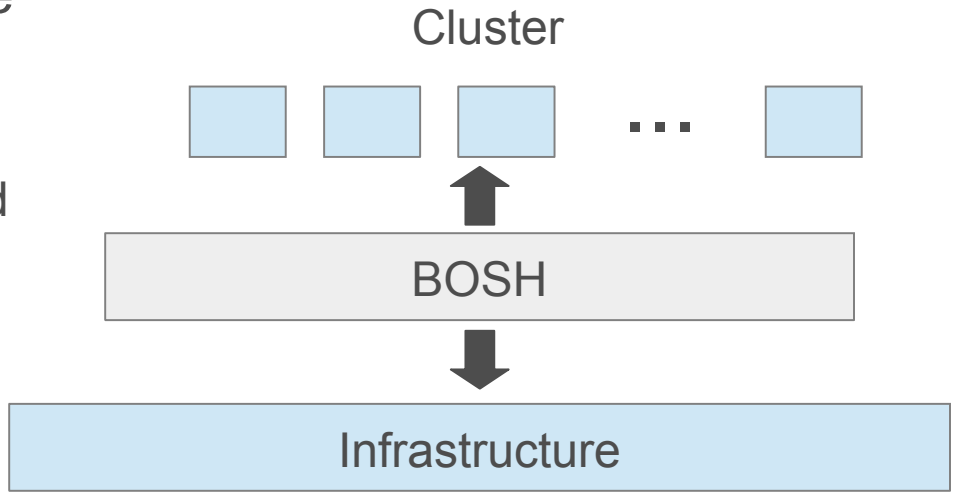
Ops Manager and BOSH Introduction

Topics

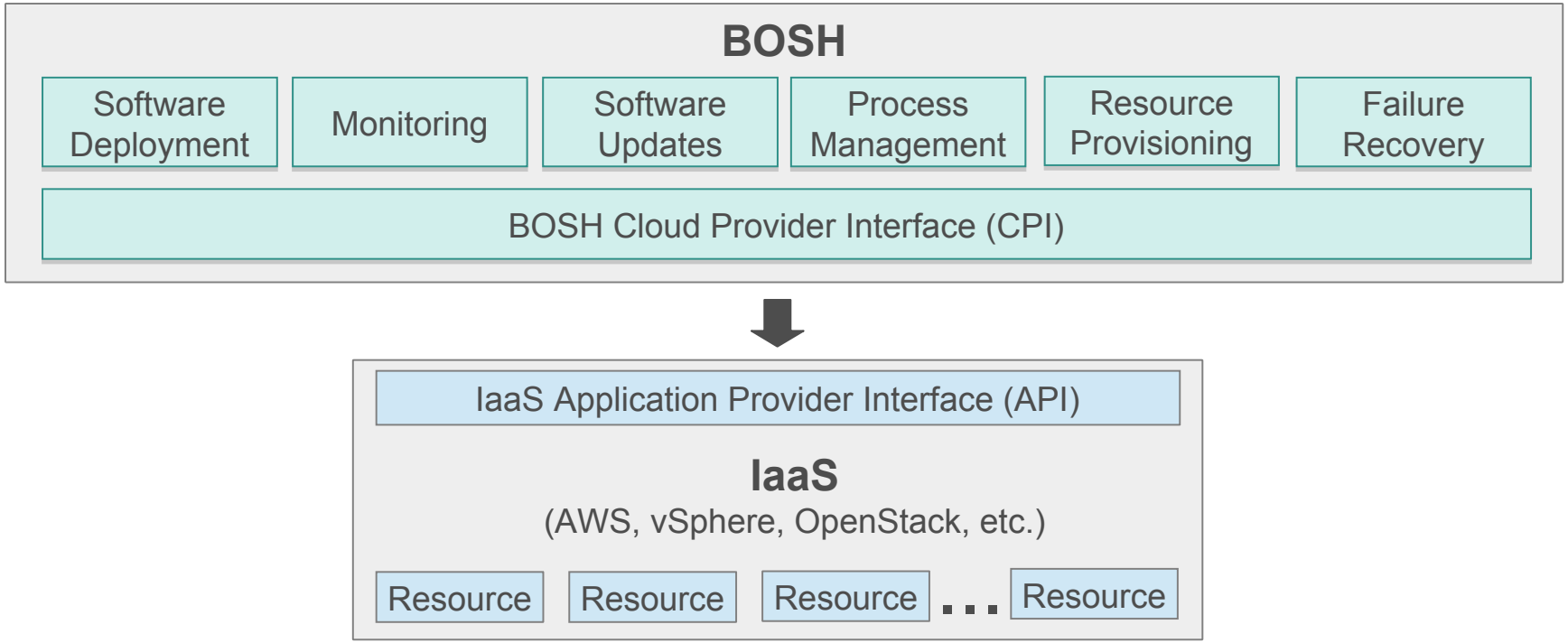
- **BOSH and Ops Manager Introduction**
- BOSH Architecture Introduction
- BOSH Deployments
- Using the BOSH CLI

What is BOSH?

- BOSH is open source software that can deploy and manage the lifecycle of any software
  - Especially good for distributed systems and clusters
- BOSH can run on any infrastructure
  - For example, vSphere, Amazon Web Services, a Vagrant VM



BOSH Functionality



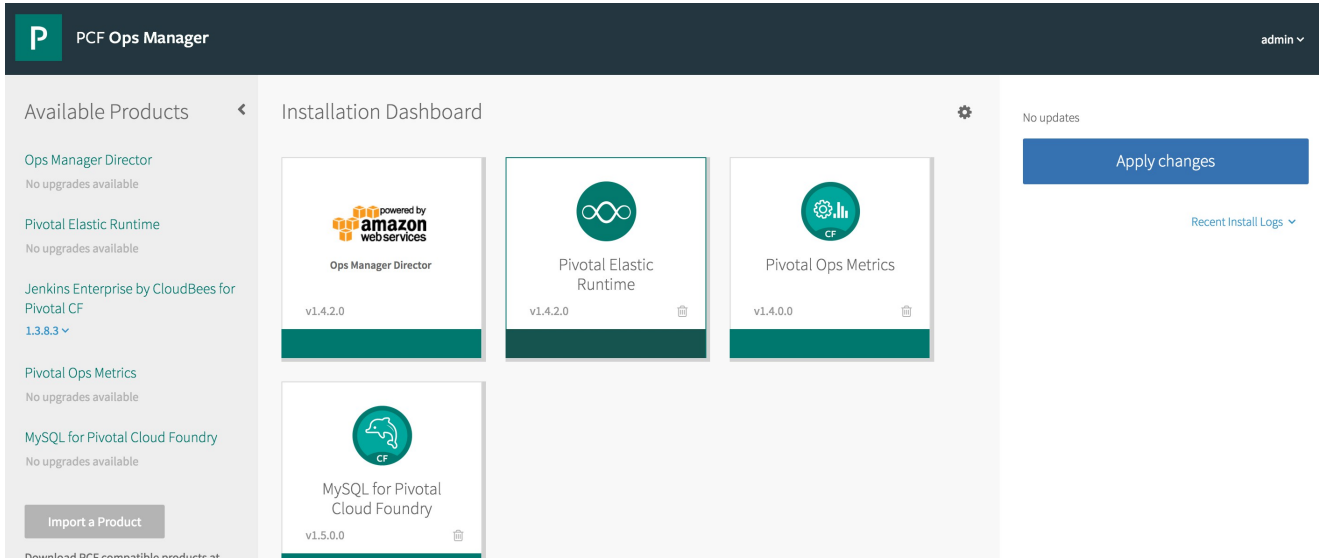
Why BOSH?

