Asignatura	Datos del alumno
Devops & Cloud	Apellidos: Lorenzo Villoria
	Nombre: Miguel Angel

Informe Caso Práctico 2:

Automatización de despliegues en entornos Cloud

Repositorio: https://github.com/WillyVilloria/Practica_2.git

version 0.0.3

Objetivos de la actividad

Objetivo de el caso practico 2:

- Crear infraestructura de forma automatizada en un proveedor de Cloud pública.
- Utilizar herramientas de gestión de la configuración para automatizar la instalación y configuración de servicios.
- Desplegar mediante un enfoque totalmente automatizado aplicaciones en forma de contenedor sobre el sistema operativo.
- Desplegar mediante un enfoque totalmente automatizado aplicaciones que hagan uso de almacenamiento persistente sobre una plataforma de orquestación de contenedores.

Terraform

Creo infraestructura con terraform de forma automatizada en azure.

- **archivo terra.sh** --> archivo bash con los comandos terraform para poder ser utilizados por el archivo deploy.sh de ansible
- **archivo acs.tf** -- >
    - genera el grupo de recursos (rg).
    - genera el container registry (acr).
- **archivo aks.tf** --> genera el cluster de kubernetes (aks) de azure.
- **archivo vm.tf** --> genera los siguientes elementos de azure

  - virtual network.
  - subnet.
  - network interface.
  - public ip.
  - virtual machine (vm).
  - admin de ssh.
  - plan.
  - source image reference.
  - grupo de network security (ngs1).
    - Permito rango de puertos http 8080-8090 para poder tener más de un puerto de acceso.
  - azurerm_subnet_network_security_group_association (ngs-link)

  Los detalles del Sistema operativo y demás servicios están en el apartado de "infraestructura generada con terraform".

- **archivo imput-vars.tf** --> archivo de variables con los nombres y datos necesarios para crear los recursos nombrados en los archivos anteriores.
- **archivo outputs.tf** --> archivo con las variables de salida.

Ansible

Despliegue con ansible de aplicaciones:

- **Archivo deploy.sh** --> archivo con comando de consola que realiza las siguientes funciones:
  - llamada al archivo terra.sh para ejecutar los comandos de terraform y realizar el despliegue de la infraestructura comentada anteriormente

Una vez terminado el despliegue se realiza la llamada de los playbooks de ansible:

- **playbook obtenerlogs.yaml** --> ejecuta un comando shell que obtiene las variables de salida definidas en el despliegue de terraform con el archivo outputs.tf, guarda la información en un registro y después lo vuelco a dos archivos diferentes llamados outputs pero uno con formato json y el otro yaml (sólo voy a utilizar uno de ellos, en este caso utilizaré el archivo .json).

- **Utilizo el archivo dep_vars.sh**, básicamente leo las variables del archivo vars.sjon y utilizo la ip para guardarla en los archivos hosts e inventory y así poder automatizar el despliegue con ansible.
- **playbook_instalarpodman.yaml** --> instala la aplicación podman. Utilizaré los archivos de variables vars.yaml y el de outputs.json con los datos obtenidos del despliegue de terraform.
- **playbook_instalar.yaml** --> instala las aplicaciones y módulos necesarios para realizar la práctica. Destaco la instalación del módulo passlib de python ya que tenía un error en el despliegue en el que se me comunicaba que era imposible exportar este módulo desde el plano de control. Variables vars.yaml y el de outputs.json
- **playbook_copiar.yaml** -->
    - crea el directorio webserver que es donde se copiarán los archivos necesarios para el despliegue de la aplicación web requerida en la práctica.
    - copio archivo principal de la web -> index.html.
    - copio archivo .htacces de configuración de la autenticación.
    - copio archivo httpd.conf con la configuración de un servidor apache2
    - copio archivo Containerfile con la configuración los chivos que se deben volcar en los direcotrios de apache2.
- **playbook_certificados.yaml** --> se generan los certificados de seguridad OppenSSL
- **playbook_podmanlogin.yaml** --> se loguea podman con el acr de azure con los datos guardados en el archivo outputs.json.
- **playbook_images.yaml** -->
    - genero imagen
    - tageo la imagen con el nombre de la actividad: casopractico2
    - subo la imagen al acr de azure
    - creo el contenedor para un servidor web
    - inicio el servicio.
- **playbook_imagefor_k8s.yaml** -->
    - Genero un directoriopara albergar los archivos (appi)
    - Copio el archivo Containerfile al directorio generado previamente (appi)

