

# Docker 101

Date **Monday, April 27, 2020 - Thursday, April 30, 2020** Duration **2 hours per day** Time **14:00 - 16:00**

Level **Beginner**

Format **Coding Workshop**

Computer required **YES with Windows 10 Pro or MacOS or Linux 32Bits / 64Bits**

Audience **Manager, Analyst, Programmer, Tester, QA, Project Manager and Interesting Person**

Monday, April 27, 2020	Tuesday, April 28, 2020	Wednesday, April 29, 2020	Thursday, April 30, 2020
<b>Overview</b> <ul style="list-style-type: none"><li>- From Physical to Visual</li><li>- Containerize concept</li><li>- Docker Overview<ul style="list-style-type: none"><li>- Dockerfile</li><li>- Image</li><li>- Container</li></ul></li><li>- Run First Container<ul style="list-style-type: none"><li>- Daemon mode</li></ul></li><li>- Stop, Start, Restart, Remove</li></ul>	<b>Build First Image</b> <ul style="list-style-type: none"><li>- FROM</li><li>- ADD,COPY</li><li>- RUN</li><li>- CMD</li><li>- ENTRYPOINT</li><li>- VOLUME</li><li>- EXPOSE</li></ul> <b>Publish First Image</b> <ul style="list-style-type: none"><li>- Tag</li><li>- Docker hub</li></ul> <b>Manage Image</b> <ul style="list-style-type: none"><li>- Tag</li><li>- Docker hub</li></ul>	<b>Investigate containers</b> <ul style="list-style-type: none"><li>- History</li><li>- Inspect</li></ul> <b>Run Multi-containers</b> <ul style="list-style-type: none"><li>- Docker compose</li><li>- Up</li><li>- Down</li><li>- Build</li><li>- Scale</li></ul>	<b>Healthy Container</b> <ul style="list-style-type: none"><li>- health check</li></ul> <b>Image Optimization</b> <ul style="list-style-type: none"><li>- Keep small</li><li>- Multi-stage build</li></ul> <b>More Use cases</b>



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

สยามชั้นนำคิท  
SIAM CHANNON KIT



Shu Ha Ri



We Love Bug

Docker 101

April 2020





Shu Ha

Ri



SEAL



We Love

Bug



# Agenda

- Why Docker?
- Concept
- Run your first container
- Build your first image
- Share image to the world
- Run multi-containers

Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](#).

# Why Docker



# Let's talk about History



<https://brewminate.com/wp-content/uploads/2020/02/GeorgeThompsonTeachingHistory01.png>



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Look back to 90s - 2000s



# Physical Server Era



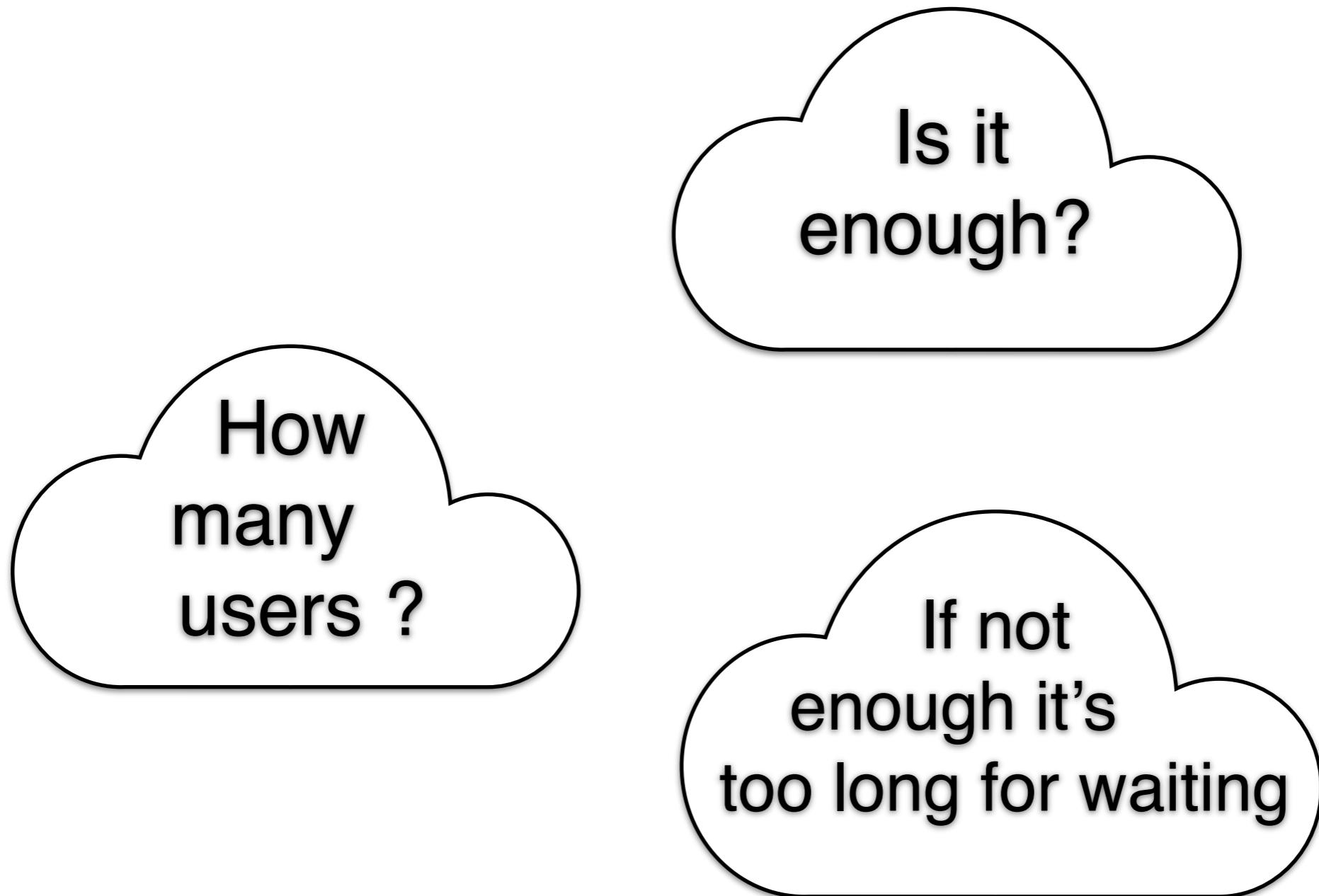
CPU 16 Core  
RAM 32 GB  
HDD 100 GB

Price **250,000.00 Baht**  
Shipping in 1-6 Months

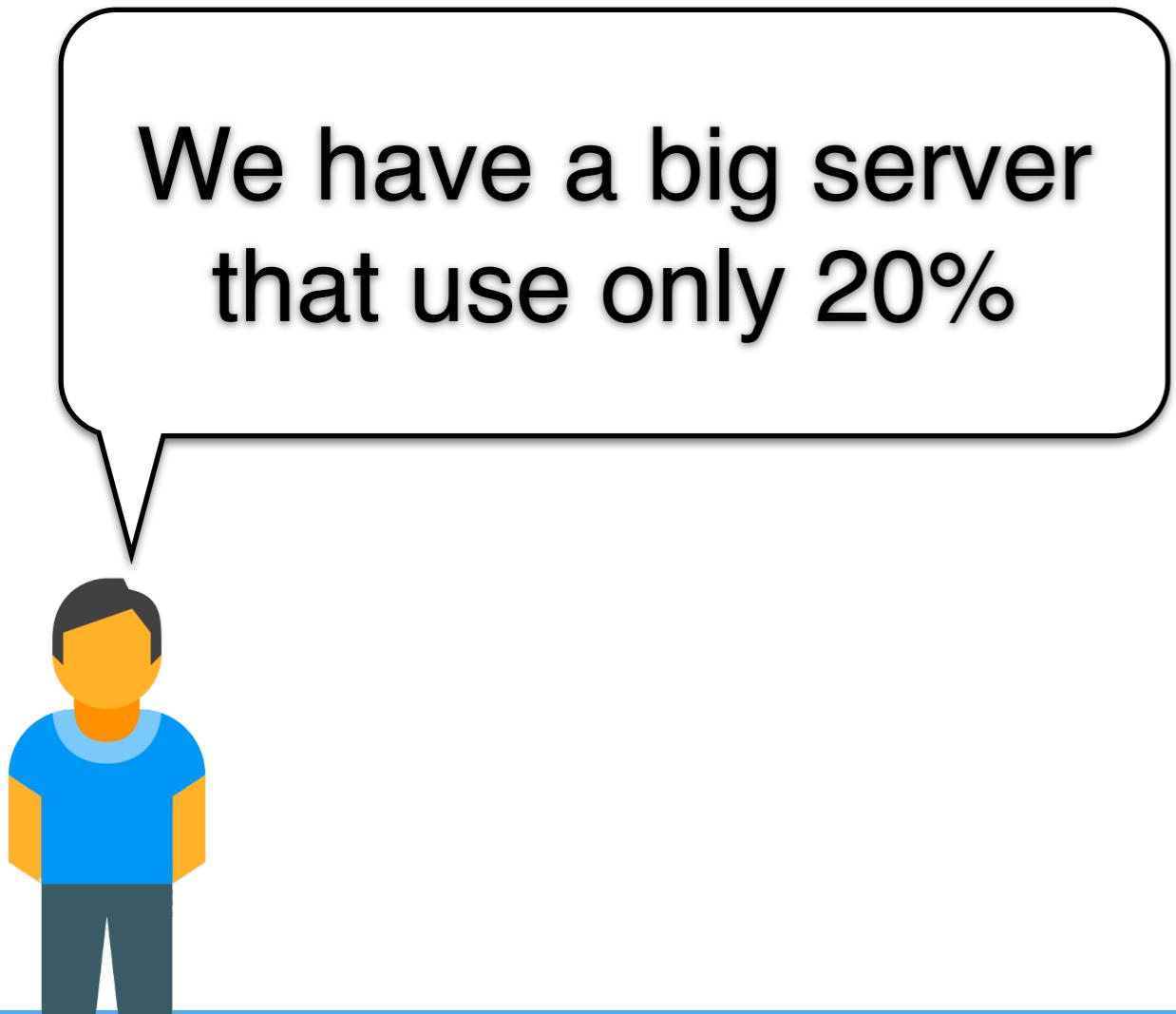
OMG!!



# Physical Server Era



# Shared Server Era



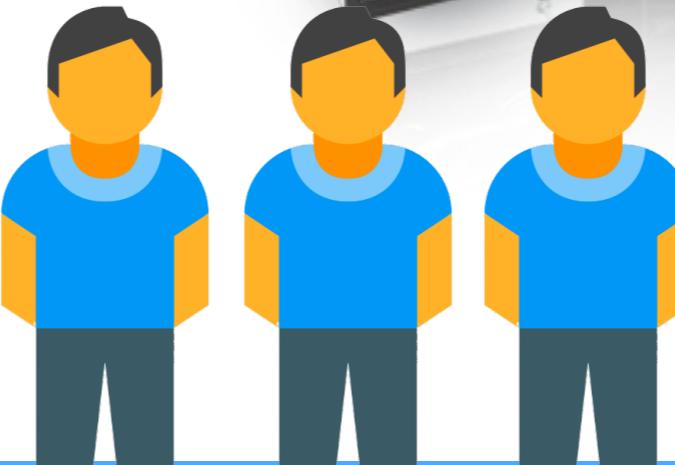
# Shared Server Era

We have a big server  
that use only 20%



Can we share?

Sure



# Shared Server Era

CPU 16 Core  
RAM 32 GB  
HDD 100 GB



Java 1.8  
NodeJS 6.0  
Python 2.7

I need Java 1.8

I need Java 1.10  
and NodeJS 6.0

NodeJS 6.0 is too old,  
I need 10.0 to enable  
features

This Python is 2.7 but I need  
3.0. If I change Someone  
will broke ?



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Virtual Machine Era

I need Java 1.8



NodeJS 6.0 is too old,  
I need 10.0 to enable  
features



I need Java 1.10  
and NodeJS 6.0



This Python is 2.7 but I need  
3.0. If I change Someone  
will broke ?



CPU 16 Core  
RAM 32 GB  
HDD 100 GB



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Virtual Machine Era

I need Java 1.8



NodeJS 6.0 is too old,  
I need 10.0 to enable  
features



I need Java 1.10  
and NodeJS 6.0



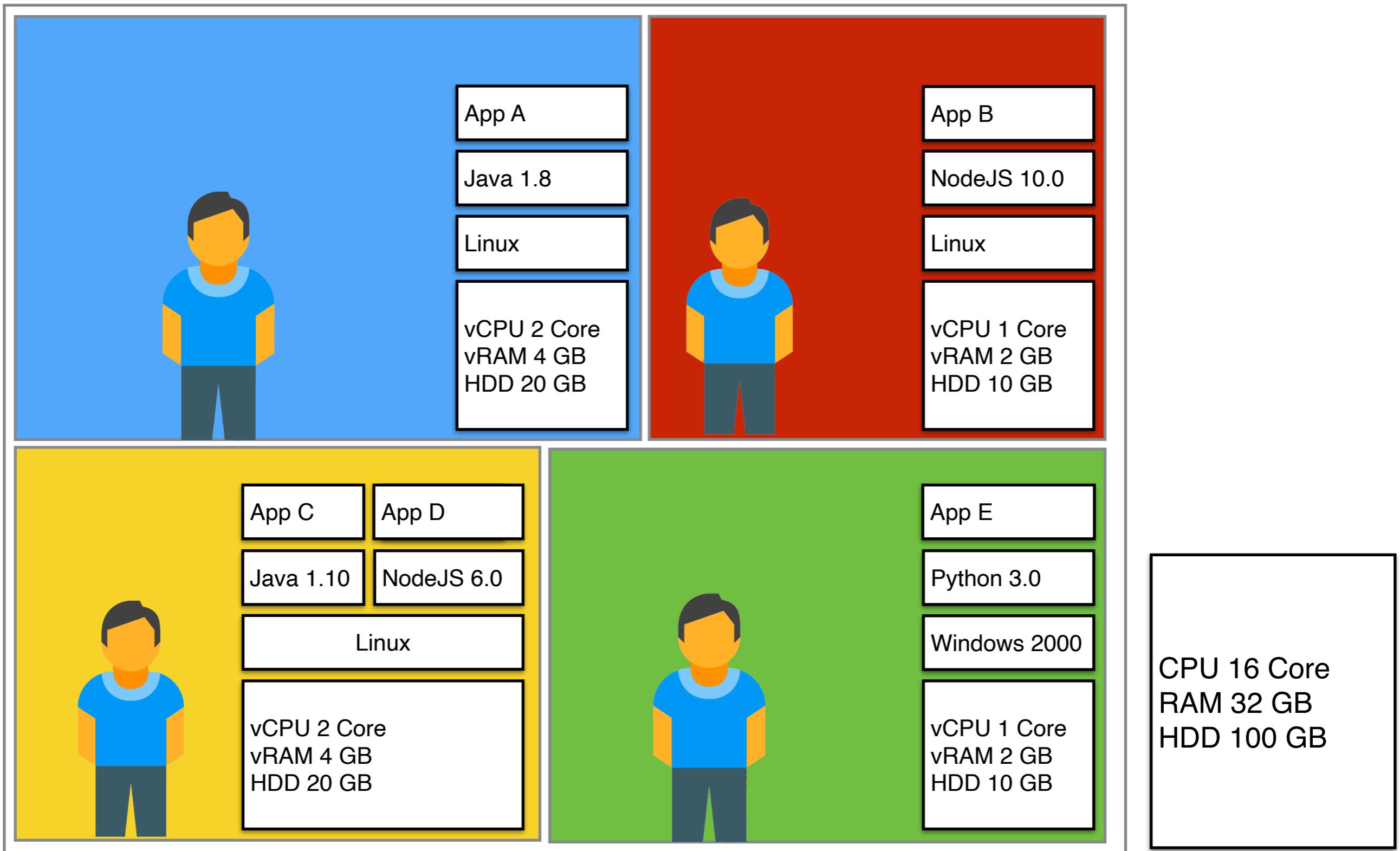
This Python is 2.7 but I need  
3.0. If I change Someone  
will broke ?



