

暨南大学本科实验报告专用纸

课程名称 云计算实验 成绩评定
实验项目名称 镜像服务 Glance 的安装、配置，镜像构建
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10.1 实验目的

完成 OpenStack 镜像服务——Glance 的安装、配置；完成镜像构建。

10.2 实验内容

- 镜像服务 Glance 的安装与配置
- 镜像构建

10.3 实验步骤

10.3.1 创建数据库

10.3.1.1 以 root 用户进入 mysql 数据库(本环境中 MYSQL 数据库的默认密码为 123456)

```
mysql -u root -p123456
```

```
root@controller:~# mysql -u root -p123456
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 36
Server version: 10.3.37-MariaDB-0ubuntu0.20.04.1 Ubuntu 20.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> █
```

10.3.1.2 创建 glance 数据库

```
CREATE DATABASE glance;
```

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```
MariaDB [(none)]> CREATE DATABASE glance;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> █
```

10.3.1.3 授予对 glance 数据库的适当访问权限（替换 123456 为你想设置的密码并记住）

```
GRANT ALL PRIVILEGES ON glance.* TO 'glance'@'localhost' IDENTIFIED BY '123456';
GRANT ALL PRIVILEGES ON glance.* TO 'glance'@'%' IDENTIFIED BY '123456';
```

```
MariaDB [(none)]> GRANT ALL PRIVILEGES ON glance.* TO 'glance'@'localhost' IDENTIFIED BY '123456';
Query OK, 0 rows affected (0.092 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON glance.* TO 'glance'@'%' IDENTIFIED BY '123456';
Query OK, 0 rows affected (0.000 sec)

MariaDB [(none)]> █
```

10.3.1.4 退出数据库命令终端

```
exit;
```

```
MariaDB [(none)]> exit
Bye
root@controller:~# █
```

10.3.2. 获取管理员凭据

10.3.2.1 导入之前创建的 admin-openrc 文件中的环境变量，获取管理员凭据（注意命令前面有个“.”）

```
. admin-openrc
```

10.3.3 创建服务凭证

10.3.3.1 创建 glance 用户

```
openstack user create --domain default --password-prompt glance
```

```
root@controller:~# . admin-openrc
root@controller:~# openstack user create --domain default --password-prompt glance
User Password:
Repeat User Password:
+-----+-----+
| Field | Value |
+-----+-----+
| domain_id | default |
| enabled | True |
| id | b05fac5bc0924c63a27b181531c1d913 |
| name | glance |
| options | {} |
| password_expires_at | None |
+-----+-----+
root@controller:~# █
```

10.3.3.2 将 admin 角色添加到 glance 用户和 service 项目（该命令无输出信息）

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```
openstack role add --project service --user glance admin
```

10.3.3.3 创建 glance 服务实体

```
openstack service create --name glance --description "OpenStack Image" image
```

```
root@controller:~# openstack role add --project service --user glance admin
root@controller:~# openstack service create --name glance --description "OpenStack Image" image
+-----+
| Field | Value |
+-----+
| description | OpenStack Image |
| enabled | True |
| id | 02afaca1f07843ae93c31be929442261 |
| name | glance |
| type | image |
+-----+
root@controller:~#
```

10.3.4 创建图像服务 API 端点

```
openstack endpoint create --region RegionOne image public http://controller:9292;
```

```
openstack endpoint create --region RegionOne image internal http://controller:9292;
```

```
openstack endpoint create --region RegionOne image admin http://controller:9292;
```

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```
root@controller:~# openstack endpoint create --region RegionOne image public http://controller:9292;
```

Field	Value
enabled	True
id	497b4a46698940fe9218a05725a8d3e5
interface	public
region	RegionOne
region_id	RegionOne
service_id	02afaca1f07843ae93c31be929442261
service_name	glance
service_type	image
url	http://controller:9292

