



A Soin International Company

Test Automation - Selenium

Presented By: Sachin Kumar

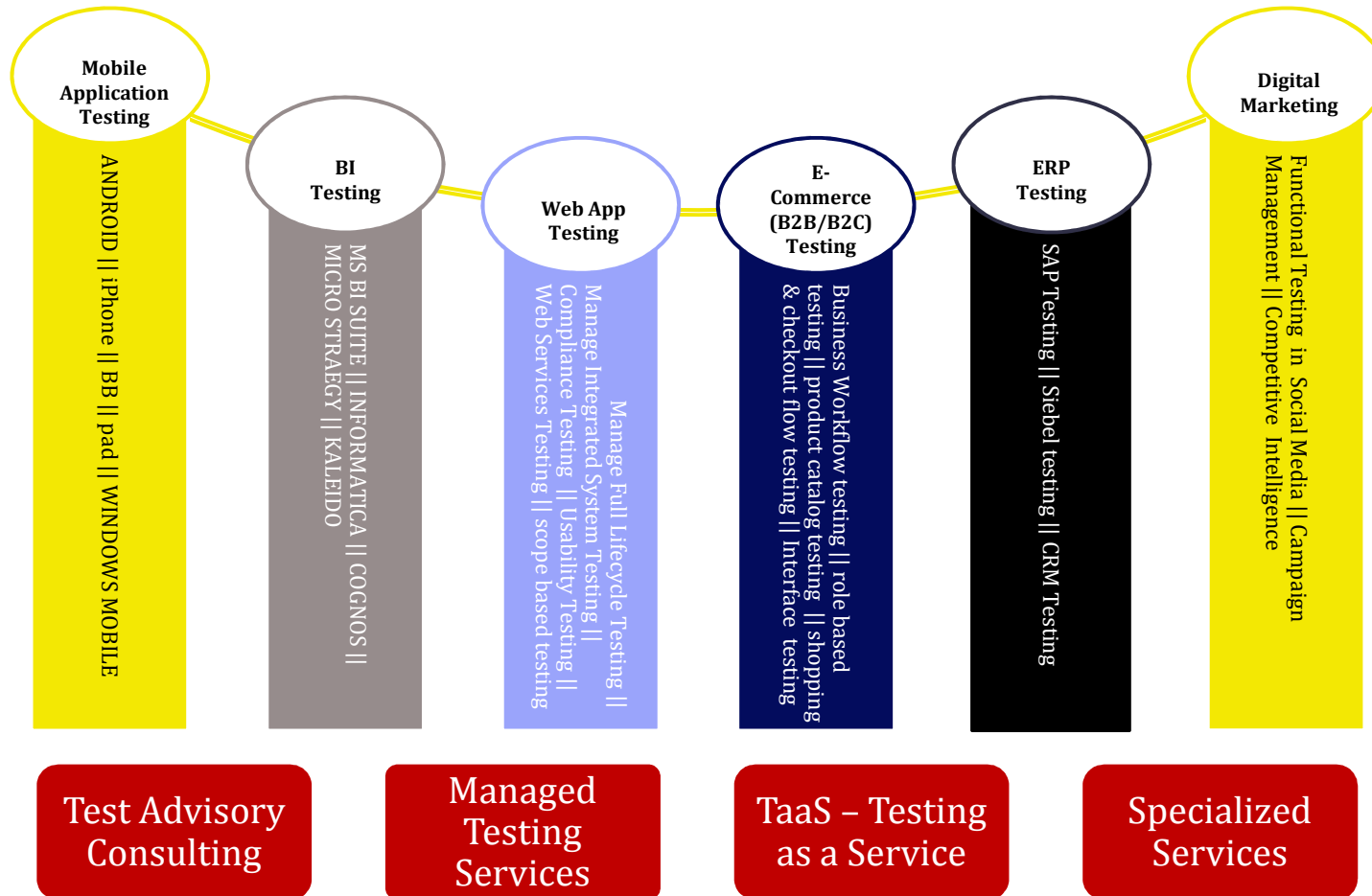
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About Corbus

