

# Pivotal

## Cloud Native Workshop

### The Cloud Native Platform

Pivotal Cloud Foundry

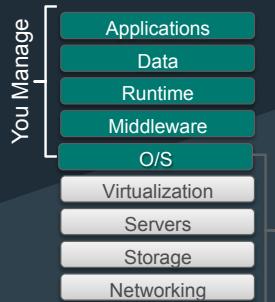
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## Cloud Native Application Platforms

### Traditional IT

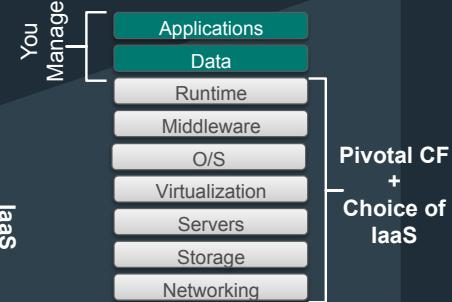


### IaaS

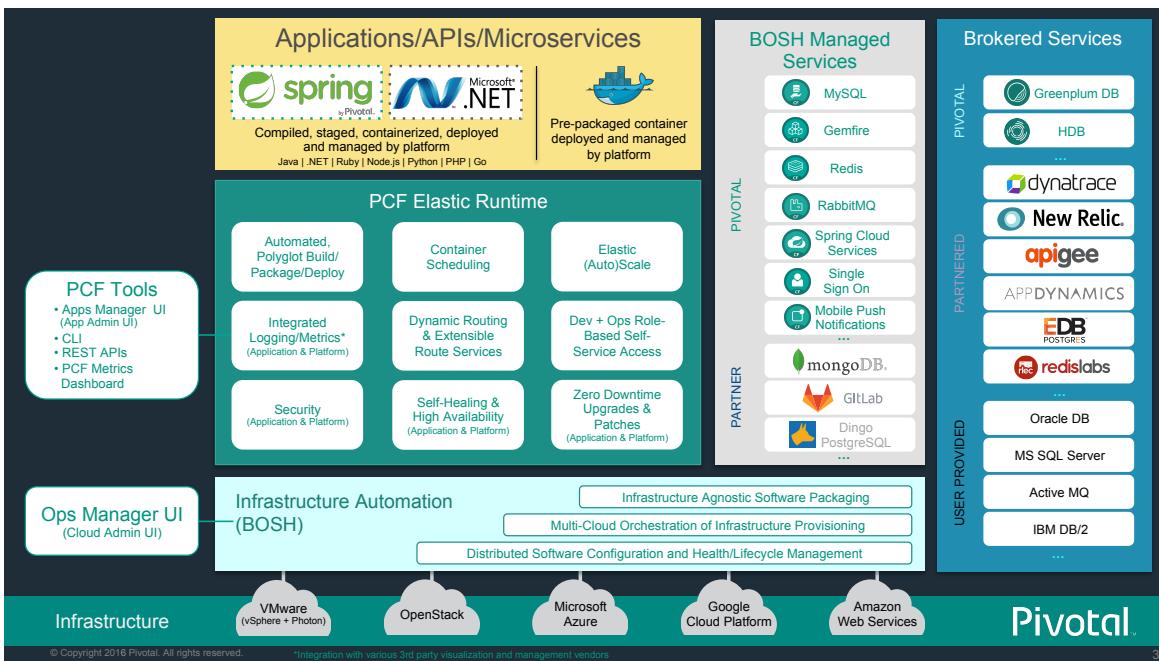


Business Value, Agility & Cost Savings

### Cloud Native

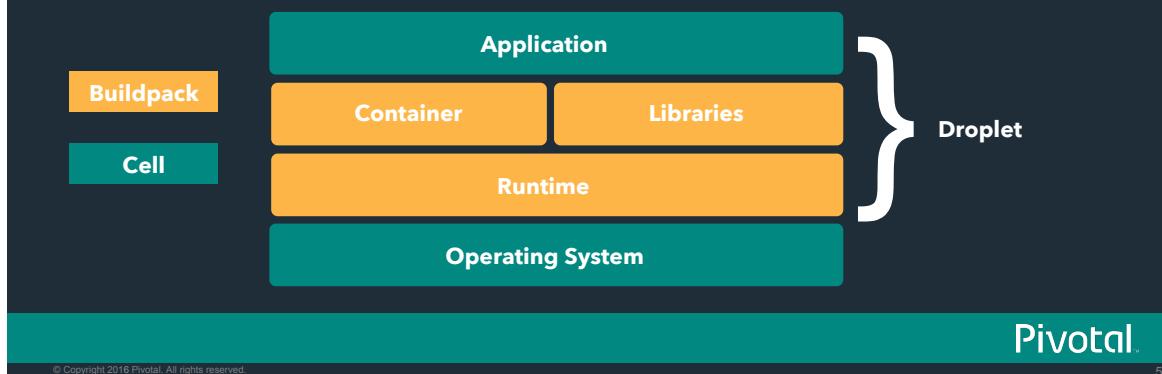


