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Data Driven Framework for Curespring Application using Selenium Web Driver

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Abstract- **Development of web applications plays a major role in our day-to-day life. The usage of web applications increasing enormously to fulfill user needs. Modeling is an important phase in web application development in-order to produce quality and efficient application, otherwise it leads for poor qualify and low performance. Moreover, testing improves the functionality of web application. Automation Testing is a process to enhance the performance of web application by rectifying the bugs easily an also reduces man power. Selenium Web Driver is an automation testing tool that allows users to perform web based test automation and supports wide range of web browsers and programming languages. In this paper, a data driven framework has developed for testing Curespring web application using Selenium web driver. Curespring is an online medical health care service in which doctors and specialists connect with each other over the cloud and share patients' information, appointments, and schedules. Data driven framework built with set of test scripts for Curespring application to rectify the bugs, to improve the performance of application and also provides the reusability. This framework reduces the number of scripts to cover all test scenarios with optimized code. After the execution of test scripts, test results are obtained that provide the execution duration, test start time and end time which have failed or passed during testing.**

Index Terms- Software testing, Automation Framework, Curespring application, Test Script, Selenium Web Driver.

I. INTRODUCTION

A. *Test Automation Framework*

To develop any [1] automation testing framework, we should plan a test and arrange it to minimize the code for development. Mainly, we have three types of test automation like Unit testing, Integration tests and Black-box testing. To build an Automation framework for curespring web application, black-box automated testing is very useful. Our Framework mainly focuses on user requirements i.e., input for development and output is user satisfaction after delivery of the product. The functionality for any test automation framework is to define the acceptable formats for input and output, drive the application and connect for test, execute the selected tests, return failures and parallel runs, handle the errors and exception, report the test results and logs. There are four types of automation framework: Data driven automation framework helps in reducing code the huge number of test scripts and it is ease of testing. Keyword driven framework enables documentation functionality of an application under test in a tabular format. In Modular automation framework, there are two types: test script modularity framework which enables creation of small, independent scripts represents the modules and functioning of Application under test (AUT), test library architecture framework which enables for creation of library files representing modules and functions of the AUT. Hybrid automation framework is a combination of all frameworks. The Testing framework is responsible for defining: the format to express expectations, creating a method to test the application fastly, executing the tests, reporting results.

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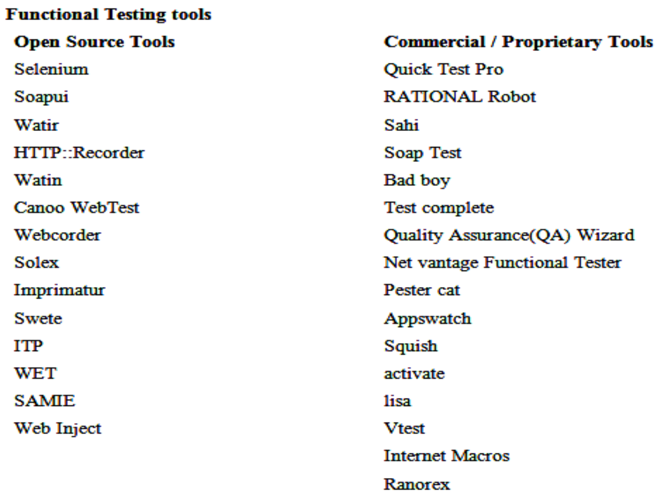
B. *Curespring Application*

Curespring is being developing for a next generation cloud based medical practice and social networking system. This allows doctors and specialists to connect with each other over the cloud and exchange the patient information, appointments, schedules and do online practice (guiding the doctor to cure the patient) using this system. The system makes use of some technologies such as Amazon Cloud, Distributed application architecture, Single sign on and social networking system. It also integrates online medical imaging and visualization system using open source technologies and supports HL7 (Healthcare Level Seven International)imaging standards such as DICOM (Digital Imaging and Communications in Medicine)standards, WADO(Web Access to DICOM Persistent Objects) protocol to allow doctors to visualize images from anywhere in the network. To develop curespring application, it requires a scalable architecture and to test it some technologies such as Java, PHP, PostgreSQL, WEB RTC(Real Time Communication), Android applications, JavaScript, Server side Angular JS and so on can be used. It also uses a cluster of HTML5 technologies and third party frameworks. Curespring test Automation framework hopes to build a scalable framework from a single cloud or server based platform and to test it, a variety of test automation tools are used for estimating.

