Automation has been seen as the long term solution for cost reduction of manual testing across the globe. A successfully implemented automation project will not only result in reduced costs but will also give several other advantages like enhanced quality, software stability, faster releases etc. At the same time, automation done without proper...
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Test Automation = Software Development

Yes, it is a radical thought and some people might not agree on it but alike software development, test automation also calls for designing the test programs, develop reusable components, write the test scripts and then test them to ensure the quality of test automation. In generic terms, Test Automation is a standardized testing process of converting the manual test cases to programmable test scripts which can be executed by a system without much of human intervention.

Automation has been seen as the long term solution for cost reduction of manual testing across the globe. A successfully implemented automation project will not only result in reduced costs but will also give several other advantages like enhanced quality, software stability, faster releases etc. At the same time, automation done without proper homework can be disastrous. It is very necessary to understand the scope of test automation, defining the business/technical goals of it, identifying the percentage of test cases which can be automated, getting the right set of tools & framework in place etc.

Components of Test Automation

There are several components of Test Automation and each one plays a key role in success of the project. The more important ones are:

- Test Environment – Setting up of test lab similar to development lab
- Test Automation framework – Either data-driven or keyword-driven depending on your approach
- Test Automation tool – Open source or patented as per the requirements
- Test Scripts – The program or code to test the data
- Test cases – The manual cases which needs to be automated
- Test Data – Predictable expected results
- Test Engineers – Test experts with good knowledge on using the automation tool
- Lastly, the software which has to be automated

Test Automation best practices

There are few important points to remember before initiating the test automation exercise. Some of them are noted down below:

- Not everything can be automated. It’s highly necessary to identify the modules which should be automated & which should not be. Mostly, the repeated tests should be automated
- Don’t follow the record & playback method – it will bring bugs. Have standardized processes in place
• Have a separate test engineering team for writing the test scripts instead of using the development team for it
• Use a platform based approach. It will provide the scalability and reuse of components
• Selecting the right automation tool is a very important exercise. Most of the automation projects fail because of wrong tool selection
• Gauge your returns from the automation beforehand. ROI depends a lot on the type of software you have and the processes you have in place. Not all software can be automated
• Test Automation is an added quality check and not the replacement to manual testing
• Make sure management goals and engineering goals are in line
• Do POCs (Proof of Concept) to test waters before jumping completely. Use a phase-wise approach
• Most importantly, the maintenance/enhancement of test scripts should be continuously done as the product keeps growing

Test Automation as mentioned before is a strategic initiative where one needs to analyze all the pros and cons of it before starting the project. Many a times we have seen customers fast pacing towards automation in order to bring down the regression testing costs without giving required attention to their business & technical goals and thus jeopardizing the complete project. As it involves good amount of cost & effort, the teams should have a standardized approach towards it. Our approach towards Test Automation is a result of our working with 100+ clients across the globe from different domains and with different needs of automation. Below is a brief presentation of the general idea behind our approach and we customize it for every project as per the requirements. The four phases of our Test Automation approach are:

• Assess – Knowledge Transfer phase
• Identify – Tool/Platform evaluation phase
• Recommend – Selection of right set of tool(s) & platform
• Implement – Development & execution of test scripts
Aspire's Approach to Test Automation

**Assess**

This phase is used to understand the user’s system (technology landscape) & the high level features of the software to be automated. The parameters required for evaluating the test automation tools are captured and documented. In this phase Aspire’s team speak with all the stakeholders involved to understand their technical as well as the business expectations from this initiative like software stability, ROI etc. The phase is also used to assess the modules/functionalities which should be automated to reap maximum returns.

The major deliverables from this phase are software understanding/Knowledge Acquisition document and the Test Strategy document. The test strategy document contains information on the test environment setup, integration testing, database testing approach, risks & assumptions etc as required. The duration of this phase can be from 3 days to 2 weeks.

**Key Activities**

- High Level understanding of the software
- Knowledge Transfer on the current team, process & technology setup

**Deliverables**

- Knowledge Acquisition document
- Test Strategy Document

**Identify**

In this phase, Aspire’s team evaluate the tools & platforms required to support the automation initiatives considering the needs of the customer as assessed in the 1st phase. The team tries to identify all the root causes & lists down solution for each of them. Also, few tools are identified for the automation work and a small POC on these tools are done. The POC consists of writing few test scripts and automating them using the tools identified.

