

01 - DEPLOY

As a CF operator

CLOUD ON YOUR LAPTOP

- Simulate a cloud on your laptop with BOSH-lite
- cp <USB>/operating-the-foundry to your PC

```
cd path/to/operating-the-foundry/bosh-lite  
vagrant up
```

- Adjust your power settings to prevent your machine going to sleep
 - `_installs/Caffeine1.1.1.zip`
- Wait until ...

```
=====  
BOSH-lite cloud ready  
=====
```

WHAT IS A CLOUD?

- Technical:
 - Virtual infrastructure
 - VMs
 - Networks
 - Disks
 - Driven by an API
- Cultural:
 - Automated, repeatable operations
 - Cattle, not pets

WHAT IS BOSH?

- BOSH is a cloud orchestration engine
- BOSH CPI – Cloud Provider Interface
 - `create_vm`, `attach_disk`, `delete_vm` ...
 - for: vSphere | Openstack | AWS | Azure | GCE
- 1 x BOSH director, n x VMs running BOSH agents

WHAT IS BOSH-LITE?



CLOUD ON YOUR LAPTOP

- Back to...

```
cd path/to/bosh-lite  
vagrant up
```

- should now see

```
=====  
BOSH-lite cloud ready  
=====
```

DEPLOY CF TO THAT CLOUD

- Deploy CF to that cloud

```
vagrant ssh  
deploy_cf
```

- Wait ~15 min until ...

```
=====
```

BOSH CONCEPTS - OVERVIEW

- Stemcell.tgz - a mimimal VM image running the

BOSH CONCEPTS - STEMCELL

- Download for your cloud type from bosh.io/stemcells
- Minimalist Ubuntu/CentOS + BOSH agent
-

BOSH CONCEPTS - RELEASES

- Download from bosh.io/releases
- Tarball contains everything to be deployed;
 - runtimes (JVM, Ruby...),
 - services (Redis, CloudController...),
 - config templates
- Uploaded to BOSH director

```
bosh releases
```



BOSH CONCEPTS - MANIFEST

- Cluster configuration
 - stemcell and release(s) versions
 - VM & network specification
 - Jobs – software templates to be installed on each VM
 - config values
- YAML (passed through ERB)

DEPLOY CF TO THAT CLOUD

- should now see ...

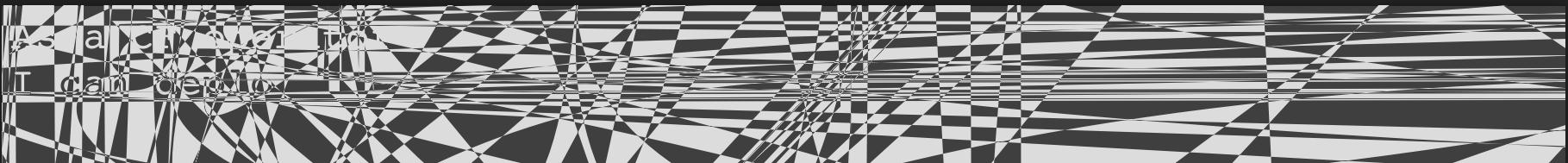
```
=====  
Cloud Foundry deployed!  
=====
```


COMMUNITY

- www.cloudfoundry.org – participate!
 - Mailing lists – lists.cloudfoundry.org
 - Repositories – github.com/cloudfoundry,
github.com/cloudfoundry-incubator

