdangerous
```



```
Last login: Sat Jul  8 23:37:10 on ttys003
ethylene@wangyixideMacBook-Pro 单机 MySQL % kubectl apply -f mysql-pv.yaml

persistentvolume/mysql-pv-volume created
persistentvolumeclaim/mysql-pv-claim created
ethylene@wangyixideMacBook-Pro 单机 MySQL % kubectl apply -f mysql-deployment.ya
ml

service/mysql created
deployment.apps/mysql created
```

初步创建数据库，验证其功能



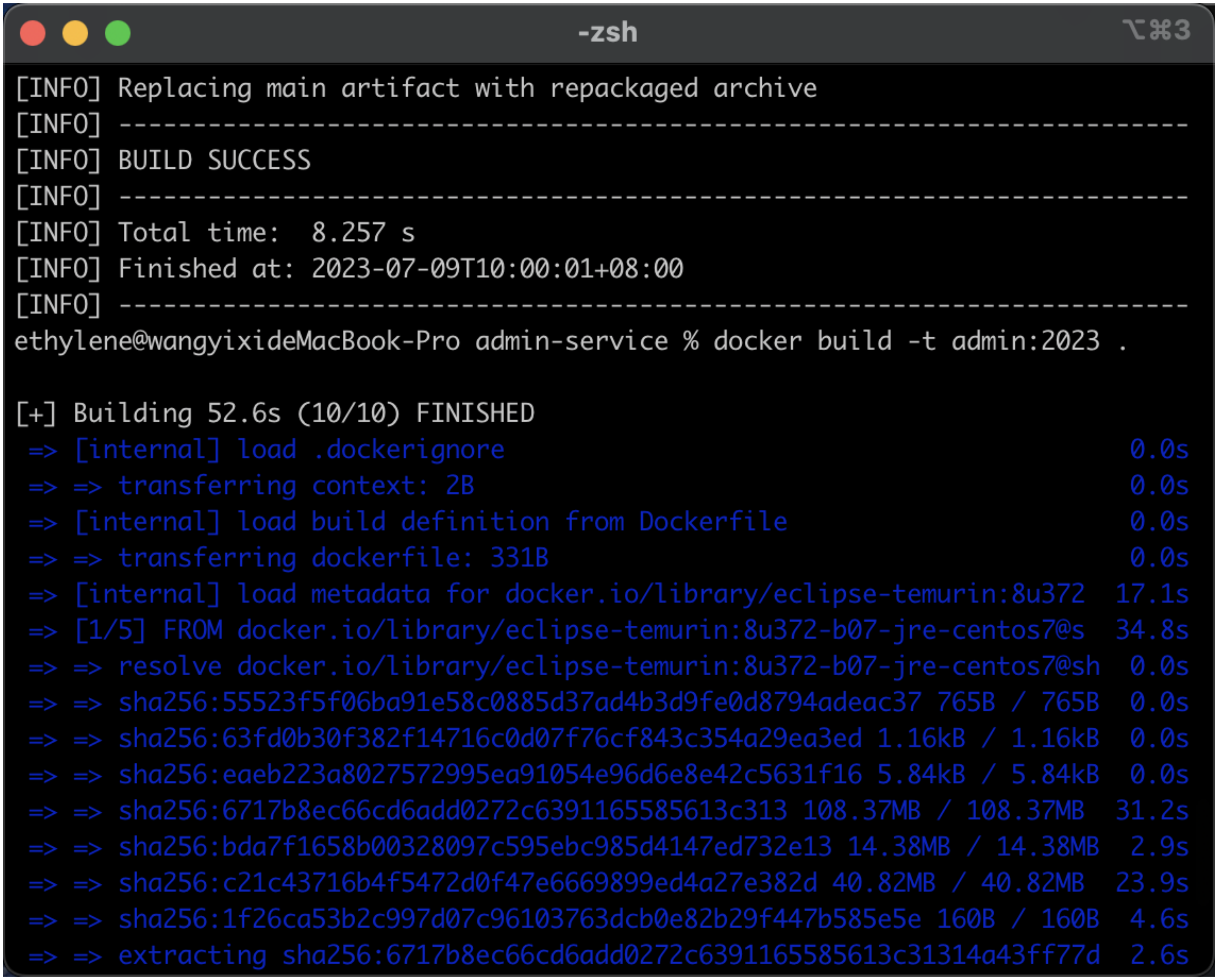
```
ethylene@wangyixideMacBook-Pro hw2 % kubectl run -it --rm --image=mysql:8.0.33 --restart=Never mysql-client -- mysql -h mysql -pdangerous

If you don't see a command prompt, try pressing enter.

mysql> SHOW databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
| user               |
+--------------------+
5 rows in set (0.02 sec)

mysql> USER user
    -> ;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'USER user' at line 1
mysql> USE user
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> SHOW TABLES;
+--------------------+
| Tables_in_user     |
+--------------------+
| hibernate_sequence |
| user               |
+--------------------+
2 rows in set (0.00 sec)

mysql> select * from user;
Empty set (0.00 sec)

mysql> CREATE TABLE usr(id INT NOT NULL, name VARCHAR(32) NOT NULL, pwd VARCHAR(64) NOT NULL);
Query OK, 0 rows affected (0.05 sec)

mysql> INSERT INTO usr (id,name,pwd) VALUES(1,'wyx','password');
Query OK, 1 row affected (0.00 sec)

mysql> select * from usr
    -> ;
+----+------+----------+
| id | name | pwd      |
+----+------+----------+
|  1 | wyx  | password |
+----+------+----------+
1 row in set (0.00 sec)