CPU 16 Core  
RAM 32 GB  
HDD 100 GB



# Virtual Machine Era

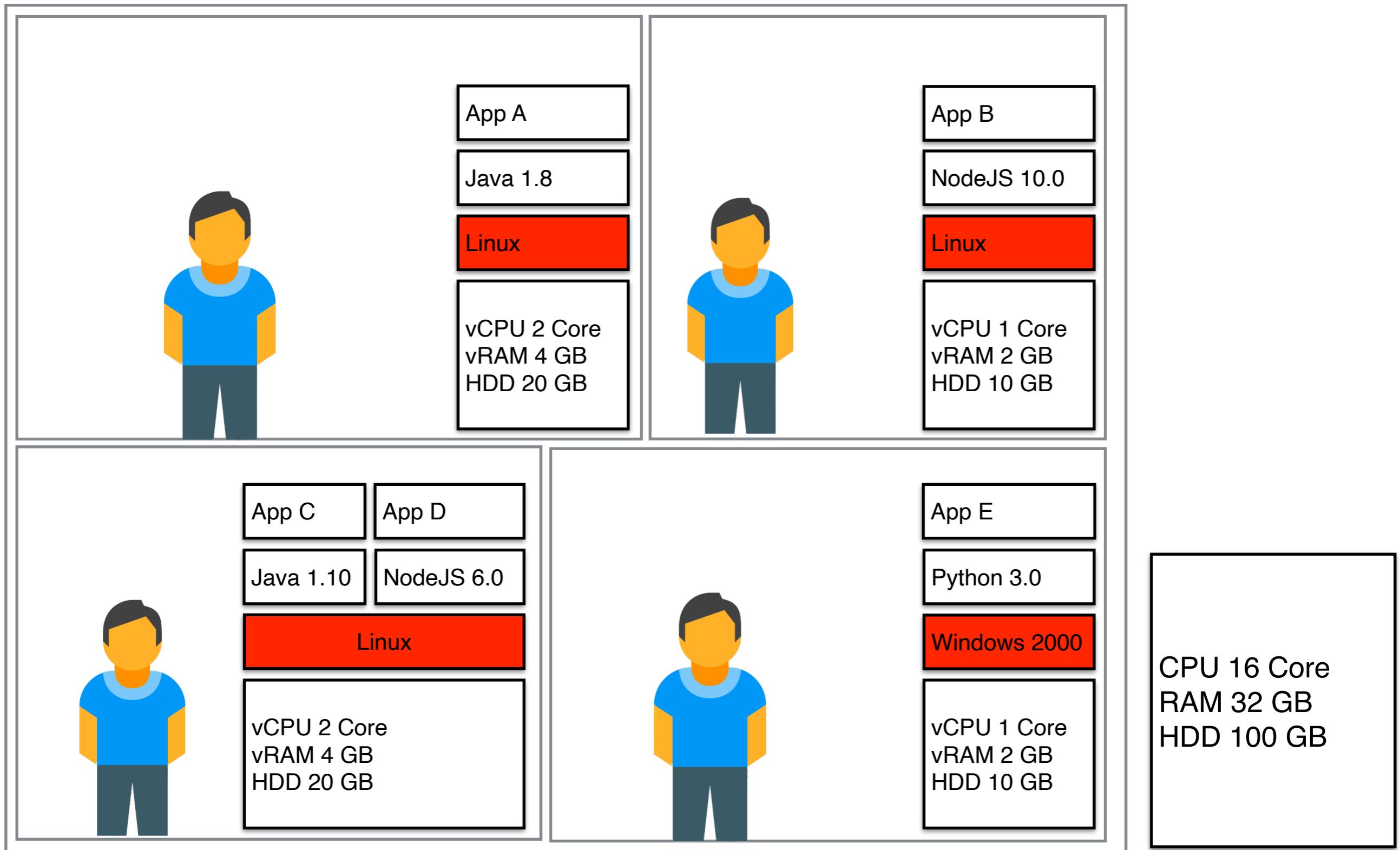


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Virtual Machine Era

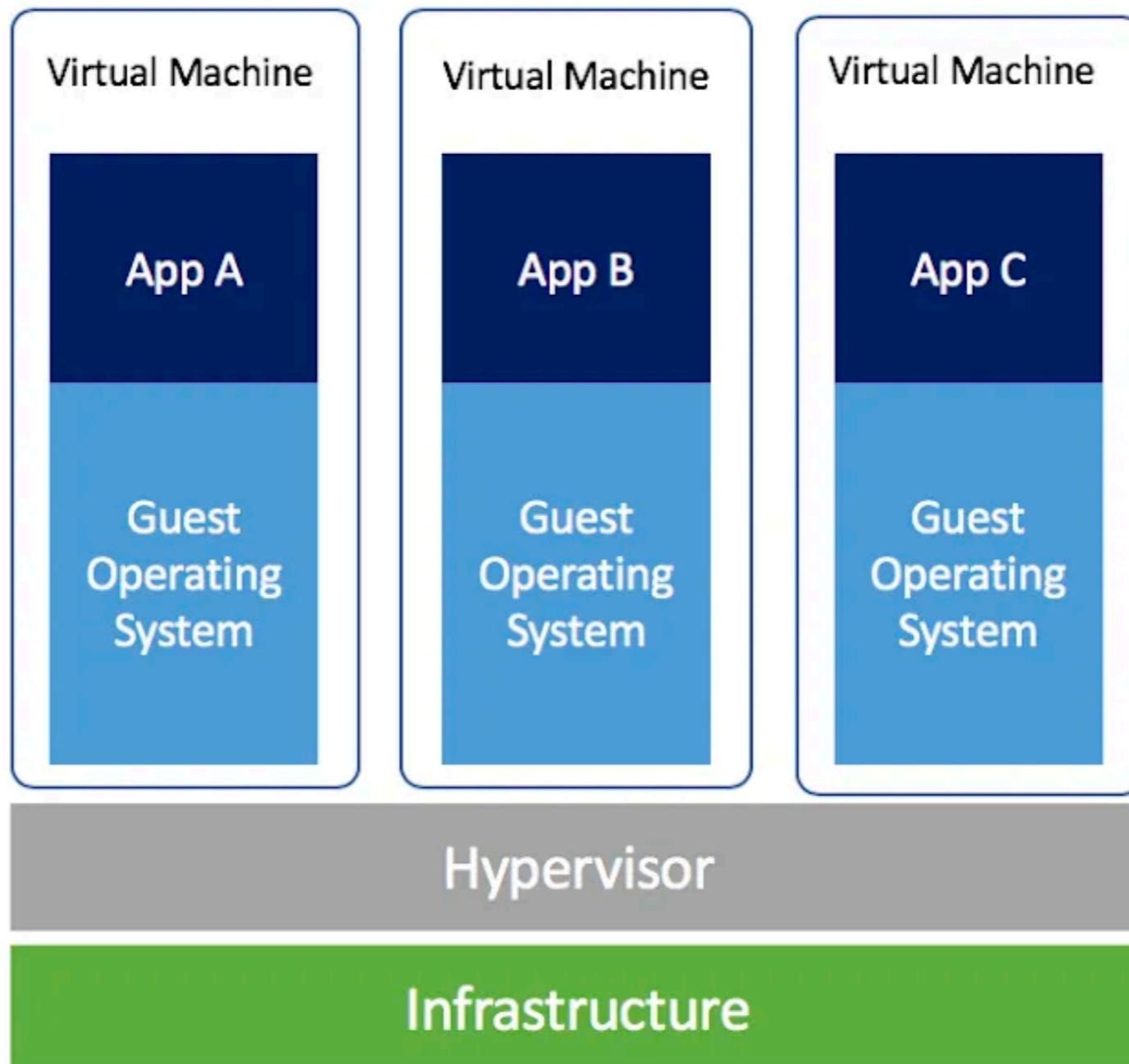


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Virtual Machine Era

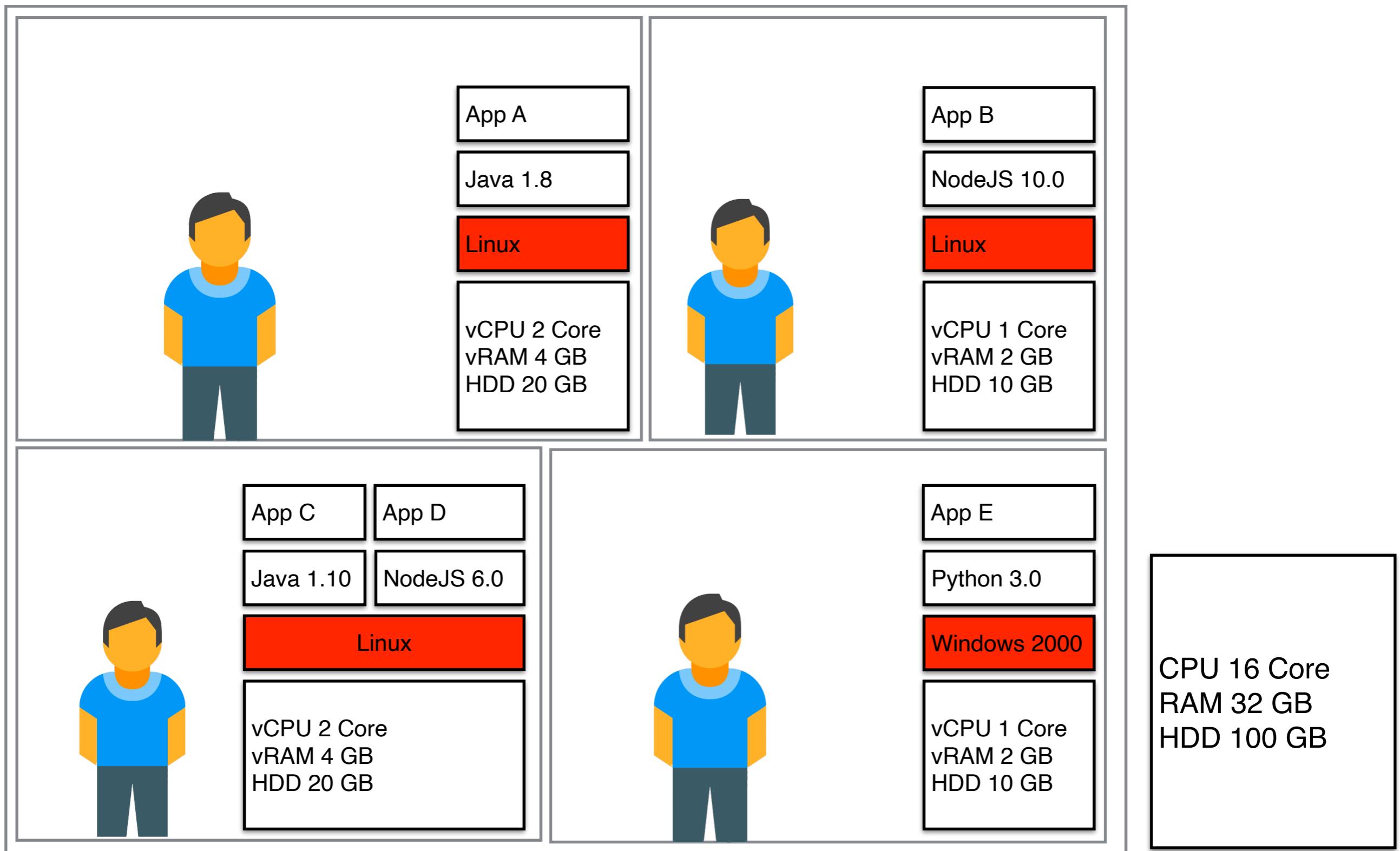


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Container Era

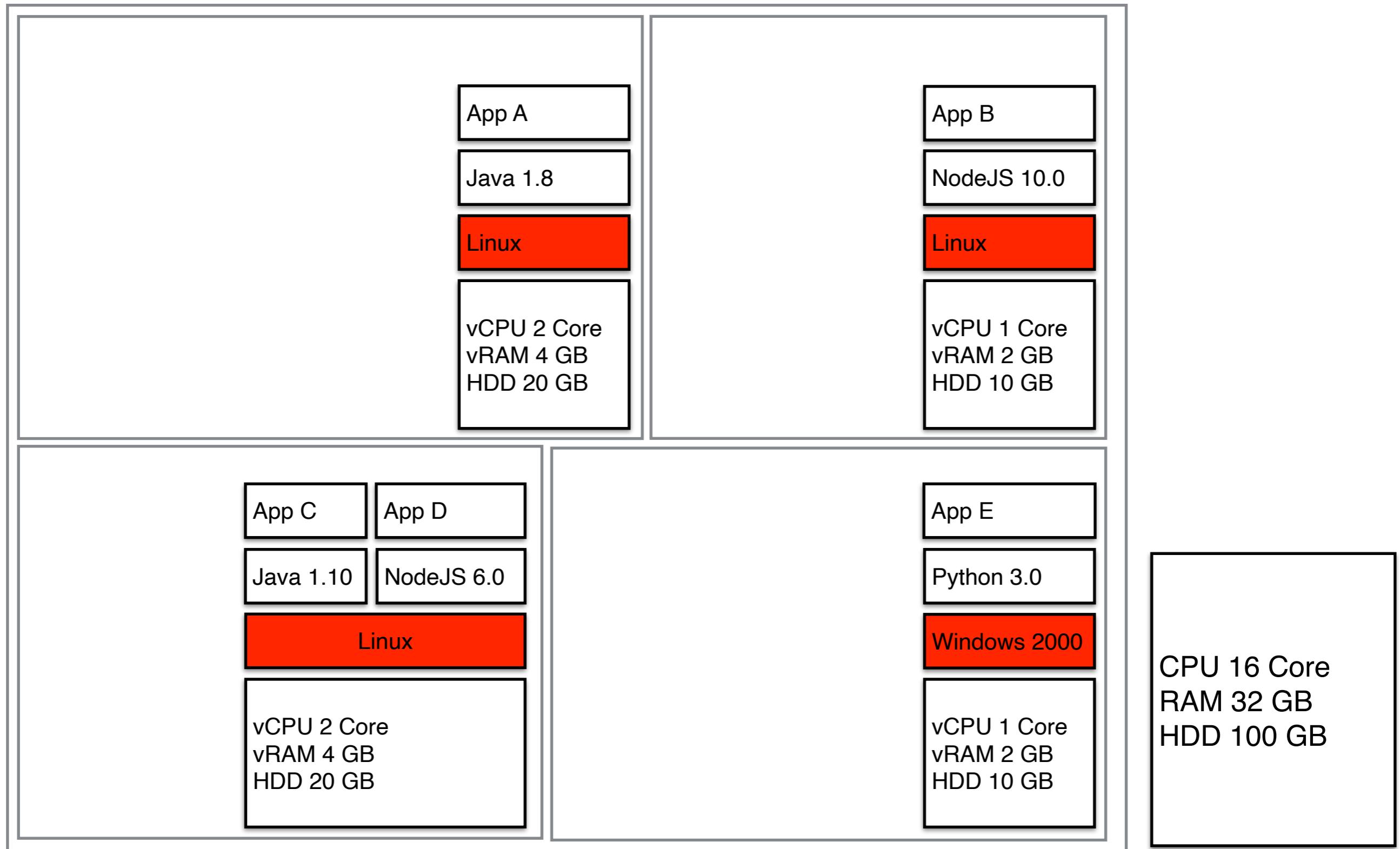


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Container Era



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Container Era

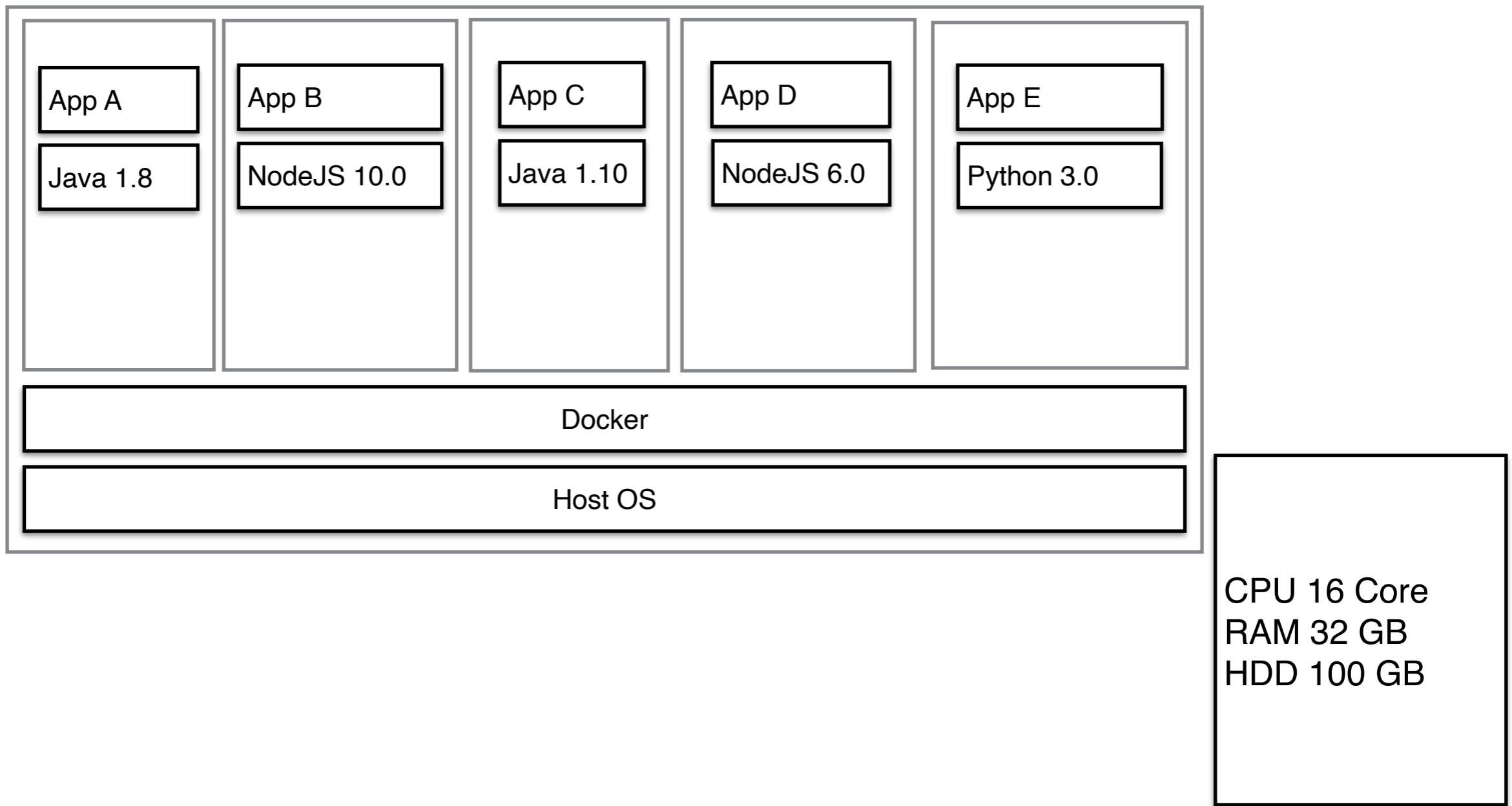


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

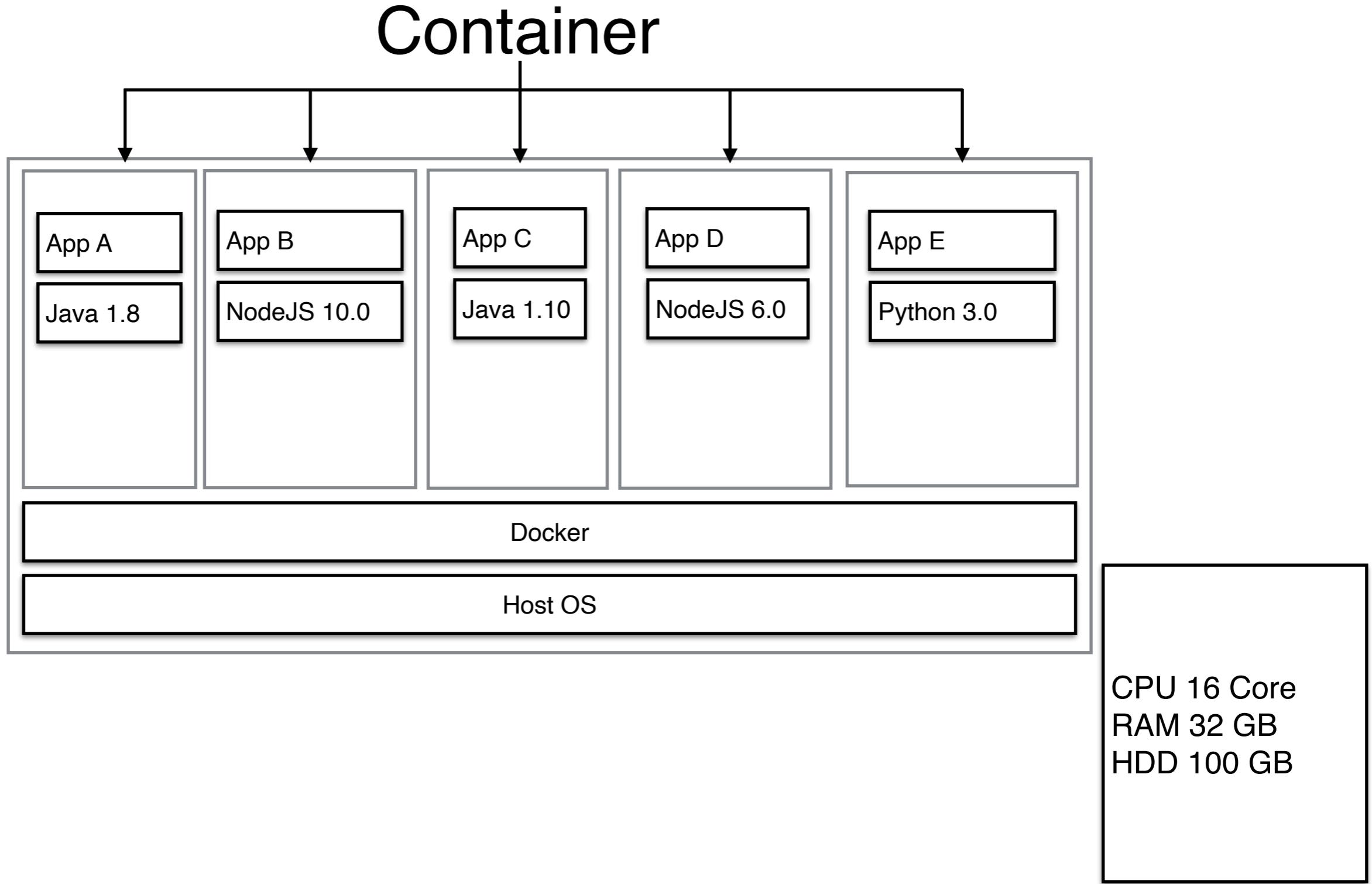
NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

