INTEL® CLEAR CONTAINERS

Amy Leeland
Program Manager
Clear Linux, Clear Containers
And Ciao

Containers are…

Speedy

Fast create, update and uninstall cycle.

Request and provision in (milli)seconds

Manageable

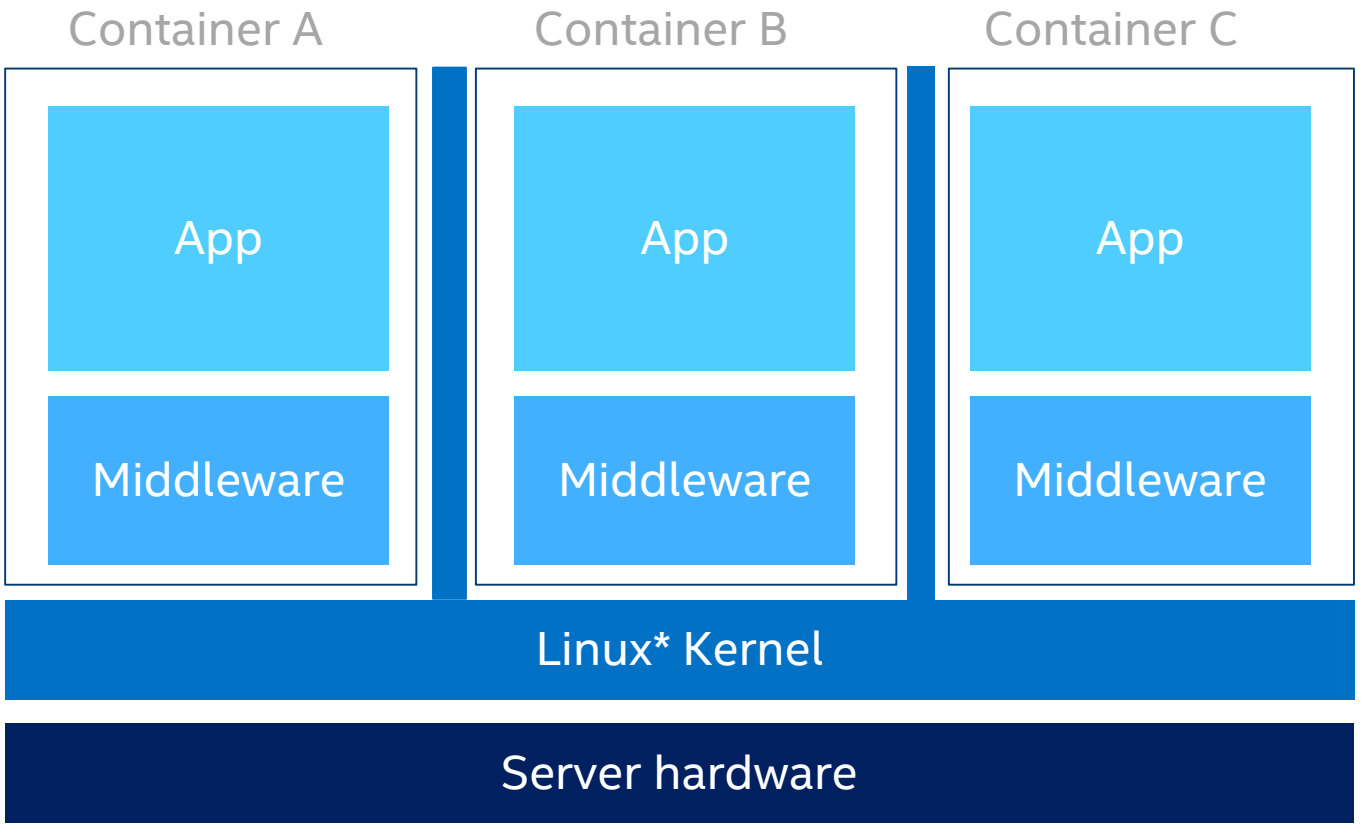
Containers take the complexity out of bundling, distributing and installing applications

Easy

Simple and easy to use and maintain

Secure?