mysql> 
```

二. 构建镜像并配置

构建Eureka镜像并配置

配置admin镜像

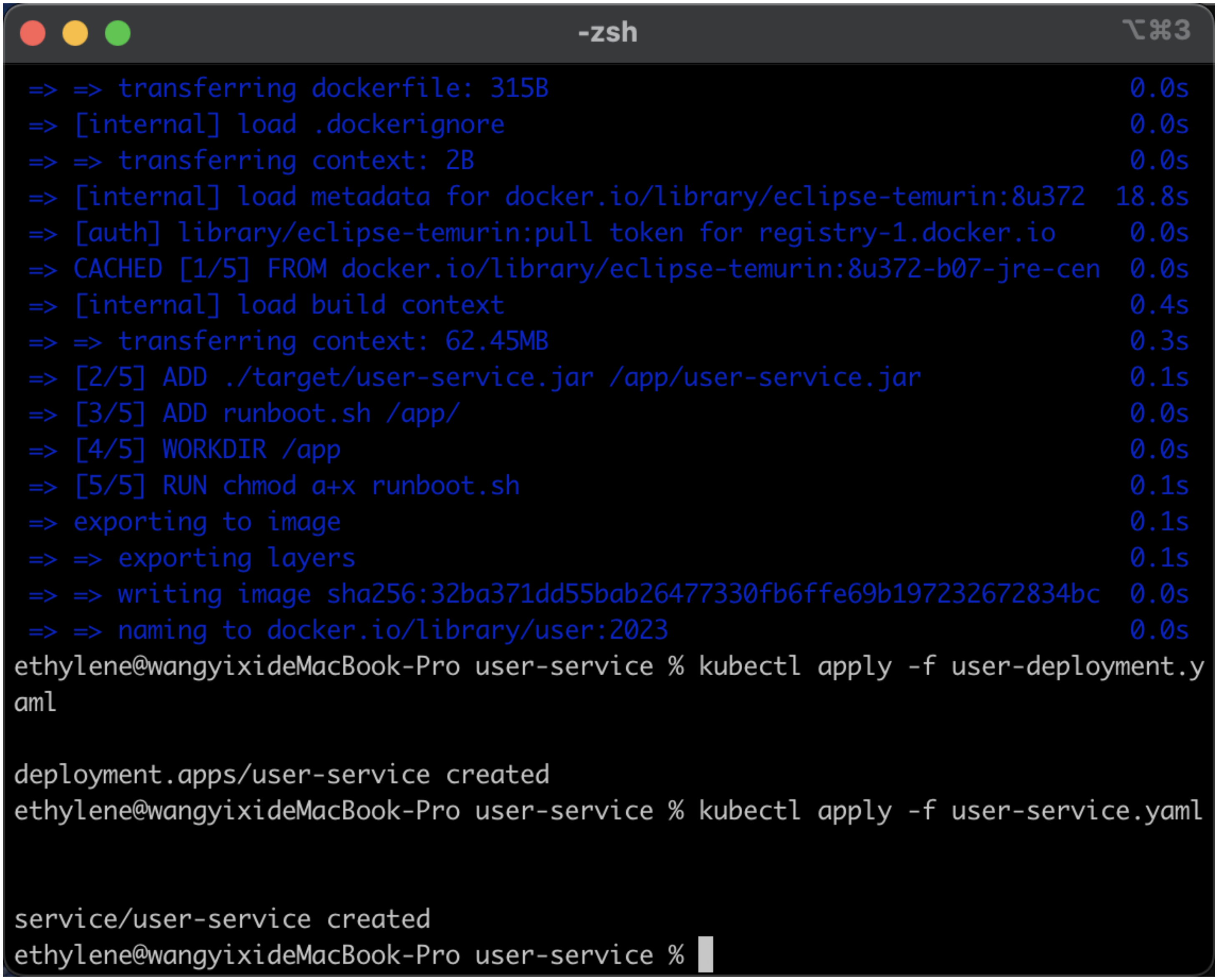
```
mvn -B -Dmaven.test.skip clean package
docker build -t admin-service:2023 .
kubectl apply -f admin-deployment.yaml
kubectl apply -f admin-service.yaml
```



```
[INFO] Replacing main artifact with repackaged archive
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  8.257 s
[INFO] Finished at: 2023-07-09T10:00:01+08:00
[INFO] ------------------------------------------------------------------------
ethylene@wangyixideMacBook-Pro admin-service % docker build -t admin:2023 .

