Dell™ PowerVault™ DL Backup to Disk Appliance and the Symantec Backup Exec Storage Provisioning Option

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Contents

Introducing the Dell™ PowerVault™ DL Backup to Disk Appliance and the Backup Exec Storage Provisioning Option

This chapter includes the following topics:

About the Dell™ PowerVault™ DL Backup to Disk Appliance and the Backup Exec Storage Provisioning Option

The Backup Exec Storage Provisioning Option provides you with automated discovery, provisioning, and management of the disk storage resources that are connected to the Dell™ PowerVault™ DL Backup to Disk Appliance (DL Appliance).

Table 1-1   Features of the Storage Provisioning Option

Feature	Description
Automatic virtual disk creation and configuration	Backup Exec automatically creates and configures striped with parity (RAID 5) virtual disks from the physical disks it detects in the DL Appliance.
Discovery and provisioning of new storage arrays and virtual disks	Backup Exec discovers new storage arrays and the virtual disks that you add to a storage array. If you create virtual disks by using the Dell™ OpenManage™ Server Administrator, Backup Exec also detects those virtual disks.
Trend analysis of disk space usage	Backup Exec collects statistical information to predict the amount of disk space that is required on the storage arrays. Alerts are sent if the available disk space does not meet the predicted amount of disk space that is needed.
Alerts for low disk space	Backup Exec sends an alert when available disk space reaches each of three thresholds that you set for a virtual disk.

Backup Exec logically groups multiple Serial ATA (SATA) physical disks that are attached to a PowerVault™ MD1000 enclosure into one or more disk groups. From these disk groups, Backup Exec then creates multiple striped with parity virtual disks, which can be used as destination devices for jobs.

Up to three enclosures can be daisy-chained together. By daisy-chaining enclosures, Backup Exec can use the additional enclosures to increase the number of disk groups and virtual disks it creates.

With Backup Exec installed, the DL Appliance can be considered as a Backup Exec media server.

About the DL Appliance configuration states and configuration policies

The DL Appliance operates in one of two configuration states: standard or advanced. Backup Exec automatically determines the configuration state by checking the type, size, and configuration of the physical disks within the storage enclosure. You select the configuration policy, which tells Backup Exec how to manage newly-discovered physical disks.

The following table describes the configuration states:

Table 1-2   DL Appliance configuration states

Configuration state	Description
Standard configuration	Each storage enclosure that is attached to the DL Appliance consists of logically-connected physical disks. Slots 1 through 7 contain a set of physical disks that are logically connected to form one disk group. Slots 8 through 15 optionally contain an additional set of physical disks that are logically connected to form a second disk group. Slot 0 is used to reserve a physical disk that is used as a hot spare for storage array fault tolerance purposes.
	When the DL Appliance is in the standard configuration state, you can use one of two automatic configuration policies to create virtual disks.
	The policies include the following:
	■ Automatic with confirmation
	■ Automatic without confirmation
	Table 1-3 describes the DL Appliance configuration policies.
Advanced configuration	A DL Appliance that is configured in any manner that is not standard.
	With the DL Appliance in the advanced configuration state, you can select only a manual configuration policy. This means that all virtual disks must be manually created. You can use the Dell™ OpenManage™ Server Administrator to manually create virtual disks.

The following table describes DL Appliance configuration policies:

Table 1-3   DL Appliance configuration policies

Configuration policy	Description
Automatic with confirmation Automatic without confirmation	With the Automatic with confirmation policy, Backup Exec first determines the total amount of disk space that is available in a disk group. It then prompts you to confirm the creation of striped with parity virtual disks. In addition, if slot 0 contains a physical disk, Backup Exec designates the physical disk as a hot spare. With the Automatic without confirmation policy, Backup Exec determines the total amount of disk space available in a disk group. It then creates the striped with parity virtual disks with no user action required. In addition, if slot 0 contains a physical disk, Backup Exec designates the physical disk as a hot spare. The total amount of disk group space determines the number of virtual disks that Backup Exec creates. The maximum size of each virtual disk that Backup Exec creates is two terabytes, depending on the total capacity of the disk group. When you review storage array capacities after Backup Exec creates all virtual disks, note that parity calculations generally use storage space equal to one physical disk. For example, for a disk group that is formed from seven 1TB physical disks and has a total capacity of seven terabytes, Backup Exec creates three virtual disks. Each virtual disk has a capacity of two terabytes. After the virtual disks are created, you have six terabytes of total storage capacity. In this case, one terabyte of unallocated space is reserved for parity calculations. For a disk group that is formed from seven 500GB physical disks and has a total capacity of 3.5 terabytes, Backup Exec creates two virtual disks. Each virtual disk has a capacity of 1.5 terabytes. In this case, Backup Exec reserves 500GBs of unallocated space for parity calculations. Parity ensures that if one physical disk fails, data is not lost. **Note:** Dell recommends that you populate the enclosure with physical disks of the same capacity. If you use physical disks with different capacities, the result is wasted physical disk space. Wasted disk space occurs because the disk group's total storage capacity is calculated based on the physical disk with the least capacity. It is not calculated based on the aggregate capacities of each physical disk.

Table 1-3   DL Appliance configuration policies *(continued)*

Configuration policy	Description
Manual	Backup Exec does not configure the disk groups or hot spares. You can use the Dell™ OpenManage™ Server Administrator to create virtual disks or to configure hot spares. Although Backup Exec does not issue alerts for physical disk insertions, it does monitor the status and health of the storage arrays. It also issues the alerts for storage array capacity issues, or when the health and status of storage arrays change.

About the Backup Exec license keys

Backup Exec license keys are required to enable the Backup Exec options that are installed on the DL Appliance. Each license key must be entered on the Backup Exec Enter License Keys panel that appears during the Backup Exec installation. You can find the Backup Exec license keys on the enclosed Dell Software License Key product card.

You can add licenses or activate additional agents or options at any time after you configure the DL Appliance. If the evaluation period expires for an agent or option, you need to enter a license key to continue to use it.

Note: To purchase additional license keys for agents and options, contact your Dell representative.

