SOGETI

Realising the Business Benefits of Automated Delivery

Applications Delivered at Speed with

Automation and Continuous Testing

The Limitations of Traditional Test Automation

An advanced automation strategy that applies to the entire software delivery life cycle (SDLC) is key to your organisation's journey to continuous delivery. When executed properly, automated delivery will secure a competitive advantage by ensuring application quality, cost-effectiveness and speed to market.

Traditionally automation in Quality Assurance (QA) is limited to designing a pass or fail set of scripting and test execution data points for an isolated user story or application requirement. This is no longer sufficient to meet the demands of the seemingly limitless application user scenarios enabled by today's cutting-edge technologies.

The Need for Continuous Testing

Facilitated by automation, continuous testing goes way beyond traditional test automation. It embraces the use of automation as an integrated part of the software delivery pipeline, rapidly providing insights into the business risks of a software release. This involves applying automation to functional, code quality, security and performance tests. It also means automating some of the QA life cycle processes, such as test environment management and release deployment.

Combined with a shift-left, look-right test approach, automation enables continuous testing, reduces the need for regression testing and enables testers to embed quality from the outset by preventing bugs rather than fixing them. This enables a continuous flow of high quality releases into production.
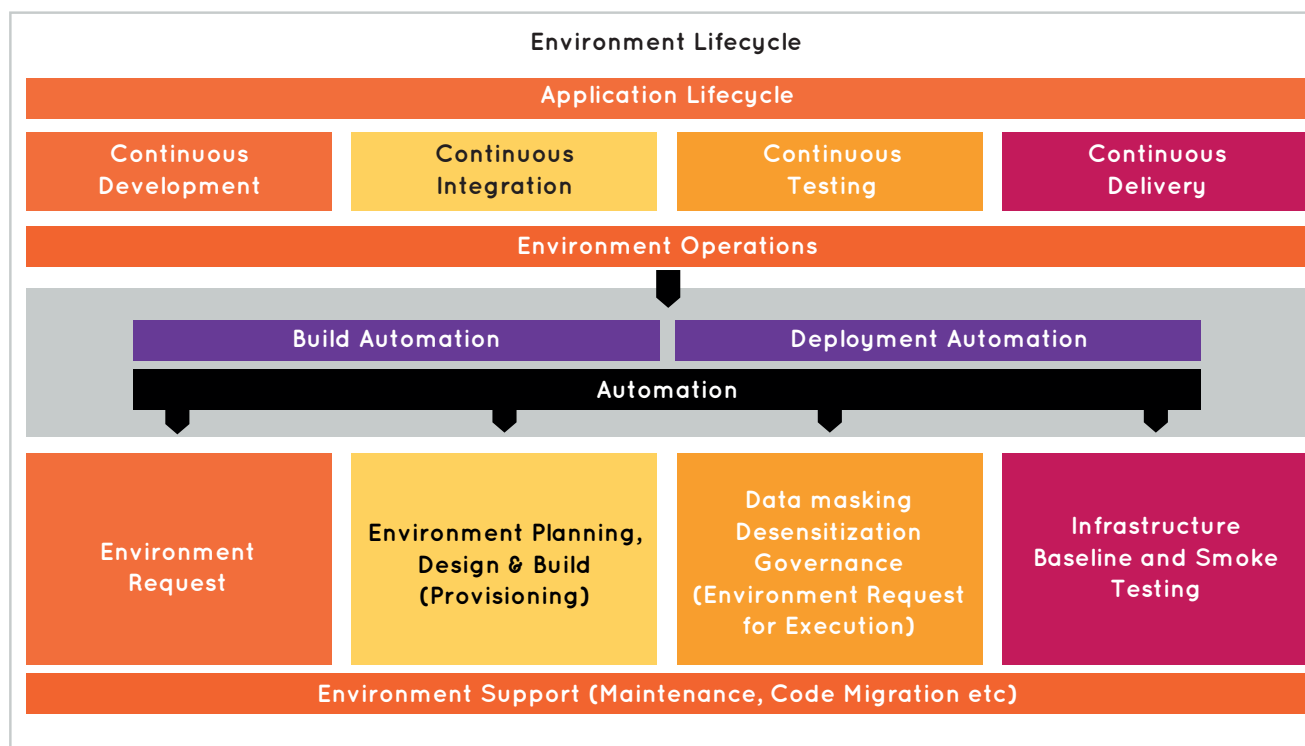
Achieving Automated Delivery

