EMC²

TECHNICAL NOTES

RESTORING MICROSOFT SQL SERVER 2000 AND 2005

AVAMAR 3.7.1 OR LATER

TECHNICAL NOTE

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Introduction

This document describes the optimum method for restoring a single instance of Microsoft SQL Server 2000 or 2005 after a database corruption or full catastrophic (hardware) failure. It also offers best practices regarding the operation of SQL Server.

A thorough description of basic restore procedures is beyond the scope of this document. Refer to the *Avamar System Administration Manual* for additional information.

Assumptions

These instructions are based on the following assumptions:

ITEM	ASSUMPTION
Avamar software	Version 3.7.1 or higher
Operating system	Microsoft Windows Server 2003 (minimum SP1)
Microsoft SQL Server	2000 (minimum SP3 or SP3a) 2005 (minimum SP1)
User	Familiarity with Microsoft Windows, Active Directory, Avamar software and network and systems administration

Best Practices

For optimal backups of SQL Server data, the following should be considered:

FACTOR	BEST PRACTICE
Maintenance Plans	At minimum, run regular maintenance on SQL Server databases regardless of backup method.
	Perform the following maintenance plan for daily backups of all system databases (does not include transaction logs): • Full recovery mode for model database only. Transaction log backup not necessary. • Simple recovery mode for most system databases. Transaction log backup not allowed.
	Perform the following maintenance plan for daily backups of all user databases (includes transaction logs): • Separate maintenance plan recommended for transaction log backups. Scheduled between database backups. • Database change rate determines frequency of transaction log backups.
SQL Server 2000	Use the Avamar SQL agent at least daily to back up all databases and .BAK files from daily Avamar backup maintenance plans.
SQL Server 2005	Use flat file database backups (for system and user databases) to recover SQL Server 2005 data. The Avamar SQL agent does not support SQL Server 2005. Ensure .BAK files from the maintenance plan are included in daily Avamar backups.
Exclusions	Exclude live SQL database and log files from Avamar backups. **IMPORTANT:** However, back up the directory in which the maintenance plan backup files are stored.

SQL Server 2000 Restoration Scenarios

Use the following procedures to restore Microsoft SQL Server 2000 after a catastrophic (hardware) failure or a database corruption.

Refer to Microsoft document *SQL Server 2000 Administrator's Pocket Consultant: Database Backup and Recovery* for additional information on SQL Server 2000 backup and restore procedures.

Refer to Microsoft document *SQL Server 2000 Administrator's Pocket Consultant: Core Database Administration* for additional information on SQL Server 2000 system databases and their function.

Full Rebuild After Hardware Failure — SQL Server 2000

This procedure applies to Microsoft SQL Server 2000 after a full catastrophic failure.

1. Reinstall or re-image Windows on the server.

2. Configure the server with the same host name and IP address as before the hardware failure.

3. Install Microsoft SQL Server 2000 and previously-installed service packs, security updates and hot fixes.

   > **IMPORTANT:** Install the operating system and applications in their original locations (drive, directory and so forth). Recovery procedures are more complex if you install in new locations.

4. Install the Avamar client and SQL Server agent.

5. Right-click the Avamar Client icon in the system tray and choose **Activate**.

   The **Activate Client Setup** dialog box appears.

6. Enter the **Administrator Server Address** and **Client Domain**.

7. Click **Activate**.

8. In Avamar Administrator, restore to the server the required SQL Server flat file backups for the master, model and msdb databases.

   The default SQL Server backup directory is `DRIVELETTER\Program Files\Microsoft SQL Server\MSSQL\BACKUP\`, although you can restore to any location.

9. Open a **Command Prompt** window.

10. Stop the SQL Server service by entering the following:

    net stop mssqlserver

11. Close the **Command Prompt** window.

12. Start SQL Server in single-user mode by entering the following:

    INSTALLDIR\MSSQL\Binn\sqlservr.exe -m

    Where INSTALLDIR is the installation path for SQL Server.

13. Open SQL Enterprise Manager.

14. Restore the master database.

   - Right-click the master database and choose **All Tasks > Restore Database**.
   - Select the `.BAK` file for the master database that you restored in step 8.
   - On the **Options** tab, select **Force restore over existing database**.
   - Click **OK**.

   When the restore is complete, the system will stop and start SQL Server. If messages appear requesting that you reconnect, make selections that do not reconnect (do this until the messages stop appearing and you can exit SQL Enterprise Manager).

15. Open a **Command Prompt** window.

16. Restart the SQL Server service by entering the following:

   ```
   net start mssqlserver
   ```

17. Close the **Command Prompt** window.

18. Open SQL Enterprise Manager.

19. Restore the model and msdb databases from flat files as you did for the master database in step 14.

20. Perform the procedure in *Restoration of SQL Database With Avamar SQL Agent* (page 5) to restore all live databases.

   Live databases should be restored while the service is running. They probably do not exist at this point because of SQL Server is newly installed. If they have been recreated, they must be taken offline for restore to succeed.

21. Verify database user, access and functionality.

NOTE: By restoring system databases, all previous SQL Server configuration data is restored (SQL Server agent jobs, maintenance plans, security and so forth). User databases appear grayed out and marked suspect. When a user database is restored (same file names and location), it comes back online containing everything as before, including database security.

Restoration of SQL Database With Avamar SQL Agent

This procedure applies to Microsoft SQL Server 2000 after a database corruption occurs. Restore can be performed through the process described in the previous section (through SQL Enterprise Manager) or through the following procedure that uses Avamar SQL Server agent backups to restore the corrupted database.