About creating a Backup Exec services account

As part of the Backup Exec configuration process, you are prompted to create a Backup Exec services account. All Backup Exec services operate in the context of a user account, which is configured for the Backup Exec system services. You can create this new account or you can use an existing user account.

If this media server is a member of a domain, you can enter a Domain Administrators account. You also can enter an equivalent account that is part of the Domain Admins group. In the Domain list, you can select or enter a Domain name.

If this media server is a member of a workgroup, you can enter the Administrator account. You also can enter an equivalent account that is part of the Administrators group on the media server. In the Domain list, you can select or enter the computer name.

Any new or existing account that you designate for Backup Exec services is assigned the following rights:

- Authenticate as any user and then gain access to resources under any user identity.

- Create a token object, which can then be used to access any local resources.

- Log on as a service.

- Administrative rights (provides complete and unrestricted rights to the computer).

- Backup operator rights (provides rights to restore files and directories).

- Manage auditing and security log.

To install Backup Exec on a computer that runs Windows Server 2008, the user account must meet one of the following conditions::

- It has a password.

- It is set up to allow blank passwords.

If you try to use a user account that has a blank password, the following error message appears when the Backup Exec services are created:

```
The given password is not correct for account [server]\[username]
```

You can, however, configure Windows to allow for blank passwords.

See your Microsoft Windows documentation.

About virtual disks in the Storage Provisioning Option

A virtual disk is a logical disk in a storage array. Backup Exec uses a configured virtual disk in the same manner in which it uses a backup-to-disk folder. The media on a virtual disk appear as .bkf files.

See About backup-to-disk folders and files in the *Symantec Backup Exec for Windows Servers Administrator's Guide*.

Backup Exec does not assign a drive letter to the virtual disk. You cannot browse for a virtual disk or access it from a command prompt. Since you cannot browse to the virtual disk, you cannot back it up with Backup Exec. Dell recommends that you create a duplicate backup data job to move the data from the virtual disk to a tape.

After Backup Exec creates the virtual disks, each virtual disk appears in the Backup Exec Devices pane under All Virtual Disks. They also appear under the storage array name in Storage Arrays.

You can configure three low disk space thresholds for the virtual disks. As available disk space reaches each threshold, Backup Exec sends an alert. When the available disk space on the virtual disk reaches the third threshold, the alert warns you to create more disk space immediately.

You can configure these thresholds as defaults that apply to all new virtual disks, or as defaults that apply to a specific virtual disk.

Note: You cannot share a virtual disk between two computers.

Virtual disks can have the following states:

Table 1-4   States for virtual disks

States for virtual disks	Icon	Description
Configured		The virtual disk is in use as a device or as a hot spare.
Unconfigured		The virtual disk is not configured for use with Backup Exec.
Offline		The virtual disk is offline. Backup Exec cannot access it.
Disabled		The virtual disk is disabled. Backup Exec cannot access it.

About hot spares in the Storage Provisioning Option

A hot spare is a physical disk that logically takes the place of any physical disk that fails in a striped with parity disk group. You should specify a hot spare that is at least the same size as the physical disk with the least capacity in each disk group. The DL Appliance cannot rebuild a virtual disk with a hot spare that has a capacity that is less than the smallest physical disk.

Note: In a standard configuration, each DL Appliance enclosure supports one hot spare. Slot 0 is used to reserve one physical disk as a hot spare for storage array fault tolerance purposes. If you use additional slots for hot spares, the DL Appliance configuration state changes from standard to advanced.

If a physical disk fails, the DL Appliance automatically rebuilds the disk group by logically including the hot spare in the rebuilt disk group. After you replace the failed physical disk, the disk group is again rebuilt to include the new physical disk. Data that is written on the hot spare is copied back to the virtual disk, which includes the new physical disk. After the copy operation completes, the physical disk in Slot 0 again becomes a hot spare.

Note: During a disk group rebuild operation, the DL Appliance is in a degraded operational state, which affects system performance.

Installing and configuring Backup Exec by using the Storage Provisioning Option

This chapter includes the following topics:

- Completing the Backup Exec installation by using the Dell™ PowerVault™ DL Backup to Disk Appliance Configuration Wizard

- About configuring virtual disks during initial startup

- About using the Backup Exec Command Line Applet with the Storage Provisioning Option

- About recovering the DL Appliance using the Intelligent Disaster Recovery option

Completing the Backup Exec installation by using the Dell™ PowerVault™ DL Backup to Disk Appliance Configuration Wizard

After the Dell™ PowerVault™ DL Backup to Disk Appliance Configuration Wizard completes the Dell and Microsoft Windows-related tasks, Backup Exec configuration option panels appear. The wizard guides you through the process of completing the Backup Exec installation.

Note: Before you complete the Backup Exec installation, find the Backup Exec license keys. These keys are required to complete the installation.

To purchase license keys for additional Backup Exec agents and options, contact your Dell representative.

To complete the Backup Exec installation by using the Dell™ PowerVault™ DL Backup to Disk Appliance Configuration Wizard

1   On the Welcome panel, click **Next**.

2   On the License Agreement panel, read the license agreement, and then click **I accept the terms of the license agreement**.

3   Click **Next**.

4   On the Enter License Keys panel, type a license key into the license key field.

5   Click **Add**.

6   Repeat steps 4 and 5 for each license key.

7   After you enter all of the license keys, click **Next**.

8   On the Symantec Backup Exec Options panel, click **Next**.

9   On the Symantec Backup Exec Services panel, provide a user name, password, and domain name for the Administrator account that the Backup Exec system services can use.

10   Click **Next**.

11   On the Ready to Install the Program panel, click **Install**.

12   When the Install Wizard Completed panel appears, click **Finish**.

After the Backup Exec installation finishes, the Dell™ PowerVault™ Backup to Disk Appliance Configuration Wizard starts the Dell™ PowerVault™ DL Backup to Disk Appliance Console, from which you can start Backup Exec.

