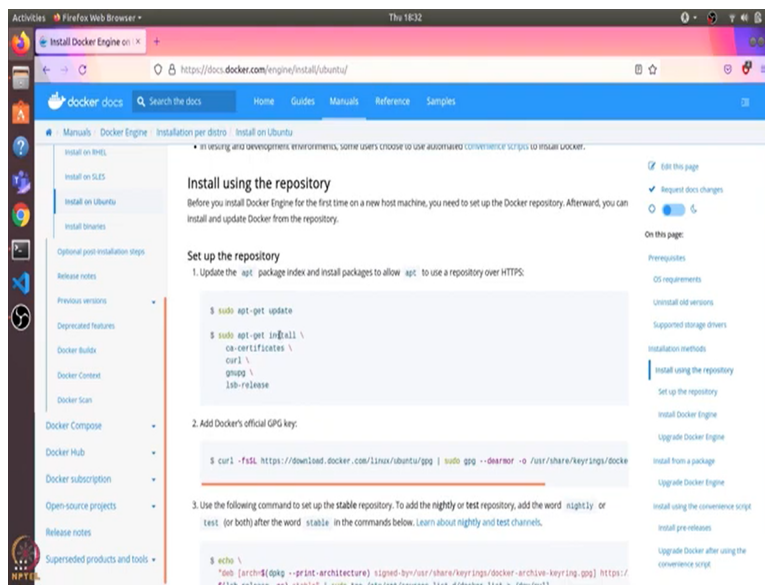
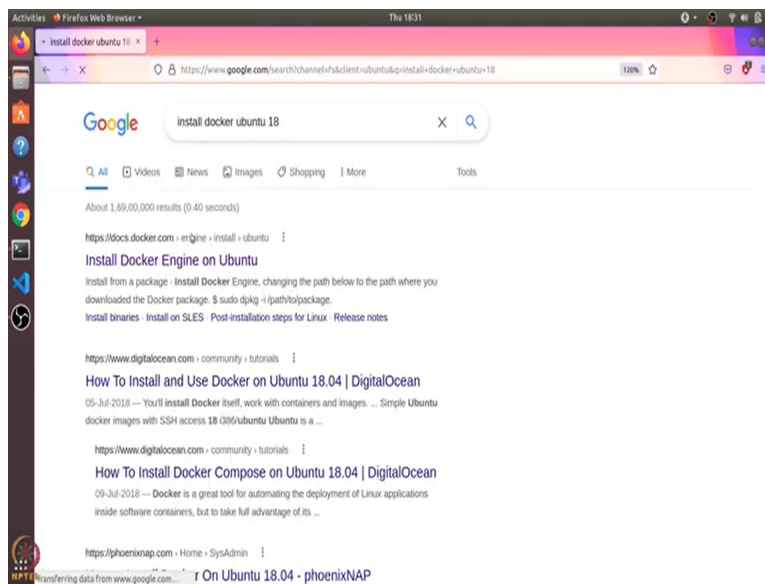


Design and Engineering of Computer Systems
Professor. Mythili Vutukuru
Computer Science and Engineering
Indian Institute of Technology, Bombay
Week 3, Tutorial 2
Docker Installation

Hi students in this video we will see how to install Docker in Ubuntu 18.

(Refer Slide Time: 00:24)



So, I will open the browser and just type in install Docker Ubuntu 18 and it gives me this stocks.docker link and I will click on this link. So, it shows various installation methods I will

follow the first method which is setting up the repository and then installing it. So, I will open a terminal and run this command one by one.

(Refer Slide Time: 00:49)

The image consists of two screenshots. The top screenshot shows the Docker documentation page for Ubuntu installation. The bottom screenshot shows a terminal window with the command `sudo apt-get update` being executed.

