Dell Red Hat Cloud Solutions

Powered by Red Hat Enterprise Linux OpenStack Platform
V4 Spec Sheet

Future Ready Clouds powered by Dell, Red Hat and OpenStack

Dell and Red Hat are jointly engineering scalable, open, cloud computing solutions with OpenStack® technologies. Dell and Red Hat Cloud Solutions powered by Red Hat® Enterprise Linux® OpenStack® Platform remove complexity, stabilize the moving parts in OpenStack, streamline code maintenance and will make your OpenStack cloud reality a success. Dell Red Hat cloud solutions have achieved all requirements set forth by the OpenStack Foundation for the OpenStack Powered designation.

Enhancing OpenStack's capabilities to make it truly enterprise capable is a key priority for Dell and Red Hat. Together, Dell and Red Hat and Intel are actively engineering enhancements in a number of key areas including:

- seamless rolling updates of OpenStack
- continuous availability for core OpenStack Services
- guest (VM) high availability and related host evacuation

All of this joint engineering is conducted with strict adherence to open source development protocols with all code up streamed to the OpenStack community.

Solution Architecture[1]

A core output of Dell and Red Hat's joint engineering is a comprehensive and flexible Reference Architecture for OpenStack clouds. This architecture provides fully validated and prescribed configurations for compute, infrastructure, networking, and multiple options for storage.

Designed to be elastic, fault tolerant and self-healing, the architecture is easily right-sized for your needs now and the future by adding or removing (mix and match) compute and storage. Dell and Red Hat put all configurations and deployment options through extensive validation stress testing in Dell and Red Hat labs so you can deploy with confidence.

Multiple storage solutions are supported including Red Hat Ceph (Block and Object), Dell EqualLogic, and Dell Compellent. Core OpenStack services are deployed in a high availability (HA) configuration. All infrastructure is price-performance, space and power optimized across compute, infrastructure and storage node functions. Multiple options are provided for compute node processors, memory and disk drives so you can tailor server configurations for your specific use cases.

The core compute and storage configuration can be expanded to a maximum of three (3) full rack (or 90U total) and can easily support up to 2,000 virtual machines. This enterprise capable solution provides an open flexible infrastructure for scale out cloud applications and for hosting production workloads.

Deployments larger than three racks are designed and engineered by Dell and Red Hat Services based on your specific requirements using a highly consultative and iterative project process. Dell and Red Hat will address your specific cloud solution needs with massive scale-out OpenStack powered configurations that integrate Dell compute, storage, and networking optimized with Red Hat Enterprise Linux OpenStack platform and added enhancements from the OpenStack eco-system of technologies and solutions.

[1] Complete details and configuration options are provided in the Dell Red Hat Cloud Solutions Reference Architecture available at Dell.com/openstack

Components at a glance

- Dell PowerEdge R630/R430/R730/R730xd Servers with optimized configurations for compute
- Dell PowerEdge R730xd Servers with optimized configurations for Ceph storage
- Dell Networking S3048/4048 switches configured for resiliency
- Red Hat Enterprise Linux OpenStack Platform 7
  - Red Hat Enterprise Linux 7 operating system optimized for OpenStack
  - OpenStack (Kilo) software, hardened, patched, tested by Red Hat
  - Enterprise software lifecycle: maintenance updates, patches, bug fixes, security fixes, back porting of selected new features released by OpenStack
  - Support Subscription, 1-3 year terms available
- Red Hat Ceph Enterprise v1.3 – block and object storage
- Dell EqualLogic storage via Cinder plug-in
- Dell Compellent storage via Cinder plugin
- Dell Storage PS and SC series via Cinder plug-in
- Database/HA: MariaDB and Galera
- Messaging: Rabbit MQ
- Dell ProSupport
- Dell Professional Services
- Extensions and value added options:
  - Dell Cloud Manager via custom deployment
  - Midokura Midonet software defined networking
  - OpenStack Ceilometer monitoring

Red Hat Enterprise Linux OpenStack Platform 7

Red Hat Enterprise Linux OpenStack Platform is an integrated and open foundation for creating, deploying, and scaling a secure OpenStack cloud. This enterprise-class cloud platform combines the power of the Red Hat Enterprise Linux 7 operating system with Red Hat OpenStack (Kilo) technology, giving you the competitive advantage to quickly meet customer demands without compromising on availability, security, or performance.

