*Modern organizations have to manage ever-increasing amounts of data, which drives up storage costs and can lead to poorly performing applications. Use the built-in Data Compression and Backup Compression features of*

*Microsoft® SQL Server® 2008 R2 to reduce data storage costs and help to ensure optimal performance for your mission-critical applications.*

**Top Features**

* Built-in compression features enable you to reduce hardware costs, optimize storage, improve performance, and reduce backup times.
* Extend the benefits of compression to applications that use Unicode data with Unicode UCS-2 compression.
* Benefit from flexible configuration options with page and row data compression settings and the ability to compress tables, indexes, and partitions.
* Use backup compression to improve backup and restore times and reduce backup storage costs.

**DATA AND BACKUP COMPRESSION**

SAVE STORAGE SPACE

Data Compression and Backup Compression enable you to make more efficient use of disks and other storage media by storing more data per gigabyte of space. This helps to reduce the purchase costs for data storage and can also help to make it easier to manage large volumes of data. Data Compression and Backup Compression can benefit any organization that hosts large amounts of data, and they are particularly useful in scenarios such as data warehousing and server consolidation.

The amount of space that you can save by using compression depends on the type of data that you have, because some types of data compress better than others.

Customers have achieved space savings of over 80 percent with Data Compression1 and up to 66 percent with Backup Compression.2

*“Upgrading to SQL Server 2008 and taking advantage of the Data Compression feature has enabled us to extend the useful life of our SANs … We are seeing data compression in excess of 80 percent, in some cases up to 90 percent.”*

TJ Fang, Quanta Computer1

To help you to plan your data storage strategy, you can use the stored procedure sp\_estimate\_data\_compression\_savings to provide an estimate of the likely savings that you will achieve.

TAKE ADVANTAGE OF UNICODE COMPRESSION

SQL Server 2008 R2 offers USC-2 Unicode compression, which enables you to compress Unicode data types such as **nchar** and **nvarchar**. Unicode uses two bytes to store each data character (for example, the letter ‘S’) and is typically used when storing data in languages whose alphabets have a large number of characters. The ability to compress Unicode data is a significant benefit for organizations with international customer bases and for those who must store Unicode data for other reasons. Unicode compression offers storage savings of up to 50 percent3 and provides similar performance benefits to non-Unicode Data Compression.

BENEFIT FROM IMPROVED PERFORMANCE

In addition to saving space, Data Compression can improve performance and help you to achieve faster response times for users. This is particularly true for queries that are I/O bound (when the factor that limits query performance is input/output operations). Customers have reported improvements in response times of 50 percent or more in some cases.4

The improvement in performance with Data Compression occurs because less space is needed to store the same number of data rows when compared to storing uncompressed data; consequently, fewer data pages need to be read when processing queries. Performance is further improved because, due to the smaller size of compressed data, SQL Server can keep more data in its memory cache; it can then use this cached data to answer more queries, which is faster than reading from disk.

*“With SQL Server 2008, the data compression runs in the background, while users continue to access the information. There is only a minor, virtually undetectable performance hit from compressing tables online. Because compression enables us to have more data in cache, overall performance can actually be enhanced.”*

TJ Fang, Quanta Computer1

UTILIZE FLEXIBLE CONFIGURATION OPTIONS

Data Compression offers flexible configuration options, so you can tailor the settings to suit your requirements. For example, you can choose to compress only specific parts of a database, leaving other parts uncompressed. SQL Server 2008 R2 enables you to compress tables, partitions, and indexes, including indexed views.

SQL Server also gives you the choice of two data compression mechanisms: row compression and page compression. Row compression saves space by storing data in a variable length format, even if the column data type is defined with a non-variable data type like **char** or **integer**. For example, a single character of **integer** data is normally 4 bytes in size, but compressed it will take up between 0 and 4 bytes, depending on the value stored. Page compression works in a different way. It looks for recurring bit patterns on a page that represent multiple occurrences of individual values. It then stores each repeating pattern just once and references it from the relevant columns. When you enable page compression, row compression is automatically implemented as well.

Page compression has a higher CPU cost than row compression but results in better compression ratios. When deciding whether to use row compression or page compression, you should weigh the CPU usage cost incurred against the storage and performance improvements that you can achieve. For example, on a partitioned table, you can choose to use page compression to compress only partitions that contain infrequently accessed or archive data, because the higher CPU cost of accessing this data is offset by the fact that it is not done very often. You can then enable row compression, with its lower CPU cost, for partitions that contain more frequently accessed data.

REDUCE BACKUP TIMES AND BACKUP STORAGE

Save even more space by compressing SQL Server backups. Compressed backups are smaller, so you can make more efficient use of storage and free up existing media to store more backups, to keep individual backups for a longer time, or for other purposes.

*“There are ... storage savings for the daily backups of the SQL Server databases. This has been reduced from 30GB per day down to 11. It is estimated that this will prevent the addition of 1TB of storage per year.”*

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The amount of space saved will vary according to the characteristics of the data, but a typical database will yield a compression ratio of between 1:4 and 1:6.6 Furthermore, you can use Backup Compression on databases that have already been compressed with Data Compression to achieve even greater savings.

Compressed backups run more quickly because the I/O required is reduced, and it is therefore easier to complete backups within the scheduled backup windows and avoid overruns.

*“The backup compression rates we’re seeing from SQL Server 2008, which are about 8.5 to 1, are significantly reducing the time required to perform backups, as well as the size of the backup image.”*

*TJ Fang, Quanta Computer1*

Backup Compression can also help you to minimize periods of service interruption and maintain high availability. This is because a compressed backup restores more quickly than an uncompressed backup of the same data, so in the event of data loss, you can make data available to users again more quickly.

**learn more:**http://msdn.microsoft.com/en-us/library/bb964719.aspx http://msdn.microsoft.com/en-us/library/dd894051.aspx

1<http://www.microsoft.com/Casestudies/Case_Study_Detail.aspx?casestudyid=4000003962>

2 <http://www9.unisys.com/eprise/main/admin/corporate/doc/41371394.pdf>

3 <http://msdn.microsoft.com/en-us/library/ee240835%28SQL.105%29.aspx>

4 <http://msdn.microsoft.com/en-us/library/dd894051.aspx>

5 <http://download.microsoft.com/download/d/1/1/d11349b8-af33-45c4-a89c-f0dc64bbd431/TEI%20of%20SQL%20Server%202008%20Upgrade.pdf>

6 <http://sqlcat.com/whitepapers/archive/2009/08/13/a-technical-case-study-fast-and-reliable-backup-and-restore-of-a-vldb-over-the-network.aspx>