Instant secure erase

Instant Secure Erase (ISE) drives use the same encryption technology as SED drives but do not allow the encryption key to be secured. The encryption technology allows the drive to be re-purposed and securely erased using the cryptographic erase function.

NOTE: ISE drives do not provide protection against theft.

4 KB sector disk drives

PERC 11 controllers support 4 KB sector disk drives, which enables you to efficiently use the storage space.

Before installing Windows on 4 KB sector disk drives, see Windows operating system installation errors.

NOTE: Mixing 512–byte native and 512–byte emulated drives in a virtual disk is allowed, but mixing 512–byte and 4 KB native drives in a virtual disk is not allowed.

NOTE: 4 K is only supported in UEFI mode and not legacy BIOS.

NOTE: 4 K devices do not appear under the select boot device option. For more information, see Enable boot support.

Fault tolerance

The PERC 11 series supports the following:

- Self-Monitoring and Reporting Technology (SMART)
- Patrol read
- Physical disk failure detection
- Controller cache
- Battery Transparent Learn Cycle

The next sections describe some methods to achieve fault tolerance.

The SMART feature

The SMART feature monitors certain physical aspects of all motors, heads, and physical disk electronics to help detect predictable physical disk failures. Data on SMART compliant physical disks can be monitored to identify changes in values and determine whether the values are within threshold limits. Many mechanical and electrical failures display some degradation in performance before failure.

A SMART failure is also referred to as predicted failure. There are numerous factors that are predicted physical disk failures, such as a bearing failure, a broken read/write head, and changes in spin-up rate. In addition, there are factors related to read/write surface failure, such as seek error rate and excessive bad sectors.

NOTE: For detailed information on SCSI interface specifications, see t10.org and for detailed information on SATA interface specifications, see t13.org.

Automatic Replace Member with predicted failure

A replace member operation can occur when there is a SMART predictive failure reporting on a physical disk in a virtual disk. The automatic replace member is initiated when the first SMART error occurs on a physical disk that is part of a virtual disk. The target disk needs to be a hot spare that qualifies as a rebuild disk. The physical disk with the SMART error is marked as failed only after the successful completion of the replace member. This prevents the array from reaching degraded state.

If an automatic replace member occurs using a source disk that was originally a hot spare (that was used in a rebuild), and a new disk is added and set as a target disk for the replace member operation, the hot spare drive will revert to the hot spare state after the replace member operation successfully completes.

NOTE: To enable automatic replace member, use the Dell storage management application.

Patrol Read

The Patrol read feature is designed as a preventative measure to ensure physical disk health and data integrity. Patrol read scans and resolves potential problems on configured physical disks. The Dell storage management applications can be used to start patrol read and change its behavior.

The following is an overview of patrol read behavior:

- Patrol read runs on all disks on the controller that are configured as part of a virtual disk, including hot spares.
- Patrol read does not run on physical disks that are not part of a virtual disk or are in Ready state.
- The amount of controller resources dedicated to patrol read operations adjusts based on the number of outstanding disk I/O operations. For example, if the system is processing a large number of I/O operations, then patrol read uses fewer resources to allow the I/O to take a higher priority.
- Patrol read does not run on disks that are involved in any of the following operations:
  - Rebuild
  - Replace member
  - Full or background initialization
  - CC
  - RLM or OCE

  NOTE: By default, patrol read automatically runs every seven days on configured SAS and SATA hard drives.

For more information about patrol read, see the Dell OpenManage documentation at www.dell.com/openmanagemanuals.

Physical disk failure detection

If a disk fails and it is replaced with a new disk, the controller will automatically start a rebuild on the new disk. See, Configured slot behavior. Automatic rebuilds can also occur with hot spares. If you have configured hot spares, the controller will automatically try to use them to rebuild the degraded virtual disk.

Using persistent hot spare slots

NOTE: The persistent hot spare slot feature is disabled by default.

The PERC 11 series can be configured so that the system backplane or storage enclosure disk slots are dedicated as hot spare slots. This feature can be enabled using the Dell storage management application.

Once enabled, any slots with hot spares configured automatically become persistent hot spare slots. If a hot spare disk fails or is removed, a replacement disk that is inserted into the same slot automatically becomes a hot spare with the same properties as the one it is replacing. If the replacement disk does not match the disk protocol and technology, it does not become a hot spare.

For more information on persistent hot spares, see the Dell OpenManage documentation at www.dell.com/openmanagemanuals.

Configured slot behavior

This feature is similar to persistent hot spare slot behavior. If a redundant VD is configured to the system and if a drive is replaced, the configured slot will automatically rebuild or copyback on the inserted drive regardless of the data on the drive. This operation will overwrite the data on the drive.

Table 7. Drive state/operation

Drive state/operation	Unconfigured slot	Slot configured in VD
Insert unconfigured drive into the system	Ready	Rebuild or copyback start
Insert configured drive into the system	Foreign	• Rebuild or copyback start • Original drive data lost
Insert configured locked drive into the system (unlockable)	Foreign	Cryptographic Erase (If configured VD is not secured) • Rebuild or copyback start

Table 7. Drive state/operation (continued)

Drive state/operation	Unconfigured slot	Slot configured in VD
		• Original drive data lost
Insert locked drive into the system (non-unlockable)	Foreign locked	Foreign locked

Physical disk hot swapping

Hot swapping is the manual replacement of a disk while the PERC 11 series cards are online and performing their normal functions. The following requirements must be met before hot swapping a physical disk:

- The system backplane or enclosure must support hot swapping for the PERC 11 series cards.
- The replacement disk must be of the same protocol and disk technology. For example, only a SAS hard drive can replace a SAS hard drive and only a NVMe drive can replace a NVMe drive.

Using replace member and revertible hot spares

The replace member functionality allows a previously commissioned hot spare to revert to a usable hot spare. When a disk failure occurs within a virtual disk, an assigned hot spare, dedicated, or global, is commissioned and begins rebuilding until the virtual disk is optimal. After the failed disk is replaced in the same slot and the rebuild to the hot spare is complete, the controller automatically starts to copy data from the commissioned hot spare to the newly inserted disk. After the data is copied, the new disk is a part of the virtual disk and the hot spare is reverted to being a ready hot spare. This allows hot spares to remain in specific enclosure slots. While the controller is reverting the hot spare, the virtual disk remains optimal. The controller automatically reverts a hot spare only if the failed disk is replaced with a new disk in the same slot. If the new disk is not placed in the same slot, a manual replace member operation can be used to revert a previously commissioned hot spare.

NOTE: A replace member operation typically causes a temporary impact to disk performance. Once the operation completes, performance returns to normal.

Controller cache

The PERC 11 series of cards contain local DRAM on the controllers. This DRAM can cache I/O operations for Write Back, Read Ahead virtual disks to improve the performance.

NOTE: Virtual disks consisting of SSDs may not see a difference in performance using controller cache and may benefit by Fastpath.

I/O workload that is slow to HDDs, such as random 512 B and 4 kB, may take some time to flush cached data. Cache is flushed periodically but for configuration changes or system shutdown, the cache is required to be flushed before the operation can be completed. It can take several minutes to flush cache for some workloads depending on the speed of the HDDs and the amount of data in the cache.

The following operations require a complete cache flush:

- Configuration changes (add or delete VDs, VD cache setting changes, foreign configuration scan, and import)
- System reboot or shutdown
- Abrupt power loss causing cache preservation

NOTE: The iDRAC or OpenManage periodically scans for the foreign configurations when the foreign disks are present. This action degrades the performance. If a foreign disk is present, it is recommended that you import, clear, or remove the foreign disk to prevent an impact on the performance.

Controller cache preservation

The controller is capable of preserving its cache in the event of a system power outage or improper system shutdown. The PERC 11 series controller is attached to a battery backup unit (BBU) that provides backup power during system power loss to preserve the controller's cache data.

Cache preservation with non-volatile cache

The non-volatile cache (NVC) allows controller cache data to be stored indefinitely. If the controller has data in the cache memory during a power outage or improper system shutdown, a small amount of power from the battery is used to transfer the cache data to non-volatile flash storage where it remains until power is restored and the system is booted. If the cache preservation process is interrupted by power-on, the controller may request an extra reset during the boot to complete the process. The system displays a message during boot as `Dell PERC at Bus <X> Dev <Y> has requested a system reset. System will reboot in 5 seconds.`

Recovering cache data

About this task

Complete these steps if a system power loss or improper system shutdown has occurred.

Steps

1. Restore the system power.
2. Boot the system.
3. When preserved cache exists on the controller, an error message is shown. For more information about how to recover cache, see Preserved Cache State.

Battery Transparent Learn Cycle

A transparent learn cycle is a periodic operation that calculates the charge that is remaining in the battery to ensure that there is sufficient energy. The operation runs automatically, and causes no impact to the system or controller performance.

The controller automatically performs the transparent learn cycle (TLC) on the battery to calibrate and gauge its charge capacity once every 90 days. The operation can be performed manually if required.

NOTE: Virtual disks stay in write-back mode, if enabled, during transparent learn cycle. When the TLC completes, the controller sets the next TLC to +90 days.

Transparent Learn Cycle completion time

The time frame for completion of a learn cycle is a function of the battery charge capacity and the discharge and charge currents used. Typical time completion for a transparent learn cycle is between 4 to 8 hours. If the learn cycle is interrupted mid cycle, it begins at a new cycle.

Conditions for replacing the battery

The PERC battery is marked failed when the state or health of the battery is declared bad. If the battery is declared failed, then all the virtual disks in write-back mode transitions to write-through mode, and the firmware runs learn cycles in subsequent reboots until the battery is replaced. On replacing the battery, virtual disk transitions to write-back mode.

Linux operating system device enumeration

Virtual disks and non-RAID disks are presented to the operating system as SCSI devices. The operating system enumerates these devices based on the SCSI target device ID.

Enumeration order for PERC H355 adapter SAS, PERC H355 front SAS, and PERC H350 adapter SAS

1. Non-RAID disks are enumerated first.
2. Virtual disks (VDs) are enumerated second, based on virtual disk target ID.

Target IDs are assigned to the VDs in the ascending order when they are created. The first created VD is assigned the lowest available target ID, and the last created VD is assigned the highest available target ID. Therefore, the first created VD is discovered first by the operating system.

NOTE: The PERC H355 adapter SAS, PERC H355 front SAS, and PERC H350 adapter SAS non-RAID disks may not appear in the slot order.

Enumeration order for PERC H755 front SAS, PERC H755 front SAS, PERC H755N front NVMe, PERC H750 adapter SAS, and PERC H755 MX adapter

1. Non-RAID disks are enumerated first based on slot ID.
2. Virtual disks (VDs) are enumerated, second based on the virtual disk target ID.

   Target IDs are assigned to the VDs in the descending order when they are created. The first created VD is assigned the highest available target ID, and the last created VD is assigned the lowest available target ID. Therefore, the last created VD is discovered first by the operating system.

   NOTE: Operating system enumeration may not be in this order if virtual disks or non-RAID disks are created while the operating system is running. The operating system may name devices based on the order in which they were created resulting in the operating system enumeration changing after reboot. It is recommended to reboot the system for the final device enumeration after creating any virtual disks or non-RAID disks.

