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TANGER



Master SIM

MODULE : Cloud Computing

Projet de Fin de Module :
Installation OpenStack & Implémentation IaaS et SaaS



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Introduction

OpenStack est un ensemble d'outils logiciels gratuits et open source utilisée pour le cloud computing. Il convient aux clouds publics et privés.

Openstack utilisé pour gérer et contrôler le stockage informatique, le réseau et d'autres ressources de gestion via un tableau de bord. Il est utilisé par de nombreuses grandes entreprises pour gérer leur serveur cloud.

Les raisons du choix de la méthode d'implémentation d'OpenStack

J'ai installé OpenStack à l'aide de l'utilitaire **PACKSTACK** car Packstack est un utilitaire qui utilise des modules Puppet pour déployer divers parties d'OpenStack sur plusieurs serveurs préinstallés via SSH automatiquement. Et aussi il a une grande communauté c'est-à-dire si on trouve des problèmes au niveau de l'installation. On va le résoudre rapidement. Ensuite, Packstack très facile et rapide.

Au niveau de la machine, J'ai installé openstack sur La distribution du Linux : Centos 7 avec 9Go dans RAM ,3 CPUs pour Le Processeur et 100 Go SSD.

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Les étapes d'installation OpenStack

1- Configuration du reseaux

- Stop/disable Firewallld and NetworkManager

```
systemctl stop firewalld
systemctl disable firewalld
systemctl stop NetworkManager
systemctl disable NetworkManager
systemctl restart network
```

```
tarik@localhost:~
[tarik@localhost ~]$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
[tarik@localhost ~]$ systemctl stop firewalld
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-units ===
Authentication is required to manage system services or units.
Authenticating as: root
Password:
==== AUTHENTICATION COMPLETE ===
[tarik@localhost ~]$ sudo systemctl disable firewalld
[sudo] password for tarik:
Removed symlink /etc/systemd/system/multi-user.target.wants/firewalld.service.
Removed symlink /etc/systemd/system/dbus-org.fedoraproject.FirewallD1.service.
[tarik@localhost ~]$
[tarik@localhost ~]$
[tarik@localhost ~]$ sudo systemctl stop NetworkManager
[tarik@localhost ~]$ sudo systemctl disable NetworkManager
Removed symlink /etc/systemd/system/multi-user.target.wants/NetworkManager.service.
Removed symlink /etc/systemd/system/dbus-org.freedesktop.nm-dispatcher.service.
Removed symlink /etc/systemd/system/network-online.target.wants/NetworkManager-wait-online.service.
[tarik@localhost ~]$
```

```
[tarik@localhost ~]$ systemctl restart network
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-units ===
Authentication is required to manage system services or units.
Authenticating as: root
Password:
==== AUTHENTICATION COMPLETE ===
[tarik@localhost ~]$
```

- Disable SELinux

On ouvre le fichier `/etc/selinux/config` à l'aide de la commande ci-dessous et modifiez la ligne de `SELINUX=enforcing` à `SELINUX=disabled`

```
Select tarik@msr:~
GNU nano 2.3.1 File: /etc/selinux/config

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#   enforcing - SELinux security policy is enforced.
#   permissive - SELinux prints warnings instead of enforcing.
#   disabled - No SELinux policy is loaded.
SELINUX=disabled
# SELINUXTYPE= can take one of three values:
#   targeted - Targeted processes are protected,
#   minimum - Modification of targeted policy. Only selected processes are protected.
#   mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

Après, On redémarre la machine par la commande : **reboot**

2- Installation d'OpenStack

Tout d'abord, on exécute la commande suivante pour installer le référentiel **openstack queens**

yum install centos-release-openstack-queens -y

```
tarik@localhost:~$ sudo yum install centos-release-openstack-queens -y
[sudo] password for tarik:
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: mirror.tedra.es
 * extras: mirror.marwan.ma
 * updates: mirror.tedra.es
Resolving Dependencies
--> Running transaction check
--> Package centos-release-openstack-queens.noarch 0:1-2.el7.centos will be installed
--> Processing Dependency: centos-release-qemu-ev for package: centos-release-openstack-queens-1-2.el7.centos.noarch
--> Processing Dependency: centos-release-ceph-luminous for package: centos-release-openstack-queens-1-2.el7.centos.noarch
--> Running transaction check
--> Package centos-release-ceph-luminous.noarch 0:1.1-2.el7.centos will be installed
--> Processing Dependency: centos-release-storage-common for package: centos-release-ceph-luminous-1.1-2.el7.centos.noarch
--> Package centos-release-qemu-ev.noarch 0:1.0-4.el7.centos will be installed
--> Processing Dependency: centos-release-virt-common for package: centos-release-qemu-ev-1.0-4.el7.centos.noarch
--> Running transaction check
--> Package centos-release-storage-common.noarch 0:2-2.el7.centos will be installed
--> Package centos-release-virt-common.noarch 0:1-1.el7.centos will be installed
^[[S
```

- **Install Packstack**

Packstack est un utilitaire de configuration d'OpenStack. On utilise la commande ci-dessous pour l'installer.

yum install openstack-packstack -y

