

Role of Intelligent Test Automation in
Accelerating Digital Transformation

■ Executive Summary

As businesses globally scale up their automation efforts to propel their digital transformation journey, the traditional approach to development and testing has undergone a sea change, owing to scale and complexity of the projects. Test automation is critical in achieving the desired leverage. However, enterprises seem to be stuck either in manual mode or slow down at various points in their automation journey. The Agile lifecycle demands that Automated Testing should cover more ground now and faster.

Some of the common impediments to automation efficiency and speed are the high volume of test case backlog, lack of visibility and direction, inadequate information on testing priority and critical, high-risk test requirements to align with changes in business priority.

Intelligent test Automation – that is automation led by data, Artificial Intelligence(AI) and Machine Learning (ML), is the evolutionary approach that answers some of these problems. It fulfils the full promise of agility and innovation for enterprise and its capabilities extend far beyond the conventional test automation model. How can the enterprise use intelligence to realize automation maturity?

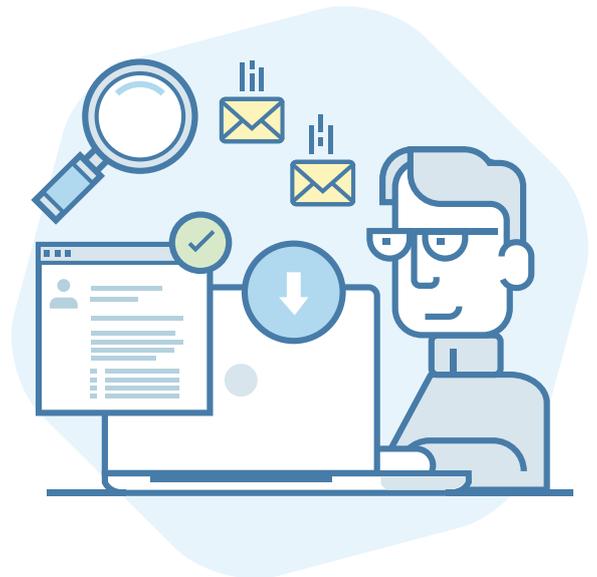
This paper discusses how intelligent automation can drive quality and provide remarkable efficiency and release velocity. How AI and ML can enhance software quality with continuous feedback and prescriptive project improvements. More importantly, how you can learn to use tools and processes to supercharge your digital transformation efforts.

■ Overview

Digital quality has already run the cycle of evolution from conventional testing approach to Continuous Testing and Test Automation. Digital maturity however demands high quality at the speed of business, and accordingly the expectations from quality lifecycle have escalated.

Transformational initiatives like software test automation and agile test data management have certainly increased efficiency and achieved higher volumes of testing in addition to eliminating some of the roadblocks faced by manual testing.

Test automation and continuous testing possess the ability to deliver quality and speed. However, automation is underexploited in **QA and testing**.

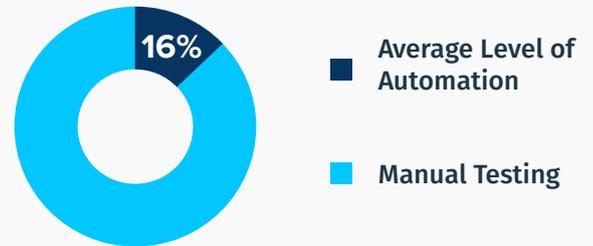


Agile Lifecycle demands intelligent test Automation



Intelligence based prioritization of test automation efforts yields better results

Findings from the World Quality Report 2017-18 show that the “average level of automation for test activities is around 16%. While we see a rise in the number organizations benefitting from automation, the value they generate is largely unchanged.”



Yet the application economy is growing at a break-neck speed. Customer expectations and experiences have been defined by the real-time, high quality benchmarks set by digital behemoths. This has great implications on how companies innovate to deliver those experiences and build software that meets these high benchmarks. Most enterprises are therefore wired to release swiftly, offer better features and services, innovating faster than their peers in order to acquire, retain and delight customers and survive the disruption.

Increased business pressure to deliver new products/releases and services at digital velocity has shifted the focus to QA. Agile teams are constantly developing and releasing changes more frequently to the test cycles

Automation brings in efficiency, reusability, reliability and shorter sprints. But its purpose shouldn't be to simply replicate manual processes. More importantly, as businesses struggle to deliver test environments that match the pace of their exponential dev schedule, there are many aspects that act as impediments. Simply put, it is not anymore just a speed/quality issue.

“ Strong adoption of DevOps has increased the need for higher levels of automation, and puts pressure on organizations that have low automation rates ”

Gartner's Research on Critical Capabilities for Software Test Automation- February 2018

DevOps and Quality Engineering have shifted the testing to the left so test environments need constant refresh and higher clarity – this has obvious impact on cost of IT. While automation has enabled testing at scale, it now requires complex analysis to sift through the test data to avoid redundant test cases.

The emergence of smarter applications, IoT and a gamut of products demands a more sophisticated and intelligent approach to these constantly evolving apps and products in the fast-paced market.

The difficulty of reusing and repeating tests across agile teams and lack of actionable insights continue to be a sore point.

There is availability of high volumes of test data – both historical and real time but inability to streamline and gain intelligence from it.



