UNIVERSITÉ
DE REIMS
CHAMPAGNE-ARDENNE

Vagrant

PRACTICAL WORK 5

TIZIANO NARDONE
UNIVERSITY OF REIMS | FRANCE

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I. Requirements for Windows 10

- Check if Intel technology virtualization is enabled in the Bios
- Install CMDER on Wind10

If you wish to use VirtualBox on Windows, you must ensure that Hyper-V is not enabled on Windows. You can turn off the feature by running this Powershell command:

- Disable-WindowsOptionalFeature -Online -FeatureName Microsoft-Hyper-V-All

II. Question 1: Vagrant installation on Windows 10

1. Vagrant

https://www.vagrantup.com/docs/installation

https://www.vagrantup.com/downloads

```
D:\Sotfwares\cmder
λ vagrant -v
Vagrant 2.2.19
```

III. Question 2: Download & installation Ubuntu 18.04

- find Vagrant boxes
  - https://app.vagrantup.com/boxes/search
- Create a directory wherever you want to work

2. Download the Ubuntu 18.04 image

```
D:\Practical works\RT702 - Introduction to virtualisation\TP5\Vagrant
λ vagrant box add aspyatkin/ubuntu-18.04-server
==> box: Loading metadata for box 'aspyatkin/ubuntu-18.04-server'
    box: URL: https://vagrantcloud.com/aspyatkin/ubuntu-18.04-server
==> box: Adding box 'aspyatkin/ubuntu-18.04-server' (v1.5.0) for provider: virtualbox
    box: Downloading: https://vagrantcloud.com/aspyatkin/boxes/ubuntu-18.04-server/versions/1.5.0/provid
ers/virtualbox.box
    box:
    box: Calculating and comparing box checksum...
==> box: Successfully added box 'aspyatkin/ubuntu-18.04-server' (v1.5.0) for 'virtualbox'!
```

3. Creation of the Vagrant file for the configuration

```
D:\Practical works\RT702 - Introduction to virtualisation\TP5\Vagrant
λ vagrant init ubuntu/bionic64
A `Vagrantfile` has been placed in this directory. You are now
ready to `vagrant up` your first virtual environment! Please read
the comments in the Vagrantfile as well as documentation on
`vagrantup.com` for more information on using Vagrant.

D:\Practical works\RT702 - Introduction to virtualisation\TP5\Vagrant
λ ls
Vagrantfile
```

4. Launch the VM

```
D:\Practical works\RT702 - Introduction to virtualisation\TP5\Vagrant
λ vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Box 'ubuntu/bionic64' could not be found. Attempting to find
```

5. Get SSH information

```
D:\Practical works\RT702 - Introduction to virtualisation\TP5\Vagrant
λ vagrant ssh-config
Host default
  HostName 127.0.0.1
  User vagrant
  Port 2222
  UserKnownHostsFile /dev/null
  StrictHostKeyChecking no
  PasswordAuthentication no
  IdentityFile "D:/Practical works/RT702 - Introduction to virtualisation/TP5/Vagrant/.vagrant/machines/
default/virtualbox/private_key"
  IdentitiesOnly yes
  LogLevel FATAL
```

6. Access with SSH Command

```
D:\Practical works\
λ vagrant ssh
```

7. Get VM information

- IP addresses

```
Last login: Mon Dec  6 14:28:43 2021 from 10.0.2.2
vagrant@ubuntu-bionic:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 02:7d:29:b7:e5:bc brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s3
       valid_lft 85667sec preferred_lft 85667sec
    inet6 fe80::7d:29ff:feb7:e5bc/64 scope link
       valid_lft forever preferred_lft forever
```

- CPU – Disk – Memory

```
 System load:  0.0               Processes:             98
 Usage of /:   2.7% of 38.71GB   Users logged in:       0
 Memory usage: 12%               IP address for enp0s3: 10.0.2.15
 Swap usage:   0%
```

```
vagrant@ubuntu-bionic:~$ cat /proc/cpuinfo | grep 'processor'
processor       : 0
processor       : 1
```

```
vagrant@ubuntu-bionic:~$ cat /proc/meminfo | grep 'MemTotal'
MemTotal:        1008552 kB
```