- Corbus, LLC, a global solutions provider founded in 1994, offers superior services combining years of experience, solid partnerships and adaptability. Corbus' solution offering includes Information Technology (IT), Supply Chain Management (SCM) and Project Management (PMO) services.
- IT portfolio consists of E-Commerce, Business Intelligence, Content Management, Third Party Testing and Custom Solutions. In SCM, Corbus specialize in Source-to-Pay (S2P), Procure-to-Pay (P2P), Spend Management and MRO
- Management Team:
 - Rajesh (Raj) K. Soin - CEO
 - David P Spencer - COO
 - Jason Evans - Sr. VP – Sales & Marketing
 - Dr. Amit Shekhar – India Head
 - Stephen - CFO

Corbus IVS Offerings

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Tools

Selenium || QTP || Load runner || Meter || Bromine || HP Web Inspect || Hi Software Accessibility

Agenda

- Challenges of Test Automation
- Points to consider while calculating the ROI for automation
- Can automation suite be used beyond Regression testing?
- To what extent can you automate?
- When to start automation?
- Automation Life Cycle
- Advantages and disadvantages of using Selenium
- Selenium Vs other commercial tools
- Test case template and checklist for writing effective test cases
- Hybrid framework on Selenium using C#.

Challenges – Test Automation

- Selection of Automation Tool
- No Defined Process for Executing Automation Project within an organization
- Availability of Right Resources
- Commitment from Customer or Management

Overcoming Challenges – Using Selenium

- Selenium is an Open Source Tool developed by ThoughtWorks. It is one of the best tool for web application automation.
- Some of the Selenium Tool under ThoughtWorks umbrella are:
 - ❖ Selenium IDE – It is a Firefox add-on that makes it easy to record and playback tests in Firefox 2+. You can even use it to generate code to run the tests with Selenium Remote Control.
 - ❖ Selenium Remote Control (RC) – It is a client/server system that allows you to control web browsers locally or on other computers, using almost any programming language and testing framework.
 - ❖ Selenium Grid – It takes Selenium Remote Control to another level by running tests on many servers at the same time and cutting down on the time it takes to test multiple browsers or operating systems.
 - ❖ Bromine – It is a web-based QA tool of Selenium that enables you to easily run Selenium RC tests and view the results. It scales beautifully, from the single tester who just wants to run some tests without all the hassle; to the corporate solution, with multiple user-groups and hundreds of test cases.
- Selenium does not have any cost attached to it. The only cost is the effort which will go for designing and developing the script for the application
- Selenium scripting can be done in a number of programming languages like C#, Perl, PHP, Ruby etc.. One can easily find right resources for the programming language chosen for Selenium Automation

Automation ROI – Points for Consideration

No. of Test Cases Planned for Automation	Effort for Manually Executing the Test Cases	Automation Execution Effort
Number of Test Iteration Planned in a Year	Automation Effort for Automating the Test Cases	Automation Cost
Maintenance/Support Cost	Net Savings in a Year	

Automation ROI – Illustration

Application Name	<u>ABC</u>
Number of Test Cases	2000 (Sample Number)
Manual Effort (hours) to execute	168 (Considering 5 Min is required for one Test Case Execution)
Automated Effort (hours) to execute	66 (Considering 2 Min for one Test Script)
Number of Test Iteration Planned Yearly	10 (10 Iteration are planned in a Year. Each iteration will require execution of 2000 Test Cases).
Total Projected Hours Saved	$(168*10) - (66*10) = 1680 - 660 = 1020$
Total Projected FTE Savings Annually (\$)	$1020 * 60 = 61,200$ (Considering 60\$ per hour is one FTE Rate)
Savings %	$(1020/1680)*100 = 61\%$
Automation Effort Estimate	4000 (Considering 2 hours for Scripting one Test Case)
Automated Effort FTE Cost (\$)	$4000 * 60 = 2,40,000$ (Considering 60\$ per hour is one FTE Rate)
Maintenance/Support Cost (\$)	5% of 2,40,000 = 12,000 (Considering 5% of Automation Effort is the maintenance/Support Cost)
Net Savings Annually (1st Year)	$(61,200 - 2,40,000) - 12,000 = -1,90,800$
2nd Year Savings	$61,200 - 12,000 = 49,200$

