



SQL Server In-Depth

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This session provides you with information about Microsoft SQL Server. It is based on SQL Server 2000 but also discusses SQL Server 2005. Some of the features discussed herein may not be available on earlier versions.

Microsoft SQL Server is a very powerful database manager. As such, you are able to do activities which can destroy or alter your data in such a way as to be unusable. So be very careful when using this product and maintain database backups with periodic permanent back up copies.

1. SQL Server Components

- a. SQL Server Enterprise Manager.
- b. SQL Server Query Analyzer.
- c. Data Transformation Services (DTS).
- d. Client Network Utility.
- e. Server Network Utility.
- f. Server Manager.

2. SQL Server 2005

- a. halFILE 3.0 is SQL Server 2005 ready!
- b. halFILE 2.2 will run on SQL Server 2005 if SQL Server 2005 was installed in compatibility mode.

3. SQL Server vs. MSDE vs. SQL 2005 Express

- a. SQL Server is the full Microsoft product. Current release is SQL Server 2005 while most halFILE installations are running SQL Server 2000.
- b. MSDE (“Microsoft Data Engine”) is a free database engine that is compatible with Microsoft SQL Server. The version hal distributes is SQL Server 2000. MSDE has the following limitations:

- We recommend no more than 3 users on an MSDE installation.
 - MSDE does not include administrative tools such as SQL Server Enterprise Manager. Because of this it is difficult to maintain and thus better suited to small installations.
 - Instead MSDE includes a set of “command prompt” utilities. The most notable of which is OSQL from which you can run SQL commands.
 - MSDE has internal code that limits its performance. As more users are added, it gets slower (unlike SQL Server). Again, it is therefore better suited to small installations (1-3 users).
 - MSDE supports a maximum database size of 2GB.
- c. SQL Server 2005 Express is the SQL 2005 version of MSDE. It is also free and has the following differences with MSDE.
- A version of the SQL Enterprise Manager (called SQL Server Management Studio) is delivered with SQL 2005 Express making it easier to manage. This is downloaded separately but readily available.
 - Maximum database size is 4GB.
 - We recommend no more than 5 users on SQL Server Express.
 - SQL Server Express has less strict performance limitations. It can address only 1 CPU and 1GB of RAM.
- d. If you use install.bat to install MSDE, the correct security options will be set. Otherwise, after installing MSDE, there are a couple of security steps to run in order to use it with halfILE. There is a white paper document describing those steps.
- e. <http://www.microsoft.com/sql/msde/default.asp>

4. SQL Server 2000 vs. SQL Server 2005

Microsoft lists numerous advantages of SQL Server 2005 over SQL Server 2000. We have limited experience but in the real world, here is what we've found.

- a. SQL 2005 Management Studio, the replacement to SQL Server 2000's Enterprise Manager, can be frustrating and cumbersome.
- b. SQL Server 2005 does not support some of the SQL statements that were used in prior versions of SQL Server. We are programming around these as they are discovered.

- c. SQL Server 2005 comes with many flavors (Express, Workgroup, Standard, Enterprise) which is confusing. They vary primarily in power (how many CPUs and how much RAM is supported) and priced (from free to very expensive).
- d. SQL Server 2005 includes some features that we may take advantage of in future versions such as SQL Reporting Services which could become an alternative to Crystal Reports.

5. Database Backup Functions

- a. It is recommended that a permanent database backup be performed prior to making any database changes to your SQL Server halfILE database.
- b. To use the halfILE Backup Scripts to make this permanent backup, perform the following steps.

- Go into SQL Server Enterprise Manager and follow the tree down to Management-SQL Server Agent-Jobs.
- Find the halfILE Database Backup job. This should have a step to run the scripts SP_HFWBACKUP for each of your database backups in the form:

```
sp_HFWBackup 'HFWParams','e:\halfile\database\backup\','SERVER01','user','pwd'
```

where HFWParams = database name

e:\halfile\database\backup\ = folder to place the backup files into (include trailing \)

SERVER01 = SQL Server name

user = SQL Server user id (usually 'sa')

pwd = SQL Server password for above user

- Either run the entire job to back up all your halfILE databases or copy the step for the database being altered and run that step in Query Analyzer.
 - Browse to the designated backup folder and find the database backup files that will be altered. These will begin with the database name, followed by an underscore, followed by the table name, followed by an extension of TXT (Example: ABCHFOTP_Primetable.txt).
 - Highlight all the tables for the database being altered and right click and select send to-zip folder. This will create a ZIP file of the database backup files.
 - Rename the ZIP file to reflect the date (Example: ABCHFOTP_10272006.zip)
- c. While you can recover halfILE SQL Server databases from the files created by the SP_HFWBACKUP script, you may not know the **structure** of your database

tables which can make it difficult to recover if you have a system crash. The following procedure will create script files to rebuild the database tables and indices.