Top Screenshot: Docker Installation Guide on Ubuntu

The browser window displays the Docker documentation page for Ubuntu. The page title is "Set up the repository". The instructions are as follows:

1. Update the `apt` package index and install packages to allow `apt` to use a repository over HTTPS:

```
$ sudo apt-get install \
ca-certificates \
curl \
gnupg \
lsb-release
```
2. Add Docker's official GPG key:

```
$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker
```
3. Use the following command to set up the `stable` repository. To add the `nightly` or `test` repository, add the word `nightly` or `test` (or both) after the word `stable` in the commands below. [Learn about nightly and test channels.](#)

```
$ echo \
"deb [arch=amd64] signed-by=/usr/share/keyrings/docker-arch-keyring.gpg https:// \
$[lsb_release -cs] stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
```

Below the instructions, there is a section titled "Install Docker Engine" with the instruction: "1. Update the `apt` package index, and install the latest version of Docker Engine and containers, or go to the next step to install a

Bottom Screenshot: Terminal Window

The terminal window shows the execution of the command `sudo apt-get update`. The output is as follows:

```
saurav@ubuntu-18:~$ sudo apt-get update
Hit:1 http://packages.microsoft.com/repos/code stable InRelease
Hit:2 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:3 http://archive.ubuntu.com/ubuntu bionic InRelease
Hit:4 http://ppa.launchpad.net/obsproject/obs-studio/ubuntu bionic InRelease
Hit:5 https://packages.microsoft.com/repos/ms-teams stable InRelease
Get:7 https://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Hit:8 http://ppa.launchpad.net/ubuntu-toolchain-r/test/ubuntu bionic InRelease
Hit:9 https://download.docker.com/linux/ubuntu bionic InRelease
Get:10 http://archive.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:11 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [2,328 kB]
Get:12 http://archive.ubuntu.com/ubuntu bionic-updates/main i386 Packages [1,386 kB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1,771 kB]
67% [13 Packages 358 kB/1,771 kB 20%] 656 kB/s 4s
```

Activities Panel Web Browser Thu 18:34

Install Docker Engine on: x

https://docs.docker.com/engine/install/ubuntu/

docker docs Search the docs Home Guides Manuals Reference Samples

Manuals Docker Engine Installation per distro Install on Ubuntu

Install on ARMv8
Install on SLES
Install on Ubuntu
Install on Windows
Optional post installation steps
Release notes
Previous versions
Deprecated features
Docker Builds
Docker Content
Docker Scan
Docker Compose
Docker Hub
Docker subscription
Open-source projects
Release notes
Superseded products and tools

Set up the repository

1. Update the `apt` package index and install packages to allow `apt` to use a repository over HTTPS:

```
$ sudo apt-get update
```

```
$ sudo apt-get install \
```

```
  ca-certificates \
```

```
  curl \
```

```
  gnupg \
```

```
  lsb-release
```

2. Add Docker's official GPG key:

```
$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor --> /usr/share/keyrings/docker
```

3. Use the following command to set up the `stable` repository. To add the `nightly` or `test` repository, add the word `nightly` or `test` (or both) after the word `stable` in the commands below. [Learn about nightly and test channels.](#)

```
$ echo \
```

```
"deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/docker-archive-keyring.gpg] https://
```

```
$(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
```

Install Docker Engine

1. Update the `apt` package index, and install the latest version of Docker Engine and containerd, or go to the next step to install a

On this page:

- Prerequisites
- OS requirements
- Uninstall old versions
- Supported storage drivers
- Installation methods
- Install using the repository
 - Set up the repository
 - Install Docker Engine
 - Upgrade Docker Engine
 - Install from a package
 - Upgrade Docker Engine
- Install using the convenience script
- Install pre-releases
- Upgrade Docker after using the convenience script