Red Hat pioneered the co-engineering of Linux and OpenStack together, recognizing the critical interdependencies between the two. Red Hat Enterprise Linux OpenStack Platform delivers an integrated and optimized foundation designed to stand up to the rigors of a production-level OpenStack cloud.

Architecture - specifications and configurations

The solution is powered with Dell PowerEdge R630/R430/R730/R730xd series high-density rack servers. The Dell PowerEdge R630 server is a compact two-socket, 1U rack server with a large memory footprint and impressive I/O options that make it an exceptional platform for space-sensitive cloud environments. With its hyper-dense memory (up to 768GB in a 1U form factor) and the Intel® Xeon® processor E5-2600 v3 product families, the R630 is perfect for cloud and high-performance computing applications.

The Dell PowerEdge R430 server delivers peak 2-socket performance for space-constrained data centers in a short-depth (24") from factor. It is an excellent fit for an entry level OpenStack cloud environment.

The PowerEdge R730 delivers outstanding functionality in just 2U of rack space with the combination of powerful processors, large memory, fast storage options and GPU accelerator support. The R730 supports up to sixteen 12Gb SAS drives and the high-performance 12Gb PowerEdge RAID Controller (PERC9) and is powered by the latest generation Intel Xeon processor E5-2600 v3 product family.

The PowerEdge R730xd server is Dell's 13G mainstream 2-socket 2U rack server. It is designed to deliver an optimal balance of storage utilization, performance and cost with an optional in-server hybrid storage configuration that can support tiering and capacity for up to 28 drives in a 2U system. The R730xd hosts the Ceph storage infrastructure in this Dell and Red Hat architecture.

Dell Red Hat Cloud Solutions

The core server configurations in the architecture are as follows:

Compute nodes

Machine Function	Solution Bundle Compute Nodes
Platform	PowerEdge R630
CPU	2 x E5-2650v3
RAM (Minimum)	128 GB
LOM	2 x 1Gb, 2 x Intel X520 10Gb
Add-in Network	1 x Intel X520 DP 10Gb DA/SFP+
Disk	6 x 600GB 10k SAS
Storage Controller	PERC H730
RAID	RAID 10

Controller nodes

Machine Function	Solution Bundle Controller Nodes
Platform	PowerEdge R630
CPU	2 x E5-2650
RAM (Minimum)	128 GB
LOM	2 x 1Gb, 2 x Intel X520 10Gb
Add-in Network	1 x Intel X520 DP 10Gb DA/SFP+
Disk	4 x 500GB 7.2k NLSAS
Storage Controller	PERC H730
RAID	RAID 10

Infrastructure nodes

Machine Function	Solution Bundle Infrastructure Nodes
Platform	PowerEdge R630
CPU	2 x E5-2630v3 (8-core)
RAM (Minimum)	32 GB
LOM	2 x 1Gb, 2 x Intel X520 10Gb
Add-in Network	1 x Intel X520 DP 10Gb DA/SFP+
Disk	4 x 500GB 7.2 NLSAS
Storage Controller	PERC H730
RAID	RAID 10

Storage nodes

Machine Function	Solution Bundle Storage Nodes
Platforms	PowerEdge R730xd
CPU	2 x E5-2650v3 (10-core)
RAM (Minimum)	48 GB
LOM	1 x 1Gb, 2 x Intel X520 10Gb
Add-in Network	2 x Intel X520 DP 10Gb DA/SFP+
Disk	Flex Bay: 2 X 300GB 10K 2.5-inch (OS) Front Drives: 3 X 200GB SSD 13 x 2TB or 4TB NL SAS 7.2K 3.5-inch
Storage Controller	PERC H730
RAID	RAID 1 (operating system) pass through SSD pass through each data disk

The core configuration is deployed with 10 servers: Node 1 = Admin Host and Red Hat OpenStack Manager, there are three (3) OpenStack Controller nodes, four (4) Nova Compute nodes, and three (3) Ceph Storage nodes on R730xd servers. A Dell EqualLogic Array is supported as an option. Networking is a 10GbE design with two (2) Dell Networking S4810 and one Dell Networking S55 switches.