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## Staging and Buildpacks

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

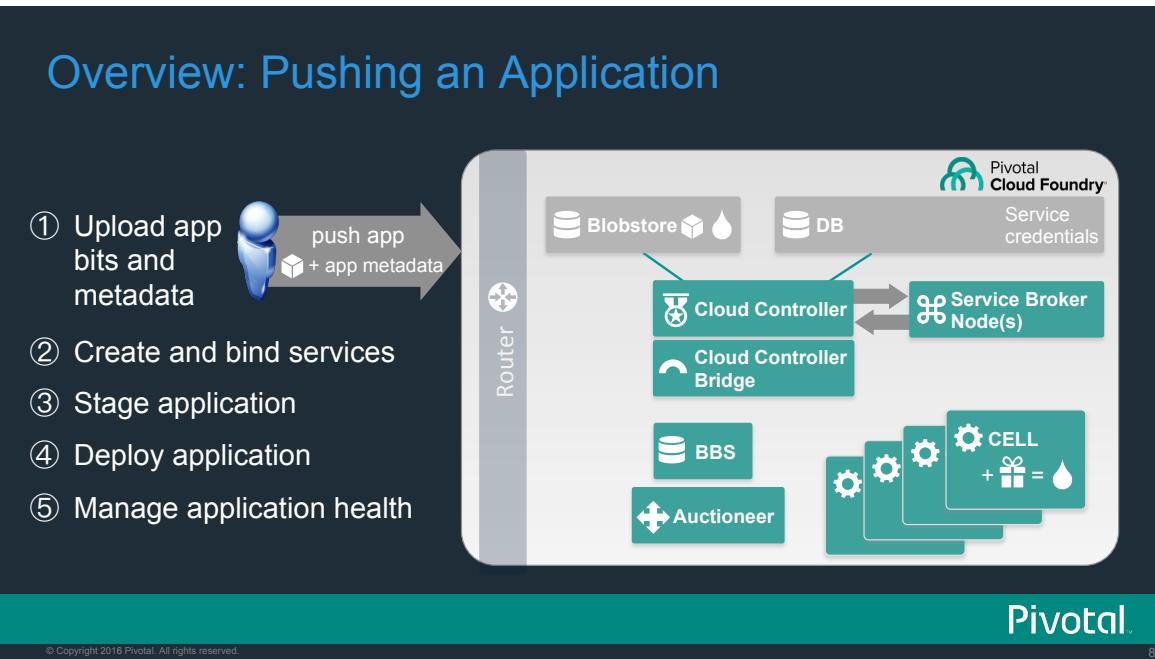
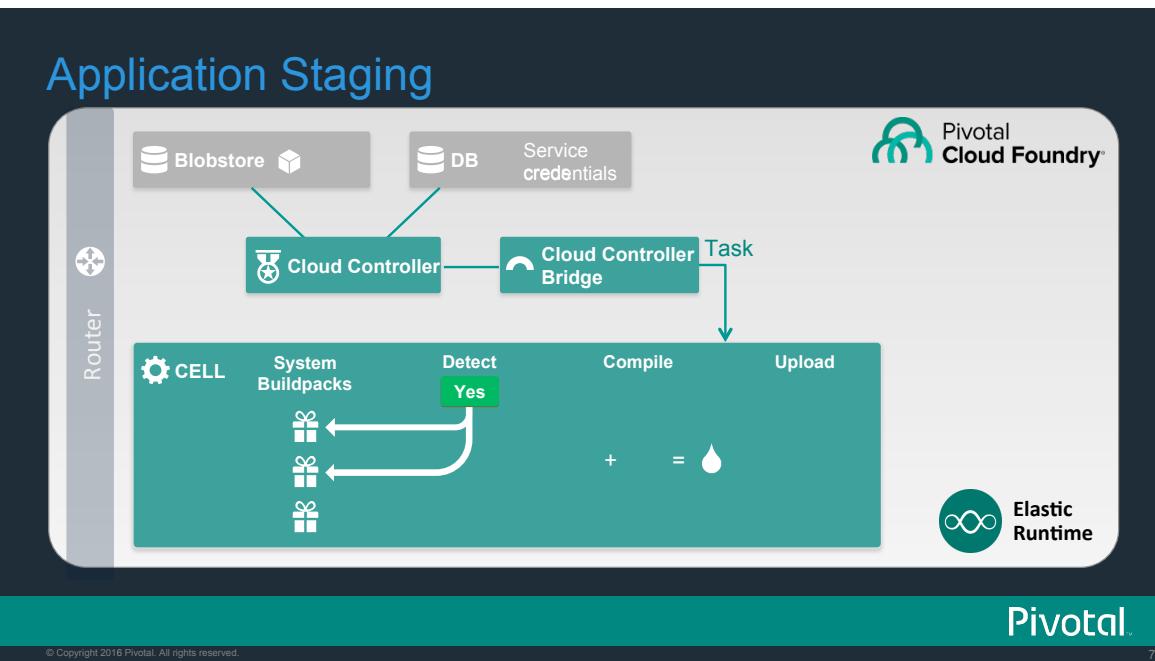


## Buildpacks

- 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
  - Go
  - Python
  - PHP

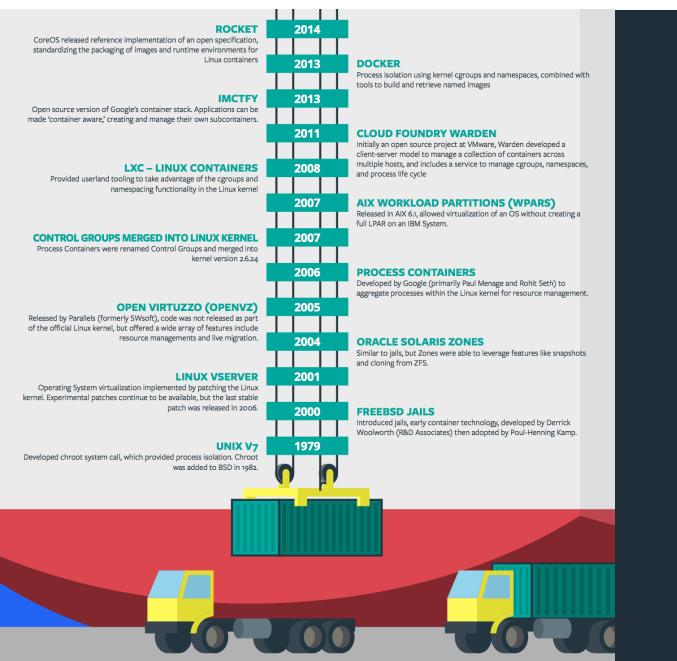
[Cloud Foundry Community Buildpack](#)  
Write your own

