



# Dell OpenStack Cloud Solution

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Fast. Easy. Now.

[Dell.com/OpenStack](http://Dell.com/OpenStack)  
[Dell.com/Crowbar](http://Dell.com/Crowbar)

# Cloud expectations and promises

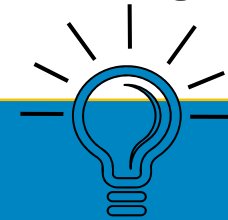
## Support the mobile & social marketplace and workforce

Anytime, anywhere, on any device access and engagement. (BYOD) increases productivity and job satisfaction



## Innovate and grow

Speed time to market when introducing new goods and services



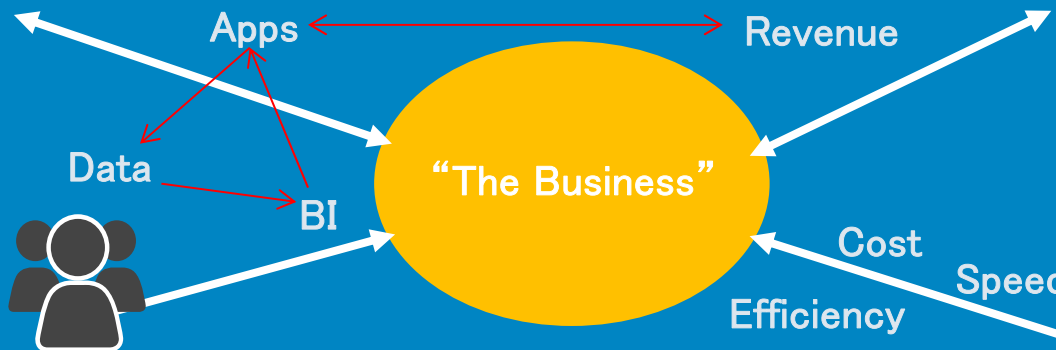
## Attract & retain new customers

Connect customer data, gain intelligence on customers to better target, nurture and solidify leads



## Reduce IT cost, deliver operational results

On-demand, self-service and automated access lowers costs and decreases demands on IT



