

# Dell PowerEdge R760xa

## Technical Guide

## Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

<b>Chapter 1: System overview</b>	<b>5</b>
Key workloads	5
New technologies	5
<b>Chapter 2: System features and generational comparison</b>	<b>7</b>
<b>Chapter 3: Chassis views and features</b>	<b>10</b>
Chassis views	11
Front view of the system	11
Rear view of the system	14
Inside view of the system	15
Quick Resource Locator	16
<b>Chapter 4: Processor</b>	<b>17</b>
Processor features	17
Supported processors	17
<b>Chapter 5: Memory subsystem</b>	<b>19</b>
Supported memory	19
<b>Chapter 6: Storage</b>	<b>20</b>
Storage controllers	20
Supported Drives	20
Internal storage configuration	21
External Storage	21
<b>Chapter 7: Networking</b>	<b>22</b>
Overview	22
OCP 3.0 support	22
Supported OCP cards	22
OCP NIC 3.0 vs. rack Network Daughter Card comparisons	23
<b>Chapter 8: PCIe subsystem</b>	<b>24</b>
PCIe risers	24
<b>Chapter 9: Power, thermal, and acoustics</b>	<b>30</b>
Power	30
Power Supply Units	31
Thermal	31
Thermal design	32
Acoustics	33
Acoustical configurations of R760xa	33
PowerEdge acoustical specifications	34

<b>Chapter 10: Rack, rails, and cable management.....</b>	<b>42</b>
Rails and cable management information.....	42
<b>Chapter 11: Operating Systems and Virtualization.....</b>	<b>49</b>
Supported Operating Systems.....	49
<b>Chapter 12: Dell OpenManage Systems Management.....</b>	<b>50</b>
Integrated Dell Remote Access Controller (iDRAC).....	50
Systems Management software support matrix.....	51
<b>Chapter 13: Appendix D: Service and support.....</b>	<b>53</b>
Default support levels.....	53
Default deployment levels.....	53
Other services and support information.....	53
Dell deployment services.....	53
Dell custom deployment Services.....	57
Dell Residency Services.....	57
Dell Data Migration Services.....	57
Dell Enterprise Support Services.....	58
Enterprise connectivity.....	60
Dell TechDirect.....	61
Dell Technologies Consulting Services.....	61
<b>Chapter 14: Appendix A: Additional specifications.....</b>	<b>63</b>
Chassis dimension.....	63
Chassis weight.....	64
NIC port specifications.....	64
Video specifications.....	64
USB ports specifications.....	65
PSU rating.....	65
Environmental specifications.....	66
Thermal air restrictions.....	67
Liquid cooling restrictions.....	67
Thermal restriction matrix.....	68
<b>Chapter 15: Appendix A. Standards compliance.....</b>	<b>70</b>
<b>Chapter 16: Appendix C Additional resources.....</b>	<b>71</b>

# System overview

The Dell PowerEdge R760xa is Dell's latest two-socket, rack server that is designed to run complex workloads using highly scalable memory, I/O, and network options.

The system features:

- Up to two 4<sup>th</sup> Generation Intel Xeon Scalable processors with up to 56 cores
- Optional Direct Liquid Cooling for required CPU SKU configurations
- Up to 32 DDR5 DIMM slots
- Up to 4 double-wide or up to 12 single-wide GPU accelerators
- Two redundant AC or DC power supply units
- Up to 6 x 2.5-inch NVMe, 8 x 2.5-inch NVMe/SAS, 6 x E3.S Gen5 NVMe drives
- PCI Express® (PCIe) 5.0 enabled expansion slots
- Network interface technologies to cover Network Interface Card (NIC)

## Topics:

- [Key workloads](#)
- [New technologies](#)

## Key workloads

- AI/ML/DL Training medium to large data sets
- HPC, VDI, performance graphics
- Digital Twins, Render farms, virtualization

## New technologies

**Table 1. New technologies**

Technology	Detailed Description
4 <sup>th</sup> Generation Intel Xeon Scalable processors	Core count: Up to 56 core processor
	UPI speed: Up to 4 links per CPU, speed: 12.8 GT/s, 14.4 GT/s, 16 GT/s
	Maximum number of PCIe lanes per CPU: Integrated 80 PCIe 5.0 lanes @ 32GT/s PCIe Gen5
	Maximum TDP: 350 W
4800 MT/s DDR5 Memory	Max 16 DIMM per processor and 32 DIMMs per system
	Supports DDR5 ECC RDIMM
Flex I/O	2 x 1GbE LOM card (optional) with BCM5720 LAN controller
	Rear I/O with: <ul style="list-style-type: none"> <li>• 1x Dedicated iDRAC Ethernet port</li> <li>• 1 x USB 3.0</li> <li>• 1 x USB 2.0</li> <li>• 1 x VGA port (optional for Direct Liquid Cooling configuration)</li> </ul>
	Serial Port Option with STD RIO board

**Table 1. New technologies (continued)**

<b>Technology</b>	<b>Detailed Description</b>
	Optional OCP Mezz 3.0 (supported by x8 PCIe lanes) Front I/O with: <ul style="list-style-type: none"><li>● 1 x USB 2.0</li><li>● 1x iDRAC Direct (Micro-AB USB) port</li><li>● 1 x VGA port</li></ul>
CPLD 1-wire	Support payload data of Front PERC, Riser, BP and Rear IO to BOSS-N1 and iDRAC
Dedicated PERC	Front Storage module PERC with Front PERC11 and PERC12
Power Supplies	86 mm dimension PSU
	Platinum 2400 W AC/HVDC
	Titanium 2800 W AC/HVDC


## System features and generational comparison

The following table shows the comparison between the PowerEdge R760xa with the PowerEdge R750xa.

**Table 2. Features comparison**

Features	PowerEdge R760xa	PowerEdge R750xa
Processors	Two 4 <sup>th</sup> Gen Intel® Xeon® Scalable Processors	Two 3 <sup>rd</sup> Generation Intel Xeon Scalable processors
CPU interconnect	Intel Ultra Path Interconnect (UPI)	Intel Ultra Path Interconnect (UPI)
Memory	<ul style="list-style-type: none"> <li>32 x DDR5 RDIMM</li> <li>Up to 4800 MT/s (1 DPC) / 4400 MT/s (2 DPC)</li> </ul>	<ul style="list-style-type: none"> <li>32 x DDR4 RDIMM, LRDIMM</li> <li>16 x PMem ( Intel Optane Persistent Memory 200 Series)</li> </ul>
Storage Controllers	<ul style="list-style-type: none"> <li>PERC 11: H755, H755N, H355</li> <li>PERC 12: H965i, H965e</li> <li>HBA 11: HBA355i, HBA355e</li> <li>BOSS-N1</li> <li>Software RAID: S160</li> </ul>	Adapters: HBA355I, HBA355E, H345, H355, H745, H755, H755N, H840  BOSS S2  BOSS S1  Software RAID: S150
Drive Bays	Front bays: <ul style="list-style-type: none"> <li>Up to 8 x 2.5-inch NVMe or SAS/SATA SSD max 122.88 TB</li> <li>Up to 6 x E3.S Gen5 NVMe max 46.08 TB</li> </ul>	Front bays: <ul style="list-style-type: none"> <li>Up to 8 x 2.5 inches SAS/SATA SSD or NVMe</li> </ul>
Power Supplies	<ul style="list-style-type: none"> <li>AC (Platinum): 2400 W</li> <li>AC (Titanium): 2800 W</li> <li>DC (Mixed Mode): 2400 W, 2800 W</li> </ul>	<ul style="list-style-type: none"> <li>AC (Platinum): 1400 W, 2400 W</li> <li>AC (Titanium): 1800 W, 2800 W</li> <li>DC (Mixed Mode): 1400 W, 1800 W, 2400 W, 2800 W</li> </ul>
Cooling Options	<ul style="list-style-type: none"> <li>Air Cooling</li> <li>Optional Direct Liquid Cooling (DLC) for CPUs only</li> </ul> <p><b>NOTE:</b> DLC is a rack solution and requires rack manifolds and a cooling distribution unit (CDU) to operate.</p>	<ul style="list-style-type: none"> <li>Air Cooling</li> </ul> <p><b>NOTE:</b> DLC is a rack solution and requires rack manifolds and a cooling distribution unit (CDU) to operate.</p>
Fans	Standard (STD) fan  Up to six hot swap fans	Up to eight hot plug fans
Dimension	Height: 86.8 mm (3.41 inches) Width: 482 mm (18.97 inches) Depth: 946.73 mm (37.27 inches) with bezel 932.89 mm (36.73 inches) without bezel	Height: 86.8 mm (3.41 inches) Width: 482.0 mm (18.97 inches) Depth: 908.64 mm (35.77 inches) with bezel 894.8 mm (35.22 inches) without bezel
Form Factor	2U rack server	2U rack server
Embedded Management	<ul style="list-style-type: none"> <li>iDRAC9</li> </ul>	<ul style="list-style-type: none"> <li>iDRAC9</li> </ul>

**Table 2. Features comparison (continued)**

Features	PowerEdge R760xa	PowerEdge R750xa								
	<ul style="list-style-type: none"> <li>• iDRAC Direct</li> <li>• iDRAC RESTful with Redfish</li> <li>• iDRAC Service Manual</li> <li>• Quick Sync 2 wireless module</li> </ul>	<ul style="list-style-type: none"> <li>• iDRAC Direct</li> <li>• iDRAC Service Module</li> <li>• Quick Sync 2 wireless module</li> </ul>								
Bezel	Optional LCD bezel or security bezel	Optional LCD bezel or security bezel								
OpenManage Software	<ul style="list-style-type: none"> <li>• CloudIQ for PowerEdge plug in</li> <li>• OpenManage Enterprise</li> <li>• OpenManage Enterprise Integration for VMware vCenter</li> <li>• OpenManage Integration for Microsoft System Center</li> <li>• OpenManage Integration with Windows Admin Center</li> <li>• OpenManage Power Manager plugin</li> <li>• OpenManage Service plugin</li> <li>• OpenManage Update Manager plugin</li> </ul>	<ul style="list-style-type: none"> <li>• OpenManage Enterprise</li> <li>• OpenManage Power Center</li> </ul>								
Mobility	OpenManage Mobile	OpenManage Mobile								
Integrations and Connections	OpenManage Integrations <ul style="list-style-type: none"> <li>• BMC TrueSight</li> <li>• Microsoft System Center</li> <li>• OpenManage Integration with ServiceNow</li> <li>• Red Hat Ansible Modules</li> <li>• Terraform Providers</li> <li>• VMware vCenter and vRealize Operations Manager</li> </ul>	<table border="1"> <tr> <td>OpenManage Integrations</td> <td> <ul style="list-style-type: none"> <li>• IBM Tivoli Netcool/OMNibus</li> <li>• IBM Tivoli Network Manager IP Edition</li> <li>• Micro Focus Operations Manager</li> <li>• Nagios Core</li> <li>• Nagios XI</li> </ul> </td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>• BMC TrueSight</li> <li>• Microsoft System Center</li> <li>• Red Hat Ansible Modules</li> <li>• VMware vCenter</li> </ul> </td> <td></td> </tr> </table>	OpenManage Integrations	<ul style="list-style-type: none"> <li>• IBM Tivoli Netcool/OMNibus</li> <li>• IBM Tivoli Network Manager IP Edition</li> <li>• Micro Focus Operations Manager</li> <li>• Nagios Core</li> <li>• Nagios XI</li> </ul>	<ul style="list-style-type: none"> <li>• BMC TrueSight</li> <li>• Microsoft System Center</li> <li>• Red Hat Ansible Modules</li> <li>• VMware vCenter</li> </ul>					
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Security	<ul style="list-style-type: none"> <li>• Cryptographically signed firmware</li> <li>• Secure Boot</li> <li>• Secure Erase</li> <li>• Silicon Root of Trust</li> <li>• System Lockdown (requires iDRAC9 Enterprise or Datacenter)</li> <li>• TPM 2.0 FIPS, CC-TCG certified, TPM 2.0 China NationZ</li> <li>• Secured Component Verification (Hardware integrity check)</li> <li>• Data at Rest Encryption (SEDs with local or external key mgmt)</li> </ul>	<ul style="list-style-type: none"> <li>• Cryptographically signed firmware</li> <li>• Secure Boot</li> <li>• Secure Erase</li> <li>• Silicon Root of Trust</li> <li>• System Lockdown (requires iDRAC9 Enterprise or Datacenter)</li> <li>• TPM 1.2/2.0 (optional)</li> </ul>								
Embedded NIC	2 x 1 GbE LOM (optional)	2 x 10 GbE								
Networking Options	OCP x8 (optional) Mezz 3.0  <b>NOTE:</b> The system allows either LOM card or an OCP card or both to be installed in the system.	-								
GPU Options	Up to 4 x double wide 350 W, or 12 x single wide 75 W accelerators	Up to 4 x double wide 300 W or 8 x single wide 150 W accelerators								
Ports	<table border="1"> <tr> <td>Front Ports</td> <td>Rear Ports</td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>• 1 x USB 2.0</li> <li>• 1 x iDRAC Direct (Micro-AB USB) port</li> <li>• 1 x VGA</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• 1 x USB 2.0</li> <li>• 1 x iDRAC Direct ethernet port</li> <li>• 1 x USB 3.0</li> </ul> </td> </tr> </table>	Front Ports	Rear Ports	<ul style="list-style-type: none"> <li>• 1 x USB 2.0</li> <li>• 1 x iDRAC Direct (Micro-AB USB) port</li> <li>• 1 x VGA</li> </ul>	<ul style="list-style-type: none"> <li>• 1 x USB 2.0</li> <li>• 1 x iDRAC Direct ethernet port</li> <li>• 1 x USB 3.0</li> </ul>	<table border="1"> <tr> <td>Front Ports</td> <td>Rear Ports</td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>• 1 x USB 2.0</li> <li>• 1 x iDRAC Direct (Micro-AB USB) port</li> <li>• 1 x VGA</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• 1 x USB 2.0</li> <li>• 1 x USB 3.0</li> </ul> </td> </tr> </table>	Front Ports	Rear Ports	<ul style="list-style-type: none"> <li>• 1 x USB 2.0</li> <li>• 1 x iDRAC Direct (Micro-AB USB) port</li> <li>• 1 x VGA</li> </ul>	<ul style="list-style-type: none"> <li>• 1 x USB 2.0</li> <li>• 1 x USB 3.0</li> </ul>
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**Table 2. Features comparison (continued)**

Features	PowerEdge R760xa	PowerEdge R750xa
	<ul style="list-style-type: none"> <li>• 1 x Serial port (optional)</li> <li>• 1 x VGA</li> </ul>	
	Internal Port (optional): 1 x USB 3.0	Internal Port (optional): 1 x USB 3.0
PCIe	Up to 4 x PCIe SW Gen5 slots (Rear)+ Up to 8 x PCIe SW Gen5 slots (Front), Or Up to 4 x PCIe DW Gen5 slots (Front)	8 x PCIe Gen 3 slots (4 x 8) 8 x Gen 3 slots (4 x 16)
Operating System and Hypervisors	<ul style="list-style-type: none"> <li>• Canonical Ubuntu Server LTS</li> <li>• Windows Server with Hyper-V</li> <li>• Red Hat Enterprise Linux</li> <li>• SUSE Linux Enterprise Server</li> <li>• VMware ESXi</li> </ul> <p>For specifications and interoperability details, see <a href="#">Dell Enterprise Operating Systems on Servers, Storage, and Networking</a> page at <a href="#">Dell.com/OSsupport</a>.</p>	<ul style="list-style-type: none"> <li>• Canonical Ubuntu Server LTS</li> <li>• Citrix Hypervisor</li> <li>• Windows Server LTSC with Hyper-V</li> <li>• Red Hat Enterprise Linux</li> <li>• SUSE Linux Enterprise Server</li> <li>• VMware ESXi</li> </ul> <p>For specifications and interoperability details, see <a href="#">Dell Enterprise Operating Systems on Servers, Storage, and Networking</a> page at <a href="#">Dell.com/OSsupport</a>.</p>

# Chassis views and features

**Topics:**

- [Chassis views](#)

