

Meeting the Pegasystems BPM Testing Challenge

Executive Summary

Today's businesses not only must meet global competitive threats, but they also need to do so while complying with ever increasing government, industry and internal regulatory requirements. Meeting these challenges requires implementing the most efficient possible business processes, geared to the needs of the industry and market segments that the organization serves globally.

To tune their processes for maximum business returns, more and more companies are turning to BPM (business process management) software. Rather than attempt to build this software in-house, many find that customizing commercial off-the-shelf (COTS) solutions deliver faster and greater return on investment.

The leader in the BPM market is Pegasystems, Inc., whose SmartBPM technology and industry-specific frameworks speed the return on investment in BPM software for companies worldwide. Pegasystems' SmartBPM technology combines business rules and business processes into composite applications that leverage existing systems and business rules to deliver superior business results.

The latest version, SmartBPM 6, delivers advanced collaboration capabilities, increased speed and improved usability via its Web-based user interface. It also offers enhanced process discovery and role-based views to enhance ease of use. SmartBPM 6 allows users to directly capture their objectives and execute changes in a unified environment without costly handoffs between disjointed stacks of products. Manual software coding and change is eliminated, speeding solution delivery and reducing costs.

The SmartBPM suite is complemented by best-practice frameworks designed for leaders in financial services, insurance, healthcare, government, life sciences, communications, manufacturing and other industries. These frameworks include field-proven processes for functions ranging from product development to billing, service enrollment, opportunity to order, order to cash, cash to delivery and document management.

To attain maximum BPM benefits, organizations must first test their applications. Yet testing BPM systems -- especially the customizations that match applications to an organization's specific needs -- is more difficult with COTS than homegrown environments. BPM solutions offer flexibility of implementation of business processes across disparate applications running on different platforms. They allow flexibility of integration with such applications, thereby creating scenarios where testing the business processes with end-to-end integration becomes challenging. BPM applications in areas such as customer on-boarding and checking operations in the banking industry, medical management and claims administration services in the healthcare industry, and claim status tracking in the insurance industry are positioned at the core of business operations. With the proper modeling tools, knowledge and test processes, organizations can cost-effectively assure their Pegasystems BPM applications deliver the maximum possible value. This white paper examines the unique requirements for testing Pegasystems BPM applications, as well as how we help customers meet those challenges.

The Challenges of Pegasystems BPM Testing

Implementing and testing Pegasystems' SmartBPM suite creates unique requirements, both because it is a COTS rather than a custom application and because implementing a BPM system involves changes not only in a company's technology, but also in its workflows and even organizational responsibilities.

Implementation challenges include the following:

- Testing BPM solutions from a COTS provider involves unique requirements. While these applications are developed by an outside vendor such as Pegasystems rather than internal developers, the purchasing organization may customize as much as 80% of its pre-existing components to meet its individual needs.

Reasons for BPM Project Failure

As a result, the customary functional approach to testing -- making sure the

software works as users expect it to (without any understanding of the software's internal structure) -- is insufficient. A customized BPM application requires 'white box' or 'rules' testing, based on an understanding of the internal structure of the application, focusing on the components that have been created or modified to meet the customer's needs and thus are at the greatest risk of failure.

Many customers try to automate poorly documented manual processes described in multiple, inconsistent, hard-to-understand formats such as Microsoft Word documents or Excel spreadsheets.

