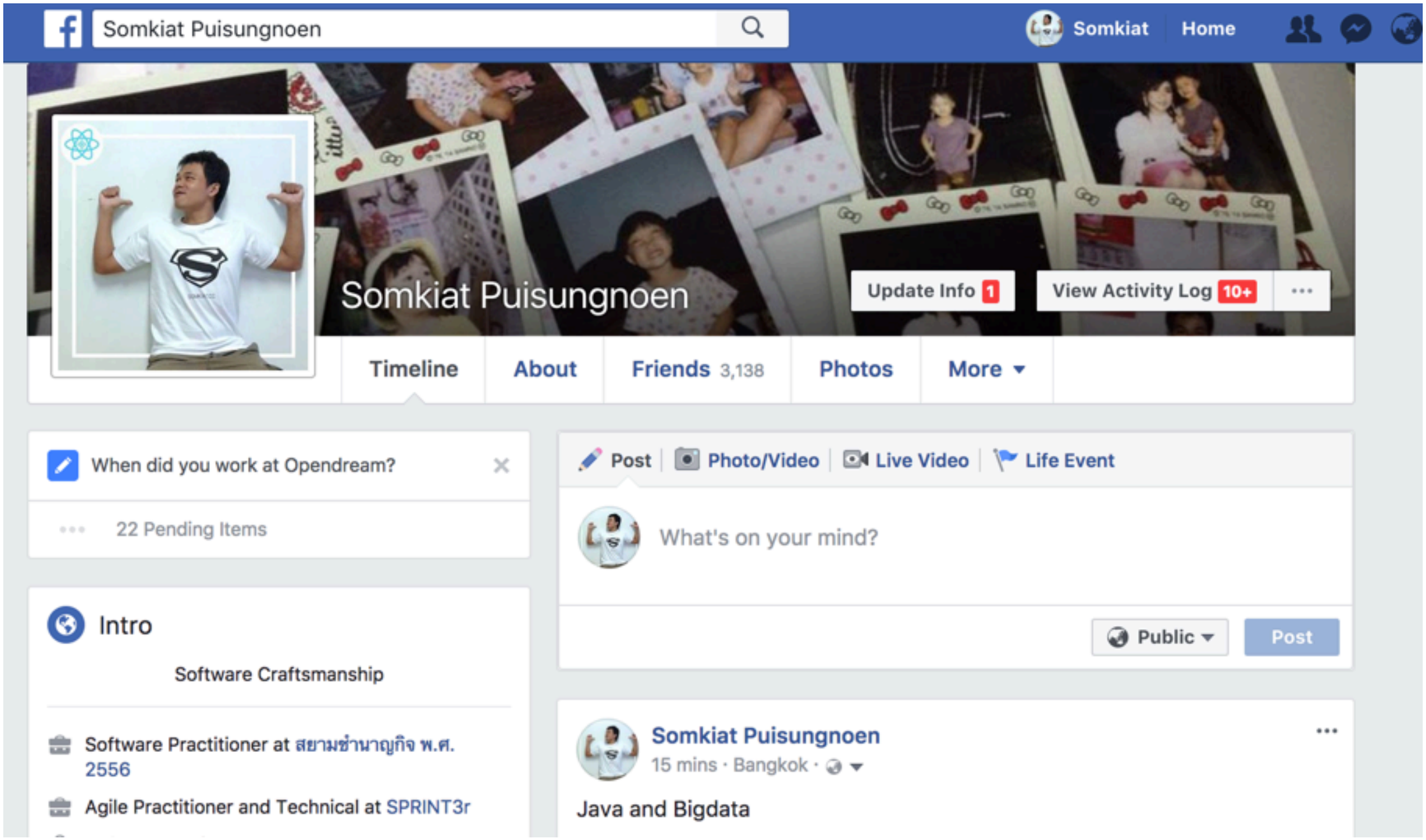
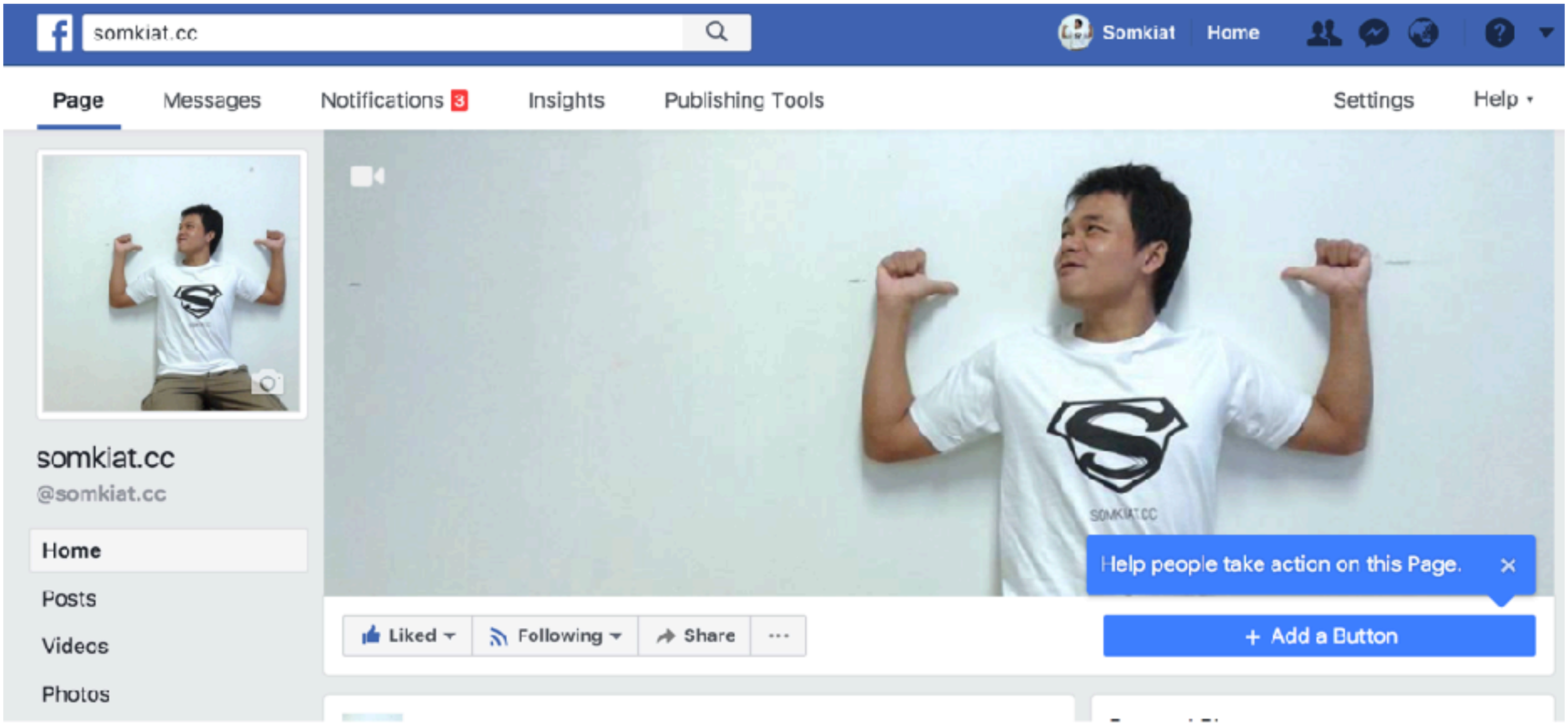
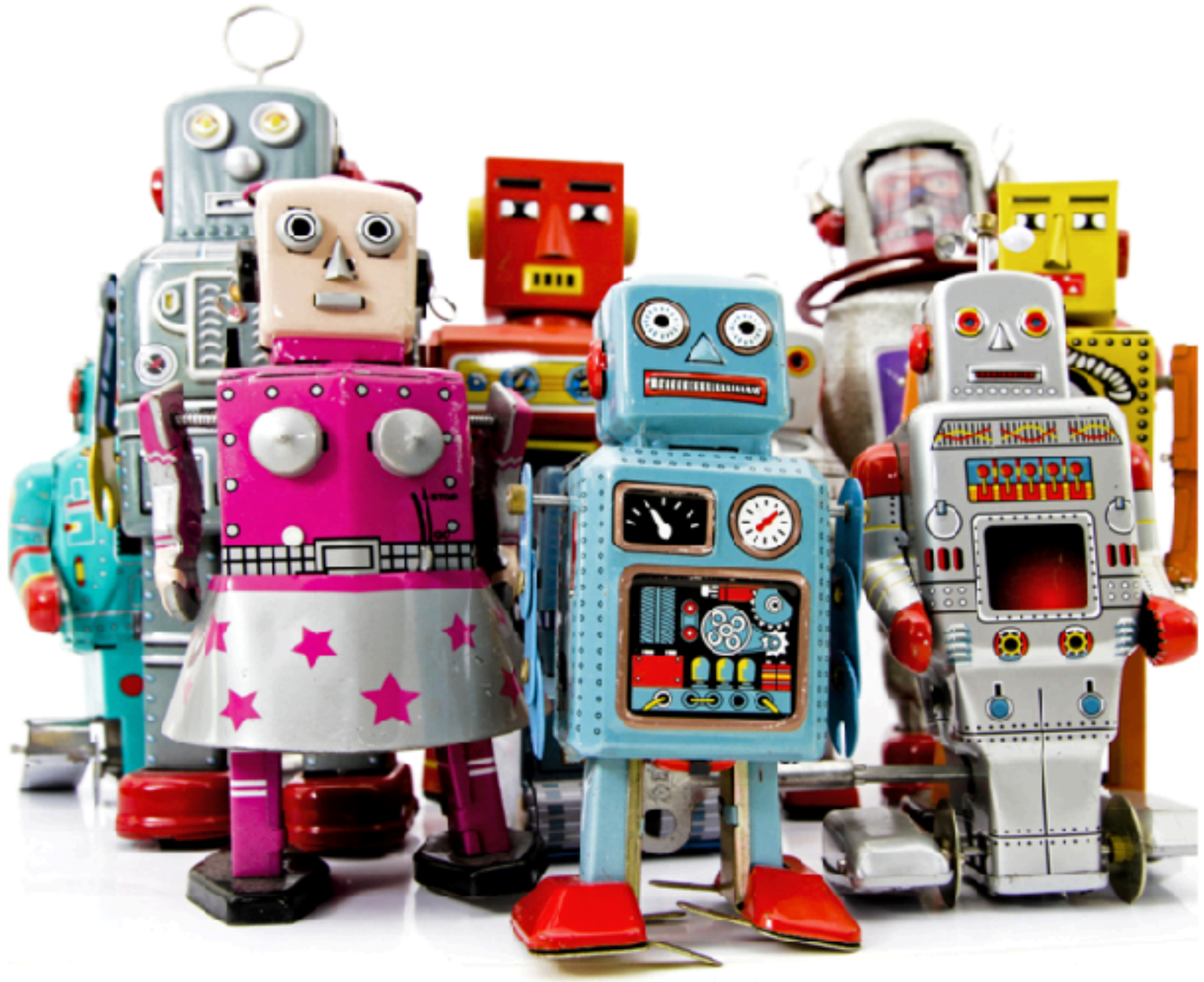
