Lab 3 Terraform

Etape 1 : installation de Terraform

```
root@benameurfedi-VirtualBox:/home/benameurfedi# terraform version
Terraform v1.7.5-dev
on linux_amd64

Your version of Terraform is out of date! The latest version
is 1.7.5. You can update by downloading from https://www.terraform.io/downloads.
html
root@benameurfedi-VirtualBox:/home/benameurfedi# terraform init
Terraform initialized in an empty directory!

The directory has no Terraform configuration files. You may begin working
with Terraform immediately by creating Terraform configuration files.
```

Etape 2: Provisionner une instance sur KVM

```
root@benameurfedi-VirtualBox:/home/benameurfedi# apt install -y qemu qemu-kvm li
bvirt-daemon bridge-utils virt-manager virtinst
Lecture des listes de paquets... Fait
Construction de l'arbre des dépendances... Fait
Lecture des informations d'état... Fait
Note : sélection de « qemu-system-x86 » au lieu de « qemu-kvm »
bridge-utils est déjà la version la plus récente (1.7-1ubuntu3).
virt-manager est déjà la version la plus récente (1:4.0.0-1).
virtinst est déjà la version la plus récente (1:4.0.0-1).
libvirt-daemon est déjà la version la plus récente (8.0.0-1ubuntu7.8).
qemu-system-x86 est déjà la version la plus récente (1:6.2+dfsg-2ubuntu6.17).
qemu est déjà la version la plus récente (1:6.2+dfsg-2ubuntu6.17).
Les paquets suivants ont été installés automatiquement et ne sont plus nécessair
es :
  linux-headers-6.5.0-18-generic linux-hwe-6.5-headers-6.5.0-18
  linux-image-6.5.0-18-generic linux-modules-6.5.0-18-generic
  linux-modules-extra-6.5.0-18-generic
Veuillez utiliser « sudo apt autoremove » pour les supprimer.
0 mis à jour, 0 nouvellement installés, 0 à enlever et 0 non mis à jour.
root@benameurfedi-VirtualBox:/home/benameurfedi# lsmod | grep -i kvm
kvm_intel             487424  0
kvm                  1409024  1 kvm_intel
irqbypass              12288  1 kvm
```

```
root@benameurfedi-VirtualBox:/home/benameurfedi# systemctl start libvirtd
root@benameurfedi-VirtualBox:/home/benameurfedi# systemctl enable libvirtd --now
root@benameurfedi-VirtualBox:/home/benameurfedi# systemctl status libvirtd
● libvirtd.service - Virtualization daemon
     Loaded: loaded (/lib/systemd/system/libvirtd.service; enabled; vendor preset: enabled)
     Active: active (running) since Mon 2024-03-25 06:46:50 CET; 1min 4s ago
TriggeredBy: ● libvirtd-admin.socket
             ● libvirtd-ro.socket
             ● libvirtd.socket
       Docs: man:libvirtd(8)
             https://libvirt.org
   Main PID: 5482 (libvirtd)
      Tasks: 19 (limit: 32768)
     Memory: 5.3M
        CPU: 113ms
     CGroup: /system.slice/libvirtd.service
             └─5482 /usr/sbin/libvirtd

06:46:50 25 مايس benameurfedi-VirtualBox systemd[1]: Starting Virtualization daemon...
06:46:50 25 مايس benameurfedi-VirtualBox systemd[1]: Started Virtualization daemon.
root@benameurfedi-VirtualBox:/home/benameurfedi#
```

```
root@benameurfedi-VirtualBox:/home/benameurfedi# virsh net-list --all
 Name      State      Autostart   Persistent
-----------------------------------------------
 default   inactive   yes         yes

root@benameurfedi-VirtualBox:/home/benameurfedi# systemctl start systemd-networkd
root@benameurfedi-VirtualBox:/home/benameurfedi# systemctl enable systemd-networkd
root@benameurfedi-VirtualBox:/home/benameurfedi# systemctl status systemd-networkd
● systemd-networkd.service - Network Configuration
     Loaded: loaded (/lib/systemd/system/systemd-networkd.service; enabled; vendor preset: e>
     Active: active (running) since Mon 2024-03-25 06:43:35 CET; 6min ago
TriggeredBy: ● systemd-networkd.socket
       Docs: man:systemd-networkd.service(8)
   Main PID: 761 (systemd-network)
     Status: "Processing requests..."
      Tasks: 1 (limit: 4594)
     Memory: 2.7M
        CPU: 43ms
     CGroup: /system.slice/systemd-networkd.service
             └─761 /lib/systemd/systemd-networkd

06:43:36 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: enp0s8: Link UP
06:43:36 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: enp0s8: Gained carrier
06:43:36 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: enp0s9: Link UP
06:43:37 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: enp0s9: Gained carrier
06:43:38 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: virbr0: Link UP
06:43:38 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: enp0s9: Gained IPv6LL
06:43:38 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: enp0s3: Gained IPv6LL
06:43:38 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: virbr0: Link DOWN
06:43:39 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: enp0s8: Gained IPv6LL
06:45:36 25 مايس benameurfedi-VirtualBox systemd-networkd[761]: docker0: Link UP
lines 1-23...skipping...
● systemd-networkd.service - Network Configuration
     Loaded: loaded (/lib/systemd/system/systemd-networkd.service; enabled; vendor preset: enabled)
     Active: active (running) since Mon 2024-03-25 06:43:35 CET; 6min ago
TriggeredBy: ● systemd-networkd.socket
       Docs: man:systemd-networkd.service(8)
   Main PID: 761 (systemd-network)
     Status: "Processing requests..."
      Tasks: 1 (limit: 4594)
```

