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PCF Operations Workshop - Platform & Application Health

<Presenter>

<Title>

Operations Workshop Agenda

- PCF Introduction
- Services Overview
- Platform Installation & Setup
- Role Based Access Control
- Platform & Application Scaling
- **Platform & Application Health**
- Patching & Updates
- Security
- Advanced BOSH

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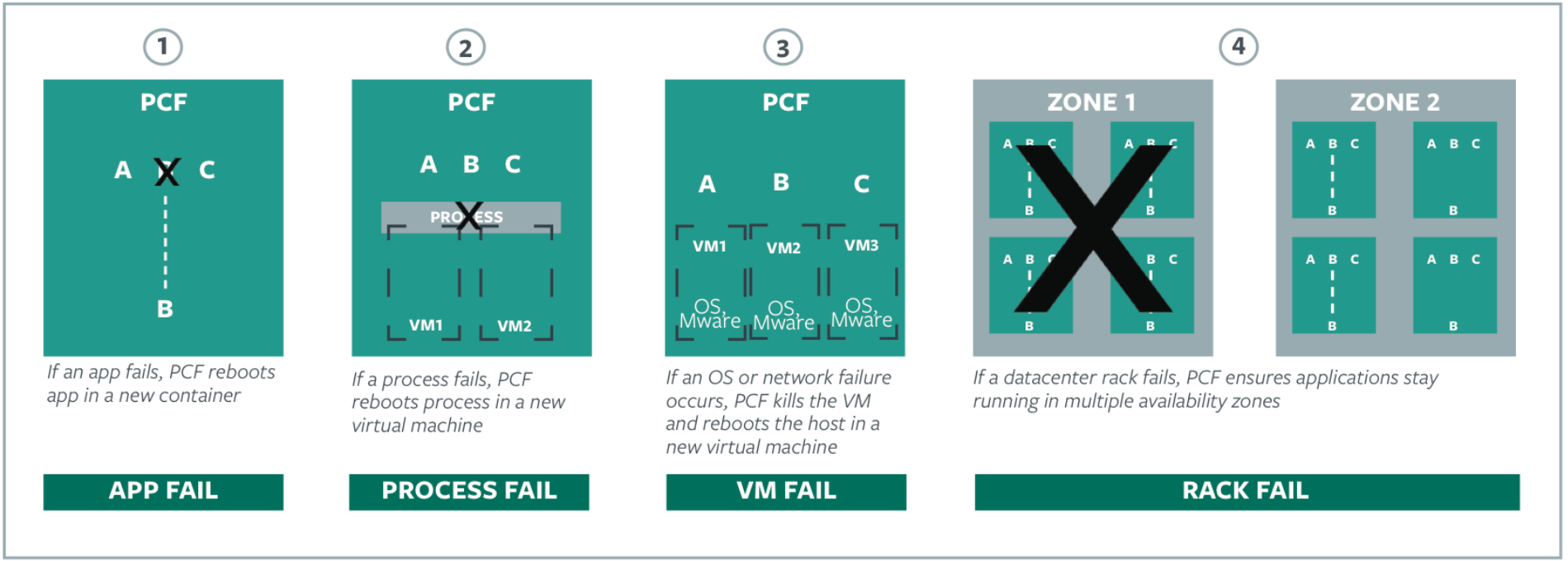
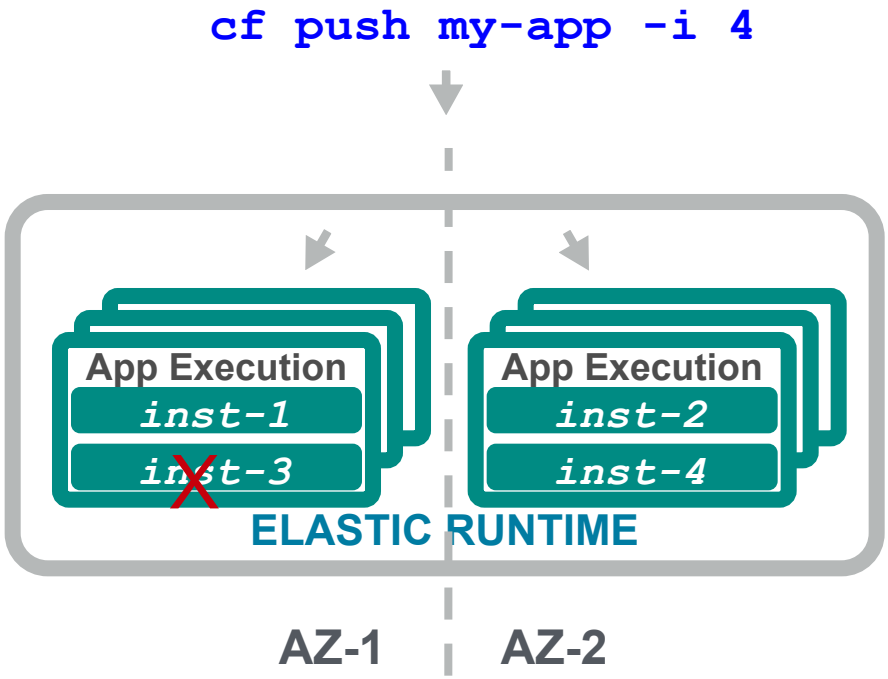
4 Layers of Self Healing



