OPENSTACK FOR DATACENTRE NETWORKS

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What is OpenStack?

Solution, Community, Foundation

• An emerging open source IaaS cloud management framework targeted at both Enterprise and SP environments

• Created by Rackspace & NASA
  • July 2010: merged and open sourced Cloud Software (storage) and Nebula (compute)
  • September 2012: OpenStack Foundation launched for a more vendor neutral consortium

• While not the first initiative in that space, OpenStack has captured the hearts and minds of the industry
  • Rapidly becoming the de facto open source standard for Cloud computing, benefiting from a worldwide developer community
  • Is an entryway for hosting providers and enterprises to build private and public clouds: allows to create and offer cloud computing capabilities using open source software, rapidly and at a low cost
## OpenStack Taxonomy

**Five Major Components**

### OpenStack core services:
- Virtual Machines (compute)
- Object Store (object, data blurb)
- Block Storage aka Virtual Block Devices (hard drives, volume)
- Virtual Networks (networking)
- Dashboard (user portal)

### Additional Components
- The disk image registry (Glance)
- The authorization and authentication framework (Keystone)

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<table>
<thead>
<tr>
<th>Cloud Core Services</th>
<th>OpenStack Project</th>
<th>Amazon Web Services Equivalent</th>
<th>Rackspace Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Machines</td>
<td>Nova</td>
<td>EC2</td>
<td>Cloud Servers</td>
</tr>
<tr>
<td>Object Store</td>
<td>Swift</td>
<td>S3</td>
<td>Cloud Files</td>
</tr>
<tr>
<td>Block Storage</td>
<td>Cinder</td>
<td>EBS</td>
<td>Cloud Block Storage</td>
</tr>
<tr>
<td>Virtual Networks</td>
<td>Quantum, Neutron,</td>
<td>VPC</td>
<td>Cloud Networks</td>
</tr>
<tr>
<td></td>
<td>Melange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dashboard</td>
<td>Horizon</td>
<td>AWS Mgmt Console</td>
<td>Cloud Control Panel</td>
</tr>
</tbody>
</table>

Source: http://www.pistoncloud.com/cloud-technology/what-is-openstack/
Why does OpenStack “matter?”

- Running a large private cloud?
- Enables interoperability between clouds by seamlessly federating virtual workloads across them
  - Portability: vendor & technology agnostic
- Is extensible to meet specific deployment needs
  - Vertical flexibility (plugin)
  - Horizontal flexibility (API extension)
- Is designed to be massively scalable
  - Very large groups of virtual private servers, terabytes or even petabytes of data
  - Platform itself scales horizontally

No Standards

With OpenStack

Architect for in-house

Re-architect for service provider

Architect once

Deploy anywhere
OpenStack Marketplace Significance
Open Source, Open Architecture

- 8,000 participants in the Open Source community
- 200+ companies
- 87 countries
- 550 developers
- 300,000 downloads
- 50+ early adopters in production
Cloud Management with OpenStack

- **Users and Administrators**
- **Self-service Portal / API**
  - (Service Catalog, SLA Reports, Billing)
- **Business Logic**
  - (Service Management, Resource Management, Metrics Data Collection)
- **Orchestration Engine**
  - (Provisioning, Configuration, Scheduling)
- **Compute Controller**
- **Network Controller**
- **Storage Controller**

**Infrastructure Pre-staging**
- App & VM Mgr
- NMS
- SRM

**Service Monitoring**

**Service Metering**

**VMware**

**Hyper-V**

**XenServer**

**KVM**

**L2 VLAN**

**Flat Networking**

**L3**

**Local disks**

**Block Storage**

**Object Store**

**NAS**

**iSCSI**
Brocade and OpenStack

• Brocade are fully committed to OpenStack
  • OpenStack is a very useful orchestration framework

• Product support will be developed further
  • L2/L3
  • Load Balancing
  • Fibre Channel
Brocade’s Key OpenStack Contributions

OpenStack Pluggable and Extensible Architecture

- Brocade joined in May 2011, became Corporate Sponsor in September 2012
- Drive networking architecture (frameworks, services, APIs) in the OpenStack community
- Contribute back and open source Brocade integration and add-on software
  - Network Controller (Quantum) plugin for VCS
  - Network Controller (Quantum) for ADX
  - Drive FC Block Storage Controller (Cinder) initiative with HP, EMC, IBM and HDS
    - FC storage framework extension Community approved
    - Brocade FC SAN blueprint
    - FC SAN framework extension for FC SAN (Zone Mgr)
    - FC SAN plugin for Brocade SAN products
OpenStack Integration Roadmap