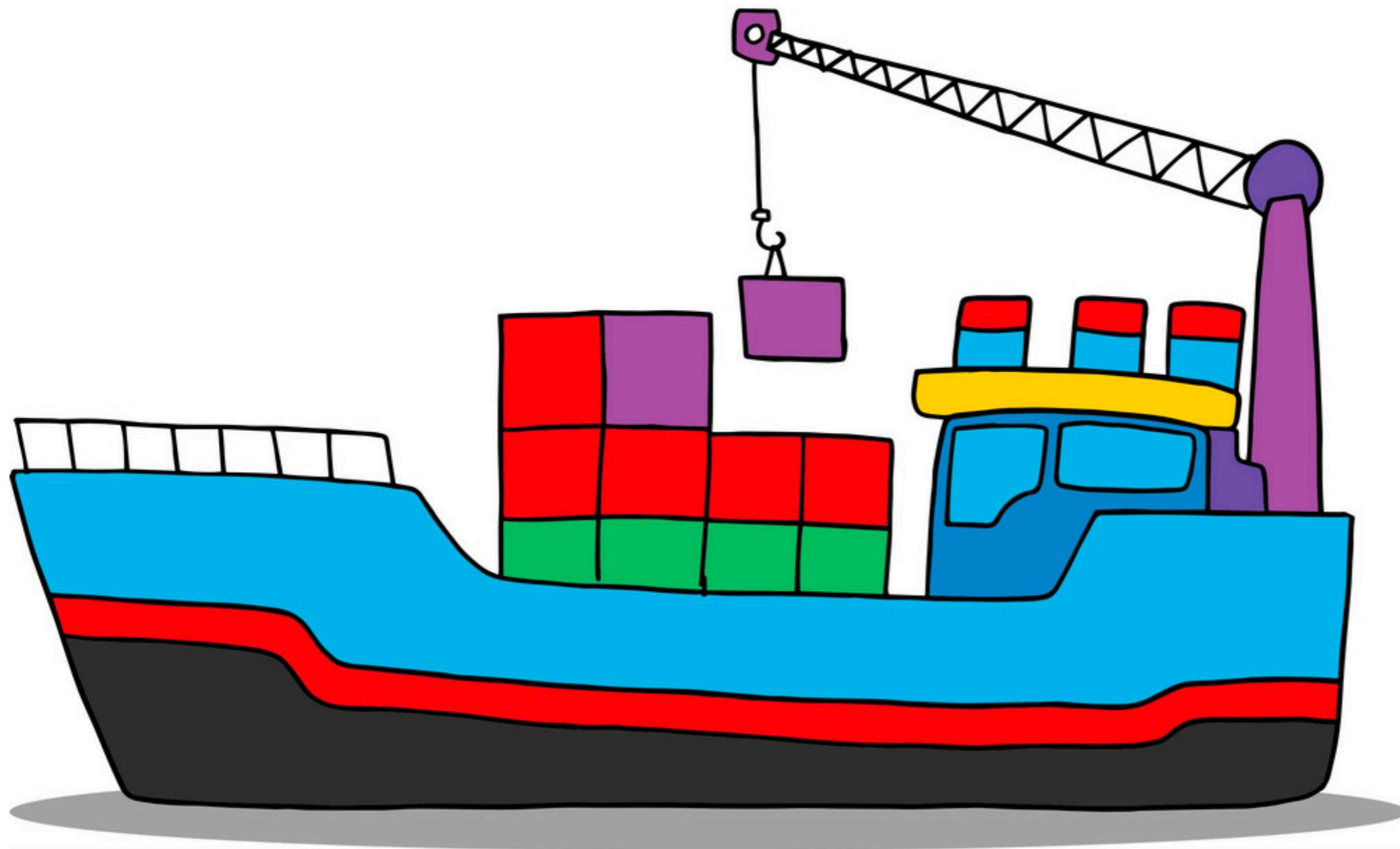
# Container Era



# Container Era



# Container Era



<https://cdn3.vectorstock.com/i/1000x1000/29/37/cartoon-of-container-ship-vector-12882937.jpg>

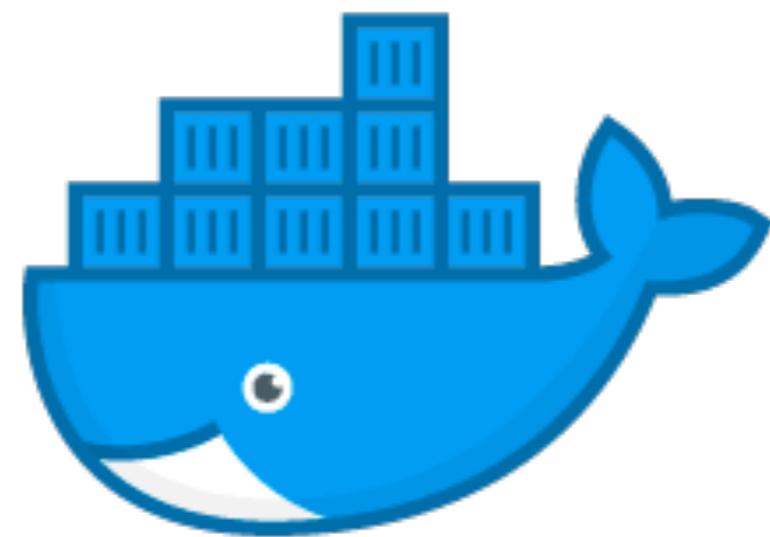


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Container Era



docker

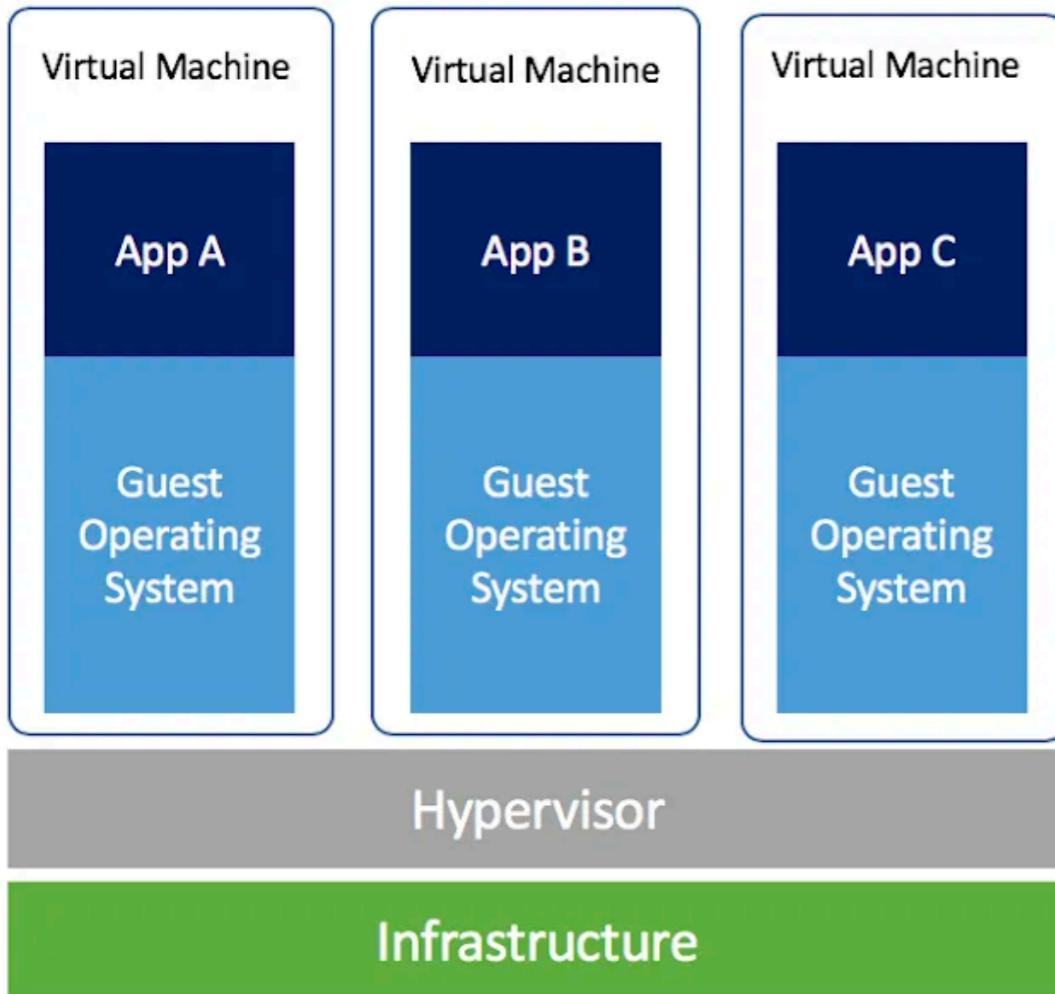


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

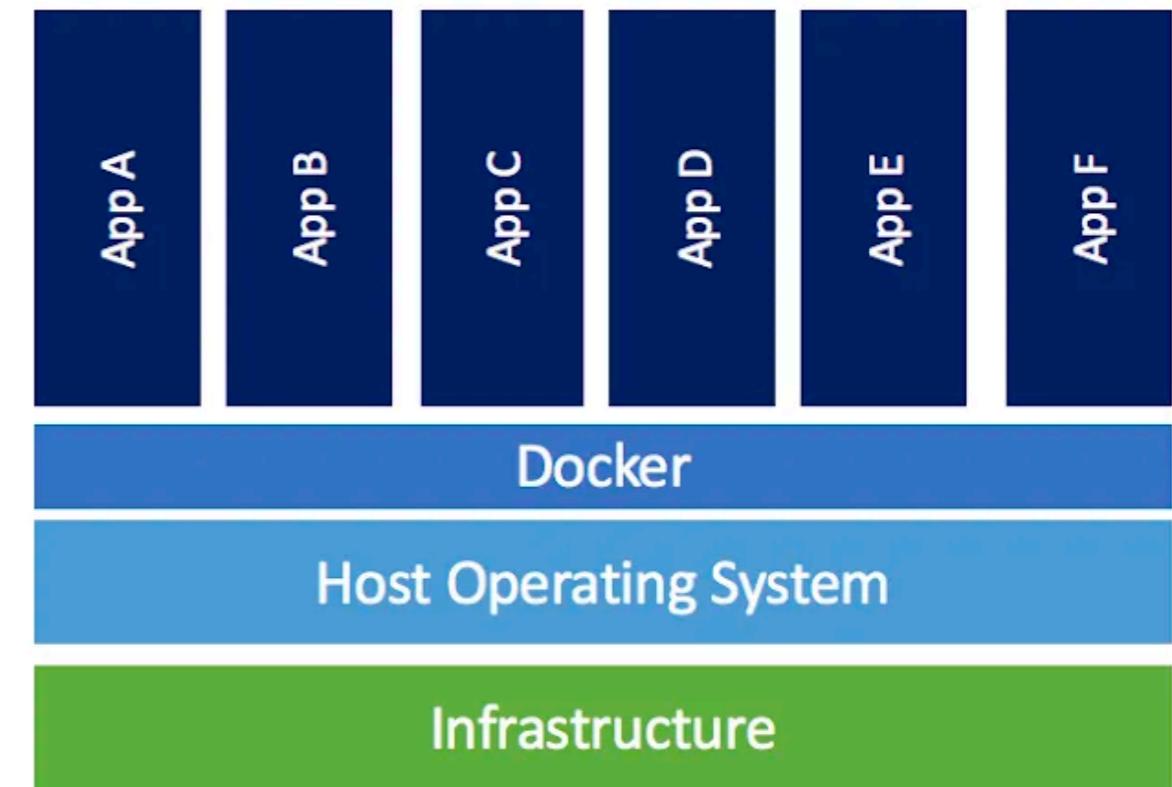
NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Container Era



Containerized Applications



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

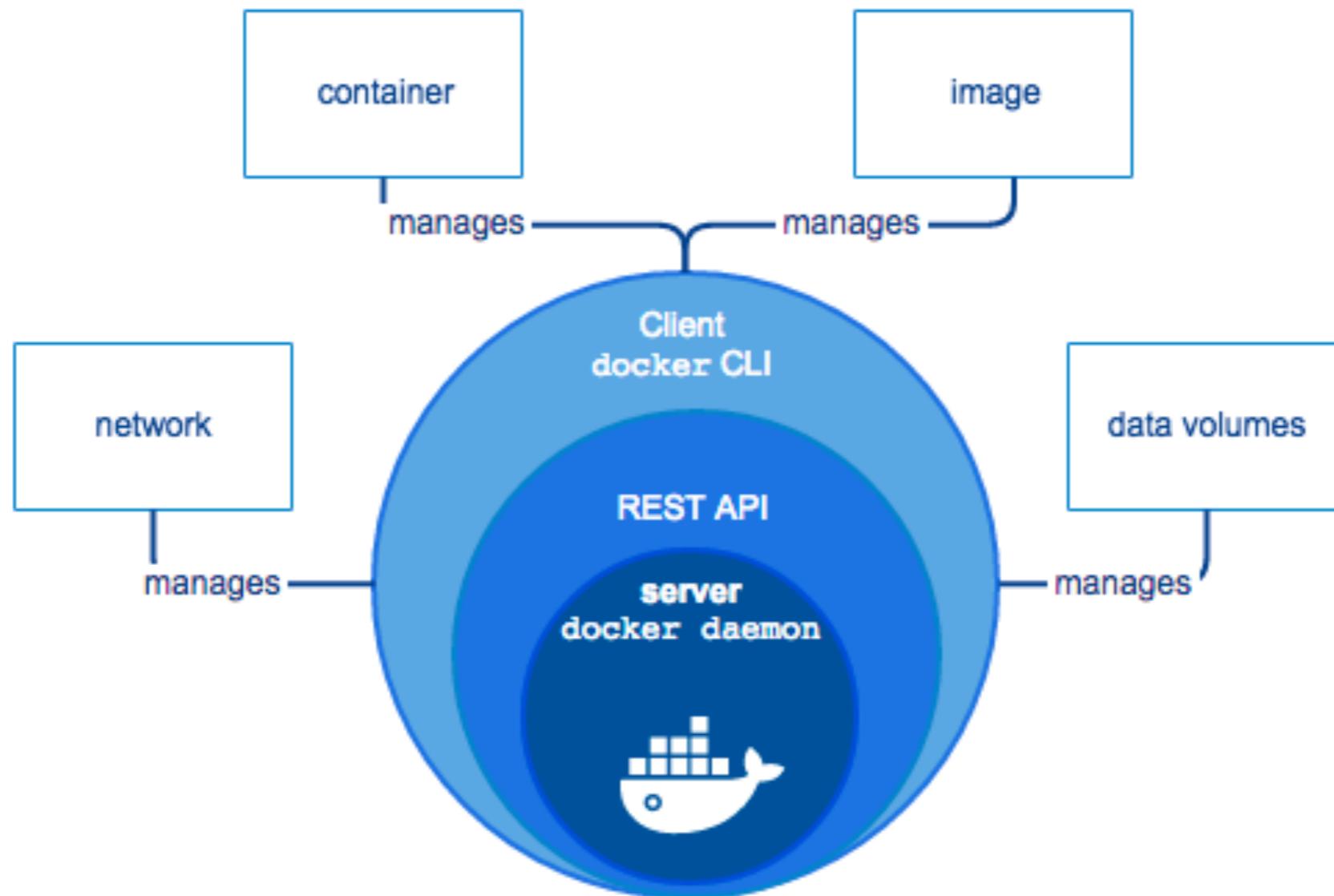
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Concept

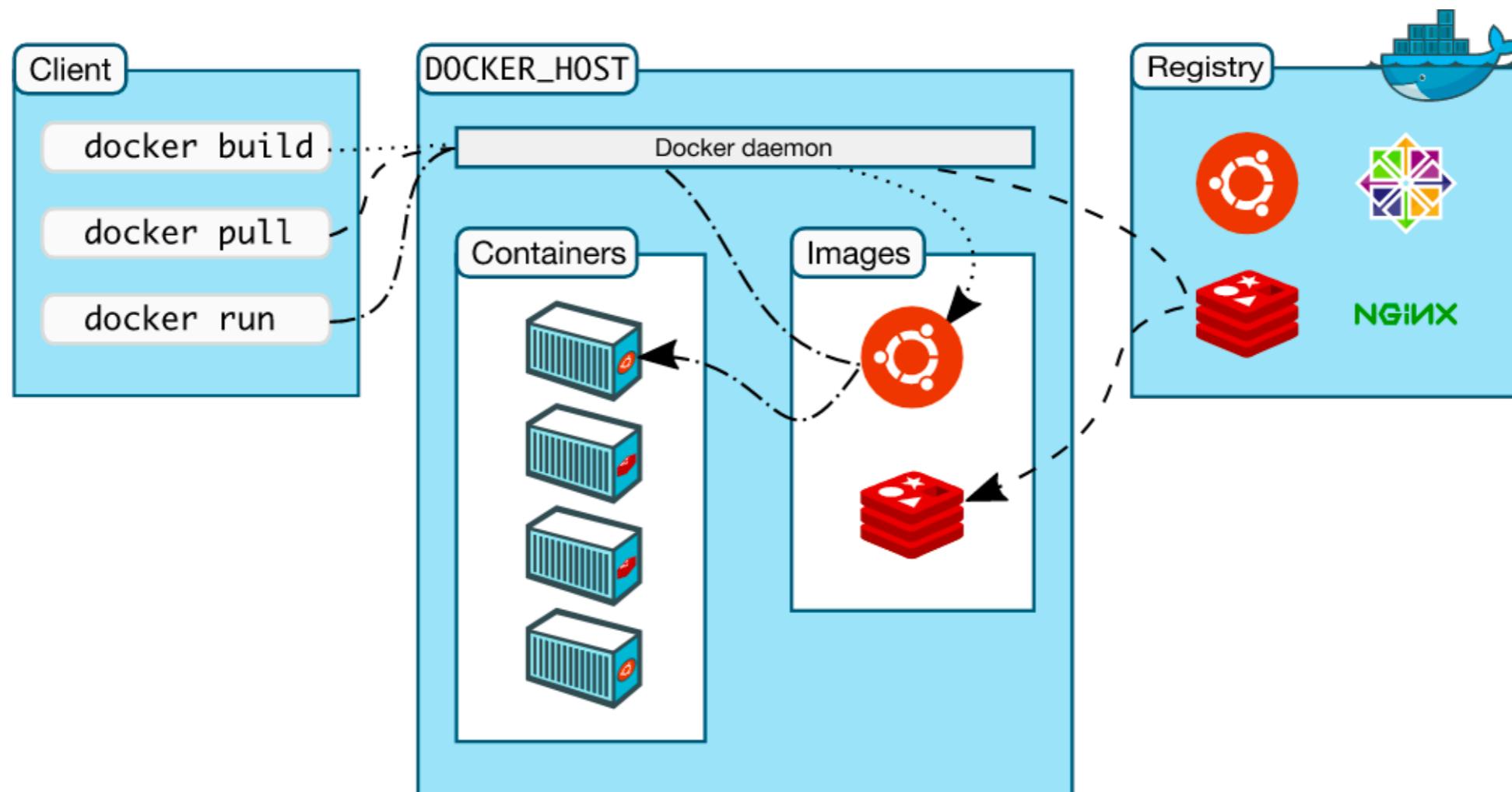


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](#).

