



ATTIX⁵
BACKUP PROFESSIONAL

DATABASE BACKUP

SUB-FILE PROGRESSIVE INCREMENTAL – BETTER DATABASE BACKUPS

The problem with traditional database backups is that you must either backup the entire database every night or rely on a differential (changes since the last full backup) or incremental (changes since the last backup) backup process. While backing up using these techniques helps to reduce the data backed up on a nightly basis it slows the restore process down tremendously and adds additional risk.

Restoring from a differential backup requires first restoring from the last full backup and then restoring the last differential. Restoring from an incremental requires first restoring from the last full backup but then having to restore every incremental sequentially since then. The increase in recovery time is obvious but what is not so obvious is that every separate recovery increases the risk associated with data corruption from faulty processes or media. A single error introduced will affect every backup made after that but will not be apparent until recovery is attempted.

Backup Professional uses an enhanced backup strategy. This means that a full backup of the database is created every day. Rather than transfer the full backup to disk every day, the system extracts just the changes to the file since the previous backup on a binary or block level. Data transfer and storage is thus minimised as well as the storage requirements to keep a number of versions available online. This is known as sub-file incremental. During the restore process the user chooses a specific backup date from which to recover and the server is able to deliver a single full backup copy as per that date by dynamically adding all sub-file incrementals before sending to the user. This process is transparent to the user and has all the advantages of reduced daily backup combined with the rapid restore benefits of daily full backups. This is known as a progressive incremental backup.

Attix5 Backup Professional uses this technique for all database backups. An application specific API call (API as provided by the software vendor e.g. the 'backup database command' in SQL that provides us with a full **online** database dump; without stopping the database) is made to the database application to do a full backup to a specific drive location and then creates the sub-file incremental by comparing this full backup with the previous full backup. The comparison can be either binary or block level depending on the nature and size of the database, the amount of disk space available and the bandwidth between the client and server. The table below – based on the backup of a 20 GB exchange information store – gives an idea of the effectiveness of the solution and can be applied generally to all databases. Compression will vary according to the amount of white space in the database but Exchange is probably a worst-case scenario.

VSS DATABASE PLUG-IN

Attix5 Backup Professional makes use of the MS Volume Shadow Copy Service (VSS) to backup open files like your Outlook PST file, which is just a fraction of what VSS can do.

The MS VSS Database plug-in utilises VSS on a much more advanced level by allowing you to protect any VSS enabled database and application available on your server with one single plug-in and without the need for a database dump.

Please note that this explanation will only focus on functionality related to databases, even though VSS is not limited to databases only. VSS (Volume Shadow Copy Service) consists of a number of three basic components:

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1. Writers (e.g. MSSQL)

It is the responsibility of each database vendor (MS SQL, Oracle, Exchange etc) to develop a VSS writer which will allow a requestor (see below) to backup the data without having to understand the exact inner workings of the database engine. The writer ensures data consistency and provides a safe way to backup the data even while the application or database is still running. It provides a common backup interface that is similar across all databases, regardless of the vendor. Using writers is a way to ensure that the database vendor controls the data access, not an outside party.

2. Requestors (e.g. Backup Professional)

A requestor initiates the VSS process. The requestor uses a generic set of instructions to initiate the VSS process and read data from the database. The instructions are the same regardless of the database being backed up.

3. Providers (e.g. Microsoft Windows)

The provider is the interface to the point-in-time imaging capabilities. An in depth discussion of providers is not needed for the purpose of this document. It is more important to understand the Writer and Requestor.

Advantages

- Makes use of a generic set of instructions. So as new Writers are developed for databases, Attix5 Backup Professional should be able to back it up via the VSS Database plug-in.
- NO DUMP SPACE needed. The VSS Database plug-in reads the data directly from the database, without the need to make a database dump.
- The backup should be much quicker since data is not first dumped and then patched and compressed

Disadvantages

- Not all the features that are provided in the existing Backup Professional plug-ins are available in the VSS plug-in (for example to use an Exchange recovery group).

BINARY PATCHING OF A 20GB EXCHANGE DATABASE

	Process	Time	Result	Percent
Day 1	Compression	1.6 hrs	8.4 GB	42%
Day 2	Patching	3.3 hrs	190 MB	0.95%
Day 3	Patching	3.3 hrs	182 MB	0.89%
Day 4	Patching	1.9 hrs	52 MB	0.26%
Day 5	Patching	4.1 hrs	260 MB	1.60%
Day 6	Patching	2.6 hrs	112 MB	0.56%
Day 7	Patching	3.1 hrs	172 MB	0.86%

Average process time (excl. Day 1): 2.8 hrs

Average backup size (excl. Day 1): 161 MB (0.81%)

Average local disk cache size: 10.8 GB

DELTA BLOCKING OF A 20GB EXCHANGE DATABASE

	Process	Time	Result	Percent
Day 1	Compression	1.2 hrs	10.6 GB	53%
Day 2	Patching	0.8 hrs	2.01 GB	10%
Day 3	Patching	0.5 hrs	0.92 GB	4.60%
Day 4	Patching	0.7 hrs	1.34 GB	6.70%
Day 5	Patching	0.81 hrs	1.69 GB	8.45%
Day 6	Patching	0.74 hrs	1.39 GB	6.95%
Day 7	Patching	0.82 hrs	1.83 GB	9.15%

Average process time (excl. Day 1): 0.72 hrs

Average backup size (excl. Day 1): 1.53 GB (7.65%)

Average local disk cache size: 16.4 MB

SUPPORTED DATABASE APPLICATIONS

IBM Lotus Software

- Lotus Domino 7
- Lotus Domino 6.5

Microsoft Corporation

- Microsoft Exchange 2007
- Microsoft Exchange 2003
- Microsoft Exchange 2000
- Microsoft Exchange 2003 and 2000 Single Mailbox Recovery (SMR)
- Microsoft SharePoint 2003
- Microsoft SQL Server 2005
- Microsoft SQL Server 2000
- Microsoft SQL Server 7
- Microsoft System State (Windows 2000 and+)

Oracle Corporation

- Oracle 10g
- Oracle 9i

Sybase

- Sybase ASE 12.5