

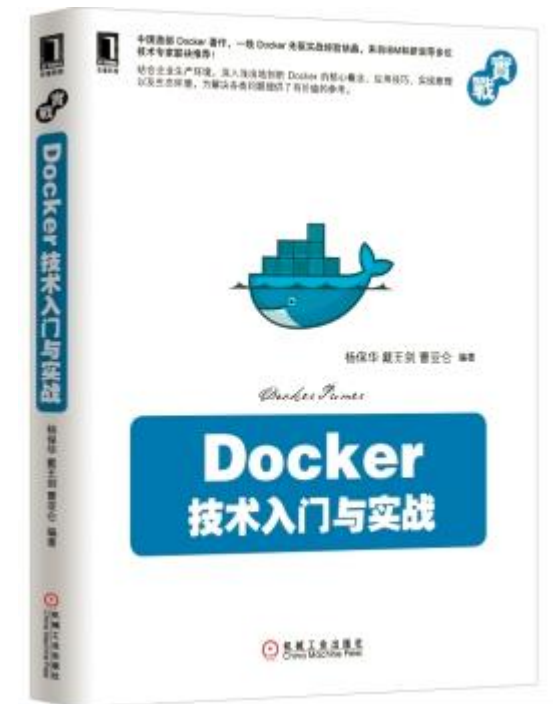
Container 101

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2015-11-05

Docker -- 从入门到实践

- https://github.com/yeasy/docker_practice
- Open-Source since August, 2014
- Contributors: 20+
- Commits: 300+
- Stars: 1300+
- Readers: 65, 000+*
- Views: 800, 000+

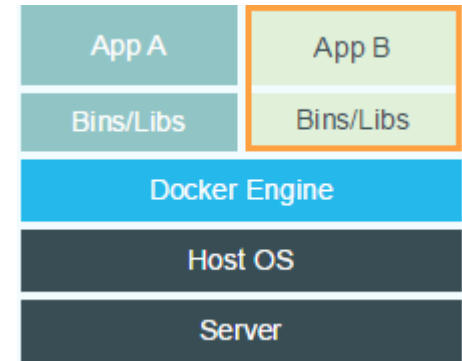
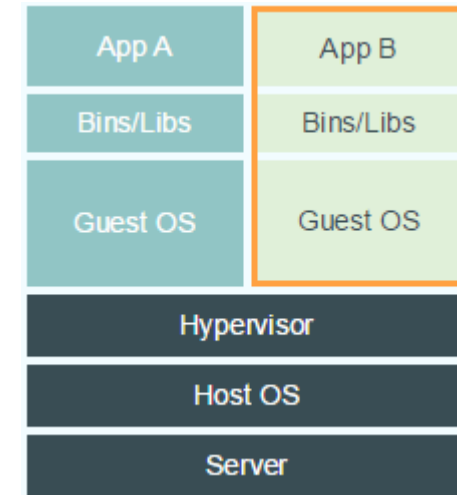
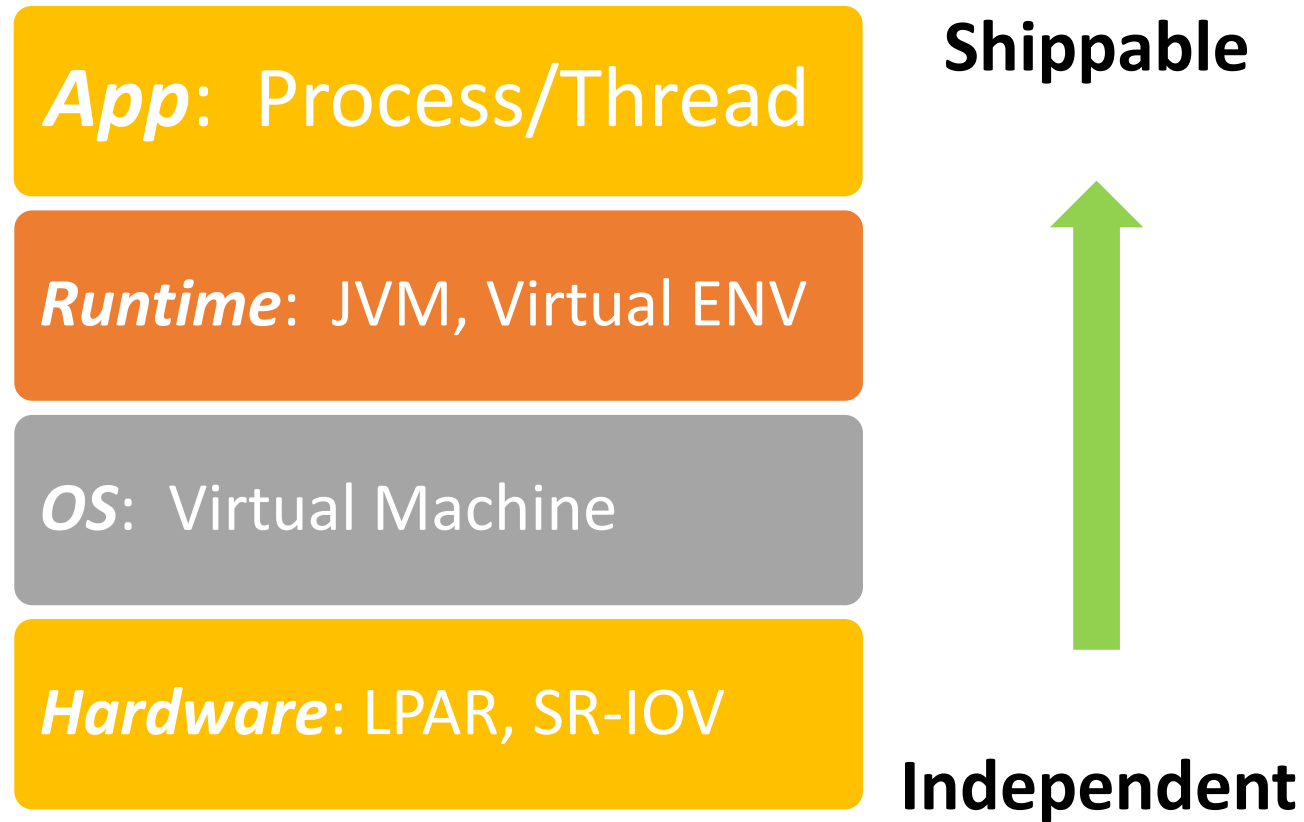