[+] Building 52.6s (10/10) FINISHED
 => [internal] load .dockerignore                                          0.0s
 => => transferring context: 2B                                            0.0s
 => [internal] load build definition from Dockerfile                       0.0s
 => => transferring dockerfile: 331B                                       0.0s
 => [internal] load metadata for docker.io/library/eclipse-temurin:8u372  17.1s
 => [1/5] FROM docker.io/library/eclipse-temurin:8u372-b07-jre-centos7@s  34.8s
 => => resolve docker.io/library/eclipse-temurin:8u372-b07-jre-centos7@sh  0.0s
 => => sha256:55523f5f06ba91e58c0885d37ad4b3d9fe0d8794adeac37 765B / 765B  0.0s
 => => sha256:63fd0b30f382f14716c0d07f76cf843c354a29ea3ed 1.16kB / 1.16kB  0.0s
 => => sha256:eaeb223a8027572995ea91054e96d6e8e42c5631f16 5.84kB / 5.84kB  0.0s
 => => sha256:6717b8ec66cd6add0272c6391165585613c313 108.37MB / 108.37MB  31.2s
 => => sha256:bda7f1658b00328097c595ebc985d4147ed732e13 14.38MB / 14.38MB  2.9s
 => => sha256:c21c43716b4f5472d0f47e6669899ed4a27e382d 40.82MB / 40.82MB  23.9s
 => => sha256:1f26ca53b2c997d07c96103763dcb0e82b29f447b585e5e 160B / 160B  4.6s
 => => extracting sha256:6717b8ec66cd6add0272c6391165585613c31314a43ff77d  2.6s
```

配置user镜像

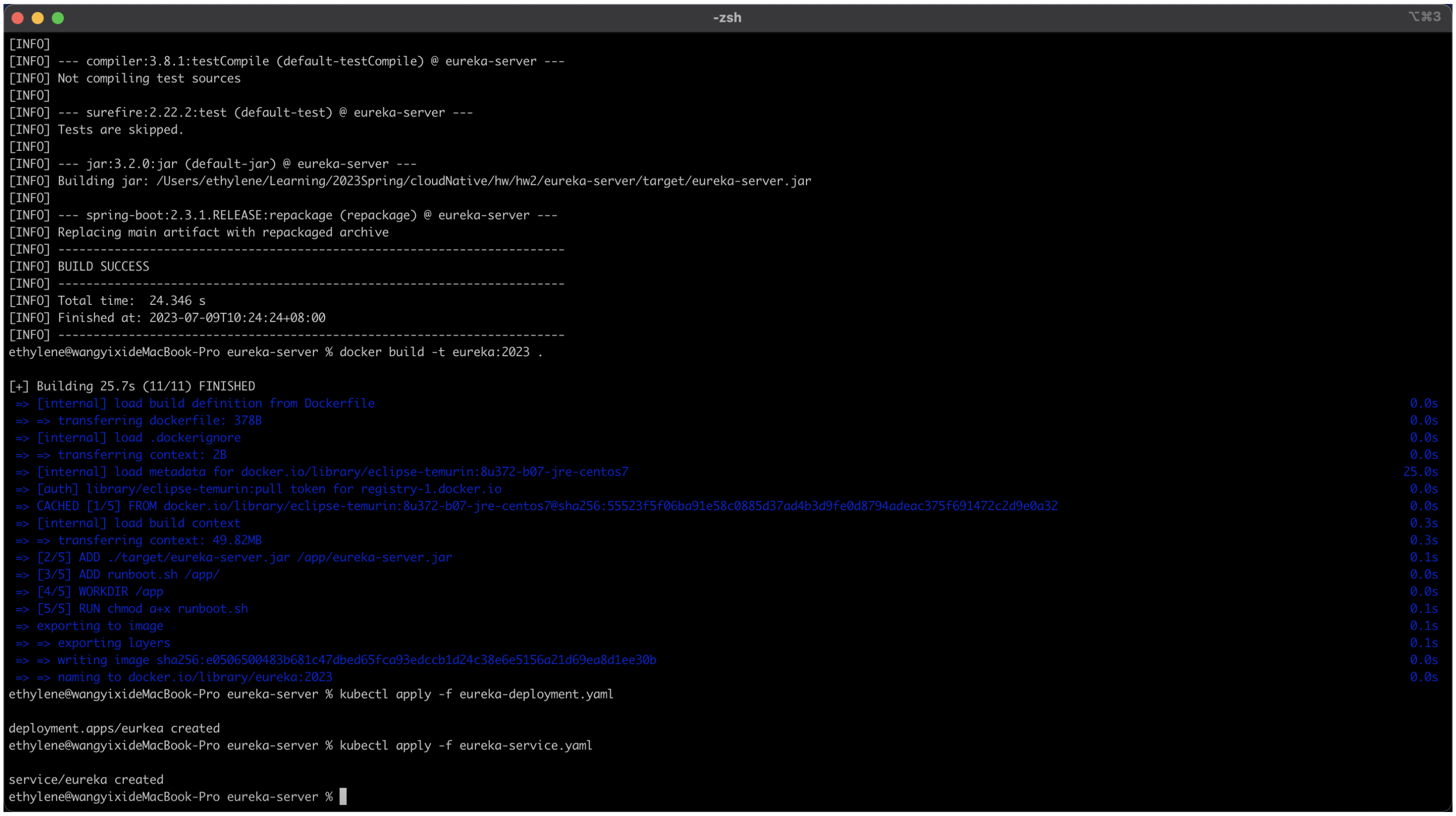
```
mvn -B -Dmaven.test.skip clean package
docker build -t user-service:2023 .
kubectl apply -f user-deployment.yaml
kubectl apply -f user-service.yaml
```



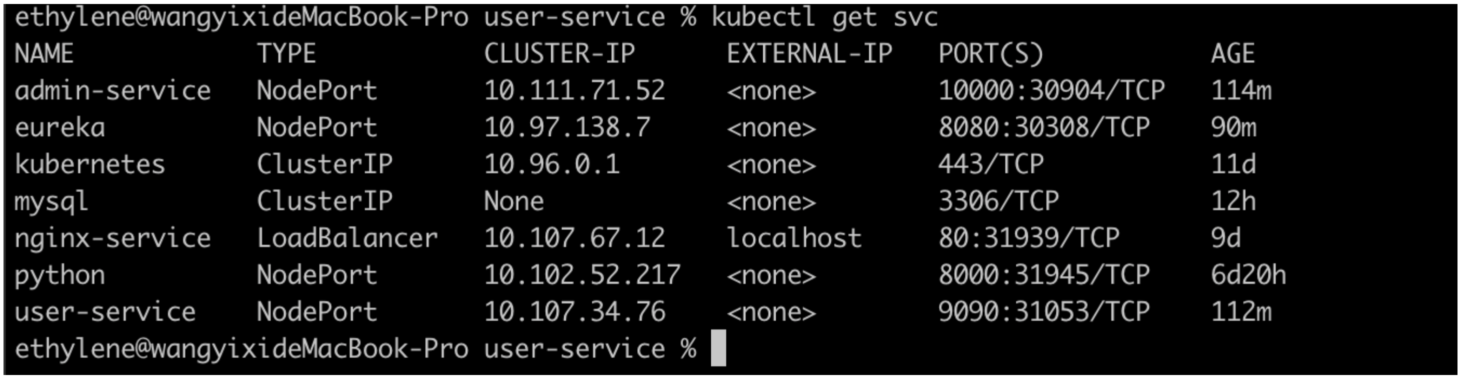
```
 => => transferring dockerfile: 315B                                        0.0s
 => [internal] load .dockerignore                                            0.0s
 => => transferring context: 2B                                              0.0s
 => [internal] load metadata for docker.io/library/eclipse-temurin:8u372  18.8s
 => [auth] library/eclipse-temurin:pull token for registry-1.docker.io      0.0s
 => CACHED [1/5] FROM docker.io/library/eclipse-temurin:8u372-b07-jre-cen  0.0s
 => [internal] load build context                                            0.4s
 => => transferring context: 62.45MB                                         0.3s
 => [2/5] ADD ./target/user-service.jar /app/user-service.jar                0.1s
 => [3/5] ADD runboot.sh /app/                                               0.0s
 => [4/5] WORKDIR /app                                                       0.0s
 => [5/5] RUN chmod a+x runboot.sh                                           0.1s
 => exporting to image                                                       0.1s
 => => exporting layers                                                      0.1s
 => => writing image sha256:32ba371dd55bab26477330fb6ffe69b197232672834bc  0.0s
 => => naming to docker.io/library/user:2023                                 0.0s
ethylene@wangyixideMacBook-Pro user-service % kubectl apply -f user-deployment.y
aml

deployment.apps/user-service created
ethylene@wangyixideMacBook-Pro user-service % kubectl apply -f user-service.yaml


service/user-service created
ethylene@wangyixideMacBook-Pro user-service %
```

配置eureka镜像

