

OUTPUT Clause and Derived Tables



**EMERGENCY
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Presented by Steve Stedman and Aaron Buma

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OUTPUT Clause

Correlated Subqueries and Subquery Extensions



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Welcome

- Welcome to all those joining us remotely.
 - For any questions via Google On Air Broadcasts, we will address most of these at the end of the training.
- Training provided by Emergency Reporting
 - <http://EmergencyReporting.com>

Live Broadcast

- Using Google On Air Broadcasts
 - There is about a 40 to 50 second delay from live to what you see.
 - We are still learning how to properly use Google On Air Broadcasts. Please be patient.
 - Session will be available on my YouTube Channel about an hour after it the presentation ends.
 - <http://SteveStedman.com/YouTube>

Questions

- We will have time for questions at the end of the session.
- Q&A available via Google On Air Hangout panel. Click the 3x3 grid icon near the top right, then select Q&A to see what people are asking, or to ask your own question.
- When you ask a question, it shows up for us about 40 to 50 seconds delayed.

Agenda

- Correlated Subqueries and Subquery Extensions
 - Correlated Sub Queries
 - Sub Query Extensions (ANY, ALL, SOME)
 - Exists
- OUTPUT Clause

Correlated Subqueries and Subquery Extensions



Presented by Aaron Buma

Correlating Subqueries Together

- Also known as derived tables, a correlated subquery is a nested query
- It can be in the selected columns, in a join or as a filter in the where clause
- Subqueries return result sets to their outer query
- You can nest up to 32 queries together

SubQuery Extensions

- Used in the where clause to filter on the query based on a single-column correlated query
- Operators: ALL, ANY, SOME, EXISTS

ALL

- Syntax: 'WHERE 5 <= ALL (SELECT col1 FROM..)
- All rows of col1 must match the condition (col1 <= 5) in order for that correlated condition to be true

ANY

- Syntax: 'WHERE 5 <= ANY (SELECT col1 FROM..)
- Any of the rows of col1 must match the condition (col1 <= 5) in order for that correlated condition to be true

SOME

- Syntax: 'WHERE 5 <= SOME (SELECT col1 FROM..)
- Is the ISO standard of ANY, they will return the same results

EXISTS

- Syntax: 'WHERE EXISTS (SELECT column FROM..)'
- A hardcoded value (1,'x') can be used instead of a column because the columns data is not actually returned
- The first match resolves the condition as TRUE and the parser stops evaluating for the correlated value
- Is more performant than ANY or SOME because it doesn't have to process the all of the correlated results

Demo

Basic Subqueries and
Correlated Subqueries

Demo

Subquery Extensions:
ALL, ANY, SOME and EXISTS

Review

- Correlated Query – Filtering a derived table or subquery based on a column in the main query.
- Using the 'ALL' operator returns TRUE only if all rows fit the condition
- Using 'ANY' or 'SOME' returns TRUE if one or more of the subquery rows match condition
- Using 'EXISTS' has the same results as 'ANY' or 'SOME' does not return data and will stop processing at first match with the condition, returning TRUE

Up next OUTPUT Clause



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OUTPUT Clause



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What is the OUTPUT clause

- A way to get a result set on queries that don't normally return a result set.
 - For instance INSERT, DELETE, UPDATE, and MERGE.

OUTPUT Clause Applies To

- INSERT
- DELETE
- UPDATE
- MERGE
 - Using output with MERGE will be covered when we cover the MERGE Statement

Availability of the OUTPUT Clause

- SQL Server 2005 and newer
- Available on all editions
 - Express
 - Standard
 - Enterprise
 - Developer
 - Azure

INSERT

OUTPUT INSERTED.*

- Displays the entire row that was just inserted.

Returning the IDENTITY inserted without the OUTPUT clause

- @@IDENTITY returns the last identity value generated for any table in the current session, across all scopes. **You need to be careful here**, since it's across scopes. You could get a value from a trigger, instead of your current statement.
- SCOPE_IDENTITY returns the last identity value generated for any table in the current session and the current scope. **Generally what you want to use.**
- IDENT_CURRENT returns the last identity value generated for a specific table in any session and any scope. This lets you specify which table you want the value from, in case the two above aren't quite what you need (**very rare**). You could use this if you want to get the current IDENTITY value for a table that you have not inserted a record into.

IDENTITY values of multi-row INSERT

- These only return one:
 - @@IDENTITY
 - SCOPE_IDENTITY
 - IDENT_CURRENT
- **OUTPUT INSERTED.***
 - Will return all inserted.

Demo

OUTPUT Clause – With an INSERT
Statement

UPDATE

`[DELETED].*`, `[INSERTED].*`

- DELETED returns the before value.
- INSERTED returns the after value.

Demo

OUTPUT Clause – With an UPDATE
Statement

DELETE

[DELETED].*

- DELETED returns the row that was deleted.

Demo

OUTPUT Clause – With an DELETE
Statement

Demo

Auditing with the OUTPUT Clause

OUTPUT Clause Gotchas

- Get results, even if the transaction fails.
- Columns returned from OUTPUT reflect the data as it exists after the INSERT, UPDATE, or DELETE statement has completed but before triggers are executed.

Not supported in the following:

- DML statements that reference local partitioned views, distributed partitioned views, or remote tables.
- INSERT statements that contain an EXECUTE statement.
- A user-defined function cannot be created if it contains an OUTPUT INTO clause that has a table as its target.

Review

- INSERT
- DELETE
- UPDATE
- MERGE
 - Using output with MERGE will be covered when we cover the MERGE Statement

Quiz 1:

- All of the following are true, so which is better to use: ANY, SOME or EXISTS?
 - a) ANY because it comes first alphabetically
 - b) SOME because it is the ISO standard of ANY
 - c) EXISTS because it is more performant than ANY or SOME

Quiz 2:

- Which is better to track or log changes to a table, the OUTPUT clause or a TRIGGER?
 - a) The OUTPUT clause has less overhead, therefore it is better.
 - b) A TRIGGER is the best option since it guarantees the information will be logged.
 - c) It depends on the specific environment, and your specific needs. In some cases the OUTPUT clause is better, and in other cases the TRIGGER is the best option.

Any Questions?

- OUTPUT Clause
- Derived Table Queries (ie Subqueries)
 - Correlated Sub Queries
 - Sub Query Extensions (ANY, ALL, SOME)
 - Exists

For More Information

- Visit <http://EmergencyReporting.com> to find out more about Emergency Reporting.
- Aaron on the web
 - <http://AaronBuma.com>
 - Twitter: @AaronDBuma
- Steve on the web
 - <http://SteveStedman.com>
 - twitter: @SqlEmt

Tune in next week

- Thursday 2/17 at 9:00am (pacific time).
- Topics
 - Data Recursion
 - Self JOIN
 - Range Heirarchy
 - Recursive CTE
 - Merge Statement