Pivotal

Introduction to Pivotal Cloud Foundry

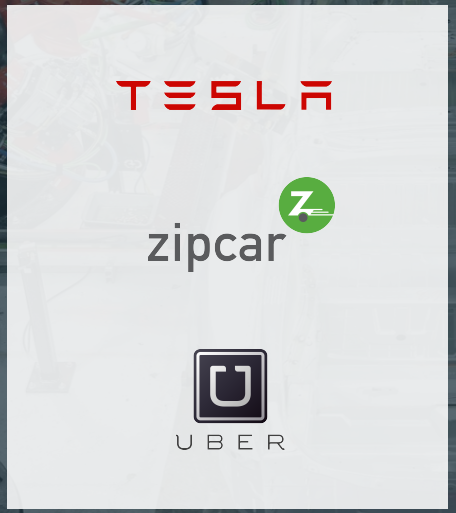
New Age of Digital Transformation

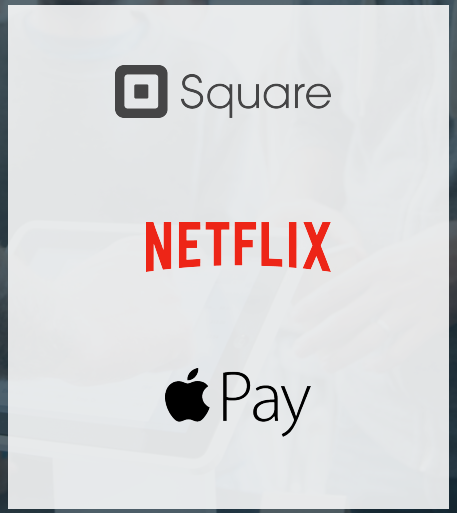
COMPETING ON

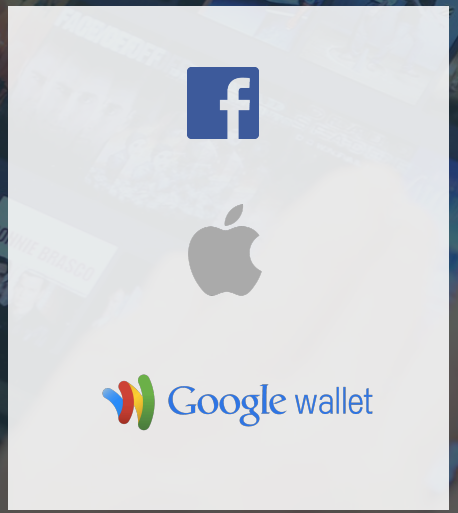
Product

Business Model

Customer Experience







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“From 2 months for provisioning servers to
delivering products in less than 5 weeks”
Humana®

Pivotal

“Moving from 100 day [cycles] to **minutes**”

“We get to drive business as a

Technology Company

(not an old insurance company driven by actuaries)”

Allstate®

Pivotal

New age of Digital Transformation

Enterprises operating at startup speeds

Bloomberg

comcast

GARMIN

verizon

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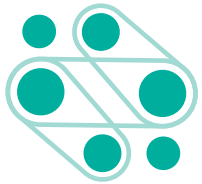
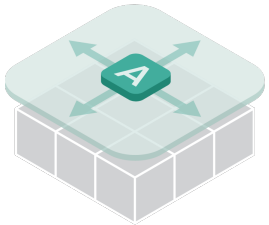
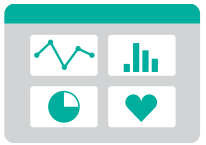
Changing Model for Application Delivery

Architecture	Development	Abstraction Layer	Deployment	“Day 2” Ops
Monolithic App	Linear / Sequential	App Server on Machine	Sparingly at designated times	Many tools, ad hoc automation
				
Microservices / Composite app	**Short cycles, test driven, iterative**	**App on “disposable” infrastructure**	**Ready for prod at any time**	**Manage services, not servers**

DEVELOPMENT

OPERATIONS

Multiple Languages — Java, Microsoft .NET, node.js, ...

Microservices Support — Spring Boot, Spring Cloud

Services Marketplace — Native, User Provided, Partner

App Deployment & Management — CI/CD Tools, ID, Security

Availability — Health, Metrics, Patching

Visibility & Administration — Apps & Platform Dashboards

Operating System

Container Orchestration

Cloud API

Google | AWS | Azure | VMW | Openstack

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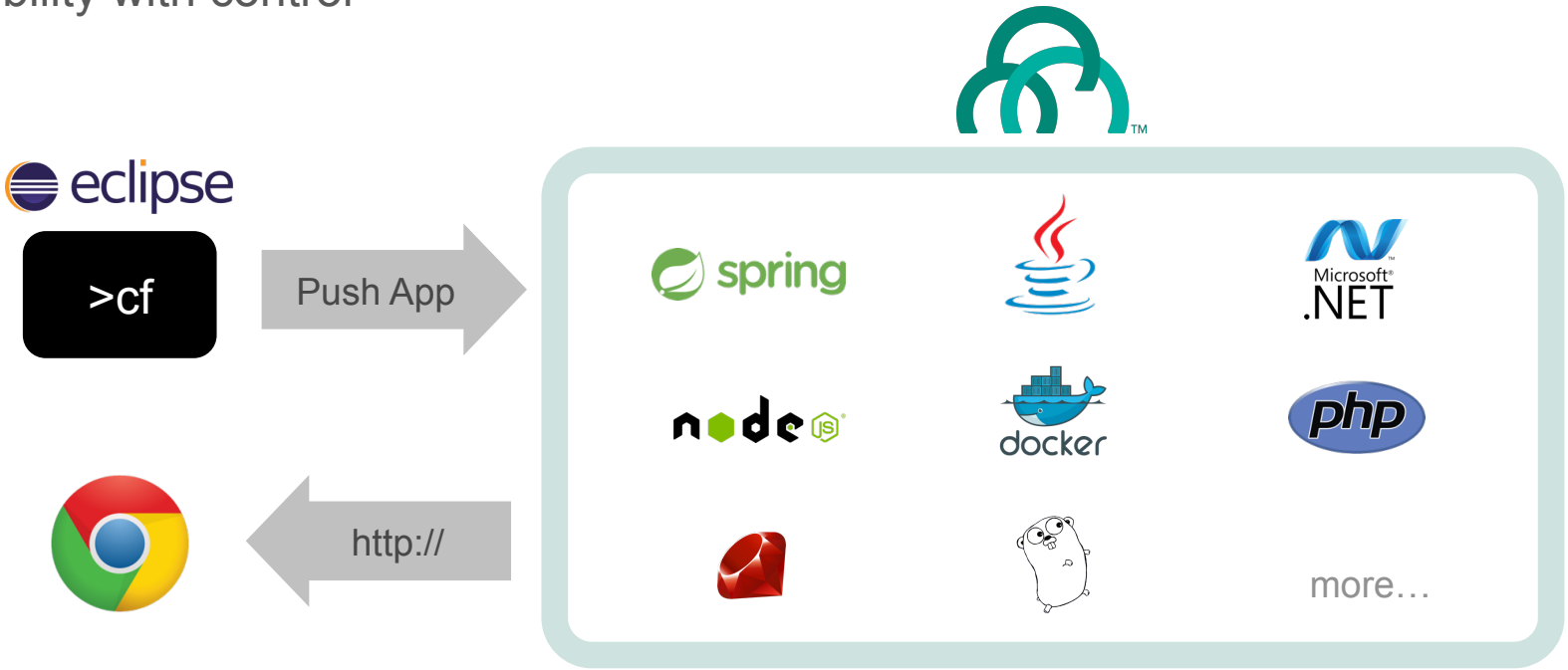
Developer Self Service Provisioning

Flexibility with control



Push your app and it just works…no “snowflakes”, no waiting.

