

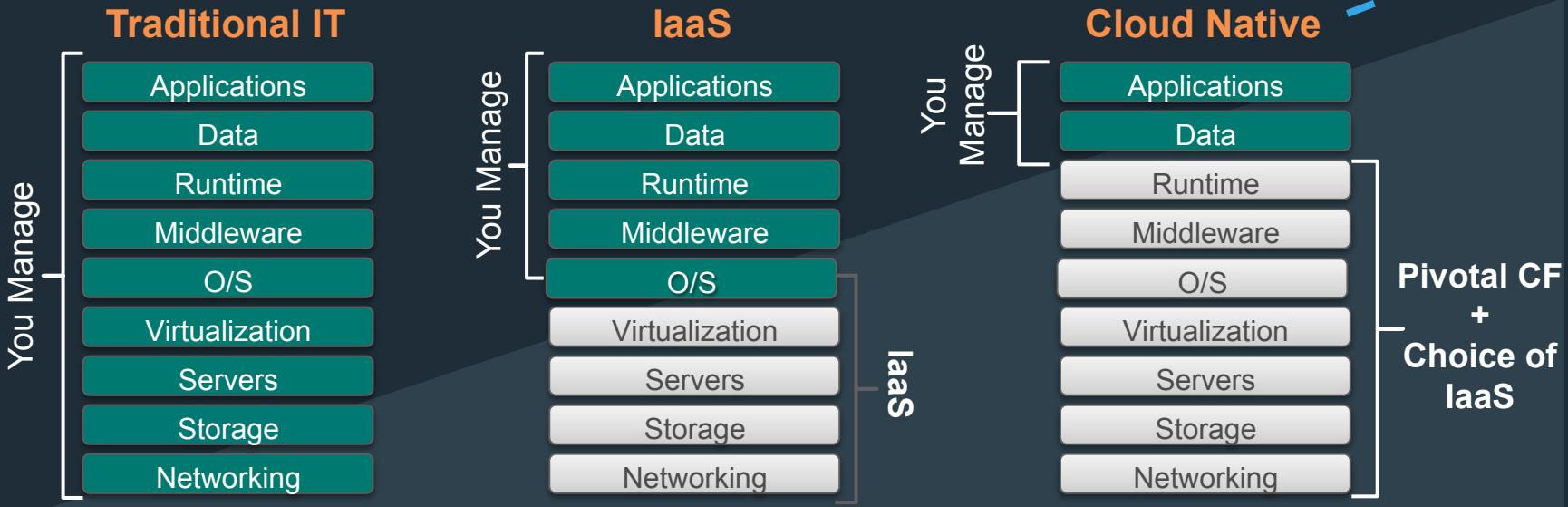
Pivotal

Pivotal Cloud Foundry

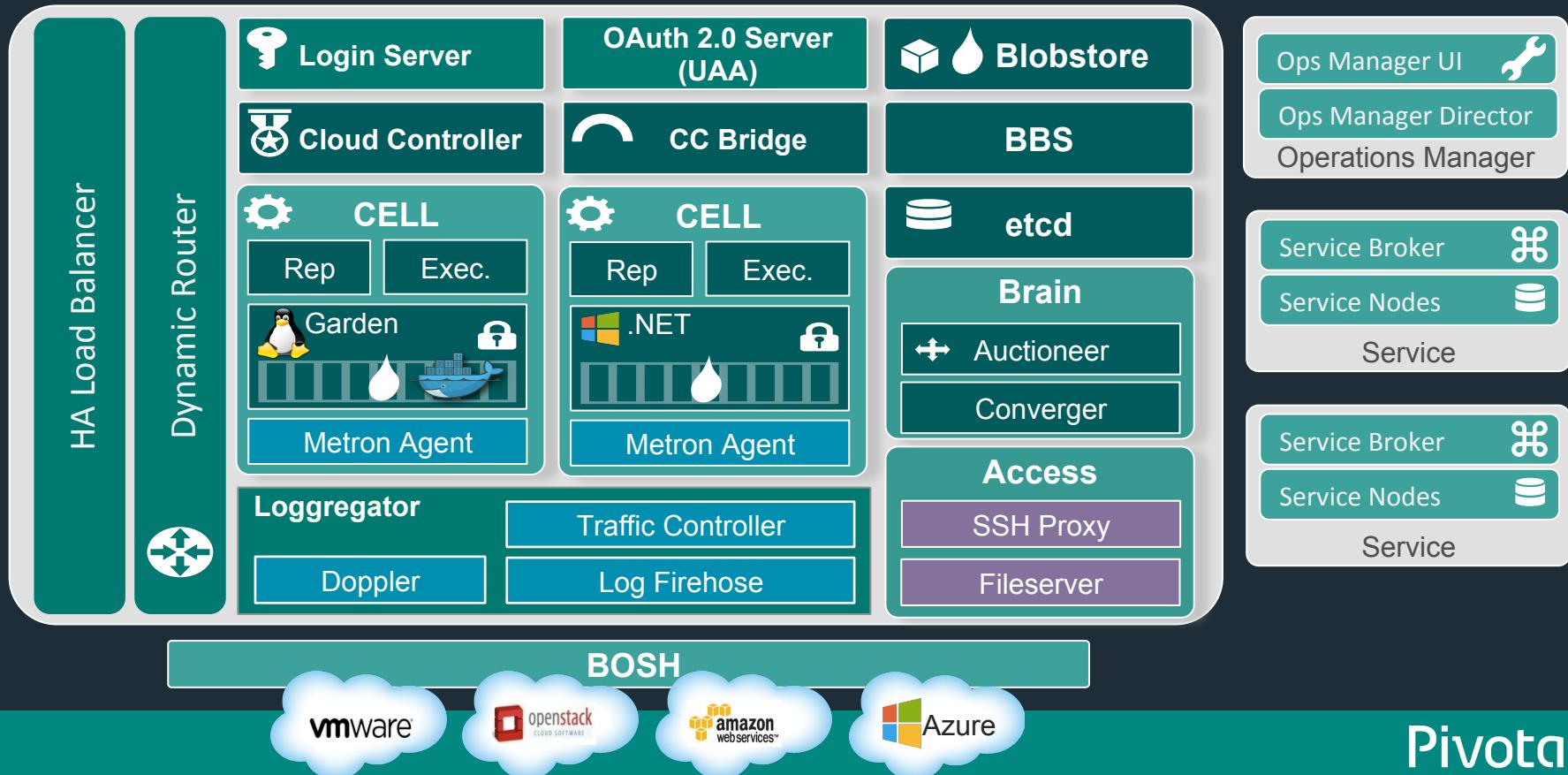
Architecture, Containers, and Operations

