App Container

github.com/appc

appc-dev@googlegroups.com

Rocket

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 distro

PYTHON
JAVA
NGINX
MYSQL
OPENSSL

APP

Application Containers

self-contained, portable
(decoupled from operating system)
isolated (memory, network, …)

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

Rocket

github.com/coreos/rocket

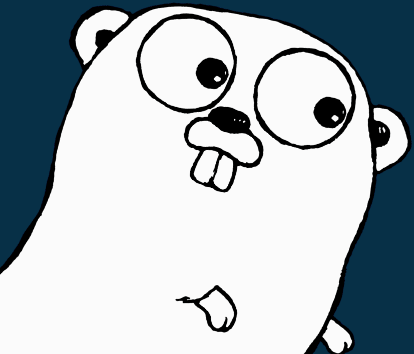
rocket-dev@googlegroups.com

implementation of appc

discovery
executor
metadata service

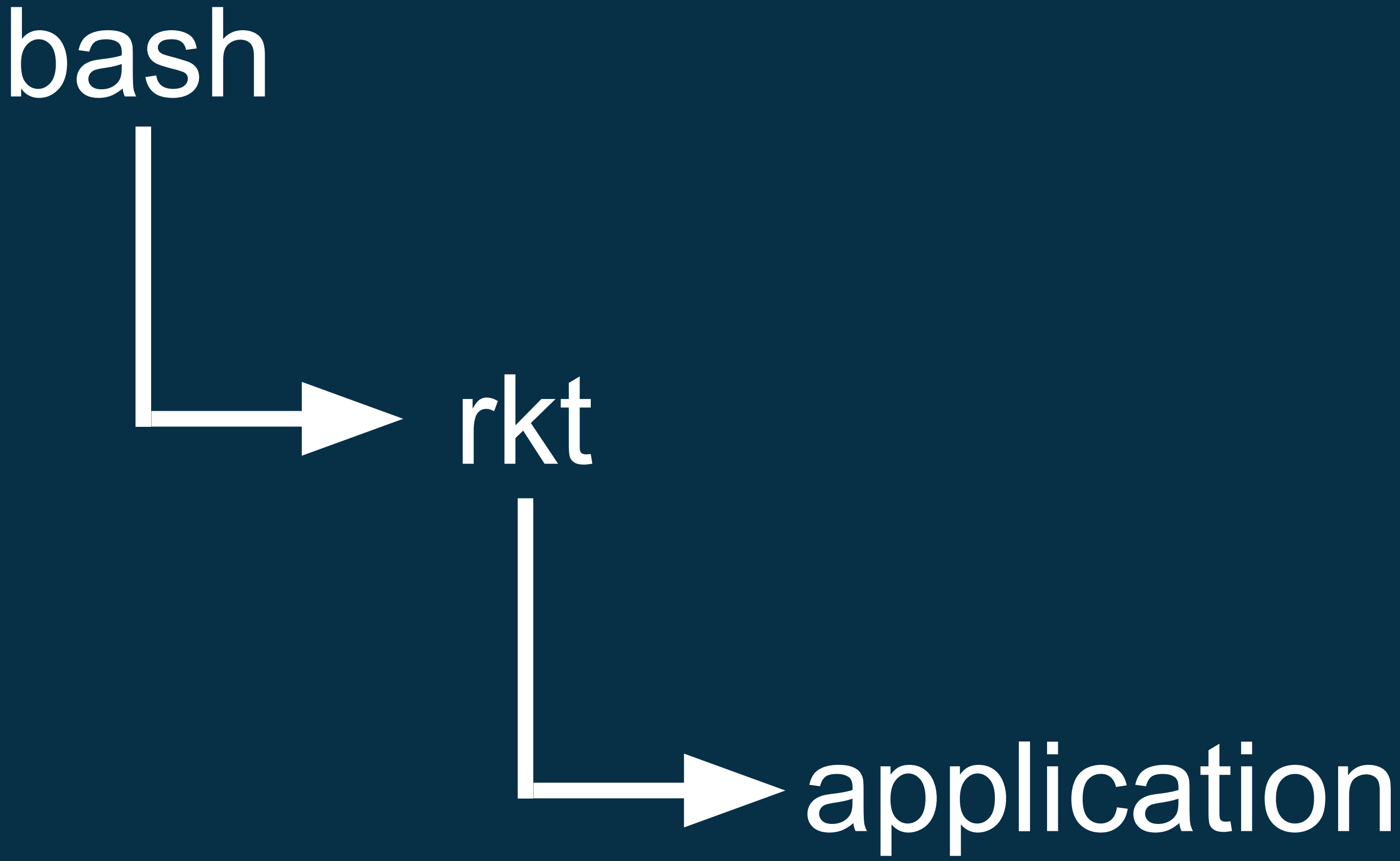
golang + Linux

self-contained
init system agnostic



CLI only

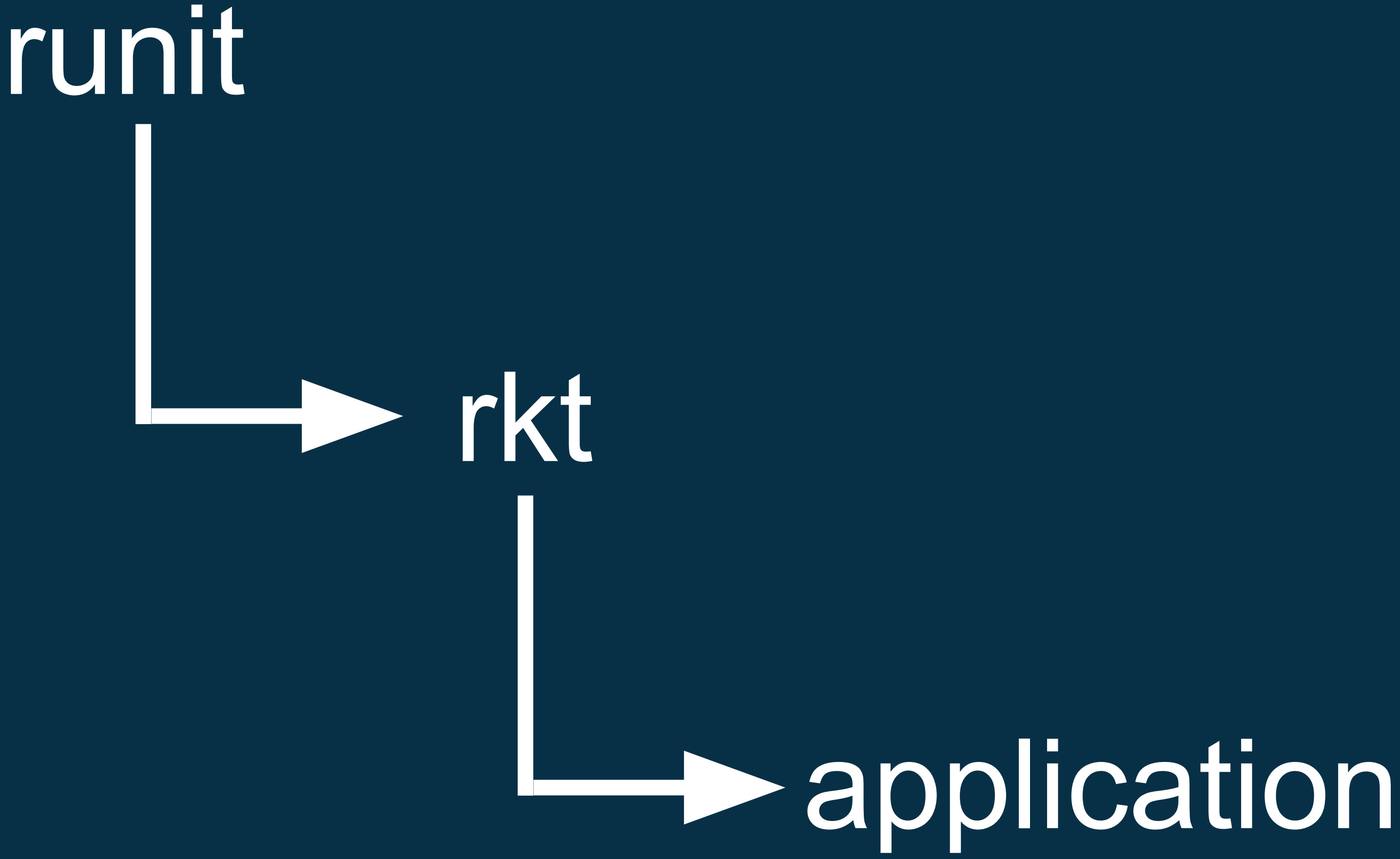
no daemon
apps run directly under spawning process



