NetWitness® Platform XDR

Version 12.1.0.0

PowerVault (Dell MD1400-8TB) Setup Guide

NETWITNESS
Platform XDR

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October 2022

Contents

About this Document

This document provides instructions for installing a PowerVault external storage device on RSA Series 5 and Series 6 (Network) Decoder, Log Decoder, Concentrator, Archiver, and Hybrid hosts.

The hardware setup instructions in this document are for hardware only; they do not apply to a specific release of RSA NetWitness Platform software. This document is for new hardware only. It is not intended for PowerVaults with preexisting data.

The PowerVault installation script instructions in this guide apply only to NetWitness Platform 11.2 and earlier. For NetWitness Platform 11.3 and later, use the hardware connection information in this guide, but refer to *Storage Guide for RSA NetWitness Platform Version 11.3 and later* for instructions on how to allocate storage for your hardware.

Caution: If you are adding a previously used PowerVault and would like to preserve the data, DO NOT follow the instructions in this guide. Contact RSA Customer Support. Running the script on a previously used PowerVault could erase any existing data.

Note: When viewing a printed guide, be aware that a newer version of the guide may be available online at **RSA Link** in RSA NetWitness® Platform under Hardware Setup Guides: https://community.rsa.com/community/products/netwitness/hardware-setup-guides

Hardware Description

The RSA PowerVault (Dell MD 1400) high capacity storage device is a drive array enclosure powered by EMC/Dell. PowerVault is used to extend the usable storage on the RSA Series 5 and Series 6 (Network) Decoder, Log Decoder, Concentrator, Archiver, and Hybrid hosts.

High-Level Capacity Information

PowerVault:

- Stores up to 120 TB for a single enclosure.
- Accommodates up to 12 hot-pluggable 3.5" and 2.5" drives (2.5" available with adapter).
- Allows you to daisy-chain eight PowerVaults (four enclosures per channel).
- Provides improved device monitoring and management.
- Is compatible with Dell OpenManage/iDRAC system management technology.

Enclosure Options

Host	SKU	Description	Specification
Decoder / Archiver	NW-PVHD96	NetWitness PowerVault High Density 96TB	DellStorage MD1400, 12HDs 3.5", Rackmount, 2Us ,12x8TB NLSAS
Decoder / Archiver	NW-PVHD144	NetWitness PowerVault High Density 144TB	DellStorage MD1400, 12HDs 3.5", Rackmount, 2Us, 12x12TB NL-SAS
Decoder / Archiver	NW-PVHDE96	NetWitness PowerVault High Density 96TB SED (Self Encrypted Drives)	DellStorage MD1400, 12HDs 3.5", Rackmount, 2Us, 12x8TB NL-SAS SED
Concentrator	NW-PVHP76	NetWitness PowerVault High Performance 76TB	DellStorage MD1400, 12HDs 3.5", Rackmount, 2Us, 9x8TB NLSAS, 3x1.6TB SSD
Concentrator	NW-PVHP113	NetWitness PowerVault High Performance 113TB	DellStorage MD1400, 12HDs 3.5", Rackmount, 2Us, 9x12TB NLSAS, 3x1.6TB SSD
Concentrator	NW-PVHPE78	NetWitness PowerVault High Performance 78TB SED	DellStorage MD1400, 12HDs 3.5", Rackmount, 2Us, 9x8TB NLSAS SED, 3x1.92TB SSD SED

Unencrypted PowerVault Storage Enclosures Supported

Series 5 & 6 Core Hosts (R630 &R640)	Series 5 Hybrid Host (R730)	Series 6 Hybrid Host (R740)
Eight PowerVaults	One, 96TB PowerVault	One, 144TB PowerVault
Four DACs and Four PowerVault (mixed mode)		Two, 96TB PowerVaults

Encrypted PowerVault Storage Enclosures Supported

Series 6 Core Archiver, Decoder, and Log Decoder Hosts (R640)	Series 6 Core Concentrator Host (R640)	Series 5 Core Hosts (R630)	Series 5 & 6 Hybrid Hosts (R730 & R740)
Four, 96TB, SED PowerVaults	Four, 78TB, SED PowerVaults	Not Supported	Not Supported

Capability with RSA NetWitness Platform Series 5 or 6 Hosts

RSA NetWitness Platform Series 5 or 6 hosts are shipped with the software to support a PowerVault installation. The initial setup of a PowerVault in your network involves these steps:

1. Review site requirements and safety information.
2. Install PowerVault.

Package Contents

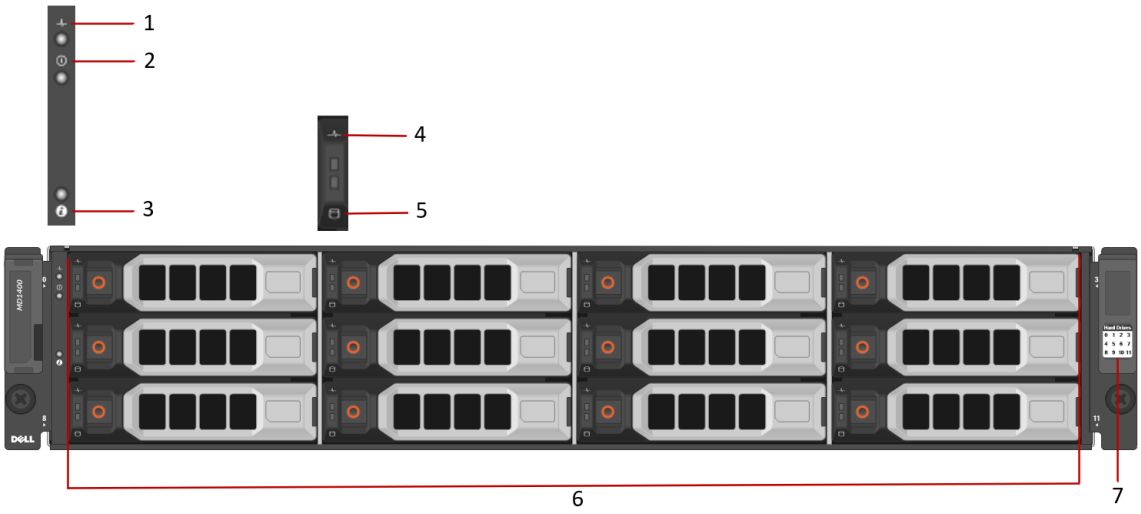
Refer to the documentation that is included with the PowerVault. The *Dell Storage MD1400 Enclosures Hardware Owner's Manual* (https://topics-cdn.dell.com/pdf/md1400om_en-us.pdf) contains detailed instruction on all the optional setups you can implement with PowerVault to address the needs of your environment.

Note: The PowerVault comes with two SAS cables. You only need one cable to connect the PowerVault to a Series 5 or 6 host. Use a cable with the mini-to-mini-SAS connectors to connect the PowerVault to a Series 5 or 6 host.

Customer Supplied Materials

You do not need to supply any materials.

Front View of the PowerVault



Item numbers 1-3 are indicators located on the front control panel, which indicate the status of the enclosure. Item numbers 4-5 are hard disk drive indicators. For more detailed information, see The *Dell Storage MD1400 Enclosures Hardware Owner's Manual* (https://topics-cdn.dell.com/pdf/md1400om_en-us.pdf).

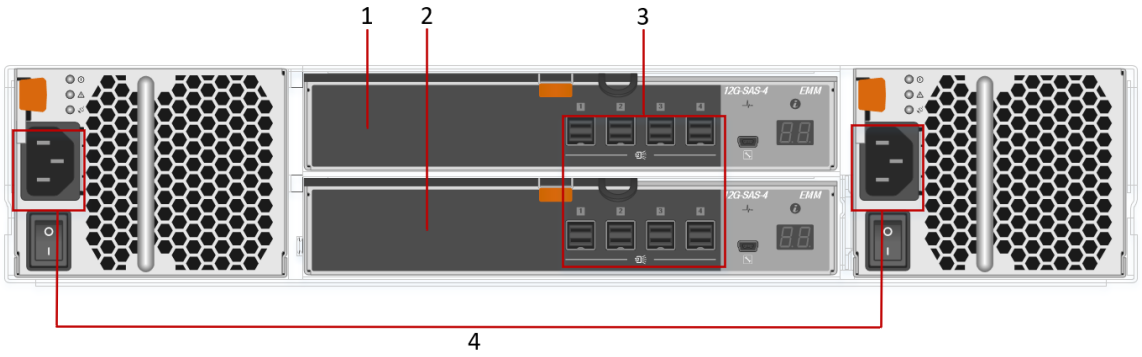
Key	Description
1	Enclosure status LED. The enclosure status LED on the front control panel lights when the enclosure power is on. • Lights solid blue during normal operation. • Blinks blue when a host server is identifying the enclosure or when the system identification button is pressed. • Blinks amber or remains solid amber for a few seconds and then turns off when the enclosure management modules (EMMs) are booting or resetting. • Blinks amber for an extended time when the enclosure is in a warning state. • Remains solid amber when the enclosure is in the fault state.
2	Power LED. The power LED on the front control panel lights when at least one power supply unit is supplying power to the enclosure.
3	System identification button. The system identification button on the front control panel can be used to locate a particular enclosure within a rack. When the button is pressed, the system status indicators on the control panel blink blue until the button is pressed again.

Key	Description
4	Hard disk drive status indicator. • **Blinks green two times per second:** Identify hard disk drive or preparing for removal • **Off:** The hard disk drive is ready for insertion or removal. This can also be an indicator of a drive failure. • **Blinks green, amber, and off:** Hard disk drive predicted failure • **Blinks amber four times per second:** Hard disk drive failed • **Blinks green slowly:** Hard disk drive rebuilding • **Steady green:** Hard disk drive online • **Blinks green for three seconds, amber for three seconds, and turns off in six seconds:** Rebuild aborted
5	Hard disk drive activity indicator (green).
6	Hard disk drives. **High Density:** Total - 12 Drives • Slots 0-11: 3.5 inch SAS hot-swappable hard drives **High Performance:** Total - 12 Drives • Slots 0-2: 2.5 inch SSD (in 3.5 in carrier) hot-swappable solid state drives • Slots 4-11: 3.5 inch SAS hot-swappable hard drives
7	Hard drives table, which shows the PowerVault drive slot locations.

PowerVault Front View Showing Drive Numbers

The PowerVault drive locations are listed on a table to the right on the front of the PowerVault. The drive numbers are also labeled in this diagram. For information on how to flash and replace the hard disk drives, see the *Hard Disk Drive Replacement Guide* in the Hardware Setup Guides on RSA Link: https://community.rsa.com/community/products/netwitness/hardware-setup-guides.

Rear View of the PowerVault



Key	Description
1	Primary enclosure management module (EMM 0). The EMM provides: • a data path between the enclosure and the host server. • enclosure management functions for your enclosure.
2	Secondary EMM (EMM 1)
3	SAS ports. Each set of ports has a Primary port and an Expansion port. In each set, the Primary port is closer to the center of the chassis. There are two rows of ports. In each row, the ports are labeled 1 to 4 from left to right. Start with the upper row port 1. You can daisy chain using the rest of the ports if you have multiple PowerVaults connected to a Series 5 or 6 host.
4	Power Input Connections

For more detailed information, see The *Dell Storage MD1400 Enclosures Hardware Owner's Manual* (https://topics-cdn.dell.com/pdf/md1400om_en-us.pdf).

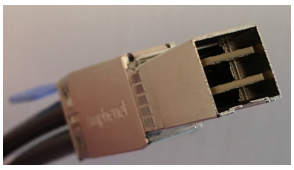
PowerVault Cable

You receive multiple cables with the PowerVault. Both connectors on PowerVault cables are square, **Mini-SAS (Codename SFF-8088)** connectors. You use these cables to connect:

- A PowerVault to a host.
- A PowerVault to another PowerVault in a daisy chain.

The following figures shows a **Mini-SAS** connector.

Note: You must insert the cable correctly at both ends with the correct side up. If you have done this correctly, you hear a click and a green light displays on the rear of the PowerVault and the rear of the Series 5 or Series 6 host indicating a live connection.

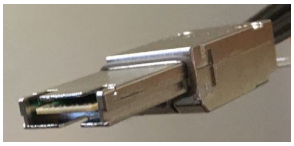


DAC Cables

You can Install PowerVaults and 15-Drive DACs on a Series 5 or Series 6 Host (Mixed Mode). The DAC has two types of cables:

- A cable with a **Mini-SAS (Codename SFF-8088)** connector at one end of the cable and a rectangular **Mini-SAS HD (Codename SFF-8614)** connector at the other end. You connect the square, **Mini-SAS (Codename SFF-8088)** connector to the host and the rectangular **Mini-SAS HD (Codename SFF-8614)** connector to the first DAC.
- Multiple cables with a rectangular **Mini-SAS HD (Codename SFF-8614)** at both ends of the cable to connect a DAC to another DAC in a daisy chain.

The following figure shows a rectangular **Mini-SAS HD (Codename SFF-8614)** connector.



Monitoring PowerVault Through IDRAC

You can monitor PowerVault MD array communication through the Integrated Dell Remote Access Controller (IDRAC). Refer to the "Monitoring network devices using web interface" and "Monitoring network devices using RACADM" sections of the *Integrated Dell Remote Access Controller 8/7 Version 2.60.60.60 User's Guide* (https://topics-cdn.dell.com/pdf/idrac7-8-lifecycle-controller-v2606060_users-guide_en-us.pdf) for information on how to monitor network devices through IDRAC.

PowerVault Support by Host

This topic lists the maximum number of PowerVaults you can attach to RSA physical hosts.

Unencrypted PowerVaults

Series 5 - R630 Core (Decoder, Log Decoder, Concentrator, and Archiver) Host supports the following unencrypted PowerVaults:

- Eight unencrypted PowerVaults.
- In mixed mode, supports up to four unencrypted PowerVaults and four unencrypted DACs for a total of eight external storage devices.

Series 5 - R730 Hybrid Host supports one, unencrypted, 72TB PowerVault.

Series 6 - R640 Core Host supports the following unencrypted PowerVaults:

- Eight unencrypted PowerVaults.
- In mixed mode, supports up to four unencrypted PowerVaults and four unencrypted DACs for a total of six external storage devices.

Series 6 - R740 Hybrid Host supports two, unencrypted, 72TB PowerVaults or one unencrypted 144TB PowerVault.

Encrypted PowerVaults

Series 6 - R640 Core (Decoder, Log Decoder, Concentrator, and Archiver) Host supports up to four, SED (Self Encrypted Drive) PowerVaults. A Decoder or Archiver installed on a Series 6 R640 requires 96-TB SED PowerVaults. A Concentrator installed on a Series 6 R640 requires 78-TB SED PowerVaults. RSA does not support encrypted PowerVaults for:

- Series 5 hosts, (that is, R630 core hosts and R730 hybrid hosts).
- Series 6 R740 hybrid host.

Install PowerVault without Encryption

This topic describes how to install a PowerVault without encryption on RSA Series 5 and Series 6 Decoder, Log Decoder, Concentrator, Archiver, and Hybrid physical hosts.

Prerequisites

Make sure that you have the following required software:

- For RSA NetWitness Platform 11.1.0.2 and later versions:

  `rsa-sa-tools-11.2.1.0-1901070555.5.d1d4cb3.el7.noarch.rpm` or newer version of this file, which contains the script you need to configure the storage.

- For RSA Security Analytics 10.6.6.1 and later versions:
  `rsa-sa-tools-10.6.6.1-199.5.47209f4.el6.noarch.rpm` or newer or newer version of this file, which contains the script you need to configure the storage. This file is available on RSA Link at https://community.rsa.com/docs/DOC-100361.

