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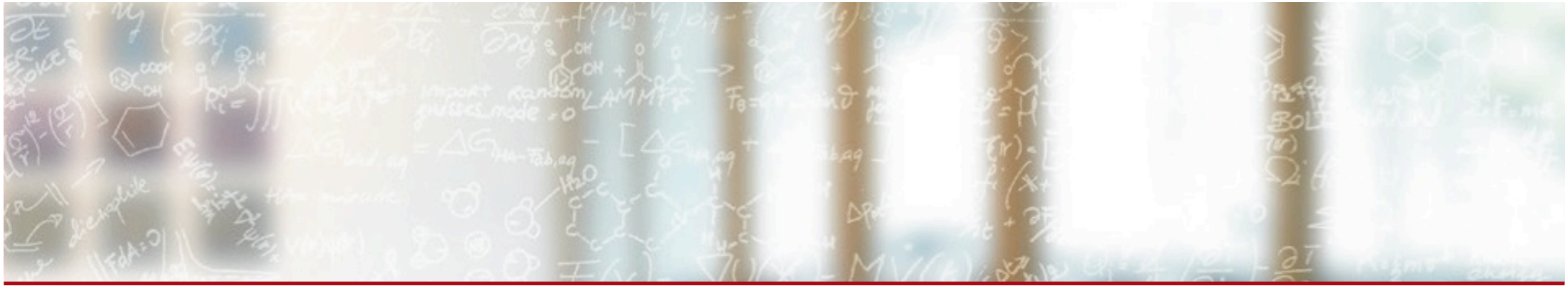

# Integrating your Infrastructure with CSCS's: Towards Cloud Services

Marco Passerini, CSCS
September 9th, 2019
User Lab Day

## Summary

- Cloud computing
- OpenStack
- OpenStack at CSCS
- Using OpenStack
- Object storage
- Conclusion

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# Cloud computing

## Cloud computing – services and interfaces

- **Everything as a Service**:
  - Infrastructure As A Service
  - Platform As A Service
  - Software As A Service
  - Container As A Service
  - Database As A Service
  - Function As A Service
- **Focus on programmability and automation**:
  - RESTful APIs
  - Software Defined Networking
  - Software Defined Storage

# Cloud computing – access to resources

- **Cloud models:**
  - Public
  - Private
  - Hybrid
- **Resource sharing**
  - virtualization
  - containers
- **Dynamic scaling**
  - Capacity planning is key
- **Immediate resource availability**
  - No queuing systems
- **Pay as you go**

## Cloud computing – Benefits for users

- **Minimize** up-front IT infrastructure **costs**
- **Faster** application **deployment**
- Improved **manageability**
- **Less maintenance**
- Adjust resources to **meet fluctuating demands**

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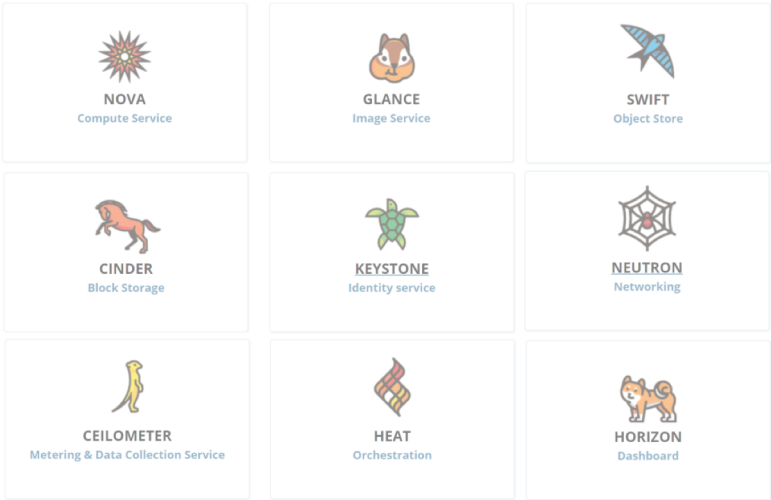
# OpenStack

## Cloud computing – OpenStack

"OpenStack is a free and **open-source software platform** for **cloud computing**, mostly deployed as infrastructure-as-a-service (**IaaS**), whereby **virtual servers and other resources** are made available to customers."

