



# OPENSIFT VS PIVOTAL CLOUD FOUNDRY COMPARISON

Presenter

Title

Date

## RED HAT OPENSIFT CONTAINER PLATFORM

An integrated application  
platform to run, orchestrate,  
monitor and scale containers  
(CaaS and PaaS)

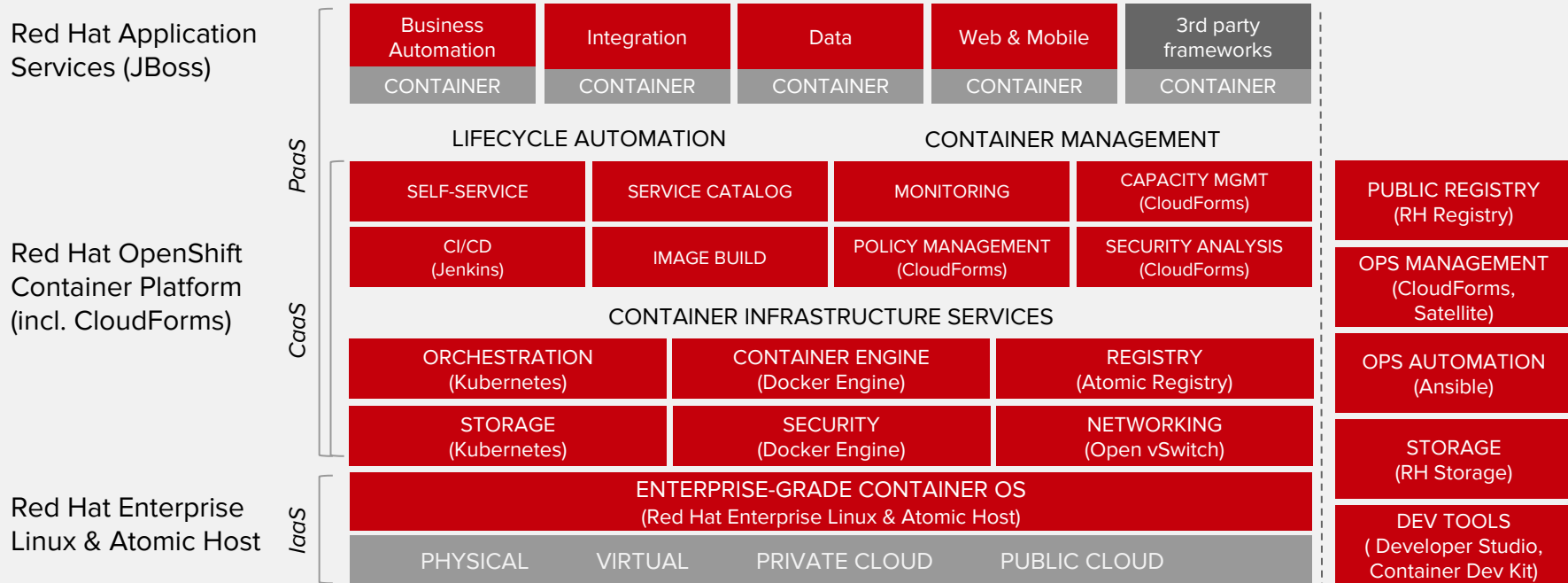
## PIVOTAL CLOUD FOUNDRY®

A platform-as-a-service for  
cloud-native applications  
(PaaS)

