TP4 DEVOPS :

Objectifs :

l'objectif du TP 4 devops est de créer à l'aide de terraform une machine virtuel avec un IP publique sur azure et de ce connecter sur cette VM.

Contenu du code :

Fichiers :

- <u>Création de la VM à l'aide de terraform</u>

    FICHIER DATA :

    ```
    data "azurerm_resource_group" "tp4" {

    name = "devops-TP2"


    }
    data "azurerm_virtual_network" "tp4"{ # fait référence en écriture au virtual network

    name = "example-network"
    resource_group_name = "devops-TP2"


    }
    output "virtual_network_id" {
    value = data.azurerm_virtual_network.tp4.id


    }
    data "azurerm_subnet" "tp4"{ # fait référence en écriture au subnet
    name = "internal"
    resource_group_name = "devops-TP2"
    virtual_network_name = "example-network"
    }
    ```

- ***Provider :***

    Code :

```
terraform {

  required_version = ">=0.12"

  required_providers {
    azurerm = {
      source = "hashicorp/azurerm"
      version = "~>2.0"
    }
  }
}

provider "azurerm" {
  features {}
  subscription_id = "765266c6-9a23-4638-af32-dd1e32613047"
}
```

- *Fichier variable :*

```
variable "region" {
  default      = "francecentral"
  description  = "Azure region"
  type = string
}
```

- création de la vm et définition de l'adresse publique :

```hcl
resource "azurerm_public_ip" "mynewterraformpublicip" {
  name                = "PublicIP_20210325"
  location            = var.region
  resource_group_name = "devops-TP2"
  allocation_method   = "Dynamic"
}

# Create Network Security Group and rule
resource "azurerm_network_security_group" "mynewterraformnsg"
  name                = "NetworkSecurityGroup_20210325"
  location            = var.region
  resource_group_name = "devops-TP2"

  security_rule {
    name                       = "SSH"
    priority                   = 1001
    direction                  = "Inbound"
    access                     = "Allow"
    protocol                   = "Tcp"
    source_port_range          = "*"
    destination_port_range     = "22"
    source_address_prefix      = "*"
    destination_address_prefix = "*"
  }
}

# Create network interface
resource "azurerm_network_interface" "mynewterraformnic" {
  name                = "NIC_20210325"
  location            = var.region
```

- Output pour récupérer l'adress publique et la clé privé pour ssh :

```
output "public_ip_address_20210325" {

 value = azurerm_linux_virtual_machine.devops-20210325.public_ip_address

 }



 output "tls_private_key" {

 value = tls_private_key.example_ssh.private_key_pem

 sensitive = true

 }
```

On lance le Script :

Init :

```
anas@DESKTOP-1DM2KEV:/mnt/c/Users/azagh/Desktop/TP4_devops$ terraform init

Initializing the backend...

Initializing provider plugins...
- Reusing previous version of hashicorp/tls from the dependency lock file
- Reusing previous version of hashicorp/azurerm from the dependency lock file
- Reusing previous version of hashicorp/random from the dependency lock file
- Using previously-installed hashicorp/random v3.3.2
- Using previously-installed hashicorp/tls v3.4.0
- Using previously-installed hashicorp/azurerm v2.99.0

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.
```