- Cloud Foundry is a distributed system that runs on many infrastructures
- BOSH was mainly designed as a *holistic* approach
  - BOSH keeps the Cloud Foundry runtime running

Note: Other tools could potentially be used to deploy Cloud Foundry, but you would lose the management and self-healing aspects that BOSH provides

Ops Manager and BOSH

- Ops Manager is a user interface on top of BOSH
- When you install or make changes in Ops Manager, BOSH-level changes are being made
  - You will see BOSH-related messages in the logs



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- **BOSH Architecture Introduction**
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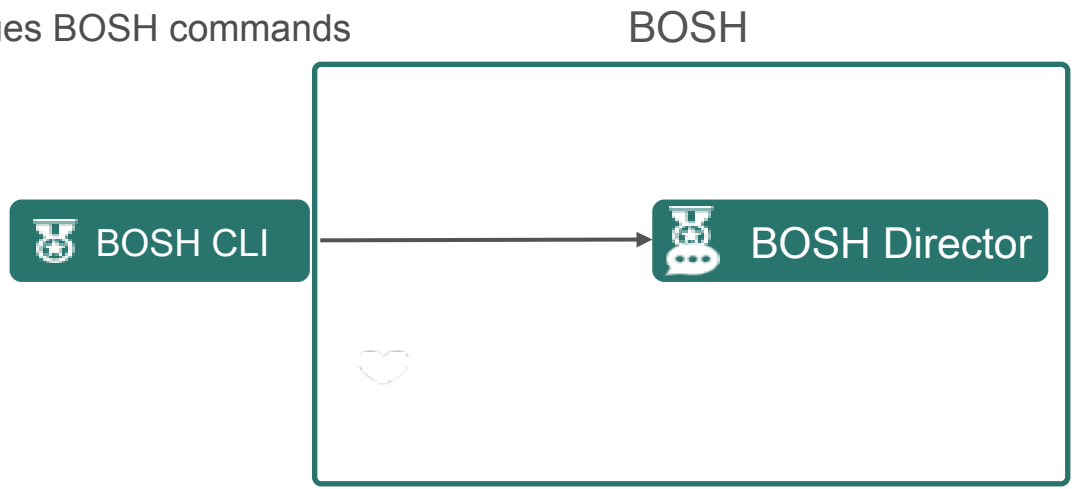
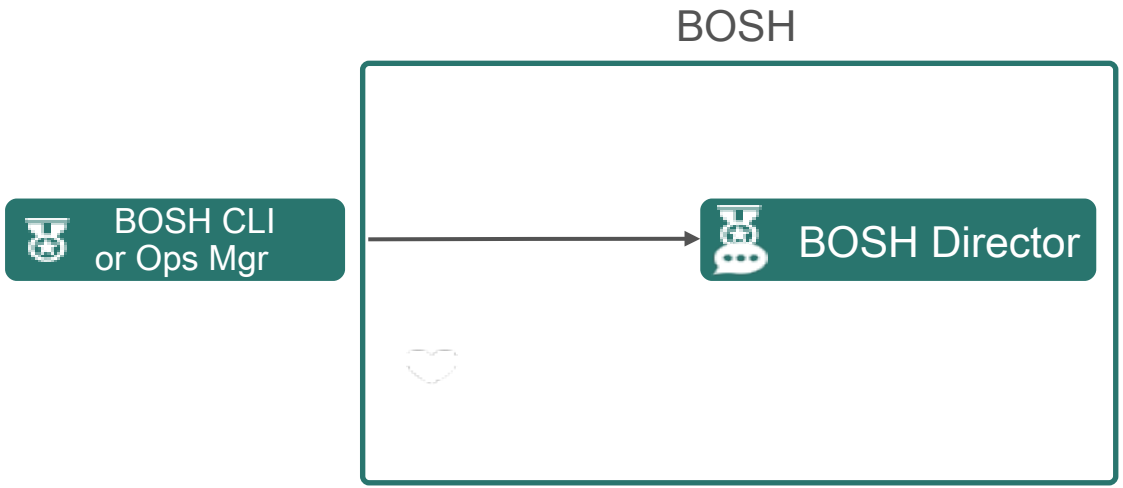
BOSH Director and CLI

- The BOSH director is the heart of BOSH
  - Communicates with the infrastructure (calls its API) and components of the cluster (usually VMs)
- Connect to it using the BOSH CLI (command line interface)
  - Separate from the cf CLI
  - Issues BOSH commands



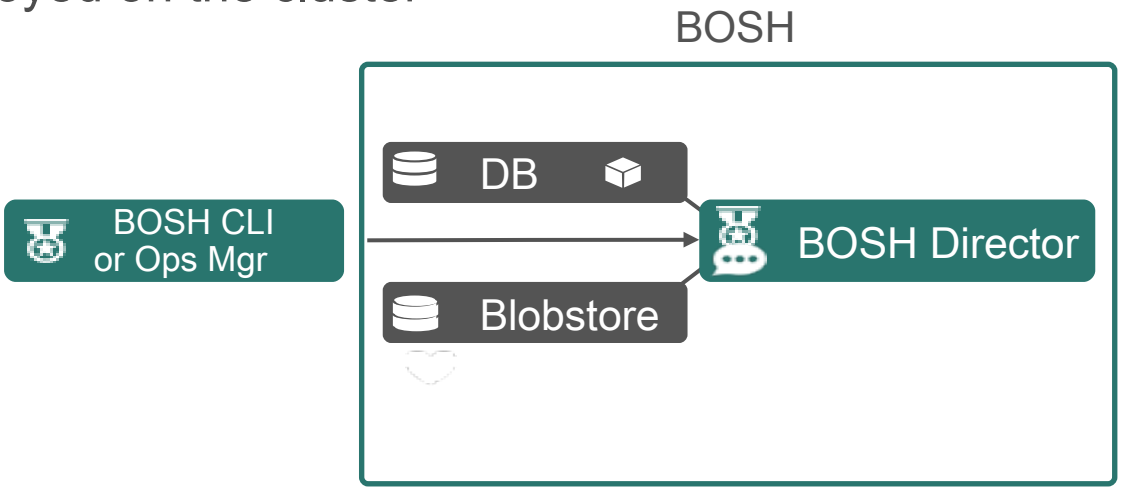
BOSH Director and Ops Manager

- Ops Manager and the BOSH CLI issue the same BOSH commands



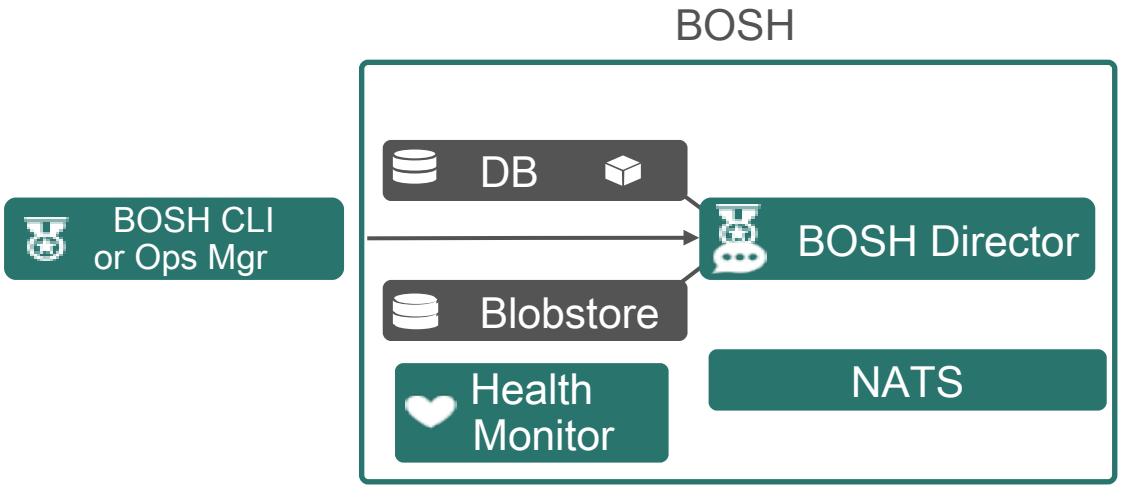
BOSH Database and Blobstore

- The BOSH Database- stores configuration information for the infrastructure it is using and the cluster that it is deploying
- The BOSH Blobstore- used to store assets associated with the software deployed on the cluster



