CONFIGURATION GUIDE

DELL EMC AND RED HAT CONFIGURATIONS FOR SAP HANA

Dell EMC and Red Hat solutions for SAP HANA

Combining Dell EMC enterprise-class products and services, SAP HANA®, and Red Hat® Enterprise Linux® for SAP HANA allows you to conduct real-time analytics, performance management, and operations, all from a single system. Dell EMC and Red Hat solutions for SAP HANA are optimally configured, SAP-certified, and include hardware, software, and services. With these solutions, you can deliver complex analytic solutions quickly to differentiate your organization.

Overview of components and services

Integrated Dell EMC and Red Hat solutions for SAP HANA include:

- **Dell EMC PowerEdge servers.** Dell EMC PowerEdge R940 servers incorporate Intel E7 Skylake technology and are certified for SAP HANA. Powerful system management features like Lifecycle Controller enable seamless, integrated implementation and administration. Available at no extra cost, Dell EMC Live Optics lets you track workload performance to optimize spending and operations for your SAP HANA environment.
- **Dell EMC Compellent storage systems.** Dell EMC Compellent storage systems provide shared storage for larger, scale-out SAP HANA configurations. These systems use Dell's Fluid Architecture to deliver high performance with enterprise-class management and availability to your SAP HANA environment.
- **Pre-loaded software.** SAP HANA appliance software and the Red Hat Enterprise Linux for SAP HANA operating system (OS) are pre-loaded on the solution hardware. Red Hat Enterprise Linux for SAP HANA brings the reliability, scalability, and performance of the world's leading enterprise Linux platform to SAP HANA.
- **Support services.** World-class Dell ProSupport and Mission Critical services keep your SAP HANA environment running smoothly. Adding Dell HANA Managed Services gives you comprehensive management and support for your SAP HANA landscape, including 24x7 monitoring, ongoing remote health checks, firmware and software upgrades like application patching, and assistance with problem tracking and resolution.

Installation and configuration services are also available. These include:

- Planning for your SAP HANA deployment.
- Design for your SAP HANA landscape.
- Installation and testing of SAP HANA in-memory databases to support development, quality assurance, and production landscape designs.

Configurations for single-node and scale-out deployments

Tables 1-3 detail single-node and scale-out configurations for Dell EMC and Red Hat solutions for SAP HANA. Visit the SAP certified and supported hardware directory to learn more about future configurations and support options.

Table 1. Dell SAP HANA single-node, SSD storage-based configurations

Component	Configuration

192GB to 384GB single node for Analytics, Business Warehouse, Suite on HANA	• **Server:** Dell EMC PowerEdge R740xd or R940
	• **CPU:** 2 to 4 x Intel E7 8180 2.5GHz, 8180M 2.5GHz, 8176 2.1GHz, or 8176M 2.1GHz processors
	• **Memory:**
	  • 192GB, 2 to 4 sockets, 24 x 8GB RDIMM
	  • 192GB, 2 sockets, 12 x 16GB RDIMM
	  • 384GB, 2 sockets, 12 x 32GB RDIMM
	  • 384GB, 4 sockets, 48 x 8GB RDIMM
	  • 384GB, 2 to 4 sockets, 24 x 16GB RDIMM
	• **OS:** Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions
	• **OS+SAP+LOG:** 5 x 1.8 TB SAS + 1 hot spare configured as RAID5
	• **DATA volume:** 3 x 800 GB or 3 x 1.6TB, 1.92TB, 3.2TB, or 3.84TB SAS SSD + 1 hot spare configured as RAID5
	• **File system:** XFS for DATA and LOG volumes

576GB single node for Analytics, Business Warehouse, Suite on HANA	• **Server:** Dell EMC PowerEdge R740xd or R940 • **CPU:** 2 x Intel E7 8180 2.5GHz, 8180M 2.5GHz, 8176 2.1GHz, or 8176M 2.1GHz processors • **Memory:** 576GB, 2 sockets, 12 x 16GB + 12 x 32GB RDIMM • **OS:** Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions • **OS+SAP+LOG:** 5 x 1.8TB SAS + 1 hot spare configured as RAID5 • **DATA volume:** 4 x 800GB or 3 x 1.6TB, 1.92TB, 3.2TB, or 3.84TB SAS SSD + 1 hot spare configured as RAID5 • **File system:** XFS for DATA and LOG volumes

