OpenStack API 快速入门

目录

Although you install each OpenStack service separately, the OpenStack services work together to meet your cloud needs: Identity, Compute, Image service, Block Storage, Networking (neutron), Object Storage, Orchestration, and Telemetry. With the TryStack OpenStack installation, these services work together in the background of the installation.

通过 OpenStack 认证服务的认证后，您可以使用其它的 OpenStack API 来创建和管理您的 OpenStack 云中的资源。您可以从镜像启动虚拟机实例，并通过计算服务 API 或者 nova 命令行客户端来给实例分配元数据。

使用如下的方法之一以发送 API 请求：

- cURL

  一个能够让我们发送 HTTP 请求并接收响应的命令行工具。请参考 “OpenStack API” 一节 [1]。

- OpenStack 命令行客户端

  每个 OpenStack 项目都提供了一个让您通过简单的命令访问其 API 的命令行客户端。请参考 “OpenStack 命令行客户端” 一节 [8]。

- REST 客户端

  Both Mozilla and Google provide browser-based graphical interfaces for REST. For Firefox, see RESTClient. For Chrome, see rest-client.

- OpenStack Python 软件开发工具包(SDK)

  Use this SDK to write Python automation scripts that create and manage resources in your OpenStack cloud. The SDK implements Python bindings to the OpenStack API, which enables you to perform automation tasks in Python by making calls on Python objects rather than making REST calls directly. All OpenStack command-line tools are implemented by using the Python SDK. See OpenStack Python SDK in the OpenStack End User Guide.

OpenStack API

要认证对 OpenStack 服务的访问，您首先需要向 OpenStack 认证服务发出认证请求以获得认证令牌。您必须提供有效的证书才能够请求认证令牌。

证书通常是您的用户名和密码的组合，或者是您的云环境中的租户的名称或者 ID。联系您的云管理员得到您的用户名、密码以及租户等信息以便于生成认证令牌。作为另外一种选择，您可以提供令牌而不是每次都要提供用户名和密码。

发送 API 请求时，您需要将令牌信息置于 HTTP 的 X-Auth-Token 头。当需要访问多个服务时，您需要为每个服务获取一个令牌。令牌只在一个有限的时间内是有效的，超时即无效。令牌也可能因为其他原因而变得无效。例如，如果用户的角色发生了变化，该用户当前存在的令牌也会变得无效。

认证与 API 请求工作流

1. 从云管理员提供的认证服务接入点请求一个认证令牌。在发送的请求中包含一个有效的证书：

参数	类型	描述
username（必需）	xsd:string	用户名。如果您不提供用户名和密码，那么必须提供令牌。
password（必需）	xsd:string	该用户的密码。
tenantName（可选）	xsd:string	租户名称。租户 Id 和 租户名称 都是可选的，但不能被同时使用。如果这两个属性值都被指定了，服务将会返回 400错误请求。
tenantId（可选）	capi:UUID	租户的 ID。租户 Id 和 租户名称 都是可选的，但不能被同时使用。如果这两个属性值都被指定了，服务将会返回 400错误请求。如果您不知道 tenantId，您可以发送一个以 "" 作为 tenantId 的请求并在返回中得到该 ID。
token（可选）	capi:UUID	令牌。假如您不提供令牌，则必须提供用户名和密码。

   在请求成功的情况下，服务器将会返回一个认证令牌。

2. 将令牌置于 HTTP 的 X-Auth-Token 头部发送 API 请求。继续使用该令牌发送 API 请求直到工作完成或者 服务器返回 401Unauthorized。

3. 当 401Unauthorized 错误出现时，请申请一个新的令牌。

The examples in this section use cURL commands. For information about cURL, see http://curl.haxx.se/. For information about the OpenStack APIs, see OpenStack API Reference.