DELIVERED

As a developer
I can deliver

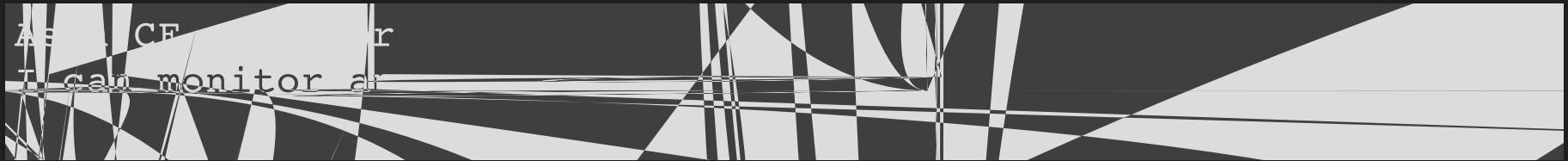


FURTHER READING

- Preparing a "real" cloud for BOSH
 - <http://bosh.io/docs/init.html>
- bosh-init – deploy BOSH director to manage a "real" cloud
 - <http://bosh.io/docs/using-bosh-init.html>
- bosh help
 - ~~bosh task recent, bosh tasks & bosh task <id> --debug~~
 - bosh recreate job

This content is copyright of CloudCredo.

02 - BOSH MONITORING



WHAT IS A CLOUD

- Container orchestration for microservices
- Routing, scaling, health

BOSSH SSI

ss o doppler /0 (ch temp sud

MONIT

- Processes are run with Monit

BOSH HEALTH MONITOR

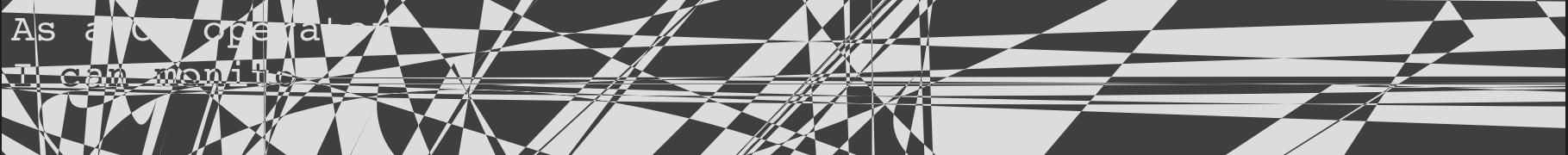
- Original terminal

```
bosh vms
```

-

DELIVERED

As a cloud operator
I can monitor



FURTHER READING

- BOSH Health Monitor plugins
 - BOSH can forward status data to external monitoring systems
 - <http://bosh.io/docs/hm-config.html>

This content is copyright of CloudCredo.
© CloudCredo 2015. All rights reserved.

03 - CF-USERS-SPACES-ORGS

As a CF operator

CF ORGS & SPACES / USERS & PERMISSIONS

- Organisations
 - Quotas
- Spaces
 - Domains
 - Spaces
 - Security Groups
 - Services
 - Apps
- Users
 - Roles

CF CLI

- CLI for interacting with CF

CF ORGS

- Create

```
cf create-org platform-ops
```

- List

```
cf orgs
```

- Details

```
cf org platform-ops
```

- Target

```
cf target -o platform-ops
```

CF SPACES

- Create

```
cf create-space  
cf create-space development
```

- List

```
cf spaces
```

- Details

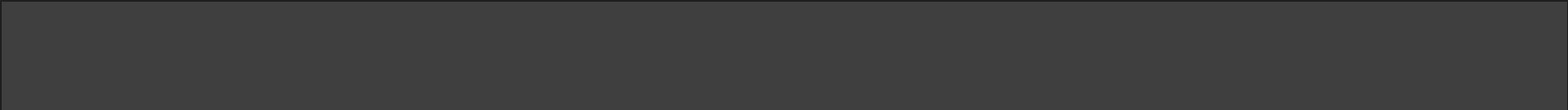
```
cf space development
```

- Target

```
cf target -s development
```

CF USERS

- Create



CF APPS

- cf push is golden

```
cd ~/exercises/03-cf-users-spaces-orgs/app  
cf push  
curl -s myapp.10.244.0.34.xip.io
```

