

# Superior Testing with

# E2E Automation

A Conformiq and Qentinel Whitepaper



**CONFORMIQ**

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# Introduction and Industry challenges

Large enterprises have multiple applications that are designed to efficiently run their operations which are evolving exponentially because of new use models and new technology platforms. Many of these enterprises are engaging in digital transformation to accelerate the development and deployment of these applications and create competitive advantage. Systematic, intelligent test automation that provides traceability and performance is critical, not only for ensuring flawless operations and fast release to production but also for providing regulatory compliance documentation. New testing approach is required to accelerate time to market while providing the operational confidence and regulatory traceability to operate profitably.

The current problem is testing is not integrated and in different test execution platforms. The test cases for each application must be manually adapted for automatic test execution which amounts to significant manual efforts that delay releases.

## **The key challenges faced by testing organizations are:**

- High testing cost for building and maintaining automation platforms
- Lengthy Test cycle time
- No experience in choosing right tools for the business needs
- Transformation to Agile/DevOps and spoilt for choice for CI/CT tools
- Testing across multiple platforms
- Agile testing for Brown field apps - Continuous process from BAs to execution
- Adhering to Change management
- Full coverage traceability

Enterprise customers need to use modern agile methods in their software development and testing processes but they have a huge amount of legacy applications which are tested and maintained manually. This manual work represents ~80% of the entire software testing market.

The software testing market is ever growing with plethora of solutions on offer but the real questions remains: what is being tested and what is being automated is the right focus in terms of the application. Enterprises are on constant look out for solutions which not only save effort and cost but also deliver optimized tests that can be automated.

**Systematic and intelligent test automation that provides traceability and performance.**

# How to deliver testing faster with high quality & coverage

With software development becoming more agile and reactive, the test processes have moved from traditional linear models to the more rapid, iterative models. The change of the development and QA processes has created a need to rethink the QA tools, too. Traditional, isolated QA teams and tools may not be viable anymore but distributing the QA effort in the development teams has brought along another kind of challenge. When tools and practices vary it may be very hard to assess to overall level of quality or to understand the total cost of testing. The hidden cost of maintaining the test tools and the tests themselves is significant, as is the amount of manual intervention still needed. Meanwhile, the preferred deployment architecture is changing from System based local installations through servers and database to Lighter internet-based access. The tool set should address three major asks – Faster Time-to-Speed, Complete Coverage and Higher Quality.

Selection of right strategy is essential in ensuring complete test automation and is not just limited to test execution alone. The users should really focus on what they need to achieve in order to get tests out. Does better coverage really matter? Does efficiency really matter? We think they should and this is probably the true difference in selecting the right approach.

Business users need an easy and seamless tool that can be integrated from requirement through execution eliminating or reducing manual intervention. Model Based Testing is one such approach that automatically models functional transaction flows into automated test cases by reducing time and effort by ~60%.

The right solution will help with automating the thinking of the test case design and then automatically generates the test cases, test steps, and validations, without any user involvement, for direct automated test execution, ensuring E2E Test Automation.

## The essentials of faster and quicker delivery cycles are:

- DevOps & Agile methodology – Adoption of BDD/TDD testing which can be run multiple times while performing continuous builds, accelerating CI/CD and DevOps
- Right Testing Tools & Strategy – Adoption of right test automation tools that can be seamlessly integrated with multiple vendors/tools to address all testing needs
- Automated Delivery Pipelines – Continuous delivery practices need full automation, reducing manual intervention and errors ensuring faster time-to-market and higher productivity
- AI Driven Testing – Automation beyond core capabilities like automated test-case generation & AI-driven test-set optimization
- Converged Testing – Maximize testing by creating tests once and reusing cross multiple platforms like web, desktop, mobile, etc

**The right solution will help with automating the thinking of the test case design and then automatically generates the test cases, test steps, and validations.**

# Why is Automated Test design essential for Success

In the previous section, we touched some key aspects of Model Based Testing and how the right strategy can yield better productivity. Let us look at how Model Based Testing accelerates Test Design Automation process.

The alternate to Test design automation tool is designing test cases manually which means the tester needs to go through the requirements documents or user stories before crafting the tests. This process is not sustainable in longer runs because of multiple loopholes like the tester needs to have design skills, the process does not guarantee the systematic and repeatable coverage, longer hours spent, and the list goes on. The only advantage with manual design is low starting cost which also fades away in longer run.