# Cloud computing – OpenStack in details

- **First released in 2010**
  - Austin, … , Mitaka, Newton, Ocata, Pike, **Queens**, Rocky, Stein, etc.
- **Web** based dashboard, **CLI**, **REST API**
- **60+ projects**
  - **Nova, Horizon, Keystone, Cinder, Swift, Neutron, Glance, Heat**, **Ironic, Mistral,** Manila, Octavia, Designate, Barbican, Aodh, Telemetry, Magnum, Sahara, Trove, Monasca, Rally, Tempest, Zaqar, Murano, etc.
- Several tools facilitate **deployments and upgrades**:
  - **TripleO**, Fuel, Bright OpenStack, Kayobe, Openstack Ansible, etc.



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# OpenStack at CSCS

## OpenStack at CSCS - Use cases

- **Scientific collaboratories, modern workflows, development**
  - **MARVEL** – National Centre of Competence in research
  - **HBP** – Human Brain Project
  - **PRACE** – Partnership for Advanced Computing in Europe
  - **CTA** – Chernekov Telescope Array
  - **SDSC** – Swiss Data Science Center

# OpenStack at CSCS - Pollux

- **Pollux** is CSCS's general purpose OpenStack system
  - since summer 2017
- **~433 VMs**
- **~338 users**
- VM uptime In 2018:
  - **99.93%** unplanned
  - **99.76%** unplanned and planned
- Currently at version Queens
  - RedHat OpenStack Platform 13

- Request access from help@cscs.ch !

# Integration to CSCS

- **Full access** from/to the **Internet**
  - Isolated from the internal network
- Same **credentials** as the rest of the center
  - Authentication with LDAP+KRB
- **Federated authentication** with SAML
- Back end integration to the CSCS storage infrastructure
  - **NFS/Spectrum Scale/SAN storage**
  - **Spectrum Protect tape library**
- **CI/CD** infrastructure runs also on Pollux
  - Internal scientific software builds

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# Using OpenStack

## Creating VMs from the GUI

- You can **create VMs** and execute other actions using the **graphical interface**
- The graphical interface of OpenStack is called **Horizon,** it can be reached at the URL:
  - **https://pollux.cscs.ch**
- Many operations can be done graphically, but the **command line** is much more complete

https://pollux.cscs.ch/dashboard/auth/login/?next=/dashboard/

redhat

RED HAT OPENSTACK PLATFORM

If you are not sure which authentication method to use, contact your administrator.

Authenticate using

CSCS

Connect

https://auth.cscs.ch/auth/realms/cscs/login-actions/authenticate?execution=5f158554-1f65-4d01-b880-b263d9ac5e85&client_i

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## Access to CSCS

### With CSCS account

Username

Password

Remember me

LOG IN

Forgot Password?

### With third-party account (beta)

Alternatively, you can sign in using another provider (you still need to have a CSCS account linked to it)
Further documentation can be found here

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Help Privacy Terms

**Swiss National Supercomputing Centre**
Via Trevano 131, 6900 Lugano, Switzerland

Phone - +41 91 610 08 11
Email - help@cscs.ch

https://pollux.cscs.ch/dashboard/project/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network | Orchestration | Data Processing | Object Store

Overview | Instances | Images | Key Pairs

Project / Compute / Overview

# Overview

## Limit Summary

**Instances**
Used 2 of 10

**VCPUs**
Used 18 of 20

**RAM**
Used 68GB of 100GB

**Floating IPs**
Allocated 3 of 50

**Security Groups**
Used 5 of 10

**Volumes**
Used 2 of 10

**Volume Storage**
Used 120GB of 200GB

## Usage Summary

Select a period of time to query its usage:

The date should be in YYYY-MM-DD format.

2019-09-04 to 2019-09-05 Submit

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network | Orchestration | Data Processing | Object Store

Overview | Instances | Images | Key Pairs

Project / Compute / Instances

# Instances

Instance ID = | Filter | Launch Instance | Delete Instances | More Actions

Displaying 2 items

| Instance Name | Image Name | IP Address | Flavor | Key Pair | Status | Availability Zone | Task | Power State | Time since created | Actions |
|---|---|---|---|---|---|---|---|---|---|---|
| aai4soa_web_server | - | 10.1.0.7<br>Floating IPs:<br>148.187.97.189 | m1.small2 | pasmarco2 | Active | nova | None | Running | 6 months | Create Snapshot |
| aai4soa_packstack_big | - | 10.1.0.17<br>Floating IPs:<br>148.187.97.185 | m1.x-large | pasmarco2 | Active | nova | None | Running | 6 months, 1 week | Create Snapshot |

