



Test Automation Process

WHITE PAPER

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Executive Summary

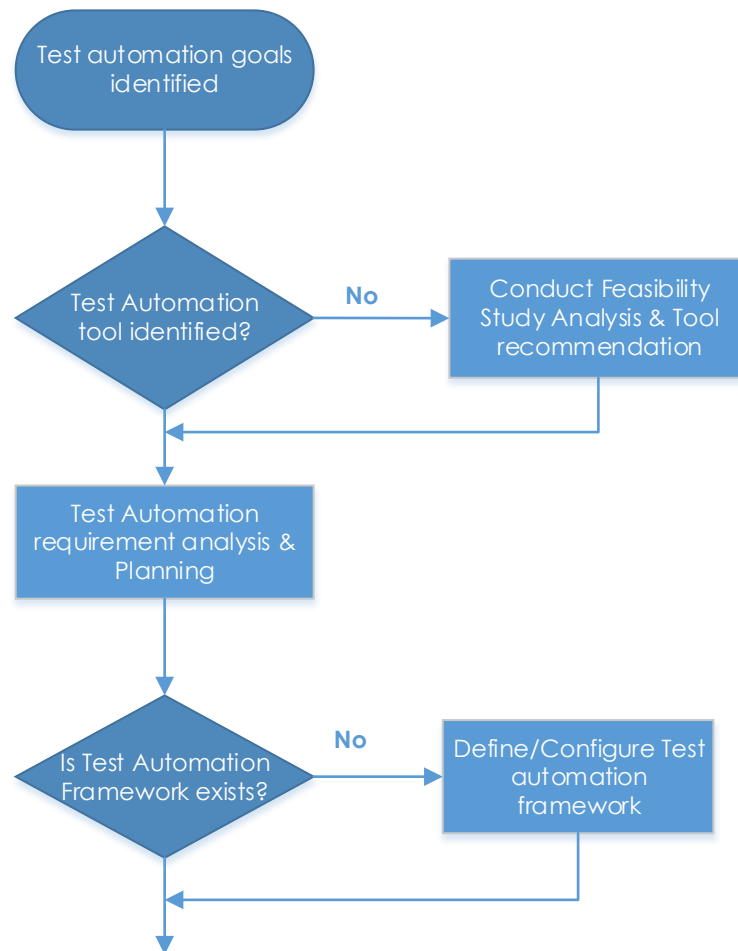
Intensive manual testing will eventually be a drain on efficiency & productivity of the test team resources. Test automation with an efficient test strategy & right set of tools can relieve the manual testers of mundane labour intensive, repetitive time consuming tasks & allows them to concentrate their efforts on more value-added testing such as – functional testing of new and changed features, enhanced user experience testing. ZenQ's CoE (Centre of Excellence) in Test automation is targeted towards delivering such highly reliable and cost-effective test automation solutions and thus help product companies to deliver software more frequently and with improved quality.

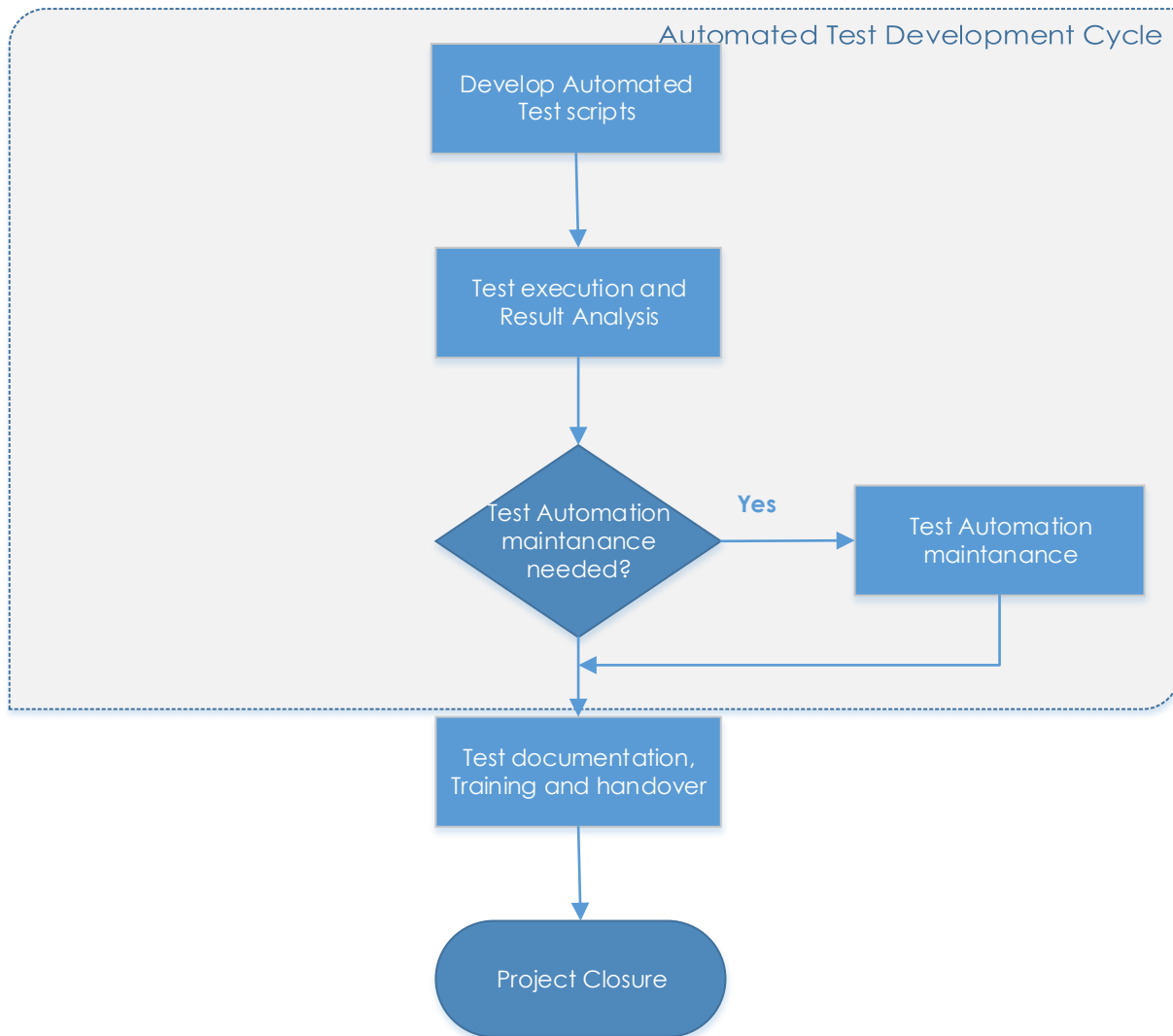
This white paper describes our focused approach with inputs from industry-wide best practices, which we've defined to setup, plan and execute test automation from concept to finish towards ensuring success of your test automation initiative.