  To verify the rsa-sa-tools version, log in as `root` on the physical hosts and run the following command:

  ```
  rpm -qa | grep sa-tools
  ```

  Results example:

  - For 11.x: `rsa-sa-tools-11.2.1.0-1901070555.5.d1d4cb3.el7.noarch.rpm`
  - For 10.6.6.x: `rsa-sa-tools-10.6.6.1-199.5.47209f4.el6.noarch.rpm`

  This RPM is updated quarterly. Contact RSA Customer Support to obtain the most recent version.

- **RSA NetWitness Platform** - The minimum version is 10.6.6.0 (licensed only). The recommended versions are 10.6.6.x and 11.1.0.2 and later.
  To verify the version, in the Administration Services view (Administration > Services), the release version is displayed to the right of each service listed. To check the version at the command line, run the following command:

  ```
  rpm -qa | grep nw
  ```

  Results example:

  ```
  nwconcentrator-10.6.6.2-182.3.0f6d16e.el6.x86_64
  ```

Caution: If you are adding a previously used PowerVault and would like to preserve the data, DO NOT follow the instructions in this guide. Contact RSA Customer Support. Running the script on a previously used PowerVault could erase any existing data.

Introduction

The following table contains the summarized installation instructions for different deployments, and detailed procedures are in individual subsections. The deployment scenarios are:

- Multiple PowerVaults in a Concentrator, (Network) Decoder, Log Decoder, and Archiver deployment.
- A single PowerVault in a Hybrid deployment.

Attach and Configure a PowerVault without Encryption

This table summarizes the steps you must complete to attach and configure a PowerVault without encryption. The scenarios are shown in detail in the topics following immediately the table.

NetWitness Platform 11.3 and Later

Deployment Scenario	Tasks
Concentrator, Archiver, Decoder, and Log Decoder (Multiple PowerVaults)	1. Connect the PowerVaults to the physical host before powering on the physical host as described in Connect PowerVaults to a Concentrator, Archiver, Decoder, or Log Decoder Physical Host . 2. Follow the instructions in the *Storage Guide for RSA NetWitness Platform Version 11.3 and Later* to allocate storage for your hardware.
Hybrid	1. Connect the PowerVault to the physical host before powering on the physical host as described in Connect a PowerVault to a Hybrid . 2. Follow the instructions in the *Storage Guide for RSA NetWitness Platform Version 11.3 and Later* to allocate storage for your hardware.

NetWitness Platform 11.2 and Earlier

Deployment Scenario	Tasks
Concentrator, Archiver, Decoder, and Log Decoder (Multiple Power-Vaults)	1. Connect the PowerVaults to the physical host before powering on the physical host as described in Connect PowerVaults to a Concentrator, Archiver, Decoder, or Log Decoder Physical Host . 2. Run the `NwArrayConfig.py` script as described in Run the PowerVault Installation Scripts on the Decoder, Log Decoder, Concentrator, or Archiver . 3. Restart the services for this host as described in Restart the Service. 4. License the services for this host (if they are not already licensed). Refer to the *Licensing Guide* available through the application Help option and RSA Link at https://community.rsa.com/docs/DOC-40370 for instructions on licensing RSA physical hosts.
Hybrid	1. Connect the PowerVault to the physical host before powering on the physical host as described in Connect a PowerVault to a Hybrid . 2. Run the `NwArrayConfig.py` script as described in Run the PowerVault Installation Scripts on a Hybrid . 3. Restart the services for this host as described in Restart the Service. 4. License the services for this host (if they are not already licensed). Refer to the Licensing Guide available through the application Help option and RSA Link at https://community.rsa.com/docs/DOC-40370 for instructions on licensing RSA physical hosts.

Connect PowerVaults to a Concentrator, Archiver, Decoder, or Log Decoder Physical Host

You can connect one or more PowerVaults to a RSA Series 5 or Series 6 Concentrator, Archiver, Decoder, or Log Decoder physical hosts. You can only add four PowerVaults per port for a total of eight PowerVaults per PERC H830 (Series 5) RAID controller or five per PERC H840 (Series 6) RAID controller.

Note: 1.) If you are attaching more then 3 PowerVaults to a single port you may received the following Error message:
`The total number of enclosures connected to connector 00, has exceeded the maximum allowable limit of 3 enclosures. Please remove the extra enclosure and then restart your system.` This error was caused by PERC profile settings. From factory, PERC profile is set to PD64. Setting the profile to PD240 corrects the issue. Profile PD240 is labeled as "default", however, this is not set from factory. To set the PD Profile:
1. Enter the DELL PERC 10 Configuration Utility. See Navigating to Dell PERC 10 configuration utility.
2. Click Main Menu > Controller Management > Advanced Controller Properties > Profile Management. Current profile and profile properties are displayed.
3. Change profile using the Choose Profile option.
4. Select Set Profile. Click Reboot.
2.) The PowerVault comes with two SAS cables. You only need one cable to connect the PowerVault to the physical host. For RSA Series 5 physical hosts, use a cable with the mini-SAS connector.

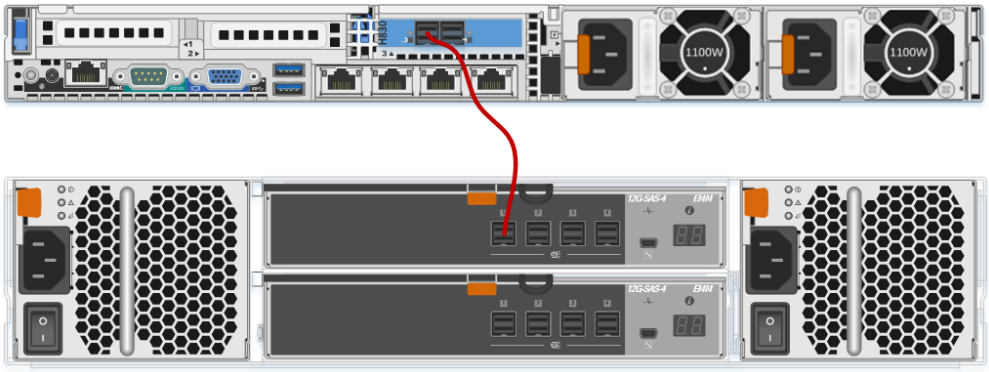
1. Ensure that the physical host is powered off.
2. Connect one end of the SAS cable to the **left** port of the RAID controller on the back of the Concentrator, Archiver, Decoder, or Log Decoder physical host.
3. Connect the other end of the SAS cable to the PowerVault unit.
   When you connect the first PowerVault to the RAID controller, make sure that you insert the cable into the **Primary SAS port** on the PowerVault as shown in the following figures.

Series 5 Physical Hosts

Series 5 - R630

The following figure shows an R630 host (port 0) connected to a PowerVault (port 1 in top row of ports) using a mini-to-mini SAS cable.
The PERC830 card for the R630 is installed in slot #3. This means that:

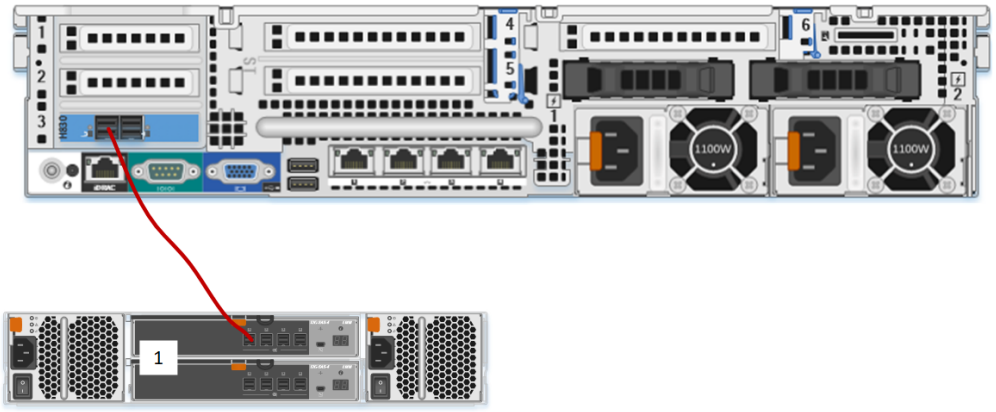
- Port 0 is on the left and port 1 is on the right on the R630.
- You must attach the cable to the R630 with the connector's blue tab on the top.
- You must attach the other end the cable to the PowerVault with the connector's blue tab on the top.
- You know if the cable is properly connected when you hear a click as the cable locks into place and see the green port light illuminate on the R630.



Series 5 - R730 (Hybrid)

The following figure shows an R730 host (port 0) connected to a PowerVault (port 1 in top row of ports) using a mini-to-mini SAS cable.
The PERC830 card for the R730 is installed in slot #3. This means that:

- Port 0 is on the left and port 1 is on the right on the R730.
- You must attach the cable to the R730 with the connector's blue tab on the top.
- You must attach the other end the cable to the PowerVault with the connector's blue tab on the top.
- You know if the cable is properly connected when you hear a click as the cable locks into place and see the green port light illuminate on the R730.



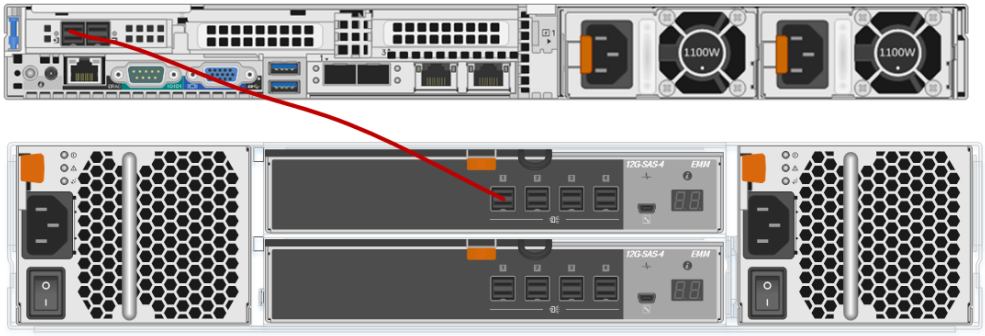
Series 6 Physical Hosts

Series 6 - R640

The following figure shows Series 6 - R640 host (port 0) connected to PowerVault (port 1 in top row of ports) using a mini-to-mini SAS cable.

The PERC H840 card for the R640 is installed in slot #1. This means that:

- Port 0 is on the left and port 1 is on the right on the R640.
- You must attach the cable to the R640 with the connector's blue tab on the top.
- You must attach the other end the cable to the PowerVault with the connector's blue tab on the top.
- You know if the cable is properly connected when you hear a click as the cable locks into place and see the green port light illuminate on the R640.



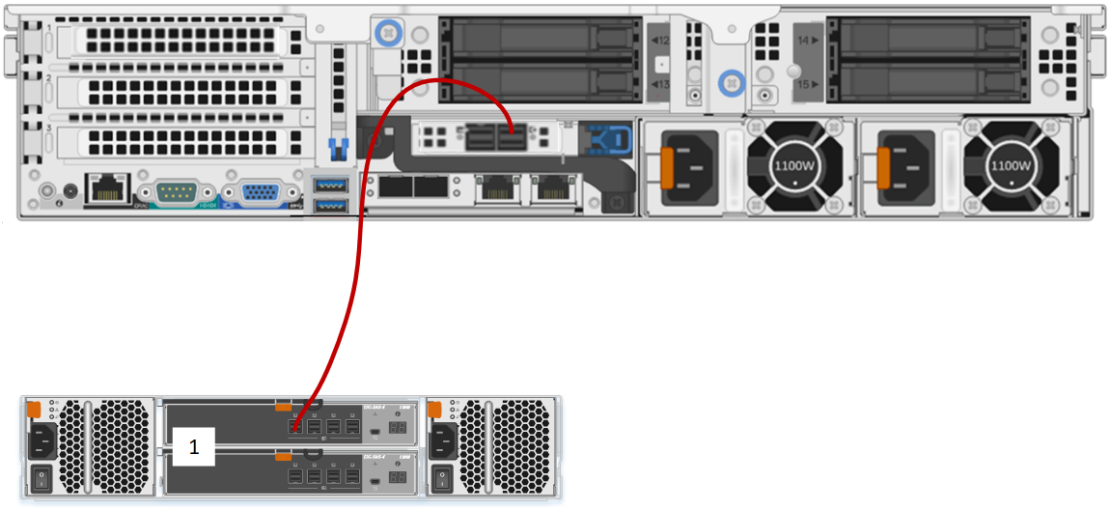
Series 6 - R740xd (Hybrid)

The following figure shows Series 6 - R740 hybrid host Port 0 connected to a PowerVault's Port 1 in top row of ports using a mini-to-mini SAS cable.

The PERC H840 card for the R740 is installed in slot #4 **inverted (upside down)** in this slot. This means that:

- **Port 0 is on the right and Port 1 is on the left on the R740 Hybrid**.
- **You must attach each cable to the R740 with the connector's blue tab on the bottom as shown in the following picture**.

- You must attach the other end the cable to the PowerVault with the connector's blue tab on the top.
- You know if the cable is properly connected when you hear a click as the cable locks into place and see the green port light illuminate on the R740.

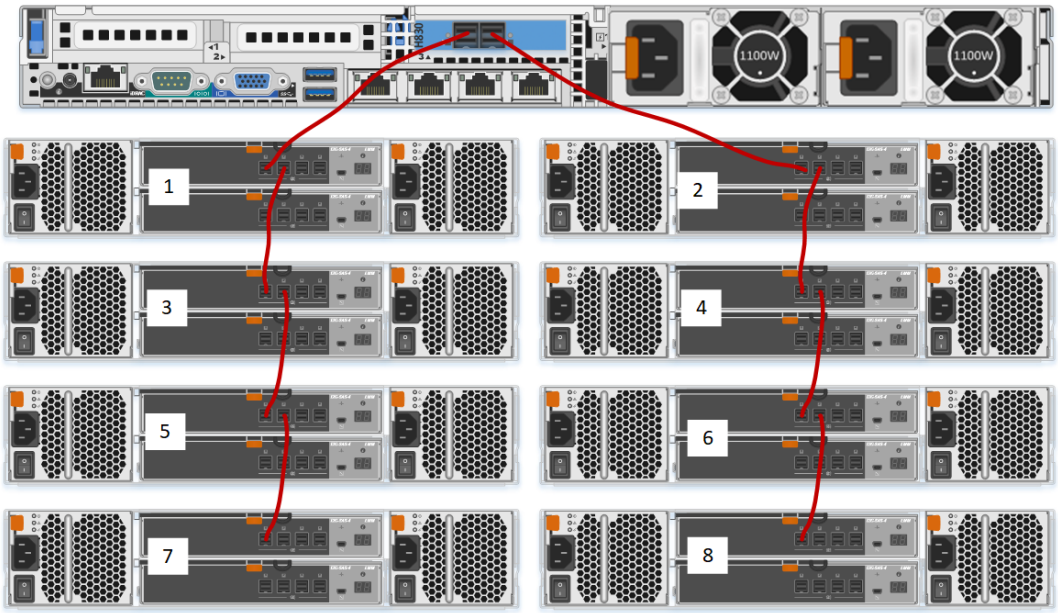


4. When you connect two or more PowerVaults to the RAID controller, make sure that you:
   a. Connect the **Primary** Port 1 of the first PowerVault to Port 0 of the Decoder RAID controller.
   b. Daisy chain up to three additional PowerVaults to the first PowerVault.
   c. Connect the **Primary** Port 1 of the second PowerVault to Port 1 of the Decoder RAID controller.
   d. Daisy chain up to three additional PowerVaults to the first PowerVault.