Installation provider KVM

```
root@benameurfedi-VirtualBox:/home/benameurfedi# mkdir ~/.terraform.d/plugins && cd ~/.terraform.d/plugins
root@benameurfedi-VirtualBox:~/.terraform.d/plugins# wget https://github.com/dmacvicar/terraform-provider-libvirt/releases/download/
v0.6.2/terraform-provider-libvirt-0.6.2+git.1585292411.8cbe9ad0.Ubuntu_18.04.amd64.tar.gz
--2024-03-25 07:00:54--  https://github.com/dmacvicar/terraform-provider-libvirt/releases/download/v0.6.2/terraform-provider-libvirt
-0.6.2+git.1585292411.8cbe9ad0.Ubuntu_18.04.amd64.tar.gz
Résolution de github.com (github.com)… 140.82.121.3
Connexion à github.com (github.com)|140.82.121.3|:443… connecté.
requête HTTP transmise, en attente de la réponse… 302 Found
Emplacement : https://objects.githubusercontent.com/github-production-release-asset-2e65be/52690290/d548f180-75d6-11ea-90a6-4b3b3e32
d947?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAVCODYLSA53PQK4ZA%2F20240325%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20
240325T060054Z&X-Amz-Expires=300&X-Amz-Signature=2efb0b1c7bc841c0dfa364425c77c8ac08f476070b69dec02cbd947229aecfa6&X-Amz-SignedHeader
s=host&actor_id=0&key_id=0&repo_id=52690290&response-content-disposition=attachment%3B%20filename%3Dterraform-provider-libvirt-0.6.2
%2Bgit.1585292411.8cbe9ad0.Ubuntu_18.04.amd64.tar.gz&response-content-type=application%2Foctet-stream [suivant]
--2024-03-25 07:00:54--  https://objects.githubusercontent.com/github-production-release-asset-2e65be/52690290/d548f180-75d6-11ea-90
a6-4b3b3e32d947?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAVCODYLSA53PQK4ZA%2F20240325%2Fus-east-1%2Fs3%2Faws4_request&X-
Amz-Date=20240325T060054Z&X-Amz-Expires=300&X-Amz-Signature=2efb0b1c7bc841c0dfa364425c77c8ac08f476070b69dec02cbd947229aecfa6&X-Amz-S
ignedHeaders=host&actor_id=0&key_id=0&repo_id=52690290&response-content-disposition=attachment%3B%20filename%3Dterraform-provider-li
bvirt-0.6.2%2Bgit.1585292411.8cbe9ad0.Ubuntu_18.04.amd64.tar.gz&response-content-type=application%2Foctet-stream
Résolution de objects.githubusercontent.com (objects.githubusercontent.com)… 185.199.108.133, 185.199.110.133, 185.199.109.133, ...
