Unit Testing T-SQL code with tSQLt

What can we test for?

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pluralsight
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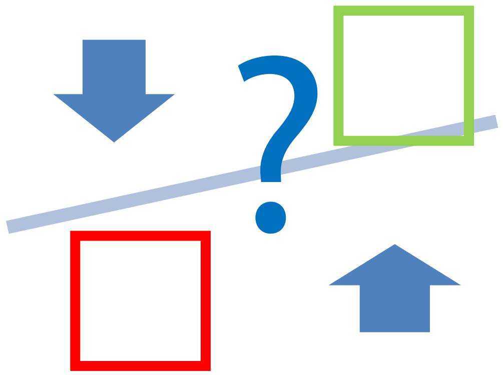
Why Assert?

- **Third part of test flow:**
  - Assemble
  - Act
  - Assert

- **Tells tSQLt if the test fails**



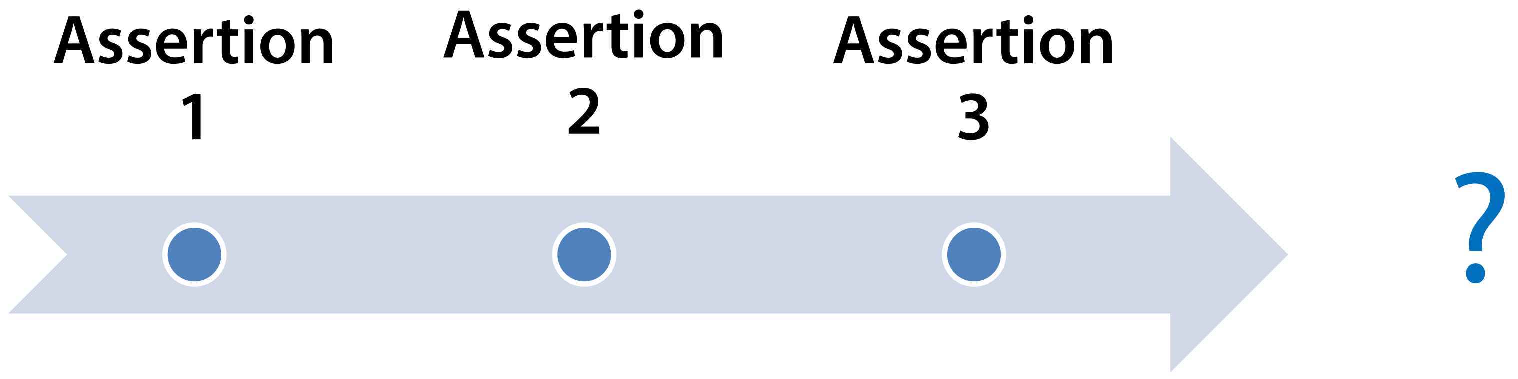
Assertions

- **The question we are testing determines which assertion we use**

- **Default test behavior is to pass**
  - If any assertion in the test fails, the test will fail