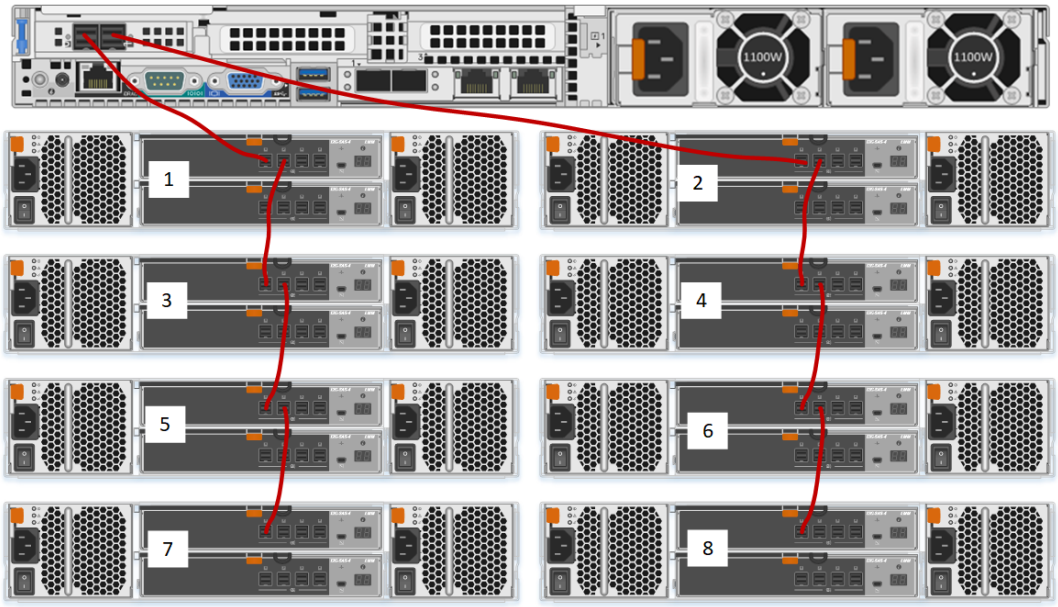
   Note: If you are only connecting two PowerVaults, each PowerVault should be connected to a dedicated port on the R630 or R640 physical hosts for improved performance.

   The following figure shows you how to connect eight PowerVaults to an RSA Series 5 and Series 6 physical hosts.

Series 5 - R630 Attached to Eight PowerVaults



Series 6 - R640 Attached to Eight PowerVaults



5. When you finish the cabling, ensure that the PowerVault is powered on and then power on the physical host.

Connect a PowerVault to a Hybrid

Note: The PowerVault comes with two SAS cables. You only need one cable to connect the PowerVault to the physical host. RSA Series 5 physical hosts require different cables. For RSA Series 6 physical hosts, use a cable with the mini-SAS connector.

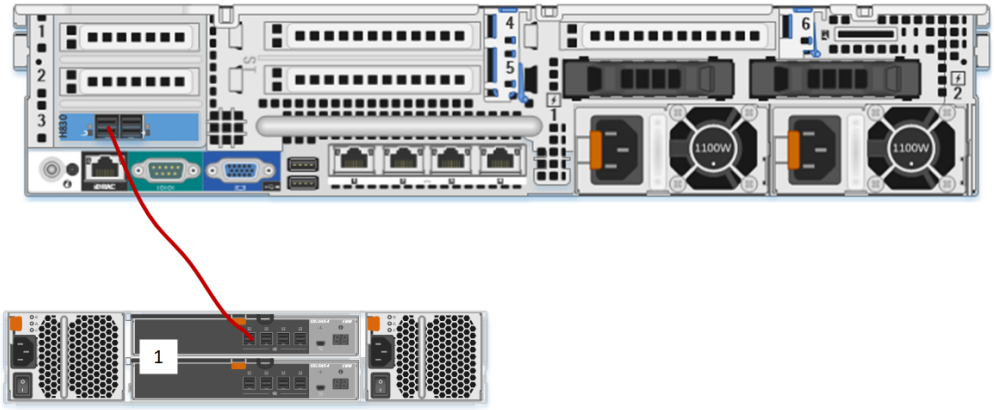
To connect a PowerVault to a Series 6 Hybrid:

Follow the instructions In the Connect PowerVaults to a Concentrator, Archiver, Decoder, or Log Decoder Physical Host procedure above and connect the RSA Series Series 6 Hybrid physical host to only one PowerVault.

To connect a PowerVault to a Hybrid physical host:

1. Ensure that the physical host is powered off.
2. Connect one end of the mini-to-mini SAS cable to the Port 0 of the RAID controller on the back of the Series 5 Hybrid physical host.
3. Connect the other end of the mini-to-mini SAS cable to the PowerVault unit (Port 1 in the following example).
   When you connect the first PowerVault to the RAID controller, make sure that you insert the cable into the **Primary SAS port** on the PowerVault as shown in the following figure.

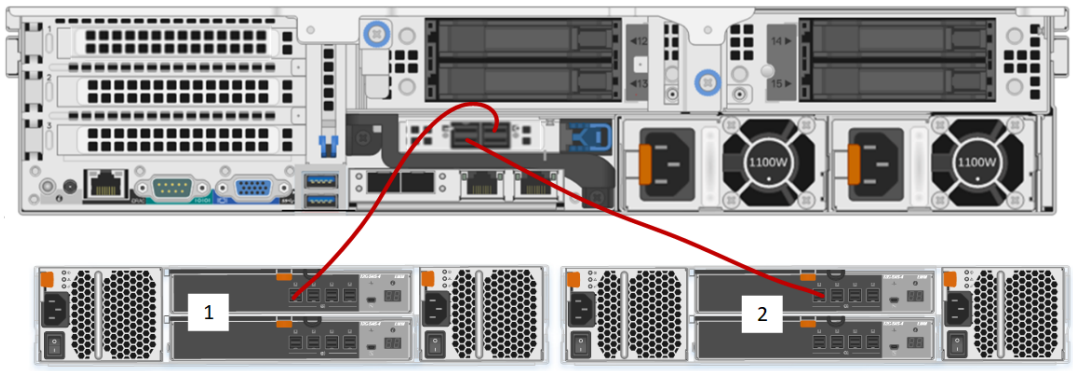
Series 5 R730 Hybrid



Series 6 R740xd Hybrid

The PERC H840 card for the R740 is installed in slot #4 **inverted (upside down)** in this slot. This means that:

- The R740 Port 0 is on the right and you connect this port to Port 1 in the top row of ports on the first PowerVault (that is 1 in the following illustration).
- The R740 Port 1 is on the left and you connect this port to Port 1 in the top row of ports on the second PowerVault (that is 2 in the following illustration).



4. When you finish the cabling, make sure that the PowerVault is powered on and then power on the physical host.

Run the PowerVault Installation Scripts on the Decoder, Log Decoder, Concentrator, or Archiver

This procedure only applies to NetWitness Platform 11.2 and earlier.

Note: For NetWitness Platform 11.3 and later, refer to Storage Guide for RSA NetWitness Platform Version 11.3 and later for instructions on how to allocate storage for your hardware.

Caution: After configuring the PowerVault the first time for a service, there is a possibility of background RAID initialization running for at least 24 hours. During this initialization, disk I/O performance may be affected.

1. Log in as `root` and verify that the **rsa-sa-tools** package is installed by running the following command:

   ```
   rpm -qa | grep rsa sa-tools
   ```

   Results example:

   ```
   rsa-sa-tools-11.2.0.0-1805091842.1.df5a541.317.noarch
   ```

   If the package is not installed, contact RSA Customer Support to obtain a copy of the RPM and install it.

2. Change the directory to the rsa-sa-tools RPM base directory:

   ```
   cd /opt/rsa/saTools
   ```

3. Execute the following command:

   ```
   ./nwraidutil.pl
   ```

4. **Important**: Check the results and resolve ALL conditions before running the script:

   ```
   Ensure that there are no foreign configurations and no drives with an
   Unconfigured(bad) state on the PowerVault drives.

   Adapter 1 (PERCH810 Adapter) enclosures found: 2
   Adapter 1 (PERCH810 Adapter) enclosure 160 slots found: 12
   Encl Slot State P.Fail.Count Raw Size   Inquiry Data
   68   0    (U)   0            10.692 TB  HGST    HUH721212AL5200 NS018DGXLB2H
   68   0    (U)   1            10.692 TB  HGST    HUH721212AL5200 NS018DGXN01H
   68   0    (U)   2            10.692 TB  HGST    HUH721212AL5200 NS018DGXKTWH
   68   0    (U)   3            10.692 TB  HGST    HUH721212AL5200 NS018DGXTHVH
   68   0    (U)   4            10.692 TB  HGST    HUH721212AL5200 NS018DGXALXH
   68   0    (U)   5            10.692 TB  HGST    HUH721212AL5200 NS018DGX9UNH
   68   0    (U)   6            10.692 TB  HGST    HUH721212AL5200 NS018DGX2MNH
   68   0    (U)   7            10.692 TB  HGST    HUH721212AL5200 NS018DGX16HH
   68   0    (U)   8            10.692 TB  HGST    HUH721212AL5200 NS018DGXM03H
   68   0    (U)   9            10.692 TB  HGST    HUH721212AL5200 NS018DGX2NPH
   68   0    (U)   10           10.692 TB  HGST    HUH721212AL5200 NS018DGXZLPH
   ```

```
68   0    (U)   11          10.692 TB  HGST    HUH721212AL5200 NS018DGXYLZH
```

If a drive is in a foreign state, it shows `F` in the `State` column. If a drive is in a bad state, it shows `B` in the `State` column. A PowerVault that has never been used before should show `U` for unconfigured.

a. Ensure that the number of drives listed in the results equals 12.

   The following example lines from the results show the correct number of drives:

   ```
   Adapter 1 (PERCH810 Adapter) enclosures found: 2
   Adapter 1 (PERCH810 Adapter) enclosure 160 slots found: 12
   ```

   The following example lines from the results show that there is a bad drive:

   ```
   Adapter 1 (PERCH810 Adapter) enclosures found: 1
   Adapter 1 (PERCH810 Adapter) enclosure 121 slots found: 11
   WARNING: Physical disk problems have been found.
   ```

   It is also important that all drives appear numerically in the `nwraidutil` output. It is possible that a bad drive may not show up at all in the output. You will see a jump in the Slot count. For example, if the enclosure has 12 drives, but you only see slots 0 - 11, it means that slot 12 is bad and cannot be seen by the RAID controller. Contact RSA Customer Support before running the script because an RMA may be necessary.

5. To run the `NwArrayConfig.py` script using the default parameters, use one of the following commands.

   For RSA NetWitness Platform versions 10.6.6.0 or later, run the following command:

   ```
   ./NwArrayConfig.py
   ```

   For RSA NetWitness Platform 11.1.0.2 and later, run the following command:

   ```
   OWB_ALLOW_NON_FIPS=1 ./NwArrayConfig.py
   ```

   Caution: When configuring RSA-provided hardware (in this case, PowerVault) , do not use any of the `NwArrayConfig` options (displayed with the `-h` argument) because they could cause the setup to fail.

   ```
   [root@P<hostname> saTools]#
   ```

   This script discovers all available PowerVaults; creates all the necessary virtual drives, logical volumes, and the directory structure; and writes the debug messages to **/opt/rsa/saTools/arrayCfg.log**. On Log Decoder and (Network) Decoder physical hosts, this script adds the database types of packetdb, metadb, and sessiondb. On Concentrator physical hosts, this script adds the data.Nwbase types of metadb and sessiondb.

   The following is an example of the output.

```
Checksum type 'md5' disabled
Creating new volume group decodersmall on /dev/sdc
Volume group "decodersmall" successfully created
Creating new volume group decoder on /dev/sdd
Volume group "decoder" successfully created
Additional enclosures available! Rerunning to add additional storage
Creating new volume group decodersmall0 on /dev/sde
Volume group "decodersmall0" successfully created
Creating new volume group decoder0 on /dev/sdf
Volume group "decoder0" successfully created

Success!: Added all available storage found. The decoder service will need to
be restarted for the extended storage to be available
```

6. Verify the results:

   a. Ensure that the script did not produce any errors by viewing the **/opt/rsa/saTools/arrayCfg.log** file:

      ```
      more /opt/rsa/saTools/arrayCfg.log
      ```

   b. Run the following command to verify the new sizes of the databases:

      ```
      df -hP | grep 'decoder\|concentrator\|archiver\|Filesystem'
      ```

      The following is an example of the results that are displayed on a Decoder:

      ```
      Filesystem                                Size  Used  Avail  Use% Mounted on
      /dev/mapper/decodersmall-decoroot          10G   33M   10G    1%   /var/netwitness/decoder
      /dev/mapper/decodersmall-decoroot          30G   33M   30G    1%   /var/netwitness/decoder/index
      /dev/mapper/decodersmall-decoroot          20T   34M   20T    1%   /var/netwitness/decoder/metadb
      /dev/mapper/decodersmall-decoroot          2.2T  34M   2.2T   1%   /var/netwitness/decoder/sessiondb
      /dev/mapper/decodersmall-decoroot          86T   35M   86T    1%   /var/netwitness/decoder/packetdb
      /dev/mapper/decodersmall-decoroot          2.2T  34M   2.2T   1%   /var/netwitness/decoder/sessiondb0
      /dev/mapper/decodersmall-decoroot          20T   34M   20T    1%   /var/netwitness/decoder/metadb0
      /dev/mapper/decodersmall-decoroot          86T   35M   86T    1%   /var/netwitness/decoder/packetdb0
      ```

   c. Ensure that there is an entry for each PowerVault added. An individual `packetdb#`, `metadb#`, and `sessiondb#` is created for each PowerVault, where `#` is the number associated with the PowerVault in the order it was added. For the first PowerVault that you add, `#` is blank and does not have a number appended. The second PowerVault that you add is appended with `0`. For example, the first PowerVault entries are `metadb`, `sessiondb`, and `packetdb`. The second PowerVault entries are `metadb0`, `sessiondb0`, and `packetdb0`.
      Verify that the size listed for `/var/netwitness/decoder/packetdb#` is what you would expect with the extended storage arrays attached. **Write this value down** so that you can verify it in the user interface.

   d. Log in to RSA NetWitness Platform and go to **Administration > Services** or **ADMIN > Services**.
      The Administration Services view is displayed.

   e. Select the appropriate service and then select  **> View > Explore**.

f. Expand the **database** folder and select the **config** folder.

g. Look at **packet.dir**, **meta.dir**,and **session.dir** as applicable to your service. Compare the output of the `df -hP` command to the database/config values shown in NetWitness Platform. Make sure that there is an entry for each PowerVault added and the size of the `db` for each service is as follows:

```
/var/netwitness/decoder/packetdb#=<n>
```

where `<n>` is similar to the size of the new storage.

For Archiver, the **packet.dir**, **meta.dir**, and **packet.dir** are found by default in the following locations:

10.6.6.0 or later: **/archiver/collections/default/database/config**

In Archiver, the `<n>` value is `0B`. For example, `/var/netwitness/archiver/database0/alldata/metadb=0B`.

Run the PowerVault Installation Scripts on a Hybrid

This procedure only applies to NetWitness Platform 11.2 and earlier.

Note: For NetWitness Platform 11.3 and later, refer to Storage Guide for RSA NetWitness Platform Version 11.3 and later for instructions on how to allocate storage for your hardware.

Caution: After configuring the PowerVault the first time for a service, there is a possibility of background RAID initialization running for at least 24 hours. During this initialization, disk I/O performance may be affected.

1. Log in as `root` and verify that the **rsa-sa-tools** package is installed by running the following command:

   ```
   rpm -qa | grep sa-tools
   ```

   Results example:

   ```
   rsa-sa-tools-11.1.0.2-1806011917.3.59001fc.el7.noarch
   ```

   If the package is not installed, contact RSA Customer Support to obtain a copy of the RPM and install it.

