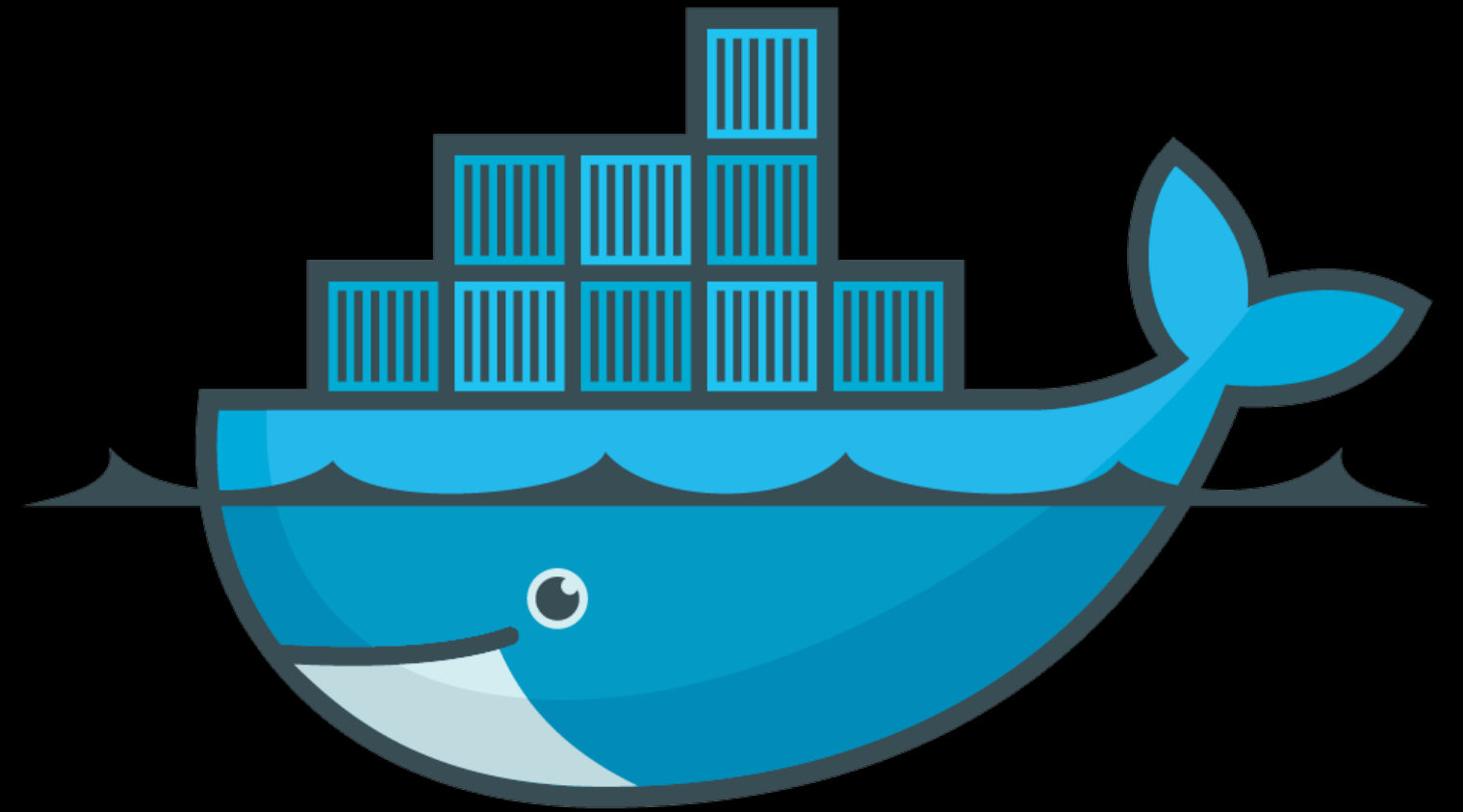


# GET ONBOARD WITH DOCKER

PEPIJN BRUIENNE

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docker

# INTRODUCTION

# ABOUT ME

## PEPIJN BRUIENNE

- ▶ **Mac Operations Lead at University of Michigan**
- ▶ **Munki and home-brew management tools (Rails)**
- ▶ **5,000+ users and growing - worldwide**
  - ▶ **No OS X Server - All Linux**



