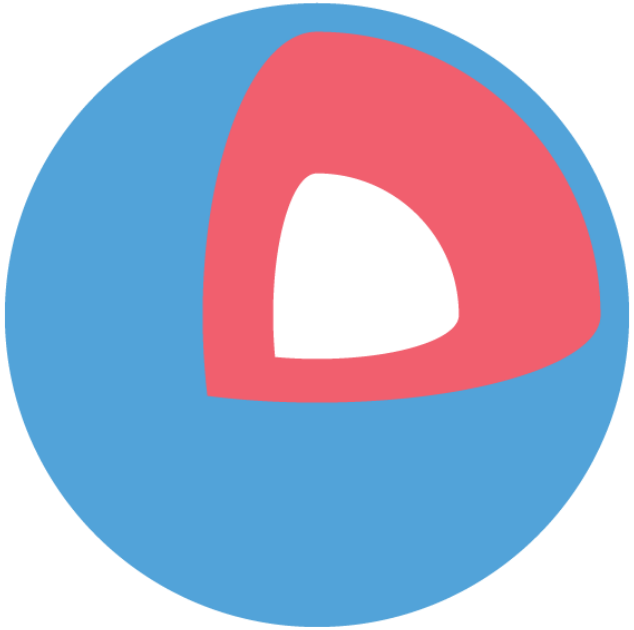

CoreOS

Ramit Surana

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Agenda

- What is CoreOS
- Introducing CoreOS as OS
- Introduction to etcd
- Use of Containers with etcd
- Raft Algorithm
- Service Discovery
- Cluster Management
- Securing etcd
- Container project by rkt
- Using CoreOS with Kubernetes

and much more .....

CoreOS

Who am I ?

- Open Source Tech Enthusiastic .
- Foodie,Traveler,Explorer.
- Join me Here :

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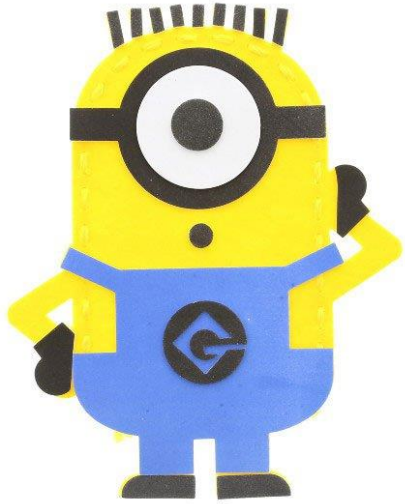
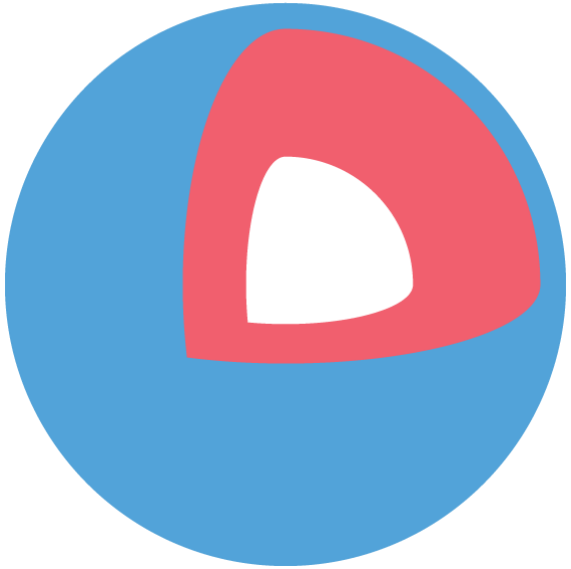


CoreOS

What is CoreOS?

- OS made up specifically for using Linux containers.
- CoreOS is made up of a number of components.
- CoreOS is open source and hackable.
- CoreOS doesn't ship a package manager - any software you would like to use must run within a container.



CoreOS

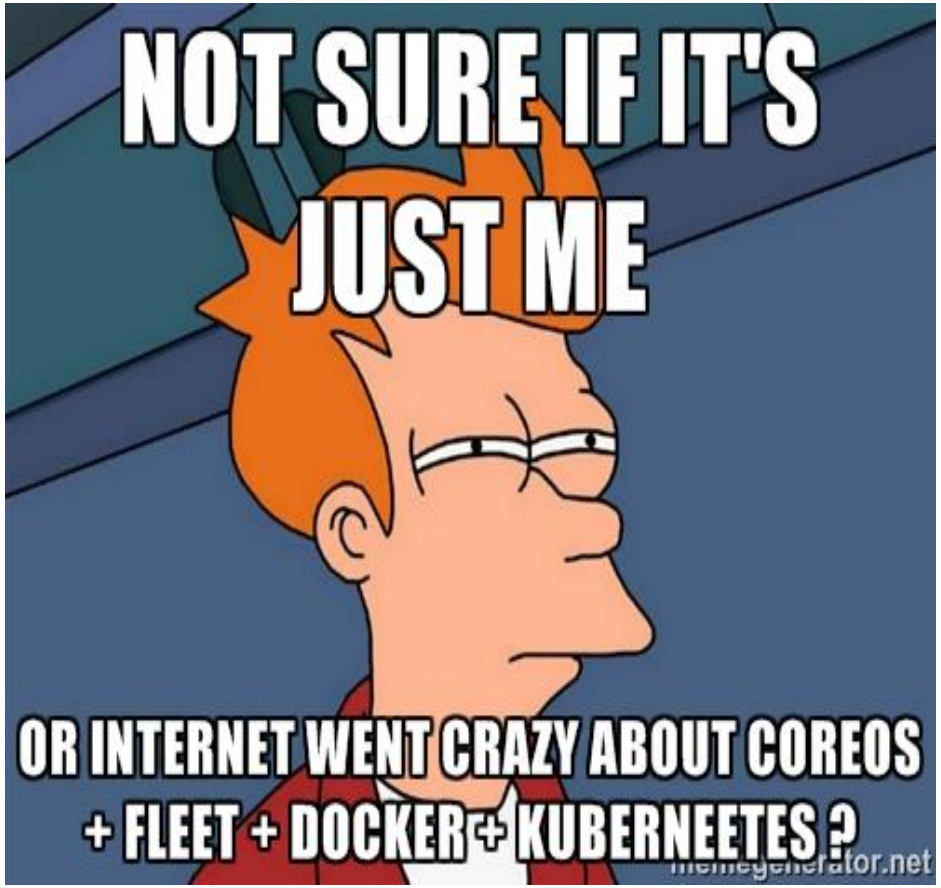
CoreOS

CoreOS as Operating System

- It is a minimal Linux distribution.
- Designed totally for security, consistency, and reliability.
- CoreOS runs on almost any platform, including Vagrant, Amazon EC2, QEMU/KVM, VMware and OpenStack and your own hardware.