Displaying 2 items

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes

Overview | Instances | Images

Project / Compute / Instances

# Instances

Displaying 2 items

| Instance Name | Im | e created | Actions |
|---|---|---|---|
| aai4soa_web_server | - | | Create Snapshot |
| aai4soa_packstack_big | - | 1 week | Create Snapshot |

Displaying 2 items

Delete Instances | More Actions

## Launch Instance

- Details
- Source *
- Flavor *
- Networks *
- Network Ports
- Security Groups
- Key Pair
- Configuration
- Server Groups
- Scheduler Hints
- Metadata

Please provide the initial hostname for the instance, the availability zone where it will be deployed, and the instance count. Increase the Count to create multiple instances with the same settings.

**Instance Name** *

my_test_instance

**Description**

**Availability Zone**

Any Availability Zone

**Count** *

1

Total Instances
(10 Max)

30%

2 Current Usage
1 Added
7 Remaining

Cancel | ‹ Back | Next › | Launch Instance

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes

Overview | Instances | Images

Project / Compute / Instances

# Instances

Displaying 2 items

| Instance Name | ... | ...ce created | Actions |
|---|---|---|---|
| aai4soa_web_server | - | | Create Snapshot |
| aai4soa_packstack_big | - | ..., 1 week | Create Snapshot |

Displaying 2 items

Delete Instances | More Actions

## Launch Instance

- Details
- Source
- Flavor *
- Networks *
- Network Ports
- Security Groups
- Key Pair
- Configuration
- Server Groups
- Scheduler Hints
- Metadata

Instance source is the template used to create an instance. You can use an image, a snapshot of an instance (image snapshot), a volume or a volume snapshot (if enabled). You can also choose to use persistent storage by creating a new volume.

**Select Boot Source**: Image

**Create New Volume**: Yes | No

**Volume Size (GB)** *: 10

**Delete Volume on Instance Delete**: Yes | No

**Device Name**: vda

### Allocated

| Name | Updated | Size | Type | Visibility |
|---|---|---|---|---|
| CentOS-7-x86_64-GenericCloud-1905 | 7/30/19 3:01 PM | 8.00 GB | raw | Public |

### Available 2

Select one

Click here for filters.

| Name | Updated | Size | Type | Visibility |
|---|---|---|---|---|
| CirrOS-0.3.5 | 7/30/19 3:46 PM | 12.65 MB | qcow2 | Public |
| Ubuntu-18.04 | 7/30/19 3:54 PM | 320.94 MB | raw | Public |

Cancel | Back | Next | Launch Instance

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes

Launch Instance

Overview | Instances

Project / Compute / Instances

# Instances

Displaying 2 items

| Instance Name |
|---|
| aai4soa_web_server |
| aai4soa_packstack_big |

Displaying 2 items

https://pollux.cscs.ch/dashboard/project/volumes/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network | Orchestration | Data Processing | Object Store

Volumes | Backups | Snapshots | Consistency Groups | Consistency Group Snapshots

Project / Volumes / Volumes

# Volumes

Filter | + Create Volume | Accept Transfer | Delete Volumes

Displaying 3 items

| Name | Description | Size | Status | Type | Attached To | Availability Zone | Bootable | Encrypted | Actions |
|---|---|---|---|---|---|---|---|---|---|
| 62f8adac-ef8a-4aef-a4e4-338520b4e54c | - | 40GiB | In-use | NFS | /dev/vda on my_test_instance | nova | Yes | No | Edit Volume |
| f7549eac-fe0e-4085-910d-77ebab619e0e | - | 20GiB | In-use | Bronze | /dev/vda on aai4soa_web_server | nova | Yes | No | |
| 41268808-f818-478f-8af7-b2afb94d4b9c | - | 100GiB | In-use | Bronze | /dev/vda on aai4soa_packstack_big | nova | Yes | No | |

Displaying 3 items

- Manage Attachments
- Create Snapshot
- Create Backup
- Change Volume Type
- Upload to Image
- Update Metadata

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes

Overview | Instances | Images

Project / Compute / Instances

# Instances

Displaying 2 items

| Instance Name | Im | e created | Actions |
|---|---|---|---|
| aai4soa_web_server | - | | Create Snapshot |
| aai4soa_packstack_big | - | 1 week | Create Snapshot |

Displaying 2 items

Delete Instances | More Actions

## Launch Instance

- Details
- Source
- Flavor
- Networks *
- Network Ports
- Security Groups
- Key Pair
- Configuration
- Server Groups
- Scheduler Hints
- Metadata

Flavors manage the sizing for the compute, memory and storage capacity of the instance.

