Pivotal Cloud Foundry®

Elastic Runtime

Architecture

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Overview

- After completing this lesson, you should be able to:
  - Understand what the Elastic Runtime does
  - Identify the function of several important Elastic Runtime components
  - Describe how an application is staged, started and run

Topics

- **Elastic Runtime Architecture**
- Staging
- Starting
- Running

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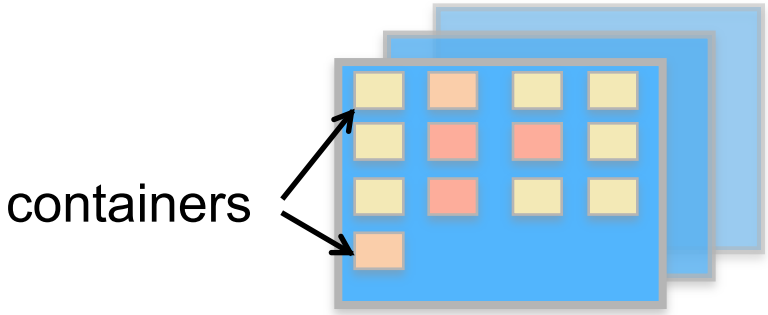
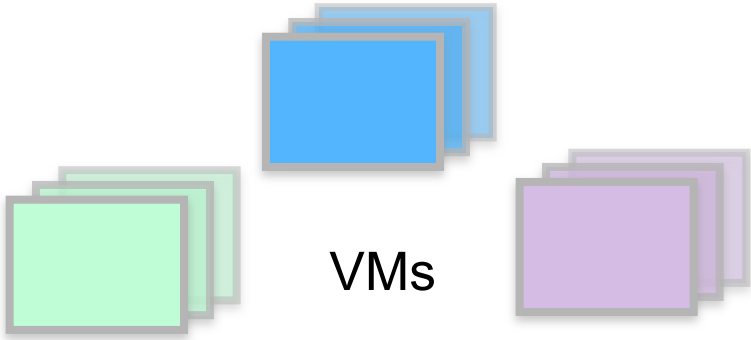
Elastic Runtime vs. BOSH

The Elastic Runtime is about managing distributed applications in **containers**



BOSH/Ops Manager is about managing distributed software on **VM** clusters



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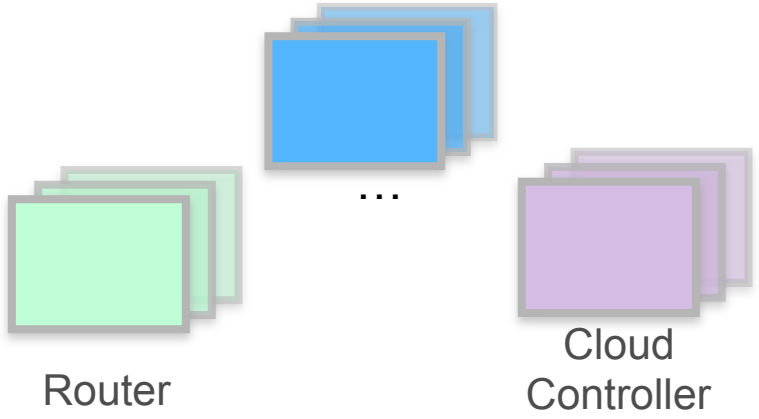
BOSH and Elastic Runtime

- The Elastic Runtime is an example of the distributed software that BOSH can manage
- The Elastic Runtime is a set of components/VMs used to run highly available, scalable applications in containers



components/VMs of Elastic Runtime

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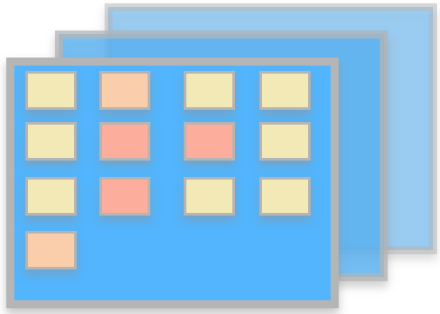
Where Apps Run: Cells and DEAs