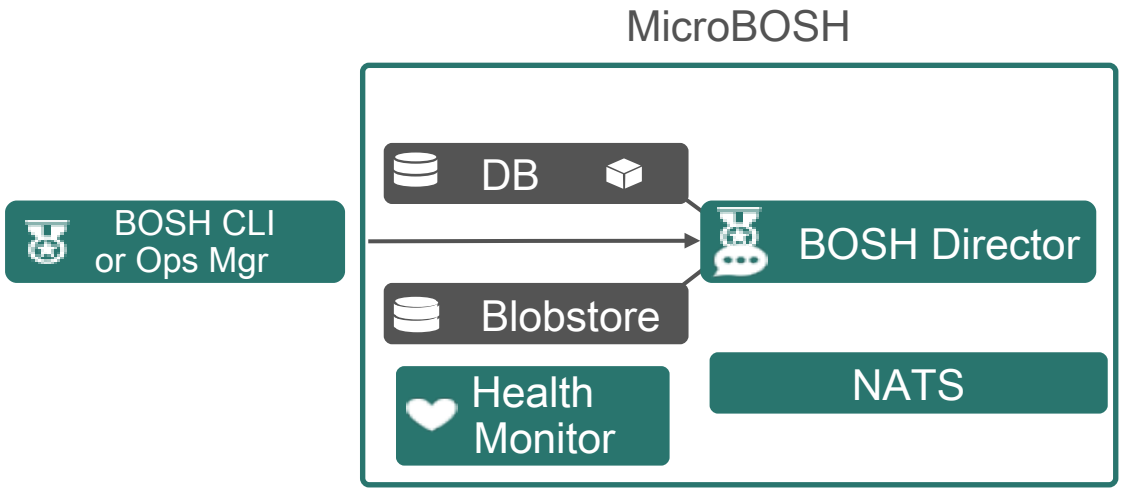
NATS and Health Monitor

- **NATS:** used for messaging between the components
- **Health Monitor:** used to make sure that the VMs created and the processes started by BOSH are up and running



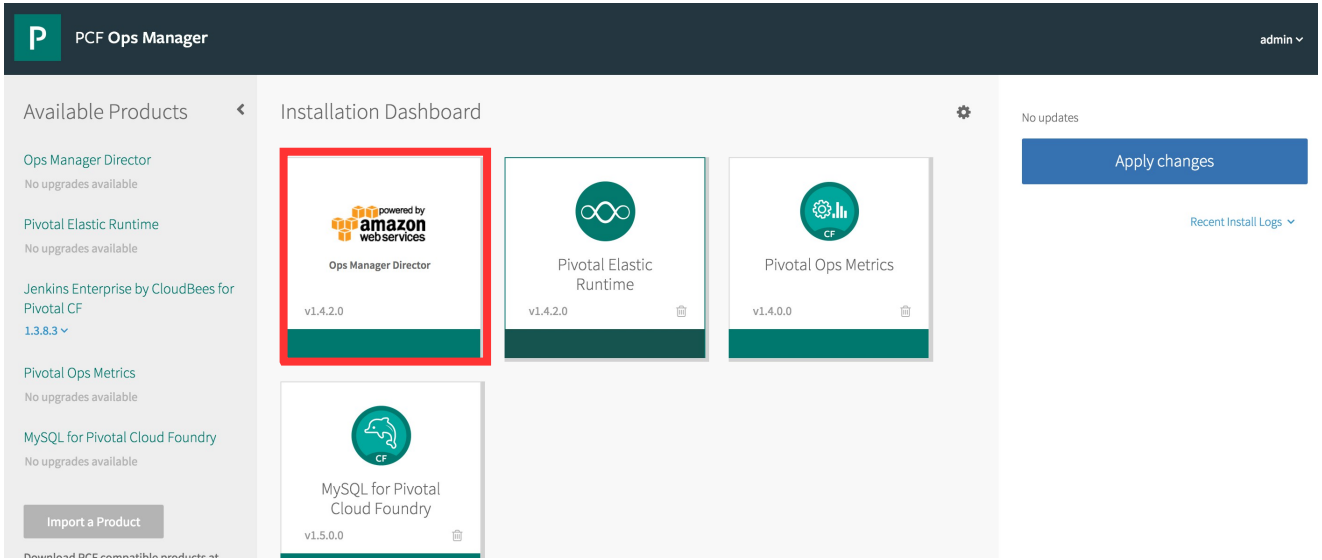
MicroBOSH

- If the BOSH Director, NATS and Health Monitor are on a single VM, it is called MicroBOSH
- The BOSH database and blobstore can also be on the MicroBOSH VM or may be external



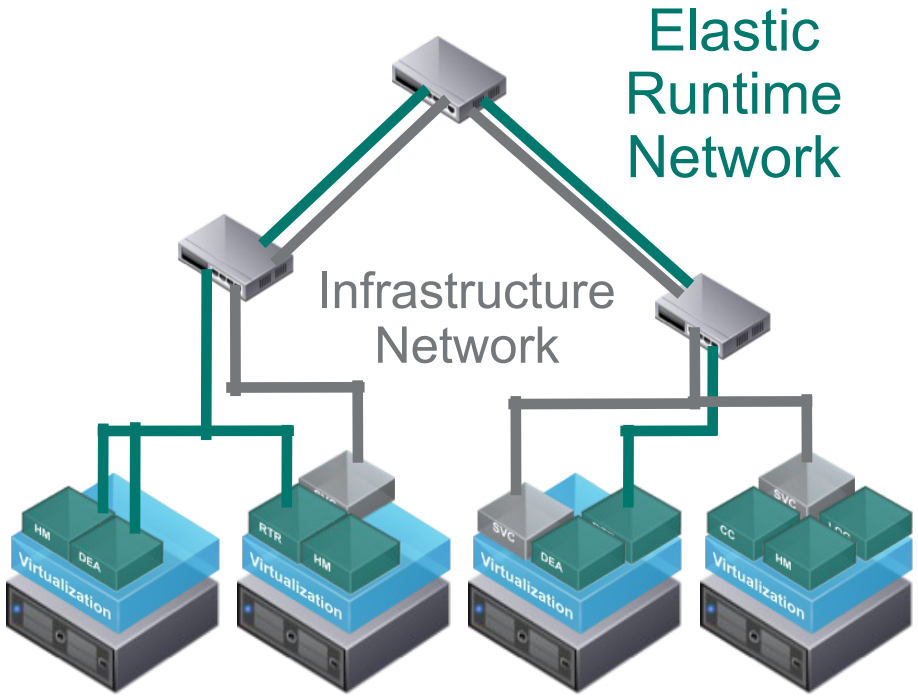
MicroBOSH and Ops Manager Director

- The Pivotal Cloud Foundry installation uses MicroBOSH
- This is configured using the Ops Manager Director tile
  - After configuring and applying changes, you will see a MicroBOSH VM running in your installation



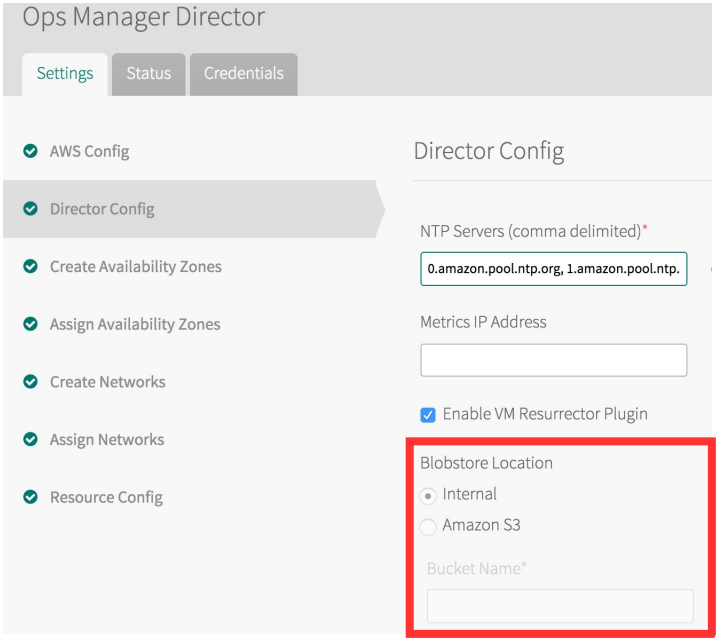
Configuring Multiple Networks

- Isolate and segregate network traffic for Elastic Runtime from Pivotal Cloud Foundry services
- Operators define networks in Ops Manager
- Operators assign a network during installation of each Pivotal Cloud Foundry tile