### Allocated

| Name | VCPUS | RAM | Total Disk | Root Disk | Ephemeral Disk | Public |
|---|---|---|---|---|---|---|
| m1.small2 | 2 | 4 GB | 40 GB | 40 GB | 0 GB | Yes |

### Available 5

Select one

Click here for filters.

| Name | VCPUS | RAM | Total Disk | Root Disk | Ephemeral Disk | Public |
|---|---|---|---|---|---|---|
| m1.medium | 4 | 16 GB | 40 GB | 40 GB | 0 GB | Yes |
| m1.x-large | 16 | 64 GB | 40 GB | 40 GB | 0 GB | Yes |
| m1.tiny | 1 | 2 GB | 40 GB | 40 GB | 0 GB | Yes |
| m1.large | 8 | 32 GB | 40 GB | 40 GB | 0 GB | Yes |
| m1.small | 2 | 8 GB | 40 GB | 40 GB | 0 GB | Yes |

Cancel | Back | Next | Launch Instance

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes

Overview | Instances | Images

Project / Compute / Instances

# Instances

Displaying 2 items

| Instance Name | Im | ce created | Actions |
|---|---|---|---|
| aai4soa_web_server | - | | Create Snapshot |
| aai4soa_packstack_big | - | 1 week | Create Snapshot |

Displaying 2 items

Delete Instances | More Actions

## Launch Instance

- Details
- Source
- Flavor
- Networks
- Network Ports
- Security Groups
- Key Pair
- Configuration
- Server Groups
- Scheduler Hints
- Metadata

Networks provide the communication channels for instances in the cloud.

### Allocated 1

Select networks from those listed below.

| | Network | Subnets Associated | Shared | Admin State | Status |
|---|---|---|---|---|---|
| 1 | aai4soa_network | aai4soa_subnet | No | Up | Active |

### Available 1

Select at least one network

Click here for filters.

| Network | Subnets Associated | Shared | Admin State | Status |
|---|---|---|---|---|
| ext-net1 | ext-net1_subnet | Yes | Up | Active |

Cancel | Back | Next | Launch Instance

https://pollux.cscs.ch/dashboard/project/network_topology/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network | Orchestration | Data Processing | Object Store

Network Topology | Networks | Routers | Security Groups | Load Balancers | Floating IPs | Trunks

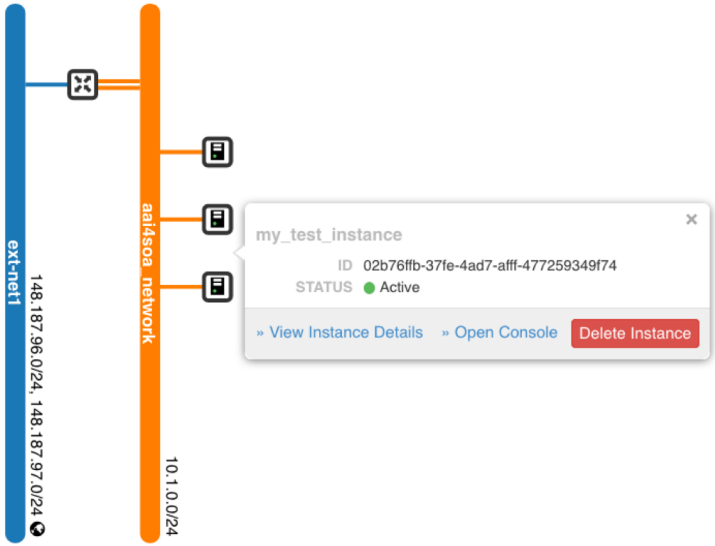
Project / Network / Network Topology

# Network Topology

Launch Instance | + Create Network | + Create Router

Topology | Graph

Small | Normal



https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes

Overview | Instances | Images

Project / Compute / Instances

# Instances

Displaying 2 items

| Instance Name | Im | e created | Actions |
|---|---|---|---|
| aai4soa_web_server | - | | Create Snapshot |
| aai4soa_packstack_big | - | 1 week | Create Snapshot |

Displaying 2 items

Delete Instances | More Actions

## Launch Instance

- Details
- Source
- Flavor
- Networks
- Network Ports
- Security Groups
- Key Pair
- Configuration
- Server Groups
- Scheduler Hints
- Metadata

Select the security groups to launch the instance in.

