



FreeBSD OCI Containers

State of The Union



whoami



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- \$pronoun: He/Him
- \$passion
 - ◆ OS Software
 - ◆ OS Hardware
 - ◆ Woodworking



Agenda



- Containers
- OCI (Open Containers Initiative)
- FreeBSD
- Why this is important ?
- How to contribute ?
- Some demos (if there is time left)





Containers



Definition Anti Patterns



→ Specific Containers Implementations

- ◆ Jails
- ◆ Zones
- ◆ Linux cgroups (Control Groups)

... or Even Worse!!!

→ Specific Vendors

- ◆ Docker Containers



Someone would ask ...



What are Containers then ?



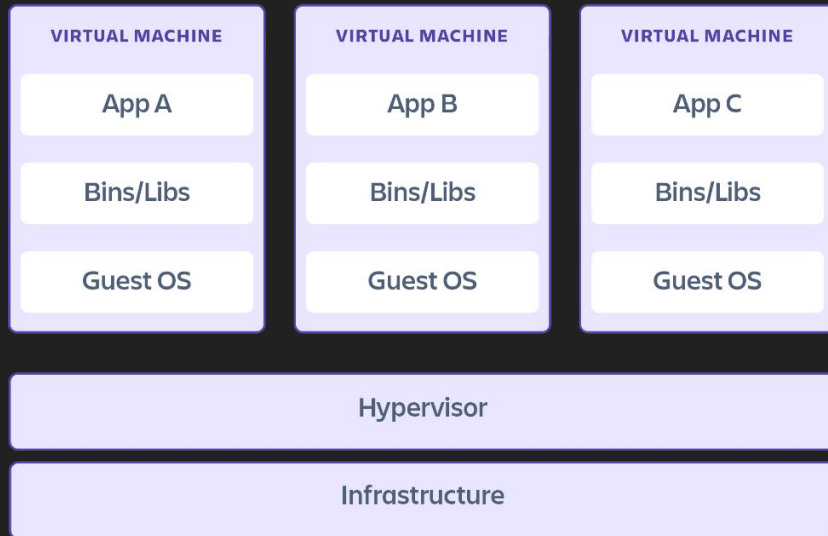
I would answer ...



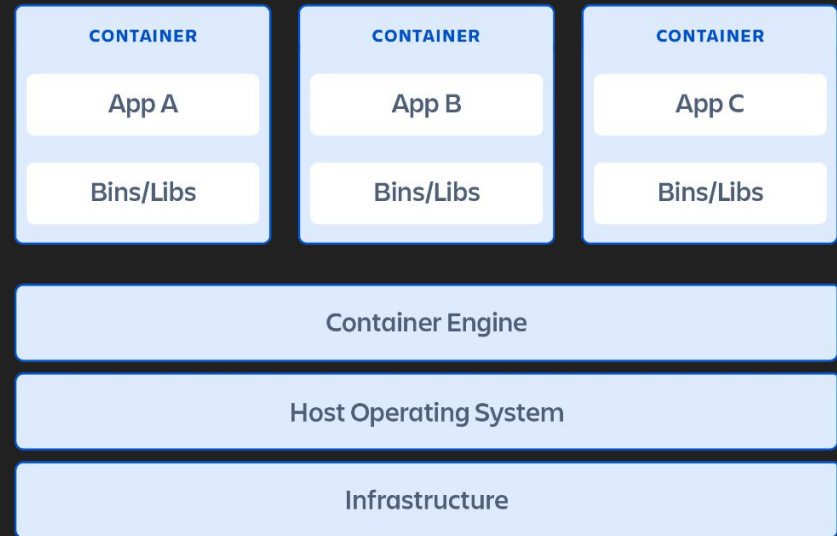
A Lightweight OS Level Virtual Entity



Virtual machines



Containers



Someone would ask ...



So ? What made them that
popular ?



I would answer ...



→ Technical Factors

- ◆ Lightweight
- ◆ Fast
- ◆ Efficient
- ◆ Standardisation
- ◆ Packaging Format

... yet they are not perfect

- VMs still offer a more strict/harder isolation
- New breed of Lightweight VMs and Customised Guest OS



I would answer ...



→ Timing Factors

- ◆ VDE (Virtual Development Environments): Remember Vagrant ?
- ◆ CI/CD
- ◆ DevOps/DevSecOps
- ◆ Microservices

... yet it is still not perfect

- You still see over-Engineered systems
- There is now a lot of moving parts you need to cater for
- Certain very specialised SW can't just be packaged once and run everywhere





OCI (Open Containers Initiative)



man oci



“The Open Container Initiative (OCI) is a lightweight, open governance structure (project), formed under the auspices of the Linux Foundation, for the express purpose of creating open industry standards around container formats and runtimes. The OCI was launched on June 22nd 2015 by Docker, CoreOS and other leaders in the container industry.”



