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Pivotal Cloud Foundry – Managing Applications

Objectives of PCF

- Purpose:
  - To learn how to manage applications in cloud founry.
- Product:
  - Log Management
  - Application Performance management
  - Autoscaling
  - Zero-Downtime Deployments
- Process:
  - Understand 3rd party log, auto scaling, APM and zero-downtime deployments.

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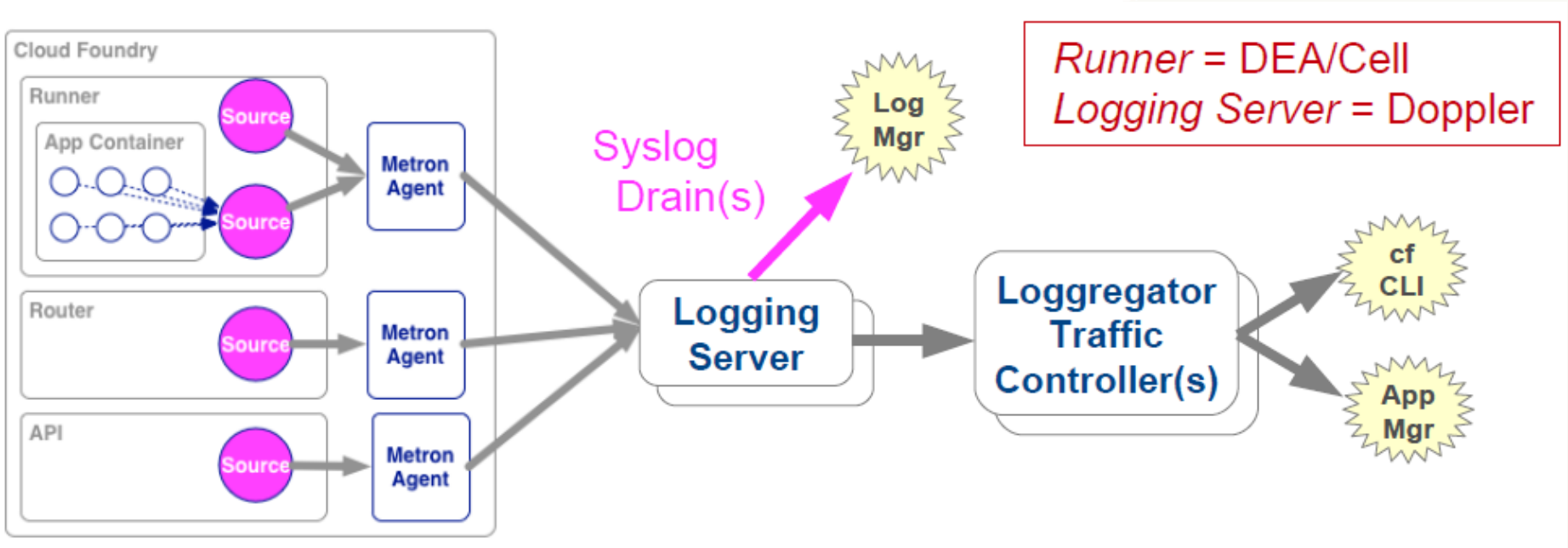
LOG MANAGEMENT

Recall: Log Aggrgation Architecture

- ***Collects*** log output from app instance, CF components
- ***Aggregates*** into a consolidated log
- ***Sinks*** to cf logs, App Mgr, third-party log managers



Why Third-Party Log Managers?

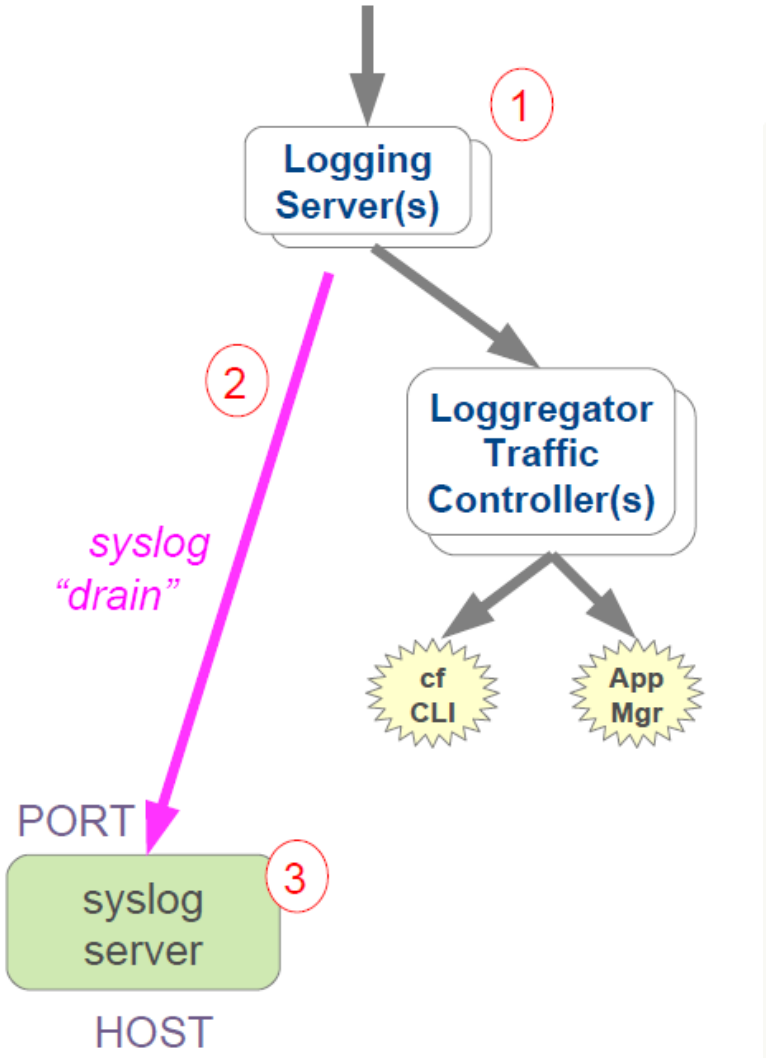
- Recommended approach
  - Can store far more logging information than CF
  - Allow for persistence, storage, searching, analyzing, metrics
- Variety of third-party log managers supported:

Connecting to Third-Party Log Managers

- Setup Log Managers, determine HOST and PORT.
  - Process varies according to vendor
- Create User ProvidedService with a Syslog drain:
  - **cf cups <SERVICE> -l syslog://<HOST>:<PORT>**
- Bind to application, restage
  - Cloud Foundry sinks loggregator output to this drain for this application

How It Works

- All output for app collected by Logging(Doppler) server 1
- Loggregator opens socket to HOST:PORT 2
  - sends all log info for app to socket in syslog format
- Received by third-party syslog server 3



Example: PWS and PaperTrail

- **PaperTrail**: Cloud-based Log Manager

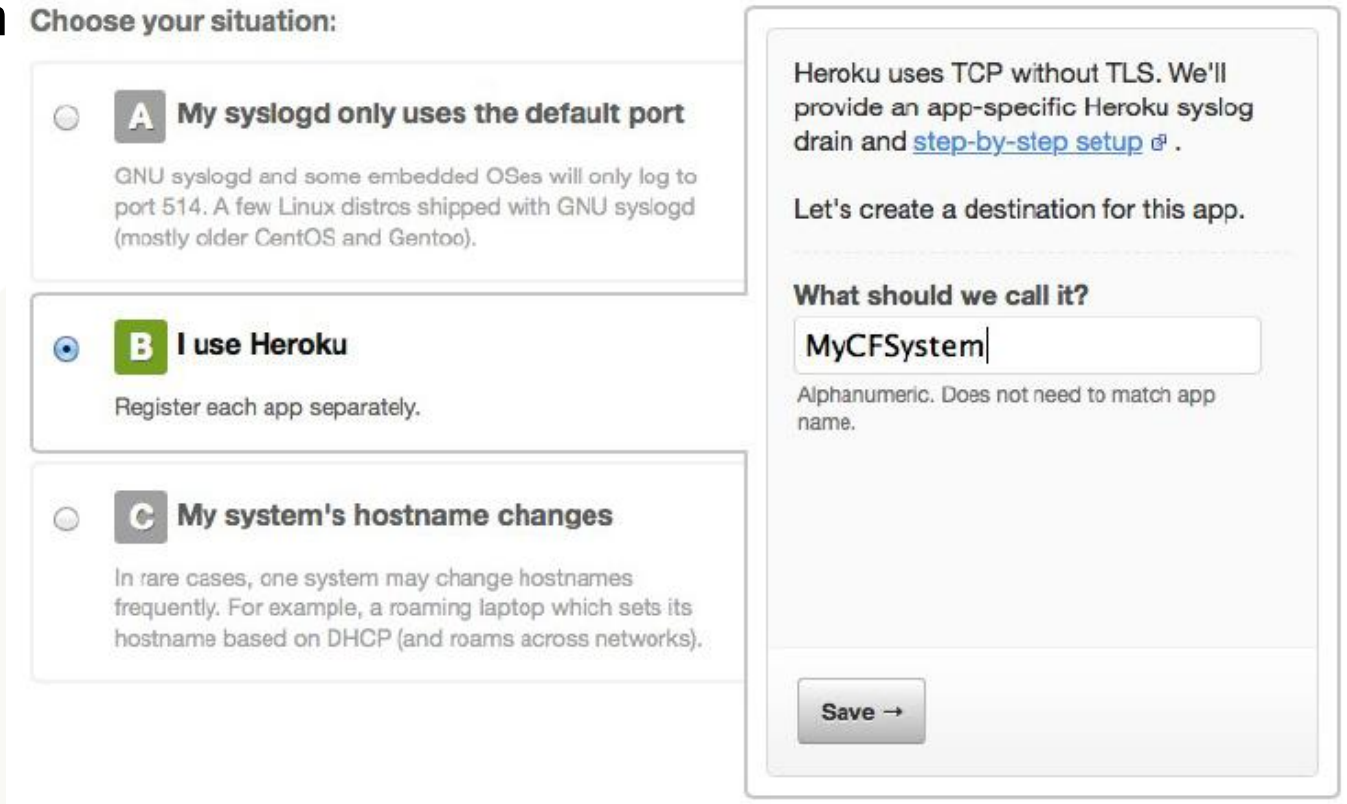
a) Create account at **https://papertrailapp.com**
b) Use the "Add System" button
   a) Papertrail will provide you the URL to use for your syslog drain
   b) Example: **logs2.papertrailapp.com:41845**