```
tarik@localhost:~$ yum install openstack-packstack -y
python2-cryptography.x86_64 0:2.1.4-2.el7
python2-netaddr.noarch 0:0.7.19-5.el7
python2-pbr.noarch 0:3.1.1-8.el7
python2-pyOpenSSL.noarch 0:17.3.0-3.el7
ruby-augeas.x86_64 0:0.5.0-1.el7
ruby-irb.noarch 0:2.0.0.648-36.el7
ruby-shadow.x86_64 0:1.4.1-23.el7
rubygem-io-console.x86_64 0:0.4.2-36.el7
rubygem-psych.x86_64 0:2.0.0-36.el7
rubygem-rngen.noarch 0:0.6.6-2.el7
yaml-cpp.x86_64 0:0.5.1-6.el7
python2-idna.noarch 0:2.5-1.el7
python2-olefile.noarch 0:0.44-1.el7
python2-pillow.x86_64 0:4.0.0-1.el7
ruby.x86_64 0:2.0.0.648-36.el7
ruby-facter.x86_64 1:3.9.3-7.el7
ruby-libs.x86_64 0:2.0.0.648-36.el7
rubygem-bigdecimal.x86_64 0:1.2.0-36.el7
rubygem-json.x86_64 0:1.7.7-36.el7
rubygem-rdoc.noarch 0:4.0.0-36.el7
rubygems.noarch 0:2.0.14.1-36.el7
Replaced:
python-six.noarch 0:1.9.0-2.el7
Complete!
[tarik@localhost ~]$
```

- Install and Run OpenStack using Packstack

packstack --allinone

tarik@localhost:~

```
[tarik@localhost ~]$ sudo packstack --allinone
```

Welcome to the Packstack setup utility

The installation log file is available at: /var/tmp/packstack/20210619-133713-yoP223/openstack-setup.log

Packstack changed given value to required value /root/.ssh/id_rsa.pub

Installing:

```
Clean Up [ DONE ]
Discovering ip protocol version [ DONE ]
Setting up ssh keys [ DONE ]
Preparing servers [ DONE ]
Pre installing Puppet and discovering hosts' details [ DONE ]
Preparing pre-install entries [ DONE ]
Setting up CACERT [ DONE ]
Preparing AMQP entries [ DONE ]
Preparing MariaDB entries [ DONE ]
Fixing Keystone LDAP config parameters to be undef if empty [ DONE ]
Preparing Keystone entries [ DONE ]
Preparing Glance entries [ DONE ]
Checking if the Cinder server has a cinder-volumes vg [ DONE ]
Preparing Cinder entries [ DONE ]
Preparing Nova API entries [ DONE ]
Creating ssh keys for Nova migration [ DONE ]
Gathering ssh host keys for Nova migration [ DONE ]
Preparing Nova Compute entries [ DONE ]
Preparing Nova Scheduler entries [ DONE ]
Preparing Nova VNC Proxy entries [ DONE ]
Preparing OpenStack Network-related Nova entries [ DONE ]
Preparing Nova Common entries [ DONE ]
Preparing Neutron LBaaS Agent entries [ DONE ]
Preparing Neutron API entries [ DONE ]
Preparing Neutron L3 entries [ DONE ]
Preparing Neutron L2 Agent entries [ DONE ]
Preparing Neutron DHCP Agent entries [ DONE ]
Preparing Neutron Metering Agent entries [ DONE ]
Checking if NetworkManager is enabled and running [ DONE ]
Preparing OpenStack Client entries [ DONE ]
Preparing Horizon entries [ DONE ]
Preparing Swift builder entries [ DONE ]
Preparing Swift proxy entries [ DONE ]
Preparing Swift storage entries [ DONE ]
Preparing Gnocchi entries [ DONE ]
Preparing Redis entries [ DONE ]
Preparing Ceilometer entries [ DONE ]
Preparing Aodh entries [ DONE ]
Preparing Puppet manifests [ DONE ]
Copying Puppet modules and manifests [ DONE ]
Applying 192.168.1.20_controller.pp
Testing if puppet apply is finished: 192.168.1.20_controller.pp [ / ]
192.168.1.20_controller.pp: [ DONE ]
Applying 192.168.1.20_network.pp
192.168.1.20_network.pp: [ DONE ]
Applying 192.168.1.20_compute.pp
Testing if puppet apply is finished: 192.168.1.20_compute.pp [ \ ]
```

