



IBM Tivoli Support Technical Exchange Web Seminar:

Differences between image and snapshot backups

Tivoli. software



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Welcome to the IBM Tivoli support technical exchange Web seminar for Tivoli Storage Manager differences between image and snapshot backups.

Outline

- Terminology
- What is an image backup
- What is a snapshot backup
- Advantages and disadvantages of an image backup
- Advantages and disadvantages of a snapshot backup
- How to set up and perform an image backup
- How to set up and perform a snapshot backup
- Incremental image backup

Today we are going to cover the following:

- terminology
- what is an image backup
- what is a snapshot backup
- advantages and disadvantages of an image backup
- advantages and disadvantages of a snapshot backup
- how to set up and perform an image backup
- how to set up and perform a snapshot backup
- incremental image backup

Terminology

- Offline image backups
 - ▶ Image backup
- Online image backup
 - ▶ Snapshot backup
- LVSA
 - ▶ Logical volume snapshot agent

Terminology

- Offline Image Backups

Offline image backups are often referred to simply as image backups

- Online Image Backup

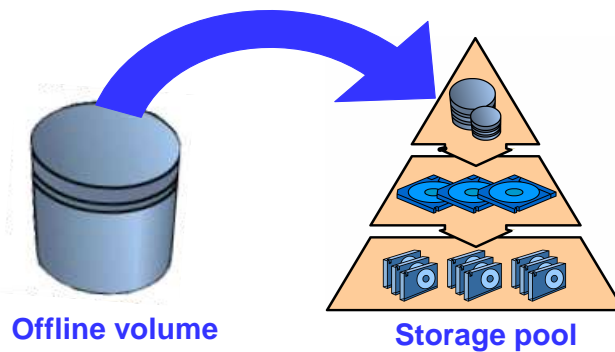
Online image backups are often referred to as snapshot backups. We will discuss the what the difference between online and offline image backups are later in this presentation

- LVSA

Stands for Logical Volume Snapshot Agent. LVSA is a driver that is used during online backups. Its operations are completely transparent to the user.

What is an image backup

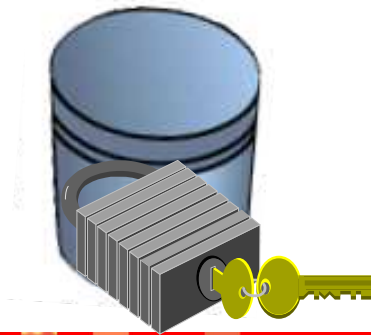
- IBM Tivoli Storage Manager enables you to back up a file system or raw logical volume as a single object from your client machine to your storage pool



IBM Tivoli Storage Manager enables you to back up a file system or raw logical volume as a single object from your client machine to your storage pool. This is done via both online and offline image backups.

What is an image backup

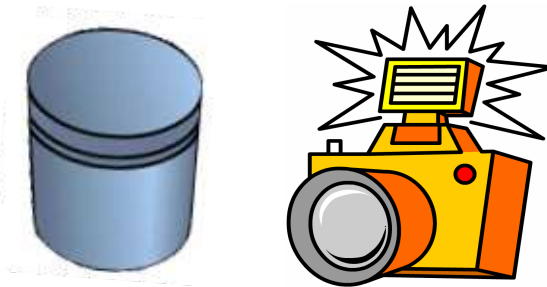
- The volume being backed up is made unavailable to all other applications
- The backup-archive client is the only process with access to the volume
- Once the image backup is complete, the backup-archive client makes the volume available to the system and other applications



During an offline image backup, the volume being backed up is made unavailable to all other applications. This means that the backup-archive client is the only process with access to the volume being backed up. Once the image backup is complete, the backup-archive client makes the volume available to the system and other applications.

What is a snapshot backup

- A snapshot backup performs an online image backup of file system or raw logical volume in which the file system or raw logical volume stays active and available for read and write operations during the backup.



A snapshot image backup performs an online image backup of file system or raw logical volume in which the file system or raw logical volume stays active and available for read and write operations during the backup. This means that other processes have access to the volume during the backup.