### Allocated 3

| Name | Description |
|---|---|
| default | Default security group |
| SSH | security group for SSH servers |
| HTTPS | security group for HTTP servers |

### Available 2

Select one or more

Click here for filters.

| Name | Description |
|---|---|
| HTTP | security group for HTTP servers |
| ALL_CSCS | security group for CSCS servers |

Cancel | Back | Next | Launch Instance

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes

Overview | Instances | Images

Project / Compute / Instanc

# Instances

Displaying 2 items

| Instance Name |
|---|
| aai4soa_web_server |
| aai4soa_packstack_b |

Displaying 2 items

Launch Instance

https://pollux.cscs.ch/dashboard/project/security_groups/c27dd4d2-1a35-478b-a7ae-13d8a3f1f5a2/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network | Orchestration | Data Processing | Object Store

Network Topology | Networks | Routers | Security Groups | Load Balancers | Floating IPs | Trunks

Project / Network / Security Groups / Manage Security Group Rul…

# Manage Security Group Rules: SSH (c27dd4d2-1a35-478b-a7ae-13d8a3f1f5a2)

+ Add Rule | Delete Rules

Displaying 3 items

| Direction | Ether Type | IP Protocol | Port Range | Remote IP Prefix | Remote Security Group | Actions |
|---|---|---|---|---|---|---|
| Egress | IPv4 | Any | Any | 0.0.0.0/0 | - | Delete Rule |
| Egress | IPv6 | Any | Any | ::/0 | - | Delete Rule |
| Ingress | IPv4 | TCP | 22 (SSH) | 0.0.0.0/0 | - | Delete Rule |

Displaying 3 items

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes

Overview | Instances | Images

Project / Compute / Instances

# Instances

Displaying 2 items

| Instance Name | Im | e created | Actions |
|---|---|---|---|
| aai4soa_web_server | - | | Create Snapshot |
| aai4soa_packstack_big | - | 1 week | Create Snapshot |

Displaying 2 items

Delete Instances | More Actions

## Launch Instance

- Details
- Source
- Flavor
- Networks
- Network Ports
- Security Groups
- **Key Pair**
- Configuration
- Server Groups
- Scheduler Hints
- Metadata

A key pair allows you to SSH into your newly created instance. You may select an existing key pair, import a key pair, or generate a new key pair.

+ Create Key Pair | Import Key Pair

### Allocated

Displaying 1 item

| Name | Fingerprint |
|---|---|
| pasmarco2 | 14:9a:67:45:4a:44:5e:81:9b:e5:db:91:d4:37:98:f5 |

Displaying 1 item

### Available 0

Select one

Click here for filters.

Displaying 0 items

| Name | Fingerprint |
|---|---|
| *No items to display.* | |

Displaying 0 items

Cancel | < Back | Next > | Launch Instance

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network | Orchestration | Data Processing | Object Store

Overview | Instances | Images | Key Pairs

Project / Compute / Instances

# Instances

Instance ID = | Filter | Launch Instance (Quota exceeded) | Delete Instances | More Actions

Displaying 3 items

| Instance Name | Image Name | IP Address | Flavor | Key Pair | Status | Availability Zone | Task | Power State | Time since created | Actions |
|---|---|---|---|---|---|---|---|---|---|---|
| my_test_instance | - | 10.1.0.28 | m1.small2 | pasmarco2 | Active | nova | None | Running | 1 minute | Create Snapshot |
| aai4soa_web_server | - | 10.1.0.7<br>Floating IPs:<br>148.187.97.189 | m1.small2 | pasmarco2 | Active | nova | None | Running | 6 months | Create Snapshot |
| aai4soa_packstack_big | - | 10.1.0.17<br>Floating IPs:<br>148.187.97.185 | m1.x-large | pasmarco2 | Active | nova | None | Running | 6 months, 1 week | Create Snapshot |

Displaying 3 items

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network

Overview | Instances | Images | Key Pairs

Project / Compute / Instances

# Instances

## Manage Floating IP Associations

**IP Address** *

148.187.97.67

**Port to be associated** *

my_test_instance: 10.1.0.28

Select the IP address you wish to associate with the selected instance or port.

