



Delivering True Business Impact with Test Automation

White Paper



Introduction

“Testing is an infinite process of comparing the invisible to the ambiguous in order to avoid the unthinkable happening to the anonymous.” - James Bach

Let's accept it. Conventional testing is dead. At the same time, the demand for higher quality products is ever increasing. Digital technologies are fundamentally transforming businesses and the expectations of digitally empowered consumers. Consumers are engaging with businesses in dramatically different ways than they did just a few years ago. This has forced enterprises to relook at the way their software releases happen. Agile and DevOps have become a new norm today. As a part of these new approaches, IT needs to constantly interact with businesses and users and build and release software to meet the changing business requirements. With the Continuous Testing approach, test automation is carried out along with product development to support Continuous Integration.

With this, to ensure a predictable, reliable and high quality of products, the traditional QA processes also have undergone dramatic changes. Test automation has assumed a critical role in software development. Going beyond just regression testing, organizations have started looking at test automation for a much wider scope.

In today's age of Digital Transformation, it is important to understand the critical role of test automation in software product development and release. In this comprehensive guide by InfoBeans, we try to provide an overview on test automation. In this guide, we will know –

- What is test automation and what are the business drivers for it
- The key benefits of test automation
- The need for test automation in DevOps
- The top challenges faced by organizations with their test automation initiatives and how to handle those
- An introduction to some of the popular test automation tools and frameworks



What is Test Automation

Test automation, also called as automated testing, is a software testing method which uses special software tools to control the execution of software tests and then compares actual test results with expected results. The test execution is done automatically with little or no human intervention. Traditionally, automation testing has been used to perform regression tests or time-consuming and repetitive tests.

The last few years saw some major changes in the test automation practices. For example: Record and playback frameworks are replaced by more flexible keyword-driven and data-driven frameworks, test scripts are now more modular and reusable, and scriptless test automation tools have removed the complexities of scripting and coding. With such rapid changes, test automation has now become a business-driven testing program which helps in enhancing the software application quality, increasing the test coverage, and achieving better productivity.

Business Drivers of Test Automation

As per World Quality Report 2016-2017¹, it is predicted that the overall spending on QA and testing will increase to 40% in 2019. With an increase in the adoption of agile testing methodologies and DevOps, a large portion of this budget will be dedicated to test automation.

Here are a few factors which are driving the adoption of test automation in enterprises -

Digital Disruption

52% of the Fortune 500 companies since 2000 are gone because they did not adapt themselves to the digital shift. With iPhone, more than 25 business models got killed. Digital Disruption is much more than just making a technological shift. It is about transforming the complete business model to make the digital shift. To sustain in this rapidly changing digital ecosystem, enterprises need to innovate faster. To facilitate this, testing needs to become more business driven and needs to be able to manage disruption.



Need for Faster Time to Market

The traditional product development lifecycles and go-to-market cycles which used to run in years have shrunk to months or days with changing business scenarios. Businesses are looking to launch products quickly and gather customer feedback. Agility helps them in achieving quicker ROI. At the same time, quality is of prime importance and that's where automation is playing a critical role.

Need for Greater Traceability and Responsiveness

Today's digital consumer demands a high degree of responsiveness. If something goes wrong, she wants to be attended to and the problem needs to be solved. To be able to do so, it is important for the companies to understand the root cause of the problem. Since test automation creates exact records of all the tests including timing, actual results, configurations, and test data, it helps in tracking and solving the issues quickly.

Heterogeneity of the Systems

With evolving technologies and frameworks, today's products are becoming very complex. Add to it the complexity of the overall IT eco-system with different vendors and platforms, cloud, and mobility working together to provide a seamless experience to the end users. This has put an added load on the testing teams because of the sheer number of permutations and combinations which need to be tested. Automation helps in reducing the human errors which could happen in manual testing and at the same time, helps in achieving wider test coverage.

Increased Security and Compliance

With increasing threat levels and newer nature of threats, Security Compliance is one of the core activities which need to be performed as a part of validation cycles of every release. Doing all such rigorous tests manually can add to longer release cycles. Automation helps in ensuring that tests such as penetration testing and security testing are done with every release cycle and security compliance is assured.



Benefits of Test Automation

The global test automation market is expected to reach US\$ 85.84 Billion by the end of 2024 2.

As companies are trying to ship as fast as possible, the need for test automation is increasing. New research shows that 86% percent of organizations already have some kind of test automation in place³.

What makes test automation so relevant? Let us take a look at the benefits of test automation.

Test automation offers -

- Better detection of defects
- Better consistency
- Higher test coverage and assured better quality
- Faster feedback
- Enormous saving on time required for testing
- Reduced efforts due to the time saved in running repetitive tests resulting in tangible cost saving
- Improved testing efficiency
- Reusability of automated tests
- Early detection of defects leading to overall increase in development speed
- Faster time to market
- Better security and compliance with the use of right test data
- No risk of human error even after multiple iterations of test executions
- Better synchronization of repositories based on business rules and application rules
- More agility and scalability
- Easier implementation of Continuous Integration and Continuous Delivery practices
- Enhanced regression testing



Test Automation and DevOps

DevOps is gaining huge popularity in the software development world. So much so, that the global DevOps platform market is expected to grow at a CAGR of 19.42% during the period 2016-2020.⁴

The DevOps methodology is based on a tight collaboration between development (including testing) and operations teams all through the product lifecycle – right from design to post release management. DevOps focuses heavily on continuous testing and continuous integration. With continuous integration comes a high frequency of changes and releases and, therefore, DevOps relies heavily on automation.