What about security and isolation? Can a container include hardware isolation like a Virtual Machine?



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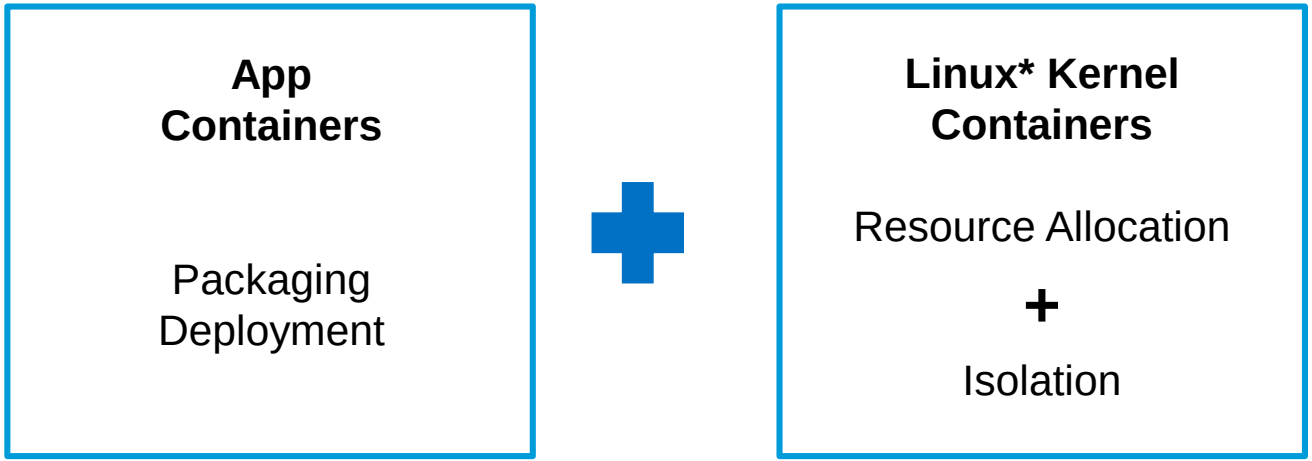
The word “Container” is used for different things

Containers =



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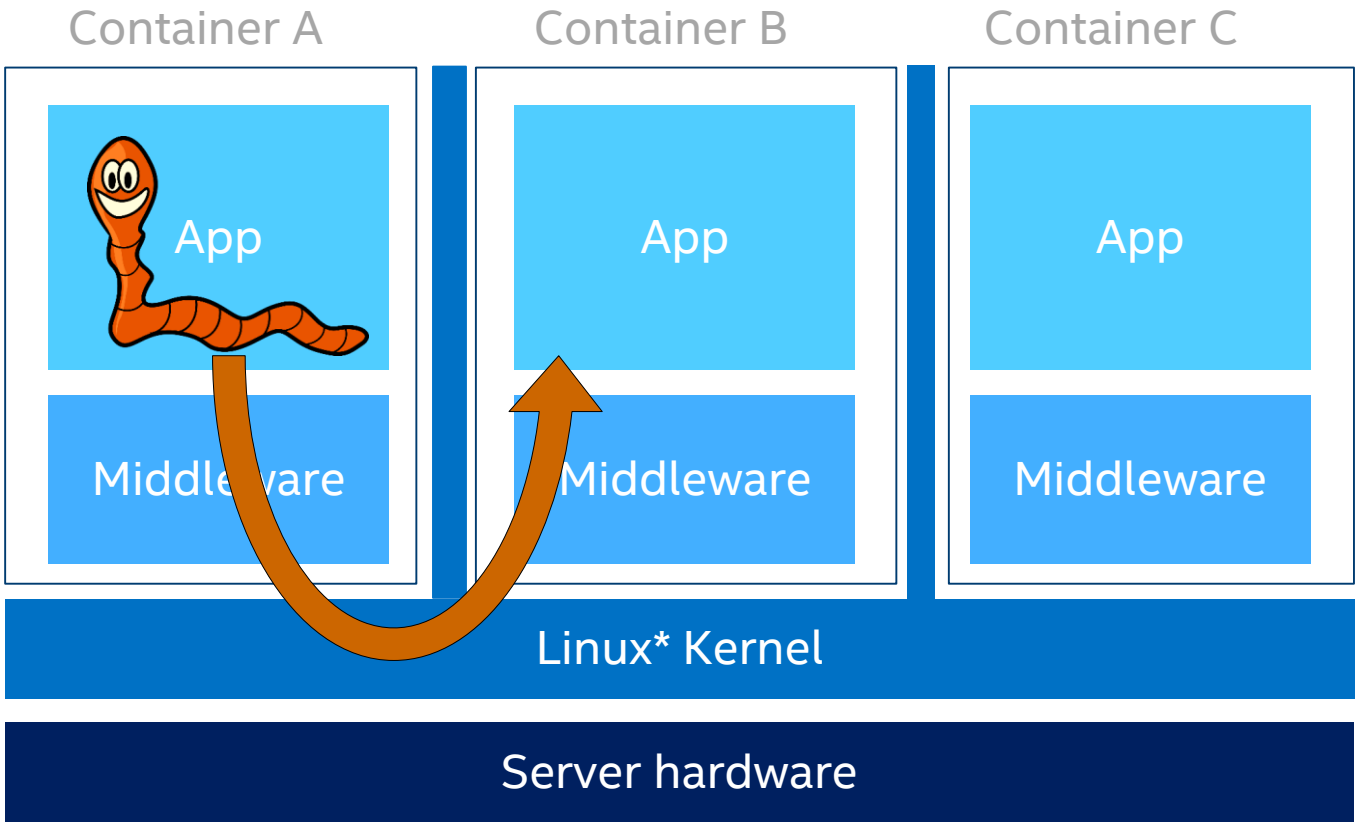