Scenario 1: Application Failure & Recovery

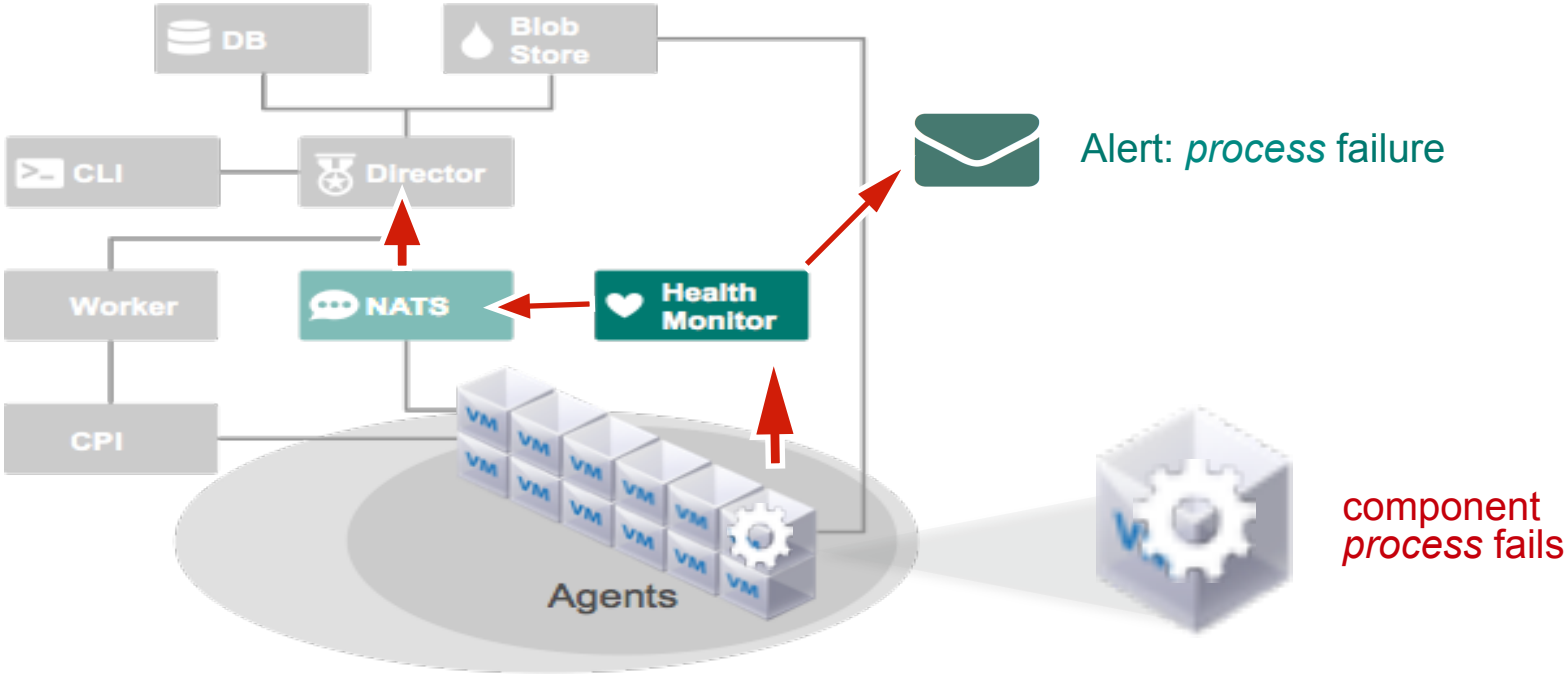
- The Elastic Runtime monitors application instance processes, and detects failures
- On failed instances, the container is destroyed and a new container is created
  - Droplet is copied from the Cloud Controller blobstore to the container and started



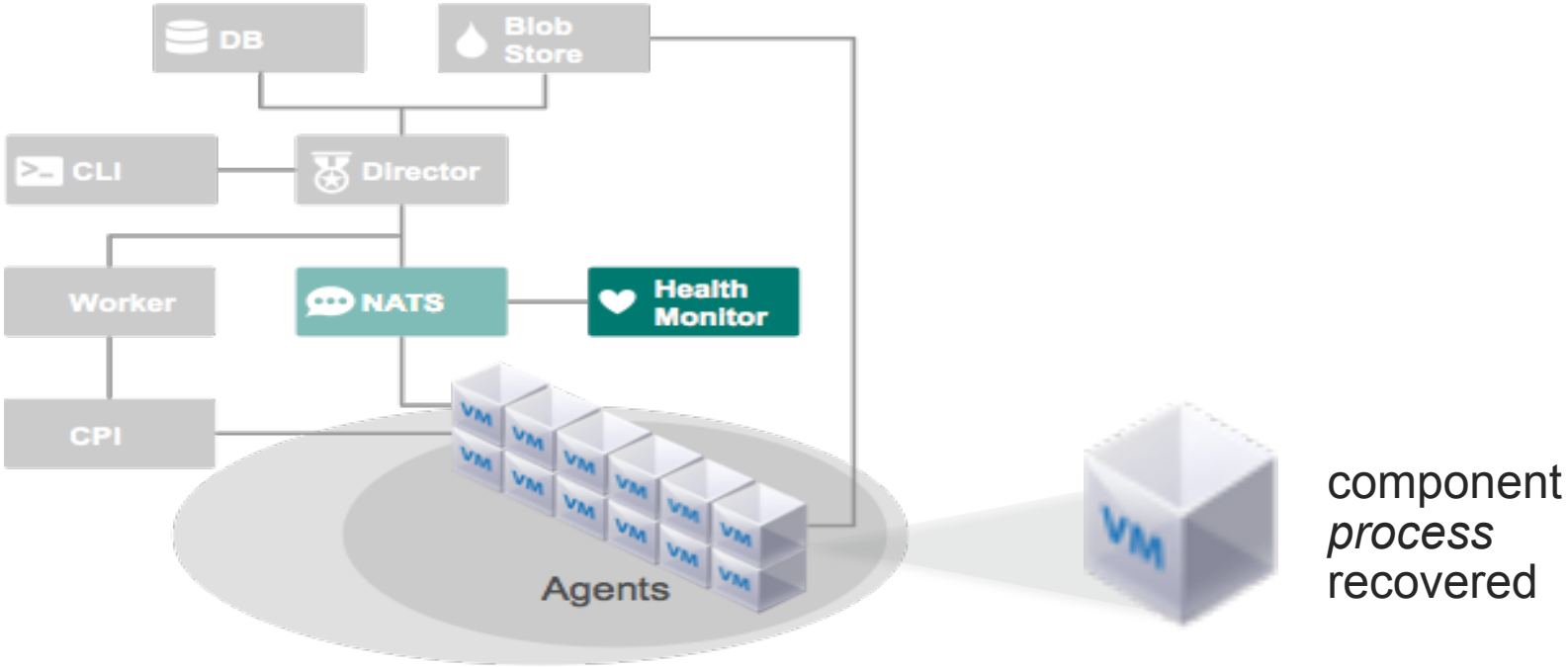
Scenario 2: Process Failure & Recovery

- Monit utility running on the component VMs automatically restarts failed processes
- BOSH release defines which processes to monitor

