Building a Private Cloud with OpenStack

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What is OpenStack?

OpenStack is a modular, open-source software platform for cloud computing, with components that manage resources for compute, networking, and storage.
What is Red Hat OpenStack Platform?

Red Hat’s officially supported, enterprise-class, OpenStack distribution

Tightly integrated with Red Hat Enterprise Linux

With a focus on:

- Code maturity, stability, and security
- Extensive lifecycle for customers to standardise for longer than 6 months
- Integrated deployment and long-term management tooling
- 3rd party ecosystem of value-add components and certified platforms
- Rich product documentation and reference architectures
- Much more than just an OpenStack distribution; a complete solution & services
Why Does OpenStack Matter?

<table>
<thead>
<tr>
<th>IT Initiative</th>
<th>2015 Completed</th>
<th>2015 Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Cloud Computing</td>
<td>46%</td>
<td>53%</td>
</tr>
<tr>
<td>Datacenter Modernization</td>
<td>52%</td>
<td>46%</td>
</tr>
<tr>
<td>Security</td>
<td>51%</td>
<td>45%</td>
</tr>
<tr>
<td>DevOps</td>
<td>34%</td>
<td>41%</td>
</tr>
<tr>
<td>Big Data</td>
<td>29%</td>
<td>35%</td>
</tr>
<tr>
<td>Customer Engagement</td>
<td>25%</td>
<td>23%</td>
</tr>
<tr>
<td>Mobility (inc mobile apps)</td>
<td>20%</td>
<td>26%</td>
</tr>
<tr>
<td>Internet of Things</td>
<td>12%</td>
<td>20%</td>
</tr>
</tbody>
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Private cloud is top initiative in 2016 with large increase over 2015.
OpenStack is Leading Private Cloud

Nearly half of those surveyed will be implementing private cloud in 2016, with 40% doing OpenStack proof of concepts (POCs) or production deployments. Big plans also around public cloud, PaaS and containers.

What major initiatives are you implementing in a cloud-based environment?

- Private cloud: 49%
- Public cloud: 30%
- Cloud App Dev Platform (PaaS): 27%
- Containers: 26%
- OpenStack POC: 22%
- No cloud initiatives: 21%
- OpenStack in production: 18%
- Database as a service: 12%
- Application marketplace: 7%
So why isn’t everyone doing it?
So why isn’t everyone doing it?

A lot of FUD; some real, and some not
FUD #1: Public Cloud has Already Won!

The Datacentre Battle is over and Public Cloud has won

The Battle For Datacentre Dominance Is Over, And Public Cloud Has Won

20/12/2015

By Doug Johnstone

2015 has become the year that Public Cloud has broken through into the consciousness of global organisations like Rackspace and beginning to sell their competitor, Datacentre providers (somewhat reluctantly) on their lower costs and further consolidation of global and local businesses begin to be heavily substituted.

Try again, cloud contenders: Amazon, Google, and Microsoft have won

IaaS and PaaS markets will no longer support smaller providers, which now need to find new specialties or call it quits

MORE LIKE THIS

Dark skies hang over midtier cloud providers
FUD Breaker: It’s Early Days

Also, ~25% of enterprise IT leaders do not yet have a clear cloud strategy.
FUD Breaker: It’s a Hybrid World

Type of Cloud Strategy

- Primarily private: 44%
- Primarily public: 33%
- Hybrid: 17%
- None: 7%
FUD #2: Building Infrastructure is futile
Public Cloud Providers can undercut costs
FUD Reality Check: Needing to cut costs is real!

But... not without **Security & Compliance**

**Greatest IT Challenges for 2016**

- **Cutting costs**: 43%
- **Security or compliance**: 38%
- **Increasing automation**: 38%
- **Accelerating service delivery**: 35%
- **Agile application delivery**: 32%
- **New cloud services**: 30%

FUD Breaker: Enterprises want critical workloads in privately-controlled infrastructure

➢ Security is a significant concern for organizations looking to use public cloud services
   ○ Where is the data, and who has access to it? (Think: Patriot Act)
   ○ Is the infrastructure shared with other customers or malicious users?
   ○ Is the infrastructure compliance-ready? (e.g. PCI DSS)

➢ Customers are keen to avoid shadow-IT
   ○ Want the flexibility and agility of public cloud, but built on-site
   ○ Want to manage their own data security, data/workload availability, access, etc.
FUD Breaker: Developers will use private cloud if it feels like public cloud
Our OpenStack Journey

Richard Haigh (Head of Delivery Enablement)
What makes us special?

