

PEMU 2020- Laboratorio 4

Minikube - Kubernetes

Objetivo

Implementar un ambiente de Kubernetes de evaluación y realizar el primer despliegue de un POD que provea un micro -servicio de servidor web (NGIX).

Descripción General

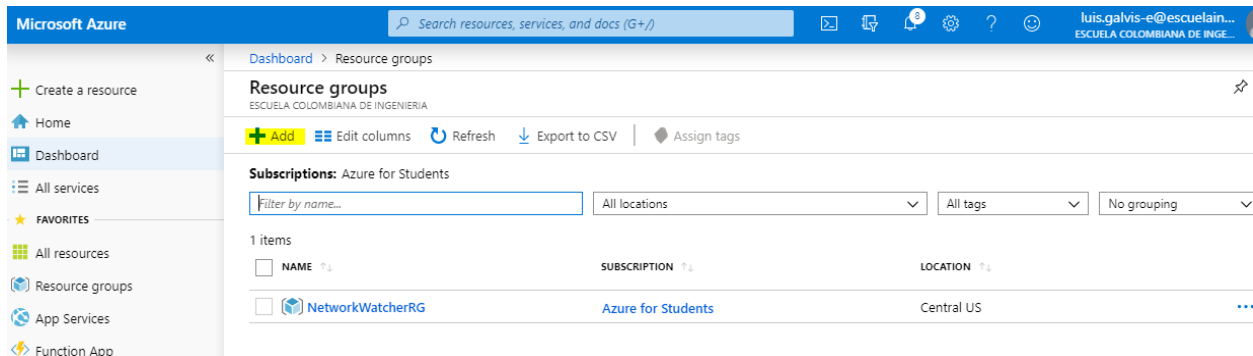
En este laboratorio se implementará un sistema de Kubernetes utilizando el proyecto MiniKube. Minikube permite tener un sistema de Kubernetes para desarrollo y evaluación en una máquina virtual. Después de implementar MiniKube, se procederá a crear un microservicio que lanzará un servidor web (NGIX) mediante las siguientes actividades:

1. Creación de una Máquina Virtual en Azure usando la Imagen Ubuntu Server y con autenticación de usuario y contraseña
2. Instalación del proyecto de MiniKube usando repositorios de paquetes
3. Instalación del Ambiente Grafico y Ejecución de Consola de Kubernetes
4. Despliegue de POD en el Cluster Kubernetes para ejecutar un servidor Web NGIX.

Instrucciones

1. Creación de Maquina Virtual

Acceda a la Consola de Azure y cree un ResourceGroup llamado Kubernetes



The screenshot shows the Microsoft Azure portal interface. The left sidebar contains navigation links: 'Create a resource', 'Home', 'Dashboard', 'All services', 'FAVORITES', 'All resources', 'Resource groups', 'App Services', and 'Function App'. The main content area is titled 'Resource groups' and shows a table of resource groups. The table has columns for 'NAME', 'SUBSCRIPTION', and 'LOCATION'. One resource group is listed: 'NetworkWatcherRG' under the 'Azure for Students' subscription in the 'Central US' location.

NAME	SUBSCRIPTION	LOCATION
NetworkWatcherRG	Azure for Students	Central US

Seleccione (US) East US como región y de Click en Review + créate

Microsoft Azure

Search resources, services, and docs (G+)

Dashboard > Resource groups > Create a resource group

Create a resource

Home

Dashboard

All services

FAVORITES

All resources

Resource groups

App Services

Function App

SQL databases

Azure Cosmos DB

Virtual machines

Load balancers

Storage accounts

Virtual networks

Azure Active Directory

Monitor

Advisor

Security Center

Cost Management + Billing

Help + support

Create a resource group

Basics Tags Review + create

Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. [Learn more](#)

Project details

* Subscription ⓘ Azure for Students

* Resource group ⓘ Kubernetes

Resource details

* Region ⓘ (US) East US

Review + create < Previous Next : Tags >

Después de que la validación del Resource Group sea exitoso, proceda a crear el Resource Group

Create a resource group

✓ Validation passed.

