Automation Testing, Selenium Tool (Quality Analysis)

A Thesis Submitted in partial Fulfillment of the Requirement for the Award of the Degree of

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Submitted By

TANU TRIPATHI

Roll. No. 801761016

Under Supervision of

DR. HARDEEP SINGH

Associate Professor

ELECTRONICS AND COMMUNICATION ENGINEERING DEPARTMENT

THAPAR INSTITUTE OF ENGINEERING

&

TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

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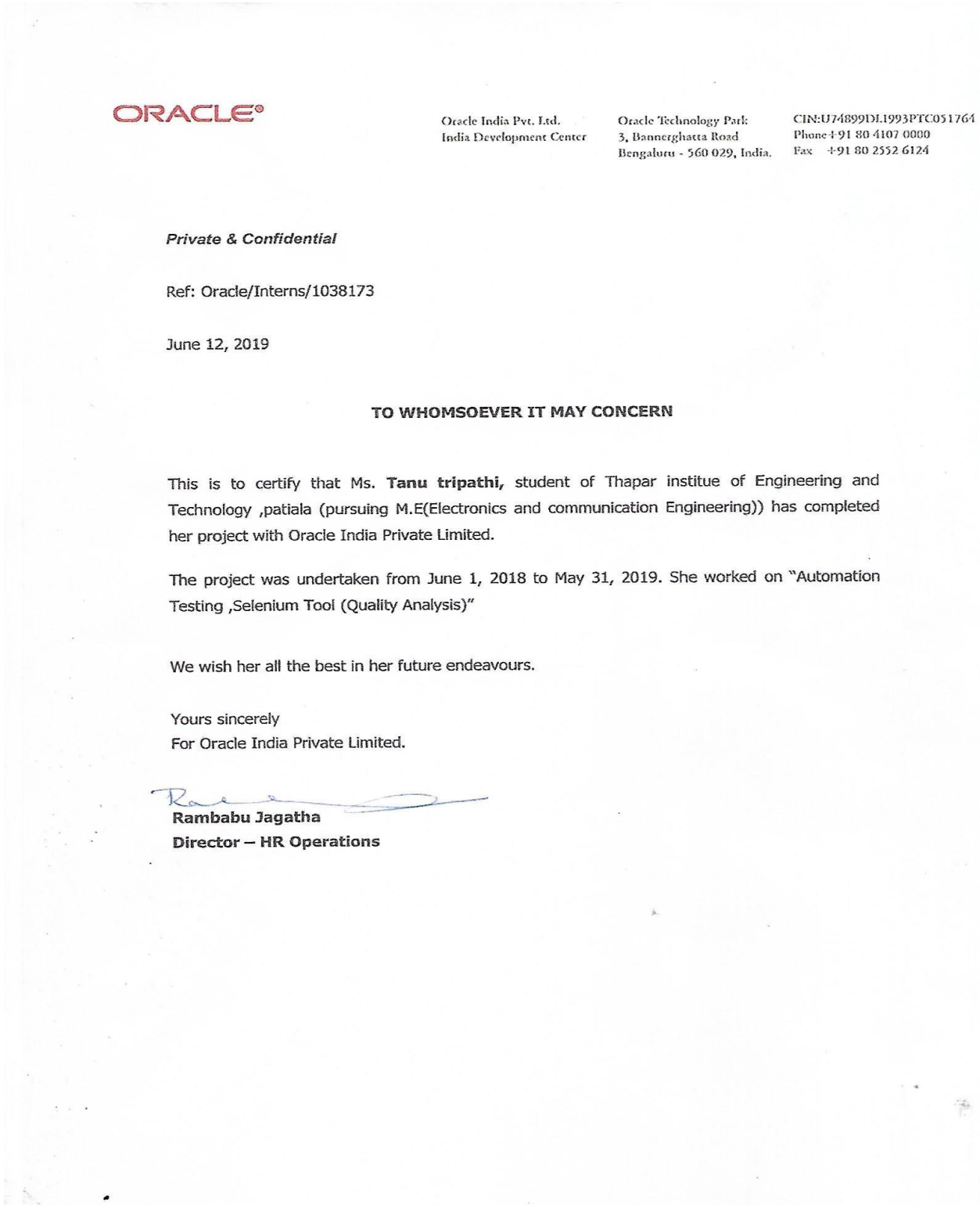

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Oracle Technology Park
3, Bannerghatta Road
Bengaluru - 560 029, India.

CIN:U74899DL1993PTC051764
Phone +91 80 4107 0000
Fax +91 80 2552 6124

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This is to certify that Ms. **Tanu tripathi,** student of Thapar institue of Engineering and Technology ,patiala (pursuing M.E(Electronics and communication Engineering)) has completed her project with Oracle India Private Limited.

The project was undertaken from June 1, 2018 to May 31, 2019. She worked on "Automation Testing ,Selenium Tool (Quality Analysis)"

We wish her all the best in her future endeavours.

Yours sincerely
For Oracle India Private Limited.

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DECLARATION

I, Tanu Tripathi hereby declare that the work presented in this thesis entitled "**Automation Testing, Selenium Tool(Quality Analysis)**" in partial fulfillment of the requirement for the award of degree of Master of Engineering (ECE) submitted at Electronics and Communication Engineering Department, Thapar Institute of Engineering & Technology (Deemed to be University), Patiala is an authentic record of work carried out under supervision of **Dr. Hardeep Singh (Associate Professor ,ECED)** from June 2018 to June 2019. The matter presented in this has not been submitted either in part or full to any other university or institute for the award of any other degree.

Tanu Tripathi

Date: 13-06-19

Tanu Tripathi
801761016

Date: 13-06-19

Dr. Hardeep Singh
Associate Professor
Department of Electronics And Communication Engineering
Thapar Institute of Engineering & Technology
(A deemed To be University), Patiala, Punjab

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Date: 13-06-2019

Place: Patiala

Tanu Tripathi

TANU TRIPATHI

ABSTRACT

In modern world the most important is to decrease time and to enhance the work done. In industry previously people were using manual testing and it was much time consuming and tedious too. To avoid this now-a-days people are switching from manual to automation testing by using different types of automation tools. Now-days there are many automation tools which are based upon different types of languages and these languages need different tools to operate.

Various tools of automation have been used, amongst which selenium tool is one of them. In modern world selenium tool is used on a large scale to automate the sites. In this thesis, I am using the detailed description of selenium tool as well as different types of tools which are being used to automate in different ways. In the modern world, we are using a large number of testing tools. The testing tools may be manual testing and automation testing. Depending upon the needs, there are various automation testing as a different types of testing are being used for different types of work done.

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LIST OF ABBREVIATIONS

STLC	-	Software Testing Life Cycle
SDLC	-	Software Development Life Cycle
QA	-	Quality Assurance
IT	-	Information Technology
SFTP	-	Secure File Transfer Protocol
MMPI	-	Minnesota Multiphase Personality Inventory
ETS	-	Educational Testing Services
SAT	-	Scholastic Aptitude Test
GRE	-	Graduate Record Examinations
SQL	-	Structured Query Language
UAT	-	User Acceptance Testing
Selenium IDE	-	Selenium Integrated Development Environment
Selenium RC	-	Selenium Remote Control
HTML	-	Hypertext Markup Language
Php	-	Personal Home Page
API	-	Application Program Interface
AD	-	Active Directory
DHCP	-	Dynamic Host Configuration Protocol
VMS	-	Virtual Memory System
OS	-	Operating System
VMS	-	Virtual Memory System
SLA	-	Service-Level Agreement
HaaS	-	Horizontal level as a Service
QoS	-	Quality as a Service
SSH	-	Secure Shell
TaaS	-	Trust for Advancement of Agricultural Sciences
IBM	-	International Business Machines

RFT	-	Request For Tender
API	-	Application Program Interface
FRS	-	Functional Requirements Statement
SRS	-	Software Requirements Specification
DB	-	Data Base
XML	-	Extensible Markup
UTF	-	Unicode Transformation Format
DSL	-	Digital Subscriber Line
BVT	-	Build Verification Testing
POM	-	Page Object Model
CI	-	Continuous Integration
IDM	-	Identity Management
IAM	-	Integrated Access Management
MFP	-	Multi Function-Printer
ORASE	-	Oracle Retail Advance Science Cloud Service
RPM	-	Retail Price Management
RDF	-	Resource Description Framework

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CHAPTER 1
INTRODUCTION

1.1 Research Motivation

This thesis is based on implementation of new coding style to enhance and to boost the speed of work. As before in a company all things are implemented manually and for large number of task it might take months for completing task by any person and it enhance cost to a team and as all it is tedious to do large number of task but nowadays task are done within a week or within few hours and this is by the use of many new and enhancing technology and change them as per our need.

As number of new technology enhance it, enhance customer demand to and need to much work to be completed by a company. So a company need variety of employer for their work in different area as per requirement and in them testing emerge as an imported key for them to test there product successfully. Therefore, we need a new testing tools and implementation of new codes by them as per need and new platform this is requirement of our day-to-day life and this is important key of my thesis work. Need to understand various testing tools and how to use them in our work to boost the speed and save time.SDLC gives a progression of steps to be taken build up a product item efficiently. SDLC structure tells the following steps:

Figure 1.1 Introduction of SDLC [1]

In findings of this first the entire communication process goes on. The requirements are going to tell to the Business Analyst team and stories are written in order to get the product. These needs are studied for knowing the probability of enhancement in present product or studying the possibility and scope for any product that has to be designed from start.

System analysis [1] is going to occur as the requirements and feasibility falls in place. Software Design is formulated to give an idea of the upcoming product and to verify that it is in line with the user requirements. Then at last the requirements along with system analysis are passed onto the Development branch. Then final people boosts coding the product or functionality. The point to understand at last is , by the time testing team gets their hands on product and finds bugs i.e., errors , almost all the effort and money gets invested in this cycle. At this point i.e., at end time , the amount of cost of finding and fixing a bug is much higher than the cost if it would have been fixed at starting stages.

So, finally the Automation testing based on Behavior-Driven Development Testing Technique had to be get in picture to optimize the process of organization. With the usage of Automation Testing using Cucumber-Selenium Integration, this could be achieved as Testing and structuring of test scripts started at tender stages of product development itself. Thus, the very basic bugs or can say error could easily be detected/find while drafting test scripts itself. Even before the fully product was developed completely, the testing scripts, test cases were ready beforehand. This enhanced the system and made it very efficient and optimized in terms of cost and effort and as well saves time.

1.2 Research Objective

Test Planning is crucial important phase of Software testing life cycle in which all testing strategy is defined. This phase is also known or called as **Test Strategy** phase. In this phase, typically Test Manager (or Test Lead based on company to company) involved to determine the effort and cost estimates for entire project. This phase will be kicked off once the requirement-gathering phase is completed & based on the requirement analysis, start preparing the Test Plan. The Result of Test Planning phase will be Test Plan or Test strategy & Testing Effort estimation documents. Once test-planning phase is completed, the QA team can start with test cases development activity. Ideally, the next step is based on previous step or we can say next step cannot be started unless and until previous step is completed. It is possible in the ideal situation, but practically it is not always true.

Figure 1.2.1: Software Testing Life Cycle in Detail [2]

Requirement Analysis is the very first step in [2]. In this step Quality Assurance (QA), team understands the requirement in terms of what we will testing & figure out the testable requirements. If any conflict, missing or not understood any requirement, then QA team follow up with the various stakeholders like Business Analyst, System Architecture, Client, Technical Manager/Lead etc. to better understand [3] the detail knowledge of requirement. From very first step QA involved in the where STLC which helps to prevent the introducing defects into Software under test. The requirements can be either Functional or Non-Functional like Performance, Security testing. Also requirement and Automation feasibility of the test cases can be done in this stage

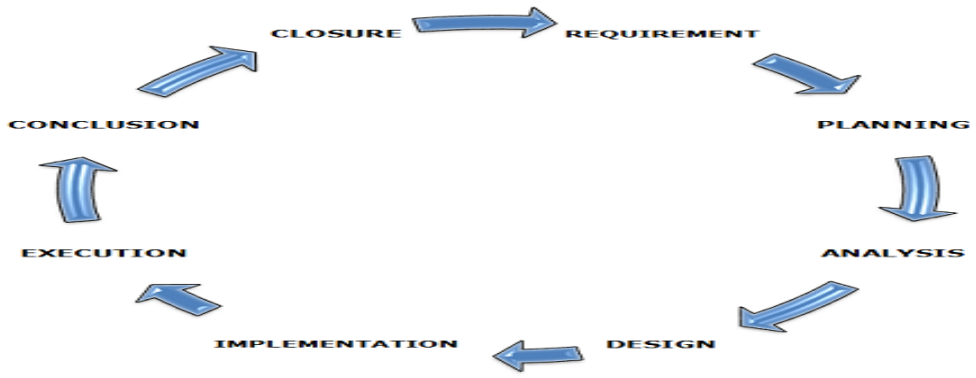


Figure 1.2.2: Life Cycle of SDLC Framework [3]

Below Table shows how to deal with various testing and what activities depend on various entry criteria have to decide:

Table1.1 Types of Testing [4]

Entry condition	**Activity**	**Output**
Given below are some eligibility criteria should be available: • Requirement Specification. • Implicational architectural Along with above documents Acceptance criteria should be required to be defined.	Prepare list of queries and design and check it by using Automation Testing tool.	List of things that have to be shown and do automation testing in them.

1.3 Objective Overview

Software testing objective is essential in [4] to find out the defects and errors that were made during the development phases.

1) It is essential since it makes sure of the Customer's reliability and their satisfaction in the application. It is very important to ensure the Quality of the product.
2) Testing is necessary in order to provide the facilities to the customers like the delivery of high quality product
3) Testing is required for an effective performance of software application or product. It is important to ensure that the application should not result into any failures because it can be very expensive. It is required to stay in the business.

The biggest need to perform software testing is to retain and expand your customer chain. Every application available in the market doesn't push even the tiniest of software related change or bug fix without thorough testing. Considering the amount of competition existing in the IT world, you need to maintain your app as close to perfect as you can or else the route to your competitors is never too far. Especially not for a client. So software testing is performed to check the quality of the product and to either applaud or criticize the development team for their effort demonstrated in the application.

1.4 Pre-Requisitive Knowledge Needed

Before going in detailed to this thesis I would like to tell some pre-required knowledge needed to understand the work and to implement some design in coding field.

Some bold area knowledge needed are in following fields:

1) Knowledge in Java language.

2) Basic knowledge in ruby.

3) Basic of SFTP protocol and some knowledge of host and server needed.

4) Knowledge of manual testing and automation testing needed.

5) What is SDLC must be aware of it.

Some specified knowledge in Java Language is needed which are as below:

1. Basic data types
2. Variables
3. Basic statements (if, switch, for, while)
4. Arrays
5. Lists
6. Java api classes

1.5 Origin of Testing

The testings are of various types as depend on the types we broadly classify them in two types that are:

1) Manual testing type
2) Automated testing type

On the discussion of the how they are originated the testing the originated as per used use of final touch. After the computer work on languages are came and the adancement started theTesting came as a need.as after the manufacturacing of anything it is needed to test that thing.

So the testing process is shown in [4] is came as a crucial part in term lof technology to gtest the final thing and give the result as what we done correct or not as ytesting is needed in arious of fields and so testing is done as automated and as well as manual both depend upon the requirement . Now-a-days automation testing is in the trend because it is having many of adantages which we will dicuss in this whole thesis report.

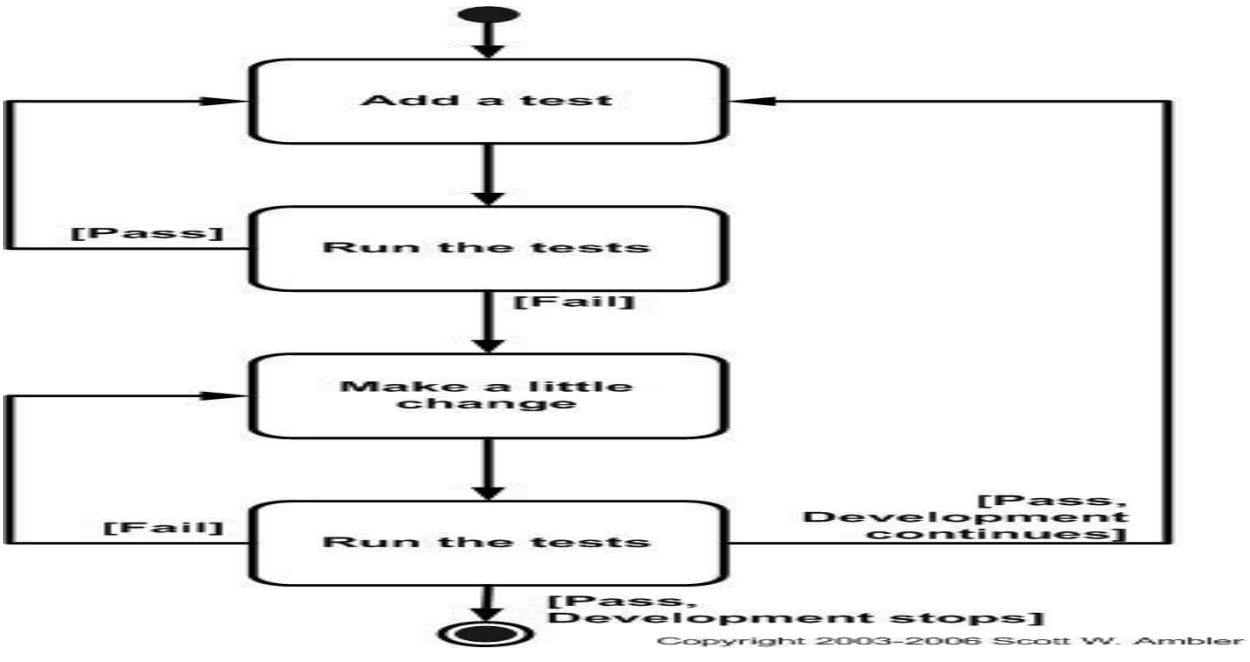


Figure 1.5: Flow Chart of Test Execution [4]

1.6 Need of Testing

The testing is needed as because we are dealing with the final too create the platform for such of the work. As a developer work is to make or to create the platform needed to work the thing. So at last in the final the testing of the equipment is needed that is we must aware that what we are made is correct or not so to find out the correctness of the work we need to do the testing the testing are various types and it depends total on our need.