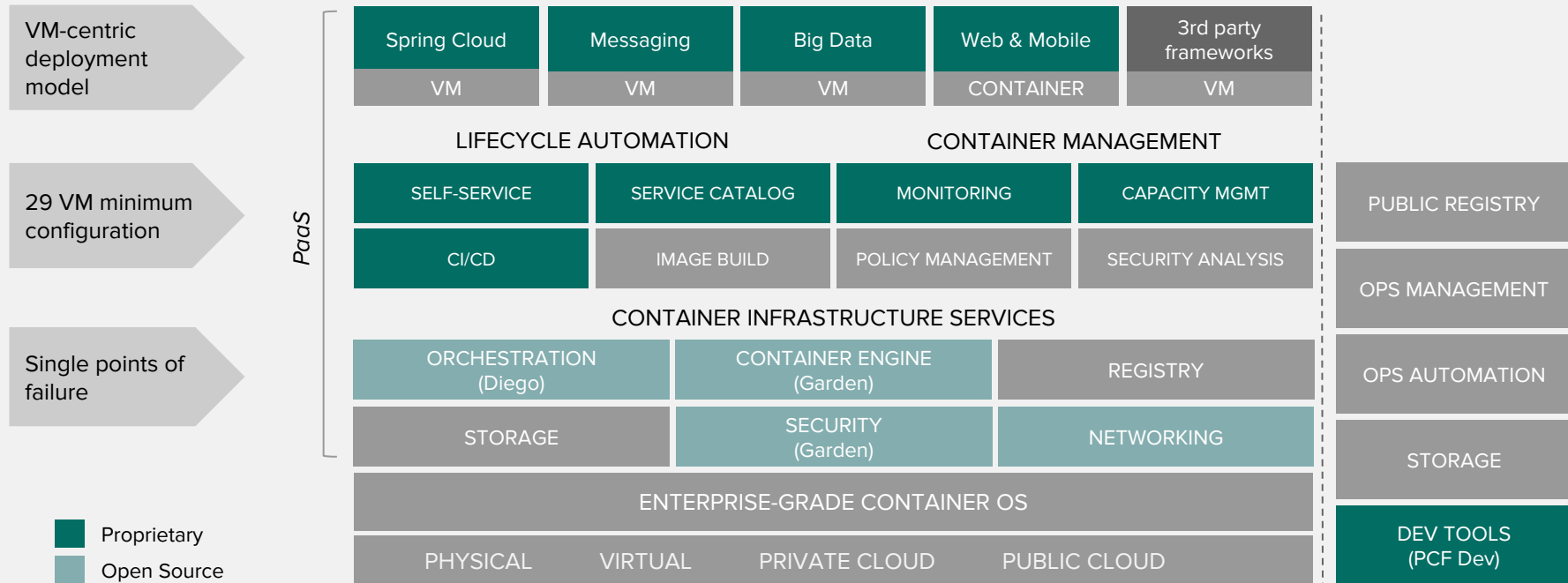
# PIVOTAL CLOUD FOUNDRY

- Pivotal spun off out of EMC and VMWare
- Based on open source Cloud Foundry
- Products
  - **Pivotal Cloud Foundry:** on-premise PaaS
  - **Pivotal Web Services:** hosted PaaS on Amazon Web Services (AWS)
  - **PCF Dev:** local instance on dev machines
  - **Pivotal Labs:** consulting method

# RED HAT CONTAINER STACK



# PIVOTAL CLOUD FOUNDRY STACK



# KEY OPENSIFT ADVANTAGES

- Enterprise grade security
  - Built on top of RHEL and uses industry-standard SELinux isolation
- Full stack support
  - Single vendor supporting OS, platform, containers and middleware
- Enterprise middleware services including full Java EE support
  - Red Hat JBoss EAP, JWS, A-MQ, Fuse, BRMS, BPMS, JDG, Mobile, API and SSO
- Standard containers and orchestration
  - Linux containers and orchestration with Docker and Kubernetes
- Built-in operational management
  - Infrastructure provisioning, policy-management and vulnerability scanning
- Supported by Red Hat
  - Trusted open source leader
- 100% Open Source

# COMMUNITY AND VENDORS

## **OpenShift community vs Cloud Foundry community**

- Cloud Foundry community is polarized with 80% contributions by Pivotal and IBM
- OpenShift community is democratized by many contributors and is 5x more active

