

# **Dell EMC PowerEdge R940**

## Technical Specifications

## 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.

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# PowerEdge R940 overview

The PowerEdge R940 is a 3U rack system, which is available in the following configurations:

**Table 1. PowerEdge R940 configurations**

Configurations	Specifications
8-drive bay system (without Processor Expansion Module)	<ul style="list-style-type: none"><li>• Two Intel Xeon Scalable processors</li><li>• 24 DIMM slots supporting up to 3 TB of memory</li><li>• Up to two AC or DC power supply units (PSUs)</li><li>• 8 drives or SSDs</li></ul>
24-drive bay system (with PEM)	<ul style="list-style-type: none"><li>• Four Intel Xeon Scalable processors</li><li>• 48 DIMM slots supporting up to 6 TB of memory</li><li>• Up to two AC or DC power supply units (PSUs)</li><li>• 24 drives or SSDs</li></ul>

**NOTE:** The PowerEdge R940 system supports hot swappable hard drives.

**NOTE:** The PowerEdge R940 system is also available in a diskless (no backplane) configuration.

# PowerEdge R940 technical specifications

The technical and environmental specifications of your system are outlined in this section.

**Topics:**

- [System dimensions](#)
- [System weight](#)
- [Cooling fan specifications](#)
- [Processor specifications](#)
- [Supported operating systems](#)
- [PSU specifications](#)
- [System battery specifications](#)
- [Expansion bus specifications](#)
- [Memory specifications](#)
- [Storage controller specifications](#)
- [Remote management port specifications](#)
- [Drive specifications](#)
- [Ports and connectors specifications](#)
- [Video specifications](#)
- [Environmental specifications](#)

## System dimensions

This section describes the physical dimensions of the system.

