



# IBM Tivoli Support Technical Exchange Web Seminar

## *IBM Tivoli Storage Manager database backup*



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Updated October 29, 2007

Welcome to the IBM Tivoli support technical exchange Web seminar for Tivoli Storage Manager database backups.

## Outline

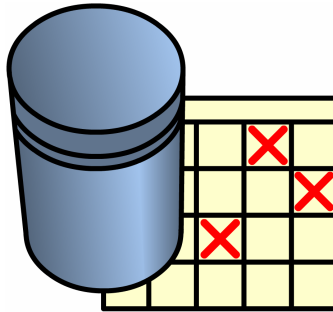
- What is the Tivoli Storage Manager database
- Why do you need to back up the database
- What needs to be done before your first database backup
- Types of database backups
- How to perform a database backup
  - ▶ How to perform a database backup using the command line
  - ▶ How to perform a database backup using the ISC
- Best practices

Today we are going to cover the following:

- What is the TSM database
- Why you need to backup the database
- What you need to do before your first database backup
- Types of database backups
- How to perform a database backup. This will include how to backup the database from the command line and from the ISC
- Finally we will discuss some of the best practices with database backups

## What is the Tivoli Storage Manager database

- The TSM database contains valuable information about the TSM server and clients. It also contains information about the data that is being managed.



The TSM database is a vital component of TSM. It contains information about the server and clients as well as data that is being managed.

## Why you need to backup the database

The TSM database is essential to the backup and recovery of data that is managed



If the TSM database is lost, you can no longer restore the files

Without the information stored in the database, it is impossible to restore or recover the data that has been backed up or archived. This is why it is essential that you backup your database frequently.

## Before your first database backup

- Define device classes for backups
- Set the recovery log mode
- Estimate the recovery log size
- Schedule database backups

There are a few steps that need to have been completed before you can perform your first database backup.

First a device class must be defined for the backups. You can use existing device classes for backups or define a new ones. This allows you to define where you want the backups to go.

The recovery log mode must also be set to either normal mode or roll-forward mode. For information on the difference between these please refer to the "Database and Recovery Log Protection" section of the TSM Administrator's guide.

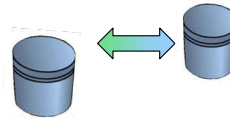
If you are in roll-forward mode you should consider the size of the recovery log. In this mode, the recovery log keeps all transactions since the last database backup and normally requires more space than normal mode does.

Scheduling database backups is not required, but it recommended. Database backups require devices, media, and time. Consider scheduling your database backups when the system is not under the pressure of running client backups, reclamation, expiration, and so on.

## Types of database backups

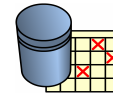
### Regular (full) backup

- ▶ Copy of the entire database



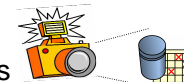
### Incremental

- ▶ Only the pages that have changed
- ▶ Up to 32 incremental backups between full backups



### Database out-of-band (snapshot) backup

- ▶ Image of the database
- ▶ Does not interrupt the full plus incremental backup series



### Full backup when these occur:

- ▶ Database has never been backed up
- ▶ Maximum incremental backups reached
- ▶ Database has been extended or reduced
- ▶ Recovery log mode is changed to roll-forward

There are three basic types of database backups

Regular, also known as full. Full backups are a copy of the entire database. As such they take longer to perform than incremental backups. However, they have shorter recovery times since you must only load one set of volumes to restore the database.

Incremental database backups only backup the pages in the database that have changed. This makes incremental backups much faster than full backups to perform. However, incremental backups increase the time to restore the database since the full database backup must be loaded first, followed by some or all of the incremental backups. It is recommended that no more than 32 incremental backups are run between each full backup. A full backup plus the incremental backups following it are known as a backup series.

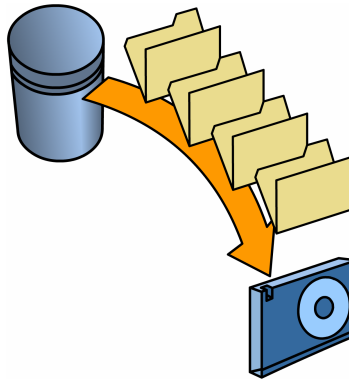
Database out-of-band backups, also known as snapshot backups, are full backups that do not interrupt a backup series. This is useful for making a database backup that will be stored off-site for disaster recovery. A snapshot backup does not empty the recovery log like a full backup.

