Docker: Installation and Basic usage on Ubuntu 16.04

This tutorial exists for these OS versions

- Ubuntu 15.04 (Vivid Vervet)

On this page

Docker is an open-source project that provides an open platform for developers and sysadmins to build, package, and run applications anywhere as a lightweight container. Docker automates the deployment of applications inside software containers. Docker development has been started by Solomon Hykes as an internal project at dotCloud, an enterprise PaaS (platform as a service), the software is now maintained by the docker community and Docker Inc. More about Docker can be found in the documentation here https://docs.docker.com/.
Docker requires a *64-bit architecture* for installation and Linux Kernel must be 3.10 or newer. I will use Ubuntu 16.04 here with 4.4.0 kernel version.

Things to know about Docker

Here the basic terms in the docker world that you should know.

Docker Images

A *Docker image* is the basic template for a Docker container. An image usually contains the OS and applications that readily installed. The Docker image is used to run the container, you can find many images with a variety of operating systems and software that has been installed in the Docker Hubhttps://hub.docker.com/.

Docker Container

Docker Container is an image which can be read and written to that runs on top of the Docker image. Docker is using the union-file-system as backend for the container, any changes that are made in the container will be saved in a new layer above the base image. The container is the layer where we install applications in. Each container that runs isolated in the host machine and therefore, provides a secure application platform.

Docker Registry

Docker registry is a repository for Docker images. It provides public and private repositories. The public Docker registry is called the Docker Hub. Here we can push and pull our own images.

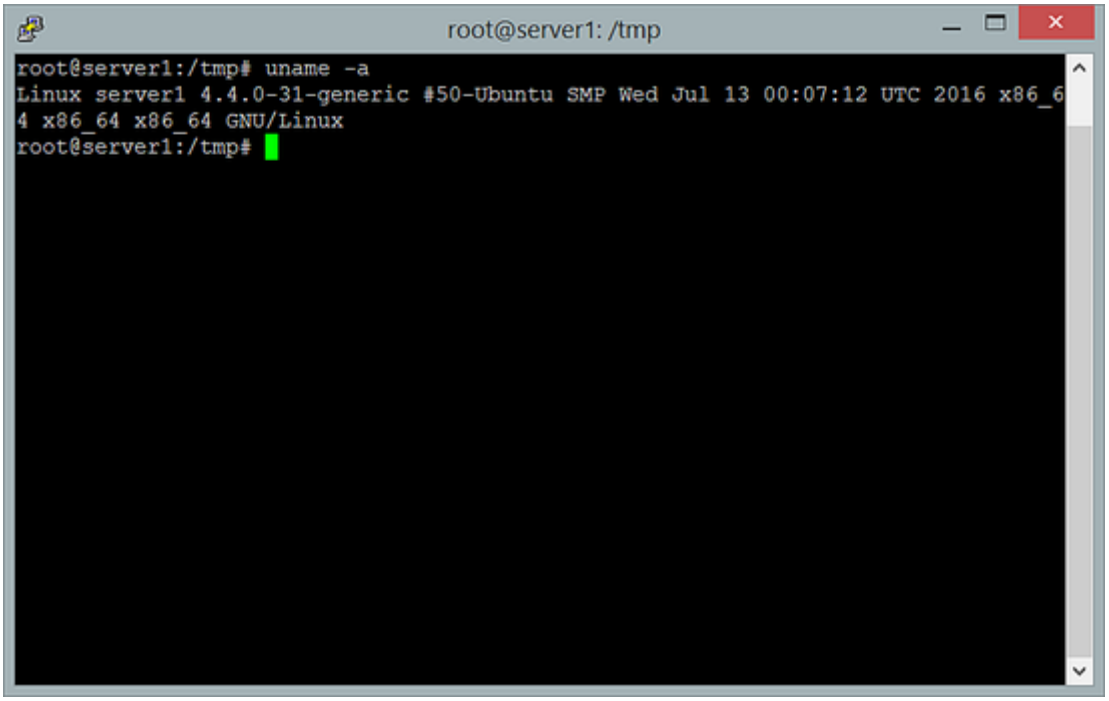
Installing Docker on Ubuntu 16.04

In this section, you will be guided to install docker. Before you install the software, check the kernel version and the OS architecture. The next commands have to be run as root user. Run this command to become root on your Ubuntu system.

```
sudo -s
```

