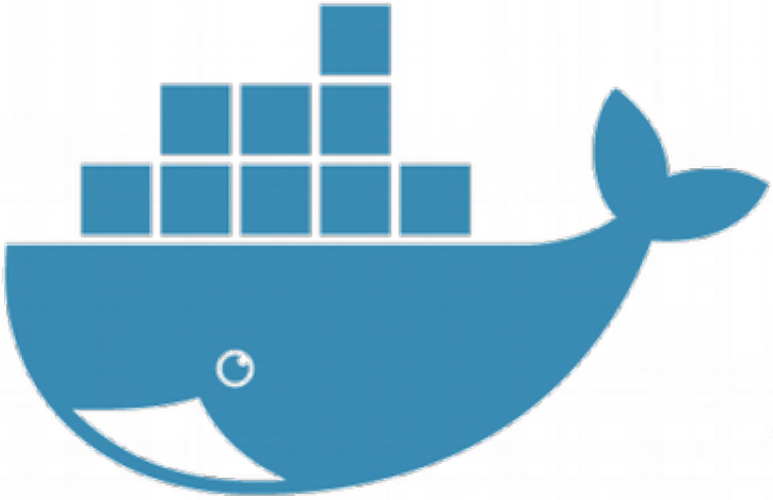
Introduction to Docker Container



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Me ?

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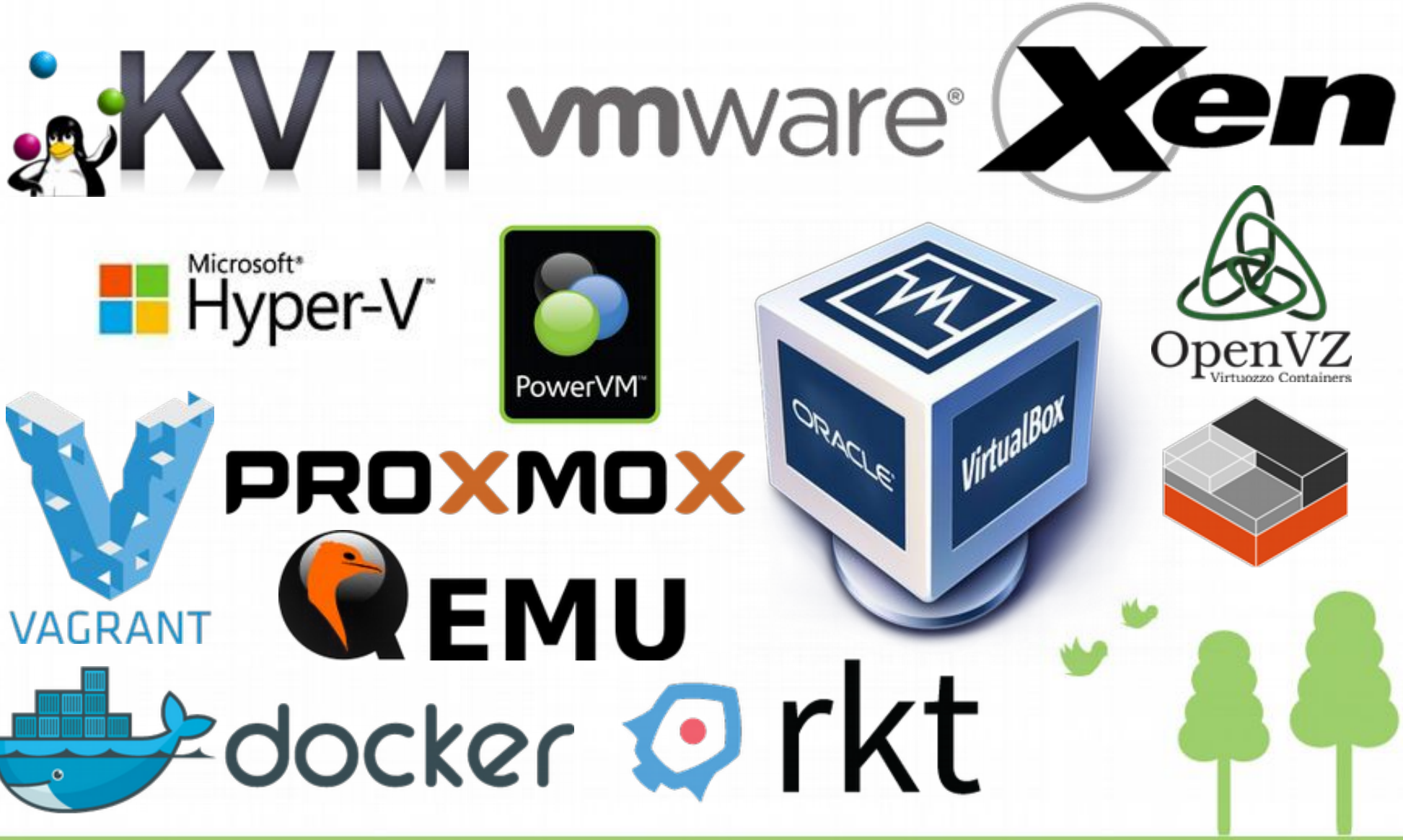
distinction on technology

KOMUNITAS GNU/LINUX MALANG

Contents

- Virtualization?
- Introduction to Container
- What is Docker?
- Who use Docker?
- How to Install?
- Docker Engine
- Docker Architecture
- Docker Hub/Registry
- Docker CLI
- Demo Time