C. Automation Tools

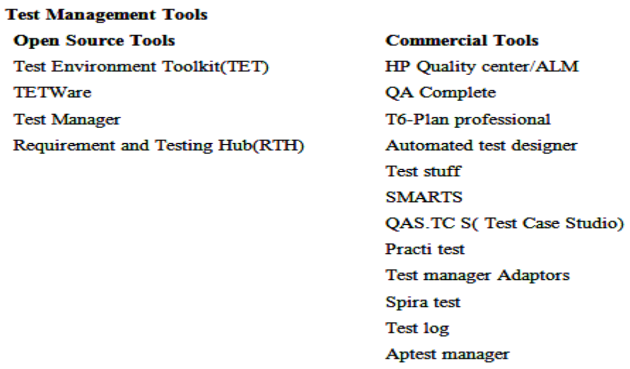
Automation Tool [2] helps in automatic testing, by providing a record/playback feature for all tests that is test suites without learning a test scripting language. The automated tests will be done in such a way that it can be reusable, maintainable, understandable and modular. When writing the test cases, create small scripts rather than combining all scripts as it makes complex for test and also very difficult to understand, update and debug them. Test cases can be many for a task and for each task, test cases are to be written manually and test them automatically. Test Scripts are also known as test cases. The scripts can be reusable; they are small to use and also focus on a single task. For an instance when testing an application for a small task the test scripts be written and will be tested. Suppose, with the same functionalities in that application itself some other task is being developed then test scripts of the similar task can be reused and can be performed. Each and every script of application will be automatically done, to decrease the effort and develop within time. Some of the automation tools are shown in below figures 1, 2, and 3



Functional Testing tools

Open Source Tools	**Commercial / Proprietary Tools**
Selenium	Quick Test Pro
Soapui	RATIONAL Robot
Watir	Sahi
HTTP::Recorder	Soap Test
Watin	Bad boy
Canoo WebTest	Test complete
Webcorder	Quality Assurance(QA) Wizard
Solex	Net vantage Functional Tester
Imprimatur	Pester cat
Swete	Appswatch
ITP	Squish
WET	activate
SAMIE	lisa
Web Inject	Vtest
	Internet Macros
	Ranorex

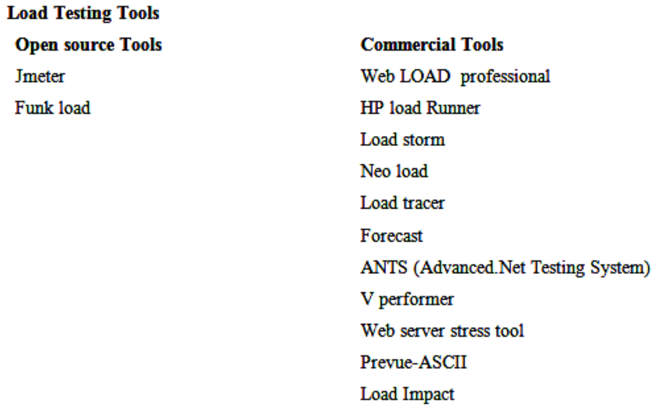
Fig.1 Functional Testing Tools



Test Management Tools

Open Source Tools	**Commercial Tools**
Test Environment Toolkit(TET)	HP Quality center/ALM
TETWare	QA Complete
Test Manager	T6-Plan professional
Requirement and Testing Hub(RTH)	Automated test designer
	Test stuff
	SMARTS
	QAS.TC S(Test Case Studio)
	Practi test
	Test manager Adaptors
	Spira test
	Test log
	Aptest manager