8. Default Shared folder

- Host's folder

```
==> default: Mounting shared folders...
    default: /vagrant => D:/Practical works/RT702 - Introduction to virtualisation/TP5/Vagrant
```

- Guest's folder (/vagrant)

```
vagrant@ubuntu-bionic:/vagrant$ ls
Vagrantfile  hello.txt  sharedFolderHost  ubuntu-bionic-18.04-cloudimg-console.log
```

IV. Question 3: Starting up with GUI & Memory limitation

- Edit Vagrantfile

```
config.vm.provider "virtualbox" do |vb|
#   # Display the VirtualBox GUI when booting the machine
   vb.gui = true
#
#   # Customize the amount of memory on the VM:
   vb.memory = "1024"
end
#
```

V. Question 4: Networks

9. Port forwarding :

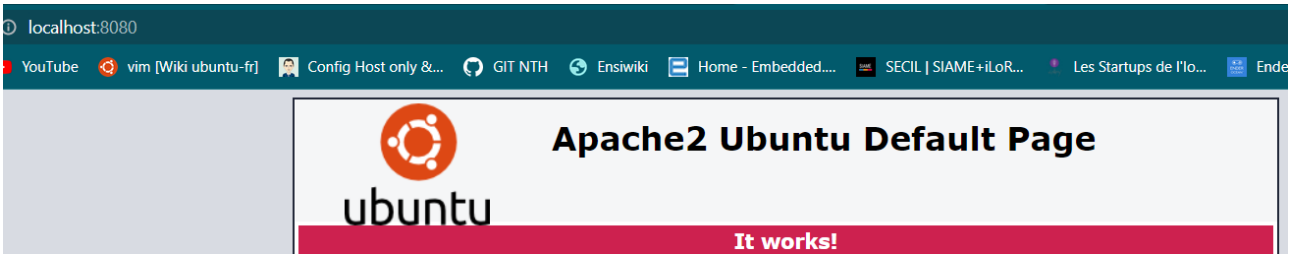
- Configuration

```
# Create a forwarded port mapping which allows access to a specific port
# within the machine from a port on the host machine and only allow access
# via 127.0.0.1 to disable public access
config.vm.network "forwarded_port", guest: 80, host: 8080, host_ip: "127.0.0.1"
```

- Interfaces status *(no interfaces needed for forwarding ports)*

```
vagrant@ubuntu-bionic:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 02:7d:29:b7:e5:bc brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s3
       valid_lft 86183sec preferred_lft 86183sec
    inet6 fe80::7d:29ff:feb7:e5bc/64 scope link
```

- Test



10. Private network

- Configuration

```
config.vm.network "private_network", ip: "192.168.59.220"
```

- Interfaces status

```
vagrant@ubuntu-bionic:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 02:7d:29:b7:e5:bc brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s3
       valid_lft 86321sec preferred_lft 86321sec
    inet6 fe80::7d:29ff:feb7:e5bc/64 scope link
       valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:9b:45:c2 brd ff:ff:ff:ff:ff:ff
    inet 192.168.59.220/24 brd 192.168.59.255 scope global enp0s8
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe9b:45c2/64 scope link
       valid_lft forever preferred_lft forever
```

- Test

```
Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::28c3:9b9f:9363:bc96%20
   IPv4 Address. . . . . . . . . . . : 192.168.59.201
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :
```

```
C:\Users\tizia>ping 192.168.59.220

Pinging 192.168.59.220 with 32 bytes of data:
Reply from 192.168.59.220: bytes=32 time<1ms TTL=64
Reply from 192.168.59.220: bytes=32 time=1ms TTL=64
Reply from 192.168.59.220: bytes=32 time=1ms TTL=64
```

11. Public network (Full bridge)

- Configuration

```
# Create a public network, which generally matched to bridged network.
# Bridged networks make the machine appear as another physical device on
# your network.
config.vm.network "public_network"
```

