

南昌大学实验报告

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课程名称：Linux程序设计实验

实验项目名称

Lab 5 -- Build it and Share it

!!!注 由于openstack过于庞大，在我的笔记本电脑上无法成功部署服务，所以我把openstack换成了更加轻量级的服务 -- Docker

构建环境为我个人的腾讯云服务器学生机(ip: 119.29.148.227)

实验目的

- 1.理解IaaS架构的机制
- 2.尝试部署一个工程服务
- 3.理解构建一个可视化web服务的过程

实验基础

1. Docker
2. Linux

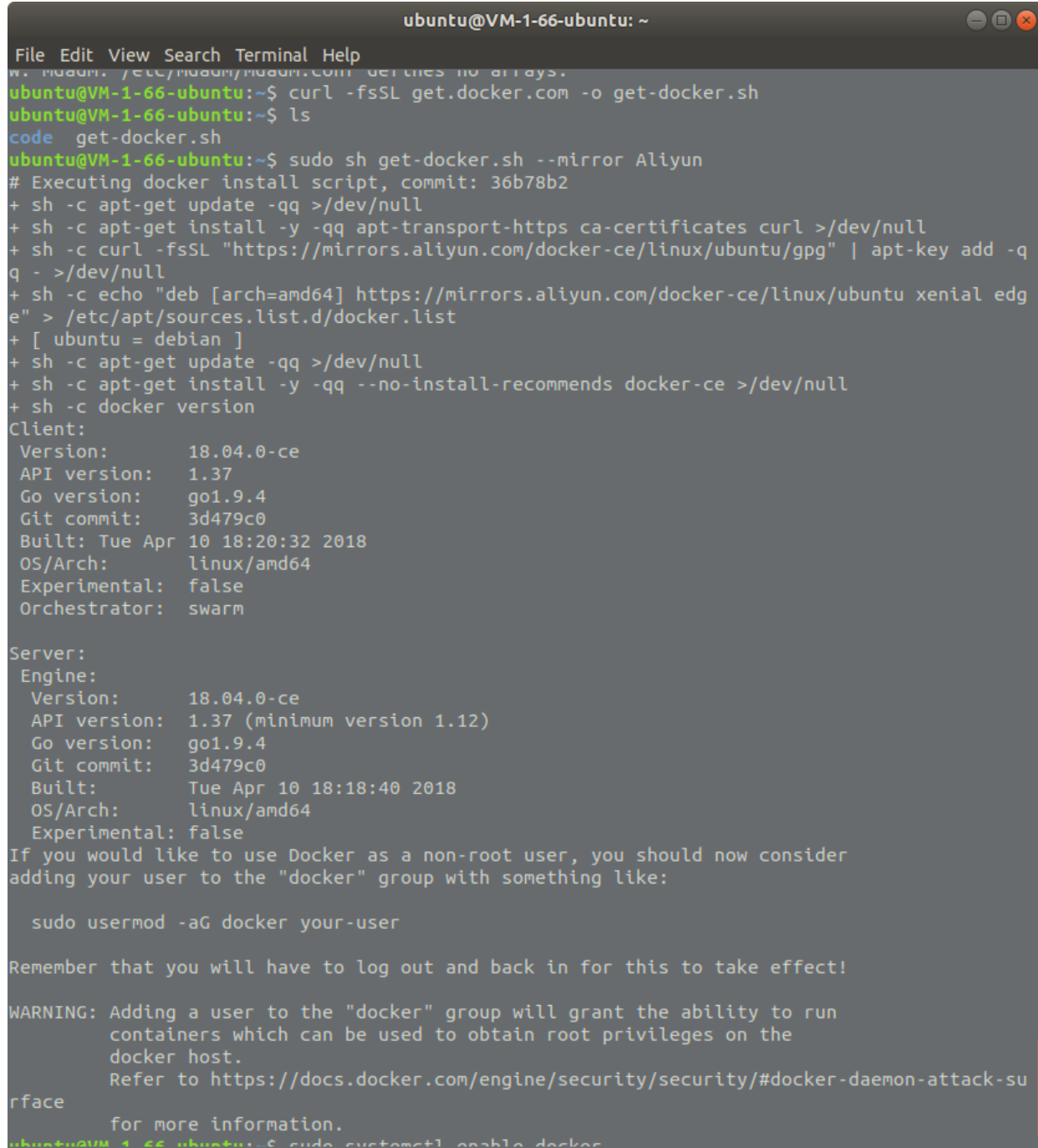
实验步骤

- 1.安装docker

使用Docker官方提供的脚本进行安装

```
$ curl -fsSL get.docker.com -o get-docker.sh
```

```
$ sudo sh get-docker.sh --mirror Aliyun
```