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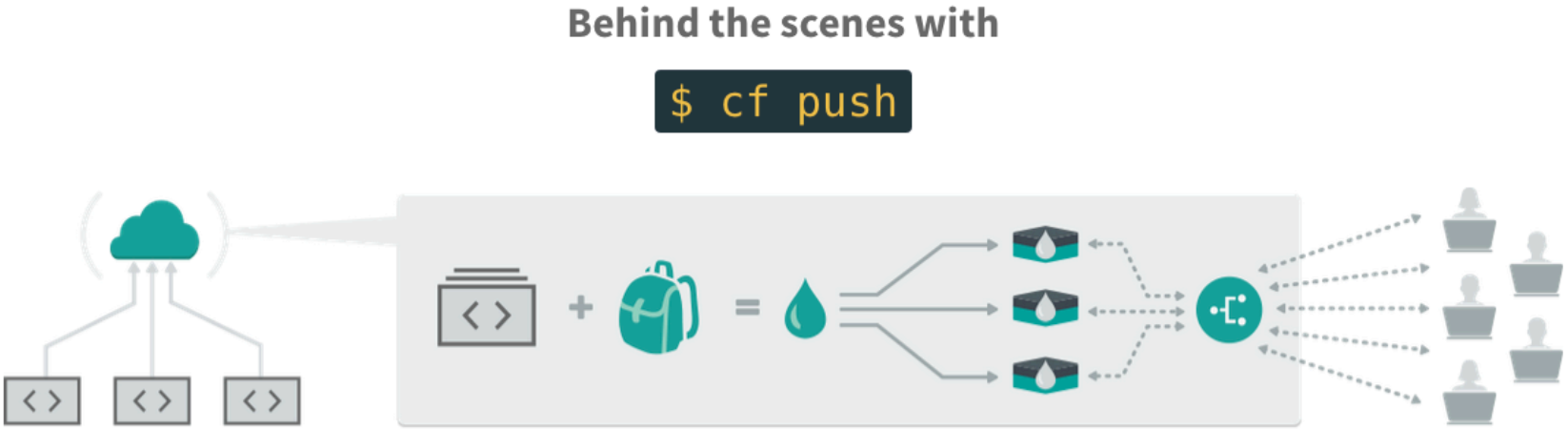
Automate Deployments



Upload

'cf push' uploads the application bits and metadata to the Cloud Controller

Stage

Behind the scenes the code goes through a set of staging scripts called BuildPacks which create a container blueprint called 'Droplet'

Distribute

'Diego' which is an auction based workload scheduler spins up containers and with the 'Droplet' image, and alerts the 'Cloud Controller' that the app is ready to receive traffic

Route

Your app receives an entry in the routing tier which provides a dynamic loadbalancer

Pivotal Cloud Foundry CF

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Deploying an Application

IaaS versus PCF

- Provision VM
- Install Application Runtime
- Deploy Application
- Configure Load Balancer
- Configure SSL Termination
- Configure Service Connectivity
- Configure Firewall

Pivotal CF™

- cf push

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Scaling an Application

IaaS versus PCF

Pivotal CF™

- Provision New VM
- Install Application Runtime
- Deploy Application
- Configure Load Balancer / Update Route
- Configure Service Connectivity
- Configure Firewall

- cf scale

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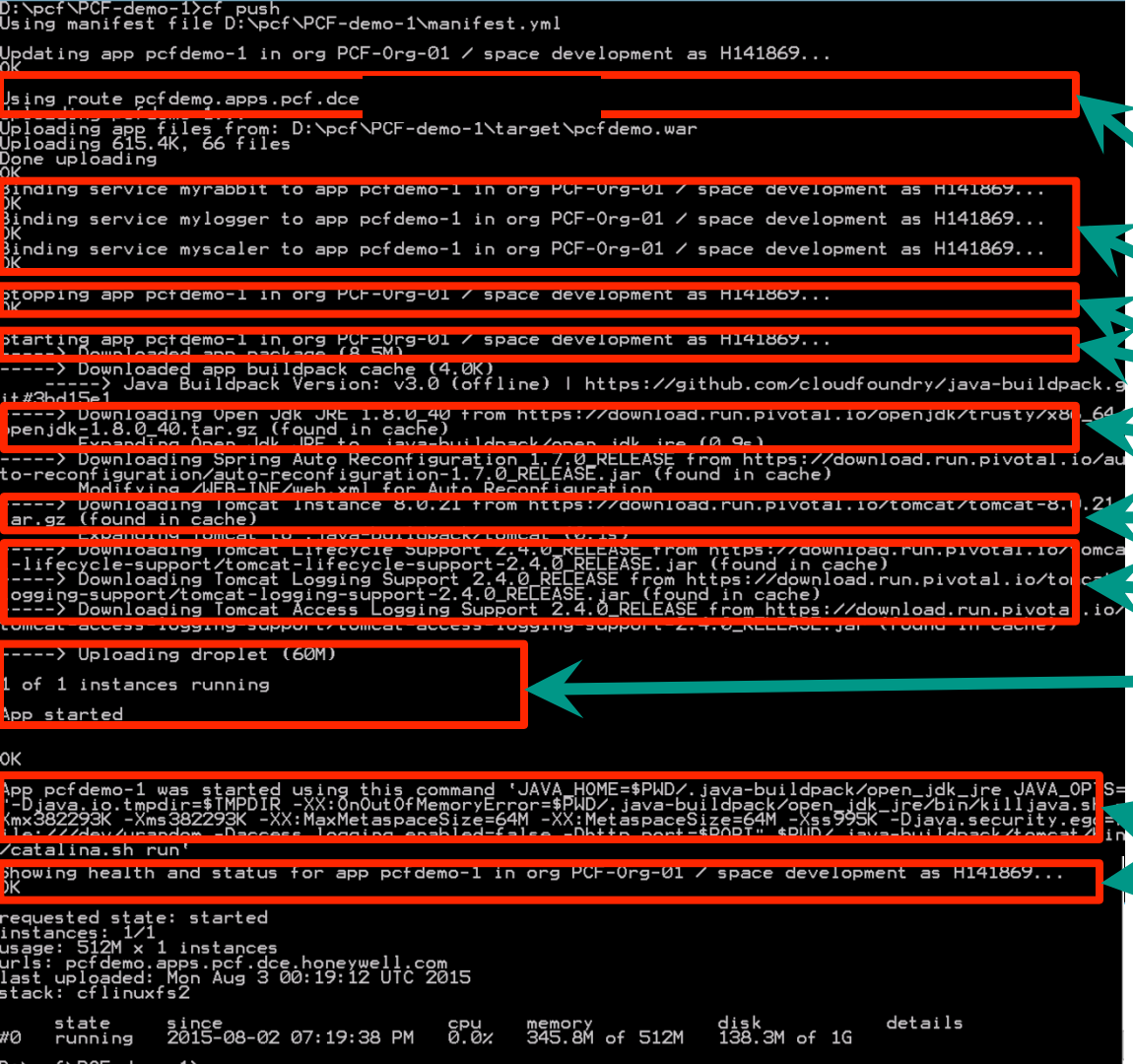
Eliminating Service Tickets