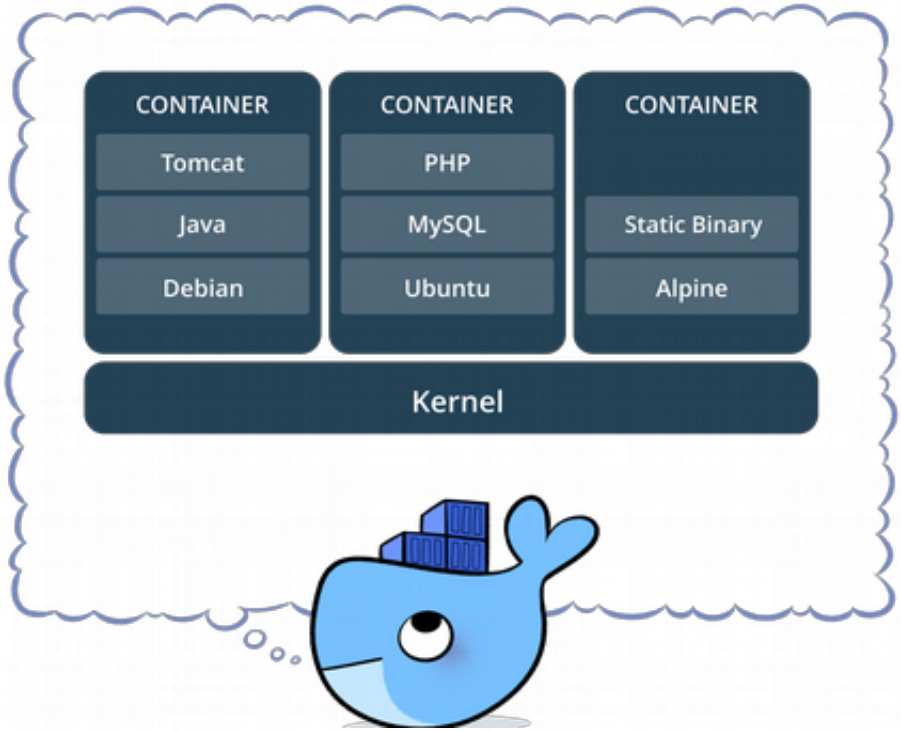
Virtualization?



Virtualization Types

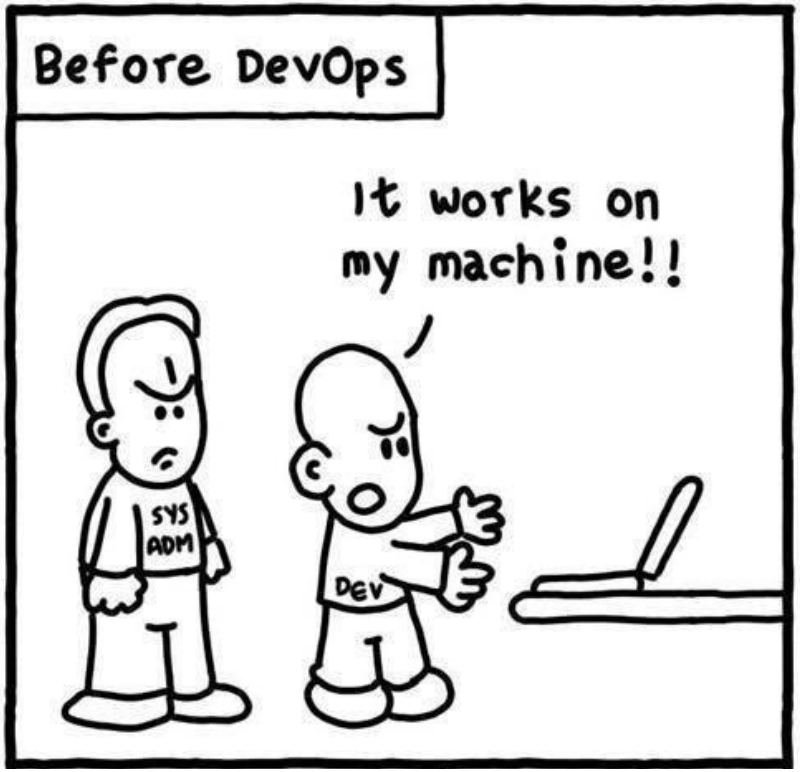
- Hardware Level
  - Full Virtualization: Oracle VirtualBox, VMWare Workstation, Qemu
  - Bare Metal Virtualization: RedHat KVM, Citrix Xen, VMWare Vsphere, Microsoft HyperV
- Operating System Level (OS Container): OpenVZ, LXC
- Application Level (Application Container): Docker, rkt

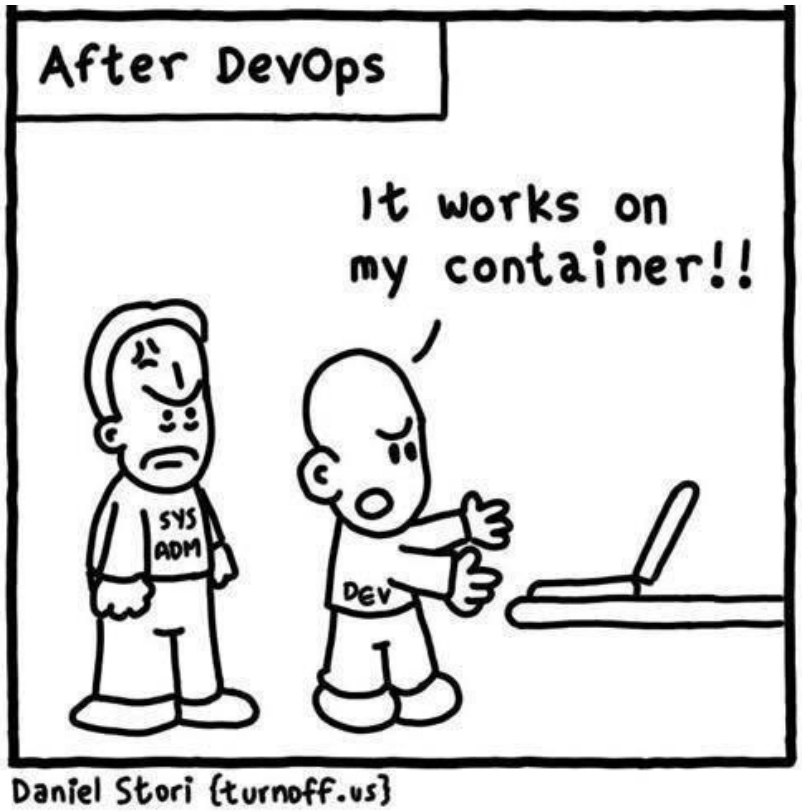
Introduction to Container



- Standardized packaging for software and dependencies
- Isolate apps from each other
- Share the same OS kernel
- Works with all major Linux and Windows Server

