App Container

github.com/appc

appc-dev@googlegroups.com

github.com/coreos/rocket

rocket-dev@googlegroups.com

Jonathan Boulle

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CoreOS

App Container (appc)

github.com/appc
appc-dev@googlegroups.com

appc != Rocket

App Container Spec *noun*

A new, open specification for running applications in containers

Containers?!

KERNEL
SYSTEMD
SSH

PYTHON
JAVA
NGINX
MYSQL
OPENSSL

distro distro distro distro distro distro distro distro distro distro distro

APP

KERNEL
SYSTEMD
SSH

LXC/DOCKER/
ROCKET

distro distro distro distro distro distro distro distro distro distro

PYTHON
JAVA
NGINX
MYSQL
OPENSSL

APP

Application Containers

self-contained
portable
decoupled from operating system

appc principles

Why are we doing this?

Open

Independent GitHub organisation
Contributions from Cloud Foundry,
Mesosphere, Google, Red Hat
(and many others!)

Simple but efficient

Simple to understand and implement, but eye to optimisation (e.g. content-based caching)

Secure

Cryptographic image addressing
Image signing and encryption
Container identity

Standards-based

Well-known tools (tar, gzip, gpg, http), extensible with modern technologies (bittorrent, xz)

Composable

Integrate with existing systems
Non-prescriptive about build workflows
OS/architecture agnostic

appc components

Image Format

Application Container Image
tarball of rootfs + manifest
uniquely identified by ImageID (hash)

Image Discovery

App name →artefact

`example.com/http-server`

`coreos.com/etcd`

HTTPS + HTML

Executor

grouped applications
runtime environment
isolators
networking

Metadata Service

`http://$AC_METADATA_URL/acMetadata`

container metadata

container identity (HMAC verification)

appc tooling

$ actool build

rootfs + manifest → ACI

$ actool validate

is this ACI compliant with the spec?

$ actool discover

example.com/app -> https://example.com/releases/app.aci

ACE validator

is this executor compliant with the spec?

$EXECUTOR run ace_validator.aci

appc community

cdaylward/libappc

C++ library for working with app containers

cdaylward/nosecone

C++ executor for running app containers

(sidenote: mesos)

https://issues.apache.org/jira/browse/MESOS-2162

3ofcoins/jetpack

FreeBSD Jails/ZFS-based executor
(by @mpasternacki)

sgotti/acido

ACI toolkit (build ACIs from ACIs)