Activities Terminal Thu 18:34

Install Docker Engine on: x

https://docs.docker.com/engine/install/ubuntu/

saureav@ubuntu-18: ~\$

```
Get:11 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [2,328 kB]
```

```
Get:12 http://archive.ubuntu.com/ubuntu bionic-updates/main i386 Packages [1,386 kB]
```

```
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1,771 kB]
```

```
Get:14 http://archive.ubuntu.com/ubuntu bionic-updates/universe i386 Packages [1,592 kB]
```

```
Fetched 2,534 kB in 26s (98.1 kB/s)
```

```
Reading package lists... Done
```

```
saureav@ubuntu-18:~$ sudo apt-get install \
```

```
> ca-certificates \
```

```
> curl \
```

```
> gnupg \
```

```
> lsb-release
```

```
Reading package lists... Done
```

```
Building dependency tree... 50%
```

```
Building dependency tree
```

```
Reading state information... Done
```

```
lsb-release is already the newest version (9.20170808ubuntu1).
```

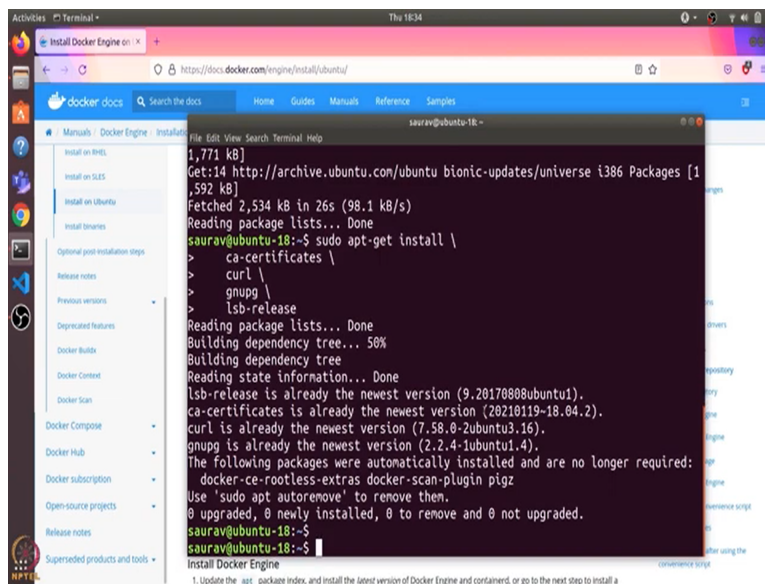
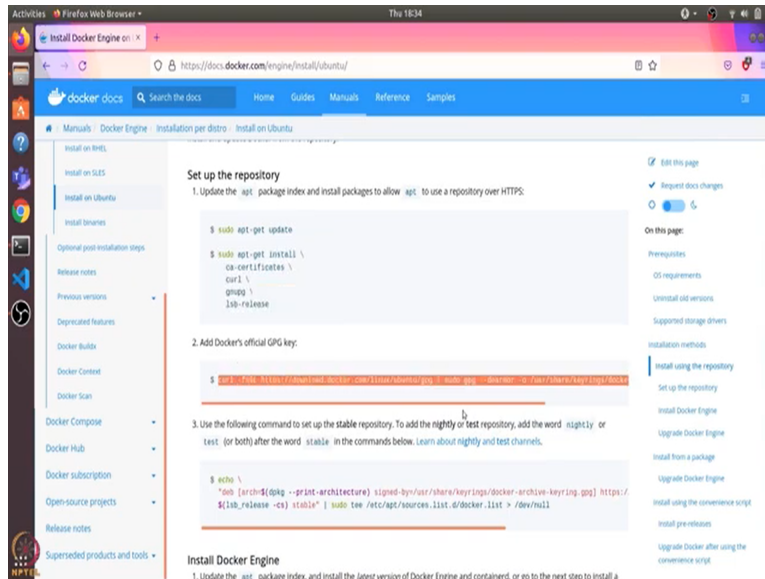
```
ca-certificates is already the newest version (20210119-18.04.2).
```

```
curl is already the newest version (7.58.0-2ubuntu3.16).
```

```
gnupg is already the newest version (2.2.4-1ubuntu1.4).
```

Install Docker Engine

1. Update the `apt` package index, and install the latest version of Docker Engine and containerd, or go to the next step to install a



Let us first run `sudo apt-get update`. This will update any existing packages. All right now let us run the second command. And now I will run this command to add Docker's official gpg key, gpg is gnu privacy guard. Because I have already added the key it is asking me whether I want to override the file. So, I will just type `y` and press enter.