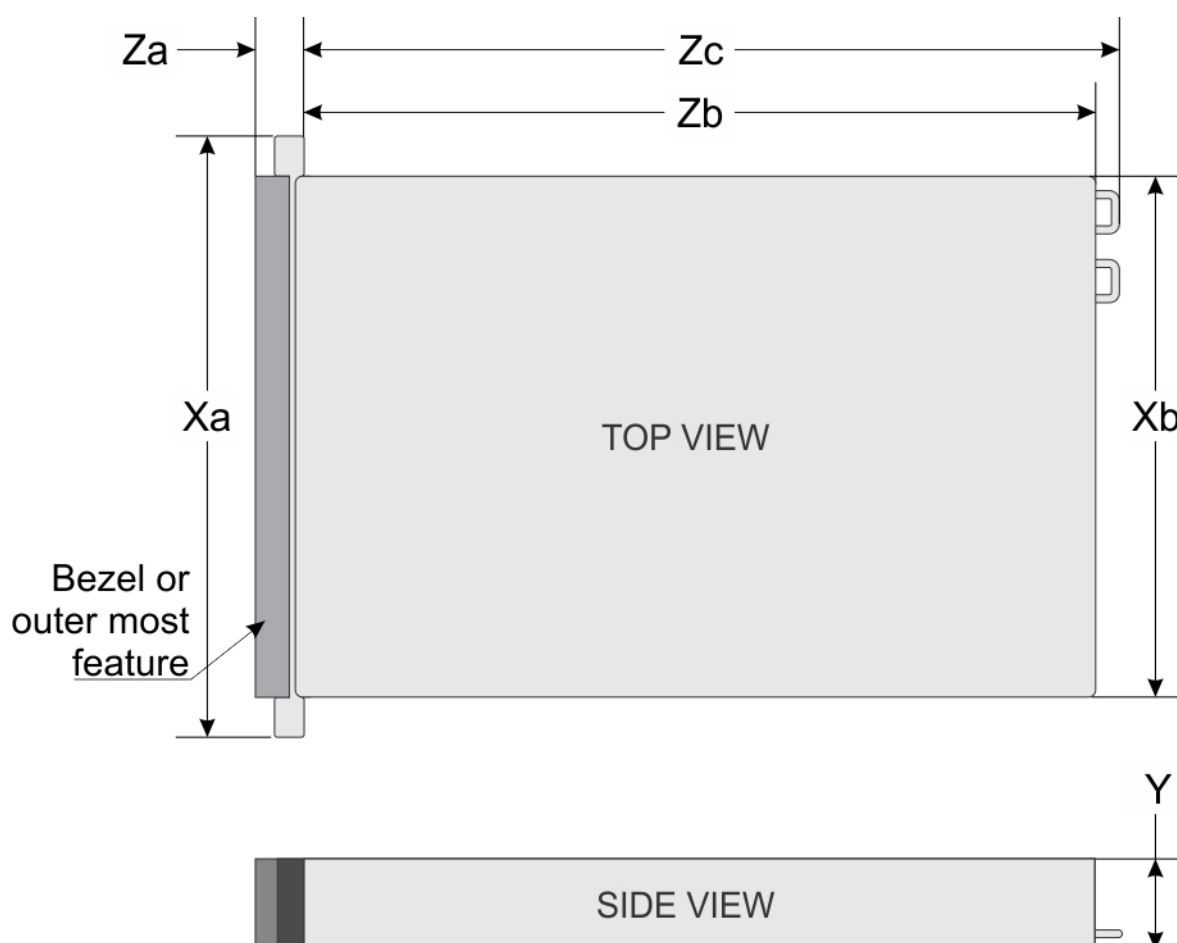


Figure 1. System dimensions of PowerEdge R940 system

Table 2. System dimensions of PowerEdge R940 system

System	Xa	Xb	Y	Za (with bezel)	Za (without bezel)	Zb	Zc
PowerEdge R940	482.0 mm (18.9 inches)	434.0 mm (17.08 inches)	130.3 mm (5.13 inches)	35.0 mm (1.37 inches)	22.0 mm (0.86 inches)	726.2 mm (28.59 inches)	777.046 mm (30.59 inches)

## System weight

Table 3. System weight of PowerEdge R940 system

System	Maximum weight (with all hard drive/SSDs)
PowerEdge R940	49.9 kg (110.01 lb)

## Cooling fan specifications

The PowerEdge R940 system supports up to eight standard or high performance hot swappable cooling fans.

## Processor specifications

The PowerEdge R940 system supports two or four Intel Xeon Scalable Processors, up to 28 cores per socket.

# Supported operating systems

The table below lists the primary operating systems supported on the PowerEdge R940:

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

**NOTE:** For more information about the specific versions and additions, see <https://www.dell.com/support/home/Drivers/SupportedOS/poweredge-r940>.

## PSU specifications

The PowerEdge R940 system supports up to two AC or DC power supply units (PSUs):

- Two 2400 W, 2000 W, 1600 W, or 1100 W AC power supply units (PSUs)
- Two 1100 W DC PSUs
- Two 1100 W Mixed Mode HVDC PSUs

**NOTE:** The PowerEdge R940 system supports hot swappable PSUs.

**CAUTION:** If two PSUs are installed, both the PSUs must have the same type of label. For example, Extended Power Performance (EPP) label. Mixing PSUs from previous generations of PowerEdge servers is not supported, even if the PSUs have the same power rating. This results in a PSU mismatch condition or failure to turn the system on.

**NOTE:** Titanium PSU is nominally rated for 200 V AC to 240 V AC input only.

**NOTE:** When two identical PSUs are installed, power supply redundancy (1+1 – with redundancy or 2+0 – without redundancy) is configured in system BIOS. In redundant mode, power is supplied to the system equally from both PSUs when Hot Spare is disabled. When Hot Spare is enabled, one of the PSUs is put into the sleep mode when system utilization is low in order to maximize efficiency.

**NOTE:** If two PSUs are used, they must be of the same maximum output power.

Table 4. PSU specifications

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage	Power rating	Current
1100 W AC	Platinum	4100 BTU/hr	50/60 Hz	100–120 V AC, autoranging	derated to 1050 W	12 A–6.5 A
				200–240 V AC, autoranging	1100 W	
1100 W DC	N/A	4416 BTU/hr	N/A	–(48–60) V DC, autoranging	1100 W	32 A
1100 W Mixed Mode HVDC (for China and Japan only)	Platinum	4100 BTU/hr	50/60 Hz	100–120 V AC, autoranging	derated to 1050 W	12 A–6.5 A
	N/A	4100 BTU/hr	N/A	200–380 V DC, autoranging	1100 W	6.4 A–3.2 A
1600 W AC	Platinum	6000 BTU/hr	50/60 Hz	100–120 V AC, autoranging	derated to 800 W	10 A
				200–240 V AC, autoranging	1600 W	
2000 W AC	Platinum	7500 BTU/hr	50/60 Hz	100–120 V AC, autoranging	derated to 1000 W	11.5 A
				200–240 V AC, autoranging	2000 W	

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage	Power rating	Current
2400 W AC	Platinum	9000 BTU/hr	50/60 Hz	100-120 V AC, autoranging 200-240 V AC, autoranging	derated to 1400 W 2400 W	16 A

**NOTE:** Heat dissipation is calculated using the PSU wattage rating.

**NOTE:** This system is also designed to connect to the IT power systems with a phase to phase voltage not exceeding 240 V.