Example: PWS and PaperTrail

c) Click the "Alternatives" link

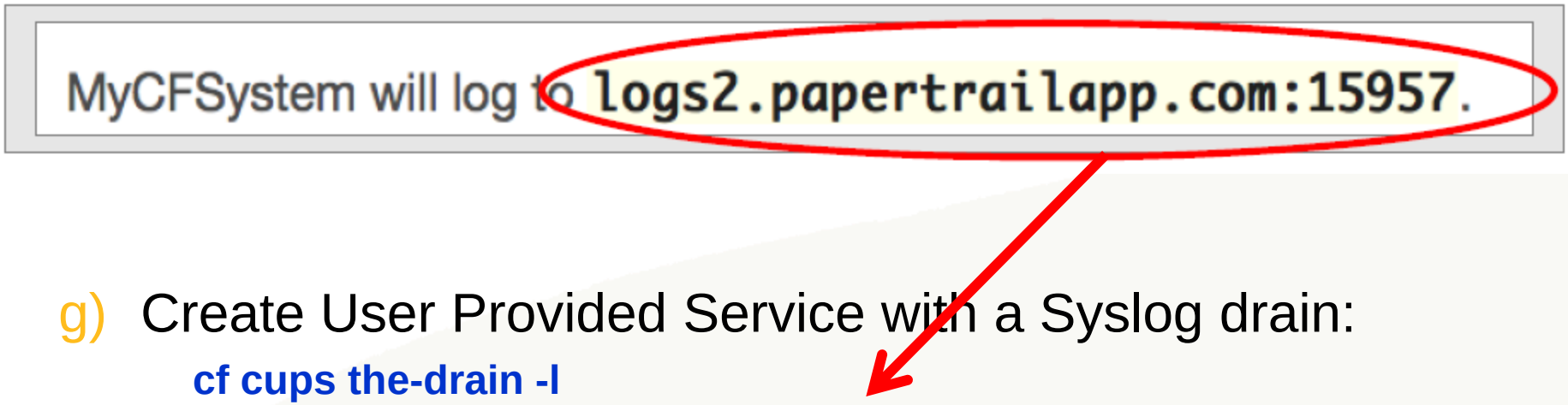
d) Select the "Heroku" option

e) Name your system



Example: PWS and PaperTrail

f) Setup user defined service using Papertrail's URL



g) Create User Provided Service with a Syslog drain:

cf cups the-drain -l

syslog://logs2.papertrailapp.com:15957

h) Bind to application, restart:

cf bind-service the-app the-drain

cf restart the-app

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About Syslog

- De facto standard for logging on Unix/Linux
  - Can log to a file or a server *syslogd* (via a protocol)
  - Splunk, Papertrail and others provide syslog servers
- To log to syslog
  - Generate a TCP and UDP message in the right format
  - Open a socket to your syslog server and send
- Higher level logging options exists
  - **https://github.com/cloudfoundry-community/java-loggregator**
  - Output handlers for Java logging or log4j/ logback

APPLICATION PERFORMANCE MANAGEMENT

Application Performance Management

- Logs and analysis only takes you so far
- Important to have real-time monitoring of applications
  - Uptime, performance, etc.
- Application Performance Monitoring (APM) Tools
  - Monitor your application while running
  - Several choices available in Cloud Foundry
    - PWS - New Relic and AppDynamics
    - Pivotal Spring Insight

Pivotal Web Services and New Relic

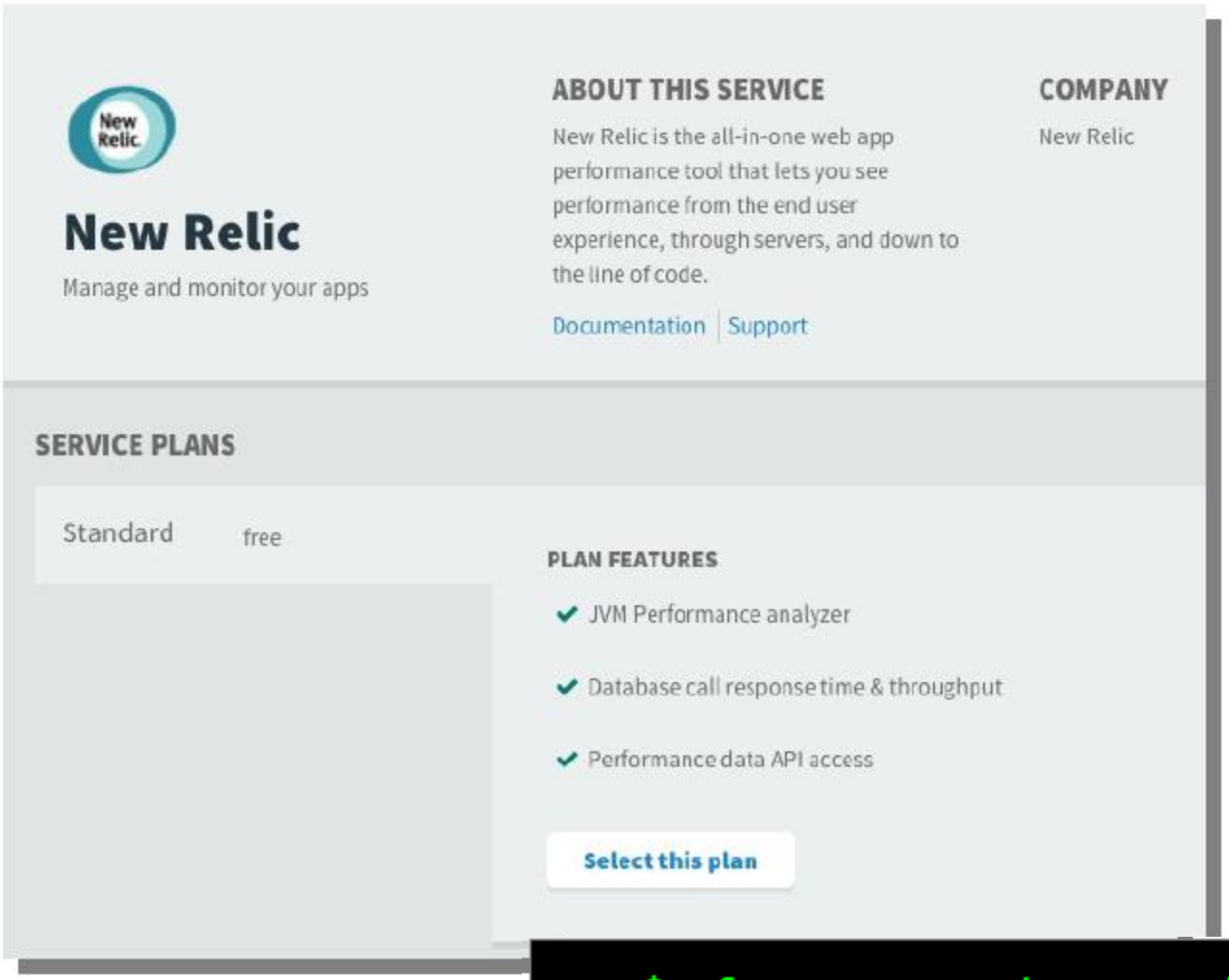
New Relic

- PWS offers simple interface to New Relic
  - Available as Marketplace Service
  - Tracks different instances of application
  - Monitors down to the line of code

- How to Use:
  - Create New Relic service in desired space
  - Bind to desired Application(s)
  - Re-stage application
    - Java Buildpack includes New Relic Agent, others may not
  - APM available as a link from within PWS

