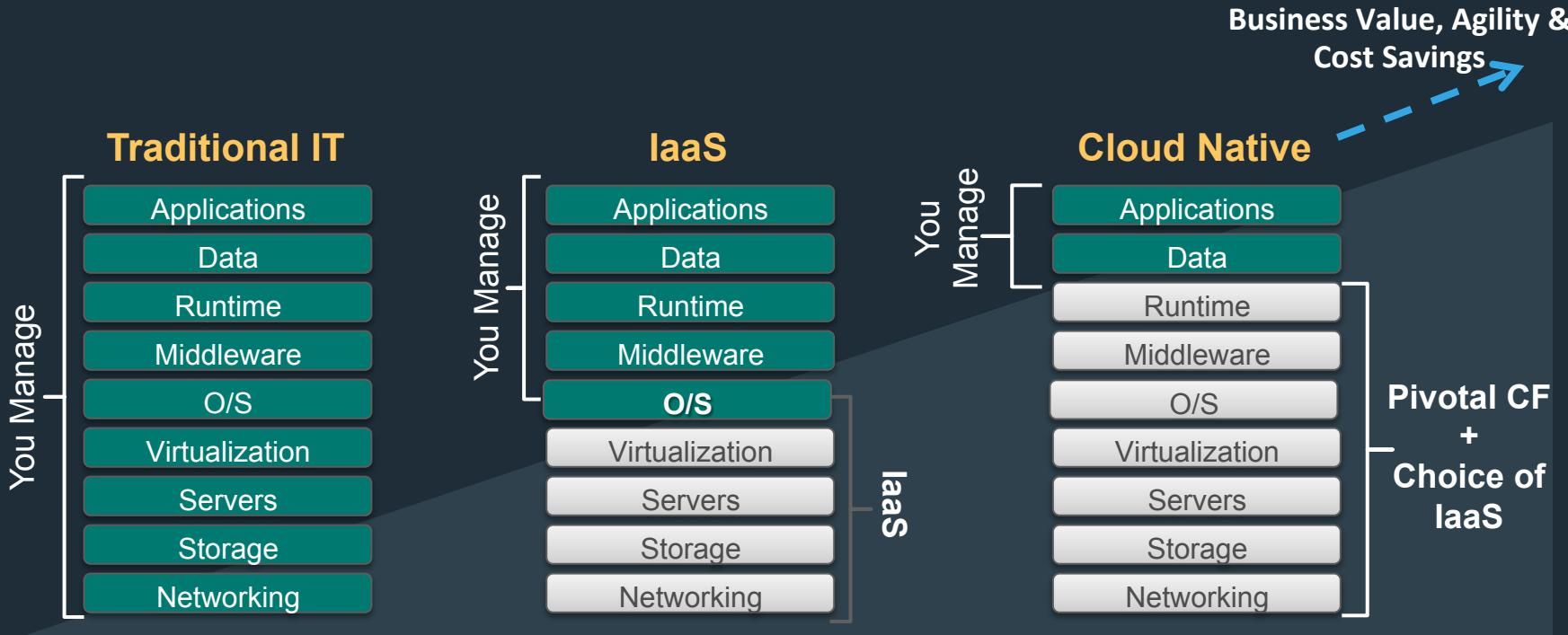


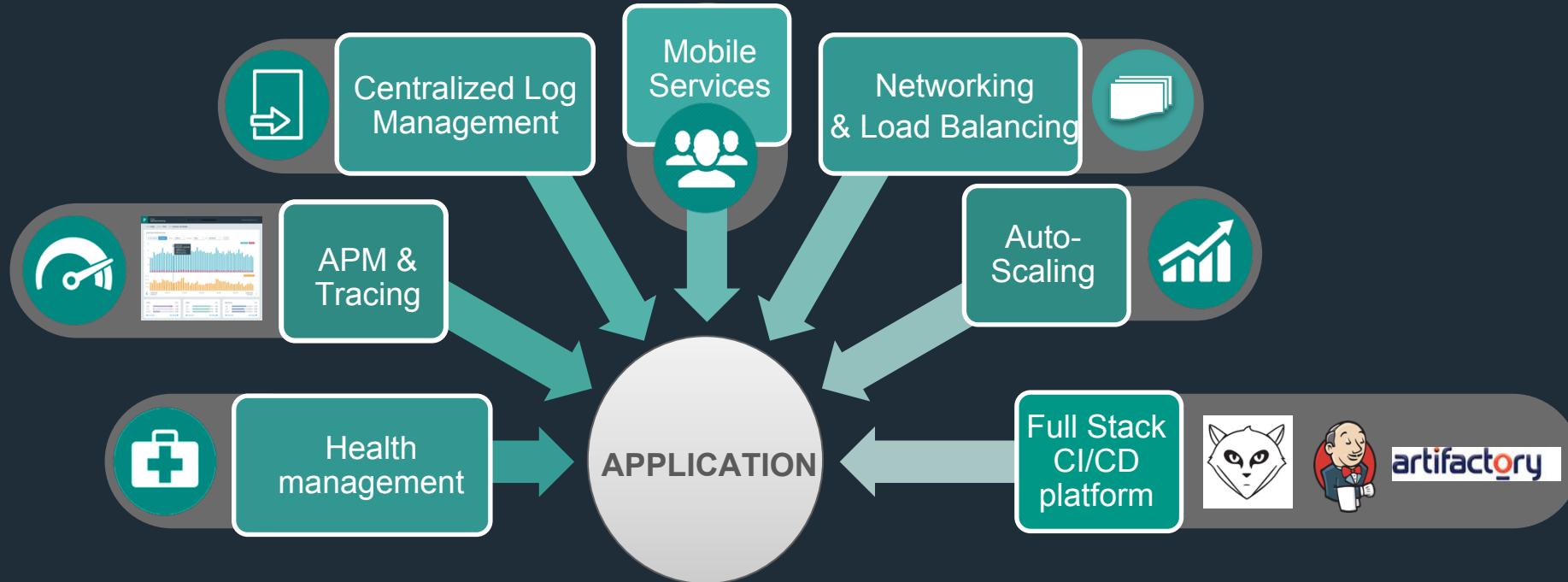
# Pivotal Cloud Foundry

Architecture & Operations

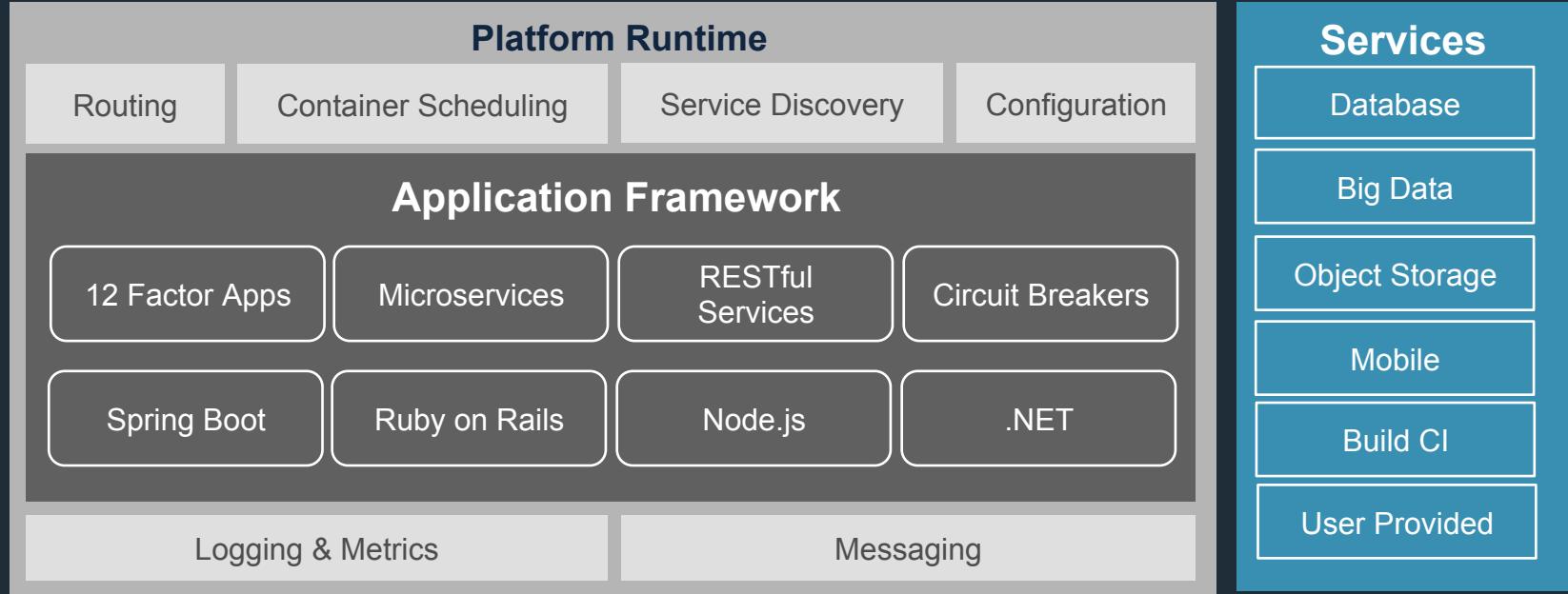
# The Cloud Platform Evolution



# Cloud Foundry: An Application-centric Platform



# Pivotal Cloud Foundry at a Glance



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# Applications/APIs/Microservices