There are two main parts in testing as below:
1.) Functional testing
2.) Non-functional testing

1.7 Types of Testing

Various types of Software Testing such as Functional Testing, Non-Functional Testing, Automation Testing, Agile Testing, and their sub-types etc. Each of us would have come across several types of testing in our testing journey. We might have heard some and we might have worked on some, but not everyone has knowledge about all the testing types.

Functional testing types include:

- Unit testing
- Integration Testing
- System Testing
- Sanity Testing
- Smoke Testing
- Interface Testing
- Regression Testing
- Beta/Acceptance Testing

Non-functional testing types include:

- Performance Testing
- Load Testing
- Stress Testing
- Volume Testing
- Security Testing

- Compatibility Testing
- Install Testing
- Recovery Testing
- Reliability Testing
- Usability Testing
- Compliance Testing
- Localization Testing
- Alpha Testing

It is the most common type of testing used in the Software industry. The objective of this testing is to identify all possible issues or defects before releasing it into the market or to the user. Alpha testing is carried out at the end of the software development phase but before the Beta Testing. Still, minor design changes may be made as a result of such testing. Alpha testing is conducted at the developer's site. In-house virtual user environment can be created for this type of testing.

1. **Acceptance Testing**

   An acceptance test is performed by the client and verifies whether the end to end the flow of the system is as per the business requirements or not and if it is as per the needs of the end user. Client accepts the software only when all the features and functionalities work as expected. It is the last phase of the testing, after which the software goes into production. This is also called User Acceptance Testing (UAT).

2. **Ad-hoc Testing**

   The name itself suggests that this testing is performed on an ad-hoc basis i.e. with no reference to the test case and also without any plan or documentation in place for such type of testing. The objective of this testing is to find the defects and break the application by executing any flow of the application or any random functionality.

   Ad-hoc testing is an informal way of finding defects and can be performed by anyone in the project. It is difficult to identify defects without a test case but sometimes it is possible that defects found during ad-hoc testing might not have been identified using existing test cases.

3. **Accessibility Testing**

The aim of accessibility testing is to determine whether the software or application is accessible for disabled people or not. Here disability means deaf, colour blind, mentally disabled, blind, old age and other disabled groups. Various checks are performed such as font size for visually disabled, colour and contrast for colour blindness etc.

4. Beta Testing

Beta Testing is a formal type of software testing which is carried out by the customer. It is performed in **the Real Environment** before releasing the product to the market for the actual end users. Beta testing is carried out to ensure that there are no major failures in the software or product and it satisfies the business requirements from an end-user perspective. Beta testing is successful when the customer accepts the software.

5. **Back-end Testing**

Whenever an input or data is entered on front-end application, it stores in the database and the testing of such database is known as Database Testing or Backend testing. There are different databases like SQL Server, MySQL, and Oracle etc. Database testing involves testing of table structure, schema, stored procedure, data structure and so on. In back-end testing GUI is not involved, testers are directly connected to the database with proper access and testers can easily verify data by running a few queries on the database. There can be issues identified like data loss, deadlock, data corruption etc during this back-end testing and these issues are critical to fixing before the system goes live into the production environment

6. **Browser Compatibility Testing**

It is a subtype of Compatibility Testing (which is explained below) and is performed by the testing team. Browser Compatibility Testing is performed for web applications and it ensures that the software can run with the combination of different browser and operating system. This type of testing also validates whether web application runs on all versions of all browsers or not.

7. **Backward Compatibility Testing**

It is a type of testing which validates whether the newly developed software or updated software works well with older version of the environment or not. Backward Compatibility Testing checks whether the new version of the software works properly with file format created by older version of the software; it

also works well with data tables, data files, data structure created by older version of that software. If any of the software is updated then it should work well on top of the previous version of that software.

8. **Black Box Testing**

Internal system design is not considered in this type of testing. Tests are based on the requirements and functionality.

1.8 Selenium as a Saver

Selenium is a type of open-source tool which is available in all over the world it means that it is present in every equipment and we can use them very easily and on a great extent. Selenium tool is having various types of features in them which are using in different area. Selenium is a tool for testing web-based application as well as the mobile based application too. In selenium is divided in the four parts which are shown in [5] .

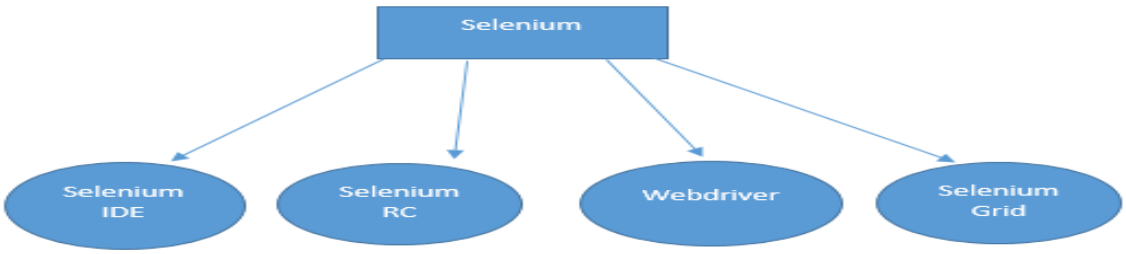


Figure 1.8 Selenium Descriptions by Parts [5]

1.9 Feature of Selenium Tool

Selenium IDE is an easy-to-use and integrated development environment used by web app developers to record, edit, and debug tests. Originally implemented as a Firefox add-on, it is a recording tool which permits developers to automatically capture their interactions with the browser or website so they can generate, develop, and maintain test cases.

As an ideal environment for developing Selenium tests, Selenium IDE comes with a rich set of commands that are used to test the existence of UI elements, specific content, selection list options, submission of forms, and the features of a web application. With Selenium IDE, users will be able to set breakpoints and start points

as they find and fix errors in their test cases. Last but not least, the tool can support saving of tests as HTML, Ruby scripts, and other formats.

Automatic Recording of Test Cases

Selenium IDE has the capability to automatically record test cases based on interactions with a website. This automatic recording feature, however, can be disabled. As the tool records a test case, commands are automatically inserted into the test case depending on the actions performed by the test developer; such as clicking a link, entering values, selecting options from drop-down list boxes, and clicking radio buttons.

Add Verifications and Asserts

Building test cases through Selenium IDE include the ability to add assert and verify commands to test cases. These are commands used to check the properties of web pages. When users right-click a specific UI element like a text block which is currently displayed on the web page, the context menu shows a list of assert and verify commands, along with pre-defined parameters based on the context of the selected UI element. This list of commands will expand as test developers continue to use Selenium IDE. Thus, the IDE can predict the possible commands and parameters they can apply for selected UI elements on web pages.

Flexible Execution of Test Cases

In terms of running test cases, Selenium IDE provides test developers with different options. They will be able to run all the test cases contained within the currently loaded test suite (a collection of test cases) or pause and resume a test case. They can also allow Selenium IDE to start running a test case from a specific command in the middle of the test case or stop it from running on a particular command. In addition, the IDE permits them to run a single command, which is very useful if they are not sure if the command they created is correct.

Rich Set of Commands

Selenium IDE functions based on a set of commands called “sleekness.” These are commands that define the things the IDE needs to do, and they are very important in testing web apps virtually. There are three types of Selenium commands: Actions, Accessory, and Assertions.

Actions are commands that are called to manipulate the state of an application. Actions include clicking a particular link or selecting an option. When an action returns an error, Selenium IDE stops the execution of the test currently being run. On the other hand, Accessory are used to assess the state of an application. All the results returned by such commands are stored in variables (e.g., “store Title”).

Lastly, to verify whether the state of an application conforms to what is expected, Selenium Assertions are called. For instance, through such commands, users will be able to check if the application is on the right page, the page title is correct, or verify if the checkbox is checked.

- Flexible Running of Test Cases
- Verify Page Elements
- Intelligent Field Selection
- Locator Types
- Walk Through Tests
- Save Tests as HTML, Ruby scripts, or Any Other Format
- Debug and Set Breakpoints
- Support for Selenium User-Extensions.js File

1.10 Infra Testing

It is a type of testing which is also known as backend-testing tool it is based on ruby language. In a network there is several of host connection and application expiry based information and several of things by using this type of tool it is very much helpful as because there are several of key things which should be updated and should be check time-to-time the infra testing is the one of them. By using this type of techniques we can check the host connection, application validation information and many of all these things which are very much crucial and very much helpful. It is also help to find the OHS proxy detail and the type of network connection in between the host all these things information is given by this infra-testing tool.

1.11 SFTP Protocol and there Use

Sftp is stands for secure file transfer protocol. In this it is used in communication field when we want to communicate between the different host and different user with each other. In various types of companies work and in normal use too the file is being transferred by using this technology very well by using this we are able to transfer the file in a secure manner. Infect not only the file transfer but in fact to transfer any folder and any work form your desktop to the host this type of technique is used in a large amount.

CHAPTER 2
LITERATURE SURVEY

In this chapter we see that how different types of testing are work what work are crucial playing, on which fundamental concepts they are based on This chapter holds three important concept which are helpful in knowledge of automation testing technique and why we are using. First we start knowing need of knowing testing and in testing automation testing. As we are aware of the concept Saas which is used in recent area, now why it is used and what it is tell in next section. Now we start learning about CLOUD TERMINOLOGY.

2.1 Introduction

Cloud computing is an emerging word coming in era of computers. As it is not a new word coming in area of modern world. In 1970 [8] L. Klein anticipated, computer networks work are still in their famous. As the time passes this new area is increasing so fast as they cannot only make development in that field but in home apple an world was taken in mid 1998s when grid computing was first coined to allow consumers to obtain computing power on demand.

The origin of cloud computing is seen as evolution of this thing fast is emerging so fps also it is emerging so utility technologies. Cloud computing was given prominence first by Google's Manger Ericson Schmidedt in late 2009. Hence the judgment of cloud computer technology is latest phenomena its main belong to some previous ideas with new thinking or growth and new style of working. From taking architectural point of view cloud is mainly made on an existing based basic architecture and uses the previous services and adds some technologies like implementation and some architectural models. In explanation cloud is importantly of commodity computing network together in basic or different same locations, operation together to give a number of people with different need and work based on demand basis with the help of implementation. Cloud services are provided to the cloud users as important requirement like water, electricity, television using pay as you use business model. They are the basic services are which are known as XaaS (X as a Service) where X can be Software as a Platform, or Infrastructure as a service etc.

Cloud operators use these operations provided by the cloud operational, to make their applications on the host, and at last deliver these to their last users. At last, the cloud operators do not have to tense about installing, maintaining hardware and software that are required. In fact, they can take these applications, as they have to pay as much as they use. So, the cloud consumers can avoid as there cost and effort in the field of IT sectors using cloud applications as avoid of establishing IT application by them. Cloud applications are basically provided by in a large amount of discrete data centers. So the data centers are prepared as last as and the cloud is made on top of the using services. Cloud users are provided with imaginary images of the physical machines in the data centers. Ignition is one of the basic concepts of cloud computing engineering technology so finally mainly builds the extraction over the physical system units. Many cloud applications are retaining popularity for their availability, reliability, scalability and consumability model. These functions made distributed computing easy as the critical Cloud Computing aspects are tackled by the cloud provider by them self.

2.2 Cloud Computing Basics

Computing of cloud is a historical city of distributed computing to provide the customers on there requirement, use based computing services. Cloud consumers have capacity to provide more reliable, available and update the applications to their clients in order. Cloud by their own contains of physical machines in the centers of data of cloud consumers.

Imagination is provided on top of all these physical equipment. This type of virtual equipment is provided to the cloud consumers. Various cloud consumers consumes cloud applications of different level of abstraction. E.g. Samsung EC7 makes the consumers to tackle very minute level of details where Google App-Software makes a functional platform for the various types of developers to develop their platform. So the cloud application is classified into many different types of software as Software.as.a.Service, Platform as a Service or Infrastructure as a Service. so facilities are present In all the whole of fully internet world in which the cloud word acts as the small minute of taking for authorizing all end users . Computing of cloud features locations of architectural large scale data processing.

2.3 Cloud Service Model

There are present three simple classification of computing of clouds which that are given below

2.3.1 SaaS (Software as a Service)

The Saas is most crucial part in cloud computing. It emphasis in a multitenant architecture, that in which the architecture is made up of in a way which allows system many customers to share basic of infrastructure in an unique way, without losing the privacy or security of each consumer's data.

By using multi-tenancy, computing of cloud delivers an application for thousands of consumer's web browsers.

They are is no directly investment in servers or host for consumers, and balancing just one format that makes the cost of low providers as compared to conventional host work. Google and Doc, Gmail and Zoho are some of the examples in this part.

2.3.2 IaaS (Infrastructure as a Service)

Haas is types of computing of clouds are used in this type of example. IT infrastures are being rented out in this example of cloud computing or a specified period of time, and payment is done by the client for specific period of time X by using the IaaS customer are being using the resources, IT infrastructure example are storage of desired work, processing the thing, networking of the Internet. The client are allowed to dynamically scale down the system, and pay for the services which are used. IaaS is used in three different types of models that are: Private, Public, and Hybrid.

Private cloud says that infrastructure placed at the consumer's premises, and behind the firewall the internal networking is being used. The single group is used to serve the resources for cloud computing. Public cloud is located on cloud computing platform vendor's data center and provides public accessible services over the Internet, i.e. a service provider makes resources available to the public over the Internet.

Hybrid cloud is a combination of the aforementioned models with customer choosing the best of each world. It allows an organization to provide and manage few of its resources in-house and has others externally.

2.3.3 PaaS (Platform as a Service)

This type of cloud computing not only deals with operation systems, but also provides a platform that can run existing applications or develop and test new ones without hurting internal system by allowing the customer to rent virtualized servers and associated services. Using PaaS enables development teams that are geographically distributed to work on a single software development project. AppEngine and Bungee Connect are two examples in this category.

Figure 2.3: Cloud Service Models [5]

2.4 Cloud Architecture

The cloud providers actually have the physical data centers to provide virtualized services to their users through Internet. The cloud providers often provide separation between application and data. This scenario is mention in the [6]. The underlying physical machines are generally organized in grids and they are usually geographically distributed. Virtualization plays an important role in the cloud scenario. The data centre hosts provide the physical hardware on which virtual machines resides. User potentially can use any OS supported by the virtual machines used.

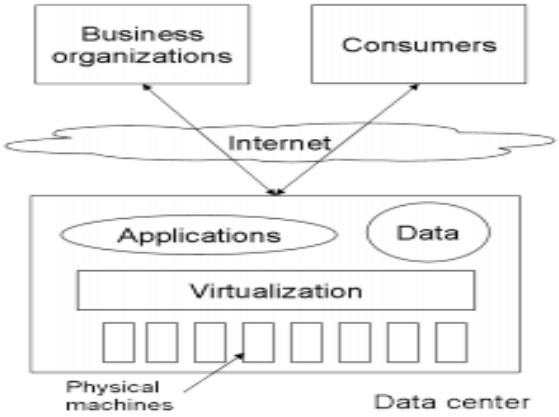


Figure 2.4: Basic Cloud Computing Architecture [6]

Operating systems are designed for specific hardware and software. It results in the lack of portability of operating system and software from one machine to another machine which uses different instruction set architecture. The concept of virtual machine solves this problem by acting as an interface between the hardware and the operating system called as system VMs. Another category of virtual machine is called process virtual machine which acts as an abstract layer between the operating system and applications. Virtualization can be very roughly said to be as software translating the hardware instructions generated by conventional software to the understandable format for the physical hardware. Virtualization also includes the mapping of virtual resources like registers and memory to real hardware resources. The underlying platform in virtualization is generally referred to as host and the software that runs in the VM environment is called as the guest.

The Figure 2.4.1 given in [7] shows very basics of virtualization. Here the virtualization layer covers the physical hardware. Operating System accesses physical hardware through virtualization layer. Applications can issue instruction by using OS interface as well as directly using virtual zing layer interface.

