

Automation Testing



Agenda

Part1 - Presentation

- QA Engineer
 - Y2K Problem
 - QA Engineer
- Automation Testing
- Performance Test
- Security Testing
- Robot Framework
- Cucumber
- AI in Software Testing

Part2 - Workshop

- Cypress - Workshop

Why is Testing Necessary?



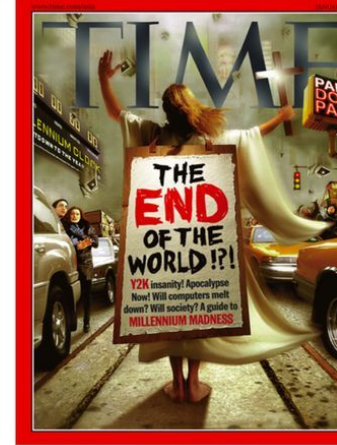
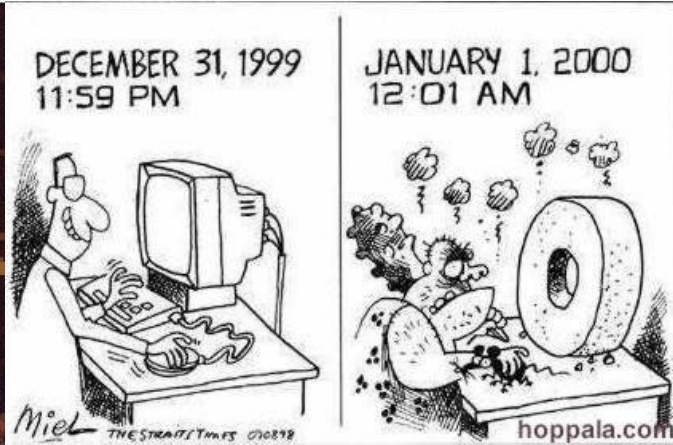
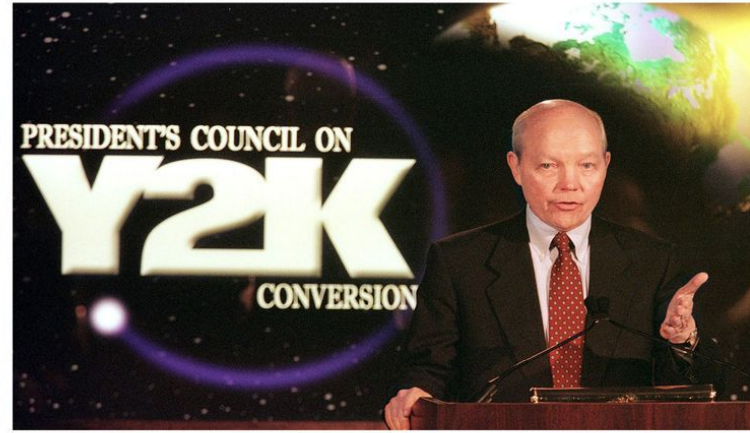
Y2K Problem



23:59:59
Dec 31 1999 Fri
ST3160815A

A digital clock display on a blue background. The time shown is 23:59:59, with the final '59' highlighted in a red box. Below the time, the date 'Dec 31 1999' and the day of the week 'Fri' are displayed. At the bottom, a hexadecimal-like string 'ST3160815A' is shown.

Y2K Problem



Y2K Problem

The Rise and Fall

The Nasdaq Composite Index, daily close



QA Engineer

QA Automation microsoft in United States

378 results

Set alert



Senior Quality Engineer ✓



Microsoft

Redmond, WA (Hybrid)

\$112K/yr - \$238.6K/yr



62 school alumni work here

1 week ago



Process Engineering and Value Delivery – Transformation Process Lead ✓



Microsoft

Redmond, WA (Hybrid)



62 school alumni work here

18 hours ago



Software Engineer ✓



Microsoft

Redmond, WA (Hybrid)

Senior Quality Engineer

Microsoft · Redmond, WA (Hybrid)

Apply

Save



Responsibilities

- Establish and drive supplier quality management to ensure the highest level of manufacturing Hardware Quality
- Drive hardware quality and quality systems with suppliers to enable steady hardware performance that meet business KPIs and metrics.
- Influence engineering teams and OEM Manufacturing teams through a collaborative working style while maintaining the position of the customer.
- Work closely with external development partners, internal Microsoft V-teams made up of both hardware and software development teams, and with upstream component vendors to drive, monitor and improve the hardware quality of Microsoft products going into data centers globally.
- Participate in the Hardware development activities representing the quality organization and work with established teams and V-teams to drive identified issues or challenges to resolution.
- Be a hardware quality expert who leads failure analysis and root cause identification of hardware issues and supplier quality gaps. Responsible for conducting and overseeing the RCA investigations.
- Represent the quality team in supplier performance evaluation.

QA Engineer Skills

Automation
Testing

Business
Analysis

Integration
Testing

API
Testing

Database
Analysis

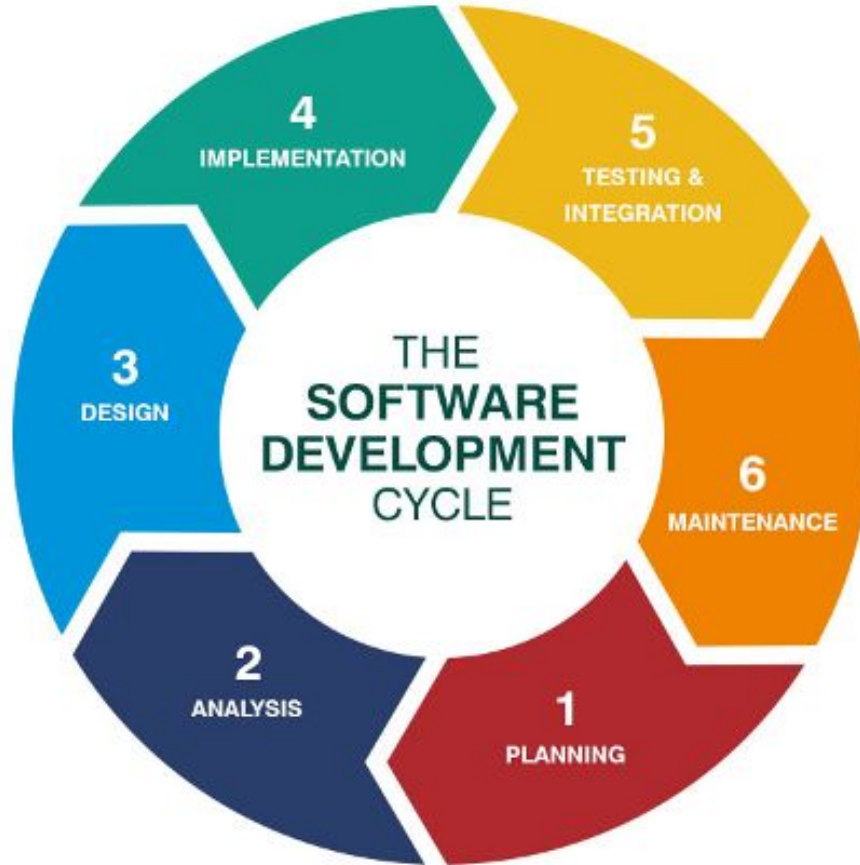
Manual
Testing

Performance
Testing

Security
Testing

Front-end
Testing

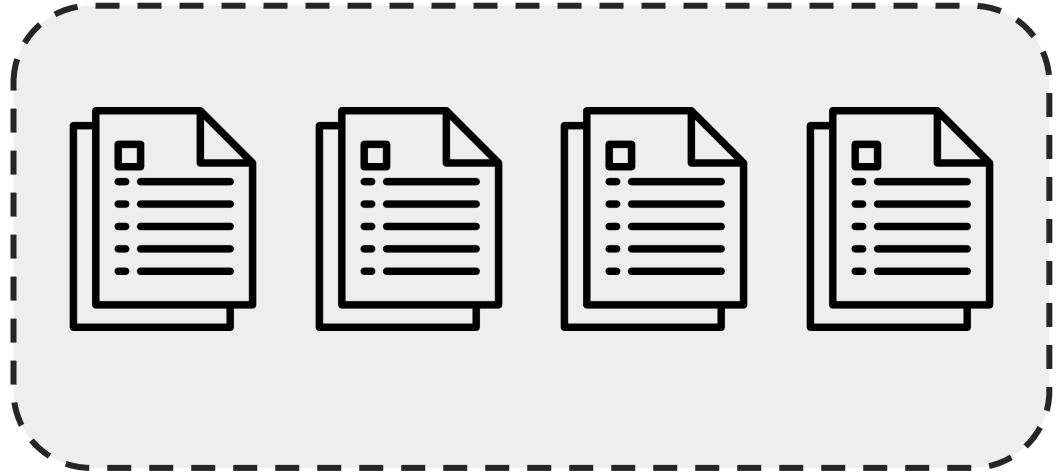
Where is Test Automation in SDLC?