Creating the New Relic Service

New Relic



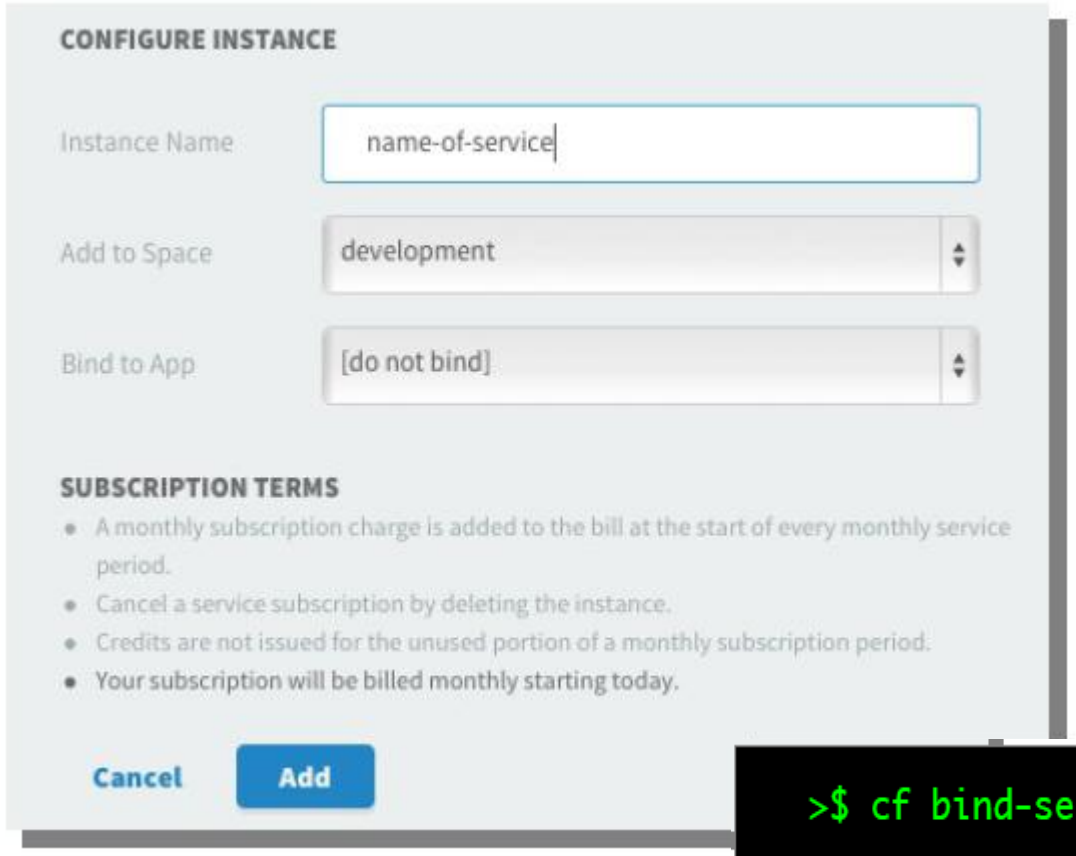
- Use App Manager Console
- Use **CF** CLI

```
>$ cf create-service newrelic standard apm
```

Create Service / Bind Application

New Relic.

- Use CF CLI or App Manager Console:

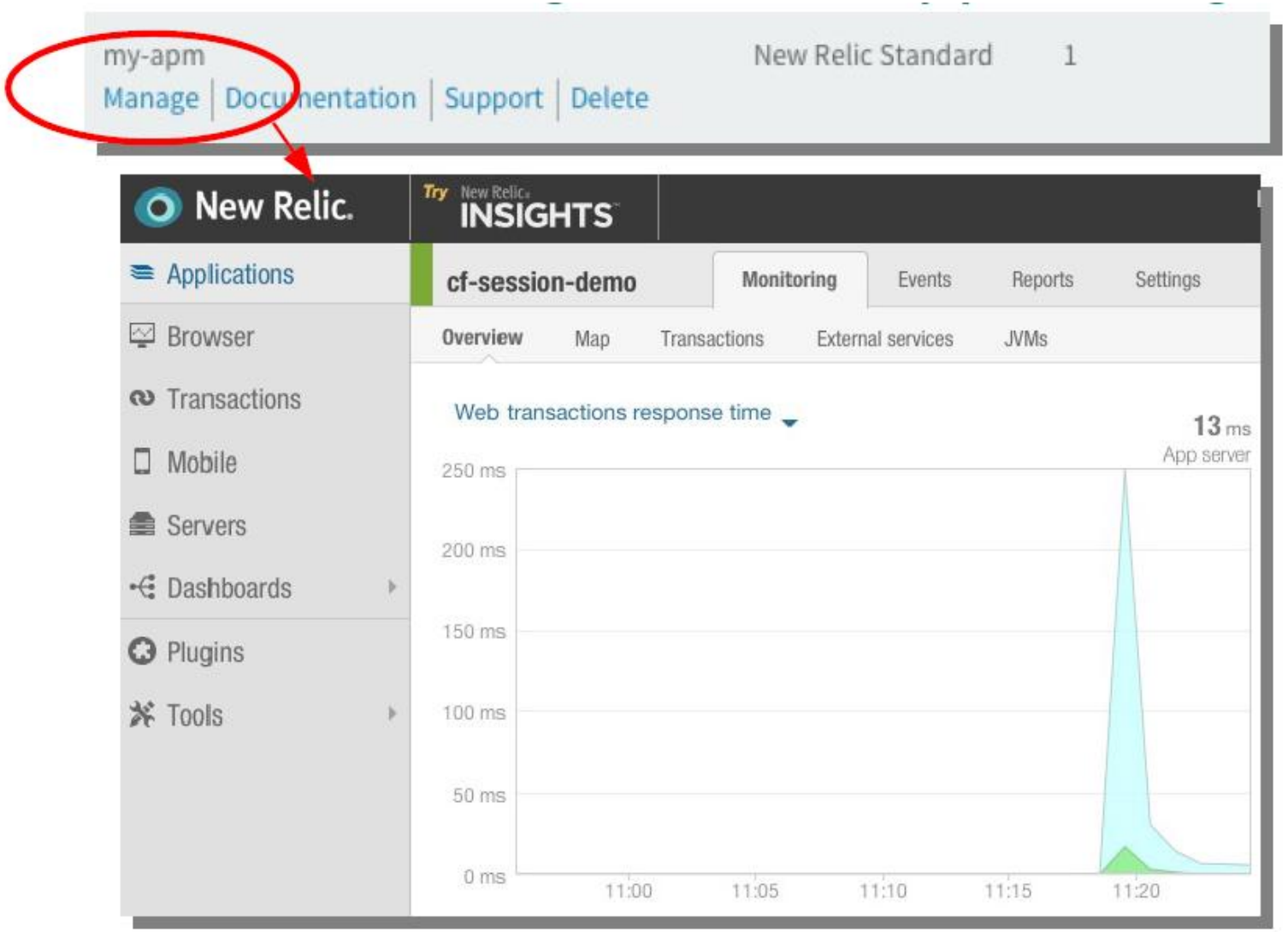



```
>$ cf bind-service some-app apm
```


All work described was performed by Capgemini or a Capgemini affiliate

Access via Manage Link in App Manger

New Relic.



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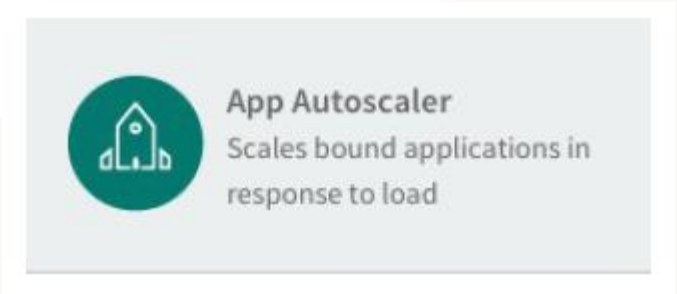
AUTOSCALING

Scaling Options

- CF allows horizontal scaling
  - Controlling the # of instances of an application running
  - All behind a common router (load balancer)
  - Controllable via the manifest, cf command line, or App Manager console
- All options require manaual intervention

AutoScaling

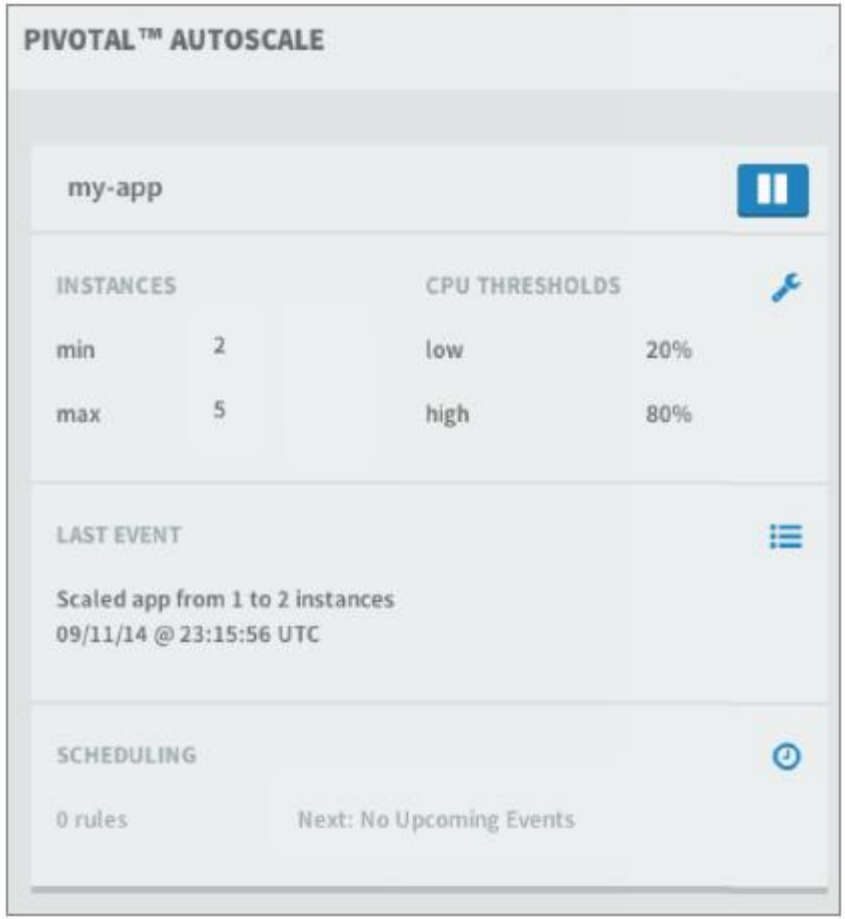
- CF can allow applications to be automatically scaled
  - "AutoScaling"
- System load can be used as a trigger in place of manual interaction.