## The concept of Model Based Testing has changed over the years and Conformiq has adapted the solution ensuring three main approaches:

- Graphical test modeling approach
- Environment model driven test generation
- System model driven test generation

Conformiq's Creator provide a unique Model Based Test Design solution that automatically creates optimized test cases

from system business models. Creator is not just about test generation! Creator integrates and connects with requirement & test management, version control and test automation/CI integration.

## This approach vastly helps the business users in multiple ways:

- Conformiq automatically designs and creates test cases with test input used to stimulate the application combined with exact expected response from the application, all with full data content and with exact timings, by applying a user defined set of testing methods and strategies
- Conformiq has the ability to automatically generate sufficient and correct test data which is a cornerstone functionality of an automated test design solution. Any solution that is capable of only generating test flows offers very limited value
- Conformiq's data verification will automatically determine which user specified data values are redundant to optimize test cases for execution. Additionally, it will automatically identify if any necessary data is missing for complete test coverage
- Conformiq supports data-driven testing

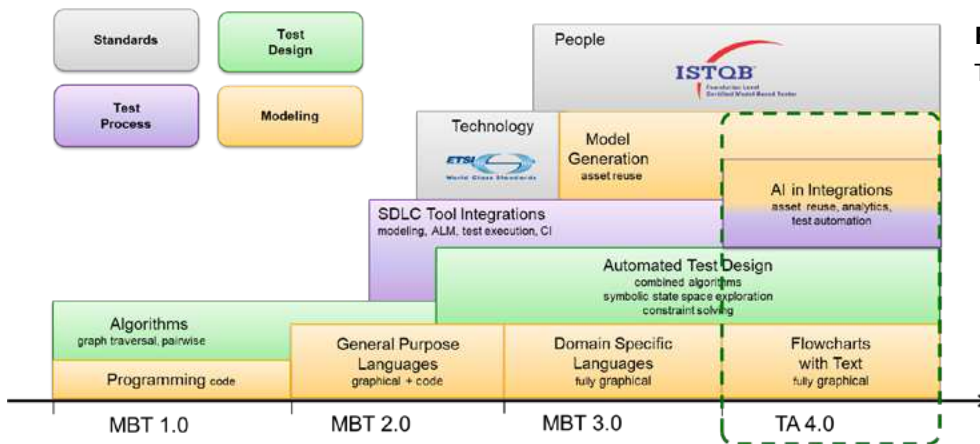
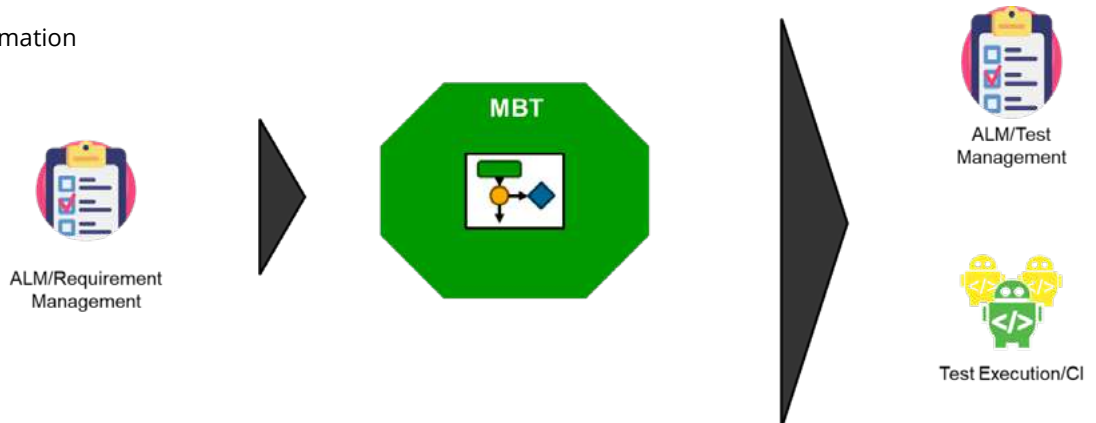


Fig: 1 Evolution of Model Based Testing

Fig: 2 Enabling Test Automation



# Robotic software testing in the cloud

Once designed, tests need to be executed. As Model Based Testing can effectively produce an adequate number of tests, adequate execution capacity has to be available.

Qentinel Pace is a cloud based robotic software testing platform with practically unlimited execution capacity. While Conformiq takes care of producing the test design, Qentinel Pace takes care of producing the test results.