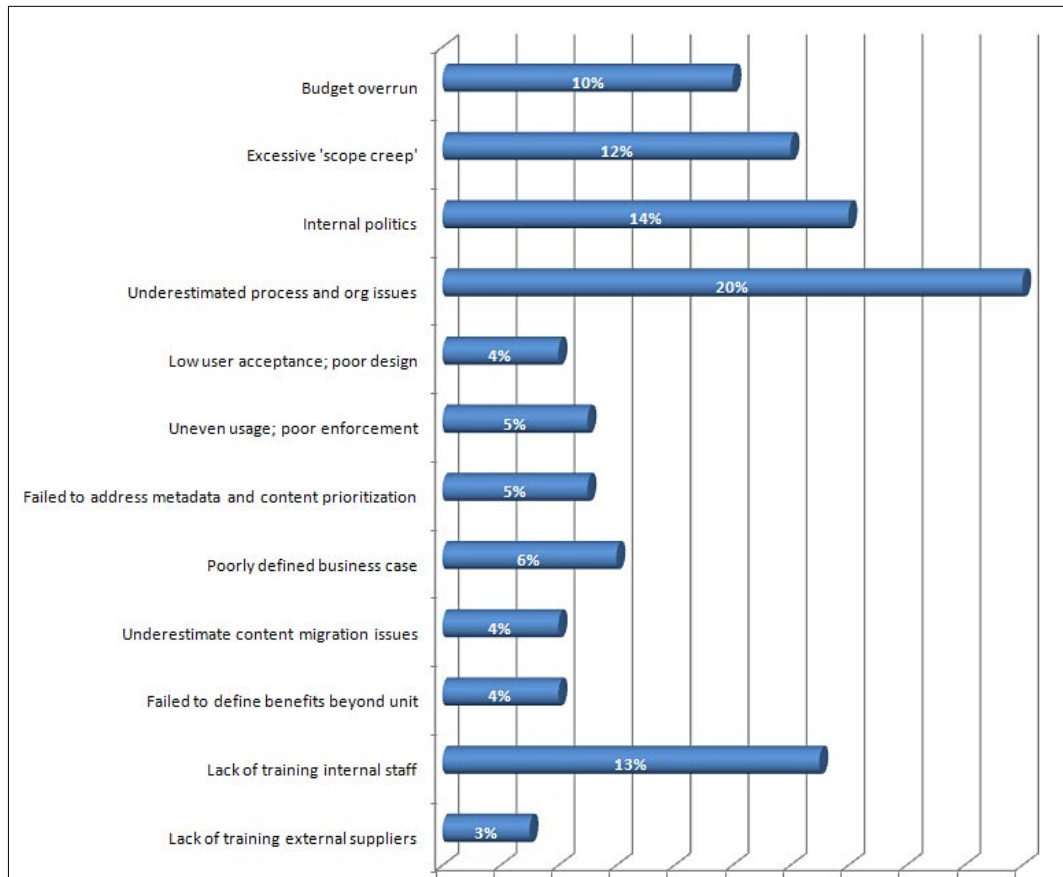


Figure 1

Source: 'BPM: Not Just Workflow Anymore,' AIIM International survey, 2007.

- This means important processes may be captured incorrectly or not at all. Even after test analysts have identified the processes, they must create test cases for review by business users. This effort consumes time and makes it difficult or impossible to prioritize business processes, which makes it far more difficult to determine which testing is most critical. In a healthcare BPM application, one of the most critical aspects is member eligibility determination for any claim adjudication.

If all the aspects of determining a member's eligibility criteria are not tested, it may lead to major issues in production claims processing. This is one of several business process-related instances that must be captured correctly in a standardized form of use cases that are usually skipped in most project execution cycles.

Many BPM efforts are hobbled by divided or conflicting responsibility, particularly when a process spans multiple departments, business units or external partners.

- For example, a change in the workflow required to approve a manufacturing change order might also trigger changes in the processes for ordering raw materials, product testing or assuring regulatory compliance. Without capturing all the related changes, it's impossible to properly configure and test the BPM system.
- BPM solutions provide a level of built-in intelligence that allows process reconfiguration on the fly. This strength of the solution often becomes the greatest weakness in the hands of a team less inclined toward following the processes of requirements and configuration

management. Many IT and business teams are insufficiently trained on BPM configuration. The result: subpar coding and incoherent requirements, which causes a lack of synchronization with standardized IT processes. A study conducted on the defects uncovered during the system and integration testing (SIT) phase of a Pega Rules Process Commander (PRPC) implementation project for a banking and financial services (BFS) customer (see Figure 2) reveals that nearly a third of the defects were attributed to misinterpreted or missed requirements.

Root Cause Analysis of SIT Defects for a PRPC Implementation for a BFS customer

- Owing to the complexity of BPM implementation, chances of defect creep are significantly high when compared with a standard IT project. The defect leakage possibilities increase when there are changes to the critical areas of the application, such as work-item routing and processing logic, work-basket categorization and processing. These features are complex in nature and involve integration of several aspects of BPM application usage, including creation of a work item, processing different business requests and routing them to

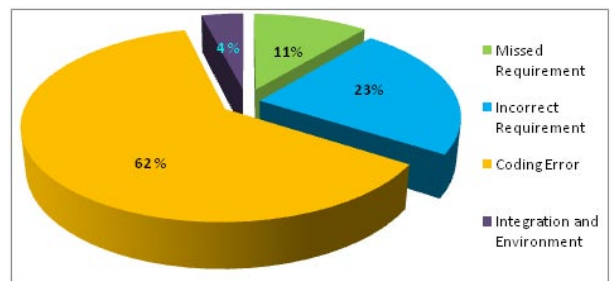


Figure 2
Source: SIT defect assessment for PRPC implementation project at Cognizant, highlighting the root cause related to coding, requirements and infrastructure.

appropriate agents for completion and reporting. Such features with a wider regression impact have a significantly high defect leakage in user-accepted testing and production if an extensive regression test cycle is not executed. Root cause analysis carried out for a PRPC implementation for a large insurance customer indicated that more than half the defects could be attributed to regression testing (see Figure 3).

