Continuous Delivery for DC/OS with Spinnaker

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Cerner

Deploying software is challenging

Why continuous delivery?

- Decrease risks of deployment
- Decrease cost of deployment
- Decrease delay between feature development and availability

Deployments should be:

- Safe
- Automated
- Flexible

Cerner

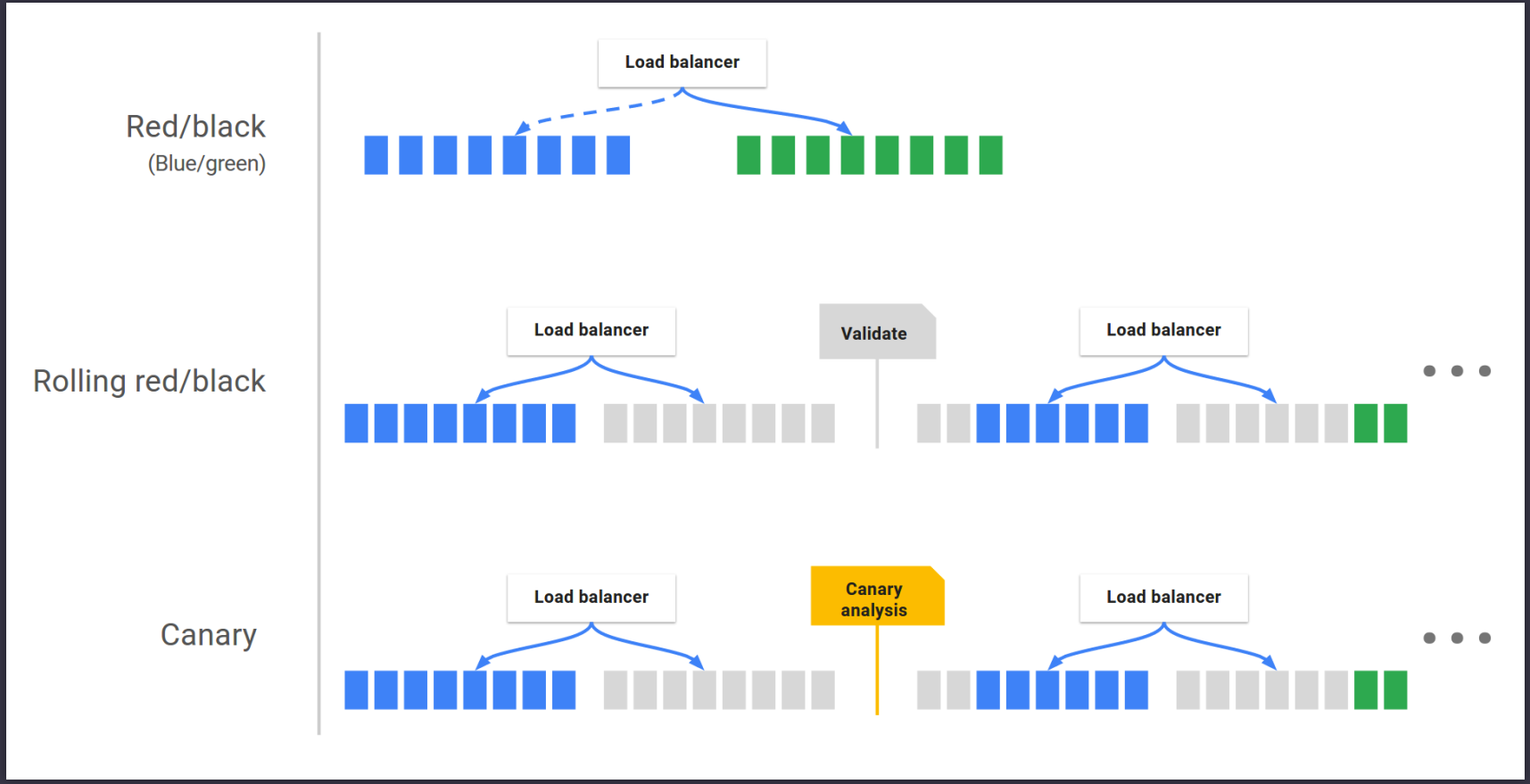
Safety features

- Unit tests
- Sandbox deployments
- Smoke tests
- Zero downtime deployments
- Rolling/canary deployments

Automation

- Automation is an enabler of safety
- Define and test the parts of deployments that aren't often performed
- Deploy smaller changes more frequently

Deployment Strategies



Source: https://www.spinnaker.io/concepts/#deployment-strategies

Flexible

- Many teams with similar needs, but some variation
- Engineers naturally want to automate
- Make it easy to share and reuse

How?

Introducing Spinnaker

The open-source, multi-cloud, continuous delivery tool

Continuous Delivery Features

- Pipelines from commit to production
- CI builds
- Image baking
- Deployment strategies
- Validation
- Promotion across environments

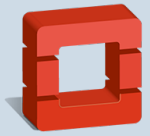
Multi-cloud

DC/OS

Google Cloud Platform

kubernetes

Microsoft Azure



openstack™

App Engine

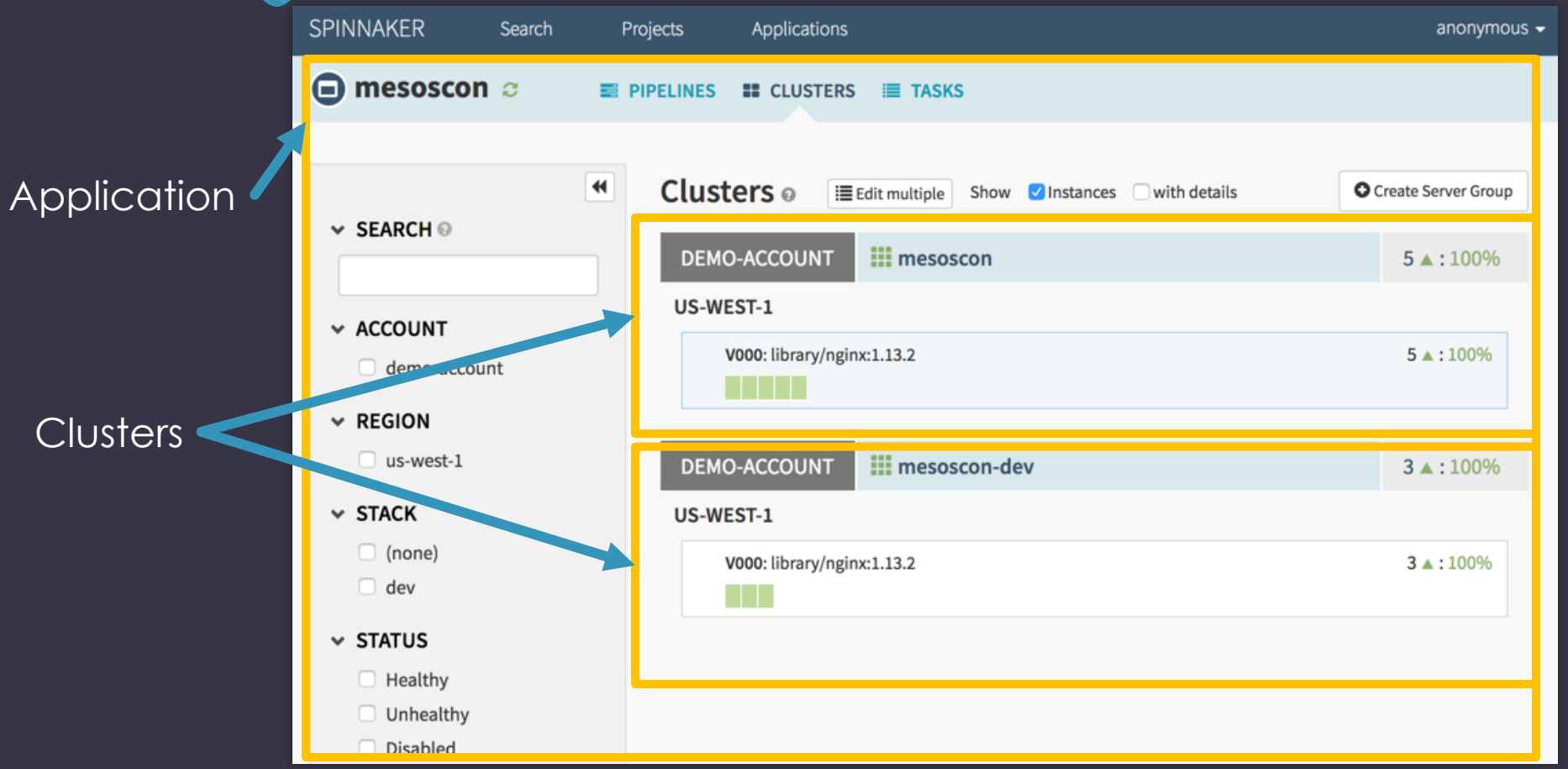
Multi-cloud

- Spinnaker is multi-cloud but not a pure abstraction

Spinnaker Concepts

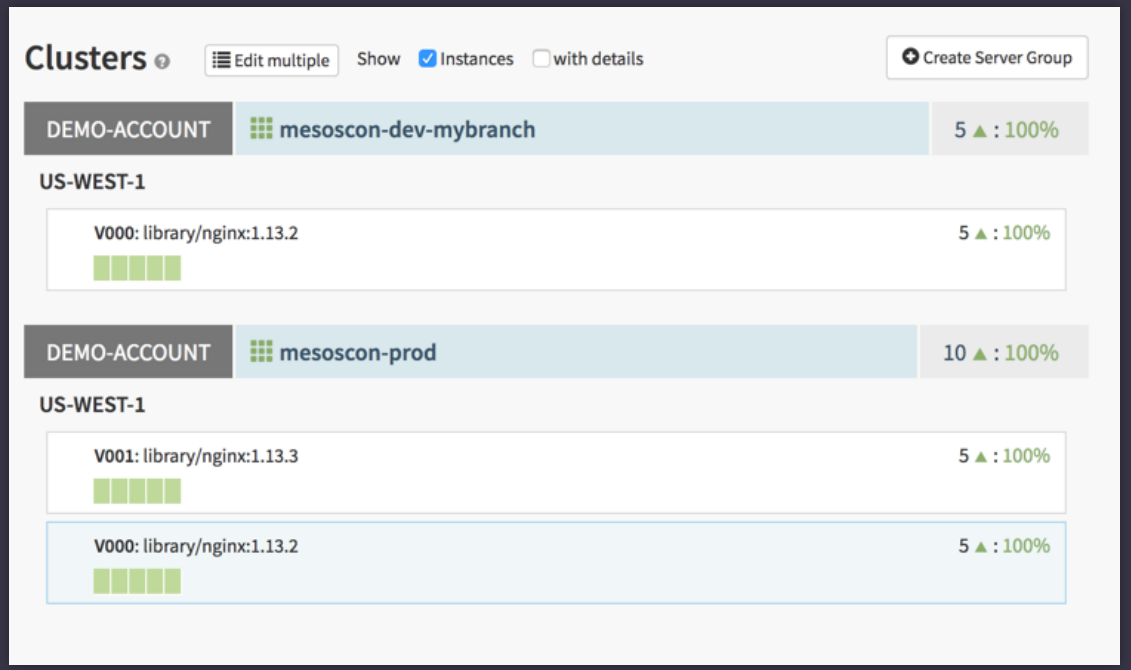
Applications, Clusters, Server Groups, and Instances