2. Change the directory to the rsa-sa-tools RPM base directory:

   ```
   cd /opt/rsa/saTools
   ```

3. Execute the following command:

   ```
   ./nwraidutil.pl | more
   ```

4. **Important**: Check the results and resolve ALL conditions before running the script:

   a. Make sure that there are no foreign configurations and no drives with an `Unconfigured (bad)` state on the PowerVault drives.

```
Adapter 1 (PERC H810 Adapter) enclosure 160 slots found: 12
Encl Slot State P.Fail.Count Raw Size Inquiry Data
160  0     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S5EL
160  1     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S4A4
160  2     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6RF9W
160  3     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S2PS
160  4     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S50X
160  5     (U)    0           3.638 TB SEAGATE T4000NXCLAR4000GS1CZ1Z6S4RX
160  6     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S4DP
160  7     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S64N
160  8     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6RFD1
160  9     (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S4AY
160  10    (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S4ZV
160  11    (U)    0           3.638 TB SEAGATE ST4000NXCLAR4000GS1CZ1Z6S66M

WARNING: Physical disk problems have been found.
```

   If a drive is in a foreign state, it shows `F` in the `State` column. If a drive is in a bad state, it shows `B` in the `State` column. A PowerVault that has never been used before should show `U` for unconfigured.

   b. Ensure that the number of drives listed in the results equals 12.
   The following example lines from the results show the correct number of drives:

```
Adapter 1 (PERCH810 Adapter) enclosures found: 1
Adapter 1 (PERCH810 Adapter) enclosure 160 slots found: 12
```

   The following example lines from the results show that there is a bad drive:

```
Adapter 1 (PERCH810 Adapter) enclosures found: 1
Adapter 1 (PERCH810 Adapter) enclosure 121 slots found: 11
WARNING: Physical disk problems have been found.
```

   It is also important that all drives appear numerically in the `nwraidutil` output. It is possible that a bad drive may not show up at all in the output. You will see a jump in the Slot count. For example, if the enclosure has 12 drives, but you only see slots 0 - 11, it means that slot 12 is bad and cannot be seen by the RAID controller. Contact RSA Customer Support before running the script because an RMA may be necessary.

5. To run the `NwArrayConfig.py` script, enter one of the following commands.
   For RSA NetWitness Platform versions 10.6.6.0 or later, run the following command:

```
./NwArrayConfig.py --drives <N>
```

For RSA NetWitness Platform versions 11.1.0.2 and later, run the following command:

```
OWB_ALLOW_NON_FIPS=1 ./NwArrayConfig.py --drives <N>
```

where `<N>` is the number of drives to be assigned to the Concentrator service. By default `<N>` is `3`. If this is a Log Decoder Hybrid for logs, RSA recommends using a value of `7` to more efficiently allocate the storage between the two services.

```
[root@P<hostname> saTools]#
```

This script discovers all available PowerVaults; creates all the necessary virtual drives, logical volumes, and the directory structure; and writes the debug messages to **/opt/rsa/saTools/arrayCfg.log**.

6. Verify the results:

   a. Ensure that the script did not produce any errors by viewing the **/opt/rsa/saTools/arrayCfg.log** file:

      ```
      more /opt/rsa/saTools/arrayCfg.log
      ```

   b. Run the following command to verify the new sizes of the databases:

      ```
      df -hP | grep 'decoder\|concentrator\|Filesystem'
      ```

      The following is an example of the results that are displayed for a Hybrid Network Decoder:

      ```
      Filesystem                          Size Used Avail Use% Mounted on
      /dev/mapper/concentrator-root       30G  47M  30G   1%   /var/netwitness/concentrator
      /dev/mapper/index-index             929G 9.6G 919G  2%   /var/netwitness/concentrator/index
      /dev/mapper/concentrator-sessiondb  2.0T 18G  1.9T  1%   /var/netwitness/concentrator/sessiondb
      /dev/mapper/concentrator-metadb     18T  483G 17T   3%   /var/netwitness/concentrator/metadb
      /dev/mapper/decodersmall-decoroot   10G  62M  10G   1%   /var/netwitness/decoder
      /dev/mapper/decodersmall-index      30G  33M  30G   1%   /var/netwitness/decoder/index
      /dev/mapper/decodersmall-metadb     6.6T 107G 6.5T  2%   /var/netwitness/decoder/metadb
      /dev/mapper/decodersmall-sessiondb  746G 4.1G 742G  1%   /var/netwitness/decoder/sessiondb
      /dev/mapper/decoder-packetdb        95T  3.9T 91T   5%   /var/netwitness/decoder/packetdb
      /dev/mapper/decodersmall0-sessiondb 746G 4.1G 742G  1%   /var/netwitness/decoder/sessiondb0
      /dev/mapper/decodersmall0-metadb    6.6T 105G 6.5T  2%   /var/netwitness/decoder/metadb0
      /dev/mapper/decoder0-packetdb       95T  3.8T 91T   5%   /var/netwitness/decoder/packetdb0
      ```

   c. Ensure that there is an entry for the added PowerVault. An individual `packetdb0`, `metadb0`, and `sessiondb0` is created for the added PowerVault. Verify that the size listed for `/var/netwitness/decoder/packetdb0` is what you would expect with the extended storage arrays attached. **Write this value down** so that you can verify it in the NetWitness Platform Interface.

   d. Log in to RSA NetWitness Platform and go to **Administration > Services** or **ADMIN > Services**.
      The Administration Services view is displayed.

e. Select the Decoder or Log Decoder and then select  > **View** > **Explore**.

f. Expand the **database** folder and select the **config** folder.

g. Look at the **packet.dir** node and expand it fully. Ensure there is an entry for the added PowerVault and the size of the packetdb is as follows:

`/var/netwitness/decoder/packetdb#=<n>`

where `<n>` is similar to the size of the new storage.

h. Follow steps 6 e-g and verify the **meta.dir** node on the Concentrator.

Restart the Service

You must restart the Decoder, Log Decoder, Concentrator, or Archiver service so that the service can recognize the new volumes.

Note: If this physical host has a Log Decoder or (Network) Decoder service which is currently capturing, it is a best practice to stop capture before restarting these services (to ensure database writes are completed). If this physical host has a Concentrator or Archiver service which is aggregating, it is recommended to stop aggregation before restarting these services (to allow the indexes in memory to be saved to disk).

1. To restart the service, run the following commands using the appropriate service name for your service.

   For RSA NetWitness Platform versions 10.6.6.0 or later:

   `stop <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder>` (Wait until this completes.)

   `start <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder>`

   For RSA NetWitness Platform 11.1.0.2 and later:

   `service <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder> stop` (Wait until this completes.)

   `service <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder> start`

2. Make sure that the service comes back online and begins capture.

   a. In the NetWitness Platform Services view (**Administration** > **Services** or **ADMIN** > **Services**), verify that the service status is green.

   b. Select the service and then select  > **View** > **System**.

   c. If you see the **Start Capture** or **Start Aggregation** icon in the toolbar, click the icon to start it.

Task 4 - (Conditional) License Host Services

License host services (if not already licensed). Refer to the *Licensing Guide* available through the application Help option and RSA Link at https://community.rsa.com/docs/DOC-40370 for instructions on licensing RSA hosts.

Install PowerVault with Encryption on a Series 6 R640 Host

This topic describes how to install a PowerVault with Self Encrypted Drives (SED) on an RSA Series 6 Archiver, Concentrator, Log Decoder, or (Network) Decoder (R640) host with encrypted PowerVault external storage. Currently, encrypted PowerVault external storage is:

- Not Supported for Series 5 Hosts
- Not Supported for Series 6 Hybrid (R740) Host

Enclosure Options for Encryption

Host	SKU	Description	Specification
Log Decoder Network) Decoder Archiver	NW-PVHDE96	NetWitness PowerVault High Density 96TB SED (Self Encrypted Drives)	DellStorage MD1400, 12HDs 3.5", Rackmount, 2Us, 12x8TB NL-SAS SED
Concentrator	NW-PVHPE78	NetWitness PowerVault High Performance 78TB SED (Self Encrypted Drives)	DellStorage MD1400, 12HDs 3.5", Rackmount, 2Us, 9x8TB NLSAS SED, 3x1.92TB SSD SED

Minimum NetWitness Platform Software Versions

For RSA NetWitness Platform Software 11.x, the minimum version is 11.2.0.0-1808301802.5.941817f.

Caution: If you are adding a previously used PowerVault and would like to preserve the data, DO NOT follow the instructions in this guide. Contact RSA Customer Support. Running the script on a previously used PowerVault could erase any existing data.

Attach and Configure New PowerVault with Encryption

This table summarizes the tasks you must complete to attach and configure a PowerVault with Encryption. The tasks are shown in detail in the topics following immediately the table.

NetWitness Platform 11.3 and Later

Deployment Scenario	Tasks
Concentrator, Archiver, Log Decoder or (Network) Decoder to Multiple PowerVaults	1. Connect the PowerVaults to the host before powering on the host as described in Task 1 - Connect PowerVaults to an Archiver, Concentrator, Log Decoder, or (Network) Decoder Host . 2. Follow the instructions in the *Storage Guide for RSA NetWitness Platform Version 11.3 and Later* to allocate storage for your hardware.

NetWitness Platform 11.2 and Earlier

Deployment Scenario	Tasks
Concentrator, Archiver, Log Decoder or (Network) Decoder to Multiple PowerVaults	1. Connect the PowerVaults to the host before powering on the host as described in Task 1 - Connect PowerVaults to an Archiver, Concentrator, Log Decoder, or (Network) Decoder Host . 2. Run the `NwArrayConfig.py` script as described in Task 2 - Run the PowerVault Installation Scripts on the Archiver, Concentrator, Log Decoder, or (Network) Decoder . 3. Restart the service as described in Task 3 - Restart the Service. 4. (Conditional) License host services (if not already licensed).

Task 1 - Connect PowerVaults to an Archiver, Concentrator, Log Decoder, or (Network) Decoder Host

If you are encrypting the PowerVaults, you can connect one to four PowerVaults to an RSA Series 6 Archiver, Concentrator, Log Decoder, or (Network) Decoder host.

Note: If you are attaching more then 3 PowerVaults to a single port you may receive the following Error message:
`The total number of enclosures connected to connector 00, has exceeded the maximum allowable limit of 3 enclosures. Please remove the extra enclosure and then restart your system.` This error was caused by the PERC profile settings. From the factory, the PERC profile is set to PD64. Setting the profile to PD240 corrects the issue. Profile PD240 is labeled as "default", however, this is not set from the factory.
To set the PD Profile:
1. Enter the DELL PERC 10 Configuration Utility. See Navigating to Dell PERC 10 configuration utility.
2. Click Main Menu > Controller Management > Advanced Controller Properties > Profile Management. Current profile and profile properties are displayed.
3. Change profile using the Choose Profile option.
4. Select Set Profile. Click Reboot.

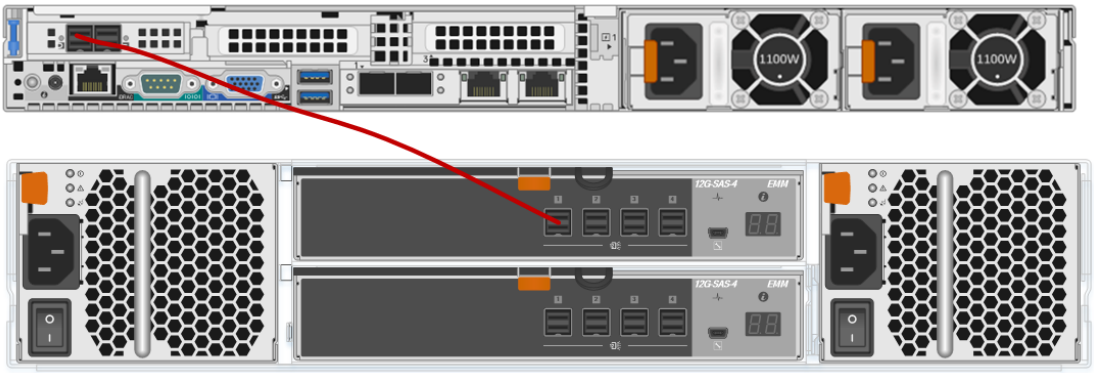
The PowerVault comes with two SAS cables. You only need one cable to connect the PowerVault to the host. For an RSA Series 6 host, use a cable with the mini-mini SAS connector.

1. Ensure that the host is powered off.
2. Connect one end of the SAS cable to the **left** port of the RAID controller on the back of the Archiver, Concentrator, Log Decoder, or (Network) Decoder, host.

3. Connect the other end of the SAS cable to the PowerVault unit.

   When you connect the first PowerVault to the RAID controller, make sure that you insert the cable into the **Primary SAS port** on the PowerVault as shown in the following figure.

   The following figure shows an RSA Series 6 (R640) host (port 0) connected to a PowerVault (port 1 in top row of ports) using a mini-to-mini SAS cable.

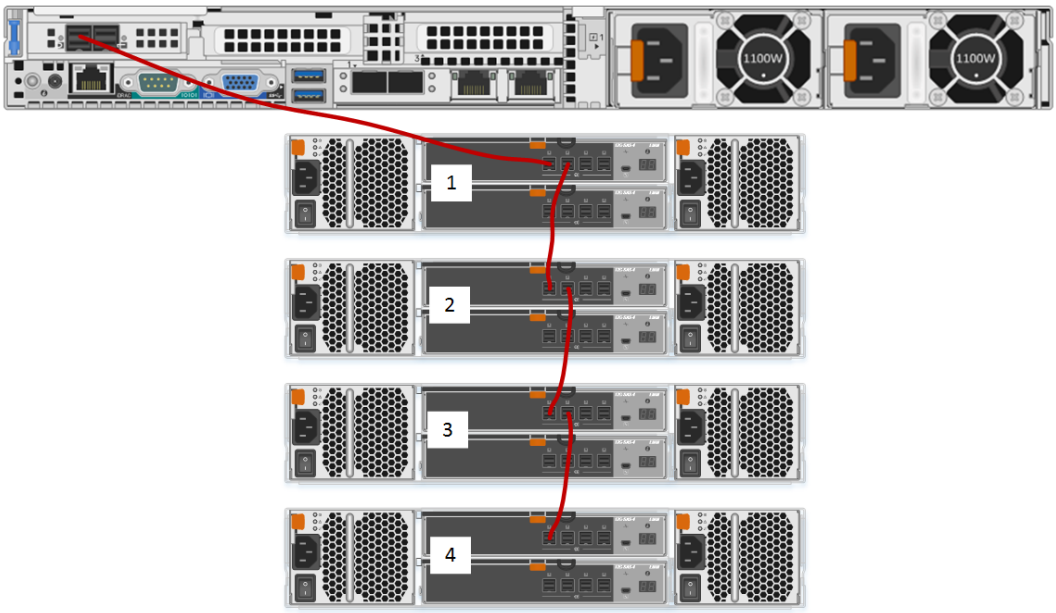


4. For the **Series 6 - R640** host, you can connect two to four PowerVaults to the RAID controller if you are encrypting the PowerVaults.

   a. Connect the **Primary** Port 1 of the first PowerVault to Port 0 of the Decoder RAID controller.

   b. Daisy chain up to three additional PowerVaults to the first PowerVault.

   The following figure shows you how to connect multiple PowerVaults to an RSA Series 6 hosts. You can attach up to four PowerVaults. You connect the first PowerVault to Port 0 of the Series 6 - R640 host and daisy-chain PowerVaults two, three, and four to the first PowerVault.



5. When you finish the cabling, ensure that the PowerVault is powered on and then power on the host.

Task 2 - Run the PowerVault Installation Scripts on the Archiver, Concentrator, Log Decoder, or (Network) Decoder

This procedure only applies to NetWitness Platform 11.2 and earlier.

Note: For NetWitness Platform 11.3 and later, refer to Storage Guide for RSA NetWitness Platform Version 11.3 and later for instructions on how to allocate storage for your hardware.

