

Advanced Protection For Open Files

VERITAS Backup Exec™ 9.0 for Windows Servers

Advanced Open File Option

TABLE OF CONTENTS

Introduction	3
Solution.....	3
How the Advanced Open File Option Works.....	3
Point-in-Time Record	3
Changing Files	4
Supported Snapshot Technologies.....	4
Static Volume	5
Advantages to Using Advanced Open File Option	6
Proper Protection of Databases.....	7
Using the Advanced Open File Option.....	7
Performing a Backup with the Advanced Open File Option.....	7
Setting the Advanced Open File Option as the Default for All Backup Jobs	7
Using Advanced Open File Option with Intelligent Image Option	8
Advanced Open File Option Requirements	8
Summary	9

VERITAS Backup Exec™ 9.0 for Windows Servers Advanced Open File Option is a separately licensed and priced option designed to run with VERITAS Backup Exec 9.0 for Windows Servers to protect open files during backups.

INTRODUCTION

Today's IT administrators are faced with the daunting task of ensuring business continuity through the proper protection of their company's data. Backup operations are becoming increasingly complex due to mixed environments and the variety of software applications that must be backed up even while in use. Three key challenges facing IT administrators during backup operations are:

1. **Incomplete backups.** According to a survey conducted by Strategic Research Corporation, open files cause 97% of incomplete backups. One measurement of a quality backup is that all files are backed up completely providing the capability of a point-in-time recovery. In the event that a file restoration or recovery is needed, the ability to recover all files at a point in time ensures data consistency.
2. **Minimal or no backup window.** Today's fast-paced, competitive business environment requires networks to be operational around the clock. Web sites, e-mail systems, and other databases must be available 24-hours-a-day, seven-days-a-week, three hundred and sixty five days a year. This means that bringing down a system or the entire network to perform backup operations is unacceptable.
3. **Maintaining Data integrity.** If files are left open and are changing during a backup, corruption of the files is likely to occur without the right open file protection solution. Corrupt files are not restorable and the backup becomes obsolete rendering businesses the inability to recover in the event of a disaster.

SOLUTION

VERITAS Backup Exec 9.0 for Windows Servers Advanced Open File Option alleviates these challenges and ensures quality backups by providing:

1. **100% complete backups.** By allowing files to be open during a backup, Advanced Open File Option offers complete data backups at a specific point in time enabling businesses to create a "recovery consistent backup". Recovery consistency is critical if businesses want to recover all data, as it existed at a point in time. The Advanced Open File Option also offers the ability to create a snapshot of all volumes selected for backup at one time.
2. **100% system availability.** With the use of the Advanced Open File Option during a backup, all systems are available preventing a delay in productivity.
3. **100% data integrity.** A mechanism that permits data changes during a backup operation without corruption of the data is essential for recovery. Advanced Open File Option has the ability to create a point-in-time snapshot of the data, guaranteeing that any files that were open during the backup can be recovered without data corruption.

HOW THE ADVANCED OPEN FILE OPTION WORKS

The Advanced Open File Option has the ability to simultaneously create a point-in-time record or snapshot of the data while allowing data to change during a backup.

POINT-IN-TIME RECORD

1. *Diagram 1*, shows a Backup Exec backup job with Advanced Open File Option selected is scheduled to backup Volume C on a Windows Server. When the job is scheduled to begin, Backup Exec will notify the Advanced Open File Option that a backup is about to start.
2. When the Advanced Open File Option receives notification, a snapshot is taken of Volume C. Similar to taking a photograph, the snapshot provides an exact point-in-time record of the data. For example, if the backup job started at noon, the data written to tape is exactly as it existed on Volume C at noon.
3. Once the snapshot is taken, the backup job starts and the data on Volume C is written to tape.

CHANGING FILES

4. During the backup job, files can be open and data can change. The Advanced Open File Option allows data to change by making a copy of the original data. The snapshot tracks data changes. This is illustrated in *Diagram 2*.

For example, an open file, Word document, contains the data A, B, and C in blocks 1, 2, and 3.

- i. During the backup job, "B" changes to "D" in block 2.
 - ii. The original data in block 2 is copied to a "static volume". In this case, "B" is the original data.
 - iii. The changed file is now the most current file.
5. When the snapshot comes to a changed block, it replaces these blocks with the original data from the static volume before being sent to tape. The snapshot then sends the point-in-time data to Backup Exec. The data is then written to tape.

When the backup is complete, the snapshot is released.