4

Install and remove a PERC 11 card

Topics:

- Safety instructions
- Before working inside your system
- After working inside your system
- Remove the PERC H755 adapter
- Install the PERC H755 adapter
- Remove the PERC H755 front SAS card
- Install the PERC H755 front SAS card
- Remove the PERC H755N front NVMe card
- Install the PERC H755N front NVMe card
- Remove the PERC H755 MX adapter
- Install the PERC H755 MX adapter
- Remove the PERC H750 adapter SAS
- Install the PERC H750 adapter SAS
- Remove the PERC H355 adapter SAS
- Install the PERC H355 adapter SAS
- Remove the PERC H355 front SAS
- Install the PERC H355 front SAS card
- Remove the PERC H350 adapter SAS
- Install the PERC H350 adapter SAS

Safety instructions

NOTE: To avoid injury, do not lift the system on your own. Get others to assist you.

WARNING: Opening or removing the system cover while the system is turned on may expose you to a risk of electric shock..

CAUTION: **Do not operate the system without the cover in place for a duration exceeding five minutes. Operating the system without the system cover in place can result in component damage.**

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

CAUTION: **To ensure proper operation and cooling, all system bays and fans must be always populated with a component or a blank.**

NOTE: It is recommended that you always use an antistatic mat and antistatic strap while working on components inside the system.

NOTE: While replacing the hot swappable PSU, after next server boot; the new PSU automatically updates to the same firmware and configuration of the replaced one. For more information about the Part replacement configuration, see the *Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals

NOTE: While replacing faulty storage controller/FC/NIC card with the same type of card, after you power on the system; the new card automatically updates to the same firmware and configuration of the faulty one. For more information about the Part replacement configuration, see the *Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals

NOTE: For detailed information on cabling the PERC 11 cards, see the system-specific owner's manual at Installation and Service Manual available at https://www.dell.com/poweredgemanuals

Before working inside your system

Steps

1. Power off the system and all attached peripherals.
2. Disconnect the system from the electrical outlet, and disconnect the peripherals.
3. If applicable, remove the system from the rack.
   For more information, see the *Rail Installation Guide* relevant to your rail solutions at www.dell.com/poweredgemanuals.
4. Remove the system cover.

After working inside your system

Steps

1. Replace the system cover.
2. If applicable, install the system into the rack.
   For more information, see the *Rail Installation Guide* relevant to your rail solutions at www.dell.com/poweredgemanuals.
3. Reconnect the peripherals and connect the system to the electrical outlet, and then power on the system.

Remove the PERC H755 adapter

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.

   NOTE: Perform a graceful shutdown of the system to ensure data in the cache is moved to the disk before the controller is removed.

2. Open the system.
3. Locate the PERC card in the expansion riser on the system board.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Unfasten and lift the riser from the system board. Remove the PERC card.
5. Disconnect any cables connected to the card:
   a. Press down and hold the metal tab on the cable connector.
   b. Pull the cable out of the connector.
6. Replace the storage controller card and reconnect the data cables before placing them in the riser. For more information on installing the card, see Install PERC H755 adapter.
7. Reinstall the riser on the system board and fasten the riser.
8. Close the system.

9. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

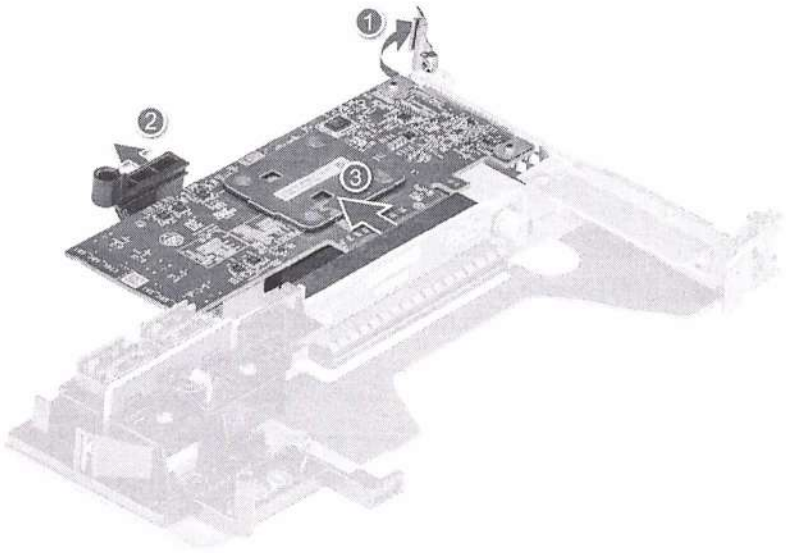

Figure 9. Remove the PERC H755 adapter

Install the PERC H755 adapter

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system.
3. Align the card-edge connector with the connector on the system board.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Press the card-edge down until the card is fully seated.
5. Connect the data cable connectors to the card.
6. Route the data cable through the channel on the inner side of the chassis to the backplane.
7. Attach the connector to the corresponding connector on the backplane as labeled on the controller.
8. Close the system.
9. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

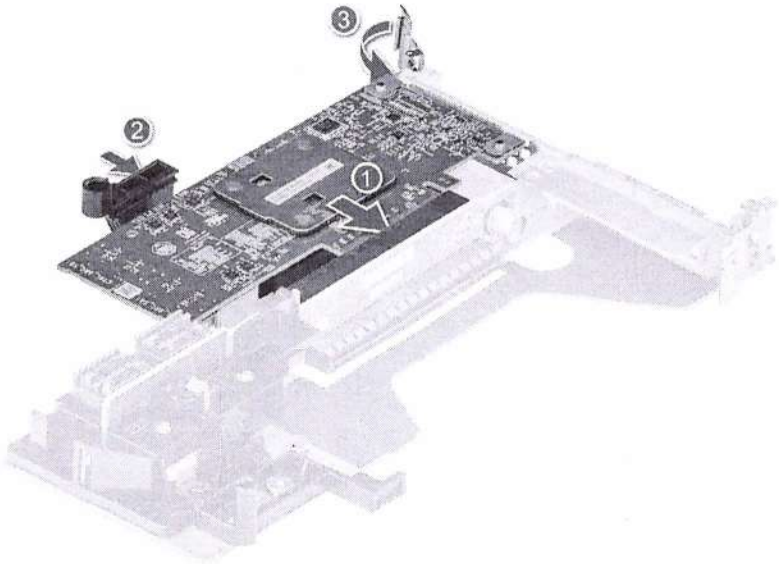

Figure 10. Install the PERC H755 adapter

Remove the PERC H755 front SAS card

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.

   NOTE: Perform a graceful shutdown of the system to ensure data in the cache is moved to the disk before the controller is removed.

2. Open the system.
3. Locate the PERC card in the controller carrier at the front of the system.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Unscrew the fasteners on the controller carrier and slide the carrier away from the backplane, disconnecting the controller from the backplane.

   If you are removing a PERC H755 front SAS controller in the upside down orientation, you must remove both the backplane and the controller at the same time because of the limited clearance available:

   a. Uninstall all drives from the backplane.
   b. Disconnect all cables between the PERC and the backplane.
   c. Lift the backplane and PERC from the system.

5. Disconnect any cables connected to the card:
   a. Press down and hold the metal tab on the cable connector.
   b. Pull the cables out of the connector.
6. Remove the PERC controller from the controller carrier.

7. Insert the replacement controller into the carrier and secure it with the appropriate screws.
8. Take the replacement storage controller and reconnect the cables before reconnecting it to the backplane.

   If you are removing a PERC H755 front SAS controller in the upside down orientation, reattach the PERC controller to the backplane first before reinstalling the backplane into the system. For more information on installing the card, see Install PERC H755 front SAS card.
9. Close the system.
10. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

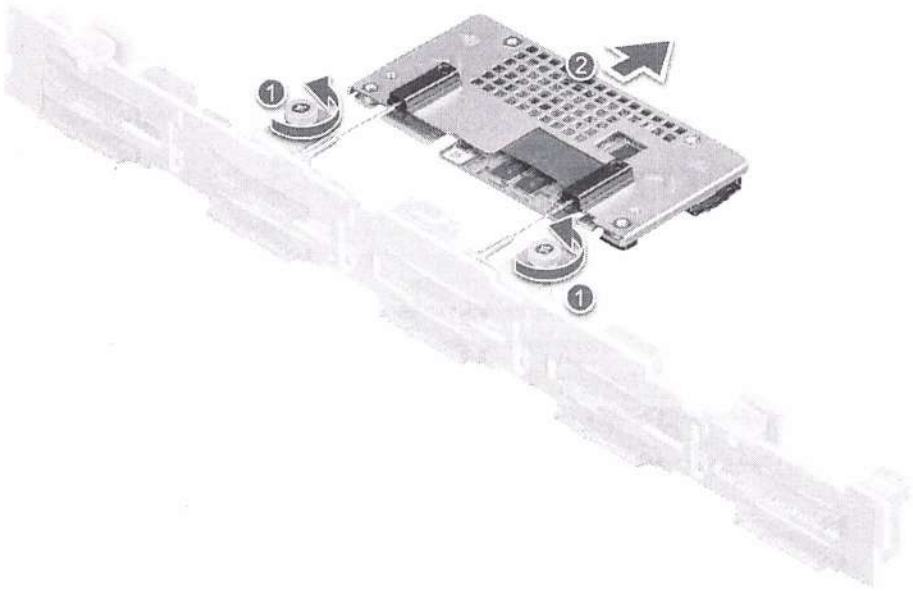

Figure 11. Remove the PERC H755 front SAS card

Install the PERC H755 front SAS card

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

NOTE: Perform a graceful shutdown of the sled to ensure that data in the cache is moved to the disk before the controller is removed.

2. Open the system.
3. Connect the PERC card to the carrier and ensure that the screws are properly fastened in place.

CAUTION: **To prevent damage to the card, hold the card by its edges only.**

4. Align the carrier with the guide pins until the controller is securely seated.
5. Slide the card into the connector until it is fully seated in the connector. Tighten the screws on the carrier that connect to the chassis to secure the carrier.
6. Connect the cable connectors to the card.

NOTE: Ensure that you connect the cable according to the connector labels on the cable. The cable does not function properly if reversed.

7. Close the system.
8. Reconnect the system to its electrical outlet and turn on the system and any attached peripherals.

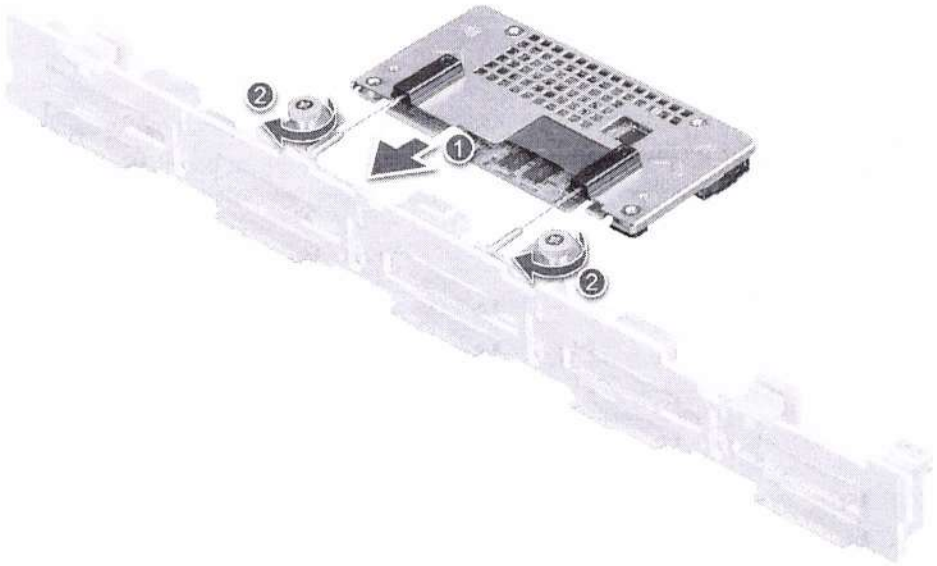

Figure 12. Install the PERC H755 front SAS card

Remove the PERC H755N front NVMe card

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or**

telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.

