Free Signup: www.cloudfoundry.com, code: **openstack2013**

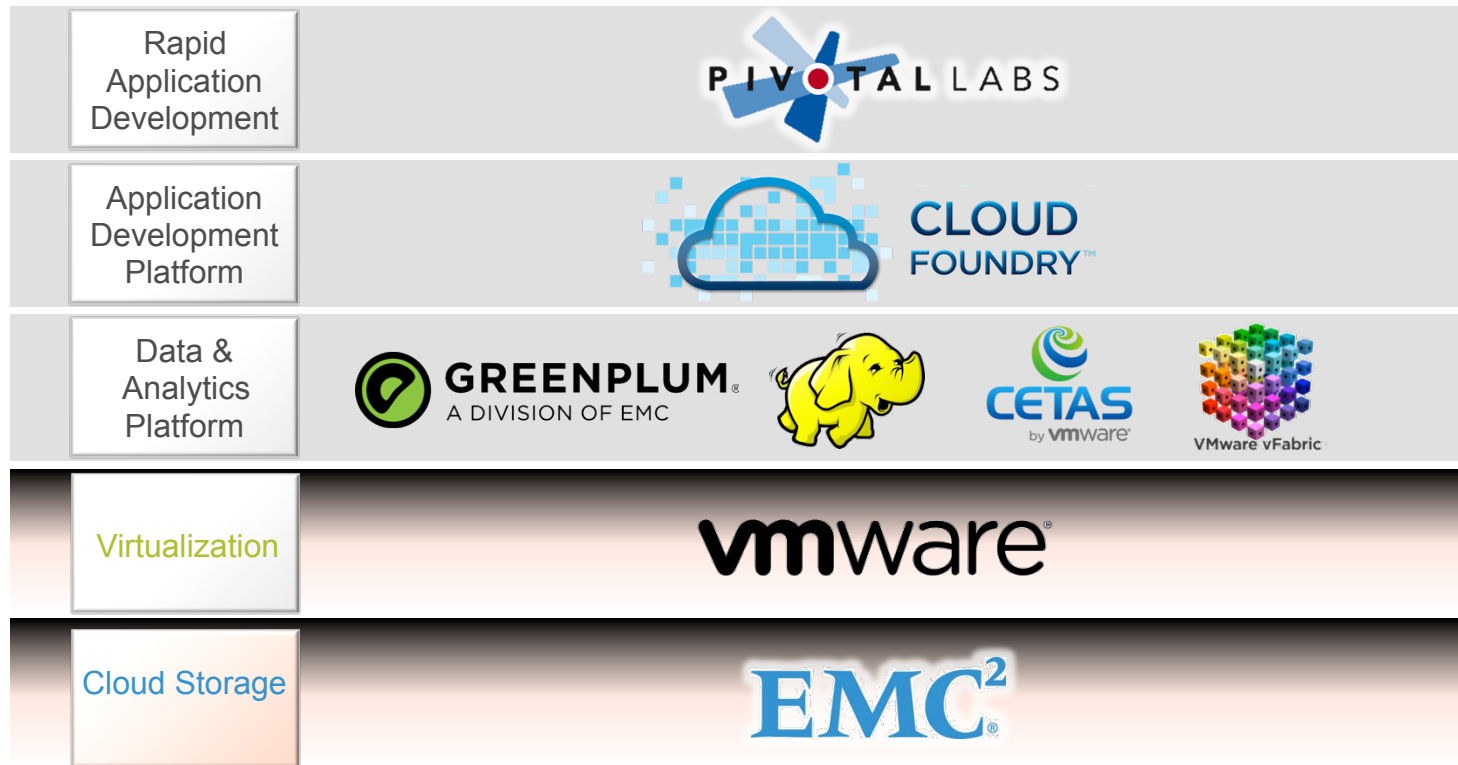# Cloud Foundry and OpenStack

Ferran Rodenas, Dekel Tankel
Cloud Foundry, Pivotal

frodenas@vmware.com , twitter: @ferdy
dekel@vmware.com, twitter: @dekt
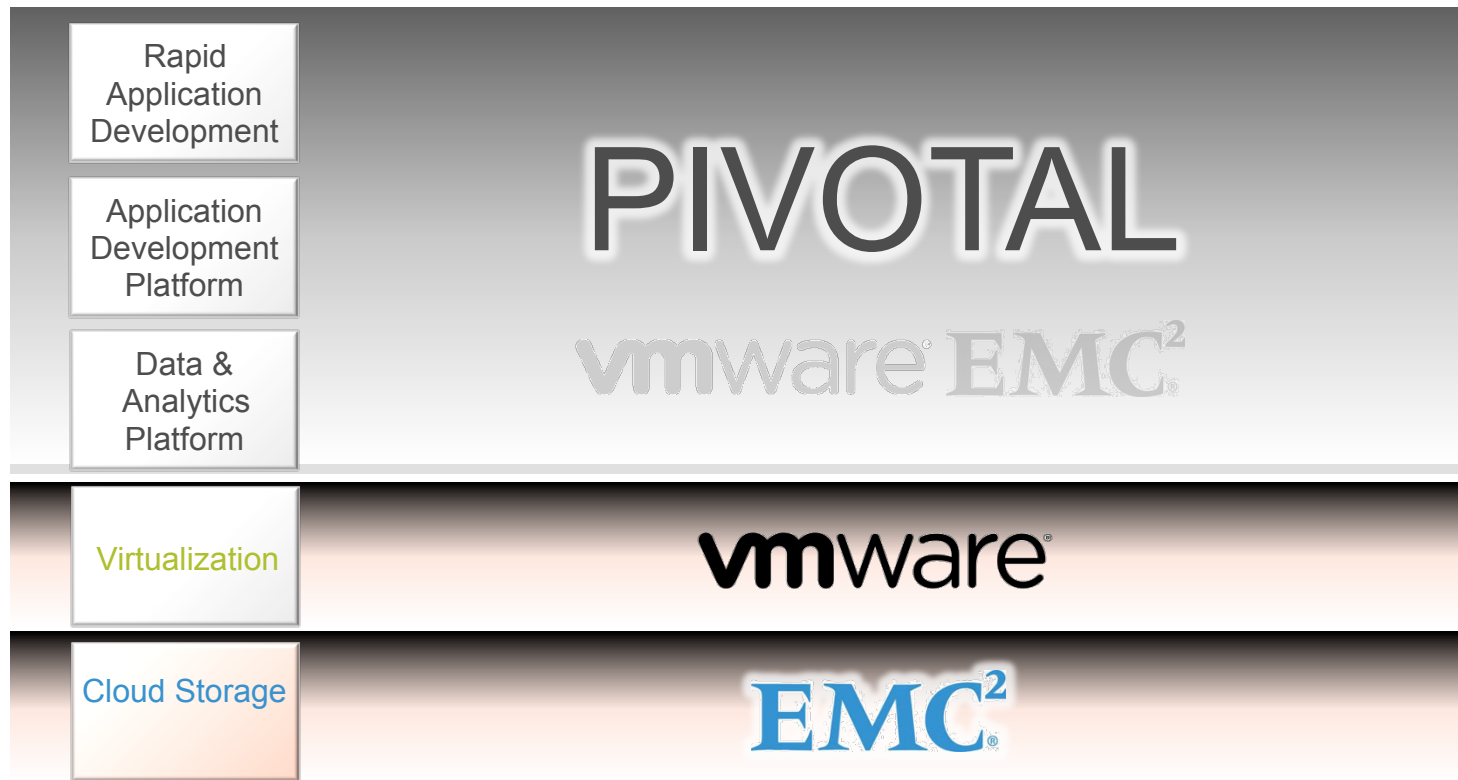
OpenStack Summit, April 2013

Pivotal

Pivotal – A New Platform for a New Era

Rapid Application Development	PIVOTAL LABS
Application Development Platform	CLOUD FOUNDRY™
Data & Analytics Platform	GREENPLUM A DIVISION OF EMC · CETAS by vmware · VMware vFabric