Assertions

- Assertions can be combined



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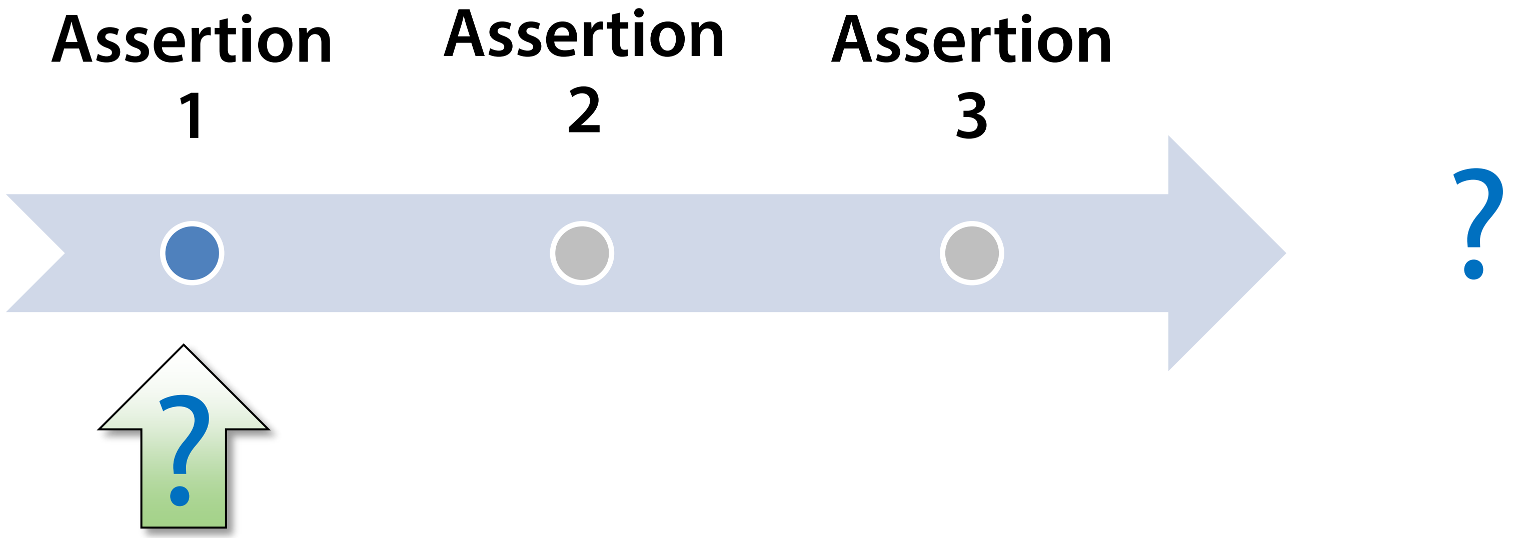
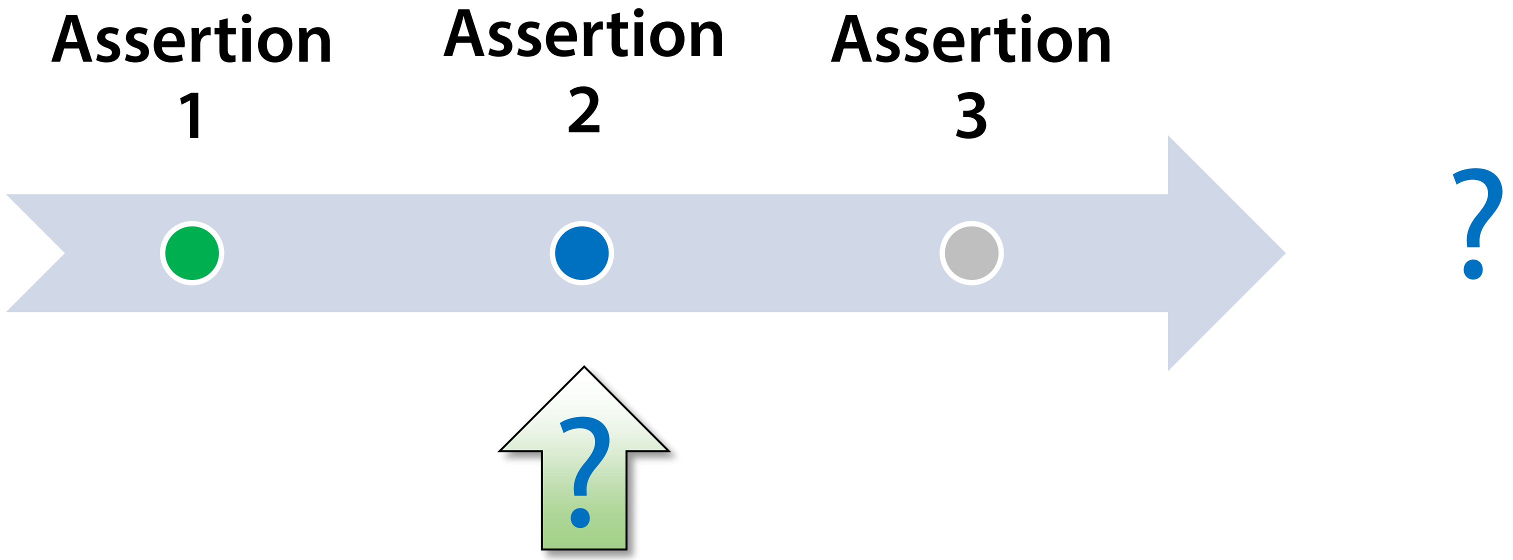