Plan :

```
anas@DESKTOP-1DM2KEV:/mnt/c/Users/azagh/Desktop/TP4_devops$ terraform plan
tls_private_key.example_ssh: Refreshing state... [id=8318fb140369cafd98cd3a76f588b24e6ffa035f]
azurerm_network_security_group.mynewterraformnsg: Refreshing state... [id=/subscriptions/765266c6-9a23-4638-af32-dd1e326
13047/resourceGroups/devops-TP2/providers/Microsoft.Network/networkSecurityGroups/NetworkSecurityGroup_20210325]
azurerm_public_ip.mynewterraformpublicip: Refreshing state... [id=/subscriptions/765266c6-9a23-4638-af32-dd1e32613047/re
sourceGroups/devops-TP2/providers/Microsoft.Network/publicIPAddresses/PublicIP_20210325]
data.azurerm_subnet.tp4: Reading...
data.azurerm_resource_group.tp4: Reading...
data.azurerm_virtual_network.tp4: Reading...
data.azurerm_resource_group.tp4: Read complete after 0s [id=/subscriptions/765266c6-9a23-4638-af32-dd1e32613047/resource
Groups/devops-TP2]
data.azurerm_subnet.tp4: Read complete after 0s [id=/subscriptions/765266c6-9a23-4638-af32-dd1e32613047/resourceGroups/d
evops-TP2/providers/Microsoft.Network/virtualNetworks/example-network/subnets/internal]
random_id.randomId: Refreshing state... [id=HmhfgTevDn8]
azurerm_network_interface.mynewterraformnic: Refreshing state... [id=/subscriptions/765266c6-9a23-4638-af32-dd1e32613047
/resourceGroups/devops-TP2/providers/Microsoft.Network/networkInterfaces/NIC_20210325]
data.azurerm_virtual_network.tp4: Read complete after 0s [id=/subscriptions/765266c6-9a23-4638-af32-dd1e32613047/resourc
eGroups/devops-TP2/providers/Microsoft.Network/virtualNetworks/example-network]
azurerm_network_interface_security_group_association.example: Refreshing state... [id=/subscriptions/765266c6-9a23-4638-
af32-dd1e32613047/resourceGroups/devops-TP2/providers/Microsoft.Network/networkInterfaces/NIC_20210325|/subscriptions/76
5266c6-9a23-4638-af32-dd1e32613047/resourceGroups/devops-TP2/providers/Microsoft.Network/networkSecurityGroups/NetworkSe
curityGroup_20210325]
azurerm_linux_virtual_machine.devops-20210325: Refreshing state... [id=/subscriptions/765266c6-9a23-4638-af32-dd1e326130
47/resourceGroups/devops-TP2/providers/Microsoft.Compute/virtualMachines/devops_20210325]

Changes to Outputs:
  + tls_private_key        = (sensitive value)
```
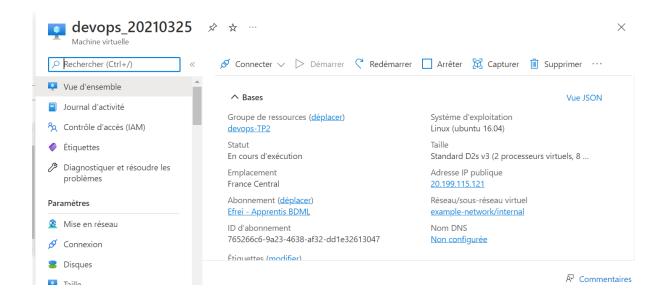
connect to azure :

```
anas@DESKTOP-1DM2KEV:/mnt/c/Users/azagh/Desktop/TP4_devops$ az login
A web browser has been opened at https://login.microsoftonline.com/organizations/oauth2/v2.0/authorize. Please continue
the login in the web browser. If no web browser is available or if the web browser fails to open, use device code flow w
ith `az login --use-device-code`.
[
  {
    "cloudName": "AzureCloud",
    "homeTenantId": "413600cf-bd4e-4c7c-8a61-69e73cddf731",
    "id": "0824b62e-ae1f-4bec-b00b-66156e0a0dea",
    "isDefault": false,
    "managedByTenants": [],
    "name": "Azure for Students",
    "state": "Disabled",
    "tenantId": "413600cf-bd4e-4c7c-8a61-69e73cddf731",
    "user": {
      "name": "anas.zaghloul@efrei.net",
      "type": "user"
    }
  },
  {
    "cloudName": "AzureCloud",
    "homeTenantId": "413600cf-bd4e-4c7c-8a61-69e73cddf731",
    "id": "765266c6-9a23-4638-af32-dd1e32613047",
    "isDefault": true,
    "managedByTenants": [],
    "name": "Efrei - Apprentis BDML",
    "state": "Enabled",
    "tenantId": "413600cf-bd4e-4c7c-8a61-69e73cddf731",
```
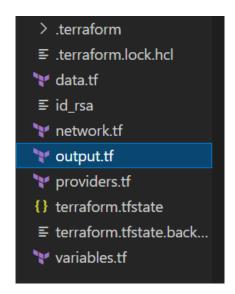
Apply :

```
azurerm_public_ip.mynewterraformpublicip: Creating...
azurerm_network_security_group.mynewterraformnsg: Creating...
azurerm_public_ip.mynewterraformpublicip: Creation complete after 2s [id=/subscriptions/765266c6-9a23-4638-af32-dd1e3261
3047/resourceGroups/devops-TP2/providers/Microsoft.Network/publicIPAddresses/PublicIP_20210325]
azurerm_network_interface.mynewterraformnic: Creating...
azurerm_network_interface.mynewterraformnic: Creation complete after 2s [id=/subscriptions/765266c6-9a23-4638-af32-dd1e3
2613047/resourceGroups/devops-TP2/providers/Microsoft.Network/networkInterfaces/NIC_20210325]
azurerm_linux_virtual_machine.devops-20210325: Creating...
azurerm_network_security_group.mynewterraformnsg: Creation complete after 5s [id=/subscriptions/765266c6-9a23-4638-af32-
dd1e32613047/resourceGroups/devops-TP2/providers/Microsoft.Network/networkSecurityGroups/NetworkSecurityGroup_20210325]
azurerm_network_interface_security_group_association.example: Creating...
azurerm_network_interface_security_group_association.example: Creation complete after 1s [id=/subscriptions/765266c6-9a2
3-4638-af32-dd1e32613047/resourceGroups/devops-TP2/providers/Microsoft.Network/networkInterfaces/NIC_20210325|/subscript
ions/765266c6-9a23-4638-af32-dd1e32613047/resourceGroups/devops-TP2/providers/Microsoft.Network/networkSecurityGroups/Ne
tworkSecurityGroup_20210325]
azurerm_linux_virtual_machine.devops-20210325: Still creating... [10s elapsed]
azurerm_linux_virtual_machine.devops-20210325: Creation complete after 13s [id=/subscriptions/765266c6-9a23-4638-af32-dd
1e32613047/resourceGroups/devops-TP2/providers/Microsoft.Compute/virtualMachines/devops_20210325]

Apply complete! Resources: 5 added, 0 changed, 0 destroyed.

Outputs:

public_ip_address_20210325 = "20.199.115.121"
tls_private_key_20210325 = <sensitive>
virtual_network_id = "/subscriptions/765266c6-9a23-4638-af32-dd1e32613047/resourceGroups/devops-TP2/providers/Microsoft.
Network/virtualNetworks/example-network"
```

