

# Dell EMC PowerEdge R940xa

## 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.

# System overview

## Topics:

- [Introduction](#)
- [New technologies](#)

## Introduction

The Dell EMC PowerEdge R940xa is designed to run complex workloads using highly scalable memory, I/O, and network options. The systems feature the 2nd Generation Intel Xeon Scalable processor family, with up to 48 DDR4 DIMMs, 12 PCI Express PCIe Gen3 enabled expansion slots, and a choice of embedded NIC technologies. The 4S, 4U PowerEdge R940xa accelerates applications to deliver real-time decisions. The PowerEdge R940xa combines four CPUs with four GPUs in a powerful 1:1 ratio to drive database acceleration. With up to 15.36 TB of memory and four-socket performance, the PowerEdge R940xa delivers consistent and fast response times.

The PowerEdge R940xa adds large storage capacity for high performance and GPU database acceleration, making it well suited for compute-intensive applications that require greater storage, while not sacrificing I/O performance.

## New technologies

The PowerEdge R940xa features the 2nd Generation Intel Xeon Processor Scalable family, gold, and platinum processors (up to 28 cores per socket) and supports up to 48 DIMMs (DDR4 RDIMM/LR-DIMM), DCPMM, and 12 NVDIMM.

The R940xa system has the following features:

- 2nd Generation Intel Xeon Scalable processors
- Simultaneous Multi-Threading (SMT) support
- High Reliability mode/profile support
- 12 PCIe slots for expansion and a choice of embedded NIC technologies
- Software RAID support for SATA and NVMe
- Ideal for compute-intensive applications that require greater storage, while not sacrificing I/O performance. Support for 4 double-width GPUs (in a 1: 1 CPU to GPU ratio), or up to 4 double-width FPGAs, or up to 8 single-width FPGAs to accelerate business-critical workloads like AI and machine learning.

**Table 1. New technologies**

| Technology                                   | Detailed description                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2nd Generation Intel Xeon Scalable Processor | <ul style="list-style-type: none"> <li>• 14 nm process technology</li> <li>• Intel Ultra Path Interconnect (UPI)</li> <li>• Up to 28 cores per socket</li> <li>• Up to 3.7 GHz</li> <li>• Max TDP: 205 W</li> </ul>                                                                                                                                               |
| Intel C620 chipset                           | Intel Platform Controller Hub (PCH)                                                                                                                                                                                                                                                                                                                               |
| 2933 MT/s DDR 4 memory                       | <p>The PowerEdge R940xa supports two DIMMs per channel at 2933 MT/s.</p> <ul style="list-style-type: none"> <li>• 6x DDR4 Channels per socket, 2 DIMMs per channel (2DPC)</li> <li>• Up to 2933 MT/s (configuration-dependent)</li> <li>• RDIMMs up to 32 GB and LRDIMMs at 64 GB and 128 GB supported</li> <li>• NVDIMMS of 16 GB and 32 GB supported</li> </ul> |

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

| <b>Technology</b>                         | <b>Detailed description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intel Optane DC persistent memory (DCPMM) | <p>A new class of memory with same DDR4 electrical and physical constraints and close to DRAM latency.</p> <ul style="list-style-type: none"> <li>● Up to 6 per CPU socket. Max 24 for 4S configuration</li> <li>● 256 GB, 512 GB per DIMM</li> <li>● 1866, 2133, 2400, 2666 MT/s</li> <li>● Up to 12.28 TB max (15.36 TB max with DCPMM and LDRIMM)</li> </ul>                                                                                                                                                                                                                                                                                                                          |
| iDRAC9 with Lifecycle Controller          | <p>The embedded systems management solution for PowerEdge servers features hardware and firmware inventory and alerting, in-depth memory alerting, faster performance, a dedicated gigabit port and many more features.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Wireless management                       | <p>The Quick Sync feature is an extension of NFC-based low-bandwidth Quick sync interface. Quick Sync 2.0 will offer feature parity with NFC interface with improved user experience. Since the introduction of iDRAC in PowerEdge Server, the server management has been improved by adding different local and remote user interfaces (Web GUI, RACADM, WSMAN, BIOS F2 Setup, and LCD) to iDRAC. The addition of Quick Sync 1.0 (NFC) interface in 13G server with handheld devices (Mobile, tablet) and OMM Android application. To extend this Quick Sync feature to wide variety of Mobile OSs with higher data throughput, the Quick Sync 2.0 version replaces NFC technology.</p> |

## System features

### Topics:

- [Product comparison](#)
- [Specifications](#)

## Product comparison

The following table shows the comparison between the PowerEdge R940xa and the R930:

**Table 2. Comparison table**

| Feature             | R940xa                                                                                                                                                                                                                                  | R930                                                                                                                        |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| CPU                 | 4x 2nd Generation Intel Xeon Processor Scalable Family (Gold and Platinum)                                                                                                                                                              | 4x Intel Xeon E5-5600 v3                                                                                                    |
| CPU interconnect    | Intel Ultra Path Interconnect (UPI)                                                                                                                                                                                                     | Intel QuickPath Interconnect (QPI)                                                                                          |
| Memory              | <ul style="list-style-type: none"> <li>• 48x DDR4 RDIMM, LRDIMM, 12x NVDIMM</li> <li>• Up to 6 TB with 48x 128 GB LRDIMM</li> <li>• DCPMM 12.28 TB (15.36 TB with LRDIMM)</li> </ul>                                                    | <ul style="list-style-type: none"> <li>• 96 x DDR4 RDIMM, LRDIMM</li> <li>• Up to 3 TB with 96x 32 GB LRDIMM</li> </ul>     |
| Disk Drives         | 2.5 inches - 12 Gb SAS, 6 Gb SATA                                                                                                                                                                                                       | 2.5 inches - 12 Gb SAS, 6 Gb SATA                                                                                           |
| Storage Controllers | Adapters: HBA330, H330, H350, H730P, H740P, H750, 12G SAS HBA, H840, HBA350i and HBA355e<br>SW RAID: S140                                                                                                                               | 12 Gbps PERC-9 series                                                                                                       |
| PCIe SSD            | Up to 4x PCIe SSD                                                                                                                                                                                                                       | 8x PCIe SSD with dedicated slots using two extender cards.                                                                  |
| PCIe Slots          | Max 12 PCIe 3.0                                                                                                                                                                                                                         | Max 10 PCIe 3.0                                                                                                             |
| rNDC                | 4x 1 GB, 4x 10 GB, 2x 10 GB+2x 1 GB, or 2x 25 GB                                                                                                                                                                                        | 4x 1 Gb, 4x 10 Gb, or 2x 10 Gb+2x 1 Gb                                                                                      |
| Accelerators        | Up to 4 double-width GPUs or up to 4 double-width or up to 8 single-width FPGAs.                                                                                                                                                        | Not Available                                                                                                               |
| USB Ports           | Front: 2 ports (USB 2.0), 1 managed (micro-usb)<br>Rear: 2 ports (USB 3.0)<br>Internal: 1 port (USB 3.0)<br>Optional: 1 Front port (USB 3.0) - only offered on 8-drive configuration                                                    | Front: 2 ports (USB 2.0)<br>Rear: 2 ports (USB 2.0)<br>Internal: 1 port (USB 2.0)                                           |
| Rack Height         | 4U                                                                                                                                                                                                                                      | 4U                                                                                                                          |
| Power Supplies      | <ul style="list-style-type: none"> <li>• AC (Platinum): 750 W, 1100 W, 1600 W, 2000 W, 2400 W</li> <li>• Mix Mode: 750 W PSU (DC input for China only)</li> <li>• AC (Titanium): 750 W, 1600 W, 2600 W</li> <li>• DC: 1100 W</li> </ul> | <ul style="list-style-type: none"> <li>• AC: 750 W, 1100 W</li> <li>• DC: 1100 W</li> <li>• Mix Mode/HVDC: 750 W</li> </ul> |

**Table 2. Comparison table (continued)**

| Feature           | R940xa                                                                                                                                                          | R930                                                                                                                                                            |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | <ul style="list-style-type: none"> <li>Mix Mode/HVDC: 750 W (for China only), 1100 W</li> </ul>                                                                 |                                                                                                                                                                 |
| System Management | Lifecycle Controller 3.x, OpenManage, QuickSync2.0, OMPC3, Digital License Key, iDRAC Direct (dedicated micro-USB port), Easy Restore, vFlash                   | Lifecycle Controller 2.x, OpenManage, Digital License Key, iDRAC QuickSync, iDRAC Direct, Easy Restore                                                          |
| Availability      | <ul style="list-style-type: none"> <li>Hot-plug Drives</li> <li>Hot-plug Redundant Cooling</li> <li>Hot-plug Redundant Power Supplies</li> <li>IDSDM</li> </ul> | <ul style="list-style-type: none"> <li>Hot-plug Drives</li> <li>Hot-plug Redundant Cooling</li> <li>Hot-plug Redundant Power Supplies</li> <li>IDSDM</li> </ul> |

## Specifications

**Table 3. Technical specifications**

| Feature            | PowerEdge R940xa                                                                                                                                                                                               |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Processors         | 4x 2nd Generation Intel Xeon Processor Scalable Family Gold and Platinum                                                                                                                                       |
| Chipset            | Intel C620 - Intel Platform Controller Hub (PCH)                                                                                                                                                               |
| CPU Interconnect   | Intel Ultra Path Interconnect (UPI)                                                                                                                                                                            |
| Number of cores    | Up to 28 cores per socket                                                                                                                                                                                      |
| Memory             | <ul style="list-style-type: none"> <li>48x DDR4 RDIMM/LRDIMM</li> <li>12x NVDIMM</li> <li>DCPMM 12.28 TB (15.36 TB with LRDIMM)</li> </ul>                                                                     |
| Chassis            | Storage design modularity <ul style="list-style-type: none"> <li>Up to 32 Hard Drive Chassis</li> <li>Up to 8 Hard Drive Chassis</li> </ul>                                                                    |
| Accelerators       | Up to 4 double-width GPUs or up to 4 double-width or up to 8 single-width FPGAs                                                                                                                                |
| Disk Drives        | <ul style="list-style-type: none"> <li>4 x 2.5-inch NVMe only</li> <li>8 x 2.5-inch SAS/SATA or SATA only</li> <li>24 x 2.5-inch SAS/SATA</li> <li>32 x 2.5-inch SAS/SATA or SATA only</li> </ul>              |
| PCIe SSD           | Up to 4x CPU Direct Attach PCIe SSD                                                                                                                                                                            |
| Storage Controller | S140, HBA330, HBA350, H330, H730, H730P, H740P, H750, H840 (external), 12 Gbps SAS HBA (external), HBA355e (external), HBA350i(internal)                                                                       |
| LCD Module         | LCD module option in bezel                                                                                                                                                                                     |
| PCIe Slots         | Up to 12 x PCIe Gen3—x16/x16/x16                                                                                                                                                                               |
| Embedded NIC       | 4x 1 GB, 4x 10 GB, 2x 10 GB+2x 1 GB, or 2x 25 GB                                                                                                                                                               |
| Power Supplies     | AC (Platinum): <ul style="list-style-type: none"> <li>1100 W</li> <li>1600 W</li> <li>2000 W</li> <li>2400 W</li> </ul> AC (Titanium): <ul style="list-style-type: none"> <li>750 W</li> <li>1600 W</li> </ul> |

**Table 3. Technical specifications (continued)**

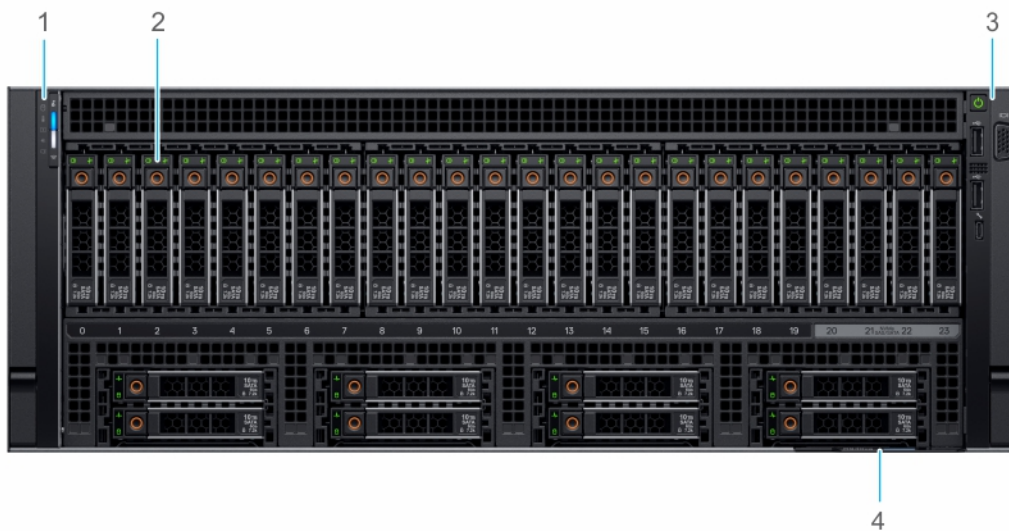
| Feature                 | PowerEdge R940xa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | <ul style="list-style-type: none"> <li>● 2600 W</li> </ul> DC: <ul style="list-style-type: none"> <li>● 1100 W</li> <li>● Mix Mode: 750 W (for China only)</li> </ul> Mix Mode/HVDC (China and Japan only): <ul style="list-style-type: none"> <li>● 1100 W</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Remote Management       | iDRAC9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Systems management      | <p><b>Dell EMC Systems management consoles and tools:</b></p> <ul style="list-style-type: none"> <li>● OpenManage Enterprise</li> <li>● OpenManage Mobile</li> <li>● OpenManage Power Manager</li> </ul> <p><b>Embedded management:</b></p> <ul style="list-style-type: none"> <li>● iDRAC9</li> <li>● iDRAC RESTful API with Redfish</li> <li>● iDRAC Direct</li> <li>● Quick Sync 2 BLE/wireless module</li> </ul> <p><b>Integrations:</b></p> <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> <p><b>Connections:</b></p> <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 I</li> <li>● Nagios Core</li> <li>● Nagios XI</li> </ul> |
| TPM                     | TPM China, TPM1.2, TPM2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| iDRAC Direct front port | Micro USB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Fan                     | Up to 6 fans                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IDSDM Module            | Internal Dual SD Module (IDSDM) and vFlash                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| BOSS Module             | M.2 SATA interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| PERC                    | PERC 9, 10 and 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

# Chassis views and features

## Topics:

- Front view of the system
- Back view of the system
- Control panels
- Locating the information tag of your system
- Security features

## Front view of the system

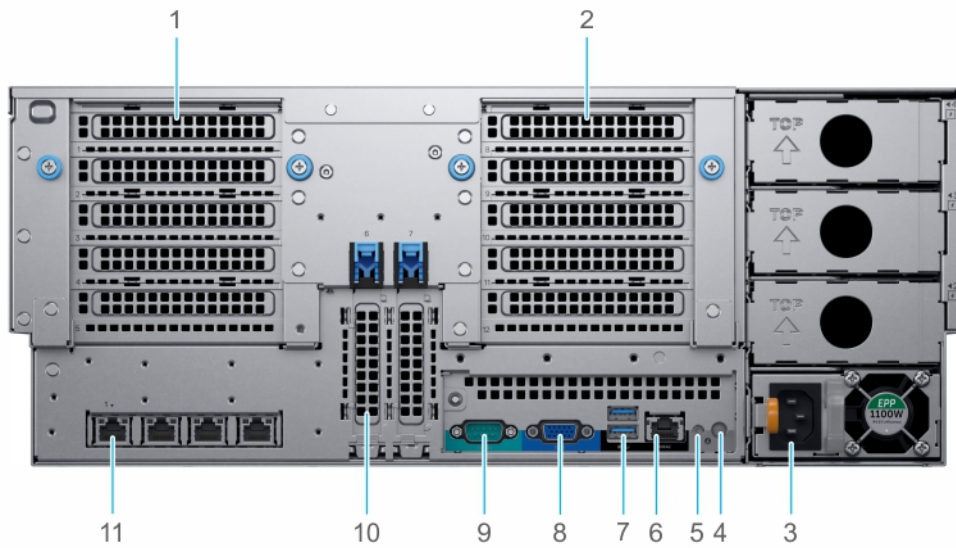


**Figure 1. Front view of 32 x 2.5-inch drive system**

1. Left control panel
2. Drives (32)
3. Right control panel
4. Information tag



# Back view of the system



**Figure 2. Back view of the system**

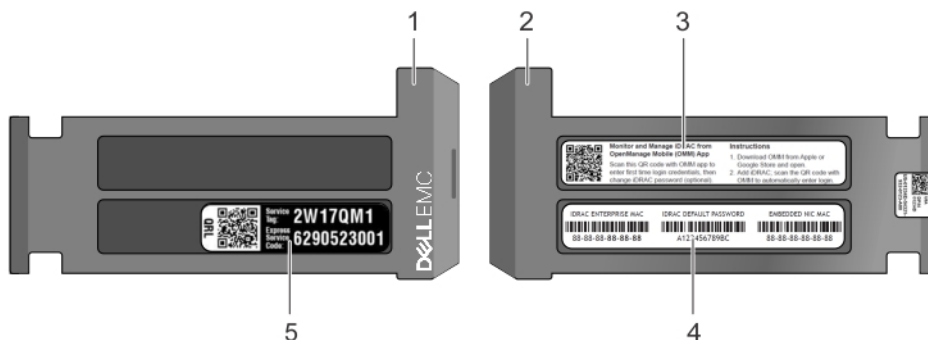
- |                                  |                                          |
|----------------------------------|------------------------------------------|
| 1. Full-height expansion riser 1 | 2. Full-height expansion riser 2         |
| 3. Power supply units (4)        | 4. System identification button          |
| 5. CMA power port                | 6. iDRAC9 dedicated port                 |
| 7. USB 3.0 ports (2)             | 8. VGA port                              |
| 9. Serial port                   | 10. Low profile expansion card slots (2) |
| 11. NIC ports (4)                |                                          |

**NOTE:** The expansion card configurations are X8 PCIe Riser 1+X8 PCIe Riser 2 or X16 PCIe Riser 1+X16 PCIe Riser 2.

## Control panels

### Locating the information tag of your system

You can identify your system using the unique Express Service Code and Service Tag. Pull out the information tag in front of the system to view the Express Service Code and Service Tag. Alternatively, the information may be on a sticker on the back of the system chassis. The mini Enterprise Service Tag (EST) is found on the back of the system chassis. This information is used by Dell to route support calls to the appropriate personnel.