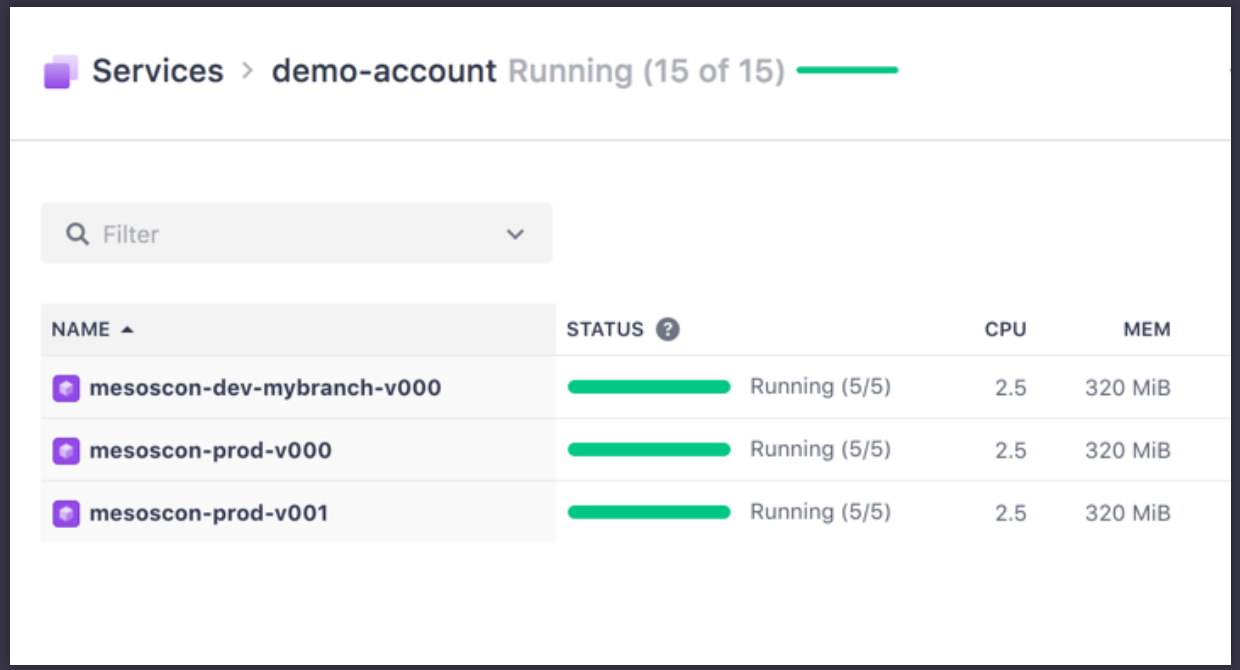
Applications and Clusters



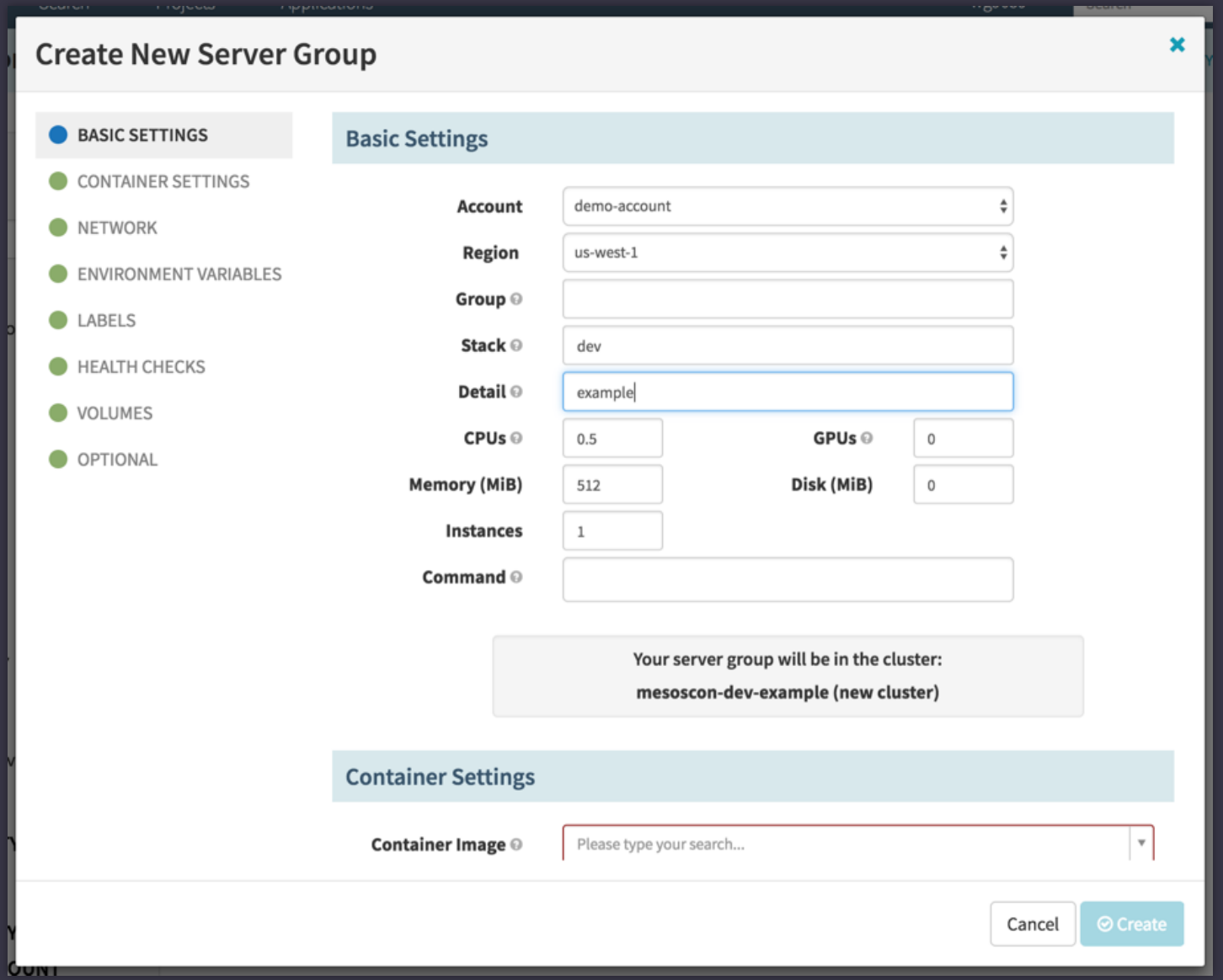
Server Groups and Instances

Marathon applications and tasks

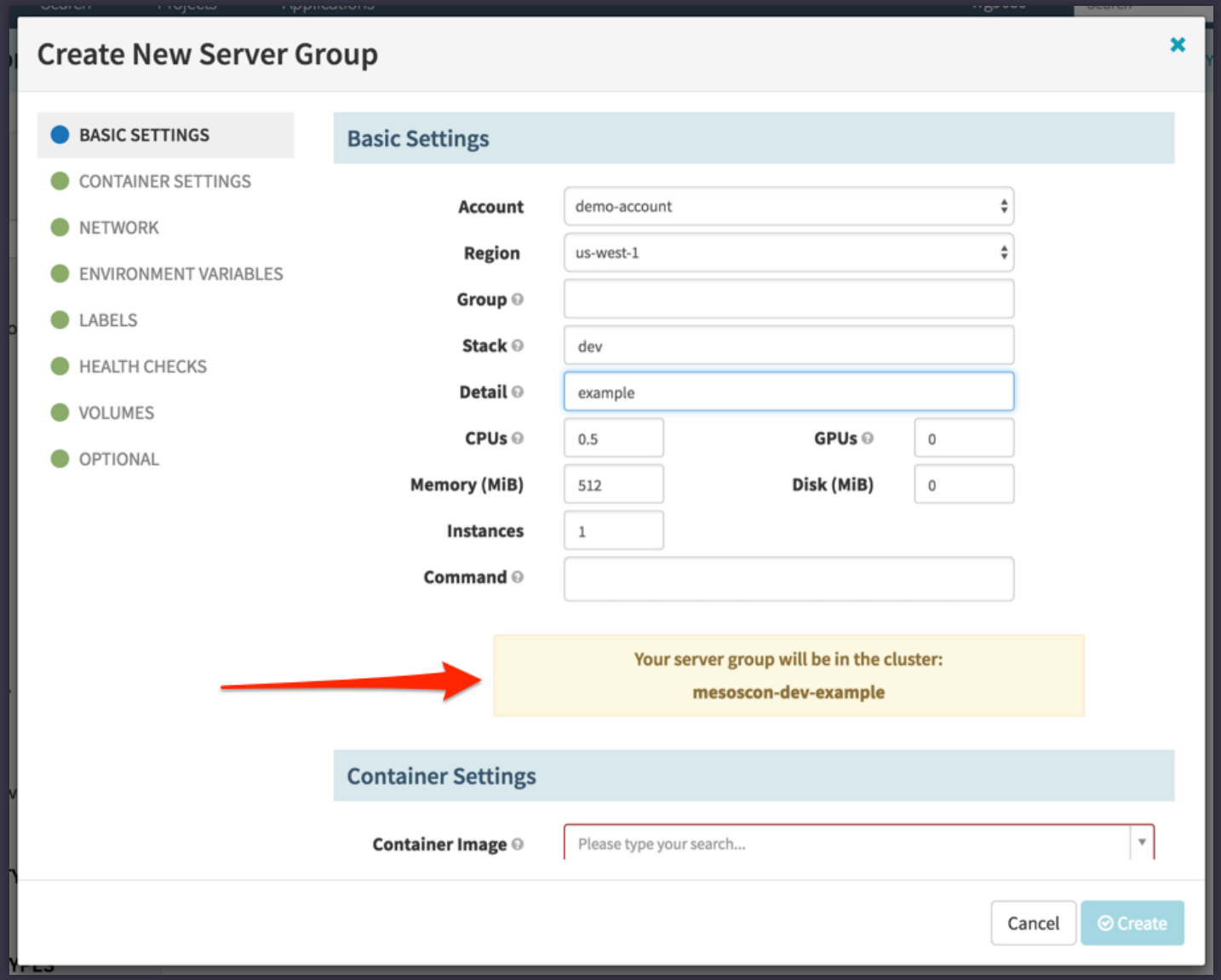




Create New Server Group



Create New Server Group



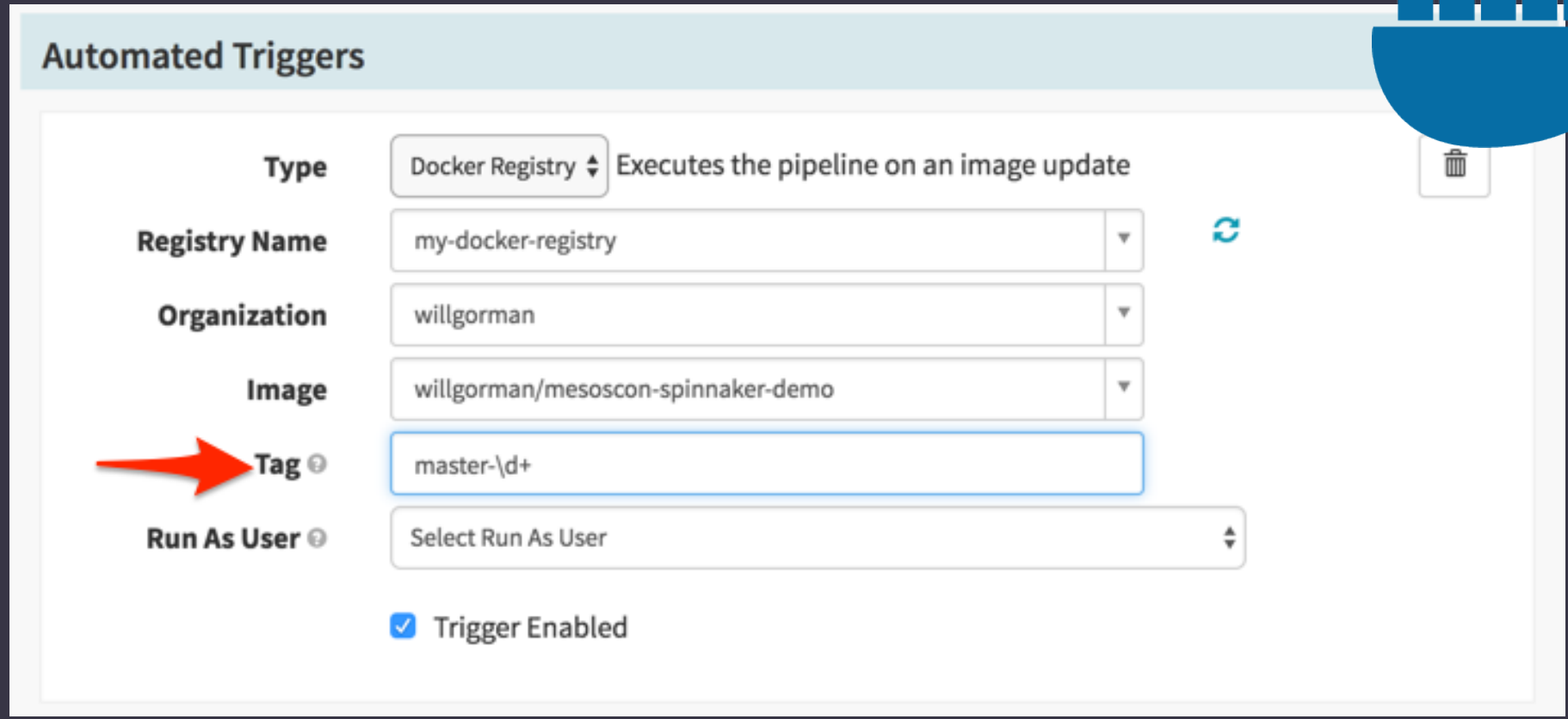
Multi-Region Deployments

Pipelines

Deploy to Dev
Permalink
Create
Configure
Pipeline Actions
Configuration
Jenkins Build
Deploy New Version
Smoke Test
Destroy New Version
Fail
Destroy Previous Version
Prod Pipeline
Add stage
Copy an existing stage

Triggers

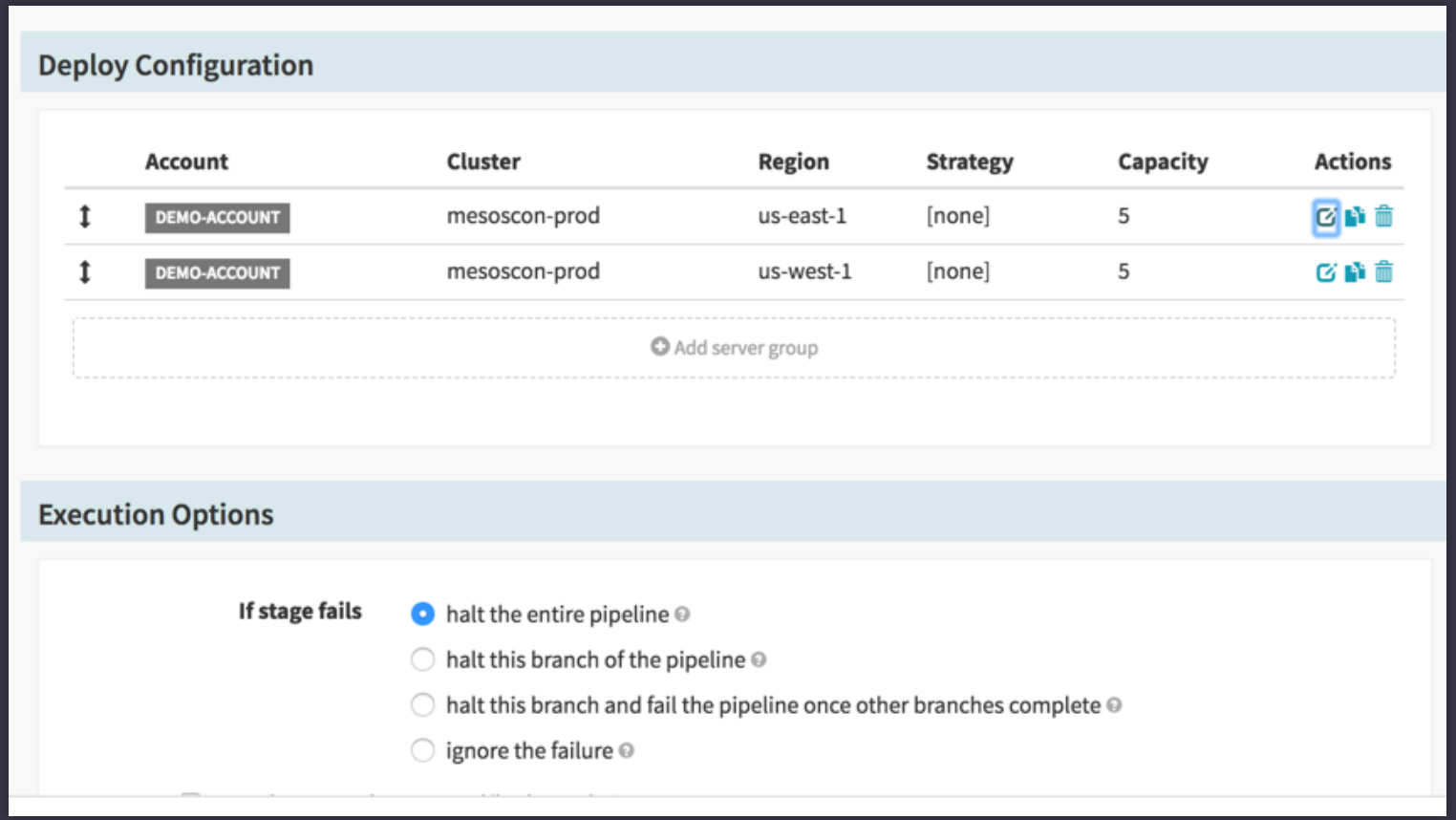
Docker Registry Trigger



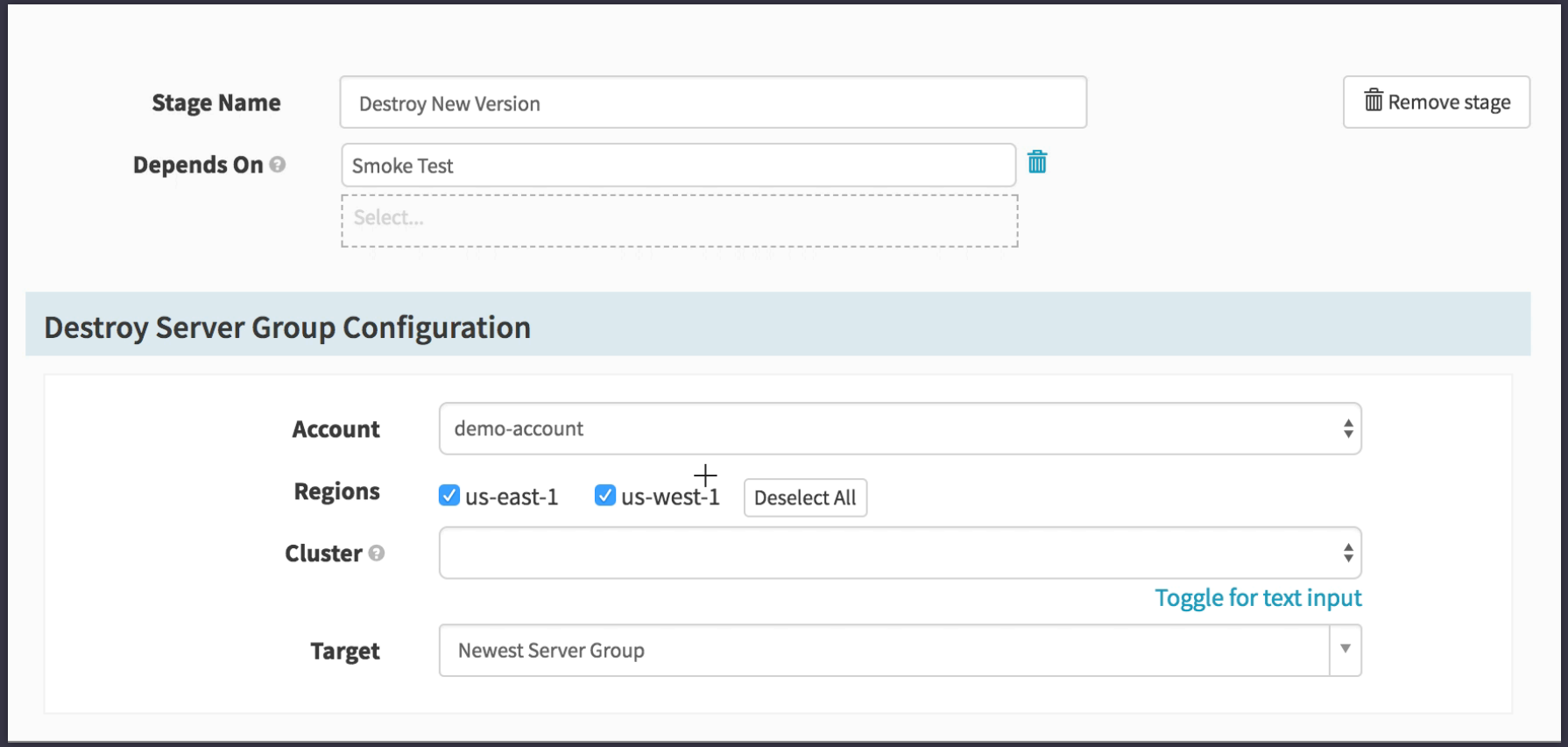
DC/OS Stages Supported

- Pipeline Stages
  - Check preconditions
  - Deploy
  - Destroy Server Group
  - Disable Cluster
  - Find Image from Cluster
  - Jenkins, Manual Judgement, Pipeline, Resize Server Group, Run Job, Scale Down Cluster, Script, Shrink Cluster, Wait
- Server Groups
  - Create
  - Resize
  - Clone
  - Destroy

Deploy


Deploy Configuration
Account
Cluster
Region
Strategy
Capacity
Actions
DEMO-ACCOUNT
mesoscon-prod
us-east-1
[none]
5
DEMO-ACCOUNT
mesoscon-prod
us-west-1
[none]
5
Add server group
Execution Options
If stage fails
halt the entire pipeline
halt this branch of the pipeline
halt this branch and fail the pipeline once other branches complete
ignore the failure

