



Document Number:
File Name:
Date: 10/16/2008
Product: InteractX, SQL Server, SQL Server

Application Note

Associated Project:

Related Documents: BackupScript.sql

KEYWORDS

InteractX, database, SQL Server, SQL Server Express, backup, maintenance.

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This application note is designed to provide general guidance on database management topics for the Microsoft SQL Server and SQL Server Express products. Parker recommends the use of the Microsoft SQL Server family of products as a database engine for use with our InteractX HMI product. Some of the most frequently asked questions that we receive on these databases are “How do I perform maintenance on my database” and “How do I backup my database data”.

This application note provides guidelines and even a script example to perform some of these maintenance functions. It is not a substitute for Microsoft’s documentation, but rather a starting point.

How to Backup a Database in SQL SERVER or SQL SERVER Express

This needs DB administrator access rights.

1. Open SQL Server management Studio and Connect.
2. Expand Databases, select a database that you want to backup
3. Right-click the database, point to Tasks, and then click Back Up. The Back Up Database dialog box appears.
4. In the Database list box, verify the database name. You can optionally select a different database from the list.
5. You can perform a database backup for any recovery model (FULL, BULK_LOGGED, or SIMPLE).
6. In the Backup type list box, select Full.
7. Note that only after creating a full database backup, you can create a differential database backup;
8. For Backup component, click Database.
9. Either accept the default backup set name suggested in the Name text box, or enter a different name for the backup set.
10. Optionally, in the Description text box, enter a description of the backup set.
11. Specify when the backup set will expire and can be overwritten without explicitly skipping verification of the

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expiration data:

- a. To have the backup set expire after a specific number of days, click after (the default option), and enter the number of days after set creation that the set will expire. This value can be from 0 to 99999 days; a value of 0 days means that the backup set will never expire.
The default value is set in the Default backup media retention (in days) option of the Server Properties dialog box (Database Settings Page). To access this, right-click the server name in Object Explorer and select properties; then select the Database Settings page.
 - b. To have the backup set expire on a specific date, click On, and enter the date on which the set will expire.
12. Choose the type of backup destination by clicking Disk or Tape. To select the paths of up to 64 disk or tape drives containing a single media set, click Add. The selected paths are displayed in the Backup to list box.
 13. To remove a backup destination, select it and click Remove. To view the contents of a backup destination, select it and click Contents.
 14. To view or select the advanced options, click Options in the Select a page pane.
 15. Select an Overwrite Media option, by clicking one of the following:
 - a. Back up to the existing media set
For this option, click either Append to the existing backup set or Overwrite all existing backup sets.
 - b. Optionally, select Check media set name and backup set expiration to cause the backup operation to verify the date and time at which the media set and backup set expire.
Optionally, enter a name in the Media set name text box. If no name is specified, a media set with a blank name is created. If you specify a media set name, the media (tape or disk) is checked to see whether the actual name matches the name you enter here.
 - c. Back up to a new media set, and erase all existing backup sets
For this option, enter a name in the New media set name text box, and, optionally, describe the media set in the New media set description text box.
 16. In the Reliability section, optionally check:
 - a. Verify backup when finished.
 - b. Perform checksum before writing to media, and, optionally, Continue on checksum error.
 17. If you are backing up to a tape drive (as specified in the Destination section of the General page), the Unload the tape after backup option is active. Clicking this option activates the Rewind the tape before unloading option.

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How to Restore a Database Backup in SQL Server or SQL Server Express

This needs DB administrator access rights.

