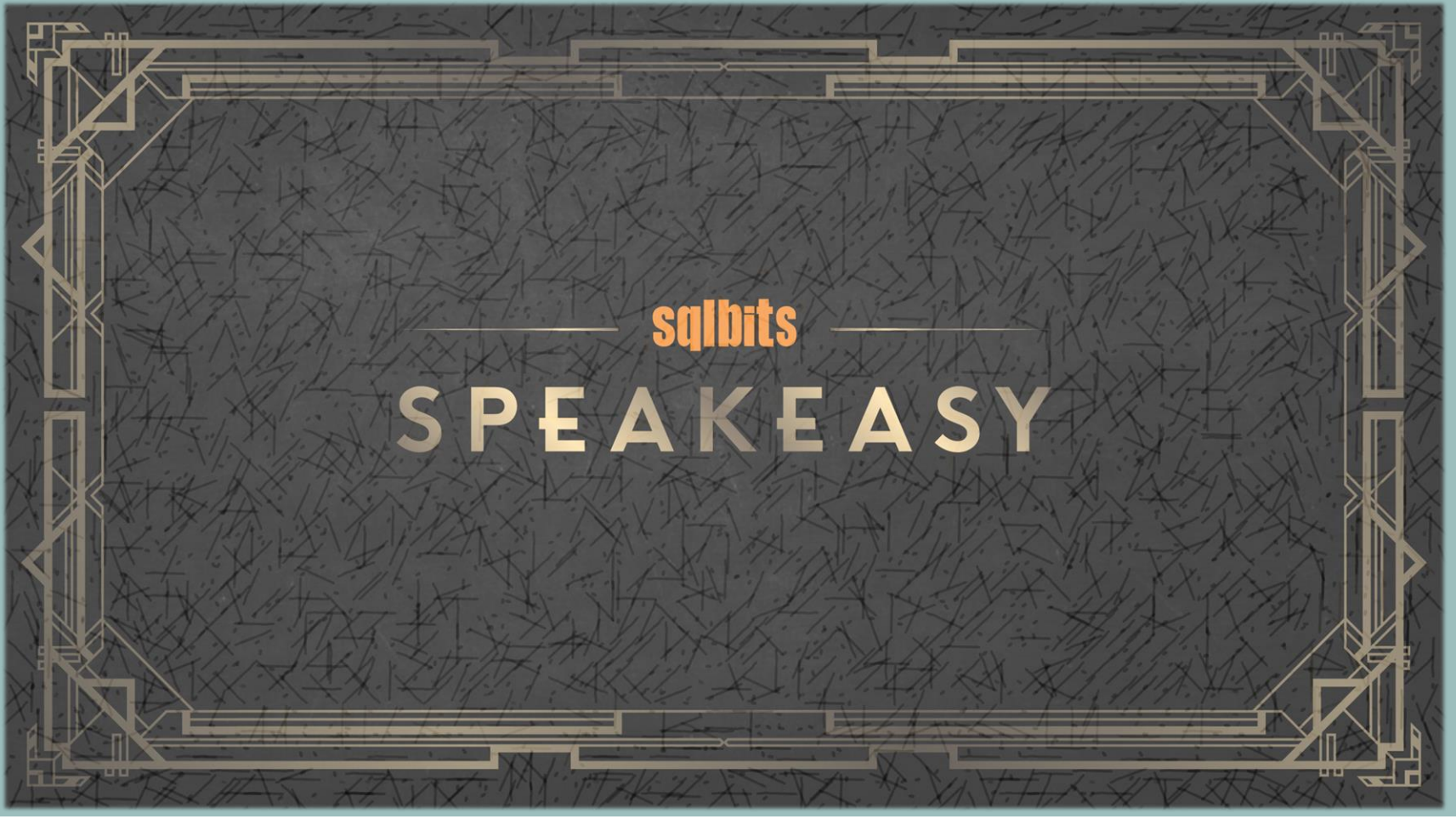

ADDING UNIT TESTS WITH TSQLT TO THE DATABASE DEPLOYMENT PIPELINE

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#sqlbits

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ABOUT ME

Adding unit tests with tSQLt to the database deployment pipeline

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TSQLT

Adding unit tests with tSQLt to the database deployment pipeline

- Database unit testing framework for Microsoft SQL Server
  - Allow to write T-SQL code as tests
  - Tests are automatically run within transactions
  - Provides a way to isolate code and tables using mocking
  - Output can be plain text or XML

TSQLT INSTALL

Adding unit tests with tSQLt to the database deployment pipeline

- **tSQLt.class.sql**
  - CLR
    - clr enabled
    - clr strict security
  - Should be installed in the development database

WHAT'S A TSQLT TEST?