Configuring virtual disks and configuring the Intelligent Disaster Recovery Option

After the Dell™ PowerVault™ DL Backup to Disk Appliance Configuration Wizard finishes, you should start Backup Exec and configure the virtual disks. After Backup Exec configures the virtual disks, you can configure the Intelligent Disaster Recovery Option.

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Completing the Backup Exec installation by using the Dell™ PowerVault™ DL Backup to Disk Appliance Configuration
Wizard

Note: If you create a virtual disk with an application other than Backup Exec, you must configure it before Backup Exec uses it as a device for jobs.

See "Configuring an unconfigured virtual disk for use with Backup Exec" on page 52.

To configure virtual disks an configuring the Intelligent Disaster Recovery Option

1   From the Dell™ PowerVault™ DL Backup to Disk Appliance Console, start Backup Exec.

2   Do one of the following:

If you selected an automatic configuration policy that does not require a confirmation	Do nothing. Upon initial startup, Backup Exec automatically submits a virtual disk creation job and begins to create and configure virtual disks for each disk group it detects.
If you selected an automatic configuration policy that prompts you for confirmation	Continue with the following steps.

3   When the Device Intervention alert appears, review the alert, and then click **Yes**.

   Backup Exec submits a virtual disk creation utility job. A job named Configure Storage Array begins to create and configure virtual disks for each disk group it detects.

4   Click **Yes**.

5   On the Getting Started with Backup Exec page, click **Step 4 - Configure Intelligent Disaster Recovery** to configure the IDR options.

6   After you finish configuring IDR, exit the wizard and then close the Getting Started with Backup Exec page.

7   Click **Close**.

   See "About manually creating a virtual disk" on page 52.

   See Using the Getting Started with Backup Exec page in the *Symantec Backup Exec for Windows Systems Administrator's Guide*.

   See Symantec Backup Exec Intelligent Disaster Recovery Option in the *Symantec Backup Exec for Windows Systems Administrator's Guide*.

Creating a bootable CD image for the DL Appliance

Dell recommends that you create a bootable CD image for the DL Appliance. You can use the Intelligent Disaster Recovery Preparation Wizard to create the bootable CD image. If a failure occurs, you can use IDR, the bootable CD image, the disaster recovery file (.DR file) and a full backup to recover the DL Appliance.

To create a bootable CD image for the DL Appliance

1   On the Backup Exec menu, click **Tools > Wizards > Intelligent Disaster Recovery Preparation Wizard**.

2   Follow the wizard to create a bootable CD image.

3   After you create the bootable CD image, burn the .iso image to a CD by using third-party CD burning software.

4   After you create the bootable CD, store it in a safe location, preferably off-site.

See Creating a bootable CD image in the *Symantec Backup Exec for Windows Servers Administrator's Guide*.

Best practices for protecting data on the DL Appliance

To protect the data on the DL Appliance, Dell recommends the following best practices:

■   Configure a full backup job of the DL Appliance and schedule it to run periodically.

■   Use Intelligent Disaster Recovery and the IDR Preparation Wizard to create a bootable CD image that you can use if you need to recover the DL Appliance. The IDR Preparation Wizard guides you through the creation of the bootable media. You can also use the Intelligent Disaster Recovery Preparation Wizard to make updated copies of the disaster recovery *.dr files.
    See "Creating a bootable CD image for the DL Appliance" on page 18.
    See

■   Copy the updated IDR disaster recovery file *.dr file to a safe storage location after every full backup of the DL Appliance.
    IDR updates the *.dr file after each full backup.

See the Intelligent Disaster Recovery Option in the *Symantec Backup Exec for Windows Servers Administrator's Guide*.

About configuring virtual disks during initial startup

After you finish with the Dell™ PowerVault™ DL Backup to Disk Appliance Configuration Wizard, and you start Backup Exec for the first time, virtual disk creation takes place. Backup Exec does the following:

■ Detects the configuration state of all storage enclosures that are attached to the DL Appliance.

■ Determines the virtual disk configuration policy that you selected in the Dell™ PowerVault™ DL Backup to Disk Appliance Configuration Wizard.

When Backup Exec detects a standard configuration and the configuration policy is set to Automatic without confirmation, it immediately submits a job to create the virtual disks. Confirmation alerts are not issued although informational alerts continue to be generated in the future when storage array changes are detected.

When Backup Exec detects a standard configuration and the selected disk configuration policy is set to Automatic with confirmation, both configuration alerts and informational alerts appear. The configuration alert prompts you to confirm the creation of the virtual disks for each disk group. After you respond to the alerts, the virtual disk creation process continues.

For example, when Backup Exec detects a standard configuration with unconfigured SATA physical disks in all enclosure slots, Backup Exec issues an informational alert. The alert informs you that the storage array is ready for configuration. It also informs you of the actual slots of the disk groups to be configured. Finally, it informs you that unconfigured physical disks in Slot 0 of any enclosure are configured as hot spares.

The following table describes alert responses.

Table 2-1   Alert response descriptions

Response	Description
Yes	When you click Yes, Backup Exec submits one or more virtual disk configuration utility jobs to create the virtual disks. These utility jobs are called Configure Storage Array jobs. The virtual disks are created based on the parameters of a standard configuration.

Table 2-1   Alert response descriptions *(continued)*

Response	Description
No	When you click No, Backup Exec stops virtual disk configuration. If you select No, the alert does not automatically appear again unless you do the following: ■ Scan the storage array. ■ Change the hardware configuration. For example, remove the physical disk for a short time and then re-insert it into the slot.
Close	When you click Close, the alert remains active. You can review the alert in the Active Alerts view of the Alerts pane.

If you selected manual configuration policy but you did not manually create virtual disks, only the storage array name appears in Storage Arrays.

About using the Backup Exec Command Line Applet with the Storage Provisioning Option

The Backup Exec Command Line Applet lets you access the features of the Storage Provisioning Option from command line.

When you use the Command Line Applet, you can do the following:

■ View physical disk information.

■ View storage array or virtual disk information.

■ Configure unconfigured virtual disks.

■ Rename a storage array or virtual disk.

■ Rediscover storage arrays.