UNIVERSITY OF  
MICHIGAN



**WHAT? WHO?**



*What is this about?*

**DOCKER AND APPLICATION  
CONTAINERIZATION**

*Who is this for?*

**FOR MAC ADMINS AND DEVELOPERS**



# GOALS

(We need some)

# GOALS

- ▶ What Docker is
- ▶ How Docker works
- ▶ Why use Docker
- ▶ Learn more about Docker

# OPERATING SYSTEM-LEVEL VIRTUALIZATION

- ▶ chroot - <http://en.wikipedia.org/wiki/Chroot>
- ▶ FreeBSD Jails - [http://en.wikipedia.org/wiki/FreeBSD\\_jail](http://en.wikipedia.org/wiki/FreeBSD_jail)
- ▶ Solaris Zones - <http://www.oracle.com/technetwork/>
  - ▶ Linux LXC - <https://linuxcontainers.org/>
- ▶ virtualenv (Python)- <http://virtualenv.readthedocs.org/>
- ▶ rbenv - <http://rbenv.org/> - rvm - <http://rvm.io/> (Ruby)





# CONTAINERS

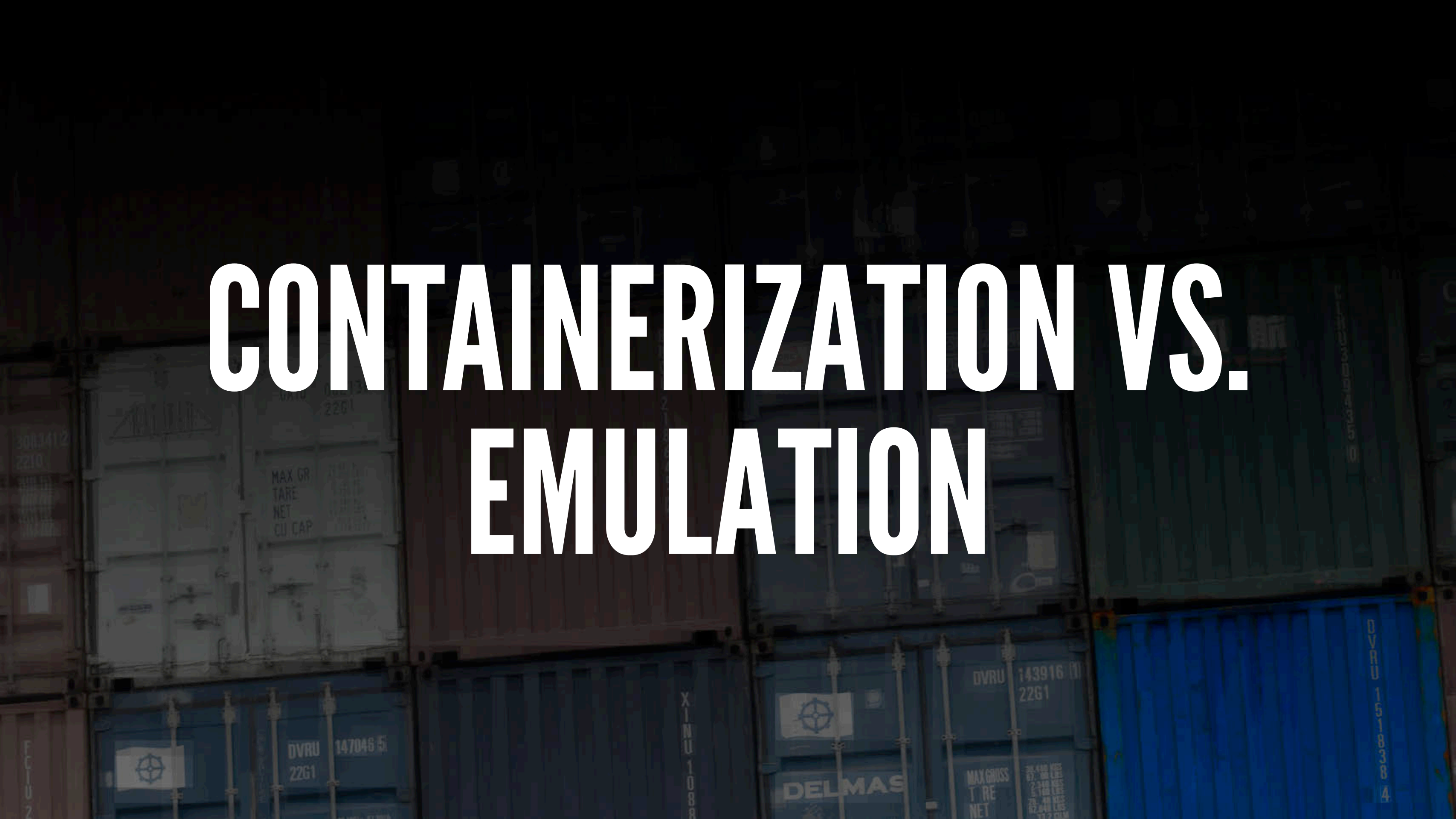


# CONTAINERS

- ▶ **Intermodal Shipping Container - ISO standard**
  - ▶ **Standard unit of payload**
  - ▶ **Contents irrelevant as long as they fit**
  - ▶ **Can be moved between truck, train or boat**



