Dell and Openstack with Crowbar

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HPC Engineer, Dell AU/NZ
Firstly what is **DevOps**? Why is it important?

• Traditionally:
  – IT Developers want **change** (frequent delivery of new features)
  – IT Operations want **stability** (availability, stability & cost efficiency)

• DevOps is an operational model for software development
  – **Infrastructure as Code**
  – Virtual machines shield software from configuration issues
  – **Highly Automated**
  – Layered Deployments (not full image based)
  – Continuous Deployment

• Shaped by Amazon Cloud
  – API only access to infrastructure
  – Elastic **Resources** that are **easier to recreate than change**

• Configuration Management Tooling
  – Chef & Puppet to automate configuration
  – Builds **applications from** open source **modules/recipes**
  – Modules/recipes built on interdependent hierarchy if required
  – Not quite coding, but far from manual
What is OpenStack?
What is OpenStack?

- **An operating platform / toolkit for orchestrating clouds.**

- OpenStack is
  - a **community**
  - A **stack of open source software** (Apache 2.0 license)

- Contains a collection of open source projects that are community-maintained
  - **Compute** (code named “Nova”)
  - **Object Storage** (code named “Swift”)
  - **Image service** (code named “Glance”)
  - **Authentication** (code named “Keystone”)
  - **Dashboard** (code named “Horizon”)
  - **Network** (code named “Quantam”)
  - **Block Storage** (Code named “Cinder”)

- OpenStack’s basic requirement: “**Clouds must be simple to implement and massively scalable.**”

- Open Standards and versatility:
  - Amazon APIs are supported
  - Multiple hypervisors (Xen, KVM, VMWare, Hyper-V, etc.)

- [www.OpenStack.org](http://www.OpenStack.org)
Openstack Overview
Dell and OpenStack to date

- **First Solution Launched: July 2011**
  - The market’s first OpenStack Cloud solution featuring hardware, software, and services

- Only HW solutions provider at announcement
  - The most history with OpenStack

- Contributions
  - Development of Crowbar software
    - Crowbar open sourced. Download at [www.dell.com/openstack](http://www.dell.com/openstack)
  - “BootStrapping OpenStack Clouds” technical whitepaper
    - 1 out of 3 visitors downloading
  - Video, press releases, event sponsorships, etc

- Key partnerships
  - Rackspace, Citrix, Opscode, and more

- Dell experts visible in OpenStack community

www.Dell.com/OpenStack
## Dell OpenStack Cloud Solution

### The Market’s First OpenStack Solution

<table>
<thead>
<tr>
<th>Hardware</th>
<th>HW Reference Architecture</th>
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</table>
|          | • Poweredge & PoweredgeC Servers  
|          | • Storage and compute  
|          | • Force 10 or PowerConnect LAN |
| **Configuration** | **Min of 6 nodes** |

<table>
<thead>
<tr>
<th>Software</th>
<th>Software</th>
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</table>
|          | • OpenStack Installer (Crowbar)  
|          | • OpenStack cloud SW  
|          | • Other SW elements installed by Crowbar |

| Operating System | • Ubuntu or RedHat  
|                  | • Windows (Guests)  
|                  | • Linux (Guests) |

| Hypervisor | KVM, Xen |

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<tr>
<th>Services</th>
<th>Deployment</th>
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|          | • Onsite HW Install  
|          | • Onsite SW Install  
|          | • Whiteboard session & training (via RCB) |

| Support | • HW: Dell ProSupport  
|         | • SW: OpenStack support (via RCB) |
What is Crowbar?
Cloud is great but HOW?

- How do I go from bare metal to cloud?
- How do I customise the hardware?
- How do I provision servers?
- How do I configure networks?
- How do I configure storage?
- How do I assign roles?
- How do I monitor availability?
- How do I monitor performance?
- How do I manage all those servers?
- How do I change things quickly?
- **How do I sleep?!**
How do you manage a CLOUD that won’t stay still?