**Figure 3. Locating the information tag of your system**

1. Information tag (Top view)
2. Information tag (Bottom view)
3. OpenManage Mobile (OMM) label
4. iDRAC MAC address and iDRAC secure password label

**NOTE:** If you have opted for secure default access to iDRAC, the iDRAC secure default password is available on the back of the system Information tag. This label will be blank, if you have not opted for secure default access to iDRAC, then the default user name and password are **root** and **calvin**.

5. Service Tag

## Security features

A number of physical security features are present on the latest generation of the R940xa. Additional security features (non-physical) are included in the BIOS and iDRAC sections.

The following table shows the available security features for the R940xa:

**Table 4. Security features**

| Features                   | Description                                                                                                                                                                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cover latch                | The system cover contains a non-keyed locking mechanism integrated into the latch.                                                                                                                                                                                                    |
| Front bezel                | An optional bezel may be mounted to the front of the chassis. The bezel includes a keyed lock to prevent its removal and to protect from unauthorized access to externally accessible media, such as hard drives. The system status remains viewable even when the bezel is attached. |
| Intrusion detection switch | An internal intrusion detection switch allows for users to be alerted when the system cover has been removed.                                                                                                                                                                         |
| Power button               | The power button functionality can be disabled through BIOS.                                                                                                                                                                                                                          |

## Processors

The PowerEdge R940xa server features the exceptional performance, value, and power efficiency of the 2nd Generation Intel Xeon Scalable Processor. These processors can provide high performance no matter what your constraint—floor space, power, or budget—and on workloads that range from the most complicated scientific exploration to crucial web-serving and infrastructure applications. In addition to providing raw performance gains, improved I/O is also made possible with Intel Integrated I/O, which can reduce latency by adding more lanes and doubling bandwidth. This helps to reduce network and storage bottlenecks, which improves the processor performance capabilities.

### Topics:

- [Processor features](#)
- [Supported processors](#)
- [Chipset](#)

## Processor features

The 2nd Generation Intel Xeon Processor Scalable Family provides the foundation for a powerful data center platform. The key features are as follows:

- **Higher Per-Core Performance:** Up to 28 cores, delivery high performance and scalability for compute-intensive workloads across compute, storage and network usages. 2nd Generation Intel Xeon Processors can offer even greater core or frequencies, or both.
- **Large Memory Bandwidth/Capacity:** Six memory channels and up to 6 DCPMMs per socket of Intel Optane DC persistent memory for data-centric workloads on select processors
- **AI capability:** Intel Deep Learning Boost drives inferencing for vector neural networks right in your CPU.
- **Expanded I/O:** 48 lanes of PCIe 3.0 bandwidth and throughput for demanding I/O-intensive workloads.
- **Intel Ultra Path Interconnect (UPI):** Up to three Intel UPI channels increase scalability of the platform to as many as eight sockets, and improves inter-CPU bandwidth for I/O intensive workloads.
- **Intel Advanced Vector Extensions 512 (Intel AVX-512)** with a single AVX512 fused multiply add (FMA) execution units. SKUs which support Advanced RAS enable a 2nd FMA execution unit.
- **Security without Compromise:** Near-zero encryption overhead enables higher performance on all secure data transactions with enhanced hardware mitigation.

## Supported processors

**Table 5. Supported processors for PowerEdge R940xa**


| Intel SKU | SKU type | Stepping | Speed (GHz) | Cache (MB) | Cores | Max Memory Speed (MT/s) | TDP (W) |
|-----------|----------|----------|-------------|------------|-------|-------------------------|---------|
| 5122      | Gold     | XCC      | 3.6         | 16.5       | 4     | 2666                    | 105     |
| 5115      | Gold     | HCC      | 2.4         | NA         | 10    | 2666                    | 85      |
| 5117      | Gold     | XCC      | 2.0         | 19.25      | 10    | 2666                    | 105     |
| 5118      | Gold     | HCC      | 2.3         | NA         | 12    | 2666                    | 105     |
| 5120      | Gold     | HCC      | 2.2         | NA         | 14    | 2666                    | 105     |
| 5222      | Gold     | XCC      | 3.8         | 16.5       | 4     | 2933                    | 105     |
| 5220      | Gold     | XCC      | 2.2         | 24.75      | 18    | 2666                    | 125     |
| 5218      | Gold     | XCC      | 2.3         | 22         | 16    | 2666                    | 105     |
| 5217      | Gold     | HCC      | 3           | NA         | 8     | 2666                    | 125     |

**Table 5. Supported processors for PowerEdge R940xa (continued)**

| Intel SKU | SKU type | Stepping | Speed (GHz) | Cache (MB) | Cores | Max Memory Speed (MT/s) | TDP (W) |
|-----------|----------|----------|-------------|------------|-------|-------------------------|---------|
| 5215      | Gold     | HCC      | 2.5         | NA         | 10    | 2666                    | 85      |
| 5215M     | Gold     | HCC      | 2.6         | NA         | 10    | 2666                    | 85      |
| 5215L     | Gold     | HCC      | 2.6         | NA         | 10    | 2666                    | 85      |
| 6126      | Gold     | XCC      | 2.6         | 19.25      | 12    | 2666                    | 125     |
| 6128      | Gold     | XCC      | 3.4         | NA         | 6     | 2666                    | NA      |
| 6132      | Gold     | XCC      | 2.6         | 19.25      | 14    | 2666                    | 135     |
| 6130      | Gold     | XCC      | 2.1         | 22         | 16    | 2666                    | 125     |
| 6142      | Gold     | XCC      | 2.6         | 22         | 16    | 2666                    | 150     |
| 6138      | Gold     | XCC      | 2.0         | 27.5       | 20    | 2666                    | 125     |
| 6136      | Gold     | XCC      | 3.0         | 24.75      | 12    | 2666                    | 150     |
| 6140M     | Gold     | NA       | 2.3         | 1.5TB      | 18    | 2666                    | 140     |
| 6140      | Gold     | XCC      | 2.3         | 24.75      | 18    | 2666                    | 140     |
| 6150      | Gold     | XCC      | 2.7         | 24.75      | 18    | 2666                    | 165     |
| 6148      | Gold     | XCC      | 2.4         | 27.5       | 20    | 2666                    | 150     |
| 6142M     | Gold     | NA       | 2.6         | 1.5TB      | 16    | 2666                    | 150     |
| 6154      | Gold     | XCC      | 3.0         | 24.75      | 18    | 2666                    | 200     |
| 6134M     | Gold     | NA       | 3.2         | 24.75      | 8     | 2666                    | 130     |
| 6134      | Gold     | XCC      | 3.2         | 24.75      | 8     | 2666                    | 130     |
| 6152      | Gold     | XCC      | 2.1         | 30.25      | 22    | 2666                    | 140     |
| 6262V     | Gold     | XCC      | 1.9         | 33         | 24    | 2400                    | 135     |
| 6254      | Gold     | XCC      | 3.1         | NA         | 18    | 2933                    | 200     |
| 6252      | Gold     | XCC      | 2.1         | NA         | 24    | 2933                    | 150     |
| 6248      | Gold     | XCC      | 2.5         | 27.5       | 20    | 2933                    | 150     |
| 6246      | Gold     | XCC      | 3.6         | 24.75      | 12    | 2933                    | 165     |
| 6244      | Gold     | XCC      | 3.7         | 24.75      | 8     | 2933                    | 150     |
| 6242      | Gold     | XCC      | 2.8         | 24.75      | 16    | 2933                    | 150     |
| 6240      | Gold     | XCC      | 2.6         | 24.75      | 18    | 2933                    | 150     |
| 6240M     | Gold     | XCC      | 2.6         | NA         | 18    | 2933                    | 150     |
| 6240L     | Gold     | XCC      | 2.6         | NA         | 18    | 2933                    | 150     |
| 6238      | Gold     | XCC      | 2.1         | 30.25      | 22    | 2933                    | 140     |
| 6238M     | Gold     | XCC      | 2.1         | NA         | 22    | 2933                    | 140     |
| 6238L     | Gold     | XCC      | 2.1         | NA         | 22    | 2933                    | 140     |
| 6234      | Gold     | XCC      | 3.3         | 24.75      | 8     | 2933                    | 130     |
| 6230      | Gold     | XCC      | 2.1         | NA         | 20    | 2933                    | 125     |
| 6222V     | Gold     | XCC      | 1.8         | 27.5       | 20    | 2400                    | 115     |
| 6226      | Gold     | XCC      | 2.7         | 19.25      | 12    | 2933                    | 125     |

**Table 5. Supported processors for PowerEdge R940xa (continued)**

| Intel SKU | SKU type | Stepping | Speed (GHz) | Cache (MB) | Cores | Max Memory Speed (MT/s) | TDP (W) |
|-----------|----------|----------|-------------|------------|-------|-------------------------|---------|
| 8164      | Platinum | NA       | 2.0         | 35.75      | 26    | 2666                    | 150     |
| 8160M     | Platinum | NA       | 2.1         | 1.5TB      | 24    | 2666                    | 150     |
| 8160      | Platinum | XCC      | 2.1         | 33         | 24    | 2666                    | 150     |
| 8158      | Platinum | XCC      | 3.0         | NA         | 12    | 2666                    | 150     |
| 8156      | Platinum | NA       | 3.6         | 16.5       | 4     | 2666                    | 105     |
| 8168      | Platinum | XCC      | 2.7         | 33         | 24    | 2666                    | 205     |
| 8170M     | Platinum | NA       | 2.1         | 1.5TB      | 26    | 2666                    | 165     |
| 8170      | Platinum | XCC      | 2.1         | 35.75      | 26    | 2666                    | 165     |
| 8176M     | Platinum | NA       | 2.1         | NA         | 28    | 2666                    | 165     |
| 8176      | Platinum | XCC      | 2.1         | 38.5       | 28    | 2666                    | 165     |
| 8180M     | Platinum | NA       | 2.5         | NA         | 28    | 2666                    | 205     |
| 8180      | Platinum | XCC      | 2.5         | 38.5       | 28    | 2666                    | 205     |
| 8153      | Platinum | XCC      | 2.0         | NA         | 16    | 2666                    | 125     |
| 8280L     | Platinum | XCC      | 2.7         | 38.5       | 28    | 2933                    | 205     |
| 8280M     | Platinum | XCC      | 2.7         | 38.5       | 28    | 2933                    | 205     |
| 8280      | Platinum | XCC      | 2.7         | 38.5       | 28    | 2933                    | 205     |
| 8276L     | Platinum | XCC      | 2.2         | NA         | 28    | 2933                    | 165     |
| 8276M     | Platinum | XCC      | 2.2         | NA         | 28    | 2933                    | 165     |
| 8276      | Platinum | XCC      | 2.2         | NA         | 28    | 2933                    | 165     |
| 8270      | Platinum | XCC      | 2.7         | NA         | 26    | 2933                    | 205     |
| 8268      | Platinum | XCC      | 2.9         | NA         | 24    | 2933                    | 205     |
| 8260L     | Platinum | XCC      | 2.4         | NA         | 24    | 2933                    | 165     |
| 8260M     | Platinum | XCC      | 2.4         | NA         | 24    | 2933                    | 165     |
| 8260      | Platinum | XCC      | 2.4         | NA         | 24    | 2933                    | 165     |
| 8256      | Platinum | XCC      | 3.8         | NA         | 4     | 2933                    | 105     |
| 8253      | Platinum | XCC      | 2.2         | NA         | 16    | 2933                    | 125     |

 **NOTE:** The CPU SKUs ending with M can support up to 1.5TB of memory per socket

## Processor configurations

The PowerEdge R940xa supports four processors with up to 28 cores per processor.

## Processor Installation

For processor installation instructions see the PowerEdge R940xa Installation and Service Manuals.

# Chipset

The PowerEdge R940 systems use the Intel chipset that provides extensive I/O support. Functions and capabilities include:

- ACPI Power Management Logic Support, Revision 4.0a
- PCI Express Base Specification Revision 3.0
- Integrated Serial ATA host controller supports data transfer rates of up to 6 Gb/s on all ports.
- xHCI USB controller with SuperSpeed USB 3.0 ports
- Direct Media Interface
- Serial Peripheral Interface
- Enhanced Serial Peripheral Interface
- Flexible I/O - Allows some high-speed I/O signals to be configured as PCIe root ports, PCIe uplink for use with certain PCH SKUs, SATA (and sSATA), or USB 3.0.
- General Purpose Input Output (GPIO)
- Low Pin Count interface, interrupt controller, and timer functions
- System Management Bus Specification, Version 2.0
- Integrated Clock Controller/Real Time Clock Controller
- Intel High Definition Audio and Intel Smart Sound Technology
- Integrated 10/1 Gb Ethernet
- Integrated 10/100/1000 Mbps Ethernet MAC
- Supports Intel Rapid Storage Technology Enterprise
- Supports Intel Active Management Technology and Server Platform Services
- Supports Intel Server Platform Service firmware
- Supports Intel Virtualization Technology for Directed I/O
- Supports Intel Trusted Execution Technology
- JTAG Boundary Scan support
- Intel PCIe QuickAssist card
- Intel Trace Hub for debug

For more information, go to [Intel.com](https://www.intel.com)

## System memory

Each CPU has 12 memory DIMM slots. Those DIMMs are organized into six different channels so there are 2 DIMMs per channel. For best performance all memory channels should be populated with the same number of DIMMs, either 6 or 12 DIMMs per CPU.

### DIMM Type

There are four different types of DIMMs.

#### RDIMM:

Registered DIMM - Provides for higher capacity options and advanced RAS features. It is the most commonly used DIMM type, and offers the best mix of frequency, capacity, and rank structure choices.

#### LRDIMM:

Load Reduced DIMM - Provides maximum capacity beyond that of an RDIMM but at a higher power consumption. Uses a buffer to reduce memory loading to a single load on all DDR signals, allowing for greater density.

#### DCPMM (also known as Intel Optane DC persistent memory):

Provides a large memory capacity at an affordable price. Any application can take advantage of DCPMM in Memory Mode with a compatible operating system. Unlock more performance and persistency when using an application that supports App Direct Mode. DCPMM is used along with RDIMMs or LRDIMMs, and a maximum number of 6 DCPMMs can be used per CPU. This persistent memory technology does not require a battery.

#### NVDIMM

Non-Volatile DIMM - Provides a persistent memory solution with NAND and DRAM that maintains data in power loss, system crash, or normal shutdown. This solution requires a battery as a power source for an AC loss condition. It can be used along with RDIMMs.

### Intel Optane DC Persistent Memory (DCPMM)

Intel Optane DC Persistent Memory is a new memory technology that allows customers to reach a large memory capacity at an affordable price. Also, when operating the memory in "App Direct Mode" the memory is persistent.

DCPMM comes in 3 different memory sizes, 128 GB, 256 GB, and 512 GB.

RDIMMs and LRDIMMs are used along with Intel Optane DC persistent memory. Each channel is populated with up to one DIMM of DRAM and one DIMM of DCPMM. That means that each CPU has up to 6 DIMMs of DRAM and 6 DIMMs of DCPMM. For best performance, it is recommended to have all 12 DIMMs slots per CPU populated.

Intel Optane DC persistent memory operates in two modes, Memory Mode and Application Direct Mode.

| Trait               | Memory Mode                                          | App Direct Mode                                           |
|---------------------|------------------------------------------------------|-----------------------------------------------------------|
| Application support | Any application                                      | Application must state that it supports "App Direct Mode" |
| DRAM                | Used as cache and is not available as system memory. | Both DCPMM and DRAM are available as system memory.       |
| Persistence         | No                                                   | Yes                                                       |

### Memory Operating Modes

#### Performance Optimized or Optimizer Mode

Prioritizes performance and does not provide any RAS features beyond standard ECC (Error-Correcting Code).

### Memory mirroring

Memory mirroring has two adjacent memory channels that are configured to write the same data to each channel. If one memory channel fails or encounters an error, the other channel continues to transmit data. It is an excellent safeguard for systems requiring uninterrupted operation, though it cuts memory capacity in half, doubles the cost per gigabyte, and can increase power consumption.

### Fault resilient memory

Fault resilient memory is a Dell patented technology that works with the VMWare ESXi Hypervisor to provide a fault resilient zone that protects virtual machines from the ramifications of memory faults.

### Memory sparing

Memory sparing can reduce downtime from correctable errors by allocating one rank (64-bit wide data area on a DIMM) per channel (Single Rank Spare Mode) or two ranks per channel (Multi Rank Spare Mode) as memory spares. If a correctable error occurs in a rank or channel, it is moved to the spare rank while the operating system is running. This prevents the error from causing a failure. Memory sparing reduces memory capacity by one rank per channel or two ranks per channel (depending if Single Rank or Multi Rank is selected) and can increase the cost per gigabyte.

## DIMM Speed and Frequency

The following table lists the PowerEdge R840 memory speeds and CPU support:

**Table 6. PowerEdge R840 memory speeds and CPU support**

| CPU family                                                | DIMM type | DIMM ranking | Capacity                   | Speed (MT/s) |
|-----------------------------------------------------------|-----------|--------------|----------------------------|--------------|
| Intel Xeon Scalable                                       | RDIMM     | 1R/2R        | 8 GB, 16 GB, and 32 GB     | 2666         |
| 2nd Generation Intel Xeon Scalable                        | RDIMM     | 1R           | 8 GB                       | 2666         |
| 2nd Generation Intel Xeon Scalable                        | RDIMM     | 2R           | 16 GB, 32 GB, and 64 Gb    | 2933         |
| Intel Xeon Scalable                                       | LRDIMM    | 4R/8R        | 64 GB                      | 2666         |
|                                                           |           | 4R           | 128 GB                     | 2933         |
| 2nd Generation Intel Xeon Scalable                        | LRDIMM    | 8R           | 128 GB                     | 2666         |
|                                                           |           |              | 256 GB                     | 2666         |
| 2nd Generation Intel Xeon Scalable                        | DCPMM     | N/A          | 128 GB, 256 GB, and 512 GB | 2666         |
| Intel Xeon Scalable or 2nd Generation Intel Xeon Scalable | NVDIMM    | 1R           | 16 GB                      | 2666         |

**NOTE:** The maximum ambient temperature for 256 GB LRDIMMs is 30°C.



# Storage

## Topics:

- [Storage](#)
- [Storage Controller](#)
- [IDSDM with vFlash card](#)
- [External storage](#)

## Storage

The Dell EMC PowerEdge R940xa provide scalable storage that allows you to adapt to your workload and operational demands. The Dell EMC PowerEdge R940xa offers storage expansion with the middle hard drive tray and rear hard drive cage. The hard drive bay supports up to 32 2.5-inch hard drives or SSDs.