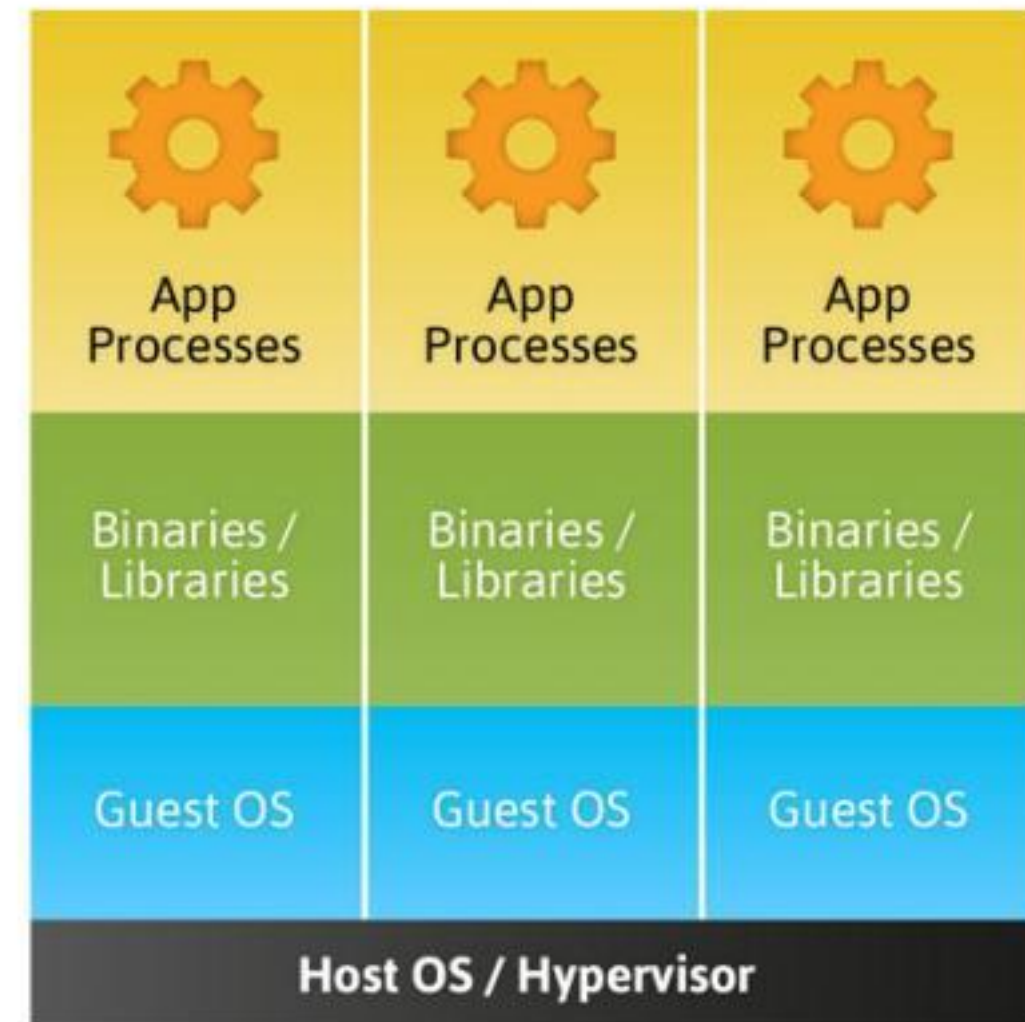
# CONTAINERIZATION VS. EMULATION





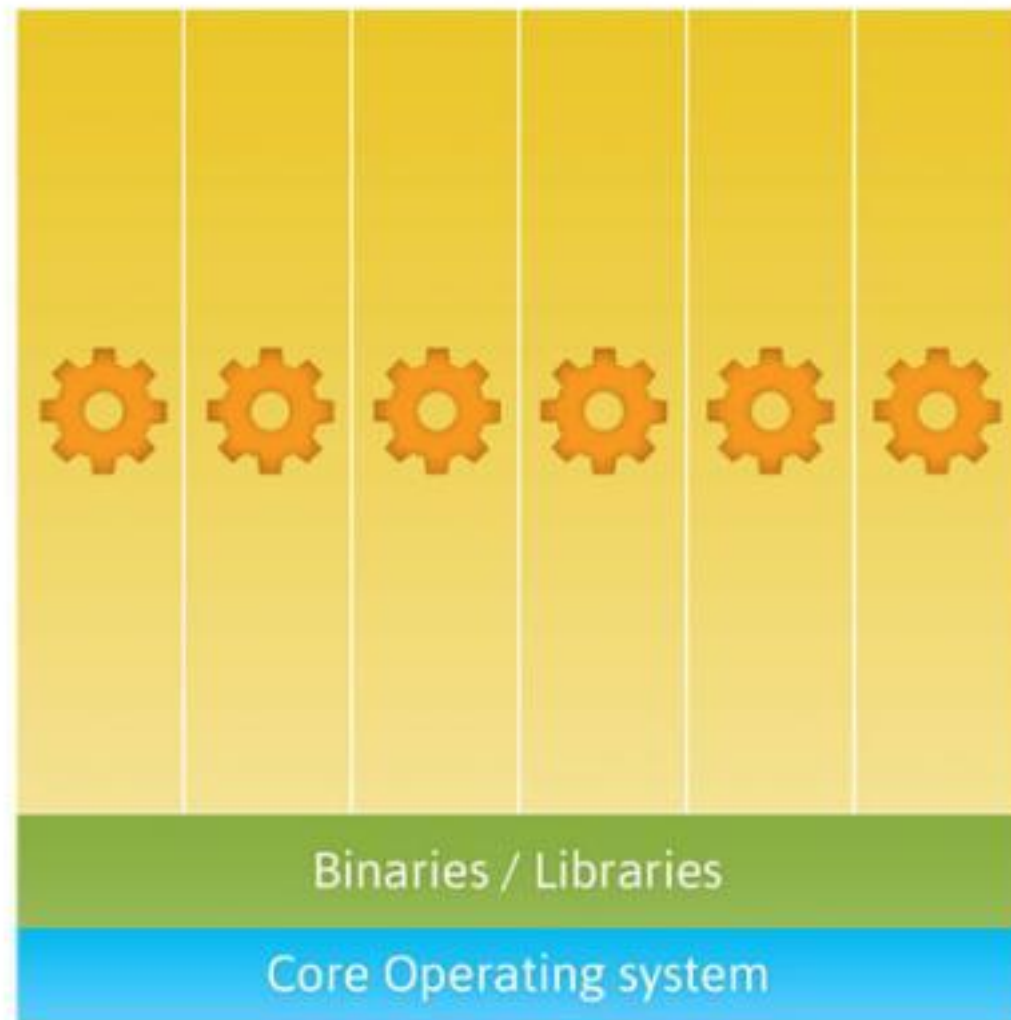
# VIRTUALIZATION

- ▶ Higher overhead
- ▶ Full OS for each guest
- ▶ Dependencies persist





# CONTAINERS



- ▶ **More granularity**
- ▶ **Use only resources for application**
- ▶ **Dependencies stay with application**

