

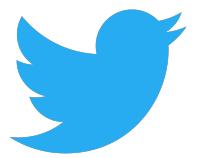
Introduction to Containers

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About Me

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Containers

New* and modern way to **build**,
package and **run** software
applications



* Not much new - containers have been around since 2013**

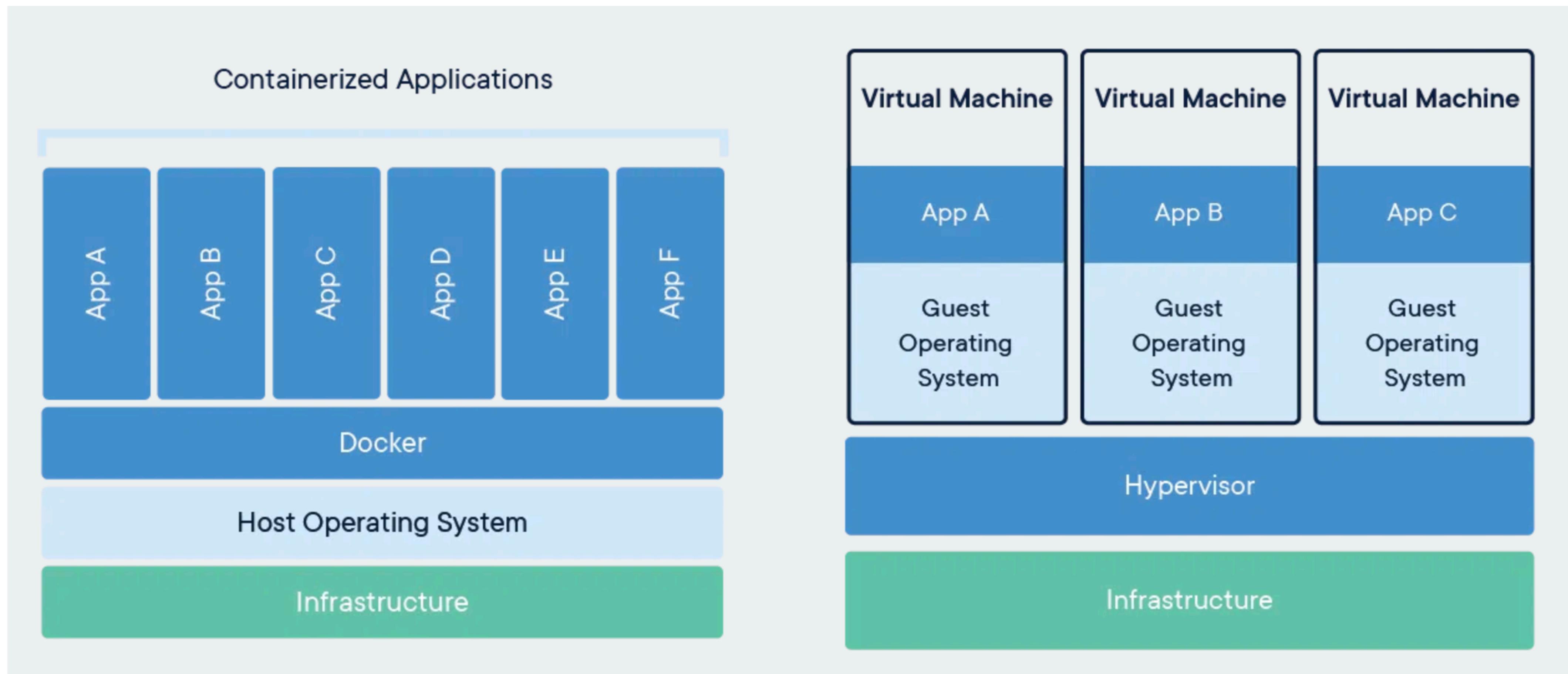
** And even before that

Containers

An application container contains everything needed to run a given application - runtime, dependencies, application binary/code, etc.



Containers vs. Virtual Machines



Benefits of using Containers

- **Interoperability** - you can run **any container** on **any machine** that has a container runtime installed
- **Efficiency** - containers don't have their own OS/kernel and reuse the host OS
- **Security** - containers are isolated, and generally considered more secure than virtual machines*

* This depends on the configuration of the containers. The opposite can also be true.

Why learn containers?

- Containers are a standard way to run applications
- As a developer, it's quite possible your application will be running in a container
- You can use containers in your local development environment for things like databases, caches, etc.
- With containers you can run applications, without having any language-specific tooling installed on your machine

Linux and Windows Containers

- 99% of the time when someone says “Containers” they mean “**Linux containers**”
- Windows containers also exist, but they are not widely used
- **In this presentations we are going to talk only about Linux containers**

A little bit of history

Pre-2013

Containers work by utilising Linux kernel features like **cgroups** and **namespaces**.