สยามชำนาญกิจ
SIAM CHAMNAN KIT

Robot Framework workshop





https://github.com/up1/course-robotframework



Robot Framework Workshop

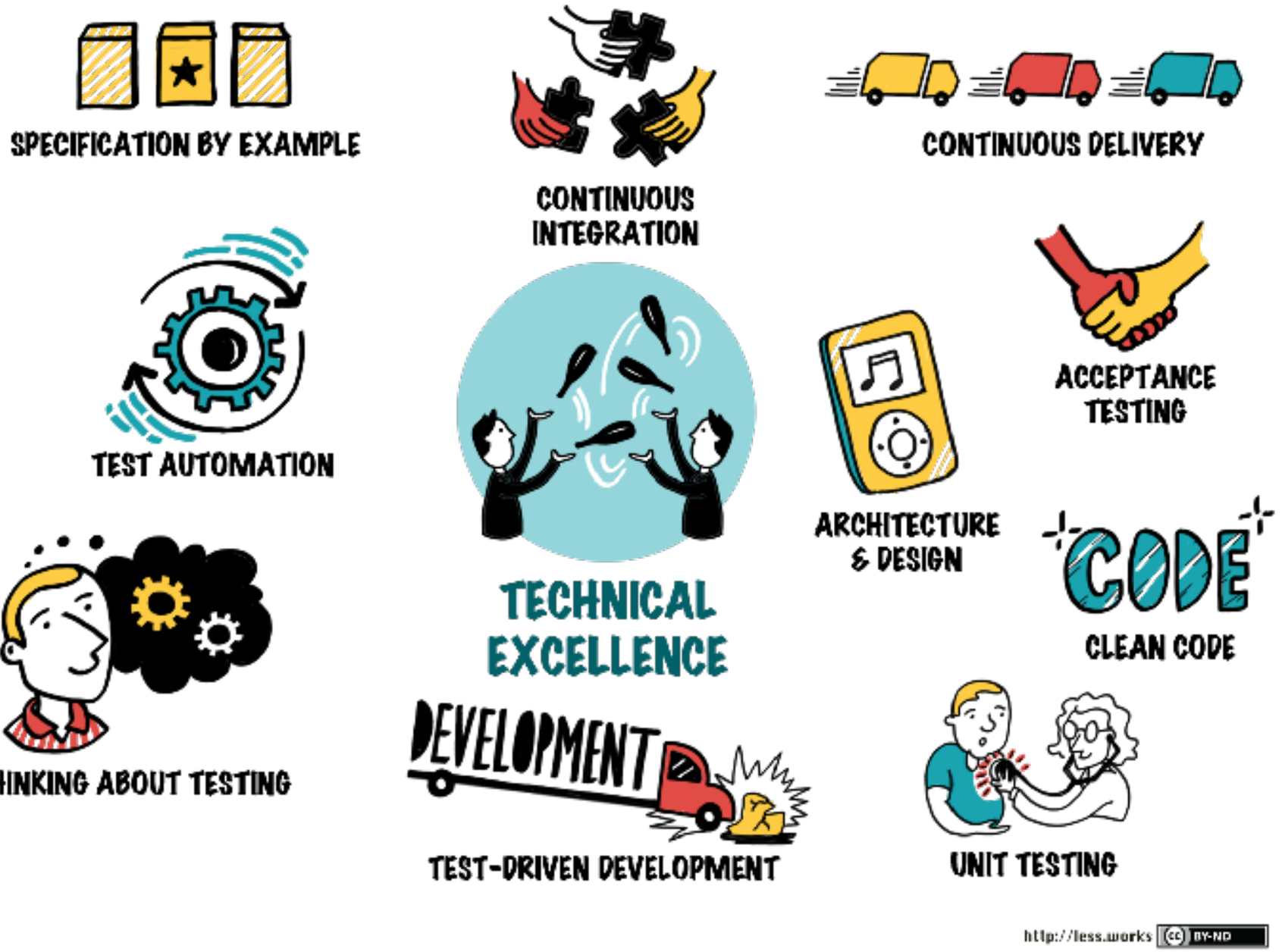
Agenda

- Acceptance Test-Driven Development (ATDD)
- Test strategies