```
mvn -B -Dmaven.test.skip clean package
docker build -t eureka:2023 .
kubectl apply -f eureka-deployment.yaml
kubectl apply -f eureka-service.yaml
```

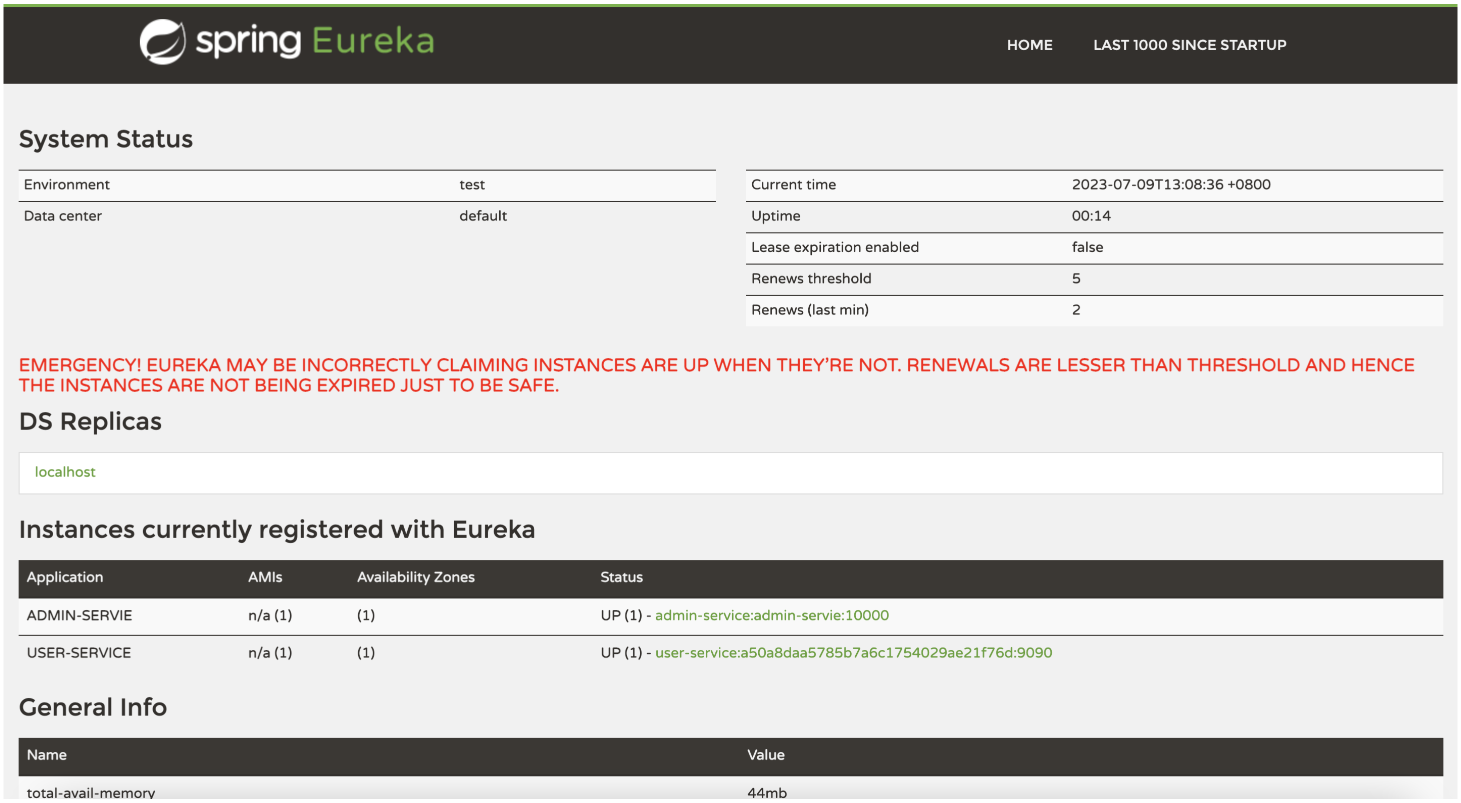


```
[INFO]
[INFO] --- compiler:3.8.1:testCompile (default-testCompile) @ eureka-server ---
[INFO] Not compiling test sources
[INFO]
[INFO] --- surefire:2.22.2:test (default-test) @ eureka-server ---
[INFO] Tests are skipped.
[INFO]
[INFO] --- jar:3.2.0:jar (default-jar) @ eureka-server ---
[INFO] Building jar: /Users/ethylene/Learning/2023Spring/cloudNative/hw/hw2/eureka-server/target/eureka-server.jar
[INFO]
[INFO] --- spring-boot:2.3.1.RELEASE:repackage (repackage) @ eureka-server ---
[INFO] Replacing main artifact with repackaged archive
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  24.346 s
[INFO] Finished at: 2023-07-09T10:24:24+08:00
[INFO] ------------------------------------------------------------------------
ethylene@wangyixideMacBook-Pro eureka-server % docker build -t eureka:2023 .

[+] Building 25.7s (11/11) FINISHED
 => [internal] load build definition from Dockerfile                                                                                                    0.0s
 => => transferring dockerfile: 378B                                                                                                                    0.0s
 => [internal] load .dockerignore                                                                                                                       0.0s
 => => transferring context: 2B                                                                                                                         0.0s
 => [internal] load metadata for docker.io/library/eclipse-temurin:8u372-b07-jre-centos7                                                               25.0s
 => [auth] library/eclipse-temurin:pull token for registry-1.docker.io                                                                                  0.0s
 => CACHED [1/5] FROM docker.io/library/eclipse-temurin:8u372-b07-jre-centos7@sha256:55523f5f06ba91e58c0885d37ad4b3d9fe0d8794adeac375f691472c2d9e0a32   0.0s
 => [internal] load build context                                                                                                                       0.3s
 => => transferring context: 49.82MB                                                                                                                    0.3s
 => [2/5] ADD ./target/eureka-server.jar /app/eureka-server.jar                                                                                         0.1s
 => [3/5] ADD runboot.sh /app/                                                                                                                          0.0s
 => [4/5] WORKDIR /app                                                                                                                                  0.0s
 => [5/5] RUN chmod a+x runboot.sh                                                                                                                      0.1s
 => exporting to image                                                                                                                                  0.1s
 => => exporting layers                                                                                                                                 0.1s
 => => writing image sha256:e0506500483b681c47dbed65fca93edccb1d24c38e6e5156a21d69ea8d1ee30b                                                            0.0s
 => => naming to docker.io/library/eureka:2023                                                                                                          0.0s
ethylene@wangyixideMacBook-Pro eureka-server % kubectl apply -f eureka-deployment.yaml