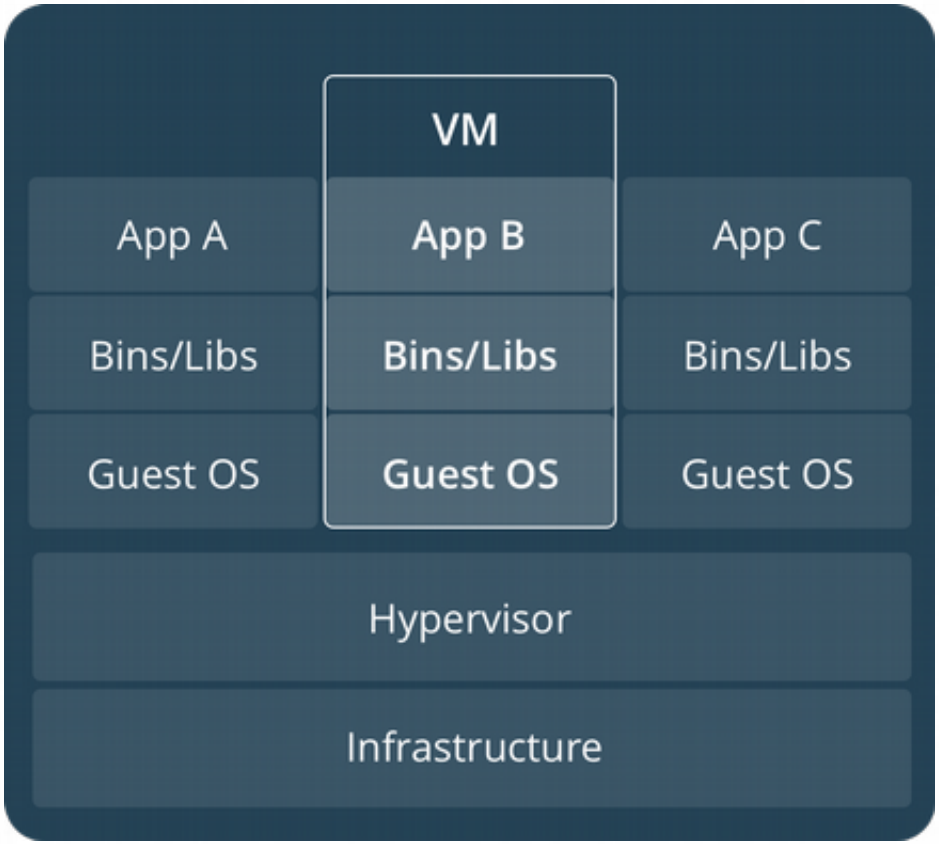
Why Container?