Specifying an External BOSH Blobstore or DB

- When you configure the Ops Manager Director (MicroBOSH), use the Director Config tab to specify the blobstore or DB location



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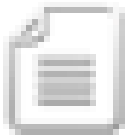
BOSH Deployment

Three Main Components

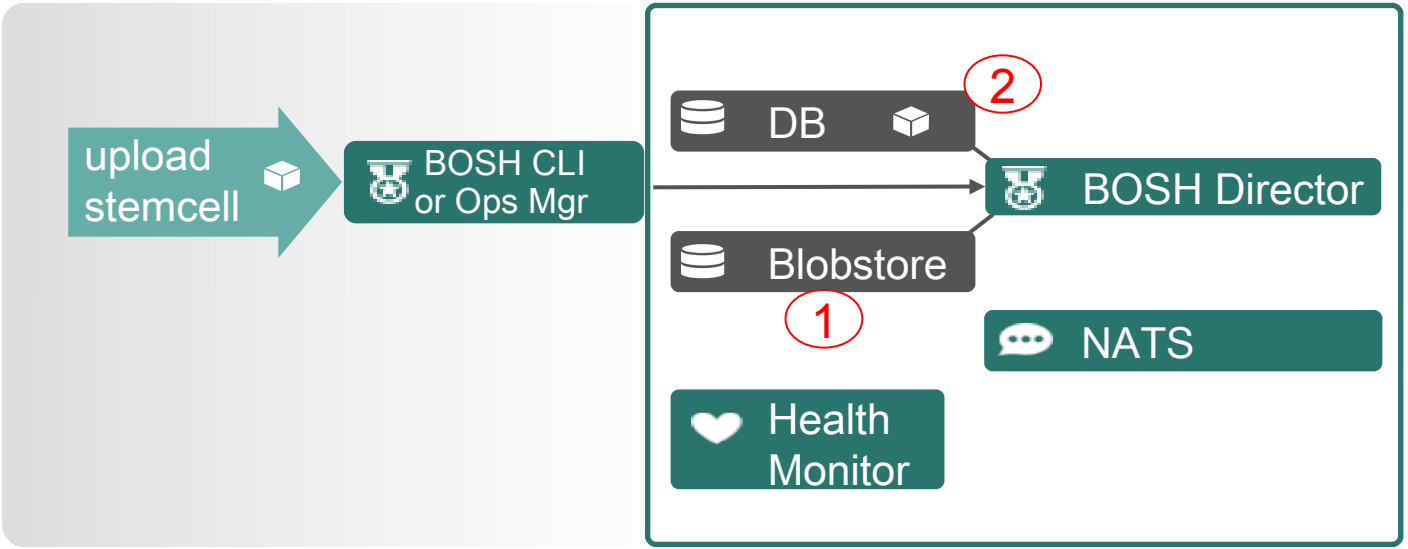
- **Stemcell:** A template VM used for the cluster
- **Release:** Software and information on how to build the VMs in a cluster
- **Manifest:** Describes the cluster using configuration (YAML file)

Release



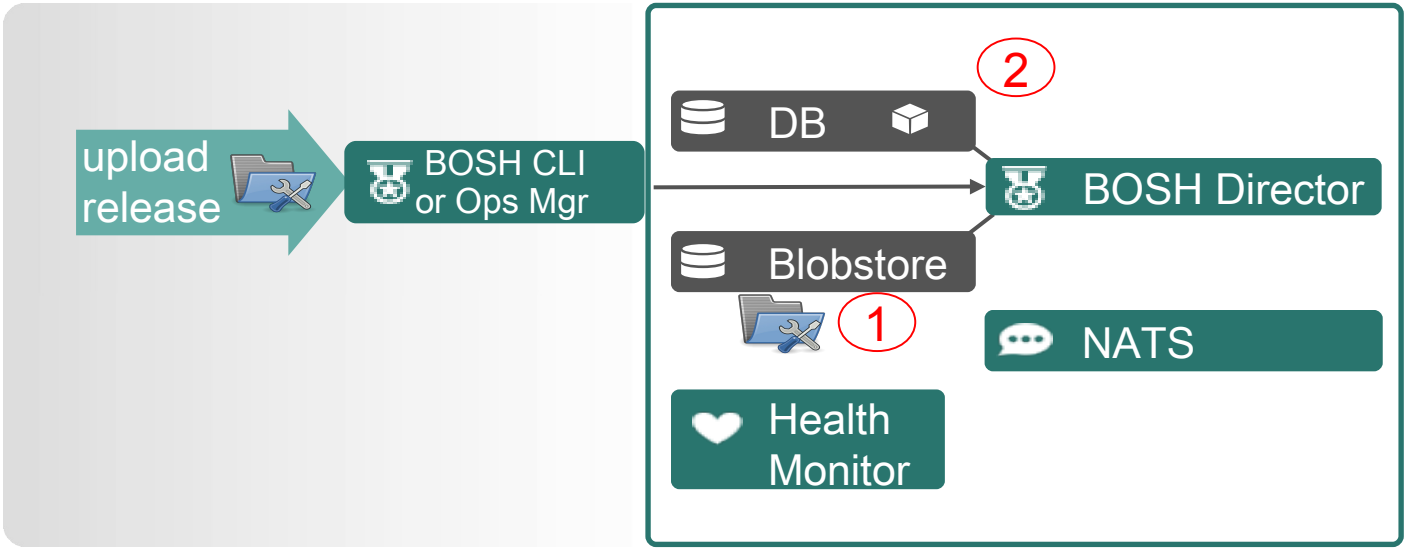
Manifest

BOSH Deployment (1 of 4)



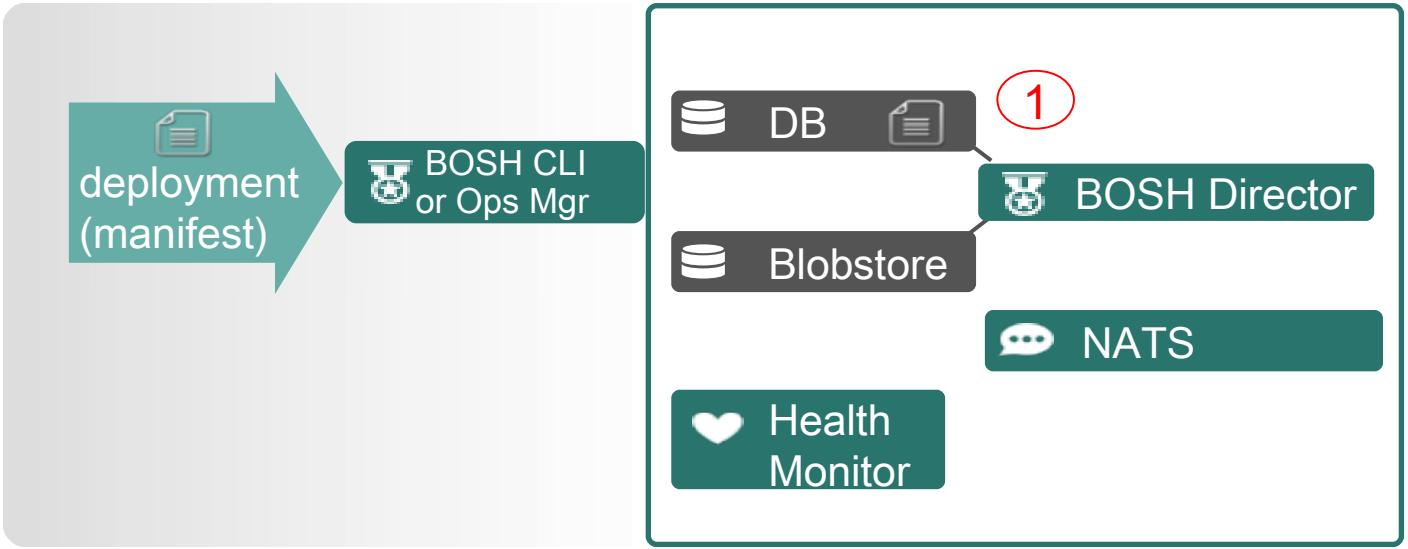
1. Upload stemcell (VM template) to blobstore
2. Register in director's DB