768GB single node for Analytics, Business Warehouse, Suite on HANA	• **Server:** Dell EMC PowerEdge R740xd or R940
	• **CPU:** 2 to 4 x Intel E7 8180 2.5GHz, 8180M 2.5GHz, 8176 2.1GHz, or 8176M 2.1GHz processors
	• **Memory:**
	  • 768GB, 2 to 4 sockets, 24 x 32GB RDIMM
	  • 768GB, 2 sockets, 12 x 64GB LRDIMM
	  • 768GB, 4 sockets, 48 x 16GB RDIMM
	• **OS:** Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions
	• **OS+SAP+LOG:** 5 x 1.8TB SAS + 1 hot spare configured as RAID5
	• **DATA volume:** 5 x 800GB or 3 x 1.6TB, 1.92TB, 3.2TB, or 3.84TB SAS SSD + 1 hot spare configured as RAID5
	• **File system:** XFS for DATA and LOG volumes

1152GB single node for Analytics, Business Warehouse, Suite on HANA	• **Server:** Dell EMC PowerEdge R940 • **CPU:** 4 x Intel E7 8180 2.5GHz, 8180M 2.5GHz, 8176 2.1GHz, or 8176M 2.1GHz processors • **Memory:** 1152GB, 4 sockets, 24 x 16GB + 24 x 32GB RDIMM • **OS:** Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions • **OS+SAP+LOG:** 5 x 1.8TB SAS + 1 hot spare configured as RAID5 • **DATA volume:** 6 x 800GB or 4 x 1.6TB, 1.92TB, 3.2TB, or 3.84TB SAS SSD + 1 hot spare configured as RAID5 • **File system:** XFS for DATA and LOG volume

Table 1. Dell SAP HANA single-node, SSD storage-based configurations	
Component	Configuration

1.5TB single node for Analytics, Business Warehouse, Suite on HANA	• **Server:** Dell EMC PowerEdge R740xd or R940
	• **CPU:** 2 to 4 x Intel E7 8180 2.5GHz, 8180M 2.5GHz, 8176 2.1GHz, or 8176M 2.1GHz processors
	• **Memory:**
	  • 1.5TB, 4 sockets, 48 x 32GB RDIMM
	  • 1.5TB, 4 sockets, 24 x 64GB LRDIMM
	  • 1.5TB, 2 sockets, 24 x 64GB LRDIMM
	  • 1.5TB, 2 sockets, 12 x 128GB LRDIMM
	• **OS:** Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions
	• **OS+SAP+LOG:** 5 x 1.8TB SAS + 1 hot spare configured as RAID5
	• **DATA volume:** 8 x 800GB, 5 x 1.6TB or 1.92TB, or 4 x 3.2TB or 3.84TB SAS SSD + 1 hot spare configured as RAID5
	• **File system:** XFS for DATA and LOG volumes

3TB single node for Analytics, Business Warehouse, Suite on HANA	• **Server:** Dell EMC PowerEdge R940
	• **CPU:** 4 x Intel E7 8180 2.5GHz, 8180M 2.5GHz, 8176 2.1GHz, or 8176M 2.1GHz processors
	• **Memory:**
	  • 3TB, 4 sockets, 48 x 64GB LRDIMM
	  • 3TB, 4 sockets, 24 x 128GB LRDIMM
	• **OS:** Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions
	• **OS+SAP+LOG:** 5 x 1.8TB SAS + 1 hot spare configured as RAID5
	• **DATA volume:** 14 x 800GB, 8 x 1.6TB or 1.92TB, or 6 x 3.2TB or 3.84TB SAS SSD + 1 hot spare configured as RAID5
	• **File system:** XFS for DATA and LOG volumes

3TB single node for Business Suite on SAP HANA	• **Server:** Dell EMC PowerEdge R740xd or R940
	• **CPU:** 2 to 4 x Intel E7 8180 2.5GHz, 8180M 2.5GHz, 8176 2.1GHz, or 8176M 2.1GHz processors
	• **Memory:**
	  • 3TB, 2 to 4 sockets, 24 x 128GB LRDIMM
	  • 3TB, 4 sockets, 48 x 64GB LRDIMM
	• **OS:** Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions
	• **OS+SAP+LOG:** 5 x 1.8TB SAS + 1 hot spare configured as RAID5
	• **DATA volume:** 14 x 800GB, 8 x 1.6TB or 1.92TB, or 6 x 3.2TB or 3.84TB SAS SSD + 1 hot spare configured as RAID5
	• **File system:** XFS for DATA and LOG volumes

6TB single node for Business Suite on SAP HANA	• **Server:** Dell EMC PowerEdge R940 • **CPU:** 4 x Intel E7 8180M 2.5GHz or 8176M 2.1GHz processors • **Memory:** 6TB, 4 sockets, 48 x 128GB LRDIMM • **OS:** Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions • **OS+SAP+LOG:** 8 x 1.8TB SAS + 1 hot spare configured as RAID5 • **DATA volume:** 14 x 1.6TB or 1.92TB or 10 x 3.2TB or 3.84TB SAS SSD + 1 hot spare configured as RAID5 • **File system:** XFS for DATA and LOG volumes