Advantages and disadvantages of an image backup

Advantages

- ▶ Improves the speed with which TSM backs up and restores file systems containing many small files
- ▶ Conserves resources on the server during backups since only one entry is required for the image
- ▶ Provides a point-in-time picture of your file system
- ▶ Data is restored to the same state it was when the backup was performed

Disadvantages

- ▶ May be disruptive since it requires the file system to be locked down
- ▶ Does not provide a per file based backup

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There are several advantages and disadvantages of an offline image backup

The advantages of offline image backups are that they

- Improve the speed with which TSM backs up and restores file systems containing many small files.
- Conserves resources on the server during backups since only one entry is required for the image
- Provides a point-in-time picture of your file system
- Data is restored to the same state it was when the backup was performed

The disadvantages of offline image backups are that they

- May be disruptive since it requires the file system to be locked down in order to perform the backup
- Does not provide a per file based backup. This means that if you want to restore file A, but not file B, this is not possible.

Advantages and disadvantages of a snapshot backup

▪ Advantages

- ▶ Improves the speed with which TSM backs up and restores file systems containing many small files
- ▶ Conserves resources on the server during backups since only one entry is required for the image
- ▶ Provides a point-in-time picture of your file system
- ▶ Data is restored to the same state it was when the backup was performed
- ▶ Volume remains available to all applications during backup

▪ Disadvantages

- ▶ Requires additional software to be installed
- ▶ Does not provide a per file based backup

There are several advantages and disadvantages of an online image backup

The advantages of an online image backup are that they

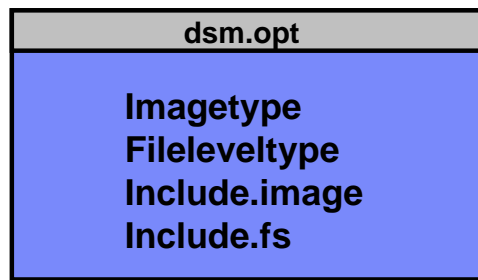
- Improve the speed with which TSM backs up and restores file systems containing many small files
- Conserves resources on the server during backups since only one entry is required for the image
- Provides a point-in-time picture of your file system
- Data is restored to the same state it was when the backup was performed
- Volume remains available to all applications during backup

The disadvantages of online image backups are that they

- Requires additional software to be installed, namely the LVSA driver
- Does not provide a per file based backup

How to set up an image backup

- To perform an image backup you must have administrative authority on the system
- Ensure that the volume to be backed up is not in use by another application during the backup
- Add include options to the TSM options file



The diagram shows a rectangular box representing a file named `dsm.opt`. The box has a grey header with the filename and a blue body containing the following text:

```
Imagetype
Fileleveltype
Include.image
Include.fs
```

Now we will discuss how to set up both an offline and online image backups.

Remember that in order to perform an image backup you must have administrative authority on the system. Also ensure that for an offline image backup the volume to be backed up is not in use by another application during the backup.

The options for image backups may be placed in your options file prior to running an offline or online image backup.

Include options for an image backup

- **Imagetype** - specifies the type of image backup to perform
 - ▶ Static – performs an offline backup
 - ▶ Snapshot – performs an online backup
- **Fileleveltype** - specifies the type of image backup to perform
 - ▶ Dynamic – performs an offline backup
 - ▶ Snapshot – performs an online backup
- **Include.image** - includes a file space or logical volume in the backup
 - ▶ include.image H: imagetype=static
- **Include.fs** - includes a file space or logical volume in the backup
 - ▶ include.fs H: fileleveltype=dynamic

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Differences between image and snapshot backups

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- The Imagetype option specifies the type of image backup to perform. There are two parameters that go with this option. The static parameter performs an offline backup. The snapshot parameter performs an online backup
 - The Fileleveltype option also specifies the type of image backup to perform. The dynamic parameter performs an offline backup. The snapshot parameter performs an online backup
 - The Include.image option includes a file space or logical volume in the backup. For example `include.image H: imagetype=static` would make an image backup of the H volume. Also since the image type option is set to static, we know that an offline image backup will be taken of the H volume. If you wanted an online image backup, just change the image type parameter to snapshot.
 - The Include.fs option includes a file space or logical volume in the backup. For example `include.fs H: fileleveltype=dynamic` would also make an image backup of the H volume since the fileleveltype option is set to dynamic. As with the previous example, you can perform an online image backup by setting the fileleveltype to snapshot
- Remember that you will need to restart the Backup Archive client after saving the modified option file.

