



# ShadowProtect™ User Guide



# ShadowProtect User Guide

## Version 4.x

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# Table of Contents

<b>Chapter 1: About the User Guide</b>	<b>5</b>
<b>Chapter 2: ShadowProtect Overview</b>	<b>7</b>
2.1 Features and Components.....	8
2.2 Usage Scenarios.....	10
<b>Chapter 3: How ShadowProtect Works</b>	<b>13</b>
3.1 Create a Backup Image.....	14
3.2 Restore a Backup Image.....	15
3.3 Backup Image Files.....	15
<b>Chapter 4: Installing ShadowProtect</b>	<b>18</b>
4.1 Requirements.....	18
4.2 License and Install Options.....	20
4.3 Starting ShadowProtect.....	21
4.4 Activating ShadowProtect.....	21
4.5 Uninstalling ShadowProtect.....	24
<b>Chapter 5: Understanding ShadowProtect Console</b>	<b>25</b>
5.1 Menu Bar.....	25
5.2 Navigation Panel.....	27
5.3 Tabs .....	29
5.4 Management View .....	35
5.5 Network View.....	36
<b>Chapter 6: Creating Backup Image Files</b>	<b>38</b>
6.1 Backup Image File Storage Locations.....	40
6.2 Destinations.....	41
6.3 Options.....	43
6.4 Deleting Backup Image Files.....	48
<b>Chapter 7: Mounting Backup Image Files</b>	<b>49</b>
7.1 Mounting Backup Image Files in Windows.....	51

7.2 Backup Image Mount Options.....	51
7.3 Dismounting Backup Image Files.....	52
<b>Chapter 8: Restoring a Volume</b>	<b>54</b>
<b>Chapter 9: Backup Image Tool</b>	<b>57</b>
<b>Chapter 10: Remote Management</b>	<b>60</b>
10.1 Remote Management with the Management Console.....	60
10.2 Remote Management with the Network View.....	64
<b>Chapter 11: Using VirtualBoot</b>	<b>67</b>
11.1 VirtualBoot Requirements.....	67
11.2 Limitations.....	68
11.3 Creating a VM.....	68
11.4 Configuring a VM.....	73
<b>Chapter 12: Other Operations</b>	<b>76</b>
12.1 Verifying Backup Image Files.....	76
12.2 Configuring Email Notifications.....	78
12.3 Log Files.....	79
12.4 Creating Key Files.....	79
12.5 Changing Partiton Creation Policy .....	81
12.6 Creating a Recovery CD.....	82
<b>Chapter 13: Best Practices</b>	<b>83</b>
<b>Chapter 14: Retention Policy Configurations</b>	<b>84</b>
<b>Chapter 15: Product Support</b>	<b>85</b>
<b>Chapter 16: Glossary</b>	<b>86</b>
<b>Chapter 17: End User License Agreement</b>	<b>90</b>

## Chapter 1: About the User Guide

Welcome to the *ShadowProtect User Guide*. This Guide describes the ShadowProtect technology, how to use the product, and how to derive maximum benefit from ShadowProtect. ShadowProtect comes in three editions. While most differences between the various editions of ShadowProtect relate to the associated user license, this Guide specifically identifies information that applies to a specific edition.

**Table 1: ShadowProtect editions**

Edition	Description
<b>ShadowProtect Desktop Edition</b>	Provides volume backup and restore options for a single system. This edition is most suitable for home use.
<b>ShadowProtect Server Edition</b>	Provides backup and restore options for multiple desktop and server systems.
<b>ShadowProtect SBS Edition</b> (Small Business)	Provides backup and restore options for multiple desktop and server systems in a small business environment.

This Guide includes the following general sections:

- Chapter 2: ShadowProtect Overview<sup>[7]</sup>
- Chapter 3: How ShadowProtect Works<sup>[13]</sup>
- Chapter 4: Installing ShadowProtect<sup>[18]</sup>
- Chapter 5: Understanding ShadowProtect Console<sup>[25]</sup>
- Chapter 6: Creating Backup Image Files<sup>[38]</sup>
- Chapter 7: Mounting Backup Image Files<sup>[49]</sup>
- Chapter 8: Restoring a Volume<sup>[54]</sup>
- Chapter 9: Backup Image Tool<sup>[57]</sup>
- Chapter 10: Remote Management<sup>[60]</sup>
- Chapter 11: Using VirtualBoot<sup>[67]</sup>
- Chapter 12: Other Operations<sup>[76]</sup>
- Chapter 13: Best Practices<sup>[83]</sup>

Additionally, this Guide includes the following general information sections.

- Chapter 14: Common Retention Policy Configurations<sup>[84]</sup>
- Chapter 15: Product Support<sup>[85]</sup>
- Chapter 16: Glossary<sup>[86]</sup>
- Chapter 17: Technician License Agreement<sup>[90]</sup>

## Additional Information

- For emerging issues and other resources, see the following:
  - The `readme.txt` file included on the ShadowProtect CD.
  - The StorageCraft technical support Web site at [www.storagecraft.com/support.html](http://www.storagecraft.com/support.html)
- This User Guide is also available in the ShadowProtect user interface from the Help menu.
- For a glossary of ShadowProtect terms and definitions, see Chapter 16: Glossary<sup>[86]</sup>.

## Documentation Conventions



This symbol designates Note or Warning text that provides important information about the configuration and/or use of ShadowProtect.

## Chapter 2: ShadowProtect Overview

ShadowProtect provides robust and flexible disaster recovery by creating and managing backup image files. Each backup image file represents the exact state of your system at a given point-in-time. ShadowProtect provides tremendous advantages over traditional disaster recovery methods.

**Table 2: Restoring a system volume**

Other Methods		ShadowProtect	
1	Repair hardware if necessary	1	Repair hardware if necessary
2	Collect all necessary OS media	2	Boot from Recovery CD
3	Reload OS from CD-ROM	3	Restore entire system or selected files
4	Reboot	4	Reboot
5	Apply multiple service packs	FULLY RESTORED IN MINUTES	
6	Reboot (this could take several reboots)		
7	Reload backup software from CD-ROM		
8	Patch backup software to the latest support level		
9	Reboot		
10	Load recovery tape and restore		
FULLY RESTORED IN HOURS			

You should be aware of the following information as you prepare to install and use ShadowProtect:

- Features and Components [\[ 8 \]](#)
- Usage Scenarios [\[ 10 \]](#)
- Backup Image Files [\[ 15 \]](#)

## 2.1 Features and Components

ShadowProtect consists of the following primary components:

**Table 3: ShadowProtect components**

Component	Features
ShadowProtect Console	<p>A Windows-based disaster recovery environment that provides the following primary features:</p> <ul style="list-style-type: none"> <li>• <b>New!</b> VirtualBoot lets you create a VM from any backup image file that you can then boot in the VirtualBox Virtual Machine environment.</li> <li>• <b>New!</b> The Backup Image tool now provides the ability to convert backup image files into virtual file formats, including the VMWare VMDK format and the Microsoft VHD format.</li> <li>• <b>New!</b> Support for Windows 7 and Windows Server 2008 R2, including 64-bit support.</li> <li>• <b>New!</b> The Management View greatly simplifies the administration of ShadowProtect on multiple systems, including the ability to push the ShadowProtect Backup agent out to remote systems.</li> <li>• Microsoft Volume Shadow Copy Service (VSS) aware.</li> <li>• Schedule live backups in the background while you work.</li> <li>• Backup to any accessible drive, including network storage (SAN, NAS, iSCSI), removable drives (USB, FireWire), and optical media (CD, DVD, Blu-Ray).</li> <li>• Verify backup images to ensure complete recovery.</li> <li>• An easy-to-use user interface that lets you quickly recover folders or files from a backup image.</li> <li>• Create compressed and encrypted backup image files for efficiency and security.</li> <li>• Mount backup images for simple folder or file updates.</li> <li>• Restore your system to an exact point-in-time.</li> <li>• Restore images to different hardware or to virtual environments (P2P,P2V,V2P).</li> <li>• View backup images for quick file and folder recovery.</li> <li>• Shrink Volume allows you to shrink an image file so you can restore to a smaller drive.</li> <li>• I/O throttling for each backup job.</li> <li>• Remotely manage system backup and recovery operations.</li> </ul>
StorageCraft Recovery Environment	<p>The ShadowProtect CD contains a bootable Windows environment for disaster recovery options without installing any software. For more information about the Recovery Environment, see the <i>StorageCraft Recovery Environment User Guide</i>.</p> <ul style="list-style-type: none"> <li>• <b>New!</b> Resume on Interrupt lets you resume an interrupted restore operation from the point of interruption, rather than having to start the restore process over again.</li> </ul>



	<ul style="list-style-type: none"> <li>• <b>New!</b> An improved Boot Configuration Tool with support for Windows 7.</li> <li>• <b>New!</b> HeadStart Restore lets you restore a volume while ShadowProtect continues to add Incremental backup images to the same backup image chain. This can reduce restore time from days or weeks to minutes or hours, even for very large volumes.</li> <li>• Access all the features of the ShadowProtect Console from a standalone disaster recovery environment.</li> <li>• Loads from the bootable ShadowProtect CD.</li> <li>• Create ExactState™ backup images without installing any software.</li> <li>• If the system is unable to boot, ShadowProtect lets you back up the system before a destructive restore potentially destroys valuable data</li> <li>• Use Hardware Independent Restore (HIR) to restore backup image files to a different environment, either physical or virtual.</li> <li>• Network configuration tool to manage TCP/IP properties, domains and network resources.</li> <li>• Remotely recover your system and data</li> <li>• Perform a quick and simple bare metal system recovery.</li> </ul>
ShadowProtect Backup Agent	<p>The engine that creates and manages a system's point-in-time backup images. The Backup Agent also handles mounting of backup image files. You can manage the operation of the Backup Agent from the ShadowProtect Console.</p> <p>To access the ShadowProtect Backup Agent, you must be a domain user with local administration rights.</p>
ImageManager	<p>ImageManager provides unprecedented control over your backup image files. It provides policy-driven services for managing backup image files, including:</p> <ul style="list-style-type: none"> <li>• Consolidation of Incremental backup image files into daily, weekly, and monthly consolidated image files that greatly reduce the number of files in an image chain.</li> <li>• Verification and re-verification of backup image files, including consolidated files.</li> <li>• Replication of backup image files to a local drive.</li> <li>• <b>New!</b> For an additional fee you can extend replication support to off-site storage through LAN/WAN and FTP.</li> <li>• <b>New!</b> For an additional fee, Head Start Restore (HSR) provides the ability to restore a backup image while ShadowProtect continues to add Incremental backup images to the same backup image chain. In a world of multi-Terabyte storage HSR lets you short-circuit the restore process, greatly limiting the down-time associated with hardware failure or migration tasks.</li> </ul> <p>For more information about ImageManager features, see the <i>ShadowProtect ImageManager User Guide</i>.</p>

## 2.2 Usage Scenarios

ShadowProtect offers a variety of backup and recovery solutions, depending on your needs. This section includes several usage scenarios that help describe ShadowProtect features and benefits. ShadowProtect usage scenarios are organized into the following types:

- ShadowProtect Console Scenarios<sup>[10]</sup>
- VirtualBoot Scenarios<sup>[11]</sup>

### ShadowProtect Console Scenarios

The following scenarios introduce several common use cases for ShadowProtect:

#### Live Backup

**Problem:** When taking system backups, I cannot take the time to shutdown a system each time I want to create a backup image.

**ShadowProtect Solution:** By leveraging disk imaging with existing Windows snapshot technology, ShadowProtect lets you create live system backups without any system downtime. ShadowProtect creates live backup images that include a system's operating system, critical data and configuration settings.

#### ExactState Backup Images

**Problem:** I need to create the most reliable and recoverable backup images possible.

**ShadowProtect Solution:** ShadowProtect includes ExactState backup image technology that lets you create an image from the StorageCraft Recovery Environment, thereby ensuring that all system files and resources are closed and in a state where ShadowProtect can create a complete backup image. ExactState image technology supports all Windows server and desktop operating systems.

#### Create Full and Incremental Backup Images

**Problem:** Making a full backup image every time I backup a system is very time consuming. I need to be able to make incremental backup images to save time and space.

**ShadowProtect Solution:** ShadowProtect uses a sector-based backup strategy that lets it backup just the changes to a file in an Incremental backup image file. Sector-based incremental backup is the quickest and most efficient way to take an incremental backup. Once you have an initial Full backup, you can create regular Incremental backup images from that point forward.

#### Individual Folder and File Restore

**Problem:** Restoring individual files and folders traditional backup systems, such as a tape drive, can be very difficult and time-consuming...assuming I can even find the necessary data in the first place. I need a quick and easy method to recover lost files or folders.

**ShadowProtect Solution:** Use the ShadowProtect Backup Explore Wizard to mount a backup image file as a volume using a Drive letter or mount point. Once mounted, you can explore and recover individual files and folders from the backup image. Disk-based backup images provide fast file access, and you can even share backup images so Since the backups are disk-based, the process is very fast and easy and uses Windows Explorer. The IT administrator can mount a backup image and share this with end users who can select the files and folders they need to

restore.

## Update an Existing Backup Image

**Problem:** I have an existing backup image, but need to update a driver in that image, or clean a virus or other malware from the backup image before restoring files. I don't want to have to clean the system, then re-create the backup image before using it to restore a system.

**ShadowProtect Solution:** Because you can mount ShadowProtect backup image files as read/write volumes, you can modify and repair backup images as needed. ShadowProtect saves backup image changes as a separate Incremental image file.

## VirtualBoot Scenarios

The following scenarios introduce several possible use cases for VirtualBoot:

### Historical Data Access

**Problem:** After transitioning to a new financial management system, you are audited. To satisfy the audit, you need access to historical tax records stored in the proprietary format of the old financial software. Unfortunately, you no longer have the old software, so you cannot access your historical tax records.

**VirtualBoot Solution:** Rather than trying to restore a complete backup image that contains the old financial software, use VirtualBoot to boot the backup image, which gives you access to both the application and the data from your system at the time of the backup. By preserving the applications with the data, you can greatly extend the lifespan of your data.

### Software Testing

**Problem:** You need to find out how some new software performs on your production system, but you don't want to risk having any problems.

**VirtualBoot Solution:** VirtualBoot the latest backup of your production system, then install the software in the virtual machine. You can evaluate the software performance using your system's actual production environment without any risk to your production system.

### Backup Image Testing

**Problem:** You need to confirm that your backup images restore properly and that they provide access to all your mission critical applications and data.

**VirtualBoot Solution:** VirtualBoot a recent backup image and you can verify that the restored applications and data perform as expected..

### Hardware Failure

**Problem:** You have a database server and the 20TB disk array crashes. You need to get the system back on-line and replace the disk subsystem.

**VirtualBoot Solution:** VirtualBoot the latest backup image of your database server and continue to create incremental backups within the VM (the incremental backups are part of the original backup image chain). As soon as the VM is available, users can continue to use the database server as if the database server is still on-line. The interim VM solution performs well because there is no file conversion required. StorageCraft provides native support for its backup image files in the VirtualBox

environment.

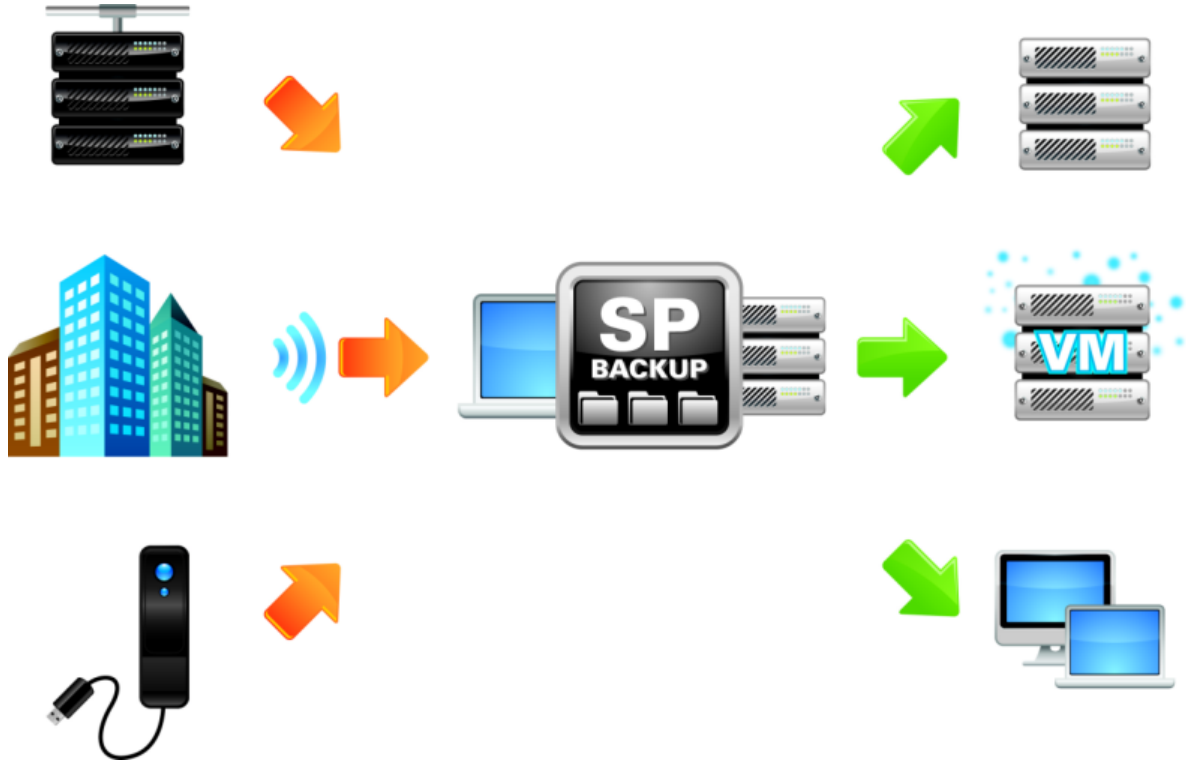
Once the VM is up and running, start a Head Start Restore (HSR) on the database server's new disk subsystem (For information about HSR, see the *ShadowProtect ImageManager User Guide*). Once HSR catches up to the most current incremental, you can finalize the HSR installation on the new disk subsystem, take the VM down, then bring the database server back on-line. VirtualBoot reduces downtime from several days to only minutes.



**Note:** Once you have the replacement VM environment running, and continuing the incremental backup image chain, you have the ability to recover the system several different ways, including: restore to the original hardware, repaired as necessary; restore to new hardware (using HIR); or restore permanently to a VM environment. Whatever you choose, VirtualBoot helps eliminate the downtime associated with the failure.

## Chapter 3: How ShadowProtect Works

ShadowProtect provides robust and flexible disaster recovery by creating and managing backup image files. Each backup image file represents the exact state of your system at a given point-in-time.



### ShadowProtect Backup and Restore - How it Works

There are two primary tasks related to data recovery with ShadowProtect:

- Create a Backup Image<sup>14</sup>.
- Restore a Backup Image<sup>15</sup>.

### 3.1 Create a Backup Image

Creating a ShadowProtect backup image involves two key processes:

#### Create a Virtual Volume

Using Microsoft VolSnap and VSS (with Windows Server 2003, Windows XP, or later), ShadowProtect creates a point-in-time snapshot of the volume you want to backup. The entire process of taking a snapshot of a volume and creating a virtual volume takes only seconds and does not interfere with system operation.

**Table 4: Snapshot methods supported by ShadowProtect**

Snapshot	Supported OS	Image Speed	Quality	Comments
StorageCraft VSM with VSS	Windows Server 2000 Family	Fast	Best	<ul style="list-style-type: none"> <li>• VSS aware applications are managed to achieve best backups.</li> <li>• Can use script files to manage applications that are not VSS aware to improve backups.</li> </ul>
Microsoft VolSnap with VSS	Windows Server 2003/2008 Family	Slow	Best	<ul style="list-style-type: none"> <li>• VSS aware applications are managed automatically to achieve best backups.</li> <li>• Use script files (before and after the snapshot) to manage non-VSS-aware applications and improve backups.</li> <li>• Cannot create Incremental Image File (see Chapter 16: Glossary<sup>[86]</sup>).</li> </ul>
StorageCraft VSM direct	Windows 2000 Server Family Windows 2003/2008 Server Family	Fast	Good	<ul style="list-style-type: none"> <li>• Use script files (before and after the snapshot) to manage applications (both VSS and non-VSS) and improve backups.</li> </ul>

Additionally, ShadowProtect provides a Backup Scheduler that lets you configure automated backup jobs for protected volumes. You can schedule Full Image, Incremental Images (as often as every 15 minutes), and manage the retention of backup Image Sets. The ShadowProtect Backup Image Tool simplifies image management by letting you manage existing image files, including consolidating files in an Image Set, modifying password encryption and compression, and merging or splitting image files.

#### Capture the Virtual Volume

To backup the volume, ShadowProtect replicates the virtual volume to create a backup image file. A *backup image file* is a sector-by-sector representation of the volume at the time the volume snapshot was taken. For more information about backup image files, see Backup Image Files<sup>[15]</sup>.

ShadowProtect writes the backup image file to the designated storage media. Options include network storage (SAN, iSCSI, NAS, etc.), removable storage (USB / FireWire), and optical storage (CD, DVD, Blu-ray). The amount of time it takes to write the backup image file depends upon the system hardware and the size of the image file. For information about configuring and creating backup image files, see Chapter 6: Creating Backup Image Files<sup>[38]</sup>.

## 3.2 Restore a Backup Image

Once you have created a backup image, you can use a ShadowProtect backup image to restore data in two different ways:

### Recover individual files and folders

Use the ShadowProtect Mount utility to mount the backup image file as a volume using either a drive letter or a mount point. The Mount utility can efficiently mount hundreds of backup images simultaneously, if desired. Furthermore, since the mounted backup image files preserve the Windows volume properties, users can share and access the backup image file for emergency access to backup image file data, including modifying and saving changes to the backup image file as an incremental backup file.

For more information about mounting backup image files to recover data, see Chapter 7: Mounting Backup Image Files<sup>[49]</sup>.

### Restore an entire volume

Use the ShadowProtect Restore Wizard to restore an entire volume from a backup image file. You can restore system volumes (that contains the system's operating system) using the StorageCraft Recovery Environment, or restore non-system volumes using either Recovery Environment or while running ShadowProtect Console in Windows. For more information about recovering volumes, see Chapter 8: Restoring Backup Image Files<sup>[54]</sup>.