Assertions

- **Assertions can be combined**
  - Once an assertion passes, tSQLt moves to the next step in the test



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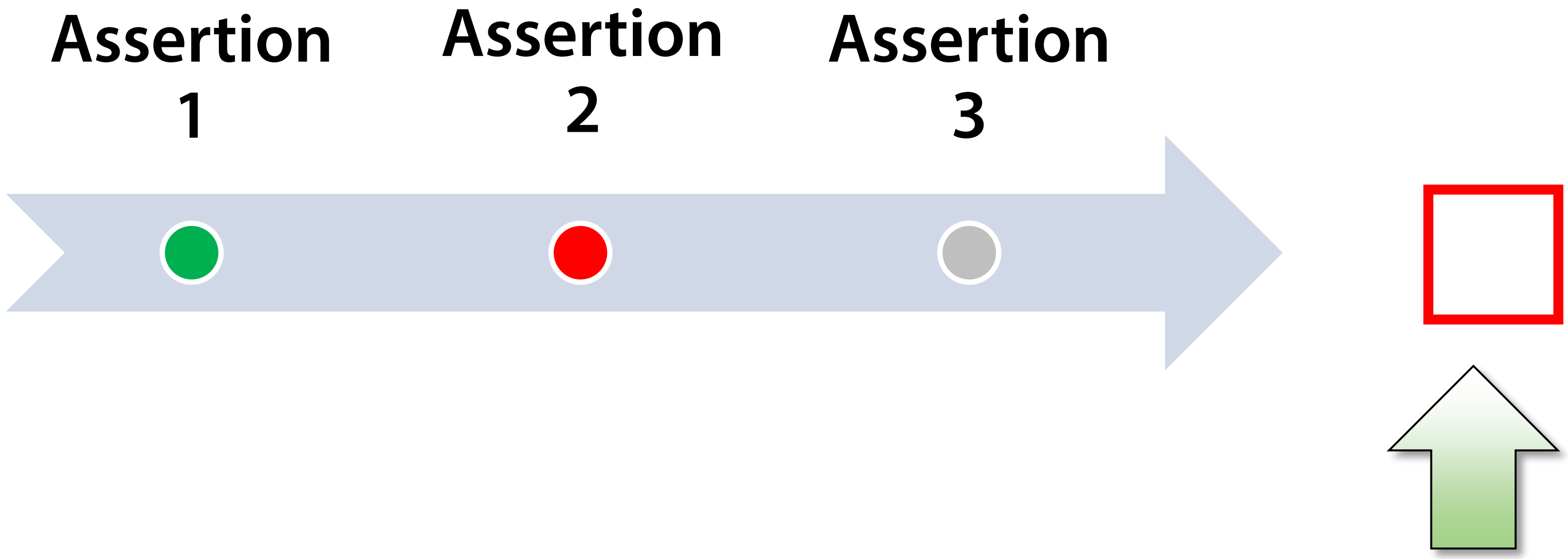