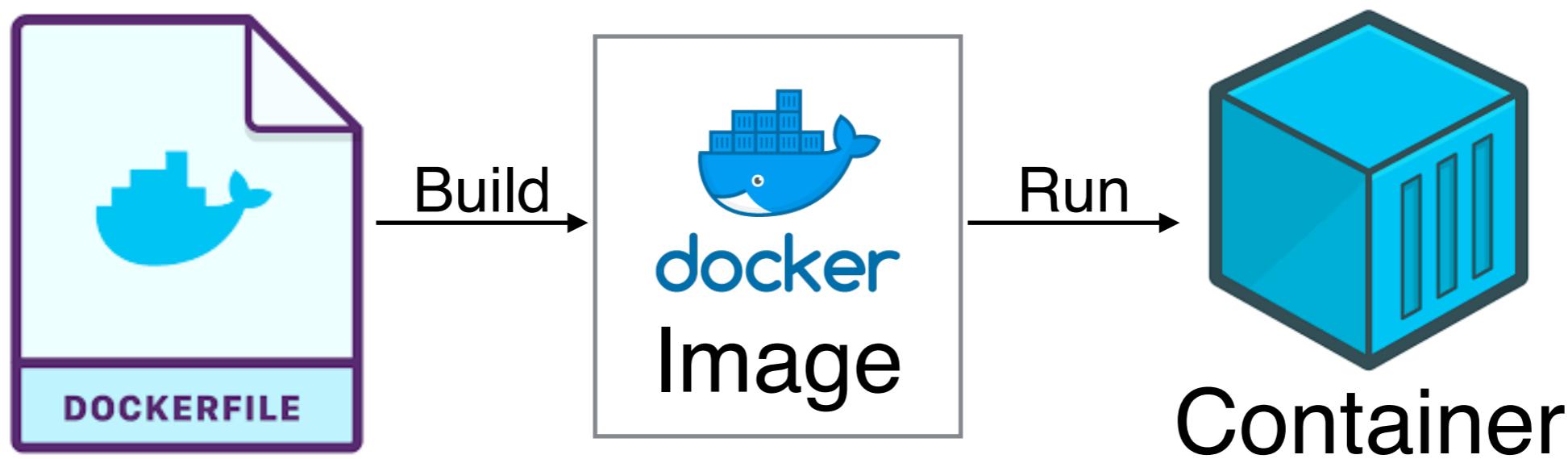
# Docker Engine



# Docker Architecture



# Dockerfile, Image, Container



# Installation



# Installation

For Windows

Windows 10 64-bit: Pro, Enterprise

Hyper-V and Containers Windows features must be enabled

RAM: 4 GB+

<https://docs.docker.com/docker-for-windows/install/>

For Mac

MacBook 2010+

macOS 10.13+

RAM: 4 GB+

<https://docs.docker.com/docker-for-mac/install/>



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

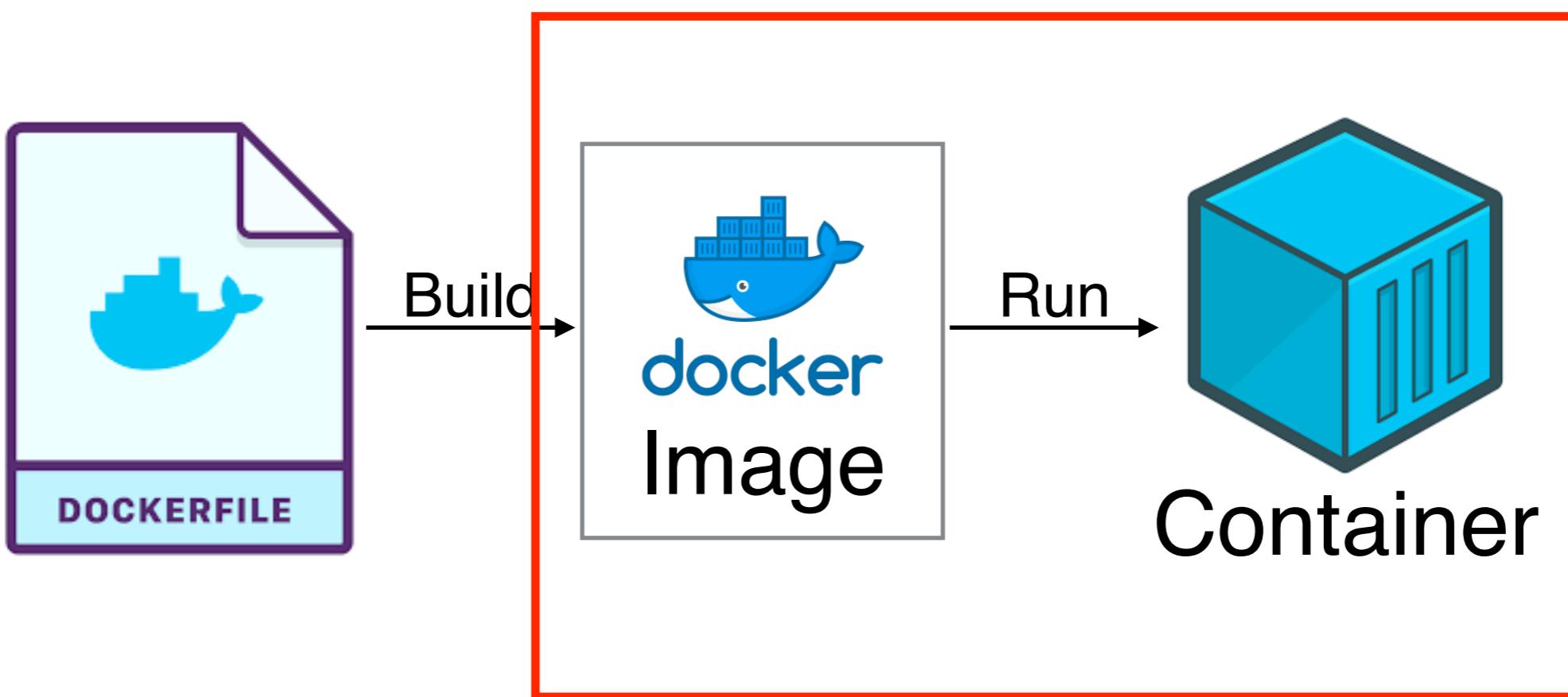
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Run your first container



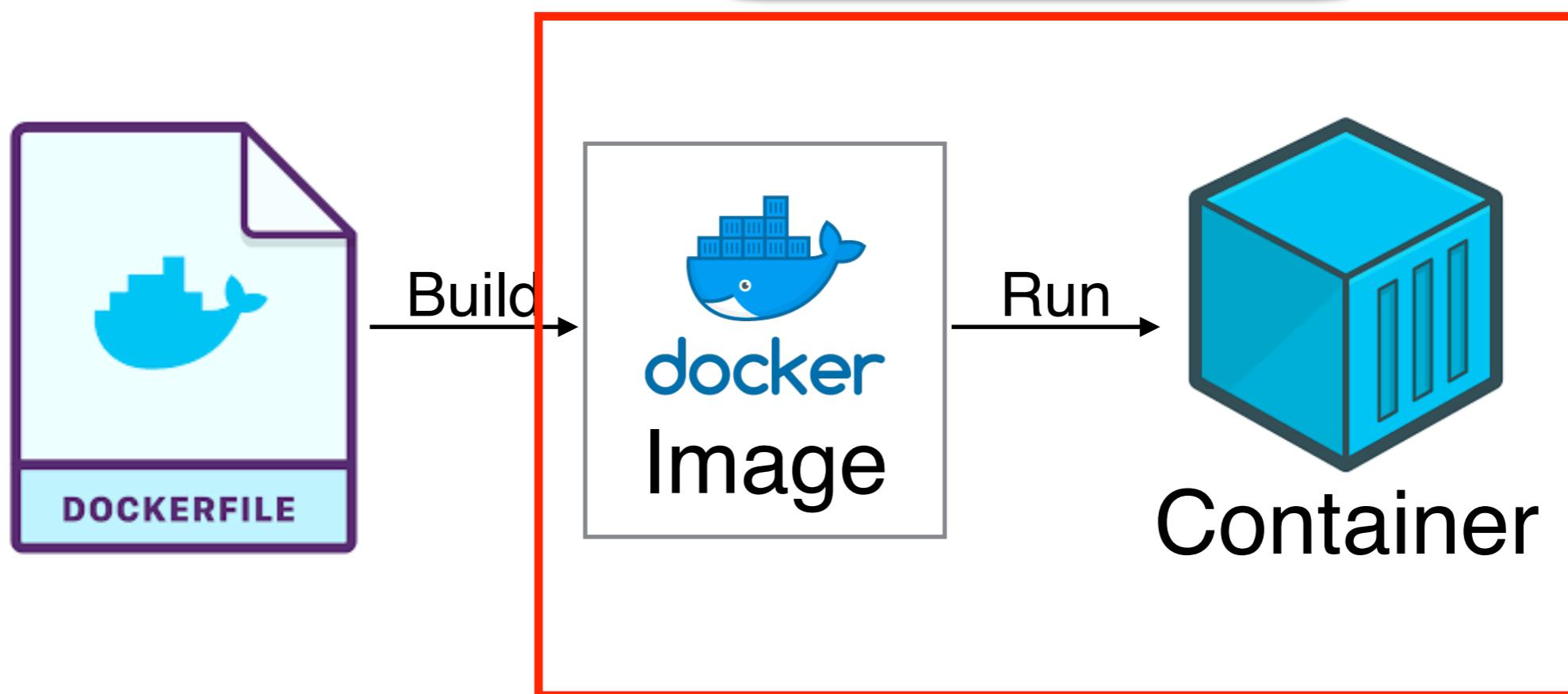
Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](#).

# Run First Container



# Run First Container

```
$ docker run
```



# First of any new technology



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
**NonCommercial** — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# First of any new technology

Hello World



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World

```
$ docker run hello-world
```



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World



# Hello World

Image name



```
$ docker run hello-world  
// alternative  
$ docker container run hello-world
```



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World

```
$ docker run hello-world
```

```
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
0e03bdcc26d7: Pull complete
Digest: sha256:8e3114318a995a1ee497790535e7b88365222a21771ae7e53687ad76563e8e76
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/>



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World

```
$ docker run hello-world
```

```
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
0e03bdcc26d7: Pull complete
Digest: sha256:8e3114318a995a1ee497790535e7b88365222a21771ae7e53687ad76563e8e76
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/>

1. Pull Image

2. Run Container



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World

\$ docker run hello-world

```
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
0e03bdcc26d7: Pull complete
Digest: sha256:8e3114318a995a1ee497790535e7b88365222a21771ae7e53687ad76563e8e76
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/>

1. Pull Image

2. Run Container



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World (Continue)

```
$ docker run hello-world
```

```
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
0e03bdcc26d7: Pull complete
Digest: sha256:8e3114318a995a1ee497790535e7b88365222a21771ae7e53687ad76563e8e76
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/>



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World (Continue)

```
$ docker run -it ubuntu bash
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World (Continue)

Specific command

```
$ docker run -it ubuntu bash
```

-i - interactive mode

-t - tty (input, output to device screen)



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Hello World (Continue)

```
$ docker run -it ubuntu bash
```

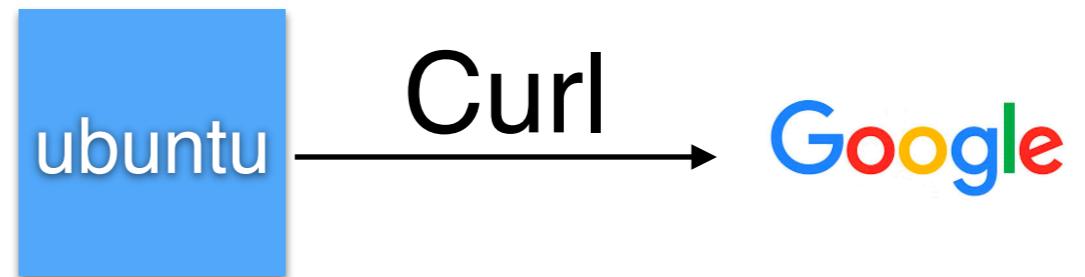
```
root@7dc14327463d:/#
```



# Hello World (Continue)

```
$ docker run -it ubuntu bash
```

```
root@7dc14327463d:/#
```

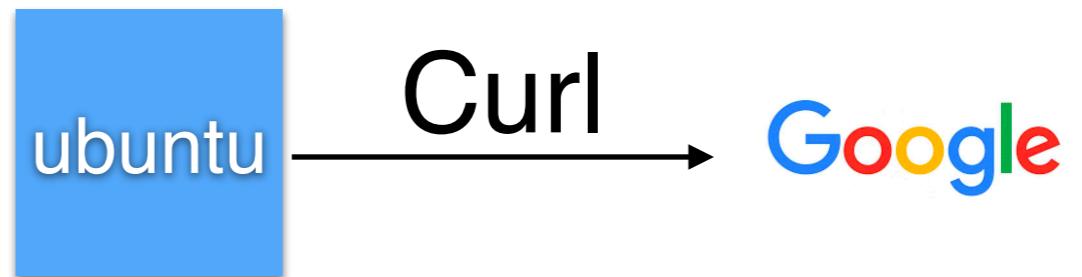


# Hello World (Continue)

```
$ docker run -it ubuntu bash
```

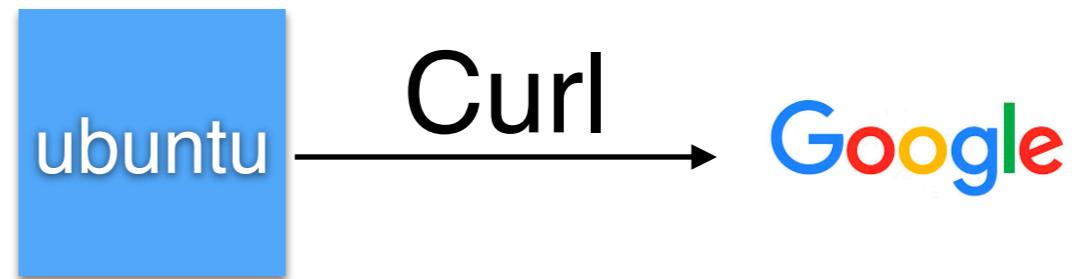
```
root@7dc14327463d:/# apt-get update
```

```
root@7dc14327463d:/# apt-get install curl -y
```



# Hello World (Continue)

```
root@7dc14327463d:/# curl http://www.google.co.th
```



# Hello World (Continue)

```
root@7dc14327463d:/# exit  
// alternative
```

CTRL

D



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Start another one

```
$ docker run -it ubuntu bash
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Why?

```
$ docker run -it ubuntu bash
```

```
root@36add31ad99c:/# curl http://www.google.com  
bash: curl: command not found
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Why?

## New one

```
$ docker run -it ubuntu bash
```

```
root@36add31ad99c:/#
```

## Old one

```
$ docker run -it ubuntu bash
```

```
root@7dc14327463d:/#
```



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Why?

## New one

```
$ docker run -it ubuntu bash
```

```
root@36add31ad99c:/#
```

## Old one

```
$ docker run -it ubuntu bash
```

```
root@7dc14327463d:/#
```



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Why?

## New one

```
$ docker run -it ubuntu bash
```

```
root@36add31ad99c:/#
```

## Old one

```
$ docker run -it ubuntu bash
```

```
root@7dc14327463d:/#
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# It's Container



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Pet vs Cattle



VS



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Pet Scale Up



VS



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Pet Scale Up



VS



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Cattle Scale Out



VS



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

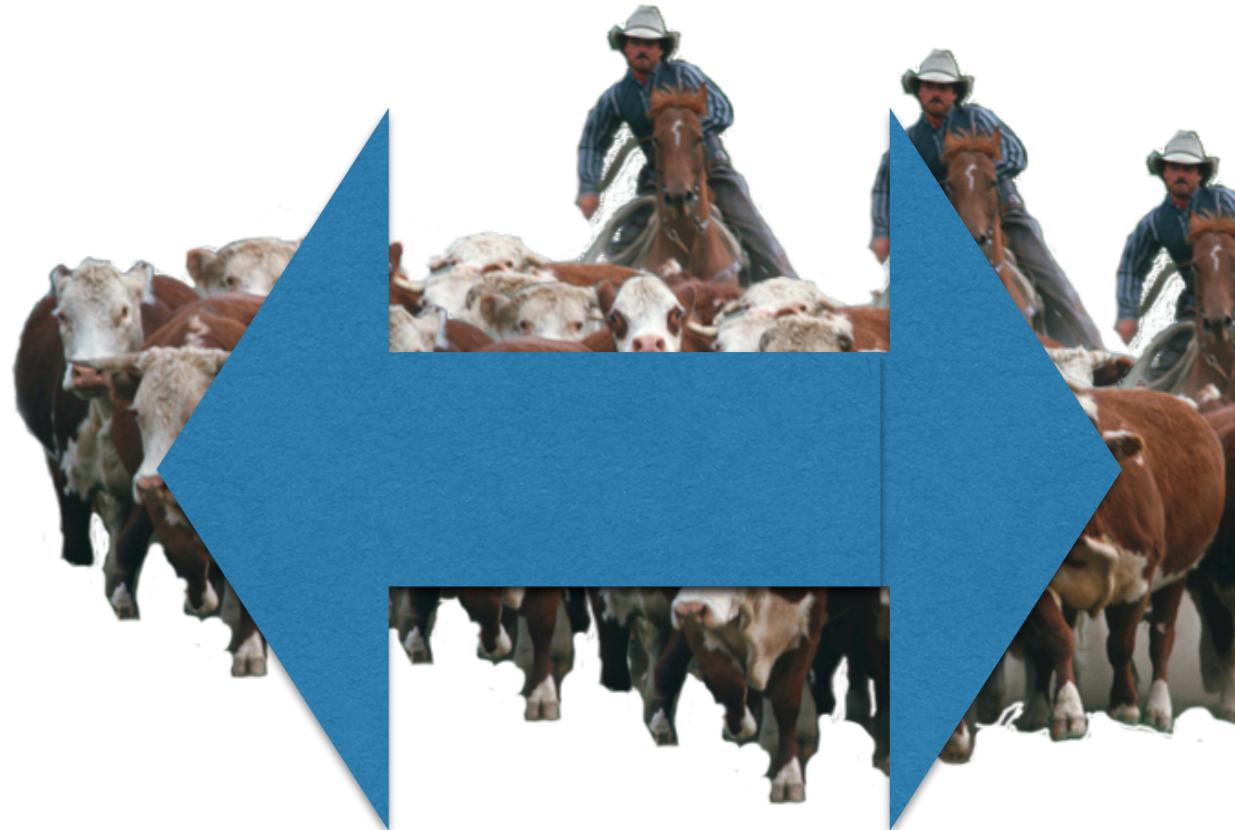
NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Cattle Scale Out