```
root@controller:~# openstack endpoint create --region RegionOne image internal http://controller:9292;
```

Field	Value
enabled	True
id	f8a72c70b9994366b6b407838cdb6ac1
interface	internal
region	RegionOne
region_id	RegionOne
service_id	02afaca1f07843ae93c31be929442261
service_name	glance
service_type	image
url	http://controller:9292

```
root@controller:~# openstack endpoint create --region RegionOne image admin http://controller:9292;
```

Field	Value
enabled	True
id	419ed6f665a546a59f067a91bb343a7e
interface	admin
region	RegionOne
region_id	RegionOne
service_id	02afaca1f07843ae93c31be929442261
service_name	glance
service_type	image
url	http://controller:9292

10.3.5 安装和配置 glance 组件

10.3.5.1 安装软件包（执行命令，输入 y 执行安装）

```
apt install glance
```

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```
Setting up python3-taskflow (4.1.0-0ubuntu1) ...
Setting up os-brick-common (3.0.8-0ubuntu1) ...
Setting up python3-simplegeneric (0.8.1-3) ...
Setting up python3-suds (0.8.4-1) ...
Setting up python3-swiftclient (1:3.9.0-0ubuntu1.2) ...
Setting up python3-castellan (3.0.1-0ubuntu1) ...
Setting up python3-oslo.vmware (3.3.1-0ubuntu1) ...
Setting up python3-oslo.reports (2.0.1-0ubuntu1) ...
Setting up liblapack3:amd64 (3.9.0-1build1) ...
update-alternatives: using /usr/lib/x86_64-linux-gnu/lapack/liblapack.so.3 to provide /usr/lib/x86_64-linux-gnu/liblapack.so.3 (liblapack.so.3-x86_64-linux-gnu) in auto mode
Setting up python3-wsme (0.9.3-3) ...
Setting up python3-cffi (1.14.0-1build1) ...
Setting up python3-numpy (1:1.17.4-5ubuntu3) ...
Setting up python3-oslo.privsep (2.1.1-0ubuntu1) ...
Setting up python3-cursive (0.2.2-2) ...
Setting up python3-os-brick (3.0.8-0ubuntu1) ...
Setting up python3-glance-store (2.0.0-0ubuntu3) ...
Setting up python3-glance (2:20.2.0-0ubuntu1) ...
Setting up glance-api (2:20.2.0-0ubuntu1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/glance-api.service → /lib/systemd/system/glance-api.service.
Setting up glance (2:20.2.0-0ubuntu1) ...
Processing triggers for systemd (245.4-4ubuntu3.18) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...
root@controller:~#
```

10.3.5.2 修改 glance 配置文件 glance-api.conf

1)备份原有配置文件

```
cp /etc/glance/glance-api.conf /etc/glance/glance-api.conf.bak
```

2)去除注释文字（只为方便集中查看配置，可不执行）

```
grep -Ev '^$|#' /etc/glance/glance-api.conf.bak > /etc/glance/glance-api.conf
```

3)打开配置文件

```
vi /etc/glance/glance-api.conf
```

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```
root@controller:~# cat /etc/glance/glance-api.conf
[DEFAULT]
[cinder]
[cors]
[database]
connection = mysql+pymysql://glance:123456@controller/glance
backend = sqlalchemy
[file]
[glance.store.http.store]
[glance.store.rbd.store]
[glance.store.s3.store]
[glance.store.swift.store]
[glance.store.vmware_datastore.store]
[glance_store]
stores = file,http
default_store = file
filesystem_store_datadir = /var/lib/glance/images/
[image_format]
disk_formats = ami,ari,aki,vhd,vhdx,vmdk,raw,qcow2,vdi,iso,ploop.root-tar
[keystone_authtoken]
#auth_uri已经被弃用, 使用www_authenticate_uri替代
www_authenticate_uri = http://controller:5000
auth_url = http://controller:5000
memcached_servers = controller:11211
auth_type = password
project_domain_name = Default
user_domain_name = Default
project_name = service
username = glance
password = 123456
[oslo_concurrency]
[oslo_messaging_amqp]
[oslo_messaging_kafka]
[oslo_messaging_notifications]
[oslo_messaging_rabbit]
[oslo_middleware]
[oslo_policy]
[paste_deploy]
flavor = keystone
[profiler]
[store_type_location_strategy]
[task]
[taskflow_executor]
root@controller:~#
```

10.3.5.4 填充 glance 服务数据库（确保之前步骤没有出错!!）