• Born in 1999
• UK, Romania, Portugal, Ireland, Malta, Gibraltar, USA
• Engineering Blog: www.betsandbits.com
• 800+ Engineers and Growing
• Products: Exchange, Sportsbook, Games

~1.7M active users
~135M daily transactions
~3.7Bn daily API calls
~2.5TB daily log data output
~120,000/s monitoring points
~500 Deployments a week
E2E P95 transaction times <4ms

• Merged with Paddy Power Feb 2016, FTSE100, Market Cap ~£7Bn
The Business Needs

• We needed more scale from our infrastructure
• We wanted to provision faster – much faster
• We wanted to extend our CD work into the infrastructure layer
• We wanted to give Devs control and automate everything…
Requirements

- Resilient DCs
- Software Defined Network
- Central Storage
- Commodity compute
- Virtual and Bare Metal
- Rich APIs for automation
- Scale for future growth
- Compliant
... as code!
Vendor Selection

Enterprise vs. Open Source
Our Tool Chain

Orchestration
- go
- Continuous Delivery

Execution
- Jenkins

Source
- GitLab

Provisioning
- CHEF
- ANSIBLE

Repository
- JFrog Artifactory

Security
- Qualys
Our “Reference” Stack

• **Arista** (Switching)
• **Citrix** (Routing)
• **Nuage** (SDN & App Firewall)
• **Red Hat** (OpenStack and KVM)
• **Pure** (Flash Storage)
• **HP** (x86 Compute)
KVM and Openstack (Red Hat)

• Supported hypervisors
• Experience in creating OpenStack installations at this scale
• Supportive of Open Source approach (of course)
• ‘High-Touch’ programme
• Already worked with SDN providers (joined up approach)
• Train up / Scale down approach
• Subscription commercial model (easy to leave)
SDN and App Firewalls (Nuage)

- Chosen by Red Hat as partner
- Proven at scale
- Distributed app-app firewall model
- Referenced by some other ‘big’ customers in this stack
- ’Customer forum’ programme
- Train up / Scale down approach
- Interesting follow on products (VPN, Branch site)
Project: PoC - COMPLETE

• 4 weeks
• Build a 2-Zone OpenStack environment
• Include Switching, SDN, Storage, Blade/Pizza compute
• Test for functionality and performance
Project: Pilot - COMPLETE

7.5 months
Seeds of production
Full stack integration
Legacy integration
Delivery Tooling Design
Monitoring Services
OSP7 Upgrade (Director)
Currently a handful of apps in production
200+ components to on-board

Architecture work for active-active
Virtual vs. Physical choice
Self-selection of flavour and contention

Also:
Technical debt from Pilot Labs
Bare Metal
Project: Decommission - STARTING

• Turning off the old kit
• Freeing up space in the DCs
And now for something completely different
FUD #3: Containers make OpenStack obsolete

“Containers are the new wave, who needs OpenStack?”
Containers don’t NEED OpenStack… but they DO need infrastructure

Containers are an OS technology, and that OS needs to run somewhere
- OpenStack is a great platform provider to run container hosts
- Re-use infrastructure automation
- Scale much higher with OpenStack
- Use integration points

OpenStack and Containers are Complementary

Layer 7: Application Workflow
Layer 6: Container Orchestration
Layer 5: Container Scheduling
Layer 4: Container Engine
Layer 3: Operating System
Layer 2: Virtual Infrastructure
Layer 1: Physical Infrastructure
FUD Breaker: Enterprises want Containers on Private Cloud

Where are Containers Deployed, now and in 2 Years

- Public Cloud: 24% today, 29% in 2 years
- Hosted Private Cloud: 32% today, 31% in 2 years
- On-Premises Private Cloud: 45% today, 40% in 2 years

FUD #4: OpenStack is too complex
FUD Reality Check: OpenStack is Not Always Easy

What are the issues that introduce complexity?

- Hugely configurable and extensible
- No “one size fits all” OpenStack topology
- Installation and on-going management (upgrades, monitoring, etc)
- Fault-finding and troubleshooting
- Rate of change in the upstream community
- Finding talent in the industry to bring onboard
- Interoperability is sometimes challenging
FUD Breaker: It doesn’t HAVE to be hard

➢ There is a lot of help and choice:
  ○ Managed Hosted OpenStack: Red Hat & Rackspace
  ○ Datacenter-ready OpenStack Appliances: Red Hat & Dell
  ○ Trusted Advisors and Consultants
  ○ Training and Certification

➢ There are also huge improvements helping:
  ○ OpenStack Director
  ○ Red Hat Cloud Suite
  ○ Ansible, puppet and other orchestration & automation tools
  ○ Vendors playing “nice” with each other
Red Hat OpenStack Platform Services

**Training**
- RH318 Red Hat Enterprise Virtualization Administration
- CL210 Red Hat OpenStack Administration
- CL220R Red Hat CloudForms Administration

**Certification**
- Red Hat Certified Virtualization Administrator (RHCVA)
- Red Hat Certificate of Expertise in OpenStack IaaS