- obtengo una imagen de nginx desde dockers
- tageo la imagen con el nombre de la actividad: casopractico2
- subo la imagen al acr de azure
- genero el servicio de la aplicación

- **playbook_autenticacion_k8s.yaml** -->
  - Instalo con pip kubernetes, ya que he tenido varios errores debido a que no se encontraban en el plano de control algún archivo relacionado con este módulo, he tenido que desinstalar todos los programas relacionados con kubernetes e instalarlo desde ansible y han remitido los errores.
  - a través del shell obtengo las credenciales del kluster de aks
  - creo un namespace
  - **archivo de variables vars_k8s.yaml**→ apunta hacia el archivo de configuración del servicio que se encuentra en el directorio k8sfiles.
    - **archivo k8s_persistent_storage.yaml** → define la configuración del servicio
      - creo un servicio con persistencia que consiste:
        - archivo
        - un deployment
        - un persistent volume pv
        - un persistent volume claim
        - un pod asociado al pv

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Infraestructura generada con terraform:

```
miguel@willy:~/Documentos/Proyectos/Practica_2/ansible$ chmod +x deploy.sh
 miguel@willy:~/Documentos/Proyectos/Practica_2/ansible$ . deploy.sh
Archivos despliegue de ansible
Archivo creación recursos terraform

Initializing the backend...

Initializing provider plugins...
- Reusing previous version of hashicorp/azurerm from the dependency lock file
- Using previously-installed hashicorp/azurerm v3.37.0

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.

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:

  # azurerm_container_registry.acr will be created
```

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```
+ resource "azurerm_container_registry" "acr" {
    + admin_enabled             = true
    + admin_password            = (sensitive value)
    + admin_username            = (known after apply)
    + encryption                = (known after apply)
    + export_policy_enabled     = true
    + id                        = (known after apply)
    + location                  = "uksouth"
    + login_server              = (known after apply)
    + name                      = "practica2acr"
    + network_rule_bypass_option  = "AzureServices"
    + network_rule_set          = (known after apply)
    + public_network_access_enabled = true
    + resource_group_name       = "practica2rg"
    + retention_policy          = (known after apply)
    + sku                       = "Basic"
    + trust_policy              = (known after apply)
    + zone_redundancy_enabled   = false
  }