At the end of the phase, Aspire’s team present the demo on these tools and also submit the test scripts document created. We also give the user manual of the identified tools for the better understanding for the customer’s team. The approximate duration of this phase is from 2 – 4 weeks.
Aspire's Approach to Test Automation

Identify

Key Activities
- Evaluation of automation tools
- Identifying root causes & their solutions
- POC on the tool selected

Deliverables
- Demo on the selected tools
- Test Scripts document
- Tools user manual

Recommend

Once multiple solutions are identified for the project and a POC is done to check the effectiveness of these solutions, the team recommends the best solution to the customer. It is done considering all the parameters identified in the first phase and the target goals from automation. It includes functionalities of the tool(s), easy development/maintenance of scripts, low costs, easy integration with different technologies/platforms etc. The final decision on tool(s), platform & scripting language involves the customer’s stakeholders as well. Sometimes multiple tools are selected for different functionalities or to do performance/load testing etc.

Aspire's team submits the automation tool evaluation report along with the estimates document at the end of the phase. The tool evaluation report contains detailed information on the parameters/functionalities tested for each tool and a comparison on the tools to select the best one. The estimates document will contain the cost & effort required to automate the software. Also, the no. & type of resources required will be presented in the estimates document. This phase generally takes 3 days to a week time.
Aspire's Approach to Test Automation

**Recommend**

### Key Activities
- Finalization of automation tool(s)
- Effort, Resource & Cost estimation

### Deliverables
- Automation tool evaluation report
- Estimates document

**Implement**

The final phase of the engagement starts with the contract signing between Aspire & the Customer. A test lab is setup at either Aspire’s end or customer’s end with the necessary environment required. The team identifies & creates test cases for end to end business flows, design the automation scripts, execute the builds and prepare the detailed reports & execution status of the builds. The automation scripts designed are maintained in a version control tool for easier execution using Aspire’s proprietary Test Automation Management Tool. All new test cases created in the process are added to the maintenance bucket and regression test scripts are executed periodically.

The phase continues until all the modules are automated which is followed by script maintenance. Several reports like Daily/Weekly/Monthly status reports, build status report, Test Efficiency report, Resource Utilization report, Defect Density and Test coverage report etc are submitted to the customer on a continuous basis during the project. Customized reports/metrics are available on need basis.

A maintenance document is prepared to summarize all the list of methods/functions used in the automation script along with a test execution guide on how to configure the test scripts on the test server. These documents and status meetings help customers to keep track of the project and assess Aspire’s capabilities better. During this phase the ownership of the project rests at Aspire’s end and customer’s support team is trained on automation. The approximate duration of the engagement is finalized in the recommendation stage and both the teams adhere to it.
Aspire's Approach to Test Automation

Few value additions which Aspire brings to the table for any Test Automation project:

Integrated Quality Approach

It stands for Integrated Quality Approach developed by our test experts & consultants with hands on experience on more than 1000+ software releases. It enhances the Test Quality of the project by extensively collaborating with all the stakeholders involved. The different stakeholders for a given project could be the Business Analysts, Product Manager, Development Team, QA Team, Beta Testers, UI Team, Implementation & Support team etc as highlighted in below image:
The QA project manager would speak with all these people to understand the requirements and work along with them to ensure all are in same page. Also, the software quality will be measured at every stage of development lifecycle thus yielding defects at early stage of development and saving huge costs & effort. This also helps in maximizing test coverage and reducing defect leakage & risks in the release cycle. The detailed whitepaper can be accessed at:


Aspire's Approach to Test Automation

It is a keyword driven framework developed by our in-house experts with a library of reusable functions & components to save time & cost by 30%. Its major components as shown in the below image are:

- **Control file** – to define the configuration & flow of test cases to be executed
- **Driver Script** – to invoke & configure the application, pick test cases, generate failure reports, if any, and do recovery tasks
- **Test Case script** – to execute the test scripts using test data file, verify, synchronize and populate the results
- **Test Data** – this is prepared for each test script
- **Test cases** – these are the manual regression test cases available
- **Test Results** – The reports containing the pass/fail results of test scripts
- **Function Library** – Generic & Application library are present to use the available components in the test scripts
- **Workflow driver** – to define the overall workflow of the test project execution and Object Repository
The QA Manager prepares the Test case script, driver script and Test data file to be uploaded in the framework. The control file then uses the information from driver script to start the application & execute test scripts using the existing test cases and test data prepared. Based on the pass/fail result of the test, the driver script generates the report & test result file is updated. The function libraries are used as per the need in preparing test scripts. All the newly written test scripts are evaluated to see if they can be a part of generic/application function library for future use. All the components are coupled in such a manner that it provides the control to user to customize it as per the need at the same time without compromising on the effectiveness of it.