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cloud Operator Challenge</th>
<th>Cloud User Challenge</th>
<th>Solution</th>
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</thead>
<tbody>
<tr>
<td>Code is constantly changing</td>
<td>Deployment time &gt; code delivery rate</td>
<td>Pace of innovation is fast</td>
<td>Continuous deployment</td>
</tr>
<tr>
<td>Resources are constantly changing</td>
<td>At scale, no system is steady state</td>
<td>Match output with consumption demand</td>
<td>Automated deployment</td>
</tr>
<tr>
<td>Too many components to track</td>
<td>Complexity is EXPENSIVE $$$</td>
<td>Require dynamic integration</td>
<td>Centralized configuration management</td>
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</table>
Crowbar “A Zero Touch Cloud Installer”

Servers in boxes to fully functioning cloud in under 4 hours

• Provides **Provisioning, Management & Monitoring** of cloud resources

• **Fast & Flexible**
  – Bare metal install including BIOS, RAID & Network config
  – Autodiscover of servers
  – Choose how the server is configured via “barclamps”

• **DevOps Embracing**
  – Ongoing **Operations Model** for continuous integration and management
  – Leverages and wraps Opscode Chef Server recipes for “barclamps”
  – Customer can create their own barclamps

• **Developed by Dell** then Opensourced
  – *Not* specific to OpenStack – can be used with other applications (hadoop)
  – *Not* restricted to Dell hardware
  – Apache 2 licensed
Modular Design: Barclamps

Deployment, provisioning and configuration automation software for Dell OpenStack cloud solution.

- Dell Crowbar
- Cloud Infrastructure & Dell IP Extensions
- Core Components & Operating Systems
- Physical Resources

- APIs, User Access, & Ecosystem Partners
- Network
- RAID
- BIOS
- BMC
- DHCP
- DNS
- NTP
- Loggin
- Glance Image
- Cinder Block Storage
- Quantum Networking
- Keystone Authent
- Swift Obj Storage
- Nova Compute
- Horizon Dashboard
- Ganglia
- Nagios
- Crowbar
- Deployer
- Provisioner
- IPMI
Crowbar Software Framework

Proven solutions

Modular, open source framework that accelerates multi-node deployments, simplifies maintenance, and streamlines ongoing updates

- Deploy an OpenStack cloud or Hadoop cluster in hours instead of days
- Use or build barclamps to install and configure software modules
- Supports a cloud operations model to interact, modify, and build based on changing needs

Proven components

Opscode Chef Server Capabilities

Download the open source software: https://github.com/dellcloudedge/crowbar

Active community
http://lists.us.dell.com/mailman/listinfo/crowbar

Resources on the Wiki:
https://github.com/dellcloudedge/crowbar/wiki

Rob Hirschfeld’s blog

“Dell solved a problem that we had. And when Dell solved that problem, our engineers thought, ‘We’re going to use this.’”

Ben Cherian, GM of Emerging Technologies, DreamHost
Simple crowbar install

Servers in boxes to fully functioning cloud in under 4 hours!

- Get your servers and networks cabled up
- Download the crowbar iso from github
- Install crowbar on your “admin” node
- PXE boot the rest of your nodes
- Start assigning your OpenStack barclamps
  - Nova
  - Swift
  - Glance
  - Etc...
- Crowbar does the rest!
Crowbar Dashboard

- The main dashboard shows the nodes and if they are ready
  - The columns are the discovered switches and the nodes are under the switch they are connected to
  - Green icon means ready. Red icon means not ready. Next to the switch is a pie chart of the status of the underlying nodes
- Selecting a node will bring up the details for that node. The stats and info about the node is displayed. Selecting a role in the role list will highlighting all nodes that also have that role.
Monitor the services installed by Crowbar

- Nagios and Ganglia are installed by default and are configured to correctly monitor the services installed by Crowbar.
Dell OpenStack-Powered Cloud Solution

Proven solutions

Elastic, vastly scalable and designed to handle massive data loads

• Tested, validated, and innovative designs in infrastructure, software, and services
• What you need to develop, deploy, and deliver your cloud environment
• Quickly offer new cloud services, lower software licensing costs, and help mitigate the risks of cloud computing

Proven components

OpenStack Cloud operating system
Dell-developed Crowbar Software
PowerEdge & PowerEdge C servers
Force10 or PowerConnect Switches
Reference Architecture
Deployment Guide
Dell Service and Support
Emerging Solutions Ecosystem (Canonical, enStratus & Mirantis)

“Dell’s commitment to OpenStack and their team with deep expertise in Data Center Solutions is the foundation for a great partnership.”

Ben Cherian, General Manager of Emerging Technologies, DreamHost
Thanks :-}