CoreOS

Why CoreOS is a HIT .....



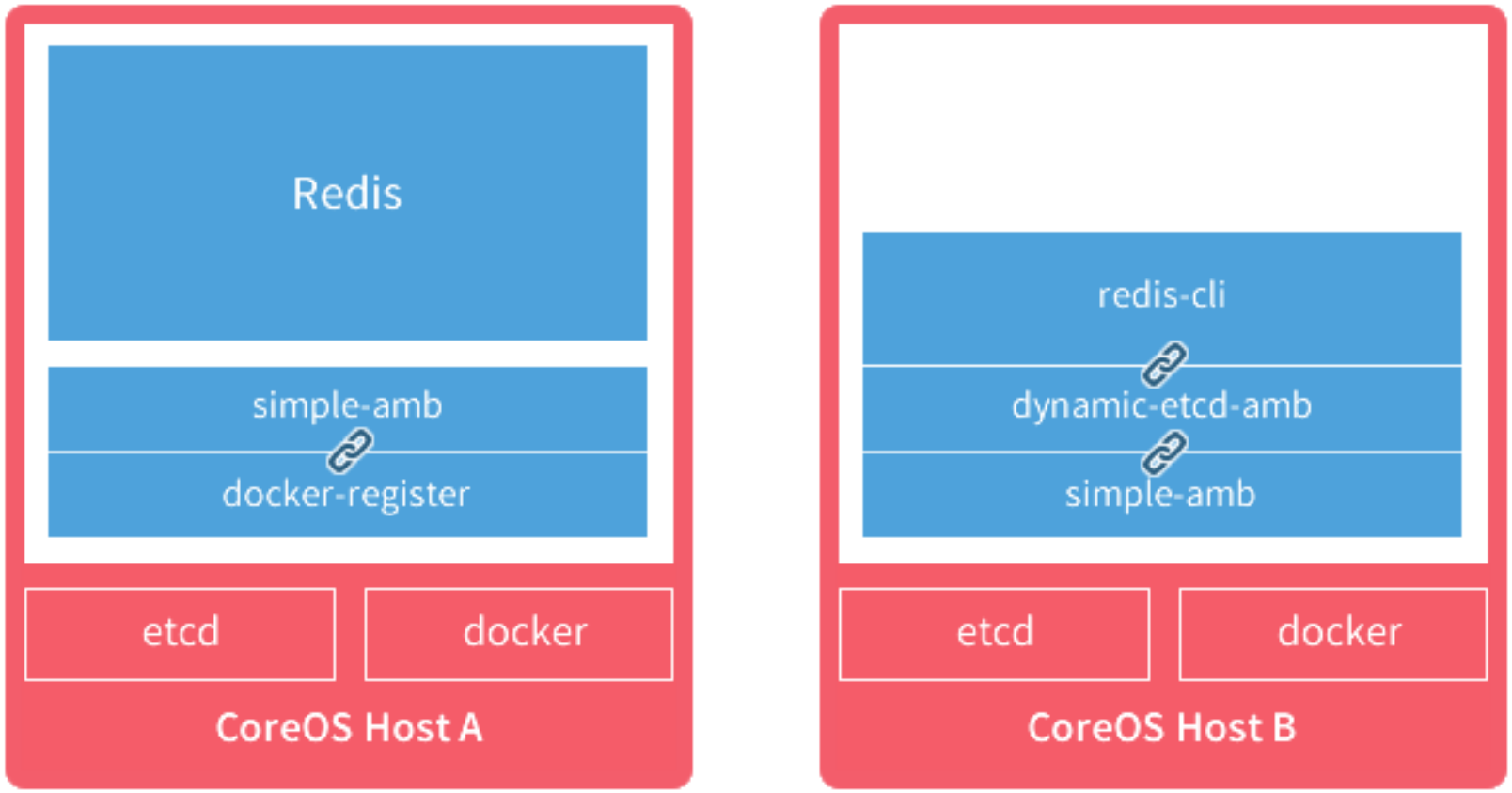
CoreOS

What is etcd?

- Consensus and Discovery Service.
- Consisted Highly Available key/value store.
- Designed for understandability and simplicity.
- Applications can read and write data into etcd.
- A simple use-case is to store database connection details or feature flags in etcd as key value pairs.