Automation Beyond Regression Testing

- Substitute 1st Round of Manual Testing with Automation – Using Progressive Automation
- Use it for Smoke Testing, Sanity Testing

If 50 - 60% of the test cases do not require Manual Execution even for the first time, then imagine the cost and effort benefit due to automation.

How much Automation?

□ Automation %age Metrics based on Complexity

Complexity	Target %age for Automation
Simple	100%
Medium	60 – 80%
Complex	40-60%

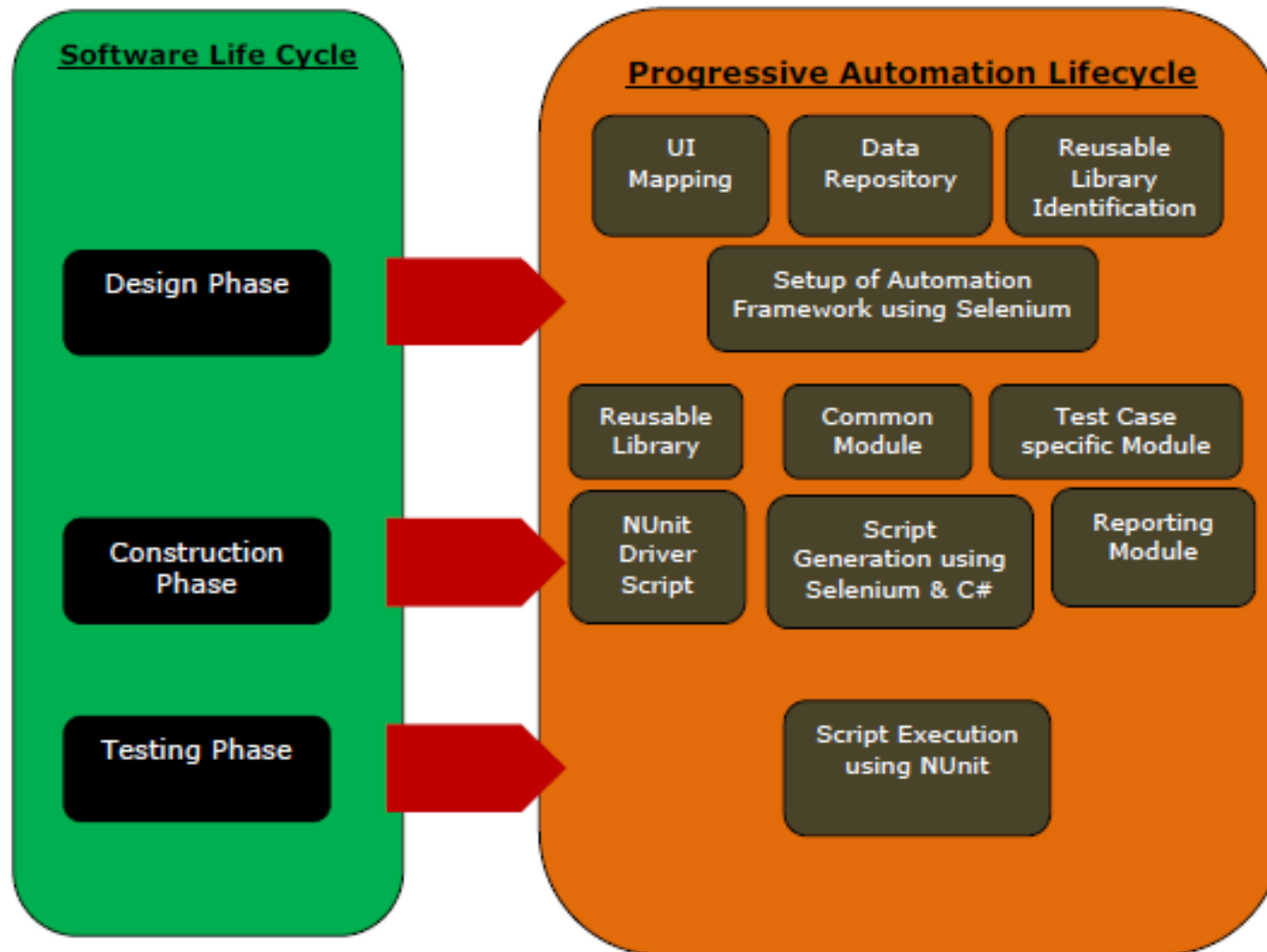
Simple - The Web based application is a static site with Navigation, Content Rendering, Login Feature, Role wise access, Simple Transaction and a Content Management System with well defined workflow.