appc/docker2aci

docker2aci busybox/latest
docker2aci quay.io/coreos/etcd

appc/goaci

goaci github.com/coreos/etcd

appc status

Stabilising
v0.3.0+git
TODO: pods, isolators

github.com/coreos/rocket

rocket-dev@googlegroups.com

implementation of appc

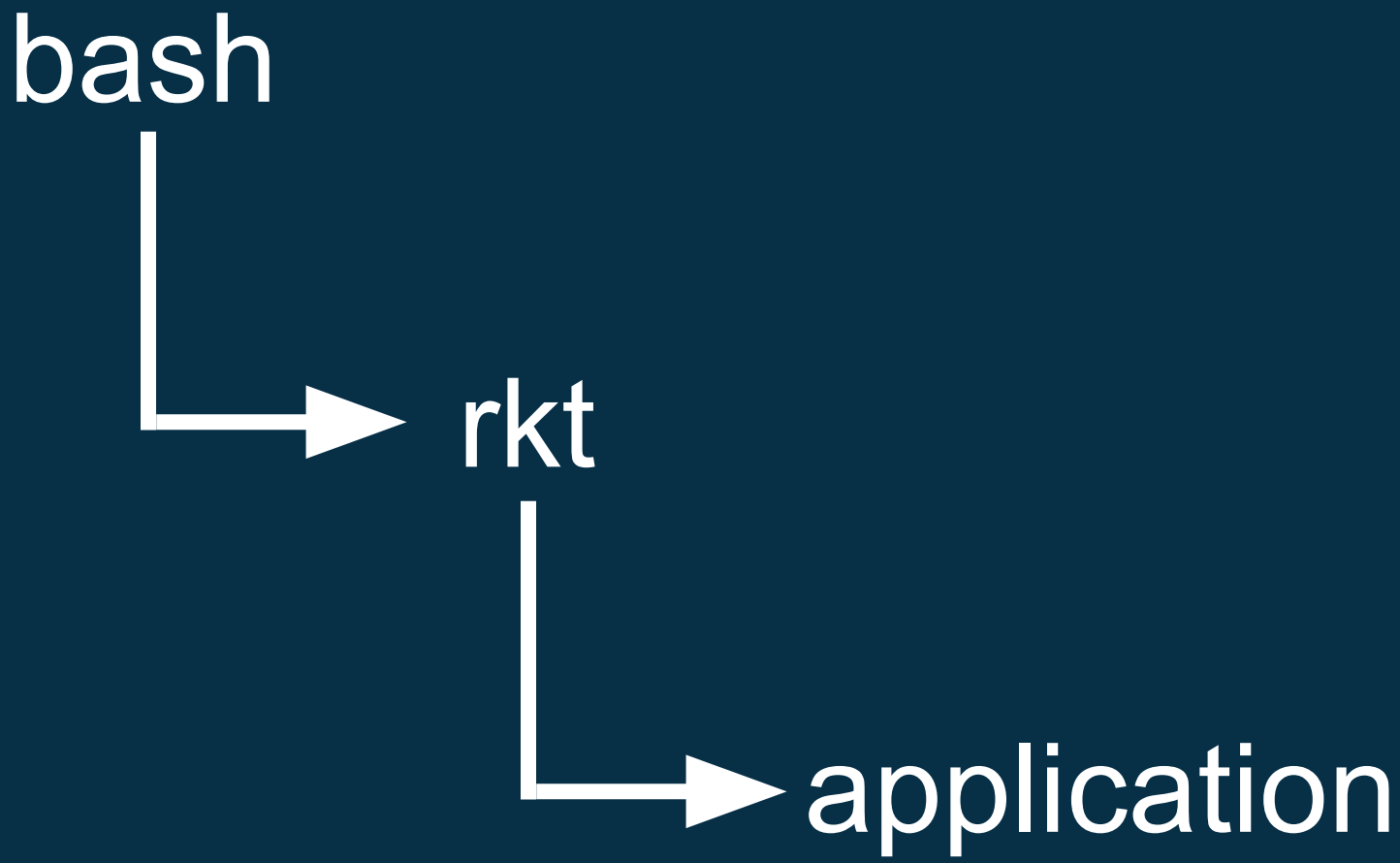
discovery
executor
metadata service

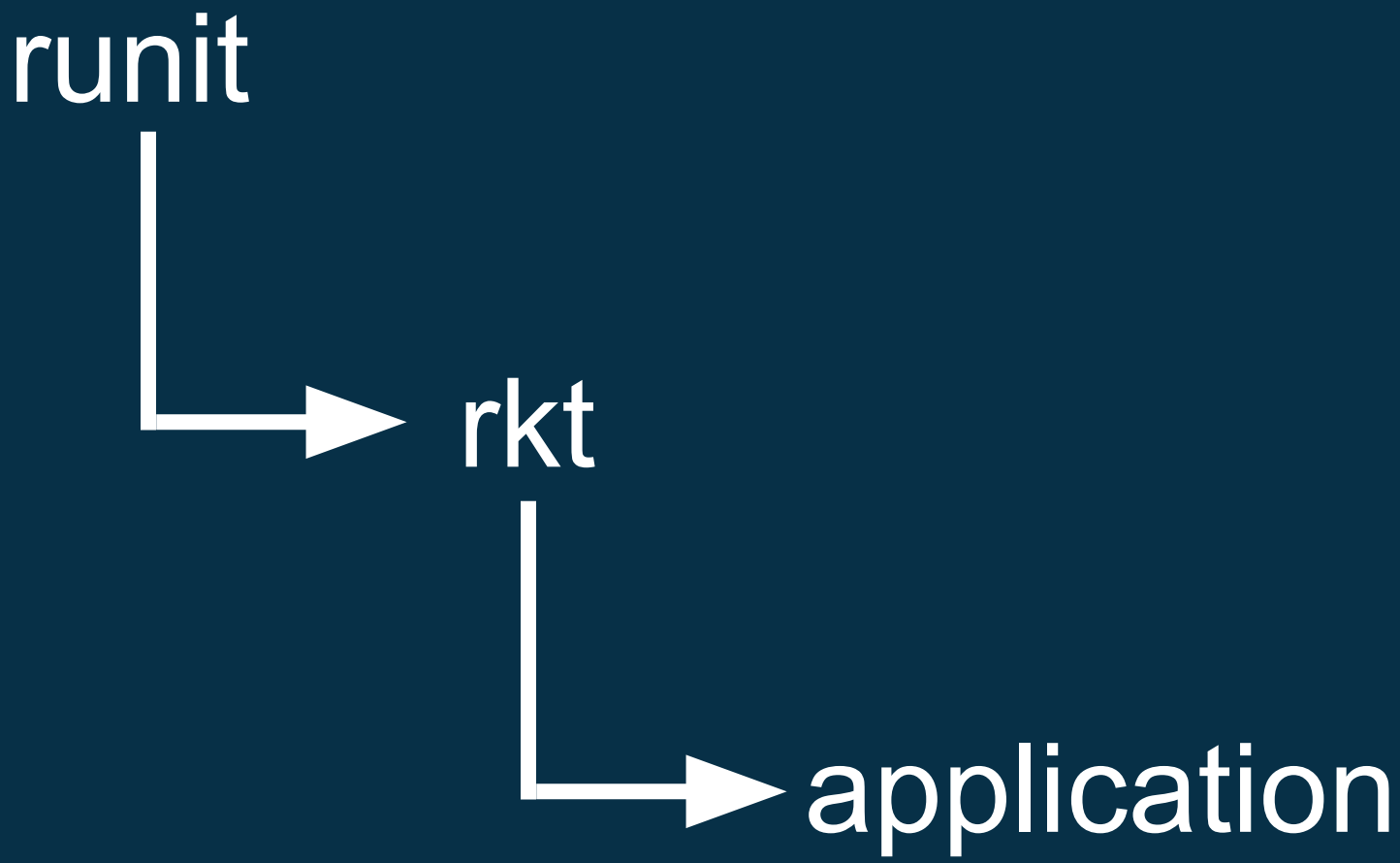
golang + Linux

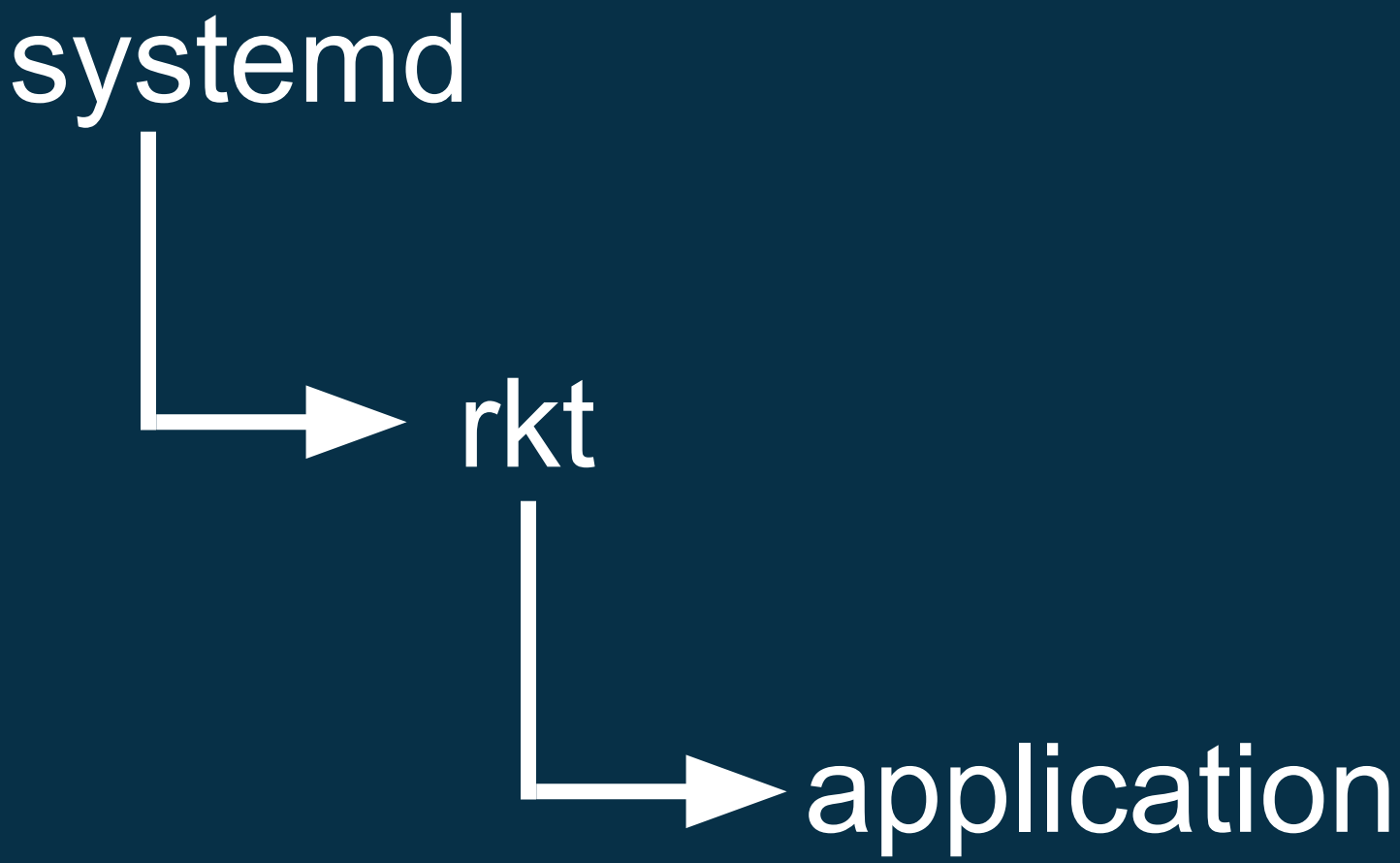
self-contained
init system agnostic

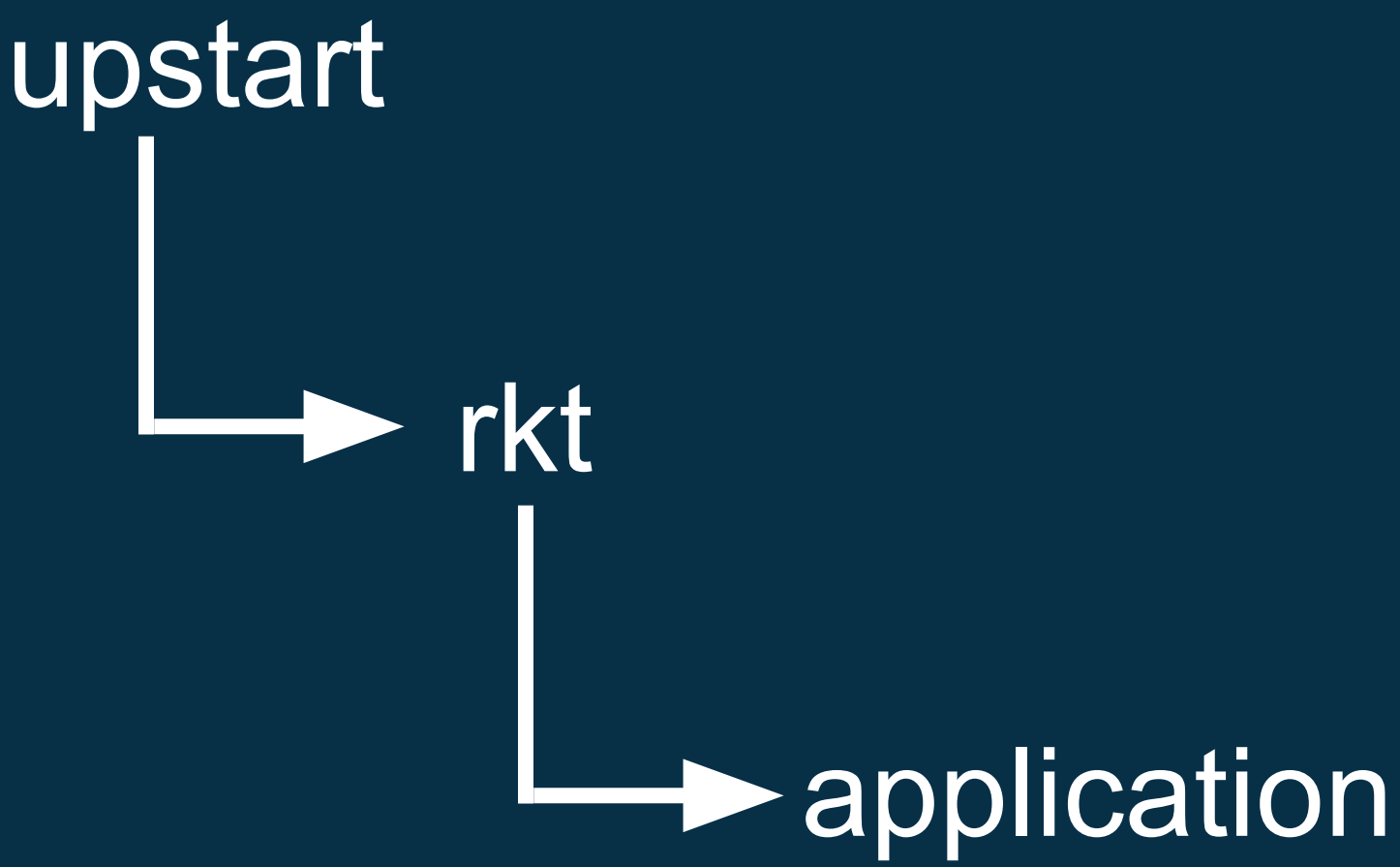
CLI only

no daemon
apps run directly under spawning process


bash
rkt
application


runit
rkt