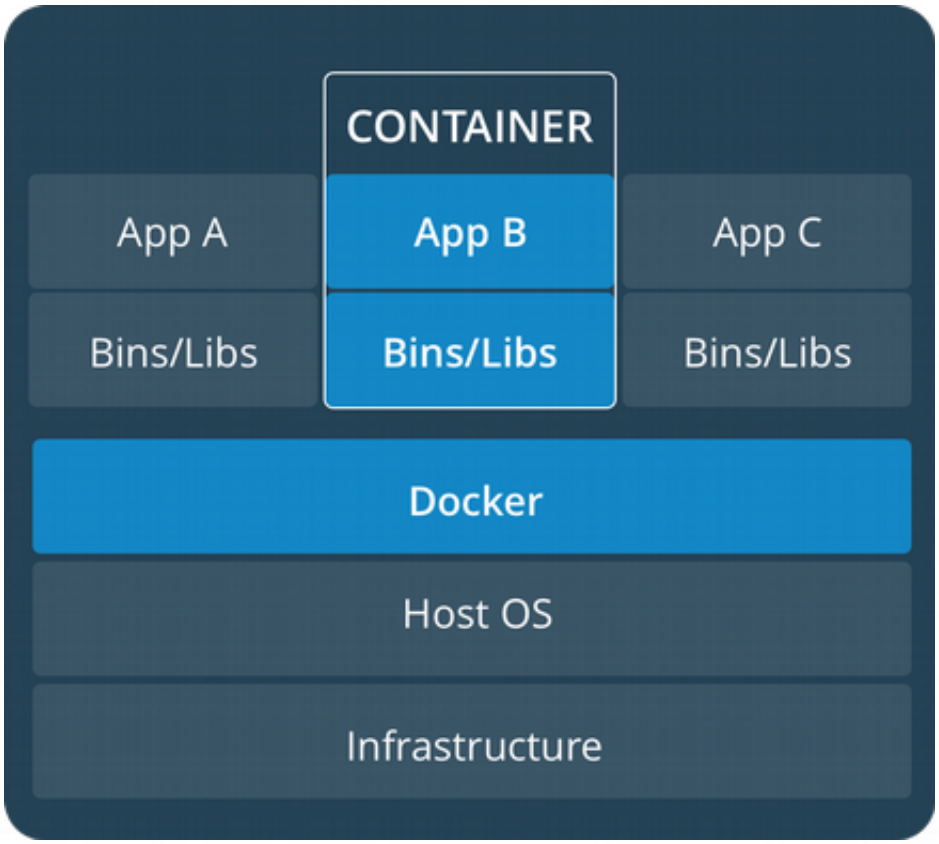


https://devrant.com/search?term=devops

Container vs VM

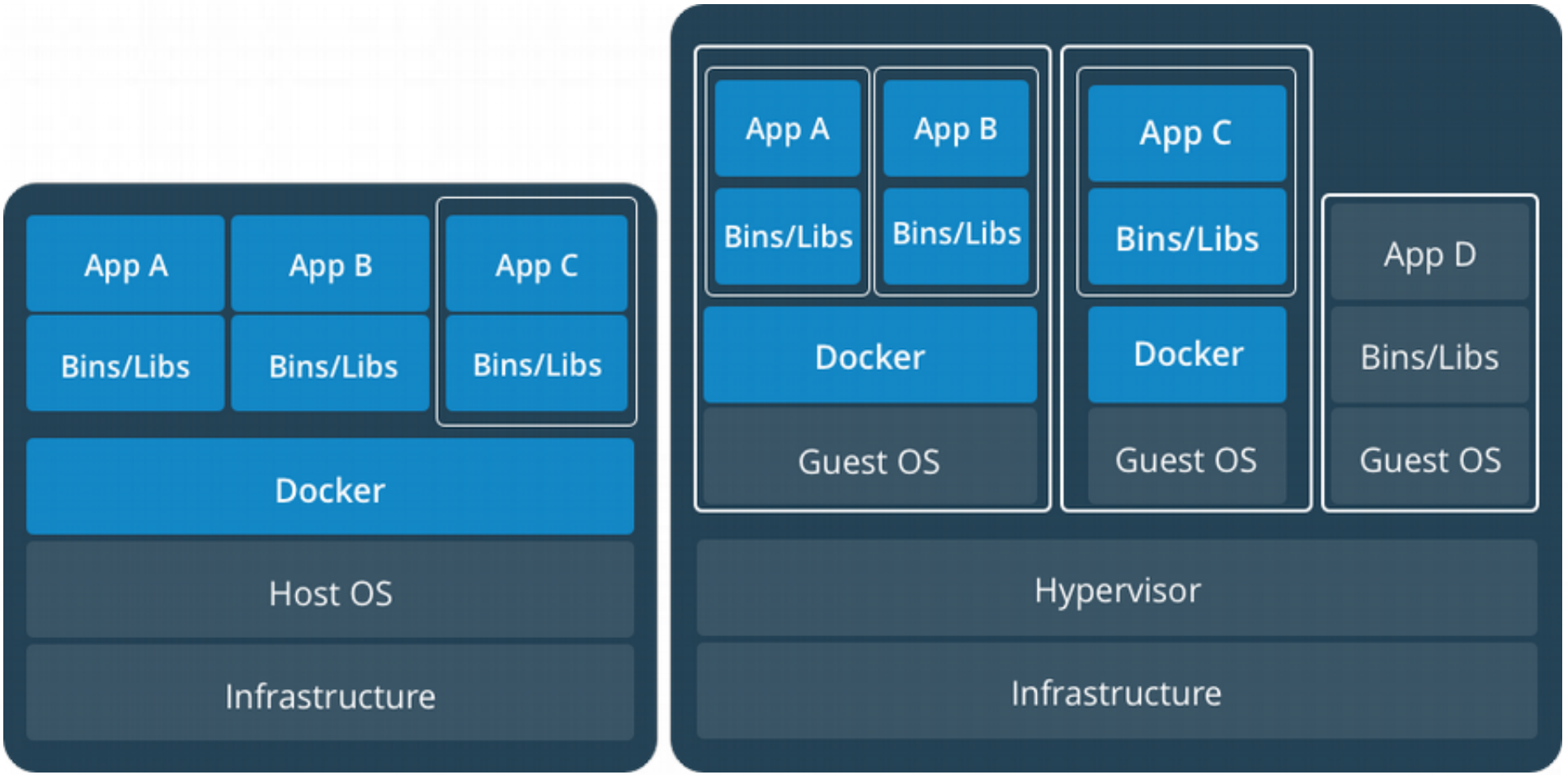


VMs are an infrastructure level construct to turn one machine into many servers



Containers are an app level construct

Container & VM



Containers and VMs together provide a tremendous amount of flexibility for IT to optimally deploy and manage apps.

What is  ?

- Docker is an open-source project that automates the deployment of applications inside software container
- Docker containers wrap up a piece of software in a complete file system that contains everything it needs to run: code, runtime, system tools, system libraries – anything you can install on a server.
- This guarantees that it will always run the same, regardless of the environment it is running in.

Key Benefits of Docker Containers

Speed

No OS to boot
=
Application online in secons

Portability

Less dependency between process layers
=
Ability to move between infrastructure

Efficiency

- Less OS Overhead

- Improve VM density

Why Developers Care?

- Build once, run anywhere
  - A clean, safe, hygienic and portable runtime environment for your app.
  - No worries about missing dependencies, packages and other pain points during subsequent deployments.
  - Run each app in its own isolated container, so you can run various versions of libraries and other dependencies for each app without worrying

Why Developers Care?

- Automate testing, integration, packaging...anything you can script
- Reduce/eliminate concerns about compatibility on different platforms, either your own or your customers.
- Cheap, zero-penalty containers to deploy services? A VM without the overhead of a VM? Instant replay and reset of image snapshots? That's the power of Docker

Why DevOps Care?

- Configure once...run anything
  - Make the entire lifecycle more efficient, consistent, and repeatable
  - Increase the quality of code produced by developers.
  - Eliminate inconsistencies between development, test, production, and customer environments

Why DevOps Care?