```
Applying 192.168.1.20_controller.pp
```

```
Testing if puppet apply is finished: 192.168.1.20_controller.pp [ / ]
```

```
192.168.1.20_controller.pp: [ DONE ]
```

```
Applying 192.168.1.20_network.pp
```

```
192.168.1.20_network.pp: [ DONE ]
```

```
Applying 192.168.1.20_compute.pp
```

```
192.168.1.20_compute.pp: [ DONE ]
```

```
Applying Puppet manifests [ DONE ]
```

```
Finalizing [ DONE ]
```

**** Installation completed successfully ****

Additional information:

- * A new answerfile was created in: /root/packstack-answers-20210619-133716.txt
- * Time synchronization installation was skipped. Please note that unsynchronized time on server instances might be problem for some OpenStack components.
- * File /root/keystonerc_admin has been created on OpenStack client host 192.168.1.20. To use the command line tools you need to source the file.
- * To access the OpenStack Dashboard browse to <http://192.168.1.20/dashboard>.

Please, find your login credentials stored in the keystone_admin in your home directory.

- * The installation log file is available at: /var/tmp/packstack/20210619-133713-yoP223/openstack-setup.log
- * The generated manifests are available at: /var/tmp/packstack/20210619-133713-yoP223/manifests

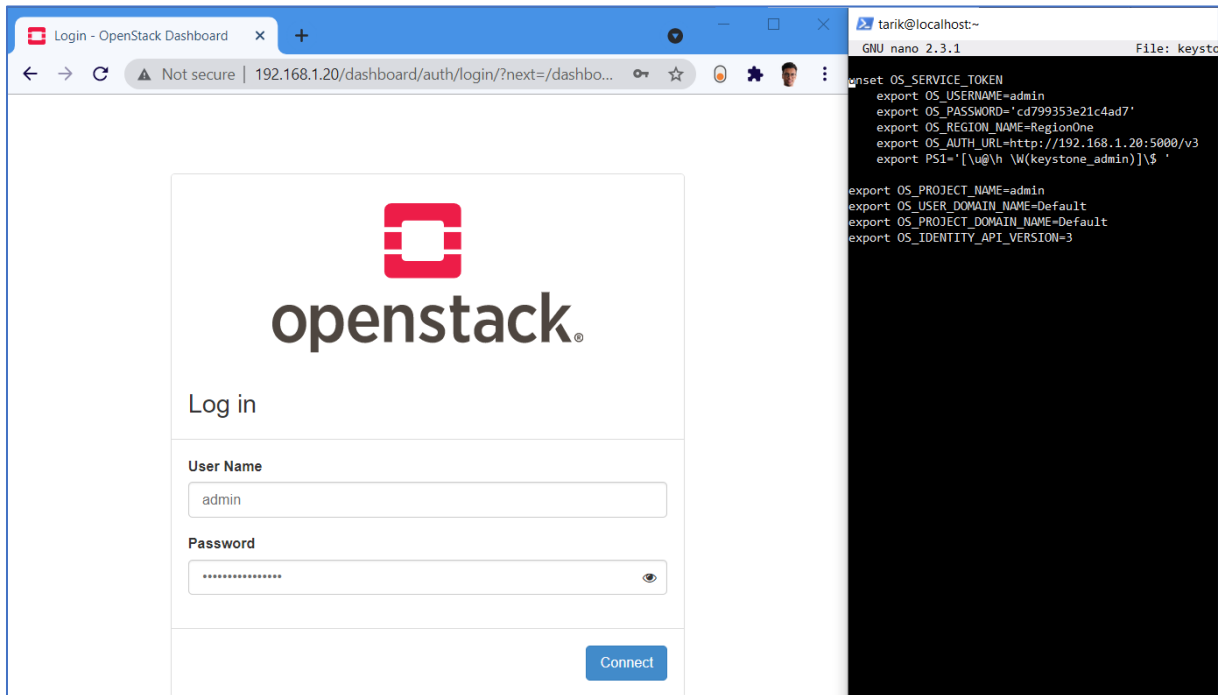
```
[tarik@localhost ~]$
```

3- Accéder à OpenStack

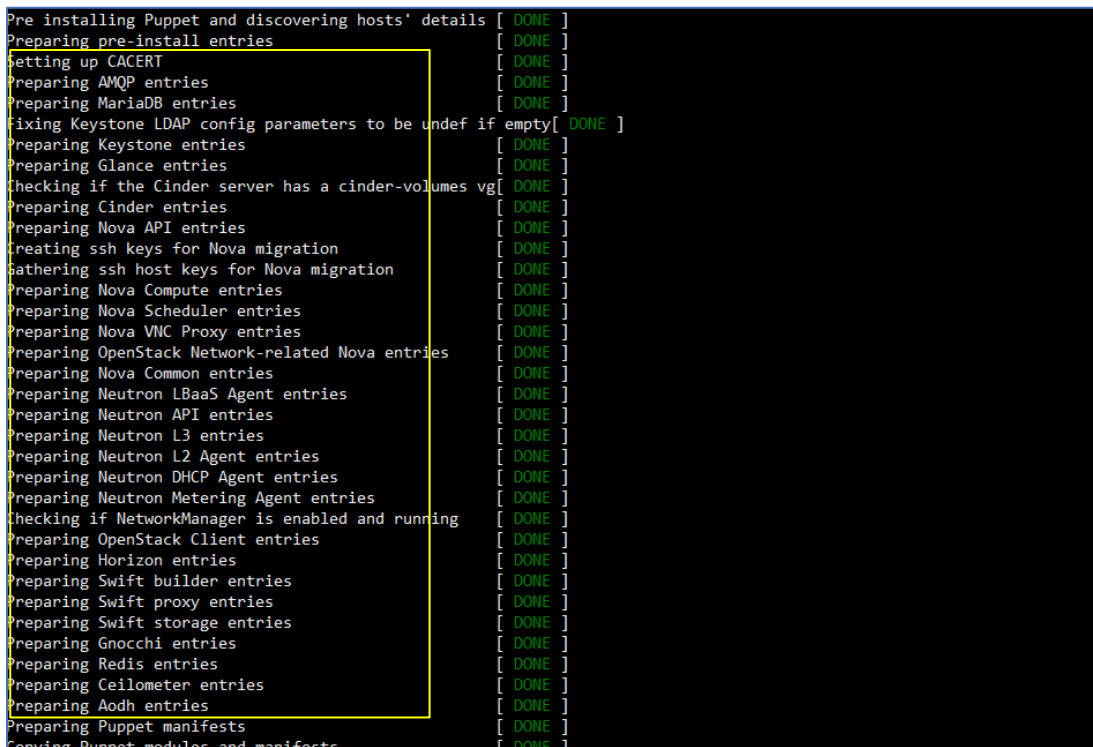
Une fois terminé, On ouvre notre navigateur Web et on utilise le lien ci-dessous pour accéder à OpenStack

<http://192.168.1.20/dashboard>

Note : Le nom d'utilisateur "**admin**" et son mot de passe est stocké dans le fichier : `/root/keystonerc_admin` .



4- Les modules installés et leurs rôles



Parmi les Modules Installés :

- **Keystone** : gère les authentifications et autorisations pour tous les services OpenStack.
- **Horizon** : interface web, permet de visualiser et d'agir sur les différents composants d'OpenStack
- **Neutron** fournit une connectivité réseau dans OpenStack avec des fonctionnalités avancées (tunneling, QoS, Réseaux virtuels et équilibrage de charge...)
- **Ceilometer**, composant de facturation, permet de calculer la consommation de chaque client
- **Glance** : offre un catalogue et un référentiel pour les machines virtuelles
- **Heat** propose des services d'orchestration comme par exemple, démarrer automatiquement une machine virtuelle supplémentaire en cas de charge importante.
- **Trove** offre une base de données en tant que service - DBaaS, DataBase as a Service - pour les moteurs de bases de données relationnelles et non relationnelles.
- **Sahara**, composant dédié au Big Data, offre des services de traitement des données.
- **Nova** : Le cœur d'OpenStack, s'occupe de la gestion des hyperviseurs et du contrôle des ressources
- **Swift** : assure la prise en charge de la gestion du stockage objet.
- **Cinder** : permet la gestion du stockage de type bloc

Implementation du module IaaS

1-creation du réseau

openstack admin

Project / Network / Networks

Networks

Name = Filter + Create Network Delete Networks

Create Network

Network Subnet Subnet Details

Network Name
Network1

Create a new network. In addition, a subnet associated with the network can be created in the following steps of this wizard.

☒ **Enable Admin State** ⓘ

☐ **Shared**

☒ **Create Subnet**

Availability Zone Hints ⓘ
nova