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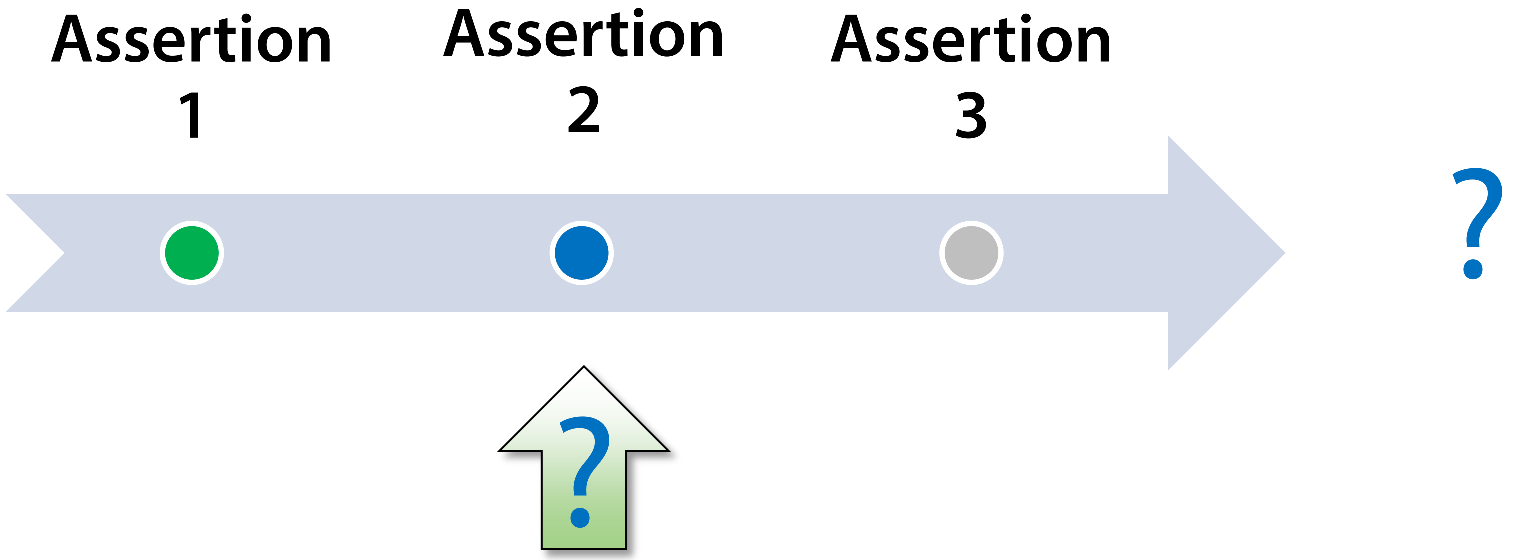

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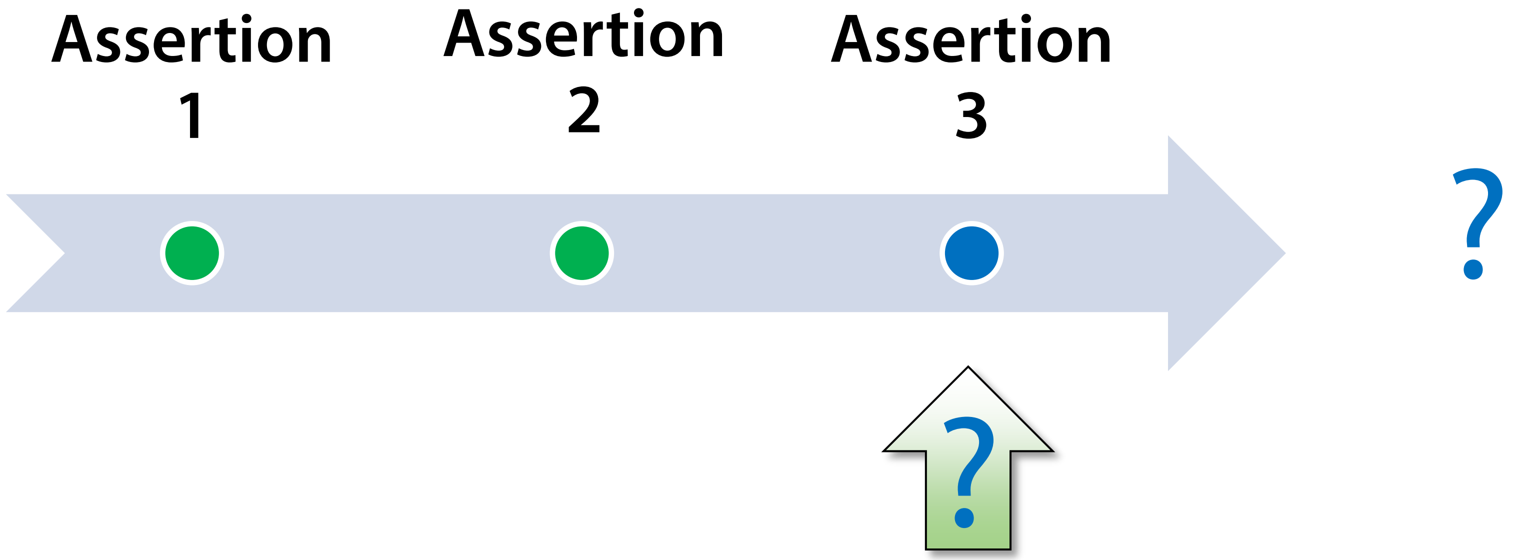
  - It is only when all assertions pass and we reach the end that the test passes