### Drive

The PowerEdge R940xa system supports SAS, SATA, Nearline SAS hard drives/SSDs, or NVMe drives.

The supported drive options for the PowerEdge R940xa system are:

- **8 drives system** - Up to eight 2.5-inch (SAS, SATA, or Nearline SAS) front accessible drives in slots 0 through 7.
- **32 drives system** - Up to 24 2.5-inch (SAS, SATA, or Nearline SAS) including 4 NVMe front accessible drives (slots 20 to 23) in slots 0 to 23 of upper drives bay, and up to eight 2.5-inch (SAS, SATA, or Nearline SAS) front accessible drives in slots 24 to 31 of lower drives bay.

## Supported drives

**Table 7. Supported Drives - SAS and SATA or SSD**

| Form Factor | Type      | Speed | Rotational Speed | Capacities                                                                                       |
|-------------|-----------|-------|------------------|--------------------------------------------------------------------------------------------------|
| 2.5-inch    | SATA, SSD | 6 Gb  | N/A              | 240 GB, 400 GB, 480 GB, 800 GB, 960 GB, 1600 GB, 1920 GB, 3200 GB, 3840 GB, 7680 GB              |
|             | SATA      | 6 Gb  | 7.2 K            | 1 TB, 2 TB                                                                                       |
|             | SAS       | 12 Gb | 7.2 K            | 1 TB, 2 TB, 2 TB(SSED FIPS)                                                                      |
|             | SAS, SSD  | 12 Gb | N/A              | 400 GB, 480 GB, 800 GB, 960 GB, 1600 GB, 1920 GB, 3840 GB, 800 GB(SSED FIPS), 1600 GB(SSED FIPS) |
|             | SAS       | 12 Gb | 10K              | 300 GB, 600 GB, 1.2 TB, 1.8 TB, 2.4 TB, 1.2 TB(SSED FIPS), 2.4 TB (SED FIPS)                     |
|             | SAS       | 12 Gb | 15 K             | 300 GB, 600 GB, 900 GB, 900 GB (SED FIPS)                                                        |

The NVMe SSD drives supported by the Dell EMC PowerEdge R940xa are:

| Description                          |
|--------------------------------------|
| NVMe PM1735a 1.6TB GB 2.5" PCIe SSD  |
| NVMe PM1735a 3.2TB GB 2.5" PCIe SSD  |
| NVMe PM1735a 6.4TB GB 2.5" PCIe SSD  |
| NVMe PM1735a 12.8TB GB 2.5" PCIe SSD |
| NVMe PM1733a 1.92TB GB 2.5" PCIe SSD |

| Description                            |
|----------------------------------------|
| NVMe PM1733a 3.8TB GB 2.5" PCIe SSD    |
| NVMe PM1733a 7.6TB GB 2.5" PCIe SSD    |
| NVMe PM1733a 15.36 TB GB 2.5" PCIe SSD |
| Kioxia CD7 960 GB 2.5" PCIe SSD        |
| Kioxia CD7 1.92 TB 2.5" PCIe SSD       |
| Kioxia CD7 3.84 TB 2.5" PCIe SSD       |
| Kioxia CD7 7.68 TB 2.5" PCIe SSD       |

## Storage Controller

Dell EMC's RAID controller options offer performance improvements, including the MiniPERC solution. Mini PERC 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.

The new PERC controller offerings leverage heavily on previous generation PERC family. The premium performance PERC series controller drives better IOPs and enhanced the SSD performance.

**Table 8. PERC series controller offerings**

| Performance Level          | Controller & Description                                                                                                                                                                     |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Entry</b>               | S140 (SATA, NVMe) SW RAID SATA                                                                                                                                                               |
| <b>Value</b>               | HBA330 (Internal), 12Gbps SAS HBA (External) Memory: None x8 12 Gb SAS x8 PCIe 3.0, H330, H350, 12Gbps SAS HBA (External), HBA355e (External) Memory: None x8 12 Gb SAS x8 PCIe 3.0, HBA350i |
| <b>Value Performance</b>   | H730P Memory: 2GB, NV 72-bit, 866MHz x8 12 Gb SAS x8 PCIe 3.0 , H750                                                                                                                         |
| <b>Premium Performance</b> | H740P, 8x8 ROC Memory: 4/8GB, NV 72-bit                                                                                                                                                      |

## IDSDM with vFlash card

The Internal Dual microSD Module (IDSDM) and vFlash card are combined into a single card module in the latest PowerEdge systems. The following are SKUs available for PowerEdge R940xa systems:

- vFlash only
- IDSDM only
- vFlash and IDSDM

 **NOTE:** The IDSDM only option come with vFlash hardware but required iDRAC Enterprise license to enable it.

The IDSDM with vFlash module sits in the back of the chassis, in a Dell-proprietary PCIe x1 slot using a USB 3.0 interface to host. In 14 Gen system, the IDSDM and/or vFlash card moves from SD to microSD and the supported capacity for IDSDM microSD cards are 16, 32, and 64 GB while for vFlash the capacity is 16 GB only. The write-protect switch is built onboard on the IDSDM with vFlash module.

## External storage

**Table 9. External storage device types**

| Device Type          | Description                                       |
|----------------------|---------------------------------------------------|
| <b>External Tape</b> | Supports connection to external USB tape products |

**Table 9. External storage device types (continued)**

| <b>Device Type</b>                | <b>Description</b>                          |
|-----------------------------------|---------------------------------------------|
| <b>NAS/IDM appliance software</b> | Supports NAS software stack                 |
| <b>JBOD</b>                       | Supports connection to 12Gb MD-series JBODs |

## Optical drives

The PowerEdge R940xa supports one of the following internal optical drive options:

- DVD-ROM
- DVD+RW

## Tape drives

The PowerEdge R940xa does not support internal tape drives. However, external tape drives are supported. The supported external tape drives are as mentioned below:

- External RD1000 USB
- External LTO-5, LTO-6, LTO-7 and 6 Gb SAS tape drives
- 114X rack mount chassis with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL1000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL2000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL2000 with LTO-5, LTO-6, and LTO-7 8Gb FC tape drives
- TL4000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL4000 with LTO-5, LTO-6, and LTO-7 8Gb FC tape drives
- ML6000 with LTO-5, LTO-6, 6 Gb SAS tape drives
- ML6000 with LTO-5, LTO-6, LTO-7 8Gb FC tape drives

# PCIe subsystem

The section below contains information about the PCIe Risers, expansion cards, and PCIe slot power.

## Topics:

- [Expansion card installation guidelines](#)
- [PCIe slot power](#)

## Expansion card installation guidelines

The PowerEdge R940xa system supports up to 12 PCI express (PCIe) generation 3 expansion cards, that can be installed on the system board using expansion card risers.

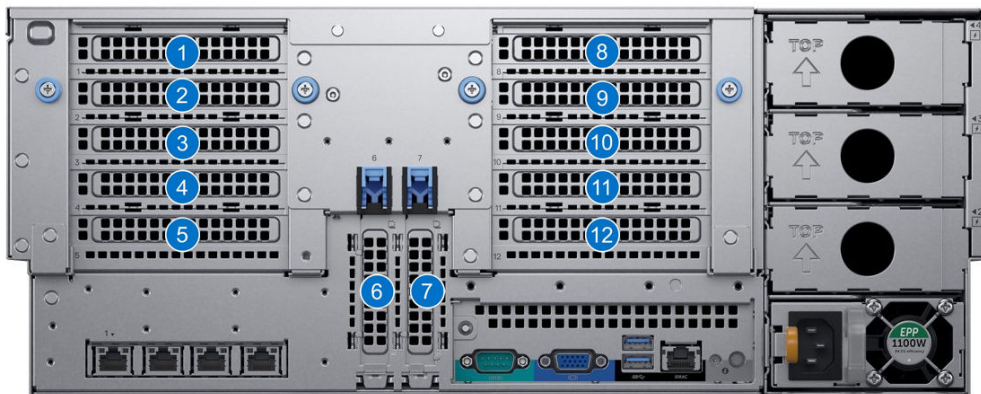


Figure 4. PCIe slot numbering

The following table provides detailed information about the expansion card riser specifications:

Table 10. Expansion card riser specifications

| Number of processors | NVMe       | GPU                                            | Riser size       | Slot size        | Slot quantity | Available slots | Height       | Length |
|----------------------|------------|------------------------------------------------|------------------|------------------|---------------|-----------------|--------------|--------|
| 4                    | NA         | GPU Ready/<br>Double wide accelerators capable | X16 PCIe Riser 1 | X 16             | 2             | 2,4             | FH           | FL     |
|                      |            |                                                |                  | X 8              | 1             | 5               | FH           | HL     |
|                      |            |                                                | X16 PCIe Riser 2 | X 16             | 2             | 9,11            | FH           | FL     |
|                      |            |                                                |                  | X 8              | 1             | 12              | FH           | HL     |
|                      | NA         | Non-GPU/<br>Single wide FPGA                   | X8 PCIe Riser 1  | X 8              | 5             | 1,2,3,4,5       | FH           | HL     |
|                      |            |                                                |                  | X8 PCIe Riser 2  | X 8           | 5               | 8,9,10,11,12 | FH     |
|                      | Front NVMe | GPU Ready/<br>Double wide accelerators capable | X16 PCIe Riser 1 | X 16             | 2             | 2,4             | FH           | FL     |
|                      |            |                                                |                  | X16 PCIe Riser 2 | X 16          | 2               | 9,11         | FH     |
|                      | Front NVMe | Non-GPU/<br>Single wide FPGA                   | X8 PCIe Riser 1  | X 8              | 4             | 1,2,3,4         | FH           | HL     |
|                      |            |                                                |                  | X8 PCIe Riser 2  | X 8           | 4               | 8,9,10,11    | FH     |

**Table 10. Expansion card riser specifications (continued)**

| Number of processors | NVMe | GPU                                            | Riser size       | Slot size | Slot quantity | Available slots | Height | Length |
|----------------------|------|------------------------------------------------|------------------|-----------|---------------|-----------------|--------|--------|
| 2                    | NA   | GPU Ready/<br>Double wide accelerators capable | X16 PCIe Riser 1 | X 16      | 1             | 4               | FH     | FL     |
|                      |      |                                                | X16 PCIe Riser 2 | X 16      | 1             | 11              | FH     | FL     |
|                      | NA   | Non-GPU/<br>Single wide FPGA                   | X8 PCIe Riser 1  | X 8       | 2             | 3,4             | FH     | HL     |
|                      |      |                                                | X8 PCIe Riser 2  | X 8       | 2             | 10,11           | FH     | HL     |

**NOTE:** Use double-wide accelerator capable for installation or removal of Xilinx card.

**Table 11. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2) in a dual processor configuration**

| Card Type                                                                                                   | Slot Priority | Maximum number of Cards |
|-------------------------------------------------------------------------------------------------------------|---------------|-------------------------|
| Intel 25G NICs                                                                                              | 11,4          | 2                       |
| Intel 25G NICs                                                                                              | 6,7           | 2                       |
| Nvidia GPU                                                                                                  | 4,11          | 2                       |
| Intel FPGA                                                                                                  | 11,4          | 2                       |
| Xilinx FPGA<br><b>NOTE:</b> Use double-wide accelerator capable for installation or removal of Xilinx card. | 11,4          | 2                       |
| Dell design PERC10/11                                                                                       | 7             | 1                       |
| Mellanox Infiniband HCA EDR                                                                                 | 6,7           | 2                       |
| Mellanox Infiniband HCA EDR                                                                                 | 11,4          | 2                       |
| Mellanox 100G NICs                                                                                          | 6,7           | 2                       |
| Mellanox 100G NICs                                                                                          | 11,4          | 2                       |
| INTEL Omni-Path HFI                                                                                         | 6,7           | 2                       |
| INTEL Omni-Path HFI                                                                                         | 11,4          | 2                       |
| Dell design BOSS                                                                                            | 11,4          | 1                       |
| Dell design BOSS                                                                                            | 6,7           | 1                       |
| Dell design External RAID                                                                                   | 6,7           | 2                       |
| Dell design External RAID                                                                                   | 11,4          | 2                       |
| Mellanox Infiniband HCA FDR                                                                                 | 6,7           | 2                       |
| INTEL 40Gb NICs                                                                                             | 11,4          | 2                       |
| INTEL 40Gb NICs                                                                                             | 6,7           | 2                       |
| Mellanox 40G NICs                                                                                           | 6,7           | 2                       |
| Mellanox 40G NICs                                                                                           | 11,4          | 2                       |
| Emulex FC32 HBA                                                                                             | 11,4          | 2                       |
| Emulex FC32 HBA                                                                                             | 6,7           | 2                       |
| Qlogic FC32 HBA                                                                                             | 11,4          | 2                       |
| Qlogic FC32 HBA                                                                                             | 6,7           | 2                       |

**Table 11. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2) in a dual processor configuration (continued)**

| <b>Card Type</b>          | <b>Slot Priority</b> | <b>Maximum number of Cards</b> |
|---------------------------|----------------------|--------------------------------|
| Broadcom 25G NICs         | 6,7                  | 2                              |
| Broadcom 25G NICs         | 11,4                 | 2                              |
| INTEL 25Gb NICs           | 11,4                 | 2                              |
| INTEL 25Gb NICs           | 6,7                  | 2                              |
| Mellanox 25G NICs         | 11,4                 | 2                              |
| Mellanox 25G NICs         | 6,7                  | 2                              |
| Qlogic 25G NICs           | 11,4                 | 2                              |
| Qlogic 25G NICs           | 6,7                  | 2                              |
| Emulex FC16 HBA           | 11,4                 | 2                              |
| Emulex FC16 HBA           | 6,7                  | 2                              |
| Qlogic FC16 HBA           | 11,4                 | 2                              |
| Qlogic FC16 HBA           | 6,7                  | 2                              |
| Broadcom 10Gb NICs        | 6,7                  | 2                              |
| Broadcom 10Gb NICs        | 11,4                 | 2                              |
| INTEL 10Gb NICs           | 6,7                  | 2                              |
| INTEL 10Gb NICs           | 11,4                 | 2                              |
| Mellanox 10Gb NICs        | 6,7                  | 2                              |
| Mellanox 10Gb NICs        | 11,4                 | 2                              |
| Qlogic 10Gb NICs          | 11,4                 | 2                              |
| Qlogic 10Gb NICs          | 6,7                  | 2                              |
| Solarflare 10Gb NICs      | 11,4                 | 2                              |
| Solarflare 10Gb NICs      | 6,7                  | 2                              |
| Emulex FC8 HBA            | 6,7                  | 2                              |
| Emulex FC8 HBA            | 11,4                 | 2                              |
| Qlogic FC8 HBA            | 6,7                  | 2                              |
| Qlogic FC8 HBA            | 11,4                 | 2                              |
| Broadcom 1Gb NICs         | 11,4                 | 2                              |
| Broadcom 1Gb NICs         | 6,7                  | 2                              |
| INTEL 1Gb NICs            | 6,7                  | 2                              |
| INTEL 1Gb NICs            | 11,4                 | 2                              |
| Dell design Non-RAID      | 6,7                  | 2                              |
| Dell design Non-RAID      | 11,4                 | 2                              |
| Dell design NVMe PCIe SSD | 6,7,11,4             | 4                              |
| INTEL rNDC                | Integrated Slot      | 1                              |
| Broadcom rNDC             | Integrated Slot      | 1                              |
| Mellanox rNDC             | Integrated Slot      | 1                              |
| Qlogic rNDC               | Integrated Slot      | 1                              |

**Table 11. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2) in a dual processor configuration (continued)**

| Card Type     | Slot Priority | Maximum number of Cards |
|---------------|---------------|-------------------------|
| GPU           | 4,11          | 2                       |
| 100G NICs     | 6,7           | 2                       |
| 100G NICs     | 11,4          | 2                       |
| External RAID | 6,7           | 2                       |
| External RAID | 11,4          | 2                       |
| External RAID | 11,4,6,7      | 4                       |
| FC32 HBA      | 11,4          | 2                       |
| FC32 HBA      | 6,7           | 2                       |
| 25G NICs      | 11,4          | 2                       |
| 25G NICs      | 6,7           | 2                       |
| 10Gb NICs     | 6,7           | 2                       |
| 10Gb NICs     | 11,4          | 2                       |
| Non-RAID      | 6,7           | 2                       |
| Non-RAID      | 11,4          | 2                       |
| Non-RAID      | 11,4,6,7      | 4                       |
| HBA355e       | 11, 4, 6, 7   | 2                       |

**Table 12. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2) in a dual processor configuration**

| Card Type                   | Slot Priority | Maximum number of Cards |
|-----------------------------|---------------|-------------------------|
| Intel 25G NICs              | 3,4,10,11     | 4                       |
| Intel 25G NICs              | 6,7           | 2                       |
| Dell design PERC10          | 4             | 1                       |
| Dell design PERC11          | 7             | 1                       |
| Intel FPGA                  | 3,4,10,11     | 4                       |
| Mellanox Infiniband HCA EDR | 6,7           | 2                       |
| Mellanox 100G NICs          | 6,7           | 2                       |
| INTEL Omni-Path HFI         | 6,7           | 2                       |
| Dell design BOSS            | 3,4,10,11     | 1                       |
| Dell design BOSS            | 6,7           | 1                       |
| Dell design External RAID   | 6,7           | 2                       |
| Dell design External RAID   | 3,4,10,11     | 2                       |
| Mellanox Infiniband HCA FDR | 6,7           | 2                       |
| INTEL 40Gb NICs             | 3,4,10,11     | 4                       |
| INTEL 40Gb NICs             | 6,7           | 2                       |
| Mellanox 40G NICs           | 6,7           | 2                       |
| Mellanox 40G NICs           | 3,4,10,11     | 4                       |
| Emulex FC32 HBA             | 3,4,10,11     | 4                       |