# DOCKER HISTORY

- ▶ Current version is 1.3.0
- ▶ PaaS provider dotCloud, now Docker
- ▶ Internal project by Solomon Hykes and other dotCloud employees
  - ▶ Open-sourced March 2013
- ▶ Initially used LXC, since v0.9 libcontainer, written in Go
  - ▶ Over 1,700 forks, 400+ contributors on GitHub

# DOCKER DAEMON REQUIREMENTS

## KERNEL

- ▶ Version 3.8+ (Ubuntu/Debian)
- ▶ Version 2.6.32-431+ (RHEL/CentOS/Fedora)



# RUNTIME DEPENDENCIES

- ▶ iptables 1.4+
- ▶ Git 1.7+
- ▶ procps (or working ps)
- ▶ XZ Utils 4.9+
- ▶ Properly mounted cgroupfs hierarchy



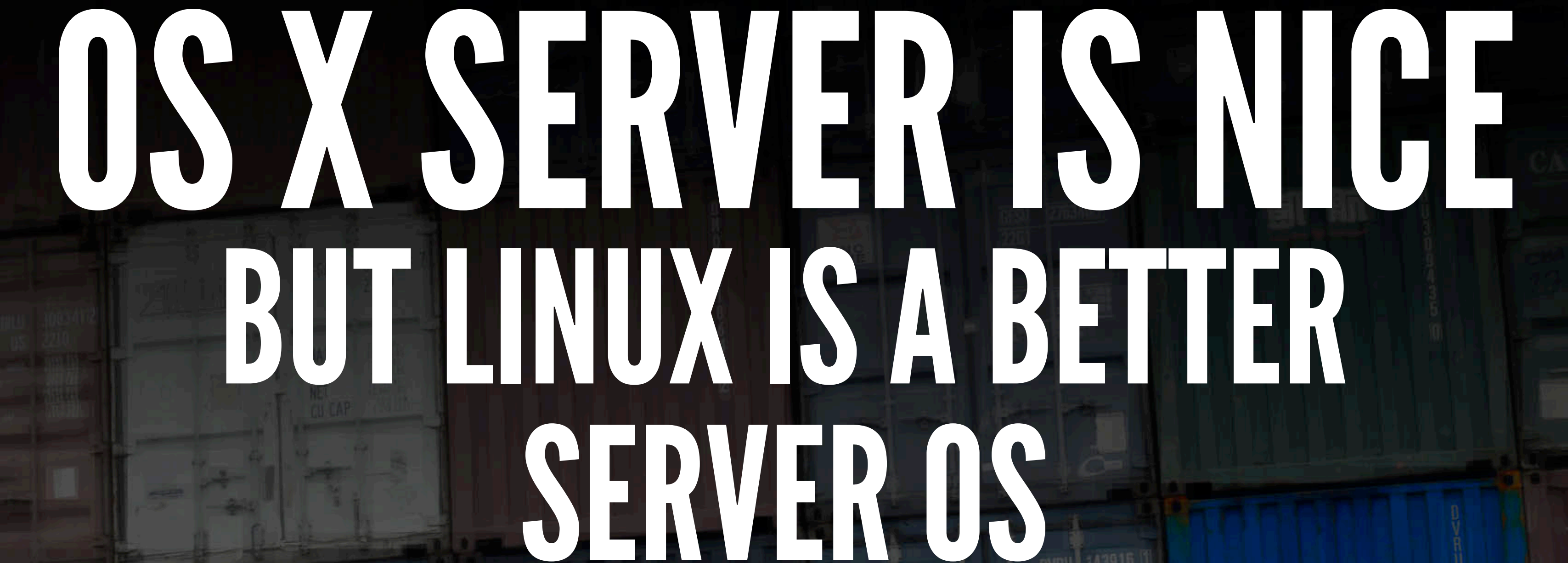
# DOCKER ECOSYSTEM

Configuration Management  
Big Data  
Hosting Providers  
Developer Tools  
Orchestration  
Host OSes  
App Development Platforms