- Introduction to Robot Framework
- Structure of test case
- Working with Web application

Agenda

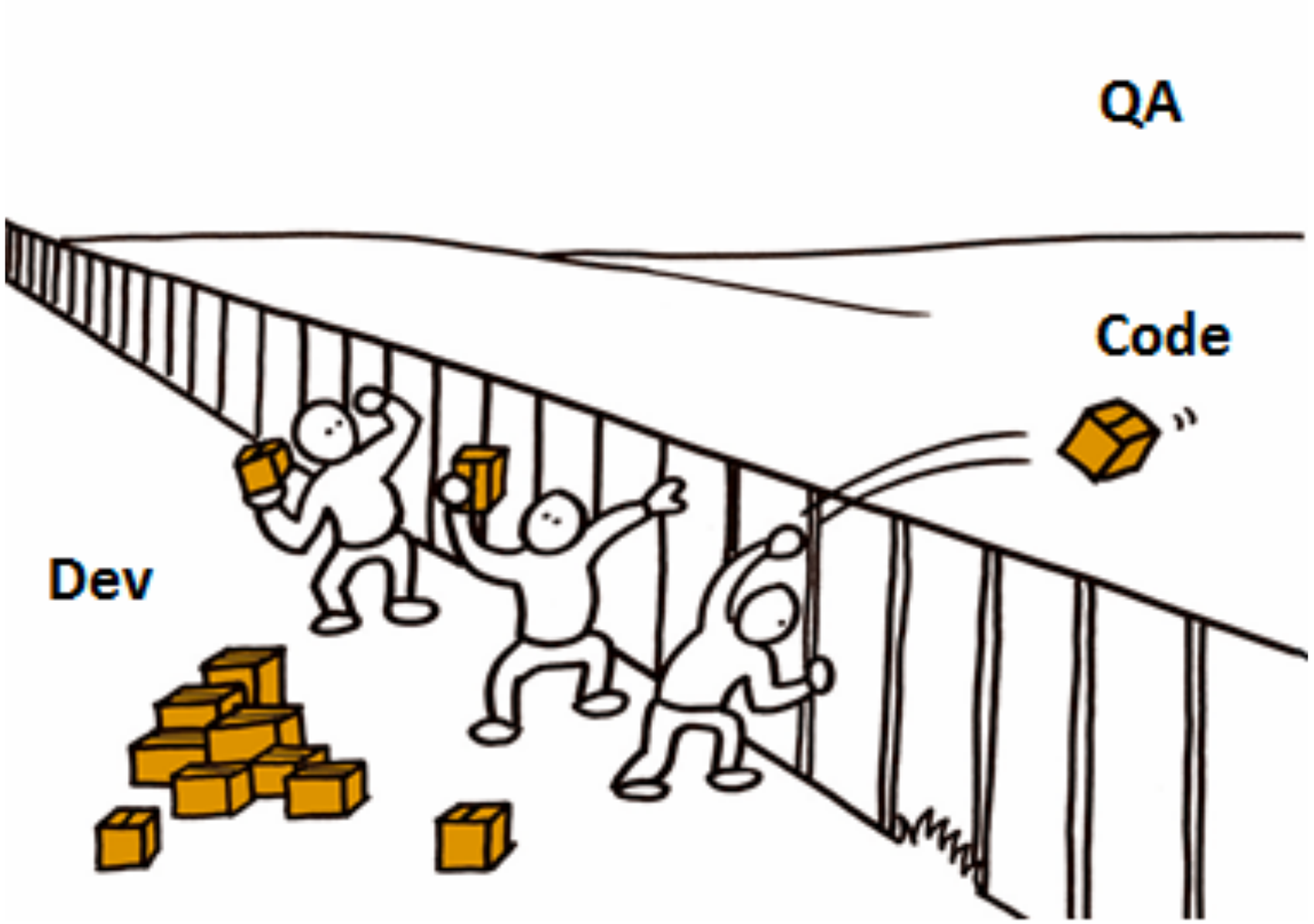
- Test life cycle of Robot Framework
- Better test case
- Better test structure with Page Object pattern