Cloud Native Application Platforms

Business Value, Agility & Cost Savings



Pivotal CF Architecture



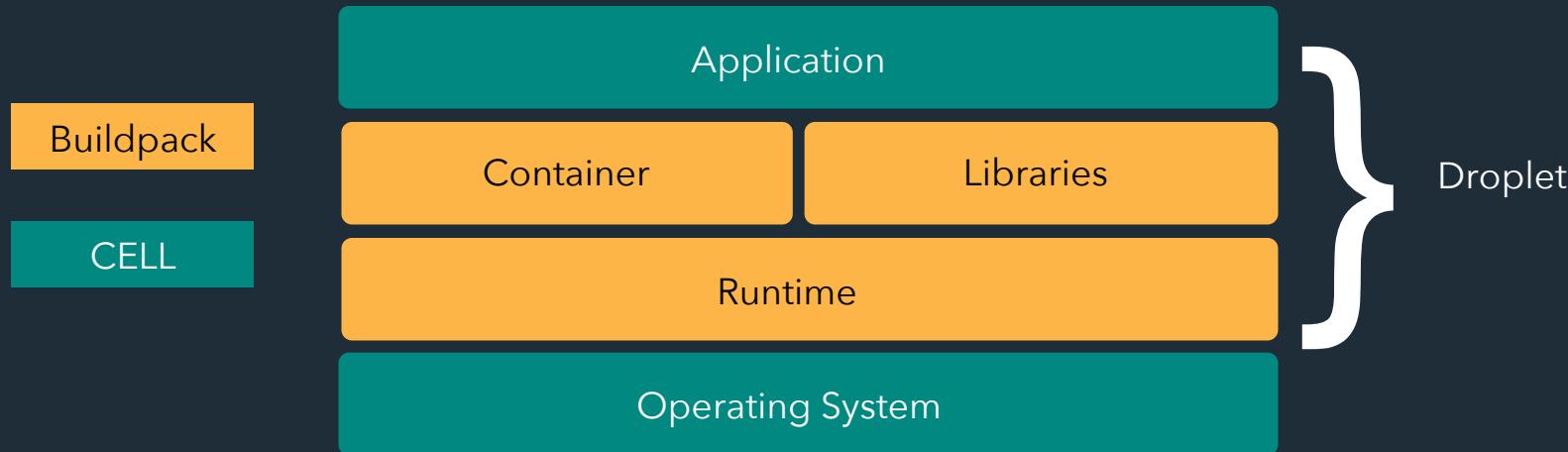


DEMO

CF

Staging and Buildpacks

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



Buildpacks

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

Buildpacks provided by public Cloud Foundry

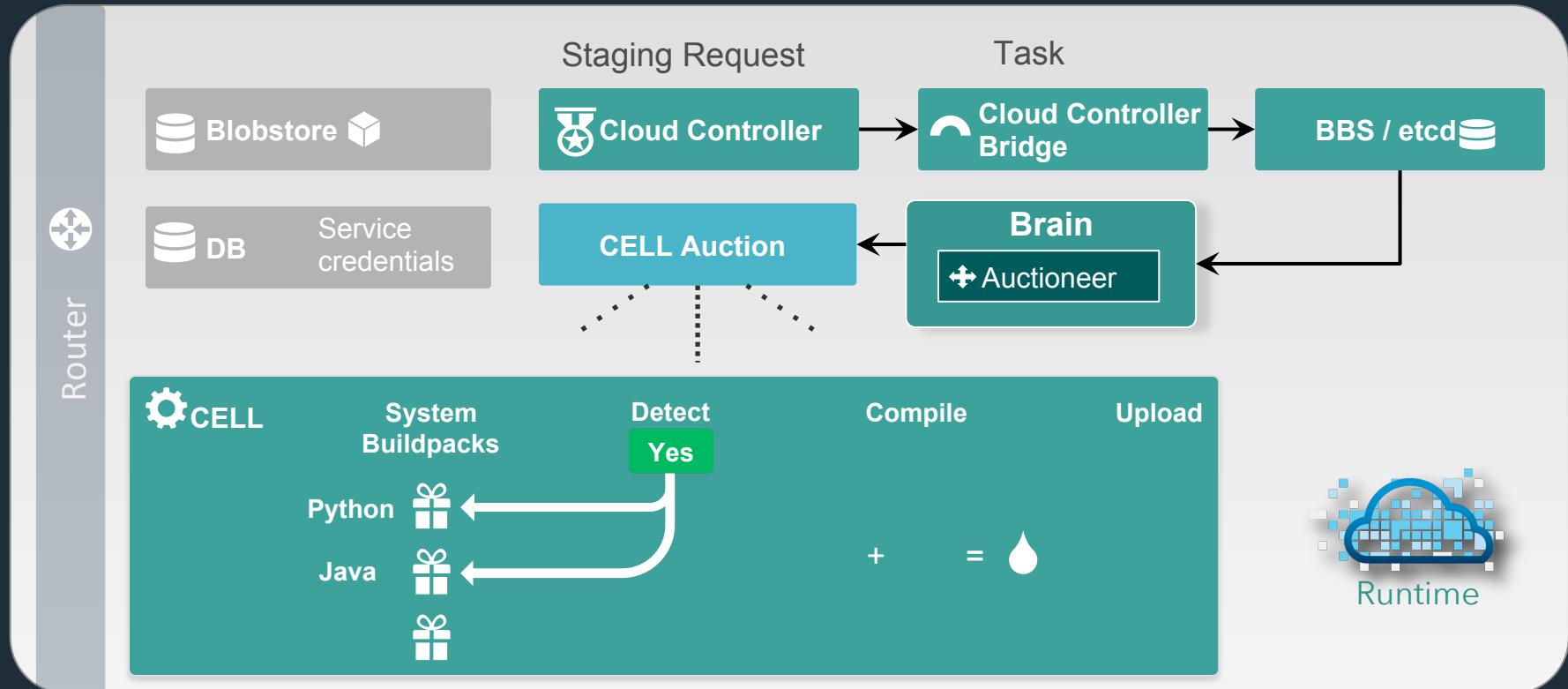
- Java
- Ruby
- Node.js
- Binary
- Go
- Python
- PHP
- Staticfile

[Java Buildpack](#)

[Cloud Foundry Community Buildpack](#)

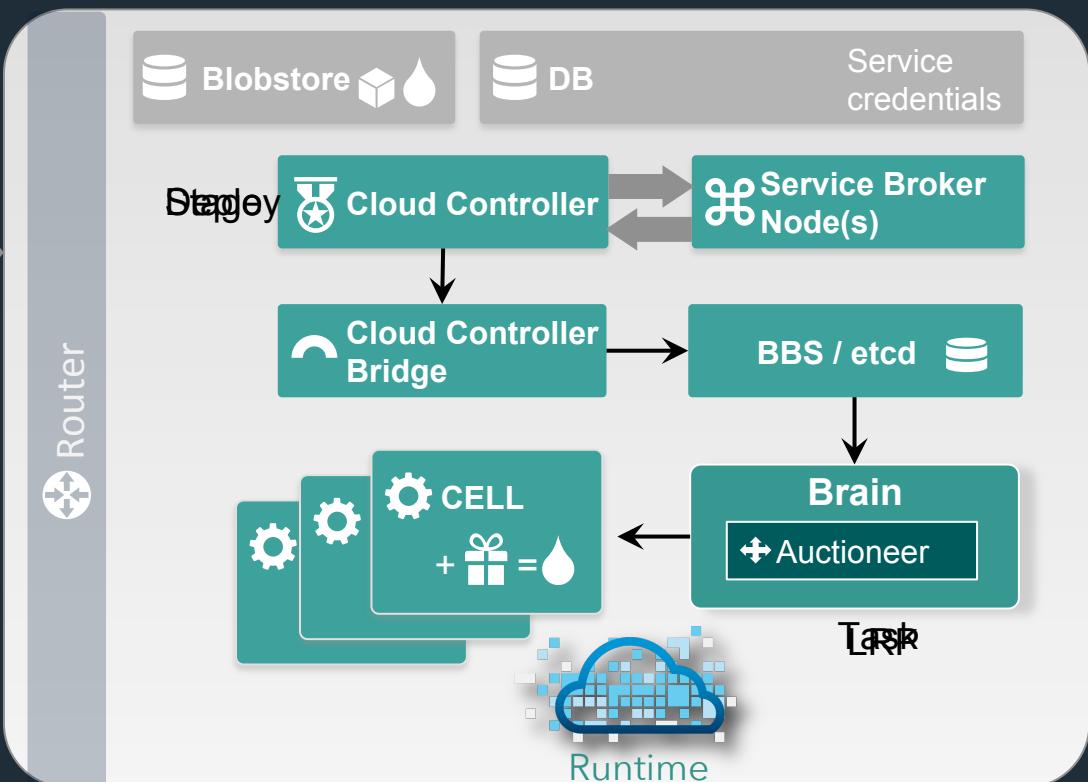
Write your own

Staging an Application



Overview: Pushing an Application

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



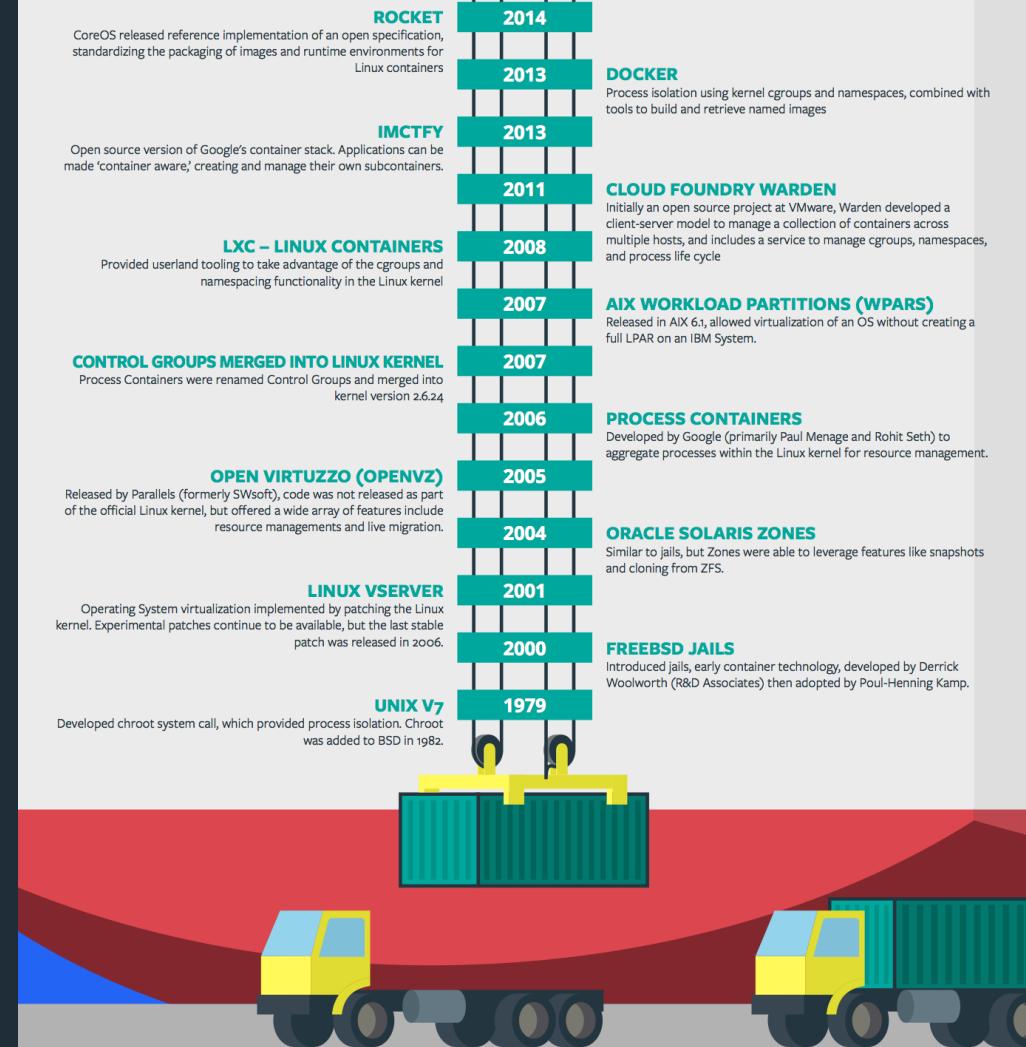


DEMO

CF

Containers - History

- Containers are not new
- CF has used containers since it's inception
- CF supports multiple container technologies as first class citizens including Docker, Warden, Garden and runC



