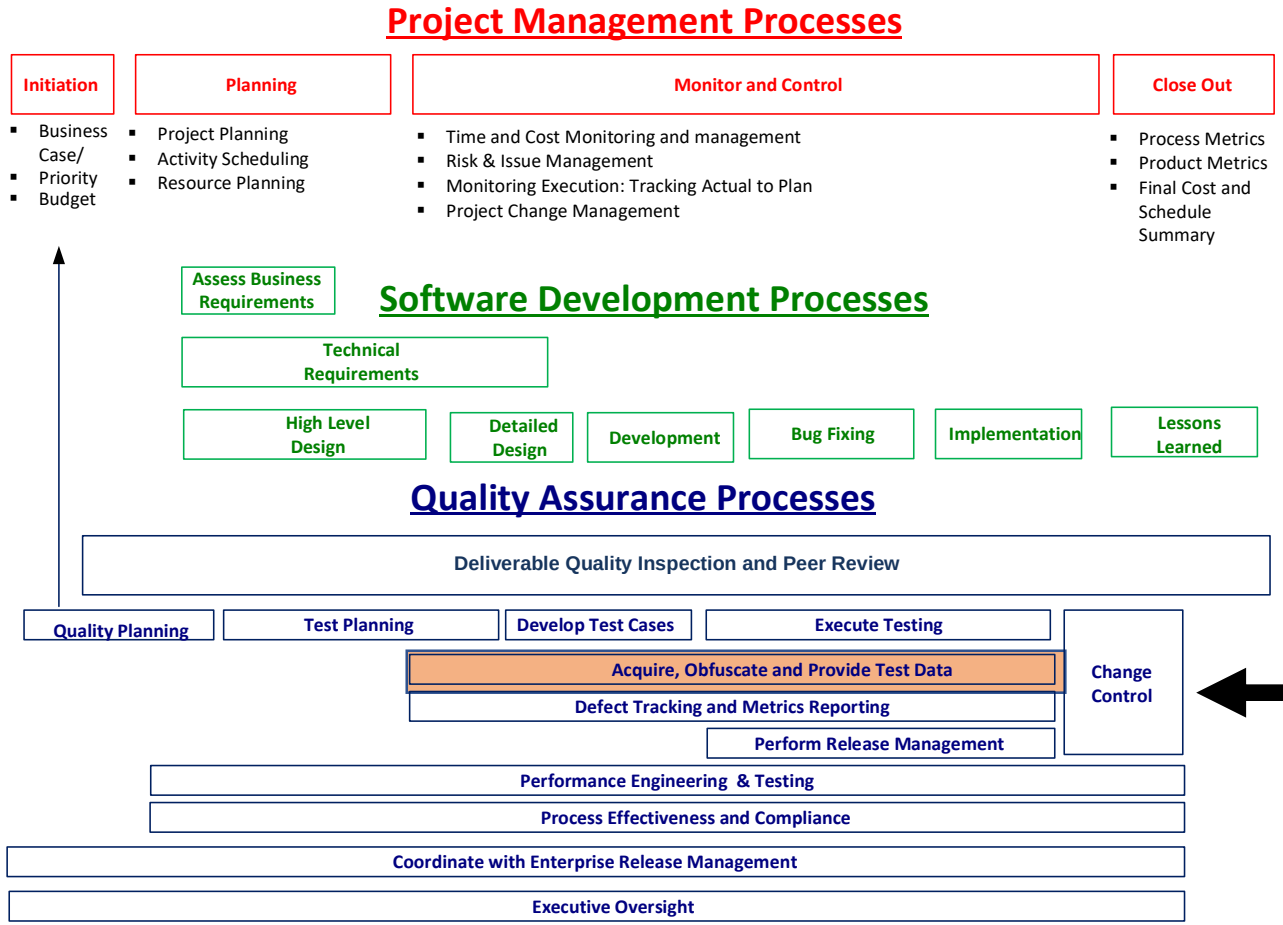
Rethinking Testing

Enable Agile and DevOps Across the Enterprise

Test Data Drives Testing

Testing is (or should be) an integral aspect of all phases of product development



