Rob Hirschfeld @ Dell

Operating the Hyperscale Cloud

How "Crowbar" grew from installer to an Ops Foundation

Rob Hirschfeld
twitter: @zehicle

- Into *cloud* since 1999
- Principal Cloud Solution Architect at Dell
- Based in DCS, the hyperscale solutions group
- Lead in Dell's work with Azure, Joyent, and Eucalyptus

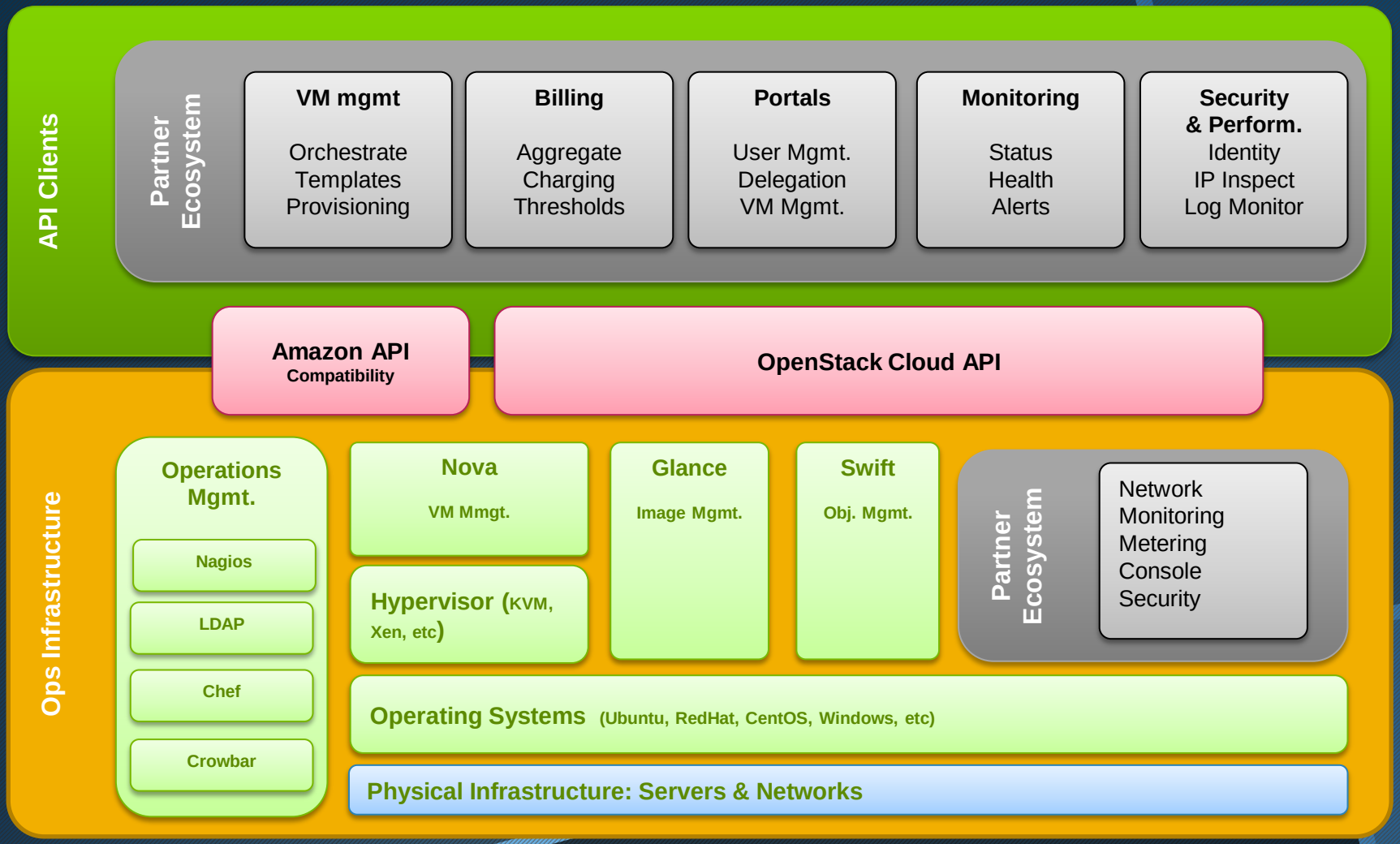
Dell <3s OpenStack

- It's ***Open, Capable, and Affordable***
- Dell Leadership in Community
  - First hardware solutions vendor
  - Active community participation
  - Solutions now being offered
- Working with Rackspace, Opscode, Equinix and others
- Solution Available **NOW**
  - Hyperscale whitepaper
  - Reference Architecture
  - "Crowbar" bare metal installer
  - Hardware & Services
    - with Rackspace Cloud Builders

