Mastering Dynamic SQL

- Deborah Melkin
- She\Her
- Data Engineer

About Me

- 25 years as a DBA
- Mainly work with SQL Server
- Mainly work with OLTP
- Data Platform WIT co-leader
- WITspiration cofounder
- Redgate Community Ambassador
- Microsoft MVP – Data Platform

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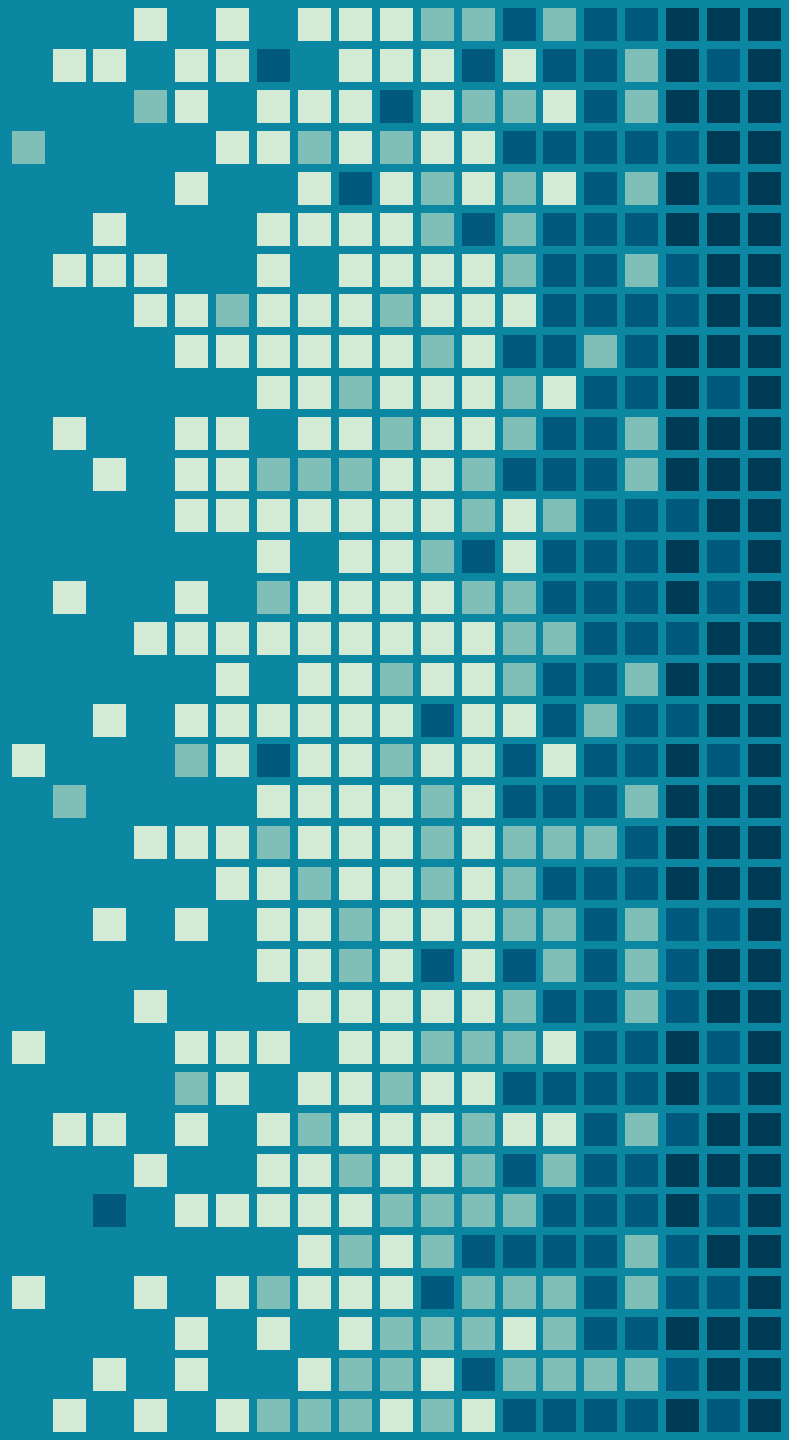
MVP

