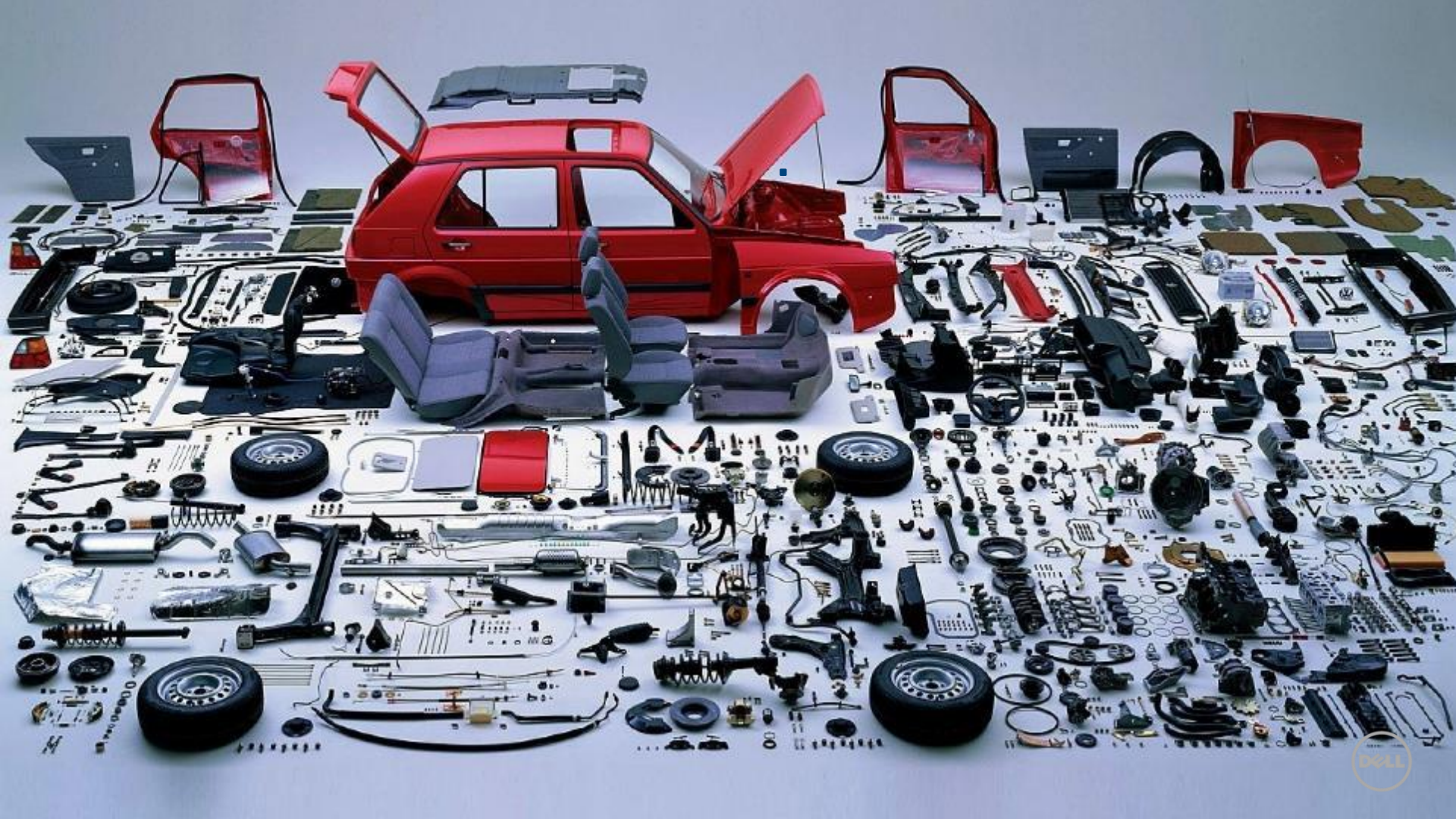
戴爾解決方案藍圖

OpenStack 參考架構

CP Li 李俊邦

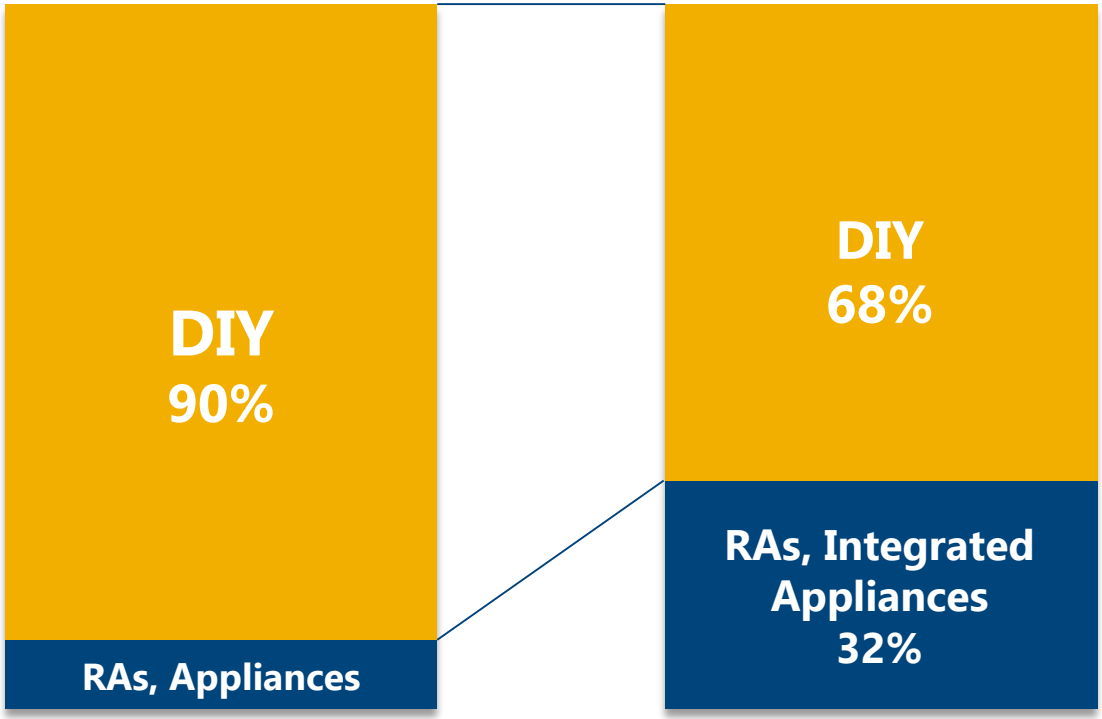
Enterprise Technologist

Dell



Dramatic shift in customer buying behavior

Shift toward pre-engineered bundles and solutions



Empowering **your agenda, your way**

Future-Ready Enterprise

workload-ready
Databases | Collaboration | HPC

virtual infrastructure-ready
VMware | Microsoft

software-defined
SDN | SDS | SDDC | VDI

cloud-ready
Microsoft | VMware | OpenStack

big data-optimized
Hadoop | Cloudera

Traditional IT | **New IT**

Dell Integrated Systems for Oracle 12c Database

ORACLE

Dell Acceleration Appliances for Databases

FUSION-IO

Dell Blueprint for UC&C

Microsoft

Dell Blueprints for virtualization and Cloud-Client Computing (VDI)