VS



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

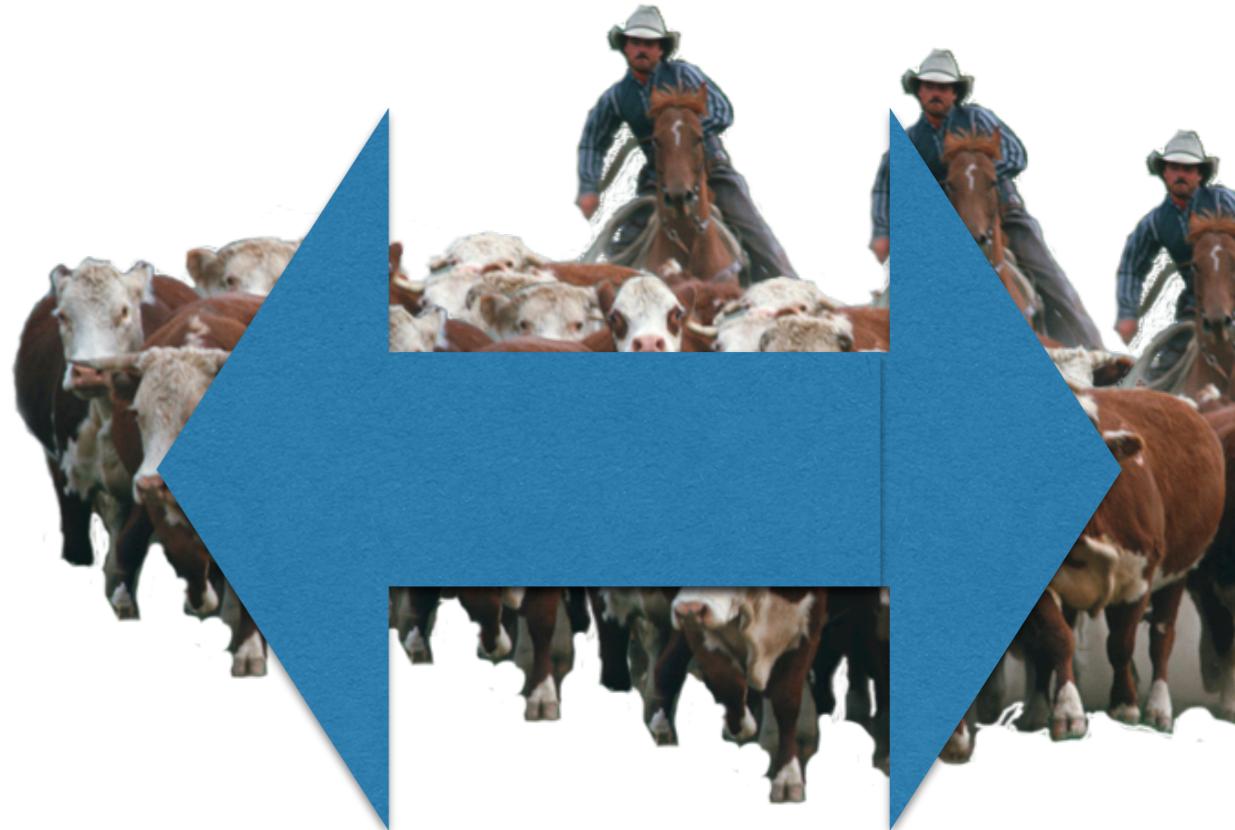
NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Cattle Scale Out



VS



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# If we want ubuntu with curl?



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
**NonCommercial** — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# ubuntu with curl

1. Run container
2. Install software
3. Create new image
4. Share image



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# 1.Run container

```
$ docker run -it ubuntu bash
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

## 2. Install Software

```
$ docker run -it ubuntu bash
```

```
root@7dc14327463d:/# apt-get update
```

```
root@7dc14327463d:/# apt-get install curl -f
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

### 3. Create new image

```
root@7dc14327463d:/# exit  
// alternative
```

CTRL

D



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

### 3. Create new image

```
$ docker container ls -a  
// alternative  
$ docker ps -a
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

### 3. Create new image

List all container

```
$ docker container ls -a
```

// alternative

```
$ docker ps -a
```



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# 3. Create new image

```
$ docker container ls -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
3da779ba145a	ubuntu	"bash"	16 hours ago	Exited (0)	16 hours ago	reverent_mirzakhani
9624d7c7cc16	ubuntu	"bash"	16 hours ago	Exited (127)	16 hours ago	serene_taussig



### 3. Create new image

```
$ docker diff <id>  
// alternative  
$ docker container diff <id>
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# 3. Create new image

Show different that change since container start

```
$ docker diff <id>
```

// alternative

```
$ docker container diff <id>
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

### 3. Create new image

```
$ docker commit <id>  
// alternative  
$ docker container commit <id>
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# 3. Create new image

Commit change from container to new image

```
$ docker commit <id>
```

// alternative

```
$ docker container commit <id>
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# 3. Create new image

## List image

```
$ docker images  
// alternative  
$ docker image ls
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# 3. Create new image

\$ docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
None	none	e0612a51bc6a	3 months ago	13.3kB
hello-world	latest	bf756fb1ae65	3 months ago	13.3kB
Ubuntu	16.04	5e13f8dd4c1a	9 months ago	120MB



# 3. Create new image

## Tag image

```
$ docker tag
```

// alternative

```
$ docker image tag
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

### 3. Create new image

```
$ docker image tag e0612a51bc6a ubuntu-with-curl
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# 3. Create new image

\$ docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
ubuntu-with-curl	latest	e0612a51bc6a	3 months ago	13.3kB
hello-world	latest	bf756fb1ae65	3 months ago	13.3kB
Ubuntu	16.04	5e13f8dd4c1a	9 months ago	120MB

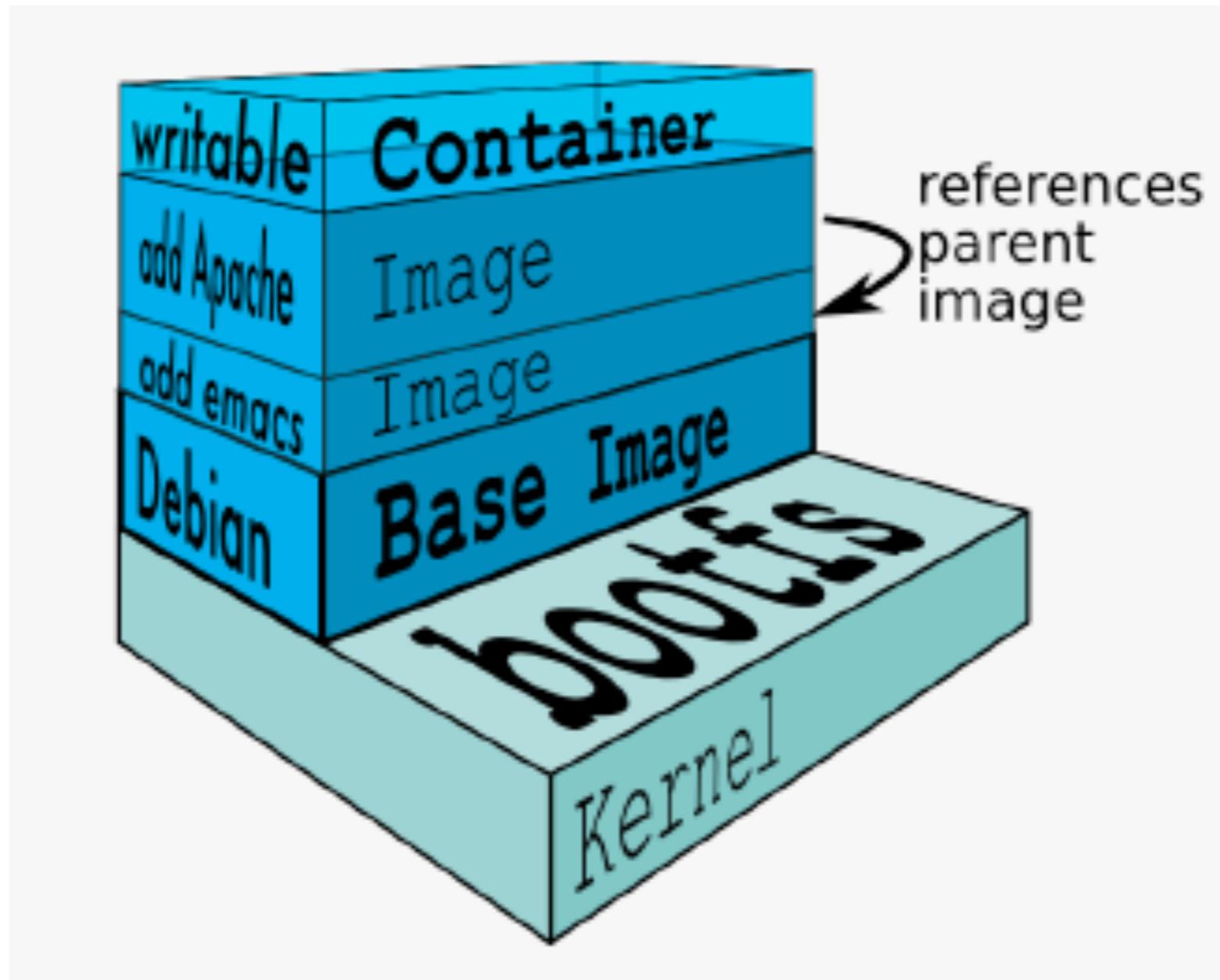


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Docker Image



# Docker Image

```
$ docker images
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Docker Image

```
$ docker images  
// alternative  
$ docker image ls
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Docker Image

\$ docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
hello-world	latest	bf756fb1ae65	3 months ago	13.3kB
Ubuntu	16.04	5e13f8dd4c1a	9 months ago	120MB



# Recap

```
$ docker container ls
```

```
$ docker container run
```

```
$ docker container commit <container-id>
```

```
$ docker image ls
```

```
$ docker image tag <id | image:tag> <new image:tag>
```



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

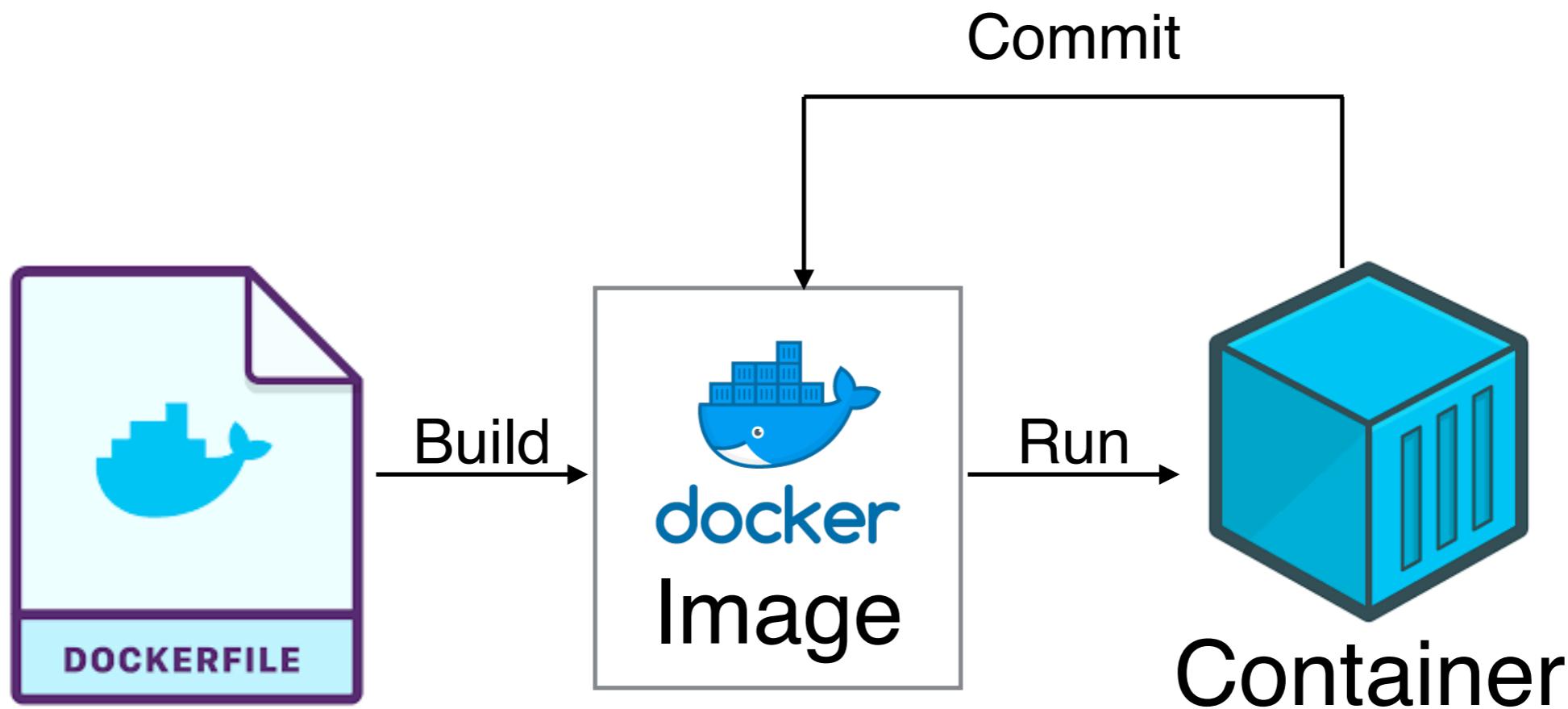
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build your first image

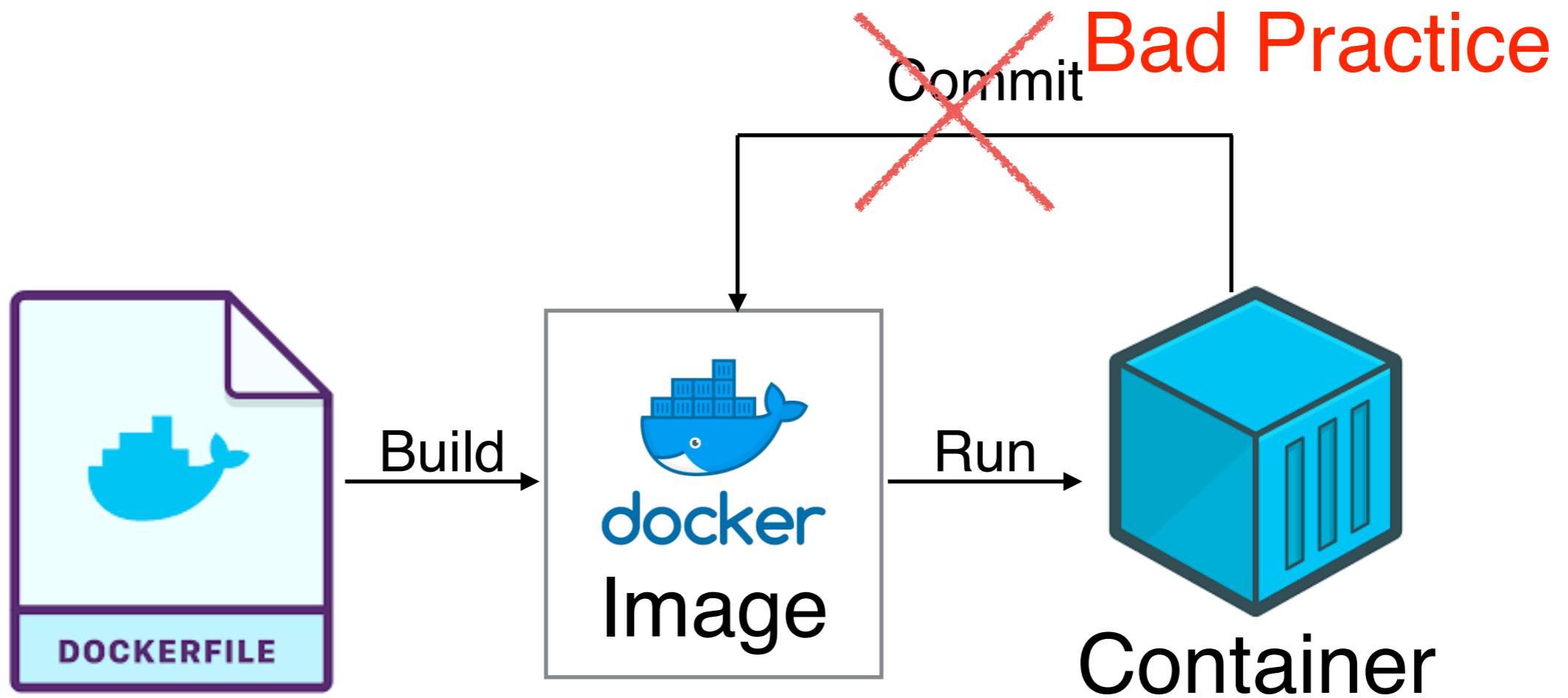


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](#).

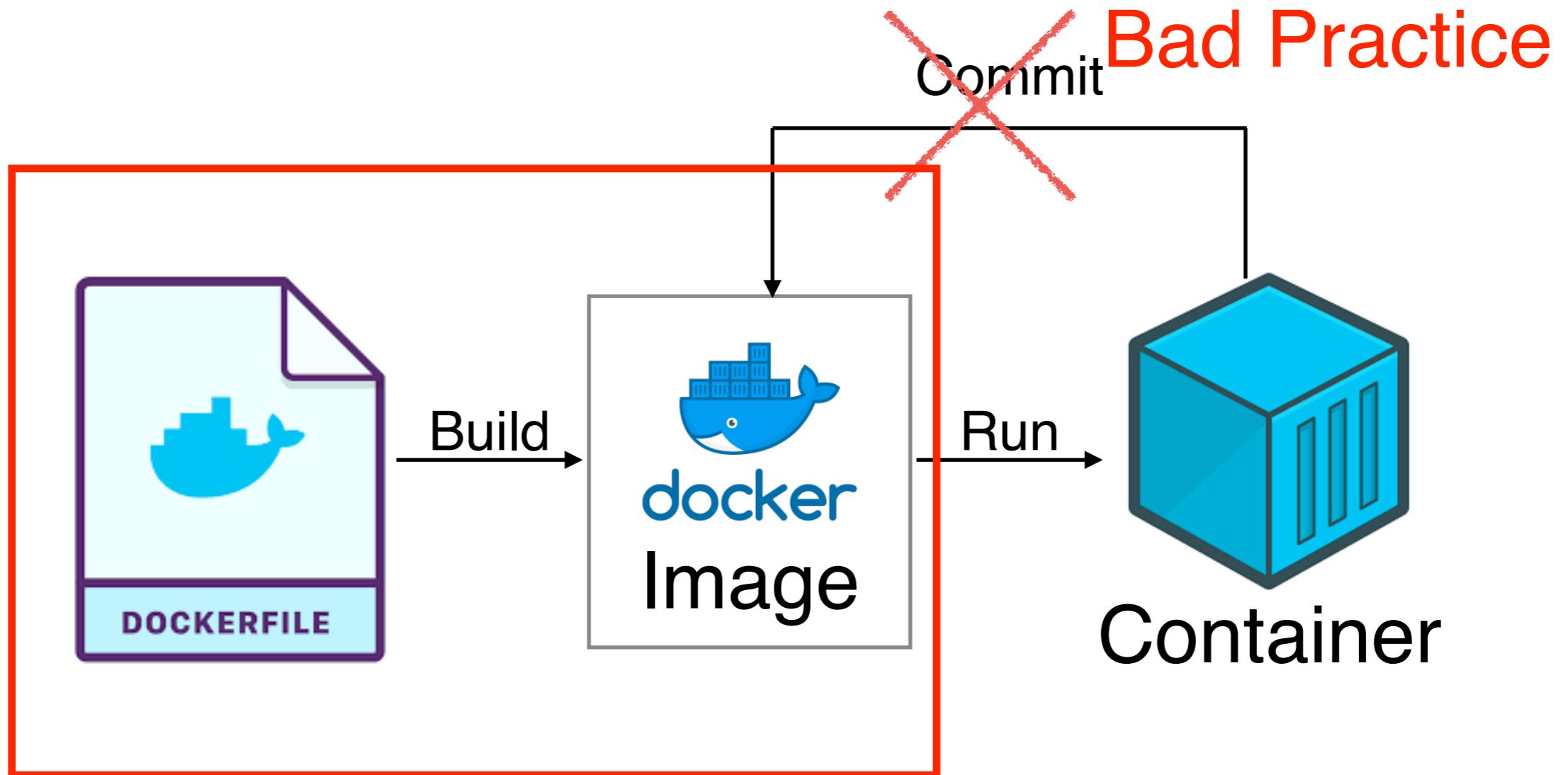
# Build image



# Build image



# Build image



# How to create ubuntu with curl

1. Run container ubuntu
2. Install software curl



# How to create ubuntu with curl

filename: Dockerfile