```
su -s /bin/sh -c "glance-manage db_sync" glance
```

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```
root@controller:~# su -s /bin/sh -c "glance-manage db_sync" glance
2022-12-01 15:15:46.266 5776 INFO alembic.runtime.migration [-] Context impl MySQLImpl.
2022-12-01 15:15:46.266 5776 INFO alembic.runtime.migration [-] Will assume non-transactional DDL.
2022-12-01 15:15:46.290 5776 INFO alembic.runtime.migration [-] Context impl MySQLImpl.
2022-12-01 15:15:46.290 5776 INFO alembic.runtime.migration [-] Will assume non-transactional DDL.
INFO [alembic.runtime.migration] Context impl MySQLImpl.
INFO [alembic.runtime.migration] Will assume non-transactional DDL.
/usr/lib/python3/dist-packages/pymysql/cursors.py:170: Warning: (1280, "Name 'alembic_version_pkc' ignored for PRIMARY key.")
result = self._query(query)
INFO [alembic.runtime.migration] Running upgrade → liberty, liberty initial
INFO [alembic.runtime.migration] Running upgrade liberty → mitaka01, add index on created_at and updated_at columns of 'images' table
INFO [alembic.runtime.migration] Running upgrade mitaka01 → mitaka02, update metadata os_nova_server
INFO [alembic.runtime.migration] Running upgrade mitaka02 → ocata_expand01, add visibility to images
INFO [alembic.runtime.migration] Running upgrade ocata_expand01 → pike_expand01, empty expand for symmetry with pike_contract01
INFO [alembic.runtime.migration] Running upgrade pike_expand01 → queens_expand01
INFO [alembic.runtime.migration] Running upgrade queens_expand01 → rocky_expand01, add os_hidden column to images table
INFO [alembic.runtime.migration] Running upgrade rocky_expand01 → rocky_expand
02, add os_hash_algo and os_hash_value columns to images table
INFO [alembic.runtime.migration] Running upgrade rocky_expand02 → train_expand
01, empty expand for symmetry with train_contract01
INFO [alembic.runtime.migration] Running upgrade train_expand01 → ussuri_expand
d01, empty expand for symmetry with ussuri_contract01
INFO [alembic.runtime.migration] Context impl MySQLImpl.
INFO [alembic.runtime.migration] Will assume non-transactional DDL.
Upgraded database to: ussuri_expand01, current revision(s): ussuri_expand01
INFO [alembic.runtime.migration] Context impl MySQLImpl.
INFO [alembic.runtime.migration] Will assume non-transactional DDL.
INFO [alembic.runtime.migration] Context impl MySQLImpl.
INFO [alembic.runtime.migration] Will assume non-transactional DDL.
Database migration is up to date. No migration needed.
INFO [alembic.runtime.migration] Context impl MySQLImpl.
INFO [alembic.runtime.migration] Will assume non-transactional DDL.
INFO [alembic.runtime.migration] Context impl MySQLImpl.
INFO [alembic.runtime.migration] Will assume non-transactional DDL.
INFO [alembic.runtime.migration] Running upgrade mitaka02 → ocata_contract01,
remove is_public from images
INFO [alembic.runtime.migration] Running upgrade ocata_contract01 → pike_contr
act01, drop glare artifacts tables
INFO [alembic.runtime.migration] Running upgrade pike_contract01 → queens_con
tract01
INFO [alembic.runtime.migration] Running upgrade queens_contract01 → rocky_con
tract01
INFO [alembic.runtime.migration] Running upgrade rocky_contract01 → rocky_con
tract02
INFO [alembic.runtime.migration] Running upgrade rocky_contract02 → train_con
tract01
INFO [alembic.runtime.migration] Running upgrade train_contract01 → ussuri_con
tract01
INFO [alembic.runtime.migration] Context impl MySQLImpl.
INFO [alembic.runtime.migration] Will assume non-transactional DDL.
Upgraded database to: ussuri_contract01, current revision(s): ussuri_contract01
INFO [alembic.runtime.migration] Context impl MySQLImpl.
INFO [alembic.runtime.migration] Will assume non-transactional DDL.
Database is synced successfully.
```