Firewall & Routes

Service Bindings

App Lifecycle

Runtime Installation & Config

Middleware Installation & Config

Application Installation & Config

App Lifecycle

Logging, Health, Telemetry

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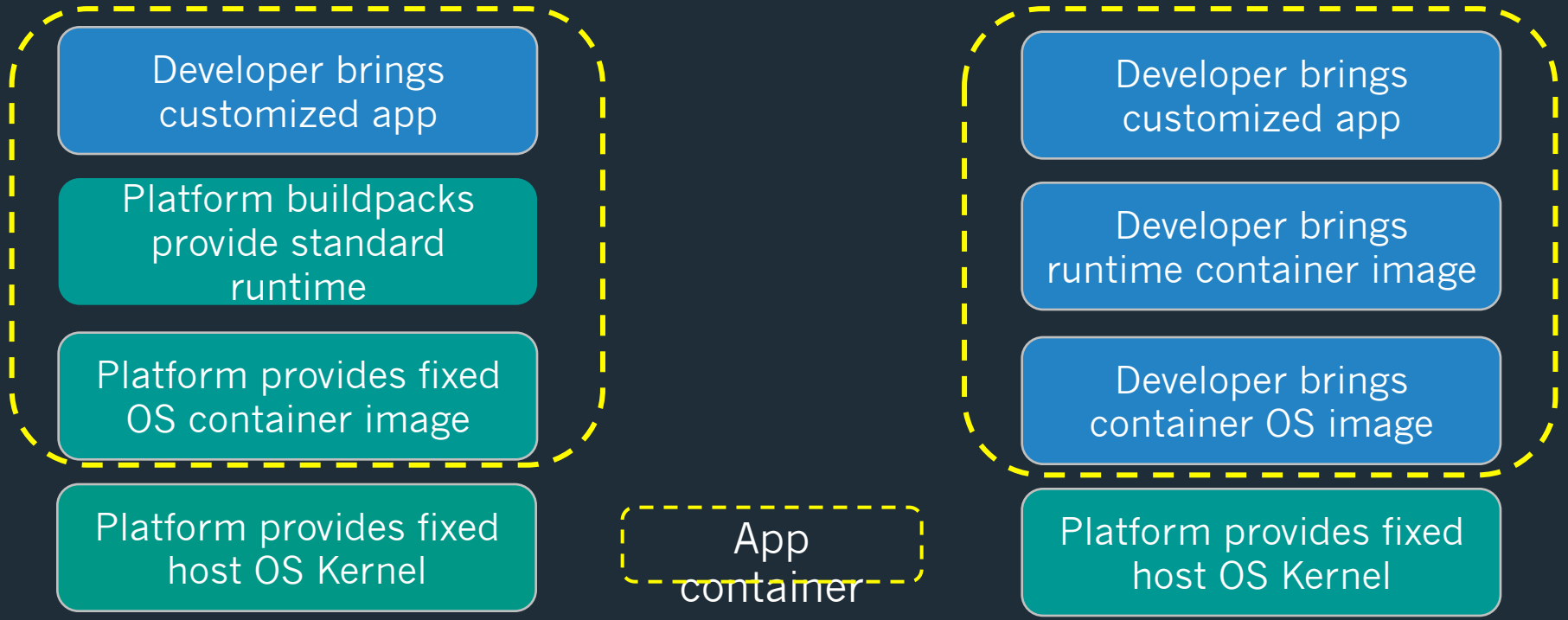
Serverless: Runtime vs No-Runtime



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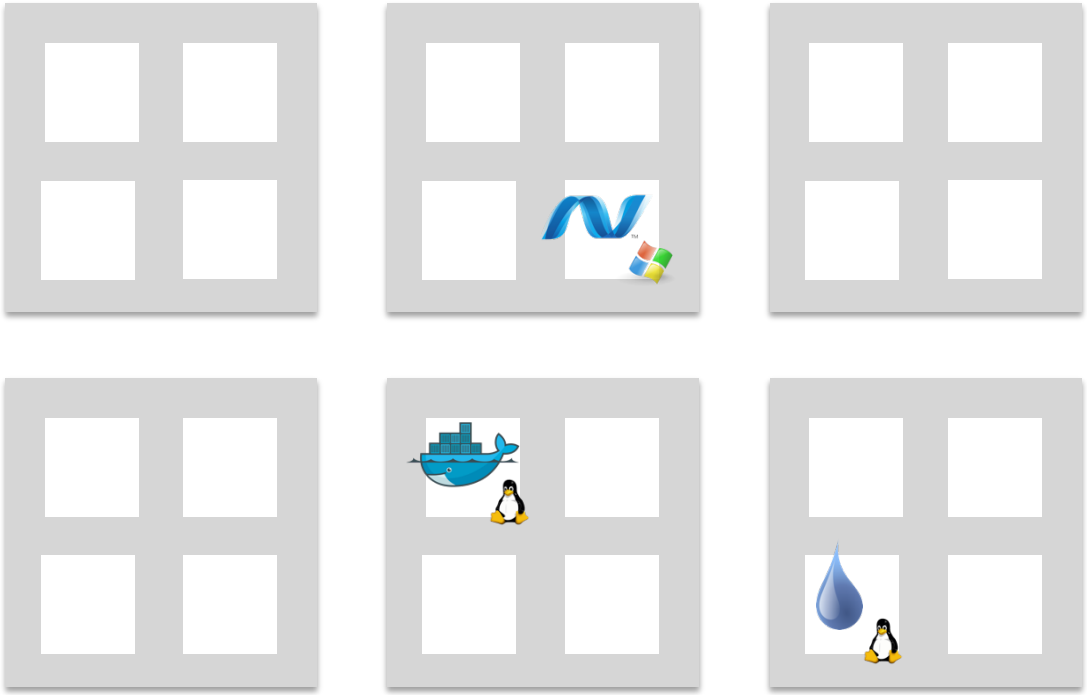
Container Scheduler Handles Workloads



