

Analyzing the Business of Enterprise IT Innovation

An analyst perspective on cloud and e-Infrastructure

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An analyst perspective on cloud and e-Infrastructure

The 451	Group
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Cloud Introduction

Cloud Market Overview

Cloudy issues for e-Infrastructure

- HPC in the Cloud

- Applications

- Private Clouds

- Storage

- Security

Conclusions

451 Research





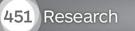


Change Wave Research

UptimeInstitute



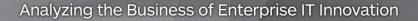
- Unique combination of research, analysis & data
- Published syndicated research on emerging markets
- Daily qualitative & quantitative insight
- Analyst advisory, support
- Global events
- Go-to-market support



CloudScape – Service Overview

- Interdisciplinary approach 451 Research & Tier 1
- A comprehensive, coherent conceptual framework, the Cloud Codex
- Cloud marketplace surveillance and analysis – vendors, service providers
- Market sizing, surveys
- End users: best practices, vendor selection, peer events
- Actionable advice to improve opportunity for success
- Supported by TheInfoPro and ChangeWave

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<list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item> - Car enclusion is a large force in the source in the sour</list-item></list-item></list-item></list-item></list-item></list-item></list-item></list-item>	 Experimentation with basic applications in the public cloud and planning for eventual bridging of internal and public clouds is happening across most industry 	 Open source is a winner as far as users in this report are concerned. A lack of flexibility for running commercial software licenses in clouds is still a bottleneck. 	to quickly develop and deploy applications and services; eliminate the need to procure and manage hardware; pay only for what is consumed; scale up and down;
 adoption, most organizations duscus, are eventues, they will production basis. <i>PME</i> 12 most organizations production basis. <i>PME</i> 13 most organizations production basis. <i>PME</i> 13 most organizations production basis. <i>PME</i> 14 most organization basis production ba	 Cost reduction is a key short-term driver, but operational flexibility, quick response to changing needs and faster time to market are usually more important in the long 	are getting from internal resources, the less economic sense it makes to use a cloud. Companies with bursty or seasonal models are	accelerate time to market. Cloud is an arrow that all IT managers must
 Francial various: fram harring statistication, statistication and well with code and not have not well with code and not have not well well well well well well well wel	adoption, most organizations suggest that when their specific issues are overcome, they will begin to use external clouds on a	be addressed: If every company in a sector uses a cloud and has the same seasonal/peak demands, will	
eeedd to move and manuge data and 'White and between clouds: PAGE 54 OCTOBER 2009 THE 451 GROUP: COUDSCAPE O 2009 THE 61	 Financial services firms have typically led the way as early adopters of grids, HPC, low latency, utility computing and certain types of virtualization. With clouds, we see comparable activity in other sectors, including plarmaceutical, taree and retail. 	the use of laaS; most developers and application owners want to show up with code and not have to worry about the infrastructure. The PaaS war among Microsoft, Oracle and Whware is on. PAGE 15 • So far most use of AGE 15 • So far most use of AGE 15 workload swipple programs running on remote computers. Never workloads will be rich with data	
PAGE 54 OCTOBER 2009 (53) group STIerTResearch 0 2009 THE 61 GROUP. LOUDSCAPE 0 2009 THE 61 GROUP. LOUDSCAPE 0 2009 THE 61 GROUP. LOUDSCAPE 0 2009 THE 61 GROUP. LOUDSCAPE		needed to move and manage data	
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Early-Adopter Program

- 12 years working with early adopters and innovators
- Cloud is a logical endpoint
- Shining a light on the arc of adoption
- 250+ enterprises have participated across many verticals



Let's pinch ourselves

Analyzing the Business of Enterprise IT Innovation

amazon.com web services



CloudScape Codex: 8 Cloud Attributes

Research

451



SaaS: Software as a Service

PaaS: Platform as a Service

laaS: Infrastructure as a Service

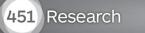




Community/partner

Hybrid

Private



Cloud computing is IT as a Service

THE CLOUD

What End Users See

What IT/Service Providers See Utility Computing

Policy, Governance Chargeback/Billing Runbook/Process Automation

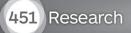
On-boarding, Lifecycle Management Workload Management