Compiled, staged, containerized, deployed and managed by platform  
Java | .NET | Ruby | Node.js | Python | PHP | Go



Pre-packaged container deployed and managed by platform

## PCF Tools

- Apps Manager UI (App Admin UI)
- CLI
- REST APIs
- PCF Metrics Dashboard

## PCF Elastic Runtime

Automated, Polyglot Build/Package/Deploy

Container Scheduling

Elastic (Auto)Scale

Integrated Logging/Metrics\* (Application & Platform)

Dynamic Routing & Extensible Route Services

Dev + Ops Role-Based Self-Service Access

Security (Application & Platform)

Self-Healing & High Availability (Application & Platform)

Zero Downtime Upgrades & Patches (Application & Platform)

## Ops Manager UI (Cloud Admin UI)

## Infrastructure Automation (BOSH)

Infrastructure Agnostic Software Packaging

Multi-Cloud Orchestration of Infrastructure Provisioning

Distributed Software Configuration and Health/Lifecycle Management

## Infrastructure

VMware vSphere + Photon

OpenStack

Microsoft Azure

Google Cloud Platform

Amazon Web Services

## BOSH Managed Services



MySQL



Gemfire



Redis



RabbitMQ



Spring Cloud Services



Single Sign On



Mobile Push Notifications



mongoDB



GitLab



Dingo PostgreSQL

PIVOTAL

PARTNER

## Brokered Services



Greenplum DB



HDB



**dynatrace**



**New Relic**



**apigee**



**APP DYNAMICS**



**redislabs**



...



Oracle DB



MS SQL Server



Active MQ



IBM DB/2

PIVOTAL

PARTNERED

USER PROVIDED

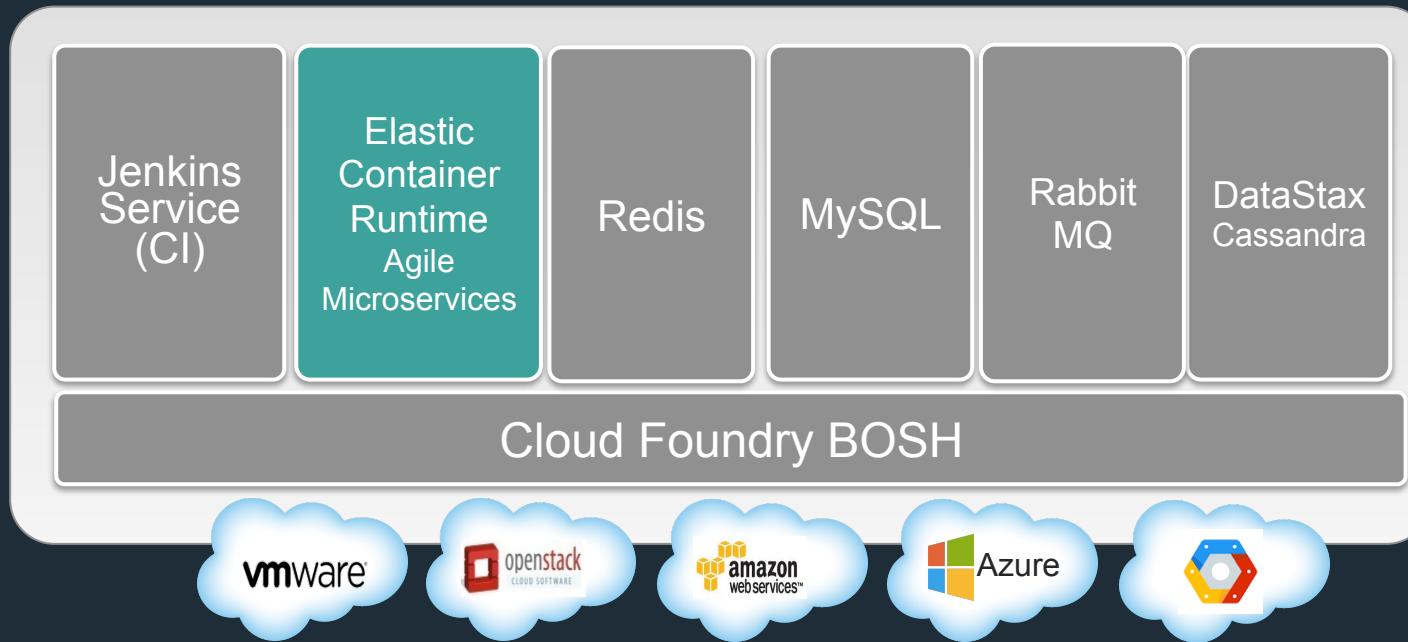


# DEMO

CF

# The Whole Stack

# A Multi-Cloud 3<sup>rd</sup> Platform: Cloud Foundry



Elastic managed runtime service integrated into leading data services; all scaled and managed by CF BOSH

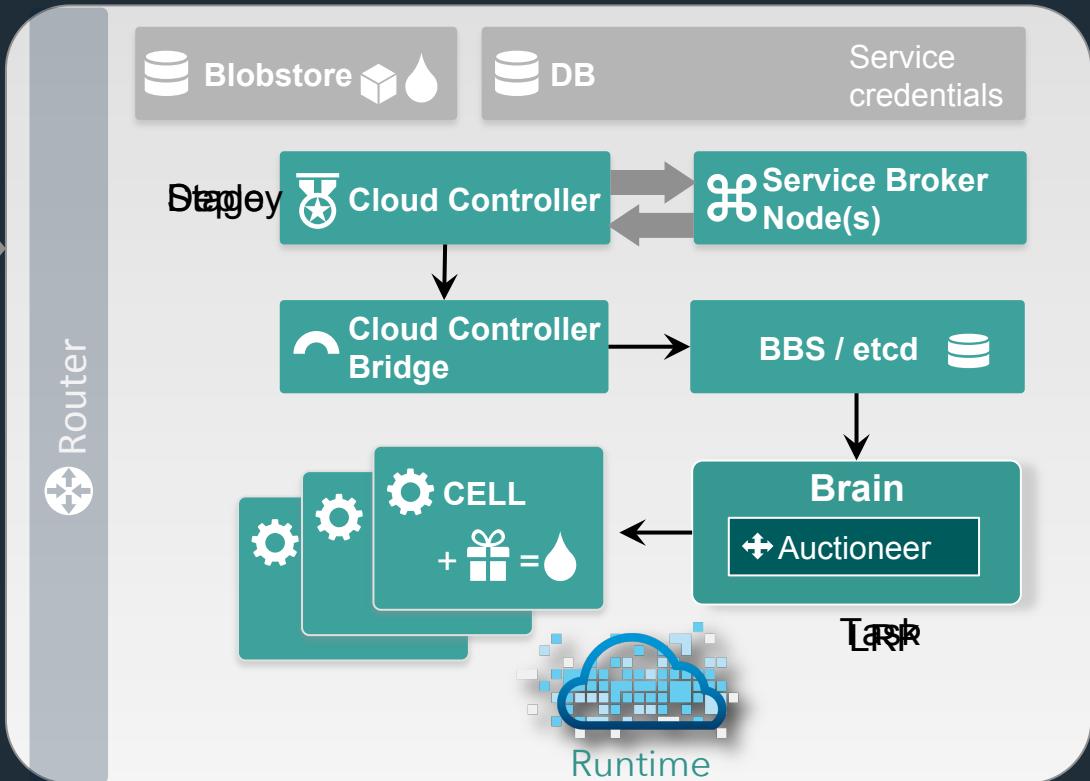
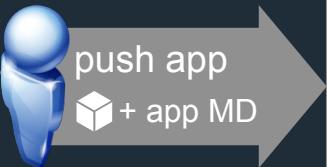
Multi-Cloud Declarative Service Deployment, Operations