Virtualization	vmware
Cloud Storage	EMC²

Pivotal

Pivotal – A New Platform for a New Era

Rapid Application Development	
Application Development Platform	**PIVOTAL**
Data & Analytics Platform	vmware® EMC²
Virtualization	**vm**ware®
Cloud Storage	**EMC²**

Pivotal

CLOUD FOUNDRY™

The industry's open platform as a service

Deploy and scale applications in seconds on your choice of clouds

Productivity, Scalability, Extensibility, Openness
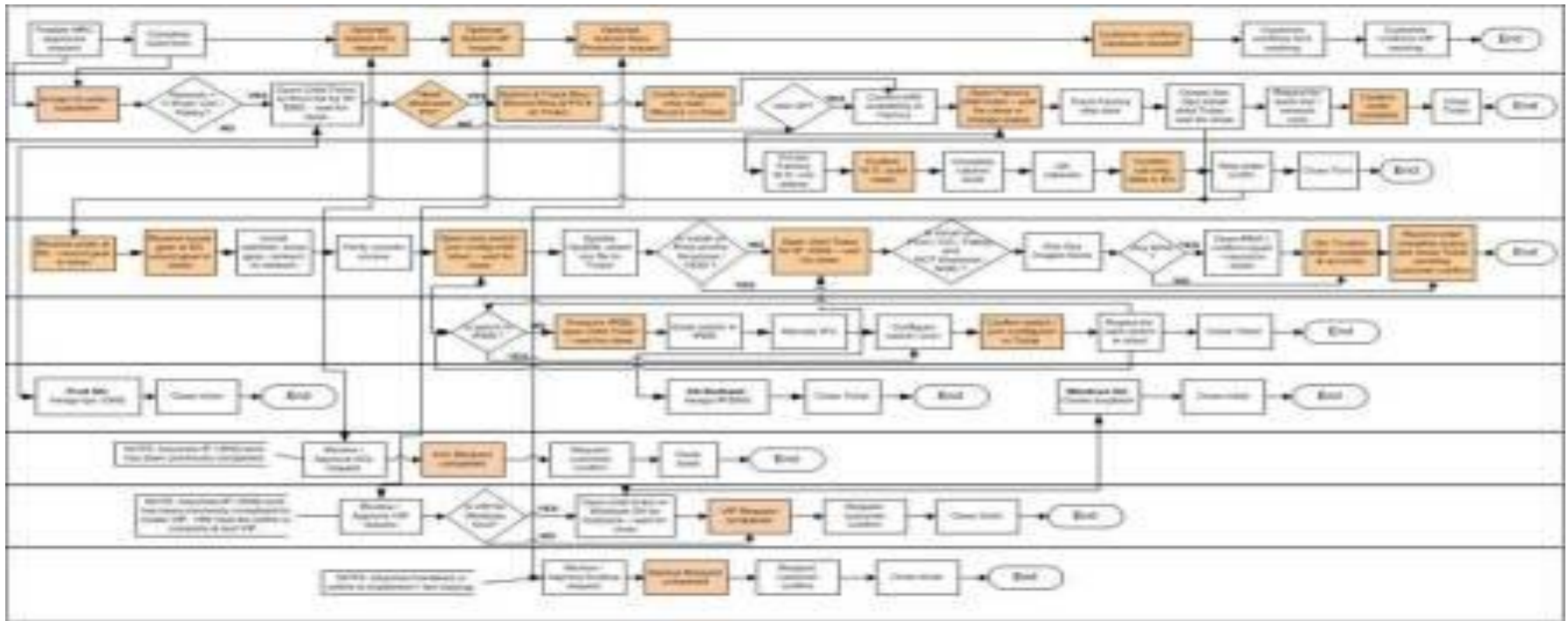
Pivotal