To achieve truly automated delivery we must take automation further, beyond the testing domain, and reap the time, resource and cost benefits by applying it to all relevant phases of the SDLC, such as design, development, integration testing and implementation. The 5 keys to successful automated delivery are therefore:

1. Aligning test and development efforts to business goals
2. Adopting an integrated Quality Assurance model
3. Applying automation to all areas of the development lifecycle and the wider IT function
4. Test Automation combined with Continuous Testing and a shift left approach
5. Using intelligent data analysis for better business decisions

Figure 1: A Test Environment Automation Approach[1]

Environment Lifecycle			
Application Lifecycle			
Continuous Development	Continuous Integration	Continuous Testing	Continuous Delivery
Environment Operations			
Build Automation		Deployment Automation	
Automation			
Environment Request	Environment Planning, Design & Build (Provisioning)	Data masking Desensitization Governance (Environment Request for Execution)	Infrastructure Baseline and Smoke Testing
Environment Support (Maintenance, Code Migration etc)			

Types of Test Automation

When asked which automation technique they would most like to adopt in the next 12 months, 43% of participants in the 2016-17 World Quality Report cited cognitive automation. Robotics and test design automation were a close second with 42% while 40% were keen to use automated predictive analysis to enable early risk identification, strategy and quality decisions and generate test sets.

Other types of test automation that are becoming increasingly popular are test data automation, machine learning and self-remediation test environment virtualization.

When Not to Use Automation

A critical success factor in your automation strategy is to know when not to use automation at all. For example, if you know you are only going to execute a certain test once, you're conducting exploratory tests or you are GUI testing and require human feedback on the look and feel of a user interface, then you would want to rely on manual testing.

1. https://www.capgemini.com/2017/02/automated-test-environments-for-devops/

What are the Benefits of Automated Testing & Delivery?

Freeing Up Resources

Manual testing and other repetitive tasks throughout the SDLC can be laborious and lead to repetition fatigue, resulting in human error. Traditional manual approaches to end-to-end regression testing can be expensive and time-consuming, causing bottlenecks and slowing down release. It's also not always possible to carry out every relevant test due to time constraints. When you automate, you free up your workforce to carry out other business-critical tasks, raising productivity, optimising your resources and increasing risk mitigation.

Speed, Value, Transparency & Control

Automation gives you speed, accuracy and consistency and enables you to create reusable assets for other scenarios. It's an effective gatekeeper, ensuring that you can validate code modifications before they're released to QA or the customer. Service virtualisation enables a shift left to earlier integration testing, helping to find defects earlier in the SDLC so delivery deadlines can be met. Environments can be deployed within a matter of hours rather than days or weeks. Done properly, automation delivers an increase in the amount of testing, in a shorter time frame with less effort, resulting in cost savings and an excellent ROI.

According to 42% of the 2016-17 World Quality Report respondents, better detection of defects is the top benefit of automation. A better reuse of test cases was rated second by 40%, and better control and transparency of test activities 38%.