Cancel | Associate

nce (Quota exceeded) | Delete Instances | More Actions

Displaying 3 items

| Instance Name | Image Name | IP Address | Flavor | Key Pair | Status | | Availability Zone | Task | Power State | Time since created | Actions |
|---|---|---|---|---|---|---|---|---|---|---|---|
| my_test_instance | - | 10.1.0.28 | m1.small2 | pasmarco2 | Active | | nova | None | Running | 5 minutes | Create Snapshot |
| aai4soa_web_server | - | 10.1.0.7<br>Floating IPs:<br>148.187.97.189 | m1.small2 | pasmarco2 | Active | | nova | None | Running | 6 months | Create Snapshot |
| aai4soa_packstack_big | - | 10.1.0.17<br>Floating IPs:<br>148.187.97.185 | m1.x-large | pasmarco2 | Active | | nova | None | Running | 6 months, 1 week | Create Snapshot |

Displaying 3 items

https://pollux.cscs.ch/dashboard/project/instances/

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network | Orchestration | Data Processing | Object Store

Overview | Instances | Images | Key Pairs

Project / Compute / Instances

# Instances

Instance ID = | Filter | Launch Instance (Quota exceeded) | Delete Instances | More Actions

Displaying 3 items

| Instance Name | Image Name | IP Address | Flavor | Key Pair | Status | Availability Zone | Task | Power State | Time since created | Actions |
|---|---|---|---|---|---|---|---|---|---|---|
| my_test_instance | - | 10.1.0.28<br>Floating IPs:<br>148.187.97.67 | m1.small2 | pasmarco2 | Active | nova | None | Running | 5 minutes | Create Snapshot |
| aai4soa_web_server | - | 10.1.0.7<br>Floating IPs:<br>148.187.97.189 | m1.small2 | pasmarco2 | Active | nova | None | Running | 6 months | Create Snapshot |
| aai4soa_packstack_big | - | 10.1.0.17<br>Floating IPs:<br>148.187.97.185 | m1.x-large | pasmarco2 | Active | nova | None | Running | 6 months, 1 week | Create Snapshot |

Displaying 3 items

# CLI access

- You can fully **operate OpenStack from the command line**
- First **configure your environment** for CSCS access as documented in https://user.cscs.ch/tools/openstack/
- This is a simplified example of how to create a VM:

```
$ source pollux.env
        (then choose the project you want to run in)
$ openstack server create --flavor m1.small \
                          --image CentOS7 \
                          --security-group default \
                          --key-name my_key \
                          my_test_instance
```

- The complete **CLI command documentation** is available at:
  - https://docs.openstack.org/python-openstackclient/queens/cli/command-list.html

# Creating VMs with Ansible

- Ansible is one of the tools you can use to define your **infrastructure as code**
- **Ansible OpenStack modules documentation** it available at: https://docs.ansible.com/ansible/latest/modules/list_of_cloud_modules.html#openstack
- E.g.:

```
- name: Create server instance
  os_server:
    state: present
    name: marco_http_server
    image: CentOS-7
    flavor: m1.small
    boot_from_volume: True
    volume_size: 15
    security_groups:
      - SSH
      - HTTP
      - default
    key_name: ”my_key"
```

# Object storage

## Object storage

- “The **OpenStack Object Store** project, known as **Swift**, offers **cloud storage software** so that you can **store and retrieve lots of data with a simple API**. It's built for **scale** and optimized for **durability**, **availability**, and **concurrency** across the entire data set. Swift is ideal for storing **unstructured data** that can grow without bound. “

SWIFT

an OpenStack Community Project

# Object storage

- Two entities:
  - **Objects** (~files)
  - **containers** (~directories)
- Access through **REST APIs**, but there are many clients available (explained in the next slides)
- **Role based access control** (RBAC)
  - Users can have different roles on different projects (admin, normal user, data operator etc)
- **Access control lists** (ACL)
  - **R and/or W** access can be potentially granted **to specific users on specific projects**
  - **Public** access is available
  - **Temporary URLs** for anonymous access
- **Metadata** can be associated to objects and containers
- **Documentation** for CSCS' Swift: https://user.cscs.ch/storage/object_storage/

https://pollux.cscs.ch/dashboard/project/containers/container/PID

RED HAT OPENSTACK PLATFORM | Project | Identity | Project | Help | pasmarco

Project | Compute | Volumes | Network | Orchestration | Data Processing | Object Store

Containers

Project / Object Store / Containers

# Containers

+ Container

Click here for filters.