VXRAIL

Microsoft Hyper-V

vmware

nexenta

NUTANIX

cumulus networks

big switch networks

vmware EVO SDDC

Dell Blueprints for Cloud

VXRAIL

vmware EVO SDDC

Microsoft

hadoop

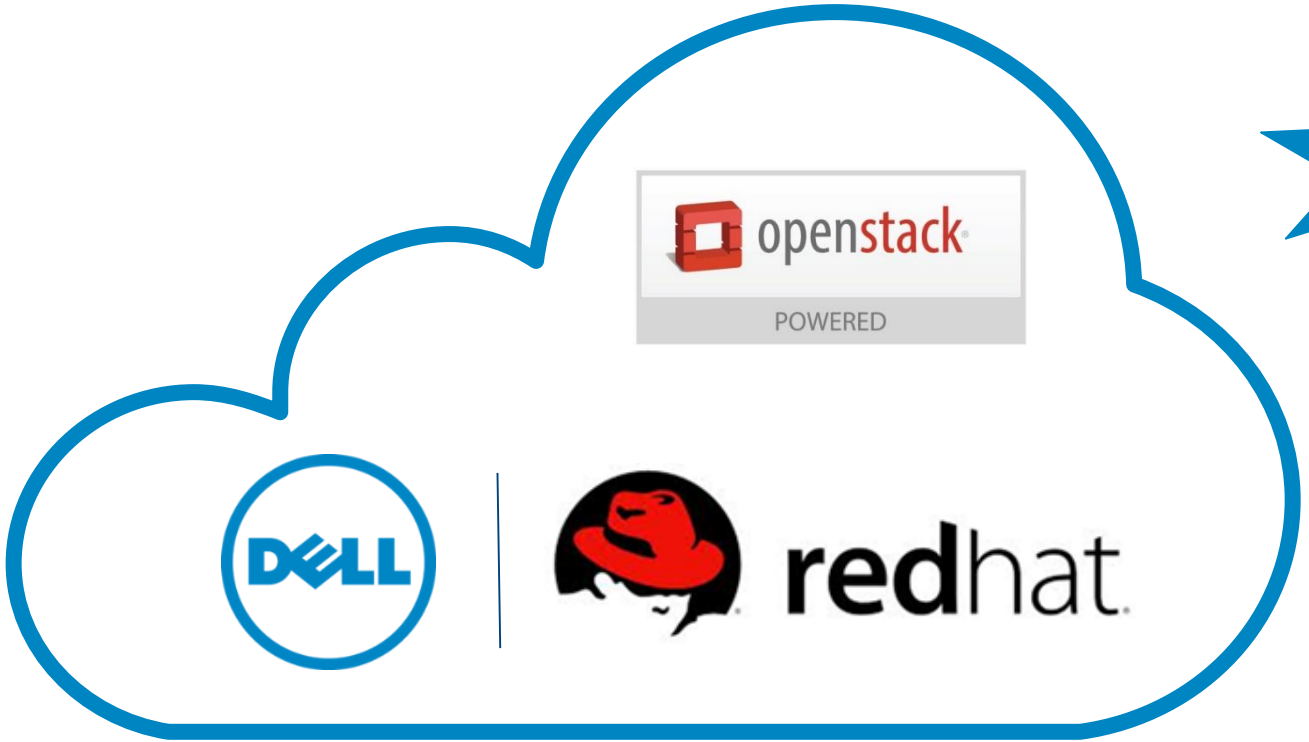
Dell Blueprint for Big Data and Analytics

Dell Enterprise Portfolio + Dell Statistica, Toad Data Point, Boomi

cloudera

SAP HANA

Innovative open cloud infrastructure



New version 5.0

Dell Red Hat OpenStack cloud

1st to deliver
Instance HA, host live migration, containers

Greater flexibility
flexible RA with validated options and extensions

Cost effective entry price,
expand on your terms

openstack
POWERED

1st
to Co-engineer OpenStack Cloud solution

Only
OpenStack config supporting multiple storage backends via cinder

1st
SPEC Cloud IaaS benchmark

1st
to integrate Ceph object storage and SDS architectures

Version 5.0 — **what's new!**

Elastic architecture
0.5 to 3 racks

RHEL OSP 8
OpenShift
comes with containers
CloudForms

Intel Xeon E5-2600 V4 processors
"Broadwell"

NEW options
- Midokura
- Dell S6000

Live migration and VM HA

OSP director with OpenStack TripleO

Optimized Ceph object

Seamless version upgrades

Architecture details

Dell Red Hat Cloud Solutions

V5 Core architecture – elastic sizing, reliable, highly available

Scale down 16 U
~ 50- 100 VMs

Core Architecture 30U
~ 120 - 250VMs

Scale out 90U
~ 2,500 VMs

Mix and match compute R430/R630/R730. Storage R730xd/Ceph, Dell PS/SC series

Dell Engineered Solutions

Powered by Intel Xeon E5-2600 V4 processors

Dell and Red Hat enterprise cloud solutions

Prescriptive, practical, right-sized choices fit for you

Specs at a glance

- Core architecture: 10 nodes, 10Gb networking, 1 rack
- Mix-Match sizing, scale back to 0.5 rack, out to 3 racks
- Dell PowerEdge R430/630/730/730xd servers
- Dell Networking S4048/S3048-ON
- Red Hat Enterprise Linux OpenStack Platform 8
- Red Hat Ceph 1.3
- OpenStack Neutron
- Controller nodes clustered
- Active–Active High Availability
- Supports multiple storage back ends simultaneously

Core Architecture

Dell Red Hat OpenStack Cloud

Validated Extensions

- **Cloud Management**
- **Performance management**
- **Software defined networking**
- **App Management, Containers, PaaS**

Core Architecture

Red Hat Cloud Forms

openstack
POWERED

Dell Red Hat OpenStack Cloud

DELL | redhat

Validated extension
- Scale tested
- Verified configs
- Deployment guide

Cloud Management

- **Accelerate service delivery**
- **Reduce operational costs**
- **Improve operational control**
- **Ensure compliance/governance**
- Self-service portal/catalog with automatic provisioning
- Workload life-cycle management,
- Resource quota enforcement
- Cost allocation, and chargeback
- Resource usage, optimization, and capacity planning
- Automated policy enforcement
- Approval workflows
- Configuration auditing, change tracking, and drift analysis