# Chassis views

## Front view of the system



Figure 1. Front view of 6 x 2.5-inch NVME drives system



Figure 2. Front view of 8 x 2.5-inch NVME/SAS4 drives system



Figure 3. Front view of 6 x E3.S drives system

## Rear view of the system



Figure 4. Rear view of the system

## Inside view of the system

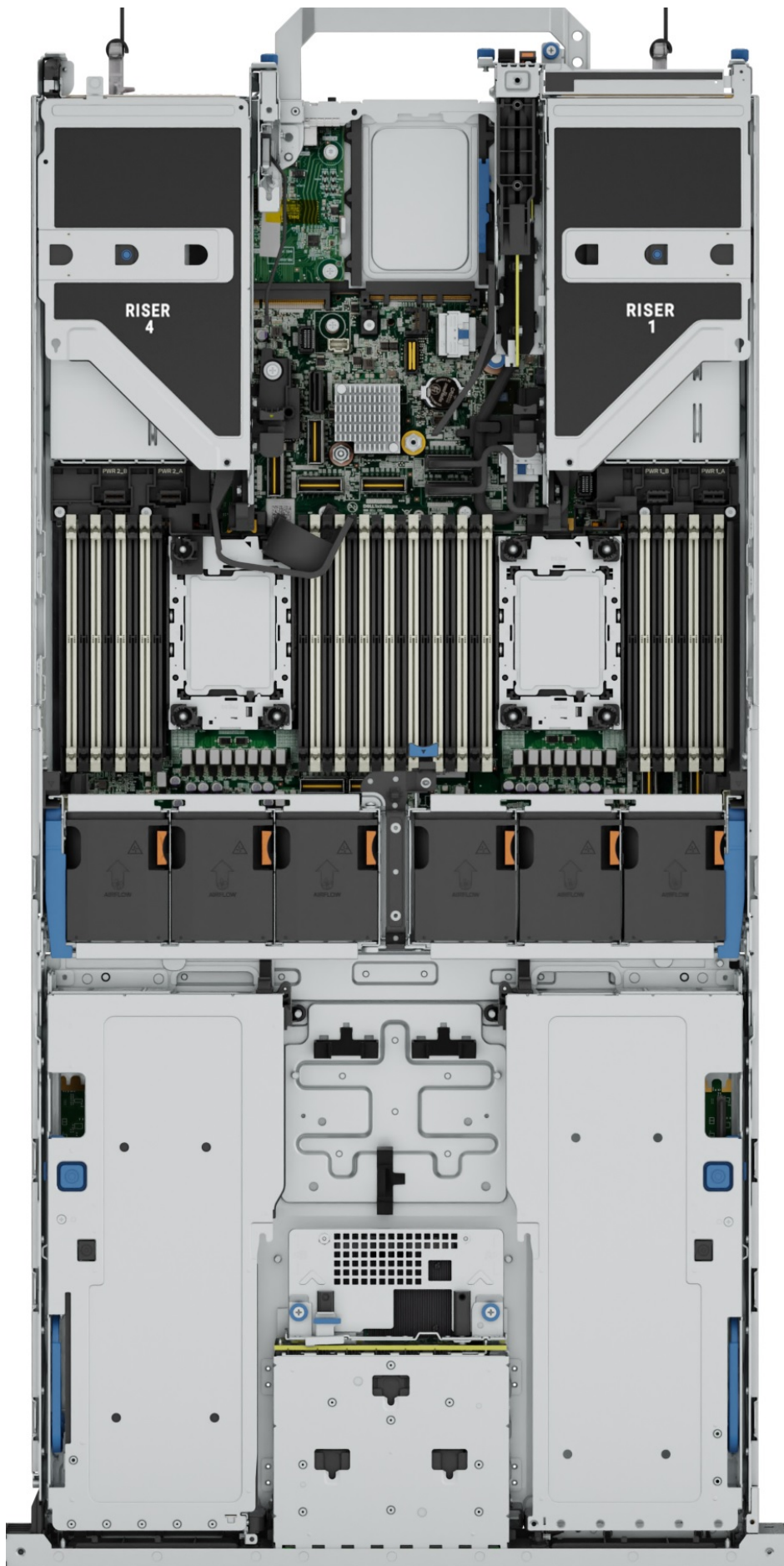


Figure 5. Inside view of the system

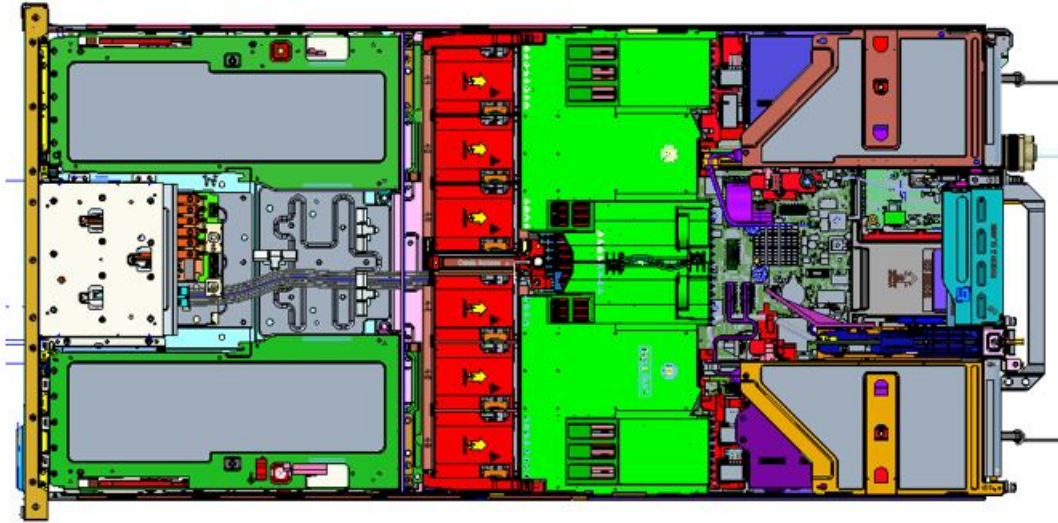


Figure 6. Inside the system 6 x E3.S

## Quick Resource Locator

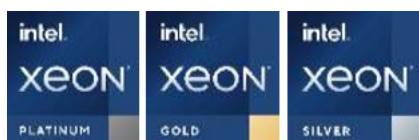
The QRL on everything (SILs, GSG, Owner's Manual except on the EST) is a generic QRL for R760xa that leads to a webpage for that product. That webpage has links for things like setup and service videos, iDRAC manual, and other things that apply to the platform. The QRL on the EST is unique and specific to that service tag and will contain the Service Tag number and the iDRAC password. The label and the QRL code within it are printed on demand at the L10 factories. This QRL links to a webpage that shows the exact configuration as built for that customer, and the specific warranty purchased. It is one click away from the same content of generic information that applies to R760xa that is available in the other QRLs.



Figure 7. Quick Resource Locator for PowerEdge R760xa system



# Processor



## Topics:

- [Processor features](#)

## Processor features

The Intel 4<sup>th</sup> Generation Xeon® Scalable Processors stack is the next generation data center processor offering with significant performance increases, integrated acceleration, and next generation memory and I/O. Sapphire Rapids accelerate customer usages with unique workload optimizations.

The following lists the features and functions that are in the upcoming 4<sup>th</sup> Generation Intel® Xeon Scalable Processor offering:

- Faster UPI with up to four Intel Ultra Path Interconnect (Intel UPI) at up to 16 GT/s, increasing multisocket bandwidth
- More, faster I/O with PCI Express 5 and up to 80 lanes (per socket)
- Enhanced Memory Performance with DDR5 support and memory speed up to 4800 MT/s in one DIMM per channel (1DPC) and 4400 MT/s in two DIMM per channel (2DPC)
- New built-in accelerators for data analytics, networking, storage, crypto, and data compression

## Supported processors

**Table 3. Supported processors**

Processor	Clock Speed (GHz)	Cache (M)	UPI (GT/s)	Cores	Threads	Turbo	Memory Speed (MT/s)	Memory Capacity	TDP
8480+	2	105	16	56	112	Turbo	4800	4 TB	350 W
8470Q	2.1	105	16	52	104	Turbo	4800	4 TB	350 W
8470	2	105	16	52	104	Turbo	4800	4 TB	350 W
8468	2.1	105	16	48	96	Turbo	4800	4 TB	350 W
8462Y+	2.8	60	16	32	64	Turbo	4800	4 TB	300 W
8460Y+	2	105	16	40	80	Turbo	4800	4 TB	300 W
8458P	2.7	83	16	44	88	Turbo	4800	4 TB	350 W
8452Y	2	68	16	36	72	Turbo	4800	4 TB	300 W
6458Q	3.1	60	16	32	64	Turbo	4800	4 TB	350 W
6448Y	2.1	60	16	32	64	Turbo	4800	4 TB	225 W
6442Y	2.6	60	16	24	48	Turbo	4800	4 TB	225 W
6438Y+	2	60	16	32	64	Turbo	4800	4 TB	205 W
6438M	2.2	60	16	32	64	Turbo	4800	4 TB	205 W

**Table 3. Supported processors (continued)**

<b>Processor</b>	<b>Clock Speed (GHz)</b>	<b>Cache (M)</b>	<b>UPI (GT/s)</b>	<b>Cores</b>	<b>Threads</b>	<b>Turbo</b>	<b>Memory Speed (MT/s)</b>	<b>Memory Capacity</b>	<b>TDP</b>
6426Y	2.5	38	16	16	32	Turbo	4800	4 TB	185 W
5420+	2	53	16	28	56	Turbo	4400	4 TB	205 W
5418Y	2	45	16	24	48	Turbo	4400	4 TB	185 W
5416S	2	30	16	16	32	Turbo	4400	4 TB	150 W
4416+	2	38	16	20	40	Turbo	4000	4 TB	165 W
4410Y	2	30	16	12	24	Turbo	4000	4 TB	150 W

# Memory subsystem

## Topics:

- Supported memory


## Supported memory

**Table 4. Memory technology comparison**

Feature	PowerEdge R760xa (DDR5)
DIMM type	RDIMM
Transfer speed	4800 MT/s (1DPC), 4400 MT/s ( 2DPC)
Voltage	1.1 V

**Table 5. Supported memory matrix**

DIMM type	Rank	Capacity	DIMM rated voltage and speed	Operating Speed	
				1 DIMM per channel (DPC)	2 DIMMs per channel (DPC)
RDIMM	1 R	16 GB	DDR5 (1.1 V), 4800 MT/s	4800 MT/s	4400 MT/s
	2 R	32 GB, 64 GB	DDR5 (1.1 V), 4800 MT/s	4800 MT/s	4400 MT/s
	4 R	128 GB	DDR5 (1.1 V), 4800 MT/s	4800 MT/s	4400 MT/s
	8 R	256 GB	DDR5 (1.1 V), 4800 MT/s	4800 MT/s	4400 MT/s

 **NOTE:** The processor may reduce the performance of the rated DIMM speed.

# Storage

## Topics:

- Storage controllers
- Supported Drives
- Internal storage configuration
- External Storage

## Storage controllers

Dell RAID controller options offer performance improvements, including the fPERC solution. fPERC provides a base RAID HW controller without consuming a PCIe slot by using a small form factor and high-density connector to the base planar.

16G PERC Controller offerings are a heavy leverage of 15G PERC family. The Value and Value Performance levels carry over to 16G from 15G. New to 16G is the Avenger-based Premium Performance tier offering. This high-end offering drives IOPs performance and enhanced SSD performance.

**Table 6. PERC Series controller offerings**

Performance Level	Controller and Description
Entry	S160
Value	PERC H355
Value Performance	PERC H755, PERC H755N
Premium Performance	H965i Avenger 1 Memory: 8GB DDR4 NV cache 72-bit memory 2133 MHz Low profile form factors Dual A15 1.2 GHz CPU X8PCIe 3.0, x8 12Gb SAS

**NOTE:** For more information on the features of the Dell PowerEdge RAID controllers (PERC), Software RAID controllers, or BOSS card, and on deploying the cards, see the storage controller documentation at [www.dell.com/storagecontrollermanuals](http://www.dell.com/storagecontrollermanuals).

## Supported Drives

The table shown below lists the internal drives supported by the R760xa. Refer to Agile for the latest SDL.

**Table 7. Supported Drives**

Form Factor	Type	Speed	Rotational Speed	Capacities
2.5 inches	SATA SSD	6 GB	SSD	480GB , 960GB, 1.92TB, 3.84TB, 7.68TB

**Table 7. Supported Drives (continued)**

Form Factor	Type	Speed	Rotational Speed	Capacities
2.5 inches	SAS SSD	12 GB	SSD	960GB, 1.92TB, 3.84TB, 7.68TB
2.5 inches	SAS SSD	24 GB	SSD	800GB, 960GB, 1.6TB, 1.92TB, 3.2TB, 3.84TB, 7.68TB, 12.8TB, 15.36TB

## Internal storage configuration

R760xa available internal storage configurations:

- 6 x 2.5-inch NVMe direct attached (S160)
- 8 x 2.5-inch NVMe RAID
- 8 x 2.5-inch SAS/SATA
- 6 x E3.S Gen5 NVMe direct attached (S160)

## External Storage

The R760xa support the external storage device types listed in the table below.

**Table 8. Support External Storage Devices**

Device Type	Description
External Tape	Supports connection to external USB tape products
NAS/IDM appliance software	Supports NAS software stack
JBOD	Supports connection to 12 Gb MD-series JBODs

# Networking

## Topics:

- [Overview](#)
- [OCP 3.0 support](#)

## Overview

PowerEdge offers a wide variety of options to get information moving to and from our servers. Industry best technologies are chosen, and systems management features are added by our partners to firmware to tie in with iDRAC. These adapters are rigorously validated for worry-free, fully supported use in Dell servers.

## OCP 3.0 support

**Table 9. OCP 3.0 feature list**

Feature	OCP 3.0
Form factor	SFF
PCIe Gen	Gen4
Max PCIe width	x8
Max no. of ports	4
Port type	BT/SFP/SFP+/SFP28
Max port speed	25 GbE
NC-SI	Yes
WoL	Yes

## Supported OCP cards

**Table 10. Supported OCP cards**

Form factor	Vendor	Port type	Port speed	Port count
OCP 3.0	Broadcom	SFP28	25 GbE	4
	Intel	SFP28	25 GbE	2
	Broadcom	SFP28	25 GbE	2
	Intel	SFP28	25 GbE	2
	Broadcom	BT	10 GbE	2
	Broadcom	BT	10 GbE	4
	Intel	BT	10 GbE	4
	Broadcom	BT	1 GbE	4

**Table 10. Supported OCP cards (continued)**

Form factor	Vendor	Port type	Port speed	Port count
	Intel	BT	1 GbE	4

## OCP NIC 3.0 vs. rack Network Daughter Card comparisons

**Table 11. OCP 3.0, 2.0, and rNDC NIC comparison**

Form Factor	Dell rNDC	OCP 2.0 (LOM Mezz)	OCP 3.0	Notes
PCIe Gen	Gen 3	Gen 3	Gen 4	Supported OCP3 are SFF (small form factor)
Max PCIe Lanes	x8	Up to x16	Up to x8	See server slot priority matrix
Shared LOM	Yes	Yes	Yes	This is iDRAC port redirect
Aux Power	Yes	Yes	Yes	Used for Shared LOM

# PCIe subsystem

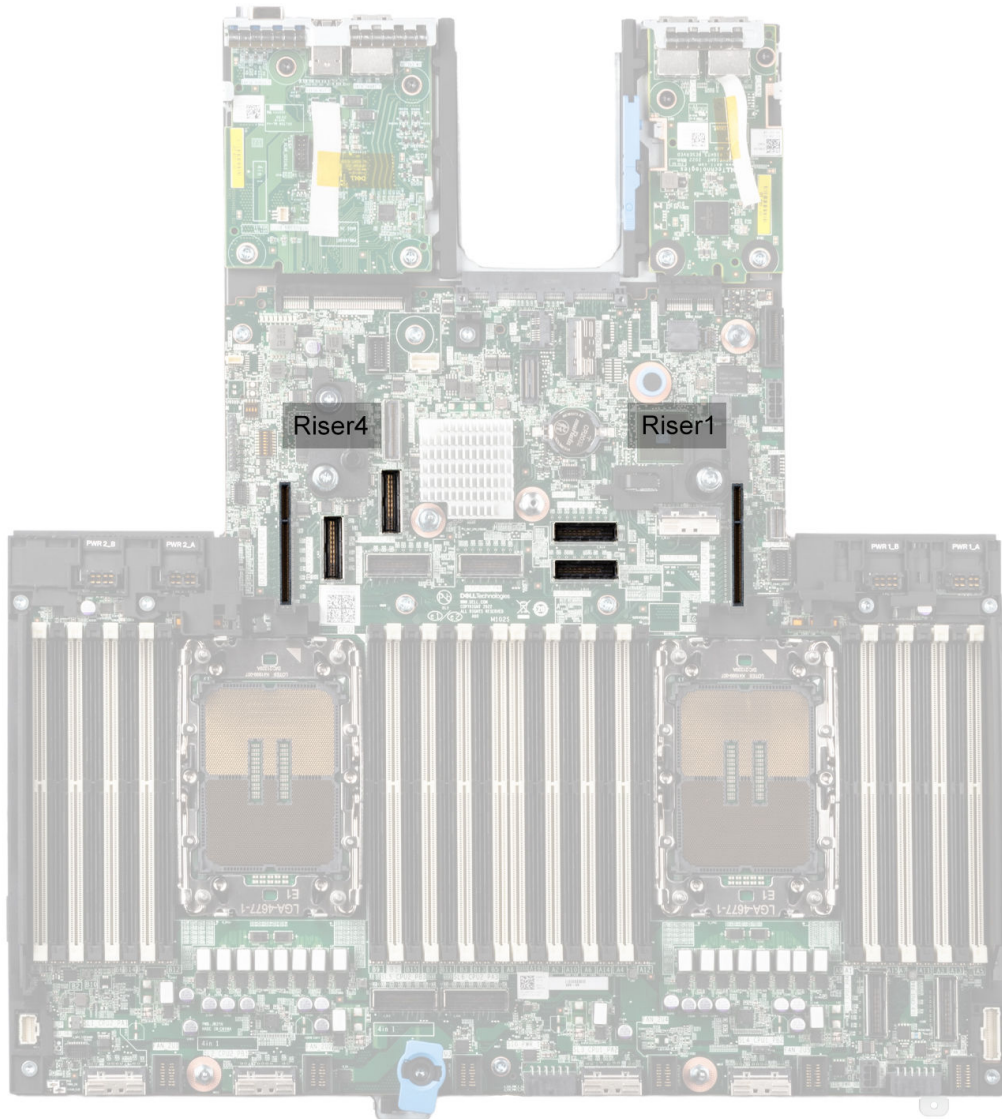
**Topics:**

- [PCIe risers](#)

## PCIe risers

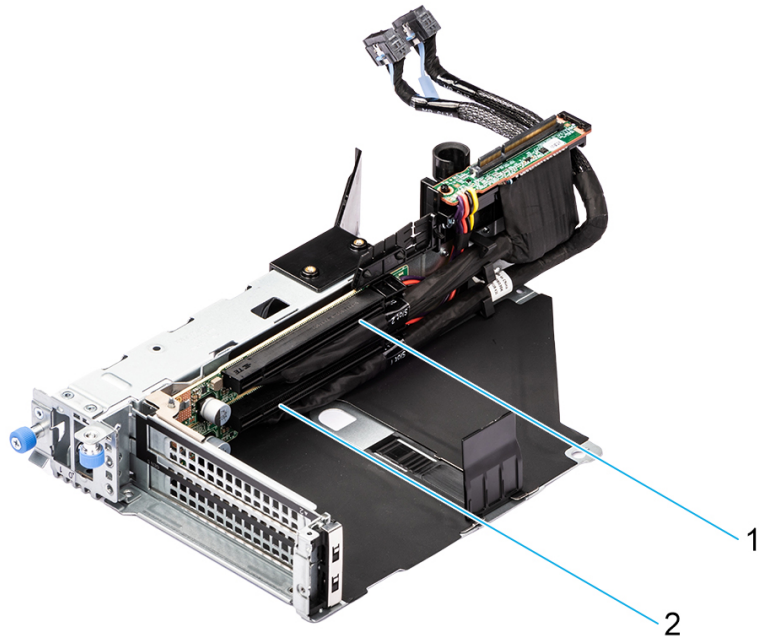
Shown below are the riser offerings for the R760xa platform.





