

Cloud Computing

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M. R. Pamidi, Ph. D.
[C-Cube Consulting](#)

Glossary

aaS as a Service

DBaaS Database

IaaS Infrastructure

NMAaaS Network Management

NSaaS Network Security

PaaS Platform

SaaS Software

SMAaaS Systems Management

AWS Amazon Web Services

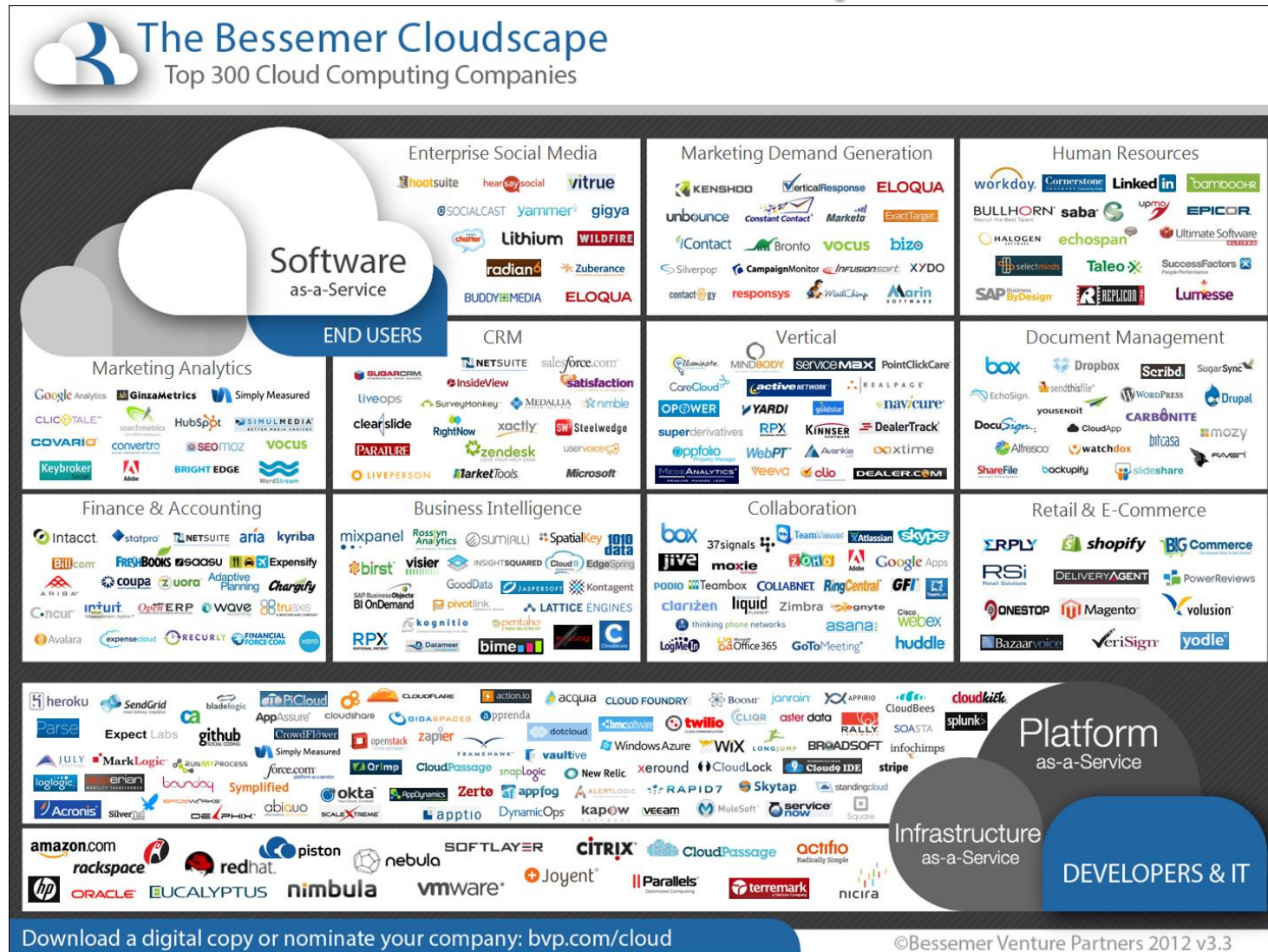
EC2 Elastic Compute Cloud (part of AWS)

CLI Command Line Interface

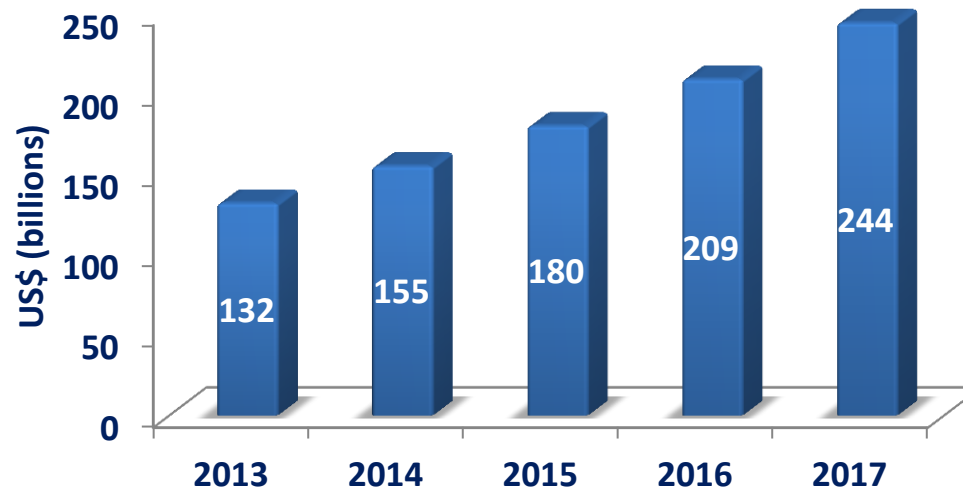
Agenda

- Cloud Computing Landscape
- CloudStack vs. OpenStack
 - History
 - Architecture
 - Supporters
 - Sample Implementation
 - Pros and Cons
 - SWOT Analysis
 - Conclusions