Fig.2 Test Management Tools



Load Testing Tools

Open source Tools	**Commercial Tools**
Jmeter	Web LOAD professional
Funk load	HP load Runner
	Load storm
	Neo load
	Load tracer
	Forecast
	ANTS (Advanced.Net Testing System)
	V performer
	Web server stress tool
	Prevue-ASCII
	Load Impact

Fig.3 Load Testing Tools

II. DESIGN ARCHITECTURE

1. Selenium

Selenium is an open source [3] automation testing tool. We hope to test the software for quality assurance and provide a valuable help to boost the efficiency in software testing processes. Selenium offers a plentiful collection of commands for complete testing of web application. It can run on multiple browsers and also supports for Cross Browser Testing. It allows scripting in different languages like Java, C#, Ruby PHP and Python. Selenium as different types of components as shown in fig.4 the command set is called **Selenese**. These commands basically create a language for testing. In this selenese, one can be able to test the reality of user interface (UI) elements based on HTML tags to test for a particular content, test for damaged links, input domains, selection of record options, presenting forms and table information among another devices. Selenium commands are of three types: **Actions**, **Accessors** and **Assertions**. Actions are generally operated to state application. **Accessors** test the position of the application and also save the outcomes in variables. **Assertions** are similar to Accessors but vary in verifying the state of the application and make conform to whatever are estimates.

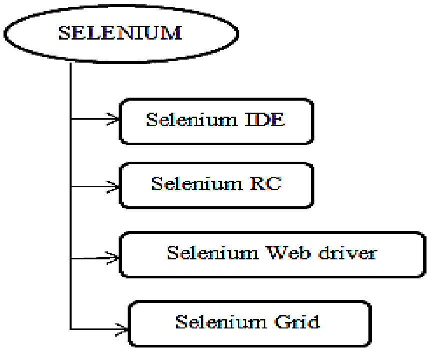


Fig.4 Selenium Components

a. *Selenium IDE and Remote Control (RC)*

IDE means Integrated Development Environment for developing Selenium test cases. It operates on Firefox browser add-on plug-in and provides easy way to use interface for developing and running separate test cases or whole test suites. In Selenium RC, the Selenium Server launch and kill the browsers, interpret and runs with the Selenese commands which are passed from the test program, acts like an HTTP proxy, capture and verifies the HTTP messages that are passed in between the browser and the AUT.

b. *Selenium WebDriver*

Selenium Web Driver accepts commands and sends to browser. It is implemented by a browser specific **driver** that which send commands to a browser and also retrieves the results. Most selenium drivers launch and get into a browser application as shown in fig.5 (such as Firefox or Google chrome or Internet Explorer). Selenium RC needs server to run the tests but for Selenium Web Driver no need of any server separately to run tests. To [4] develop a data driven framework (DDF) for Curespring application, we are using the selenium webdriver.

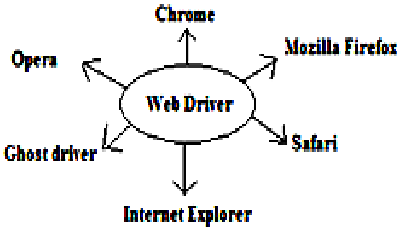


Fig.5 Selenium Web Driver

i. *Selenium WebDriver with TestNG Plug-in*

TestNG means Test **N**ext **G**eneration [5] which is an open source test automation framework. TestNG introduces new functionalities that which make it easier to use. TestNG will cover all types of tests like unit, functional, integration, etc., TestNG plug-in helps the developers in writing the code flexibly to perform tests.