The Command Line Applet uses a set of functional switches that you type in a command prompt to perform Storage Provisioning Option functions and utilities. To use the Command Line Applet on the computer, type the appropriate command line switch and any additional parameters that are required. For example, to see information about a physical disk in a storage array, type the following at the command prompt:

```
bemcmd -o531 -pi:<physical disk ids>
```

The following table describes the command line switches that can be used with the Storage Provisioning Option.

Table 2-2   Command line switches for the Storage Provisioning Option

Function	Operation	Switch	Description
View physical disk properties	-o531		Outputs the properties for a specified physical disk on a storage array. Returns a 1 if the command succeeds or a -1 if the command fails.
		-si:storage array IDs or -sn:storage array names	Specifies the ID or the name of the storage array. You should separate the multiple IDs or multiple names with a comma.
		-pi:physical disk IDs or -pn:physical disk names	Specifies the ID or the name of the storage array. You should separate the multiple IDs or multiple names with a comma.
		-pl:physical enclosure\slot list	Specifies the enclosure that the physical disk is in and the slot that the physical disk occupies. Enter the name of the enclosure and slot in the enclosure1\slot1 format. You should separate the multiple names with a comma.
		-hot:hot spare	Returns a 1 if the disk is configured as a hot spare or a 0 if the disk is not configured as a hot spare.
		-cf:configured	Returns a 1 if the disk is configured for use with Backup Exec or a 0 if the disk is not configured.

Table 2-2   Command line switches for the Storage Provisioning Option
(continued)

Function	Operation	Switch	Description
		`-ucf:unconfigurable`	Returns a 1 if the disk cannot be configured because it is in a bad state. Returns a 0 if the disk is available for configuration so that Backup Exec can use it.
View storage array properties	`-o532`		Outputs the properties for a specified storage array. Returns a 1 if the command succeeds or a -1 if the command fails.
		`-sa:`	Lists all the storage arrays.
		`-si:storage array IDs` or `-sn:storage array names`	Required. Specifies the IDs or the names of the storage array. You should separate the multiple IDs or multiple names with a comma.
		`-vd:`	Lists all the virtual disks.
		`-vi:virtual disk IDs` or `-vn:virtual disk names`	Specifies the IDs or the names of the virtual disk on the storage array. You should separate the multiple IDs or multiple names with a comma.
Configure a virtual disk on a storage array	`-o534`		Configures a virtual disk on a storage array to use with Backup Exec. Returns a 1 if the command succeeds or a -1 if the command fails.

Table 2-2   Command line switches for the Storage Provisioning Option
(continued)

Function	Operation	Switch	Description
		`-vi:virtual disk ID` or `-vn:virtual disk name`	Required. Specifies the ID or the name of the virtual disk on the storage array.
		`-w`	Waits for the present operation to finish.
Rename a virtual disk or a storage array	`-o535`		Renames a virtual disk or a storage array. Returns a 1 if the command succeeds or a -1 if the command fails. You must specify either a storage array or a virtual disk to rename; you cannot specify both.
		`-si:storage array ID` or `-sn:storage array name`	Required. Specifies the ID or the name of the storage array.
		`-vi:virtual disk ID` or `-vn:virtual disk name`	Required. Specifies the ID or the name of the virtual disk on the storage array.
		`-nn:new name`	Required. Provides the new name for the device.
Detect a new storage array	`-o536`	No switch required.	Runs a scan operation to find new storage arrays, virtual disks, or physical disks.

You can find information about the Command Line Applet and other switches in a PDF document named *BEWSCommandLine_<language>.pdf*. This document is located in the Backup Exec installation directory.

About recovering the DL Appliance using the Intelligent Disaster Recovery option

You can use the Intelligent Disaster Recovery Option (IDR) to automatically recover the DL Appliance system disk if a failure occurs.

Review the following requirements:

■ You must have an operational DL Appliance enclosure.

■ You must have a full backup of the DL Appliance system disk on a virtual disk.

■ You must have access to the current IDR disaster recovery * .dr file.
The *.dr file is created when you run a full backup of the DL Appliance.

■ You must have a bootable CD image for the DL Appliance.

See Performing an automated restore by using the Disaster Recovery Wizard in the *Symantec Backup Exec for Windows Servers Administrator's Guide*.

Viewing general properties, components, and virtual disks in Backup Exec

This chapter includes the following topics:

- About viewing storage array components in Backup Exec

About viewing storage array components in Backup Exec

After Backup Exec detects disk groups and configures the virtual disks, it creates a Storage Arrays icon in the Devices view under the media server name. Each virtual disk appears under the storage array to which it belongs. An All Virtual Disks device pool also appears under the Device Pools icon. Backup Exec automatically places each virtual disk it creates in the All Virtual Disks device pool.

Figure 3-1   Storage Arrays icon and the All Virtual Disks icon
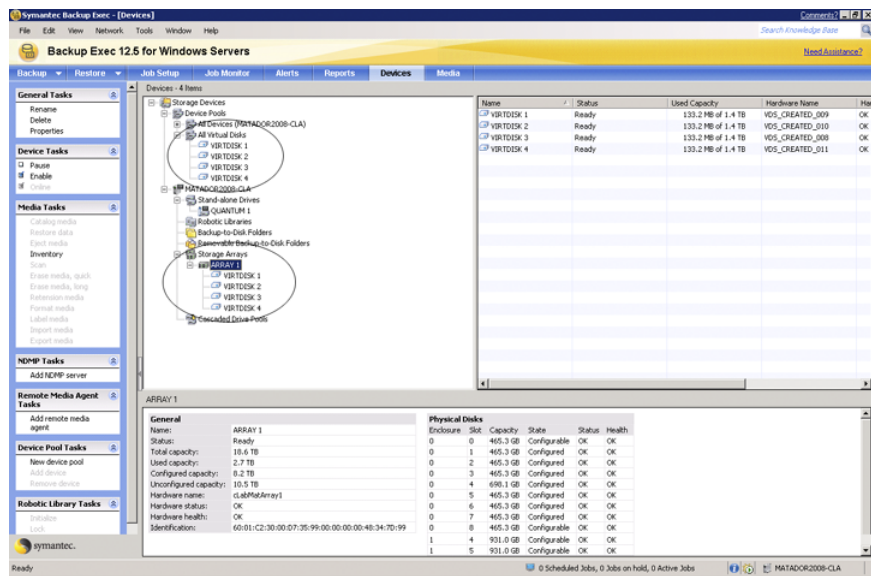
Viewing storage array components in Backup Exec

You can view the storage array components in Backup Exec:

To view storage array components in Backup Exec

1   On the navigation bar, click **Devices**.

2   Expand Storage Arrays.

3   View the storage array components.

See "About manually creating a virtual disk" on page 52.