# Cloud – Challenges for SP and Enterprise

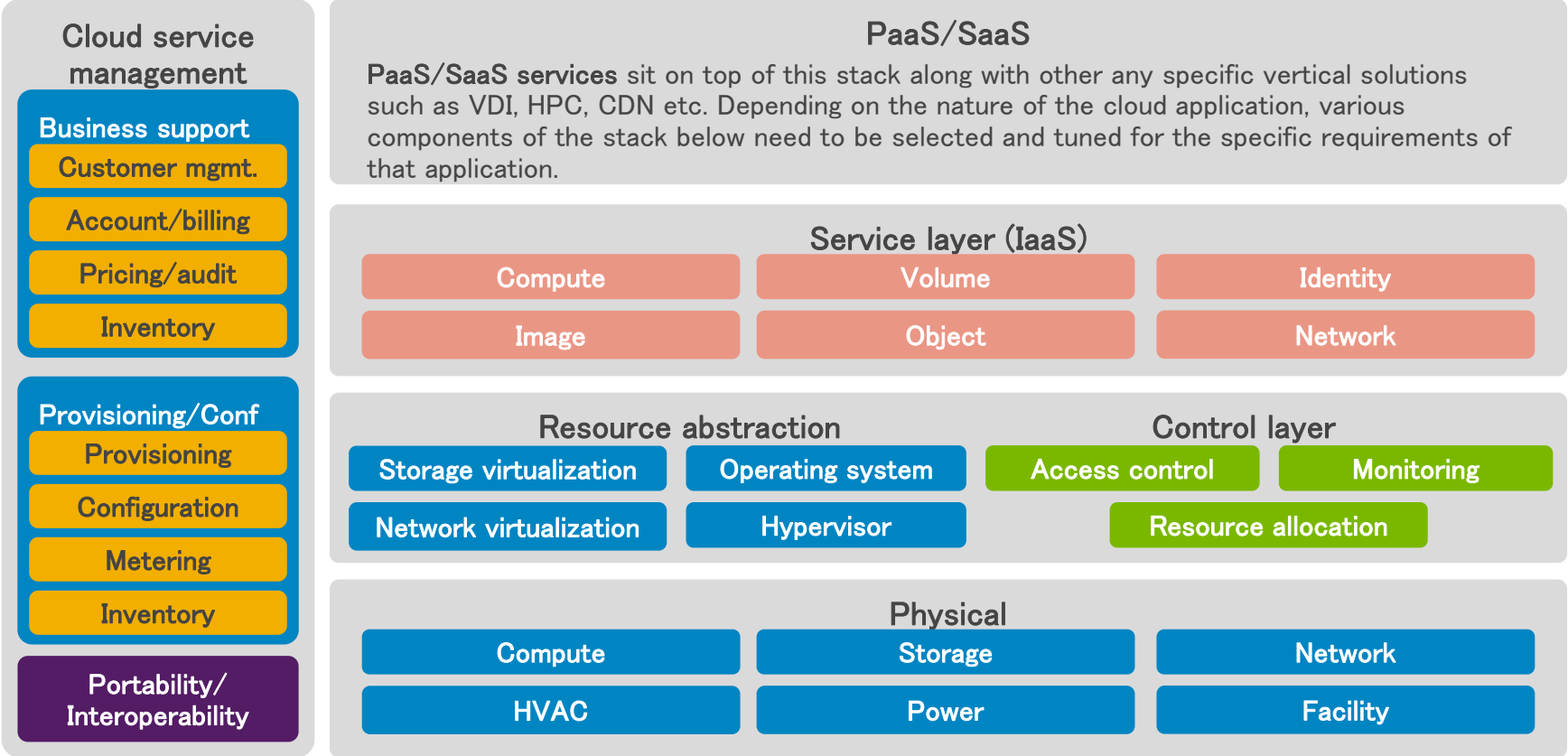
## Service provider challenges

- Cost-effectively **scaling**, and **competing** in the emerging public cloud ecosystem
- Ability to **quickly launch** new cloud services
- Keeping **license costs down** on traditional virtualization solutions – costs increase linearly with scale (often per node)
- Keeping **maintenance costs down** on home-grown components that have been built haphazardly over time
- **Flexibility to rapidly add/change features** in response to customer needs – commercial solutions **lack features** they need

## Enterprise challenges

- **Lack of infrastructure standardization and automation** leading to poor resource utilization, cost escalation, slow application delivery
- **Locked-in** to proprietary vendors and technologies – increasing **license costs** with growth and scale
- Poor understanding of cost allocations
- Long resource provisioning cycle times
- Inflexible and non-adaptive infrastructure
- Building a cloud is **too complex** and **takes too long**
- Lack of availability and support of the **entire end-to-end solution**

# Cloud Taxonomy – Complex?



# Challenges with OpenStack Deployment

## Deployments have many parameters

- Server, networking, storage
- Physical infrastructure configuration
- 1000+ parameters across 10+ major components
- Variety of tools
- New releases every 6 months
- Wide range of applications / workloads



GAP

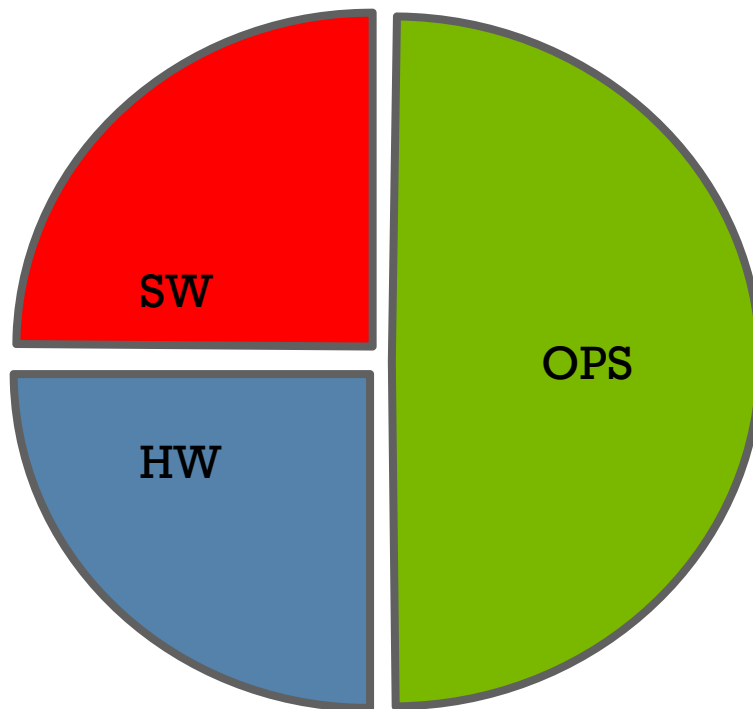
## Customers want concrete results and fast time-to-value

- Performance
- Predictability
- Reliability
- High availability
- Management
- Monitoring
- Scalability