# Elastic Container Runtime

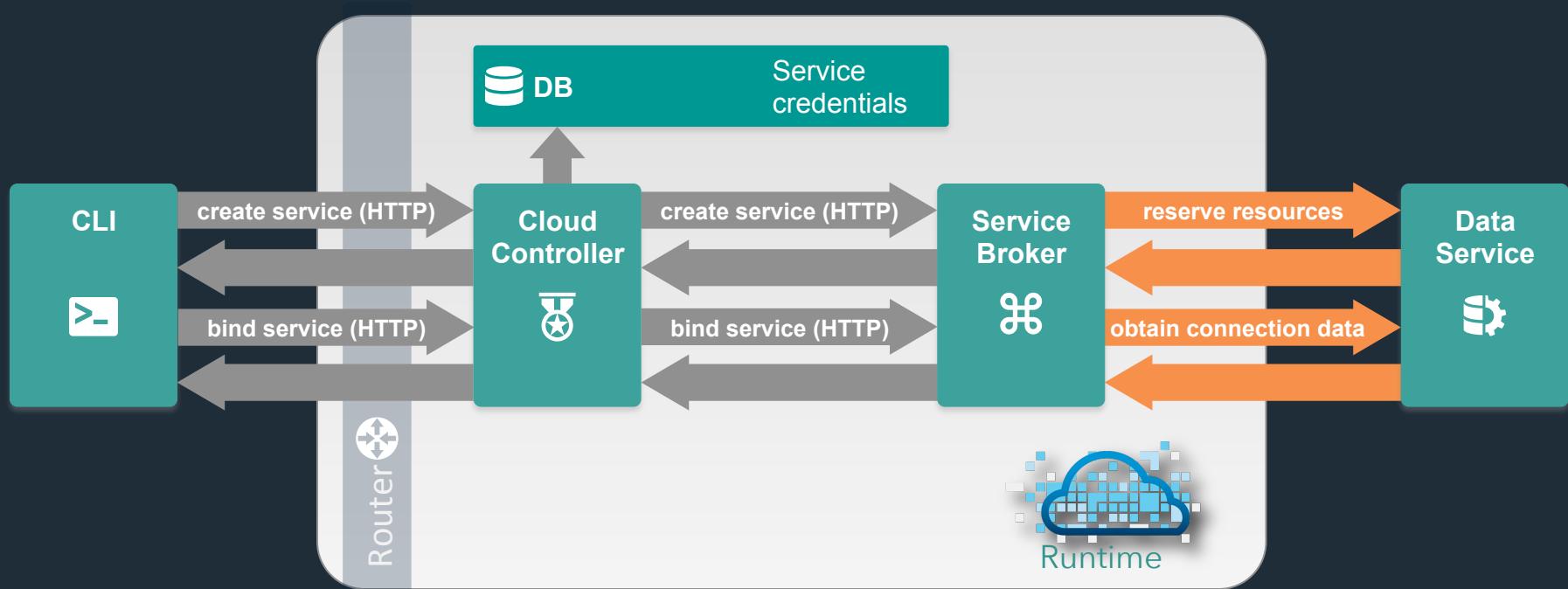
Technical Drill Down

# Overview: Pushing an Application

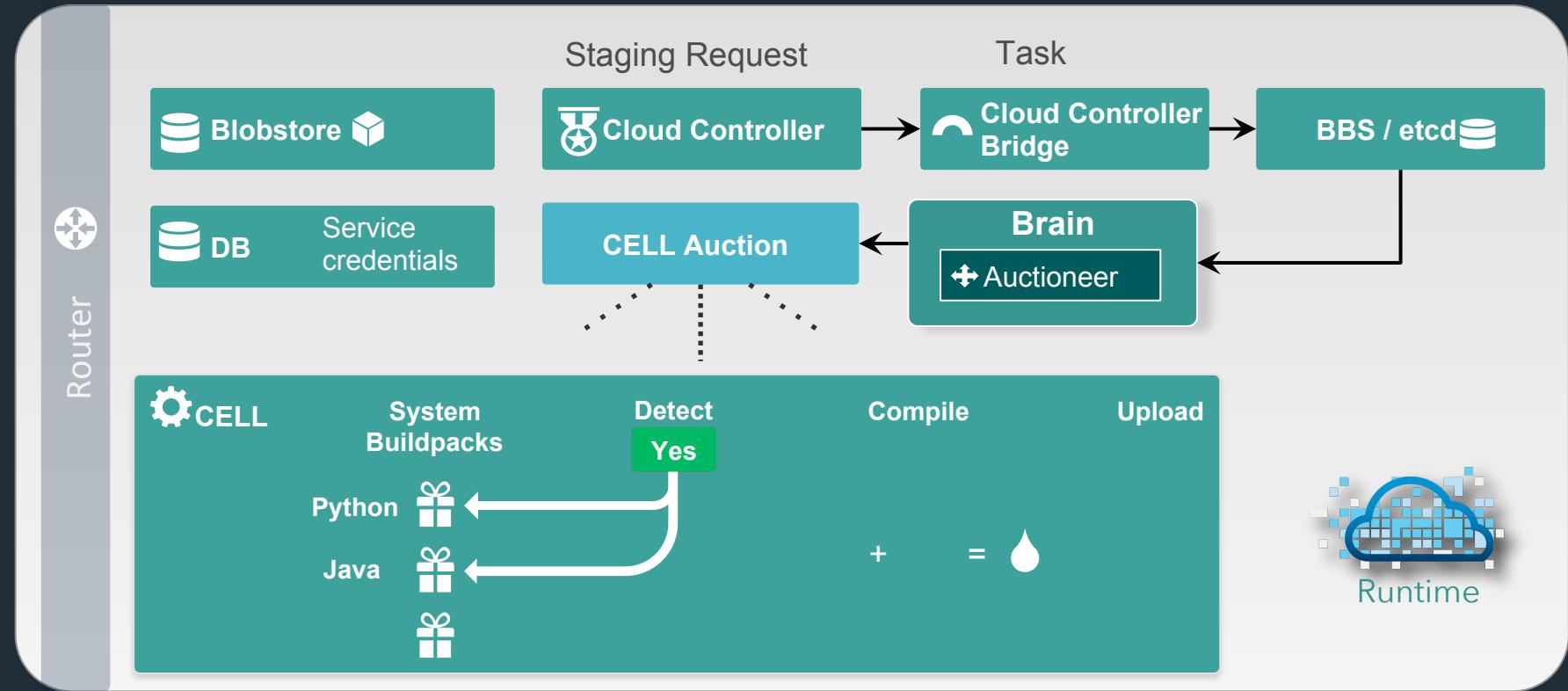
- ① Upload app bits and metadata
- ② Create and bind services
- ③ Stage application
- ④ Deploy application
- ⑤ Manage application health



# Creating and Binding a Service

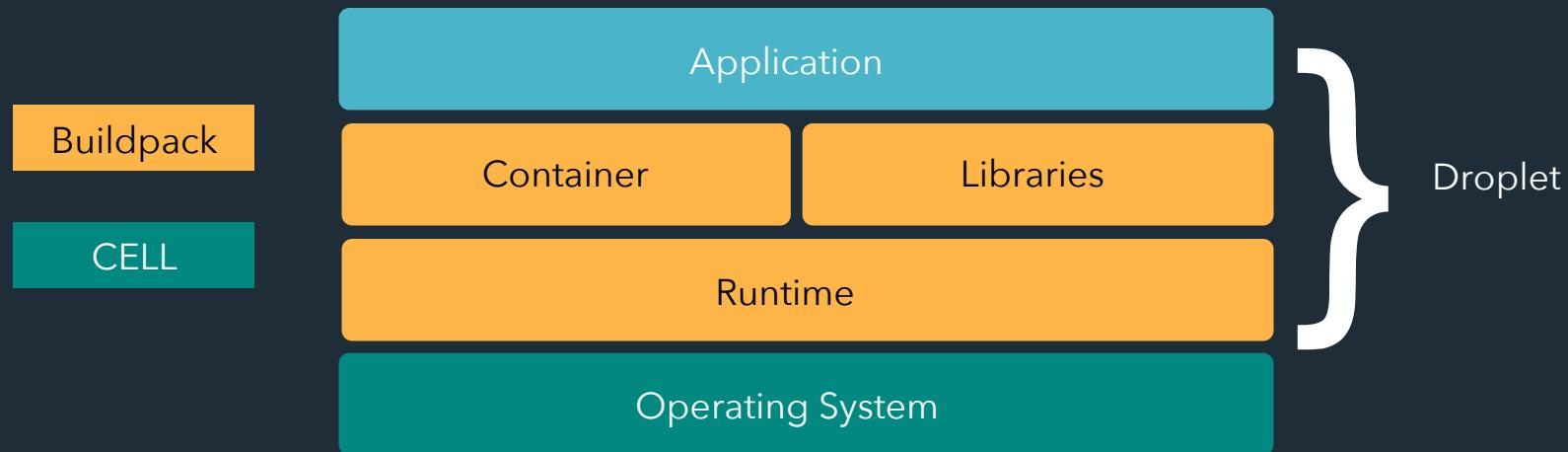


# Staging an Application



# Staging and Buildpacks

Buildpacks are responsible for preparing the machine image for an application.



