



# OpenStack CLI

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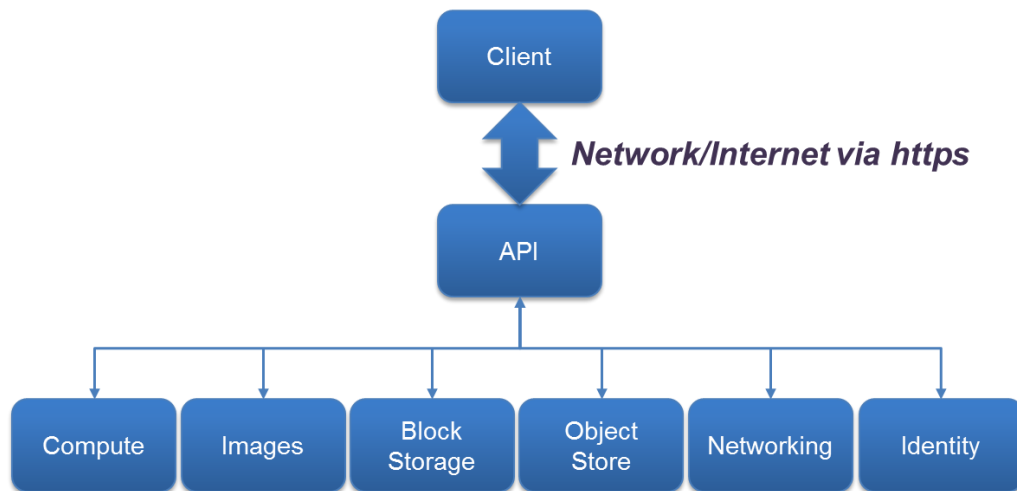
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## ❖ OpenStack API

- OpenStack components provide their own API server
  - Nova API, Neutron API, Glance API, etc.
- RESTful APIs
  - HTTP requests with the APIs' URI to get the corresponding services
- OpenStack client is comprised of dashboard (Horizon) and CLI

URIs of OpenStack service API



Service	Service Endpoint
Compute	http://192.168.11.11:8774/v2/693d71ca29d94460878b0c3ec3acdbe9
Network	http://192.168.11.11:9696
Computev3	http://192.168.11.11:8774/v3
Identity	http://192.168.11.11:5000/v2.0
Image	http://192.168.11.11:9292



## ❖ OpenStack CLI

- OpenStack CLI is comprised of Unified and Legacy CLI clients
    - A CLI command creates its API request with various HTTP options (GET/POST, URI, media type) and sends it to the desirable API server using cURL
    - A debug option prints the sequence of OpenStack API calls across the related OpenStack components
  - Unified CLI client
    - Available to most OpenStack services (depending on OpenStack release)
    - The syntax of commands has the following form
      - (Take) OBJECT1 (and perform) ACTION (using) OBJECT2 (to it)
      - Objects and actions: <https://docs.openstack.org/developer/python-openstackclient/>
- ```
$ openstack [<global-options>] <object-1> <action> [<object-2>] [<command-arguments>]
```
- Mapping guide for Unified CLI and Legacy CLI commands
    - <https://docs.openstack.org/developer/python-openstackclient/decoder.html>



## ❖ OpenStack CLI

### ■ Legacy CLI client

- Nova CLI, Neutron CLI, ... : different syntax for each component
- Keystone Legacy CLI is deprecated
- Command specifications:
  - <https://docs.openstack.org/cli-reference/>