Container Isolation

shared resources



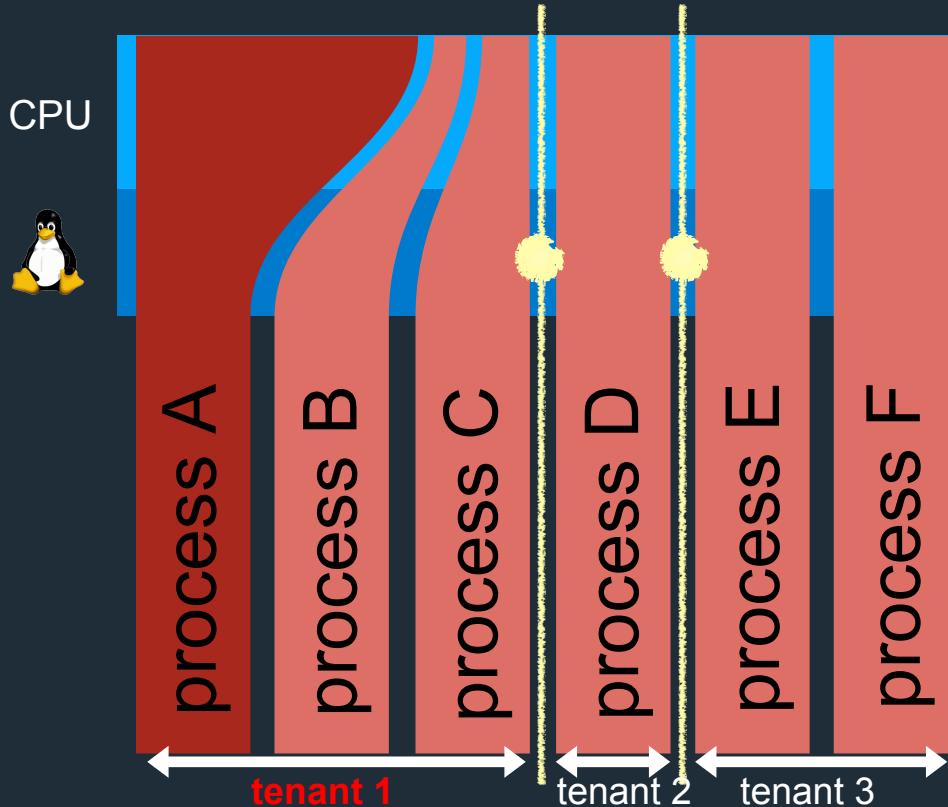
kernel

resource isolation

namespace isolation



Container Isolation



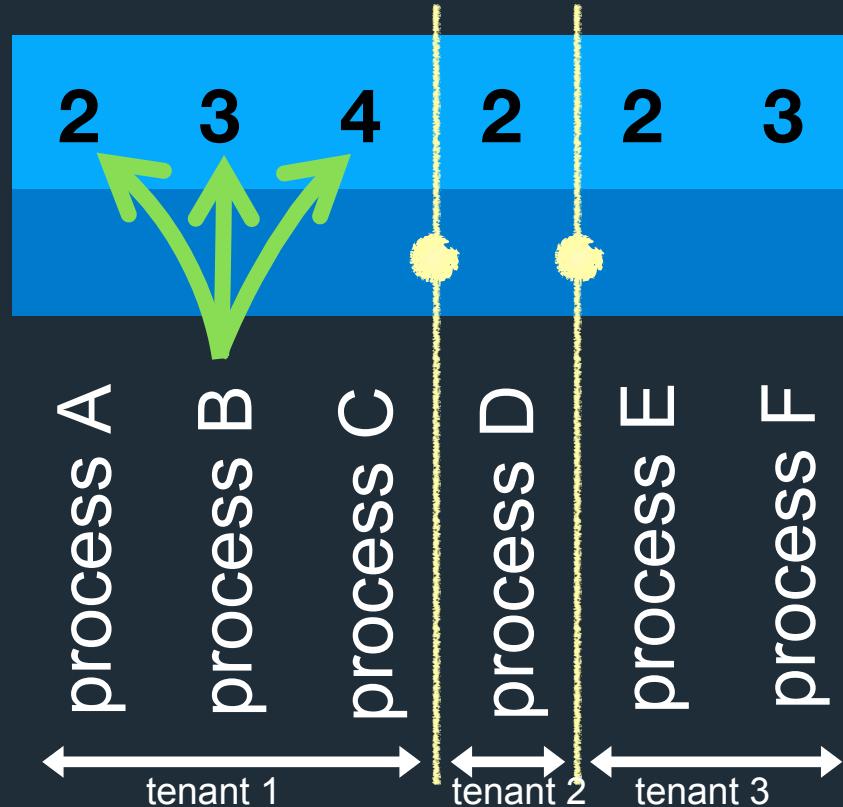
resource isolation

namespace isolation



A Linux kernel feature that limits, accounts for, and isolates the resource usage of a collection of processes

Container Isolation



resource isolation

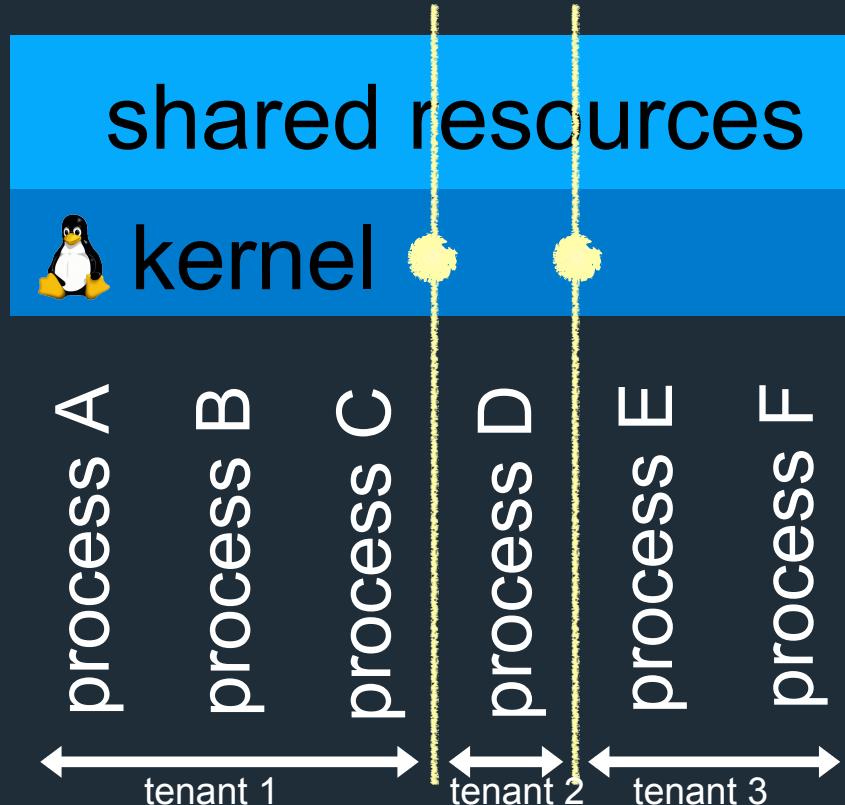
namespace isolation



PID namespace

The PID namespace provides isolation for the allocation of process identifiers (PIDs), lists of processes and their details.

