Test Automation: Agile Enablement for Business Intelligence Teams

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Guest Ranch Childhood

Colorado College: Southwest Studies
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Focused on agile and data projects since the mid-90’s
CBIP – Mastery Level, Certified Scrum Professional, SAFe-
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Agenda

• Why is test automation important for agile data teams?
• Why aren’t all data teams automating their tests today?
• What is the path to test automation?
• What does simple DW test automation look like?
Why is test automation important to agile data teams?
Agile Demands Something Different

Agile calls for small increments of “potentially shippable code”.

That means QA is essential on a regular, frequent basis.

The test suite grows larger each iteration.

Manual testing quickly becomes infeasible.

Doesn’t break something we did back here

How can we be sure that something we do here
Testing is Central to Agile

Agile BI development is driven by tests

Acceptance criteria are the definition of “done”

Passing tests are the measure of “done”

Regression tests are the measure of “still done”
Agile Teams Understand...

... that test automation is a key technical enabler to “being agile”
Why aren’t all data teams automating their tests today?
DW/BI Test Automation Challenges

Data industry does not focus on testing as much as other disciplines:

- Education
- Team Members
- Skills & Discipline
DW/BI Test Automation Challenges

Existing tools are not easily adapted to the data world:

Development Languages

Web, Mobile and UI Focus
DW/BI Test Automation Challenges

Good test data sets are hard to come by:

- Large volumes (on small environments)
- Shared test environments
- Data sensitivity
- Small sets need extra planning and design
What is the path to test automation?
Exercise: Path to test automation

In small groups, discuss the following pre-requisites to test automation and decide on the first three steps a DW/BI team should take toward test automation:

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<th>Business Domain Knowledge</th>
<th>Learning Culture</th>
<th>Test Maintenance</th>
<th>Repeatable Tests</th>
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<td>Test Design</td>
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<td>Exploratory Testing</td>
<td>Testing Skills</td>
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<td>Test Environment</td>
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<td>Testing is a Team Sport</td>
<td>Test Organization</td>
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<td>Manual Tests</td>
<td>Build Quality In</td>
<td>Acceptance Tests</td>
<td>Test Automation Tool</td>
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Testing is a Team Sport
Agile Testing Perspectives

1) Attitudes & Culture
- Testing is a Team Sport
- Learning Culture
- Build Quality In

2) Skills & Practices
- Test Environment
- Build Automation
- Test Data Sets
- Test Automation Tool

3) Tools & Automation
- Testing Skills
- Test Design, Organization & Maintenance
- Repeatable Tests
- Feedback Loops

High Quality DW/BI System
Test Automation Pyramid

Subjective user feedback is essential

Brittle tests that are affected by UI changes

Write these in business domain language

Push as many tests as possible to this layer

Good Places to Start

- Unit tests on new development

  AGILE TEAMS WRITE TESTS BEFORE WRITING ANY CODE

- Regression tests you wish you had, before building something new

- Deployment tests to ensure each build migrated correctly

- Painful test setup or test execution prone to error
What does simple data warehousing test automation look like?
Basic Approach

Source Schema
- Test Data

Component under test

Target Schema
- Actual Results

Static Test Data

Test Queries
- Expected Results
- Compare results

Setup
Execute
Test
Report
Clean Up

Test Automation

load test data

Based on specific input data

leave no trace

execute tests

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What Constitutes a Test?

- Actual Result (from test)
- Expected Result (queried or pre-calculated)
What Does It Look Like?
Testing Framework

Functionality and Components:

- Example source system
  - SQL Server and related model ("AdventureWorks")
- Screens for describing and creating test cases
  - Microsoft Access form
- Test execution
  - SQL Server stored procedures (individual tests)
  - Power Shell scripts (batch execution)
- BI Reports and Dashboards for monitoring
  - MS Power BI
Demo Workflow

1) Define a test (MS Access form)

2a. Execute a single test (SQL Server stored procedure)

2b. Execute a batch of tests (PowerShell scripts)

3. Report on test results (MS Power BI)
Define a Test (MS Access) – Expected Result

```
select cast(sum(TotalDue) as numeric(10,0))
from Stage.dbo.SalesOrderHeader
where year(orderDate) = 2017
```
Define a Test (MS Access) – Query Result
Execute a Single Test (SQL Server)

```sql
-- Test 2
-- Total Sales 2017 (actual - before we fix)
select cast(sum(TotalDue) as numeric(10,0))
    from Stage.dbo.SalesOrderHeader
    where year(orderDate) = 2017
-- 36575198

gexec testFramework.dbo.SPLOAD_Test_Results @DebugFlag = 'Y', @TestDefCD = 'TOT_SLS_2017'
```