## 3.3 Backup Image Files

A ShadowProtect backup image file is a point-in-time representation of a computer volume. It is not a standard file copy of the volume, but rather a sector-by-sector duplicate of the volume. Because of this, you can mount a backup image file (using the ShadowProtect Mount utility) and view its contents as if it were a regular volume. In the event that you need to recover data, you can recover specific files and folders from the image or you may recover the entire volume to the exact point-in-time that the backup image was taken.

ShadowProtect uses the following types of backup image files to provide a complete disaster recovery solution.

**Table 5: Types of backup image files**

Backup Images	Description
Full (.spf)	A stand-alone image file that represents a disk volume at a specific point-in-time. Full backup image files do not rely and does not rely on any other files.
Incremental (.spi)	An image file that contains volume changes relative to another backup image file. You can create Incremental backup image files relative to Full backup images or other Incremental backup images. ShadowProtect also creates an Incremental image file when an existing image file is mounted as a read/write volume and modified.

	Incremental backup image files let ShadowProtect offer multiple volume backup strategies, including Differential and Incremental backup options. See Chapter 16: Glossary for information about these backup strategies.
Spanned (.sp#)	Image files that belong to a spanned Image Set. Spanned Image Sets are made by breaking a backup image file into pieces for increased portability (for example, to save the image file on multiple CDs).  The actual Spanned image file name replaces the pound sign (#) with a number that indicates the position of the file within the spanned Image Set.
ImageManager (-cd.spi, -cw.spi, -cm.spi)	Image files that have been automatically collapsed by ShadowProtect ImageManager. The suffix before the file extension indicates if the file is a daily, weekly or monthly collapsed backup files.
.spk	A password key file used to encrypt backup image files.

## File Naming Conventions

ShadowProtect backup image files use the following naming convention to help you identify the file and its relationship to, and dependencies on, other backup image files.

*<Volume Identifier>-b<base-seq>-d<diff-seq>-i<inc-seq>.<extension>*

**volume identifier:** Identifies the volume that the backup image file represents.

**base-seq:** The Base Image File sequence number. This either identifies the sequence number of this file, or identifies the Base Image File upon which this file is dependent.

**diff-seq:** The Differential backup sequence number. This either identifies the sequence number of this file, or identifies the Differential Image File upon which this file is dependent.

**inc-seq:** The Incremental backup sequence number. This either identifies the sequence number of this file, or identifies the Incremental Image File upon which this file is dependent.

**extension:** The file extension, which identifies if the file is a Full, Incremental, or Spanned backup image file.

**Table 6: Examples of backup image file names**

File Type Extension	Description
C_Vol-b001.spf	Full image of the C:\ volume.
C_Vol-b001-d001-i000.spi *  or C_Vol-b001.d001.spi	Differential image of the C:\ volume with a dependency on the full backup image file C_Vol-b001.spf



C_Vol-b001-d000-i001.spi *  or C_Vol-b001-i001.spi	Incremental image of the C:\ volume with a dependency on the full backup image file C_Vol-b001.spf
C_Vol-b001-d001.i001.spi	Incremental backup image file of the C:\ volume with a dependency on the differential backup image file C_Vol-b001-d001.i000 which in turn has a dependency on C_Vol-b001.spi.



**Note:** Backup image file names that have a “-d000” or “-i000” segment use these name segments only as place holders, and indicate that a differential backup image or an incremental backup image are not part of the image and the backup image file has no dependency on a previous differential or incremental backup image file.

## File Dependencies

By examining the name of a backup image file, ShadowProtect users can identify the files on which it depends. However, it is not possible to determine if other backup image files are dependent on this file. Because of this, it is very important to use the Backup Image Tool (see Chapter 9: Backup Image Tool<sup>[57]</sup>) to review dependencies prior to moving, modifying or deleting backup images.



**Warning:** Deleting a backup image file on which other files depend renders the dependent backup image files useless. You cannot browse or restore files contained by these dependent backup image files.



**Note:** Deleting a full image file from an active backup image job causes ShadowProtect to create a new Full image during the next scheduled backup and start a new backup Image Set.

## Chapter 4: Installing ShadowProtect

Before installing ShadowProtect, review the Requirements<sup>[18]</sup> and the License and Install Options<sup>[20]</sup>.

### To Install ShadowProtect

1. Insert the ShadowProtect CD into the system's CD drive.  
  
If the installation does not start automatically, browse the ShadowProtect CD and run **AUTORUN** from the root of the CD.
2. On the Product Installation CD home page, select the product version to install (Desktop, Server, Small Business Server).  
  
The appropriate install Wizard loads to walk you through the installation process.
3. On the Welcome page, click **Next**.
4. On the License Agreement page, select **I accept the terms of the license agreement**, then click **Next**.  
  
You must accept the license agreement to install ShadowProtect. Click **Print** to print out the License Agreement.
6. On the Choose Components page, select the ShadowProtect components to install, then click **Next**.  
  
**Agent:** Installs the ShadowProtect Backup agent, which lets you remotely manage ShadowProtect operations on this system.  
  
**Console:** Installs the ShadowProtect Management View, which lets you manage ShadowProtect operations for the system, and remote systems if desired..  
  
**Mount:** Installs the ShadowProtect mount driver and adds the ability to mount and dismount a backup image file using the right-click menu in Windows Explorer.
7. In the Ready to Install the Program page, click **Install**.
8. In the InstallShield Wizard Complete page, select **Yes, I want to restart my computer now**, then click **Finish**.  
  
If you cannot restart the computer immediately, select **No, I will restart my computer later**. However, you must restart the computer before attempting to use ShadowProtect.
9. Remove the ShadowProtect CD from the system's CD drive.

### 4.1 Requirements

ShadowProtect has the following hardware and software requirements:

- Hardware Requirements<sup>[19]</sup>
- Supported Operating Systems<sup>[19]</sup>
- Supported File Systems<sup>[20]</sup>
- Supported Storage Media<sup>[20]</sup>

## Hardware Requirements

Table 7: ShadowProtect hardware requirements

Hardware	ShadowProtect Console	Recovery Environment
CPU	300 MHz or higher Pentium compatible CPU	300 MHz or higher Pentium compatible CPU
Memory	The greater of 128 MB or the Operating System minimum	Windows XP: 256 MB minimum Windows Vista: 512 MB minimum
Hard Drive space	10 MB free disk space	N/A
CD-ROM or DVD drive	Required	Required

## Supported Operating Systems

Specific Operating System support is dependent upon the edition of ShadowProtect that you have purchased. However, ShadowProtect supports both 32-bit and 64-bit versions of the operating system, where applicable.

Table 8: ShadowProtect operating system requirements

Edition	Description
<b>ShadowProtect Desktop Edition</b>	<ul style="list-style-type: none"> <li>Windows XP Family, including: <ul style="list-style-type: none"> <li>XP Home</li> <li>XP Professional</li> </ul> </li> <li>Windows Vista Family, including: <ul style="list-style-type: none"> <li>Vista Home Basic</li> <li>Vista Home Premium</li> <li>Vista Business</li> <li>Vista Ultimate</li> </ul> </li> <li>Windows 7</li> </ul>
<b>ShadowProtect Server Edition</b>	<ul style="list-style-type: none"> <li>Windows 2000 Server Family (Cold Backup only through the StorageCraft Recovery Environment. For more information, see the <i>StorageCraft Recovery Environment User Guide</i>. <ul style="list-style-type: none"> <li>2000 Server</li> <li>2000 Advanced Server</li> <li>2000 Datacenter Server</li> <li>Small Business Server 2000</li> </ul> </li> <li>Windows Server 2003 Family, including: <ul style="list-style-type: none"> <li>Server 2003 Standard Edition</li> <li>Server 2003 Standard Edition R2</li> <li>Server 2003 Advanced Edition</li> <li>Server 2003 Advanced Edition R2</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Server 2003 Enterprise Edition</li> <li>• Server 2003 Enterprise Edition R2</li> <li>• Server 2003 Datacenter Edition</li> <li>• Server 2003 Datacenter Edition R2</li> <li>• Server 2003 Web Edition</li> <li>• Small Business Server 2003</li> <li>• Windows Server 2008 (including R2)</li> </ul>
<b>ShadowProtect SBS Edition</b> (Small Business)	<ul style="list-style-type: none"> <li>• Small Business Server 2003</li> <li>• Small Business Server 2008</li> </ul>

## Supported File Systems

ShadowProtect supports the following File Systems:

- FAT16
- FAT16X
- FAT32
- FAT32X
- NTFS
- Dynamic Disks

## Supported Storage Media

ShadowProtect supports the following storage media:

- Locally-connected hard drives
- Removeable hard drives (USB or FireWire)
- Network drives (SAN, NAS, iSCSI)
- Optical media (CD, DVD, Blu-Ray)

## 4.2 License and Install Options

Use of ShadowProtect is governed by the ShadowProtect End User License Agreement (see Chapter 17: End User License Agreement<sup>[90]</sup>). However, StorageCraft provides the following ShadowProtect license options to help you in your decision-making process:

**Purchased License:** StorageCraft licenses ShadowProtect on a per system basis (based on the number of systems for which you are making backups. For example, using ShadowProtect to backup 100 computers requires 100 licenses. Before using the Software, review the complete End User License Agreement .

**Evaluation Version License:** StorageCraft provides an Evaluation version of the ShadowProtect Software as a CD or ISO image file. With the Evaluation version, you can create backup image files of system and data volumes. You can also restore system and data volumes or specific files and

folders. The Evaluation version includes the StorageCraft Recovery Environment, so you can restore system volumes with the Evaluation version. The Evaluation version expires and ceases to operate when the Evaluation period ends. Images created during the Evaluation period are fully compatible with the registered (purchased) version of the Software.

**Trial Version License:** StorageCraft provides a Trial version of the ShadowProtect software as a free download. With the Trial version, you can create backup image files of system and data volumes. You can also restore system and data volumes or specific files and folders. However, the Trial version expires and ceases to operate when the trial period ends. Images created during the trial period are fully compatible with the registered (purchased) version of ShadowProtect. However, you cannot restore the system volumes because StorageCraft Recovery Environment is not included with the Trial version.

## 4.3 Starting ShadowProtect

You can access ShadowProtect in two ways:

**From Windows:** Select **Start > All Programs > ShadowProtect > ShadowProtect**.

**From Recovery Environment:** Put the ShadowProtect CD in the system's CD-ROM drive, then boot the system. Make sure your system boot sequence is set to boot from the CD before the hard drive. For more information about loading and using Recovery Environment, see the *Recovery Environment User Guide*.

## 4.4 Activating ShadowProtect

When you purchase ShadowProtect, StorageCraft provides you with a product serial number and an Evaluation version of the purchased product. The Evaluation version provides 30 days of product access, during which you must activate the product. If you do not activate the product within 30 days of installation, the product times out and stops functioning.

You can activate ShadowProtect in the following ways:

- Automatic Activation<sup>[21]</sup>
- Manual Activation<sup>[23]</sup>

You can also deactivate a previously activated ShadowProtect installation to free a product license for use by another system (see Deactivating ShadowProtect<sup>[23]</sup>).

### Automatic Activation

StorageCraft provides an activation server that you can use to quickly and easily activate your ShadowProtect installation.

**Activation -- [ localhost ]**

Customer Name: Corp1, Inc. Optional

Serial Number: 9999-E123-B456-F789 Required

Machine ID: 59D6-46C2

☒ Automatic online activation

☐ Manual activation

StorageCraft's activation system does not require User Name. You may choose to enter User Name to better assist StorageCraft in looking up activation records by User Name as an alternative to Serial Number. StorageCraft's activation system will not collect, transmit or use any personally identifying information (with the exception of User Name which is completely optional).

Deactivate Cancel

### To activate ShadowProtect automatically

1. Start ShadowProtect.

For more information, see Starting ShadowProtect<sup>[21]</sup>.

2. From the Menu Bar select **Help > Product Activation**.

3. In the Product Activation dialog box, provide the requested information, then click **OK**.

**Customer Name:** (Optional) Specify the name of the product purchaser, either person or organization.

**Product Serial Number:** Enter the serial number that you received when purchasing ShadowProtect.

4. ShadowProtect notifies you if the activation process was successful.
  - a. If the activation is successful, click **Close**.
  - b. If the activation was not successful, review the message to determine why the activation was unsuccessful. To correct the problem, do one of the following:
    - i. Review the information in the Product Activation dialog box for accuracy. Correct any errors, then **OK** to resubmit the activation request.
    - ii. If your computer cannot successfully communicate to the activation server or the Internet, wait for a while and try the activation process again.. You can also try using a manual activation option.
    - iii. If the number of allowed activations for the serial number has been exceeded, you must purchase additional licenses. If you feel you received this message in error, contact StorageCraft Support (see Chapter 15: Product Support<sup>[85]</sup>.)
    - iv. For all other activation issues, contact StorageCraft Support (see Chapter 15: Product Support<sup>[85]</sup>.)

## Manual Activation

If for some reason you are unable to use the automated activation method, StorageCraft provide the following manual options for activating your ShadowProtect installation. These manual options require you to receive the activation key and manually apply it to your ShadowProtect installation.

### To get an activation key

1. Use one of the following methods to contact StorageCraft and request an activation key.

**Online:** Open a Web browser to [http://www.storagecraft.com/product\\_activation.php](http://www.storagecraft.com/product_activation.php).

**Email:** Request an activation key from StorageCraft Support ([support@storagecraft.com](mailto:support@storagecraft.com)).

**Phone:** Call StorageCraft Support (see Chapter 15: Product Support<sup>[85]</sup>).

2. Provide the information required to generate an activation key.

**Product Serial Number:** Enter the serial number that you received when purchasing ShadowProtect.

**Machine ID:** ShadowProtect generates the Machine ID during the installation process. You can view the Machine ID in the ShadowProtect Activation dialog box (select **Help > Product Activation**).

**Version:** The ShadowProtect version you installed. You can view this by selecting **Help > About**.

**Language:** The product language you are using (English, Japanese, French, or German).

3. When you receive the activation key, continue with **To activate ShadowProtect manually**.

Depending on the method used to request the activation key, StorageCraft will deliver it to you either in a Web form or via an Email where you can copy and paste it into your ShadowProtect installation.

### To activate ShadowProtect manually

1. Start ShadowProtect.

For more information, see Starting ShadowProtect<sup>[21]</sup>.

2. From the Menu Bar select **Tools > Product Activation**.
3. In the Activation dialog box, select **Manual activation**.
4. In the Activation Key field, type or copy the activation key, then click **Activate**.

## Deactivating ShadowProtect

When retiring a system, you can deactivate the ShadowProtect license to make the license available for use on another system.

### To deactivate a ShadowProtect license

1. Start ShadowProtect.

For more information, see Starting ShadowProtect<sup>[21]</sup>.

2. From the Menu Bar select **Help > Product Activation**.

3. Click **Deactivate**.

ShadowProtect displays a message stating you can no longer use this product key on this machine

4. Click **OK**.

## 4.5 Uninstalling ShadowProtect

Use the standard Windows application removal tool to uninstall ShadowProtect.

### To uninstall ShadowProtect

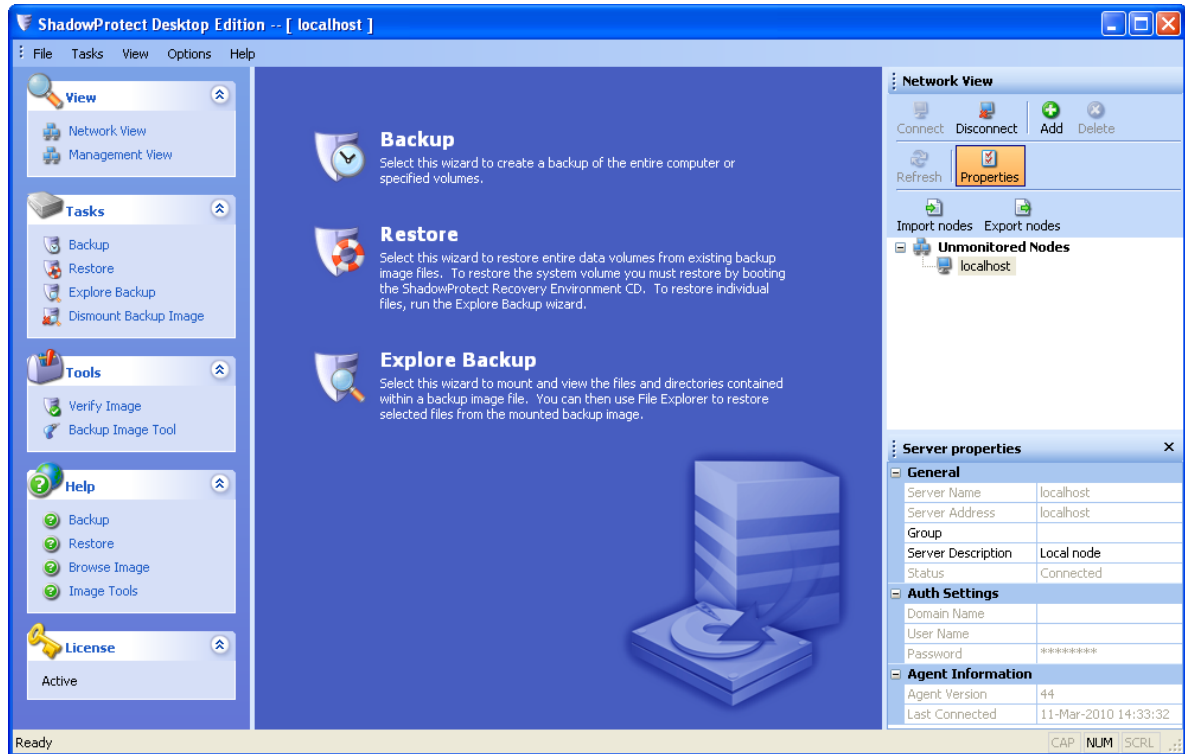
1. In Windows, select **Start > Settings > Control Panel > Add or Remove Programs**.
2. Select ShadowProtect 4.x, then click **Remove**.
3. Click **Yes** to complete the uninstall.

After uninstalling ShadowProtect, you must reboot the computer for the changes to take effect.



## Chapter 5: Understanding ShadowProtect Console

ShadowProtect Console provides access to most configuration and operation controls for ShadowProtect:



ShadowProtect Console

The console is divided into three panels:

**Navigation Panel:** Located on the left side of the console, the Navigation panel provides access to the tasks and tools necessary to configure and operate ShadowProtect. For more information, see [Navigation Panel](#)<sup>[27]</sup>.

**Main Panel:** Located in the center of the console, the Main panel contains tabbed views of ShadowProtect tasks and information. For more information, see [Tabs](#)<sup>[29]</sup>.

**Network Panel:** Located on the right side of the console, the Network panel, or Network View, provides access to the remote management features in ShadowProtect. For more information, see [Chapter 10: Remote Management](#)<sup>[60]</sup>.

### 5.1 Menu Bar

ShadowProtect Console has a menu bar that includes the following menus:

Table 9: ShadowProtect console menus


Menu	Description	Options
File	Access application-level options.	<b>Exit:</b> Close the ShadowProtect UI.

<b>Tasks</b>	Access ShadowProtect Wizards.	<p><b>Backup:</b> Launches the Backup Wizard (see Chapter 6: Creating Backup Image Files [38]).</p> <p><b>Restore:</b> Launches the Restore Wizard (see Chapter 8: Restoring a Volume [54]).</p> <p><b>Explore Backup:</b> Launches the Explore Backup Image Wizard (see Chapter 7: Mounting Backup Image Files [49]).</p> <p><b>Dismount Backup Image:</b> Launches the Backup Image Dismount Wizard (see Section 7.3: Dismounting Backup Image Files [52]).</p> <p><b>Verify Image:</b> Launches the Verify Image Wizard (see Section 13.1: Verifying Backup Image Files [76]).</p> <p><b>Backup Image Tool:</b> Launches the Backup Image Tool Wizard (see Chapter 9: Backup Image Tool [57]).</p> <p><b>Add Destination:</b> Opens the Destination dialog box where you can create named destinations for backup image files (see Section 6.2: Destinations [41]).</p> <p><b>Refresh Volume Info:</b> Refreshes the ShadowProtect volume list for the current system.</p>
<b>View</b>	Create custom toolbars and manage toolbar visibility.	<p><b>Toolbars:</b> Opens the Customize Tool Bar dialog box, where you can create customized tool bars for the ShadowProtect UI.</p> <p><b>Status Bar:</b> Toggles a status bar at the bottom of ShadowProtect Console that provides application and environment status information.</p> <p><b>Task Panel:</b> Toggles visibility of the Navigation Panel (see Navigation Panel [27]).</p>
<b>Options</b>	Access ShadowProtect Agent options.	<p><b>Agent Options:</b> Opens the Agent Options dialog box where you can configure Email notification settings for the current system. You can choose to send Email notifications for both failed and successful backup jobs.</p>
<b>Help</b>	Access ShadowProtect help resources.	<p><b>Contents:</b> Launches the ShadowProtect on-line help system. The help is available only when running ShadowProtect Console in Windows (not in the Recovery Environment).</p> <p><b>About:</b> Displays the ShadowProtect version and copyright information. Click <b>System Info</b> to open the Microsoft System Information dialog box, which contains detailed information about the computer.</p> <p><b>Product Activation:</b> Opens the Activation dialog box, where you can activate (or deactivate) the ShadowProtect installation (see Section 4.4: Activating ShadowProtect [21]).</p> <p><b>Check for Latest Version:</b> Queries the StorageCraft Web site for updates to the current ShadowProtect installation. If there is an update available, a message displays the URL where you can get the update.</p>

## 5.2 Navigation Panel

The left-side Task panel provides quick access to ShadowProtect tasks and tools. You can toggle the Navigation panel on or off by selecting **View > Task Panel**. The Navigation panel is organized into the following categories. You can collapse and expand each category, as desired.