# Buildpack Flavors

Buildpacks installed into a Cloud Foundry instance or loaded from an external location at app deployment time

Buildpacks provided by public Cloud Foundry

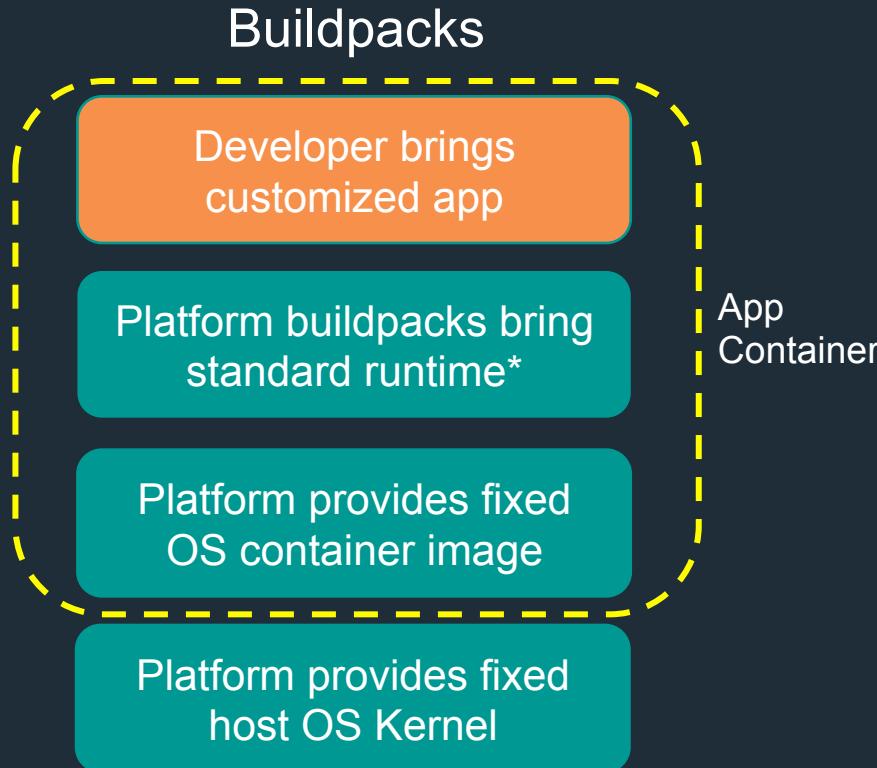
- Java
- Ruby
- Node.js
- Binary
- Go
- Python
- PHP
- Staticfile

[Java Buildpack](#)

[Cloud Foundry Community Buildpack](#)

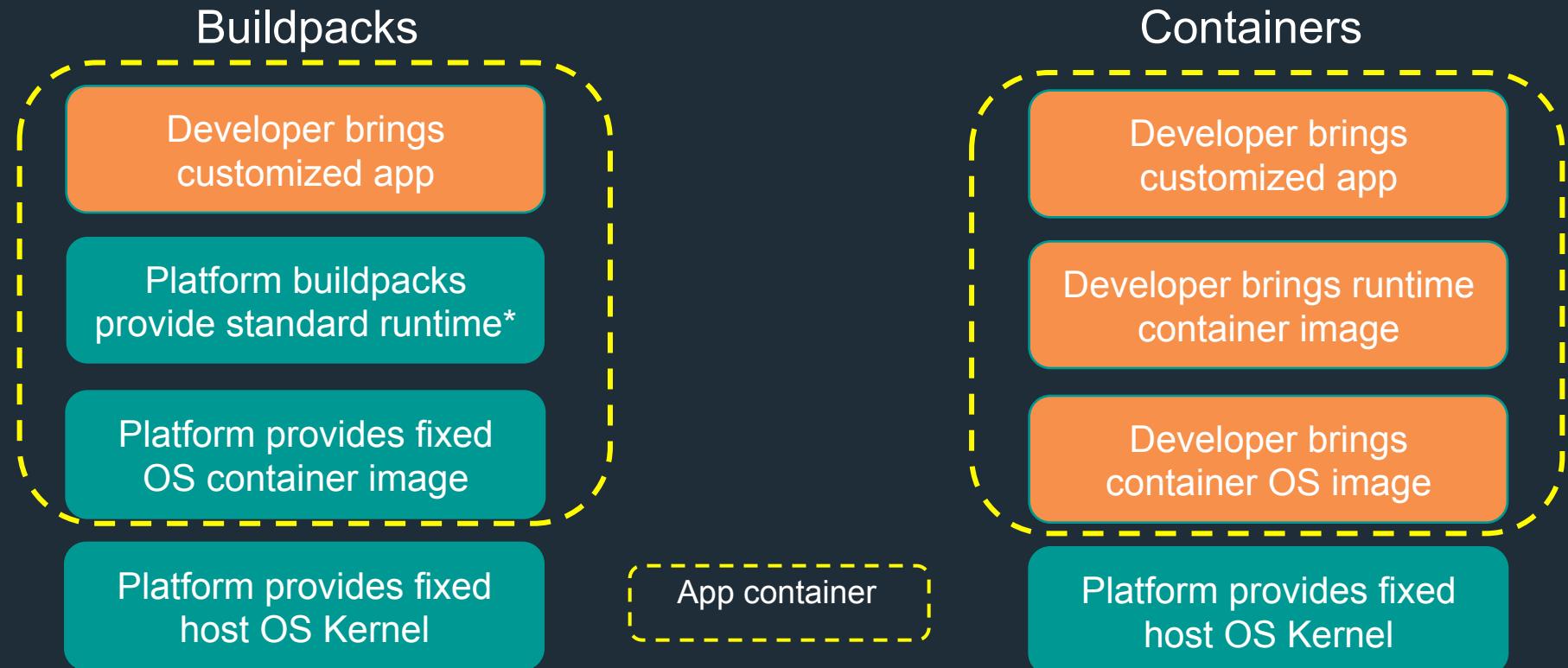
Write your own

# Customize the Container Experience



\* Devs may bring a custom buildpack

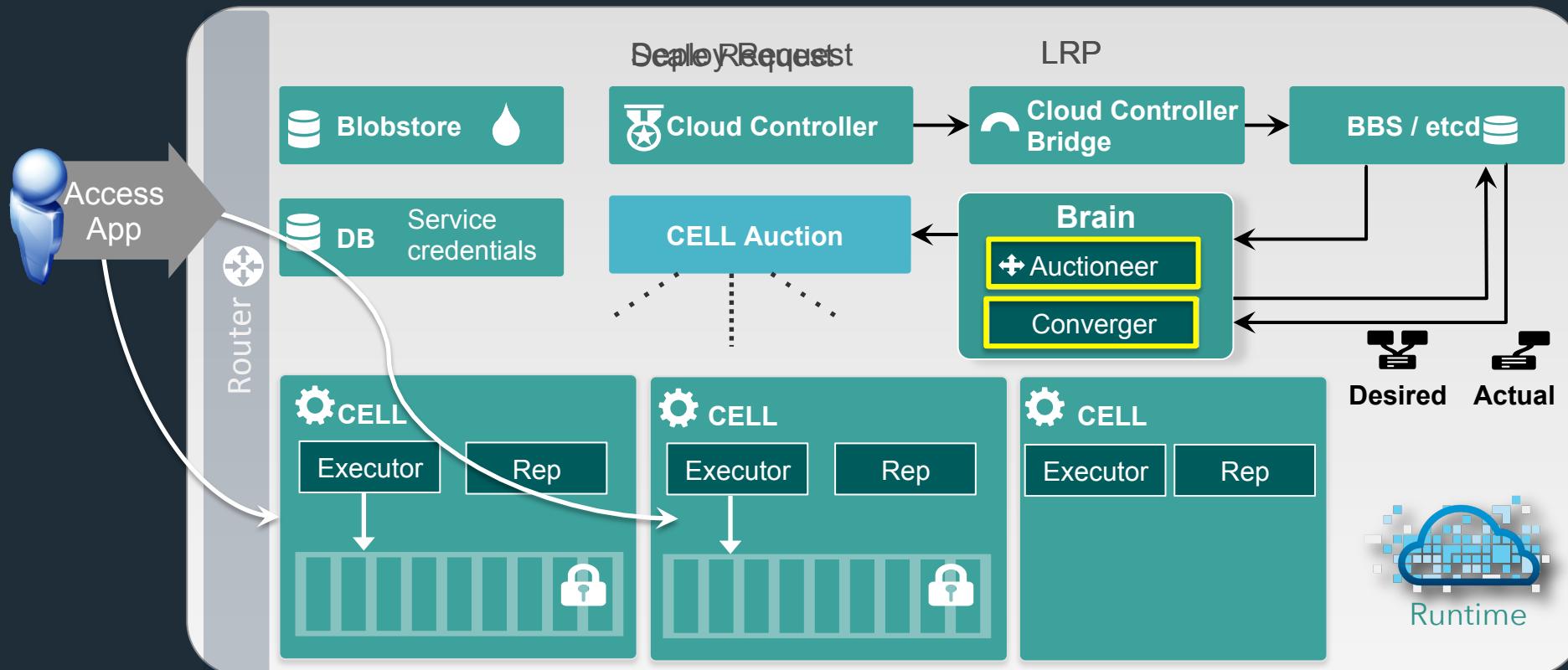
# Customize the Container Experience



\* Devs may bring a custom buildpack

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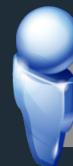
# Application Containers and Scaling