   NOTE: Perform a graceful shutdown of the system to ensure that data in the cache is moved to the disk before the controller is removed.

2. Open the system.
3. Locate the PERC card in the controller carrier at the front of the system.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Unscrew the fasteners on the controller carrier, and slide the carrier away from the backplane to disconnect the controller from the backplane.

   If you are removing a PERC H755N front NVMe controller in the upside down orientation, you must remove both the backplane and the controller at the same time because of the limited clearance available:

   a. Uninstall all drives from the backplane.
   b. Disconnect all cables between the PERC and the backplane.
   c. Lift the backplane and PERC from the system.

5. Disconnect any cables connected to the card:
   a. Press down and hold the metal tab on the cable connector.
   b. Pull the cable out of the connector.
6. Remove the PERC controller from the controller carrier.
7. Insert the replacement controller into the carrier and secure it with the appropriate screws.
8. Take the replacement storage controller and reconnect the cable before reconnecting it to the backplane.

   If you are removing a PERC H755 front NVMe controller in the upside down orientation, reattach the PERC controller to the backplane first before reinstalling the backplane into the system. For more information on installing the card, see Installing the PERC H755N front NVMe card.

9. Close the system.
10. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

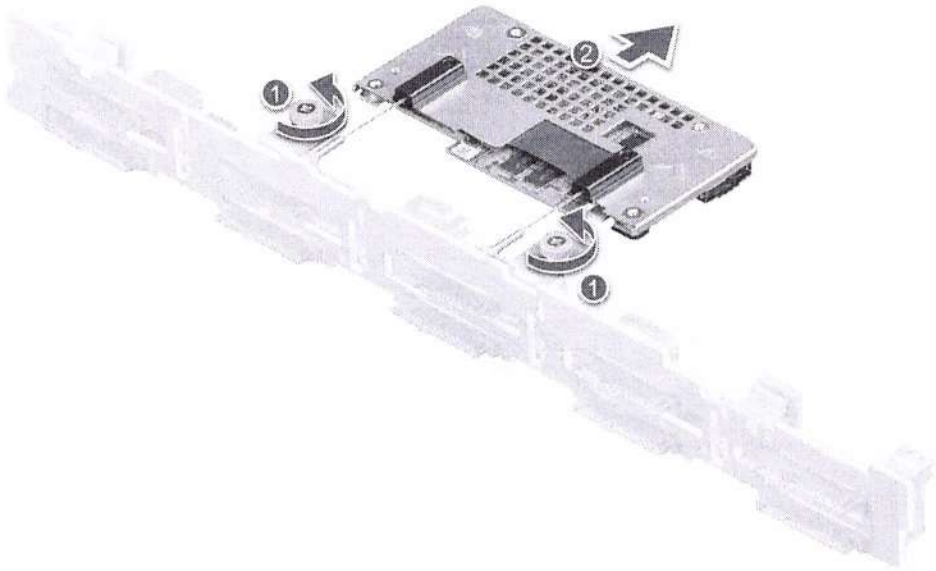

Figure 13. Remove the PERC H755N front NVMe card

Install the PERC H755N front NVMe card

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

   NOTE: Perform a graceful shutdown of the sled to ensure that data in the cache is moved to the disk before the controller is removed.

2. Open the system.
3. Connect the PERC card to the carrier and ensure the screws are properly fastened in place.

   CAUTION: **To prevent damage to the card, hold the card by its edges only.**

4. Align the carrier with the guide pins until the controller is securely seated.

5. Slide the card until it is fully seated in the connector. Tighten the screws on the carrier that connect to the chassis to secure the carrier.
6. Connect the cable connectors to the card.

   NOTE: Ensure that you connect the cable according to the connector labels on the cable. The cable does not function properly if reversed.

7. Close the system.
8. Reconnect the system to its electrical outlet and turn on the system and any attached peripherals.

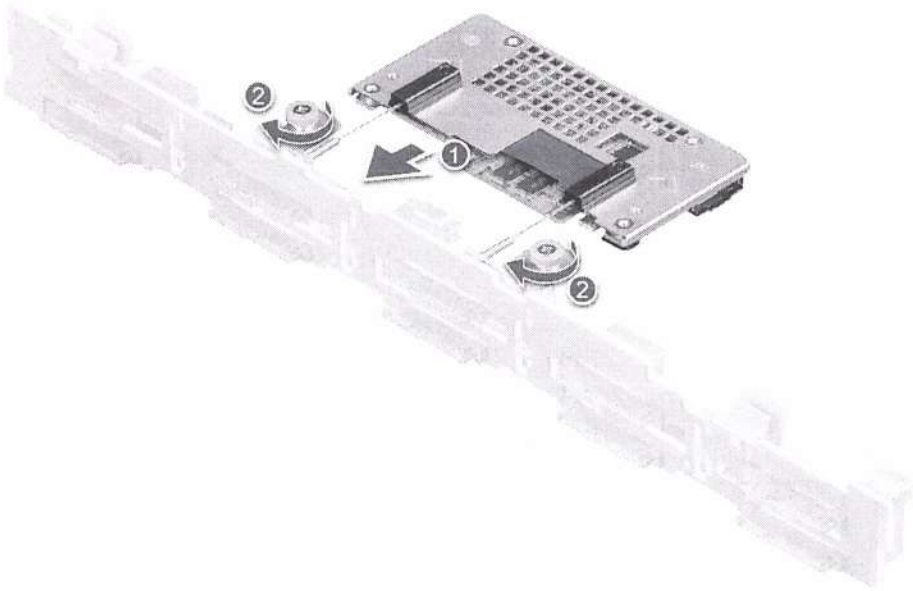

Figure 14. Install the PERC H755N front NVMe card

Remove the PERC H755 MX adapter

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

CAUTION: **To prevent damage to the card, hold the card by its edges only.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the sled, including any attached peripherals, and remove the sled from the MX chassis.

   NOTE: Perform a graceful shutdown of the system to ensure that data in the cache is moved to the disk before the controller is removed.

2. Open the sled.
3. Locate the PERC card on the system board.

   CAUTION: **To prevent damage to the card, hold the card by its edges only.**

4. Using the blue tab, rotate the lever of the controller.
5. Pull the release lever upward to disengage the controller from the connector.
6. Disconnect the cable from the card. To disconnect the cable:
   a. Press and hold the metal tab on the cable connector.
   b. Pull the cable out of the connector.
7. Lift the card from the system board.
8. Replace the storage controller card and connect the cable. For information on installing the card, see Install the PERC H755 MX adapter.
9. Close the sled.
10. Insert the sled into the MX chassis and turn on the system and any attached MX chassis peripherals.

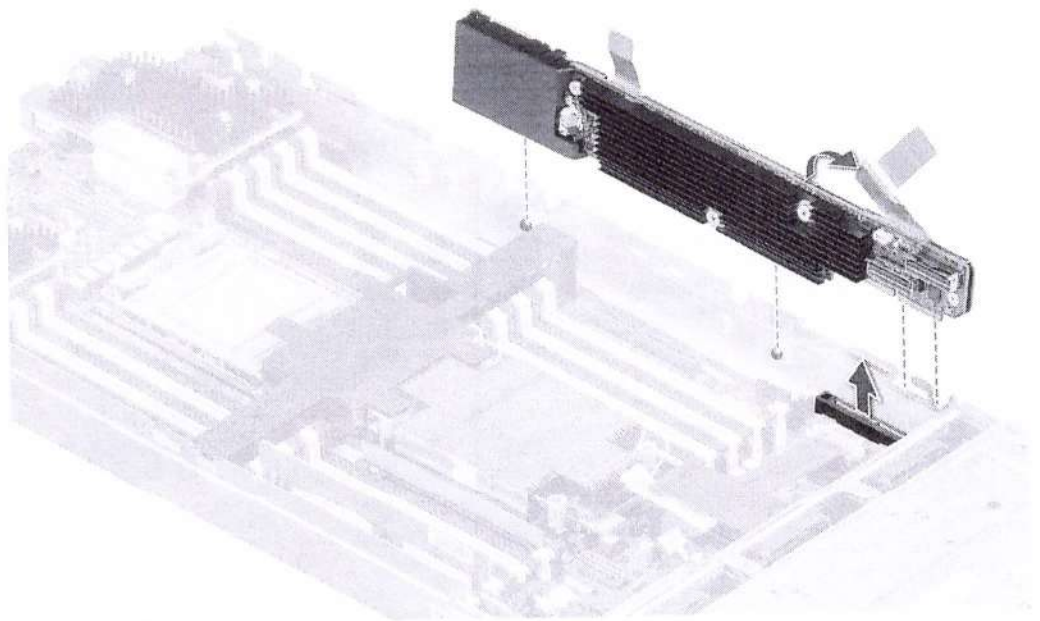

Figure 15. Remove the PERC H755 MX adapter

Install the PERC H755 MX adapter

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or**

telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the sled and any attached peripherals, and remove the sled from the MX chassis.
2. Open the sled.
3. Connect the backplane data cable connector to the card.

   NOTE: Ensure that you connect the cable according to the connector labels on the cable. The cable does not function properly if reversed.

4. Align the bracket notches with the tabs on the sides of the sled chassis and align the PERC card connector with the connector on the system board.

   CAUTION: **To prevent damage to the card, hold the card by its edges only.**

5. Press the PERC card into the connector until it is firmly seated.
6. Press the release lever to secure the card to the sled.

   NOTE: The pin on the release lever secures the card to the chassis of the sled.

7. Route the data cable through the clip on the card and through the channel on the inner side of the chassis.
8. Attach the connector to the corresponding connector on the backplane as labeled in the controller.
9. Close the sled.
10. Insert the sled into the MX chassis and turn on the system and any attached MX chassis peripherals.