Data Platform WIT Meetup

About Me

- Longtime member of the Alto section
- 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



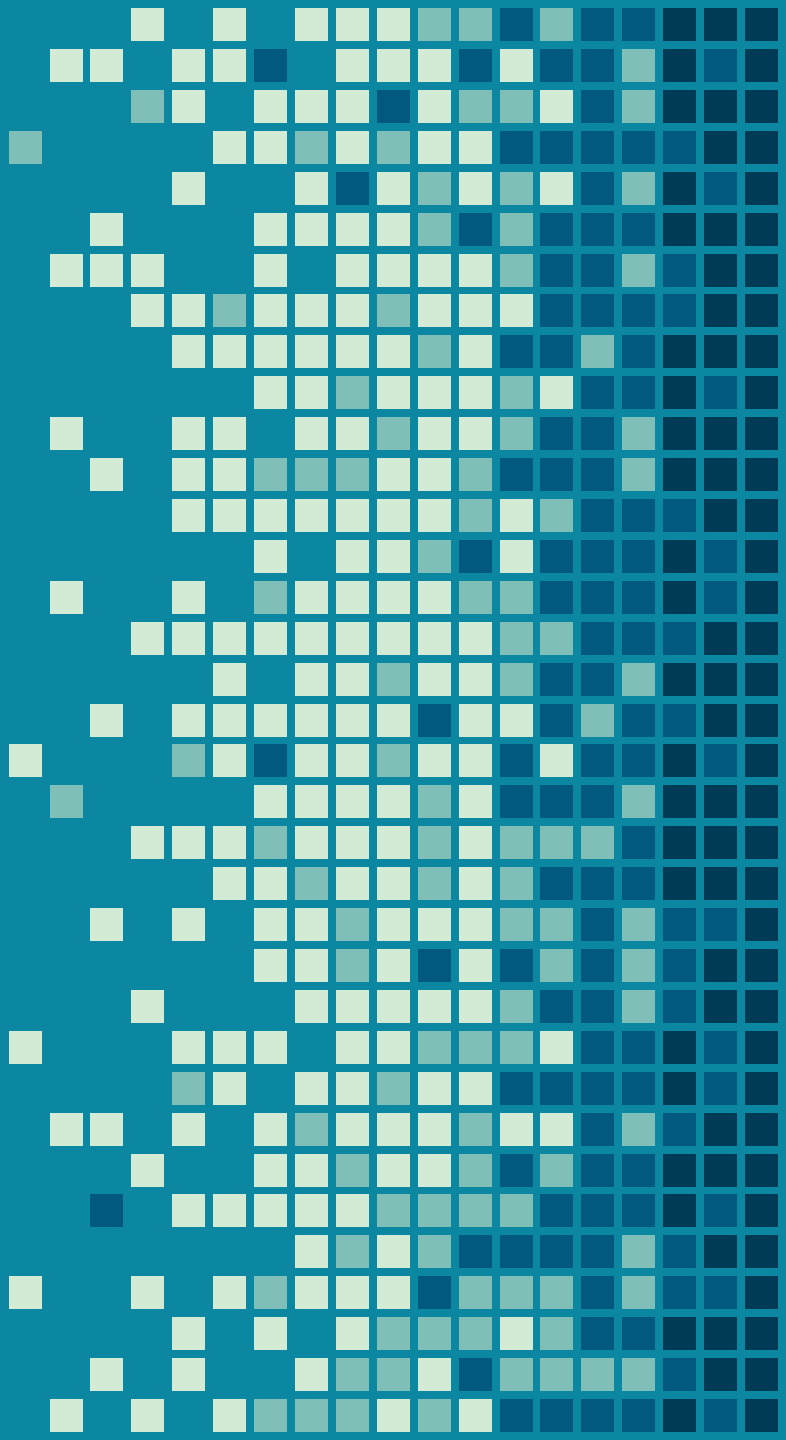
> *Q: What is Dynamic SQL?*

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

Agenda

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

“ Use Cases



“Catch-All” Queries

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

```
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)
```