- Buildpacks – convert code into runnable droplet.tgz
- List

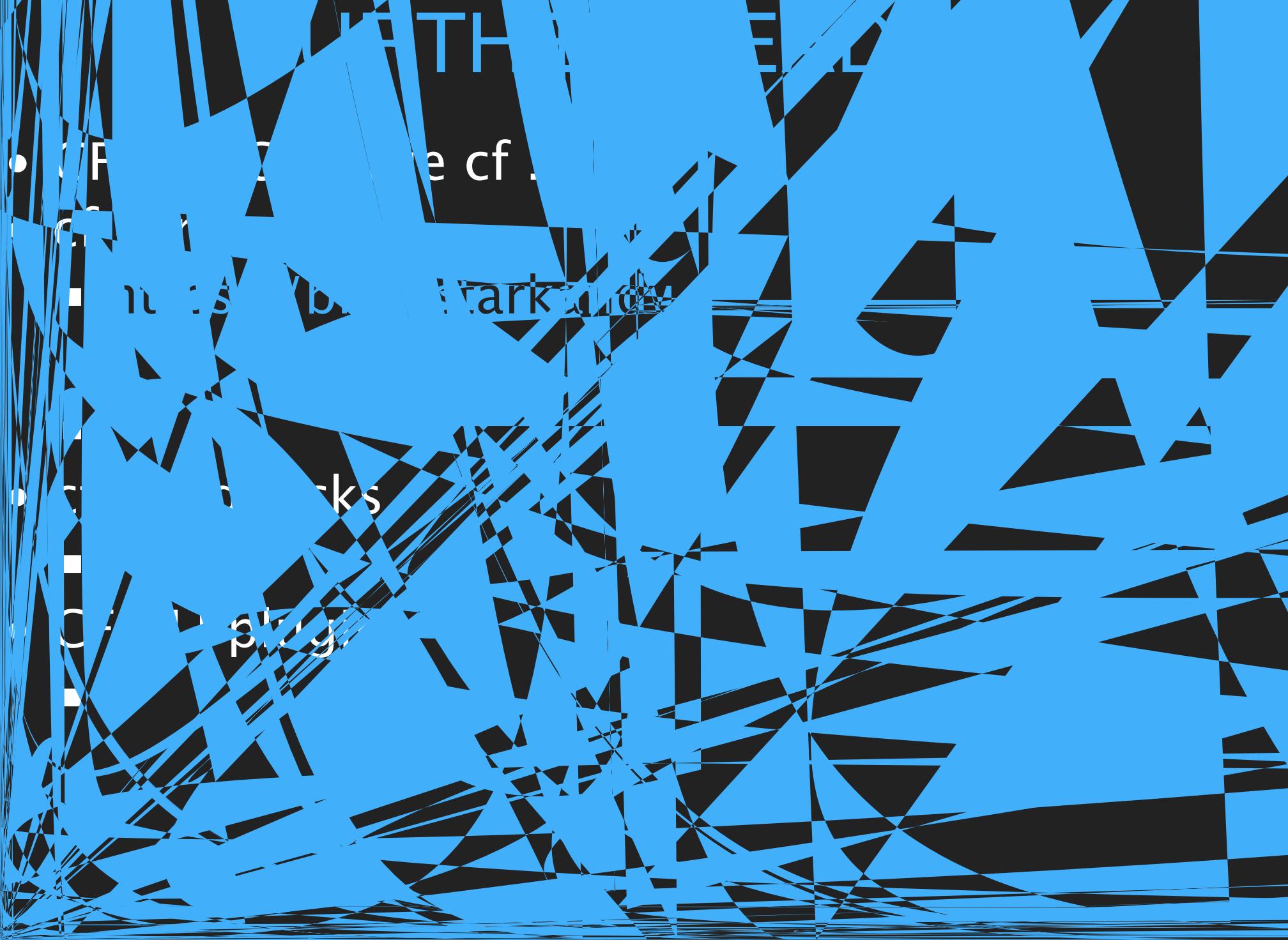
```
cf apps
```

- Details

```
cf app myapp  
cf events myapp  
cf logs myapp --recent
```

DELIVERED

As a CF operator
I can provision a new CF user
So that user can `cf push` their app



WITH

e cf.