OpenStack services and clients

| Service                                     | Client     | Package                 | Description                                                                                                                                                                                              |
|---------------------------------------------|------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application Catalog service                 | murano     | python-muranoclient     | Creates and manages applications.                                                                                                                                                                        |
| Bare Metal service                          | ironic     | python-ironicclient     | manages and provisions physical machines.                                                                                                                                                                |
| Block Storage service                       | cinder     | python-cinderclient     | Creates and manages volumes.                                                                                                                                                                             |
| Clustering service                          | senlin     | python-senlinclient     | Creates and manages clustering services.                                                                                                                                                                 |
| Compute service                             | nova       | python-novaclient       | Creates and manages images, instances, and flavors.                                                                                                                                                      |
| Container Infrastructure Management service | magnum     | python-magnumclient     | Creates and manages containers.                                                                                                                                                                          |
| Database service                            | trove      | python-troveclient      | Creates and manages databases.                                                                                                                                                                           |
| Deployment service                          | fuel       | python-fuelclient       | Plans deployments.                                                                                                                                                                                       |
| DNS service                                 | designate  | python-designateclient  | Creates and manages self service authoritative DNS.                                                                                                                                                      |
| Image service                               | glance     | python-glanceclient     | Creates and manages images.                                                                                                                                                                              |
| Key Manager service                         | barbican   | python-barbicanclient   | Creates and manages keys.                                                                                                                                                                                |
| Monitoring                                  | monasca    | python-monascaclient    | Monitoring solution.                                                                                                                                                                                     |
| Networking service                          | neutron    | python-neutronclient    | Configures networks for guest servers.                                                                                                                                                                   |
| Object Storage service                      | swift      | python-swiftclient      | Gathers statistics, lists items, updates metadata, and uploads, downloads, and deletes files stored by the Object Storage service. Gains access to an Object Storage installation for ad hoc processing. |
| Orchestration service                       | heat       | python-heatclient       | Launches stacks from templates, views details of running stacks including events and resources, and updates and deletes stacks.                                                                          |
| Rating service                              | cloudkitty | python-cloudkittyclient | Rating service.                                                                                                                                                                                          |
| Shared File Systems service                 | manila     | python-manilaclient     | Creates and manages shared file systems.                                                                                                                                                                 |
| Telemetry service                           | ceilometer | python-ceilometerclient | Creates and collects measurements across OpenStack.                                                                                                                                                      |
| Telemetry v3                                | gnocchi    | python-gnocchiclient    | Creates and collects measurements across OpenStack.                                                                                                                                                      |
| Workflow service                            | mistral    | python-mistralclient    | Workflow service for OpenStack cloud.                                                                                                                                                                    |



## ❖ OpenStack CLI

- CLI commands for description of a certain VM instance

```
[root@controller ~(keystone_admin)]# nova show 67947ff9-aae8-4be4-8015-128e03aefa78
```

| Property                             | Value                                                   |
|--------------------------------------|---------------------------------------------------------|
| OS-DCF:diskConfig                    | AUTO                                                    |
| OS-EXT-AZ:availability_zone          | compute2                                                |
| OS-EXT-SRV-ATTR:host                 | compute2.openstack                                      |
| OS-EXT-SRV-ATTR:hypervisor_hostname  | compute2.openstack                                      |
| OS-EXT-SRV-ATTR:instance_name        | instance-00000002                                       |
| OS-EXT-STS:power_state               | 1                                                       |
| OS-EXT-STS:task_state                | -                                                       |
| OS-EXT-STS:vm_state                  | active                                                  |
| OS-SRV-USG:launched_at               | 2017-04-06T07:24:32.000000                              |
| OS-SRV-USG:terminated_at             | -                                                       |
| accessIPv4                           |                                                         |
| accessIPv6                           |                                                         |
| config_drive                         |                                                         |
| created                              | 2017-04-06T07:24:23Z                                    |
| flavor                               | m1.nano (c0439e2b-f0a3-4e1b-a244-110059359e99)          |
| hostId                               | fadc2b3ae9b4b70a15203a607a5b3776439562359cafd981945540b |
| id                                   | 67947ff9-aae8-4be4-8015-128e03aefa78                    |
| image                                | cirros (ba00db38-f24b-4d7f-9e4e-f9253ca2129d)           |
| key_name                             | demo_key                                                |
| metadata                             | {}                                                      |
| name                                 | test-2                                                  |
| os-extended-volumes:volumes_attached | []                                                      |
| private network                      | 10.10.0.102, 192.168.11.102                             |
| progress                             | 0                                                       |
| security_groups                      | default                                                 |
| status                               | ACTIVE                                                  |
| tenant_id                            | 43377c7a3eaa496a939ed2e883562884                        |
| updated                              | 2017-04-10T13:18:48Z                                    |
| user_id                              | 40f5ee423e2e49c190e7d133a09e54fd                        |

<Legacy CLI: **nova show** <instance\_ID> >

```
[root@controller ~(keystone_admin)]# openstack server show 67947ff9-aae8-4be4-8015-128e03aefa78
```

