Лабораторная работа №1

Соколов А.Д. Б20-505.

Vagrant

Установка плагина:

```
$$ % vagrant plugin install vagrant-vbguest
Installing the 'vagrant-vbguest' plugin. This can take a few minutes...
Fetching micromachine-3.0.0.gem
Fetching vagrant-vbguest-0.31.0.gem
Installed the plugin 'vagrant-vbguest (0.31.0)'!
```

Инициализация с использованием существующего бокса:

```
$$ % vagrant init ubuntu/jammy64
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.
```

Запуск:

```
$$ % vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Box 'ubuntu/jammy64' could not be found. Attempting to find and install...
    default: Box Provider: virtualbox
    default: Box Version: >= 0
==> default: Loading metadata for box 'ubuntu/jammy64'
    default: URL: https://vagrantcloud.com/api/v2/vagrant/ubuntu/jammy64
==> default: Adding box 'ubuntu/jammy64' (v20231213.1.0) for provider: virtualbox
    default: Downloading: https://vagrantcloud.com/ubuntu/boxes/jammy64/versions/20231213.1.0/providers/virtualbox/unknown/vagrant.box
Download redirected to host: cloud-images.ubuntu.com
==> default: Successfully added box 'ubuntu/jammy64' (v20231213.1.0) for 'virtualbox'!
==> default: Importing base box 'ubuntu/jammy64'...
==> default: Matching MAC address for NAT networking...
==> default: Checking if box 'ubuntu/jammy64' version '20231213.1.0' is up to date...
==> default: Setting the name of the VM: ubuntu2004-docker_default_1702601823233_64151
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
```

Остановка:

```
$$ % vagrant destroy
    default: Are you sure you want to destroy the 'default' VM? [y/N] y
==> default: Forcing shutdown of VM...
==> default: Destroying VM and associated drives...
```

Измененный Vagrantfile:

```
$$ % cat Vagrantfile
Vagrant.configure("2") do |config| # version 2
  config.vm.box = "ubuntu/jammy64"
  config.vm.define "ubuntu-docker"

  config.vbguest.auto_update = false
  config.vm.provider "virtualbox" do |vb|
    vb.memory = 2048
    vb.cpus = 2
    vb.name = "ubuntu-docker"
  end
end
```

Запуск:

```
$$ % vagrant up
Bringing machine 'ubuntu-docker' up with 'virtualbox' provider...
==> ubuntu-docker: Checking if box 'ubuntu/jammy64' version '20231213.1.0' is up to date...
==> ubuntu-docker: Clearing any previously set forwarded ports...
==> ubuntu-docker: Clearing any previously set network interfaces...
==> ubuntu-docker: Preparing network interfaces based on configuration...
    ubuntu-docker: Adapter 1: nat
==> ubuntu-docker: Forwarding ports...
    ubuntu-docker: 22 (guest) => 2222 (host) (adapter 1)
==> ubuntu-docker: Running 'pre-boot' VM customizations...
==> ubuntu-docker: Booting VM...
==> ubuntu-docker: Waiting for machine to boot. This may take a few minutes...
    ubuntu-docker: SSH address: 127.0.0.1:2222
    ubuntu-docker: SSH username: vagrant
    ubuntu-docker: SSH auth method: private key
    ubuntu-docker:
    ubuntu-docker: Vagrant insecure key detected. Vagrant will automatically replace
    ubuntu-docker: this with a newly generated keypair for better security.
    ubuntu-docker:
    ubuntu-docker: Inserting generated public key within guest...
    ubuntu-docker: Removing insecure key from the guest if it's present...
    ubuntu-docker: Key inserted! Disconnecting and reconnecting using new SSH key...
==> ubuntu-docker: Machine booted and ready!
==> ubuntu-docker: Checking for guest additions in VM...
    ubuntu-docker: The guest additions on this VM do not match the installed version of
    ubuntu-docker: VirtualBox! In most cases this is fine, but in rare cases it can
    ubuntu-docker: prevent things such as shared folders from working properly. If you see
    ubuntu-docker: shared folder errors, please make sure the guest additions within the
    ubuntu-docker: virtual machine match the version of VirtualBox you have installed on
    ubuntu-docker: your host and reload your VM.
    ubuntu-docker:
    ubuntu-docker: Guest Additions Version: 6.0.0 r127566
    ubuntu-docker: VirtualBox Version: 7.0
==> ubuntu-docker: Mounting shared folders...
    ubuntu-docker: /vagrant => /home/sarkoxedaf/Working/University/containers/lab1/Linux/ubuntu2004-docker
```

Создание снимка:

```
$$ % vagrant snapshot save ubuntu-docker
==> ubuntu-docker: Snapshotting the machine as 'ubuntu-docker'...
==> ubuntu-docker: Snapshot saved! You can restore the snapshot at any time by
==> ubuntu-docker: using `vagrant snapshot restore`. You can delete it using
==> ubuntu-docker: `vagrant snapshot delete`.
```

```
$$ % vagrant ssh
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-91-generic x86_64)

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

  System information as of Thu Dec 21 02:19:48 UTC 2023

  System load:  0.0732421875    Processes:               100
  Usage of /:   3.7% of 38.70GB  Users logged in:         0
  Memory usage: 9%               IPv4 address for enp0s3: 10.0.2.15
  Swap usage:   0%


Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

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


The list of available updates is more than a week old.
To check for new updates run: sudo apt update

vagrant@ubuntu-jammy:~$ |
```