- Command lines tips
- Scaling with parallel and distributed testing
- Design pipeline with automated test

Technical Excellence

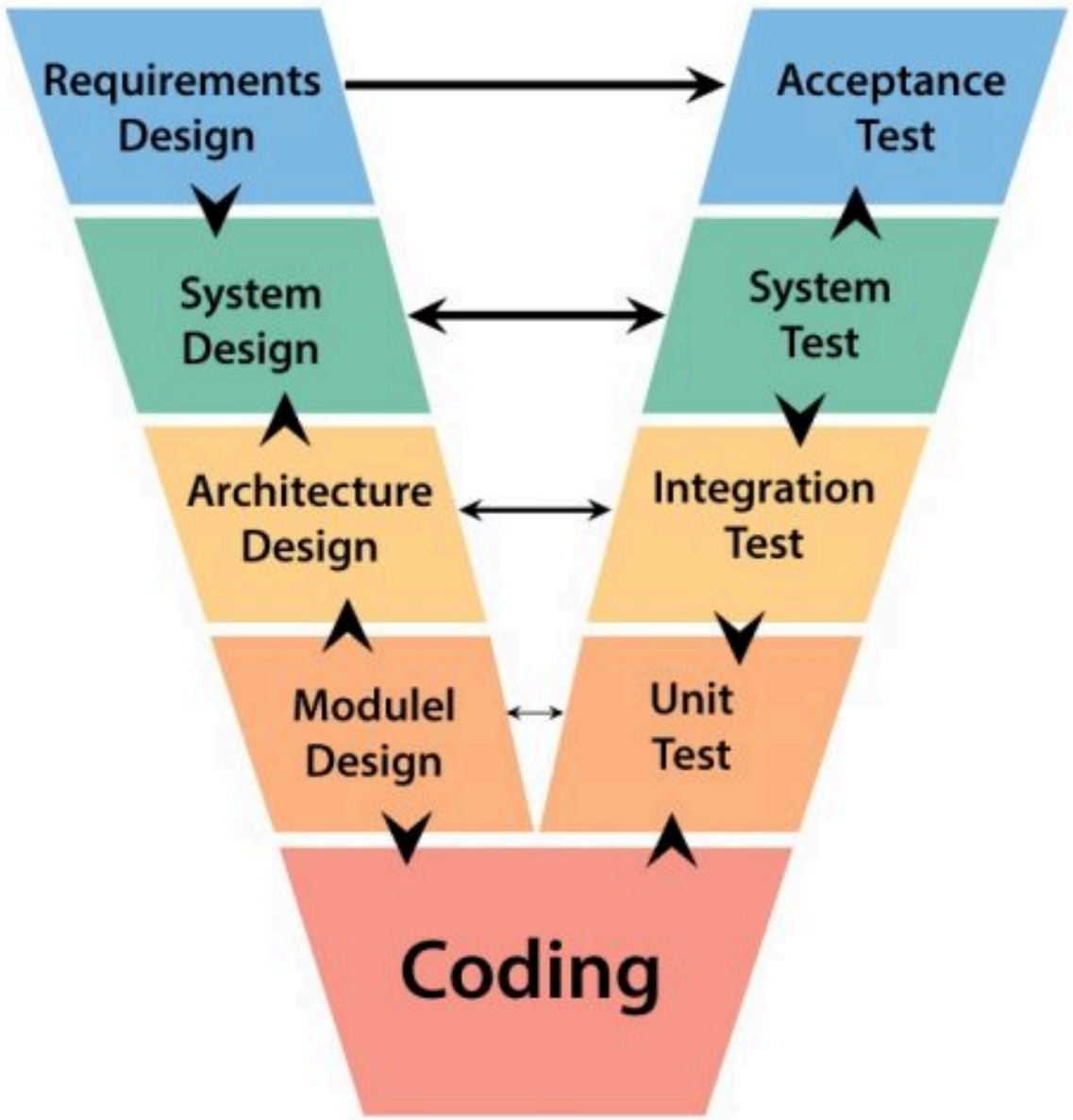


https://less.works/less/technical-excellence