Adding unit tests with tSQLt to the database deployment pipeline

- Stored Procedure
  - Starts with the word **test**
  - Must be in a schema that contains the extended property tSQLt.TestClass = 1
    - tSQLt.NewTestClass
  - Each test is wrapped in a transaction
    - Modifications are rolled back and the results saved

WHAT'S A TSQLT TEST?

Adding unit tests with tSQLt to the database deployment pipeline

- Benefits
  - Business requirements documentation
  - Code refactoring
  - Isolation - unrelated changes do not affect other parts of the system
  - Help structure code into distinct components – keep it small

TSQLT CREATE

Adding unit tests with tSQLt to the database deployment pipeline

```
EXEC tSQLt.NewTestClass my_new_test_class';
GO

CREATE PROCEDURE my_new_test_class.[test something important]
AS
BEGIN
-------Assemble
    --This section is for code that sets up the environment

-------Act
    --  Execute the code under test like a stored procedure, function or view
    --  and capture the results in variables or tables.

-------Assert
    --  Compare the expected and actual
END;
```

TSQLT RUN

Adding unit tests with tSQLt to the database deployment pipeline

- **tSQLt.RunAll**
  - Execute all the tests
- **tSQLt.Run '[your_test_class].[your_test]**
  - Execute a specific test
- **tSQLt.Run '[your_test_class]'**
  - Execute a specific test class

WHAT CAN BE TESTED?

Adding unit tests with tSQLt to the database deployment pipeline

- Stored Procedures
- Functions
- Views
- Tables
- Tables constrains that are critical

TESTING (WHITOUT DATA)

Adding unit tests with tSQLt to the database deployment pipeline

- Unit tests is about testing code
  - You do not need a database full of data, you need the opposite
  - Makes creating unit tests easy
- Data setup
  - Only the necessary data for making the test work is needed
- Mocking
  - tSQLt.FakeTable
  - tSQLt.FakeFunction
  - tSQLt.SpyProcedure

ISOLATING OBJECTS

Adding unit tests with tSQLt to the database deployment pipeline

- tSQLt.FakeTable
  - Fakes the original table without constrains
  - Isolate the table from constrains – I don't need unnecessary data
- tSQL.FakeFunction
  - Simply replaces the original function
  - Allow to simplify the logic
- tSQLt.SpyProcedure
  - Replace the original SP with a spy
  - The spy will record the parameters that were passed to it