- Autoscaling Service
  - Must be installed by administrator
  - Not available in PWS

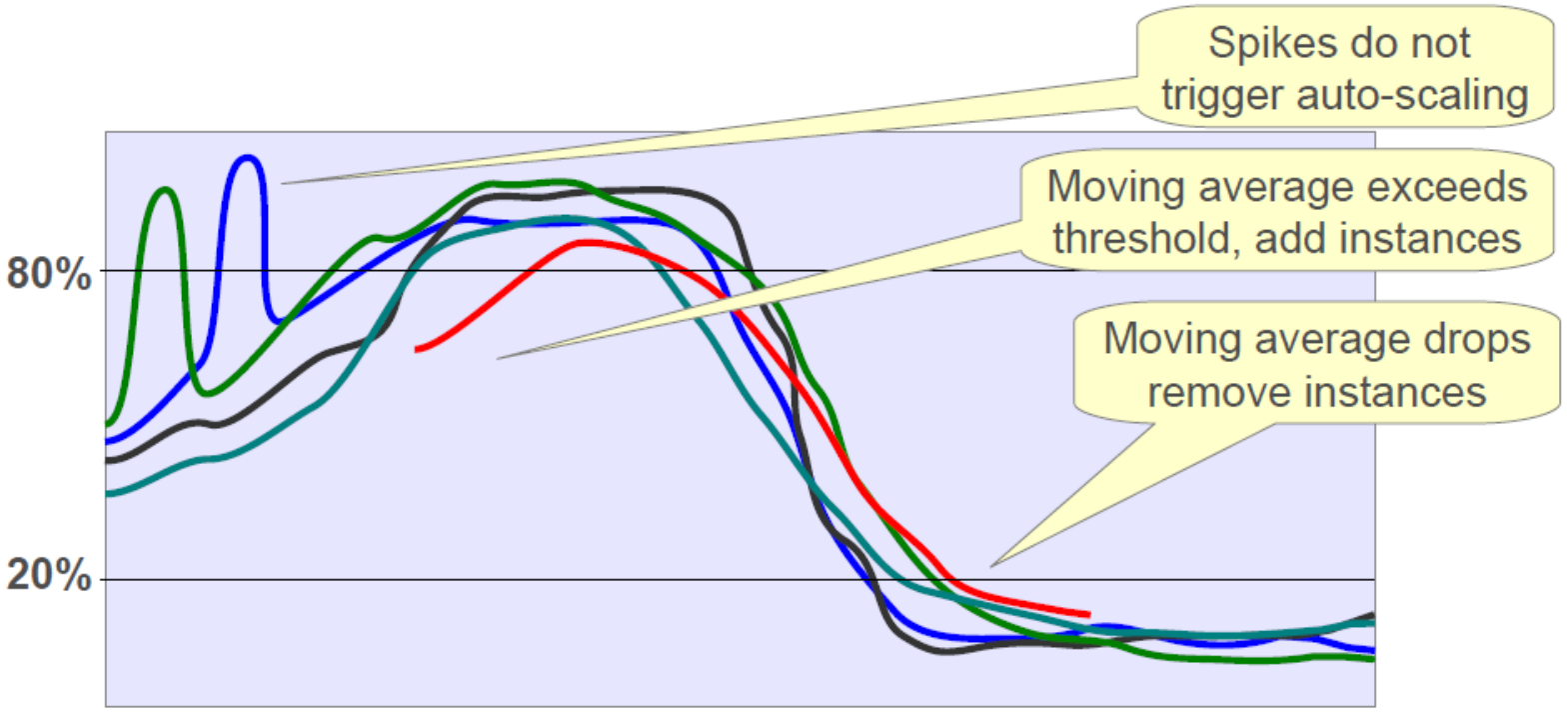
AutoScaling Service - Steps

- Create the service
  - Select the desired plan
- Bind to Application
- Set desired scaling parameters
  - Add instance whenever high threshold is reached
  - Subtract instance whenever low threshold is reached

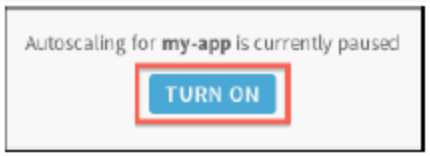


AutoScaling - Moving Average

- Scaling activity based on moving averages
  - Softens effect of temporary spikes

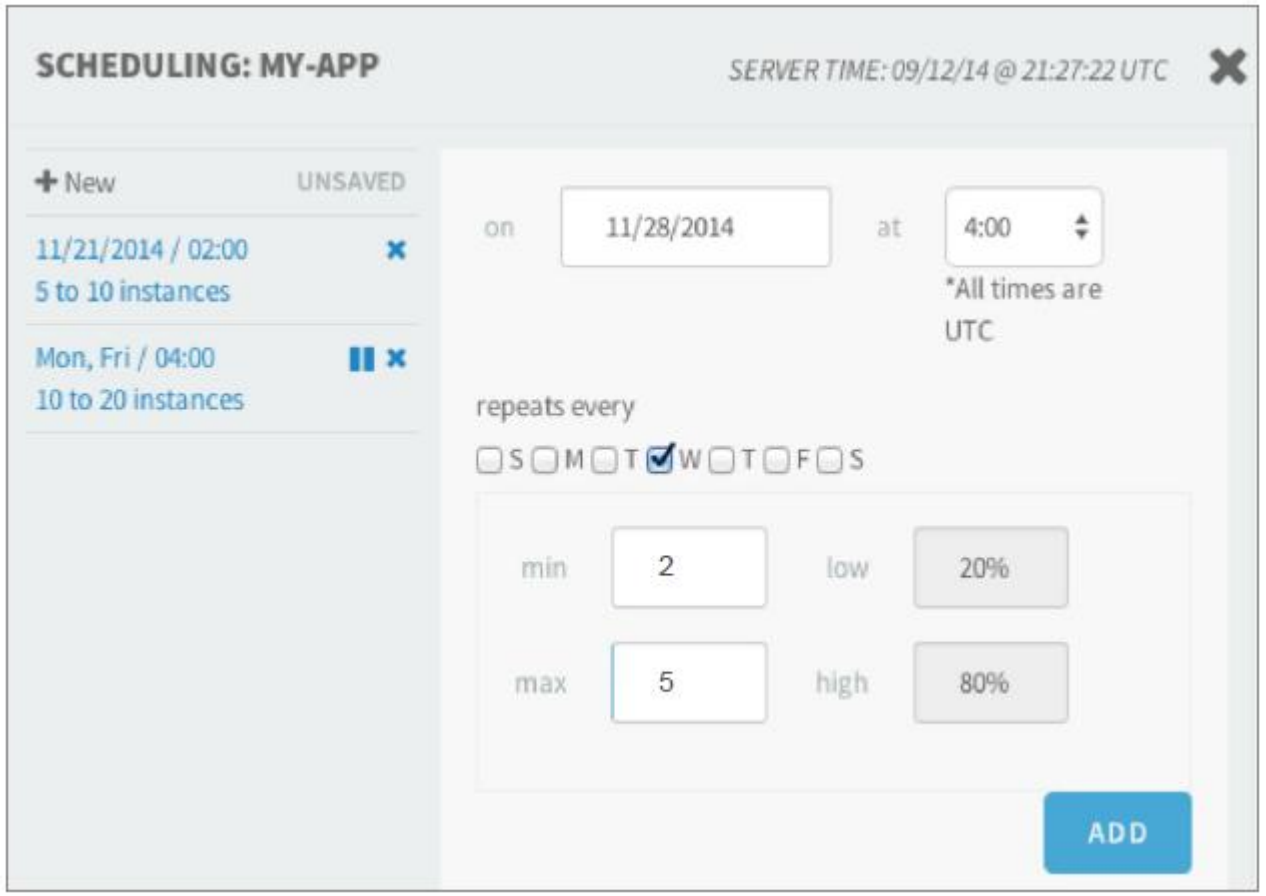


- Manual scaling disables AutoScaling
  - Re-enable:



AutoScaling - Scheduling

- Autoscaling events can be scheduled
- Changes auto scaling behaviour on the given date / time.
- May be single event or recurring