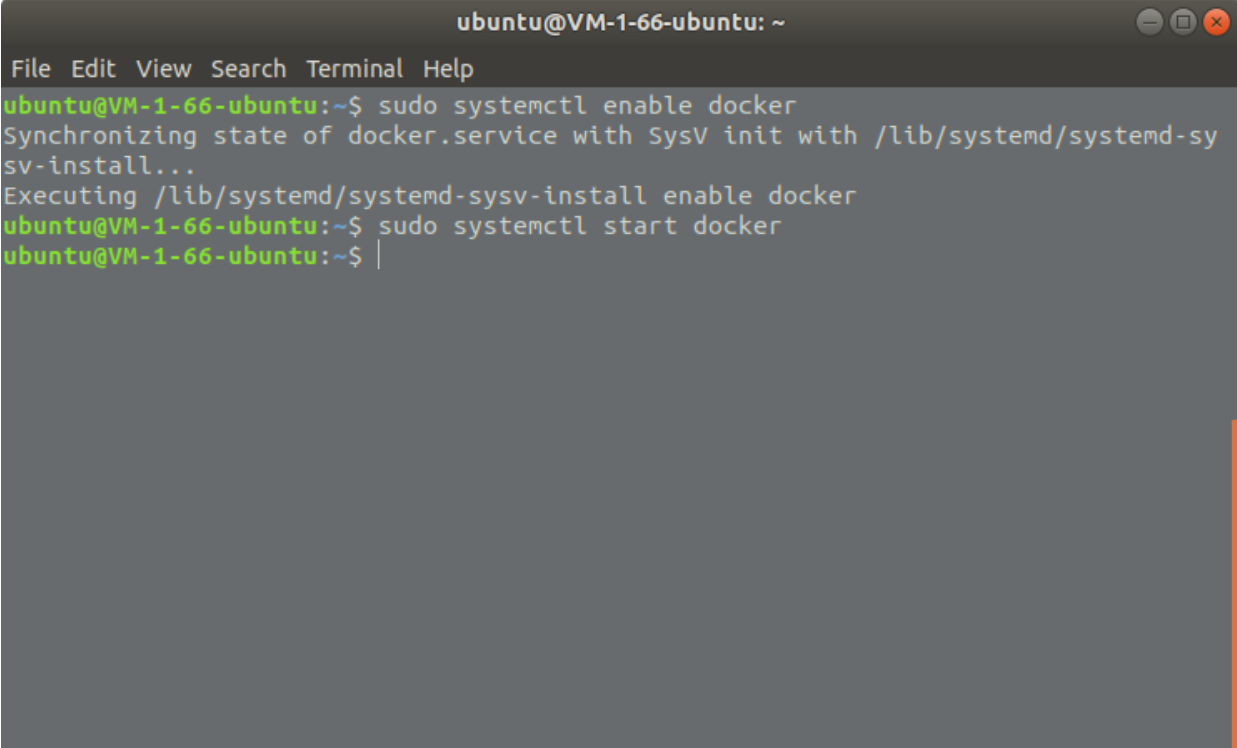
A terminal window titled 'ubuntu@VM-1-66-ubuntu: ~' showing the installation of Docker. The user runs 'curl -fsSL get.docker.com -o get-docker.sh' and 'ls', showing the file 'get-docker.sh' in the current directory. Then, they run 'sudo sh get-docker.sh --mirror Aliyun'. The script executes several commands: 'apt-get update', 'apt-get install -y -qq apt-transport-https ca-certificates curl', 'curl -fsSL "https://mirrors.aliyun.com/docker-ce/linux/ubuntu/gpg" | apt-key add -q', 'echo "deb [arch=amd64] https://mirrors.aliyun.com/docker-ce/linux/ubuntu xenial edge" > /etc/apt/sources.list.d/docker.list', 'apt-get update', 'apt-get install -y -qq --no-install-recommends docker-ce', and 'docker version'. The output shows Docker Client and Server versions (18.04.0-ce), API version (1.37), Go version (go1.9.4), Git commit (3d479c0), build date (Tue Apr 10 18:20:32 2018), OS/Arch (linux/amd64), and experimental status (false). It also shows the Docker Engine version and details. A warning message states: 'If you would like to use Docker as a non-root user, you should now consider adding your user to the "docker" group with something like: sudo usermod -aG docker your-user. Remember that you will have to log out and back in for this to take effect! WARNING: Adding a user to the "docker" group will grant the ability to run containers which can be used to obtain root privileges on the docker host. Refer to https://docs.docker.com/engine/security/security/#docker-daemon-attack-surface for more information.'

```
ubuntu@VM-1-66-ubuntu: ~  
File Edit View Search Terminal Help  
w: /etc/motd/motd.com get-ies no arrays.  
ubuntu@VM-1-66-ubuntu:~$ curl -fsSL get.docker.com -o get-docker.sh  
