AUTOMATION TESTING Tutorial: Process, Planning & Tools

What is Automation Testing?

Manual testing is performed by a human sitting in front of a computer carefully executing the test steps.

Automation Testing means using an automation tool to execute your test case suite.

The automation software can also enter test data into the System Under Test , compare expected and actual results and generate detailed test reports.

Test Automation demands considerable investments of money and resources.

Successive development cycles will require execution of same test suite repeatedly.

Using a test automation tool it's possible to record this test suite and re-play it as required.

Once the test suite is automated, no human intervention is required .

This improved ROI of Test Automation.

Goal of Automation is to reduce number of test cases to be run manually and not eliminate manual testing all together.

Please be patient. The Video will load in some time. If you still face issue viewing video click here

Why Automated Testing?

Automated software testing is important due to following reasons:

- Manual Testing of all work flows, all fields , all negative scenarios is time and cost consuming
- It is difficult to test for multi lingual sites manually
- Automation does not require Human intervention. You can run automated test unattended (overnight)
- Automation increases speed of test execution
- Automation helps increase Test Coverage
- Manual Testing can become boring and hence error prone.

Which Test Cases to Automate?

Test cases to be automated can be selected using the following criterion to increase the automation ROI

- High Risk - Business Critical test cases
- Test cases that are executed repeatedly
- Test Cases that are very tedious or difficult to perform manually
- Test Cases which are time consuming

The following category of test cases are not suitable for automation:

- Test Cases that are newly designed and not executed manually atleast once
- Test Cases for which the requirements are changing frequently
- Test cases which are executed on ad-hoc basis.

Automated Testing Process:

Following steps are followed in an Automation Process

Test tool selection

Test Tool selection largely depends on the technology the Application Under Test is built on. For instance QTP does not support Informatica. So QTP cannot be used for testing Informatica applications. **It's a good idea to conduct Proof of Concept of Tool on AUT**

Define the scope of Automation

Scope of automation is the area of your Application Under Test which will be automated. Following points help determine scope:

- Feature that are important for the business
- Scenarios which have **large amount of data**
- **Common functionalities** across applications
- Technical feasibility
- Extent to which business components are reused
- **Complexity** of test cases
- Ability to use the same test cases for cross browser testing

Planning, Design and Development

During this phase you create Automation strategy & plan, which contains following details-

- Automation tools selected
- Framework design and its features
- In-Scope and Out-of-scope items of automation
- Automation test bed preparation
- Schedule and Timeline of scripting and execution
- Deliverables of automation testing

Test Execution

Automation Scripts are executed during this phase. The scripts need input test data before there are set to run. Once executed they provide detailed test reports.

Execution can be performed using the automation tool directly or through the Test Management tool which will invoke the automation tool.

Example: Quality center is the Test Management tool which in turn it will invoke QTP for execution of automation scripts. Scripts can be executed in a single machine or a group of machines. The execution can be done during night , to save time.

Maintenance

As new functionalities are added to the System Under Test with successive cycles, Automation Scripts need to be added, reviewed and maintained for each release cycle. **Maintenance becomes necessary to improve effectiveness of Automation Scripts.**

Framework in Automation

A framework is set of automation guidelines which help in

- Maintaining consistency of Testing
- Improves test structuring
- Minimum usage of code
- Less Maintenance of code
- Improve re-usability
- Non Technical testers can be involved in code
- Training period of using the tool can be reduced
- Involves Data wherever appropriate

There are four types of framework used in automation software testing:

1. Data Driven Automation Framework
2. Keyword Driven Automation Framework
3. Modular Automation Framework
4. Hybrid Automation Framework

Automation Tool Best Practices

To get maximum ROI of automation, observe the following

- Scope of Automation needs to be determined in detail before the start of the project. This sets expectations from Automation right.
- Select the right automation tool: A tool must not be selected based on its popularity but it's fit to the automation requirements.
- Choose appropriate framework
- Scripting Standards- Standards have to be followed while writing the scripts for Automation .Some of them are-
  - Create uniform scripts, comments and indentation of the code
  - Adequate Exception handling - How error is handled on system failure or unexpected behavior of the application.
  - User defined messages should be coded or standardized for Error Logging for testers to understand.
- Measure metrics- Success of automation cannot be determined by comparing the manual effort with the automation effort but by also capturing the following metrics.
  - Percent of defects found
  - Time required for automation testing for each and every release cycle
  - Minimal Time taken for release
  - Customer satisfaction Index
  - Productivity improvement

The above guidelines if observed can greatly help in making your automation successful.