Basics Tags Review + create

Basics

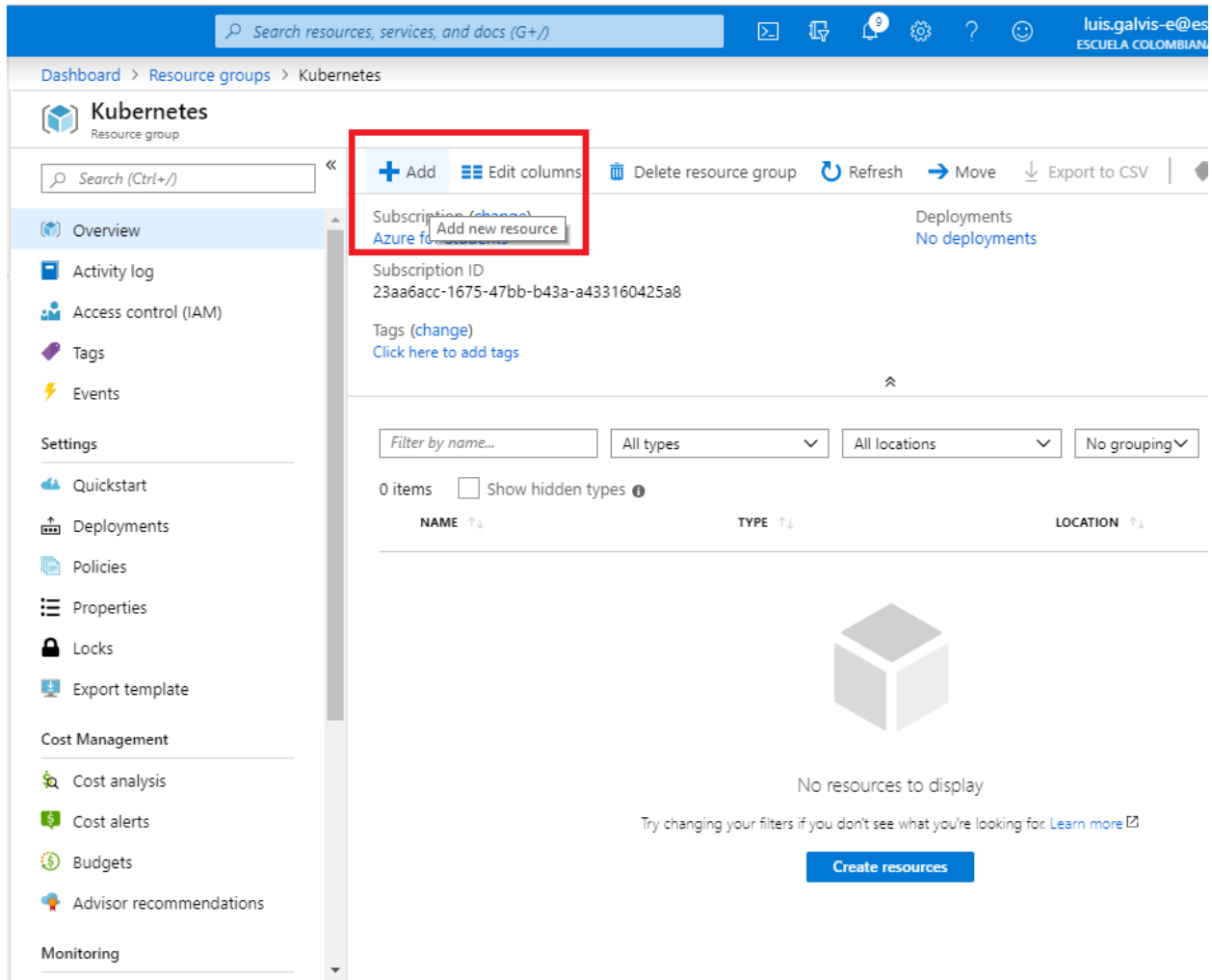
Subscription	Azure for Students
Resource group	Kubernetes
Region	(US) East US

Create

< Previous

Next >

Acceda al Resource Group y proceda a crear un nuevo recurso



The screenshot shows the Azure portal interface for a resource group named 'Kubernetes'. The top navigation bar includes a search bar and user information. The left sidebar contains various navigation options like Overview, Activity log, Access control, and Settings. The main content area shows the 'Add' button highlighted with a red box, with a dropdown menu open showing 'Add new resource' as the selected option. Below this, the subscription details are displayed, including the Subscription ID and Tags. A table of resources is shown with columns for NAME, TYPE, and LOCATION, but it is currently empty. A 'Create resources' button is visible at the bottom.

Search resources, services, and docs (G+)

Dashboard > Resource groups > Kubernetes

Kubernetes
Resource group

Search (Ctrl+/)

+ Add Edit columns Delete resource group Refresh Move Export to CSV

Subscription (change)
Azure portal Add new resource

Deployments
No deployments

Subscription ID
23aa6acc-1675-47bb-b43a-a433160425a8

Tags (change)
Click here to add tags

Filter by name... All types All locations No grouping

0 items ☐ Show hidden types

NAME	TYPE	LOCATION
------	------	----------

No resources to display

Try changing your filters if you don't see what you're looking for. [Learn more](#)

Create resources

Busque en el Marketplace Ubuntu Server como imagen del recurso. Seleccione la Versión 18.04 LTS

Dashboard > Kubernetes > Marketplace

Marketplace

My Saved List

Recently created

Service Providers

Categories


- Get Started
- AI + Machine Learning
- Analytics
- Blockchain
- Compute
- Containers
- Databases
- Developer Tools
- DevOps
- Identity
- Integration
- Internet of Things
- IT & Management Tools
- Media

Pricing : All

Operating System : All

Publisher : All


Showing All Results




Ubuntu Server

Canonical

Ubuntu Server delivers the best value scale-out performance available.







Ubuntu Server 19.04

Canonical

Ubuntu Server delivers the best value scale-out performance available.







Ubuntu Server 18.04 LTS

Canonical

Ubuntu Server delivers the best value scale-out performance available.







Data Science Virtual Machine for Linux (Ubuntu)

Microsoft

Virtual machine image with deep learning frameworks and tools for machine learning and data science.







Ubuntu Server

tunnelbiz.com

Ubuntu Server for developer






Xeams on Ubuntu

Apps4Rent LLC

A secure and powerful mail server with strong junk filtering engine on Ubuntu by Apps4Rent



Proceda a crear el Recurso

[Dashboard](#) > [Kubernetes](#) > [Marketplace](#) > Ubuntu Server 18.04 LTS

Ubuntu Server 18.04 LTS

Canonical



Ubuntu Server 18.04 LTS

Canonical

[Save for later](#)

Create

Start with a pre-set configuration

Deploy with Resource Manager [\(change to Classic\)](#)

Ubuntu Server 18.04 LTS amd64 Public Azure, Azure Germany, Azure China. Ubuntu Server is the world's most popular Linux for cloud environments. Updates and patches for Ubuntu 18.04 will be available until April 2023. Ubuntu Server is the perfect virtual machine (VM) platform for all workloads from web applications to NoSQL databases and Hadoop. For more information see [Ubuntu on Azure](#) and [using Juju to deploy your workloads](#).