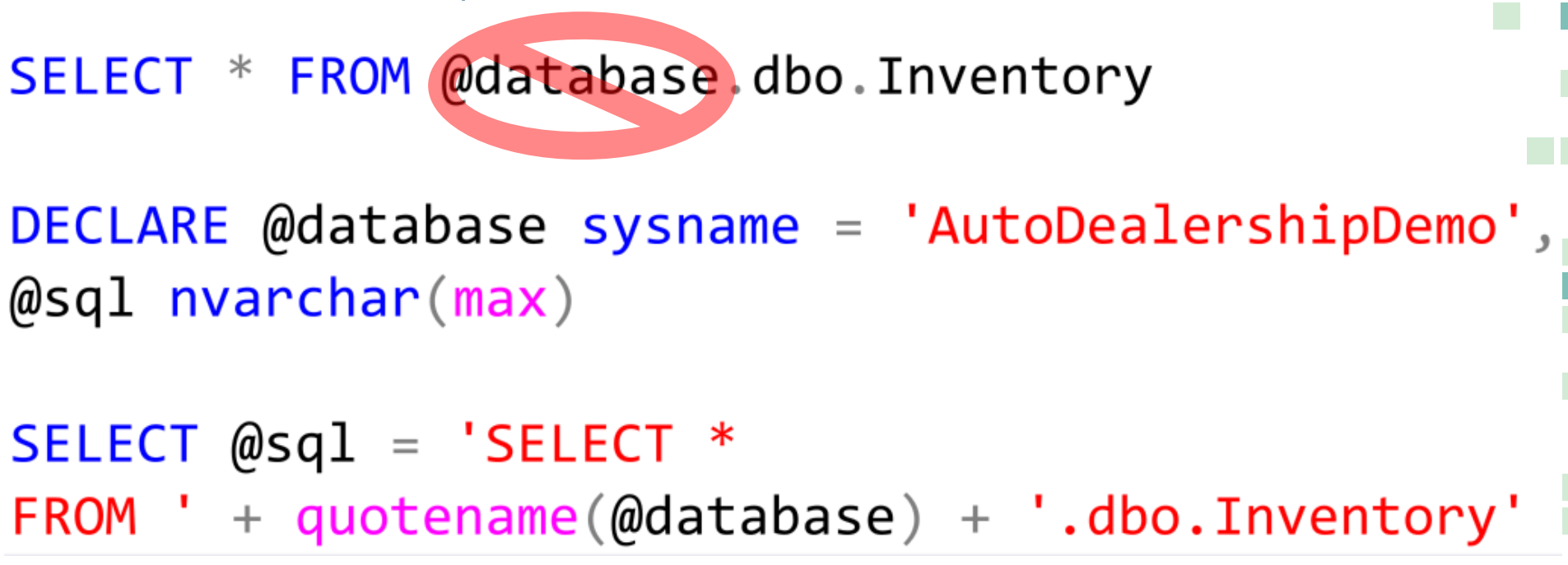
End User Customized Queries

Application has screens that display data based on what clients choose.

- 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.