**NOTE:** PSUs rated for 1600 W and higher require high-line voltage (200-240 V) to supply their rated capacity.

## System battery specifications

The PowerEdge R940 system supports CR 2032 3.0-V lithium coin cell system battery.

## Expansion bus specifications

The PowerEdge R940 system supports PCI express (PCIe) generation 3 expansion cards, which you can install on the expansion slots available on the system board. If you are using PowerEdge R940 system with four processor configuration, then you can also install the cards by using the expansion card riser. This system supports up to two expansion card risers. The following table provides the expansion card riser specifications:

**Table 5. Expansion card slots supported on the system board**

PCIe slot on the system board	Processor connection	PCIe slots on system board (Height)	PCIe slots on system board (length)	Link width	Slot width
Slot 1	Processor 1	full height	half length	x8	x16
Slot 2	Processor 1	full height	half length	x16	x16
Slot 3	Processor 1	full height	half length	x16	x16
Slot 4	Processor 2	full height	half length	x16	x16
Slot 5	Processor 2	full height	half length	x8	x16
Slot 6	Processor 2	full height	half length	x8	x16
Slot 7	Processor 2	full height	half length	x16	x16

**Table 6. Expansion card riser configurations**

Riser	PCIe slot on the expansion card riser	Processor connection	PCIe slots on riser (Height)	PCIe slots on riser (length)	Link width	Slot width
Riser 2 (IO_RISER2)	Slot 8	Processor 3	full height	3/4 length	x16	x16
	Slot 9	Processor 3	full height	half length	x16	x16
	Slot 10	Processor 3	full height	half length	x16	x16
Riser 3 (IO_RISER3)	Slot 11	Processor 4	full height	3/4 length	x16	x16
	Slot 12	Processor 4	full height	half length	x16	x16
	Slot 13	Processor 4	full height	half length	x16	x16



# Memory specifications

Table 7. Memory specifications

Memory module sockets	DIMM type	DIMM rank	DIMM capacity	Dual processors		Quad processors	
				Minimum RAM	Maximum RAM	Minimum RAM	Maximum RAM
Twenty four 288-pins	LRDIMM	Octa rank	128 GB	256 GB	3 TB	512 GB	6 TB
		Quad rank	64 GB	128 GB	1.5 TB	256 GB	3 TB
	RDIMM	Single rank	8 GB	16 GB	192 GB	32 GB	384 GB
		Dual rank	16 GB	32 GB	384 GB	64 GB	768 GB
		Dual rank	32 GB	64 GB	768 GB	128 GB	1.5 TB
		Dual rank	64 GB	64 GB	768 GB	128 GB	1.5 TB
	NVDIMM-N	Single rank	16 GB	16 GB	192 GB	Supported on the system board only (No NVDIMM-N on PEM)	
	DCPMM	NA	128 GB	RDIMM: 384 GB	LRDIMM: 1536 GB	RDIMM: 384 GB	LRDIMM: 3072 GB
				DCPMM: 1536 GB	DCPMM: 1536 GB	DCPMM: 248 GB	DCPMM: 3072 GB
		NA	256 GB	RDIMM: 192 GB	LRDIMM: 1536 GB	RDIMM: 384 GB	LRDIMM: 3072 GB
				DCPMM: 2048 GB	DCPMM: 3072 GB	DCPMM: 4096 GB	DCPMM: 6144 GB
		NA	512 GB	RDIMM: 384 GB	LRDIMM: 1536 GB	RDIMM: 768 GB	LRDIMM: 3072 GB
				DCPMM: 4096 GB	DCPMM: 6144 GB	DCPMM: 8192 GB	DCPMM: 12,288 GB

**NOTE:** 8 GB RDIMM and NVDIMM-N must not be mixed.

**NOTE:** NVDIMM-N memory modules must be installed only on the memory sockets available on the system board.

**NOTE:** The DIMM slots are not hot-pluggable.

**NOTE:** NVDIMM-N memory slots and NVDIMM-N battery are not hot-pluggable.

## Storage controller specifications

The PowerEdge R940 system supports:

- **Internal controllers:** S140 (NVMe drives only), and NVMe PCIe SSD adapter.
- **Internal controllers:** PowerEdge RAID Controller (PERC) H330, H730P, H740P Boot optimized storage subsystem.
- **External HBAs (RAID):** H840
- **External HBAs (non-RAID):** 12Gbps SAS HBA

## Remote management port specifications

The PowerEdge R940 system supports one dedicated 1Gbe Ethernet port with optional card and up to two optional shared NIC ports.