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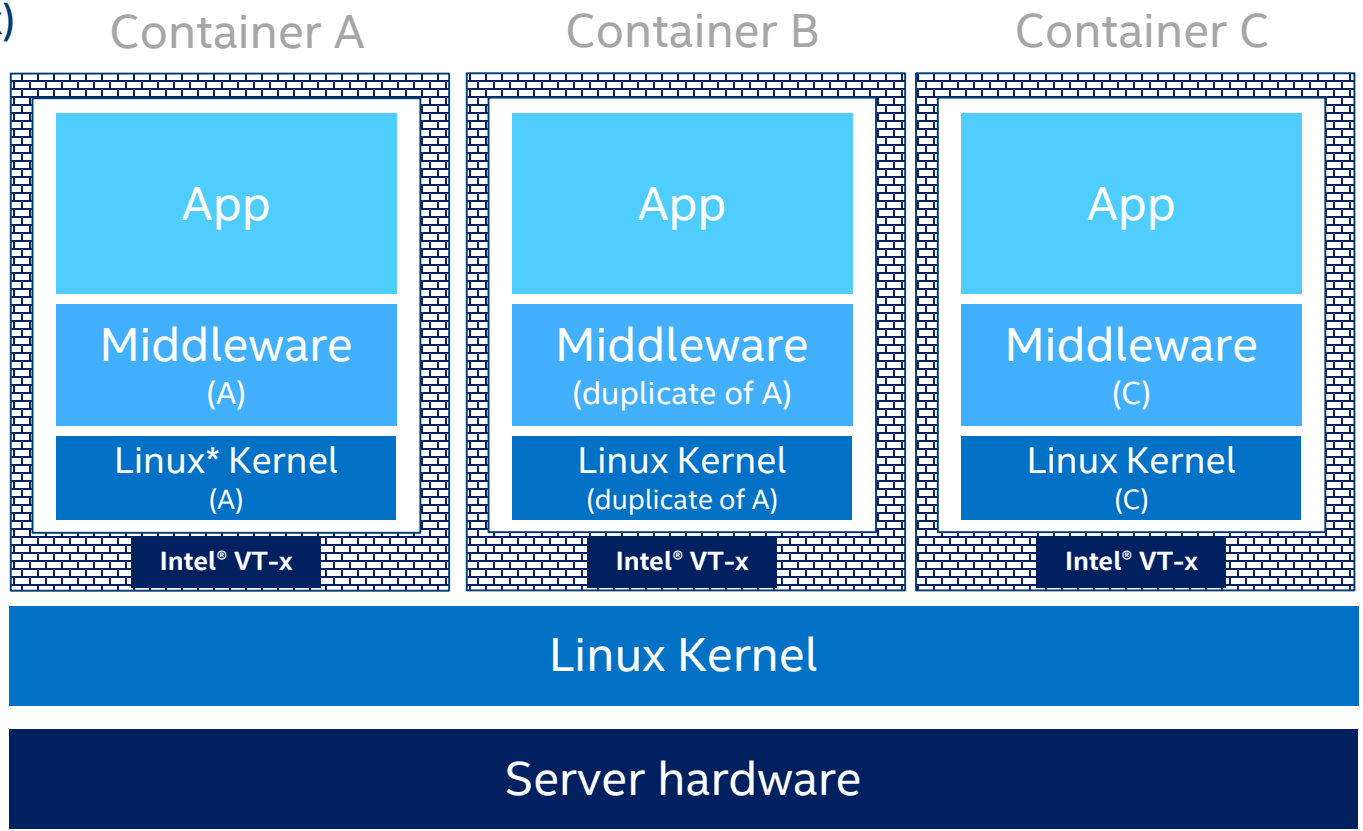
http://www.clearlinux.org

