

# 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.

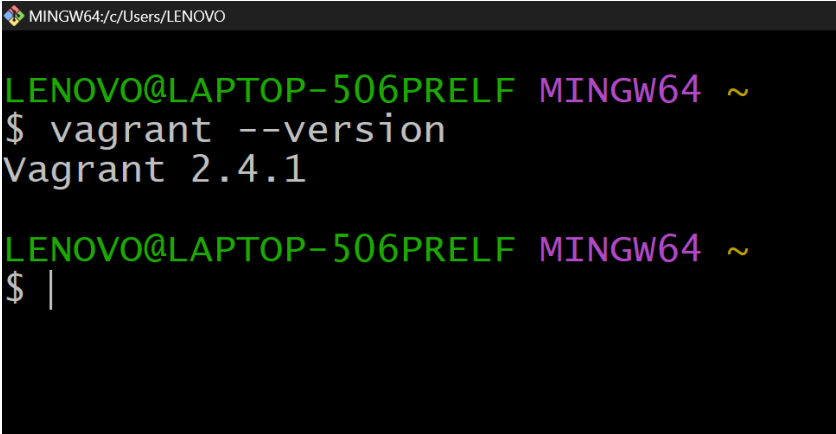
## ✓ Step-by-Step Exercise:

### 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
```

A screenshot of a terminal window with a black background and green and purple text. The window title is 'MINGW64:/c/Users/LENOVO'. The prompt is 'LENOVO@LAPTOP-506PRELF MINGW64 ~'. The user enters '\$ vagrant --version' and the output is 'Vagrant 2.4.1'. The prompt returns to '\$ |'.

### 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
```

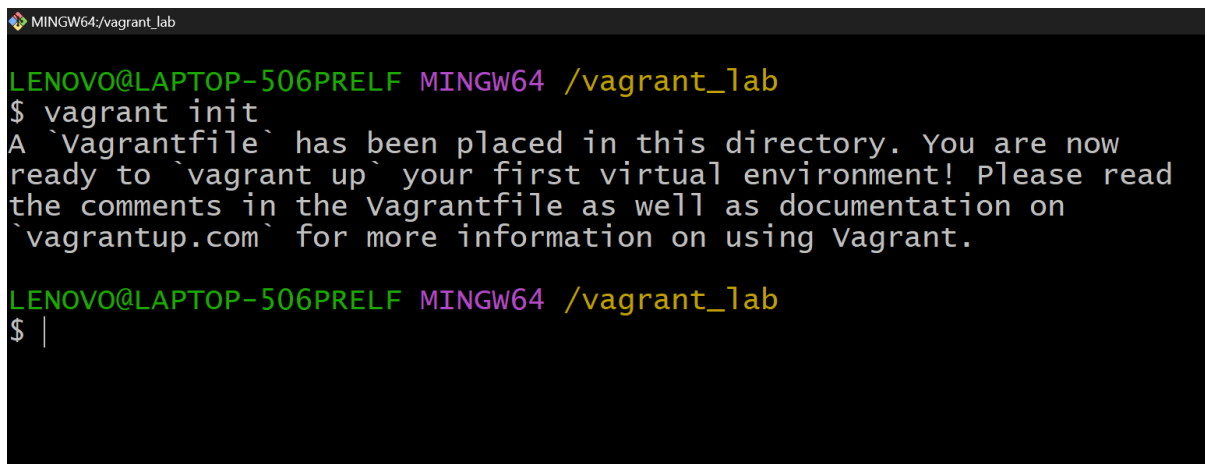
```
cd vagrant_lab
```

## 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.

A terminal window titled 'MINGW64:/vagrant\_lab' shows the command 'vagrant init' being executed. The output message states: '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.' The prompt returns to the user.

```
LENOVO@LAPTOP-506PRELF MINGW64 /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.
LENOVO@LAPTOP-506PRELF MINGW64 /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
```

```
  config.vm.provider "virtualbox" do |vb|
```

```
vb.memory = "1024" # Allocates 1GB of RAM to the VM

end

end
```

## 4. Launching and Managing the VM:

Start the VM:

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

```
vagrant up
```

```
LENOVO@LAPTOP-506PRELF MINGW64 /vagrant_lab
$ vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Box 'ubuntu/xenial64' could not be found. Attempting to find and install...
default: Box Provider: virtualbox
default: Box Version: >= 0
==> default: Loading metadata for box 'ubuntu/xenial64'
default: URL: https://vagrantcloud.com/api/v2/vagrant/ubuntu/xenial64
==> default: Adding box 'ubuntu/xenial64' (v20211001.0.1) for provider: virtualbox
default: Downloading: https://vagrantcloud.com/ubuntu/boxes/xenial64/versions/20211001.0.1/providers/virtualbox/unknown/vagrant.box
Download redirected to host: cloud-images.ubuntu.com
Progress: 12% (Rate: 176k*/s, Estimated time remaining: 0:25:25)
Progress: 23% (Rate: 167k*/s, Estimated time remaining: 0:21:50)
default:
==> default: Successfully added box 'ubuntu/xenial64' (v20211001.0.1) for 'virtualbox'!
==> default: Importing base box 'ubuntu/xenial64'...
==> default: Matching MAC address for NAT networking...
==> default: Checking if box 'ubuntu/xenial64' version '20211001.0.1' is up to date...
==> default: Setting the name of the VM: vagrant_lab_default_1723445417679_44014
Vagrant is currently configured to create VirtualBox synced folders with
the 'SharedFoldersEnableSymlinksCreate' option enabled. If the Vagrant
guest is not trusted, you may want to disable this option. For more
information on this option, please refer to the VirtualBox manual:

  https://www.virtualbox.org/manual/ch04.html#sharedfolders

This option can be disabled globally with an environment variable:

  VAGRANT_DISABLE_VBOXSYMLINKCREATE=1

or on a per folder basis within the Vagrantfile:

  config.vm.synced_folder '/host/path', '/guest/path', SharedFoldersEnableSymlinksCreate: false
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
default: Adapter 1: nat
==> default: Forwarding ports...
default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Running 'pre-boot' VM customizations...
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
default: SSH address: 127.0.0.1:2222
default: SSH username: vagrant
default: SSH auth method: private key
```

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

```
LENOVO@LAPTOP-506PRELF MINGW64 /vagrant_lab
$ vagrant ssh
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.4.0-210-generic 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.

45 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.

vagrant@ubuntu-xenial:~$
vagrant@ubuntu-xenial:~$
vagrant@ubuntu-xenial:~$
vagrant@ubuntu-xenial:~$
vagrant@ubuntu-xenial:~$ touch cxsffjhs
vagrant@ubuntu-xenial:~$ ls
cxsffjhs
vagrant@ubuntu-xenial:~$ |
```

- 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

```
LENOVO@LAPTOP-506PRELF MINGW64 /vagrant_lab
$ vagrant halt
==> default: Attempting graceful shutdown of VM...
```

Destroy the VM (optional):

To remove the VM completely, use the following command:

```
vagrant destroy
```

```
LENOVO@LAPTOP-506PRELF MINGW64 /vagrant_lab
$ vagrant destroy
   default: Are you sure you want to destroy the 'default' VM? [y/N] y
==> default: Destroying VM and associated drives...
```

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.