Viewing general properties for a storage array

You can view general properties for a storage array.

To view general properties for a storage array

1   On the navigation bar, click **Devices**.

2   Expand Storage Arrays, and then select the storage array that you want to view.

3 In the task pane, under General Tasks, click **Properties**.,and then click the General tab.

4 On the General tab, view the following information:

Name	Displays the name that Backup Exec assigns to the storage array. The name is ARRAYx, where x is a number that is incremented each time that you add a storage array. You can edit this field to rename the device. Names cannot exceed 128 characters.
	The name differs if you use the Dell™ OpenManage™ Server Administrator to configure the storage array. To change the name of the storage array, you must use the Dell™ OpenManage™ Server Administrator.
Status	Lists the current status of the storage array.
	Statuses are as follows:
	■ Pause. The storage array is temporarily stopped. You can pause a storage array to perform maintenance activities. Active jobs are not affected if they start before the storage array is paused.
	■ Enable. The storage array is available for use with Backup Exec. If the storage array is not enabled, it is available for use with other applications.
	■ Online. The storage array is available for use.
	■ Offline. Backup Exec cannot access the storage array. You can click this check Offline to try to bring the storage array online.
	■ Failed. Backup Exec cannot access the storage array.
	See the *Backup Exec for Windows Servers Administrator's Guide*.

Total capacity	Lists the expected amount of total raw capacity of all the physical disks in the storage array.
	If a storage array can read the total capacity, then it appears in this field. Otherwise, Backup Exec estimates the total capacity.
Used capacity	The amount of raw capacity of all of the physical disks in the storage array that have been used. Backup Exec calculates used capacity by subtracting available capacity from total capacity.
Configured capacity	The amount of expected total raw capacity of all of the configured physical disks in the storage array.
Unconfigured capacity	The expected amount of total raw capacity of all of the unconfigured physical disks in the storage array.
Hardware name	The name that the Dell™ OpenManage™ Server Administrator assigns to the storage array hardware.
Hardware status	Values for hardware status are as follows:

- OK.

  Note: The storage array is online.
- Offline.
  The storage array and the virtual disks on the storage array are offline. Backup Exec cannot access them.

For more information, see your Dell documentation.

Hardware health	Values for hardware health are as follows:
	■ OK. The storage array is online. ■ Warning. The storage array may fail or produce errors, but it is currently operational. The storage array and the virtual disks on the storage array are offline. Backup Exec cannot access them. ■ Critical. The storage array has failed. The storage array and the virtual disks on the storage array are offline. Backup Exec cannot access them. For more information, see your Dell documentation.
Identification	Information that Dell provides to assist you with identification of the attached storage array hardware. See your Dell documentation.

Changing or viewing general properties of virtual disks on storage arrays

You can change or view general properties for a virtual disk on a storage array.

To change or view general properties of virtual disks on storage arrays

1   On the navigation bar, click **Devices**.

2   Expand Storage Arrays, and then select the virtual disk that you want to view.

3   In the task pane, under General Tasks, click **Properties**.

4   On the General tab, view or set the following defaults as appropriate:

Name	Displays the name Backup Exec assigns to the virtual disk. The name is VIRTDISK x , where x is a number that increments each time that you add a virtual disk. You can edit this field to rename the device. Names cannot exceed 128 characters. You can choose a name if you use the Dell™ OpenManage™ Server Administrator to configure the virtual disk. To change the name of the virtual disk, use the Dell™ OpenManage™ Server Administrator.
Status	The current status of the virtual disk is checked. Statuses for a virtual disk are as follows: ■ Pause. 　The virtual disk is temporarily stopped. ■ Enable. 　The virtual disk is available for use with Backup Exec. If the virtual disk is disabled, it is available for use with other applications. Backup Exec does not monitor the low disk space thresholds for a disabled virtual disk. ■ Online. 　The virtual disk is available for use. ■ Offline. 　Backup Exec cannot access the virtual disk. You can check **Offline** to try to bring the storage array online.
Used capacity	The amount of raw capacity of all of the physical disks in the storage array that were used. Backup Exec calculates used capacity by subtracting available capacity from total capacity.
Hardware name	The name that the Dell™ OpenManage™ Server Administrator assigns to the virtual disk.

Hardware status	Values for the hardware status are as follows: ■ OK The virtual disk is online. ■ Offline The virtual disk is offline. Backup Exec cannot access it. To bring the virtual disk online, refer to the Dell documentation and management software that is supplied with the storage array. ■ Failed The virtual disk has failed. Backup Exec cannot access it. To troubleshoot the issue, refer to the Dell documentation and management software that is supplied with the storage array. After the issue is resolved, the virtual disk is automatically brought online.
Hardware health	Values for the hardware health are as follows: ■ OK The virtual disk is online. ■ Warning The virtual disk may fail or produce errors, but it is currently operational. ■ Critical The virtual disk has failed. Backup Exec cannot access it. To troubleshoot the issue, refer to your Dell documentation and Dell management software. ■ Unspecified The virtual disk is in the process of configuration.