Core Architecture

Midokura Midonet

Dell Red Hat OpenStack Cloud

Validated extension

- Scale tested
- Verified configs
- Deployment guide

Software defined networking

- **Simplify Neutron -** Replace OvS with Midonet plugin
- **Agility -** Implement L2/L3 advanced services, LBaaS, FWaaS in seconds
- **Improved performance -** single hop processing, direct programming of the Linux kernel
- **OpenStack Scale -** fetches and caches logical flow state at the edge, flow decisions made on each host
- Build, opLeverages standard Neutron APIs
- Limitless VLANs
- 40Gb high throughput processing

Operate, manage virtual networks at scale, with agility and security

Core Architecture

OpenShift by Red Hat

Dell Red Hat OpenStack Cloud

Validated extension
- Scale tested
- Verified configs
- Deployment guide

App Management, Containers, PaaS

- **Modernize applications**
- **Deliver new services**
- **Accelerate development processes, DevOps**
- Deliver innovative apps to market faster
- Integrated Docker, Kubernetes
- Container portability: write once deploy anywhere
- Supports stateful and stateless apps
- Self-service provisioning
- Auto-scaling

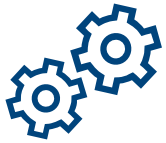
1st solution integrating OpenShift with OpenStack

Red Hat OpenStack Platform 8

Operations
Deployments and upgrades

Software defined
Workloads and Infrastructure

Management
Workloads and Infrastructure



Automation

- Automated seamless OpenStack version upgrades, OSP updates
- Accelerated deployment with OSP director
- System wide orchestration of resources

Enterprise Ready

- Hardened bug fixes, patching, compatibility certifications
- Auto host evacuation, node fencing, workload auto-restart
- HA OpenStack services

SDS, PaaS, NFV Ready

- Red Hat Ceph, 64TB included
- Red Hat Cloud Forms, manage OpenStack workloads and infrastructure
- Red Hat OpenShift app platform (optional)

Stable OpenStack

- Stabilized OpenStack with RHEL 7
- Extended lifecycle support on Openstack and RHEL
- SELinux military-grade security integration

https://www.redhat.com/en/technologies/linux-platforms/openstack-platform

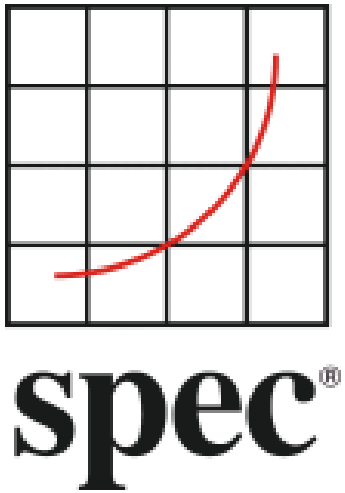
Dell PowerEdge 13G

R430/R630R730/730xd power Dell Red Hat Cloud Solutions

- Latest generation Intel® Xeon® E5-2600 V4 processors with up to 16 cores
- Ideal for cloud and virtualization
- Maximum scalability, large memory footprint, broad range of local storage options
- Optimized R430/R630/730 configs for OpenStack Admin. Compute
- Optimized 730xd configs for Ceph storage nodes

SPEC Cloud IaaS Benchmark

Dell publishes **first and only** benchmark result



- Benchmarks IaaS performance in private and public clouds
- Measures both control and data planes
- Executes workloads that resemble real applications
- Documents metrics for elasticity, scalability, provisioning
  - https://www.spec.org/benchmarks.html#cloud
  - https://www.spec.org/cloud_iaas2016/results/cloudiaas2016.html
- Non-profit corporation establishing, maintain and endorse a standardized set of industry benchmarks

What will the benchmark measure ?

Scalability

Measures the total amount of work performed by a group of application instances running in a cloud.

Scalability is reported as a unit-less number and is the aggregate of workload metrics normalized by workload metrics from a reference platform obtained during development of the benchmark.

It answers the question: How much more work gets done if N, instead of one (1) AI are deployed?

Elasticity

Measures how close to perfect linearity the scalability of the cloud is by comparing the average performance of all Application Instances against the established baseline.

Elasticity is expressed as a percentage.

