Tips & Tricks for Writing Better Queries

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Agenda

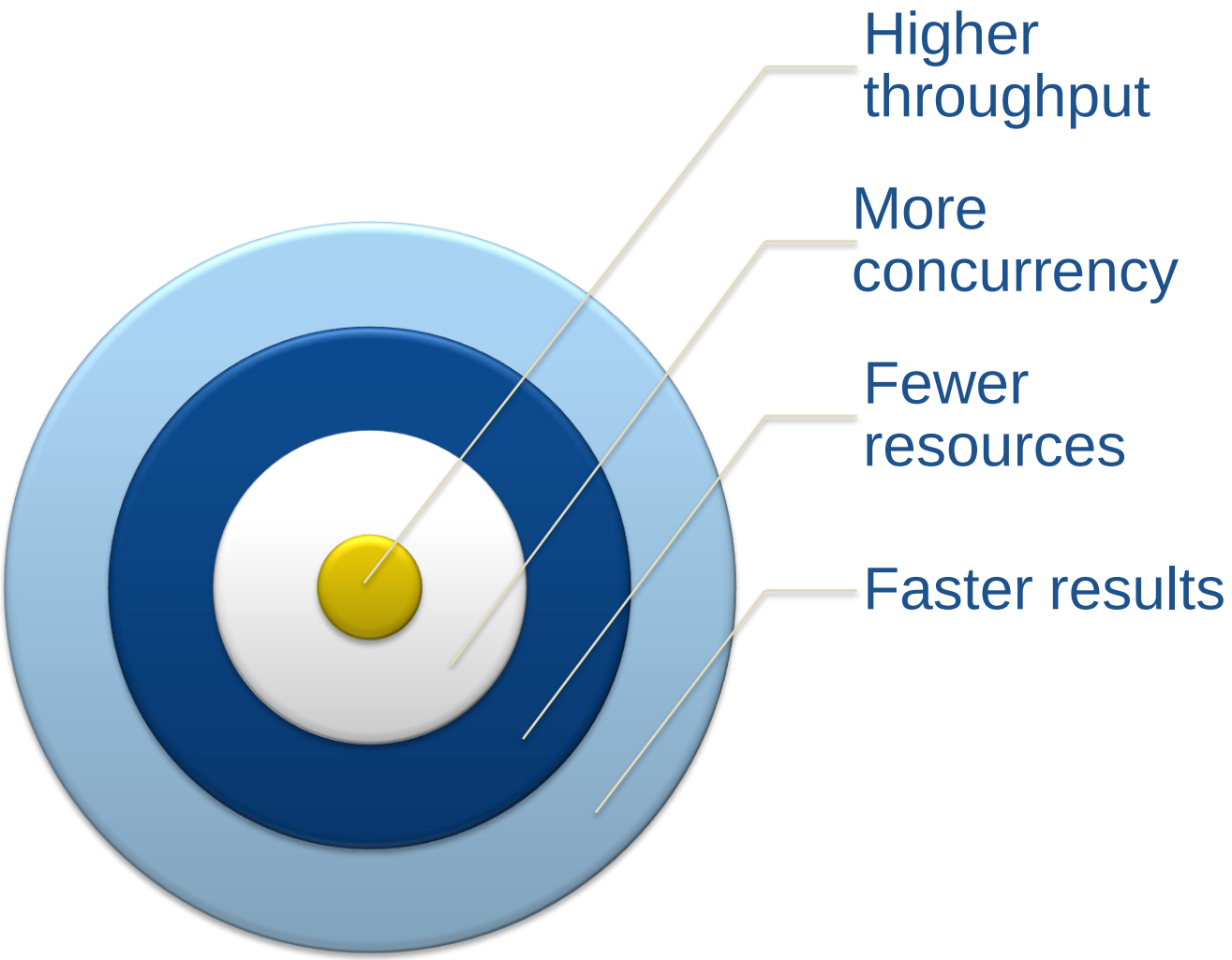
The Basics

- What is Better?
- Tools of the Trade