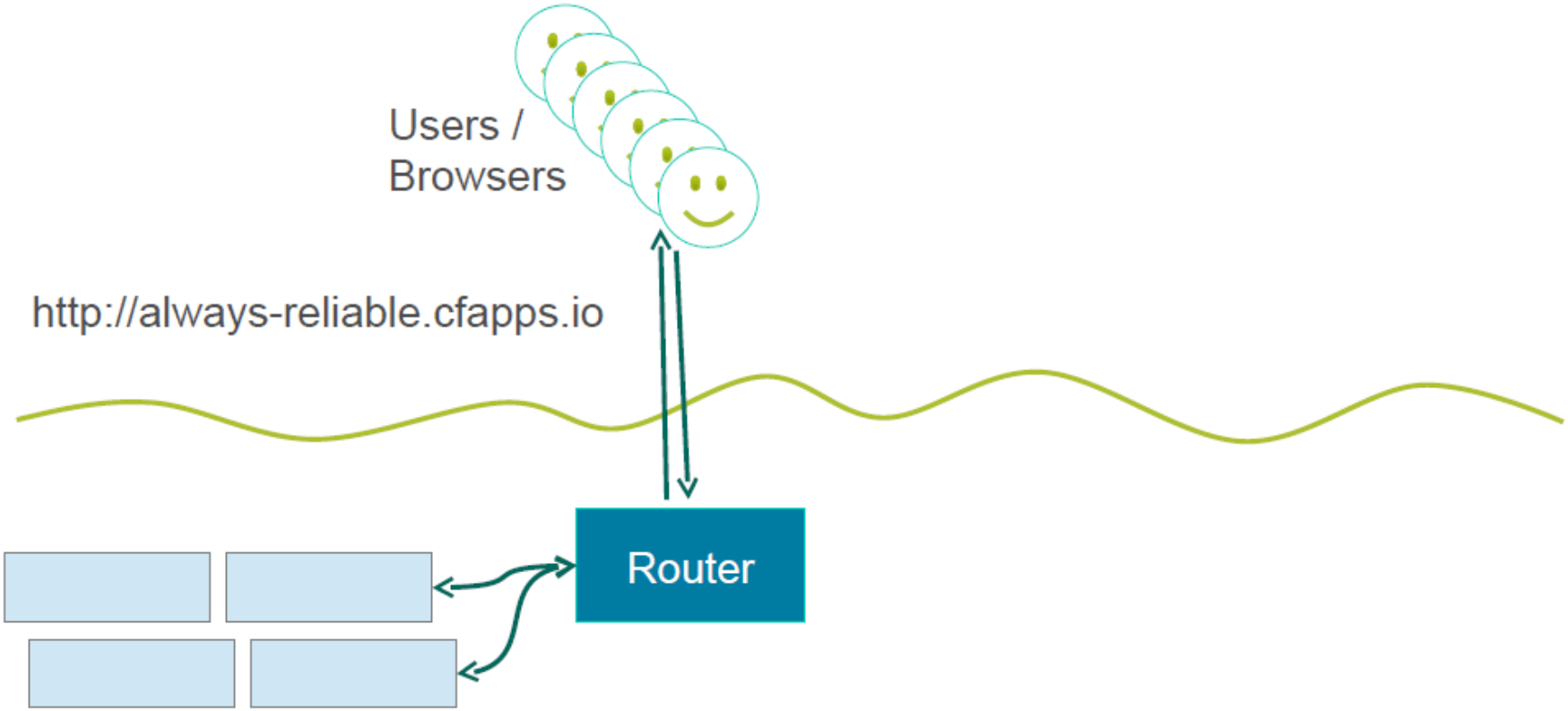
ZERO-DOWN TIME DEPLOYMENT

Blue Green Deployments

- **cf** push causes CF to stop old instances, then start new
  - Bad news if you are a user
- Blue/Green Deployment eliminates user downtime
  - Also known as *"zero-downtime*" or "A/B" Deployment
  - Avoids "*Site Temporarily Down for Maintenance*"
- How it works:
  - Run 2 versions of an application (new /old)
  - Not merely multiple instances
  - Alter routes for applications to transfer traffic
  - **Note**: Users can still experience session loss.