PROBLEMS

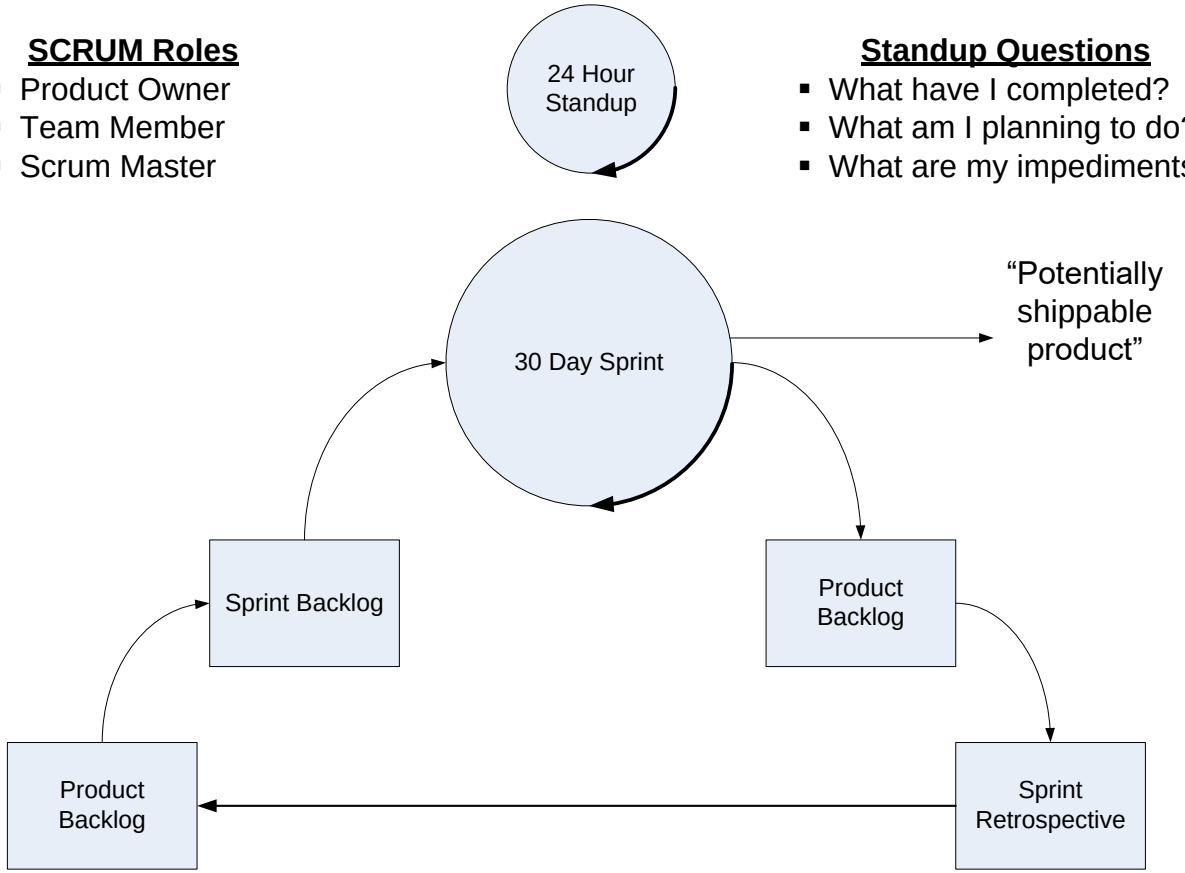
- **How to provide "Just-In-Time" testing (and test data) for Agile and DevOps projects?**
- **Data designs typically stabilize late in product lifecycle**
- **Projects are delayed from fabricating "correct" data to match evolving use cases**
- **Fabricated data is frequenty incomplete, incorrect and insufficient matching evolving business rules**
- **Test data becomes "stale", demanding effort searching for "fresh" test data**
- **Difficulties in resetting data state to enable retest of found defects**
- **Each tester (business, development and QA) invests time and effort to find, create and maintain test data**
- **Searching for "edge" data cases time consuming**

- ***Resolving defects in Production can cost 100 times more than if found and fixed earlier in the lifecycle***

Test Data Drives Testing

In Agile, testing is an integral component of each iteration within each sprint

SCRUM Roles
- Product Owner
- Team Member
- Scrum Master



Standup Questions
- What have I completed?
- What am I planning to do?
- What are my impediments?