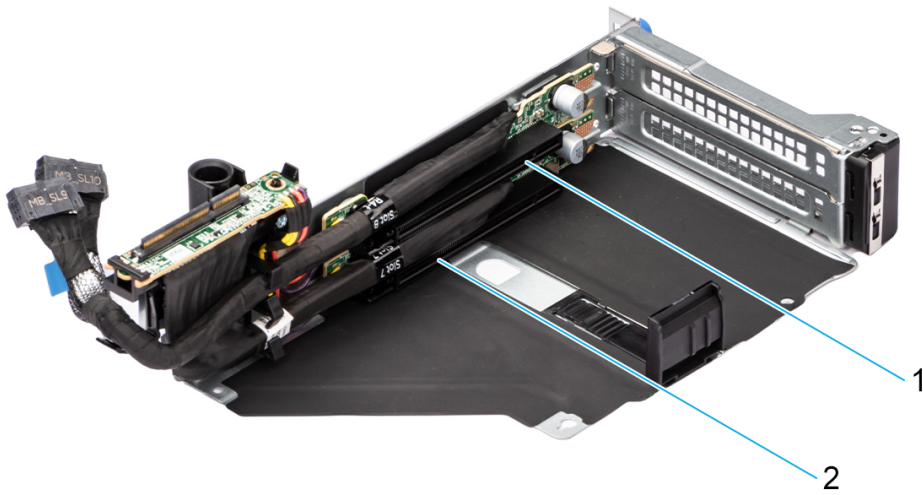
**Figure 8. Riser connector location on system board**

1. Riser 1
2. Riser 4



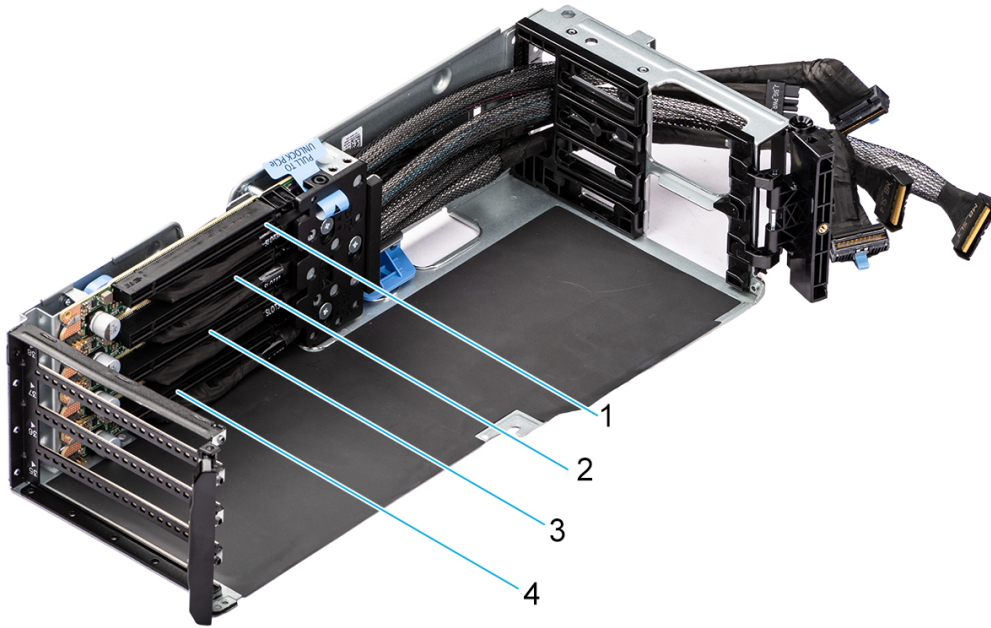
**Figure 9. Riser R1V**

- 1. Slot 2
- 2. Slot 1



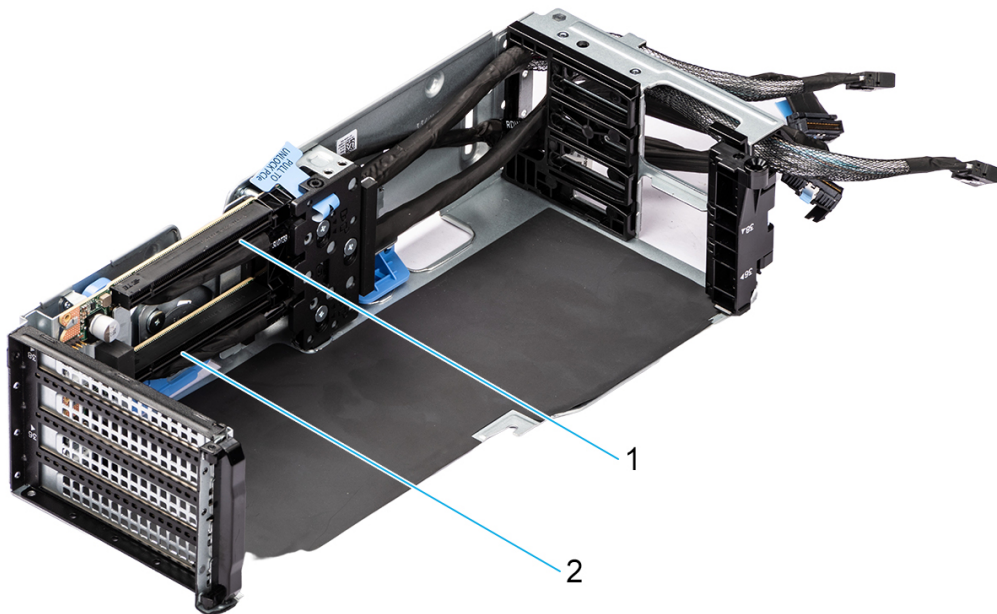
**Figure 10. Riser R4T**

- 1. Slot 8
- 2. Slot 7



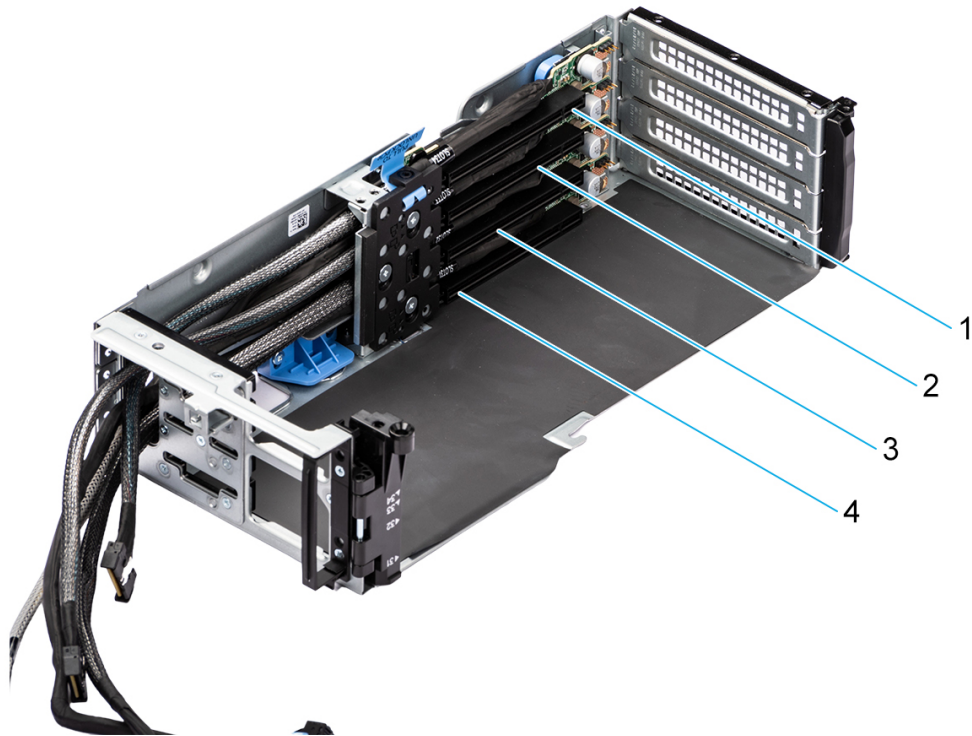
**Figure 11. GPU Right Riser RF1B**

- |            |            |
|------------|------------|
| 1. Slot 38 | 2. Slot 37 |
| 3. Slot 36 | 4. Slot 35 |



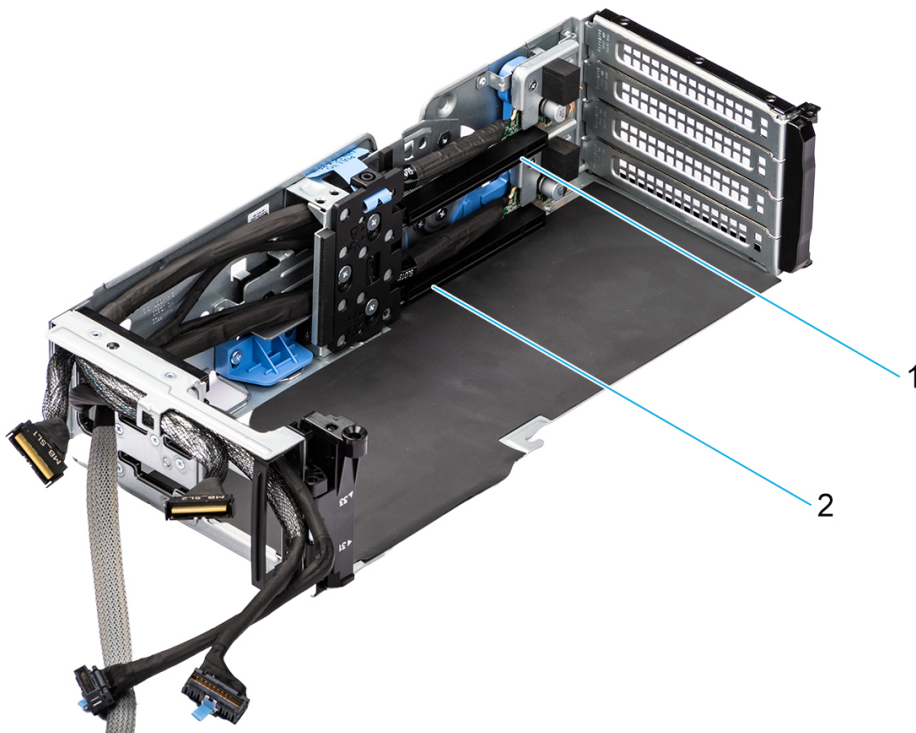
**Figure 12. GPU Right Riser RF1A**

- |            |
|------------|
| 1. Slot 38 |
| 2. Slot 36 |



**Figure 13. GPU Left Riser RF2B**

- |            |            |
|------------|------------|
| 1. Slot 34 | 2. Slot 33 |
| 3. Slot 32 | 4. Slot 31 |



**Figure 14. GPU Left Riser RF2A**

- |            |
|------------|
| 1. Slot 33 |
| 2. Slot 31 |



**Table 12. Riser configurations**

<b>Configurations</b>	<b>Expansion card risers</b>	<b>PCIe Slots</b>	<b>Controlling processor</b>	<b>Height</b>	<b>Length</b>	<b>Slot width</b>
Config 0-1. Without GPU bridge  4 x16 Rear FH + 4 x16 Front FH DW	R1V	1 and 2	Processor 1	Full height	Half length	x16 + x16
	RF1A	36 and 38	Processor 1	Full Height, double width	Full length	x16 + x16
	R4T	7 and 8	Processor 2	Full height	Half length	x16 + x16
	RF2A	31 and 33	Processor 2	Full Height, double width	Full length	x16 + x16
Config 0-1. With GPU bridge  4 x16 Rear FH + 4 x16 Front FH DW	R1V	1 and 2	Processor 1	Full height	Half length	x16 + x16
	RF1A	36 and 38	Processor 1	Full Height, double width	Full length	x16 + x16
	R4T	7 and 8	Processor 2	Full height	Half length	x16 + x16
	RF2A	31 and 33	Processor 2	Full Height, double width	Full length	x16 + x16
Config1.  4 x16 Rear FH + 8 x8 Front FH SW	R1V	1 and 2	Processor 1	Full height	Half length	x16 + x16
	R4T	7 and 8	Processor 2	Full height	Half length	x16 + x16
	RF1B	35, 36, 37 and 38	Processor 1	Full Height, single width	Full length	x8 + x8 + x8 + x8
	RF2B	31, 32, 33 and 34	Processor 2	Full Height, single width	Full length	x8 + x8 + x8 + x8

## Power, thermal, and acoustics

PowerEdge servers have an extensive collection of sensors that automatically track thermal activity, which helps to regulate temperature by reducing server noise and power consumption. The table below lists the tools and technologies Dell offers to lower power consumption and increase energy efficiency.

### Topics:

- [Power](#)
- [Thermal](#)
- [Acoustics](#)

## Power

**Table 13. Power tools and technologies**

Feature	Description
Power Supply Units(PSU) portfolio	Dell's PSU portfolio includes intelligent features such as dynamically optimizing efficiency while maintaining availability and redundancy. Find additional information in the Power supply units section.
Tools for right sizing	Enterprise Infrastructure Planning Tool (EIPT) is a tool that can help you determine the most efficient configuration possible. With Dell's EIPT, you can calculate the power consumption of your hardware, power infrastructure, and storage at a given workload. Learn more at <a href="http://www.dell.com/calc">www.dell.com/calc</a> .
Industry Compliance	Dell's servers are compliant with all relevant industry certifications and guide lines, including 80 PLUS, Climate Savers and ENERGY STAR.
Power monitoring accuracy	PSU power monitoring improvements include: <ul style="list-style-type: none"> <li>• Dell's power monitoring accuracy is currently 1%, whereas the industry standard is 5%</li> <li>• More accurate reporting of power</li> <li>• Better performance under a power cap</li> </ul>
Power capping	Use Dell's systems management to set the power cap limit for your systems to limit the output of a PSU and reduce system power consumption. Dell is the first hardware vendor to leverage Intel Node Manager for circuit-breaker fast capping.
Systems Management	iDRAC Enterprise and Datacenter provides server-level management that monitors, reports and controls power consumption at the processor, memory and system level.  Dell OpenManage Power Center delivers group power management at the rack, row, and data center level for servers, power distribution units, and uninterruptible power supplies.
Active power management	Intel Node Manager is an embedded technology that provides individual server-level power reporting and power limiting functionality. Dell offers a complete power management solution comprised of Intel Node Manager accessed through Dell iDRAC9 Datacenter and OpenManage Power Center that allows policy-based management of power and thermal at the individual server, rack, and data center level. Hot spare reduces power consumption of redundant power supplies. Thermal control off a speed optimizes the thermal settings for your environment to reduce fan consumption and lower system power consumption.  Idle power enables Dell servers to run as efficiently when idle as when at full workload.
Rack infrastructure	Dell offers some of the industry's highest-efficiency power infrastructure solutions, including:

**Table 13. Power tools and technologies (continued)**

Feature	Description
	<ul style="list-style-type: none"> <li>Power distribution units (PDUs)</li> <li>Uninterruptible power supplies (UPSs)</li> <li>Energy Smart containment rack enclosures</li> </ul> Find additional information at: <a href="https://www.delltechnologies.com/en-us/servers/power-and-cooling.htm">https://www.delltechnologies.com/en-us/servers/power-and-cooling.htm</a> .

## Power Supply Units

Energy Smart power supplies have intelligent features, such as the ability to dynamically optimize efficiency while maintaining availability and redundancy. Also featured are enhanced power-consumption reduction technologies, such as high-efficiency power conversion and advanced thermal-management techniques, and embedded power-management features, including high-accuracy power monitoring. The table below shows the power supply unit options that are available for the R760xa.

**Table 14. Power Supply Unit Options**

Wattage	Frequency	Voltage/Current	Class	Heat dissipation
2400 W mixed mode	50/60 Hz	100–240 Vac/ 16—13.5 A	Platinum	9000 BTU/hr
	N/A	240 Vdc/11.2 A	N/A	9000 BTU/hr
2800 W mixed mode	50/60 Hz	200–240 Vac/15.6 A	Titanium	10,500 BTU/hr
	N/A	240 Vdc/13.6 A	N/A	10,500 BTU/hr

**NOTE:** If a system with AC 2400 W PSUs operates at low line 100-120 Vac, and then the power rating per PSU is degraded to 1400 W.

**Table 15. PSU power cords**

Form factor	Output	Power cord
Redundant 86 mm	2400 W AC	C19
	2800 W AC	C21



**Figure 15. PSU power cords**

**NOTE:** C19 power cord combined with C20 to C21 jumper power cord can be used to adapt 2800 W PSU.

## Thermal

PowerEdge servers have an extensive collection of sensors that automatically track thermal activity, which helps regulate temperature thereby reducing server noise and power consumption.

## Thermal design

Thermal management of the platform helps deliver high performance with the right amount of cooling to components, while maintaining the lowest fan speeds possible. This is done across a wide range of ambient temperatures from 10°C to 35°C (50°F to 95°F) and to extended ambient temperature ranges.