# Drive specifications

## Hard drives

The PowerEdge R940 system supports SAS, SATA, Nearline SAS, NVMe hard drives or SSDs.

**Table 8. Supported drive options for the PowerEdge R940 system**

System	Description
Eight drives system	Up to eight 2.5-inch (SAS, SATA or Nearline SAS) front accessible drives in slots 0 through 7
Twenty four drives system	Up to twenty four 2.5-inch (SAS, SATA or Nearline SAS) front accessible drives in slots 0 through 23
Twenty four drives system	Up to twenty SAS + 4 NVMe SAS/SATA drives in slots 0 to 19 + slots 20 to 23
Twenty four drives system	Up to sixteen SAS + 8 NVMe SAS/SATA drives in slots 0 to 15 + slots 16 to 23

# Ports and connectors specifications

## USB ports

The PowerEdge R940 system supports:

- Two USB 3.0-compliant ports on the front panel
- Two USB 3.0-compliant ports on the back panel
- One USB 3.0-compliant internal port

An optional USB memory key installed inside your system can be used as a boot device, security key, or mass storage device. To boot from the USB memory key, configure the USB memory key with a boot image and then specify the USB memory key in the boot sequence in System Setup.

## NIC ports

The PowerEdge R940 system supports up to four NDC ports on the back panel, which are available in the following configurations:

- Four RJ-45 ports that support 10 Mbps, 100 Mbps, and 1000 Mbps
- Four RJ-45 ports that support 100 M, 1 G and 10 Gbps
- Four RJ-45 ports, where two ports support maximum of 10 G and the other two ports maximum of 1 G
- Two RJ-45 ports that support up to 1 Gbps and 2 SFP+ ports that support up to 10 Gbps
- Four SFP+ ports that support up to 10 Gbps
- Two SFP28 ports that support up to 25 Gbps

 **NOTE:** The NDC slot is not hot-pluggable.

## Serial port

The PowerEdge R940 system supports one serial port on the back panel, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

## Internal Dual SD Module or vFlash card

The PowerEdge R940 system supports Internal Dual SD module (IDSDM) and vFlash card. In 14th generation of PowerEdge servers, IDSDM and vFlash card are combined into a single card module, and are available in these configurations:

- vFlash or
- IDSDM or
- vFlash and IDSDM

The IDSDM/vFlash card sits in the back of the system, in a Dell-proprietary slot. IDSDM/vFlash card supports three micro SD cards (two cards for IDSDM and one card for vFlash). Micro SD cards capacity for IDSDM are 16/32/64 GB while for vFlash the microSD card capacity is 16 GB.

 **NOTE:** The write-protect switch is on the IDSDM or vFlash module.

## VGA ports

The PowerEdge R940 system supports two 15-pin VGA ports. One of the VGA ports is located on the front of the system and the other port is located on the back of the system.

## Video specifications

The PowerEdge R940 system supports integrated Matrox G200eW3 graphics controller with 16 MB of video frame buffer.

**Table 9. Resolution information for video modes**

Resolution	Refresh rate (Hz)
1024 x 768	60
1280 x 800	60
1280 x 1024	60
1360 x 768	60
1440 x 900	60
1600 x 900	60 (RB)
1600 x 1200	60
1680 x 1050	60 (RB)
1920 x 1080	60
1920 x 1200	60

## Environmental specifications

 **NOTE:** For additional information about environmental certifications, please refer to the Product Environmental Datasheet located with the Manuals & Documents on [www.dell.com/poweredgemanuals](http://www.dell.com/poweredgemanuals).

**Table 10. Temperature specifications**

Temperature	Specifications
Storage	–40°C to 65°C (–40°F to 149°F)
Continuous operation (for altitude less than 950 m or 3117 ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.
Maximum temperature gradient (operating and storage)	20°C/h (68°F/h)

**Table 11. Relative humidity specifications**

Relative humidity	Specifications
Storage	5% to 95% RH with 33°C (91°F) maximum dew point. Atmosphere must be non-condensing at all times.
Operating	10% to 80% relative humidity with 29°C (84.2°F) maximum dew point.