**Table 10: ShadowProtect task panel options**


Category	Description	Options
<b>View</b>	Display or hide the Network View.	<p><b>Network View:</b> Displays the nodes running the ShadowProtect Backup Agent (see Chapter 10: Remote Management<sup>[60]</sup>).</p> <p><b>Management View:</b> Displays the Management View in the Main panel (see Management View Tab<sup>[35]</sup>).</p>
<b>Tasks</b>	Access ShadowProtect Wizards.	<p><b>Backup:</b> Launches the Backup Wizard (see Chapter 6: Creating Backup Image Files<sup>[38]</sup>).</p> <p><b>Restore:</b> Launches the Restore Wizard (see Chapter 8: Restoring a Volume<sup>[54]</sup>).</p> <p><b>Explore Backup:</b> Launches the Explore Backup Image Wizard (see Chapter 7: Mounting Backup Image Files<sup>[49]</sup>).</p> <p><b>Dismount Backup Image:</b> Launches the Backup Image Dismount Wizard (see Section 7.3: Dismounting Backup Image Files<sup>[52]</sup>).</p> <p><b>Verify Image:</b> Launches the Verify Image Wizard (see Section 13.1: Verifying Backup Image Files<sup>[76]</sup>).</p> <p><b>Backup Image Tool:</b> Launches the Backup Image Tool Wizard (see Chapter 9: Backup Image Tool<sup>[57]</sup>).</p> <p><b>Add Destination:</b> Opens the Destination dialog box where you can create named destinations for backup image files (see Section 6.2: Destinations<sup>[41]</sup>).</p> <p><b>Refresh Volume Info:</b> Refreshes the ShadowProtect volume list for the current system.</p>
<b>Tools</b>	Access ShadowProtect tools.	<p> <b>Note:</b> Several tools are available only in the Recovery Environment (RE). For more information about these tools, see the <i>StorageCraft Recovery Environment User Guide</i>.</p> <p><b>Verify Image:</b> Launches the Verify Image Wizard (see Section 12.1: Verifying Backup Image Files<sup>[76]</sup>).</p> <p><b>Backup Image Tool:</b> Launches the Backup Image Tool Wizard (see Chapter 9: Backup Image Tool<sup>[57]</sup>).</p> <p><b>Refresh Volume Info:</b> Refreshes the ShadowProtect volume list for the current system.</p> <p><b>Network Configuration:</b> (RE only) Launches the Network Configuration utility, where you can configure a computer's network access settings.</p> <p><b>HIR Configuration:</b> (RE only) Launches the Hardware Independent</p>

		<p>Restore (HIR) utility, where you can restore a backup image to a different environment from which it was created.</p> <p><b>Load Drivers:</b> (RE only) Opens the Load Drivers dialog box, where you can configure storage drivers for use in the Recovery Environment.</p> <p><b>File Browser:</b> (RE only) A simple file browser that lets you browse files and folders of a backup image file.</p> <p><b>Text Editor:</b> (RE only) A simple text editor.</p> <p><b>Vista BCD:</b> (RE only) Launches the Vista BCD editor, where you can edit Boot Configuration Data (BCD) on systems running Windows Vista.</p> <p><b>Partition Table Editor:</b> (RE only) A simple partition table editor.</p> <p><b>UltraVNC:</b> (RE only) Launches the Remote Management utility, where you can configure remote access to systems running the Recovery Environment.</p> <p><b>Select Your Time Zone:</b> (RE only) Launches the Time Zone utility, where you can adjust the system's time zone information.</p> <p><b>Enable Logging:</b> (RE only) Opens the Logging dialog box, where you can configure ShadowProtect event logging.</p>
<b>Help</b>	(Windows only) Access to on-line help topics.	<p><b>Backup:</b> Opens the on-line help to Chapter 6: Creating Backup Image Files <a href="#">[38]</a>.</p> <p><b>Restore:</b> Opens the on-line help to Chapter 8: Restoring a Volume <a href="#">[54]</a>.</p> <p><b>Browse Image:</b> Opens the on-line help to Chapter 7: Mounting Backup Image Files <a href="#">[49]</a>.</p> <p><b>Image Tools:</b> Opens the on-line help to Chapter 9: Backup Image Tool <a href="#">[57]</a>.</p>
<b>License</b>	(Windows only) Displays current licensing information for this ShadowProtect installation.	<p><b>Trial or Evaluation version:</b> Displays the number of days before the ShadowProtect installation expires.</p> <p><b>Licensed version:</b> Displays "Active", meaning that the product is fully licensed and activated.</p>
<b>Info</b>	(RE only) Display system information.	A quick reference to basic system information, including Computer Name, IP Address and Time Zone information.
<b>Status</b>	(RE only) Displays the current state of the system, including:	<p><b>Queued Tasks:</b> The number of queued tasks waiting to run.</p> <p><b>Running Tasks:</b> The number of tasks currently running.</p>

## 5.3 Tabs

The ShadowProtect Console provides the following pages in the Center panel:

- Wizards<sup>[29]</sup>
- Disk Map Tab<sup>[30]</sup>
- Backup Jobs Tab<sup>[31]</sup>
- Destinations Tab<sup>[33]</sup>
- Backup History Tab<sup>[34]</sup>

With the exception of the Management View, you can close a tabbed page by selecting it, then clicking the Close icon  to the right side of the tab list. Once closed, you can re-open a tab for a particular node by right-clicking the node in the Management View, then selecting the tab to open from the drop-down list.

### Wizards

The Wizards pane is the default state of the Main panel if no tabs are displayed. It provides access to three Wizards (Backup, Restore, and Explore Backup) that guide users through the most common ShadowProtect tasks.



ShadowProtect Wizards tab










- **Backup:** Starts the Backup Wizard, which guides you through the creation of a backup job. For more information, see Chapter 6: Creating Backup Image Files<sup>[38]</sup>.
- **Restore:** Starts the Restore Wizard, which guides you through the process of restoring a

volume from a backup image file. For more information, see Chapter 8: Restoring a Volume<sup>[54]</sup> for additional information.

- **Explore Backup:** Starts the Explore Backup Wizard, which guides you through mounting a backup image file as a volume so you can restore individual files and folders. For more information, see Chapter 7: Mounting Backup Image Files<sup>[49]</sup>.

## Disk Map Tab

The Disk Map tab provides a graphical view of system drives. Disk Map lists each physical disk drive with the partitions available on that drive.

 <b>Disk 0:</b> FUJITSU MH22160BJ FF 149.05 GB		 <b>No Label (*:\)</b> 39.10 MB FAT	 <b>No Label (C:\)</b> 149.01 GB NTFS Active			
 <b>CD-ROM 0</b> PLDS DVD+-RW DU-8A25 (Removable Media) 0 B						
Drive Letter	Volume	File System	Size	Used	Partition Type	Partition Flags
 <b>Disk 0: FUJITSU MH22160BJ FF</b>						
*:\	 No Label	FAT	39.10 MB	8.66 MB	Dell	Pri
C:\	 No Label	NTFS	149.01 GB	37.02 GB	NTFS	Act, Pri
 <b>CD-ROM 0: PLDS DVD+-RW DU-8A25 (Removable Media)</b>						
D:\	 CD Drive		0 B	0 B		

ShadowProtect Disk Map tab

Right-clicking an entry in the Disk Map opens an actions menu for that entry.

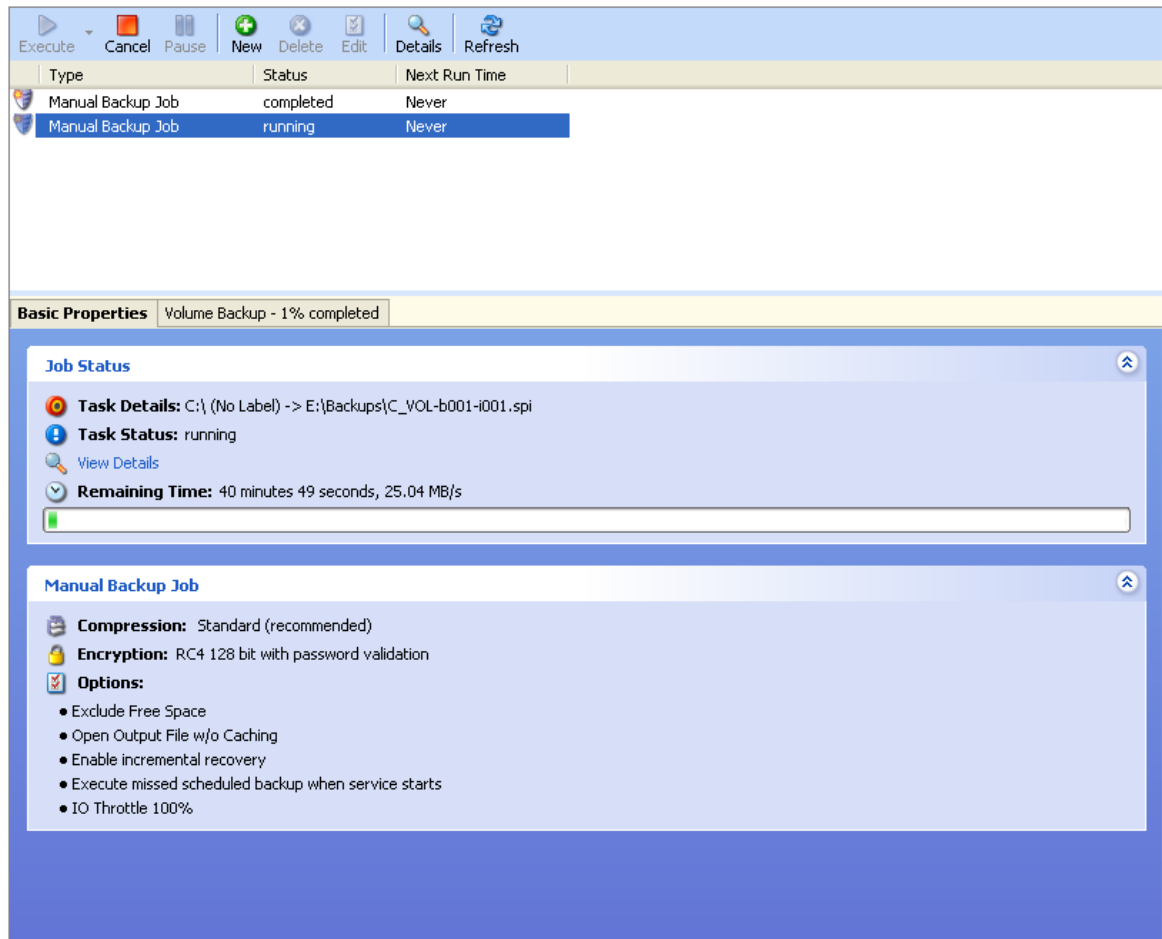
Table 11: Disk Map action menu options

Entry	Right-click Actions
<b>Physical Drive</b>	<b>Edit Policy:</b> Opens the Partition Creation Policy Editor dialog box. <b>Refresh Volumes Info:</b> Refreshes the ShadowProtect volume list for the current system.
<b>Partition</b>	<b>Backup:</b> Launches the Backup Wizard (see Chapter 6: Creating Backup Image Files <sup>[38]</sup> ). <b>Restore:</b> Launches the Restore Wizard (see Chapter 8: Restoring a Volume <sup>[54]</sup> ). <b>Delete Partition:</b> Deletes the selected partition. <b>Set Active:</b> Sets the selected partition as the active (bootable) partition on the physical drive. <b>Edit Policy:</b> Opens the Partition Creation Policy Editor dialog box. For more information, see Section 12.5: Changing Partiton Creation Policy <sup>[81]</sup> . <b>Refresh Volumes Info:</b> Refreshes the ShadowProtect volume list for the current system.

The Disk Map tab lets you access the Backup and Restore Wizards, and change partition creation policies for the selected drive. Additionally, in the Recovery Environment you can also run Check Disk, format a drive and edit the selected disk's `boot.ini`.

## Backup Jobs Tab

The Backup Jobs tab displays scheduled backup jobs. From this tab, you have complete control over the ShadowProtect jobs configured for the current system.











ShadowProtect Backup Jobs tab

The Backup Jobs tab is divided into two panes:

**Job Controls Pane:** The upper Job Controls pane lets you manage backup jobs. Select a backup job from the job list to manage it, and view job information in the Job Information pane. The Job Controls pane includes the following controls:

Table 12: Controls in the job control pane

Control	Description
Execute 	Executes the selected backup job.
Cancel 	Cancels the selected backup job. This terminates a currently running job, but keeps the job status as <i>enabled</i> (the job executes at its Next Run Time).
Pause 	Toggles the selected job status between <i>enabled</i> and <i>disabled</i> . A disabled job is suspended and will not run until re-enabled.

New 	Launches the Backup Wizard (see Chapter 6: Creating Backup Image Files <a href="#">[38]</a> ).
Delete 	Deletes the selected job from the Job Scheduler.
Edit 	Launches the Backup Wizard, where you can edit the selected job's configuration (see Chapter 6: Creating Backup Image Files <a href="#">[38]</a> ).
Details 	Opens the Volume Backup tab in the Job Information pane so you can see details about the currently selected backup job.
Refresh 	Refreshes the volume information in the Backup Job Information pane.

**Job Information:** Displayed in the lower pane, the Job Information pane includes two tabs that provide information about the currently selected backup job.










**Table 13: Tabs in the job information pane**

Component	Description
Basic Properties	<p>Displays information about the currently selected backup job in three panes:</p> <p><b>Job Status:</b> Displays information about the current backup job, including the destination backup image file, and status (queued, running, completed), and the time remaining (running job) or total time (completed job). Click <b>View Details</b> to view the Volume Backup tab.</p> <p><b>Backup Job:</b> Displays information about the backup job configuration, including Compression, Encryption, and the backup job options.</p> <p><b>Schedule:</b> If the selected backup job is a recurring job, the Basic Properties tab displays the job schedule for both Full backup images, and Incremental backup images, where applicable.</p>
Volume Backup	Displays detailed information about the currently running backup job, including time remaining, throughput, and an Event log. If no backup job is running, the Volume Backup tab displays details from the most recent backup job.



## Destinations Tab

The Destinations tab displays information about the system's named destinations, which are pre-defined storage locations for backup image files. From this tab, you have complete control over the Destinations defined on the current system. For more information see Section 6.2: Destinations<sup>[41]</sup>.

 Add  Delete  Edit  Refresh			
Type	Name	Path	
 Network Share	Omni-Backup	\\Omniportal-db\tech	
 Local Directory	External Drive	E:\Backups	
Base Name	First Image Creation Time	Last Image Creation Time	Points in Time
 C_VOL-b002	11/7/2009 1:01:47 PM	11/7/2009 1:01:47 PM	1
 C_VOL-b001	11/4/2009 7:22:35 AM	11/4/2009 9:21:35 AM	2
 30303030_VOL-b001	11/4/2009 7:22:35 AM	11/4/2009 7:22:35 AM	1

ShadowProtect Destinations tab

The Destinations tab includes the following panes:

**Destinations List:** The upper pane displays a list of currently defined Destinations for the system. To delete or edit a destination location, highlight the destination location in the list and then select the operation to perform. Information about backup Image Sets stored at the destination location is presented for the highlighted entry in the Destination Information.

**Destination Usage:** The lower pane displays information about the backup Image Sets stored in the currently selected Destination, including Base Name, First Image Creation Time, Last Image Creation Time and number of "point-in-time" image files in the backup Image Set.

Additionally, the Destinations tab includes the following icons for working with Destinations:

**Add:** Opens the Destination dialog box (see Section 6.2: Destinations<sup>[41]</sup> for additional information).

**Delete:** Deletes the currently selected Destination.

**Edit:** Opens the Destinations dialog box so you can modify an existing Destination configuration (see Section 6.2.1: Editing Destinations<sup>[43]</sup>).

**Refresh:** Updates the Destination Objects List and the Destination Objects Information List.

## Backup History Tab

The Backup History tab displays log information for completed backup jobs. The Backup History lets you analyze ShadowProtect backup activity over time, including failed jobs, if any.

Delete All		Details				
Start Time	End Time	Type	Source	Destination	Status	
11/7/2009 1:00:15 PM	11/7/2009 1:46:55 PM	Full backup	(C:\) NTFS	E:\Backups\C_VOL-b002.spf	Completed	
11/9/2009 10:00:01 AM	11/9/2009 10:48:11 AM	Full backup	(C:\) NTFS	E:\Backups\C_VOL-b003.spf	Completed	
11/9/2009 11:00:00 AM	11/9/2009 11:00:34 AM	Incremental backup	(C:\) NTFS	E:\Backups\C_VOL-b003-i001.spi	Completed	
11/9/2009 12:00:00 PM	11/9/2009 12:03:30 PM	Incremental backup	(C:\) NTFS	E:\Backups\C_VOL-b003-i002.spi	Completed	
11/9/2009 1:00:00 PM	11/9/2009 1:00:31 PM	Incremental backup	(C:\) NTFS	E:\Backups\C_VOL-b003-i003.spi	Completed	
11/9/2009 2:00:00 PM	11/9/2009 2:00:27 PM	Incremental backup	(C:\) NTFS	E:\Backups\C_VOL-b003-i004.spi	Completed	
11/9/2009 3:00:00 PM	11/9/2009 3:00:32 PM	Incremental backup	(C:\) NTFS	E:\Backups\C_VOL-b003-i005.spi	Completed	
11/9/2009 4:00:00 PM	11/9/2009 4:00:26 PM	Incremental backup	(C:\) NTFS	E:\Backups\C_VOL-b003-i006.spi	Completed	
11/9/2009 5:00:00 PM	11/9/2009 5:00:32 PM	Incremental backup	(C:\) NTFS	E:\Backups\C_VOL-b003-i007.spi	Completed	
11/10/2009 5:51:32 AM	11/10/2009 5:51:32 AM	Incremental backup	(C:\) NTFS	E:\Backups\C_VOL	Execution Failed	
Timing	Module	Code	Message			
10-Nov-2009 05:51:32	service	100	service (build 43) started job by incremental trigger			
10-Nov-2009 05:51:32	service	104	3.5.0.3570 305F-9CAF 1999-27f0-522A-81C4			
10-Nov-2009 05:51:32	service	100	backup volume C:\ (NTFS)			
10-Nov-2009 05:51:32	service	509	Cannot get access to destination object			
10-Nov-2009 05:51:32	service	101	Cannot execute job (The system cannot find the path specified. 0x80070003(2147942403))			

The Backup History tab

The Backup History tab includes the following panes:

**Job History:** The upper pane displays a list of completed backup jobs. Select a job to view job details in the Job Log.

**Job Log:** The lower pane displays the log entries for the selected job. This is the same information available in the Volume Backup tab (see Backup Jobs Tab [31](#).)

You can sort the backup history lists by clicking on the column headers. You can also adjust the column width by dragging the column header borders.

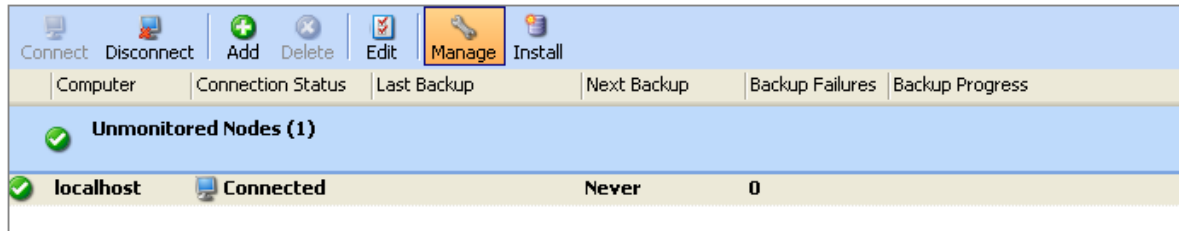
Additionally, the Backup History tab includes the following icons:

**Delete All:** Clears the Job List.

**Details:** Displays or hides the Job Log pane.

## 5.4 Management View








The Management View is one way to access the remote management capabilities of ShadowProtect. It is the preferred management view for users of ShadowProtect Server and ShadowProtect SBS because it lets you easily manage many nodes from a single location.



The Management View tab is divided into two panes:

**Node Controls Pane:** The upper Node Controls pane lets you manage connected nodes. Select a node from the Node Information pane to manage it. The Node Controls pane includes the following controls:

Table 11: Controls in the job control pane

Control	Description
Connect 	Connects a previously added managed remote node to the ShadowProtect user interface.
Disconnect 	Disconnects a managed remote node from the ShadowProtect user interface.
Add 	Adds a system that has the ShadowProtect Backup Agent installed to the node list.
Delete 	Deletes a remote node from the managed node list.
Edit 	Opens the Server Details dialog box of the currently selected node (see <a href="#">Modifying Remote Node Properties</a> <a href="#">[65]</a> ).
Manage 	Opens the ShadowProtect tabs (Disk Map, Backup Jobs, Destinations, Backup History) for the currently selected node.
Install 	Opens the ShadowProtect Push Wizard, which lets you push the ShadowProtect agent out to other systems that you want to manage from this Management View. For more information, see <a href="#">Installing the Backup Agent Remotely</a> <a href="#">[60]</a> .

**Node Information List:** The Node Information pane displays a list of nodes currently managed by this management console.

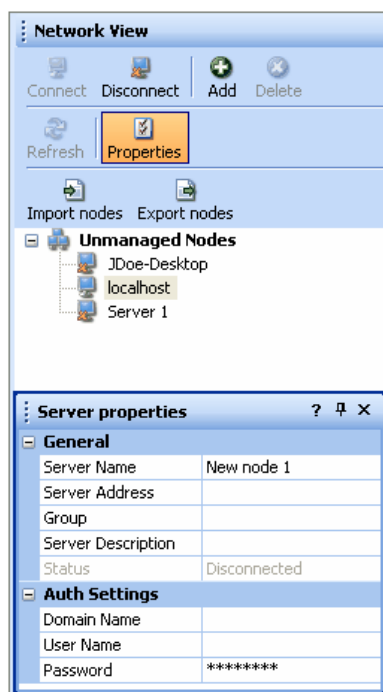
Table 12: Tabs in the job information pane

Component	Description
Basic Properties	Displays information about the currently selected backup job in three panes:  <b>Job Status:</b> Displays information about the current backup job, including the destination backup image file, and status (queued, running, completed), and the

	<p>time remaining (running job) or total time (completed job). Click <b>View Details</b> to view the Volume Backup tab.</p> <p><b>Backup Job:</b> Displays information about the backup job configuration, including Compression, Encryption, and the backup job options.</p> <p><b>Schedule:</b> If the selected backup job is a recurring job, the Basic Properties tab displays the job schedule for both Full backup images, and Incremental backup images, where applicable.</p>
Volume Backup	Displays detailed information about the currently running backup job, including time remaining, throughput, and an Event log. If no backup job is running, the Volume Backup tab displays details from the most recent backup job.