An ideal cloud would post 100% for the Elasticity score

Two application families covered:

Hadoop (KMeans)

Web apps (YCSB)

- https://www.spec.org/cloud_iaas2016/

13GMLK + JS 5 results

SPEC Cloud IaaS 2016 Benchmark

Copyright © 2016 Standard Performance Evaluation Corporation

Cloud Vendor: Dell Inc. **Cloud Type / SUT Type: private/whitebox** **Hardware Platform: x86_64** **Hypervisor: KVM** **Cloud Infrastructure: Red Hat Enterprise Linux Openstack Platform 8**	**Scalability: 29.5 @ 20 Application Instances** **Elasticity: 71.9%** **Mean Instance Provisioning Time: 135s**

Tested by: Dell Revolutionary Cloud and Big Data	SPEC Licence Number : 999	Test Date : Jun-2016

Performance Sections	SUT Configuration Sections	Elasticity + Scalability Phase Date/Time and Test Region	Cloud Informational Metrics
Performance Summary Performance Details Validation, Errors, and Issues Glossary of Terms	Instance Configuration Cloud Configuration Network Configuration Storage Configuration	Elasticity + Scalability Start Time: 2016-06-08_22:08:14_UTC Elasticity + Scalability End Time: 2016-06-08_23:33:38_UTC Test Region: US Central Time Zone	AI Provisioning Success: 86.96% AI Run Success: 100.00 Total Instances: 131

12G Hardware, JS 4.0.1

SPEC Cloud IaaS 2016 Benchmark

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Cloud Vendor: Dell Inc. **Cloud Type / SUT Type: private/whitebox** **Hardware Platform: x86_64** **Hypervisor: KVM** **Cloud Infrastructure: Red Hat Enterprise Linux Openstack Platform 7**	**Scalability: 10.3 @ 10 Application Instances** **Elasticity: 63.0%** **Mean Instance Provisioning Time: 163s**

Tested by: Dell Opensource Solutions	SPEC Licence Number : 999	Test Date : Apr-2016

Performance Sections	SUT Configuration Sections	Elasticity + Scalability Phase Date/Time and Test Region	Cloud Informational Metrics
Performance Summary Performance Details Validation, Errors, and Issues Glossary of Terms	Instance Configuration Cloud Configuration Network Configuration Storage Configuration	Elasticity + Scalability Start Time: 2016-03-05_17:33:51_UTC Elasticity + Scalability End Time: 2016-03-05_18:19:59_UTC Test Region: US Central Time Zone	AI Provisioning Success: 100.00% AI Run Success: 100.00 Total Instances: 65

The industry's largest Network Function Virtualization OpenStack cloud deployment

verizon

DELL redhat big switch networks

- **Resiliency at Scale** Hyperscale-inspired "core and pod" at 5 data centers across the US
- **No Bandwidth Bottlenecks** Leaf-spine architecture with centralized SDN control
- **Logical Network Design Flexibility** Unique NFV workloads with unique logical network
- **Reduced Operational Complexity** Simplified lifecycle management of network control systems
- **Integrated Security and Visibility** Compliant and secure against intrusions

> "We consider this achievement to be **foundational for building the Verizon cloud.**"
>
> *Adam Koeppe, VP, Verizon*

> "Verizon is building a next-generation, automated, software-defined network ... to **build a network that changes at the pace of software,** not hardware."
>
> *Darrell Jordan-Smith, VP, Red Hat*

Dell and Red Hat Cloud Solutions

V5.0 at glance

Target Use Cases

- **Today's Apps** – cloud enabled apps (mobility, eCommerce, social, LOB)
- **Developer self-service** – streamline productivity, IaaS on-demand
- **Application repatriation** – manage Opex, address control issues, data protection
- **Storage as-a-Service** – on-demand storage for $0.01's per GB

Features

- **Containers and PaaS** – with Red Hat OpenShift
- **Seamless version upgrades** – Liberty going forward
- **VM live migration** – VM issues, its moved
- **Instance high availability** – Pacemaker, fencing, auto restart
- **Host maintenance mode** – Gracefull removal and re-introduce nodes
- **Storage flexibility** – multiple storage backends simultaneously
- **Elastic Ref. Arch.** – Scale 0.5 - 3 racks, mix and match exxpansion
- **High Availability** – across services, networking, hardware
- **Networking –** Neutron SDN, 10GB, OVS, vLAN, highly resilient
- **PowerEdge 13G** – (**Broadwell)** optimized price-performance, efficiency
- **Co-Engineered** – unique Dell and Red Hat joint investment
- **Validated** – Dell and Red Hat, design, tested, validated
- **Extended Support** – collaborative, HW-Dell SW-Red Hat

Components

- **Dell PowerEdge R430/630/R730/R730xd**
- **Dell Networking S3048-ON/4048-ON**
- **Red Hat OpenStack Platform 8**
  - Red Hat Enterprise Linux 7.2
  - Red Hat OpenStack (Liberty)
- OpenStack **Neutron**
- **Red Hat Ceph V1.3** Block/Object
- **Dell** and **Red Hat Services**
- **Validated** optional extensions

*Please consult latest Ref. Architecture for details

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