READY SOLUTIONS FOR SERVICE PROVIDERS – SPEC SHEET

DELL EMC NFV READY BUNDLE FOR RED HAT

A turnkey solution optimized to simplify and accelerate production deployments. With this solution, Dell EMC has built a fully integrated and validated solution that enables service providers to immediately launch their own services on top of this Network Function Virtualization (NFV) platform, minimizing, if not eliminating, the need to apply engineering resources to develop their own infrastructure.

Dell EMC Cloud Infrastructure Overview

Dell EMC cloud infrastructure is a scaled-down version of the Dell EMC solutions and supports all foundational elements for NFV Infrastructure (NFVI) and virtualized infrastructure manager (VIM). The cloud infrastructure includes hardware and software elements from Dell EMC (server, storage, networking) as well as software elements from industry leaders for virtualization, orchestration, automation, analytics, security and cloud services. Key benefits:

- **100 percent open and standards-based**: Aligned to ETSI, OPNFV and built on industry-standard Intel x86 servers combined with industry-leading open networking platforms and a rich set of open interfaces for maximum interoperability, manageability and investment protection.
- **Scalability in any direction**: Scale easily — up, down or out — to accommodate a wide range of design goals, service capabilities and environmental conditions. Ideal for small, unstaffed points of presence, central office environments or hyperscale data centers.
- **Maximum choice and flexibility**: Supports the widest range of software configurations with mix-and-match modularity. Choose from various guest OS, data plane acceleration technologies, service chaining and orchestration packages that tailor the Dell EMC NFV Ready Bundle for Red Hat to meet your needs.

Dell EMC NFV Ready Bundle for Red Hat

The Dell EMC NFV Ready Bundle for Red Hat combines hardware, software, and Dell EMC engineering and is designed to create a more flexible, scalable, and agile platform for CSPs. It includes open standards-based Dell EMC cloud infrastructure hardware (compute, networking) and Red Hat OpenStack Platform.

The solution is pre-validated with Red Hat OpenStack Platform software, and it encompasses both hardware and software. This specific software is optimized for Dell EMC cloud infrastructure. The pre-validated solution minimizes adoption time and significantly reduces time to service from weeks to days/hours. In addition, the solution provides carrier-grade reliability to meet SLA requirements.

JetPack Automation Tool Kit is included that manages the hardware configuration of the Solution Admin Host (SAH) node as well as managing the automated hardware discovery, configuration, and software deployment for the rest of the cluster. This tool kit enables the deployment of the Red Hat OpenStack cluster in hours, rather than days.

At its core, Red Hat OpenStack Platform includes the Kernel-based Virtual Machine (KVM) hypervisor, Open vSwitch (OVS) and Neutron plugins as well as Cinder, Glance, and Swift OpenStack storage modules. Deploying Red Hat Enterprise Linux (RHEL) as host nodes and virtual machines will allow the gaining performance, security, and operational advantages.

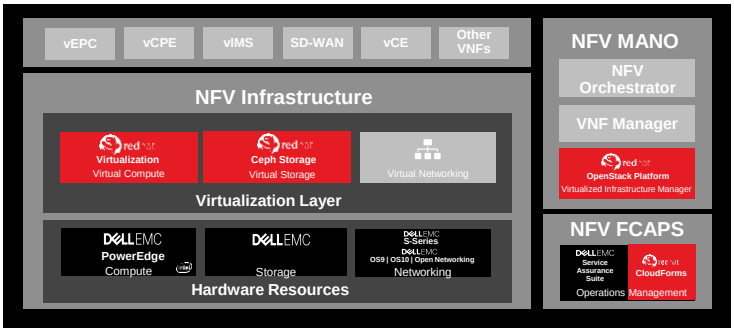

Figure 1: Dell EMC NFV Ready Bundle for Red Hat

Dell EMC and Red Hat designed this integrated solution to make it easy for service providers to build their own operational readiness cluster and design their initial offerings, using the current releases. Dell EMC and Red Hat provide the support and services customers need to stand up production-ready OpenStack clusters.