- A VM that holds the containers for applications is called a Cell or a DEA
  - They are part of the Elastic Runtime
- DEAs (Droplet Execution Agents) are used for the pre-Diego Elastic Runtime
- Cells are used in Diego
  - Starting with CF 1.5
  - Diego is a rewrite of parts of the Elastic Runtime
    - Including DEAs



Cells or DEAs (VMs)

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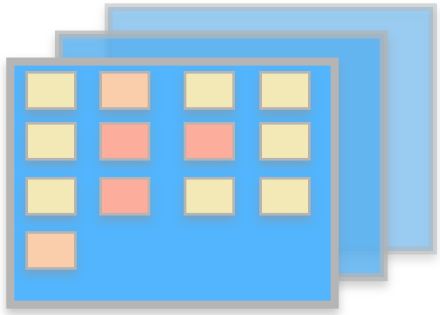
Garden

- The containers are managed by a runtime
  - For example, when an application instance is added, the runtime will create a Linux container
- **Pre-Diego:** container runtime manager on a DEA is called *Warden*
- **Diego**: runtime manager on a Cell is called *Garden*



Cells-
Containers Managed
by Garden

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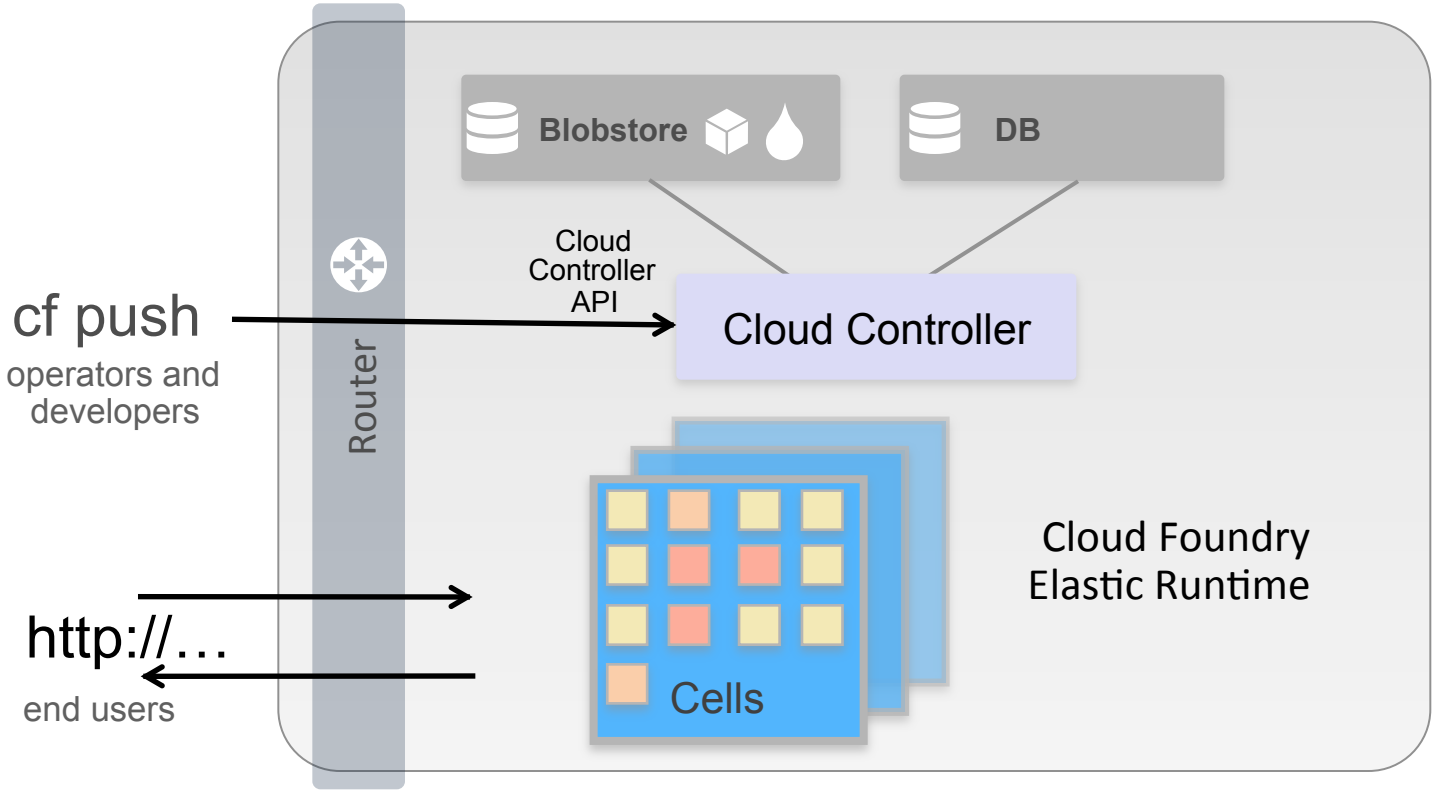
Simplified Cloud Foundry Elastic Runtime Architecture