Configuration Management

Application Streaming Automation

OS Provisioning

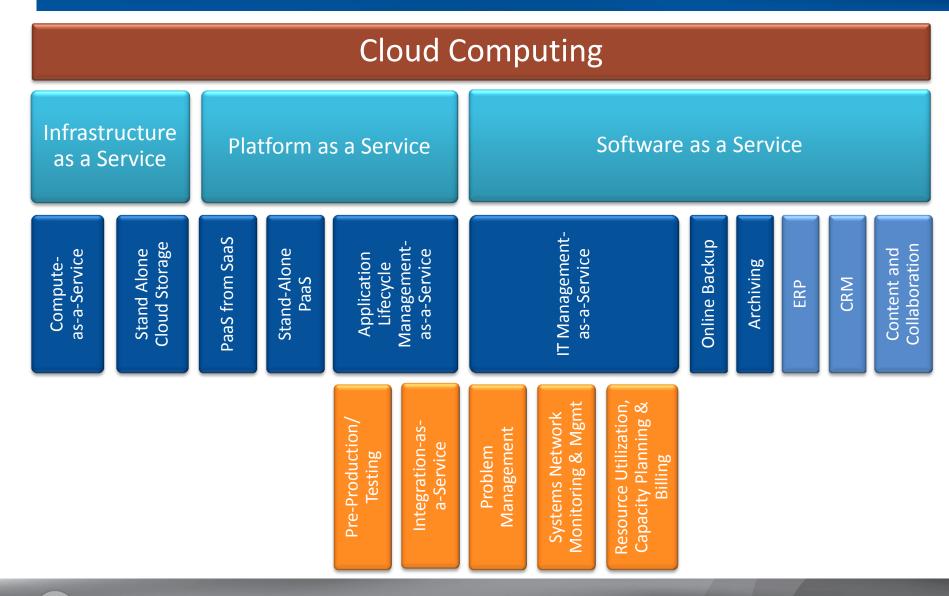
Virtualization GRID/HPC/clusters



Cloud Market Overview

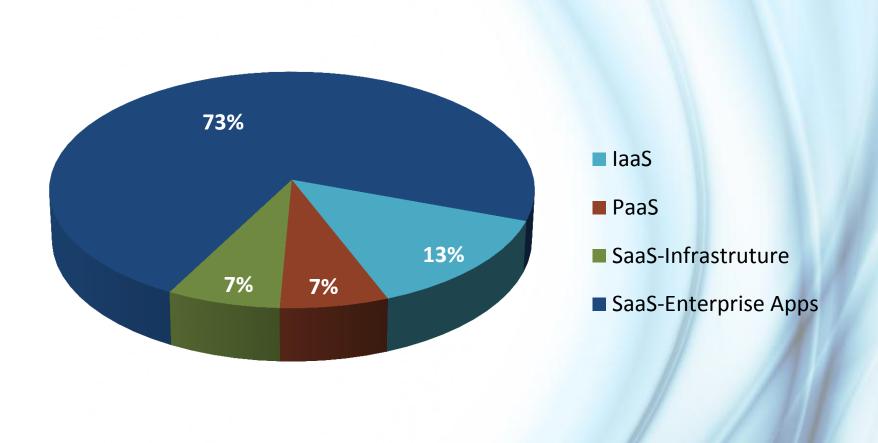


Cloud as-a-Service categories