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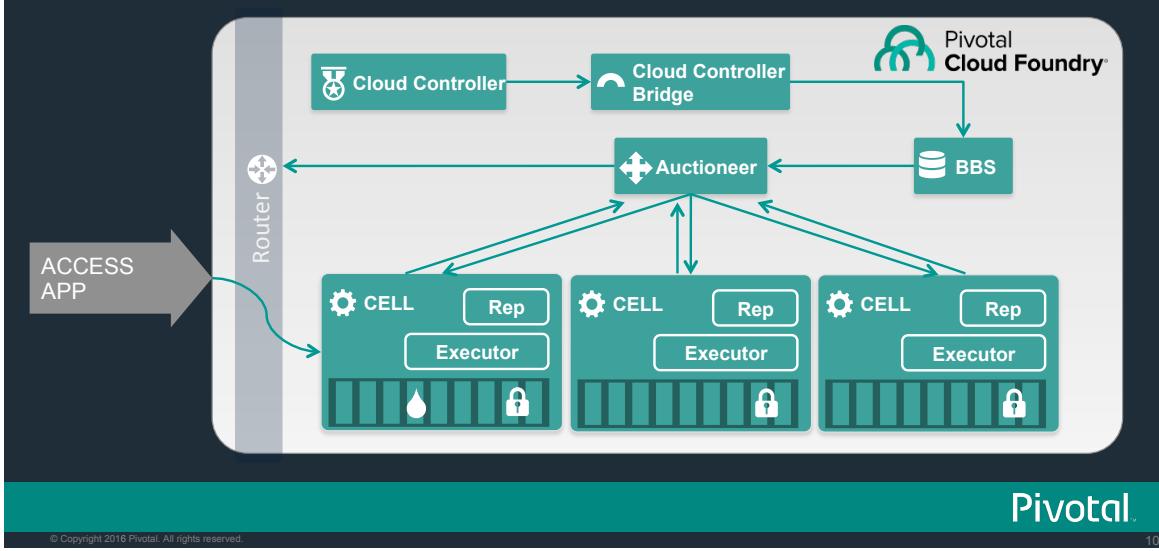


## Containers - History

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



## Deploying an Application and containers



## Application scaling

App Ops



Service  
credentials

Blobstore



Cloud Controller

DB

Cloud Controller  
Bridge

BBS

Converger & Auctioneer

Access App

Router



Elastic  
Runtime

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# Pivotal Cloud Foundry

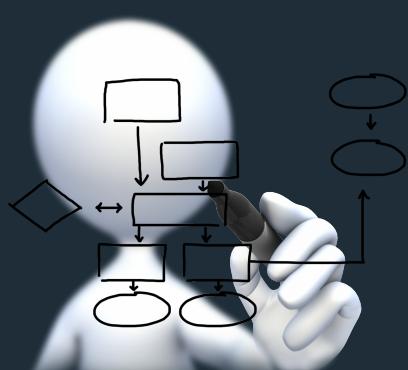
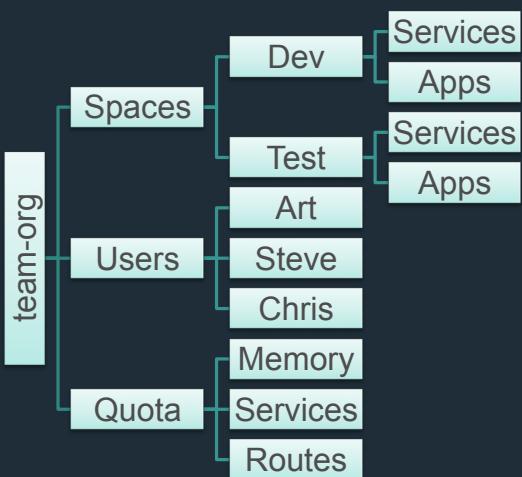
Multi-tenancy

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## Orgs, Spaces, Users and Quotas



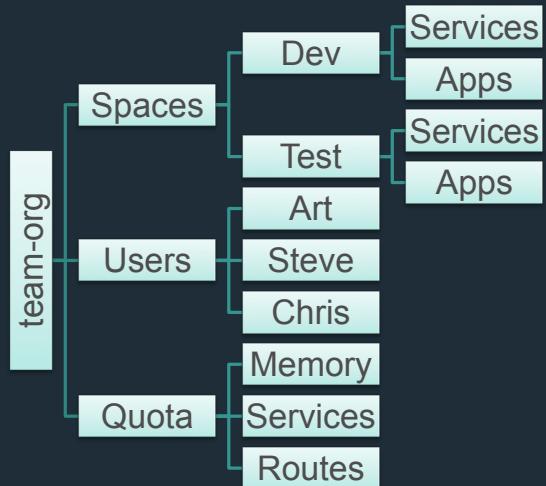
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## Organizations

- 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



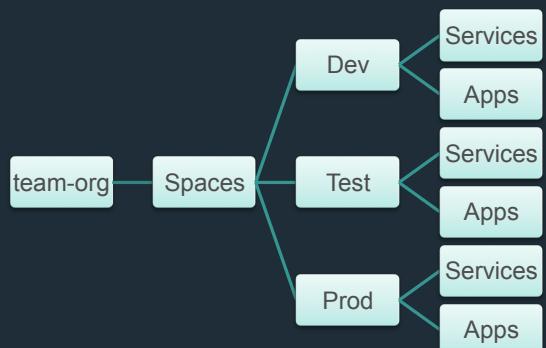
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## Spaces

- 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



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## Quotas and 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



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# Pivotal Cloud Foundry

## Services

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## What is a Service

- Allows resources to be easily provisioned on-demand
- Typically middleware, frameworks, and other “components” necessary for applications
- Can be a persistent, stateful layer



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## Two Types of Services



- **Managed**

Fully integrated, with full lifecycle management

- **User-Provided**

Created and managed external to the platform

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## Rapid self-service provisioning

