Dell EMC PowerEdge MX5016s and MX5000s

Technical specifications

Regulatory Model: E04B Series and E21M Series
Regulatory Type: E04B002 and E21M001

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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System overview

Dell EMC PowerEdge MX5016s sled overview

The PowerEdge MX5016s is a Storage Sled installed in the PowerEdge MX7000 enclosure to provide disk expansion for PowerEdge MX series Compute Sleds. In the PowerEdge MX7000 enclosure, the PowerEdge MX5016s is connected through an internal SAS fabric (Fab-C). The PowerEdge MX5000s provides flexible SAS connectivity between compute sleds, and internal storage sleds connected to the MX7000 enclosure.

PowerEdge MX5016s supports up to:

- 16 hot-swappable 2.5-inch SAS drives
- Two hot-swappable expanders providing dual SAS paths for all drives(HDDs/SSDs)
- Dual x4 SAS links to the MX platform infrastructure
- 12 GB/s SAS support

NOTE: All instances of SAS hard drives and SSDs are referred to as drives in this document, unless specified otherwise.

Dell EMC PowerEdge MX5000s SAS IOM overview

The Dell EMC PowerEdge MX5000s is a redundant, hot-swappable SAS switch solution for the Dell EMC PowerEdge MX7000 enclosure that is designed to be used with the Dell EMC PowerEdge MX5016s storage sleds and SAS controllers that are installed in compute sleds. The IOM facilitates SAS Storage subsystem, drive assignments, reporting health status and event logs for the associated SAS devices. You can manage SAS fabric by using the OpenManage Enterprise-Modular user interface to view inventory, storage event logs and manage drive or enclosure assignments.

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Technical specifications

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

Topics:

- Sled dimensions
- Sled weight
- Supported operating systems
- Storage expander specifications
- Drive specifications
- Drive assignment
- Module dimensions
- Module weight
- Environmental specifications
- Expanded operating temperature
- Particulate and gaseous contamination specifications

Sled dimensions

Table 1. System dimensions of the Dell EMC PowerEdge MX5016s

System	Height	Width	Depth(handle closed)
PowerEdge MX5016s	250.2 mm (9.85 inches)	42.15 mm (1.65 inches)	600.00 mm (23.62 inches)

Sled weight

Table 2. Dell EMC PowerEdge MX5016s system weight

System	Maximum weight
PowerEdgeMX5016s	12 kg (26.45 lbs)

Supported operating systems

The Dell EMC PowerEdge MX5016s supports the following operating systems:

Red Hat Enterprise Linux
Novell SUSE Linux Enterprise Server
Microsoft Windows Server
Ubuntu
VMware ESXi
Citrix Xen Server

For more information about the specific versions and additions, go to https://www.dell.com/support/home/us/en/04/Drivers/SupportedOS/poweredge-MX5016s

Storage expander specifications

The storage expander modules provide the storage subsystem for the drives in the PowerEdge MX5016s. The SAS expanders each connect to ports on all 16 HDDs. The first expander connects to port A of the first eight HDDs and port B of the second eight HDDs. The second expander is the opposite and connects to port B of the first eight HDDs and port A of the other eight HDDs. There is also a SAS link between the expanders to facilitate communication/synchronization between the two expanders.

Drive specifications

The Dell EMC PowerEdge MX5016s supports the following drive types:

- Support for 10,000 RPM and 15,000 RPM 2.5-inch SAS drives
- Support for 2.5-inch SAS SSD
- Support for 7.2 K RPM 2.5-inch NearLine SAS drives

NOTE: SATA and NVMe drives are not supported but mixing of rotational and SSD SAS drives is supported.

Drive assignment

Each slot in the PowerEdge MX7000 chassis supports a Compute Sled or a Storage Sled, and there are no fixed mappings for the sleds. Using the OpenManage Enterprise-Modular web interface the disks in a storage sled can be mapped to a Compute Sled that gives you the following options:

- Enclosure-Assigned mode
- Drive-Assigned mode

Enclosure-Assigned mode:

- All the drives in the PowerEdge MX5016s are assigned to the selected compute sleds.
- The Fab-C Mezz controller can be either PERC H745P MX, or HBA330 MMZ. Enclosure assignment mode is required if the PowerEdge MX5016s is to be shared between multiple compute sleds (that is clustered). Only HBA330 MMZ controller supports shared assignments.