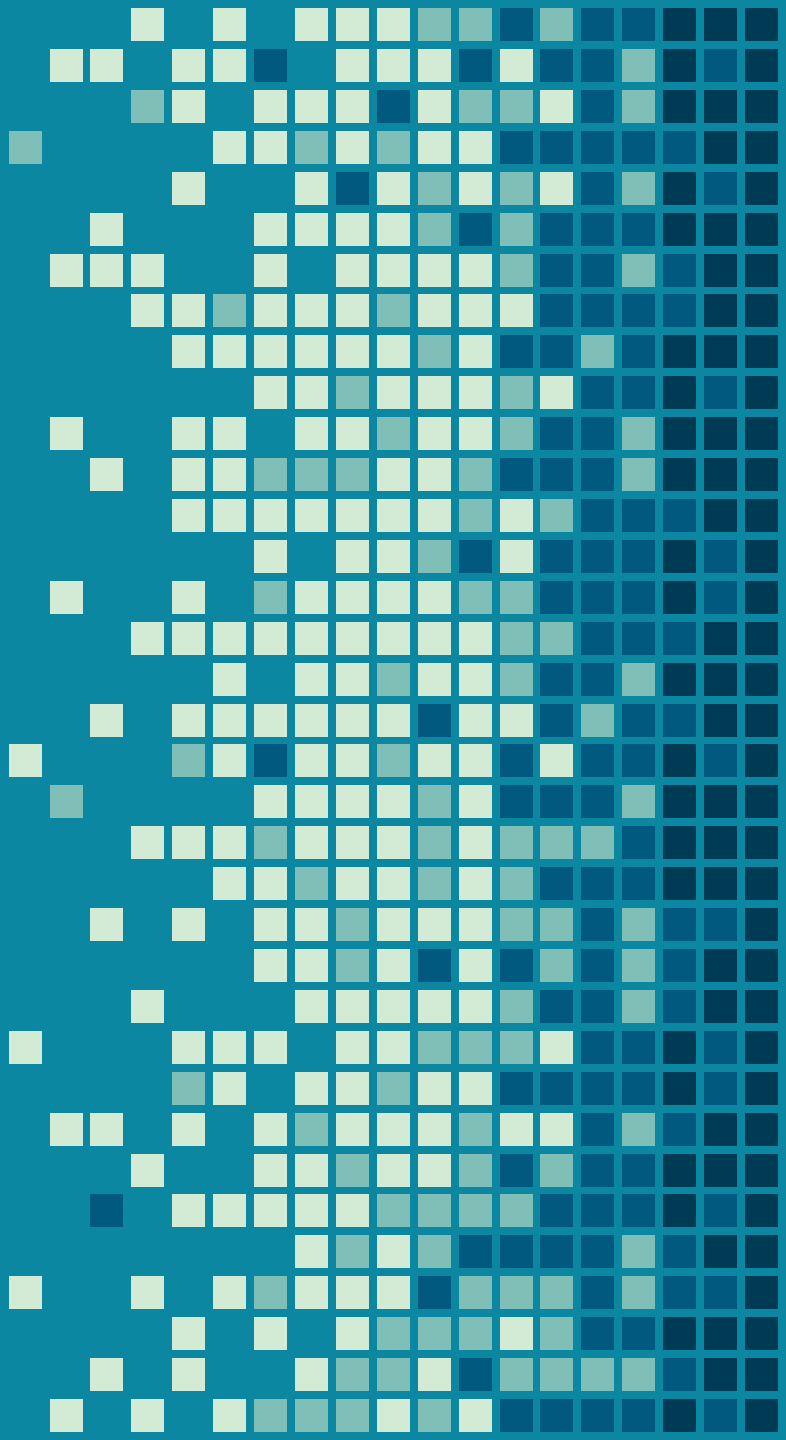
```
SELECT * FROM @database.dbo.Inventory

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.

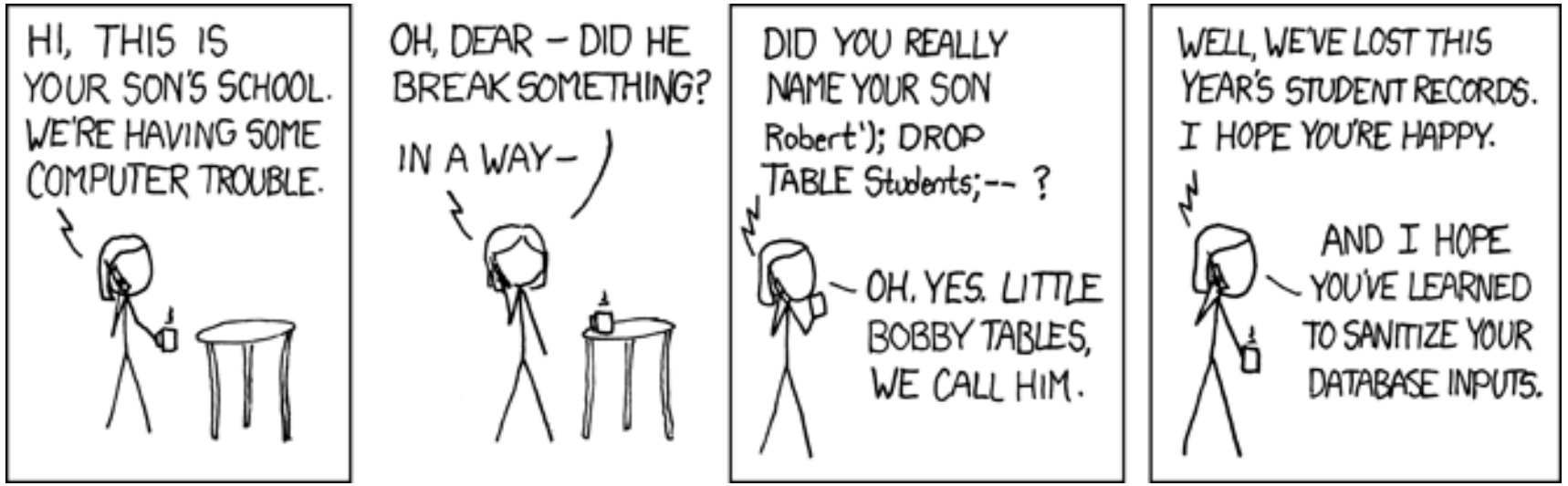
```
SELECT UpgradeTestID, StaticColumn, DropThisColumn
FROM DynamicSQL.UpgradeTestTable