Legal Terms

By clicking the Create button, I acknowledge that I am getting this software from Canonical and that the [legal terms](#) of Canonical apply to it. Microsoft does not provide rights for third-party software. Also see the [privacy statement](#) from Canonical.

Useful Links

[Linux VM Documentation](#)

[Ubuntu Documentation](#)

[FAQ](#)

[Pricing Details](#)

Seleccione su cuenta de Suscripción y el Resource Group creado. Como nombre Virtual de la Maquina asigne **MiniKube**

[Basics](#) [Disks](#) [Networking](#) [Management](#) [Advanced](#) [Tags](#) [Review + create](#)

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image.

Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization.

Looking for classic VMs? [Create VM from Azure Marketplace](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

* Subscription ⓘ	<input type="text" value="Azure for Students"/>
* Resource group ⓘ	<input type="text" value="Kubernetes"/>

[Create new](#)

Instance details

* Virtual machine name ⓘ	<input type="text" value="MiniKube"/>
* Region ⓘ	<input type="text" value="(US) Central US"/>
Availability options ⓘ	<input type="text" value="No infrastructure redundancy required"/>
* Image ⓘ	<input type="text" value="Ubuntu Server 18.04 LTS"/>

[Browse all public and private images](#)

* Size ⓘ	Standard D2s v3
	2 vcpus, 8 GiB memory
	Change size

En las opciones de Autenticación, seleccione la autenticación por contraseña. Indique un usuario i contraseña para la administración. Recuerde las credenciales ya que serán usadas en gran parte del laboratorio. Permita el acceso para los servicios HTTP, HTTPS y SSH y proceda con la revisión y creación del recurso.

Administrator account

Authentication type ⓘ

☒ Password ☐ SSH public key

* Username ⓘ

lgalvis ✓

* Password ⓘ

..... ✓

* Confirm password ⓘ

..... ✓

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

* Public inbound ports ⓘ

☐ None ☒ Allow selected ports

* Select inbound ports

HTTP, HTTPS, SSH ✓



These ports will be exposed to the internet. Use the Advanced controls to limit inbound traffic to known IP addresses. You can also update inbound traffic rules later.

Review + create

< Previous

Next : Disks >

Revise los valores de acuerdo a la siguiente imagen y proceda a crear el recurso.

Create a virtual machine

✓ Validation passed

Basics Disks Networking Management Advanced Tags Review + create

PRODUCT DETAILS

Standard D2s v3
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ
0.1100 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Basics

Subscription	Azure for Students
Resource group	Kubernetes
Virtual machine name	MiniKube
Region	(US) Central US
Availability options	No infrastructure redundancy required
Authentication type	Password
Username	Igalvis
Public inbound ports	HTTP, HTTPS, SSH

Disks

OS disk type	Premium SSD
Use managed disks	Yes
Use ephemeral OS disk	No

Networking

Create < Previous Next > [Download a template for automation](#)

Espere hasta que el recurso sea creado. Una vez finalizado acceda el recurso

Dashboard > CreateVm-Canonical.UbuntuServer-18.04-LTS-20190917200455 - Overview

CreateVm-Canonical.UbuntuServer-18.04-LTS-20190917200455 - Overview

Deployment

Search (Ctrl+ /)

- Overview
- Inputs
- Outputs
- Template

« Delete Cancel Redeploy Refresh

✓ Your deployment is complete

Deployment name: CreateVm-Canonical.UbuntuServer-18.04-LTS-...
Subscription: [Azure for Students](#)
Resource group: [Kubernetes](#)

▼ Deployment details ([Download](#))

^ Next steps

[Go to resource](#)

Tenga en cuenta la dirección IP Publica del recurso

Dashboard > CreateVm-Canonical.UbuntuServer-18.04-LTS-20190917200455 - Overview > MiniKube

MiniKube

Virtual machine

Search (Ctrl+ /)

Connect Start Restart Stop Capture Delete Refresh

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems

Settings

- Networking
- Disks
- Size
- Security
- Extensions
- Continuous delivery (Preview)

Resource group ([change](#))
[Kubernetes](#)

Status
Running

Location
Central US

Subscription ([change](#))
[Azure for Students](#)

Subscription ID
23aa6acc-1675-47bb-b43a-a433160425a8

Tags ([change](#))
[Click here to add tags](#)

Computer name
MiniKube

Operating system
Linux (ubuntu 18.04)

Size
Standard D2s v3 (2 vcpus, 8 GiB memory)