Diagram 2

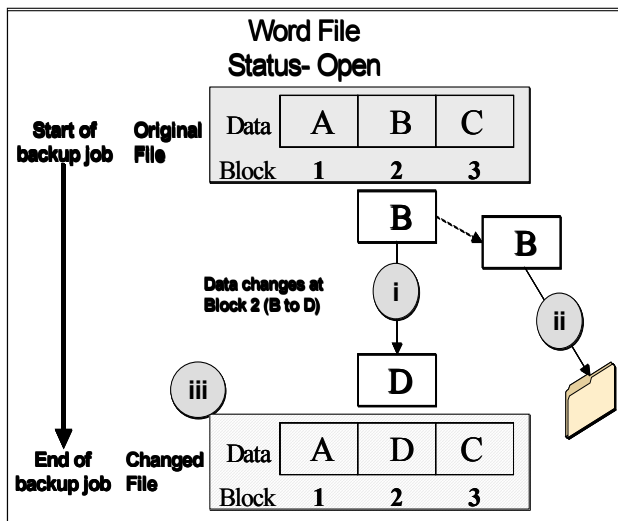
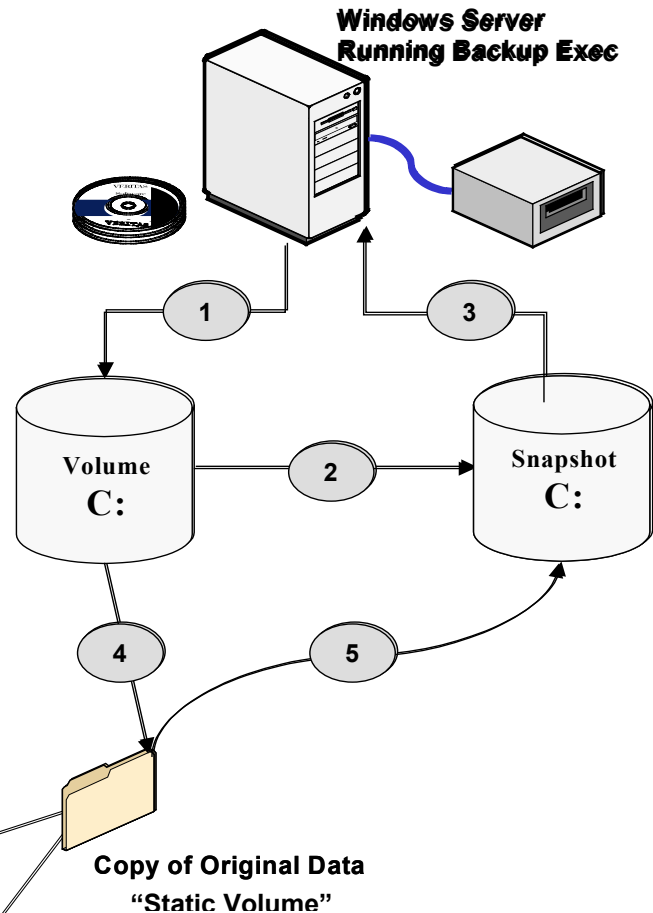


Diagram 1



SUPPORTED SNAPSHOT TECHNOLOGIES

When creating a snapshot of a volume, Backup Exec has the ability to recognize the following advanced snapshot technologies to momentarily suspend write activity to a hard drive so that a point in time, or snapshot of a volume can be created and then backed up:

- VERITAS Advanced Open File Option using the VERITAS Volume Snapshot Provider
- VERITAS Volume Manager FlashSnap Option
- Microsoft Volume Shadow Copy Service

Third party software vendors often provide additional technologies that work in conjunction with the Microsoft Volume Shadow Copy Service. These technologies, called Writers, are used to close any open files residing in the computer's memory before the Microsoft Volume Shadow Copy Service makes a snapshot of the volume to be backed up. Using a writer along with the Microsoft Volume Shadow Copy Service ensures a complete backup of your volume. (See your software documentation for information about writers that may be provided by the software vendor). After making backup selections and then choosing the Advanced Open File Option, Backup Exec increases performance by recognizing any of the above mentioned snapshot technologies that are installed on the server and offers users the choice to select preferred option (writer) to optimize an open file backup. If preferred, Backup Exec can automatically make the determination for you.

The following table serves as a guide to assist you when selecting the proper snapshot technology.