It should be noted that a full database backup is required in these situations:

- Database has never been backed up
- Maximum incremental backups reached
- Database has been extended or reduced
- Recovery log mode is changed to roll-forward

## How to perform a database backup from the command line

```
Backup DB DEVclass=devclassname  
Type=Incremental | Full | DBSnapshot  
VOLumentnames=volname(s)  
Scratch=Yes | No Wait=Yes | No
```



Here is the command for backing up the database from the command line. I will go over each of the parameters in this command.

## Parameter description

- **DEVCLASS=DEVCLASSNAME**
  - ▶ Specifies the name of the sequential access device class to use for the backup
- **TYPE=TYPEVALUE**
  - ▶ Specifies the type of backup to run
  - ▶ Default value is INCREMENTAL
- **VOLUMENAMES=VOLNAME**
  - ▶ Specifies the volumes to use for the backup
- **SCRATCH=SCRATCHVALUE**
  - ▶ Specifies whether scratch volumes can be used for the backup
  - ▶ Default value is YES
- **WAIT=WAITVALUE**
  - ▶ Specifies whether to wait for the server to complete processing the command in the foreground
  - ▶ Default value is NO

### DEVclass (Required)

Specifies the name of the sequential access device class to use for the backup. You should note that you cannot use a device class with a device type of NAS.

### Type

Specifies the type of backup to run (incremental, full, or snapshot). This parameter is optional. The default is INCREMENTAL.

### VOLumenames

Specifies the volumes used to back up the database. This parameter is optional. However, if you specify SCRATCH=NO, you must specify a list of volumes.

### Scratch

Specifies whether scratch volumes can be used for the backup. This parameter is optional. The default is YES.

### Wait

Specifies whether to wait for the server to complete processing this command in the foreground. The default is NO.



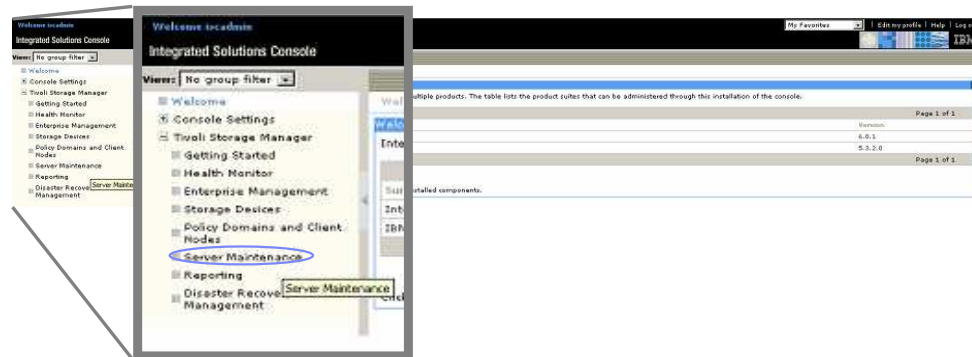
## Checking to see if the backup was successful

Query DB Format=Detailed

```
Available Space (MB): 8
Assigned Capacity (MB): 4
Maximum Extension (MB): 4
Maximum Reduction (MB): 0
Page Size (bytes): 4,096
Total Usable Pages: 1,024
Used Pages: 94
Pct Util: 9.2
Max. Pct Util: 9.2
Physical Volumes: 3
Buffer Pool Pages: 64
Total Buffer Requests: 4,702
Cache Hit Pct.: 97.68
Cache Wait Pct.: 0.00
Backup in Progress?: No
Type of Backup In Progress:
Incrementals Since Last Full: 0
Changed Since Last Backup (MB): 0.37
Percentage Changed: 100.00
Last Complete Backup Date/Time: 09/15/03 15:51:21
Estimate of Recoverable Space (MB): 321
Last Estimate of Recoverable Space: 09/13/03 06:03:20
```

You can check to see when the last database backup was done by issuing this query from the TSM command line. Notice the "Last Complete Backup Date/Time" This shows when the last full backup was performed. The "incrementals since last full" will also increase each time a new incremental backup is performed. Another important piece is the "Changed since last backup". This indicates how much of the database has changed. A warning message will be issued to the activity log if this exceed recommended thresholds.