Brief History

- Chroot (1982)
- Original Design for Namespace (1992)
- FreeBSD jails (2000)
- Linux-Vserver (2001)
- Solaris Containers (2004)
- OpenVZ (2005)
- Cgroups (2006)
- LXC (2008)
- Docker (2013)
- LXD (2015)



Abstractions Does Matter



Operating System-level Abstraction

- vs. Hardware virtualization in VMs
 - Share host's kernel
 - private spaces for processing (process ids), networking and fs
- More agile/lighter approach
 - MBs vs GBs
 - Resize almost instantaneous
- Much higher density per node
 - 1000 vs 10
- Allow low overhead access to specialty devices in the host
- Reaching maturity in terms of security and usability
- Leverage Cgroups and namespaces

CGroups and Namespaces

- CGroups (currently 12)
 - Control resources allocated to group of processes, to restrict the amount of resources a group consumes
 - CPU, Memory, I/O bandwidth, network bandwidth, device access, ...
- Namespaces (currently 6)
 - Virtualize resources, so they are only visible to processes in the same namespace
 - Network
 - UTS: hostname, domain name, ...
 - Mount: independent mount trees
 - IPC: semaphores, message queues, ...
 - Process ID: independent processes trees starting at PID 1 (init)
 - User: provides security for hostile roots
- Containers can use all or none of groups or namespaces