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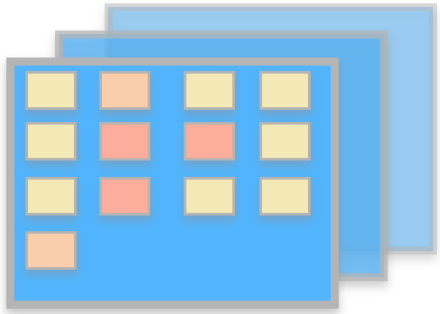
Application States

- Applications managed by the Elastic Runtime have three main states
  - Staging
  - Starting
  - Running



What is happening in the Elastic Runtime during each of these states? …

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Topics

- Elastic Runtime Architecture
- **Staging**
- Starting
- Running

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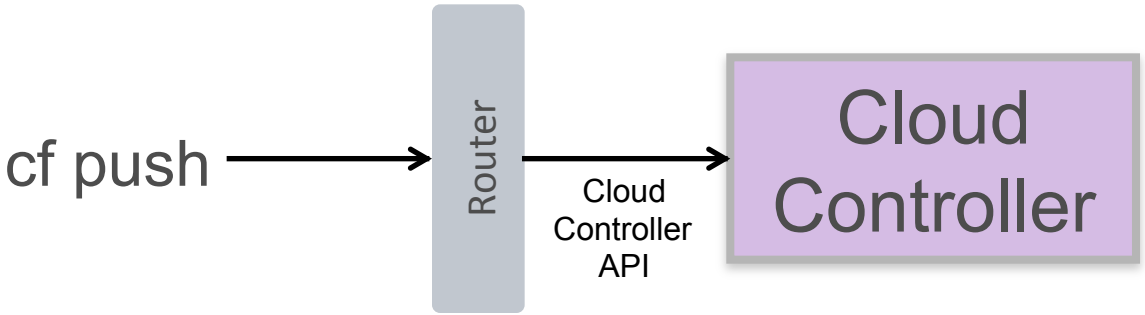
Cloud Controller

- When you run `cf push` from the CLI, you are calling the Cloud Controller API
- The cf CLI, Apps Manager and other clients call this API
- You can also call the API directly