Test Automation Process

ZenQ's Test Automation process consists of the following 7-steps -

1. Feasibility Study & Tool Recommendation
2. Test Automation Requirement Analysis & Planning
3. Define test automation framework, Tools, Setup Infrastructure
4. Develop automated tests
5. Test Execution & Analysis
6. Test Automation & Maintenance
7. Documentation and training

Figure 1: **Test Automation Process Flow**



Feasibility Study & Tool Selection

The identification of right test automation tool is a key determinant of success in any Test Automation effort. A detailed analysis of various tools must be performed before selecting a tool by assigning a dedicated test team (This is generally called as 'feasibility study'). While selecting tools, it is important to remember that no single tool will satisfy all the requirements. The tool that meets most of the evaluation criteria should be chosen based on the tools limitations with respect to requirements

The Figure 2 depicts the approach that we follow for selection of the right test automation tool.

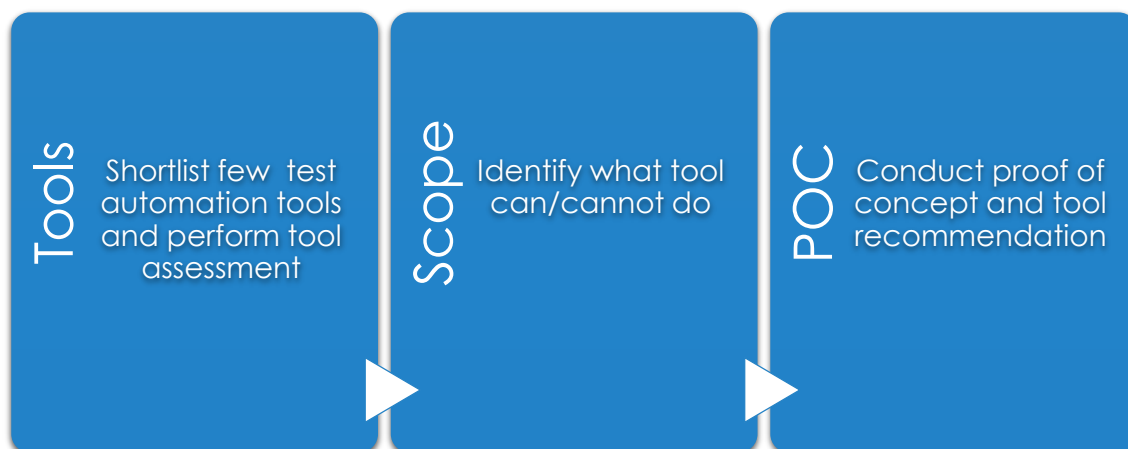


Figure 2: Process for feasibility study and analysis

The dedicated team assigned to the project gathers & analyses the project requirements. Based on the requirements, a set of candidate tools are then identified. An extensive assessment of the identified tools is conducted by the dedicated team of test automation experts.

