



CUSTOMER SUCCESS STORY

MAJOR PHARMACEUTICAL COMPANY UNDERGOES TESTING TRANSFORMATION TO REDUCE COSTS AND IMPROVE OVERALL TESTING PROCESS

ABOUT THE CLIENT

The client is a global pharmaceutical corporation with over \$39B in annual revenues. They manufacture prescription pharmaceuticals and biologics in several therapeutic areas, including cancer, HIV/AIDS, cardiovascular disease, diabetes, hepatitis, rheumatoid arthritis and psychiatric disorders.

PROJECT BACKGROUND

The client organization faced the increasingly challenging issue of rising testing costs. The client then trusted their testing services partner for the solution to their ever-increasing software testing costs. Even though they outsource testing to testing services companies, the costs are continuously increasing. Their primary testing services provider engaged with them to deliver a solution that would reduce costs without compromising testing quality or time to market. It was clear that the company would not solve their quality problem merely by substituting existing testers with new testers. It was also clear that cutting labor costs would not be viable for their testing partner. To solve this issue, their partner engaged in a root cause investigation of their testing costs to provide a solution. The answer came from an alliance partner selected for just this situation – Conformiq.

With Conformiq Creator, the client organization achieved a 94% efficiency gain.

BUSINESS OBJECTIVES

The client company identified key objectives, aimed at validating the efficiency gains they expected to achieve by eliminating the issues associated with their manual process. Specific KPIs were also created and formed the basis of the quantitative direct objective comparison. The company's goals are shown below:

- Automated Test Design without manual intervention
- Integrating with ALM and WorkSoft seamlessly
- Optimized minimum number of test cases
- 100% requirements coverage
- Application test coverage visualization
- Generation of test steps and expected execution results
- Ability to create and share with team test coverage and test steps
- Ability to easily maintain and reuse test assets
- Show faster and more complete test coverage than by manual test design
- Ability to quickly create test cases after a design change
- Ability to reuse and improve existing test cases

CLIENT CHALLENGES

The pharma company faced testing challenges across multiple groups involved in the testing process, starting with Business Analysts (BAs), then the test managers, the testers, Subject Matter Experts (SMEs), test reviewers, and finally the regression test execution teams – in other words, the entire functional testing organization. The real challenge was the time consumption with test cases creation and maintenance and Compliance and validation activities added to the complexity of the test design.

The issues they encountered were typical for big projects, but those issues had never been targeted seriously for improvement. Each group identified their process challenges with the current manual test design approach. The findings are summarized in the next page:

Business Analysts

- Using multiple modeling tools to build an application flow from business requirements was complicated
- Spending considerable time with testers and developers to explain requirements and changes delayed testing
- Reviewing requirements and user stories for correctness and completeness verbally and textually was slow
- Managing regular interactions and coordination between business, testers and development teams to ensure consistent understanding as the application design evolves was difficult



Subject Matter Experts

- Dependency on BAs for requirement understanding delayed testing process
- Manual testing led to slow redesign of test cases and validations with every requirement and design change
- Script maintenance was time consuming
- Achieving test design consistency across testers was difficult
- Different test reviewers had differing, sometimes conflicting opinions, as to whether all requirements were covered



Test Reviewers

- Incomplete and uncertain coverage and traceability made reviews slow
- Difficulty balancing review of functional requirements coverage versus syntax and spelling errors delayed testing
- Different testers have different styles of writing a test case increasing time to review and provide feedback
- Repetitive and / or overlapping test cases often were missed



Test Managers

- Lack of documentation or process to quickly train new testers caused delays
- Inability to find testers with sufficient analytical and logical reasoning skills to manually create robust test cases for complex scenarios left test case gaps
- Trying to reduce testing costs by hiring junior resources took too much training time and resulted in poor test quality
- Inconsistency in test case design language and quality, i.e. spelling, grammar, syntax, etc. caused extra time
- Multiple separate priorities – e.g., speed time to market, adopt agile, , and increase automation



Test Execution Teams

- Test syntax and keywords are different from each tester requiring adjustment of test cases
- Often similar or duplicate test cases are created, resulting in extra (unnecessary) tests being executed
- Test automation requires scripting to execute; multiple execution tools need multiple tool programmers and specialists increasing testing costs
- Testing occurs long after each new design element has code drop, putting great pressure on the execution team to complete quickly or delay product release
- Team often is delayed waiting for the SMEs to forward test files for execution
- Valid test cases in the regression pack are unknown



Testing challenges faced by different stakeholders

THE SOLUTION

Conformiq Creator, part of the Conformiq 360° Test Automation solution, enables an end-to-end automation process that starts with the creation of a model. A model is a graphical description of the application being developed using the requirements and user stories. From the model, all functional test cases, documentation, and executable scripts are automatically generated without user involvement except to select the test design algorithms. These models were created directly from the requirements or the user stories. Conformiq Creator also integrated seamlessly with other existing testing tools like ALM and WorkSoft.

Creator is designed to connect the BA to the execution specialist in a seamless continuous testing flow. The Conformiq solution was shown to be capable of eliminating or minimizing all the issues the service provider was currently experiencing with their existing process of manual test design followed by automated test execution. Conformiq Creator achieved all their objectives during project delivery.