- Support segregation of duties
- Significantly improves the speed and reliability of continuous deployment and continuous integration systems
- Because the containers are so lightweight, address significant performance, costs, deployment, and portability issues normally associated with VMs

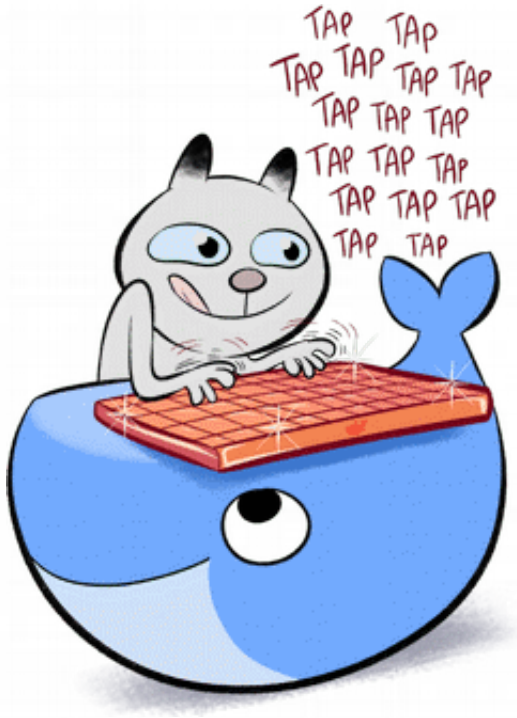
Who use Docker?

https://www.docker.com/customers

Docker Edition

- Community Edition (CE)
- Enterprise Edition (EE)

Capabilities	Community Edition	Enterprise Edition Basic	Enterprise Edition Standard	Enterprise Edition Advanced
Container engine and built in orchestration, networking, security	✓	✓	✓	✓
Certified infrastructure, plugins and ISV containers		✓	✓	✓
Image management			✓	✓
Container app management			✓	✓
Image security scanning				✓



How to Install?

- Community Edition (CE)
- Ubuntu 16.04
- https://docs.docker.com/install/linux/docker-ce/ubuntu/

```
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable"
sudo apt install -y apt-transport-https
sudo apt-get update
apt-cache policy docker-ce
sudo apt-get install -y docker-ce
sudo systemctl status docker
sudo usermod -aG docker [username]   <~~ change with your host username
```

How to Install?

- Too long?

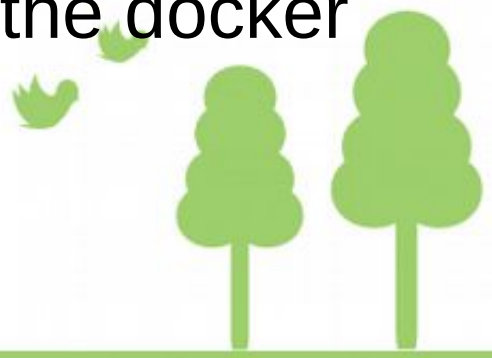
```
sudo curl -sSL https://get.docker.io/ | sh
```

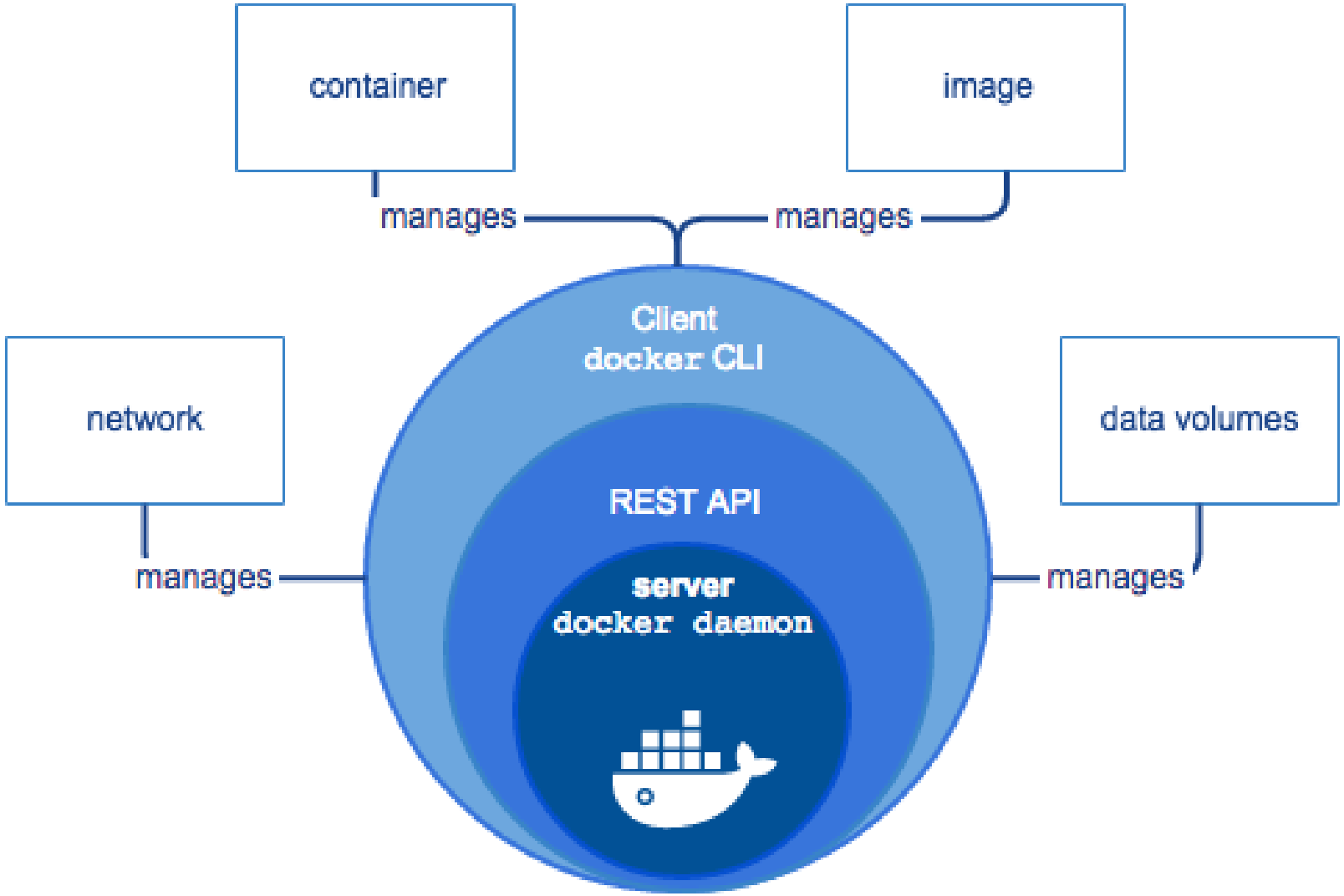
Other distro and OS?