Ephemeral OS disk
N/A

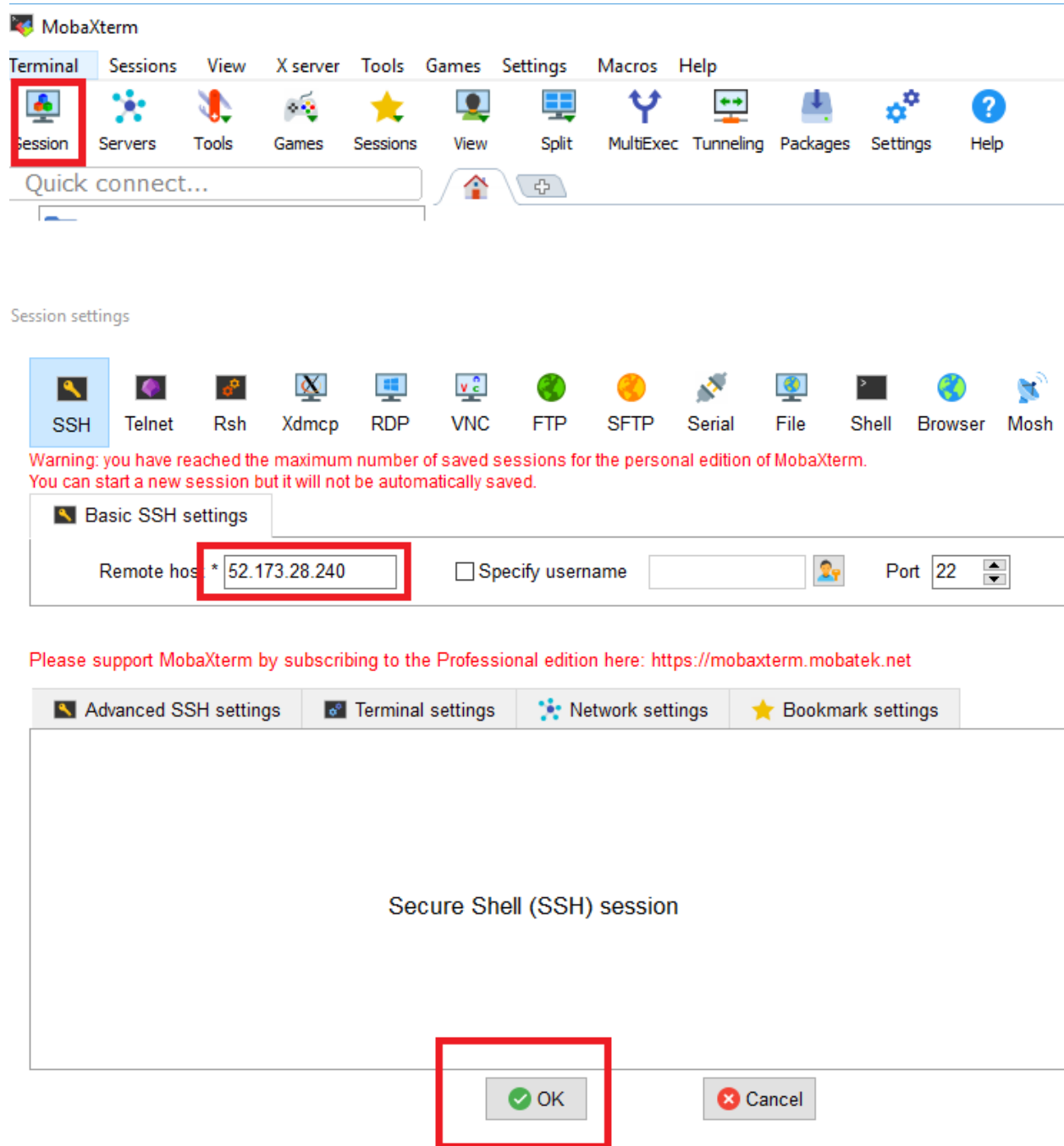
Public IP address
52.173.28.240

Private IP address
10.0.0.4

Virtual network/subnet
[Kubernetes-vnet/default](#)

DNS name
[Configure](#)

Acceda al recurso usando la aplicación MobaXterm. Cree una Sesión SSH usando la IP publica:



The screenshot shows the MobaXterm application window. The 'Terminal' menu is open, and the 'Session' option is highlighted with a red box. Below the menu, the 'Session settings' dialog is displayed. The 'SSH' tab is selected, and the 'Remote host' field contains the IP address '52.173.28.240', which is also highlighted with a red box. The 'Port' is set to '22'. A warning message is visible: 'Warning: you have reached the maximum number of saved sessions for the personal edition of MobaXterm. You can start a new session but it will not be automatically saved.' Below the settings, the 'Advanced SSH settings' tab is selected, and the 'Secure Shell (SSH) session' dialog is shown. The 'OK' button is highlighted with a red box.

MobaXterm

Terminal Sessions View X server Tools Games Settings Macros Help

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help

Quick connect...

Session settings

SSH Telnet Rsh Xdmcp RDP VNC FTP SFTP Serial File Shell Browser Mosh

Warning: you have reached the maximum number of saved sessions for the personal edition of MobaXterm.
You can start a new session but it will not be automatically saved.

Basic SSH settings

Remote host * 52.173.28.240 ☐ Specify username Port 22

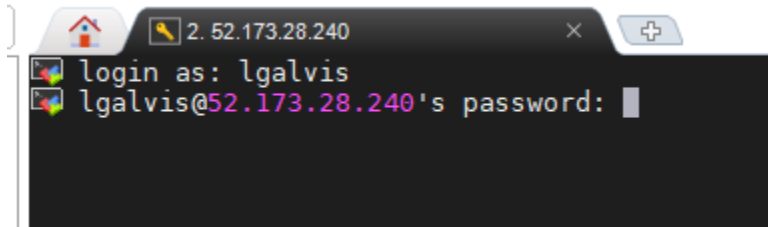
Please support MobaXterm by subscribing to the Professional edition here: <https://mobaxterm.mobatek.net>

Advanced SSH settings Terminal settings Network settings Bookmark settings

Secure Shell (SSH) session

OK Cancel

Ingrese las credenciales que asigno al recurso creado



```
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 5.0.0-1018-azure x86_64)

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

System information as of Wed Sep 18 01:20:40 UTC 2019

System load:  0.14           Processes:            122
Usage of /:   4.2% of 28.90GB Users logged in:        0
Memory usage: 4%            IP address for eth0: 10.0.0.4
Swap usage:   0%

7 packages can be updated.
7 updates are security updates.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

/usr/bin/xauth:  file /home/lgalvis/.Xauthority does not exist
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

lgalvis@MiniKube:~$
```