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

“ *Security & Vulnerabilities*

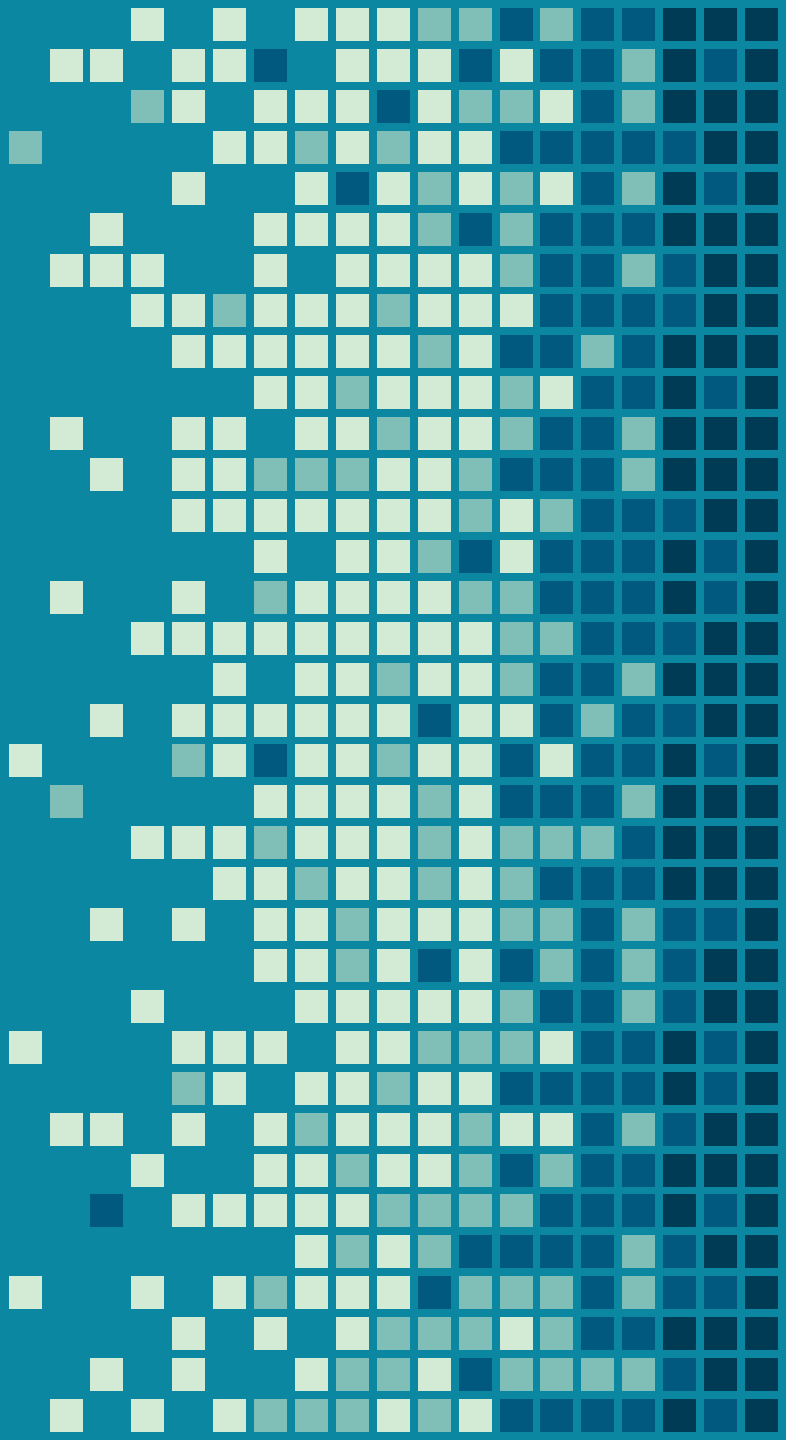


Protect Against SQL Injection