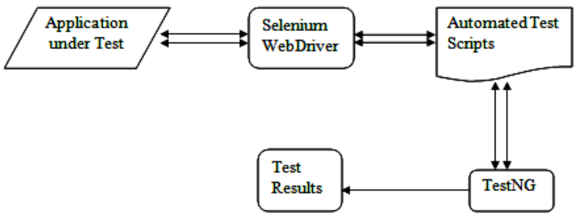


Fig.6 Selenium Data Driven Framework Architecture

From the above fig.6 we can know the design and use data driven automation framework in Selenium WebDriver using Java. Selenium WebDriver make use of TestNG unit testing framework which provides rich set of annotations and also it is able to generate reports. While testing a Curespring application, it is required to test the same functionality with different set of input data. In such situation test data should not be fixed with test script for reusability. Data can be stored in some external files like xml, excel, database and csv. The benefit of this framework is to do the functionality testing with different dataset then we no need to change the code. We use to give just the path of that data which reduces time and effort.

III. METHODS OF SELENIUM WEBDRIVER

Selenium webDriver methods are shown in table.1

Table.1 Selenium WebDriver Methods

S.No	Method Name	Description	Syntax
1	get()	Opens/Exact/given/correct URL(Uniform Resource Locator)	Oject.get("URL");
2	getTitle()	Displays/returns title of the browser	Object.getTitle("Welcome");
3	getPageSource()	It returns the HTML source code	Object.getPageSource("xxx");
4	getCurrentURL()	It returns current / present URL of the browser	Object.getCurrentURL("www.google.com");
5	navigate().to()	Loads a new webpage in the current URL of browser	Object.navigate().to("URL");
6	navigate().back()	Loads a previous webpage or single page back in the browser	Object.navigate().back("URL");
7	navigate().forward()	Moves a single page forward in the browser	Object.navigate().forward("Google");
8	navigate().refresh()	Refresh the current webpage	Object.navigate().refresh();
9	Close()	It closes the current browser or first opened browser or focused browser	Object.close();
10	quit()	It quits from the browser by closing all pages in web driver	Object. Quit();
11	find element()	Finds the first element in the browser of current page using the given locator	driverObject.findElement(By.locator("value")).method();
12	sendkeys()	Enters a value into edit box	driverObject.sendkeys(By.locator("value")).sendkeys("value");
13	clear()	It clears the value from the edit box	driverObject.findElement(By.locator("value")).clear();
14	click()	Clicks an element	driverObject.findElement(By.locator("value")).click();
15	isEnabled()	Checks whether the element is in enable state or not	Boolean variableName= driverObject.findElement(By.locator("value").isEnabled();
16	isDisplayed	Checks whether the element is displayed or not	Boolean variableName = driverObject.findElement(By.locator("value").isDisplayed();
17	browserMaximize() also called as manage().window(). maximize()	It makes the browser maximize	driver.manage().window().maximize();

IV. IMPLEMENTATION AND RESULTS

a) *Requirements*

To test an application automatically, you need Intel i3 processor, 4GB RAM with OS Windows 7, java platform, Eclipse Juno and Selenium tool.

The following are the steps to implement DDF for Curespring application as shown in fig.7

Step 1 Create test data with which we would be executing the test scripts for Curespring web application by Selenium IDE

Step 2 Create java programming for data object

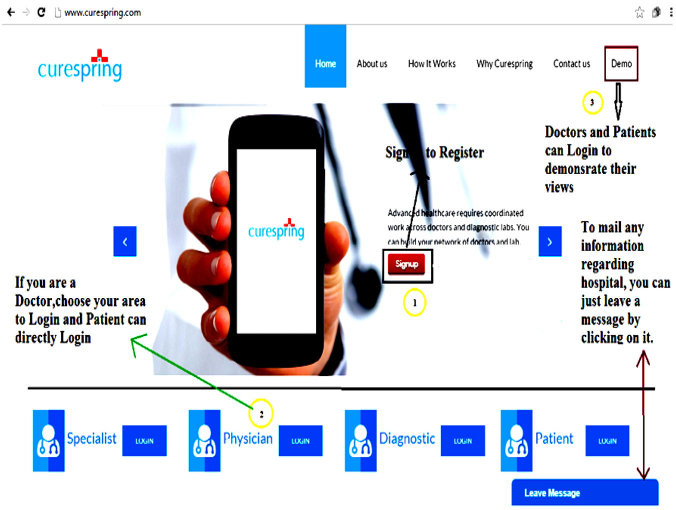
Step 3 Setup() method is used to load the tests of objects in java