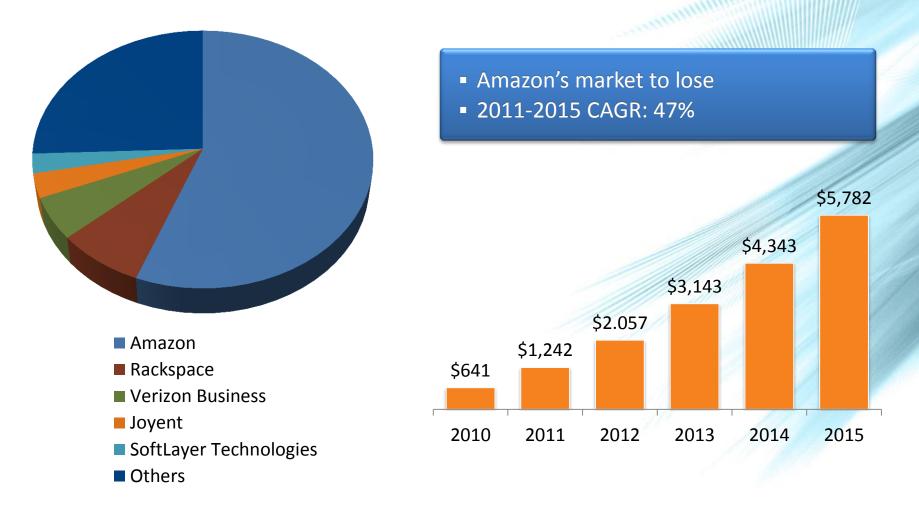
451 Research

Estimated 2012 Cloud Revenue Breakdown, Including SaaS





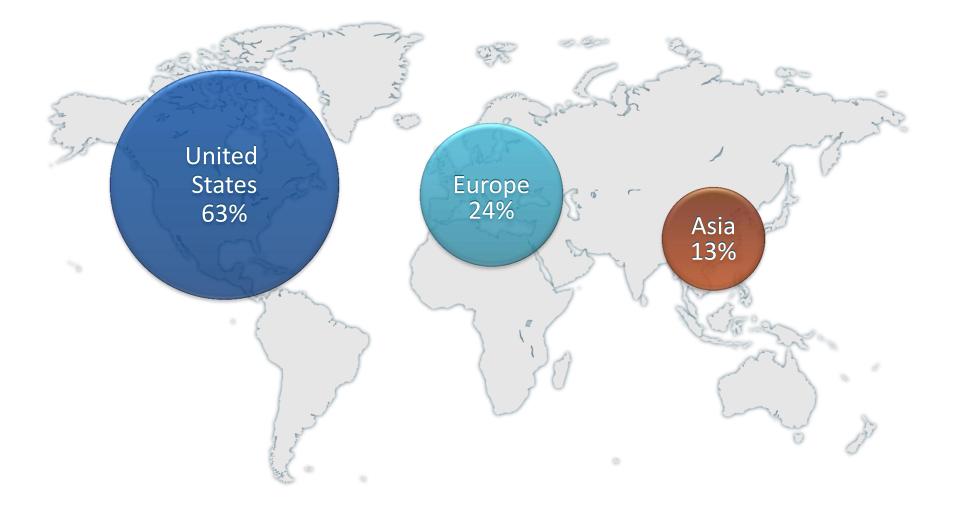
IaaS Market Overview (\$m)



Source: 451 Research Market Monitor (Data Cut 3/28/12)