**Table 12. Maximum vibration specifications**

Maximum vibration	Specifications
Operating	0.26 G <sub>rms</sub> at 5 Hz to 350 Hz (all three axes).
Storage	1.88 G <sub>rms</sub> at 10 Hz to 500 Hz for 15 min (all six sides tested).

**Table 13. Maximum shock specifications**

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

**Table 14. Maximum altitude specifications**

Maximum altitude	Specifications
Operating	3048 m (10,000 ft)
Storage	12,000 m (39,370 ft)

**Table 15. Operating temperature de-rating specifications**

Operating temperature de-rating	Specifications
Up to 35°C (95°F)	Maximum temperature is reduced by 1°C/300 m (1°F/547 ft) above 950 m (3,117 ft).
35°C to 40°C (95°F to 104°F)	Maximum temperature is reduced by 1°C/175 m (1°F/319 ft) above 950 m (3,117 ft).
40°C to 45°C (104°F to 113°F)	Maximum temperature is reduced by 1°C/125 m (1°F/228 ft) above 950 m (3,117 ft).

## Standard operating temperature

**Table 16. Standard operating temperature specifications**

Standard operating temperature	Specifications
Continuous operation (for altitude less than 950 m or 3117 ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.
Humidity percentage range	10% to 80% Relative Humidity with 29°C (84.2°F) maximum dew point.

## Expanded operating temperature

**Table 17. Expanded operating temperature specifications**

Expanded operating temperature	Specifications
Continuous operation	5°C to 40°C at 5% to 85% RH with 29°C dew point.

## Expanded operating temperature

## Specifications

≤ 1% of annual operating hours

**NOTE:** Outside the standard operating temperature (10°C to 35°C), the system can operate continuously in temperatures as low as 5°C and as high as 40°C.

For temperatures between 35°C to 40°C, de-rate maximum allowable temperature by 1°C per 175 m above 950 m (1°F per 319 ft).

–5°C to 45°C at 5% to 90% RH with 29°C dew point.

**NOTE:** Outside the standard operating temperature (10°C to 35°C), the system can operate down to –5°C or up to 45°C for a maximum of 1% of its annual operating hours.

For temperatures between 40°C and 45°C, de-rate maximum allowable temperature by 1°C per 125 m above 950 m (1°F per 228 ft).

**NOTE:** When operating in the expanded temperature range, system performance may be impacted.

**NOTE:** When operating in the expanded temperature range, ambient temperature warnings may be reported in the System Event Log.

## Expanded operating temperature restrictions

- Do not perform a cold startup below 5°C.
- The operating temperature specified is for a maximum altitude of 3050 m (10,000 ft).
- 150 W/8 core, 165 W/12 core and higher wattage processor [Thermal Design Power (TDP)>165 W] are not supported.
- Redundant power supply unit is required.
- Non-Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.
- NVMe drives are not supported.
- NVDIMMs are not supported.
- DCPMMs are not supported.
- Tape backup unit is not supported.

## Thermal restrictions

Following table lists the configuration required for efficient cooling.

**Table 18. Thermal restriction for efficient cooling**

Configuration	Number of processor s	Heatsink	Processor blank	DIMM blanks	Fresh air	Fan
Eight 2.5 inch hard drive system	2	Two heat sinks for CPU < 165W	Not required	12	Yes	eight standard fans
		Two heat sinks for CPU ≥ 165 W			No	
	4	Four standard heat sinks for CPU < 165 W	Not required	24	Yes	eight standard fans
		Four heat sinks CPU ≥ 165 W			No	
Twenty four 2.5 inch hard drive system	2	Two standard heat sinks for CPU < 165W	Not required	12	Yes	eight standard fans
		Two heat sinks for CPU ≥ 165 W			No	
	4	Four standard heat sinks for CPU < 165 W	Not required	24	Yes	eight standard fans
		Four heat sinks for CPU ≥ 165 W			No	

**Table 19. NIC card slot restrictions**

System	Configuration	Slot restriction	Ambient restriction
PowerEdge R940	Eight 2.5-inch hard drive system	Slots 1, 5, and 6 do not support NIC cards	35°C
	Twenty four 2.5-inch hard drive system	Slots 1, 5, and 6 do not support NIC cards	35°C

## Ambient temperature limitations

The following table lists configurations that require ambient temperature less than 35°C.