ubuntu@VM-1-66-ubuntu:~$ ls  
code  get-docker.sh  
ubuntu@VM-1-66-ubuntu:~$ sudo sh get-docker.sh --mirror Aliyun  
# Executing docker install script, commit: 36b78b2  
+ sh -c apt-get update -qq >/dev/null  
+ sh -c apt-get install -y -qq apt-transport-https ca-certificates curl >/dev/null  
+ sh -c curl -fsSL "https://mirrors.aliyun.com/docker-ce/linux/ubuntu/gpg" | apt-key add -q  
q - >/dev/null  
+ sh -c echo "deb [arch=amd64] https://mirrors.aliyun.com/docker-ce/linux/ubuntu xenial edge  
e" > /etc/apt/sources.list.d/docker.list  
+ [ ubuntu = debian ]  
+ sh -c apt-get update -qq >/dev/null  
+ sh -c apt-get install -y -qq --no-install-recommends docker-ce >/dev/null  
+ sh -c docker version  
Client:  
Version:      18.04.0-ce  
API version:  1.37  
Go version:   go1.9.4  
Git commit:   3d479c0  
Built: Tue Apr 10 18:20:32 2018  
OS/Arch:     linux/amd64  
Experimental: false  
Orchestrator: swarm  
  
Server:  
Engine:  
Version:      18.04.0-ce  
API version:  1.37 (minimum version 1.12)  
Go version:   go1.9.4  
Git commit:   3d479c0  
Built:        Tue Apr 10 18:18:40 2018  
OS/Arch:     linux/amd64  
Experimental: false  
If you would like to use Docker as a non-root user, you should now consider  
adding your user to the "docker" group with something like:  
  
    sudo usermod -aG docker your-user  
  
Remember that you will have to log out and back in for this to take effect!  
  
WARNING: Adding a user to the "docker" group will grant the ability to run  
containers which can be used to obtain root privileges on the  
docker host.  
Refer to https://docs.docker.com/engine/security/security/#docker-daemon-attack-su  
rface  
for more information.  
ubuntu@VM-1-66-ubuntu:~$ sudo systemctl enable docker
```