2. Instalación MiniKube

En la terminal realice la actualización del Sistema. Ejecute los siguientes comandos

```
sudo apt-get update
sudo apt-get install apt-transport-https
sudo apt-get upgrade
```

Instale el paquete de VirtualBox (Minikube creara una máquina de virtual box) ejecutando el siguiente comando

```
sudo apt install virtualbox virtualbox-ext-pack
```

Confirme la descarga de paquetes e instalación:

```
Need to get 112 MB of archives.
After this operation, 627 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```

Package configuration

Configuring virtualbox-ext-pack

Oracle Corporation requests VirtualBox users to acknowledge and accept the "VirtualBox Personal Use and Evaluation License" (PUEL). Please read the license below. If you accept this license, the package installation will continue. If you refuse it, it will be interrupted.

VirtualBox Extension Pack Personal Use and Evaluation License (PUEL)

License version 10, 20 July 2017

PLEASE READ THE FOLLOWING ORACLE VM VIRTUALBOX EXTENSION PACK PERSONAL USE AND EVALUATION LICENSE CAREFULLY BEFORE DOWNLOADING OR USING THE ORACLE SOFTWARE. THESE TERMS AND CONDITIONS CONSTITUTE A LEGAL AGREEMENT BETWEEN YOU AND ORACLE.

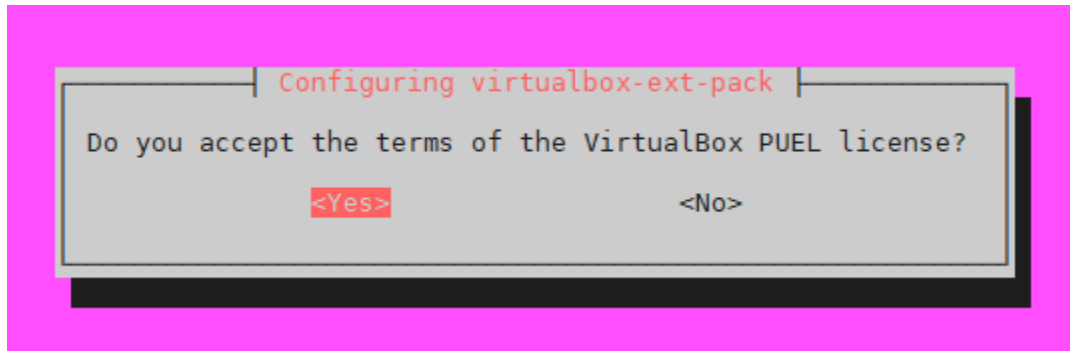
ORACLE AMERICA, INC. ("ORACLE") IS WILLING TO LICENSE THE PRODUCT DEFINED IN SECTION 1 BELOW ONLY ON THE CONDITION THAT YOU ACCEPT ALL OF THE TERMS CONTAINED IN THIS VIRTUALBOX EXTENSION PACK PERSONAL USE AND EVALUATION LICENSE AGREEMENT ("AGREEMENT").

IF YOU ARE AGREEING TO THIS LICENSE ON BEHALF OF AN ENTITY (RATHER THAN AS AN INDIVIDUAL HUMAN BEING), YOU REPRESENT THAT YOU HAVE THE APPROPRIATE AUTHORITY TO ACCEPT THESE TERMS AND CONDITIONS ON BEHALF OF SUCH ENTITY.

1 SUBJECT OF AGREEMENT. This Agreement governs your use of the binary software package called "Oracle VM VirtualBox Extension Pack" (the "Product"), which contains a set of additional features for "Oracle VM VirtualBox" that enhance the operation of multiple virtual machines ("Guest Computers") on a single physical computer ("Host Computer"). The Product consists of executable files in machine code, script files, data files, and all documentation and updates provided to You by Oracle.

2 GRANT OF LICENSE. Oracle grants you a personal, non-exclusive, non-transferable, limited license without fees to reproduce, install, execute, and use internally the Product on Host Computers for your Personal Use, Educational Use, or Evaluation. "Personal Use" is noncommercial use solely by the person downloading the Product from Oracle on a single Host Computer, provided that no more than one client or remote computer is connected to that Host Computer and that client or remote computer is used solely to remotely view the Guest Computer(s). "Educational Use" is any use by teachers or students in an academic institution (schools, colleges and universities) as part of the institution's educational curriculum. "Evaluation" means testing the Product for up to thirty (30) days; after expiry of that term, you are no longer permitted to use the Product. Personal Use and/or Educational Use expressly exclude any use of

<Ok>



Finalizada la instalación de Virtual Box, descargue los binarios de MiniKube y añádalos al path del sistema ejecutando el siguiente comando:

```
wget https://storage.googleapis.com/minikube/releases/latest/minikube-linux-  
amd64  
chmod +x minikube-linux-amd64  
sudo mv minikube-linux-amd64 /usr/local/bin/minikube
```

Verifique la versión ejecutando el comando **minikube version**

```
lgalvis@MiniKube:~$ minikube version  
minikube version: v1.3.1  
commit: ca60a424ce69a4d79f502650199ca2b52f29e631  
lgalvis@MiniKube:~$
```

Instale la aplicación **kubctl**. kubectl es una herramienta de línea de comandos usada para desplegar y administrar aplicaciones en kubernetes. Para ello ejecute el siguiente comando que descarga el repositorio requerido