PROBLEMS

- **A 30 day sprint may include a new or modified data architecture; for which source data doesn't exist**
- **Lack of test automation inhibits sprint integration and final acceptance as a part of the larger product regression**
- **Regression testing, a key facet of continuous integration, is hampered by a lack of automation and correct data**
- **Extreme programming methods include Test Directed Development, where test case are built prior to coding; test case execution dependent on availability of test data**
- **Data designs stabilize late in sprint; test data becomes obsolete**

- ***Resolving defects in Production can cost 100 times more than if found and fixed earlier in the lifecycle***

Test Data Drives Testing

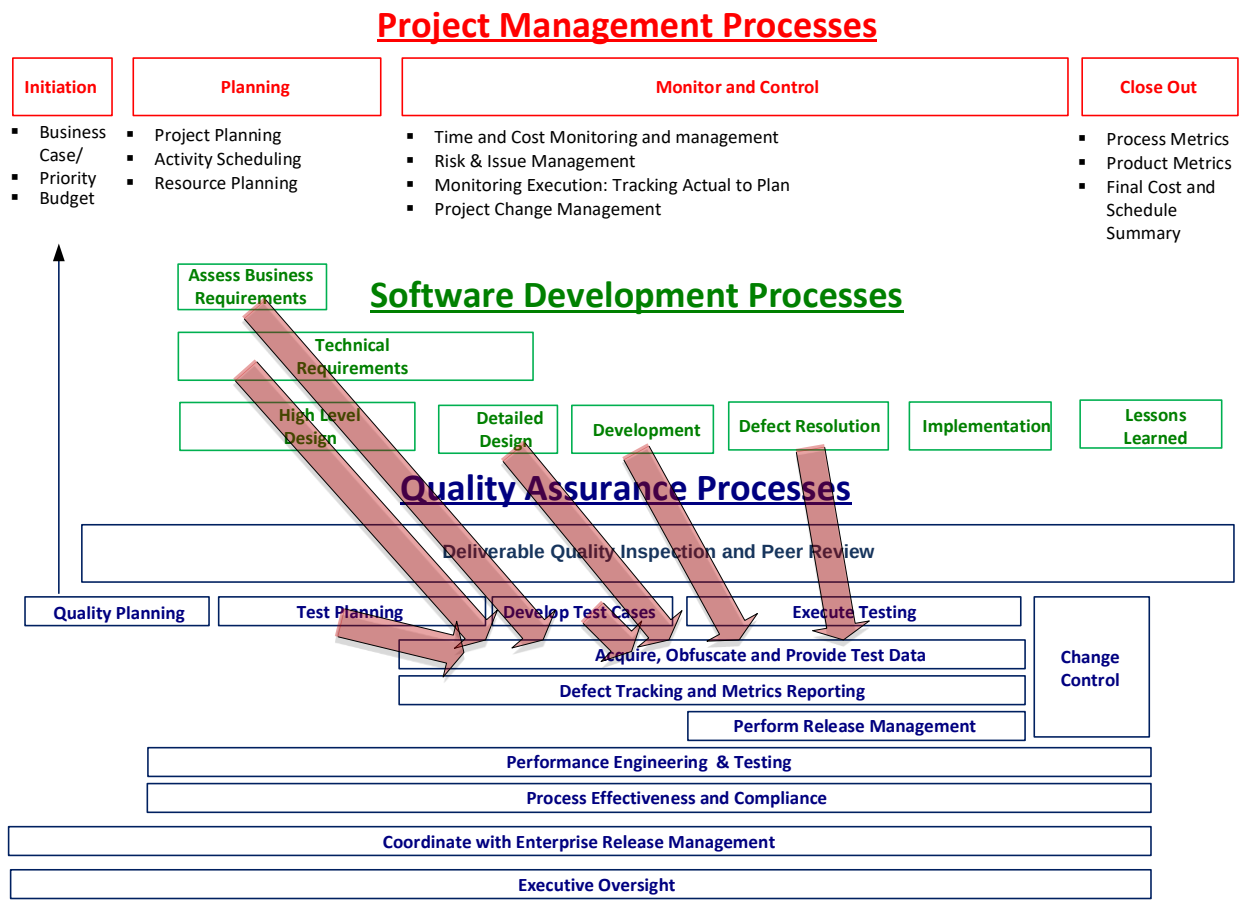
Is there an Easy button?

