第一章 部署准备

1.1 目的

将 spring boot 程序做成 docker 镜像，推送到镜像仓库，使用 jenkins 自动部署和回滚。

1.2 规划

OS ：CentOS_7.5 x64
IP ：10.1.5.64，jenkins 服务器
172.16.6.32，harbor 搭建的 docker 私仓
172.16.6.33，运行程序（jar）
三台机器均安装如下包:
docker-ce-cli ：18.09.0
docker-ce ：18.09.0
其中，172.16.6.32 还需要部署 harbor，参考其他文档。

第二章 docker 安装

操作对象：

10.1.5.64
172.16.6.32
172.16.6.33

安装方法有很多，这里选择其中一种，rpm 方式。

2.1 安装

添加 docker 源：

```
yum-config-manager --add-repo
https://download.docker.com/linux/centos/docker-ce.repo
```

从指定源安装 docker-ce ：

```
yum install docker-ce --enablerepo=docker-ce-stable -y

systemctl start docker
systemctl enable docker
```

查看是否开机运行：

```
systemctl list-unit-files|grep docker
```

2.2 确认

```
docker version
```

```
[root@docker01 ~]# docker version
Client:
 Version:           18.09.0
 API version:       1.39
 Go version:        go1.10.4
 Git commit:        4d60db4
 Built:             Wed Nov  7 00:48:22 2018
 OS/Arch:           linux/amd64
 Experimental:      false

Server: Docker Engine - Community
 Engine:
  Version:          18.09.0
  API version:      1.39 (minimum version 1.12)
  Go version:       go1.10.4
  Git commit:       4d60db4
  Built:            Wed Nov  7 00:19:08 2018
  OS/Arch:          linux/amd64
  Experimental:     false
```

2.3 ubuntu 安装（补充）

方法有很多，这里只说一种。

```
curl -sSL https://get.docker.com/ | sh
systemctl start docker
chkconfig docker on
```

第三章 harbor 安装

操作对象：

172.16.6.32

不是本文档的重点，这里不再想说，参考其他文档。

第四章 jenkins 环境准备

4.1 基础软件安装

操作对象：

10.1.5.64

需要准备 tomcat+jenkins+maven+jdk，搭建一个 jenkins 的环境，步骤比较简单，这里不再详细介绍。

4.2 ansible 安装

安装 ansible，方法很多，这里也不再详细介绍。

4.3 密钥认证

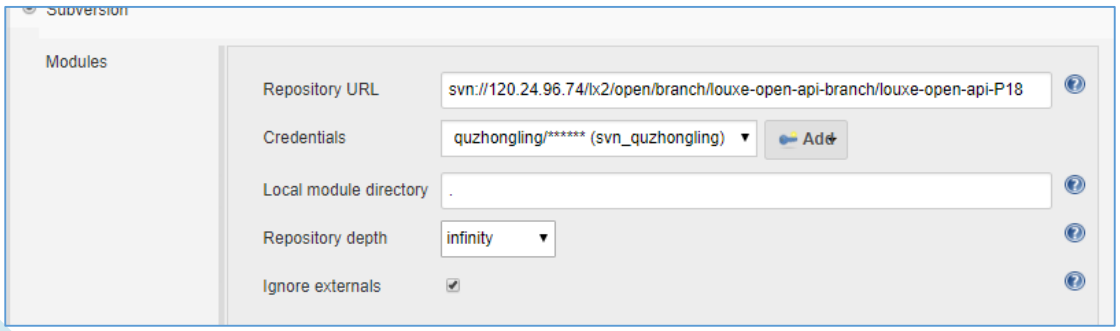
即是将 jenkins 本机的公钥发送到 172.16.6.33 机器，做免密认证，步骤很简单，这里不再详细介绍。

第五章 jenkins 配置

5.1 参数化构建

如上图，为了适应通用性，尽量多配置变量:
pname：字符参数，区分各个不同的项目，这里使用打包出来的 jar 的名称进行区分
version：字符参数，选择版本，用于回滚
action_choice：选项参数，用于区分是部署还是回滚
env_choice：选项参数，用于区分是灰度环境还是生产环境
port：字符参数，定义项目启用的端口