application


systemd
rkt
application


upstart
rkt
application

Rocket internals

modular architecture
execution divided into *stages*
stage0 → stage1 → stage2

stage0

rkt binary
discover, retrieve application images
set up container filesystems

stage1

execution environment for apps
container *rootfs* + *init* binary
app process management, cgroups,
metadata service

stage2

actual app execution

rocket v0.1.0

first version (announcement)
somewhat limited..

rkt fetch

rkt fetch https://example.com/my_app.aci
rkt fetch coreos.com/etcd:v2.0.0.rc1
simple CAS on disk

rkt run

rkt run coreos.com/etcd:v2.0.0-rc.1
rkt run ./my-app.aci
rkt run sha512-fcdf125873...

rocket v0.3.2+git

what's new?

new commands!

rkt enter
rkt list
rkt status
rkt gc
rkt trust

rkt enter, list

enter the namespaces of an application
list containers on the system

rkt status, rkt gc

file-based locking (flock)
mark-and-sweep gc (time based)

rkt trust

easily manage public ACI signing keys
rkt trust --prefix coreos.com/etcd
rkt trust --root https://foo.com/key.asc

stage1 as ACI

no more go-bindata
swappable execution environments
distribution packaging friendly!

Docker image support

rkt run docker://redis:latest

Rocket

Crash course!

rocket v0.4.0+

what's coming?

networking

"it's complicated"

networking

IP-per-pod
extensible plugin-based system
http://goo.gl/IQA9PB

host systemd integration

$ machinectl list
$ machinectl terminate

developer environments

interactive containers
filesystem diffs → new ACI

Kubernetes

github.com/GoogleCloudPlatform/kubernetes/issues/2725

http://goo.gl/kJTj96

App Container

+

get involved!

GitHub: "help wanted" label

Questions?

Credits

- SpaceX Falcon 9 Landing by Elon Musk
- Golang gopher by Renee French, licensed under CC BY 3.0
- Tux by Larry Ewing, Simon Budig and Anja Gerwinski