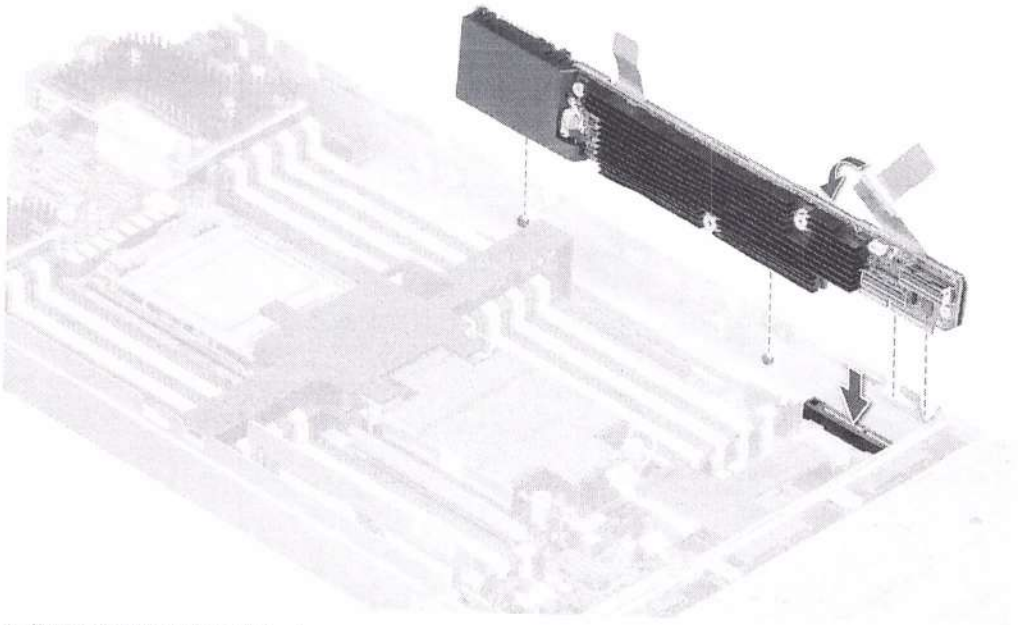

Figure 16. Install the PERC H755 MX adapter

Remove the PERC H750 adapter SAS

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Open the system.
3. Locate the PERC card on the system board.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Lift the card to remove it from the connector on the system board.
5. Disconnect the SAS cables connected to the card:
   a. Press down and hold the metal tab on the SAS cable connector.
   b. Pull the SAS cable out of the connector.
6. Replace the storage controller card and connect the cable. For more information on installing the card, see Install the H750 adapter SAS.
7. Close the system.
8. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

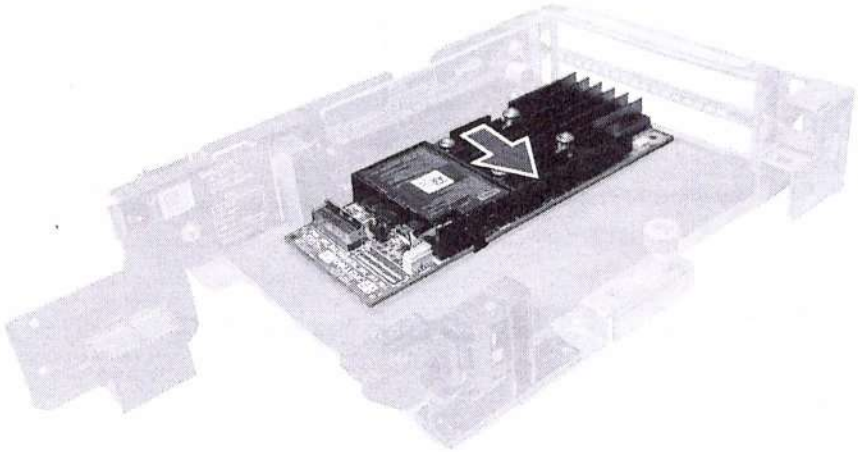

Figure 17. Remove PERC H750 adapter SAS

Install the PERC H750 adapter SAS

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system.
3. Align the card-edge connector with the connector on the system board.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Press the card-edge down until the card is fully seated.
5. Connect the SAS data cable connector to the card.

   NOTE: Ensure that you connect the cable according to the connector labels on the cable. The cable does not function properly if reversed.

6. Route the SAS data cable through the channel on the inner side of the chassis to the backplane.
7. Attach the connector labeled SAS A to connector SAS A on the backplane.
8. Close the system.
9. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

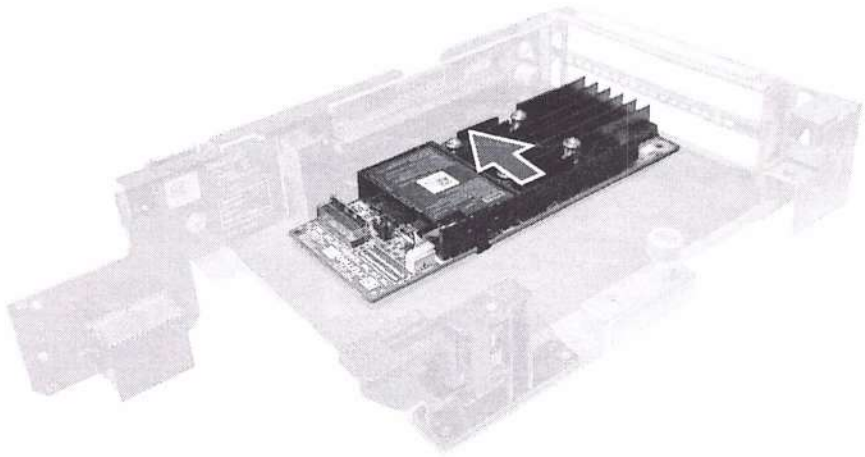

Figure 18. Install PERC H750 adapter SAS

Remove the PERC H355 adapter SAS

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Open the system.

3. Locate the PERC card in the expansion riser on the system board.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Unfasten and lift the riser from the system board. Remove the PERC card.
5. Disconnect any SAS cables connected to the card:
   a. Press down and hold the metal tab on the SAS cable connector.
   b. Pull the SAS cable out of the connector.
6. Replace the storage controller and reconnect the SAS cable before placing them in the riser. For more information on installing the card, see Install the PERC H355 adapter.
7. Reinstall the riser on the system board and fasten the riser.
8. Close the system.
9. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

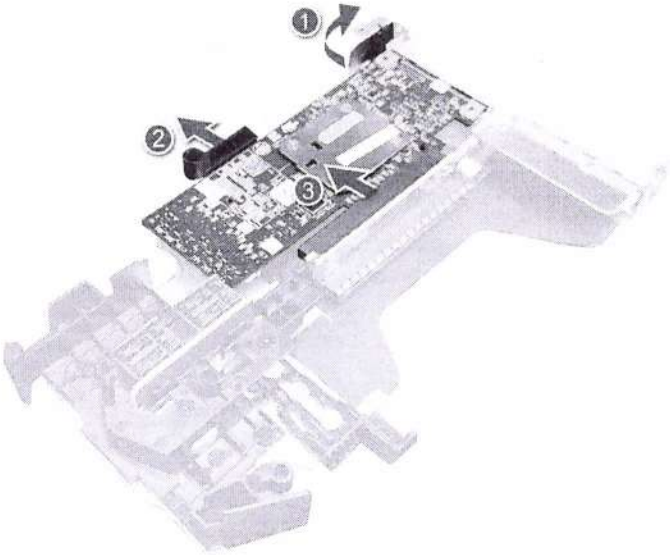

Figure 19. Remove the PERC H355 adapter SAS

Install the PERC H355 adapter SAS

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system.
3. Align the card-edge connector with the connector on the system board.

CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Press the card-edge down until the card is fully seated.
5. Connect the SAS data cable connectors to the card.

   NOTE: Ensure that you connect the cable according to the connector labels on the cable. The cable does not function properly if reversed.

6. Route the SAS data cable through the channel on the inner side of the chassis to the backplane.
7. Attach the connector labeled SAS A to connector SAS A on the backplane, and attach the connector labeled SAS B to connector SAS B on the backplane.
8. Close the system.
9. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

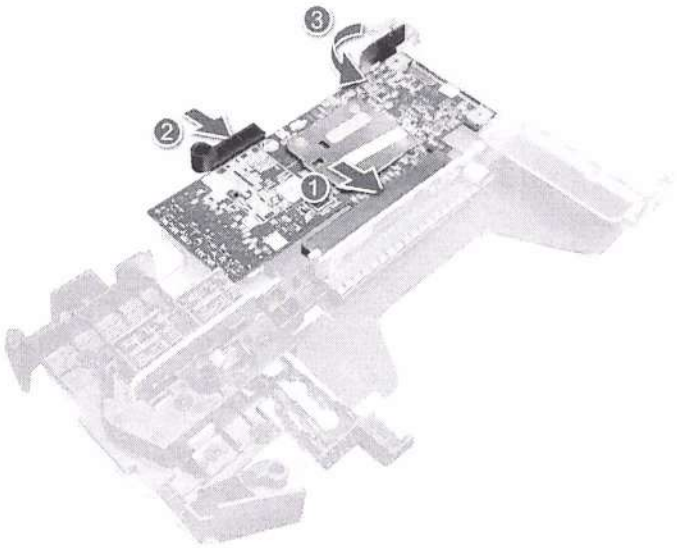

Figure 20. Install the PERC H355 adapter SAS

Remove the PERC H355 front SAS

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.

   NOTE: Perform a graceful shutdown of the system to ensure data in the cache is moved to the disk before the controller is removed.

2. Open the system.

3. Locate the PERC card in the controller carrier at the front of the system.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Unscrew the fasteners on the controller carrier and slide the carrier away from the backplane, disconnecting the controller from the backplane.

   If you are removing a PERC H355 front SAS controller in the upside down orientation, you must remove both the backplane and the controller at the same time because of the limited clearance available:

   a. Uninstall all drives from the backplane.
   b. Disconnect all cables between the PERC and the backplane.
   c. Lift the backplane and PERC from the system.

5. Disconnect any cables connected to the card:
   a. Press down and hold the metal tab on the cable connector.
   b. Pull the cables out of the connector.
6. Remove the PERC controller from the controller carrier.
7. Insert the replacement controller into the carrier and secure it with the appropriate screws.
8. Take the replacement storage controller and reconnect the cables before reconnecting it to the backplane.

   If you are removing a PERC H355 front SAS controller in the upside down orientation, reattach the PERC controller to the backplane first before reinstalling the backplane into the system. For more information on installing the card, see Install the PERC H355 front.
9. Close the system.
10. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

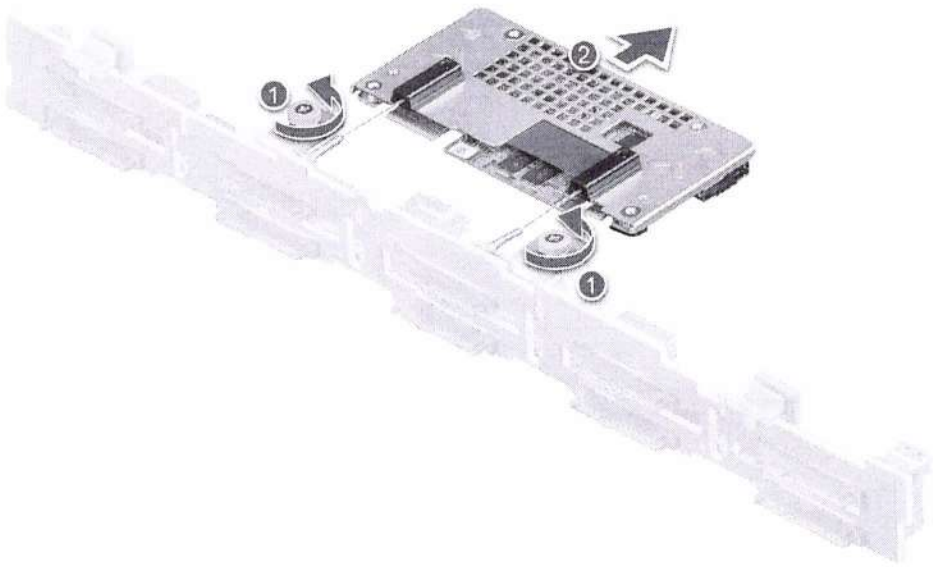

Figure 21. Remove the PERC H355 front SAS

Install the PERC H355 front SAS card

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

   NOTE: Perform a graceful shutdown of the sled to ensure that data in the cache is moved to the disk before the controller is removed.

