How to create an instance of virtual machine in your Project

1. Log in to the dashboard https://cloud.hpc.cineca.it

After subscribing, go to the OpenStack dashboard at https://cloud.hpc.cineca.it, select “CINECA IdP” as Authentication method and then insert your HPC-CINECA credential to login in.

After the login, on the top-right of the window is displayed your user name, while on the top-left there are all the Projects you are associated listed in a menu.

The Projects are organizational units in the cloud. Each user is a member of one or more projects. Within a Project, a user can create and manage instances, security groups, volumes, images, and more.

From the Project tab, you can view and manage the resources assigned in a particular project, including instances, images and volumes. You can select one of the project you are associated by the menu on the top-left side of the window.
2. Check and configure the Internal Network in the Project

In order to build and use virtual machine within a specific Project, it is mandatory the presence of the internal network, subnet and router.

Select the Project of interest and check the presence of such components click on tab Project  Network  Network Topology.

If it is present only the "external network", you must create network, subnet and router. Please, follow the instruction below:

- Create private network and subnet.

  Click on: Project -> Network -> Network Topology -> Create Network.

  Then set:

  - **Tab Network:**
    
    Network name: <the name you want>
    
    Enable Admin State: check
    
    Create Subnet: check

  - **Tab subnet:**
    
    Subnet name: <the name you want>
    
    Network Address (eg. 192.168.0.0/24)
    
    IP Version (IPv4)
    
    Gateway IP (eg, the last address 192.168.0.254 for subnet 192.168.0.0/24)
    
    Disable Gateway: disabled, uncheck

  - **Tab Subnet Details:**
    
    Enable DHCP: enabled, check
    
    Allocation Pools: leave blank
    
    Host Routers: leave blank

  Finally, click on “create”

- Create private router and set the gateway.
Click on: Project -> Network -> Routers -> Create Router.

Then set:

- **Router name:** <the name you want>
- **Enable Admin State:** check
- **External Network:** select "externalNetwork"

Finally, click on "create router".

Now, select the router just created and click on "Interfaces" and then on "Add interface"

- **subnet:** select the subnet
- **IP address:** write THE SAME IP ADDRESS of the gateway, in this example it is 192.168.0.254

Finally click on "Submit".

Verify that the Status of router is “ACTIVE” and the Admin state is “UP”.

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### 3. Set up a keypairs

Keypairs are used to access virtual machines when:

1. the instance is launched using a default image for cloud (e.g. centos or ubuntu)
2. in the virtual machine is set a login with ssh -key

You can set up a keypair in two ways. From "Project Compute Key Pairs" menu, you can:

- click on "Create Key Pair", to obtain a new key pair.
- click on "import Public Key" to import your key pair.

Remember to modify the permission of the key file to 600 in order to avoid errors when you use it to login to your virtual machine.

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### 4. Set the security rules, that will be the firewall of your virtual machine

The firewall of the virtual machine must be defined using the OpenStack Security Groups and Security Rules.

Inside the virtual machine, the firewall must be disabled.

A **security rule** defines which traffic is allowed to instances assigned to the security group.

A **security group** is a group of security rules that can be assigned to an instance.
The security groups and security rules can be created click on "Project Network Security Groups".

Common default rules are:

- SSH (port 22)
- ICMP (allow to "ping" a server)
- HTTP (port 80)
- HTTPS (port 443)

Note: It is always possible to modify, add and remove security groups in a virtual machine after its creation.

- If you modify a security group, adding or removing rules, and the security group is already associated to the virtual machine, the changes will be available in real time
- If you want add or remove a security group from a virtual machine, click on “Project Compute Instances”, select the virtual machine and from the menu on the right, click on "Edit Security Group". So, add or remove the security groups to the instance.

5. Launch an instance of Linux virtual machine

Once your key pair and your security group is defined, proceed building the virtual machine.

- Click on “Project Compute Instances”
- Click on “Launch instance” button
- In the “Details” box, enter:
  - the instance name
  - the instance number (count)
- In the "Source" box, enter:
  - the boot source for the instance. Can be an image, a bootable volume or a bootable volume snapshot.
    - Images: we provide some default images (centos, ubuntu, etc.). For this default images, it is set a default user that can login into the virtual machine using a key pair. Such user can execute commands as root. The password of the user root is embedded. If you want to use your personal image, you can create it in the cloud environment click on “Project Compute Images”, the “Create Image” and upload it.
    - Note If you want to create a bootable volume from your instance, select “yes” in "Create New Volume" and select the size of such volume.
- In the “Flavor” box, select the flavor you want to use, accordingly with the resources you have.
  - NB: if you select to create a volume from your instance, the root disc of the virtual machine will have the size of the volume, not the size set in the flavor
- In the "Networks" box, enter the network internal to your project on which connect the virtual machine
- In the "Security Groups" box, select the security groups you want. Remember that you can always modify them after the virtual machine creation.
- In the "Key Pair" box, select the key pair you want to use for ssh login.
6. Follow the boot process

The boot process can be followed on the instances screen. Once the VM is in state ACTIVE, you will be able to open the console and follow the boot process.

To follow the installation, you can access the graphical console using the browser once the VM is in BUILD state.

The console is accessed by selecting the "Instance Details" for the machine and then click on the tab "Console".

7. Associate a Floating IP (FIP) to the virtual machine

Where floating IPs are configured in a deployment, each project will have a limited number of floating IPs controlled by a quota. However, these need to be allocated to the project from the central pool prior to their use.

To allocate a floating IP to a project, click on "Project Network Floating IPs", then click on the button "Allocate IP to project" on the right side of the dashboard page.

Once allocated, a floating IP can be associated to running instances click on "Associate" action on the right of the page. In the popup, select your virtual machine by the menu in "Port to be associated".

The inverse action, Dissociate Floating IP, is available from "Instances" page.

8. Login to the virtual machine using ssh

After the association of a Floating IP to your virtual machine,

you can login using the default user and key (if you have used a native default image for cloud), or using an other username (if you have used your personal image with a custom user defined in it).

Suppose you have used the default ubuntu cloud image, you can login as:

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$ ssh -i MyKey.pem ubuntu@<floating IP address>
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