## 5.5 Network View



The Network view displays information for managing ShadowProtect on remote systems (see Chapter 10: Remote Management<sup>[60]</sup>).









The Network View panel

The Network View includes the following controls:

Table 14: Controls in the job control pane

Control	Description
Connect 	Connects a previously added managed remote node to the ShadowProtect user interface.
Disconnect 	Disconnects a managed remote node from the ShadowProtect user interface.

Add 	Adds a system that has the ShadowProtect Backup Agent installed to the node list.
Delete 	Deletes a remote node from the managed node list.
Refresh 	Refreshes the remote node list.
Properties 	Toggles the Server Properties table on and off.
Import Nodes 	Imports a previously exported node list into your Network View.
Export Nodes 	Exports your node list into an XML file.

## Chapter 6: Creating Backup Image Files



**Note:** For information about creating a backup image file in Recovery Environment, see the *StorageCraft Recovery Environment User Guide*.

ShadowProtect provides two ways to create backup image files:

**One-Time Backup:** The Backup Wizard guides you through creating a backup image file immediately. Consider the following when creating a one-time backup job:

- To create a one-time backup job, you must be a member of the Administrator group on the system where you are creating a backup.
- One-time backup jobs do not affect scheduled backup jobs.
- ShadowProtect supports one-time backup images from both Windows and Recovery Environment. For more information about each of these options, see Section 2.1: Features and Components<sup>[8]</sup>.

**Scheduled Backup:** The Backup Wizard guides you through the process of creating a recurring backup job (see Chapter 6: Creating Backup Image Files<sup>[48]</sup>). Consider the following when creating a scheduled backup job:

- A volume can belong to no more than one scheduled backup job that includes Incremental backups. This limitation does not include one-time backup images or Differential backup images, as long as they do not disrupt sector tracking for the Incremental backup.
- If ShadowProtect is currently running a backup job, or the computer is turned off and unavailable, ShadowProtect skips any scheduled backup jobs during that time.
- ShadowProtect supports scheduled backup images only from Windows (not Recovery Environment).

### To create a backup image file

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. Start the Backup Wizard, then click **Next**.

There are several ways to start the Backup Wizard, including:

- In the Wizards tab, click **Backup**.
- In the Tasks menu, click **Backup**.
- In the Menu Bar, select **Tasks > Backup**.

3. On the Volumes to Back Up page, select the volumes to backup, then click **Next**.

ShadowProtect creates a separate backup file for each volume.

4. On the Backup Name and Destination page, specify the following information about the backup image file, then click **Next**.

<b>Location</b>	<p>You can select either a local drive or network location to store the backup image file:</p> <p><b>Local Drive:</b> Click Browse. In the Open Folder dialog box, select the local drive and folder to store the backup image file.</p>
-----------------	--

	<b>Network Share:</b> In the drop-down list, select <Network Locations>. This opens the Destinations dialog box where you can define the network share. For more information, see Section 6.2: Destinations <sup>[41]</sup> .
<b>Name</b>	The File Name table displays the volumes (with default file names) selected for the backup job. Double-click a table row to modify the file name.

5. On the Specify the Backup Schedule page, specify the schedule and backup image type, then click **Next**.



**Note:** The selected backup schedule determines the available backup image types. For more information about the backup image types, see Chapter 16: Glossary<sup>[86]</sup>.

<b>Now</b>	Full Differential	Creates a one-time backup job that starts as soon as the Backup Wizard closes.
<b>Later</b>	Full	Creates a one-time backup job at the specified date and time.  By default, the Start Time fields display the current date and time. To change the date and time settings, click on an element of the date/time (month, day, year, hour minute, second, AM/PM), then type or use the up/down buttons to set the desired value.
<b>Weekly</b>	Full Incremental	Creates a recurring backup job based on a weekly schedule. You select the weekdays and time of day to start a Full backup.  Optionally, you can specify a schedule for Incremental backups.  a. Select the weekdays to create Incremental backups.  b. Specify times of day to start and stop creating Incremental backups.  c. Specify the Incremental backup frequency (minutes between Incremental backups).
<b>Monthly</b>	Full Incremental	Creates a recurring backup job based on a monthly schedule. You select the days of the month and time of day to start a Full backup.  Optionally, you can specify a schedule for Incremental backups.  a. Select the weekdays to create Incremental backups.  b. Specify times of day to start creating Incremental backups.
<b>Continuous Incrementals</b>	Incremental	Creates a single Full backup, then creates recurring Incremental backups from that point forward. This option requires ShadowProtect ImageManager (see the <i>ShadowProtect ImageManager User Guide</i> ).  To specify the Incremental backup schedule:

		a. Select the weekdays to create Incremental backups. b. Specify times of day to start and stop creating Incremental backups. c. Specify the Incremental backup frequency (minutes between Incremental backups).
--	--	--

6. (Conditional) On the Previous Backup Image page, select the existing backup image file to use as a basis for creating the Differential backup image, then click **Next**.

This page displays only when you specified a Differential backup in the Backup Schedule page.

7. On the Options page, select the desired backup image file options, then click **Next**.

The Options page lets you set both basic and advanced backup image options. For more information about each of the available options, see Backup Image File Options<sup>[43]</sup>.

8. On the Wizard Summary page, review the backup job configuration, then click **Finish**.

Select Execute Now to run the backup job immediately in addition to the schedule defined in the job.

You can monitor the progress of the backup in the Backup Jobs tab (see Section 5.3.3: Backup Jobs Tab<sup>[31]</sup>).

## 6.1 Backup Image File Storage Locations

ShadowProtect lets you store backup image files on any disk device, including hard drives, removable USB/FireWire drives, network drives and NAS (Network Attached Storage) devices. You can also store backup images to optical media such as CDs, DVDs, or Blu-Ray discs.



**Note:** If you select a destination that does not have enough disk space to save the backup image, the backup job fails due to lack of destination storage space. ShadowProtect notes the reason for the failure in its log file.

**Table 15: Advantages and disadvantages for various storage locations**

Location	Advantages	Disadvantages
Local Hard Drive	<ul style="list-style-type: none"> <li>Fast backup and restore.</li> <li>Inexpensive.</li> </ul>	<ul style="list-style-type: none"> <li>Consumes local disk space.</li> <li>Vulnerable to loss if the drive fails.</li> </ul>
Local USB/FireWire Drive	<ul style="list-style-type: none"> <li>Fast backup and restore.</li> <li>Preserves disk space on local drives.</li> <li>Inexpensive.</li> <li>Easy off-site storage.</li> </ul>	<ul style="list-style-type: none"> <li>More expensive than local hard drives.</li> <li>Vulnerable to loss if the drive fails.</li> </ul>
Network Hard Drive	<ul style="list-style-type: none"> <li>Fast backup and restore.</li> <li>Protection from local hard drive failure.</li> <li>Off-site storage.</li> </ul>	<ul style="list-style-type: none"> <li>Must have network interface card drivers supported by Recovery Environment.</li> <li>Complexity. Users must have network rights to save and access backup images.</li> </ul>
CD/DVD/Blu-Ray	<ul style="list-style-type: none"> <li>Good media for archiving.</li> <li>Protection from local hard</li> </ul>	<ul style="list-style-type: none"> <li>Slower backups due to media speeds.</li> <li>File restrictions due to limited size.</li> </ul>



Location	Advantages	Disadvantages
	drive failure.	

## 6.2 Destinations

Backup destinations let you create pre-defined storage locations for backup image files, either locally or on a network. You can then select these destinations when creating backup jobs. Then, if you need to modify the destination, you can do so by editing the destination object rather than deleting and recreating new backup jobs.

Add Delete Edit Refresh			
Type	Name	Path	
Network Share	Omni-Backup	\\Omniportal-db\tech	
Local Directory	External Drive	E:\Backups	
Base Name	First Image Creation Time	Last Image Creation Time	Points in Time
C_VOL-b002	11/7/2009 1:01:47 PM	11/7/2009 1:01:47 PM	1
C_VOL-b001	11/4/2009 7:22:35 AM	11/4/2009 9:21:35 AM	2
30303030_VOL-b001	11/4/2009 7:22:35 AM	11/4/2009 7:22:35 AM	1

The ShadowProtect Destinations tab

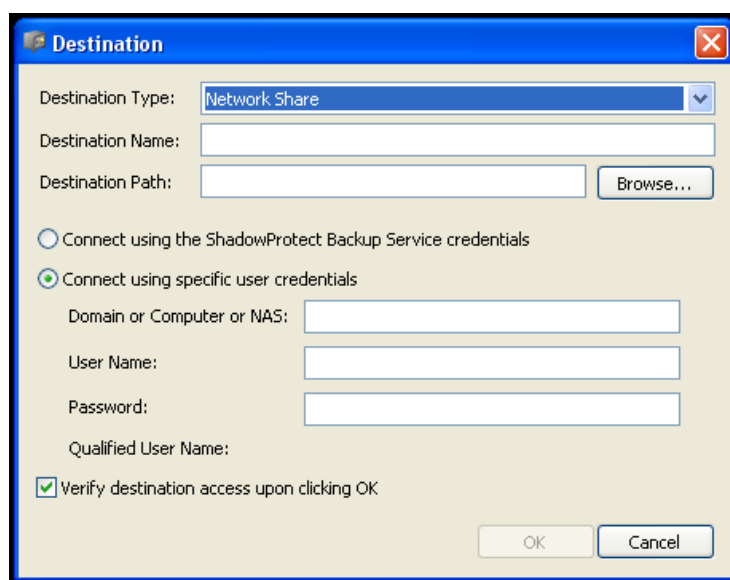


**Note:** ShadowProtect requires that every system has a unique Destination for its backup image files. Multiple systems should not save files to the same folder.

### To create a backup job destination

1. Open the ShadowProtect Console, then select **Tasks > Add Destination**.

This opens the Destinations dialog box. You can also open the Destinations dialog box from the Backup Name and Destination page of the Backup Wizard (see Chapter 6: Creating Backup Image Files<sup>38</sup>).



Destinations dialog box

2. Specify the settings for the new destination, then click **OK**.

<b>Destination Type</b>	<p>Select the type of destination to create:</p> <p><b>Local Directory:</b> The destination is on a locally connected storage device (HDD, USB drive, etc.)</p> <p><b>Network Share:</b> The destination is on the network.</p>
<b>Destination Name</b>	Specify the path to the a descriptive name for this destination.
<b>Destination Path</b>	<p>Specify the details of the destination. The information you need to provide depends on the Destination Type.</p> <p><b>Local Directory:</b> Click <b>Browse</b>, then select the local drive and folder to store backup images.</p> <p><b>Network Share:</b> Click <b>Browse</b>, then select the network location to store backup images. You must also specify the network credentials that ShadowProtect should use to access the specified network location:</p> <p>ShadowProtect Backup Service credentials: Use the</p> <p>Specific User credentials: Provide the Container (Domain, Computer name, or NAS device name), Username and Password that ShadowProtect should use to access this network share.</p>
<b>Verify Destination Access</b>	<p>Instructs ShadowProtect to verify the destination path and access credentials, if necessary, before creating the Destination object.</p> <p>If the destination access verification is not successful the program will alert you that the destination could not be created as requested. You should then check the path and credentials used to make sure they are accurate and retry creating the destination.</p>

## Editing Destinations

### To edit a backup job destination

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. Select the Destinations tab.
3. Select the destination to edit, then click **Edit**.

This opens the Destination dialog box, which displays the current destination configuration. From this dialog box, you can edit all Destination properties except the Destination Type (Network Share or Local Directory).

## Deleting Destinations

### To delete a backup job destination

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. Select the Destinations tab.
3. Select the destination to delete, then click **Delete**.



**Note:** Before deleting a Destination, make sure to modify or delete any backup jobs that use the Destination or the jobs will fail. For information about editing backup jobs, see Section 5.3.3: Backup Jobs Tab<sup>[31]</sup>.

## 6.3 Options

When creating a backup job, ShadowProtect provides the following backup image file options. The Backup Wizard provides access to these options when you are creating a backup job (see Chapter 6: Creating Backup Image Files<sup>[38]</sup>).

- Compression Method<sup>[43]</sup>
- Encryption<sup>[44]</sup>
- Split Image File<sup>[44]</sup>
- Backup Comment<sup>[45]</sup>

### Compression Method

ShadowProtect provides the following file compression options when creating a backup image file:

**None:** No data compression. If disk space is not an issue, this option provides the fastest data backup.

**Standard:** Typically compresses data by about 40%. This is the default compression option, and provides a balance between backup speed and disk space usage.

**High:** Typically compresses data by about 50%. This option requires the most system resources, and results in the slowest data backup, but is useful when disk space is limited.

## File Protection

ShadowProtect provides the following file protection mechanisms when creating a backup image file. This is particularly useful when storing backup image files on a network, or off-site, to help prevent unauthorized access and use of your backup image files. If you select to protect the backup image file, you must specify the correct password in order to mount or restore the backup image.

**Password Protection:** Assigning a password requires you to enter the correct password before using the backup image file (for example, to restore a volume or create a Differential backup image based on the password-protected file. ShadowProtect supports passwords comprised of alphanumeric characters. Use the following guidelines when creating a password for the greatest security with password encrypted backup image files.

- Use at least eight characters.
- Use a random mixture of characters, upper and lower case and numbers.
- Don't use a word found in the dictionary.
- Change your password regularly or if you suspect your password has been compromised.



**Warning:** If you forget the password, you cannot access the backup image file. StorageCraft cannot access an encrypted backup image file.

**File Encryption:** ShadowProtect uses the password as an encryption key when encrypting the backup image file. You can select one of three encryption methods in the Advanced Options dialog box. For more information, see "Encryption" in Section 6.3.5: Advanced Options<sup>[45]</sup>.

**Use Password File:** You can use password file, also known as a Key File, to encrypt a backup image. This is helpful if you are not managing your own backups and you don't want other users to have access to the password used to protect the backup image files. For information about creating a Key File, see Section 12.4: Creating Key Files<sup>[79]</sup>.

## Split Image File

ShadowProtect lets you split a backup image file into multiple smaller files, creating a *Spanned Image Set*. This is useful when you need to move a backup image file onto fixed length media such as CDs or DVDs.

You can split a backup image file when you create it by selecting **Split Image File** in the Backup Wizard's Options page. Once selected, specify the desired file size, in MB, in the **Split Image File** field. For more information about the Backup Wizard, see Creating Backup Image Files<sup>[38]</sup>.

You can also split an existing backup image file using the Backup Image Tool (see Chapter 9: Backup Image Tool<sup>[57]</sup>).



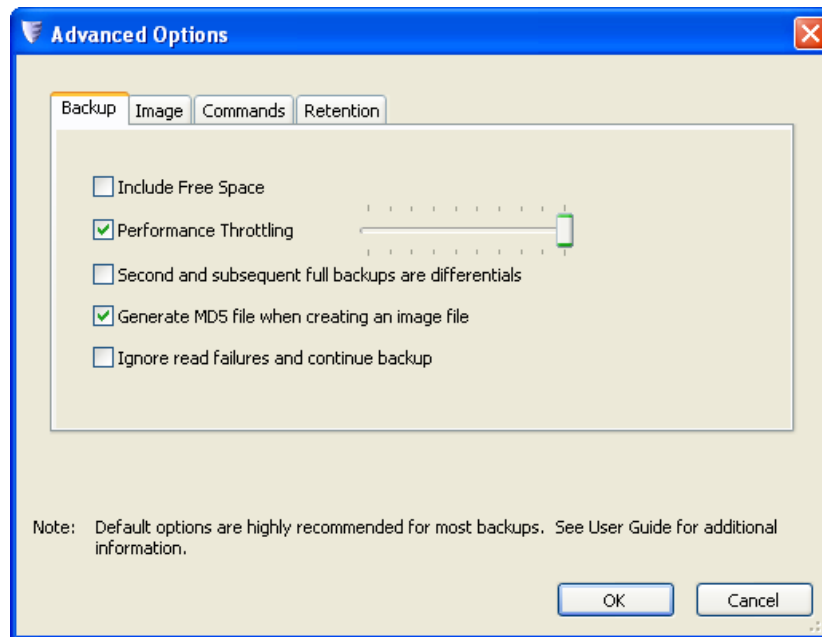
**Note:** If a backup image file is divided into multiple files, the filename suffix will change to .sp1, .sp2, ..., .spN, where N represents the file's sequence within the Spanned Image Set.

## Backup Comment

The Backup Comment option lets you attach a comment to a backup image file. These comments are available for review when mounting or restoring the backup image file at a later date. By default the time and date stamp are added to the backup image.

## Advanced Options

ShadowProtect supports the following advanced options when creating a backup image job. You can access advanced options from the Options page of the Backup Wizard (see Creating Backup Image Files<sup>[38]</sup>).



Advanced Options page in the Backup Wizard

ShadowProtect organizes its advanced options into four tabs:

- Backup<sup>[46]</sup>
- Image<sup>[46]</sup>
- Commands<sup>[47]</sup>
- Retention<sup>[48]</sup>



**Note:** StorageCraft recommends using the default advanced option settings unless you fully understand the impact of changing these features.

## Backup

The Backup tab includes the following advanced options:

**Include free space:** (Default = Off) Backs up all sectors on the volume, including those sectors marked as free space. This can result in a much larger image file, but can help preserve previously deleted files.

**Performance throttling:** (Default = On, 100% I/O usage) Specifies how much I/O bandwidth that ShadowProtect can use when creating a backup image file. Use the slider bar to adjust this setting. Reducing (throttling) ShadowProtect I/O usage increases the time it takes to create a backup image file, but can reserve I/O bandwidth for other processes.

**2nd and subsequent full backups are differentials:** (Default = Off) Instructs ShadowProtect to create Differential images rather than Full images for second and subsequent scheduled backup jobs. For example, if you have a weekly backup schedule that creates a new Full image each Monday, selecting this option instructs ShadowProtect to create Differential images each Monday that are based on the initial Full image created when the backup job ran for the first time. This reduces storage needs for the backup image files over time.

**Generate MD5 file when creating an image file:** (Default = On) Instructs ShadowProtect to create an MD5 (Message Digest 5) checksum file when creating a backup image file. The checksum lets you confirm the file integrity of backup image files.

**Ignore read failures and continue backup:** (Default = Off) Instructs ShadowProtect to ignore disk read errors that occur during the creation of backup image files.

## Image

The Image tab includes the following advanced options:

**Enable write caching:** (Default = Off) Enables or disables using file caching when writing the backup image file. Turning this option on might slow down the imaging process.

**Enable concurrent task execution:** (Default = Off) Enables or disables creating backup images simultaneously for multiple volumes rather than creating only one backup images at a time. When using this option, you should have hardware capable of supporting a high disk load.

**Enable self-healing incremental recovery:** (Default = On) Determines how ShadowProtect reacts to a system error that interrupts the ShadowProtect incremental tracking feature. When Off, ShadowProtect recovers by generating a new Full image and starting a new Image Set. When On, ShadowProtect recovers by creating an Incremental image as planned, along with a Differential image based on the most recent Incremental image and the current volume. This prevents disruption of the Incremental backup schedule, but can result in increased CPU and network bandwidth when compared to creating a new backup Image Set.

**Auto-execution of unexecuted task:** (Default = On) Enables or disables executing the last scheduled backup job if it was missed (for example, because the system was powered off). This option executes only the last unexecuted backup job if ShadowProtect misses more than one scheduled backup job.

## Commands

The Commands tab lets you specify command files (.exe, .cmd, .bat) to execute at key points in the backup image file creation process. The command files cannot rely on any user interaction, so you should test each command file before using them with ShadowProtect. ShadowProtect allows 5 minutes at each stage (Pre-snapshot, Post-snapshot, and Post-backup) for command files to complete. If the command files do not complete in 5 minutes, ShadowProtect proceeds while the command files continue executing.

To use a command file, enter the full file name, including path, into the appropriate field:

**Pre-Snapshot:** Executes the specified command file before taking the image snapshot (see "Snapshot" in Chapter 16: Glossary<sup>[86]</sup>). For example, you might execute a pre-snapshot command file that places non-VSS aware applications or databases into a backup state.



**Note:** It takes only a few seconds to create a snapshot, so non-VSS databases or applications are out of production only briefly before they can be returned to normal operating mode with a post-snapshot command.

**Post-Snapshot:** Executes the specified command file after taking the image snapshot (see "Snapshot" in Chapter 16: Glossary<sup>[86]</sup>). For example, you might execute a post-snapshot command file to return non-VSS aware applications or databases to normal operating mode.

**Post-Backup:** Executes the specified command file after creating the backup image file. For example, you might execute a post-backup command file to automatically copy the backup image file to an off-site location or FTP server.



**Note:** To avoid the 5 minute execution limit for post-backup command files, you can call a command file that simply executes another command file and then finishes. This lets you complete the ShadowProtect-associated command file in the 5 minute allotment while the secondary command file performs tasks that take longer to complete (synchronizing or copying the backup image files to an alternate location, scanning the backup image file for viruses, etc).

## Encryption

The Encryption tab lets you select the algorithm used to encrypt the backup image file. The Encryption tab is displayed only when you have selected **Enter Password** on the Options page of the Backup Wizard (see Section 6.3.2: File Protection<sup>[44]</sup>).

**RC4 128-bit:** This encryption option is the fastest, but least secure of the algorithms.

**AES 128-bit:** This encryption option strikes a balance between speed and security.

**AES 256-bit:** This encryption option is the most secure, but slowest, of the algorithms.

## Retention

The Retention tab lets you specify a policy for automatically managing the retention of backup Image Sets (see "Image Set" in Chapter 16: Glossary<sup>[86]</sup>). The Retention tab is not available if you are using the Continuous Incremental backup schedule, which leverages ShadowProtect ImageManager to manage backup Image Sets. For more information, see the *ShadowProtect ImageManager User Guide*.

The Retention tab includes the following advanced options:

**Enable a retention policy:** (Default = Off) Enables or disables an automatic Image Set retention policy.

**Number of backup Image Sets to retain:** (Default = 3) Specifies the maximum number of Image Sets to retain. When the specified maximum (M) is reached, ShadowProtect deletes the oldest Image Set. By default, ShadowProtect enforces the retention policy after creating an Image Set, meaning that ShadowProtect creates the M+1 Image Set, then deletes the oldest Image Set, thereby retaining M Image Sets.