<i>If you are running:</i>	<i>It is recommended you use the option:</i>
VERITAS Advanced Open File Option	<p>VERITAS Volume Snapshot Provider</p> <p>This is the Backup Exec default, as it is compatible with each of Microsoft's operating environments (Windows NT 4.0, Windows 2000, Windows XP or Windows Server 2003).</p>
VERITAS Volume Manager in a Windows 2000 environment only	<p>VERITAS Volume Manager FlashSnap Option</p> <p>For more information on VERITAS Volume Manager FlashSnap Option, please read the FlashSnap Option white paper: http://eval.veritas.com/downloads/pro/fsnap_guide_wp.pdf</p>
Vendor-specific, third party software, along with Windows XP or .Windows Server 2003	<p>Microsoft Volume Shadow Copy Service</p> <p>Microsoft's Volume Shadow Copy Service technology enables third party hardware and software vendors to create snapshot plugins for use with Microsoft's technology.</p>

STATIC VOLUME

As previously demonstrated, when a backup job is submitted with the Advanced Open File Option selected, a snapshot view of each volume where data is selected for backup is created all at once. When changes are made to files during a backup, the original data is copied to a temporary space called the static volume. The original copy of the data is then backed up, not the changed data. This method is commonly referred to as "copy on write".

If the files selected for backup reside on more than one volume, Backup Exec creates a static volume for each volume containing data to be backed up. For example, if the data to be backed up resides on a single volume, a single static volume is created. If you have data residing on four volumes, four static volumes are created. After the selected files have been backed up, the static volumes are deleted.

Backup Exec automatically calculates the size of the static volumes needed for the backup, as well as the location of the static volumes, or the Advanced Open File Option wizard can be used to enter specific values for the size and location of the static volume. However, if the amount of data selected to back up is significantly less (30%)

than the total amount of data on the volume, the backup may run faster if the Advanced Open File Option wizard is used to decrease the size of the static volumes (rather than letting Backup Exec automatically calculate them).

Note: these percentages can be modified by the user from the Open File Option wizard. Use caution when manually entering specific sizes for the static volumes since those sizes are used regardless of the sizes of the volumes backed up. If enough space is not allocated, the job could fail. By creating and backing up a snapshot view of the files on a volume, the Advanced Open File Option can back up files even as they are being changed, which is very useful when protecting databases.

ADVANTAGES TO USING ADVANCED OPEN FILE OPTION

Backup Exec *for Windows Servers* natively gives users other methods for open file backup if the Advanced Open File Option is not selected. Although Backup Exec provides alternatives for open file backup other than the Advanced Open File Option, it is important to know that these alternatives have disadvantages and do not provide a complete backup of open files or do not protect the integrity of the data. If the Advanced Open File Option is not used, the following alternatives are available:

<i>Open File Backup Optional selections:</i>	<i>Description:</i>
Never	Select this option to have Backup Exec skip open files if they are encountered during the backup operation. A listing of skipped files appears in the backup job log. <i>Disadvantage:</i> Risk not having a complete backup.
If closed within X seconds	Select this option to have Backup Exec wait the specified time interval for files to close and then backup it up. If the file does not close during the specified interval, it is skipped. A listing of skipped files appears in the job log for the backup. <i>Disadvantage:</i> If multiple files are open, Backup Exec waits the specified time interval for each file; depending on the number of open files, this may significantly increase the backup time.
With a lock	Select this option to have Backup Exec attempt to lock files that are in use. If Backup Exec is able to lock a file, other processes are prevented from writing to it. <i>Disadvantage:</i> Backing up open files is not as effective as closing applications and allowing the files to be backed up in a consistent state.
Without a lock	Select this option to have Backup Exec backup files without lock during a backup. This allows other applications to write data to the file during the backup operation. <i>Disadvantage:</i> This option allows files to be backed up that contain inconsistent data and possibly corrupt data.

PROPER PROTECTION OF DATABASES

The recommended method for protecting databases such as Exchange, SQL, Oracle and others is with Backup Exec agents. Backup Exec agents provide selective restores of data and more integration with the database application while preventing backups of partial transactions.

The Advanced Open File Option can be used on the same volume as a database to provide open file support for other applications. The Advanced Open File Option is designed to provide generic protection for data that is not supported by the Backup Exec agents.

USING THE ADVANCED OPEN FILE OPTION

You can use the Advanced Open File Option for specific backup jobs, or you can set the advanced Open File Option as the default to be used for every backup job. If the volume selected for backup does not meet the recommended requirements for using the Advanced Open File Option, then other options for backing up open files can be selected to perform the backup. For example, if the option to back up open files with a lock is selected on the Advanced Backup dialog box, that option applies to a backup job if the Advanced Open File Option cannot run on the volume.