Automation Testing



Purpose of Test Automation

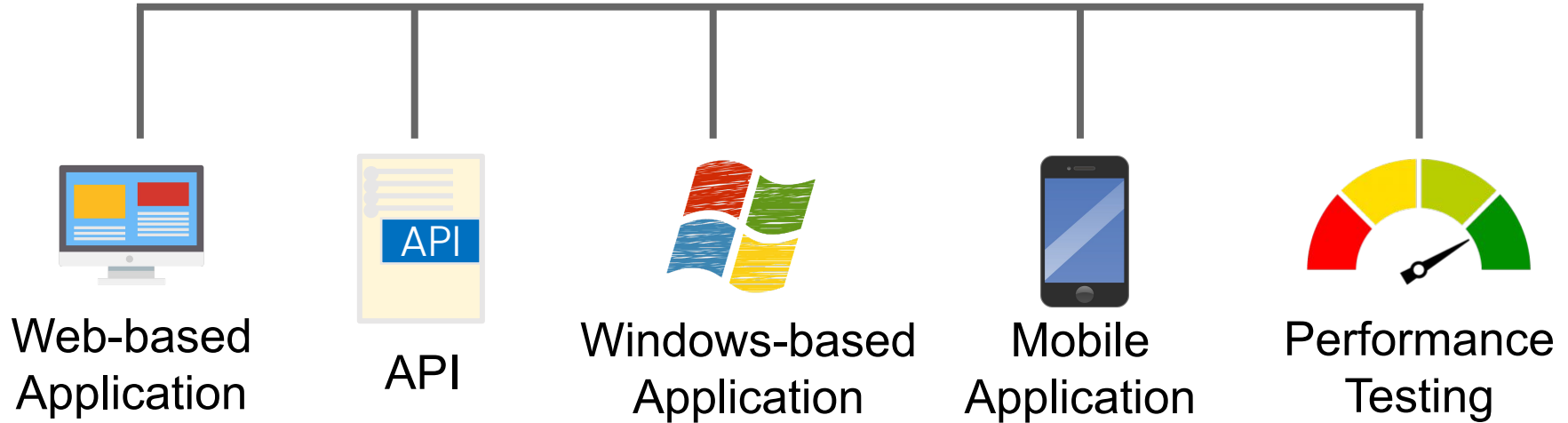


- Help run many test cases consistently and repeatedly on different versions of the SUT and/or
- Running a test suite without human interaction.environments


































































Why Test Automation?

- Increasing the test frequency/reducing the time required for test cycles
- Providing wider function coverage
- Reducing the total test cost
- Performing tests that manual testers cannot
- Shortening the test execution period

Test Adaptation Layer



Test Automation Tools

Web	Mobile	Desktop	API (Service)	Performance	Codeless
 Selenium	 Appium	 WinApp Driver	 Postman	 JMeter	 Katalon
 Cypress	 Detox	 Winium	 Rest Assured	 k6.io	 Test Project.io
 Playwright	 Katalon	 Ranorex	 SoapUI	 Gatling	 automation HQ
 WebdriverIO	 Espresso	 TestComplete	 ReadyAPI	 Locust	 contextQA
 Robot Framework	 Nightwatch	 IBM RFT	 Karate	 Blaze Meter	 Ghost Inspector
 TestCafe	 Calabash	 HP UFT (QTP)	 Apigee	 LoadRunner	 Testim.io
 Puppeteer	 XCUITest (iOS)	 AutoIT	 Tricentis Tosca	 WebLoad	 TestResults.io
 Katalon	 Selendroid	 SikuliX	 Insomnia REST	 NeoLoad	 Tricentis Tosca
 Nightwatch	 EarlGrey (iOS)	 Squish	 Katalon	 Taurus	 TestRigor
 Tricentis Tosca	 Micro Focus SilkTest	 Eggplant Functional	 Cypress	 artillery.io	 Telerik Test Studio
		 Tricentis Tosca			 Worksoft Certify
					 Avo Assure
					 Subject7
					 TestYantra



ROBOT
FRAME
WORK/



SoapUI



TestComplete



cucumber



Telerik
Test Studio

Test Automation Framework

A test automation framework (TAF) that is easy to use, well documented and maintainable, supports a consistent approach to automating tests.

- **Keyword-driven testing**
- **Data-driven testing**
- **Hybrid testing**
- **Model-based testing**
- **Behavior driven development**

Keyword-Driven Testing

Keyword Driven Testing is a scripting technique that uses data files to contain the keywords related to the application being tested. These keywords describe the set of actions that is required to perform a specific step.

Keywords	Object Identifier	Parameter
Input Text	id="firstname"	john
Input Text	Id="lastname"	canon
Click Button	Id="submit"	

First Name

Last Name

Submit

How to Set Up Automation Testing?

- **Defining automation scope**
- **Test tool selection**
- **Planning, design, and development**
- **Test execution**
- **Test suite maintenance**

