Case Study:

Telecom Giant Deploys Conformiq 360° Test Automation™ Widely to Speed OSS/BSS Application Testing

Background

An American multinational telecommunications corporation investigated options for improving the speed and effectiveness of their application testing methods. They recognized that traditional manual test design and execution methods could no longer sustain the delivery pace needed for them to get new products to market quickly reliably. They understood that innovation was the key to new customers and expanded profits. New products, combinations, and capabilities drive new business. If they were not delivering these services, their competitors would be, and they stood to lose millions of dollars every month they were delayed in releasing products. Therefore, every bottleneck in their overall product testing process needed to be identified and removed.

New products are being continuously introduced, so new product and installation provisioning needed to be deployed using a customized OSS (Operations Support System) application. Additionally, the billing and business side of new products with customized BSS (Business Support System) software also needed to be created, updated, and thoroughly tested independently and together with the OSS software, prior to deployment. Since their new products could not be deployed until the OSS and BSS support infrastructure and supporting software were in place, the push to get these applications with all their connections to other applications to support the company's business had to occur quickly and accurately. Further, new products were being continuously added and the testing process was repeated monthly, or sooner as the products dictated.

Any error in configuring the end user selected product combinations, account reporting or new product provisioning could prove to be a nightmare of customer relations. These are broad scale applications with many Application Programming Interfaces (APIs) that connect with all the other company's applications to transfer the information between them. The company was looking to design and test over 2,000 new APIs for their improved OSS/BSS services.

The company's primary testing service provider introduced Conformiq, presenting the Conformiq 360° Test Automation solution, based on Model Based Testing (MBT), as a testing transformation to greatly improve the current manual test design process. To make a corporate decision of this broad magnitude, the company ran multiple Proofs of Concept (PoCs) to fully and deeply explore all the capabilities, boundaries, interfaces, and benefits that Conformiq's technology delivers for user interface, web services, and back-end application testing.

As the telecommunications company's goals were test design speed, the previous manual times and efforts to complete the test case designs were known and matched against the Conformiq generated results. The telecom's key target of test design speed was easily demonstrated by Conformiq Creator™. Additionally,

Creator automatically generated the test execution stimuli and expected correct test execution results plus an Excel mapping file with pre-defined library mappings, which easily linked the executable scripts with the harness. This allowed the telecom company to achieve an automated end-to-end testing process and further efficiency gains. Because Creator automatically provided impact analysis after each model change, maintenance was improved: the no longer valid test cases were not carried further for execution. Additionally, as for all projects, they wanted documentation in their own reporting format, and the Conformiq report scripter was quickly modified so documentation was generated in their format.

After all the PoCs were completed, Conformiq Creator was selected to automate all of the telecommunications giant's functional test design, and to create a seamless integrated SDLC process with their existing tool chain.

Project Deployment

Once the decision was made, the company moved directly to full deployment. This meant that all SDLC tool integrations, plus training classes and best practices workshops for both the company's direct users and their testing service provider had to occur immediately in multiple cities, in multiple countries, across the world. Our Conformiq service provider deployed Conformiq software in four off-shore delivery centers across India, and three customer locations in the US. Conformiq trained the trainers and in less than a year, over 250 users were successful Conformiq Creator users. This represents what is likely the largest single deployment of advanced MBT in the world.
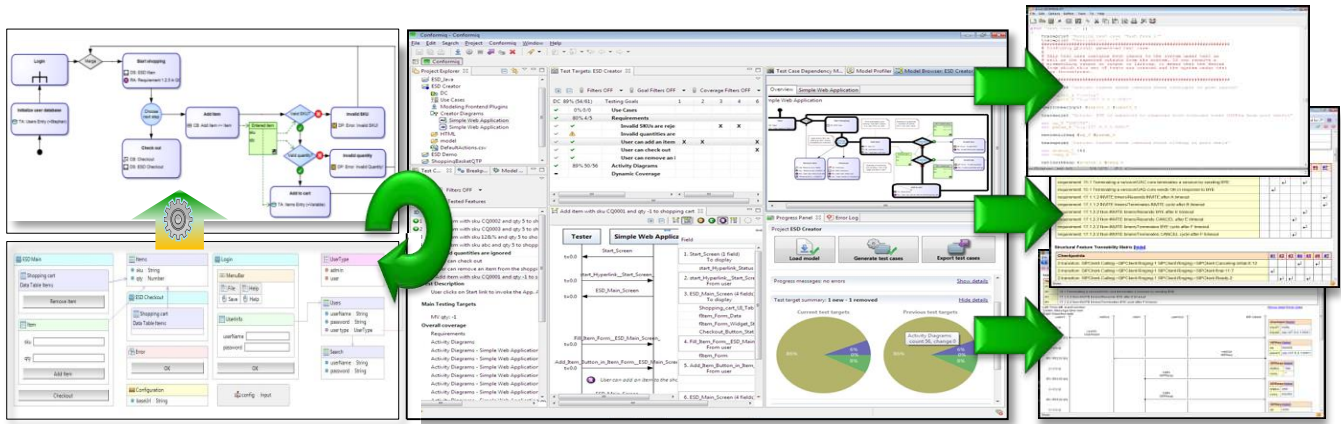
Automating Test Design in the Customer's SDLC Process

