What's Up Docker

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What is Docker ?

Is a open source software Container platform. It's benefits are eliminating "works on my machine" problems when collaborating on code with co-workers. Operators use Docker to **run and manage apps side-by-side in isolated containers** to get better compute density. In a nutshell Docker is a runtime for Linux Containers.

Company: Docker (docker.com)
The company was founded as dotCloud, Inc. in 2010

What programming language is Docker written in ?

Go (often referred to as **golang**) is a free and open source programming language created at Google in 2007. A 'C' style language developed to the creators dislike of C++.
(https://godoc.org/github.com/docker/distribution)

Docker History

Solomon Hypes started Docker in France as an internal project within dotCloud, a platform-as-a-service company, with initial contributions by other dotCloud engineers including Andrea Luzzardi and Francois-Xavier Bourlet. Docker represents an evolution of dotCloud’s proprietary technology, which is itself built on earlier open-source projects such as Cloudlets

Supported Platforms

Desktop

Platform	Docker CE x86_64	Docker CE ARM	Docker EE
Docker for Mac (macOS)	✔		
Docker for Windows (Microsoft Windows 10)	✔		

Cloud

Platform	Docker CE x86_64	Docker CE ARM	Docker EE
Amazon Web Services	✔		✔
Microsoft Azure	✔		✔

Supported Platforms (Cont.)

Server

Platform	Docker CE x86_64	Docker CE ARM	Docker CE IBM Z (s390x)	Docker EE x86_64	Docker EE IBM Z (s390x)
CentOS	✓			✓	
Debian	✓	✓			
Fedora	✓				
Microsoft Windows Server 2016				✓	
Oracle Linux				✓	
Red Hat Enterprise Linux				✓	✓
SUSE Linux Enterprise Server				✓	✓
Ubuntu	✓	✓	✓	✓	✓

What is a Docker Container ?

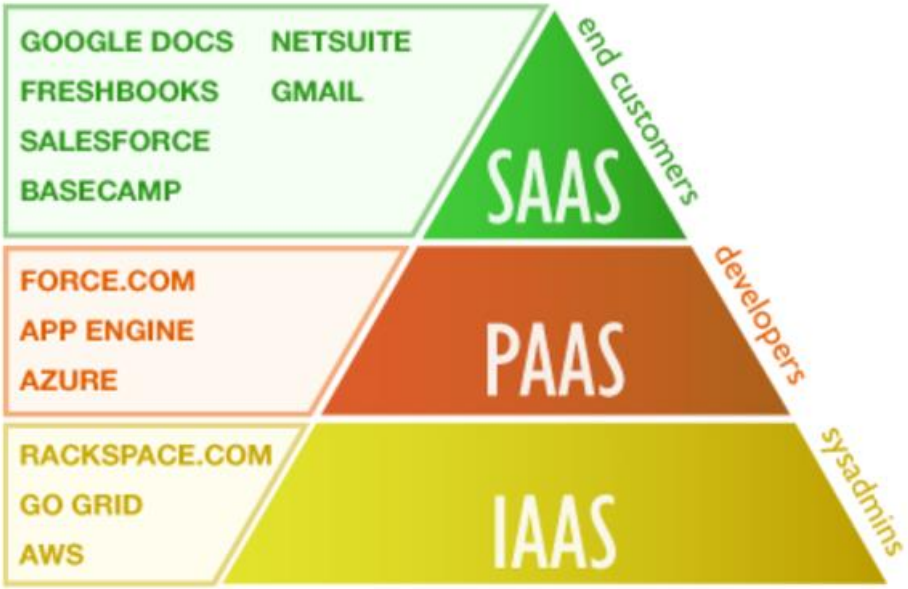
A container is a runtime instance of an image—what the image becomes in memory when actually executed. It runs completely isolated from the host environment by default, only accessing host files and ports if configured to do so.

Container as a Service (CaaS)

Containers are a way to package software in a format that can run isolated on a shared operating system. Unlike VMs, containers do not bundle a full operating system - only libraries and settings required to make the software work are needed. This makes for efficient, lightweight, self-contained systems and guarantees that software will always run the same, regardless of where it’s deployed.

aaS (as a Service) sounds familiar ?

SaaS (Software-as-a-Service)
PaaS (Platform-as-a-Service)
IaaS (Infrastructure-as-a-Service)



Docker Image

A Docker image is the template a Docker Container is derived from. You have 1 image but can create many Containers from that Image.

You download is the software image. For example, Avada provides a Infrared360 image that you download and run. This in turn becomes a container in the docker runtime..