```
FROM ubuntu
RUN apt-get update
RUN apt-get install curl -y
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build Docker Image

```
$ docker build -t <image-name:tag>  
// alternative  
$ docker image build -t <image-name:tag>
```



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build Docker Image

```
$ docker image build -t first-image .
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build Docker Image

```
$ docker image build -t first-image .
```

Tag name    Context directory



# List Docker Image

```
$ docker image ls
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Try it

```
$ docker container run first-image bash
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Better way

filename: Dockerfile

```
FROM ubuntu
RUN apt-get update && apt-get install curl -y
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a website

<http://localhost:8080>

Hello World



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
**NonCommercial** — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a website



1. We need web server
2. We copy html to server
3. Running on port 8080



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a website



Nginx

1. We need **web server**
2. We copy html to server
3. Running on port 8080



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Docker hub nginx official

The screenshot shows the Docker Hub interface for the official Nginx repository. At the top, there's a header with a lock icon, the URL 'hub.docker.com/\_/nginx', a two-factor authentication notice, and navigation links for 'Explore', 'Pricing', 'Sign In', and 'Sign Up'. Below the header, the breadcrumb navigation shows 'Explore > nginx'. The main content area features the NGINX logo, the repository name 'nginx ★', and the status 'Docker Official Images'. It describes the image as an 'Official build of Nginx.' Below this, there's a download count of '1B+' and a list of supported architectures: Container, Linux, 386, IBM Z, x86-64, ARM, PowerPC 64 LE, ARM 64, Application Infrastructure, and Official Image. On the right side, a specific tag 'Linux - ARM 64 ( latest )' is highlighted with a copy-to-clipboard button and a command line pull instruction ('docker pull nginx'). A link to 'View Available Tags' is also present. At the bottom of the page, there's a section titled 'Supported tags and respective Dockerfile links' containing a list of tags: 1.17.10, mainline, 1, 1.17, latest, 1.17.10-perl, mainline-perl, 1-perl, 1.17-perl, perl, 1.17.10-alpine, mainline-alpine, 1-alpine, 1.17-alpine, alpine, 1.17.10-alpine-perl, mainline-alpine-perl, 1-alpine-perl, 1.17-alpine-perl, alpine-perl, 1.18.0, stable, 1.18, 1.18.0-perl, stable-perl, 1.18-perl.



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Add html file to image

filename: Dockerfile

```
FROM nginx
```



# We need a website



1. We need web server
2. We copy html to server
3. Running on port 8080



# Add html file to image

filename: Dockerfile

```
FROM nginx
COPY index.html /usr/share/nginx/html
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build Docker Image

```
$ docker image build -t hello-world-web .
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Run Web server

```
$ docker container run hello-world-web
```

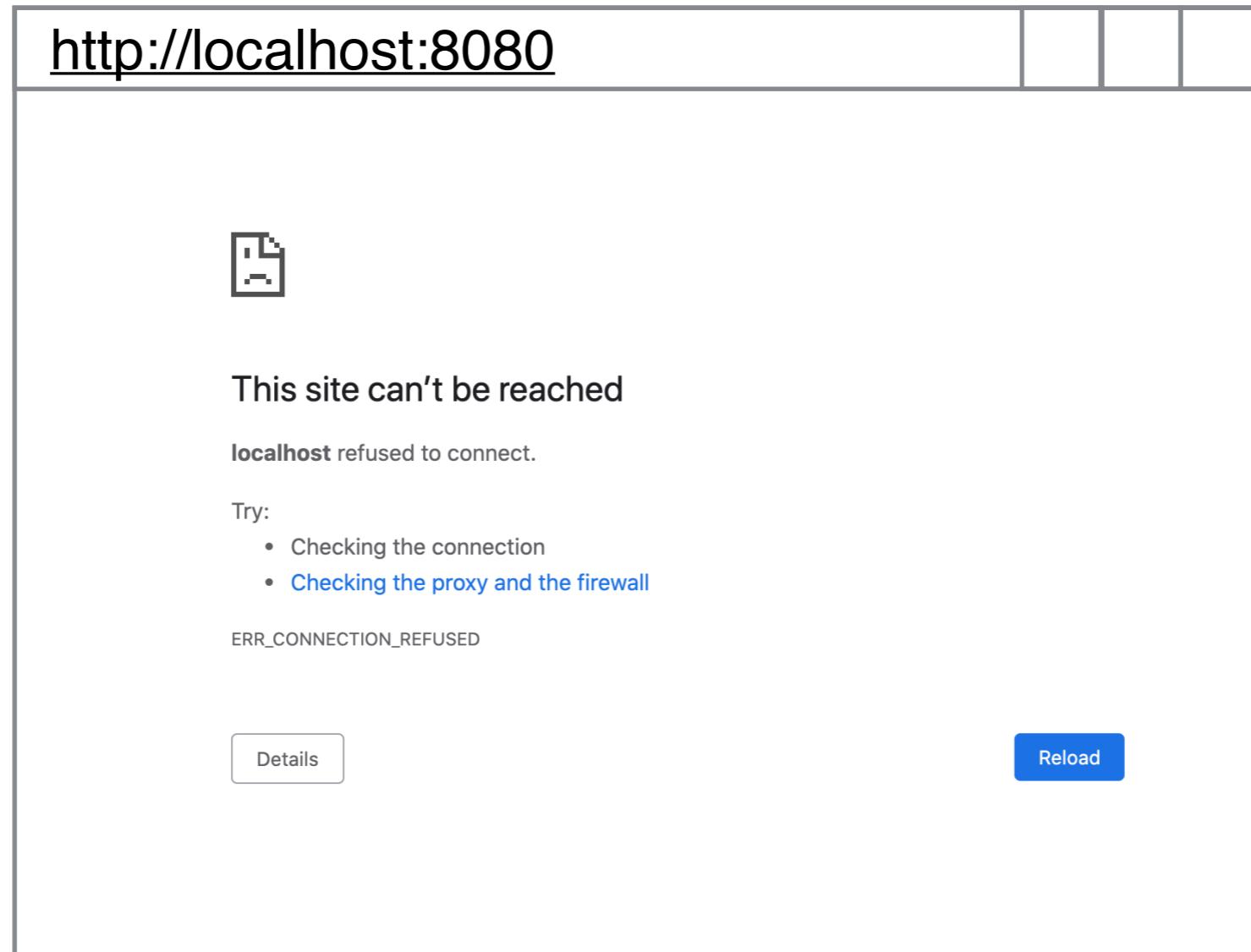


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

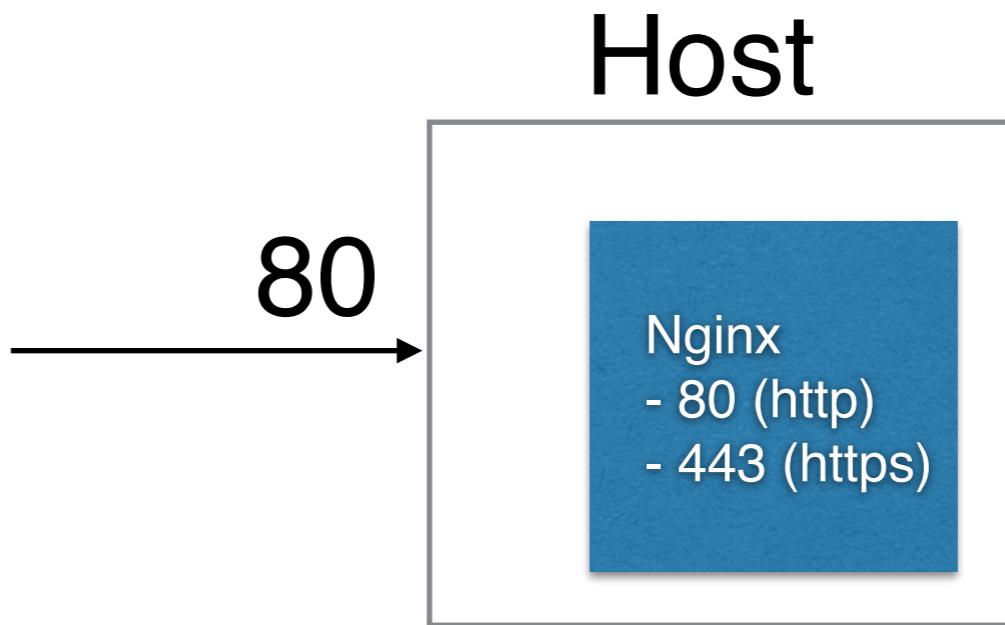
# We need a website



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

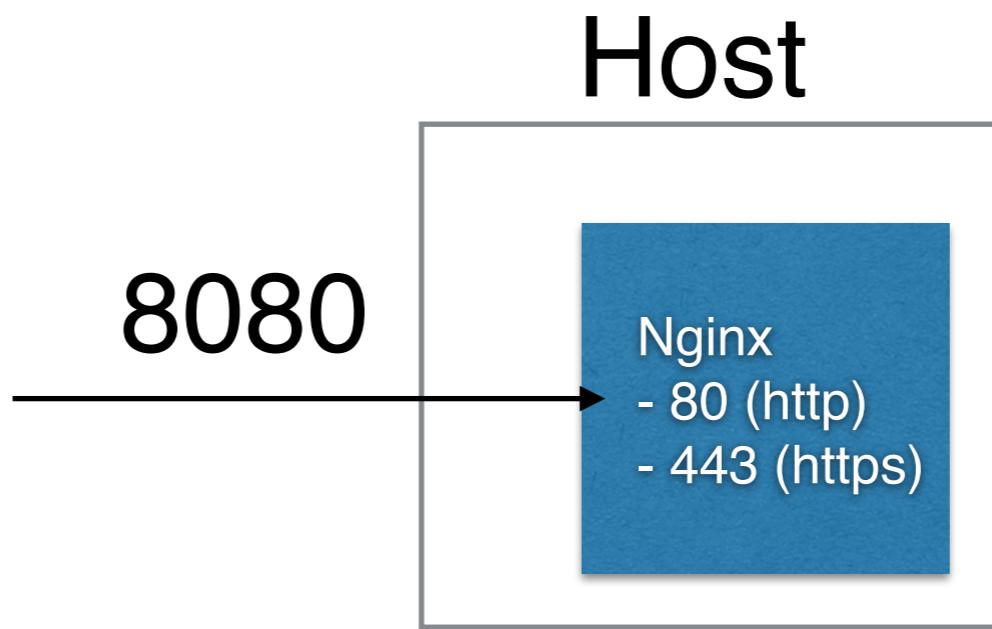
# Run Web server

```
$ docker container run hello-world-web
```



# Run Web server

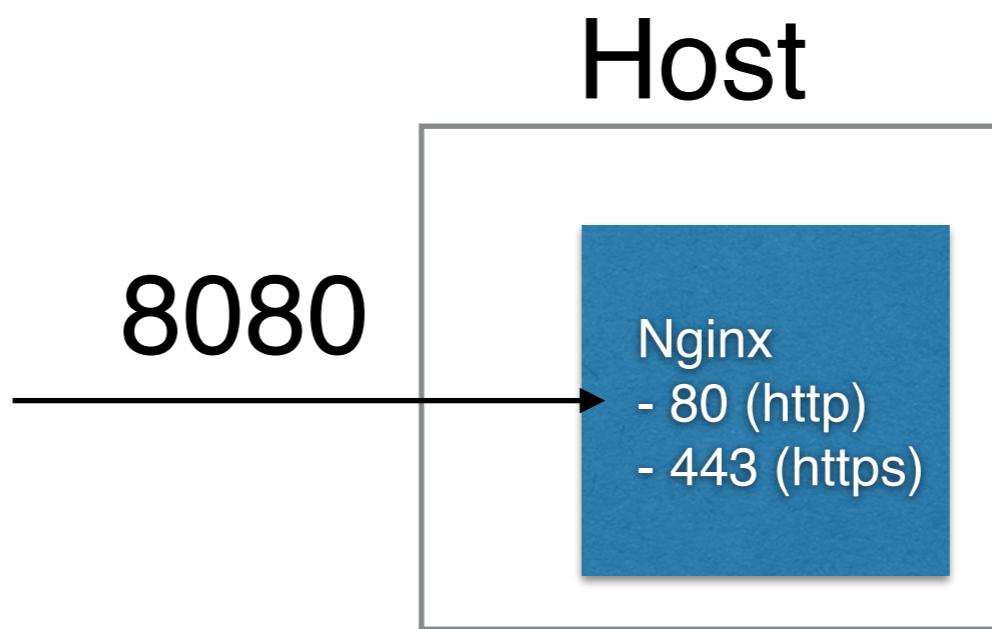
```
$ docker container run -p 8080:80 hello-world-web
```



# Run Web server

Host port: container port

```
$ docker container run -p 8080:80 hello-world-web
```



# Boom!

<http://localhost:8080>

Hello World



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Foreground and Background

## Foreground

```
$ docker container run -p 8080:80 hello-world-web
```

## Interactive Foreground

```
$ docker container run -it ubuntu bash
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Foreground and Background

## Background

```
$ docker container run -d -p 8080:80 hello-world-web
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Foreground and Background

```
$ docker container ls  
$ docker container start <id | name>  
$ docker container stop <id | name>  
$ docker container restart <id | name>
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Foreground and Background

## Container naming

```
$ docker container run -d \  
    -p 8080:80 \  
    --name hello-nginx \  
    hello-world-web
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Foreground and Background

## Container naming

```
$ docker container run -d \  
    -p 8080:80 \  
    --name hello-nginx \  
    hello-world-web
```



# Foreground and Background

Stop container

```
$ docker container stop hello-nginx
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Foreground and Background

Delete container

```
$ docker container rm hello-nginx
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Remove after exit

Remove after exited status

```
$ docker container run -d \  
    -p 8080:80 \  
    --rm \  
    hello-world-web
```

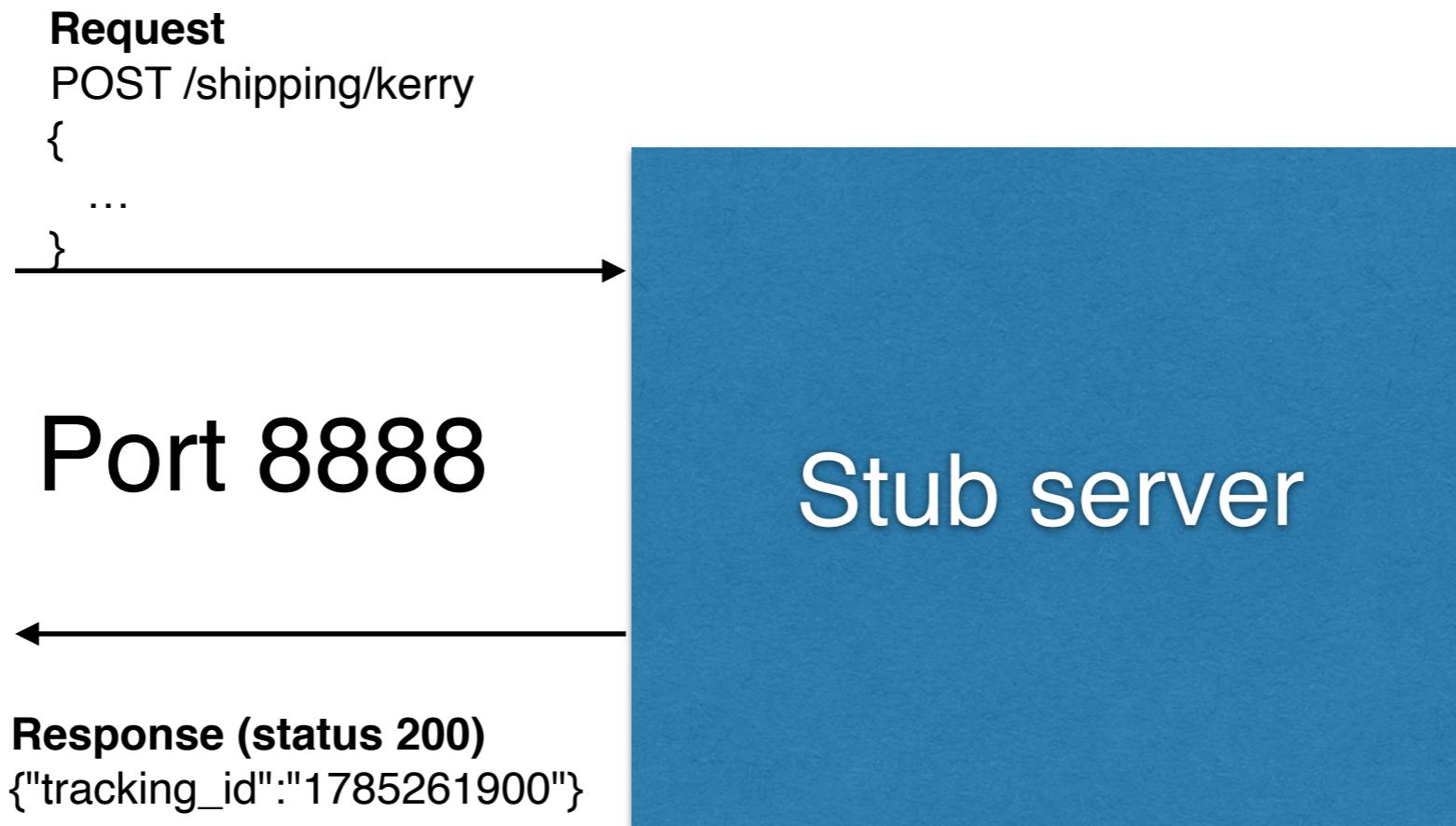


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a stub server



# We need a stub server

Stub server

1. We need stub engine
2. Add Request / Response
3. Run on port 8888



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a stub server

Stub server

1. We need **stub engine**
2. Add Request / Response
3. Run on port 8888



Java JDK8



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a stub server

FROM openjdk:8



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a stub server

```
FROM openjdk:8  
WORKDIR /app
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a stub server