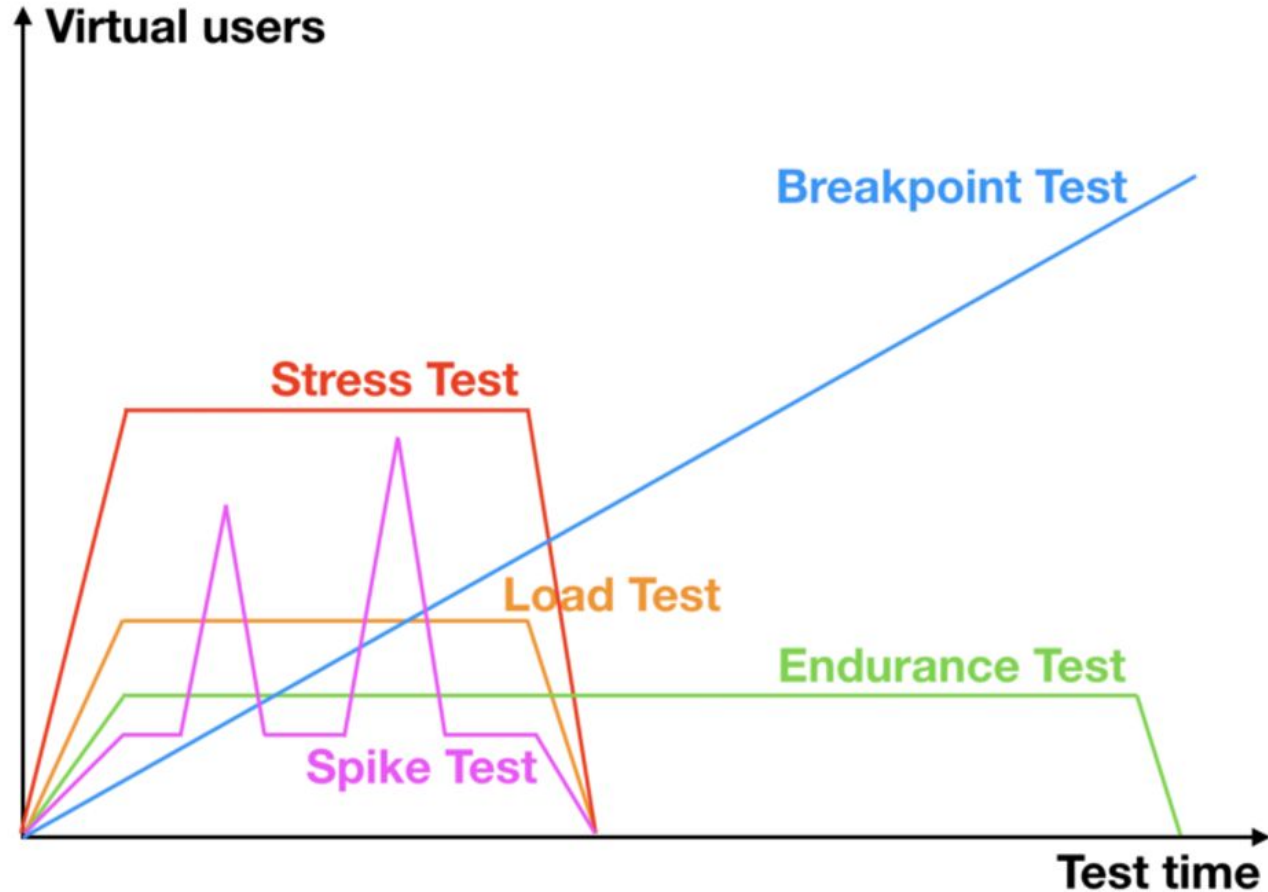
Performance Test



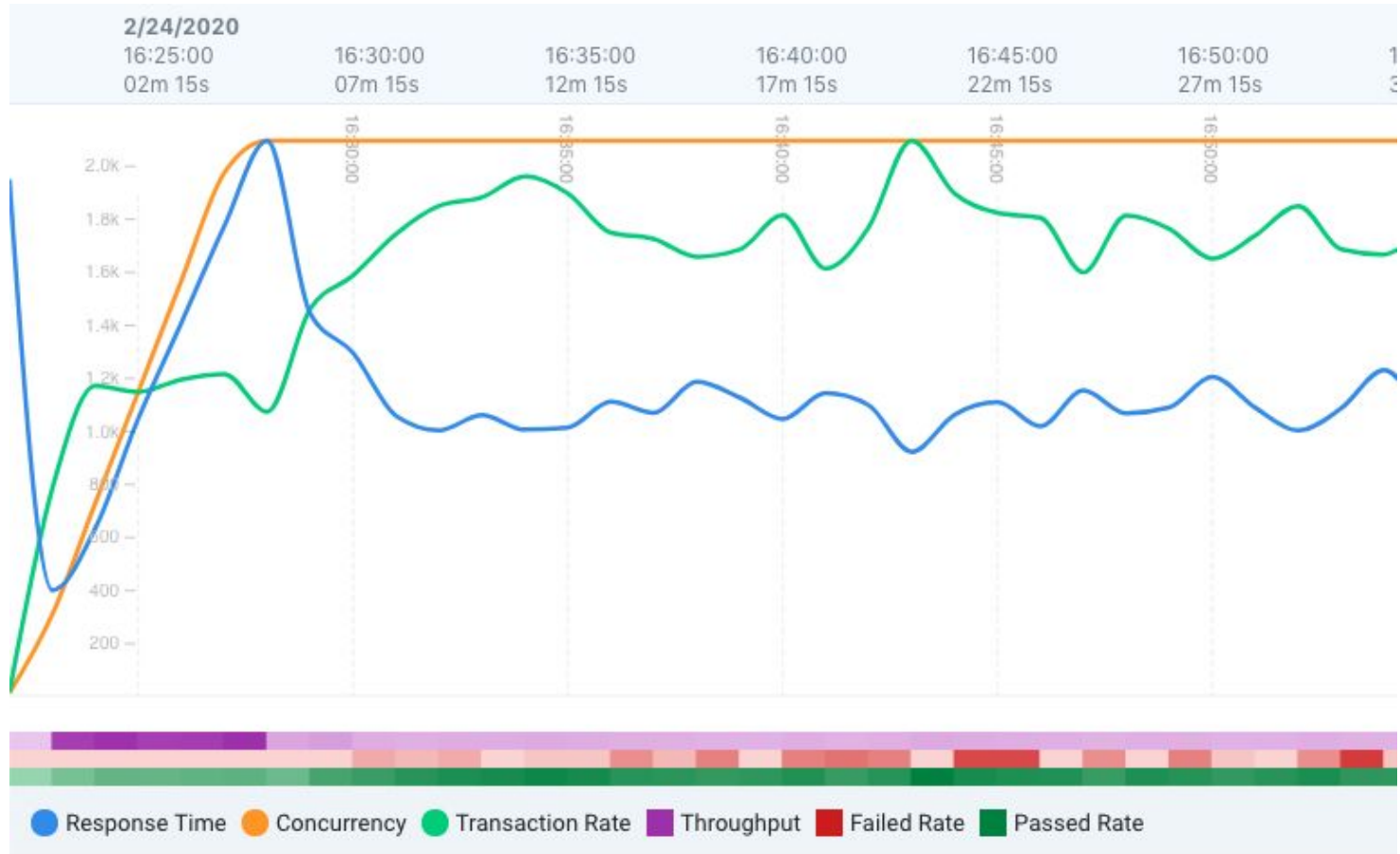
What is Performance Testing?

- **Performance Testing is a software testing process used for testing the speed, response time, stability, reliability, scalability, and resource usage of a software application under a particular workload**
- **The main purpose of performance testing is to identify and eliminate the performance bottlenecks in the software application. It is a subset of performance engineering and is also known as “Perf Testing”**