认证

在一个运行着认证服务的典型 OpenStack 环境中，使用如下的 cURL 命令来获取令牌：

```
$ curl -s -X POST http://8.21.28.222:5000/v2.0/tokens
       -H "Content-Type: application/json"
       -d '{"auth": {"tenantName": """$OS_TENANT_NAME""", "passwordCredentials":
       {"username": """$OS_USERNAME""", "password": """$OS_PASSWORD"""}}}'
       | python -m json.tool
```

当请求成功时，你将会得到 200 OK 的 HTTP 状态码，以及后续一个包含着令牌及其超时时间的响应体。令牌的形式如 "id":"令牌"，超时时间的形式如 "expires":"日期及时间"。

下面的例子展示了一个成功的响应：


```
{
  "access": {
    "metadata": {
      "is_admin": 0,
      "roles": [
        "9fe2ff9ee4384b1894a90878d3e92bab"
      ]
    },
    "serviceCatalog": [
      {
        "endpoints": [
          {
            "adminURL": "http://10.100.0.222:8774/v2/TENANT_ID",
            "id": "0eb78b6d3f644438aea327d9c57b7b5a",
            "internalURL": "http://10.100.0.222:8774/v2/TENANT_ID",
            "publicURL": "http://8.21.28.222:8774/v2/TENANT_ID",
            "region": "RegionOne"
          }
        ],
        "endpoints_links": [],
        "name": "nova",
        "type": "compute"
      },
      {
        "endpoints": [
          {
            "adminURL": "http://10.100.0.222:9696/",
            "id": "3f4b6015a2f9481481ca03dace8acf32",
            "internalURL": "http://10.100.0.222:9696/",
            "publicURL": "http://8.21.28.222:9696/",
            "region": "RegionOne"
          }
        ],
        "endpoints_links": [],
        "name": "neutron",
        "type": "network"
      },
      {
        "endpoints": [
          {
            "adminURL": "http://10.100.0.222:8776/v2/TENANT_ID",
            "id": "16f6416588f64946bdcdf4a431a8f252",
            "internalURL": "http://10.100.0.222:8776/v2/TENANT_ID",
            "publicURL": "http://8.21.28.222:8776/v2/TENANT_ID",
            "region": "RegionOne"
          }
        ],
        "endpoints_links": [],
        "name": "cinder_v2",
        "type": "volumev2"
      },
      {
        "endpoints": [
          {
            "adminURL": "http://10.100.0.222:8779/v1.0/TENANT_ID",
            "id": "be48765ae31e425cb06036b1ebab694a",
            "internalURL": "http://10.100.0.222:8779/v1.0/TENANT_ID",
            "publicURL": "http://8.21.28.222:8779/v1.0/TENANT_ID",
            "region": "RegionOne"
          }
        ],
        "endpoints_links": [],
        "name": "trove",
        "type": "database"
      },
```

```
{
  "endpoints":[
    {
      "adminURL":"http://10.100.0.222:9292",
      "id":"1adfcb5414304f3596fb81edb2dfb514",
      "internalURL":"http://10.100.0.222:9292",
      "publicURL":"http://8.21.28.222:9292",
      "region":"RegionOne"
    }
  ],
  "endpoints_links":[],
  "name":"glance",
  "type":"image"
},
{
  "endpoints":[
    {
      "adminURL":"http://10.100.0.222:8777",
      "id":"350f3b91d73f4b3ab8a061c94ac31fbb",
      "internalURL":"http://10.100.0.222:8777",
      "publicURL":"http://8.21.28.222:8777",
      "region":"RegionOne"
    }
  ],
  "endpoints_links":[],
  "name":"ceilometer",
  "type":"metering"
},
{
  "endpoints":[
    {
      "adminURL":"http://10.100.0.222:8000/v1/",
      "id":"2198b0d32a604e75a5cc1e13276a813d",
      "internalURL":"http://10.100.0.222:8000/v1/",
      "publicURL":"http://8.21.28.222:8000/v1/",
      "region":"RegionOne"
    }
  ],
  "endpoints_links":[],
  "name":"heat-cfn",
  "type":"cloudformation"
},
{
  "endpoints":[
    {
      "adminURL":"http://10.100.0.222:8776/v1/TENANT_ID",
      "id":"7c193c4683d849ca8e8db493722a4d8c",
      "internalURL":"http://10.100.0.222:8776/v1/TENANT_ID",
      "publicURL":"http://8.21.28.222:8776/v1/TENANT_ID",
      "region":"RegionOne"
    }
  ],
  "endpoints_links":[],
  "name":"cinder",
  "type":"volume"
},
{
  "endpoints":[
    {
      "adminURL":"http://10.100.0.222:8773/services/Admin",
      "id":"11fac8254be74d7d906110f0069e5748",
      "internalURL":"http://10.100.0.222:8773/services/Cloud",
      "publicURL":"http://8.21.28.222:8773/services/Cloud",
      "region":"RegionOne"
    }
  ],
  "endpoints_links":[],
  "name":"nova_ec2",
  "type":"ec2"
},
{
  "endpoints":[
    {
      "adminURL":"http://10.100.0.222:8004/v1/TENANT_ID",
      "id":"38fa4f9afce34d4ca0f5e0f90fd758dd",
      "internalURL":"http://10.100.0.222:8004/v1/TENANT_ID",
      "publicURL":"http://8.21.28.222:8004/v1/TENANT_ID",
      "region":"RegionOne"
    }
  ],
  "endpoints_links":[],
  "name":"heat",
  "type":"orchestration"
},
{
```

```
        "endpoints": [
          {
            "adminURL": "http://10.100.0.222:35357/v2.0",
            "id": "256cdf78ecb04051bf0f57ec11070222",
            "internalURL": "http://10.100.0.222:5000/v2.0",
            "publicURL": "http://8.21.28.222:5000/v2.0",
            "region": "RegionOne"
          }
        ],
        "endpoints_links": [],
        "name": "keystone",
        "type": "identity"
      }
    ],
    "token": {
      "audit_ids": [
        "gsjrNoqFSQeuLUo0QeJprQ"
      ],
      "expires": "2014-12-15T15:09:29Z",
      "id": "TOKEN_ID",
      "issued_at": "2014-12-15T14:09:29.794527",
      "tenant": {
        "description": "Auto created account",
        "enabled": true,
        "id": "TENANT_ID",
        "name": "USERNAME"
      }
    },
    "user": {
      "id": "USER_ID",
      "name": "USERNAME",
      "roles": [
        {
          "name": "_member_"
        }
      ],
      "roles_links": [],
      "username": "USERNAME"
    }
  }
}
```