- Go into SQL Enterprise Manager.
 - Traverse the tree down to the database for which you want to save the table creation scripts for.
 - Right click on the database and select All tasks-Generate SQL Script.
 - Click Show All to show all the tables in the database.
 - Click the “all tables” check box to select all the tables in the database for scripting.
 - Click the **Formatting tab** and uncheck the “Generate the DROP <object>...” option. This option deletes the table which is sort of scary to leave in a script that someone may inadvertently run.
 - Click the **Options tab** and select the Script index and the MS-DOS text (OEM) options.
 - Click OK and select a folder and filename to save the script to. One good place to save these scripts is the halfile\database\backup folder.
- d. The SQL Server databases have extensions of MDF and LDF. To see the file names and locations, right click on the database in Enterprise Manager and select Properties, then go to the Data Files and Transaction Log tabs. Your tape backup software (or other backup strategy) will not be able to backup these files unless the SQL Server engine is stopped either by an agent that is provided with the backup software or by scheduling stop/start engine scripts. This is one reason why the halFILE database backup scripts are provided.

6. Database Overview (Databases/Tables/Fields/Indexes)

- a. Database – collection of tables, indexes, procedures
- b. Tables – entity with a database containing the data in a structure of fields
- c. Fields – a column of data within a table with certain attributes (type, size)
- d. Indexes – part of the database where a field or fields are catalogued for fast access.

4. SQL Enterprise Manager Basic Functions

- a. Traversing the Enterprise Manager tree
- b. Stopping/Starting Services
- c. Viewing database information
- d. Viewing table structure
- e. View table data
- f. Viewing table indexes
- g. halFILE database structure

5. SQL Enterprise Manager Advanced Functions

- a. Moving a database (detach/attach)
- b. Maintenance Plan
- c. Adding a field to a table
- d. Deleting a field from a table
- e. Rearranging table fields
- f. Change the field properties
- g. Impact database structure changes have on halFILE

6. Data Transformation Services

Data Transformation Services (DTS) is used to Import/Export data to/from SQL Server database tables. It acts as a wizard within Enterprise Manager that is invoked by right clicking a database or table and selecting All Tasks – Import Data or All Tasks – Export Data. Some uses for DTS include:

- a. Importing data from other databases. It can import (Text, Excel, Access, Foxpro and more). The wizard includes field mapping capabilities.
- b. Exporting data to other databases. Supports the same database type list as import. The wizard includes options for selecting what data to export.
- c. Exporting/Importing data to/from other halFILE databases.

7. SQL Server Agent

The SQL Server Agent is a job scheduler. We use it to schedule the halfFILE database backup scripts and auto archive. It is capable of running command line programs, sql statements, scripts and more. It can handle multiple steps with some decision making based on if a step was successful or unsuccessful.

The SQL Server Agent is a Service that can be started with the SQL Server Service Manager. There is an option to automatically start this service and system startup.

8. Common SQL Server Issues

- a. The password that was used to start a SQL Server Service has changed. The most common result of this is your SQL Server jobs will fail. We recommend permanent passwords on these services but if the password or account does change, it can be fixed in Control Panel-Administrative Tools-Services.
- b. A new SQL Server is replacing the existing halfFILE SQL Server. This will take some as the following steps are required to replace your halfFILE SQL Server:
 - Detach SQL Server databases from old server.
 - Copy the mdf and ldf files to new SQL Server.
 - Attach mdf and ldf files to new SQL Server.
 - Export any SQL Agent jobs that you have. This creates a SQL Script that can be executed in Query Analyzer on the new server to create the jobs there.
 - If there are any special SQL Server users on the old server, these must be created and database or table rights set.
 - Edit all the ODBC File DSNs in the halffile\dsn folder to reflect the new server name.
 - Run CreateDB.exe and set the SQL Server name.

10. SQL Query Analyzer

Query Analyzer is a tool for running SQL Server scripts. It includes a Transaction-SQL help file which describes the sql script commands. Common script examples are as follows.

- a. To find out the number of halfFILE documents in your database.


```
Select count(*) from primetable
```
- b. To examine the contents of a particular halfFILE document.

Select * from primetable where prserv = '<half file document number>'

Select * from multi where prserv = '<half file document number>'

- c. To show the records for a particular date range.

Select * from primetable where file_date >= '1/1/1987' and file_date <= '12/31/1987'

- g. To change all the Instrument Type fields having a value of "WD" to "DT" perform the following routine:

- Backup the database.
- Run a SELECT sql query to review what records you will be updating:

Select * from primetable where Instrument_Type = 'WD'

- Run the update statement:

Update primetable set Instrument_Type = 'DT' where Instrument_Type = 'WD'

- h. To delete all the records from the halFILE database for a particular file date.

- Backup the database.
- Run a SELECT sql queries (for multi and primetable) to review what records you will be updating:

Select * from multi where multi.prserv in (select prserv from primetable where File_Date = '01/01/2000')

Select * from primetable where File_Date = '01/01/2000'

- Run the Update statements. First do the statement for the Multi table records because once the records are deleted from Primetable you will not have the file date to reference in the where clause.

Delete from multi where multi.prserv in (select prserv from primetable where File_Date = '01/01/2000')