# Analyzing SQL Statements for Performance

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# Module Outline

Generating an execution plan

Reading an execution plan

Viewing execution statistics

Rewriting SQL statements for performance

Common execution plan operations

# Statement Performance Comparison

| Metric | Without Index | With Index |
| --- | --- | --- |
| Data Access Operation | Clustered index scan | Index seek |
| Statement Cost | 14.921 | 0.189 |
| Logical Reads | 12,116 | 305 |
| CPU Time (ms) | 141 ms | < 1 ms |
| Elapsed Time (ms) | 136 ms | < 1 ms |

Rewriting a statement sometimes improves performance

Subqueries can be rewritten as joins

Joins can be rewritten as subqueries

EXISTS and NOT EXISTS are best in some scenarios

# SQL Server Data Access Operations

| Operation | Description |
| --- | --- |
| Clustered Index Scan | Reads all of the rows stored in a table stored as a clustered index |
| Table Scan | Reads all the rows in a table that is stored as a heap structure |
| Clustered Index Seek | Traverses the tree structure of a table stored as a clustered index to find the needed row(s) |
| Index Scan | Reads all of the key values of an index to find the matching data |
| Index Seek | Traverses the tree structure of an index to find the matching index keys |

# SQL Server Join Operations

| Operation | Description |
| --- | --- |
| Nested Loops Join | For each value in the first data set, SQL Server loops through the second data set looking for matches |
| Merge Join | Used to join two data sets that are already sorted using the same key. A row from each source is obtained. If the rows match they are joined. If the rows do not match, the lower value row is discarded and a new row is obtained from that source. |
| Hash Match | A hashtable of the smaller data set is created, then SQL Server loops through the larger data set probing the hashtable for matching values. Used when two large data sets must be joined |

# Statement Tuning Options

Add an index

Rewrite subqueries/joins/EXISTS clauses

Evaluate if statement can be more selective

Getting an execution plan helps you identify the most costly operations within your statement so you can tune those operations

# Up Next

## Building Effective Database Indexes