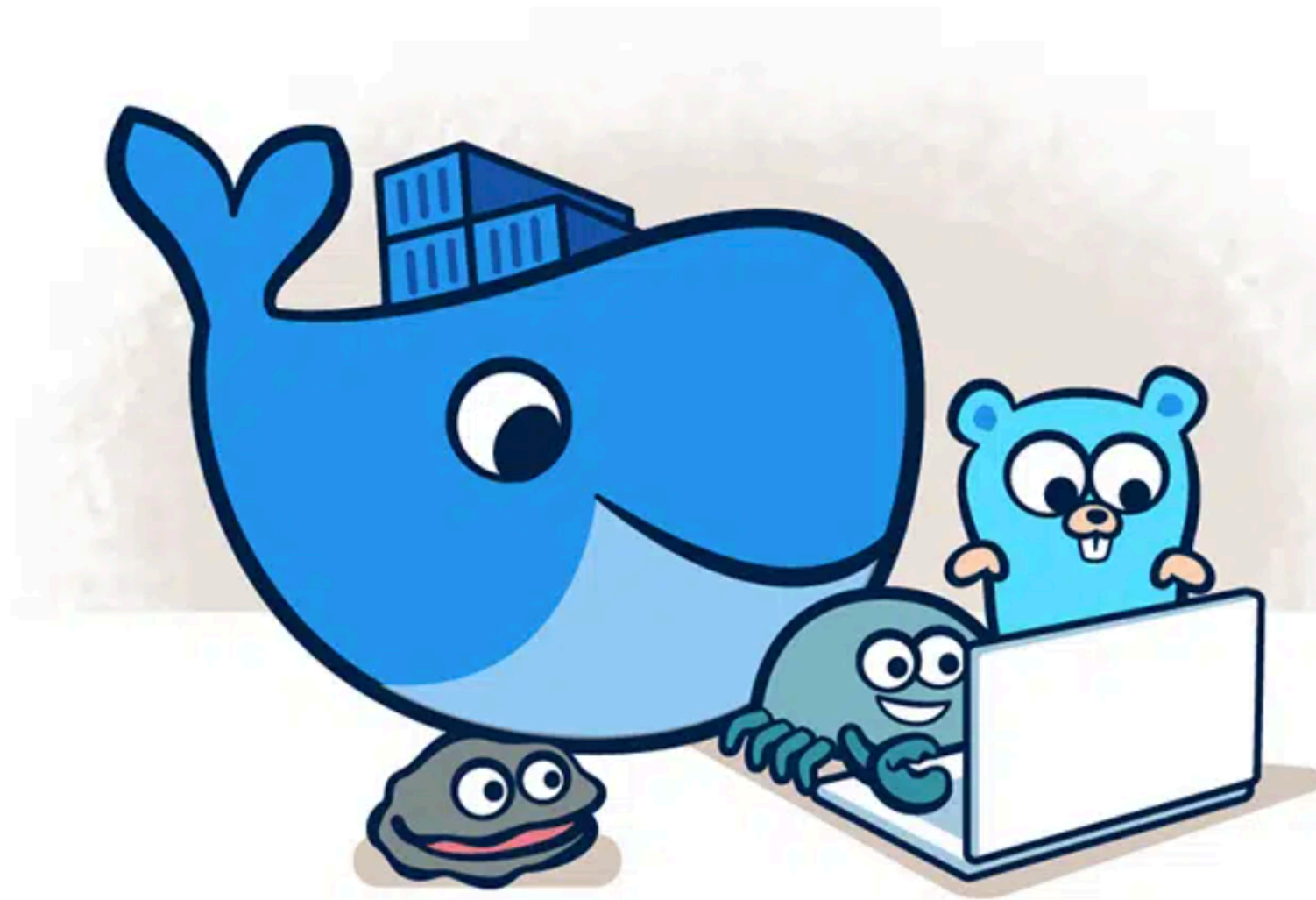


DOCKER

May 13, 2022

Emma Neil



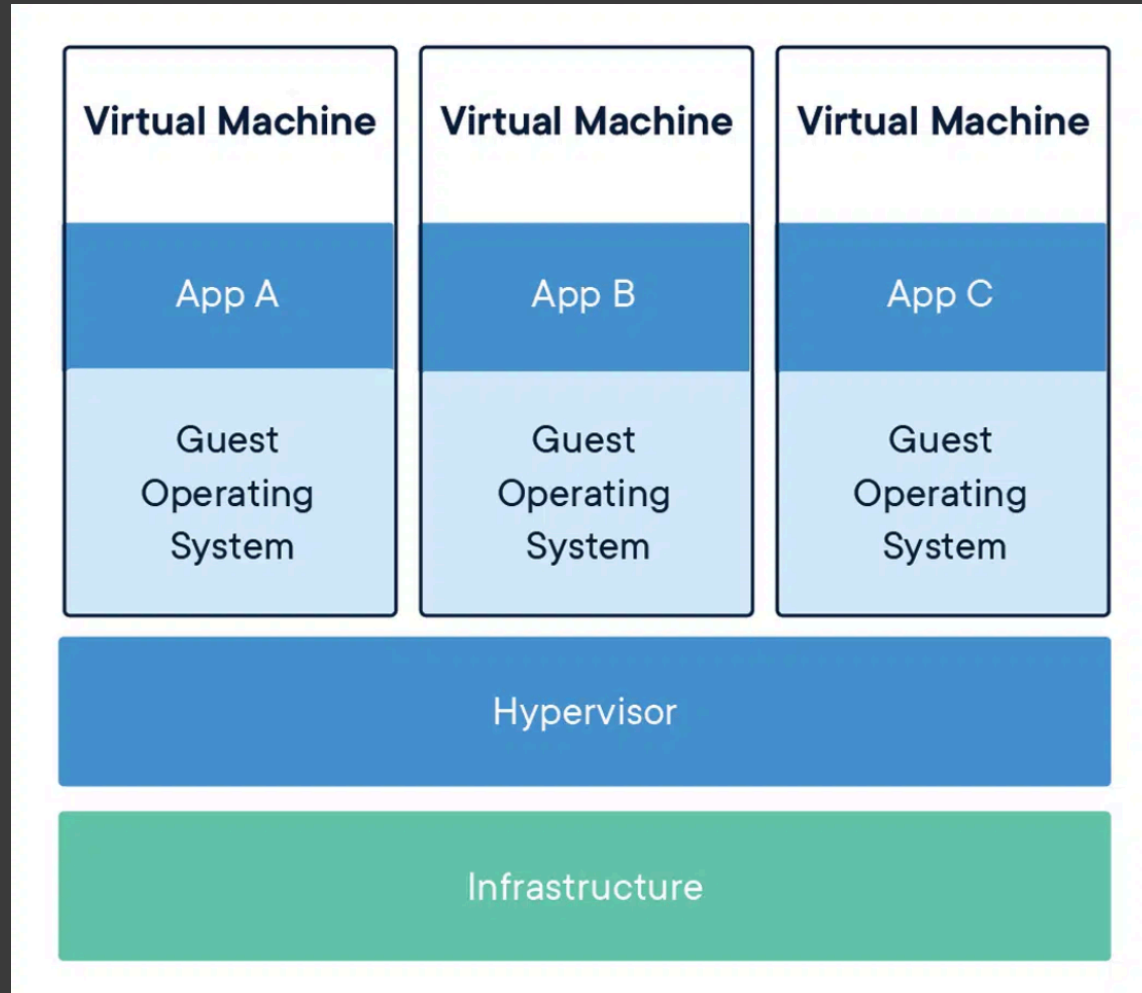
WHAT IS A VIRTUAL MACHINE?

An isolated, software-based version of a computer which allows a physical computer or server to be split into multiple ~virtual~ computing environments.