This design enables the users to use applications not compatible with the operating system. Virtualization enables the migration of the virtual image from one physical machine to another and this feature is useful for cloud as by data locality lots of optimization is possible and also this feature is helpful for taking back up in different locations. This feature also enables the provider to shut down some of the data centre physical machines to reduce power consumption.

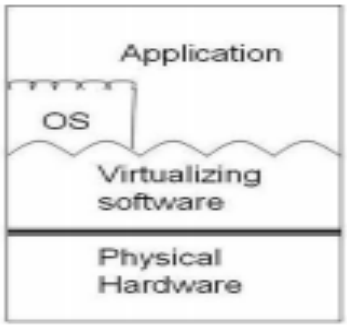


Figure 2.4.1: Virtualization Basic [7]

2.5 Could Testing

Cloud testing is defined as TaaS, Testing as a Service. This testing includes both functional testing, including redundancy and performance scalability, as well as nonfunctional testing, including security, stress, load, performance, and interoperability, of numerous applications and products.

Cloud testing is not testing the cloud.

Cloud testing advantages are:

- Using scalable cloud system infrastructure to test and evaluate system performance and scalability.
- Leveraging On-demand testing to perform extensive and effective real-time online validation.
- Reducing costs by taking advantage of using computing resources in clouds
- Integration testing in clouds: In a cloud infrastructure, engineers must deal with the integration of different applications in the cloud in a black-box view according to their APIs and protocols, and there is a lack of well-defined validation methods and quality assurance standards to address the connectivity protocols, interaction interfaces, and service APIs provided by applications and clouds APIs.
- Regression testing issues and challenges: Software changes and bug fixing would cause regression-testing challenges. We lack dynamic software validation methods and solutions in order

to address these regression- testing issues, especially for on-demand software, and the dynamic features of SaaS and clouds.

Next part in this chapter is **AUTOMATION PRINCIPAL** it tell the principal over which this automation testing is based upon .It tell that over which principle automation principle is working on :

The academic view son test automation was studied with a system design review while he practitioners' views we reassessed with a survey, where data was collected from software professionals. The survey shows that benefits of test automation were related to test re-usability; test coverage and effort saved infest executions. The limitations were high initial invests in automation setup, tool selection and training. According to a study 49%ofthe respondents agreed that available tools in the market offer poor fit frothier needs, hence a customized test automation frame work has to be developed according to their respective functionality. Automation testing which is also known as Test Automation is when the tester writes scripts and uses software to test the software. This process involves automation of a manual process. Automation Testing is used to re-run the test scenarios that were performed manually, quickly and repeatedly.

Apart from regression testing, Automation testing is also used to test the application from load, performance and stress point of view. It increases the test coverage; improve accuracy, saves time and money in comparison to manual testing. The motivation for automating test case sis to have non-programmers not lose the comfort level that they would have with the degree of in formality, edibility, ambiguity that is in here noting natural-language expression and that would be closer to their thought processes. Thus, the goal is to improve the efficiency of automating the manual tests by automating the automation task.

Automated software testing [8] is automating the manual process of testing software. Automated Testing is gaining interest these days as it reduces the time and increases efficiency for testing the applications.

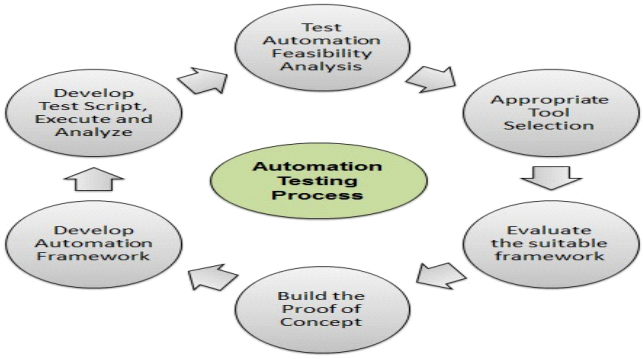


Figure 2.5: Automation Test Process. [8]

1. Test Automation Feasibility Analysis: Automation is done or cannot is check in this step [8]. Because of this limitation not all user are able to check this method.

2. The important action of thing at present is to create a method that tells Purpose, Scope, Strategies, Major Requirements, Schedule, Budget etc.

3. Selecting appropriate tools: In this some important types of tools are being used as per the need and as; per the requirement we are going to deals with the different projects.

4. Evaluate the suitable framework: Framework is being chosen after selecting the required tool. In this there are required various framework and each framework has its own significance.

5. Build the Proof of Concept: Proof of Concept (POC) is developed with an end-to-end scenario to evaluate if the tool can support the automation of the application. A sit is performed with an end-to-end scenario which will ensure that the major functionalities can be automated.

6. Develop Automation Framework: After building the POC, framework development is carrier out which is a crucial step for the success of any test automation project. Framework should be built after diligent analysis of the technology used by the application and its key features.

7. DevelopTest Script, Execute and Analyze: Once Script development is completed, the scripts are executed, and results are analyzed. Once the tool and the scripts are ready, they are integrated together and deployed on the test environment. The working of the automation solution is reviewed and to identify issues and limitations and provide feedback. This will help to further enhance the solution.

Software Test automation can be mention as follow:

Efforts and Activities that are mentioned in programmed engineering tasks and operations in a software test process are as given below.

Goals and the Objectives of automation testing in software process:

- To minimize Testing time and cost.
- To minimize redundant method.
- To make testing process speed up.
- To improve quality of work.
- To enhance the coverage area of testing.
- To decrease the manual work.

Limitations are as follow:

1. If the application or products are not having many these cycles, it is time consuming to automate one or two cycle.
2. This process of automation is very expensive.
3. In everywhere we cannot use automation testing process. In some areas it is having some drawback.

When can we use this automation testing tool?

1. In case of build type of application we can use this method.
2. In case of various values (Retesting./Data Driven Testing).
3. When load or stress types of testing are used.

The cases in which methods are not automated:

1. In one time of testing it cannot be used.
2. When Exploratory Testing /Ad-hoc testing are going to be used.
3. When there is frequent changing in test cases.

In market are some automation testing tools they are given as below:

Ex:

- HP - Win Runner, QTP (Quick Test Professional), Load Runner.
- IBM - Rational Robot, RFT (Rational Functional Tester), RPT (Rational Performance Tester).
- Micro Focus – Silk Test, Silk Performer.
- Oracle – Open Script, Synergy.
- Open source – Selenium, In Spec. Jeer, Web LOAD.

2.6 Automation Framework

In automation framework there are some sets of rules, process and some standards used in this type of testing. Low cost of maintenance is one of the most important key features of automation testing. Only one file changes can be possible if we need to change the process in automation process. Driver Script and Start-up script will be same through the process.

Right framework and test procedure is very important to reduce the cost of work. Cost is increasing in them due to some framework or scripting technique enhancement. The scripting techniques scripting technology in this automation framework is increasing the cost of production of using them testing tool.

- Linear (procedural code, possibly generated by tools like those that use record and playback work)
- Structured (uses is control structures – like if, if-else these type statement)
- Data-driven method

- Keyword-driven method
- Hybrid (two or more in above is used)

Now we study the last part of this chapter which is very important to know before dealing with testing and it is **SOFTWARE TESTING**

To check the correctness of the method it is being used. Software testing is being used because of the following two reasons:

- Detection of defect
- In this we go by comparing the expected value with the actual value.

Software testing is not an activity to take up when the product is ready. Effective software testing begins with a proper plan from the user requirements stage itself. Software Testing is an integral, costly and time-consuming activity in the software development life cycle.

2.7 Software Testing Rules

- Perform the software Test early and test the software often.
- Integrate the application development and testing life cycles during software testing.
- Formalize a Software testing methodology; this will help test everything the same way and help with uniform results.
- Develop a comprehensive Software Test plan. It forms the basis for the Software Testing methodology.
- Use both static and dynamic testing during the software-testing phase.
- Define the expected results early during software testing.
- Understand the business reason behind the application or software on which you are testing to write a better test cases or scripts
- Use multiple levels and types of testing (regression, systems, integration, stress and load) during the entire software testing cycle.
- Review and inspect the work.

2.8 Types of Testing

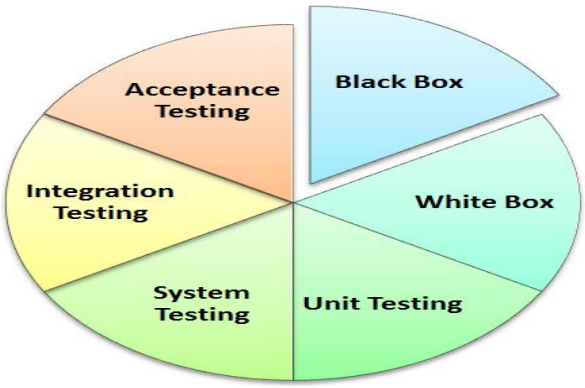


Figure 2.8: Types of Testing [8]

- Testing of Black Box:

  In this type of testing the user do not have any prior knowledge of the system in which the user is going to test the things .the input and output can be know but the system which we are using for testing cannot be know because of the system parameters are unknown to the user.

- Testing by White Box:

  In this type of testing the user should have death knowledge of the system and the language the overall code .In this testing the user have depth knowledge of the system and the coding technique which we are going to be used.

- Testing of Grey Box:

  In these types of testing the depth knowledge of the system is not known to the user .user is unaware about the deep knowledge of the system.

- Testing of Function:

  It is used when the function inside the system is not working properly. It shows that the desired output was different and what we get after the execution of the program is totally different .so some problem is with the functionality of the system then we use this type of testing to check the working condition.

- Testing of System:

  It is done to find or make the full findings of the system to find that whether the result is correct or not and the problem is in which stage to make a full complete analyze we can use this type of testing.

- Testing of Integration:

  In this type of testing a complete analysis of the system is done that is we are able to find that ok the complete evaluation of software module with the hardware module is used.
- Testing of Unit:

  In this type of testing a particular part is used to test that whether this part will completely passed that data or it will make the failed of that or what.
- Regression Testing:

  In this type of testing is done to find out that wheat her the required data which is used is correctly working or not or the issue that rise is completely filled or partially or what like these types of things it will use.
- Load Testing:

  In this type of testing we can test that which load is suitable for the use or not which load we can use and how to replace that with any other one all these things are shown.
- Smoke Testing:

  This type of testing is used mainly in it sectors work where we have a large no of test case to test and we arrange them and make according to that this type of testing is seen in that test cases.

Test Life Cycle:

1. Test Requirements Stage - Requirement Specification documents, Functional Specification documents, Design Specification documents (use cases, etc), Use case Documents, Test Trace-ability Matrix for identifying Test Coverage.

2. Test Plan - Test Scope, Test Environment, Different Test phase and Test Methodologies, Manual and Automation Testing, Defect Management, Configuration Management, Risk Management, Evaluation & identification – Test, Defect tracking tools, test schedule, resource allocation.

3. Test Design - Traceability Matrix and Test coverage, Test Scenarios Identification & Test Case preparation, Test data and Test scripts preparation, Test case reviews and Approval, Base lining under Configuration Management.

4. Test Environment Setup - Test Bed installation and configuration, Network connectivity's, All the Software/ tools Installation and configuration, Coordination with Vendors and others.

5. Test Automation - Automation requirement identification, Tool Evaluation and Identification, Designing or identifying Framework and scripting, Script Integration, Review and Approval, Base lining under Configuration Management.

6. Test Execution and Defect Tracking - Executing Test cases, Testing Test Scripts, Capture, review and analyze Test Results, Raise the defects and tracking for its closure.

7. Test Reports and Acceptance - Test summary reports, Test Metrics and process Improvements made, Build release, receiving acceptance.

CHAPTER 3
METHODOLOGY USED

This Chapter looks into the overall architecture of framework development process and view of the components that will comprise the proposed solution and the implementation of the project using those components.

3.1 Framework Design

Framework of design of selenium is shown given below:

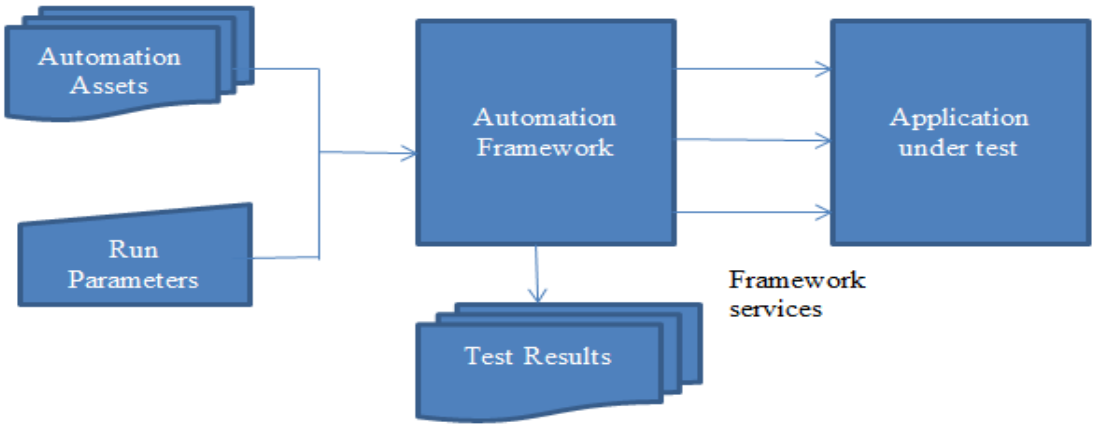


Figure 3.1: Oracle Automation Framework Architecture [9]

Asset of automation: In these all the things which are needed to automate the file is present in this all jar file, pom file and many dependencies which are present are present in this section. All things in that [9] are needed to automate the sites are present in this section.

Results of the test: We can get the output of the required result in a particular result folder.

We get the required result output in the directed destination as per the need of testing the test scripts which we are making the code.

3.2 Functional Libraries and Object Libraries

Some of the most important tools or we can say libraries and some of jar files that are needed are shown below in the below written things:

- Some of the tools which we are using as an asset to automate our test scripts are as some crucial important jar files, some of the maven project requirement that we needed to get over them to make some folders that are highly very much important.

- In the web driver we need certain files such as csv files which stores all the necessary jar things in them and we can automate the jar files and the main script as per the requirement we needed to made the script and we take the jar that are required to that particular work only.

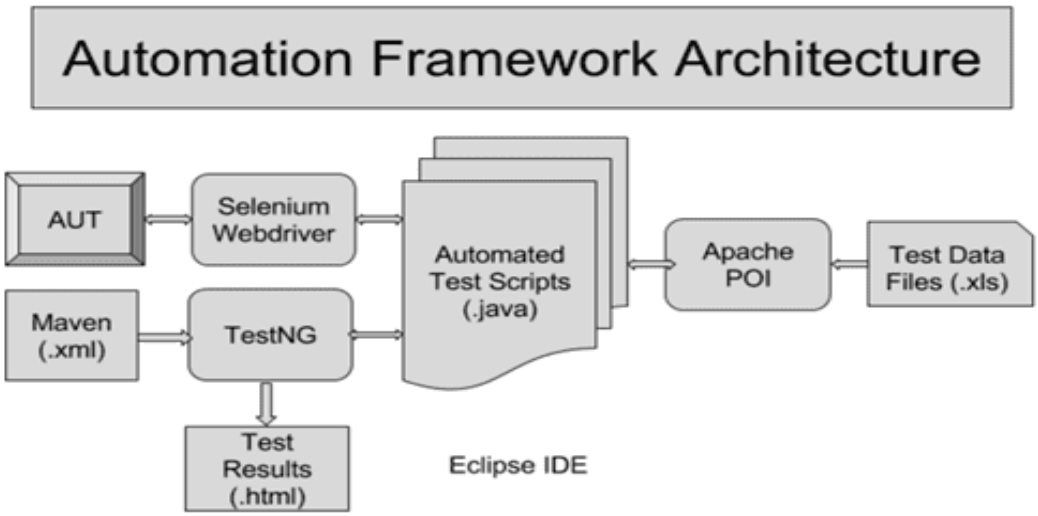


Figure 3.2 Selenium Automation Framework Developments [9]

3.3 Selenium Web Driver Framework

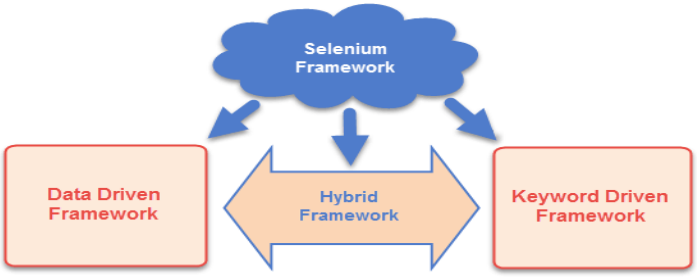


Figure 3.3: Selenium Framework [9]

- **Framework for Driving Data:**

  In this type of structure the data as input is being differentiated from the outputted data and stored in different fields as to make security of the codes .the data is stored in the csv file as it hold all the data that are require to have the security types of issues.

