White Paper

Testing in Financial Services - Leveraging Process Maps
Financial Services – The evolving environment

An account deposit is a simple credit to an account – can there be different ways of doing it? Ask a Banker and the response would be a resounding ‘YES’. It could be a drop box deposit; alternately cash deposit at an ATM; mail-in deposit and over-the-counter deposit are just some of the different ways which come to mind immediately. These are the varieties within a bank; across banks the variety increases further.

The moment we consider any activity where decisions are involved, each financial institution has some nuance which is different, process is different. To a certain extent this variation is driven by the traditional approach to banking. However, additional factors which weigh in today are also around availability of information which might impact the decision as also the regulatory environment.

Such variety and diversity has been made feasible by technology adoption by various industry segments across geographies. Technology has also enabled customizing the business process to gain even the minutest of the advantages where exit barriers for the customer could be low. One of the challenges facing the industry has been how to deliver consistent and excellent service to the customer base, without a flaw. With the variation in product and process, technology and operations groups have risen to the occasion by extensively verifying the functionality before promoting any system to real-life/production.

Being one of the most intense users of technology, Financial Services industry also has to factor in multiple channels of access and time-critical nature of transactions. The combination of channels, associated access and data security, transaction time criticality, data integrity risk and high volume variability facing the technology implementations necessitates the need to thoroughly test the various applications prior to utilizing them in live environment. The end-user visibility of the transactions/applications, translating to reputational risk, further underscores the need of testing in this environment.

Traditional Approaches in Testing & Challenges

Traditional testing approach is more like an extended arm of various popular software development models like the Waterfall Model. Various methods still in vogue include: reviews, walkthroughs, inspections (Static testing), test case design and execution (Dynamic testing). Manual testing is the oldest and most prevalent approach to testing even today. It requires the tester to do a rigorous round of manual test operations.

With increasing complexity of functionality and the requirement for thoroughness in testing, the time and effort being spent on testing as a percentage of total project time has been steadily increasing over the years (refer figure 1). One of the major reasons for the same is driven by the complexity of applications compounded by the straight through processing (STP) of various transactions.

To achieve adequacy of test coverage, today’s testing approaches have built on the traditional approaches by mushrooming the test scenarios and test cases thereby ensuring apparent adequacy of testing and reducing the possibilities of any errors during the operational environments. While it does improve test coverage, the traditional mapping to functional
requirements does not necessarily ensure 100% test coverage. Additionally, it adversely impacts the testing effort and cost of testing.

Test Automation has ensured repeatability of testing while achieving cost & effort efficiency to a large extent. Coverage is consistent, repeatable and time elapsed is minimized. Despite the increasing adoption of test automation, with testing effort has steadily increased from 22% in 2004 to 30% in 2009, adversely affecting the duration, effort and cost of the entire project. The gains from efficient design and development approaches have not been mirrored proportionately in the testing arena.

![QA’s Share of project effort](image)

The lack of efficiency, arising from increased test scenarios and test cases, and lack of verifiable test coverage in testing, become a challenge at all stages of testing, whether it is system or integration testing during the development cycle or user acceptance testing (UAT) prior to production implementation.

**Scenario Development in Banking Domain Training – ITC Infotech Experience**

To better understand the nuances of financial domain, we selectively developed a series of process flows in the more complex areas, aimed at training and orientating the technology teams. As we traversed the processes, the interdependence of current decision on a past decision point stood out. We were able to establish multiple such dependencies (or correlations) between decisions in a single session. Was it a pure coincidence?
‘NO’, and this was underscored in days to come. The finding was validated as we tracked a different business flow in the next session and realized the correlation between decisions resulted in fewer viable process paths across the operational area. We were able to develop specific scenarios (end-to-end sequence of events in a process with each decision determined) for the processes under discussion and we ascertained factually that the number of feasible scenarios was much lower than the number of simple combinations based on options for all decision points. In fact the number of feasible scenarios was less than 50% of numeric combinations in one of the cases. As we debated the value of such a finding, one of the earliest possibilities which emerged was the use of these processes/scenarios in testing.

**ITC Infotech Specialist Testing Offering for Financial Services – Leveraging Process maps and Scenarios**

Process or scenario based testing leverages the knowledge of business/operations process for planning the testing using the scenario flow as a building block of test plan. The detailed Application Process flow in case of System testing and Business Process flow for Pre-UAT and UAT testing was mapped and each and every feasible scenario was mapped. The number of scenarios was further optimized by eliminating some repetitive scenarios using orthogonal test matrix design. The scenarios shortlisted for the final repository ensured coverage of the each segment of the process thus achieving the adequacy of test coverage.