Intel® Clear Containers and Intel® Virtualization Technology (Intel® VT-x)



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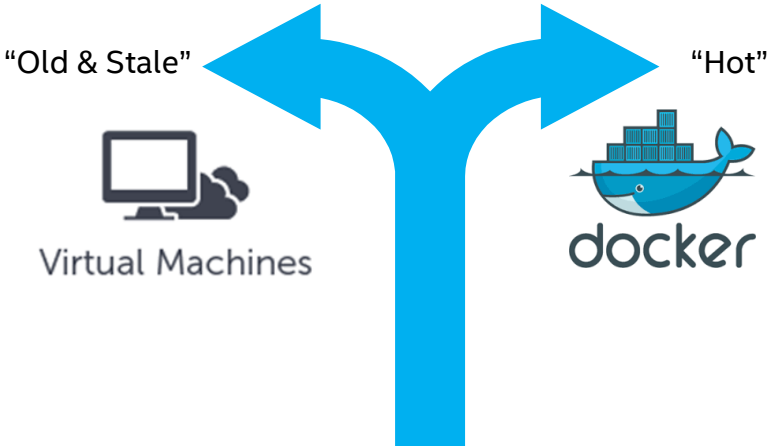
With Clear Containers, there is now a continuum between containers and virtual machines

Before Intel® Clear Containers
Q1'15



After Intel Clear Containers
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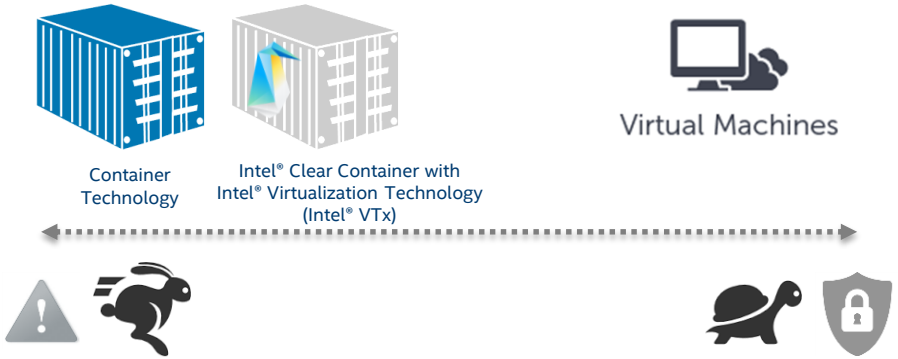