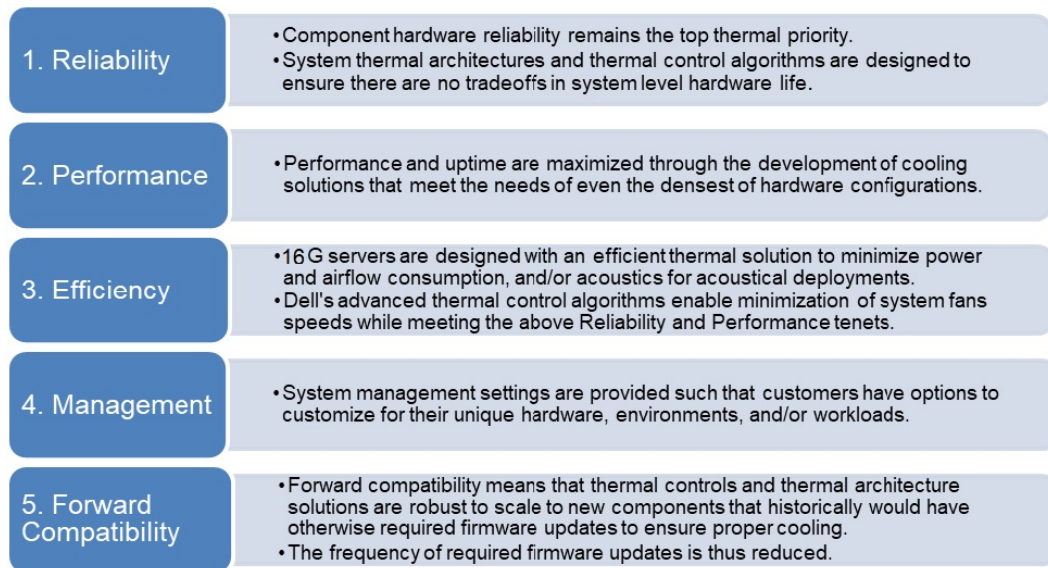


Figure 16. Thermal design characteristics

The thermal design of the PowerEdge R760xa reflects the following:

- Optimized thermal design: The system layout is architected for optimum thermal design.
- System component placement and layout are designed to provide maximum airflow coverage to critical components with minimum expense of fan power.
- Comprehensive thermal management: The thermal control system regulates the fan speed based on several different responses from all system-component temperature sensors, and inventory for system configurations. Temperature monitoring includes components such as processors, DIMMs, chipset, the inlet air ambient, hard disk drives, and OCP.
- Open and closed loop thermal fan speed control: Open loop thermal control uses system configuration to determine fan speed based on inlet air ambient temperature. Closed loop thermal control method uses feedback temperatures to dynamically determine proper fan speeds.
- User-configurable settings: With the understanding and realization that every customer has unique set of circumstances or expectations from the system, in this generation of servers, we have introduced limited user-configurable settings residing in the iDRAC BIOS setup screen. For more information, see the Dell PowerEdge R760xa Installation and Service Manual at [www.dell.com/poweredgemanuals](http://www.dell.com/poweredgemanuals) and “Advanced Thermal Control: Optimizing across Environments and Power Goals” on Dell.com.
- Cooling redundancy: The R760xa allows N+1 fan redundancy, allowing continuous operation with one fan failure in the system.
- Environmental Specifications: The optimized thermal management makes the R760xa reliable under a wide range of operating environments.



# Acoustics

## Acoustical configurations of R760xa

Dell PowerEdge R760xa is a rack server appropriate for attended data center environment. However, lower acoustical output is attainable with proper hardware or software configurations.

**Table 16. Configurations tested for acoustical experience**

Configuration	Quietest Configuration	Configuration A (HPC, AI Training, & Analytics)
CPU TDP	165 W	225 W
CPU Quantity	2	2
RDIMM Memory	16 Gb DDR5	256 Gb DDR5
Memory Quantity	2	32
Backplane Type	8x2.5 NVMe BP	8x2.5 NVMe BP
Flash Drives	PCIe SSD 1.92 TB	PCIe SSD 1.92 TB
Flash Quantity	6	6
PSU Type	2400 W	2800 W
PSU Quantity	2	2
PCI 1	x	x
PCI 2	2-port 10 Gb	1-port 200 Gb
PCI 7	x	x
PCI 8	x	1-port 200 Gb
PCI 31	Nvidia A30 165 W	Nvidia A100 300 W
PCI 33	x	Nvidia A100 300 W
PCI 36	x	Nvidia A100 300 W
PCI 38	x	Nvidia A100 300 W

**Table 17. Acoustical experience of R760xa configurations**

Configuration	Quietest Configuration	Configuration A (HPC, AI Training, & Analytics)
Acoustical Performance: Idle/ Operating @ 25°C Ambient		
L <sub>WA,m</sub> (B)	Idle <sup>(4)</sup> / Operating <sup>(5)</sup>	7.3
	Customer usage operating <sup>(6)</sup>	7.5
K <sub>v</sub> (B)	Idle <sup>(4)</sup> / Operating <sup>(5)</sup>	0.4
	Customer usage operating <sup>(6)</sup>	0.4
L <sub>pA,m</sub> (dB)	Idle <sup>(4)</sup> / Operating <sup>(5)</sup>	57
	Customer usage operating <sup>(6)</sup>	58
Prominent discrete tones <sup>(3)</sup>	Prominence ratio < 17 dB	No audible tones
Acoustical Performance: Idle @ 28°C Ambient		

**Table 17. Acoustical experience of R760xa configurations (continued)**

Configuration	Quietest Configuration	Configuration A (HPC, AI Training, & Analytics)
$L_{wA,m}^{(1)}$ (B)	7.8	7.6
$K_v$ (B)	0.4	0.4
$L_{pA,m}^{(2)}$ (dB)	62	60
Acoustical Performance: Max. loading @ 35°C Ambient		
$L_{wA,m}^{(1)}$ (B)	8.5	9.0
$K_v$ (B)	0.4	0.4
$L_{pA,m}^{(2)}$ (dB)	69	74

<sup>(1)</sup> $L_{wA,m}$ : The declared mean A-weighted sound power level (L<sub>wA</sub>) is calculated per section 5.2 of ISO 9296 with data collected using the methods described in ISO 7779 (2010). Engineering data presented here may not be fully compliant with ISO 7779 declaration requirements.

<sup>(2)</sup> $L_{pA,m}$ : The declared mean A-weighted emission sound pressure level is at the bystander position per section 5.3 of ISO 9296 and measured using methods described in ISO 7779. The system is placed in a 24U rack enclosure, 25cm above a reflective floor. Engineering data presented here may not be fully compliant with ISO 7779 declaration requirements.

<sup>(3)</sup>Prominent tones: Criteria of Annex D of ECMA-74 and Prominence Ratio method of ECMA-418 are followed to determine if discrete tones are prominent and to report them, if so.

<sup>(4)</sup>Idle mode: Idle mode is the steady-state condition in which the server is energized but not operating any intended function.

<sup>(5)</sup>Operating mode: Operating mode is represented by the maximum of the steady state acoustical output at 50% of CPU TDP or active storage drives for the respective sections of Annex C of ECMA-74.

<sup>(6)</sup> Customer Usage Operating mode: The operating mode is represented by the maximum of the steady state acoustical output at 100% GPU, 20% CPU Load, 20% IOPs load as the components showed in the above configurations.

## PowerEdge acoustical specifications

For more information about acoustical specifications, see ENG0019663. (See the category definitions.)

Dell typically categorizes servers in five categories of acoustically acceptable usage:

- Category 1: Table-top in Office Environment
- Category 2: Floor-standing in Office Environment
- Category 3: General Use Space
- Category 4: Attended Data Center
- Category 5: Unattended Data Center

### Category 1: Floor-standing in Office Environment

When Dell determines that a specific Enterprise product is to be used on a table-top in office environment, for example, on a desk around a seated user’s head height, and then the acoustical specification of the following table applies. Small, light-weight towers are examples of these types of products.

**Table 18. Dell Enterprise Category 1, “Table-top in Office Environment” acoustical specification category.**

Measurement Position re AC0158	Metric, re AC0159	Test Modes, re AC0159 (note must be in steady state, see AC0159, except where noted below)			
		Standby in 23±2° C Ambient	Idle in 23±2° C Ambient	Operating in 23±2° C Ambient – if not otherwise specified in the program’s configuration document, then processor and hard drive operating modes are required	Simulate (that is, set fan speeds representative) for Idle at 28° C & 35° C Ambient, and for 100% loading and maximum configuration, at 35° C Ambient
Sound Power	LwA-m, bels	≤ 4.2	≤ 4.7	≤ 5.0	Report
Sound Quality (both positions must meet limits): Front Binaural HEAD and Rear Microphone	Tones, Hz, dB	No prominent tones per criteria D.10.6 and D.10.8 of ECMA-74			Report tones
	Tonality, tu	≤ 0.35	≤ 0.35	≤ 0.35	Report
	Dell Modulation, %	≤ 35	≤ 35	≤ 35	Report
	Loudness, sones	Report	Report	Report	Report
	LpA-single point, dBA	Report	Report	Report	Report
Front Binaural HEAD	Transients	<ul style="list-style-type: none"> <li>● Oscillation (see AC0159), if observed, during 20-minute steady-state observation, must adhere to the following two criteria:                             <ul style="list-style-type: none"> <li>○ Max. {ΔLpA} &lt; 3.0 dB</li> <li>○ Event count &lt; 3 for “1.5 dB &lt; ΔLpA &lt; 3.0 dB”</li> <li>○ Acoustical Jump (see AC0159), during air mover speed transition from Idle to Operating Mode must be ≤ 15 dB.</li> </ul> </li> <li>● Startup behavior                             <ul style="list-style-type: none"> <li>○ Report Startup behavior re. AC0159</li> <li>○ Startup must proceed smoothly, that is, no sudden or large jumps, and fan speed during startup must not exceed 50% of its maximum</li> </ul> </li> <li>● Transient inputs: Report time-history sound pressure levels re AC0159 “Train of Step Functions on Processor”</li> </ul>			N/A
Any	Other	<p>No rattles, squeaks, or unexpected noises</p> <p>Sound should be “even” around the EUT (one side should not be dramatically louder than another)</p> <p>Unless otherwise specified, the “default” thermal-related settings shall be selected for BIOS and iDRAC.</p> <p>Specific operating conditions will be defined in “Configurations &amp; Configuration Dependencies” for each platform.</p>			
Sound Pressure	LpA-reported, dBA, re AC0158 and program configuration document	Report for all mics	Report for all mics	Report for all mics	Report for all mics

## Category 2: Floor-standing in Office Environment

When Dell determines that a specific Enterprise product is to be used primarily when it is sitting on the floor, that is, next to a user's feet, then the acoustical specification in the table below applies. Noise from the product should not annoy or otherwise interfere with the user's thoughts or speech, for example, on the telephone.

**Table 19. Dell Enterprise Category 2, "Floor-standing in Office Environment" acoustical specification category**

Measurement Position re AC0158	Metric, re AC0159	Test Modes, re AC0159 (note must be in steady state, see AC0159, except where noted below)			
		Standby in 23±2° C Ambient	Idle in 23±2° C Ambient	Operating in 23±2° C Ambient – if not otherwise specified in the program's configuration document, then processor and hard drive operating modes are required	Simulate (that is, set fan speeds representative) for Idle at 28° C & 35° C Ambient, and for 100% loading and maximum configuration, at 35° C Ambient
Sound Power	LwA-m, bels	≤ 4.9	≤ 5.1	≤ 5.4	Report
Sound Quality (both positions must meet limits): Front Binaural HEAD and Rear Microphone	Tones, Hz, dB	No prominent tones per criteria D.10.6 and D.10.8 of ECMA-74			Report tones
	Tonality, tu	≤ 0.35	≤ 0.35	≤ 0.35	Report
	Dell Modulation, %	≤ 35	≤ 35	≤ 35	Report
	Loudness, sones	Report	Report	Report	Report
	LpA-single point, dBA	Report	Report	Report	Report
Front Binaural HEAD	Transients	<ul style="list-style-type: none"> <li>● Oscillation (see AC0159), if observed, during 20-minute steady-state observation, must adhere to the following two criteria:                             <ul style="list-style-type: none"> <li>○ Max. {ΔLpA} &lt; 3.0 dB</li> <li>○ Event count &lt; 3 for "1.5 dB &lt; ΔLpA &lt; 3.0 dB"</li> </ul> </li> <li>● Acoustical Jump (see AC0159), during air mover speed transition from Idle to Operating Mode must be ≤ 15 dB.</li> <li>● Startup behavior                             <ul style="list-style-type: none"> <li>○ Report Startup behavior re. AC0159</li> <li>○ Startup must proceed smoothly, that is, no sudden or large jumps, and fan speed during startup must not exceed 50% of its maximum</li> </ul> </li> <li>● Transient inputs: Report time-history sound pressure levels re AC0159 "Train of Step Functions on Processor"</li> </ul>			N/A
Any	Other	<ul style="list-style-type: none"> <li>● No rattles, squeaks, or unexpected noises</li> <li>● Sound should be "even" around the EUT (one side should not be dramatically louder than another)</li> <li>● Unless otherwise specified, the "default" thermal-related settings shall be selected for BIOS and iDRAC.</li> <li>● Specific operating conditions are defined in "Configurations and Configuration Dependencies" for each platform.</li> </ul>			
Sound Pressure	LpA-reported, dBA, re AC0158	Report for all mics	Report for all mics	Report for all mics	Report for all mics

**Table 19. Dell Enterprise Category 2, “Floor-standing in Office Environment” acoustical specification category (continued)**

Measurement Position re AC0158	Metric, re AC0159	Test Modes, re AC0159 (note must be in steady state, see AC0159, except where noted below)			
		Standby in 23±2° C Ambient	Idle in 23±2° C Ambient	Operating in 23±2° C Ambient – if not otherwise specified in the program’s configuration document, then processor and hard drive operating modes are required	Simulate (that is, set fan speeds representative) for Idle at 28° C & 35° C Ambient, and for 100% loading and maximum configuration, at 35° C Ambient
	and program configuration document				

### Category 3: General Use Space

When Dell determines that a specific Enterprise product is to be predominantly used in a general use space, then the acoustical specification of the table below applies. These products could be found in laboratories, schools, restaurants, open office space layouts, small ventilated closets, etc., though not in close proximity to any particular person nor in quantities greater than a few in any location. People within proximity of a few of these products should not experience any impact to speech intelligibility or annoyance from the noise of the product. A rack product sitting on a table in a common area is an example.

**Table 20. Dell Enterprise Category 3, “General Use” acoustical specification category**

Measurement Position re AC0158	Metric, re AC0159	Test Modes, re AC0159 (note must be in steady state, see AC0159, except where noted below)			
		Standby in 23±2° C Ambient	Idle in 23±2° C Ambient	Operating in 23±2° C Ambient – if not otherwise specified in the program’s configuration document, then processor and hard drive operating modes are required	Simulate (that is, set air mover speeds representative) for Idle at 28° C & 35° C Ambient and for 100% loading and maximum configuration, at 35° C Ambient
Sound Power	LwA-m, bels	≤ 5.2	≤ 5.5	≤ 5.8	Report
Sound Quality (both positions must meet limits): Front Binaural HEAD and Rear Microphone	Tones, Hz, dB	No prominent tones per criteria D.10.6 and D.10.8 of ECMA-74			Report tones
	Tonality, tu	≤ 0.35	≤ 0.35	≤ 0.35	Report
	Dell Modulation, %	≤ 40	≤ 40	≤ 40	Report
	Loudness, sones	Report	Report	Report	Report
	LpA-single point, dBA	Report	Report	Report	Report
Front Binaural HEAD	Transients	<ul style="list-style-type: none"> <li>• Oscillation (see AC0159), if observed, during 20-minute steady-state observation, must adhere to the following two criteria:                             <ul style="list-style-type: none"> <li>○ Max. {ΔLpA} &lt; 3.0 dB</li> <li>○ Event count &lt; 3 for “1.5 dB &lt; ΔLpA &lt; 3.0 dB”</li> </ul> </li> </ul>			N/A

**Table 20. Dell Enterprise Category 3, “General Use” acoustical specification category (continued)**

Measurement Position re AC0158	Metric, re AC0159	Test Modes, re AC0159 (note must be in steady state, see AC0159, except where noted below)			
		Standby in 23±2° C Ambient	Idle in 23±2° C Ambient	Operating in 23±2° C Ambient – if not otherwise specified in the program’s configuration document, then processor and hard drive operating modes are required	Simulate (that is, set air mover speeds representative) for Idle at 28° C & 35° C Ambient and for 100% loading and maximum configuration, at 35° C Ambient
		<ul style="list-style-type: none"> <li>Report Acoustical Jump (see AC0159) during air mover speed transition from Idle to Operating Mode.</li> <li>Startup behavior                             <ul style="list-style-type: none"> <li>Report Startup behavior re. AC0159</li> <li>Startup must proceed smoothly, that is, no sudden or large jumps, and air mover speed during startup must not exceed 50% of its maximum</li> </ul> </li> <li>Transient inputs: Report time-history sound pressure levels re AC0159 “Train of Step Functions on Processor”</li> </ul>			
Any	Other	<p>No rattles, squeaks, or unexpected noises</p> <p>Sound should be “even” around the EUT (one side should not be dramatically louder than another)</p> <p>Unless otherwise specified, the “default” thermal-related settings shall be selected for BIOS and iDRAC.</p> <p>Specific operating conditions will be defined in “Configurations &amp; Configuration Dependencies” for each platform.</p>			
Sound Pressure	LpA-reported, dBA, re AC0158 and program configuration document	Report for all mics	Report for all mics	Report for all mics	Report for all mics

### Category 4: Attended Data Center

When Dell determines that a specific Enterprise product is to be predominantly used in an attended data center, then the acoustical specification of the table applies. The phrase “attended data center” is used to mean a space in which many (from tens to 1000s) of Enterprise products are deployed in proximity (that is, in the same room) to personnel whose speech (perhaps with raised voices) is expected to be intelligible over the data center noise. Hearing protection or hearing monitoring programs are not expected in these areas. Examples in this category include monolithic rack products.