## Ops Trends:

### Clouds Require an Operational Focus

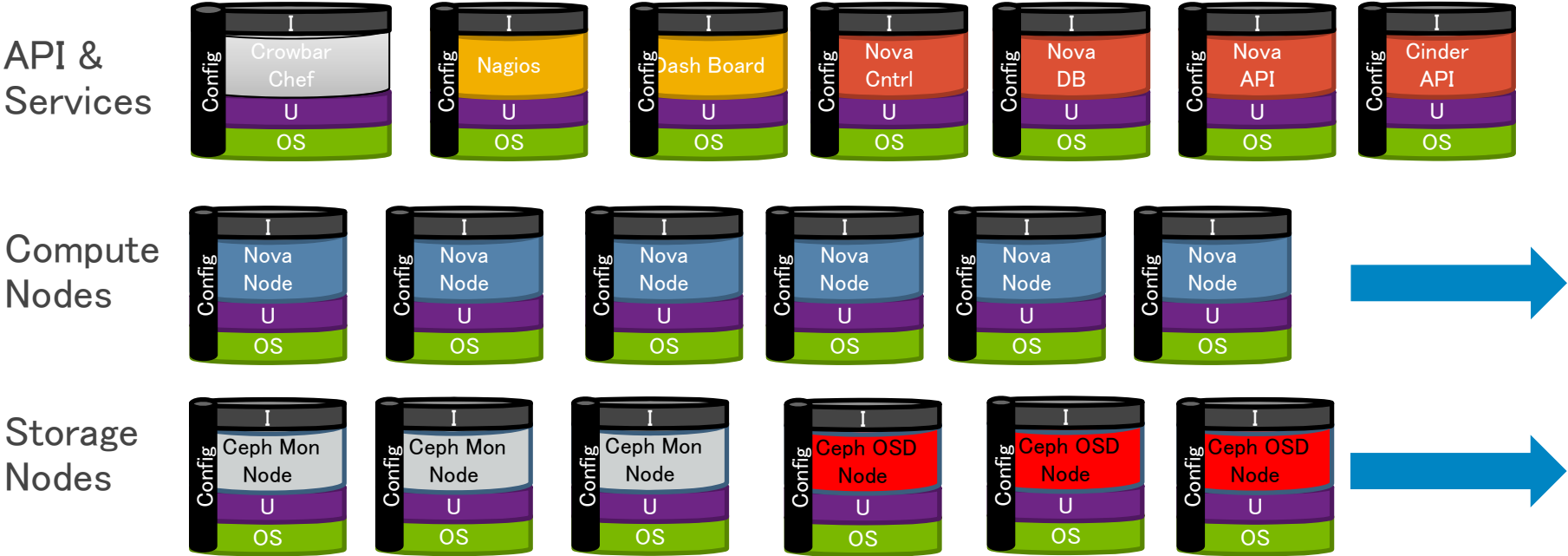


- Clouds demand significant operational and process controls
- Operational decisions drive hardware and software decisions
- We are finding ways to productize operations into best practices



# Scale-Out Operations With OpenStack

If you can't automate it, you can't scale it



# Deploy an OpenStack cloud within ~2 hours

Evolve to meet your needs over time with built-in DevOps



Crowbar  
operations  
platform

## Use Crowbar to:

- **Automate deployment** and configuration of an OpenStack cloud
- **Quickly provision** bare-metal servers from box to cluster with minimal intervention
- **Simply maintain**, upgrade & evolve your cloud over time
- **Leverage open source** framework backed by a growing global developer ecosystem

Accelerates multi-node deployments

Simplifies maintenance

Streamlines ongoing updates







# Snapshot: Dell OpenStack–Powered Cloud Solution

## Validated reference architecture built and delivered by Dell

### Proven solutions

#### Develop, deploy & deliver your own cloud

- Validated reference architecture with infrastructure, software and services
- Open cloud infrastructure to drive innovation and flexibility
- ✓ Quickly offer new cloud services
- ✓ Lower software licensing costs
- ✓ Help mitigate the risks of cloud computing

### Key components

Dell Crowbar Operations Platform Software

OpenStack Havana software release

Dell PowerEdge C8000, C6220, R720, R720xd

Dell Force10 S60 and S4810 Switches & AFM

Dell Multi-Cloud Manager support

Inktank Ceph storage support

Deployment Guide

Dell services, implementation and support



# Snapshot: Dell SUSE Cloud Solution

Complete, proven solution designed for the Enterprise



## Proven solution

### Easily deploy private and public clouds

- **Validated** reference architecture with infrastructure, software and services
- Elastic, scalable, and designed to handle massive data loads
- Targeted for mainstream **Enterprises**