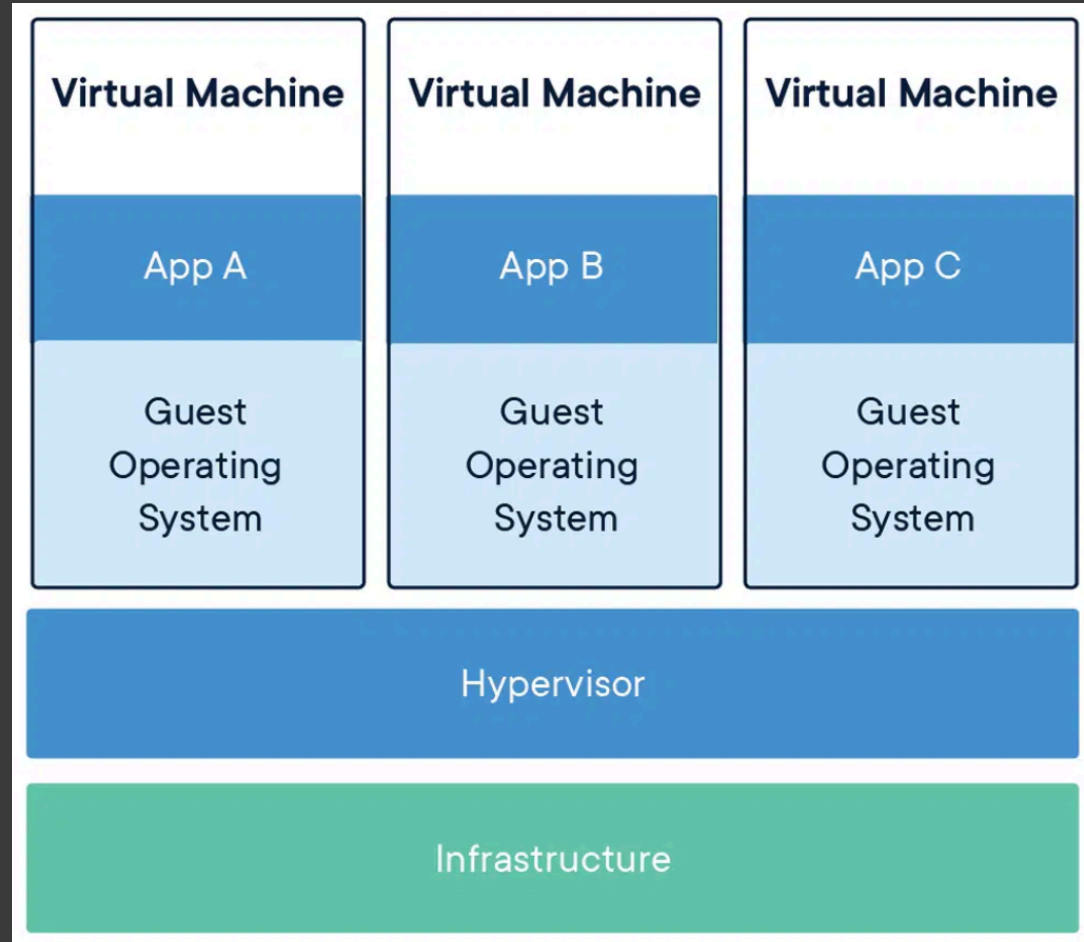
How?