Vérification de La VM créé :

Extraction de la clé privé

SSH connection to the VM :

```
anas@DESKTOP-1DM2KEV:/mnt/c/Users/azagh/Desktop/TP4_devops$ ssh -i ~/.ssh/id_rsa devops@20.199.115.121
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.15.0-1113-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

UA Infra: Extended Security Maintenance (ESM) is not enabled.

0 updates can be applied immediately.

52 additional security updates can be applied with UA Infra: ESM
Learn more about enabling UA Infra: ESM service for Ubuntu 16.04 at
https://ubuntu.com/16-04

New release '18.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


Last login: Wed Jun 29 09:12:12 2022 from 217.26.204.244
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

devops@myvm:~$
```

Destroy the Build :

```
anas@DESKTOP-1DM2KEV:/mnt/c/Users/azagh/Desktop/TP4_devops$ terraform destroy
```

```
azurerm_linux_virtual_machine.devops-20210325: Still destroying... [id=/subscriptions/765266c6-9a23-4638-af32-...ompute/
virtualMachines/devops_20210325, 30s elapsed]
azurerm_linux_virtual_machine.devops-20210325: Still destroying... [id=/subscriptions/765266c6-9a23-4638-af32-...ompute/
virtualMachines/devops_20210325, 40s elapsed]
azurerm_linux_virtual_machine.devops-20210325: Still destroying... [id=/subscriptions/765266c6-9a23-4638-af32-...ompute/
virtualMachines/devops_20210325, 50s elapsed]
azurerm_linux_virtual_machine.devops-20210325: Still destroying... [id=/subscriptions/765266c6-9a23-4638-af32-...ompute/
virtualMachines/devops_20210325, 1m0s elapsed]
azurerm_linux_virtual_machine.devops-20210325: Still destroying... [id=/subscriptions/765266c6-9a23-4638-af32-...ompute/
virtualMachines/devops_20210325, 1m10s elapsed]
azurerm_linux_virtual_machine.devops-20210325: Destruction complete after 1m17s
azurerm_network_interface.mynewterraformnic: Destroying... [id=/subscriptions/765266c6-9a23-4638-af32-dd1e32613047/resou
rceGroups/devops-TP2/providers/Microsoft.Network/networkInterfaces/NIC_20210325]
tls_private_key.example_ssh: Destroying... [id=8318fb140369cafd98cd3a76f588b24e6ffa035f]
tls_private_key.example_ssh: Destruction complete after 0s
azurerm_network_interface.mynewterraformnic: Still destroying... [id=/subscriptions/765266c6-9a23-4638-af32-...Network/n
etworkInterfaces/NIC_20210325, 10s elapsed]
azurerm_network_interface.mynewterraformnic: Destruction complete after 17s
azurerm_public_ip.mynewterraformpublicip: Destroying... [id=/subscriptions/765266c6-9a23-4638-af32-dd1e32613047/resource
Groups/devops-TP2/providers/Microsoft.Network/publicIPAddresses/PublicIP_20210325]
azurerm_public_ip.mynewterraformpublicip: Still destroying... [id=/subscriptions/765266c6-9a23-4638-af32-...rk/publicIPA
ddresses/PublicIP_20210325, 10s elapsed]
azurerm_public_ip.mynewterraformpublicip: Destruction complete after 10s

Destroy complete! Resources: 7 destroyed.
```

Pourquoi utiliser terraform :

Utiliser Terraform apporte plusieurs avantages. Cet outil ne permet pas seulement la gestion de configuration, mais aussi l'orchestration. Il est compatible avec une multitude de plateformes cloud dont AWS, Azure, Google Cloud Platform. Le transfert entre fournisseurs de cloud s'effectue très facilement.