Table 2. Dell EMC SAP HANA scale-out R940 node configuration details	
Component	**Configuration**
CPU	Up to either: • 4 x Intel Xeon SKL Platinum 8180/M 2.5G, 28C/56T, 10.4GT/s 3UPI, 38M cache • 4 x Intel Xeon SKL Platinum 8176/M 2.1G, 28C/56T, 10.4GT/s 3UPI, 38M cache
Memory	Up to 48 x DDR4 RDIMM • SAP HANA scale-out supports 3TB maximum/node with SPS11+ 48 x 64GB DIMMs • SAP HANA scale-out has 2 x 1-8TB SAS • Intel Ethernet X710 DP 10Gb DA/SFP+ +I350 1Gb BT DP network daughter card • PCIe Gen 3
I/O option base	Maximum 13 slots (3 x 8 + 10 x 16) for 4 CPUs
Network	• 1 x Intel Ethernet X710 DP 10Gb DA/SFP+ for backup network+ I350 1Gb BT DP network daughter card for SAP HANA studio/modeler for management network • 2 x Intel X710 Quad Port 10Gb Direct Attach, SPF+, Converged Network Adapter for all bond networks • bond0: Port-0 - Internal HANA internal network • bond1: Port-1 - external sources ERP, Business Intelligence platform, HANA and data sources • bond2: Port-2 - HANA shared NFS network
RAID controller	PERC-10 H740P RAID Controller 4GB NV Cache
Storage connectivity	2 x QLE2690 16Gb FC HBA (Gen 6) for front-end connectivity to storage area network (SAN)
Power	Up to 2 x AC or DC power supplies with 1+1 redundancy • AC (Platinum): 1100W, 1600W, or 2000W • DC: 1100W

The Dell EMC SAP HANA 5.x scale-out appliance consists of up to 16 PowerEdge R940 worker nodes and one or two standby nodes, each configured with 3TB of RAM with SAP HANA SPS12. The scale-out appliance can be configured from 6TB to 48TB in 3TB increments. The 48TB appliance, consisting of sixteen 3TB worker nodes and one or two 3TB standby nodes, can handle approximately 480TB of uncompressed data. Dell EMC's modular approach to SAP HANA appliance design allows you to add capacity as needed.

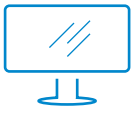
Dell EMC SAP HANA 5.x scale-out appliance solutions use external Dell EMC Compellent SC5020 storage arrays with Dell EMC Fluid File System Architecture for data persistency. The Dell EMC Fluid File System can organize high-intensity I/O requests into SSD and SAS storage tiers. As a result, Dell EMC SAP HANA scale-out solutions can route all high-intensity write I/O traffic to tier-1, high-performance SSDs.

These solutions are delivered completely installed, configured, and ready for connection to your data sources via the dedicated, redundant 10GbE network.

Table 3. Dell EMC SAP HANA 6TB scale-out solution details

Component	Configuration
SAP HANA nodes	2 x Dell EMC PowerEdge R940 active SAP HANA nodes + 1 or 2 x R940 standby SAP HANA nodes • Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions • 3TB memory per node • Up to 4 x Intel Xeon SKL Platinum 8180/M 2.5G, 28C/56T, 10.4GT/s 3UPI, 38M cache, or up to 4 x Intel Xeon SKL Platinum 8176/M 2.1G, 28C/56T, 10.4GT/s 3UPI, 38M Cache
Management	1 x Dell EMC PowerEdge R640 • Red Hat Enterprise Linux Server 7.3 for SAP HANA or Red Hat Enterprise Linux Server 7.4 for SAP Solutions • 1 x Force10 S3048-ON switch for infrastructure management network • SAP HANA Studio
Storage	1 x SC5020 dual controller array with 32GB RAM in redundant configuration • 4 x SAS, 6Gb, 4 wide-port, PCIe backend (2 per controller) • 8Gb fibre channel ports (4 per controller) • 6 x 960GB read-intensive (RI) SSD (R10 tier-1) • 18 x 1.8TB 10K RPM SAS (R5-9 tier-3)
Storage fabric	2 x Brocade 6510 24-36-48 port fibre channel 16Gb/s switch
Network	• 2 x Force10 S4048T 48 x 10GbE ports for internal SAP HANA network + external SAP HANA network (PROD) + NFS network using VLANs* for up to 8 SAP HANA nodes or 24TB • 4 x Force10 S4048T 48 x 10GbE ports for internal SAP HANA network + external SAP HANA network (PROD) + NFS network using VLANs for up to 16 SAP HANA nodes or 48TB • 1 x Force10 S3048-ON switch, 48 x 1GbE ports (management network)

* Virtual local area networks



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