Quickly offer new cloud services

Lower software licensing costs

Help mitigate the risks of cloud computing

## Proven components

- SUSE Cloud 2.0 cloud platform
- SUSE Linux Enterprise Server OS
- SUSE Studio
- SUSE Manager
- “Crowbar” operations platform (integrated)
- Dell PowerEdge C6220, R720, R720xd
- Dell Force10 S60 Switches
- Reference Architecture Guide
- SUSE Cloud Jumpstart services
- Dell services, implementation and support



# Dell's OpenStack Involvement



## 2010

Dell publicly supports Open Stack

## 2011

Dell publicly demos Crowbar at Cloud Connect

Dell recognized for *Bootstrapping OpenStack Clouds* whitepaper

Dell launches market's 1st OpenStack Solution

## 2012

Expands to Europe and Asia

Dell establishes and leads OpenStack Meetups in Austin and Boston

Dell joins Foundation as Gold

Dell launches Essex OpenStack solution including PowerEdge C6220 and Force10

Dell kicks off Emerging Solutions Ecosystem Program enStratus, Mirantis, Canonical & Morphlabs

## 2013

Dell launches Dell SUSE Cloud Solution

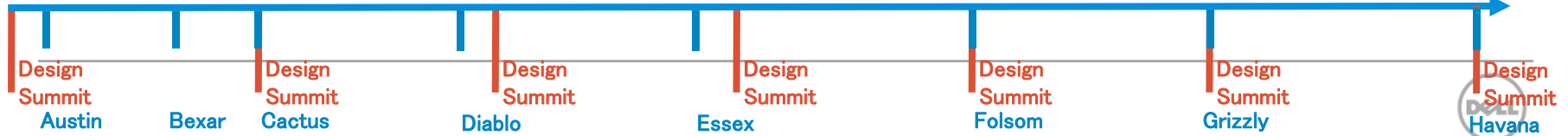
Dell launches Cloud Transformation Services for OpenStack clouds

Dell acquires Enstratus, launches Multi-Cloud Manager

Dell partners with InkTank to bring Ceph storage to OpenStack environments

Dell launches Grizzly OpenStack solution includes PowerEdge C8000, EqualLogic and 10 GbE networking

7th Consecutive Sponsorship



# Dell's Commitment to OpenStack

“Dell ... was one of the first hardware vendors to grasp the fact that cloud is about provisioning services, not about the hardware.”

Maxwell Cooter, Cloud Pro

## Proven solutions

- First OpenStack Cloud solution provider
- Pioneering OpenStack partner  
Only tier 1 & day 1 hardware provider
- Deep Partner ecosystem  
with single point of services and supports
- ONLY company with Automated software for multi-node OpenStack provisioning: Crowbar
- Dell OpenStack experts continually invest in the community
- Gold Foundation Member  
with 2 board positions (Rob H. & JBG)



