Задача 2.2: Создание многокомпонентного окружения с использованием Vagrant и VirtualBox

Подготовка

Подготовим bash-скрипт по установке java

java.sh

```
#! /usr/bin/env bash
echo "Installing java"

sudo apt update
sudo apt install -y default-jre
java -version

sudo apt install -y default-jdk
javac -version

echo "Java installation finished"
```

Подготовим bash-скрипт по установке postgresql-12

postgresql12.sh

```
#! /usr/bin/env bash
echo "Installing postgresql-12"

sudo sh -c 'echo "deb https://apt.postgresql.org/pub/repos/apt $(lsb_release -cs)-
pgdg main" > /etc/apt/sources.list.d/pgdg.list'
wget --quiet -O - https://www.postgresql.org/media/keys/ACCC4CF8.asc | sudo apt-
key add -
sudo apt-get update
sudo apt-get -y install postgresql-12

echo "Installation finished"
```

Инициализация проекта

```
vagrant init
```

В текущей директории появился файл Vagrantfile

```
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$ ll
итого 24
drwxrwxr-x 3 ruslan ruslan 4096 окт 28 19:48 ./
drwxrwxr-x 3 ruslan ruslan 4096 окт 28 19:25 ../
-rw-rw-r-- 1 ruslan ruslan  184 окт 28 19:33 java.sh
-rw-rw-r-- 1 ruslan ruslan  362 окт 28 19:41 postgresql12.sh
drwxrwxr-x 4 ruslan ruslan 4096 окт 26 20:42 .vagrant/
-rw-rw-r-- 1 ruslan ruslan 3750 окт 28 19:48 Vagrantfile
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$
```

Настройка виртуальной машины

Для настройки виртуальной машины необходимо отредактировать файл Vagrantfile:
`nano Vagrantfile`

Настройка виртуальной машины №1

1. Настройка базового образа Ubuntu 20.04:
   `vm1.vm.box = "ubuntu/focal64"`
2. Проксирование портов:
   `vm1.vm.network "forwarded_port", guest: 80, host: 8080`
3. Назначение публичного IP адреса:
   `vm1.vm.network "public_network", ip: "192.168.1.10"`
4. Запуск скрипта по установке java:
   `vm1.vm.provision "shell", path: "java.sh"`
5. Установка имени, оперативной памяти и CPU:

```
vm1.vm.provider "virtualbox" do |vb|
    vb.name = "vm1"
    vb.memory = 2048
    vb.cpus = 2
end
```

Общий вид настройки

```
config.vm.define "vm1" do |vm1|
    vm1.vm.box = "ubuntu/focal64"
    vm1.vm.network "forwarded_port", guest: 80, host: 8080
    vm1.vm.network "public_network", ip: "192.168.1.10"
    vm1.vm.provision "shell", path: "java.sh"

    vm1.vm.provider "virtualbox" do |vb|
        vb.name = "vm1"
        vb.memory = 2048
        vb.cpus = 2
    end
end
```

Настройка виртуальной машины №2

1. Настройка базового образа Ubuntu 20.04:
   `vm2.vm.box = "ubuntu/focal64"`
2. Проксирование портов:
   `vm2.vm.network "forwarded_port", guest: 81, host: 8081`
3. Назначение публичного IP адреса:
   `vm2.vm.network "public_network", ip: "192.168.1.11"`
4. Запуск скрипта по установке postgresql-12:
   `vm2.vm.provision "shell", path: "postgresql12.sh"`
5. Установка имени, оперативной памяти и CPU:

```
vm1.vm.provider "virtualbox" do |vb|
    vb.name = "vm2"
    vb.memory = 4096
    vb.cpus = 3
end
```

Общий вид настройки

```
config.vm.define "vm2" do |vm2|
    vm2.vm.box = "ubuntu/focal64"
    vm2.vm.network "forwarded_port", guest: 81, host: 8081
    vm2.vm.network "public_network", ip: "192.168.1.11"
    vm2.vm.provision "shell", path: "postgresql12.sh"

    vm2.vm.provider "virtualbox" do |vb|
        vb.name = "vm2"
        vb.memory = 4096
        vb.cpus = 3
    end
end
```

Запуск ВМ

1. Запуск виртуальной машины:
   `vagrant up`
2. Проверка статуса:
   `vagrant status`

```
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$ vagrant status
Current machine states:

vm1                       running (virtualbox)
vm2                       running (virtualbox)

This environment represents multiple VMs. The VMs are all listed
above with their current state. For more information about a specific
VM, run `vagrant status NAME`.
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$
```

3. Подключение к VM №1:

   `vagrant ssh vm1`

```
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$ vagrant ssh vm1
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.4.0-164-generic x86_64)

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

  System information as of Sat Oct 28 15:11:55 UTC 2023

  System load:  0.79              Processes:               127
  Usage of /:   5.2% of 38.70GB   Users logged in:         0
  Memory usage: 12%               IPv4 address for enp0s3: 10.0.2.15
  Swap usage:   0%                IPv4 address for enp0s8: 192.168.1.10


Expanded Security Maintenance for Applications is not enabled.

17 updates can be applied immediately.
15 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

New release '22.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


vagrant@ubuntu-focal:~$
```

4. Проверка доступа к интернету:

   `ping google.com`

```
vagrant@ubuntu-focal:~$ ping google.com
PING google.com (74.125.131.100) 56(84) bytes of data.
64 bytes from lu-in-f100.1e100.net (74.125.131.100): icmp_seq=1 ttl=63 time=38.8 ms
64 bytes from lu-in-f100.1e100.net (74.125.131.100): icmp_seq=2 ttl=63 time=34.7 ms
64 bytes from lu-in-f100.1e100.net (74.125.131.100): icmp_seq=3 ttl=63 time=39.4 ms
64 bytes from lu-in-f100.1e100.net (74.125.131.100): icmp_seq=4 ttl=63 time=40.4 ms
64 bytes from lu-in-f100.1e100.net (74.125.131.100): icmp_seq=5 ttl=63 time=37.4 ms
64 bytes from lu-in-f100.1e100.net (74.125.131.100): icmp_seq=6 ttl=63 time=38.9 ms
^C
--- google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5175ms
rtt min/avg/max/mdev = 34.742/38.269/40.435/1.820 ms
vagrant@ubuntu-focal:~$
```

5. Проверка доступа к VM №2:

   `ping 192.168.1.11`

```
vagrant@ubuntu-focal:~$ ping 192.168.1.11
PING 192.168.1.11 (192.168.1.11) 56(84) bytes of data.
64 bytes from 192.168.1.11: icmp_seq=1 ttl=64 time=1.14 ms
64 bytes from 192.168.1.11: icmp_seq=2 ttl=64 time=0.888 ms
64 bytes from 192.168.1.11: icmp_seq=3 ttl=64 time=0.801 ms
64 bytes from 192.168.1.11: icmp_seq=4 ttl=64 time=0.716 ms
64 bytes from 192.168.1.11: icmp_seq=5 ttl=64 time=0.597 ms
64 bytes from 192.168.1.11: icmp_seq=6 ttl=64 time=0.264 ms
^C
--- 192.168.1.11 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5056ms
rtt min/avg/max/mdev = 0.264/0.733/1.137/0.267 ms
vagrant@ubuntu-focal:~$
```

6. Проверка установки java:

```
java -version
javac -version
```

```
vagrant@ubuntu-focal:~$ java -version
openjdk version "11.0.20.1" 2023-08-24
OpenJDK Runtime Environment (build 11.0.20.1+1-post-Ubuntu-0ubuntu120.04)
OpenJDK 64-Bit Server VM (build 11.0.20.1+1-post-Ubuntu-0ubuntu120.04, mixed mode, sharing)
vagrant@ubuntu-focal:~$ javac -version
javac 11.0.20.1
vagrant@ubuntu-focal:~$
```

7. Подключение к VM №2:

```
vagrant ssh vm2
```

```
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$ vagrant ssh vm2
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.4.0-164-generic x86_64)

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

  System information as of Sat Oct 28 15:14:28 UTC 2023

  System load:  0.0               Processes:               152
  Usage of /:   4.6% of 38.70GB   Users logged in:         0
  Memory usage: 6%                IPv4 address for enp0s3: 10.0.2.15
  Swap usage:   0%                IPv4 address for enp0s8: 192.168.1.11


Expanded Security Maintenance for Applications is not enabled.

17 updates can be applied immediately.
15 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

New release '22.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


vagrant@ubuntu-focal:~$
```

8. Проверка доступа к интернету:

```
ping google.com
```

```
vagrant@ubuntu-focal:~$ ping google.com
PING google.com (74.125.131.101) 56(84) bytes of data.
64 bytes from lu-in-f101.1e100.net (74.125.131.101): icmp_seq=1 ttl=63 time=41.0 ms
64 bytes from lu-in-f101.1e100.net (74.125.131.101): icmp_seq=2 ttl=63 time=41.6 ms
64 bytes from lu-in-f101.1e100.net (74.125.131.101): icmp_seq=3 ttl=63 time=43.1 ms
64 bytes from lu-in-f101.1e100.net (74.125.131.101): icmp_seq=4 ttl=63 time=44.2 ms
64 bytes from lu-in-f101.1e100.net (74.125.131.101): icmp_seq=5 ttl=63 time=42.6 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4016ms
rtt min/avg/max/mdev = 40.993/42.494/44.231/1.145 ms
vagrant@ubuntu-focal:~$
```

