Test Data Management with Data Plug-In Tool - Simple innovation with an excellent value proposition

Presented by: Digital Assurance Practice
Authors : :Nagendra Kumar Kunkatla
: nagendrak@hexaware.com

www.hexaware.com

Table of Contents

About Author

Nagendra Kumar Kunkatla is Competency Head (India) of Digital Assurance Testing at Hexaware Technologies Ltd.
He has over 20 years of IT experience across different spheres of IT development, maintenance & testing and led major applications rollover UAT Program management in the European Banking sector.

References

Statistics mentioned in the business case are based on Hexaware's project experience.

Industry reference:
www.bloorresearch.com/technology/test-data-management/
www.it-director.com/technology/applications/paper.php?paper=927

Abstract

Quality of testing has a large dependency on right quality test data apart from scope & requirement clarity, source code quality, test environment . However, quality of test data many times is big challenge for testers. In the process of preparing quality data, delays are inevitable resulting in cost and schedule over-runs. In order to circumvent these challenges, we have created a tool-based solution to accelerate test data selection / preparation. This solution has resulted in reduced time to market and improved quality of testing.

In this paper, we have explained two key aspects necessary in practicing test data management:

- A simple, easy to use innovative tool baptized as "DPIN tool" (Data Plug-In tool) helping testers / business users in creating effective test data for faster execution of test cases / scripts.
- Optimization of test data requirements that result in shortening the test data preparation life cycle.

About the Client

The client is one of the largest diversified financial institutions in Germany. The client operates in about 340 branches in Germany with 7000+ employees and 6 million customers. Hexaware was involved in testing the migration of their legacy based in-house banking system to a new product based core banking system.

Business Case

The bank's core banking initiative was massive and involved 200+ functional specifications, with 70+ interfacing systems. The challenge was to provide test data support in a multi-vendor environment in which the test teams were working from more than ten locations in five countries. 100,000+ test scripts were prepared with numerous releases and test cycles.
In order to expedite testing, we created this quick fix tool to provide test data. The test data team used the tool to deliver more than two million test data for System Integration, User Acceptance Testing and Migration Testing.

Why Data Plug-In Tool

Industry statistics reveal that nearly 30% of test execution failures are due to improper test data. Hence, identification of right set of data is business critical activity. This makes test data management an integral part of software testing life cycle. One of the contributors in speeding up test data process is to automate the process. However, the solution should not be an overhead prolonging the entire test data process resulting in cost over-runs. With this objective, we applied our thought process to evolve a simple but effective test data preparation tool – the DPIN tool.

Following are the factors and scenarios that led us to this innovation:

- Plug the data directly to the test scripts based on the requirements
- Provide bulk data and eliminate the turn-around time
- Complex test data architecture
- Distributed testing teams across five countries in varied time-zones
- Volume of test cases, number cycle executions demanding high volume of test data supply in short turneaorund time
- Execution downtime due to slower turnaround in provisioning test data
- Addressing complex data requirements with unique real-time conditions (for example, the final settlement of loan repayments)
- Repeated test data requests for each Database refresh time / Change of Environment

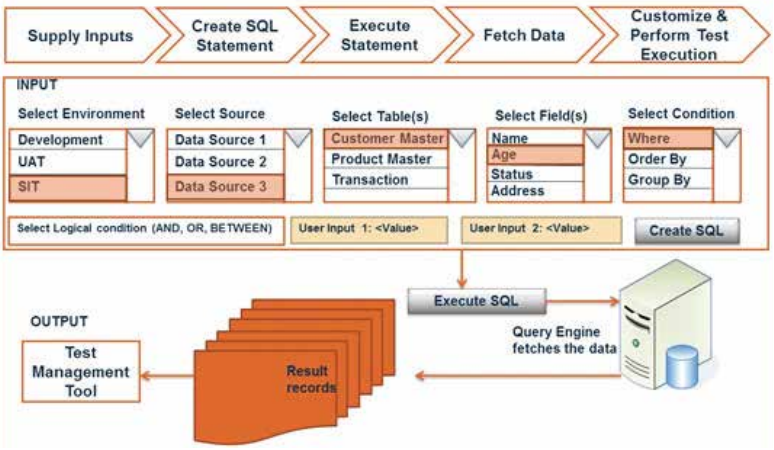


Figure 1: A High Level prototype of DPN tool

DPIN Tool - How it works:

The tool provides a user interface that builds a query or a procedure based on the selection criteria provided by the user. This is triggered by an SQL engine to fetch the data from a specified data source in a selected test environment. The tool is highly configurable and parameterized. The developed query by a naïve user is verified for syntax compliance and then executed using an interface command. The fetched results are shown in a table format which can be exported into an Excel or a Notepad format. The tool is integrated with a test management tool (HP's QC). This integration enables pushing the fetched results into QC, plugging the data to the respective test scripts.

Usage Scenarios:

DPIN tool is agile by nature in supporting test data requirements. To understand the effectiveness of the tool, the following scenario is discussed with an example:

Similar and repeated data requests:

In typical large business software implementations, business coverage testing involves usage of large sets of test data. DPIN tool helps the test team to identify the required sets of data with a query builder interface.
Let us consider testing a trading system which involves scenarios as shown below in the matrix.

Product	Transaction ↓						
	Types of Order →	Market order			Limit Order		
	Validity →	Good for day	Good till date	Max validity	Good for day	Good till date	Max validity
Equity	Buy	X	X	X	X	X	X
	Sell	X	X	X	X	X	X
	Cancel Buy	X	X	X	X	X	X
	Cancel Sell	X	X	X	X	X	X
Bonds	Buy	X	X	X	X	X	X
	Sell	X	X	X	X	X	X
	Cancel Buy	X	X	X	X	X	X
	Cancel Sell	X	X	X	X	X	X
SP	Buy	X	X	X	X	X	X
	Sell	X	X	X	X	X	X
	Cancel Buy	X	X	X	X	X	X
	Cancel Sell	X	X	X	X	X	X
ETF	Buy	X	X	X	X	X	X
	Sell	X	X	X	X	X	X
	Cancel Buy	X	X	X	X	X	X
	Cancel Sell	X	X	X	X	X	X

Table 1: Test Data

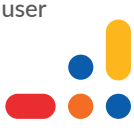
Common test data required for all of these scenarios are, eligible customer records with:

- Sufficient funds in their cash account
- Sufficient positions in their holdings account
- Customers who satisfy trade compliance clauses

The shown matrix is an abridged version of a coverage matrix that we have used in the project. According to this matrix, there are 96 end-to-end test scenarios that may require a similar set of customer records as test data. The necessary criteria are supplied as inputs to the DPIN tool. Once the query is executed, the list of test data will be available to the team for review and further upload into a test management tool.

DPIN tool within the Big Picture

The below figure illustrates the architecture of DPIN tool in a typical test data management system. This tool is strategically made available for the testing team apart from the test data management / DPIN team. The prime advantage of this tool is, eliminating direct access to the test database for the testing team. This avoids polluting the test database and data corruption by multiple user access.