## Proven components

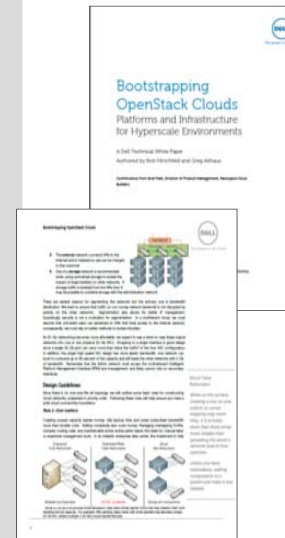
Save on TCO  
based on RA



Innovate  
aggressively

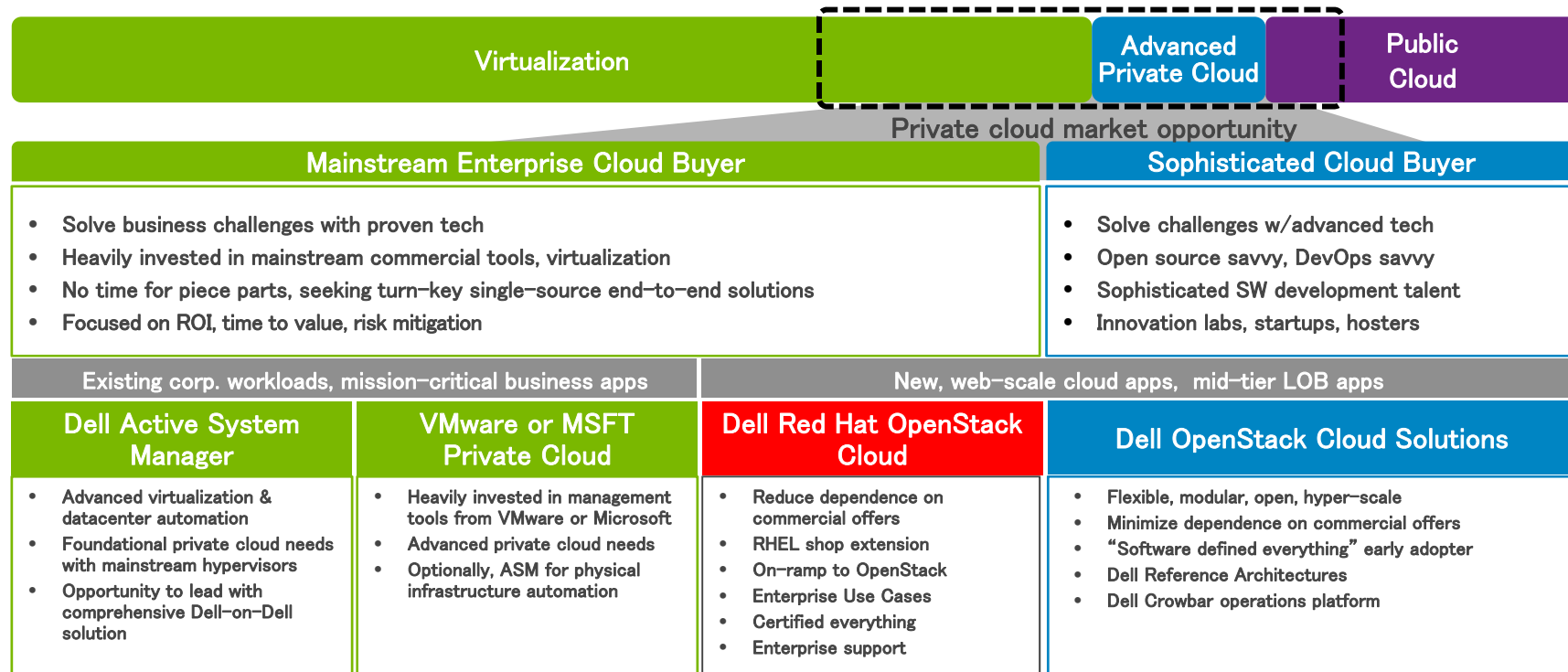


Scale operations  
efficiently



# Dell's Cloud Portfolio

Case and Choice, at any Scale





“OpenStack is now OPEN for Business”



# Dell and Red Hat Enterprise Cloud – OpenStack for Business

Coming Soon



## Certified end-to-end

Robust, trustworthy, tested solutions, so you can deploy with confidence



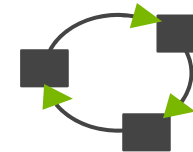
## Address the gaps

Joint engineered solutions address core enterprise needs



## Enterprise-grade

Scalable, secure, open, one-stop support for cloud infrastructure



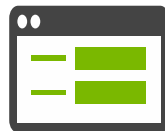
## Enterprise experience

Solutions designed, packaged, supported for rapid adoption and time to value



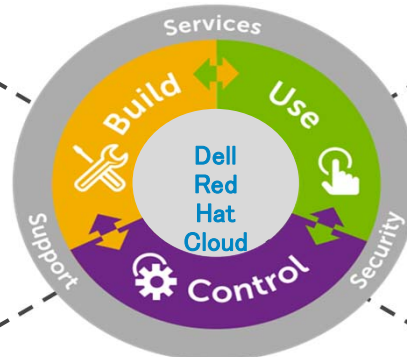
## Innovation without risk

Remove complexity, stabilize the moving parts, streamline migrations, OPEN, flexible, cutting edge without the blood







## Enterprise use cases

Purpose designed configs:  
Software defined storage;  
SW build infrastructure;  
Dev scale testing environments;  
Platform for Cloud-scale apps



# Dell and Red Hat Enterprise Cloud Solution – powered by Openstack

What are we building?