9. Проверка доступа к VM №1:

   `ping 192.168.1.10`

```
vagrant@ubuntu-focal:~$ ping 192.168.1.10
PING 192.168.1.10 (192.168.1.10) 56(84) bytes of data.
64 bytes from 192.168.1.10: icmp_seq=1 ttl=64 time=0.780 ms
64 bytes from 192.168.1.10: icmp_seq=2 ttl=64 time=0.854 ms
64 bytes from 192.168.1.10: icmp_seq=3 ttl=64 time=0.675 ms
64 bytes from 192.168.1.10: icmp_seq=4 ttl=64 time=1.06 ms
64 bytes from 192.168.1.10: icmp_seq=5 ttl=64 time=0.279 ms
64 bytes from 192.168.1.10: icmp_seq=6 ttl=64 time=0.925 ms
^C
--- 192.168.1.10 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5045ms
rtt min/avg/max/mdev = 0.279/0.762/1.059/0.246 ms
vagrant@ubuntu-focal:~$
```

10. Проверка установки postgresql-12:

    `pg_config --version`

```
vagrant@ubuntu-focal:~$ pg_config --version
PostgreSQL 12.16 (Ubuntu 12.16-1.pgdg20.04+1)
vagrant@ubuntu-focal:~$
```

Остановка и удаление ВМ:

1. Остановка виртуальных машин:

   `vagrant halt`

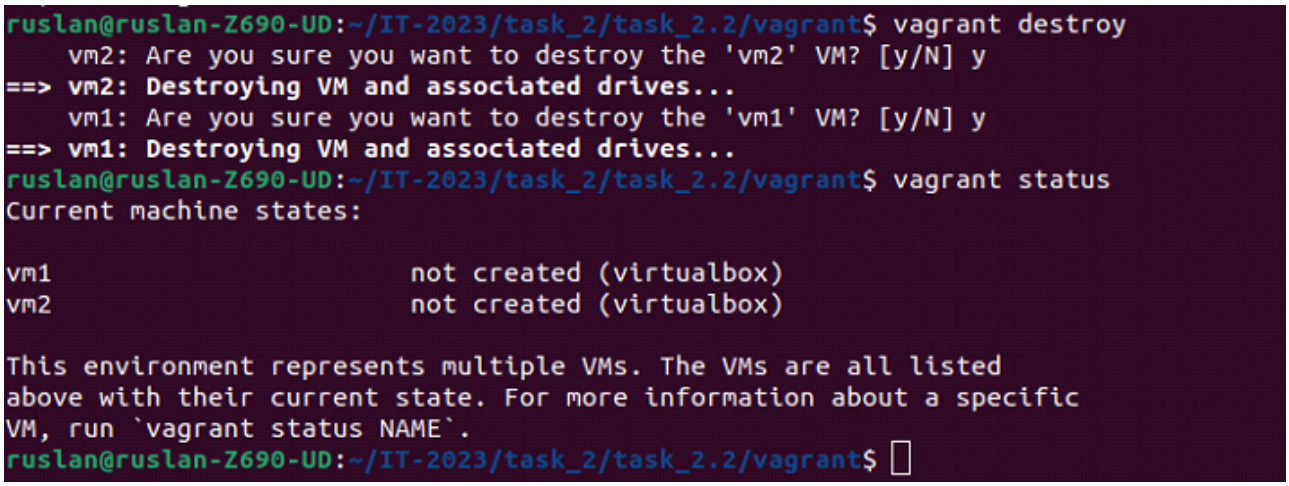
```
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$ vagrant halt
==> vm2: Attempting graceful shutdown of VM...
==> vm1: Attempting graceful shutdown of VM...
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$ vagrant status
Current machine states:

vm1                       poweroff (virtualbox)
vm2                       poweroff (virtualbox)

This environment represents multiple VMs. The VMs are all listed
above with their current state. For more information about a specific
VM, run `vagrant status NAME`.
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$
```

2. Удаление виртуальных машин:

   `vagrant destroy`


ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$ vagrant destroy
vm2: Are you sure you want to destroy the 'vm2' VM? [y/N] y
==> vm2: Destroying VM and associated drives...
vm1: Are you sure you want to destroy the 'vm1' VM? [y/N] y
==> vm1: Destroying VM and associated drives...
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$ vagrant status
Current machine states:
vm1 not created (virtualbox)
vm2 not created (virtualbox)
This environment represents multiple VMs. The VMs are all listed
above with their current state. For more information about a specific
VM, run `vagrant status NAME`.
ruslan@ruslan-Z690-UD:~/IT-2023/task_2/task_2.2/vagrant$