[Edit](http://maxiang.info/#/?provider=evernote&guid=49234c5e-89d2-43fc-be63-b81ef0e10685&notebook=%E4%BA%91%E8%AE%A1%E7%AE%97)

#openstack 安装部署

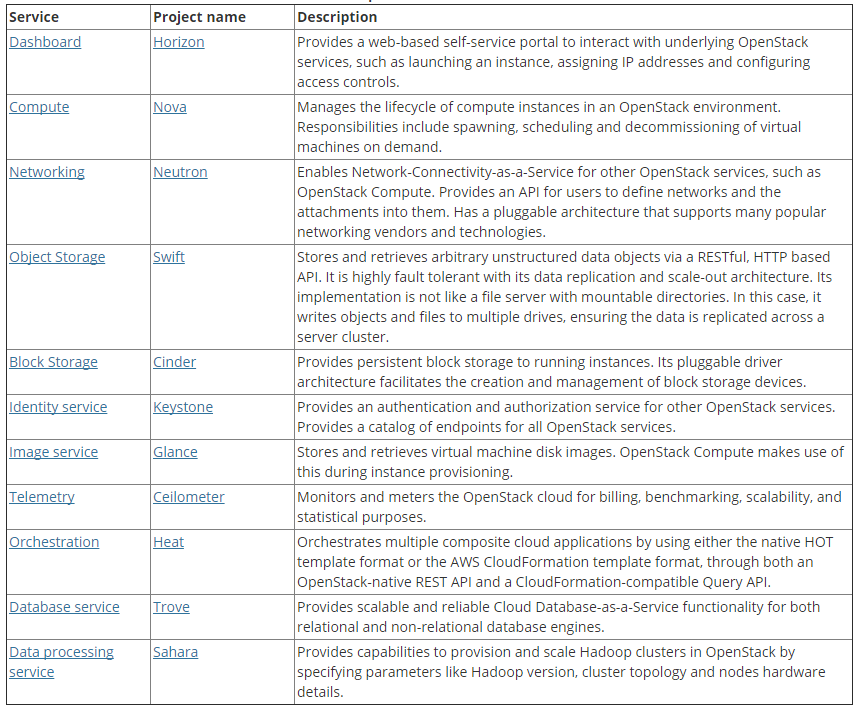
云计算 openstack

## openstack 介绍

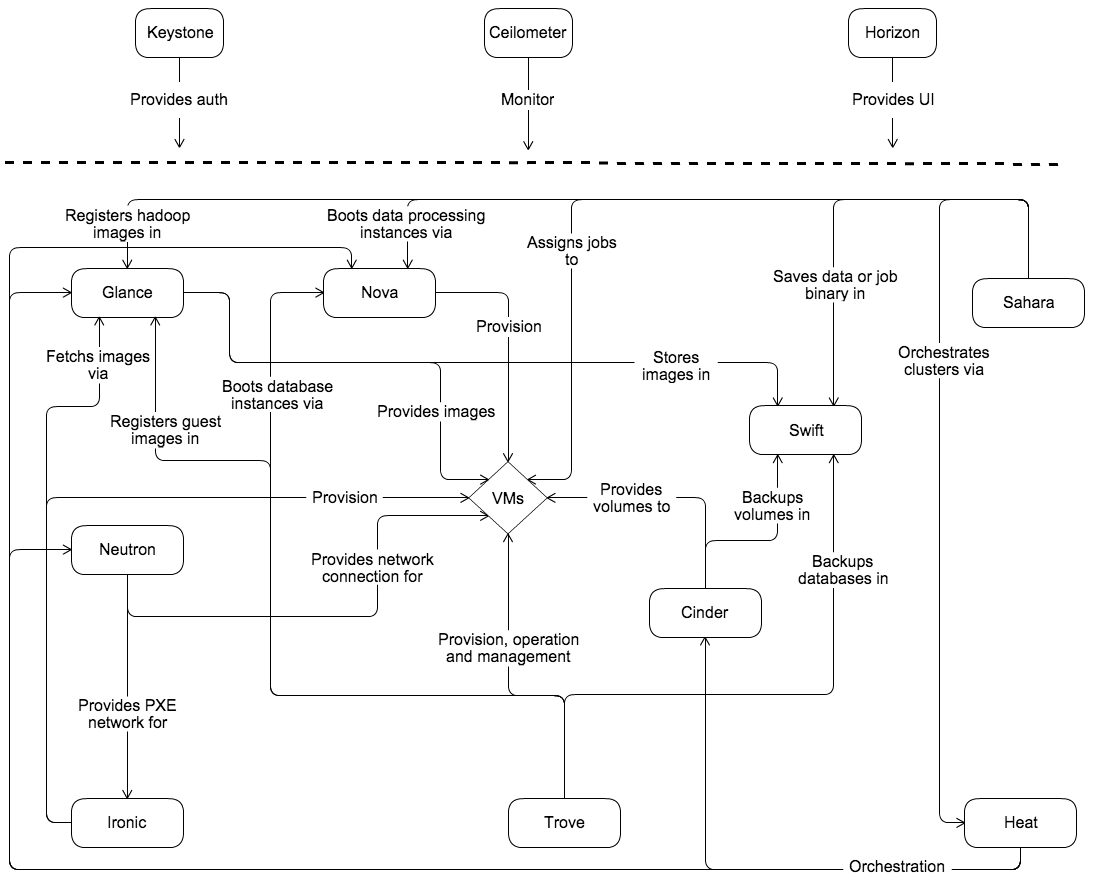
The OpenStack project is an open source cloud computing platform for all types of clouds, which aims to be simple to implement, massively scalable, and feature rich. Developers and cloud computing technologists from around the world create the OpenStack project.

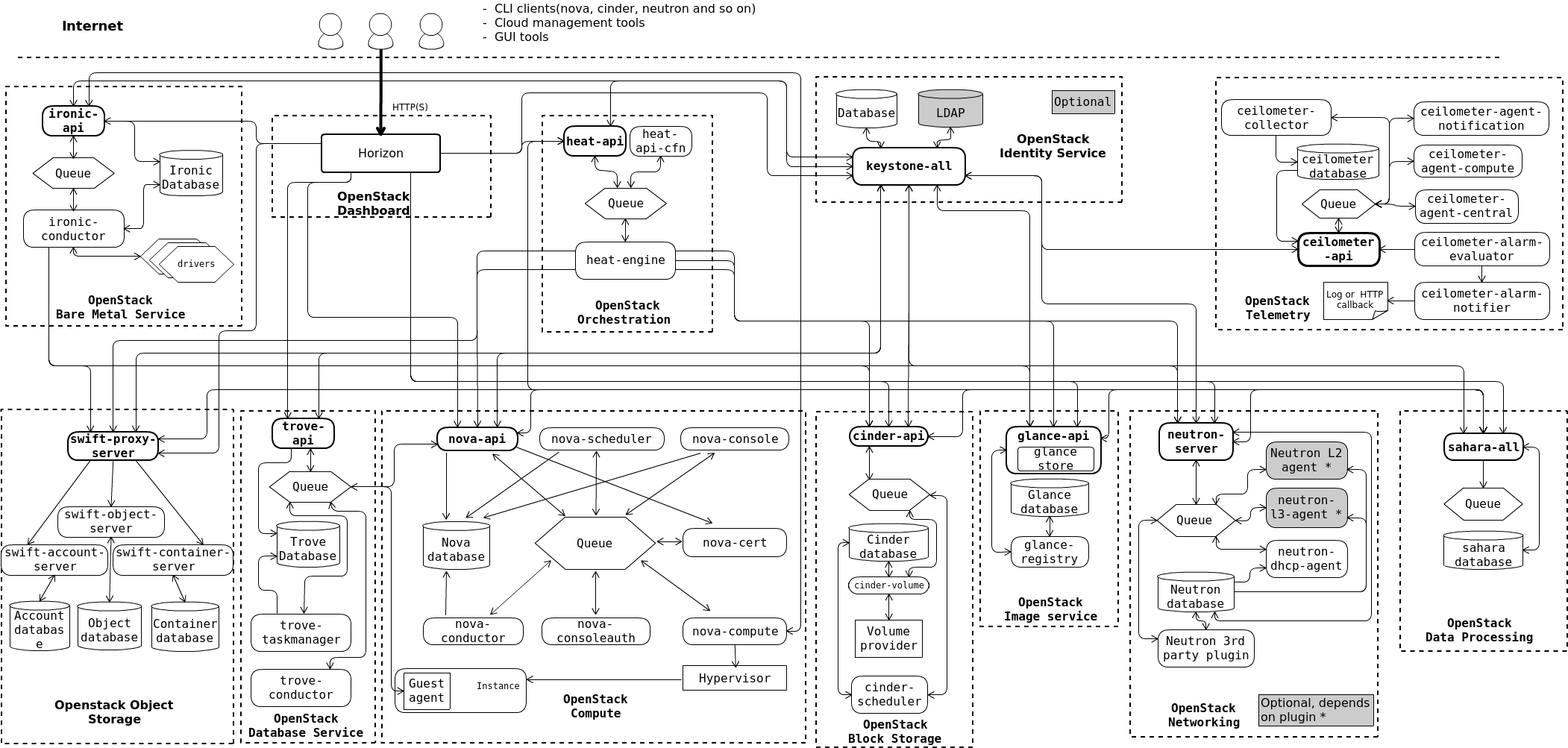
OpenStack provides an Infrastructure-as-a-Service (IaaS) solution through a set of interrelated services. Each service offers an application programming interface (API) that facilitates this integration. Depending on your needs, you can install some or all services.