2.启动Docker CE

```
$ sudo systemctl enable docker
```

```
$ sudo systemctl start docker
```

A terminal window titled 'ubuntu@VM-1-66-ubuntu: ~' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the following commands and output:

```
ubuntu@VM-1-66-ubuntu:~$ sudo systemctl enable docker
Synchronizing state of docker.service with SysV init with /lib/systemd/systemd-sv-install...
Executing /lib/systemd/systemd-sv-install enable docker
ubuntu@VM-1-66-ubuntu:~$ sudo systemctl start docker
ubuntu@VM-1-66-ubuntu:~$ |
```

3.在go工程目录下编写dockerfile

```
FROM golang:latest

MAINTAINER siliconx "siliconx@163.com"

WORKDIR $HOME/go/src/calculate
ADD . $HOME/go/src/calculate
RUN go build .

EXPOSE 8080 # 容器的暴露端口

ENTRYPOINT [ "./calculate", "3", "9"] # 命令行参数为 3 和 9
```

4.构建镜像

```
$ docker build -t calculate .
```

```
ubuntu@VM-1-66-ubuntu: ~/go/src/calculate
File Edit View Search Terminal Tabs Help
ubuntu@VM-1-66-ubuntu: ~/go/src/calculate x siliconx@Lenovo: ~/code/LinuxProgramm... x
ubuntu@VM-1-66-ubuntu:~/go/src/calculate$ vim dockerfile
ubuntu@VM-1-66-ubuntu:~/go/src/calculate$ docker build -t calculate .
Sending build context to Docker daemon 6.662MB
Step 1/7 : FROM golang:latest
latest: Pulling from library/golang
cc1a78bfd46b: Pull complete
6861473222a6: Pull complete
7e0b9c3b5ae0: Pull complete
3ec98735f56f: Pull complete
32ecd1fcfe1a: Pull complete
9889d58a42e5: Pull complete
337bad6698be: Pull complete
Digest: sha256:2ffa2f093d20c46e86435626f11bf163797400cf8f7cf14ecdc6403f1930045c
Status: Downloaded newer image for golang:latest
--> 6b369f7eed80
Step 2/7 : MAINTAINER siliconx "siliconx@163.com"
--> Running in a2418d367cc1
Removing intermediate container a2418d367cc1
--> 686948537d41
Step 3/7 : WORKDIR $HOME/go/src/calculate
Removing intermediate container 59e3a801aeb9
--> 85dc9523ca8c
Step 4/7 : ADD . $HOME/go/src/calculate
--> 9ca0937b03bf
Step 5/7 : RUN go build .
--> Running in f20674244e64
Removing intermediate container f20674244e64
--> f9e2a945fd3c
Step 6/7 : EXPOSE 8080
--> Running in 50fb59716f3e
Removing intermediate container 50fb59716f3e
--> 0bef43ecb6b5
Step 7/7 : ENTRYPOINT ["/calculate"]
--> Running in a56d5fd7a8f1
Removing intermediate container a56d5fd7a8f1
--> 891956170631
Successfully built 891956170631
Successfully tagged calculate:latest
```

5.列出镜像

```
$ docker images
```

```
ubuntu@VM-1-66-ubuntu: ~/go/src/calculate
File Edit View Search Terminal Tabs Help
ubuntu@VM-1-66-ubuntu: ~/go/src/calculate x siliconx@Lenovo: ~/code/LinuxProgramm... x
ubuntu@VM-1-66-ubuntu:~/go/src/calculate$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED
SIZE
calculate            latest             891956170631       6 minutes ago
807MB
golang               latest             6b369f7eed80       6 days ago
794MB
hello-world          latest             e38bc07ac18e       4 weeks ago
1.85kB
ubuntu@VM-1-66-ubuntu:~/go/src/calculate$ |
```

6.启动镜像

```
$ docker run -p 8080:8080 calculate # 将宿主机的8080端口映射到容器的8080端口
```

```
ubuntu@VM-1-66-ubuntu: ~/go/src/calculate
File Edit View Search Terminal Tabs Help
ubuntu@VM-1-66-ubuntu: ~/go/src/calculate x siliconx@Lenovo: ~/code/LinuxProgramm... x
ubuntu@VM-1-66-ubuntu:~/go/src/calculate$ docker run -p 8080:8080 calculate
Welcome to here!
This is a rectangle
a = 3.000
b = 9.000
perimeter = 24.000
area = 27.000
|
```

7.在浏览器中访问



至此实验完成！

实验思考

- 1.**openstack**实在过于庞大，**Docker**相比之下就显得十分轻量级了
- 2.使用**Docker**部署**web**服务比使用**openstack**方便快捷得多

参考资料

- 1.**Golang**
- 2.**Docker**