deployment.apps/eurkea created
ethylene@wangyixideMacBook-Pro eureka-server % kubectl apply -f eureka-service.yaml

service/eureka created
ethylene@wangyixideMacBook-Pro eureka-server % ▌
```



```
ethylene@wangyixideMacBook-Pro user-service % kubectl get svc
NAME            TYPE           CLUSTER-IP      EXTERNAL-IP   PORT(S)           AGE
admin-service   NodePort       10.111.71.52    <none>        10000:30904/TCP   114m
eureka          NodePort       10.97.138.7     <none>        8080:30308/TCP    90m
kubernetes      ClusterIP      10.96.0.1       <none>        443/TCP           11d
mysql           ClusterIP      None            <none>        3306/TCP          12h
nginx-service   LoadBalancer   10.107.67.12    localhost     80:31939/TCP      9d
python          NodePort       10.102.52.217   <none>        8000:31945/TCP    6d20h
user-service    NodePort       10.107.34.76    <none>        9090:31053/TCP    112m
ethylene@wangyixideMacBook-Pro user-service % ▌
```

在Eureka-Server上面成功运行



System Status

Environment	test
Data center	default

Current time	2023-07-09T13:08:36 +0800
Uptime	00:14
Lease expiration enabled	false
Renews threshold	5
Renews (last min)	2

EMERGENCY! EUREKA MAY BE INCORRECTLY CLAIMING INSTANCES ARE UP WHEN THEY'RE NOT. RENEWALS ARE LESSER THAN THRESHOLD AND HENCE THE INSTANCES ARE NOT BEING EXPIRED JUST TO BE SAFE.

DS Replicas

localhost

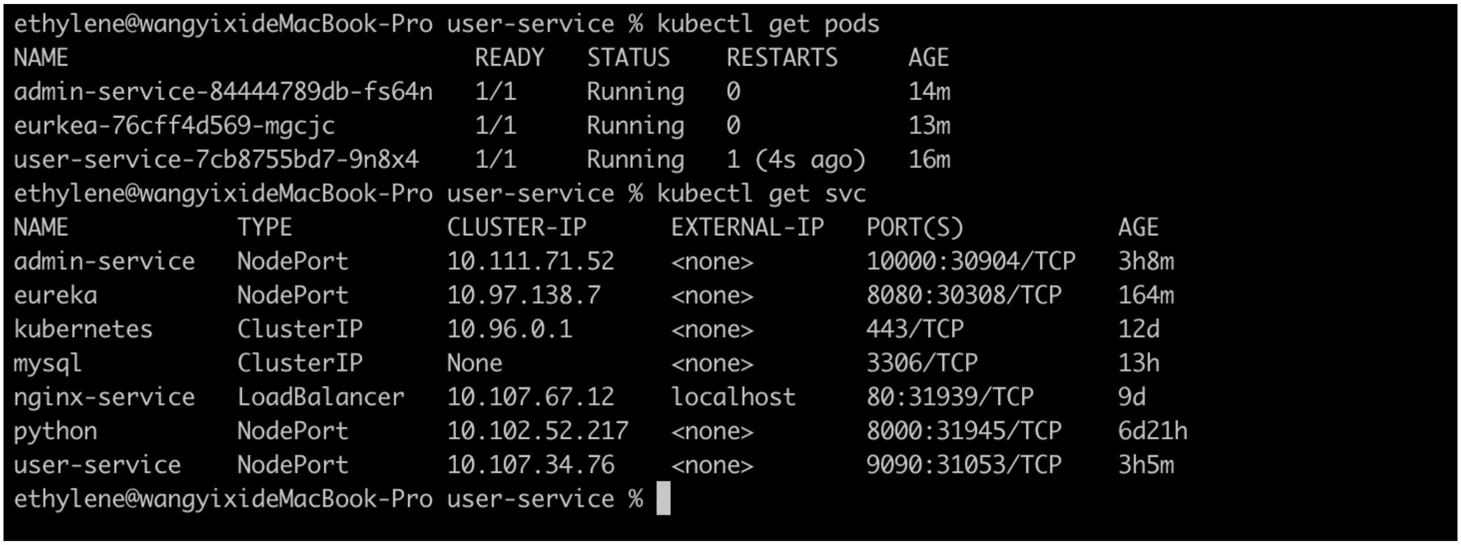
Instances currently registered with Eureka

Application	AMIs	Availability Zones	Status
ADMIN-SERVIE	n/a (1)	(1)	UP (1) - admin-service:admin-servie:10000
USER-SERVICE	n/a (1)	(1)	UP (1) - user-service:a50a8daa5785b7a6c1754029ae21f76d:9090

General Info

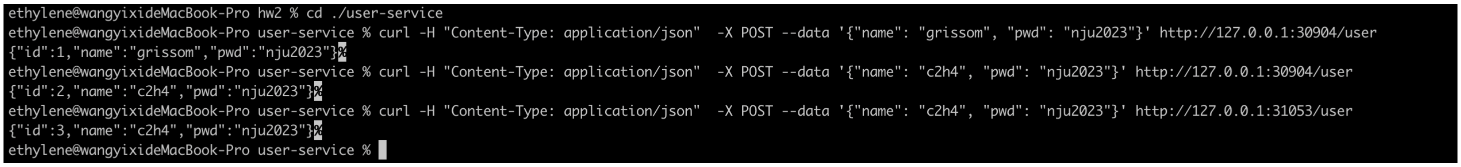
Name	Value
total-avail-memory	44mb

三.通过curl指令进行添加用户的尝试

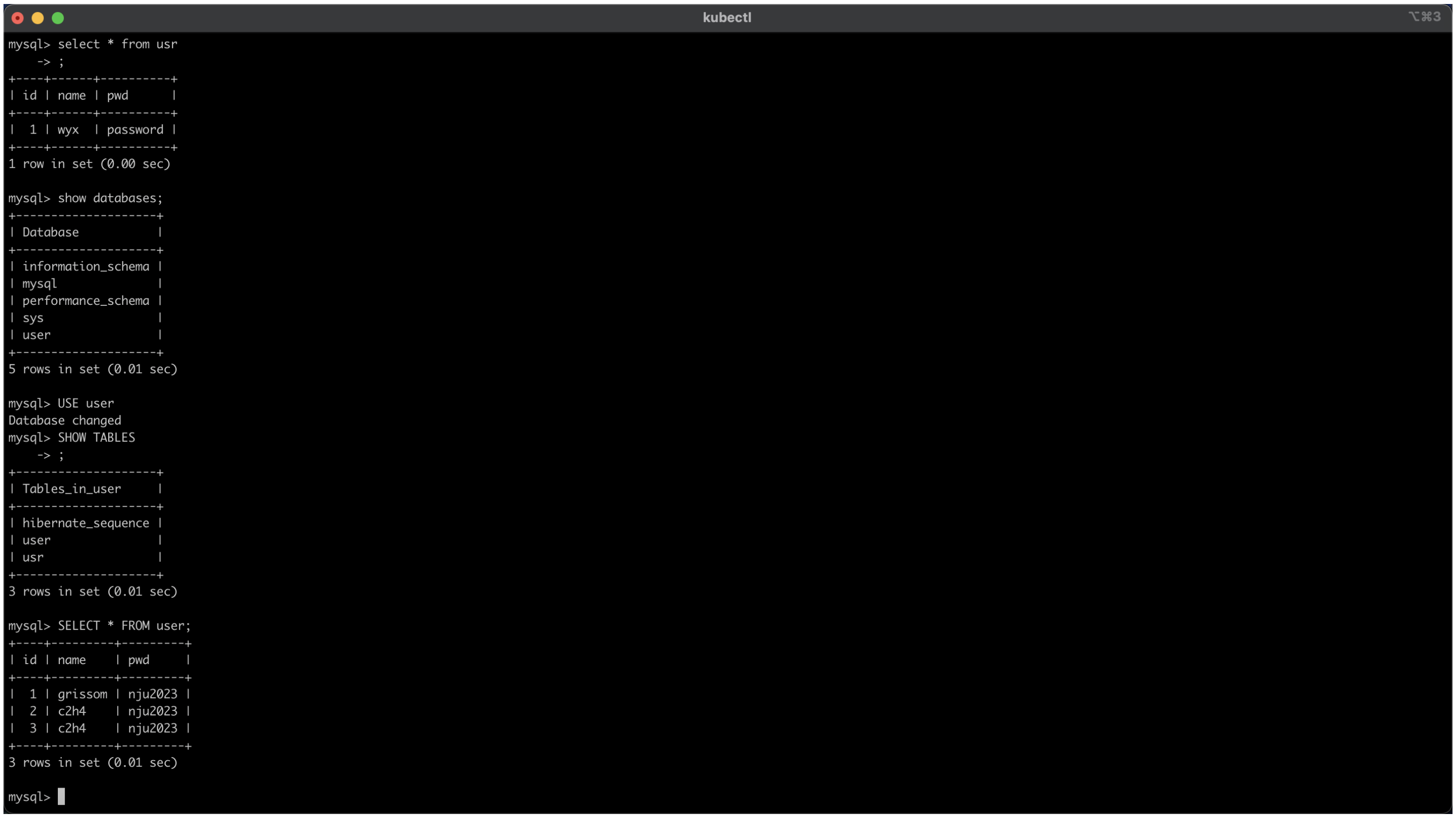