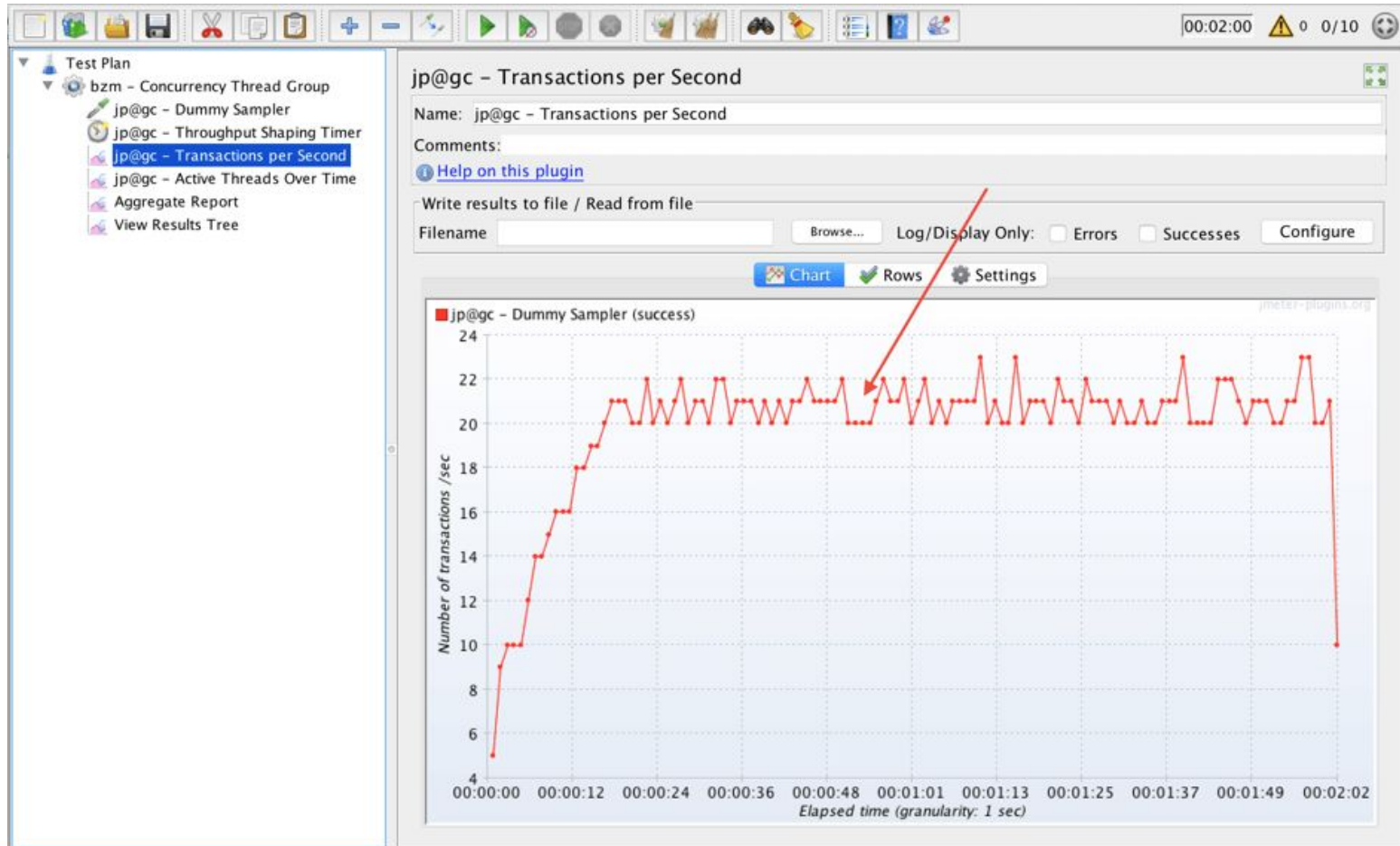
Types of Performance Tests



Performance Test Results



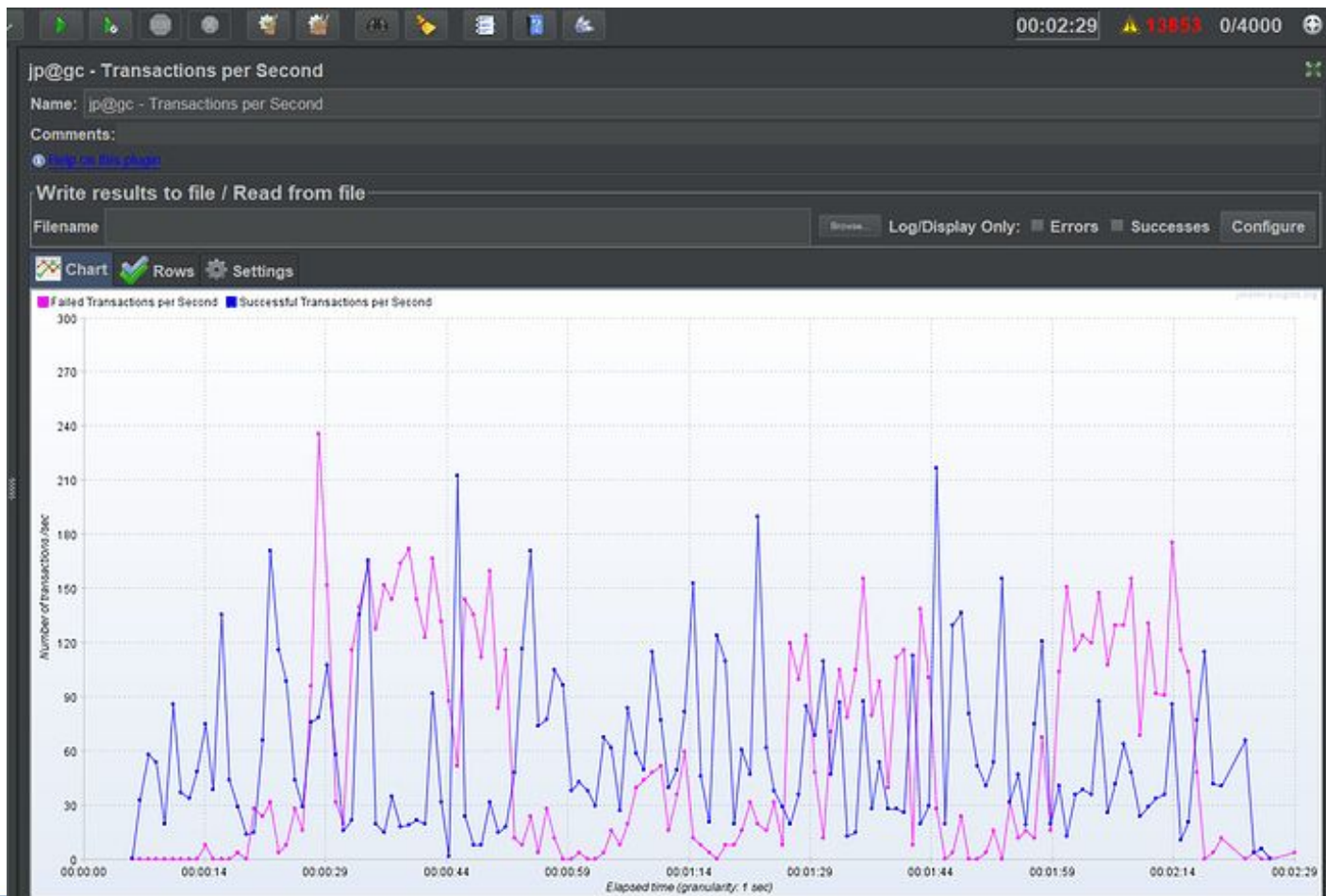
Throughput



Failed rate 1.3%



Failed rate 65%



CloudWatch Container Insights dashboard

CloudWatch > Container Insights

Container Insights

Performance monitoring

1h 3h 12h 1d 3d 1w Custom (15m)

Add to dashboard



View in maps

EKS Namespaces

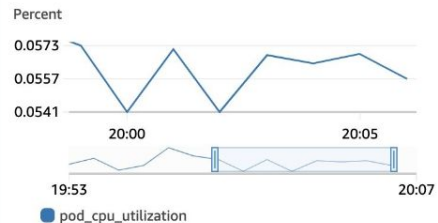
awsblog-loadtest-locust

Filters: Filter reports

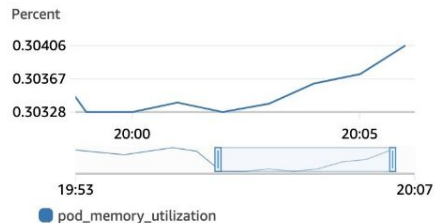
(1 selected)

Clear

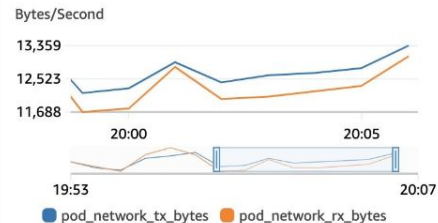
CPU Utilization



Memory Utilization



Network

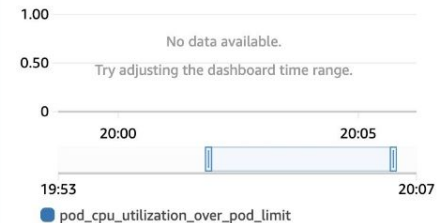


Alerts

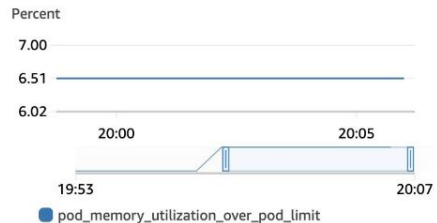
No alerts

No alerts to display

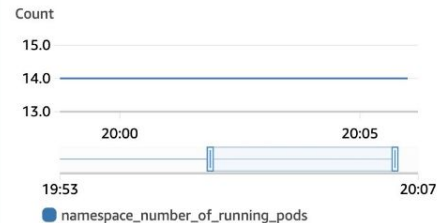
CPU Utilization (Over Limit)



Memory Utilization (Over Limit)



Number of Pods



Security Testing



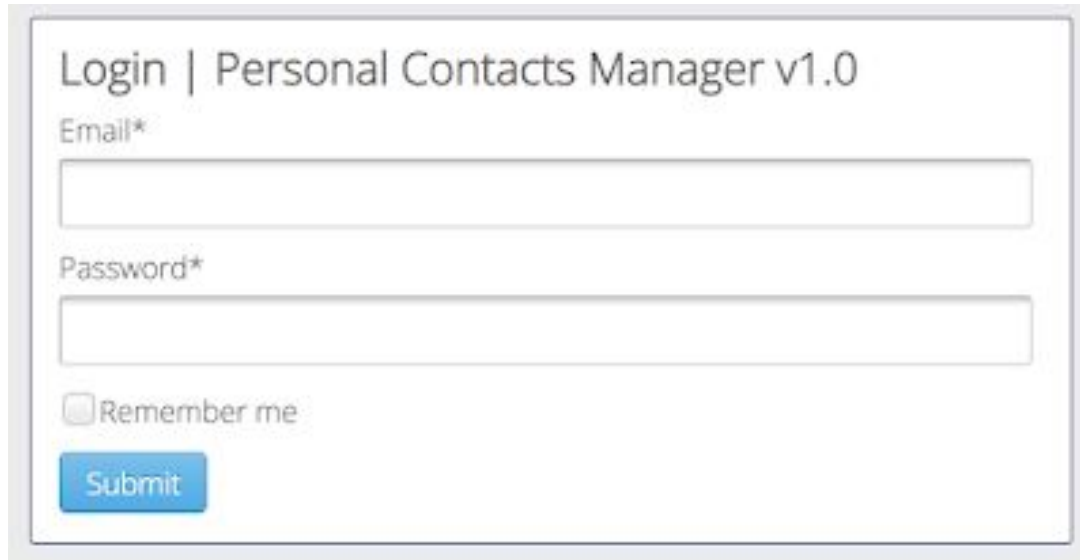
Security Testing

- **Vulnerability Scanning**
- **Security Scanning**
- **Penetration Testing**
- **Risk Assessment**
- **Security Auditing**
- **Ethical Hacking**
- **Posture Assessment**

Penetration Testing



Burp Suite For Brute Force Attack



The image shows a web form for logging into a system called 'Personal Contacts Manager v1.0'. The form has a title 'Login | Personal Contacts Manager v1.0' at the top. Below the title, there are two input fields: 'Email*' and 'Password*'. The 'Email*' field is a standard text input box. The 'Password*' field is a text input box with a small eye icon on the right side, indicating it can be toggled between visible and hidden. Below the password field, there is a checkbox labeled 'Remember me'. At the bottom of the form, there is a blue button labeled 'Submit'.

