bosh-init

bosh bootstrapping and the future of BOSH

Maria Shalbidina (Pivotal), Michael Maximilien (IBM), and BOSH team

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What is bosh-init?

- BOSH is an IaaS **agnostic** tool used to deploy different types of software such as CF Elastic Runtime, Concourse.ci, RabbitMQ, etc.

- BOSH environments start with a **single** Director VM which controls subsequent VMs

- **bosh-init:** new way to create/update **initial** Director VM

bosh-init demo
(start)

bosh-init ingredients

- OS Image = stemcell

- Software = release(s)

- Configuration = deployment manifest

Deployment manifest

- YAML file

- bosh-init is configured just like any other deployment
    - uses same deployment manifest format
    - has familiar VM and disk lifecycle management
    - supports easier specification of stemcell & release(s)

- Source of truth for the deployment (allows replication)

Some history

- `bosh micro deploy/delete` command
  - plugin for the main BOSH CLI

Limitations with the old tool

- embedded CPIs
    - "hard coded" in the Director
    - led to a few BOSH forks
    - polluted Director's Ruby runtime
    - disallowed non-Ruby CPIs
    - hard to experiment with

Limitations with the old tool (*cont.*)

- "hard coded" version of Director in stemcell
    - forced us to publish stemcells very frequently
    - hard to evolve BOSH (testing and development)

Limitations with the old tool (*cont.*)

- limiting future integrations
  - UAA based auth
  - multiple CPIs
  - jumpbox VM setup

Limitations with the old tool (*cont.*)

- painful CLI installation
    - Ruby, gem conflicts and incompatibilities
   - slow start-up times

and it's all fixed

External CPIs

- CPIs are now distributed as releases
  - no longer have to fork BOSH … almost ;)
  - separately versioned and maintained
  - allows better team separation/growth
  - allows to use non-Ruby languages
  - better at including CPI dependencies

Leaner stemcell

- Director is no longer included in stemcells
    - removed pre-compiled Director and dependencies
   - easier/independent Director or stemcell updates

credit: http://www.orthospinenews.com/magnetic-field-controls-stem-cell-activity
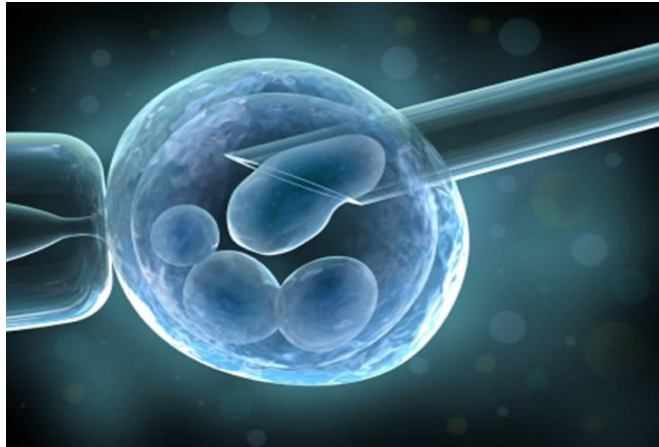
Focused releases

- bosh-init allows custom release installation
  - UAA (uaa-release) next to Director (bosh-release)
  - opens the door to installing multiple CPIs
  - create single VMs w specific purpose (e.g., jumpbox)

Re-written in Go

- bosh-init is distributed as standalone binary
    - easy to install and update (just download and run)
    - faster start-up times and feels more responsive
    - allows us to address some technical debt
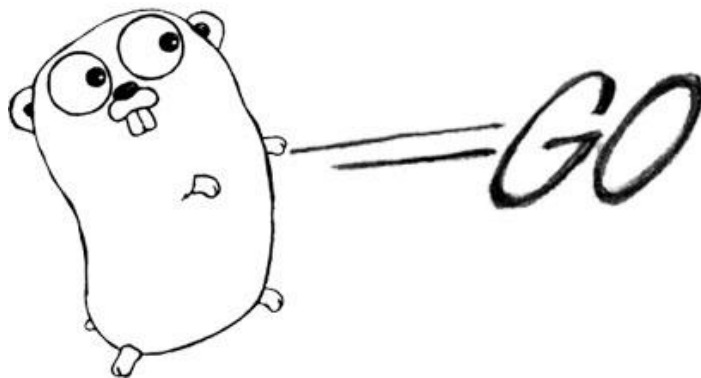
...and more

- Idempotency and resiliency checks
- Simpler and more consistent UI/UX
- Cleaner separation of orchestration and IaaS

some technical details

How do external CPIs work?

- Packaged as releases allowing to include dependencies (`genisoimage` for vSphere CPI)
- Cloud Provider Interface (CPI) stayed the same
- Each CPI release needs to include a CPI binary
- bosh-init and the Director just shell out to the CPI binary
- CPI binary is pre-configured with cloud specific config
- JSON is used for encoding/decoding CPI responses

How do external CPIs work? (*cont.*)

BOSH director

eCPI
+ create_stemcell
+ delete_stemcell

+ create_vm
+ delete_vm
+ has_vm
+ reboot_vm
+ set_vm_metadata

+ configure_networks

+ create_disk
+ attach_disk
+ detach_disk

\# optional
+ snapshot_disk
+ delete_snapshot
+ get_disks

+ current_vm_id
+ ping

The 11 essential methods to implement an external CPI and the optional methods

Many of the methods take a JSON payload to allow you to customize for your needs, e.g., `VMProperties` data to `create_vm()` method

shells out requests to CPI binary

CI update

- Transitioning from Jenkins to using Concourse CI
- Using bosh-init to set up single instance Concourse CI machines on AWS for BOSH sub-projects
- On path to provide Concourse pipeline for testing CPIs
  - generic BOSH acceptance tests with any CPI
  - generic CPI integration tests with any CPI

Soon to be contributed CPIs

How do you use bosh-init?

Check on demo

What next

- bosh.io centralize access to all BOSH info
- Use **bosh-init**, send us feedback
- Multiple VM support in bosh-init?
- BOSH notes: github.com/cloudfoundry/bosh-notes
- Contact: Dmitriy Kalinin<dkalinin@pivotal.io>

Thank you

Team

and everyone on BOSH team!

Karl Isenberg

Dmitriy Kalinin

Phan Le

Kris Hicks

https://github.com/cloudfoundry/bosh-init