



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

# PRINCIPLES, MODELS AND APPLICATIONS FOR DISTRIBUTED SYSTEMS M – Module 2

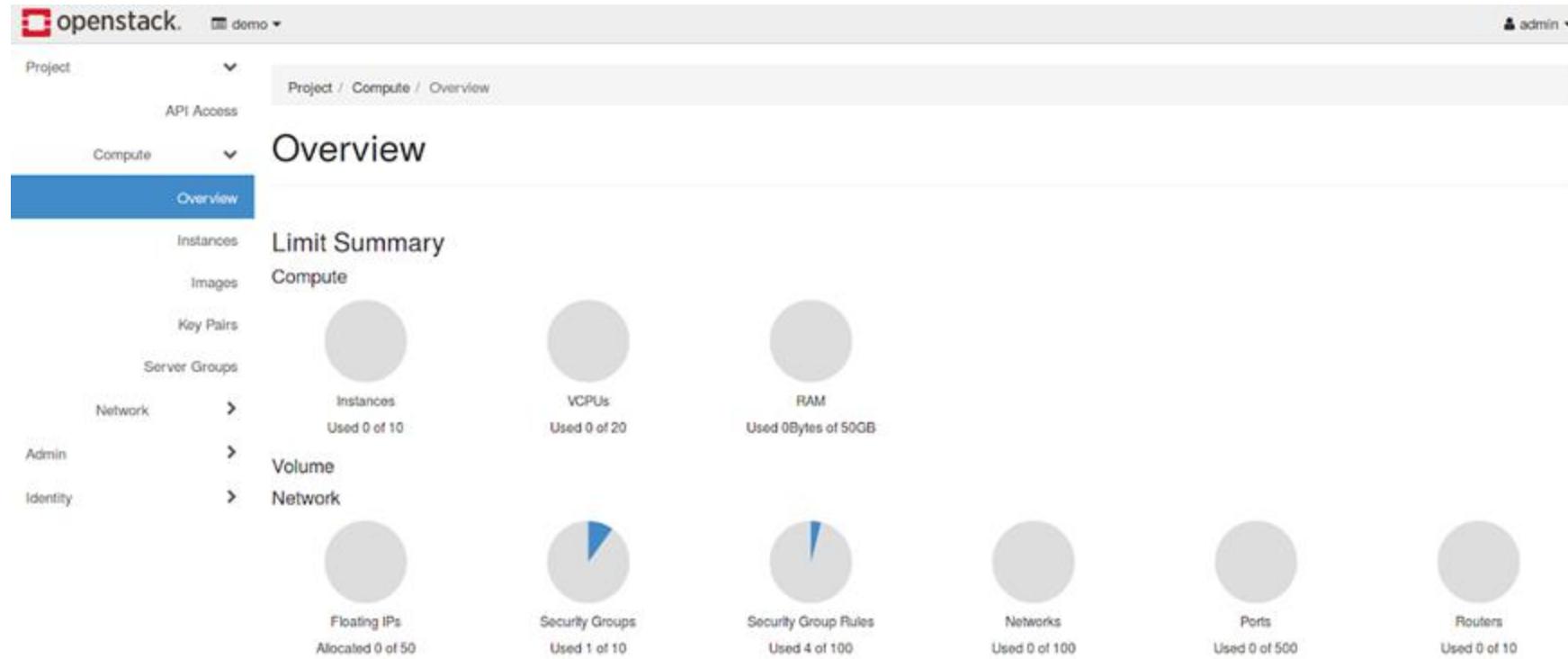
## OpenStack Hands-on

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# Openstack – Horizon

Graphical web-based interface to control the Openstack Cluster



## Lab session – Openstack cluster Access

Visit the Horizon web page: [137.204.107.63:22080](http://137.204.107.63:22080)

You can login with:

User: dist-sys-userX

Password: openstack4DistSys

With X=[1..20]. Check with the instructor the number to use. Assigned numbers can be found [here](#)

You can access a VM on the same “external” network with:

```
ssh -p 52022 dist-sys-userX@137.204.107.63
```

Password: openstack4DistSysX



# Openstack – Horizon

openstack. dist-sys-project1 admin

Project API Access

Compute > Network > Orchestration > Admin > Identity

API Access

Project / API Access

It defines the APIs contact points of the other OpenStack's services

View Credentials Download OpenStack RC File ▾

Service	Service Endpoint
Cloudformation	http://10.15.2.1:8000/v1
Compute	http://10.15.2.1:8774/v2.1
Identity	http://10.15.2.1:5000
Image	http://10.15.2.1:9292
Metric	http://10.15.2.1:8041
Network	http://10.15.2.1:9696
Orchestration	http://10.15.2.1:8004/v1/f6af0003bfee4e32ae3ac2107e3a8eaa
Placement	http://10.15.2.1:8780

