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STQA Unit - 5.

* Automation Testing

* using special testing tools and framework to minimize the human working
* It compare actual result with expected result
* functional and Non functional can be done
* Complex test Can be done
* process
  (a) Requirement Understanding
  (b) Defining Scope & automation - finding right test cases
  (c) Selecting right tool
  (d) framework creation.
  (e) scripting test cases.
  (f) CICD (Continuous Integration and Continuous delivery) Integration.
      - setting up test suit
      - So, we can check the stability with just one click after deployment.

* Automation framework.

It is set of rules, guidelines or tools that help in creating and designing test cases.

Benefits:

1. Reusability
2. Scripts easy Maintenance.

3. No hard coding
4. Improve efficiency
5. More test coverage.

Types

1. Linear Automation framework.
   - Simplest
   - just write one single program without modularity in sequential steps.

Adv.	Disadv.
1) Simple	1) No resusability.
2) less time	2) Maintenance is difficult

2. Modular based Testing
   divide application into seperate units. and All Modules are tested seperately.

Adv.	Disdv.
1. No need to test entire just test one Module having error	1. hard coding.
2. Easy maintenance	2. programming knowledge required.

3. Library Architectural Testing framework.
   - Same as Modular Testing, but Here we kept scripts having Similarity in one library.

Adv.	Disdv.
1. Easy maintenance	1. Expertise needed
2. reusability	2. hard coding

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4. Data driven framework

To run the same set of operation on multiple set of data that are kept in seperate files, mostly EXCel sheets.

Adv.	Disadv.
1) reusable	1) Complex process
2) faster	2) highly experied

5. Keyword Driven framework

Create different keywords for a different set of ~~data that are kept in seperate files,~~ operation and in the main script we can just refer to these keyword.

.	adv.	disadv.
1.	less knowledge required	1. Maintenance
2.	reusable	2. initial cost is high

6 Hybrid Test Automation.

Combined all framework.

Benefit of all.

* Benefit of Automation Testing

*	No human error	* less test engineer required.
*	Save time	* better utilization of global resource
*	frequently testing	* diff type of testing

* Provide other functionality such as configuration, installation, test data generation etc.

disadv. of Automation Testing

+ high cost
* No awarness
+ required trained staff.

* How to choose Automation Testing tool.

parameter.

(I) Platform independent
(II) Easy to use
(III) cost
(IV) Extensibility and reusability
(V) Support
(VI) Support multiple framework.
(VII) Support diff. type of testing.
(VIII) debugging, test report. etc

4 steps for selecting Automation Testing Tool.

1) Identify requirement for tools.
2) Evaluate the tools and vendors.
   * Create tool shortlist
   * ask quetion to vendors
   * trial usage
   * take feedback from other company
3) Estimate cost and Benefit
4) Make final Decision.

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* Introduction to Selenium Automation Testing Tool.

Selenium is free open source web Automation Tool which is used to perform testing on web Application.

It has four component
Selenium IDE
Selenium RC
WebDriver
selenium Grid.

+ It has rich set of testing function.

feature of Selenium (Advantage & Why Selenium)

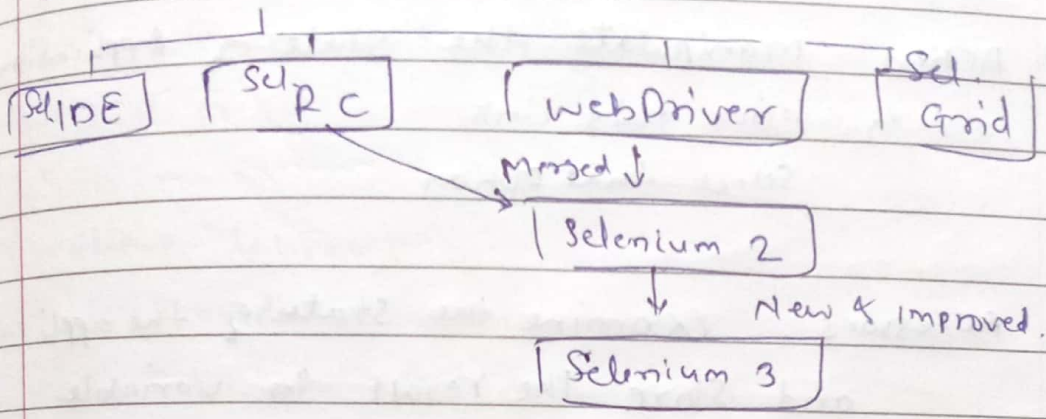
1. open source
2. multiple os
3. multiple browser
4. multiple programming lang
5. multiple framework
6. Web based Automation testing.
7. used for functional regression testing
8. Uses less Hardware resources.
9. Support parallel test case execution.
10. large community.