<https://www.techpanda.org/index.php>

Scan web applications

Burp Suite Community Edition v2021.8.4 - Temporary Project

Dashboard Target **Proxy** Intruder Repeater Sequencer Decoder Comparer Logger Extender Project options User options Learn

Intercept HTTP history WebSockets history Options

Request to http://www.techpanda.org:80 [72.52.251.71]

Forward Drop **Intercept is on** Action Open Browser

Comment this item HTTP/1 ?

Pretty **Raw** Hex \n

```
1 POST /index.php HTTP/1.1
2 Host: www.techpanda.org
3 Content-Length: 35
4 Cache-Control: max-age=0
5 Upgrade-Insecure-Requests: 1
6 Origin: http://www.techpanda.org
7 Content-Type: application/x-www-form-urlencoded
8 User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.61 Safari/537.36
9 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
10 Referer: http://www.techpanda.org/index.php
11 Accept-Encoding: gzip, deflate
12 Accept-Language: en-US,en;q=0.9
13 Cookie: PHPSESSID=f6st2m0o9bcu63doi0vikecmt3
14 Connection: close
15
16 email=test%40mail.com&password=test|
```

? ⚙️ ⬅️ ➡️ Search... 0 matches

INSPECTOR

Create Payload

DashboardTargetProxyIntruderRepeaterSequencerDecoderComparerLoggerExtenderProject optionsUser optionsLearn

1 x2 x3 x...

TargetPositionsPayloadsResource PoolOptions

?

Payload Sets

Start attack

You can define one or more payload sets. The number of payload sets depends on the attack type defined in the Positions tab. Various payload types are available for each payload set, and each payload type can be customized in different ways.

Payload set: 1

Payload count: 12

Payload type: Simple list

Request count: 0

?

Payload Options [Simple list]

This payload type lets you configure a simple list of strings that are used as payloads.

Paste

admin

Load ...

abc

Remove

user

Clear

system

wampp

pass

manager

apc

root

security

Add

Add from list ... [Pro version only]

?

Payload Processing

You can define rules to perform various processing tasks on each payload before it is used.

Add

Enabled

Rule

Edit

Remove

Up

Down

Create Payload(Uusername)

DashboardTargetProxyIntruderRepeaterSequencerDecoderComparerLoggerExtenderProject optionsUser optionsLearn

1 x2 x3 x...

TargetPositionsPayloadsResource PoolOptions

?

Payload Sets

Start attack

You can define one or more payload sets. The number of payload sets depends on the attack type defined in the Positions tab. Various payload types are available for each payload set, and each payload type can be customized in different ways.

Payload set:1

Payload count: 12

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Request count: 0

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Payload Options [Simple list]

This payload type lets you configure a simple list of strings that are used as payloads.

Paste

Load ...

Remove

Clear

admin

abc

user

system

wampp

pass

manager

apc

root

security

Add

Add from list ... [Pro version only]

?

Payload Processing

You can define rules to perform various processing tasks on each payload before it is used.

Add

Edit

Remove

Up

Down

Enabled

Rule

Create Payload(Password)

1 x2 x3 x...

TargetPositionsPayloadsResource PoolOptions

DashboardTargetProxyIntruderRepeaterSequencerDecoderComparerLoggerExtenderProject optionsUser optionsLearn

Burp Suite Community Edition v2021.8.4 - Temporary Project

?

Payload Sets

Start attack

You can define one or more payload sets. The number of payload sets depends on the attack type defined in the Positions tab. Various payload types are available for each payload set, and each payload type can be customized in different ways.

Payload set:2

Payload count:11

Payload type:Simple list

Request count:132

?

Payload Options [Simple list]

This payload type lets you configure a simple list of strings that are used as payloads.

Paste

Load ...

Remove

Clear

1234

admin

root

Welcome

Welcome1!

W@lc0me

password

mypassword

123456

123456789

Add

Add from list ... [Pro version only]

?

Payload Processing

You can define rules to perform various processing tasks on each payload before it is used.

Add

Edit

Remove

Up

Down

Enabled

Rule

Execution

2. Intruder attack of www.techpanda.org - Temporary attack - Not saved to project file

ResultsTargetPositionsPayloadsResource PoolOptions

Filter: Showing all items

Request	Payload 1	Payload 2	Status ▾	Error	Timeout	Length	Comment
131	admin@google.com	Password2010	302	<input type="checkbox"/>	<input type="checkbox"/>	2069	
132	Password2010	Password2010	302	<input type="checkbox"/>	<input type="checkbox"/>	2185	
0			200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
1	admin	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
2	abc	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
3	user	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
4	system	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
5	wampp	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
6	pass	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
7	manager	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
8	apc	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
9	root	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
10	security	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
11	admin@google.com	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
12	Password2010	1234	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	
13	admin	admin	200	<input type="checkbox"/>	<input type="checkbox"/>	2145	

RequestResponse

...

PrettyRawHex\n☰

1 POST /index.php HTTP/1.1

ⓘ⚙️⬅️➡️

Search...








0 matches

Finished

Robot Framework




Robot Framework

   robotframework.org    

ROBOT
FRAME
WORK/

INTRODUCTION | GETTING STARTED | COMMUNITY | RESOURCES | LINKS

 New website has been released! If you have feedback, feel free to post it in [GitHub](#).

INTRODUCTION

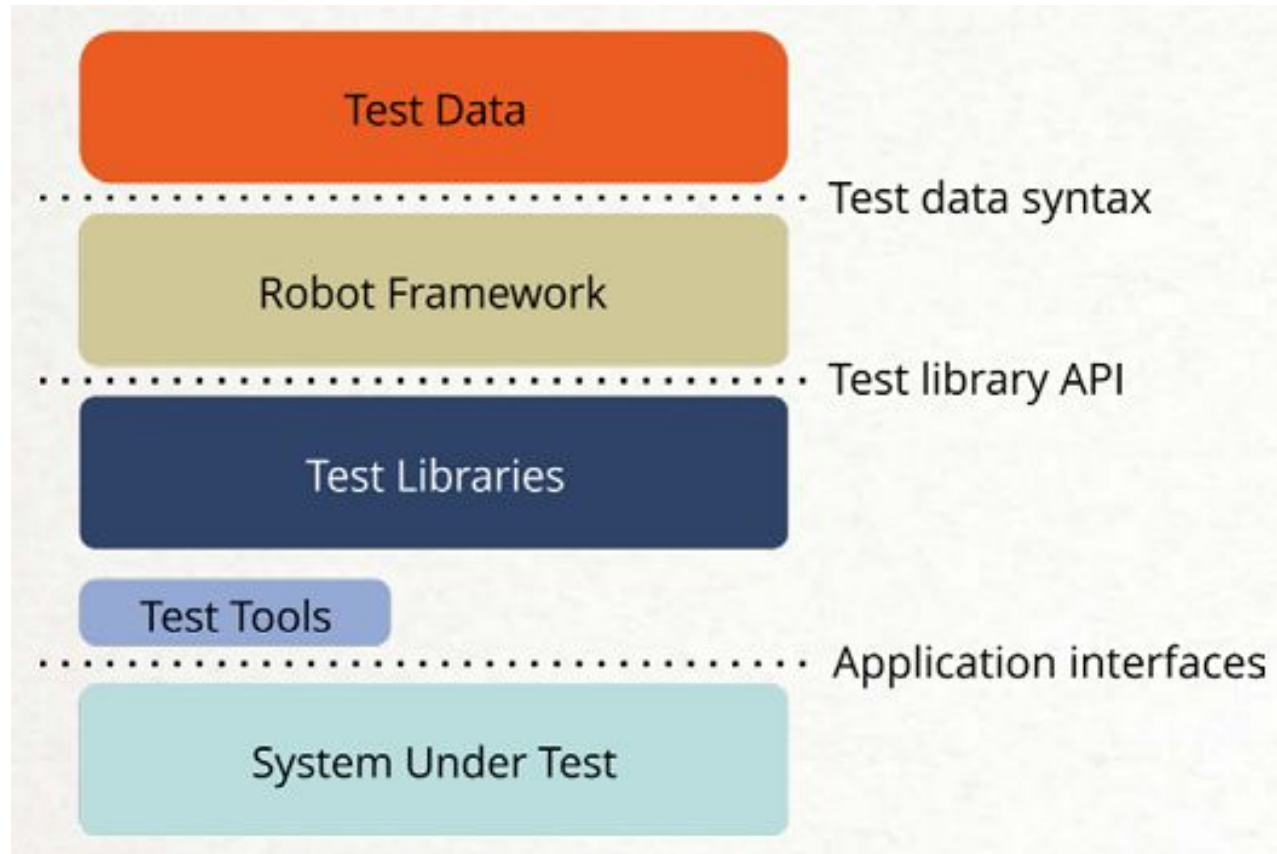
Robot Framework is a generic open source automation framework. It can be used for test automation and robotic process automation (RPA).