10.3.5.5 重启服务（无输出）

service glance-api restart

10.3.5.6 查看 glance-api 服务状态

service glance-api status

```
root@controller:~# service glance-api status
● glance-api.service - OpenStack Image Service API
   Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2022-12-01 15:16:27 CST; 13s ago
     Main PID: 5843 (glance-api)
       Tasks: 5 (limit: 4584)
      Memory: 100.8M
      CGroup: /system.slice/glance-api.service
              └─5843 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log
                  └─5869 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log
                      └─5870 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log
                          └─5871 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log
                              └─5872 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log

Dec 01 15:16:27 controller systemd[1]: Started OpenStack Image Service API.
```

10.3.5.7 测试是否可以正常访问

在宿主浏览器中访问 controller 的 9292 端口服务



10.3.6 验证 glance 服务

10.3.6.1 获取管理员凭据以访问仅限管理员的 CLI 命令

source ~/admin-openrc

10.3.6.2 下载镜像

wget http://download.cirros-cloud.net/0.4.0/cirros-0.4.0-x86_64-disk.img

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```
root@controller:~# wget http://download.cirros-cloud.net/0.4.0/cirros-0.4.0-x86_64-disk.img
--2022-12-01 15:34:47-- http://download.cirros-cloud.net/0.4.0/cirros-0.4.0-x86_64-disk.img
Resolving download.cirros-cloud.net (download.cirros-cloud.net) ... 64.90.42.85, 2607:f298:6:a036::bd6:a72a
Connecting to download.cirros-cloud.net (download.cirros-cloud.net)|64.90.42.85|:80 ... connected.
HTTP request sent, awaiting response ... 302 Found
Location: https://github.com/cirros-dev/cirros/releases/download/0.4.0/cirros-0.4.0-x86_64-disk.img [following]
--2022-12-01 15:34:47-- https://github.com/cirros-dev/cirros/releases/download/0.4.0/cirros-0.4.0-x86_64-disk.img
Resolving github.com (github.com) ... 20.205.243.166
Connecting to github.com (github.com)|20.205.243.166|:443 ... connected.
HTTP request sent, awaiting response ... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/219785102/b2074f00-411a-11ea-9620-afb551cf9af3?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWNJYAX4CSVEH53A%2F20221201%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20221201T073448Z&X-Amz-Expires=300&X-Amz-Signature=d4ecec2740dcbe4c7f0871b7594fa127aa633f2003ffdf9889dad9ba0597b1c&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=219785102&response-content-disposition=attachment%3B%20filename%3Dcirros-0.4.0-x86_64-disk.img&response-content-type=application%2Foctet-stream [following]
--2022-12-01 15:34:49-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/219785102/b2074f00-411a-11ea-9620-afb551cf9af3?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWNJYAX4CSVEH53A%2F20221201%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20221201T073448Z&X-Amz-Expires=300&X-Amz-Signature=d4ecec2740dcbe4c7f0871b7594fa127aa633f2003ffdf9889dad9ba0597b1c&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=219785102&response-content-disposition=attachment%3B%20filename%3Dcirros-0.4.0-x86_64-disk.img&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com) ... 185.199.108.133, 185.199.109.133, 185.199.110.133
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.108.133|:443 ... connected.
HTTP request sent, awaiting response ... 200 OK
Length: 12716032 (12M) [application/octet-stream]
Saving to: 'cirros-0.4.0-x86_64-disk.img'