   	<b>Solution Architectures</b> RHEL OSP v4, Openstack Havana, RHEL 6.5, Dell PowerEdge, Dell Storage, Dell Networking	<ul style="list-style-type: none"><li>• Dell RHEL OSP Enterprise solution</li><li>• Dell RHEL OSP Balanced compute + storage</li><li>• Dell RHEL OSP Storage</li><li>• Dell RHEL OSP QuickStart</li></ul>
	<b>Certifications</b>	<ul style="list-style-type: none"><li>• Joint solution certification</li><li>• Dell services staff certifications</li><li>• Customer staff certifications</li></ul>
	<b>Professional Services</b>	<ul style="list-style-type: none"><li>• Dell Assessment Services</li><li>• Dell Consulting Services</li><li>• Dell Implementation Services</li><li>• Red Hat Training and Certification services</li></ul>
	<b>Support Services</b>	<ul style="list-style-type: none"><li>• Dell ProSupport</li><li>• Red Hat Support &amp; Updates (RHEL OSP)</li></ul>
	<b>OpenStack Community</b>	<ul style="list-style-type: none"><li>• Joint code contributions</li><li>• OpenStack Foundation Board membership</li><li>• Active community engagements</li></ul>





# Unleashing Research Potential with Cloud-based Infrastructure: A case study

University of Alabama at Birmingham (UAB)

