

SQL Server Programming for Developers

Advanced T-SQL and Optimizing Procedural Code

Module 0: Overview

Bob Beauchemin
BobB@SQLskills.com



Instructor - Bob Beauchemin

- Independent Consultant/Trainer/Writer/Speaker
- Developer Skills Partner, SQLskills
 - <http://www.SQLskills.com>
 - Email: BobB@SQLskills.com
 - Blog: www.SQLskills.com/blogs/bobb
 - Twitter: @bobbeauch
 - Many postings on SQL Server 2008/2012 features
- SQL Server MVP (<http://mvp.support.microsoft.com>)
- Author of books and numerous resources related to SQL Server and data access
 - SQL Server 2005 Programmer's Guide
 - A First Look at SQL Server 2005 for Developers
 - "Best Book" SQL Server Magazine's Reader's Choice Awards (2005)
 - Co-Author: SQL Server MVP Deep Dives
 - Essential ADO.NET



2

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T-SQL 2008 Enhancements

- Syntax Enhancements
- New Data Types
- Spatial Data Support
- Filestream Storage
- Grouping Sets
- ANSI-Standard ROLLUP and CUBE
- MERGE statement
- Table-Valued Parameters
- HierarchyID data type
- Sparse Columns

T-SQL Syntax Enhancements

- Single statement declare and initialize
 - DECLARE @i int = 4;
- Compound Assignment Operators
 - SET @i += 1;
- Row Constructors
 - DECLARE @t TABLE (id int, name varchar(20));
 - INSERT INTO @t
 - VALUES (1, 'Fred'), (2, 'Jim'), (3, 'Sue');

T-SQL 2012 Enhancements

- Windowing and additional analytic functions
- Additional system functions
- Sequences, Paging
- Columnstore indexes
- THROW and FORMATMESSAGE
- Filestream improvements and FileTable
- EXEC with resultsets and new metadata
- New query iterators and hints
- Spatial enhancements
- Full-text enhancements and semantic search

M1: Data Types and Functions

- Data Types in SQL Server
- Data Operations in SQL Server
 - Functions and Operators
 - Methods and Properties
- Spatial Data and Indexes
- Filestream Storage and FileTables
- Nullability and Data Integrity
- Schemas
- Contained Databases
- Partitioning

M2: Writing Effective Queries

- Query Evaluation
- Inner/Outer Joins (with Search Arguments)
- Query Plans
- Subqueries and Derived Tables
- Set-Based Operations
- Relational Division
- CROSS APPLY and OUTER APPLY
- Common Table Expressions
- Rewriting queries for performance

M3: Summarization and Analysis

- **Aggregate functions**
 - User-Defined Aggregates
 - Grouping Sets
 - ROLLUP and CUBE
 - Data Warehouse Queries & Columnstore Indexes
- **OVER clause and windowing functions**
 - In SQL Server 2005-2008
 - In SQL Server 2012
 - With analytic and ranking functions
- **TOP**
- **Paging**
- **PIVOT and UNPIVOT**

M4: Optimizing Actions

- **INSERTing Data**
 - INSERT...SELECT, INSERT...EXECUTE, INSERT INTO
- **UPDATEing Data**
 - Update using a JOIN or subquery
- **DELETEing Data**
 - Bulk delete
- **MERGE**
- **TOP, ROWCOUNT and Actions**
- **Output from Action Statements**

M5: Alternative Structures

- **Alternate design structures**
 - Designing hierarchies
 - Open schema designs
- **Querying Hierarchies with Recursive Common Table Expressions**
- **HierarchyID Data Type**
- **Querying Sparse Attribute tables with the PIVOT operator**
- **Sparse Columns**

M6: Optimizing Stored Procedures

- Stored procedure overview
- Temporary Structures
- When to optimize T-SQL code
- Why queries run slowly
 - Query plans
 - Plan caching and reuse
- How to find query information
- How to fix it
 - Parameterization
 - Recompilation
 - Statistics
 - Hints and Plan Guides

M7: Optimizing Code – Part 2

- Triggers
- Views
- Types of User-Defined Functions
- Single Statement vs Multi-statement UDFs
- Stored Procedures v. Scalar Functions
 - Recompilation
 - Row-based operations
 - Using SQLCLR functions

The Databases

- **We'll be doing most of our coding in sample databases**
 - AdventureWorks and AdventureWorksDW
 - New sample database for SQL Server 2005-2012
 - Multiple schemas
 - Complex structures
 - Meant to illustrate best design practices
 - Northwind and Pubs - downloadable
 - Older sample databases, familiar
 - Credit database
 - Reasonably large amount of data
 - Fairly simple structure
- **Databases and Samples available**

Agenda

- **Day 1**
 - Modules 1 and 2
- **Day 2**
 - Modules 2 (con't), 3, 4, 5
- **Day 3**
 - Modules 6 – 7

Questions?