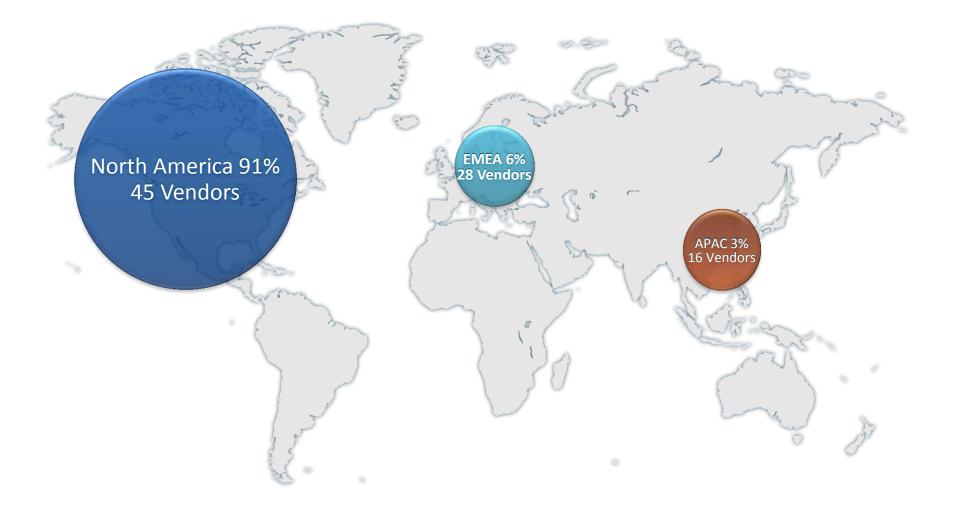


89 IaaS vendors – 2012 revenue geo breakdown





89 IaaS vendors – 2012 revenue by headquarters





Top 15 Cloud Computing providers in Europe

PROVIDER	2010	2011	2012	2013	2014
Amazon	\$51.7	\$122.6	\$242.0	\$424.6	\$649.7
Colt Technology Services Group	\$6.3	\$13.1	\$19.9	\$26.5	\$34.1
Verizon Business	\$1.0	\$11.8	\$28.0	\$51.4	\$81.5
Orange Business Services	\$5 <mark>.</mark> 5	\$10.3	\$1 <mark>5.5</mark>	\$20.6	\$25.7
iomart Group	\$3.4	\$6.1	\$9.2	\$12.8	\$16.6
UK2 Group	\$2.9	\$4.2	\$5.6	\$6.9	\$8.3
Arsys	\$3.9	\$4.0	\$4.2	\$4.4	\$4.5
ElasticHosts	\$2.4	\$4.0	\$5.7	\$7.4	\$9.1
Host Europe	\$1.6	\$3.9	\$4.9	\$5.9	\$6.9
CenturyLink (Savvis)	\$2.1	\$3.8	\$6.3	\$10.7	\$16.5
Rackspace	\$0.0	\$3.0	\$6.8	\$13.7	\$25.0
British Telecom (BT Group)	\$0.7	\$2.0	\$3 <mark>.</mark> 5	\$5.0	\$6.6
intergenia	\$0.1	\$2.0	\$2.4	\$2.5	\$2.6
Attenda	\$0.7	\$1.5	\$3.1	\$4.3	\$6.0
NTT*	\$0.4	\$1.5	\$3.6	\$6.8	\$11.4



Regional CloudScape

- Many public clouds now up and running in Europe
- Local champions emerging
- Telcos still dominate Euro IT landscape.
- Focus on private clouds
- EU revising legislation
- Patriot Act used as geo-political marketing device
- Vendors seeking pan-Europe and per country models
- Asia-Pac clouds coming on stream
- Emerging markets: China, India, Brazil
- Governments: the cloud's unlikely champions

Cloudy issues for e-Infrastructure

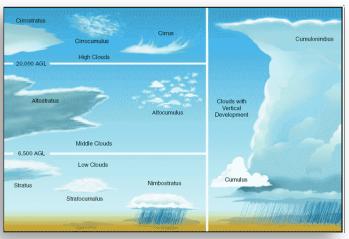


HPC in the Cloud (from 2010)

Trend

- Amazon
- Google
- Microsoft
- Telco
- ISP

Research



Forecast

- HPC is all about Optimization
- Cloud is all about

Abstraction and

Virtualization

2012

- HPC Clouds
 - Amazon
 - Penguin
 - SGI
 - Cycle

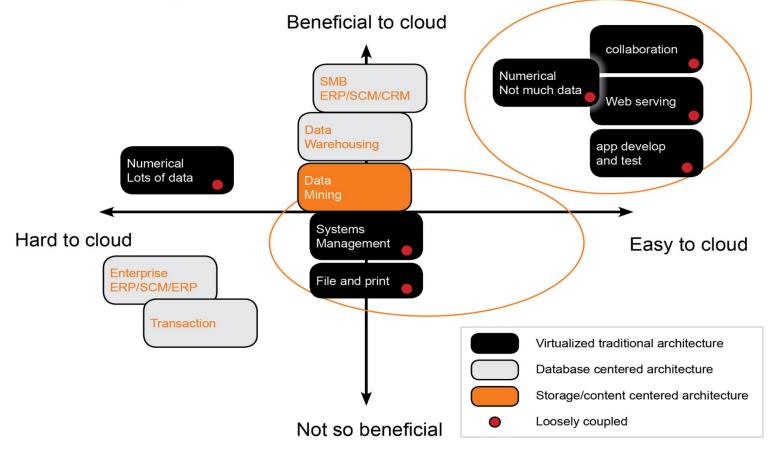
HPC in the Cloud Forecasts (2012)

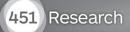
- HPC in the Cloud will reach maturity
 - More HPC/Cloud vendors
 - HPC SaaS
 - ISV licensing to adapt
 - HPC to reach new (non-HPC savvy) market





Which apps fit cloud best?