Conformiq Creator™ enables an end-to-end process, starting with the creation of a model which is a graphical description of the application being developed based on the requirements. From the model, all functional test cases, documentation, and executable scripts are automatically generated. Using Creator, with its links with most commercial and free SDLC tools, a seamless end-to-end automated testing process was established. This complete integrated SDLC system started from system requirements through to interfacing with Rally, HP QC and QTP, and Parasoft SOA test tools. Conformiq already had most of these interfaces in place for immediate deployment, but needed to implement the SOA test interface. Conformiq worked closely with Parasoft and quickly delivered a file transfer interface. . The telecomm client wanted a deeper integration, so to deliver this, Conformiq partnered with Parasoft to help specify their new interface architecture. This tight coupling between the tools was delivered with the customer's approval. Further, in support of this interface for web services testing, the telecomm company wanted to further increase efficiency by reducing the modeling needed to automatically generate test cases for SOA test execution. Conformiq created an XSD and WSDL direct import so these constructs would automatically create a model to generate test cases.

The Conformiq Creator modeling software was used to capture the application's operation and system flow from the requirements. Mismatches between requirements and the model were automatically flagged. The model was reviewed and, as it was graphical, logical process errors were easily and quickly identified. Appropriate data was included for the automatically generated positive and negative test cases.

Once modeled in part, the Conformiq test generation engine automatically generated an optimal test suite based on the user selected test design algorithms to achieve 100% coverage of the included requirements. These results were analyzed by reviewing the generated test step reports, message sequence charts, test-to-requirements traceability matrix, and the graphical model coverage diagram. With Conformiq, users understood what every test case covered and why it was generated. The Conformiq engine automatically split the model across all available computation processors, speeding the test generation for real-world

model size and complexity. Once validated, the model was extended to additional features so that system testing of the APIs was quickly completed. From these test cases, scripts for HP QTP and Parasoft SOA test were then separately generated by the Conformiq software for execution.

| Graphically model | Review and generate test cases | Generate reports and scripts |

Automated Test Design and script generation in 3 steps

The process of modeling, generated test case review, test documentation, plus test scripts for automated execution, including the expected correct test execution results (test oracle), is shown in three steps above. Incremental modeling and test generation supports agile processes and continuous integration with tools like Jenkins.

Deployment Results

The details for the scope of the deployment are as follows.

Deployment Information	Details
Number of licenses in use	>100
Number of users trained	>250
Number of user locations	7 cities/2 countries
Time to reach full deployment	10 months

The overall results for the testing work done for these four projects combined were as follows:

Program Information after One Year	Details
Application Programs deployed	20
Models developed	550
Test cases generated by Conformiq	12455
Percent Automatable Test cases That Were Automated	95.5%
Progression Testing Overall Productivity Gain	37%
Progression Testing Overall Cycle Time Reduction	32%

In addition to the above benefits, the telecomm company noted that they achieved increased test design and automated execution coverage. Further, they noted that the consistency of the generated test cases and reports made their reviews easier and validation and approval faster.

Summary

This telecom company and its testing service provider have deployed Conformiq's 360° Test Automation™ technology for over three years. As additional applications and their APIs move to development, they are modeled, most often by extending current models or by reusing and modifying component models previously created for other applications with similar interfaces. This Intellectual Property reuse has further accelerated and increased overall testing efficiency.

Although MBT is an umbrella term that can mean many different processes built on the concept of using a model, the differences between MBT tools are very large. Although they may seem similar at first glance in their high-level MBT abstract concept, details from programs such as this telecom company and their testing services company partner implemented prove that Conformiq with 360° Test Automation technology can provide great transformational improvement – benefits much greater than just faster test design. For highest level of overall capability and quality through a model-based approach, Conformiq delivers an integrated, yet open, end-to-end automated testing process easily be integrated with third-party SDLC tools and/or the customer's own tooling. The gains achieved from deploying Conformiq Creator ™ are significant, yet the largest commercial gain comes from being able to release the developed application sooner.

Conformiq's 360° Test Automation solution enables the most comprehensive testing in the industry for complex, system-level testing environments. Any company looking to improve its current functional testing would do well to look in depth at what this process change will deliver. Conformiq and its testing service partners can help achieve a successful transformation as was proven for this telecomm customer.

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