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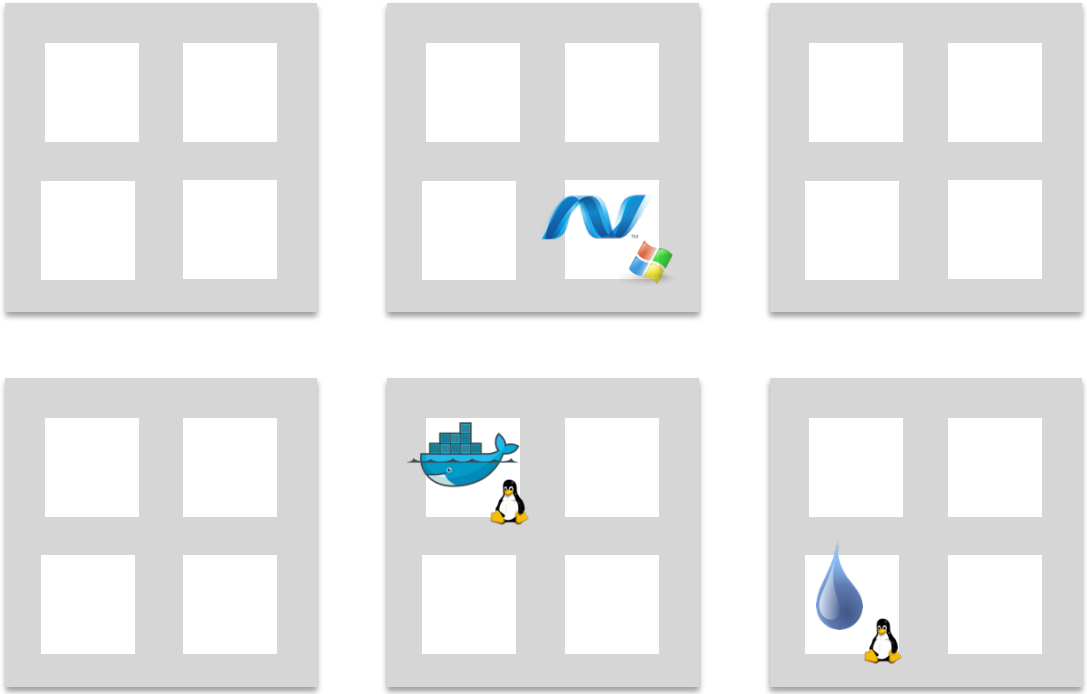
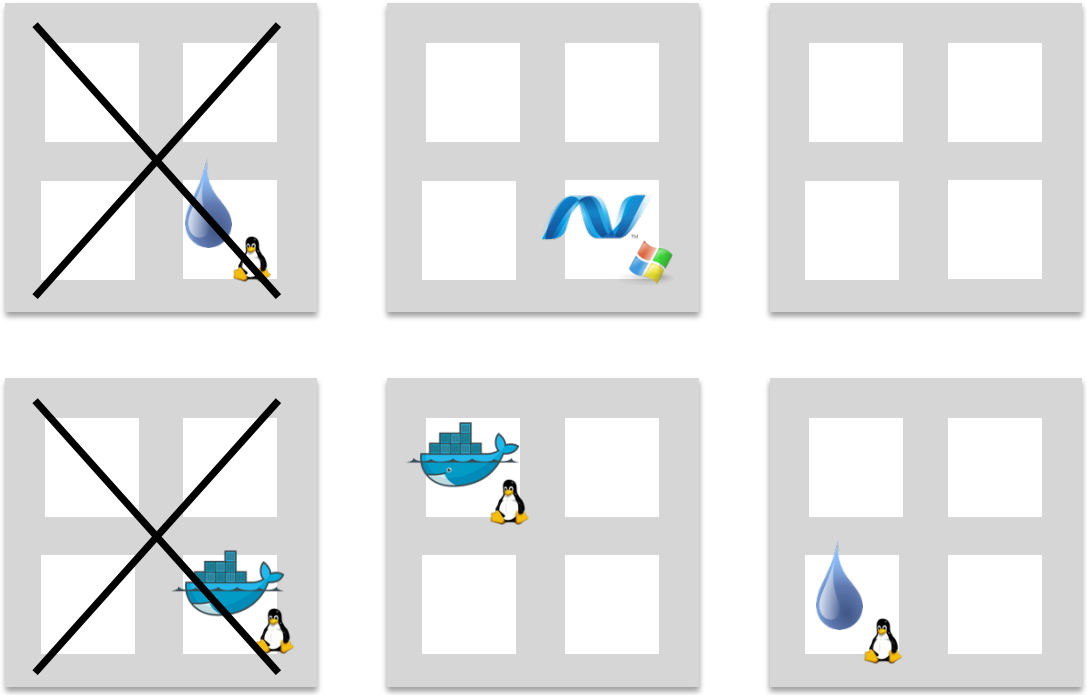


Dynamic load balancing

Container Scheduler Handles Workloads



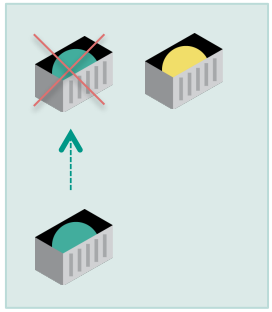
Dynamic load balancing

Remediation and rebalance of workloads

4 Levels of High Availability

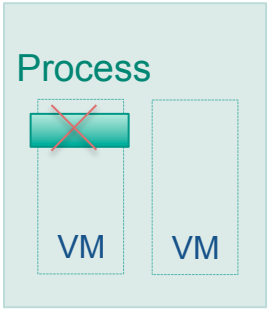
1

App Instance Fail



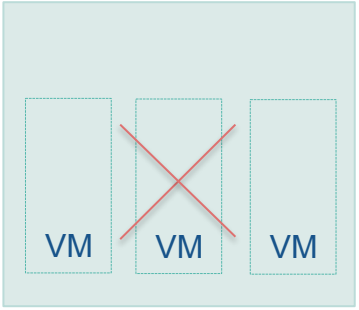
2

Process Fail



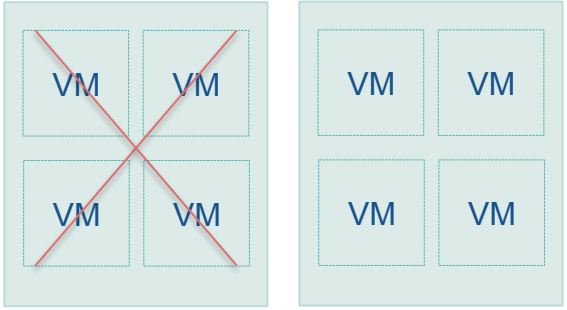
3

VM Fail



4

Availability Zone Fail



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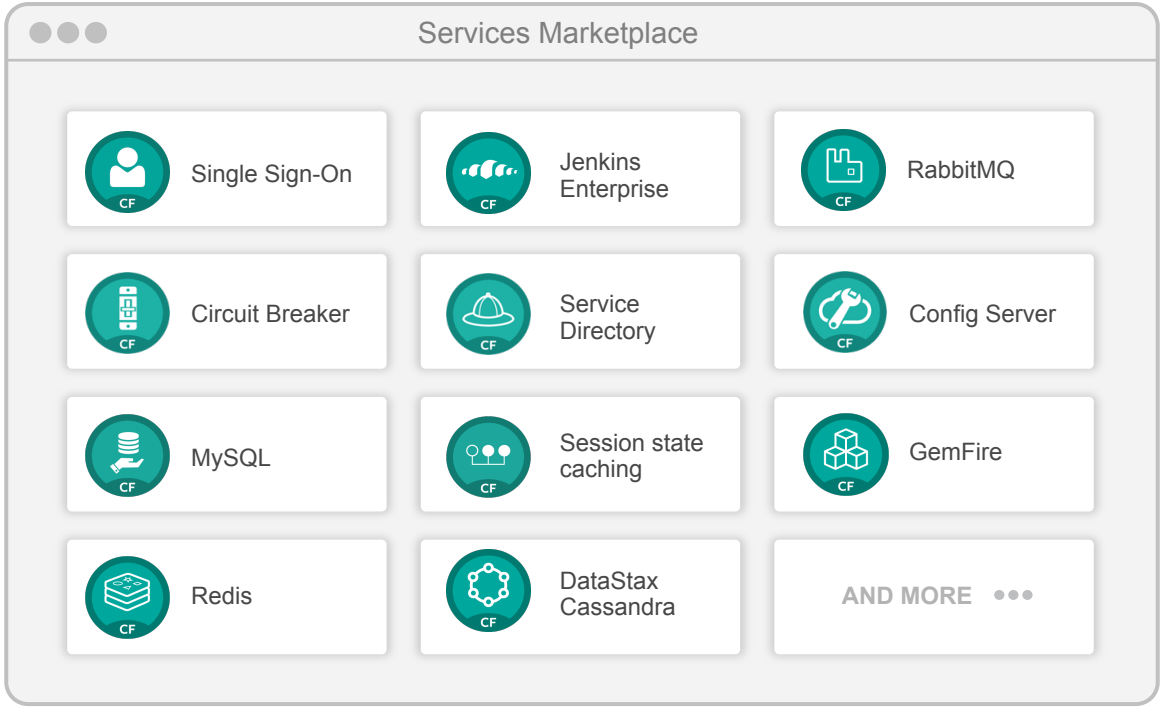
Services prepackaged for simple consumption