These features have existed for a long time, but were considered complex and hard to configure and use.

That's why not many people used containers before 2013...

<https://en.wikipedia.org/wiki/Cgroups>

https://en.wikipedia.org/wiki/Linux_namespaces

A little bit of history

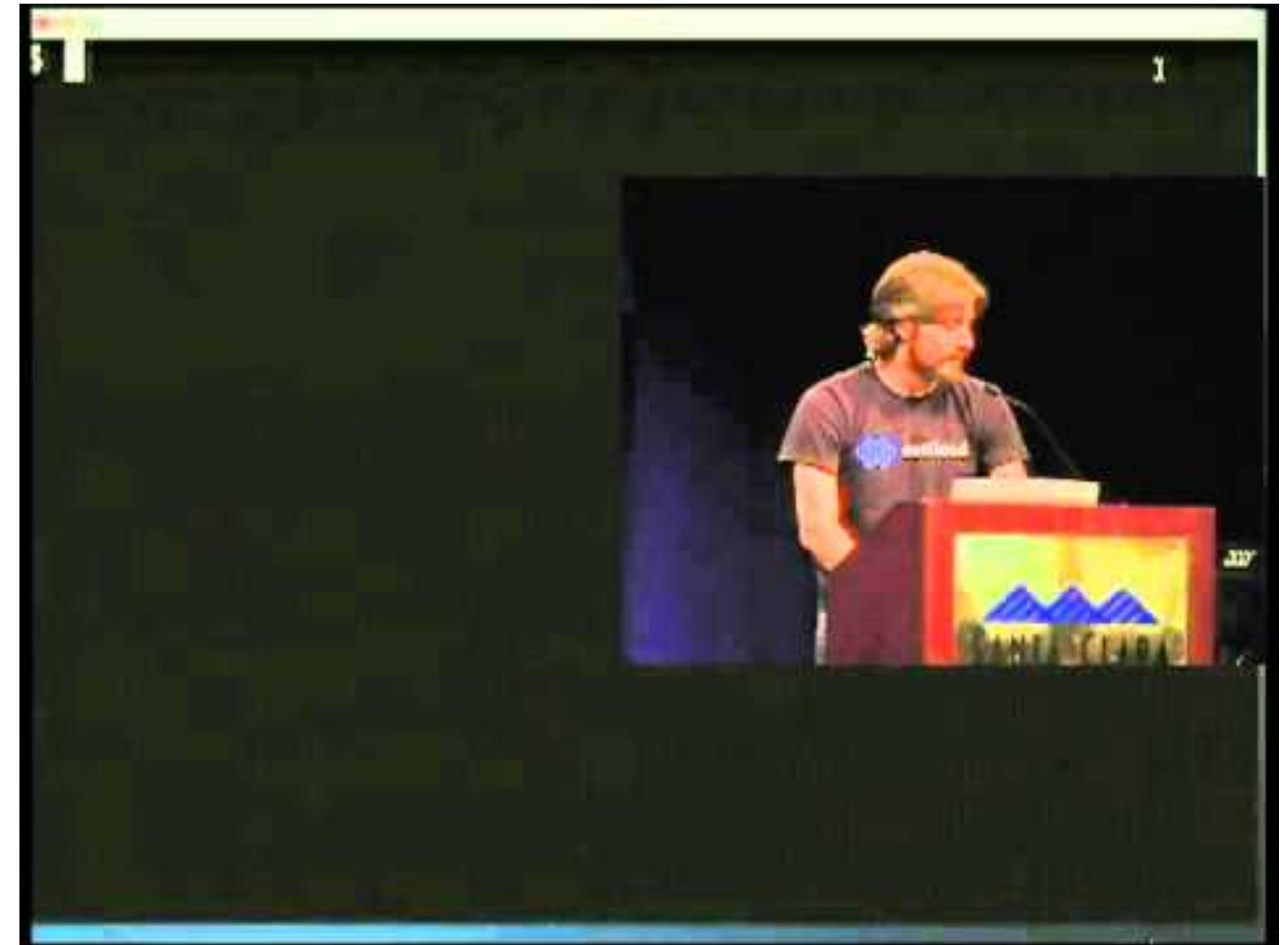
Post-2013

A company called dotCloud was using Linux containers and building tools to make running, building and distributing containers easier.

The company was later renamed to **Docker** and focused on developing these tools.

And the rest, they say is history...

The Future of Linux Containers, Solomon Hykes, PyCon 2013



<https://youtu.be/9xciauwbsuo>

But what exactly are these tools?