**Delete both Full and Incremental backup images in the set:** (Default = Off) Instructs ShadowProtect to delete the all files, both Full and Incremental, when removing an old Image Set.

**Delete only Incremental backup images (retain Full backup images):** (Default = On) Instructs ShadowProtect to delete only Incremental backup images when removing an old Image Set.

**Enforce policy before starting the next Full backup:** (Default = Off) Instructs ShadowProtect to "make room" for a new Image Set by deleting the oldest Image Set before creating the new Image Set that will replace it. This reduces the amount of disk space needed to adhere to the specified retention policy.

For more information about the benefits of retention policies, see Chapter 14: Common Retention Policy Configurations<sup>[84]</sup>.

## 6.4 Deleting Backup Image Files

You can delete backup image files using any process you normally use to delete a file in Windows. However, before deleting a backup image file, be certain of the following:

- The backup image file is not required for any active backup job. If you delete the Full image to an active backup image job, ShadowProtect creates a new Full image at the next scheduled backup and starts a new Image Set.
- Other backup image files do not depend on this backup image file. If you delete a backup image file that other point-in-time backup image files depend on, all dependent backup image files become useless. You cannot browse and restore files from these dependent backup image files. Use the Backup Image Tool to check for any file dependencies (see Chapter 9: Backup Image Tool<sup>[57]</sup>).



## Chapter 7: Mounting Backup Image Files

The ShadowProtect Explore Backup Wizard guides you through the process of mounting a backup image file. ShadowProtect automatically associates the files required to browse and restore a specific backup image file. You need only select the backup image you want to explore. Once mounted, you can treat the backup image file as you would any other Windows volume:

- Browse the backup image file.
- Share the backup image file.
- Copy individual files and folders from the backup image file.
- Modify the backup image file (if the volume is configured as writeable).
- Use standard Windows security and file properties.

While the process is the same, whether you can restore files and folders in Windows, or need to use the StorageCraft Recovery Environment, depends specifically on the state of your system and what you need to restore:

**Restore in Windows:** Windows loads, but you have lost data or had undesirable changes to applications or hardware files on a volume (excluding the operating system files).

**Restore in Recovery Environment:** Windows does not load and you have lost data or operating system files, or had undesirable changes to applications or hardware files on a volume. For more information, see the *StorageCraft Recovery Environment User Guide*.



**Note:** To restore data from an Incremental image, you must have all previous incremental backup image files and the initial full backup image. If any of these files is missing or corrupt, mounting the backup image to that point in time is not possible. ShadowProtect does not let you modify Full images prevent corrupting an entire Image Set.

For information about mount options, see Backup Image Mount Options<sup>[51]</sup>.

### To mount a backup image file

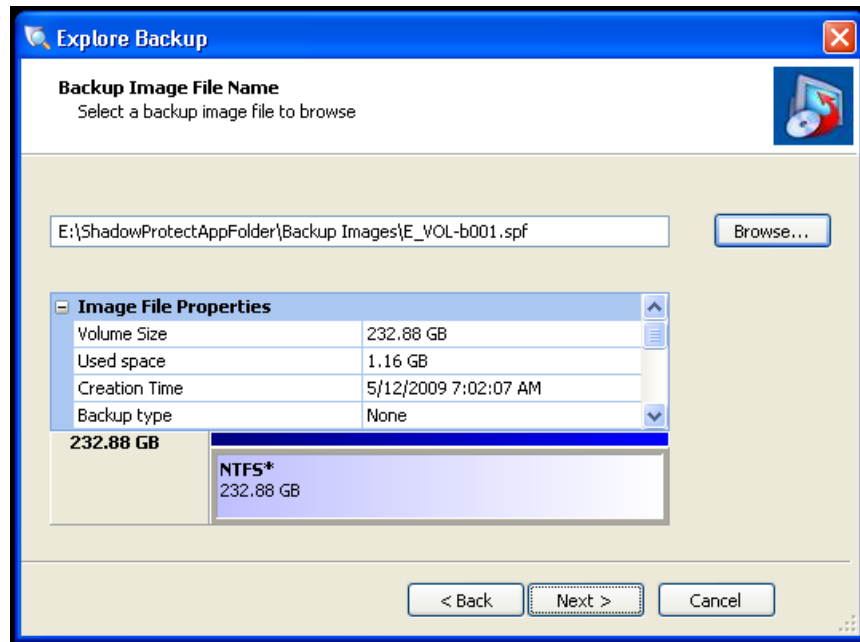
1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. Open the Explore Backup Wizard by doing one of the following:
  - In the Wizards tab, click **Explore Backup**.
  - In the Tasks menu, click **Explore Backup**.
  - In the Menu bar, select **Tasks > Explore Backup**.
3. On the Backup Image File Name page, browse to the backup image file you want to mount, then click **Next**.

For information about backup image file naming conventions, see Section 3.3.1: File Naming Conventions<sup>[16]</sup>.



**Note:** If the backup image is encrypted you must provide the appropriate password.

The Explore Backup Image Wizard displays a categorized list of information about the backup image file.



Select Backup Image File to Browse

4. (Conditional) In the Backup Image Dependencies page, select the desired point-in-time image from the selected backup Image Set, then click **Next**.
5. On the Explore Options page, select how you want to mount the backup image, then click **Next**.

For more information about mount options, see Backup Image Mount Options<sup>[51]</sup>.

- a. To mount the backup image file as a drive letter, select **Assign the following drive letter**, then select the appropriate drive letter from the drop-down list.
- b. To mount the backup image file as a mount point, select **Mount in the following empty NTFS folder**, then browse to the appropriate NTFS folder. You must also specify how to name the mount point sub-folder:

**Time/Date:** Uses the backup image's creation date and time as the sub-folder name (for example, 7-12-2008 10.19.24 AM).

**File Name:** Uses the backup image file name as the sub-folder name (for example, E\_VOL b001).

**Custom:** Lets you specify a custom sub-folder name.

- c. (Optional) Deselect **Mount Backup as Read-Only** to mount the backup image as a writeable volume.

If you mount the backup image file as a writeable volume, you can choose to save the changes to an Incremental image file when you dismount the volume (see Dismounting Backup Image Files<sup>[52]</sup>).

6. On the Wizard Summary page, review the mount information, then click **Finish**.  
ShadowProtect mounts the backup image file, then automatically launches Windows Explorer and displays the mounted volume.
7. With the backup image mounted, you can browse the contents of the volume as you would any Windows volume.

To restore individual files or folders, simply copy them from the backup image file volume to your production volume.



**Note:** Once mounted, select Refresh Volumes Info to get an accurate view of the mounted system volumes from the Disk Map tab.

## 7.1 Mounting Backup Image Files in Windows

ShadowProtect adds two options to the Context menu (the right-click menu) of backup image files:

**Mount:** Launches the Image File Mount Wizard to guide you through the process of mounting the selected backup image file. For information about the various options in the Image File Mount Wizard, see Mounting Backup Image Files<sup>[49]</sup>, starting in Step 3. You can simultaneously mount multiple backup image files, but you must mount each backup image file individually with the Image File Mount Wizard.

**Quick Mount:** Mounts the backup image file as read-only using the next available drive letter. You can select multiple backup image files, then quick mount them simultaneously, with each backup image file receiving the next available drive letter.

For information about dismounting a backup image file, see Dismounting Backup Image Files<sup>[52]</sup>.

## 7.2 Backup Image Mount Options

When mounting a backup image file, consider the following:

- Whether to mount the backup image as a drive letter or at a mount point location.
- Whether to mount the backup image as read-only or writeable.

### Mounting a Backup Image as a Drive Letter

The ShadowProtect Mount Utility lets you mount a backup image file as a drive letter on your computer with all the properties of the original volume.

After mounting a backup image as a drive letter, you may perform a variety of tasks, such as running ScanDisk (or CHKDSK), performing a virus check, defragmenting the drive, copying folders or files to an alternate location or simply viewing disk information about the drive such as used space and free space.

When a drive is mounted, you may set it up as a shared drive. Users on a network can connect to the shared drive and restore files and folders from within the backup image if you want end users to recover their own files. You also may mount one or more backup images at a time. The drives will remain mounted until you dismount them or restart the machine. If an NTFS volume uses EFS (Encrypted File System), the security remains intact on the volume when it is mounted.

### Mounting a Backup Image as a Mount Point

The ShadowProtect Mount Utility lets you mount a backup image file as a mount point (a directory on an NTFS file system). Mount points overcome the available drive letter limitation and support more logical organization of files and folders.

## Mounting a Read-Only Backup Image

By default, ShadowProtect mounts backup image files as read-only. This lets users access the backup image to do the following:

- Recover files from an existing backup image.
- View the contents of a backup image.
- Run other applications that need to access the backup image, such as a storage resource manager or data mining application.



**Note:** Windows 2000 does not support read-only NTFS volumes.

## Mounting a Writeable Backup Image

ShadowProtect can mount a backup image as writeable volume. This lets users access the backup image to do the following:

- Remove files from the backup image (viruses, malware, etc.)
- Add files to the backup image.
- Update the backup image security.
- Restore a backup image to a smaller volume (see Dismounting Backup Image Files<sup>[52]</sup>).



**Note:** ShadowProtect prevents you from modifying a Full image file to prevent corruption of an entire Image Set.

## 7.3 Dismounting Backup Image Files

Once mounted, a backup image file remains mounted until explicitly dismounted, or the system reboots. The ShadowProtect Backup Image Dismount Wizard guides you through the process of dismounting a previously mounted backup image file (see Mounting Backup Image Files<sup>[49]</sup>). As part of the dismount process, you can do the following:

- Save changes to writeable backup images.
- Shrink the volume so you can restore the image to a smaller drive.



**Note:** The Shrink Volume feature truncates mounted backup image files so that the file system ends at the last currently-allocated cluster. To reduce the backup image size as much as possible, use a disk defragmentation tool on the mounted image to consolidate file distribution within the volume and free up space at the end of the volume.

### To dismount a backup image

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. Open the Backup Image Dismount Wizard by doing one of the following:
  - In the Tasks menu, click **Dismount Backup Image**.
  - In the Menu bar, select **Tasks > Dismount Backup Image**.

3. In the Mounted Backup Images page, select the backup image volume to dismount, then click **Next**.

When selecting a mounted backup image, this page also displays the volume properties.

4. (Conditional) In the Backup Image Dismount Options page, select if you want to Save volume changes, or Shrink the backup Image, then click **Next**.

These options are available only if the backup image volume is writeable (see Backup Image Mount Options<sup>[51]</sup>).

**Save changes to incremental file:** Saves changes made to the mounted volume. Right-click the Incremental File to save the modified backup image file using a different name.

**Shrink Volume:** Lets you shrink the volume so you can restore this image to a smaller hard drive. This option is available only in the following situations:

- Dismounting a writeable backup image of an NTFS volume in Windows Vista or Windows Server 2008 (or later).
- Running StorageCraft Recovery Environment using boot option 1 (Recommended), which boots using Windows PE (Vista-based).

5. In the Backup Image Dismount Summary page, review the dismount details, then click **Finish**.



**Note:** Once dismounted, select Refresh Volumes Info to get an accurate view of the mounted system volumes from the Disk Map tab.

## Dismounting Backup Images in Windows

ShadowProtect adds two options to the Context menu (the right-click menu) of mounted backup image files. For information about mounting backup image files, see Mounting Backup Image Files<sup>[49]</sup>.

**Dismount:** Launches the Backup Image Dismount Wizard to guide you through the process of dismounting the selected backup image file. For information about the various options in the Backup image Dismount Wizard, see Dismounting Backup Image Files<sup>[52]</sup>, starting in Step 3.

**Quick Dismount:** Dismounts the backup image file without any further user interaction. ShadowProtect dismounts the backup image file without saving changes made to a writeable mounted image file, if applicable.

## Chapter 8: Restoring a Volume

ShadowProtect provides two ways to restore volumes from backup image files:

**Restore in Windows:** Restore a non-system volume using the ShadowProtect Restore Wizard. This method does not require you to reboot the system.

**Restore in Recovery Environment:** Use the bootable Recovery Environment when restoring a system volume where the operating system resides. For information about restoring a system volume from the Recovery Environment, see the *StorageCraft Recovery Environment User Guide*.

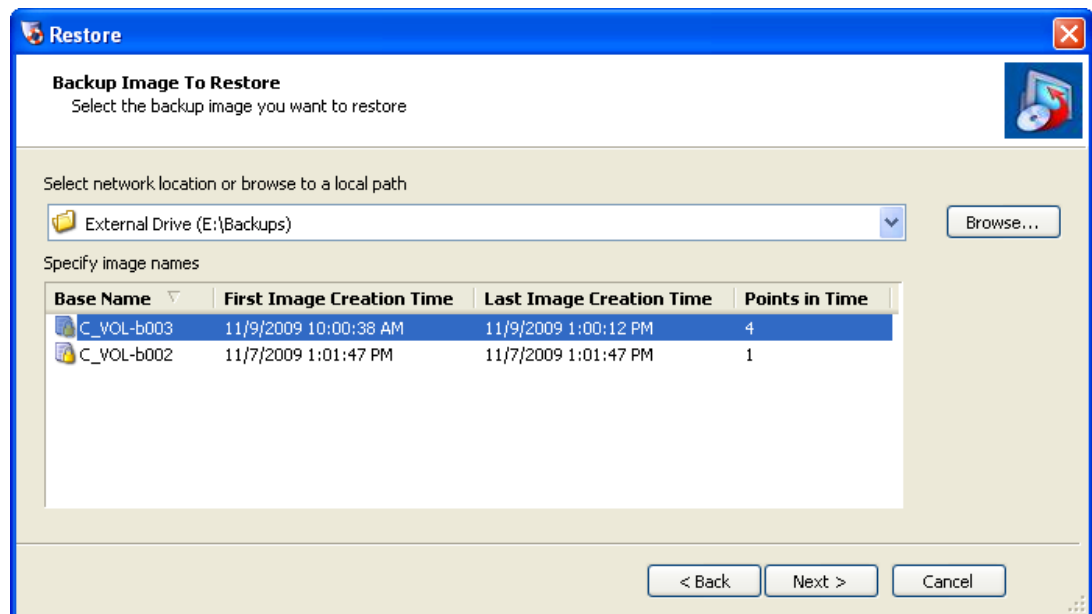


**Warning:** Restoring a backup image to a volume overwrites all data currently on the volume.

### To restore a non-system volume

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. Open the Restore Wizard by doing one of the following:
  - In the Wizards tab, click **Restore**.
  - In the Tasks menu, click **Restore**.
  - In the Menu bar, select **Tasks > Restore**.
3. On the Backup Image to Restore page, select the Image Set to restore, then click **Next**.

In the drop-down menu, select the Destination (see Section 6.2: Destinations<sup>[41]</sup>) that contains the backup Image Set to restore, or click **Browse** to locate the desired backup image set. The Specify Image Names field displays the backup Image sets available at the selected destination or path.

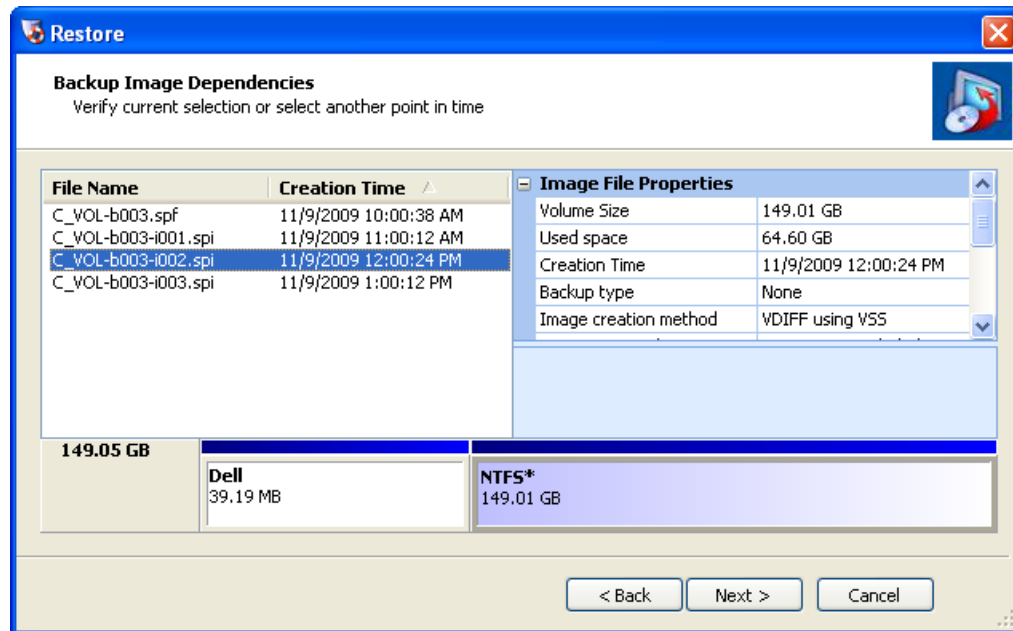


Select the backup image set to restore



**Note:** To restore a volume from a backup image set stored on a network share, you must have the proper network credentials.

4. On the Backup Image Dependencies page, select the point-in-time to restore, then click **Next**.



Select specific point-in-time to restore

This page displays all Incremental backup image files associated with the selected Image Set. Select a specific backup image file to view the following image file properties:

**Image File Properties:** Volume size, creation time, compression, password protection, comment.

**Original Partition Information:** Style, number, type, bootable option, starting offset and length.

**Disk Information:** Disk geometry, disk size and number of the first track sectors. You can also view the disk layout graphically at the bottom of the screen. This represents what the disk looked like at the time of backup.

**Originating machine:** Operating system version, the machine name, MAC address and the ShadowProtect engine version used to create the image file.

5. On the Restore Destination page, select the volume where you want to restore the backup image, then click **Next**.



**Note:** The selected partition must have space sufficient for the selected Image Set. For example, you cannot restore a 4GB backup file with only 1GB of free space.

Right-click a volume to see the following actions in the context menu:

**Delete Volume:** Deletes the selected volume. The deleted volume becomes unassigned space on the disk that can be repartitioned.

**Set Active:** Sets the selected volume as Active (bootable). Only one partition per drive can be designated as Active.

**Create an exact primary partition:** (Available only if unpartitioned disk space exists) Defines and creates a primary partition on the disk. You cannot create more than four (4) primary partitions on a disk.

**Create extended partition:** (Available only if unpartitioned disk space exists) Extends the selected partition, then subdivide the extended partition into one or more logical drives.

**Edit Policy:** Launches the Partition Creation Policy Editor.

6. On the Specify the Restoration Options page, select the appropriate volume restore options, then click **Next**.

**Set Partition Active:** Configures the restored volume as the active partition in the system (the drive the machine boots from).

**Restore MBR:** Restore the master boot record (MBR) as part of the volume restore job. The master boot record is stored in the first sector of the first physical hard drive, and contains the master boot program and partition table. The master boot program uses the partition table to determine the active partition, then starts the boot program from the boot sector of the active partition. When selected, you have the following MBR restore options:

**Restore MBR from the image file:** Restores the MBR from the backup image file.

**Restore original Windows XP MBR:** Restores the default MBR that ships with Windows XP.

**Restore disk signature:** Restores the original hard drive physical disk signature. Windows Server 2003, Windows 2000 Advanced Server, and Windows NT Server 4.0 Enterprise Edition (SP3 and later) require disk signatures to use the hard drive.

**Restore Disk Hidden Track:** Restores the first 63 sectors of a drive. Some boot loader applications require this for the system to boot.

7. On the Wizard Summary page, review the details of the volume restore operation, then click **Finish**.

You can view the progress of restore volume operation in the Backup Jobs tab.



## Chapter 9: Backup Image Tool

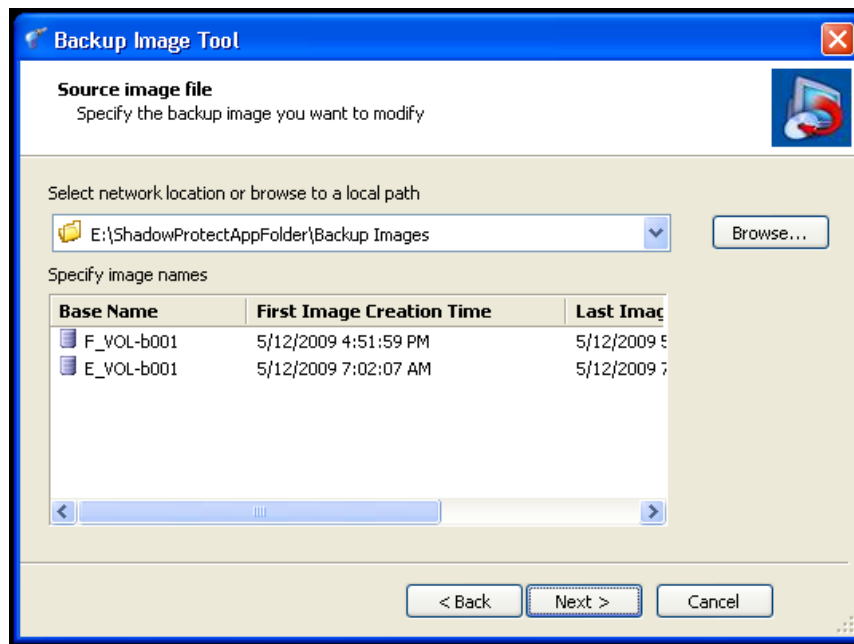
ShadowProtect provides the Backup Image Tool so you can manage existing backup image files, and provides the following primary features:

- Consolidate a point-in-time backup image (Full + Incremental images) into a new Full image.
- Change the compression setting on an existing image.
- Change the encryption setting on an existing image.
- Split an backup image file into a Spanned Set where each file has a maximum file size. This is useful for moving backup image files to CD or DVD.
- Convert a backup image into a virtual machine format (VMDK or VHD).

You can access the Backup Image Tool from either Windows or the StorageCraft Recovery Environment.

### To use the Backup Image Tool

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. In the Tools menu, click **Backup Image Tool**.
3. On the Source Image File page, browse to the location of the backup image files you want to modify.