# Deploying Cloud Foundry

## Overview

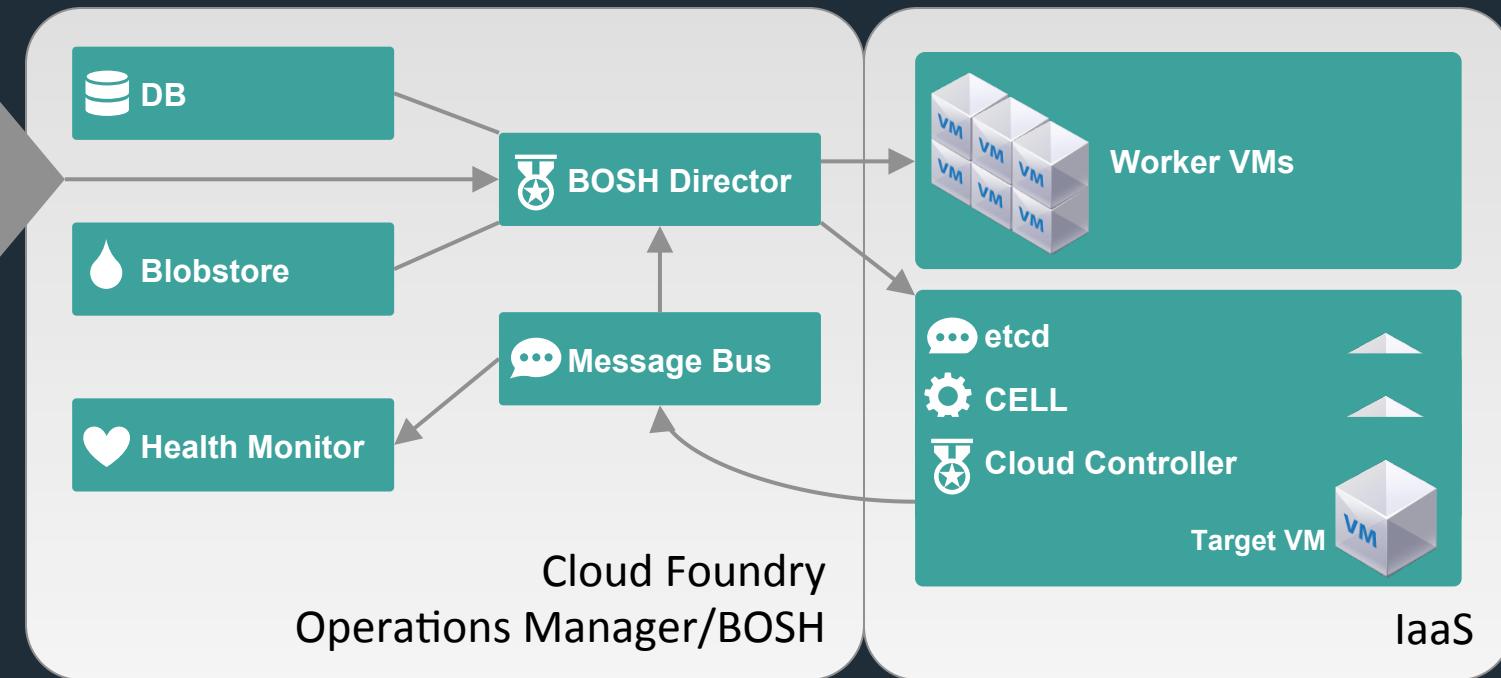
# Deploying the CF Runtime with Cloud Foundry BOSH



Deploy new  
CF Instance

## Deployment

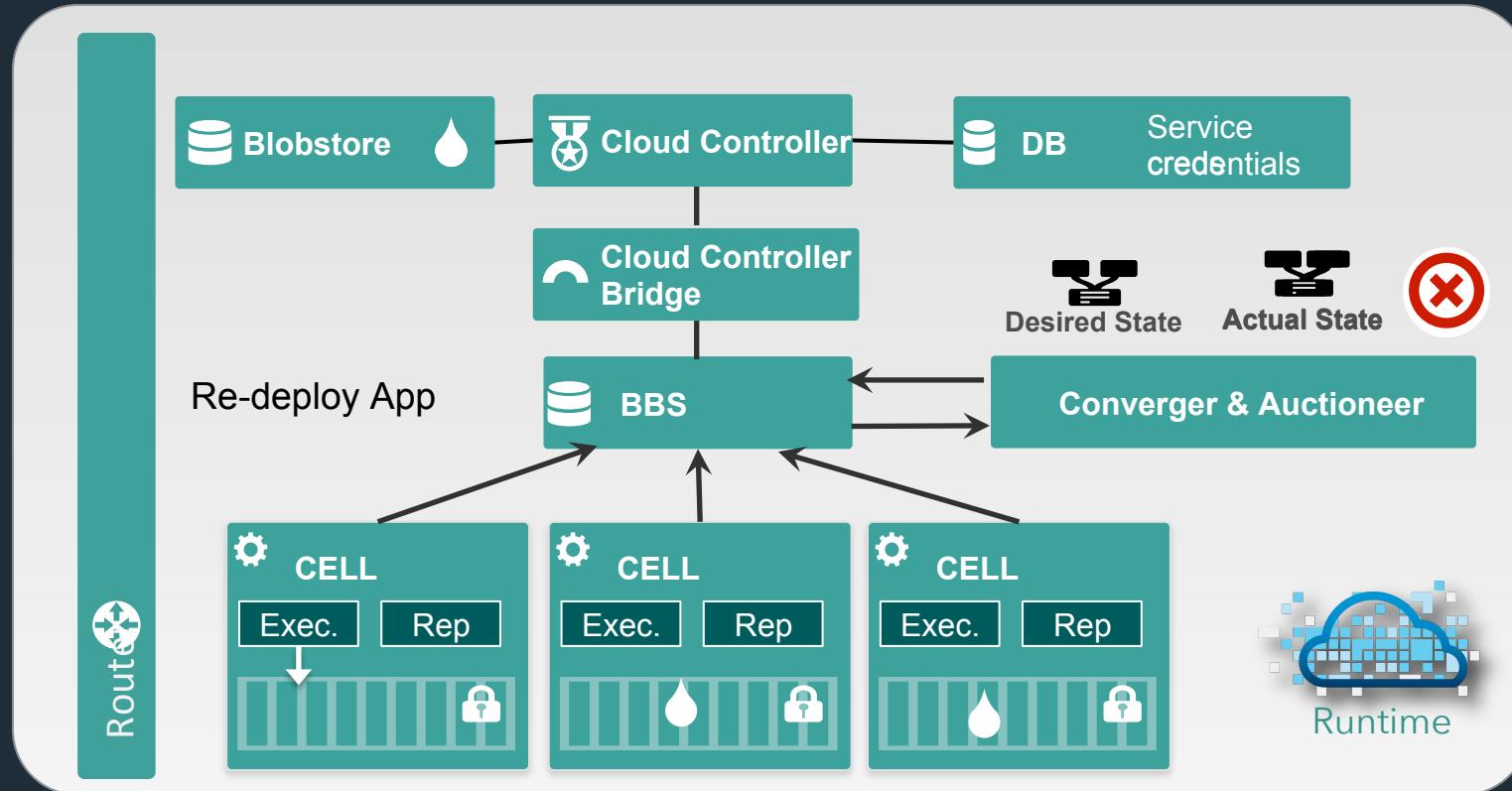
- Packages
- Blobs
- Source
- Jobs
- Manifest



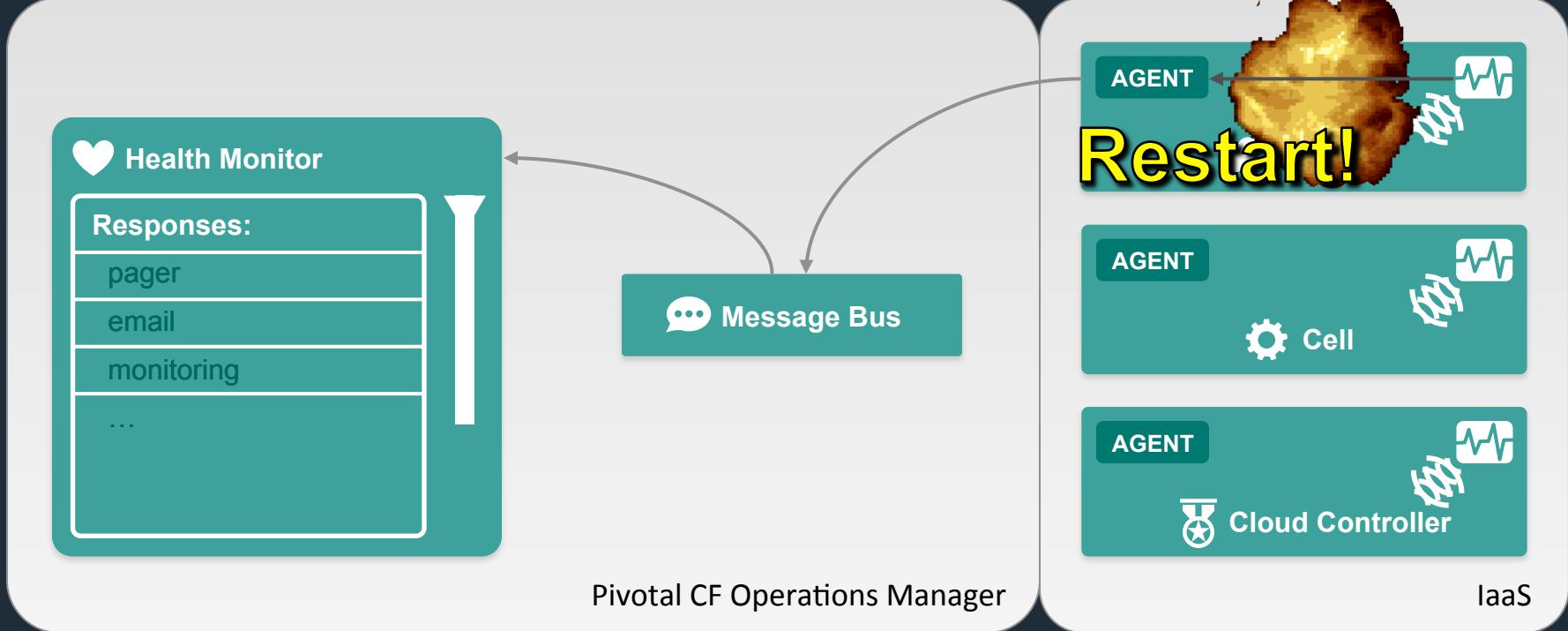
# Four Levels of HA

Built In!