![Scenario creation Hierarchy](image)

*Figure 2: Scenario creation Hierarchy*

Once the scenario list was finalized, we added the application screens/ data elements into the mix to start designing the test cases for each event within a scenario, parallely factoring in destructive test cases. Care had been taken to evolve process definition (and the scenarios) to such a granular level that no event could be further subdivided into more variants, making an event the basic building block of the process. The emerging hierarchy of the test approach is depicted in figure 2 with the Process map being the starting point.
Evaluating the resultant test plans against previously designed and used test plans, we were able to achieve reduction in test scenarios of 11-15%. However, the gains on test cases were more impressive, with 20-25% reduction in number of test cases. The test coverage was assured since the traceability of test scenarios and test cases was to the process maps for the application/business process maps and the approach had factored in the tracing of each leg of the process. The overall testing effort, inclusive of test planning, test case creation and test execution, reduced by nearly 20%. Additionally, the process maps created were also utilized as an aid in training the testing team on the functionality, providing them a better visual perspective of the domain and functionality.

In subsequent iterations, as functionality is enhanced over time, we expect greater efficiency in tracking modifications to the test packs while maintaining the coherence and efficiency of the test pack.

Further reduction in effort is achieved by identifying the repeatedly used events across scenarios by “Function Calls” as part of the test scenario pack creation. When final test cases are created, these repeatable modules of code are scripted and stored in a function library. The function library is associated with the test script while running the actual tests; the actual test script consists of calls made to the function with input field data as parameters. Changes to the test pack for changes in a screen are narrowed down to one or two function calls instead of multiple occurrences. Net advantage comes from faster test pack creation, lightweight script due to usage of “Function Calls” and better maintainability of test packs.

Progressing the scenario based testing approach further; we created the generic process flows across some of the complex business processes of the financial industry (at a generic level) and created the scenarios based on this process mapping. With some of the projects running over time and budget, these base test packs can reduce the effort to create test pack in any organization specific environment with bulk of the test plan already determined and only the organization specific variations in process to be superimposed on the generic process and generating the new set of scenarios. The approach can crash the test planning cycle and recover lost ground during the testing phase without sacrificing the testing quality due to paucity of time.

**Scenario Based Testing – Achieving testing efficiency**

In today’s environment where budgets are shrinking, leveraging such a ready-made asset with the speed and maintainability advantage, does create a stronger business case for adoption, especially if the process map parallely enhances the organization documentation levels, achievable as a by-product from a highly efficient testing approach.

For End Users and Service Providers alike, adopting the approach requires some basic investment in creating the assets (process flows and scenarios). However, the return on investment is realized through the training it imparts to the asset creation team on domain knowledge as also the premium realized from shortening the test cycle for any client. The advantage from optimizing the test cycle due to focused scenarios and the upgrade of organization documentation on processes forms an attractive proposal to prospective clients.
About the author

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Sanjay heads the Capability & Domain areas for the BFSI Cluster. He has over 20 years of experience in the areas of Information Technology & Operations. He spearheads Enterprise Technology Strategy consulting with various customers across Capital Markets and Retail Banking. His team spearheads solution development & delivery across

- Strategy Consulting, Process Consulting, Test Strategy & Design, Regulations and niche technology areas
- Solutions with a Regulatory focus on Europe & Americas
- Niche area coverage on Mobility & Rural Banking

The Domain team also manages the Business Analyst development initiative within BFSI; Banking Certification & other domain related training across Banking, Capital Markets, Insurance & Treasury areas.

Sanjay has done his MBA (Finance) from Wharton Business School, Pennsylvania in 1993 and Bachelor’s degree in Engineering (Instrumentation & Mechanical) from BITS, Pilani in 1986

ITC Infotech’s Testing Centre of Excellence contributes across various verticals of ITC Infotech. It is tasked with developing and maintaining cutting edge testing techniques and methodologies as also maintaining and upgrading the skill sets of testing practitioners. As a result, it maintains an excellent blend of resources with testing tools experience and domain capabilities and majority of the testing resources are certified by ISEB Foundation and QAI.

ITC Infotech's Banking, Financial Services, and Insurance (BFSI) practice, composed of industry specialists and technology experts, provides effective technology solutions to solve business problems for its growing list of fortune class universal banks within Europe and globally. Having internalized deep domain expertise by virtue of executing strategic banking projects, the practice today also provides domain-centric consulting services as part of its offerings. With headquarters in Bangalore and offices in near-shore locations viz. Copenhagen, Helsinki, Prague, London, New York, Bentonville Sydney, Johannesburg and Singapore the practice provides world-class services using a dynamic onshore-offshore model that best suits its clients and enables them to enhance their value propositions.