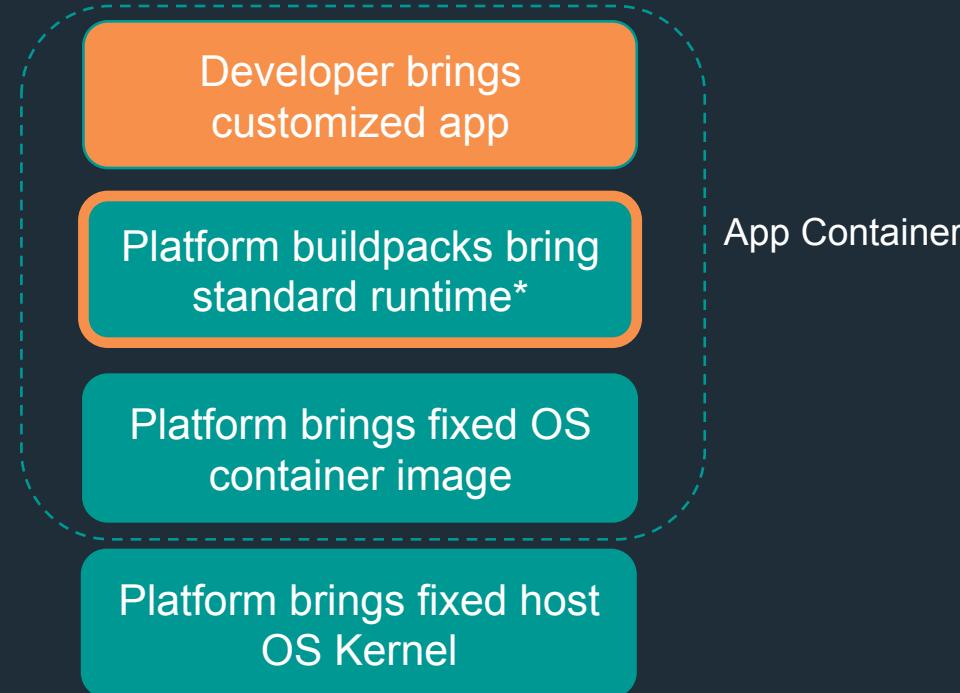
Container Isolation



resource isolation
namespace isolation
namespaces
PID
Network
Mount
User

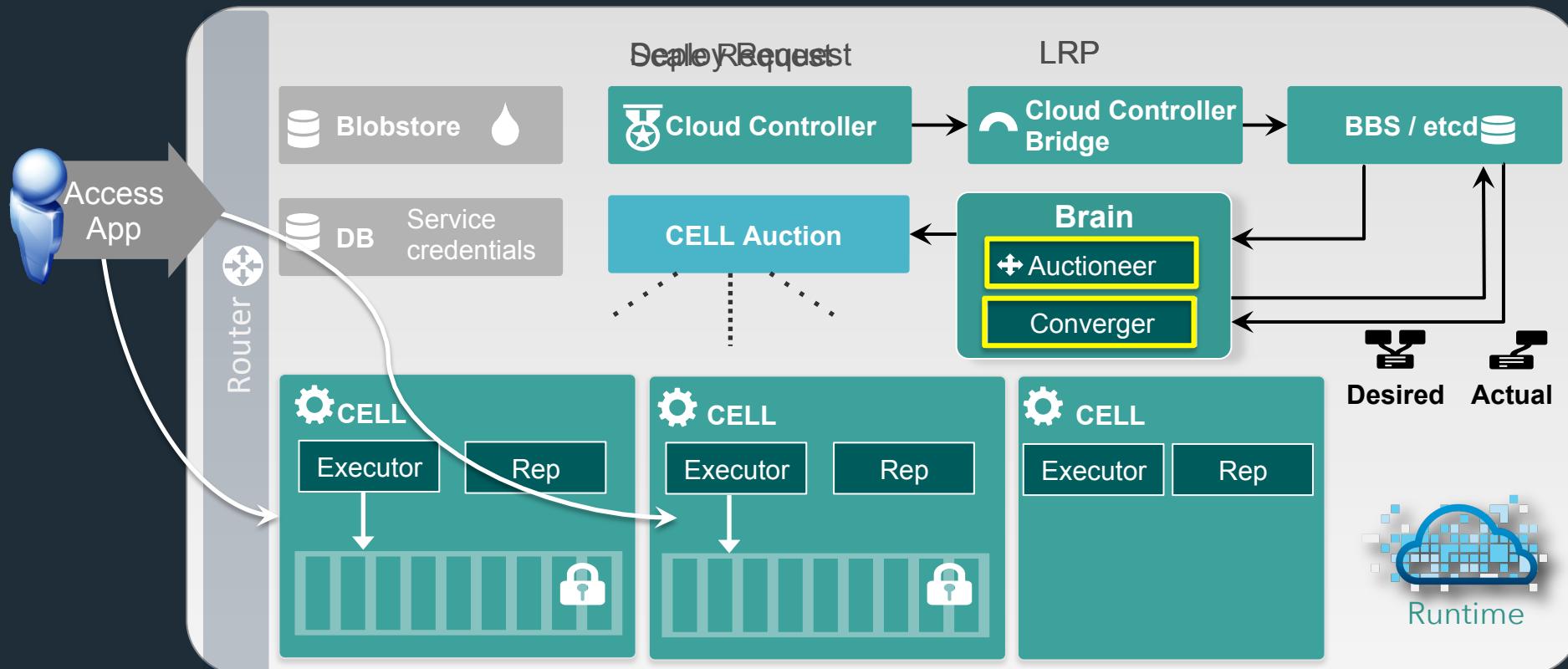
Customize the container experience

Buildpacks



* Devs may bring a custom buildpack

Application containers and scaling



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Pivotal Cloud Foundry

Services

Pivotal™

Pivotal Cloud Foundry Services

Mobile



App Distribution



Push Notifications

Security



Single Sign-on

Data



Redis



DataStax
Cassandra



MySQL



RabbitMQ



Data Flow



PivotalHD



Session state
caching



GemFire

CI/CD



Git Lab



Jenkins
Enterprise

Monitoring



App
Dynamics



New Relic

Cloud Native



Config
Server



Service
Directory



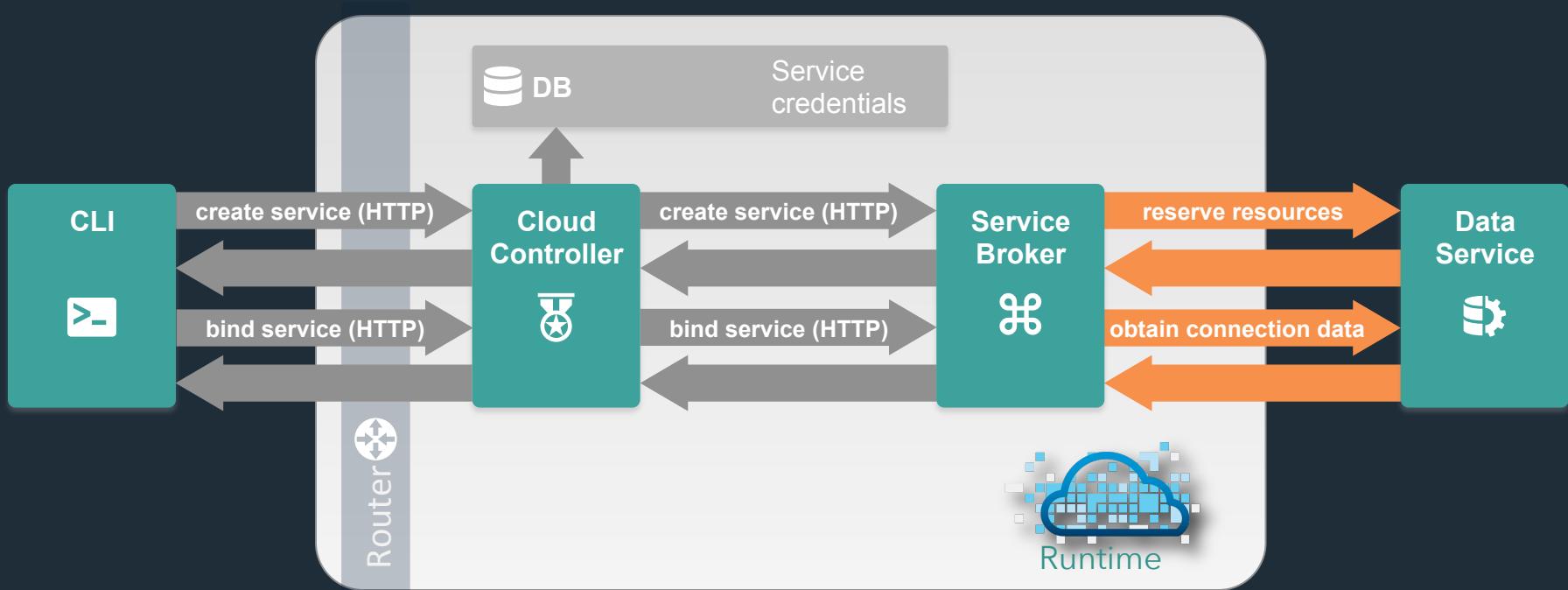
Circuit
Breaker

Powered by



Pivotal™

Creating and Binding a Service

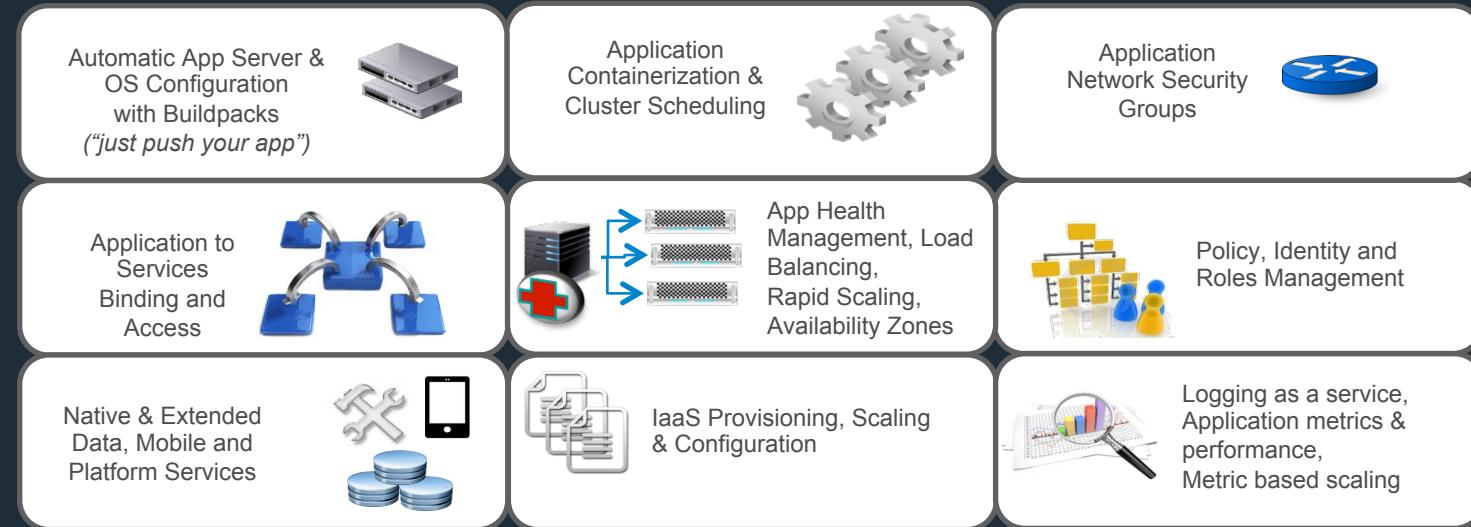


DEMO



CF

Pivotal CF: Technical Capabilities