Windows Pro and Mac OS X

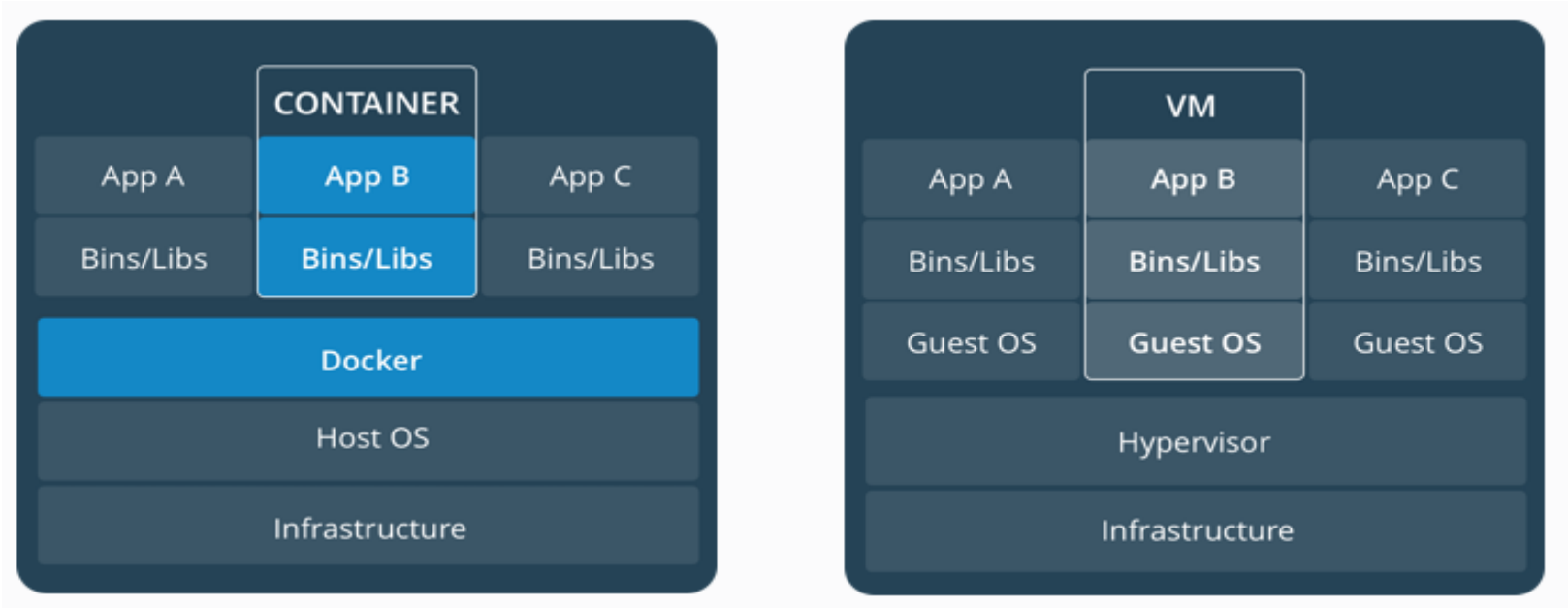
The Docker engine is running in an Alpine Linux distribution on top of an xhyve Virtual Machine on Mac OS X or on a Hyper-V VM on Windows, and that VM is managed by the Docker application

Isn’t Docker just a lightweight Virtual Machine ?

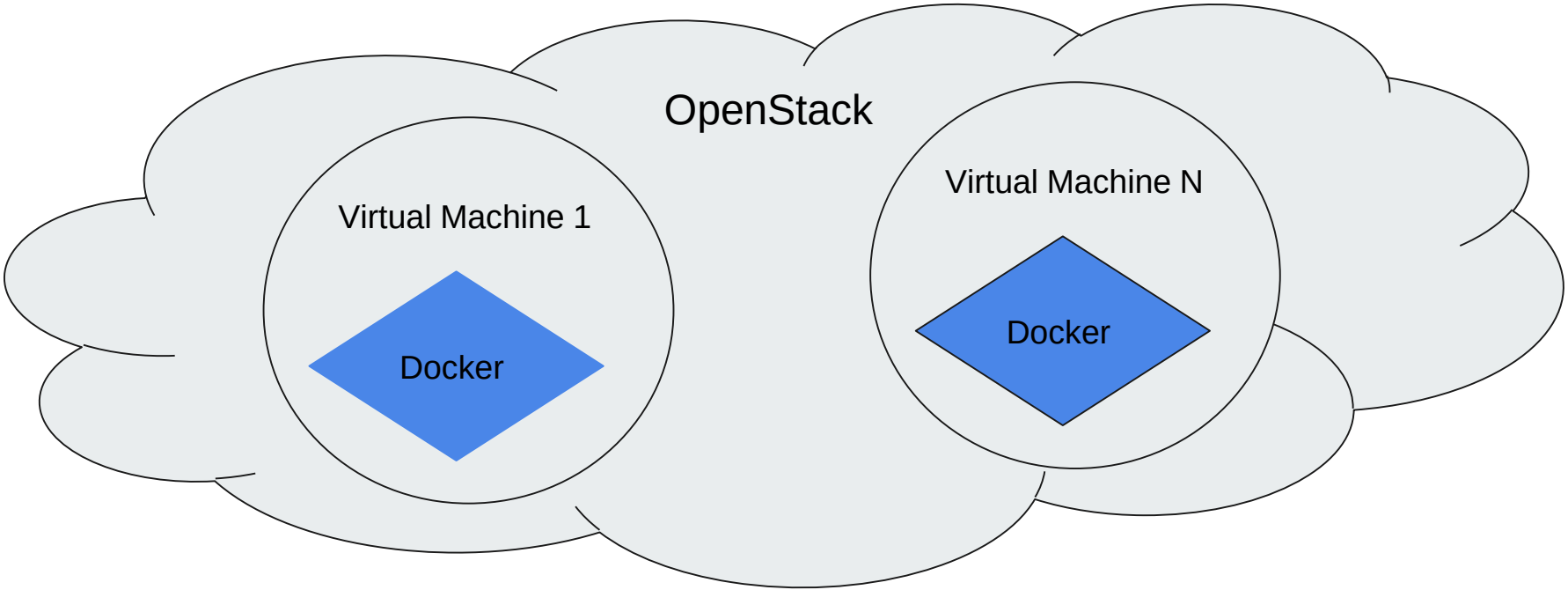
- **Containers are an abstraction at the app layer that packages code and dependencies together**. Multiple containers can run on the same machine and share the OS kernel with other containers, each running as isolated processes in user space. Containers take up less space than VMs (container images are typically tens of MBs in size), and start almost instantly.