The following table describes the OpenStack services that make up the OpenStack architecture:



下面是openstack架构，感兴趣的可以看官网介绍





<http://docs.openstack.org/admin-guide/common/get-started-with-openstack.html>

注意以下内容都需要使用epel源，和openstack-mitake源所以没有epel源的一定要加着

wget -O /etc/yum.repos.d/epel.repo http://mirrors.aliyun.com/repo/epel-7.repo

yum install -y python-openstackclient

yum install -y openstack-selinux

## 数据库

对于glance, keystone, neutron, nova 都都使用mysql来存储数据，所以首先创建对应数据库并且赋予对应用户权限

安装mysql yum install -y mariadb mariadb-server python2-PyMySQL

在*\* /etc/my.cnf.d/openstack.cnf \** 里增加配置

[mysqld]

bind-address = 192.168.56.11

efault-storage-engine = innodb

innodb\_file\_per\_table

max\_connections = 4096

collation-server = utf8\_general\_ci

character-set-server = utf8

加入开机启动，并启动mysql

systemctl enable mariadb.service

systemctl start mariadb.service

mysql\_secure\_installation

创建数据库

**MariaDB** [(none)]> create database keystone;

**MariaDB** [(none)]> create database glance;

**MariaDB** [(none)]> create database nova;

**MariaDB** [(none)]> create database nova\_api;

**MariaDB** [(none)]> create database neutron;

**MariaDB** [(none)]> grant all on keystone.\* to 'keystone'@'localhost' identified by 'keystone';

**MariaDB** [(none)]> grant all on keystone.\* to 'keystone'@'%' identified by 'keystone';

**MariaDB** [(none)]> grant all on glance.\* to 'glance'@'%' identified by 'glance';

**MariaDB** [(none)]> grant all on glance.\* to 'glance'@'localhost' identified by 'glance';

**MariaDB** [(none)]> grant all on nova.\* to 'nova'@'localhost' identified by 'nova';

**MariaDB** [(none)]> grant all on nova.\* to 'nova'@'%' identified by 'nova';

**MariaDB** [(none)]> grant all on nova\_api.\* to 'nova'@'%' identified by 'nova';

**MariaDB** [(none)]> grant all on nova\_api.\* to 'nova'@'localhost' identified by 'nova';

**MariaDB** [(none)]> grant all on neutron.\* to 'neutron'@'localhost' identified by 'neutron';

**MariaDB** [(none)]> grant all on neutron.\* to 'neutron'@'%' identified by 'neutron';

## nosql

安装memcached

yum install -y memcached python-memcached

[root@linux-node1 /etc/keystone/fernet-keys]# cat /etc/sysconfig/memcached

PORT=”11211”

USER=”memcached”

MAXCONN=”1024”

CACHESIZE=”64”

OPTIONS=”“

## 消息队列

openstack 使用消息队列来并行操作并且提供服务状态。消息队列需要运行在控制节点，openstack支持的消息队列有 rabbitmq, qpid, zeromq.这里我们使用rabbitmq。

安装rabbit-mq

yum install -y rabbitmq-server

启动服务,并且加入开机自启动

systemctl enable rabbitmq-**server**.service

systemctl start rabbitmq-**server**.service

增加openstack用户,前面是用户，后面是密码,并且赋予配置，读，写权限

rabbitmqctl add\_user openstack openstack

rabbitmq-plugins **enable** rabbitmq\_management #启用管理插件

rabbitmqctl **set**\_permissions openstack ".\*" ".\*" ".\*"

rabbitmq一共战胜三个端口

* 5672
* 15672
* 25672

<http://192.168.56.11:15672/> 这样便可以进行rabbitmq管理界面了

## 认证服务kistone

openstack认证服务提供了单独的认证，授权以及服务目录服务。别的openstack服务将身份谁服务当做通用统一API来使用。

这个认证服务包含三个组件

* server 一个中心化的服务器使用restful接口来提供认证和授权服务
* drivers 驱动或者服务后端整合进集中式服务器中，它们被用来访问opentack外部仓库的身份信息。
* Modules 中间件模块使用认证服务的openstack地址空间中。这些拦截服务请求，取出用户凭据。并将它们送入中央服务器妹求授权。

#生成管理员临时令牌

[root@linux-node1 ~]# openssl rand -hex 10

ea4023f4cda22172f8ff

安装keystone yum install openstack-keystone httpd mod\_wsgi

配置**/etc/keystone/keystone.conf**

**[DEFFAULT]**

admin\_token = ea4023f4cda22172f8ff

**[DATABASE]**

connection = mysql+pymysql://keystone:keystone@192.168.56.11/keystone

**[memcache]**

servers = 192.168.56.11:11211

**[token]**

provider = fernet

driver = memcache

mysql格式是 mysql+pymysql://USER:USER\_PASS@HOST/DATABASE

以后都是这样的写法

4 初始化认证数据

su -s /bin/sh -c "keystone-manage db\_sync" keystone

5 初始化fernet keys

keystone-manage fernet\_setup --keystone-user keystone --keystone-group keystone

在/etc/keystone/ 下创建一个目录fenet\_key 注意权限

6: 配置apache 服务器。

在**/etc/httpd/httpd.conf** 下修改ServerName

ServerName 192.168.56.11

并且在*\* /etc/httpd/conf.d/wsgi-keystone.conf\** 下面增加下面内容

Listen 5000

Listen 35357

<VirtualHost \*:5000>

WSGIDaemonProcess keystone-public processes=5 threads=1 user=keystone group=keystone display-name=%{GROUP}

WSGIProcessGroup keystone-public

WSGIScriptAlias / /usr/bin/keystone-wsgi-public

WSGIApplicationGroup %{GLOBAL}

WSGIPassAuthorization On

ErrorLogFormat "%{cu}t %M"

ErrorLog /var/log/httpd/keystone-error.log

CustomLog /var/log/httpd/keystone-access.log combined

<Directory /usr/bin>

Require all granted

</Directory>

</VirtualHost>

<VirtualHost \*:35357>

WSGIDaemonProcess keystone-admin processes=5 threads=1 user=keystone group=keystone display-name=%{GROUP}

WSGIProcessGroup keystone-admin

WSGIScriptAlias / /usr/bin/keystone-wsgi-admin

WSGIApplicationGroup %{GLOBAL}

WSGIPassAuthorization On

ErrorLogFormat "%{cu}t %M"

ErrorLog /var/log/httpd/keystone-error.log

CustomLog /var/log/httpd/keystone-access.log combined

<Directory /usr/bin>

Require all granted

</Directory>

</VirtualHost>

启动httpd

**systemctl** **enable** **httpd**.service

**systemctl** **start** **httpd**.service

基本上keystone就完成安装咯。

因为默认情况下认证服务数据库不提供任何常规的认证服务和目录服务，所以需要使用临时认证为认证服务初始化 entity and api endpoint

首先设置环境变量

**export** OS\_TOKEN=ea4023f4cda22172f8ff

**export** OS\_URL=http://192.168.56.11:35357/v3

**export** OS\_IDENTITY\_API\_VERSION=3

1. 创建域default openstack domain create --description "Default Domain" default
2. 创建admin 项目并且赋予管理权限openstack project create --domain default --description "Admin Project" admin
3. 创建 admin用户 openstack user create --domain default --password-prompt admin 需要输两次密码
4. 创建admin 规则 openstack role create admin
5. 把admin 规则 增加到 admin项目中 openstack role add --project admin --user admin admin

openstack project create --domain default --description "Service Project" service

openstack project create --domain default --description "Demo Project" demo

openstack **user** **create** --domain default --password-prompt demo

openstack **role** **create** **user**

**openstack** **role** **add** --project demo --**user** **demo** **user**

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

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

openstack **user** **create** --domain default --password-prompt nova

openstack **role** **add** --project service --**user** **nova** admin

openstack **user** **create** --domain default --password-prompt neutron

openstack **role** **add** --project service --**user** **neutron** admin

创建 *\* service entity and API endpoints \**

1 在认证服务中创建服务实体(service entity)

openstack service create \

--name keystone --description "OpenStack Identity" identity

2 创建API endpoints

openstack用户拥有三个API endpoint：admin public internal.

admin Api endpoint允许管理和修改用户和租户但其它两个就不行。

openstack endpoint create --region RegionOne identity public http://192.168.56.11:5000/v3

openstack endpoint create --region RegionOne identity internal http://192.168.56.11:5000/v3

openstack endpoint create --region RegionOne identity admin http://192.168.56.11:35357/v3