**Consulting**
- Red Hat Consulting Discovery Session: Cloud Strategy
- Red Hat Consulting Assessment: Infrastructure-as-a-Service
- Red Hat Consulting Smart Start: Infrastructure-as-a-Service
- Red Hat Consulting Guided Transition: Cloud Management
- Advanced identity management for OpenStack
FUD #5: OpenStack is not enterprise-ready, so losing steam, etc.
FUD Breaker: OpenStack is $2.5B+ Private Cloud

451 Research regularly fields a variety of OpenStack-related inquiries, with a particular focus on enterprise and service-provider opportunities, competitive landscape and investment outlook. This report covers a variety of software vendors and service providers leveraging OpenStack internally and for commercial offerings, as well as up-to-date insight into cost of ownership, ongoing debates about functionality, alignment with container technology and overall direction.

**KEY FINDINGS**

- 451 Research’s Market Monitor service expects revenue from OpenStack business models to exceed $2.5bn by 2017.
- OpenStack has become a credible cloud option and the market is growing quickly, but it is still relatively small compared to market leaders such as VMware in private clouds and Microsoft Azure or Amazon Web Services (AWS) in public clouds.
Building OpenStack Cloud for the Enterprise

Soumen Saha, IT Transformation Director
OpenStack in the Enterprise

Journey to Cloud using OpenStack

- Flourished Community of Active Users/Contributors
- Adoption across various Industry Sectors
- Strong & Active OpenStack Foundation
- Support from Industry Leaders

2 Core Services
6 Core Services

Austin 2010
Mitaka 2016

R&D focused
Enterprise focused

6 Years of Maturity
Matured User Community
Use Cases driving Business Value for the Enterprise

Legacy Tenants vs Cloud-Aware Tenants

- Enables Developer Agility for Cloud-aware Applications
- Enables programmatic API/Software Defined Infrastructure Management
- Cloud-aware applications will handle HA and DR policies on their own,

Small Private Cloud vs Large Scale Cloud Implementation

- OpenStack has a higher initial setup, design and architecture cost,
- As projects scale, you will get more value, due to the lack of licensing fees.
- Suitable for large scale cloud implementations across geographies
- Leverage existing Infrastructure to build the IaaS or PaaS with OpenStack
Planning your Cloud Journey → Delivery Robust Cloud Strategy → Delivery Cost Savings

Enterprises need to develop comprehensive strategies for making the transition to a cloud-first way of working, where the cloud is the preferred and prioritized IT model in order to:

- Be more agile and flexible
- Disrupt business models
- Improve business and IT performance
- Adapt to a rapidly-changing digital world
- Leverage multi-platform (like OpenStack, VMWare) specific best practices and accelerators

Build sustainable competitive advantage in a fast-paced digital world with the right cloud strategy tailored to your business objectives.
Considerations for Enterprise Private Cloud

Following considerations are recommended to be evaluated in context of OpenStack Cloud –

- Business Criticality driven Infrastructure Support
- Security and Compliance to Enterprise Standards
- OpenStack resiliency model depends on Environment.
- Integration with existing SSOT systems of the enterprise
- Self-Service and API driven Environment Management
- Business Value (ROI) driven Consumption Model
OpenStack Adoption Roadmap

**Recommended adoption roadmap for Enterprise Workloads...**

1. Build up Workload Assessment Criteria
   - Schedule Waves of Use Cases
   - Operationalize OpenStack Support Model
   - Cook Book for Workloads
   - Iteratively assess and onboard Workloads

2. 2-3 months in Agile Iterative mode
   - 1-2 Lighthouse Use Cases
   - Programmable API for Infra Mgmt.
   - Integration with existing App Stack

3. 4 weeks
   - 2-3 Use Cases/Workloads
   - Existing Cloud Resources

4. Proof of Concept

5. Workload Onboarding for OpenStack Cloud

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Why does Enterprises select Red Hat for their Private Cloud needs?

- Red Hat's Strategic Shift From Linux Leader To Cloud Power
- Embraced open-source OpenStack Infrastructure-as-a-Service (IaaS) Cloud
- Hybrid Cloud Stack + Container Application PaaS + Software Defined Storage & Networking + Auto Upgrades/Patches

Some of the recommended decision factors and key capabilities to embrace an Red Hat OpenStack Cloud leading to not just strategic but tactical decision by 125+ Enterprises
FUD #6: Red Hat doesn’t have OpenStack customers in production!
FUD Breaker: 350+ deployed private clouds, 40+ PoC’s currently in progress worldwide
FUD Breaker: 125+ Certified Cloud Partners Worldwide
Red Hat a Private Cloud Market Leader

The Forrester Wave™: Private Cloud Software Suites, Q1 2016

“Red Hat ... leads the evaluation with its powerful portal, top governance capabilities, and a strategy built around integration, open source, and interoperability.”