Specify Source Image File

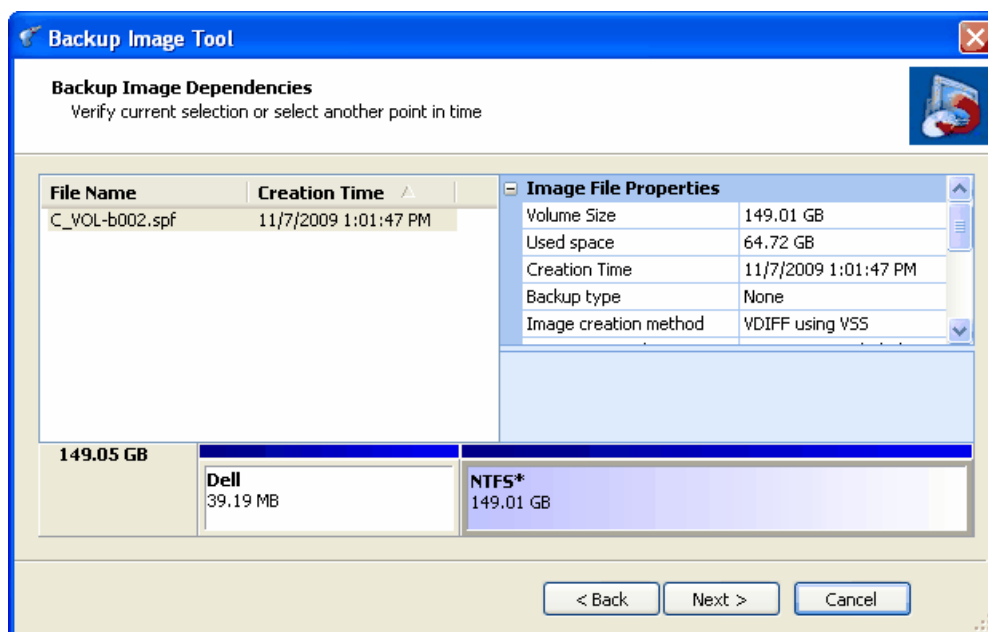
ShadowProtect displays the Full images stored in the specified location.

4. Select the Base Image File to work with, then click **Next**.



**Note:** If the backup image is encrypted you must provide the appropriate password.

5. In the Backup Image Dependencies page, select the Incremental image that represents the point-in-time to consolidate with the Full image, then click **Next**.



**Select a point-in-time to consolidate into a new Full image**

Select a backup image file (left pane) to view its properties (right pane), including:

- **Originating machine:** The operating system version, the machine name, MAC address and the engine version of ShadowProtect used to create the image file.
- **Disk Information:** Disk geometry, disk size and number of the first track sectors. You can view the original disk layout in graphical form at the bottom of the screen.
- **Original Partition Information:** Style, number, type, bootable option, starting offset and length.
- **Image File Properties:** Volume size, creation time, compression, password protection, comment.

6. In the Destination Image File page, specify the required information, then click **Next**.

<b>Select network location or browse to a local path</b>	From the drop-down menu, select the Destination (see Section 6.2: Destinations <sup>(41)</sup> ) where you want to store the destination image file, or <b>Browse</b> to the desired location.
<b>Specify image name</b>	Specify a name for the destination image file.
<b>Save As</b>	Select the type of image file you want to create. Supported options include:  <b>SPF:</b> Create a new Full (Base) image file. <b>VHD:</b> Create a Microsoft Virtual Hard Disk file compatible with Microsoft and Hyper-V virtual environments. <b>VMDK:</b> Create a Virtual Machine Disk file compatible with VMware virtual environments. <b>ESX Server:</b> Create an ESX server file compatible with VMware ESX virtual environments.

7. In the Options page, specify the desired backup image file options, then click **Next**.

For information about each of these options, including the Advanced options, see Section

### 6.3: Options<sup>43</sup>

8. In the Wizard Summary page, review the Backup Image Tool job summary, then click **Finish**.

Monitor the progress of the Backup job in the Backup Jobs tab (select the job, then click **Details**).  
Review the results of previously executed jobs in the Backup History tab.

## Chapter 10: Remote Management

ShadowProtect provides two ways to remotely manage ShadowProtect Backup Agents installed on remote servers and desktops (known as remote nodes), as long as these systems are accessible through the local area network or a virtual private network (VPN). By connecting to a remote node through one of these tools, you have full access to ShadowProtect features and functionality on the remote node.

- Remote Management with the Management View<sup>[60]</sup>
- Remote Management with the Network View<sup>[64]</sup>



**Note:** You must have administrative rights to the remote node in order to manage it. However, with the proper administrative rights, you can remotely manage both ShadowProtect Server Edition and ShadowProtect Desktop Edition nodes using either the Management View or the Network View.

### 10.1 Remote Management with the Management Console

The Management View tab is designed specifically for ShadowProtect Server and ShadowProtect SBS users that need to manage a larger number of remote ShadowProtect installations from a central location.

Although the functionality is very similar to the Network View, the Management View organizes it in a way to make it more friendly to administrators with many remote nodes to manage. You can open and close the Management View by selecting **Management View** in the View menu (see Section 5.3.2: Management View<sup>[35]</sup>).

You can do the following from the Management View:

- Installing the Backup Agent Remotely<sup>[60]</sup>
- Adding and Deleting Remote Nodes<sup>[64]</sup>
- Modifying Remote Node Properties<sup>[65]</sup>
- Connecting and Disconnecting Remote Nodes<sup>[65]</sup>

#### Installing the Backup Agent Remotely

Using the Push Agent, Management View lets you remotely install the ShadowProtect Backup agent so you can configure ShadowProtect operations on the remote system.



To remotely install the backup agent

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. In the View menu, click **Management View** to open the Management View.
3. In the Management View, click **Install**.

This opens the Push Install Wizard so you can configure the push install.

4. On the Push Wizard dialog box, provide the required information, then click **Next**.

<b>System Name</b>	The name of the system where you want to install the ShadowProtect Backup agent. Select either <b>Domain name</b> or <b>Host name</b> according to the type of system name you are providing, then type the system name in the
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	<p>field.</p> <p> <b>Note:</b> If you leave the field blank, Push Install uses your current domain or workgroup to locate a list of available systems.</p>
<b>Use Active Directory Search</b>	<p>Instructs ShadowProtect to search Microsoft Active Directory for the desired system.</p> <p>To use this parameter, click <b>options</b> (at the bottom of the Push Install dialog box when <b>Use Active Directory search</b> is selected) to refine the Active Directory search characteristics.</p>
<b>Use Specified Credentials</b>	<p>The authentication credentials that Push Install uses to gain access to the remote system.</p> <p> <b>Note:</b> If you do not provide credentials, Push Install uses your current credentials to attempt to access the remote system.</p>
<b>Discover Services</b>	<p>Push Install attempts to identify existing ShadowProtect services running on remote systems. When successful, it displays the information it gathers about agent version.</p>
<b>Automatically activate installed agents</b>	<p>Push Install automatically activates the Backup agent it installs.</p> <p>To use this parameter, click <b>settings</b> (at the bottom of the Push Install dialog box when <b>Automatically activate installed agents</b> is selected) to specify the Username and Serial # of the ShadowProtect license you want to use on the remote system.</p>
<b>Reboot after install</b>	<p>Following a successful Backup agent install, ShadowProtect automatically re-boots the remote system so the Backup agent is active.</p> <p>To use this parameter, click <b>settings</b> (at the bottom of the Push Install dialog box when <b>Reboot after install</b> is selected) to specify the details of the reboot operation. You can instruct the remote system to reboot at a specific date/time; specify a message to display before rebooting; and specify a delay before the reboot occurs (in seconds).</p>

5. (Conditional) On the Computers Overview page, select the systems where you want to install the Backup agent, then click **Next**.

If you didn't specify a system name, you can select the systems where you want to install the Backup agent here.

6. On the Install Overview page, wait until the install finishes, then click **Next**.
7. (Optional) On the Post Install Overview page, specify a Group name for each system where you installed the Backup agent, then click **Next**.

Click in the **Group name** field, then type or select the group where you want to add this system. For more information about Groups, see [Modifying Remote Node Properties](#) [62].


8. On the Summary page, click **Finish**.

The newly installed remote nodes appear in the Management View node list.

## Adding and Deleting Remote Nodes

Before managing a remote node, you must add it to your Management View.


### To add a remote node

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. If the Management View is not visible, select **Management View** from the View menu.
3. In the Management View, click **Add** .
4. In the Server Details dialog box, specify the appropriate connection information for the remote node.

For information about remote node properties, see Modifying Remote Node Properties<sup>[65]</sup>.

You can now connect to the remote node to manage ShadowProtect.

### To delete a remote node

1. In the Management View, select the remote node in the node list.
2. Click **Delete** .

Deleting a remote node does not delete ShadowProtect or any of its configurations from the remote node, or remove the remote node from the Management View of any other system that might be configured to remotely manage that node.




**Note:** You cannot delete the local node from the Management View.

## Modifying Remote Node Properties

The properties table displays the properties of the currently selected remote node. You can edit remote node properties as long as the remote node is not connected.


### To modify the properties of a remote node

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. If the Management View is not visible, select **Management View** from the View menu.
3. In the node list, select a remote node to modify.

If the Server Properties pane is not visible, click **Properties** .

4. In the Server properties pane, modify the remote node properties as needed.


Select a field to make it active. You can also use the Tab key to move from field to field. Remote Node properties include the following:

<b>Server Name</b>	A remote node name used to identify it in the node list.
<b>Server Address</b>	The IP address or machine name of the remote node. To browse the network for a particular system so you can find the IP address, click Browse  .
<b>Group</b>	The group that you want to associate with the remote node. You can create groups help organize remote nodes and make management easier.
<b>Server Description</b>	A description of the remote node. This is for your information only.

<b>Status</b>	(Informational) The remote node status ( <i>Connected</i> or <i>Disconnected</i> ).
<b>Domain Name</b>	The domain name used to access the remote node.
<b>User Name</b>	A user name with Administrator rights to the remote node.
<b>Password</b>	The user name's associated password.
<b>Agent Version</b>	(Informational) The version of the Backup Agent installed on the remote node.
<b>Last Connected</b>	(Informational) The date and time you last connected to the remote node.

## Connecting and Disconnecting Remote Nodes

### To connect to a remote node


1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).  
If the Management View is not visible, select **Management View** from the View menu.
2. In the Management View, select the remote node in the node list.
3. Click **Connect** .

You can be connected to only one node at a time. If you connect to another remote node, ShadowProtect automatically disconnects you from the previously connected node.



**Note:** You must add a remote node in order to connect to it (see Adding and Deleting Remote Nodes<sup>[64]</sup>).

### To disconnect a remote node

1. In the Management View, select the remote node in the node list.
2. Click **Disconnect** .

Disconnecting a remote node does not stop the ShadowProtect Backup Agent or affect any of ShadowProtect operations on the remote node.

## 10.2 Remote Management with the Network View

When open, the Network View appears as a right panel in the ShadowProtect Console. You can open and close the Network View by selecting **Network View** in the View menu (see Section 5.4: Network View<sup>[36]</sup>).

You can do the following from the Network View:

- Adding and Deleting Remote Nodes<sup>[64]</sup>
- Modifying Remote Node Properties<sup>[65]</sup>
- Connecting and Disconnecting Remote Nodes<sup>[65]</sup>
- Exporting and Importing Node Settings<sup>[66]</sup>

### Adding and Deleting Remote Nodes

Before managing a remote node, you must add it to your Network View.

#### To add a remote node

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).

If the Network View is not visible, select **Network View** from the View menu.

2. In the Network View, click **Add** .


This creates a new node in the Network View named *New Node 1* and opens a Server Properties pane where you can configure the remote node.

3. In the Server Properties pane, specify the appropriate connection information for the remote node.

For information about remote node properties, see Modifying Remote Node Properties<sup>[65]</sup>.

You can now connect to the remote node and manage ShadowProtect.

#### To delete a remote node

1. In the Network View, select the remote node in the node list.
2. Click **Delete** .

Deleting a remote node does not delete ShadowProtect or any of its configurations from the remote node, or remove the remote node from the Network View of any other system that might be configured to remotely manage that node.



**Note:** You cannot delete the local node from the Network View.



## Modifying Remote Node Properties


The properties table displays the properties of the currently selected remote node. You can edit remote node properties as long as the remote node is not connected.

### To modify the properties of a remote node

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).


If the Network View is not visible, select **Network View** from the View menu.

2. In the node list, select a remote node to modify.

If the Server Properties pane is not visible, click **Properties** .

3. In the Server properties pane, modify the remote node properties as needed.

Select a field to make it active. You can also use the Tab key to move from field to field. Remote Node properties include the following:

<b>Server Name</b>	A remote node name used to identify it in the node list.
<b>Server Address</b>	The IP address or machine name of the remote node. To browse the network for a particular system so you can find the IP address, click Browse  .
<b>Group</b>	The group that you want to associate with the remote node. You can create groups help organize remote nodes and make management easier.
<b>Server Description</b>	A description of the remote node. This is for your information only.
<b>Status</b>	(Informational) The remote node status (Connected or Disconnected).
<b>Domain Name</b>	The domain name used to access the remote node.
<b>User Name</b>	A user name with Administrator rights to the remote node.
<b>Password</b>	The user name's associated password.
<b>Agent Version</b>	(Informational) The version of the Backup Agent installed on the remote node.
<b>Last Connected</b>	(Informational) The date and time you last connected to the remote node.

## Connecting and Disconnecting Remote Nodes

### To connect to a remote node

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).

If the Network View is not visible, select **Network View** from the View menu.

2. In the Network View, select the remote node in the node list.

3. Click **Connect** .

You can only be connected to a single node at a time, so if you connect to another remote node, ShadowProtect automatically disconnects you from the previously connected remote node.



**Note:** You must add a remote node in order to connect to it (see Adding and Deleting Remote Nodes<sup>[64]</sup>).

#### To disconnect a remote node

1. In the Network View, select the remote node in the node list.
2. Click **Disconnect**

Disconnecting a remote node does not stop the ShadowProtect Backup Agent or affect any of ShadowProtect operations on the remote node.

## Exporting and Importing Node Settings

ShadowProtect lets you transfer remote node configurations from one ShadowProtect Console to another.

#### To export remote node configurations

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).  
If the Network View is not visible, select **Network View** from the View menu.
2. In the Network View, click **Export nodes**
3. Specify the name for the XML file that contains the exported remote node configurations, then click **Save**.

#### To import remote node configurations

1. In the Network View, click **Import nodes**
2. Browse to the XML file that contains the previously exported remote node configurations, then click **Open**.

## Chapter 11: Using VirtualBoot

VirtualBoot lets ShadowProtect users boot a backup image in a Virtual Machine (VM) environment. VirtualBoot leverages the open source Oracle VirtualBox software so you can quickly boot a backup image without performing a time-consuming restore operation, and without converting backup image files to a different format.

VirtualBoot provides tremendous value in the following situations:

**System Fail-over:** When you're dealing with Terabytes of storage, restoring a failed system can take days. However, VirtualBoot lets you quickly recreate your failed system in a VM while you rebuild the failed system. Users have full access to the system during this time, with only a brief downtime to cut-over to the new system once it is ready. Downtime drops from days to just minutes.

**Backup Test:** Disaster recovery is all about having system data stored in a way that is readily accessible should it be needed. But can you be confident that your stored data is valid? VirtualBoot lets you mount any backup image in a VM so you can test it to make sure a restored system would function properly. In just minutes you can feel confident that your backup images are ready for use when needed.

**Application-specific Data:** While backing up system data is a critical operation, sometimes the data files alone aren't useful without their associated applications. VirtualBoot lets you mount an entire system, both applications and data, in a VM where you have access to data from its associated application.

For information about VirtualBoot usage scenarios, see Section 3.3: VirtualBoot Scenarios<sup>[11]</sup>.

This section includes the following topics:

- VirtualBoot Requirements<sup>[67]</sup>
- Limitations<sup>[68]</sup>
- Creating a VM<sup>[68]</sup>
- Configuring a VM<sup>[73]</sup>

### 11.1 VirtualBoot Requirements

VirtualBoot requires you to install the following software before using it:

#### Software Requirements

- **ShadowProtect 4.x or later:** VirtualBoot supports backup image files created by any version of ShadowProtect, but you must have ShadowProtect 4.x or later to run the application. ShadowProtect 4.x includes VirtualBoot as a core component. For more information about ShadowProtect, see the StorageCraft *ShadowProtect User Guide*.



**Note:** Although VirtualBoot can generate a VM from backup image files created with any version of ShadowProtect, StorageCraft recommends using VirtualBoot with backup image files created by ShadowProtect 3.3 and later to get full access to the benefits of VirtualBoot.

- **VirtualBox 3.1.x:** VirtualBox is an open source VM environment. VirtualBoot provides native support for ShadowProtect files in a VirtualBox VM. For information about VirtualBox, and to download the software, visit [www.virtualbox.org](http://www.virtualbox.org). VirtualBox is free for personal, education, and

evaluation use.

## Hardware Requirements

VirtualBoot hardware requirements are driven primarily by the hardware requirements necessary to run VirtualBox (see VirtualBox End-User Documentation).

**Processor:** Reasonably powerful x86 processor (either Intel or AMD).

**Memory:** At least 1GB.

**Hard Drive:** Several GB at least. This is dependent upon the Operating System you want to load in the VM.

**Guest OS:** VirtualBoot supports backup image files that contain backups of the following operating systems (This is the OS that runs in the VM):


- Windows 2000
- Windows XP (32- and 64-bit)
- Windows 2003 (32- and 64-bit)
- Windows Vista (32- and 64-bit)
- Windows 2008 (32- and 64-bit)
- Windows 2008 R2 (32- and 64-bit)
- Windows 7 (32- and 64-bit)

## 11.2 Limitations

This release of VirtualBoot has the following limitations:

- VirtualBoot supports boot volumes up to 2TB. However, VirtualBoot supports data volumes (non-bootable) of any size.
- No support for LBD disk volumes (sector size > 512bytes).
- If the VM Host crashes while running a VM created from a backup image file, you must create a new VM using the latest Incremental backup image file. This is because VirtualBox stores all VM writes in a write buffer file (.spwb). These files are very efficient, but not crash-proof, so a restart of the VM loses all data in the write buffer file. Creating a new VM limits the data loss to only that since the last Incremental backup.

## 11.3 Creating a VM

Before using VirtualBoot to create a VM, review the Requirements .

### To create a virtual machine

1. Start VirtualBoot, then click **Next** on the VirtualBoot Wizard welcome page.

There are three ways to start VirtualBoot:

**Executable:** In Windows, select **Start > ShadowProtect > VirtualBoot**.

**Command Line:** From a Windows command prompt, type `VirtualBoot <backup image file>`, where `<backup image file>` is the name, including full path, of the ShadowProtect backup image file that you want to use to create a VM. For example:

```
VirtualBoot e:\backups\C_VOL-b005 spi
```

**Right-Click Menu:** In Windows Explorer, right-click the ShadowProtect backup image file that you want to use to create a VM, then select **VirtualBoot**.

2. In the Backup Image List page, provide the required information, then click **Next**.

If you start VirtualBoot using the command line or right-click menu option, VirtualBoot populates the Backup Image list with all files that are part of the backup chain for the specified backup image file.

<b>Add Image File</b>	Lets you add a backup image file to the VM.  Backup images created with ShadowProtect 3.3 or later contain metadata that lets you include multiple drives in the same VM.  If the selected backup image file is encrypted, you must provide a valid password to access it.
<b>Remove Image File</b>	Lets you remove a backup image file from the VM.
<b>Specify Boot Volume</b>	Lets you designate the boot volume in the VM. Typically, VirtualBoot detects this automatically, but if you include multiple bootable volumes in the VM, you can select the volume that VirtualBoot designates as the boot volume.




**Note:** If you specified a backup image file when starting VirtualBoot, this page lists the related backup image file information.

3. Select the backup image file (Full or Incremental) that you want to load in the VM, then click **Next**.

The Backup Image List displays all backup image files associated with the selected backup image chain.



4. In the Options page, provide the required information, then click **Next**.

<b>Specify the operating system for the new virtual machine</b>	From the dropdown menu, select the Windows OS contained in the boot volume of the backup image file.
<b>Automatically create the new virtual machine</b>	<p>Select this option to have VirtualBoot automatically create the VM as part of the configuration process. If you do not select this option, you must manually configure the VM in VirtualBox.</p> <p>In either case, VirtualBoot creates the XSP files that VirtualBox uses to define the virtual disk drives in the VM.</p> <p> <b>Note:</b> VirtualBoot ALWAYS places the boot volume in the Disk_0 XSP file.</p> <p>For more information, see <a href="#">Manually Configuring a VM</a>.</p>

<b>Automatically start the new virtual machine</b>	Select this option to launch VirtualBox automatically after the VM is complete and load it for use.
<b>Specify the name of the new virtual machine</b>	Specify a name for the VM. By default, VirtualBoot creates a name based on the machine name.
<b>Specify the amount of memory to allocate to the new virtual machine</b>	Specify the amount of memory, in MB, that VirtualBox should allocate for use by the VM when it loads.
<b>Specify the VM network adapter type</b>	<p>Select whether to include a network adapter in the VM. Supported options include:</p> <p><b>NAT PRO/1000 MT Desktop:</b> Adds a generic network adapter to the VM that uses Network Address Translation (NAT).</p> <p><b>No Network Adapter:</b> Excludes a network adapter from the VM.</p>


5. (Optional) On the Options page, click **Advanced** to open the Advanced Options dialog box.

The Advanced Options dialog box provides the following options:

<b>Import only one volume per hard disk drive within the virtual machine</b>	<p>Instructs VirtualBoot to include only one volume per VirtualBox XSP file. By default, VirtualBoot assigns four volumes per XSP file.</p> <p> <b>Note:</b> VirtualBoot ALWAYS places the boot volume in the Disk_0 XSP file.</p>
<b>Deactivate Windows within the virtual machine</b>	<p>Deactivates Windows on the VM's system volume. Because Microsoft licensing limits the number of reactivations, this options lets you use the activation grace period to accomplish your purposes with the VM.</p> <p> <b>Note:</b> If the host hardware where you start the VM is sufficiently different, Windows might deactivate automatically.</p>
<b>Store write buffers in a different directory than the image files</b>	Lets you specify a location to store the write buffers used when creating the VM. By default, VirtualBoot stores write buffers in the same location as the backup image files used to create the VM.
<b>Override personality used to configure the virtual machine OS volume</b>	For use only by StorageCraft technical support.