# azurerm_kubernetes_cluster.aks will be created
+ resource "azurerm_kubernetes_cluster" "aks" {
    + dns_prefix                = "aks01"
    + fqdn                      = (known after apply)
    + http_application_routing_zone_name  = (known after apply)
    + id                        = (known after apply)
    + image_cleaner_enabled     = false
    + image_cleaner_interval_hours  = 48
    + kube_admin_config         = (sensitive value)
    + kube_admin_config_raw     = (sensitive value)
```

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```
+ kube_config                  = (sensitive value)
+ kube_config_raw              = (sensitive value)
+ kubernetes_version           = (known after apply)
+ location                     = "uksouth"
+ name                         = "aks01"
+ node_resource_group          = (known after apply)
+ oidc_issuer_url              = (known after apply)
+ portal_fqdn                  = (known after apply)
+ private_cluster_enabled      = false
+ private_cluster_public_fqdn_enabled = false
+ private_dns_zone_id          = (known after apply)
+ private_fqdn                 = (known after apply)
+ public_network_access_enabled = true
+ resource_group_name          = "practica2rg"
+ role_based_access_control_enabled = true
+ run_command_enabled          = true
+ sku_tier                     = "Free"
+ tags                         = {
    + "Environment" = "Production"
  }
+ workload_identity_enabled    = false

+ default_node_pool {
    + kubelet_disk_type    = (known after apply)
    + max_pods             = (known after apply)
    + name                 = "default"
    + node_count           = 2
    + node_labels          = (known after apply)
    + orchestrator_version = (known after apply)
    + os_disk_size_gb      = (known after apply)
```

```
      + os_disk_type        = "Managed"
      + os_sku              = (known after apply)
      + scale_down_mode     = "Delete"
      + type                = "VirtualMachineScaleSets"
      + ultra_ssd_enabled   = false
      + vm_size             = "Standard_D2_v2"
      + workload_runtime    = (known after apply)
    }

  + identity {
      + principal_id = (known after apply)
      + tenant_id    = (known after apply)
      + type         = "SystemAssigned"
    }
}

# azurerm_linux_virtual_machine.vm will be created
+ resource "azurerm_linux_virtual_machine" "vm" {
  + admin_username                  = "casopractico2"
  + allow_extension_operations      = true
  + computer_name                   = (known after apply)
  + custom_data                     = (sensitive value)
  + disable_password_authentication = true
  + extensions_time_budget          = "PT1H30M"
  + id                              = (known after apply)
  + location                        = "uksouth"
  + max_bid_price                   = -1
  + name                            = "vm"
  + network_interface_ids           = (known after apply)
  + patch_assessment_mode           = "ImageDefault"
```

```
    + patch_mode                  = "ImageDefault"
    + platform_fault_domain       = -1
    + priority                    = "Regular"
    + private_ip_address          = (known after apply)
    + private_ip_addresses        = (known after apply)
    + provision_vm_agent          = true
    + public_ip_address           = (known after apply)
    + public_ip_addresses         = (known after apply)
    + resource_group_name         = "practica2rg"
    + size                        = "Standard_DS1_v2"
    + virtual_machine_id          = (known after apply)

    + admin_ssh_key {
        + public_key = <<-EOT
                                                                                ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAABgQDRWmwncgWDtwSn1wGM/4sxRWkJ8cw1xxf2INNt3ysMh
yW+8l9MyxN7m24M4cN6cv3IdO3kT/RXCLYWLdldWz+dfF+Y4Mo8oYvB0ZI793zACD34zvJ6eKZV8Kjl
VJjmt9j5s2NEY1KVYE6Wsh+FbuV/wKew1N2enHmJG1bkIWwXwdAOiJNaztpN3Sf2YWT03QqfEyMC
avKmpSttwMrcPj4ZWozG9zndv7SJSEszn5vBSshLeFMNQWlIAFJXEX6tL/ELvDzlcCam/+1JzGcpxGzVY
KeBJouXcNC1SqfUHbKPWi5Dqam6GYph8vglR/RF+950YEbXjH+lHtsD1COwmO0ZdHO0IcvDXRZ2uU
w17E/SofQhEzER6HBdMyCDqRfYmkdrLjVWxVO7/dmrCA04pEfBMELocw2pI/jfMJNf9yn1jYAB7uJHn
SLj9WgaNvb+685kP3r765IZk1TBbjXf/w3trMbneeYofqVIA9OkndOwhAC0sIDqSvNf3xsS/vSoVOc=
miguel@willy
        EOT
      + username   = "casopractico2"
    }

    + os_disk {
        + caching              = "ReadWrite"
        + disk_size_gb         = (known after apply)
```

```
      + name                  = (known after apply)
      + storage_account_type  = "Standard_LRS"
      + write_accelerator_enabled = false
    }

  + plan {
      + name      = "centos-8-stream-free"
      + product   = "centos-8-stream-free"
      + publisher = "cognosys"
    }

  + source_image_reference {
      + offer     = "centos-8-stream-free"
      + publisher = "cognosys"
      + sku       = "centos-8-stream-free"
      + version   = "22.03.28"
    }
}

# azurerm_network_interface.nic_vm will be created
+ resource "azurerm_network_interface" "nic_vm" {
  + applied_dns_servers          = (known after apply)
  + dns_servers                  = (known after apply)
  + enable_accelerated_networking = false
  + enable_ip_forwarding         = false
  + id                           = (known after apply)
  + internal_dns_name_label      = (known after apply)
  + internal_domain_name_suffix  = (known after apply)
  + location                     = "uksouth"
