What is compilation / recompilation?

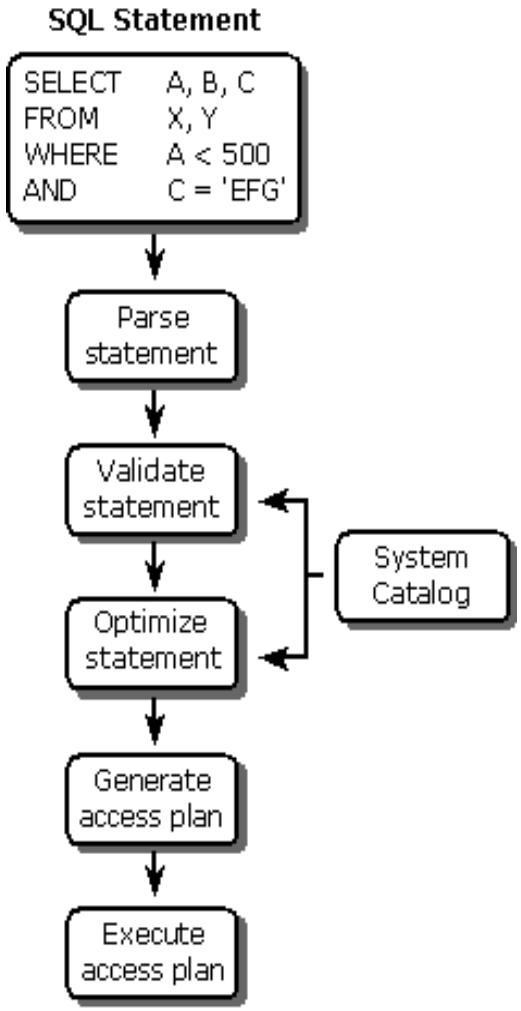
- A compilation is the process when a stored procedure's query execution plan is optimized by the optimizer. Once the optimizer completes, the compiled execution plan is saved in the cache

The purpose of the Query Optimizer

A query optimizer is a SQL component that analyzes SQL queries and generates multiple execution plans and then selects the most efficient plan

Each of these SQL statement, be it simple or complex, requires minimal use of valuable resources, such as disk reads, CPU usage and server memory

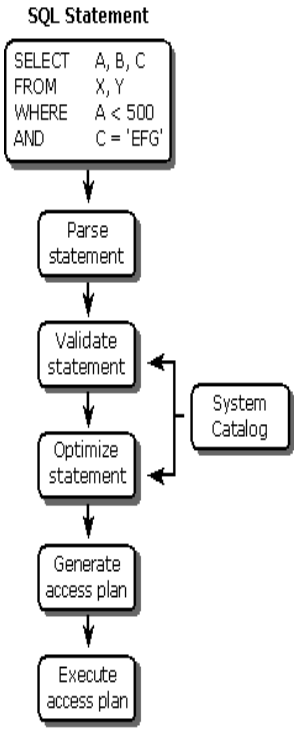
Query optimizer steps

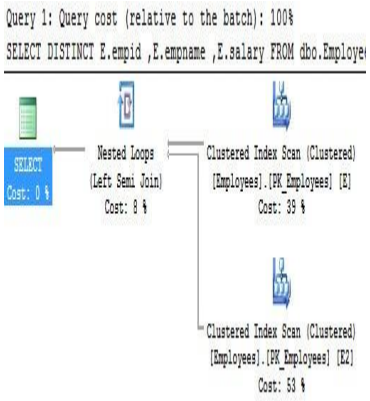


Example of a sproc compiling and execution plan

1st time a sproc is executed

Stored Procedure





It goes to the cache to see if there is an execution plan: If not it will go to disk to get the data

Cache (memory)