CoreOS

Architecture

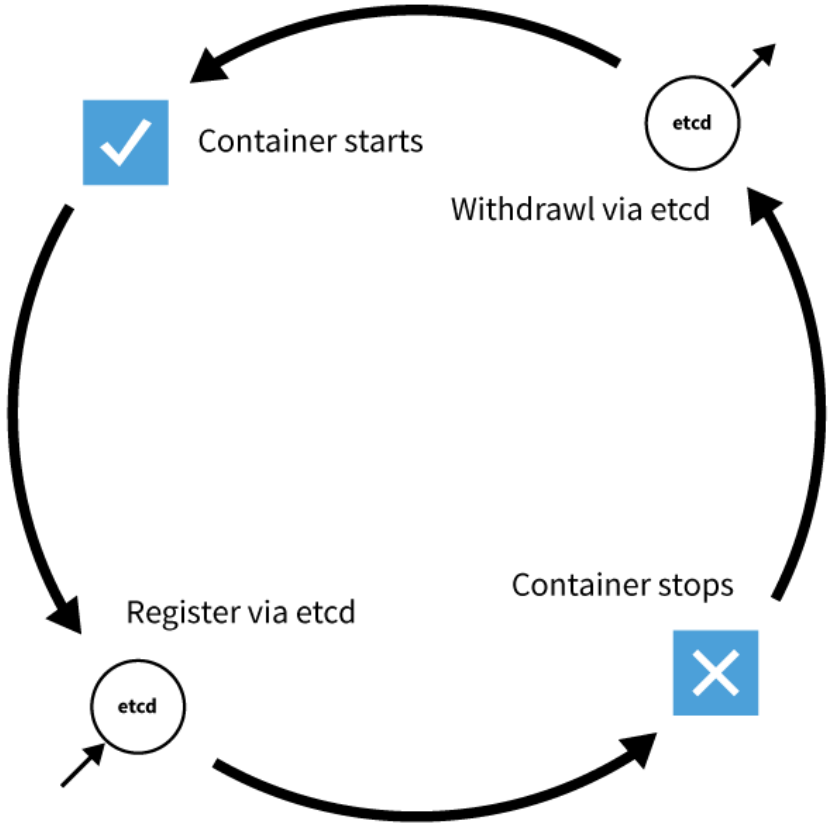


CoreOS

Use of Docker with etcd

- Docker containers can read, write and listen to etcd over the docker0 network interface.

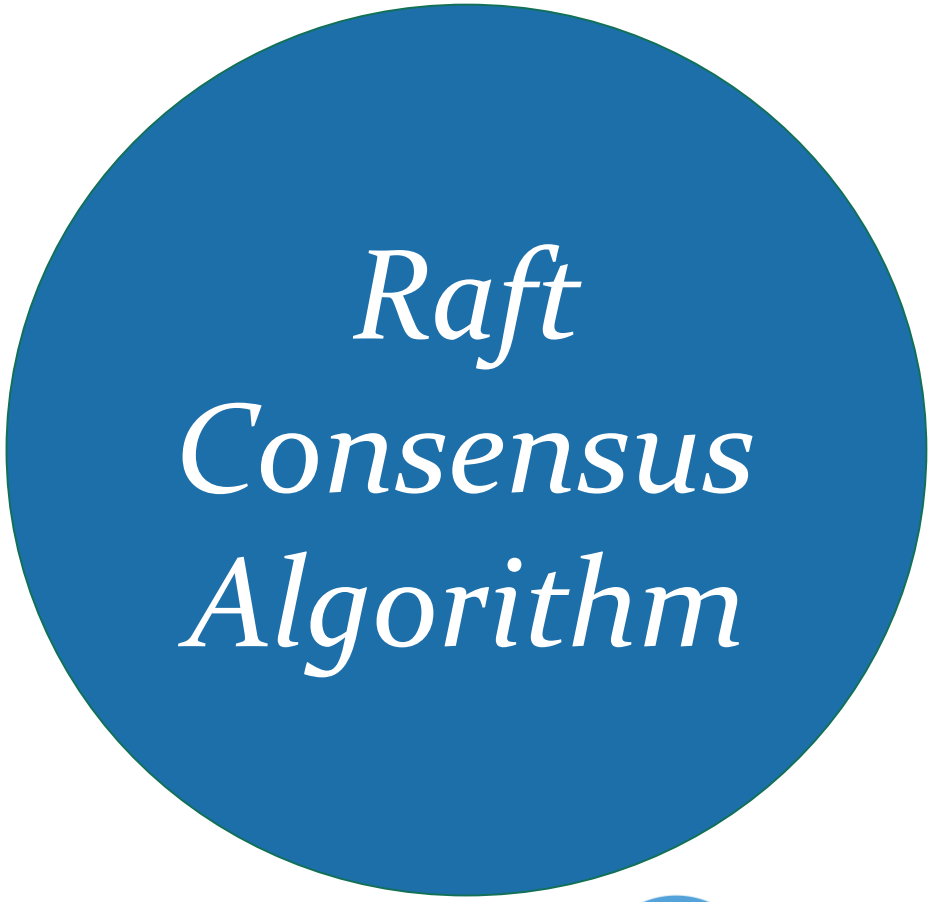
- Sidekicks will be scheduled by fleet onto the same machine as the main unit.



CoreOS

Raft Algorithm

- Raft is protocol for implementing distributed Consensus.
- Consensus Algorithm similar to Paxos.
- Built using go-raft library.
- Consists of 3 Roles :
  - The Leader
  - The Follower
  - The Candidate