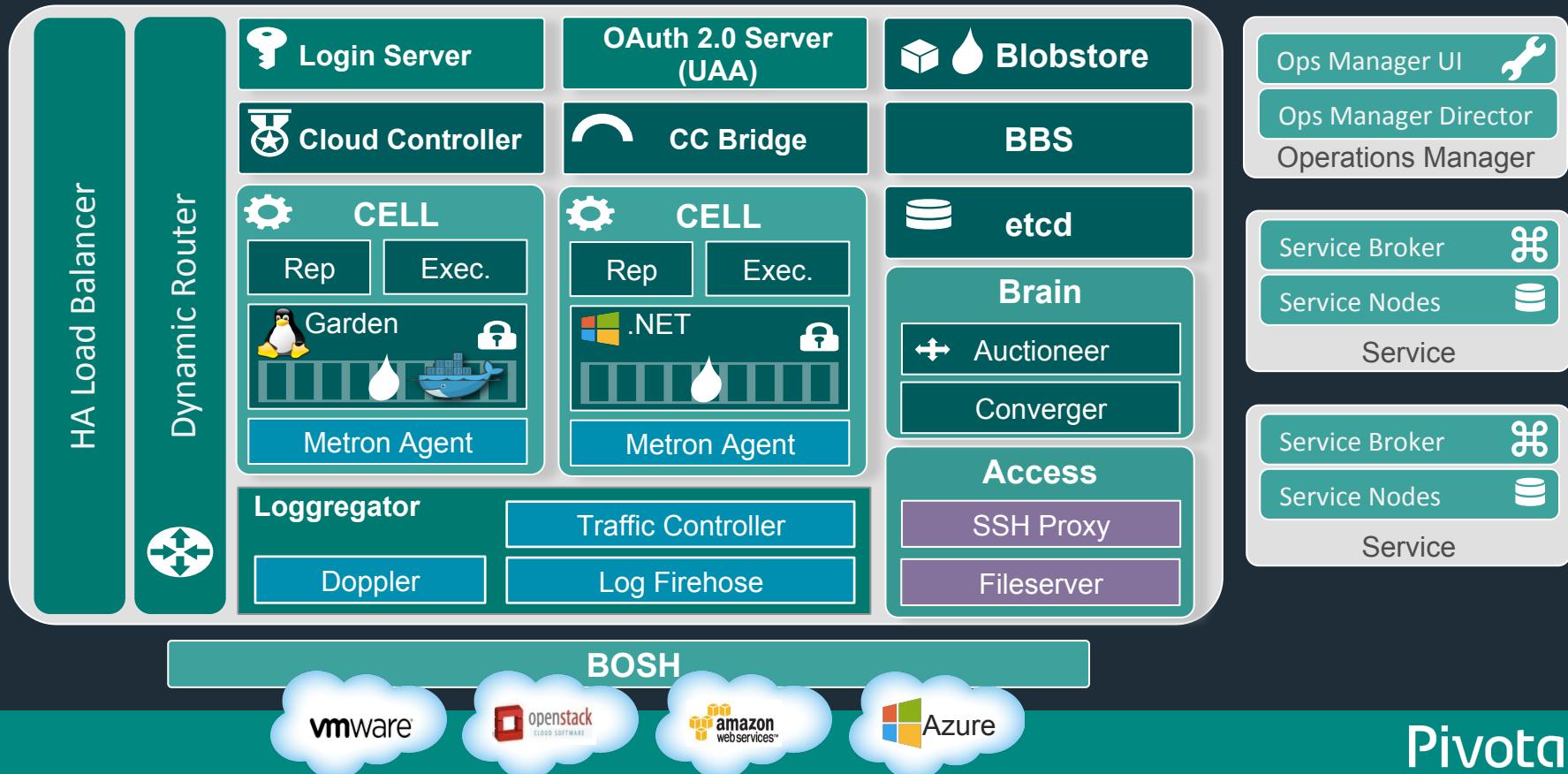


Deploy, Operate, Update & Scale with minimal downtime on choice of IaaS



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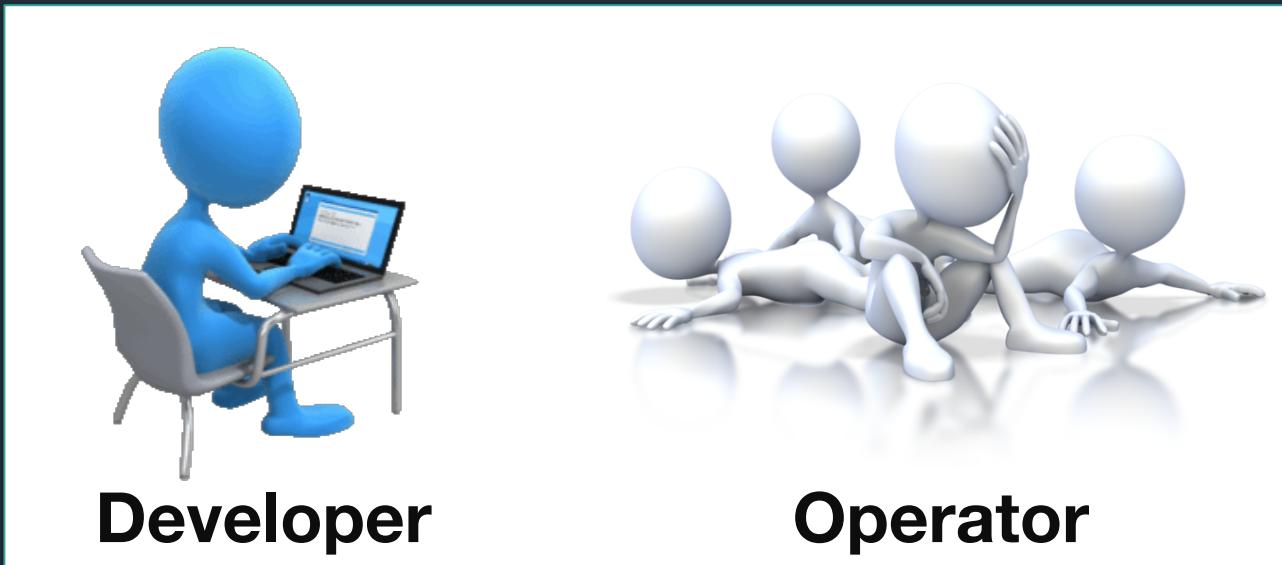
Pivotal CF Architecture - Recap



Pivotal Cloud Foundry

Operations

Pivotal CF operations





Deploy to dev



App Deployed



Install runtime and container



Install services (db, messaging, hadoop, ...)



Setup load-balancing, SSL termination and dynamic routing



Setup / config High Availability



Setup APM

Setup log streaming



Pivotal™



Pivotal™

The Pivotal CF Way



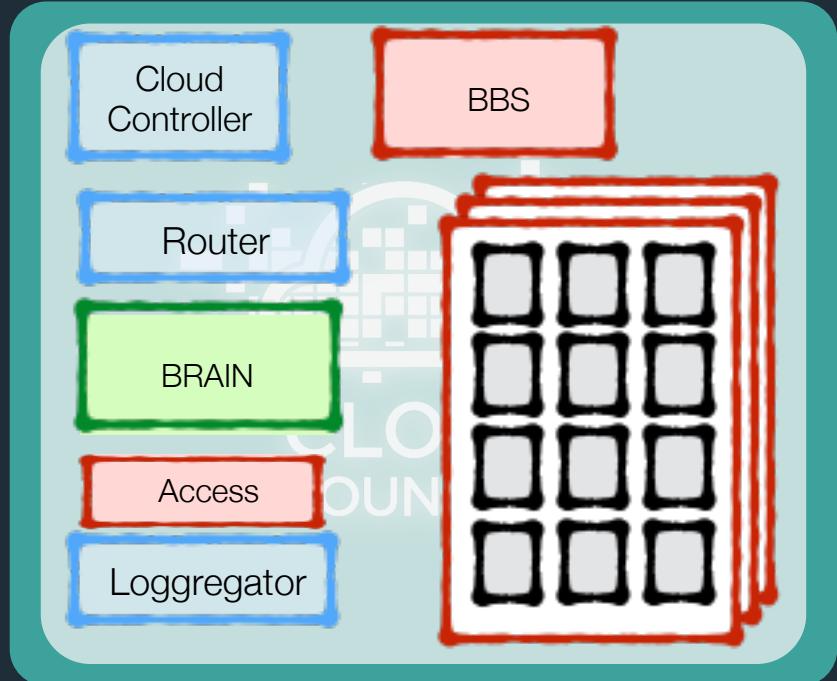
Deploy to dev



>cf push



App Deployed

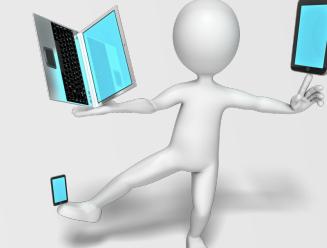
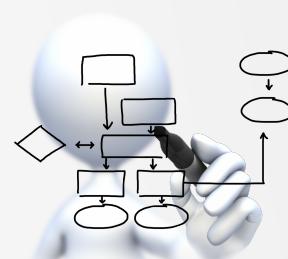


Operators in the Cloud Native Platform Era



Operator Concerns



-  **Plan capacity**
-  **Install the platform**
-  **Setup High Availability**
-  **Manage users and quotas**
-  **Handle upgrades and updates**
-  **Monitor the platform**