Step 4 Identify the positive (success) and negative (failure) test cases in data object

Step 5 Teardown() method is used to free the allocated objects

Step 6 Group all test cases and execute them in eclipse using selenium web driver

Step 7 Test result or Test report is generated for performed tests



Advanced healthcare requires coordinated work across doctors and diagnostic labs. You can build your network of doctors and lab.

Sign up to Register

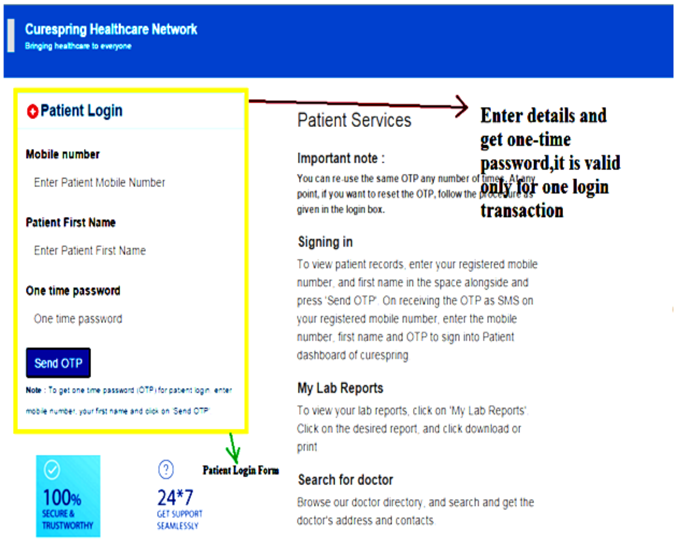
Doctors and Patients can Login to demonsrate their views

To mail any information regarding hospital, you can just leave a message by clicking on it.

If you are a Doctor,choose your area to Login and Patient can directly Login

Fig. 7 Homepage of Curespring

After the development, to test this application we should firstly register it can either patient or Doctor. To register for patients, its form is shown in fig.8 and for Doctor in Fig.9


Curespring Healthcare Network
Bringing healthcare to everyone
Patient Login
Mobile number
Enter Patient Mobile Number
Patient First Name
Enter Patient First Name
One time password
One time password
Send OTP
100% SECURE & TRUSTWORTHY
24*7 GET SUPPORT SEAMLESSLY

Note : To get one time password (OTP) for patient login, enter mobile number, your first name and click on 'Send OTP'

Patient Services

Important note :

You can re-use the same OTP any number of times. At any point, if you want to reset the OTP, follow the procedure as given in the login box.

Signing in

To view patient records, enter your registered mobile number, and first name in the space alongside and press 'Send OTP'. On receiving the OTP as SMS on your registered mobile number, enter the mobile number, first name and OTP to sign into Patient dashboard of curespring

My Lab Reports

To view your lab reports, click on 'My Lab Reports'. Click on the desired report, and click download or print

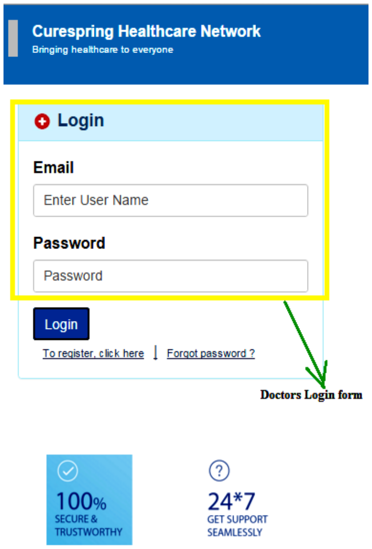
Search for doctor

Browse our doctor directory, and search and get the doctor's address and contacts