Disadvantage.

1. don't support desktop Application
2. Limited support for image testing
3. NO support from anybody

4. New feature may not work properly

Selenium's Tool Suit.



* Selenium IDE.

- It is integrated development Environment for Selenium test.
- It is implemented as firefox extension. allow you to record, edit and replay the test.
- Record and playback.
- Debug and breakpoints.
- Can export RC and webdriver.
-> Selenese command.

	feature	
1	Menu bar	file, edit, Action, option, help.
2.	Tool bar	fast-slow, run, ..
3.	Addrss bar	URL
4.	Test case pane	
5.	Test Script Editor Box	
6.	Start/Stop Recording Button.	
7.	log, Reference Pane.	

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Selenium Command - "Selenese"
Sequence of command is test script

(I) Action: Manipulate the state of Application
eg. Click this link
Select that option.

(II) Accessors: Examine the state of the application and store the result in variable.
eg. storeTitle

(III) Assertions: enable tester to verify the state of Application
eg. verifyAlert.

★ Selenium RC
Selenium Remote control. is a server written in Java that accepts commands for browser via HTTP.

features.
- Any programming lang.
- Any browser.
- All platform.
- automatically configure

→ It provide an API and library for its supporting language, Java, HTML, C# Python etc

→ It convert Selenese to programming language
→ Provide solution to cross browser testing

Components of RC.

(1) selenium Server.

→ It launches and kill browser.

→ It interpret and execute the Selnese.

→ as HTTP proxy

(2) Client library.

- Provide interface b/w programming lang and Selenium RC server.

* Selenium WebDriver.

→ It use for.

(a) Multi browser testing (better than RC)

(b) Handling multiple frame.

(c) Complex page navigation.

(d) Ajax based UI element.

→ It interact directly with browser and uses the browser's engine to control it.

→ Purely object oriented API.

→ faster.

→ Can test mobile application.

Architecture

4 components.

1. Selenium Client Library.

- It support multiple library such as Java, Ruby, Python

- language Binding

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2. JSON wire protocol Over HTTP client
→ It provide transportation Mechanism to transfer data between a server and a client.

3. Browser Drivers.
→ It Communicate with browser.
→ After receving command it execute on respective browser.
and response back in the form of HTTP response.

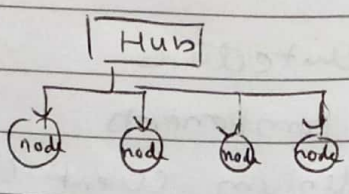
4. Browser → Google Chrome, safari, firefox.

* Selenium Grid.
- used together with Selenium RC to run test on different machine against different browser in parallel.

→ Coordinate with RC / Webdriver.

2 versions Selenium Grid 1 & Selenium Grid 2.

Architecture.



① Hub.
→ It receive all request and distribute them to right node.
→ only one Hub

② Node: instance which execute the test case

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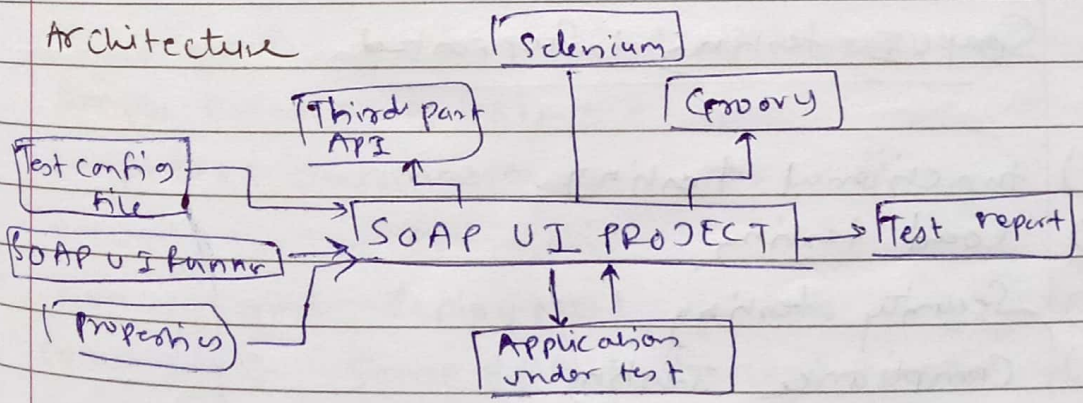
Automation Tools.
- Software applications that help users to test various desktop, web, and mobile application.