Platform as a Service (aka PaaS)

Empower developers to build great apps, not plumbing infrastructure

- An abstraction layer on top of IaaS

- Application is the unit of deployment
  - not VMs, AppServers, etc..

- Separate the concerns of AppDev & Operations
  - Databases, Messaging, Load-balancing etc.. "aaS"

- Eliminate bottleneck of provisioning & deployment

- Make full use of investments in the "Cloud"
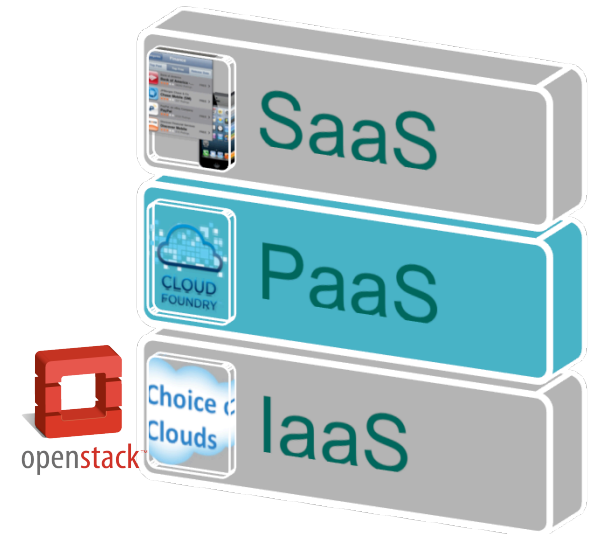
Pivotal

From Months to Deploy Applications…

* An actual application provisioning/update flow in a large enterprise. Image is blurred for privacy reasons

Pivotal

To Less than a Day!