**Table 12. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2) in a dual processor configuration (continued)**


| <b>Card Type</b>          | <b>Slot Priority</b> | <b>Maximum number of Cards</b> |
|---------------------------|----------------------|--------------------------------|
| Emulex FC32 HBA           | 6,7                  | 2                              |
| Qlogic FC32 HBA           | 3,4,10,11            | 4                              |
| Qlogic FC32 HBA           | 6,7                  | 2                              |
| Broadcom 25G NICs         | 6,7                  | 2                              |
| Broadcom 25G NICs         | 3,4,10,11            | 4                              |
| INTEL 25Gb NICs           | 3,4,10,11            | 4                              |
| INTEL 25Gb NICs           | 6,7                  | 2                              |
| Mellanox 25G NICs         | 3,4,10,11            | 4                              |
| Mellanox 25G NICs         | 6,7                  | 2                              |
| Qlogic 25G NICs           | 3,4,10,11            | 4                              |
| Qlogic 25G NICs           | 6,7                  | 2                              |
| Emulex FC16 HBA           | 3,4,10,11            | 4                              |
| Emulex FC16 HBA           | 6,7                  | 2                              |
| Qlogic FC16 HBA           | 3,4,10,11            | 4                              |
| Qlogic FC16 HBA           | 6,7                  | 2                              |
| Broadcom 10Gb NICs        | 6,7                  | 2                              |
| Broadcom 10Gb NICs        | 3,4,10,11            | 4                              |
| INTEL 10Gb NICs           | 6,7                  | 2                              |
| INTEL 10Gb NICs           | 3,4,10,11            | 4                              |
| Mellanox 10Gb NICs        | 6,7                  | 2                              |
| Mellanox 10Gb NICs        | 3,4,10,11            | 4                              |
| Qlogic 10Gb NICs          | 3,4,10,11            | 4                              |
| Qlogic 10Gb NICs          | 6,7                  | 2                              |
| Solarflare 10Gb NICs      | 3,4,10,11            | 4                              |
| Solarflare 10Gb NICs      | 6,7                  | 2                              |
| Emulex FC8 HBA            | 6,7                  | 2                              |
| Emulex FC8 HBA            | 3,4,10,11            | 4                              |
| Qlogic FC8 HBA            | 6,7                  | 2                              |
| Qlogic FC8 HBA            | 3,4,10,11            | 4                              |
| Broadcom 1Gb NICs         | 3,4,10,11            | 4                              |
| Broadcom 1Gb NICs         | 6,7                  | 2                              |
| INTEL 1Gb NICs            | 6,7                  | 2                              |
| INTEL 1Gb NICs            | 3,4,10,11            | 4                              |
| Dell design Non-RAID      | 6,7                  | 2                              |
| Dell design Non-RAID      | 3,4,10,11            | 4                              |
| Dell design NVMe PCIe SSD | 3,4,10,11,6,7        | 6                              |
| INTEL rNDC                | Integrated Slot      | 1                              |



**Table 12. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2) in a dual processor configuration (continued)**

| Card Type       | Slot Priority      | Maximum number of Cards |
|-----------------|--------------------|-------------------------|
| Broadcom rNDC   | Integrated Slot    | 1                       |
| Mellanox rNDC   | Integrated Slot    | 1                       |
| Qlogic rNDC     | Integrated Slot    | 1                       |
| 100G NICs       | 6,7                | 2                       |
| External RAID   | 6,7                | 2                       |
| External RAID   | 3,4,10,11          | 2                       |
| External RAID   | 3,4,10,11,6,7      | 4                       |
| FC32 HBA        | 3,4,10,11          | 4                       |
| FC32 HBA        | 6,7                | 2                       |
| 25G NICs        | 3,4,10,11          | 4                       |
| 25G NICs        | 6,7                | 2                       |
| 10Gb NICs       | 3,4,10,11          | 4                       |
| 10Gb NICs       | 6,7                | 2                       |
| Non-RAID        | 6,7                | 2                       |
| Non-RAID        | 3,4,10,11          | 4                       |
| Non-RAID        | 3,4,10,11,6,7      | 6                       |
| HBA355e         | 3, 4, 10, 11, 6, 7 | 2                       |
| Intel 100G NICs | 6, 7               | 2                       |

**Table 13. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2) in a quad processor configuration**

| Card Type                                                                                                                                                                                       | Slot Priority | Maximum number of Cards |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------|
| Intel 25G NICs                                                                                                                                                                                  | 5,12,9,11,2,4 | 6                       |
| Intel 25G NICs                                                                                                                                                                                  | 6,7           | 2                       |
| Nvidia GPU                                                                                                                                                                                      | 4,2,11,9      | 4                       |
| Intel FPGA                                                                                                                                                                                      | 9,11,2,4      | 4                       |
| Xilinx FPGA<br> <b>NOTE:</b> Use double-wide accelerator capable for installation or removal of Xilinx card. | 9,11,2,4      | 4                       |
| Dell design PERC10                                                                                                                                                                              | 5             | 1                       |
| Dell design PERC11                                                                                                                                                                              | 7             | 1                       |
| Mellanox Infiniband HCA EDR                                                                                                                                                                     | 6,7           | 2                       |
| Mellanox Infiniband HCA EDR                                                                                                                                                                     | 9,11,2,4      | 4                       |
| Mellanox 100G NICs                                                                                                                                                                              | 6,7           | 2                       |
| Mellanox 100G NICs                                                                                                                                                                              | 9,11,2,4      | 4                       |
| INTEL Omni-Path HFI                                                                                                                                                                             | 6,7           | 2                       |
| INTEL Omni-Path HFI                                                                                                                                                                             | 9,11,2,4      | 4                       |
| Dell design BOSS                                                                                                                                                                                | 5,12,9,11,2,4 | 1                       |

**Table 13. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2) in a quad processor configuration (continued)**

| <b>Card Type</b>            | <b>Slot Priority</b> | <b>Maximum number of Cards</b> |
|-----------------------------|----------------------|--------------------------------|
| Dell design BOSS            | 6,7                  | 1                              |
| Dell design External RAID   | 6,7                  | 2                              |
| Dell design External RAID   | 5,12,9,11,2,4        | 2                              |
| Mellanox Infiniband HCA FDR | 6,7                  | 2                              |
| INTEL 40Gb NICs             | 5,12,9,11,2,4        | 6                              |
| INTEL 40Gb NICs             | 6,7                  | 2                              |
| Mellanox 40G NICs           | 6,7                  | 2                              |
| Mellanox 40G NICs           | 5,12,9,11,2,4        | 6                              |
| Emulex FC32 HBA             | 5,12,9,11,2,4        | 6                              |
| Emulex FC32 HBA             | 6,7                  | 2                              |
| Qlogic FC32 HBA             | 5,12,9,11,2,4        | 6                              |
| Qlogic FC32 HBA             | 6,7                  | 2                              |
| Broadcom 25G NICs           | 6,7                  | 2                              |
| Broadcom 25G NICs           | 5,12,9,11,2,4        | 6                              |
| INTEL 25Gb NICs             | 5,12,9,11,2,4        | 6                              |
| INTEL 25Gb NICs             | 6,7                  | 2                              |
| Mellanox 25G NICs           | 5,12,9,11,2,4        | 6                              |
| Mellanox 25G NICs           | 6,7                  | 2                              |
| Qlogic 25G NICs             | 5,12,9,11,2,4        | 6                              |
| Qlogic 25G NICs             | 6,7                  | 2                              |
| Emulex FC16 HBA             | 5,12,9,11,2,4        | 6                              |
| Emulex FC16 HBA             | 6,7                  | 2                              |
| Qlogic FC16 HBA             | 5,12,9,11,2,4        | 6                              |
| Qlogic FC16 HBA             | 6,7                  | 2                              |
| Broadcom 10Gb NICs          | 6,7                  | 2                              |
| Broadcom 10Gb NICs          | 5,12,9,11,2,4        | 6                              |
| INTEL 10Gb NICs             | 6,7                  | 2                              |
| INTEL 10Gb NICs             | 5,12,9,11,2,4        | 6                              |
| Mellanox 10Gb NICs          | 6,7                  | 2                              |
| Mellanox 10Gb NICs          | 5,12,9,11,2,4        | 6                              |
| Qlogic 10Gb NICs            | 5,12,9,11,2,4        | 6                              |
| Qlogic 10Gb NICs            | 6,7                  | 2                              |
| Solarflare 10Gb NICs        | 5,12,9,11,2,4        | 6                              |
| Solarflare 10Gb NICs        | 6,7                  | 2                              |
| Emulex FC8 HBA              | 6,7                  | 2                              |
| Emulex FC8 HBA              | 5,12,9,11,2,4        | 6                              |
| Qlogic FC8 HBA              | 6,7                  | 2                              |

**Table 13. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2) in a quad processor configuration (continued)**

| Card Type                 | Slot Priority            | Maximum number of Cards |
|---------------------------|--------------------------|-------------------------|
| Qlogic FC8 HBA            | 5,12,9,11,2,4            | 6                       |
| Broadcom 1Gb NICs         | 5,12,9,11,2,4            | 6                       |
| Broadcom 1Gb NICs         | 6,7                      | 2                       |
| INTEL 1Gb NICs            | 6,7                      | 2                       |
| INTEL 1Gb NICs            | 5,12,9,11,2,4            | 6                       |
| Dell design Non-RAID      | 6,7                      | 2                       |
| Dell design Non-RAID      | 5,12,9,11,2,4            | 6                       |
| Dell design NVMe PCIe SSD | 5,12,6,7,9,11,2,4        | 8                       |
| INTEL rNDC                | Integrated Slot          | 1                       |
| Broadcom rNDC             | Integrated Slot          | 1                       |
| Mellanox rNDC             | Integrated Slot          | 1                       |
| Qlogic rNDC               | Integrated Slot          | 1                       |
| GPU                       | 4,2,11,9                 | 4                       |
| 100G NICs                 | 6,7                      | 2                       |
| 100G NICs                 | 9,11,2,4                 | 4                       |
| External RAID             | 6,7                      | 2                       |
| External RAID             | 5,12,9,11,2,4            | 2                       |
| External RAID             | 5,12,9,11,2,4,6,7        | 4                       |
| FC32 HBA                  | 5,12,9,11,2,4            | 6                       |
| FC32 HBA                  | 6,7                      | 2                       |
| 25G NICs                  | 5,12,9,11,2,4            | 6                       |
| 10Gb NICs                 | 6,7                      | 2                       |
| 10Gb NICs                 | 5,12,9,11,2,4            | 6                       |
| 10Gb NICs                 | 6,7                      | 2                       |
| Non-RAID                  | 6,7                      | 2                       |
| Non-RAID                  | 5,12,9,11,2,4            | 6                       |
| Non-RAID                  | 5,12,9,11,2,4,6,7        | 8                       |
| HBA355e                   | 5, 12, 9, 11, 2, 4, 6, 7 | 2                       |

**Table 14. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2) in a quad processor configuration**

| Card Type                   | Slot Priority          | Maximum number of Cards |
|-----------------------------|------------------------|-------------------------|
| Intel 25G NICs              | 1,2,3,4,5,8,9,10,11,12 | 10                      |
| Intel 25G NICs              | 6,7                    | 2                       |
| Dell design PERC10          | 5                      | 1                       |
| Dell design PERC11          | 7                      | 1                       |
| Intel FPGA                  | 1,2,3,4,8,9,10,11      | 8                       |
| Mellanox Infiniband HCA EDR | 6,7                    | 2                       |

**Table 14. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2) in a quad processor configuration (continued)**

| <b>Card Type</b>            | <b>Slot Priority</b>   | <b>Maximum number of Cards</b> |
|-----------------------------|------------------------|--------------------------------|
| Mellanox 100G NICs          | 6,7                    | 2                              |
| INTEL Omni-Path HFI         | 6,7                    | 2                              |
| Dell design BOSS            | 1,2,3,4,5,8,9,10,11,12 | 1                              |
| Dell design BOSS            | 6,7                    | 1                              |
| Dell design External RAID   | 6,7                    | 2                              |
| Dell design External RAID   | 1,2,3,4,5,8,9,10,11,12 | 2                              |
| Mellanox Infiniband HCA FDR | 6,7                    | 2                              |
| INTEL 40Gb NICs             | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| INTEL 40Gb NICs             | 6,7                    | 2                              |
| Mellanox 40G NICs           | 6,7                    | 2                              |
| Mellanox 40G NICs           | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Emulex FC32 HBA             | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Emulex FC32 HBA             | 6,7                    | 2                              |
| Qlogic FC32 HBA             | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Qlogic FC32 HBA             | 6,7                    | 2                              |
| Broadcom 25G NICs           | 6,7                    | 2                              |
| Broadcom 25G NICs           | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| INTEL 25Gb NICs             | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| INTEL 25Gb NICs             | 6,7                    | 2                              |
| Mellanox 25G NICs           | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Mellanox 25G NICs           | 6,7                    | 2                              |
| Qlogic 25G NICs             | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Qlogic 25G NICs             | 6,7                    | 2                              |
| Emulex FC16 HBA             | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Emulex FC16 HBA             | 6,7                    | 2                              |
| Qlogic FC16 HBA             | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Qlogic FC16 HBA             | 6,7                    | 2                              |
| Broadcom 10Gb NICs          | 6,7                    | 2                              |
| Broadcom 10Gb NICs          | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| INTEL 10Gb NICs             | 6,7                    | 2                              |
| INTEL 10Gb NICs             | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Mellanox 10Gb NICs          | 6,7                    | 2                              |
| Mellanox 10Gb NICs          | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Qlogic 10Gb NICs            | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Qlogic 10Gb NICs            | 6,7                    | 2                              |
| Solarflare 10Gb NICs        | 1,2,3,4,5,8,9,10,11,12 | 10                             |
| Solarflare 10Gb NICs        | 6,7                    | 2                              |

**Table 14. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2) in a quad processor configuration (continued)**

| Card Type                 | Slot Priority                         | Maximum number of Cards |
|---------------------------|---------------------------------------|-------------------------|
| Emulex FC8 HBA            | 6,7                                   | 2                       |
| Emulex FC8 HBA            | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| Qlogic FC8 HBA            | 6,7                                   | 2                       |
| Qlogic FC8 HBA            | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| Broadcom 1Gb NICs         | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| Broadcom 1Gb NICs         | 6,7                                   | 2                       |
| INTEL 1Gb NICs            | 6,7                                   | 2                       |
| INTEL 1Gb NICs            | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| Dell design Non-RAID      | 6,7                                   | 2                       |
| Dell design Non-RAID      | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| Dell design NVMe PCIe SSD | 1,2,3,4,5,8,9,10,11,12,6,7            | 12                      |
| INTEL rNDC                | Integrated Slot                       | 1                       |
| Broadcom rNDC             | Integrated Slot                       | 1                       |
| Mellanox rNDC             | Integrated Slot                       | 1                       |
| Qlogic rNDC               | Integrated Slot                       | 1                       |
| 100G NICs                 | 6,7                                   | 2                       |
| External RAID             | 6,7                                   | 2                       |
| External RAID             | 1,2,3,4,5,8,9,10,11,12                | 2                       |
| External RAID             | 1,2,3,4,5,8,9,10,11,12,6,7            | 4                       |
| FC32 HBA                  | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| FC32 HBA                  | 6,7                                   | 2                       |
| 25G NICs                  | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| 25G NICs                  | 6,7                                   | 2                       |
| 10Gb NICs                 | 6,7                                   | 2                       |
| 10Gb NICs                 | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| Non-RAID                  | 6,7                                   | 2                       |
| Non-RAID                  | 1,2,3,4,5,8,9,10,11,12                | 10                      |
| Non-RAID                  | 1,2,3,4,5,8,9,10,11,12,6,7            | 12                      |
| HBA355e                   | 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 6, 7 | 2                       |

**Table 15. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2)with NVME in a quad processor configuration**

| Card Type      | Slot Priority | Maximum number of Cards |
|----------------|---------------|-------------------------|
| Intel 25G NICs | 9,11,2,4      | 4                       |
| Intel 25G NICs | 6,7           | 2                       |
| Nvidia GPU     | 4,2,11,9      | 4                       |
| Intel FPGA     | 9,11,2,4      | 4                       |
| Xilinx FPGA    | 9,11,2,4      | 4                       |

**Table 15. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2)with NVME in a quad processor configuration (continued)**

| Card Type                                                                                                                                                                                                                      | Slot Priority | Maximum number of Cards |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------|
|  <b>NOTE:</b> Use double-wide accelerator capable for installation or removal of Xilinx card.                                                 |               |                         |
| Dell design PERC10/11                                                                                                                                                                                                          | 7             | 1                       |
| Mellanox Infiniband HCA EDR                                                                                                                                                                                                    | 6,7           | 2                       |
| Mellanox Infiniband HCA EDR<br> <b>NOTE:</b> Mellanox CX6 card only supports install in slot 11 and slot 4 for quad processors configuration. | 9,11,2,4      | 4                       |
| Mellanox 100G NICs                                                                                                                                                                                                             | 6,7           | 2                       |
| Mellanox 100G NICs                                                                                                                                                                                                             | 9,11,2,4      | 4                       |
| INTEL Omni-Path HFI                                                                                                                                                                                                            | 6,7           | 2                       |
| INTEL Omni-Path HFI                                                                                                                                                                                                            | 9,11,2,4      | 4                       |
| Dell design BOSS                                                                                                                                                                                                               | 9,11,2,4      | 1                       |
| Dell design BOSS                                                                                                                                                                                                               | 6,7           | 1                       |
| Dell design External RAID                                                                                                                                                                                                      | 6,7           | 2                       |
| Dell design External RAID                                                                                                                                                                                                      | 9,11,2,4      | 2                       |
| Mellanox Infiniband HCA FDR                                                                                                                                                                                                    | 6,7           | 2                       |
| INTEL 40Gb NICs                                                                                                                                                                                                                | 9,11,2,4      | 4                       |
| INTEL 40Gb NICs                                                                                                                                                                                                                | 6,7           | 2                       |
| Mellanox 40G NICs                                                                                                                                                                                                              | 6,7           | 2                       |
| Mellanox 40G NICs                                                                                                                                                                                                              | 9,11,2,4      | 4                       |
| Emulex FC32 HBA                                                                                                                                                                                                                | 9,11,2,4      | 4                       |
| Emulex FC32 HBA                                                                                                                                                                                                                | 6,7           | 2                       |
| Qlogic FC32 HBA                                                                                                                                                                                                                | 9,11,2,4      | 4                       |
| Qlogic FC32 HBA                                                                                                                                                                                                                | 6,7           | 2                       |
| Broadcom 25G NICs                                                                                                                                                                                                              | 6,7           | 2                       |
| Broadcom 25G NICs                                                                                                                                                                                                              | 9,11,2,4      | 4                       |
| INTEL 25Gb NICs                                                                                                                                                                                                                | 9,11,2,4      | 4                       |
| INTEL 25Gb NICs                                                                                                                                                                                                                | 6,7           | 2                       |
| Mellanox 25G NICs                                                                                                                                                                                                              | 9,11,2,4      | 4                       |
| Mellanox 25G NICs                                                                                                                                                                                                              | 6,7           | 2                       |
| Qlogic 25G NICs                                                                                                                                                                                                                | 9,11,2,4      | 4                       |
| Qlogic 25G NICs                                                                                                                                                                                                                | 6,7           | 2                       |
| Emulex FC16 HBA                                                                                                                                                                                                                | 9,11,2,4      | 4                       |
| Emulex FC16 HBA                                                                                                                                                                                                                | 6,7           | 2                       |
| Qlogic FC16 HBA                                                                                                                                                                                                                | 9,11,2,4      | 4                       |
| Qlogic FC16 HBA                                                                                                                                                                                                                | 6,7           | 2                       |