**Table 21. Dell Enterprise Category 4, “Attended Data Center” acoustical specification category.**

Measurement Position re AC0158	Metric, re AC0159	Test Modes, re AC0159 (note must be in steady state, see AC0159, except where noted below)				Simulate (that is, set fan speeds representative) for 100% loading and maximum configuration, at 35° C Ambient
		Standby in 23±2° C Ambient	Idle in 23±2° C Ambient	Operating in 23±2° C Ambient – if not otherwise specified in the program’s configuration document, then processor and hard drive operating modes are required	Simulate (that is, set fan speeds representative) for Idle at 28° C & 35° C Ambient	
Sound Power	LwA-m, B	Report	≤ 6.9	≤ 7.1	Report	≤ 8.2
Front Binaural HEAD	Tones, Hz, dB	Report	< 15 dB	< 15 dB	Report	< 20 dB
	Tonality, tu	Report	Report	Report	Report	Report
	Dell Modulation, %	Report	Report	Report	Report	Report
	Loudness, sones	Report	Report	Report	Report	Report
	LpA-single point, dBA	Report	Report	Report	Report	Report
	Transients	<ul style="list-style-type: none"> <li>• Oscillation (see AC0159), if observed, during 20-minute steady-state observation, must adhere to the following two criteria:                             <ul style="list-style-type: none"> <li>○ Max. {ΔLpA} &lt; 3.0 dB</li> <li>○ Event count &lt; 3 for “1.5 dB &lt; ΔLpA &lt; 3.0 dB”</li> <li>○ Acoustical Jump (see AC0159), during air mover speed transition from Idle to Operating Mode must be ≤ 15 dB.</li> <li>○ Startup behavior                                     <ul style="list-style-type: none"> <li>▪ Report Startup behavior re. AC0159</li> <li>▪ Startup must proceed smoothly, that is, no sudden or large jumps, and fan speed during startup must not exceed 50% of its maximum</li> </ul> </li> </ul> </li> </ul> <p>∞ Transient inputs: Report time-history sound pressure levels re AC0159 “Train of Step Functions on Processor”</p>				N/A
Any	Other	<p>No rattles, squeaks, or unexpected noises</p> <p>Sound should be “even” around the EUT (one side should not be dramatically louder than another)</p> <p>Unless otherwise specified, the “default” thermal-related settings shall be selected for BIOS and iDRAC.</p> <p>Specific operating conditions will be defined in “Configurations &amp; Configuration Dependencies” for each platform.</p>				
Sound Pressure	LpA-reported, dBA	Report for all mics	Report for all mics	Report for all mics	Report for all mics	Report for all mics

## Category 5: Unattended Data Center

When Dell determines that a specific Enterprise product is to be predominantly used in an unattended data center (and not blades or blade enclosures; these have their own category), then the acoustical specification in the table below applies. The phrase “unattended data center” is used to mean a space in which many (from tens to 1000s) of Enterprise products are deployed together, its own heating and cooling systems condition the space, and operators or servicers of equipment enter generally only to deploy, service, or decommission equipment. Hearing protection or hearing monitoring programs may be expected (per government or company guidelines) in these areas. Examples in this category include monolithic rack products.

**Table 22. Dell Enterprise Category 5, “Unattended Data Center” acoustical specification category**

Measurement Position re AC0158	Metric, re AC0159	Test Modes, re AC0159 (note must be in steady state, see AC0159, except where noted below)				Simulate (that is, set air mover speeds representative) for 100% loading and maximum configuration, at 35° C Ambient
		Standby in 23±2° C Ambient	Idle in 23±2° C Ambient	Operating in 23±2° C Ambient – if not otherwise specified in the program’s configuration document, then processor and hard drive operating modes are required	Simulate (that is, set air mover speeds representative) for Idle at 28° C & 35° C Ambient	
Sound Power	LwA-m, bels	Report	≤ 7.5	≤ 7.7	Report	≤ 8.7
Front Binaural HEAD	Tones, Hz, dB	Report	< 15 dB	< 15 dB	Report	< 20 dB
	Tonality, tu	Report	Report	Report	Report	Report
	Dell Modulation, %	Report	Report	Report	Report	Report
	Loudness, sones	Report	Report	Report	Report	Report
	LpA-single point, dBA	Report	Report	Report	Report	Report
Front Binaural HEAD	Transients	<ul style="list-style-type: none"> <li>● Oscillation (see AC0159), if observed, during 20-minute steady-state observation, must adhere to the following two criteria:                             <ul style="list-style-type: none"> <li>○ Max. {ΔLpA} &lt; 3.0 dB</li> <li>○ Event count &lt; 3 for “1.5 dB &lt; ΔLpA &lt; 3.0 dB”</li> </ul> </li> <li>● Report Acoustical Jump (see AC0159) during air mover speed transition from Idle to Operating Mode.</li> <li>● Startup behavior                             <ul style="list-style-type: none"> <li>○ Report Startup behavior re. AC0159</li> <li>○ Startup must proceed smoothly, that is, no sudden or large jumps, and air mover speed during startup must not exceed 50% of its maximum</li> </ul> </li> <li>● Transient inputs: Report time-history sound pressure levels re AC0159 “Train of Step Functions on Processor”</li> </ul>			N/A	
Any	Other	No rattles, squeaks, or unexpected noises				



**Table 22. Dell Enterprise Category 5, “Unattended Data Center” acoustical specification category (continued)**

Measurement Position re AC0158	Metric, re AC0159	Test Modes, re AC0159 (note must be in steady state, see AC0159, except where noted below)				Simulate (that is, set air mover speeds representative) for 100% loading and maximum configuration, at 35° C Ambient
		Standby in 23±2° C Ambient	Idle in 23±2° C Ambient	Operating in 23±2° C Ambient – if not otherwise specified in the program’s configuration document, then processor and hard drive operating modes are required	Simulate (that is, set air mover speeds representative) for Idle at 28° C & 35° C Ambient	
		<p>Sound should be “even” around the EUT (one side should not be dramatically louder than another)</p> <p>Unless otherwise specified, the “default” thermal-related settings shall be selected for BIOS and iDRAC.</p> <p>Specific operating conditions will be defined in “Configurations &amp; Configuration Dependencies” for each platform.</p>				
Sound Pressure	LpA-reported, dBA, re AC0158 and program configuration document	Report for all mics	Report for all mics	Report for all mics	Report for all mics	Report for all mics

# Rack, rails, and cable management

## Topics:

- [Rails and cable management information](#)

## Rails and cable management information

The rail offerings for the PowerEdge R760xa consist of one general type: Drop-in/ Stab-in rails (Combo Rail). The cable management offerings consist of an optional strain relief bar (SRB).

See the *Enterprise Systems Rail Sizing and Rack Compatibility Matrix* available at [https://i.dell.com/sites/csdocuments/Business\\_solutions\\_engineering-Docs\\_Documents/en/rail-rack-matrix.pdf](https://i.dell.com/sites/csdocuments/Business_solutions_engineering-Docs_Documents/en/rail-rack-matrix.pdf) for information regarding:

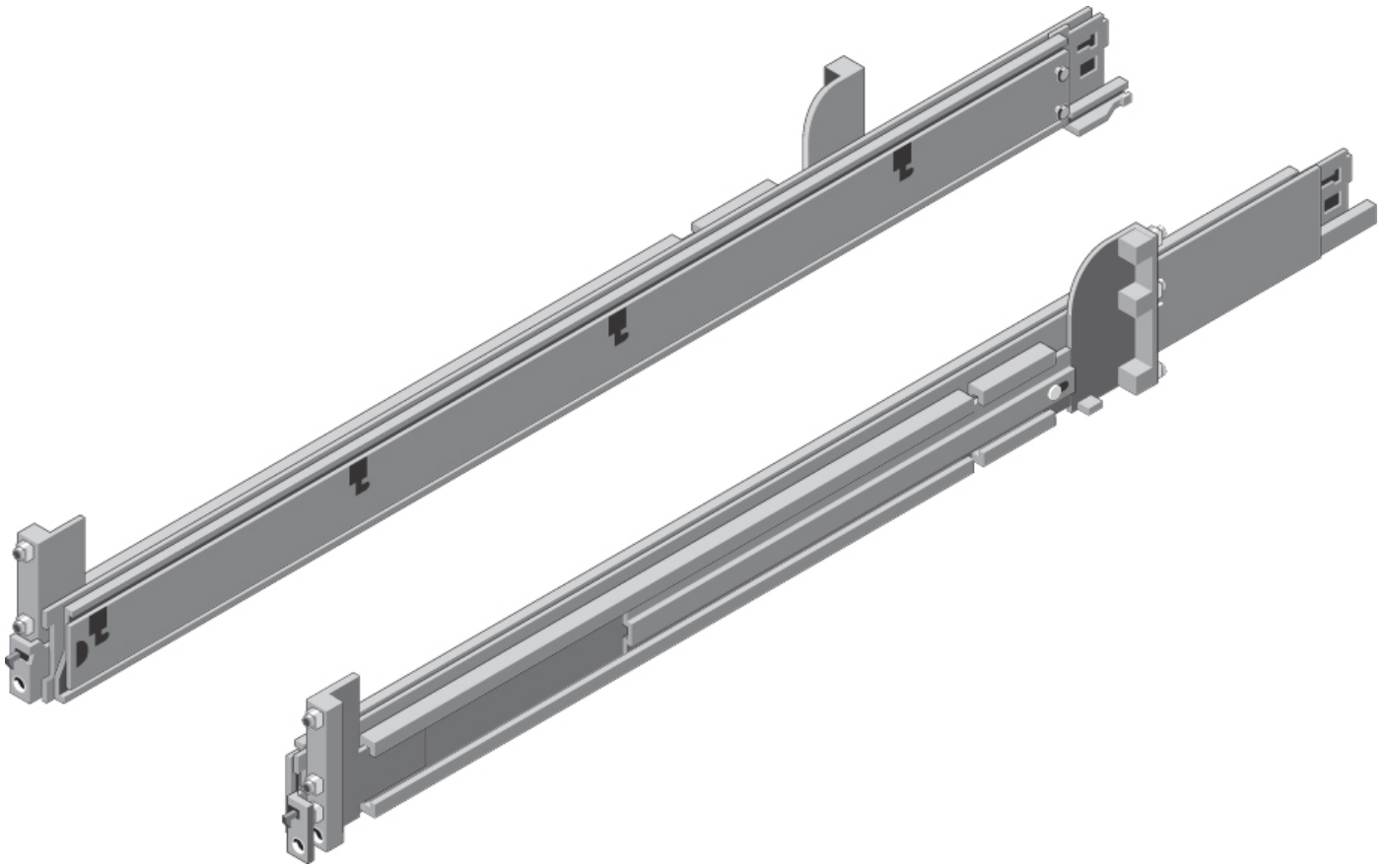
- Specific details about rail types.
- Rail adjustability ranges for various rack mounting flange types.
- Rail depth with and without cable management accessories.
- Rack types that are supported for various rack mounting flange types.

Key factors governing proper rail selection include the following:

- Spacing between the front and rear mounting flanges of the rack.
- Type and location of any equipment that is mounted in the back of the rack such as power distribution units (PDUs).
- Overall depth of the rack.

## Combo rails features summary

The sliding rails allow the system to be fully extended out of the rack for service. There is only one type of Combo rail available, Stab-in/Drop-in sliding rails. The rails are available with or without the strain relief bar (SRB).



**Figure 17. Combo rails**

**B25 Stab-in/Drop-in sliding rails for 4-post racks**

- Supports drop-in or stab-in installation of the chassis to the rails.
- Support for tool-less installation in 19" EIA-310-E compliant square, unthreaded round hole racks including all generations of the Dell racks. Also supports tool-less installation in threaded round hole 4-post racks.
- Support for tool-less installation in Dell Titan or Titan-D racks.
- Support full extension of the system out of the rack to allow serviceability of key internal components.
- Support for optional strain relief bar (SRB).

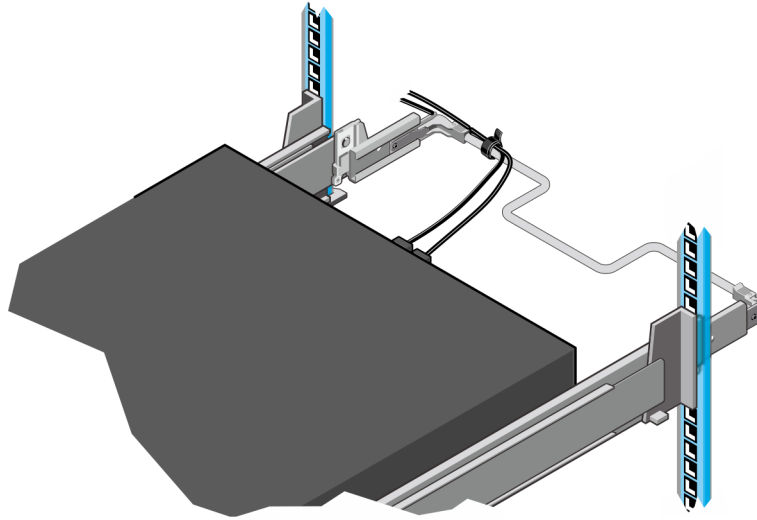
Scan the QRL code for the documentation and trouble-shooting information regarding the installation procedures for Drop-in/Stab-in rail types.



**Figure 18. Quick resource locator for combo rails**

## Strain Relief Bar (SRB)

The optional strain relief bar (SRB) for the PowerEdge R760xa organizes and supports cable connections at the rear end of the server to avoid damage from bending.



**Figure 19. Strain relief bar**

- Tool-less attachment to the rails
- Two depth positions to accommodate various cable loads and rack depths
- Supports cable loads and controls stresses on server connectors
- Cables can be segregated into discrete purpose-specific bundles

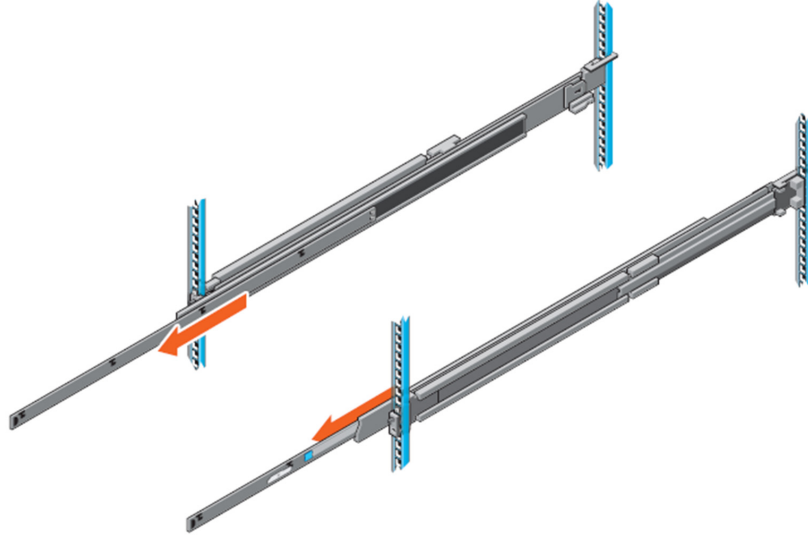
## Rack Installation

Drop-in design means that the system is installed vertically into the rails by inserting the standoffs on the sides of the system into the J-slots in the inner rail members with the rails in the fully extended position. The recommended method of installation is to first insert the rear standoffs on the system into the rear J-slots on the rails to free up a hand and then rotate the system down into the remaining J-slots while using the free hand to hold the rail against the side of the system.

Stab-in design means that the inner (chassis) rail members must first be attached to the sides of the system and then inserted into the outer (cabinet) members installed in the rack.

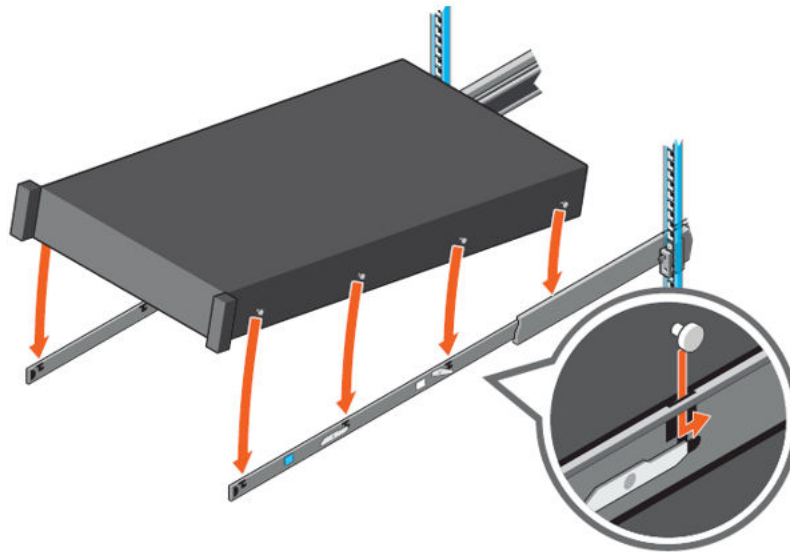
## Installing system into the rack (option A: Drop-In)

1. Pull the inner rails out of the rack until they lock into place.



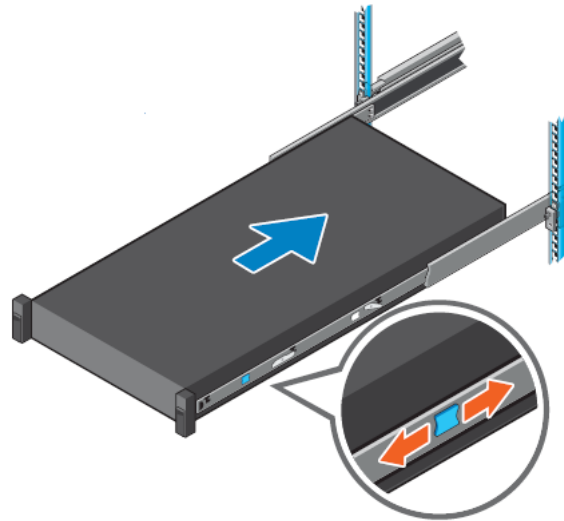
**Figure 20. Pull out inner rail**

2. Locate the rear rail standoff on each side of the system and lower them into the rear J-slots on the slide assemblies.
3. Rotate the system downward until all the rail standoffs are seated in the J-slots.



**Figure 21. Rail standoffs seated in J-slots**

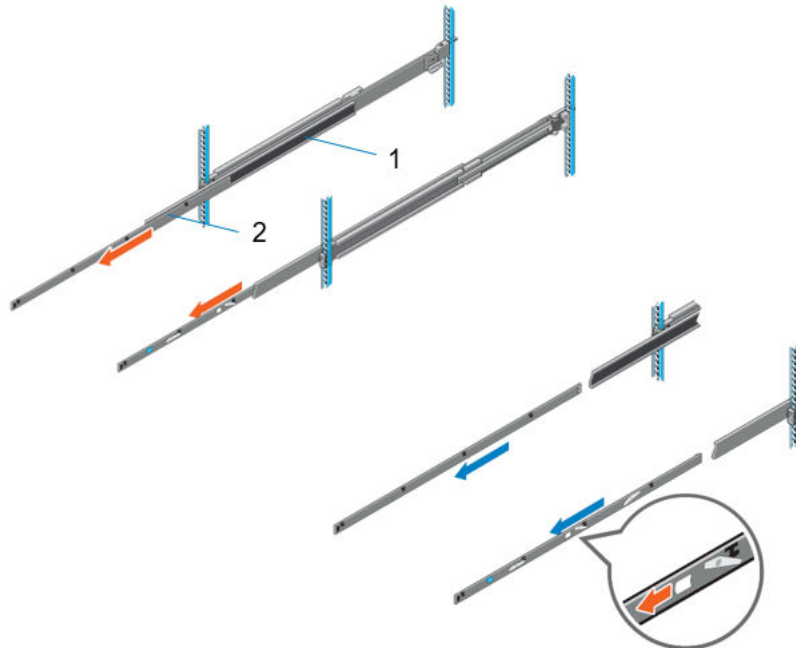
4. Push the system inward until the lock levers click into place.
5. Pull the blue side release lock tabs forward or backward on both rails and slide the system into the rack until the system is in the rack.