No Easy button; but there is an an Easier button

- ***Simplify test data acquisition with automation***

Traditional Test Process

Test data needs defined from multiple sources, frequently matching unforeseen use cases or conditions



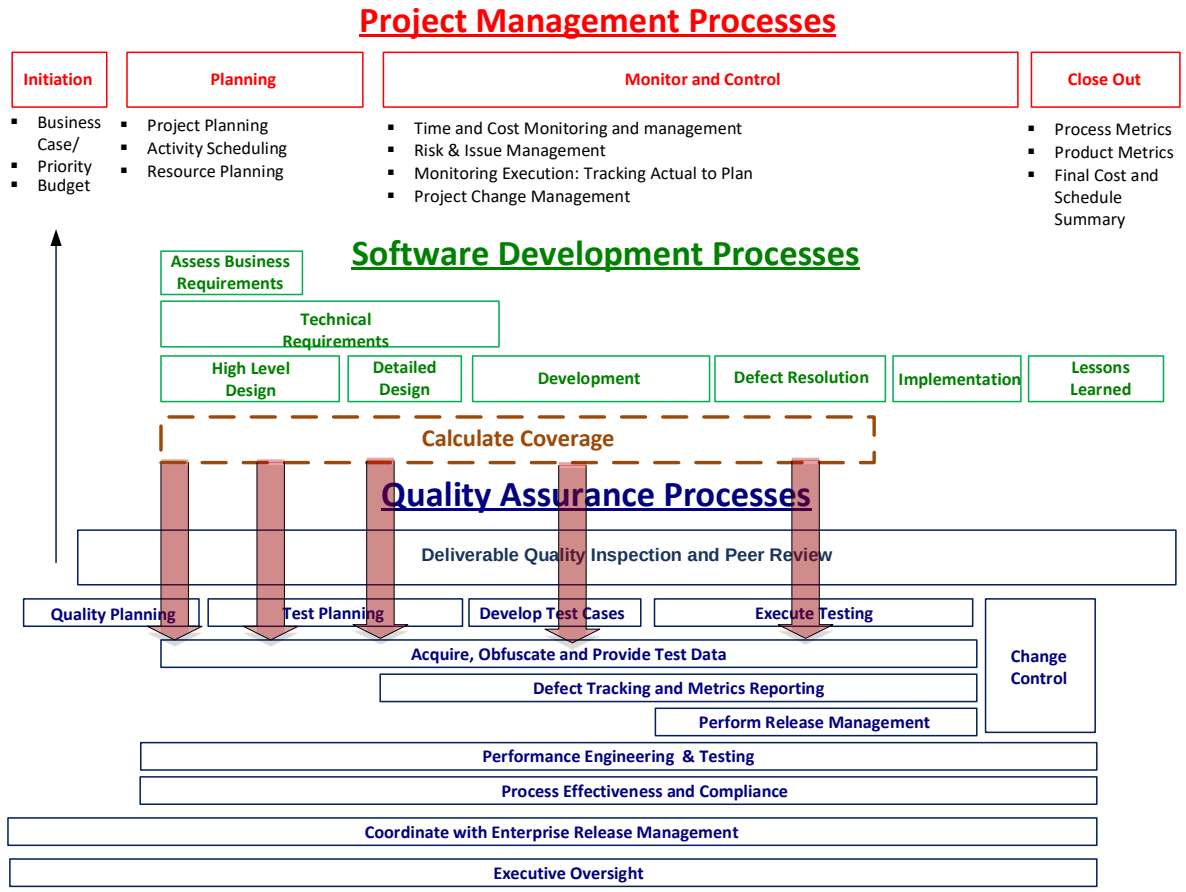
TRADITIONAL MODEL

- **Test data requirements come from multiple activities: business requirements, test planning, development testing needs, test cases and defect resolution/retest**
- **Data needs dependent are defined later in the lifecycle; from requirements, test cases and adhoc needs of defects and development**
- **Required test data became critical path; waiting on testers search for appropriate data to match, state refresh or creating data to match new and evolving data designs**

- ***Data sourced to meet unplanned conditions: defects, new or changed requirements or unforeseen use cases***