- **Framework having Hybrid Quality:**

  This is advanced version of framework use in coding structure in this the data driven concept and data inputted both are taken together and some set of security are maintain so that no outsiders can easily access the things and also we take the data from the excel sheet only.

- **Contains the Framework:**

  In this type of framework all data are written separately but only thing is that we can take data from the external architecture whenever we need and it is stored in the excel sheet of data.

The following picture explains the script workflow:

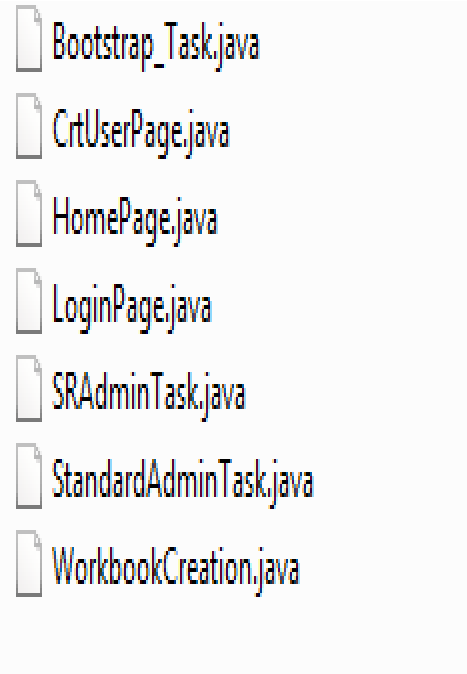


Figure 3.3.1 Functional Scripts [10]

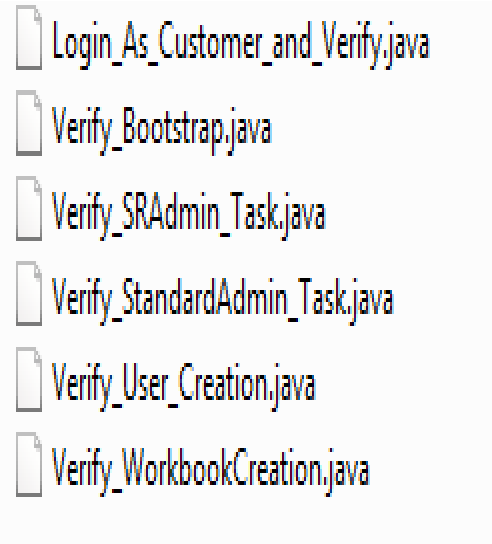


Figure 3.3.2 Test Scripts [10]

3.4 Maven/TestNG Framework

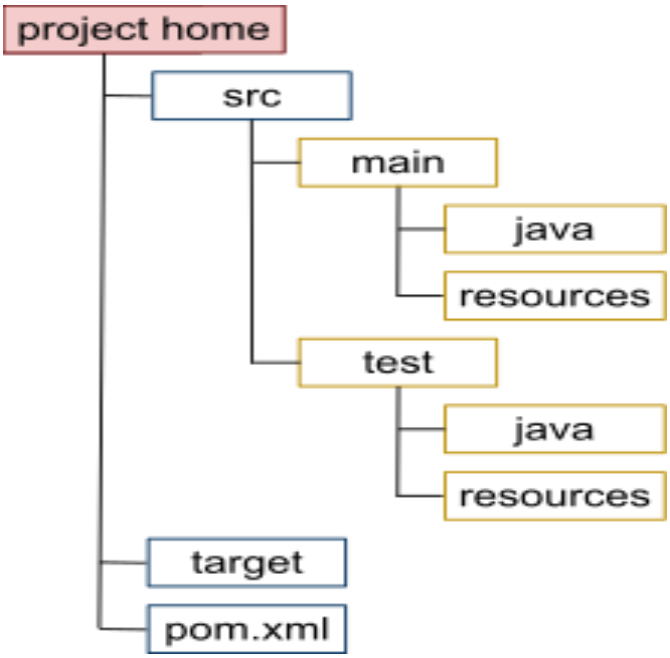


Figure 3.4 Framework of Maven/TestNG [10]

Maven is used for project management. It helps you in building the code/project effectively without much human intervention using pom.xml. This is readily available everywhere as per the need and is found in market placed installing search tab in the eclipse. It is used to create, run and generate a report of your tests. TestNG is having many different features as it have more advance features as compared to the junit as because junit have some drawback in testing technique.

TestNG is very important tool we get in selenium by using this TestNG a lot of things becomes easy as because it provides some set of language features that are very much helpful during the programming these are annotation, parameter the value etc.

Advantages we get form TestNG:

We get a lot of new features by selenium but by using them with TestNG some more new advancement we get and these are as given below in [10]diagrams :

- The graphical output in form of html output we are able to get using tesNG
- By using annotation it make codes reading and working very much concise and environmental friendly
- As per our need we can make some groupies in test cases.
- It is time saving as large no of test cases can run simultaneously together.
- We get especial type of files and they are named as log files.
- After using TestNG it is helpful to give priority on the data.

3.5 Overall System Architecture

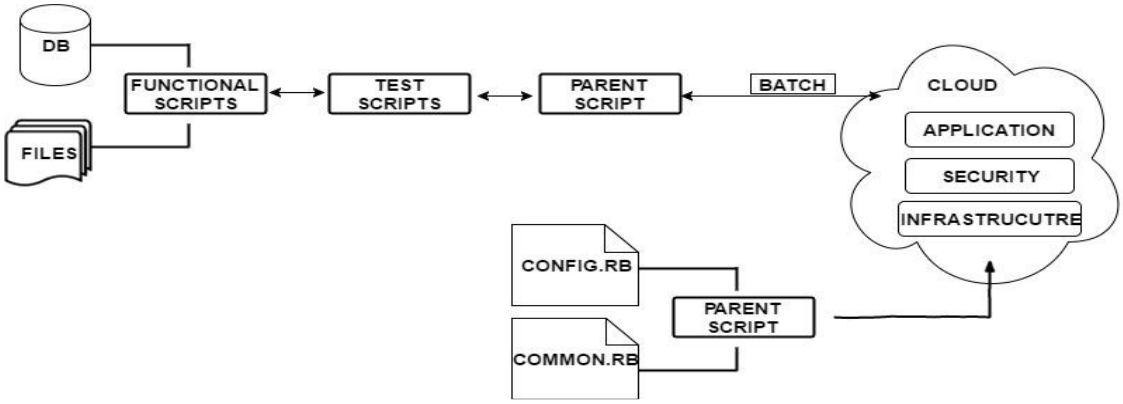


Figure 3.5.1: Data Flow Diagram [11]

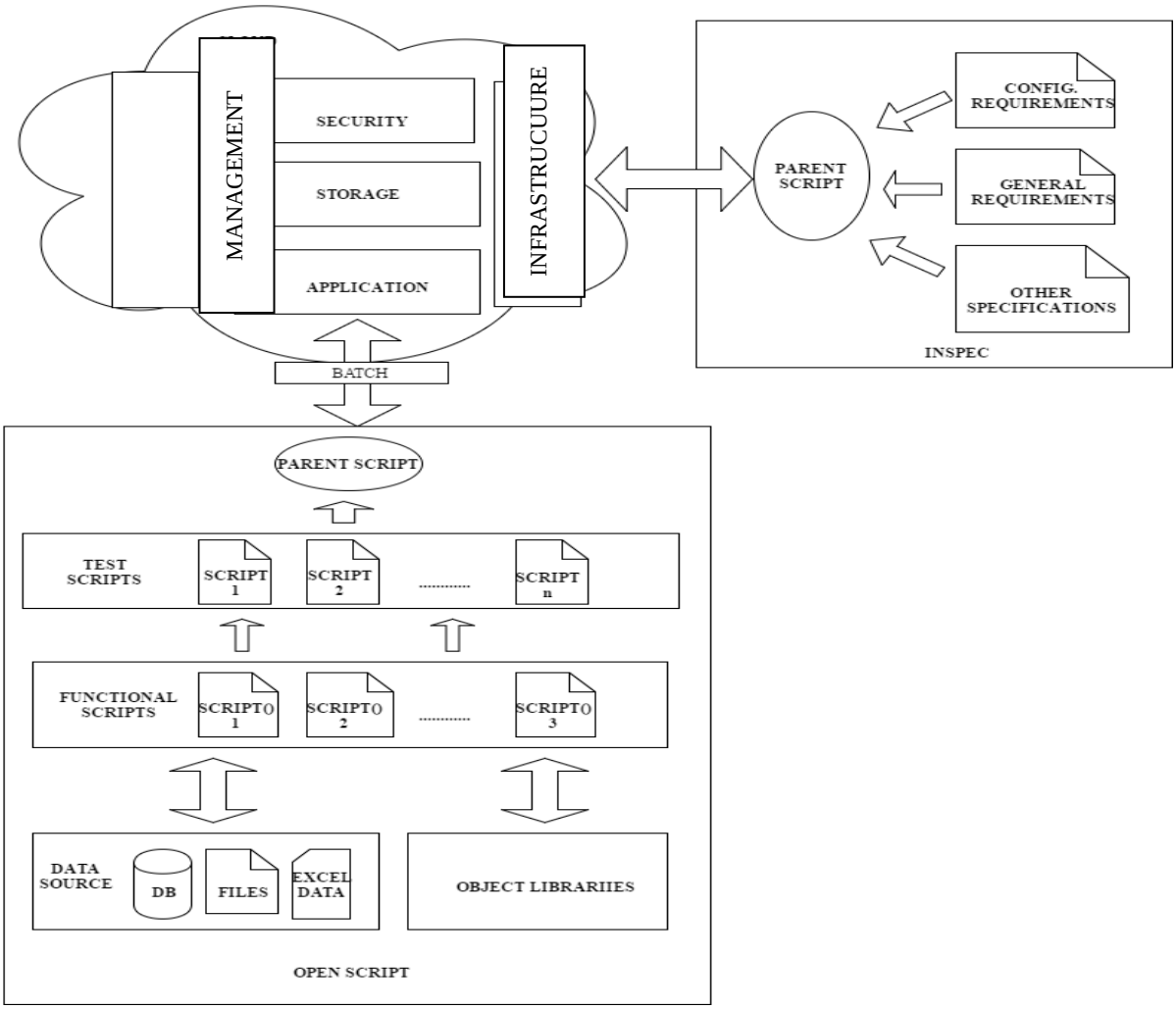


Figure 3.5.2 Architecture Diagram [11]

3.6 Libraries Used in Selenium

POI as an apache

Apache poi kinds used in java language as it is a new file generate now-a-days which gives too many of important feature in coding word as because of this only we are able to make the automation where we needs the id and password and id and passwords are stored in excel sheet and by using this coding technique we are able to read, write and any type of amendments that are needed in the excel sheet work.

The Apache POI project contains some of the following subcomponents:

1. POIFS (Poor Obfuscation Implementation File System) – This component reads and writes Microsoft's OLE 2 Compound document format. Since all Microsoft Office files are OLE 2 files, this component is the basic building block of all the other POI elements. POIFS can therefore be used to read a wider variety of files, beyond those whose explicit decoders are already written in POI.
2. HSSF (Horrible Spreadsheet Format) – reads and writes Microsoft Excel (XLS) format files. It can read files written by Excel 97 onwards; this file format is known as the BIFF
3. 8 formats. As the Excel file format is complex and contains a number of tricky characteristics, some of the more advanced features cannot be read.

4. XSSF (XML Spreadsheet Format) – reads and writes Office Open XML (XLSX) format files. Similar feature set to HSSF, but for Office Open XML files.

Web Driver

It is a very important things that we are using in selenium tool it is very much helpful to acute some of test cases and it is helpful to run the test cases in many of different types of browsers:

[1] Browser asFirefox Driver:

Firefox driver is very important when we want to e=run our test scripts in Firefox browser than we need the driver associated by them and it is the fire fox driver having lots of jar files needed to run the code in them.

[2] Chrome Driver:

A Web Driver implementation that controls a Chrome browser running on the local machine. Chrome Driver is a separate executable that Web Driver uses to control Chrome. It is maintained by the Chromium team with help from Web Driver contributors.

Features of Log4j:

Apache Log4j is a Java-based logging utility. It is a java framework/package used to do application logging of java applications. It has 3 basic components loggers, openers, and layouts which are used to serve the purpose of logging in a systematic manner.

Http Client:

This is a type of protocol which is used in various of fields now-a-days in is creasing the demand to working with various types of automation tool during automating a scripts it is important that some host information and all these things are required and this Http client is helpful to go with this set of problems.

Extent Report:

This is a report format that is very much useful in the selenium coding technique as it gives the output of the codes that we are going to be executed day-by-day and it is having the graphical representation of the result of the various test cases that we run that wheat her they are [pass or failed or what had happen to them all these things are mention in this new feature of selenium.

Features are given below:

- Very simple to use.
- Beautiful and responsive UI.
- Provides dashboard for the entire test run.
- Organizes all used media (Screen-captures) for the run in a single view.

CHAPTER 4
GOALS AND OBJECTIVES

This chapter holds what are our goals and what is the aim of making this thesis, what benefit we get by using our selenium tool and how it is working. Which site we can automate and what are the advantages to automate. First we will go to know different objectives we are having in our thesis what are they in there simple statement and then we see why we choose automation testing instead o manual what are different benefits of automation testing and which sites we automated which codes we use why we use that is description.

So first go to objective various objectives that thesis has are mention below

4.1 Objective 1: Implementation of Various Testing Methods and Use to Boost the Work

There are many ways during automate web-pages one is manually and other is by automation testing ways.

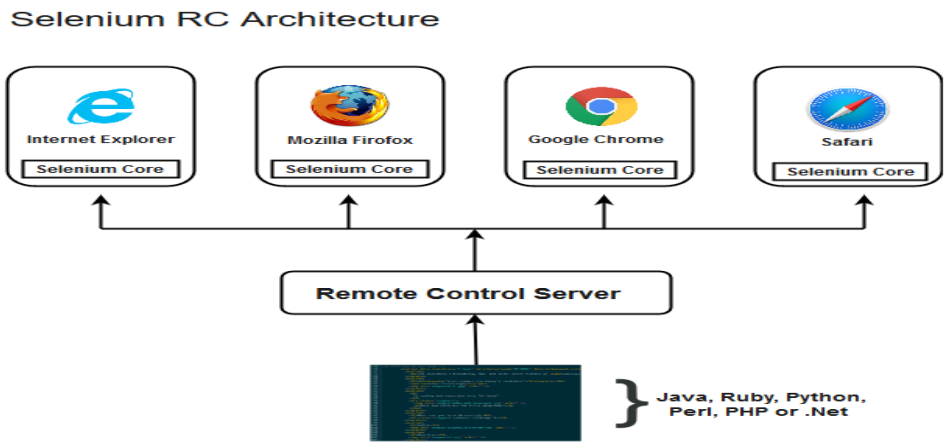


Figure 4.1: Selenium Objective to Automate Browse using Java Coding [12]

During the manufacturing or in any stage the product may be having some amount of defects in them so the SDLC life cycle is very much important to find out that where defect is done and how to remove them. The automation testing types is the one of the way to decrease the error occur in any type of defect.

4.2 Objective 2: Use of Different Testing to get a Suitable Result

Product	Selenium	Katalon Studio	Unified Functional Testing	TestComplete	SoapUI
Available since	2004	2015	1998	1999	2005
Application Under Test	Web apps	Web (UI & API), Mobile apps	Web (UI &API), Mobile, Desktop, Packaged apps	Web (UI &API), Mobile, Desktop apps	API/Web service
Pricing	Free	Free	$$$$	$$$	$$
Supported Platforms	Windows Linux OS X	Windows Linux OS X	Windows	Windows	Windows Linux OS X
Scripting languages	Java, C#, Perl, Python, JavaScript, Ruby, PHP	Java/Groovy	VBScript	JavaScript, Python, VBScript, JScript, Delphi, C++ and C#	Groovy
Programming skills	Advanced skills needed to integrate various tools	Not required. Recommended for advanced test scripts	Not required. Recommended for advanced test scripts	Not required. Recommended for advanced test scripts	Not required. Recommended for advanced test scripts
Ease of Installation and Use	Require advanced skills to install and use	Easy to setup and use	Complex in installation. Need training to properly use the tool	Easy to setup. Need training to properly use the tool	Easy to setup and use

Figure 4.2: Different Types of Testing Methodology [12]

By using various testing methods we can compare them and use one which is most optimized as per desired result.

For example:

1. Ruby is use for in spec working
2. Selenium is used to automate the web-pages.
3. SPFTP protocol is used for file transfer in various hosts.

4.3 Objective 3: Using SFTP Protocol to Transfer Files in Between Various Host

Figure 4.3 SFTP Use to Connect Various Host for File Transfer [12]

By using STFTP protocol [12] we can use it to transfer file in between various host by using some secure methodology we can transfer by using some easy steps during file transfer**.** Now next important thing is why we use automation testing what are advantages of automation testing over manual testing and which sites to automate and which codes are used for them all detailed.

4.4 Need of Automation Testing

As during the making of any product it is very much important to find that error is occur in which level and what are the different ways to decrease the defect:

1. During the starting of the product formation.
2. When we can see level or can say stages of various types of testing.
3. Host need to be tested.
4. When we need to check small scale of test level and code we are using to write is too much long than.
5. If there are having some ways in which test is cannot be done automated then.