Disk classification	The type of disk group that the virtual disk is on.
	Backup Exec creates only physical disk groups with a disk classification of Stripe with parity (RAID 5). If another disk classification appears, the disk group was created with an application other than the Storage Provisioning Option.
Maximum file size	Type the maximum size for each file that is contained on this virtual disk. Select either MB or GB. The file size can be from one MB to 4096 GB. The default is four GB.
	If you create small but numerous files, performance may slow since the computer must still process each file. However, if you create large files, file system limitations can cause memory allocation problems or network issues. These issues can be a problem if you store files across a network.
Maximum number of backup sets per file	Type the maximum number of backup sets to write to each virtual disk file. The maximum number can range from one to 8192. The default number is 100.
	If you specify fewer rather than more backup sets in a file, Backup Exec may be able to reclaim disk space faster. For example, you specify 100 backup sets per file. Backup Exec cannot reclaim any disk space until the overwrite protection period expires for all of the backup sets. If you specify one backup set per file, Backup Exec can reclaim disk space as soon as the overwrite protection period expires for that set.
Allow x concurrent jobs for this device	Type the number of concurrent operations that you want to allow to this virtual disk. This number can range from one to 16. The default number is one.

See "Setting default options for all virtual disks on a storage array" on page 39.

See "Setting default options for an individual virtual disk on a storage array" on page 41.

Viewing properties of unconfigured virtual disks on a storage array

You can view the properties of an unconfigured virtual disk on a storage array.

To view properties of unconfigured virtual disks on a storage array

1   On the navigation bar, click **Devices**.

2   Expand Storage Arrays, and then select an unconfigured virtual disk.

3   In the task pane, under General Tasks, click **Properties**.

4   On the Virtual Disk (Unconfigured) Properties dialog box, view the following information:

5   Name

Displays the name of the unconfigured virtual disk. You can edit this field to rename the device. Names cannot exceed 128 characters.

The default name is VIRTDISK x, where x is a number that increments each time that you create a virtual disk.

Hardware name

The name that the Dell™ OpenManage™ Server Administrator assigns to the virtual disk.

Hardware status

Values for the hardware status are as follows:

- OK
  The unconfigured virtual disk is online.
- Offline
  The unconfigured virtual disk is offline.
- Failed
  The unconfigured virtual disk has failed.

Hardware health	Values for the hardware health are as follows: ■ OK The unconfigured virtual disk is online. ■ Warning The unconfigured virtual disk may fail or produce errors, but it is currently operational. ■ Critical The unconfigured virtual disk has failed. ■ Unspecified The unconfigured virtual disk is in the process of configuration.
Disk classification	The type of disk group that the unconfigured virtual disk is on. Disk classifications are as follows: ■ Stripe with parity (RAID 5) ■ Simple (RAID 0) Backup Exec creates only physical disk groups with a disk classification of Stripe with parity (RAID 5). If another disk classification appears, the disk group was created with a tool other than the Storage Provisioning Option.

See "About manually creating a virtual disk" on page 52.

See "Configuring an unconfigured virtual disk for use with Backup Exec" on page 52.

Viewing properties of physical disks on a storage array

You can view properties for the physical disks in a storage array.

To view properties of physical disks on a storage array

1   On the navigation bar, click **Devices**.

2   Expand Storage Arrays, and then select the storage array that you want to view.

3   In the task pane, under General Tasks, click **Properties**.

4   On the Physical Disks tab, view the following information:

Enclosure	Identifies the enclosure that the physical disk is in.
Slot	Identifies the slot that the physical disk occupies.
Capacity	The total amount of available disk space on the physical disk in this slot.
State	States are as follows: ■ Hot spare The physical disk is configured as a hot spare. ■ Configured The physical disk is configured for use with Backup Exec. ■ Configurable The physical disk is available for configuration so that Backup Exec can use it. ■ Unconfigurable The physical disk cannot be configured because it is in a bad state, or it has failed. ■ Allocated The physical disk is in the process of configuration.

Status	Values for hardware status are as follows:
	
	■ OK
	  The physical disk is online.
	■ Offline
	  The physical disk is offline. The virtual disks that use this physical disk may also be offline. Backup Exec cannot access them.
	■ Failed
	  The physical disk has failed. The virtual disks that use this physical disk may also fail. Backup Exec cannot access the virtual disks.
	  If hot spares are configured, the virtual disk is automatically rebuilt. If your storage array does not support an automatic rebuild capability, you must use vendor tools to perform a manual rebuild of the virtual disks. Refer to your Dell documentation for more information.
	
	To troubleshoot issues, refer to the Dell documentation and management software that are supplied with DL Appliance.

Health	Values for hardware health are as follows:
	
	■ OK
	  The physical disk is online.
	■ Warning
	  The physical disk may fail or produce errors, but it is currently operational.
	■ Critical
	  The physical disk may fail. You should replace the physical disk.
	
	To troubleshoot issues, refer to the Dell documentation and management software that are supplied with DL Appliance.

Renaming a virtual disk or storage array

You can rename a virtual disk or storage array. You cannot change the hardware name.

To rename a virtual disk or storage array

1   On the navigation bar, click **Devices**.

2   Expand Storage Arrays, and then select the virtual disk or the storage array that you want to rename.

3   In the task pane, under General Tasks, click **Rename**.

4   Rename the virtual disk or storage array, and then click **OK**.

The device is renamed.

About the All Virtual Disks device pool in the Storage Provisioning Option

After you complete the Backup Exec installation, Backup Exec adds the All Virtual Disks device pool to the list of device pools. The All Virtual Disks device pool contains all virtual disks from all storage arrays on all computers in the Backup Exec environment. Unconfigured virtual disks do not appear in the All Virtual Disks device pool until they have been configured with Backup Exec.

See "About manually creating a virtual disk" on page 52.

See "Configuring an unconfigured virtual disk for use with Backup Exec" on page 52.

Chapter 4

Setting default configuration options for virtual disks

This chapter includes the following topics:

- Setting default options for all virtual disks on a storage array
- Setting default options for an individual virtual disk on a storage array

Setting default options for all virtual disks on a storage array

You can set the default options that apply to all new virtual disks on the storage arrays.