# DOCKER FOR OS X

## HOW CAN I BENEFIT?



**OS X SERVER IS NICE  
BUT LINUX IS A BETTER  
SERVER OS**



# DOCKER INSTALLATION

- ▶ Binary install - <https://docs.docker.com/installation/mac/>
- ▶ Boot2Docker - <https://github.com/boot2docker/>
- ▶ CoreOSX - <https://github.com/cap10morgan/coreosx>
- ▶ Kitematic - <https://kitematic.com/>
- ▶ Panamax - <http://panamax.io/>



# THE DOCKER IMAGE



Image Settings		
	1463ccab	6
	3f1c0c48	5
	b2ccd2c5	4
	8b65fe03	3
	5e59b387	2
Base OS	a50321be	1

- 1 FROM ubuntu:14.04
- 2 RUN apt-get update
- 3 RUN apt-get install -y openssh-server
- 4 RUN mkdir /var/run/sshd
- 5 RUN echo 'root:screencast' | chpasswd
- 6 ENV NOTVISIBLE "in users profile"
- 6 RUN echo "export VISIBLE=now" >> /etc/profile
- EXPOSE 22
- CMD ["/usr/sbin/sshd", "-D"]

# THE DOCKER CONTAINER

- ▶ Container is the running version of an image
- ▶ Any runtime changes become another layer
- ▶ Changes can be "saved" by committing them to a new image

# DOCKER BASIC COMMANDS

```
host$ docker run -i -t centos/latest /bin/bash
host$ docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
a6ee52484e4c	centos/latest	"/bin/bash"	10 seconds ago	Running		angry_bartik

```
host$ docker stop angry_bartik
host$ docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
--------------	-------	---------	---------	--------	-------	-------

```
host$ docker start angry_bartik
host$ docker ps
```

a6ee52484e4c	centos/latest	"/bin/bash"	15 minutes ago	Running		angry_bartik
--------------	---------------	-------------	----------------	---------	--	--------------



# DOCKER CONTAINER COMMANDS

```
host$ docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
a6ee52484e4c	centos/latest	"/bin/bash"	15 minutes ago	Stopped		angry_bartik

```
host$ docker rm angry_bartik
```

```
host$ docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
--------------	-------	---------	---------	--------	-------	-------



# DOCKER IMAGE COMMANDS

```
host$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	VIRTUAL SIZE
centos	latest	87e5b6b3ccc1	6 days ago	224 MB

```
host$ docker inspect centos:latest
```

```
[{
  "Architecture": "amd64",
  "Author": "The CentOS Project \u003cccloud-ops@centos.org\u003e - ami_creator",
  "Comment": "",
  "Config": {
    -----
  "Created": "2014-10-01T20:46:20.364145577Z",
  "DockerVersion": "1.2.0",
  "Id": "87e5b6b3ccc119ebfe9344583fb3f77804d6e3d9a3553d916fbf807028310e8e",
  "Os": "linux",
  "Parent": "5b12ef8fd57065237a6833039acc0e7f68e363c15d8abb5cacce7143a1f7de8a",
  "Size": 224000043
  }
}]
```

# SO WHAT CAN I DO WITH IT?

- Crypt (FV key escrow)
  - BSDPy (NetBoot)
- Munkireport PHP (reporting)
- Munkiwebadmin (management, reporting)
  - Reposado (SUS)
  - Sal (reporting)
- Spirit (DeployStudio Server)



# DEMO TIME





do\_demo()

# WRAP UP



# QUESTIONS?



# THANK YOU!

<https://docs.docker.com>

<http://dockerbook.com>

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<http://github.com/bruienne>

<https://hub.docker.com/repos/macadmins/>