4.5 Manual Testing Pros and Cons

Need of Manual Testing are:

- No need to think about type of application in manual testing.
- The use of this testing in short life time test cases.
- If we created any test cases recently first check by manually only.
- Application must be tested manually before it is automated
- When our pages of web page are changing we have to choose the manually testing only in those cases.
- In manual testing cost needed is very least so people prefer this type of testing only.
- The time needed to work in here is very less so people prefer this type of testing.
- The adhoc testing can be done by using this only.
- For doing this testing no skill is required in automation tool and in any language.

4.6 Disadvantages of Manual Testing

During case in regression testing manual testing is too much time consuming.

- Lots of error can occur during the manual testing but in automation testing this human erro can be reduce in a large extent.
- To run manual test cases for long time run it is too much cost consuming.

4.7 What is Automated Testing

Automation testing is a tool used to automate the testing condition**,** it is use**.** To automate the test cases in less amount of time and it help to boost a language too and easily we can find out any error if present in the webpage or in anywhere which result for which we are automating

4.8 Some of the Popular Automated Testing Tools

HP QTP (Quick Test Professional)/UFT (Unified Functional Testing)

1. Selenium
2. Load Runner
3. IBM Rational Functional Tester
4. Silk Test
5. Test Complete
6. Win Runner
7. WATIR

4.9 Advantages of Automated Testing

Automation testing is taking very less time during execution of test cases.

- If we are talking about long process than it is cheaper.
- It is very much trustworthy as compared to other testing process.
- It is available as an open-source tool and presents everywhere.
- In gestating type of testing it is used.
- We can take them and use any other way as automation can be used in different fields.
- Not need of any type of man work kin this type of testing.
- It can be used when a large coding technique is required.

4.10 Codes Used to Automate WebPages-POM Structure in Maven Project

Codes used in POM structure is given below:

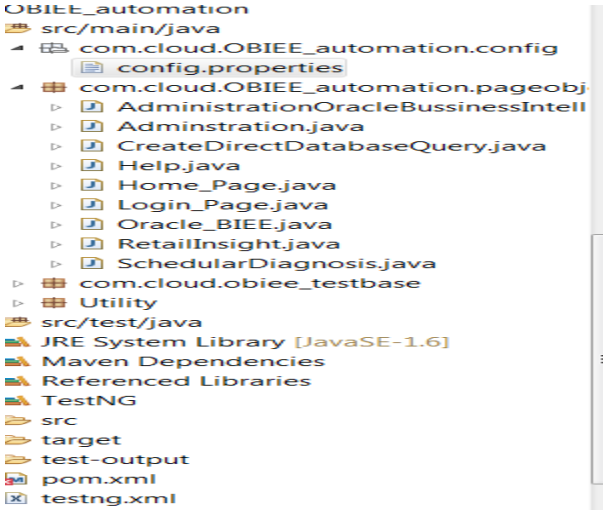


Figure 4.10 POM Structure

4.11 Some Important Codes used to Automate Site

1>The below picture tell the config page hold all customers id and password use during automation of sites:

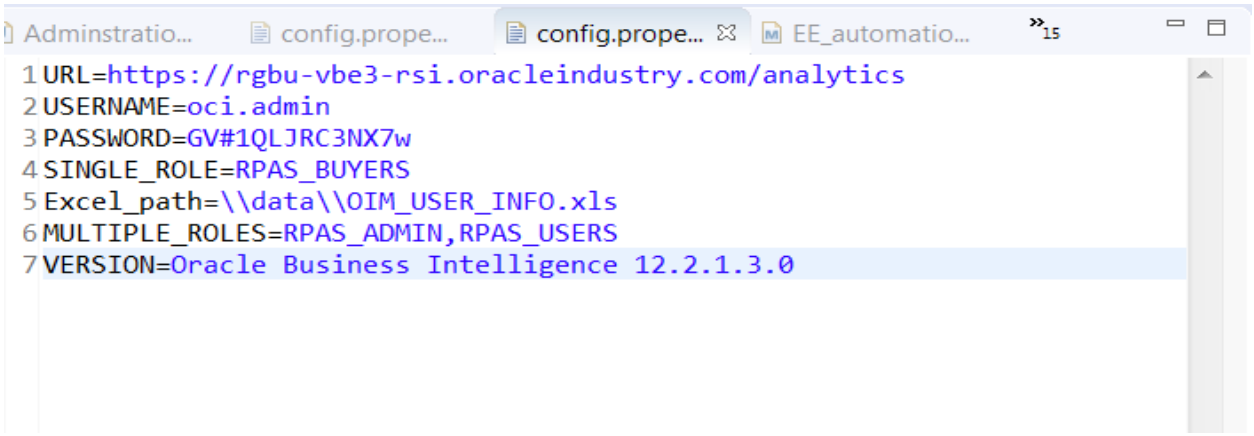


Figure 4.11.1: Main Config File Inside POM Structure

2>The below screen shot is used to tell the coding techniques implement to automate pages:

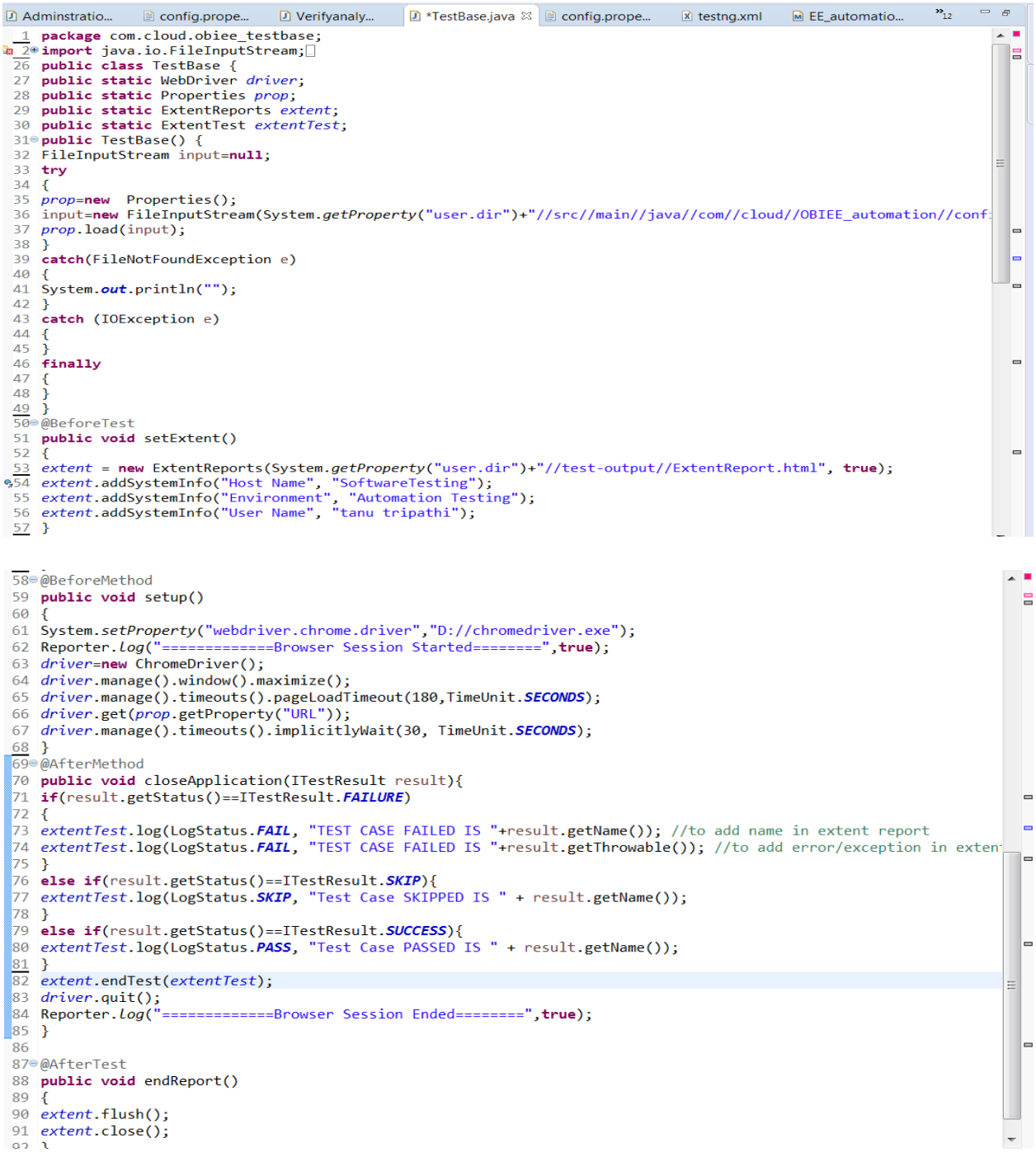


Figure 4.11.2: Test base File in POM Structure having Excel Code Detail

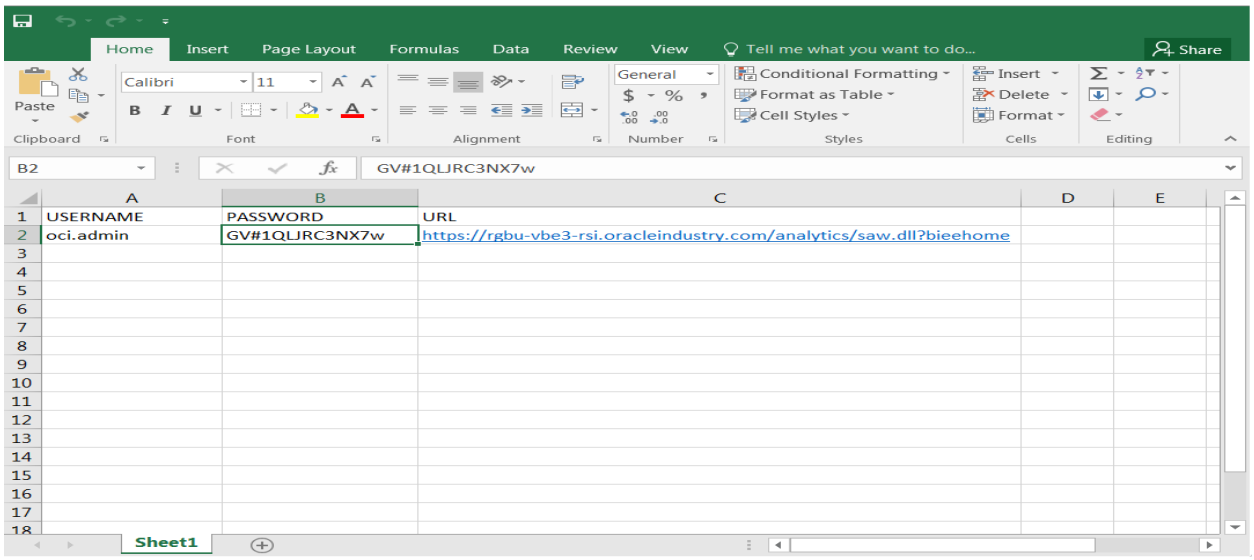
3.>There is a pom files having some repository this are as follow:

```
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
 <groupId>com.oracle.idm</groupId>
  <artifactId>EE_automation</artifactId>
  <version>1-SNAPSHOT</version>
  <packaging>jar</packaging>
 <name>EE_automation</name>
  <url>http://maven.apache.org</url>
<properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
    <suiteXmlFile>TestNG.xml</suiteXmlFile>
  </properties>
<dependencies>
    <dependency>
      <groupId>org.seleniumhq.selenium</groupId>
      <artifactId>selenium-java</artifactId>
      <version>3.8.0</version>
     </dependency>
     <dependency>
      <groupId>org.testng</groupId>
      <artifactId>testng</artifactId>
      <version>6.10</version>
     </dependency>
     <dependency>
      <groupId>log4j</groupId>
      <artifactId>log4j</artifactId>
      <version>1.2.17</version>
     </dependency>
     <dependency>
      <groupId>org.apache.poi</groupId>
      <artifactId>poi</artifactId>
      <version>3.15</version>
```

```
80      <groupId>org.junit.platform</groupId>
81      <artifactId>junit-platform-surefire-provider</artifactId>
82      <version>1.0.0</version>
83      </dependency>
84          </dependencies>
85    <build>
86   <plugins>
87       <plugin>
88       <groupId>org.apache.maven.plugins</groupId>
89       <artifactId>maven-compiler-plugin</artifactId>
90       <version>3.1</version>
91       <configuration>
92           <compilerVersion>1.8</compilerVersion>
93           <source>1.6</source>
94           <target>1.6</target>
95       </configuration>
96       </plugin>
97       <plugin>
98       <groupId>org.apache.maven.plugins</groupId>
99       <artifactId>maven-surefire-plugin</artifactId>
100      <version>2.20.1</version>
101      <configuration>
102      <suiteXmlFiles>
103      <suiteXmlFile>${suiteXmlFile}</suiteXmlFile>
104      </suiteXmlFiles>
105      </configuration>
106      </plugin>
107   </plugins>
108   </build>
109 </project>
110
111
112
```

Figure 4.11.3: POM File having Jar Files Detail in POM Structure

4.> The excel-sheet after making is look-like as below:



	A	B	C	D	E
1	USERNAME	PASSWORD	URL		
2	oci.admin	GV#1QLJRC3NX7w	https://rgbu-vbe3-rsi.oracleindustry.com/analytics/saw.dll?bieehome		

Figure 4.11.4: Excel Sheet having Detail of id and password to Automate Web-Pages

4.12 Sites to Automate using different Test Cases using Selenium

The following are the sites that I automate they are looking like Gmail or Face book sites with different features:

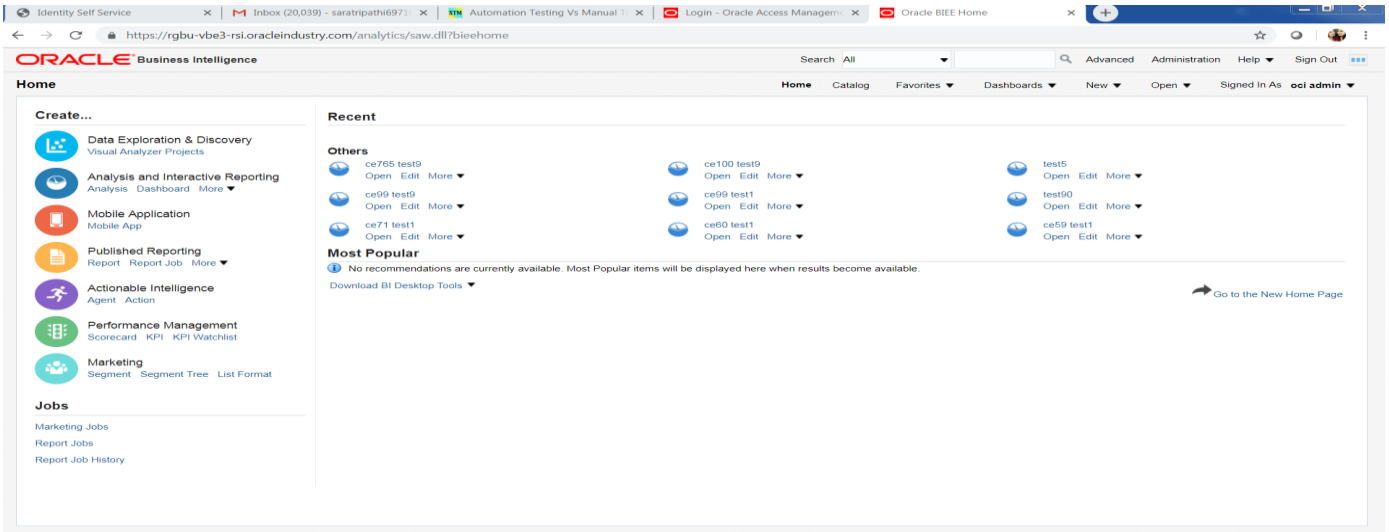


Figure 4.12.1: Analytics Page which is Automated with Different Function [13]