1. Open SQL Server Management Studio and Connect.
2. Expand Databases. select a database that you want to backup
3. Right-click the database, point to Tasks, and then click Restore.
4. Click Database, which opens the Restore Database dialog box.
5. On the General page, the name of the restoring database appears in the to database list box. To create a new database, enter its name in the list box.
6. In the to a point in time text box, either retain the default (Most recent possible) or select a specific date and time by clicking the browse button, which opens the Point in Time Restore dialog box.
7. To specify the source and location of the backup sets to restore, click one of the following options:
 - a. From database
Enter a database name in the list box.
 - b. From device
Click the browse button, which opens the Specify Backup dialog box. In the Backup media list box, select one of the listed device types. To select one or more devices for the Backup location list box, click Add.
After you add the devices you want to the Backup location list box, click OK to return to the General page.
8. In the Select the backup sets to restore grid, select the backups to restore. This grid displays the backups available for the specified location. By default, a recovery plan is suggested. To override the suggested recovery plan, you can change the selections in the grid. Any backups that depend on a deselected backup are deselected automatically.
9. To view or select the advanced options, click Options in the Select a page pane.
10. In the Restore options panel, you can choose any of the following options, if appropriate for your situation:
 - a. Overwrite the existing database
 - b. Preserve the replication settings
 - c. Prompt before restoring each backup
 - d. Restrict access to the restored database
11. Optionally, you can restore the database to a new location by specifying a new restore destination for each file in the Restore the database files as grid.
12. The Recovery state panel determines the state of the database after the restore operation. The default behavior is:
 - a. Leave the database ready to use by rolling back the uncommitted transactions. Additional transaction logs cannot be restored. (RESTORE WITH RECOVERY)
13. Note: Choose this option only if you are restoring all of the necessary backups now.

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14. Alternatively, you can choose either of the following options:

- a. Leave the database non-operational, and do not roll back the uncommitted transactions. Additional transaction logs can be restored. (RESTORE WITH NORECOVERY)
- b. Leave the database in read-only mode. Undo uncommitted transactions, but save the undo actions in a standby file so that recovery effects can be reverted. (RESTORE WITH STANDBY)

Maintenance Plan (Automated Backups and Maintenance in SQL Server)

User must have role of sysadmin

Note: SQL Express does not support Automatic maintenance plan.

SQL Server

There are two ways to create a maintenance plan: you can create a plan using the Maintenance Plan Wizard, or you can create a plan using the design surface. The Wizard is best for creating basic maintenance plans, while creating a plan using the design surface allows you to utilize enhanced workflow.

Using Wizard

1. Expand the server.
2. Expand the Management folder.
3. Right-click Maintenance Plans and select Maintenance Plan Wizard. This launches the wizard and you can now step through and create a plan customized to meet your maintenance requirements.
4. Wizard shall provide you to configure type of backup, location, frequency, backup time, and many more.

Using the design surface

1. In Object Explorer, expand a server, and then expand Management.
2. Right-click Maintenance Plans and select New Maintenance Plan.
3. In the New Maintenance Plan dialog box, type a name for the plan.
4. The Toolbox opens, and the <Maintenance Plan Name> [Design] surface opens with the default Subplan_1created. Optionally enter a description for the entire plan on the Design tab.
5. Double-click Subplan_1, and enter a name and description for the subplan in the Subplan Properties dialog box. Click the Subplan Schedule icon to enter schedule details in the Job Schedule Properties dialog box.
6. To build the subplan, drag and drop task flow elements from the Toolbox to the plan design surface to define the tasks that will be performed. Double-click tasks to open dialog boxes to configure the task options.
7. To define the workflow between tasks, click the task you want to occur first, hold the CTRL key down, and then click the task you want to occur second. Right-click either task, and then click Add Precedence Constraint.
8. To add another subplan that contains tasks run on a different schedule, click Add Subplan on the toolbar.
9. To add connections to different servers, click Manage Connections.
10. To specify reporting options, click the Reporting and Logging icon. To save more detailed information,

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select Log extended information. To write maintenance plan results information to another server, select Log to remote server. To view the results in the log file viewer, right-click the Maintenance Plans node or the specific maintenance plan, and then click View History.

SQL Server Express

SQL Express **does not** support maintenance plan. In order to perform a similarly automated backup you would need to create a SQL script, a procedure and a windows scheduled task. A sample SQL script is available from the CTC support forums.