Cancel « Back Next »

Networks - OpenStack Dashboard

Not secure | 192.168.1.20/dashboard/project/networks/#/create_network_createsubnetinfoaction

openstack admin

Create Network

Network Subnet Subnet Details

Subnet Name
Subnet_1

Network Address ⓘ
10.0.2.0/24

IP Version
IPv4

Gateway IP ⓘ
10.0.2.1

☐ **Disable Gateway**

Creates a subnet associated with the network. You need to enter a valid "Network Address" and "Gateway IP". If you did not enter the "Gateway IP", the first value of a network will be assigned by default. If you do not want gateway please check the "Disable Gateway" checkbox. Advanced configuration is available by clicking on the "Subnet Details" tab.

Cancel « Back Next »

Edit Subnet

×

Subnet *

Subnet Details

☒ Enable DHCP

Specify additional attributes for the subnet.

Allocation Pools ?

10.0.2.2,10.0.2.254

DNS Name Servers ?

192.168.1.20

Host Routes ?

Cancel

« Back

Save

Networks - OpenStack Dashboard

+

Not secure

192.168.1.20/dashboard/project/networks/#/create_network_createsubnetinfoaction

☆

openstack.

admin

admin

Project

API Access

Compute

Volumes

Network

Network Topology

Networks

Routers

Security Groups

Floating IPs

Project / Network / Networks

Networks

Name =

Filter

+ Create Network

Delete Networks

Displaying 2 items

<input type="checkbox"/>	Name	Subnets Associated	Shared	External	Status	Admin State	Availability Zones	Actions
<input type="checkbox"/>	Network k1	Subnet_1 10.0.2.0/24	No	No	Active	UP	nova	Edit Network
<input type="checkbox"/>	public	public_subnet 172.24.4.0/24	No	Yes	Active	UP	-	Edit Network

Le réseau externe, appelé public, est automatiquement créé par le script OpenStack , avec le e sous-réseau est : 172.24.4.0/24.

2- Création du router

The screenshot shows the OpenStack dashboard with the 'Create Router' modal open. The modal contains the following fields and options:

- Router Name:** A text input field containing 'router_1'.
- Enable Admin State:** A checked checkbox.
- External Network:** A dropdown menu showing 'public'.
- Enable SNAT:** A checked checkbox.
- Availability Zone Hints:** A text area containing 'nova'.
- Description:** A text area with the text: 'Creates a router with specified parameters. Enable SNAT will only have an effect if an external network is set.'
- Buttons:** 'Cancel' and 'Create Router'.

Configuration du router

The screenshot shows the OpenStack dashboard with the configuration page for 'router_1'. The page has a sidebar with navigation links and a main content area with tabs for 'Overview', 'Interfaces', and 'Static Routes'. The 'Overview' tab is active, showing the following details:

Name	router_1
ID	16f18837-4cde-49a8-9e26-cd9f27766333
Description	
Project ID	887ff71c432b4cc68656502852bd5fd9
Status	Active
Admin State	UP
Availability Zones	<ul style="list-style-type: none">nova

Below the details, there is a section for 'External Gateway' with the following information:

Network Name	public
Network ID	7dfb484a-25e3-4adc-b8a0-e348df8ceb63
External Fixed IPs	<ul style="list-style-type: none">Subnet ID d747aca4-97b3-4528-a28e-c0cb8461a24fIP Address 172.24.4.9
SNAT	Enabled

On ajoute une interface

Not secure | 192.168.1.20/dashboard/project/routers/16f18837-4cde-49a8-9e26-cd9f27766333/

tack. admin

Project / Network / Routers / router_1

router_1 Clear Gateway