After each job is completed, check the Job Log to make sure the Advanced Open File Option was used during the backup.

PERFORMING A BACKUP WITH THE ADVANCED OPEN FILE OPTION

To set the Advanced Open File Option for a single backup job:

1. On the navigation bar, click Backup.
2. Select the data to be backed up from the Backup Selections tree or choose an existing selection list from the Name field.
3. On the Properties pane, under Settings, click Advanced Open File.
4. Select Use Advanced Open File Option to activate the Advanced Open File Option for use with the job or-
5. Select any other appropriate options, and then click OK.
6. Click Run Now to immediately start the job or on the Properties pane, under Schedule, click Time and Frequency to schedule the job to run at a later time.
7. Confirm the backup job settings are correct and then click Confirm. Click Back to make modifications, if necessary.
8. To monitor the operation while it is processing, click Job Monitor on the navigation bar, and then double-click the job you want to view.
9. Check the Job Log to make sure the Advanced Open File Option is being used during the backup.

After each job finishes, check the Job Log again to make sure the Advanced Open File Option was used during the backup.

SETTING THE ADVANCED OPEN FILE OPTION AS THE DEFAULT FOR ALL BACKUP JOBS

You can set the Advanced Open File Option as the default to be used for all backup jobs. If the volume selected for backup does not meet the requirements for using the Advanced Open File Option, then any other selected options for backing up open files apply to the backup. For example, if the option to back up open files with a lock has been selected on the Advanced Backup dialog box, that option will apply to all backup jobs if the Advanced Open File Option cannot run on the volume.

To set the Advanced Open File Option as the default:

1. On the Tools menu, and click Options.
2. Double-click Job Settings and then click Advanced Open File.
3. Select Use Advanced Open File Option. Selecting this option causes Backup Exec to use the Advanced Open File Option for all backup jobs.

Note: Remember, the Backup Open Files option (Never, If closed within 30 seconds, Yes, with a lock, Yes, without a lock) only applies if the volume selected for backup does not meet the requirements for using the Advanced Open File Option.

Note: If you are using the Open File Option on a Windows 2000 volume, please note that the back up files and directories by following junction points option found in the Backup sub node under Job Settings must NOT be checked. Otherwise the job will fail.

4. Select any other appropriate options, and then click OK.

USING ADVANCED OPEN FILE OPTION WITH INTELLIGENT IMAGE OPTION

The Intelligent Image Option provides fast backup performance with less CPU processing by separately backing up all of the information about the files themselves (meta data), and then backing up all the data in the files at the block level, as one image. Unlike other raw-image backup products, Backup Exec's built-in intelligence avoids the inclusion of unused and temporary-usage space within the image file, reducing the volume size and backup time needed to complete the task. When the data needs to be restored, the administrator has the ability to either restore an individual file, directory, or the entire image.

ADVANCED OPEN FILE OPTION REQUIREMENTS

The following requirements must be in place in order to use the Advanced Open File Option on the media server, for remote Windows NT/2000/XP and Windows Server 2003 or workstations, and for volumes on those systems. The Advanced Open File Option must be purchased for each server or workstation to be protected.

The media server must have:

- Backup Exec *for Windows Servers* installed
- Pentium class processor
- If the Advanced Open File Option is to be used locally, then the media server must have Advanced Open File Option installed.
- No other open file backup solution can be loaded or running while the Backup Exec Advanced Open File Option driver is loaded.

The remote computer you want to back up with the Advanced Open File Option must have:

- Windows NT Workstation or Server (version 4.x), Windows 2000, Windows XP or Windows Server 2003
- Pentium class processor
- Advanced Open File Option installed
- Agent Accelerator installed
- An unmapped drive letter available for the Advanced Open File Option to map to the static volume

Note: The Advanced Open File Option cannot be used on CD-ROM or floppy diskettes.

SUMMARY

Complete, point-in-time backups are a challenge with standard backup applications. Without the ability to perform backup of files that are open or in use, IT administrators are confronted with incomplete backups, unacceptable downtime to perform backups and the inability to preserve data integrity. These challenges put businesses at risk in the event a disaster recovery is needed. Backup Exec's Advanced Open File Option eases these challenges by providing complete backups without interruption while maintaining data integrity and providing the ability to perform point-in-time recovery of critical data.

VERITAS Software Corporation
Corporate Headquarters
350 Ellis Street
Mountain View, CA 94043
650-527-8000 or 866-837-4827

For additional information about VERITAS Software, its products, or the location of an office near you, please call our corporate headquarters or visit our Web site at www.veritas.com.