Cloud Vendor Landscape



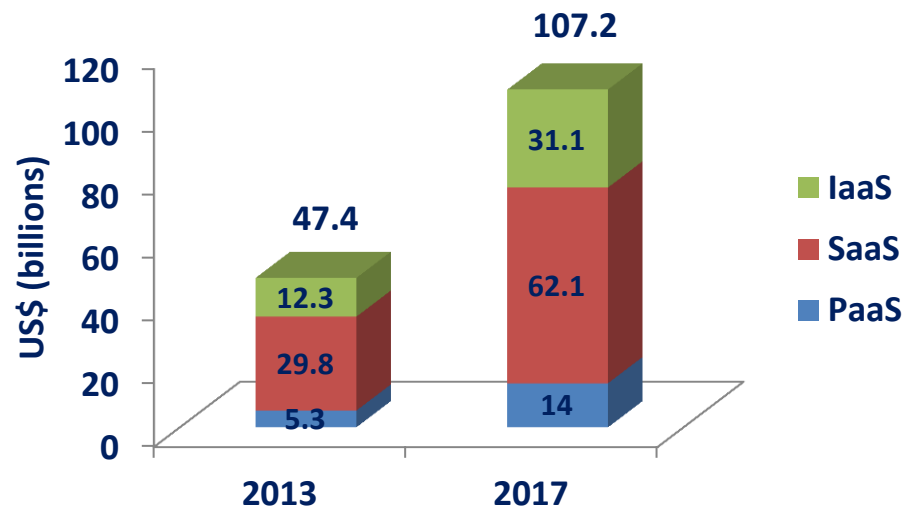
Public Cloud Services¹ Growth Forecast: Gartner²



¹ Includes applications, system infrastructure software, PaaS, servers, and basic storage.

² ["Roundup of Cloud Computing Forecasts Update, 2013,"](#) Louis Columbus, Forbes, November 16, 2013.

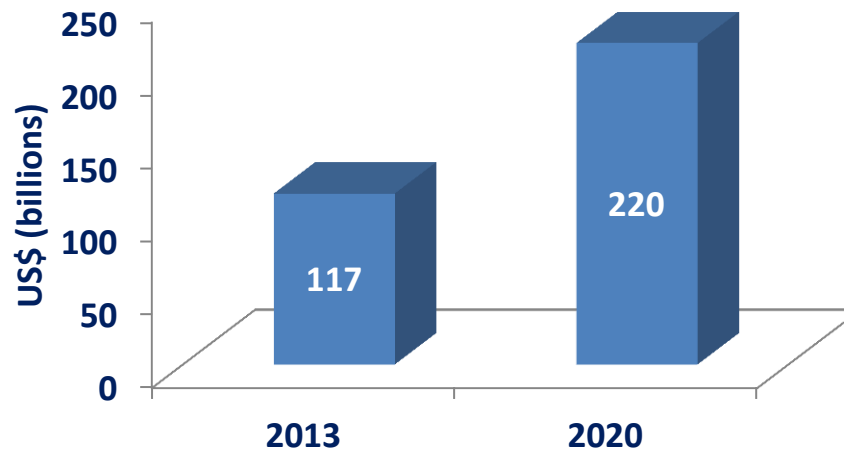
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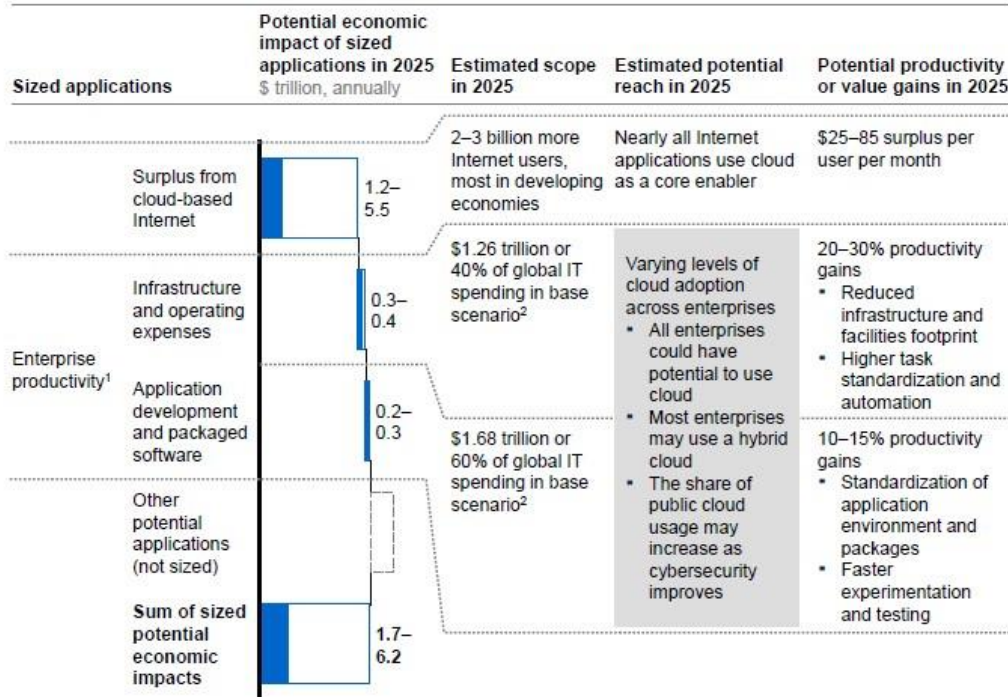
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² ["Roundup of Cloud Computing Forecasts Update, 2013,"](#) Louis Columbus, Forbes, November 16, 2013.

