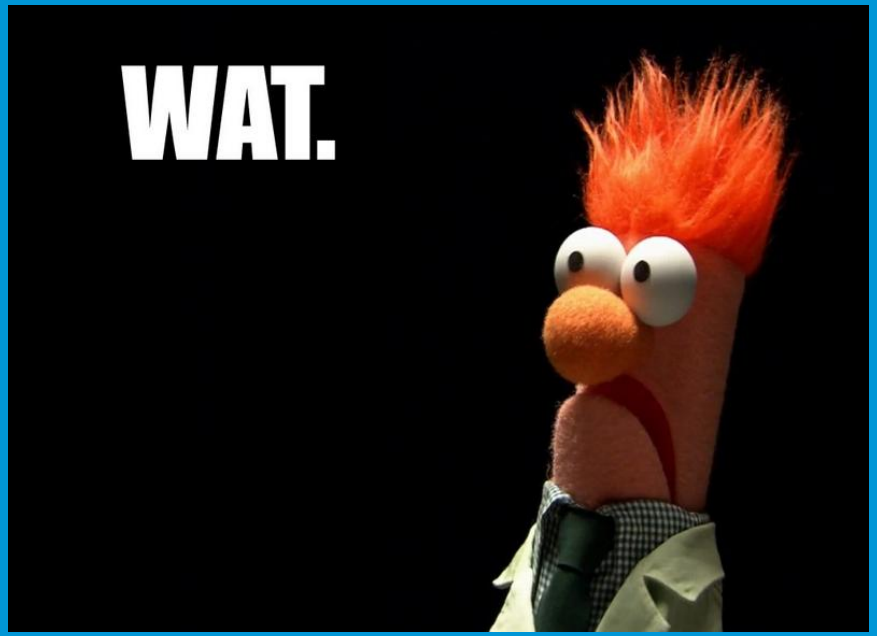
Managing OpenStack with Heat

Orchestration for “OpenStack on OpenStack”

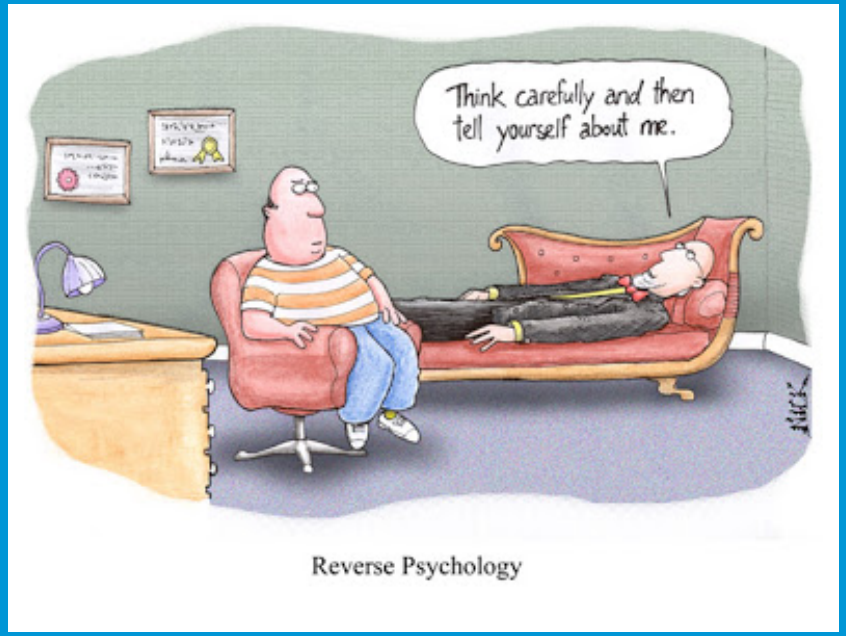
Clint Byrum / Havana OpenStack Summit April 16, 2013

