Programming SQL Server Database Triggers and Functions

INLINE TABLE-VALUED FUNCTIONS

Ryan Booz
AUTHOR AND SPEAKER

@ryanbooz https://www.softwareandbooz.com

Overview

- Review Single-Statement (Inline) Table-Valued Functions
- Create a simple Inline Table-Valued Function (ITVF)
- Convert a Mulit-Statement Function into a Single-Statement Function
- Examine parameter sniffing in Inline Table-Valued Functions

Single-Statement Table-Valued Functions

Single-Statement Table-Valued Functions

Often referred to as Inline Table-Valued Functions

No BEGIN and END

One SQL statement that returns a table of data

Can be used anywhere a table input can be used

Inline Table-Valued Function

```
CREATE OR ALTER FUNCTION dbo.SuperAdd_tvf(@a INT, @b INT)
RETURNS TABLE
WITH SCHEMABINDING
AS
RETURN (
    SELECT @a + @b;
);
```

```
SELECT * FROM
    dbo.CustSaleByYear();
```

- ITVF as independent table

```
SELECT * FROM Customers C
    INNER JOIN
dbo.CustSaleByYear() ACS
    ON C.CustID = ACS.CustID
```

- ITVF in DML statements utilizing table data

```
SELECT CustID FROM Customers C
CROSS APPLY
(SELECT * FROM
    dbo.CustSaleByYear(2019)
    WHERE CustID = C.CustID) ACS
```

- ITVF filtered using CROSS APPLY

“What’s the big deal? These don’t look all that different from Multi-Statement TVF’s.”

The Query Optimizer can take the single-statement T-SQL and include it in the calling query!

There are no more
100 row estimates!

The clearest, most performant function type within SQL Server, regardless of the version

Converting a Multi-Statement Function to an Inline Table-Valued Function

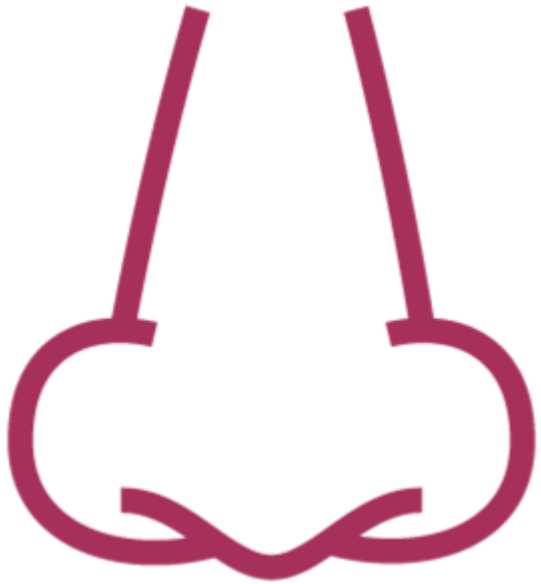
Converting Multi-Statement Functions

For complex Multi-Statement functions, creativity is often necessary

CTE's are a common go-to tool for dealing with parameters and data that was previously "multi-statement"

The resulting "inlined" query plan will help guide the best path to attain the best query performance

Parameter Sniffing in Inline Table-Valued Functions



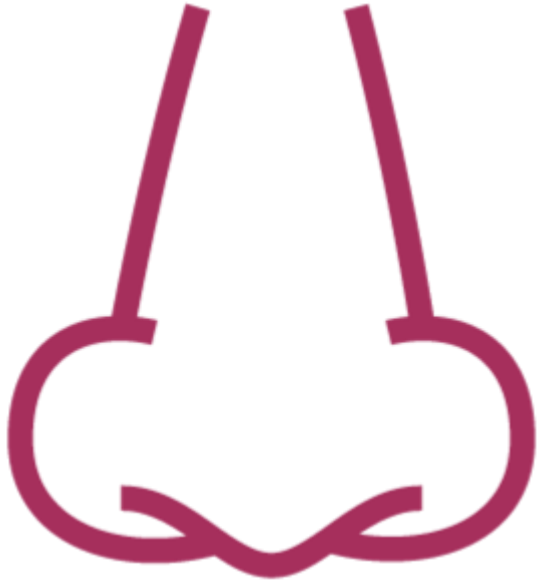
Parameter Sniffing

SQL Server saves the plans it generates in a cache to reuse later

The “key” of that plan is the actual SQL text

Sometimes the plan it chooses is not efficient in all cases

When another query "looks" like the parameterized one, a non-optimal plan might be chosen



Parameter Sniffing

Can happen with SQL that contains actual parameters, or plans that SQL Server tries to parameterize itself

Being aware of your data and potential issues with the function query

Easy to confuse with symptoms of outdated index statistics

Fixing Parameter Sniffing

Query Hints

- OPTION (RECOMPILE)
- OPTIMIZE FOR UNKNOWN
- OPTIMIZE FOR (@X = Y)

Dynamic SQL

Disable Plan Caching

Manual Inlining of the query

Summary

- Reviewed the differences with Inline Table-Valued Functions
- Created a simple Inline Table-Valued Function
- Demonstrated how to convert a Multi-Statement Function to a Single-Statement, Inline Function
- Discussed Parameter Sniffing with Inline Functions