Overview Interfaces Static Routes

+ Add Interface Delete Interfaces

Displaying 1 item

Name	Fixed IPs	Status	Type	Admin State	Actions
(e0ed56d0-4ea8)	• 172.24.4.9	Active	External Gateway	UP	Delete Interface

192.168.1.20/dashboard/project/routers/16f18837-4cde-49a8-9e26-cd9f27766333/

min admin

Project / Network / Routers / router_1

router_1 Clear Gateway

Add Interface

Subnet *

Network1: 10.0.2.0/24 (Subnet_1)

IP Address (optional) ⓘ

10.0.2.1

Description:

You can connect a specified subnet to the router.

If you don't specify an IP address here, the gateway's IP address of the selected subnet will be used as the IP address of the newly created interface of the router. If the gateway's IP address is in use, you must use a different address which belongs to the selected subnet.

Cancel Submit

+ Add Interface Delete Interfaces

Displaying 2 items

Name	Fixed IPs	Status	Type	Admin State	Actions
(31f3e401-8933)	• 10.0.2.1	Active	Internal Interface	UP	Delete Interface
(e0ed56d0-4ea8)	• 172.24.4.9	Active	External Gateway	UP	Delete Interface

Displaying 2 items

On ajoute Floating Ips pour lier les interfaces interne et externe du routeur

Not secure | 192.168.1.20/dashboard/project/floating_ips/

stack. admin

Project / Network / Floating IPs

Floating IPs

Allocate Floating IP

Pool *

public

Description

Description:

Allocate a floating IP from a given floating IP pool.

Project Quotas

Floating IP 0 of 50 Used

Cancel Allocate IP

Not secure | 192.168.1.20/dashboard/project/floating_ips/

stack. admin

Project / Network / Floating IPs

Floating IPs

Floating IP Address = Filter Allocate IP To Project

Release Floating IPs

Displaying 1 item

	IP Address	Description	Mapped Fixed IP Address	Pool	Status	Actions
	172.24.4.11		-	public	Down	Associate

Displaying 1 item

3- Creation d'instance

← → ↻ Not secure | 192.168.1.20/dashboard/project/instances/

openstack. admin

Launch Instance

Details

Source *

Flavor *

Networks *

Network Ports

Security Groups

Key Pair

Configuration

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 *

admin

Description

Availability Zone

nova

Count *

1

Total Instances (10 Max)

10%

0 Current Usage
1 Added
9 Remaining

→

↶

↷

Not secure | 192.168.1.20/dashboard/project/instances/

☆

openstack.

admin

admin

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)*

1

Delete Volume on Instance Delete

Yes

No

Allocated

Name	Updated	Size	Type	Visibility
Select an item from Available items below				

▼ Available 1

Select one

Q

Click here for filters.

×

Name	Updated	Size	Type	Visibility
➤ cirros	6/19/21 6:13 PM	273 bytes	qcow2	Public

⬆

✕ Cancel

< Back

Next >

Launch Instance

←

→

↶

↷

Not secure | 192.168.1.20/dashboard/project/instances/

☆

openstack.

admin

admin

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	Public
Select an item from Available items below				

▼ Available 5

Select one

Q

Click here for filters.

×

Name	VCPUS	RAM	Total Disk	Public
➤ m1.tiny	1	512 MB	1 GB	Yes
➤ m1.small	1	2 GB	20 GB	Yes
➤ m1.medium	2	4 GB	40 GB	Yes
➤ m1.large	4	8 GB	80 GB	Yes
➤ m1.xlarge	8	16 GB	160 GB	Yes

⬆

⬆

⬆

⬆

⬆

Page 14 | 24

Not secure | 192.168.1.20/dashboard/project/instances/

openstack admin

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	Shared	Admin State	Status	
1	Network1	No	Up	Active	↓

▼ Available 1

Select at least one network