**Table 15. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2)with NVME in a quad processor configuration (continued)**

| <b>Card Type</b>          | <b>Slot Priority</b> | <b>Maximum number of Cards</b> |
|---------------------------|----------------------|--------------------------------|
| Broadcom 10Gb NICs        | 6,7                  | 2                              |
| Broadcom 10Gb NICs        | 9,11,2,4             | 4                              |
| INTEL 10Gb NICs           | 6,7                  | 2                              |
| INTEL 10Gb NICs           | 9,11,2,4             | 4                              |
| Mellanox 10Gb NICs        | 6,7                  | 2                              |
| Mellanox 10Gb NICs        | 9,11,2,4             | 4                              |
| Qlogic 10Gb NICs          | 9,11,2,4             | 4                              |
| Qlogic 10Gb NICs          | 6,7                  | 2                              |
| Solarflare 10Gb NICs      | 9,11,2,4             | 4                              |
| Solarflare 10Gb NICs      | 6,7                  | 2                              |
| Emulex FC8 HBA            | 6,7                  | 2                              |
| Emulex FC8 HBA            | 9,11,2,4             | 4                              |
| Qlogic FC8 HBA            | 6,7                  | 2                              |
| Qlogic FC8 HBA            | 9,11,2,4             | 4                              |
| Broadcom 1Gb NICs         | 9,11,2,4             | 4                              |
| Broadcom 1Gb NICs         | 6,7                  | 2                              |
| INTEL 1Gb NICs            | 6,7                  | 2                              |
| INTEL 1Gb NICs            | 9,11,2,4             | 4                              |
| Dell design Non-RAID      | 6,7                  | 2                              |
| Dell design Non-RAID      | 9,11,2,4             | 4                              |
| Dell design NVMe PCIe SSD | 6,7,9,11,2,4         | 6                              |
| INTEL rNDC                | Integrated Slot      | 1                              |
| Broadcom rNDC             | Integrated Slot      | 1                              |
| Mellanox rNDC             | Integrated Slot      | 1                              |
| Qlogic rNDC               | Integrated Slot      | 1                              |
| GPU                       | 4,2,11,9             | 4                              |
| 100G NICs                 | 6,7                  | 2                              |
| 100G NICs                 | 9,11,2,4             | 4                              |
| External RAID             | 6,7                  | 2                              |
| External RAID             | 9,11,2,4             | 2                              |
| External RAID             | 9,11,2,4,6,7         | 4                              |
| FC32 HBA                  | 9,11,2,4             | 4                              |
| FC32 HBA                  | 6,7                  | 2                              |
| 25G NICs                  | 9,11,2,4             | 4                              |
| 25G NICs                  | 6,7                  | 2                              |
| 10Gb NICs                 | 6,7                  | 2                              |
| 10Gb NICs                 | 9,11,2,4             | 4                              |

**Table 15. Riser configuration (X16PCIe Riser 1+X16 PCIe Riser 2)with NVME in a quad processor configuration (continued)**

| Card Type | Slot Priority     | Maximum number of Cards |
|-----------|-------------------|-------------------------|
| Non-RAID  | 6,7               | 2                       |
| Non-RAID  | 9,11,2,4          | 4                       |
| Non-RAID  | 9,11,2,4,6,7      | 6                       |
| HBA355e   | 9, 11, 2, 4, 6, 7 | 2                       |

**Table 16. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2)with NVME in a quad processor configuration**

| Card Type                   | Slot Priority     | Maximum number of Cards |
|-----------------------------|-------------------|-------------------------|
| Intel 25G NICs              | 1,2,3,4,8,9,10,11 | 8                       |
| Intel 25G NICs              | 6,7               | 2                       |
| Dell design PERC10          | 4                 | 1                       |
| Dell design PERC11          | 7                 | 1                       |
| Intel FPGA                  | 1,2,3,4,8,9,10,11 | 8                       |
| Mellanox Infiniband HCA EDR | 6,7               | 2                       |
| Mellanox 100G NICs          | 6,7               | 2                       |
| INTEL Omni-Path HFI         | 6,7               | 2                       |
| Dell design BOSS            | 1,2,3,4,8,9,10,11 | 1                       |
| Dell design BOSS            | 6,7               | 1                       |
| Dell design External RAID   | 6,7               | 2                       |
| Dell design External RAID   | 1,2,3,4,8,9,10,11 | 2                       |
| Mellanox Infiniband HCA FDR | 6,7               | 2                       |
| INTEL 40Gb NICs             | 1,2,3,4,8,9,10,11 | 8                       |
| INTEL 40Gb NICs             | 6,7               | 2                       |
| Mellanox 40G NICs           | 6,7               | 2                       |
| Mellanox 40G NICs           | 1,2,3,4,8,9,10,11 | 8                       |
| Emulex FC32 HBA             | 1,2,3,4,8,9,10,11 | 8                       |
| Emulex FC32 HBA             | 6,7               | 2                       |
| Qlogic FC32 HBA             | 1,2,3,4,8,9,10,11 | 8                       |
| Qlogic FC32 HBA             | 6,7               | 2                       |
| Broadcom 25G NICs           | 6,7               | 2                       |
| Broadcom 25G NICs           | 1,2,3,4,8,9,10,11 | 8                       |
| INTEL 25Gb NICs             | 1,2,3,4,8,9,10,11 | 8                       |
| INTEL 25Gb NICs             | 6,7               | 2                       |
| Mellanox 25G NICs           | 1,2,3,4,8,9,10,11 | 8                       |
| Mellanox 25G NICs           | 6,7               | 2                       |
| Qlogic 25G NICs             | 1,2,3,4,8,9,10,11 | 8                       |
| Qlogic 25G NICs             | 6,7               | 2                       |
| Emulex FC16 HBA             | 1,2,3,4,8,9,10,11 | 8                       |



**Table 16. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2)with NVME in a quad processor configuration (continued)**

| <b>Card Type</b>          | <b>Slot Priority</b>  | <b>Maximum number of Cards</b> |
|---------------------------|-----------------------|--------------------------------|
| Emulex FC16 HBA           | 6,7                   | 2                              |
| Qlogic FC16 HBA           | 1,2,3,4,8,9,10,11     | 8                              |
| Qlogic FC16 HBA           | 6,7                   | 2                              |
| Broadcom 10Gb NICs        | 6,7                   | 2                              |
| Broadcom 10Gb NICs        | 1,2,3,4,8,9,10,11     | 8                              |
| INTEL 10Gb NICs           | 6,7                   | 2                              |
| INTEL 10Gb NICs           | 1,2,3,4,8,9,10,11     | 8                              |
| Mellanox 10Gb NICs        | 6,7                   | 2                              |
| Mellanox 10Gb NICs        | 1,2,3,4,8,9,10,11     | 8                              |
| Qlogic 10Gb NICs          | 1,2,3,4,8,9,10,11     | 8                              |
| Qlogic 10Gb NICs          | 6,7                   | 2                              |
| Solarflare 10Gb NICs      | 1,2,3,4,8,9,10,11     | 8                              |
| Solarflare 10Gb NICs      | 6,7                   | 2                              |
| Emulex FC8 HBA            | 6,7                   | 2                              |
| Emulex FC8 HBA            | 1,2,3,4,8,9,10,11     | 8                              |
| Qlogic FC8 HBA            | 6,7                   | 2                              |
| Qlogic FC8 HBA            | 1,2,3,4,8,9,10,11     | 8                              |
| Broadcom 1Gb NICs         | 1,2,3,4,8,9,10,11     | 8                              |
| Broadcom 1Gb NICs         | 6,7                   | 2                              |
| INTEL 1Gb NICs            | 6,7                   | 2                              |
| INTEL 1Gb NICs            | 1,2,3,4,8,9,10,11     | 8                              |
| Dell design Non-RAID      | 6,7                   | 2                              |
| Dell design Non-RAID      | 1,2,3,4,8,9,10,11     | 8                              |
| Dell design NVMe PCIe SSD | 1,2,3,4,8,9,10,11,6,7 | 10                             |
| INTEL rNDC                | Integrated Slot       | 1                              |
| Broadcom rNDC             | Integrated Slot       | 1                              |
| Mellanox rNDC             | Integrated Slot       | 1                              |
| Qlogic rNDC               | Integrated Slot       | 1                              |
| 100G NICs                 | 6,7                   | 2                              |
| External RAID             | 6,7                   | 2                              |
| External RAID             | 1,2,3,4,8,9,10,11     | 2                              |
| External RAID             | 1,2,3,4,8,9,10,11,6,7 | 4                              |
| FC32 HBA                  | 1,2,3,4,8,9,10,11     | 8                              |
| FC32 HBA                  | 6,7                   | 2                              |
| 25G NICs                  | 1,2,3,4,8,9,10,11     | 8                              |
| 25G NICs                  | 6,7                   | 2                              |
| 10Gb NICs                 | 6,7                   | 2                              |

**Table 16. Riser configuration (X8PCIe Riser 1+X8 PCIe Riser 2)with NVME in a quad processor configuration (continued)**

| Card Type          | Slot Priority                  | Maximum number of Cards |
|--------------------|--------------------------------|-------------------------|
| 10Gb NICs          | 1,2,3,4,8,9,10,11              | 8                       |
| 10Gb NICs          | 6,7                            | 2                       |
| Non-RAID           | 6,7                            | 2                       |
| Non-RAID           | 1,2,3,4,8,9,10,11,6,7          | 10                      |
| HBA355e            | 1, 2, 3, 4, 8, 9, 10, 11, 6, 7 | 2                       |
| Broadcom 100G NICs | 6, 7                           | 2                       |
| Intel 100G NICs    | 6, 7                           | 2                       |

**NOTE:** For information about slot form factor, see [Expansion card riser specifications](#).

**NOTE:** The expansion card slots are not hot-swappable.

## PCIe slot power

Each Slot is designed to allow 75W for each card edge connector. In addition to this there are a total of two auxiliary PCIe power connectors available-one each for Riser1 and Riser 2. Riser 1C/2C and 1D/2D auxiliary PCIe power connectors are populated on the riser itself, whereas Riser 1A/2A/1B/2B connect to auxiliary power connectors on the system board.

**Table 17. PCIe Riser Slot-Power and Aux Power Matrix**

| Slots/Riser | Riser 1 |     | Riser 2 |     | LP Slots  |           |
|-------------|---------|-----|---------|-----|-----------|-----------|
|             | 1C      | 1D  | 2C      | 2D  | Slot 3(6) | Slot 4(7) |
| Slot 1      |         | 75W |         |     |           |           |
| Slot 2      | 300W    | 75W |         |     |           |           |
| Slot 3      |         | 75W |         |     |           |           |
| Slot 4      | 300W    | 75W |         |     |           |           |
| Slot 5      | 75W     | 75W |         |     |           |           |
| Slot 6      |         |     |         |     | 75W       |           |
| Slot 7      |         |     |         |     |           | 75W       |
| Slot 8      |         |     |         | 75W |           |           |
| Slot 9      |         |     | 300W    | 75W |           |           |
| Slot 10     |         |     |         | 75W |           |           |
| Slot 11     |         |     | 300W    | 75W |           |           |
| Slot 12     |         |     | 75W     | 75W |           |           |

## Power, thermal and acoustics

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

### Topics:

- [Power consumption and energy efficiency](#)
- [Power supply units](#)
- [Thermal and acoustics](#)
- [Acoustical design](#)

## Power consumption and energy efficiency

With the rise in the cost of energy that is coupled with increasing data center density, Dell EMC provides tools and technologies to help you realize greater performance with lower energy cost and wastage. More efficient data center usage can reduce costs by slowing the need for additional data center space. The following table lists the tools and technologies that Dell EMC offers to help you achieve your data center goals by lowering power consumption and increasing energy efficiency.

**Table 18. Power tools and technologies**

| Feature                                   | Description                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Power supply units (PSU) portfolio</b> | PSU portfolio includes intelligent features such as dynamically optimizing efficiency while maintaining availability and redundancy.                                                                                                                                                                                                  |
| <b>Tools for right-sizing</b>             | Enterprise Infrastructure Planning Tool (EIPT) is a tool that helps you to plan and tune your computer and infrastructure equipment for maximum efficiency. EIPT helps you by calculating hardware power consumption, power infrastructure, and storage. You can learn more at <a href="http://Dell.com/calc">Dell.com/calc</a>       |
| <b>Industry compliance</b>                | Dell EMC's servers are compliant with all relevant industry certifications and guidelines, including 80 PLUS, Climate Savers, and ENERGY STAR.                                                                                                                                                                                        |
| <b>Power monitoring accuracy</b>          | PSU power monitoring improvements include: <ul style="list-style-type: none"> <li>• Power monitoring accuracy of 1%, whereas the industry standard is 5%</li> <li>• More accurate reporting of power</li> <li>• Better performance under a power cap</li> </ul>                                                                       |
| <b>Power capping</b>                      | Use Dell EMC'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.                                                                                    |
| <b>Systems management</b>                 | Dell EMC's servers are compliant with all relevant industry certifications and guidelines, including 80 PLUS, Climate Savers, and ENERGY STAR.<br><br>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. |

**Table 18. Power tools and technologies (continued)**

| <b>Feature</b>                 | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Active power management</b> | <p>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 that is comprised of Intel Node Manager that is accessed through Dell iDRAC9 Enterprise and OpenManage Power Center that allows policy- based management of power and thermals at the individual server, rack, and data center level. Hot spare reduces power consumption of redundant power supplies.</p> <p>Thermal control of fan 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.</p> |
| <b>Fresh Air cooling</b>       | <p>FAC is supported with certain configuration limitations. With the thermal design and reliability of Dell products, you can have the capability to operate at excursion- based temperatures beyond the industry standard of 35°C (95°F) without impacting your availability model. This solution takes into account servers, networking, storage, and other infrastructure.</p>                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Rack infrastructure</b>     | <p>Dell EMC offers some of the industry's highest- efficiency power infrastructure solutions, including:</p> <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>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## 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 R940xa:

| <b>Wattage</b>                                    | <b>Frequency</b>     | <b>Voltage</b>      | <b>Class</b> | <b>Heat dissipation</b> |
|---------------------------------------------------|----------------------|---------------------|--------------|-------------------------|
| <b>750W AC</b>                                    | 50/60 Hz             | 100–240 V AC        | Platinum     | 2891 BTU/hr             |
| <b>750W Mix Mode AC</b>                           | 50/60 Hz             | 100–240 V AC        | Platinum     | 2891 BTU/hr             |
| <b>750W Mix Mode DC (China only)</b>              | 50/60 Hz             | 240 V DC            | Platinum     | 2891 BTU/hr             |
| <b>1100W DC</b>                                   | -                    | 1-48--60Vdc/32A     | N/A          | 4416 BTU/hr             |
| <b>1100W</b>                                      | 50/60Hz              | 100-240Vac/12-6.5A  | Platinum     | 4100 BTU/hr             |
| <b>1100W Mix Mode/ HVDC(China and Japan Only)</b> | 50/60Hz              | 100-240Vac/12A-6.5A | Platinum     | 4100 BTU/hr             |
| N/A                                               | 200-380Vdc/6.4A-3.2A | N/A                 | 4100 BTU/hr  | 6000 BTU/hr             |
| <b>1600W</b>                                      | 50/60Hz              | 100-240Vac/10A      | Platinum     |                         |
| <b>1600W HLAC</b>                                 | 50/60Hz              | 200-240Vac/10A      | Titanium     | 5840 BTU/hr             |

| Wattage    | Frequency | Voltage          | Class    | Heat dissipation |
|------------|-----------|------------------|----------|------------------|
| 2000W      | 50/60Hz   | 100-240Vac/11.5A | Platinum | 7500 BTU/hr      |
| 2400W      | 50/60Hz   | 100-240Vac/16A   | Platinum | 9000 BTU/hr      |
| 2600W HLAC | 50/60Hz   | 200-240Vac/15A   | Titanium | 9500 BTU/hr      |

**NOTE:** If a system with AC 1100 W PSUs operate at low line 100-120 Vac, then the power rating per PSU is derated to 1050 W.

**NOTE:** If a system with AC 1600 W PSUs operate at low line 100-120 Vac, then the power rating per PSU is derated to 800 W.

**NOTE:** If a system with AC 2000 W PSUs operate at low line 100-120 Vac, then the power rating per PSU is derated to 1000 W.

The PowerEdge R940xa support up to 2 AC or DC power supplies with 1+1 redundancy, auto sensing, and auto-switching capability.

If two PSUs are present during POST, a comparison is made between the wattage capacities of the PSUs. In the event that the PSU wattages don't match, the larger of the two PSU's is enabled. Also, there is a PSU mismatch warning 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 will be flagged as unmatched in iDRAC and the second PSU will not be enabled

Dell EMC PSUs have achieved Platinum and Titanium efficiency levels as shown in the table below:

**Table 19. PSU efficiency level**

| Form factor    | Efficiency target by load |          |        |         |        |        |
|----------------|---------------------------|----------|--------|---------|--------|--------|
|                | Output                    | Class    | 10     | 20      | 50     | 100    |
| Redundant 86mm | 1100W AC                  | Platinum | 89.00% | 93.00%  | 94.50% | 92.00% |
|                | 1100W DC                  | Gold     | 0.00%  | 88.00%  | 91.00% | 88.00% |
|                | 1600W AC                  | Platinum | 87.00% | 90.00%  | 94.00% | 91.00% |
|                | 2000W AC                  | Platinum | 89.00% | 93.0 0% | 94.00% | 91.00% |
|                | 2400W AC                  | Platinum | 89.00% | 93.0 0% | 94.00% | 92.00% |

## Thermal and acoustics

The system's thermal management delivers high performance through optimized cooling of components at the lowest fan speeds across a wide range of ambient temperatures from 10°C to 35°C (50°F to 95°F) and to extended ambient temperature ranges. These optimizations result in lower fan power consumption which translate to lower system power and data center power consumption.