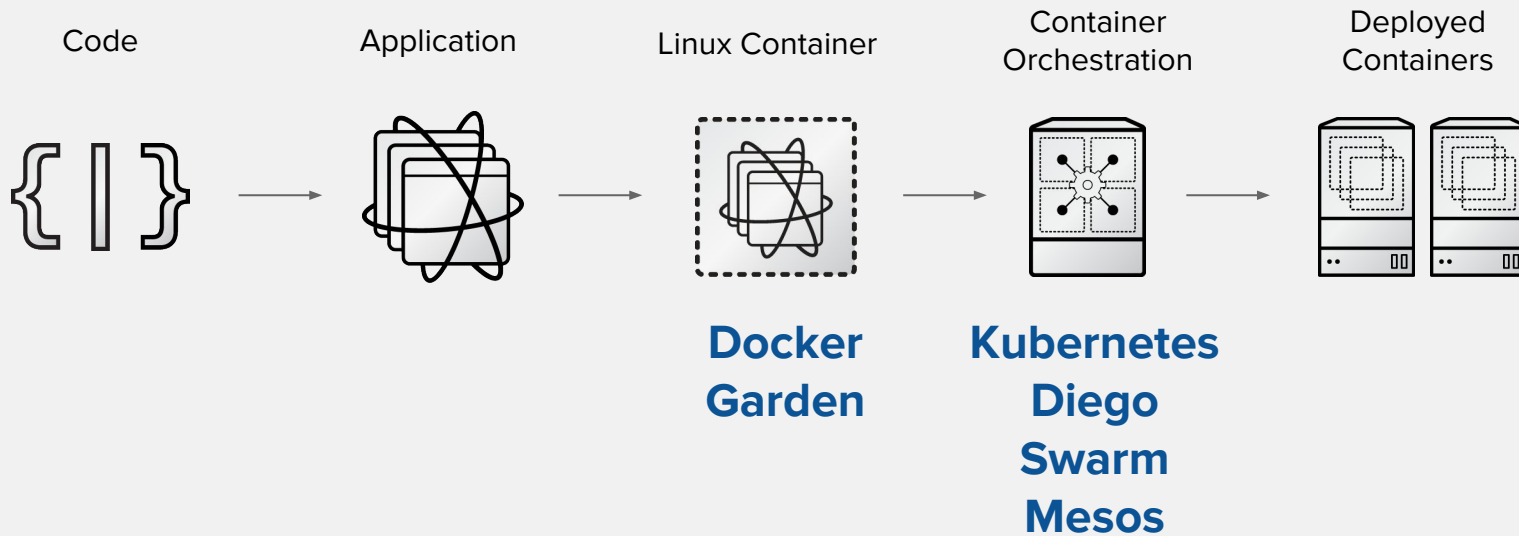
## **OpenShift vendors vs Cloud Foundry vendors**

- Authentication, app lifecycle, storage, networking, app services and messaging are proprietary and differ across certified Cloud Foundry vendors (no portability)
- All OpenShift vendors' solutions are open source and identical (portability)

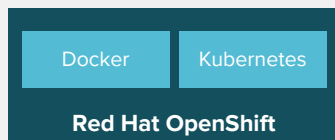
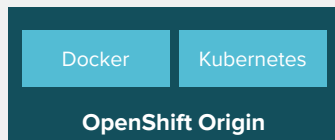
## **Switching costs is more than just PaaS/CaaS**

- Any application stack runs on OpenShift and OpenShift runs on any infrastructure
- Only Cloud Native applications run on Cloud Foundry

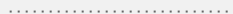
# FROM CODE TO DEPLOYED CONTAINERS



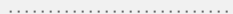




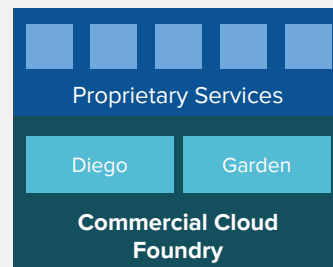
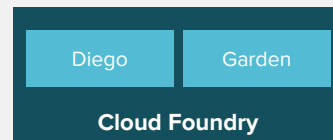
Upstream  
Community



Community  
Platform



Commercial  
Platform



**ARE YOU LOCKED-IN?**

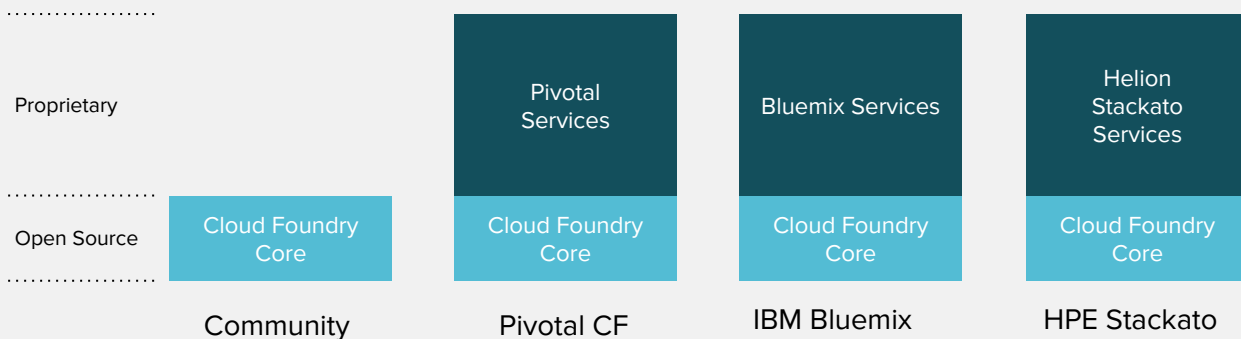
# THE LOCK-IN DILEMMA

Can you switch vendor without  
switching technology?