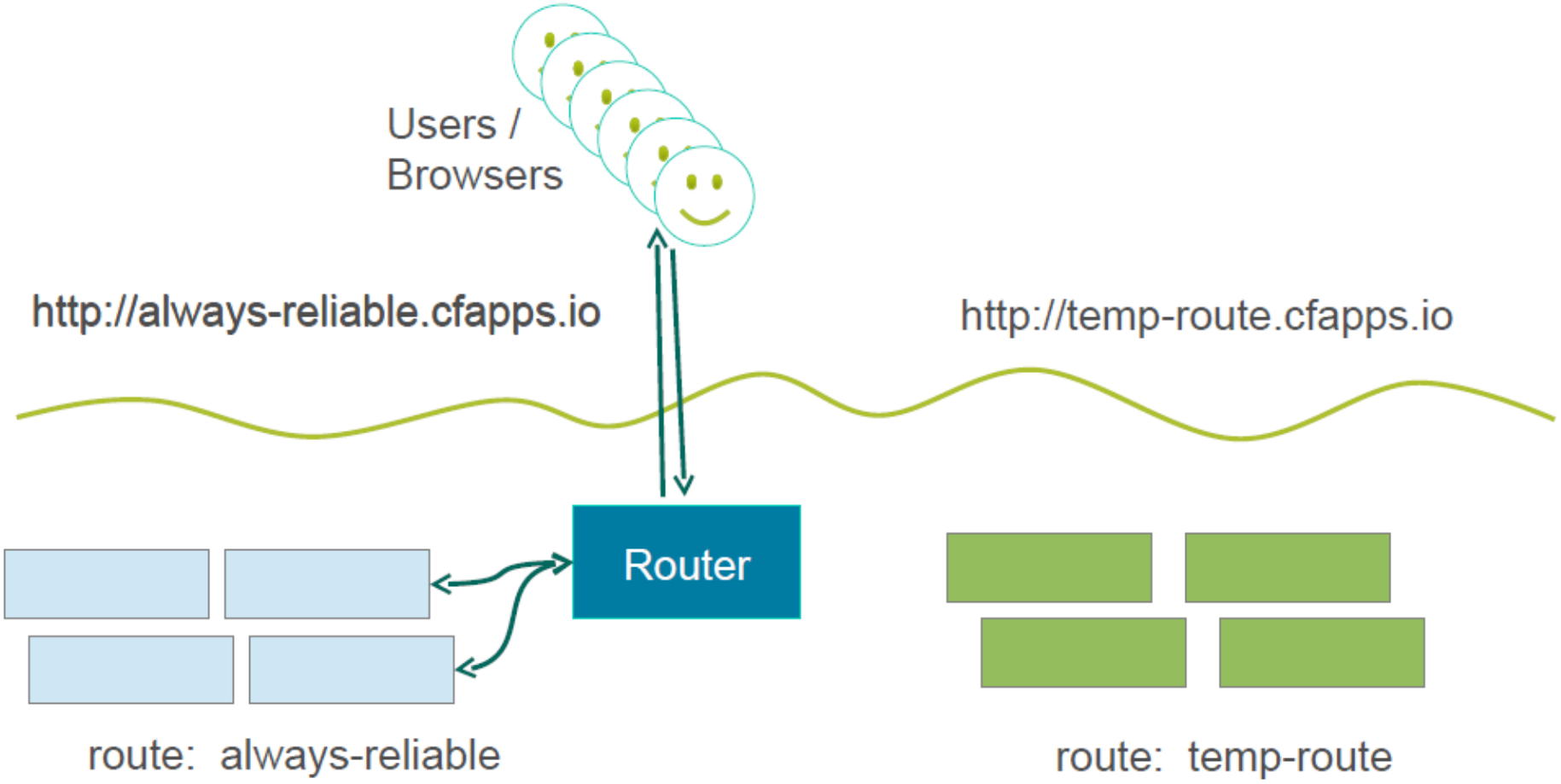
Blue Green Deployment – Existing App

cf push blue -p app.war -n always-reliable -i 4



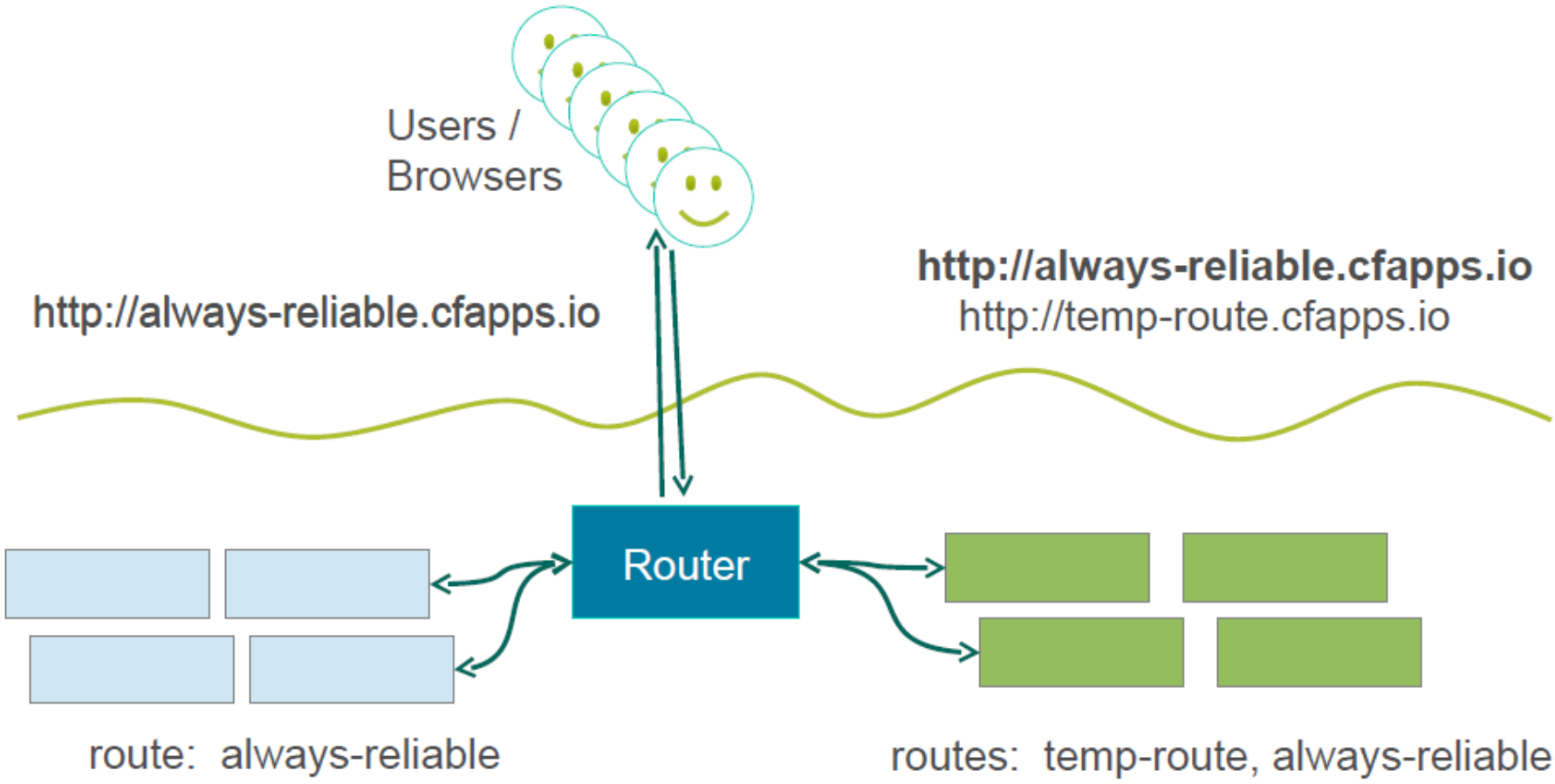
Blue Green Deployment – New App

cf push green -p app.war -n temp-route -i 4



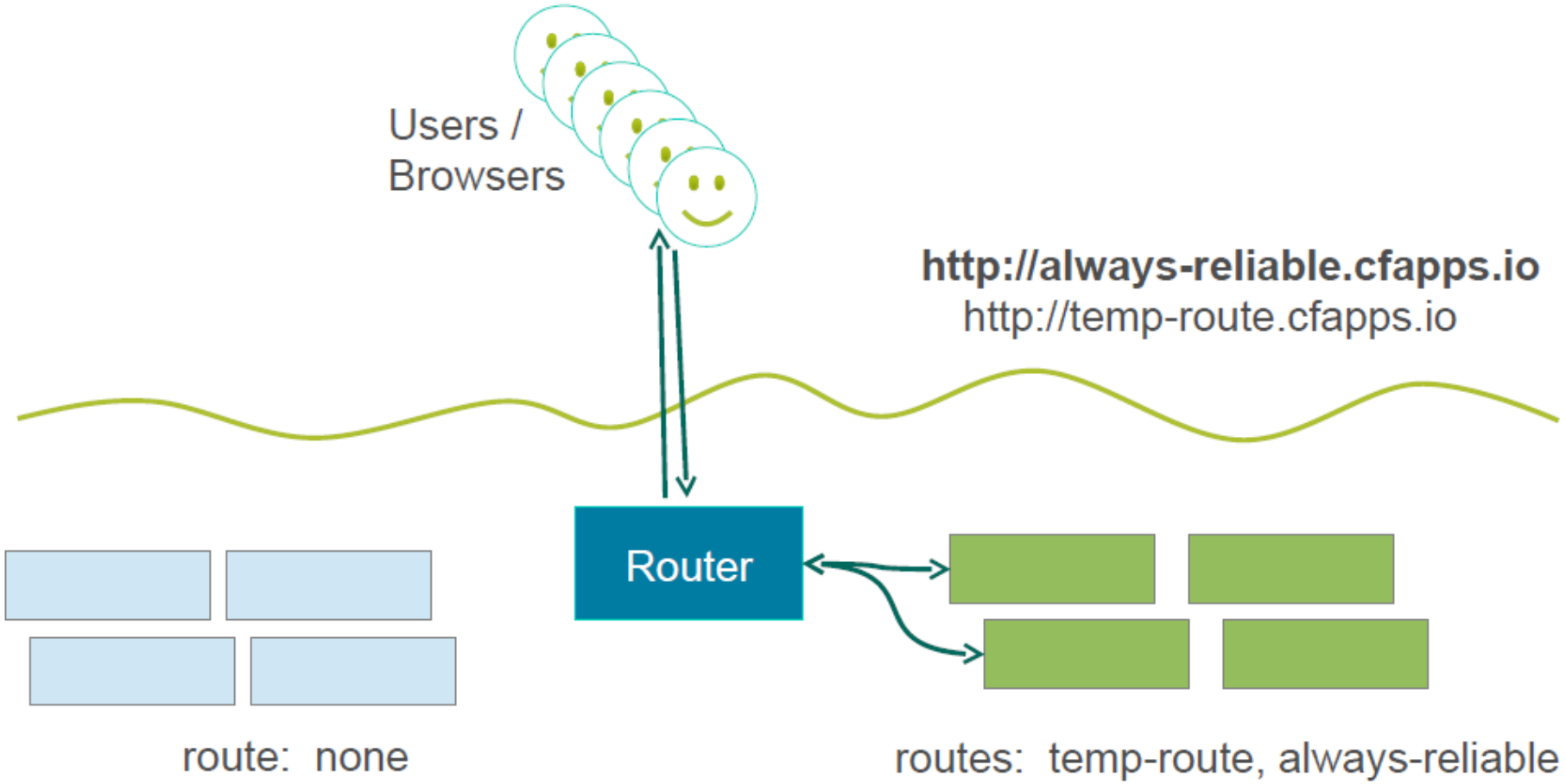
Blue Green Deployment – Duplicate Route

cf map-route green cfapps.io -n always-reliable



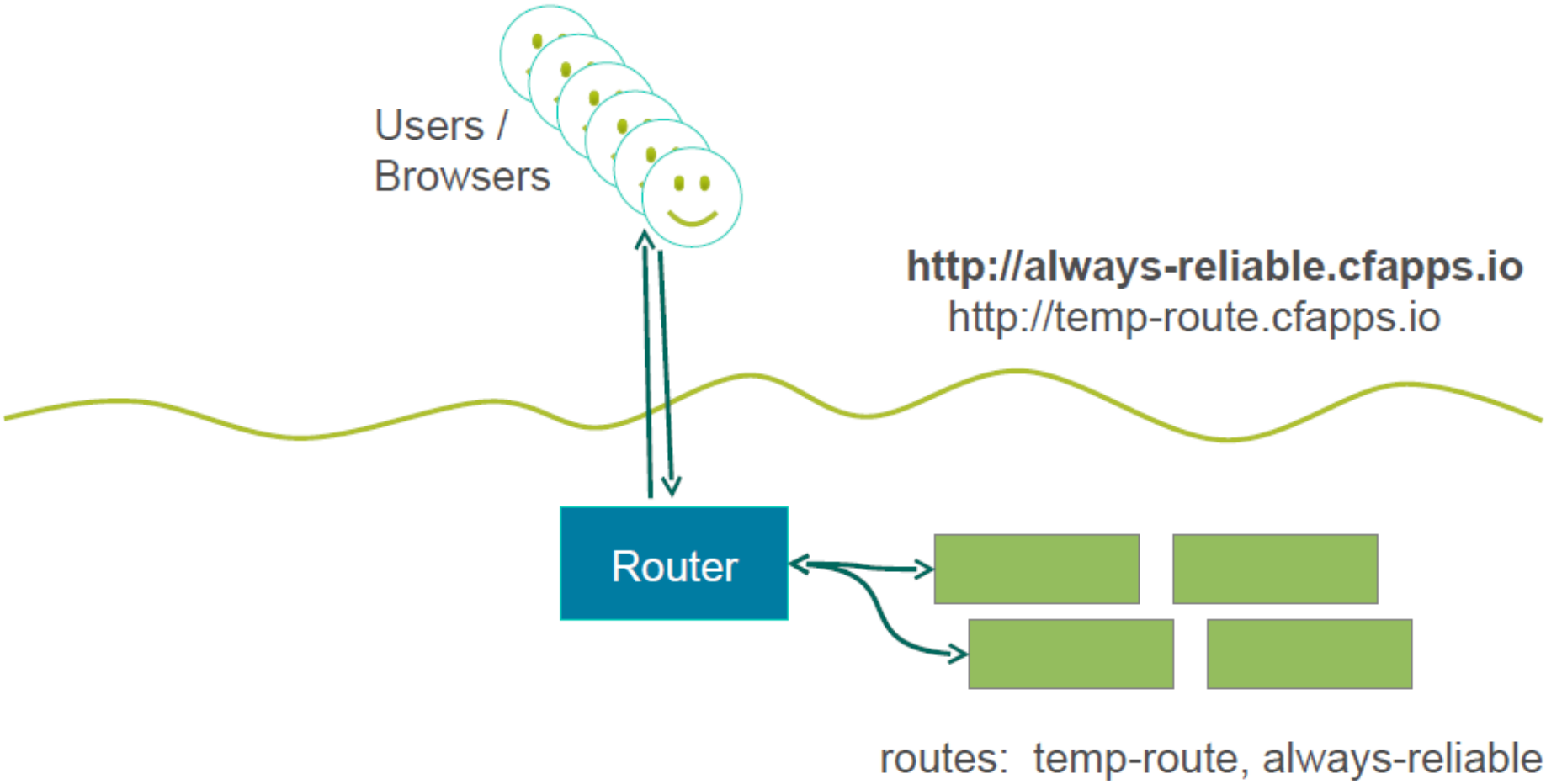
Blue Green Deployment – Disconnect Blue

cf unmap-route blue cfapps.io -n always-reliable



Blue Green Deployment – Remove Blue