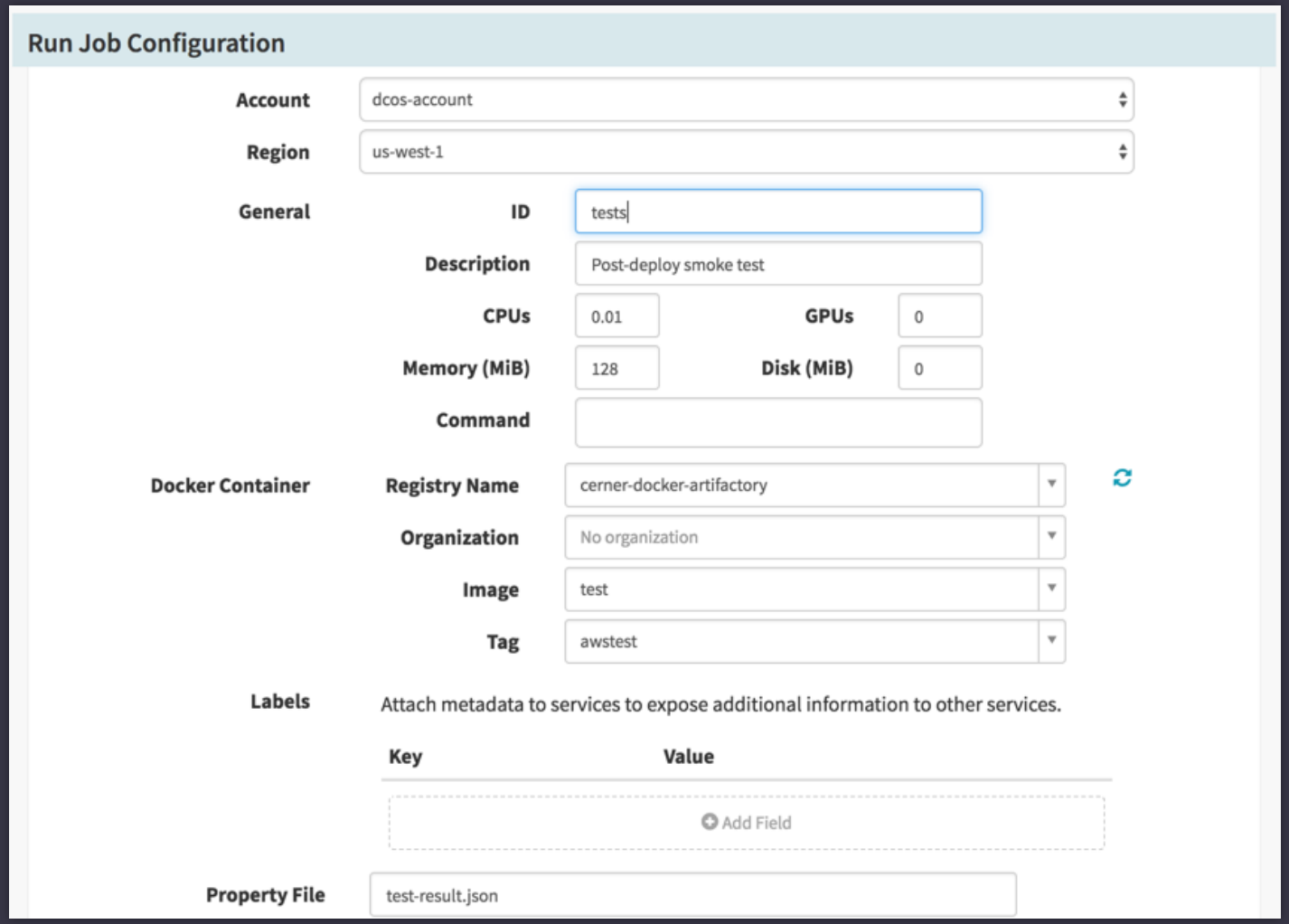
Destroy Server Group



Run Job

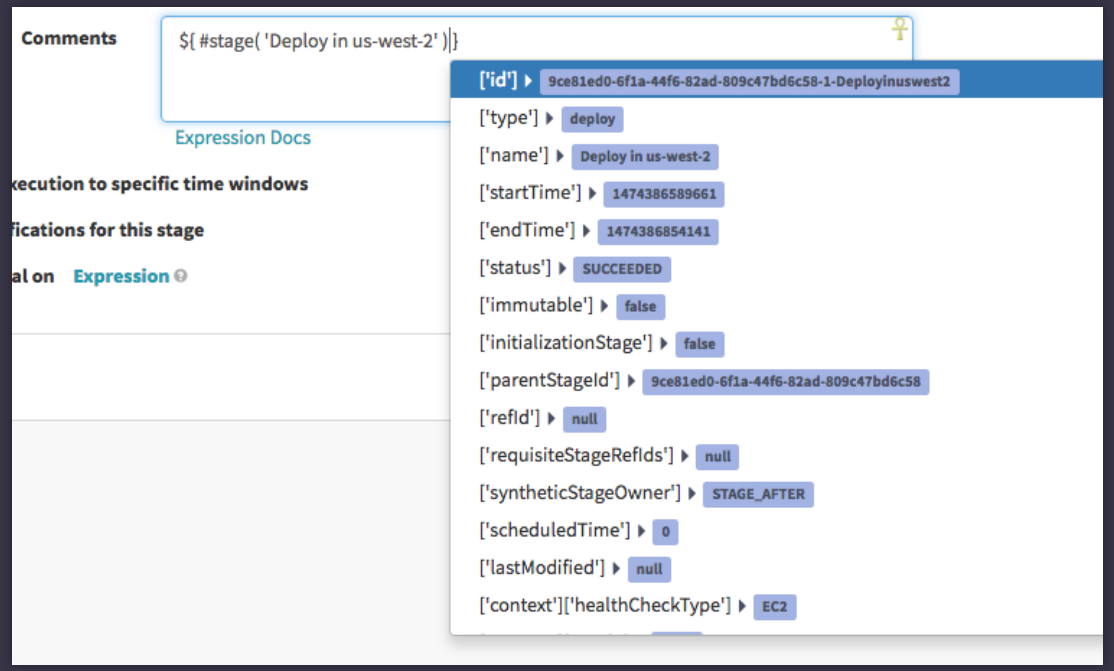
Execute a Metronome job as a step in a pipeline.

Write JSON or property file output to the Mesos sandbox to create context for later steps

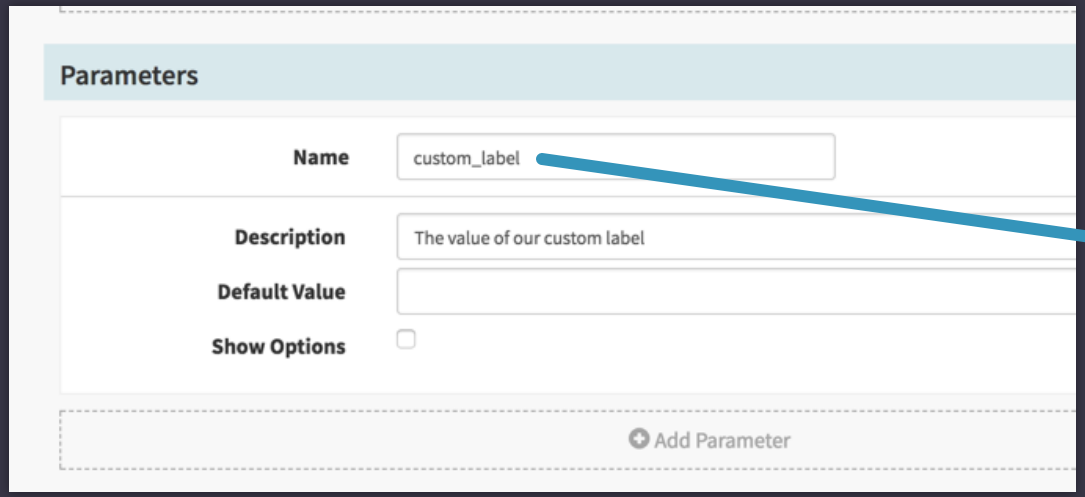


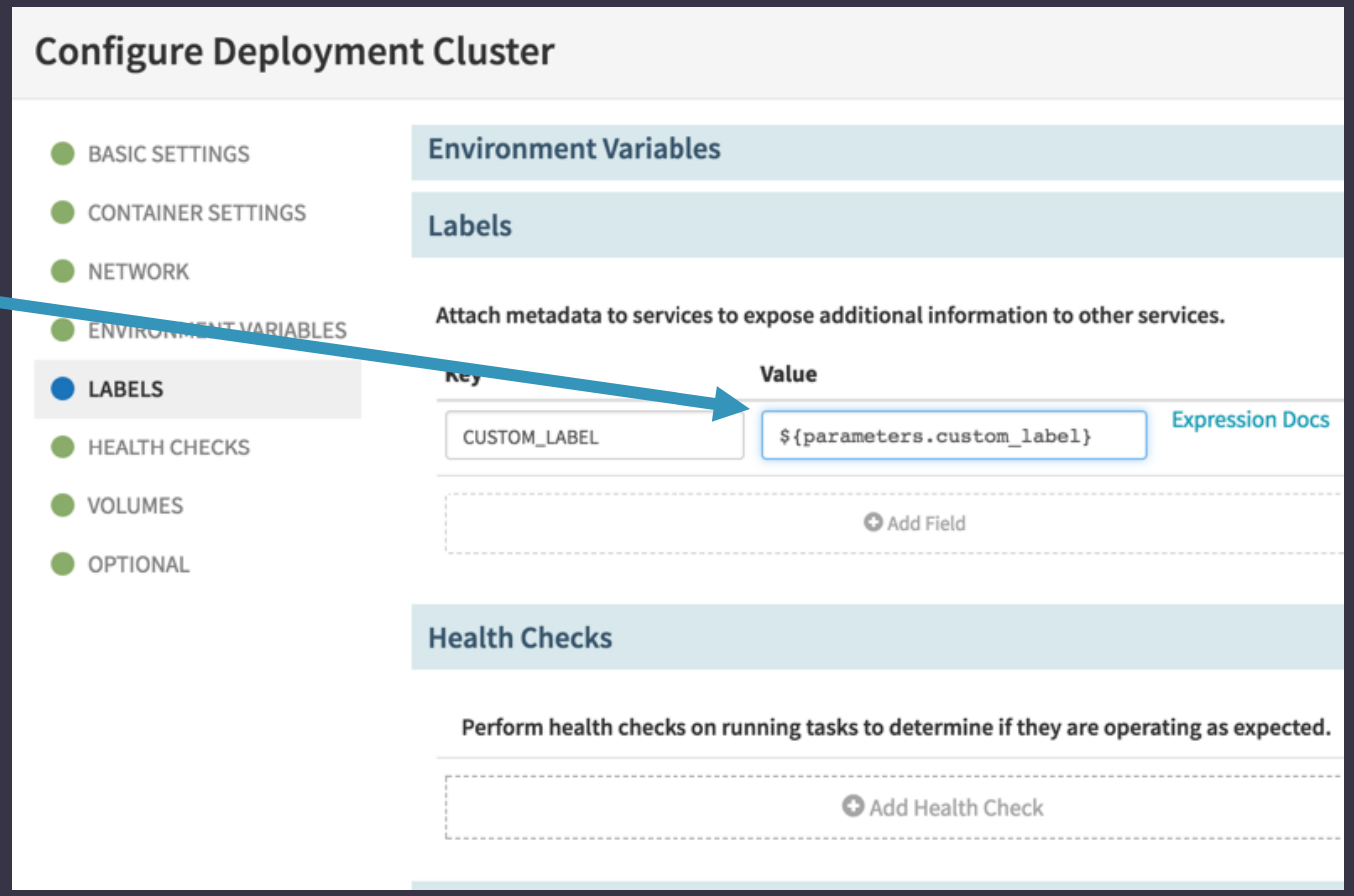
Pipeline Expressions

- Spring Expression Language
- Works almost anywhere
- Generate attributes of pipelines at run-time
- Evaluate to test for pipeline branching conditions