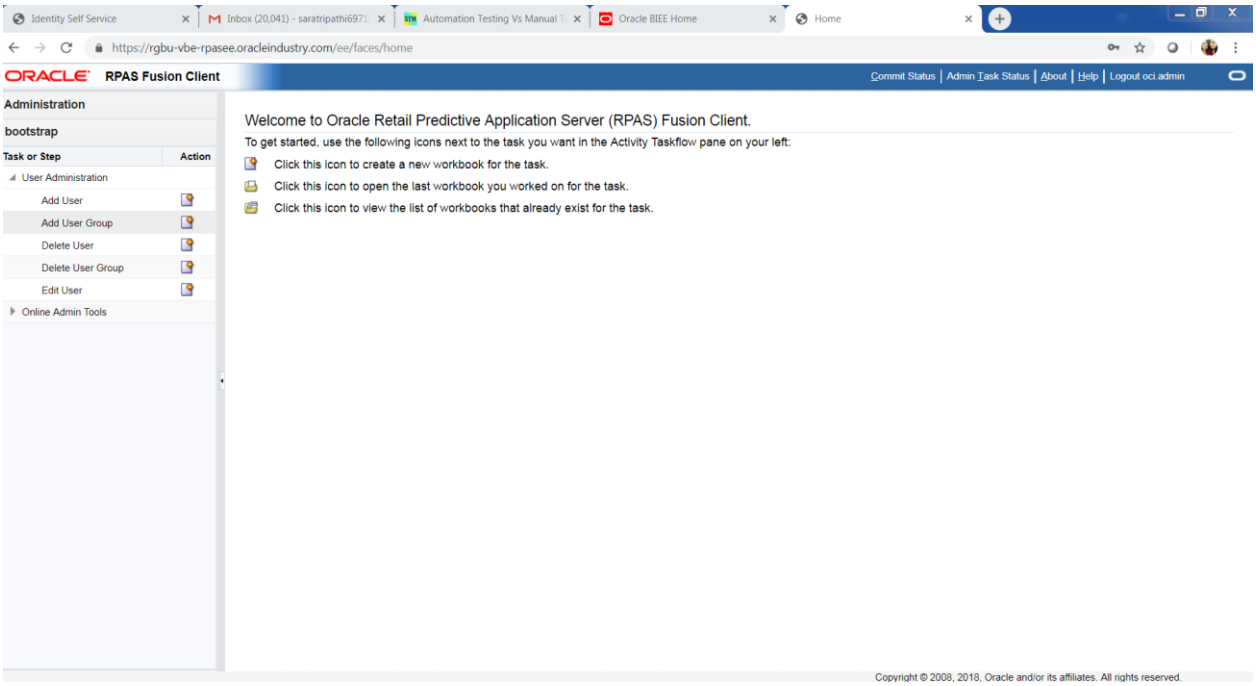


Figure 4.12.2: EE Page Need to Automate by Using Selenium Tool [13]

The given pictures contains some fill-in the blanks by selenium it will fill automatically and take least time too:

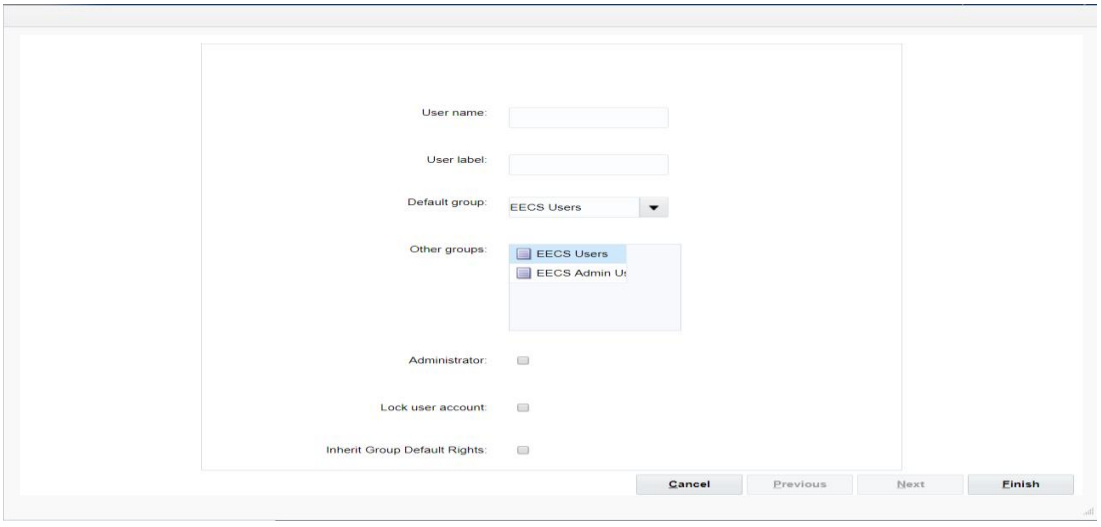


Figure 4.12.4: EE Page Showing a Table as a Task to Operate by Selenium Web Driver [13]

So, the use of automation tool to automate site shown in above diagrams [13] done, by using some implemented codes and theses codes decrease time of work and enhance the work.

Following diagram shows in diagram [14] that how selenium is useful to work under different area and to help various working scenario such as deploy of codes, review of codes as to decrease the time and or making various test cases and to design different condition follow diagram is best way to tell use o selenium in day-to-day lie.

Figure 4.12.5: Functions of Selenium [14]

CHAPTER 5

SYSTEM MODEL

As after discussion of literature review, which holds the concepts needed to work on this ideology to implement the code and after getting knowledge of methods that is needed to build or can say to design the selenium codes to automate web driver work we need to know how working is done inside the model to implement coding of Java.

This chapter is divided into two parts one holds:

1. This part give the introduction of testing components that we are using in our thesis work it tell in description the detailed overview of components that we are using in our thesis.
2. This tells working of testing tool and there detailed description that how they are working and how they are connected to provide detailed description of working

The following description tells the testing tools in detail and features they are having:

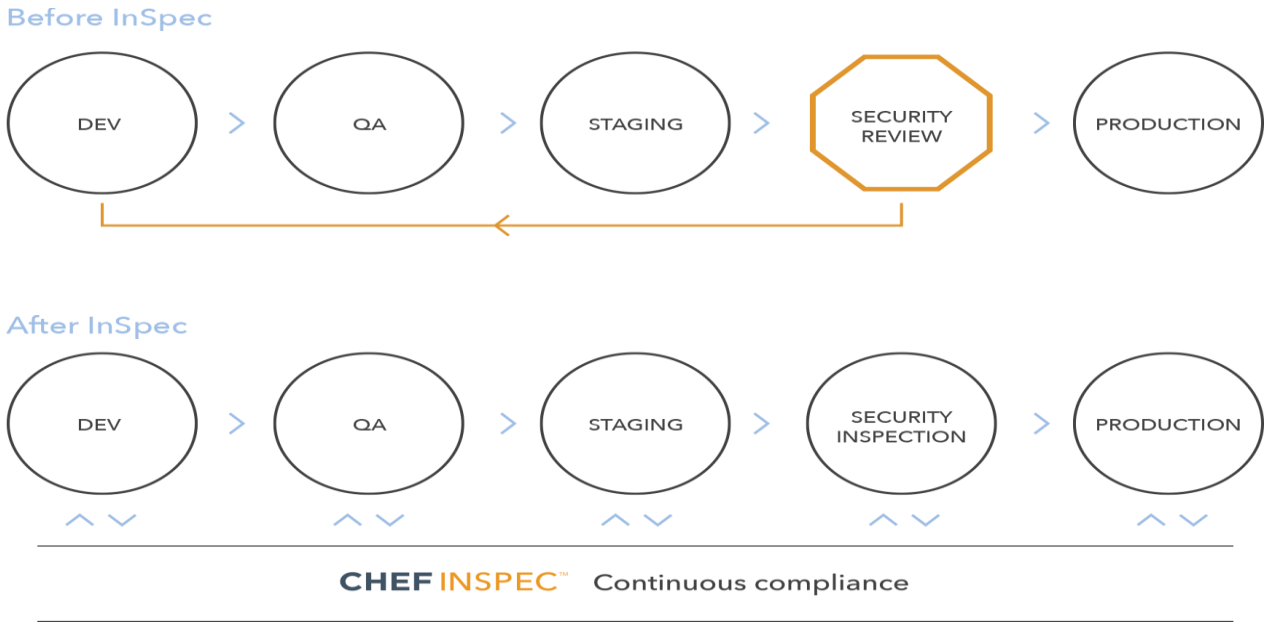
5.1 Inspec-

It is an open-source run-time framework [15] to specify compliance, security, and policy requirements; and creating automated testing (local or remote) as a part of Chef Automation to configure cloud infrastructure.

Figure 5.1.1: Inspec [15]

Chef Inspect [3] is a type of testing which is helpful in providing testing detail with full of security. InSpec allows testing each Chef node in a cloud environment checks for adherence to policy in any stage of deployment pipeline. InSpec also allows to write auditing rule scripts by using the Compliance DSL; examine

any nodes and run any tests on it; logging etc., For example InSpec may test if a Chef had deployed a package by checking the running environment; check if recipes in a cook book (configurations instructions and tasks) ran successfully. Figure 5.1.2 gives the overview of Chef InSpec continuous compliance before InSpec and after InSpec.



5.1.2: Chef InSpec Continuous Compliance [16]

5.2 Selenium

Selenium is a tool which is highly portable to anyplace. We can take them from one place to another without any harm. Selenium is a tool which is free i.e., it is open source tool and we can get it from anywhere from the internet.

Selenium is having some set of codes which are easy to understand and rich the sets of coding. Selenium has a large no of set of codes which are helpful of code comparison and having some set of codes that locate some parts on the internet.

Selenium have four different types [16] that are given below - i) Selenium Integrated Development Environment (IDE) ii) Selenium Remote Control (RC) iii) Web Driver iv) Selenium Grid.

Figure 5.2.1: Selenium Components [16]

Selenium IDE:

Selenium IDE stands for Integrated Development Environment for making the various test cases. It has some selected set of commands and it if operated in fire-fox adds on buttons to work.

It has a recording feature as it record the action set by the user and made some sets of action in corresponding to them. It also has some feature from the user to pick the set to actions by them and made codes corresponds to them. It also has the feature to make edition in the test cases as per the requirement. It has some set of commands line over which it is working.

Selenium RC:

It has the feature that it allows the consumers to take the various languages to made the code and take help from the languages of various fields. It has some set of commands which are helpful to run the test cases to provided the data as per the requirement and various different logics are used to made different varieties of test cases. Selenium-RC gives an API (Application Programming Interface) and library for each of its supported languages: Java, HTML, C#, Perl, PHP, Python, and Ruby. This feature to consume Selenium-RC with a high-level programming language to make various types of test cases to be build by using the high level programs.

Selenium Web Driver:

It is the most important and flexible tool in selenium suits.. As RC is having lots of disadvantages, Web Driver was created. By using this tool it is helpful in making the direct connection of the codes with the browsers.

Important keys of selenium web driver:

- It is highly available tool in the internet.
- It support by all the browsers to run the test cases.
- It is helpful to a large number of languages such as Java, C,C++,pearl, dot net,phython etc.
- It has the feature to run test cases parallel.
- We can integrate them with using selenium grid

  .

Selenium Grid:

It is a type of testing in which a number of test cases is collected in test suits to run the test cases. By using this technique a large number of selenium codes can be run in chrome as well as in the Mozilla in many browsers parallel form Hub registration is needed in them test cases .When selenium RC is needed when host connection in grid working mostly is needed. In this test case we can run the entire test suits at once which are group of many test cases and we can run the test cases in multiple browsers.

How to Set Selenium Web Driver Work:

The easiest way to make set-up of selenium is that first install the selenium tool and after that from eclipse market place take maven tool which we want to install and that we get POM file which is having all the required file which is necessary to work.

Once the file is created we get a different project of maven in same field were we get folder for java and then we can build maven project and in pom file we have all the dependencies that required to work. The POM file is in [9] in the form of diagram.

```xml
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>

  <groupId>cloud</groupId>
  <artifactId>WebTest</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <packaging>jar</packaging>

  <name>WebTest</name>
  <url>http://maven.apache.org</url>

  <properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
  </properties>

  <dependencies>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>3.8.1</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>
```

Overview | Dependencies | Dependency Hierarchy | Effective POM | pom.xml

Figure 5.2.2:Pom.xml File.[16]

Advantages of Web Driver:

a)It is helpful to execute the various set of test cases in all browsers but not only from Mozilla.

b) By using this we can use various types of programming language in our work.

c) Selenium RC has some drawback to overcome that we use this tool.

d) By using this any number of browsers that be interacted easily.

e) Easier to connect to various of host.

f) During execution it is having faster than any other.

g) It is using some java statement such as assertion to make comparison of actual data and expected data.

h) It is having some set of instruction which are inbuilt..

Drawback of Web Driver:

a) Some complicated set of instruction is called in here.

b) Knowledge of programming language is must.

c) All set of browsers is not supported in this web driver tool (new browsers that are coming).

d) It is not having any built-in libraries to generate some set of results that are needed.

5.3 Firebug

It is a web tool which is use for finding many things such as CSS, Dom structure in code html code and xpath which is needed during the making of the code. It is a tool which is use to run java scripts it is very much helpful in making of codes Firebug is a tool which is mainly helpful in locating the xpath of the element in finding the locations where the element are located etc.

By using fire bug in testing tool it is easier not only to get xpath but also by using the fire-bug html study becomes very much easier and html study help in a great extent in java coding and it is very much helpful to provide to provide the study of selenium codes in java in a much content manner as before.

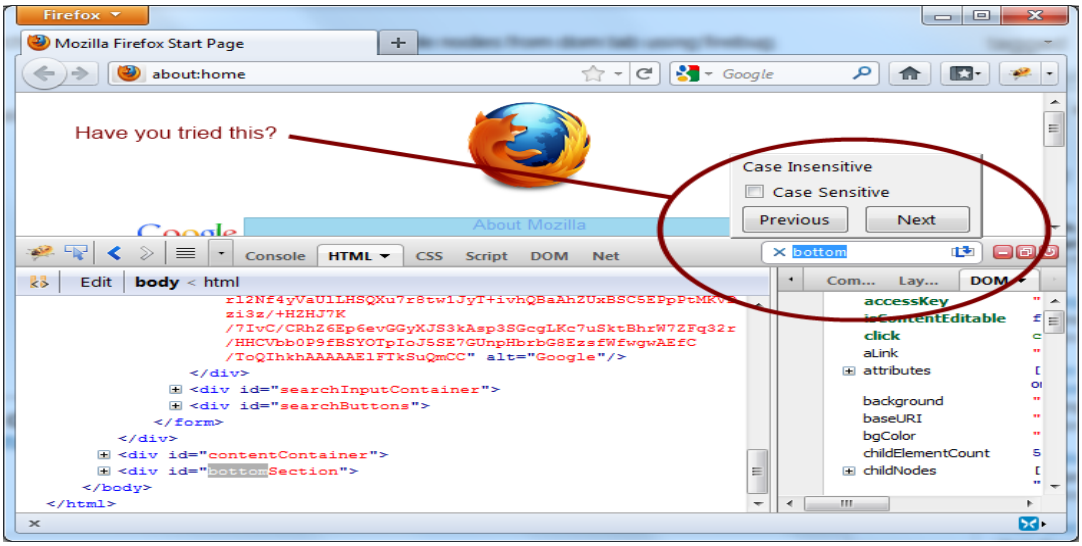


Figure 5.3: Mozilla Firebug. [16]

5.4Fire Path

This is more advance version than firebug as by using it it is easier to get CSS3 selector.

Method to use Fire Path:

- First we have to install fire path in Mozilla add-ons and then by using than in console column we get xpath directly in there.

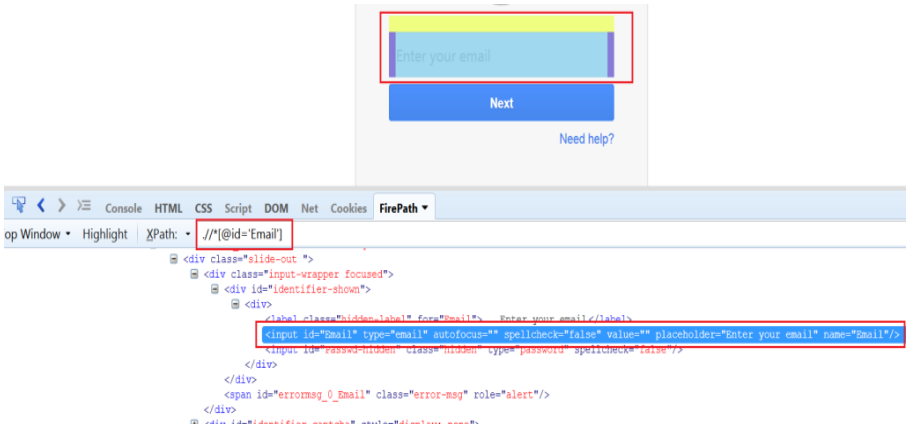


Figure 5.4: Finding Xpath using Fire Path. [16]

- In this it is very easy to get the xpath by using or we can say select first the web element of whom you want to find xpath and then see in console path we get the xpath.
- Ex: ->.//*[@id='Username']

Now we will see the detailed description of second part of this chapter i.e., low diagram and working o tool in detail as follow:

In this chapter we get to know the flow diagram that is used in total my 1 year of work and full description of that in my thesis. How we deal with different unction and how it is working is explained by using some graph.

5.5 Introduction of Selenium

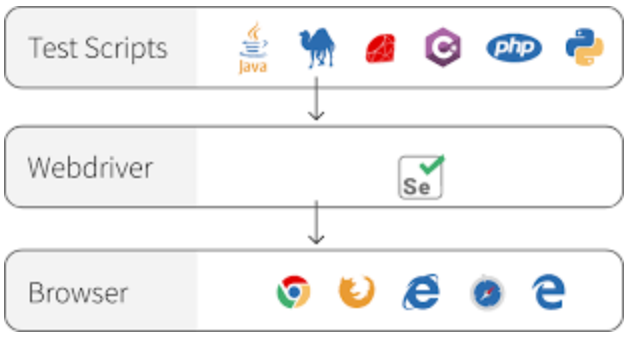


Figure 5.1 Flow Chart of Selenium [17]

The above flow chart [17] describes that what is use of selenium and how different important parts of automation testing are coordinated with each other.