Benefits of Automation Testing

Following are benefits of automated testing:

- 70% faster than the manual testing
- Wider test coverage of application features
- Reliable in results
- Ensure Consistency
- Saves Time and Cost
- Improves accuracy
- Human Intervention is not required while execution
- Increases Efficiency
- Better speed in executing tests
- Re-usable test scripts
- Test Frequently and thoroughly
- More cycle of execution can be achieved through automation
- Early time to market

Different types of software testing that can be automated

- Smoke Testing
- Unit Testing
- Integration Testing
- Functional Testing
- Keyword Testing
- Regression Testing
- Data Driven Testing
- Black Box Testing

How to Choose an Automation Tool?

Selecting the right tool can be a tricky task. Following criterion will help you select the best tool for your requirement-

- Environment Support
- Ease of use
- Testing of Database
- Object identification
- Image Testing
- Error Recovery Testing

- Object Mapping
- Scripting Language Used
- Support for various types of test - including functional, test management, mobile, etc...
- Support for multiple testing frameworks
- Easy to debug the automation software scripts
- Ability to recognize objects in any environment
- Extensive test reports and results
- Minimize training cost of selected tools

Tool selection is one of biggest challenges to be tackled before going for automation. First, Identify the requirements, explore various tools and its capabilities, set the expectation from the tool and go for a Proof Of Concept.

Automation Testing Tools

There are tons of Functional and Regression Testing Tools available in market. Here are 5 best tools certified by our experts

1. **Selenium**

It is a software testing tool used for regression testing. It is an open source testing tool that provides playback and recording facility for regression testing. The Selenium IDE only supports Mozilla Firebox web browser.

- It provides the provision to export recorded script in other languages like Java, Ruby, RSpec, Python, C#, JUnit and TestNG
- It can execute multiple tests at a time
- Autocomplete for Selenium commands that are common
- Walkthrough tests
- Identifies the element using id, name , X-path, etc.
- Store tests as Ruby Script, HTML, and any other format
- It provides an option to assert the title for every page
- It supports selenium user-extensions.js file
- It allows to insert comments in the middle of the script for better understanding and debugging

Download Selenium

2. **QTP (HP UFT)**

It is widely used for functional and regression testing, it addresses every major software application and environment. To simplify test creation and maintenance, it uses the concept of keyword driven testing. It allows the tester to build test cases directly from the application.

- It is easier to use for non-technical person to adapt to and create working test cases
- It fix defects faster by thoroughly documenting and replicating defects for developer
- Collapse test creation and test documentation at a single site

- Parameterization is easy than WinRunner
- QTP supports .NET development environment
- It has better object identification mechanism
- It can enhance existing QTP scripts without "Application Under Test" being available, by using the ActiveScreen

Download HP QTP

3. Rational Functional Tester

It is an Object-Oriented automated functional testing tool that is capable of performing automated functional, regression, data-driven testing and GUI testing. The main features of this tool are

- It supports a wide range of protocols and applications like Java, HTML, NET, Windows, SAP, Visual basic, etc.
- It can record and replay the actions on demand
- It integrates well with source control management tools such as Rational Clear Case and Rational Team Concert integration
- It allows developers to create keyword associated script so that it can be re-use
- Eclipse Java Developer Toolkit editor facilitates the team to code test scripts in Java with Eclipse
- It supports custom controls through proxy SDK (Java/.Net)
- It supports version control to enable parallel development of test scripts and concurrent usage by geographically distributed team

Download Rational Functional Tester

4. WATIR

It is an open source testing software for regression testing. It enables you to write tests that are easy to read and maintain. Watir supports only internet explorer on windows while Watir webdriver supports Chrome, Firefox, IE, Opera, etc.

- It supports multiple browsers on different platforms
- Rather than using proprietary vendorscript it uses a full featured modern scripting language Ruby
- It supports your web app regardless of what it is developed in

Download Watir

5. SilkTest

Silk Test is designed for doing functional and regression testing. For e-business application, silk test is the leading functional testing product. It is a product of Segue Software takeover by Borland in 2006. It is an object oriented language just like C++. It uses the concept of object, classes, and inheritance. Its main feature includes

- It consists of all the source script files

- It converts the script commands into GUI commands. On the same machine, commands can be run on a remote or host machine
- To identify the movement of mouse along with keystrokes, Silktest can be executed. It can avail both playback and record method or descriptive programming methods to get the dialogs
- It identifies all controls and windows of the application under test as objects and determine all of the attributes and properties of each window

Download SilkTest

Conclusion

Right selection of automation tool, testing process and team, are important players for automation to be successful. Manual and automation methods go hand-in hand for successful testing.