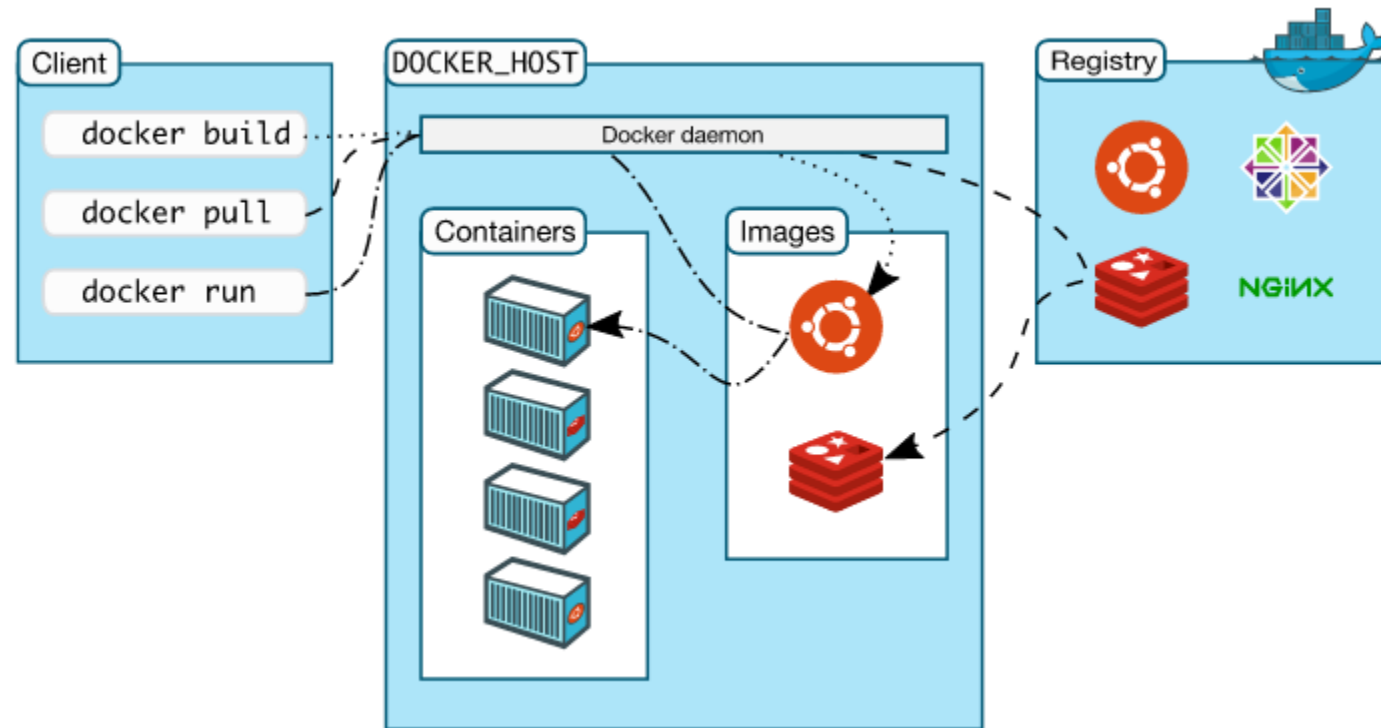
Container Category

- System Container
 - E.g., LXC, OpenVZ
 - Typically start an init System
 - Looks and uses as a VM
 - System services like sshd are started during the initialization
- Application Container
 - E.g., Docker is a framework that uses Libcontainer/LXC to start a container with a single application
 - As a software based application