ISOLATING OBJECTS

Adding unit tests with tSQLt to the database deployment pipeline

- ApplyConstraint
- RemoveObjectIfExists
- ApplyTrigger
- RemoveObject

ASSERTS

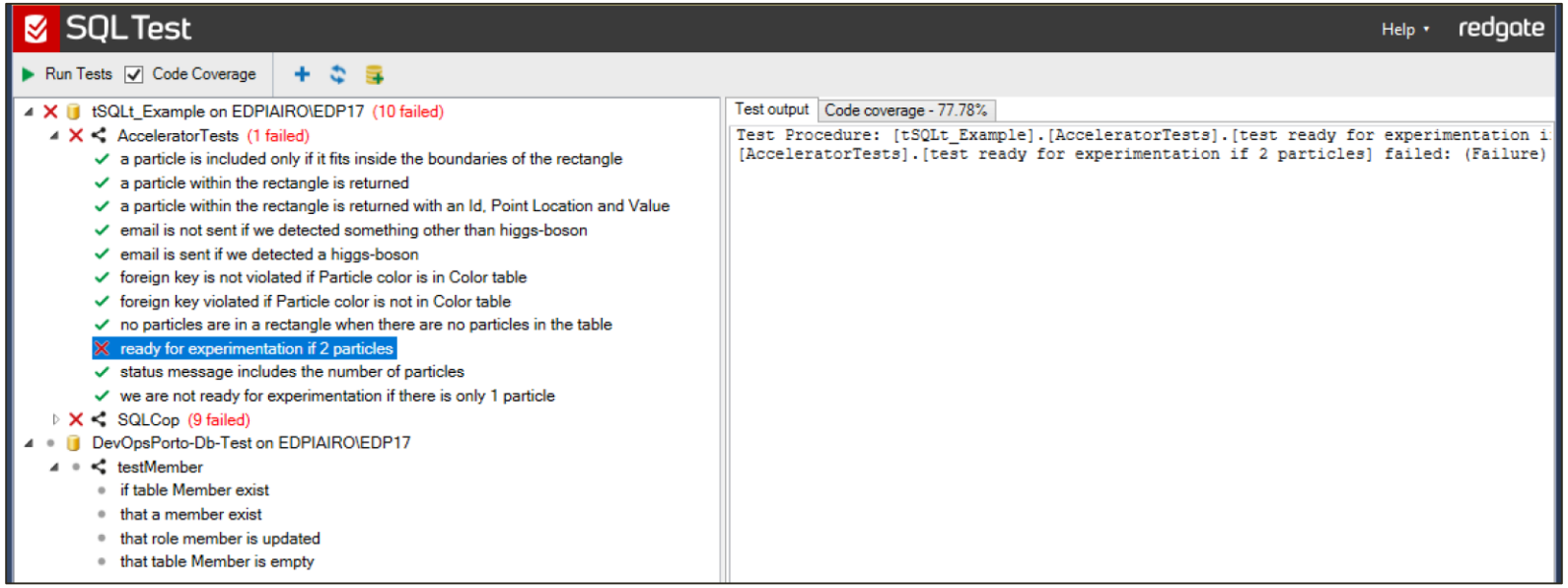
Adding unit tests with tSQLt to the database deployment pipeline

- tSQLt.AsserEquals
- tSQLr.AssertEqualsTable
- tSQLt.AssertEmptyTable
- tSQLt.AssertEqualsString
- tSQLt.AssertEqualsTableSchema
- tSQLt.AssertLike
- tSQLt.AssertNotEquals
- AssertObjectDoesNotExist
- AssertObjectExists
- AssertResultSetsHaveSameMetaData
- Fail

SQLTEST

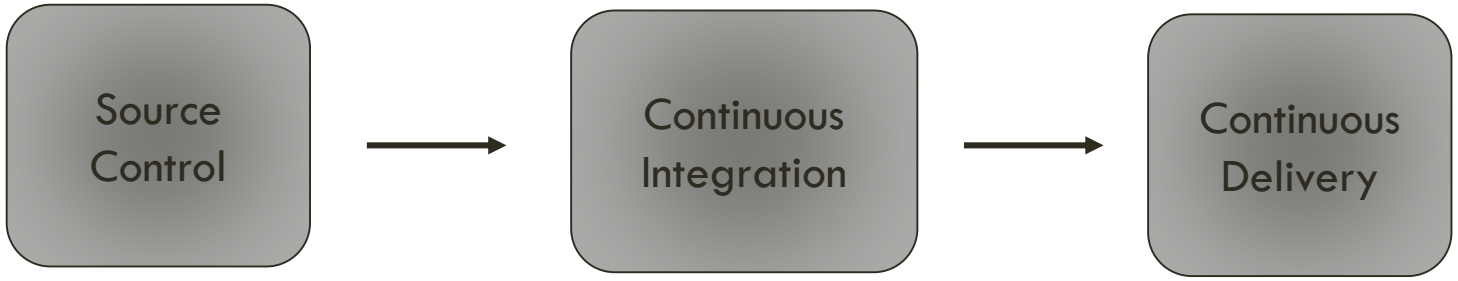
Adding unit tests with tSQLt to the database deployment pipeline

- Redgate SQL Test
  - Add-in for SSMS for creating and running unit tests
  - Measure the code coverage of those tests