bash

rkt

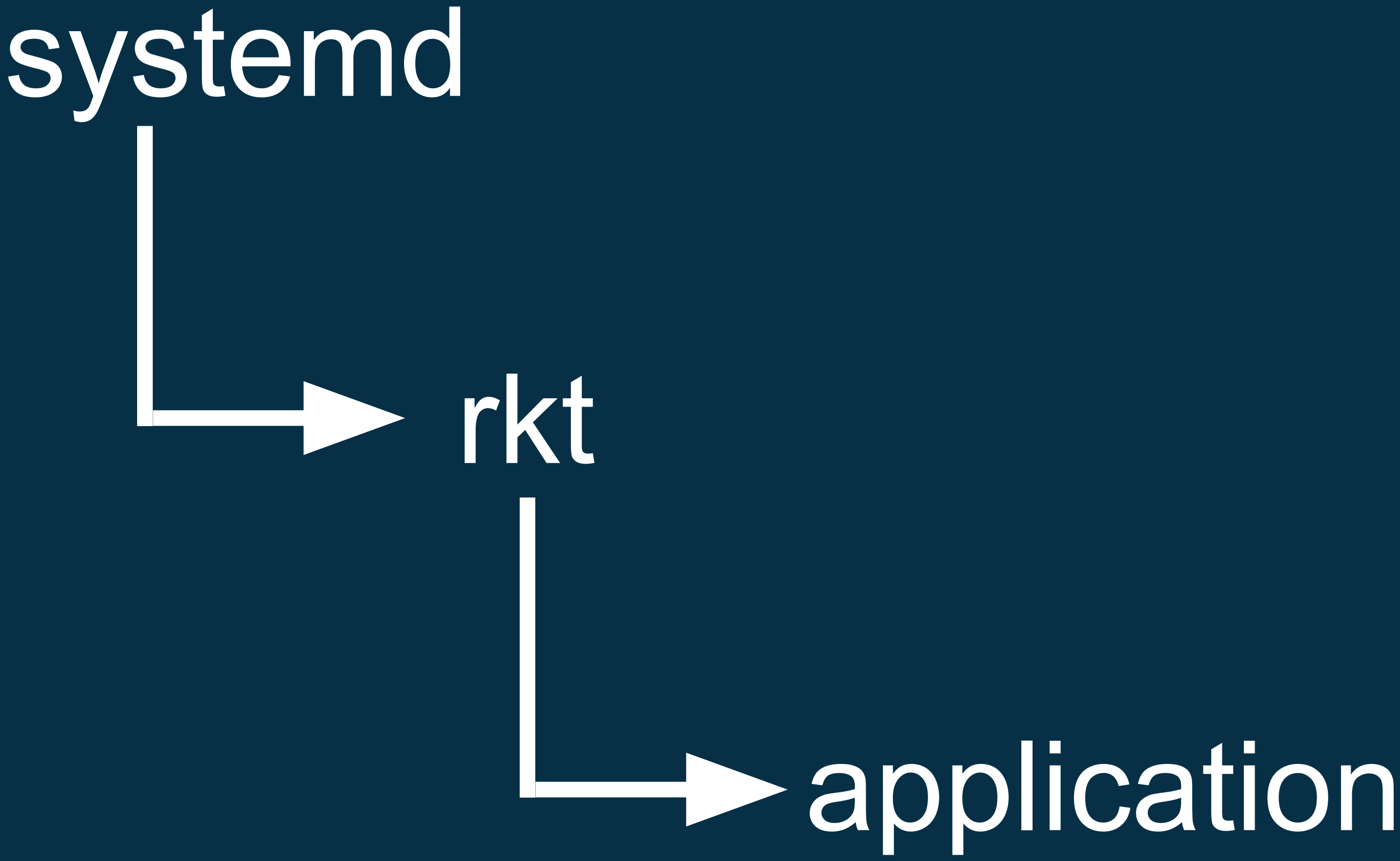
application



runit

rkt

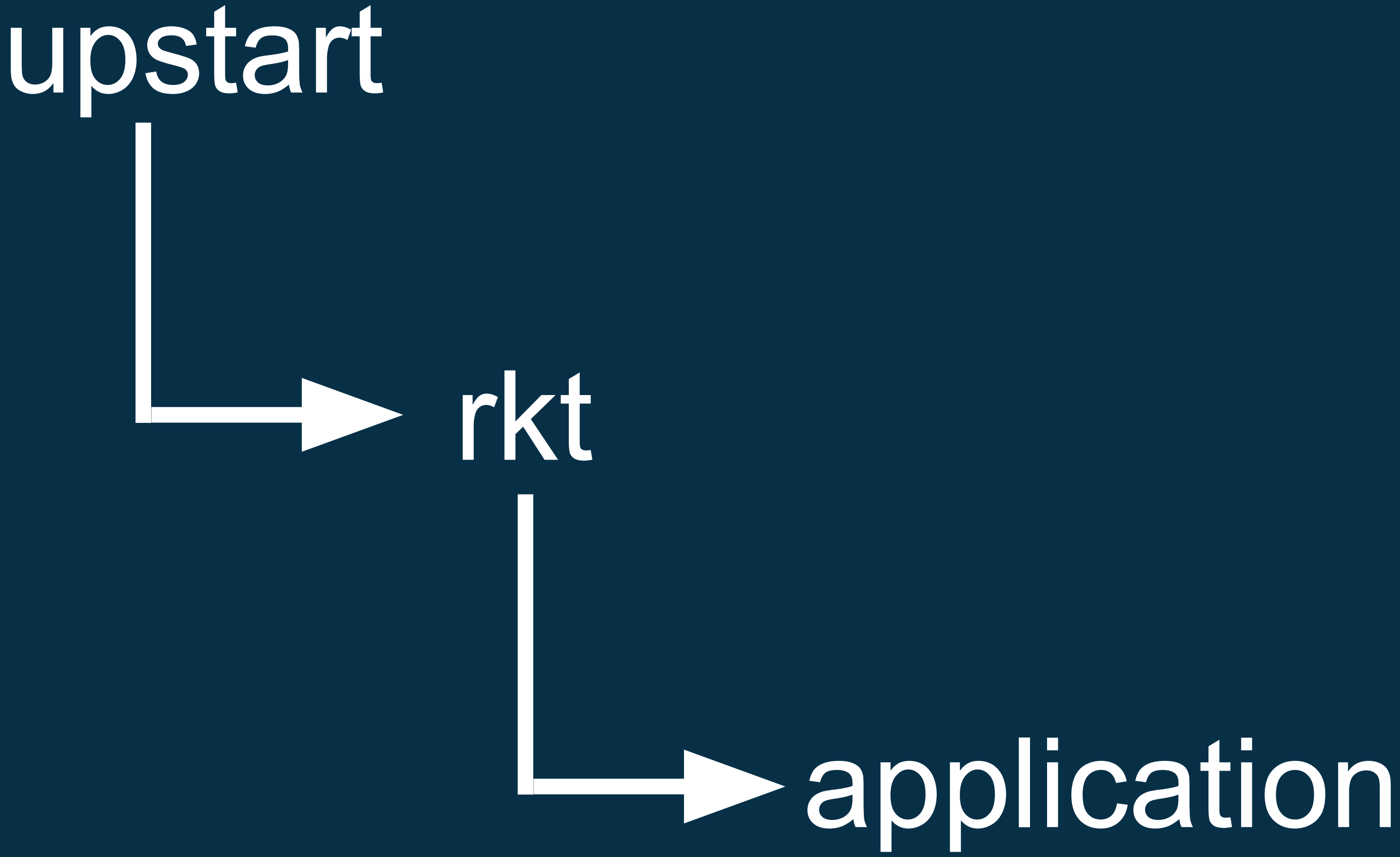
application



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/lQA9PB

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

+

Rocket

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