Click here for filters.

	Network	Shared	Admin State	Status	
	public	No	Up	Active	↑

Cancel < Back Next > Launch Instance

Not secure | 192.168.1.20/dashboard/project/instances/

ck. admin

Project / Compute / Instances

Instances

Overview

Instances

Instance ID = Filter Launch Instance Delete Instances More

Images Displaying 1 item

Key Pairs

	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
	admin	cirros	m1.tiny	-	Build	nova	None	No State	0 minutes	Associate Floating	

192.168.1.20/dashboard/project/instances/

min

Project / Compute / Instances

Instances

Displaying 1 item

Instance Name

admin

Manage Floating IP Associations

IP Address *

172.24.4.8

Port to be associated *

admin: 10.0.2.14

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

Cancel Associate

Block Device Mapping

Une 1ere Instance à été crée

Project / Compute / Instances

Instances

Instance ID = Filter

Displaying 1 item

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/>	admin	-	10.0.2.14 Floating IPs: 172.24.4.8	m1.tiny	-	Active	nova	None	Running	4 minutes	Create Snapshot

Displaying 1 item

La même chose pour la 2-ème Instance

Project / Compute / Instances

Instances

Instance ID = Filter

Displaying 2 items

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/>	admin_2	Image_1	10.0.2.4	m1.tiny	-	Spawning	nova	-	-	1 minute	Associate Floating IP
<input type="checkbox"/>	admin	-	10.0.2.14 Floating IPs: 172.24.4.8	m1.tiny	-	Active	nova	None	Running	6 minutes	Create Snapshot

Displaying 2 items

Manage Floating IP Associations

IP Address ^{*}
172.24.4.2

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

Port to be associated ^{*}
admin_2: 10.0.2.4

Project / Compute / Instances

Instances

Instance ID = Filter

Displaying 2 items

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/>	admin_1	Image_1	10.0.2.10 Floating IPs: 172.24.4.11	m1.tiny	-	Active	nova	None	Running	25 minutes	Create Snapshot
<input type="checkbox"/>	admin_2	Image_1	10.0.2.4 Floating IPs: 172.24.4.2	m1.tiny	-	Active	nova	None	Running	29 minutes	Create Snapshot

Displaying 2 items

4- L'Ajoute des roles de TCMP et SSH

Project / Network / Security Groups

Manage Security Groups

Displaying 4 items

<input type="checkbox"/>	Direction	Remote	CIDR	Actions
<input type="checkbox"/>	Egress	-	-	Delete Rule
<input type="checkbox"/>	Egress	-	-	Delete Rule

Add Rule

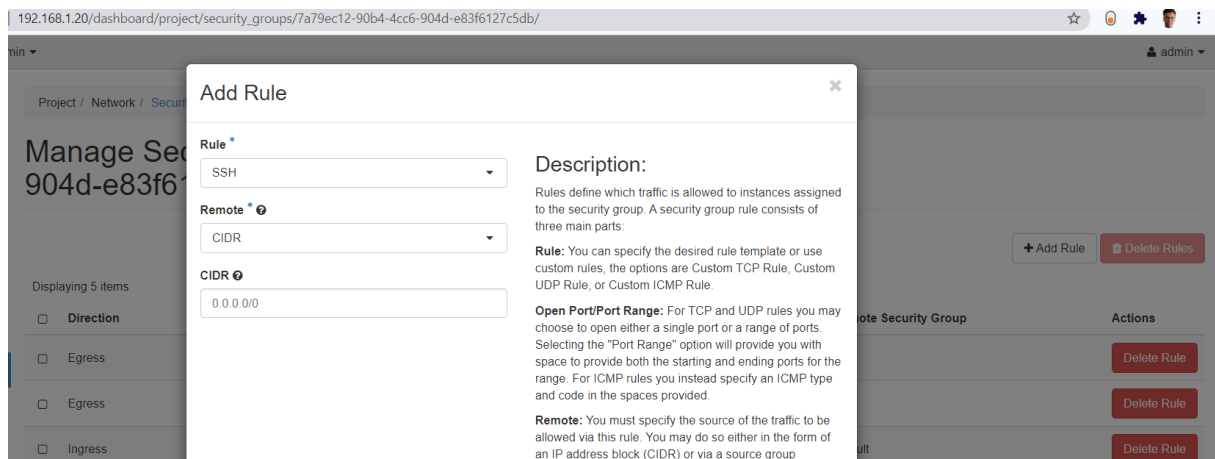
Rule ^{*}
ALL ICMP

Direction
Ingress

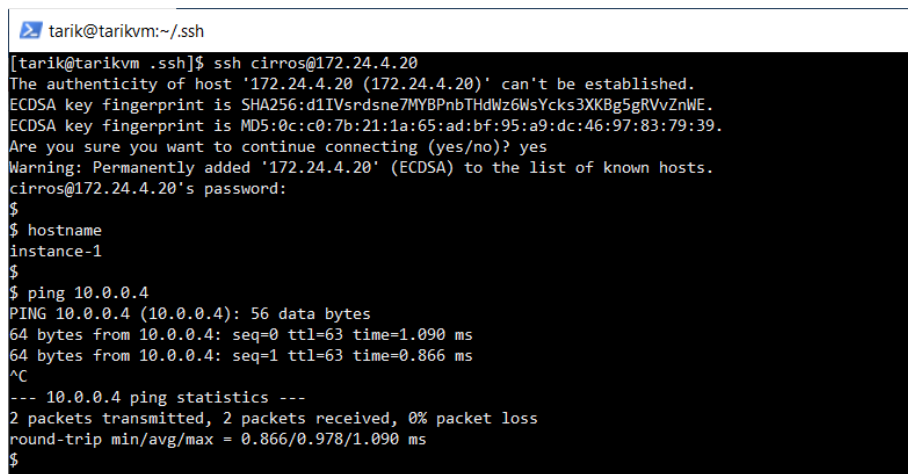
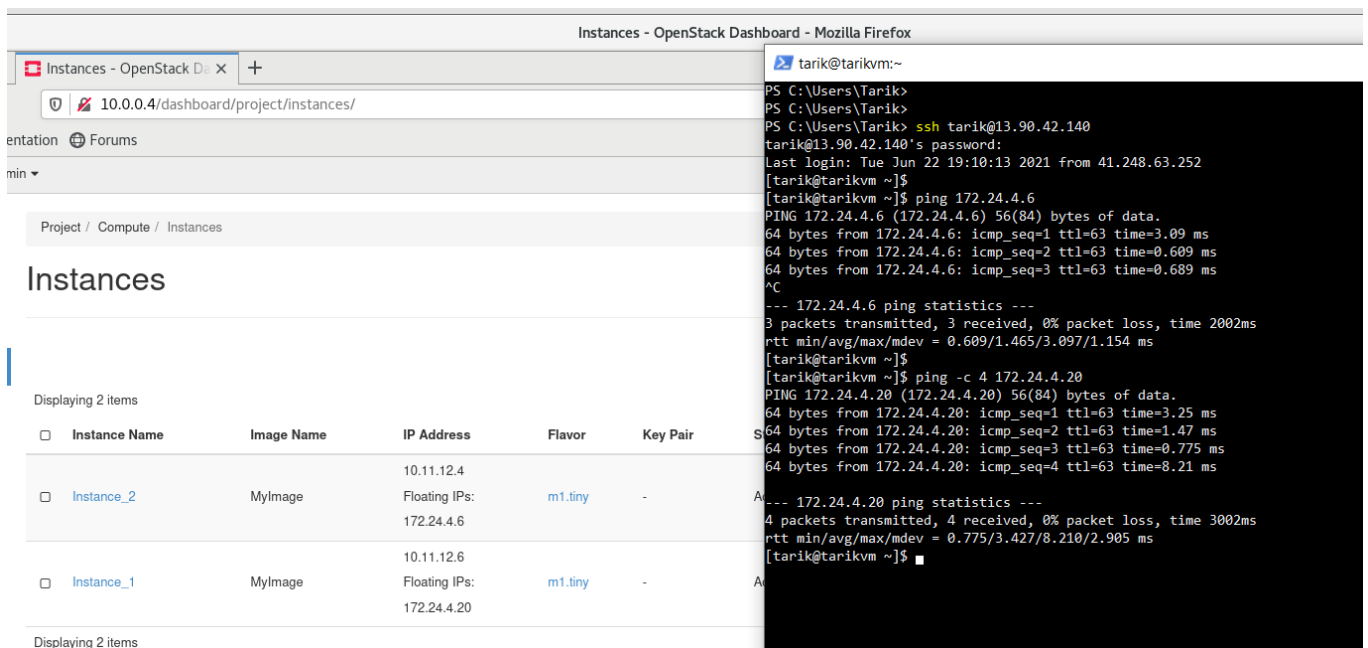
Remote ^{*}
CIDR

CIDR
0.0.0.0/0

Description:
Rules define which traffic is allowed to instances assigned to the security group. A security group rule consists of three main parts.
Rule: You can specify the desired rule template or use custom rules, the options are Custom TCP Rule, Custom UDP Rule, or Custom ICMP Rule.
Open Port/Port Range: For TCP and UDP rules you may choose to open either a single port or a range of ports. Selecting the "Port Range" option will provide you with space to provide both the starting and ending ports for the range. For ICMP rules you instead specify an ICMP type and code in the spaces provided.
Remote: You must specify the source of the traffic to be



- On teste la connexion des 2 instances d'après notre machine Host Centos



➤ Ping du Instance_2 vers La Macine Host

