



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

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

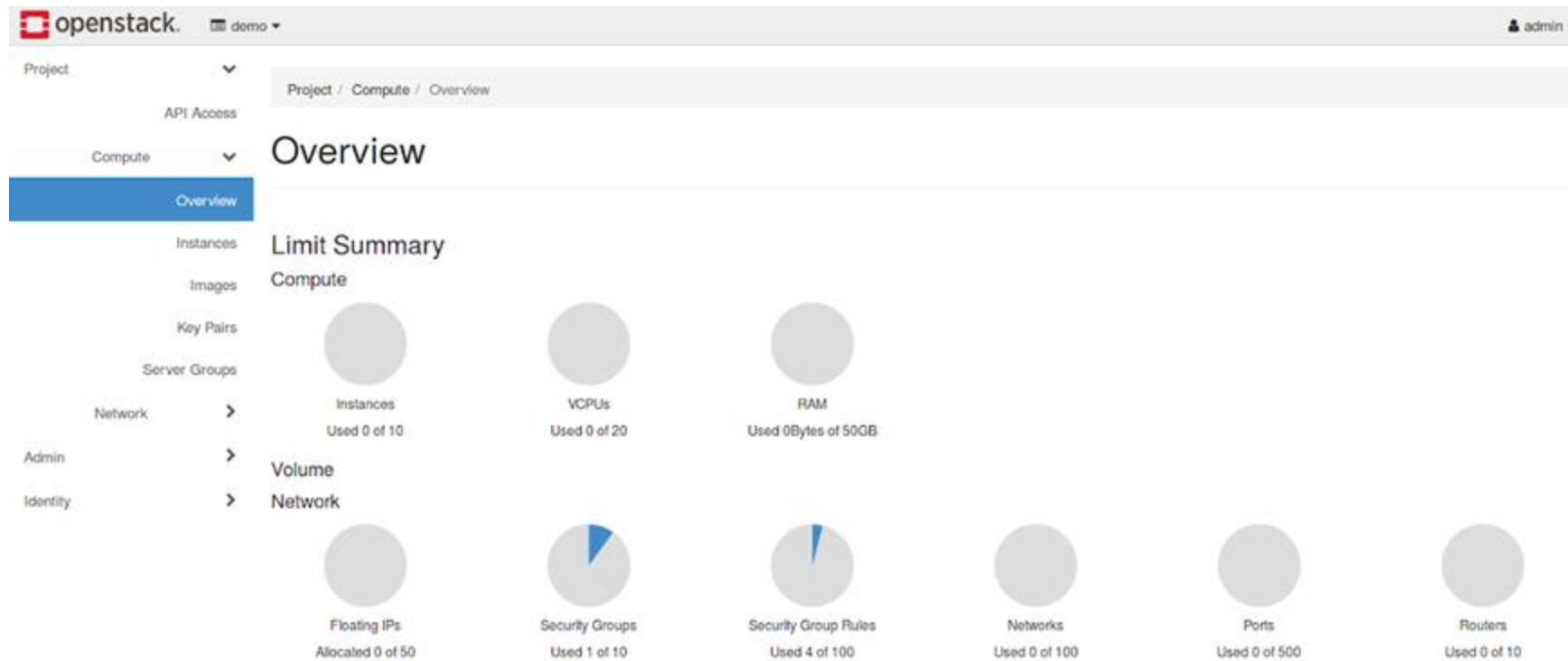
## OpenStack Hands-on

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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

Project / API Access

API Access

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

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

## API Access

Displaying 8 items

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

openstack

dist-sys-project1

admin

Project

API Access

Compute

Overview

Instances

Images

Key Pairs

Server Groups

Network

Orchestration

Admin

Identity

Project / Compute / Overview

Overview

Limit Summary

Compute

Instances  
Used 0 of 5

VCPUs  
Used 0 of 8

RAM  
Used 0B of 8GB

Volume

Network

Floating IPs  
Allocated 0 of 50

Security Groups  
Used 1 of 10

Security Group Rules  
Used 5 of 100

Networks  
Used 0 of 100

Ports  
Used 0 of 500

Routers  
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

From here you can manage everything related to the lifecycle of VMs. From Image upload, to VM creation/deletion.



# Openstack – Horizon

openstack

dist-sys-project1

admin

Project

API Access

Compute

Network

Network Topology

Networks

Routers

Security Groups

Floating IPs

Network QoS

Orchestration

Admin

Identity

Project / Network / Network Topology

Network Topology

Topology

Graph

Small

Normal

external

10.250.0.0/16

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

## 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>