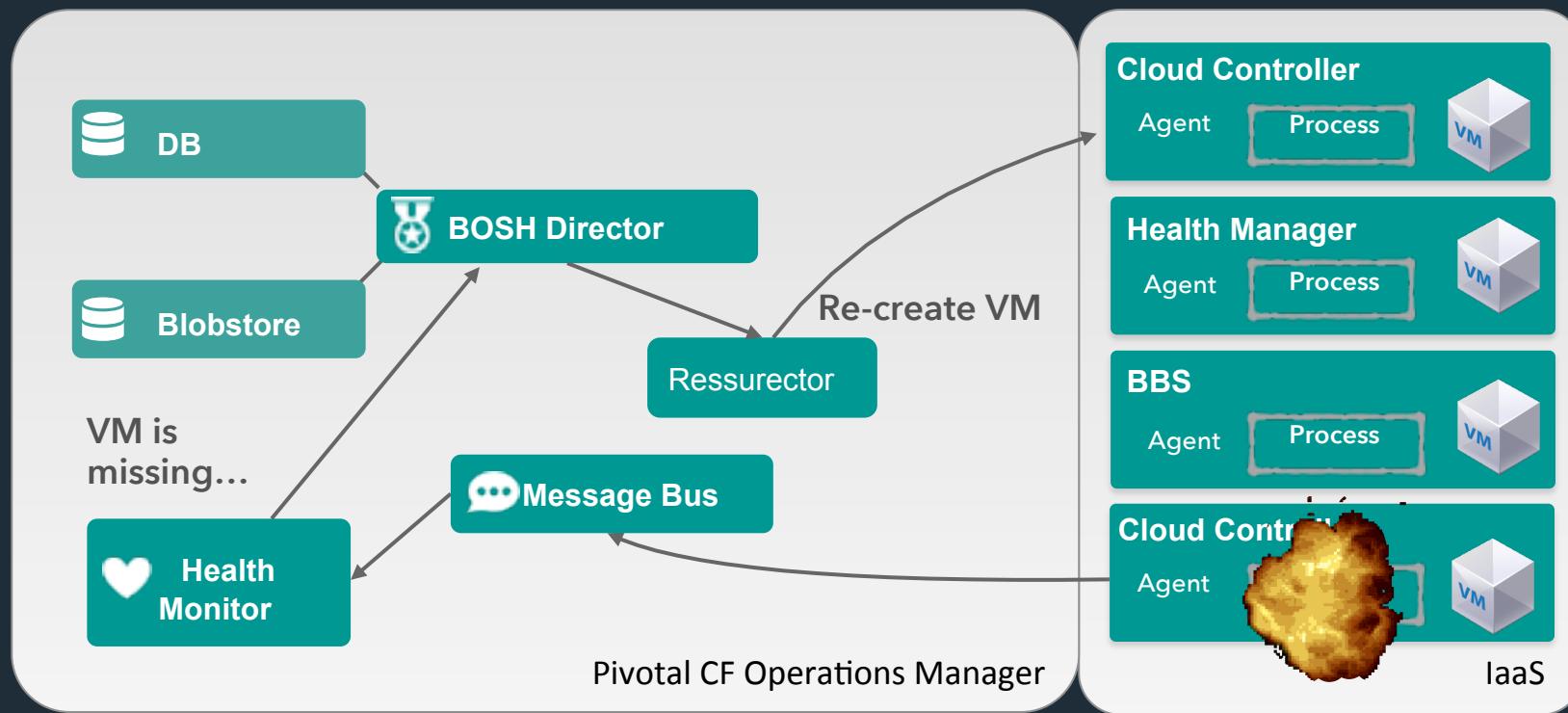
# Application Instance HA



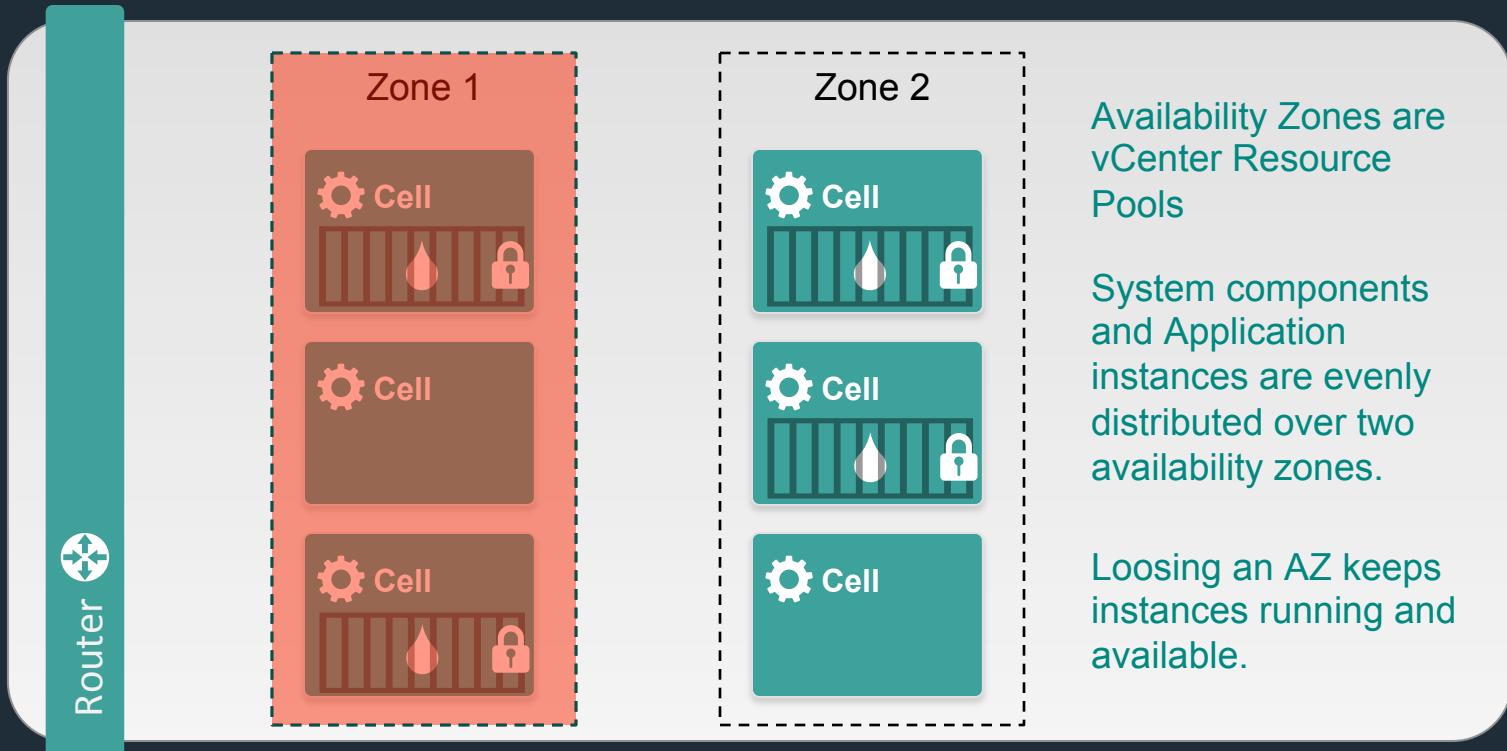
# Platform Process HA



# Platform Virtual Machine HA

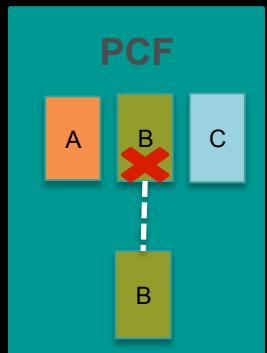


# Availability Zone HA

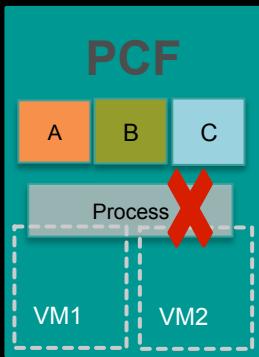


# How Pivotal CF enables four layers of HA

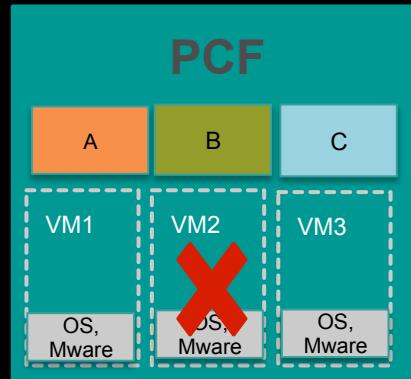
1.