Impact of Cloud Technology

Exhibit 6

Sized applications of cloud technology could have economic impact of \$1.7 trillion to \$6.2 trillion per year in 2025



¹ We have not sized the impact of increased flexibility and convenience to enterprises.

² Estimates for enterprise cloud based on a global IT budget that does not include telecommunications.

NOTE: Estimates of potential economic impact are for some applications only and are not comprehensive estimates of total potential impact. Estimates include consumer surplus and cannot be related to potential company revenue, market size, or GDP impact. We do not size possible surplus shifts among companies and industries, or between companies and consumers. These estimates are not risk- or probability-adjusted. Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute analysis

What is **IBM** up to?

- EOL'd SmartCloud (Goodbye OpenStack?)
- Pushing SoftLayer (Hello CloudStack?)
- Spending \$1 billion on cloud computing
- Making its middleware available on the cloud (including Systems Management as a Service (SMaaS))
- Plans to spend \$1.2 billion this year to build up a global cloud of computing centers
- Reduce SGA expenses (Can you say RIF¹, WFR², manpower adjustment?)

¹ Reduction in Force

² Work Force Reduction

What is up to?

- Acquired Cloudant
 - Founded in 2008; 70 employees; had raised \$15.1 million in funding
- Will be pitching Cloudant's NoSQL database CouchDB against Amazon DynamoDB, MongoDB, Couchbase, and DataStax
- CouchDB runs on AWS and Rackspace

CloudStack vs. OpenStack





Work began at Cloud.com (founded as VMOps)
in 2008.



First released by Cloud.com in May 2010
as an open source platform.

cloudstack History

Goal was to enable Service Providers and enterprises to create and operate public or private clouds with capabilities equivalent to Amazon's [EC2](#).



Major Supporters

Project Members include Citrix,
EPAM Systems, Schuberg Philis,
Sungard, and TCloud Computing.



Major Supporters

Contributors include Big Switch Networks, Brocade, Cisco, Juniper Networks, and smaller companies such as Basho Technologies, Cloudsoft, Puppet Labs, and SwiftStack.



Enter Citrix

Embraced OpenStack for Project Olympus
in May 2011.



The Citrix Saga Continues

Acquired Cloud.com in July 2011.




The Citrix Saga Continues

Abandoned Olympus in April 2012.

BUSINESS & FINANCE SOFTWARE

Citrix Takes CloudStack to Apache, Abandons OpenStack

Nancy Gohring
@@ngohring

Apr 3, 2012 5:20 AM | 

Citrix has abandoned its Olympus OpenStack distribution and will focus instead on its open-source CloudStack operating system, which it has contributed as a project under the Apache Software Foundation.



The Citrix Saga Continues

Released Cloud.com code to Apache
in April 2012.



The Citrix Saga Continues

Now supports both CloudStack and OpenStack.

Citrix Embraces 'Anyness' and the OpenStack Cloud

By Sean Michael Kerner | Posted 2013-11-11 [Email](#) [Print](#)

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VIDEO: The general manager of Citrix's cloud efforts explains how his firm both supports and competes against the open-source OpenStack cloud.

In the early days of the open-source OpenStack cloud platform's development, Citrix Systems was a key backer adopting the platform as the basis for its own Project Olympus commercial OpenStack effort in 2011.

Citrix ended up abandoning Project Olympus in 2012 in favor of the open-source Apache CloudStack platform. As it turns out, Citrix in 2013 is still somewhat invested in

OpenStack as well as CloudStack and is looking to support its customers on both cloud platforms.

In an exclusive video interview with eWEEK at the OpenStack Summit in Hong Kong, Sameer Dholakia, group vice president and general manager of cloud platforms at Citrix detailed his firm's cloud strategy and why it is still supporting OpenStack in various ways.

Citrix today is all about the concept of "anyness," that is the idea that customers can choose nearly any technology they want, Dholakia said.