- Easy accessibility through Marketplace
- Instant Provisioning and full lifecycle managed
- Bind to apps through easy to use interface
- Common access control and audit trails across services



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DEVELOPMENT

Multiple Languages

Java

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node JS

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Microservices Support

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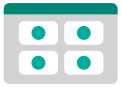

Apps & Platform Dashboards

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Comprehensive application lifecycle management

Build Pipeline Operations

Commit Code Change	Automate Build & Test (Unit Test, Static Code Analysis)	Store Binaries & Build Artifacts	Deploy, UAT, Stage App	Zero Downtime Upgrade to Production

Tool Chain

Gitlab

Jenkins

Artifactory

Pivotal Cloud Foundry

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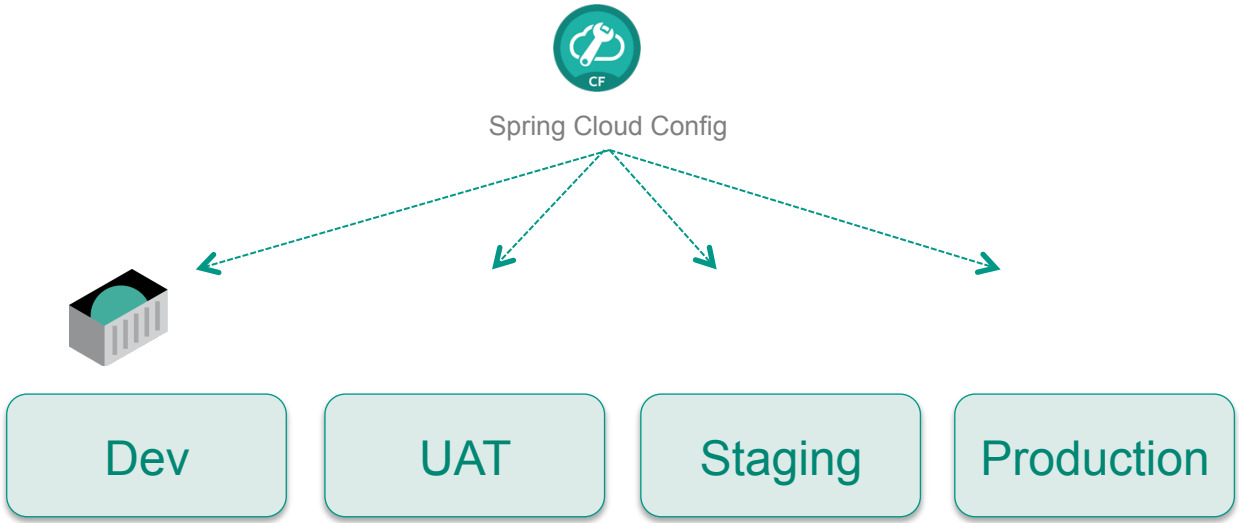
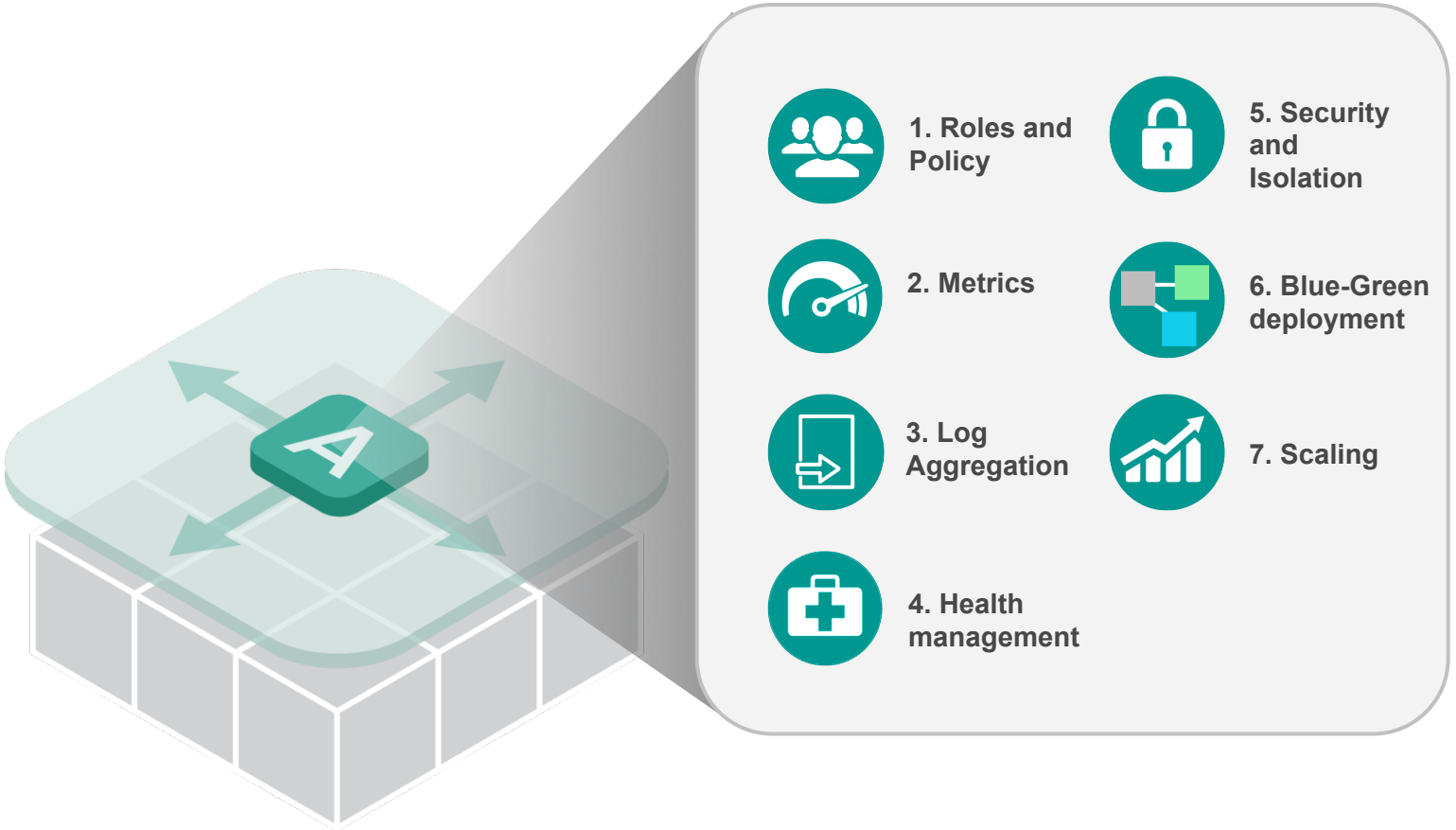
Accelerating the velocity of each iteration