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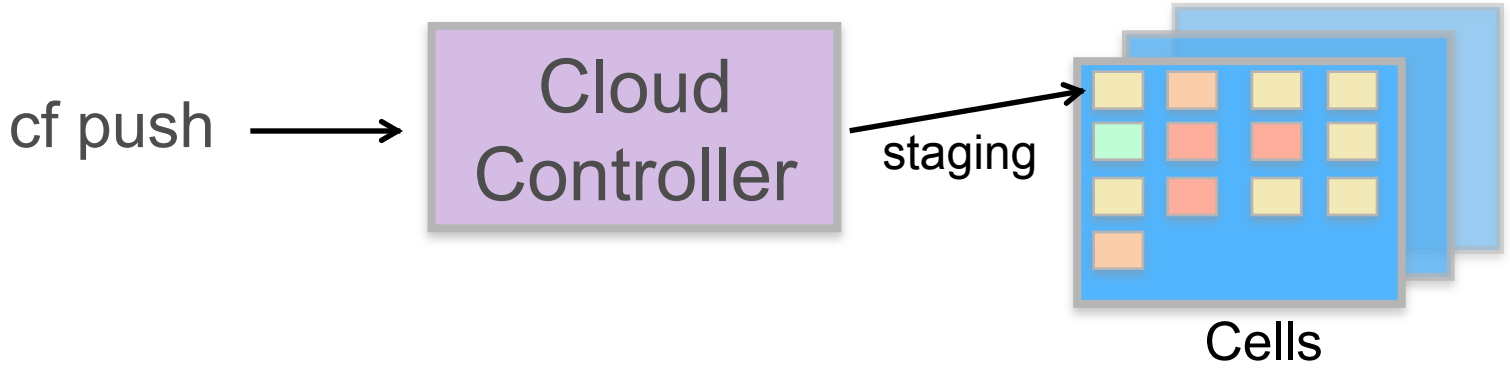
Staging

- **`cf push`** starts the process of **staging** the application
- Staging is done in one of the containers in a Cell
- Staging prepares the application to be quickly deployed and scaled on the platform
- The goal of staging is to produce a droplet…



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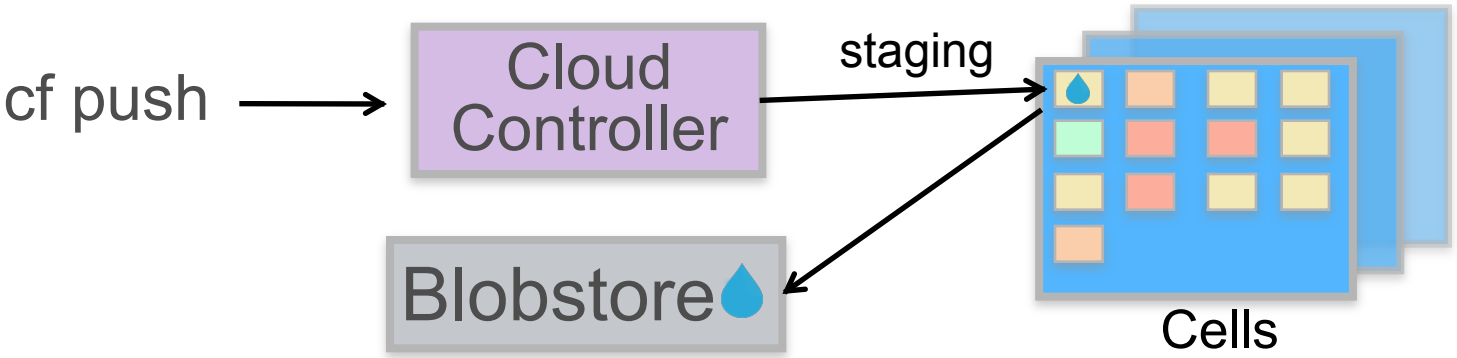
Droplet

- During staging, a **buildpack** takes all of the bits related to the application and produces a **droplet**
  - A droplet is an archived file such as a tarball
- The droplet is stored in the Elastic Runtime's **blobstore**
- The staging container is then destroyed