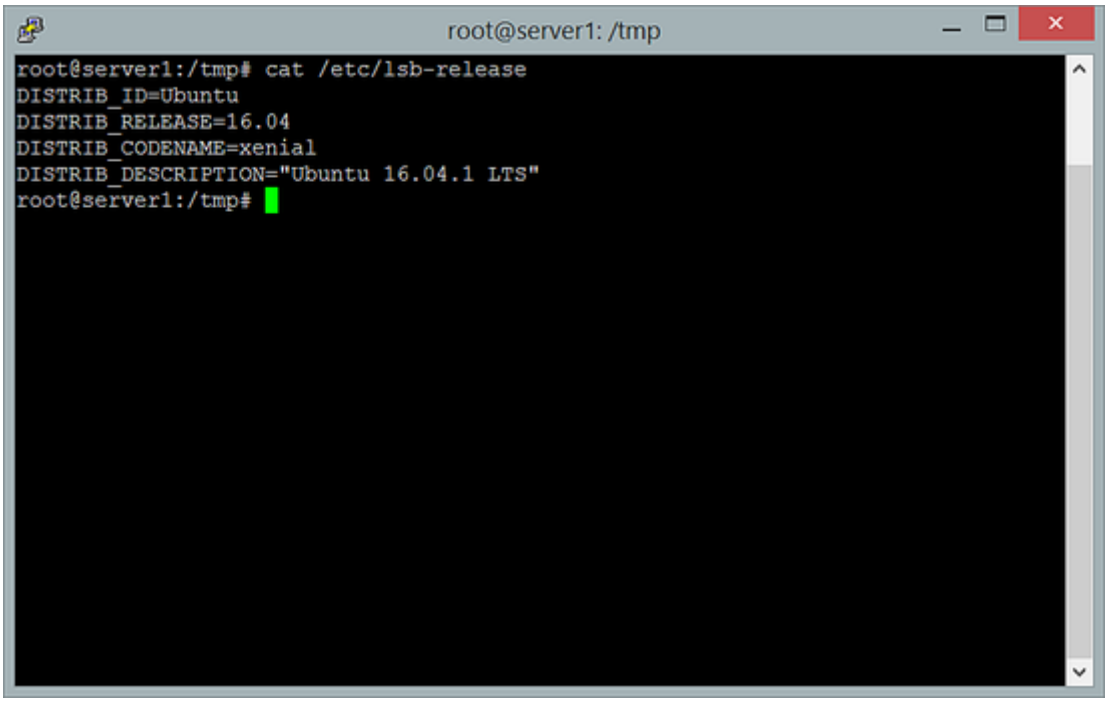
Then run uname -a to check the version of the currently running Linux kernel:

```
uname -a
```



You can see that I`m using the kernel version is 4.4.0 with a 64Bit Kernel (x86_64).
To check the Ubuntu version, run:

```
cat /etc/lsb-release
```



The command shows that the Ubuntu version is 16.04.
It is recommended to update Ubuntu before you install new software. Run the following command to fetch the latest updates from the Ubuntu repository and install them.

```
apt-get update
apt-get upgrade
```

Now install docker with the apt command:

```
apt-get install -y docker.io
```

Wait until the installation has been completed, then you can start Docker with the `systemctl` command:

```
systemctl start docker
```

Enable docker to run at system boot:

```
systemctl enable docker
```

You might also want to check the docker version:

```
docker version
```

```
root@server1:/tmp# docker version
Client:
 Version:      1.10.3
 API version:  1.22
 Go version:   go1.6.1
 Git commit:   20f81dd
 Built:        Wed, 20 Apr 2016 14:19:16 -0700
 OS/Arch:      linux/amd64

Server:
 Version:      1.10.3
 API version:  1.22
 Go version:   go1.6.1
 Git commit:   20f81dd
 Built:        Wed, 20 Apr 2016 14:19:16 -0700
 OS/Arch:      linux/amd64
```

Now docker is installed in your system. You can start making a container by downloading a Docker Image from the Docker Registry.