  + mac_address                  = (known after apply)
```

```
    + name                = "vnic-vm"
    + private_ip_address          = (known after apply)
    + private_ip_addresses        = (known after apply)
    + resource_group_name         = "practica2rg"
    + virtual_machine_id          = (known after apply)

    + ip_configuration {
        + gateway_load_balancer_frontend_ip_configuration_id = (known after apply)
        + name                                = "internal"
        + primary                             = (known after apply)
        + private_ip_address                  = (known after apply)
        + private_ip_address_allocation       = "Dynamic"
        + private_ip_address_version          = "IPv4"
        + public_ip_address_id                = (known after apply)
        + subnet_id                           = (known after apply)
      }
  }

# azurerm_network_security_group.nsg1 will be created
+ resource "azurerm_network_security_group" "nsg1" {
    + id                = (known after apply)
    + location          = "uksouth"
    + name              = "securitygroup"
    + resource_group_name = "practica2rg"
    + security_rule     = [
        + {
            + access                   = "Allow"
            + description              = ""
            + destination_address_prefix  = "*"
            + destination_address_prefixes = []
```

```
    + destination_application_security_group_ids = []
    + destination_port_range                     = "22"
    + destination_port_ranges                    = []
    + direction                                  = "Inbound"
    + name                                       = "sshrule"
    + priority                                   = 101
    + protocol                                   = "Tcp"
    + source_address_prefix                      = "*"
    + source_address_prefixes                    = []
    + source_application_security_group_ids      = []
    + source_port_range                          = "*"
    + source_port_ranges                         = []
  },
+ {
    + access                                     = "Allow"
    + description                                = ""
    + destination_address_prefix                 = "*"
    + destination_address_prefixes               = []
    + destination_application_security_group_ids = []
    + destination_port_range                     = "8080-8090"
    + destination_port_ranges                    = []
    + direction                                  = "Inbound"
    + name                                       = "httprule"
    + priority                                   = 102
    + protocol                                   = "Tcp"
    + source_address_prefix                      = "*"
    + source_address_prefixes                    = []
    + source_application_security_group_ids      = []
    + source_port_range                          = "*"
    + source_port_ranges                         = []
```

```
        },
    ]
  }

# azurerm_public_ip.pip_vm will be created
+ resource "azurerm_public_ip" "pip_vm" {
    + allocation_method      = "Dynamic"
    + ddos_protection_mode   = "VirtualNetworkInherited"
    + fqdn                   = (known after apply)
    + id                     = (known after apply)
    + idle_timeout_in_minutes = 4
    + ip_address             = (known after apply)
    + ip_version             = "IPv4"
    + location               = "uksouth"
    + name                   = "public-ip-vm"
    + resource_group_name    = "practica2rg"
    + sku                    = "Basic"
    + sku_tier               = "Regional"
  }

# azurerm_resource_group.rg will be created
+ resource "azurerm_resource_group" "rg" {
    + id       = (known after apply)
    + location = "uksouth"
    + name     = "practica2rg"
  }

# azurerm_role_assignment.aksrole will be created
+ resource "azurerm_role_assignment" "aksrole" {
    + id                           = (known after apply)
```

```
    + name                       = (known after apply)
    + principal_id               = (known after apply)
    + principal_type             = (known after apply)
    + role_definition_id         = (known after apply)
    + role_definition_name       = "AcrPull"
    + scope                      = (known after apply)
    + skip_service_principal_aad_check = true
  }

# azurerm_subnet.subnet will be created
+ resource "azurerm_subnet" "subnet" {
    + address_prefixes                          = [
        + "10.0.2.0/24",
      ]
    + enforce_private_link_endpoint_network_policies = (known after apply)
    + enforce_private_link_service_network_policies  = (known after apply)
    + id                                        = (known after apply)
    + name                                      = "subnet1"
    + private_endpoint_network_policies_enabled     = (known after apply)
    + private_link_service_network_policies_enabled  = (known after apply)
    + resource_group_name                       = "practica2rg"
    + virtual_network_name                      = "vnet1"
  }

# azurerm_subnet_network_security_group_association.nsg-link will be created
+ resource "azurerm_subnet_network_security_group_association" "nsg-link" {
    + id                        = (known after apply)
    + network_security_group_id = (known after apply)
    + subnet_id                 = (known after apply)
  }
```