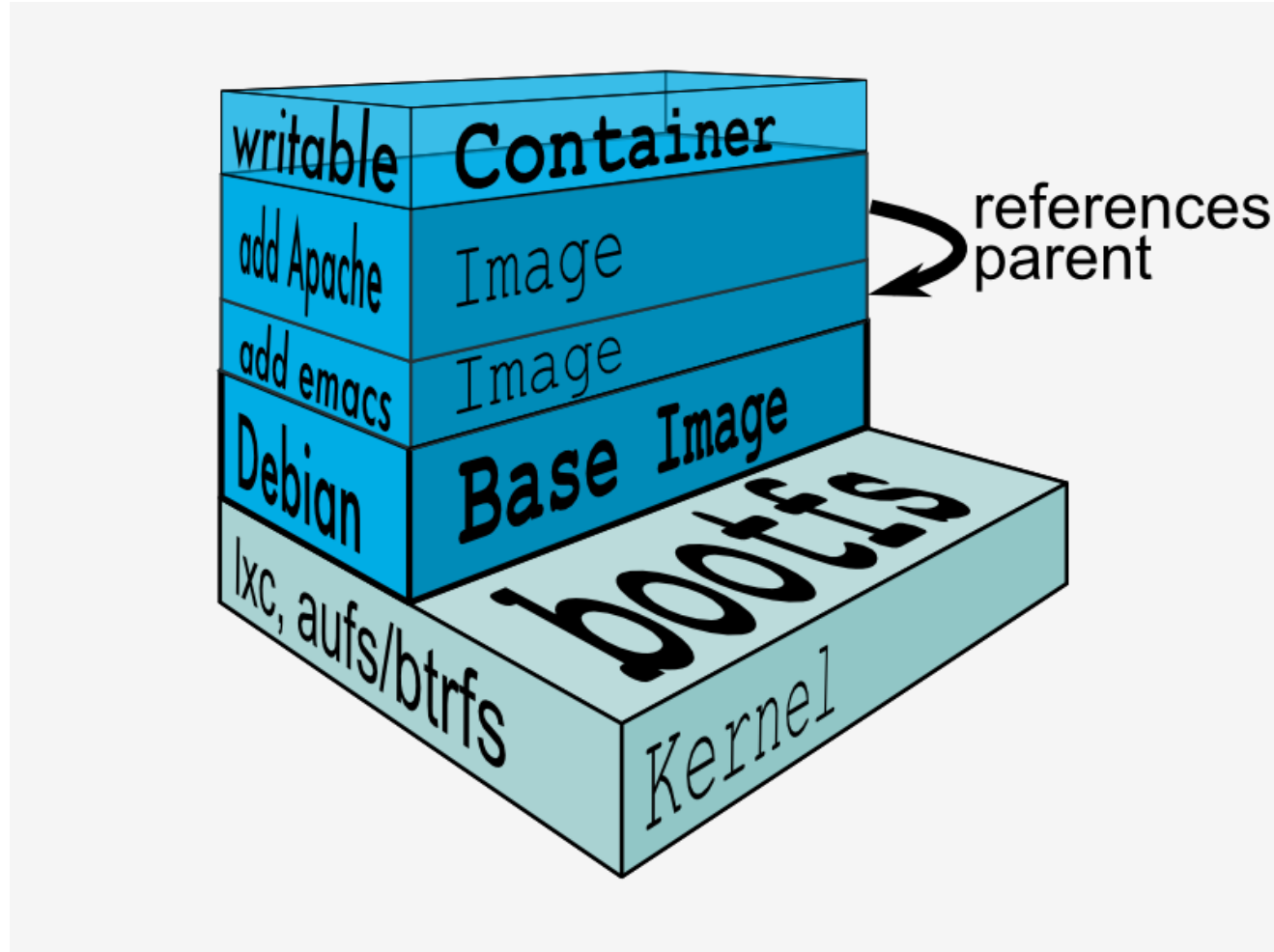
Docker

- Not a new container, but a framework that leverages existing container techniques and other wrappers
 - Image/UFS
 - Libcontainer
 - DockerHub
- Other emerging containers
 - LXC
 - W/Garden
 - AppC/Rkt...
- Container based OS:
 - CoreOS
 - Atomic
 - LXD
 - Photon...

Docker Usage Process

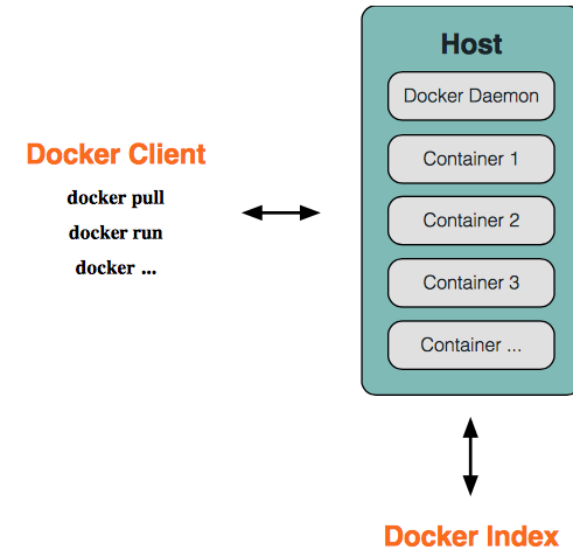


Docker Image



Docker Component

- Docker Daemon
 - Core component, running at Docker host
 - Receive REST API, manage images, etc.
- Docker Client
 - User interface binary for Docker daemon
- Docker Registry
 - Images holder
 - DockerHub
- Docker Engine
 - Execution drivers/environment for container
 - LXC → libcontainer
 - Storage drivers



DockerCon 2015



Q&A