Adoption of DevOps demands Shift Left for Test Automation

■ Difference between Test Automation & Intelligent Test Automation

	TEST AUTOMATION	INTELLIGENT TEST AUTOMATION
Test creation	Converts Manual to automation/Regression	Model based testing and TDD/BDD based automation suite
Test framework	Data/Keyword driven Automation reduces maintenance, increases coverage	Enable additional analytics to test digital frequently across channels?
Test Execution	Execution for regression testing by QA teams	Prioritized execution based on changes to ensure coverage in a short time
Test Process	Regression testing for every release	In-sprint testing – Shift left using Continuous Integration
Test Result Analysis	Results analyzed by Test Engineer	Results classified automatically with AI/ML for faster response time
Test and Biz Analytics	Mostly Execution count and Pass/Fail with error logs collected	Additional data analytics like cause of errors, RCA and other info
Test Tools	UFT, Ranorex, TestComplete, Sahi etc.	QMetry Automation Studio, Selenium, Appium
Suitable for	Mid-size companies with 5-10 applications working on one channel using Waterfall/Iterative approach	Ideal for Mid-size to larger enterprises and all DevOps/Agile practitioners
Test Maintenance	Tests maintained by automation engineer with changes in app	AI/ML automatically maintain test cases with changes in application

■ New Role of Automation

The answer lies in AI and ML- driven intelligent test automation and analytics. With the growing complexity of the app economy and greater expectations from automation, it is essential to support automation initiatives with data-backed insights and information on coverage, reliability, traceability, and validation to address the Risk Profile and business objectives.

Continuous feedback is the backbone of Intelligent automation. By integrating AI and machine learning with your automation suite, organizations can eliminate common failures, recurring issues and eliminate duplicate testing by prioritizing Test Automation that makes the most impact.

AI and ML- powered automation uses software quality metrics to convert reams and reams of test data into actionable results, insights and recommendations. Automation gets smarter with a complete drill down of test results, holistic view of Root Cause Analysis and failures.

The capabilities are not limited to predictive analytics. Its suggestive intelligence mechanism offers varying execution options based on results and insights that are both accurate and actionable

With real-time analytics and higher visibility, we move towards the right amount of test coverage and test depth for leaner management. You can accelerate time to market using AI-driven automated test analytics.

Pressure of agility and digital transformation needs a refined level of automation that transcends the capabilities of older testing platforms to balance the need for speed with their tolerance toward risk. This needs continuous testing and feedback to gather real-time insight into the application's business risks.

■ Automating Intelligently to Drive Business Value with High Quality Software

Reusable framework with data-driven testing to aid prioritization of test cases

BOTs can sift through terabytes of test data to answer some of the commonly asked questions that ail businesses. From high-risk and priority error categories, to focus areas that shorten the sprint.

Using AI and Machine Learning, it is possible to optimize every phase of your testing lifecycle right from discovery to maintenance. Finding out the overall success of the automation suite and execution results by platform and level of testing necessary for each.

Right amount of test coverage and test depth for leaner management

BOT-enabled analysis such as QMetry's Test case Optimization BOT (TOBOT) can enhance test case quality and efficiency by eliminating duplicate cases and improving reusability. This makes for smoother and easier maintenance while ensuring required coverage.



Organize Automated Suite Based on Relevance

Cognitive Defect Prediction and Prescriptive analysis

Automation that uses an adaptive learning model to continuously learn and improve using Software Quality Metrics can optimize testing efforts within the risk parameters.

From identifying common causes of failure and high-priority defects to smarter error-categorization, the processes are optimized, analyzed and prognosis-driven. This actionable drill-down and bottle-neck analysis offers project-level prescriptive suggestions with varying execution options.



Smarter Test Result Analysis to increase response time and Infrastructure Optimization

Intelligent Automation thrives on data. The more data it feeds on, the better the outcomes and results. Organizations scaling up or those with large amounts of test data from disparate systems can make the most of this result analyzer to implement suggestions and optimize in real-time. Test Automation results can be analyzed by tools like QMetry Wisdom to automatically find root cause of failures using AI. This approach can also be used to measure the use of infrastructure and enhance efficiency.

Service layer test automation and GUI layer automation for end-to-end stability

Pre-programmed BOTS cover end-to-end testing for every phase of the quality lifecycle. This gives you a head start in maturing the test processes for different types/sizes of the organization.

■ QMetry's Intelligent Automation Process



- Risk-based QA/Automation efforts to ensure coverage
- Analyzes and categorizes failures for quick resolution
- Reviews automated scripts for compliance to framework reducing maintenance
- Organizes test data in consumable and baseline category external to script
- Identifies reuse across projects using AI/ML to ensure optimal automation
- Manages consistency of test automation framework and AI-ML tools
- Ensures test data runs in a predictable test environment

■ Conclusion

Intelligent Automation unlocks the full potential of technology and automated testing to deliver on the parameters of Agility, Efficiency and Quality. Not only does it maximize the coverage but also reduces the time to market with intelligent insights and prioritizing what to focus on, how much to test and what are the high-risk areas. In the challenging digital landscape, this can mean significant cost and effort savings, and optimizing the quality lifecycle at every stage.