- Interfaces status

```
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel st
    link/ether 08:00:27:9b:45:c2 brd ff:ff:ff:ff:ff:ff
    inet 172.20.10.9/28 brd 172.20.10.15 scope global dynamic enp0s8
       valid_lft 86363sec preferred_lft 86363sec
    inet6 fe80::a00:27ff:fe9b:45c2/64 scope link
       valid_lft forever preferred_lft forever
```

- Test

```
thernet adapter Ethernet 2:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::d848:d6fe:731:9ce4%22
   IPv4 Address. . . . . . . . . . . : 172.20.10.5
   Subnet Mask . . . . . . . . . . . : 255.255.255.240
   Default Gateway . . . . . . . . . : 172.20.10.1
```

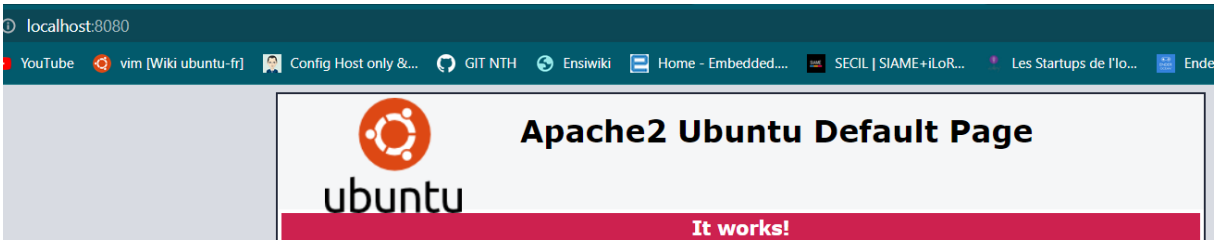
```
Pinging 172.20.10.9 with 32 bytes of data:
Reply from 172.20.10.9: bytes=32 time<1ms TTL=64
Reply from 172.20.10.9: bytes=32 time=1ms TTL=64
```

VI. Question 5: Web server & port forwarding

12. Port forwarding

```
# Create a forwarded port mapping which allows access to a specific port
# within the machine from a port on the host machine and only allow access
# via 127.0.0.1 to disable public access
config.vm.network "forwarded_port", guest: 80, host: 8080, host_ip: "127.0.0.1"
```

13. Test web server



VII. Question 6: SSH connection

- Edit Vagrantfile

```
config.ssh.username = "vagrant"
config.ssh.password = "vagrant"
```

- Edit /etc/ssh/sshd_config

```
# To disable tunneled clear text passwords
PasswordAuthentication yes
#PermitEmptyPasswords no

# Change to yes to enable challenge-respon
# some PAM modules and threads)
ChallengeResponseAuthentication no
```

- Test

```
06/12/2021 17:42.53 /home/mobaxterm ssh vagrant@127.0.0.1 -p 2222
vagrant@127.0.0.1's password:
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 4.15.0-163-generic x86_64)
```

VIII. Question7 : Stop & destroy VM

- Stop

```
D:\Practical works\RT
λ vagrant halt
```

- Destroy

```
D:\Practical works\RT702
λ vagrant destroy
```

- List Boxes

```
λ vagrant box list
aspyatkin/ubuntu-18.04-server (virtualbox, 1.5.0)
ubuntu/bionic64               (virtualbox, 20211025.0.0)
```

IX. Question 8 : Provisioning

- Private network (NAT) with static IP address
- Installation of a web server
- Copy of a HTML page located on host to guest

```
config.vm.box = "ubuntu/bionic64"
config.vm.network "private_network", ip: "192.168.50.4"
config.vm.provision "shell", inline: "sudo apt update"
config.vm.provision "shell", inline: "sudo apt-get -y install apache2"
config.vm.provision "shell", inline: "sudo systemctl start apache2.service"
config.vm.provision "shell", inline: "sudo rm /var/www/html/index.html"
config.vm.provision "file", source: "~/hello.html", destination: "/home/vagrant/"
config.vm.provision "shell", inline: "sudo cp /home/vagrant/hello.html /var/www/html/"
```

hello