Can you switch technology without  
switching vendor?

# CLOUD FOUNDRY PLATFORMS

- Small set of core services in the open source Cloud Foundry
- Large set of proprietary services on top in each vendor distribution
- Apps are not portable across platforms due the proprietary services (**tech lock-in**)
- Migration involves cut and replace vendor-specific proprietary services
- Not possible to go from vendor solution to a self-maintained (**vendor lock-in**)



# CLOUD FOUNDRY ARCHITECTURE

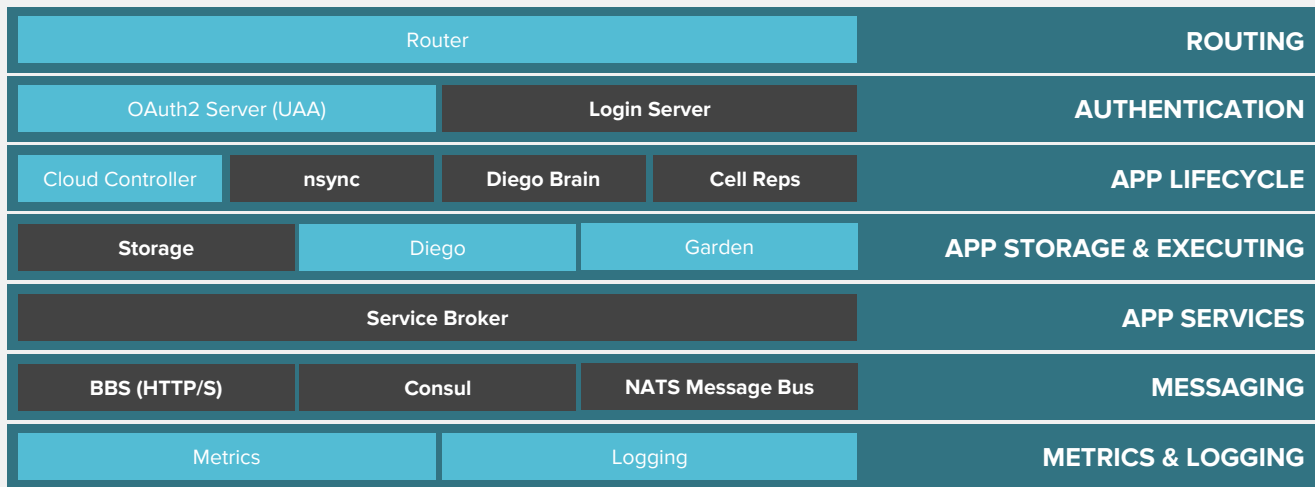
Required Elements for a Certified Provider:  
Cloud Controller, Router, Diego and Garden, UAA, Logging and Metrics

Router				ROUTING
OAuth2 Server (UAA)		Login Server		AUTHENTICATION
Cloud Controller	nsync	Diego Brain	Cell Reps	APP LIFECYCLE
Storage	Diego	Garden		APP STORAGE & EXECUTING
Service Broker				APP SERVICES
BBS (HTTP/S)	Consul	NATS Message Bus		MESSAGING
Metrics		Logging		METRICS & LOGGING

Source: Cloud Foundry PaaS Certification - 2016 Requirements <https://www.cloudfoundry.org/use/cloud-foundry-certified/certification-requirements/>

# CLOUD FOUNDRY ARCHITECTURE

**Authentication, App Lifecycle, Storage, Networking, App Services, Messaging**  
can all be different between various Cloud Foundry providers