(Refer Slide Time: 01:20)

The top screenshot shows a Firefox browser window displaying the Docker Engine installation page for Ubuntu. The page includes instructions for installing Docker Engine, including commands to set up the repository and install the engine. The bottom screenshot shows a terminal window with the following commands and output:

```
saurav@ubuntu-18:~$ sudo apt-get install \
> ca-certificates \
> curl \
> gnupg \
> lsb-release
Reading package lists... Done
Building dependency tree... 50%
Building dependency tree... Done
Reading state information... Done
lsb-release is already the newest version (9.20170808ubuntu1).
ca-certificates is already the newest version (20210119-18.04.2).
curl is already the newest version (7.58.0-2ubuntu3.16).
gnupg is already the newest version (2.2.4-1ubuntu1.4).
The following packages were automatically installed and are no longer required:
  docker-ce-rootless-extras docker-scan-plugin pigz
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
saurav@ubuntu-18:~$
saurav@ubuntu-18:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | su
do gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
gpg: WARNING: unsafe ownership on homedir '/home/saurav/.gnupg'
File '/usr/share/keyrings/docker-archive-keyring.gpg' exists. Overwrite? (y/N) y
saurav@ubuntu-18:~$
```

Activities Firefox Web Browser Thu 18:35

Install Docker Engine on: x

https://docs.docker.com/engine/install/ubuntu/

docker docs Search the docs Home Guides Manuals Reference Samples

Manuals Docker Engine Installation per distro Install on Ubuntu

Install Docker Engine

1. Update the apt package index, and install the latest version of Docker Engine and containers, or go to the next step to install a specific version:

```
$ sudo apt-get update
$ sudo apt-get install docker-ce docker-ce-cli containerd.io
```

Got multiple Docker repositories?

If you have multiple Docker repositories enabled, installing or updating without specifying a version in the `apt-get install` or `apt-get update` command always installs the highest possible version, which may not be appropriate for your stability needs.

2. To install a specific version of Docker Engine, list the available versions in the repo, then select and install:

a. List the versions available in your repo:

```
$ apt-cache madison docker-ce
```

docker-ce	5:18.09.1-3-0-ubuntu-xenial	https://download.docker.com/linux/ubuntu	xenial/stable	amd64	P
docker-ce	5:18.09.0-3-0-ubuntu-xenial	https://download.docker.com/linux/ubuntu	xenial/stable	amd64	P
docker-ce	18.06.1-ce-3-0-ubuntu	https://download.docker.com/linux/ubuntu	xenial/stable	amd64	P
docker-ce	18.06.0-ce-3-0-ubuntu	https://download.docker.com/linux/ubuntu	xenial/stable	amd64	P

b. Install a specific version using the version string from the second column, for example, `5:18.09.1-3-0-ubuntu-xenial`.

On this page:

- Prerequisites
- OS requirements
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- Upgrade Docker after using the convenience script