The session commands and output in this procedure use the (Network) Decoder as an example of the host configuration for a PowerVault with encryption.

Caution: After configuring the PowerVault the first time for a service, there is a possibility of background RAID initialization running for at least 24 hours. During this initialization, disk I/O performance may be affected.

Note: You must use a PowerVault with Self Encrypted Drives (SED).

1. Log in as `root` and verify that the **rsa-sa-tools** package is installed by running the following command:

   ```
   rpm -qa | grep rsa sa-tools
   ```

   Results example:

   ```
   rsa-sa-tools-11.2.0.0-1808301802.5.941817f.noarch
   ```

   If the package is not installed, contact RSA Customer Support to obtain a copy of the RPM and install it.

2. Change the directory to the rsa-sa-tools RPM base directory:

   ```
   cd /opt/rsa/saTools
   ```

3. Execute the following command:

   ```
   ./nwraidutil.pl
   ```

4. **Important**: Check the results and resolve ALL conditions before running the script.
   The following example illustrates how the results from the `./nwraidutil.pl` command should appear if there are no conditions.

```
PV         VG              Fmt  Attr PSize    PFree
/dev/sda2  netwitness_vg00 lvm2 a--  <930.00g    0
/dev/sdb1  netwitness_vg00 lvm2 a--    <1.82t    0
/dev/sdc   decodersmall    lvm2 a--    14.55t    0
/dev/sdd   decoder         lvm2 a--    58.21t    0
/dev/sde   decodersmall0   lvm2 a--    14.55t    0
/dev/sdf   decoder0        lvm2 a--    58.21t    0
/dev/sdg   decodersmall1   lvm2 a--    14.55t    0
/dev/sdh   decoder1        lvm2 a--    58.21t    0
/dev/sdi   decodersmall2   lvm2 a--    14.55t    0
/dev/sdj   decoder2        lvm2 a--    58.21t    0

VG             #PV #LV #SN Attr   VSize  VFree
decoder          1   1   0 wz--n- 58.21t    0
decoder0         1   1   0 wz--n- 58.21t    0
decoder1         1   1   0 wz--n- 58.21t    0
decoder2         1   1   0 wz--n- 58.21t    0
decodersmall     1   4   0 wz--n- 14.55t    0
decodersmall0    1   2   0 wz--n- 14.55t    0
decodersmall1    1   2   0 wz--n- 14.55t    0
decodersmall2    1   2   0 wz--n- 14.55t    0
netwitness_vg00  2   5   0 wz--n- <2.73t    0
```

5. To run the `NwArrayConfig.py` script using the default parameters, use one of the following commands.

   Caution: You must back up the Passphrase and retain this backup in a secure location. If your PERC adapter hardware fails, you cannot recover any data on encrypted disks without the Passphrase.

   For RSA NetWitness Platform versions 11.2.0.0-1808301802.5.941817f or later, run the following command:

   ```
   ./NwArrayConfig.py
   ```

   ```
   [root@P<hostname> saTools]#
   ```

   This script discovers all available PowerVaults; creates all the necessary virtual drives, logical volumes, and the directory structure; and writes the debug messages to **/opt/rsa/saTools/arrayCfg.log**. On (Network) Decoder hosts, this script adds the database types of packetdb, metadb, and sessiondb. On Concentrator hosts, this script adds the data.Nwbase types of metadb and sessiondb.

The following output and prompt is displayed.

```
Checksum type 'md5' disabled

The enclosure DELL MD1400 ID: 72 supports encryption, enable encryption for
this device y/n?
```

6. Type `y` and press Enter for encryption.
   The following output and prompt is displayed.
   ```
   This PERC adapter does not have a security key set.
   Enter a Passphrase for the encryption key between 8 and 32 characters
   in length,
   with a mix of lower, upper and non-alphanumeric characters?
   ```
7. Type the `<passphrase>`, for example `nFreDaW$792`, and press Enter.
   The following prompt is displayed.
   ```
   Please re-enter passphrase again for validation?
   ```
8. Type the `<passphrase>` again, for example `nFreDaW$792`, and press Enter.
   The following output and prompt is displayed.
   ```
   Enter an optional ID string for the security key less than 256
   characters or press Enter for none?
   ```
9. Press Enter if you do not want an optional ID string.
   The following output and prompt is displayed.
   ```
   ********************************************************************
   ******************
   The Passphrase for the security key *Must* be securely backed up in
   case of PERC adapter
   hardware failure, should this occur, data on all encrypted disks will
   be unrecoverable.
   Current Passphrase ('Quoted'): '<passphrase>'
   Entered KeyID ('Quoted'): ''
   ********************************************************************
   ******************
   Enter y to confirm that you backed up the Passphrase or press Enter
   to cancel?
   ```

10. Type `y` and press Enter to confirm that you backed up the Passphrase.

    Caution: You must back up the Passphrase and retain this backup in a secure location. If your PERC adapter hardware fails, you cannot recover any data on encrypted disks without the Passphrase.

    The following output and prompt is displayed.

```
Creating new volume group decodersmall on /dev/sde
  Volume group "decodersmall" successfully created
Creating new volume group decoder on /dev/sde
  Volume group "decoder" successfully created
Additional enclosures available! Rerunning to add additional storage
The enclosure DEL MD1400 ID: 73 supports encryption, enable
encryption for this device y/n?
```

11. Type `y` and press Enter to enable encryption for this device.

    The following output and prompt is displayed.

```
Creating new volume group decodersmall0 on /dev/sde
  Volume group "decodersmall0" successfully created
Creating new volume group decoder0 on /dev/sde
  Volume group "decoder0" successfully created
Additional enclosures available! Rerunning to add additional storage
The enclosure DEL MD1400 ID: 73 supports encryption, enable
encryption for this device y/n?
```

12. Type `y` and press Enter to enable encryption for this device.

    The following output and prompt is displayed.

```
Creating new volume group decodersmall1 on /dev/sde
  Volume group "decodersmall1" successfully created
Creating new volume group decoder1 on /dev/sde
  Volume group "decoder1" successfully created
Additional enclosures available! Rerunning to add additional storage
The enclosure DEL MD1400 ID: 73 supports encryption, enable
encryption for this device y/n?
```

13. Type `y` and press Enter to enable encryption for this device.

```
Creating new volume group decodersmall2 on /dev/sde
  Volume group "decodersmall2" successfully created
Creating new volume group decoder2 on /dev/sde
  Volume group "decoder2" successfully created
Additional enclosures available! Rerunning to add additional storage
The enclosure DEL MD1400 ID: 73 supports encryption, enable
encryption for this device y/n?
Success!: Added all available storage found. The decoder service will
need to be restarted for the extended storage to be available.
```

14. Verify the results:

    a. Make sure that the script did not produce any errors by viewing the `/opt/rsa/saTools/arrayCfg.log` file:

    ```
    more /opt/rsa/saTools/arrayCfg.log
    ```

    b. Run the following command to verify the new sizes of the databases:

    ```
    df -hP | grep 'decoder\|concentrator\|archiver\logdecoder|Filesystem'
    ```

    The following is an example of the results that are displayed for a Decoder:

```
Filesystem                          Size  Used Avail Use% Mounted on
/dev/mapper/netwitness_vg00-root     30G  2.5G   28G   9% /
devtmpfs                             63G     0   63G   0% /dev
tmpfs                                63G   12K   63G   1% /dev/shm
tmpfs                                63G  9.7M   63G   1% /run
tmpfs                                63G     0   63G   0% /sys/fs/cgroup
/dev/sda1                          1019M   93M  927M  10% /boot
/dev/mapper/netwitness_vg00-varlog   10G  159M  9.9G   2% /var/log
/dev/mapper/netwitness_vg00-nwhome  2.7T  361M  2.7T   1% /var/netwitness
/dev/mapper/netwitness_vg00-usrhome  10G   33M   10G   1% /home
tmpfs                                13G     0   13G   0% /run/user/0
/dev/mapper/decodersmall-decoroot    10G   34M   10G   1% /var/netwitness/decoder
/dev/mapper/decodersmall-index       30G   33M   30G   1% /var/netwitness/decoder/index
/dev/mapper/decodersmall-metadb      14T   34M   14T   1% /var/netwitness/decoder/metadb
/dev/mapper/decodersmall-sessiondb  1.5T   34M  1.5T   1% /var/netwitness/decoder/sessiondb
/dev/mapper/decoder-packetdb         59T   34M   59T   1% /var/netwitness/decoder/packetdb
/dev/mapper/decodersmall0-sessiondb 1.5T   34M  1.5T   1% /var/netwitness/decoder/sessiondb0
/dev/mapper/decodersmall0-metadb     14T   34M   14T   1% /var/netwitness/decoder/metadb0
/dev/mapper/decoder0-packetdb        59T   34M   59T   1% /var/netwitness/decoder/packetdb0
/dev/mapper/decodersmall1-sessiondb 1.5T   34M  1.5T   1% /var/netwitness/decoder/sessiondb1
/dev/mapper/decodersmall1-metadb     14T   34M   14T   1% /var/netwitness/decoder/metadb1
/dev/mapper/decoder1-packetdb        59T   34M   59T   1% /var/netwitness/decoder/packetdb1
/dev/mapper/decodersmall2-sessiondb 1.5T   34M  1.5T   1% /var/netwitness/decoder/sessiondb2
/dev/mapper/decodersmall2-metadb     14T   34M   14T   1% /var/netwitness/decoder/metadb2
/dev/mapper/decoder2-packetdb        59T   34M   59T   1% /var/netwitness/decod
```

c. Make sure that there is an entry for each PowerVault added. An individual `packetdb#`, `metadb#`, and `sessiondb#` is created for each PowerVault, where `#` is the number associated with the PowerVault in the order it was added. For the first PowerVault that you add, `#` is blank and does not have a number appended. The second PowerVault that you add is appended with `0`. For example, the first PowerVault entries are `metadb`, `sessiondb`, and `packetdb`. The second PowerVault entries are `metadb0`, `sessiondb0`, and `packetdb0`.
Verify that the size listed for `/var/netwitness/decoder/packetdb#` is what you would expect with the extended storage arrays attached. **Write this value down** so that you can verify it in the user interface.

d. Log in to RSA NetWitness Platform and go to **Administration > Services** or **ADMIN > Services**.
The Administration Services view is displayed.

e. Select the appropriate service and then select  **> View > Explore**.

f. Expand the **database** folder and select the **config** folder.

g. Look at **packet.dir**, **meta.dir**,and **session.dir** as applicable to your service. Compare the output of the `df - hP` command to the database/config values shown in NetWitness Platform. Make sure that there is an entry for each PowerVault added and the size of the `db` for each service is as follows:

```
/var/netwitness/decoder/packetdb#=<n>
```

where `<n>` is similar to the size of the new storage.

Task 3 - Restart the Service

You must restart the Archiver, Concentrator, or (Network) Decoder service so that the service can recognize the new volumes.

Note: If this host has a (Network) Decoder service which is currently capturing, it is a best practice to stop capture before restarting these services (to ensure database writes are completed). If this host has a Concentrator or Archiver service which is aggregating, it is recommended to stop aggregation before restarting these services (to allow the indexes in memory to be saved to disk).

1. To restart the service, run the following commands using the appropriate service name for your service.
For RSA NetWitness Platform 11.2.0.0-1808301802.5.941817f and later:

```
service <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder stop
```

(Wait until this completes.)

```
service <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder start
```

2. Make sure that the service comes back online and begins capture.
   a. In the NetWitness Platform Services view (**Administration > Services** or **ADMIN > Services**), verify that the service status is green.
   b. Select the service and then select  **> View > System**.
   c. If you see the **Start Capture** or **Start Aggregation** icon in the toolbar, click the icon to start it.

Task 4 - (Conditional) License Host Services

License host services (if not already licensed). Refer to the *Licensing Guide* available through the application Help option and RSA Link at https://community.rsa.com/docs/DOC-40370 for instructions on licensing RSA hosts.

Install PowerVaults and 15-Drive DACs on a Series 5 or Series 6 Host (Mixed Mode)

This topic describes how to install PowerVault and 15-Drive DAC external storage devices on an RSA:

- Series 5 Decoder, Log Decoder, and Archiver host. The Series 5 host must have an additional H830 PERC Card installed.
- Series 6 Decoder, Log Decoder, and Archiver host. The Series 6 host must have an additional H840 PERC Card installed.

Contact your RSA sales rep for information on how to purchase PERC Cards.

Note: For information on how to install the PERC Cards, see the *RSA NetWitness Platform PCI Expansion Card Installation Guide*.

Minimum NetWitness Platform Software Versions

For RSA NetWitness Platform Software 11.x, the minimum version is 11.2.0.0-1808301802.5.941817f.

For RSA NetWitness Platform Software 10.6.x, the minimum version is 10.6.6.1-199.5.47209f4.

Caution: If you are adding a previously used external storage device and would like to preserve the data, DO NOT follow the instructions in this guide. Contact RSA Customer Support. Running the script on a previously used external storage device could erase any existing data.

Introduction

The following table contains the summarized installation instructions for different deployments, and detailed procedures are in individual subsections. The deployment scenario is two PowerVaults and two 15-Drive DACs in a (Network) Decoder, Log Decoder, and Archiver deployment.

High-Level Procedure

This table summarizes the two PowerVaults and two 15-Drive DAC external storage deployment scenario.

NetWitness Platform 11.3 and Later

Deployment Scenario	Tasks
Archiver, Decoder, and Log Decoder (two Power-Vaults and two 15-Drive DACs)	1. Connect the PowerVaults and 15-Drive DACs to the host before powering on the host as described in Connect External Storage Devices to an Archiver, Decoder, or Log Decoder Host. 2. Follow the instructions in the *Storage Guide for RSA NetWitness Platform Version 11.3 and Later* to allocate storage for your hardware.

NetWitness Platform 11.2 and Earlier

Deployment Scen-ario	Tasks
Archiver, Decoder, and Log Decoder (two PowerVaults and two 15-Drive DACs)	1. Connect the PowerVaults and 15-Drive DACs to the host before powering on the host as described in Connect External Storage Devices to an Archiver, Decoder, or Log Decoder Host. 2. Run the `NwArrayConfig.py` script as described in Run the External Storage Installation Scripts on the Decoder, Log Decoder, or Archiver. 3. Restart the service as described in Restart the Service. 4. License the host's services (if not already licensed). Refer to the *Licensing Guide* available through the application Help option and RSA Link at https://community.rsa.com/docs/DOC-40370 for instructions on licensing RSA hosts.

Connect External Storage Devices to RSA Series 5 or Series 6 Archiver, Decoder, or Log Decoder Hosts

You can connect one to four PowerVaults and one to four 15-Drive DACs to RSA Series 5 or Series 6 Archiver, Decoder, or Log Decoder hosts.

Note: A PowerVault Cable has a **Mini-SAS** square connector at both ends of the cable. You use this type of cable for both the initial connection to the host and the daisy chain from PowerVault to PowerVault. The DAC requires two types of cables (see DAC Cables).
The first DAC connected to the host requires a cable with a square **Mini-SAS** connector at one end and a rectangular **Mini-SAS HD** connector at the other end. You attach the square **Mini-SAS**connector to the host and attach the rectangular **Mini-SAS HD**connector to the first DAC.
You daisy chain a DAC to another DAC with cables that have rectangular **Mini-SAS HD** connectors at both ends.

Connect External Storage Devices to Series 5 (R630)

1. Ensure that the host is powered off.
2. Connect one end of the SAS cables to the ports of the RAID controller on the back of the Archiver, Decoder, or Log Decoder host.