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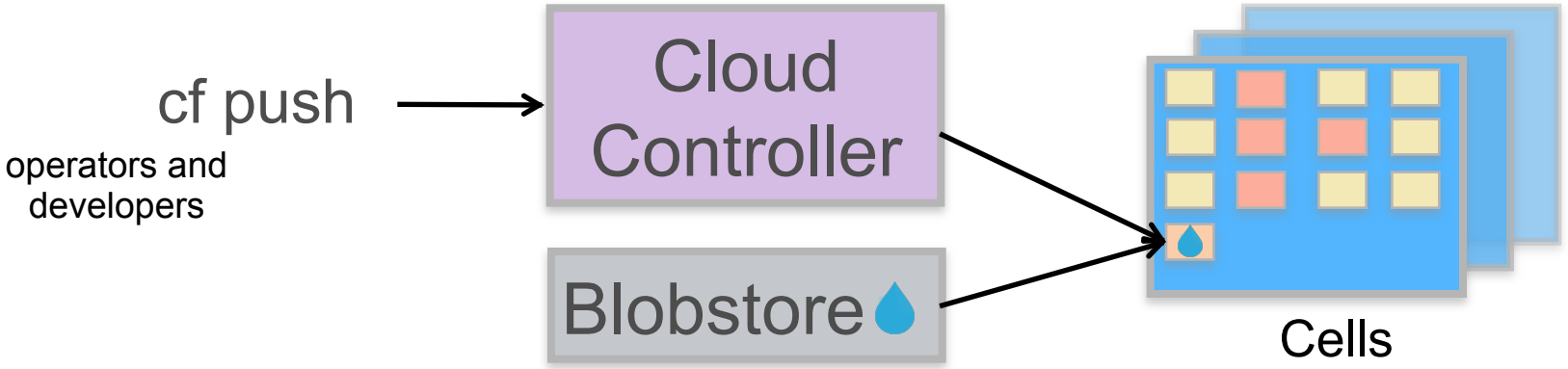
Topics

- Elastic Runtime Architecture
- Staging
- **Starting**
- Running

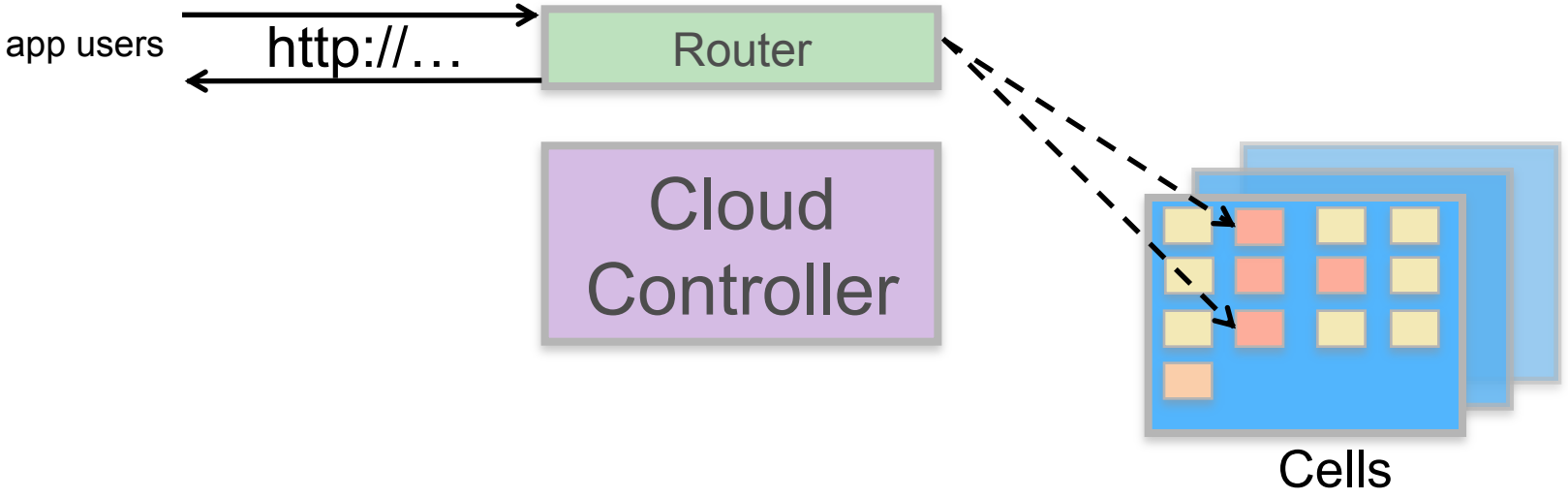
Starting

- Once the application is staged, it can be **started**
  - Starting is part of `cf push` by default
  - A droplet is copied from the blobstore into each container
- Very fast process – application instances can be scaled very quickly