5.6 Description of Selenium Flow Chart

The above mention chart tell that how test script, web-driver i.e., our selenium tool and browser. By seeing the above flow chart it is quite clear that web driver is the center part of the test script and browsers it link both with each other. Test Scripts are made up of java codes and used by using eclipse tool. Web driver is a tool used maven project to automate the WebPages.

Browsers are many as example of that is chrome, I.E. , Mozilla etc it them the automated pages are opened and we check there working using selenium. Web driver i.e., selenium is used to make connection between Browser and test scripts. Selenium plays an important role to connect java code and web driver pages.

5.7 Working of Testing Tool

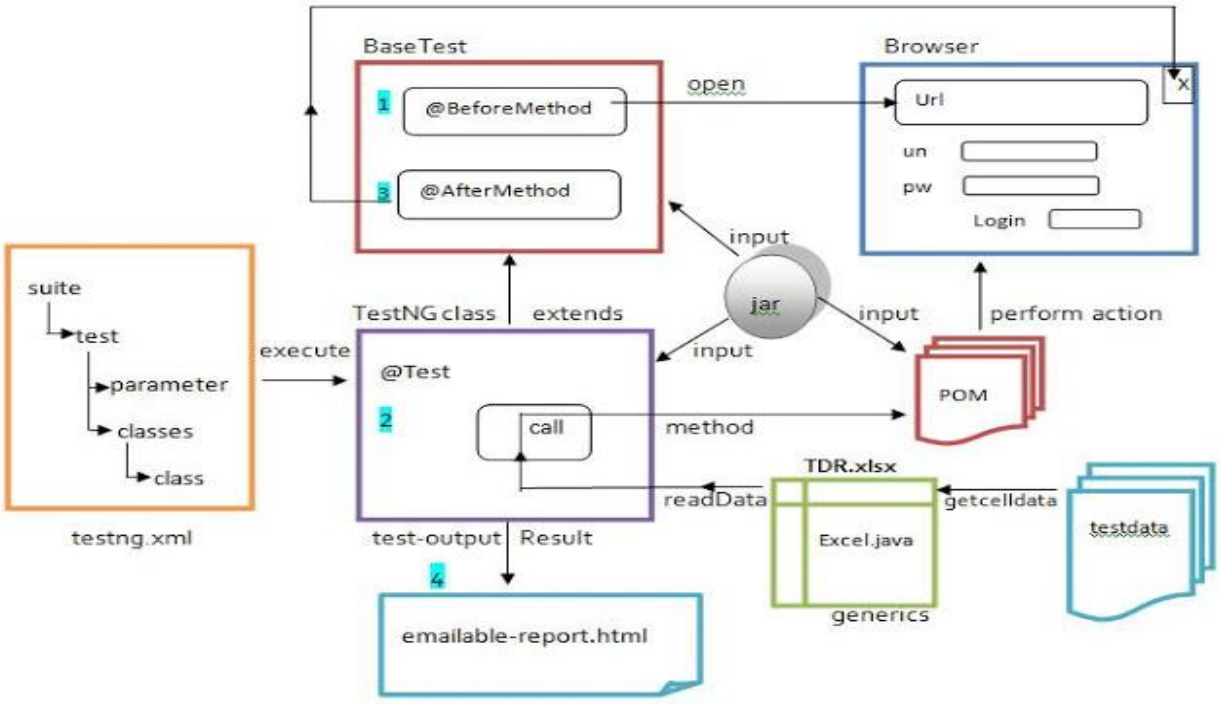


Figure 5.7 Working of Eclipse Tool in Maven Project [17]

Working: In the above diagram [17] it was clearing showing how in eclipse tool the maven project is used to build the java codes to implement that to make various types of automated scripts. Jar file is central part of working as different projects creation use different jar files after downloading jar files which mention in chapter 2 we create maven project.

Maven project is based on annotation which is java part of coding we make code by using various annotation and theses annotation are and there use are showing as follow:

@Test	Attaches a class or a method to become the part of the test.
@BeforeTest	This annotation is used where we want our code to run before each test case. In this group a set of annotation is given in which we want them to execute before every test
@BeforeMethod	In this annotation a set of task are given which we want to execute before all the function to executes.
@After Method	In this annotation after test codes will run after the particular method.
@Parameters	When we need to pass several of test cases then we need parameter Annotation in that case.
@Data Provider	It is always used when we need to take values from excel-sheet in our code. This is used as an array structure and need rows and column to defined this annotation.
@Before Class	This method is used when we to call method before any class before calling any need Some. Sets of commands to call. In this section we calls the commands which before every class.
@After Class	This method we call after every class. After every class some sets of commands hav this Section is used for that purpose that is to run code after class code done.
	This annotation which is used before the groups of code.

@BeforeGroups	
	This is a section of group which is being called in which all codes are mention v being used.
@AfterGroups	Before the groups of classes, will run after is used as codes will after some task.
@BeforeSuite	Some groups of classes which are being used before set of suits of classes.
@AfterSuite	Some classes which is being used after set of classes i.e., which is being used after the suit of lasses.

5.8 Detailed Description of Working of Selenium in TestNG Framework

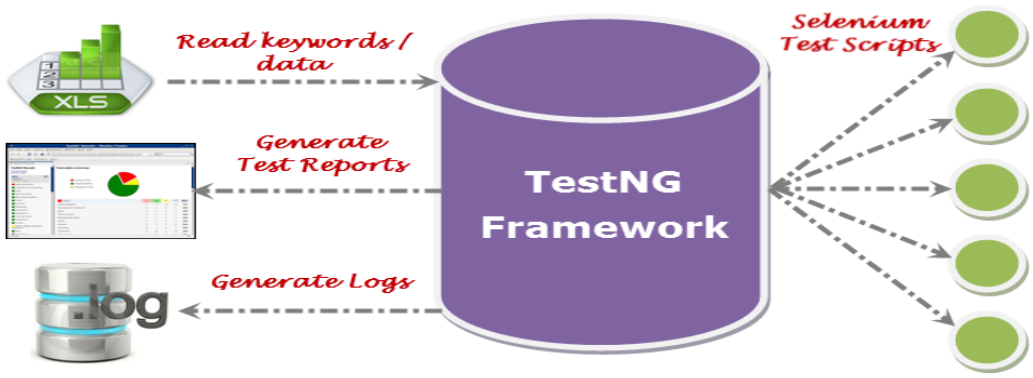


Figure 5.8 Detailed Overview of TestNG Used in Selenium Web-Driver [17]

Description of above shown diagram of using TestNG Framework

In the above diagram [17] it is explained that how TestNG is used inside selenium web driver tool to generate various of pages.

As selenium web driver cannot alone built extent report due to not having jar for making test reports but by using TestNG framework having jars of that we can generate extent report and our extent report having features of excel reading and writing. Excel sheet hold id and password odd the customers which are using to automate the sites the sites that we automate are given previous in chapter 3 a detailed description of that sites are shown there log files are generated by using TestNG framework tool and the result of using TestNG are getting as a result of selenium script.

Ultimate we get selenium scripts which are used for automate WebPages and during implementation of these codes java scripts are used especially annotation features.

CHAPTER 6
RESULTS AND DESCRIPTION

6.1 TestNG Results

TestNG is present in test-output folder and it created a file named as x.html This report is helpful for graphical creation of output page in selenium. When we go to that particular folder we get detailed result of the output page.

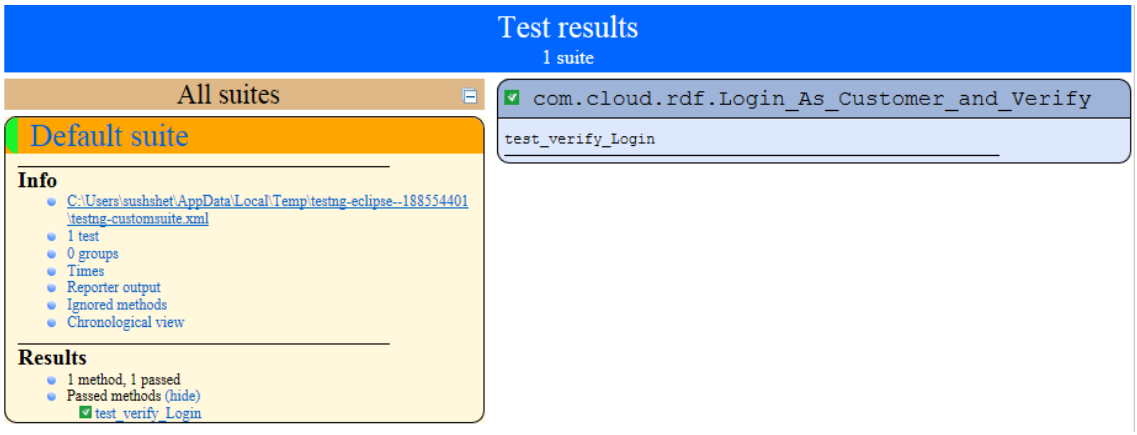


Figure 6.1.1 Report Generated by TestNG.

Features Present in TestNG

- Annotation is supported in this TestNG.
- The paramerization is supported in this TestNG.
- Test suit is not require by using this type of technology driven test technology.
- Data providers are helpful to give this type of technology.
- We can set execution priorities during execution of the test cases.
- It helpful in giving the thread free surroundings.
- It can easily plug-in with a large no of plug-in tool like eclipse etc.
- It gives the output in the form of graphical representation in them.

Test	# Passed	# Skipped	# Failed	Time (ms)	Included Groups	Excluded Groups
Default suite						
Default test	1	0	0	75,704		

Class	Method	Start	Time (ms)
Default suite			
Default test — passed			
com.cloud.rdf.Login_As_Customer_and_Verify	test_verify_Login	1543386015772	55900

Default test

com.cloud.rdf.Login_As_Customer_and_Verify#test_verify_Login

Figure 6.1.2 Emailable Report

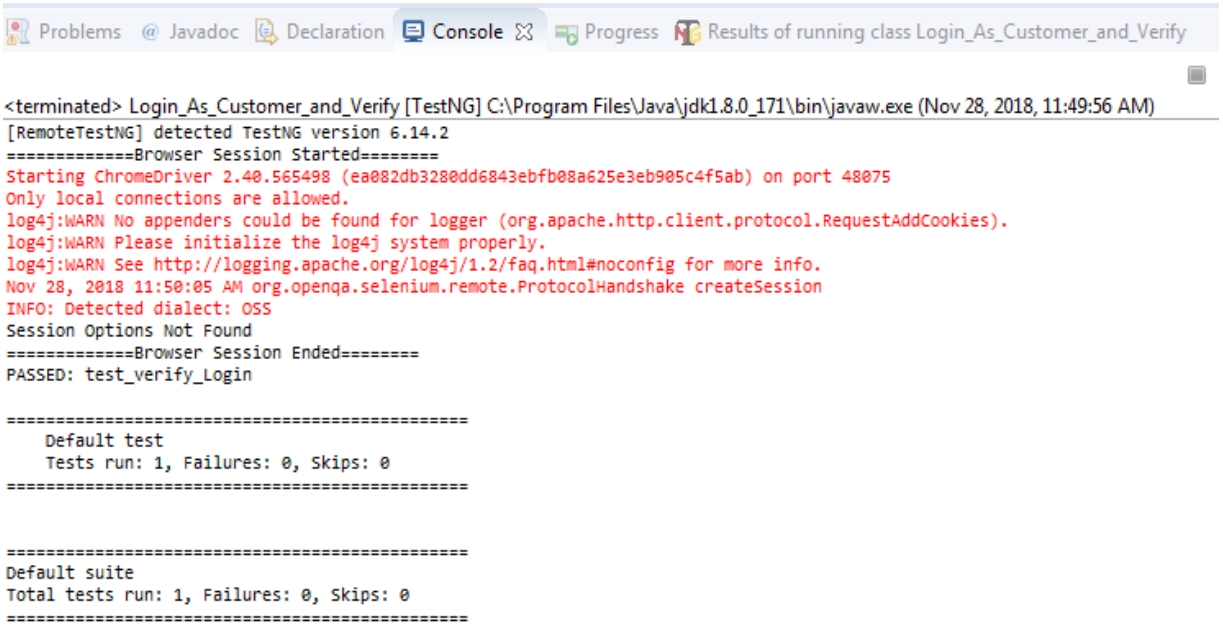
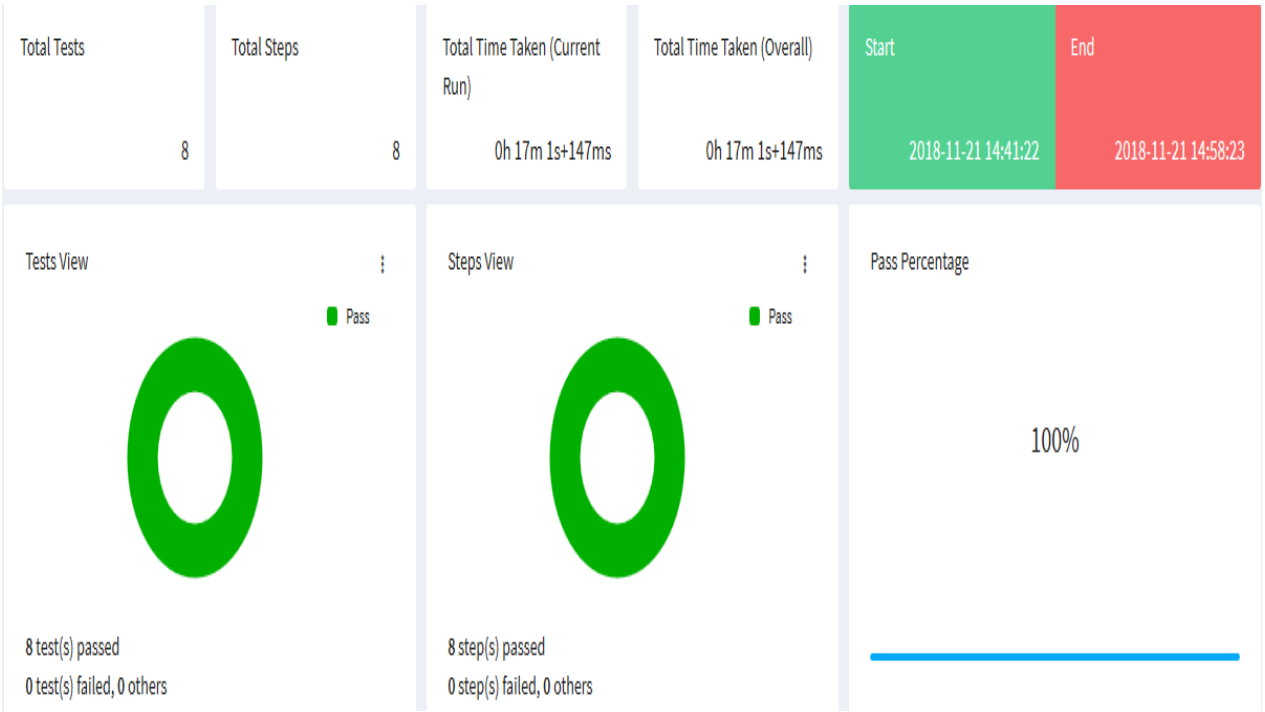


Figure 6.1.3 Console Output



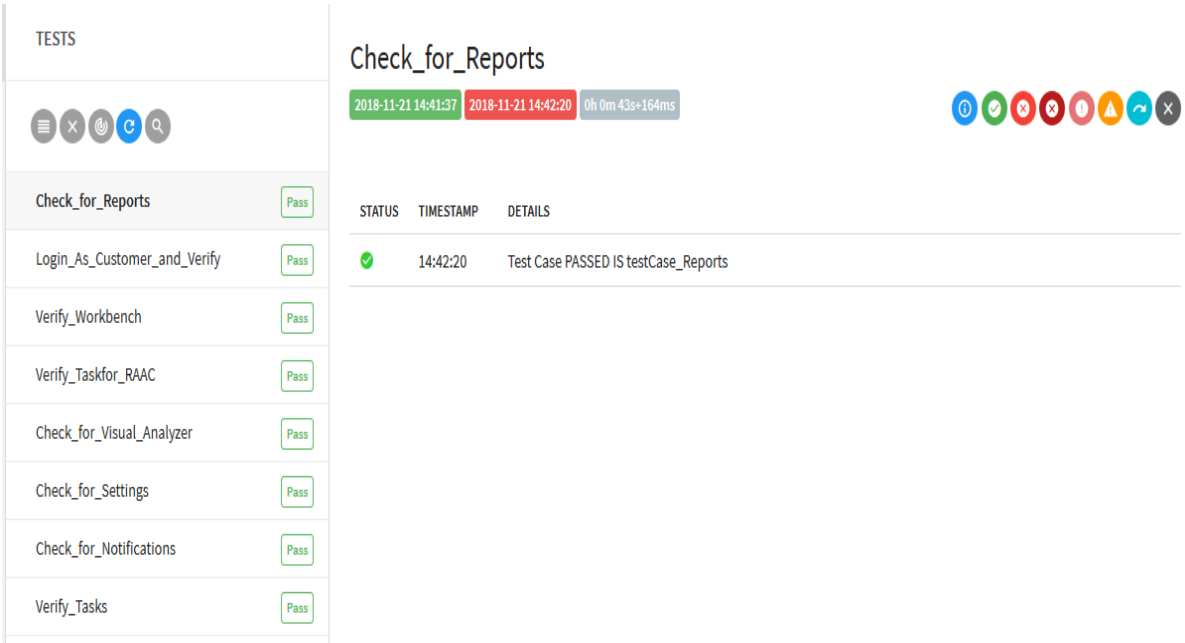


Figure 6.1.4 Customized Report Generation

The Crucial Features of Selenium Automation are:

1. Readily Available: The biggest advantages of this tool are that we can get this tool anytime and everywhere with free of cost.