The journey was critical…

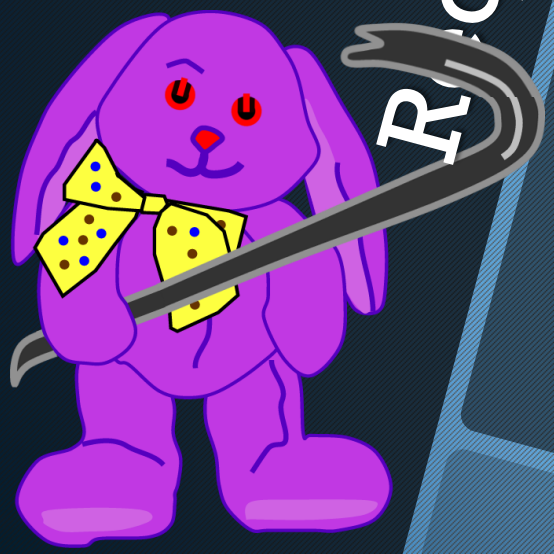
We started building an OpenStack installer,

then, we discovered something much more important.



Dell's Destination for OpenStack

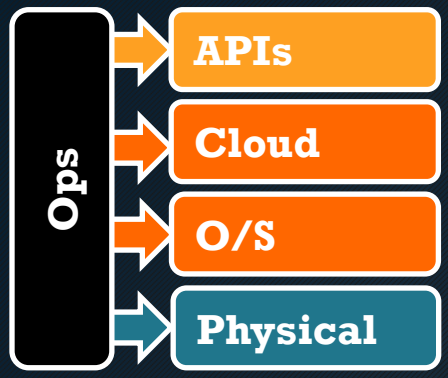
Crowbar Requirements



"**Build a cloud installer**

- <4 hours from box to cloud *without* Internet
- Enable *complete* refresh from RAID & BIOS up
- Deploy *multiple* components in parallel
- Grow to *production* scale
- *Ship-ready* ASAP

What is Crowbar?



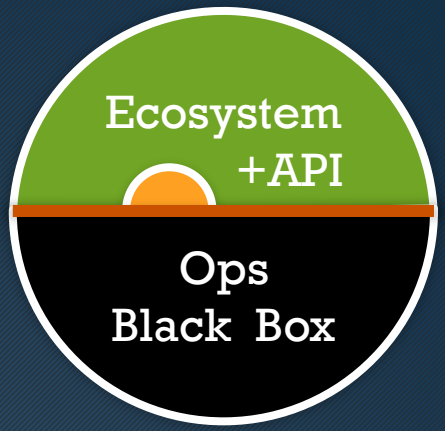
- ~~A Cloud Installer~~
- *A way to deploy the taxonomy*

- Technical
  - Discovery Engine
  - Hardware Configuration (BIOS)
  - Imaging State Machine

- Process
  - Pluggable Components
  - Cloud Deployment Logic
  - Cloud Maintenance Model

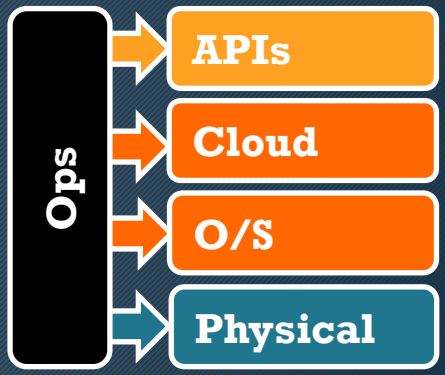
Here is what we learned…

Two Sides of Cloud



Cloud = Ops

CloudOps



Obligatory "What is Cloud?" Slide

"NOT ABOUT

- Selecting technology
- An end state
- A single product

"IS ABOUT

- Process innovation
- Business acceleration
- Service

Cloud is *always* ready, *never* finished.