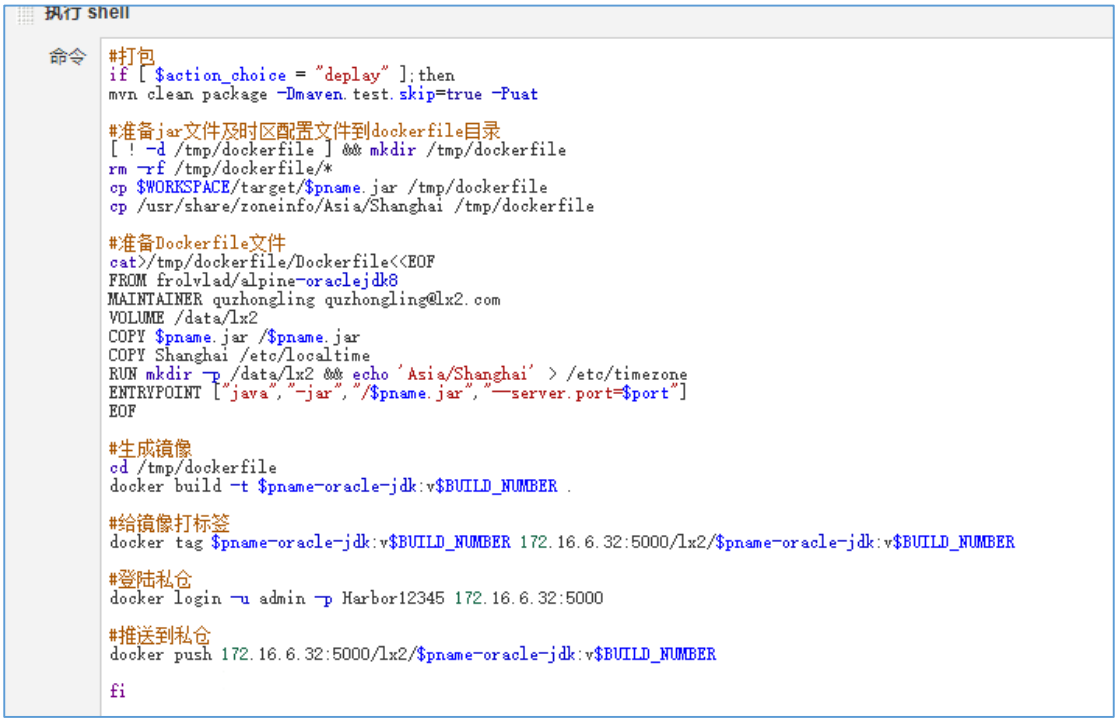
5.2 源码管理



如图，这里使用的是 svn 管理的，配置即可。

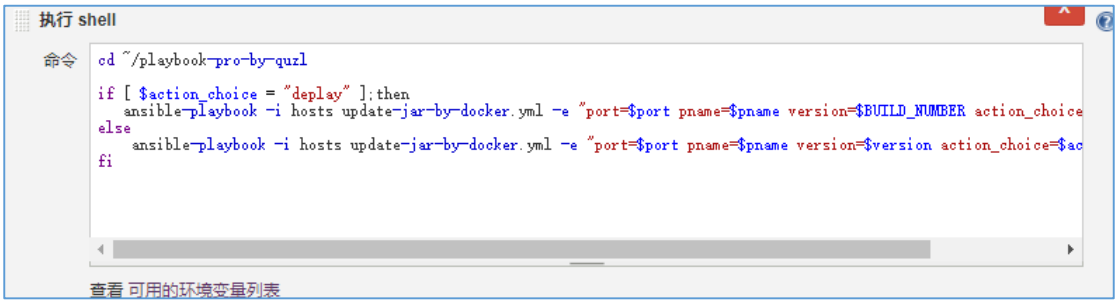
5.3 构建-打包和推送镜像

```
#打包
if [ $action_choice = "deplay" ];then
mvn clean package -Dmaven.test.skip=true -Puat

#准备 jar 文件及时区配置文件到 dockerfile 目录
[ ! -d /tmp/dockerfile ] && mkdir /tmp/dockerfile
rm -rf /tmp/dockerfile/*
cp $WORKSPACE/target/$pname.jar /tmp/dockerfile
cp /usr/share/zoneinfo/Asia/Shanghai /tmp/dockerfile

#准备 Dockerfile 文件
cat>/tmp/dockerfile/Dockerfile<<EOF
FROM frolvlad/alpine-oraclejdk8
MAINTAINER quzhongling quzhongling@lx2.com
VOLUME /data/lx2
COPY $pname.jar /$pname.jar
COPY Shanghai /etc/localtime
RUN mkdir -p /data/lx2 && echo 'Asia/Shanghai' > /etc/timezone
ENTRYPOINT ["java","-jar","/$pname.jar","--server.port=$port"]
EOF

#生成镜像
cd /tmp/dockerfile
docker build -t $pname-oracle-jdk:v$BUILD_NUMBER .

#给镜像打标签
docker tag $pname-oracle-jdk:v$BUILD_NUMBER
172.16.6.32:5000/lx2/$pname-oracle-jdk:v$BUILD_NUMBER

#登陆私仓
docker login -u admin -p Harbor12345 172.16.6.32:5000

#推送到私仓
docker push 172.16.6.32:5000/lx2/$pname-oracle-jdk:v$BUILD_NUMBER

fi
```