- Regression test planning with extensive coverage of product features with wider functional implications.
- Verification of processes, assuring they produce the desired results regardless of multiple process paths and changes due to human interaction and other variables.
- Streamlining the process and tools to be used across the different phases of testing.
- Automating the traceability of requirements to ensure that all critical user requirements are tested.

Root Cause Analysis of Post SIT Defects for PRPC Implementation

The key requirements for proper BPM testing include the following:

- Component-based, or "white-box," testing that addresses the highest-risk areas first, ensuring testers are familiar with the design before functional testing. This allows testers to adapt to the iterative development of BPM systems.
- End-to-end testing and validation that provides comprehensive coverage of the underlying process components and business logic.

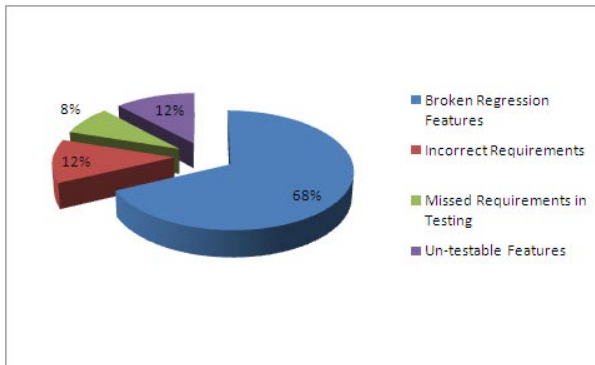


Figure 3
Source: Post SIT defect assessment of a large PRPC implementation engagement to assess the root cause mainly associated with regression functionalities.

How Cognizant Helps

Our proprietary tools and processes reduce the cost and time required to test Pegasystems' BPM applications.

We do this by first ensuring that all the business's critical processes are captured quickly and correctly, as well as focusing testing on the most important customized components and implementing an automated testing approach where necessary. Doing this drives effort reduction and schedule adherence by delivering higher productivity and efficiency.

The key elements of our approach include the following:

- **Component-based testing:** Rather than taking a top-down, functional approach, which begins by testing every component of a Pegasystems BPM system whether or not it has been modified, our component-based testing is based on an understanding of the internal structure of the system. Key BPM

components include the process engine, business rules, decision trees and business analytics components (reports, dashboards, etc.), which are identified for structured test planning. This saves time and cost by first testing modified components, which are thus most vulnerable to failure, before conducting full-fledged system testing. It also improves test quality by assuring that all the components affected by a change will be tested, along with the modified component itself. This ability to quickly identify all components affected by a modification is ideally suited to the iterative process used to implement most BPM applications, where requirements (and the components that meet those requirements) are changed often in response to user feedback.

ADPART in Action

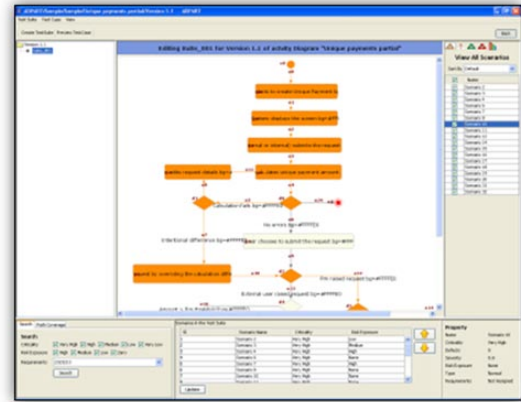


Figure 4

- **ADPART (Activity Diagram-Based Path Analysis and Regression Testing):** This visual modeling tool replaces the clumsy, confusing maze of written documents often used to document important business processes with activity diagrams through which users can easily capture each process flow.

ADPART then translates the requirements into a flow chart and automatically generates test cases that are easily imported into Quality Center, saving anywhere from one-third to half the time usually required for this step (see Figure 4).

ADPART also helps testers identify the most recent changes made through iterative application modeling, as well as which other system components are affected by any customization.

Instances like changes to routing logic in a workflow, modifications to the success criteria of a rule, etc. have significant functionality implications and are very good candidates for ADPART use when modeling revised business flows and creating corresponding test cases. It accommodates scenarios created in Microsoft Visio, as well as from our own scenario repository (described below).

- **Scenario Repository:** This Cognizant-developed repository stores more than 400 test cases across various Pegasystems frameworks in industries such as health care, financial services and insurance. Not only does this eliminate the time and cost required to recreate test scenarios, but it also makes it easier to identify customized components. The scenario repository is a key input to our risk-based testing process (see below) that first addresses customized components that are of greatest risk of failure.
- **Risk-based testing:** Since no organization can afford to exhaustively test every component within every application, risk-based testing prioritizes testing based on both the likelihood of failure of any given module and the impact on the business if such a failure occurs.