- Dev, Test, Staging and Production on the same platform
- Bit for bit consistent environments
- Logical groupings of user access controls

Everything to Deploy and Manage the App



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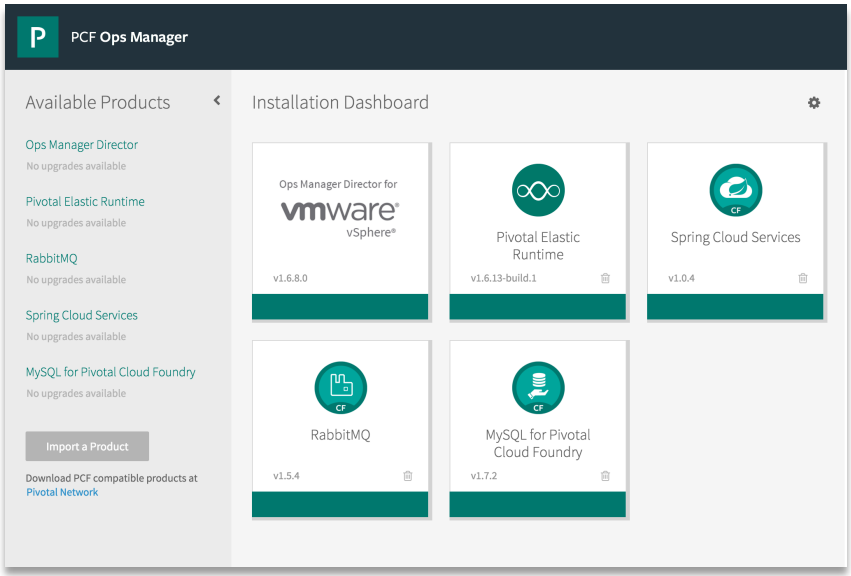
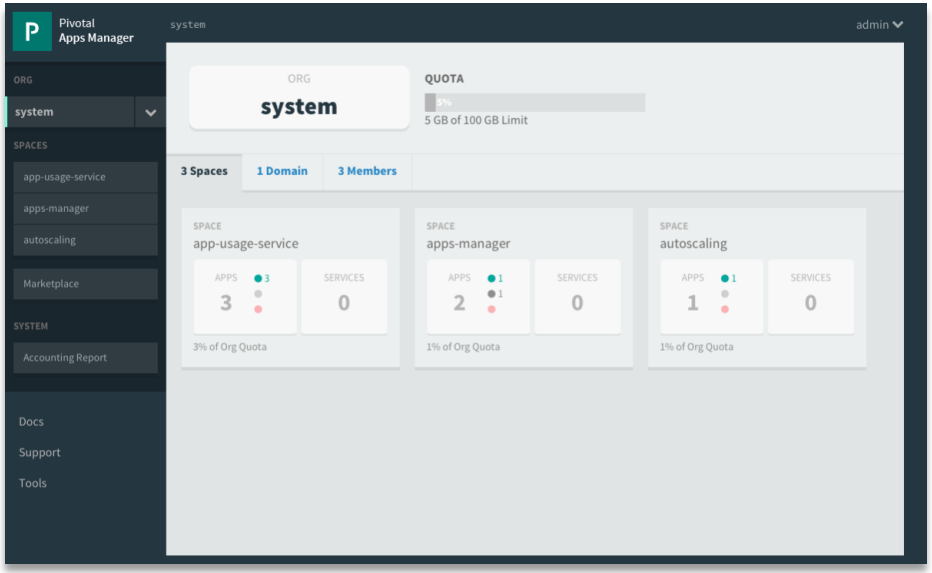
Comprehensive Visibility & Administration