Scenario 2: Process Failure & Recovery



Scenario 2: Process Failure & Recovery



Scenario 3: VM Failure & Recovery

- Each component of Cloud Foundry is a VM deployed and managed by BOSH
- BOSH health monitor continuously compares current component state to desired state, including:
  - number of instances
  - running processes
- If current state differs from desired state, the health monitor:
  - triggers the VM resurrector, or
  - sends alerts

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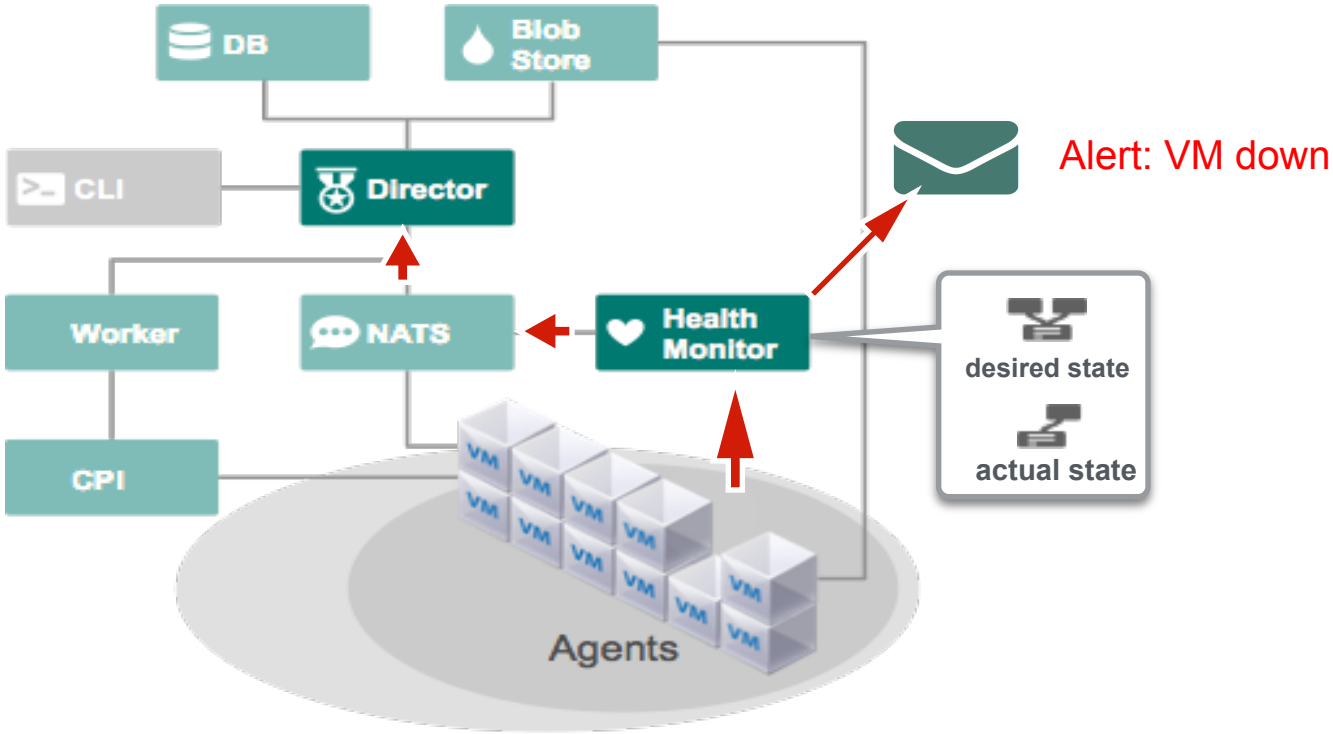
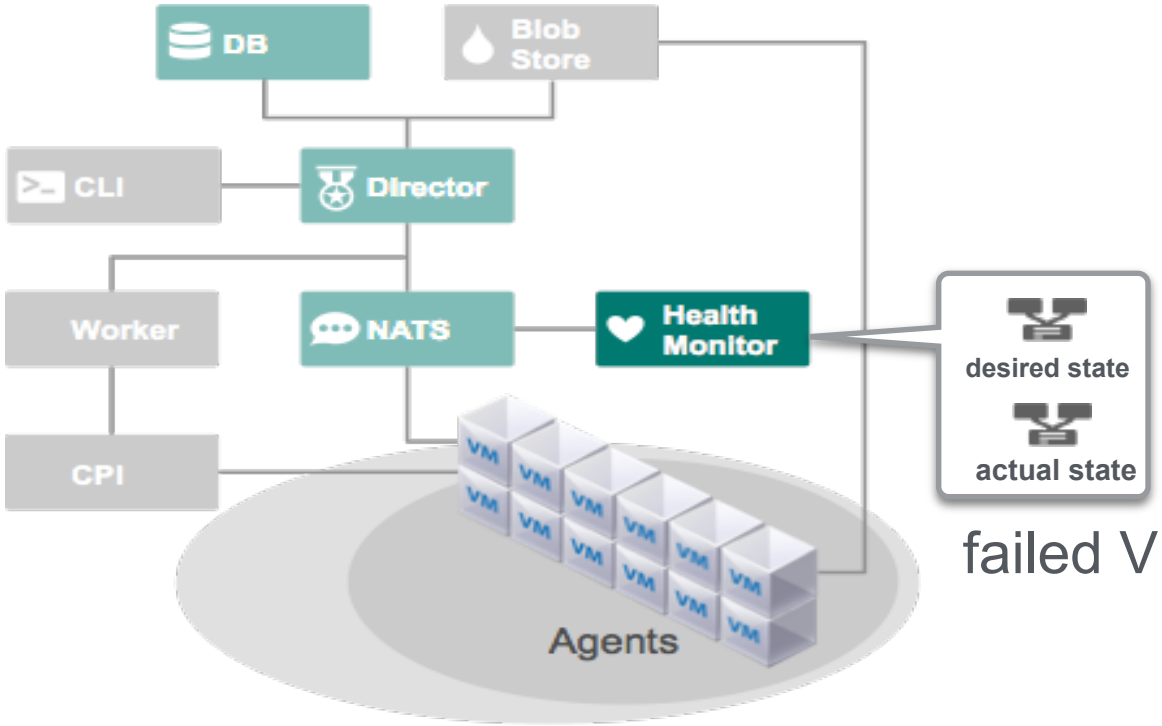
Scenario 3: VM Failure & Recovery