### Thermal design

The thermal design of the system 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 minimal expense of fan power.
- Comprehensive thermal management: The thermal control system regulates the system fan speeds based on feedback from system component temperature sensors, as well as for system inventory and subsystem power draw. Temperature monitoring includes components such as processors, DIMMs, chipset, system inlet air ambient, hard disk drives, NDC, and GPU.
- Open and closed loop fan speed control: Open loop fan control uses system configuration to determine fan speed based on system inlet air temperature. Closed loop thermal control uses temperature feedback to dynamically adjust fan speeds based on system activity and cooling requirements.

- User-configurable settings: With the understanding and realization that every customer has a unique set of circumstances or expectations from the system, in this generation of servers, we have introduced limited user-configurable settings in the iDRAC9 BIOS setup screen. For more information, see the Dell EMC PowerEdge system Installation and Service Manual on [Dell.com/Support/Manuals](http://Dell.com/Support/Manuals) and “Advanced Thermal Control: Optimizing across Environments and Power Goals” on [Dell.com](http://Dell.com).
- Cooling redundancy: The system allows N+1 fan redundancy, allowing continuous operation with one fan failure in the system.
- Environmental Specifications: The optimized thermal management makes the R940xa reliable under a wide range of operating environments.

## Expanded operating temperature restrictions

- The operating temperature is for a maximum altitude of 950 m for fresh air cooling
- No cold start-ups below 5°C due to hard drive constraints
- Apache Pass DIMM, NVDIMM, PCIeSSD and NVME are not supported
- GPGPU configuration are not supported
- LRDIMM > 32 GB are not supported in x4 socket configurations
- DCPMMs are not supported.
- Redundant power supply units are required
- Non Dell qualified peripheral cards and /or peripheral cards greater than 25 W are not supported
- Intel FPGA is not supported
- Mellanox CX5 is not supported

## Acoustical design

The acoustical design of the PowerEdge R940xa reflect the following:

- Versatility: The R940xa save you power draw in the data center but are also quiet enough for office environment in typical and minimum configurations. You may find that the system is sufficiently quiet where the sound it emits blends into the environment .
- Adherence to Dell EMC's high sound quality standards: Sound quality is different from sound power level and sound pressure level in that it describes how humans respond to annoyances in sound, like whistles and hums. One of the sound quality metrics in the Dell EMC specification is prominence ratio of a tone.
- Noise ramp and descent at boot-up from power off: Fan speeds and noise levels ramp during the boot process (from power-off to power- on) in order to add a layer of protection for component cooling in the event that the system were not to boot properly. In order to keep the boot-up process as quiet as possible, the fan speed reached during boot-up is limited to about half of full speed.
- Noise level dependencies: If acoustics is important to you, several configuration choices and settings are important to consider:
  - For lower acoustical output, use a small number of lower rotational- speed SATA hard drives, nearline SAS hard drives, or non- rotational devices like SSDs. 15k hard drives generate more acoustic noise than that of lower rotational- speed hard drives, and noise increases with number of hard drives.
  - Fan speeds and noise may increase from baseline factory configurations if certain profiles are changed by the user or the system configurations are updated.

The following is a list of items that impact fan speeds and acoustical output:

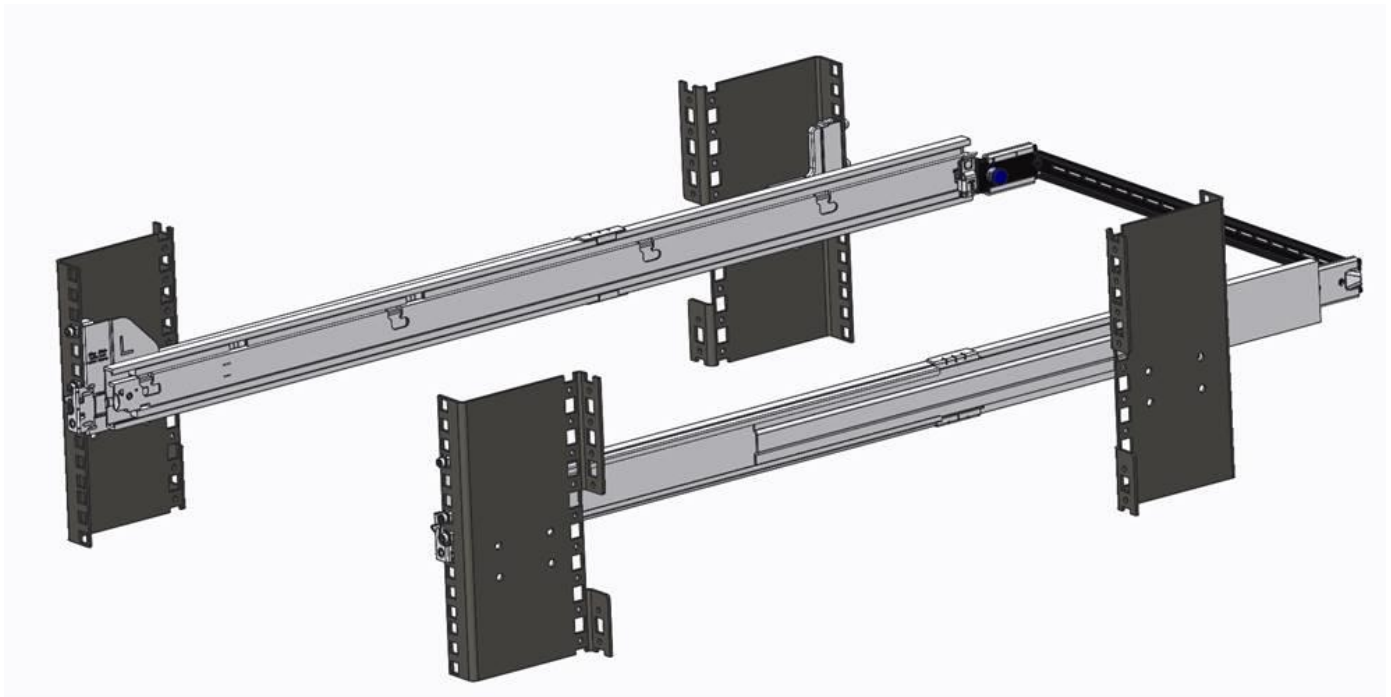
- iDRAC9 BIOS settings: Performance Per Watt (DAPC or OS) may be quieter than Performance or Dense Configuration (iDRAC Settings > Thermal > Max. Exhaust Temperature or Fan speed offset).
- The quantity and type of PCIe cards installed: This affects overall system acoustics. Installation of more than two PCIe cards results in an increase in overall system acoustics.
- Using a GPU card: This results in an increase in overall system acoustics.
- PCIe controller-based SSD drives: Drives such as Express flash drives and Fusion- IO cards require greater airflow for cooling, and result in significantly higher noise levels.
- Systems with an H330 PERC: This configuration may be quieter than those with an H730P PERC with battery backup. However, higher noise levels result when a system is configured as non-RAID.
- Hot spare feature of power supply unit: In the system default setting, the Hot Spare Feature is disabled; acoustical output from the power supplies is lowest in this setting.

## Rack rails

Stab-in/Drop-in sliding rails are offered for the R940xa. The R940xa does not have a static rail option.

### Sliding rails features summary

Sliding rails allow the system to be fully extended out of the rack for service. A strain relief bar (SRB) is provided with each rail kit to organize and secure cables exiting the back of the server. A cable management arm (CMA) is not available.



**Figure 5. Sliding rails with SRB**

#### **Stab-in/Drop-in sliding rails for 4-post racks (New for PowerEdge R940xa systems)**

- Supports drop-in or stab-in installation of the chassis to the rails.
- Supports tool-less installation in 19" EIA-310-E compliant 4-post square hole racks, including all generations of the Dell racks.
- Supports tool-less installation in 19" EIA-310-E compliant 4-post round hole racks and threaded hole racks.
- Required for installing R940xa in a Dell EMC Titan or Titan-D rack.
- Support full extension of the system out of the rack to allow serviceability of key internal components.
- Support for strain relief bar.
- Minimum rail mounting depth without the SRB: 846 mm.
- Minimum rail mounting depth with the SRB: 903 mm.
- Square-hole rack adjustment range: 602-928 mm.
- Round-hole rack adjustment range: 602-928 mm.
- Threaded-hole rack adjustment range: 602-928 mm.

#### **Strain Relief Bar**

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

# System-to-Rail Installation Method

The Stab-In/Drop-In sliding rails allows you to choose how to install the system to the rails. The drop-in method is similar to the ReadyRail sliding rails. The Stab-in method is similar to static rails. For more information, see *Rail Installation Guide*.

**NOTE:** ReadyRails Sliding rails (B6) are drop-in only.

**Table 20. Stab-in/Drop-in sliding rails**

| Rails                |                                 | Rail detail             |   |
|----------------------|---------------------------------|-------------------------|---|
| Rail identifier      |                                 | B16                     |   |
| Rail type            |                                 | Stab-in/Drop-in Sliding |   |
| Installation method  |                                 | Stab-in/Drop-in         |   |
| Supported rack types | Dell EMC Titan or Titan-D Racks |                         | √ |
|                      | 4-Post                          | Square                  | √ |
|                      |                                 | Round                   | √ |
|                      |                                 | Thread                  | √ |
|                      | 2-Post                          | Flush                   | X |
|                      |                                 | Center                  | X |

**NOTE:** Screws are included with the rails to secure them to a square hole or unthreaded round hole rack for moving or unstable environments.

**NOTE:** No screws are required for the Stab-in/Drop-in Sliding (B16) rails when mounting the rails to the racks

Other 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 mounted in the back of the rack such as power distribution units (PDUs)
- Overall depth of the rack

**Table 21. Rail Adjustability Range and Rail Depth**

| Rails                          |             |     | Rail detail             |  |
|--------------------------------|-------------|-----|-------------------------|--|
| Rail Identifier                |             |     | B16                     |  |
| Rail Type                      |             |     | Stab-in/Drop-in Sliding |  |
| Rail Adjustability Range (mm)* | Square      | Min | 602                     |  |
|                                |             | Max | 928                     |  |
|                                | Round       | Min | 602                     |  |
|                                |             | Max | 928                     |  |
|                                | Threaded    | Min | 602                     |  |
|                                |             | Max | 928                     |  |
|                                | Without SRB |     | 846                     |  |
|                                | With SRB    |     | 903                     |  |

\* Values represent the distance between the outside-facing surfaces of the front and rear mounting flanges on the rack.

+ Measured from the front surface of the front rack mounting flange.

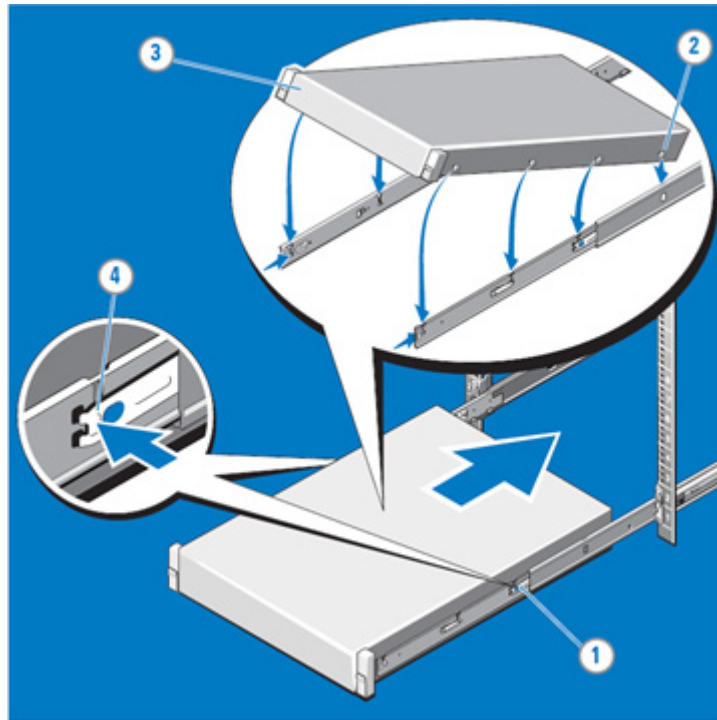


# Rack Installation

The R940xa is offered with combination Stab-in/Drop-in Sliding rails (B16).

A "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.

A "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 rail assembly that is installed in the rack.



**Figure 6. Stab-in design**

**NOTE:** For systems that are 2U and larger, it is recommended that two people perform this operation.

The 4U system requires two people for installation due to its heavier weight.

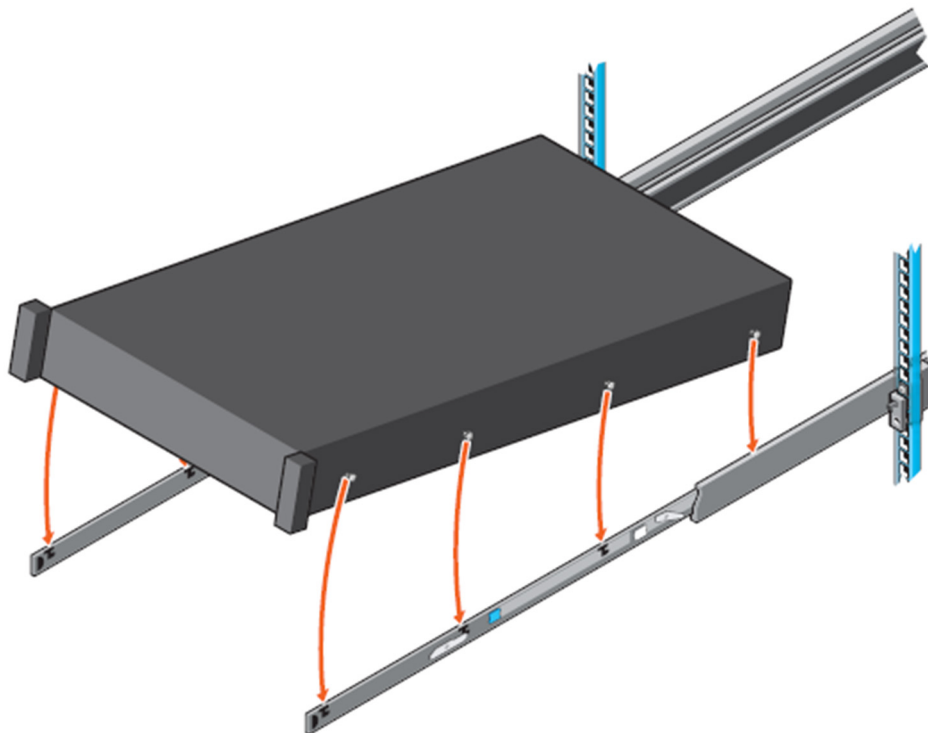
## Installing system into the rack (option A: Drop-In)

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



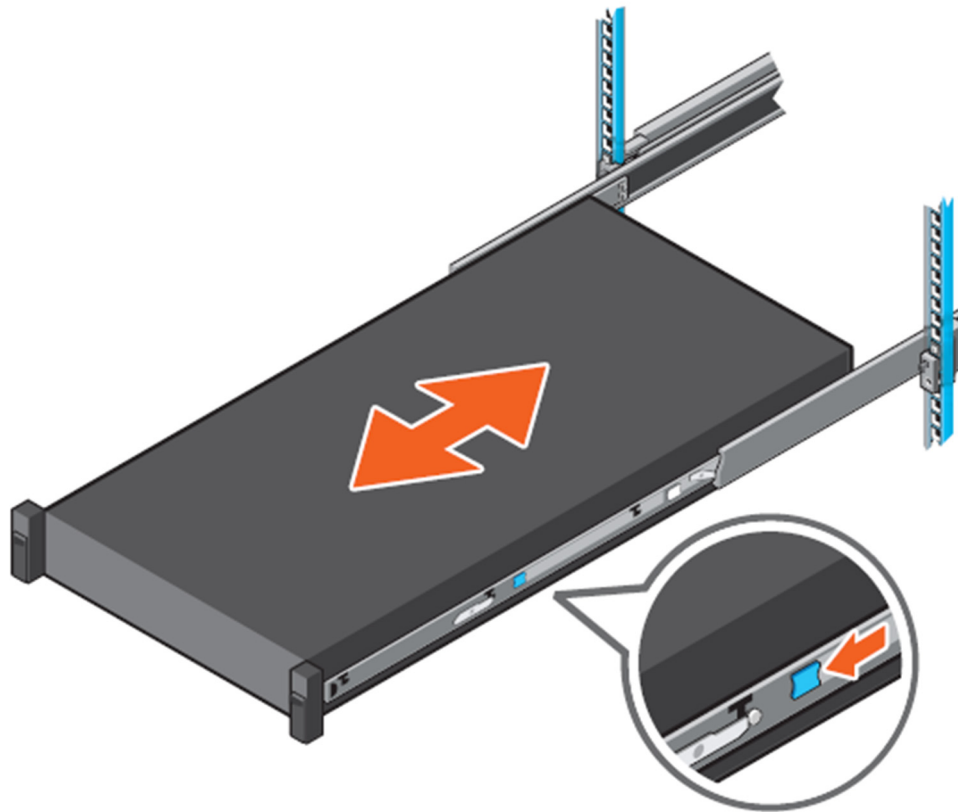
**Figure 7. Pull out inner rail**

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 8. Rail standoffs seated in J-slots**

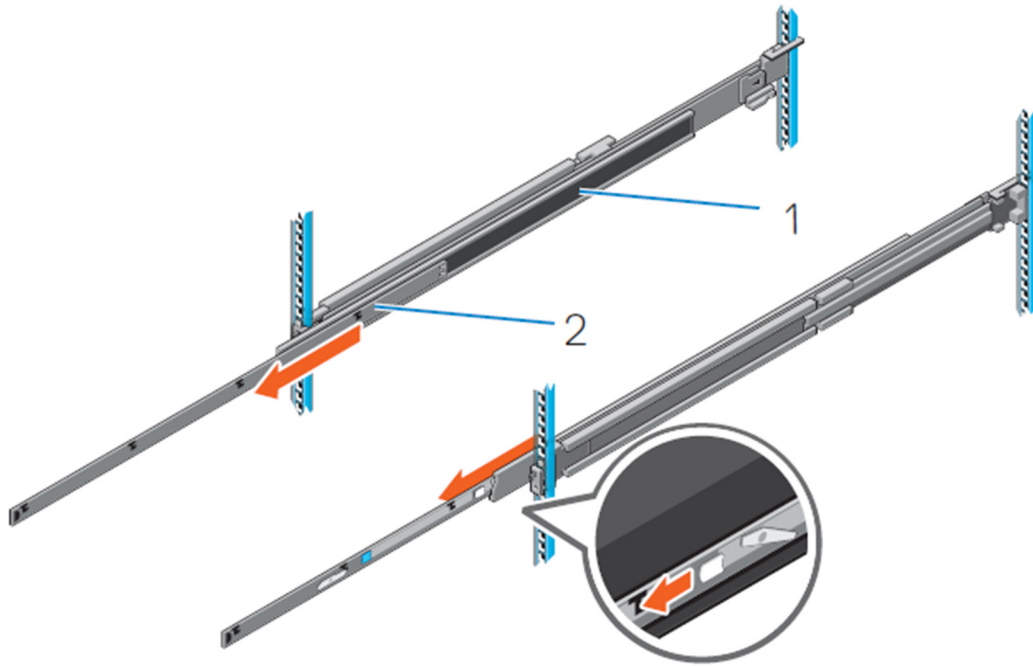
4. Push the system inward until the lock levers click into place.
5. Pull the blue slide release lock tabs forward on both rails and slide the system into the rack until the system is in the rack.



