

# Defragmenting Exchange 2003 Server Databases

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Exchange databases run a defragmentation process once a day by default. This process rearranges mailbox store and public folder store data more efficiently, eliminating unused storage space. Exchange database online defragmentation occurs automatically as part of the database maintenance process. Online defragmenting is performed automatically at 2:00 AM every day by default. Online defragmentation makes additional database space available by detecting and removing database objects that are no longer being used. The defragmentation process provides more database space without actually changing the file size of the database.

The following are two ways to schedule database defragmentation:

1. To schedule database defragmentation for an individual database, on the Database tab of a mailbox store or public folder store object, configure the maintenance interval using the Maintenance interval option.
2. To schedule database defragmentation for a collection of mailbox stores and public folder stores, on the Database (Policy) tab of a mailbox store or a public folder store policy, configure the maintenance interval using the Maintenance interval option.

Although online defragmentation provides some additional database space, you should also defragment your Exchange database offline to reduce the physical size of your Exchange database. You can perform offline defragmentation by using the ESE utility (ESEUTIL) while your mailbox stores and public folder stores are offline.

You would perform offline defragmentation, for instance, if you had recently moved a large number of users from a server running Exchange 2000/2003. In that case, defragmenting offline decreases the size of your Exchange databases by rearranging the data on the server's Exchange databases, and discarding any unused database pages.

Note that the length of time that the defragmentation will take will depend on the amount of white space in the database, as well as the size of the transactions recorded in the database, and your hardware specifications.

Offline defragmentation creates a new database **by copying all records and tables from the old database into the new database**. Because this is a copy, defragmentation requires free disk space equal to the size of the database (actually, you'll need 110% of free space).

**Very important note:** After defragmentation is complete, ESE considers the new database to be a different database from the original. Therefore, the original database is deleted and its member log files **cannot** be replayed into the successor database.

**A full backup should be completed as soon as possible!**

Prior incremental or differential backups are no longer useful because they reference database pages that were reordered by the defragmentation process. ESEUTIL defragments a database by creating a new database, copying the old database records to the new one, and discarding unused database pages, which results in a newly organized compact database file.

Microsoft recommends a conservative 5 - 7 GB per hour for a defrag operation, which means that your server will be offline for as long as it takes, assuming no hardware failures will occur.

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When you run ESEUTIL /d against a database to defragment it, the streaming file associated with the database is automatically defragmented. This is the default behavior.

For example, if you run the following command at a command prompt:

The Priv1.edb and Priv1.stm files are defragmented. If you do not want the streaming file to be defragmented, include the /i option.

Run ESEUTIL with the /p switch to configure ESEUTIL to create the new defragmented database on an alternate location (for example, to a location on a different hard disk). This switch lets you preserve your original defragmented database (which lets you revert back to your original database if necessary). This switch also significantly reduces the amount of time it takes to defragment a database, because you are rebuilding to a new location, rather than rebuilding the database in place.

**Note:** The database you wish to defragment must be taken offline (i.e. dismounted) before attempting to perform the defragmentation operation. When you run ESEUTIL against a Microsoft Exchange computer where its database is still mounted you will receive the following error message:

*Operation terminated with error -550 <JET\_errDatabaseInconsistent, Database is in inconsistent state>*

If the database is still mounted, use the following steps to dismount the database, and then run ESEUTIL:

1. Start Exchange System Manager.
2. Right-click the database that you want to dismount.
3. Click All Tasks, and then click Dismount Store.

Disk defragmentation involves rearranging data on a server's hard disks to make the files more contiguous for more efficient reads. Defragmenting your hard disks helps increase disk performance and helps ensure that your servers that run Exchange run smoothly and efficiently.

Because severe disk fragmentation can cause performance problems, run a disk defragmentation program (such as Disk Defragmenter) on a regular basis or when server performance levels fall below normal. Because more disk reads are necessary when backing up a heavily fragmented file system, make sure that your disks are recently defragmented.

Exchange databases also require defragmentation. However, fragmentation of Exchange data occurs within the Exchange database itself. Specifically, Exchange database defragmentation refers to rearranging mailbox store and public folder store data to fill database pages more efficiently, thereby eliminating unused storage space.

There are two types of Exchange database defragmentation: online and offline.

## Online Defragmentation

Online defragmentation is one of several database-related processes that occur during Exchange database maintenance. By default, on servers running Exchange 2000 Server and Exchange

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Server 2003, Exchange Server database maintenance occurs daily between 01:00 (1:00 A.M.) and 05:00 (5:00 A.M.). Online defragmentation occurs while Exchange Server databases remain online. Therefore, your e-mail users have complete access to mailbox data during the online defragmentation process.

The online defragmentation process involves automatically detecting and deleting objects that are no longer being used. This process provides more database space without actually changing the file size of the databases that are being defragmented.

**Note:** To increase the efficiency of defragmentation and backup processes, schedule your maintenance processes and backup operations to run at different times.

You can schedule database defragmentation in two ways:

- To schedule database defragmentation for an individual database, use the **Maintenance interval** option on the **Database** tab of a mailbox store or public folder store object.
- To schedule database defragmentation for a collection of mailbox stores and public folder stores, use the **Maintenance interval** option on the **Database (Policy)** tab of a mailbox store or a public folder store policy.

For information about how to create a mailbox store policy or public folder policy, see "Create a Mailbox Store Policy" and "Create a Public Folder Store Policy" in Exchange 2000 Server or Exchange Server 2003 Help.

## Offline Defragmentation

Offline defragmentation involves using the Exchange Server Database Utilities (Eseutil.exe). ESEUTIL is an Exchange Server utility that you can use to defragment, repair, and check the integrity of Exchange Server databases. It is available through the following sources:

- If you are running Exchange 2000 Server, ESEUTIL is located in the *E:\Support\Utils* folder of your Exchange 2000 CD (where *E:\* is the drive letter of your CD-ROM drive).
- If you are running Exchange Server 2003, ESEUTIL is located in the *F:\Program Files\exchsrvr\bin* directory after running Exchange Server 2003 Setup (where *F:\* is the drive letter of the drive to which you installed Exchange Server).

You can only perform offline defragmentation when your Exchange Server databases are offline. Therefore, your e-mail users will not have access to mailbox data during the offline defragmentation processes.

During the offline defragmentation process, Eseutil.exe creates a new database, copies the old database records to the new one, and then discards unused pages, resulting in a new compact database file. To reduce the physical file size of the databases, you must perform an offline defragmentation in the following situations:

- After performing a database repair (using Eseutil /p)
- After moving a considerable amount of data from an Exchange Server database.
- When an Exchange Server database is much larger than it should be.

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**Important:** You should consider an offline defragmentation only if many users are moved from an Exchange Server database or after a database repair. Performing offline defragmentation when it is not needed could result in decreased performance.

When using Eseutil.exe to defragment your Exchange Server databases, consider the following:

To rebuild the new defragmented database on an alternate location, run Eseutil.exe in defragmentation mode (using the command **Eseutil /d**) and include the **/p** switch. Including the additional **/p** switch during a defragmentation operation enables you to preserve your original defragmented database (in case you need to revert to this database). Using this switch also significantly reduces the amount of time it takes to defragment a database.

Because offline defragmentation alters the database pages completely, you should create new backups of Exchange Server 2003 databases immediately after offline defragmentation. If you use the Backup utility to perform your Exchange Server database backups, create new Normal backups of your Exchange Server databases. If you do not create new Normal backups, previous Incremental or Differential backups do not function because they reference database pages that were re-ordered by the defragmentation process.