Test Coverage As Enabler

Testing and test data needs are defined earlier in lifecycle, using reusable components evolving as requirements evolve



USING COVERAGE TO DEFINE TESTING

- **Test data requirements defined from data architecture and designs. As tables, columns evolve or are designed, a coverage matrix is assembled**
- **The testing and test data requirements are assembled from design, as known at any point in the project.**
- **Test and test data needs are defined much earlier in the lifecycle, supporting Agile and Agile TDD Test Directed Development**
- **Assembled data requirements are reused over and over again, enabling faster time-to-market**
- **Enables early testing defining test data requirements synchronized with Agile TDD (Test Directed Development) and automated enabling DevOps**

- ***Data sourced as known, when known, from data designs as they grow and evolve. Test data comes off critical path***

Test Data Solution – Initial Sprint

Calculate test coverage to eliminate design/documentation dependency

Project Landscape: Verify Add Customer

The initial TDD/Test Scenario

Customer	
Customer ID	
Customer Name	
Customer Type	Retail Wholesale Warehousing Full Logistics
Customer Location ID	Single Location Multiple Locations Retail Stores

Calculated test coverage data needs based on source variables

Customer ID – RECORD 1
Customer Name
Customer Type Retail
Customer Location ID Single Location
Customer ID – RECORD 2
Customer Name
Customer Type Retail
Customer Location ID Multiple Locations
Customer ID – RECORD 3
Customer Name
Customer Type Retail
Customer Location ID Retail Stores

Customer ID – RECORD 4
Customer Name
Customer Type Wholesale
Customer Location ID Single Location
Customer ID – RECORD 5
Customer Name
Customer Type Wholesale
Customer Location ID Multiple Locations
Customer ID – RECORD 6
Customer Name
Customer Type Wholesale
Customer Location ID Retail Stores

Customer ID – RECORD 7
Customer Name
Customer Type Warehousing
Customer Location ID Single Location
Customer ID – RECORD 8
Customer Name
Customer Type Warehousing
Customer Location ID Multiple Locations
Customer ID – RECORD 9
Customer Name
Customer Type Warehousing
Customer Location ID Retail Stores

Customer ID – RECORD 10
Customer Name
Customer Type Full Logisitics
Customer Location ID Single Location
Customer ID – RECORD 11
Customer Name
Customer Type Full Logisitics
Customer Location ID Multiple Locations
Customer ID – RECORD 12
Customer Name
Customer Type Full Logisitics
Customer Location ID Retail Stores

- ***Test coverage matrix from the "known" meta-data results in 12 records***

Test Data Solution – Initial Sprint

Filter based on use case business rules

Project Landscape: Verify Add Customer

The initial TDD/Test Scenario

Customer	
Customer ID	
Customer Name	
Customer Type	Retail Wholesale Warehousing Full Logistics
Customer Location ID	Single Location Multiple Locations Retail Stores

Filter unrealistic test cases based on business rules: warehousing and logistics customers do not have retail stores

Customer ID – RECORD 1
Customer Name
Customer Type Retail
Customer Location ID Single Location

Customer ID – RECORD 2
Customer Name
Customer Type Retail
Customer Location ID Multiple Locations

Customer ID – RECORD 3
Customer Name
Customer Type Retail
Customer Location ID Retail Stores

Customer ID – RECORD 4
Customer Name
Customer Type Wholesale
Customer Location ID Single Location

Customer ID – RECORD 5
Customer Name
Customer Type Wholesale
Customer Location ID Multiple Locations

Customer ID – RECORD 6
Customer Name
Customer Type Wholesale
Customer Location ID Retail Stores

Customer ID – RECORD 7
Customer Name
Customer Type Warehousing
Customer Location ID Single Location

Customer ID – RECORD 8
Customer Name
Customer Type Warehousing
Customer Location ID Multiple Locations

Customer ID – RECORD 9
Customer Name
Customer Type Warehousing
Customer Location ID Retail Stores

Customer ID – RECORD 10
Customer Name
Customer Type Full Logisitics
Customer Location ID Single Location

Customer ID – RECORD 11
Customer Name
Customer Type Full Logisitics
Customer Location ID Multiple Locations