注意

假如您不知道您的租户名称或者 ID，您可以使用空 tenantName 发送认证请求，如下所示：

```
$ curl -s -X POST http://8.21.28.222:5000/v2.0/tokens
          -H "Content-Type: application/json"
          -d '{"auth": {"tenantName": "", "passwordCredentials":
          {"username": """$OS_USERNAME""", "password": """$OS_PASSWORD"""}}}'
          | python -m json.tool
```

发送 API 请求

This section shows how to make some basic Compute API calls. For a complete list of Compute API calls, see Compute APIs and Extensions.

使用计算服务 API 列出云主机类型，如下所示：

```
$ curl -s -H
       "X-Auth-Token:令牌"
       http://8.21.28.222:8774/v2/租户 id/flavors
       | python -m json.tool
```

```
{
  "flavors": [
    {
      "id": "1",
      "links": [
        {
          "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/flavors/1",
          "rel": "self"
        },
        {
          "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/flavors/1",
          "rel": "bookmark"
```

```
        }
      ],
      "name": "m1.tiny"
    },
    {
      "id": "2",
      "links": [
        {
          "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/flavors/2",
          "rel": "self"
        },
        {
          "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/flavors/2",
          "rel": "bookmark"
        }
      ],
      "name": "m1.small"
    },
    {
      "id": "3",
      "links": [
        {
          "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/flavors/3",
          "rel": "self"
        },
        {
          "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/flavors/3",
          "rel": "bookmark"
        }
      ],
      "name": "m1.medium"
    },
    {
      "id": "4",
      "links": [
        {
          "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/flavors/4",
          "rel": "self"
        },
        {
          "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/flavors/4",
          "rel": "bookmark"
        }
      ],
      "name": "m1.large"
    },
    {
      "id": "5",
      "links": [
        {
          "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/flavors/5",
          "rel": "self"
        },
        {
          "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/flavors/5",
          "rel": "bookmark"
        }
      ],
      "name": "m1.xlarge"
    }
  ]
}
```