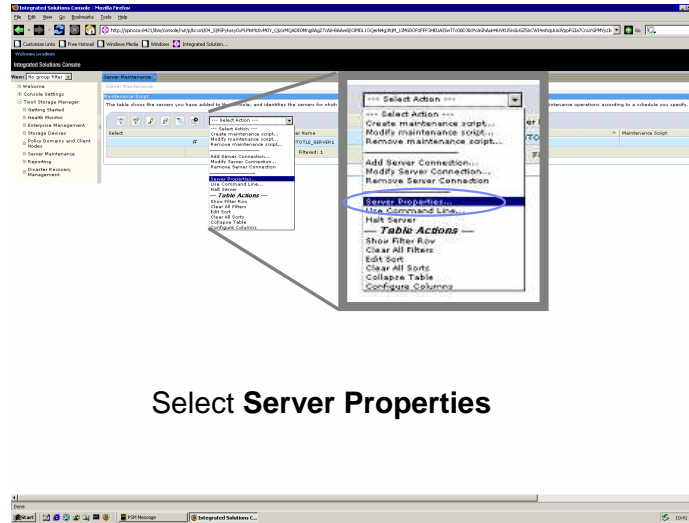
## How to perform a database backup from the integrated solutions console



Select **Server Maintenance**

Now I will discuss how to do a database backup from the ISC. Start up the ISC, and notice in the left hand side of the screen there is server maintenance tab. Select server maintenance.

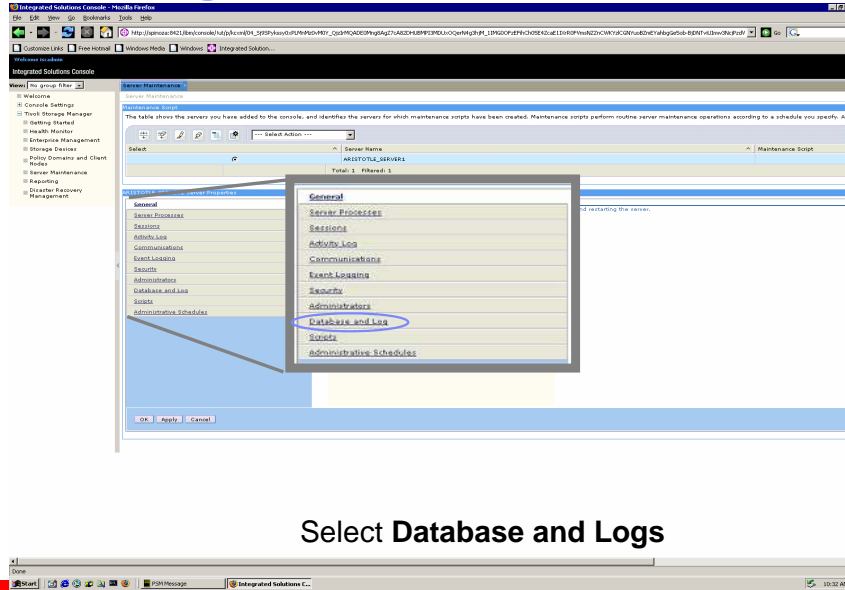
## How to perform a database backup from the integrated solutions console



Select **Server Properties**



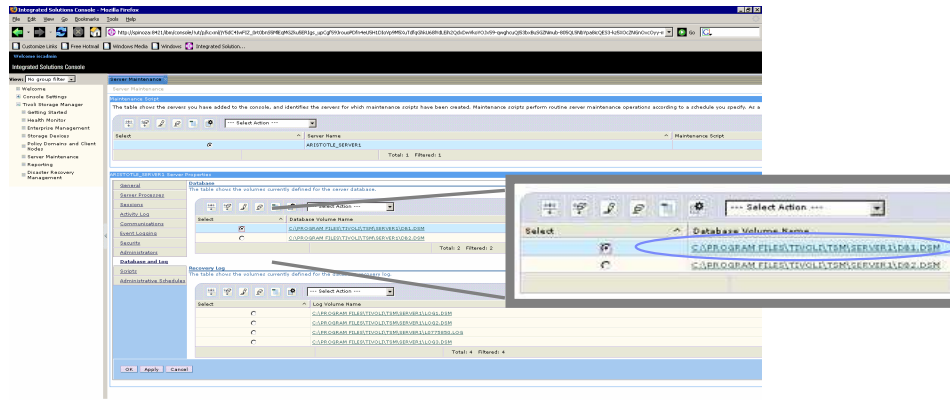
## How to perform a database backup from the integrated solutions console



Select Database and Logs

Next, select database and logs...