```
ethylene@wangyixideMacBook-Pro user-service % kubectl get pods
NAME                               READY   STATUS    RESTARTS     AGE
admin-service-84444789db-fs64n     1/1     Running   0            14m
eurkea-76cff4d569-mgcjc            1/1     Running   0            13m
user-service-7cb8755bd7-9n8x4      1/1     Running   1 (4s ago)   16m
ethylene@wangyixideMacBook-Pro user-service % kubectl get svc
NAME            TYPE           CLUSTER-IP      EXTERNAL-IP   PORT(S)           AGE
admin-service   NodePort       10.111.71.52    <none>        10000:30904/TCP   3h8m
eureka          NodePort       10.97.138.7     <none>        8080:30308/TCP    164m
kubernetes      ClusterIP      10.96.0.1       <none>        443/TCP           12d
mysql           ClusterIP      None            <none>        3306/TCP          13h
nginx-service   LoadBalancer   10.107.67.12    localhost     80:31939/TCP      9d
python          NodePort       10.102.52.217   <none>        8000:31945/TCP    6d21h
user-service    NodePort       10.107.34.76    <none>        9090:31053/TCP    3h5m
ethylene@wangyixideMacBook-Pro user-service % 
```

```
curl -H "Content-Type: application/json"  -X POST --data '{"name": "grissom", "pwd": "nju2023"}' http:/
```

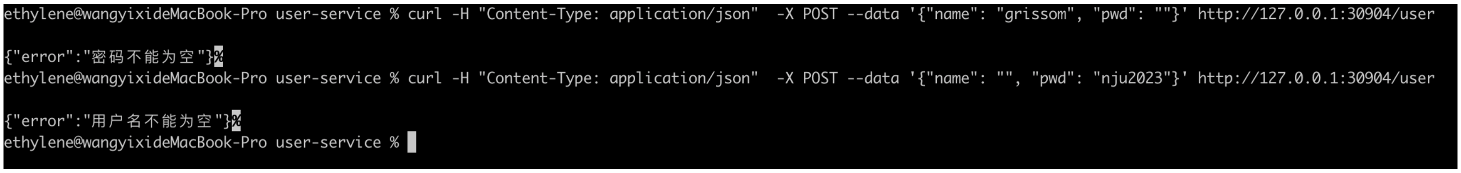


