

# EXPERIMENT 1

## **Lab Exercise: Introduction to Vagrant and Vagrantfile**

This exercise will guide them through setting up a virtual environment using Vagrant, configuring the environment via a Vagrantfile, and managing the virtual machines (VMs) with basic Vagrant commands.

### **Objective:**

- Learn how to set up and configure virtual environments using Vagrant.
- Understand the structure and components of a Vagrantfile.
- Gain hands-on experience in managing virtual machines using Vagrant commands.

### **Prerequisites:**

- Basic knowledge of virtualization concepts.
- Familiarity with command-line interfaces.
- Installation of Vagrant and VirtualBox (or any other supported provider) on your local machine.

## Step-by-Step Exercise:

### 1. Setting Up the Environment:

#### Install Vagrant:

- Download and install Vagrant from the official website.
- Ensure you have VirtualBox installed as it is a commonly used provider with Vagrant.
- Verify Installation:
- Open a terminal or command prompt.
- Run the following commands to verify the installation:

```
vagrant --version
```

```
Windows PowerShell
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PS C:\Users\2004a> VBoxManage --version
7.0.20r163906
PS C:\Users\2004a> vagrant --version
Vagrant 2.4.1
PS C:\Users\2004a> |
```

### 2. Creating a New Vagrant Project:

- Create a Project Directory:
- In your terminal, create a new directory for your Vagrant project and navigate into it:

```
mkdir vagrant_lab
```

```
cd vagrant_lab
```

```
PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1> cd vagrant_lab
PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1\vagrant_lab> ls
```

#### Initialize Vagrant:

- Run the following command to initialize a new Vagrantfile in your project directory:

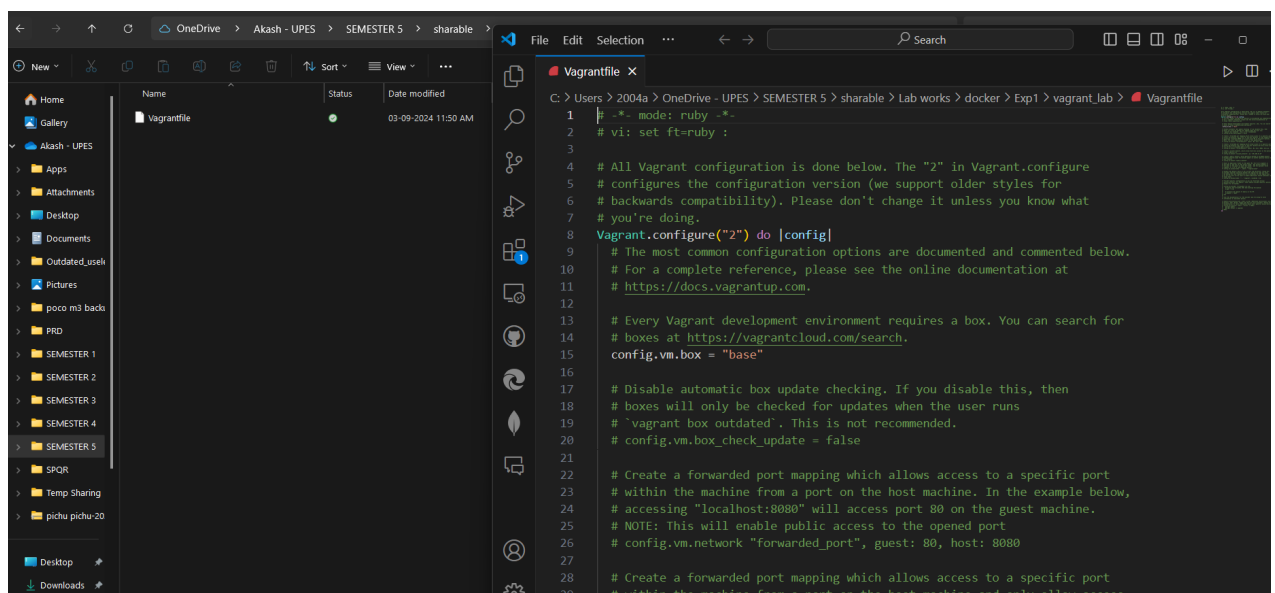
vagrant init

This command will generate a Vagrantfile in the current directory.

```
PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1\vagrant_lab> vagrant init
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.
PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1\vagrant_lab> |
```