Operations Manager



Applications Manager

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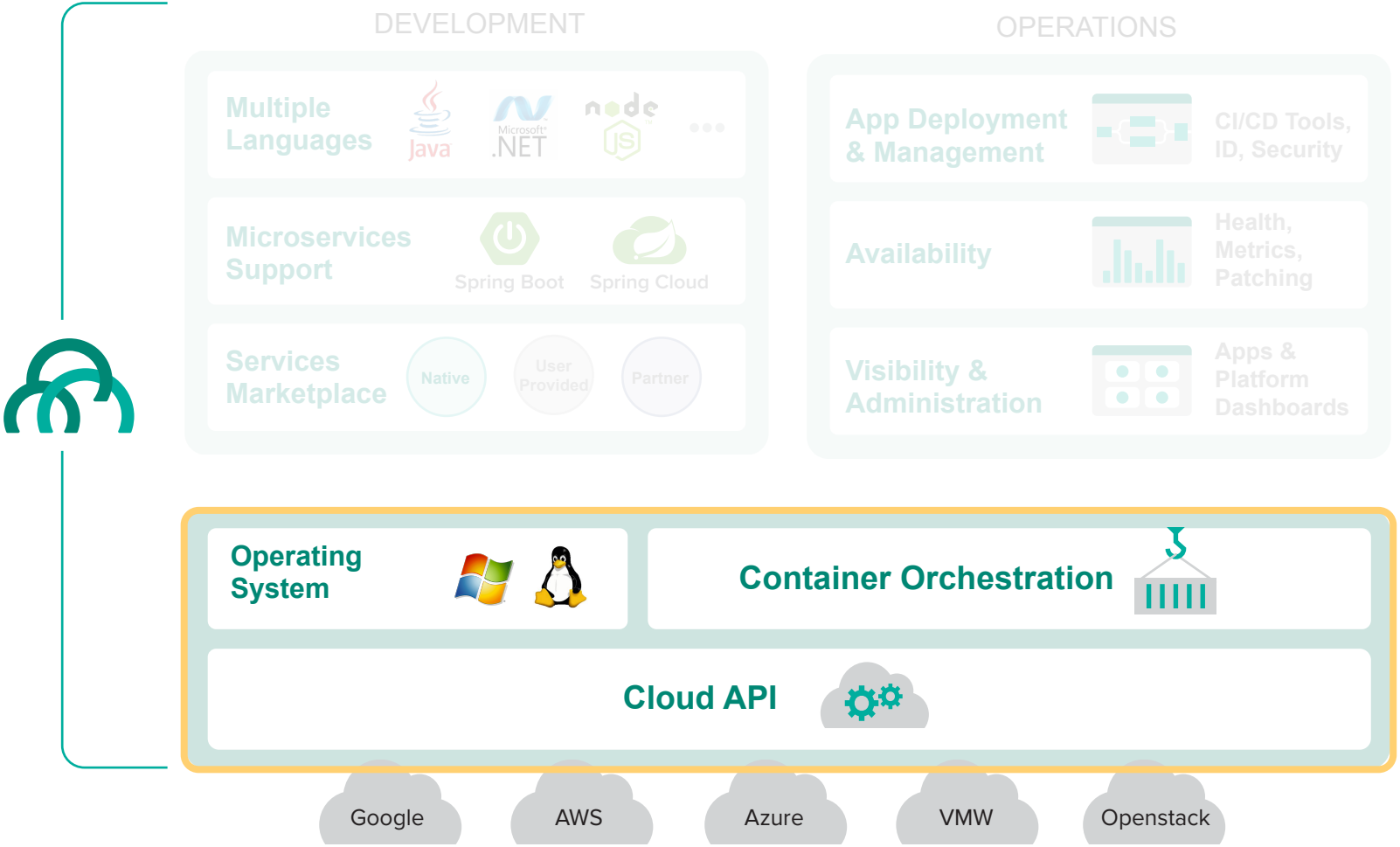
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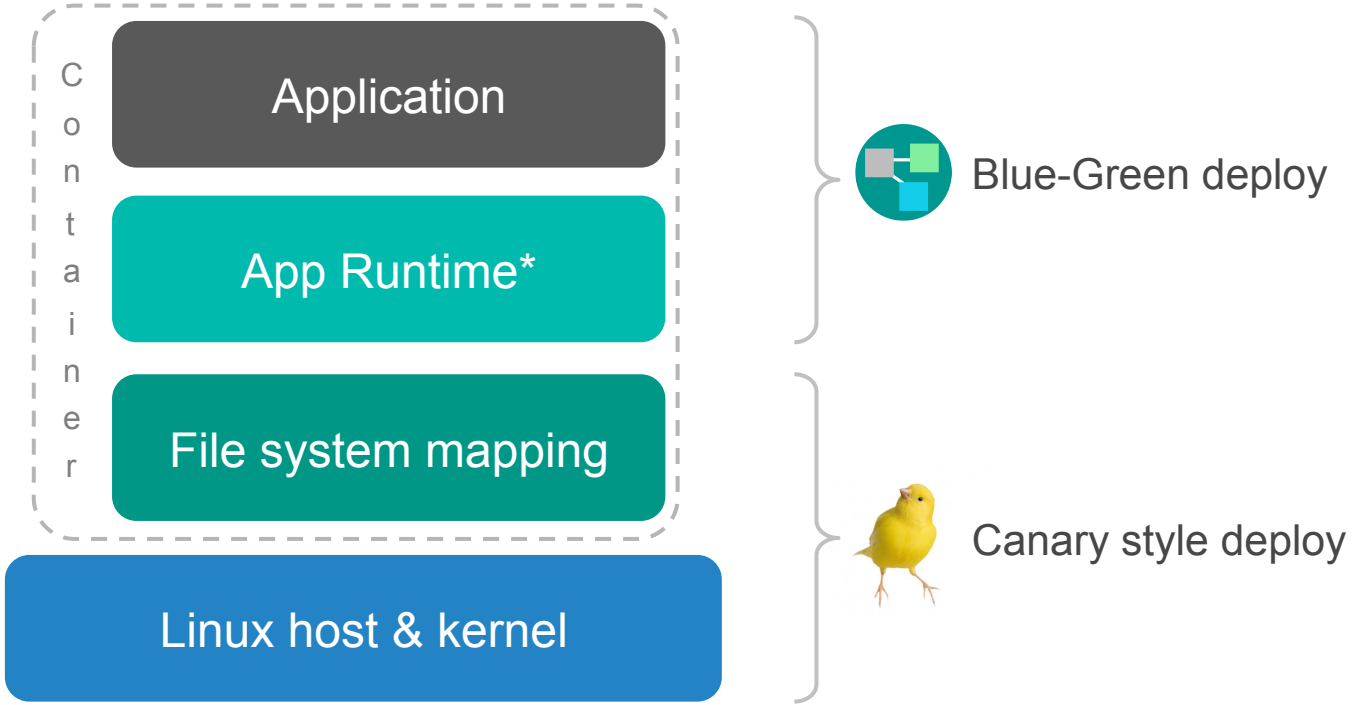
Each Layer Upgradable with No Downtime



* e.g. Embedded webserver, app configurations, JRE, agents for services packaged as buildpacks

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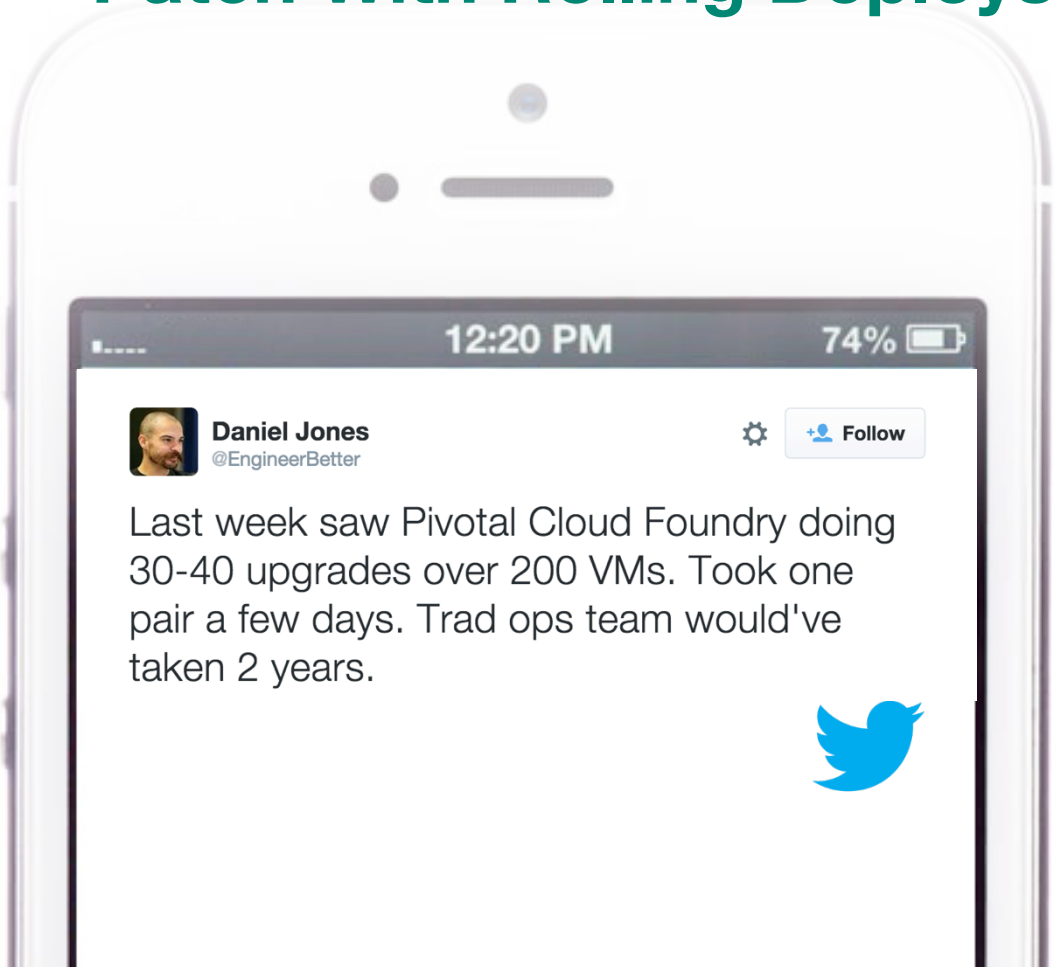
Patch With Rolling Deploys