Figure 2: Test Automation Benefits
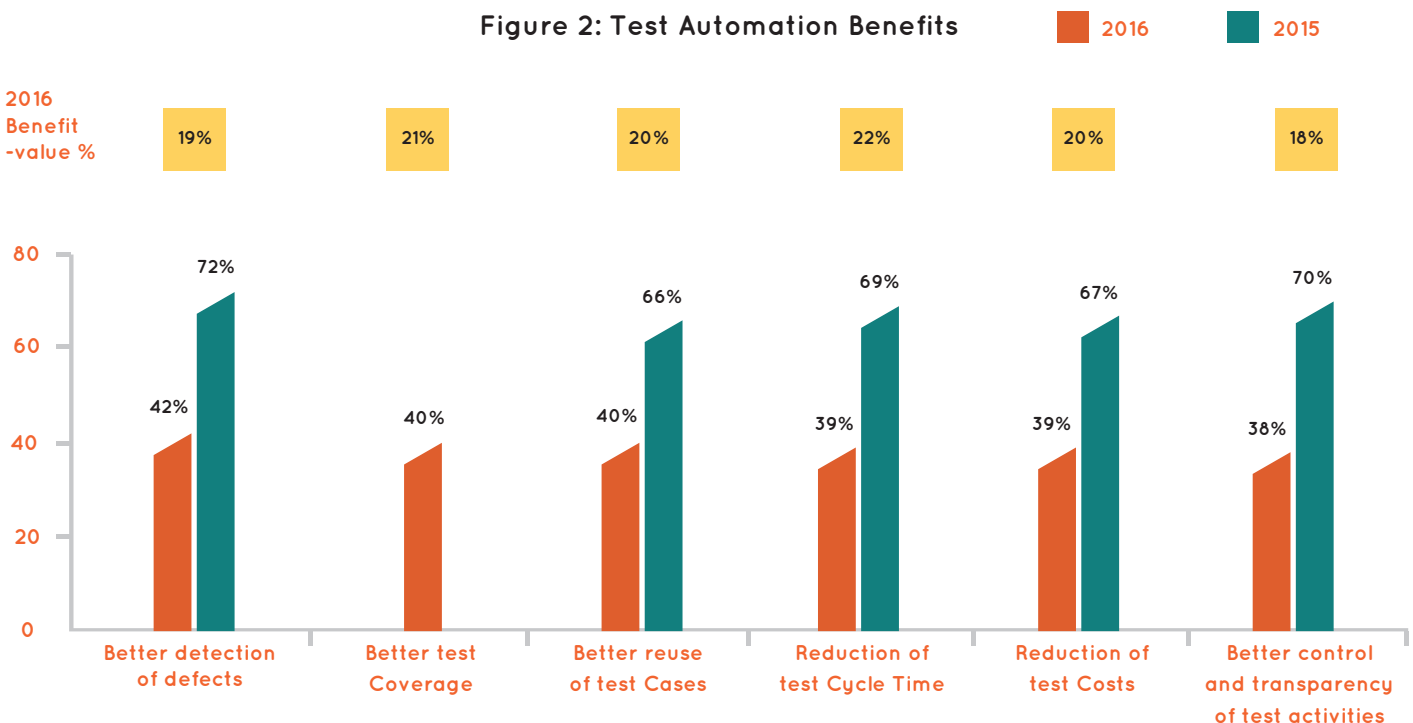
Automation Beyond Testing

When you take your automation beyond testing, you move further along the path to automated delivery. For example, when using virtual machines (VM), the effort and time required to build and test them manually is considerable. If you utilise automation a VM can be created from a template, deployed, smoke tested, and made ready for test execution in 15 minutes, which would take approximately 2 hours if done manually and potentially introduce errors.