```
curl -s https://packages.cloud.google.com/apt/doc/apt-key.gpg | sudo apt-key  
add -
```

Añada el repositorio al Sistema ejecutando el siguiente comando:

```
echo "deb http://apt.kubernetes.io/ kubernetes-xenial main" | sudo  
tee /etc/apt/sources.list.d/kubernetes.list
```

Actualice los repositorios e instale kubectl en el Sistema ejecutando los siguientes comandos:

```
sudo apt update
```

```
sudo apt -y install kubectl
```

Verifique la versión de MiniKube ejecutando el siguiente comando:

```
# kubectl version -o json
{
  "clientVersion": {
    "major": "1",
    "minor": "10",
    "gitVersion": "v1.10.4",
    "gitCommit": "5ca598b4ba5abb89bb773071ce452e33fb66339d",
    "gitTreeState": "clean",
    "buildDate": "2018-06-06T08:13:03Z",
    "goVersion": "go1.9.3",
    "compiler": "gc",
    "platform": "linux/amd64"
  }
}
```

Ya Minikube se encuentra listo para iniciar. Inicie el Clúster ejecutando el siguiente comando

```
minikube start
```

El proceso puede tardar varios minutos

```
lgalvis@MiniKube:~$ minikube start
* minikube v1.3.1 on Ubuntu 18.04
* Downloading VM boot image ...
minikube-v1.3.0.iso.sha256: 65 B / 65 B [-----] 100.00% ? p/s 0s
minikube-v1.3.0.iso: 131.07 MiB / 131.07 MiB [-----] 100.00% 133.34 MiB p/s 1s
* Creating virtualbox VM (CPUs=2, Memory=2000MB, Disk=20000MB) ...
```

```
lgalvis@MiniKube:~$ minikube start
! minikube 1.4.0 is available! Download it: https://github.com/kubernetes/minikube/releases/tag/v1.4.0
* To disable this notice, run: 'minikube config set WantUpdateNotification false'
* minikube v1.3.1 on Ubuntu 18.04
* Tip: Use 'minikube start -p <name>' to create a new cluster, or 'minikube delete' to delete this one.
* Starting existing virtualbox VM for "minikube" ...
* Waiting for the host to be provisioned ...
* Preparing Kubernetes v1.15.2 on Docker 18.09.8 ...
* Relaunching Kubernetes using kubeadm ...
* Waiting for: apiserver proxy etcd scheduler controller dns
* Done! kubectl is now configured to use "minikube"
lgalvis@MiniKube:~$
```

3. Instalación de Ambiente Grafico

Con el objetivo de obtener un explorador Web que nos permita observar la consola de Kubernetes y el microservicio a crear.

Instale el ambiente de escritorio xfce4 ejecutando el siguiente comando en la terminal de la maquina virtual.

```
sudo apt install xfce4 xfce4-goodies
```

Instale el cliente ligero vnc ejecutando el siguiente comando en la terminal:

```
sudo apt install tightvncserver
```

Inicialice ambiente de escritorio e indique un password ejecutando el siguiente comando:

```
vncserver :1
```

```
lgalvis@MiniKube:~$ vncserver :1
You will require a password to access your desktops.
Password:
Warning: password truncated to the length of 8.
Verify:
Would you like to enter a view-only password (y/n)? n
New 'X' desktop is MiniKube:1
Creating default startup script /home/lgalvis/.vnc/xstartup
Starting applications specified in /home/lgalvis/.vnc/xstartup
Log file is /home/lgalvis/.vnc/MiniKube:1.log
```


En las opciones de Networking en la consola de Azure para la máquina virtual de MiniKube, adicione una regla para permitir el puerto 5901.

Home > Resource groups > Kubernetes > MiniKube - Networking

MiniKube - Networking

Virtual machine

Search (Ctrl+F)

Attach network interface Detach network interface

Network interface: minikube472 Effective security rules Topology
Virtual network/subnet: Kubernetes-vnet/default NIC Public IP: 52.173.26.240 NIC Private IP: 10.0.0.4 Accelerated networking: Disabled

Inbound port rules Outbound port rules Application security groups Load balancing

Network security group MiniKube-nsg (attached to network interface: minikube472)
Impacts 0 subnets, 1 network interfaces

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
300	HTTP	80	TCP	Any	Any	Allow
320	HTTPS	443	TCP	Any	Any	Allow
340	SSH	22	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

Add inbound security rule
MiniKube-nsg

Basic

* Source
Any

* Source port ranges
*

* Destination
Any

* Destination port ranges
5901

* Protocol
Any TCP UDP ICMP

* Action
Allow Deny

* Priority
350

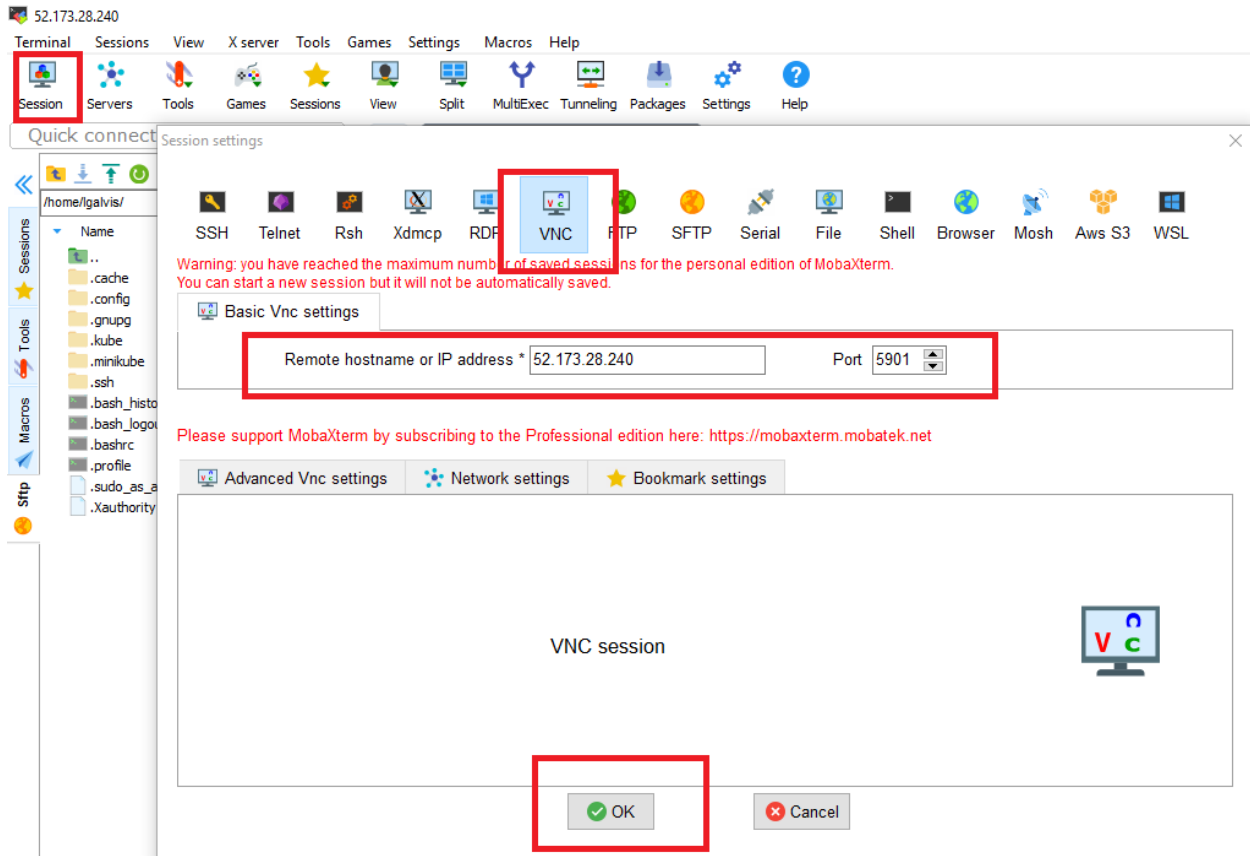
* Name
VNC

Description
VNC Access

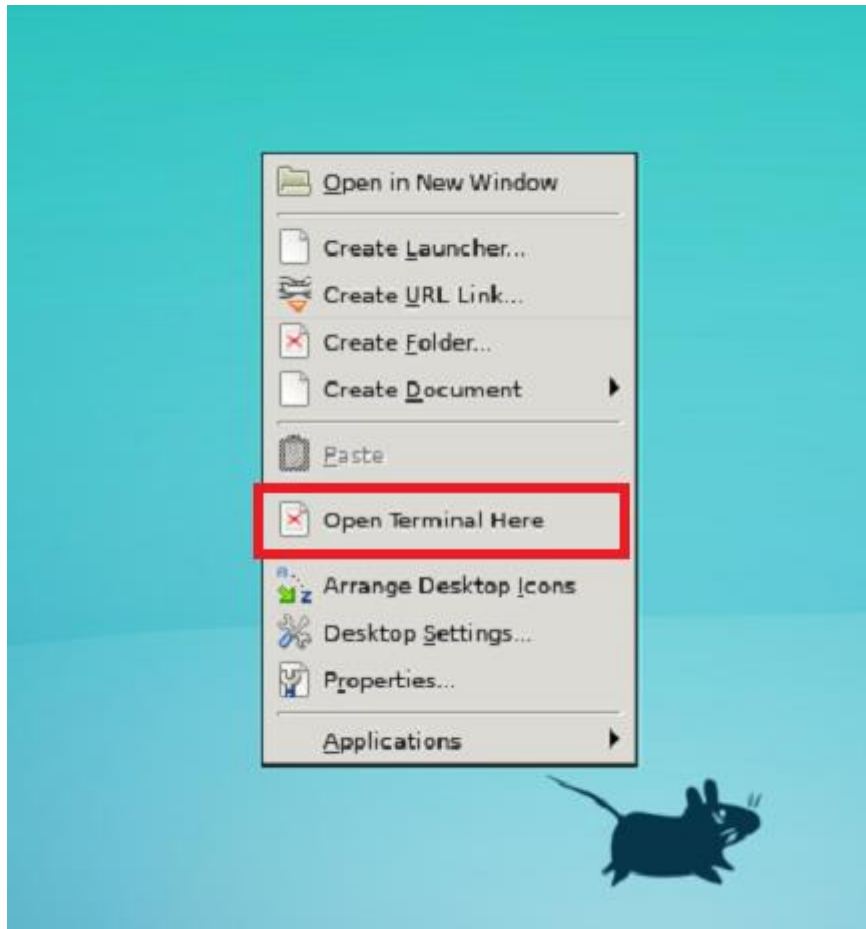
Add

4. Despliegue de un microservicio en Kubernetes para NGIX

Iniciar una sesión VNC en MobaXterm usando la IP publica de la máquina y el puerto 5901



Realice click derecho en el escritorio y abra una terminal



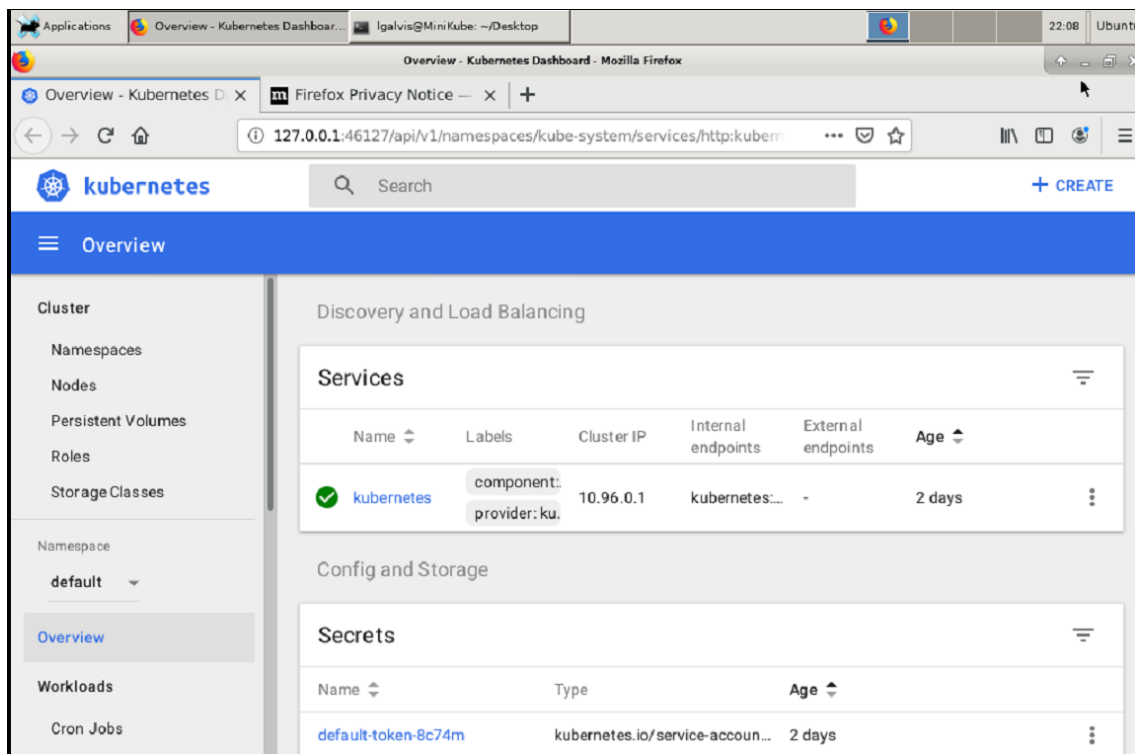
Instale un explorador Web mediante el siguiente comando