Basic Usage of Docker

In this section, I will show you commonly used options of the *`docker command`*. E.g. how to download a docker image, build a container and how to access the container.
To create a new ***container***, you should start by choosing a base image with the OS, e.g. ubuntu or centos or another. You can search for a base image with the *`docker search`* command:

```
docker search ubuntu
```

This command will show you all ubuntu images. You can try by yourself *`docker search centos`* etc.

```
root@server1:/tmp# docker search ubuntu
NAME                              DESCRIPTION                                     STARS     OFFICIAL   AUTOMATED
ubuntu                            Ubuntu is a Debian-based Linux operating s...   4397      [OK]
ubuntu-upstart                    Upstart is an event-based replacement for ...   65        [OK]
rastasheep/ubuntu-sshd            Dockerized SSH service, built on top of of...   30                   [OK]
torusware/speedus-ubuntu          Always updated official Ubuntu docker imag...   26                   [OK]
ubuntu-debootstrap                debootstrap --variant=minbase --components...   25        [OK]
nickistre/ubuntu-lamp             LAMP server on Ubuntu                           8                    [OK]
nuagebec/ubuntu                   Simple always updated Ubuntu docker images...   6                    [OK]
nickistre/ubuntu-lamp-wordpress   LAMP on Ubuntu with wp-cli installed            6                    [OK]
nimmis/ubuntu                     This is a docker images different LTS vers...   5                    [OK]
maxexcloo/ubuntu                  Docker base image built on Ubuntu with Sup...   2                    [OK]
admiringworm/ubuntu               Base ubuntu images based on the official u...   1                    [OK]
darksheer/ubuntu                  Base Ubuntu Image -- Updated hourly             1                    [OK]
jordi/ubuntu                      Ubuntu Base Image                               1                    [OK]
lynxtp/ubuntu                     https://github.com/lynxtp/docker-ubuntu         0                    [OK]
datenbetrieb/ubuntu               custom flavor of the official ubuntu base ...   0                    [OK]
life360/ubuntu                    Ubuntu is a Debian-based Linux operating s...   0                    [OK]
esycat/ubuntu                     Ubuntu LTS                                      0                    [OK]
widerplan/ubuntu                  Our basic Ubuntu images.                        0                    [OK]
smartentry/ubuntu                 ubuntu with smartentry                          0                    [OK]
croscon/ubuntu                    Crosconized Ubuntu                              0                    [OK]
webhippie/ubuntu                  Docker images for ubuntu                        0                    [OK]
teamrock/ubuntu                   TeamRock's Ubuntu image configured with AW...   0                    [OK]
ustclug/ubuntu                    ubuntu image for docker with USTC mirror        0                    [OK]
konstruktoid/ubuntu               Ubuntu base image                               0                    [OK]
dorapro/ubuntu                    ubuntu image                                    0                    [OK]
root@server1:/tmp#
```

Now it's time to download the base image to our server, use the command:

```
docker pull ubuntu
```

`The docker pull imagename` command will download an image to your server from docker registry/DockerHub.

```
root@server1:/tmp# docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu

43db9dbdcb30: Pull complete
2dc64e8f8d4f: Pull complete
670a583e1b50: Pull complete
183b0bfcd10e: Pull complete
Digest: sha256:c6674c44c6439673bf56536c1a15916639c47ea04c3d6296c5df938add67b54b
Status: Downloaded newer image for ubuntu:latest
```

Now you can see all downloaded images by using the command:

```
docker images
```

```
root@server1:/tmp# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
ubuntu              latest              42118e3df429        11 days ago         124.8 MB
root@server1:/tmp#
```

The Ubuntu image was downloaded from DockerHub/Docker Registry. The next step is to create a container from that image.
To create the container, you can use *docker create* or *docker run*.

```
docker create ubuntu:16.04
```

```
root@server1:/tmp# docker create ubuntu:16.04
Unable to find image 'ubuntu:16.04' locally
16.04: Pulling from library/ubuntu

Digest: sha256:c6674c44c6439673bf56536c1a15916639c47ea04c3d6296c5df938add67b54b
Status: Downloaded newer image for ubuntu:16.04
d5df265ef0cf361d8f43335686942f1c2c820289afa5a85f8104db8707c88873
```

docker create command will create a new container but not start it. So now you can use *run*command:

```
docker run -i -t ubuntu:16.04 /bin/bash
```