Reduce Defects into Live

Figure 3: Defect Injection vs. Defect Removal
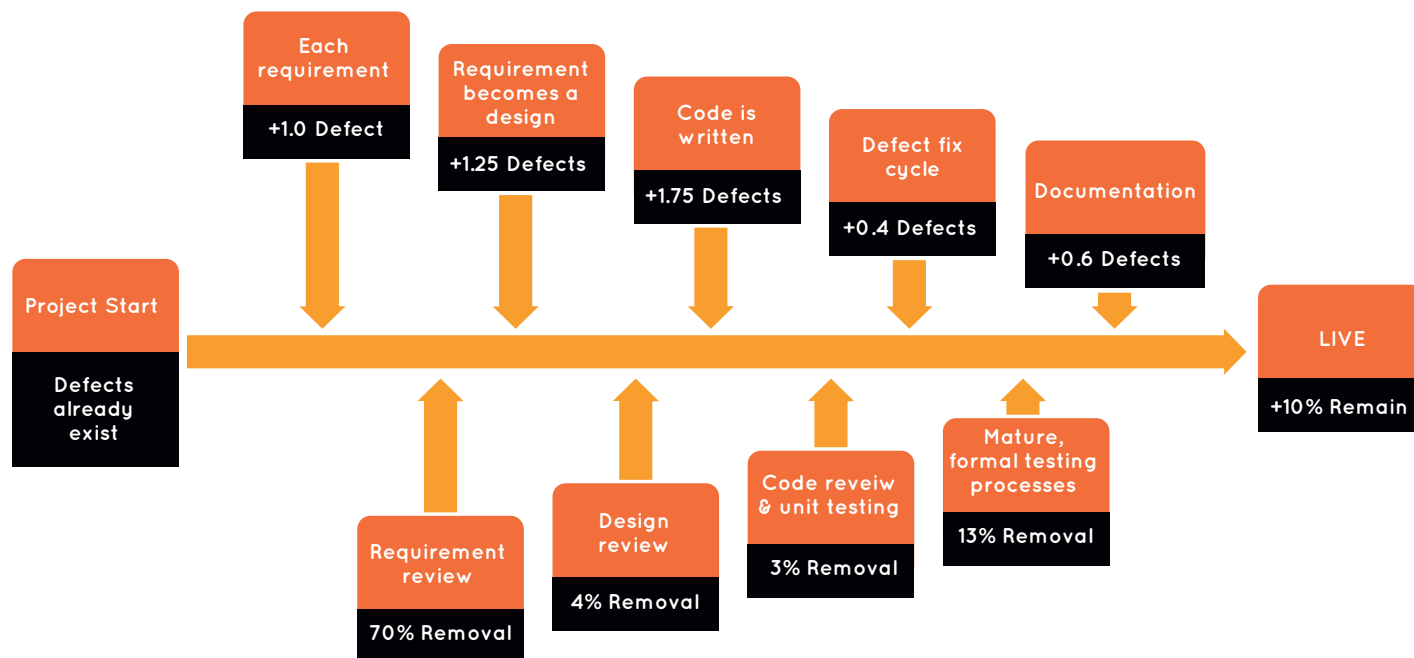
In a well organised process, testing can remove a substantial amount of defects. The challenge, however, is to prevent the defects and remove them before formal testing begins, which will in turn reduce the risk to both testing and go live. This is where continuous testing and automation delivers results.

Creating a Business Case for Automation

Recent Research

Interestingly, Sogeti's most recent research shows that the percentage of automation carried out by organisations is nearly 50% lower than in the 2016/17 World Quality Report. However this statistic should not be taken at face value. Rather than showing a drop in automation, it reflects a growing maturity whereby businesses are understanding the full scope of what can be automated, and realising that their current automation efforts are only addressing a fraction of the automation possibilities.

Manual vs Automation

Traditionally the case for automation was based on a comparison of the manual effort versus the automation effort for scripting, maintenance, and execution. Automation can be time-consuming to set up but when done well, huge cost and time savings can be made during execution and these increase over time with each subsequent execution of a script.

If you're scripting from scratch, as opposed to automating an existing manual script, then the benefits of execution should outweigh the effort. If you're adjusting existing manual scripts, you need to determine if the test debt will be eliminated and the ROI outweighs the initial set-up time and cost.

Quantitative & Qualitative Questions

When creating a business case for automation, organisations need to ask the following qualitative and quantitative questions:

- What are our business and testing goals?
- What are our existing pain points?
- How can automation address them?
- How will automation free up resources and for what purpose?
- What in the SDLC can be automated?
- Which tests are repeatable and suitable for automation?
- How much money, time and effort will it take to set up compared to manual?
- How can we improve the critical path?
- What are the time and costs associated with automating test data and environments?

Automation Cost Benefit Analysis

A successful business case for implementing automation, whilst it does need to have a value contribution at its heart in terms of cost and/or time, must take into consideration a more strategic view. This will mean creating a plan which highlights dependencies and blockers, and being willing and able to make changes beyond just a technical remit, therefore implementing automation through People, Process and Technology as a complete solution.

Why Do Some Automation Projects Fail?

Despite the significant business benefits of automation and the relative ease of creating a good business case for it, a high percentage of automation projects fail or don't result in the expected ROI.

Major contributors to this are a lack of central coordination and collaboration; not understanding which areas to prioritise; utilising the wrong tools or not optimising them; lack of internal expertise; and focusing on a quick fix for an individual project, rather than a long-term automation strategy.

A lack of maturity in this area can also result in some organisations focusing on automating the wrong things. For example, applying high levels of automation to UI testing, which require regular maintenance, can mean that the cost outweighs the benefits and frustration leads to the automation project being abandoned.