To set defaults for all virtual disks on a storage array

1   On the Tools menu, click **Options**.

2   In the Properties pane, under Settings, click **Virtual Disk**.

3 Set the following defaults as appropriate:

Maximum number of backup sets per file	Type the maximum number of backup sets to write to a virtual disk. The maximum number can be from one to 8192. The default is 100.
	If you specify fewer rather than more backup sets in a file, Backup Exec may be able to reclaim disk space faster. For example, you specify 100 backup sets per file. Backup Exec cannot reclaim any disk space until the overwrite protection period expires for all of the backup sets. If you specify one backup set per file, Backup Exec can reclaim disk space as soon as the overwrite protection period expires for that set.
Maximum size for files	Type the maximum size for each file that this virtual disk contains. Select either MB or GB as the unit of size. The file size can be from one MB to 4096 GB. The default size is four GB.
	If you create small but numerous files, performance may be slow since the computer must still process each file. However, if you create large files, file system limitations can cause memory allocation issues or network issues. These issues can be a problem if you store files across a network.
Allow x concurrent jobs	Type the number of concurrent operations that you want to allow to this virtual disk. This number can be from one to 16.
Threshold 1	Type the low disk space threshold at which you want Backup Exec to send the first of three alerts. The default is 75%, which is a percentage of the total available disk space on this virtual disk. You can change the default, and you can change the amount of space from a percentage to megabytes or gigabytes.

Threshold 2	Type the low disk space threshold at which you want Backup Exec to send the second of three alerts. The default is 85%, which is a percentage of the total available disk space on this virtual disk. You can change the default, and you can change the amount of space from a percentage to megabytes or gigabytes.
Threshold 3	Type the low disk space threshold at which you want Backup Exec to send the last of three alerts. The default is 95%, which is a percentage of the total available disk space on this virtual disk. You can change the default, and you can change the amount of space from a percentage to megabytes or gigabytes.

4 Click **OK**.

Setting default options for an individual virtual disk on a storage array

You can set the default options that apply to individual virtual disks.

To set defaults options for an individual virtual disk on a storage array

1 On the navigation bar, click **Devices**.

2 Expand Storage Arrays, and then select the virtual disk that you want to view.

3 In the task pane, under General Tasks, click **Properties**.

4 On the Advanced tab, change the following information as appropriate:

First threshold	Type the first low disk space threshold at which you want Backup Exec to send an alert. You can change the value of the threshold, and you can change the amount of disk space to megabytes or gigabytes.
	When the amount of used disk space reaches this threshold, Backup Exec sends an alert. The default is 75%, which is a percentage of the total available disk space on this virtual disk.

Second threshold	Type the second low disk space threshold at which you want Backup Exec to send an alert. You can change the value of the threshold, and you can change the amount of disk space to megabytes or gigabytes.
	When the amount of used disk space reaches this threshold, Backup Exec sends an alert. The default is 85%, which is a percentage of the total available disk space on this virtual disk.
Third threshold	Type the third low disk space threshold at which you want Backup Exec to send an alert. You can change the value of the threshold, and you can change the amount of disk space to megabytes or gigabytes.
	When the amount of used disk space reaches this threshold, Backup Exec sends an alert. The default is 95%, which is a percentage of the total available disk space on this virtual disk.
Auto detect settings	Check **Auto detect settings** to let Backup Exec automatically detect the preferred settings for this device.
	Uncheck **Auto detect settings** if you want to set buffered reads or writes.
	The default setting is On.
Buffered read	Check **Buffered read** in the following situations:
	■ You do not want Backup Exec to automatically detect settings for this device.
	■ You want this device to allow buffered reads, which is the reading of large blocks of data.
	If you enable Buffered read, it may provide increased performance.
	The default setting is Off.

Buffered write	Check **Buffered write** in the following situations:
	■ You do not want Backup Exec to automatically detect settings for this device.
	■ You want this device to allow buffered writes, which is the writing of large blocks of data.
	The default setting is On.

5 Click **OK**.

Predicting disk usage, setting thresholds, and configuring alerts using Backup Exec

This chapter includes the following topics:

About predicting disk usage in the Storage Provisioning Option

After you install the Storage Provisioning Option, Backup Exec can predict the usage of disk space on the storage arrays. You can configure Backup Exec to send an alert when it predicts the amount of available disk space for all storage arrays is low. The alert provides information about whether the current disk space resources are sufficient, and can help you plan when to increase disk space.

Backup Exec gathers sample data for statistical analysis. For example, you can use the defaults to let Backup Exec gather data for a one-week period of 24-hour days. To ensure statistical accuracy, by default Backup Exec keeps 35 sample groups of data. Backup Exec examines the job history data for each sample group and uses the new data to recalculate the disk usage trends.

Backup Exec uses the sample data to estimate the rate at which future jobs will use space in the disk array. Backup Exec computes the statistical average for previous usage and determines any upward trends or downward trends. Backup Exec also calculates the amount of used disk space that becomes available as the overwrite protection periods expire for previous backup sets.

Backup Exec combines these estimates with the amount of available disk space on storage arrays. Backup Exec can then predict how much time remains before the disk space on all storage arrays is depleted.

The accuracy of the prediction is reduced if any of the following conditions occur:

■ The amount of history data is insufficient for a statistically valid estimate.

■ The history data shows substantial variance and lack of repeatability.

Backup Exec sends the alerts to notify you when these conditions occur.

See "Configuring an alert for low disk space on storage arrays" on page 46.

Configuring an alert for low disk space on storage arrays

Backup Exec gathers disk usage information for all attached storage arrays. Through statistical analysis, Backup Exec then estimates how much time remains before the disk space on all storage arrays is depleted. You can also specify how many days before low disk space occurs that you want Backup Exec to send an alert.

See "About predicting disk usage in the Storage Provisioning Option" on page 45.

To configure an alert for low disk space on storage arrays

1   On the Tools menu, click **Options**.

2   In the Properties pane, under Settings, click **Storage Provisioning Alert**.

3   Change the following defaults as appropriate:

Send low disk space alert x days before predicted low disk space condition for all storage arrays	Type the number of days before low disk space occurs that you want Backup Exec to send an alert.