5.4 构建-部署和回滚

```
cd ~/playbook-pro-by-quzl

if [ $action_choice = "deplay" ];then
   ansible-playbook -i hosts update-jar-by-docker.yml -e "port=$port
pname=$pname version=$BUILD_NUMBER action_choice=$action_choice"
else
    ansible-playbook -i hosts update-jar-by-docker.yml -e "port=$port
pname=$pname version=$version action_choice=$action_choice"
fi
```



5.5 补充 ansible 脚本

cat update-jar-by-docker.yml

```
---
```

```
- hosts: louxe-open-api-by-docker
  gather_facts: false  #不采集系统信息，有利于加速访问
  remote_user: root
  serial: 1  #串行执行
  tasks:
    - name: 登陆私仓
      docker_login:
        registry: 172.16.6.32:5000
        username: admin
        password: Harbor12345
        reauthorize: no

    - name: 拉取镜像
      docker_image:
        name: 172.16.6.32:5000/lx2/{{ pname }}-oracle-jdk
        tag: v{{ version }}
        pull: yes
    - name: 停止当前运行的容器
      shell: docker stop $(docker ps|grep louxe-open-api|awk '{print
$NF}')
      ignore_errors: yes
    - name: 删除旧容器，保留最近的 30 个
      shell: docker rm $(docker ps -a -f name=^{{ pname }} -q|tail -n
+30)
      ignore_errors: yes
    - name: 删除旧的镜像，保留最近的 30 个
      shell: docker rmi $(docker images
172.16.6.32:5000/lx2/{{pname}}-oracle-jdk -q|tail -n +31)
      ignore_errors: yes
    - name: 启动新容器-版本是-{{version}}
      docker_container:
        name: "{{ pname }}-v{{ version }}"
        image: 172.16.6.32:5000/lx2/{{ pname }}-oracle-
jdk:v{{ version }}
        state: started
        volumes:
          - /data/lx2:/data/lx2
        ports:
          - "{{ port }}:{{ port }}"
...
```

对应的 host 文件包含如下内容:

```
root@jenkins:~/playbook-pro-by-quzl# grep docker -A1 hosts
############  docker test  ###################
[louxe-open-api-by-docker]
172.16.6.33
############  docker test ###################
```

第六章 验证

6.1 部署

```
Started by user jenkins系统管理员
Building in workspace /root/.jenkins/workspace/louxe-open-api-for-docker
Updating svn://120.24.96.74/lx2/open/branch/louxe-open-api-branch/louxe-open-api-P18 at revision '2018-11-23T15:24:33.808 +0800'
At revision 153

No changes for svn://120.24.96.74/lx2/open/branch/louxe-open-api-branch/louxe-open-api-P18 since the previous build
[louxe-open-api-for-docker] $ /bin/sh -xe /data/tomcat-jenkins-prd-8080/temp/jenkins2972227035154900508.sh
+ [ deplay = deplay ]
+ mvn clean package -Dmaven.test.skip=true -Puat
[INFO] Scanning for projects...
```