It helps in successful execution of the projects. Few key features of this tool are:

**Selective script execution** – It allows the manager to execute few scripts of his choice on a need basis. So, when the user wants to test only a particular functionality or a critical build run, they can use this option to do selective execution. This saves a lot of time as the whole build need not be tested everytime.

**User scheduling control** – The execution of test scripts can be scheduled whenever needed. This facilitates the user by scheduling the build run in the night and checking the results in the morning. It also has the test plan hierarchy feature where the priorities can be defined for each test script.

**Test results notification** – One of the added advantage of using Test Automation Management Tool is getting the detailed test result report on email thus saving the necessity to login to the test lab and access it. Users can schedule the build execution in night and morning they can check the results via email itself.

**1-click execution** – The Test Automation Management Tool comes with simple & user friendly installation features and the builds can be executed in a single click thus making it easier for non QA people as well to see the effectiveness of automation. Any user with access to Test Automation Management Tool can run the build and check the reports thus reducing the dependency on QA team.
Test Maturity is the overall efficiency of the QA team of any company. It depends on the effectiveness of requirements gathering, test design, test planning, test execution, defect tracking and management processes. With the Test Maturity Assessment tool companies can calculate their Test Maturity Index and get a summarized score card. The report will show their overall Maturity index as RED (Evolving), AMBER (Formalizing) or GREEN (Mature) and also highlights the areas which are matured and the areas which need improvement. The below image provides a snapshot of a sample report generated!!

The tool can be accessed at: [http://www.aspiresys.com/testmaturityindex/](http://www.aspiresys.com/testmaturityindex/)
Aspire's Approach to Test Automation

Test Automation ROI Calculator

It is always good to know the returns before investment. Considering this, Aspire spoke with 450+ QA Managers & Directors to understand their Test Automation processes and came out with the calculator to measure the returns on Automation process. The tool considers several parameters like Manual & Automation team size, automation tool cost, QA environment cost, existing test cases, number of configurations to be tested, % of test cases for automation etc and generates a detailed report with the returns expected in 5 years and the break-even point. It also gives a year by year comparison between Manual cost & automation cost.

The tool can be accessed at: http://www.aspiresys.com/testautomationroi/

Benefits of AIRI

Some of the key benefits one can get by using the AIRI approach of Aspire are:

- Structured & streamlined approach with deliverables at each phase
- Thorough understanding of customer’s requirements removing any loopholes in the system
- Pre-project calculation of ROI expected from the automation thus allowing the customer to make informed decisions
- Proper evaluation of all the tools available in market (open-source as well as patented) to provide best functionalities
- Detailed set of reports & metrics on the effectiveness of automation on several parameters
- Use of value added functionalities like Integrated Quality Approach, Test Automation Framework, Test Automation Management Tool etc

Aspire's Approach to Test Automation
Conclusion

Manual Testing & Automation testing co-exist. They are not replacements to each other. Test Automation is not magic. It is one another process to bring in additional quality control of the software and ensuring a faster time-to-market. Start with an open eye towards it, make sure you follow the right processes and put in required effort & time. With skilled resources, careful planning and holistic approach there is a high probability to make the test automation project a huge success.

ABOUT ASPIRE SYSTEMS

Aspire Systems is an Outsourced Product Development firm committed to helping our customers build software products better and faster. We work with some of the world’s most innovative Independent Software Vendors and software-enabled businesses, ranging from start-ups to established industry leaders, transforming the way software is built.

Aspire provides complete product lifecycle services, ranging from new product development and product advancement to product migration, re-engineering, sustenance and support. Our product development teams are spread between our Global Innovation Center in Chennai, India and offices in the United States.