3 创建完成后便可以验证下操作然后把临时授权关闭

$ unset OS\_TOKEN OS\_URL

$ openstack --os-auth-url http://controller:35357/v3 \

--os-project-domain-**name** **default** --os-user-domain-**name** **default** \

--os-project-**name** admin --os-username admin token issue

输入密码，如果有数据，说明到目操作OK。接下来就创建一个授权脚本**admin-openrc**以后每次使用openstach这个命令都需要**source admin-openrc**

**export** OS\_PROJECT\_DOMAIN\_NAME=**default**

**export** OS\_USER\_DOMAIN\_NAME=**default**

**export** OS\_PROJECT\_NAME=admin

**export** OS\_USERNAME=admin

**export** OS\_PASSWORD=admin

**export** OS\_AUTH\_URL=http://controller:35357/v3

**export** OS\_IDENTITY\_API\_VERSION=3

**export** OS\_IMAGE\_API\_VERSION=2

再创建一个demo的授权脚本。**demo-openr**

**export** OS\_PROJECT\_DOMAIN\_NAME=**default**

**export** OS\_USER\_DOMAIN\_NAME=**default**

**export** OS\_PROJECT\_NAME=demo

**export** OS\_USERNAME=demo

**export** OS\_PASSWORD=demo

**export** OS\_AUTH\_URL=http://controller:5000/v3

**export** OS\_IDENTITY\_API\_VERSION=3

**export** OS\_IMAGE\_API\_VERSION=2

检查一下admin授权是否成功

**source** admin-openr

openstack token issue

## 镜像服务glance

* glance-api   
  Accepts Image API calls for image discovery, retrieval, and storage.
* glance-registry   
  Stores, processes, and retrieves metadata about images. Metadata includes items such as size and type.
* Database   
  Stores image metadata and you can choose your database depending on your preference. Most deployments use MySQL or SQLite.
* Storage repository for image files   
  Various repository types are supported including normal file systems, Object Storage, RADOS block devices, HTTP, and Amazon S3. Note that some repositories will only support read-only usage.
* Metadata definition service   
  A common API for vendors, admins, services, and users to meaningfully define their own custom metadata. This metadata can be used on different types of resources like images, artifacts, volumes, flavors, and aggregates. A definition includes the new property’s key, description, constraints, and the resource types which it can be associated with.

安装glance yum install openstack-glance

修改 **/etc/glance/glance-api.conf** 配置文件

[database]

...

connection = mysql+pymysql://glance:glance@192.168.56.11/glance

[keystone\_authtoken]

auth\_uri = http://192.168.56.11:5000

auth\_url = http://192.168.56.11:35357

memcached\_servers = 192.168.56.11:11211

auth\_type = password

project\_domain\_name = default

user\_domain\_name = default

project\_name = service

username = glance

password = glance

[paste\_deploy]

flavor = keystone

[glance\_store]

stores = file,http

default\_store = file

filesystem\_store\_datadir = /var/lib/glance/images/

修改 **/etc/glance/glance-registry.conf**

[database]

connection = mysql+pymysql://glance:glance@192.168.56.11/glance

[keystone\_authtoken]

auth\_uri = http://192.168.56.11:5000

auth\_url = http://192.168.56.11:35357

memcached\_servers = controller:11211

auth\_type = password

project\_domain\_name = default

user\_domain\_name = default

project\_name = service

username = glance

password = glance

[paste\_deploy]

flavor = keystone

然后初始脂数据库su -s /bin/sh -c "glance-manage db\_sync" glance

启动glance并增加到开机启动

$ systemctl enable openstack-glance-api.service \

openstack-glance-registry.service

$ systemctl start openstack-glance-api.service \

openstack-glance-registry.service

最后咱们创建glance 实体，并且增加API endpoint

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

openstack endpoint create --region RegionOne **image** **public** http://192.168.56.11:9292

openstack endpoint create --region RegionOne **image** internal http://192.168.56.11:9292

openstack endpoint create --region RegionOne **image** admin http://192.168.56.11:9292

创建小镜像

$ wget http://download.cirros-cloud.net/0.3.4/cirros-0.3.4-x86\_64-disk.img

$ openstack image create "cirros" \

--file cirros-0.3.4-x86\_64-disk.img \

--disk-format qcow2 --container-format bare \

--public

$ openstack image list # 查看镜像

## 计算节点 nova

OpenStack Compute interacts with OpenStack Identity for authentication; OpenStack Image service for disk and server images; and OpenStack dashboard for the user and administrative interface. Image access is limited by projects, and by users; quotas are limited per project (the number of instances, for example). OpenStack Compute can scale horizontally on standard hardware, and download images to launch instances.

nova 控制节点安装node1

$ yum install openstack-nova-api openstack-nova-conductor \

openstack-nova-**console** openstack-nova-novncproxy \

openstack-nova-scheduler

nova 计算节点安装 node2

$ yum **install** -y openstack-nova-**compute** sysfsutils

修改配置文件 *\* /etc/nova/nova.conf \**

**[DEFAULT]**

enabled\_apis = osapi\_compute,metadata

auth\_strategy = keystone

use\_neutron = **True**

firewall\_driver = nova.virt.firewall.NoopFirewallDriver

rpc\_backend = rabbit

**[api\_database]**

connection = mysql+pymysql://nova:nova@192.168.56.11/nova\_api

**[database]**

connection = mysql+pymysql://nova:nova@192.168.56.11/nova

**[oslo\_messaging\_rabbit]**

rabbit\_host = 192.168.56.11

rabbit\_userid = openstack

rabbit\_password = openstack

**[keystone\_authtoken]**

auth\_uri = http://controller:5000

auth\_url = http://controller:35357

memcached\_servers = controller:11211

auth\_type = password

project\_domain\_name = default

user\_domain\_name = default

project\_name = service

username = nova

password = nova

**[vnc]**

vncserver\_listen = 192.168.56.11

vncserver\_proxyclient\_address = 192.168.56.11

**[glance]**

api\_servers = http://192.168.56.11:9292

**[oslo\_concurrency]**

lock\_path = /var/lib/nova/tmp

这里还要配neutron的配置等到了neutron那一节再讲

然后初始化数据库

$ **su** -s /bin/**sh** -c "nova-manage api\_db sync" nova

$ **su** -s /bin/**sh** -c "nova-manage db sync" nova

在keystone中注册API endpoint

openstack service create --name nova --description "OpenStack Compute" compute

openstack endpoint create --region RegionOne compute **public** http://192.168.56.11:8774/v2.1/%\(tenant\_id\)s

openstack endpoint create --region RegionOne compute admin http://192.168.56.11:8774/v2.1/%\(tenant\_id\)s

openstack endpoint create --region RegionOne compute internal http://192.168.56.11:8774/v2.1/%\(tenant\_id\)s

启动并增加到开机自启动

# **systemctl** **enable** **openstack-nova-api**.service \

**openstack-nova-consoleauth**.service **openstack-nova-scheduler**.service \

**openstack-nova-conductor**.service **openstack-nova-novncproxy**.service

# **systemctl** **start** **openstack-nova-api**.service \

**openstack-nova-consoleauth**.service **openstack-nova-scheduler**.service \

**openstack-nova-conductor**.service **openstack-nova-novncproxy**.service

在计算节点

修改 *\* /etc/nova/nova.conf\** 配置文件

[DEFAULT]

enabled\_apis=osapi\_compute,metadata

rpc\_backend = rabbit

auth\_strategy = keystone

use\_neutron = True

firewall\_driver = nova.virt.firewall.NoopFirewallDriver

[oslo\_messaging\_rabbit]

rabbit\_host = 192.168.56.11

rabbit\_userid = openstack

rabbit\_password = openstack

[keystone\_authtoken]

auth\_uri = http://192.168.56.11:5000

auth\_url = http://192.168.56.11:35357

memcached\_servers = 192.168.56.11:11211

auth\_type = password

project\_domain\_name = default

user\_domain\_name = default

project\_name = service

username = nova

password = nova

[vnc]

enabled = True

vncserver\_listen = 0.0.0.0

vncserver\_proxyclient\_address = 192.168.56.12

novncproxy\_base\_url = http://controller:6080/vnc\_auto.html

[glance]

api\_servers = http://controller:9292

[oslo\_concurrency]

lock\_path = /var/lib/nova/tmp

[libvirt]

virt\_type = kvm

启动并增加到开机自启动

$ systemctl enable libvirtd.service openstack-nova-compute.service

$ systemctl start libvirtd.service openstack-nova-compute.service

在控制节点上

$ openstack compute service list

+----+--------------------+------------+----------+---------+-------+----------------------------+

| Id | Binary | Host | Zone | Status | State | Updated At |

+----+--------------------+------------+----------+---------+-------+----------------------------+

| 1 | nova-consoleauth | controller | internal | enabled | up | 2016-02-09T23:11:15.000000 |

| 2 | nova-scheduler | controller | internal | enabled | up | 2016-02-09T23:11:15.000000 |

| 3 | nova-conductor | controller | internal | enabled | up | 2016-02-09T23:11:16.000000 |

| 4 | nova-compute | compute1 | nova | enabled | up | 2016-02-09T23:11:20.000000 |

+----+--------------------+------------+----------+---------+-------+----------------------------+

如果出现这个，那么说明是正常的

## 网络服务neutron

OpenStack Networking (neutron) allows you to create and attach interface devices managed by other OpenStack services to networks. Plug-ins can be implemented to accommodate different networking equipment and software, providing flexibility to OpenStack architecture and deployment.