BOSH Deployment (2 of 4)



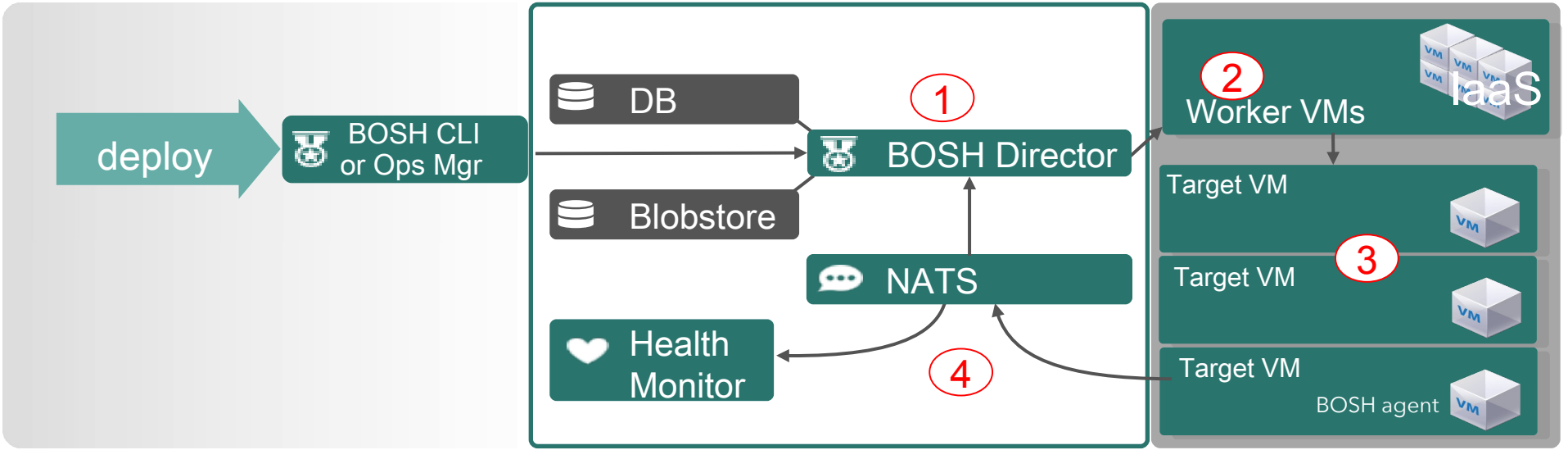
1. Upload release (software to install) into blobstore
2. Register in director's DB

BOSH Deployment (3 of 4)



1. Pass manifest (deployment instructions) to director

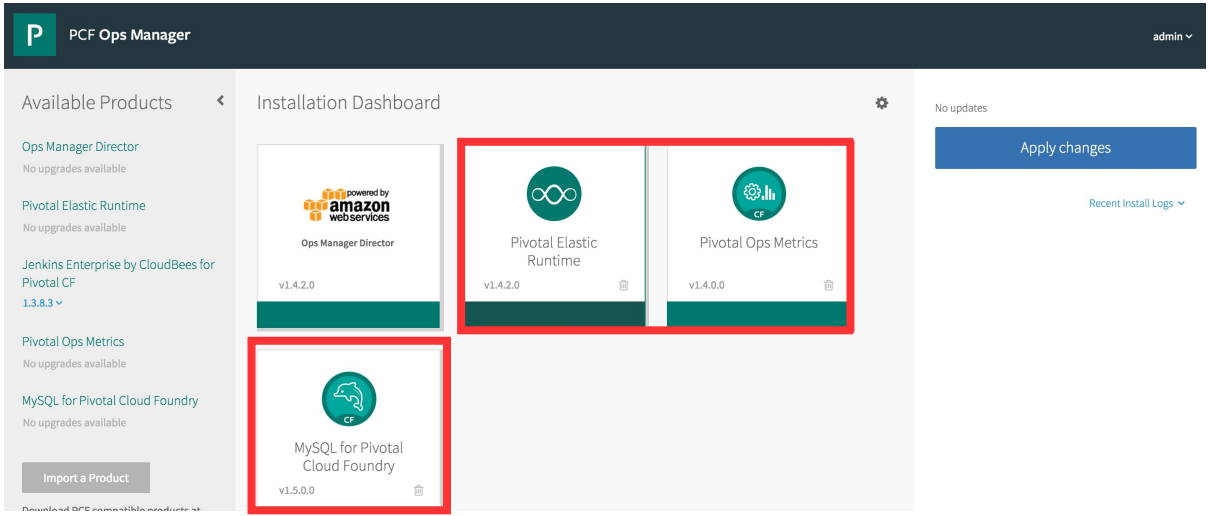
BOSH Deployment (4 of 4)



1. Director runs deployment
2. Drives worker VMs
3. Workers deploy desired VMs (from stemcells)
4. Director & HM updated with new system status

BOSH Deployments and Ops Manager Tiles

- The tiles in Ops Manager are each tied to BOSH deployments
  - The exception is Ops Manager Director, which is BOSH
- Clicking “Apply changes” starts the deployment



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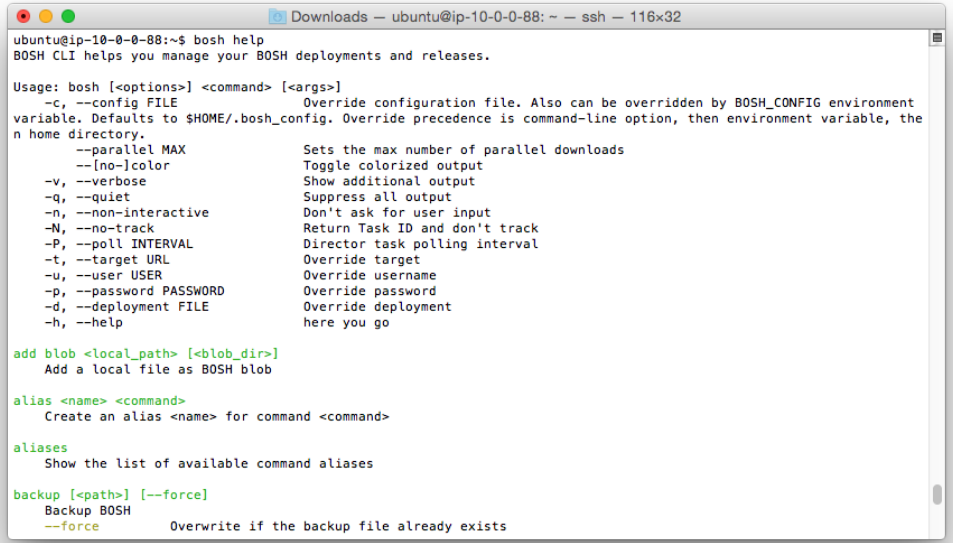
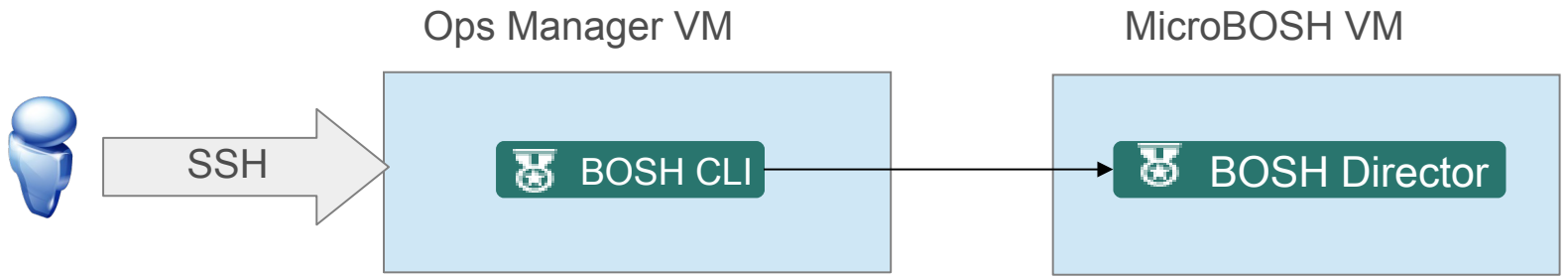
The BOSH CLI