Robot Framework is actively supported, with many industry-leading companies using it in their software development.

Robot Framework is open and extensible. Robot Framework can be integrated with virtually any other tool to create powerful and flexible automation solutions. Robot Framework is free to use without licensing costs.

Robot Framework has easy syntax, utilizing human-readable keywords. Its capabilities can be extended by libraries implemented with Python, Java or many other programming languages. Robot Framework has a rich ecosystem around it, consisting of libraries and tools that are developed as separate projects.

Architecture of Robot Framework



Libraries

LIBRARIES

BUILT-IN

TOOLS

Separately developed external libraries that can be installed based on your needs. Creating your own libraries is a breeze. For instructions, see [creating test libraries](#) in Robot Framework User Guide.

Filter by tag

Name	Description	Stars ▾	Tags
SeleniumLibrary	Web testing library that uses popular Selenium tool internally.	1074	WEB, SELENIUM
HTTP RequestsLibrary (Python)	HTTP level testing using Python Requests internally.	365	HTTP
AppiumLibrary	Android and iOS testing. Uses Appium internally.	272	MOBILE
Browser Library	A modern web testing library powered by Playwright . Aiming for speed, reliability and visibility.	173	WEB
RESTinstance	Test library for HTTP JSON APIs.	164	HTTP
SikuliLibrary	Provides keywords to test UI through Sikulix . This library supports Python 2.x and 3.x.	114	UI
Database Library (Python)	Python based library for database testing. Works with any Python interpreter, including Jython.	113	DB

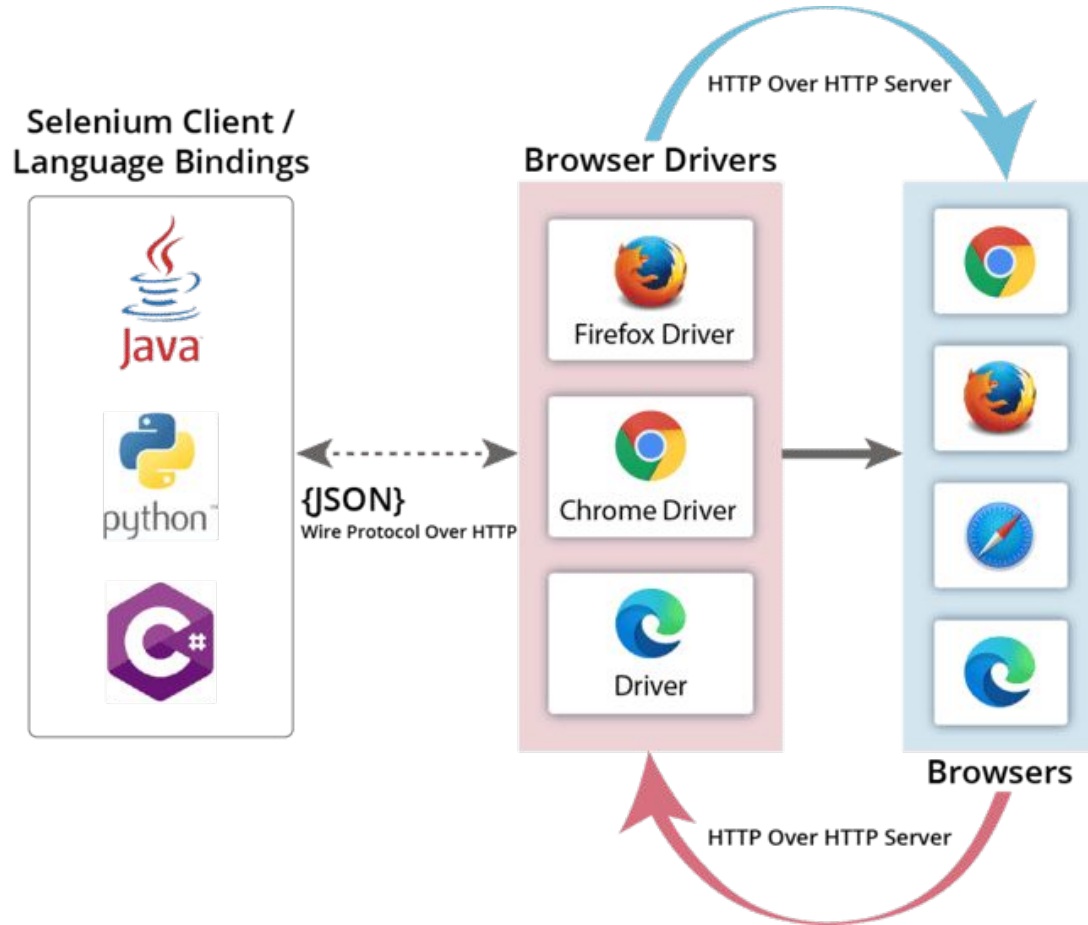
Add-ons languages

- Python
- Java
- .NET
- Perl
- JavaScript

Python External Libraries

- **HTTP requests library**
- **Database Library (Python)**
- **Django Library**
- **Python confluent kafka**
- **Robotic Process Automation (RPA)**
- **Custom module in Python**

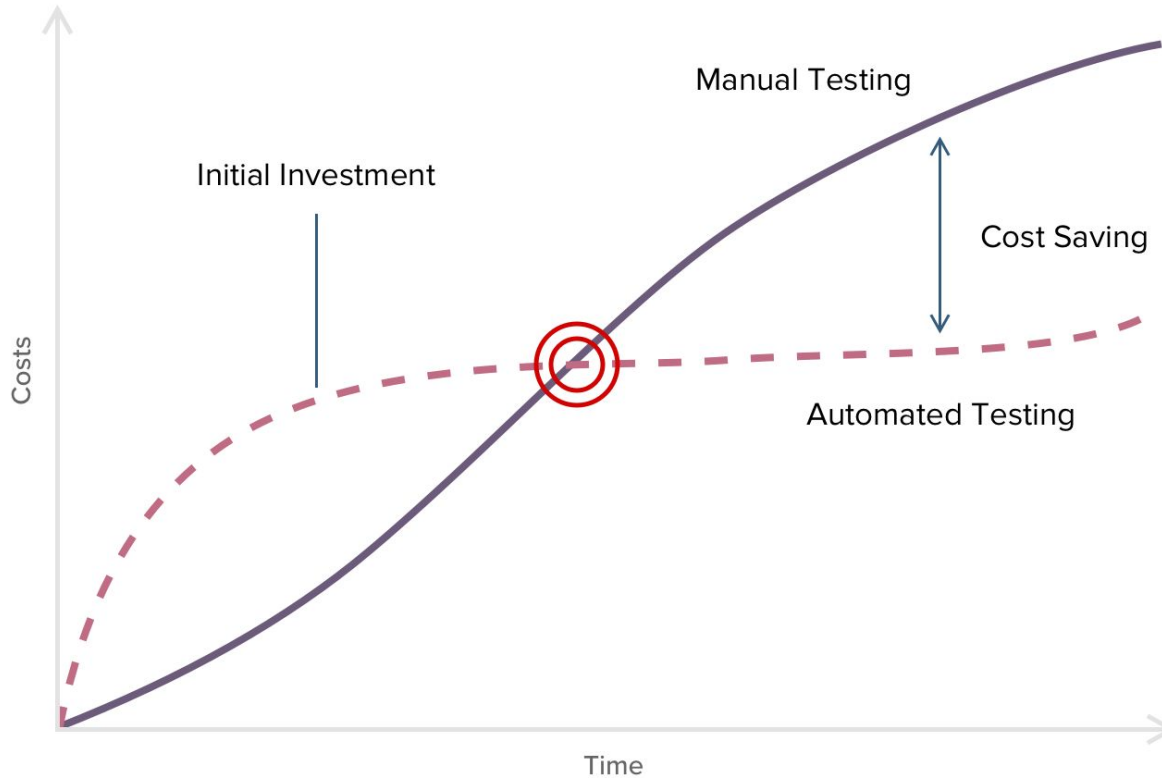
Selenium WebDriver Architecture



Advantages of Test Automation

- **Tests run faster**
- **More effective and efficient use of testing resources**
- **Quicker feedback regarding software quality**
- **Tests are less subject to operation error**
- **Improved system reliability (e.g., repeatability, consistency)**