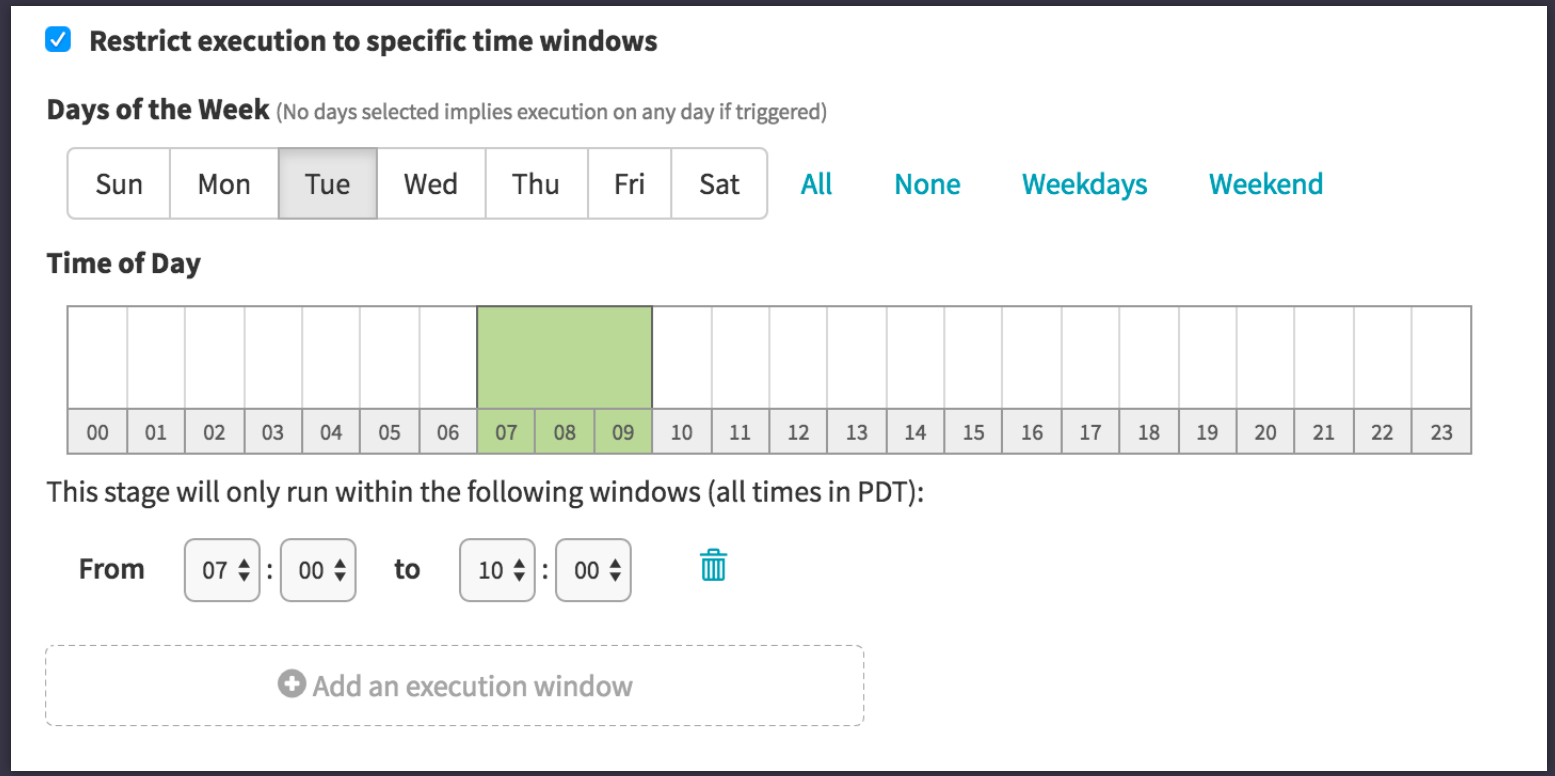
Pipeline Expressions





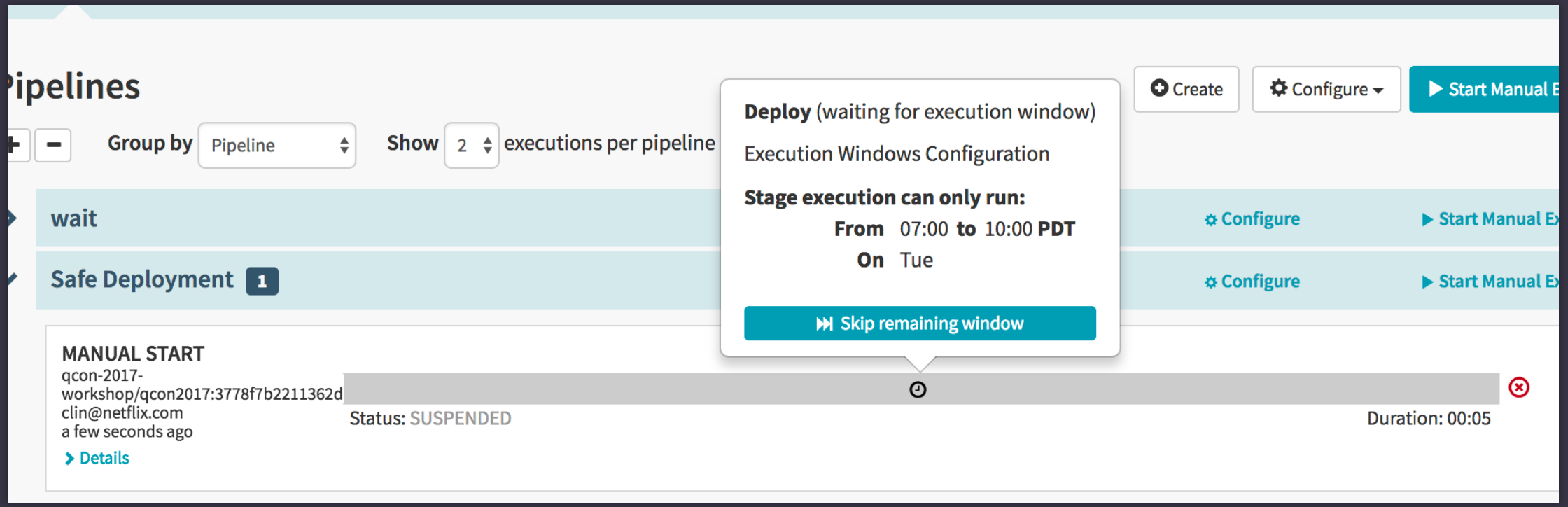
Deployment Safeguards

Execution Windows



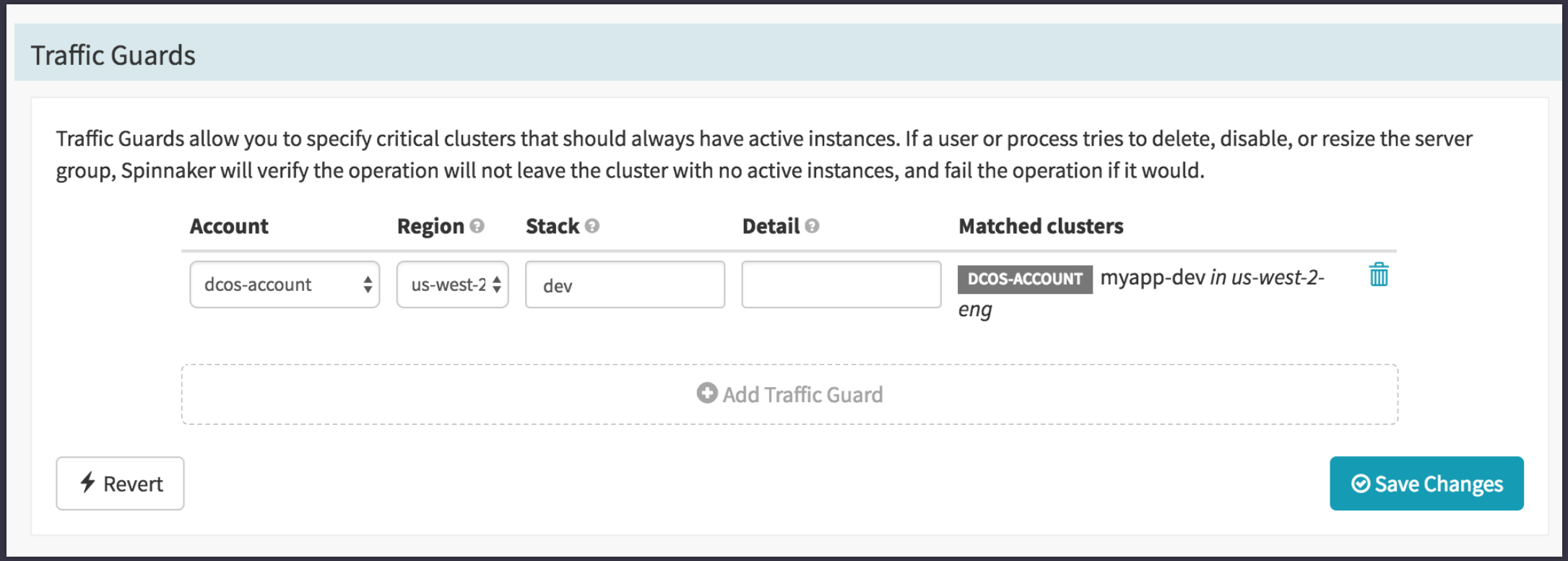
Source: https://www.spinnaker.io/guides/tutorials/codelabs/safe-deployments/