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```
 # azurerm_virtual_network.vnet will be created
 + resource "azurerm_virtual_network" "vnet" {
    + address_space      = [
       + "10.0.0.0/16",
      ]
    + dns_servers        = (known after apply)
    + guid               = (known after apply)
    + id                 = (known after apply)
    + location           = "uksouth"
    + name               = "vnet1"
    + resource_group_name = "practica2rg"
    + subnet             = (known after apply)
   }

Plan: 11 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + acr_admin_pass     = (sensitive value)
  + acr_admin_user     = (sensitive value)
  + acr_login_server   = (known after apply)
  + client_certificate = (sensitive value)
  + kube_config        = (sensitive value)
  + ssh_user           = "casopractico2"
  + vm_public_ip       = (known after apply)
azurerm_resource_group.rg: Creating...
azurerm_resource_group.rg: Creation complete after 1s [id=/subscriptions/4cec99f2-dcb1-40e5-
b292-66072a2186b8/resourceGroups/practica2rg]
azurerm_virtual_network.vnet: Creating...
azurerm_public_ip.pip_vm: Creating...
```

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azurerm_network_security_group.nsg1: Creating...

azurerm_container_registry.acr: Creating...

azurerm_kubernetes_cluster.aks: Creating...

azurerm_public_ip.pip_vm: Creation complete after 3s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/publicIPAddresses/public-ip-vm]

azurerm_network_security_group.nsg1: Creation complete after 3s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/networkSecurityGroups/securitygroup]

azurerm_virtual_network.vnet: Creation complete after 6s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/virtualNetworks/vnet1]

azurerm_subnet.subnet: Creating...

azurerm_container_registry.acr: Still creating... [10s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [10s elapsed]

azurerm_subnet.subnet: Creation complete after 5s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/virtualNetworks/vnet1/subnets/subnet1]

azurerm_subnet_network_security_group_association.nsg-link: Creating...

azurerm_network_interface.nic_vm: Creating...

azurerm_subnet_network_security_group_association.nsg-link: Creation complete after 4s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/virtualNetworks/vnet1/subnets/subnet1]

azurerm_network_interface.nic_vm: Creation complete after 5s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/networkInterfaces/vnic

-vm]

azurerm_linux_virtual_machine.vm: Creating...

azurerm_container_registry.acr: Still creating... [20s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [20s elapsed]

azurerm_container_registry.acr: Creation complete after 23s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.ContainerRegistry/registries/practica2acr]

azurerm_linux_virtual_machine.vm: Still creating... [10s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [30s elapsed]

azurerm_linux_virtual_machine.vm: Still creating... [20s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [40s elapsed]

azurerm_linux_virtual_machine.vm: Creation complete after 27s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Compute/virtualMachines/vm]

azurerm_kubernetes_cluster.aks: Still creating... [50s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [1m0s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [1m10s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [1m20s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [1m30s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [1m40s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [1m50s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [2m0s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [2m10s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [2m20s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [2m30s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [2m40s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [2m50s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [3m0s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [3m10s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [3m20s elapsed]

azurerm_kubernetes_cluster.aks: Still creating... [3m30s elapsed]

azurerm_kubernetes_cluster.aks: Creation complete after 3m39s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.ContainerService/managedClusters/aks01]

azurerm_role_assignment.aksrole: Creating...

azurerm_role_assignment.aksrole: Still creating... [10s elapsed]

azurerm_role_assignment.aksrole: Still creating... [20s elapsed]

azurerm_role_assignment.aksrole: Creation complete after 26s [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.ContainerRegistry/registries/practica2acr/providers/Microsoft.Authorization/roleAssignments/f8f79836-64f0-782b-a8e0-d9c838d8ab70]

Apply complete! Resources: 11 added, 0 changed, 0 destroyed.

Outputs:

acr_admin_pass = <sensitive>

acr_admin_user = <sensitive>

acr_login_server = "practica2acr.azurecr.io"

client_certificate = <sensitive>

kube_config = <sensitive>

ssh_user = "casopractico2"

vm_public_ip = ""

azurerm_resource_group.rg: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg]

azurerm_virtual_network.vnet: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/virtualNetworks/vnet1

```
]
azurerm_public_ip.pip_vm: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/publicIPAddresses/public-ip-vm]
azurerm_container_registry.acr: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.ContainerRegistry/registries/practica2acr]
azurerm_network_security_group.nsg1: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/networkSecurityGroups/securitygroup]
azurerm_kubernetes_cluster.aks: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.ContainerService/managedClusters/aks01]
azurerm_subnet.subnet: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/virtualNetworks/vnet1/subnets/subnet1]
azurerm_subnet_network_security_group_association.nsg-link: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/virtualNetworks/vnet1/subnets/subnet1]
azurerm_network_interface.nic_vm: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Network/networkInterfaces/vnic-vm]
azurerm_role_assignment.aksrole: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.ContainerRegistry/registries/practica2acr/providers/Microsoft.Authorization/roleAssignments/f8f79836-64f0-782b-a8e0-d9c838d8ab70]
```

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	Nombre: Miguel Angel

azurerm_linux_virtual_machine.vm: Refreshing state... [id=/subscriptions/4cec99f2-dcb1-40e5-b292-66072a2186b8/resourceGroups/practica2rg/providers/Microsoft.Compute/virtualMachines/vm]

Outputs:

acr_admin_pass = <sensitive>
acr_admin_user = <sensitive>
acr_login_server = "practica2acr.azurecr.io"
client_certificate = <sensitive>
kube_config = <sensitive>
ssh_user = "casopractico2"
vm_public_ip = "20.90.107.110"

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Despliegue de playbooks de ansible:

```
PLAY [inicio]
**********************************************************************************


TASK [Ejecutar Terraform]
**********************************************************************************
changed: [localhost]


TASK [Crear archivo de outputs json]
*********************************************************************
changed: [localhost]


TASK [Crear archivo de outputs yaml]
*********************************************************************
changed: [localhost]


TASK [leer una variable de output]
**********************************************************************************
changed: [localhost]