Medium - The application is dynamic in nature like Online Booking System or Rail Reservation System.

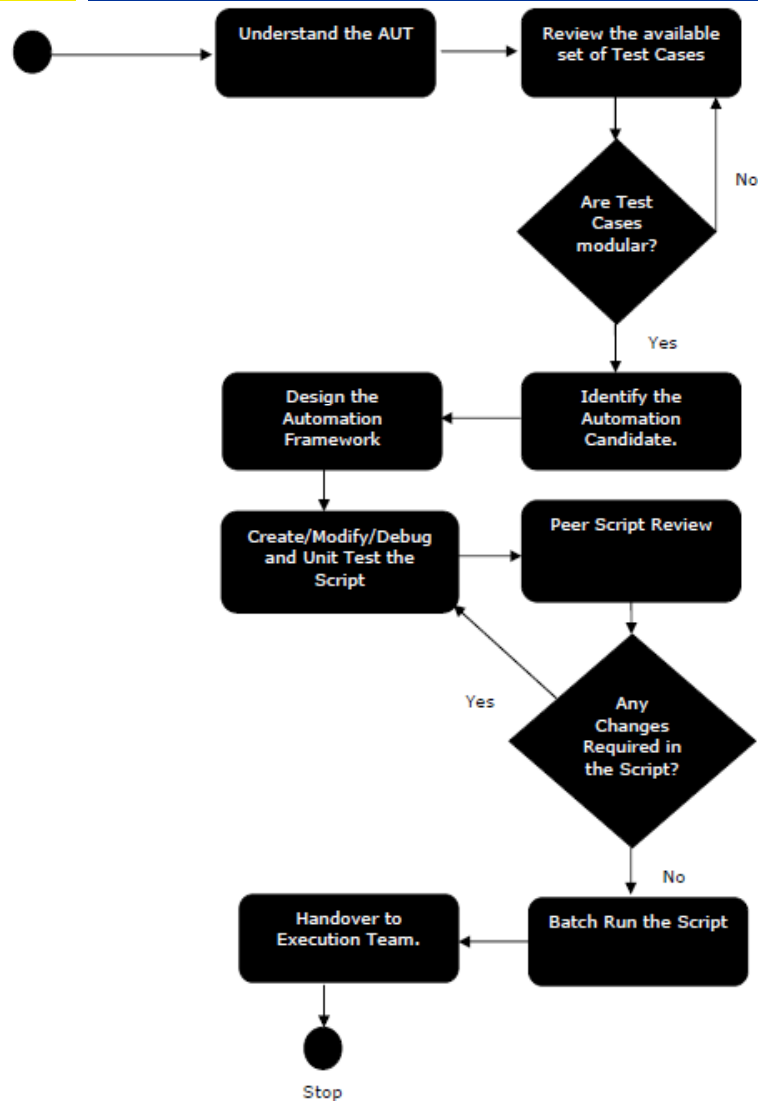
Complex - The application built for Banking domain, Ecommerce Domain wherein integration with other enterprise system is involved. The data is coming through various layers and the business logic is complex.

