

Intro to rkt

Derek Gonyeo



Outline

- ▶ What are containers?
- ▶ What is rkt?
- ▶ How do I get rkt?
- ▶ How do I use rkt?
- ▶ How does rkt compare to docker?
- ▶ How does rkt work?
- ▶ How do I build rkt containers?
- ▶ How does rktnetes work?



Core OS

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What are containers?

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Linux containers are a way to isolate applications.

They're implemented with:

- ▶ The chroot syscall provides a different view of the filesystem
- ▶ pid namespaces prevent an application from seeing other processes
- ▶ network namespaces give an application a different network interface
- ▶ mount namespaces let an application have different mounts than its host
- ▶ Also UTS/IPC/cgroup/user namespaces

What are containers?

Linux containers are a way to run applications, be it in production or on your laptop.



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What are containers?

Linux containers are a way to run applications, be it in production or on your laptop.

They provide:

- ▶ A way to package your applications and their dependencies into an image.
- ▶ An easy way to share these container images between machines (via centralized repositories).
- ▶ A way to run your applications in an isolated and consistent environment.



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- ▶ Fetch container images



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Specifically, it can:

- ▶ Fetch container images
- ▶ Store and manage local container images
- ▶ Run a container image



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Core OS

What is rkt?

rkt follows the Unix philosophy:

- ▶ Simple cli interface
- ▶ Has well-defined operations
- ▶ No central privileged long-running components
- ▶ Has separate privileges for different operations



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How do I get rkt?

rkt is only available on Linux, for amd64 and arm64.
GitHub releases should work on any system with glibc.

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- ▶ Debian
- ▶ Fedora
- ▶ Arch
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There's also a `Vagrantfile` in the rkt repo!



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How do I use rkt?

Let's start out with an interactive alpine container:

```
rkt run quay.io/coreos/alpine-sh -interactive
```



How do I use rkt?

`rkt list` will show you all of your exited and running pods.

How do I use rkt?

`rkt image list` will show you all of your stored images.

How do I use rkt?

To remove old containers: `rkt gc`

To remove old images: `rkt image gc`

How do I use rkt?

rkt supports docker images! You can refer to them using the `docker://` prefix.

```
rkt run docker://ubuntu -interactive -exec=bash
```



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How do I use rkt?

A non-interactive example...

```
rkt run coreos.com/etcd:v3.0.3  
rkt list  
rkt enter hash /etcdctl cluster-health
```



How do I use rkt?

Expected question: “wait, it’s always in the foreground?”

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Answer: yup! Use your init system to manage rkt processes, same as any long-running process.

Use Ctrl+] three times to kill rkt.



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Same example, but with `systemd-run`:

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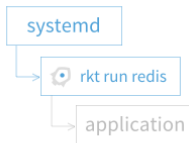


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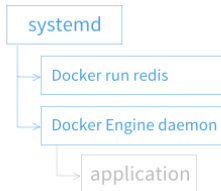
How does rkt compare to docker?

Container Engine Process Models

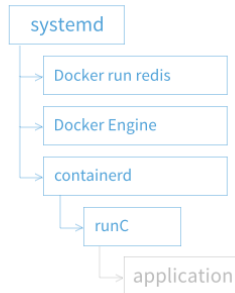
rkt 1.0+



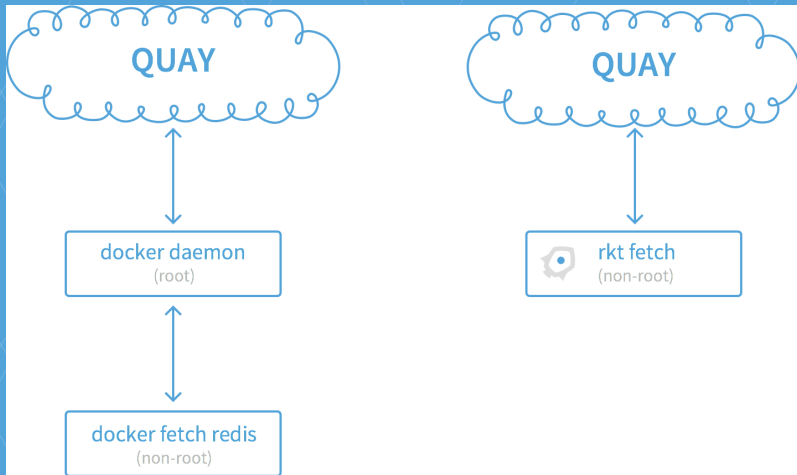
Docker < 1.11.0



Docker 1.11.0+



How does rkt compare to docker?



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docker works with:

- ▶ The docker spec



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- ▶ The docker spec
- ▶ The AppC spec
- ▶ The OCI image spec

How does rkt compare to docker?

rkt was designed with pods in mind.

- ▶ Running an image is running a pod with one app
- ▶ rkt can also accept pod manifests

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How does rkt work?

When a pod is run with rkt, there are three stages to this.

How does rkt work?

stage0:

- ▶ fetches images
- ▶ verifies images
- ▶ manages the image store
- ▶ manages overlayfs mounts



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How does rkt work?

stage1:

- ▶ sets up isolation
- ▶ manages application mounts
- ▶ manages application networks
- ▶ starts application hypervisor

How does rkt work?

stage2:

- ▶ Your app!

How does rkt work?

The stage1 is pluggable!

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Provided stage1s:

- ▶ coreos
- ▶ host

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- ▶ Install via GitHub release



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How do I build rkt containers?

acbuild: the App Container build system

- ▶ Another cli tool
- ▶ Install via GitHub release
- ▶ Can create and modify ACIs

How do I build rkt containers?

Example 1: a static go binary

How do I build rkt containers?

Example 2: nginx

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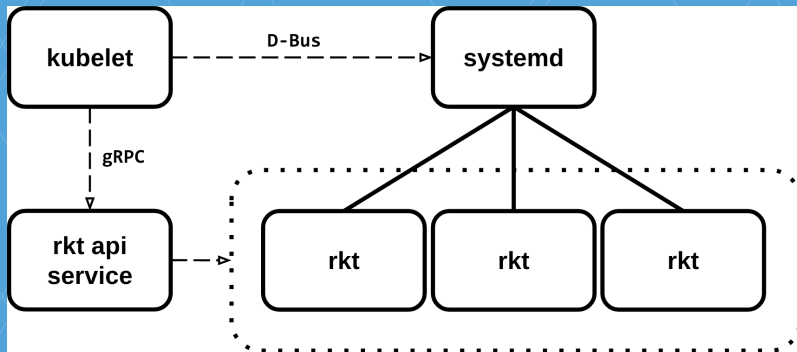
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Questions?