2. Open the system.
3. Connect the PERC card to the carrier and ensure that the screws are properly fastened in place.

   CAUTION: **To prevent damage to the card, hold the card by its edges only.**

4. Align the carrier with the guide pins until the controller is securely seated.
5. Slide the card into the connector until it is fully seated in the connector. Tighten the screws on the carrier that connect to the chassis to secure the carrier.
6. Connect the cable connectors to the card.

   NOTE: Ensure that you connect the cable according to the connector labels on the cable. The cable does not function properly if reversed.

7. Close the system.
8. Reconnect the system to its electrical outlet and turn on the system and any attached peripherals.

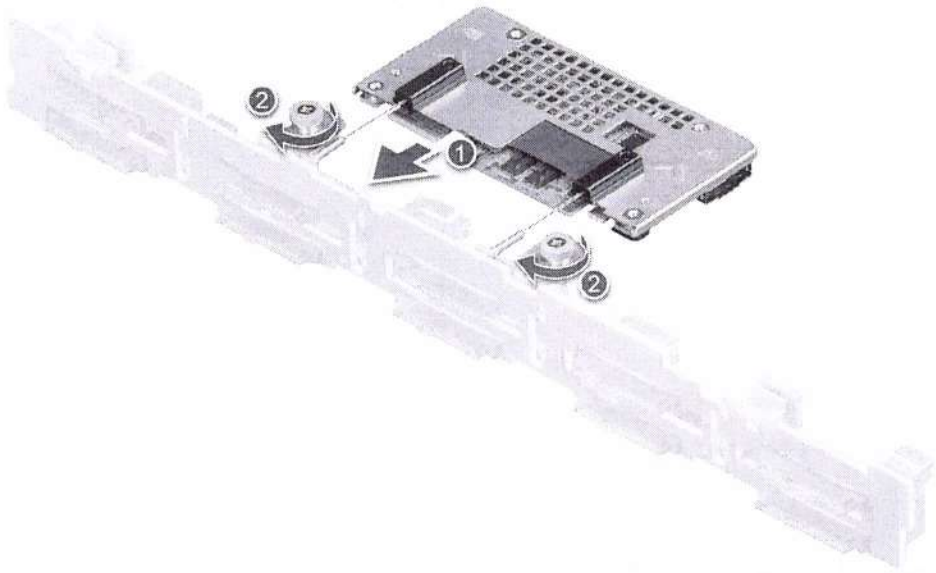

Figure 22. Install the PERC H755 front SAS card

Remove the PERC H350 adapter SAS

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Open the system.
3. Locate the PERC card on the system board.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Lift the card to remove it from the connector on the system board.
5. Disconnect the SAS cables connected to the card:
   a. Press down and hold the metal tab on the SAS cable connector.
   b. Pull the SAS cable out of the connector.

6. Replace the storage controller card and connect the cable. For more information on installing the card, see Install the PERC H350 adapter.
7. Close the system.
8. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

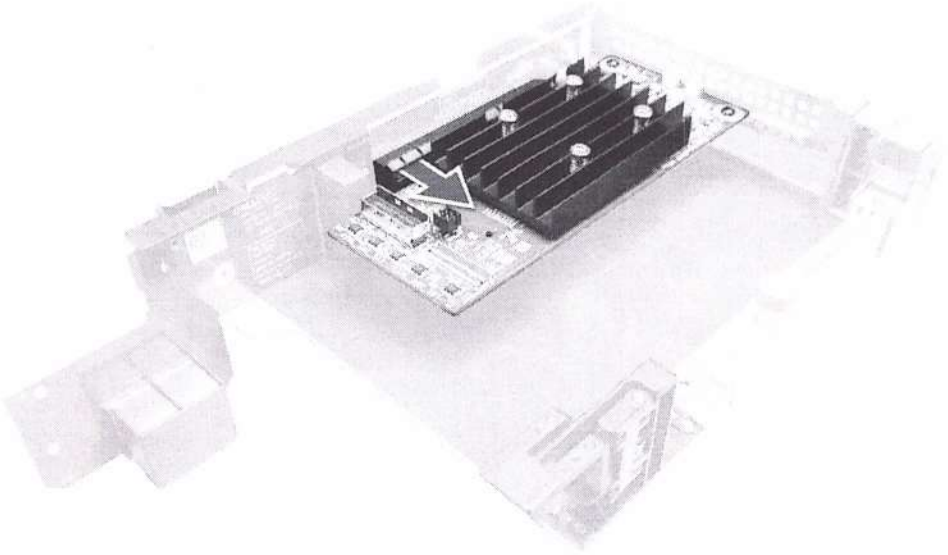

Figure 23. Remove the PERC H350 adapter SAS

Install the PERC H350 adapter SAS

Prerequisites

CAUTION: **Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system.
3. Align the card-edge connector with the connector on the system board.

   CAUTION: **To prevent damage to the card, you must hold the card by its edges only.**

4. Press the card-edge down until the card is fully seated.
5. Connect the SAS data cable connector to the card.

   NOTE: Ensure that you connect the cable according to the connector labels on the cable. The cable does not function properly if reversed.

6. Route the SAS data cable through the channel on the inner side of the chassis to the backplane.
7. Attach the connector labeled SAS A to connector SAS A on the backplane.
8. Close the system.
9. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

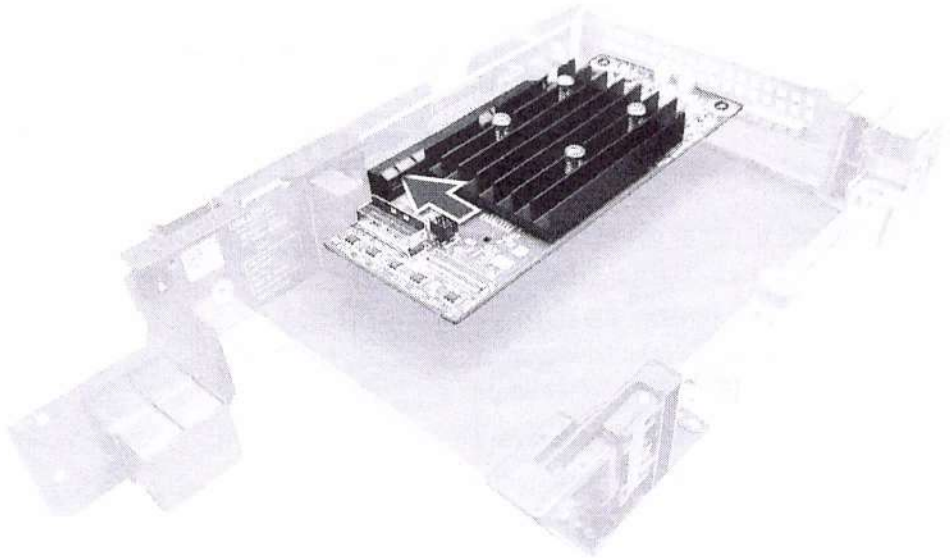

Figure 24. Install the PERC H350 adapter SAS

5

Driver support for PERC 11

The PERC 11 series require software drivers to operate with the supported operating systems.

This chapter contains the procedures for installing the drivers for the PERC 11 cards.

NOTE: The driver for PERC 11 for VMware ESXi is packaged within the VMware ESXi ISO image downloaded from Dell. For more information, see the VMware documentation at www.dell.com/virtualizationsolutions. It is not recommended to have drivers from controllers prior to PERC 11 on the same system.

The two methods for installing a driver discussed in this chapter are:

- **Installing a driver during operating system installation:** Use this method if you are performing a new installation of the operating system and want to include the drivers.
- **Updating existing drivers:** Use this method if the operating system and the PERC 11 family of controllers are already installed and you want to update to the latest drivers.

Topics:

Creating the device driver media

Use one of the following two methods to create the device driver media:

- Downloading Drivers From The Dell Support Website
- Downloading Drivers From The Dell Systems Service And Diagnostic Tools Media

Download and save PERC 11 drivers from the support site

About this task

To download drivers from the Dell Support website:

Steps

1. Go to www.dell.com/support/home.
2. Enter the service tag of your system in the **Choose by Service Tag to get started** field or select **Choose from a list of all Dell products**.
3. Select the **System Type**, **Operating System**, and **Category** from the drop-down list.
   The drivers that are applicable to your selection are displayed.
4. Download the drivers that you require to a USB drive, CD, or DVD.
5. During the operating system installation, use the media that you created to load the driver. For more information on reinstalling the operating system, see the relevant section for your operating system later in this guide.

Download and save PERC 11 drivers from the Dell Systems Service and Diagnostic Tools

About this task

To download drivers from the **Dell Systems Service and Diagnostic Tools** media:

Steps

1. Insert the **Dell Systems Service and Diagnostics Tools** media in your system.
   The **Welcome to Dell Service and Diagnostic Utilities** screen is displayed.
2. Select your system model and operating system.
3. Click **Continue**.
4. From the list of drivers displayed, select the driver you require.
5. Select the self-extracting ZIP file and click **Run**.
6. Copy the driver to a CD, DVD, or USB drive.
7. Repeat steps 1 to 6 for all the drivers you require.

Windows driver installation

Before you install the Windows driver for PERC 11, you must first create a device driver media.

- Read the Microsoft **Getting Started** document that shipped with your operating system.
- Ensure that your system has the latest BIOS, firmware, and driver updates. If required, download the latest BIOS, firmware, and driver updates from www.dell.com/support/home.
- Create a device driver media using one of the methods listed below:
  - USB drive
  - CD
  - DVD

Install PERC 11 driver while newly installing the Windows Server 2016 and later

About this task

To install the driver:

Steps

1. Boot the system using the Windows Server 2016, or newer media.
2. Follow the on-screen instructions until you reach **Where do you want to install Windows Server 2016 or later** window and then select **Load driver**.
3. As prompted, insert the installation media and browse to the appropriate location.
4. Select a PERC 11 series card from the list.
5. Click **Next** and continue installation.

Install PERC 11 driver on which the Windows Server 2016 is already installed and later

About this task

Perform the following steps to configure the driver for the RAID controller on which the Windows Server 2016 is already installed:

Steps

1. Turn off the system.
2. Install the new RAID controller in the system.
   For detailed instructions on installing the RAID controller in the system, see Install and remove a PERC 11 card.
3. Turn on the system.
   The **Found New Hardware Wizard** screen displays the detected hardware device.
4. Click **Next**.

5. On the **Locate device driver** screen, select **Search for a suitable driver for my device** and click **Next**.
6. Browse and select the drivers from the **Locate Driver Files** screen.
7. Click **Next**.
   The wizard detects and installs the appropriate device drivers for the new RAID controller.
8. Click **Finish** to complete the installation.
9. Reboot the system when prompted.

Update PERC 11 driver that runs on Windows Server 2016 and later

Prerequisites

NOTE: Close all applications on your system before you update the driver.

Steps

1. Insert the media containing the driver.
2. Select **Start** > **Settings** > **Control Panel** > **System.**
   The **System Properties** screen is displayed.
   NOTE: The path to **System** might vary depending on the operating system family.
3. Click the **Hardware** tab.
4. Click **Device Manager**.
   The **Device Manager** screen is displayed.
   NOTE: The path to **Device Manager** might vary depending on the operating system family.
5. Expand **Storage Controllers** by double-clicking the entry or by clicking on the plus (+) symbol next to **Storage Controllers**.
6. Double-click the RAID controller for which you want to update the driver.
7. Click the **Driver** tab and click **Update Driver**.
   The screen to update the device driver wizard is displayed.
8. Select **Install from a list or specific location**.
9. Click **Next**.
10. Follow the steps in the wizard and browse to the location of the driver files.
11. Select the INF file from the drive media.
12. Click **Next** and continue the installation steps in the wizard.
13. Click **Finish** to exit the wizard and reboot the system for the changes to take place.