- **Storage options:** This solution leverages OpenStack Cinder's multi-backend and multi-instances with Red Hat Ceph and Dell Storage. This provides flexibility by supporting multiple storage systems simultaneously to meet different application or use cases requirements with a single infrastructure. Ceph storage is instantiated on Dell PowerEdge R730xd servers and various options for memory and disks in the servers are supported. Ceph and EqualLogic can be added in single node increments in any combination to expand the storage environment. Dell Storage PS and SC are also supported.*

- **Sizing options:** The core configuration can be scaled out by adding compute and storage capacity of up to three racks or 90U's total. Each rack can support up to 20 servers or 30U total, and you can add any combination (mix and match) of compute R630 and storage nodes R730xd (Ceph) or Dell EqualLogic to fill out the 30U. Note: the 30U of space is completely available for servers and storage; networking devices do not impact the available expansion space. Recommended designs for Networking are documented in the solution Reference Architecture. Fully built-out this configuration can support up to 2,000 virtual machines.

- **Compute node options:*** The core configuration is built on the PowerEdge R630 for compute and infrastructure nodes, and within the servers you can select various CPU, memory, and disk options. PowerEdge R430 and R730 servers are also supported for compute.*

- **High Availability:** HA is designed into this configuration. Key OpenStack services are made highly available by clustering the OpenStack Controller nodes. In addition, the HA controllers nodes are also used to host redundant active-active database configurations leveraging MariaDB and Galera. The networking design is based on 10GB bonds with Dell S4810 switches for data networks and the network switches are setup for HA with Virtual Link Trunking.

Networking Overview: The network configuration uses OpenStack Neutron functionality provided in the Red Hat Enterprise Linux OpenStack Platform 7 code base and does not use any additional third-party drivers. The reference configuration uses Neutron ML2 drivers for OpenVswitch with the vLAN option.

The networking design consists of three major infrastructure layouts:
- **Data network infrastructure** — data network consists of the server NICs, the top-of-rack (ToR) switches, and aggregation switches.
- **Management network infrastructure** — BMC management network, consisting of iDRAC ports and the out-of-band management ports of the switches, is aggregated into a 1-RU S55 switch in one of the three racks in the cluster. This 1-RU switch in turn can connect to one of the aggregation or core switches to create a separate network with a separate vLAN.
- **Core network infrastructure** — connectivity of aggregation switches to the core for external connectivity
- **Networking options:*** Dell and Red Hat have co-engineered network designs and configurations to ensure high availability, consistency and reliability. The designs implement Dell Networking S3048/4048 10-Gigabit Ethernet switches as the top-of-rack connectivity and the solution Reference Architecture implements a minimum seven vLANs. Dell provides an open standard that enables you to configure the switching environments to meet your needs.*

Software Defined Networking Option:
The Dell Red Hat Cloud solution supports Midokura Midonet for software-defined networking. MidoNet is an open source network virtualization platform for Infrastructure-as-a-service (IaaS) clouds. By decoupling the IaaS cloud from the network hardware; Midonet creates an intelligent, software-based network abstraction layer between the hosts and the physical network, allowing operators to move from hardware-based network appliances to software-based, multi-tenant virtual domains.

Midonet is tightly integrated with OpenStack Neuron, and when deployed replaces the default Open vSwitch (OVS) plugin with a Midonet plugin. Further, Midonet integrates with the OpenStack Horizon UI for a seamless single pane of glass operation. Deployment guidelines for Midonet will be published in a technical guide and made available on Dell TechCenter web site in late 2015.

Dell and Red Hat are streamlining and removing the complexities of OpenStack and its operating environment, to directly address enterprise needs for high availability, security, and an enterprise lifecycle with global scale. Dell Red Hat Cloud Solutions powered by Red Hat Enterprise Linux OpenStack Platform provide the foundation to make your organization future-ready. With Dell and Red Hat you will transform your IT systems into a dynamic service delivery engine and accelerate your time to value.

Learn More
Dell Red Hat OpenStack Cloud Solutions
Dell.com/OpenStack

Dell – Red Hat Alliance
Dell.com/RedHat

Dell Solution Centers
Dell.com/SolutionCenters

Get Started
Engage Dell Solution Centers
- Technology Briefings
- Architecture Design workshops
- Proof of Concepts, Pilots

Dell.com/SolutionCenters

---

* Please consult the solution Reference Architecture for complete details for expansion and configuration options.

Dell Red Hat Cloud Solutions