## How to perform a database backup from the integrated solutions console

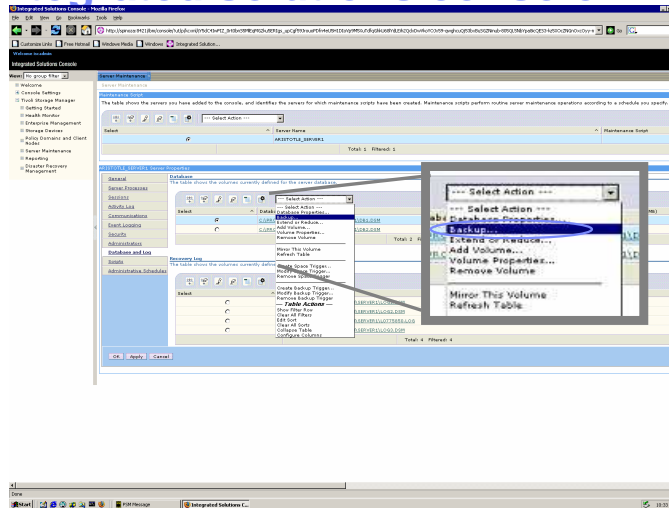


Select the database volume to back up



...and select the database volume to be backed up.

## How to perform a database backup from the integrated solutions console



Select **Backup**

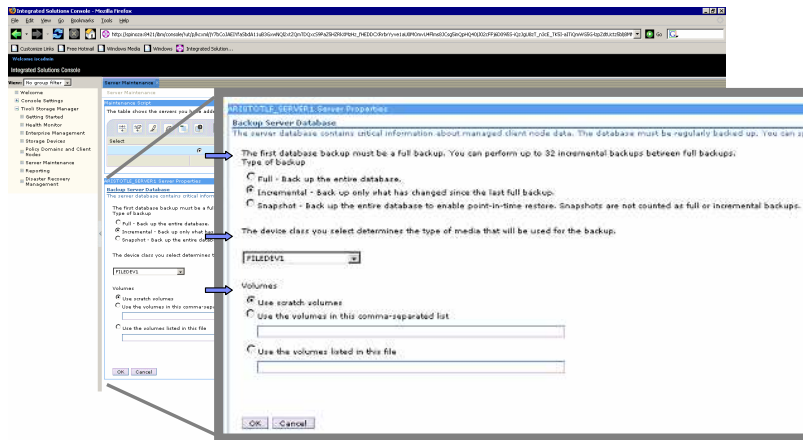
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IBM Tivoli Storage Manager database backup

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Next, from the drop down menu, select backup.

## How to perform a database backup from the integrated solutions console



Select type of backup, device class, and volumes to use.



Next you will be provided with a screen as seen here. This allows you to select what type database backup you want to do – full, incremental, or snapshot. It also allows you to select the device class that you want to use, and the volumes that will be used at this time. You can use scratch volumes, or you can specify which volumes to use.

## How to perform a database backup from the integrated solutions console



The screenshot shows a message box at the top stating: "Started database backup as process 6. This process can take some time to complete. Use the Server Processes tab to monitor the process." Below the message is a "Close Message" button. Underneath, the "Database" section contains a table of volumes. The table has columns for "Database Volume Name" and "Size (MB)". Two volumes are listed, both with a size of 12 MB. The table footer shows "Total: 2 Filtered: 2".

