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## TEST AUTOMATION

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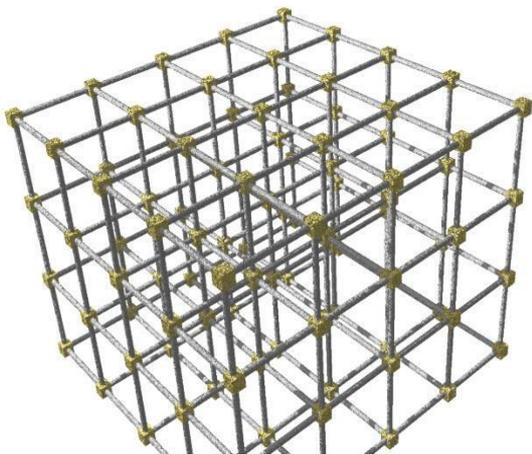
## Introduction

In this modern age of heavy competition, all the organisations are looking to take advantage by introducing new products. As a consequence there is drastic reduction in the product development cycle time. Testing, a vital and most critical phase of the development cycle, had to suffer from this shrinking of cycle time. Due to which the testers are usually given lesser and lesser time to fulfil their tasks, which makes them more prone to committing errors and depleted quality of the product leading to failures.

Test Automation is the one of the most sought out solution by the Testing Teams across the world to conquer the deadlines along with delivering the best quality product. This is achieved by a marked reduction in the QA cycle time, without compromising on the test coverage and the ultimate quality of the product.

## Automation Frameworks:

**Framework:** An Automation Framework is collection of assumptions, concepts and practices which are required to bring in while developing the automation project.



### Uses for a framework:

Automation Framework has many uses, below are the list of the uses by following the

**Maintainability:** Automation framework provides a better maintainability in order to have a consistent automation effort. Let's consider a website which has few commonly

used links across all the pages. And assume that we are automating this website. At the time of identifying the objects which are indexed across all the pages there will be a chance of getting updated in the future layout changes. So, if we refer the links by their names which can help you out in minimal code changes or no code changes. A framework provides 'modularization' and eliminates 'hard coding' which saves 50% of script development and maintenance effort.

**Reusability:** Record and playback is not always a preferred approach in test automation as we may not reuse the recorded code for several suites (When needed) if the test suite remains the same and all that required is just a parameter updating. Whereas, in descriptive programming, we can write the script once and can call that script with different parameters any number of times.

**Performance:** Automation Framework targets the time to market for a product with better efficiency by reducing the testing cycle time with enhanced test coverage.

**Cost:** Automation Framework reduces the cost incurring to the organisation on total testing phase, as the number of resources working for a manual testing project would reduce as most of the chunk would be taken care by the automation framework. Test Automation gives a serious cost advantage when automation begins early in the product development life cycle.

## Advantages of Test Automation over Manual Testing

There are few advantages while using an automation tool instead of manual testing. They are:

**Improved Accuracy:** Even the most experienced and professional testers can make mistakes during manual testing. A tool performs the same task precisely every time in a more effective way.

**Increased Test Coverage:** This is one of the key advantage when we use an automation tool as the Complex test cases become easily executable, And we can even Provide the maximum coverage that was previously impossible with manual tests.

**Faster Time to Market:** Test automation provides the testers an ability to execute tests simultaneously and parallel which gives the edge to automate complex and long regression tests in a fraction of time which improves the time to delivery of the desired software.

**Easy Maintenance:** We can have an easy maintenance of test cases and test scripts when using a test automation tool comparatively with the manual testing.

### Principles of Test Automation:

**Hierarchy:** A test suite is a collection test case which internally has a hierarchy. Instead of creating the scripts for certain test cases, a tester needs to have prior focus on the test suite hierarchy. This hierarchy assumes great importance in the scenario of automation.

**Atomic Tests:** Single test case should test only one functionality of a product.

**Independent Tests:** It was seen quite a few times in the test automation where, if one test fails in certain module then all the subsequent tests which are dependent on the failed test is not executed. This is beneficial in Manual Testing.

### Choosing the Right Automation Tool:

Selection of right automation tool is the most

important factor that will ultimately decide the success of your test automation project - poor choices unfortunately often may result in project failure. We can select the automation tool based on some features and factors:

- Performance
- Multi-user support
- Results and reporting based on industry best practices
- Functionality
- Object Recognition
- Automated scripting support using different scripting languages
- Support for cross browser and cross platform testing
- Parallel Execution
- Support for integration with 3rd party open & commercial tools
- Inbuilt exception handling or recovery mechanism
- Support for different types of testing
- Parallel Execution
- Ease of use.