- Hypervisor
- Guest O/S

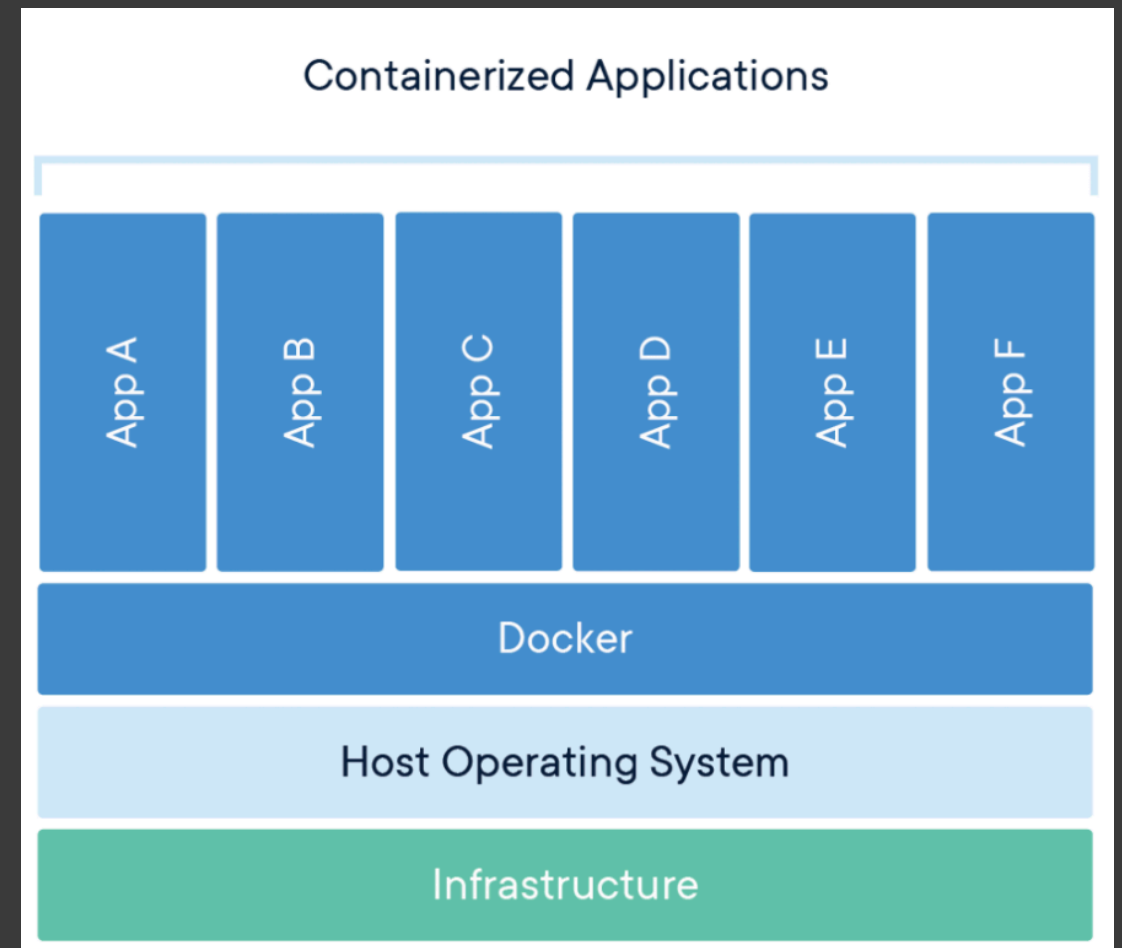
WHAT IS A VIRTUAL MACHINE?



VIRTUAL MACHINE



VS. DOCKER



WHAT IS DOCKER?

A Linux-based solution to the “*it works on my computer*” problem.

It **containerizes** apps and accesses the host OS’s resources directly.

It is consistent, uses resources efficiently, and lightweight.

DOCKER BUILDING BLOCKS



- Docker Image – A read-only template with instructions (in the form of a *Dockerfile*) for creating a Docker container.
- Docker Container – A sandboxed process that is isolated from all other processes on the host machine.
- Docker Daemon – The background process which manages all Docker images, containers, networks, and storage volumes.

DOCKER IMAGES ARE LIKE AN ONION

```
# syntax=docker/dockerfile:1
FROM ubuntu:18.04
LABEL org.opencontainers.image.authors="org@example.com"
COPY . /app
RUN make /app
RUN rm -r $HOME/.cache
CMD python /app/app.py
```

DOCKER CONTAINERS ARE LIKE A WRITEABLE ONION

```
# syntax=docker/dockerfile:1
FROM ubuntu:18.04
LABEL org.opencontainers.image.authors="org@example.com"
COPY . /app
RUN make /app
RUN rm -r $HOME/.cache
CMD python /app/app.py
```

Writeable Layer

IMPORTANT LINUX CONCEPTS

- Namespace – An abstraction of global system resources which assigns processes to a “space” that contains a resource that the process needs.
- Control Groups (cgroups) – A mechanism for dividing tasks into hierarchical groups that each have their own specialized behavior.