使用计算服务的 API 列出镜像，如下所示：

```
$ curl -s -H
       "X-Auth-Token:令牌"
       http://8.21.28.222:8774/v2/租户 id/images
       | python -m json.tool
```


```
{
  "images": [
    {
      "id": "2dadcc7b-3690-4a1d-97ce-011c55426477",
      "links": [
        {
          "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/images/2dadcc7b-3690-4a1d-97ce-011c55426477",
          "rel": "self"
        },
        {
          "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/images/2dadcc7b-3690-4a1d-97ce-011c55426477",
          "rel": "bookmark"
        },
        {
```

```
        "href": "http://8.21.28.222:9292/f9828a18c6484624b571e85728780ba8/images/2dadcc7b-3690-4a1d-97ce-011c55426477",
        "type": "application/vnd.openstack.image",
        "rel": "alternate"
      }
    ],
    "name": "Fedora 21 x86_64"
  },
  {
    "id": "cfba3478-8645-4bc8-97e8-707b9f41b14e",
    "links": [
      {
        "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/images/cfba3478-8645-4bc8-97e8-707b9f41b14e",
        "rel": "self"
      },
      {
        "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/images/cfba3478-8645-4bc8-97e8-707b9f41b14e",
        "rel": "bookmark"
      },
      {
        "href": "http://8.21.28.222:9292/f9828a18c6484624b571e85728780ba8/images/cfba3478-8645-4bc8-97e8-707b9f41b14e",
        "type": "application/vnd.openstack.image",
        "rel": "alternate"
      }
    ],
    "name": "Ubuntu 14.04 amd64"
  },
  {
    "id": "2e4c08a9-0ecd-4541-8a45-838479a88552",
    "links": [
      {
        "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/images/2e4c08a9-0ecd-4541-8a45-838479a88552",
        "rel": "self"
      },
      {
        "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/images/2e4c08a9-0ecd-4541-8a45-838479a88552",
        "rel": "bookmark"
      },
      {
        "href": "http://8.21.28.222:9292/f9828a18c6484624b571e85728780ba8/images/2e4c08a9-0ecd-4541-8a45-838479a88552",
        "type": "application/vnd.openstack.image",
        "rel": "alternate"
      }
    ],
    "name": "CentOS 7 x86_64"
  },
  {
    "id": "c8dd9096-60c1-4e23-a486-82955481df9f",
    "links": [
      {
        "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/images/c8dd9096-60c1-4e23-a486-82955481df9f",
        "rel": "self"
      },
      {
        "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/images/c8dd9096-60c1-4e23-a486-82955481df9f",
        "rel": "bookmark"
      },
      {
        "href": "http://8.21.28.222:9292/f9828a18c6484624b571e85728780ba8/images/c8dd9096-60c1-4e23-a486-82955481df9f",
        "type": "application/vnd.openstack.image",
        "rel": "alternate"
      }
    ],
    "name": "CentOS 6.5 x86_64"
  },
  {
    "id": "f97b8d36-935e-4666-9c58-8a0afc6d3796",
    "links": [
      {
        "href": "http://8.21.28.222:8774/v2/f9828a18c6484624b571e85728780ba8/images/f97b8d36-935e-4666-9c58-8a0afc6d3796",
        "rel": "self"
      },
      {
        "href": "http://8.21.28.222:8774/f9828a18c6484624b571e85728780ba8/images/f97b8d36-935e-4666-9c58-8a0afc6d3796",
        "rel": "bookmark"
      },
      {
        "href": "http://8.21.28.222:9292/f9828a18c6484624b571e85728780ba8/images/f97b8d36-935e-4666-9c58-8a0afc6d3796",
        "type": "application/vnd.openstack.image",
        "rel": "alternate"
      }
    ],
    "name": "Fedora 20 x86_64"
  }
 ]
}
```

使用计算服务 API 列出虚拟机，如下所示：

```
$ curl -s -H
       "X-Auth-Token:令牌"
       http://8.21.28.222:8774/v2/租户 id/servers
       | python -m json.tool
```


```
{
  "servers": [
    {
      "id": "41551256-abd6-402c-835b-e87e559b2249",
      "links": [
        {
          "href": "http://8.21.28.222:8774/v2/f8828a18c6484624b571e85728780ba8/servers/41551256-abd6-402c-835b-e87e559b2249",
          "rel": "self"
        },
        {
          "href": "http://8.21.28.222:8774/f8828a18c6484624b571e85728780ba8/servers/41551256-abd6-402c-835b-e87e559b2249",
          "rel": "bookmark"
        }
      ],
      "name": "test-server"
    }
  ]
}
```