You have a problem



http://images.cryhavok.org/v/Wat.jpg.html

I have a problem



http://telostherapy.blogspot.com/2012_10_01_archive.html

We have a problem

http://coconnect.me/2011/11/11/hello-colorado-we-have-a-problem/

DIRTY FLOORS

http://www.flickr.com/photos/lambj/2714026706/

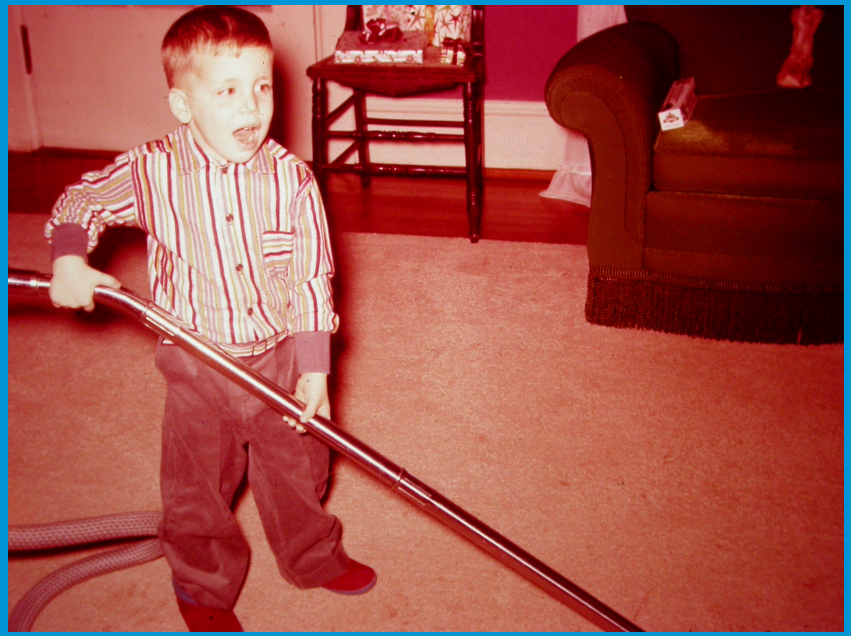
The solution is obvious and simple - vacuum

http://www.flickr.com/photos/exlibris/4768359807/

In theory, we are all capable of sending people to Space, given enough time...