| Field                                | Value                                                   |
|--------------------------------------|---------------------------------------------------------|
| OS-DCF:diskConfig                    | AUTO                                                    |
| OS-EXT-AZ:availability_zone          | compute2                                                |
| OS-EXT-SRV-ATTR:host                 | compute2.openstack                                      |
| OS-EXT-SRV-ATTR:hypervisor_hostname  | compute2.openstack                                      |
| OS-EXT-SRV-ATTR:instance_name        | instance-00000002                                       |
| OS-EXT-STS:power_state               | 1                                                       |
| OS-EXT-STS:task_state                | None                                                    |
| OS-EXT-STS:vm_state                  | active                                                  |
| OS-SRV-USG:launched_at               | 2017-04-06T07:24:32.000000                              |
| OS-SRV-USG:terminated_at             | None                                                    |
| accessIPv4                           |                                                         |
| accessIPv6                           |                                                         |
| addresses                            | private=10.10.0.102, 192.168.11.102                     |
| config_drive                         |                                                         |
| created                              | 2017-04-06T07:24:23Z                                    |
| flavor                               | m1.nano (c0439e2b-f0a3-4e1b-a244-110059359e99)          |
| hostId                               | fadc2b3ae9b4b70a15203a607a5b3776439562359cafd981945540b |
| id                                   | 67947ff9-aae8-4be4-8015-128e03aefa78                    |
| image                                | cirros (ba00db38-f24b-4d7f-9e4e-f9253ca2129d)           |
| key_name                             | demo_key                                                |
| name                                 | test-2                                                  |
| os-extended-volumes:volumes_attached | []                                                      |
| progress                             | 0                                                       |
| project_id                           | 43377c7a3eaa496a939ed2e883562884                        |
| properties                           |                                                         |
| security_groups                      | [[{'u'name': 'u'default'}]]                             |
| status                               | ACTIVE                                                  |
| updated                              | 2017-04-10T13:18:48Z                                    |
| user_id                              | 40f5ee423e2e49c190e7d133a09e54fd                        |

<Unified CLI: **openstack server show** <instance\_ID> >



## ❖ OpenStack CLI

- CLI commands for description of a certain floating IP
  - OpenStack Mitaka does not support the unified CLI command

```
[root@controller ~(keystone_admin)]# neutron floatingip-show 77b06007-223b-44ec-a7f1-9eaa08011eb5
+-----+-----+
| Field          | Value                               |
+-----+-----+
description	
fixed_ip_address	10.10.0.101
floating_ip_address	192.168.11.101
floating_network_id	187ea4b1-a32e-49f7-b81e-acc8d6c6e37b
id	77b06007-223b-44ec-a7f1-9eaa08011eb5
port_id	c9d471a6-fe4f-4718-8284-d085b16d32c8
router_id	97c13550-4e00-4cf7-8944-8eb839c42d30
status	ACTIVE
tenant_id	43377c7a3eaa496a939ed2e883562884
+-----+-----+
```

<Legacy CLI: **neutron floatingip-show** <floatingip\_ID> >

```
[root@controller ~(keystone_admin)]# openstack floating ip show 77b06007-223b-44ec-a7f1-9eaa08011eb5
openstack: 'floating' is not an openstack command. See 'openstack --help'.
Did you mean one of these?
  container create
  container delete
  container list
  container save
  container set
  container show
  container unset
```

<Unified CLI: **openstack floating ip show** <floatingip\_ID> >



## ❖ OpenStack CLI

- “openstack server show <instance id> --debug”
  - 1) A request for authentication and tokens to Keystone API server (<http://192.168.11.11:5000/v2.0>) and its response

```
Get_auth_ref
REQ: curl -g -i -X GET http://192.168.11.11:5000/v2.0 -H "Accept: application/json" -H "User-Agent: python-openstackclient keystoneauth1/2.4.1 python-requests/2.11.1 CPython/2.7.5"
Starting new HTTP connection (1): 192.168.11.11
"GET /v2.0 HTTP/1.1" 200 229
RESP: [200] Date: Mon, 10 Apr 2017 17:30:53 GMT Server: Apache/2.4.6 (CentOS) Vary: X-Auth-Token,Accept-Encoding x-openstack-request-id: req-7487cedd-7858-464c-8180-4a126fa3a962 Content-Encoding: gzip Content-Length: 229 Connection: close Content-Type: application/json
RESP BODY: {"version": {"status": "stable", "updated": "2014-04-17T00:00:00Z", "media-types": [{"base": "application/json", "type": "application/vnd.openstack.identity-v2.0+json"}], "id": "v2.0", "links": [{"href": "http://192.168.11.11:5000/v2.0/", "rel": "self"}, {"href": "http://docs.openstack.org/", "type": "text/html", "rel": "describedby"}]}}
```