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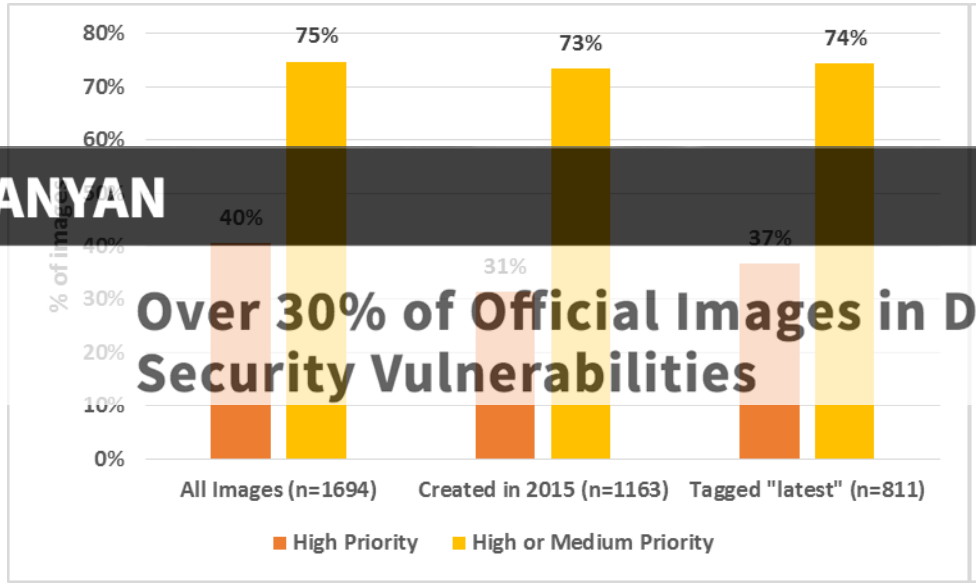
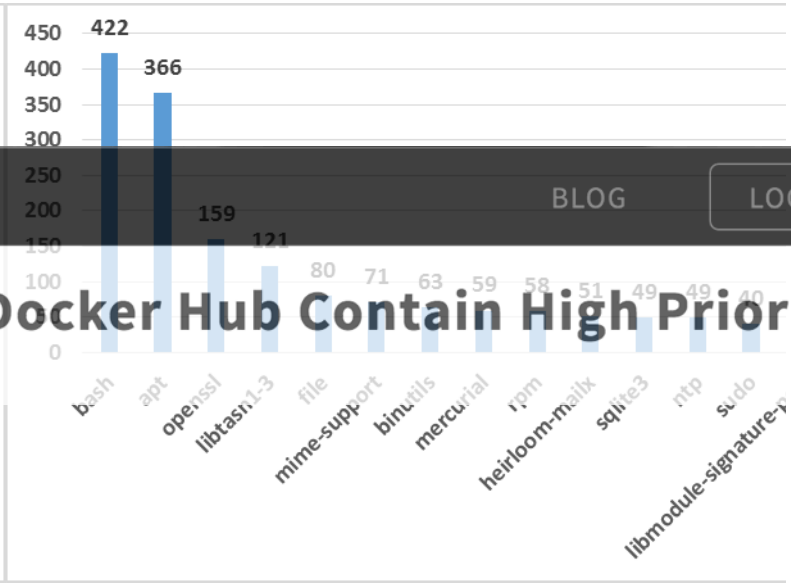
Vulnerabilities in Docker images





BANYAN

BLOG

LOG IN

Over 30% of Official Images in Docker Hub Contain High Priority Security Vulnerabilities

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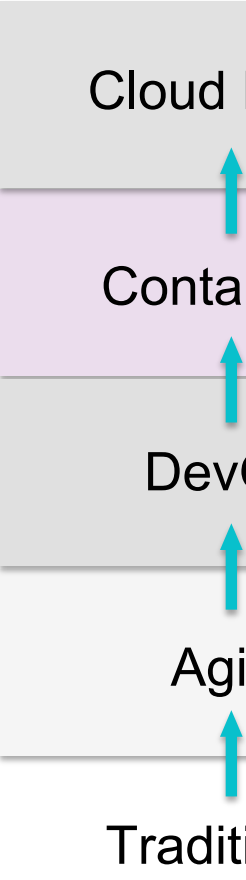
Improve Enterprise Security Culture

- Makes it easier to do the right things
- Prevents vulnerabilities due to
  - Leaked/misused credentials
  - Misconfigured/Unpatched software
  - Slow & rigid processes

Platform Trust

- Repave, Repair, Rotate - more secure architecture
- Zero downtime deployments and upgrades
- Explicit, known dependencies
- Homogeneity in the environment, no drift
- Combined CVE / vulnerability management
- Federated login with enterprise directories
- Control access to services and other resources
- Enforce policies (server, runtime, libraries, etc.)
- IPSec on every network segment
- Custom monitoring agents
- (Soon) runC integration for AppArmor and user namespaces

App Modernization



- Believer in opinionated platforms, enforcing cloud-native design
- Shipping microservices with full CI/CD, automated lifecycle management
- Struggling with modernizing applications, reskilling

- Believer in reproducible builds, operational visibility, open-source
- Shipping a container runtime, microservices, automated provisioning
- Struggling with adhoc operations, manual CI/CD, unintegrated tools, curating OSS

- Believer in automation, opinionated software, microservices, 12 Factor
- Shipping API-first applications,
- Struggling with adhoc operations, lack of tooling and monitoring, security

- Believer in agile, speed to market, software as a differentiator
- Shipping greenfield projects in public cloud because on-premise is too slow
- Struggling with CI/CD, provisioning environments, lack of operational visibility

- Believer in IT as a cost center, large projects, customizing off-the-shelf software
- Shipping completed software projects
- Struggling with failed projects, long lead times, business advantages of software

Modernization Strategies

Evaluate your application portfolio, which apps are under active development, and the cost/benefit of refactoring an app to a 12 Factor design.

A. Rehost 12 Factor apps

B. Refactor/rebuild app to 12 Factor and containerize

C. Refactor/rebuild app to BOSH virtual machine

D. Large scale rearchitecture for service and data decomposition

Modernize with microservice components and integrate legacy apps via APIs.
Professional service options for knowledge transfer, app evaluation and delivery.

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Rehost, Refactor & Rearchitect Strategies

Traditional App Environment


Load Balancer


Web Server


App Server


Database


ERP

Platform Runtime


API Gateway


Microservice App


12 Factor App

BOSH VMs


App Server

Backing Services

Database


Dynamic Router


Service Discovery

Off Platform


ERP

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Evaluate Your Microservices Competency

Rapid Provisioning

Fast Deployments

DevOps Culture

Basic Monitoring

- Martin Fowler


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Transforming How The World Builds Software