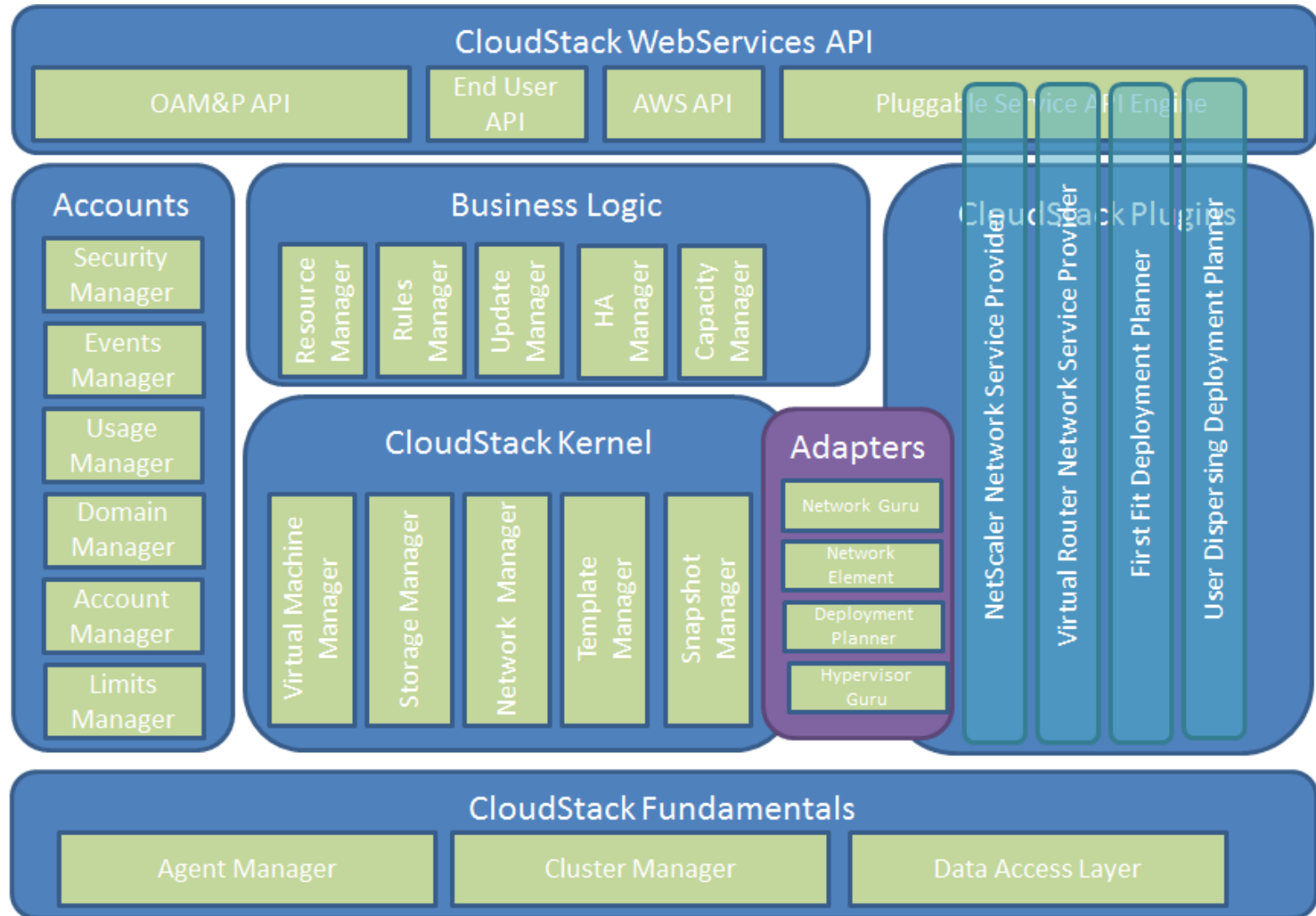


IBM PureFlex™ System: The Future of Datacenter Management

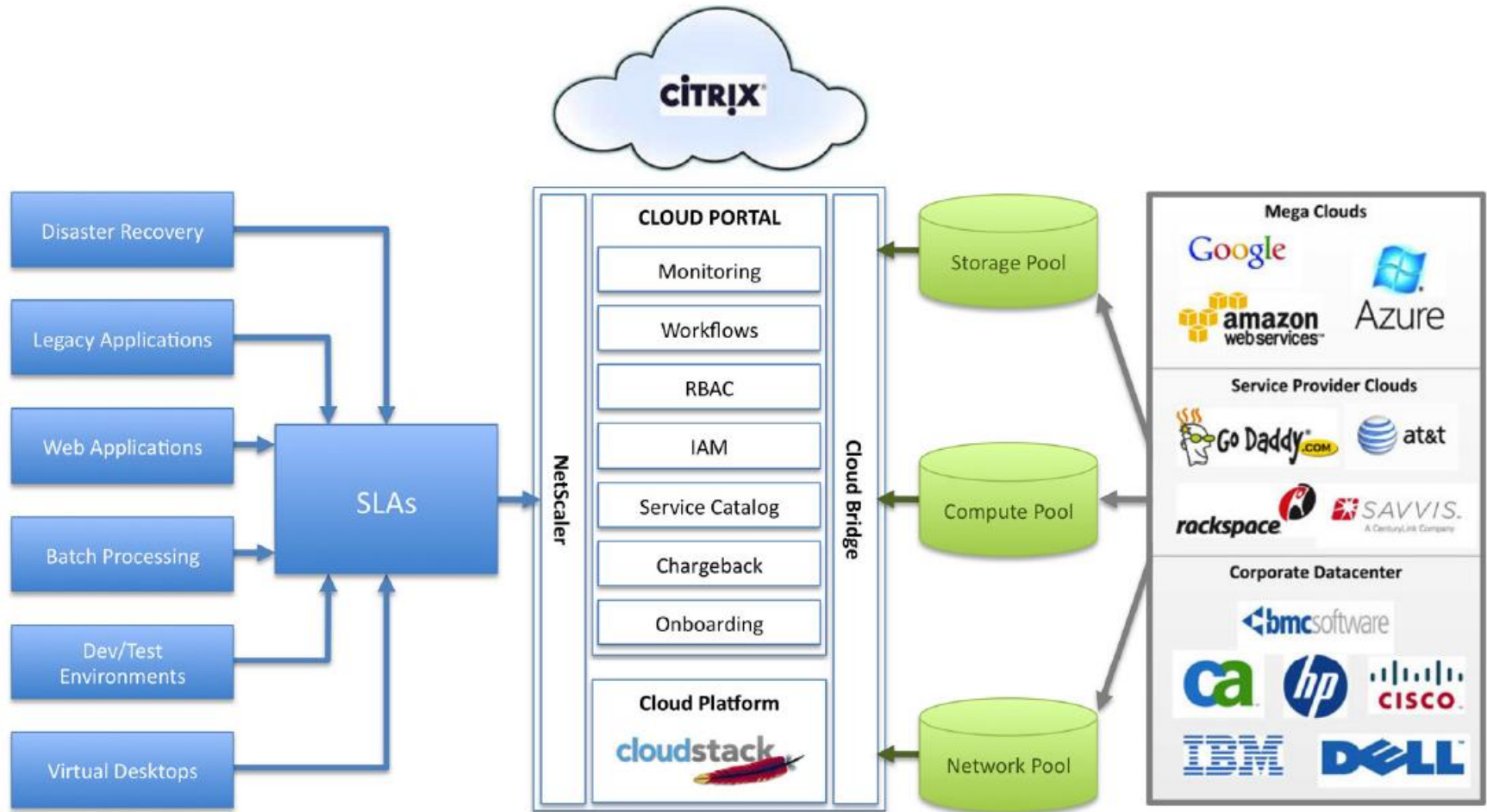
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"We fundamentally believe that customers deserve and require choice," Dholakia said. "Whatever they want to work with, we will work with."