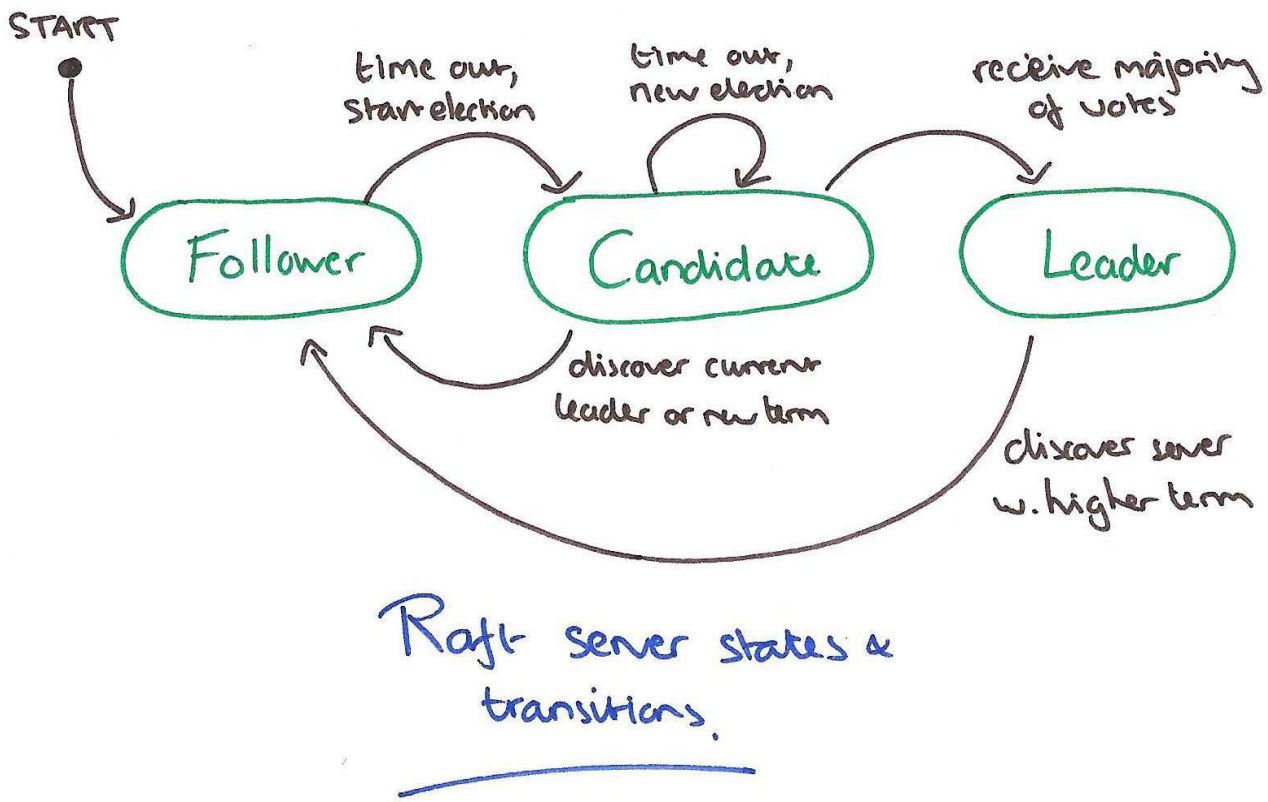
CoreOS

Raft Algorithm (contd.)

- Consensus is a fundamental problem in fault-tolerant distributed systems. Consensus involves multiple servers agreeing on values.
- Each server has a state machine and a log.
- State machine is the component that we want to make fault-tolerant, such as a hash table.
- Consensus algorithm is used to agree on the commands in the servers' logs.

CoreOS

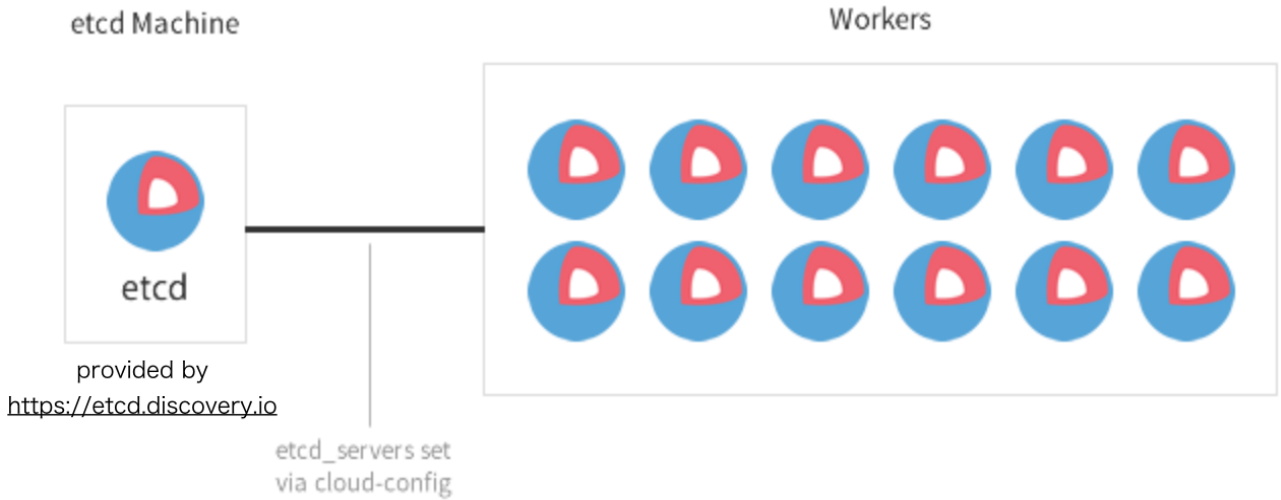
Raft Algorithm (contd.)



CoreOS

Service Discovery

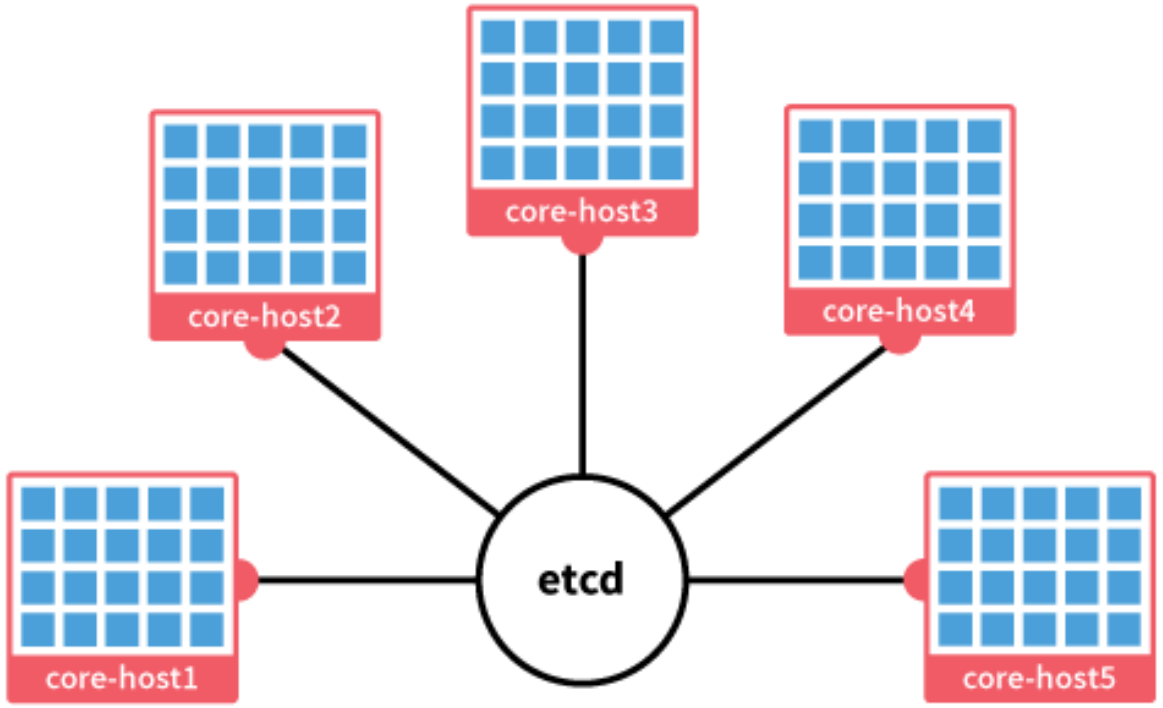
- A free service to help connect etcd instances together by storing a list of peer addresses, metadata and the initial size of the cluster under a unique address, known as the discovery URL.