deploy <my cloud>

target <my cloud>

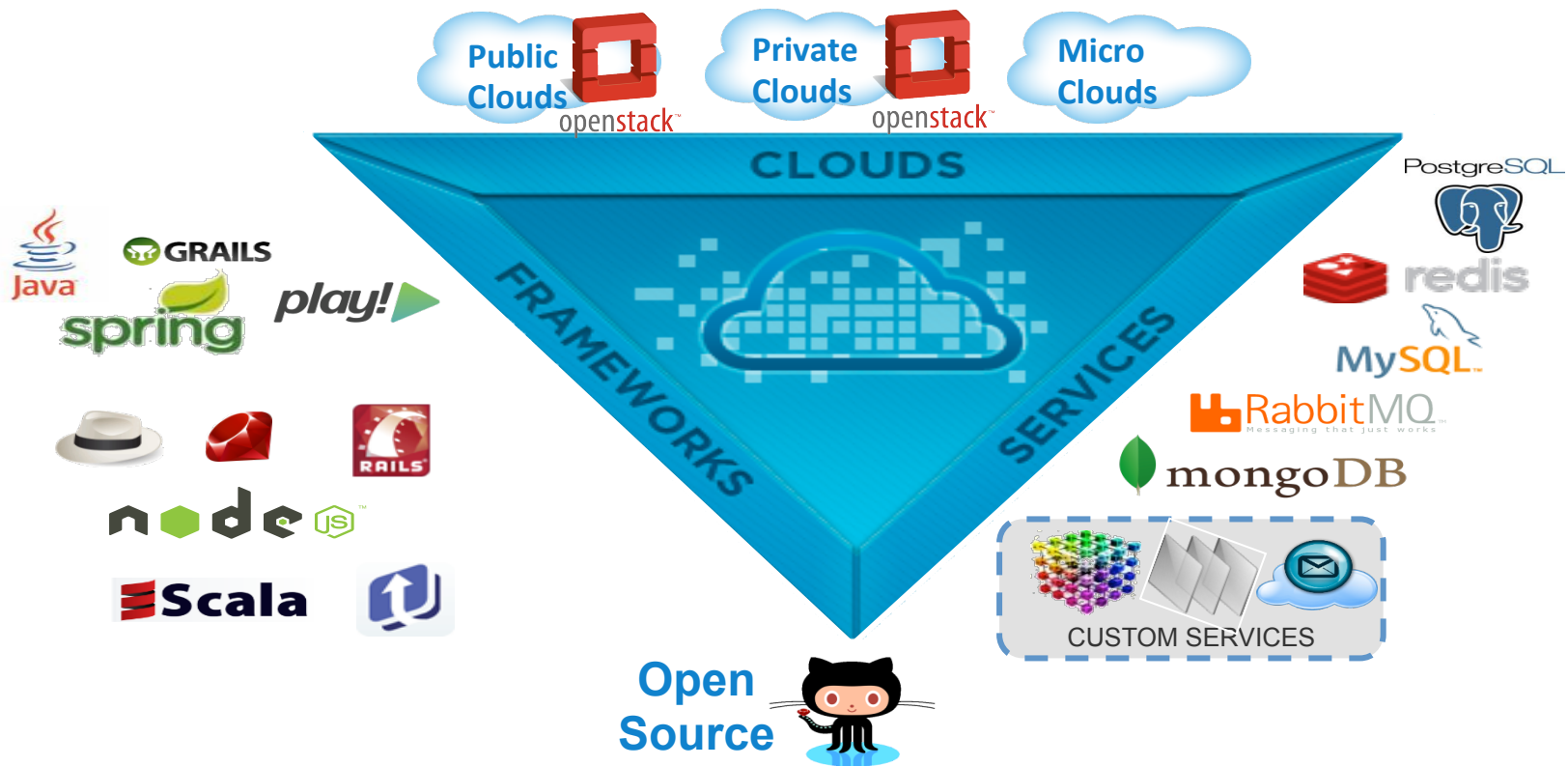*push <my app>*

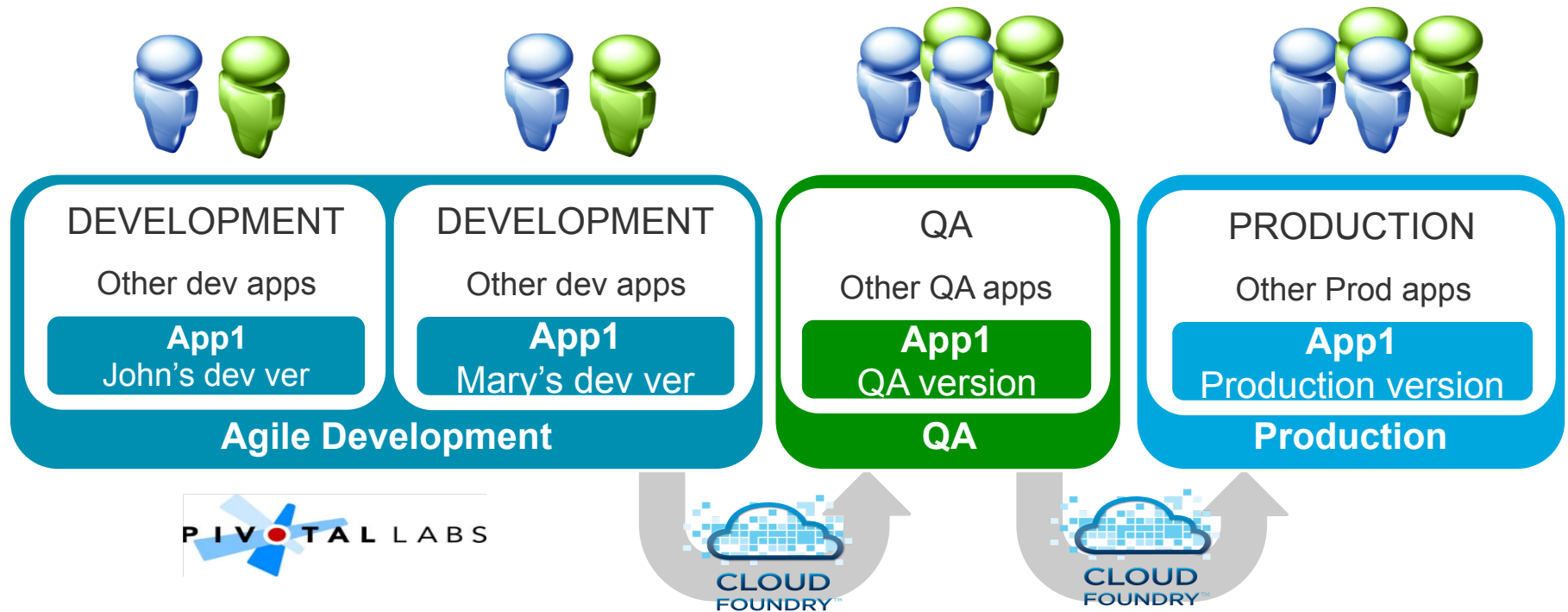*bind <my services>*

instances <my app> +100

add_capacity <my cloud>

CLOUD FOUNDRY™

Operator
Developer

Pivotal

Cloud Foundry Open PaaS

"From Idea to Production in a Day"

DEVELOPMENT	DEVELOPMENT	QA	PRODUCTION
Other dev apps	Other dev apps	Other QA apps	Other Prod apps
App1 John's dev ver	**App1** Mary's dev ver	**App1** QA version	**App1** Production version
Agile Development		**QA**	**Production**

PIVOTAL LABS

CLOUD FOUNDRY™

CLOUD FOUNDRY™

No code or configuration changes!

Pivotal

Why Cloud Foundry?