PLAY RECAP
**********************************************************************************
localhost                  : ok=4    changed=4    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0


20.90.107.110


PLAY [playbook instala podman en vm]
**********************************************************************************
```

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```
TASK [Gathering Facts]
*********************************************************************************
The authenticity of host '20.90.107.110 (20.90.107.110)' can't be established.
ECDSA key fingerprint is SHA256:oEfRFVXdlaAENmaEUsdXiR6tGoBkwRcL3l1+wrqvGpw.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
ok: [20.90.107.110]

TASK [instalo podman]
*********************************************************************************
changed: [20.90.107.110]

PLAY RECAP
*********************************************************************************
20.90.107.110          : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0


PLAY [playbook instala aplicaciones en vm]
*********************************************************************************

TASK [Gathering Facts]
*********************************************************************************
ok: [20.90.107.110]

TASK [cambio zonahoraria]
*********************************************************************************
changed: [20.90.107.110]

TASK [instalo httpd]
```

```
*****************************************************************************

changed: [20.90.107.110]

TASK [instalo openssl]
*****************************************************************************

ok: [20.90.107.110]

TASK [Instalar passlib en el host remoto]
*****************************************************************************

changed: [20.90.107.110]

PLAY RECAP
*****************************************************************************

20.90.107.110              : ok=5    changed=3    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0


PLAY [playbook copia los archivos del directorio /file]
*****************************************************************************


TASK [Gathering Facts]
*****************************************************************************

ok: [20.90.107.110]

TASK [Create a directory if it does not exist]
*****************************************************************************

changed: [20.90.107.110]

TASK [Copy file index.html]
*****************************************************************************
```

```
changed: [20.90.107.110]

TASK [Copy file ansible/files/.htaccess]
*********************************************************************************
changed: [20.90.107.110]

TASK [Copy file ansible/files/httpd.conf]
*********************************************************************************
changed: [20.90.107.110]

TASK [Copy file ansible/files/Containerfile]
*********************************************************************************
changed: [20.90.107.110]

PLAY RECAP
*********************************************************************************
20.90.107.110          : ok=6    changed=5    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0


PLAY [Generar certificados]
*********************************************************************************
TASK [Gathering Facts]
*********************************************************************************
ok: [20.90.107.110]
TASK [Generate file htpasswd]
*********************************************************************************
changed: [20.90.107.110]

TASK [Generate an OpenSSL private key with a different size (2048 bits)]
```

```
**********************************************************************

changed: [20.90.107.110]

TASK [Generate an OpenSSL Certificate Signing Request]
*****************************************************************************

changed: [20.90.107.110]

TASK [Generate a Self Signed OpenSSL certificate]
*****************************************************************************

changed: [20.90.107.110]

PLAY RECAP
*****************************************************************************

20.90.107.110              : ok=5    changed=4    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0


PLAY [playbook login podman with acr]
*****************************************************************************

TASK [Gathering Facts]
*****************************************************************************

ok: [20.90.107.110]

TASK [Login to default registry with outputs.json]
*****************************************************************************

changed: [20.90.107.110]

PLAY RECAP
*****************************************************************************
```

Asignatura	Datos del alumno
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```
*********************************************

20.90.107.110          : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0


PLAY [playbook despliegue']
*********************************************************************************


TASK [Gathering Facts]
*********************************************************************************
ok: [20.90.107.110]

TASK [Build a basic image]
*********************************************************************************
changed: [20.90.107.110]

TASK [containers.podman.podman_tag]
*********************************************************************************
changed: [20.90.107.110]

TASK [Build and push an image using existing credentials]
*********************************************************************************
changed: [20.90.107.110]

TASK [Create a webserver container]
*********************************************************************************
changed: [20.90.107.110]

TASK [Iniciar servicio de web]
*********************************************************************************
```

```
changed: [20.90.107.110]

PLAY RECAP
*********************************************************************************
20.90.107.110          : ok=6    changed=5    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0


PLAY [playbook despliegue para k8s]
*********************************************************************************

TASK [Gathering Facts]
*********************************************************************************
ok: [20.90.107.110]

TASK [Create a directory if it does not exist]
*********************************************************************************
changed: [20.90.107.110]

TASK [Copy file ansible/files_k8s/Containerfile]
*********************************************************************************
changed: [20.90.107.110]

TASK [Pull an image]
*********************************************************************************
changed: [20.90.107.110]