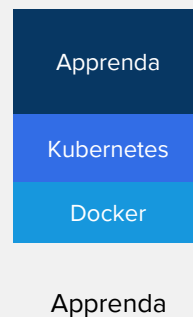
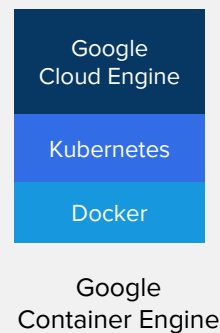
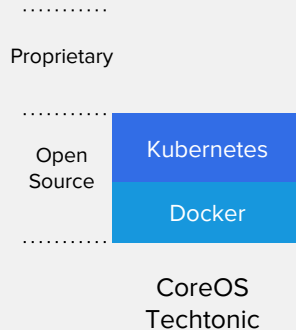
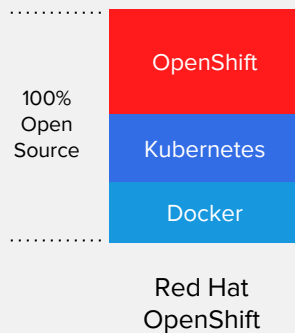


Source: Cloud Foundry PaaS Certification - 2016 Requirements <https://www.cloudfoundry.org/use/cloud-foundry-certified/certification-requirements/>

With Cloud Foundry, every vendor switch  
involves **sizable application migration**  
between Cloud Foundry providers

# KUBERNETES PLATFORMS

- Many platforms have adopted Docker and Kubernetes
- App containers are fully portable across platforms
- App migration might involve cut and replace vendor-specific services
- This is essentially the Cloud Foundry model



Google  
CoreOS  
Apcera  
Apprenda  
Huawei  
Mesosphere  
WSO2  
Canonical  
EngineYard  
Rancher  
Eldarion

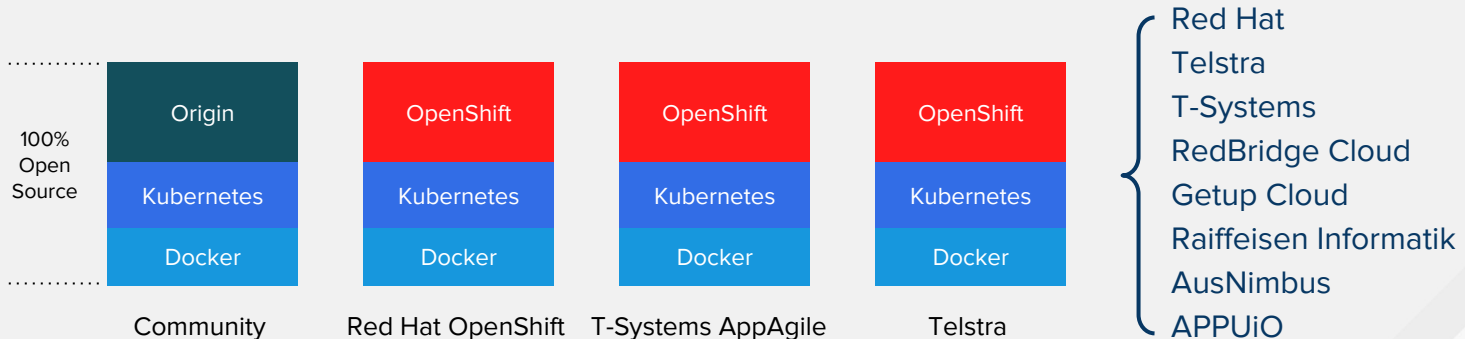


With Kubernetes, vendor switch **might**  
involve **application migration** between  
Kubernetes providers

# OPENSIFT PLATFORMS

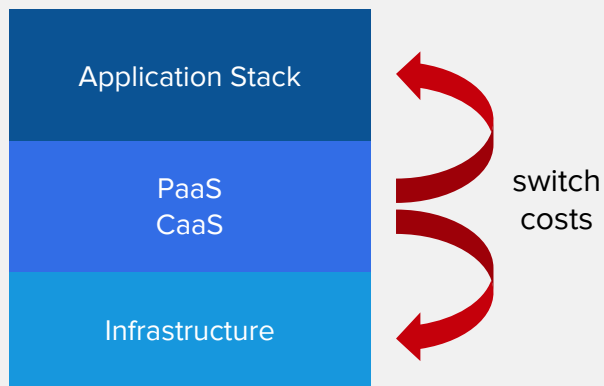
- Based on docker containers and Kubernetes
- 100% open-source
- App containers are fully portable across docker platforms
- Apps are fully portable across vendors
- Zero-effort application migration between vendors
- Vendor solution can be self-maintained by customer