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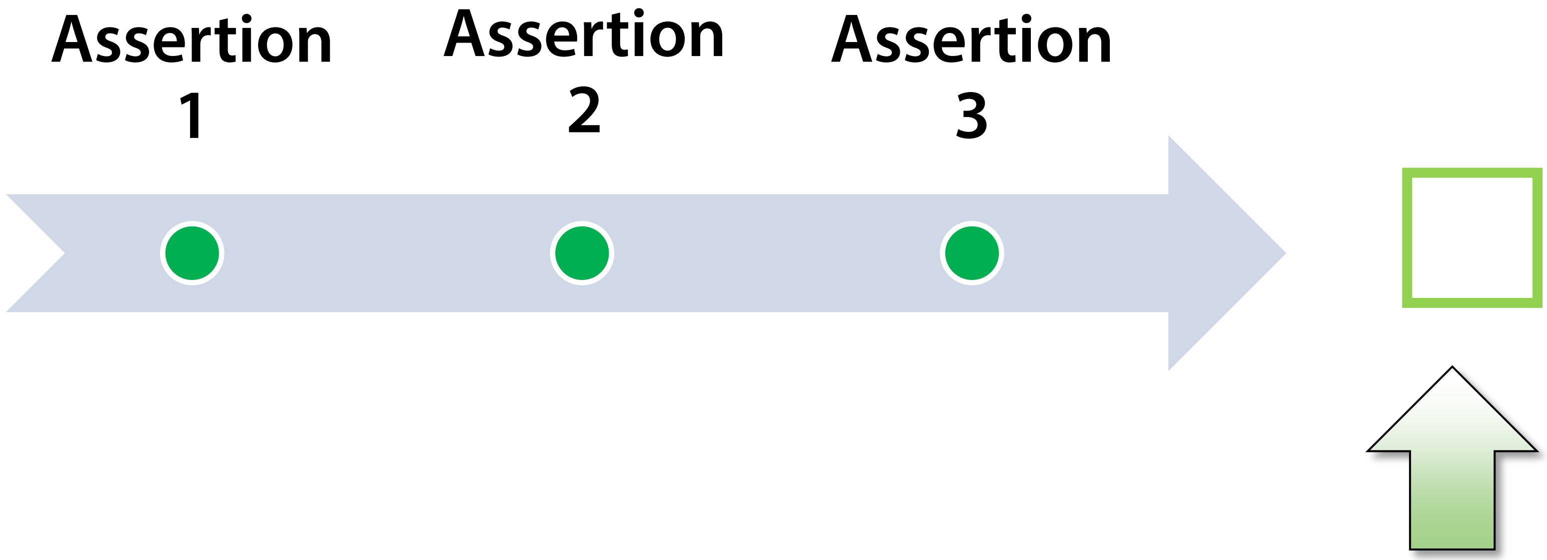
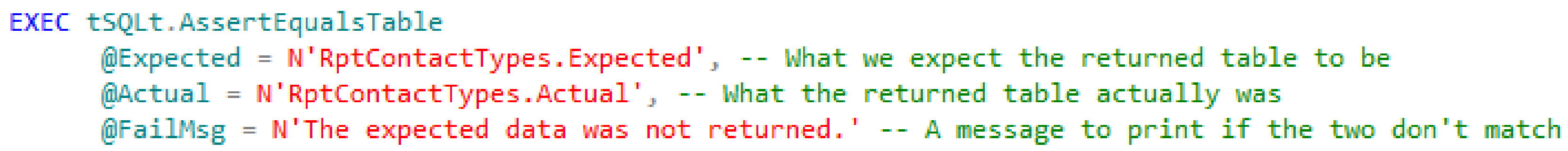