It includes the following components:

neutron-server

Accepts and routes API requests to the appropriate OpenStack Networking plug-in for action.

OpenStack Networking plug-ins and agents

Plugs and unplugs ports, creates networks or subnets, and provides IP addressing. These plug-ins and agents differ depending on the vendor and technologies used in the particular cloud. OpenStack Networking ships with plug-ins and agents for Cisco virtual and physical switches, NEC OpenFlow products, Open vSwitch, Linux bridging, and the VMware NSX product.

The common agents are L3 (layer 3), DHCP (dynamic host IP addressing), and a plug-in agent.

Messaging queue

Used by most OpenStack Networking installations to route information between the neutron-server and various agents. Also acts as a database to store networking state for particular plug-ins.

OpenStack Networking mainly interacts with OpenStack Compute to provide networks and connectivity for its instances.

### neutron 安装

在控制节点上

yum **install** -y openstack-neutron openstack-neutron-ml2 \

openstack-neutron-linuxbridge ebtables

在计算节点上

yum **install** -y openstack-neutron openstack-neutron-linuxbridge ebtables

配置*\* /etc/neutron/neutron.conf\**文件

**[database]**

connection = mysql+pymysql://neutron:neutron@192.168.56.11/neutron

**[DEFAULT]**

auth\_strategy = keystone

core\_plugin = ml2

service\_plugins =

notify\_nova\_on\_port\_status\_changes = **True**

notify\_nova\_on\_port\_data\_changes = **True**

rpc\_backend = rabbit

**[oslo\_messaging\_rabbit]**

rabbit\_host = 192.168.56.11

rabbit\_userid = openstack

rabbit\_password = openstack

**[keystone\_authtoken]**

auth\_uri = http://192.168.56.11:5000

auth\_url = http://192.168.56.11:35357

memcached\_servers = 192.168.56.11:11211

auth\_type = password

project\_domain\_name = default

user\_domain\_name = default

project\_name = service

username = neutron

password = neutron

**[nova]**

auth\_url = http://192.168.56.11:35357

auth\_type = password

project\_domain\_name = default

user\_domain\_name = default

region\_name = RegionOne

project\_name = service

username = nova

password = nova

**[oslo\_concurrency]**

lock\_path = /var/lib/neutron/tmp

修改 *\* /etc/neutron/plugins/ml2/ml2\_conf.ini \** 配置文件

[ml2]

type\_drivers = flat,vlan

tenant\_network\_types =

mechanism\_drivers = linuxbridge,openvswitch

extension\_drivers = port\_security

[ml2\_type\_flat]

flat\_networks = public

[securitygroup]

enable\_ipset = True

编辑 *\* /etc/neutron/plugins/ml2/linuxbridge\_agent.ini\** 配置文件

[linux\_bridge]

physical\_interface\_mappings = provider:eth0

[vxlan]

enable\_vxlan = False

[securitygroup]

enable\_security\_group = True

firewall\_driver = neutron.agent.linux.iptables\_firewall.IptablesFirewallDriver

编辑 *\* /etc/neutron/dhcp\_agent.ini\** 配置文件

[DEFAULT]

interface\_driver = neutron.agent.linux.interface.BridgeInterfaceDriver

dhcp\_driver = neutron.agent.linux.dhcp.Dnsmasq

enable\_isolated\_metadata = True

现在修改原数据配置文件**/etc/neutron/metadata\_agent.ini**

[DEFAULT]

nova\_metadata\_ip = 192.168.56.11

metadata\_proxy\_shared\_secret = sandow

然后修改 **/etc/nova/nova.conf** 配置文件

[neutron]

...

url = http://192.168.56.11:9696

auth\_url = http://192.168.56.11:35357

auth\_type = password

project\_domain\_name = default

user\_domain\_name = default

region\_name = RegionOne

project\_name = service

username = neutron

password = neutron

service\_metadata\_proxy = True

metadata\_proxy\_shared\_secret = sandow

最后初始化数据库

$ ln -s /etc/neutron/plugins/ml2/ml2\_conf.ini /etc/neutron/plugin.ini

$ su -s /bin/sh -c "neutron-db-manage --config-file /etc/neutron/neutron.conf \

--config-file /etc/neutron/plugins/ml2/ml2\_conf.ini upgrade head" neutron

启动neutron之前要重启nova-api

$ systemctl restart openstack-nova-api.service

$ systemctl enable neutron-server.service \

neutron-linuxbridge-agent.service neutron-dhcp-agent.service \

neutron-metadata-agent.service

$ systemctl start neutron-server.service \

neutron-linuxbridge-agent.service neutron-dhcp-agent.service \

neutron-metadata-agent.service

然后在keystone下注册API endpoint

openstack service create --name neutron --description "OpenStack Networking" network

openstack endpoint create --region RegionOne network **public** http://192.168.56.11:9696

openstack endpoint create --region RegionOne network admin http://192.168.56.11:9696

openstack endpoint create --region RegionOne network internal http://192.168.56.11:9696

验证操作

neutron agent-list

[root@linux-node1 /etc/neutron]# neutron agent-list

+--------------------------------------+--------------------+-------------------------+-------------------+-------+----------------+---------------------------+

| id | agent\_type | host | availability\_zone | alive | admin\_state\_up | binary |

+--------------------------------------+--------------------+-------------------------+-------------------+-------+----------------+---------------------------+

| 11b7a902-1ae8-46cc-80ef-7cf027a7dea5 | Metadata agent | linux-node1.gsandow.com | | :-) | True | neutron-metadata-agent |

| 4a3986cc-674a-4011-a78b-2b258509b393 | DHCP agent | linux-node1.gsandow.com | nova | :-) | True | neutron-dhcp-agent |

| cb6bdfe5-d5b2-4a0c-9323-fd33083bcd75 | Linux bridge agent | linux-node1.gsandow.com | | :-) | True | neutron-linuxbridge-agent |