Once upon a time ...



- There was a dotCloud (2008) that became Docker (2013)
 - ◆ Introduced the Docker Runtime Engine
 - ◆ Introduced Container Images and Layers
 - ◆ Introduced Container Registries
 - ◆ Introduced Docker Machine later to be Docker Desktop
- Then came along the smart people of CoreOS
 - ◆ Introduced AppC (App Container) Specification
 - ◆ Introduced rkt Container Runtime
 - ◆ Introduced focusing more on Open Standards and Specifications
 - ◆ That helped introducing Jetpack for FreeBSD
- Then there was a Fight!
 - ◆ Introduced the OCI (Open Containers Initiative)



The 3 Pillars ...



- image-spec
- distribution-spec: Standard implementation donated by Docker under name *Distribution*
 - ◆ Docker Hub, AWS ECR / AWS ECR Public Gallery, Microsoft Azure Container Registry and GCP Artifact Registry
 - ◆ In addition to ones which you can run locally or host on your own
- runtime-spec: Standard implementation donated by Docker under name *runc*
 - ◆ crun and youki from Containers (Open Repository for Container Tools) project
 - ◆ VM based runtimes like Kata Containers runtime

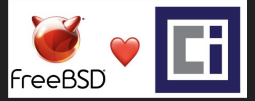


Worth mentioning ...



- CNCF (Cloud Native Computing Foundation): Hosts different projects many of them play a big role in the Containers Ecosystem
 - ◆ Containerd
 - ◆ CNI (Container Network Interface)
 - ◆ K8S (Kubernetes)
 - ◆ etcd
- Moby: An open community started by Docker to drive open innovations in the Containers ecosystem





FreeBSD



man freebsd



- Open Source UNIX OS
- Supports a variety of platforms
- Focuses on features, speed and stability
- Derived from 386BSD
- Has pioneered Containers technology since 2000 with its Jails feature
 - ◆ Initially developed by Poul-Henning Kamp
 - ◆ Robert Watson
 - ◆ Bjoern A. Zeeb
 - ◆ James Gritton



FreeBSD meets OCI



→ Samuel Karp

- ◆ Chair of TOB (Technical Oversight Board) @ OCI
- ◆ Staff Software Engineer @ Google
- ◆ Started runj: A Jails OCI compliant runtime written in Go

→ Doug Rabson

- ◆ Veteran FreeBSD Src Committer
- ◆ Started ocijail: A Jails OCI compliant runtime written in C/C++
- ◆ Did port many of the Containers project tools
 - Podman: A drop-in replacement for Docker
 - Buildah: A tool to help working with container images
 - Skopeo: A tool to help work with container registries

→ Other FreeBSD contributors helped

- ◆ Porting Containerd



Someone would ask ...



But ... why then Linux
containers became more
popular than Jails or Zones ?



I would answer ...



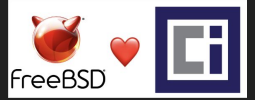
→ Money factors

- ◆ Linux containers core tech started @ Google
- ◆ Big investments were pouring in
- ◆ Projects like K8S

→ Tech factors

- ◆ A decade or more ago it was much easier to have a Linux laptop with a decent DE than it is on FreeBSD or maybe also OpenBSD
- ◆ Docker did succeed a lot in making it dead simple for Software Developers get started with Containers on almost any laptop: Linux, Mac OS and on Windows





Why this is important ?



Jails runtimes did already exist...



- iocage
- ezjails
- pot
- BastilleBSD

... but they all lacked

- Standardisation
- Unified image concept if had images at all
- Very detached from the mainstream Containers ecosystem



FreeBSD has a lot more to offer...



- OCI Containers run natively on FreeBSD: No VM Included!
- With Linuxulator you can even run Linux containers: To some extent :D
- Brings mainstream ecosystem to FreeBSD
- Brings FreeBSD as a proud member to mainstream ecosystem
- Help developers migrate with ease to work with or on FreeBSD
- They can even still develop using Linux containers





How to contribute ?



Here is a list to start with...



- Join FreeBSD OCI Runtime WG
 - ◆ <https://github.com/opencontainers/wg-freebsd-runtime>
- Join Podman testing: At the moment running till end of the year but can be extended
 - ◆ <https://github.com/oci-playground/freebsd-podman-testing>
- Help porting more of the Containers ecosystem to run natively on FreeBSD
- Help further maintaining the currently available ports
- Start using FreeBSD as your main development machine
- If you have cases (research or business) where you can use FreeBSD OCI Containers
- Join the freebsd-jail@freebsd.org mailing list
- Join the #freebsd-jails IRC channel



Worth mentioning



- FreeBSD Foundation secured a big funding to help further bring more Laptops support for FreeBSD!!!





Demos!!!