The default number is 30 days. |
| Sample groups | Type the number of sample groups for Backup Exec to average to ensure a valid analysis.

The default number is 35 sample groups. |
| Samples per group | Type the number of samples per group. Each sample is a period of time during which Backup Exec gathers data. For example, if you specify the default of seven samples per group, Backup Exec gathers data for seven periods of time. The period of time is the sample interval that you specify. Backup Exec averages the samples in the group for statistical analysis.

The default number is seven samples per group. |
| Sample interval | Type the number of hours during which Backup Exec gathers data for a sample. For example, if you specify the default sample interval of 24 hours, Backup Exec gathers data for 24 hours.

The default sample interval is 24 hours. |

4   Click **OK**.

See "About predicting disk usage in the Storage Provisioning Option" on page 45.

Configuring disk space thresholds for a virtual disk

You can set low disk space thresholds for a virtual disk.

To configure disk space thresholds for a virtual disk

1   On the navigation bar, click **Devices**.

2   Expand Storage Arrays, and then select the virtual disk that you want to view.

3   In the task pane, under General Tasks, click **Properties**.

4   On the Advanced tab, complete the following information as appropriate:

First threshold	Type the first low disk space threshold at which you want Backup Exec to send an alert. You can change the value of the threshold, and you can change the amount of disk space to megabytes or gigabytes.
	When the amount of used disk space reaches this threshold, Backup Exec sends an alert. The default threshold is 75%, which is a percentage of the total available disk space on this virtual disk.
Second threshold	Type the second low disk space threshold at which you want Backup Exec to send an alert. You can change the value of the threshold, and you can change the amount of disk space to megabytes or gigabytes.
	When the amount of used disk space reaches this threshold, Backup Exec sends an alert. The default threshold is 85%, which is a percentage of the total available disk space on this virtual disk.
Third threshold	Type the third low disk space threshold at which you want Backup Exec to send an alert. You can change the value of the threshold, and you can change the amount of disk space to megabytes or gigabytes.
	When the amount of used disk space reaches this threshold, Backup Exec sends an alert. The default threshold is 95%, which is a percentage of the total available disk space on this virtual disk.
Auto detect	Check **Auto detect settings** to let Backup Exec automatically detect the preferred settings for this device.
	Uncheck **Auto detect settings** if you want to set buffered reads or writes.
	The default setting is On.

Buffered read	Check **Buffered read** in the following situations:
	■ You do not want Backup Exec to automatically detect settings for this device.
	■ You want this device to allow buffered reads, which is the reading of large blocks of data.
	If you enable Buffered read, increased performance may result.
	The default setting is Off.
Buffered write	Check **Buffered write** in the following situations:
	■ You do not want Backup Exec to automatically detect settings for this device.
	■ You want this device to allow buffered writes, which is the writing of large blocks of data.
	The default setting is On.

Expanding storage capabilities of the Dell™ PowerVault™ DL Backup to Disk Appliance by using the Storage Provisioning Option

This chapter includes the following topics:

About detecting a new storage array enclosure

You can expand the storage capacity of the DL Appliance by adding an additional storage array enclosure. Backup Exec automatically detects the new enclosure and issues an alert when the following conditions are present:

- The enclosure is configured in a standard configuration.
- The DL Appliance uses the configuration policy called Automatic with confirmation.

Backup Exec creates and configures virtual disks for each disk group it detects in the new enclosure. Backup Exec then adds the virtual disk names to the All Virtual Disks device pool. It also adds the names to the storage array that is found under the Storage Arrays icon.

If the DL Appliance uses a policy called Automatic without confirmation, Backup Exec immediately creates the virtual disks. It adds the virtual disks to the All Virtual Disks device pool and to the storage array that is found under Storage Arrays.

See "About the DL Appliance configuration states and configuration policies" on page 9.

Detecting new physical disks in the storage array enclosure

New SATA physical disks that you add to the storage array enclosure are automatically detected when you start Backup Exec. Backup Exec also detects them when you run the Scan operation. Run a scan operation to let Backup Exec detect new storage arrays, physical disks, or virtual disks.

To detect new physical disks

1   On the navigation bar, click **Devices**.

2   Expand **Storage Arrays**.

3   In the task pane, under Media Tasks, click **Scan**.

    After the scan completes, the new storage array appears in the Devices view, under Storage Arrays.

4   If the scan does not discover the storage array, restart the Backup Exec services.

    After you restart the services, the new storage array appears in the Devices view, under Storage Arrays.

About manually creating a virtual disk

You can use the Dell™ OpenManage™ Server Administrator to manually create a virtual disk. After you manually create the virtual disk, Backup Exec automatically detects it as an unconfigured virtual disk on the storage array. An unconfigured virtual disk must be configured before Backup Exec can use it.

Configuring an unconfigured virtual disk for use with Backup Exec

After you create a virtual disk with the Dell™ OpenManage™ Server Administrator, you must configure the virtual disk to use with Backup Exec. Backup Exec can only use configured virtual disks as destination devices for jobs. When you configure the virtual disk, Backup Exec submits a job named Configure Virtual Disk. When the job completes, the virtual disk is configured and added to the All Virtual Disks device pool.

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About manually creating a virtual disk

To configure an unconfigured virtual disk for use with Backup Exec

1   On the navigation bar, click **Devices**.

2   Expand Storage Arrays, and then select the unconfigured virtual disk.

3   In the task pane, under Media Tasks, click **Configure**.

4   When you are prompted, click **OK**.

    Backup Exec submits a Configure Virtual Disk job to configure the virtual
    disk as a destination device for jobs.

See "Setting default options for an individual virtual disk on a storage array"
on page 41.

Troubleshooting

This chapter includes the following topics:

■ Troubleshooting the DL Appliance

Troubleshooting the DL Appliance

Refer to the Dell documentation and management software for help if the following issues occur with the DL Appliance:

■ The hardware health status for the storage array is Offline.

■ The hardware status for the storage array is Failed.

■ The hardware health status for the storage array is Critical.

After an issue is resolved, the storage array and the associated virtual disks are brought online automatically by Backup Exec.

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