cirros-0.4.0-x86_64 100%[=====>] 12.13M 3.69MB/s in 3.3s

2022-12-01 15:34:53 (3.69 MB/s) - 'cirros-0.4.0-x86_64-disk.img' saved [12716032/12716032]
```

10.3.6.3 查看下载的镜像

ls -l

```
root@controller:~# ls -l
total 12436
-rw-r--r-- 1 root root      261 Nov 28 18:16 admin-openrc
-rw-r--r-- 1 root root 12716032 Dec  7 2021 cirros-0.4.0-x86_64-disk.img
-rw-r--r-- 1 root root      273 Nov 28 17:57 keystone_admin
-rw-r--r-- 1 root root      266 Nov 28 18:17 myuser-openrc
drwxr-xr-x 3 root root    4096 Feb  6 2021 snap
root@controller:~#
```

10.3.6.4 查看 openstack image 镜像操作帮助

openstack image -h

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```
root@controller:~# openstack image -h
openstack: 'image -h' is not an openstack command. See 'openstack --help'.
Did you mean one of these?
  image add project
  image create
  image delete
  image list
  image member list
  image remove project
  image save
  image set
  image show
  image unset
  usage list
  usage show
root@controller:~#
```

10.3.6.5 创建镜像，将镜像上传到 GLANCE 镜像服务，设置 QCOW2 磁盘格式、bare 容器格式和公开可见，以便所有项目都可以访问它

```
glance image-create --name "cirros" \
  --file cirros-0.4.0-x86_64-disk.img \
  --disk-format qcow2 --container-format bare \
  --visibility=public
- container-format <容器格式>
```

图像容器格式。支持的选项有：ami、ari、aki、bare、docker、ova、ovf。默认格式为：bare

- disk-format <磁盘格式>

映像磁盘格式。支持的选项有：ami、ari、aki、vhd、vmdk、raw、qcow2、vhdx、vdi、iso、ploop。默认格式为：raw

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```
root@controller:~# glance image-create --name "cirros" \
> --file cirros-0.4.0-x86_64-disk.img \
> --disk-format qcow2 --container-format bare \
> --visibility=public
+-----+
| Property | Value |
+-----+
| checksum | 443b7623e27ecf03dc9e01ee93f67afe |
| container_format | bare |
| created_at | 2022-12-01T07:36:49Z |
| disk_format | qcow2 |
| id | f6e79efc-4db9-4167-9b2b-3ad57f3dad8f |
| min_disk | 0 |
| min_ram | 0 |
| name | cirros |
| os_hash_algo | sha512 |
| os_hash_value | 6513f21e44aa3da349f248188a44bc304a3653a04122d8fb4535423c8e1d14cd6a153f735bb0982e |
| os_hidden | False |
| owner | 3ddfe4b9e5b14e2fbea2958c3d44525b |
| protected | False |
| size | 12716032 |
| status | active |
| tags | [] |
| updated_at | 2022-12-01T07:36:52Z |
| virtual_size | Not available |
| visibility | public |
+-----+
```

10.3.6.6 查看上传的镜像列表信息

openstack image list