- The BOSH CLI is a client for communicating with a BOSH Director
- Similar in concept to the CF CLI, but for the BOSH layer rather than the application layer
- Use 'bosh help' to see the commands and options



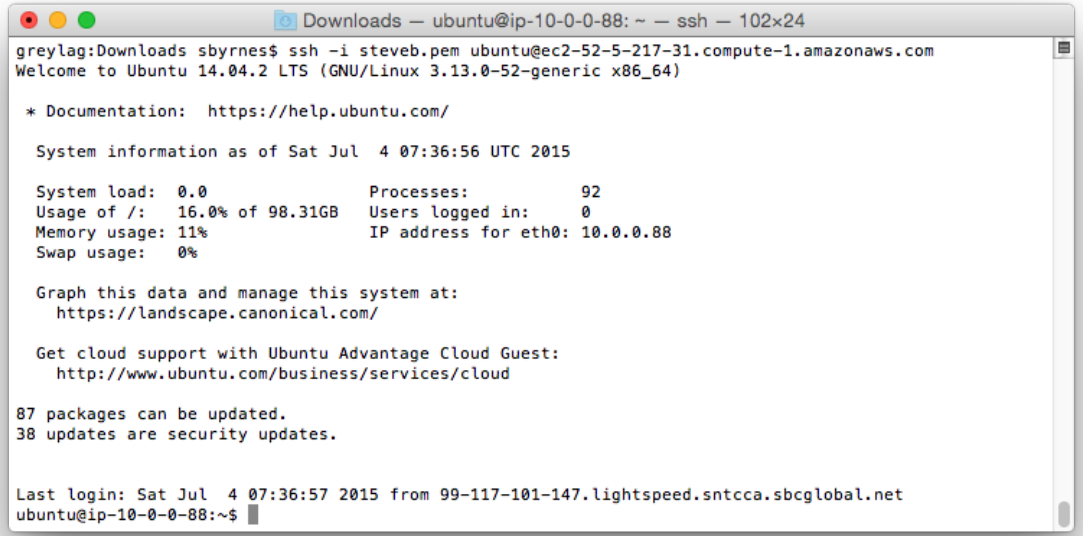
Accessing the BOSH CLI via the Ops Manager VM

- In a typical Pivotal Cloud Foundry installation, the BOSH director is on the MicroBOSH VM
- The MicroBOSH VM is instantiated from the Ops Manager VM
- The Ops Manager VM has an accessible URL, but the MicroBOSH VM does not
- To access the BOSH director, SSH into the the Ops Manager VM and use the BOSH CLI from there



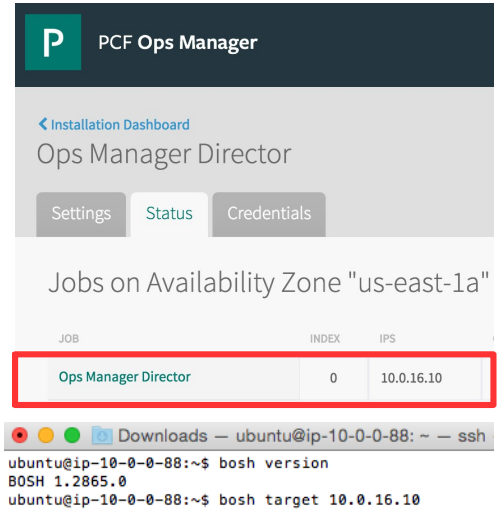
SSH into the Ops Manager VM

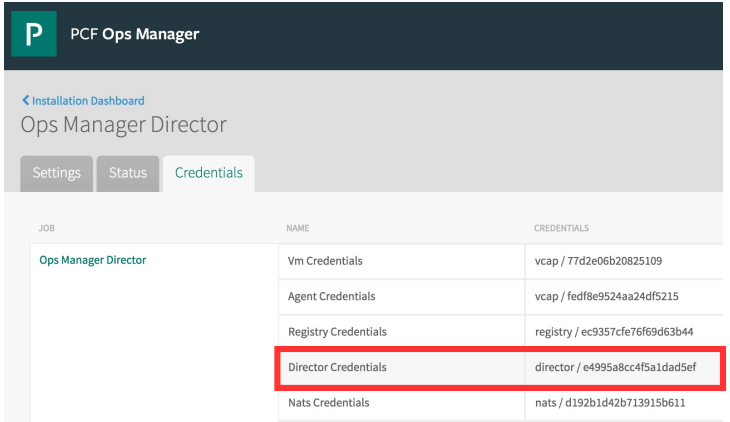
- In a terminal window:
  - `(AWS) ssh -i mykey.pem ubuntu@[ops manager VM DNS]`
  - `(vSphere) ssh ubuntu@[ops manager VM DNS]`



Targeting the BOSH Director on the MicroBOSH VM

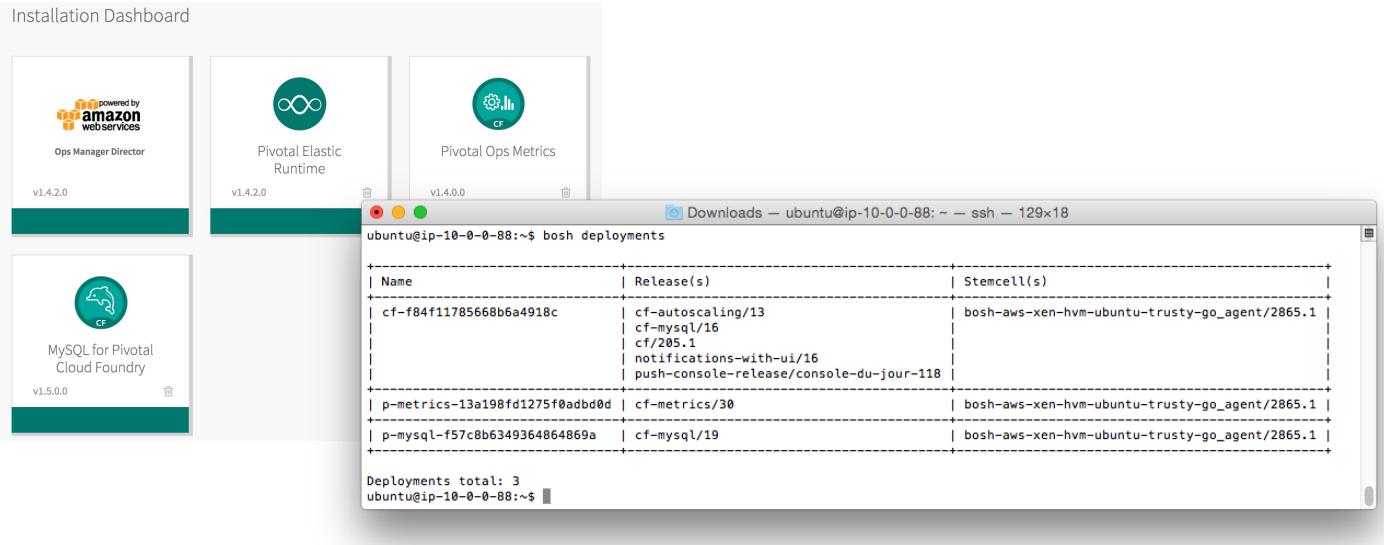
- In Ops Manager, use the Status tab for the Ops Manager Director tile to obtain the IP address of the Ops Manager Director (MicroBOSH)
- Use the Credentials tab to determine the login credentials
- Then in a terminal use `bosh target [ops manager IP address]` to target the BOSH director