OpenStack 命令行客户端

如果使用脚本操作，可以使用比如 python-novaclient 之类的命令行客户端。这个客户端能够让您通过命令行接口来使用计算 API。

For information about the command-line clients, see OpenStack Command-Line Interface Reference.

安装客户端

Use pip to install the OpenStack clients on a Mac OS X or Linux system. It is easy and ensures that you get the latest version of the client from the Python Package Index. Also, pip lets you update or remove a package.

您必须独立安装每个客户端。

运行如下命令安装或更新客户端软件包：

```
$ sudo pip install [--upgrade] python-工程client
```

PROJECT 是工程名称。

例如，可以运行如下命令安装 nova 的客户端：

```
$ sudo pip install python-novaclient
```

运行如下命令更新 nova 的客户端：

```
$ sudo pip install --upgrade python-novaclient
```

运行如下命令移除 nova 的客户端：

```
$ sudo pip uninstall python-novaclient
```

在执行客户端命令之前，您必须先下载并 source openrc 这个文件以设置环境变量。

For complete information about the OpenStack clients, including how to source the openrc file, see OpenStack End User Guide, OpenStack Admin User Guide, and OpenStack Command-Line Interface Reference.

启动一个实例

启动虚拟机实例前，需要为其选择名称，镜像和云主机类型。

通过 nova 客户端调用相关的计算服务 API 以列出所有可用的镜像，如下所示：

```
$ nova image-list
```

```
+--------------------------------------+---------------------------------+------+------+
| ID                                   | Name                            | Status | Server |
+--------------------------------------+---------------------------------+------+------+
| 949c80c8-b4ac-4315-844e-69f9bef39ed1 | cirros-0.3.1-x86_64-uec         | ACTIVE |      |
| 2d96f33d-ff66-4cac-b377-820cdf51204a | cirros-0.3.1-x86_64-uec-kernel  | ACTIVE |      |
| eda9e5cb-4c8c-4e88-b580-7fac80ad8e78 | cirros-0.3.1-x86_64-uec-ramdisk | ACTIVE |      |
+--------------------------------------+---------------------------------+------+------+
```

运行如下命令以列出云主机类型：

```
$ nova flavor-list
```

```
+----+---------+---------+----+---------+----+-------+-------------+---------+
| ID | Name    | Memory_MB | Disk | Ephemeral | Swap | VCPUs | RXTX_Factor | Is_Public |
+----+---------+---------+----+---------+----+-------+-------------+---------+
| 1  | m1.tiny  | 512     | 0  | 0       |    | 1     | 1.0         | True    |
| 2  | m1.small | 2048    | 20 | 0       |    | 1     | 1.0         | True    |
| 3  | m1.medium | 4096   | 40 | 0       |    | 2     | 1.0         | True    |
| 4  | m1.large | 8192    | 80 | 0       |    | 4     | 1.0         | True    |
| 42 | m1.nano  | 64      | 0  | 0       |    | 1     | 1.0         | True    |
| 5  | m1.xlarge | 16384  | 160 | 0      |    | 8     | 1.0         | True    |
| 84 | m1.micro | 128     | 0  | 0       |    | 1     | 1.0         | True    |
+----+---------+---------+----+---------+----+-------+-------------+---------+
```