C

nts' b

mark and

cks

p
j

This content is copyright of CloudCredo.
© CloudCredo 2015. All rights reserved.

04 - DATASERVICE-MARKETPLACE



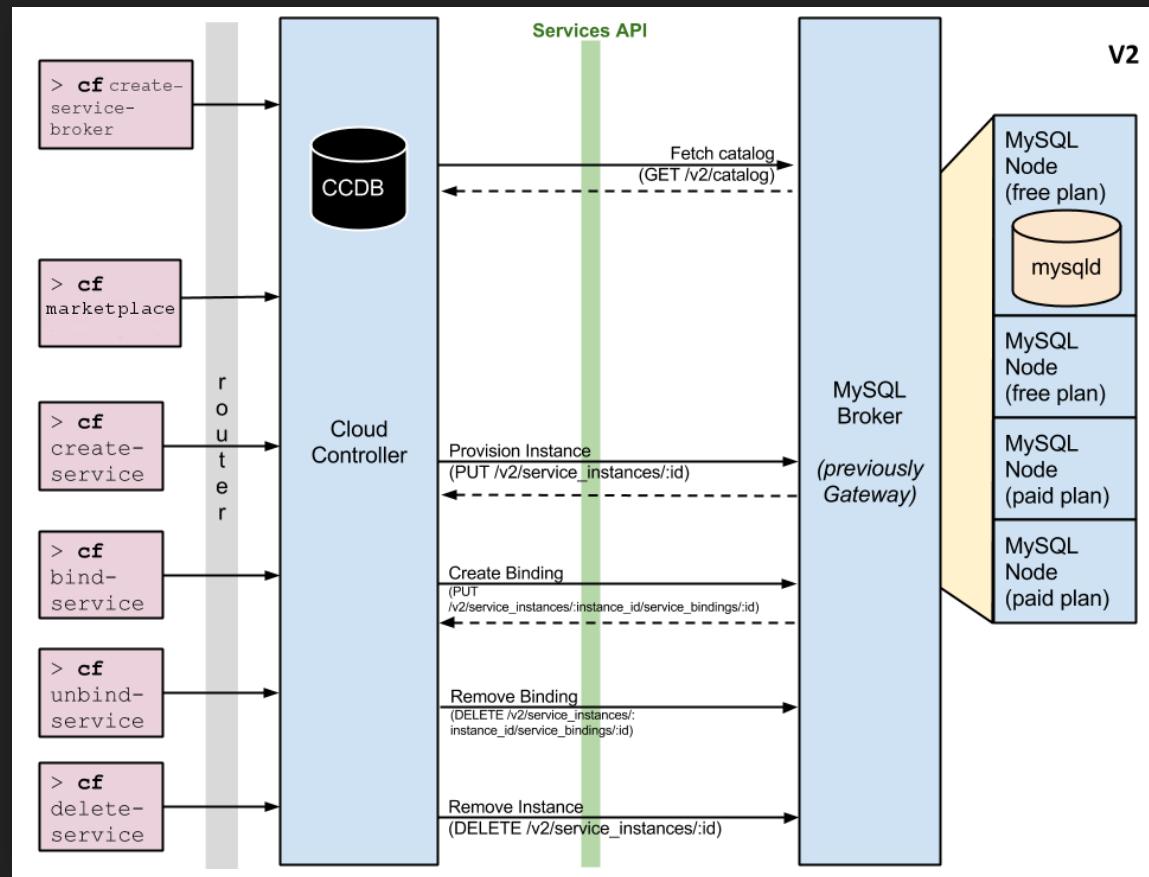
DATA SERVICE MARKETPLACE

- CF runs stateless apps – where does the data go?
- Many BOSH releases for data services – see bosh.io

```
cd ~/exercises/04-dataservice-marketplace
bosh upload release cf-redis-release-407.tgz
bosh deployment cf-redis-deployment.yml
bosh -n deploy
```