```
FROM openjdk:8  
WORKDIR /app
```

Default directory



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a stub server

```
FROM openjdk:8  
WORKDIR /app  
COPY stubby4j-6.0.2.jar .  
COPY kerry.yml .
```

Jar + stub config



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a stub server

```
FROM openjdk:8  
WORKDIR /app  
COPY stubby4j-6.0.2.jar .  
COPY kerry.yml .  
CMD java -jar stubby4j-6.0.2.jar -l 0.0.0.0 -d kerry.yml
```

Execute command



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build Docker Image

```
$ docker image build -t stub-server .
```



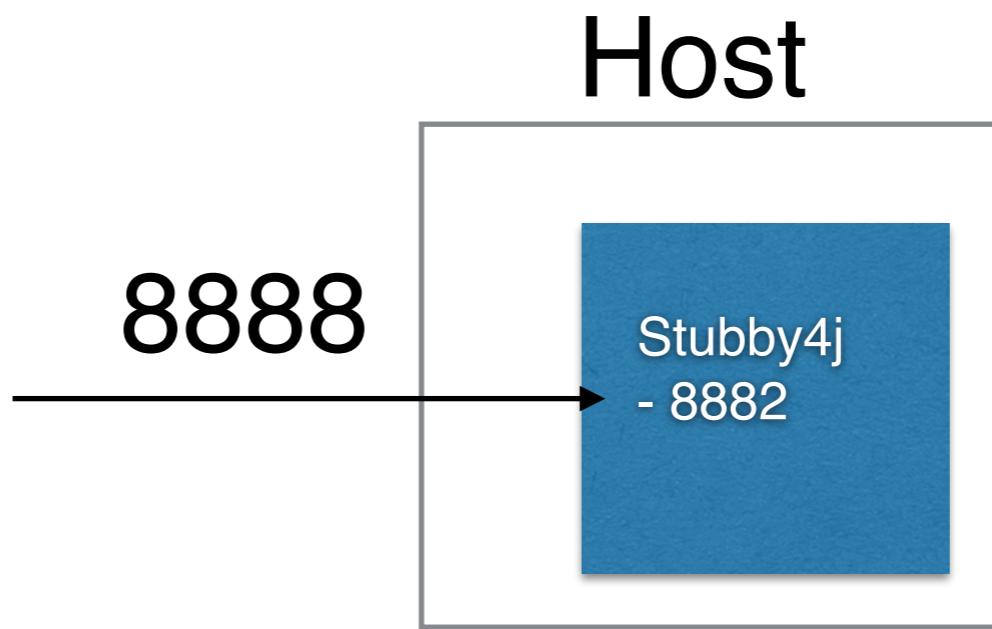
Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

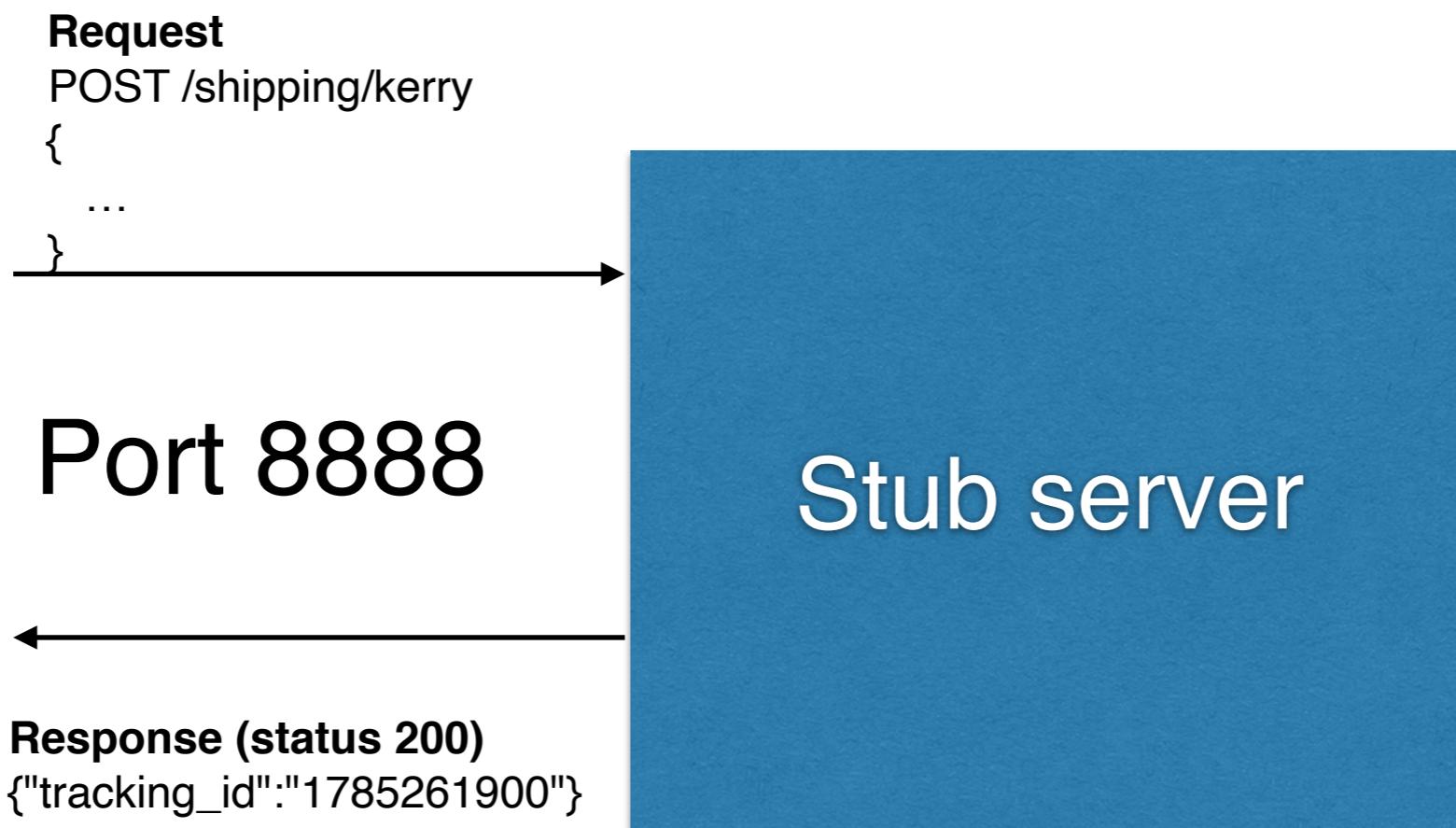
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Run Stub server

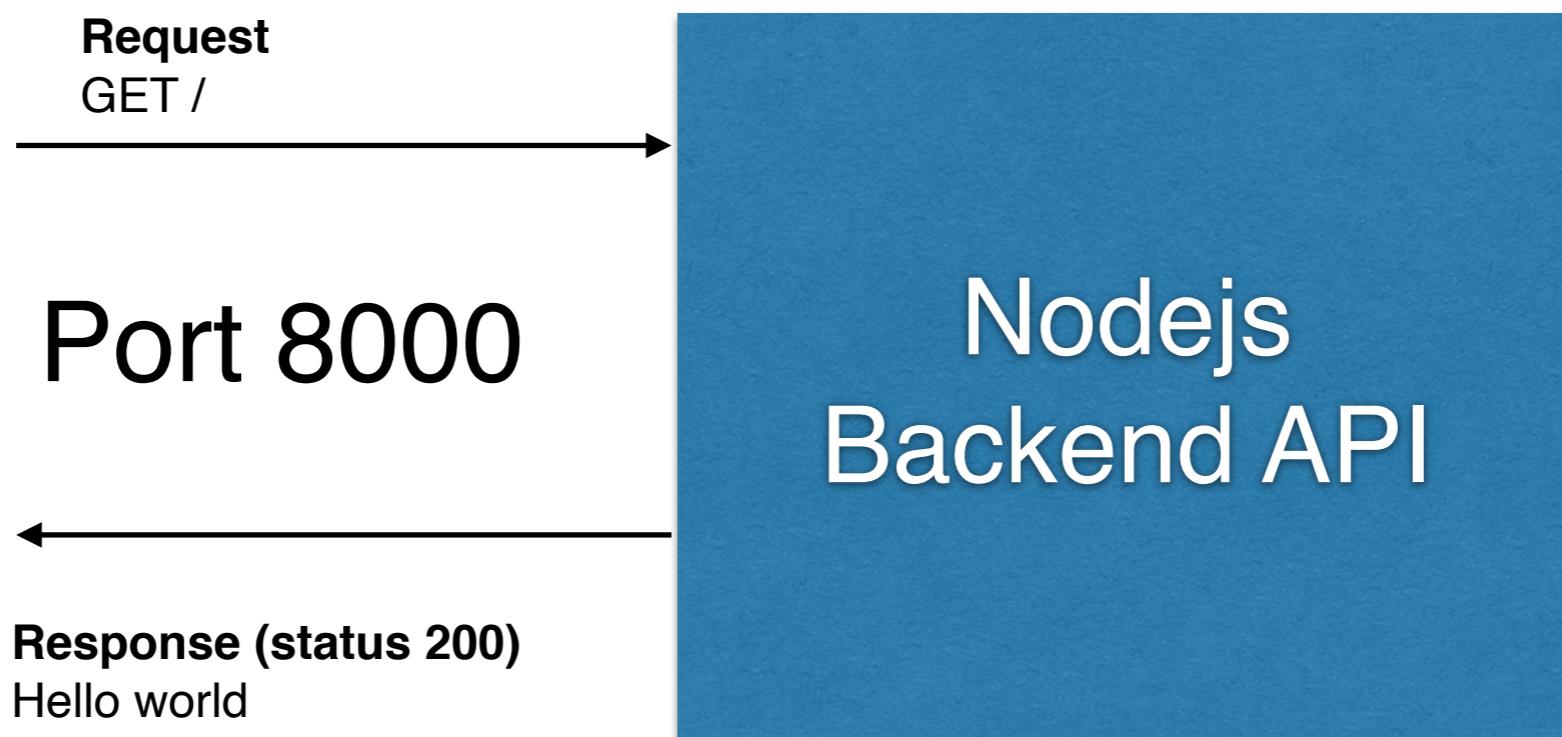
```
$ docker container run -p 8888:8882 stub-server
```



# Try Stub server



# We need a Nodejs Backend API!



# We need a Nodejs Backend API!

Backend API

1. We need Node version 12
2. Install dependency via npm
3. Copy project
4. Execute server at port 8000



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a Nodejs Backend API!

FROM node:12



# We need a Nodejs Backend API!

```
FROM node:12  
WORKDIR /app
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a Nodejs Backend API!

```
FROM node:12
WORKDIR /app
COPY package.json .
COPY package-lock.json .
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a Nodejs Backend API!

```
FROM node:12
WORKDIR /app
COPY package.json .
COPY package-lock.json .
RUN npm install
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a Nodejs Backend API!

```
FROM node:12
WORKDIR /app
COPY package.json .
COPY package-lock.json .
RUN npm install
COPY index.js .
```



# We need a Nodejs Backend API!

```
FROM node:12
WORKDIR /app
COPY package.json .
COPY package-lock.json .
RUN npm install
COPY index.js .
EXPOSE 3000
CMD node index.js
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a Nodejs Backend API!

```
FROM node:12
WORKDIR /app
COPY package.json .
COPY package-lock.json .
RUN npm install
COPY index.js .
EXPOSE 3000
CMD node index.js
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build Docker Image

```
$ docker image build -t node-api .
```



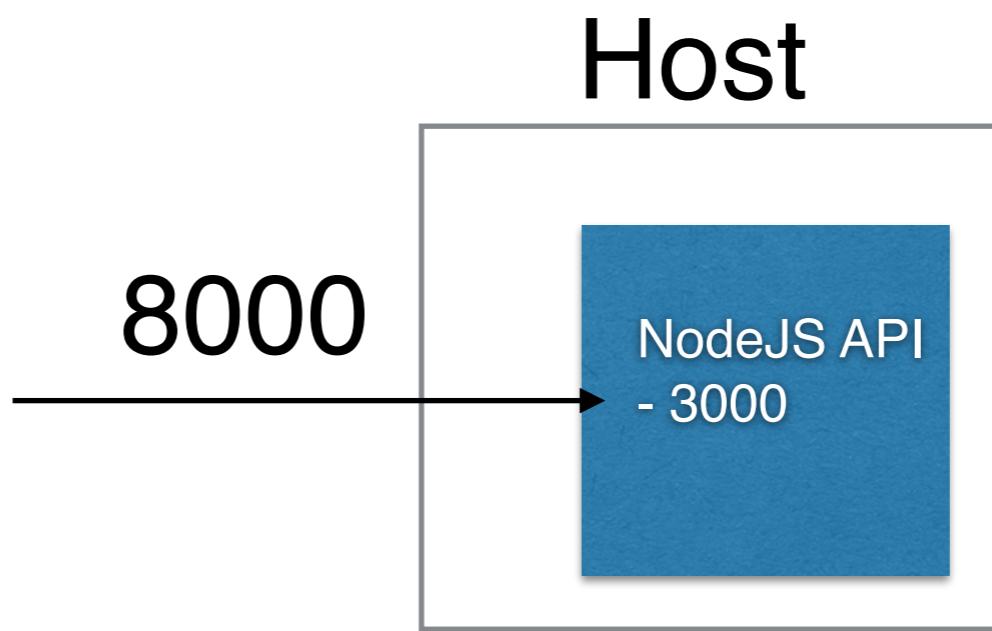
Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

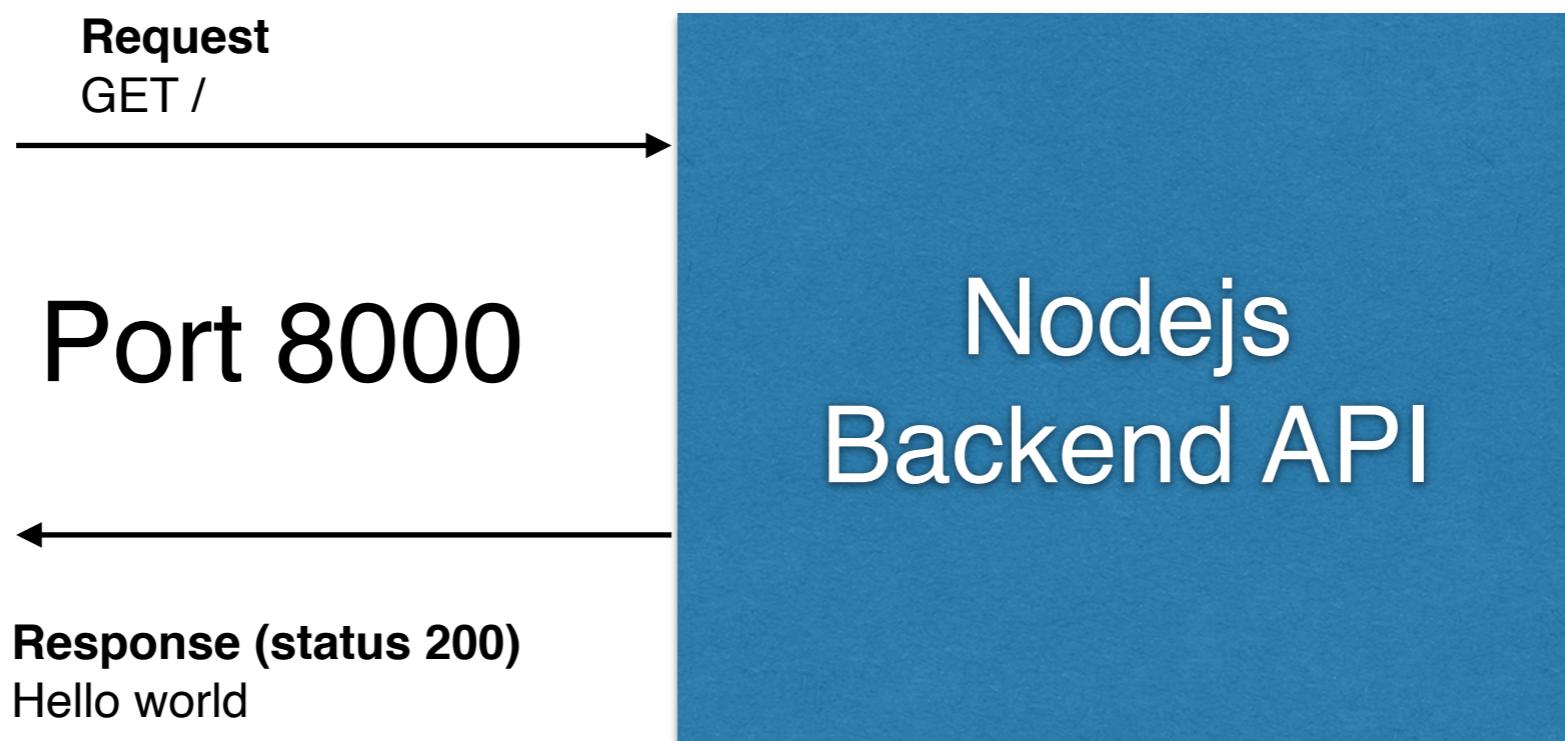
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Run NodeJS API

```
$ docker container run -p 8000:3000 node-api
```