**Figure 22. Slide system into the rack**

## Installing the system into the rack (option B: Stab-In)

1. Pull the intermediate rails out of the rack until they lock into place.
2. Release the inner rail lock by pulling forward on the white tabs and sliding the inner rail out of the intermediate rails.

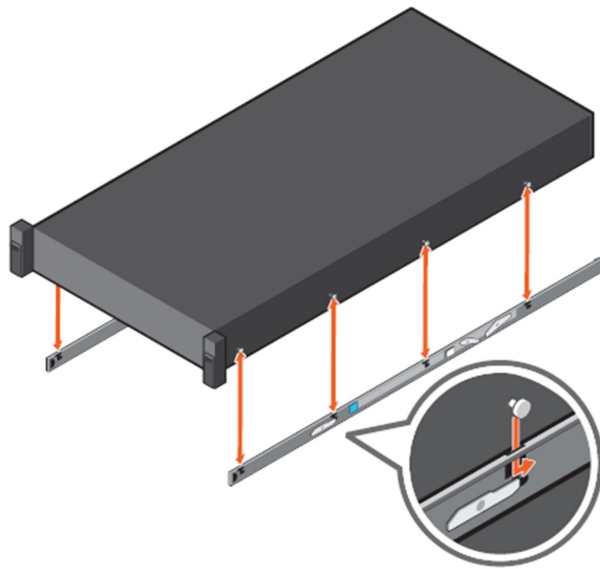


**Figure 23. Pull out the intermediate rail**

**Table 23. Rail component label**

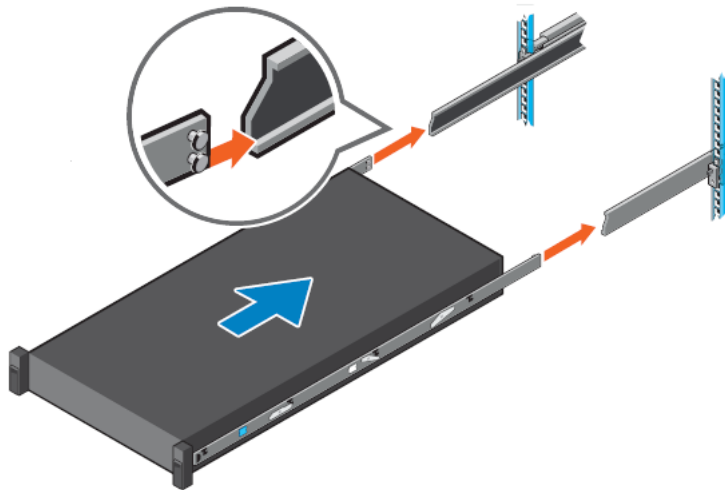
Number	Component
1	Intermediate rail
2	Inner rail

3. Attach the inner rails to the sides of the system by aligning the J-slots on the rail with the standoffs on the system and sliding forward on the system until they lock into place.



**Figure 24. Attach the inner rails to the system**

4. With the intermediate rails extended, install the system into the extended rails.



**Figure 25. Install system into the extended rails**

5. Pull blue slide release lock tabs forward or backward on both rails, and slide the system into the rack.

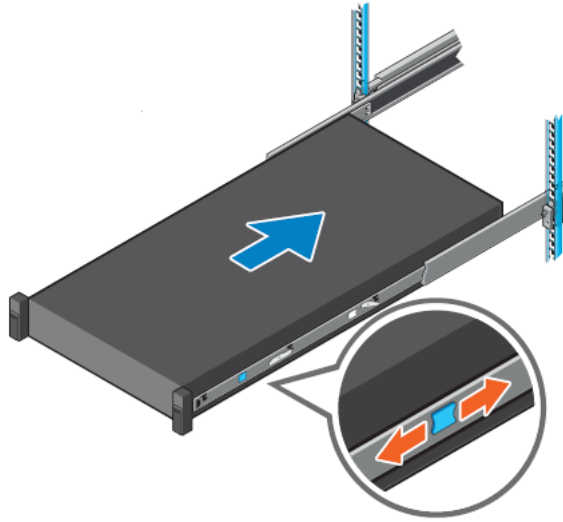


Figure 26. Slide system into the rack



# Operating Systems and Virtualization

## Topics:

- [Supported Operating Systems](#)

## Supported Operating Systems

The PowerEdge system supports the following operating systems:

- Canonical® Ubuntu® Server LTS
- Microsoft® Windows Server® with Hyper-V
- Red Hat® Enterprise Linux
- SUSE® Linux Enterprise server
- VMware® ESXi®

Links to specific OS versions and editions, certification matrices, Hardware Compatibility Lists (HCL) portal, and Hypervisor support are available at [Dell Enterprise Operating Systems](#).

# Dell OpenManage Systems Management

Dell delivers management solutions that help IT administrators effectively deploy, update, monitor, and manage IT assets. OpenManage solutions and tools enable you to quickly respond to problems by helping them to manage Dell servers efficiently; in physical, virtual, local, and remote environments; all without the need to install an agent in the operating system.

The OpenManage portfolio includes:

- Innovative embedded management tools - integrated Dell Remote Access Controller (iDRAC)
- Consoles - OpenManage Enterprise
- Extensible with plug-ins - OpenManage Power Manager
- Update tools - Repository Manager

Dell has developed comprehensive systems management solutions that are based on open standards and has integrated with management consoles from partners such as Microsoft and VMware, allowing advanced management of Dell servers. Dell management capabilities extend to offerings from the industry's top systems management vendors and frameworks such as Ansible, Splunk, and ServiceNow. OpenManage tools automate the full span of server life cycle management activities along with powerful RESTful APIs to script or integrate with your choice of frameworks.

For more information about the entire OpenManage portfolio, see:

- The latest [Dell Systems Management Overview Guide](#).

## Topics:

- [Integrated Dell Remote Access Controller \(iDRAC\)](#)
- [Systems Management software support matrix](#)

## Integrated Dell Remote Access Controller (iDRAC)

iDRAC9 delivers advanced, agent-free, local and remote server administration. Embedded in every PowerEdge server, iDRAC9 provides a secure means to automate a multitude of common management tasks. Because iDRAC is embedded within every PowerEdge server, there is no additional software to install; just plug in power and network cables, and iDRAC is ready to go. Even before installing an operating system (operating system) or hypervisor, IT administrators have a complete set of server management features at their fingertips.

With iDRAC9 in-place across the Dell PowerEdge portfolio, the same IT administration techniques and tools can be applied throughout. This consistent management platform allows easy scaling of PowerEdge servers as an organization's infrastructure grows. Customers can use the iDRAC RESTful API for the latest in scalable administration methods of PowerEdge servers. With this API, iDRAC enables support for the Redfish standard and enhances it with Dell extensions to optimize at-scale management of PowerEdge servers. By having iDRAC at the core, the entire OpenManage portfolio of Systems Management tools allows every customer to tailor an effective, affordable solution for any size environment.

Zero Touch Provisioning (ZTP) is embedded in iDRAC. ZTP - Zero Touch Provisioning is Intelligent Automation Dell's agent-free management puts IT administrators in control. Once a PowerEdge server is connected to power and networking, that system can be monitored and fully managed, whether you're standing in front of the server or remotely over a network. In fact, with no need for software agents, an IT administrator can: · Monitor · Manage · Update · Troubleshoot and remediate Dell servers With features like zero-touch deployment and provisioning, iDRAC Group Manager, and System Lockdown, iDRAC9 is purpose-built to make server administration quick and easy. For those customers whose existing management platform utilizes in-band management, Dell does provide iDRAC Service Module, a lightweight service that can interact with both iDRAC9 and the host operating system to support legacy management platforms.

When ordered with DHCP enabled from the factory, PowerEdge servers can be automatically configured when they are initially powered up and connected to your network. This process uses profile-based configurations that ensure each server is configured per your specifications. This feature requires an iDRAC Enterprise license.

iDRAC9 offers following license tiers:

**Table 24. iDRAC9 license tiers**

License	Description
iDRAC9 Basic	<ul style="list-style-type: none"> <li>Available only on 100-500 series rack/tower</li> <li>Basic instrumentation with iDRAC web UI</li> <li>For cost conscious customers that see limited value in management</li> </ul>
iDRAC9 Express	<ul style="list-style-type: none"> <li>Default on 600+ series rack/tower, modular, and XR series</li> <li>Includes all features of Basic</li> <li>Expanded remote management and server life-cycle features</li> </ul>
iDRAC9 Enterprise	<ul style="list-style-type: none"> <li>Available as an upsell on all servers</li> <li>Includes all features of Basic and Express. Includes key features such as virtual console, AD/LDAP support, and more</li> <li>Remote presence features with advanced, Enterprise-class, management capabilities</li> </ul>
iDRAC9 Datacenter	<ul style="list-style-type: none"> <li>Available as an upsell on all servers</li> <li>Includes all features of Basic, Express, and Enterprise. Includes key features such as telemetry streaming, Thermal Manage, automated certificate management, and more</li> <li>Extended remote insight into server details, focused on high end server options, granular power, and thermal management</li> </ul>

For a full list of iDRAC features by license tier, see [Integrated Dell Remote Access Controller 9 User's Guide](#) at [Dell.com](#).

For more details on iDRAC9 including white papers and videos, see:

- [Support for Integrated Dell Remote Access Controller 9 \(iDRAC9\)](#) on the [Knowledge Base](#) page at [Dell.com](#)

## Systems Management software support matrix

**Table 25. Systems Management software support matrix**

Categories	Features	PE mainstream
Embedded Management and In-band Services	iDRAC9 (Express, Enterprise, and Datacenter licenses)	Supported
	OpenManage Mobile	Supported
	OM Server Administrator (OMSA)	Supported
	iDRAC Service Module (iSM)	Supported
	Driver Pack	Supported
Change Management	Update Tools (Repository Manager, DSU, Catalogs)	Supported
	Server Update Utility	Supported
	Lifecycle Controller Driver Pack	Supported
	Bootable ISO	Supported
Console and Plug-ins	OpenManage Enterprise	Supported
	Power Manager Plug-in	Supported
	Update Manager Plug-in	Supported
	SupportAssist Plug-in	Supported
	CloudIQ	Supported
Integrations and connections	OM Integration with VMware Vcenter/vROps	Supported
	OM Integration with Microsoft System Center (OMIMSC)	Supported
	Integrations with Microsoft System Center and Windows Admin Center (WAC)	Supported

**Table 25. Systems Management software support matrix (continued)**

<b>Categories</b>	<b>Features</b>	<b>PE mainstream</b>
	ServiceNow	Supported
	Ansible	Supported
	Third-party Connectors (Nagios, Tivoli, Microfocus)	Supported
Security	Secure Enterprise Key Management	Supported
	Secure Component Verification	Supported
Standard operating system	Red Hat Enterprise Linux, SUSE, Windows Server 2021 Ubuntu, CentOS	Supported (Tier-1)

# Appendix D: Service and support

## Topics:

- [Default support levels](#)
- [Other services and support information](#)

## Default support levels

This system offers 3 years Dell ProSupport Next Business Day (NBD), including 24x7 phone support and NBD parts and labor support.

## Default deployment levels

This system is defaulted to the Dell Basic Deployment which includes onsite hardware installation and remote software configuration. Optionally, the customer may choose to any of the factory or field deployment offers listed below.

## Other services and support information

Dell Technologies Services include a wide, customizable range of service options to simplify the assessment, design, implementation, management and maintenance of IT environments and to help transition from platform to platform.

Depending on the current business requirements and correct level of service for customers, we provide factory, onsite, remote, modular, and specialized services that fit the customer requirements and budget. We will help with a little or a lot, based on the customers choice, and provide access to our global resources.

## Dell deployment services

### [Dell ProDeploy Infrastructure Suite](#)

ProDeploy Infrastructure Suite provides a variety of deployment offerings that satisfy a customer's unique needs. It is made up of 5 offers: ProDeploy Configuration Services, ProDeploy Rack Integration Services, Basic Deployment, ProDeploy, and ProDeploy Plus.

# ProDeploy Infrastructure Suite for servers

Versatile choices for accelerated deployments

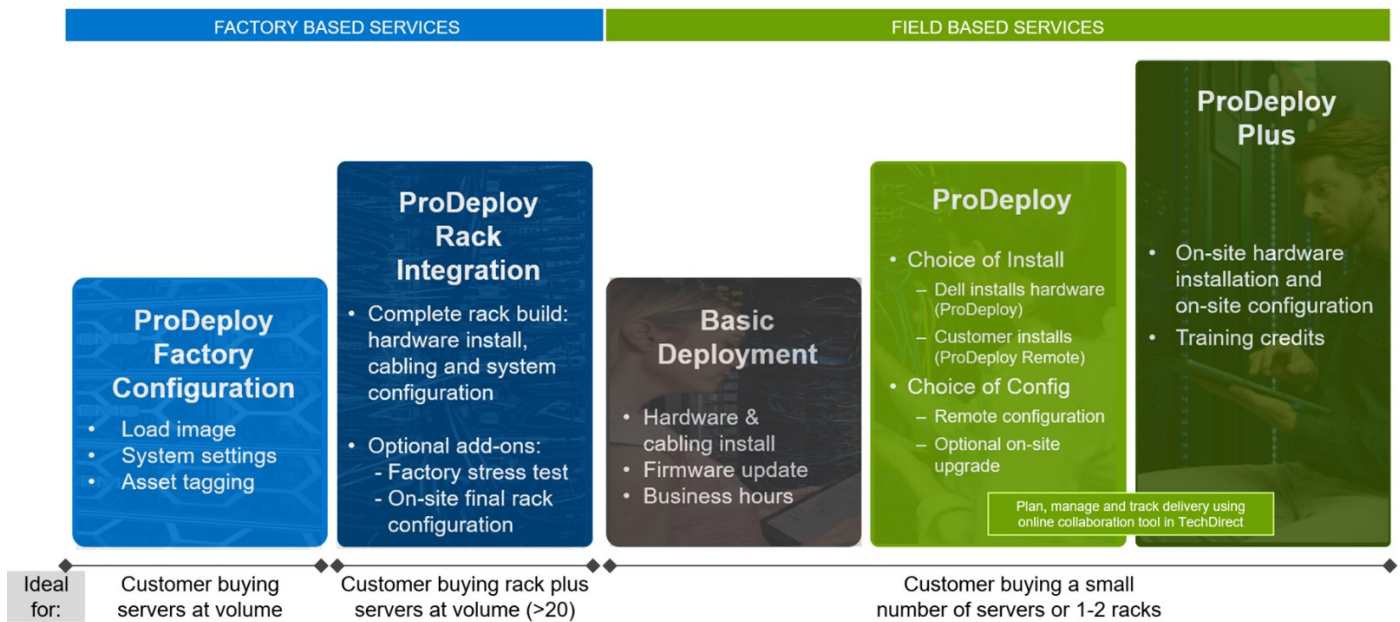


Figure 27. ProDeploy Infrastructure Suite for servers

The new Factory Services consist of two tiers of deployment that happen prior to shipping to the customer's site.

## Factory Based Services:

- ProDeploy Factory Configuration - Ideal for customers buying servers in volume and seeking pre-configuration prior to shipping such as: custom image, system settings, and asset tagging so it arrives ready to use out of the box. Furthermore, servers can be packaged and bundled to meet specific shipping and distribution requirements for each customer location to facilitate the rollout process. Upsell one of the field based services (below) if a customer needs assistance with the final server installation.
- ProDeploy Rack Integration - Ideal for customers seeking to build out fully integrated racks prior to shipping. These rack builds include hardware install, cabling, and full system configuration. You can also add-on a factory stress test and optional on-site final rack configuration to complete the rack installation.
  - STANDARD SKUs for Rack Integration is available in US only and requires:
    - 20 or more devices (R and C series servers and all Dell or non-Dell switches). Use Informational SKUs for Dell switches or 3rd party products
    - Shipping to contiguous US
  - USE CUSTOM QUOTE for Rack Integration for:
    - All countries except USA
    - Racks containing less than 20 servers
    - Any rack that includes VxRail or Storage
    - Shipping outside contiguous US
    - Shipping to multiple locations

## Field Based Services:

- Basic Deployment consists of the hardware installation, cabling and firmware update during normal standard business hours. Basic Deployment is traditionally sold to Competency Enabled Partners. Competency enabled partners often have Dell do the hardware installation while they complete the software configuration.
- ProDeploy consists of your hardware installation and configuration of the software using offshore resources. ProDeploy is great for customers who are price sensitive or who are remote from their data centers and don't require an onsite presence.
- ProDeploy Plus will give you in-region or onsite resources to complete the engagement for the customer. It also comes with additional features such as Post Deployment Configuration Assistance and Training Credits.