**No Tech Lock-in**  
**No Vendor Lock-in**

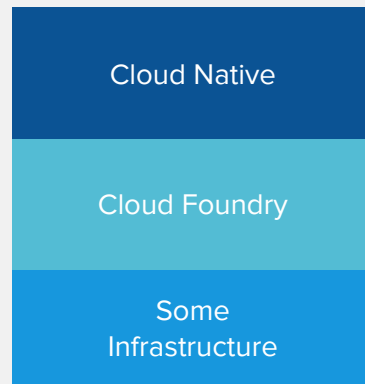
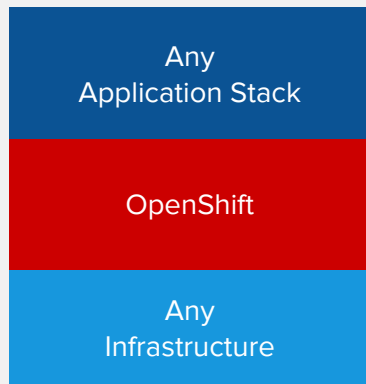


With OpenShift, vendor switch involves  
**zero application migration** between  
OpenShift providers

# SWITCH COSTS IS NOT JUST ABOUT THE CONTAINER PLATFORM



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# AT A GLANCE

## PIVOTAL CF

- Garden and Diego
- .NET and Spring
- Only Cloud-native apps
- Container security on Ubuntu
- Deployment automation
- Open Core
- Pivotal Labs consulting method

## OPENSIFT

- Docker and Kubernetes
- .NET, Spring and JBoss Middleware (including full Java EE)
- Cloud-native and stateful apps
- Enterprise-grade security on Red Hat Enterprise Linux
- Complete Ops Management
- 100% Open Source
- Red Hat Innovation Labs consulting method

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5x Price

# BRIEF COMPARISON



# CONTAINER & ORCHESTRATION

## PIVOTAL CF

### Garden & Diego

- Garden uses OCI runC backend
- Not portable across Cloud Foundry distros
- Containers share host IP
- No image registry
- Private registries are not supported
- No image build
- Adoption only in Cloud Foundry

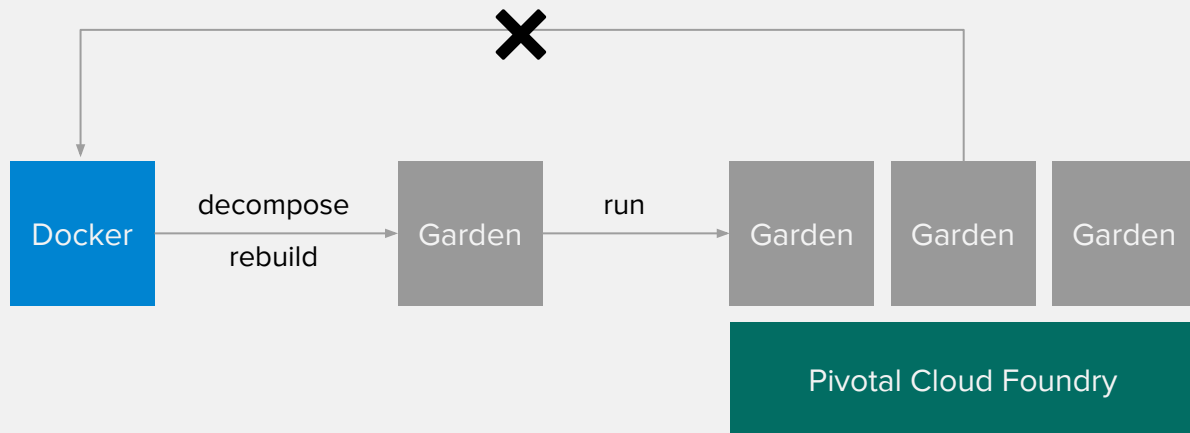
## OPENSIFT

### Docker & Kubernetes

- Portable across all docker platforms
- IP per container
- Integrated image registry
- Image build from source and binary
- Adoption in many solutions

# NO NATIVE DOCKER IN CLOUD FOUNDRY

No support to **run** docker containers. Cloud Foundry **transforms** docker containers to Garden and runs the Garden container