Activities Terminal Thu 18:35

Install Docker Engine on: x

https://docs.docker.com/engine/install/ubuntu/

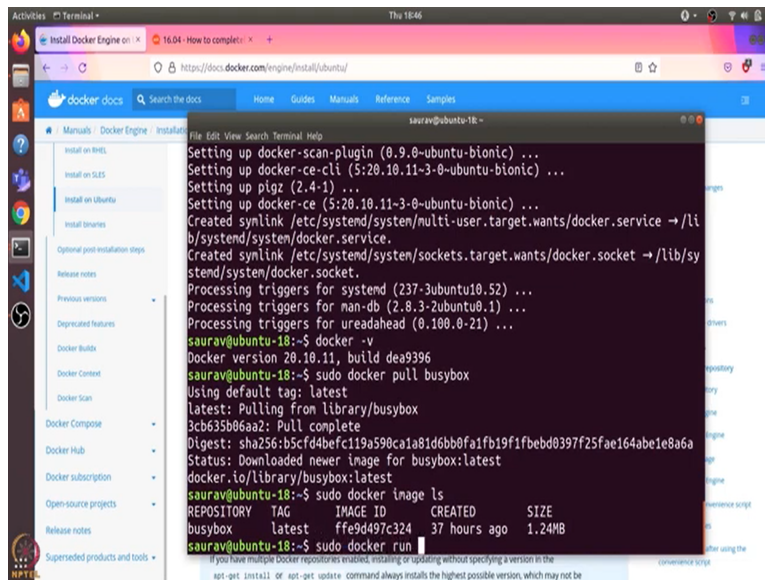
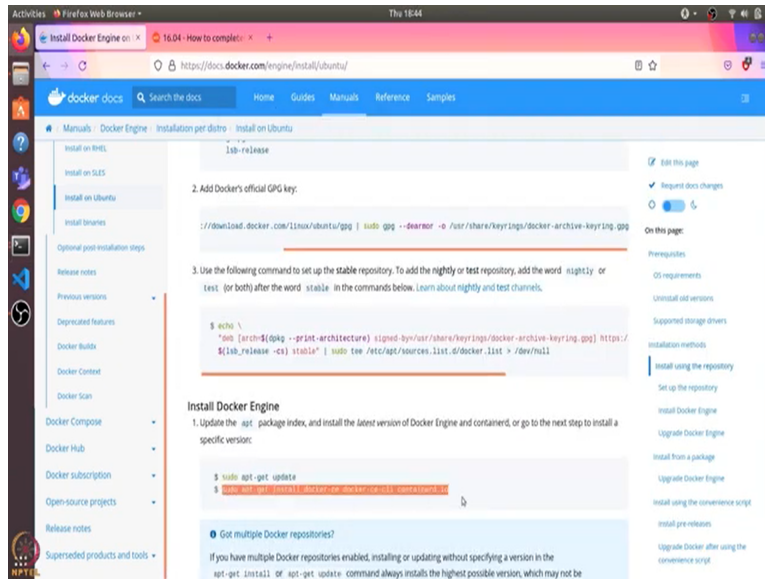
docker docs Search the docs Home Guides Manuals Reference Samples

Manuals Docker Engine Installation per distro Install on Ubuntu

File Edit View Search Terminal Help

```
Reading package lists... Done
Building dependency tree... 50%
Building dependency tree
Reading state information... Done
lsb-release is already the newest version (9.20170808ubuntu1).
ca-certificates is already the newest version (20210119-18.04.2).
curl is already the newest version (7.58.0-2ubuntu3.16).
gnupg is already the newest version (2.2.4-1ubuntu1.4).
The following packages were automatically installed and are no longer required:
  docker-ce-rootless-extras docker-scan-plugin pigz
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
saurav@ubuntu-18:~$
saurav@ubuntu-18:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
gpg: WARNING: unsafe ownership on homedir '/home/saurav/.gnupg'
File '/usr/share/keyrings/docker-archive-keyring.gpg' exists. Overwrite? (y/N) y
saurav@ubuntu-18:~$ echo \
> "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/docker-
  archive-keyring.gpg] https://download.docker.com/linux/ubuntu \
> $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
saurav@ubuntu-18:~$
saurav@ubuntu-18:~$
```

b. Install a specific version using the version string from the second column, for example, `5:18.09.1-3-0-ubuntu-xenial`.