Private Cloud Enablement

Imitate Emulate Replicate

Turn your own datacenter into a cloud that works like Amazon, Rackspace...

Advantages:

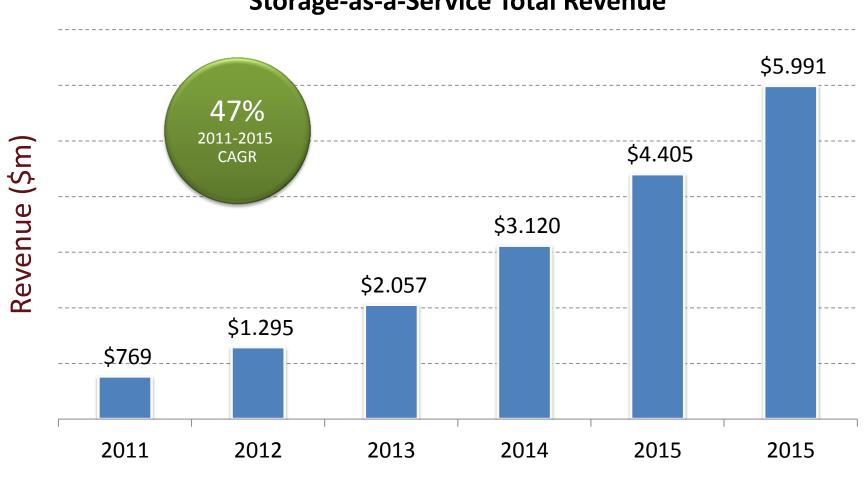
- Security and compliance
- Leveraging existing investment in datacenters
- Powers new IT-as-a-service model inside organizations
- New IT refresh cycle for suppliers!

But

- Private cloud is ring-fenced and finite
- Doesn't reproduce elasticity of hosted cloud



Market Sizing – Cloud Storage



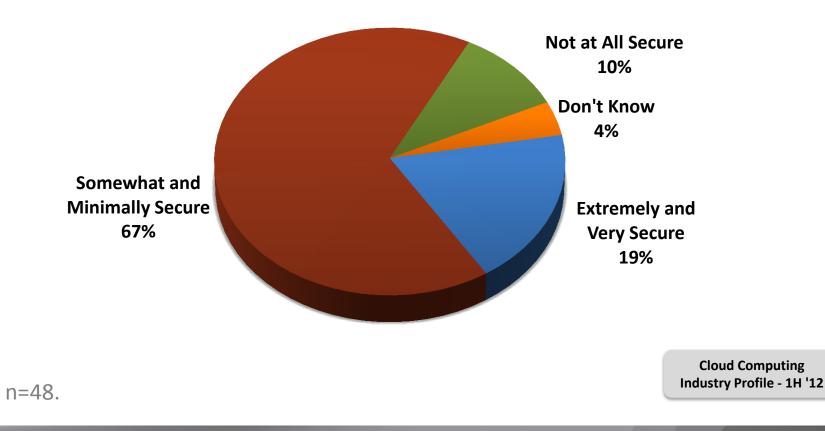
Storage-as-a-Service Total Revenue

Source: 451 Research



Security of Data in the Public Cloud

On the issue of security, please rate how secure data is when using the public cloud computing services available today? *Please use a 1-5 scale where "1" is not at all secure and "5" is extremely secure.*





Conclusions

- Is the Cloud ready for serious HPC?
- Is the Cloud ready for the scale of serious HPC?
- Are Applications ready for the Cloud?
- Should the first step be to a Private Cloud?
- It's the data, stupid!

Thank you. Questions? Comments? John.barr@451research.com



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