Install the platform

Pivotal Ops Manager



Setup High Availability

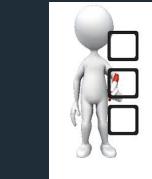


Target multiple clouds

IaaS



Handle live upgrades and updates



Install and manage services



Scale and plan capacity

Pivotal™

Click to install

No downtime updates

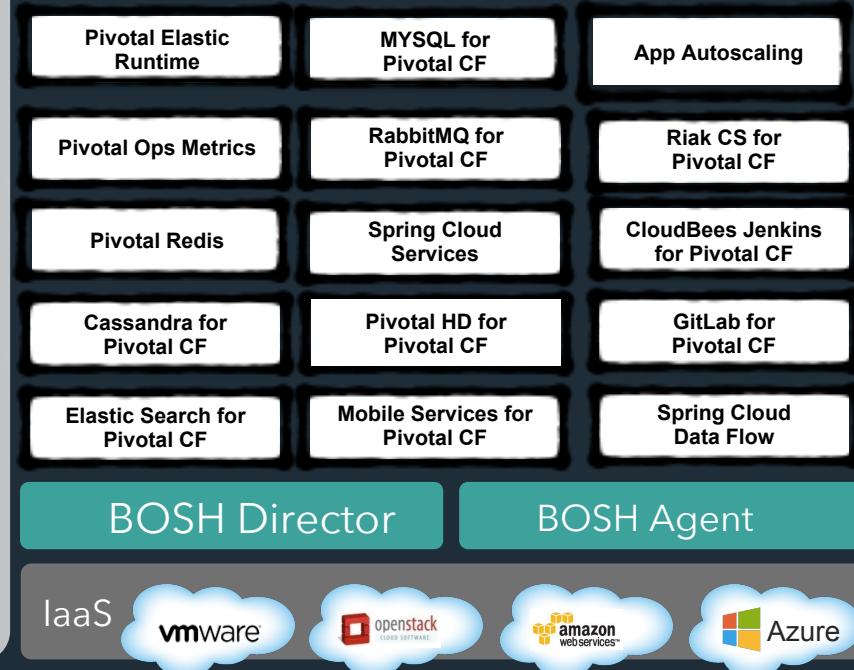
Explore install logs

Click to scale the platform

Built-in High Availability

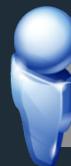
Built-in Platform Monitoring

Integrated services



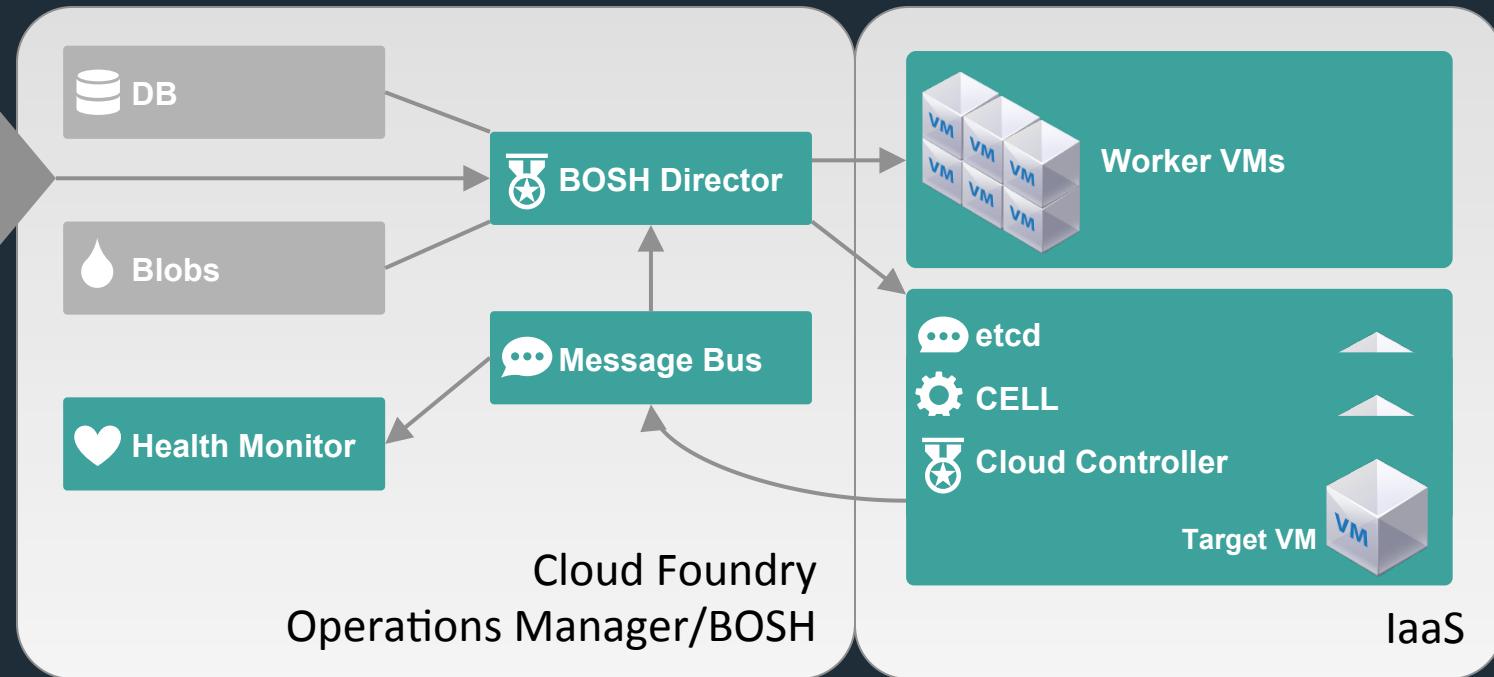
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Deploying the CF Runtime with Cloud Foundry BOSH



Deploy new
CF Instance

- Deployment**
- Packages
 - Blobs
 - Source
 - Jobs
 - Manifest

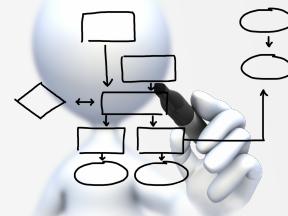




DEMO

CF

Operator Concerns



Manage users
and quotas



Plan capacity



Install the
platform



Setup High
Availability

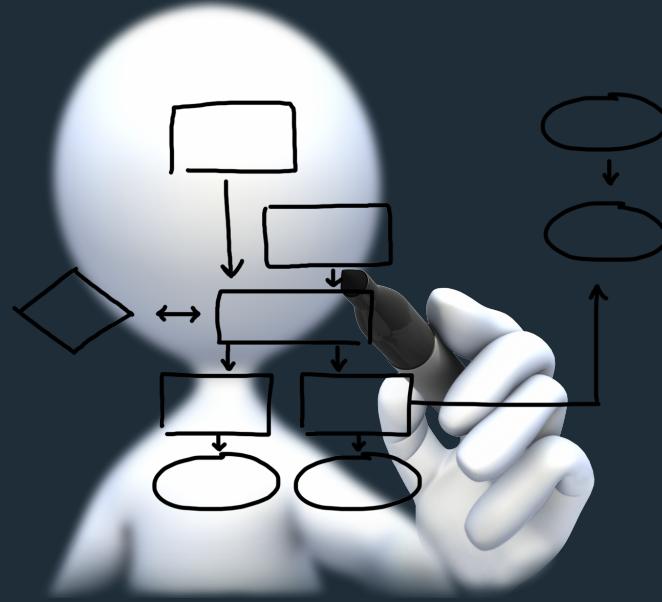
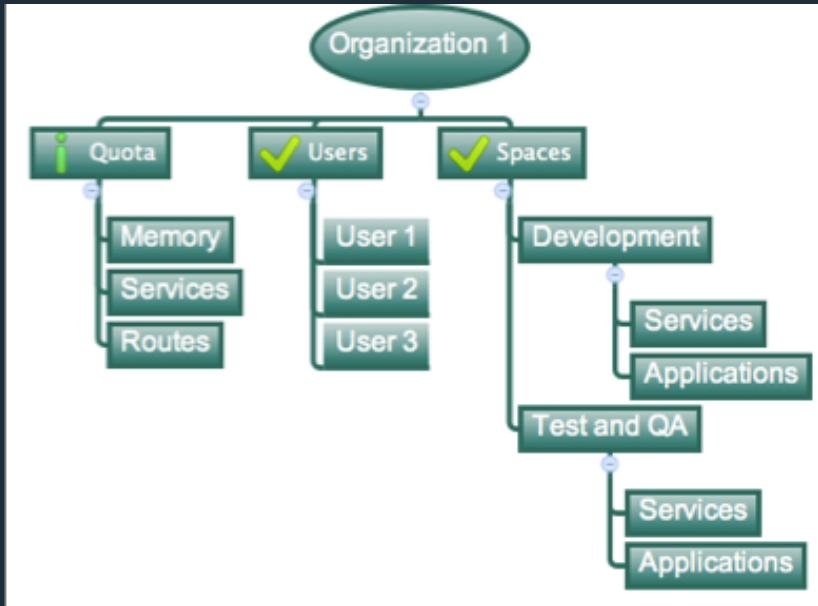