- Developer productivity
  - On-demand agile deployment and processes
  - High productivity frameworks and services

- Raise top line growth
  - Deliver social, mobile and modern web apps faster
  - Engage developers to build richer apps on your platform

- Lower operational costs
  - Standardize and automate the application lifecycle
  - Abstract middleware and infrastructure to reduce complexity

Pivotal

Selected Customers

Internal IT: "From Idea To Production In One Day"

Next generation applications platform (US)

Online donations platform (UK)

eBay's next generation ecommerce platform

Global ecommerce platform (Japan)

Cloud^N platform for enterprises (Japan)

Pivotal

Broad Industry investment

**Instances &
Multi-Cloud
Providers**

**Polyglot
Frameworks
and
Services**

**Add-On
Marketplace
And
Partnerships**

Pivotal

12

Significant Community Adoption – Dev and "DevOps"

- Hundred of thousands of active Cloud Foundry users

- Thousands of members on Dev and "DevOps" mailing lists

- Significant adoption for Java and Spring tools

- 7k+ contributions and followers on the Github repositories

- 100k+ downloads of Cloud Foundry software and tools

- 140+ outreach events with thousands of attendees worldwide

- 60+ technical integrations/partners in 2013

- 30+ integrators and consultants installing and customizing apps
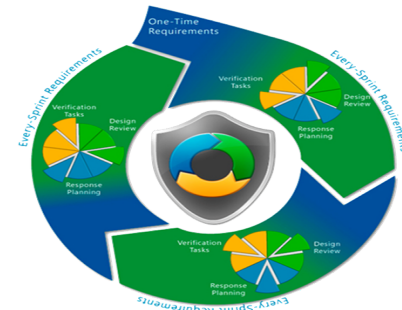
Pivotal

Popular Use-Cases

Mobile/Social
refresh
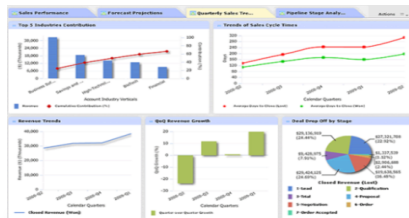
App modernization

Dev-test-trial

Agile transformation

Multiple Delivery Channels

- Your Datacenter / Private Clouds
  - Cloud Foundry Lighthouse Program
  - Packaged product coming soon

- Hosted / Public Clouds
  - CloudFoundry.com
  - Other Cloud Foundry public PaaS via partners

- Developer Laptop
  - Micro Cloud Foundry free developer tool

Public Clouds   **Private Clouds**   **Micro Clouds**

Multi-Cloud, No App Changes!

Pivotal

Cloud Foundry Logical View
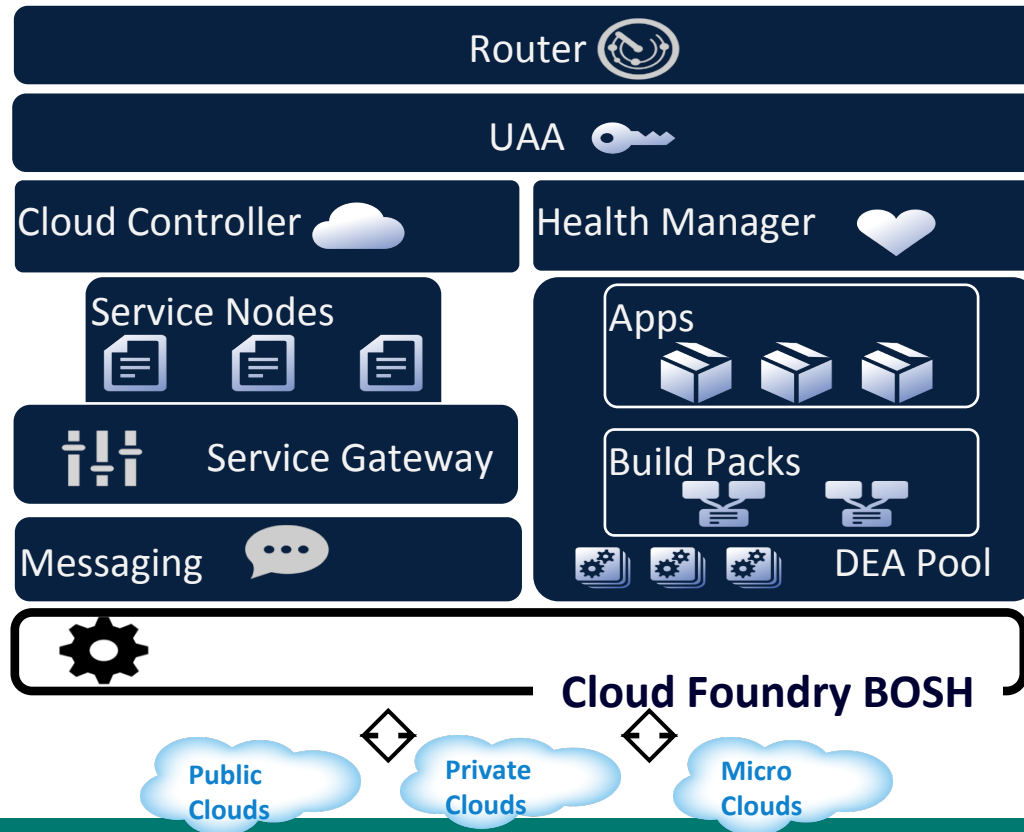
Running Cloud Foundry on OpenStack