- **Virtual machines (VMs) are an abstraction of physical hardware turning one server into many servers**. The hypervisor allows multiple VMs to run on a single machine. Each VM includes a full copy of an operating system, one or more apps, necessary binaries and libraries - taking up tens of GBs. VMs can also be slow to boot.

Container versus Virtual Machine Architecture



Cloud (OpenStack), Virtual Machines, Docker Layout



Running Docker in the Enterprise

Runtime tooling Swarm or Kubernetes. Configuring and deploying Containers is complex.

Adoption of Docker ?

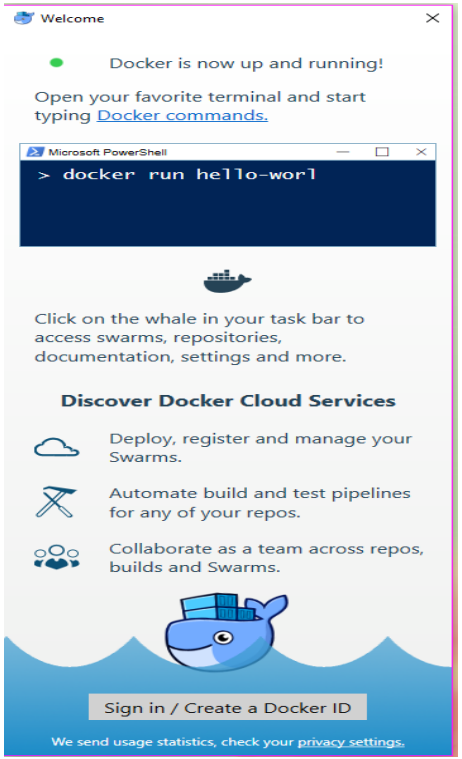
In 2015 The Open Container Project (OCP) was announced as a shared initiative to promote a set of common, minimal, open standards and specifications around container technology. OCP was later rebranded as the Open Container Initiative (OCI) as counts Google, Docker, RedHat and Microsoft as members

Windows Server Containers: The recent launch of Windows Server 2016 has brought the benefits of Linux containers to Microsoft workloads

Installation of Docker (Windows 10 Pro)

Download and double click EXE - Docker for Windows Installer.exe

```
PS C:\Users\rober> docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
5b0f327be733: Pull complete
Digest: sha256:1f19634d26995c320618d94e6f29c09c6589d5df3c063287a00e6de8458f8242
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.
 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://cloud.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/engine/userguide/
```



Installation of Docker (CENTOS)

docker-ce-17.06.2.ce-1.el7.centos.x86_64.rpm
[rsordillo@centos Downloads]$ sudo yum install docker-ce-17.06.2.ce-1.el7.centos.x86_64.rpm

$ sudo systemctl start docker

Verify that docker is installed correctly by running the hello-world image.

$ sudo docker run hello-world

This command downloads a test image and runs it in a container. When the container runs, it prints an informational message and exits.

Building a Container Image with a Dockfile

```
$ docker build -t Infrared360sa -f Dockerfile .
```

IT’s showtime...

Basic Commands:

docker version
docker info
docker images
docker ps
docker help
docker run <image>
docker kill <container guid>

docker run hello-world ← test environment
docker run -it ubuntu bash ← run ubuntu
Container

docker ps -a ← list running Containers
docker rm <Container ID/Name> ← remove Container
Docker rmi <Image ID/Name> ← remove Image

docker container start infrared360sa
docker container logs -f infrared360sa
docker inspect infrared360sa