## Key characteristics and benefits of Qentinel Pace include:

- Cross-platform and cross-browser testing for web, desktop, and mobile
- Pacewords scripting language an AI assisted test editor that have proven easy to learn for even non-programmer and appears similar regardless of the target platform; naturally, with Model Based Testing one rarely even needs to go to the script level
- Scalable execution platform with unlimited test robot capacity
- Complete and detailed test execution history with screenshots and videos of failed tests creates a fully traceable test history
- Predictive quality metrics based on Qentinel's patented Quality Intelligence technology
- Project-level access control and user management that enables also inter-company collaboration
- Open APIs for integration with any DevOps tool or software engineering database

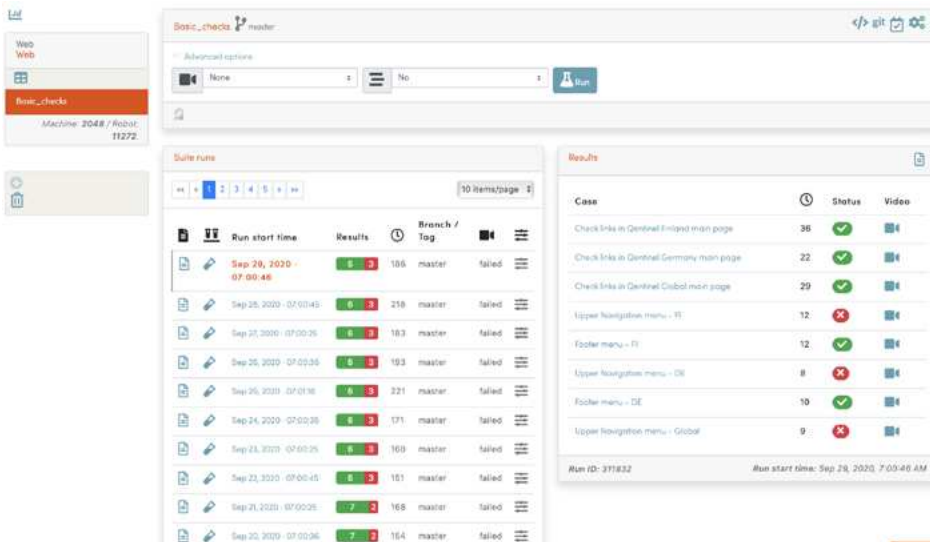
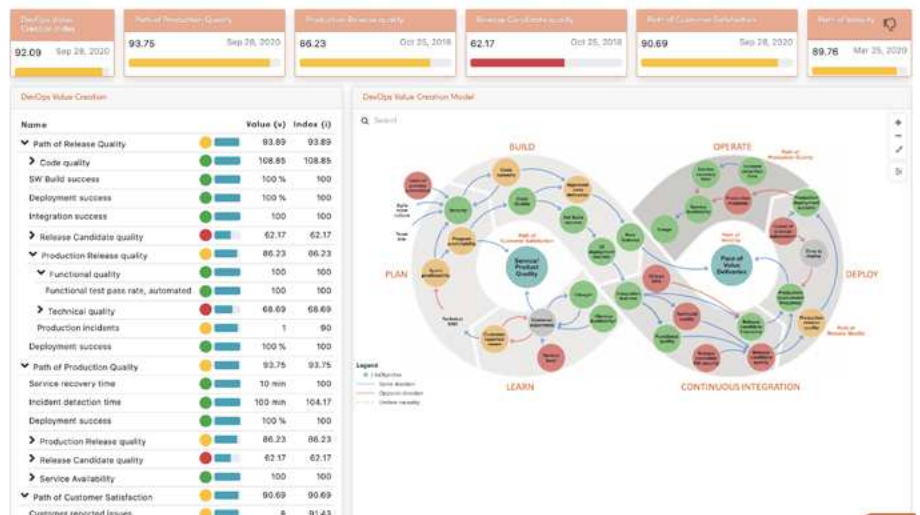