*Push button deployed service instance*

- Bind to apps through easy to use interface
- Easy accessibility through Marketplace
- Common access control and audit trails across the breadth of services

### Marketplace

MySQL	Pivotal GemFire for PCF
RabbitMQ	Session state caching powered by Pivotal GemFire
Redis	Cloudbees Jenkins Enterprise
Spring Cloud Services	GitLab Enterprise

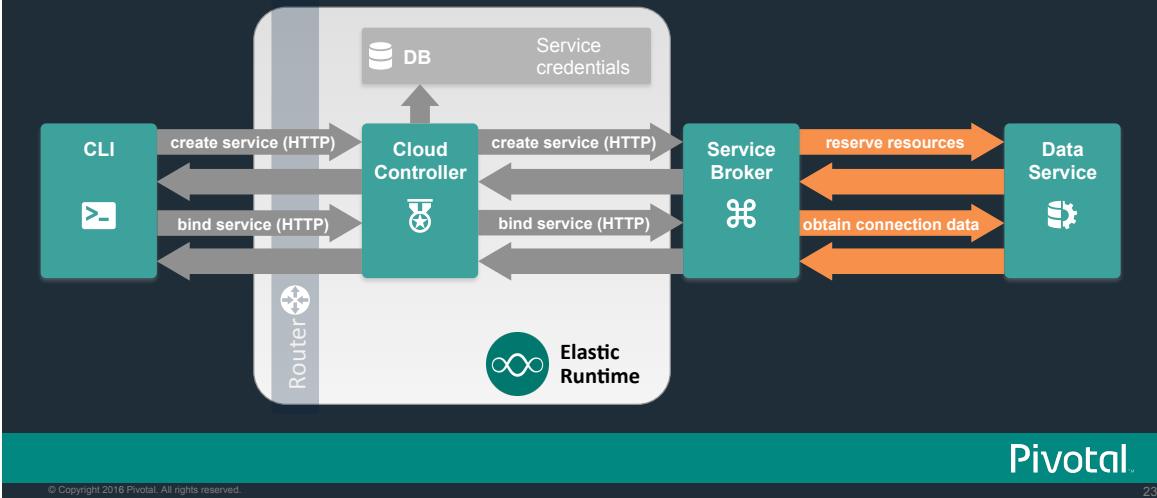
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## Creating and Binding a Service



# Pivotal Cloud Foundry

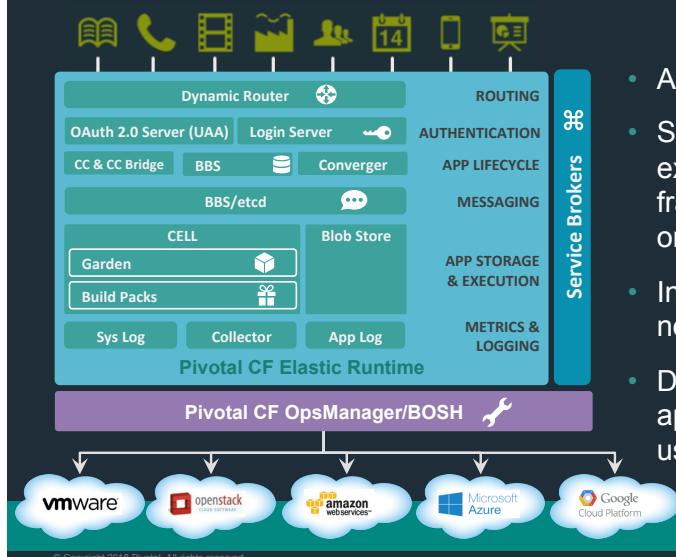
## Architecture & 4 Layers of High Availability

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## Elastic Runtime – High Level Architecture