Note: The above metrics are prepared based on our organization benchmark and may vary depending on the nature of application and underlying business

When to Start Automation - Progressive



Automation Lifecycle



- Understand AUT
- Review the available Test Cases
- Modify the Test Cases to make it modular
- Identify Automation Candidate from existing test cases
- Design the Framework
- Start Generating the Script
- Debug the script and implement robust error handling
- Peer Review of Script
- Unit Test the Script
- Batch Run the Script
- Analyze the Result
- Make Changes based on Result Analysis
- Handover to Test Execution Team

Selenium Advantages & Disadvantages

Advantages	Disadvantages
Open source tool without any cost.	Object scanning feature is not available, so one has to record the application in Selenium IDE and check the Object detail from the generated Selenese code
Supports many languages for scripting like Java, Groovy, C#, Perl, PHP, Python and Ruby	You cannot drive your test cases from Test Management Tool other than Bromine. You have to manually drive the test cases from the Framework using NUnit
Support for multiple browser and platform. You can run the same version of the script on multiple browsers and platform by designing a framework around it.	Selenium can only be used for automating Web Based System and cannot be used for Desktop application

Comparison – Selenium Vs. QTP

Feature	Selenium	QTP	Comments
Recording Feature	X	X	Use Selenium IDE for recording
Playback Feature	X	X	Use Selenium IDE for Playback
Checkpoints	X	X	Use Inbuilt Selenium Checkpoints, function, methods etc. for implementing verification point
In Built Report	-	X	Build Report Module in Selenium to get an Excel based Report.
Script Customization	X	X	You can add conditional logic, loops in Selenium Script when used with language of your choice.
Multiple Browser Support	X	X	Selenium provides inherent capability for running the same script on multiple browsers which is supported in QTP but complex to implement.
Multiple Language Support for Scripting	X	-	Selenium scripting can be done in C#, Perl, PHP, Ruby, Groovy etc. while QTP scripting can be done only in VB Script. This 1 feature will provide the Scripter the power of Object Oriented Programming which can be used to design a robust framework even for complex application.
Modularity	X	X	QTP does support limited modularity as VB scripting is the core language use for Automation.
OOPS	X	-	Selenium choice of language gives the power of OOPS.
Extensibility	X	-	Since selenium is an open source tool and its core library file is exposed to user, so you can extend the Library to make amendment as per your requirement. QTP base code cannot be extended being a legacy tool.

Test Case Template

Functional Test Cases

Scenario 1

Step 1
Step 2
Step 3
Step 4
Step 5

Scenario 2

Step 1
Step 2
Step 3
Step 4
Step 5

GUI Test Cases

Scenario 1

Step 1
Step 2
Step 3
Step 4

Check the Modularity of the test cases. The test cases should be written in a modular way.

The reusable test cases such as Login, Navigation etc.. should be marked as Template Test Case which will be referred while writing the test cases for other Business Function. These Reusable Test Cases can be maintained separately to for easy reference while doing automation.