CloudStack Architecture



CloudStack: Citrix Implementation





openstack™
CLOUD SOFTWARE

History

Began as an open source project in 2010 by [Rackspace Hosting, Inc.](#) and [NASA](#).



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CLOUD SOFTWARE

History

At the time, Rackspace was developing a storage component for its **public** cloud, and NASA was developing a compute component for its **private** cloud.



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CLOUD SOFTWARE

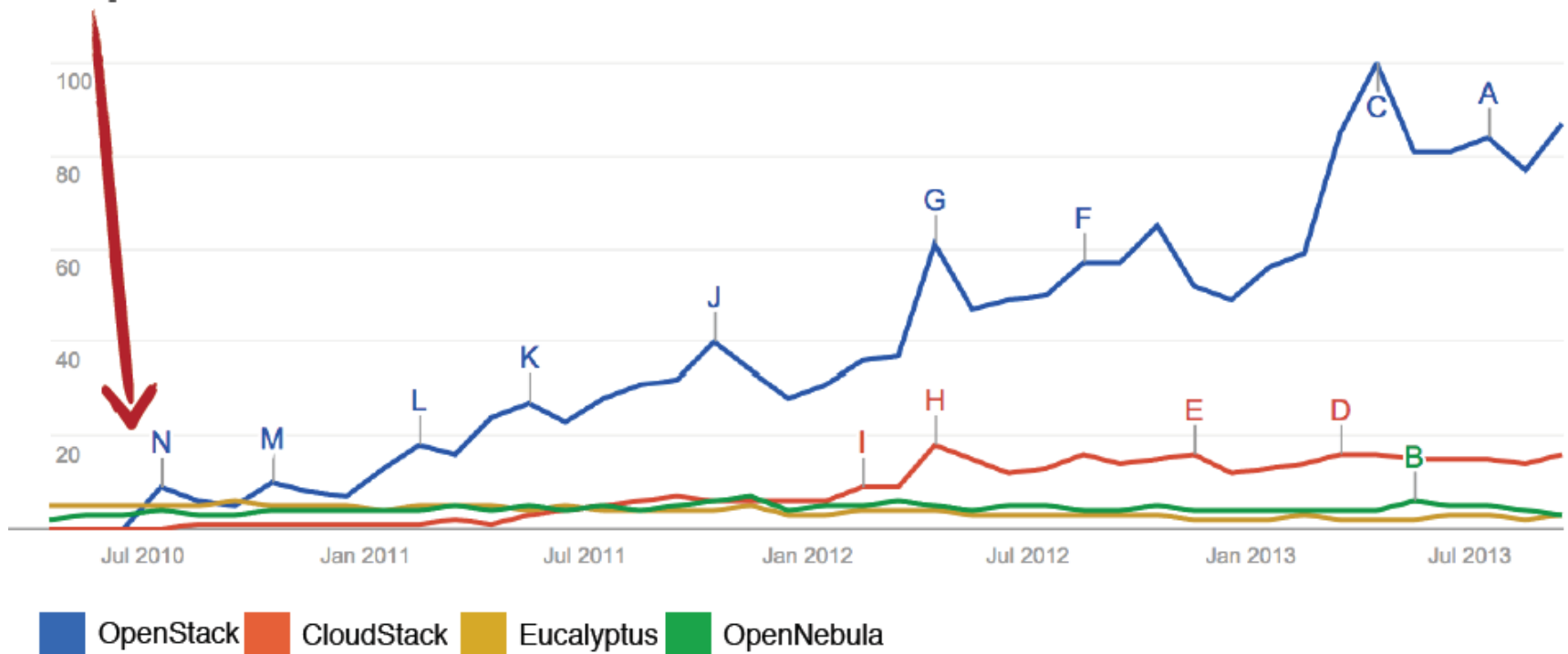
History

To avoid redundant efforts, they combined their efforts and created the OpenStack project.

NASA dumped OpenStack in 2012 and moved to an AWS-based services model.

Stacks Timeline¹

OpenStack Launch



¹ "State of the Stack v2," Randy Bias, OpenStack Summit, Hong Kong, November 7, 2013.