SERVICE BROKERS

- Register data service with CF runtime
- Provision service
- Provide connection credentials



BOSH ERRANDS

- BOSH jobs can be long running (default), or run once (errands)
- Many releases encapsulate setup scripts in an errand



CREATE SERVICE

Create

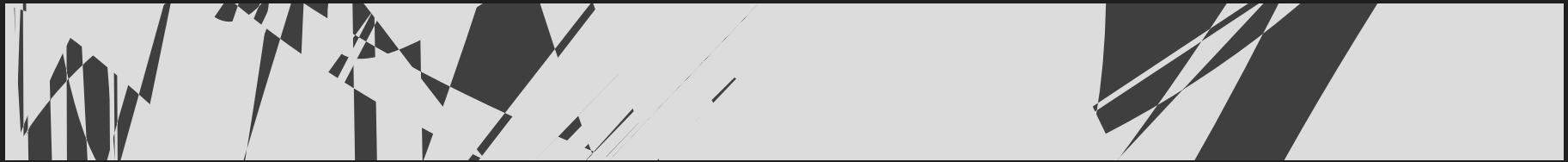
```
cf create-service redis shared -v myapp-
```

Bind

```
cf bind-service myapp -v myapp-
```

SECURITY GROUPS

- Security Groups restrict outbound network access



DELIVERED

As a CF operator

FURTHER

- BOSH deployable components
 - bosh upload/releases
- Manually provisioned data sources

This content is copyright of CloudCredo.

MORE FARM, MORE REDUNDANCY

Scale up by adding nodes

- scale out - more EA VMs (also redundancy)
- manifest - add configuration to scaling spec -
 - scale up by changing `spec` -
 - ensure pods
 - scale out by adding more job instance VMs -
 - jobs

EDIT THE MANIFEST TO SCALE OUT

- Get deployed manifest

```
cd bosh-repository  
bosh target https://  
bosh -n > cf-deployment.yml
```

- Edit cf-deployment.yml, increment instances

```
mono /exercise/05-scaling.cs
```

APP INSTANCES DISTRIBUTED

SCALE DOWN

- Edit cf-deployment.yml, decrement instances

```
nano cf-deployment.yml  
^W runner_z1
```