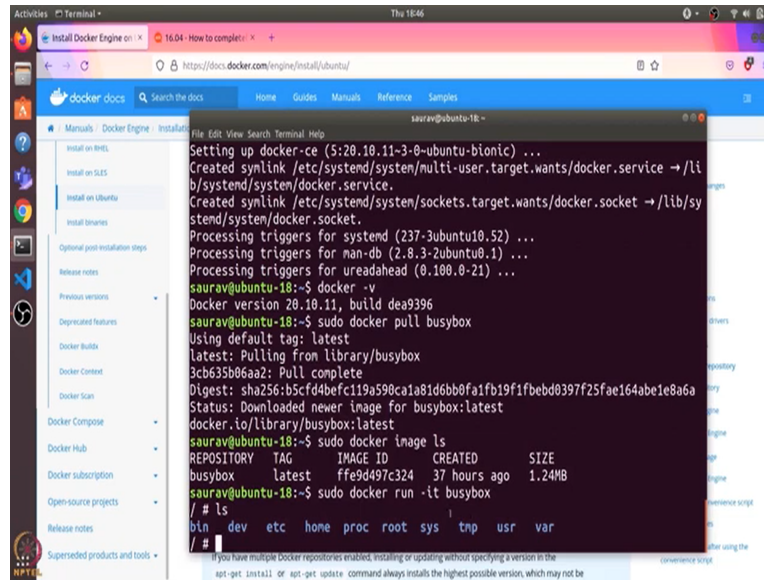


Then I will run this command to set up the stable repository. And then let us run this update command once again. So finally let us run this apt-get install Docker command to install the Docker. It will use around 400 mb of disk space. So I will type in y and press enter. Let us wait for the installation to finish. All right. So now that the installation is finished let us check the Docker version using Docker minus v command.

So, it shows that the Docker was in 20.10. And now let us see how can we start a container using the Docker. So, to start a container first of all we need to pull some image using which we can start a container. So, we can pull any Docker image using Docker pull command. So, for instance, let us pull the busy box image I will use sudo Docker pull busy box to pull the busy box

image and by default it will pull the latest image. So, once the pull is complete we can see what all images are there using Docker image LS command so you can see that there is just one image.

(Refer Slide Time: 03:03)