- Overview of Execution Plans

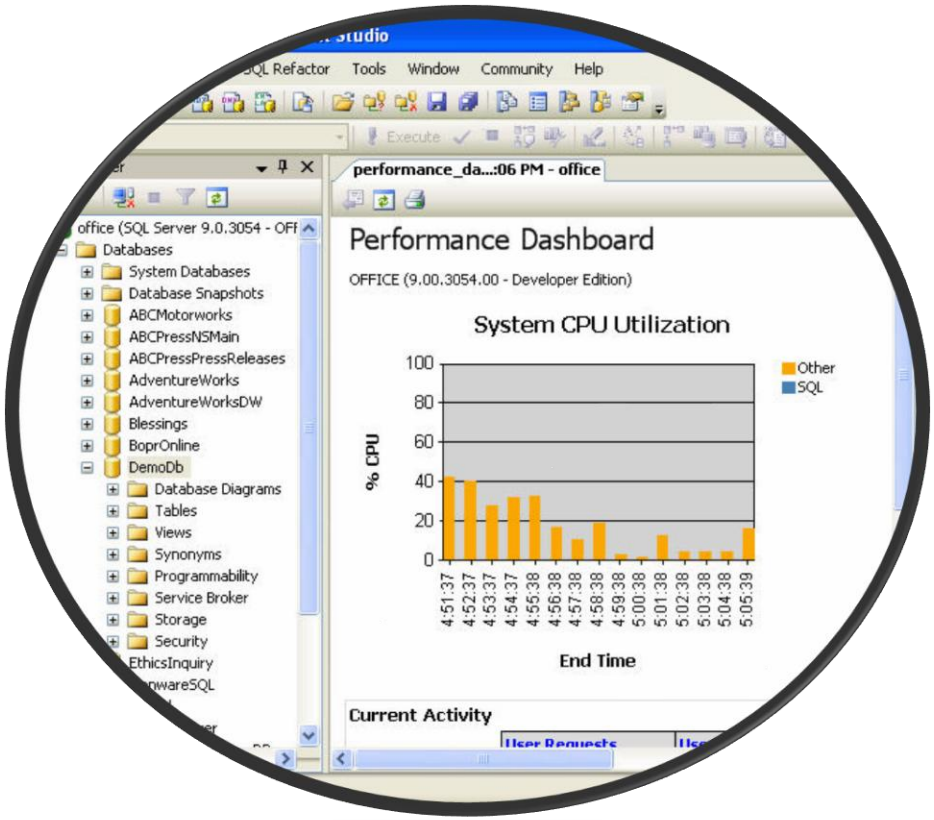
Accessing Database Objects

- Improving CRUD operations
- Do’s and Don’ts
- Tips and Tricks

What is “better”?

