

Case Study:

Major Pharmaceutical Company Undergoes Testing Transformation to Reduce Costs and Improve Overall Testing Process

A major pharmaceutical company looked to its testing services partner for an answer to their ever-increasing software testing costs. The solution included Conformiq Creator which enabled them to achieve a 94% efficiency gain.

Background

A US headquartered global pharmaceutical corporation with over \$16B in annual revenues faced the increasingly challenging issue of rising 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.

Testing 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 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 tables below.

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

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 penetration confused delivery of a coherent testing process

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SMEs

- 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 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
- Don't know which of the many test cases in the regression pack are valid and should be executed

Objectives

In order to demonstrate the benefits of Conformiq Creator™ and its MBT testing process, the company identified key objectives, aimed at validating the efficiency gains they expected to achieve by eliminating the issues associated with their manual process (outlined above). Specific KPIs were also created and formed the basis of the quantitative direct objective comparison. The company's goals are shown below. Conformiq Creator, with its 360° Test Automation process, achieved all their objectives during project delivery.

- Automated Test Design without manual intervention
- 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

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Project Deployment with Conformiq 360° Test Automation™

Conformiq Creator software, 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.

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.

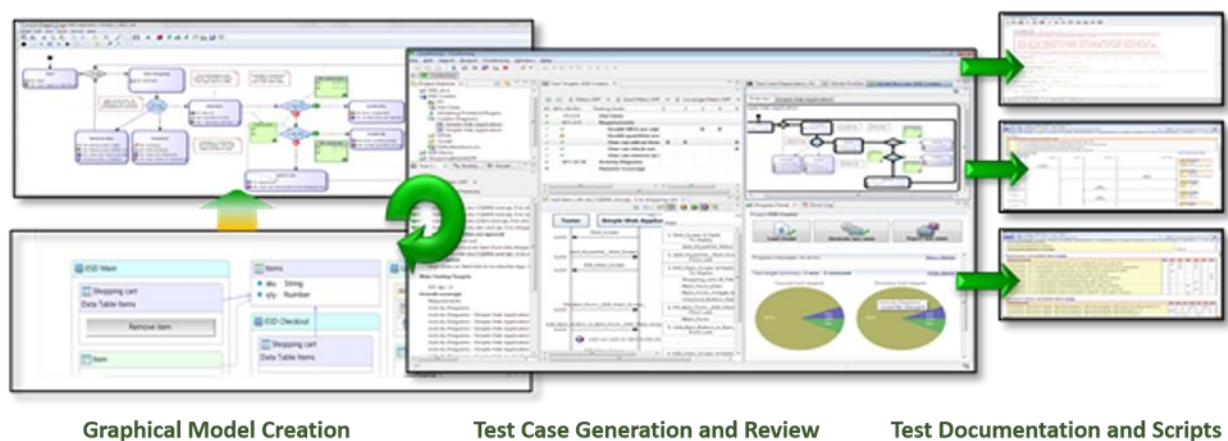


Figure 1: Three Step Process for Automated Test Design

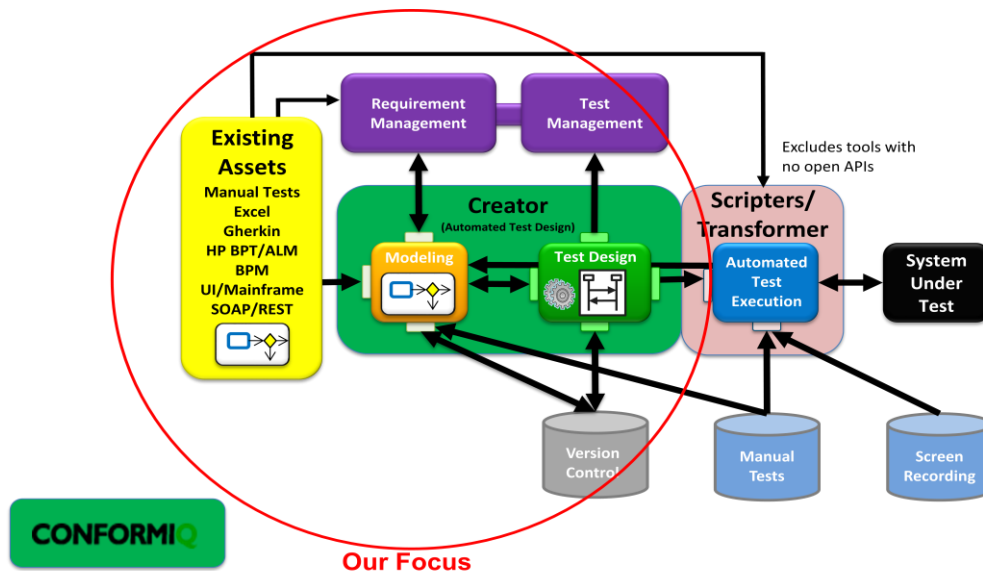


Figure 2: Complete Testing Process Using Conformiq

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Project Results Using Conformiq 360° Test Automation

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

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 3: 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

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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 below.

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 4: Test Case Reverse Engineering Times