Tool evaluation is carried out based on client requirements, several major tool selection criteria such as

- ✓ The tool should be compatible with the operating systems the application supports
- ✓ The tool should be able to recognize objects in any environment
- ✓ The test management system that the tool integrates with (if any)
- ✓ The tool should support various types of test – including functional, test management, mobile, etc.
- ✓ The licensing cost of the tool should also be considered within the company's budget
- ✓ The tool should also be version control friendly so that scripts created can be brought under source code control

The team then conducts a Proof-of-concept (PoC), where few test scenarios that cover the length & breadth of the application are identified & executed to evaluate the candidate tools based on how they meet the requirements of the project. Upon completion of the proof-of-concept, a detailed feasibility study report that includes outcome of proof-of-concept, list of functional areas which are recommended/not recommended for automation & recommendation on tool is then provided collectively to the client organization to help them make a more informed decision.

Requirement Analysis & Planning

This phase involves understanding what to automate and identifying how & when to automate. It starts with identifying list of test cases or scenarios based on test case category (Smoke, Regression etc.) or importance of a particular functional area to be automated.

A high level plan that includes - Test automation framework architecture, Phased automation approach & deliverables, Effort estimation in person days to automate selected test cases, Test resources, Timeline, Tools, licensing & environments used, Test data etc. is also defined as a part of this phase. Any budgetary planning for investing on test automation development and tool procurement can be done after this phase.

At the end of this phase, Test Automation plan that encompasses all the information above is then submitted to the client for review & sign-off.

Define Test Automation Framework & Set up Tools, Infrastructure

Once the Test automation plan is reviewed and approved, test automation framework is defined during the next phase. During this phase, a test automation framework that encompasses the process, tools, standards required to build a robust test automation suite is developed. This serves as a baseline and makes it easier to create & maintain automated tests.

Listed below are few tasks involved in test automation framework development:

- Define test automation project structure
- Define processes and standards to create new scripts, adding UI objects, creating re-usable business libraries
- Define processes and tools to handle exceptions, Unexpected scenarios
- Develop reporting tools at different levels(Summary, Test, Screenshot, videos, logs etc)
- Develop Email tools to send test results automatically
- Develop script execution monitoring tools
- Develop tools to integrate with build process
- Setup of Source control systems
- Setup common coding standards
- Setup configuration tools
- Setup of required machines, environment for automated test execution
- Develop Utility methods (e. g. File handling, Browser, OS, Synchronization etc.)
- Develop classes/methods to facilitate easy test maintenance

Our experts from Test Automation Centre of Excellence (CoE) have developed in-built plug & play test automation frameworks for popular test automation tools which fulfils most of the common test automation framework needs.

The outcome of this phase is the setup of several systems, tools, Test framework source code, process documents and standards.

Develop Automated Tests

Once a basic test automation framework is in place, test automation experts develop automated tests according to the scope and estimates defined in test automation plan.

Listed below are the steps involved

- Add required objects to object repository, adhering to common UI object naming standards and optimized UI properties.
- Implement user interactions on the above UI objects using enhanced and overridden safe click, set etc. methods
- Perform trial runs to make sure that the draft scripts performs intended user interactions
- Extract the methods and add them to respective reusable library files, adhering to common coding standards
- Construct a test script that calls methods from reusable library files
- Embed required test verifications
- Perform trial runs to make sure that test script performs intended user interactions and basic test verifications
- Add control/loop statements to reusable library methods to handle alternate flows, negative flows, exceptions etc.
- Add necessary code components to fit in to framework

- Add detail history and comments for each reusable method and test script
- Perform final trial runs to ensure test script runs consistently on positive and negative cases

The output from this phase is the source code of automated test script checked into source control system.

Test Execution & Analysis

This phase involves actual execution of automated tests or integrates the automation framework with build systems such as Hudson, Cruise control etc. such that post-build step kicks off the automated test execution. This phase also involves verifying the reports generated by automated tests, analysing the failures and logging appropriate failures as defects in defect tracking system.

The test reports generated by automated test and defect reports are then submitted to the client at the end of this phase.

Test Automation Maintenance

This phase is part of continuous process improvement. Test Maintenance is an on-going effort, where all the automated tests are updated regularly to accommodate the functional & UI changes in the AUT (application under test) so that they remain true of intent and continue to deliver reliable test results.

Absence of this phase will result in false-alarms in test results and creates confusion. It also includes addition of any new test cases or test cases of new functional areas which were not considered during test automation planning phase. Enhancing test automation framework components and addition of new features are also considered part of this phase.

Documentation and Training

To ensure successful completion of project, this phase involves hand off any pending deliverables, writing detail documentation for each automated test, Framework architecture & components, their usage. Also, a detailed instructions document would be provided with step-by-step instructions with screenshots to setup, execute, and update the automated tests. On project demand, an extensive web-based training on automation framework would also be provided.

Conclusion

Test Automation, has its own challenges, but when executed with a well-defined strategy can yield great benefits. ZenQ's well-defined approach, framework, integrated with our experience & expertise across most of the commercial or open source tools and diverse application types allows us to efficiently cater to the test automation needs of our clients, allowing them to achieve optimum return on investment & maximize benefits from their test automation initiative.

About ZenQ

ZenQ is a global provider of high quality Software Development & Testing Services, offering cost effective value-add outsourcing solutions to our clients. Our highly competent IT Professionals, Domain experts, combined with industry best practices & our investments in state-of-the-art technologies makes us a dependable and long-term IT service partner to all our clients

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