Customer ID – RECORD 12
Customer Name
Customer Type Full Logisitics
Customer Location ID Retail Stores

- ***Applying business rules filters test data needs down to 10 records***

Test Data Solution – Initial Sprint

Use IBM InfoSPhere Optim Test Data Orchestrator to automate the coverage calculation, or what data is needed:
Integrate with IBM InfoSphere Optim (or other tools) provisioning test data matching coverage matrix

What data is needed

Customer ID
Customer Name
Customer Type Retail
Customer Location ID Single Location
Customer ID
Customer Name
Customer Type Retail
Customer Location ID Multipl Locations
Customer ID
Customer Name
Customer Type Retail
Customer Location ID Retail Stores

Customer ID
Customer Name
Customer Type Wholesale
Customer Location ID Single Location
Customer ID
Customer Name
Customer Type Wholesale
Customer Location ID Multiple Locations
Customer ID
Customer Name
Customer Type Wholesale
Customer Location ID Retail Stores

Customer ID
Customer Name
Customer Type Full Logisitics
Customer Location ID Single Location
Customer ID
Customer Name
Customer Type Full Logisitics
Customer Location ID Multiple Locations

Customer ID
Customer Name
Customer Type Warehousing
Customer Location ID Single Location
Customer ID
Customer Name
Customer Type Warehousing
Customer Location ID Multiple Locations

IBM InfoSphere Optim Test Data Orchestrator

Provisioning the data

IBM InfoSphere Optim Data Privacy –
De-identify structured data
UMASK –
De-identify unstructured data

Test coverage matrix: the roadmap of data verifying Landscape scenario requirements

Integrate with IBM InfoSphere Optim Test Data Management Or Rational Integration Tester or SQL or "something else" (export coverage as comma delimited)

Fabricate data not present in existing sources

IBM InfoSphere Optim Test Data Fabrication

- ***Create test data coverage matrix matching coverage needs from "known" meta-data***

Test Data Solution – 2nd Sprint

As design changes, revise the coverage matrix with new columns or tables – across single or federated data sources

Project Landscape: Verify Customer Add

Calculated test coverage data requirements from source variables

2nd Test Scenario

Customer	
Customer ID	
Customer Name	
Customer Type	Retail Wholesale Warehousing Full Logistics
Customer Location ID	Single Location Multiple Locations Retail Stores

Customer ID	
Customer Location ID	
Location Type	Office Warehouse Sales Office
Contact Name	
Contact Phone	
Address	

Customer ID	Customer ID	Customer ID	Customer ID
Customer Name	Customer Name	Customer Name	Customer Name
Customer Type Retail	Customer Type Wholesale	Customer Type Warehousing	Customer Type Full Logisitics
Customer Location ID Single Location	Customer Location ID Single Location	Customer Location ID Single Location	Customer Location ID Single Location
Customer ID	Customer ID	Customer ID	Customer ID
Customer Name	Customer Name	Customer Name	Customer Name
Customer Type Retail	Customer Type Wholesale	Customer Type Warehousing	Customer Type Full Logisitics
Customer Location ID Multiple Locations	Customer Location ID Multiple Locations	Customer Location ID Multiple Locations	Customer Location ID Multiple Locations
Customer ID	Customer ID		
Customer Name	Customer Name		
Customer Type Retail	Customer Type Wholesale		
Customer Location ID Retail Stores	Customer Location ID Retail Stores		

Customer ID	Customer ID	Customer ID
Customer Location ID	Customer Location ID	Customer Location ID
Location Type Office	Location Type Warehouse	Location Type Sales Office
Contact Name	Contact Name	Contact Name
Contact Phone	Contact Phone	Contact Phone
Address	Address	Address

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- ***Reuse existing components revising Coverage Matrix data needs***

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Summary

Resolve IT projects quality delays by focusing testing and test needs on data designs

- **IT projects are data projects: eliminate requirements, design, development delays which impact test case designs and test data requirements**
- **Increase Extreme Programming (XP) and Agile methodology success by reducing or eliminating dependence on incomplete and incorrect test data**
- **Increase quality by focusing testing and test data coverage on data variations**
- **Increase DevOps compliance by automating the testing and test data acquisition process**
- **Maintain right-sized databases by defining only that data necessary for testing**

- ***Focus on product quality and eliminating project delays***