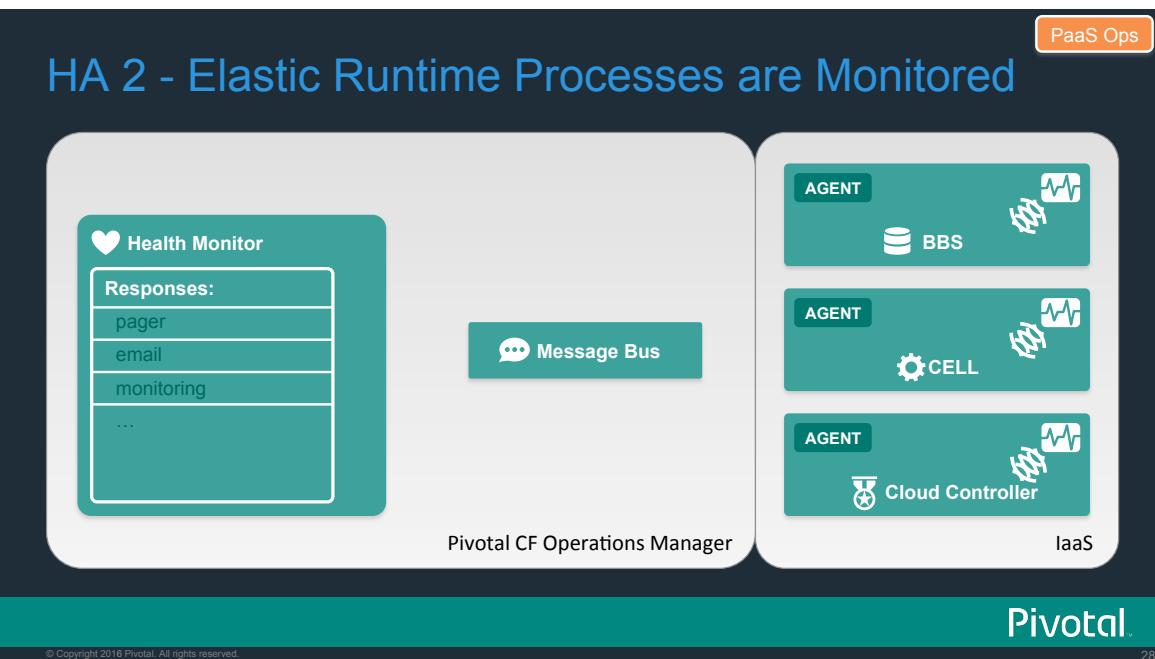
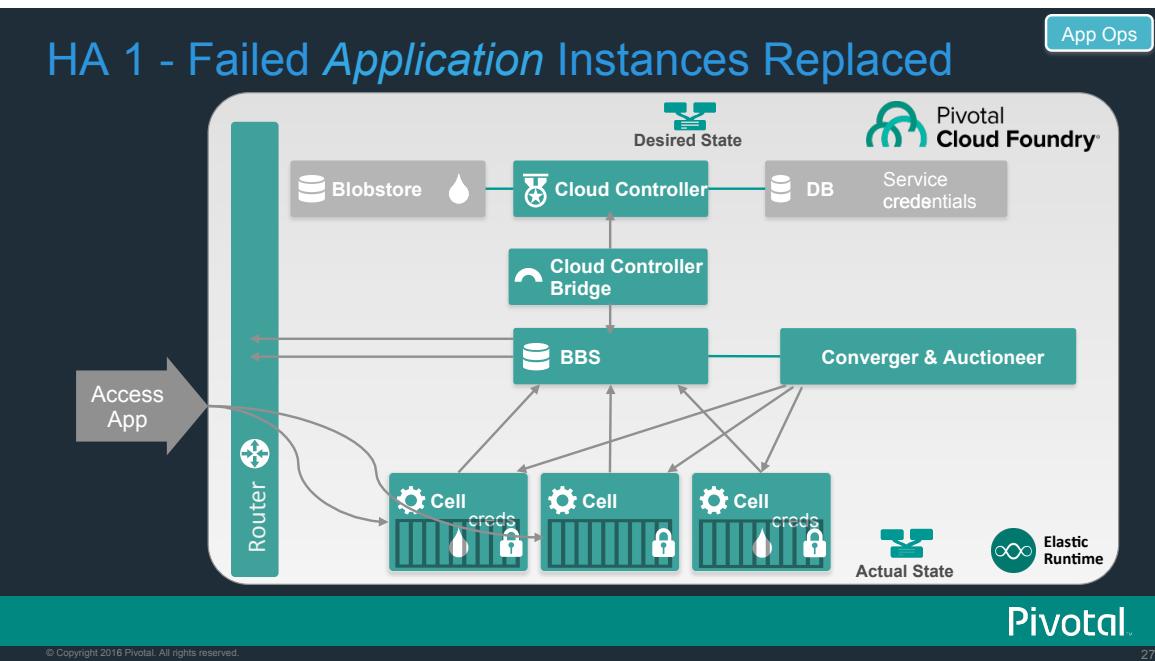


- Automated Platform-as-a-Service
- Scalable runtime environment, extensible to most modern frameworks and languages running on Linux
- Instant expansion or upgrade with no downtime
- Deploy, scale and manage applications with bindable services using simplified semantics and APIs