Mytest_file.txt

PID

**Object Count:** 7
**Size:** 997 bytes
**Date Created:** Apr 17, 2019
**Public Access:** Disabled

TEST_SGORINI

TEST_SGORINI_versions

TEST_birgit

TestCJM

TestCJM_versions

aiellir

aiellir_versions

## PID

Click here for filters. + Folder

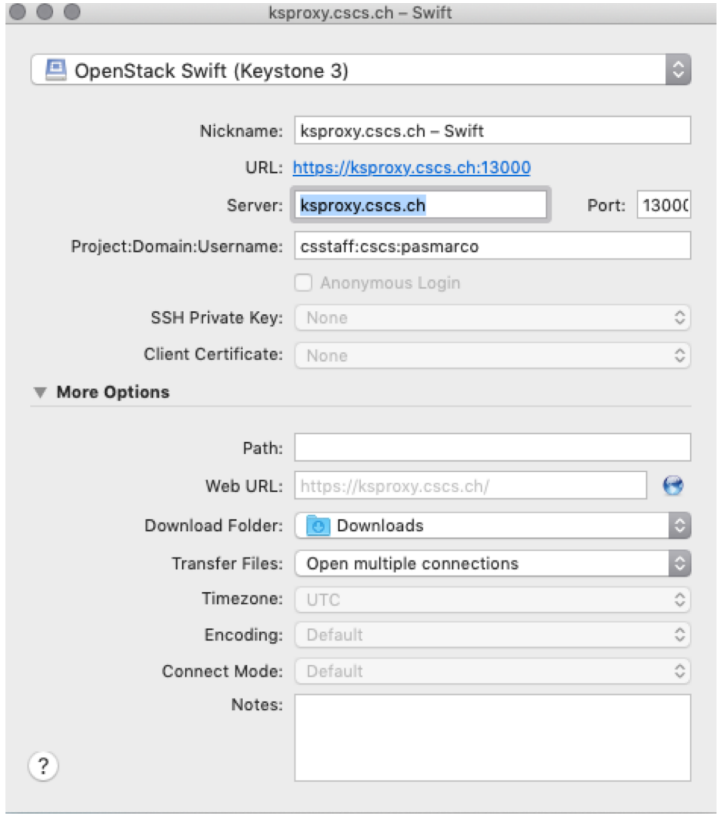
Displaying 7 items

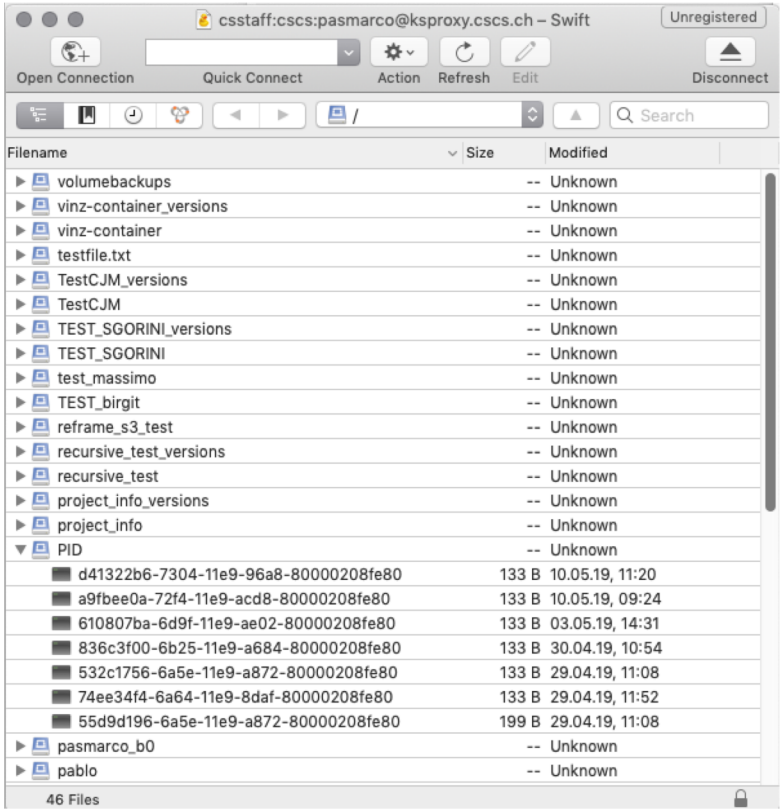
| Name | Size | |
|---|---|---|
| 532c1756-6a5e-11e9-a872-80000208fe80 | 133 bytes | Download |
| 55d9d196-6a5e-11e9-a872-80000208fe80 | 199 bytes | Download |
| 610807ba-6d9f-11e9-ae02-80000208fe80 | 133 bytes | Download |
| 74ee34f4-6a64-11e9-8daf-80000208fe80 | 133 bytes | Download |
| 836c3f00-6b25-11e9-a684-80000208fe80 | 133 bytes | Download |
| a9fbee0a-72f4-11e9-acd8-80000208fe80 | 133 bytes | Download |
| d41322b6-7304-11e9-96a8-80000208fe80 | 133 bytes | Download |