CoreOS

Cluster Management

- By utilizing fleet, without having to worry about the individual machines each container is running on
- If a machine fails or needs to be updated, containers running on that machine will be moved to other qualified machines in the cluster.



CoreOS

Securing etcd

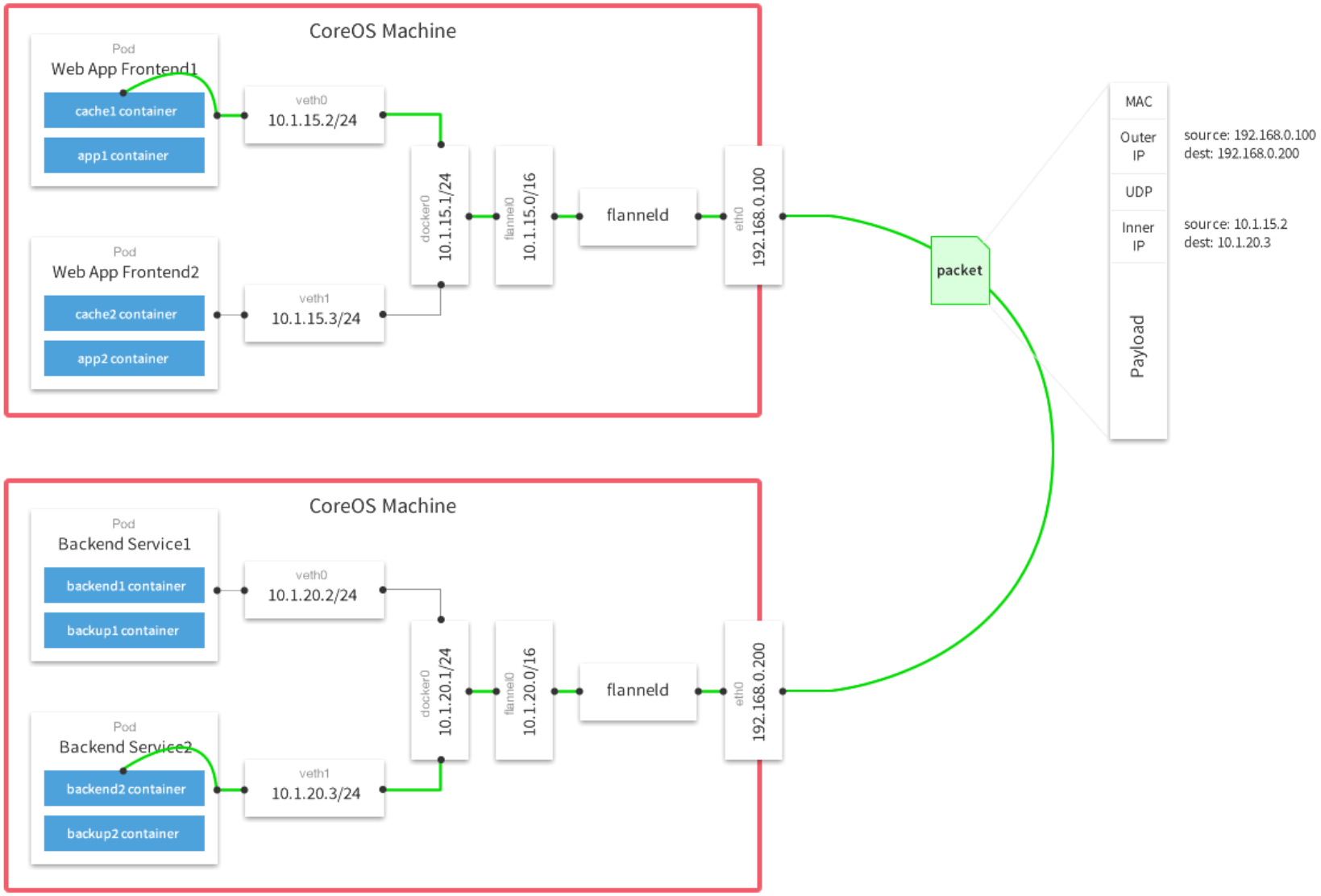
- Supports SSL/TLS as well as authentication through client certificates.
- The etcd should not be exposed outside of the CoreOS cluster.
- Communication within the cluster can be secured with client certificates.

CoreOS

Flannel

- It is a virtual network that gives a subnet to each host for use with container runtimes.
- Advantage of this model is that it reduces the complexity of doing port mapping.
- Flannel uses etcd to store the network configuration, allocated subnets, and auxiliary data (such as host's IP).