Execution Windows

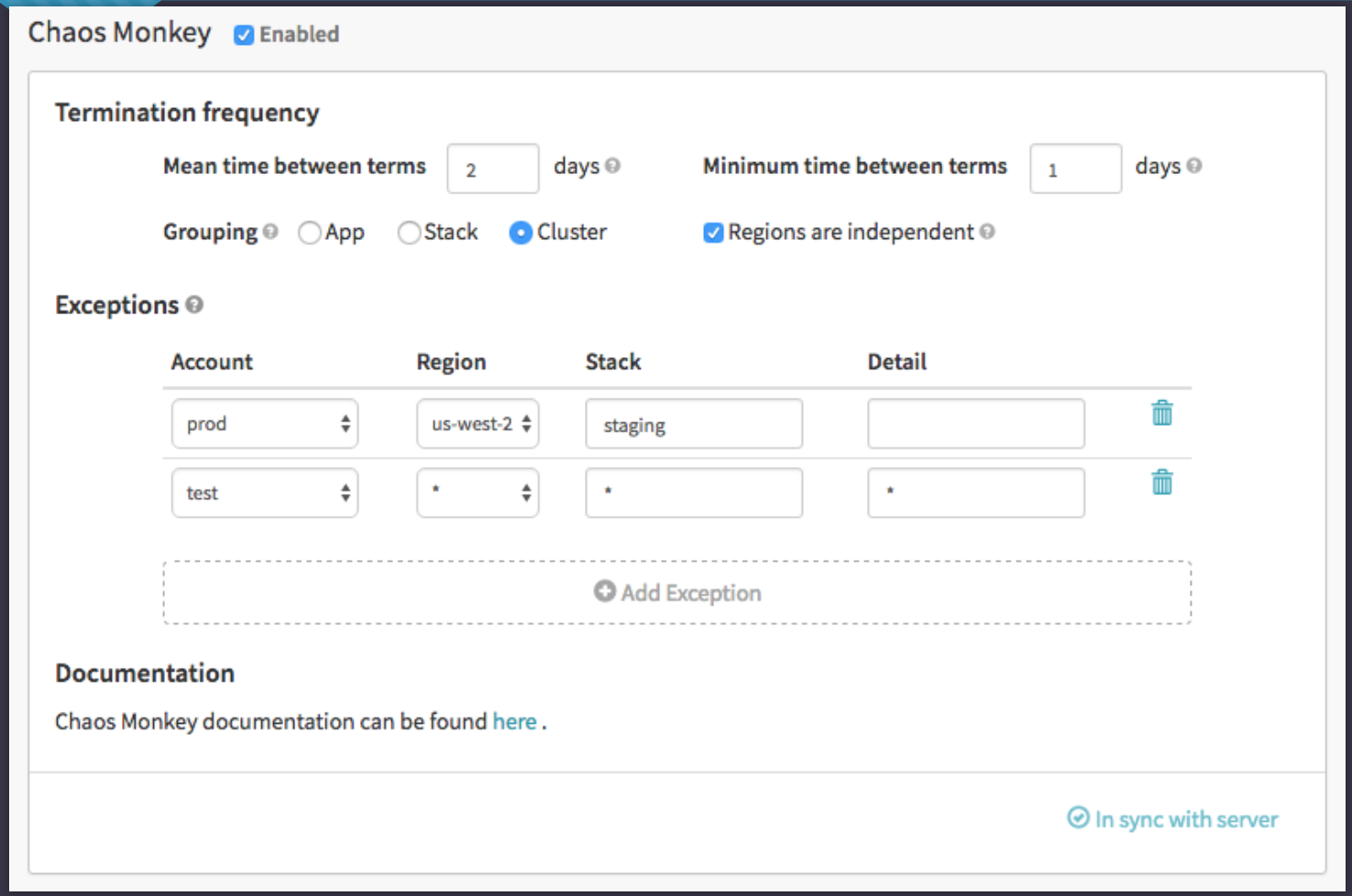


Source: https://www.spinnaker.io/guides/tutorials/codelabs/safe-deployments/

Traffic Guards



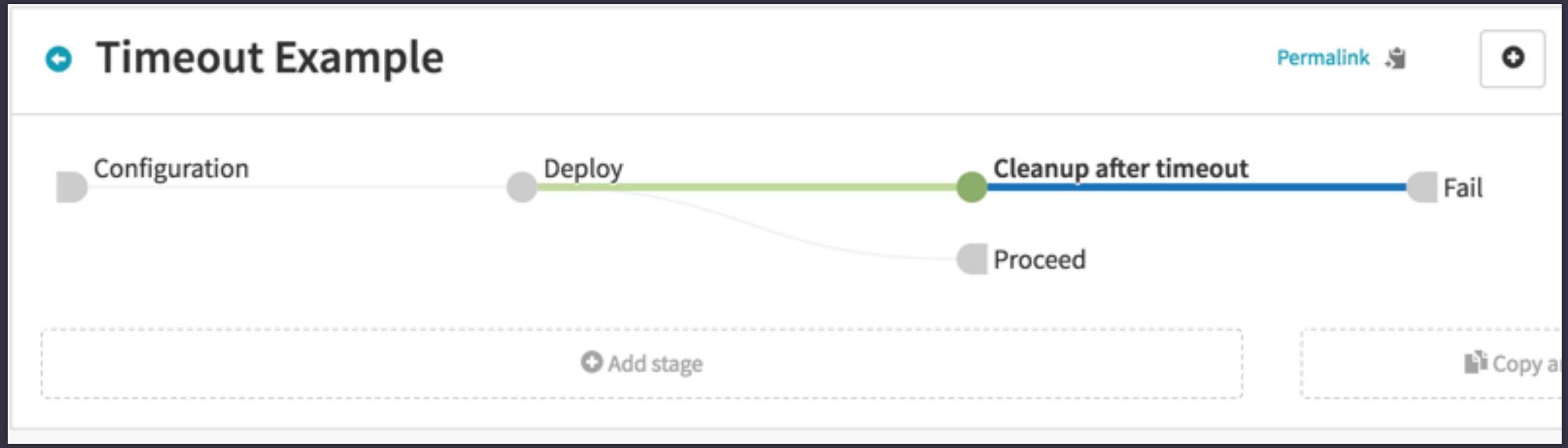
Chaos Monkey



Source: https://netflix.github.io/chaosmonkey/Configuring-behavior-via-Spinnaker/

Spinnaker Patterns for DC/OS

Deployment timeouts



```
"docker": {
  "image": {
    "account": "my-docker-registry",
    "imageId": "index.docker.io/library/nginx:oops",
    "registry": "index.docker.io",
    "repository": "library/nginx",
```

Deploy Configuration

	Account	Cluster	Region	Strategy	Capacity	Actions
↕	DEMO-ACCOUNT	mesoscon	us-west-1	[none]	N/A	

Add server group

Execution Options

If stage fails

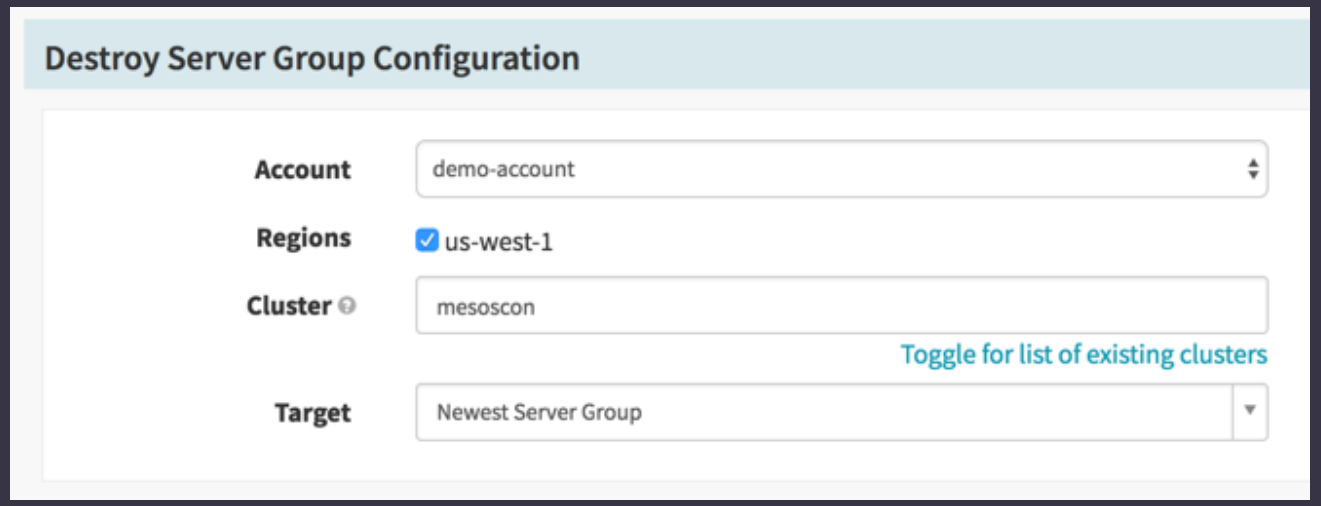
- ○ halt the entire pipeline
- ○ halt this branch of the pipeline
- ○ halt this branch and fail the pipeline once other branches complete
- ◉ ignore the failure

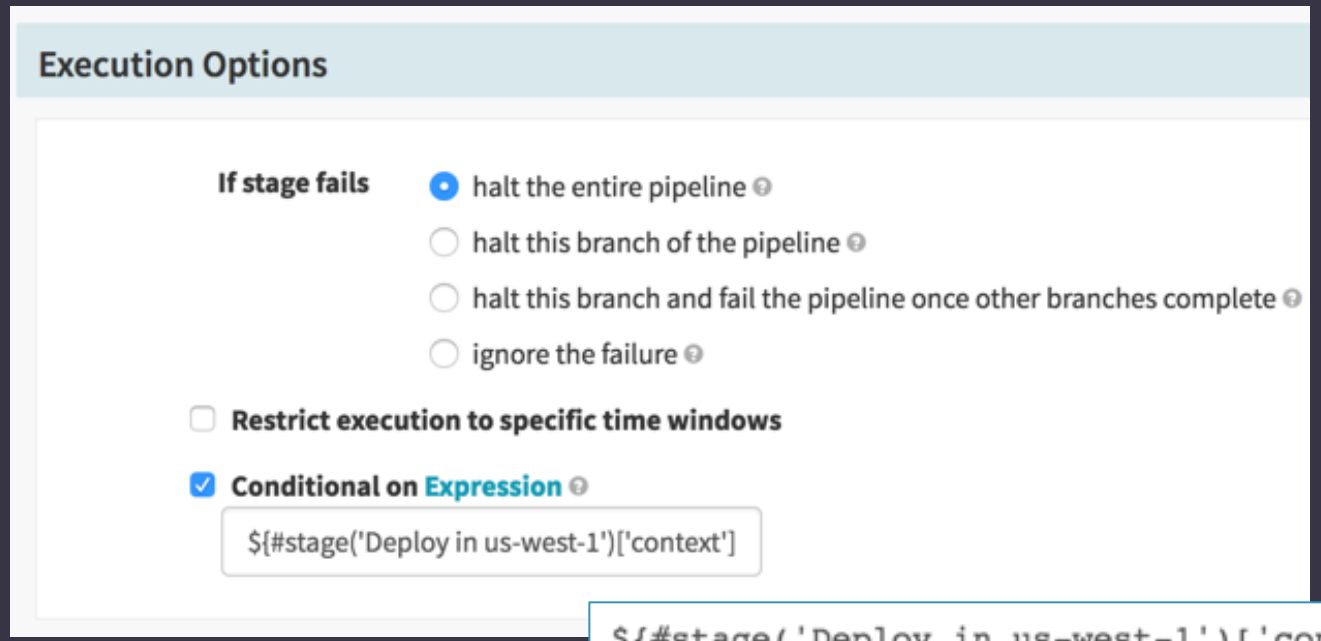
☐ **Restrict execution to specific time windows**

☑ **Override default timeout** (1 hour)

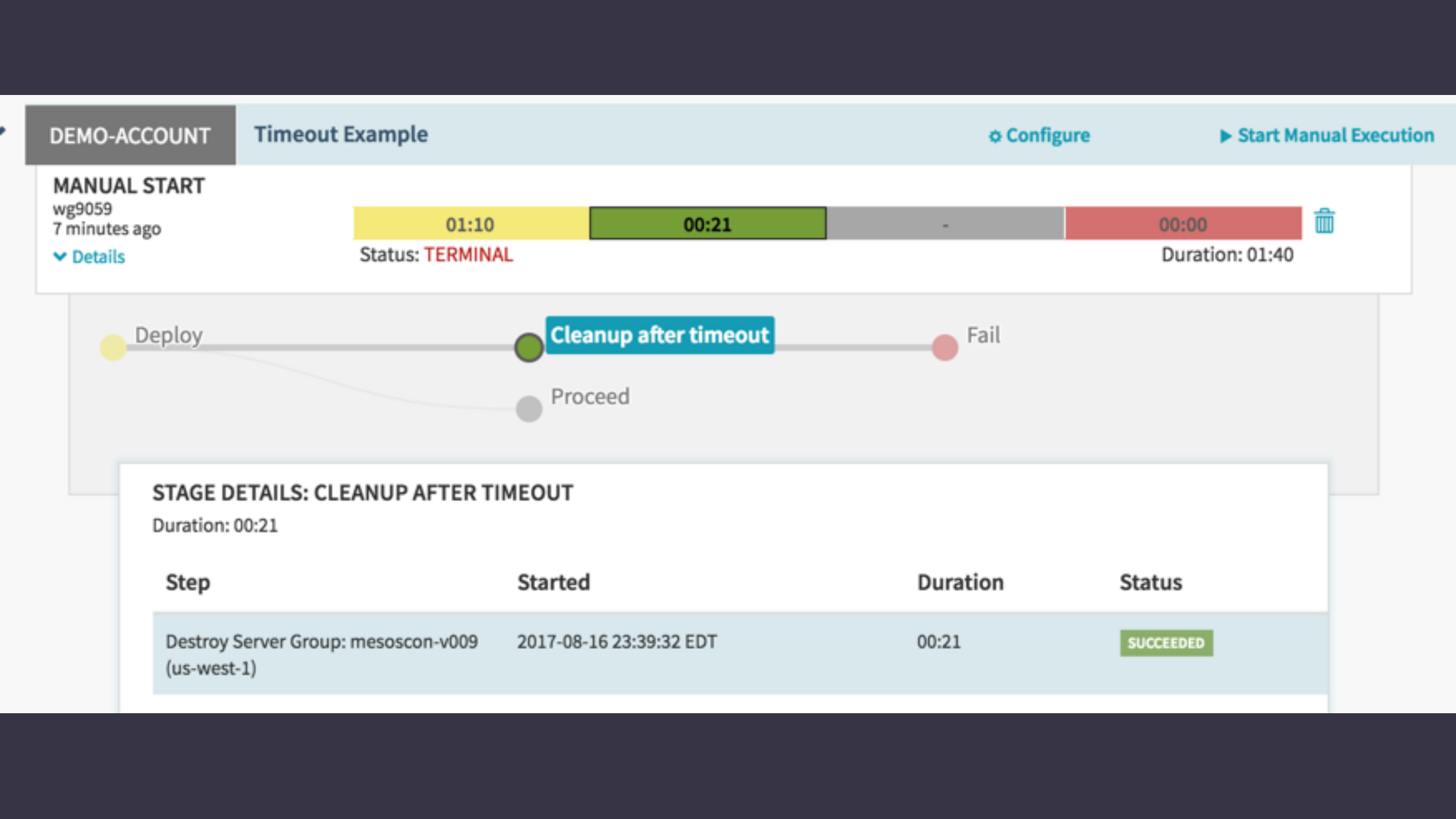
Fail this stage if it takes longer than 0 hours 1 minutes to complete