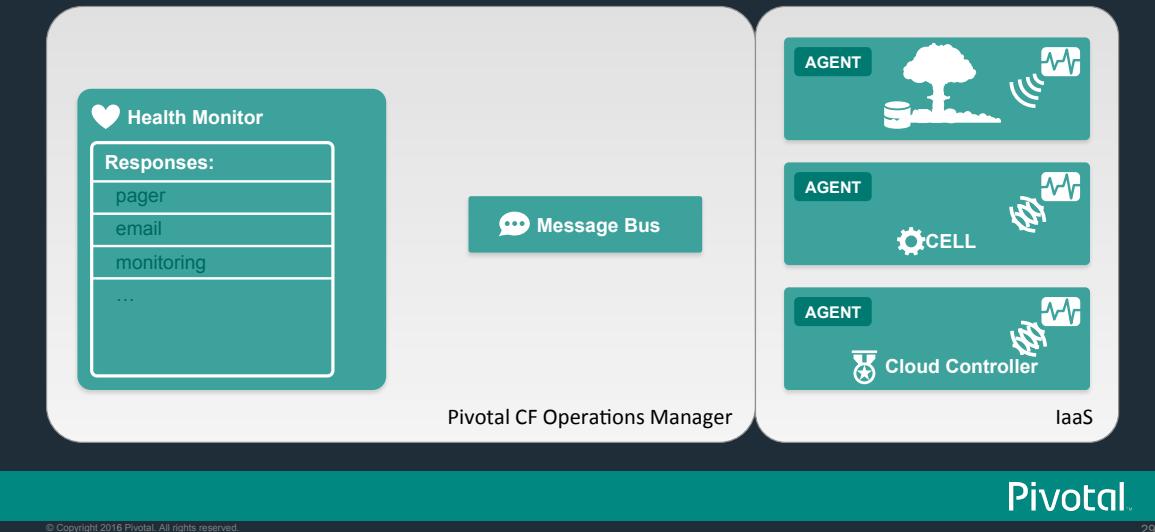
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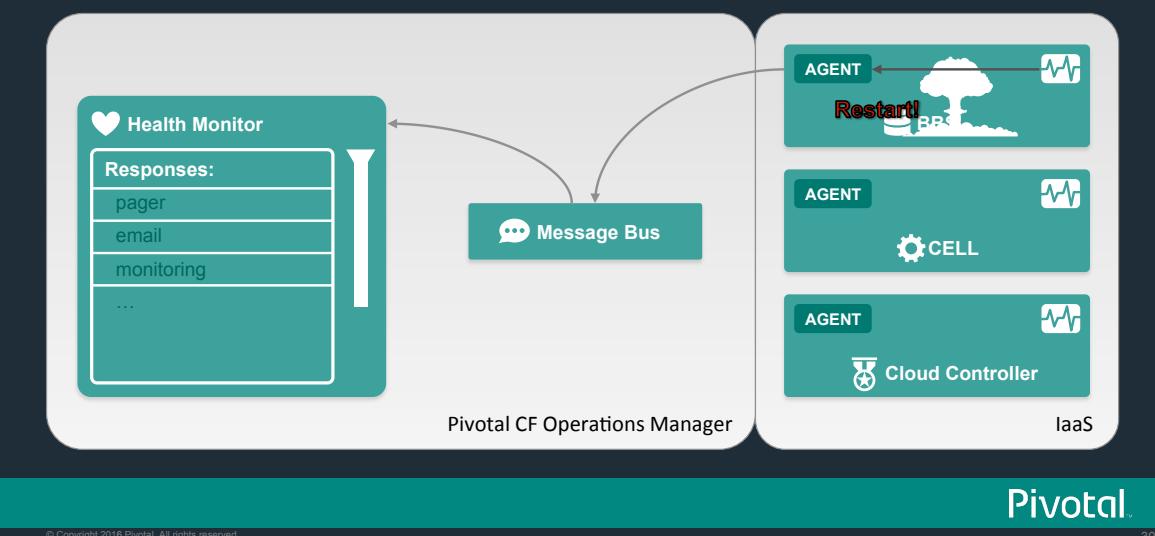
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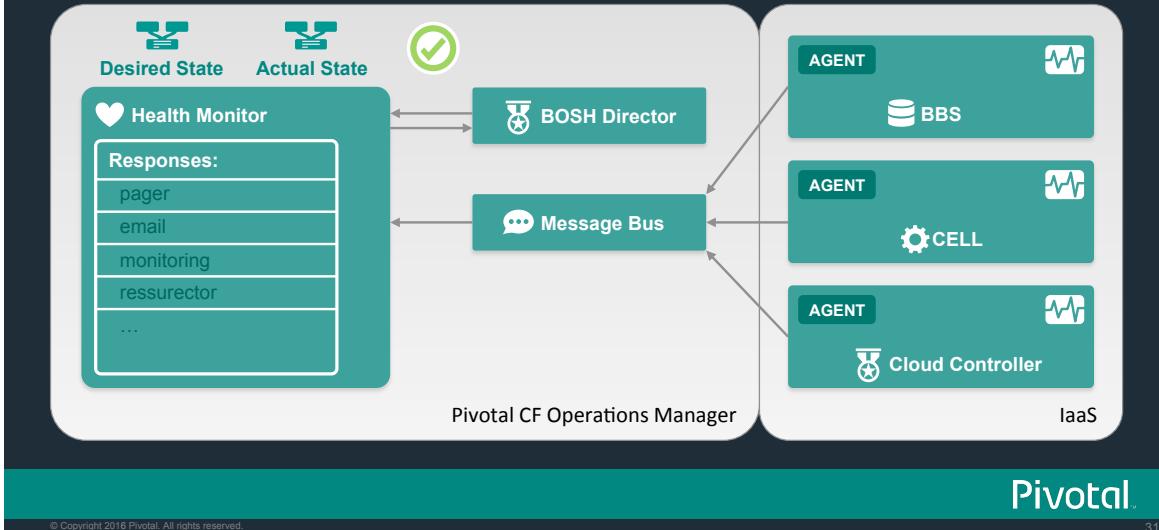
## HA 2 - Elastic Runtime Processes are Monitored



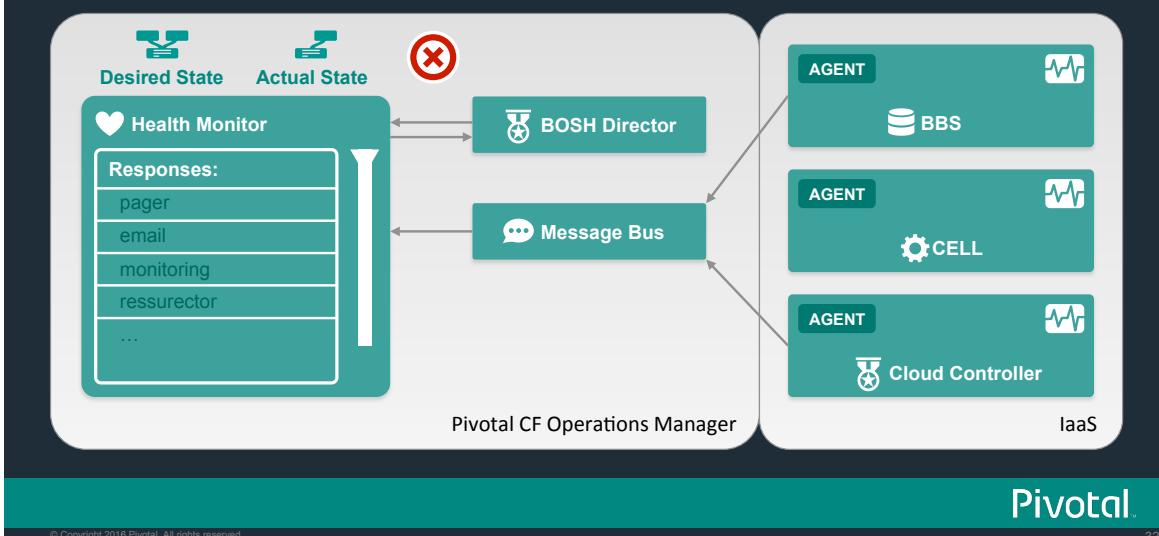
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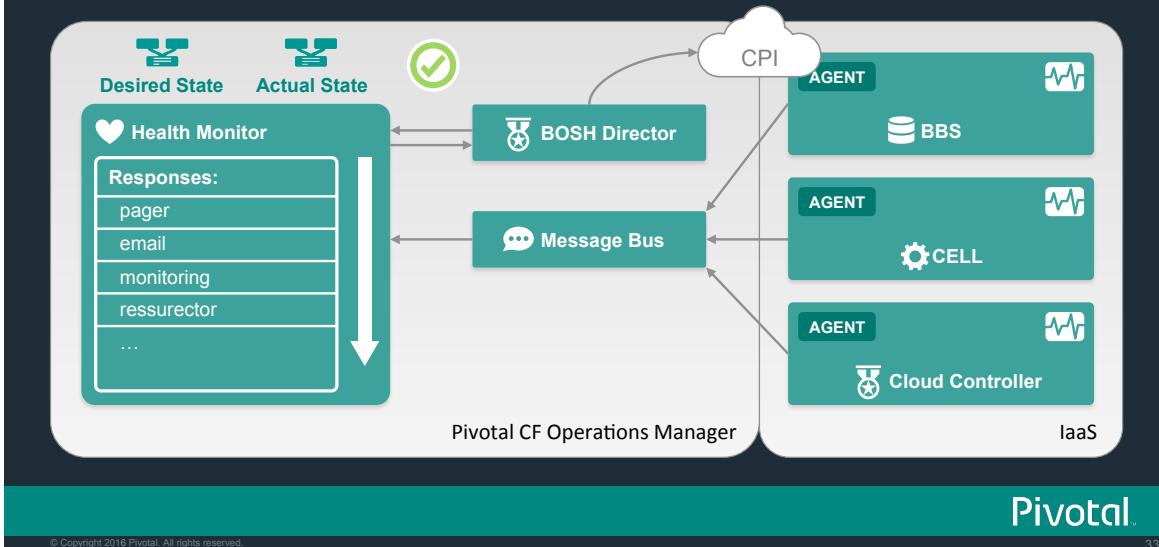
## HA 3 - VMs are Monitored