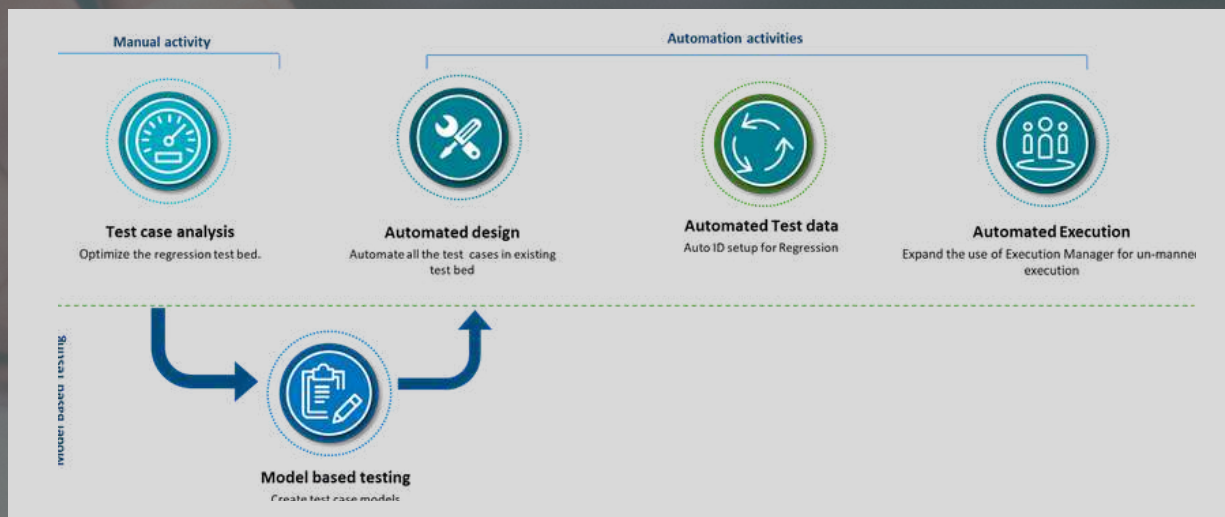


Figure 1: Complete Testing Process Using Conformiq

CLIENT BENEFITS

For this project, portions of the commercial ServiceNow™ application with the customer's customizations were tested. To fully demonstrate the efficiency gains that Creator delivers, two approaches were used to accelerate testing of this application.

1 - Forward Engineering

The first testing method used was "forward engineering" where the application models were graphically created from scratch by assembling prebuilt library elements available in Creator. The Service Portal part of the application was tested. Testing included creation of models for:

- Service Group
- Service Family
- Business Services
- Service Offering

CLIENT BENEFITS

Included in this work was the auto generation of test cases, test steps, and test validations, which could be directly used for automated test execution. It also included auto generation of full test documentation in a variety of coverage reports. The direct comparison of results for generating 20 test cases (i.e., manually versus using Conformiq) is shown below.

Test Phase and Activity	Manual Testing (Hours)	Conformiq (Hours)
Analysis	10	2
Test Design Effort	120	6
Review and Rework	10	1
Traceability Matrix	2	0
End-to-End Effort	142	9
End-to End productivity gain	~ 94%	

Figure 2: Test Case Design Results Comparison

One of the service provider's testing challenges was/is to speed up testing when application changes are made. The speed up in test design as shown above was so effective that there was no need to also demonstrate the even greater efficiency gains, which come from the automatic regeneration of test cases when the model (application) is changed. Specifically, when the model (application) is updated, Creator does an impact analysis on the changes, automatically noting which test cases are still valid, which are no longer valid, and which are newly added. By optimizing the test cases in the regression pack in this way (i.e., to include only the ones currently needed), the pharma company would achieve even further efficiency gains in test execution.

2 - Reverse Engineering

The second modeling method was "reverse engineering" where existing manual test cases of the application were imported and graphical models were generated from prebuilt library elements available in Creator. User interactions in the Service Portal within ServiceNow were tested. This testing included reverse engineering generation of models for:

- Create and Update a Business Service Record
- Create and Update a Learning Resource
- Create and Update a Policy Procedure and Portal Access Template
- Create and Update a Service Action
- Create and Update a Service Family Record
- Create and Update a Service Group Record
- Create and Update a Service Offering Record

In this part of the work, models were automatically generated, reviewed and reworked for completeness. Using Creator, the models were then used to auto generate optimized test cases, test steps, and test validations, including full test documentation in a variety of formats. The time taken to create these seven (7) models is shown.

Test Phase and Activity	Conformiq (Hours)
Analysis	1
Test Design Effort	0
Review and Rework	1
Traceability Matrix	0
End-to-End Effort	2

Figure 3: Test Case Reverse Engineering

As can be seen from these results, 27 minutes was reduced to 17 minutes for each model creation (9 hours for 20 models versus 2 hours for 7 models), which was 63% faster for these examples when existing test assets were reused, further strengthening Conformiq's process improvements.

SUMMARY

The key project benefits demonstrated from using Conformiq's MBT-based tool process were:

- **REUSABILITY:** Reverse engineer existing test assets helped with reusable test models repository
- **EARLY FAULT DETECTION:** Visualize functional flow of the SUT helped with increase in quality of test cases
- **FASTER TEST GENERATION:** Test design effort were reduced by ~20%
- **FASTER TEST EXECUTION:** Execute only the optimized minimum number of test cases
- **REDUCED TIME TO MARKET:** Progression test during sprints
- **TEST REJECTION:** Test cases review comments and test rejection percentage was reduced to <5%
- **GREATER CONFIDENCE:** Achieve known test coverage and traceability helped with End to end traceability maintenance
- **EFFICIENT DESIGN CHANGES:** View impact analyses and automatically optimize regression suites with every change to model/requirements
- **AUTOMATION OF THE ENTIRE TESTING LIFECYCLE:** Integrated with existing and new SDLC tools and processes to streamline test flow like ALM and WorkSoft
- **CONSISTENT AND REPEATABLE TESTING:** Formalize a consistent testing process

Conformiq's unique 360° Test Automation solution enables the next generation of testing for complex testing environments. Conformiq and its testing service partners can help achieve a successful transformation and aid in the faster release of products and applications.