# Basic Virtual Machine creation at CERN cloud with OpenStack under Linux
### (August 2016)

- OpenStack software controls large pools of compute, storage, and networking resources throughout a data-center, managed through a dashboard or via OpenStack API.

- A complete guide for understanding how *CERN cloud infrastructure* works can be found in: https://clouddocs.web.cern.ch/clouddocs/

Main Steps (Everything must be done from our *lxplus* profile):

- Log on to your lxplus:
  ```
  $ ssh lxplus.cern.ch
  ```

- Setting the environment. We need to make the system understand OpenStack software. In our **home directory** a file called .openrc should be created with *(use Vim or any other text editor)*:

  ```
  $ vim .openrc (then press i to insert text)
  export OS_AUTH_URL=https://keystone.cern.ch/krb/v3
  export OS_AUTH_TYPE=v3kerberos
  export OS_USERNAME=`id -un`
  export OS_TENANT_NAME="Personal $OS_USERNAME"
  export OS_IDENTITY_API_VERSION=3
  export OS_PROJECT_DOMAIN_ID=default
  ```

  ```
  (then press esc and :wq to quit saving)
  ```

  ```
  Sourcing from the new file:

  $ source .openrc
  ```

- Creating our own keypair.

  Creating a keypair if we don't have one
  ```
  $ ssh-keygen -t dsa
  ```

  Upload the new keypair to our profile
  ```
  $ openstack keypair create --public-key ~/.ssh/id_dsa.pub $key_name$
  ```

- Now, everything is ready to **create our first Virtual Machine**, let's first use CERN precompiled images. To list them

  ```
  $ openstack image list
  ```

  From the list, choose your favorite distro and include it as a parameter, in addition to the keypair that you have created in the last step.

  ```
  $ openstack server create --key-name $key_name$ --flavor m2.small –image \
  "SLC6 CERN" $VM_name$
  ```

## Choosing VM flavor:

You are allowed to choose the size of your future VM between some standard options that CERN Cloud offers. These options goes from a tiny machine of 1 core and 512 MB of RAM to 4 cores and 8 GB with 120 GB of HHD. Each flavor has a standard name that you will have to include in the VM creation command.

```
ID      | Name         | RAM  | Disk | Ephemeral | Swap | VCPUs |
+-------+--------------+------+------+-----------+------+-------+
| 1     | m1.tiny      |  512 |   0  |        0  |      |    1  |
| 2     | m1.small     | 2048 |  20  |        0  |      |    1  |
| 3     | m1.medium    | 4096 |  40  |        0  |      |    2  |
| 4     | m1.large     | 8192 |  80  |        0  |      |    4  |
| 17895 | m2.small     | 1875 |  10  |        0  |      |    1  |
| 38242 | m2.medium    | 3750 |  20  |        0  |      |    2  |
| 12076 | m2.large     | 7500 |  40  |        0  |      |    4  |
| 50    | win.small    | 2048 |  60  |        0  |      |    1  |
| 51    | win.medium   | 4096 |  80  |        0  |      |    2  |
| 52    | win.large    | 8192 | 120  |        0  |      |    4   
```

*If your wish is to have a non-standard VM, open a ticket and cross the fingers.

## Choosing VM image (Standard VS User Supplied):

**Standard.** CERN cloud offers a set of images for the supported OS based con CERN CentOS and Scientific Linux. Images can be pulled with two different flavors, Base and Extra (AFS, auto updates...). There are also Windows images available.

**User supplied images.** CERN cloud users are allowed to use non-standard images but it is important to bear in mind that the cloud infrastructure does not support any non-standard images.

- Download the image from your favorite repository (following Ubuntu example):
  ```
  $ wget http://uec-images.ubuntu.com/quantal/$image_name$.img
  ```

- Create OpenStack image from the downloaded one and load it to your profile
  ```
  $ openstack image create "Ubuntu" \
  --disk-format=qcow2 --container-format=bare \
  --property hypervisor-type=qemu \
  --file $image_name$.img
  ```

- Check that the image is ready for you:
  ```
  $ openstack image list
  ```

Some others relevant services:

- VM deletion. Create and delete your VM as many times as you want.

- Create Snapshot. Once you have a stable version of your own system, save a copy and use it as image for other Vms. Use them for rollback and rebuild your own VM in case of failure. It is faster than recreate it.

- Create a boot volume. A very useful choice for not redundant servers that creates an external disk outside from the local disk of the hypervisor which becomes a single point of failure.

- Contextualisation of your VM. This only runs once your VM is created and allows the user to customize it further. Install new software, create additional users....

- Create your VM using a browser and manage it with an easy GUI.

- Containers, load balancing and many more!.

To know more....

https://clouddocs.web.cern.ch/clouddocs/

http://www.openstack.org/

https://en.wikipedia.org/wiki/Cloud_computing

https://www.openstack.org/user-stories/cern/