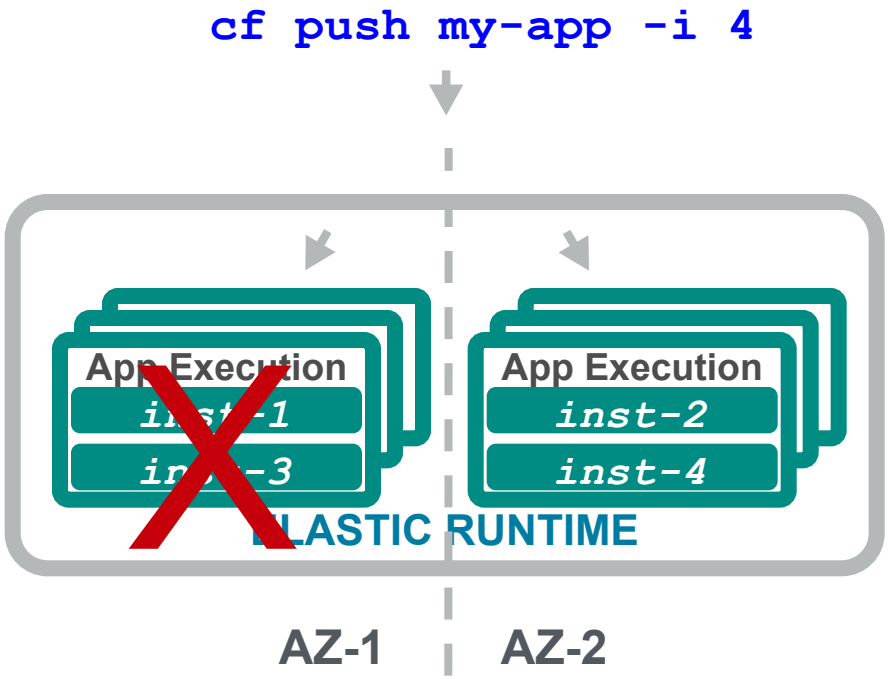
Scenario 3: VM Failure & Recovery



failed VM restored

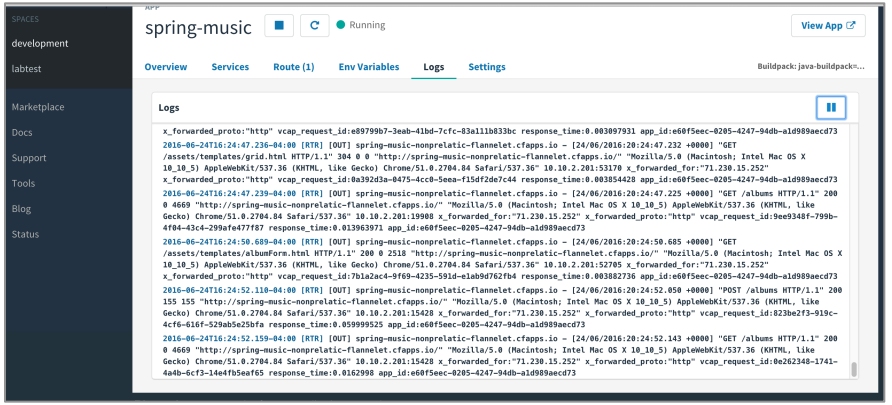
Scenario 4: AZ Failure & Recovery

- If one zone fails, the application instances in the other zone pick up the load
- No outage



Logging

- Available through the CLI and Apps Manager
- Application layer log aggregation provides consolidated view across all application instances and Routers.
- Ability to tail logs for real-time aggregated analysis
- Flush logs to permanent storage



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Loggregator - The Voice of the System

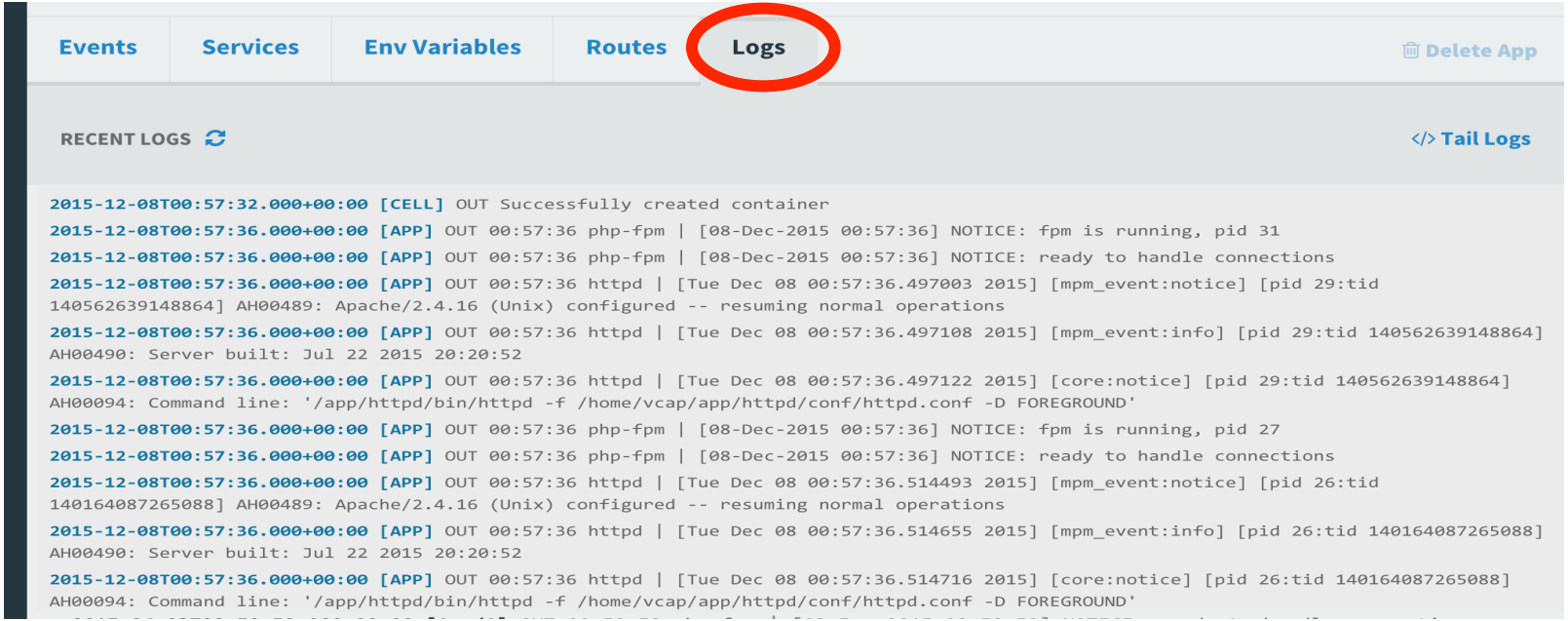
- Provides logging and metrics for the Elastic Runtime
- A modern approach to logging that emphasizes:
  - Support for ephemeral, container-based applications
  - Productivity by streaming logs and metrics to operators and developers (no log shipping)
  - Accessibility and visibility into your applications and the platform
  - Seamless integration with modern log management services (e.g. Splunk, LogStash)