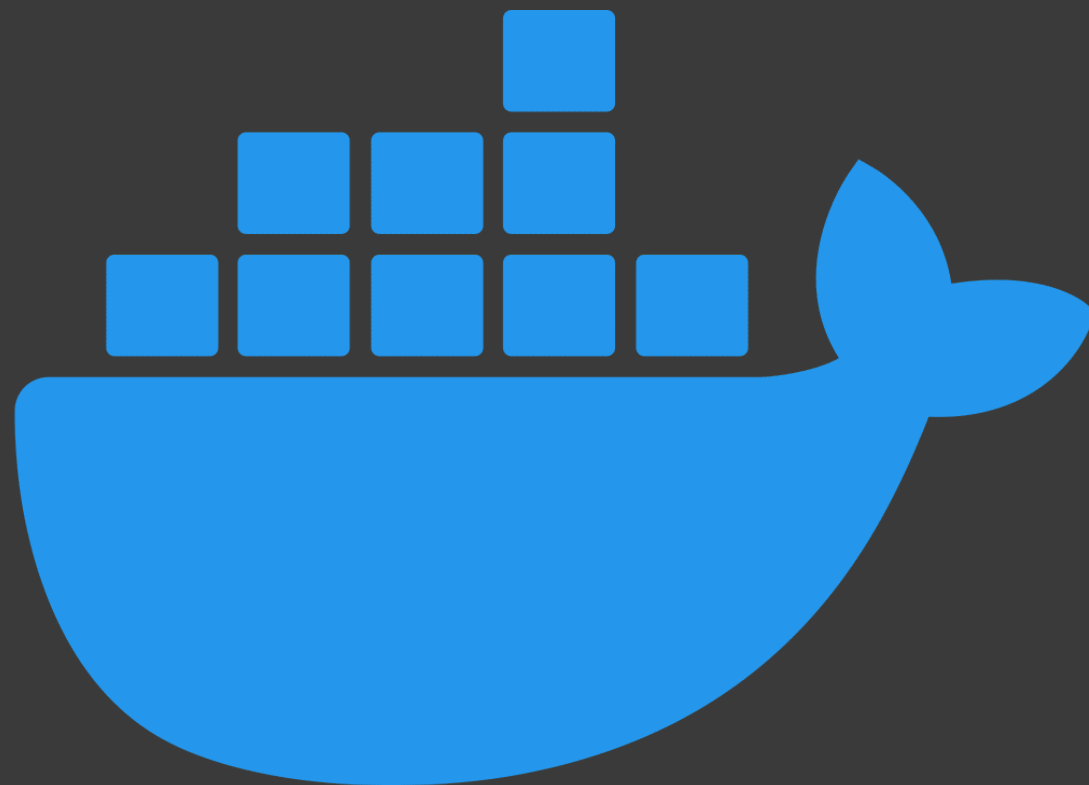
WHY IS DOCKER USEFUL?

- Consistent
- Efficient usage of system resources
- Lightweight and fast

SOURCES

1. "What's Under the Hood of Docker? Process Separation in the Linux kernel by Janos Pasztor"
2. <https://ieeexplore.ieee.org/abstract/document/7093032>
3. <https://www.section.io/engineering-education/lxc-vs-docker-what-is-the-difference-and-why-docker-is-better/>
4. <https://www.kernel.org/doc/Documentation/cgroup-v1/cgroups.txt>
5. <https://www.infoworld.com/article/3204171/what-is-docker-the-spark-for-the-container-revolution.html#:~:text=Hykes%20first%20demoed%20Docker%20at,technology%20powering%20the%20DotCloud%20platform>
6. <https://www.hitechnectar.com/blogs/hypervisor-vs-docker/>
7. Docker Github: <https://github.com/docker>
8. Docker Docs: <https://docs.docker.com/>

QUESTIONS?



docker®