**Figure 9. Slide system into the rack**

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

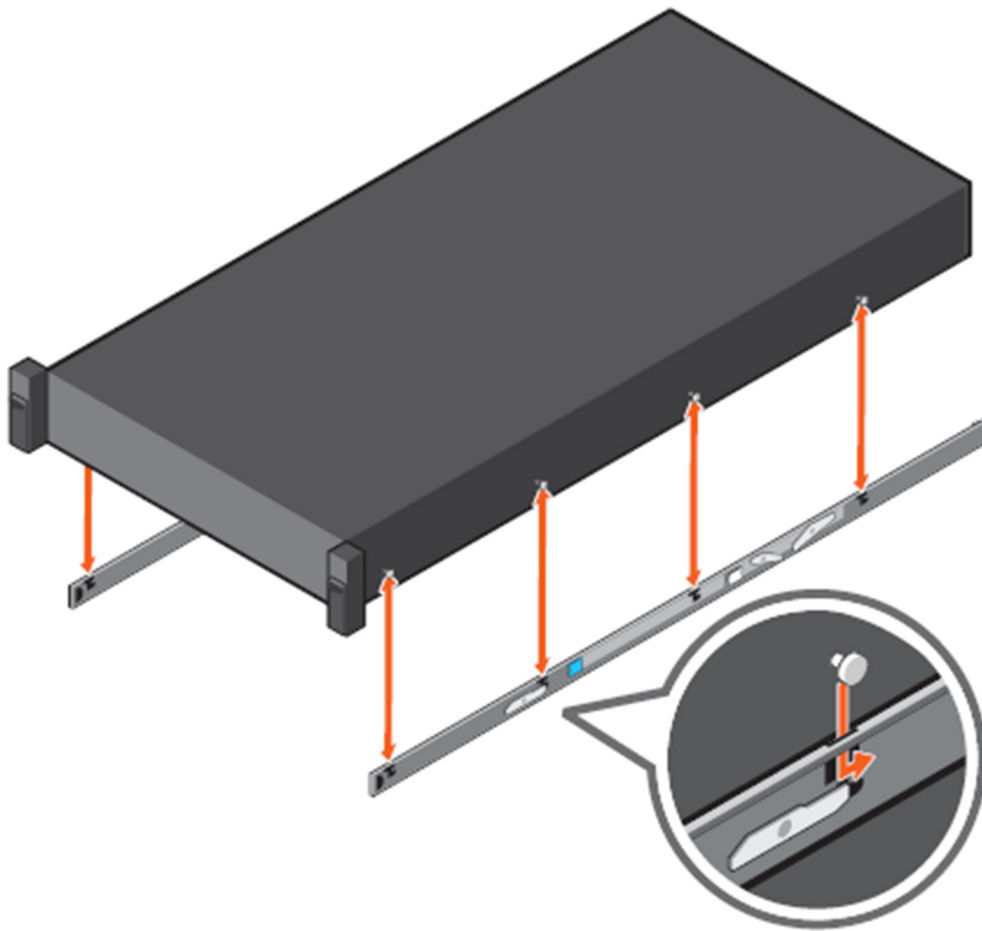
1. Pull the intermediate rails out of the rack until they lock into place.
2. Release the inner rail lock by pulling forward on the white tabs and sliding the inner rail out of the intermediate rails.



**Figure 10. Pull out the intermediate rail**

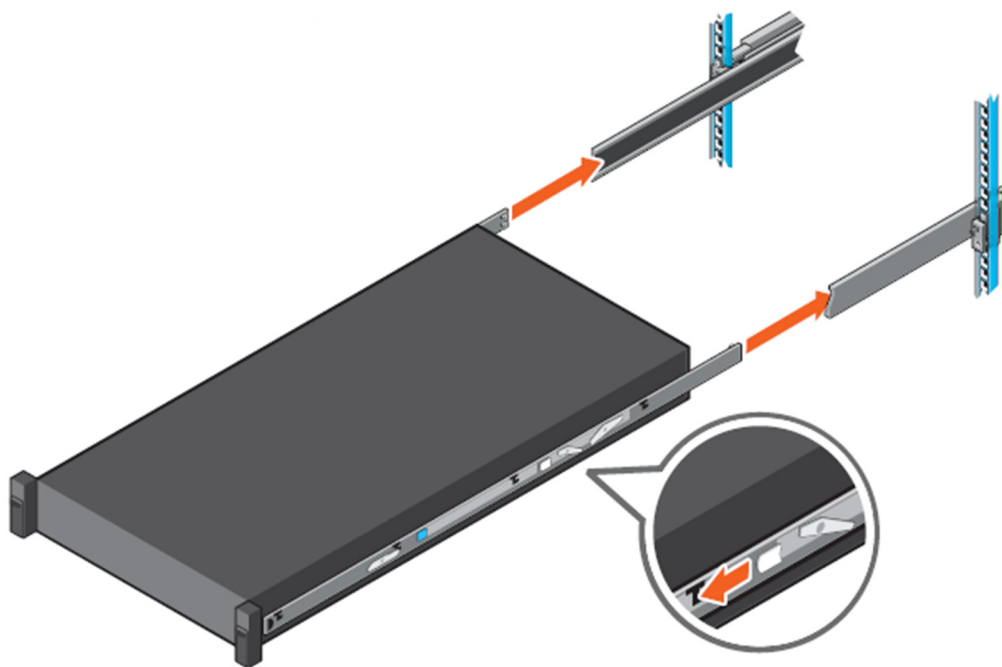
The components of a Stab-in/Drop-in sliding rails are:

- a. Intermediate rail
  - b. 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.



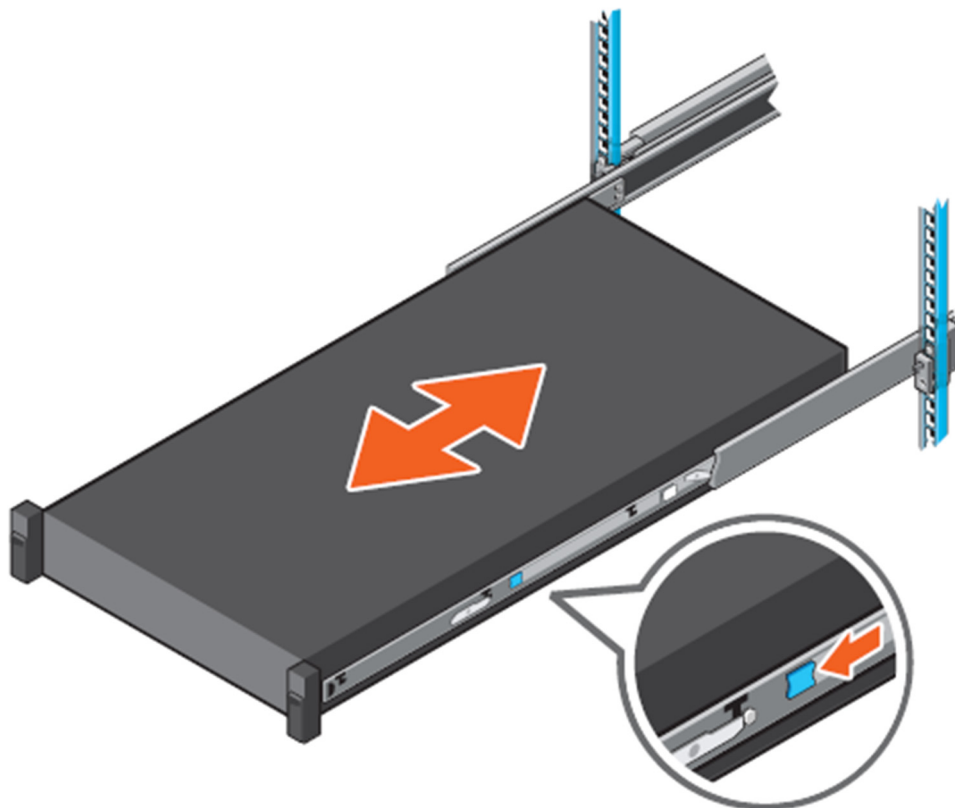
**Figure 11. Attach the inner rails to the system**

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



**Figure 12. Install system into the extended rails**

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



**Figure 13. Slide system into the rack**

# Supported operating systems

The supports the following operating systems:

- Canonical Ubuntu LTS
- Citrix Hypervisor
- Microsoft Windows Server LTSC with Hyper-V
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- VMware ESXi

For more information on the specific versions and additions, visit [Dell.com/OSsupport](https://Dell.com/OSsupport).

# Dell EMC OpenManage systems management

## Dell EMC OpenManage Portfolio

Simplifying hardware management through ease of use and automation

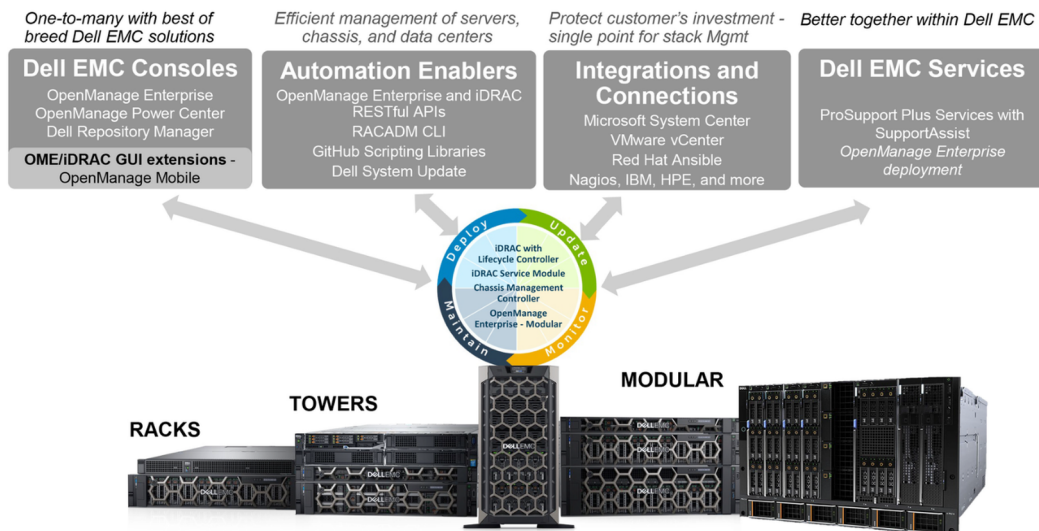


Figure 14. Dell EMC OpenManage Portfolio

Dell EMC 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 EMC servers effectively and efficiently; in physical, virtual, local, and remote environments, operating in-band, and out-of-band (agent-free). The OpenManage portfolio includes innovative embedded management tools such as the integrated Dell Remote Access Controller (iDRAC), Chassis Management Controller and Consoles like OpenManage Enterprise, OpenManage Power Manager plug in, and tools like Repository Manager.

Dell EMC has developed comprehensive systems management solutions based on open standards and has integrated with management consoles that can perform advanced management of Dell hardware. Dell EMC has connected or integrated the advanced management capabilities of Dell hardware into offerings from the industry's top systems management vendors and frameworks such as Ansible, thus making Dell EMC platforms easy to deploy, update, monitor, and manage.

The key tools for managing Dell EMC PowerEdge servers are iDRAC and the one-to-many OpenManage Enterprise console. OpenManage Enterprise helps the system administrators in complete lifecycle management of multiple generations of PowerEdge servers. Other tools such as Repository Manager, which enables simple yet comprehensive change management.

OpenManage tools integrate with systems management framework from other vendors such as VMware, Microsoft, Ansible, and ServiceNow. This enables you to use the skills of the IT staff to efficiently manage Dell EMC PowerEdge servers.

### Topics:

- [Server and Chassis Managers](#)
- [Dell EMC consoles](#)
- [Automation Enablers](#)
- [Integration with third-party consoles](#)
- [Connections for third-party consoles](#)
- [Dell EMC Update Utilities](#)
- [Dell resources](#)



## Server and Chassis Managers

- Integrated Dell Remote Access Controller (iDRAC)
- iDRAC Service Module (iSM)

## Dell EMC consoles

- Dell EMC OpenManage Enterprise
- Dell EMC Repository Manager (DRM)
- Dell EMC OpenManage Enterprise Power Manager plugin to OpenManage Enterprise
- Dell EMC OpenManage Mobile (OMM)

## Automation Enablers

- OpenManage Ansible Modules
- iDRAC RESTful APIs (Redfish)
- Standards-based APIs (Python, PowerShell)
- RACADM Command Line Interface (CLI)
- GitHub Scripting Libraries

## Integration with third-party consoles

- Dell EMC OpenManage Integrations with Microsoft System Center
- Dell EMC OpenManage Integration for VMware vCenter (OMIVV)
- Dell EMC OpenManage Ansible Modules
- Dell EMC OpenManage Integration with ServiceNow

## Connections for third-party consoles

- Micro Focus and other HPE tools
- OpenManage Connection for IBM Tivoli
- OpenManage Plug-in for Nagios Core and XI

## Dell EMC Update Utilities

- Dell System Update (DSU)
- Dell EMC Repository Manager (DRM)
- Dell EMC Update Packages (DUP)
- Dell EMC Server Update Utility (SUU)
- Dell EMC Platform Specific Bootable ISO (PSBI)

## Dell resources

For additional information about white papers, videos, blogs, forums, technical material, tools, usage examples, and other information, go to the OpenManage page at <https://www.dell.com/openmanagemanuals> or the following product pages:

**Table 22. Dell resources**

| <b>Resource</b>                                              | <b>Location</b>                                                                                                                             |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Integrated Dell Remote Access Controller (iDRAC)             | <a href="https://www.dell.com/idracmanuals">https://www.dell.com/idracmanuals</a>                                                           |
| iDRAC Service Module (iSM)                                   | <a href="https://www.dell.com/support/article/sln310557">https://www.dell.com/support/article/sln310557</a>                                 |
| OpenManage Ansible Modules                                   | <a href="https://www.dell.com/support/article/sln310720">https://www.dell.com/support/article/sln310720</a>                                 |
| OpenManage Essentials (OME)                                  | <a href="https://www.dell.com/support/article/sln310714">https://www.dell.com/support/article/sln310714</a>                                 |
| OpenManage Mobile (OMM)                                      | <a href="https://www.dell.com/support/article/sln310980">https://www.dell.com/support/article/sln310980</a>                                 |
| OpenManage Integration for VMware vCenter (OMIVV)            | <a href="https://www.dell.com/support/article/sln311238">https://www.dell.com/support/article/sln311238</a>                                 |
| OpenManage Integration for Microsoft System Center (OMIMSSC) | <a href="https://www.dell.com/support/article/sln312177">https://www.dell.com/support/article/sln312177</a>                                 |
| Dell EMC Repository Manager (DRM)                            | <a href="https://www.dell.com/support/article/sln312652">https://www.dell.com/support/article/sln312652</a>                                 |
| Dell EMC System Update (DSU)                                 | <a href="https://www.dell.com/support/article/sln310654">https://www.dell.com/support/article/sln310654</a>                                 |
| Dell EMC Platform Specific Bootable ISO (PSBI)               | <a href="https://www.dell.com/support/article/sln296511">Dell.com/support/article/sln296511</a>                                             |
| Dell EMC Chassis Management Controller (CMC)                 | <a href="https://www.dell.com/support/article/sln311283">www.dell.com/support/article/sln311283</a>                                         |
| OpenManage Connections for Partner Consoles                  | <a href="https://www.dell.com/support/article/sln312320">https://www.dell.com/support/article/sln312320</a>                                 |
| OpenManage Enterprise Power Manager                          | <a href="https://www.dell.com/solutions/openmanage/power-management.htm">https://www.dell.com/solutions/openmanage/power-management.htm</a> |
| OpenManage Integration with ServiceNow (OMISNOW)             | <a href="https://www.dell.com/support/article/sln317784">Dell.com/support/article/sln317784</a>                                             |

 **NOTE:** Features may vary by server. Please refer to the product page on <https://www.dell.com/manuals> for details.

## Appendix A. Additional specifications

This section contains information about additional specifications for the PowerEdge R940xa.

### Topics:

- System dimensions
- Environmental specifications
- Video specifications
- USB peripherals

### System dimensions

This section describes the physical dimensions of the system.