3. Connect the other end of the SAS cables to the External Storage units. See

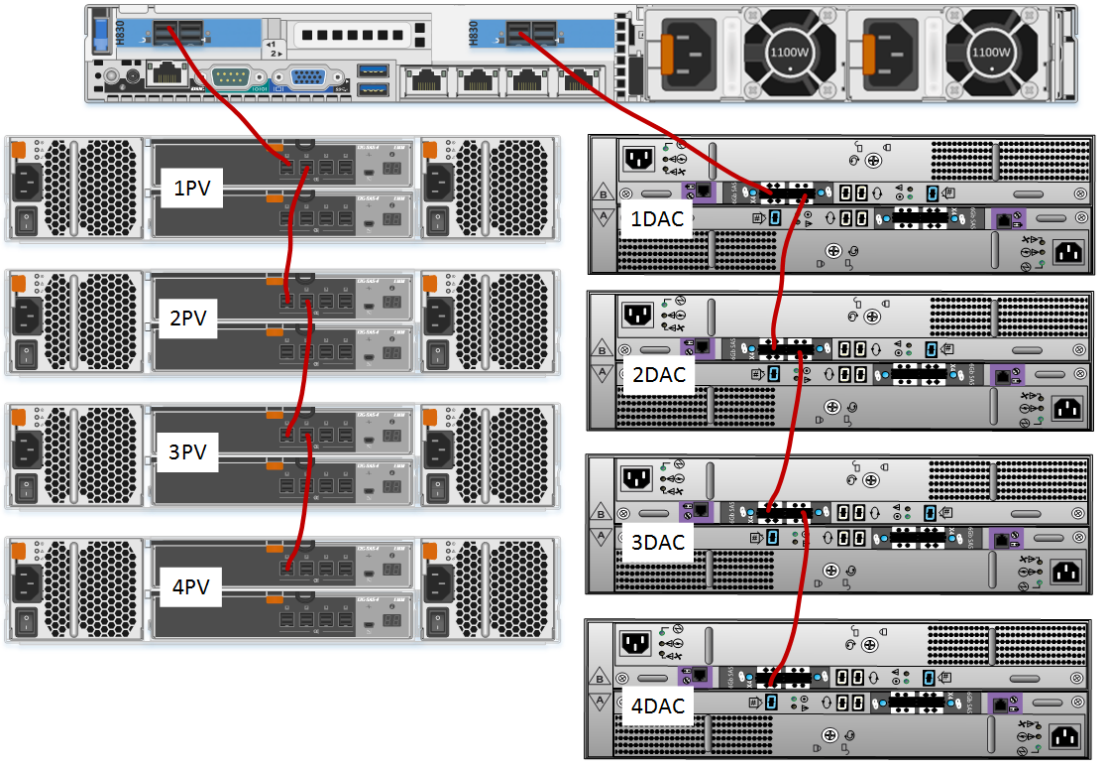
   a. Connect the **Primary** Port 1 of the first PowerVault to Port 0 of the PERC Card on the left using a cable with square **Mini-SAS (Codename SFF-8088)** to square **Mini-SAS (Codename SFF-8088)** connectors.

   b. Daisy chain up to three additional PowerVaults to the first PowerVault using cables with square **Mini-SAS (Codename SFF-8088)** to square **Mini-SAS (Codename SFF-8088)** connectors.

   c. Connect the **Primary** Port 1 of the first 15-Drive DAC to Port 0 of the PERC Card on the right using a cable with rectangular **Mini-SAS HD (Codename SFF-8614)** to square **Mini-SAS (Codename SFF-8088** connectors.

   d. Daisy chain up to three additional 15-Drive DACs to the first 15-Drive DAC using cables with rectangular **Mini-SAS HD (Codename SFF-8614)** to rectangular **Mini-SAS HD (Codename SFF-8614)** connectors.

   The following figure shows an RSA Series 5 (R630) host connected to four PowerVaults and four 15-Drive DACs.



4. When you finish the cabling, make sure that the external storage devices are powered on and then power on the host.
   - Make sure that you have a live connection to PowerVaults.
     - Make sure that the green light next to the Port 0 of the left PERC Card on the RSA Series 5 host is green.
     - Make sure that the green lights next to the PowerVault ports are green.
   - Make sure that you have a live connection to the 15-Drive DACs.
     - Make sure that the green light next to the Port 0 of the right Card on the RSA Series 5 is green.
     - Make sure that the blue lights next to the 15-Drive DACs are blue.

Connect External Storage Devices to Series 6 (R640)

1. Ensure that the host is powered off.
2. Connect one end of the SAS cables to the ports of the RAID controller on the back of the Archiver, Decoder, or Log Decoder host.

3. Connect the other end of the SAS cables to the External Storage units.

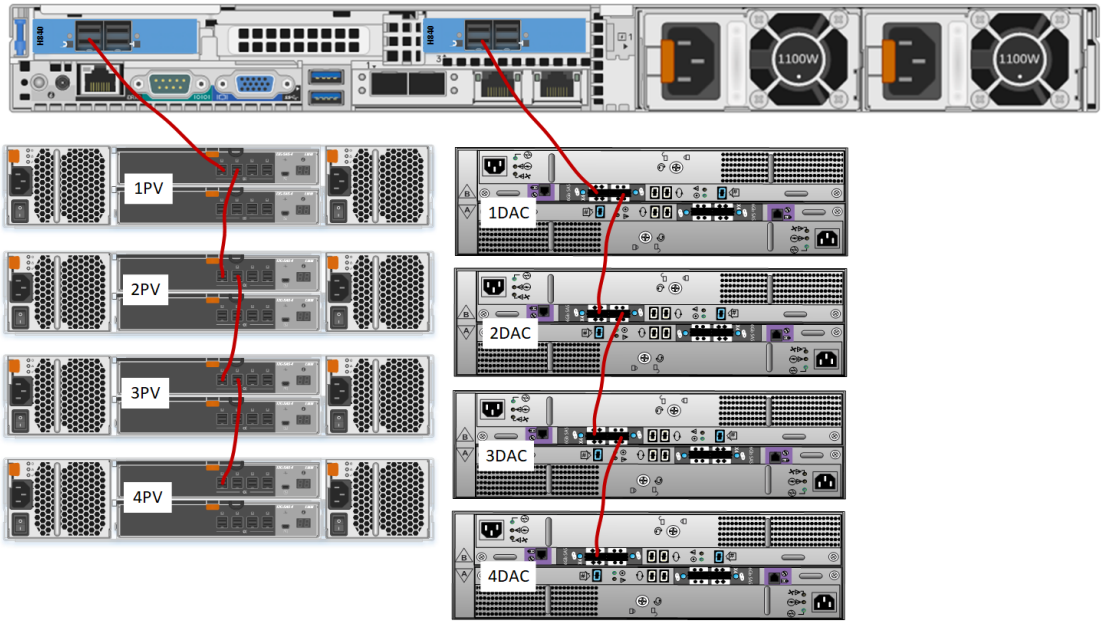
   a. Connect the **Primary** Port 1 of the first PowerVault to Port 0 of the PERC Card on the left using a cable with square **Mini-SAS Codename SFF-8088)** to square **Mini-SAS (Codename SFF-8088)** connectors.

   b. Daisy chain up to three additional PowerVaults to the first PowerVault using cables with square **Mini-SAS (Codename SFF-8088)** to square **Mini-SAS (Codename SFF-8088)** connectors.

   c. Connect the **Primary** Port 1 of the first 15-Drive DAC to Port 0 of the PERC Card on the right using a cable with rectangular **Mini-SAS HD (Codename SFF-8614)** to square **Mini-SAS(Codename SFF-8088)** connectors.

   d. Daisy chain up to three additional 15-Drive DACs to the first 15-Drive DAC using cables with rectangular **Mini-SAS HD (Codename SFF-8614)** to rectangular **Mini-SAS HD (Codename SFF-8614)** connectors.

   The following figure shows an RSA Series 6 (R640) host connected to four PowerVaults and two 15-Drive DACs.



4. When you finish the cabling, make sure that the external storage devices are powered on and then power on the host.

   - Make sure that you have a live connection to PowerVaults.
     - Make sure that the green light next to the Port 0 of the left PERC Card on the RSA Series 6 host is green.

- Make sure that the green lights next to the PowerVault ports are green.

- Make sure that you have a live connection to the 15-Drive DACs.
  - Make sure that the green light next to the Port 0 of the right Card on the RSA Series 6 host is green.
  - Make sure that the blue lights next to the 15-Drive DACs are blue.

Run the External Storage Script on the Decoder, Log Decoder, or Archiver

This procedure only applies to NetWitness Platform 11.2 and earlier.

Note: For NetWitness Platform 11.3 and later, refer to Storage Guide for RSA NetWitness Platform Version 11.3 and later for instructions on how to allocate storage for your hardware.

Caution: 1.) After configuring the PowerVault the first time for a service, there is a possibility of background RAID initialization running for at least 24 hours. During this initialization, disk I/O performance may be affected. 2.)

1. Log in as `root` and verify that the **rsa-sa-tools** package is installed by running the following command:

   ```
   rpm -qa | grep rsa sa-tools
   ```

   Results example for 11.2.0.0-1808301802.5.941817f

   ```
   rsa-sa-tools-11.2.0.0-1808301802.5.941817f.el7.noarch
   ```

   Results example for 10.6.6.1-199.5.47209f4

   ```
   rsa-sa-tools-10.6.6.1-199.5.47209f4.el6.noarch
   ```

   If the package is not installed, contact RSA Customer Support to obtain a copy of the RPM and install it.

2. Change the directory to the rsa-sa-tools RPM base directory:

   ```
   cd /opt/rsa/saTools
   ```

3. Execute the following command for:

   - For 11.2.0.0-1808301802.5.941817f

     ```
     ./nwraidutil.pl
     ```

   - For 10.6.6.1-199.5.47209f4

     ```
     ./nwraidutil.pl
     ```

4. **Important**: Check the results and resolve ALL conditions before running the script. The following is an example of the output from the `nwraidutil.pl` command.

```
Ensure that there are no foreign configurations and no drives with an
Unconfigured(bad) state on the PowerVault drives.
Adapters found: 3
Adapter 0 (PERC H730P Mini) enclosures found: 1
Adapter 0 (PERC H730P Mini) enclosure 32 slots found: 4
Encl Slot State P.Fail.Count Raw Size   Inquiry Data
32   0    (O)   0            931.512 GB SEAGATE ST1000NX0453 NS02W4706A31
32   1    (O)   0            931.512 GB SEAGATE ST1000NX0453 NS02W4706SVS
32   2    (O)   0            1.819 TB  SEAGATE ST2000NX0463 NT31W460HWX6
32   3    (O)   0            1.819 TB  SEAGATE ST2000NX0463 NT31W460HWH2
Adapter 1 (PERC H830 Adapter) enclosures found: 4
Adapter 1 (PERC H830 Adapter) enclosure 0 slots found: 12
Encl Slot State P.Fail.Count Raw Size  Inquiry Data
0    0    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGW5Z8H
0    0    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6JKD
0    2    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYKTKH
0    3    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYKYUH
0    4    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGTLH2H
0    5    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYVWJH
0    6    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYAWRH
0    7    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGZ2D1H
0    8    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6E4D
0    9    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6END
0    10   (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYZ14H
0    11    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGZ2GXH
Adapter 1 (PERC H830 Adapter) enclosure 13 slots found: 12


Encl Slot State P.Fail.Count Raw Size  Inquiry Data
13   0    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6G3D
13   1    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6J6D
13   2    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6EWD
13   3    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6EBD
13   4    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGX0P9D
13   5    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6JHD
13   6    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6DYD
13   7    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6E3D
13   8    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYBY1H
13   9    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGX0S1D
13   10   (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6DTD
13   11   (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYJMPH
Adapter 1 (PERC H830 Adapter) enclosure 82 slots found: 12

Encl Slot State P.Fail.Count Raw Size Inquiry Data
82   0    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYL6EH
82   1    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYGGHH
82   2    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGXW1VH
82   3    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGULG8H
82   4    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGXAZ8H
82   5    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGV41YH
82   6    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6HBD
82   7    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGUK0AH
82   8    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6GAD
```

```
82   9    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYKPBH
82   10   (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6JND
82   11   (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGXXDRH
Adapter 1 (PERC H830 Adapter) enclosure 93 slots found: 12
Encl Slot State P.Fail.Count Raw Size Inquiry Data
93   0    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYBKVH
93   1    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYJNJH
93   2    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGUMPHH
93   3    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6GXD
93   4    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGY197H
93   5    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYL3JH
93   6    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6J0D
93   7    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6ELD
93   8    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGT6DXD
93   9    (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGY7N4H
93   10   (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGYGDXH
93   11   (O)   0            10.692 TB HGST HUH721212AL5200 NS018DGUG7LH
Adapter 2 (PERC H830 Adapter) enclosures found: 4
Adapter 2 (PERC H830 Adapter) enclosure 41 slots found: 15
Encl Slot State P.Fail.Count Raw Size Inquiry Data
41   0    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KETGYB
41   1    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEKX6B
41   2    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE2WKB
41   3    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE2X8B
41   4    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEAA7B
41   5    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE4W0B
41   5    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KDUAZB
41   7    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEGW7B
41   8    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE8PZB
41   9    (O)   0            2.728 TB HITACHI US72604CLAR3000N9C0K4KDWPJB
41   10   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KDT26B
41   11   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KDYY0B
41   12    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KBNTGB
41   13   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEKZ7B
41   14   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEA9RB
Hotspare Information
Adapter 2 (PERC H830 Adapter) enclosure 57 slots found: 15
Encl Slot State P.Fail.Count Raw Size Inquiry Data
57   0    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE9Y7B
57   1    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEA3EB
57   2    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KETDBB
57   3    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEKX5B
57   4    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEU2GB
57   5    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KESL9B
57   6    (O)   0            2.728 TB HITACHI US72604CLAR3000N9C0K4KEA2NB
57   7    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KETD4B
57   8    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KERG5B
57   9    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEL19B
57   10   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEKVSB
57   11   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEJSKB
57   12   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KBNX0B
57   13   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE2WBB
57   14   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEBTLB
```

```
Hotspare Information
Adapter 2 (PERC H830 Adapter) enclosure 73 slots found: 15
Encl Slot State P.Fail.Count Raw Size Inquiry Data
73   0    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE2XSB
73   1    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEADHB
73   2    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KDWPKB
73   3    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE2Z1B
73   4    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEA92B
73   5    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEA40B
73   6    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEAABB
73   7    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEA88B
73   8    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEABZB
73   9    (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEADBB
73   10   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEAA8B
73   11   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEA70B
73   12   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KEE2EB
73   13   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KE2WGB
73   14   (O)   0            2.728 TB HITACHI HUS72604CLAR3000N9C0K4KDU6VB
Hotspare Information
Adapter 2 (PERC H830 Adapter) enclosure 74 slots found: 15
Encl Slot State P.Fail.Count Raw Size Inquiry Data
74   0    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LPQJ
74   1    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LPYN
74   2    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LP45
74   3    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LX7F
74   4    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14FYWJ
74   5    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LXNP
74   6    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LPJ9
74   7    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LNRZ
74   8    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LWTB
74   9    (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LWVJ
74   10   (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LX7N
74   11   (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14H9YR
74   12   (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LX13
74   13   (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LXAK
74   14   (O)   0            3.638 TB SEAGATE STMFSND2CLAR4000BS03ZC14LXD4
Hotspare Information

WARNING: Physical disk problems have been found.
```

If a drive is in a foreign state, it shows `F` in the `State` column. If a drive is in a bad state, it shows `B` in the `State` column. A PowerVault that has never been used before should show `U` for unconfigured.

a. Make sure that the number of PV drives listed equals 48 in total.

b. Make sure that the number of DAC drives listed equals 60 in total.

Caution: For Series 6 (R640) hosts only, make sure that the BIOS level is 50.5.0-1750 before you run the `NwArrayConfig.py` script .