Our Risk-Inspired Scenario Evaluator (RISE) methodology more precisely assesses risks than other methodologies because it requires subject matter experts and business users to assign a quantitative value rather than a less precise qualitative value to the likelihood and impact of defects.

Common examples are depicted for testing scenarios involving integration of a BPM application with peripheral applications that are costly or difficult to simulate in a test environment. Fax, print and interactive voice response applications are typical examples with test scenarios that are complex or at times impossible to simulate in a test environment. Our RISE methodology is very accurate in identifying and assessing such conditions during the test planning phase.

- **Test automation:** Our extensive experience in test automation allows for a reduction in the cost and effort of Pegasystems BPM testing. We provide this automation through our CRAFT framework that simplifies the process of script development and execution by creating reusable libraries of business functions that can be used across multiple test cases.

Test automation at the rules level enables testers to quickly determine and test the highest-risk areas before moving to full functional testing, and to perform efficient root-cause analysis of defects. It also helps ensure all decision points and branches are tested, using various combinations of data to validate rules.

- **Use of industry-standard tools and centers of excellence (CoE):** Our longstanding experience with industry-standard tools, such as HP QuickTest Professional, Selenium HP Load Runner, Apache Jmeter, as well as TRUST (our proprietary test management tool), enables us to speed script development and execution. We are also a strategic partner with Pegasystems, with deep expertise in Pegasystems technology. Moreover, our test efforts draw on numerous centers of excellence that combine expertise in many specialized areas, including functional and white-box testing.
- **Business consulting and management skills:** In addition to technical test skills, our experienced business consultants and project managers help cut through the complexity that often surrounds BPM efforts. Among other time-saving contributions, these resources help clients identify stakeholders, reduce unneeded customizations, incorporate proven templates for project management and efficiently and effectively integrate testing into the overall BPM implementation.

A BPM testing engagement of a centralized workflow application for one of the leading global insurance companies based in the U.S. delivered a considerable improvement in its testing process by supporting the delivery of a highly stable system after the quality assurance (QA) phase. Developed from scratch, the application went through several modifications through its requirement, development and testing lifecycle. We identified 97% of total defects in the QA phase itself. This BPM application was one of the most ambitious projects undertaken by the company, intended to reduce its underwriting overheads in half within a period of two years.

A phased implementation meant an increased volume of business changes for each release. This challenge was very aptly handled by utilizing ADPART, which kept test scenarios precise and the test case inventory consistently up-to-date (with the help of a comprehensive Scenario Repository). Efficient utilization of component-based testing and automation utilized the Quality Center tool and Pegasystems' Test Management Framework, resulting in significant schedule and effort adherence. Our CoE expertise was utilized at every critical juncture and, by the first year of the engagement, had increased productivity by over 100%. Our frameworks and methodologies also ensured steady quality improvement for all subsequent releases and helped the client realize all of its business goals within the stipulated timeframe.

Conclusion

Companies implement BPM solutions such as Pegasystems' SmartBPM Suite to help make their employees and their organizations more efficient. They also want to save time, money and effort in the deployment and testing of the BPM applications. Top-down, manual BPM testing based on manual, error-prone modeling processes wastes more time and money than organizations today can afford.

Our methodology and field-proven proprietary tools and processes for testing Pegasystems deployments reduce the cost and time required for testing BPM applications. They also improve test accuracy by identifying all the components affected by a customization, helping to assure that critical business workflows are there when employees need them.

Footnote

Some Pegasystems customers report as much as 30% revenue growth and as much as a 40% increase in productivity - [Source](#)

About Cognizant

Cognizant (NASDAQ:CTSH) is a leading provider of information technology, consulting, and business process outsourcing services. With over 50 global delivery centers and approximately 88,700 employees, we dedicate our global technology and innovation know-how, our industry expertise and worldwide resources to working together with clients to make their businesses stronger. A member of the NASDAQ-100 Index and S&P 500 Index, Cognizant is a Forbes Global 2000 company and a member of the Fortune 1000 and is ranked among the top information technology companies in BusinessWeek's Hot Growth and Top 50 Performers listings.

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Cognizant

Passion for building stronger businesses

World Headquarters

500 Frank W. Burr Blvd.
Teaneck, NJ 07666 USA
Phone: +1 201 801 0233
Fax: +1 201 801 0243
Toll Free: +1 888 937 3277
Email: inquiry@cognizant.com

European Headquarters

Haymarket House
28-29 Haymarket
London SW1Y 4SP UK
Phone: +44 (0) 20 7321 4888
Fax: +44 (0) 20 7321 4890
Email: infouk@cognizant.com

India Operations Headquarters

#5/535, Old Mahabalipuram Road
Okkiyam Pettai, Thoraipakkam
Chennai, 600 096 India
Phone: +91 (0) 44 4209 6000
Fax: +91 (0) 44 4209 6060
Email: inquiryindia@cognizant.com