

Elastic Runtime

Architecture

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

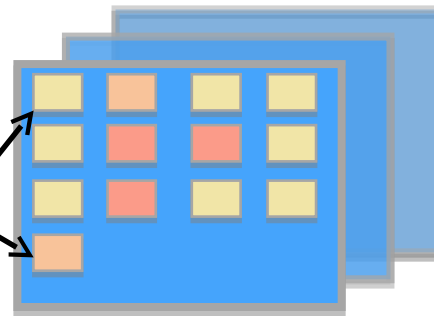
Topics

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

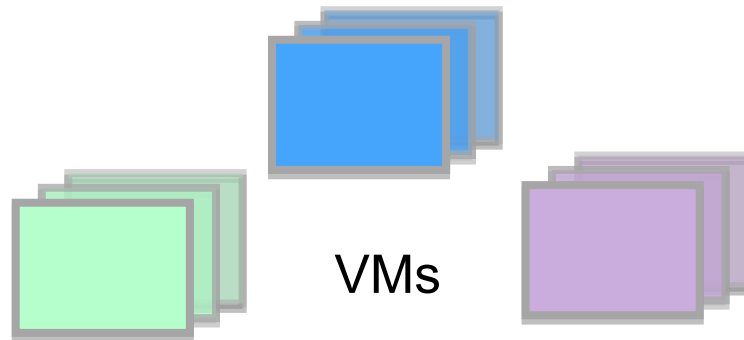
Elastic Runtime vs. BOSH

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

containers

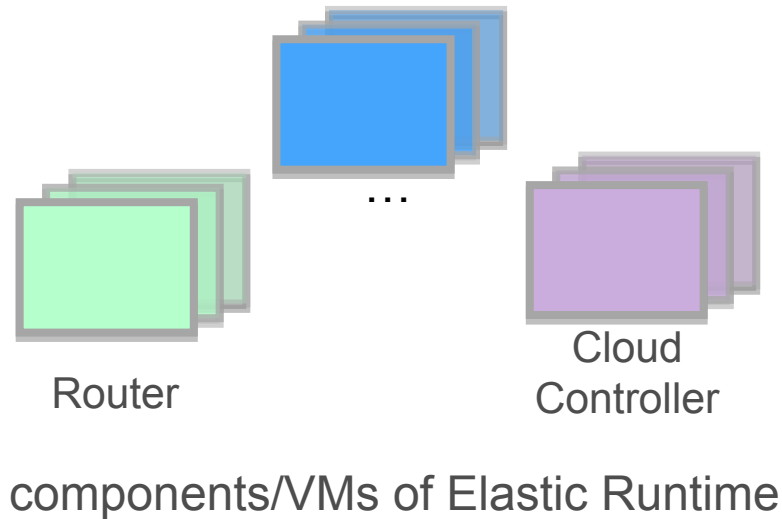


BOSH/Ops Manager is about managing distributed software on **VM** clusters



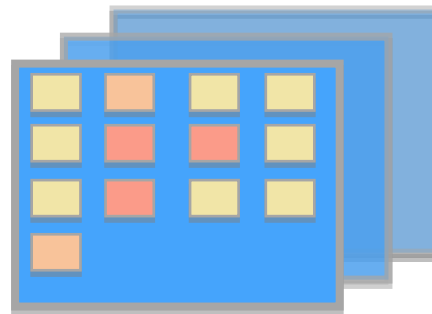
BOSH and Elastic Runtime

- 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



Where Apps Run: Cells and DEAs

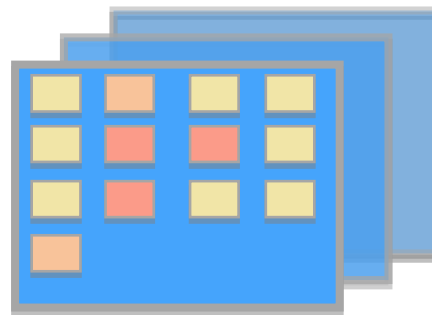
- A VM that holds the containers for applications is called a Cell or a DEA
 - They are part of the Elastic Runtime
- DEAs (Droplet Execution Agents) are used for the pre-Diego Elastic Runtime
- Cells are used in Diego
 - Starting with CF 1.5
 - Diego is a rewrite of parts of the Elastic Runtime
 - Including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



Cells or DEAs (VMs)