Solution Configuration

Dell EMC NFV Ready Bundle for Red Hat consists of the following components:

Hardware elements:

- 1x Out of band switch
- 2x Spine switches
- 2x Leaf switches
- 1x VIM Controller nodes
- 1x SAH node
- 3x OpenStack Controller nodes
- 3x Compute nodes
- 3x Storage nodes

Virtualization software:

- Red Hat Virtualization
- Red Hat Ceph Storage
- Red Hat OpenStack Director Installer

Networking software:

- Dell EMC Networking OS9.x or greater
- Open Networking options available

Management software:

- Dell EMC OpenManage Network Manager
- Dell EMC OpenManage Essentials

Orchestration/VIM software:

- Red Hat OpenStack Platform

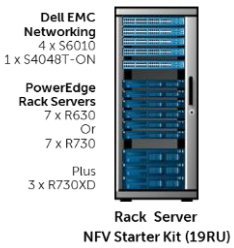

Figure 2: Dell EMC NFV Ready Bundle for Red Hat Rack Configuration

Dell EMC and Red Hat Professional Services

Dell EMC NFV Ready Bundle for Red Hat is supported by a comprehensive portfolio of Dell EMC and Red Hat professional services spanning consulting, design, deployment and world class extended lifecycle support.

Professional Services, Support, and Training:

- Dell EMC ProSupport Plus
- Collaborative support for Red Hat products
- Red Hat OpenStack Platform and Red Hat Ceph Storage
- Consulting and deployment services available jointly
- Classroom, virtual, and self-paced training options through Red Hat Training
- Expanded availability of solution presented upon request

Key Component Summary

The table below summarizes the components for the Dell EMC NFV Ready Bundle for Red Hat. It can be expanded with additional compute, networking and storage upon request.

Rack Server NFV Starter Kit	
Form Factor	Fixed (19 RU)
Compute and Controller Nodes	
Hardware Node	6x PowerEdge R630 servers or 6x PowerEdge R730 servers (carrier grade available)
Processor	Two Intel® Xeon® E5-2650 v4
Memory	Minimum: 128GB (16GB RDIMM, 2400MT/s)
Local Disk	Default: - 8x 600GB 10K RPM SAS 12Gbps 2.5in Hot-plug Hard Drive
Communications	Intel DP 10Gb X520 + I350 DP 1Gb RJ45 (NDC) Intel DP 10Gb X520 with SR Optics (PCIe)
Network Fabric 40GbE	
Spine	2x S6010 1/10/40/GbE Ethernet switch (alternative: S6000, Z9100@40GbE) - 32x 40GbE can break out to 96x 10GBE per unit - 2.56Tbps throughput at 600ns latency per unit - Quick Installation using ReadyRails™ - Energy efficient, lower power, Fresh Air® capable - Bare metal provisioning
Leaf	2x S6010 1/10/40/GbE Ethernet switch (alternative: S6000, Z9100@40GbE) - Breakout 96x 10GbE SFP+ fiber/copper - 2.56Tbps throughput at 600ns latency per unit - Quick Installation using ReadyRails - Energy efficient, lower power, Fresh Air capable - Bare metal provisioning

Out-of-band	1x S4048T-ON 1/10/40GbE Ethernet switch (alternative: S4820T) - 48x 1/10GbE BASE-T autosensing, non-blocking, line rate ports (100M/1G/10G) - 4x 40GbE QSFP+ ports - 1.28Tbps fabric capacity - L2/L3 capable
Solution Admin Host (SAH)	
Hardware	2x Dell EMC PowerEdge R630 (carrier grade available)
Processor	Two Intel® Xeon® E5-2650 v4
Memory	Minimum: 128GB (16GB RDIMM, 2400MT/s)
Local Disk	Default: - 8x 600GB 10K RPM SAS 12Gbps 2.5in Hot-plug Hard Drive
Communications	Intel DP 10Gb X520 + I350 DP 1Gb RJ45 (NDC) Intel DP 10Gb X520 with SR Optics (PCIe)
Dell EMC optional components	- Optional enablement of OVS-DPDK at the deployment time - Optional enablement of HugePages, NUMA and CPU Pinning, IPv6 networking for Tenant VMs - Optional customer/partner provided VNF software - Optional customer/partner provided management and orchestration software - Optional Dell/customer/partner NFVI management, monitoring, and additional software and services available - Open Source or Standard Software requiring separate download includes: Cacti, Nagios, Gangli - Optional enablement of SR-IOV with active-active mode on compute nodes - Optional NIC alignment for latency optimization

Default Compute Configuration

Components can be changed according to need; primary objective is high availability with the ability to grow based on VNF use case requirements.

SAH, N1	
SAH Node	PowerEdge R630 or PowerEdge R730 rack mount server - 1x SAH node
Controller N1, N2, N3	
Controller Node	PowerEdge R630 or PowerEdge R730 rack mount server - 3x controller nodes prepared for HA
Compute N1, N2, N3	
Compute Node	PowerEdge R630 or PowerEdge R730 rack mount server - 3x compute node
Storage	
Storage Node	PowerEdge R730XD rack mount server - 3x storage nodes

Learn more about Dell EMC

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