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



“ *Syntax*

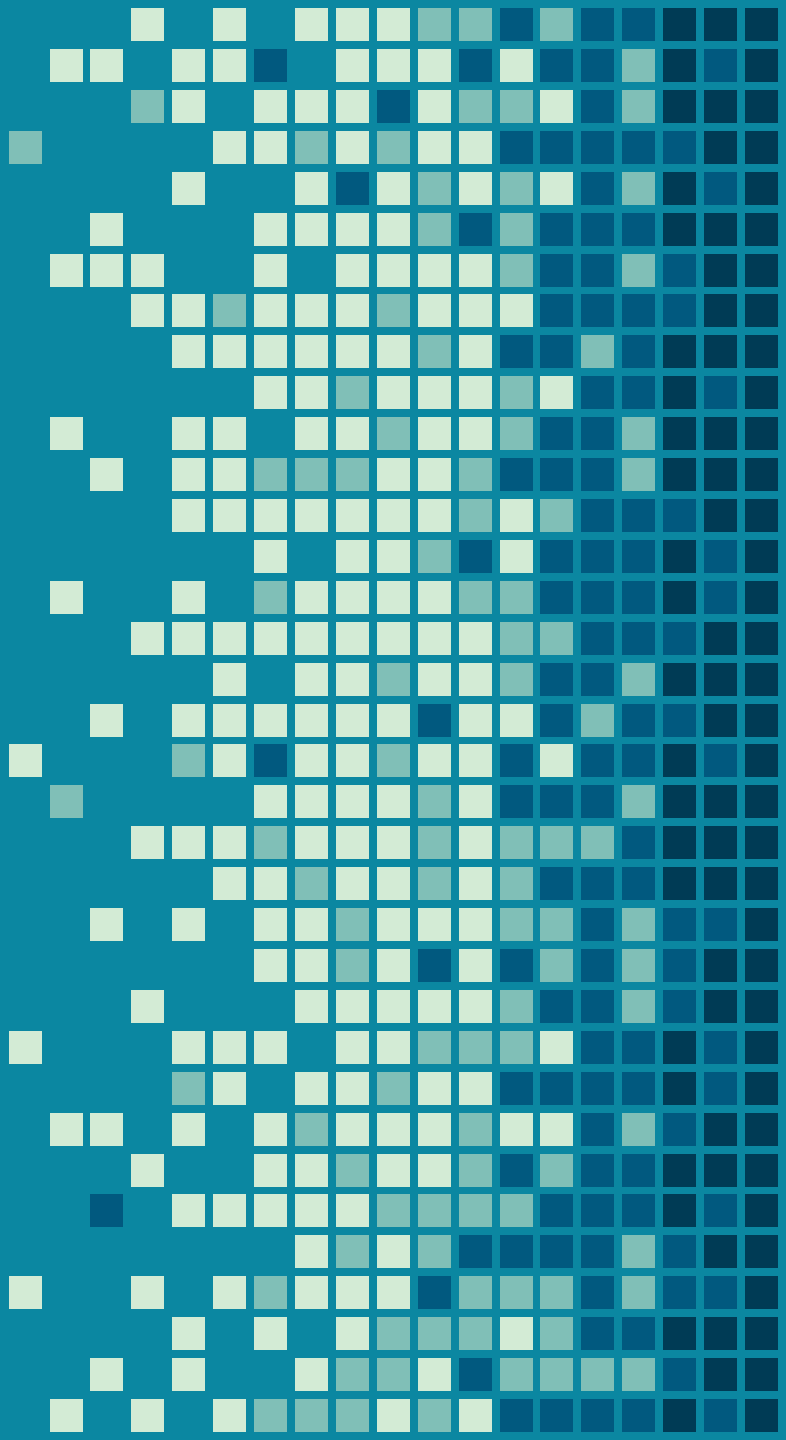


Ways to Write Dynamic SQL

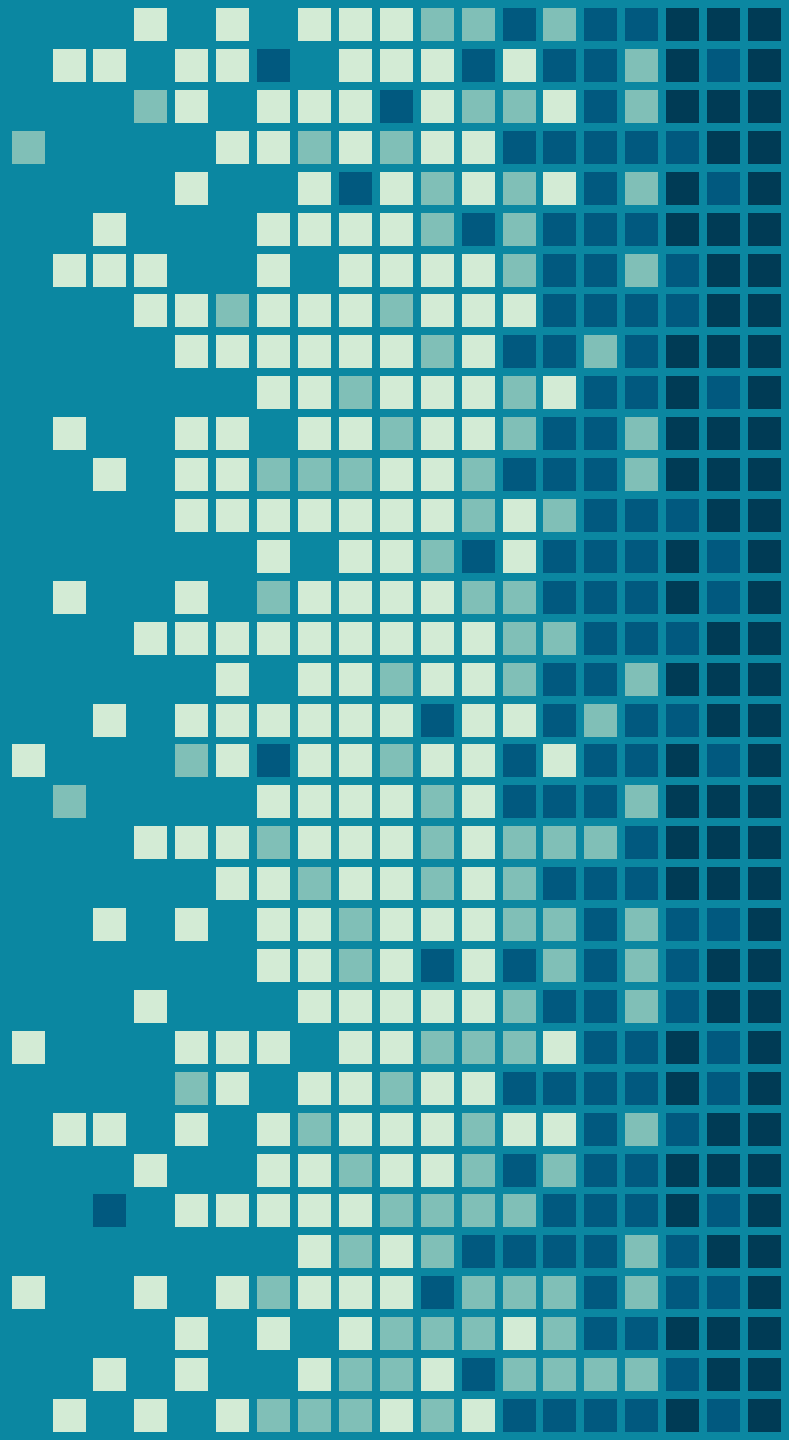
- EXEC (@sql)
- EXEC sp_executesql @sql
  - Allows for parameters to be passed in and out of the statement
- EXEC sp_MSforeachdb @sql
  - Not documented or officially supported