Установка Docker

```
vagrant@ubuntu-jammy:~$ sh get-docker.sh
# Executing docker install script, commit: e5543d473431b782227f8908005543bb4389b8de
+ sudo -E sh -c apt-get update -qq >/dev/null
+ sudo -E sh -c DEBIAN_FRONTEND=noninteractive apt-get install -y -qq apt-transport-https ca-certificates curl >/dev/null
+ sudo -E sh -c install -m 0755 -d /etc/apt/keyrings
+ sudo -E sh -c curl -fsSL "https://download.docker.com/linux/ubuntu/gpg" | gpg --dearmor --yes -o /etc/apt/keyrings/docker.gpg
+ sudo -E sh -c chmod a+r /etc/apt/keyrings/docker.gpg
+ sudo -E sh -c echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/docker.gpg] https://download.docker.com/linux/ubuntu jammy stable" > /etc/apt/sou
rces.list.d/docker.list
+ sudo -E sh -c apt-get update -qq >/dev/null
+ sudo -E sh -c DEBIAN_FRONTEND=noninteractive apt-get install -y -qq docker-ce docker-ce-cli containerd.io docker-compose-plugin docker-ce-rootles
s-extras docker-buildx-plugin >/dev/null
+ sudo -E sh -c docker version
Client: Docker Engine - Community
 Version:           24.0.7
 API version:       1.43
 Go version:        go1.20.10
 Git commit:        afdd53b
 Built:             Thu Oct 26 09:07:41 2023
 OS/Arch:           linux/amd64
 Context:           default

Server: Docker Engine - Community
 Engine:
```

Проверка работы докера:

```
vagrant@ubuntu-jammy:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
c1ec31eb5944: Pull complete
Digest: sha256:ac69084025c660510933cca701f615283cdbb3aa0963188770b54c31c8962493
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/get-started/
```

Создание образа ubuntudocker.box

Остановка машины:

```
$$ % vagrant halt
==> ubuntu-docker: Attempting graceful shutdown of VM...
```

Упаковка машины:

```
$$ % vagrant package --output ubuntudocker
==> ubuntu-docker: Clearing any previously set forwarded ports...
==> ubuntu-docker: Exporting VM...
==> ubuntu-docker: Compressing package to: /home/sarkoxedaf/Working/University/containers/lab1/Linux/ubuntu2004-docker/ubuntudocker
```

Добавление образа в локальный репозиторий:

```
$$ % vagrant box add ubuntudocker ubuntudocker
==> box: Box file was not detected as metadata. Adding it d
==> box: Adding box 'ubuntudocker' (v0) for provider:
    box: Unpacking necessary files from: file:///home/sarko
==> box: Successfully added box 'ubuntudocker' (v0) for ''!

sarkoxedaf               ~/Working/University/containers/
$$ % vagrant box list
ubuntu/jammy64 (virtualbox, 20231213.1.0)
ubuntudocker   (virtualbox, 0)
```

После повторной инициализации сохраняем состояние с названием default:

```
$$ % vagrant snapshot save default
==> default: Snapshotting the machine as 'default'...
==> default: Snapshot saved! You can restore the snapshot at any time by
==> default: using `vagrant snapshot restore`. You can delete it using
==> default: `vagrant snapshot delete`.
```

Создаем файл b на машине:

```
Last login: Thu Dec 21 02:49:58 2023 from 10.0.2.2
vagrant@ubuntu-jammy:~$ echo aaaaaaaaaa > b
vagrant@ubuntu-jammy:~$ ls
b  get-docker.sh
vagrant@ubuntu-jammy:~$ cat b
aaaaaaaaaa
vagrant@ubuntu-jammy:~$ []
```

Восстанавливаем предыдущую версию:

```
$$ % vagrant snapshot restore default
==> default: Forcing shutdown of VM...
==> default: Restoring the snapshot 'default'...
==> default: Resuming suspended VM...
==> 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
==> default: Machine booted and ready!
==> default: Machine already provisioned. Run `vagrant provision` or use the `--provision`
==> default: flag to force provisioning. Provisioners marked to run always will still run.
```

Проверяем, что файла b нет:

```
$$ % vagrant ssh
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-91-generic x86_64)

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

  System information as of Thu Dec 21 02:53:04 UTC 2023

  System load:  0.427734375      Processes:                108
  Usage of /:   6.6% of 38.70GB  Users logged in:          0
  Memory usage: 11%              IPv4 address for docker0: 172.17.0.1
  Swap usage:   0%               IPv4 address for enp0s3:  10.0.2.15


Expanded Security Maintenance for Applications is not enabled.

10 updates can be applied immediately.
9 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


Last login: Thu Dec 21 02:49:58 2023 from 10.0.2.2
vagrant@ubuntu-jammy:~$ ls
get-docker.sh
vagrant@ubuntu-jammy:~$ []
```