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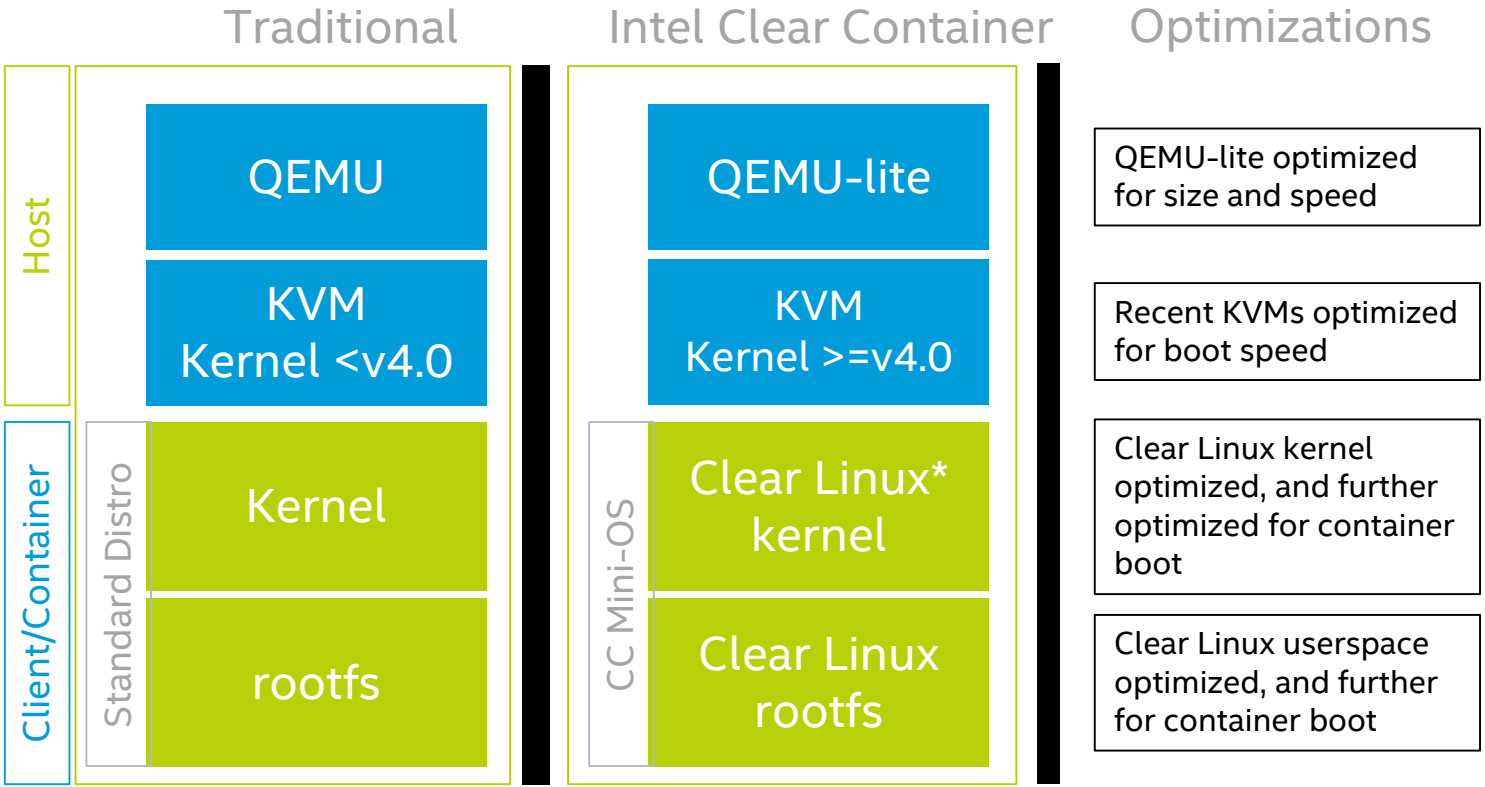
Intel® Clear Containers vs traditional VMs

How we made them smaller and faster



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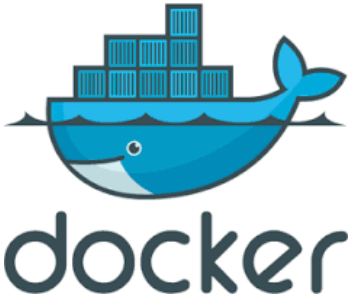
Intel® Clear Containers with Docker*!