# NO NATIVE DOCKER IN CLOUD FOUNDRY

## **Converters Are Terrible**

Cloud Foundry is based on the Garden container runtime, not Docker, and then has RunC and Windows backends. RunC is not Docker, just the lowest runtime layer

## **Docker Developer Experience Does Not Exist in PCF**

PCF “cf push” Dev Experience does not exist for Docker. In Openshift v3 we built S2I to provide that same experience on top of native Docker images/containers

## **Diego Is Not Kubernetes**

Kubernetes has become the defacto standard for orchestrating docker containers. Diego orchestrates Garden containers and is used only by Cloud Foundry users

# APPLICATIONS

## PIVOTAL CF

### **.NET and Spring**

- Small buildpack service community
- Java, .NET Framework
- Spring Boot and Spring Cloud
- Community CI/CD

### **Only Cloud-native Apps**

- No persistent storage

## OPENSSHIFT

### **.NET and JBoss Middleware**

- Large docker service community
- Full Java EE, .NET Core
- Spring and JBoss middleware portfolio
- Certified Jenkins and Deployment Pipelines

### **Cloud-native and Stateful Apps**

- Persistent storage support

# SECURITY AND OPERATIONS

## PIVOTAL CF

### Basic Security on Ubuntu

- Container traffic rules
- AppArmor integration
- Unprivileged containers (no root)

### Deployment Automation

- Deployment via BOSH and Ops Manager
- No ops management
- No bare-metal

## OPENSIFT

### Enterprise-grade Security on Red Hat Enterprise Linux

- SELinux and OpenScap
- Unprivileged containers (no root)

### Complete Ops Management

- Deployment via Ansible
- Ops management with Red Hat CloudForms
- Built-in log management (Elasticsearch/Kibana)

# ECOSYSTEM

## PIVOTAL CF

### Open Core

- Proprietary (based on open source)
- CF Foundation with 65+ members

### Pivotal Labs Consulting Method

## OPENSIFT

### 100% Open Source

- 100% Open Source
- Active open-source community
- OpenShift Commons with 200+ members

### Red Hat Innovation Labs Consulting Method

# DETAILED COMPARISON

# CONTAINER

## PIVOTAL CF

- **Garden** linux container and **buildpacks** based on OCI runC backend
- Adopted only in Cloud Foundry
- Runs Docker by converting to Garden
- Not portable across platforms (e.g Bluemix)
- **No** image registry
- Private registries not supported
- Containers share host IP
- All communication through load-balancer

## OPENSIFT

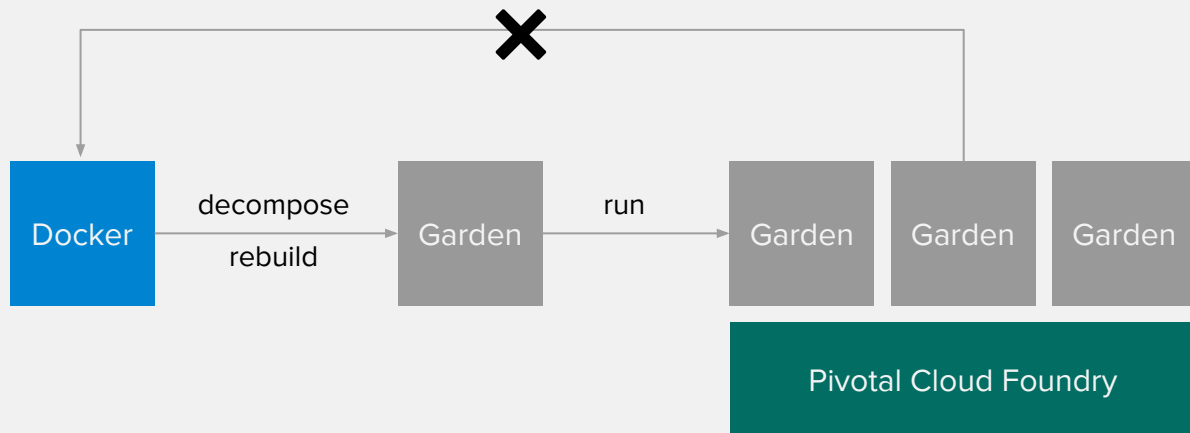
- Native **Docker** linux container
- Widespread commercial adoption
- Portable across platforms
- Integrated image registry
- Built-in SDN
- IP per container
- Inter-container communication