The screenshot shows a terminal window on a Linux system. The user has installed Docker and is now managing images. The terminal output shows the following commands and their results:

```
saarav@ubuntu-18:~$ docker -v
Docker version 20.10.11, build dea9396

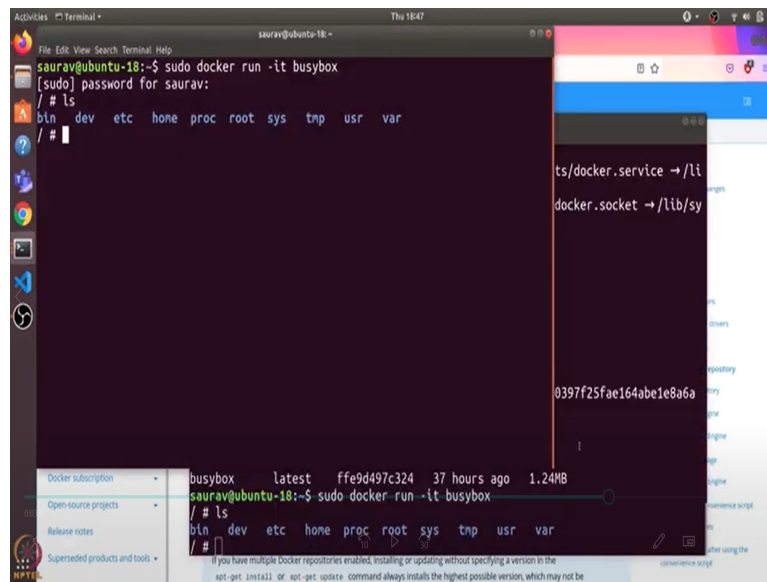
saarav@ubuntu-18:~$ sudo docker pull busybox
latest: Pulling from library/busybox
Digest: sha256:b5cfd4bfc119a590ca1a81d6bb0fa1fb19f1fbed0397f25fae164abe1e8a6a
Status: Downloaded newer image for busybox:latest
docker.io/library/busybox:latest

saarav@ubuntu-18:~$ sudo docker image ls
REPOSITORY TAG IMAGE ID CREATED SIZE
busybox latest ffe9d497c324 37 hours ago 1.24MB

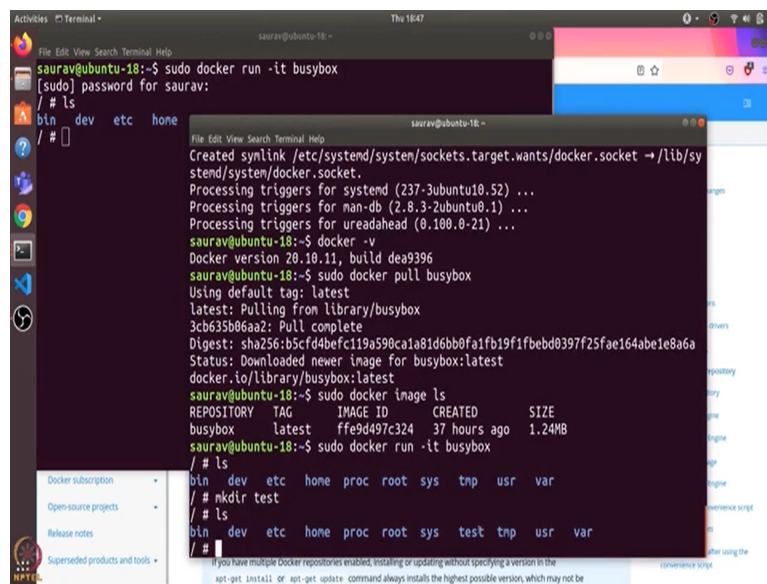
saarav@ubuntu-18:~$ sudo docker run -it busybox
/# ls
bin dev etc home proc root sys tmp usr var
```

And now let us see how can we start a container using this image. We can use the Docker run command to run a container and I will use the -it option to start an interactive shell. And I will now give it the image name. So, we have an interactive shell running using this busy box image. Let us see what all files are there so it has all the folders which are there in the root folder of a Linux system.

(Refer Slide Time: 03:33)

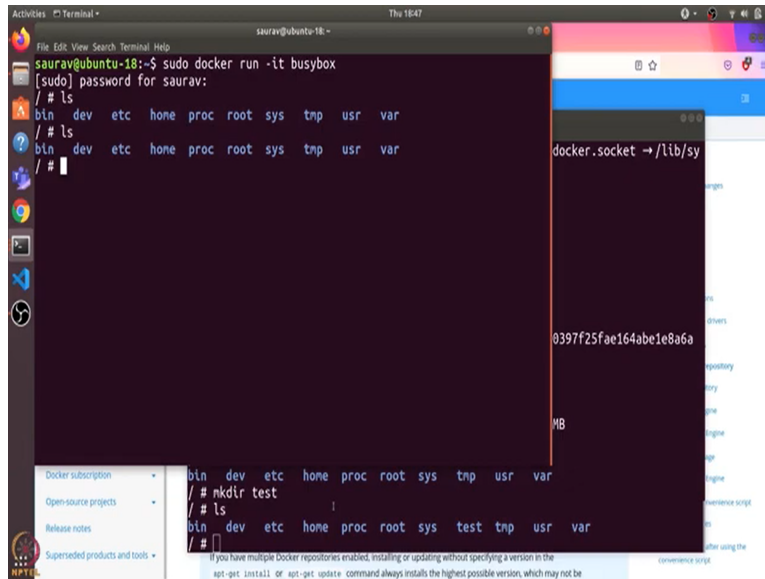


```
saaurav@ubuntu-18:~$ sudo docker run -it busybox
[sudo] password for saaurav:
/# ls
bin dev etc home proc root sys tmp usr var
/#
```