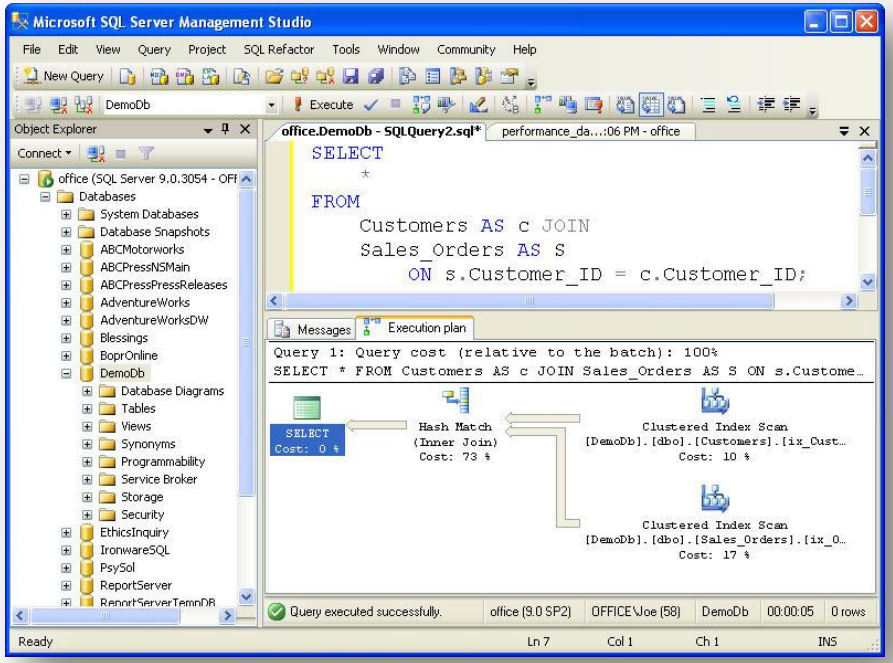


Tools of the Trade



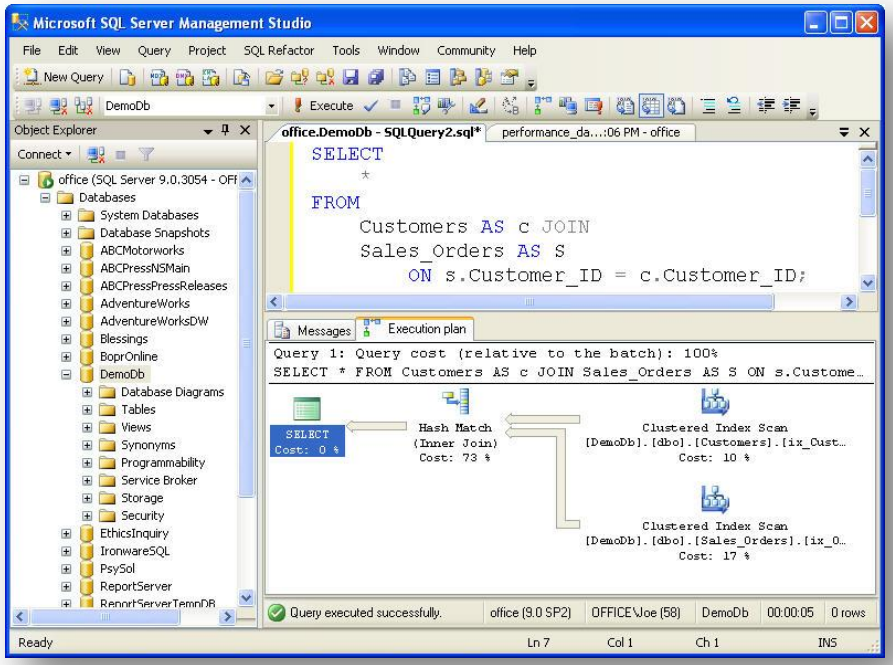
- Performance Monitor
- SQL Profiler
- Performance Dash Board
- Query Execution Plans
- Client Statistics