cf delete blue



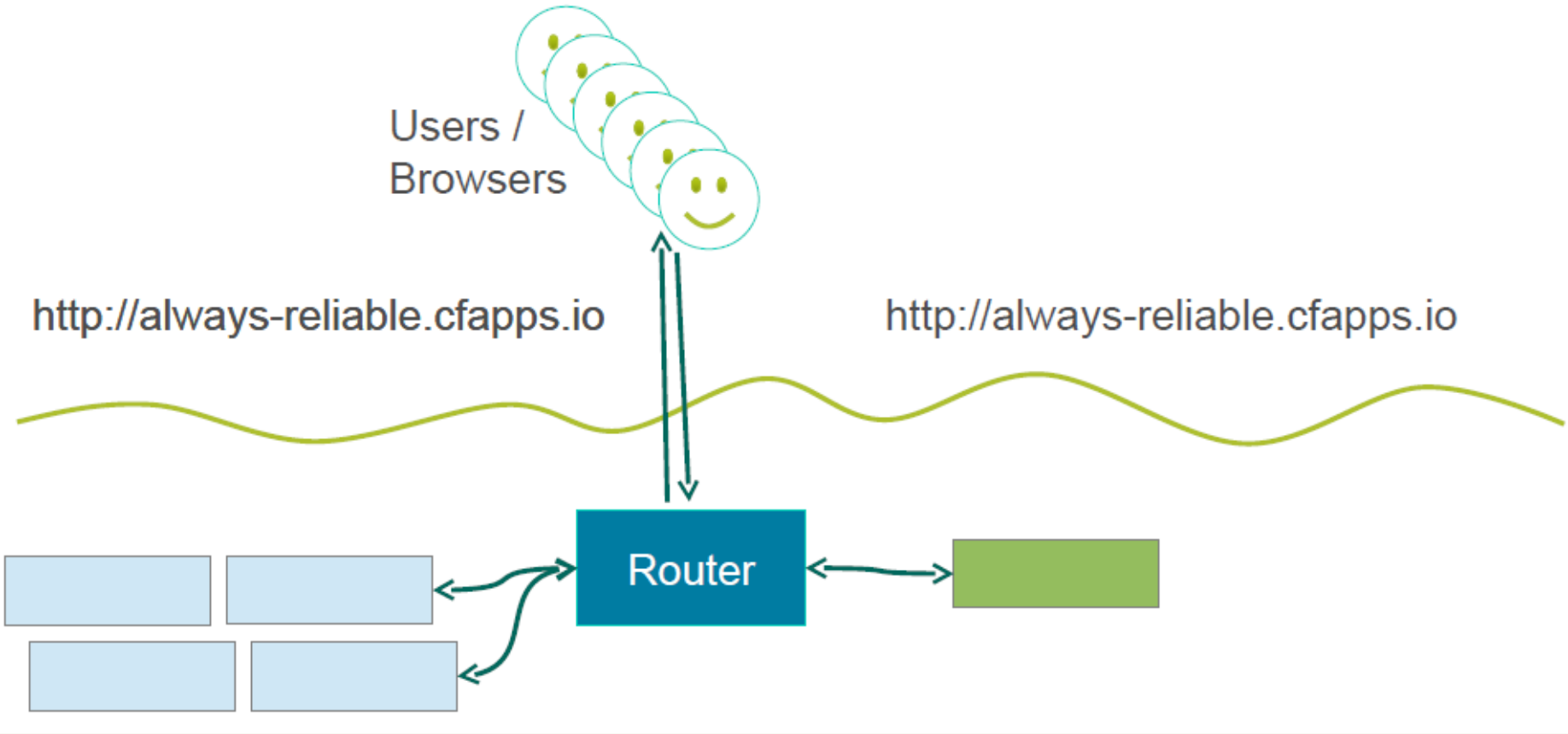
Canary Deployments

- variation on the Blue/Green deployment
  - "Canary in a coal mine"

1. Start with many 'blue' instances
2. Start a single 'green' instance, route traffic to both
   - Green instance is the 'Canary'
3. Watch the Canary
   - If it behaves, scale 'green' up /scale 'blue' down.
4. Continue monitoring and scaling until zero blue instances.

Canary Deployment – Push The Canary

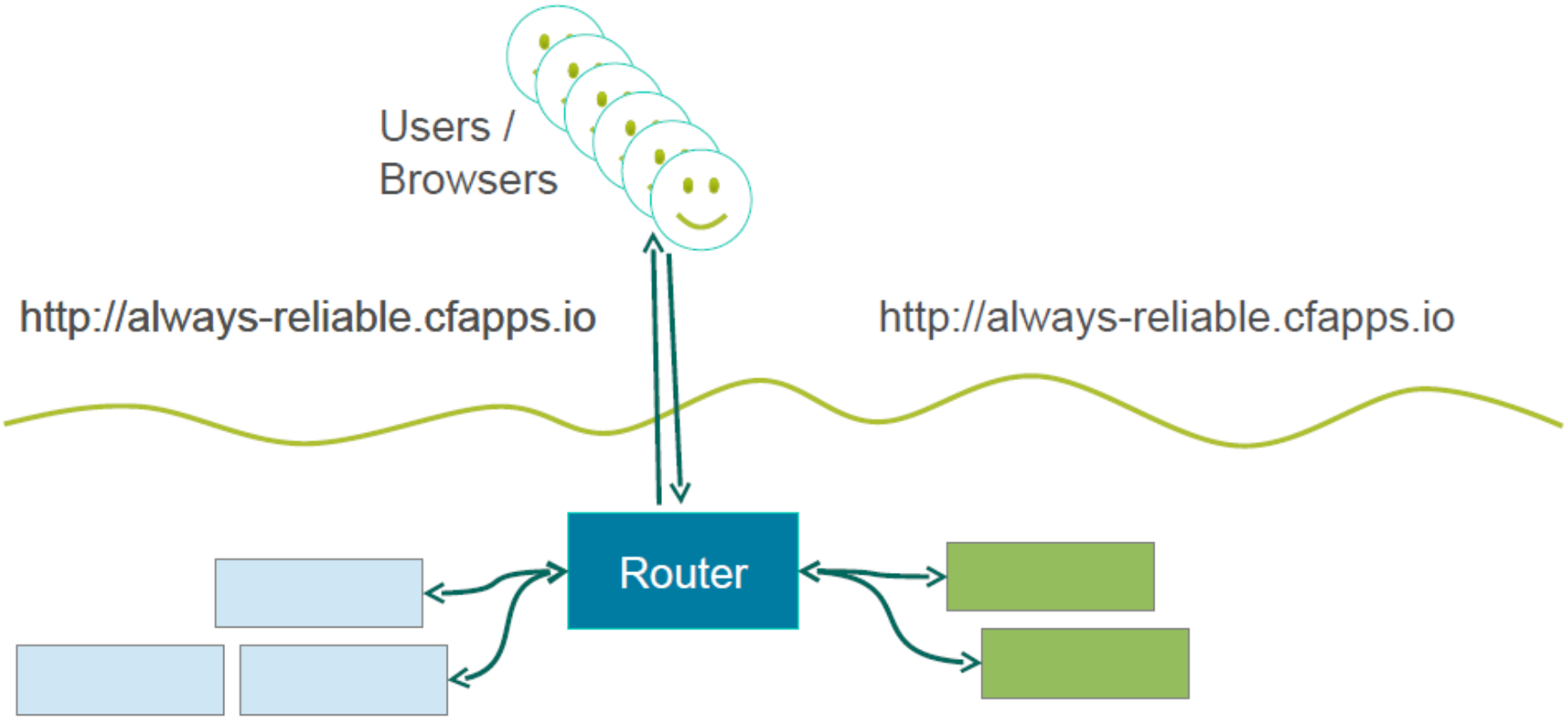
cf push green -p app.war -n always-reliable -i 1