# Try!



# Tips: Use Alpine

```
FROM node:12-alpine
WORKDIR /app
COPY package.json .
COPY package-lock.json .
RUN npm install
COPY index.js .
CMD node index.js
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Tips: Use Alpine

## Alpine Linux

---

From Wikipedia, the free encyclopedia

**Alpine Linux** is a [Linux distribution](#) based on [musl](#) and [BusyBox](#), designed for security, simplicity, and resource efficiency.<sup>[3][4][5][6][7]</sup> It used a [hardened kernel](#) until release 3.8 and compiles all [user-space binaries](#) as [position-independent executables](#) with [stack-smashing protection](#).<sup>[8]</sup>

Because of its small size, it is commonly used in [containers](#) providing quick boot-up times.<sup>[9]</sup>

The [postmarketOS](#) project which is designed to run on mobile devices is based on Alpine Linux.



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Tips: Use Alpine

## Alpine Linux

---

From Wikipedia, the free encyclopedia

**Alpine Linux** is a [Linux distribution](#) based on [musl](#) and [BusyBox](#), designed for security, simplicity, and resource efficiency.<sup>[3][4][5][6][7]</sup> It used a [hardened kernel](#) until release 3.8 and compiles all [user-space binaries](#) as [position-independent executables](#) with [stack-smashing protection](#).<sup>[8]</sup>

Because of its small size, it is commonly used in [containers](#) providing quick boot-up times.<sup>[9]</sup>

The [postmarketOS](#) project which is designed to run on mobile devices is based on Alpine Linux.



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Pull Docker Image

```
$ docker pull node:12-alpine  
// alternative  
$ docker image pull node:12-alpine
```



# Pull Docker image

The screenshot shows the Docker Hub website at [hub.docker.com/\\_/node/](https://hub.docker.com/_/node/). The page displays the Docker Official Images for Node.js. Key elements include:

- node ☆**: The main title and icon.
- Docker Official Images**: A link to the official Docker repository.
- Description**: A brief description stating "Node.js is a JavaScript-based platform for server-side and networking applications."
- Downloads**: 1B+.
- Tags**: Container, Linux, IBM Z, 386, PowerPC 64 LE, x86-64, ARM 64, ARM, Application Infrastructure, Official Image.
- Latest Tag**: Linux - ARM 64 (latest).
- Copy and paste command**: docker pull node
- View Available Tags**: A link to see all available tags.
- Supported tags and Dockerfile links**: A section listing supported tags:
  - 14.0.0-stretch, 14.0-stretch, 14-stretch, stretch, current-stretch, 14.0.0, 14.0, 14, latest, current
  - 14.0.0-stretch-slim, 14.0-stretch-slim, 14-stretch-slim, stretch-slim, current-stretch-slim, 14.0.0-slim, 14.0-slim, 14-slim
  - 14.0.0-buster, 14.0-buster, 14-buster, buster, current-buster
  - 14.0.0-buster-slim, 14.0-buster-slim, 14-buster-slim, buster-slim, current-buster-slim
  - 14.0.0-alpine3.10, 14.0-alpine3.10, 14-alpine3.10, alpine3.10, current-alpine3.10



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Pull Docker Image

```
$ docker image ls
```

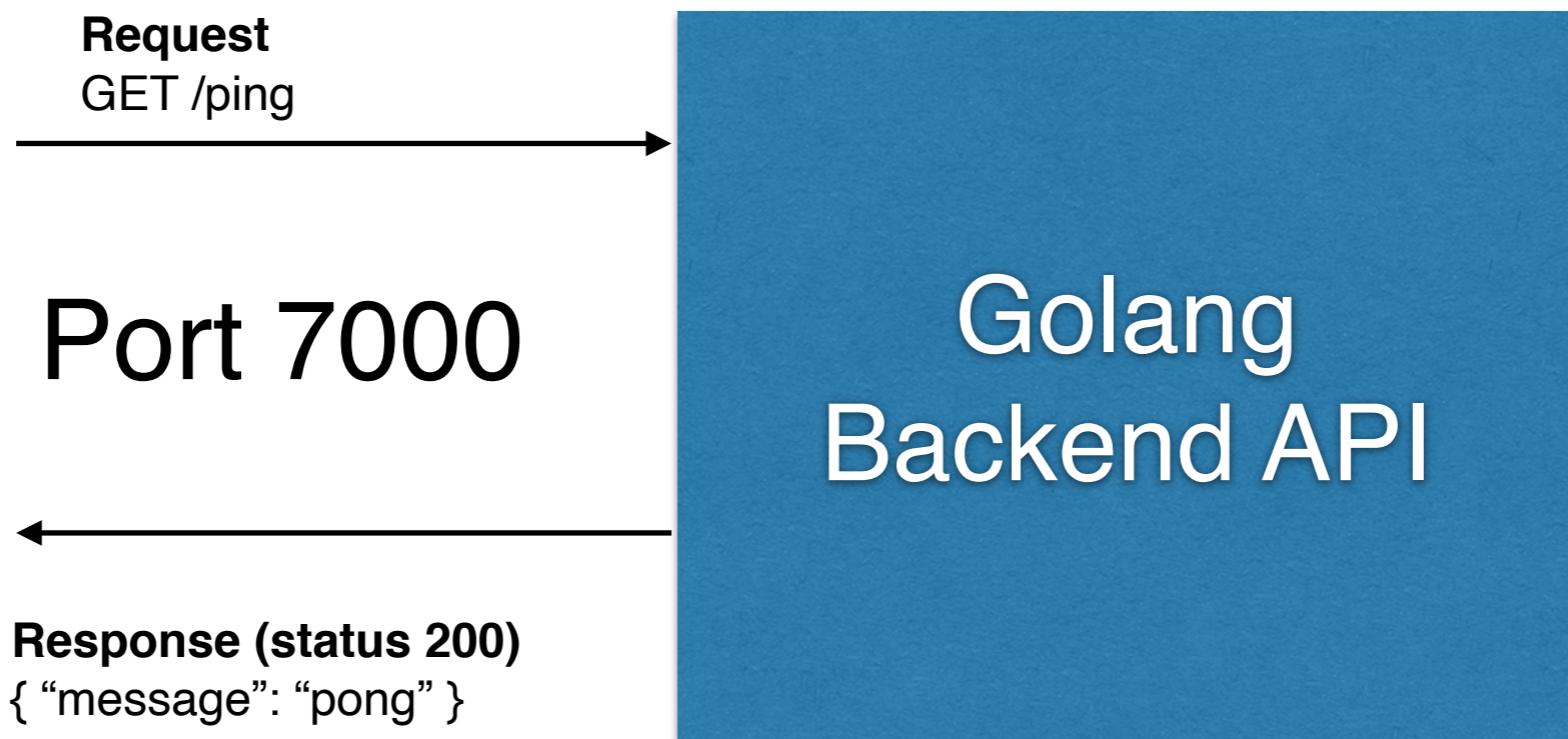


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# We need a Golang Backend API!



# We need a Golang Backend API!

Backend API

1. We need Go version 1.12
2. Install dependency via go mod
3. Copy project
4. Build Binary
5. Execute Binary at port 8080



Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Go version 1.12

```
FROM go:1.12
WORKDIR /app
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Install dependency

```
FROM go:1.12
WORKDIR /app
COPY go.mod .
COPY go.sum .
RUN go mod download
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Copy project

```
FROM go:1.12
WORKDIR /app
COPY go.mod .
COPY go.sum .
RUN go mod download
COPY ..
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build Binary

```
FROM go:1.12
WORKDIR /app
COPY go.mod .
COPY go.sum .
RUN go mod download
COPY ..
RUN go build -o ./bin/app ./main.go
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Execute Binary at port 8080

```
FROM go:1.12
WORKDIR /app
COPY go.mod .
COPY go.sum .
RUN go mod download
COPY ..
RUN go build -o ./bin/app ./main.go
ENV GIN_MODE release
EXPOSE 8080
CMD ./bin/app
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Build Golang pingpong API

```
$ docker build -t pingpong-api .
```



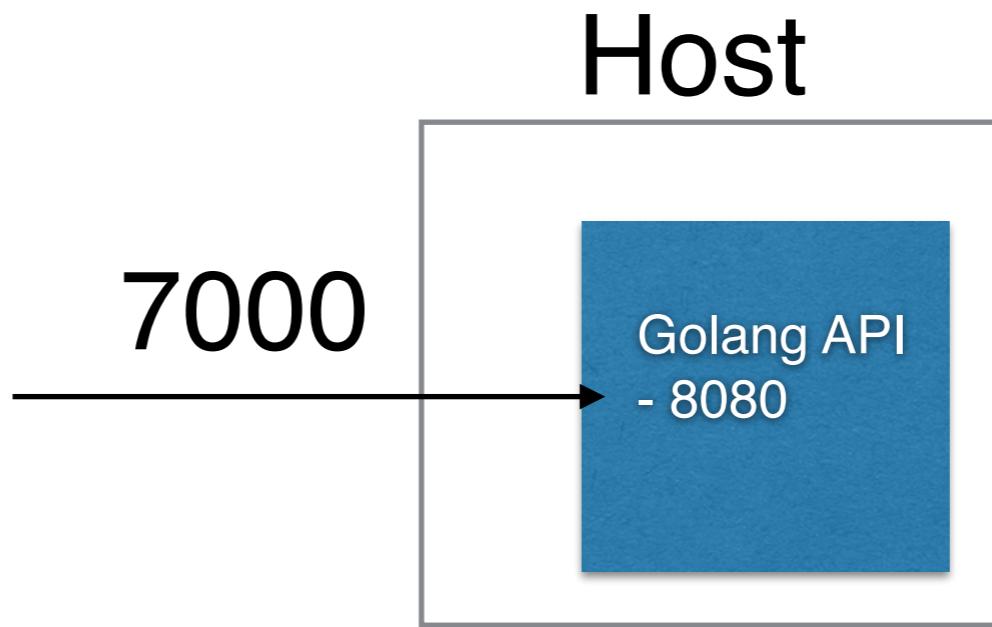
Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Run Golang Pingpong API

```
$ docker container run -p 7000:8080 pingpong-api
```



# Multi-stage Build

```
FROM go:1.12
WORKDIR /app
COPY go.mod .
COPY go.sum .
RUN go mod download
COPY ..
RUN go build -o ./bin/app ./main.go
ENV GIN_MODE release
EXPOSE 8080
CMD ./bin/app
```

Build

Run



# Multi-stage Build

```
FROM go:1.12 as builder
WORKDIR /app
COPY go.mod .
COPY go.sum .
RUN go mod download
COPY ..
RUN CGO_ENABLED=0 GOOS=linux go build -o ./bin/app ./main.go
```

```
FROM alpine:3
WORKDIR /root/
COPY --from=builder /app/bin/app .
ENV GIN_MODE release
EXPOSE 8080
CMD ./app
```

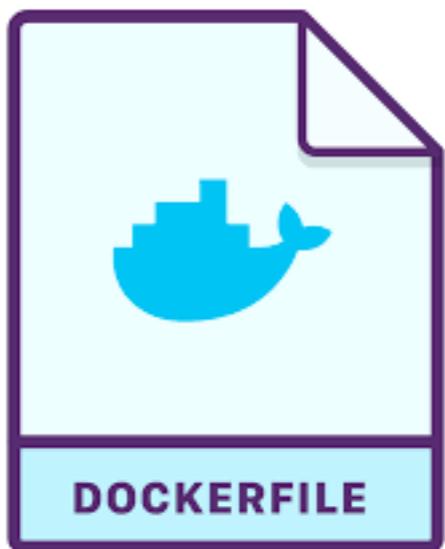


Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Dockerfile



FROM - which parent image to use  
ADD, COPY - add file to image  
RUN - execute command when build  
CMD - command use to run container  
WORKDIR - default work directory

EXPOSE - tell which port that image provide  
ENTRYPOINT  
VOLUME  
ENV, ARG  
LABEL



# Share image to the world



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](#).

# Docker hub

NAME	LAST UPDATED	VISIBILITY	
sckseal / toy-store-service	11 days ago	Public	
sckseal / shopping-cart-init	17 days ago	Public	
sckseal / toy-store-shippinggateway	17 days ago	Public	
sckseal / toy-store-bankgateway	17 days ago	Public	
sckseal / toy-store-nginx	17 days ago	Public	
sckseal / toy-store-web	17 days ago	Public	
sckseal / shoppingcart-service	--	Public	
sckseal / shoppingcart-web	--	Public	



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Docker Official Image

The screenshot shows the Docker Hub page for the official Node.js image. At the top, there's a navigation bar with links for Explore, Pricing, and Sign In. Below that, the search bar contains the query "node". The main content area features the Node.js logo and the title "node ☆". It highlights "Docker Official Images" and describes Node.js as a JavaScript-based platform for server-side and networking applications. A download count of "1B+" is shown. Below the description, there are several filter tags: Container, Linux, IBM Z, 386, PowerPC 64 LE, x86-64, ARM 64, ARM, Application Infrastructure, and Official Image. On the right side, a button for "Linux - ARM 64 ( latest )" is visible, along with a "Copy and paste to pull this image" link and a "docker pull node" command. A "View Available Tags" link is also present. The bottom section is titled "Supported tags and respective Dockerfile links" and lists various tags: 14.0.0-stretch, 14.0-stretch, 14-stretch, stretch, current-stretch, 14.0.0, 14.0, 14, latest, current, 14.0.0-stretch-slim, 14.0-stretch-slim, 14-stretch-slim, stretch-slim, current-stretch-slim, 14.0.0-slim, 14.0-slim, 14-slim, 14.0.0-buster, 14.0-buster, 14-buster, buster, current-buster, 14.0.0-buster-slim, 14.0-buster-slim, 14-buster-slim, buster-slim, current-buster-slim, and 14.0.0-alpine3.10, 14.0-alpine3.10, 14-alpine3.10, alpine3.10, current-alpine3.10.



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Docker Unofficial Image

hub.docker.com/orgs/sckseal/repositories

NAME	LAST UPDATED	VISIBILITY
sckseal / toy-store-service	11 days ago	Public
sckseal / shopping-cart-init	17 days ago	Public
sckseal / toy-store-shippinggateway	17 days ago	Public
sckseal / toy-store-bankgateway	17 days ago	Public
sckseal / toy-store-nginx	17 days ago	Public
sckseal / toy-store-web	17 days ago	Public
sckseal / shoppingcart-service	--	Public
sckseal / shoppingcart-web	--	Public



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Docker hub

The screenshot shows the Docker Hub homepage with a blue header bar. The header includes the Docker Hub logo, a search bar with placeholder text "Search for great content (e.g., mysql)", and navigation links for "Explore", "Pricing", "Sign In", and a prominent "Sign Up" button.

**Build and Ship any Application Anywhere**

Docker Hub is the world's easiest way to create, manage, and deliver your teams' container applications.

**Sign Up Today**

Already have an account? [Sign In](#)

Docker ID

Email

Password

Send me occasional product updates and announcements.

I'm not a robot reCAPTCHA  
Privacy - Terms

**Sign Up**

By creating an account, you agree to the [Terms of Service](#), [Privacy Policy](#), and [Data Processing Terms](#).



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Login to docker hub

```
$ docker login
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Docker Tagging

```
$ docker image tag pingpong-api <user>/pingpong-api:latest  
$ docker image tag <user>/pingpong-api:latest <user>/pingpong-api:1.0.0
```



Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Share Image to the World

```
$ docker image push <user>/pingpong-api:latest  
// alternative  
$ docker push <user>/pingpong-api:latest
```



# Share Image to the World

```
$ docker image push <user>/pingpong-api:1.0.0
```

// alternative

```
$ docker push <user>/pingpong-api:1.0.0
```



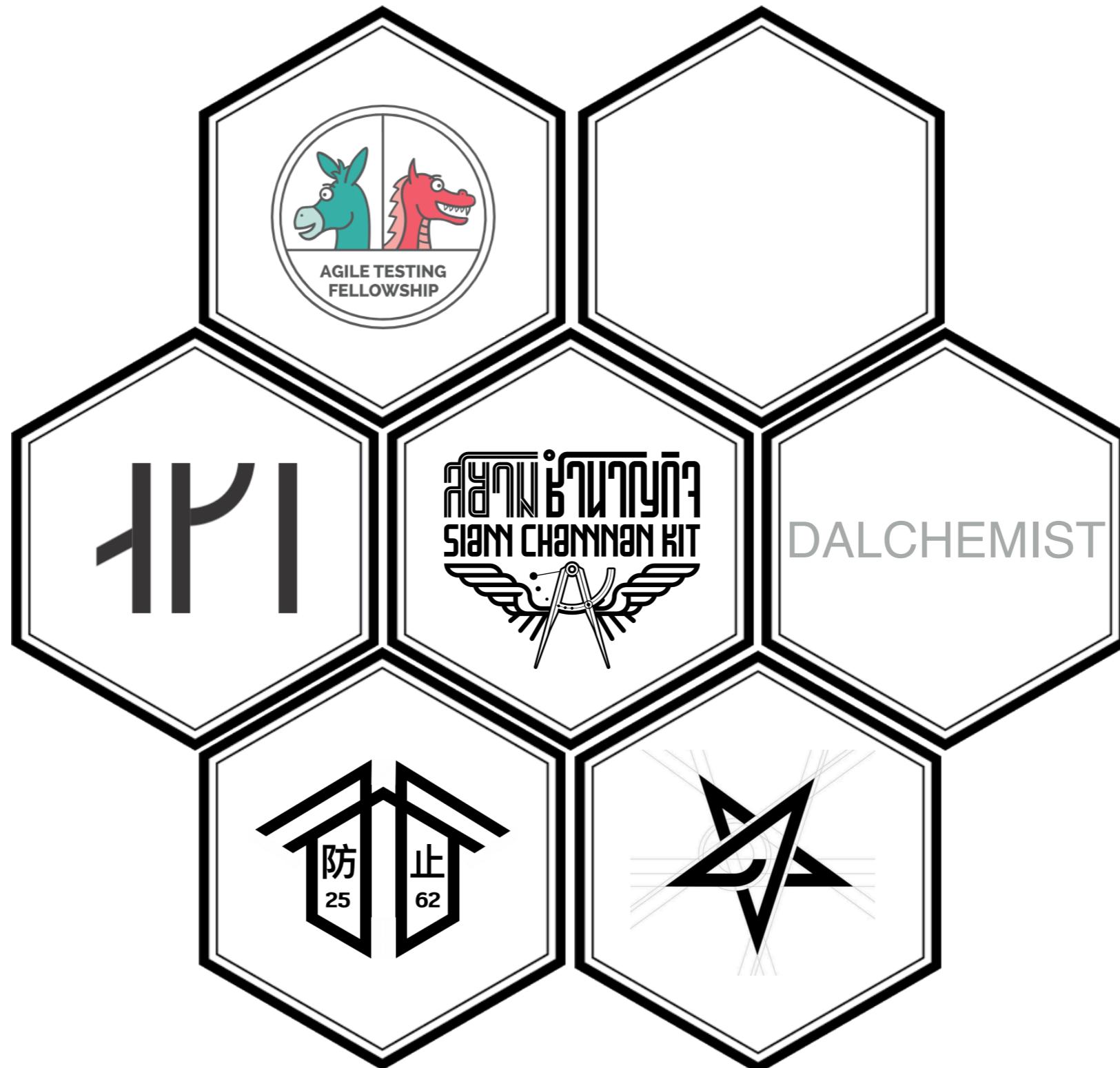
Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.

NonCommercial — You may not use the material for commercial purposes.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

# Run Multi-containers





Share — copy and redistribute the material in any medium or format.  
Adapt — remix, transform, and build upon the material.  
NonCommercial — You may not use the material for commercial purposes.  
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.