Two Sides of Clouds

Clouds have 2 sides:

1) A public facing API and
2) A hidden elastic infrastructure

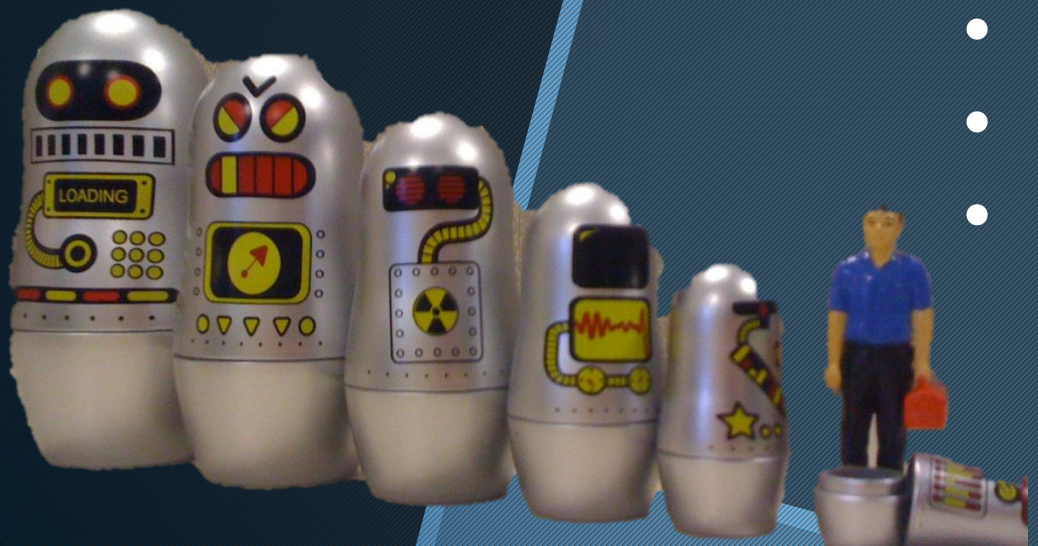
API + Ecosystem

“ **APIs** provide the smallest usable “surface area”

- Creates resource abstraction (cloud is infinitely elastic)
- Enables standards
- Limits provider’s exposure

“ **Ecosystem** exists beyond the API

- Creates a cloud market
- Targeted use cases & usability
- Frees the cloud provider to focus on scale



Ops Black Box

“ **Inside** clouds should seem to be a

- perfectly performing,
- strictly partitioned and
- totally elastic resource pool.

“ To the API user, it does not matter if the inside is ugly, inefficient, or inelegant

“ Except, of course, that it *does matter* a great deal to the cloud operator.

Cloud = Ops

We have capable hardware & software, the *real question* is how are we going to operate it as a service?

Bringing DevOps into the Black Box

- “ We’ve been calling this ***CloudOps***
- “ Different mindset to infrastructure
  - Software is constantly changing
  - Fluid resources instead of servers
  - Manual touch is poison