**NOTE:** The ambient temperature limit must be adhered to ensure proper cooling and to avoid excess CPU throttling, which may impact system performance.

**Table 20. Configuration based ambient temperature restrictions**

System	Front drive configuration	Processor Thermal Design Power (TDP)	Processor count and Memory	Ambient Restriction
PowerEdge R940	Any	150 W/8 core, 165 W/12 core, 200 W, 205 W	Any	35°C
	NVMe	Any	Any	35°C
	Any	Any	4 CPUs with DCPMMs	35°C
	Any	Any	Any number of CPUs with NVDIMMs	35°C

## Particulate and gaseous contamination specifications

The following table defines the limitations that help avoid any equipment damage or failure from particulate and gaseous contamination. If the levels of particulate or gaseous pollution exceed the specified limitations and result in equipment damage or failure, you may need to rectify the environmental conditions. Remediation of environmental conditions is the responsibility of the customer.

**Table 21. Particulate contamination specifications**

Particulate contamination	Specifications
Air filtration	<p>Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit.</p> <p><b>NOTE:</b> The ISO Class 8 condition applies to data center environments only. This air filtration requirement does not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.</p> <p><b>NOTE:</b> Air entering the data center must have MERV11 or MERV13 filtration.</p>
Conductive dust	<p>Air must be free of conductive dust, zinc whiskers, or other conductive particles.</p> <p><b>NOTE:</b> This condition applies to data center and non-data center environments.</p>
Corrosive dust	<ul style="list-style-type: none"> <li>Air must be free of corrosive dust.</li> <li>Residual dust present in the air must have a deliquescent point less than 60% relative humidity.</li> </ul> <p><b>NOTE:</b> This condition applies to data center and non-data center environments.</p>

**Table 22. Gaseous contamination specifications**

<b>Gaseous contamination</b>	<b>Specifications</b>
Copper coupon corrosion rate	<300 Å/month per Class G1 as defined by ANSI/ISA71.04-2013.
Silver coupon corrosion rate	<200 Å/month as defined by ANSI/ISA71.04-2013.

 **NOTE:** Maximum corrosive contaminant levels measured at ≤50% relative humidity.

## Getting help

### Topics:

- [Contacting Dell EMC](#)
- [Documentation feedback](#)
- [Accessing system information by using QRL](#)
- [Recycling or End-of-Life service information](#)

## Contacting Dell EMC

Dell EMC provides several online and telephone based support and service options. If you do not have an active internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell EMC product catalog. Availability varies by country and product, and some services may not be available in your area. To contact Dell EMC for sales, technical assistance, or customer service issues:

### Steps

1. Go to [www.dell.com/support/home](http://www.dell.com/support/home).
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
  - a) Enter your system Service Tag in the **Enter your Service Tag** field.
  - b) Click **Submit**.  
The support page that lists the various support categories is displayed.
4. For general support:
  - a) Select your product category.
  - b) Select your product segment.
  - c) Select your product.  
The support page that lists the various support categories is displayed.
5. For contact details of Dell EMC Global Technical Support:
  - a) Click [Global Technical Support](#).
  - b) The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell EMC Global Technical Support team.

## Documentation feedback

You can rate the documentation or write your feedback on any of our Dell EMC documentation pages and click **Send Feedback** to send your feedback.

## Accessing system information by using QRL

You can use the Quick Resource Locator (QRL) located on the information tag in the front of the PowerEdge R930, to access the information about the PowerEdge R930.

### Prerequisites

Ensure that your smartphone or tablet has the QR code scanner installed.

The QRL includes the following information about your system:

- How-to videos
- Reference materials, including the Installation and Service Manual, LCD diagnostics, and mechanical overview
- Your system service tag to quickly access your specific hardware configuration and warranty information
- A direct link to Dell to contact technical assistance and sales teams



### Steps

1. Go to [www.dell.com/qrl](http://www.dell.com/qrl) and navigate to your specific product or
2. Use your smartphone or tablet to scan the model-specific Quick Resource (QR) code on your system or in the Quick Resource Locator section.

## Quick Resource Locator for PowerEdge R940 system



Figure 2. Quick Resource Locator for PowerEdge R940 system

## Recycling or End-of-Life service information

Take back and recycling services are offered for this product in certain countries. If you want to dispose of system components, visit [www.dell.com/recyclingworldwide](http://www.dell.com/recyclingworldwide) and select the relevant country.