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现在在计算节点配置

%20%23openstack%20%u5B89%u88C5%u90E8%u7F72%0A@%28%u4E91%u8BA1%u7B97%29%5Bopenstack%5D%0A%0A%23%23%20openstack%20%u4ECB%u7ECD%0AThe%20OpenStack%20project%20is%20an%20open%20source%20cloud%20computing%20platform%20for%20all%20types%20of%20clouds%2C%20which%20aims%20to%20be%20simple%20to%20implement%2C%20massively%20scalable%2C%20and%20feature%20rich.%20Developers%20and%20cloud%20computing%20technologists%20from%20around%20the%20world%20create%20the%20OpenStack%20project.%0A%0AOpenStack%20provides%20an%20Infrastructure-as-a-Service%20%28IaaS%29%20solution%20through%20a%20set%20of%20interrelated%20services.%20Each%20service%20offers%20an%20application%20programming%20interface%20%28API%29%20that%20facilitates%20this%20integration.%20Depending%20on%20your%20needs%2C%20you%20can%20install%20some%20or%20all%20services.%0A%0AThe%20following%20table%20describes%20the%20OpenStack%20services%20that%20make%20up%20the%20OpenStack%20architecture%3A%0A%0A%0A%0A%21%5BAlt%20text%5D%28./1477378632543.png%29%0A%0A%u4E0B%u9762%u662Fopenstack%u67B6%u6784%uFF0C%u611F%u5174%u8DA3%u7684%u53EF%u4EE5%u770B%u5B98%u7F51%u4ECB%u7ECD%0A%21%5Bfsdf%5D%28http%3A//docs.openstack.org/admin-guide/\_images/openstack\_kilo\_conceptual\_arch.png%29%0A%21%5Bdetail%5D%28http%3A//docs.openstack.org/admin-guide/\_images/openstack-arch-kilo-logical-v1.png%29%0A%0Ahttp%3A//docs.openstack.org/admin-guide/common/get-started-with-openstack.html%0A%0A%0A%3E%20%u6CE8%u610F%u4EE5%u4E0B%u5185%u5BB9%u90FD%u9700%u8981%u4F7F%u7528epel%u6E90%uFF0C%u548Copenstack-mitake%u6E90%u6240%u4EE5%u6CA1%u6709epel%u6E90%u7684%u4E00%u5B9A%u8981%u52A0%u7740%0A%3E%20%60wget%20-O%20/etc/yum.repos.d/epel.repo%20http%3A//mirrors.aliyun.com/repo/epel-7.repo%60%0A%3E%20%60yum%20install%20-y%20python-openstackclient%60%20%0A%3E%20%60yum%20install%20-y%20openstack-selinux%60%0A%23%23%20%u6570%u636E%u5E93%0A%u5BF9%u4E8Eglance%2C%20keystone%2C%20neutron%2C%20nova%20%u90FD%u90FD%u4F7F%u7528mysql%u6765%u5B58%u50A8%u6570%u636E%uFF0C%u6240%u4EE5%u9996%u5148%u521B%u5EFA%u5BF9%u5E94%u6570%u636E%u5E93%u5E76%u4E14%u8D4B%u4E88%u5BF9%u5E94%u7528%u6237%u6743%u9650%0A%u5B89%u88C5mysql%20%60yum%20install%20-y%20mariadb%20mariadb-server%20python2-PyMySQL%20%60%0A%u5728\*\*%20/etc/my.cnf.d/openstack.cnf%20\*\*%20%u91CC%u589E%u52A0%u914D%u7F6E%0A%5Bmysqld%5D%0Abind-address%20%3D%20192.168.56.11%0Aefault-storage-engine%20%3D%20innodb%0Ainnodb\_file\_per\_table%0Amax\_connections%20%3D%204096%0Acollation-server%20%3D%20utf8\_general\_ci%0Acharacter-set-server%20%3D%20utf8%0A%0A%u52A0%u5165%u5F00%u673A%u542F%u52A8%uFF0C%u5E76%u542F%u52A8mysql%0A%60%60%60%0A%20systemctl%20enable%20mariadb.service%0A%20systemctl%20start%20mariadb.service%0A%20mysql\_secure\_installation%20%0A%60%60%60%0A%u521B%u5EFA%u6570%u636E%u5E93%0A%60%60%60%0AMariaDB%20%5B%28none%29%5D%3E%20create%20database%20keystone%3B%0AMariaDB%20%5B%28none%29%5D%3E%20create%20database%20glance%3B%0AMariaDB%20%5B%28none%29%5D%3E%20create%20database%20nova%3B%0AMariaDB%20%5B%28none%29%5D%3E%20create%20database%20nova\_api%3B%0AMariaDB%20%5B%28none%29%5D%3E%20create%20database%20neutron%3B%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20keystone.\*%20to%20%27keystone%27@%27localhost%27%20identified%20by%20%27keystone%27%3B%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20keystone.\*%20to%20%27keystone%27@%27%25%27%20identified%20by%20%27keystone%27%3B%20%20%0A%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20glance.\*%20to%20%27glance%27@%27%25%27%20identified%20by%20%27glance%27%3B%20%20%20%20%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20glance.\*%20to%20%27glance%27@%27localhost%27%20identified%20by%20%27glance%27%3B%20%0A%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20nova.\*%20to%20%27nova%27@%27localhost%27%20identified%20by%20%27nova%27%3B%20%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20nova.\*%20to%20%27nova%27@%27%25%27%20identified%20by%20%27nova%27%3B%20%0A%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20nova\_api.\*%20to%20%27nova%27@%27%25%27%20identified%20by%20%27nova%27%3B%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20nova\_api.\*%20to%20%27nova%27@%27localhost%27%20identified%20by%20%27nova%27%3B%20%0A%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20neutron.\*%20to%20%27neutron%27@%27localhost%27%20identified%20by%20%27neutron%27%3B%20%20%20%20%20%20%0AMariaDB%20%5B%28none%29%5D%3E%20grant%20all%20on%20neutron.\*%20to%20%27neutron%27@%27%25%27%20identified%20by%20%27neutron%27%3B%20%20%20%20%20%20%20%20%20%0A%0A%60%60%60%0A%23%23%20nosql%20%0A%0A%u5B89%u88C5memcached%0A%0A%60yum%20install%20-y%20memcached%20python-memcached%60%0A%0A%5Broot@linux-node1%20/etc/keystone/fernet-keys%5D%23%20cat%20/etc/sysconfig/memcached%20%0APORT%3D%2211211%22%0AUSER%3D%22memcached%22%0AMAXCONN%3D%221024%22%0ACACHESIZE%3D%2264%22%0AOPTIONS%3D%22%22%0A%23%23%20%u6D88%u606F%u961F%u5217%0Aopenstack%20%u4F7F%u7528%u6D88%u606F%u961F%u5217%u6765%u5E76%u884C%u64CD%u4F5C%u5E76%u4E14%u63D0%u4F9B%u670D%u52A1%u72B6%u6001%u3002%u6D88%u606F%u961F%u5217%u9700%u8981%u8FD0%u884C%u5728%u63A7%u5236%u8282%u70B9%uFF0Copenstack%u652F%u6301%u7684%u6D88%u606F%u961F%u5217%u6709%20rabbitmq%2C%20qpid%2C%20zeromq.%u8FD9%u91CC%u6211%u4EEC%u4F7F%u7528rabbitmq%u3002%0A%u5B89%u88C5rabbit-mq%20%20%0A%60yum%20install%20-y%20rabbitmq-server%60%0A%u542F%u52A8%u670D%u52A1%2C%u5E76%u4E14%u52A0%u5165%u5F00%u673A%u81EA%u542F%u52A8%0A%60%60%60%0Asystemctl%20enable%20rabbitmq-server.service%0Asystemctl%20start%20rabbitmq-server.service%0A%60%60%60%0A%u589E%u52A0openstack%u7528%u6237%2C%u524D%u9762%u662F%u7528%u6237%uFF0C%u540E%u9762%u662F%u5BC6%u7801%2C%u5E76%u4E14%u8D4B%u4E88%u914D%u7F6E%uFF0C%u8BFB%uFF0C%u5199%u6743%u9650%0A%60%60%60%0Arabbitmqctl%20add\_user%20openstack%20openstack%0Arabbitmq-plugins%20enable%20rabbitmq\_management%20%23%u542F%u7528%u7BA1%u7406%u63D2%u4EF6%0Arabbitmqctl%20set\_permissions%20openstack%20%22.\*%22%20%22.\*%22%20%22.