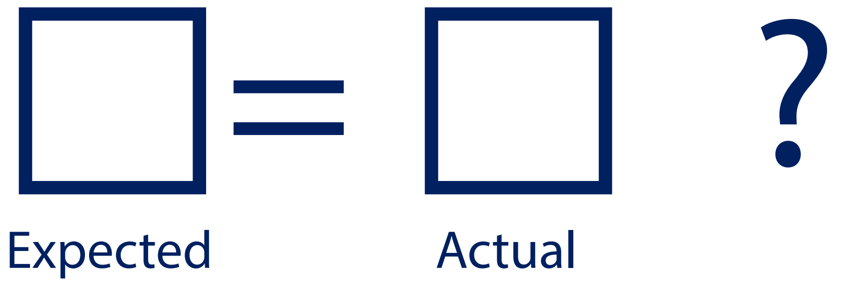
Checking data in tables

- **tSQLt.AssertEqualsTable**



```
EXEC tSQLt.AssertEqualsTable
      @Expected = N'RptContactTypes.Expected', -- What we expect the returned table to be
      @Actual = N'RptContactTypes.Actual', -- What the returned table actually was
      @FailMsg = N'The expected data was not returned.' -- A message to print if the two don't match
```

- **Compares tables**
  - You can insert result sets into a table then compare



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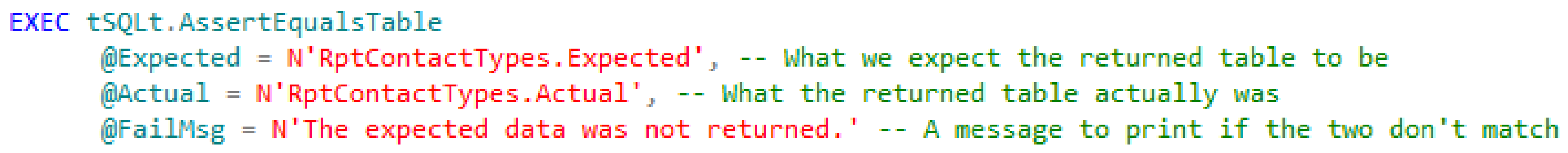

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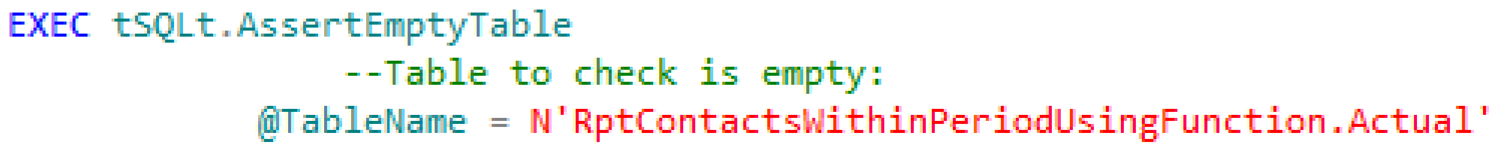
- Failure message is optional, but helps troubleshooting
- Not all datatypes are supported
- Only columns that are present in the expected table are compared

What if I don’t want any data returned?

Absence of data rows can be tested in two ways:

1. **Calling tSQLt.AssertEqualsTable with a blank expected table**
   - We saw this in the previous module
   - Supported in earlier versions of tSQLt

2. **tSQLt.AssertEmptyTable**
   - Raises an error if table is not empty
   - No need to set up expected table



```
EXEC tSQLt.AssertEmptyTable
                --Table to check is empty:
            @TableName = N'RptContactsWithinPeriodUsingFunction.Actual'
```

Checking Tables

What else needs checking?