```
sudo apt-get install firefox
```

```
lgalvis@MiniKube: ~/Desktop
File Edit View Search Terminal Help
lgalvis@MiniKube:~/Desktop$ sudo apt-get install firefox
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libdbusmenu-glib4 libdbusmenu-gtk3-4 xul-ext-ubufox
Suggested packages:
  fonts-lyx
The following NEW packages will be installed:
  firefox libdbusmenu-glib4 libdbusmenu-gtk3-4 xul-ext-ubufox
0 upgraded, 4 newly installed, 0 to remove and 8 not upgraded.
Need to get 50.3 MB of archives.
After this operation, 189 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Habilite el dashboard de Kubernetes ejecutando el siguiente comando:

```
minikube dashboard &
```



Para crear el primer microservicio lanzando un container que ejecute nginx, en la terminal use **kubectl** ejecutando el siguiente comando:

```
kubectl create deployment mynginxapp --image=nginx:latest --port=80
```

```
lgalvis@MiniKube:~/Desktop$ kubectl run mynginxapp --image=nginx:latest --port=80
kubectl run --generator=deployment/apps.v1 is DEPRECATED and will be removed in
a future version. Use kubectl run --generator=run-pod/v1 or kubectl create inste
ad.
deployment.apps/mynginxapp created
```

Exponga la aplicación del POD como Servicio ejecutando el siguiente comando:

```
kubectl expose deployment mynginxapp --type=NodePort
```

```
lgalvis@MiniKube:~/Desktop$ kubectl expose deployment mynginxapp --type=NodePort
service/mynginxapp exposed
```

Verifique el estado del POD y el Servicio ejecutando el siguiente comando

```
kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
mynginxapp2-f4bf7fc-n5m4r	1/1	Running	0	60s

```
lgalvis@MiniKube:~$
```

Por ultimo, verifique el Servicio del POD ejecutando el siguiente comando

```
minikube service mynginxapp
```



Instrucciones de Entrega:

Cree un Documento Word donde adjunte los siguientes screenshots:

- Estado del POD en la Consola Web de Kubernetes
- Portal NGIX
- Estado del Servicio en la Consola Web de Kubernetes
- Estado del Nodo en la Consola Web de Kubernetes

Cargue el documento en Campus Virtual.

Punto Extra

Modifique el Container para que cambie la página de inicio de NGIX por una que muestre su nombre.

Hints:

- Busque el comando de **kubectl** que le permita acceder a la consola del container
- Busque la ruta donde NGIX por defecto deja el archivo **index.html**
- Renombre el archivo **index** y cree un archivo **index.html** que tenga como contenido su nombre
- Refresque la página Web

Una vez finalizado el LAB y los entregables. Destruya todos los elementos del Resource Group en su suscripción de Azure!.