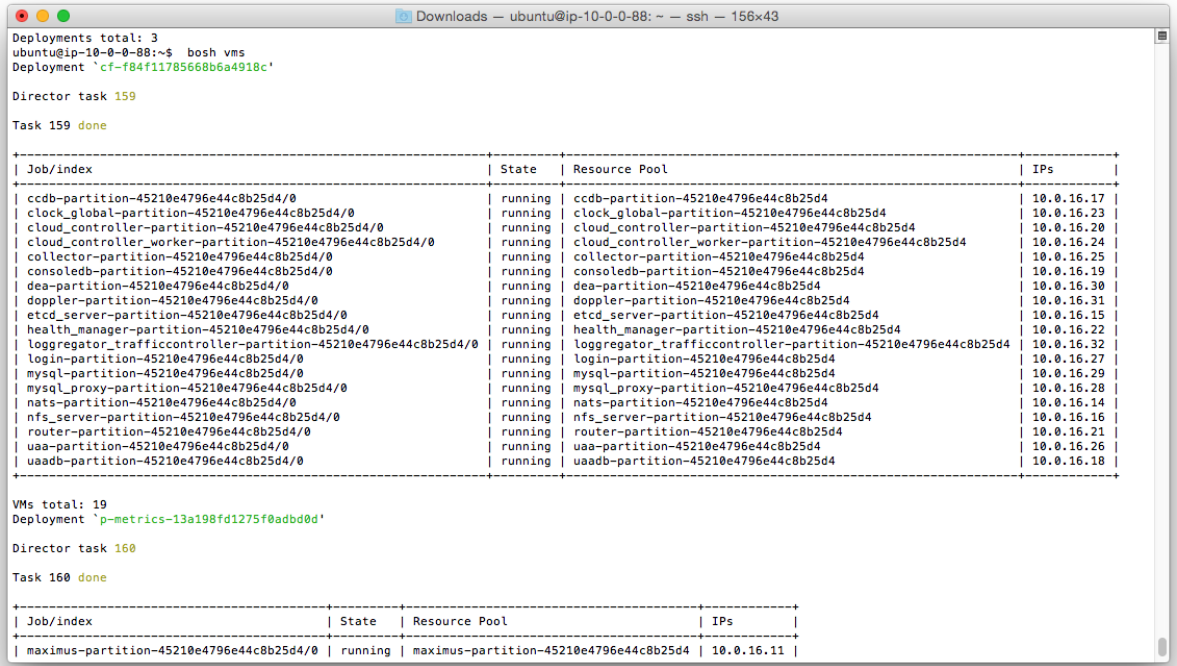
Viewing the BOSH Deployments

- Use `bosh deployments` to view the current deployments associated with BOSH director
  - Here, we see the deployments for Elastic Runtime, Ops Metrics and MySQL tiles in Ops Manager



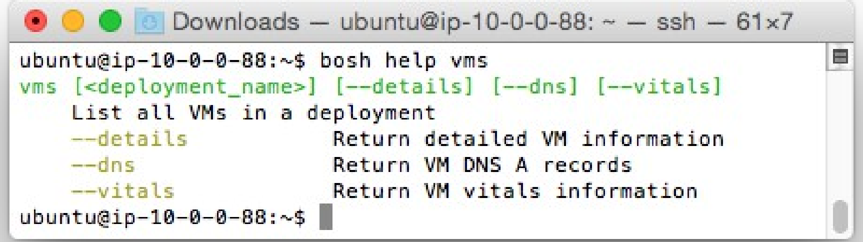
Viewing the BOSH-Managed VMs

- Use `bosh vms` to view the VMs associated with each deployment



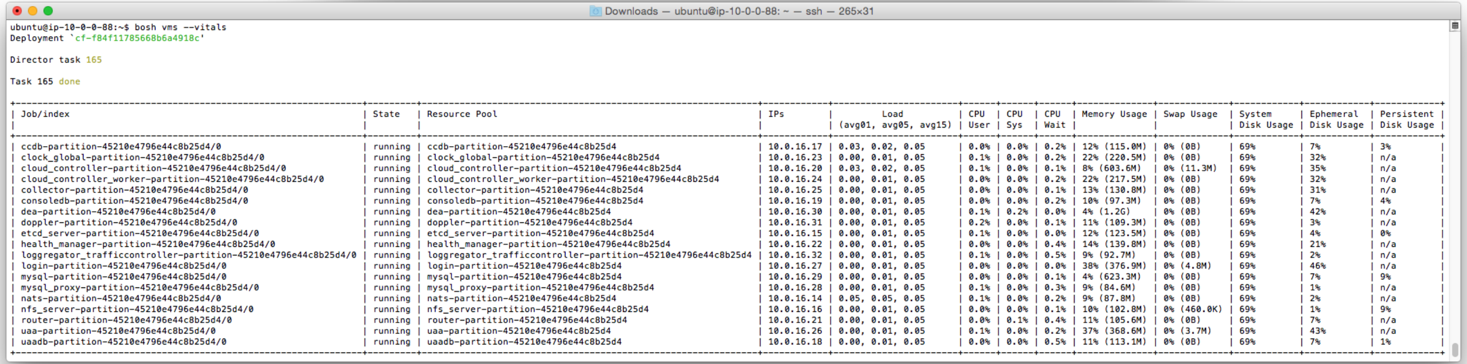
Viewing VM Details

- Use `bosh vms --vitals` to get current VM information



Downloads — ubuntu@ip-10-0-0-88: ~ — ssh — 61×7

```
ubuntu@ip-10-0-0-88:~$ bosh help vms
vms [<deployment_name>] [--details] [--dns] [--vitals]
    List all VMs in a deployment
    --details           Return detailed VM information
    --dns               Return VM DNS A records
    --vitals            Return VM vitals information
ubuntu@ip-10-0-0-88:~$
```



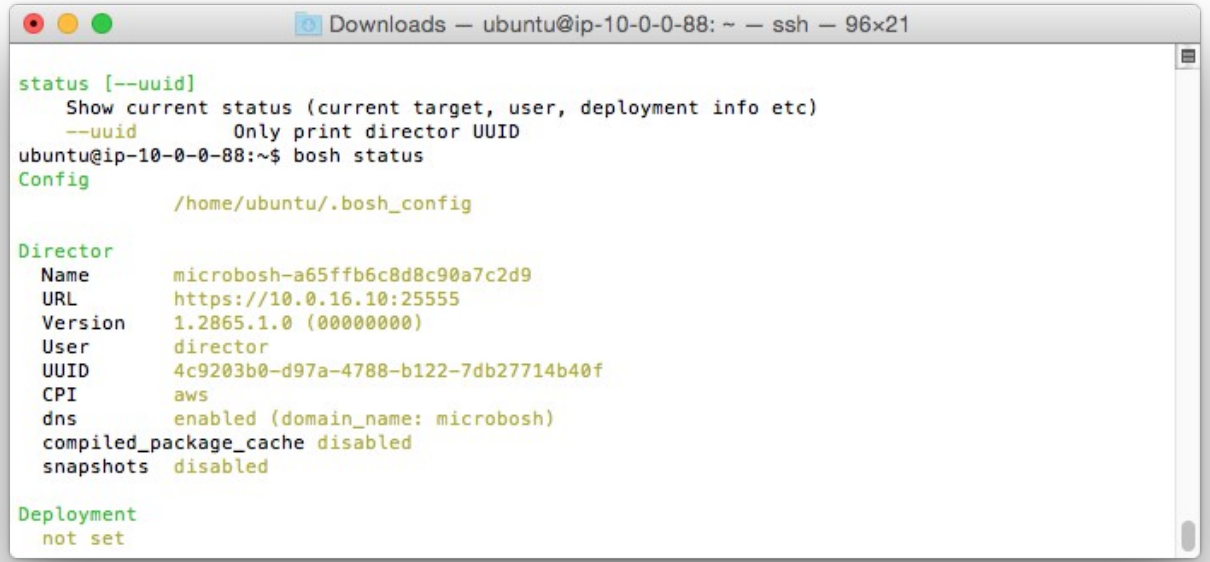
Downloads — ubuntu@ip-10-0-0-88: ~ — ssh — 265×31

```
ubuntu@ip-10-0-0-88:~$ bosh vms --vitals
Deployment `cf-f84f11785668b6a4918c'

Director task 165

Task 165 done
```