A Dell OpenStack-Powered Cloud Solution with Ceph-based Storage



## What is Ceph?

**inktank**

### Traditional enterprise storage

Single purpose

Hardware

Single vendor

Fixed limits to scale



Multi-Purpose, Unified

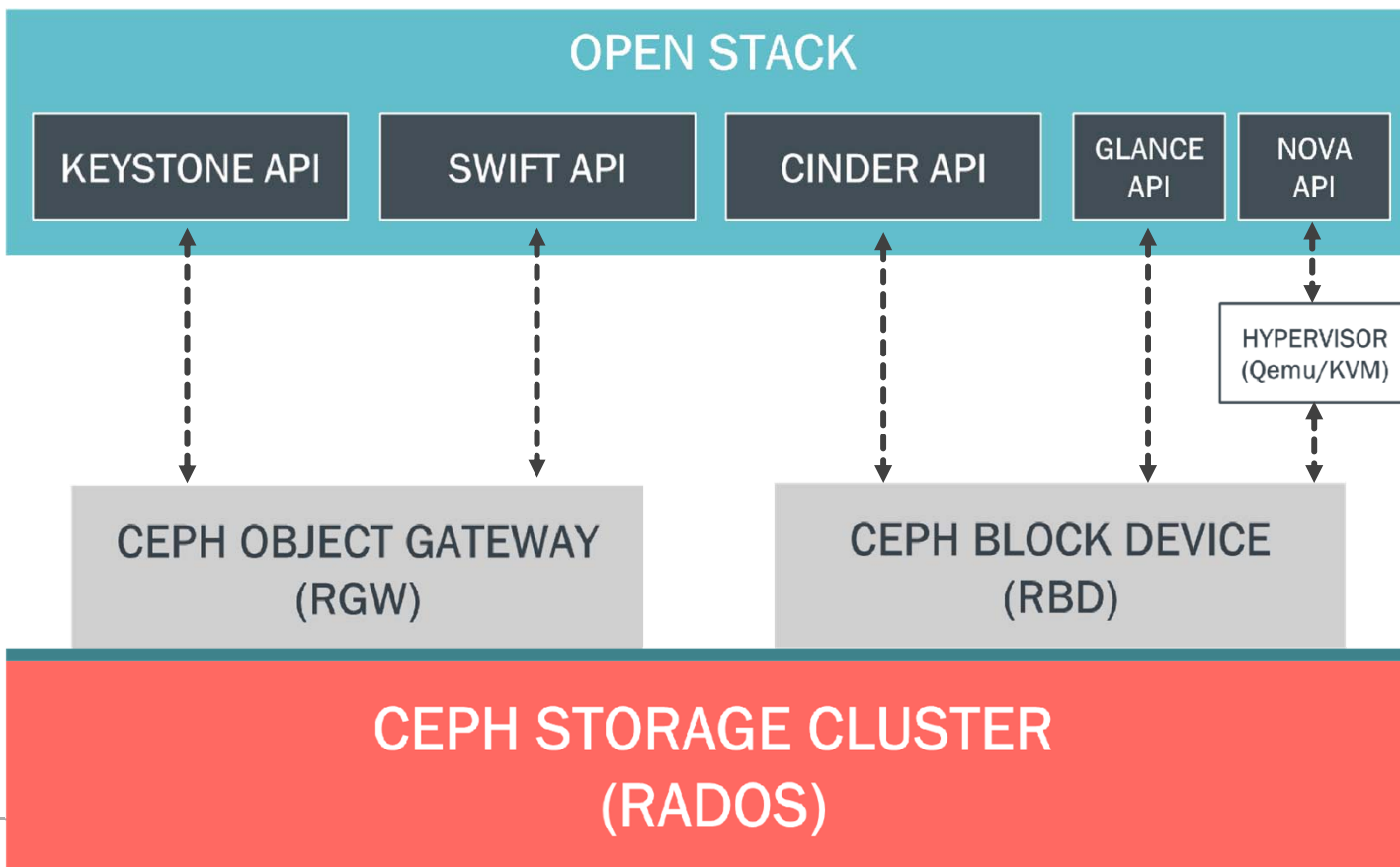
Distributed software

Open

Unlimited scale

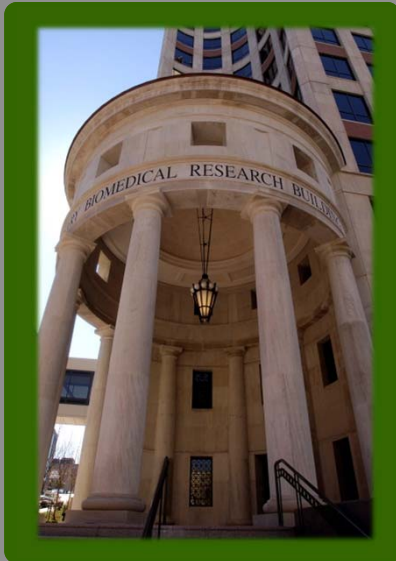


# Ceph with OpenStack



## Overcoming a data deluge

**Inconsistent data management across research teams hampers productivity**



- Growing data sets challenged available resources
- Research data distributed across laptops, USB drives, local servers, HPC clusters
- Transferring datasets to HPC clusters took too much time and clogged shared networks
- Distributed data management reduced researcher productivity and put data at risk

## Solution: a storage cloud

### Centralized storage cloud based on OpenStack and Ceph

- Flexible, fully open-source infrastructure based on Dell reference design
  - OpenStack, Crowbar and Ceph
  - Standard PowerEdge servers and storage
  - 400+ TBs at less than 41¢ per gigabyte
- Distributed scale-out storage provisions capacity from a massive common pool
  - Scalable to 5 petabytes
- Data migration to and from HPC clusters via dedicated 10Gb Ethernet fabric
- Easily extendable framework for developing and hosting additional services
  - Simplified backup service now enabled

“We’ve made it possible for users to satisfy their own storage needs with the Dell private cloud, so that their research is not hampered by IT.”

David L. Shealy, PhD  
Faculty Director, Research Computing  
Chairman, Dept. of Physics



## Building a research cloud

### Project goals extend well beyond data management

“We envision the OpenStack-based cloud to act as the gateway to our HPC resources, not only as the purveyor of services we provide, but also enabling users to build their own cloud-based services.”