Flannel Architecture



CoreOS

Zookeeper vs etcd

- Pros -
  - Used by ebay,yahoo etc.
  - Lots of client bindings, tools, API …
- Cons -
  - Complex
  - Java

- Pros -
  - Easy to deploy, setup and use
  - Encryption and authentication by private keys.
  - Planned ACL implementation
- Cons -
  - Very young project as compared to zookeeper

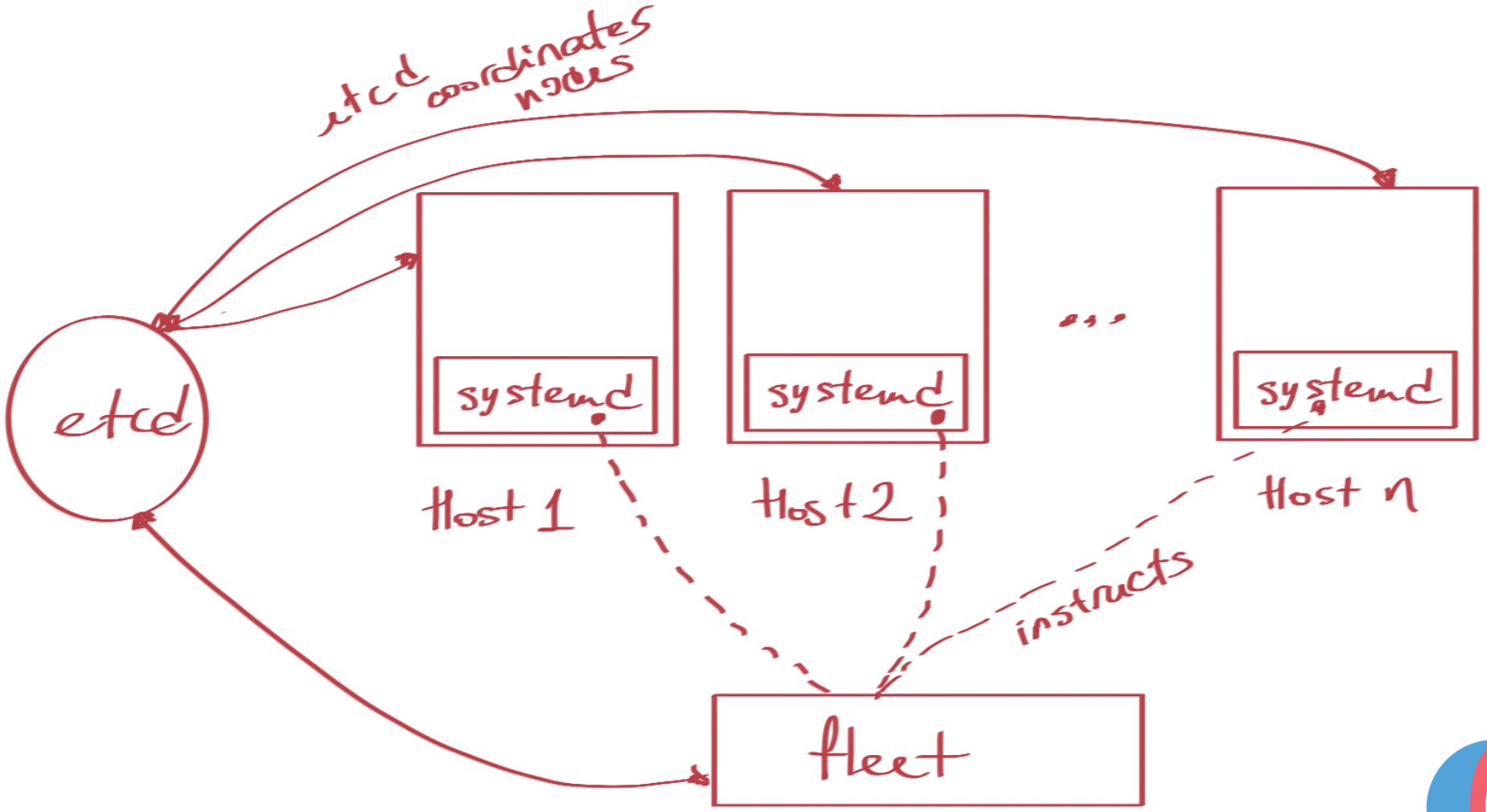
CoreOS

Fleet

- It ties together systemd and etcd into a simple distributed init system.
- Fleet is oriented around systemd units and is not a container manager or orchestration system.
- Fleet supports very basic scheduling of systemd units in a cluster.

CoreOS

How Fleet works...