How to perform an image backup using the command line

```
dsmc backup image h: imagetype=static
```

- The options `imagetype` and `include.image` can be used to specify the type of image backup to perform.
- If these are not specified, TSM performs an image backup if LVSA (Logical Volume Snapshot Agent) is not installed. If the LVSA is installed a snapshot backup will be performed.

Now we will discuss how to perform an image backup using the command line. To do this, use the command "dsmc backup image h: imagetype=static". The image option specifies that you want to do an image backup, H: is the volume to backup and the image type option specifies that you want to do a static or offline image. The options `imagetype` and `include.image` can be used to specify the type of image backup to perform either online or offline. If these are not specified, TSM performs an offline image backup if the LVSA driver is not installed. If the LVSA driver is installed an online backup will be performed.

Verifying the success of an image backup using the command line

```
Volume --> 108,347,904 \\ibm\t$ [sent]
Image Backup processing of '\\ibm\t$' finished without
failure.

Total number of objects inspected:          1
Total number of objects backed up:         1
Total number of objects updated:           0
Total number of objects rebound:          0
Total number of objects deleted:           0
Total number of objects expired:           0
Total number of objects failed:            0
Total number of bytes transferred:         84.27 MB
Data transfer time:                        15.00 sec
Network data transfer rate:                5,753.27 KB/sec
Aggregate data transfer rate:              3,742.04 KB/sec
Objects compressed by:                     0%
Elapsed processing time:                    00:00:23
```

After the image backup complete you will get a report similar to the one seen here. To verify that the image backup did finish successfully, look to see that it says the number of objects backed up is the number of volumes you wanted to back up. In this example there was only one volume, so the report is showing that one volume was inspected and one volume was backed up.

How to set up a snapshot backup

- To perform a snapshot backup you must have administrative authority on the system
- Add include options to the TSM options file



Now we will discuss how to set up an online, or snapshot, image backup. To perform an online image backup you must have administrative authority on the system. You also may add the options previously listed for offline image backups in your options file with the setting for online image backups. There are additional options specific to online image backups. These too must be added to your options file. These will be discussed on the next slide.

Include options for a snapshot backup

- **SNAPSHOTCACHESize** - determines the size of the cache file containing the original data for blocks that change during the snapshot
- **SNAPSHOTCACHELocation** - specifies the location where the LVSA places the cache file
- **SNAPSHOTFSIDLEWait** - specifies the amount of time that must pass in which there is no write activity on the volume before performing the snapshot
- **SNAPSHOTFSIDLERetries** - specifies the number of additional times the LVSA should try to achieve the snapshot
- **PRESNapshotcmd** - specifies a command to execute before performing the snapshot
- **POSTSNapshotcmd** - specifies a command to execute after performing the snapshot

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SNAPSHOTCACHESize determines the size of the cache file containing the original data for blocks that change during the snapshot.

SNAPSHOTCACHELocation specifies the location where the LVSA places the cache file. If it is on the same volume that is being backed up this is referred to as resident cache. If it is on a separate volume it is referred to as non-resident cache.

SNAPSHOTFSIDLEWait specifies the amount of time that must pass in which there is no write activity on the volume before performing the snapshot. Once the backup starts, this parameter does not have any affect on the backup.

SNAPSHOTFSIDLERetries specifies the number of additional times the LVSA should try to achieve the snapshot if the idle wait time passes without starting the backup.

PRESNapshotcmd specifies a command to execute before performing the snapshot.