OpenStack interface for Cloud Foundry BOSH

Pivotal

Production Grade Cloud Foundry Clusters

- 50 – 5,000 VMs

- 40+ unique node types

- 75+ unique software packages

- 24x7x365 non-stop downtime

- 2x/week cf.com updates

- No-downtime deployments

- Reliable, robust, repeatable deployments, update

- Small teams manage many instances

cloudfoundry.com

production, staging, stress, qa, dev

Pivotal
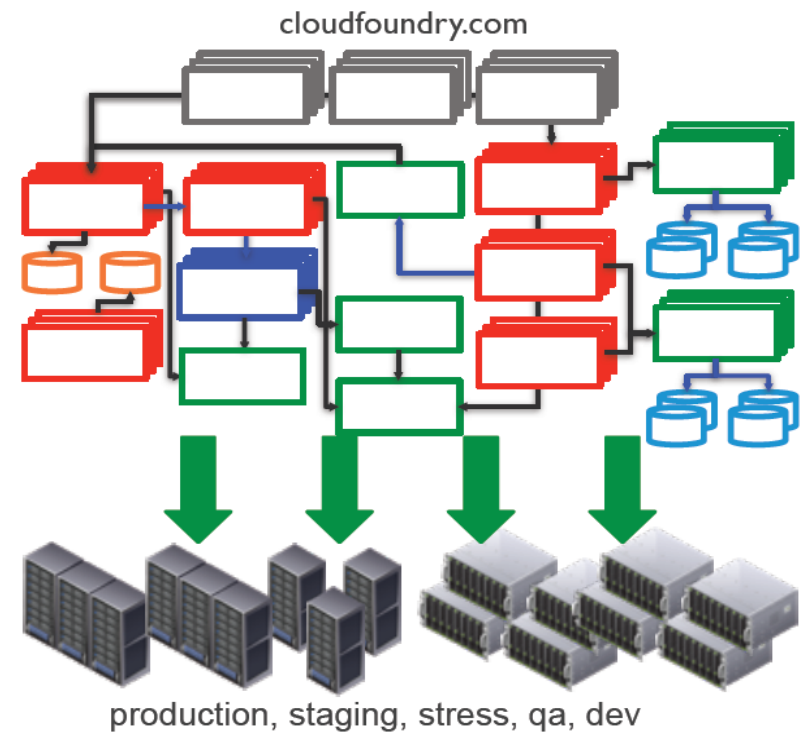
Cloud Foundry BOSH

- Tool chain for release engineering, deployment & lifecycle management

  - Optimized for large-scale distributed services

- Enable the systematic and prescriptive evolution of services

  - Automates a variety of cloud infrastructures

  - Service updates with consistent results <u>and minimal to no down time</u>

- Facilitates operation of any large-scale service on any infrastructure

  - Proven in the course of operating CloudFoundry.com

  - Support for AWS, OpenStack, vSphere and vCloud

Pivotal

BOSH Components

- Source / blobs

- Packages

- Jobs

- Releases

- Stemcells

- Deployments

Release

Job

Package

Source / Blob

Pivotal
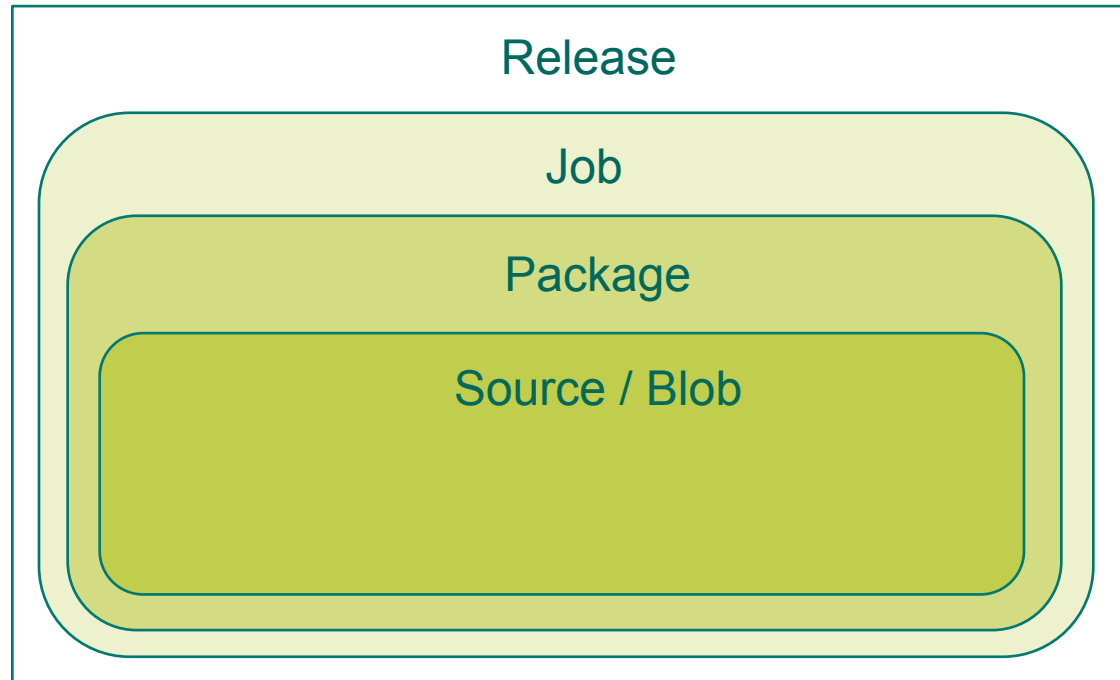
Bosh under the hood

- CLI
- Director
- Blobstore
- Workers
- Message Bus
- Health Monitor
- IaaS CPI
- Agents

IaaS Neutral

vSphere: battle tested implementation
vCloud Director: code completed

AWS: battle testing in progress

Cloud Foundry BOSH

Cloud Provider Interface
(CPI)