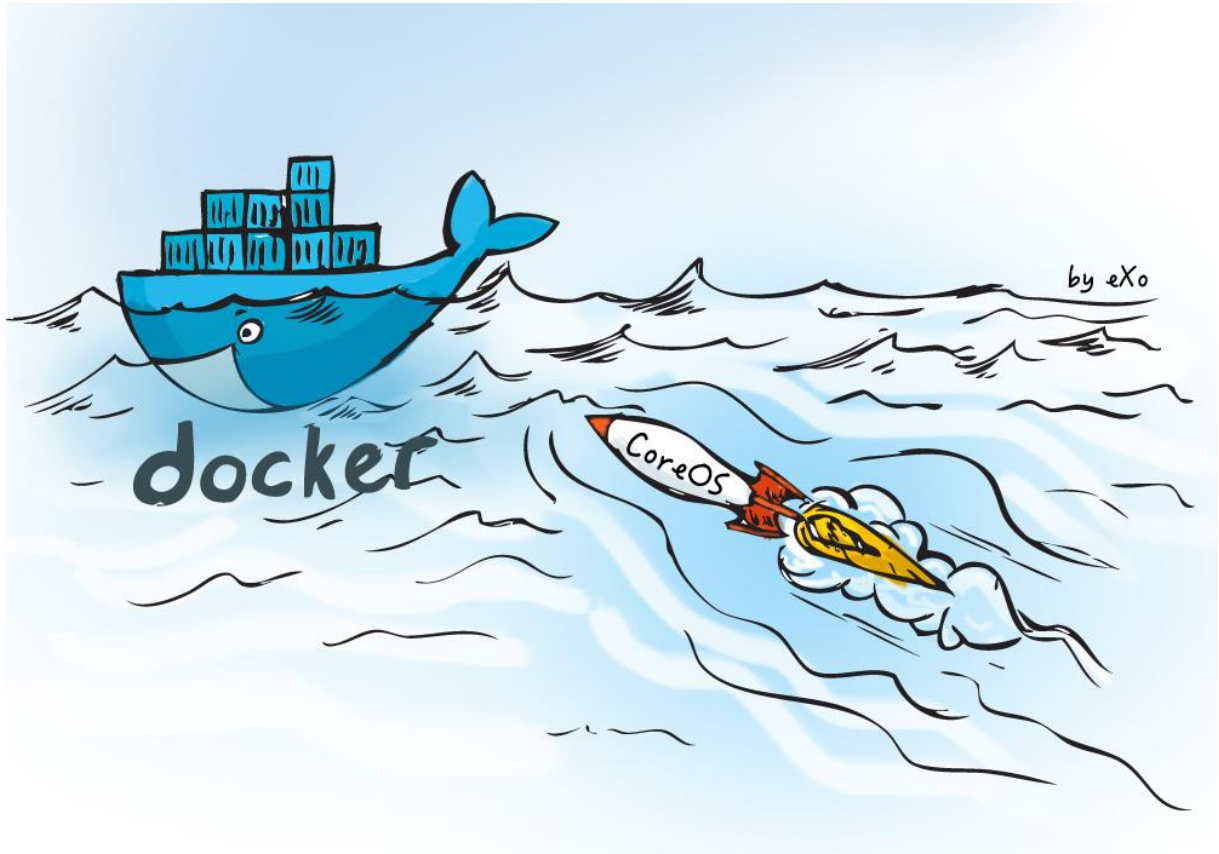


CoreOS

Rkt

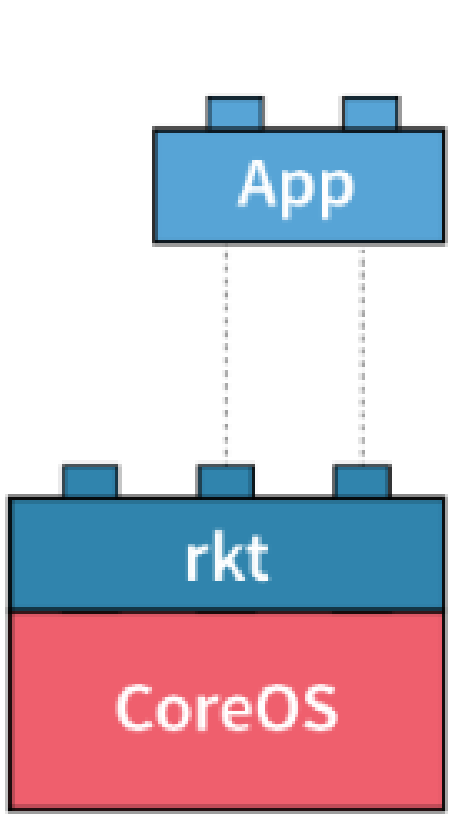
- *rkt (pronounced as "rock-it"*) is a CLI for running app containers on Linux.
- New open source container initiative built by CoreOS.
- It was built by CoreOS because of a minor conflict between Docker and CoreOS guys.

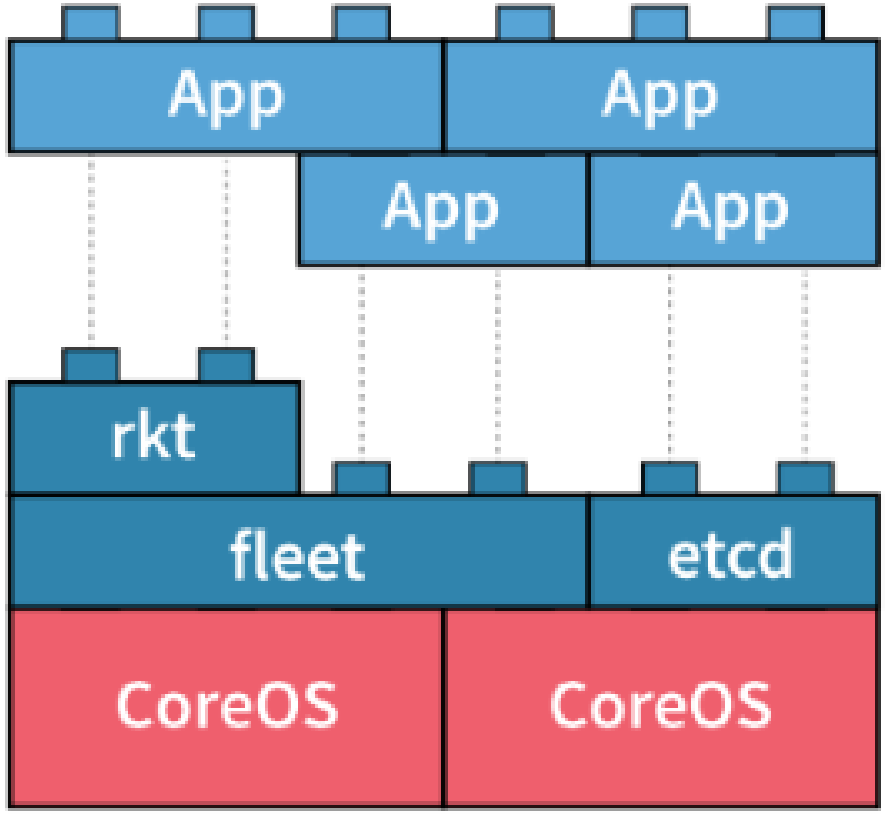
Why Rkt started ?



CoreOS

Solving the final puzzle





CoreOS

Tectonic

- In simple terms:

Kubernetes + CoreOS platform for Businesses.

- Deploy, manage, and secure your containers anywhere.
- Tectonic pre-packages all of the open source components required to build a Google-style infrastructure.

CoreOS

Using CoreOS with Kubernetes

- The Best option available in the market for implementing Kubernetes over a secure and fast OS.
- Many of the CoreOS products such as etcd,fleet is natively used by kubernetes to work.