Job/index	State	Resource Pool	IPs	Load (avg01, avg05, avg15)	CPU User	CPU Sys	CPU Wait	Memory Usage	Swap Usage	System Disk Usage	Ephemeral Disk Usage	Persistent Disk Usage
ccdb-partition-45210e4796e44c8b25d4/0	running	ccdb-partition-45210e4796e44c8b25d4	10.0.16.17	0.03, 0.02, 0.05	0.0%	0.0%	0.2%	12% (115.0M)	0% (0B)	69%	7%	3%
clock_global-partition-45210e4796e44c8b25d4/0	running	clock_global-partition-45210e4796e44c8b25d4	10.0.16.23	0.00, 0.01, 0.05	0.1%	0.0%	0.2%	22% (220.5M)	0% (0B)	69%	32%	n/a
cloud_controller-partition-45210e4796e44c8b25d4/0	running	cloud_controller-partition-45210e4796e44c8b25d4	10.0.16.20	0.03, 0.02, 0.05	0.1%	0.0%	0.1%	8% (603.6M)	0% (11.3M)	69%	35%	n/a
cloud_controller_worker-partition-45210e4796e44c8b25d4/0	running	cloud_controller_worker-partition-45210e4796e44c8b25d4	10.0.16.24	0.00, 0.01, 0.05	0.0%	0.0%	0.2%	22% (217.5M)	0% (0B)	69%	32%	n/a
collector-partition-45210e4796e44c8b25d4/0	running	collector-partition-45210e4796e44c8b25d4	10.0.16.25	0.00, 0.01, 0.05	0.0%	0.0%	0.1%	13% (130.8M)	0% (0B)	69%	31%	n/a
consoledb-partition-45210e4796e44c8b25d4/0	running	consoledb-partition-45210e4796e44c8b25d4	10.0.16.19	0.00, 0.01, 0.05	0.0%	0.0%	0.2%	10% (97.3M)	0% (0B)	69%	7%	4%
dea-partition-45210e4796e44c8b25d4/0	running	dea-partition-45210e4796e44c8b25d4	10.0.16.30	0.00, 0.01, 0.05	0.1%	0.2%	0.0%	4% (1.2G)	0% (0B)	69%	42%	n/a
doppler-partition-45210e4796e44c8b25d4/0	running	doppler-partition-45210e4796e44c8b25d4	10.0.16.31	0.00, 0.01, 0.05	0.2%	0.0%	0.1%	11% (109.3M)	0% (0B)	69%	3%	n/a
etcd_server-partition-45210e4796e44c8b25d4/0	running	etcd_server-partition-45210e4796e44c8b25d4	10.0.16.15	0.00, 0.01, 0.05	0.1%	0.0%	0.0%	12% (123.5M)	0% (0B)	69%	4%	0%
health_manager-partition-45210e4796e44c8b25d4/0	running	health_manager-partition-45210e4796e44c8b25d4	10.0.16.22	0.00, 0.01, 0.05	0.0%	0.0%	0.4%	14% (139.8M)	0% (0B)	69%	21%	n/a
loggregator_trafficcontroller-partition-45210e4796e44c8b25d4/0	running	loggregator_trafficcontroller-partition-45210e4796e44c8b25d4	10.0.16.32	0.00, 0.01, 0.05	0.1%	0.0%	0.5%	9% (92.7M)	0% (0B)	69%	2%	n/a
login-partition-45210e4796e44c8b25d4/0	running	login-partition-45210e4796e44c8b25d4	10.0.16.27	0.00, 0.01, 0.05	0.0%	0.0%	0.0%	38% (376.9M)	0% (4.8M)	69%	46%	n/a
mysql-partition-45210e4796e44c8b25d4/0	running	mysql-partition-45210e4796e44c8b25d4	10.0.16.29	0.00, 0.01, 0.05	0.0%	0.0%	0.1%	4% (623.3M)	0% (0B)	69%	7%	9%
mysql_proxy-partition-45210e4796e44c8b25d4/0	running	mysql_proxy-partition-45210e4796e44c8b25d4	10.0.16.28	0.00, 0.01, 0.05	0.1%	0.0%	0.3%	9% (84.6M)	0% (0B)	69%	1%	n/a
nats-partition-45210e4796e44c8b25d4/0	running	nats-partition-45210e4796e44c8b25d4	10.0.16.14	0.05, 0.05, 0.05	0.1%	0.0%	0.2%	9% (87.8M)	0% (0B)	69%	2%	n/a
nfs_server-partition-45210e4796e44c8b25d4/0	running	nfs_server-partition-45210e4796e44c8b25d4	10.0.16.16	0.00, 0.01, 0.05	0.0%	0.0%	0.1%	10% (102.8M)	0% (460.0K)	69%	1%	9%
router-partition-45210e4796e44c8b25d4/0	running	router-partition-45210e4796e44c8b25d4	10.0.16.21	0.00, 0.01, 0.05	0.0%	0.1%	0.4%	11% (105.6M)	0% (0B)	69%	7%	n/a
uaa-partition-45210e4796e44c8b25d4/0	running	uaa-partition-45210e4796e44c8b25d4	10.0.16.26	0.00, 0.01, 0.05	0.1%	0.0%	0.2%	37% (368.6M)	0% (3.7M)	69%	43%	n/a
uaadb-partition-45210e4796e44c8b25d4/0	running	uaadb-partition-45210e4796e44c8b25d4	10.0.16.18	0.00, 0.01, 0.05	0.0%	0.0%	0.5%	11% (113.1M)	0% (0B)	69%	7%	1%

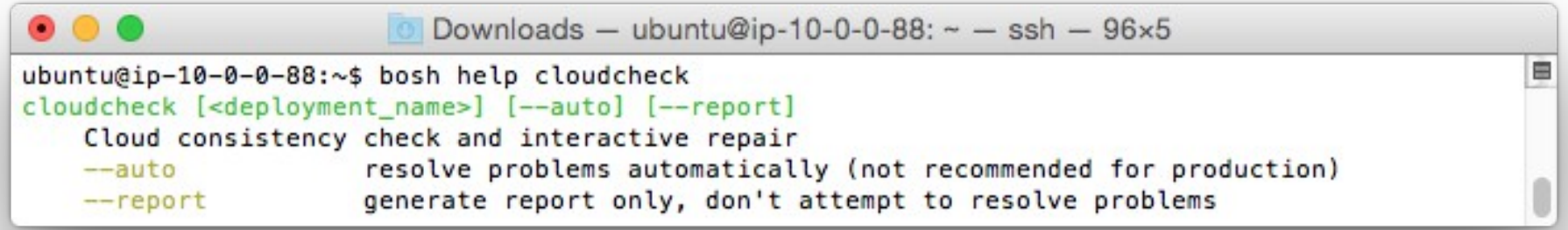
BOSH status

- Use `bosh status` to view overall BOSH information



BOSH cloudcheck

- Use `bosh cloudcheck --report` to view a problem report
  - Pivotal support may request a copy of this report



Viewing BOSH Commands in Installation Logs

If you install or update products using Ops Manager, the logs will show deployment-related BOSH commands

```
Running "bundle exec bosh -n upload stemcell
/var/tempest/stemcells/light-bosh-stemcell-2865.1-aws-xen-
hvm-ubuntu-trusty-go_agent.tgz –skip-if-exists"

Running "bundle exec bosh -n upload release
/var/tempest/releases/cf-metrics-30.tgz --skip-if-exists"

Running "bundle exec bosh -n deployment
/var/tempest/workspaces/default/deployments/p-metrics-
13a198fd1275f0adbd0d.yml"

Running "bundle exec bosh -n deploy"
```

Topics

- BOSH and Ops Manager Introduction
- BOSH Architecture Introduction
- BOSH Deployments
- Using the BOSH CLI

Lab

Install Ops Manager, Ops Manager Director and use the BOSH CLI