```
root@controller:~# openstack image list
+-----+-----+-----+
| ID | Name | Status |
+-----+-----+-----+
| f6e79efc-4db9-4167-9b2b-3ad57f3dad8f | cirros | active |
+-----+-----+-----+
root@controller:~# █
```

10.3.6.7 查看镜像详细信息

openstack image show cirros

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```
root@controller:~# openstack image show cirros
+-----+-----+
| Field           | Value                                     |
+-----+-----+
| checksum        | 443b7623e27ecf03dc9e01ee93f67afe       |
| container_format | bare                                     |
| created_at      | 2022-12-01T07:36:49Z                   |
| disk_format     | qcow2                                  |
| file            | /v2/images/f6e79efc-4db9-4167-9b2b-3ad57f3dad8f/file |
| id              | f6e79efc-4db9-4167-9b2b-3ad57f3dad8f   |
| min_disk        | 0                                       |
| min_ram         | 0                                       |
| name            | cirros                                 |
| owner           | 3ddfe4b9e5b14e2fbea2958c3d44525b     |
| properties      | os_hash_algo='sha512', os_hash_value='6513f21e44aa3da349f248188a44bc304a3653a04122d8fb4535423c8e1d14cd6a153f735bb0982e2161b5b5186106570c17a9e58b64dd39390617cd5a350f78', os_hidden='False' |
| protected       | False                                  |
| schema          | /v2/schemas/image                    |
| size            | 12716032                               |
| status          | active                                 |
| tags            |                                         |
| updated_at      | 2022-12-01T07:36:52Z                   |
```

10.3.6.8 查看 image set 可选参数

openstack image set --h

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```
root@controller:~# openstack image set -h
usage: openstack image set [-h] [--name <name>] [--min-disk <disk-gb>]
                             [--min-ram <ram-mb>]
                             [--container-format <container-format>]
                             [--disk-format <disk-format>]
                             [--protected | --unprotected]
                             [--public | --private | --community | --shared]
                             [--property <key=value>] [--tag <tag>]
                             [--architecture <architecture>]
                             [--instance-id <instance-id>]
                             [--kernel-id <kernel-id>] [--os-distro <os-distro>]
                             [--os-version <os-version>]
                             [--ramdisk-id <ramdisk-id>]
                             [--deactivate | --activate] [--project <project>]
                             [--project-domain <project-domain>]
                             [--accept | --reject | --pending]
                             <image>
```

10.3.6.9 修改镜像参数（修改镜像名称）

```
openstack image set --name cirros2 cirros
```

```
root@controller:~# openstack image set --name cirros2 cirros
root@controller:~# openstack image list
+-----+-----+-----+
| ID                  | Name    | Status |
+-----+-----+-----+
| f6e79efc-4db9-4167-9b2b-3ad57f3dad8f | cirros2 | active |
+-----+-----+-----+
root@controller:~#
```

10.3.6.10 查看镜像 ID

```
openstack image list
```

10.3.6.11 删除上传的镜像（可根据镜像 ID 或 Name 删除如果存在多个同名镜像，必须用 ID 删除，否则报错）

```
openstack image delete IMG_ID
```

把 IMG_ID 换成自己实验环境中的镜像 ID

10.3.6.12 查看镜像是否还在

```
openstack image list
```

```
root@controller:~# openstack image list
+-----+-----+-----+
| ID                  | Name    | Status |
+-----+-----+-----+
| f6e79efc-4db9-4167-9b2b-3ad57f3dad8f | cirros2 | active |
+-----+-----+-----+
root@controller:~# openstack image list
+-----+-----+-----+
| ID                  | Name    | Status |
+-----+-----+-----+
| f6e79efc-4db9-4167-9b2b-3ad57f3dad8f | cirros2 | active |
+-----+-----+-----+
root@controller:~# openstack image delete IMG_ID
Failed to delete image with name or ID 'IMG_ID': No Image found for IMG_ID
Failed to delete 1 of 1 images.
root@controller:~# openstack image delete f6e79efc-4db9-4167-9b2b-3ad57f3dad8f
root@controller:~# openstack image list
root@controller:~#
```

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实验问题与解决

本次实验是镜像服务 **Glance** 的安装、配置，镜像构建，在安装、配置过程中，因网络配置问题，无法下载镜像，修改网络/etc/sysctl.conf 之后问题得以解决。。