Execution Plans



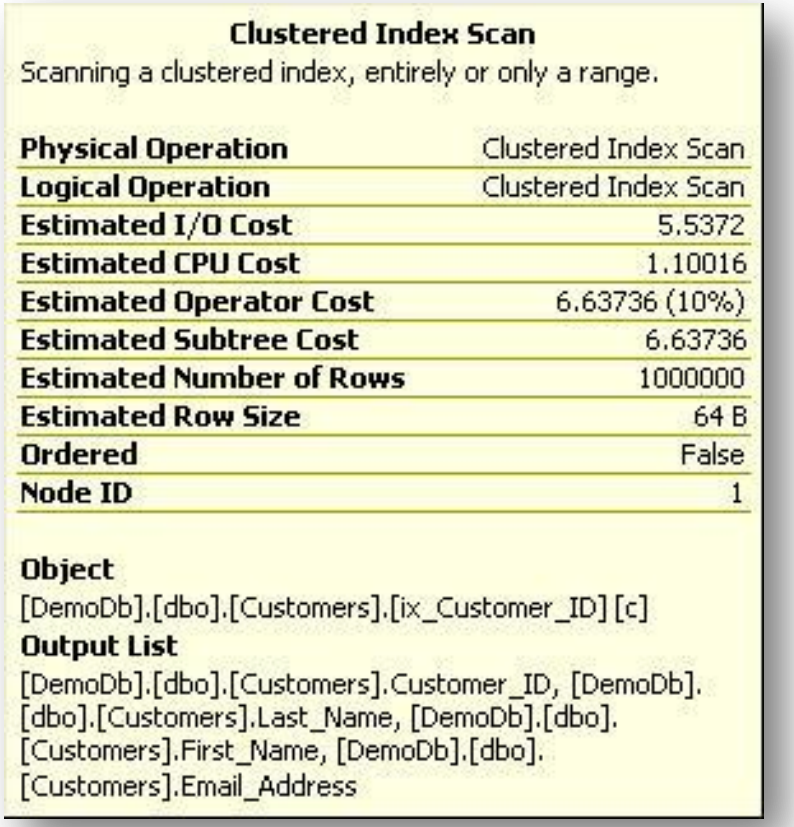
- Provide graphical, text-based, or XML-based representation for the data retrieval methods chosen by the Query Optimizer
- Execution costs for specific statements are displayed

Understanding Execution Plans



- Estimated & Actual Execution Plan
- Displays cost of each physical operation
- Read from right to left, top to bottom

Understanding Execution Plans



Clustered Index Scan

Scanning a clustered index, entirely or only a range.

Physical Operation	Clustered Index Scan
Logical Operation	Clustered Index Scan
Estimated I/O Cost	5.5372
Estimated CPU Cost	1.10016
Estimated Operator Cost	6.63736 (10%)
Estimated Subtree Cost	6.63736
Estimated Number of Rows	1000000
Estimated Row Size	64 B
Ordered	False
Node ID	1

Object

[DemoDb].[dbo].[Customers].[ix_Customer_ID] [c]

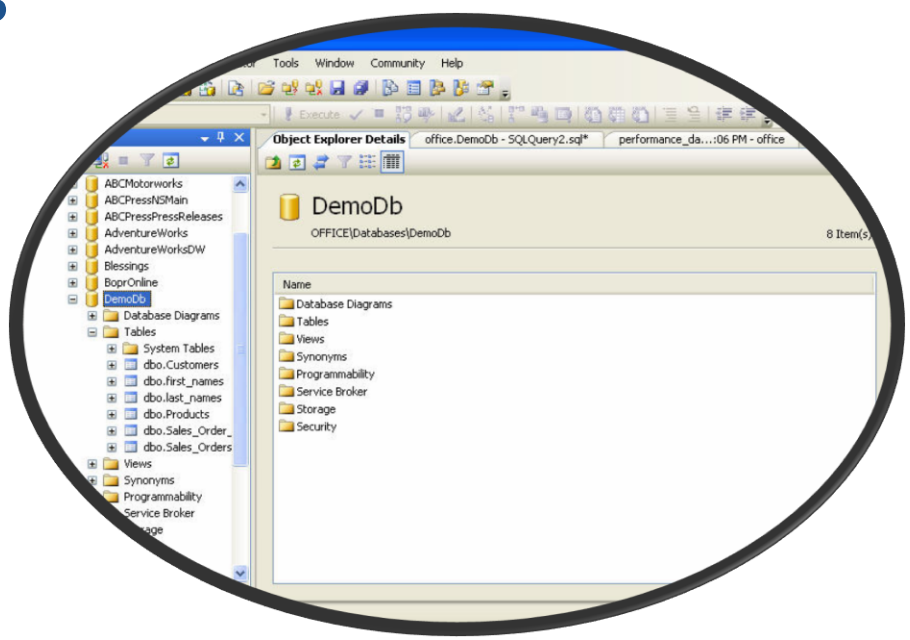
Output List

[DemoDb].[dbo].[Customers].Customer_ID, [DemoDb].[dbo].[Customers].Last_Name, [DemoDb].[dbo].[Customers].First_Name, [DemoDb].[dbo].[Customers].Email_Address