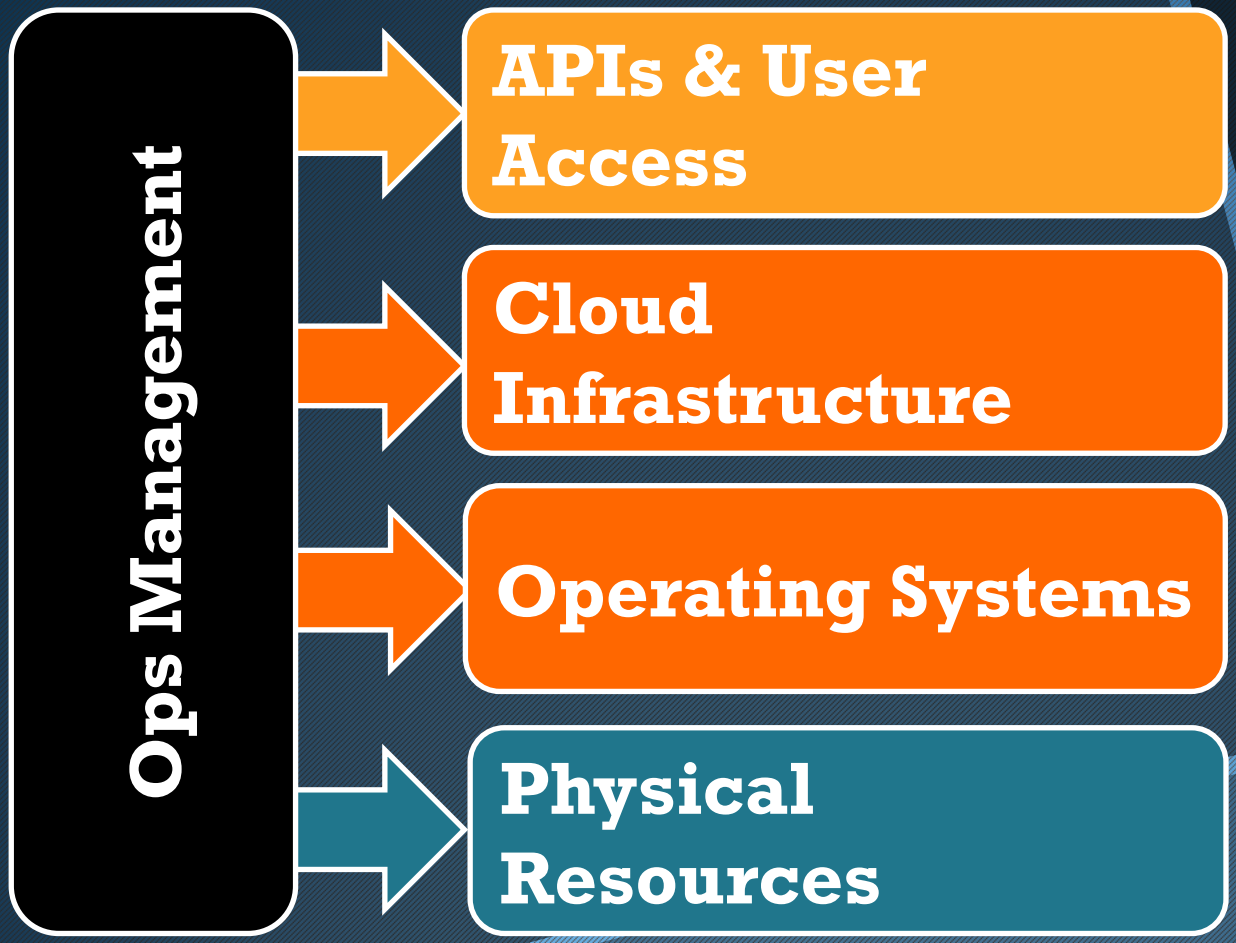
    “Automate or Die!”

Ultimately, all the rules for operating the data center become encoded *as automation software.*

From Crowbar To CloudOps

- **Opscode Chef Server** based
  - Classic DevOps tool
  - Crowbar deploys using Cookbooks & Recipes
  - General Community Scripts
- Flexible (not prescriptive)
  - Pluggable modules (**Barclamps**)
  - Expected to be site specific
- Agile (iterative)
  - repeatable & highly scalable
- *Deploy, Fix, Redeploy, Repeat!*

Crowbar in the Taxonomy



Crowbar drives an Ops Model to deploy components at *all layers* of the cloud taxonomy.

Crowbar will be open source

- Apache 2 license
- Release pending field trials
- Working with collaboration partners including Rackspace, Citrix and Opscode
- To be Site Validated
  - Via DOSS customers
  - Working with partners
- Released as an independent project to be submitted for inclusion in OS at next design conference

Cloud Agility: CloudOps 7 tenants

CloudOps 1: Ownership

- **Operational Ownership**
- Don't wait for all the king's horses and consultants to put your cloud back together again, but…
- Asking for help is OK.

CloudOps 2-3: Alignment

“ Simple APIs

reduce the ways that consumers can stress the system making the scale challenges more predictable.

“ Efficiency based financial incentives

customers will dramatically modify their consumption if you offer rewards that better match your black box’s capabilities.

CloudOps 4-5: Operations

"**Automated processes & verification**

ensures that changes and fixes can propagate at scale while errors are self-correcting.

"**Frequent incremental rolling adjustments**

prevents the great from being the enemy of the good so that systems are constantly improving (learn more about "split testing")

CloudOps 6-7: Process

“ **Passion for operational simplicity**

Complexity translates into increased risk and reduced agility

“ **Hunger for feedback & root-cause knowledge**

The only thing more frustrating than fixing a problem at scale, is fixing the same problem multiple times.

Next Steps

- More Reading?
  - RobHirschfeld.com
  - Dell.com/OpenStack
  - Hyperscale white paper
- More Action?
  - Dell OpenStack Starter Solution (DOSS)
  - Crowbar collaboration
- More Dialog?