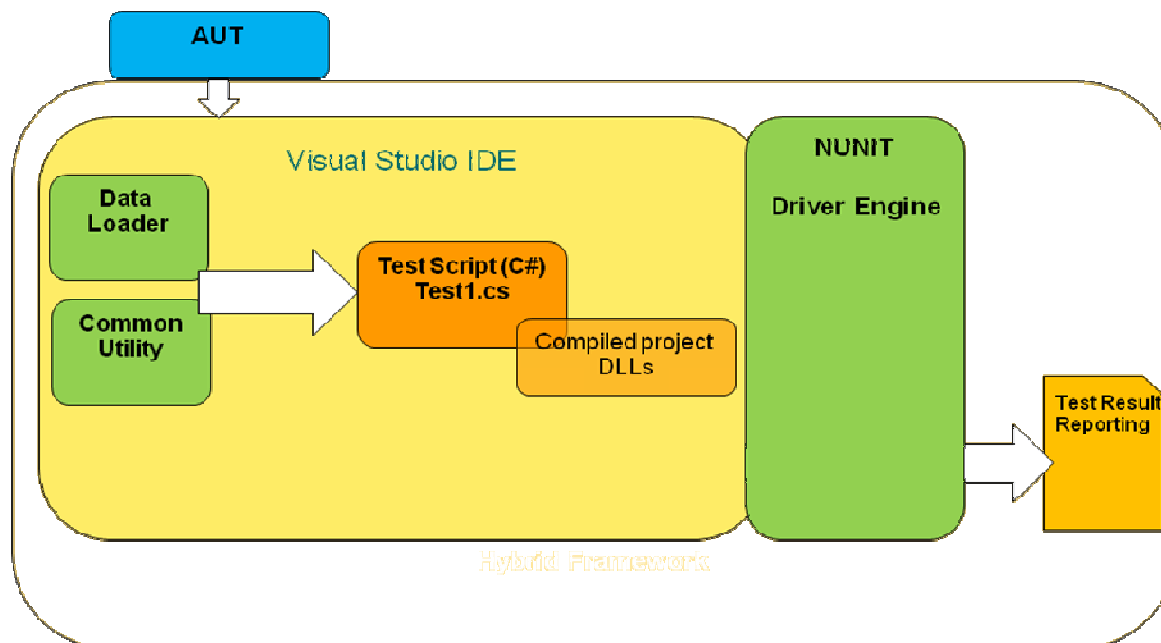
Hybrid Framework in Selenium using C#

Pre-requisite

- ✓ Visual Studio 2003 with C#
- ✓ NUnit Tool
- ✓ Selenium .NET Client Driver
- ✓ Selenium IDE in Firefox
- ✓ Selenium RC
- ✓ JRE for Selenium RC
- ✓ Excel Report Module

Automation Steps

- ✓ Record the Test Steps for each Scenario in Selenium IDE
- ✓ Insert required validation point while recording the script
- ✓ Convert the Selenese Script into C#
- ✓ Copy the C# Script
- ✓ Open Visual Studio and create a project
- ✓ Add C# File and Paste the copied Script
- ✓ Add Conditional Statement as per Test Case Steps
- ✓ Call the Reporting Module wherever you are checking the Test Condition for Pass & Fail
- ✓ Compile the code and fix any compilation error.
- ✓ Add the Compiles DLLs in NUnit
- ✓ Unit Test the Test Script
- ✓ Analyze the Result
- ✓ Turnover the Test Script for execution.



Online References

- <http://www.seleniumhq.org>
- <http://code.google.com/p/flash-selenium/>
- <http://release.seleniumhq.org/selenium-core/0.8.0/reference.html>

Selenium Tool	Latest Version	URL
Selenium IDE	1.14	http://release.seleniumhq.org/selenium-ide/1.4.1/selenium-ide-1.4.1.xpi
Selenium RC	2.14.0	http://selenium.googlecode.com/files/selenium-server-standalone-2.14.0.jar
Selenium Client Drivers		
Java	2.14.0	http://selenium.googlecode.com/files/selenium-java-2.14.0.zip
C#	2.14.0	http://selenium.googlecode.com/files/selenium-dotnet-2.14.0.zip
Ruby	2.14.0	http://rubygems.org/gems/selenium-webdriver
Python	2.14.0	http://pypi.python.org/pypi/selenium

Next Steps

- Get Started – Visit -
<http://seleniumhq.org/docs/>
- For any query, please drop me an email at
sachink@corbus.com

Visit us at www.corbus.com

Q&A