POSTSNapshotcmd specifies a command to execute after performing the snapshot.

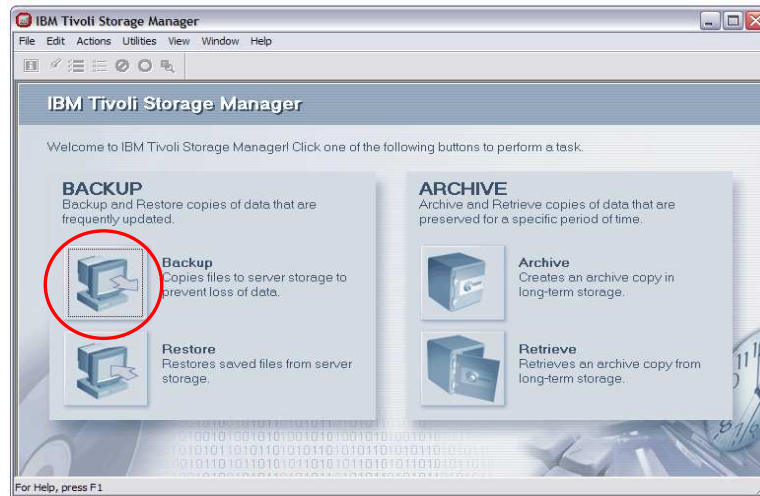
How to perform an image or snapshot backup using the GUI

- When you perform an image or snapshot backup using the client GUI image backup option, TSM honors the image type setting in your dsm.opt file.
- If these are not specified, TSM performs an image backup when LVSA is not installed. If the LVSA is installed a snapshot backup will be performed.

Now we will discuss how to perform a snapshot, or online image backup using the client GUI.

Note that when you perform an online backup using the client GUI image backup option, TSM honors the image type setting in your dsm.opt file. If these are not specified, TSM performs an image backup when LVSA is not installed. If the LVSA is installed a snapshot backup will be performed.

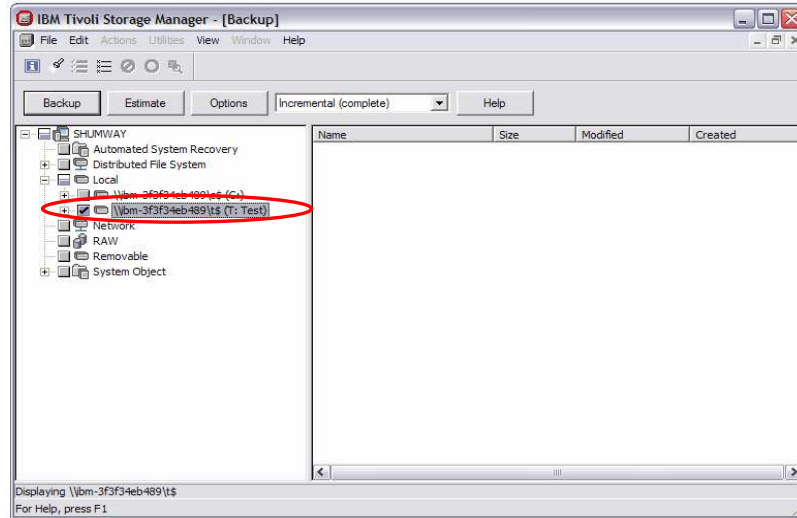
How to perform a image or snapshot backup using the GUI