6. On the Wizard Summary page, click **Finish**.

VirtualBoot generates the files necessary to support the new VM and, if specified in the VM configuration, creates the VM and launches it for use.

 **Note:** For information about manually creating a VM in VirtualBox, see [Creating a VM Manually](#) [71].

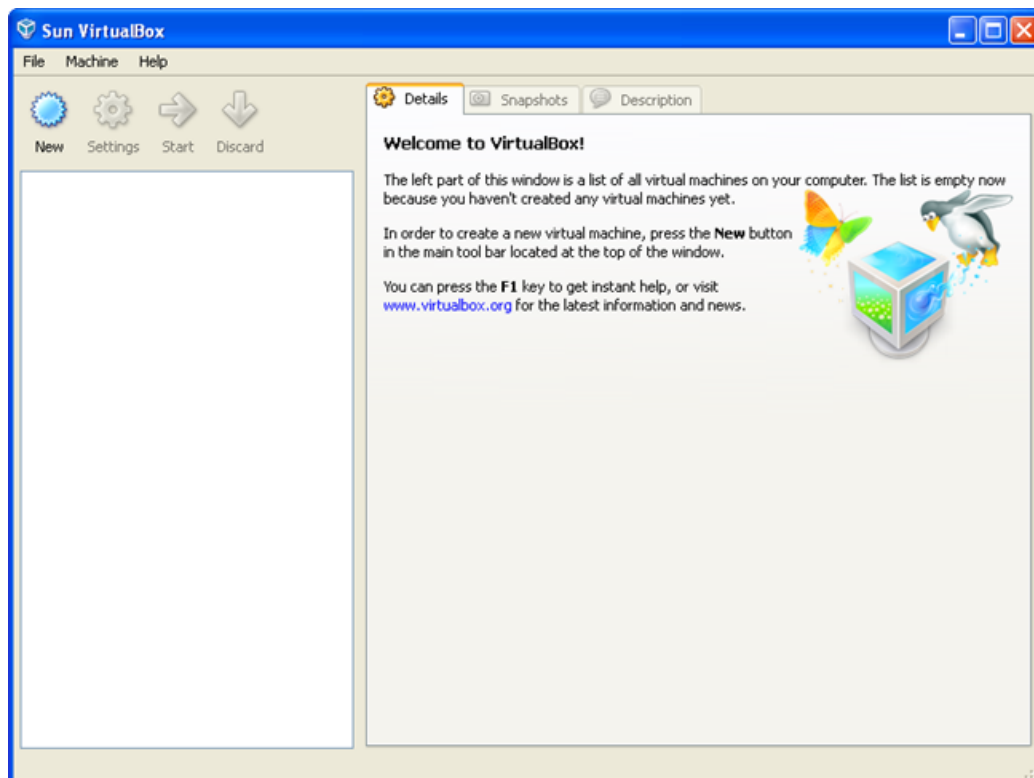
7. (Conditional) If you do not start the VM as part of the VirtualBoot creation process, you must start the VM manually from VirtualBox.
  - a. Launch VirtualBox.
  - b. In the left-side VM list, select the VM, then click **Start**.
8. Continue with Configuring a VM<sup>[73]</sup>.

## Creating a VM Manually

If you elected not to have VirtualBoot start the VM for you as part of the VM creation process (see Step 4 in Creating a VM<sup>[68]</sup>), you must manually create the VM in VirtualBox.



**Note:** The following task is based on VirtualBox v 3.1.4. Task details might vary slightly with different versions of VirtualBox.



The VirtualBox UI

### To manually create a virtual machine

1. Launch VirtualBox, then click **New**.
2. On the Create New Virtual Machine Wizard, click **Next**.
3. On the VM Name and OS Type page, specify the required information, then click **Next**.

<b>Name</b>	The name of the virtual machine. You should make the name descriptive of the OS and environment used in the VM.
-------------	---

<b>Operating System</b>	The model of operating system used in the VM. VirtualBoot supports only Microsoft Windows.
<b>Version</b>	The specific Windows operating system used in the VM.

4. On the Memory page, specify the amount of system memory (RAM) to allocate for use by the VM.

More memory makes the VM faster and more efficient. StorageCraft recommends at least 512MB.

5. On the Virtual Hard Disk page, select **Use existing hard disk**, then select the bootable virtual disk created by VirtualBoot.

The VirtualBoot virtual hard disk files have an XSP extension. VirtualBoot ALWAYS places the boot volume in the Disk\_0 XSP file.

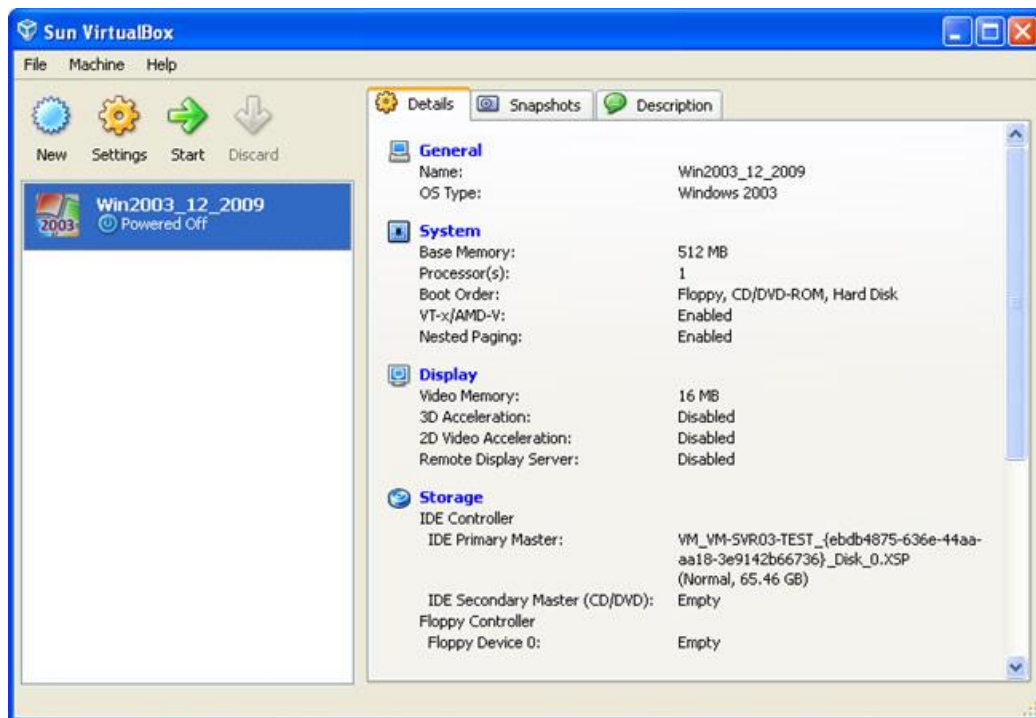
6. On the Summary page, click **Finish**.

VirtualBox creates the VM.

7. Once created, you can start the VM manually from VirtualBox.

- a. Select the VM in the left-side list.
- b. Click **Start**.

8. Continue with Configuring a VM<sup>73</sup>.



A new VirtualBox VM



## 11.4 Configuring a VM

Once you have started a VM, you must configure it for use, much like you might configure a new Windows installation. This process involves the following tasks:

- Configuring Drivers<sup>[74]</sup>
- Installing Guest Additions<sup>[74]</sup>
- Configuring a Network Driver<sup>[73]</sup>
- Continuing Continuous Incrementals<sup>[74]</sup>



**Note:** When working with a VM, you must be able to switch keyboard/mouse focus between the VM and your system environment. To switch focus to the VM, simply click the mouse in the VM window. To switch focus out of the VM, press the right `Ctrl` button.

### Configuring a Network Adapter

If you choose not have VirtualBoot create a network adapter (NIC) in the VM, you can add it after the fact. For the following reasons, this might be a good idea if you want to boot a backup image while the source system is still operational:

- Two systems on the network with the same network ID can cause routing problems, particularly at the Domain controllers.
- Both the VM and the source system might save Incremental backup images to the same network location. This can threaten the integrity of your backup image chain.

Keeping the VM off the network lets you resolve these types of issues before they cause any problems. For example, once the VM loads you can pause ShadowProtect backup operations in the VM, or change the backup image file destination to a local storage location so it does not conflict with the source system.

#### To add network support to the VM

1. Launch VirtualBox.
2. On the VirtualBox main page, select the VM where you want to add a NIC, then click **Settings**.

The VM must be powered off to modify the VM settings.

3. On the Settings page, select **Network** in the left-side navigation.
4. Select the Adapter 1 tab, then select **Enable Network Adapter**.
5. In the **Attached To** field, select how you want the virtual NIC to communicate with your host.

By default, VirtualBox uses Network Address Translation (NAT), but it supports other connection options. For more information, see the VirtualBox documentation.

6. Click **Advanced**, then select the virtual adapter type to use in the VM.

In testing, the "Intel Pro/1000 MT Desktop" appears to be a good generic driver for the VirtualBoot environment.

7. Click **OK** to modify the network adapter settings.

## Configuring Drivers

After starting a VM for the first time, you must allow Windows to detect and configure drivers for the VM environment.

### To configure a virtual machine for use

1. In the VM window, click **Machine > Insert Ctrl-Alt-Delete** to launch the Windows login, then log in to the VM.

Click in the VM window to transfer mouse and keyboard control to the VM.

2. Allow Windows to identify hardware and install drivers in the VM.

Windows goes through its initial boot sequence, identifying hardware and attempting to load drivers for those devices. This process is similar to performing a Hardware Independent Restore (HIR) in ShadowProtect. Follow the on-screen prompts and allow Windows to reboot as needed to load the necessary drivers.

3. After rebooting, log in to the VM.



**Note:** Because of hardware changes detected by Windows as part of the transition to the VM environment, you will likely be prompted to reactivate Windows when you log in to the VM. However, you typically have a three-day grace period for doing this. Because Microsoft restricts the number of hardware reactivations for each Windows license, you might want to leave Windows deactivated if you can get the production system ready to restore within the three day grace period. If this is not possible, activate Windows in the VM using the standard Microsoft activation process, and your Windows VM is licensed for as long as you need it.

## Installing Guest Additions

After Windows has installed drivers for the VM environment, you can install VirtualBox additions that provide enhanced interaction with, and control over, the VM environment.

### To install VirtualBox guest additions

1. From the VM menu bar, select **Devices > Install Guest Additions**.

This loads a virtual CD into the VM that has extra software designed to make the VM run quickly and smoothly. If the CD does not auto-run, browse the CD drive in the VM and execute one of the following:

**vBoxWindowsAdditions-x86.exe:** 32-bit Windows VM.

**vBoxWindowsAdditions-amd64.exe:** 64-bit Windows VM.

2. Follow the directions in the Guest Additions Wizard, then reboot the VM.
3. Log in to the VM.

## Continuing Incrementals Backups

To facilitate a true fail-over option and Head Start Restore (HSR), you must be able to continue the incremental backup process from within the VM. You must have a network adapter configured in the

VM to continue Incremental backups. For more information, see [Configuring a Network Adapter](#)<sup>73</sup>.



**Note:** To prevent performance problems in the VM, all incremental images should be created using the fast (VDiff) incremental option rather than a diff/comparison-based (DiffGen) method. Make sure your backup job uses VDiff incrementals before starting it in your VM environment.

#### To continue incremental backups in the VM

1. Launch VirtualBox, then start the appropriate VM.
2. Once the VM loads, log in, then start ShadowProtect.
3. In ShadowProtect, select the Destinations tab.
4. In the Destinations tab, select the destination object used to store the VM's source backup image files, then click **Edit**.



**Warning:** Do not delete the destination object or you will break the backup image chain. Rather, modify the destination object as needed to point to the current location of the backup image files used to create the VM.

5. In the Destination dialog box, modify the Destination Path to point to the location of the backup image files used to create the VM, then click **OK**.

You might need to modify the network credentials (Domain, User, Password) in the destination object to access the backup image files in their new location. If you have problems with name resolution in the VM environment, try using the IP address of the host machine rather than its Host name.

6. In the ShadowProtect main page, select the Backups tab.
7. Select the appropriate backup job, then click Execute.

ShadowProtect starts an incremental backup job. The naming of incremental backup files in the VM starts where the last Incremental image file used to create the VirtualBoot VM left off. The new incremental image file depends on the Incremental image file chain used to create the VM. This maintains a single backup image chain and makes it possible to provide Head Start Restore (HSR) capabilities.

## Chapter 12: Other Operations

ShadowProtect provides the following features to help you manage and maintain your backup environment:

- Verifying Backup Image Files<sup>[76]</sup>
- Email Notification<sup>[78]</sup>
- Log Files<sup>[79]</sup>

### 12.1 Verifying Backup Image Files

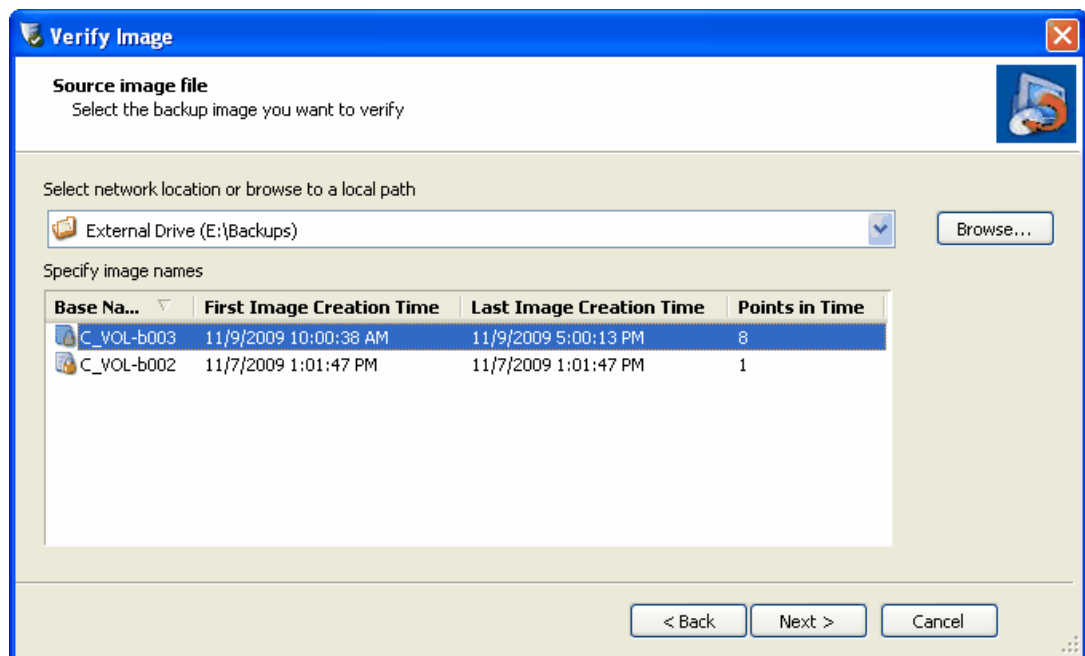
It is important to verify the quality and integrity of backup images on a routine basis to ensure that a backup image is ready should you need it.

One way to do this is to mount a backup image and browse the files and folders. If you can do this successfully, you know the backup image is healthy. However, you can also use the Verify Image tool to test the integrity of a specific backup image.

#### To test a backup image with the Verify Image tool

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. Open the Verify Image Wizard by doing one of the following:
  - In the Tools menu, click **Verify Image**.
  - In the Menu bar, select **Tasks > Verify Image**.
3. On the Source Image File page, select the Image Set to verify, then click **Next**.

In the drop-down menu, select the Destination (see Section 6.2: Destinations<sup>[41]</sup>) that contains the backup Image Set to restore, or click **Browse** to locate the desired backup Image Set. The Specify Image Names field displays the Image Sets available at the selected Destination or path.

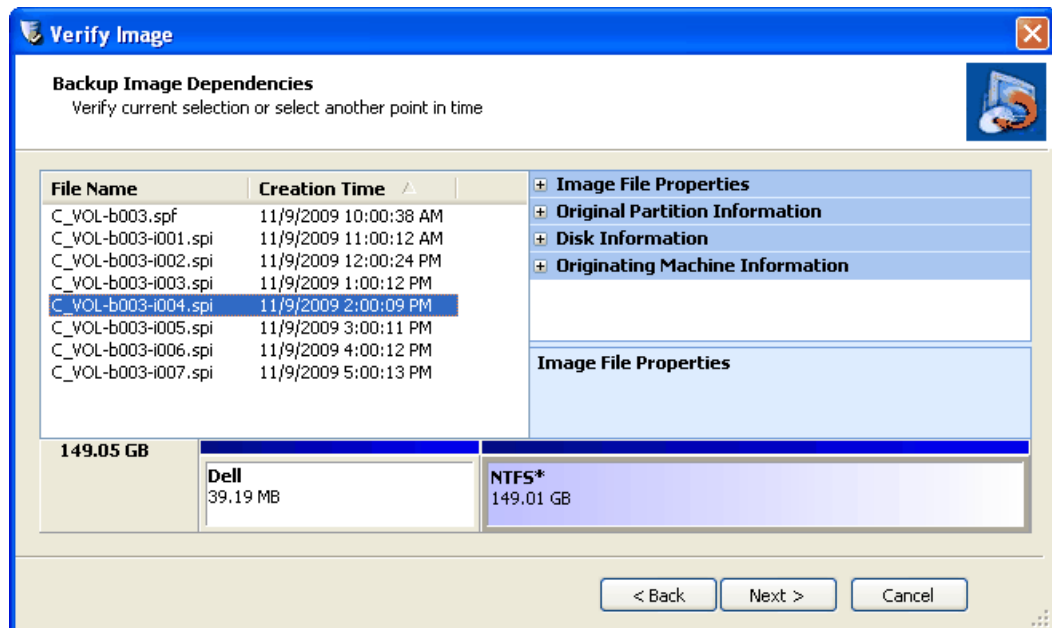


Select an image set to verify



**Note:** To verify a backup Image Set stored on a network share, you must have the proper network credentials.

- On the Backup Image Dependencies page, select the point-in-time to restore, then click **Next**.



Select a specific point-in-time to verify

This page displays all Incremental backup image files associated with the selected Image Set. Select a specific backup image file to view the following image file properties:

**Image File Properties:** Volume size, creation time, compression, password protection, comment.

**Original Partition Information:** Style, number, type, bootable option, starting offset and length.

**Disk Information:** Disk geometry, disk size and number of the first track sectors. You can also view the disk layout graphically at the bottom of the screen. This represents what the disk looked like at the time of backup.

**Originating machine:** Operating system version, the machine name, MAC address and the ShadowProtect engine version used to create the image file.

5. On the Specify the Verify Options page, select what you want to verify, then click **Next**.

**Verify only selected image:** The Verify Image tool checks only the selected backup image file.

**Verify selected image and all dependent files:** Verifies the selected backup image file and all files that it depends on. This verifies the integrity of the full point-in-time backup. If you select this option, specify the order to verify the files (**Newest to Oldest** or **Oldest to Newest**).

6. On the Wizard Summary page, review the details of the verify operation, then click **Finish**.

You can view the progress of verify operation in the Backup Jobs tab.

## 12.2 Configuring Email Notifications

ShadowProtect can be configured to send Email notifications on the success or failure of a backup job. The Email notification includes the following information:

- **Email Subject:** Indicates that this notification is for a successful or unsuccessful back up job.
- **Email Body:** Contains the following information about the backup job.
  - Start time
  - Finish time
  - Source volume
  - Destination path

### To configure email notifications

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. In the Menu bar, select **Options > Agent Options**.
3. On the Agent Options page, provide the details of the Email configuration, then click **OK**.


<b>SMTP Server Name or IP Address</b>	The host name or IP address of the outgoing SMTP server to use when sending Email notifications (for example smtp@mycorp.com).
<b>SMTP Port</b>	(default: 25) The port used by the SMTP service.
<b>SMTP Login User Name</b>	The username ShadowProtect uses to access the SMTP server.
<b>SMTP Login Password</b>	The password associated with the SMTP user name.
<b>SMTP Authentication Method</b>	The authentication method used by the SMTP server. Select the appropriate authentication method from the drop-down list.
<b>Use SSL</b>	(Default: Off) Indicates if you want to use a secure connection to communicate with the SMTP server.


<b>Email From Address</b>	The Email address that appears in Email message's From field.
<b>Email To Addresses</b>	A semi-colon separated list of Email addresses that you want to receive the notification. For example, john@mycorp.com;bill@mycorp.com.
<b>Character Encoding</b>	The character-encoding to use with the Email subject and body. Select the appropriate value from the drop-down list.
<b>Custom Subject Suffix</b>	(Optional) A text string that appears the Email Subject field. Use <code>/r</code> for carriage return, <code>/n</code> for new line, and <code>/t</code> for tab characters.
<b>Custom Body Prefix</b>	(Optional) A text string that appears in the Email Message field. Use <code>/r</code> for carriage return, <code>/n</code> for new line, and <code>/t</code> for tab characters.
<b>Send Email on Success</b>	(Default: Off) Set to On to send Emails upon the successful completion of a ShadowProtect job.
<b>Send Email on Failure</b>	(Default: Off) Set to On to send Emails upon the failure of a ShadowProtect job.

- (Optional) Click **Test Email** to send a test message and confirm that the Email configuration is working properly.

## 12.3 Log Files

ShadowProtect creates a log file for each backup job. This log file provides information about the backup job results, including the reason for failure, if any. You can view the log for any backup job in the Backup History tab (see Section 5.3.6: Backup History Tab<sup>[34]</sup>).

Each log entry provides information about the related backup job: Start Time, End Time, Type (Full or Incremental), Source, Destination and Status. Backup jobs that finished successfully have a status of "Completed." ShadowProtect marks jobs that do not complete successfully with a Warning icon . These jobs have a status other than "Completed," such as "Execution Failed" or "Aborted." It is important to review these entries and determine why the job failed.

The Job Log provides information about the events that occurred during that job: Timing (when the event occurred), Module, Code, and Message. Backup jobs that finished successfully have a status of "Completed." ShadowProtect marks events that do not complete successfully with Failed icon .

## 12.4 Creating Key Files

Key Files provide an alternative mechanism for protecting backup images. Key Files let you delegate the creation and storage of backup image files without losing control of the passwords used to protect your backup image files.