Connexion à objects.githubusercontent.com (objects.githubusercontent.com)|185.199.108.133|:443… connecté.
requête HTTP transmise, en attente de la réponse… 200 OK
Taille : 9764547 (9.3M) [application/octet-stream]
Enregistre : 'terraform-provider-libvirt-0.6.2+git.1585292411.8cbe9ad0.Ubuntu_18.04.amd64.tar.gz'

terraform-provider- 100%[====================>]   9.31M  1.17MB/s    ds 8.0s

2024-03-25 07:01:03 (1.16 MB/s) - 'terraform-provider-libvirt-0.6.2+git.1585292411.8cbe9ad0.Ubuntu_18.04.amd64.tar.gz' enregistré [9
764547/9764547]
```

```
root@benameurfedi-VirtualBox:~/.terraform.d/plugins# tar xvf terraform-provider-libvirt-
0.6.2+git.1585292411.8cbe9ad0.Ubuntu_18.04.amd64.tar.gz
terraform-provider-libvirt
root@benameurfedi-VirtualBox:~/.terraform.d/plugins# rm terraform-provider-libvirt-0.6.2
+git.1585292411.8cbe9ad0.Ubuntu_18.04.amd64.tar.gz
root@benameurfedi-VirtualBox:~/.terraform.d/plugins# usermod -aG kvm,libvirt $USER
root@benameurfedi-VirtualBox:~/.terraform.d/plugins# echo 'security_driver = [ "none" ]'
 > /etc/libvirt/qemu.conf
root@benameurfedi-VirtualBox:~/.terraform.d/plugins# systemctl restart libvirtd
root@benameurfedi-VirtualBox:~/.terraform.d/plugins# systemctl status libvirtd
● libvirtd.service - Virtualization daemon
     Loaded: loaded (/lib/systemd/system/libvirtd.service; enabled; vendor pres>
     Active: active (running) since Mon 2024-03-25 07:08:23 CET; 11s ago
TriggeredBy: ● libvirtd-ro.socket
             ● libvirtd.socket
             ● libvirtd-admin.socket
       Docs: man:libvirtd(8)
             https://libvirt.org
   Main PID: 6449 (libvirtd)
      Tasks: 19 (limit: 32768)
     Memory: 10.5M
        CPU: 128ms
     CGroup: /system.slice/libvirtd.service
             └─6449 /usr/sbin/libvirtd

07:08:23 25 مارس benameurfedi-VirtualBox systemd[1]: Starting Virtualization da>
07:08:23 25 مارس benameurfedi-VirtualBox systemd[1]: Started Virtualization dae>
07:08:23 25 مارس benameurfedi-VirtualBox libvirtd[6449]: libvirt version: 8.0.0>
07:08:23 25 مارس benameurfedi-VirtualBox libvirtd[6449]: hostname: benameurfedi>
07:08:23 25 مارس benameurfedi-VirtualBox libvirtd[6449]: Configured security dr>
```