5. To run the `NwArrayConfig.py` script using the default parameters, use one of the following commands.

   For RSA NetWitness Platform versions 10.6.6.1-199.5.47209f4 or later, run the following command:

   ```
   ./NwArrayConfig.py
   ```

   For RSA NetWitness Platform 11.2.0.0-1808301802.5.941817f and later, run the following command:

   ```
   OWB_ALLOW_NON_FIPS=1 ./NwArrayConfig.py
   ```

   ```
   [root@P<hostname> saTools]#
   ```

   This script discovers all available PowerVaults; creates all the necessary virtual drives, logical volumes, and the directory structure; and writes the debug messages to **/opt/rsa/saTools/arrayCfg.log**. On a Log Decoder and (Network) Decoder host, this script adds the database types of packetdb, metadb, and sessiondb.

The following is an example of the output.

```
  VG              #PV #LV #SN Attr   VSize   VFree
  decoder           1   1   0 wz--n- <85.54t    0
  decoder0          1   1   0 wz--n- <85.54t    0
  decoder1          1   1   0 wz--n- <85.54t    0
  decoder2          1   1   0 wz--n- <85.54t    0
  decoder3          1   1   0 wz--n- <27.29t    0
  decoder4          1   1   0 wz--n-  36.38t    0
  decoder5          1   1   0 wz--n- <27.29t    0
  decoder6          1   1   0 wz--n- <27.29t    0
  decodersmall      1   4   0 wz--n-  21.38t    0
  decodersmall0     1   2   0 wz--n-  21.38t    0
  decodersmall1     1   2   0 wz--n-  21.38t    0
  decodersmall2     1   2   0 wz--n-  21.38t    0
  decodersmall3     1   2   0 wz--n-  <5.46t    0
  decodersmall4     1   2   0 wz--n-  <7.28t    0
  decodersmall5     1   2   0 wz--n-  <5.46t    0
  decodersmall6     1   2   0 wz--n-  <5.46t    0
  netwitness_vg00   2   5   0 wz--n-  <2.73t    0
```

```
PV         VG              Fmt  Attr PSize    PFree
/dev/sda2  netwitness_vg00 lvm2 a--  <930.00g    0
/dev/sdb1  netwitness_vg00 lvm2 a--    <1.82t    0
/dev/sdc   decodersmall    lvm2 a--    21.38t    0
/dev/sdd   decoder         lvm2 a--   <85.54t    0
/dev/sde   decodersmall0   lvm2 a--    21.38t    0
/dev/sdf   decoder0        lvm2 a--   <85.54t    0
/dev/sdg   decodersmall1   lvm2 a--    21.38t    0
/dev/sdh   decoder1        lvm2 a--   <85.54t    0
/dev/sdi   decodersmall2   lvm2 a--    21.38t    0
/dev/sdj   decoder2        lvm2 a--   <85.54t    0
/dev/sdk   decodersmall3   lvm2 a--    <5.46t    0
/dev/sdl   decoder3        lvm2 a--   <27.29t    0
/dev/sdm   decodersmall4   lvm2 a--    <7.28t    0
/dev/sdn   decoder4        lvm2 a--    36.38t    0
/dev/sdo   decodersmall5   lvm2 a--    <5.46t    0
/dev/sdp   decoder5        lvm2 a--   <27.29t    0
/dev/sdq   decodersmall6   lvm2 a--    <5.46t    0
/dev/sdr   decoder6        lvm2 a--   <27.29t    0
```

6. Verify the results:

   a. Ensure that the script did not produce any errors by viewing the **/opt/rsa/saTools/arrayCfg.log** file:

      ```
      more /opt/rsa/saTools/arrayCfg.log
      ```

b. Run the following command to verify the new sizes of the databases:

```
df -hP | grep 'decoder\|concentrator\|archiver\|Filesystem'
```

The following is an example of the results that are displayed on a Decoder:

```
Filesystem                                Size  Used  Avail  Use% Mounted on
/dev/mapper/decodersmall-decoroot         10G   33M   10G    1%   /var/netwitness/decoder
/dev/mapper/decodersmall-decoroot         30G   33M   30G    1%   /var/netwitness/decoder/index
/dev/mapper/decodersmall-decoroot         20T   34M   20T    1%   /var/netwitness/decoder/metadb
/dev/mapper/decodersmall-decoroot         2.2T  34M   2.2T   1%   /var/netwitness/decoder/sessiondb
/dev/mapper/decodersmall-decoroot         86T   35M   86T    1%   /var/netwitness/decoder/packetdb
/dev/mapper/decodersmall-decoroot         2.2T  34M   2.2T   1%   /var/netwitness/decoder/sessiondb0
/dev/mapper/decodersmall-decoroot         20T   34M   20T    1%   /var/netwitness/decoder/metadb0
F/dev/mapper/decodersmall-decoroot        86T   35M   86T    1%   /var/netwitness/decoder/packetdb0
```

c. Ensure that there is an entry for each PowerVault and DAC added. An individual `packetdb#`, `metadb#`, and `sessiondb#` is created for each PowerVault, where `#` is the number associated with the PowerVault in the order it was added. For the first PowerVault that you add, `#` is blank and does not have a number appended. The second PowerVault that you add is appended with `0`. For example, the first PowerVault entries are `metadb`, `sessiondb`, and `packetdb`. The second PowerVault entries are `metadb0`, `sessiondb0`, and `packetdb0`.
Verify that the size listed for `/var/netwitness/decoder/packetdb#` is what you would expect with the extended storage arrays attached. **Write this value down** so that you can verify it in the user interface.

d. Log in to RSA NetWitness Platform and go to **Administration > Services** or **ADMIN > Services**.
The Administration Services view is displayed.

e. Select the appropriate service and then select  **> View > Explore**.

f. Expand the **database** folder and select the **config** folder.

g. Look at **packet.dir**, **meta.dir**,and **session.dir** as applicable to your service. Compare the output of the `df - hP` command to the database/config values shown in NetWitness Platform. Make sure that there is an entry for each PowerVault added and the size of the `db` for each service is as follows:

`/var/netwitness/decoder/packetdb#=<n>`

where `<n>` is similar to the size of the new storage.

For Archiver, the **packet.dir**, **meta.dir**, and **packet.dir** are found by default in the following locations:

10.6.6.1-199.5.47209f4 or later: **/archiver/collections/default/database/config**

In Archiver, the `<n>` value is `0B`. For example, `/var/netwitness/archiver/database0/alldata/metadb=0B`.

Restart the Service

You must restart the Decoder, Log Decoder, or Archiver service so that the service can recognize the new volumes.

Note: If the host has a Log Decoder or (Network) Decoder service which is currently capturing, it is a best practice to stop capture before restarting these services (to ensure database writes are completed). If the host has an Archiver service which is aggregating, it is recommended to stop aggregation before restarting these services (to allow the indexes in memory to be saved to disk).

1. To restart the service, run the following commands using the appropriate service name for your service.

   For RSA NetWitness Platform versions 10.6.6.1-199.5.47209f4 or later:

   `stop <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder>` (Wait until this completes.)

   `start <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder>`

   For RSA NetWitness Platform 11.2.0.0-1808301802.5.941817f and later:

   `service <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder> stop` (Wait until this completes.)

   `service <nwdecoder, nwarchiver, nwconcentrator, nwlogdecoder> start`

2. Make sure that the service comes back online and begins capture.

   a. In the NetWitness Platform Services view (**Administration > Services** or **ADMIN > Services**), verify that the service status is green.

   b. Select the service and then select  **> View > System**.

   c. If you see the **Start Capture** or **Start Aggregation** icon in the toolbar, click the icon to start it.

Install PowerVault on Core Appliance Used as a Hybrid

This topic describes how to install a PowerVault on RSA Series 5 (R630) and Series 6 (R640) used as a hybrid. In this context , a hybrid refers to:

- Log Hybrid - runs the Log Collector, Log Decoder, and Concentrator services on one host (Series 5 - R630 or Series 6 - 640).
- Network Hybrid - runs the Concentrator and Decoder services on one host (R630 or R640).

Note: You can install PowerVault with or without Encryption on an RSA Series 5 (R630) and Series 6 (R640) used as a hybrid.

Prerequisites

Make sure that you have the following required software.

rsa-sa-tools - `rsa-sa-tools-11.x.x.x-<build-information>.el7.noarch.rpm`

or later, which contains the script you need to configure the storage. For RSA NetWitness Platform 11.3 and later, use the version shipped with the product.

To verify the rsa-sa-tools version, log in as `root` on the physical hosts and run the following command:

```
rpm -qa | grep sa-tools
```

Results example:

```
rsa-sa-tools-11.x.x.x-<build-information>.el7.noarch.rpm
```

This RPM is updated quarterly. Contact RSA Customer Support to obtain the most recent version.

Caution: If you are adding a previously used PowerVault and would like to preserve the data, DO NOT follow the instructions in this guide. Contact RSA Customer Support. Running the script on a previously used PowerVault could erase any existing data.

Introduction

The following table contains the summarized installation instructions for different deployments, and detailed procedures are in individual subsections. The deployment scenarios are:

- Multiple PowerVaults in a Concentrator, (Network) Decoder, Log Decoder, and Archiver deployment.
- A single PowerVault in a Hybrid deployment.

High-Level Procedure

NetWitness Platform 11.3 and Later

Deployment Scenario	Tasks
Log Hybrid or Network Hybrid Running on Core Appliance	1. Connect a Concentrator PowerVault (NW-PVHP56, NW-PVHP113, or NW-PVHPE78) to an R630 or R640 the physical host before powering on the physical host as described in Install PowerVault on Core Appliance Used as a Hybrid. 2. Follow the instructions in the *Storage Guide for RSA NetWitness Platform Version 11.3 and Later* to allocate storage for your hardware.

NetWitness Platform 11.2 and Earlier

Deployment Scenario	Tasks
Log Hybrid or Network Hybrid Running on Core Appliance	1. Connect a Concentrator PowerVault (NW-PVHP56, NW-PVHP113, or NW-PVHPE78) to an R630 or R640 the physical host before powering on the physical host as described in Install PowerVault on Core Appliance Used as a Hybrid. 2. Run the `NwArrayConfig.py` script as described in Run the PowerVault Installation Scripts on an R603 or R640 Used as a Hybrid . 3. Restart the services for this host as described in Restart the Services. 4. License the services for this host (if they are not already licensed). Refer to the *Licensing Guide* available through the application Help option and RSA Link at https://community.rsa.com/docs/DOC-40370 for instructions on licensing RSA physical hosts.

Connect PowerVaults to a Core Physical Host Used as a Hybrid

You can connect one or more PowerVaults to a RSA Series 5 - R630 or Series 6 - R640 physical host Used as a hybrid (Log Hybrid or Network Hybrid).

Caution: You must attach a Concentrator PowerVault (that is, NW-PVHP56, NW-PVHP113, or NW-PVHPE78) to port 0 and configure it first.

You can only add four PowerVaults per port for a total of eight PowerVaults per PERC H830 (Series 5) RAID controller or five per PERC H840 (Series 6) RAID controller.

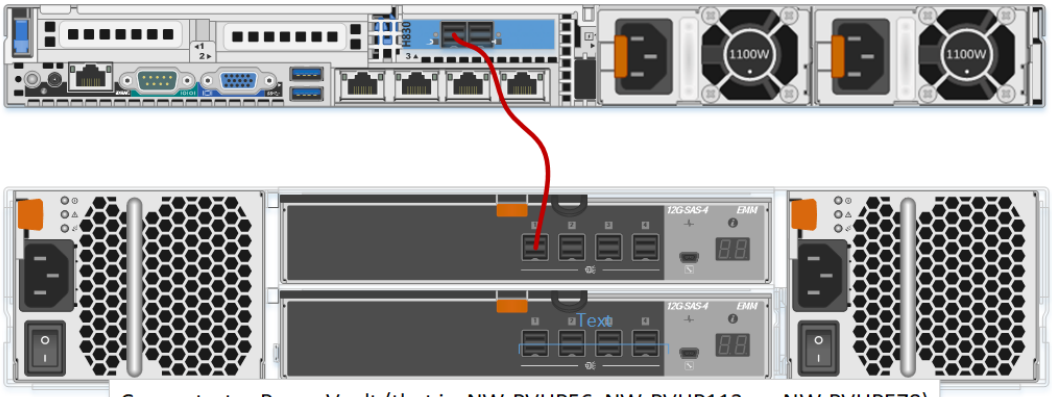
Note: 1.) If you are attaching more then 3 PowerVaults to a single port you may received the following Error message:
`The total number of enclosures connected to connector 00, has exceeded the maximum allowable limit of 3 enclosures. Please remove the extra enclosure and then restart your system.` This error was caused by PERC profile settings. From factory, PERC profile is set to PD64. Setting the profile to PD240 corrects the issue. Profile PD240 is labeled as “default”, however, this is not set from factory. To set the PD Profile:
1. Enter the DELL PERC 10 Configuration Utility. See Navigating to Dell PERC 10 configuration utility.
2. Click Main Menu > Controller Management > Advanced Controller Properties > Profile Management. Current profile and profile properties are displayed.
3. Change profile using the Choose Profile option.
4. Select Set Profile. Click Reboot.
2.) The PowerVault comes with two SAS cables. You only need one cable to connect the PowerVault to the physical host. For RSA Series 5 physical hosts, use a cable with the mini-SAS connector.

1. Ensure that the physical host is powered off.
2. Connect one end of the SAS cable to the **left** port of the RAID controller on the back of the physical host.
3. Connect the other end of the SAS cable to the PowerVault unit.
   When you connect the first PowerVault to the RAID controller, make sure that:
   a. It is a Concentrator PowerVault (NW-PVHP56, NW-PVHP113, or NW-PVHPE78). If you attach additional PowerVaults, they do not need to be Concentrator PowerVaults.
   b. You insert the cable into the **Primary SAS port** on the PowerVault as shown in the following figures.

Series 5 - R630 Host

The following figure shows an R630 host (port 0) connected to a PowerVault (port 1 in top row of ports) using a mini-to-mini SAS cable.
The PERC830 card for the R630 is installed in slot #3. This means that:

- Port 0 is on the left and port 1 is on the right on the R630.
- You must attach the cable to the R630 with the connector's blue tab on the top.
- You must attach the other end the cable to the PowerVault with the connector's blue tab on the top.
- You know if the cable is properly connected when you hear a click as the cable locks into place and see the green port light illuminate on the R630.



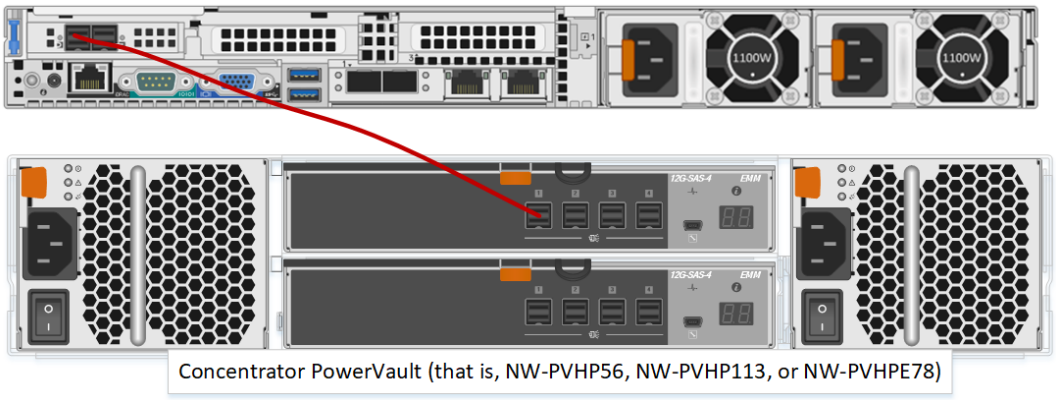
Concentrator PowerVault (that is, NW-PVHP56, NW-PVHP113, or NW-PVHPE78)

Series 6 - R640 Physical Hosts

The following figure shows Series 6 - R640 host (port 0) connected to PowerVault (port 1 in top row of ports) using a mini-to-mini SAS cable.