- **Debian** : https://docs.docker.com/engine/installation/linux/docker-ce/debian/
- **OpenSUSE** : https://opensuse.id/2017/11/15/memasang-docker-ce-pada-opensuse-leap-42-2-dan-42-3/
- **CentOS** : https://docs.docker.com/engine/installation/linux/docker-ce/centos/
- **Fedora** : https://docs.docker.com/engine/installation/linux/docker-ce/fedora/
- **Windows** : https://docs.docker.com/docker-for-windows/install/
- **MacOS** : https://docs.docker.com/docker-for-mac/install/

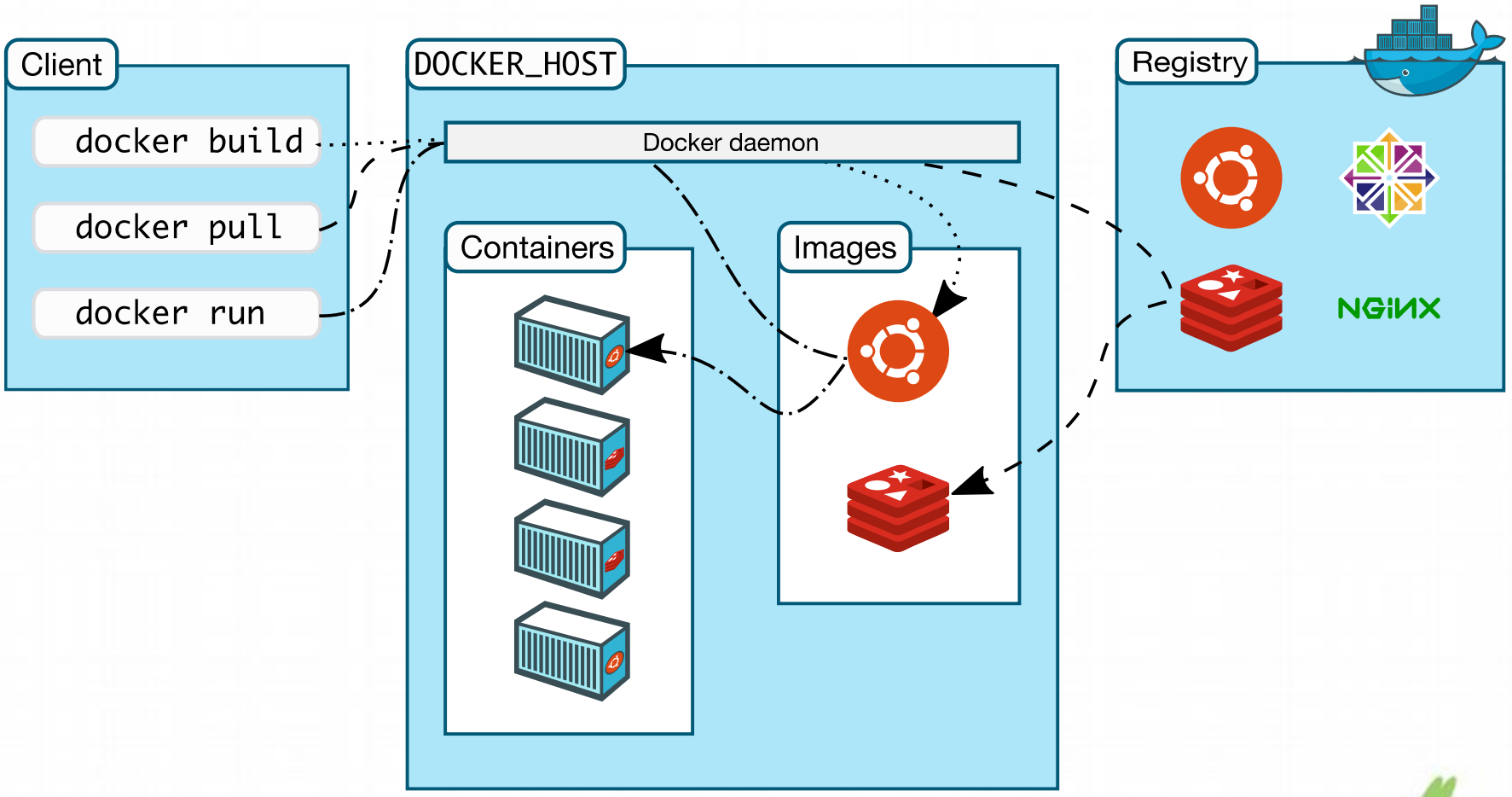
Docker Engine

- Docker Engine is a client-server application with these major components:
  - A server which is a type of long-running program called a daemon process (the dockerd command).
  - A REST API which specifies interfaces that programs can use to talk to the daemon and instruct it what to do.
  - A command line interface (CLI) client (the docker command).



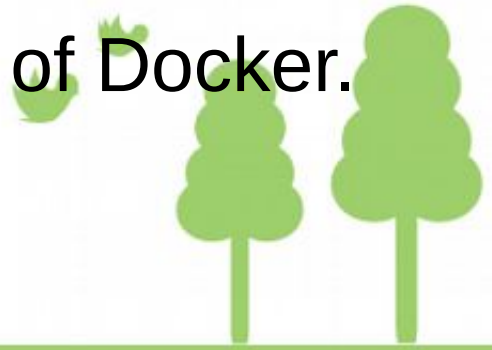

container
image
manages
manages
Client
docker CLI
network
data volumes
REST API
manages
server
docker daemon
manages

Docker Architecture



Docker Images

- A Docker image is a read-only template. For example, an image could contain an Ubuntu operating system with Apache and your web application installed.
- Images are used to create Docker containers. Docker provides a simple way to build new images or update existing images, or you can download Docker images thatother people have already created.
- Docker images are the build component of Docker.