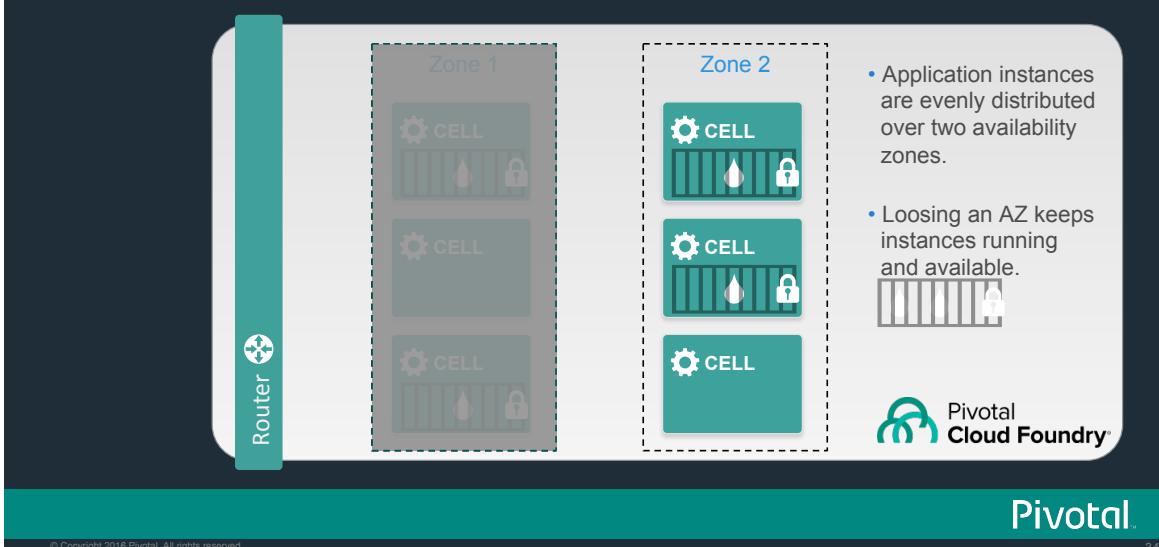
## HA 3 - VMs are Monitored



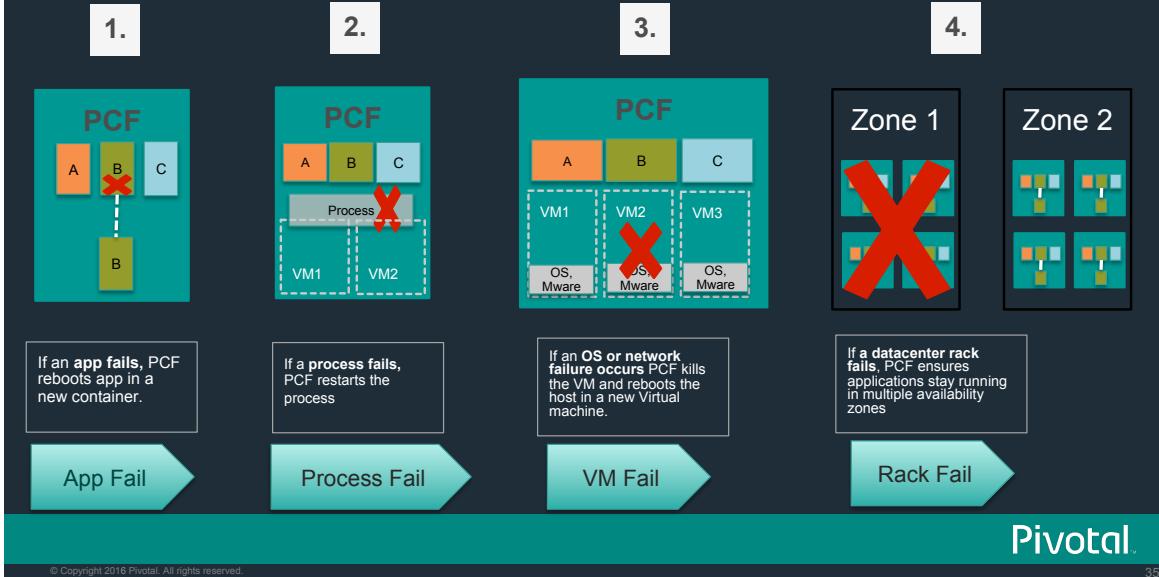
## HA 3 - VMs are Monitored



## HA 4 - Application Instances and Availability Zones



## How Pivotal CF enables four layers of HA



## Pivotal Cloud Foundry = Enterprise-grade Platform

- Cloud-scale, distributed, self-healing, eventually consistent architecture
  - Similar patterns in Elastic Runtime (for your apps) and BOSH (for your services)
- Declarative – you declare your desired state and Pivotal Cloud Foundry keeps the system consistent with that desired state (4 levels of HA!!)
- Zero-downtime, rolling upgrades
- Pivotal Cloud Foundry manages containers (ERS) and VMs (BOSH)