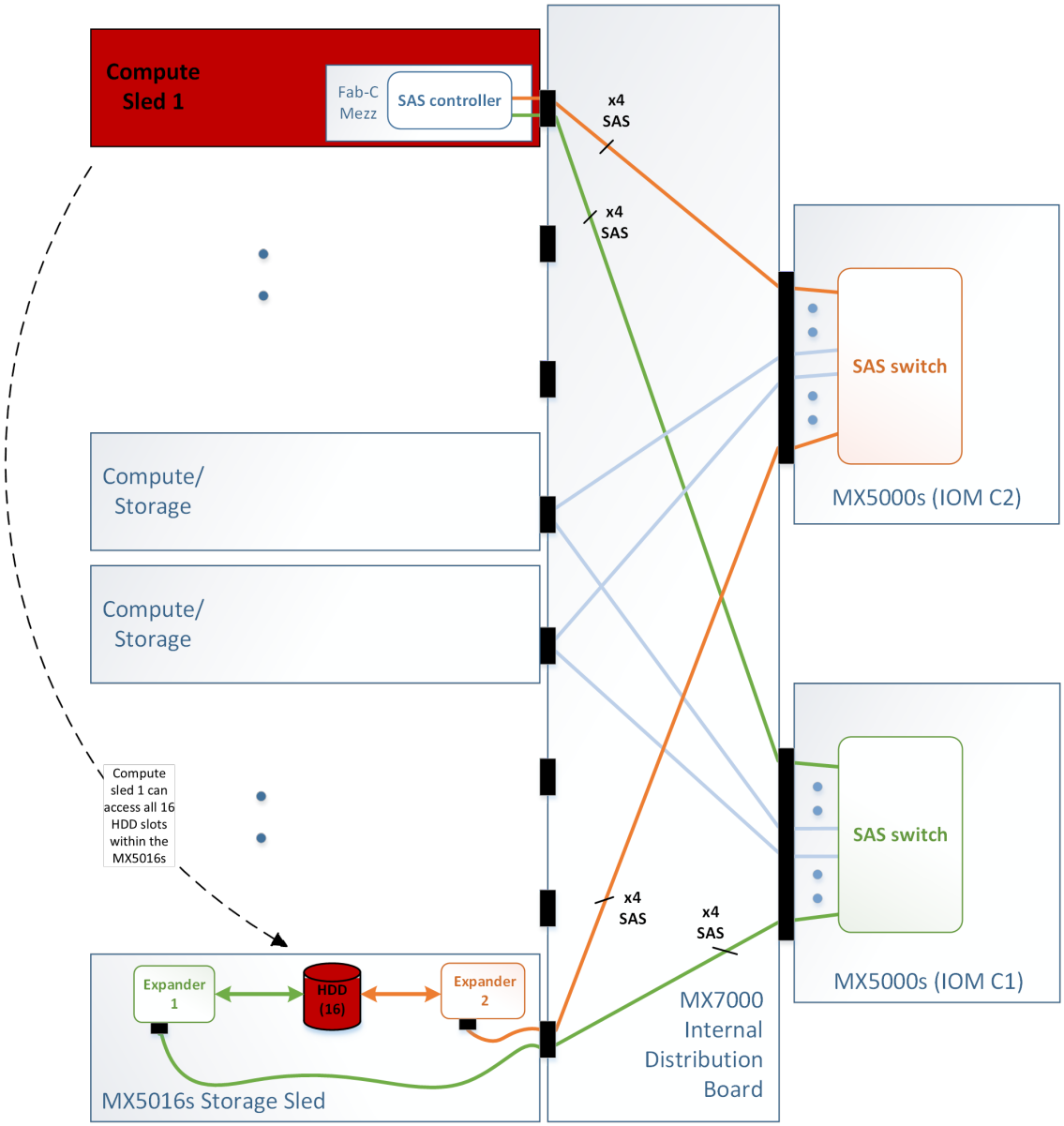

Figure 1. Enclosure-Assigned mode

Drive-Assigned mode:

- A specified group of disks is assigned.
- Drive-Assigned mode assigns the individual drive from the PowerEdge MX5016s to another compute sleds (but cannot be assigned to more than one sled simultaneously). The Fab-C Mezz controller on the mapped compute sled can be either a PERC H745P MX, or HBA330 MMZ.