Test Automation ROI



Test Cases Shouldn't Automated

- Tests that will be executed only one time
- Anti-automation features, like CAPTCHA
- Tests based on visual perception, like beautiful html template
- Unstable functionality

Disadvantages of test automation

- **Additional costs are involved**
- **Test Automation requires lot of efforts at initial stage**
- **100% Test automation is imposible**
- **Programming Knowledge is required**
- **Additional errors may be introduced by automation**

Cucumber

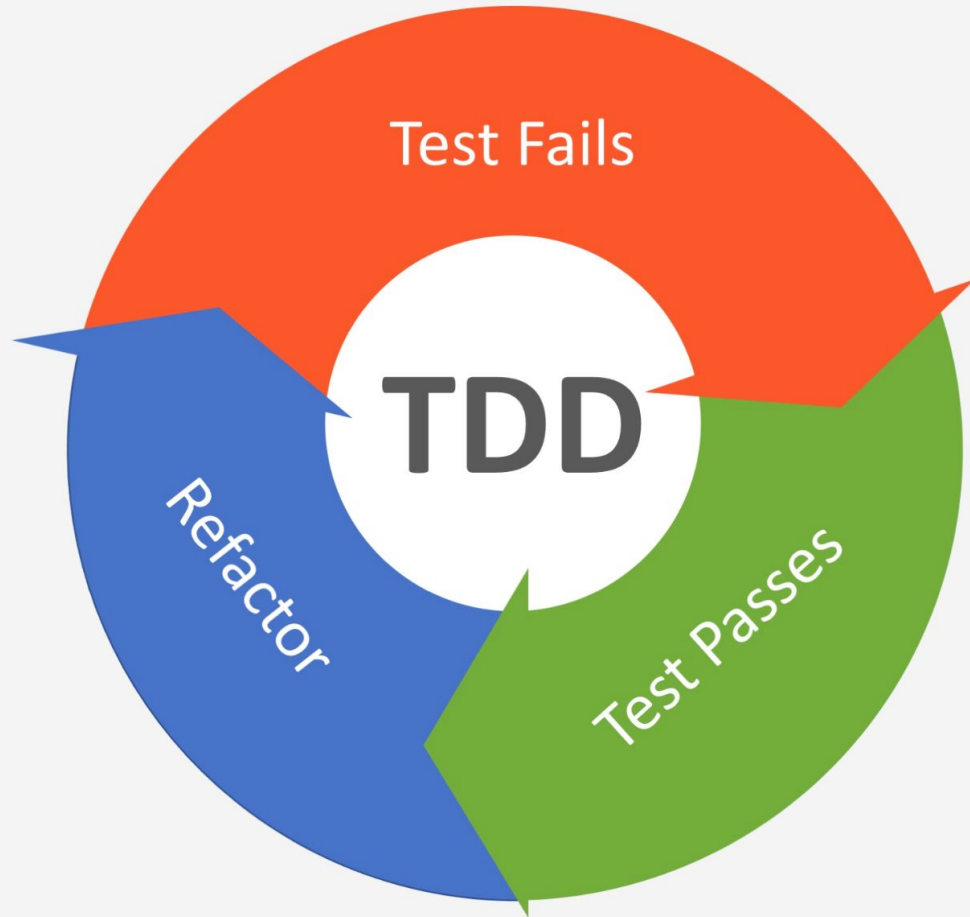


Test Driven Development (TDD)

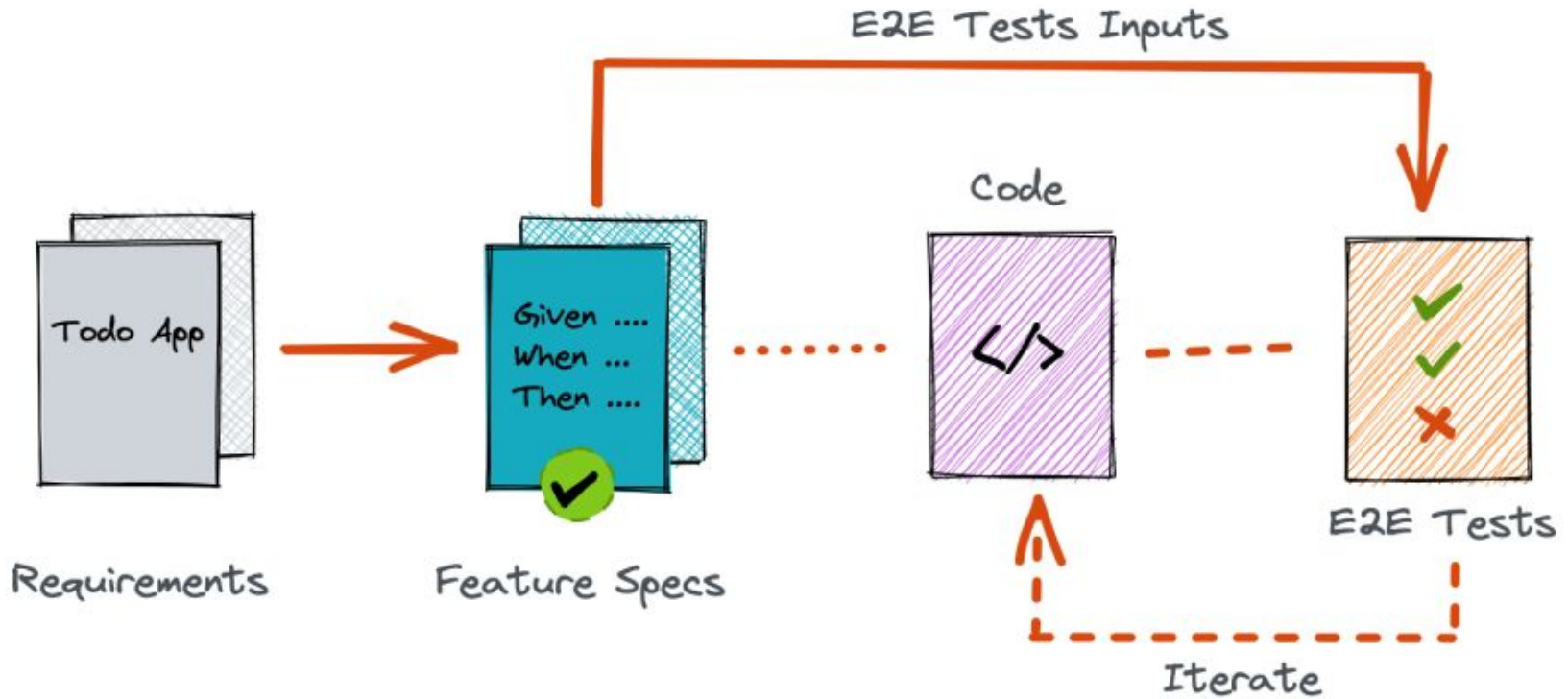


TEST DRIVEN DEVELOPMENT

Test Driven Development (TDD)



Behavior Driven Development(BDD)



Behavior Driven Development(BDD)

User Story: user sign-up

As a new user

I want to be able to sign-up an account

So that the system can remember me and my data

Acceptance criteria:

1. Registration page contains a form with the following mandatory fields
 - First Name
 - Last Name
 - Email
 - Password
2. Submitting the sign-up form will create a new account
3. An account name is set as my Email

