

Pivotal.

Using CFCR to manage your Kubernetes Clusters



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Introduction

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- Staff Software Engineer at Pivotal
- Joined the Kubo team before it was called Kubo in December 2016
- Moved to Pivotal Container Service team after team split

Brendan Nolan

- Principal Software Engineer at Pivotal
- Joined the CFCR team in May of 2017
- Currently working on Pivotal Container Service team

Agenda

What is CFCR

Why?

What problem is it trying to solve?

Powered by BOSH

CFCR Demo

Vision for CFCR

Pivotal Container Service (PKS)

Q+A

What is CFCR?



- An Open Source Software project part of Cloud Foundry
- Allows the deployment of vanilla kubernetes clusters using BOSH
- Pivotal, Google, VMWare and Swisscom are major contributors

Why not application runtime?



- Cloud Foundry customers have been using Application Runtime to deploy Cloud Native applications
- It is a highly opinionated framework
- It is not suited to all types of workloads
 - Legacy applications
 - Third party applications delivered as containers
 - Applications with complex network or persistence requirements

Why Kubernetes?



For these types of workloads Kubernetes is the obvious choice

Why inside Cloud Foundry?

- Customers love the Cloud Foundry operator experience
- They want the same experience they get operating CFAR for Kubernetes
- A simple way to deploy
- A simple way to upgrade
- A simple way to apply security patches
- A simple way to maintain VM infrastructure



CLOUDFOUNDRY

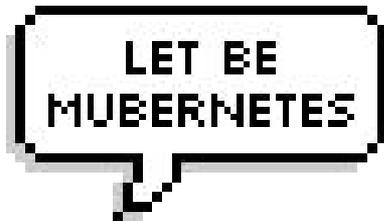
What problems is CFCR trying to solve?

- Installation of Kubernetes is pretty straight forward.
- Day 2 is not so easy
 - How to you upgrade clusters?
 - How do you deal with CVEs in your operating systems running clusters?
 - Kubernetes keeps your applications running but what keep Kubernetes running.
 - High availability doesn't come out of the box.

Powered by BOSH

CLOUDFOUNDRY

BOSHTM



CLOUDFOUNDRY



**CONTAINER
RUNTIME**



Powered by BOSH

BOSH is a tool for release engineering, deployment, lifecycle management and monitor of distributed systems.

- Teams can create their own software releases that are deployable in a repeatable fashion.
- Operators can deploy these software releases in a consistent and reproducible manner and they can do so quickly.
- Multi IaaS via Cloud Provider Interfaces (CPI)
- Uses OS Stemcells to standardize deployments and quickly patch CVEs
- Operation Teams are incredibly efficient using



Powered by BOSH

What does BOSH mean for CFCR

- CFCR is a BOSH release of Kubernetes
 - Each release is for a specific Kubernetes version
 - CFCR will keep up-to-date with latest Kubernetes releases.
- It plans to track the Kubernetes version in use by GKE.
- High Availability / VM Healing
- Scaling
- Upgrades



Demo

- Day 1 - Installation
 - Initial cluster installation
- Day 2
 - Capacity issue - Show scaling of worker VMS
- Day 2
 - Software update - Kubernetes version upgrade
 - OS CVE - Stemcell upgrade

Powered by BOSH

Deployment

- Running system
 - Releases
 - VMs with disks
 - Network configuration
 - Process instances
- Monitored by BOSH

Powered by BOSH

Deployment manifest

- Declarative
- VM Layout
- Versioned Software packages - Releases
- Versioned base OS images - Stemcell
- Configuration parameters
- Cloud agnostic

Powered by BOSH

Release

- Versioned
- Software packages
- Scripts required to start
- Definition of properties
- Can be rebuilt from source at any time
- Made of jobs

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Jobs

- Describes single service
- Start/Stop scripts
- Monitoring (using monit)
- Configuration
- Hooks: pre-start, post-start, post-deploy, and drain

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Stemcell

- Disk image with installed system software on it
- Same versions of all software in all infrastructures
- Managed by Cloud Foundry BOSH team
- CVE patched in 2 days

Powered by BOSH

Credhub

- Have all your credentials in one place
- Generate new credentials for each deployment
- Easily rotate credentials

Vision for Cloud Foundry Container Runtime

To make CFCR the defacto standard for deploying and managing Kubernetes clusters.

- We want to delight users of CFCR when deploying, managing and upgrading Kubernetes clusters.
- Automate with Day 2 operations in mind.
- Vanilla Kubernetes
 - Conformance
 - GKE compatibility



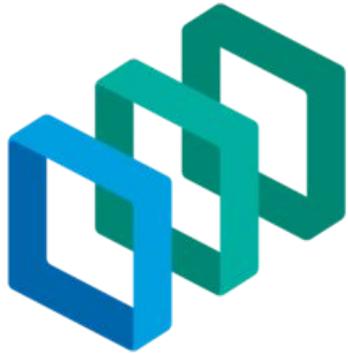
Container Runtime 0.10

- Service catalog integration
- Guaranteed release upgrades
- Tested Resurrection in pipelines

Future

What CFCR team plan to work on next

- Security - Working with the Cloud Foundry Security Enablement team and adopting CIS suggestions
- Availability - Focusing on making multi-AZ work for master nodes
- Defining processes around 48hr CVE patches
- Defining processes around one week K8s upgrades



Pivotal
Container Service™

Pivotal Container Service (PKS)

Build for Day 2 operations

- On Demand Provisioning
- Open Source Kubernetes
- Multicloud

Pivotal Container Service (PKS)

Enterprise Ready

- VMWare Integration
 - NSX-T Integration
 - Harbour
 - vRealize
- All the operation efficiencies offered by BOSH
- Controlled access BETA will be available mid December

Links

- Docs
 - <http://docs-cfcr.cfapps.io/>
 - <https://www.cloudfoundry.org/container-runtime/>
 - <https://bosh.io/docs/>
- Code
 - <https://github.com/cloudfoundry-incubator/kubo-release>
 - <https://github.com/cloudfoundry-incubator/kubo-deployment>
- Slack:
 - <https://cloudfoundry.slack.com/messages/cfcr>
- Demo:
 - <https://github.com/bstick12/kubecon>



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