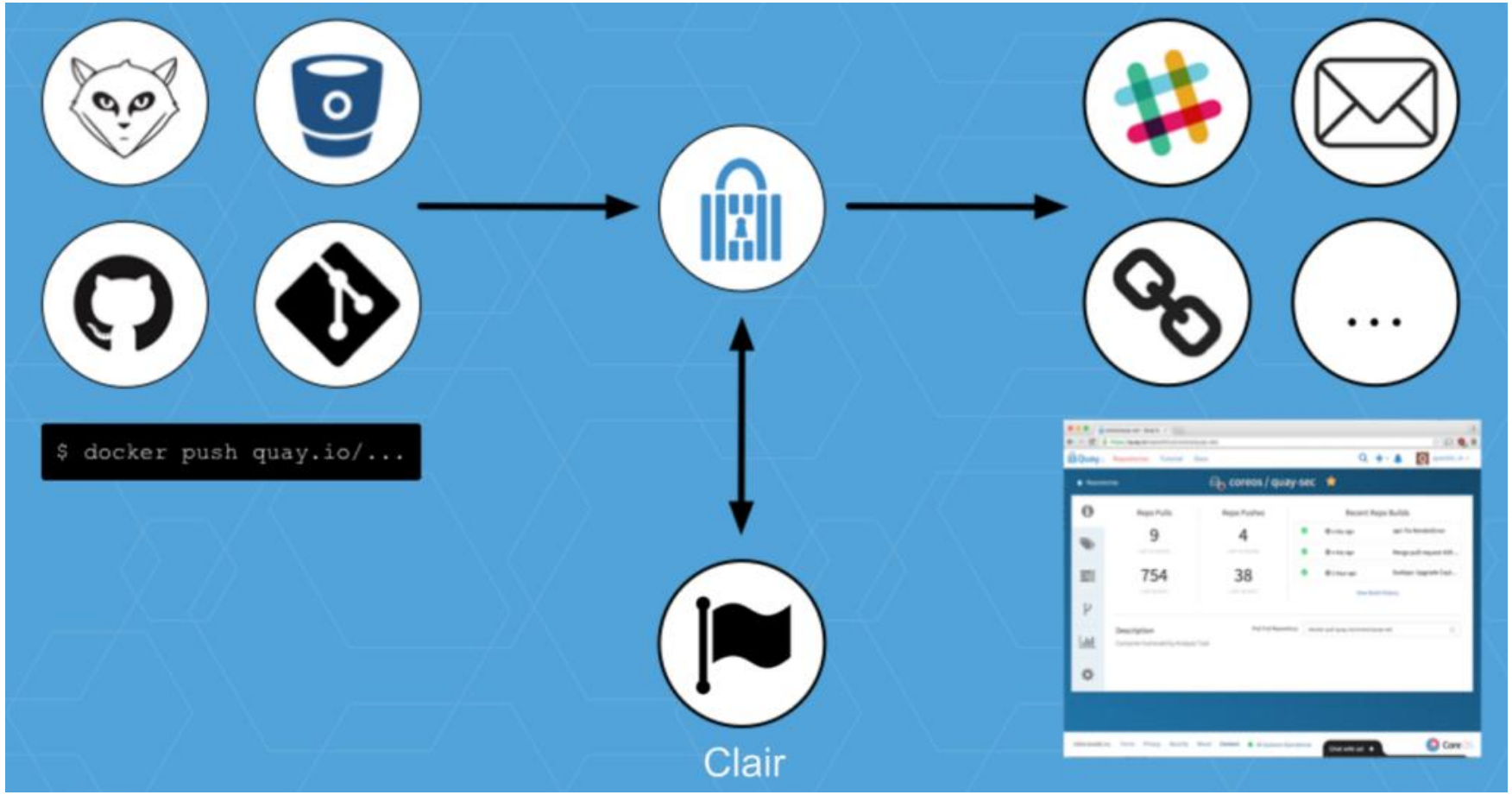
CoreOS

Introducing Clair

- container vulnerability analysis service
- It provides a list of vulnerabilities that threaten a container, and can notify users when new vulnerabilities that affect existing containers.
- Clair analyzes each container layer once, and does not execute the container to perform its examination.
- Clair currently supports three operating systems and their package managers,*Debian* (dpkg), *Ubuntu* (dpkg), *CentOS* (rpm).

CoreOS

How Clair Works .....



CoreOS

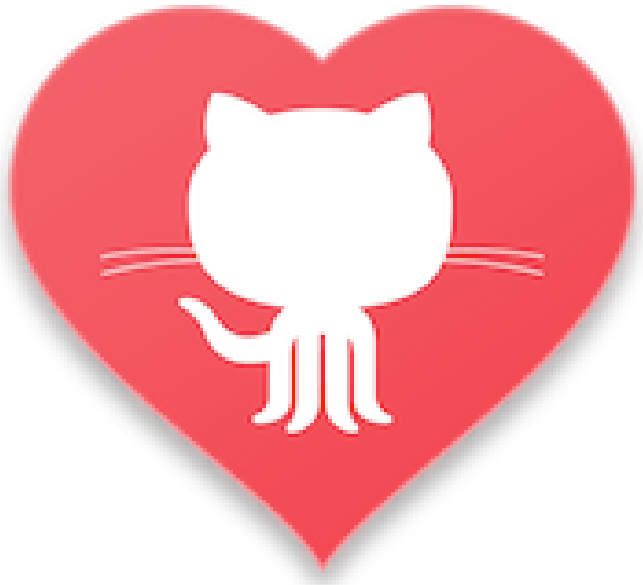
Fast Patch

- An active-passive root partition scheme.
- Reliable update of the CoreOS via a continuous stream of updates.
- Instead of updating a single package at a time, CoreOS downloads an entirely new root filesystem and installs it to the passive partition.
- Using system update the update can be rolled back.
- The managed Linux customers have access to an additional tool, CoreUpdate, a hosted dashboard that allows for full control over access and downloading of updates.

CoreOS

Please Contribute !!

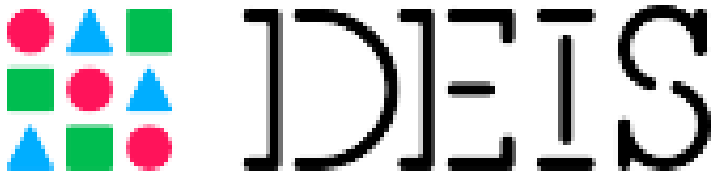
https://github.com/coreos



CoreOS

Customers


rackspace
the #1 managed cloud company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Questions ?

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