Fig: 3 Complete, traceable test history

Fig: 4 Predictive quality metrics



# Integrated E2E approach

*For faster & continuous testing cycles*

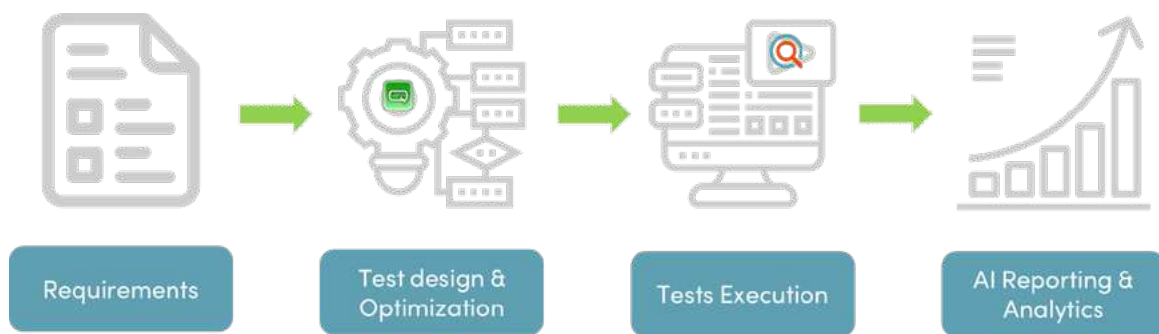
Testing time is spent on

- 1) understanding what to test;
- 2) designing the needed test cases;
- 3) executing the test cases;
- 4) analyzing and understanding the test results;
- 5) reporting the test results.

All these main activities can be automated to a certain extent, at least.

Conformiq Creator and Qentinel PACE integrated platform covers this whole chain of activities, providing a solution

which is more comprehensive and unique to large-scale test automation for business-critical information systems. With enhanced technology platforms, this strategy will address two core customer asks – Deliver value fast and Assure end-to-end business processes. As a result, the enterprises deliver High Quality @ Speed by implementing a no-touch, script-free testing platform.



**Fig: 5** Our Approach - Complete Integrated Workflow

## Client can achieve the following benefits:

- Automated Test design and model-based testing saving upto 60% time & effort
- Requirements traceability upto 100%
- 100% visibility on test coverage
- 100% Test Optimization – Upto 50% reduction in Test Cases
- Requirements as the single source of truth
- Complete sync between AUT and test assets
- Risk based test optimization
- Seamless integration with Requirements and Test Execution environments

**This strategy will address two core customer asks – Deliver value fast and Assure end-to-end business processes.**

# Leveraging AI & RPA in testing processes

Meeting customer expectations by embracing changing technological changes

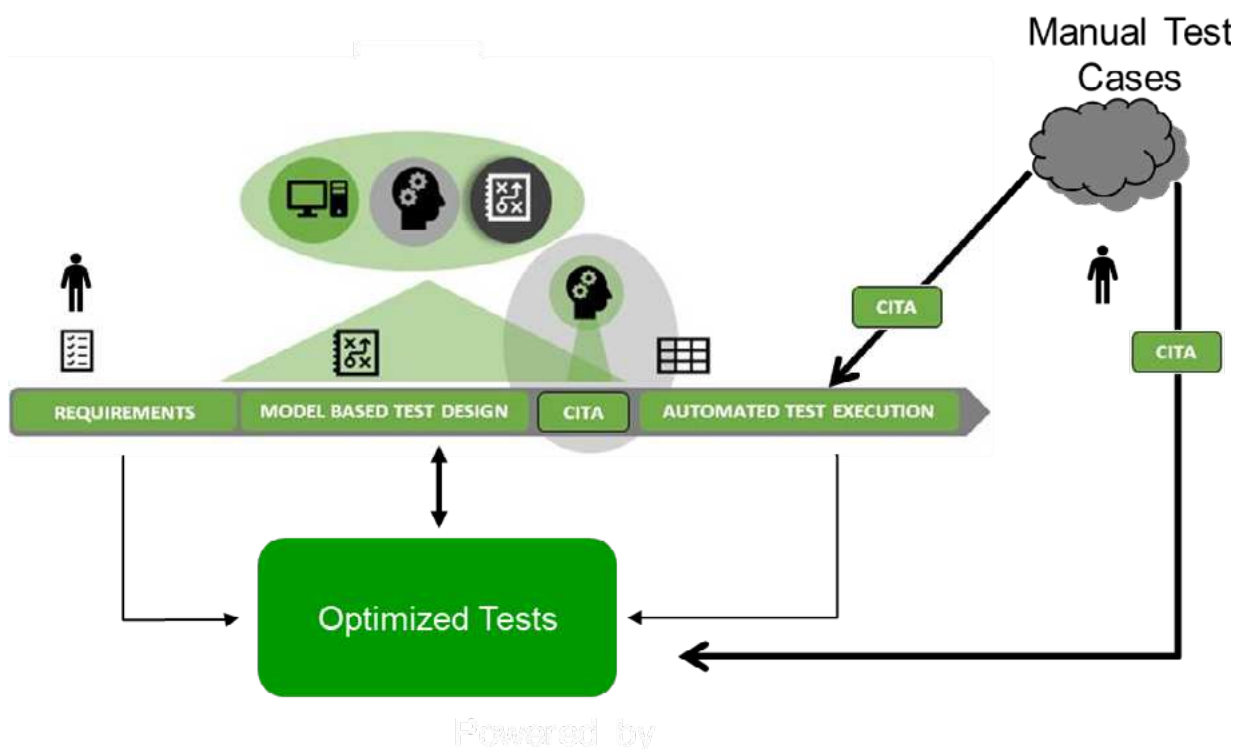
Today, AI & Machine Learning are centered on training software to understand input data versus output - this is quite similar to the testing activities performed manually today. With Artificial Intelligence, machine come up with testing possibilities and automatically optimizes the test case creation process.