```
ethylene@wangyixideMacBook-Pro hw2 % cd ./user-service
ethylene@wangyixideMacBook-Pro user-service % curl -H "Content-Type: application/json"  -X POST --data '{"name": "grissom", "pwd": "nju2023"}' http://127.0.0.1:30904/user
{"id":1,"name":"grissom","pwd":"nju2023"}%
ethylene@wangyixideMacBook-Pro user-service % curl -H "Content-Type: application/json"  -X POST --data '{"name": "c2h4", "pwd": "nju2023"}' http://127.0.0.1:30904/user
{"id":2,"name":"c2h4","pwd":"nju2023"}%
ethylene@wangyixideMacBook-Pro user-service % curl -H "Content-Type: application/json"  -X POST --data '{"name": "c2h4", "pwd": "nju2023"}' http://127.0.0.1:31053/user
{"id":3,"name":"c2h4","pwd":"nju2023"}%
ethylene@wangyixideMacBook-Pro user-service % 
```



```
mysql> select * from usr
    -> ;
+----+------+----------+
| id | name | pwd      |
+----+------+----------+
|  1 | wyx  | password |
+----+------+----------+
1 row in set (0.00 sec)

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
| user               |
+--------------------+
5 rows in set (0.01 sec)

mysql> USE user
Database changed
mysql> SHOW TABLES
    -> ;
+--------------------+
| Tables_in_user     |
+--------------------+
| hibernate_sequence |
| user               |
| usr                |
+--------------------+
3 rows in set (0.01 sec)

mysql> SELECT * FROM user;
+----+---------+---------+
| id | name    | pwd     |
+----+---------+---------+
|  1 | grissom | nju2023 |
|  2 | c2h4    | nju2023 |
|  3 | c2h4    | nju2023 |
+----+---------+---------+
3 rows in set (0.01 sec)

mysql> 
```

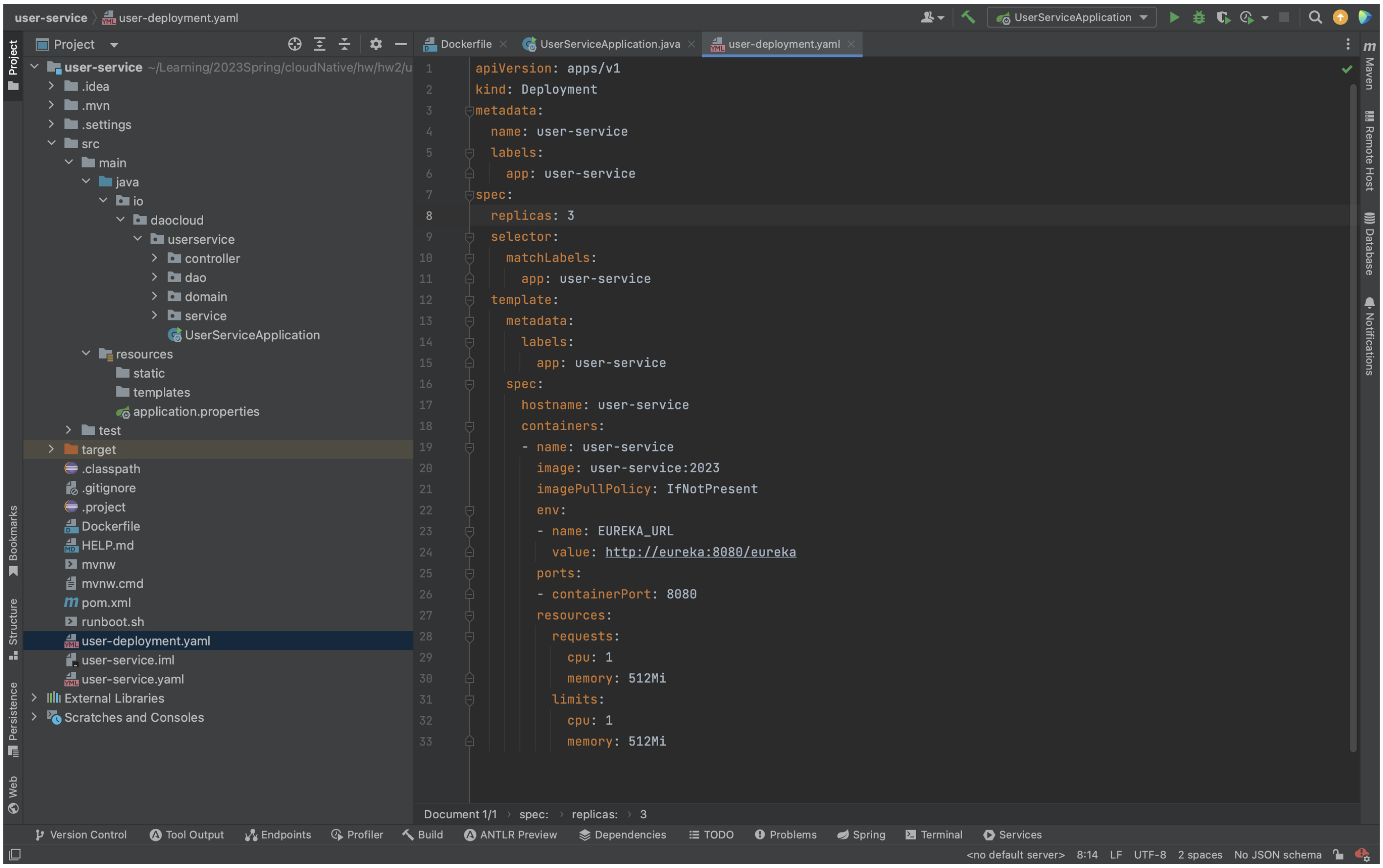
尝试输入空密码或空用户名发现无法插入



```
ethylene@wangyixideMacBook-Pro user-service % curl -H "Content-Type: application/json"  -X POST --data '{"name": "grissom", "pwd": ""}' http://127.0.0.1:30904/user

{"error":"密码不能为空"}%
ethylene@wangyixideMacBook-Pro user-service % curl -H "Content-Type: application/json"  -X POST --data '{"name": "", "pwd": "nju2023"}' http://127.0.0.1:30904/user