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# ORCHESTRATION

## PIVOTAL CF

- **Diego** orchestrator
  - Adoption **only** in Cloud Foundry
  - **No** distributed and cron jobs
- 
- Service registry **only** for Spring apps
  - Service catalog
  - Config Server for Spring apps

\* coming soon

## OPENS SHIFT

- **Kubernetes** orchestrator
  - Adoption in many solutions
  - Distributed and cron\* job support
  - Custom scheduling
  - Resource limits and quotas with **QoS tiering**
  - **Multi-cluster** orchestration\*
- 
- Service discovery for all containers
  - Service catalog\*
  - Loosely-coupled application configuration



# APPLICATION SERVICES

## PIVOTAL CF

- **Few** community buildpacks
- Supported runtimes: Java, Ruby, ...
- .NET support
- Compelling Big Data services
- Spring Boot and Spring Cloud Services
- Microservices with Spring Boot
- Third-party services
- Stateful and legacy apps **not** supported
- **No** persistent storage

## OPENS SHIFT

- **Many** community Docker images
- Supported runtimes: **Full Java EE**, Java, Ruby, ...
- .NET Core support
- Red Hat JBoss Middleware
- Microservices with JBoss and Spring
- Third-party services
- Stateful and legacy apps supported
- Persistent storage support



# APPLICATION LIFECYCLE

## PIVOTAL CF

- No container images
  - **No** Docker build
  - Containers run from source and binary
- 
- Spinnaker and Concourse CI
  - CloudBees Jenkins integration

## OPENSIFT

- **Image build** from source and binary
  - Automated redeploy on image update
  - Docker build support
  - CI/CD Integration
- 
- Certified Jenkins
  - Support for Jenkins slaves
  - Built-in CI/CD and Pipeline
  - CloudBees Jenkins integration



# SECURITY

## PIVOTAL CF

- Container traffic rules (in- and outbound)
- AppArmor integration
- Seccomp integration
- Unprivileged containers (no root)

## OPENSIFT

- Containers jailed with **SELinux**
- Unprivileged containers (no root)
- End-to-end cluster security with TLS
- Fine-grained role-based policies
- Container **vulnerability scanning** through Red Hat CloudForms and BlackDuck (partner)



# OPERATIONS & MANAGEMENT

## PIVOTAL CF

- Ubuntu (support partnership with Canonical)
- Virtual, private and public cloud
- Container metrics
- Basic log aggregation
- Deployment via BOSH and OpsManager
- **No** operational management

## OPENSIFT

- Red Hat Enterprise Linux and Atomic Host 
- **Physical**, virtual, private and public cloud
- Container metrics
- Container log aggregation and management
- Built-in **ElasticSearch** and **Kibana**
- Deployment via Red Hat CloudForms 
- Complete operational management (capacity, audit, policy, forensic, etc)

# ECOSYSTEM

## PIVOTAL CF

- Proprietary (open core)
- Cloud Foundry Foundation with 65+ members
- OCI member
- Vibrant partner community
- Pivotal Labs consulting method for enabling Agile and DevOps

## OPENSIFT

- **100%** Open Source
- OpenShift Commons with **200+ members**
- OCI and Platinum CNCF member
- Kubernetes adopted in CNCF
- Active open-source community
- Vibrant partner community
- Red Hat Innovation Labs consulting method





# OPENSIFT AWARDS



## InfoWorld

### Review: OpenShift 3 rocks Docker containers

"For both developers and operators, OpenShift fulfills the promise of PaaS."

<http://www.infoworld.com/article/3005681/paas/review-openshift-3-rocks-docker-containers.html>

# OPENSIFT CUSTOMERS

amadeus

FICO™

BBVA

  
CISCO™

  
technologies

  
LESHOP.CH  
MIGROS

PAYCHEX®

T·Systems·



THE UNIVERSITY  
of NORTH CAROLINA  
at CHAPEL HILL

 UTS

 Penn  
UNIVERSITY of PENNSYLVANIA

read more at [opensift.com/customers](https://opensift.com/customers)

# OPENSIFT COMMONS



An interactive community for all OpenShift PaaS Users, Customers, Contributors, Partners, Service Providers and Developers to share ideas, code, best practices, and experiences.

More at <http://commons.openshift.org>



# THANK YOU



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