Tooling & Metrics

An excellent tooling strategy and a strong set of automation metrics to determine what is working and what isn't will go a long way towards realising the potential benefits of zero touch testing, reduced cycle time and 20-30% cost savings.

Upskilling & Cross-training

Getting the right skillset in the development and testing teams is critical to success. Hiring pure automation specialists is not sufficient. A strong team will also include test strategists and environment and data specialists. Cross-training your developers in testing and your testers in coding will enable them to work together to create the test automation framework and shift testing left.

A Centralised Strategy

When you partner with an organisation that is expert in automation and testing, you can create a Quality Management Office (QMO) to determine the right level of automation coverage and the best toolset. The QMO will prioritise test and behaviour driven development; functional and non-functional automation; service and environment virtualisation; and be committed to the continuous improvement of your automated delivery strategy.

How Sogeti Adds Value with Automation

Automation as an Accelerator

Working with a large Government department, Sogeti has implemented automation at several key points in the SDLC, far beyond the traditional approach of automating regression scripts. In this project, we have used automation as an accelerator by:

• Utilising Smart APIs and Service Virtualisation to shift left and test and identify defects earlier in the SDLC to meet delivery deadlines
• Creating consistent data sets and ensuring integrity across systems, reducing data creation from days to minutes
• Taking a framework approach to automation to protect unchanged areas of the system, enabling us to make individual changes to functionality and create re-usable assets for system integration and end-to-end testing
• Utilising Smart APIs and creating reusable assets allows us to carry out testing more quickly enabling significant year-on-year savings in test creation and delivery costs, through a significant reduction in test effort

Automation in the Build Pipeline

Another programme for a different client is tasked with delivering software to provide the tools and intelligence to strengthen and improve national security.

Prior to Sogeti's involvement, this organisation's automation efforts were focused on regression testing. While this delivered an improvement over previous manual test execution, testing hadn't met its true potential. A lack of automated test execution in the build pipeline resulted in poorly-structured tests that were out of step with the developers' needs for fast-feedback on defect fixes and regression.

In collaboration with the client, Sogeti and Capgemini have made significant progress towards the clients' twin goals of continuous integration and continuous delivery. We completely restructured existing Selenium tests and improved Groovy DSL and bash defined seed jobs, to extend the build pipeline and run targeted elements of the automated test suites as part of the build.

The pipeline now delivers much faster feedback to developers enabling better decision-making and accurate changes. We've also automated the creation of test environments by utilising Infrastructure-as-Code, giving us flexibility to create and destroy environments on-demand.

These changes amplified existing efforts in test automation, reducing the end-to-end deployment of features, and ultimately allowed our client to realise the value from its software development efforts faster.

The Future of Automation

To gain a competitive advantage, automation must permeate the entire software delivery lifecycle, impacting ideation; requirements; development; testing; pre-delivery and delivery. Once organisations have reached a level of automation maturity whereby they are starting to see a return on their strategy, they can then start to explore more advanced automation techniques. UX is paramount to application success, and to test it properly requires real-time business intelligence based on predictive big data analytics and a cognitive approach to test automation.

A Proof of Concept

Whether you're looking to address the full SDLC or an individual test automation project, Sogeti can create a proof of concept in which we:

- Agree automation project goals
- Advise on the right automation tools at the best price
- Set up and implement the PoC
- Provide a demonstration
- Make project recommendations
- Create a proposal for next stage

In addition to this bespoke PoC service Sogeti can also deliver automation, performance and other specialised testing services at a fixed price, through our offshore service.

About Sogeti

Sogeti is a leading provider of technology and engineering services. Sogeti delivers solutions that enable digital transformation and offers cutting-edge expertise in Cloud, Cybersecurity, Digital Manufacturing, Digital Assurance & Testing, and emerging technologies. Sogeti combines agility and speed of implementation with strong technology supplier partnerships, world class methodologies and its global delivery model, Rightshore®. Sogeti brings together more than 25,000 professionals in 15 countries, based in over 100 locations in Europe, USA and India. Sogeti is a wholly-owned subsidiary of Capgemini SE, listed on the Paris Stock Exchange.

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