Select Backup

Select the backup button on the left side of the GUI

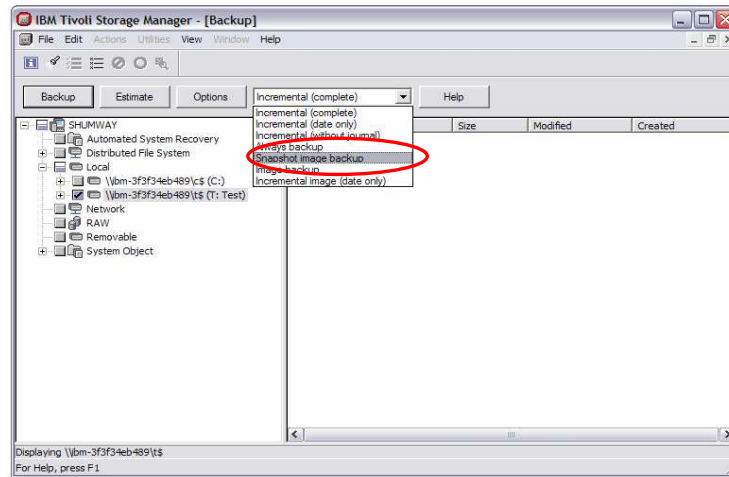
How to perform a image or snapshot backup using the GUI



Select the volumes to be backed up

Select the volumes that you want to back up using the directory tree structure provided.

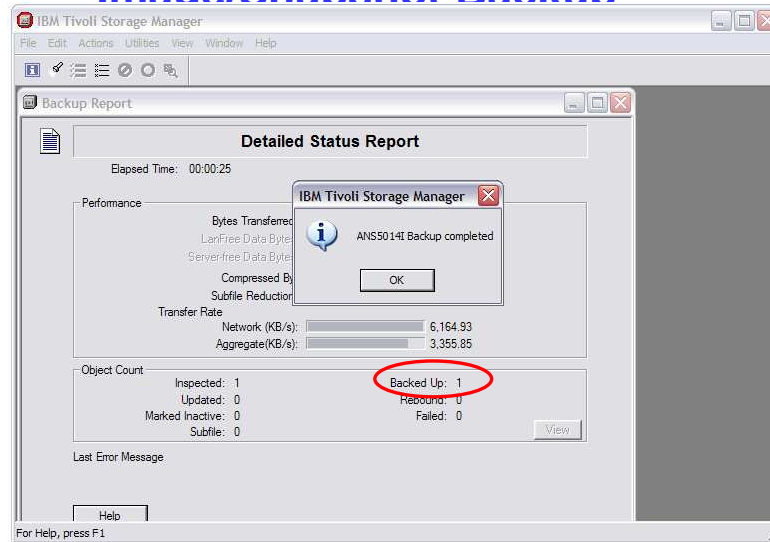
How to perform a image or snapshot backup using the GUI



Select **Snapshot image backup**

From the backup type drop down menu select Snapshot Image Backup and click on the backup button to start the backup.

Verifying the Success of an Image/Snapshot Backup



Similarly to a command line backup, a report is produced. Make sure that the number of objects inspected is the number of objects backed up.

Additional information

- Performs an online or offline image backup depending on the image type setting in your Include.Image statement in the Include-Exclude Preferences page in the GUI or in the client options file.
- If the image type is set to Snapshot, then the client performs an online image backup.
- If the image type is set to Static, then the client performs an offline image backup.
- If there is no Include.Image statement or no image type setting, then the client defaults to performing an online image backup if the Logical Volume Snapshot Agent (LVSA) is installed.
- If the LVSA is not installed, then the client defaults to performing an offline image backup.

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Additional information to be aware of concerning offline and online image backups.

- Performs an online or offline image backup depending on the image type setting in your Include.Image statement in the Include-Exclude Preferences page in the GUI or in the client options file.
- If the image type is set to Snapshot, then the client performs an online image backup.
- If the image type is set to Static, then the client performs an offline image backup.
- If there is no Include.Image statement or no image type setting, then the client defaults to performing an online image backup if the LVSA driver is installed. If the LVSA is not installed, then the client defaults to performing an offline image backup.

Resources:

- IBM Tivoli Storage Manager Concepts
<http://www.redbooks.ibm.com/redbooks/pdfs/sg244877.pdf>
- IBM Tivoli Storage Manager Backup-Archive Clients Installation and User's Guide
<http://publib.boulder.ibm.com/infocenter/tivihelp/v1r1/index.jsp?toc=/com.ibm.itstorage.doc/toc.xml>

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