Beginning Test Total Sales 2017
Starting Test with ID: 2054 and description: Total Sales 2017
Ret Col Count: 1
Setting Database Context
Query Actual Value
Query Expected Value
Insert Results
!!!--FAILED--!!!
    Fetch the next record
Starting Updates to Current Flags
Execute a Batch of Tests (Power Shell)

Windows PowerShell
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PS C:\Users\Ch> cd documents
PS C:\Users\Ch\documents> cd "sql server management studio"
PS C:\Users\Ch\documents\sql server management studio> cd testautomation
PS C:\Users\Ch\documents\sql server management studio\testautomation> .\RunIntegTests.psl

Changed database context to 'TestFramework'.

Running tests for type: Integration

Beginning Test SalesOrderDetail.SalesOrderDetailID OrderQty Not Null
***PASSED***

Beginning Test SalesOrderDetail.SalesOrderDetailID LineTotal Not Null
***PASSED***

Beginning Test SalesOrderDetail.SalesOrderDetailID UnitPrice Not Null
***PASSED***

Beginning Test SalesOrderDetail.SalesOrderDetailID UnitPriceDiscount Not Null
***PASSED***

Beginning Test SalesOrderDetail.SalesOrderDetailID rowguid Not Null
***PASSED***

Beginning Test SalesOrderDetail.SalesOrderDetailID rowguid Unique
***PASSED***

Beginning Test SalesOrderDetail check for orphaned records
***PASSED***

Beginning Test SalesOrderDetail.CarrierTrackingNumber Count Uniques
***PASSED***

Beginning Test SalesOrderDetail.ProductID Count Uniques
***PASSED***

Beginning Test Total sales in 2014 for all territories
***PASSED***

Beginning Test Total Sales for CustomerID = 29671 and OrderYear = 2013
***PASSED***

Beginning Test Total Sales 2014
!!!-FAILED-!!!

Beginning Test Checksum on the customer table Test Stage to EDW
***PASSED***
Report on Test Results (MS Power BI)
Summary and Resources
Session Intent

1) Why:
   Test Automation is key to DW/BI agile success

2) How:
   Automate a solid testing practice; don’t automate chaos

3) Show:
   DW/BI test automation is not that hard
# DW/BI Test Automation References

<table>
<thead>
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<tbody>
<tr>
<td><strong>Agile Analytics: A Value-Driven Approach to Business Intelligence and Data Warehousing</strong> by Dr. Ken Collier</td>
<td>Chapter 7: Test-Driven Data Warehouse Development</td>
</tr>
<tr>
<td><strong>Automated Data Warehouse Testing: Beginner’s Step-by-Step Guide</strong> by G. Suden</td>
<td>Java-based test automation for simple data warehousing tests</td>
</tr>
<tr>
<td><strong>Agile Testing: A Practical Guide for Testers and Agile Teams</strong> by Lisa Crispin and Janet Gregory</td>
<td>Great introduction to agile testing for any type of development</td>
</tr>
<tr>
<td><strong>More Agile Testing: Learning Journeys for the Whole Team</strong> by Lisa Crispin and Janet Gregory</td>
<td>Includes several chapters on test automation as well as one dedicated to agile testing for DW/BI</td>
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# DW/BI Test Automation Tools

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<tr>
<td>DBFit</td>
<td>Open source database testing tool</td>
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<tr>
<td><a href="dbfit.github.io/dbfit/">dbfit.github.io/dbfit/</a></td>
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<tr>
<td>iCEDQ</td>
<td>Test automation tools designed specifically for Data Warehousing and related projects.</td>
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<tr>
<td><a href="icedq.com">icedq.com</a></td>
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<tr>
<td>QuerySurge</td>
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<td><a href="Zuzena.com">Zuzena.com</a></td>
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<td>Informatica Data Validation</td>
<td>Accelerate and automate Informatica ETL testing in both production environments and dev/test</td>
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<tr>
<td><a href="www.informatica.com/etl-testing">www.informatica.com/etl-testing</a></td>
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<td>Analytix Data Services</td>
<td>DW automation tools that include test automation capabilities.</td>
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<td>DW-friendly test automation tool</td>
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Questions?

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