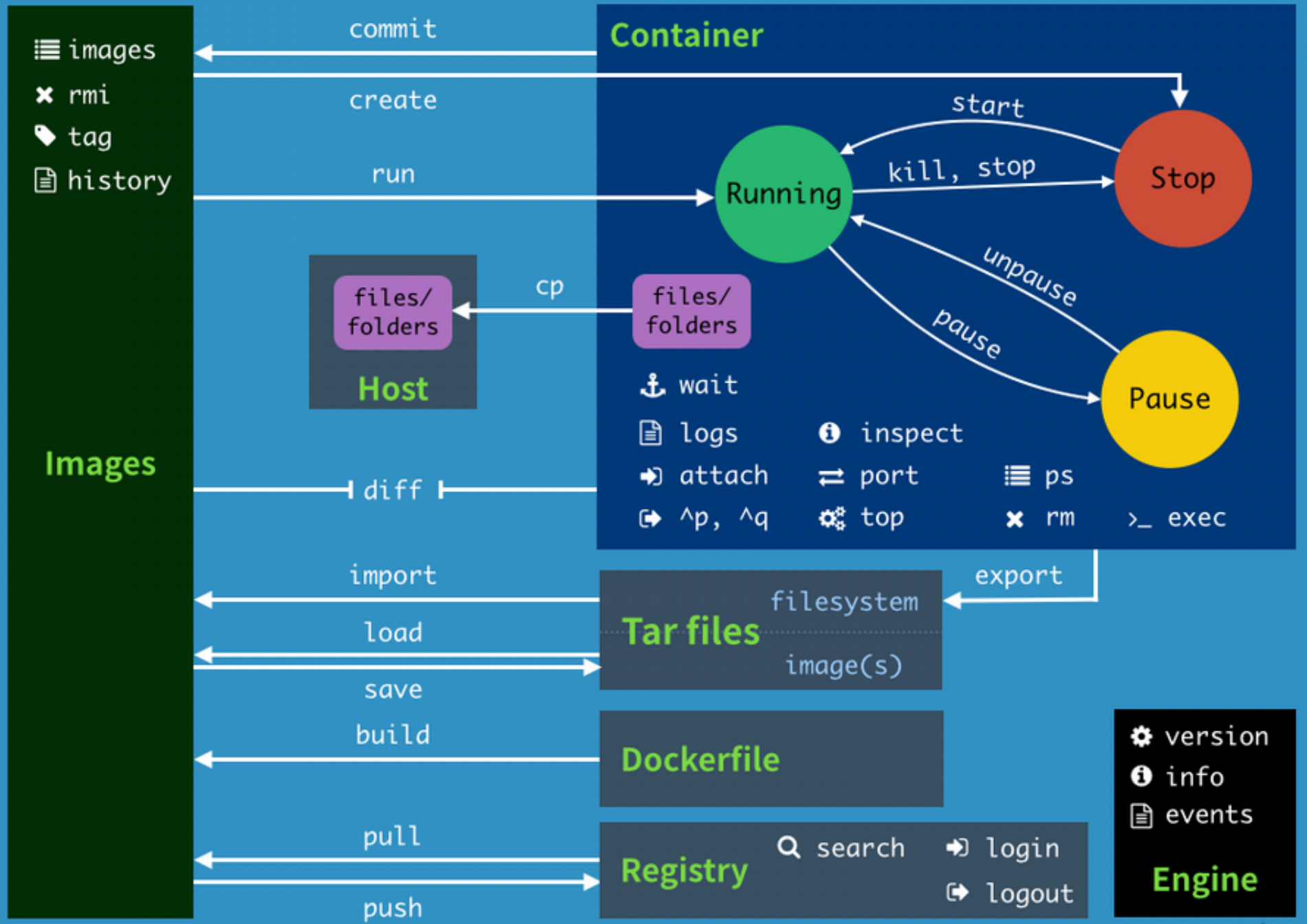
Docker Hub/Registry

- A Docker registry stores Docker images. Docker Hub and Docker Cloud are public registries that anyone can use, and Docker is configured to look for images on Docker Hub by default. You can even run your own private registry.
- http://hub.docker.com