{"error":"用户名不能为空"}%
ethylene@wangyixideMacBook-Pro user-service % 
```

四.实现负载均衡

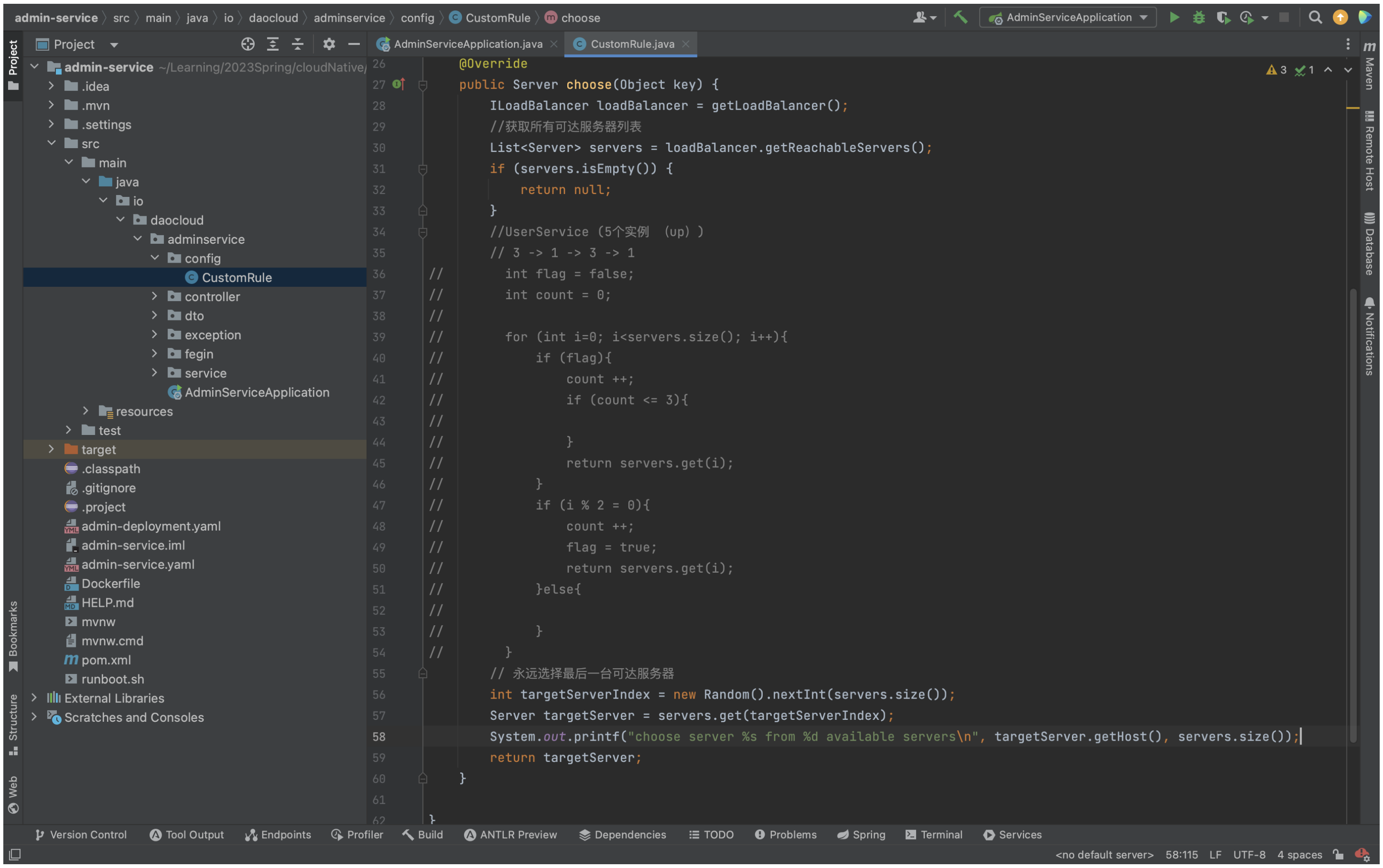
修改user-deployment，Deployment 配置会启动 3 个 Pod 副本，并将它们标记为 `app=user-service`，以便实现负载均衡



```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: user-service
  labels:
    app: user-service
spec:
  replicas: 3
  selector:
    matchLabels:
      app: user-service
  template:
    metadata:
      labels:
        app: user-service
    spec:
      hostname: user-service
      containers:
      - name: user-service
        image: user-service:2023
        imagePullPolicy: IfNotPresent
        env:
        - name: EUREKA_URL
          value: http://eureka:8080/eureka
        ports:
        - containerPort: 8080
        resources:
          requests:
            cpu: 1
            memory: 512Mi
          limits:
            cpu: 1
            memory: 512Mi
```

修改src/main/java/io/daocloud/adminservice/config/CustomRule.java中的choose方法

```java
@Override
    public Server choose(Object key) {

        ILoadBalancer loadBalancer = getLoadBalancer();

        // 获取所有可达服务器列表
        List<Server> servers = loadBalancer.getReachableServers();
        if (servers.isEmpty()) {
            return null;
        }

        //用一个随机函数，随机访问实现负载均衡
        int targetServerIndex = new Random().nextInt(servers.size());
        Server targetServer = servers.get(targetServerIndex);

        System.out.printf("choose server %s from %d available servers\n", targetServer.

        return targetServer;
    }
```



```java
    @Override
    public Server choose(Object key) {
        ILoadBalancer loadBalancer = getLoadBalancer();
        //获取所有可达服务器列表
        List<Server> servers = loadBalancer.getReachableServers();
        if (servers.isEmpty()) {
            return null;
        }
        //UserService (5个实例  (up) )
        // 3 -> 1 -> 3 -> 1
//        int flag = false;
//        int count = 0;
//
//        for (int i=0; i<servers.size(); i++){
//            if (flag){
//                count ++;
//                if (count <= 3){
//
//                }
//                return servers.get(i);
//            }
//            if (i % 2 = 0){
//                count ++;
//                flag = true;
//                return servers.get(i);
//            }else{
//
//            }
//        }
        // 永远选择最后一台可达服务器
        int targetServerIndex = new Random().nextInt(servers.size());
        Server targetServer = servers.get(targetServerIndex);
        System.out.printf("choose server %s from %d available servers\n", targetServer.getHost(), servers.size());
        return targetServer;
    }

}
```

修改后在admin-service的日志中发现每次插入都可能使用不同的userservice