http://www.flickr.com/photos/ttrueman/8085059326/

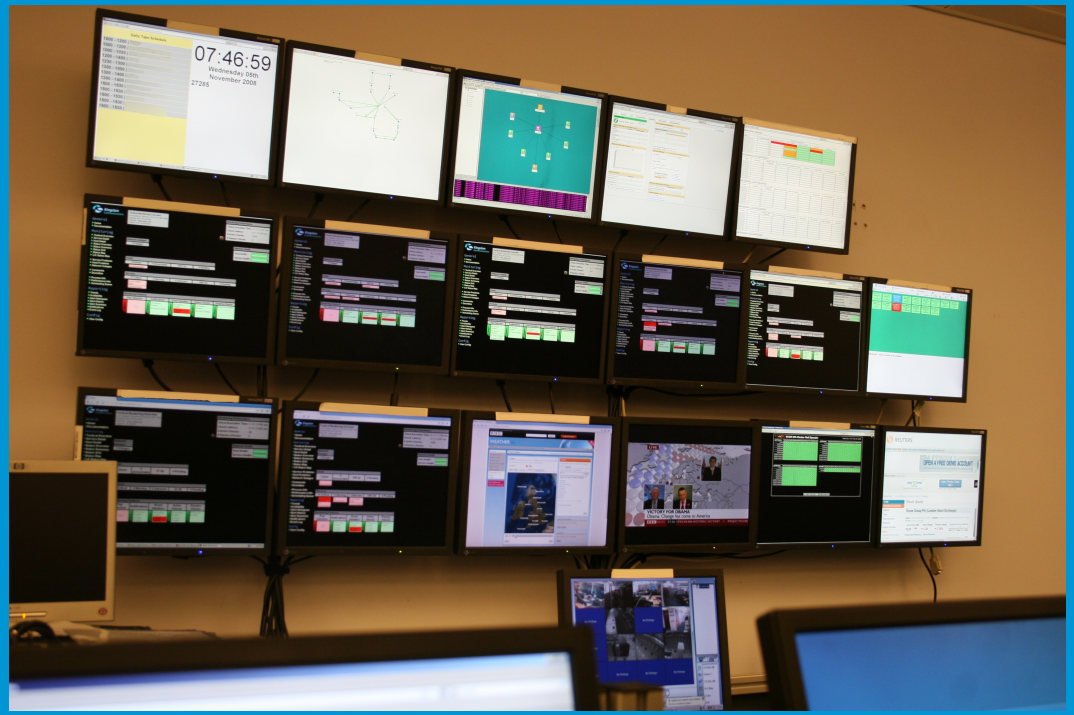
But, we have to vacuum



http://www.flickr.com/photos/ncreedplayer/2147181279/

NO stupid

http://www.flickr.com/photos/graustark/2278714646/



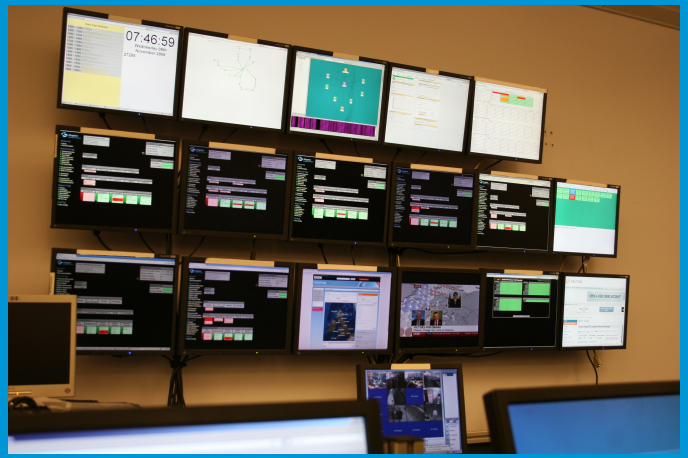
DataCenter operators have dirty floors too

http://www.flickr.com/photos/mogwai_83/3022261893/

But thats my job…

If you run a datacenter with little or no automation…

If you run a datacenter with little or no automation, your job sucks



So stop wasting time, automate

But I did, I have (chef/puppet/salt)

Ever done this?

- for server in $(server-lister-thing) ; do ssh $server update-software-thing ; done

Oops, now what?