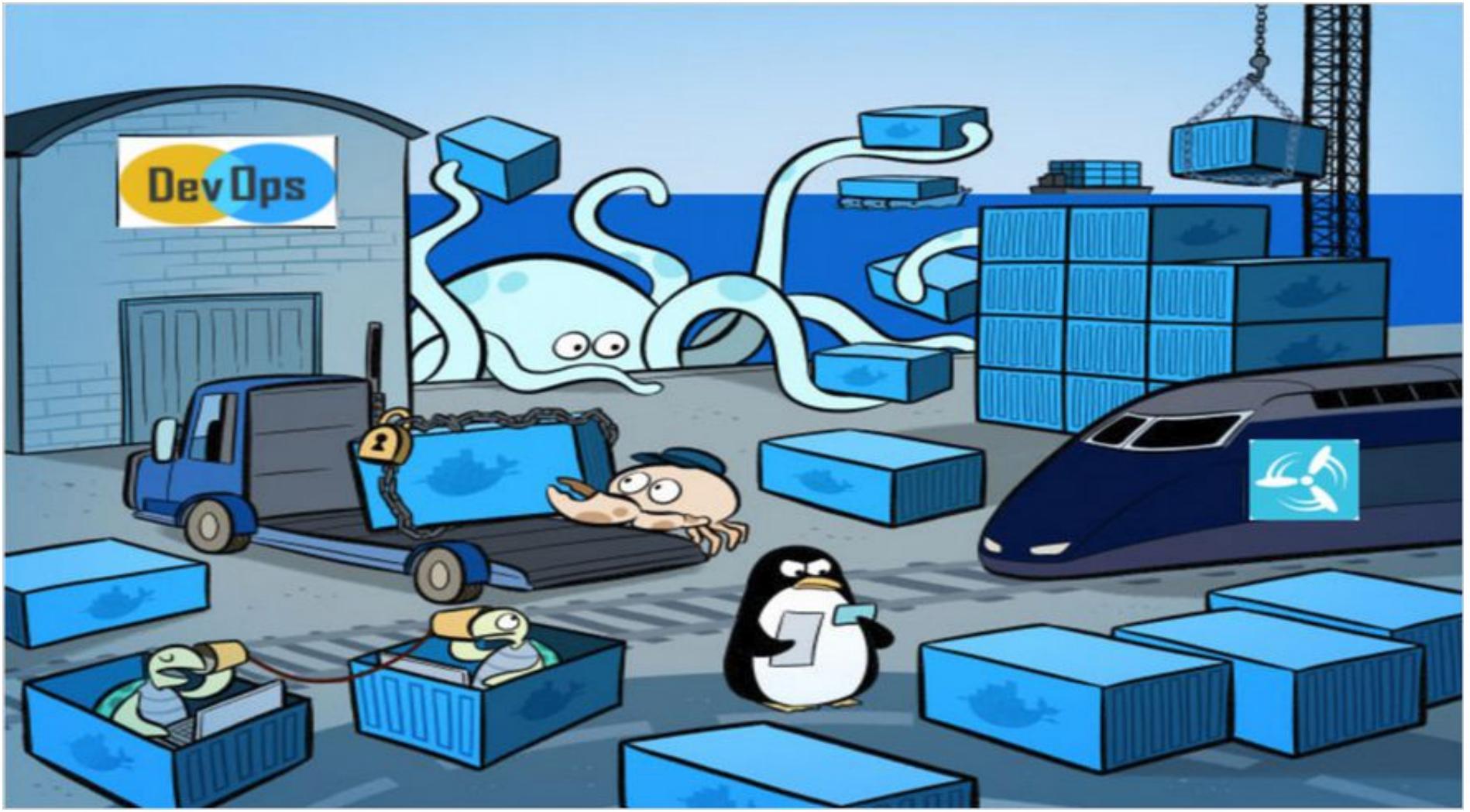
Docker CLI

- docker run
- docker images
- docker ps
- docker start | stop | restart
- docker build
- docker rm
- docker rmi
- docker inspect

Docker Commands Diagram




nixCraft: The Best Linux ... @nixcraft · 1h
Making mistakes is human.
Automating them is DevOps.
6
111
206

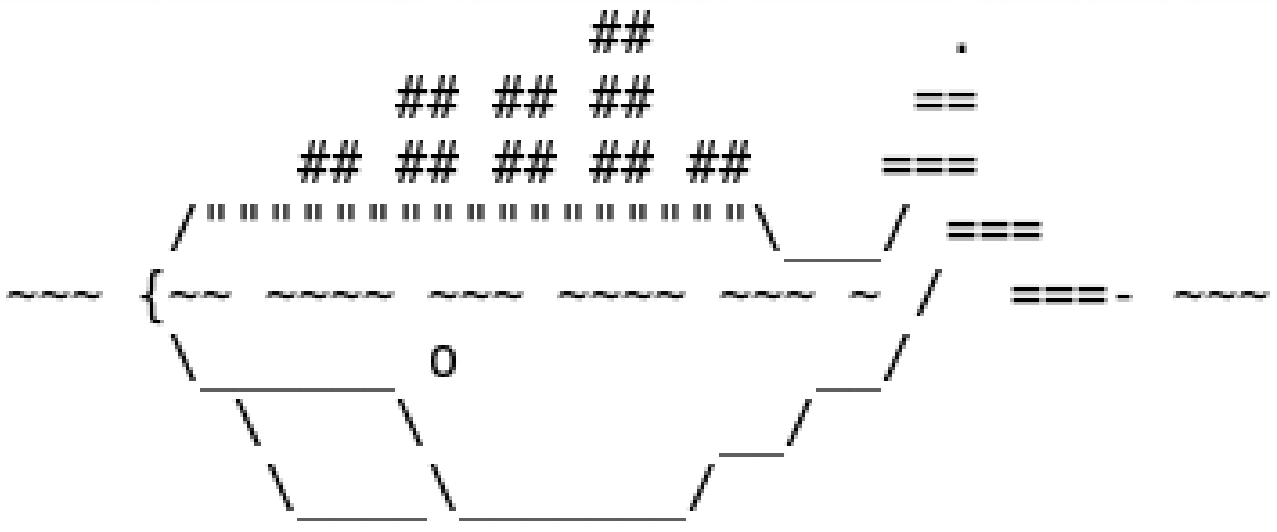


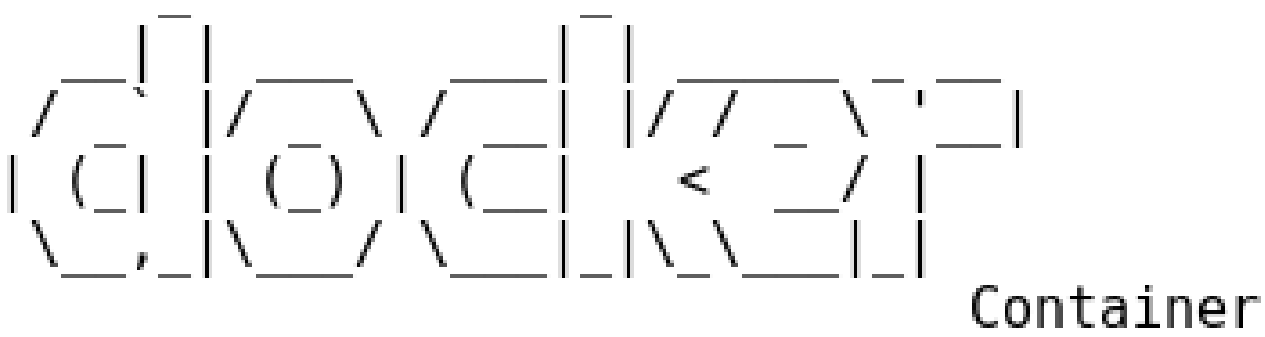
Demo Time

Question?

What next?

- Docker Machine
- Docker Compose
- Docker Swarm
- Kubernetes
- .....





Thanks