SCS Case Study

Columnstore Indexes

Solution Snapshot

Business Situation: An industrial client with an ERP system that prepares accounting data needed better, faster reporting on that data.

Multi-Point Solution: SCS implemented a solution featuring Columnstore Indexes a unique feature found in SQL Server 2012 that indexes the star schema fact table and improves query performance.

Benefits: Columnstore Indexes contain a data structure that is often capable of a high degree of data compression, resulting in decreased report response time. Since the client already had SQL Server 2012, SCS could develop and implement a solution quickly and efficiently.

The Client:

The client is a medium-sized company that distributes industrial raw materials. They have an ERP system that, among other things, prepares accounting transactions based on business activity. The client wanted to do extensive reporting on this accounting data. For their reporting infrastructure, the client selected the Microsoft BI Suite of products including SQL Server, Integration Services and Analysis Services.

The Challenge:

The client was developing a reporting system to query accounting data that had been loaded into a star schema. That data would then be queried using a third party reporting package. SCS was called in to assist in designing and implementing the star schema on SQL Server, and to help with preparing an Extract, Transfer and Load (ETL) process that would load the accounting data into a star schema. One of the highest priority project objectives was to provide a solution that would create reports rapidly, generally in a second or less. The reporting tool, when reading the star schema, was taking too long to run reports.

The Solution:

Since the client was using SQL Server 2012, SCS suggested using a feature that first appeared in SQL Server 2012, Columnstore Indexes, to index the star schema fact table and improve query performance.

The Columnstore Index is a SQL Server implementation of the VertiPaq/X Velocity technology originally developed for PowerPivot. It contains a data structure that is often capable of a high degree of data compression. The Columnstore Index is optimized for Business Intelligence queries and stores data with a column orientation rather than the row orientation that has characterized SQL Server indexing in the past. In its SQL Server 2012 implementation, it is a read-only index. When the underlying data needs to be changed, the index must be dropped and then added again after data changes have been made. Again, this lends itself well to Business Intelligence where the data is typically refreshed from operational systems in a nightly process.

In this particular case, the client had a 30 million-row fact table. SCS built a Columnstore Index that contained all of the columns in the fact table the client would be reporting on. This was specifically added because, if a query refers to columns not contained in the Columnstore Index, SQL Server will revert to the underlying indexes - which will be slower than the Columnstore Index. For this 30 million-row fact table, adding (or building) the Columnstore took about five minutes.

The Result:

Once the Columnstore Index had been applied to the fact table, the client reported report response time that met project objectives. During times when the Columnstore was dropped to facilitate updating the fact table, the client reported that report response time was unacceptably slow. So, using the Columnstore made the difference between success and failure for this project. SQL Server 2014 is reported to support Columnstore Indexes that can be updated without dropping and re-creating the indexes, and the client was advised that this would be an advantage of updating from SQL Server 2012 to the 2014 product. The client reported that the project was considered a success.

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