部署 deplay，拉取代码，

```
[INFO] --- spring-boot-maven-plugin:1.5.10.RELEASE:repackage (default) @ louxe-
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 17.523 s
[INFO] Finished at: 2018-11-23T15:24:54+08:00
[INFO] Final Memory: 51M/589M
[INFO] ------------------------------------------------------------------------
```

maven 构建成功

```
+ [ ! -d /tmp/dockerfile ]
+ rm -rf /tmp/dockerfile/Dockerfile /tmp/dockerfile/Shanghai /tmp/dockerfile/louxe-open-api.jar
+ cp /root/.jenkins/workspace/louxe-open-api-for-docker/target/louxe-open-api.jar /tmp/dockerfile
+ cp /usr/share/zoneinfo/Asia/Shanghai /tmp/dockerfile
+ cat
+ cd /tmp/dockerfile
+ docker build -t louxe-open-api-oracle-jdk:v65 .
Sending build context to Docker daemon  64.02MB

Step 1/7 : FROM frolvlad/alpine-oraclejdk8
 ---> b81355b10fa3
Step 2/7 : MAINTAINER quzhongling quzhongling@lx2.com
 ---> Using cache
 ---> 59d1243ab9c9
Step 3/7 : VOLUME /data/lx2
 ---> Using cache
 ---> 26a987e88898
Step 4/7 : COPY louxe-open-api.jar /louxe-open-api.jar
 ---> 96bf695c545d
Step 5/7 : COPY Shanghai /etc/localtime
 ---> d7b2c8c4cf54
Step 6/7 : RUN mkdir -p /data/lx2 && echo 'Asia/Shanghai' > /etc/timezone
 ---> Running in 7c8ea523f3a2
Removing intermediate container 7c8ea523f3a2
 ---> 44edf9551a0d
Step 7/7 : ENTRYPOINT ["java","-jar","/louxe-open-api.jar","--server.port=8081"]
 ---> Running in 45e794c8f265
Removing intermediate container 45e794c8f265
 ---> 46d104218ecc
Successfully built 46d104218ecc
Successfully tagged louxe-open-api-oracle-jdk:v65
+ docker tag louxe-open-api-oracle-jdk:v65 172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v65
```

生成镜像，并推送到镜像仓库

```
v65: digest: sha256:ee6a06340bf79a9b2fde4d411c9361412e0ac373c65961e118e609003b70f983 size: 1577
[louxe-open-api-for-docker] $ /bin/sh -xe /data/tomcat-jenkins-prd-8080/temp/jenkins5245370163964628770.sh
+ cd /root/playbook-pro-by-quzl
+ [ deplay = deplay ]
+ ansible-playbook -i hosts update-jar-by-docker.yml -e port=8081 pname=louxe-open-api version=65 action_choice=deplay
 [WARNING]: Found variable using reserved name: port

PLAY [louxe-open-api-by-docker] ************************************************

TASK [登陆私仓] ****************************************************************
ok: [172.16.6.33]

TASK [拉取镜像] ****************************************************************
changed: [172.16.6.33]

TASK [停止当前运行的容器] ******************************************************************
changed: [172.16.6.33]

TASK [删除旧容器，保留最近的30个] ************************************************************
fatal: [172.16.6.33]: FAILED! => {"changed": true, "cmd": "docker rm $(docker ps -a -f name='louxe-open-api -q|tail -n +30)", "d
11-23 15:26:19.082249", "failed": true, "rc": 1, "start": "2018-11-23 15:26:18.939424", "stderr": "\"docker rm\" requires at les
help'.\n\nUsage:  docker rm [OPTIONS] CONTAINER [CONTAINER...]\n\nRemove one or more containers", "stderr_lines": ["\"docker rm\
'docker rm --help'.", "", "Usage:  docker rm [OPTIONS] CONTAINER [CONTAINER...]", "", "Remove one or more containers"], "stdout"
...ignoring

TASK [删除旧的镜像，保留最近的30个] ************************************************************
fatal: [172.16.6.33]: FAILED! => {"changed": true, "cmd": "docker rmi $(docker images 172.16.6.32:5000/lx2/louxe-open-api-oracle
"0:00:00.144304", "end": "2018-11-23 15:26:19.680412", "failed": true, "rc": 1, "start": "2018-11-23 15:26:19.536108", "stderr":
argument.\nSee 'docker rmi --help'.\n\nUsage:  docker rmi [OPTIONS] IMAGE [IMAGE...]\n\nRemove one or more images", "stderr_line
1 argument.", "See 'docker rmi --help'.", "", "Usage:  docker rmi [OPTIONS] IMAGE [IMAGE...]", "", "Remove one or more images"],
...ignoring

TASK [启动新容器-版本是-65] ****************************************************************
changed: [172.16.6.33]

PLAY RECAP *********************************************************************
172.16.6.33                : ok=6    changed=5    unreachable=0    failed=0
```