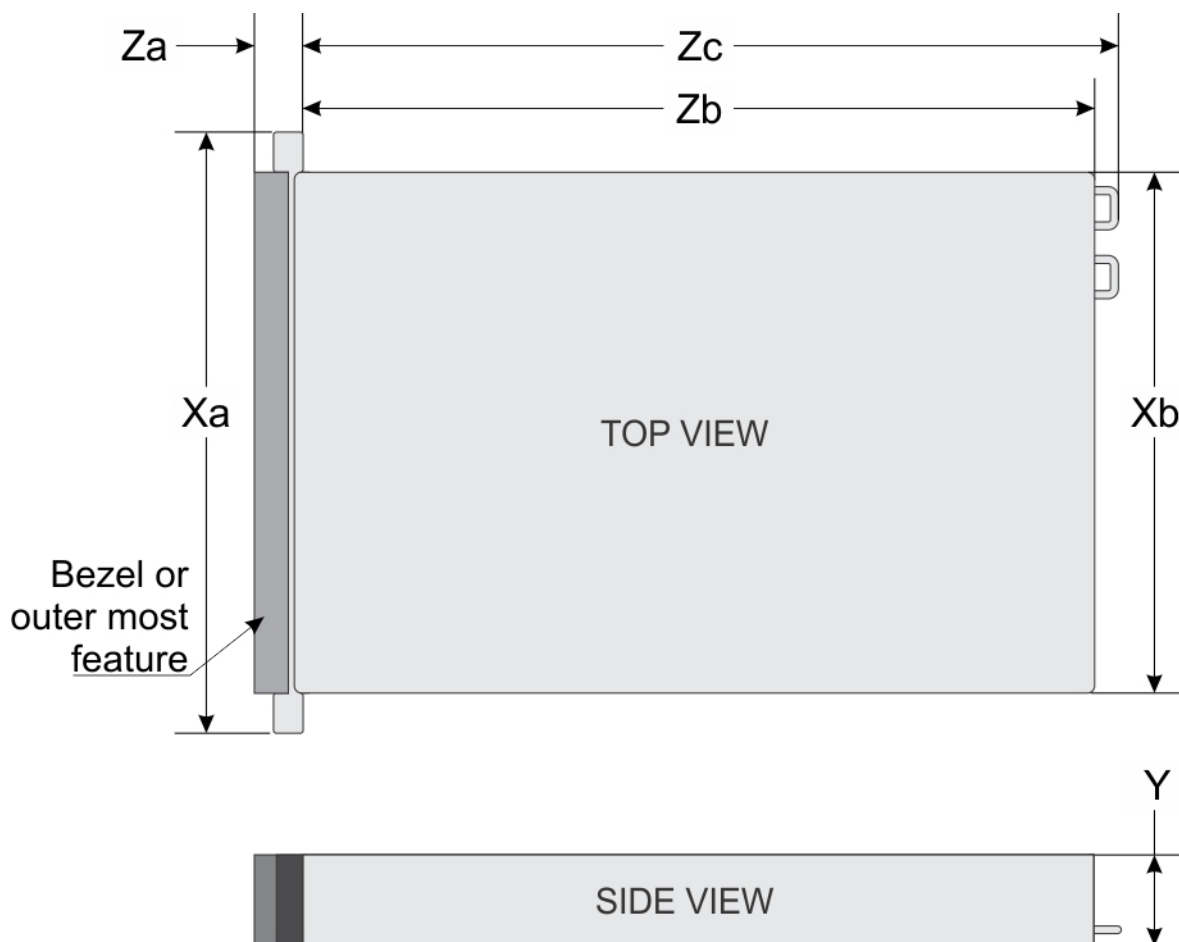


Figure 15. System dimensions of PowerEdge R940xa system

**Table 23. Dimensions**

| System           | Xa                         | Xb                          |                            | Y                         | Za                        |                          | Zb                       | Zc                       |
|------------------|----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
|                  |                            | Upper                       | Bottom                     |                           | (with bezel)              | (without bezel)          |                          |                          |
| PowerEdge R940xa | 482.0 mm<br>(18.98 inches) | 441.16 mm<br>(17.37 inches) | 422.5 mm<br>(16.64 inches) | 174.3 mm<br>(6.87 inches) | 35.84 mm<br>(1.41 inches) | 23.9 mm<br>(0.94 inches) | 812 mm<br>(31.96 inches) | 842 mm<br>(33.14 inches) |

## Environmental specifications

See Dell EMC PowerEdge R940xa installation service manuals on [Dell.com/Support/Manuals](http://Dell.com/Support/Manuals) for detailed environmental specifications.

## Video specifications

The PowerEdge R940xa system supports integrated Matrox G200eW3 graphics controller with 16 MB of video frame buffer.

**Table 24. Supported video resolution options**

| Resolution         | Refresh Rate | Color depth (bits) | Horizontal Freq. | Pixel Clock | Rear Panel | Front Panel | DVO DisplayPort |
|--------------------|--------------|--------------------|------------------|-------------|------------|-------------|-----------------|
| <b>1024 x 768</b>  | 60 Hz        | 8, 16, 32          | 48.4 kHz         | 65.0 MHz    | Yes        | Yes         | Yes*            |
| <b>1280 x 800</b>  | 60 Hz        | 8, 16, 32          | 49.7 kHz         | 83.5 MHz    | Yes        | Yes         | Yes*            |
| <b>1280 x 1024</b> | 60 Hz        | 8, 16, 32          | 64.0 kHz         | 108.0 MHz   | Yes        | TBD         | Yes*            |
| <b>1360 x 768</b>  | 60 Hz        | 8, 16, 32          | 47.71 kHz        | 85.5 MHz    | Yes        | Yes         | Yes*            |
| <b>1440 x 900</b>  | 60 Hz        | 8, 16, 32          | 55.9 kHz         | 106.5 MHz   | Yes        | TBD         | Yes*            |
| <b>1600 x 900</b>  | 60 Hz (RB)   | 8, 16, 32          | 55.54 kHz        | 97.75 MHz   | Yes        | Yes         | Yes*            |
| <b>1600 x 1200</b> | 60 Hz        | 8, 16, 32          | 75.0 kHz         | 162.0 MHz   | TBD        | TBD         | Yes*            |
| <b>1680 x 1050</b> | 60 Hz (RB)   | 8, 16, 32          | 64.7 kHz         | 119.0 MHz   | Yes        | TBD         | Yes*            |
| <b>1920 x 1080</b> | 60 Hz        | 8, 16, 32          | 67.158 kHz       | 173.0 MHz   | TBD        | No          | No              |
| <b>1920 x 1200</b> | 60 Hz        | 8, 16, 32          | 74.556 kHz       | 193.25 MHz  | TBD        | No          | No              |

 **NOTE:** 1920 x 1080 and 1920 x 1200 resolutions are only supported in reduced blanking mode.

## USB peripherals

Front, rear, and internal USB ports are included in the base system for PowerEdge R940xa. Rear and internal ports support up to USB 3.0, while front ports support USB 2.0. The PowerEdge R940xa offer an upsell option that adds an additional USB 3.0 port to the front of the chassis. The optional USB module cable connects to the internal USB port on the planar and the default internal moves closer to the front of the chassis

## Appendix B. Standards compliance

**Table 25. Industry standard documents**

| Standard                                                                   | URL for information and specifications                                                                                                                            |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ACPI</b> Advance Configuration and Power Interface Specification, v2.0c | <a href="http://acpi.info">acpi.info</a>                                                                                                                          |
| <b>Ethernet</b> IEEE 802.3-2005                                            | <a href="http://standards.ieee.org/getieee802/802.3.html">standards.ieee.org/getieee802/802.3.html</a>                                                            |
| <b>HDG</b> Hardware Design Guide Version 3.0 for Microsoft Windows Server  | <a href="http://microsoft.com/whdc/system/platform/pcdesign/design/desguide/serverdg.mspx">microsoft.com/whdc/system/platform/pcdesign/desguide/serverdg.mspx</a> |
| <b>IPMI</b> Intelligent Platform Management Interface, v2.0                | <a href="http://intel.com/design/servers/ipmi">intel.com/design/servers/ipmi</a>                                                                                  |
| <b>DDR4 Memory</b> DDR4 SDRAM Specification                                | <a href="http://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 Rev. 2.0 and 3.0         | <a href="http://pcisig.com/specifications/pciexpress">pcisig.com/specifications/pciexpress</a>                                                                    |
| <b>PMBus</b> Power System Management Protocol Specification, v1.2          | <a href="http://pmbus.info/specs.html">pmbus.info/specs.html</a>                                                                                                  |
| <b>SAS</b> Serial Attached SCSI, v1.1                                      | <a href="http://t10.org">t10.org</a>                                                                                                                              |
| <b>SATA</b> Serial ATA Rev. 2.6; SATA II, SATA 1.0a Extensions, Rev. 1.2   | <a href="http://sata-io.org">sata-io.org</a>                                                                                                                      |
| <b>SMBIOS</b> System Management BIOS Reference Specification, v2.7         | <a href="http://dmtf.org/standards/smbios">dmtf.org/standards/smbios</a>                                                                                          |
| <b>TPM</b> Trusted Platform Module Specification, v1.2 and v2.0            | <a href="http://trustedcomputinggroup.org">trustedcomputinggroup.org</a>                                                                                          |
| <b>UEFI</b> Unified Extensible Firmware Interface Specification, v2.1      | <a href="http://uefi.org/specifications">uefi.org/specifications</a>                                                                                              |
| <b>USB</b> Universal Serial Bus Specification, Rev. 2.0                    | <a href="http://usb.org/developers/docs">usb.org/developers/docs</a>                                                                                              |

## Appendix C. Additional resources

**Table 26. 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 messages</li> <li>• System codes and indicators</li> <li>• System BIOS</li> <li>• Remove and replace procedures</li> <li>• Troubleshooting</li> <li>• Diagnostics</li> <li>• Jumpers and connectors</li> </ul> | <a href="https://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> <li>• Key system features</li> <li>• Technical specifications</li> </ul>                                                                                                                                     | <a href="https://Dell.com/Support/Manuals">Dell.com/Support/Manuals</a> |
| Rack Installation Instructions       | This document ships with the rack kits, and provides instructions for installing a server in a rack.                                                                                                                                                                                                                                                                                                        | <a href="https://Dell.com/Support/Manuals">Dell.com/Support/Manuals</a> |
| Information Update                   | This document ships with the system, is also available in PDF format online, and provides information on system updates.                                                                                                                                                                                                                                                                                    | <a href="https://Dell.com/Support/Manuals">Dell.com/Support/Manuals</a> |
| System Information Label             | 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.                                                                                                                                                                                      | Inside the system chassis cover                                         |
| Quick Resource Locator (QRL)         | 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.                                                                                                                                                                                 | Inside the system chassis cover                                         |
| Energy Smart Solution Advisor (ESSA) | The Dell online ESSA enables easier and more meaningful estimates to help you determine the most efficient configuration possible. Use ESSA to calculate the power consumption of your hardware, power infrastructure, and storage.                                                                                                                                                                         | <a href="https://Dell.com/calc">Dell.com/calc</a>                       |

## Appendix D. Support and deployment services

### Topics:

- Dell EMC ProDeploy Enterprise Suite
- Deployment services
- Dell EMC Remote Consulting Services
- Dell EMC Data Migration Service
- ProSupport Enterprise Suite
- ProSupport Plus
- ProSupport
- ProSupport One for Data Center
- Support Technologies
- Additional professional services
- Dell Education Services
- Dell EMC Global Infrastructure Consulting Services
- Dell EMC Managed Services

## Dell EMC ProDeploy Enterprise Suite

ProDeploy Enterprise Suite gets your server out of the box and into optimized production—fast. Our elite deployment engineers with broad and deep experience utilizing best-in-class processes along with our established global scale can help you around the clock and around the globe. From simple to the most complex server installations and software integration, we take the guess work and risk out of deploying your new server technology.

|                 |                                                                                  | Basic Deployment | ProDeploy | ProDeploy Plus |
|-----------------|----------------------------------------------------------------------------------|------------------|-----------|----------------|
| Pre-deployment  | Single point of contact for project management                                   |                  | •         | In-region      |
|                 | Site readiness review                                                            |                  | •         | •              |
|                 | Implementation planning                                                          |                  | •         | •              |
|                 | Technology Service Manager (TSM) engagement for ProSupport Plus entitled devices |                  |           | •              |
| Deployment      | Deployment service hours                                                         | Business hours   | 24x7      | 24x7           |
|                 | Onsite hardware installation*                                                    | •                | •         | •              |
|                 | Packaging materials disposal                                                     | •                | •         | •              |
|                 | Install and configure system software                                            |                  | •         | Onsite         |
| Post-deployment | Project documentation with knowledge transfer                                    |                  | •         | •              |
|                 | Deployment verification                                                          |                  | •         | •              |
|                 | Configuration data transfer to Dell EMC technical support                        |                  | •         | •              |
|                 | 30-days of post-deployment configuration assistance                              |                  |           | •              |
|                 | Training credits for Dell EMC Education Services                                 |                  |           | •              |

Figure 16. ProDeploy Enterprise Suite capabilities

**NOTE:** Hardware installation not applicable on selected software products.

## Dell EMC ProDeploy Plus

From beginning to end, ProDeploy Plus provides the skill and scale needed to successfully execute demanding deployments in today's complex IT environments. Certified Dell EMC experts start with extensive environmental assessments and detailed migration planning and recommendations. Software installation includes set up of most versions of Dell EMC SupportAssist and

OpenManage system management utilities. Post-deployment configuration assistance, testing, and product orientation services are also available.

## Dell EMC ProDeploy

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 as most versions of Dell EMC SupportAssist 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 EMC Basic Deployment

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

## Dell EMC Residency Services

Residency Services helps customers transition to new capabilities quickly with the assistance of on-site or remote Dell EMC experts whose priorities and time you control. Residency experts can provide post implementation management and knowledge transfer related to a new technology acquisition or day-to-day operational management of the IT infrastructure.

## Deployment services

Deployment services details and exceptions can be found in service description documents at the Enterprise Configuration and Deployment page on [Dell.com](http://Dell.com).

## Dell EMC Remote Consulting Services

When you are in the final stages of your PowerEdge server implementation, you can rely on Dell EMC Remote Consulting Services and our certified technical experts to help you optimize your configuration with best practices for your software, virtualization, server, storage, networking, and systems management.

## Dell EMC Data Migration Service

Protect your business and data with our single point of contact to manage your data migration project. Your project manager will work with our experienced team of experts to create a plan using industry-leading tools and proven processes based on global best practices to migrate your existing files and data so your business system get up and running quickly and smoothly.

## ProSupport Enterprise Suite

With the ProSupport Enterprise Suite, we can help you keep your operation running smoothly, so you can focus on running your business. We will help you maintain peak performance and availability of your most essential workloads. ProSupport Enterprise Suite is a suite of support services that enable you to build the solution that is right for your organization. Choose support models based on how you use technology and where you 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 your IT resources by choosing the right support model.





Figure 17. ProSupport Enterprise Suite

## ProSupport Plus

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

- An assigned Services Account Manager (SAM) who knows your business and your environment
- Access to senior ProSupport engineers for faster issue resolution
- Personalized, preventive recommendations based on analysis of support trends and best practices from across the Dell EMC customer base to reduce support issues and improve performance
- Predictive analysis for issue prevention and optimization enabled by SupportAssist
- Proactive monitoring, issue detection, notification and automated case creation for accelerated issue resolution enabled by SupportAssist
- On-demand reporting and analytics-based recommendations enabled by SupportAssist and TechDirect

## ProSupport

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

- 24x7x365 access to certified hardware and software experts
- Collaborative 3rd party support
- Hypervisor and OS support
- Consistent level of support available for Dell EMC hardware, software and solutions
- Onsite parts and labor response options including next business day or four-hour mission critical

## 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 your

company's needs. While not for everyone, it offers a truly unique solution for Dell EMC's largest customers with the most complex environments.

- Team of assigned Services Account Managers (SAM) with remote, on-site options
- Assigned ProSupport One technical and field engineers who are trained on your environment and configurations
- On-demand reporting and analytics-based recommendations enabled by SupportAssist and TechDirect
- Flexible on-site support and parts options that fit your operational model
- A tailored support plan and training for your operations staff

|                                                | ProSupport                            | ProSupport Plus                       | ProSupport One for Data Center |
|------------------------------------------------|---------------------------------------|---------------------------------------|--------------------------------|
| Remote technical support                       | 24x7                                  | 24x7                                  | 24x7                           |
| Parts and labor response options               | Next business day or Mission Critical | Next business day or Mission Critical | Flexible                       |
| Automated issue detection and case creation    | •                                     | •                                     | •                              |
| Self-service case initiation and management    | •                                     | •                                     | •                              |
| Hypervisor and OS support                      | •                                     | •                                     | •                              |
| Priority access to specialized support experts |                                       | •                                     | •                              |
| Designated Technology Service Manager          |                                       | •                                     | •                              |
| Personalized assessments and recommendations   |                                       | •                                     | •                              |
| On-demand support and utilization reports      |                                       | •                                     | •                              |
| Systems Maintenance guidance                   |                                       | Semiannual                            | Optional                       |
| Designated technical and field support teams   |                                       |                                       | •                              |

Figure 18. Enterprise Support feature comparison

## Support Technologies

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

### SupportAssist

The best time to solve a problem is before it happens. The automated proactive and predictive technology SupportAssist\* helps reduce steps and time to resolution, often detecting issues before they become a crisis. Benefits include:

- Value - SupportAssist is 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 EMC experts.
- Gain insight and control - optimize enterprise devices with on-demand ProSupport Plus reporting in TechDirect and get predictive issue detection before the problem starts.

SupportAssist is included with all support plans but features vary based on service level agreement.

|                                                                   | Basic Hardware Warranty | ProSupport | ProSupport Plus |
|-------------------------------------------------------------------|-------------------------|------------|-----------------|
| Automated issue detection and system state information collection | •                       | •          | •               |
| Proactive, automated case creation and notification               |                         | •          | •               |
| Predictive issue detection for failure prevention                 |                         |            | •               |
| Recommendation reporting available on-demand in TechDirect        |                         |            | •               |

Figure 19. SupportAssist model

Get started at [Dell.com/SupportAssist](http://Dell.com/SupportAssist)

### TechDirect

Boost your IT teams productivity when supporting Dell EMC systems. With over 1.4 million self-dispatches processed each year, TechDirect has proven its effectiveness as a support tool. You can:

- Self-dispatch replacement parts
- Request technical support
- Integrate APIs into your help desk

Or, access all your Dell EMC certification and authorization needs. Train your staff on Dell EMC products as TechDirect allows you to:

- Download study guides
- Schedule certification and authorization exams
- View transcripts of completed courses and exams

Register at [techdirect.dell.com](http://techdirect.dell.com)

## Additional professional services

### Dell Education Services

Dell Education Services offers the PowerEdge server training courses designed to help you achieve more with your hardware investment. The curriculum is designed in conjunction with the server development team, as well as Dell EMC's technical support team, to ensure that the training delivers the information and practical, hands-on skills you and your team need to confidently manage and maintain your Dell EMC server solution. To learn more or register for a class today, visit [LearnDell.com/Server](http://LearnDell.com/Server).

### Dell EMC Global Infrastructure Consulting Services

Dell EMC Global Infrastructure Consulting Services use skilled solution architects, innovative tools, automated analysis and Dell EMC's intellectual property to give rapid insight into the root causes of unnecessary complexity. We seek better answers than traditional service models, and our strategy is to help quickly identify high-impact, short-duration projects that deliver return on investment (ROI) and free up resources. The results are practical, action-oriented plans with specific, predictable, measurable outcomes. From data center optimization to server virtualization to systems management, our consulting services can help build a more efficient enterprise.

### Dell EMC Managed Services

Dell EMC Managed Services are a modular set of lifecycle services designed to help you automate and centrally configure, deploy, and manage your day-to-day data center operations. These services extend your existing on-premise IT infrastructure with off-premise cloud services designed to better address challenges with mobility, highly distributed organizations, security, compliance, business continuity, and disaster preparedness.