- **Structure and shape of the data**
- **What columns exist in my source data?**
- **tSQLt.AssertEqualsTable does not check that columns exist, purely that data in the columns that do exist, match.**
- **This minimizes test revision when looking at wide tables**
    - No need to change each test when adding a new column
    - However test scenarios should be reviewed to check they are still valid

What does it matter what my data types are?

- What do we mean when we say “ the value should be 5”?

Value	Data Type	Storage Space	Range
“5”	Varchar(10)	Up to 12 bytes	-999999999 -> 9999999999
5	Int	4 bytes	-2,147,483,648 -> 2,147,483,647
5	Tinyint	1 byte	0 -> 255

Checking shape and structure of data

How can we check metadata?

- **tSQLt.AssertResultSetsHaveSameMetaData**
- **Compares columns and datatypes**
- **Not run as part of tSQLt.AssertEqualsTable**

Review

Assertion	Checks	Typical use
AssertEqualsTable	Table data	Check a result Set
AssertEmptyTable	Table contains no data	Testing for no output data
AssertResultSetsHaveSameMetaData	Table Metadata	Checking columns & data types

What if my code doesn’t return a table?

- **Straight string comparison with tSQLt.AssertEqualsString**

- **Useful for :**
  - Feedback from functions
  - Messages to user
  - Checking for specific, known messages

- **All inputs are NVARCHAR(MAX)**

- **NULL=NULL**

My code returns a string that changes each run!

- **Wildcard string comparison with tSQLt.AssertLike**
  - Uses LIKE Syntax

- **Useful for :**
  - Messages which vary with a predictable pattern

    "This proc ran in XX ms" (duration of run)

    "Query ran at XX:XX" (time of run)

- **All inputs are NVARCHAR(MAX)**

- **NULL=NULL**

Checking Values

Functions and output parameters frequently return specific values

- **These can be checked with tSQLt.AssertEquals**

- **Or tSQLt.AssertNotEquals**

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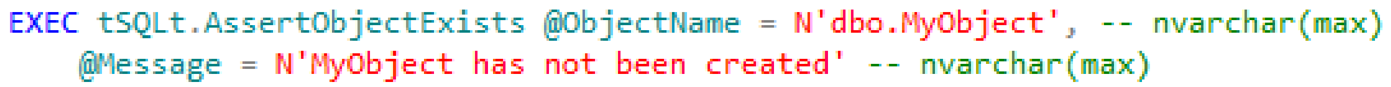
AssertEqualsString	2 nvarchar(max) strings for exact match	Checking large strings are the same
AssertLike	One nvarchar string against a pattern	Checking strings against a pattern, e.g. message of time taken to execute
AssertEquals	2 values	Output from a function
AssertNotEquals	2 values (to ensure they are different)	Output from a function

Code that creates objects

- If your code creates an object, this needs to be tested
- You may need to remove existing objects first

You can check an object exists using tSQLt.AssertObjectExists:



```
EXEC tSQLt.AssertObjectExists @ObjectName = N'dbo.MyObject', -- nvarchar(max)
    @Message = N'MyObject has not been created' -- nvarchar(max)
```

Exceptions

Produced when :

- RAISERROR is used
- SQL Server encounters an error
- THROW is used

Severity	Meaning	Cancels Execution	tSQLt can test for
0-10	Warning	No	No (not an exception)
11-15	Error – special meanings	Sometimes	Yes
16	Error – user-correctable issue – Default	Sometimes	Yes
17-19	Errors that cannot be corrected by the user	Sometimes	Yes
20-24	System errors	Yes – closes connection	No

Exceptions

- **Sometimes we want to get the exception, other times we want to ensure we don't see it.**
- **Default behaviour is that an exception will cause a test to ERROR**
  - Can cause rollback issues
- **We need to anticipate the exception and plan our test accordingly**
- **Expectations not Assertions**

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ExpectException	An exception is raised	To check error condition
ExpectNoException	No exception is raised	To check error is handled

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Summary

- **Assertions are what establish whether our criteria have been met (or not)**
- **Assertions can be chained together**
  - To answer one question
- **Assertions are available to check a variety of circumstances**
- **Exceptions can be checked too**