How can Loggregator help me?

- Debugging applications
- Application insights
- Monitoring system and application health
- Exporting metrics into visualization tools

Viewing App Logs Using Apps Manager

- In Apps Manager, select your app, then select Logs



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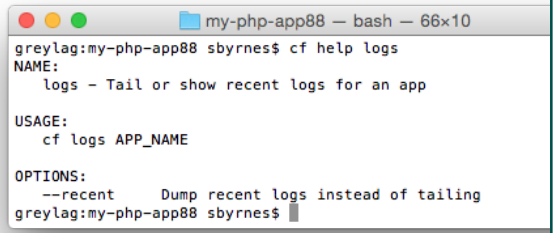
Viewing Logs For an App Using the cf CLI

- Use “cf logs <app_name> --recent” to see recent logs
- Use “cf logs <app_name>” to tail application logs




```
greylag:repos sbyrnes$ cf logs my-php-app88 --recent
Connected, dumping recent logs for app my-php-app88 in org sbyrnes-org / space development as sbyrnes@pivotal.io...

2015-12-22T13:14:36.13-0800 [CELL/0]      OUT Creating container
2015-12-22T13:14:36.83-0800 [CELL/0]      OUT Successfully created container
2015-12-22T13:14:40.13-0800 [APP/0]       OUT 21:14:40 php-fpm | [22-Dec-2015 21:14:40] NOTICE: fpm is running, pid 27
2015-12-22T13:14:40.13-0800 [APP/0]       OUT 21:14:40 php-fpm | [22-Dec-2015 21:14:40] NOTICE: ready to handle connections
2015-12-22T13:14:40.16-0800 [APP/0]       OUT 21:14:40 httpd   | [Tue Dec 22 21:14:40.153683 2015] [mpm_event:notice] [pid 25:
tid 140364163196736] AH00489: Apache/2.4.12 (Unix) configured -- resuming normal operations
2015-12-22T13:14:40.16-0800 [APP/0]       OUT 21:14:40 httpd   | [Tue Dec 22 21:14:40.153867 2015] [mpm_event:info] [pid 25:ti
d 140364163196736] AH00490: Server built: Mar  2 2015 15:50:48
2015-12-22T13:14:40.16-0800 [APP/0]       OUT 21:14:40 httpd   | [Tue Dec 22 21:14:40.153925 2015] [core:notice] [pid 25:tid 1
40364163196736] AH00094: Command line: '/home/vcap/app/httpd/bin/httpd -f /home/vcap/app/httpd/conf/httpd.conf -D FOREGROUND'
2015-12-22T13:14:40.28-0800 [HEALTH/0]    OUT healthcheck passed
2015-12-22T13:14:40.28-0800 [HEALTH/0]    OUT Exit status 0
2015-12-22T13:14:44.76-0800 [RTR/1]       OUT my-php-app87.cfapps.io - [22/12/2015:21:14:44 +0000] "GET / HTTP/1.1" 200 0 185
"-" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_2) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/47.0.2526.80 Safari/537.36
" 10.10.2.247:23755 x_forwarded_for:"209.234.137.222" x_forwarded_proto:"http" vcap_request_id:f210e3a5-24c1-41ca-7edd-56d406
da2cf7 response_time:0.00228655 app_id:a4263c77-3ada-4030-9ae9-fa2d0e6c5579
2015-12-22T13:14:44.77-0800 [APP/0]       OUT 21:14:44 httpd   | 209.234.137.222 - - [22/Dec/2015:21:14:44 +0000] "GET / HTTP/
1.1" 200 185 vcap_request_id=f210e3a5-24c1-41ca-7edd-56d406da2cf7 peer_addr=10.10.16.16
2015-12-22T13:14:48.88-0800 [APP/0]       OUT 21:14:48 httpd   | [Tue Dec 22 21:14:48.853886 2015] [core:info] [pid 36:tid 140
364103026432] [client 209.234.137.222:37018] AH00128: File does not exist: /home/vcap/app/htdocs/favicon.ico, referer: http:/
/my-php-app87.cfapps.io/
2015-12-22T13:14:48.88-0800 [APP/0]       OUT 21:14:48 httpd   | 209.234.137.222 - - [22/Dec/2015:21:14:48 +0000] "GET /favico
n.ico HTTP/1.1" 404 209 vcap_request_id=0968141d-f21a-44ab-53e7-ce571fbb9020 peer_addr=10.10.80.16
2015-12-22T13:15:10.30-0800 [HEALTH/0]    OUT healthcheck passed
2015-12-22T13:15:10.30-0800 [HEALTH/0]    OUT Exit status 0
```