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

Demo Time!



“ Tips & Tricks



Tips & Tricks

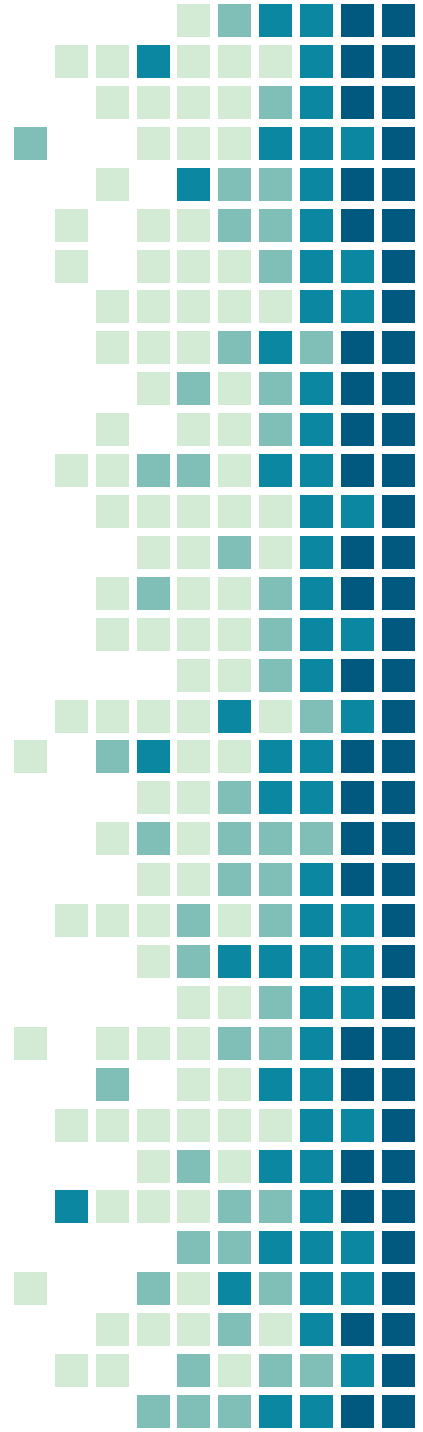
- Add `@debug bit` to your procs
- Validate your parameters
- Use `QUOTENAME` for your objects
- Add error handling

Tips & Tricks (cont'd)

- 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)

- Erland Sommarskog –
  - The Curse and Blessings of Dynamic SQL
  - Error and Transaction Handling Part 2
- Kenneth Fisher - Demystifying Dynamic SQL

Resources (cont'd)

- Deborah Melkin –
  - Dynamic SQL, Sessions, and Execution
  - Openrowset Dynamic SQL Error Handling
- Microsoft documentation: sp_executesql
- Optimized sp_executesql with SQL Server 2025

Have more Qs?

- **Email:** dgmelkin@gmail.com
- **Blog:** DebtheDBA.wordpress.com
- **Socials:** @dgmelkin (.bsky.social) (@dataplatform.social)
- **Github:** https://github.com/DebtheDBA/MasteringDynamicSQL




Thanks for coming!