- Updater [server1]: OK
- Updater [server2]: FAIL
- Updater [server3]: OK
- $

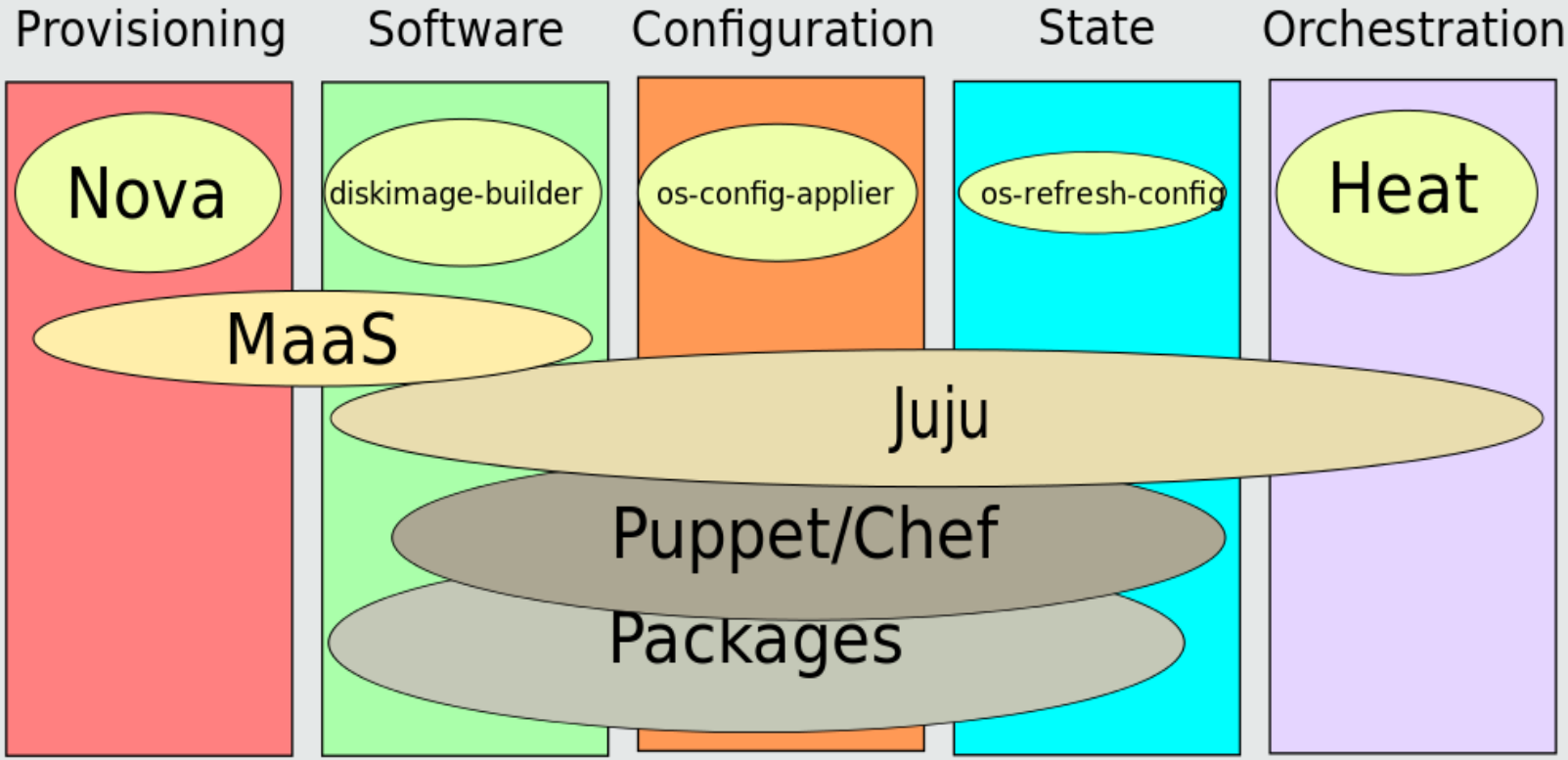
Oh right

- Updater [server1]: OK
- Updater [server2]: FAIL
- Updater [server3]: OK
- $ vacuum server2

The cloud way

- **nova delete server2 ; nova boot … server2**
- **Oops! Bye bye data .. Volumes, shared-nothing**
- **imperative and thus complex**

The “TripleO” cloud way



Heat's Job

- **Structured declarative multi-node/multi-service orchestration**
- **Completely agnostic of config systems inside instances**

Example

```
Resources:
  UpdateCondition:
    Type: AWS::CloudFormation::WaitCondition
    Properties:
      Timeout: 30
      Count: 3
  UpdateHandle:
    Type: AWS::CloudFormation::WaitConditionHandle
    WaitCondition: UpdateCondition
  ServerConfig:
    Type: OS::Heat::LaunchConfiguration
    Properties:
      ImageId: server-image-1
      Flavor: super-big-awesome
    Metadata:
      UpdateWaitHandle: {Ref: UpdateHandle}
      ImportantConfig: foo
  Servers:
    Properties:
      Type: OS::Heat::InstanceGroup
      Properties:
        LaunchConfiguration: {Ref: ServerConfig}
        Size: 3
      Metadata:
        UpdateWaitHandle: {Ref: UpdateHandle}
```