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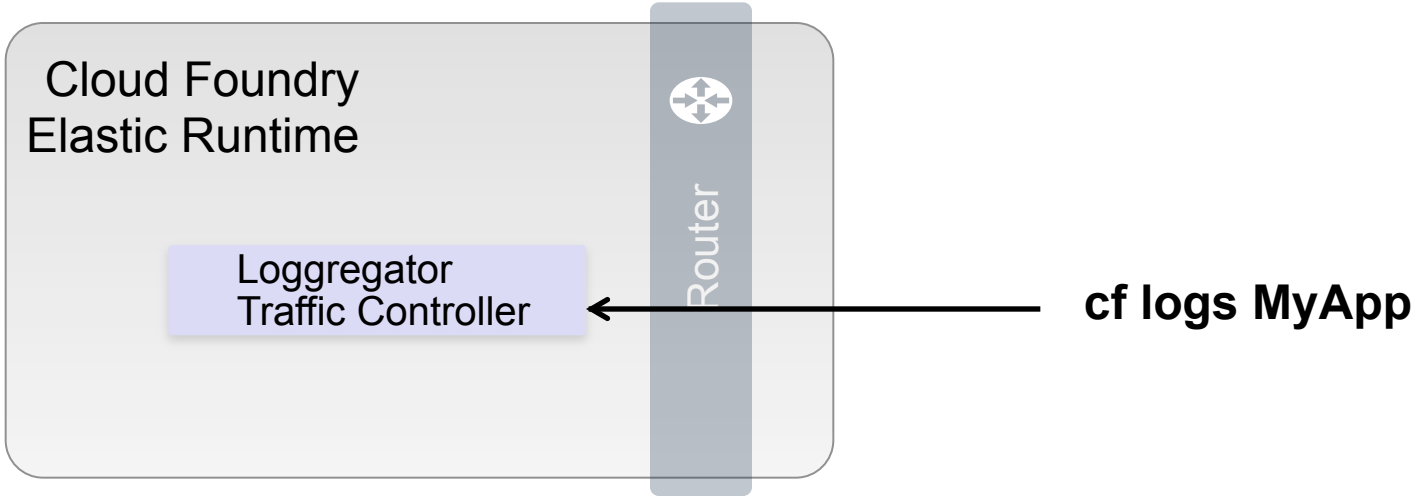
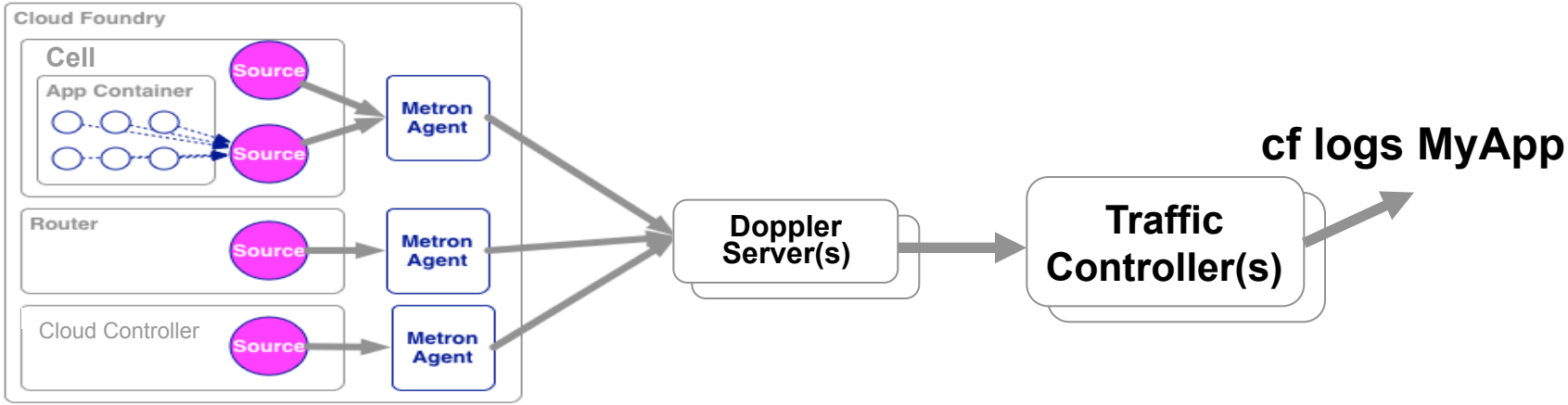
cf logs- Behind the Scenes

- A component of the Loggregator system called the Traffic Controller receives and responds to requests for logs and metrics