### 3. Understanding the Vagrantfile:

- Open the Vagrantfile:
- Open the Vagrantfile in a text editor of your choice.
- The Vagrantfile is a Ruby-based configuration file used to define the virtual environment.
- Basic Vagrantfile Configuration:
- 



- Modify the Vagrantfile to configure a basic virtual machine.

For example:

```
Vagrant.configure("2") do |config|
```

```
  config.vm.box = "ubuntu/bionic64" # Specifies the base box to use (Ubuntu 18.04)
```

```
  config.vm.network "private_network", type: "dhcp" # Configures a private network
```

## 4. Launching and Managing the VM:

Start the VM:

In the terminal, start the VM using the following command:

```
vagrant up
```

```
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/plugins/providers/virtualbox/action/check_virtualbox.rb:23:in 'call'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/action/warden.rb:38:in 'call'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/action/builder.rb:183:in 'call'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/action/runner.rb:184:in 'block in run'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/uitl/busy.rb:22:in 'busy'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/action/runner.rb:184:in 'run'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/machine.rb:247:in 'action_raw'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/machine.rb:216:in 'block in action'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/environment.rb:649:in 'lock'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/machine.rb:282:in 'call'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/machine.rb:282:in 'action'
from C:/Program Files/Vagrant/embedded/gems/gems/vagrant-2.4.1/lib/vagrant/batch_action.rb:69:in 'block (2 levels) in run'
PS C:\Users\2804a\OneDrive - UPES\SEMESTER 5\shareable\Lab works\docker\Expt\lab\lab> vagrant up
Vagrant failed to initialize at a very early stage:

There is a syntax error in the following Vagrantfile. The syntax error
message is reproduced below for convenience:

C:/Users/2804a/OneDrive - UPES/SEMESTER 5/shareable/Lab works/docker/Expt/lab/Vagrantfile:11: syntax error, unexpected end-of-input, expecting 'end'
PS C:\Users\2804a\OneDrive - UPES\SEMESTER 5\shareable\Lab works\docker\Expt\lab\lab> vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
=> default: Box 'ubuntu/bionic64' could not be found. Attempting to find and install...
default: Box Provider: virtualbox
default: Box Version: >= 0
=> default: Loading metadata for box 'ubuntu/bionic64'
default: URL: https://vagrantcloud.com/api/v2/vagrant/ubuntu/bionic64
=> default: Adding box 'ubuntu/bionic64' (v20230607.0.2) for provider: virtualbox
default: Downloading: https://vagrantcloud.com/ubuntu/boxes/bionic64/versions/20230607.0.2/providers/virtualbox/unknown/vagrant.box
Download redirected to host: cloud-images.ubuntu.com
```

## Now a image of ubuntu will be downloaded

Vagrant will download the specified box (if not already downloaded) and launch the VM.

SSH into the VM:

- Connect to the running VM using SSH:

```
vagrant ssh
```

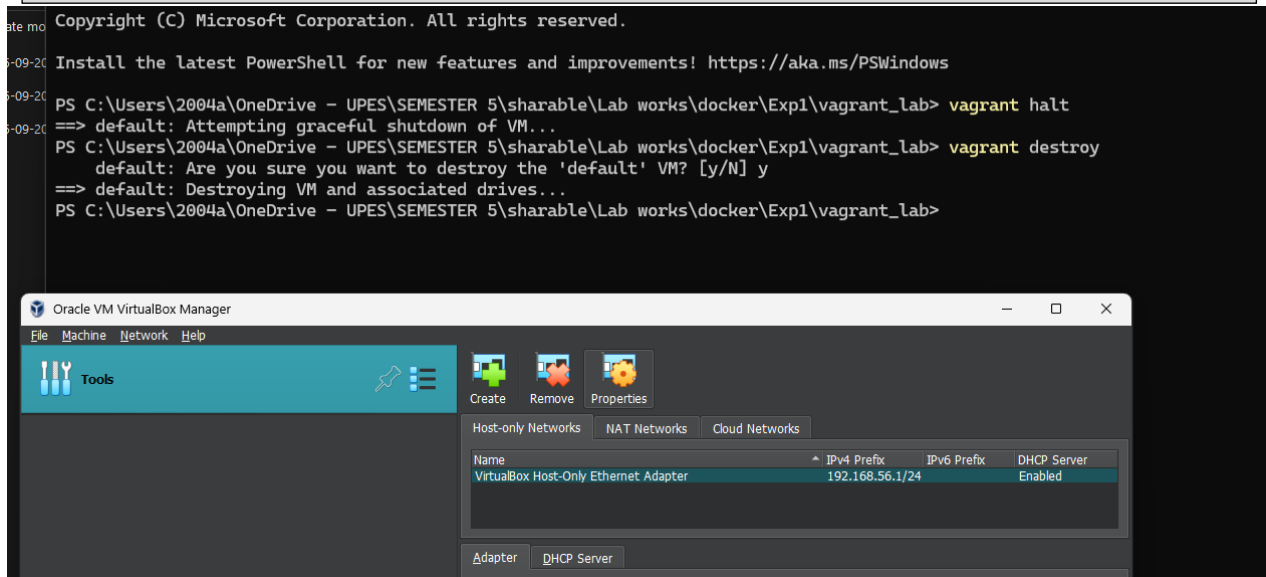
- This command will log you into the VM's shell.
- Exploring the VM:
- Inside the VM, explore the filesystem, install packages, and run commands to understand the environment.
- Stop the VM:
- Exit the SSH session by typing exit.
- Stop the VM with the following command:

```
vagrant halt
```

Destroy the VM (optional):

To remove the VM completely, use the following command:

```
vagrant destroy
```



The screenshot shows a PowerShell terminal window at the top with the following text:

```
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PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1\vagrant_lab> vagrant halt  
==> default: Attempting graceful shutdown of VM...  
PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1\vagrant_lab> vagrant destroy  
default: Are you sure you want to destroy the 'default' VM? [y/N] y  
==> default: Destroying VM and associated drives...  
PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1\vagrant_lab>
```

Below the terminal is the Oracle VM VirtualBox Manager window. The 'Host-only Networks' tab is selected, showing a table with one entry:

Name	IPv4 Prefix	IPv6 Prefix	DHCP Server
VirtualBox Host-Only Ethernet Adapter	192.168.56.1/24		Enabled

This will remove all traces of the VM, including any data stored on it.

Explore the benefits of using Vagrant for development and testing environments.

### Submission:

- Submit a brief report including the Vagrantfile you configured, screenshots of the running VM, and the output of any commands run within the VM.
- Reflect on the learning experience and any challenges faced during the exercise.

This lab exercise provides a hands-on introduction to Vagrant, focusing on creating and managing virtual environments through a Vagrantfile. It offers both foundational learning and opportunities to explore more advanced features.

Challenges that I have faced :

Host network accessibility issue

Then I had to check for IP address conflicts

```
A host only network interface you're attempting to configure via DHCP
already has a conflicting host only adapter with DHCP enabled. The
DHCP on this adapter is incompatible with the DHCP settings. Two
host only network interfaces are not allowed to overlap, and each
host only network interface can have only one DHCP server. Please
reconfigure your host only network or remove the virtual machine
using the other host only network.
PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1\vagrant_lab> vagrant ssh
VM must be running to open SSH connection. Run 'vagrant up'
to start the virtual machine.
PS C:\Users\2004a\OneDrive - UPES\SEMESTER 5\sharable\Lab works\docker\Exp1\vagrant_lab> vagrant ssh
VM must be running to open SSH connection. Run 'vagrant up'
to start the virtual machine.
```