Containers and Some Odds and Ends About Computational Infrastructure

DOSAR

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Follow Along at:

- https://osg-htc.org/dosar/ASP2022/ASP2022_Materials/

Open Science Grid

Containers

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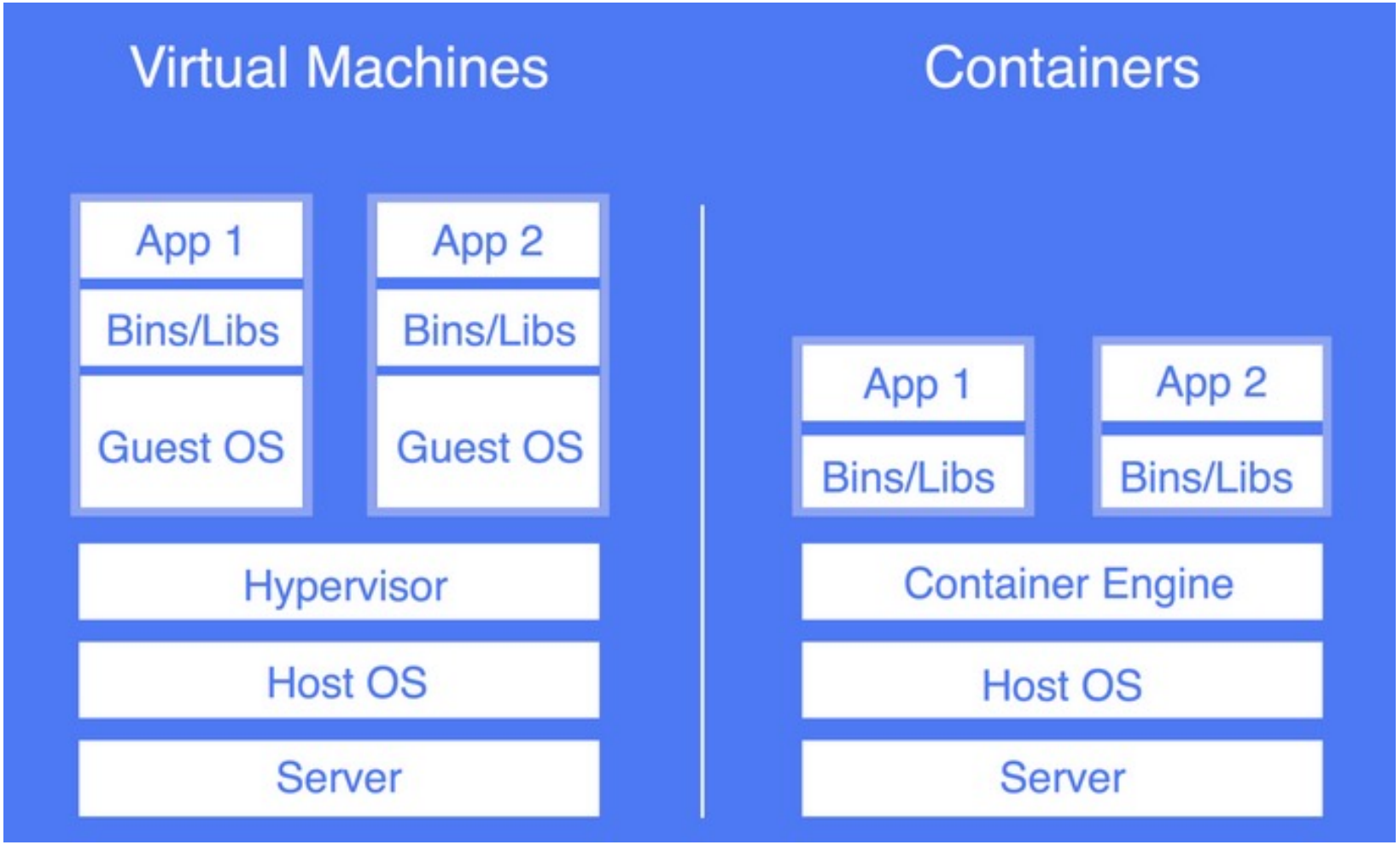
What are containers?

- Operating System Level Virtualization
  - Lightweight, providing the minimal level of overhead for the application to function properly.
  - Super minimalist VMs
  - No Hypervisor
  - Abstracts away the operating system and hardware
  - Share the OS Kernel with other containers
  - Container size is very small and therefore quick and easy to provision

How do they differ from VMs?



More differences…

- Size
  - Containers are usually 10s of MB
  - VMs can be several GB
- Shared hypervisor vs. shared kernel
- VMs have their own kernels so a deeper level of isolation
- Containers virtualize the OS while VMs virtualize the hardware

Container Advantages

- Size
- Less resource intensive
- Quick provisioning
- Easy allocation of resources
- Quicker development cycles
- Cost effective
- Very good for microservices

Container Disadvantages

- Security – shared kernel with root access
- Less flexibility in OS
- Networking can be tricky
  - Properly configuring sufficient networking resources is challenging

Container Software

- Docker
- Singularity
- LXC, LXD
- Solaris Zones
- RKT
- BSD Jails
- chroot

Questions?

- Questions? Comments?
  - Feel free to ask us questions now or later:

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Exercises start here:

- https://osg-htc.org/dosar/ASP2022/ASP2022_Materials/

Presentations are also available from this URL.