\*%22%0A%60%60%60%0Arabbitmq%u4E00%u5171%u6218%u80DC%u4E09%u4E2A%u7AEF%u53E3%20%0A-%205672%0A-%2015672%0A-%2025672%0A%0Ahttp%3A//192.168.56.11%3A15672/%20%20%u8FD9%u6837%u4FBF%u53EF%u4EE5%u8FDB%u884Crabbitmq%u7BA1%u7406%u754C%u9762%u4E86%0A%0A%0A%0A%23%23%20%u8BA4%u8BC1%u670D%u52A1kistone%0Aopenstack%u8BA4%u8BC1%u670D%u52A1%u63D0%u4F9B%u4E86%u5355%u72EC%u7684%u8BA4%u8BC1%uFF0C%u6388%u6743%u4EE5%u53CA%u670D%u52A1%u76EE%u5F55%u670D%u52A1%u3002%u522B%u7684openstack%u670D%u52A1%u5C06%u8EAB%u4EFD%u8C01%u670D%u52A1%u5F53%u505A%u901A%u7528%u7EDF%u4E00API%u6765%u4F7F%u7528%u3002%0A%u8FD9%u4E2A%u8BA4%u8BC1%u670D%u52A1%u5305%u542B%u4E09%u4E2A%u7EC4%u4EF6%0A-%20server%20%u4E00%u4E2A%u4E2D%u5FC3%u5316%u7684%u670D%u52A1%u5668%u4F7F%u7528restful%u63A5%u53E3%u6765%u63D0%u4F9B%u8BA4%u8BC1%u548C%u6388%u6743%u670D%u52A1%0A-%20drivers%20%u9A71%u52A8%u6216%u8005%u670D%u52A1%u540E%u7AEF%u6574%u5408%u8FDB%u96C6%u4E2D%u5F0F%u670D%u52A1%u5668%u4E2D%uFF0C%u5B83%u4EEC%u88AB%u7528%u6765%u8BBF%u95EEopentack%u5916%u90E8%u4ED3%u5E93%u7684%u8EAB%u4EFD%u4FE1%u606F%u3002%0A-%20Modules%20%u4E2D%u95F4%u4EF6%u6A21%u5757%u4F7F%u7528%u8BA4%u8BC1%u670D%u52A1%u7684openstack%u5730%u5740%u7A7A%u95F4%u4E2D%u3002%u8FD9%u4E9B%u62E6%u622A%u670D%u52A1%u8BF7%u6C42%uFF0C%u53D6%u51FA%u7528%u6237%u51ED%u636E%u3002%u5E76%u5C06%u5B83%u4EEC%u9001%u5165%u4E2D%u592E%u670D%u52A1%u5668%u59B9%u6C42%u6388%u6743%u3002%0A%0A%60%60%60%0A%23%u751F%u6210%u7BA1%u7406%u5458%u4E34%u65F6%u4EE4%u724C%0A%5Broot@linux-node1%20%7E%5D%23%20openssl%20rand%20-hex%2010%0Aea4023f4cda22172f8ff%0A%60%60%60%0A%u5B89%u88C5keystone%20%60%20yum%20install%20openstack-keystone%20httpd%20mod\_wsgi%20%60%0A%0A%u914D%u7F6E\*\*/etc/keystone/keystone.conf\*\*%0A%60%60%60%0A%5BDEFFAULT%5D%0Aadmin\_token%20%3D%20ea4023f4cda22172f8ff%0A%5BDATABASE%5D%0Aconnection%20%3D%20mysql+pymysql%3A//keystone%3Akeystone@192.168.56.11/keystone%0A%5Bmemcache%5D%0Aservers%20%3D%20192.168.56.11%3A11211%0A%0A%5Btoken%5D%0Aprovider%20%3D%20fernet%0Adriver%20%3D%20memcache%0A%60%60%60%0Amysql%u683C%u5F0F%u662F%20%20mysql+pymysql%3A//USER%3AUSER\_PASS@HOST/DATABASE%0A%u4EE5%u540E%u90FD%u662F%u8FD9%u6837%u7684%u5199%u6CD5%0A%0A4%20%u521D%u59CB%u5316%u8BA4%u8BC1%u6570%u636E%20%0A%60su%20-s%20/bin/sh%20-c%20%22keystone-manage%20db\_sync%22%20keystone%60%0A%0A5%20%u521D%u59CB%u5316fernet%20keys%0A%60keystone-manage%20fernet\_setup%20--keystone-user%20keystone%20--keystone-group%20keystone%60%0A%0A%u5728/etc/keystone/%20%u4E0B%u521B%u5EFA%u4E00%u4E2A%u76EE%u5F55fenet\_key%20%20%20%u6CE8%u610F%u6743%u9650%0A%0A6%3A%20%u914D%u7F6Eapache%20%u670D%u52A1%u5668%u3002%0A%u5728\*\*/etc/httpd/httpd.conf\*\*%20%u4E0B%u4FEE%u6539ServerName%0A%60ServerName%20192.168.56.11%60%0A%u5E76%u4E14%u5728\*\*%20/etc/httpd/conf.d/wsgi-keystone.conf\*\*%20%u4E0B%u9762%u589E%u52A0%u4E0B%u9762%u5185%u5BB9%0A%60%60%60roboconf%0AListen%205000%0AListen%2035357%0A%0A%3CVirtualHost%20\*%3A5000%3E%0A%20%20%20%20WSGIDaemonProcess%20keystone-public%20processes%3D5%20threads%3D1%20user%3Dkeystone%20group%3Dkeystone%20display-name%3D%25%7BGROUP%7D%0A%20%20%20%20WSGIProcessGroup%20keystone-public%0A%20%20%20%20WSGIScriptAlias%20/%20/usr/bin/keystone-wsgi-public%0A%20%20%20%20WSGIApplicationGroup%20%25%7BGLOBAL%7D%0A%20%20%20%20WSGIPassAuthorization%20On%0A%20%20%20%20ErrorLogFormat%20%22%25%7Bcu%7Dt%20%25M%22%0A%20%20%20%20ErrorLog%20/var/log/httpd/keystone-error.log%0A%20%20%20%20CustomLog%20/var/log/httpd/keystone-access.log%20combined%0A%0A%20%20%20%20%3CDirectory%20/usr/bin%3E%0A%20%20%20%20%20%20%20%20Require%20all%20granted%0A%20%20%20%20%3C/Directory%3E%0A%3C/VirtualHost%3E%0A%0A%3CVirtualHost%20\*%3A35357%3E%0A%20%20%20%20WSGIDaemonProcess%20keystone-admin%20processes%3D5%20threads%3D1%20user%3Dkeystone%20group%3Dkeystone%20display-name%3D%25%7BGROUP%7D%0A%20%20%20%20WSGIProcessGroup%20keystone-admin%0A%20%20%20%20WSGIScriptAlias%20/%20/usr/bin/keystone-wsgi-admin%0A%20%20%20%20WSGIApplicationGroup%20%25%7BGLOBAL%7D%0A%20%20%20%20WSGIPassAuthorization%20On%0A%20%20%20%20ErrorLogFormat%20%22%25%7Bcu%7Dt%20%25M%22%0A%20%20%20%20ErrorLog%20/var/log/httpd/keystone-error.log%0A%20%20%20%20CustomLog%20/var/log/httpd/keystone-access.log%20combined%0A%0A%20%20%20%20%3CDirectory%20/usr/bin%3E%0A%20%20%20%20%20%20%20%20Require%20all%20granted%0A%20%20%20%20%3C/Directory%3E%0A%3C/VirtualHost%3E%0A%60%60%60%0A%0A%u542F%u52A8httpd%0A%60%60%60%0Asystemctl%20enable%20httpd.service%0Asystemctl%20start%20httpd.service%0A%60%60%60%0A%u57FA%u672C%u4E0Akeystone%u5C31%u5B8C%u6210%u5B89%u88C5%u54AF%u3002%0A%0A%u56E0%u4E3A%u9ED8%u8BA4%u60C5%u51B5%u4E0B%u8BA4%u8BC1%u670D%u52A1%u6570%u636E%u5E93%u4E0D%u63D0%u4F9B%u4EFB%u4F55%u5E38%u89C4%u7684%u8BA4%u8BC1%u670D%u52A1%u548C%u76EE%u5F55%u670D%u52A1%uFF0C%u6240%u4EE5%u9700%u8981%u4F7F%u7528%u4E34%u65F6%u8BA4%u8BC1%u4E3A%u8BA4%u8BC1%u670D%u52A1%u521D%u59CB%u5316%20entity%20and%20api%20endpoint%20%0A%u9996%u5148%u8BBE%u7F6E%u73AF%u5883%u53D8%u91CF%0A%60%60%60%0Aexport%20OS\_TOKEN%3Dea4023f4cda22172f8ff%0Aexport%20OS\_URL%3Dhttp%3A//192.168.56.11%3A35357/v3%0Aexport%20OS\_IDENTITY\_API\_VERSION%3D3%0A%60%60%60%0A%0A1.%20%u521B%u5EFA%u57DFdefault%20%60openstack%20domain%20create%20--description%20%22Default%20Domain%22%20default%60%0A2.%20%u521B%u5EFAadmin%20%u9879%u76EE%u5E76%u4E14%u8D4B%u4E88%u7BA1%u7406%u6743%u9650%60%20openstack%20project%20create%20--domain%20default%20%20%20--description%20%22Admin%20Project%22%20admin%60%0A3.%20%u521B%u5EFA%20admin%u7528%u6237%20%60openstack%20user%20create%20--domain%20default%20%20--password-prompt%20admin%60%20%u9700%u8981%u8F93%u4E24%u6B21%u5BC6%u7801%0A4.%20%u521B%u5EFAadmin%20%u89C4%u5219%20%60openstack%20role%20create%20admin%60%0A5.%20%u628Aadmin%20%u89C4%u5219%20%u589E%u52A0%u5230%20admin%u9879%u76EE%u4E2D%20%60openstack%20role%20add%20--project%20admin%20--user%20admin%20admin%60%0A%60%60%60%0Aopenstack%20project%20create%20--domain%20default%20%20%20--description%20%22Service%20Project%22%20service%0Aopenstack%20project%20create%20--domain%20default%20%20%20--description%20%22Demo%20Project%22%20demo%0A%0Aopenstack%20user%20create%20--domain%20default%20%20%20--password-prompt%20demo%0Aopenstack%20role%20create%20user%0Aopenstack%20role%20add%20--project%20demo%20--user%20demo%20user%0A%0Aopenstack%20user%20create%20--domain%20default%20--password-prompt%20glance%0Aopenstack%20role%20add%20--project%20service%20--user%20glance%20admin%0Aopenstack%20user%20create%20--domain%20default%20--password-prompt%20nova%0Aopenstack%20role%20add%20--project%20service%20--user%20nova%20admin%0Aopenstack%20user%20create%20--domain%20default%20--password-prompt%20neutron%0Aopenstack%20role%20add%20--project%20service%20--user%20neutron%20admin%0A%0A%60%60%60%0A%0A%u521B%u5EFA%20\*\*%20service%20entity%20and%20API%20endpoints%20\*\*%0A1%20%u5728%u8BA4%u8BC1%u670D%u52A1%u4E2D%u521B%u5EFA%u670D%u52A1%u5B9E%u4F53%28service%20entity%29%0A%60%60%60%0Aopenstack%20service%20create%20%5C%0A%20%20--name%20keystone%20--description%20%22OpenStack%20Identity%22%20identity%0A%60%60%60%0A2%20%u521B%u5EFAAPI%20endpoints%0Aopenstack%u7528%u6237%u62E5%u6709%u4E09%u4E2AAPI%20endpoint%uFF1Aadmin%20public%20internal.