Restoring a system database sometimes requires that you restore additional system databases depending on the data being recovered and the types of changes since the most recent system database backup. The following procedure

assumes the database still exists and the original names and location exist for the files being restored.

1. Perform a full backup of the existing database you are replacing, if possible.

2. Close SQL Server Enterprise Manager, if applicable.

3. Open Avamar Administrator.

4. Perform a restore.

   (a) Select the Windows SQL backup you want to restore.

   (b) Select the database(s) you want to restore.

   (c) On the **Restore Options** page, select **Restore everything to its original location**.

   Wait until restore is complete.

5. Open SQL Server Enterprise Manager.

6. Verify the failed, corrupted or missing database is online and in the expected recovered state.

   Observe whether the data that was missing has been recovered.

SQL Server 2005 Restoration Scenarios

Avamar does not currently offer an agent for backing up SQL Server 2005. It is critically important that you implement a backup schedule using maintenance plans to capture backups of your database, and that you back up those files in your daily Avamar backups. Both restore procedures that follow rely on the .BAK backup file from those maintenance plan backup jobs.

See the Microsoft article *Backing Up and Restoring System Databases* for additional information about backing up and restoring system databases in Microsoft SQL Server 2005.

Full Rebuild After Hardware Failure — SQL Server 2005

1. Reinstall or re-image Windows 2003 on the server.

2. Configure the server with the same host name and IP address as before the hardware failure.

3. Install Microsoft SQL Server 2005 and previously-installed service packs, security updates and hot fixes.

   > **IMPORTANT:** Install the operating system and applications in their original locations (drive, directory and so forth). Recovery procedures are more complex if you install in new locations.

4. Install the Avamar client and SQL Server agent.

5. Right-click the Avamar Client icon in the system tray and choose **Activate**.

    The **Activate Client Setup** dialog box appears.

6. Enter the **Administrator Server Address** and **Client Domain**.

7. Click **Activate**.

8. In Avamar Administrator, restore to the server the required SQL Server flat file backups for the master, model, msdb and all user databases.

    The default SQL Server backup directory is `DRIVELETTER\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\BACKUP\`, although you can restore to any location.

9. Open a **Command Prompt** window.

10. Stop the SQL Server service by entering the following:

    `net stop mssqlserver`

11. Close the **Command Prompt** window.

12. Start SQL Server in single-user mode by entering the following:

    `INSTALLDIR\MSSQL.1\MSSQL\Binn\sqlservr.exe -m`

    Where INSTALLDIR is the installation path for SQL Server.

    Do not close the DOS window that opens.

13. Open Microsoft SQL Server Management Studio.

14. Locate the master database and right-click on it.

15. Choose **Tasks > Restore > Database**.

16. Select **From Device** and click the browse button (**...**).

17. Add the .BAK backup file for the master database restored in step 8.

18. Select (check mark in the restore box) the selected file.

19. For **To database:**, select master.

20. On the **Restore Options** page, select **Overwrite the existing database**.

21. Click **OK**.

    Wait until restore is complete. Disregard any error message that might appear after restore is complete.

22. Close SQL Server Management Studio.

23. Close the DOS window that opened in step 12.

    This action stops SQL Server service.

24. Open a **Command Prompt** window.

25. Restart the SQL Server service by entering the following:

    `net start mssqlserver`

26. Close the **Command Prompt** window.

27. Repeat steps 13 through 22, substituting model and msdb databases for the master.

> **IMPORTANT:** At this point, the SQL Server Agent service should be stopped. It must not be running when restoring the msdb database.

Since the server has just been rebuilt, user databases should be visible in SQL Server Management Studio but there should be no related database and log files for them.

28. Right-click a user database you want to recover and click **Detach**.

    The **Detach Database** window appears.

29. Click **OK**.

    SQL Server Management Studio no longer displays the database.

30. In **Object Explorer**, right-click the server name and click **Databases**.

31. Select **Restore Database**.

32. Select **From Device** and click the browse button (**...**).

33. Add the .BAK backup file for the user database.

34. Select (check mark in the restore box) the selected file.

35. For **To database:**, select the user database.

36. On the **Restore Options** page, select **Overwrite the existing database**.

37. Click **OK**.

    Wait until restore is complete. SQL Server Management Studio should again display the user database.

38. Repeat steps 28 through 37 to recover additional user databases.

39. After all databases have been restored, verify database user, access and functionality.

Restore additional transaction logs from Avamar along with .BAK backup files for the database by performing step 8 in this topic.

During database restore, select the restore recovery state option that leaves the database nonoperational. This allows additional transaction logs to be restored to the database. Each transaction log is then restored using the same restore recovery state option. When the last transaction log is restored, select the restore recovery state option that leaves the database operational and online.

See the Microsoft articles *Applying Transaction Log Backups* and *Working with Transaction Log Backups* for more information about restoring log files.

Restoration of User Database

The following procedure describes how to restore a user database in Microsoft SQL Server 2005.

1. In Avamar Administrator, restore the required SQL .BAK backup file for the user database you want to restore.

   You can restore the file to any location.

2. Open Microsoft SQL Server Management Studio.

3. Right-click the database you want to restore and choose **Tasks > Restore > Database**.

4. Select **From Device** and click the browse button (**...**).

5. Add the .BAK backup file for the user database.

6. Select (check mark in the restore box) the selected file.

7. For **To database:**, select the user database.

8. On the **Restore Options** page, select **Overwrite the existing database**.

9. Click **OK**.

   Wait until restore is complete.

10. Verify database user, access and functionality.