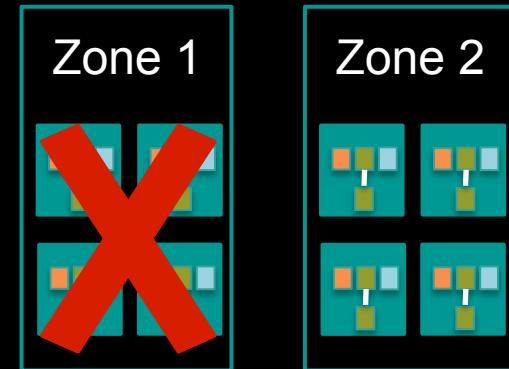
2.



3.



4.



If an app fails, PCF reboots app in a new container.

If a process fails, PCF restarts the process

If an **OS or network failure occurs** PCF kills the VM and reboots the host in a new Virtual machine.

If a **datacenter rack fails**, PCF ensures applications stay running in multiple availability zones

App Fail

Process Fail

VM Fail

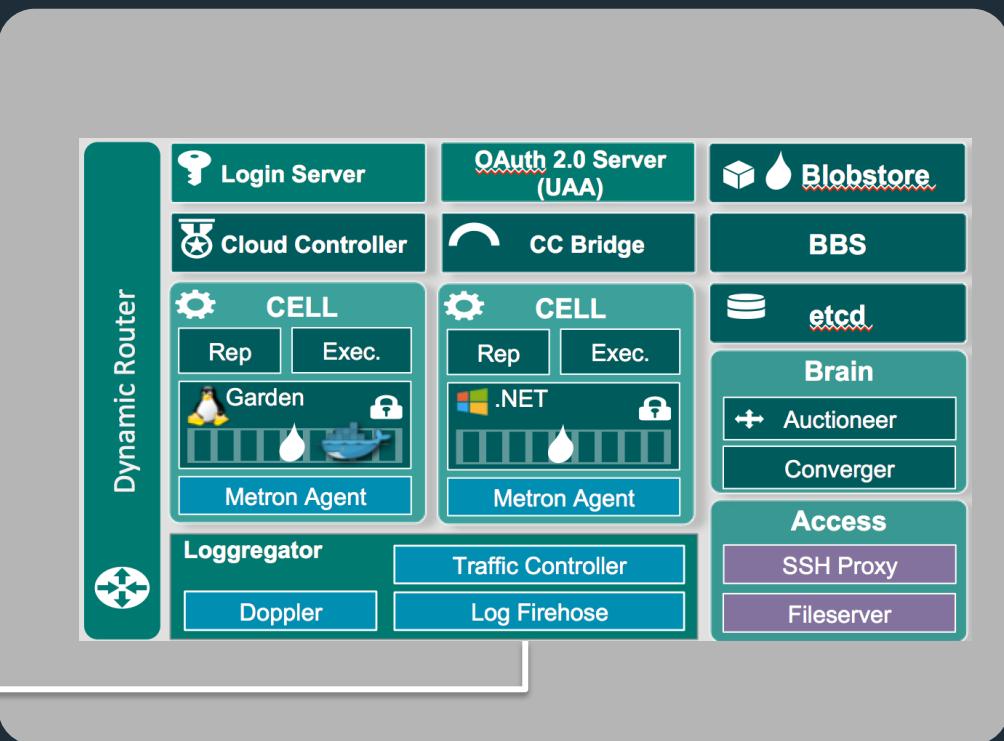
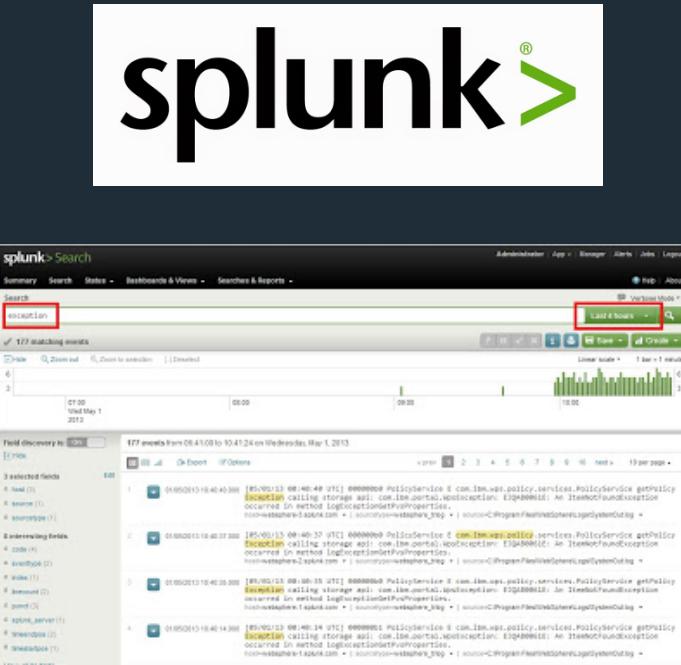
Rack Fail

Pivotal

# Platform Monitoring

## Overview

# Platform Monitoring



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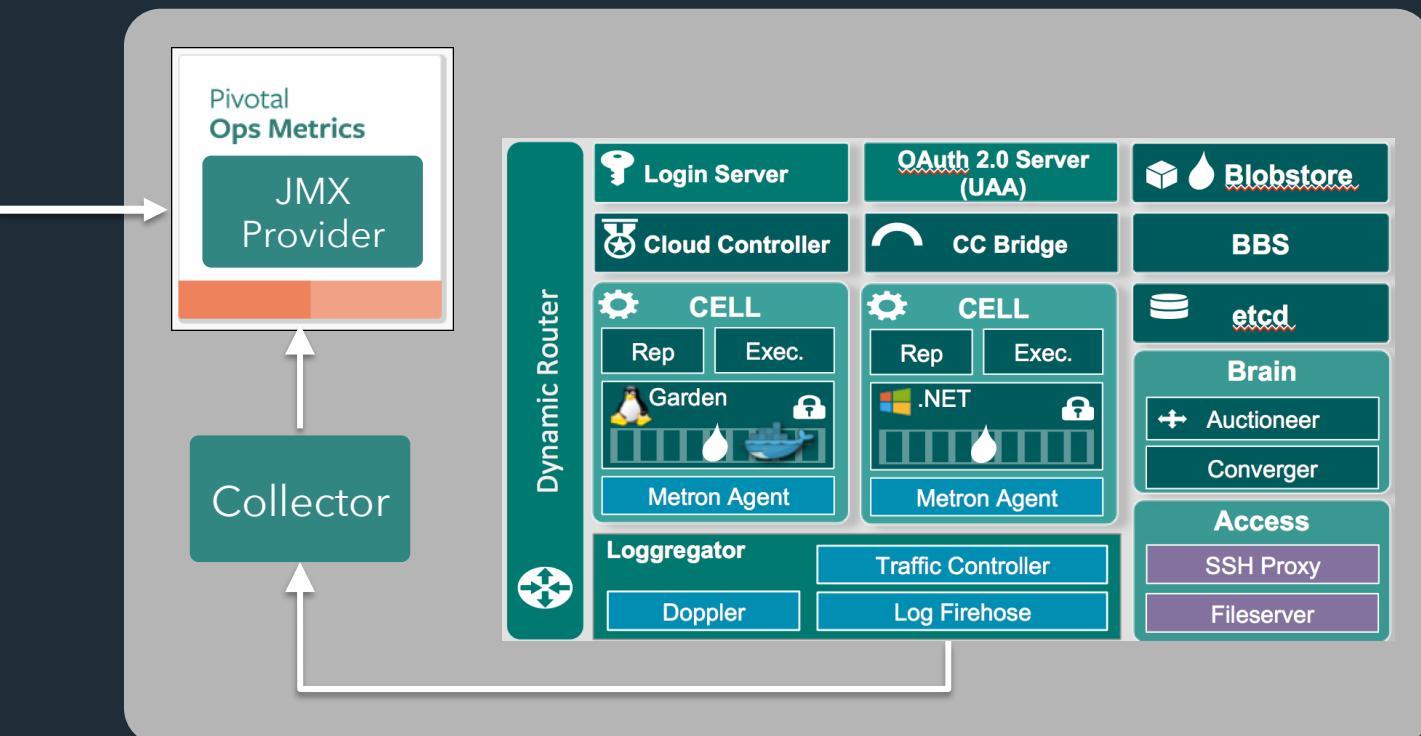
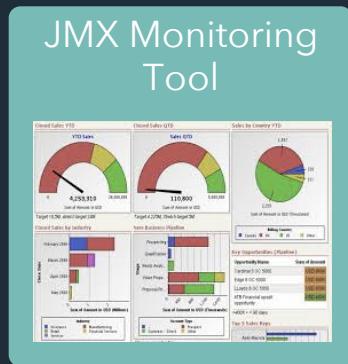
# Platform Monitoring

Pivotal Ops Metrics provides a single JMX interface to access metrics for each Pivotal CF component

- Cells
- Cloud Controllers
- Routers
- Health Managers
- BBS, UAA, Login Server, ...