DevOps aims at increasing the deployment frequency. To help the QA team in keeping pace with the development process, the testing has to be automated. In fact, the automation of test cases starts along with product development. Repeatable and regression tests (including unit tests and functional tests) are the first candidates to be considered for automation in the DevOps world. In the DevOps environment, where development is iterative and releases are frequent, test automation allows teams to reduce regression testing time and deploy new functionalities in production more frequently. This helps in tremendous time and cost saving.

Unit tests for the features which are going to remain reasonably stable across releases, regression testing, integration testing and testing for the build are the types of testing which organizations choose for automation in DevOps.



Top Test Automation Challenges

“If you automate a mess, you get an automated mess.” - Rod Michael

While test automation offers a lot of benefits, it is not a cakewalk. Organizations could face some challenges in test automation adoption. However, here are some tips to help you overcome the most common challenges –

High Upfront Investment

Agreed. Usually, the initial phase of test automation is expensive as it requires analysis, design, and creation of test automation framework, library, scripts etc. In case of licensed test automation tools, one needs to consider the procurement and operating costs as well. However, test automation can very quickly pay for itself. As Randall Rice has rightly said, “Test automation promises increased productivity and accuracy, which is where the business case must be made. The cost of a single defect ... can offset the price of one or more tool licenses.”

Selection of the right tool and technology

The selection of the right tool and technology can make or break the test automation initiatives. Instead of first selecting the tool and then trying to address your business requirements through that tool, you should evaluate the tool based on your requirements. In case you are selecting an open source technology, do consider the cost of implementation and customization. If you have any specific questions or queries, there are several testing communities and groups where you can get answers from the experts.

Defining the scope

One should never aim for 100% test automation. In many cases, that’s not even an ideal situation. Some of your test cases might be better handled through manual testing and automation might just add additional burden in those cases. Select the appropriate test cases



for automation where you can see tangible RoI. Automation of unit tests, acceptance tests, integration tests might give you higher RoI quickly.

Automation Test Suit Update

Many organizations think that test automation is a one-time effort. However, in reality, the automation test suite needs to be always up-to-date with the latest test cases. The automation scripts need to be updated as new functionalities get added to the product or old features are removed. If the automation suite is designed with maintainability in mind, then it becomes easier to keep it current.

An Introduction to Popular Test Automation Tools and Frameworks

Here are some of the popular test automation tools and frameworks –

Selenium

[Selenium](#) is one of the most popular test automation tools. Available freely as open source, Selenium is widely used by the testing community. It supports a wide variety of operating systems such Windows, Linux Macintosh and web browsers including Chrome, Firefox, IE, Safari, and Opera. Developers using Selenium can use any programming language of their choice such as Java, C#, Python, or PHP and can also any use the IDE of their choice for creating the testing scripts. Selenium boasts of a very active user community and also offers thorough documentation and support to help its users.

Robot

[The Robot Framework](#) is a generic test automation framework for acceptance testing and acceptance test-driven development. It is an open source framework. Robot is extremely easy to use and allows the creation of test cases using keyword testing methodology. The test cases are written in a tabular format – using plain text, HTML, or even tab separated values. The testing capabilities of Robot can be extended with test libraries which can be implemented in Python or Java. The framework is operating system and application independent.



Cucumber

[Cucumber](#) is an open source tool which is optimized for Behavior Driven Development. It allows plain text specifications. While it was originally built on Ruby, the other implementations of Cucumber also exist for Java, .NET, and other such platforms. It offers unobtrusive automation allowing non-technical people to engage with features and scenarios rather than worry about the code.

Appium

Appium is one of the most popular mobile app automation testing technologies. Appium is available as open source and can be used on both Mac and Windows operating systems. It offers support for multiple languages such as .Net, java, Python and also multiple IDEs.

JMeter

[JMeter](#) is a Java application which is available as an open source testing software. It helps in the automation of load testing, functional testing, performance testing, and regression testing. Using JMeter requires Java Development Kit.



Conclusion

“Automation does not do what testers used to do, unless one ignores most things a tester really does. Automated testing is useful for extending the reach of the testers work, not to replace it.”- James Bach

Digital disruption has forced enterprises to release faster, innovate faster, and deliver a stellar experience to the modern digitally-savvy consumers. When releases are faster and demand for quality is high, test automation is no more optional. Software development world is ruled by DevOps and Agile and continuous testing is required for continuous integration. Test automation offers the right solution to support all such demands. It helps organizations in ensuring good quality, achieving faster time to market, improving test efficiency, getting wider test coverage, and reduce time, efforts, and costs in testing. There are several open source as well as licensed test automation tools and technologies available in the market. But only access to technology is seldom enough. Enterprises need access to a stellar team of test automation experts who can assist in defining the test automation strategy, designing the test automation suite, selecting the right test cases for automation, and keeping the test suite relevant along with product updates.

About InfoBeans

InfoBeans is a technology service provider offering development and implementation of cutting-edge software solutions for various small and large enterprises across all verticals. With our extremely innovative, dedicated and experienced team, we have helped organizations worldwide in developing robust and ascendable solutions.

InfoBeans has worked with enterprises in the automobile, engineering, telecom, currency printing, and storage domains and helped them with their custom software development, storage and virtualization, UI/UX, eCommerce, and automation engineering needs.



Our team of experts specialize in build and release automation that enables businesses to achieve continuous integration and faster deployment cycles.

For more information, visit us at <http://www.infobeans.com>

References

1. <https://www.sogeti.com/explore/press-releases/world-quality-report-2016-2017/>
2. <https://www.automation.com/automation-news/industry/test-automation-market-to-reach-us8584-bn-by-2024-spending-on-security-testing-projected-to-rise-rapidly>
3. <http://qablog.practitest.com/wp-content/uploads/2016/04/StateofTesting2016.pdf>
4. The New Market Research Report “DevOps Platform Market 2017 Global Analysis and Forecast to 2021”

EOD