ShadowProtect includes the KeyFileMaker tool for generating Key Files. KeyFileMaker is provided on the ShadowProtect CD, but is not installed by default.

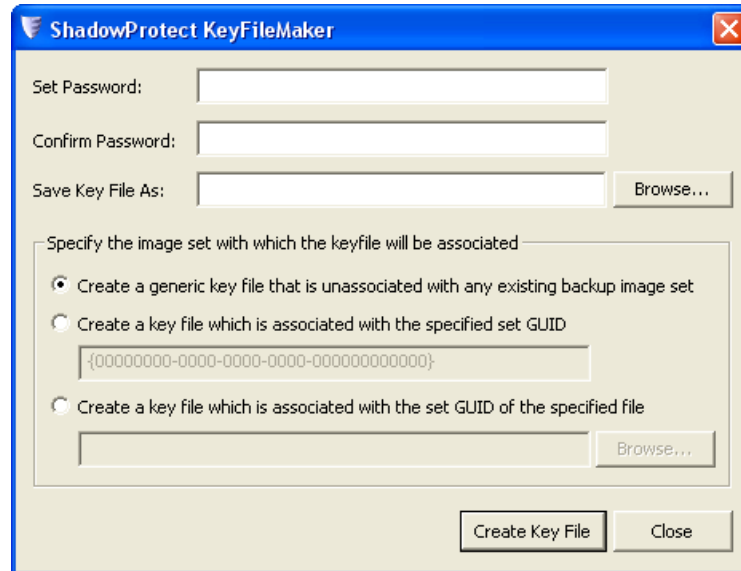


**Note:** When using a Continuous Incrementals schedule (see Step 5 in Chapter 6: Creating Backup Image Files<sup>[38]</sup>), ShadowProtect automatically creates a new Key File each time it generates a new Full image. ImageManager uses the Key File when collapsing Incremental images. For more information about ImageManager, see the *ShadowProtect ImageManager User Guide*.

### To install KeyFileMaker

1. Insert the ShadowProtect CD into the system's CD drive.
2. Browse to the \Installers folder, then execute `KEYFILEMAKERSETUP.exe`.
3. Follow the steps in the Installation Wizard to install the KeyFileMaker software.

Once installed, you can access KeyFileMaker in Windows by selecting **Start > Programs > ShadowProtect > ShadowProtect KeyFileMaker**.



ShadowProtect KeyFileMaker

### To create a key file

1. Launch KeyFileMaker (**Start > Programs > ShadowProtect > ShadowProtect KeyFileMaker**).
2. In the KeyFileMaker dialog box, provide the following information, then click **Create Key File**.

Key files have a `.spk` file extension.

<b>Set Password / Confirm Password</b>	Specify the password to store in the Key File.
<b>Save Key File As</b>	Specify the name and location for the Key File. You must save the Key File in the same folder as the backup image files that rely on it.
<b>Key File Association</b>	<p>Specify the backup Image Set that you want to associate with the Key File.</p> <p><b>Generic Key File:</b> The key file is not associated with any Image Set. You can use a generic key file if all backup image files in a given folder are part of the same Image Set.</p> <p><b>Key File associated with a GUID:</b> The File Set GUID (Globally Unique ID) of the Image Set that you want to associate with this Key File.</p> <p><b>Key File associated with a backup image file:</b> The full file name, including path, to a backup image file from the Image Set that you want to associate with this Key File.</p>

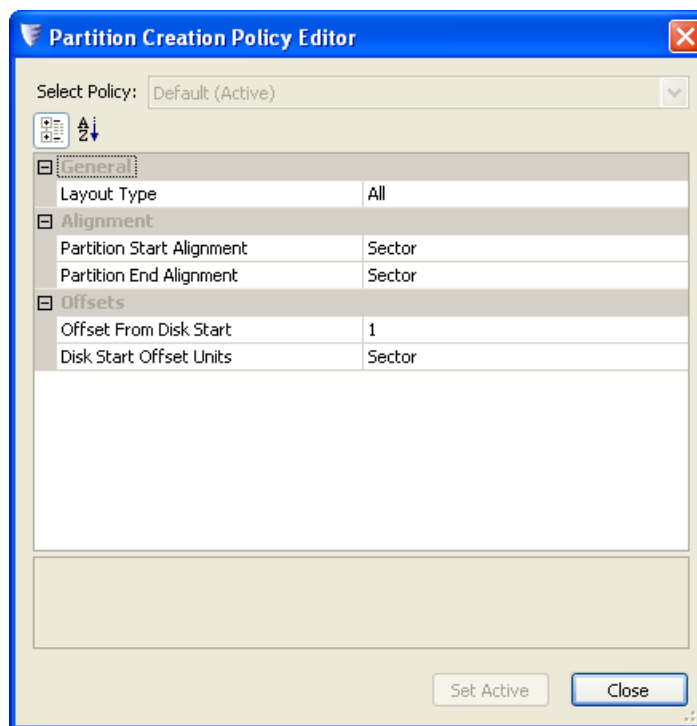


All backup image files in an Image Set share the same File Set GUID. You can view a backup image file's File Set GUID in the Image File Mount Wizard:

- a. In Windows Explorer, double-click the backup image file.
- b. On the Image File Name page, open the File Dependency Properties property group.

## 12.5 Changing Partiton Creation Policy

The Partition Creation Policy Editor lets you modify basic disk geometry settings used to create a new partition. You can access the Partition Creation Policy Editor from the Disk Map tab (see Section 5.3.3: Disk Map Tab<sup>[30]</sup>) action menu (right-click menu).



The Partition Creation Policy dialog box

### To modify partition creation settings

1. Start the ShadowProtect Console (see Section 4.3: Starting ShadowProtect<sup>[21]</sup>).
2. On the Center panel, select the Disk Map tab.
3. Right-click the desired partition, then select **Edit Policy**.
4. In the Partition Creation Policy Editor, modify the partition creation settings as desired, then click **Set Active**.

To modify a particular setting, click in the appropriate field, then type the desired value, or select it from the drop-down list (if available).

<b>Layout Type</b>	Specifies a name for the partition creation policy.
--------------------	---

<b>Partition Start Alignment</b>	(Default: <b>Track</b> ) Identifies the partition starting point, which typically occurs at a specific disk boundary. Supported options include: Cylinder, Track, and Sector.
<b>Partition End Alignment</b>	(Default: <b>Sector</b> ) Identifies the partition end point. Supported options include: Cylinder, Track, and Sector.
<b>Offset from Disk Start</b>	Specifies an offset from the start of the disk where you want the partition to begin. This should be a Whole number.
<b>Disk Start Offset Units</b>	(Default: <b>Sector</b> ) Specifies the units to use with the specified offset. Supported options include: Cylinder, Track, Sector, Byte.

## 12.6 Creating a Recovery CD

StorageCraft provides an ISO image file that you can use to create a bootable Recovery Environment disk. For more information about using the StorageCraft Recovery Environment, see the *StorageCraft Recovery Environment User Guide*.

### To create a Recovery Environment disk

1. If necessary, download the Recovery Environment ISO image file.
  - a. Open a Web browser to the StorageCraft ISO Download Web page.
  - b. In the Serial Number field, specify the product serial number you received when you purchased ShadowProtect, then click **Submit**.
  - c. Save the Recovery Environment ISO image (ShadowProtect\_RE\_4.0.0.iso) to a local drive.
2. Insert a blank CD/DVD/Blu-Ray in your system's optical drive.
3. From Windows, select **Start > ShadowProtect > ISO Tool**.
4. Browse to and select the ShadowProtect ISO file, then click **Burn the Disk**.

Select **Overwrite any existing data...** if you want to replace existing data on the disk.
5. When ISO Tool finishes transferring the ISO image, click **Close**.

The ISO transfer can take several minutes to complete.

## Chapter 13: Best Practices

**Turn off disk defrag software if using incremental backups.** When you take an incremental backup, you are writing a file of only the sectors which have changed since the last full or incremental backup image was taken. If you run disk defrag software, you will be changing the sectors on the disk and cause the time and size of the incremental backup image to greatly increase. If you want to run disk defrag software, it is recommended that you do it before you run a Full backup image and then do not run or schedule the disk defrag software to run while ShadowProtect is scheduled to take Incremental backup images.

**Test the StorageCraft Recovery Environment.** Make sure the ShadowProtect CD lets you boot your system and gain access to both any local drives and network devices that you might need.

**Monitor disk space usage where images are stored.** Make sure your backup image file storage location has sufficient disk space for new backup image files, or backup jobs will fail.

**Monitor the ShadowProtect log files.** Routinely examine the ShadowProtect log files. The log files will provide status of backup jobs, letting you know the backup jobs were completed successfully or if the backup jobs failed. If the backup job failed, the log files will provide details of the failure allowing you to take action to correct the situation.

**Use password encryption to protect backup image files.** Since ShadowProtect backup images include all the contents of the disk drive, use password encryption to help protect data security.

**Include multiple volumes in your backup job.** If you have databases or applications that span volumes, include all relevant volumes in the backup image. ShadowProtect snapshots can operate simultaneously on multiple volumes, thereby ensuring cross-volume consistency.

**Periodically save backup image files on a removable hard drive.** CD, DVD, and Blue-Ray storage lets you easily store backup image files at an off-site location. This helps ensure available backup images in the case of a disaster.

**Use the Backup Image Tool to manage backup images.** You can consolidate backup images, split backup images for CD or DVD storage, and apply new password encryption to existing backup image files in the event passwords are compromised (see Chapter 9: Backup Image Tool [57]).

**Use Email notification.** Automatic Emails keep you informed of the operation of your ShadowProtect backup jobs so you can quickly identify and resolve problems that might arise (see Configuring Email Notifications [78]).

**Use a retention policy that maximizes point-in-time histories.** Review the options available in the ShadowProtect for retaining point-in-time histories, including using Differential images for second and subsequent Full images (see "Retention" in Section 6.3.5: Advanced Options [45]).

## Chapter 14: Retention Policy Configurations

ShadowProtect employs a unique method for maximizing point-in-time backup images while minimizing storage consumption that results in the ability to store more point-in-time histories in substantially less storage space. The following two tables present four common retention policies for a scheduled backup job, and the resulting performance of each. For more information about creating scheduled backup jobs and retention policies, see Chapter 6: Creating Backup Image Files [38].

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Use Differentials	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Delete Only the Incrementals	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Delete the Full and Incrementals	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Image Set 1	C_Vol-b001	C_Vol-b001	C_Vol-b001	
Image Set 2	C_Vol-b001-d001		C_Vol-b002	
Image Set 3	C_Vol-b001-d002		C_Vol-b003	
Image Set 4	C_Vol-b001-d003		C_Vol-b004	
Image Set 5	C_Vol-b001-d004		C_Vol-b005	
Image Set 6	C_Vol-b001-d005 C_Vol-b001-d005-i001 C_Vol-b001-d005-i002 C_Vol-b001-d005-i003	C_Vol-b001-d005 C_Vol-b001-d005-i001 C_Vol-b001-d005-i002 C_Vol-b001-d005-i003	C_Vol-b006 C_Vol-b006-i001 C_Vol-b006-i002 C_Vol-b006-i003	C_Vol-b006 C_Vol-b006-i001 C_Vol-b006-i002 C_Vol-b006-i003
Image Set 7	C_Vol-b001-d006 C_Vol-b001-d006-i001 C_Vol-b001-d006-i002 C_Vol-b001-d006-i003	C_Vol-b001-d006 C_Vol-b001-d006-i001 C_Vol-b001-d006-i002 C_Vol-b001-d006-i003	C_Vol-b007 C_Vol-b007-i001 C_Vol-b007-i002 C_Vol-b007-i003	C_Vol-b007 C_Vol-b007-i001 C_Vol-b007-i002 C_Vol-b007-i003
Image Set 8	C_Vol-b001-d007 C_Vol-b001-d007-i001 C_Vol-b001-d007-i002 C_Vol-b001-d007-i003	C_Vol-b001-d007 C_Vol-b001-d007-i001 C_Vol-b001-d007-i002 C_Vol-b001-d007-i003	C_Vol-b008 C_Vol-b008-i001 C_Vol-b008-i002 C_Vol-b008-i003	C_Vol-b008 C_Vol-b008-i001 C_Vol-b008-i002 C_Vol-b008-i003

### Relative Rank Across Scenarios

CPU Utilization	2 <sup>1</sup>	2 <sup>1</sup>	1	1
Network Utilization	2 <sup>2</sup>	2 <sup>2</sup>	1	1
Storage Requirement	2	1	4	3
Point-in-time History	1	2	1	3 <sup>3</sup>

<sup>1</sup> On machines using local storage the difference between scenarios is minimal. However on machines using network storage, the difference in CPU utilization is more apparent.

<sup>2</sup> On machines using local storage this is not a consideration

<sup>3</sup> The only difference between Scenario 2 and 4 is the unique information retained in the first full image.

### Comparison of various retention policies

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## Chapter 16: Glossary

**Backup:** The activity of copying files, volumes, and databases to preserve them in case of equipment failure or other catastrophe. An important part of a disaster recovery strategy, backup is often neglected, particularly for personal computer users.

**Backup Image File:** Files that contain the contents of a backup activity, Backup Image Files let you restore the contents of a computer system to a specific point-in-time.

**Bare Metal Recovery:** The complete restoration of computer data after a catastrophic failure, including the operating system, file system, partitions, volumes and data, from a complete backup image.

**Base Image File:** Backup files that contain a copy of all used sectors on a disk drive. This image file contains all data on the computer, including the operating system, applications, and data.

**Basic Disk:** A physical disk drive that can be accessed by MS-DOS\* and all Windows\* operating systems. Basic disks can contain up to four primary partitions, or three primary partitions and an extended partition with multiple logical drives.

**Cold Backup:** A backup taken from the Recovery Environment, rather than when the computer's operating system is loaded.

**Continuous Incrementals:** A backup scheduling model for ShadowProtect that lets you create a base backup file, then create additional incremental backup files that include only changes that occurred since the last backup.

**Compression:** A technology that reduces the size of a file. Compression lets you save time, bandwidth and storage space.

**Differential Image File:** Backup files containing the hard drive sectors that have changed since the Base Image File was created. Differential image files take about the same time to create as Base Image Files, but they are smaller. When restoring a drive (or files and folders), you must use the Base Image File with the appropriate Differential Image File to restore the computer to a specific point-in-time.

**Disaster Recovery:** The ability to recover from the complete loss of a computer, whether due to natural disaster or malicious intent. Typical disaster recovery strategies include replication and backup/restore.

**Disk Device:** A locally accessible disk drive, including locally attached USB or FireWire disk drives, and network drives such as SAN, NAS, iSCSI, SCSI, USB or FireWire.

**Driver:** A program that interacts with a particular device or software. The driver provides a common interface to the device, or software, that makes it accessible to other computer systems and the user.

**Drive Letter:** See Mount as Drive Letter.

**Dynamic Disk:** A physical disk that provides features that basic disks do not (see Basic Disk), such as support for volumes spanning multiple disks. Dynamic disks use a hidden database to track information about dynamic volumes on the disk and other dynamic disks in the computer.

**Encryption:** A procedure that renders the contents of a file unintelligible to anyone that cannot present the appropriate decryption key.

**ExactState™ Imaging:** The ability to create a backup image at a point where the computer is in the best state for creating a backup (for example, no open files).

**Full Image File –** See *Base Image File*.

**Hard Drive:** An electromagnetic storage device, also referred to as a “disk drive,” “hard drive,” or “hard disk drive” that stores and provides access to data on a computer.

**Head Start Restore (HSR):** The ability to begin the restoration of a large backup image chain while ShadowProtect continues to add Incremental backup image files to the same image chain. This reduces the time necessary to restore a large volume from days or weeks, to minutes or just a few hours.

**Hot Backup:** A backup image taken when ShadowProtect is loaded on the computer's standard operating system. A hot backup requires the use of a snapshot filter driver (see Snapshot).

**Hot Restore:** The restoration of a backup image while the computer or server remains up and running. You cannot perform a hot restore of a system volume.

**Image or Image File:** See *Backup Image File*.

**Image Set:** The combination of a Full image and all additional Incremental images necessary to restore a computer to a given point-in-time.

**Incremental Image File:** Backup files containing the sectors that have changed since the last Incremental backup was taken. Incremental Images are fast to create and smaller than either Base Image Files or Differential Image Files. When restoring a drive (or files and folders), you must use the Base Image File and the appropriate Incremental Image Files necessary to restore the computer to a specific point-in-time.

**Lock Volume:** A software request to gain exclusive access to a particular drive. Locking the volume prevents other software programs from changing the file system or opening files during the process of writing the image file.

**Microsoft VolSnap:** The proprietary Microsoft snapshot technology.

**Microsoft Volume Shadow Copy Service (VSS):** The backup infrastructure for Microsoft Windows XP and Microsoft Windows Server 2003 operating systems, as well as a mechanism for creating consistent point-in-time copies of data. The Volume Shadow Copy Service produces consistent snapshots by coordinating with business applications, file-system services, backup applications, fast-recovery solutions, and storage hardware.

**Mount as Drive Letter:** The process of assigning volumes (active primary partitions and logical partitions) to specific letter designators in the root namespace of a Microsoft operating system. Unlike mount points (see Mount Point), drive letter assignment permits only letters in the namespace, and they solely represent volumes. In other words, it is a process of naming the roots of the “forest” that represents the file-system (with each volume being an independent tree therein).

**Mount Point:** A directory on a volume that an application can use to “mount” (set up for use) a different volume. Mount points overcome the limitation of drive letters (see Mount as Drive Letter) and allow for more logical organization of files and folders.

**Mounted Volume:** The ability to see and use a backup image that is physically located somewhere else on the network. When mounted, the backup image appears as a volume and behaves as if it is a part of the local computer system. Mounted volumes are read/write capable so users can update existing image files, scan for viruses or other malware, and repair the image file.

**Operating System:** Software that, after being loaded into the computer by a boot program, manages all other programs on a computer. Other programs are called *applications* or application programs.

**Partition:** The portion of a physical disk that functions as though it were a physically separate disk. Once created, a partition must be formatted and assigned a drive letter before data can be stored on it. On basic disks, partitions can contain basic volumes, which include primary partitions and logical

drives. On dynamic disks, partitions are known as dynamic volumes and come in the following types: simple, striped, spanned, mirrored, and RAID-5 (striped with parity) volumes.

**Restoring:** The activity of retrieving computer data from a previously saved backup image file.

**Snapshot:** A type of backup that provides a point-in-time view of a volume. When you perform a backup or scheduled backup, ShadowProtect uses either StorageCraft Volume Snapshot Manager (VSM) or Microsoft Volume Shadow Copy Service (VSS) to take a snapshot of the volume. Any changes that occur to the volume after the snapshot is taken are not included in the backup.

**.spf:** A file extension representing a ShadowProtect full or base image file.

**.spi:** A file extension representing a ShadowProtect incremental or differential image file.

**.sp(number):** A file extension representing a ShadowProtect image file that spans multiple files. The number following `.sp` is the sequence of the file in the spanned image file group.

**Point-In-Time Backup:** A backup routine that lets you restore a file, folder, or the entire system to a specific point-in-time. Point-in-time backups are often used to roll-back a computer to a point prior to a computer problem.

**Protected Volumes:** Volumes that users have selected for backup by ShadowProtect.

**RAID:** Redundant Array of Independent Disks. A collection of disk drives that offers increased performance and fault tolerance. There are a number of different *RAID* levels. The three most commonly used are 0, 1, and 5:

- Level 0: striping without parity (spreading out blocks of each file across multiple disks).
- Level 1: disk mirroring or duplexing.
- Level 5: block-level striping with distributed parity.

**Real-Time:** A level of computer responsiveness that a user perceives as essentially immediate, or that enables the computer to keep up with some external process such as backing up.

**Recovery Environment:** See StorageCraft Recovery Environment.

**Remote Computer (Node):** A computer that is physically located somewhere else on a network but is accessible from a local computer.

**Service:** A program, routine, or process that performs a specific system function to support other programs, particularly at a low (close to the hardware) level.

**Scheduled Job:** A job created in the ShadowProtect interface. Scheduled jobs let ShadowProtect backup events to occur automatically.

**Spanned Image Set:** A Backup Image File that has been divided into multiple smaller files for easier management or storage. This lets you save the Backup Image File to removable media such as a CD or DVD.

**StorageCraft Recovery Environment:** A secondary boot environment (or operating system) that gives a user the functionality necessary to access and restore Backup Image Files on a network. This environment is typically used when a drive cannot be restored from within Windows or when the computer has suffered a catastrophic failure and the entire hard drive must be restored.

**System downtime:** The amount of time a server or PC is offline and inaccessible to users. This is commonly known as having the system out of production.

**System Volume:** The volume that stores the boot files necessary to load an operating system. Typically, this is the `C:\` volume.



**Tray Icon:** A graphical representation of a computer program or application. For example, ShadowProtect uses a tray icon for the user to gain information about the program. Tray icons reside in the system tray.

**UNC (Universal Naming Convention):** A method used to identify folders, files and programs on a network computer. A UNC path begins with two backslashes \\ followed by the server name, share name, directory and filename. For example, \\server\_name\share\_name\backup\_name.spi.

**Unprotected Volumes:** Volumes not protected by ShadowProtect.

**User Interface (UI):** The portions of a computer system with which a user interacts (display, keyboard, mouse, etc.) and the portion of a software program that accepts and responds to user interaction.

**Virtual Private Network (VPN):** A private data network that makes use of the public telecommunication infrastructure. VPNs maintain privacy through the use of tunneling protocols, encryption, and other security procedures.

**VirtualBoot:** The ability to create a Virtual Machine based on an existing backup image chain. Once started, the VM provides complete access to data, applications, and services provided by the original system, in a state corresponding with the last Incremental image included in the VM.

**Virtual Volume:** A locally referenced volume that does not physically exist on the system. ShadowProtect uses virtual volumes for the benefit of protecting computer systems.

**Volume:** An area of storage on a hard disk. A volume is formatted by using a file system, such as file allocation table (FAT) or NTFS, and typically has a drive letter assigned to it. A single hard disk can have multiple volumes, and volumes can also span multiple disks.

**VSS Aware:** An application designed to work with Microsoft Volume Shadow Copy Services (VSS) framework to ensure consistent data backup.

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