1st time a sproc is executed: Gets the data from disk

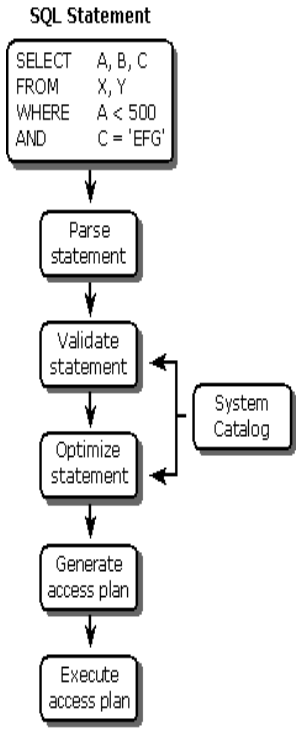
Disk

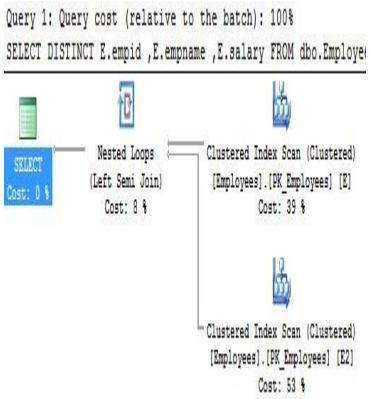
1. Sproc is executed
2. Optimizer creates an execution plan
3. Optimizer checks cache for existence of plan
4. If not in cache, it will go to the disk to find data
5. This first time creation of an execution plan is compiling

Example of a sproc compiling and execution plan

2nd time a sproc is executed

Stored Procedure





It goes to the cache to see if there is an execution plan: DOES EXISTS

Cache (memory) Sproc

Disk

1. 2ND time Sproc is executed
2. Optimizer creates an execution plan
3. Optimizer checks cache for existence of plan
4. If DOES EXIST in cache, it will NOT go to the disk to find data
5. Execution plan is saved in cache for reuse

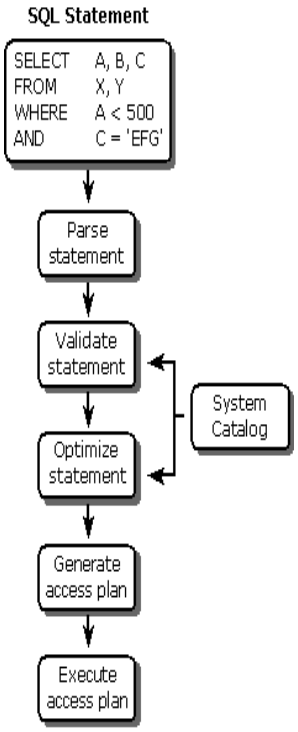
What is recompilation?

- A recompilation is the same process as a compilation, just executed again
- Recompilation occurs when the database structure or data change significantly causing a new query execution plan to be reproduced
- This recompilation degrades SQL Server performance as it’s not using the cached execution plan
- Queries are reused, but their query execution plan is not

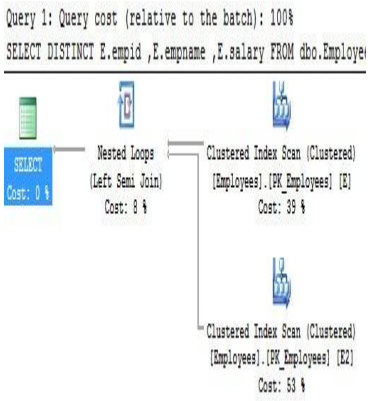
Example of a sproc **recompiling** and execution plan

CHANGE OR MODIFICATION IN SPROC

Stored Procedure



DIFFERENT EXECUTION PLAN



It goes to the cache to see if there is an execution plan: DOES NOT EXISTS

Cache (memory) Sproc

Disk

1. Sproc is executed WITH MODFICATION
2. Optimizer creates ANOTHER execution plan
3. Optimizer checks cache for existence of plan
4. If DOES NOT EXIST in cache, it will NOT go to the disk to find data
5. Execution plan is saved in cache for reuse

What is the plan cache?

- The part of the memory pool that is used to store execution plans is referred to as the plan cache. There are many type of plan cache. The one we will focus on is the SQL PLAN
- Plans are cached for possible reuse opportunities. If a query plan is not even cached, its reuse opportunity is zero.
- Such a plan will be compiled every time it is executed, resulting in poor performance.