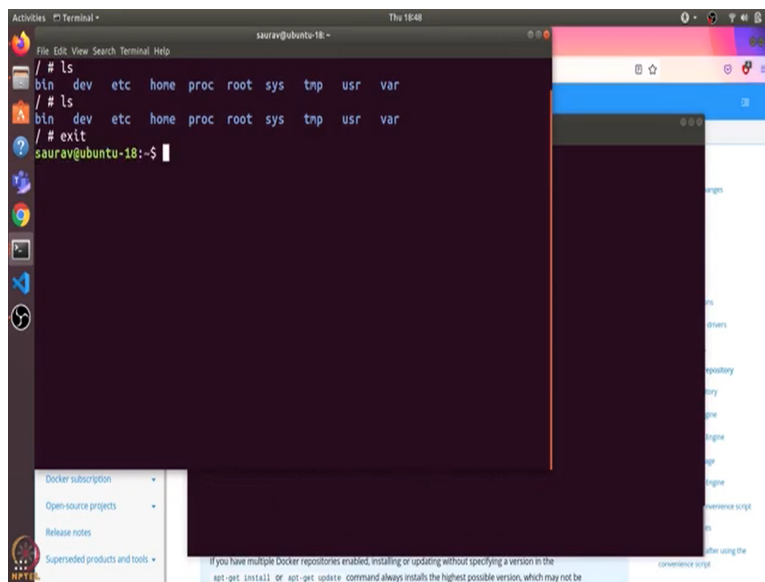


```
saaurav@ubuntu-18:~$ sudo docker run -it busybox
[sudo] password for saaurav:
/# ls
bin dev etc home
/#

Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib/sy
stend/system/docker.socket.
Processing triggers for systemd (237-3ubuntu10.52) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for ureadahead (0.100.0-21) ...
saaurav@ubuntu-18:~$ docker -v
Docker version 20.10.11, build dea9396
saaurav@ubuntu-18:~$ sudo docker pull busybox
Using default tag: latest
latest: Pulling from library/busybox
3cb635b06aa2: Pull complete
Digest: sha256:b5cfd4b6fc119a590ca1a81d6bb0fa1fb19f1fbedd0397f25fae164abe1e8a6a
Status: Downloaded newer image for busybox:latest
docker.io/library/busybox:latest
saaurav@ubuntu-18:~$ sudo docker image ls
REPOSITORY TAG IMAGE ID CREATED SIZE
busybox latest ffe9d497c324 37 hours ago 1.24MB
saaurav@ubuntu-18:~$ sudo docker run -it busybox
/# ls
bin dev etc home proc root sys tmp usr var
/# mkdir test
/# ls
bin dev etc home proc root sys test tmp usr var
/#
```

```
saurav@ubuntu-18:~$ sudo docker run -it busybox
[sudo] password for saurav:
/# ls
bin  dev  etc  hone  proc  root  sys  tmp  usr  var
/# ls
bin  dev  etc  hone  proc  root  sys  tmp  usr  var
/#
/# mkdir test
/# ls
bin  dev  etc  hone  proc  root  sys  test  tmp  usr  var
/#
```



```
saurav@ubuntu-18:~$ sudo docker run -it busybox
[sudo] password for saurav:
/# ls
bin  dev  etc  hone  proc  root  sys  tmp  usr  var
/# ls
bin  dev  etc  hone  proc  root  sys  tmp  usr  var
/# exit
saurav@ubuntu-18:~$
```

Let us open one more terminal and start another container again using the same image. So, now we have two containers running and what if I create a new folder here would this folder be visible in this container as well and the answer is no. Because both these containers have isolated file systems we can exit this container using the exit command. So, that is it for this video thanks and have a nice day.