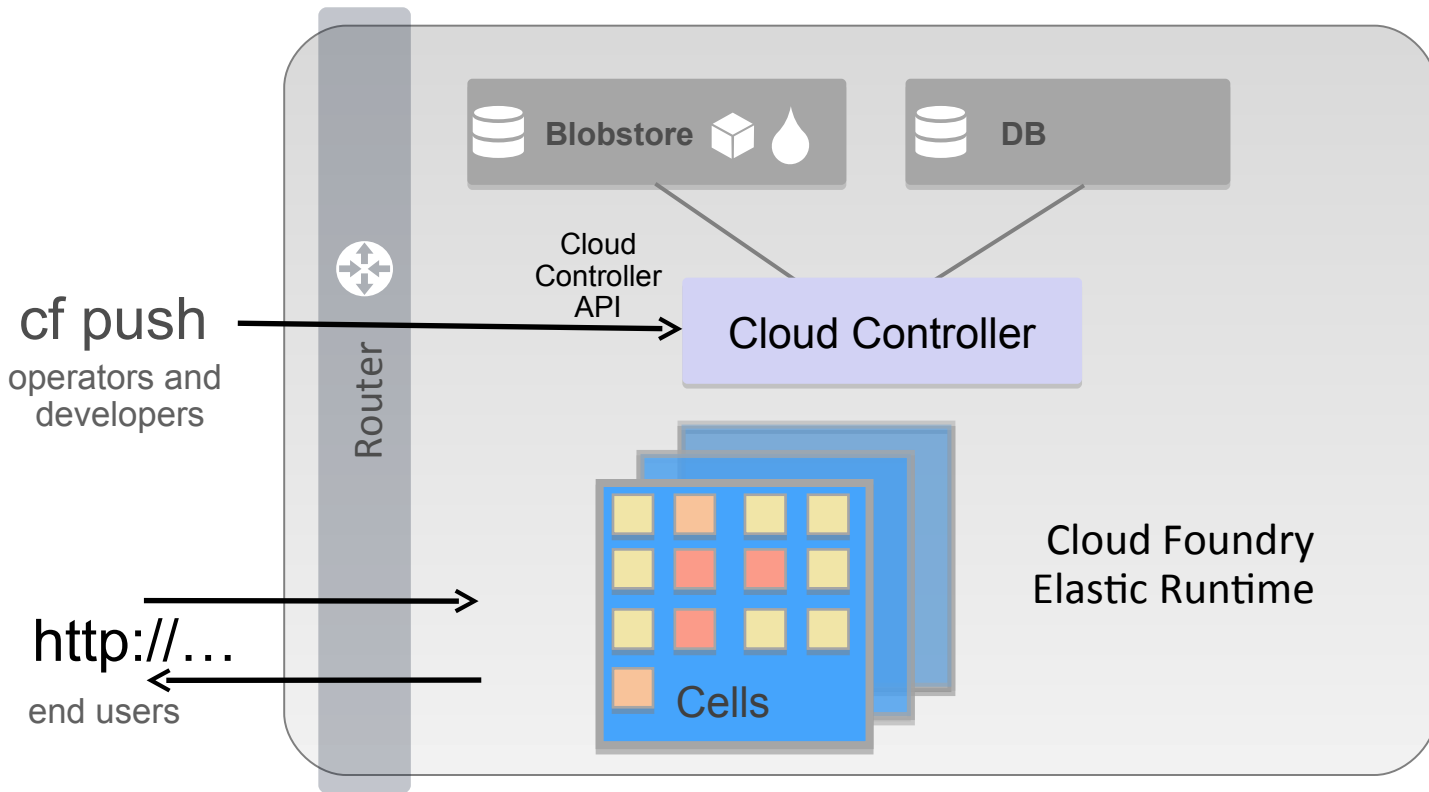
Garden

- 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*



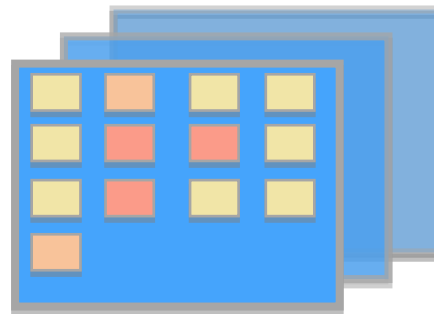
Cells-
Containers Managed
by Garden

Simplified Cloud Foundry Elastic Runtime Architecture



Application States

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



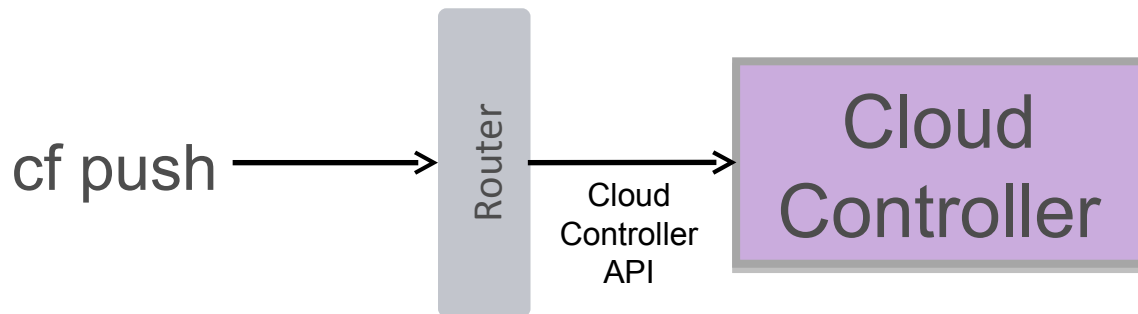