Handle upgrades
and updates



Monitor the
platform

Orgs, Spaces, Users & Quotas



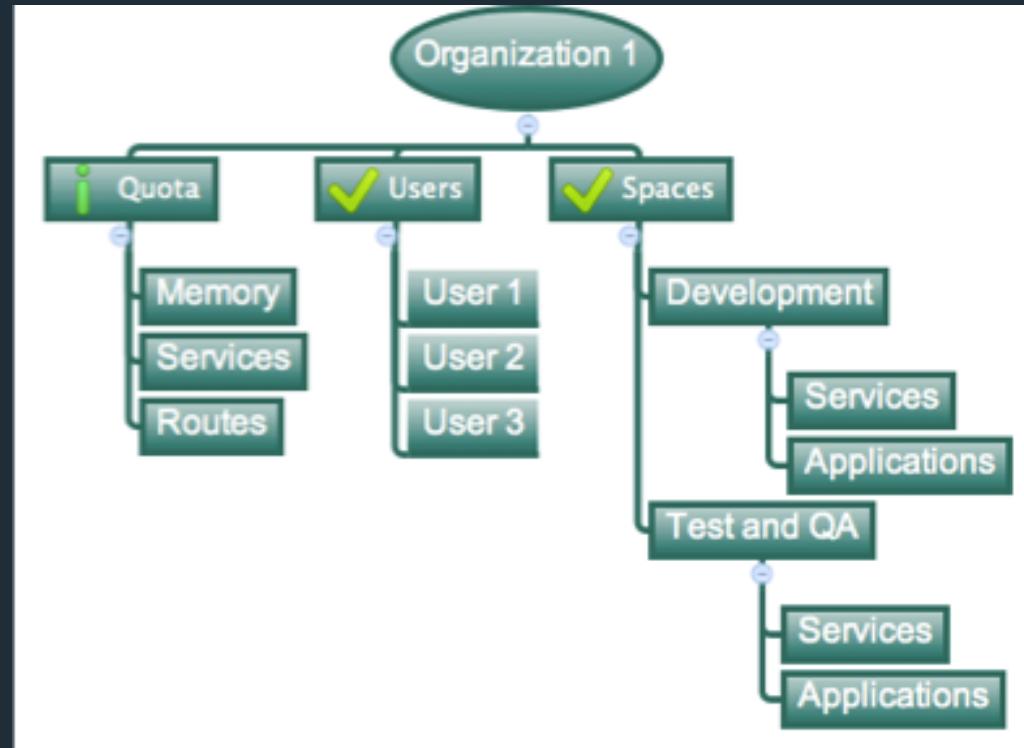
Organizations

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

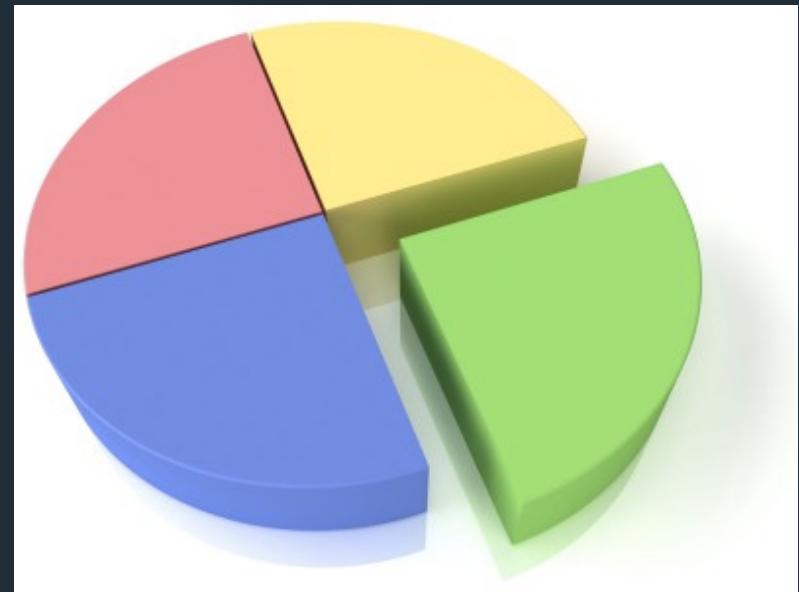


Quotas & Plans

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



Platform Monitoring



- How do I know when to scale Cells?
- How many requests each Router is servicing?
- What is the current load of my Cloud Controllers?

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, ...