John-Paul Robinson, System Architect

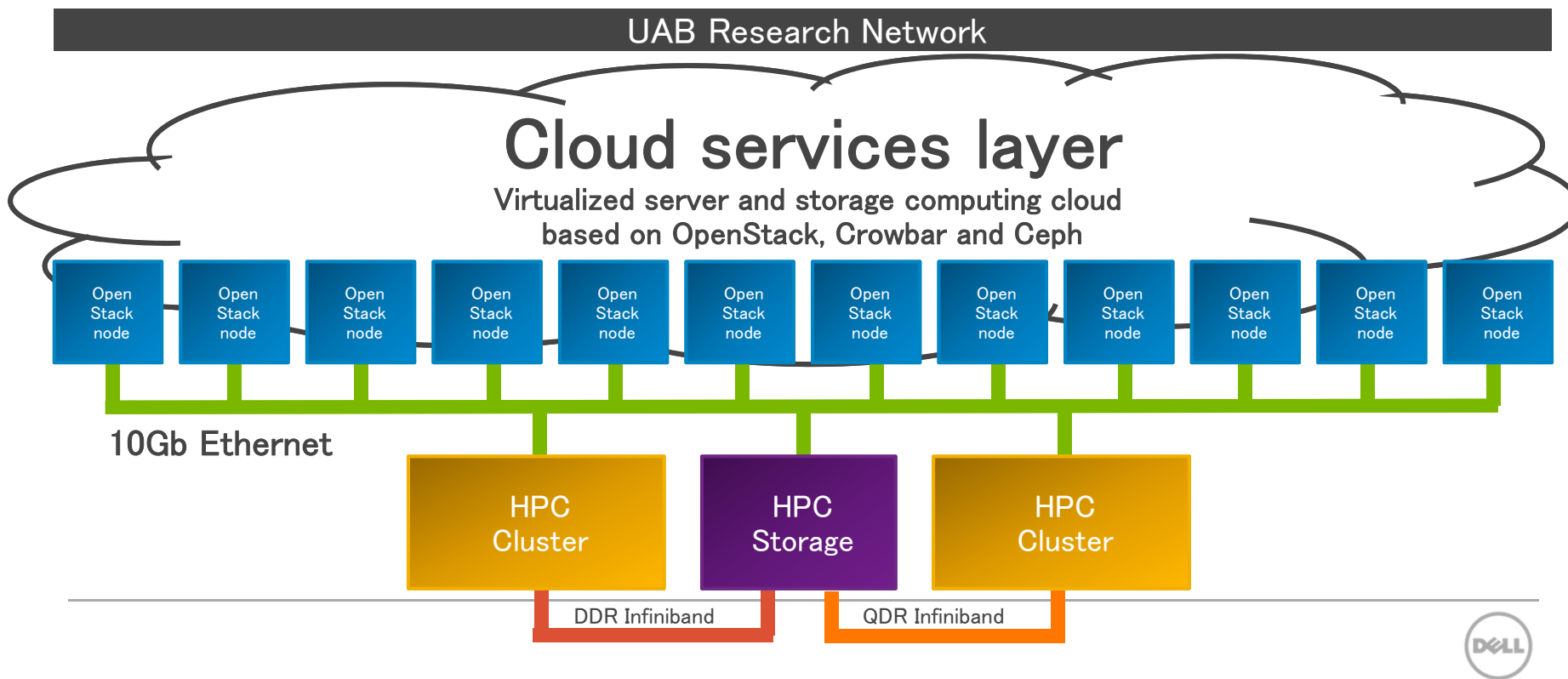


- Designed to support emerging data-intensive scientific computing paradigm
  - 12 x 16-core compute nodes
  - 1 TB RAM, 420 TBs storage
  - 36 TBs storage attached to each compute node
- Virtual servers and virtual storage meet HPC
  - Direct user control over all aspects of the application environment
  - Ample capacity for large research data sets
- Individually customized test/development/ production environments
  - Rapid setup and teardown
- Growing set of cloud-based tools & services
  - Easily integrate shareware, open source, and commercial software

# Research Computing System (Next Gen)



A cloud-based computing environment with high speed access to dedicated and dynamic compute resources



For more information:

Visit [Dell.com/OpenStack](http://Dell.com/OpenStack)  
Email: [openstack@dell.com](mailto:openstack@dell.com)

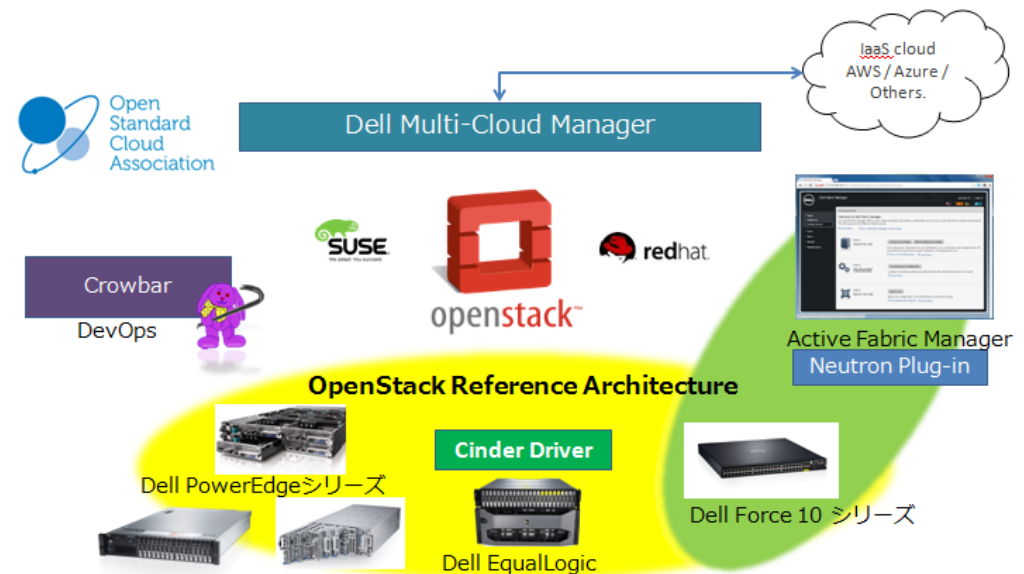
And...





Dell の Openstack 取り組みについて、詳しくご紹介！

デルの展示ブースにも足をお運び下さい



実機を使ったCinder デモ環境もご用意しています。