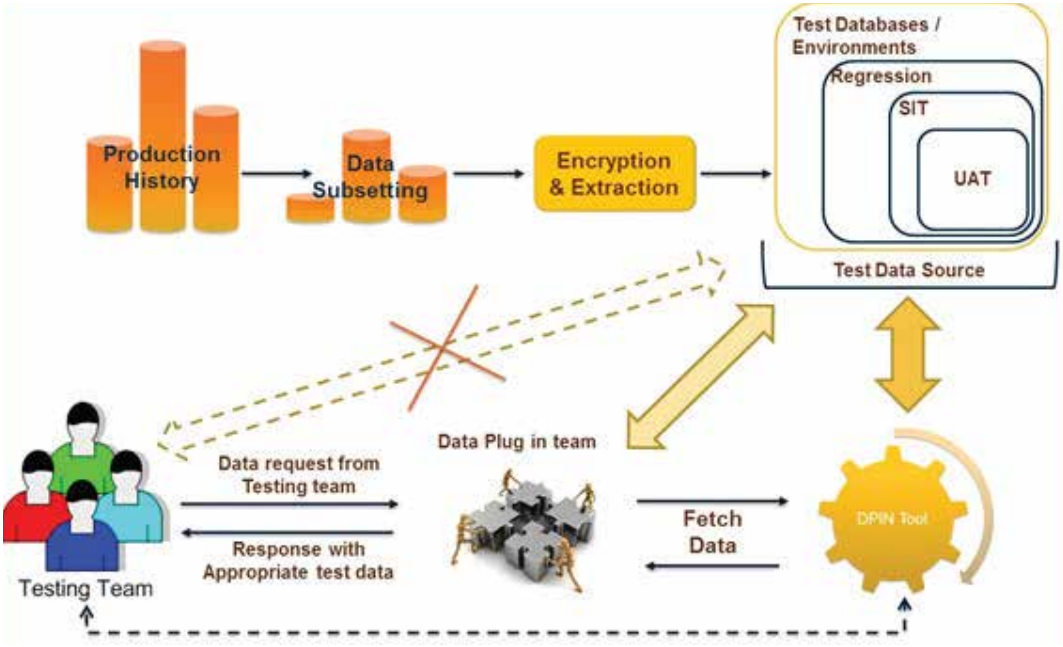


Figure 2: DPN Tool in the System

Limitations of Tool:

Like any tool, DPIN tool has certain limitations where test data is necessary to customize the fetched data and supply the proper set of data for execution

Conclusion:

There could be a robust test data management strategy shouldering the test data requirements for critical projects where large volume of test cases execution involved for each cycle. But still, human errors contribute around 30% of defects using improper data. Hence, instead of teams directly working with the test databases, usage of interface tools like the DPIN tool secures data manipulations and nullifies human error in data identification process. This ensures accuracy in fetching the right data. In addition, if the test data management team follows quality procedures and optimizes data usage, an approximate 30% of TDM effort and additional execution downtime effort could be saved. On an average, this solution and the optimization practice put together reduces testing budget by 10% for large engagements.

About Hexaware

Hexaware is the fastest growing next-generation provider of IT, BPO and consulting services. Our focus lies on taking a leadership position in helping our clients attain customer intimacy as their competitive advantage. Our digital offerings have helped our clients achieve operational excellence and customer delight by 'Powering Man Machine Collaboration.' We are now on a journey of metamorphosing the experiences of our customer's customers by leveraging our industry-leading delivery and execution model, built around the strategy— 'Automate Everything, Cloudify Everything, Transform Customer Experiences.'
We serve customers in Banking, Financial Services, Capital Markets, Healthcare, Insurance, Manufacturing, Retail, Education, Telecom, Professional Services (Tax, Audit, Accounting and Legal), Travel, Transportation and Logistics. We deliver highly evolved services in Rapid Application prototyping, development and deployment; Build, Migrate and Run cloud solutions; Automation-based Application support; Enterprise Solutions for digitizing the back-office; Customer Experience Transformation; Business Intelligence & Analytics; Digital Assurance (Testing); Infrastructure Management Services; and Business Process Services. Hexaware services customers in over two dozen languages, from every major time zone and every major regulatory zone. Our goal is to be the first IT services company in the world to have a 50% digital workforce.

NA Headquarters
Metro 101, Suite 600,101 Wood Avenue South, Iselin,
New Jersey - 08830
Tel: +001-609-409-6950
Fax: +001-609-409-6910

India Headquarters
152, Sector – 3
Millennium Business Park
'A' Block, TTC Industrial Area
Mahape, Navi Mumbai – 400 710
Tel : +91-22-67919595
Fax : +91-22-67919500

EU Headquarters
Level 19, 40 Bank Street,
Canary Wharf,
London - E14 5NR
Tel: +44-020-77154100
Fax: +44-020-77154101

APAC Headquarters
180 Cecil Street,
#11-02, Bangkok Bank Building,
Singapore 069546
Tel : +65-63253020
Fax : +65-6222728