This command will create and run a container based in ubuntu 16.04 image and run a command */bin/bash* inside the container, you will be automatically inside the container after running the command.

```
root@server1:/tmp# docker run -i -t ubuntu:16.04 /bin/bash
root@8f64bd2b0547:/# exit
exit
root@server1:/tmp#
```

The container will stop when you leave it with the command *exit*. If you like to have a container that is running in the *background*, you just need to add the *-d* option in the command.

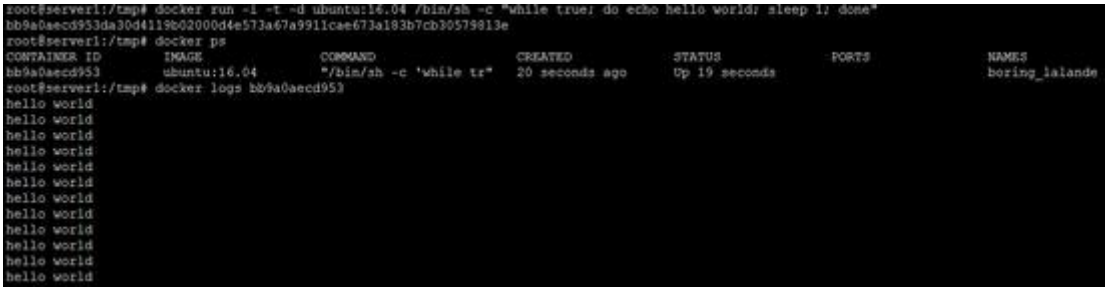
```
docker run -i -t -d ubuntu:16.04 /bin/sh -c "while true; do echo hello world; sleep 1; done"
```

/bin/sh -c "while true; do echo hello world; sleep 1; done" this is bash script to echo ***"hello word"*** forever.
Now you can see the container running in the background by using command:

```
docker ps
```

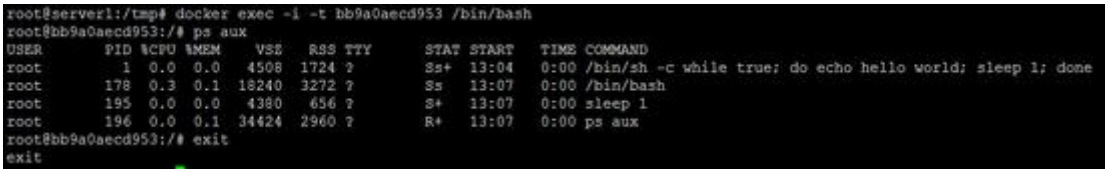
or if you want to see the logs result from that bash command you can use the command:

```
docker logs NAMES/ContainerID
```



How can I access the shell of container that runs in the background mode? This command will connect you to the shell of the container:

```
docker exec -i -t NAMES/ContainerID /bin/bash
```



You can see the hostname and the container ID are equal, this means that you are inside of the container shell. When you type `exit` on that shell you will leave that shell but the container is still running.
Another command that you will use often is:

```
docker stop NAME/ContainerID
```

This will stop the container without deleting it, so you can start it again with the command:

```
docker start NAME/ContainerID
```

If you like to remove the container, stop it first and then remove it with the command:

```
docker rm NAME/ContainerID
```

This is just a short introduction on the installation and basic usage of Docker on Ubuntu, you can find the detailed Docker documentation page here.
An in-depth introduction to Docker is available in this Howtoforge tutorial series: https://www.howtoforge.com/tutorial/how-to-use-docker-introduction/

Conclusion

Docker is an open source container virtualization platform which helps developers to deploy their applications and system administrators to manage applications in a safe virtual container environment. Docker runs on the Intel / AMD 64-bit architecture and the kernel should be higher 3.10 version. With dDocker, you can build and run your application inside a container and then move your containers to other machines running docker without any worries.