Enter details and get one-time password,it is valid only for one login transaction

Patient Login Form

Fig. 8 Login Form of Patient

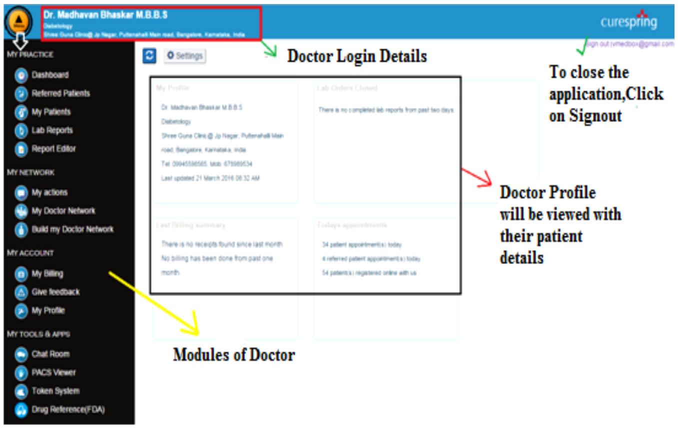

Curespring Healthcare Network
Bringing healthcare to everyone
Login
Email
Enter User Name
Password
Password
Login
To register, click here
Forgot password ?
100% SECURE & TRUSTWORTHY
24*7 GET SUPPORT SEAMLESSLY

Doctors Login form

Fig.9 Login Form of Doctor

For any web application, opening and closing of application is login and logout which are mandatory for secure. Now, let us test the doctor form and perform the test scripts to generate the test results. In the fig.10 we can see the doctor login form. The actions will be common for all doctors. Only the specialist, physician can open the doctor form with their name and password. Patient can just login and select the doctor for treatment after registration. Doctor can perform many actions as seen in fig. We can see the modules of doctor at left side of the doctor's profile. Doctors payment, referred patients, network with other doctors everything can be known.

Moreover, Patients will be treated based on the token number wise. Patients will choose their doctors based on their problems. Rural people can be treated nearby laborites. In Curespring health care all laborites, physicians, specialists come together and treat the patients in online, if the doctor has no idea of the patient problem. By doctor network module, they will connect with some other doctor and take suggestions of problem and cure them. Interaction among the doctors will be taken by the Skype call. In this way, this online healthcare service helps in curing the patients and save their life.



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Last updated 21 March 2016 08:32 AM

There is no completed lab reports from past two days

There is no receipts found since last month
No billing has been done from past one month

34 patient appointment(s) today
4 referred patient appointment(s) today
54 patient(s) registered online with us

Doctor Login Details

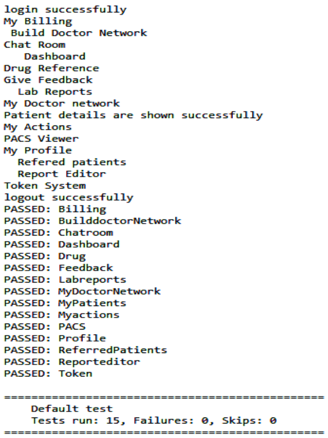
To close the application,Click on Signout