TASK [containers.podman.podman_tag]
*********************************************************************************
changed: [20.90.107.110]
```

Asignatura	Datos del alumno
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```
TASK [Build and push an image using existing credentials]
**********************************************************************************
changed: [20.90.107.110]

TASK [Run container]
**********************************************************************************
changed: [20.90.107.110]

PLAY RECAP
**********************************************************************************
20.90.107.110          : ok=7    changed=6    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0


PLAY [Autenticacion kubernetes]
**********************************************************************************

TASK [Gathering Facts]
**********************************************************************************
ok: [localhost]

TASK [Instalar kubernetes]
**********************************************************************************
ok: [localhost]

TASK [credenciales aks]
**********************************************************************************
changed: [localhost]
```

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```
TASK [Create a k8s namespace]
**********************************************************************************
changed: [localhost]

TASK [Create a persistant service from a local file]
**********************************************************************************
changed: [localhost]

PLAY RECAP
**********************************************************************************
localhost                  : ok=5    changed=3    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0
```

Asignatura	Datos del alumno	Fecha
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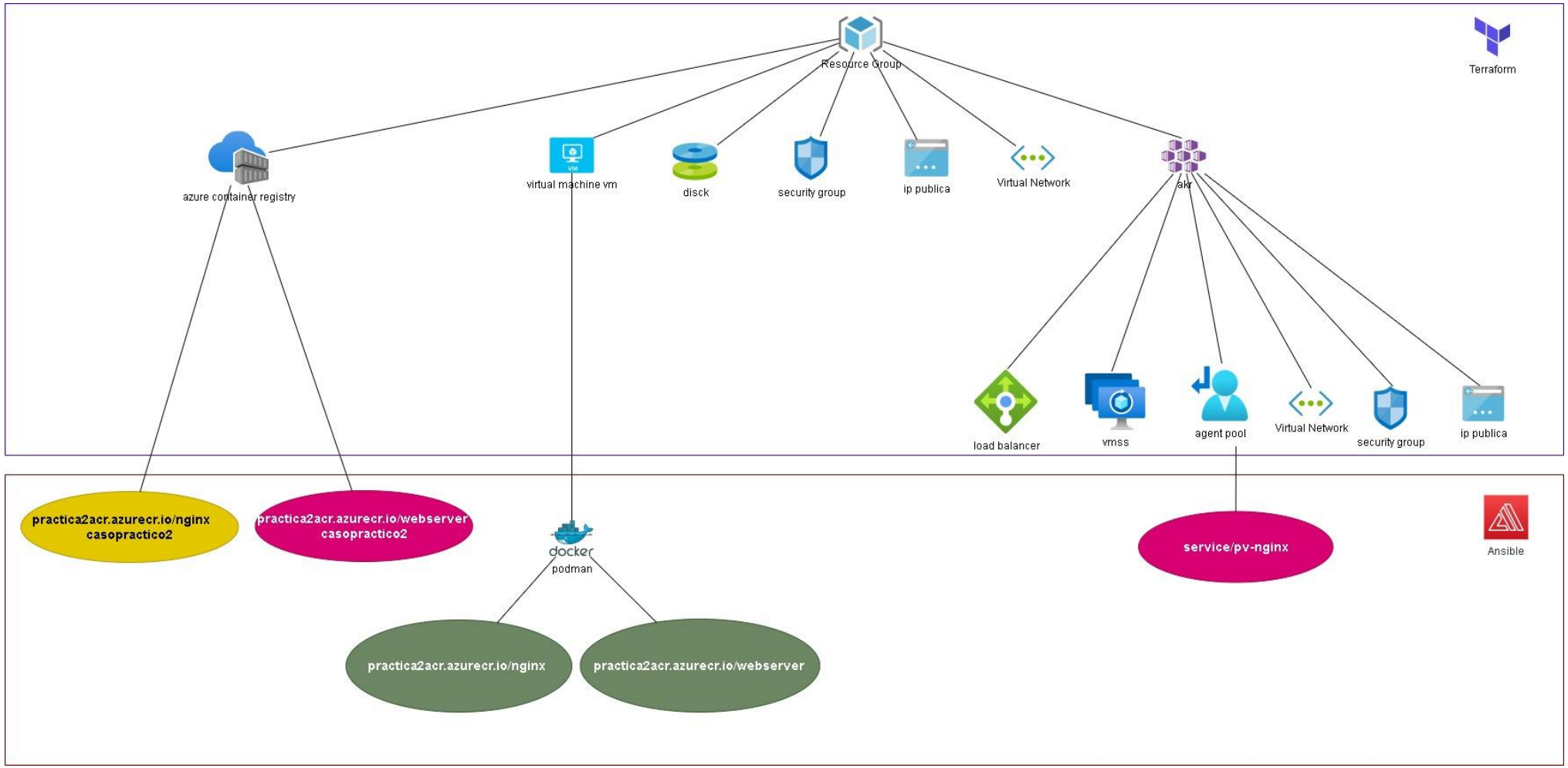
	Nombre: Miguel Angel	

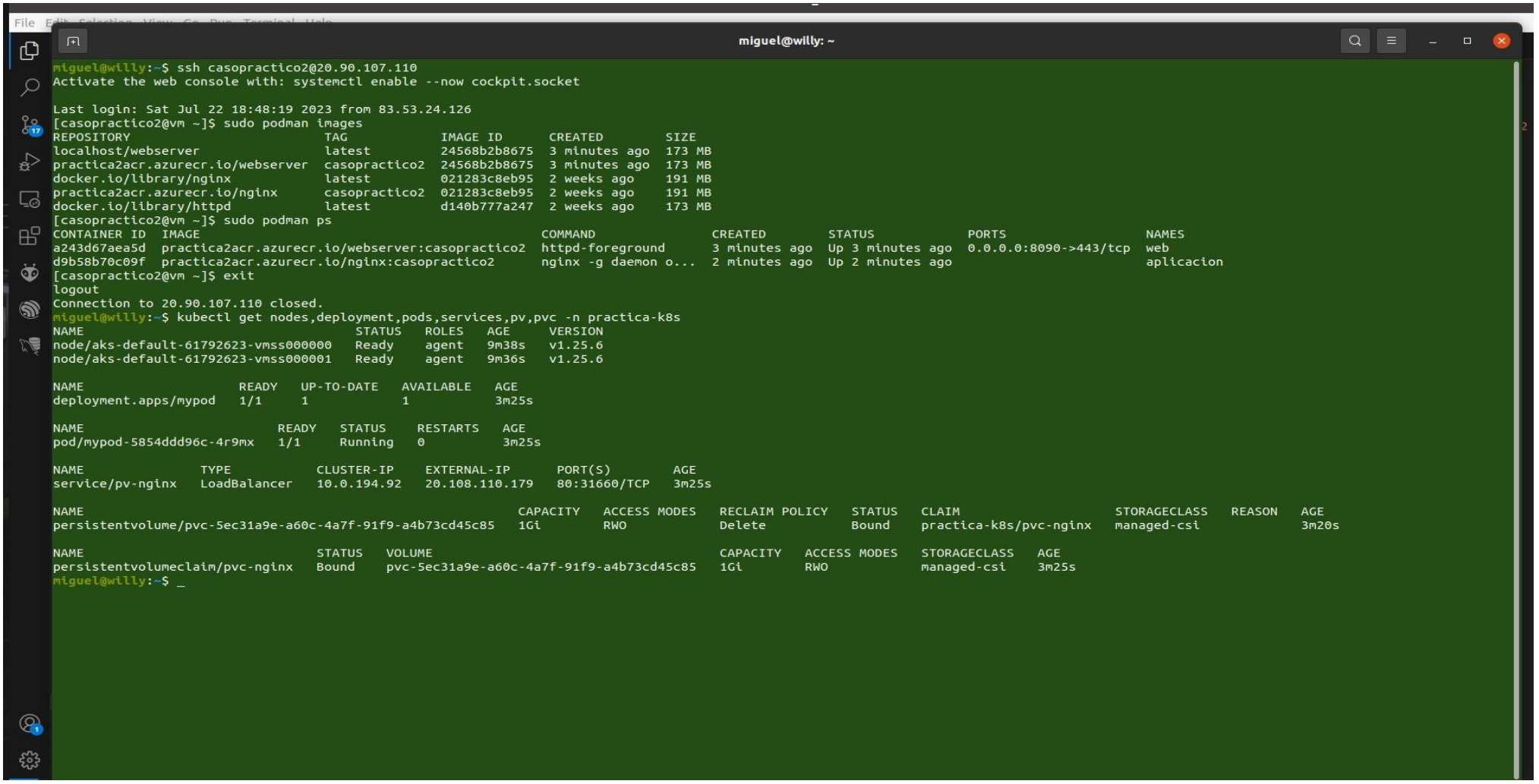
Diagrama



Actividades

Asignatura	Datos del alumno	Fecha
Devops & Cloud	Apellidos: Lorenzo Villoria	24/07/2023
	Nombre: Miguel Angel	

Pantallas



Asignatura	Datos del alumno	Fecha
Devops & Cloud	Apellidos: Lorenzo Villoria	24/07/2023
	Nombre: Miguel Angel