Runtimes

Images

Registries

Container Runtimes

The component that runs the containers

Popular container runtimes are **Docker**, **containerd** and **runc**



<https://www.docker.com/>

<https://containerd.io/>

<https://github.com/opencontainers/runc>

Container Images

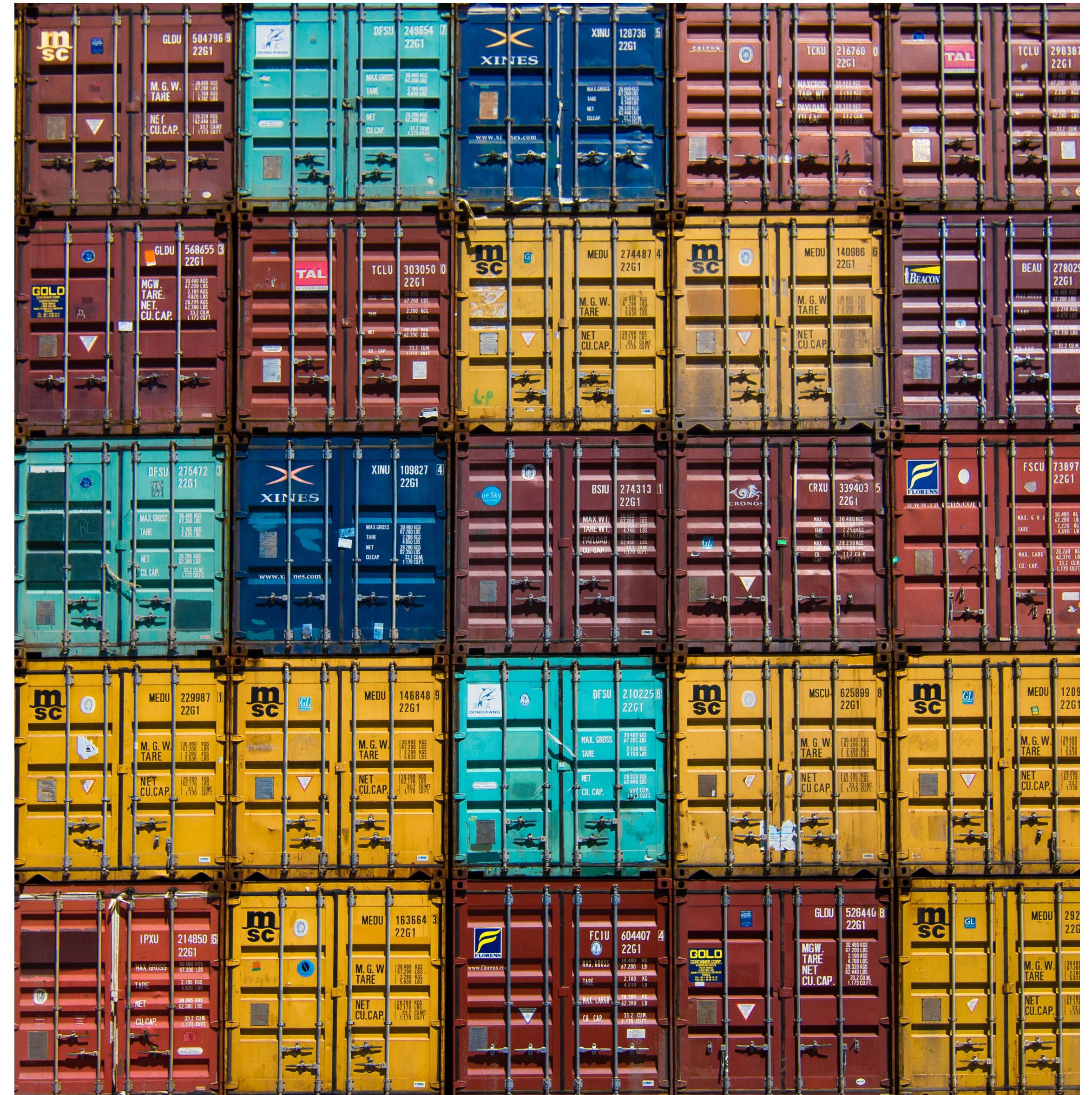
The blueprint for a container

Container runtimes run containers from images

Images consist of layers

We can build images via **Docker** or **Buildpacks**

<https://www.docker.com/>
<https://buildpacks.io/>



Container Registries

A place that **stores** container images

Container runtimes pull images from containers registries and run containers from them

Popular container registries are **Docker Hub**, **GitHub Container Registry**, **quay.io**, **Harbor** and others.

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

<https://github.com/>

<https://quay.io/>

<https://goharbor.io/>



Let's build some containers

Summary

- Containers are one of the most popular way to build and run applications
- Containers have been around for a long time, but went mainstream around 10 years ago
- **Docker** is one of the preferred ways to **build**, **run** and **store** containers

Thank you!



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