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# Pivotal Cloud Foundry

## Auditing and Logging

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## Visibility Through Logs and Metrics

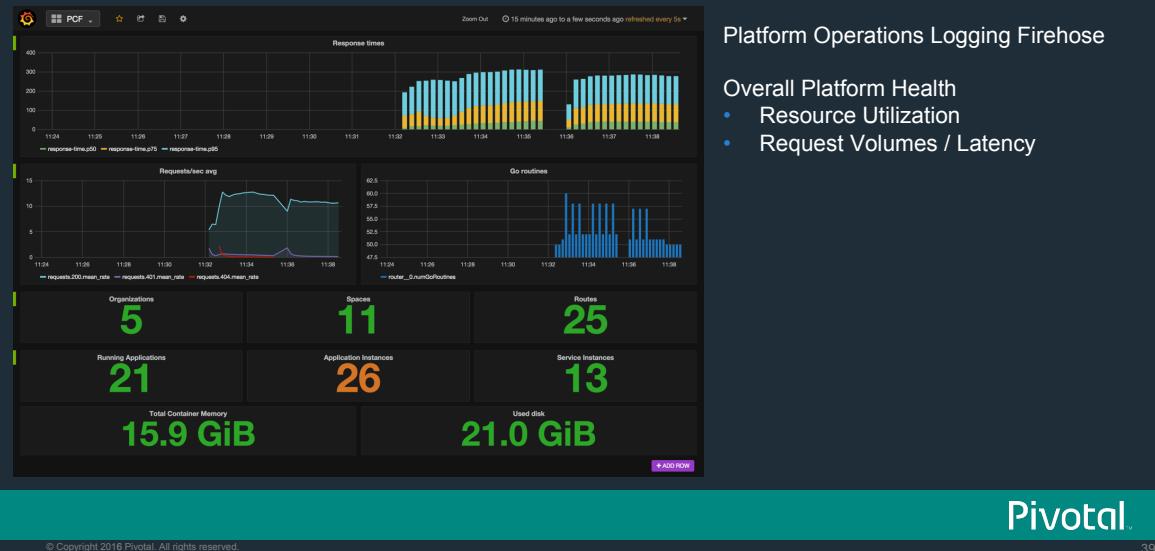
Single source for all platform logs and metrics. Single view console that makes system and application monitoring visible and actionable

- First packet logging
  - Enables tool for external audit controls
- Aggregated Logging
  - HTTP Events, Counters, Gauges, Errors
  - Every `stdout` and `stderr` from all apps and platform components
  - Health gauges
- Snap-in best of breed application monitors
  - AppDynamics, New Relic, Splunk, etc.



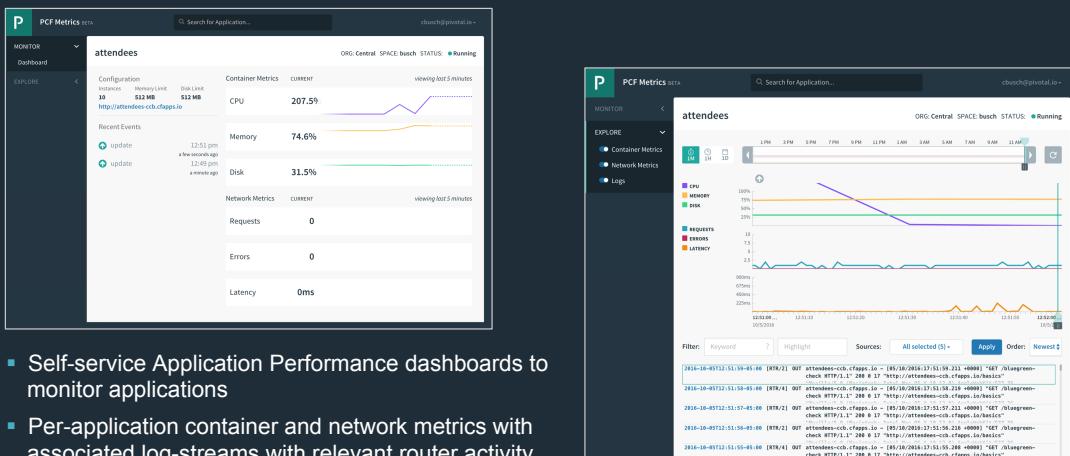
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## Platform Operations Logging



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## Application Operations Logging & Metrics



- Self-service Application Performance dashboards to monitor applications
- Per-application container and network metrics with associated log-streams with relevant router activity

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**HANDS-ON LABS**



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## Hands-on Lab Instructions

- Prerequisites
  - CF CLI installed
  - Git installed
    - `git clone https://github.com/cbusch-pivotal/stl-cloud-native-spring-workshop.git`
  - Download zip and unzip
    - <https://github.com/cbusch-pivotal/stl-cloud-native-spring-workshop/archive/master.zip>
- Lab instructions
  - <https://github.com/cbusch-pivotal/stl-cloud-native-spring-workshop>

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A NEW PLATFORM FOR A NEW ERA