↑ SoapUI
- open source.
- API testing tool.
- It is most widely used automation tool for testing web service and web APIs of SOAP and REST interfaces.
- Non functional + functional testing
- Exchange info in XML or JSON.
→ Simple and easy
→ Support all standard protocol

Architecture



Test Config file: include Database connection, variable Expected result and setup etc.
Selenium: Selenium JAR
Groovy: Library that provide Scripting lang
Third party API - used to create test automation framework
SoapUI Runner - use to run.
Test Report -

properties: used to hold any dynamically generated data.

Adv.

- Simple GUI
- Cross platform desktop based application.
- All protocol support
- less cost
- fast
- Support drag and drop

disadv.

→ longer to request big data.
→ Security testing require enhancement.

SoapUI testing: supported

1) functional testing.
2) Load testing.
3) Security testing.
4) Compliance Testing
5) Regression Testing.

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Robotic Process Automation (RPA)

It software ~~tool~~ robots running on a physical or virtual Machine.

- RPA is the process by which a software bot uses a combination of automation, computer vision, and Machine Learning to automate repetitive, high volume tasks that are rule based and trigger driven.

- It mimic the actions of a user at user interface (UI) features.
- Rich analytical suite:- It manage and monitor from central console
- Simple creation of bots.
- Scriptless automation - No coding
- Security - encryption.
- Hosting and deployment of bots in group.
- Debugging: Some RPA tool need to stop running to rectify the error while other tool allow dynamic interaction while debugging.

RPA Benefit.	drawback.
- Reduced cost	→ Scalability issue
- Reduce Operational risk	→ require structured data.
- Quality and accuracy	
- & reduce workload	
- Improve Busines.	

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Types RPA

(1) unattended RPA → No human intervention
(2) attended RPA → human intervention.
(3) Hybrid → Both

working.

(i) planning;
(ii) Design and development: creation of bot
(iii) Deployment and testing: execution of bot
(iv) Support and maintenance.

* Tosca.

- Topology and orchestration specification for cloud Application.

→ It offer the best solutions for software Testing and SQA.

→ Tricentis

feature

(1) Automated and Manual Testing
(2) Support parallel execution.
(3) Security testing
(4) Scriptless test case
(5) Can be integrated with CI tool.
(6) less time

* use for large scale application.

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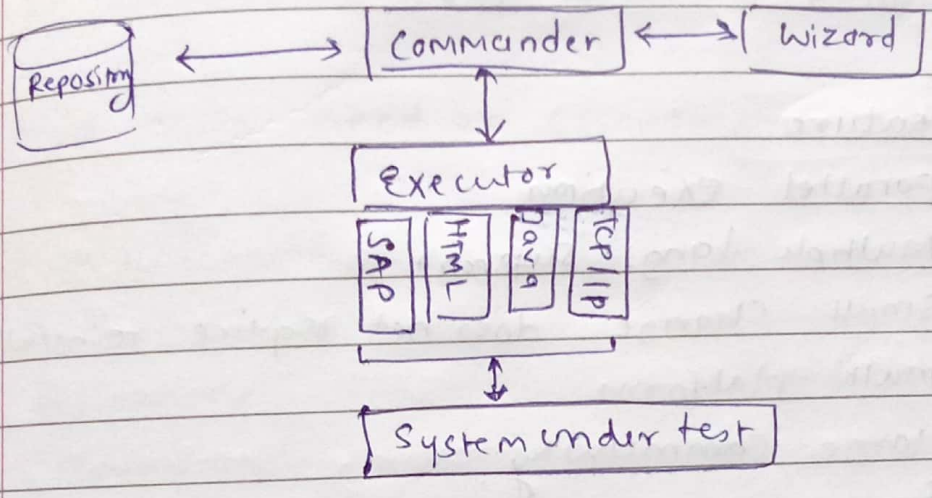
disadvantage

(i) Highly expensive.
(ii) heavy tool.

Components.



(1) Tosca Commander.
→ used to enable the test creation, execution, Management and analysis of test script efficiently.

(2) Tosca Executor.
- run test cases on the test object.

(3) Tosca XScan
- It Scan the screen, and their input fields and saves the information as module in Tosca Commander.

(4) Tosca Repository
- Used to Manage project in Database.

Appium

→ Open source Mobile testing tool.
→ ios & Android
→ All application. including Native, Hybrid and web apps.

feature

(1) parallel execution.
(2) Multiple lang. support.
(3) small change does not require reinstallation
(4) multi platform
(5) large community.
(6) free

Disadv.

(1) a bit slow
(11) lack of detailed report

Architecture of Appium