    NOTE: Dell provides the Dell Update Package (DUP) to update drivers on systems running Windows Server 2016 and newer operating system. DUP is an executable application that updates drivers for specific devices. DUP supports command line interface and silent execution. For more information, see https://www.dell.com/support.

Linux driver installation

The driver update disk (DUD) images are created only for those operating system releases in which the native (in-box) driver is insufficient for installation. In the event that an operating system is being installed with a corresponding DUD image, see, Installing or updating the RPM driver package with KMOD support. If not, proceed with using the native device driver and then skip to the topic Installing or Updating the RPM Driver Package With KMP Support.

NOTE: The driver update disk (DUD) images are created only for those operating system releases in which the native (in-box) driver is insufficient for installation. In the event that an operating system is being installed with a corresponding DUD image, follow the instructions below.

NOTE: To view the complete list of boot loader options, see the installation guide of your operating system.

NOTE: If using out-of-box drivers with RHEL 7 and higher, a tainted kernel message will be displayed in the log. RedHat does not provide a mechanism to sign external drivers for RHEL.

Install or update a RPM driver package using the KMOD support

Prerequisites

NOTE: This procedure is applicable for Red Hat Enterprise Linux 7.x and higher.

About this task

Perform the following steps to install the RPM package with KMOD support:

Steps

1. Uncompress the gzipped tarball driver release package.
2. Install the driver package using the command: `rpm -ihv kmodmegaraid_ sas-<version>.rpm`.

   NOTE: Use `rpm -Uvh <package name>` when upgrading an existing package.

3. If the previous device driver is in use, you must reboot the system for the updated driver to take effect.
4. Verify the loaded driver version by running the following command: `modinfo megaraid_sas`.

Install or update a RPM driver package using the KMP support

Prerequisites

NOTE: This procedure is applicable for SUSE Enterprise Linux 15.x.

About this task

Perform the following steps to install the RPM package with KMP support:

Steps

1. Uncompress the gzipped tarball driver release package.
2. Install the driver package using the command: `rpm -ihv kmpmegaraid_ sas- <version>.rpm`.

   NOTE: Use `rpm -Uvh <package name>` when updating an existing package.

3. If the previous device driver is in use, you must reboot the system for the updated driver to take effect.
4. Verify the loaded driver version by running the following command: `modinfo megaraid_sas`.

Upgrading the Kernel

About this task

When upgrading to a new kernel, you must reinstall the DKMS-enabled driver packages. Perform the following steps to update or install the driver for a new kernel:

Steps

1. At a **terminal** window, type the following: `dkms build -m <module_name> - v <module version> - k <kernel version> dkms install -m <module_name> - v <module version> - k <kernel version>`.
2. To check if the driver is successfully installed in the new kernel, type: `dkms status`.
   A message similar to the following is displayed: `<driver name>, <driver version>, <new kernel version>: installed`.
3. If the previous device driver is in use, you must restart the system for the updated driver to take effect.

Loading the driver while installing an operating system

Steps

1. Perform the following operation to install the driver media:
   a. Download the PERC linux driver ISO, or install the LC driver pack.
   b. Mount the ISO to the Server, burn the ISO to CD/DVD, or copy the ISO file to USB. The USB has to match with the ISO.
   c. For LC driver pack, boot the life-cycle controller and go through the operating system deployment wizard.
2. Boot to the installer.
3. In the Installation screen, press E.
4. Perform the following operation:
   - If the operating system is Red Hat Enterprise Linux 7 or RHEL 8, the CLI displays the syntax `vmlinuz`. Enter **inst.dd**.

     For example, when you are prompted with the command `vmlinuz intrd=initrd.img inst.stage2=hd:LABEL=RHEL-7.0\x20x86_64 quiet inst.dd`.
   - If the operating system is SLES 15, the CLI displays the syntax `linuxefi..` Enter **dud=1**.

     For example, when you are prompted with the command `linuxefi/boot/x86_64/loader/linux splash=silent dud=1`.

   NOTE: Boot parameters may vary based on the operating system version. See operating system installation manuals for exact boot parameter syntax.
5. Attach the driver media (ISO, USB).
6. Press F10 to boot to the operating system.
   A screen is displayed prompting you to select the driver media (USB, CD, ISO, and so on).
7. When prompted select the driver media.
   If applicable select the PERC driver `...megaraid_sas...`

   NOTE: Ensure that the driver is selected with an X symbol.
8. The driver should be extracted or loaded.
9. Before proceeding or exiting the driver select menu, disconnect the driver media.

   NOTE: Ensure that you disconnect the driver media so that the drivers are loaded successfully. If the installation media is deleted, reattach it.
10. Press C or exit to go to the installation.

6

Firmware

This section provides information about downloading and installing the firmware using Dell Update Package (DUP).

Topics:

- Update firmware controller using Dell Update Package (DUP)

Update firmware controller using Dell Update Package (DUP)

Steps

1. Navigate to www.dell.com/support/home.
2. Locate your controller.
3. Download the DUP.
   a. For Window/iDRAC update, download Windows executable file.
   b. For Linux update, download **.bin** file.

   NOTE: For VMware, firmware should be updated through iDRAC or the PERC CLI utility.

4. Install the DUP.
   a. For Windows, run the executable in Windows environment.
   b. For Linux, run **.bin** file in Linux environment.
   c. For iDRAC, navigate to **system iDRAC** > **Maintenance** > **System Update**, upload Windows executable, and then install.

7

Manage PERC 11 controllers using HII configuration utility

The Human Interface Infrastructure (HII) configuration utility is a storage management application integrated into the System BIOS <F2>. It is used to configure and manage the controller(s), virtual disks, and physical disks. This utility is independent of the operating system.

Topics:

Enter the PERC 11 HII configuration utility

About this task

Perform the following steps to boot to the HII configuration utility:

Steps

1. Turn on the system.
2. While the system startup, press <F2> to enter **System Setup**.
3. Click **Device Settings**.
   Device Settings screen lists all the RAID controllers in the system.

   To access the management menu for the controller, use the arrow keys or the mouse.

   NOTE: For more information in all the options, click Help that is available on the top right-hand corner of the browser screen. Help information for individual option menus can also be viewed by scrolling down on each option.

   NOTE: Some of the options within the HII configuration utility are not present if the controller does not support the corresponding feature. Options may also be grayed out if the feature is not applicable to the current configuration.

Exit the PERC 11 HII configuration utility

About this task

To exit the HII configuration utility, perform the following steps:

Steps

1. Click **Finish** at the bottom-right corner on the **System Setup Main Menu** screen.
   Displays a warning message to confirm your choice.
2. Click **Yes** to exit the HII configuration utility.

Navigate to Dell PERC 11 configuration utility

Steps

1. Enter the UEFI configuration Utility. See Enter the PERC 11 HII configuration utility.
   The **Device Settings** screen displays a list of NIC ports and the RAID controllers.
2. To enter PERC 11 configuration utility, click the appropriate PERC controllers.
   The **Dashboard view** screen is displayed.

View the HII Configuration utility dashboard

The first screen that is displayed when you access the HII Configuration Utility is the **Dashboard View** screen. The following table provides detailed information about the options available on the **Dashboard View** screen.

Table 8. Dashboard view screen

Dashboard view options	Description
Main menu	Displays the following configuration options: • Configuration Management • Controller Management • Virtual Disk Management • Physical Disk Management • Hardware Components
Help	Provides context sensitive help message.
Properties	Displays the following information about the controller: • Status — displays the status of the controller. • Backplane — displays information about the number of backplanes connected to the controller. • BBU — displays information about the availability of Battery Backup Unit (BBU). • Enclosure — displays information about the number of enclosures connected to the controller. • Physical Disks — displays information about the number of physical disks connected to the controller. • Disk Groups — displays information about the number of disk groups connected to the controller. • Virtual Disks — displays information about the number of virtual disks connected to the controller.
View server profile	Displays HII Spec version supported on the system and also displays the following menu options for controller components: • Controller Management • Hardware Components • Physical Disk Management • Virtual Disk Management
Actions	Displays the following options: • Configure — displays configuration options that are supported by the controller. • Set Factory Defaults — restore factory default values for all controller properties.
Background operations	Displays if virtual disk or physical disk operations are in progress.

Configuration management

Auto Configure RAID 0

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Configuration Management** > **Auto Configure RAID 0**.
3. Select **Confirm** and click **Yes** to continue.
   A RAID 0 Virtual disk is created on all physical disks that are in Ready state.

Create virtual disks

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See, Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Configuration Management** > **Create Virtual Disk**.
   The following list of options are displayed for you to define the virtual disk parameters:

Option	Description
Create Virtual Disk	Allows you to create virtual disk selecting the RAID level, physical disks, and virtual disk parameters
Select RAID level	Allows you to choose the RAID level of your choice
Secure Virtual Disk	If you want to create a secured virtual disk, select **Secure Virtual Disk**. ⓘ **NOTE:** The Secure Virtual Disk option is enabled by default, only if the security key has been configured. Only SED physical disks are listed.
Select Physical Disks From	Allows you to select one of the physical disk capacities: • **Unconfigured Capacity**: creates a virtual disk on unconfigured physical disks. • **Free Capacity**: utilizes unused physical disk capacity that is already part of a disk group.
Select Physical Disks	If you want to select the physical disks from which the virtual disks are being created, click **Select Physical Disks**. This option is displayed if you select **Unconfigured Capacity** as your physical disk capacity.
Select Disk Groups	If you want to select the disk groups from which the virtual disks are being created, click **Select Disk Group**. This option is displayed if you select **Free Capacity** as your physical disk capacity.
Configure Virtual Disk Parameters	Allows you to set the virtual disk parameters when creating the virtual disk. For more information, see Configuring virtual disk parameters.

3. Click **Create Virtual Disk**.
   The virtual disk is created successfully.

Configure virtual disk parameters

Steps

1. Create a virtual disk, see Creating the virtual disks.
   The **Configure Virtual Disk Parameters** section is displayed on the **Create Virtual Disk** screen.

2. In the **Configure Virtual Disk Parameters** section, you can set the following virtual disk parameters:

Table 9. Configure virtual disk parameters

Virtual disk parameters	Description
Virtual Disk Name	Allows you to enter the name for the virtual disk **NOTE:** Allowed characters are A-Z, a-z, 0-9, underscore (_), and hyphen (-) only.
Virtual Disk Size	Displays the maximum capacity available for the virtual disk
Virtual Disk Size Unit	Displays the virtual disk storage space in megabytes, gigabytes, and terabyte.
Strip Element Size	Allows you to select the strip element size The disk striping involves partitioning each physical disk storage space in stripes of the following sizes: 64 KB, 128 KB, 256 KB, 512 KB, and 1 MB. By default, the strip element size is set to 256 KB.
Read Policy	Displays the controller read policy You can set the read policy to: • No read ahead—specifies that the controller does not use read ahead for the current virtual disk. • Read ahead—specifies that the controller uses read ahead for the current virtual disk. Read ahead capability allows the controller to read sequentially ahead of requested data and store the additional data in the cache memory, anticipating that the data is required soon. By default, the read cache policy is set to read ahead.
Write Policy	Displays the controller write cache policy You can set the write policy to: • Write through—the controller sends a data transfer completion signal to the host when the disk subsystem has received all the data in a transaction. • Write back—the controller sends a data transfer completion signal to the host when the controller cache has received all the data in a transaction. By default, the write policy is set to Write Back.
Disk Cache	Allows you to set the disk cache policy to default, enable, or disable. By default, the disk cache is set to default.
Default Initialization	Displays the virtual disk initialization options. You can set the default initialization to: • No — The virtual disk is not initialized. • Fast — The first 8 MB of the virtual disk is initialized. • Full — The entire virtual disk is initialized. For more information, see Virtual disk initialization. By default, the default initialization is set to No.