☐ **Conditional on Expression**





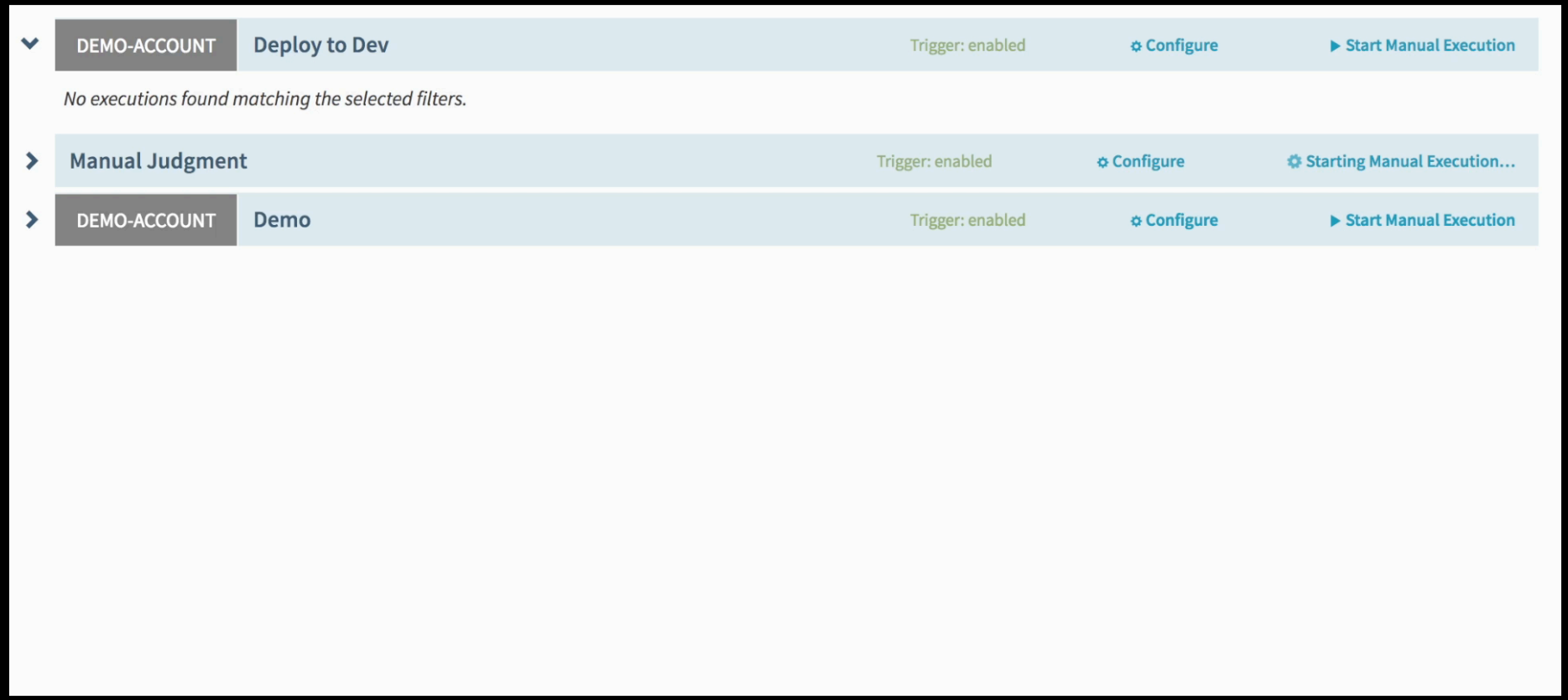

```
${#stage('Deploy in us-west-1')['context']['exception']['exceptionType'].toString()
== 'TimeoutException'}
```


DEMO-ACCOUNT
Timeout Example
Configure
Start Manual Execution
MANUAL START
wg9059
7 minutes ago
Details
01:10
00:21
-
00:00
Status: TERMINAL
Duration: 01:40
Deploy
Cleanup after timeout
Fail
Proceed
STAGE DETAILS: CLEANUP AFTER TIMEOUT
Duration: 00:21
Step
Started
Duration
Status
Destroy Server Group: mesoscon-v009 (us-west-1)
2017-08-16 23:39:32 EDT
00:21
SUCCEEDED

Incremental Automation

- Problem: Not everything in our release process is completely automated yet

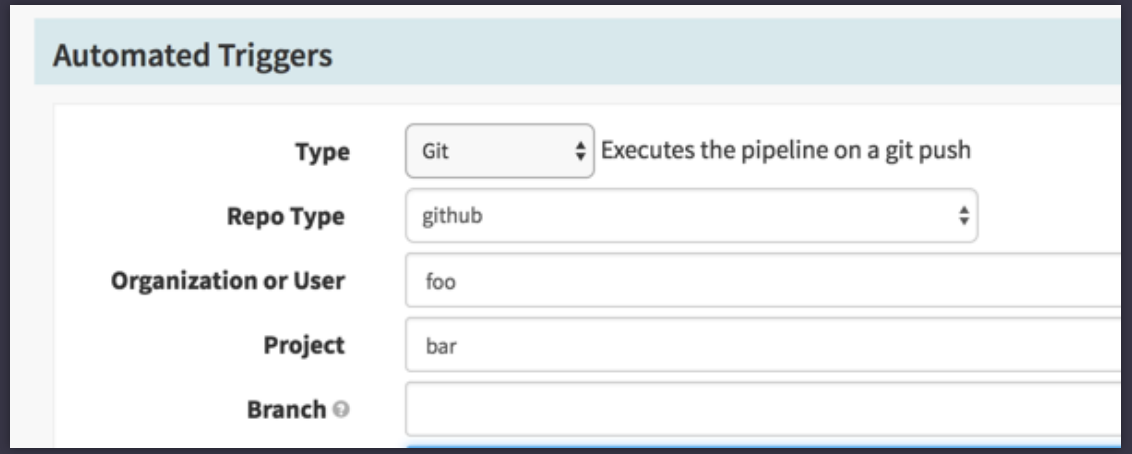
Manual Judgment to Rollback

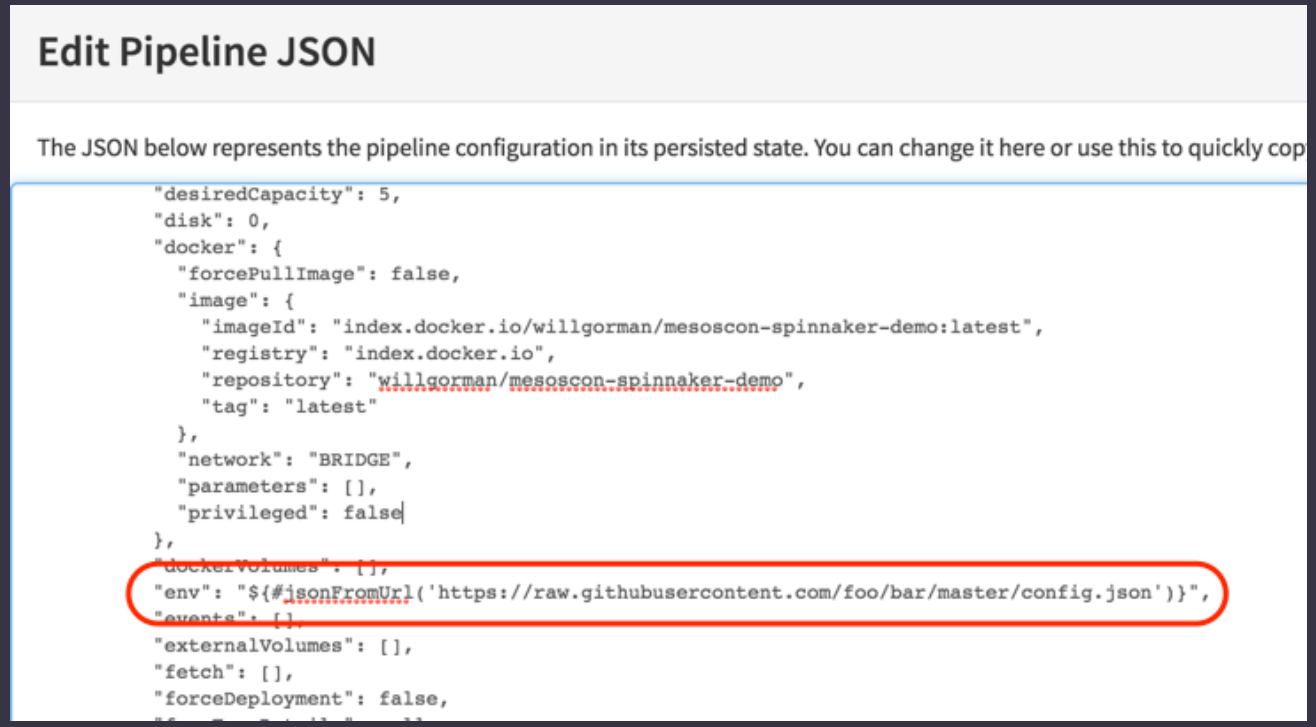


Configuration Change Triggers

- Problem: Spinnaker pipeline configuration isn't the primary source for our application configuration
- Prefer configuration to be stored in version control or generated to reduce duplication across applications