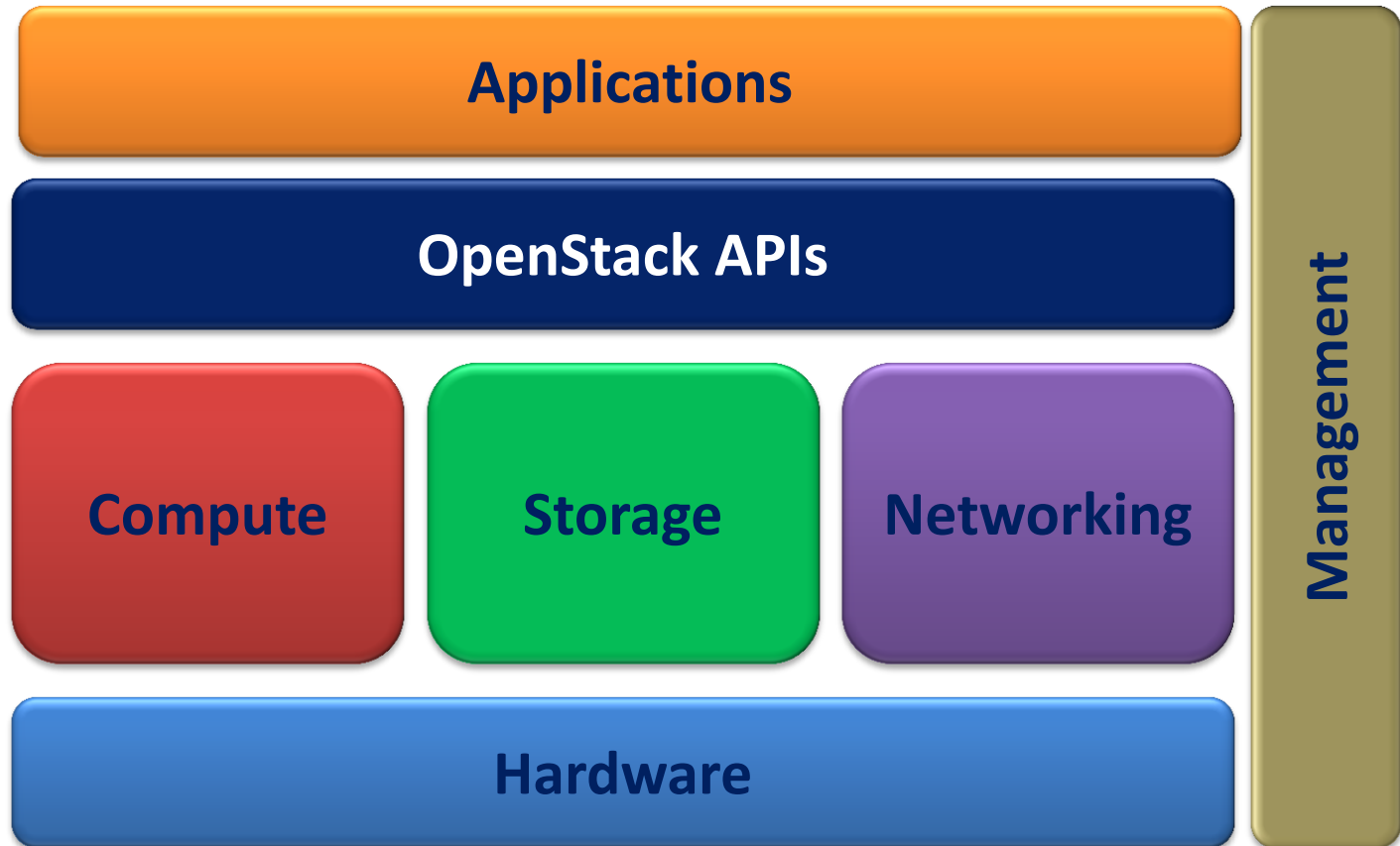
Major openstack™ Cloud Software Supporters

Over 275 member companies in more than 72 countries worldwide, including Alcatel-Lucent, Arista Networks, Cisco, Citrix, Dell, EMC, Ericsson, HP, IBM, Juniper, NetApp, Rackspace, Red Hat, SUSE, VMware, and Yahoo!

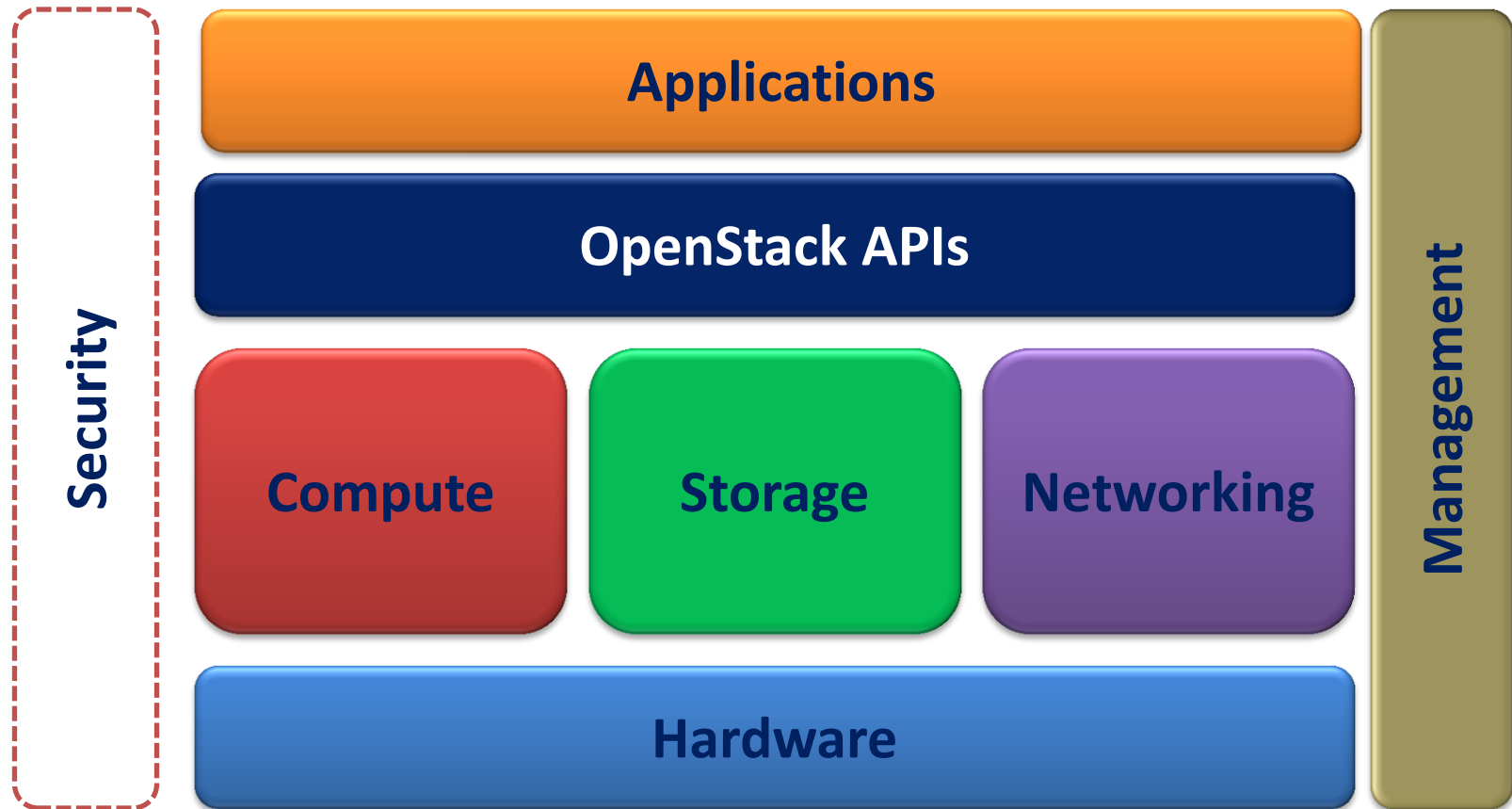
Major openstack™ Cloud Software Supporters