拉取镜像并部署

6.2 回滚

```
Started by user jenkins系统管理员
Building in workspace /root/.jenkins/workspace/louxe-open-api-for-docker
Updating svn://120.24.96.74/lx2/open/branch/louxe-open-api-branch/louxe-open-api-P18 at revision '2018-11-23T15:33:07.764 +080
At revision 153

No changes for svn://120.24.96.74/lx2/open/branch/louxe-open-api-branch/louxe-open-api-P18 since the previous build
[louxe-open-api-for-docker] $ /bin/sh -xe /data/tomcat-jenkins-prd-8080/temp/jenkins3790457368197757490.sh
+ [ roolback = deplay ]
[louxe-open-api-for-docker] $ /bin/sh -xe /data/tomcat-jenkins-prd-8080/temp/jenkins3150239448498531080.sh
+ cd /root/playbook-pro-by-quzl
+ [ roolback = deplay ]
+ ansible-playbook -i hosts update-jar-by-docker.yml -e port=8081 pname=louxe-open-api version=59 action_choice=roolback
 [WARNING]: Found variable using reserved name: port
PLAY [louxe-open-api-by-docker] ************************************************

TASK [登陆私仓] ****************************************************************
ok: [172.16.6.33]

TASK [拉取镜像] ****************************************************************
ok: [172.16.6.33]

TASK [停止当前运行的容器] ******************************************************************
changed: [172.16.6.33]

TASK [删除旧容器，保留最近的30个] ************************************************************
fatal: [172.16.6.33]: FAILED! => {"changed": true, "cmd": "docker rm $(docker ps -a -f name='louxe-open-api -q|tail -n +30)",
11-23 15:34:14.897640", "failed": true, "rc": 1, "start": "2018-11-23 15:34:14.739809", "stderr": "\"docker rm\" requires at l
help'.\n\nUsage:  docker rm [OPTIONS] CONTAINER [CONTAINER...]\n\nRemove one or more containers", "stderr_lines": ["\"docker r
'docker rm --help'.", "", "Usage:  docker rm [OPTIONS] CONTAINER [CONTAINER...]", "", "Remove one or more containers"], "stdou
...ignoring
```