Displaying 7 items

# CyberDuck access

- Documented at https://user.cscs.ch/storage/object_storage/cyberduck/



# CLI access

- You can access Swift from the OpenStack CLI, e.g.:

```
$ source pollux.env
$ openstack container list
+-------------------------------+
| Name                          |
+-------------------------------+
| my_container                  |
+-------------------------------+
$ openstack object list my_container
+--------------------------------------+
| Name                                 |
+--------------------------------------+
| a_test_file                          |
| another_test_file.dat                |
+--------------------------------------+
$ openstack object upload my_container test.txt
+-------------------+--------------+----------------------------------+
| object            | container    | etag                             |
+-------------------+--------------+----------------------------------+
| test.txt          | my_container | 89c062b7d89091b7bb5768174a2c038c |
+-------------------+--------------+----------------------------------+
$ swift stat my_container /home/ma/test.txt
               Account: AUTH_21e698ff1238438fabc72e5cf9d59165
             Container: my_container
                Object: test.txt
          Content Type: text/plain
        Content Length: 141418
         Last Modified: Tue, 03 Sep 2019 13:38:56 GMT
                  ETag: 89c062b7d89091b7bb5768174a2c038c
         Accept-Ranges: bytes
           X-Timestamp: 1567517935.49746
            X-Trans-Id: tx15f2fb66d46c4984beef8-005d6e6cfa
X-Openstack-Request-Id: tx15f2fb66d46c4984beef8-005d6e6cfa
$ openstack object save my_container test.txt
$ openstack object delete my_container test.txt
```

# Other access options

- It’s also possible to access Swift from:
  - **S3 interface**
    - e.g. with s3curl
  - **Python OpenStack libraries**
  - **REST APIs**

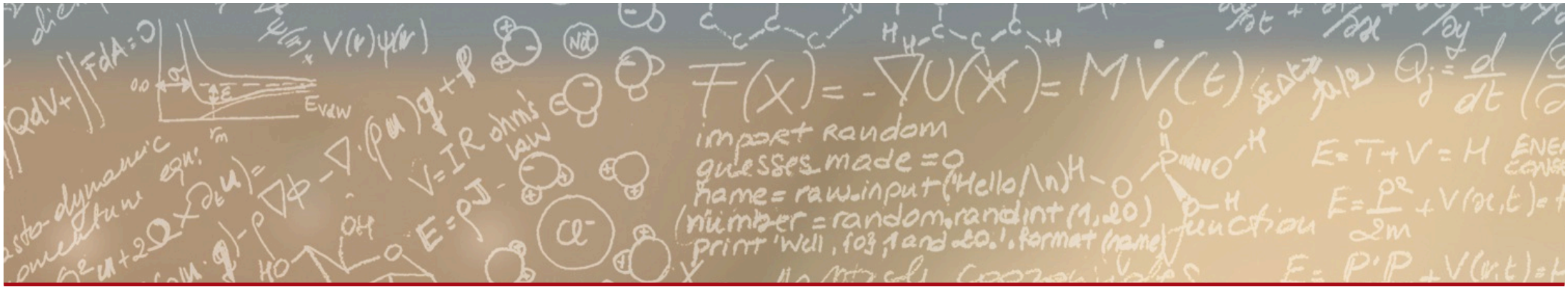
# Conclusion

## Conclusion

- **Pollux** is CSCS's **OpenStack platform** for your **cloud workloads**!
- **Get access** by writing to:
  - help@cscs.ch
- The **system documentation** is on the User Portal:
  - https://user.cscs.ch/

CSCS
Centro Svizzero di Calcolo Scientifico
Swiss National Supercomputing Centre

ETH zürich




# Thank you for your attention.