Example

```
      Flavor: super-big-awesome
    Metadata:
      UpdateWaitHandle: {Ref: UpdateHandle}
-     ImportantConfig: foo
+      ImportantConfig: bar
  Servers:
    Properties:
      Type: OS::Heat::InstanceGroup
```

```
$ heat stack-update my-servers –template-file=new-template.yaml
```

“Bare metal” is not special*

- **Evoke power control and PXE instead of hypervisor, image delivered via iSCSI**
- **Network – KISS or OpenFlow**
- **Data – iSCSI or Special cased DAS volumes [not solved yet]**

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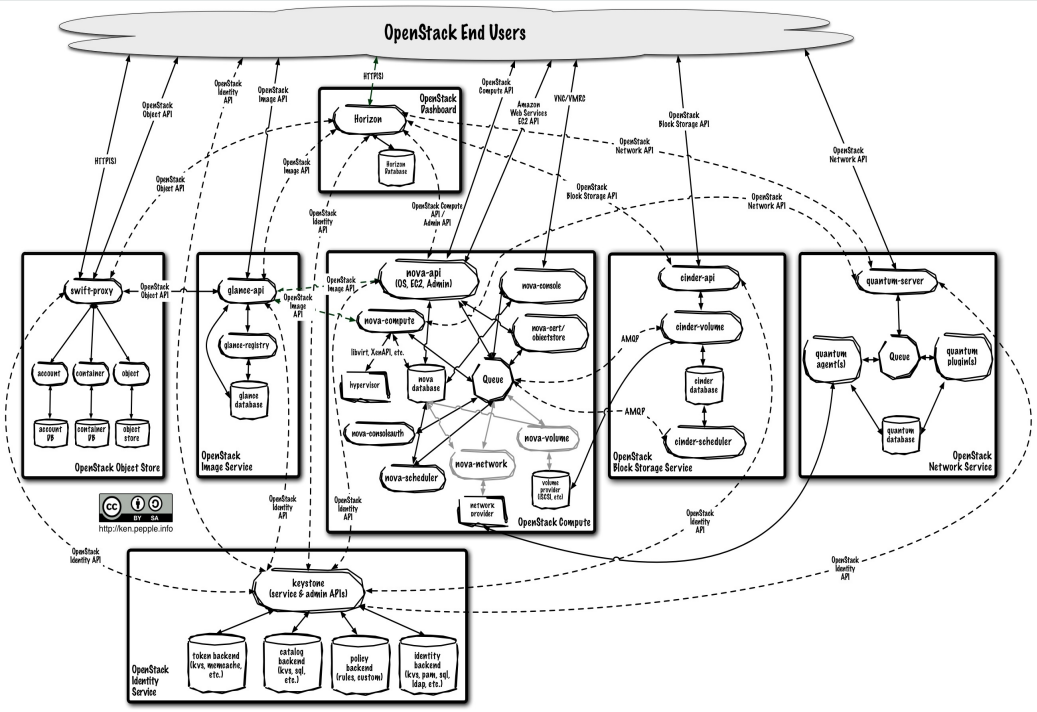
“refstack”

- **Heat templates, https://github.com/openstack-ops/templates**



Heat at Scale - Canaries

- **Heat will wait for x% of servers to report update success before updating more, fails can rollback [blueprint: rolling-updates]**

Heat at Scale – Security

- TLS/SSL for coms
- Keystone Trusts
- API/Engine Separation

Heat at Scale – Performance

- **Parallelism**
- **Scale-out engines**

“TripleO” – OpenStack on OpenStack

- **Using refstack templates**
- **https://github.com/stackforge/os-config-applier for config file writing**
- **https://github.com/stackforge/diskimage-builder for software delivery**
- **https://github.com/stackforge/os-refresh-config for system state management**
- **Aimed at gating OpenStack (like devstack, but with production in mind)**

Thank you

- Clint Byrum – clint.byrum@hp.com
- SpamapS - Freenode IRC - #tripleo , #heat