Four Layers of High Availability – Built In

Application Instance

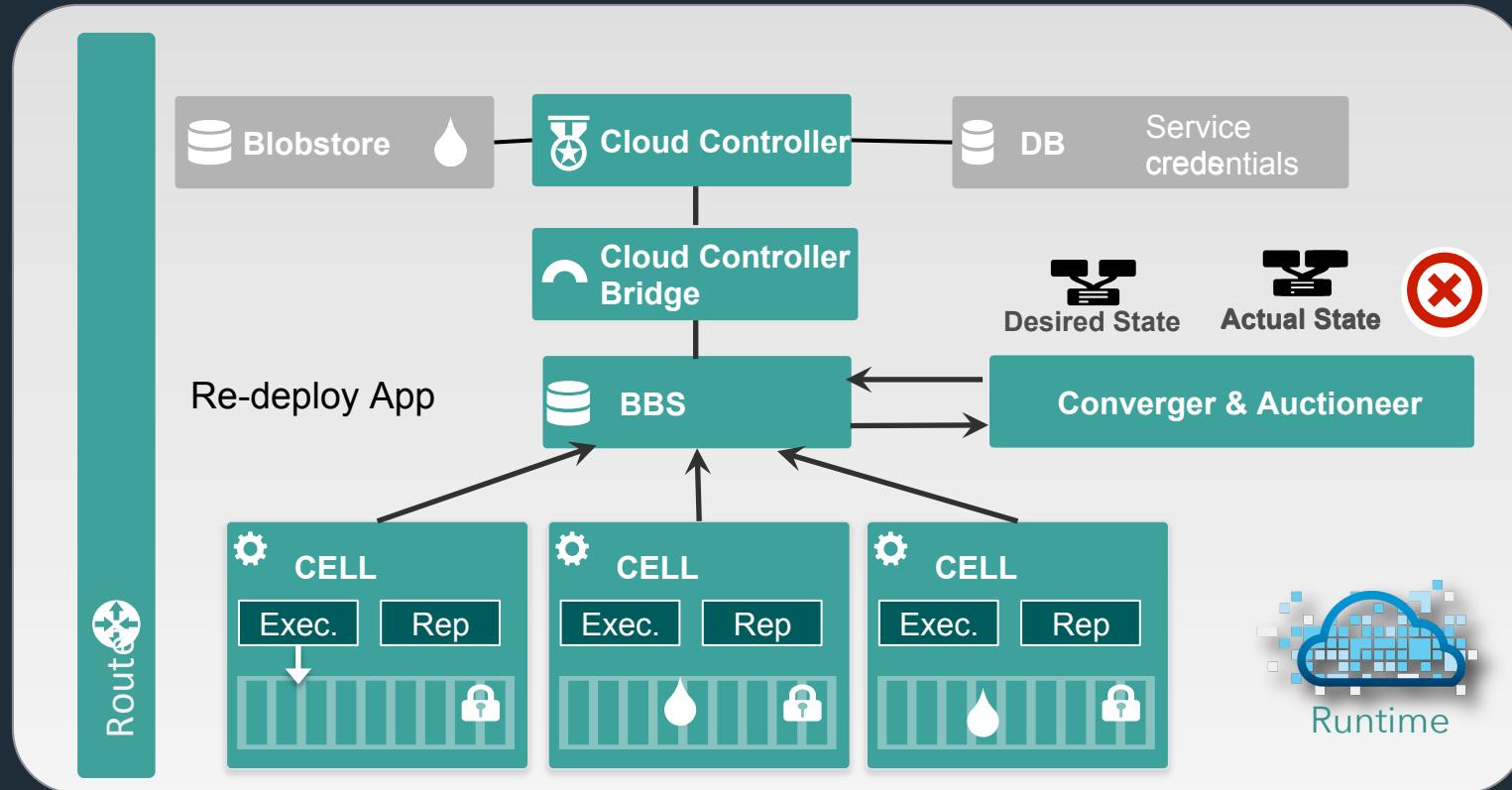
Platform Processes

Platform VMs

Availability Zones



Application Instance HA

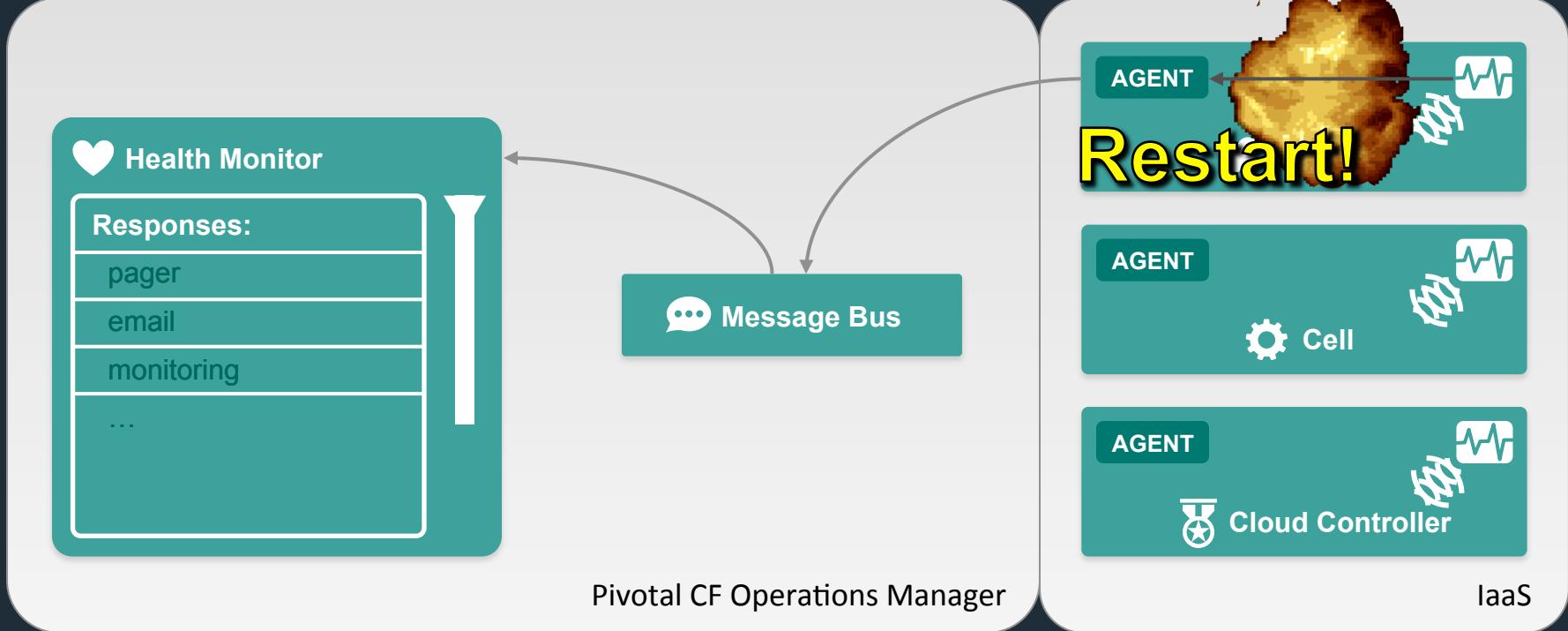


DEMO

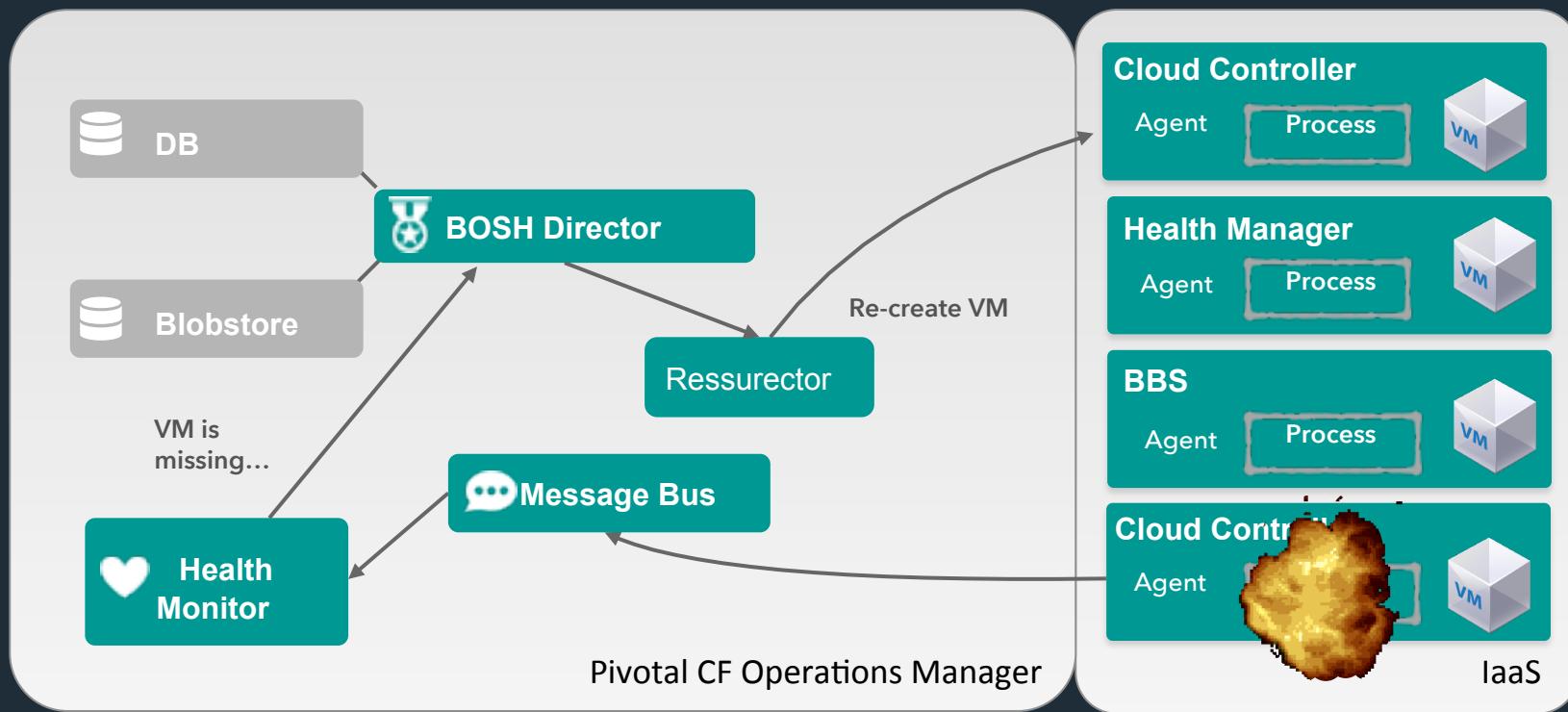


CF

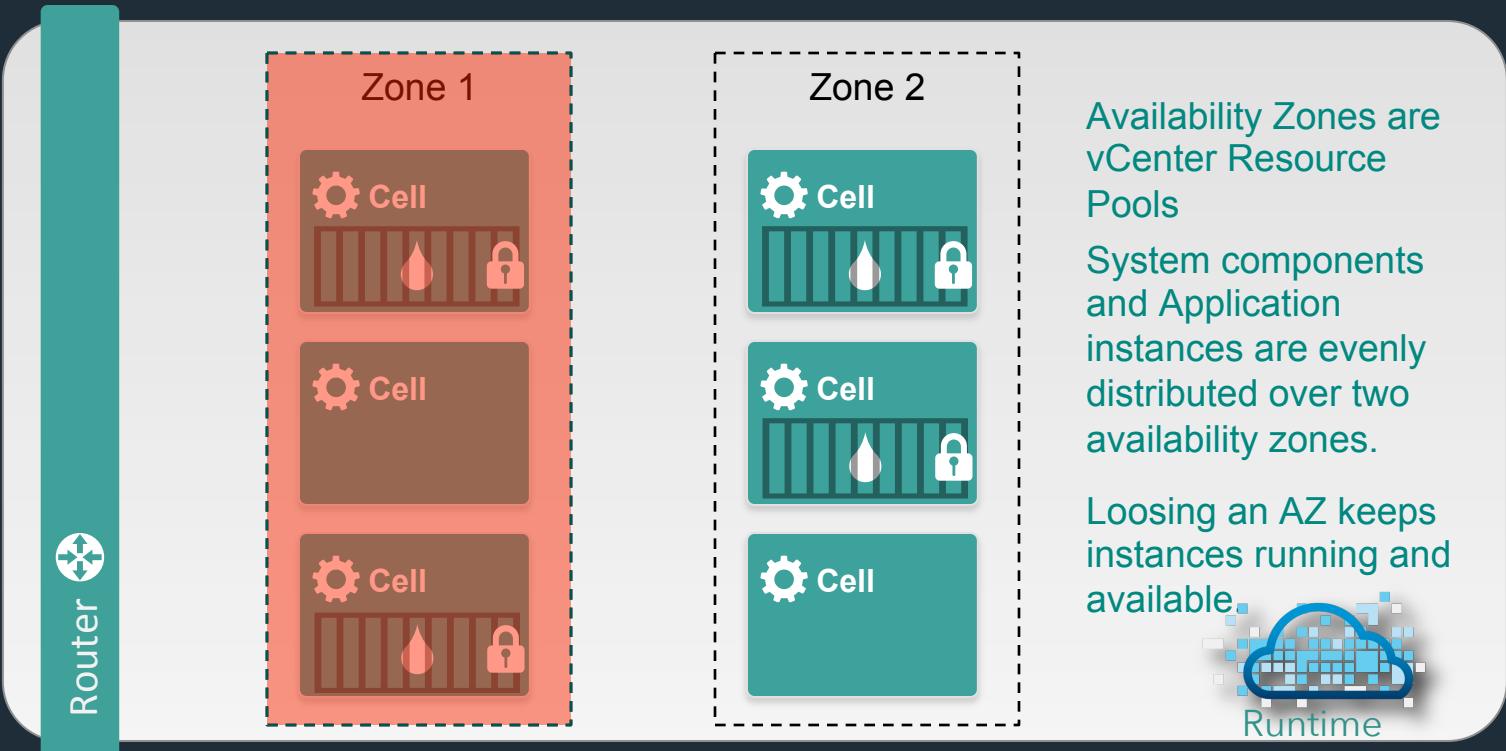
Platform Process HA



Platform Virtual Machine HA

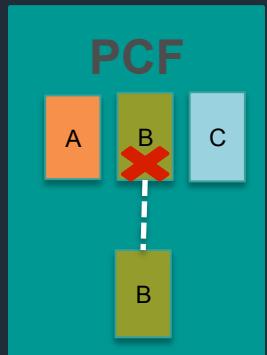


Availability Zone HA

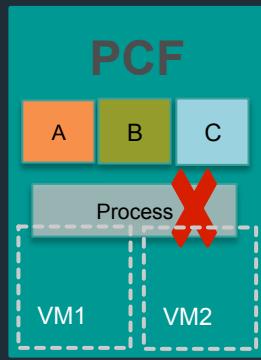


How Pivotal Enables Four Levels of HA

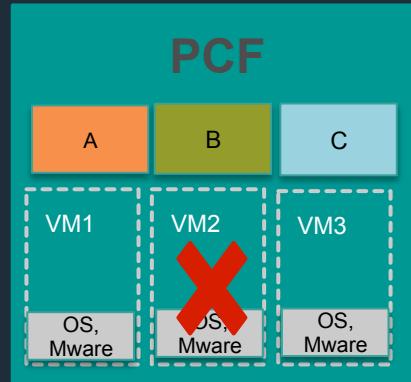
1.



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

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Operator Concerns



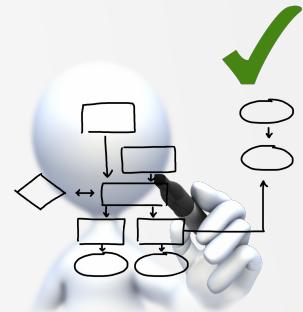
Plan capacity



Install the platform



Setup High Availability



Manage users and quotas



Handle upgrades and updates



Monitor the platform

Pivotal

A NEW PLATFORM FOR A NEW ERA