What is happening in the Elastic Runtime during each of these states? ...

Topics

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

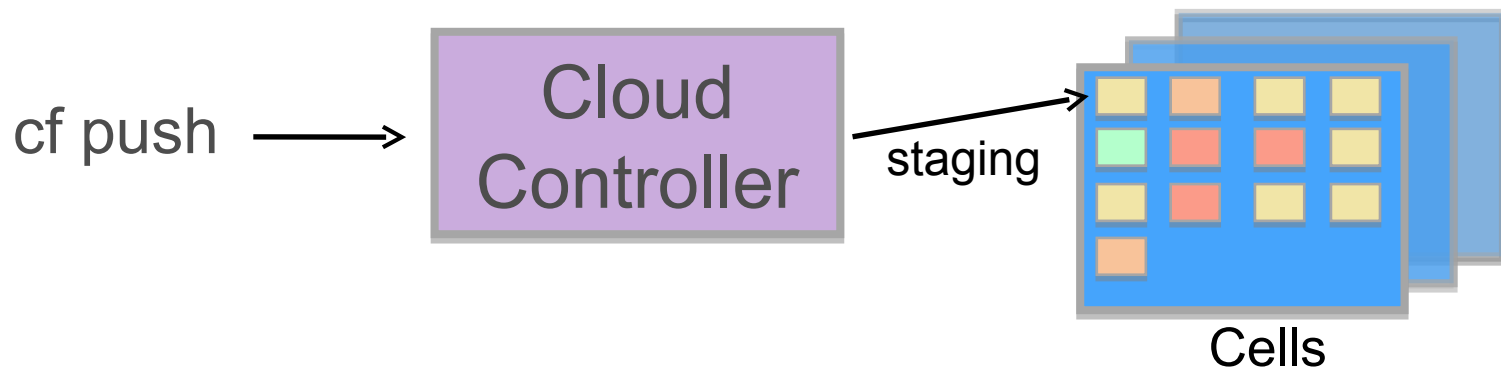
Cloud Controller

- 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



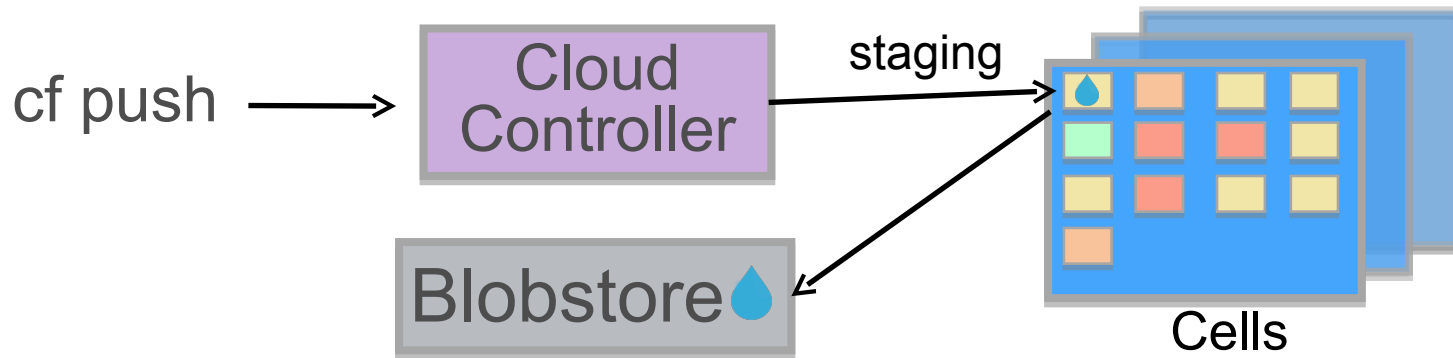
Staging

- **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...