Approvisionnement d'une machine virtuelle

```
root@benameurfedi-VirtualBox:~/.terraform.d/plugins# mkdir ~/monprojet && cd ~/monprojet
root@benameurfedi-VirtualBox:~/monprojet# virsh pool-define-as pool dir - - - - /var/lib
/libvirt/images
Pool pool defined

root@benameurfedi-VirtualBox:~/monprojet# virsh pool-autostart pool
Pool pool marked as autostarted

root@benameurfedi-VirtualBox:~/monprojet# virsh pool-start pool
Pool pool started

root@benameurfedi-VirtualBox:~/monprojet# virsh pool-list
 Name    State    Autostart
---------------------------
 pool    active   yes
```

main.tf
~/monprojet

Ouvrir | Enregistrer

```terraform
1 terraform {
2 required_providers {
3 libvirt = {
4 source = "dmacvicar/libvirt"
5 }}}
6 provider "libvirt" {
7 uri = "qemu:///system"
8 }
9 resource "libvirt_volume" "cirros-img" {
10 name = "cirros-img"
11 pool = "pool"
12 source = "https://download.cirros-cloud.net/0.5.1/cirros-0.5.1-aarch64-disk.img"
13 format = "qcow2"
14 }
15 resource "libvirt_domain" "myvm" {
16 name = "myvm"
17 memory = "1024"
18 vcpu = 1
19 network_interface {
20 network_name = "default"
21 }
22 disk {
23 volume_id = libvirt_volume.cirros-img.id
24 }
25 console {
26 type = "pty"
27 target_type = "serial"
28 target_port = "0"
29 }
30 graphics {
31 type = "spice"
32 listen_type = "address"
33 autoport = true
34 }
35 output "ip" {
36 value = "${libvirt_domain.myvm.network_interface.0.addresses.0}"
37 }
```

Terraform   Largeur des tabulations : 8   Lig 34, Col 2   INS

```
root@benameurfedi-VirtualBox:~/monprojet# terraform init

Initializing the backend...

Initializing provider plugins...
- Finding latest version of dmacvicar/libvirt...
- Installing dmacvicar/libvirt v0.7.6...
- Installed dmacvicar/libvirt v0.7.6 (self-signed, key ID 0833E38C51E74D26)

Partner and community providers are signed by their developers.
If you'd like to know more about provider signing, you can read about it here:
https://www.terraform.io/docs/cli/plugins/signing.html

Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
```

```
root@benameurfedi-VirtualBox:~/monprojet# terraform plan

Terraform used the selected providers to generate the following execution plan.
Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # libvirt_domain.myvm will be created
  + resource "libvirt_domain" "myvm" {
      + arch        = (known after apply)
      + autostart   = (known after apply)
      + emulator    = (known after apply)
      + fw_cfg_name = "opt/com.coreos/config"
      + id          = (known after apply)
      + machine     = (known after apply)
      + memory      = 1024
      + name        = "myvm"
      + qemu_agent  = false
      + running     = true
      + type        = "kvm"
      + vcpu        = 1

      + console {
          + source_host    = "127.0.0.1"
          + source_service = "0"
          + target_port    = "0"
          + target_type    = "serial"
          + type           = "pty"
        }

      + disk {
          + scsi      = false
          + volume_id = (known after apply)
        }
```

```
      + graphics {
          + autoport        = true
          + listen_address = "127.0.0.1"
          + listen_type     = "address"
          + type            = "spice"
        }

      + network_interface {
          + addresses     = (known after apply)
          + hostname      = (known after apply)
          + mac           = (known after apply)
          + network_id    = (known after apply)
          + network_name = "default"
        }
    }

  # libvirt_volume.cirros-img will be created
  + resource "libvirt_volume" "cirros-img" {
      + format = "qcow2"
      + id     = (known after apply)
      + name   = "cirros-img"
      + pool   = "pool"
      + size   = (known after apply)
      + source = "https://downlaod.cirros-cloud.net/0.5.1/cirros-0.5.1-aarch64-disk.img"
    }

Plan: 2 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + ip = (known after apply)


Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to
take exactly these actions if you run "terraform apply" now.
```

```
Changes to Outputs:
  + ip = (known after apply)

Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

  Enter a value: yes

libvirt_domain.myvm: Creating...

  Error: error defining libvirt domain: operation failed: domain 'myvm' already exists w
ith uuid c15502cb-e014-46c5-b724-348d15e41473

    with libvirt_domain.myvm,
    on main.tf line 18, in resource "libvirt_domain" "myvm":
    18: resource "libvirt_domain" "myvm" {
```

```
root@benameurfedi-VirtualBox:~/monprojet# virsh list --all
 Id   Name   State
----------------------
  -    myvm   shut off
```