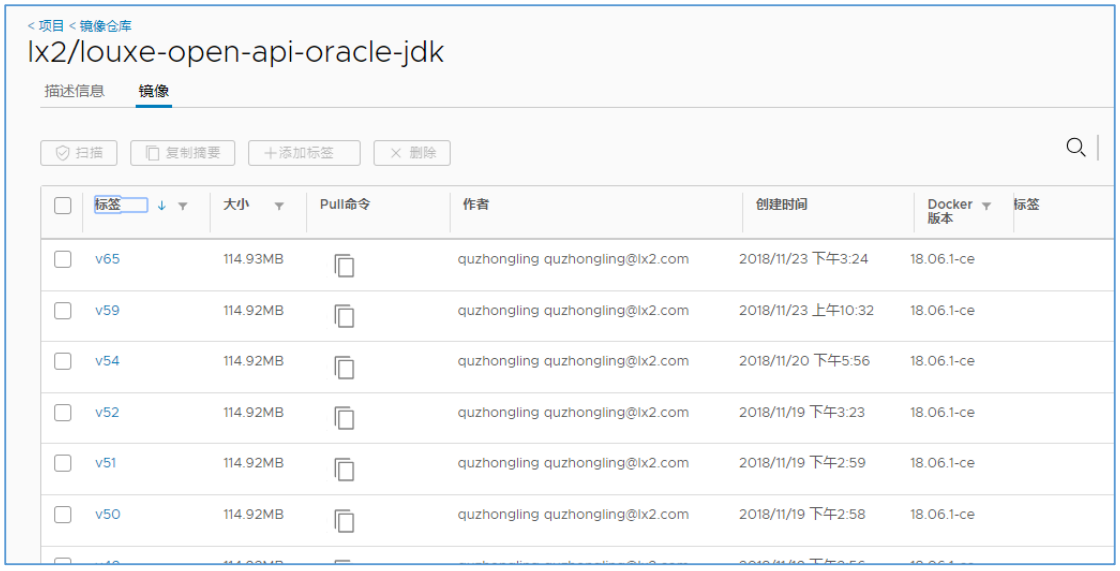
直接启动本地已有的容器，版本是 59

6.3 程序宿主机观察

```
[root@docker03 louxe-open-api]# docker images
REPOSITORY                                          TAG                 IMAGE ID            CREATED             SIZE
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v65                 46d104218ecc        11 minutes ago      232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v59                 03f175765c33        5 hours ago         232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v54                 00b7859f6236        2 days ago          232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v52                 942c88c98df8        4 days ago          232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v51                 1e117f7b3b57        4 days ago          232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v50                 bcda384a523b        4 days ago          232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v49                 a445bc1205c1        4 days ago          232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v46                 71a788d8ad63        4 days ago          232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v45                 0d8d07fc2f4c        4 days ago          232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v44                 b0b38b00dda0        7 days ago          232MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v42                 8c2db4d55dda        7 days ago          231MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v41                 7779ee6ded9c        7 days ago          231MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v40                 633d10876c80        7 days ago          231MB
172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk      v39                 441a81277b6d        7 days ago          231MB
[root@docker03 louxe-open-api]# docker ps -a
CONTAINER ID        IMAGE                                               COMMAND                  CREATED             STATUS                      PORTS                    NAMES
c803a5890cf7        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v65  "java -jar /louxe-op…"   10 minutes ago      Exited (143) 2 minutes ago                           louxe-open-api-v65
fa0dd38579ad        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v59  "java -jar /louxe-op…"   5 hours ago         Up 2 minutes                0.0.0.0:8081->8081/tcp   louxe-open-api-v59
3eed8675ec9c        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v54  "java -jar /louxe-op…"   2 days ago          Exited (143) 5 hours ago                             louxe-open-api-v54
12ece0aa0212        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v51  "java -jar /louxe-op…"   4 days ago          Exited (143) 2 days ago                              louxe-open-api-v51
57f5dc704bf2        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v52  "java -jar /louxe-op…"   4 days ago          Exited (143) 4 days ago                              louxe-open-api-v52
764c1db8b5d8        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v49  "java -jar /louxe-op…"   4 days ago          Exited (143) 4 days ago                              louxe-open-api-v49
2a1525ae76dc        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v50  "java -jar /louxe-op…"   4 days ago          Exited (143) 4 days ago                              louxe-open-api-v50
614e4b3e4370        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v46  "java -jar /louxe-op…"   4 days ago          Exited (143) 4 hours ago                             louxe-open-api-v46
9081cb01340a        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v45  "java -jar /louxe-op…"   4 days ago          Exited (143) 4 days ago                              louxe-open-api-v45
2a18984e8bc5        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v44  "java -jar /louxe-op…"   7 days ago          Exited (143) 4 days ago                              louxe-open-api-v44
46afcb0b9e08        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v42  "java -jar /louxe-op…"   7 days ago          Exited (143) 7 days ago                              louxe-open-api-v42
17f71025659d        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v41  "java -jar /louxe-op…"   7 days ago          Exited (143) 7 days ago                              louxe-open-api-v41
c35ca06855ef        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v40  "java -jar /louxe-op…"   7 days ago          Exited (143) 7 days ago                              louxe-open-api-v40
0473ae293f06        172.16.6.32:5000/lx2/louxe-open-api-oracle-jdk:v39  "java -jar /louxe-op…"   7 days ago          Exited (143) 7 days ago                              louxe-open-api-v39
[root@docker03 louxe-open-api]#
```

启动容器时，要按照规律进行命名，这样便于回滚。ansible-playbook 脚本配置保留最近的 30 个镜像、最近 30 个容器，用于回滚。如果更早的版本，会自动到镜像仓库拉取并重新生成容器。

6.4 私仓观察



只要磁盘空间够用，可保留很多镜像文件。

至此，结束!