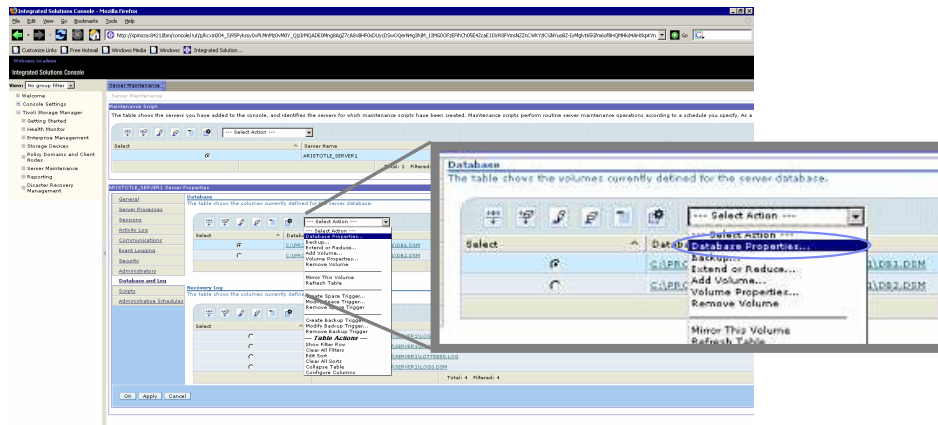
Select	Database Volume Name	Size (MB)
<input checked="" type="checkbox"/>	C:\DBO\SRAM FILESTV\OLDTSM\SERVER1\LOG1.DSM	12
<input checked="" type="checkbox"/>	C:\DBO\SRAM FILESTV\OLDTSM\SERVER1\LOG2.DSM	12

**Database backup has started.**

Once the database backup has started, you will receive a message similar to the one that is shown here.



## Checking to see if the backup was successful from the integrated solutions console



Select Database Properties



IBM Tivoli Storage Manager database backup

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Now I will discuss how to check to see if the database backup has been successful. If you select the volume, that you want to back up, and then select from the dropdown menu, Database Properties...

## Checking to see if the backup was successful from the integrated solutions console

The screenshot displays the IBM Integrated Solutions Console interface. A dialog box titled "Database Backup Information" is overlaid on the main console window. The dialog box contains the following information:

- Backup in progress:** No
- Type of backup in progress:** (blank)
- Incrementals since last full backup:** 0
- Changed since last backup:** 0.04
- Percentage changed since last backup:** 0.22
- Last complete backup:** 10/18/06 4:04:25 PM MST

At the bottom of the dialog box, a message states: "A database backup trigger is not defined. There is a database space trigger defined." Below this message are "OK" and "Cancel" buttons.

The background console window shows the "Database Properties" section, including "Database Cache Information" and "Database Backup Information".

...you will see this screen. At the bottom of this screen, you will see a section called database backup information. Notice that it contains information such as if the backup is in progress, the incrementals since last full backup, the percentage changed since last full backup, and the last completed backup.

## Best practices



- Use automatic backup triggers
- Use space triggers
- Use recovery log mirroring
- Store backup volumes off-site
- Store backup of DEVCNFG.OUT, VOLHIST.OUT, DSMSERV.OPT and DSMSERV.DSK off-site
- Complement with database mirroring for 24 x 7 environments that operate 24 hours a day, 7 days a week
- Define volume history and device class backup files
- Back up the database using administrator scheduling facility
- Schedule database backup immediately following storage pool backup
- Use Disaster Recovery Manager to automate the recovery of the TSM database

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IBM Tivoli Storage Manager database backup

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By defining the database backup trigger you are protected from a situation that the recovery log becomes full before the scheduled backup is run.

Space triggers allow you to increase the size of the database and recovery log by defining a percentage you will increase the database and recovery log when a specified utilization is reached.

Mirroring the recovery log protects you from media failures and you can always restore to the most recent state. This does require more space.

If your backups are stored on site, and you suffer from a disaster, your backups are likely to also be destroyed. Make sure that your database backups are safe. Without them, you cannot restore the database.

Copies of DEVCNFG.OUT, VOLHIST.OUT, DSMSERV.OPT and DSMSERV.DSK should also be stored off-site.

For those sites that are running operations 24 hours a day, the database mirroring feature is the only way to protect against a database media failure.

Define volume history and device class backup files

Back up the database using administrator scheduling facility

Schedule database backup immediately following storage pool backup

Use Disaster Recovery Manager to automate the recovery of the TSM database

## Resources:

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