- Deploy change

```
bosh deploy  
bosh vms # only 1 x runner
```

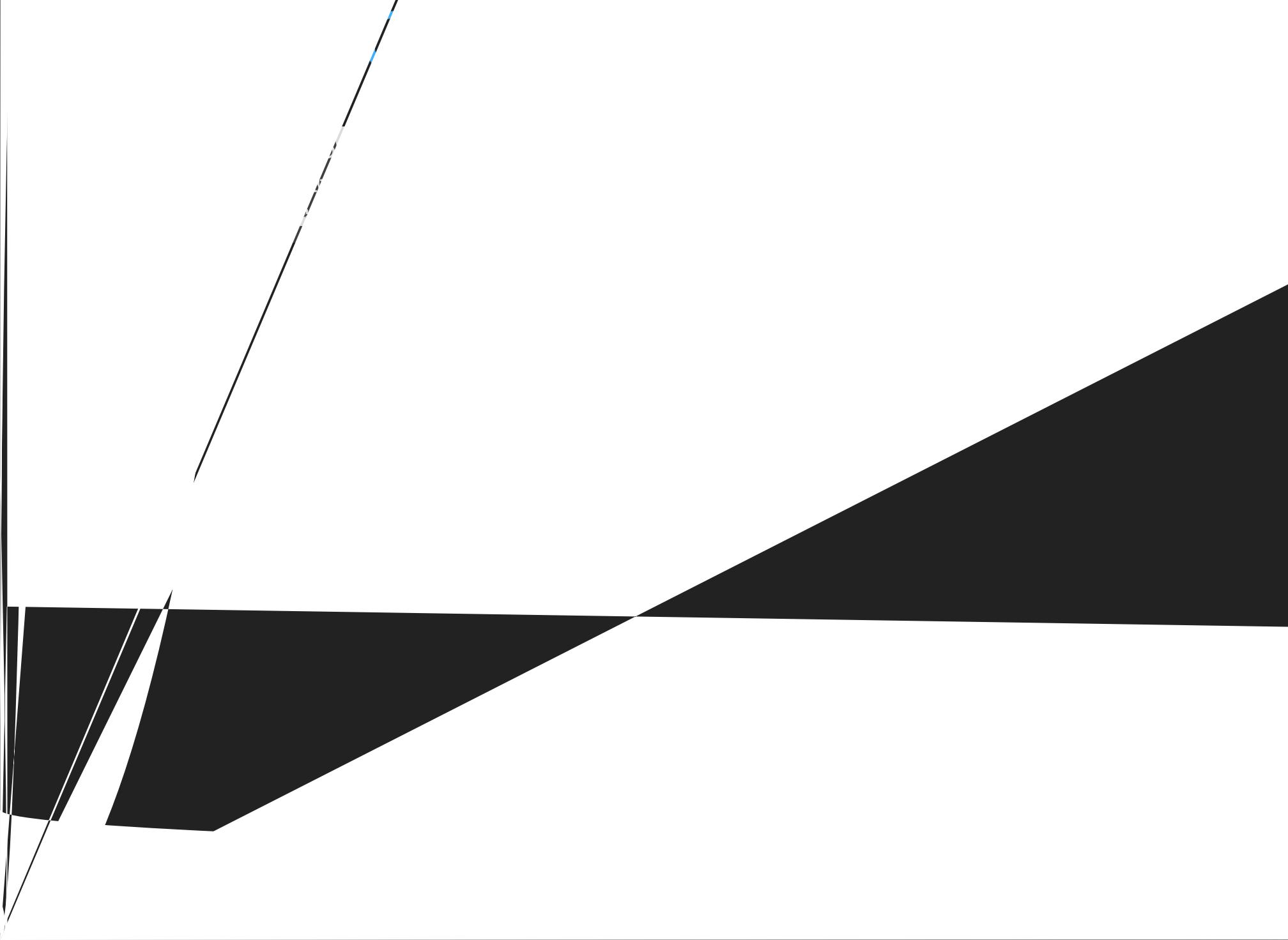
DELIVERED

As a CF operator
I can scale CF
So that more app instances can be deployed

FURTHER READING

- Canaries & max-in-flight
 - <https://bosh.io/docs/deployment-manifest.html#update>
 - <https://bosh.io/docs/terminology.html#canary>
- ~~Drain scripts~~
 - <http://bosh.io/docs/drain.html>
- ~~Availability Zones (becoming a feature)~~
 - <https://github.com/cloudfoundry/bosh->

This content is copyright of CloudCredo.
© CloudCredo 2015. All rights reserved.



ADING

d day 2 card

You should be upgrading

WHEN SHOULD YOU UPGRADE?

- Regularly – generally cannot "skip" versions
- Read release notes
 - <https://github.com/cloudfoundry/cf-release/releases/tag/v217>
- Releases are dog-fooded on run.pivotal.io
 - consider waiting 1 week for issues to emerge unless CVE

UPLOAD THE RELEASE

- For reasons of speed, we'll upgrade redis
- Process is the same for all bosh releases

```
cd ~/exercises/06-upgrade-release/  
bosh upload release cf-redis-release-408.tgz
```

MANIFEST GENERATION

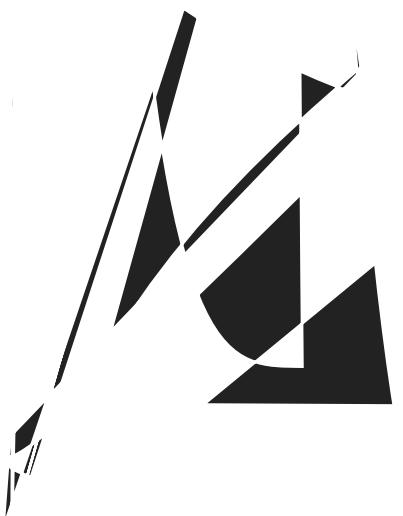


UPGRADES ARE BORING WITH BOSH!