Create profile based virtual disk

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Configuration Management** > **Creating Profile Based Virtual Disk**.
   The following list of RAID modes are displayed:
   - Generic RAID 0
   - Generic RAID 1
   - Generic RAID 5
   - Generic RAID 6
   - File Server
   - Web/Generic Server
   - Database
3. Based on the RAID mode selected, one or more the physical disk selection criteria is displayed.
4. From the **Physical Disk Selection Criteria** drop-down box, select a criterion based your requirement.
   The Profile Parameters of the selected option is displayed.
5. Click **Create Virtual Disk**.

6. Select **Confirm** and click **Yes** to continue.
   The virtual disk is created with the parameters of the profile selected.

View disk group properties

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Configuration Management** > **View Disk Group Properties**.
   The list of disk group properties are displayed:

Properties	Descriptions
Capacity Allocation	Displays all the virtual disks associated with the specific disk group. It also provides information about the available free space
Secured	Displays whether the disk group is secured or not

Convert to Non-RAID disk

Prerequisites

To convert a physical disk to non-RAID disk from the HII Configuration Utility, perform the following steps:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Configuration Management** > **Convert to Non-RAID Disk**.
   The list of physical disks appears.
3. Select the physical disk to convert to Non-RAID disk.
4. Click **Ok**.
   A screen appears asking if you are sure you want to perform the operation.
5. Select the **Confirm** option.
6. Click **Yes**.
   The operation is successful.

Delete configurations

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Configuration Management** > **Clear Configuration**.
   A screen is displayed asking if you are sure you want to perform the operation.
3. CAUTION: **It is recommended that you back up data stored on the virtual disks and hot spare disks on the controller before deleting the virtual drive.**

   Select **Confirm** and click **Yes** to continue.
   The virtual disks and hot spare disks available on the controller are deleted successfully.

Controller management

Clear controller events

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.

2. Click **Main Menu** > **Controller Management** > **Advanced Controller Management**.
3. Click **Clear Controller Events**.
   A screen is displayed asking if you are sure you want to clear the controller events.
4. Select **Confirm** and click **Yes** to continue.

Save controller events

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Management**.
3. Click **Save Controller Events**.
   A screen is displayed asking if you want to replace the existing file name.
4. Select **Confirm** and click **Yes** to continue.

Save debug log

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Management**.
3. Click **Save Debug Log**.
   A screen is displayed indicating that the operation is successful.
4. Click **Ok**.

Enable security

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Management**.
3. Click **Enable security**, select **Local Key Management**.
4. Click **Ok**.
5. If you want to use the passphrase generated by the controller, click **Suggest Passphrase** and **Confirm** the passphrase by re-entering.
   The operation is successful.
6. Select **I Recorded the Security Settings For Future Reference**, click **Enable Security**.
   A screen is displayed indicating that the security will be enabled on this controller if you proceed.
7. Select **Confirm** and click **Yes** to continue.
   The operation is successful and click **Ok**.

Disable security

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Management**.
3. Click **Disable security**.
   A screen is displayed asking if you are sure you want to disable security.
4. Select **Confirm** and click **Yes** to continue.
   The operation is successful and click **Ok**.

Change security settings

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Management**.
3. Click **Change Security Settings**, select **Change Current Security Settings**.
4. Click **Ok**.
5. If you want to use the passphrase generated by the controller, click **Suggest Passphrase** and **Confirm** the passphrase by re-entering.
   The operation is successful.
6. Click **Save Security Settings**.
7. Select **Confirm** and click **Yes** to continue.
   The operation is successful and click **Ok**.

Restore factory default settings

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Set Factory Defaults**.
   A screen is displayed asking you to confirm the operation.
3. Select **Confirm** and click **Yes** to continue.

Auto configure behavior

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Management** > **Manage Controller Mode**.
   You can view current Controller Mode.
3. Click **Manage Controller Mode**.
   You can view/change the physical disk settings for the controller, if required. The possible options are:
   - Off and Non-RAID Disk
4. Click **Apply Changes** to save the changes.
5. Select **Confirm** and click **Yes** to continue.

   NOTE: This feature is not supported on PERC H355 adapter SAS, PERC H355 front SAS, and PERC H350 adapter SAS

Manage controller profile

About this task

View the details of the profile and choose the desired profile, if supported. To view the properties of the controller profiles:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Management** > **Manage Controller Profiles**.
   The current profile and profile properties are displayed.

Advanced controller properties

Set the patrol read mode

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. Click **Patrol Read**.
   The following options are displayed:
   - Start—Starts patrol read for the selected controller.
   - Suspend—Suspends the ongoing patrol read operation on the controller.
   - Resume—Resumes the suspended patrol read operation.
   - Stop—Stops patrol read for the selected controller.
4. Set the **Mode** to **Auto**, **Manual**, or **Disabled**.
5. Click **Apply Changes**.

Enable physical disk power management

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. Click **Physical Disk Power Management**.
   The following list of options is displayed:
   - Time Interval for Spin Down—allows the user to specify the delay time before a disk is spun down.
   - Spin Down Hot Spare—allows you to enable or disable the spin down of hot spare disks.
   - Spin Down Unconfigured Good—spin down of un-configured disks.
4. Select the applicable options and click **Apply Changes**.
   The changes made are saved successfully.

Configure hot spare drives

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. Click **Spare**.
   The following list of options are displayed:
   - Persistent Hot Spare—allows you to enable or disable the ability to have same system backplane or storage enclosure disk slots dedicated as hot spare slots.
   - Allow Replace Member with Revertible Hot Spare—allows you to enable or disable the option to copy the data form a hot spare disk to physical disk.
   - Auto Replace Member on Predictive Failure—allows you to enable or disable the option to start a Replace Member operation if a predictive failure error is detected on a physical disk.
4. Select the applicable option and click **Apply Changes**.
   The changes made are saved successfully.

Set task rates

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. Click **Task Rates**.

The following options are displayed:

- Background Initialization (BGI) Rate
- Consistency Check Rate
- Rebuild Rate
- Reconstruction Rate

4. You can make the necessary changes and then click **Apply Changes**.
   The task rates operation is completely successfully.

Properties of Enterprise Key Management (EKM)

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. Click **Enterprise Key Management**.
   The properties of Enterprise Key Management is displayed.

Controller properties

Auto import foreign configuration

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. In the **Controller Properties** section, set the **Auto Import Foreign Configuration** option to **Enabled** or **Disabled**.
4. Click **Apply Changes**.

Disable auto import

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. In the **Controller Properties** section, set the **Auto Import Foreign Configuration** option to **Disabled**.
4. Click **Apply Changes**.
   The auto import is disabled successfully.

Enable auto import

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. In the **Controller Properties** section, set the **Auto Import Foreign Configuration** option to **Enabled**.
4. Click **Apply Changes**.
   The auto import is enabled successfully.

Select boot mode

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. In the **Controller Properties** section, select boot mode from the **Boot Mode** drop-down box.
   The following lists of boot mode options appear:

Table 10. Boot mode options

Option	Description
Stop on errors	The system stops during boot for errors which require attention from the user to rectify the issue.
Pause on errors	System pauses during boot to show errors but continue boot after it times out. Only critical events with an infinite timeout halt boot and require the user's attention to correct the issue.

NOTE: In UEFI BIOS mode, errors with timeouts do not appear during boot. It is designed to arise only in legacy BIOS mode.

NOTE: By default, the boot mode option is set to pause on errors.

4. Click **Apply Changes**.
   The boot mode operation is completed successfully.

Abort the consistency check

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. In the **Controller Properties** section, set the **Abort Consistency Check on Error** option to **Enabled** or **Disabled**.
4. Click **Apply Changes**.
   The option to abort the consistency check operation on a redundant virtual disk is enabled if there is any inconsistency found in the data.

Preboot trace buffer

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. In the **Controller Properties** section, set the **Preboot Trace Buffer** option to **Enabled** or **Disabled**.
4. Click **Apply Changes**.

Clear the cache memory

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management** > **Advanced Controller Properties**.
3. Click **Cache and Memory** > **Discard Preserved Cache**.
   The preserved cache is cleared successfully.

Enable boot support

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Controller Management**.
3. From the **Select Boot Device** drop-down box, select the primary bootable device.

   In **Select Boot Device**, you will not be able to view 4 K sector drives. To view all the virtual disks created, navigate to the **Virtual Disk Management** screen in HII. For more information, see Virtual disk management.

If no boot device is selected, the first virtual disk will be set as the boot device on the next reboot. A Non-RAID disk is auto-selected as the boot device, if the controller does not have any virtual disks present.

NOTE: **Select Boot Device** is only applicable in legacy BIOS mode.

NOTE: 4 K sector drives boot support is only available in UEFI mode and managed by the boot loader.

4. Click **Apply Changes**.
   Boot support is enabled for the selected controller.

Virtual disk management

Virtual disk numbering

Virtual disks are numbered in descending order beginning with the highest, ID 239.

View virtual disk properties

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Virtual Disk Management**.
   All the virtual disks associated with the RAID controller are displayed.
3. To view the properties, click on the virtual disk. You can view the following properties of the Virtual disk:

Table 11. Virtual disk properties

Option	Description
Operation	List of operations you can perform on the selected virtual disk. The options are: • Blink • Unblink • Delete Virtual Disk • Reconfigure Virtual Disks • Fast Initialization • Slow Initialization
Name	Indicates the name of the virtual disk.
RAID level	Indicates the RAID level of the virtual disk.
Status	Indicates the status of the virtual disk. The possible options are: • Optimal • Degraded • Offline • Failed
Size	Indicates the size of the virtual disk.

View physical disks associated with a virtual disk

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Virtual Disk Management**.
   All the virtual disks associated with the RAID controller are displayed.
3. Click on a virtual disk.
   The properties of the virtual disk are displayed.

4. Click **View Associated Physical Disks**.
   All the physical disks that are associated with the virtual disk are displayed.
5. From the **Associated Physical Disks** section, select the physical disk.
6. Click **View Physical Disk Properties** to view the physical disk properties.

View physical disks associated with a virtual disk

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Virtual Disk Management**.
   All the virtual disks associated with the RAID controller are displayed.
3. Click on a virtual disk.
   The properties of the virtual disk are displayed.
4. Click **Advanced...**.
   You can view the following additional properties of the virtual disk:

Table 12. Advanced properties of the virtual disk

Option	Description
Logical sector size	Indicates the logical sector size of this virtual disk.
Strip element size	Indicates the strip element size for the virtual disk.
Secured	Indicates whether the virtual disk is secured or not.
Bad blocks	Indicates whether the virtual disk has corrupted blocks.

