Mastering Dynamic SQL

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(she\her)
SQL Saturday NYC
May 6, 2023

SQL Saturday New York City 2023

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About Me

MVP

FEATURED IN THE redgate 100 MOST INFLUENTIAL IN THE DATABASE COMMUNITY 2022 redgate

- 20+ years as a DBA
- NESQL Board Member
- Azure Data Community Advisory Council
- Co-Founder, WITspiration
- Speaker Idol Winner 2019
- Idera ACE, Class of 2020
- #Redgate100
- Microsoft MVP – Data Platform

About Me

- Alto section leader in my choir.
- Pick at bluegrass jams regularly.
- Learning guitar and neglecting mandolin.
- Musical theater geek.
- My husband and I take pictures of our dog doing geeky things.

MVP

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“ Q: What is Dynamic SQL?

A: SQL batches that are created ad hoc and executed.

Agenda

- Use Cases
- Security
- Syntax
- Demos
- Tips & Tricks

“ Use Cases

When to Use

- “Catch All” Queries
- Client Customized Queries
- Variables for server, database, or object names
- Delay parsing of query

“Catch-All” Queries

- A single query that tries to account for all options available.
- Sample syntax:

```
WHERE (VIN = @vin OR @vin IS NULL)
AND (BaseModelID = @BaseModelID OR
@BaseModelID IS NULL)
AND (PackageID = @PackageID OR
@PackageID IS NULL)
AND (TrueCost = @TrueCost OR @TrueCost
IS NULL)
AND (InvoicePrice = @InvoicePrice OR
@InvoicePrice IS NULL)
```

Client Customized Queries

- Application has screens that display data based on what clients choose.
- Example:
  - Dealership A wants
    - VIN
    - True Cost
    - Invoice Price
  - Dealership B wants
    - VIN
    - Base Model Name
    - Package Name
    - MSRP

Variables for Static Info

- Allows variables to be used to specify parts of the query that can't otherwise accept variables
- Example:

```
SELECT *
FROM @database.dbo.Inventory
```

```
DECLARE @database sysname =
'AutoDealershipDemo',
@sql nvarchar(max)
```

```
SELECT @sql = 'SELECT *
FROM ' + quotename(@database) +
'.dbo.Inventory'
```

Delay Parsing

- Moves the parsing of the query to run-time execution to avoid errors or allow for better error handling.
- Example:

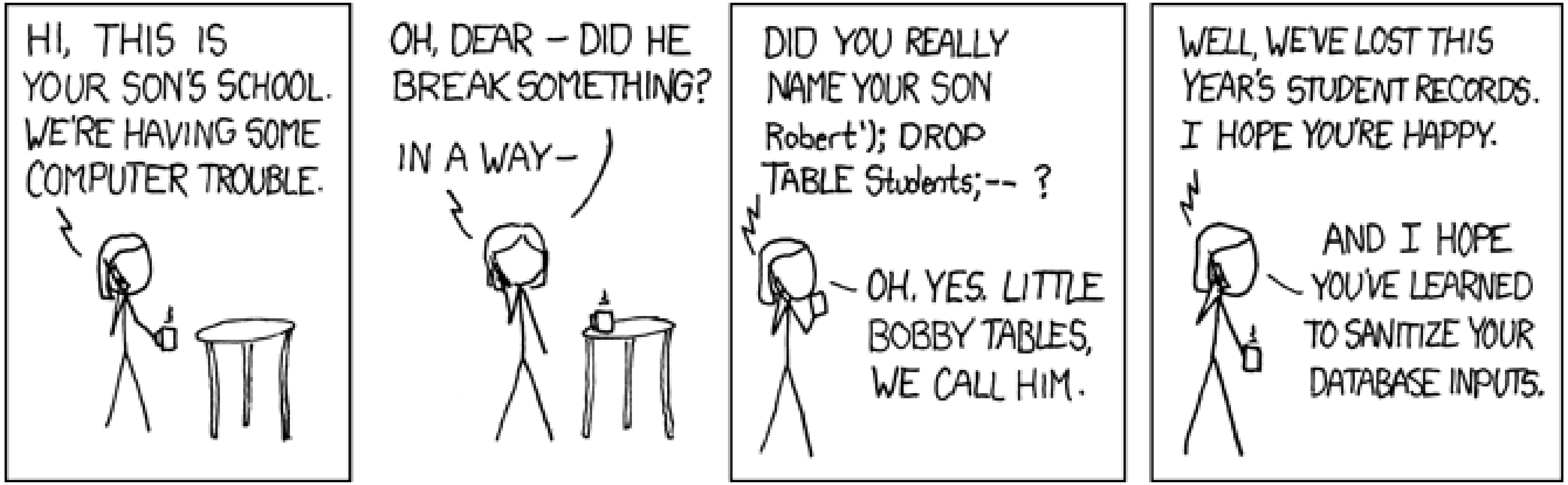
```
SELECT UpgradeTestID, StaticColumn,
DropThisColumn
FROM DynamicSQL.UpgradeTestTable

ALTER TABLE DynamicSQL.UpgradeTestTable
DROP COLUMN DropThisColumn
GO 2
```

“ Security & Vulnerabilities

Protect Against SQL Injection

- Dynamic SQL can be vulnerable to SQL Injection if you don’t code against it.
- xkcd.com: "Little Bobby Tables"


HI, THIS IS YOUR SON'S SCHOOL. WE'RE HAVING SOME COMPUTER TROUBLE.
OH, DEAR – DID HE BREAK SOMETHING?
IN A WAY–
DID YOU REALLY NAME YOUR SON Robert'); DROP TABLE Students;-- ?
OH. YES. LITTLE BOBBY TABLES, WE CALL HIM.
WELL, WE'VE LOST THIS YEAR'S STUDENT RECORDS. I HOPE YOU'RE HAPPY.
AND I HOPE YOU'VE LEARNED TO SANITIZE YOUR DATABASE INPUTS.

“ Syntax

Ways to Write Dynamic SQL

- EXEC (@sql)

- EXEC sp_executesql @sql
  - ★ Allows for parameters to be passed in and out of the statement

- EXEC sp_MSforeachdb @sql
  - Not documented or officially supported

> “ **At this point, I could talk about it or show you….**

Demo Time!

“ Tips & Tricks

Tips & Tricks

- Add `@debug bit = 1` to your procs
- Validate your parameters
- Use quotename for your objects
- Add error handling
- Performance tune the created statement like you would any other SQL in your codebase
    - You are just creating the different versions of the SQL to run.

Resources

- Tara Kizer – EXEC vs sp_executesql
- Tim Ford - Run same command on all SQL Server databases without cursors
- Eitan Blumin - Simplest Alternative To sp_msforeachdb
- Aaron Bertrand - Making a More Reliable and Flexible sp_MSforeachdb

Resources (cont’d)

- Deborah Melkin –
  - Dynamic SQL, Sessions, and Execution
  - Openrowset Dynamic SQL Error Handling
- From Microsoft documentation:
  - sp_executesql

Have more Qs?

- **Email:** dgmelkin@gmail.com
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- **Mastodon:** dataplatform.social/@dgmelkin
- **Blog:** DebtheDBA.wordpress.com
- **Github:** https://github.com/DebtheDBA/MasteringDynamicSQL

“ Thanks for coming!