2.0

Intel® Clear Containers 2.0 Available on GitHub* and clearlinux.org

OCI

Intel® Clear Containers are OCI spec compatible



1.12

Switchable runtime in Docker 1.12

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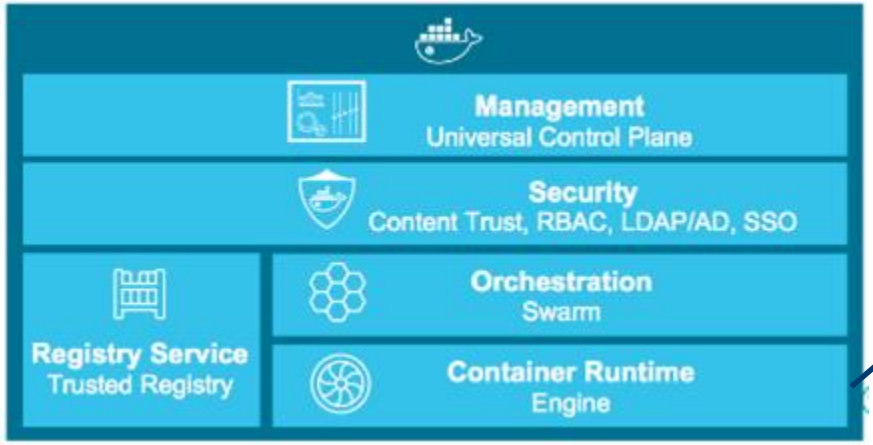
Intel® Clear Containers adds a new runtime for Docker*



Intel Clear Containers provide a plugin replacement of runc with cor, our OCI runtime.

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Industry engagement: CoreOS

Security-minded capabilities

rkt is built from the ground up to be ready for security-focused environments. Many of these principles weren't invented at CoreOS — instead, we applied common, everyday best practices that have been largely overlooked in the container industry so far.

Architected for best practices

rkt strives to embody the Unix "tools" philosophy and learn from decades of best practices in architecture and security. This includes image signature validation by default, and privilege separation between different tasks, like image discovery and retrieval — unprivileged operations in rkt — versus container execution, requiring root access. rkt's daemonless model means it can integrate easily with standard init systems, such as systemd and upstart, or with cluster orchestration systems, like Nomad and Kubernetes.

Pluggable isolation, including KVM-based "Clear Containers"

Modular isolation means that rkt supports a variety of techniques for running containers. While software-isolated Linux `cgroup`s containers are the default, advanced solutions like Intel's KVM-based "Clear Containers" or host-level rkt `fly` provide selectable degrees of container confinement.

Intel Clear Containers

With Intel's Clear Containers-based stage1, rkt is able to execute standard ACIs with CPU-enforced isolation. This balances the best of both worlds: application-focused packaging and deployment efficiencies, with the explicit hardware-guaranteed isolation of a virtual machine.

rkt fly

With the `fly` stage1 isolation environment, rkt executes a standard container image with full access to the host environment. This means you can run specially-privileged software, such as system management agents that need full host access, while maintaining image signature and deployment policies. Using rkt with `fly` retains the packaging and distribution benefits of app containers for even the lowest-level system programs.

- CoreOS announces use of Clear Containers technology in rkt 1.0
- We provide lightweight Tier 1 OSV support

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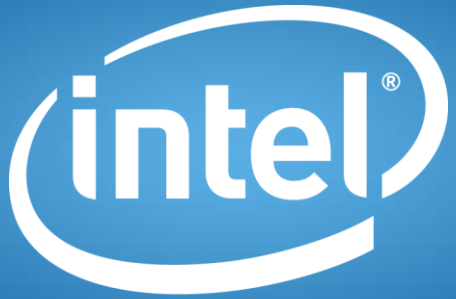

Software