Configure virtual disk policies

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Virtual Disk Management**.
   All the virtual disks associated with the RAID controller are displayed.
3. Click **Advanced...**.
   You can view the following virtual disk policies:

Table 13. Virtual disk policies

Option	Description
Current write cache	Indicates the current write cache policy for the virtual disk.
Default write cache	Allows selection of the write cache policy for the virtual disk. The possible options are: • Write Through • Write Back • Force Write Back
Read cache policy	Allows selection of the read cache policy for the virtual disk. The possible options are: • No Read Ahead • Read Ahead
Disk cache	Allows selection of the disk cache policy for the virtual disk. The possible options are: • Default (Disk Default) • Enable • Disable

4. Click **Apply Changes**.
   The changes made are saved successfully.

Configure Virtual Disks

When configuring the virtual disks, you should consider the workload intended; RAID 1: for simple boot disk; RAID 5 or 6: for file or web servers (sequential reads/writes of files); RAID 10: for transactional database (small random reads and writes).

Virtual disks configured on hard drives should use the controller default cache setting of Write Back and Read Ahead.

Virtual disks configured on SSDs can use the same controller defaults settings as hard drives. Most users perform a copy of OS files or a data base to the new array. This setting provides optimum performance in this configuration.

Once the copy is complete, the array can be used as it is depending on the number and type of SSDs. It is recommended to enable FastPath by changing the controller's Write cache policy to Write Through and the Read cache policy to No Read Ahead. FastPath is developed to achieve the best random read/write performance from SSDs.

Only IO block sizes smaller than the virtual disk's stripe size are eligible for FastPath. In addition, there should be no background operations (rebuild, initialization) running on the virtual disks. FastPath is disabled if there is active background operation.

NOTE: RAID 50, and RAID 60 virtual disks cannot use FastPath.

NOTE: The Physical Disk Power Management feature is not applicable to FastPath-capable virtual disks.

Perform expand virtual disk operation

Prerequisites

To enable expand virtual disk feature from the HII Configuration Utility, perform the following steps:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Virtual Disk Management**.
   The list of virtual disks is displayed.
3. Select the virtual disk.
4. From the **Operations** drop-down menu, select **Expand Virtual Disk**.

   NOTE: You can view the Expand Virtual Disk feature only if there is free space available in the associated disk group.

5. Click **Go**.
6. To expand virtual disk, enter the percentage of available capacity, and then click **Ok**.
   A screen is displayed asking if you are sure you want to perform the operation.
7. Select the **Confirm** option.
8. Click **Yes**.
   The expand virtual disk operation is completed successfully.

Perform consistency check

Prerequisites

To enable consistency check from the HII Configuration Utility, perform the following steps:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Virtual Disk Management**.
   The list of virtual disks is displayed.
3. Select the virtual disk.

   NOTE: Consistency check cannot be run on RAID 0 virtual disks.

4. From the **Operations** drop-down menu, select **Check Consistency**.
5. Click **Go**.

A screen is displayed asking if you are sure you want to perform the operation.

6. Select the **Confirm** option.
7. Click **Yes**.
   The consistency check operation is completed successfully.

Physical disk management

View physical disk properties

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Physical Disk Management**.
   All the physical disks associated with the RAID controller are displayed.
3. To view the properties, click the physical disk.

Table 14. Physical disk properties

Option	Description
Operation	The list of operations you can perform on the selected physical disk. The options are: • Blink • Unblink • Assign global hotspare • Cryptographic erase • Convert to non-RAID disk
Device ID	Unique identifier of the physical disk.
Backplane ID	Backplane ID in which the physical disk is located in for PERC H755 adapter, PERC H755 front SAS, PERC H755N front NVMe, PERC H750 adapter SAS, PERC H755 MX adapter, PERC H355 adapter SAS, PERC H355 front SAS, and PERC H350 adapter SAS
Slot number	The drive bay in which the physical disk is located for the corresponding backplane or enclosure to which the controller is connected.
Status	Status of the physical disk.
Size	Size of the physical disk.
Type	Type of the physical disk.
Model	Model of the physical disk.
Serial number	Serial of the physical disk.

4. To view additional properties of the physical disk, click **Advanced...**.

Table 15. Advanced physical disk properties

Option	Description
Logical sector size	Logical sector size of the selected physical disk
Physical sector size	Physical sector size of the selected physical disk
SMART status	SMART status of a physical disk
Revision	Firmware version of the physical disk
WWID	Unique identifier used to identify the device
Multipath	Multipath of the controller

Table 15. Advanced physical disk properties (continued)

Option	Description
Physical disk power state	Power condition (On or Power Save) of the physical disk
Disk cache setting	Disk cache setting NOTE: Disk cache for SATA Gen3 drives is disabled by default.
Disk protocol	Type of hard disk used
Device speed	Speed of the physical disk
Negotiated link speed	Negotiated link speed of the device
PCIe capable link width	N/A for SAS/SATA drives
PCIe negotiated link width	N/A for SAS/SATA drives
Encryption capable	Encryption capability of the physical disk
Encryption supported	Encryption capability enabled at the controller level
Secured	Security status of the physical disk
Cryptographic erase capable	Cryptographic erase capability of the physical disk

Cryptographic erase

Cryptographic erase is a process to erase all data permanently on an encryption-capable and unconfigured physical disk, and reset the security attributes.

Prerequisites

- The non-RAID and virtual disks associated with the drive are deleted.
- The disks are not hot spares.

About this task

The Cryptographic erase feature is supported only on Instant Secure Erase (ISE) and Self Encrypting Drives (SED) drives.

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Physical Disk Management**.
   The list of physical disks is displayed.
3. Select a physical disk.
4. From the **Operations** drop-down menu, select **Cryptographic Erase**.

   NOTE: If the drive installed is ISE or SED capable only then the Cryptographic erase option is displayed.

5. Click **Go**.
   A screen is displayed asking if you are sure you want to perform the operation.
6. Select the **Confirm** option.
7. Click **Yes**.
   The Cryptographic erase operation is completed successfully.

Physical disk erase

Prerequisites

To use the Physical Disk Erase feature from the HII Configuration Utility, perform the following steps:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Physical Disk Management**.
   The list of physical disks is displayed.
3. Select a physical disk.
4. From the **Operations** drop-down menu, select **Physical Disk Erase**.

   NOTE: If the drive installed is neither SED or ISE capable, then only the Physical Disk Erase option is displayed.

5. Click **Go**.
   A screen is displayed asking if you are sure you want to perform the operation.
6. Select the **Confirm** option.
7. Click **Yes**.
   The physical disk erase operation is completed successfully.

Assigning a global hot spare

Prerequisites

To assign a global hot spare from the HII Configuration Utility, perform the following steps:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Physical Disk Management**.
   The list of physical disks is displayed.
3. Select the physical disk.
4. From the **Operations** drop-down menu, select **Assign Global Hot Spare**.
5. Click **Go**.
   A screen is displayed asking if you are sure you want to perform the operation.
6. Select the **Confirm** option.
7. Click **Yes**.
   The global hot spare disk is created successfully.

Assigning a dedicated hot spare

Prerequisites

To assign a dedicated hot spare from the HII Configuration Utility, perform the following steps:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Physical Disk Management**.
   The list of physical disks is displayed.
3. Select the physical disk.
4. From the **Operations** drop-down menu, select **Assign Dedicated Hot Spare**.
5. Click **Go**.
   A screen is displayed asking if you are sure you want to perform the operation.
6. Select the **Confirm** option.
7. Click **Yes**.
   The dedicated hot spare disk is created successfully.

Convert to RAID capable

Prerequisites

To convert a non-RAID disk to RAID capable disk from the HII Configuration Utility, perform the following steps:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Physical Disk Management**.
   The list of physical disks appears.
3. Select the physical disk.
4. From the **Operations** drop-down menu, select **Convert to RAID capable**.
5. Click **Go**.
   A screen appears asking if you are sure you want to perform the operation.
6. Select the **Confirm** option.
7. Click **Yes**.
   The operation is successful.

Convert to Non-RAID disk

Prerequisites

To convert a physical disk to non-RAID disk from the HII Configuration Utility, perform the following steps:

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Physical Disk Management**.
   The list of physical disks appears.
3. Select the physical disk.
4. From the **Operations** drop-down menu, select **Convert to Non-Raid disk**.
5. Click **Go**.
   A screen appears asking if you are sure you want to perform the operation.
6. Select the **Confirm** option.
7. Click **Yes**.
   The operation is successful.

Hardware components

View battery properties

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Hardware Components** > **Battery Management**.
   The battery and capacity information are displayed.
3. You can view the following properties of the battery:

Table 16. Battery properties

Field	Description
Type	Displays the type of battery available.
Status	Displays the current status of the battery.

Table 16. Battery properties (continued)

Field	Description
Temperature	Displays the current temperature of the battery and also indicates whether the temperature is normal or high.
Charge	Displays the available charge of the battery in percentage.

4. Displays click **Advanced...**.
   The additional advanced properties of the physical battery are displayed.
5. You can view the following advanced properties of the battery:

Table 17. Advanced battery properties

Field	Description
Status	Displays whether the current status of the battery is learning, degraded, or failed.
Voltage	Displays whether the voltage status of the battery is normal or high.
Current	Displays power consumption of the battery in milliamps (mA).
Full capacity	Displays the maximum charge capacity of the battery.
Remaining capacity	Displays the current charge capacity of the battery.
Expected margin of error	Displays expected margin of error.
Completed discharge cycles	Displays the completed discharge cycles.
Learn mode	Displays the condition of the battery. The learn cycle is a periodic operation that calculates the charge that is remaining in the battery to ensure there is sufficient energy.

View physical disks associated with an enclosure

Steps

1. Enter the **Dell PERC 11 Configuration Utility**. See Navigate to Dell PERC 11 configuration utility.
2. Click **Main Menu** > **Hardware Components** > **Enclosure Management**.
3. From the **Select Enclosure** field, choose the enclosure for which you need to view the physical disks.
   All the physical disks that are associated with the virtual disk are displayed.
4. Click the **Attached Physical Disks** drop-down box.
   All the physical disks that are associated with the selected enclosure are displayed.

Security key management in HII configuration utility

The Dell OpenManage storage management application and the **HII Configuration Utility** of the controller allow security keys to be created and managed as well as create secured virtual disks. The following section describes the menu options specific to security key management and provide detailed instructions to perform the configuration tasks. The contents in the following section apply to the **HII Configuration Utility**. For more information on the management applications, see Applications and User Interfaces supported by PERC 11 .

- The **Controller Management** screen displays controller information and action menus. You can perform the following security-related actions through the controller management menu:
  - **Security Key Management**—Creates or changes the local key management (LKM) security key. Deletes the local key management (LKM) or secure enterprise key manager (SEKM) security key.
- The **Virtual Disk Management** screen displays physical disk information and action menus. You can perform the following security related actions through the virtual disk management menu:
  - **Secure Disk Group**—Secures all virtual disks in disk group.
  - **Create secure virtual disk**—Creates a new virtual disk that is secured with the security key on the controller.

- The **Physical Disk Management** screen displays physical disk information and action menus. You can perform the following security-related actions through the physical disk management menu:
  - **Secure non-RAID disk**—Secures the non-RAID disk with the controller security key.
  - **Cryptographic Erase**—Permanently erases all data on the physical disk and resets the security attributes.

For more information on the Physical Disk Management screen and the Virtual Disk Management screen, see Physical disk management and Virtual disk management.