Execution Plan (Roadmap)

<table>
<thead>
<tr>
<th>Phase 1 (Essex Release)</th>
<th>Phase 2 (Grizzly and Havana Releases)</th>
<th>Phase n (Ultimate State)</th>
</tr>
</thead>
<tbody>
<tr>
<td>POC delivered</td>
<td>H2 2013</td>
<td>TBD</td>
</tr>
</tbody>
</table>

- **OpenStack Dashboard**
  - VCS Plugin
  - VDX 67xx
  - VCS Technology
  - App OS
  - App OS

- **Rackspace Private Cloud**
  - Piston Cloud
  - Red Hat RHOS

- **OpenStack Ecosystem**
  - Brocade Plugins (Network & Block Storage)

- **OpenStack Integration Roadmap**
  - Execution Plan (Roadmap)
  - 4/7/2013

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**OpenStack**

**Physical Topology**

- **OpenStack Controller**
  - Runs OpenStack Orchestration Services

- **OpenStack Compute Node**
  - Runs the Virtual Machines that are deployed

- **Brocade VCS Fabric**
  - Implements RESTful API and Port Profiles

- **Clients**
  - Cloud users manage VMs through dashboard
  - End users access deployed applications
OpenStack: One Workflow

Deployment of New Application

Tenant connects to OpenStack dashboard

• Create Network(s)
  • Tenant defines the inside and outside networks necessary for the application

• Deploy new image(s)
  • Tenant deploys two VMs from menu selection of images: one for a web server and one for the database server

• Access virtual machine images
  • Verify network and application access
OpenStack Architecture
Brocade Plug-in for Quantum

• Create Network
  - Brocade plug-in for Quantum instructs VDX to create VLAN information & Port Profiles within the Brocade VCS fabric
  - Information is distributed to all nodes in fabric

• Deploy Image
  - The new image is automatically tied to the Port Profile using the MAC address of the VM
  - Port Profile is installed on physical port of VDX and network is reconfigured automatically
  - MAC address tie minimises reconfiguration
Port Profiles?

• Configuration data tied to MAC addresses, grouped by function
  • VLANs, QoS, security policies by MAC rather than physical port

• Shared across network fabric: configured once per fabric, not once per switch
  • Lessens chance of errors

• VM Aware
  • Moving a VM doesn’t mean reconfiguring the network
  • Creating a VM minimises reconfiguration too

• Not just an OpenStack focused feature...
THANK YOU
OpenStack Open Source Project & Community

- OpenStack is an open source project (under Apache License) building software for private and public cloud. It started by Rackspace and NASA, and now under the governance of OpenStack foundation. Check it out at: http://www.openstack.org/

Brocade on OpenStack

- Brocade on OpenStack videos:
  - http://www.youtube.com/watch?v=FDm2VfjXO8A&feature=youtu.be - VideoFlash Video on OpenStack
  - https://www.youtube.com/watch?v=sNdvc2uBkHc - short version
  - https://www.youtube.com/watch?v=TCq825Xwawk - long version
  - http://www.youtube.com/watch?v=frkTtKHe3ec&feature=youtu.be - Brocade’s OpenStack Spring Launch
  http://community.brocade.com/community/brocadeblogs/data_center/blog/2012/10/12/brocade-and-openstack
- IDC video blog on FC SAN Extension in OpenStack Cinder: http://goo.gl/6PTkQ
Brocade on OpenStack Useful Information 2/2

**OpenStack Ecosystem**

- **Red Hat** Announces Preview Version of Enterprise-Ready OpenStack Distribution
- **Rackspace Private Cloud** offering
  RackSpace head and OpenStack co-founder: [http://www.youtube.com/watch?v=hWJXywSDZL0&feature=youtu.be](http://www.youtube.com/watch?v=hWJXywSDZL0&feature=youtu.be)
  Reference architectures: [http://www.rackspace.com/cloud/private/architecture](http://www.rackspace.com/cloud/private/architecture)
  Technical Resources Center: [http://www.rackspace.com/knowledge_center/article/private-cloud-tech-resources](http://www.rackspace.com/knowledge_center/article/private-cloud-tech-resources)
- **Piston Cloud**