启动虚拟机实例前，记录下您所需的镜像和云主机类型的 ID。

使用之前记录下来的镜像和云主机类型的 ID 以及虚拟机名称运行 nova boot 命令，启动一个名为 my_instance 的虚拟机，如下所示：

```
$ nova boot --image 949c80c8-b4ac-4315-844e-69f9bef39ed1 --flavor 2 my_instance
```

```
+--------------------------------------+--------------------------------------+
| Property                             | Value                                |
+--------------------------------------+--------------------------------------+
| OS-DCF:diskConfig                    | MANUAL                               |
| OS-EXT-AZ:availability_zone          | nova                                 |
| OS-EXT-SRV-ATTR:host                 | None                                 |
| OS-EXT-SRV-ATTR:hypervisor_hostname  | None                                 |
| OS-EXT-SRV-ATTR:instance_name        | instance-00000001                    |
| OS-EXT-STS:power_state               | 0                                    |
| OS-EXT-STS:task_state                | scheduling                           |
| OS-EXT-STS:vm_state                  | building                             |
| accessIPv4                           |                                      |
| accessIPv6                           |                                      |
| adminPass                            | XysUgJRnkB2y                         |
| config_drive                         |                                      |
| created                              | 2013-11-07T17:34:16Z                 |
| flavor                               | m1.small                             |
| hostId                               |                                      |
| id                                   | 66129319-1f1d-420d-a226-bf9fc5ea0138 |
| image                                | cirros-0.3.1-x86_64-uec              |
| key_name                             | None                                 |
| metadata                             | {}                                   |
| name                                 | my_instance                          |
| progress                             | 0                                    |
| security_groups                      | [{u'name': u'default'}]              |
| status                               | BUILD                                |
| tenant_id                            | 604bbe45ac7143a79e14f3158df67091     |
| updated                              | 2013-11-07T17:34:16Z                 |
| user_id                              | 3273a50d6cfb4a2ebc75e83cb86e1554     |
+--------------------------------------+--------------------------------------+
```

使用 nova list 查看虚拟机：

```
$ nova list
```

```
+--------------------------------------+----------+------+---------+----------+--------------+
| ID                                   | Name     | Status | Task State | Power State | Networks     |
+--------------------------------------+----------+------+---------+----------+--------------+
```

```
| 66129319-1f1d-420d-a226-bf9fc5ea0138 | my_instance | ACTIVE | None     | Running    | private=10.0.0.2 |
+--------------------------------------+------------+--------+----------+------------+------------------+
```

使用 nova show 命令，可以查看指定虚拟机的具体信息。包括虚拟机的 ID：

```
$ nova show 66129319-1f1d-420d-a226-bf9fc5ea0138
```

```
+-------------------------------------+----------------------------------------------------------+
| Property                            | Value                                                    |
+-------------------------------------+----------------------------------------------------------+
| OS-DCF:diskConfig                   | MANUAL                                                   |
| OS-EXT-AZ:availability_zone         | nova                                                     |
| OS-EXT-SRV-ATTR:host                | devstack-grizzly                                         |
| OS-EXT-SRV-ATTR:hypervisor_hostname | devstack-grizzly                                         |
| OS-EXT-SRV-ATTR:instance_name       | instance-00000001                                        |
| OS-EXT-STS:power_state              | 1                                                        |
| OS-EXT-STS:task_state               | None                                                     |
| OS-EXT-STS:vm_state                 | active                                                   |
| accessIPv4                          |                                                          |
| accessIPv6                          |                                                          |
| config_drive                        |                                                          |
| created                             | 2013-11-07T17:34:16Z                                     |
| flavor                              | m1.small (2)                                             |
| hostId                              | d57e6f9f7885c615794b4d5a87103509620b6a7f567f7e7bd57e97a2 |
| id                                  | 66129319-1f1d-420d-a226-bf9fc5ea0138                     |
| image                               | cirros-0.3.1-x86_64-uec (949c80c8-b4ac-4315-844e-69f9bef39ed1) |
| key_name                            | None                                                     |
| metadata                            | {}                                                       |
| name                                | my_instance                                              |
| private network                     | 10.0.0.2                                                 |
| progress                            | 0                                                        |
| security_groups                     | [{u'name': u'default'}]                                  |
| status                              | ACTIVE                                                   |
| tenant_id                           | 604bbe45ac7143a79e14f3158df67091                         |
| updated                             | 2013-11-07T17:34:32Z                                     |
| user_id                             | 3273a50d6cfb4a2ebc75e83cb86e1554                         |
+-------------------------------------+----------------------------------------------------------+
```

注意

For information about the default ports that the OpenStack components use, see Appendix A. Firewalls and default ports in the OpenStack Configuration Reference.