The PERC H840 card for the R640 is installed in slot #1. This means that:

- Port 0 is on the left and port 1 is on the right on the R640.
- You must attach the cable to the R640 with the connector's blue tab on the top.
- You must attach the other end the cable to the PowerVault with the connector's blue tab on the top.
- You know if the cable is properly connected when you hear a click as the cable locks into place and see the green port light illuminate on the R640.



Concentrator PowerVault (that is, NW-PVHP56, NW-PVHP113, or NW-PVHPE78)

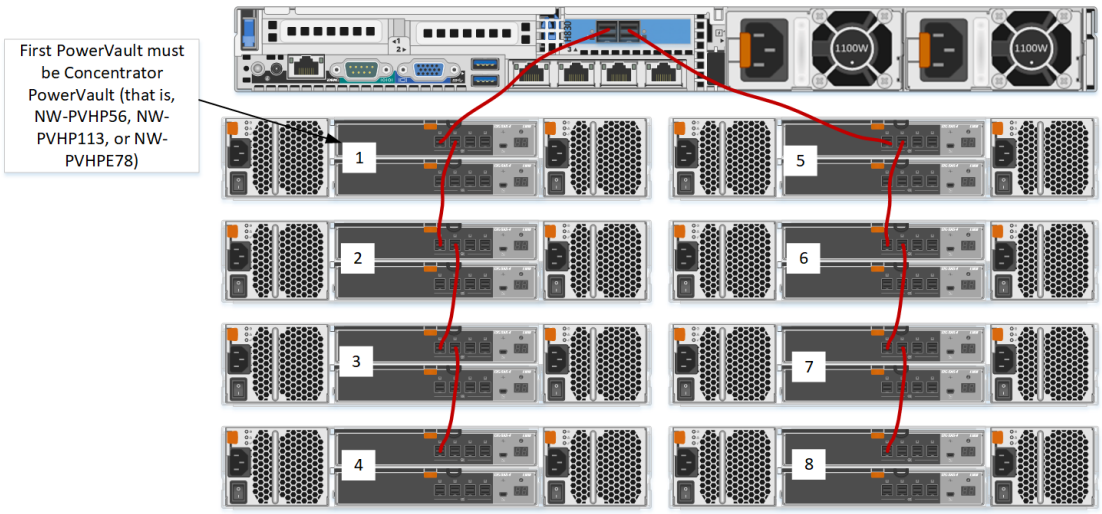
4. When you connect two or more PowerVaults to the RAID controller, make sure that you:

   - Connect the **Primary** Port 1 of the first Concentrator PowerVault to Port 0 of the RAID controller.

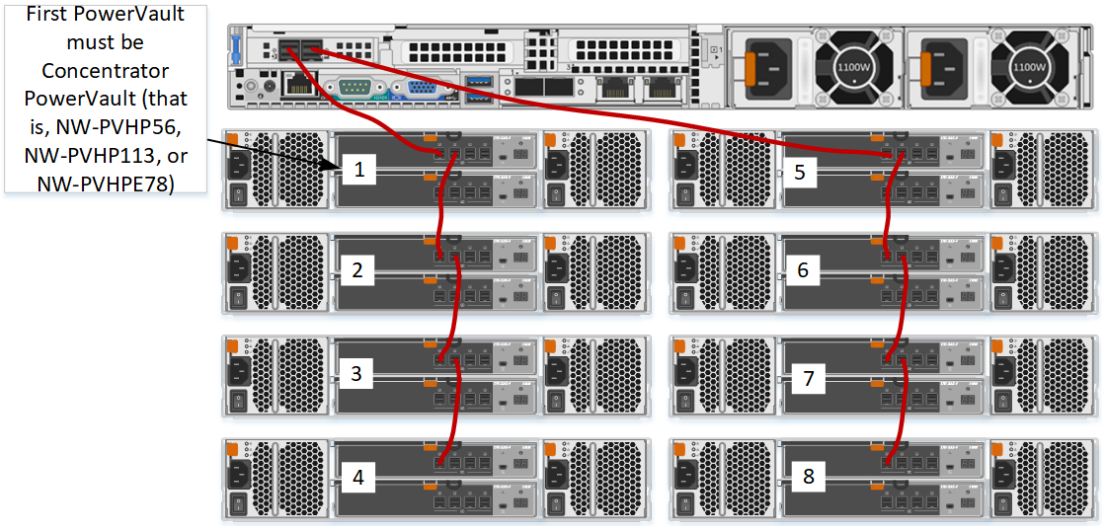
   Daisy chain up to three additional PowerVaults to the first PowerVault.

   The following figure shows you how to connect eight PowerVaults to an RSA Series 5 and Series 6 physical hosts.

Series 5 - R630 Attached to Eight PowerVaults



Series 6 - R640 Attached to Eight PowerVaults



5. When you finish the cabling, make sure that the PowerVault is powered on and then power on the physical host.

Run the PowerVault Installation Scripts on an R603 or R640 Used as a Hybrid

This procedure only applies to NetWitness Platform 11.2 and earlier.

Note: For NetWitness Platform 11.3 and later, refer to Storage Guide for RSA NetWitness Platform Version 11.3 and later for instructions on how to allocate storage for your hardware.

Caution: After configuring the PowerVault the first time for a service, there is a possibility of background RAID initialization running for at least 24 hours. During this initialization, disk I/O performance may be affected.

Note: You must attach a Concentrator PowerVault (that is, NW-PVHP56, NW-PVHP113, or NW-PVHPE78) to port 0 and configure it first.

1. Log in as `root` and verify that the **rsa-sa-tools** package is installed by running the following command:

   ```
   rpm -qa | grep rsa sa-tools
   ```

   Results example:

   ```
   rsa-sa-tools-11.3.0.0-1812111924.1.a4af8c6.el7.noarch.rpm
   ```

   If the package is not installed, contact RSA Customer Support to obtain a copy of the RPM and install it.

2. Change the directory to the rsa-sa-tools RPM base directory:

   ```
   cd /opt/rsa/saTools
   ```

3. Execute the following command:

   ```
   ./nwraidutil.pl
   ```

4. **Important**: Check the results and resolve ALL conditions before running the script:

   ```
   Ensure that there are no foreign configurations and no drives with an
   Unconfigured(bad) state on the PowerVault drives.

   Adapter 1 (PERCH810 Adapter) enclosures found: 2
   Adapter 1 (PERCH810 Adapter) enclosure 160 slots found: 12
   Encl Slot State P.Fail.Count Raw Size Inquiry Data
   68 0 (U)   0           10.692 TB  HGST    HUH721212AL5200 NS018DGXLB2H
   68 0 (U)   1           10.692 TB  HGST    HUH721212AL5200 NS018DGXN01H
   68 0 (U)   2           10.692 TB  HGST    HUH721212AL5200 NS018DGXKTWH
   68 0 (U)   3           10.692 TB  HGST    HUH721212AL5200 NS018DGXTHVH
   68 0 (U)   4           10.692 TB  HGST    HUH721212AL5200 NS018DGXALXH
   68 0 (U)   5           10.692 TB  HGST    HUH721212AL5200 NS018DGX9UNH
   68 0 (U)   6           10.692 TB  HGST    HUH721212AL5200 NS018DGX2MNH
   68 0 (U)   7           10.692 TB  HGST    HUH721212AL5200 NS018DGX16HH
   68 0 (U)   8           10.692 TB  HGST    HUH721212AL5200 NS018DGXM03H
   ```

```
68 0 (U)    9           10.692 TB  HGST    HUH721212AL5200 NS018DGX2NPH
68 0 (U)    10          10.692 TB  HGST    HUH721212AL5200 NS018DGXZLPH
68 0 (U)    11          10.692 TB  HGST    HUH721212AL5200 NS018DGXYLZH
```

If a drive is in a foreign state, it shows `F` in the `State` column. If a drive is in a bad state, it shows `B` in the `State` column. A PowerVault that has never been used before should show `U` for unconfigured.

a. Ensure that the number of drives listed in the results equals 12.

   The following example lines from the results show the correct number of drives:

   ```
   Adapter 1 (PERCH810 Adapter) enclosures found: 2
   Adapter 1 (PERCH810 Adapter) enclosure 160 slots found: 12
   ```

   The following example lines from the results show that there is a bad drive:

   ```
   Adapter 1 (PERCH810 Adapter) enclosures found: 1
   Adapter 1 (PERCH810 Adapter) enclosure 121 slots found: 11
   WARNING: Physical disk problems have been found.
   ```

   It is also important that all drives appear numerically in the `nwraidutil` output. It is possible that a bad drive may not show up at all in the output. You will see a jump in the Slot count. For example, if the enclosure has 12 drives, but you only see slots 0 - 11, it means that slot 12 is bad and cannot be seen by the RAID controller. Contact RSA Customer Support before running the script because an RMA may be necessary.

5. To run the `NwArrayConfig.py` script using the default parameters, use one of the following commands.

   For RSA NetWitness Platform versions 10.6.6.0 or later, run the following command:

   ```
   ./NwArrayConfig.py
   ```

   For RSA NetWitness Platform 11.1.0.2 and later, run the following command:

   ```
   OWB_ALLOW_NON_FIPS=1 ./NwArrayConfig.py
   ```

   If you are not using the defaults, the following options are available:

   ```
   [root@<hostname> saTools]# ./NwArrayConfig.py -h
   Usage: NwArrayConfig.py [options]
   Options:
   -h, --help            show this help message and exit
   -s SRVC, --service=SRVC
                         Enter the service type to use 3rd party storage with.
                         You will be prompted to chose a volume group to use
                         for each DB. (decoder | logdecoder | concentrator |
                         archiver)
   ```

```
-d DRVS, --drives=DRVS
                      Number of drives for the concentrator service on
                      hybrid or for the meta on logdecoder. (3-11) [3]
-r REST, --rest=REST  Configured REST port if different from default
-u USER, --user=USER  The user name for logging into the service. [admin]
-w PSWD, --password=PSWD
                      Password for user or enter 'ask' to be prompted.
                      [netwitness]
-c CRYP, --ssl=CRYP   Is SSL enabled? (0|1) [0]
[root@P<hostname> saTools]#
```

This script discovers all available PowerVaults; creates all the necessary virtual drives, logical volumes, and the directory structure; and writes the debug messages to **/opt/rsa/saTools/arrayCfg.log**. On Log Decoder and (Network) Decoder physical hosts, this script adds the database types of packetdb, metadb, and sessiondb. On Concentrator physical hosts, this script adds the data.Nwbase types of metadb and sessiondb.

The following is an example of the output.

```
Checksum type 'md5' disabled
Creating new volume group decodersmall on /dev/sdc
Volume group "decodersmall" successfully created
Creating new volume group decoder on /dev/sdd
Volume group "decoder" successfully created
Additional enclosures available! Rerunning to add additional storage
Creating new volume group decodersmall0 on /dev/sde
Volume group "decodersmall0" successfully created
Creating new volume group decoder0 on /dev/sdf
Volume group "decoder0" successfully created

Success!: Added all available storage found. The decoder service will need to
be restarted for the extended storage to be available
```

6. Verify the results:

   a. Ensure that the script did not produce any errors by viewing the **/opt/rsa/saTools/arrayCfg.log** file:

      ```
      more /opt/rsa/saTools/arrayCfg.log
      ```

   b. Run the following command to verify the new sizes of the databases:

      ```
      df -hP | grep 'decoder\|concentrator\|archiver\|Filesystem'
      ```

      The following is an example of the results that are displayed on a Decoder:

```
Filesystem                                Size  Used  Avail  Use% Mounted on
/dev/mapper/decodersmall-decoroot         10G   33M   10G    1%   /var/netwitness/decoder
/dev/mapper/decodersmall-decoroot         30G   33M   30G    1%   /var/netwitness/decoder/index
/dev/mapper/decodersmall-decoroot         20T   34M   20T    1%   /var/netwitness/decoder/metadb
/dev/mapper/decodersmall-decoroot         2.2T  34M   2.2T   1%   /var/netwitness/decoder/sessiondb
/dev/mapper/decodersmall-decoroot         86T   35M   86T    1%   /var/netwitness/decoder/packetdb
/dev/mapper/decodersmall-decoroot         2.2T  34M   2.2T   1%   /var/netwitness/decoder/sessiondb0
/dev/mapper/decodersmall-decoroot         20T   34M   20T    1%   /var/netwitness/decoder/metadb0
/dev/mapper/decodersmall-decoroot         86T   35M   86T    1%   /var/netwitness/decoder/packetdb0
```

c. Ensure that there is an entry for each PowerVault added. An individual `packetdb#`, `metadb#`, and `sessiondb#` is created for each PowerVault, where `#` is the number associated with the PowerVault in the order it was added. For the first PowerVault that you add, `#` is blank and does not have a number appended. The second PowerVault that you add is appended with `0`. For example, the first PowerVault entries are `metadb`, `sessiondb`, and `packetdb`. The second PowerVault entries are `metadb0`, `sessiondb0`, and `packetdb0`.
Verify that the size listed for `/var/netwitness/decoder/packetdb#` is what you would expect with the extended storage arrays attached. **Write this value down** so that you can verify it in the user interface.

d. Log in to RSA NetWitness Platform and go to **Administration > Services** or **ADMIN > Services**.
The Administration Services view is displayed.

e. Select the appropriate service and then select  **> View > Explore**.

f. Expand the **database** folder and select the **config** folder.

g. Look at **packet.dir**, **meta.dir**,and **session.dir** as applicable to your service. Compare the output of the `df - hP` command to the database/config values shown in NetWitness Platform. Make sure that there is an entry for each PowerVault added and the size of the `db` for each service is as follows:

`/var/netwitness/decoder/packetdb#=<n>`

where `<n>` is similar to the size of the new storage.

For Archiver, the **packet.dir**, **meta.dir**, and **packet.dir** are found by default in the following locations:

10.6.6.0 or later: **/archiver/collections/default/database/config**

In Archiver, the `<n>` value is `0B`. For example, `/var/netwitness/archiver/database0/alldata/metadb=0B`.

Restart the Services

You must restart the Log Hybrid or Network Hybrid services so that the services can recognize the new volumes.

Note: If this physical host has a Log Decoder or (Network) Decoder service which is currently capturing, it is a best practice to stop capture before restarting these services (to ensure database writes are completed). If this physical host has a Concentrator or Archiver service which is aggregating, it is recommended to stop aggregation before restarting these services (to allow the indexes in memory to be saved to disk).

1. To restart the service, run the following commands using the appropriate service name for your service.
   - For Log Hybrid:
     `service <nwlogcollector, nwlogdecoder, nwconcentrator> stop` (Wait until this completes.)
     `service <nwlogcollector, nwlogdecoder, nwconcentrator> start`
   - For Network Hybrid:
     `service <nwdecoder, nwconcentrator> stop` (Wait until this completes.)
     `service <nwdecoder, nwconcentrator> start`
2. Make sure that the service comes back online and begins capture.
   a. In the NetWitness Platform Services view (**Administration > Services** or **ADMIN > Services**), verify that the service status is green.
   b. Select the service and then select  **> View > System**.
   c. If you see the **Start Capture** or **Start Aggregation** icon in the toolbar, click the icon to start it.

Revision History

Date	Description
September 12, 2019	Includes latest documentation defect corrections.
February 12, 2020	Added PowerVault front view information, added EMM back view information, and updated the *Dell Storage MD1400 Enclosures Hardware Owner's Manual* hyperlink. Also updated the following tables: Enclosure Options, Unencrypted PowerVault Storage Enclosures Supported, and Encrypted PowerVault Storage Enclosures Supported.