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.

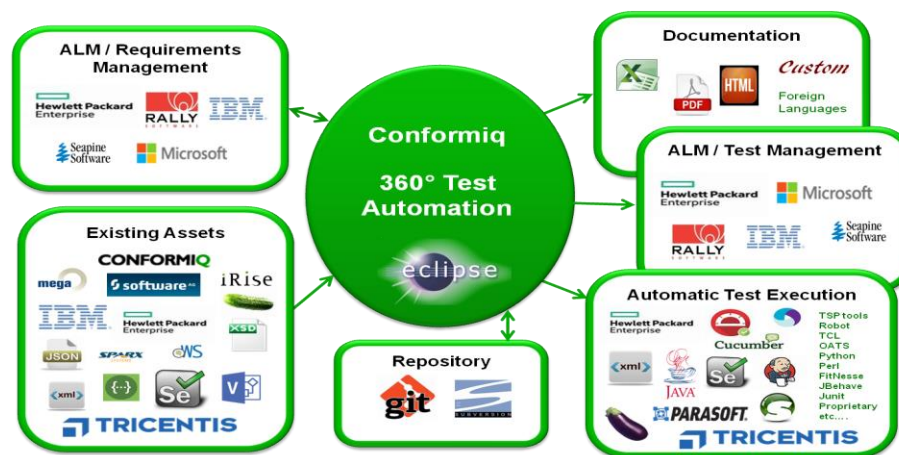


Figure 5: Integration Across All SDLC Tools

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Summary

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

- **REUSABILITY:** Reverse engineer existing test assets
- **EARLY FAULT DETECTION:** Visualize functional flow of the SUT
- **FASTER TEST GENERATION:** Computer generate test cases/scripts/validations
- **FASTER TEST EXECUTION:** Execute only the optimized minimum number of test cases
- **REDUCED TIME TO MARKET:** Progression test during sprints
- **GREATER CONFIDENCE:** Achieve known test coverage and traceability
- **EFFICIENT DESIGN CHANGES:** View impact analyses and automatically optimize regression suites with every change to model/requirements
- **AUTOMATION OF THE ENTIRE TESTING LIFECYCLE:** Integrate with existing and new SDLC tools and processes to streamline test flow
- **CONSISTENT and REPEATABLE TESTING:** Formalize a consistent testing process

MBT is an umbrella term that can signify many different processes built on the concept of using a model. The differences between MBT tools are very large and, even though they are similar in their high level abstract concept, the details from projects such as the one for this customer, prove that there are major differences in the overall benefits achieved – benefits much greater than test optimization alone. To deliver the highest level of capability, Conformiq delivers an integrated, yet open end-to-end automated testing process. The Conformiq solution makes it possible to tightly integrate with and improve the efficiency of both third-party SDLC tools and/or the customer's own tooling. Customers achieve significant software test process gains and quality from deploying Conformiq 360° Test Automation, and even larger gains come from earlier commercial deployment of the developed application.

Conformiq's unique 360° Test Automation solution enables the next generation of testing for complex testing environments. Any company looking to improve its current functional testing should consider the benefits that this transformational process will deliver. Conformiq and its testing service partners can help achieve a successful transformation and aid in the faster release of products and applications.

Conformiq serves enterprise IT, communications and embedded software markets worldwide. Privately-held Conformiq is headquartered in San Jose, California, with a worldwide delivery and support organization including offices in Finland and India.

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