ADDING TSQLT TO THE DEPLOYMENT PIPEPLINE

Adding unit tests with tSQLt to the database deployment pipeline



ADDING TSQLT TO THE DEPLOYMENT PIPEPLINE

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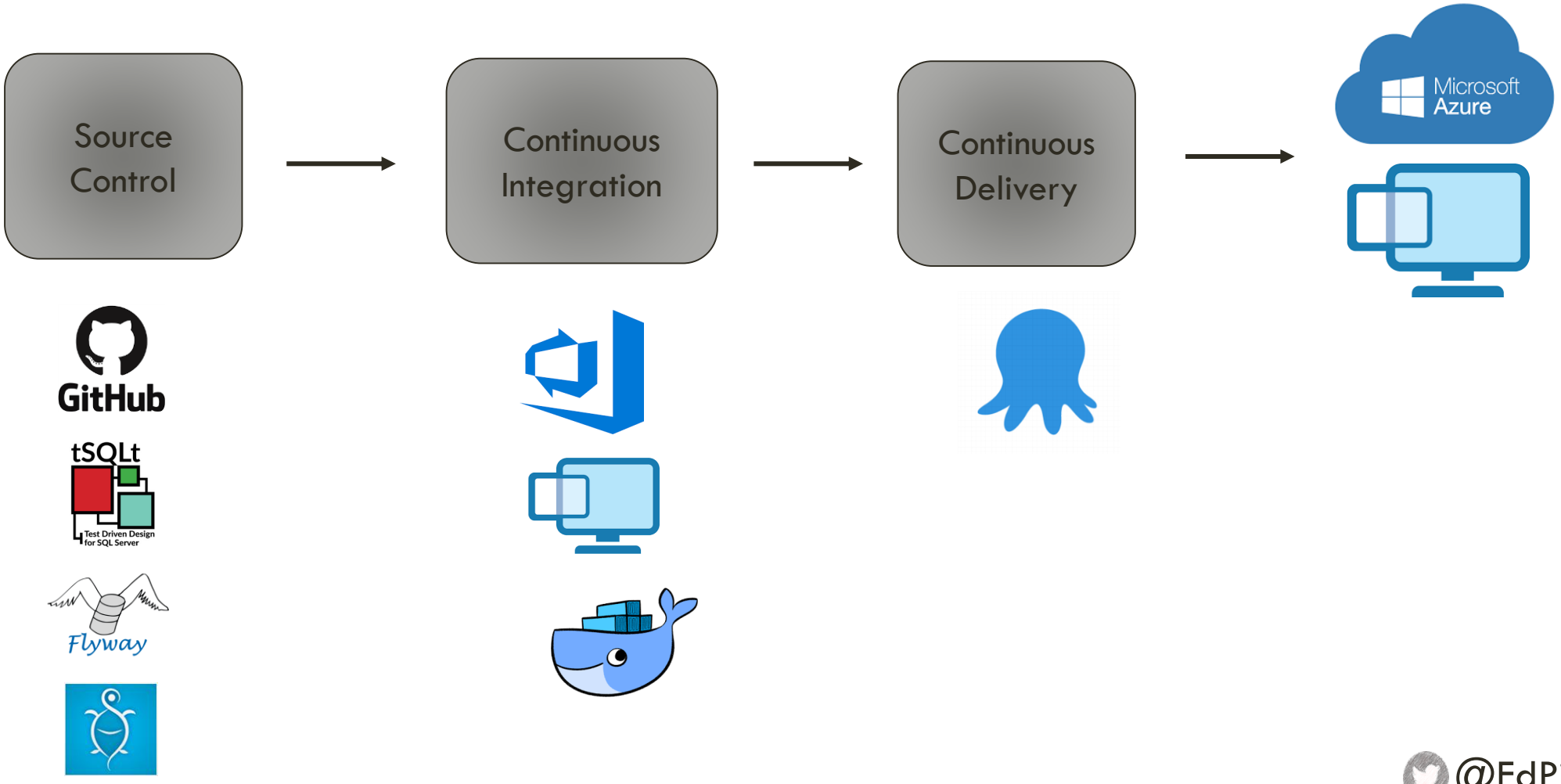

SOURCE CONTROL

Adding unit tests with tSQLt to the database deployment pipeline

- GitHub
  - T-SQL migrations
  - tSQLt tests
  - Pester tests
  - Building scripts

CONTINUOUS INTEGRATION

Adding unit tests with tSQLt to the database deployment pipeline

- VSTS
  - TEST environment setup (Local Machine | Docker)
    - Test and Report
  - Build artefact

CONTINUOUS DELIVERY

Adding unit tests with tSQLt to the database deployment pipeline

- Octopus Deploy
  - Local Machine
  - Azure

REFERENCES & MATERIALS

Adding unit tests with tSQLt to the database deployment pipeline

- References
  - https://tsqlt.org/user-guide/
  - https://courses.agilesql.club/
- Source code available @ GitHub
  - https://github.com/eduardopiairo/devopsporto-db

Q&A

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