Router

- Once the application is started, the **router** can route traffic to it
- The Cloud Controller is not involved in application requests



Topics

- Elastic Runtime Architecture
- Staging
- Starting
- **Running**

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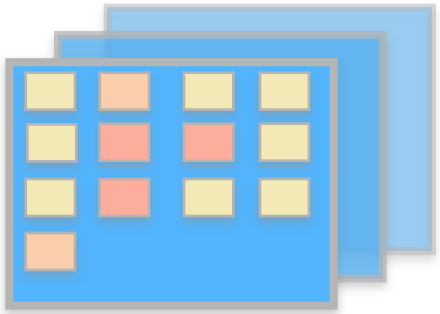
Running- Health Management

- Once an application is running, it is continuously being monitored
  - If an application instance dies, it is recreated
  - If an entire Cell or DEA dies, application instances are redistributed to other Cells/DEAs
- **Pre Diego:** the **health manager** performed this function
- **Diego:** this function is incorporated into **the Brain**



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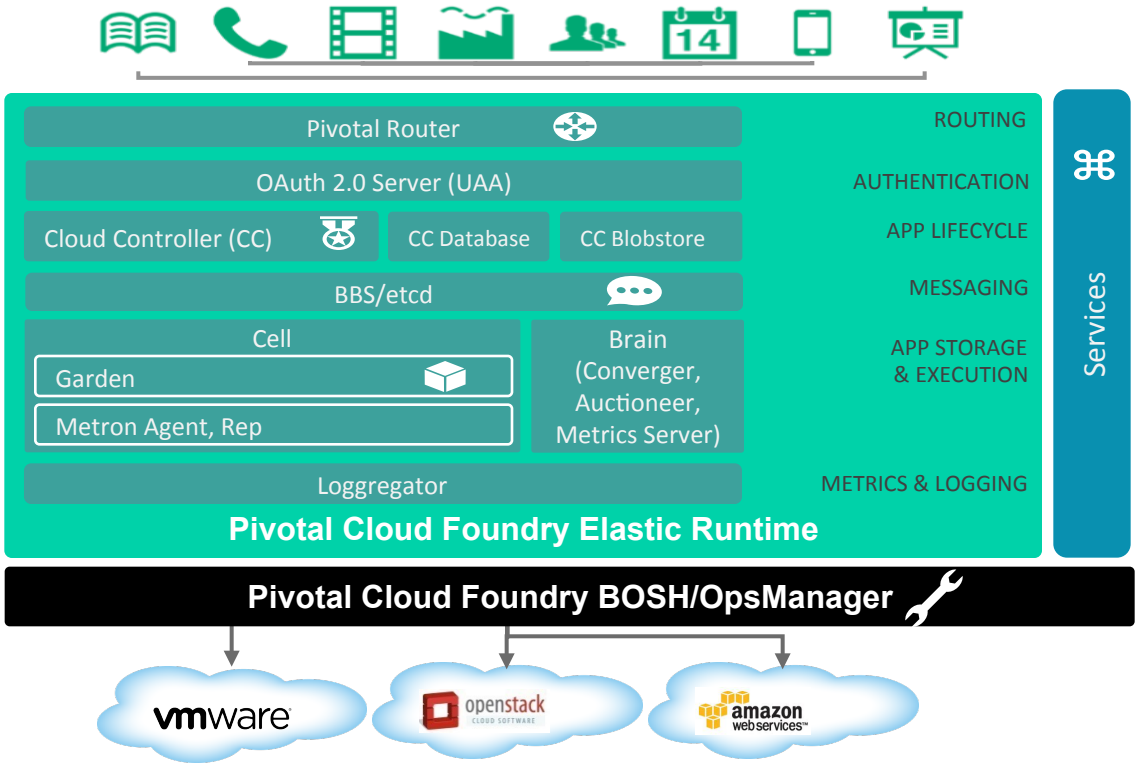
Elastic Runtime- The Big Picture



The Elastic Runtime contains approximately 20 unique VMs

Lab

Install the Elastic Runtime