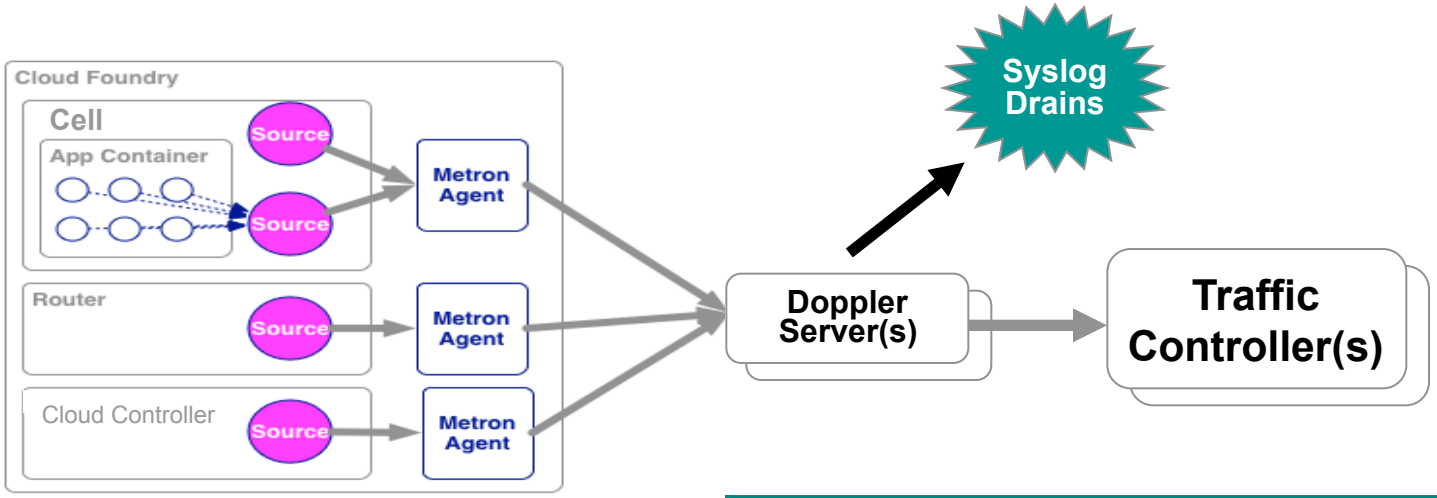
cf logs MyApp- Deeper Behind the Scenes

- Sources of logging and metrics data send data to Metron Agents, which reside on Cloud Foundry components
- The Metron Agents send the data to Doppler Servers
- When the request for logs is made, the Traffic Controller gets the data from the Doppler Servers



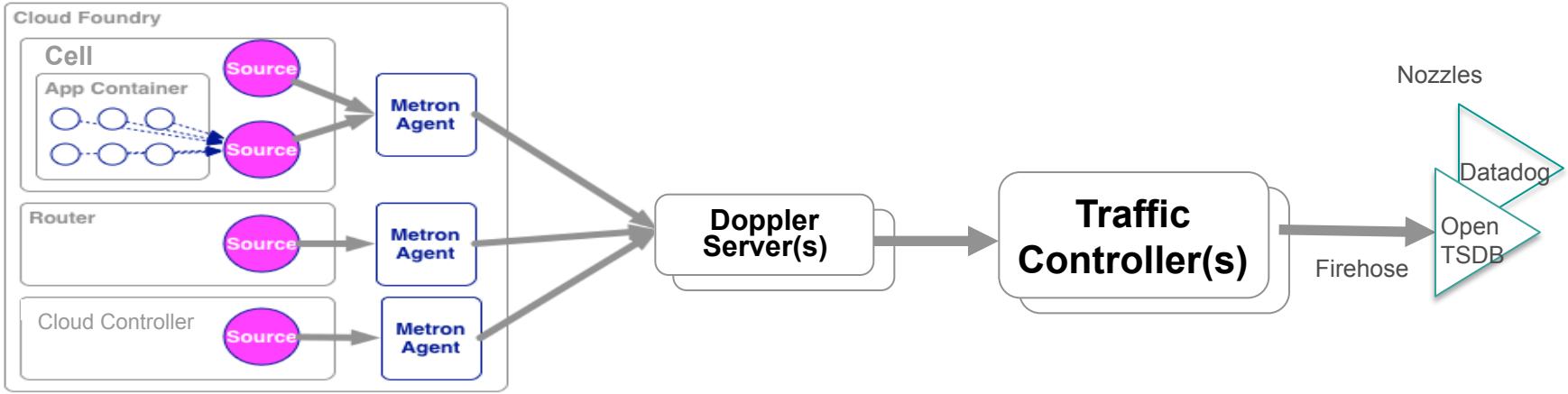
Syslog Drains

- Syslog drains allow data related to an application to be sent to third-party log managers
- The data from the Doppler Servers is sent to the Syslog drain
  - The Traffic Controller is not used



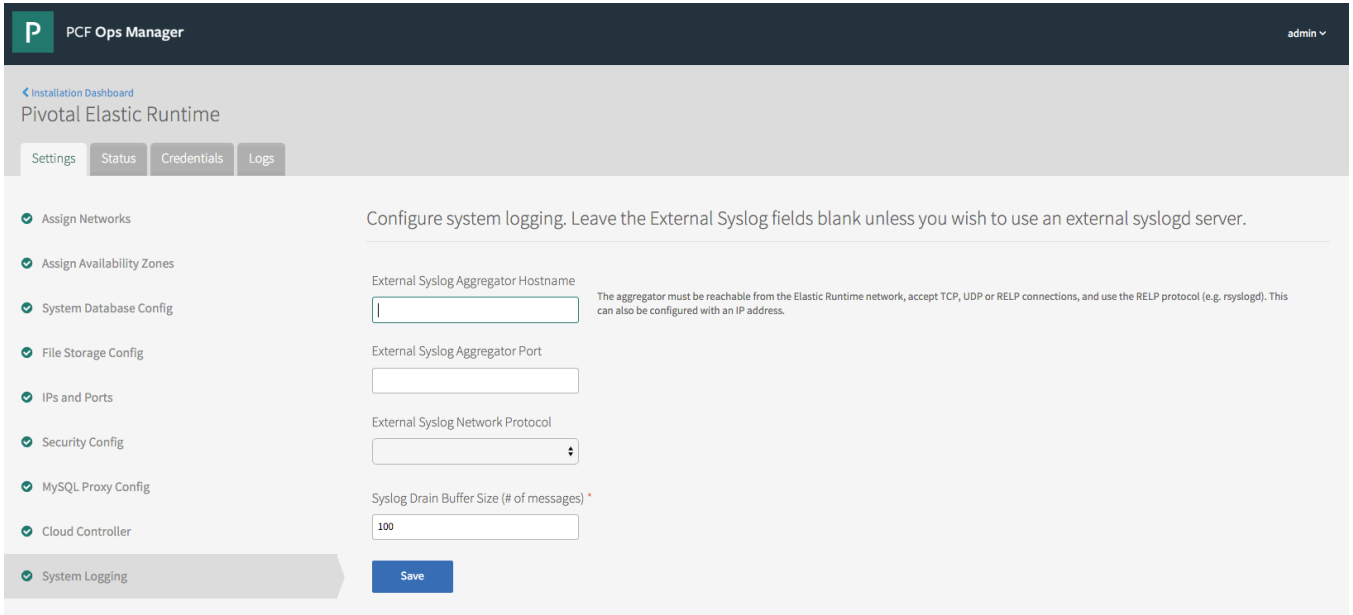
Firehose and Nozzles

- Traffic Controllers have a Firehose endpoint
- The Firehose streams all the event data coming from an Elastic Runtime deployment
  - Includes application logs, HTTP events and container metrics
  - Includes metrics from all Elastic Runtime components
  - Does not include Elastic Runtime component logs
- Operators can deploy nozzles to the Firehose endpoint, which listen for a subset of data from the Firehose