```
[tarik@tarikvm .ssh]$ ssh cirros@172.24.4.6
The authenticity of host '172.24.4.6 (172.24.4.6)' can't be established.
ECDSA key fingerprint is SHA256:gwkbK+cakV/TqfohB0vNFtJd1K/RTsenqd96nokcZ2U.
ECDSA key fingerprint is MD5:bc:42:72:85:a4:0d:68:33:9e:23:25:08:59:f2:56:71.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '172.24.4.6' (ECDSA) to the list of known hosts.
cirros@172.24.4.6's password:
$
$ hostname
instance-2
$ ping 10.0.0.4
PING 10.0.0.4 (10.0.0.4): 56 data bytes
64 bytes from 10.0.0.4: seq=0 ttl=63 time=0.873 ms
64 bytes from 10.0.0.4: seq=1 ttl=63 time=0.886 ms
64 bytes from 10.0.0.4: seq=2 ttl=63 time=0.806 ms
^C
--- 10.0.0.4 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.806/0.855/0.886 ms
$
```

➤ Ping de l'Instance 2 vers instance 1:

tarik@tarikvm:~/ssh

```
$ hostname
instance-2
$
$ ping 10.11.12.4
PING 10.11.12.4 (10.11.12.4): 56 data bytes
64 bytes from 10.11.12.4: seq=0 ttl=64 time=0.793 ms
64 bytes from 10.11.12.4: seq=1 ttl=64 time=0.954 ms
64 bytes from 10.11.12.4: seq=2 ttl=64 time=0.604 ms
^C
--- 10.11.12.4 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.604/0.783/0.954 ms
$ ■
```

➤ Ping de l'Instance 1 vers instance 2:

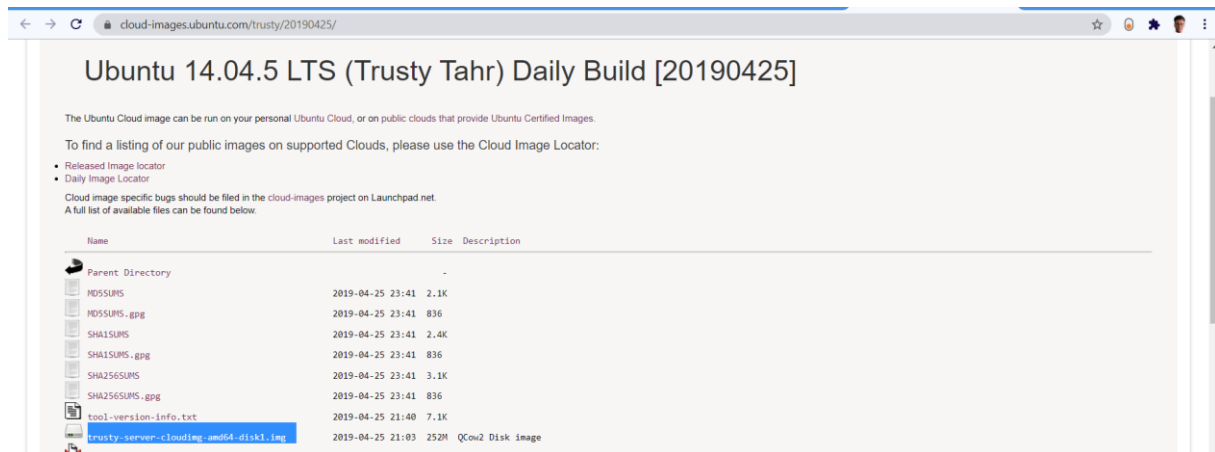
```
[tarik@tarikvm .ssh]$ ssh cirros@172.24.4.20
cirros@172.24.4.20's password:
$
$ hostname
instance-1
$
$ ping 10.11.12.6
PING 10.11.12.6 (10.11.12.6): 56 data bytes
64 bytes from 10.11.12.6: seq=0 ttl=64 time=2.034 ms
64 bytes from 10.11.12.6: seq=1 ttl=64 time=0.681 ms
64 bytes from 10.11.12.6: seq=2 ttl=64 time=0.945 ms
64 bytes from 10.11.12.6: seq=3 ttl=64 time=0.668 ms
^C
--- 10.11.12.6 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.668/1.082/2.034 ms
$ ■
```

Implémentation du module SaaS

SaaS est un modèle de licence et de livraison de logiciels, et pour cela On va créer une Instance ubuntu server 14, puis On va créer une petite application a l'aide de serveur apache.

1- Création d'image :

<https://cloud-images.ubuntu.com/trusty/20190425/trusty-server-cloudimg-amd64-disk1.img>



The screenshot shows the "Create Image" form in the OpenStack Image Service. The form is divided into several sections: "Image Details", "Image Source", "Image Requirements", and "Image Sharing".

- Image Details:** Includes fields for "Image Name" (set to "Ubuntu_Server_14") and "Image Description".
- Image Source:** Includes a "Source Type" dropdown set to "File", a "File" field with a "Browse..." button (set to "trusty-server-cloudimg-amd64-disk1.img"), and a "Format" dropdown set to "QCOW2 - QEMU Emulator".
- Image Requirements:** Includes a "Kernel" dropdown set to "Choose an image", a "Architecture" field, a "Ramdisk" dropdown set to "Choose an image", and "Minimum Disk (GB)" and "Minimum RAM (MB)" fields both set to "0".
- Image Sharing:** Includes a "Visibility" dropdown set to "Public" and a "Protected" checkbox set to "No".

Project / Compute / Images

Images

Q Click here for filters. + Create Image Delete Images

Displaying 3 items

<input type="checkbox"/>	Owner	Name ^	Type	Status	Visibility	Protected	Disk Format	Size	
<input type="checkbox"/>	services	cirros	Image	Active	Public	No	QCOW2	273 bytes	Launch
<input type="checkbox"/>	admin	Image_1	Image	Active	Public	No	QCOW2	15.58 MB	Launch
<input type="checkbox"/>	admin	Ubuntu	Image	Active	Public	No	QCOW2	251.63 MB	Launch

Displaying 3 items

2- Création de la clé pour se connecter a Ubuntu ultérieurement

Create Key Pair

Key Pair Name *

UbuntuKeyTarik

✕ Cancel

+ Create Key Pair

Key Pairs are how you login to your instance after it is launched. Choose a key pair name you will recognize. Names may only include alphanumeric characters, spaces, or dashes.

Fingerprint

No items to display.

UbuntuKeyTarik

ID	1
Name	UbuntuKeyTarik
Fingerprint	1d:d6:3e:b4:30:e2:5c:76:f2:b5:70:cb:fb:e7:ac:39
Created	Jun 22, 2021 9:32:44 PM
User ID	bf09b8f5db3f4b0993ab89a9087d7d23
Public Key	ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDPT854/nWTT0XNUlotX2V3Bn1J1hPWZK+LgqmmlijKdY4K/miYgUCwMi6Uorn1pW/uwH/8amGuRGstFpeA5PPVI/GZZBRWNED0yvkfllHpl6v4jUiQ8SqvV17gcZUAlwqcRAfI Nova

➤ On réfère les mêmes étapes qu'on a vu dans IaaS

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 *

UbuntuTarik

Description

Availability Zone

nova

Count *

1

Total Instances (10 Max)

30%

2 Current Usage

1 Added

7 Remaining

✕ Cancel

< Back

Next >

Launch Instance

Launch Instance

Details

Source

Flavor *

Networks *

Network Ports

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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

Yes

No

Create New Volume

Allocated

Name	Updated	Size	Type	Visibility
> Ubuntu_Server_14	6/22/21 9:30 PM	251.63 MB	qcow2	Public

Available 2

Select one

Click here for filters.

Name	Updated	Size	Type	Visibility
> cirros	6/22/21 12:21 PM	273 bytes	qcow2	Public
> MyImage	6/22/21 3:45 PM	15.58 MB	qcow2	Public

Cancel

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Launch Instance

Launch Instance

Details

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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.small	1	2 GB	20 GB	20 GB	0 GB	Yes

Available 4

Select one

Click here for filters.

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
> m1.tiny	1	512 MB	1 GB	1 GB	0 GB	Yes
> m1.medium	2	4 GB	40 GB	40 GB	0 GB	Yes
> m1.large	4	8 GB	80 GB	80 GB	0 GB	Yes
> m1.xlarge	8	16 GB	160 GB	160 GB	0 GB	Yes

Cancel

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Launch Instance

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Launch Instance

Details

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Networks

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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	Network	subnet	No	Up	Active	↓

▼ Available 1

Select at least one network

Click here for filters.

	Network	Subnets Associated	Shared	Admin State	Status	
	public	public_subnet	No	Up	Active	↑

Cancel

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Next >

Launch Instance

Launch Instance

Details

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Key Pair

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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	
UbuntuKeyTarik	1d:d6:3e:b4:30:e2:5c:76:f2:b5:70:cb:fb:e7:ac:39	↓

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

Instances

Instance ID =

Filter

Launch Instance

Delete Instances

More Actions

Displaying 3 items

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/>	UbuntuTarik	-	10.1.1.4 Floating IPs: 172.24.4.11	m1.small	-	Active	us-east-1a nova	None	Running	8 minutes	Create Snapshot
<input type="checkbox"/>	Instance_2	Image_1	10.1.1.15 Floating IPs: 172.24.4.5	m1.tiny	-	Active	us-east-1a nova	None	Running	1 day, 5 hours	Create Snapshot
<input type="checkbox"/>	Instance_1	Image_1	10.1.1.6 Floating IPs: 172.24.4.3	m1.tiny	-	Active	us-east-1a nova	None	Running	1 day, 5 hours	Create Snapshot

Displaying 3 items

3- L'installation du Ubuntu server

UbuntuTarik

Overview Log Console Action Log

Instance Console

If console is not responding to keyboard input: click the grey status bar below. [Click here to show only console](#)
To exit the fullscreen mode, click the browser's back button.