OpenStack: tested in small environments
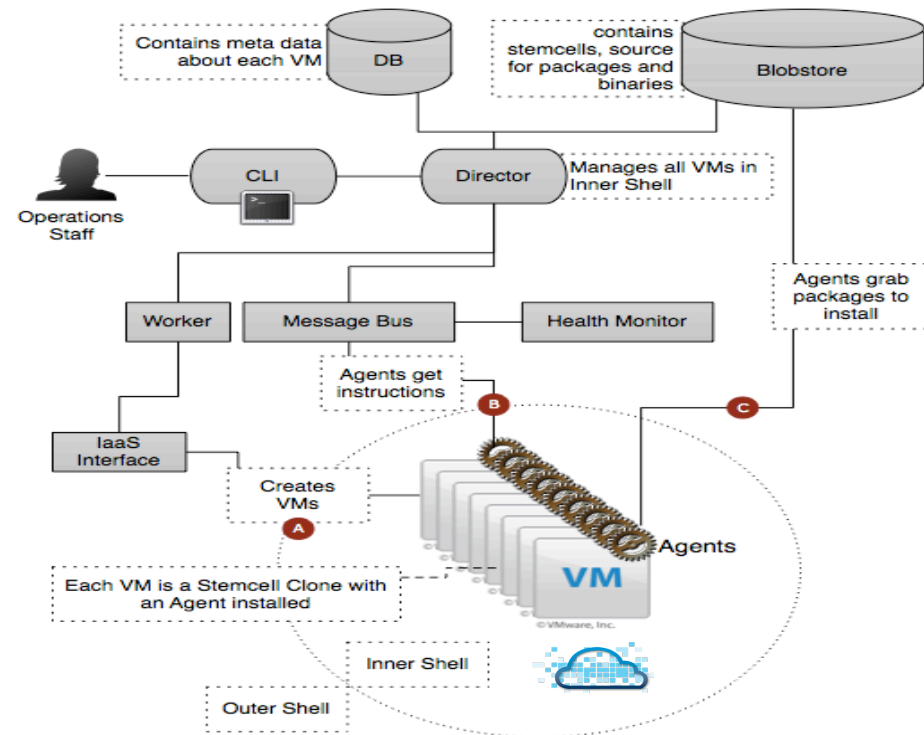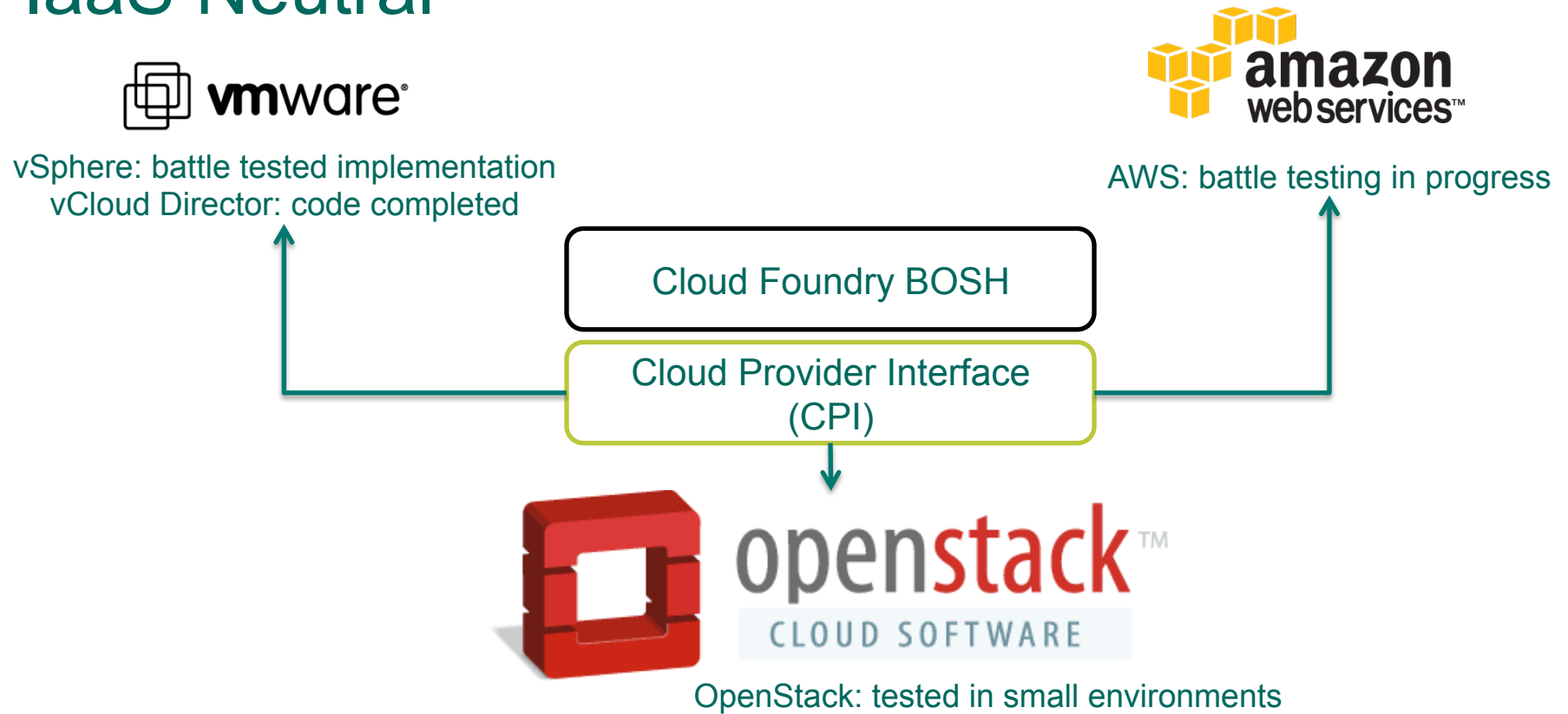
Cloud Provider Interface