Displaying 8 items



# Openstack – Horizon

The screenshot shows the Openstack Horizon dashboard for the project "dist-sys-project1". The user is logged in as "admin". The left sidebar has a red box around the "Compute" section, which is currently selected. The main content area is titled "Overview" and contains a large callout box with the text: "From here you can manage everything related to the lifecycle of VMs. From Image upload, to VM creation/deletion." Below this, there is a "Limit Summary" section for Compute resources, including pie charts for Instances, VCPUs, and RAM usage. The dashboard also includes sections for Network, Orchestration, Admin, and Identity, each with their own resource monitoring charts.

Project / Compute / Overview

Project / Compute / Overview

Compute

Instances

Images

Key Pairs

Server Groups

Network

Orchestration

Admin

Identity

Overview

Limit Summary

Compute

Instances

VCPUs

RAM

Used 0 of 5

Used 0 of 8

Used 0B of 8GB

Floating IPs

Security Groups

Security Group Rules

Networks

Ports

Routers

Allocated 0 of 50

Used 1 of 10

Used 5 of 100

Used 0 of 100

Used 0 of 500

Used 0 of 10

Usage Summary

Select a period of time to query its usage:  
The date should be in YYYY-MM-DD format.

2025-11-26 to 2025-11-27 Submit

Active Instances: 0  
Active RAM: 0B  
This Period's VCPU-Hours: 0.00  
This Period's GB-Hours: 0.00  
This Period's RAM-Hours: 0.00

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# Openstack – Horizon

The screenshot shows the Openstack Horizon dashboard for the project 'dist-sys-project1'. The user is logged in as 'admin'. The left sidebar has a red box around the 'Network' section, which is currently selected. The main content area is titled 'Network Topology' and contains a message: 'From here you can manage everything related to the networks and access control of your project.' Below the message is a vertical blue bar labeled 'external' at the top and '10.250.0.0/16' at the bottom.

openstack. dist-sys-project1 admin

Project / Network / Network Topology

Project Network Compute API Access

Compute > Network

Network Topology Networks Routers Security Groups Floating IPs Network QoS

Orchestration >

Admin >

Identity >

Network Topology

Topology Graph

Small Normal

From here you can manage everything related to the networks and access control of your project.

external  
10.250.0.0/16

## Lab session – Cloud Init

It's possible to automate some initial configuration to the VM through a file named *Cloud Init*, if the VM's OS supports it. In this way we can pass a list of commands the VM will execute directly after boot. You can find more examples [here](#)

```
#cloud-config
password: unibo
chpasswd: { expire: False }
ssh_pwauth: True

write_files:
- content: |
  # My new helloworld file

  owner: root:root
  permissions: '0644'
  path: /root/helloworld.txt
runcmd:
- sysctl -w net.ipv4.ip_forward=1
```



## Lab session – Openstack command line

To run Openstack CLI commands from the “SSH VM” you need to source a file like this.

```
for key in $( set | awk '{FS="="} /^OS_/_ {print $1}' ); do unset $key ; done
export OS_PROJECT_DOMAIN_NAME='Default'
export OS_USER_DOMAIN_NAME='Default'
export OS_PROJECT_NAME='dist-sys-projectX'
export OS_TENANT_NAME='dist-sys-projectX'
export OS_USERNAME='dist-sys-userX'
export OS_PASSWORD='openstack4DistSys'
export OS_AUTH_URL='http://10.15.2.1:5000'
export OS_INTERFACE='internal'
export OS_ENDPOINT_TYPE='internalURL'
export OS_IDENTITY_API_VERSION='3'
export OS_REGION_NAME='RegionOne'
export OS_AUTH_PLUGIN='password'
```



# Assignments

- 1) During the exam you should demonstrate you know how to create networks and VMs on OpenStack.
- 2) If the API Endpoint is at 10.15.2.1 (reachable from the VM) can we interact with the cluster via REST API?

Build a Python script that automates the creation of a network and a VM connected to it with REST API calls. The VM should have your name as ssh password.

This might be helpful to start: <https://docs.openstack.org/api-quick-start/api-quick-start.html#openstack-api-quick-guide>