```

Connected (unencrypted) to: QEMU (instance-0000000e)
[ 152.329237] random: nonblocking pool is initialized
Cloud-init v. 0.7.5 running 'init-local' at Tue, 22 Jun 2021 22:02:21 +0000. Up
156.76 seconds.
cloud-init-nonet[189.23]: waiting 10 seconds for network device
cloud-init-nonet[200.92]: waiting 120 seconds for network device
* Starting set console keymap [ OK ]
* Starting Signal sysvinit that virtual filesystems are mounted [ OK ]
* Starting Signal sysvinit that virtual filesystems are mounted [ OK ]
* Stopping set console keymap [ OK ]
* Starting Signal sysvinit that remote filesystems are mounted [ OK ]
* Starting Bridge udev events into upstart [ OK ]
* Starting device node and kernel event manager [ OK ]
* Starting load modules from /etc/modules [ OK ]
* Starting cold plug devices [ OK ]
* Starting log initial device creation [ OK ]
* Stopping load modules from /etc/modules [ OK ]
* Starting Uncomplicated firewall [ OK ]
* Starting configure network device security [ OK ]
cloud-init-nonet[325.65]: gave up waiting for a network device.
* Stopping cold plug devices [ OK ]
* Stopping log initial device creation [ OK ]
* Starting load fallback graphics devices [ OK ]
* Stopping load fallback graphics devices [ OK ]
* Starting enable remaining boot-time encrypted block devices [ OK ]

```

UbuntuTarik

Create Snapshot ▾

Overview Log Console Action Log

Instance Console

If console is not responding to keyboard input: click the grey status bar below. [Click here to show only console](#)
To exit the fullscreen mode, click the browser's back button.

```

Connected (unencrypted) to: QEMU (instance-0000000e)
Ubuntu 14.04.6 LTS ubuntu tty1
ubuntu login: tarik
Password:

```

- On se connecte a Ubuntu à l'aide de l'utile SSH en utilisant la clé qu'on a créé.