Eight Platinum Members (AT&T, HP, IBM, Rackspace...) and 14 Gold Members (Cisco, Dell, VMware...); Cisco and [Nicira](#) have taken major roles in developing [Neutron](#) (formerly [Quantum](#)), the OpenStack networking component.

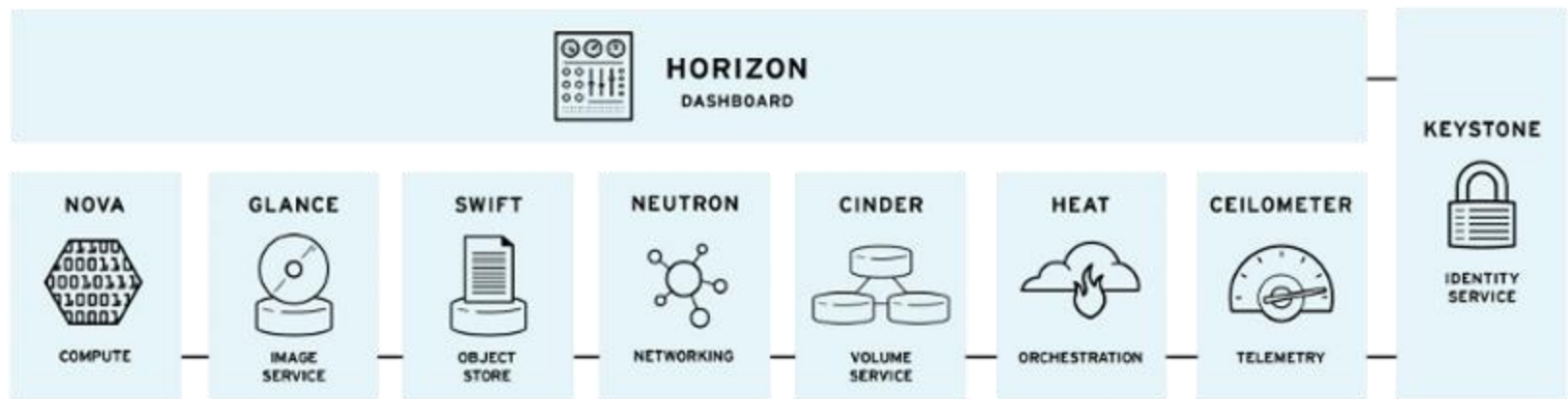
OpenStack Architecture



OpenStack Architecture



OpenStack Components

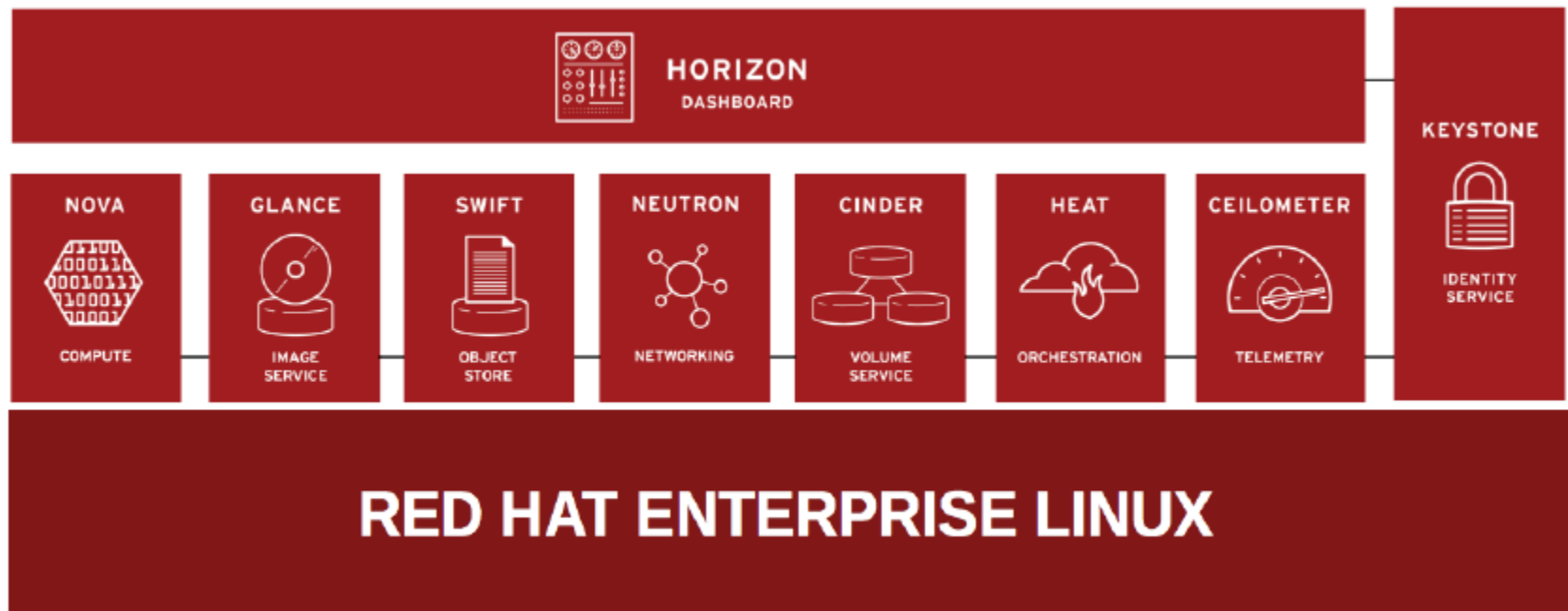


OPST0005

More about OpenStack Components

Product	Function	Details
Horizon	Dashboard	Graphical interface to access, provision, and automate cloud-based resources
Nova	Compute	Cloud computing fabric controller (the main part of an IaaS system), written in Python
Glance	Image Service	Discovery, registration, and delivery services for disk and server images
Swift	Object Storage	Scalable redundant storage system
Neutron	Networking	Managing networks and IP addresses
Cinder	Block Storage	Persistent block-level storage
Heat	Orchestration	Orchestrate multiple composite cloud applications using templates
Ceilometer	Telemetry	Single point of contact for billing systems
Keystone	Identity Services	Central directory of users mapped to the OpenStack services they can access

OpenStack: Implementation¹



¹Red Hat Enterprise Linux OpenStack Platform (RHELOSP)

Major Differences

Core components were
developed by Cloud.com
and then enhanced by
Citrix.

Major Differences

Monolithic architecture

Major Differences

Installation processes
require a medium level of
time and expertise.

Major Differences

Strong GUI and Amazon EC2-like CLI, offering baseline security ties and some load-balancing capabilities.

Major Differences

Pluggable model includes:

- A management component that allocates virtual machines to individual servers and an image repository.
- Network support for software-defined networking (SDN), flat networking with elastic IP, load balancing as a service, firewall, virtual private clouds, and complex VLANs.

Major Differences

Customers may choose (1) SDN support from Nicira (VMware), Midokura, or Big Switch Networks, and (2) load balancing from F5 or NetScaler (Citrix)

Major Differences

Supports KVM, vSphere, and
Citrix XenServer

Major openstack™ Differences

CLOUD SOFTWARE

Opened to a wide community early in its development, resulting in gaining support from a larger number of major vendors than CloudStack.

Major Differences

Fragmented, distributed
architecture

Major Differences

Difficult to install, driven by
multiple CLIs

Major openstack™ Differences

CLOUD SOFTWARE