Configuration Change Triggers

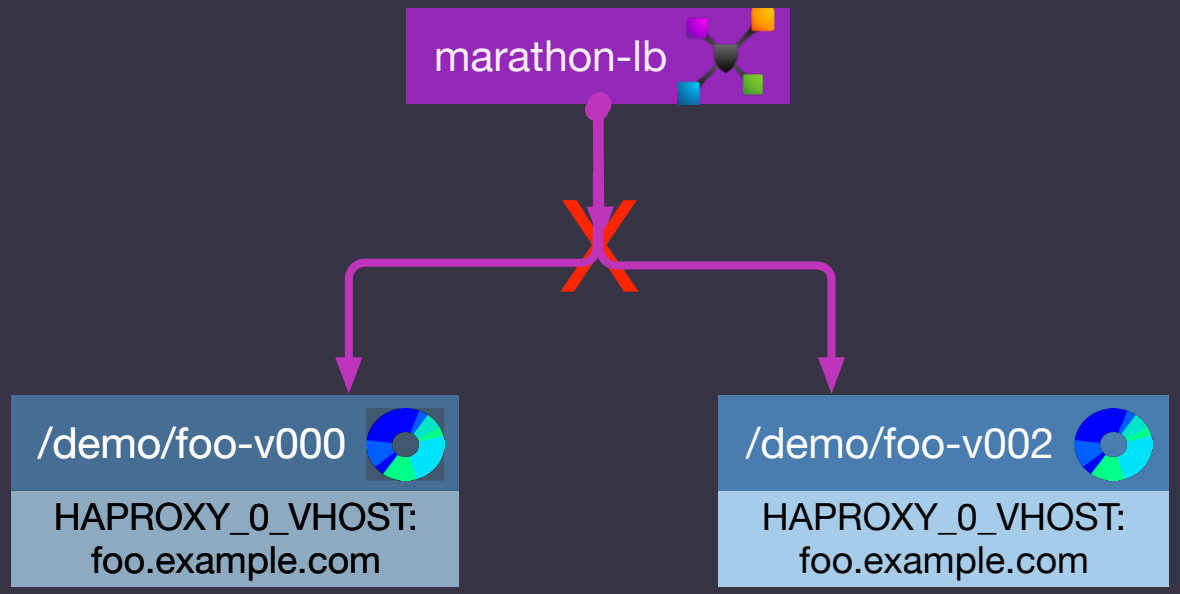




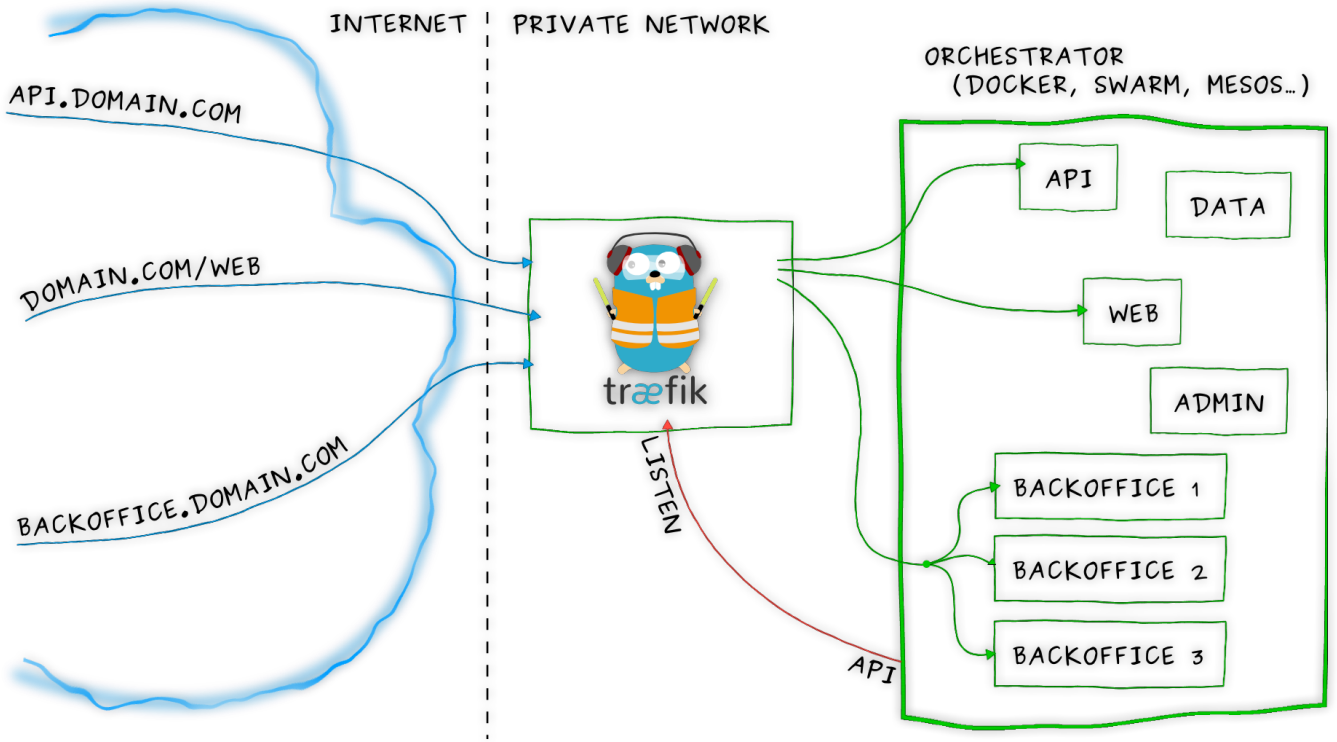
Load Balancer

- Problem: Marathon-LB doesn't support Spinnaker load balancer operations

Load Balancer

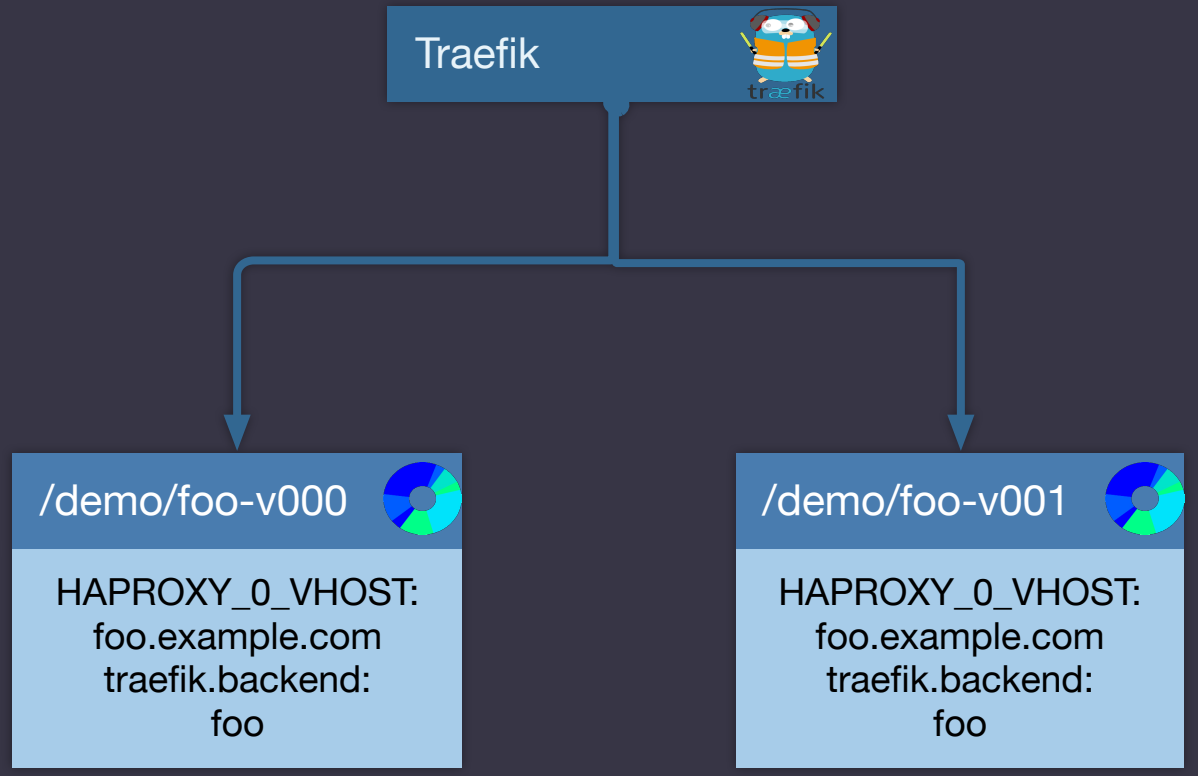


Traefik



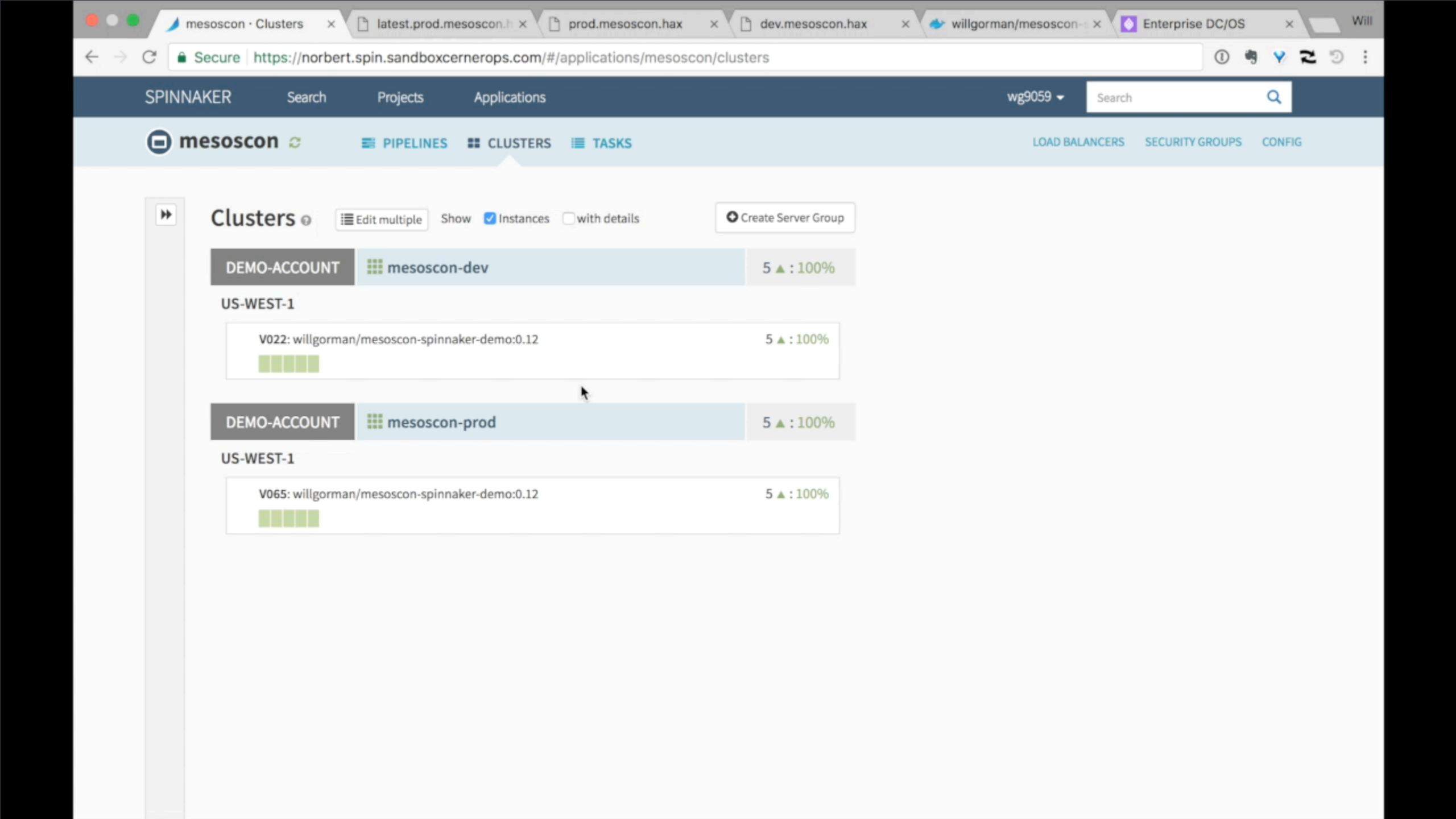
Source: https://traefik.io/

Traefik


Traefik
/demo/foo-v000
HAPROXY_0_VHOST:
foo.example.com
traefik.backend:
foo
/demo/foo-v001
HAPROXY_0_VHOST:
foo.example.com
traefik.backend:
foo

Load Balancer

- Problem: Traefik still discovers routing rules through labels, which can't change after an instance is started
  - Solution – DC/OS 1.10 programmable Edge-LB package (beta)


mesoscon · Clusters
latest.prod.mesoscon.h
prod.mesoscon.hax
dev.mesoscon.hax
willgorman/mesoscon-s
Enterprise DC/OS
Will
Secure
https://norbert.spin.sandboxcernerops.com/#/applications/mesoscon/clusters
SPINNAKER
Search
Projects
Applications
wg9059
Search
mesoscon
PIPELINES
CLUSTERS
TASKS
LOAD BALANCERS
SECURITY GROUPS
CONFIG
Clusters
Edit multiple
Show
Instances
with details
Create Server Group
DEMO-ACCOUNT
mesoscon-dev
5 ▲ : 100%
US-WEST-1
V022: willgorman/mesoscon-spinnaker-demo:0.12
5 ▲ : 100%
DEMO-ACCOUNT
mesoscon-prod
5 ▲ : 100%
US-WEST-1
V065: willgorman/mesoscon-spinnaker-demo:0.12
5 ▲ : 100%

Enterprise and Open Source DC/OS

- Only supports DC/OS Enterprise authentication methods currently
- DC/OS Open Source works with authentication disabled

Thanks!

- https://www.spinnaker.io/
- Slack: https://join.spinnaker.io

- http://careers.cerner.com
- http://engineering.cerner.com