- weeks of manual work is being automated
- provisioning servers, installing based OS, installing services, updating config, updating inventory
- with zero downtime (with full scale deployment)
- during working hours

SIDE THE

leads



DELIVERED

As a CF operator
I can change/upgrade my CF release

R REA

• R

-



This content is copyright of CloudCredo.
© CloudCredo 2015. All rights reserved.

06 - UPDATING-STEMCELLS

As a CF operator

I can patch my CF cluster's base OS images

So that my users apps aren't vulnerable to security CVEs

This content is copyright of CloudCredo.

© CloudCredo 2015. All rights reserved.

PRIMING STEM

Conrad
d / ex se

stemcell
ting-

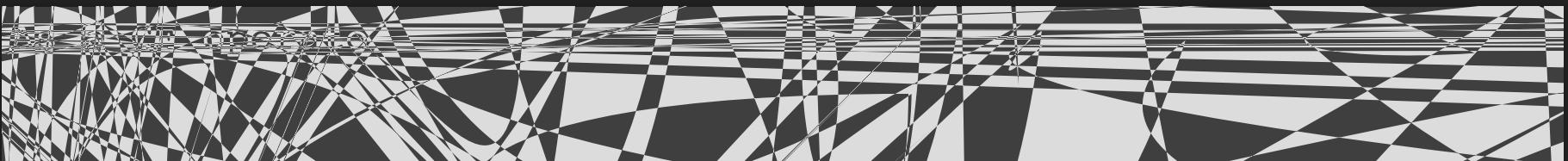
WHAT'S HAPPENING

- Recompiles packages for/on new stemcell
- Rolls through cluster recreating jobs
- Boring... – wait 20 min

WHEN TO UPGRADE

- Releases recommend stemcell versions
 - <https://github.com/cloudfoundry/cf-release/releases/tag/v217#recommended-stemcell>
- Base OS security patches – Heartbleed

DELIVERED



This content is copyright of CloudCredo.

08 - MONITORING (BONUS)

As an advanced CF operator
I can monitor my CF cluster
So that I know about problems before they affect my users

This content is copyright of CloudCredo.
© CloudCredo 2015. All rights reserved.

LOGSEARCH-FOR-CLOUDFOUNDRY

- Adds integrated log analysis to the CF platform
- BOSH deployed Elastic ELK stack customised to understand CF
- For CF operators
 - CF component logs
 - CF component metrics
- For CF apps
 - CF app logs
 - CF app metrics



DEPLOY LOGSEARCH TO CLOUDFOUNDRY

```
cd microservices  
git pull  
mvn clean package  
cd cf-deployment  
cf push sample-app  
cf curl sample-app  
curl -X POST -d "{'text': 'Hello World'}" http://sample-app:8080/api/v1/predict  
curl -X GET http://sample-app:8080/api/v1/predict
```

ANALYSING PLATFORM METRICS

- <http://logs.10.244.0.34.xip.io>
- <http://docs.pivotal.io/pivotalcf/opsguide/metrics>

DELIVERED

As a CF operator
I can monitor my CF cluster

FURTHER READING

- github.com/logsearch/logsearch-for-cloudfoundry
- logsearch.io
- <https://github.com/cloudfoundry-community/bosh-gen>
- <https://github.com/pivotal-cf-experimental/datadog-config-oss>

This content is copyright of CloudCredo.