Canary Deployment – Scale Traffic

cf scale green –i 2

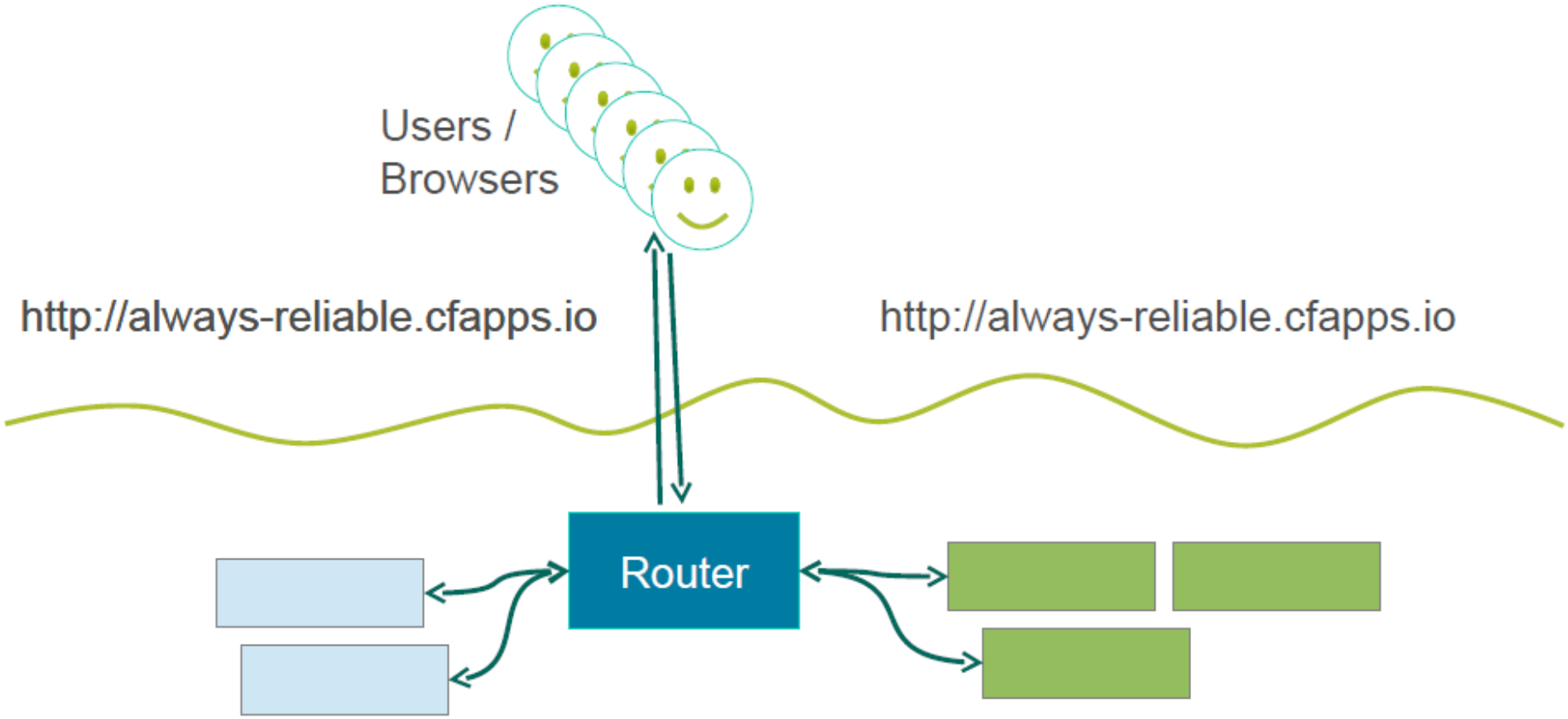
cf scale blue –i 3



Canary Deployment – Scale Traffic

cf scale green –i 3

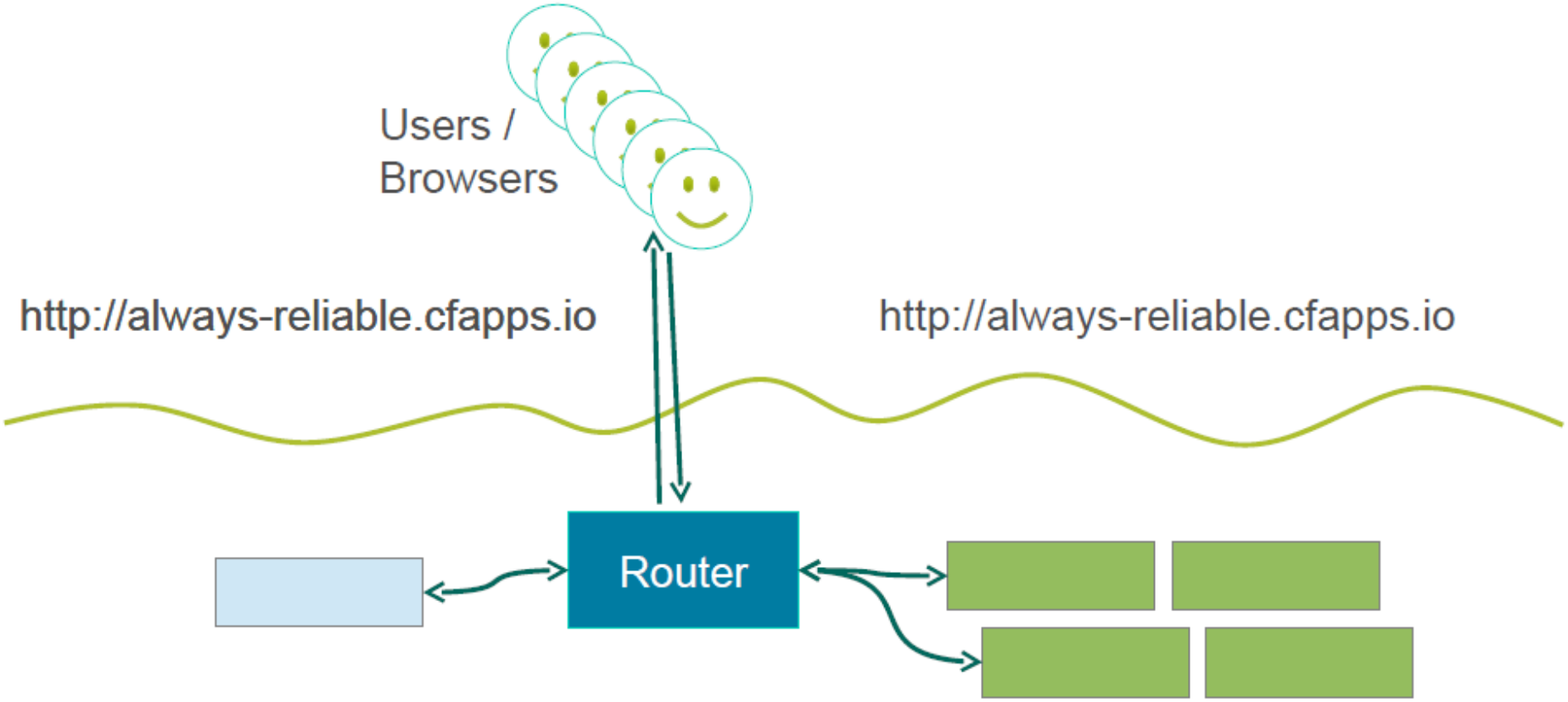
cf scale blue –i 2



Canary Deployment – Scale Traffic

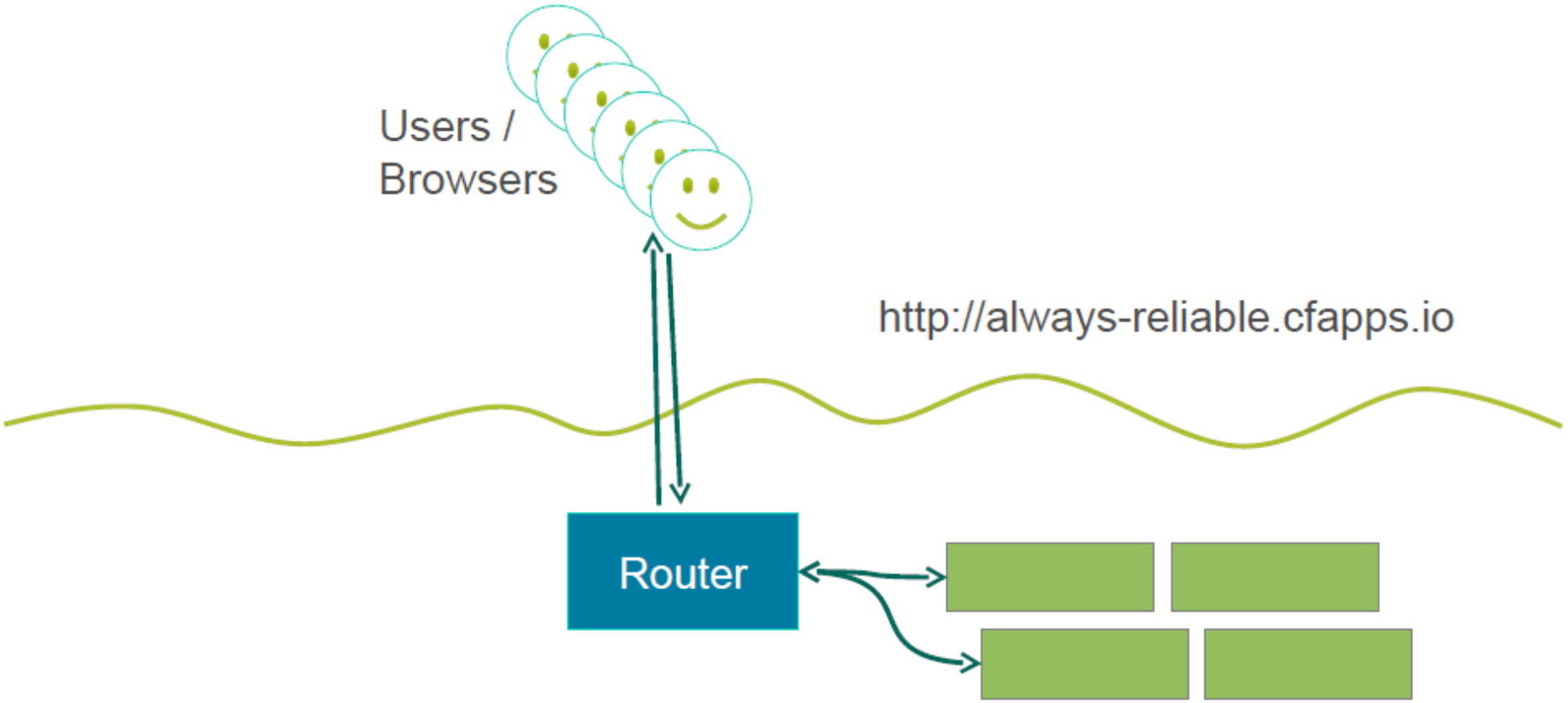
cf scale green –i 4

cf scale blue –i 1



Canary Deployment – Scale Traffic

cf delete blue



Summary

- How to integrate with third-party log manager
- How to integrate with APM services
- How to employ App Autoscaling
- How to deploy with zerotime

Recap

3rd party log

autoscale

ops manager

blue

green

zerodown-time

canary

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