Platform syslog

- Elastic Runtime can send system logs to an external syslog server
- Configure this in the System Logging tab



PCF JMX Bridge

- Collects and exposes system data from PCF components via a JMX endpoint (Cloud Controller, Router, Diego, VMs, etc)
- Composed of the following VMs:
  - JMX provider
  - VM that governs compilation
  - Nozzle for the Loggregator Firehose
- Rebranded version of “Pivotal Cloud Foundry Ops Metrics”

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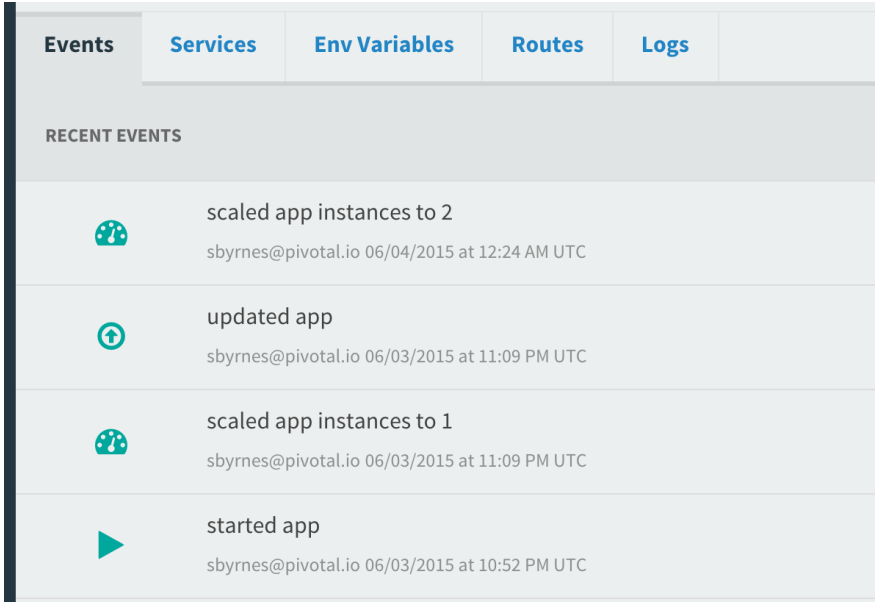
Viewing the Events for your App

- In Apps Manager, select your app, then select Events
  - Or in the cf CLI cf events <my-app-name>



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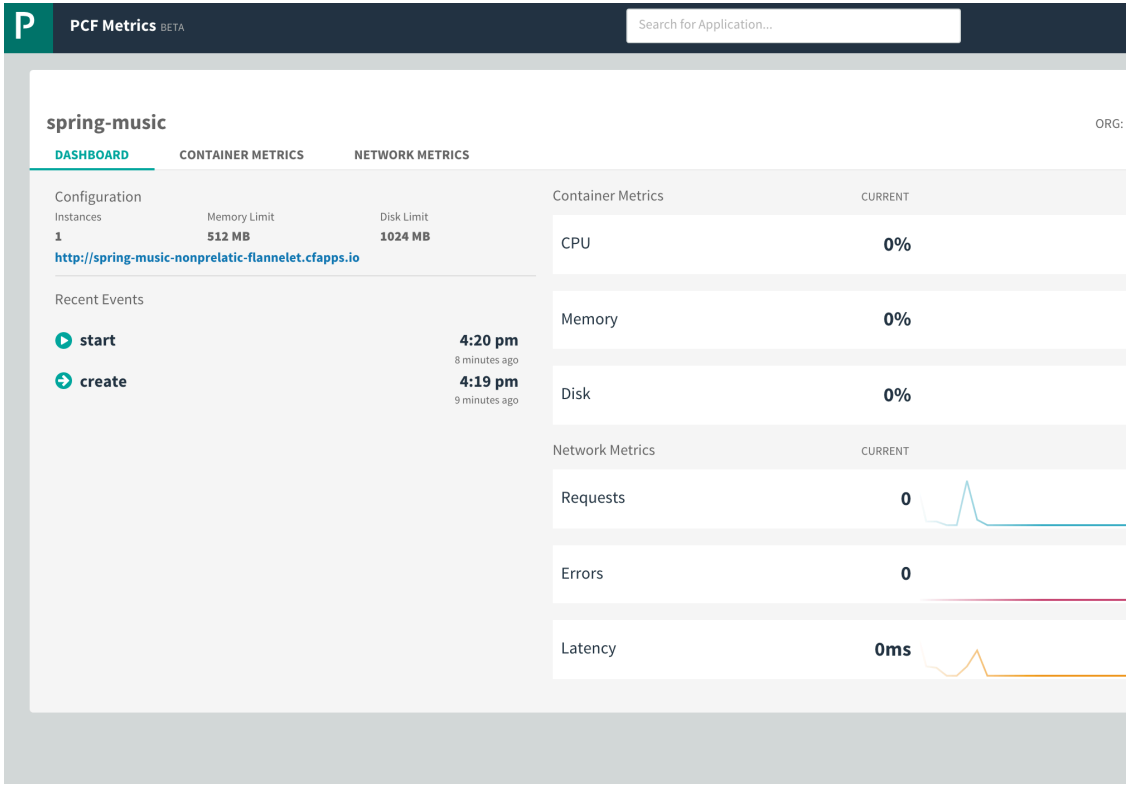
PCF Metrics



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Application Performance Monitoring

- PCF Metrics provides a real-time application monitoring dashboard
- 3rd Party Tiles provide in-depth monitoring of applications running on PCF via an embedded agent bundled with applications that are deployed using Buildpacks
    - Dynatrace
    - New Relic
    - AppDynamics