2. Many Languages are supported by it: It supports a large number of languages as we can work with some of selenium commands with any languages as java, ruby, pearl, c, c++ etc.

3. Various Operating System is supported: By using selenium tools we can work this tool on various types of operating system as various types of operating system is supported by selenium It can work on any platform no need of a fix operating system.

4. It takes various types of browsers for the work: It supports various types of browsers no matter of Mozilla, Firefox, internet explorer or anything else.
5. Supports various types of languages as a framework: The selenium takes various types of framework and integrates with various things to create a desired framework.

6. Selenium can work across mobile phones: Selenium using TestNG is helpful in a large variety of things especially it is helpful to automate the web pages and also to the web application as selenium is helpful to not only automate WebPages and also the mobile based applications too.

7. Selenium gives cost friendly environment: The selenium is very much helpful to a large numbers of things not only in case of cost friendly things but also in integration aspects and in large number of tools to integrate a provided the updated result as per the required desire.

8. Large number of selenium suits: A selenium is helpful to take a large number of selenium suits as a large number of suits make the creation of programming work efficiently and with full of easy available tools too.

9. Selenium with TestNG is ease tool: As selenium is easily available and integration of selenium with the TestNG makes the output easily under stable and selenium with maven project makes the results that we get is very much attractive and easy to understand too.

Selenium with maven projects and with integration with TestNG tool is very much important as by using all these works we can integrate the work and it can be readily available as a attractive output form in test-output folder..

10. Again and again use of same codes in different browsers: By using selenium tool and by using TestNG tool we can make and can create attractive output which are being required as per the required result.

11. Supported environments: Selenium supports huge list of application environments like the following:
    - Fusion Applications
    - Custom web Applications
    - Web Services
    - Database Testing

Selenium has also good support for test automation on different web browsers like:

- Fire Fox
- Google Chrome

6.2 Inspec Result

Identifying the configuration requirements and general requirements for cloud infrastructure to deploy an application

- Web logic
- Java
- Patches applied
- Server Specification

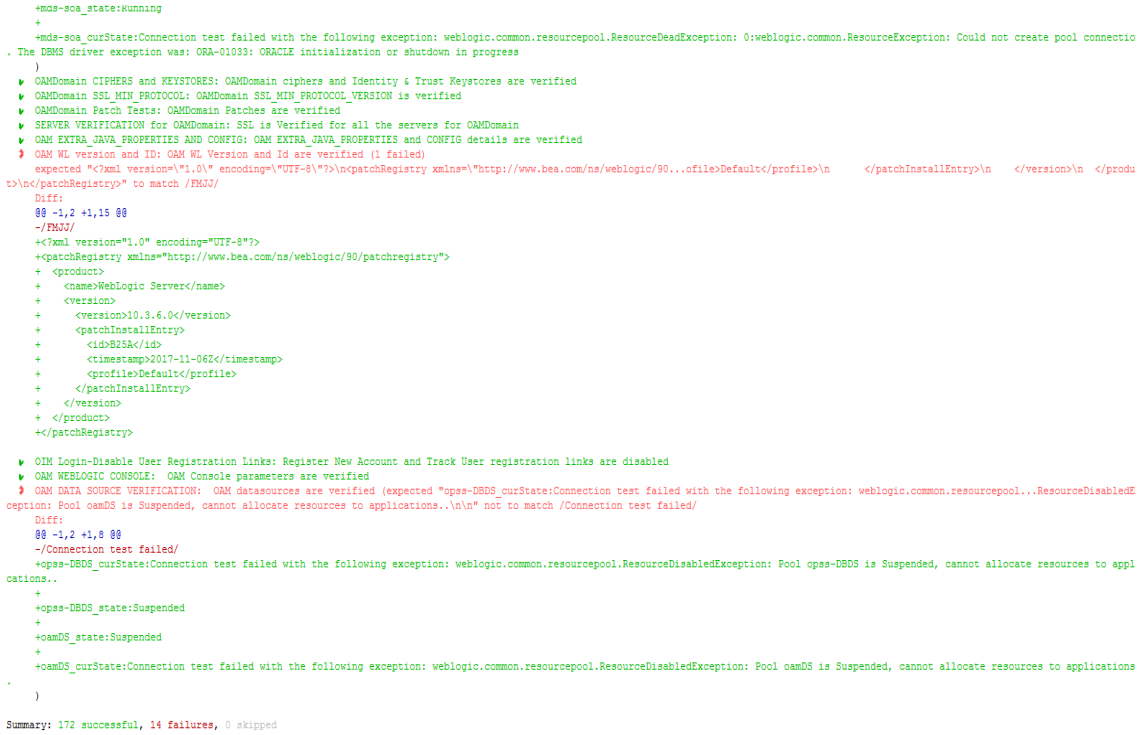
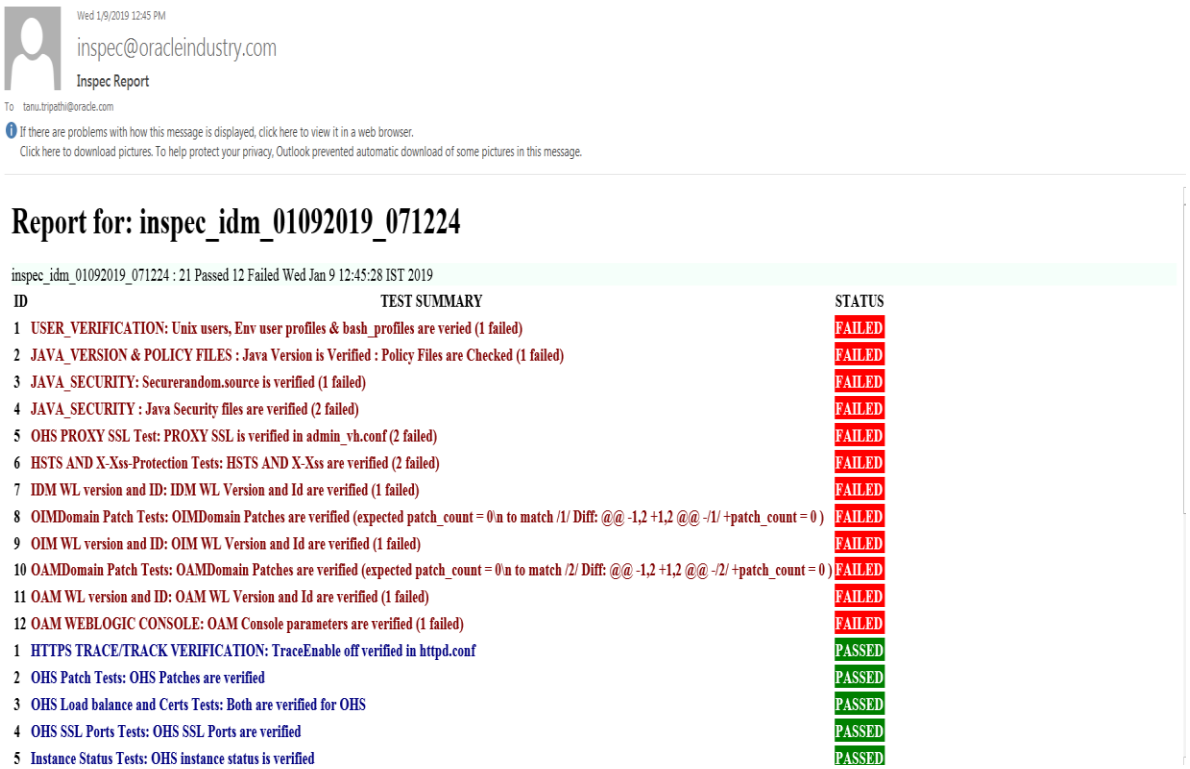


Figure 6.2.1: Inspec Console Output

Benefits of Inspec

- Inspec is an open source tool.
- Inspec Script is written in Ruby.
- Its development is supported by Chef Software Inc.,
- It has Wide-range of community to solve issues,
- Inspec has Very high Rich Resource.
- Inspec can run anywhere. Ex: local workstation, SSH, ducker or winrm.
- It has an interactive shell.
- It works on most of the popular operating Systems.



Wed 1/9/2019 12:45 PM

inspec@oracleindustry.com

Inspec Report

To tanu.tripathi@oracle.com

If there are problems with how this message is displayed, click here to view it in a web browser.
Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Report for: inspec_idm_01092019_071224

inspec_idm_01092019_071224 : 21 Passed 12 Failed Wed Jan 9 12:45:28 IST 2019

ID	TEST SUMMARY	STATUS
1	USER_VERIFICATION: Unix users, Env user profiles & bash_profiles are veried (1 failed)	FAILED
2	JAVA_VERSION & POLICY FILES : Java Version is Verified : Policy Files are Checked (1 failed)	FAILED
3	JAVA_SECURITY: Securerandom.source is verified (1 failed)	FAILED
4	JAVA_SECURITY : Java Security files are verified (2 failed)	FAILED
5	OHS PROXY SSL Test: PROXY SSL is verified in admin_vh.conf (2 failed)	FAILED
6	HSTS AND X-Xss-Protection Tests: HSTS AND X-Xss are verified (2 failed)	FAILED
7	IDM WL version and ID: IDM WL Version and Id are verified (1 failed)	FAILED
8	OIMDomain Patch Tests: OIMDomain Patches are verified (expected patch_count = 0\n to match /1/ Diff: @@ -1,2 +1,2 @@ -/1/ +patch_count = 0)	FAILED
9	OIM WL version and ID: OIM WL Version and Id are verified (1 failed)	FAILED
10	OAMDomain Patch Tests: OAMDomain Patches are verified (expected patch_count = 0\n to match /2/ Diff: @@ -1,2 +1,2 @@ -/2/ +patch_count = 0)	FAILED
11	OAM WL version and ID: OAM WL Version and Id are verified (1 failed)	FAILED
12	OAM WEBLOGIC CONSOLE: OAM Console parameters are verified (1 failed)	FAILED
1	HTTPS TRACE/TRACK VERIFICATION: TraceEnable off verified in httpd.conf	PASSED
2	OHS Patch Tests: OHS Patches are verified	PASSED
3	OHS Load balance and Certs Tests: Both are verified for OHS	PASSED
4	OHS SSL Ports Tests: OHS SSL Ports are verified	PASSED
5	Instance Status Tests: OHS instance status is verified	PASSED

Figure 6.2.2 Customized Inspec Email Report

6.3 Software Requirements

For developing environment:

- System to operate : Unix v, Windows 8
- Needed Equipments : In spec, Selenium Web driver, Eclipse, Open script
- Others: Putty.exe, Remote Desktop Connection.

Environments that are needed to deploy**:**

- Serer on Websites : Oracle Web Logic Server
- Oracle needed Client : Oracle (Sun) Java Runtime Environment
- Computer needed Browser : Microsoft Internet Explorer 9.0 Mozilla Firefox 3.6.2.3 above

6.4 Hardware Requirements

- Computer needs Processor unit : Intel Pentium IV
- Memory storage RAM : 2.8GHz or higher
- In computer Display Resolution : 1024 x 986 or higher

6.5 Requirement of technologies are:

- Platform or space needed: MS-excel, Eclipse IDE.
- Space needed the Frameworks: TestNG, Maven ,Selenium Web Driver, ,
- Libraries: Apache POI, Web Driver, Extent Reports.
- Plug-in: Firebug (Firefox plug in), Firebugs.

CHAPTER 7

OVERVIEW AND FUTURE SCOPE

This chapter holds two important topics of all thesis first it tell all product and there description as an overview which we automate in 1 year of work and then second we find what are future scope of the topic we study and what are new emerging area that need selenium First we start with product overview that we automate by using selenium tools are given below

Some of the Oracle products in Cloud are:

7.1 IDM

This software is provided by oracle it gives us IAM services. The IDM helps the customers to manage end-to-end lifecycles the products management and management of projects being used there. The IDM provides the various types of facilities that are listed in there use. It is the main control part of oracle team.

In this application all management work it is dealing by this application only, user creation ,user deletion and all functions are performed in this team only.

7.2 MFP

Oracle Retail Merchandise Financial Planning Cloud Service (MFP-CS) is a best in class merchandise financial planning solution that enables retailers to drive profit and remain flexible to the changing retail environment. This solution is accessible to all retail business models by lowering the overall total cost of ownership.

7.3 Orase

Oracle Retail Advanced Science Cloud Services are having scientific features in them it is made for making enhancement of work. The Oracle network team is working on all the work as such checking, monitoring, providing function etc in the team.

This team working is related to all scientism function and help during the disaster condition. This team work is very much innovative type it is using the different kinds of functionality in them which is not present in other teams. The Saas model is used in this team work to enhance the work flow. This team also deals with various type of cost related work.

7.4 ReSA:

This stands for Retail Sales Audit ensures consistent, which deals with the sales data. This team deals with all the money, financial related terminology terms it deals with company funding and working of various types of works in cost related matters. This team has great work in sequential delivery of data in a required interval of time to meet the required conditions. So high availability of data and high requirement of data all these things can be easily flourish.

7.5 RPM:

It stands for Oracle Retail Price Management is designed for retailers who require complete visibility and control in order to streamline pricing decisions across all selling channels throughout the item lifecycle. Oracle's solution provides retailers with a rules-based pricing strategy and execution engine to ensure that target margin or a competitive position is achieved in line with corporate objectives. With Oracle Retail Price Management, retailers can manage the entire pricing process with a more predictable and profitable outcome.

7.6 RMS:

This software solution provides retailers operations for new product introduction, establishment of connection between items, locations and suppliers, tracking and maintenance of purchase orders knows as POs, monitoring of deal income, reorder points, manage replenishment settings, management of pricing decisions, transformation information and final inventory valuation amongst many others.

7.7 Test Cases:

Below are the some of the Test Cases which need to be automated using Selenium.

MFP-01- Login as Customer
MFP-02- Create a new user
MFP-03- Submit Online Admin Task
MFP-04- Workbook Creation
MFP-05- Bootstrap Task

RDF-01- Login as Customer
RDF-02- Create a new user
RDF-03- Submit Online Admin Task
RDF-04- Workbook Creation

RDF-05- Bootstrap Task

ORASE-01-Login as Customer

ORASE-02-Check for Tasks

ORASE-03-Check for Reports

ORASE-04-Check for Notification

ORASE-05-Check for Visual Analyzer

ORASE-06-Check for Settings

ORASE-07-Task for RAAC

ORASE-08- Task for Workbench

7.8 Details of Work Done

- Training on Ruby, In spec, Web logic Server, Selenium.
- Web functional automation using Selenium.
- Automated the process of executing multiple functional script from single parent script.
- Importing and exporting data between excel and data table.
- Script for Generation of HTML Report using Inspec.
- Html Report emailed using Selenium.
- Automated 20 Test Cases Using Selenium.
- Parallel Execution of Test Cases is done.
- Infrastructure automation using chef Inspec.

Now we go to future use of selenium in new emerging tool .what are use of selenium in new tool and what are they are in below topic:

7.9 Automation with Dockers

What is Dockers? Dockers are a software containerization platform that provides virtualization from the operating system level. In Dockers, all software parts can be organised in containers. This includes the operating system, software, dependencies, environment variables, etc.

Containers can be shared among different users, enabling quick installation and running of software and services. This makes Dockers handy for automation testing, as the relevant container can just be downloaded and run as part of the automated test. However, Dockers is also secure because it runs as an isolated process on the host machine. Dockers can be run on any computer on any infrastructure as well as in the cloud, including Linux, Windows, Mac, Amazon, Azure and more.

Advantages

1. No longer need a virtual machine spin up for each application
2. Greater portability
3. Lesser resources Virtual Machines Vs Dockers

Reason to use selenium with docker tool is given below:

The reason we integrate selenium with Dockers are given below:

- By using docker installation it make selenium work quicker as no need to go from the start command.
- By using docker java installation is not needed.
- No need to install all the necessary browsers.
- By using containers a new Selenium instance can be created whenever needed, can be discard and then start fresh. Only reboot is needed in case it get crash.
- If various team members are using. Dockers they are not get affected by having several of operating system as Dockers provides same platform regardless to different operating system they are working on.

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