### Popular Automation Tools Available in the Market:

- Selenium
- HP UFT/QTP
- Test Complete

**Table1: Comparison of Test Automation Tools\* (Ref 1, Ref 2, Ref 3)**

Tools/Criteria	Selenium	HP UFT/QTP	Test Complete
Pricing (USD)	Open Source & Free of Cost	Licensed & Cost will be around 12000	Licensed & Cost will be around 4000
Cross Platform	Windows, Unix, Linux, MAC	Only Windows	Windows XP, Windows 7 & later
Application Support	Web Applications Only	Web, Desktop & Mobile Applications	Web, Desktop & Mobile Applications
Browsers Support	Chrome, Firefox, IE & Opera	IE, Firefox & Chrome	IE, Firefox, Opera & Chrome
Language Used	Java, C#, Ruby, Python, PHP, JavaScript	VBScript	VBScript, Delphi, C++, C#, JavaScript
Data Driven Framework	Excel/CSV	Excel files, Text files, XML & DB files	Excel, CSV
Report Generation	HTML	HTML	HTML

### Types of Framework:

**Data Driven:** This is one of the most ongoing approaches where, variables are used to store the test data. At runtime, these variables could be loaded from an external data source (Ex: Excel sheets, Text Docs, etc.). This approach reduces the problem of hard coding and we can easily avoid passing the test data in the script.

**Keyword Driven:** In this approach, we include input, user actions and expected output in different keywords that are typically independent of the AUT. Test suites composed of test cases which are built using these keywords are typically stored in tables.

**Hybrid:** This approach combines both the Data Driven and Keyword Driven approaches, and brings in benefits which are delivered. Over a period of time, there is much scope for hybrid frameworks coming into existence for Test Automation.

### Challenges in Automation:



- Scope of Automation
- Exact time frame to stop Testing? To how much extent is the coverage needed?
- Making scripts Reusable means a fair amount of labour, Don't be discouraged
- In web applications, switching between windows test cases are challenging and difficult to automate.

- Integrations between other applications are sometimes difficult to automate.
- Identifying the objects is challenging when the web applications are developed with few concepts in different technologies (ex: ActiveX, frames etc.,)

### Automation Best Practices:

We recommend the following best practices for automation.



**Automate Regression Tests:** Automating regression tests is really a good practice because you want to execute the test repeatedly on every new release. If the test requires to be executed only once, then the effort to automate the test can outweigh the benefits.

**Design Tests Before Automating Them:** It is always a good practice to create the test cases and scenarios before starting to automate the tests. It is the good test design which helps in identifying defects, automated tests only execute the test design. The only issue when we start automating certain application without prior Test Design is, there may be a chance of missing few scenarios.

**Remove Uncertainty From Automated Tests:** One of the key points of automation testing is the ability to give consistent results, so that we can be certain that something has actually gone wrong when a test fails. If an automated test passes in one run and fails in the next run, without any changes on the software under test, we cannot be certain if the failure

is due to the application or due to other factors, such as test environment issues or problems in the test code itself.

script you have developed is another best practise that you need to adopt before every releases. So that you can update the needful before delivering things.

#### ***Don't Automate Unstable Functionality:***

Automation of an unstable functionality should be avoided as any change in business requirement may effect in the entire Automation suite. time frames is very challenging.

***Review Automated Tests For Validity:*** Having a quick review with you team member for the

***Don't Automate Every Test:*** Having a test coverage of 100% is not possible in automation as there are multiple combinations which we cannot automate. To create an automation suite aiming for

“Automating Every Test”, requires alot of time and effort hence achieving the same in the stipulated

## **Conclusion:**

Test automation always offers a promising way of improved quality and productivity relative to the time lines. But in the end, it's important to note that test automation should only be considered as a special section of testing that works to verify

the state of another piece of software. Used properly and for its anticipated purpose, test automation can lead to better results and overall success all around.

## **References:**

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#### **Headquarters**

Excel Global Solutions Inc.  
N27 W23960 Paul Road,  
Suite 101  
Pewaukee, Wisconsin 53072  
Ph: 262-347-4911



[www.excelglobalsolution.com](http://www.excelglobalsolution.com)



[info@excelglobalsolution.com](mailto:info@excelglobalsolution.com)