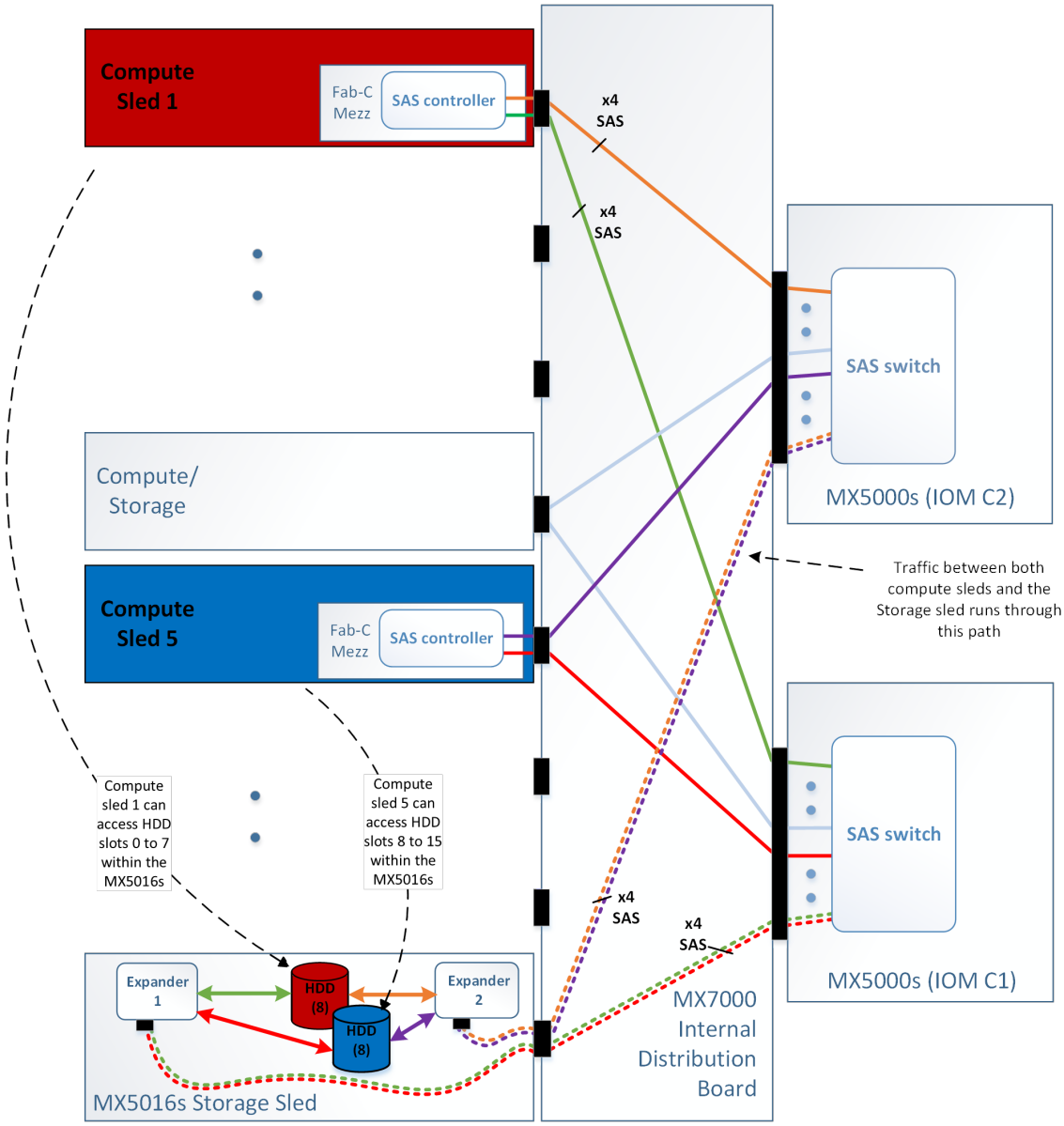

Figure 2. Drive-Assigned mode

Module dimensions

Table 3. Dimensions of the Dell EMC PowerEdge MX5000s

System	Height	Width	Depth(handle closed)
PowerEdge MX5000s	27.50 mm (1.08 inches)	214.50 mm (8.44 inches)	208.30 mm (8.20 inches)

Module weight

Table 4. Dell EMC PowerEdge MX5000s module weight

System	Maximum weight
PowerEdge MX5000s	1.5 kg (3.30 lb)

Environmental specifications

NOTE: For additional information about environmental measurements for specific system configurations, see Dell.com/environmental_datasheets.

Table 5. 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 6. 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 26°C (78.8°F) maximum dew point.

Table 7. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.26 G_{rms} at 5 Hz to 350 Hz (all operation orientations).
Storage	1.87 G_{rms} at 10 Hz to 500 Hz for 15 min (all six sides tested).

Table 8. Maximum shock specifications

Maximum shock	Specifications
Operating	One shock pulse in the positive z axis of 31 G for 2.6 ms in the operational orientation.
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 9. Maximum altitude specifications

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

Table 10. 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).

Expanded operating temperature

Table 11. Expanded operating temperature specifications

Expanded operating temperature	Specifications
Less than or equal to 10% of annual operating hours	5°C to 40°C at 5% to 85% RH with 29°C dew point. **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 and 40°C, de-rate maximum allowable dry bulb temperature by 1°C per 175 m above 950 m (1°F per 319 ft).
Less than or equal to 1% of annual operating hours	–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 maybe reported on the LCD panel and in the System Event Log.