Strong, token-based security system, and
uses Swift – the OpenStack massively
scalable redundant storage system for high
availability.

Major openstack™ Differences

CLOUD SOFTWARE

Deployment uses OpenStack components to support each required cloud function.

Major openstack™ Differences

CLOUD SOFTWARE

Includes Neutron, a networking-as-a-service which also provides load balancing, and Swift and Cinder for object and block storage.

Major openstack™ Differences

CLOUD SOFTWARE

Supports Hyper-V, KVM*, LXC, PowerVM, VMware ESX/ESXi, and Citrix XenServer*.

* Also supported by CloudStack

Pros and Cons

	CloudStack	OpenStack
Pros	<ul style="list-style-type: none">• Free• Supported by Citrix and friends• Battle tested and scalable	<ul style="list-style-type: none">• Free• Large community• Wide integration with storage, network, and compute technologies
Cons	<ul style="list-style-type: none">• Smaller community• Fewer server, network, and storage devices supported• Less flexibility	<ul style="list-style-type: none">• Limited, immature enterprise features• Difficult to deploy and configure• Lacks interoperability

CloudStack SWOT Analysis

Strengths

- Less chance of fragmentation and splintering

Weaknesses

- Limited number of 'leading' followers
- Smaller mindshare

Opportunities

- Expand adopter base

Threats

- OpenStack's continued groundswell



OpenStack SWOT Analysis

Strengths

- Large community
- Leading stack
- Flexible framework
- Many 'benevolent dictators'
- Better scalability



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Weaknesses

- No single 'benevolent dictator'
- Interoperability difficult, not impossible
- Flexibility limits interoperability



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Opportunities

- Build an SQL92 base for cloud compute
 - Reference stack
- Develop public cloud compatibility
 - AWS, GCE, and vCloud



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Threats

- Customization, fragmentation, and splintering
- Forking or Ivory Tower thinking
- Customer DIY failures



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Conclusions

- No solid winners, although...
- Red Hat appears to be emerging as the leader
- OpenStack may win in the long run, if it doesn't UNIX-ify
- Continued concerns about interoperability, privacy, portability, security...
- Keep an eye on Eucalyptus and OpenNebula

Contact

Web: C-Cube Consulting
mr.pamidi@ccubeconsulting.com

Media: IT Newswire
mr.pamidi@itnewswire.us

Questions