- 2) A request for description of the server to Nova API server (<http://192.168.11.11:8774/v2/.../servers>) and its response

```
REQ: curl -g -i -X GET http://192.168.11.11:8774/v2/693d71ca29d94460878b0c3ec3acdbe9/servers/67947ff9-aae8-4be4-8015-128e03aefa78 -H "User-Agent: python-novaclient" -H "Accept: application/json" -H "X-Auth-Token: {SHA1}f227a49dae4b235c61509d8e63c41e1e2643350a"
"GET /v2/693d71ca29d94460878b0c3ec3acdbe9/servers/67947ff9-aae8-4be4-8015-128e03aefa78 HTTP/1.1" 200 1778
RESP: [200] Content-Length: 1778 Content-Type: application/json X-Compute-Request-Id: req-c3367e0a-5abe-4a38-933a-f002d2e5f298 Date: Mon, 10 Apr 2017 17:30:54 GMT Connection: keep-alive
RESP BODY: {"server": {"status": "ACTIVE", "updated": "2017-04-10T13:18:48Z", "hostId": "fadc2b3ae9b4b70a15203a60/a5b3776439562359caf1d981945540b", "OS-EXT-SRV-ATTR:host": "compute2.openstack", "addresses": [{"private": [{"OS-EXT-IPS-MAC:mac_addr": "fa:16:3e:75:d2:42", "version": 4, "addr": "10.10.0.102"}, {"OS-EXT-IPS:type": "fixed"}], "links": [{"href": "http://192.168.11.11:8774/v2/693d71ca29d94460878b0c3ec3acdbe9/servers/67947ff9-aae8-4be4-8015-128e03aefa78", "rel": "self"}, {"href": "http://192.168.11.11:8774/693d71ca29d94460878b0c3ec3acdbe9/servers/67947ff9-aae8-4be4-8015-128e03aefa78", "rel": "bookmark"}], "key_name": "demo_key", "image": {"id": "ba00db38-f24b-4d7f-9e4e-f9253ca2129d", "links": [{"href": "http://192.168.11.11:8774/693d71ca29d94460878b0c3ec3acdbe9/images/ba00db38-f24b-4d7f-9e4e-f9253ca2129d", "rel": "bookmark"}], "OS-EXT-STS:task_state": null, "OS-EXT-STS:vm_state": "active", "OS-EXT-SRV-ATTR:instance_name": "instance-00000002", "OS-SRV-USG:launched_at": "2017-04-06T07:24:32.000000", "OS-EXT-SRV-ATTR:hypervisor_hostname": "compute2.openstack", "flavor": {"id": "c0439e2b-f0a3-4e1b-a244-110059359e99", "links": [{"href": "http://192.168.11.11:8774/693d71ca29d94460878b0c3ec3acdbe9/flavors/c0439e2b-f0a3-4e1b-a244-110059359e99", "rel": "bookmark"}], "id": "67947ff9-aae8-4be4-8015-128e03aefa78", "security_groups": [{"name": "default"}], "OS-SRV-USG:terminated_at": null, "OS-EXT-AZ:availability_zone": "compute2", "user_id": "40f5ee4232e49c190e7d133a09e54fd", "name": "test-2", "created": "2017-04-06T07:24:23Z", "tenant_id": "43377c7a3eaa496a939ed2e883562884", "OS-DCF:diskConfig": "AUTO", "os-extended-volumes:volumes_attached": [], "accessIPv4": "", "accessIPv6": "", "progress": 0, "OS-EXT-STS:power_state": 1, "config_drive": "", "metadata": {}}}}
```









## ❖ Searching for CLI Commands

- E.g. “Demo” tenant want to expand its restriction on the VM instances that he can launch
  - This service is unavailable on the dashboard GUI
  - Try to search it in the CLI specification with related keywords: “restriction”, “resource”
    - <https://docs.openstack.org/developer/python-openstackclient/commands.html>
    - Get a hint on the “quota” object
  - Get the desirable syntax for the command

```
~(keystone_admin)$ openstack --help | grep quota
quota set    Set quotas for project or class
quota show   Show quotas for project or class

~(keystone_admin)$ openstack quota set --help
usage: openstack quota set [-h] [--class] [--properties <properties>]
                        [--ram <ram>] [--secgroup-rules <secgroup-rules>]
                        [--instances <instances>] [--key-pairs <key-pairs>]
                        [--fixed-ips <fixed-ips>] [--secgroups <secgroups>]
                        [--injected-file-size <injected-file-size>]
                        [--floating-ips <floating-ips>]
                        [--injected-files <injected-files>]
                        [--cores <cores>]
                        [--injected-path-size <injected-path-size>]
                        [--gigabytes <gigabytes>] [--volumes <volumes>]
                        [--snapshots <snapshots>]
                        [--volume-type <volume-type>]
                        <project/class>
```

- Refer to <https://docs.openstack.org/developer/python-openstackclient/command-list.html> for more details

## ❖ Searching for CLI Commands

- E.g. “Demo” tenant want to expand its restriction on the VM instances that he can launch

```
(keystone_admin)$ openstack quota set --instances 20 "Demo"
```