Particulate and gaseous contamination specifications

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

Table 12. Particulate contamination specifications

Particulate contamination	Specifications
Air filtration	Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit. **NOTE: This condition applies to data center environments only. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.** **NOTE: Air entering the data center must have MERV11 or MERV13 filtration.**
Conductive dust	Air must be free of conductive dust, zinc whiskers, or other conductive particles. **NOTE: This condition applies to data center and non-data center environments.**
Corrosive dust	• Air must be free of corrosive dust. • Residual dust present in the air must have a deliquescent point less than 60% relative humidity. **NOTE: This condition applies to data center and non-data center environments.**

Table 13. Gaseous contamination specifications

Gaseous contamination	Specifications
Copper coupon corrosion rate	<300 Å/month per Class G1 as defined by ANSI/ISA71.04-1985.
Silver coupon corrosion rate	<200 Å/month as defined by AHSRAE TC9.9.

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

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Documentation resources

This section provides information about the documentation resources for your system.

To view the document that is listed in the documentation resources table:

- From the Dell EMC support site:
  a Click the documentation link that is provided in the Location column in the table.
  b Click the required product or product version.

  NOTE: To locate the product name and model, see the front of your system.

  c On the Product Support page, click **Manuals & documents**.
- Using search engines:
  – Type the name and version of the document in the search box.

Table 14. Additional documentation resources for your system

Task	Document	Location
Setting up your system	For more information about installing and securing the system into a rack, see the Rail Installation Guide included with your rack solution. For information about setting up your system, see the *Getting Started Guide* document that is shipped with your system.	Dell.com/poweredgemanuals
Configuring your system	For information about the iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide. For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM CLI Guide for iDRAC. For information about Redfish and its protocol, supported schema, and Redfish Eventing implemented in iDRAC, see the Redfish API Guide. For information about iDRAC property database group and object descriptions, see the Attribute Registry Guide. For information about Intel QuickAssist Technology, see the Integrated Dell Remote Access Controller User's Guide.	Dell.com/poweredgemanuals
	For information about earlier versions of the iDRAC documents. To identify the version of iDRAC available on your system, on the iDRAC web interface, click **?** > **About**.	Dell.com/idracmanuals

Task	Document	Location
	For information about installing the operating system, see the operating system documentation.	Dell.com/operatingsystemmanuals
Managing your system	For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.	Dell.com/poweredgemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	Dell.com/openmanagemanuals > OpenManage Server Administrator
	For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the Dell OpenManage Essentials User's Guide.	Dell.com/openmanagemanuals > OpenManage Essentials
	For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.	Dell.com/serviceabilitytools
	For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.	Dell.com/openmanagemanuals
Working with the Dell PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC), Software RAID controllers, or BOSS card and deploying the cards, see the Storage controller documentation.	Dell.com/storagecontrollermanuals
Understanding event and error messages	For information about checking the event and error messages generated by the system firmware and agents that monitor system components, see the Event and Error Message Reference Guide for 14th Generation Dell EMC PowerEdge Servers.	Dell.com/qrl
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.	Dell.com/poweredgemanuals

4

Getting help

Topics:

- Contacting Dell EMC
- Documentation feedback
- Accessing system information by using QRL
- Receiving automated support with SupportAssist

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:

1. Go to 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 MX5016s, to access the information about the Dell EMC PowerEdge MX5016s.
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 Owner's 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

1. Go to 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 the PowerEdge MX5016s system

Figure 3. Quick Resource Locator for the PowerEdge MX5016s

Receiving automated support with SupportAssist

Dell EMC SupportAssist is an optional Dell EMC Services offering that automates technical support for your Dell EMC server, storage, and networking devices. By installing and setting up a SupportAssist application in your IT environment, you can receive the following benefits:

- **Automated issue detection** — SupportAssist monitors your Dell EMC devices and automatically detects hardware issues, both proactively and predictively.
- **Automated case creation** — When an issue is detected, SupportAssist automatically opens a support case with Dell EMC Technical Support.
- **Automated diagnostic collection** — SupportAssist automatically collects system state information from your devices and uploads it securely to Dell EMC. This information is used by Dell EMC Technical Support to troubleshoot the issue.
- **Proactive contact** — A Dell EMC Technical Support agent contacts you about the support case and helps you resolve the issue.

The available benefits vary depending on the Dell EMC Service entitlement purchased for your device. For more information about SupportAssist, go to Dell.com/supportassist.