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

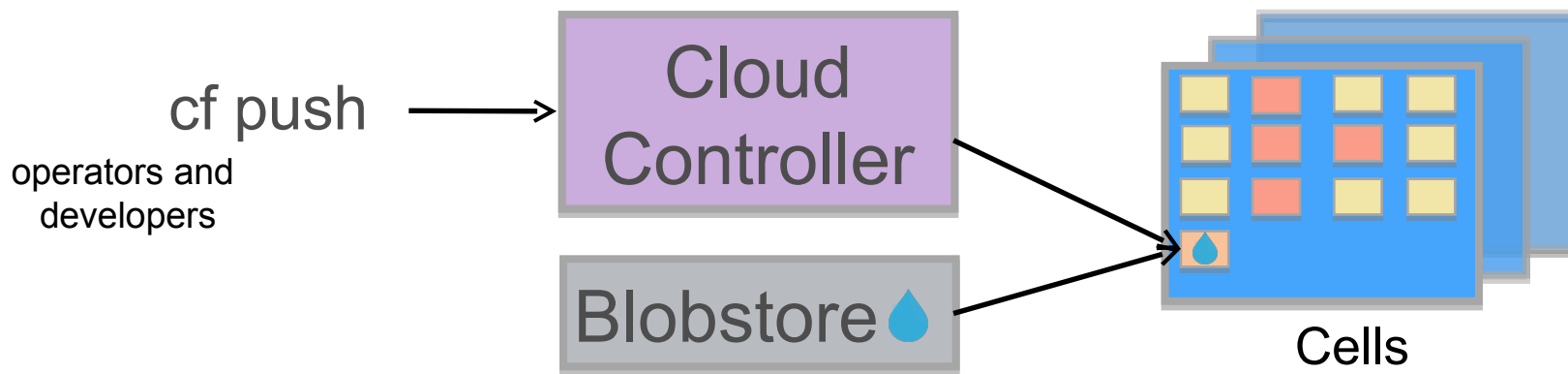


Topics

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

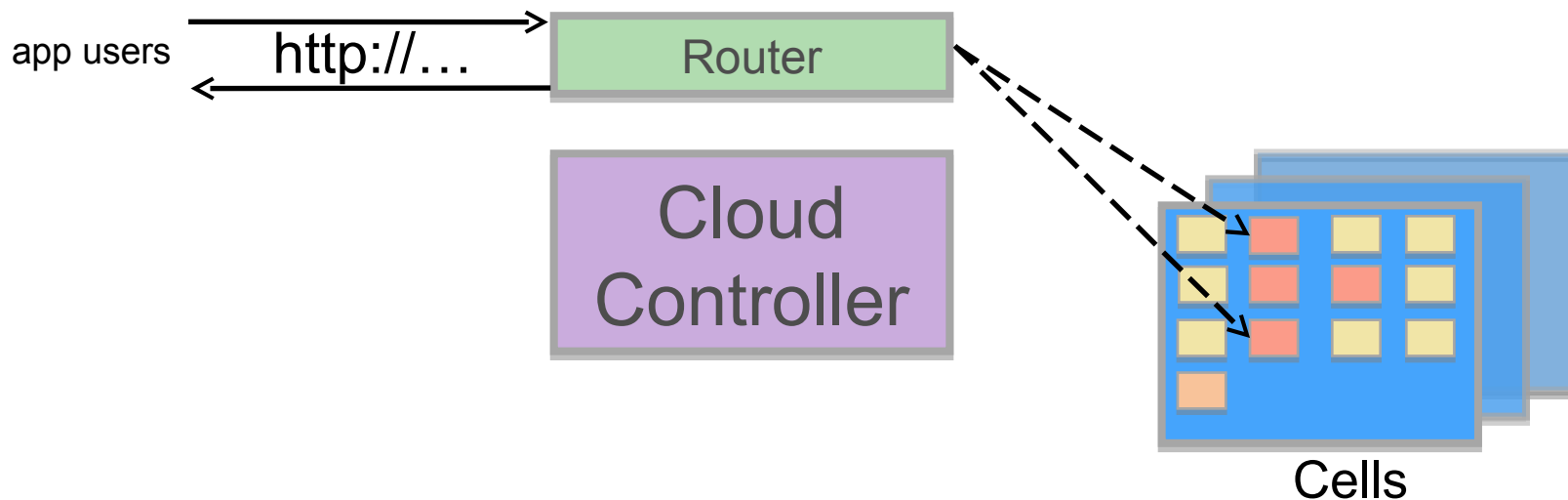
Starting

- 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

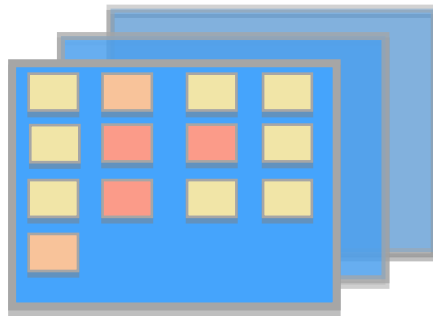