Doctor Profile will be viewed with their patient details

Modules of Doctor

Fig.10 Doctors Profile

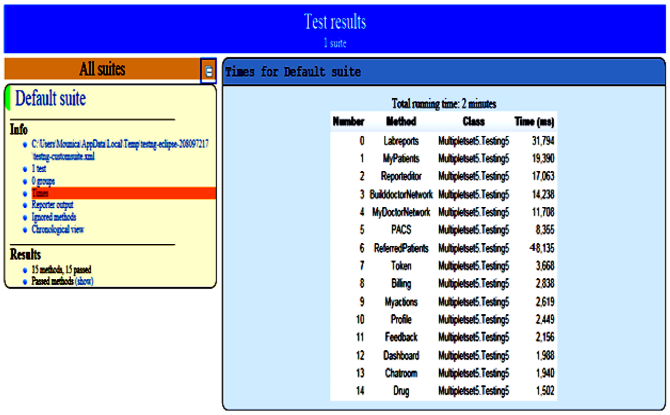
Performing all the modules in Eclipse to obtain the results by giving Selenium webDriver with TestNG plug-in



```
login successfully
My Billing
 Build Doctor Network
Chat Room
   Dashboard
Drug Reference
Give Feedback
  Lab Reports
My Doctor network
Patient details are shown successfully
My Actions
PACS Viewer
My Profile
  Refered patients
  Report Editor
Token System
logout successfully
PASSED: Billing
PASSED: BuilddoctorNetwork
PASSED: Chatroom
PASSED: Dashboard
PASSED: Drug
PASSED: Feedback
PASSED: Labreports
PASSED: MyDoctorNetwork
PASSED: MyPatients
PASSED: Myactions
PASSED: PACS
PASSED: Profile
PASSED: ReferredPatients
PASSED: Reporteditor
PASSED: Token

===============================================
    Default test
    Tests run: 15, Failures: 0, Skips: 0
===============================================
```

Fig.11 Output of TestNG Plug-in



Total running time: 2 minutes

Number	Method	Class	Time (ms)
0	Labreports	Multipletset5.Testing5	31,794
1	MyPatients	Multipletset5.Testing5	19,390
2	Reporteditor	Multipletset5.Testing5	17,063
3	BuilddoctorNetwork	Multipletset5.Testing5	14,238
4	MyDoctorNetwork	Multipletset5.Testing5	11,708
5	PACS	Multipletset5.Testing5	8,355
6	ReferredPatients	Multipletset5.Testing5	48,135
7	Token	Multipletset5.Testing5	3,668
8	Billing	Multipletset5.Testing5	2,838
9	Myactions	Multipletset5.Testing5	2,619
10	Profile	Multipletset5.Testing5	2,449
11	Feedback	Multipletset5.Testing5	2,156
12	Dashboard	Multipletset5.Testing5	1,988
13	Chatroom	Multipletset5.Testing5	1,940
14	Drug	Multipletset5.Testing5	1,502

Fig.12 Test result of TestNG for Curespring Application

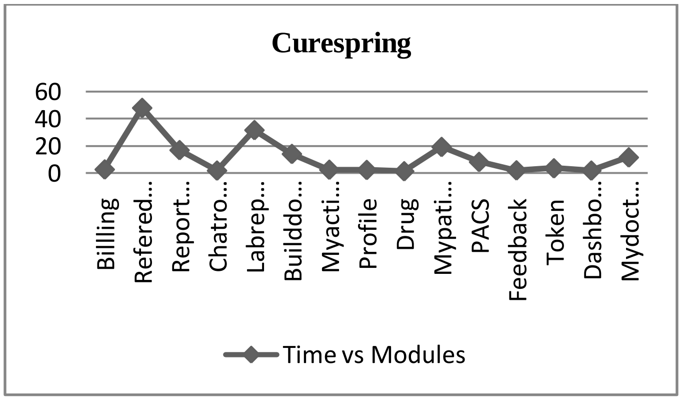


Fig.13 Graph representation of Test result

From the abovefig.11 we can see the output in java application after the execution of code in eclipse, fig.12 shows the TestNG result of curespring which are passed and failed, fig.13 graphical representation of TestNG values with x-axis Modules and Y-axis Time. The testing of modules can be tested individually and obtain test results for it.

V. CONCLUSION

A data driven framework has built by writing test scripts to perform automation testing using "Selenium Web driver" for Curespring web application. It is built for rectify the bugs and to improve the performance of Curespring application. Moreover, it provides the reusability and reduces the number of scripts with optimized code. Framework mainly offers greater flexibility for maintaining and fixing the script issues. After the execution of test scripts, test results are obtained that provide execution duration, test start time and end time which have failed or passed during testing. In this way, test scripts can be easily tested using data driven framework.

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