Behavior Driven Development(BDD)

User Story: user sign-up

As a new user

I want to be able to sign-up an account

So that the system can remember me and my data

Acceptance criteria:

Given I'm at the sign-up form

And all these mandatory fields are entered

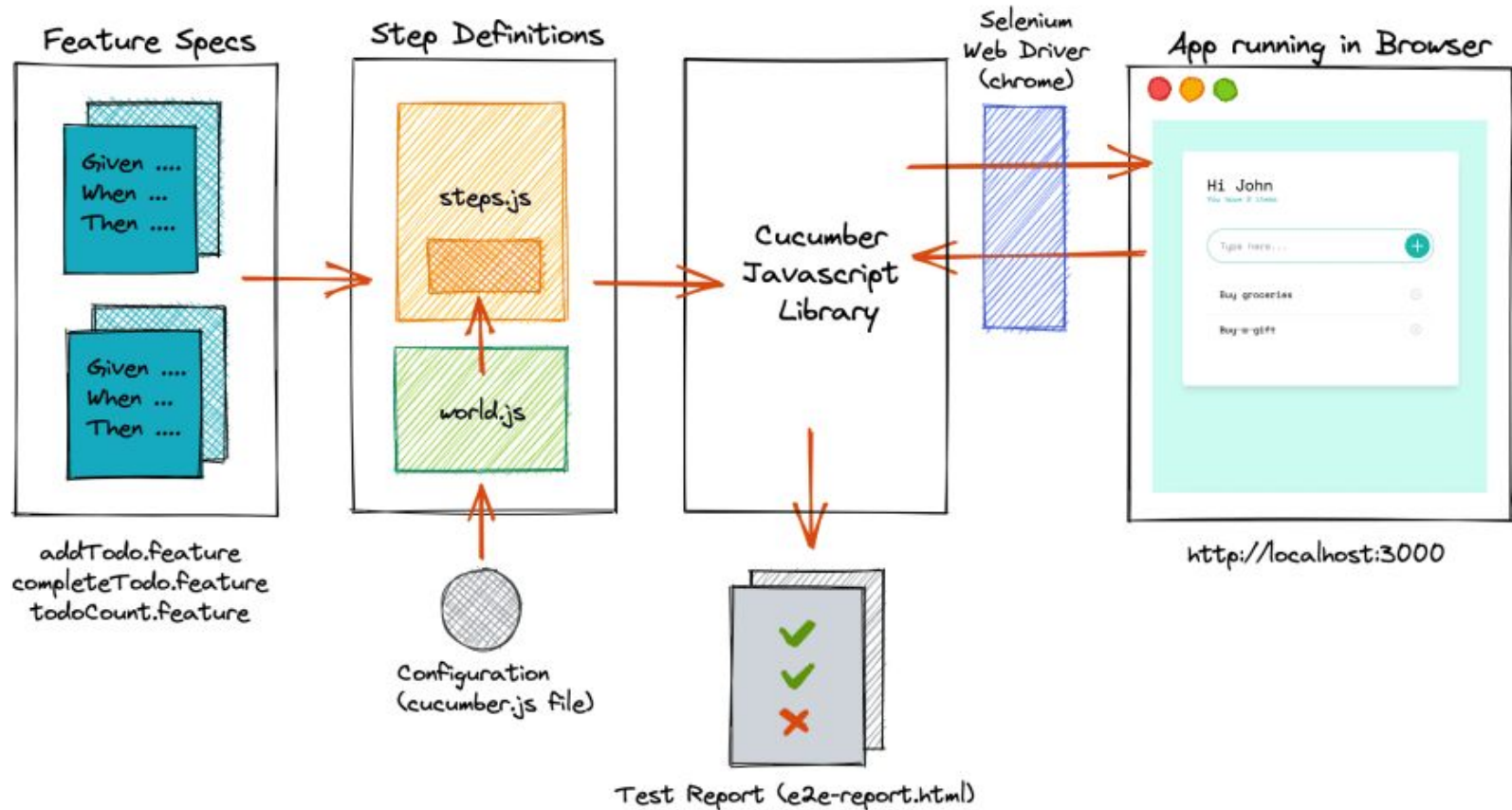
- First Name
- Last Name
- Email
- Password

When I submit the Form

Then an account is created

And account name is set as my Email

Cucumber Architecture



AI in Software Testing



Machine Learning: transferring domain knowledge via **labeled training data**



Labeling Date

I'd like to have a room for two people for the 20FEB2024.

Direction

Number of guests

Date

Labeling Date

I'd like to have a room for two people for the 30FEB2024.

Direction

Number of guests

~~Date~~

Labeling Date

I'd like to have a room for two people for the 29FEB2024.

Direction

Number of guests

Date

Labeling Date

I'd like to have a room for two people for the 29FEB2025.

Direction

Number of guests

~~Date~~

Cypress - Workshop



Thesis Generating Test Scripts for Web-Based Applications



Generating Test Scripts for Web-Based Applications

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ABSTRACT

Testing process is an essential part of the software development process as it reveals faults of the system which leads to software reliability improvement. Manual software testing is a process which testers discover software's faults by hands. Therefore, any change on the software requires tremendous effort and time to execute test cases such as regression tests. Even though we can utilize automation testing tools to speed up the execution of test cases, experienced testers, who are equipped with automation testing knowledge, are inevitably required. Since novice testers usually consume a significant amount of time to develop test scripts, this paper aims to establish an approach to simplify test scripts generation for web-based applications using URL and XSD as inputs. Our approach elicits input elements from a web page using a provided URL and then analyzes their values using XSD to create test data using boundary value testing technique. This produces test scripts that run under Robot framework.

The purpose of this paper is to describe a concept of generating test scripts for web-based applications using an automation framework. Our concept uses HTML [10], and XSD [11] as input information to generate test scripts. First, HTML structure is analyzed to extract input elements which are then used to generate test scripts with no test data. Next, XSD is analyzed to extract boundary value of inputs of the web-based applications to generate test data. Finally, the test scripts are combined with test data to generate complete test scripts.

2. BACKGROUND AND RELATED WORK

2.1 Keyword-Driven Testing

Keyword-Driven [12] is one of automated testing methodologies. Keywords are the fundamental part of test script implementation. A keyword is an action that can be executed on the web-based applications. The elements of Keyword-Driven are keywords, object identifier, and parameters. Separating

Source Code

URL: <https://panaryco.wixsite.com/myhotel>

Cypress

- <https://github.com/pantakarns/cypress>

Robot Framewrok

- https://github.com/pantakarns/robot_student_registration

Cucumber

- https://github.com/pantakarns/cucumber_student_registration



Thank You

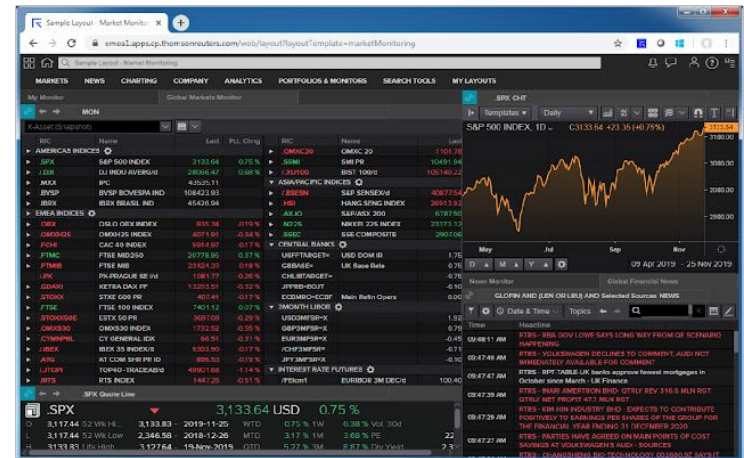
Insert the Sub Title of Your Presentation



LSEG

London Stock Exchange Group

- LSEG is a leading global financial markets
- Three business divisions
 - Data and Analytics
 - Capital Markets
 - Post Trade
- 25,000 people 70 countries
- Since 1698
- LSEG is headquartered in London



Intern

Period

- 4-6 months start in June - Nov 2024

What you will get from the program

- Intensive trainings from tech experts
- Work on global-scales software and infrastructure
- Internship allowance

Qualifications

- 3rd or 4th year under graduates
- Frontend developer with ReactJS/TypeScript, JavaScript, NodeJS, Go Lang, DevOps process, CLI Tools