Topics

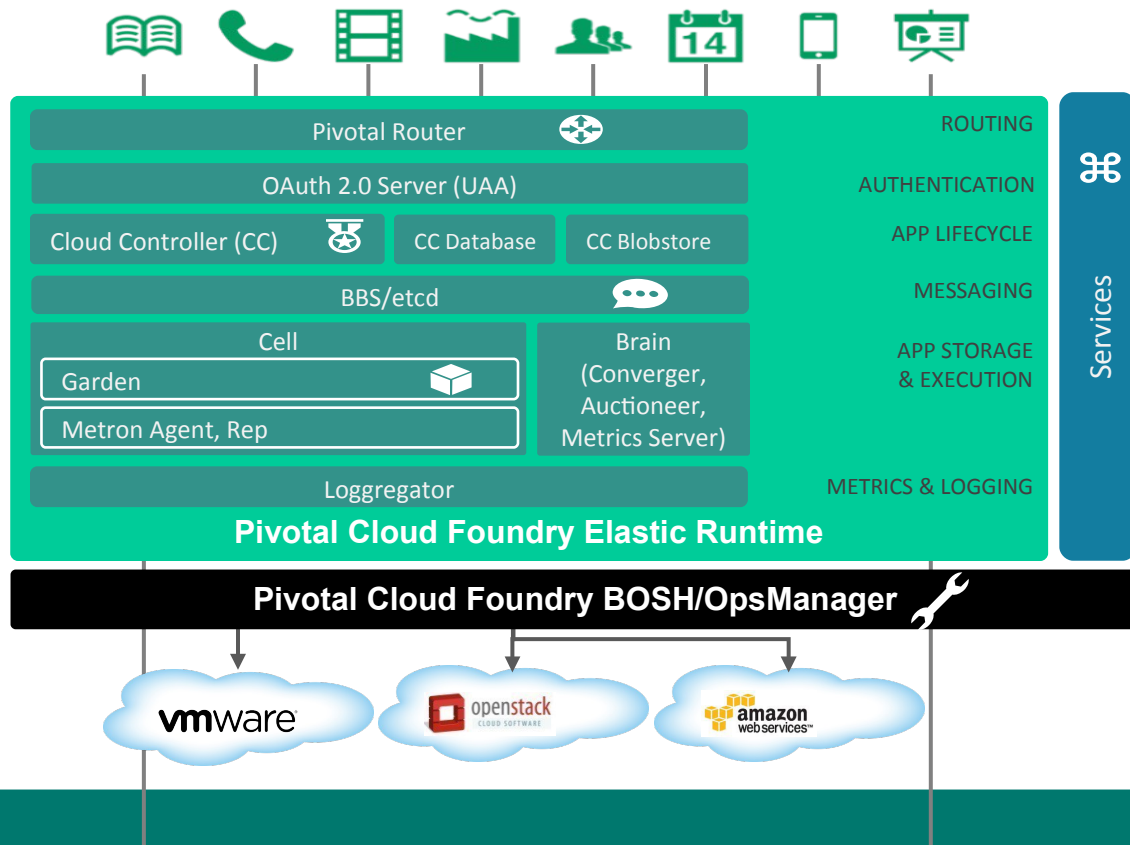
- Elastic Runtime Architecture
- Staging
- Starting
- **Running**

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**



Elastic Runtime- The Big Picture



The Elastic Runtime contains approximately 20 unique VMs

Lab

Install the Elastic Runtime