%20%0Aadmin%20Api%20endpoint%u5141%u8BB8%u7BA1%u7406%u548C%u4FEE%u6539%u7528%u6237%u548C%u79DF%u6237%u4F46%u5176%u5B83%u4E24%u4E2A%u5C31%u4E0D%u884C%u3002%0A%20%60%60%60%0A%20openstack%20endpoint%20create%20--region%20RegionOne%20%20%20identity%20public%20http%3A//192.168.56.11%3A5000/v3%0A%20openstack%20endpoint%20create%20--region%20RegionOne%20%20%20identity%20internal%20http%3A//192.168.56.11%3A5000/v3%0A%20openstack%20endpoint%20create%20--region%20RegionOne%20%20%20identity%20admin%20http%3A//192.168.56.11%3A35357/v3%0A%20%60%60%60%0A3%20%u521B%u5EFA%u5B8C%u6210%u540E%u4FBF%u53EF%u4EE5%u9A8C%u8BC1%u4E0B%u64CD%u4F5C%u7136%u540E%u628A%u4E34%u65F6%u6388%u6743%u5173%u95ED%0A%0A%60%60%60%0A%24%20unset%20OS\_TOKEN%20OS\_URL%0A%24%20openstack%20--os-auth-url%20http%3A//controller%3A35357/v3%20%5C%0A%20%20--os-project-domain-name%20default%20--os-user-domain-name%20default%20%5C%0A%20%20--os-project-name%20admin%20--os-username%20admin%20token%20issue%0A%60%60%60%0A%u8F93%u5165%u5BC6%u7801%uFF0C%u5982%u679C%u6709%u6570%u636E%uFF0C%u8BF4%u660E%u5230%u76EE%u64CD%u4F5COK%u3002%u63A5%u4E0B%u6765%u5C31%u521B%u5EFA%u4E00%u4E2A%u6388%u6743%u811A%u672C\*\*admin-openrc\*\*%u4EE5%u540E%u6BCF%u6B21%u4F7F%u7528openstach%u8FD9%u4E2A%u547D%u4EE4%u90FD%u9700%u8981\*\*source%20admin-openrc\*\*%0A%0A%60%60%60%0Aexport%20OS\_PROJECT\_DOMAIN\_NAME%3Ddefault%0Aexport%20OS\_USER\_DOMAIN\_NAME%3Ddefault%0Aexport%20OS\_PROJECT\_NAME%3Dadmin%0Aexport%20OS\_USERNAME%3Dadmin%0Aexport%20OS\_PASSWORD%3Dadmin%0Aexport%20OS\_AUTH\_URL%3Dhttp%3A//controller%3A35357/v3%0Aexport%20OS\_IDENTITY\_API\_VERSION%3D3%0Aexport%20OS\_IMAGE\_API\_VERSION%3D2%0A%60%60%60%0A%u518D%u521B%u5EFA%u4E00%u4E2Ademo%u7684%u6388%u6743%u811A%u672C%u3002\*\*demo-openr\*\*%0A%60%60%60%0Aexport%20OS\_PROJECT\_DOMAIN\_NAME%3Ddefault%0Aexport%20OS\_USER\_DOMAIN\_NAME%3Ddefault%0Aexport%20OS\_PROJECT\_NAME%3Ddemo%0Aexport%20OS\_USERNAME%3Ddemo%0Aexport%20OS\_PASSWORD%3Ddemo%0Aexport%20OS\_AUTH\_URL%3Dhttp%3A//controller%3A5000/v3%0Aexport%20OS\_IDENTITY\_API\_VERSION%3D3%0Aexport%20OS\_IMAGE\_API\_VERSION%3D2%0A%60%60%60%0A%u68C0%u67E5%u4E00%u4E0Badmin%u6388%u6743%u662F%u5426%u6210%u529F%0A%60%60%60%0Asource%20admin-openr%0Aopenstack%20token%20issue%0A%0A%60%60%60%0A%0A%23%23%20%u955C%u50CF%u670D%u52A1glance%0A-%20glance-api%0A%20%20Accepts%20Image%20API%20calls%20for%20image%20discovery%2C%20retrieval%2C%20and%20storage.%0A-%20glance-registry%0A%20%20Stores%2C%20processes%2C%20and%20retrieves%20metadata%20about%20images.%20Metadata%20includes%20items%20such%20as%20size%20and%20type.%0A-%20Database%0A%20%20%20%20Stores%20image%20metadata%20and%20you%20can%20choose%20your%20database%20depending%20on%20your%20preference.%20Most%20deployments%20use%20MySQL%20or%20SQLite.%0A-%20Storage%20repository%20for%20image%20files%0A%20%20Various%20repository%20types%20are%20supported%20including%20normal%20file%20systems%2C%20Object%20Storage%2C%20RADOS%20block%20devices%2C%20HTTP%2C%20and%20Amazon%20S3.%20Note%20that%20some%20repositories%20will%20only%20support%20read-only%20usage.%0A-%20Metadata%20definition%20service%0A%20%20A%20common%20API%20for%20vendors%2C%20admins%2C%20services%2C%20and%20users%20to%20meaningfully%20define%20their%20own%20custom%20metadata.%20This%20metadata%20can%20be%20used%20on%20different%20types%20of%20resources%20like%20images%2C%20artifacts%2C%20volumes%2C%20flavors%2C%20and%20aggregates.%20A%20definition%20includes%20the%20new%20property%u2019s%20key%2C%20description%2C%20constraints%2C%20and%20the%20resource%20types%20which%20it%20can%20be%20associated%20with.%0A%0A%u5B89%u88C5glance%20%60%20yum%20install%20openstack-glance%60%0A%0A%u4FEE%u6539%20\*\*/etc/glance/glance-api.conf\*\*%20%u914D%u7F6E%u6587%u4EF6%0A%60%60%60roboconf%0A%5Bdatabase%5D%0A...%0Aconnection%20%3D%20mysql+pymysql%3A//glance%3Aglance@192.168.56.11/glance%0A%5Bkeystone\_authtoken%5D%0Aauth\_uri%20%3D%20http%3A//192.168.56.11%3A5000%0Aauth\_url%20%3D%20http%3A//192.168.56.11%3A35357%0Amemcached\_servers%20%3D%20192.168.56.11%3A11211%0Aauth\_type%20%3D%20password%0Aproject\_domain\_name%20%3D%20default%0Auser\_domain\_name%20%3D%20default%0Aproject\_name%20%3D%20service%0Ausername%20%3D%20glance%0Apassword%20%3D%20glance%0A%0A%5Bpaste\_deploy%5D%0Aflavor%20%3D%20keystone%0A%0A%5Bglance\_store%5D%0Astores%20%3D%20file%2Chttp%0Adefault\_store%20%3D%20file%0Afilesystem\_store\_datadir%20%3D%20/var/lib/glance/images/%0A%60%60%60%0A%u4FEE%u6539%20\*\*/etc/glance/glance-registry.conf\*\*%0A%60%60%60roboconf%0A%5Bdatabase%5D%0Aconnection%20%3D%20mysql+pymysql%3A//glance%3Aglance@192.168.56.11/glance%0A%5Bkeystone\_authtoken%5D%0Aauth\_uri%20%3D%20http%3A//192.168.56.11%3A5000%0Aauth\_url%20%3D%20http%3A//192.168.56.11%3A35357%0Amemcached\_servers%20%3D%20controller%3A11211%0Aauth\_type%20%3D%20password%0Aproject\_domain\_name%20%3D%20default%0Auser\_domain\_name%20%3D%20default%0Aproject\_name%20%3D%20service%0Ausername%20%3D%20glance%0Apassword%20%3D%20glance%0A%0A%5Bpaste\_deploy%5D%0Aflavor%20%3D%20keystone%0A%0A%60%60%60%0A%u7136%u540E%u521D%u59CB%u8102%u6570%u636E%u5E93%60su%20-s%20/bin/sh%20-c%20%22glance-manage%20db\_sync%22%20glance%60%0A%u542F%u52A8glance%u5E76%u589E%u52A0%u5230%u5F00%u673A%u542F%u52A8%0A%60%60%60%0A%24%20systemctl%20enable%20openstack-glance-api.service%20%5C%0A%20%20openstack-glance-registry.service%0A%24%20systemctl%20start%20openstack-glance-api.service%20%5C%0A%20%20openstack-glance-registry.service%0A%60%60%60%0A%u6700%u540E%u54B1%u4EEC%u521B%u5EFAglance%20%u5B9E%u4F53%uFF0C%u5E76%u4E14%u589E%u52A0API%20endpoint%0A%60%60%60%0Aopenstack%20service%20create%20--name%20glance%20%20%20--description%20%22OpenStack%20Image%22%20image%0Aopenstack%20endpoint%20create%20--region%20RegionOne%20%20%20image%20public%20http%3A//192.168.56.11%3A9292%0Aopenstack%20endpoint%20create%20--region%20RegionOne%20%20%20image%20internal%20http%3A//192.168.56.11%3A9292%0Aopenstack%20endpoint%20create%20--region%20RegionOne%20%20%20image%20admin%20http%3A//192.168.56.11%3A9292%0A%60%60%60%0A%0A%u521B%u5EFA%u5C0F%u955C%u50CF%0A%60%60%60bash%0A%24%20wget%20http%3A//download.cirros-cloud.net/0.3.4/cirros-0.3.4-x86\_64-disk.img%0A%24%20openstack%20image%20create%20%22cirros%22%20%5C%0A%20%20--file%20cirros-0.3.4-x86\_64-disk.img%20%5C%0A%20%20--disk-format%20qcow2%20--container-format%20bare%20%5C%0A%20%20--public%0A%20%24%20openstack%20image%20list%20%23%20%u67E5%u770B%u955C%u50CF%0A%60%60%60%0A%0A%23%23%20%u8BA1%u7B97%u8282%u70B9%20nova%0AOpenStack%20Compute%20interacts%20with%20OpenStack%20Identity%20for%20authentication%3B%20OpenStack%20Image%20service%20for%20disk%20and%20server%20images%3B%20and%20OpenStack%20dashboard%20for%20the%20user%20and%20administrative%20interface.%20Image%20access%20is%20limited%20by%20projects%2C%20and%20by%20users%3B%20quotas%20are%20limited%20per%20project%20%28the%20number%20of%20instances%2C%20for%20example%29.%20OpenStack%20Compute%20can%20scale%20horizontally%20on%20standard%20hardware%2C%20and%20download%20images%20to%20launch%20instances.%0A%0Anova%20%u63A7%u5236%u8282%u70B9%u5B89%u88C5node1%0A%60%60%60%0A%24%20%20yum%20install%20openstack-nova-api%20openstack-nova-conductor%20%5C%0A%20%20openstack-nova-console%20openstack-nova-novncproxy%20%5C%0A%20%20openstack-nova-scheduler%0A%60%60%60%0Anova%20%u8BA1%u7B97%u8282%u70B9%u5B89%u88C5%20node2%0A%60%60%60%0A%24%20yum%20install%20-y%20openstack-nova-compute%20sysfsutils%0A%60%60%60%0A%u4FEE%u6539%u914D%u7F6E%u6587%u4EF6%20\*\*%20/etc/nova/nova.conf%20\*\*%0A%60%60%60%0A%5BDEFAULT%5D%0Aenabled\_apis%20%3D%20osapi\_compute%2Cmetadata%0Aauth\_strategy%20%3D%20keystone%0Ause\_neutron%20%3D%20True%0Afirewall\_driver%20%3D%20nova.virt.firewall.NoopFirewallDriver%0Arpc\_backend%20%3D%20rabbit%0A%5Bapi\_database%5D%0Aconnection%20%3D%20mysql+pymysql%3A//nova%3Anova@192.168.56.11/nova\_api%0A%5Bdatabase%5D%0Aconnection%20%3D%20mysql+pymysql%3A//nova%3Anova@192.168.56.11/nova%0A%0A%5Boslo\_messaging\_rabbit%5D%0Arabbit\_host%20%3D%20192.168.56.11%0Arabbit\_userid%20%3D%20openstack%0Arabbit\_password%20%3D%20openstack%0A%5Bkeystone\_authtoken%5D%0Aauth\_uri%20%3D%20http%3A//controller%3A5000%0Aauth\_url%20%3D%20http%3A//controller%3A35357%0Amemcached\_servers%20%3D%20controller%3A11211%0Aauth\_type%20%3D%20password%0Aproject\_domain\_name%20%3D%20default%0Auser\_domain\_name%20%3D%20default%0Aproject\_name%20%3D%20service%0Ausername%20%3D%20nova%0Apassword%20%3D%20nova%0A%5Bvnc%5D%0Avncserver\_listen%20%3D%20192.168.56.11%0Avncserver\_proxyclient\_address%20%3D%20192.168.56.11%0A%5Bglance%5D%0Aapi\_servers%20%3D%20http%3A//192.168.56.11%3A9292%0A%5Boslo\_concurrency%5D%0Alock\_path%20%3D%20/var/lib/nova/tmp%0A%60%60%60%0A%u8FD9%u91CC%u8FD8%u8981%u914Dneutron%u7684%u914D%u7F6E%u7B49%u5230%u4E86neutron%u90A3%u4E00%u8282%u518D%u8BB2%0A%0A%u7136%u540E%u521D%u59CB%u5316%u6570%u636E%u5E93%0A%60%60%60%0A%24%20su%20-s%20/bin/sh%20-c%20%22nova-manage%20api\_db%20sync%22%20nova%0A%24%20su%20-s%20/bin/sh%20-c%20%22nova-manage%20db%20sync%22%20nova%0A%60%60%60%0A%u5728keystone%u4E2D%u6CE8%u518CAPI%20endpoint%0A%60%60%60%0Aopenstack%20service%20create%20--name%20nova%20%20%20--description%20%22OpenStack%20Compute%22%20compute%0Aopenstack%20endpoint%20create%20--region%20RegionOne%20%20%20compute%20public%20http%3A//192.168.56.11%3A8774/v2.1/%25%5C%28tenant\_id%5C%29s%0Aopenstack%20endpoint%20create%20--region%20RegionOne%20%20%20compute%20admin%20http%3A//192.168.56.11%3A8774/v2.1/%25%5C%28tenant\_id%5C%29s%0Aopenstack%20endpoint%20create%20--region%20RegionOne%20%20%20compute%20internal%20http%3A//192.168.56.11%3A8774/v2.1/%25%5C%28tenant\_id%5C%29s%0A%60%60%60%0A%0A%u542F%u52A8%u5E76%u589E%u52A0%u5230%u5F00%u673A%u81EA%u542F%u52A8%0A%60%60%60%0A%23%20systemctl%20enable%20openstack-nova-api.service%20%5C%0A%20%20openstack-nova-consoleauth.service%20openstack-nova-scheduler.service%20%5C%0A%20%20openstack-nova-conductor.service%20openstack-nova-novncproxy.service%0A%23%20systemctl%20start%20openstack-nova-api.service%20%5C%0A%20%20openstack-nova-consoleauth.service%20openstack-nova-scheduler.service%20%5C%0A%20%20openstack-nova-conductor.service%20openstack-nova-novncproxy.service%0A%60%60%60%0A%0A%u5728%u8BA1%u7B97%u8282%u70B9%0A%u4FEE%u6539%20\*\*%20/etc/nova/nova.conf\*\*%20%u914D%u7F6E%u6587%u4EF6%0A%60%60%60roboconf%0A%5BDEFAULT%5D%0Aenabled\_apis%3Dosapi\_compute%2Cmetadata%0Arpc\_backend%20%3D%20rabbit%0Aauth\_strategy%20%3D%20keystone%0Ause\_neutron%20%3D%20True%0Afirewall\_driver%20%3D%20nova.virt.firewall.NoopFirewallDriver%0A%5Boslo\_messaging\_rabbit%5D%0Arabbit\_host%20%3D%20192.168.56.11%0Arabbit\_userid%20%3D%20openstack%0Arabbit\_password%20%3D%20openstack%0A%5Bkeystone\_authtoken%5D%0Aauth\_uri%20%3D%20http%3A//192.168.56.11%3A5000%0Aauth\_url%20%3D%20http%3A//192.168.56.11%3A35357%0Amemcached\_servers%20%3D%20192.168.56.11%3A11211%0Aauth\_type%20%3D%20password%0Aproject\_domain\_name%20%3D%20default%0Auser\_domain\_name%20%3D%20default%0Aproject\_name%20%3D%20service%0Ausername%20%3D%20nova%0Apassword%20%3D%20nova%0A%5Bvnc%5D%0Aenabled%20%3D%20True%0Avncserver\_listen%20%3D%200.0.0.0%0Avncserver\_proxyclient\_address%20%3D%20192.168.56.12%0Anovncproxy\_base\_url%20%3D%20http%3A//controller%3A6080/vnc\_auto.html%0A%5Bglance%5D%0Aapi\_servers%20%3D%20http%3A//controller%3A9292%0A%5Boslo\_concurrency%5D%0Alock\_path%20%3D%20/var/lib/nova/tmp%0A%5Blibvirt%5D%0Avirt\_type%20%3D%20kvm%0A%60%60%60%0A%0A%0A%u542F%u52A8%u5E76%u589E%u52A0%u5230%u5F00%u673A%u81EA%u542F%u52A8%0A%60%60%60%0A%24%20systemctl%20enable%20libvirtd.service%20openstack-nova-compute.service%0A%24%20systemctl%20start%20libvirtd.service%20openstack-nova-compute.service%0A%60%60%60%0A%0A%u5728%u63A7%u5236%u8282%u70B9%u4E0A%0A%60%60%60%0A%24%20openstack%20compute%20service%20list%0A+----+--------------------+------------+----------+---------+-------+----------------------------+%0A%7C%20Id%20%7C%20Binary%20%20%20%20%20%20%20%20%20%20%20%20%20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