Stemcell
```
create_stemcell(image, cloud_properties)
delete_stemcell(stemcell_id)
```

OpenStack Glance API

VM
```
create_vm(agent_id, stemcell_id, resource_pool,
          networks, disk_locality, env)
delete_vm(vm_id)
reboot_vm(vm_id)
configure_networks(vm_id, networks)
```

OpenStack Nova API

OpenStack Quantum API

Disk
```
create_disk(size, vm_locality)
delete_disk(disk_id)
attach_disk(vm_id, disk_id)
detach_disk(vm_id, disk_id)
```

OpenStack Cinder API

OpenStack Swift API

Pivotal

Sample Deployment

```
---
name: wordpress
director_uuid: 5960edfe-5cf4-4b70-95fa-728a52f12b56 # CHANGE: Director UUID

release:
  name: wordpress
  version: latest

compilation:
  workers: 3
  network: default
  reuse_compilation_vms: true
  cloud_properties:
    instance_type: m1.small

update:
  canaries: 1
  canary_watch_time: 3000-120000
  update_watch_time: 3000-120000
  max_in_flight: 4
  max_errors: 1
```

https://github.com/cloudfoundry/bosh-sample-release/tree/master/examples

Pivotal

Sample Deployment

```
networks:
  – name: floating
    type: vip
    cloud_properties: {}
  – name: default
    type: manual
    subnets:
      – name: private
        range: 10.0.1.0/24
        gateway: 10.0.1.1
        reserved:
          – 10.0.1.2 – 10.0.1.9
        static:
          – 10.0.1.10 – 10.0.1.20
        cloud_properties:
          security_groups:
            – default # CHANGE: Security Group
          net_id: 2438bca2–24fa–450f–ae7b–ec2e53b51984 # CHANGE: OpenStack Quantum network UUID
```

https://github.com/cloudfoundry/bosh-sample-release/tree/master/examples

Sample Deployment

```
resource_pools:
  - name: common
    network: default
    size: 4
    stemcell:
      name: bosh-stemcell
      version: latest
    cloud_properties:
      instance_type: m1.small

jobs:
  - name: mysql
    template: mysql
    instances: 1
    resource_pool: common
    networks:
      - name: default
        default: [dns, gateway]
        static_ips:
          - 10.0.1.10 # CHANGE: Static IP 1
```

https://github.com/cloudfoundry/bosh-sample-release/tree/master/examples

Pivotal

Sample Deployment

```
properties:
  env:

  mysql:
    address: 10.0.1.10 # CHANGE: Static IP 1
    password: rootpass

  nfs_server:
    address: 10.0.1.11 # CHANGE: Static IP 2
    network: 10.0.1.12/255.255.255.255 # CHANGE: Static IP 3
    idmapd_domain: novalocal

  wordpress:
    admin: foo@bar.com
    servers:
      – 10.0.1.12 # CHANGE: Static IP 3
    servername: 192.168.1.226 # CHANGE: Floating IP 1
    db:
      name: wp
      user: wordpress
      pass: w0rdpr3ss
```

https://github.com/cloudfoundry/bosh-sample-release/tree/master/examples

Pivotal

Dev Workflow

```
bosh target dev  ───►  bosh deployment
                        ~/dev.yml
                            │
                            ▼
                        write code
                        ▲        ╲
                       ╱          ▼
                 run tests    bosh create
                  ▲   ╲        release
                 ╱     ╲          │
            write      ▼          ▼
            git    bosh deploy ◄── bosh upload
            commit                 relase
              │
              ▼
```

Pivotal

QA Workflow

```
bosh target qa  ───────►  bosh deployment
                          ~/qa.yml
                              │
                              ▼
bug report to devs  ◄──┐   git pull  ─────┐
                       │                   ▼
bosh create       ◄────┤   run tests   bosh create
release --final        │      ▲         release
                       │      │            │
                       │   bosh deploy ◄── bosh upload
git commit  ───────────┘                  relase
    │
    ▼
```

Pivotal

Prod Workflow

```
bosh target prod  ──────▶  bosh deployment
                           ~/prod.yml
                                │
                                ▼
bug report to devs         git pull  ──────▶  bosh upload
        ▲                     ▲                  release
        │                     │                    │
        │                 run tests                │
        │                     ▲                    │
        │                     │                    ▼
      donne!  ◀───  bosh deploy  ◀───────────
```

bosh target prod

bosh deployment ~/prod.yml

bug report to devs

git pull

run tests

bosh upload release

donne!

bosh deploy

Pivotal

What's Next?

- Free Signup:
  - www.cloudfoundry.com, promo code: **openstack2013**

- Mailing lists:
  - https://groups.google.com/a/cloudfoundry.org/group/bosh-dev
  - https://groups.google.com/a/cloudfoundry.org/group/bosh-users
  - https://groups.google.com/a/cloudfoundry.org/group/vcap-dev

- Browse, fork, contribute, learn:
  - https://github.com/cloudfoundry
  - http://cloudfoundry.github.io/

Pivotal

Free Signup: www.cloudfoundry.com, code: **openstack2013**

Pivotal

A NEW PLATFORM FOR A NEW ERA

frodenas@vmware.com , twitter: @ferdy

dekel@vmware.com, twitter: @dekt

OpenStack Summit, April 2013

CLOUD
FOUNDRY™