- Physical operation
- Logical operation
- I/O cost
- CPU cost
- Rows
- Row size

Accessing Database Objects

- Temporary Tables
- User Defined Functions
- Cursors
- Stored Procedures
- Joining tables
- Limiting searches
- Transactions
- Triggers
- Indexes



Temporary Objects

- Temporary tables frequently add Disk I/O to tempdb
- Created as a heap by default. Consider indexing to improve performance
- Consider using other techniques instead
- If you must use them:
  - Create using DDL rather than SELECT INTO
  - Create all temporary objects at the start of a procedure to avoid recompiles
  - Create temporary objects outside of transactions
  - Don’t compound the problem by creating Cursors on temporary tables

Functions

User-Defined Functions

- Can behave like a Cursor or correlated subquery– be careful!
- Avoid on large result sets

Built-in Functions

- UPPER() and LOWER() are generally not needed
- Placing columns inside of functions within the WHERE clause precludes the use of indexes

Cursors

- AVOID!!!
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- If you think they are required, try harder to rewrite!
- If absolutely required, use FAST-FORWARD READ-ONLY

Stored Procedures

- Use them
- SET NOCOUNT ON
- Validate parameters early
- Return only the columns required
- Consider OUTPUT parameters for single row results
- Be mindful of widely varying parameter inputs
  - Can lead to inefficient plan reuse
- Monitor for recompiles and cache misses

Joining Tables

Columns

- Join on indexed columns
- Joins on numeric values usually out perform joins on character values
- Beware of implicit type conversations

Join types

- Keep result sets small with WHERE clause and limited columns
- Usually better than correlated sub-queries; test!
- Be wary of Joins hints

Limiting Searches

- Operators in the WHERE clause make a big difference
  - Avoid <> and LIKE
  - Use EXISTS, NOT EXISTS, and LEFT JOINS instead of NOT IN
- If you must use LIKE, make the first character a literal
- ORs can prevent the use of proper indexes
  - Use Index hints or UNIONs
- Don’t place columns inside functions!

Transactions

- Keep Transactions as short as possible
- Avoid excessively large batches
- Consider indexes to prevent table locks
- Keep reads to a minimum during a Transaction
- Judiciously use nested Transactions

Triggers

- Consider the use of Triggers
  - Declarative Referential Integrity usually out performs integrity implement through Triggers
  - Constraints typically out perform data validation implemented through Triggers
- Catch errors before entering a Trigger
- Order Triggers such that the one most likely to cause a Rollback is fired first
- Use UPDATE() and COLUMNS_UPDATED() early in the Trigger
- Don’t make time intensive calls within triggers

Indexes

- Make sure you strike a good balance for indexing
  - Too many adversely affects data input
  - Too few adversely affects reads
- Order of columns in an index matters!
- Covering indexes are the fastest query possible

Other Tips

- Despite what you see in examples, avoid
  SELECT * FROM My_Table
- Consider the impact of duplicate rows
  - Avoid SELECT DISTINCT if it doesn't cause a problem
  - Use UNION ALL instead of UNION if duplicate rows are acceptable
- Use 2 part names when referencing objects

More Tips

- Use sp_executesql rather than execute for dynamic SQL
- Consider using READ UNCOMMITTED if “dirty reads” are acceptable
- Don’t use ORDER BY unless you really need it
- Be verbose with comments!

Additional Resources

- http://blogs.msdn.com/sqlqueryprocessing/default.aspx
- http://www.sql-server-performance.com
- http://www.sqlteam.com
- http://www.sqlservercentral.com
- http://weblogs.sqlteam.com/joew
- http://www.sqlblog.com
- http://www.sqlpass.org/
- Inside SQL Server 2005 Series

Questions?

Thank you!