Conformiq's Creator CITA (Conformiq Intelligence Test Automation) technology leverages Artificial Intelligence and comes up with testing alternatives and automatically optimizes the test case creation from the application/system functional model. The model is based on the application's GUI, API or any back-end actions that can be constructed through various reverse engineering approaches. With AI, Conformiq generates test automation code automatically and takes care of the impact of changes made to the model for whole end-to-end testing processes.

**Conformiq Creator AI technology enables users to achieve:**

- Shift left testing for faster time-to-market with improved test quality
- Effectively generating and optimizing test cases, prioritizing testing and automation, enhancing UI testing, and reducing tedious analysis tasks
- Effectively producing maximum automation code and integrating smoothly into any automation environment
- Building test assets faster and easier

The testing process is full of repeated tasks, not only in test execution, but in preparing the system under test for testing, arranging and transforming test data, preparing a deployment, updating production information systems, and many others. Qentinel Pace also serves for these purposes. Its rich Pacewords technology enables for robotic process automation (RPA) equally well as automated test execution.



**Fig: 6** Conformiq Intelligent Test Automation (CITA)

Further details on Conformiq's AI approach can be read on our paper here:

<https://www.conformiq.com/download-white-paper/>



# Use Cases - Customer testimonials

## User Story 1

The user is a senior test manager - A current user of Creator and former other MBT tool user for testing complex system applications and user interfaces with a Global multi-national company

"On the surface, many features that are shown in a demo look similar but, in digging deeper, the core difference is huge:

Conformiq automatically generates the optimized test cases including both data and business logic, expected test results, automated test scripts, traceability, graphical coverage, and customized reports. Models are of the system, so changes are easy. Because Conformiq automatically does all the work, it easily scales to real world complexity. Once the model is created, everything else is AUTOMATIC.

Other MBT tools do this manually. The user traces through the model to manually click to create test cases and must create the expected result. Once manually created, these tools will optimize the flow. Data is added separately. The models have test script details manually embedded, so they are not reusable when designs are changed. Models must become very detailed to include real test points, especially for UI operation. In a real-world application, this process is too tedious and simplistic to work well. Everything except preselected data flow optimization is MANUAL.

The ability to comprehensively test real world applications and the efficiency gain differences are hugely different."

"We thought the Conformiq tool had the greatest chance at being a success for us. This is based on getting people to see the purpose, and see resulting test time efficiency, and ease of use."

## User Story 2

The user is a Senior Test Manager with a major Healthcare Software Company

"After just 3 months use of our 10 Creator licenses, we canceled our staffing plans for 50 additional testers saving \$1.25M."

## User Story 3

The user is a Test lead with a major NA Bank

# Summary and closing statements

With the software getting more and more complex and ever growing, testers need to do more testing than before. Given the integrated nature of today's systems, expectation to deliver continuously is becoming a norm. With this context, enterprises still relying on manual effort will fail to keep up with the changing business dynamics.

Test Automation is the way forward which addresses Speed with Higher Quality and Coverage. Conformiq Creator provides visibility in what needs to be tested by analyzing the requirements and generating automated optimized tests, shrinking testing time and effort by ~60%. These tests can then be executed and reported automatically through Qentinel Pace.

A total implementation of our integrated solution can empower QA teams with increased productivity across test case design, execution and reporting, resulting in faster time to market and reduced cost without compromising the test quality.

Our clients have experienced:

- Quicker ROI in < 6 months
- Reduce daily challenges of Test script maintenance and re-work by 70%
- 40% fewer test cases with 100% coverage
- Test maintenance effort reduction by 80%
- Faster time to market by 40%
- Test design time reduced by 50%
- Improved and Optimized Test Data Management with Conformiq's Data design approach
- Standardized testing procedure for repeatability across projects

**Increase productivity across test case design, execution and reporting. Get faster time to market and reduce costs without compromising the test quality.**

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