# ProDeploy Infrastructure Suite | Factory services

FACTORY BASED SERVICES

		ProDeployFactory Configuration	ProDeploy Rack Integration
Asset configuration	Single point of contact for project management	●	●
	RAID, BIOS and iDRAC configuration	●	●
	Firmware freeze	●	●
	Asset Tagging and Reporting	●	●
	Customer system image	●	●
Factory implementation	Site readiness review and implementation planning	-	●
	Hardware racking and cabling	-	●
	SAM engagement for ProSupport Plus entitled accounts/devices	-	●
	Deployment verification, documentation, and knowledge transfer	●	●
Delivery	White glove logistics	-	●
	Onsite final configuration	-	Onsite add-on
	Install support software and connect with Dell Technologies	-	Onsite add-on
	Basic Deployment	Optional onsite installation	-
Online oversight	Online collaborative environment for planning, managing and tracking delivery	-	●

1 ProDeployRack Integration Services are currently only available within the United States. Custom rack integration services are still available globally\*

**DELL** Technologies

Figure 28. ProDeploy Infrastructure Suite - Factory services

# ProDeploy Infrastructure Suite | Field services

		Basic Deployment	ProDeploy	ProDeploy Plus
Pre-deployment	Single point of contact for project management	●	●	In-region
	Site readiness review	-	●	●
	Implementation planning <sup>1</sup>	-	●	●
	SAM engagement for ProSupport Plus entitled devices	-	-	●
Deployment	Deployment service hours	Business hours	24x7	24x7
	Onsite hardware installation and packaging material removal <sup>2</sup> or remote guidance for hardware installation <sup>1</sup>	●	Remote guidance or onsite	Onsite
	Install and configure system software	-	Remote	Onsite
	Install support software and connect with Dell Technologies	-	●	●
	Project documentation with knowledge transfer	-	●	●
Post-deployment	Deployment verification	-	●	●
	Configuration data transfer to Dell Technologies technical support	-	●	●
	30-days of post-deployment configuration assistance	-	-	●
	Training credits for Dell Technologies Education Services	-	-	●
Online oversight	Online collaborative environment in <a href="#">TechDirect</a> for planning, managing and tracking delivery <sup>3</sup>	-	●	●

<sup>1</sup> Remote option includes project specific instructions, documentation and live expert guidance for hardware installation. Option available for select hardware. [List is available in the backup portion of this customer presentation](#)

<sup>2</sup> Packaging removal included with onsite hardware installation

<sup>3</sup> Included with ProDeploy or ProDeploy Plus, Not included with Basic Deployment

Figure 29. ProDeploy Infrastructure Suite - Field services

## Dell ProDeploy Plus for Infrastructure

From beginning to end, ProDeploy Plus provides the skill and scale that is must successfully perform demanding deployments in today's complex IT environments. Certified Dell experts start with extensive environmental assessments and detailed migration



planning and recommendations. Software installation includes set up of our enterprise connectivity solution (secure connect gateway) and OpenManage system management utilities.

Postdeployment configuration assistance, testing, and product orientation services are also available.

## Dell ProDeploy for Infrastructure

ProDeploy provides full-service installation and configuration of both server hardware and system software by certified deployment engineers including set up of leading operating systems and hypervisors as well our enterprise connectivity solution (secure connect gateway) and OpenManage system management utilities. To prepare for the deployment, we conduct a site readiness review and implementation planning exercise. System testing, validation, and full project documentation with knowledge transfer complete the process.

## Dell Basic Deployment

Basic Deployment delivers worry-free professional installation by experienced technicians who know Dell servers inside and out.

## Additional Deployment Services

You can tailor the ProDeploy Infrastructure Suite offer to meet your customer's unique needs by leveraging "Additional Deployment Time." ADT will cover additional tasks above the normal scope of the standard offers. ADT can be sold for Project Management or Technical Resources and is sold as blocks of four hours remote or eight hours on-site.

## Dell ProDeploy for HPC (available in US/Canada only. All other regions use custom)

HPC deployments require specialists that understand that cutting edge is yesterday's news. Dell deploys the world 's fastest systems and understands the nuances that make them perform. ProDeploy for HPC provides:

- Global team of dedicated HPC specialists
- Proven track record, thousands of successful HPC deployments
- Design validation, benchmarking, and product orientation

Learn more at [Dell.com/HPC-Services](https://Dell.com/HPC-Services).



## ProDeploy Expansion for HPC

\*Available as standard SKUs in US & Canada and as custom quote in APJC, EMEA, LATAM

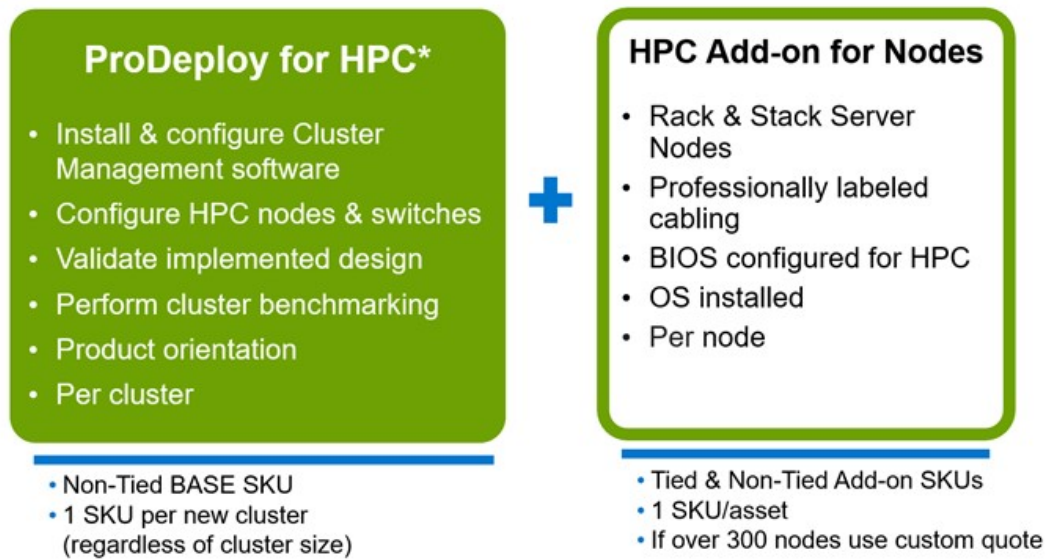


Figure 30. ProDeploy Expansion for HPC

## Dell custom deployment Services

Dell custom rack integration and other Dell configuration services help customers save time by providing systems that are racked, cabled, tested, and ready to be integrated into the data center. Dell support preconfigure RAID, BIOS and iDRAC settings, install system images, and even install third-party hardware and software.

For more information, see [Server Configuration Services](#).

## Dell Residency Services

Residency Services help customers transition to new capabilities quickly with the assistance of onsite or remote Dell experts whose priorities and time they control.

Residency experts can provide post implementation management and knowledge transfer that is related to a new technology acquisition or day-to-day operational management of the IT infrastructure.

## Dell Data Migration Services

Protect business and data of the customer with our single point of contact to manage data migration projects.

A customer project manager works with our experienced team of experts to create a plan using industry-leading tools and proven processes that are based on global best practices to migrate existing files and data, so business systems are up and running quickly and smoothly.

# Dell Enterprise Support Services

## Dell ProSupport Enterprise Suite

With the ProSupport Enterprise Suite, we help keep IT systems running smoothly, so customers can focus on running their business. We help maintain peak performance and availability of the most essential workloads. ProSupport Enterprise Suite is a suite of support services that enable customers to build the solution that is right for their organization. They choose support models that are based on how they use technology and where they want to allocate resources. From the desktop to the data center, address everyday IT challenges, such as unplanned downtime, mission-critical needs, data and asset protection, support planning, resource allocation, software application management and more. Optimize customer IT resources by choosing the right support model.

**Table 26. ProSupport Enterprise Suite**

Service	Support model	Description
ProSupport Enterprise Suite	ProSupport Plus for Enterprise	Proactive, predictive, and reactive support for systems that look after your business-critical applications and workloads
	ProSupport for Enterprise	Comprehensive 24 x 7 predictive and reactive support for hardware and software
	Basic hardware support	Reactive hardware support during normal business hours

## Dell ProSupport Plus for Enterprise

When customers purchase PowerEdge server, we recommend ProSupport Plus, our proactive and preventative support service for business-critical systems. ProSupport Plus provides all the benefits of ProSupport, plus the following:

- An assigned Services Account Manager who knows their business and environment
- Immediate advanced troubleshooting from an engineer
- Personalized, preventive recommendations that are based on analysis of support trends and best practices from across the Dell Technologies infrastructure solutions customer base to reduce support issues and improve performance
- Predictive analysis for issue prevention and optimization that is enabled by secure connect gateway technology
- Proactive monitoring, issue detection, notification, and automated case creation for accelerated issue resolution enabled by secure connect gateway
- On-demand reporting and analytics-based recommendations that are enabled by secure connect gateway and TechDirect

## Dell ProSupport for Enterprise

ProSupport service offers highly trained experts around the clock and around the globe to address IT needs. We help minimize disruptions and maximize availability of PowerEdge server workloads with:

- 24x7 support through phone, chat and online
- Predictive, automated tools and innovative technology
- A central point of accountability for all hardware and software issues
- Collaborative third-party support
- Hypervisor, operating system and application support
- Consistent experience regardless of where customers are located or what language they speak

**(i) NOTE:** Subject to service offer country or region availability.

- Optional onsite parts and labor response options including next business day or four-hour mission critical

ProSupport Enterprise Suite Feature Comparison			
	Basic	ProSupport	ProSupport Plus
Remote technical support	9x5	24x7	24x7
Covered products	Hardware	Hardware Software	Hardware Software
Onsite hardware support	Next business day	Next business day or 4hr mission critical	Next business day or 4 hr mission critical
3 <sup>rd</sup> party collaborative assistance		●	●
Self-service case initiation and management		●	●
Access to software updates		●	●
Proactive storage health monitoring, predictive analytics and anomaly detection with CloudIQ and the CloudIQ mobile app		●	●
Priority access to specialized support experts			●
Predictive detection of hardware failures			●
3 <sup>rd</sup> party software support			●
An assigned Service Account Manager			●
Proactive, personalized assessments and recommendations			●
Proactive systems maintenance			●

Availability and terms of Dell Technologies Services vary by region and by product. For more information, please view our [service descriptions](#).

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Figure 31. ProSupport Enterprise Suite

## Dell ProSupport One for Data Center

ProSupport One for Data Center offers flexible site-wide support for large and distributed data centers with more than 1,000 assets. This offering is built on standard ProSupport components that leverage our global scale but are tailored to a customer's needs. While not for everyone, this service option offers a truly unique solution for Dell Technologies largest customers with the most complex environments.

- Team of assigned Services Account Managers with remote, on-site options
- Assigned ProSupport One technical and field engineers who are trained on the customer's environment and configurations
- On-demand reporting and analytics-based recommendations that are enabled by secure connect gateway and TechDirect
- Flexible on-site support and parts options that fit their operational model
- A tailored support plan and training for their operations staff

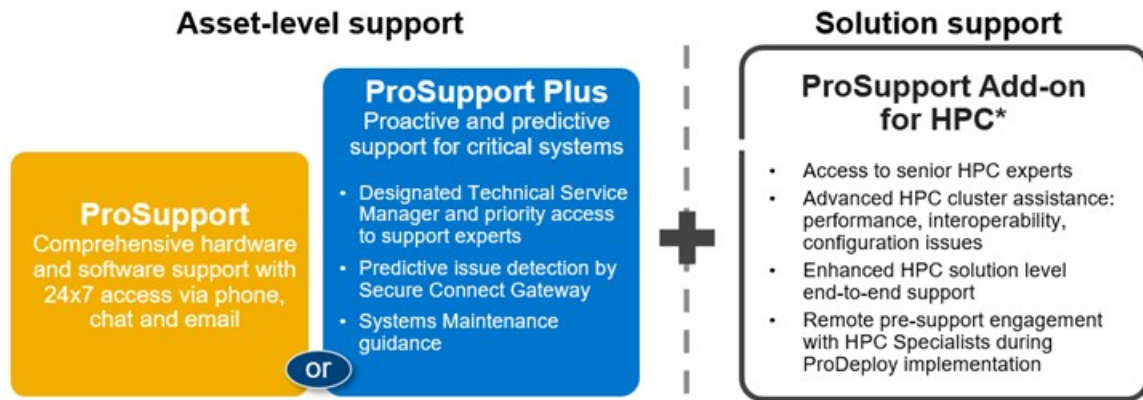
## Dell ProSupport Add-on for HPC

The ProSupport Add-on for HPC provides solution-aware support including:

- Access to senior HPC experts
- Advanced HPC cluster assistance: performance, interoperability, and configuration
- Enhanced HPC solution level end-to-end support
- Remote presupport engagement with HPC Specialists during ProDeploy implementation

Learn more at [Dell.com/HPC-Services](https://Dell.com/HPC-Services).

# ProSupport Add-on for HPC is an add-on to PS or PSP



### Eligibility

- All server, storage, and networking nodes in cluster must have PS or PSP **AND** PS Add-on for HPC attached
- All HW expansions to clusters must attach PS or PSP **AND** PS Add-on for HPC
- To retrofit an entire existing cluster with PS Add-on for HPC:
  1. HPC Specialists must review and validate the existing cluster
  2. PS or PSP **AND** the PS Add-on for HPC (APOS) must be attached to all server, storage and networking nodes

\*Available in standard SKUs in NA and EMEA and as custom quote in APJC & LATAM

DELLTechnologies

Figure 32. ProSupport Add-on for HPC is an add-on to PS or PSP

## Support Technologies

Powering the support experience with predictive, data-driven technologies.

**NOTE:** SupportAssist Enterprise capabilities are now part of the secure connect gateway technology.

## Enterprise connectivity

The best time to solve a problem is before it happens. The automated proactive and predictive support features enabled by the secure connect gateway technology helps reduce steps and time to resolution, often detecting issues before they become a crisis. The gateway technology is available in virtual and application editions. It is also implemented as a direct connect version for select Dell hardware and a Services plugin within OpenManage Enterprise for PowerEdge servers. The legacy SupportAssist Enterprise solution has been retired and is now replaced by the secure connect gateway solutions.

Benefits include:

- Value: Our connectivity solutions are available to all customers at no additional charge
- Improve productivity: Replace manual, high-effort routines with automated support
- Accelerate time to resolution: Receive issue alerts, automatic case creation, and proactive contact from Dell experts
- Gain insight and control: Optimize enterprise devices with insights in portals reporting like TechDirect, and get predictive issue detection before the problem starts

**NOTE:** Connect devices can access these features. Features vary depending on the service level agreement for the connected device. ProSupport Plus customers experience the full set of automated support capabilities.

Table 27. Features enabled by connectivity

	Basic hardware warranty	ProSupport	ProSupport Plus
Automated issue detection and system state information collection	Supported	Supported	Supported
Proactive, automated case creation and notification	Not supported	Supported	Supported

**Table 27. Features enabled by connectivity (continued)**

	<b>Basic hardware warranty</b>	<b>ProSupport</b>	<b>ProSupport Plus</b>
Predictive issue detection for failure prevention	Not supported	Not supported	Supported

Get started at [DellTechnologies.com/secureconnectgateway](https://DellTechnologies.com/secureconnectgateway).

## Dell TechDirect

TechDirect helps boost IT team productivity when supporting Dell systems.

Boost your productivity with online service for Dell products from TechDirect. From deployment to technical support, TechDirect lets you do more with less effort and faster resolution. You can:

- Open and manage support requests or in-warranty systems
- Execute online self-service for parts dispatch
- Collaborate on ProDeploy infrastructure deployment projects online
- Manage proactive and predictive alerts from secure connect gateway technology that help maximize uptime
- Integrate services functionality into your help desk with TechDirect APIs
- Join over 10,000 companies that choose TechDirect

Register at [TechDirect.Dell.com](https://TechDirect.Dell.com).


## Dell Technologies Consulting Services

Our expert consultants help customers transform faster, and quickly achieve business outcomes for the high value workloads Dell PowerEdge systems can handle. From strategy to full-scale implementation, Dell Technologies Consulting can help determine how to perform IT, workforce, or application transformation. We use prescriptive approaches and proven methodologies that are combined with portfolio and partner ecosystem of Dell Technologies to help achieve real business outcomes. From multi cloud, applications, DevOps, and infrastructure transformations, to business resiliency, data center modernization, analytics, workforce collaboration, and user experiences-we are here to help.

## Dell Managed Services

Some customers prefer Dell to manage the complexity and risk of daily IT operations, Dell Managed Services utilizes proactive, AI enabled delivery operations and modern automation to help customers realize desired business outcomes from their infrastructure investments. With these technologies, our experts run, update and fine-tune customer environments aligned with service levels, while providing environment-wide and down-to-the-device visibility. There are two types of managed service offers. First the outsourcing model or CAPEX model where Dell manages the customer owned assets using our people and tools. The second is the as-a-Service model or OPEX model called APEX. In this service, Dell owns all technology and all the management of it. Many customers will have a blend of the two management types depending on the goals of the organization.



<b>Managed</b>	Outsourcing or CAPEX model	<b>APEX</b>	as-a-Service or OPEX model
<p>We manage your technology using our people and tools.<sup>1</sup></p> <ul style="list-style-type: none"> <li>• Managed detection and response*</li> <li>• Technology Infrastructure</li> <li>• End-user (PC/desktop)</li> <li>• Service desk operations</li> <li>• Cloud Managed (Pub/Private)</li> <li>• Office365 or Microsoft Endpoint</li> </ul>		<p>We own all technology so you can off-load all IT decisions.</p> <ul style="list-style-type: none"> <li>• APEX Cloud Services</li> <li>• APEX Flex on Demand elastic capacity</li> <li>• APEX Data Center Utility pay-per-use model</li> </ul>	

1 – Some minimum device counts may apply. Order via: [ClientManagedServices.sales@dell.com](mailto:ClientManagedServices.sales@dell.com)

\* Managed detection and response covers the security monitoring of laptops, servers, & virtual servers. Min. 50 devices combined. No Networking or Storage-only systems [SAN/NAS]. Available in 32 countries. [Details here](#)

**Figure 33. Dell Managed Services**

## Dell Technologies Education Services

Build the IT skills required to influence the transformational outcomes of the business. Enable talent and empower teams with the right skills to lead and perform transformational strategy that drives competitive advantage. Leverage the training and certification required for real transformation.

Dell Technologies Education Services offers PowerEdge server training and certifications that are designed to help customers achieve more from their hardware investment. The curriculum delivers the information and the practical, firsthand skills that their team must confidently install, configure, manage, and troubleshoot Dell servers.

To learn more or register for a class today, see [Education.Dell.com](http://Education.Dell.com).