# Platform Monitoring



MONITOR

EXPLORE

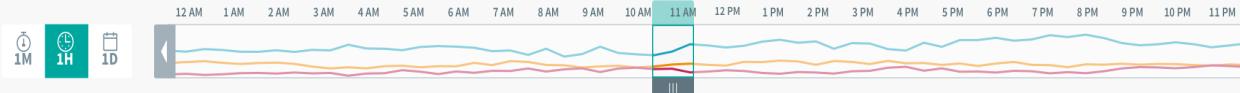
 Container Network Logs

## Lorem Ipsum Dolor App

ORG: Pivotal SPACE: Labs STATUS: Running

## TIMEFRAME

Container

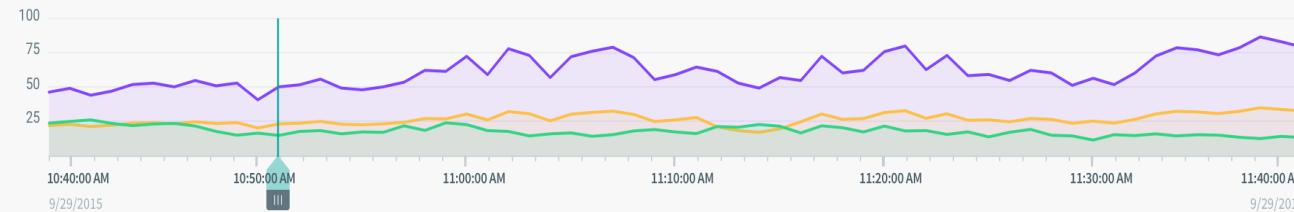


## METRICS

## Container

percent usage/minute

- CPU
- MEMORY
- DISK



## LOGS

Sources: Apps, Health

Apply

◀ PREV NEXT ▶

▶ Tue Nov 03 2015 10:50:49.123 GMT-0800 (PST) [RTR] OUT console.run.pivotal.io - [03/11/2015:18:28:49 +0000] "GET /api/apps/ff36eb5a-9d8d-41be-9571-578d95feeb0a/env\_vars HTTP/1.1" 200 0 4 "https://console.run.pivotal.io/organizations/99345203-f06a-4e1e-8f04-f05060d881d8/spaces/99345203-f06a-4e1e-8f04-f05060d881d8/spaces/51fa-2bd4-4b70-155c-04cc-65-aaef2dcf5/announcements/ff92c65a-040d-41bc-9571-578d95feeb0a#liveload" "Mozilla/5.0 (Windows NT 6.3; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko)"

Tue Nov 03 2015 10:50:50.202 GMT-0800 (PST) [APP] OUT /home/vcap/app/vendor/bundle/ruby/2.0.0/gems/actionpack-4.1.11/lib/action\_dispatch/journey/router.rb:73:in `block in call'

Tue Nov 03 2015 10:50:50.820 GMT-0800 (PST) [APP] ERROR /home/vcap/app/vendor/bundle/ruby/2.0.0/gems/newrelic\_rpm-3.10.0.279/lib/new\_relic/agent/instrumentation/middleware\_tracing.rb:67:in `call'

Tue Nov 03 2015 10:50:51.151 GMT-0800 (PST) [HEALTH] OUT /home/vcap/app/vendor/bundle/ruby/2.0.0/gems/actionpack-4.1.11/lib/action\_controller/metal/instrumentation.rb:32:in `block in process\_action'

# Multitenancy

## Overview

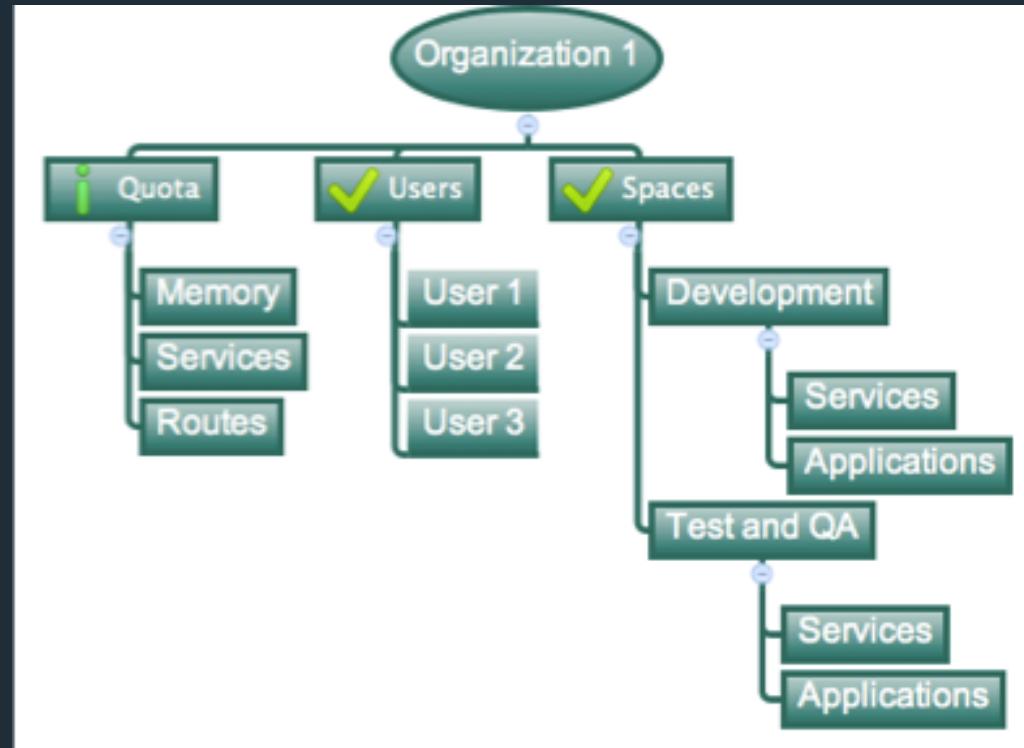
# Organizations

Logical division within a Pivotal CF install / Foundation.

Each organization has its own users and assigned quota

User permissions / roles are specified per space within an organization

Sub-divided into Spaces

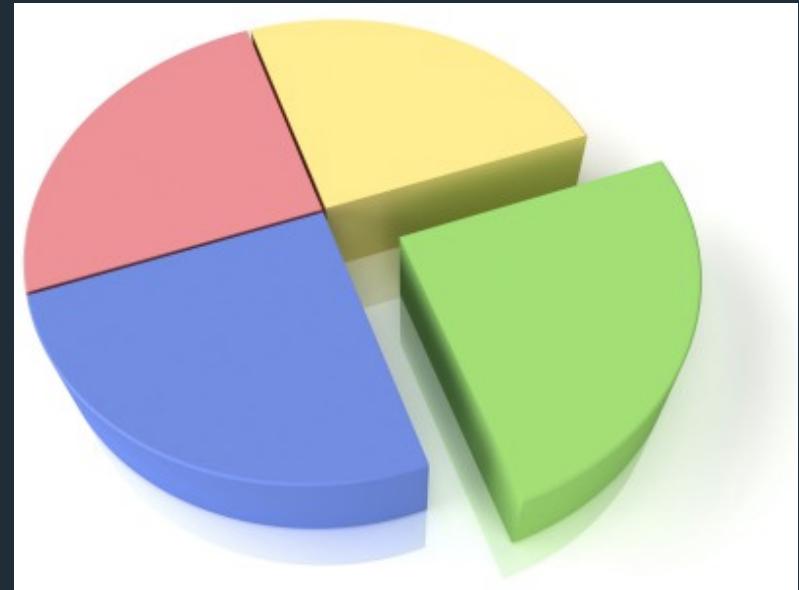


# Quotas & Plans

Different quota limits (e.g. “small”, “enterprise”, “default”, “runaway”) can be assigned per Organization

Quota defines

- Total Memory
- Total # of Services
- Total # of Routes



# Spaces

Logical sub-division within an organization

Users authorized at an organization level can have different roles per space

Services and Applications are created / specified per Space

Same Service can have different meanings per space

Spaces can be assigned quotas



# Capabilities of Pivotal Cloud Foundry

Automatic App Server & OS Configuration with Buildpacks (“just push your app”)



Application Containerization & Cluster Scheduling



Application Network Security Groups



Application to Services Binding and Access



App Health, Load Balancing, Rapid Scaling, Availability Zones



Policy, Identity and Roles Management



Native & Extended Data, Mobile and Platform Services



IaaS Provisioning, Scaling & Configuration

Logging as a service, Application metrics & performance, Metric based scaling



Deploy, Operate, Update & Scale with minimal downtime on choice of IaaS

vmware

openstack  
CLOUD SOFTWARE

amazon  
awservices™

Azure

pentagonal logo

Pivotal™

A dark, atmospheric photograph of a modern building's interior or lobby. Large glass walls and a steel frame structure are visible in the background. In the foreground, several silhouetted figures of people are walking across a polished floor.

LABS

A teal-colored cloud-shaped graphic containing the letters "CF".

CF

# Pivotal

BUILT FOR THE SPEED OF BUSINESS