# Appendix A: Additional specifications

## Topics:

- Chassis dimension
- Chassis weight
- NIC port specifications
- Video specifications
- USB ports specifications
- PSU rating
- Environmental specifications

## Chassis dimension

The R760xa has the following dimensions:

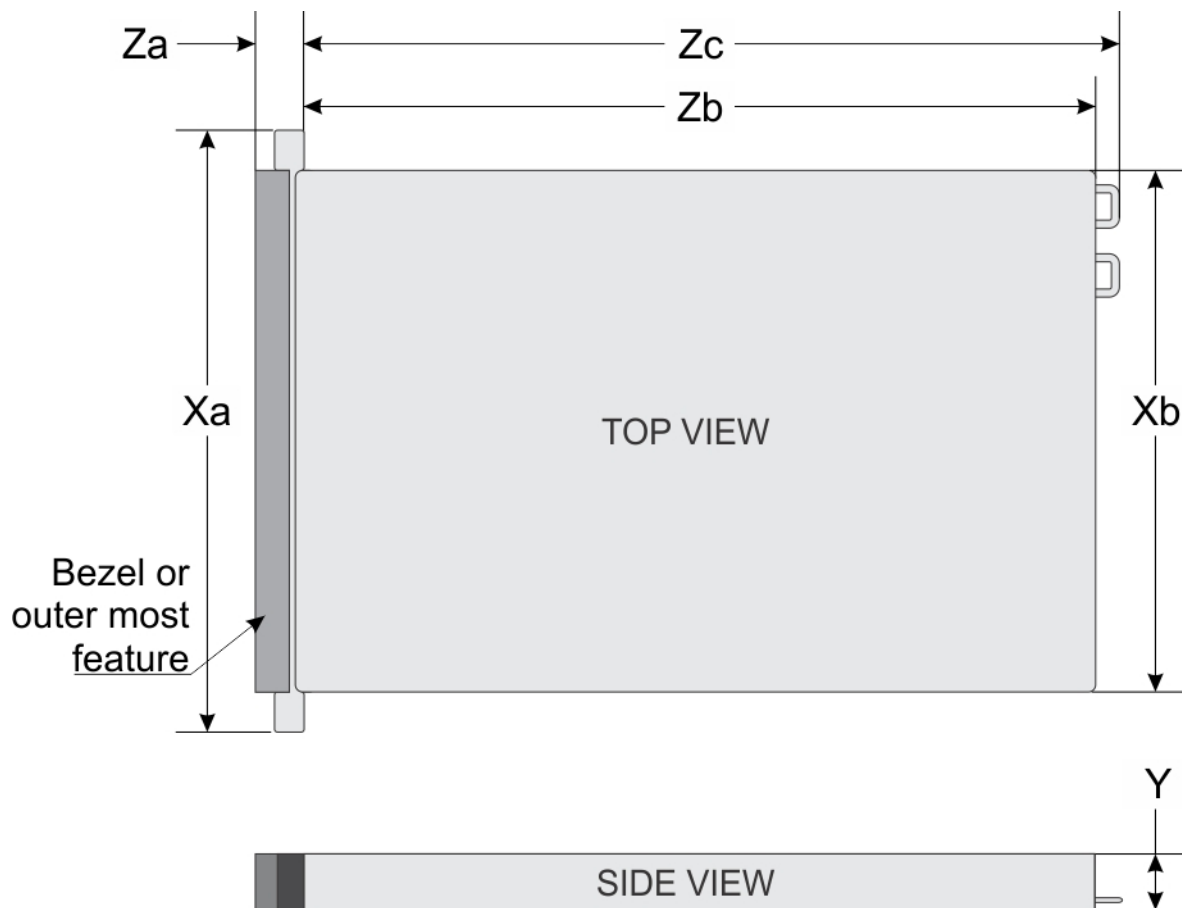


Figure 34. Chassis dimensions

**Table 28. Chassis dimensions**

Model number	Xa	Xb	Y	Za with bezel	Za without bezel	Zb	Zc	Max Sys Wgt	Chassis
R760xa	482.0 mm (18.97 inches)	434.0 mm (17 inches)	86.8 mm (3.41 inches)	35.84 mm (1.41 inches)	22.0 mm (0.86 inches)	875.3 mm (34.46 inches)	910.89mm (35.86 inches)	27.5 Kg (60.63 lbs)	2U

## Chassis weight

**Table 29. Chassis weight**

System Configuration	Maximum Weight
A server with fully populated drives	27.5 kg (60.63 lbs)
A server without drives and PSU installed	25.1 kg (55.33 lbs)

## NIC port specifications

The PowerEdge R760xa system supports up to two 10/100/1000 Mbps Network Interface Controller (NIC) ports embedded on the LAN on Motherboard (LOM) and integrated on the optional Open Compute Project (OCP) card.

**Table 30. NIC port specification for the system**

Feature	Specifications
LOM card (optional)	1 GbE x 2
OCP card (OCP 3.0) (optional)	1 GbE x 4, 10 GbE x 2, 10 GbE x 4, 25 GbE x 2, 25 GbE x 4

**NOTE:** The system should have either LOM card or an OCP card that is installed in the system.

**NOTE:** On the system board, the supported OCP PCIe width is x8; when x16 PCIe width is installed, it is downgraded to x8.

## Video specifications

The PowerEdge R760xa system supports integrated Matrox G200 graphics controller with 16 MB of video frame buffer.

**Table 31. Video specifications for R760xa**

Resolution	Refresh rate (Hz)	Color depth (bits)
1024 x 768	60	8, 16, 32
1280 x 800	60	8, 16, 32
1280 x 1024	60	8, 16, 32
1360 x 768	60	8, 16, 32
1440 x 900	60	8, 16, 32
1600 x 900	60	8, 16, 32
1600 x 1200	60	8, 16, 32
1680 x 1050	60	8, 16, 32
1920 x 1080	60	8, 16, 32



**Table 31. Video specifications for R760xa (continued)**

Resolution	Refresh rate (Hz)	Color depth (bits)
1920 x 1200	60	8, 16, 32

## USB ports specifications

**Table 32. PowerEdge R760xa USB specifications**

Front		Rear		Internal (Optional)	
USB port type	No. of ports	USB port type	No. of ports	USB port type	No. of ports
USB 2.0-compliant port	One	USB 3.0-compliant port	One	Internal USB 3.0-compliant port	One
iDRAC Direct port (Micro-AB USB 2.0-compliant port)	One	USB 2.0-compliant port	One		

**NOTE:** The micro USB 2.0 compliant port can only be used as an iDRAC Direct or a management port.

## PSU rating

Below table lists the power capacity the PSUs in high/low line operation mode.

**Table 33. PSUs highline and lowline ratings**

—	2400 W Platinum	2800 W Titanium
Peak Power (Highline/-72 VDC)	4080 W	4760 W
Highline/-72 VDC	2400 W	2800 W
Peak Power (Lowline/-40 VDC)	2380 W	N/A
Lowline/-40 VDC	1400 W	N/A
Highline 240 VDC	2400 W	2800 W
DC-48-60 V	N/A	N/A

The PowerEdge R760xa supports up to two AC power supplies with 1+1 redundancy, autosensing, and auto switching capability.

If two PSUs are present during POST, a comparison is made between the wattage capacities of the PSUs. In case the PSU wattages do not match, the larger of the two PSUs is enabled. Also, there is a PSU mismatch warning that is displayed in BIOS, iDRAC, or on the system LCD.

If a second PSU is added at run-time, in order for that particular PSU to be enabled, the wattage capacity of the first PSU must equal the second PSU. Otherwise, the PSU is flagged as unmatched in iDRAC and the second PSU is not enabled.

Dell PSUs have achieved Platinum efficiency levels as shown in the table below.

**Table 34. PSU efficiency level**

Efficiency Targets by Load						
Form factor	Output	Class	10%	20%	50%	100%
Redundant 86 mm	2400 W AC	Platinum	89.00%	93.00%	94.00%	91.50%
	2800 W AC	Titanium	90.00%	94.00%	96.00%	94%

# Environmental specifications

**i** **NOTE:** For additional information about environmental certifications, refer to the *Product Environmental Datasheet* located with the *Documentation* on [www.dell.com/support/home](http://www.dell.com/support/home).

**Table 35. Continuous Operation Specifications for ASHRAE A2**

Temperature	Specifications
Allowable continuous operations	
Temperature range for altitudes <= 900 m (<= 2953 ft)	10–35°C (50–95°F) with no direct sunlight on the equipment
Humidity percent range (non-condensing at all times)	8% RH with -12°C (10.4°F) minimum dew point to 80% RH with 21°C (69.8°F) maximum dew point
Operational altitude de-rating	Maximum temperature is reduced by 1°C/300 m (1.8°F/984 Ft) above 900 m (2953 Ft)

**Table 36. Continuous Operation Specifications for ASHRAE A3**

Temperature	Specifications
Allowable continuous operations	
Temperature range for altitudes <= 900 m (<= 2953 ft)	5–40°C (41–104°F) with no direct sunlight on the equipment
Humidity percent range (non-condensing at all times)	8% RH with -12°C (10.4°F) minimum dew point to 85% RH with 24°C (75.2°F) maximum dew point
Operational altitude de-rating	Maximum temperature is reduced by 1°C/175 m (1.8°F/574 Ft) above 900 m (2953 Ft)

**Table 37. Continuous Operation Specifications for ASHRAE A4**

Temperature	Specifications
Allowable continuous operations	
Temperature range for altitudes <= 900 m (<= 2953 ft)	5–45°C (41–113°F) with no direct sunlight on the equipment
Humidity percent range (non-condensing at all times)	8% RH with -12°C (10.4°F) minimum dew point to 90% RH with 24°C (75.2°F) maximum dew point
Operational altitude de-rating	Maximum temperature is reduced by 1°C/125 m (1.8°F/410 Ft) above 900 m (2953 Ft)

**Table 38. Common Environmental Specifications for ASHRAE A2, A3 and A4**

Allowable continuous operations	
Maximum temperature gradient (applies to both operation and non-operation)	20°C in an hour* (36°F in an hour) and 5°C in 15 minutes (9°F in 15 minutes), 5°C in an hour* (9°F in an hour) for tape <b>i</b> <b>NOTE:</b> * - Per ASHRAE thermal guidelines for tape hardware, these are not instantaneous rates of temperature change.
Non-operational temperature limits	-40 to 65°C (-40 to 149°F)
Non-operational humidity limits	5% to 95% RH with 27°C (80.6°F) maximum dew point
Maximum non-operational altitude	12,000 meters (39,370 feet)
Maximum operational altitude	3,050 meters (10,006 feet)

**Table 39. Maximum vibration specifications**

Maximum vibration	Specifications
Operating	0.21 G <sub>rms</sub> at 5 Hz to 500 Hz for 10 minutes (all operation orientations)
Storage	1.88 G <sub>rms</sub> at 10 Hz to 500 Hz for 15 minutes (all six sides tested)

**Table 40. Maximum shock pulse specifications**

Maximum shock pulse	Specifications
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axis of 6 G for up to 11 ms.
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axis (one pulse on each side of the system) of 71 G for up to 2 ms.

## Thermal air restrictions

### ASHRAE A2 environment

- Processors > 350 W are not supported
- 8470Q and 6458Q 350 W Processors are not supported
- GPU > 400 W are not supported
- Maximum 30° C (86°F) for GPU > 350 W With Processor > 225 W

### ASHRAE A3 environment

- Processors > 225 W are not supported
- GPUs at rear slots are not supported
- Nvidia A2 GPU is supported at front slots. Other GPUs are not supported
- 128 GB or greater capacity RDIMMs are not supported
- Two power supplies are required. System performance may be reduced in the event of a PSU failure
- Non-Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported
- 85°C (185°F) active optics cable is required

### ASHRAE A4 environment

- Processors > 185 W are not supported
- GPUs at rear slots are not supported
- Nvidia A2 GPU is supported at front slots. Other GPUs are not supported
- 128 GB or greater capacity RDIMMs are not supported
- 2.5-inch NVMe storages are not supported
- BOSS-N1 is not supported
- Two power supplies are required. System performance may be reduced in the event of a PSU failure
- Non-Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported
- OCP cards 3.0 are not supported
- 85°C (185°F) active optics cable is required

## Liquid cooling restrictions

### ASHRAE A2 environment

- GPU > 400 W are not supported

## ASHRAE A3 environment

- GPU at rear slots are not supported
- Nvidia A2 GPU is supported at front slots. Other GPUs are not supported
- 128 GB or greater capacity RDIMMs are not supported
- Two power supplies are required. System performance may be reduced in the event of a PSU failure
- Non Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported
- 85°C (185°F) active optics cable is required

## ASHRAE A4 environment

- GPU at rear slots are not supported
- Nvidia A2 GPU is supported at front slots. Other GPUs are not supported
- 128 GB or greater capacity RDIMMs are not supported
- 2.5 inch NVMe storage are not supported
- BOSS-N1 is not supported
- Two power supplies are required. System performance may be reduced in the event of a PSU failure
- Non Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported
- OCP cards 3.0 are not supported
- 85°C (185°F) active optics cable is required

## Thermal restriction matrix

**Table 41. References used in the restriction table.**

Label	Description
STD	Standard
HSK	Heat sink
LP	Low Profile
FH	Full Height

**Table 42. Thermal restriction matrix**

Configuration		-	Ambient temperature
Front GPU TDP		<=350 W	35°C (95°F)
Front drives		8x 2.5" SAS/SATA/NVMe	
CPU TDP/ cTDP	125 W	System Fan (60 x 76 mm) with 2U HPR HSK	
	150 W		
	165 W		
	185 W		
	195 W		
	205 W		
	225 W		
	250 W		
	270 W		
	300 W		
330 W			
350 W			

**NOTE:** The PowerEdge R760xa system supports all CPU SKUs at 35°C (95°F) except 8470Q and 6458Q 350 W CPUs that require liquid cooling support.

**NOTE:** There is only one type of fan supported in R760xa. Six fans are required to be installed for all R760xa system configurations.

**NOTE:** Fan type supported: STD

## Appendix A. Standards compliance

The system conforms to the following industry standards.

**Table 43. Industry standard documents**

Standard	URL for information and specifications
<b>ACPI</b> Advance Configuration and Power Interface Specification, v6.4	<a href="https://uefi.org/specsandtesttools">https://uefi.org/specsandtesttools</a>
<b>Ethernet</b> IEEE Std 802.3-2022	<a href="https://standards.ieee.org/">https://standards.ieee.org/</a>
<b>MSFT WHQL</b> Microsoft Windows Hardware Quality Labs	<a href="https://microsoft.com/whdc/system/platform/pcdesign/desguide/serverdg.msp">microsoft.com/whdc/system/platform/pcdesign/desguide/serverdg.msp</a>
<b>IPMI</b> Intelligent Platform Management Interface, v2.0	<a href="https://intel.com/design/servers/ipmi">intel.com/design/servers/ipmi</a>
<b>DDR5 Memory</b> DDR5 SDRAM Specification	<a href="https://jedec.org/standards-documents/docs/jesd79-4.pdf">jedec.org/standards-documents/docs/jesd79-4.pdf</a>
<b>PCI Express</b> PCI Express Base Specification, v5.0	<a href="https://pcisig.com/specifications/pciexpress">pcisig.com/specifications/pciexpress</a>
<b>PMBus</b> Power System Management Protocol Specification, v1.2	<a href="http://pmbus.org/Assets/PDFS/Public/PMBus_Specification_Part_1_Rev_1-1_20070205.pdf">http://pmbus.org/Assets/PDFS/Public/PMBus_Specification_Part_1_Rev_1-1_20070205.pdf</a>
<b>SAS</b> Serial Attached SCSI, 3 (SAS-3) (T10/INCITS 519)	<a href="http://www.t10.org/">http://www.t10.org/</a>
<b>SATA</b> Serial ATA Rev. 3.3	<a href="https://sata-io.org">sata-io.org</a>
<b>SMBIOS</b> System Management BIOS Reference Specification, v3.3.0	DMTF SMBIOS
<b>TPM</b> Trusted Platform Module Specification, v1.2 and v2.0	<a href="https://trustedcomputinggroup.org">trustedcomputinggroup.org</a>
<b>UEFI</b> Unified Extensible Firmware Interface Specification, v2.7	<a href="https://uefi.org/specifications">uefi.org/specifications</a>
<b>PI</b> Platform Initialization Specification, v1.7	
<b>USB</b> Universal Serial Bus v2.0 and SuperSpeed v3.0 (USB 3.1 Gen1)	USB Implementers Forum, Inc. <a href="https://usb.org/documents">https://usb.org/documents</a>
<b>NVMe</b> Express Base Specification. Revision 2.0c	<a href="https://nvmexpress.org/specifications/">https://nvmexpress.org/specifications/</a>
<b>NVMe</b> Command Set Specifications	
1. NVMe Express NVMe Command Set Specification. Revision 1.1c	
2. NVMe Express Zoned Namespaces Command Set. Revision 1.0c	
3. NVMe Express® Key Value Command Set. Revision 1.0c	
<b>NVMe</b> Transport Specifications	
1. NVMe Express over PCIe Transport. Revision 1.0c	
2. NVMe Express RDMA Transport Revision. 1.0b	
3. NVMe Express TCP Transport. Revision 1.0c	
<b>NVMe</b> NVMe Express Management Interface. Revision 1.2c	
<b>NVMe</b> NVMe Boot Specification. Revision 1.0	

## Appendix C Additional resources

**Table 44. Additional resources**

Resource	Description of contents	Location
Installation and Service Manual	<p>This manual, available in PDF format, provides the following information:</p> <ul style="list-style-type: none"> <li>• Chassis features</li> <li>• System Setup program</li> <li>• System indicator codes</li> <li>• System BIOS</li> <li>• Remove and replace procedures</li> <li>• Diagnostics</li> <li>• Jumpers and connectors</li> </ul>	<a href="http://Dell.com/Support/Manuals">Dell.com/Support/Manuals</a>
Getting Started Guide	<p>This guide ships with the system, and is also available in PDF format. This guide provides the following information:</p> <ul style="list-style-type: none"> <li>• Initial setup steps</li> </ul>	<a href="http://Dell.com/Support/Manuals">Dell.com/Support/Manuals</a>
Rack Installation Guide	<p>This document ships with the rack kits, and provides instructions for installing a server in a rack.</p>	<a href="http://Dell.com/Support/Manuals">Dell.com/Support/Manuals</a>
System Information Label	<p>The system information label documents the system board layout and system jumper settings. Text is minimized due to space limitations and translation considerations. The label size is standardized across platforms.</p>	Inside the system chassis cover
Quick Resource Locator (QRL)	<p>This code on the chassis can be scanned by a phone application to access additional information and resources for the server, including videos, reference materials, service tag information, and Dell contact information.</p>	Inside the system chassis cover
Enterprise Infrastructure Planning Tool (EIPT)	<p>The Dell online EIPT enables easier and more meaningful estimates to help you determine the most efficient configuration possible. Use EIPT to calculate the power consumption of your hardware, power infrastructure, and storage.</p>	<a href="http://Dell.com/calc">Dell.com/calc</a>