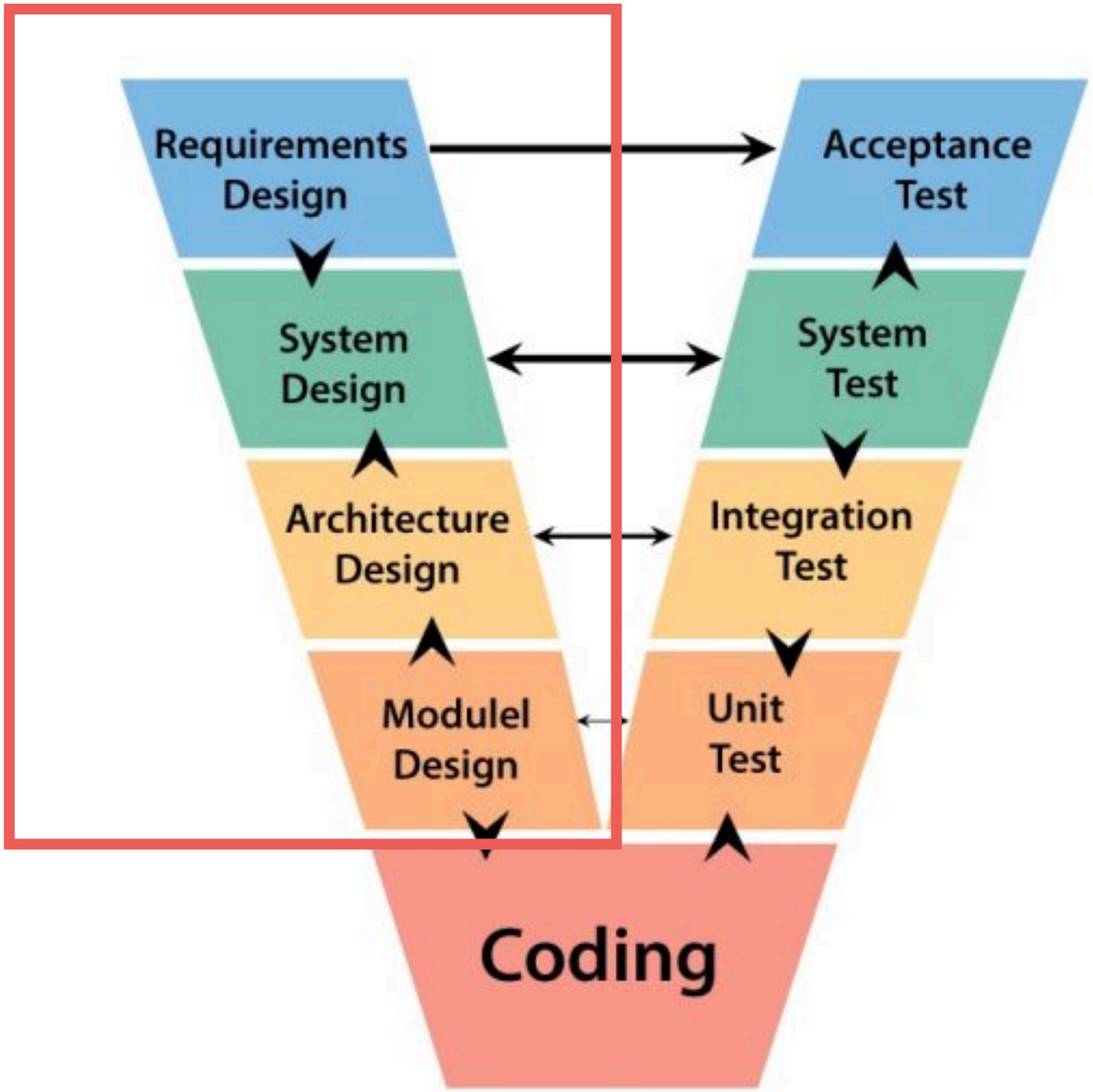
Software Development



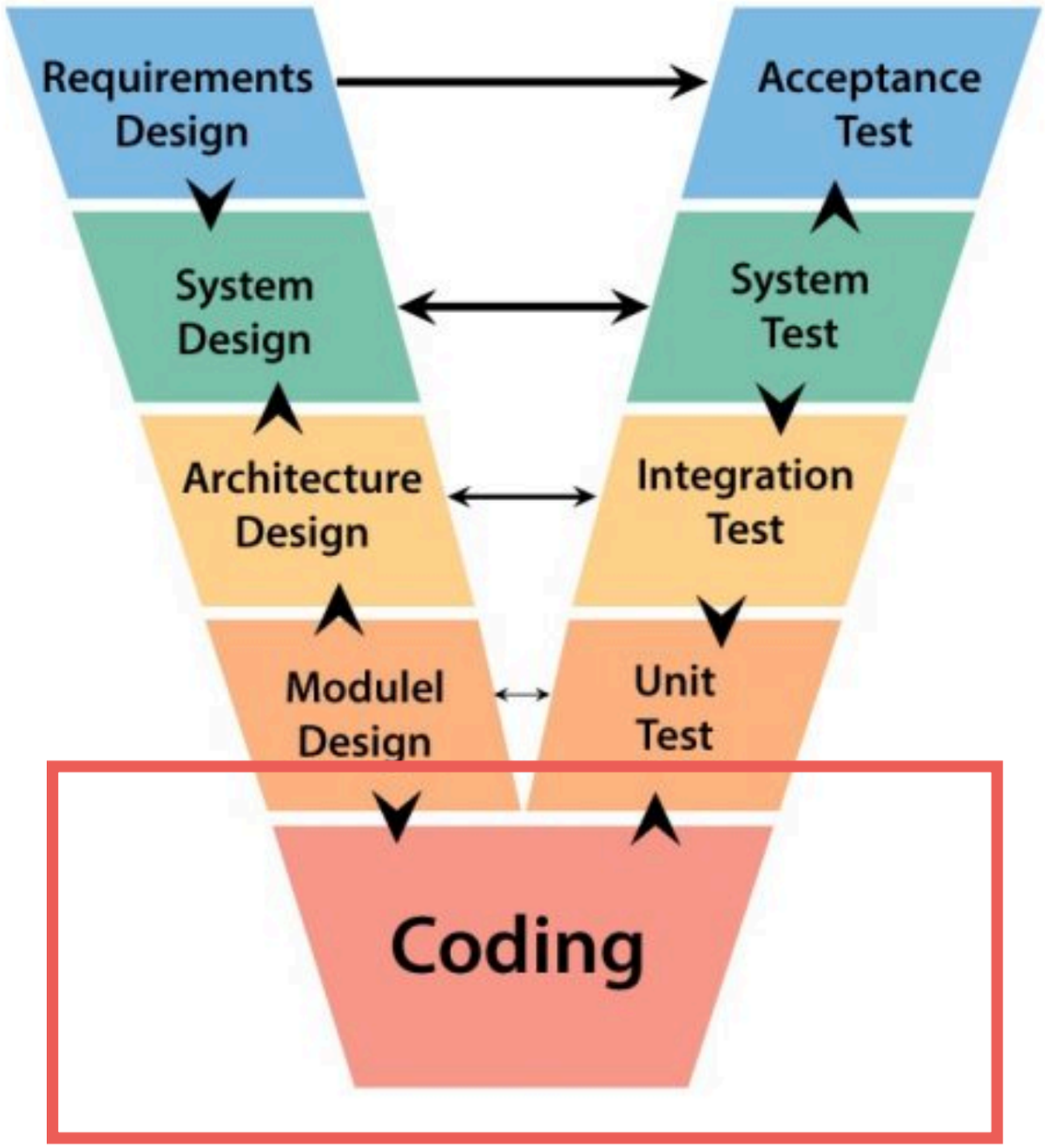
V Model or Waterfall Model



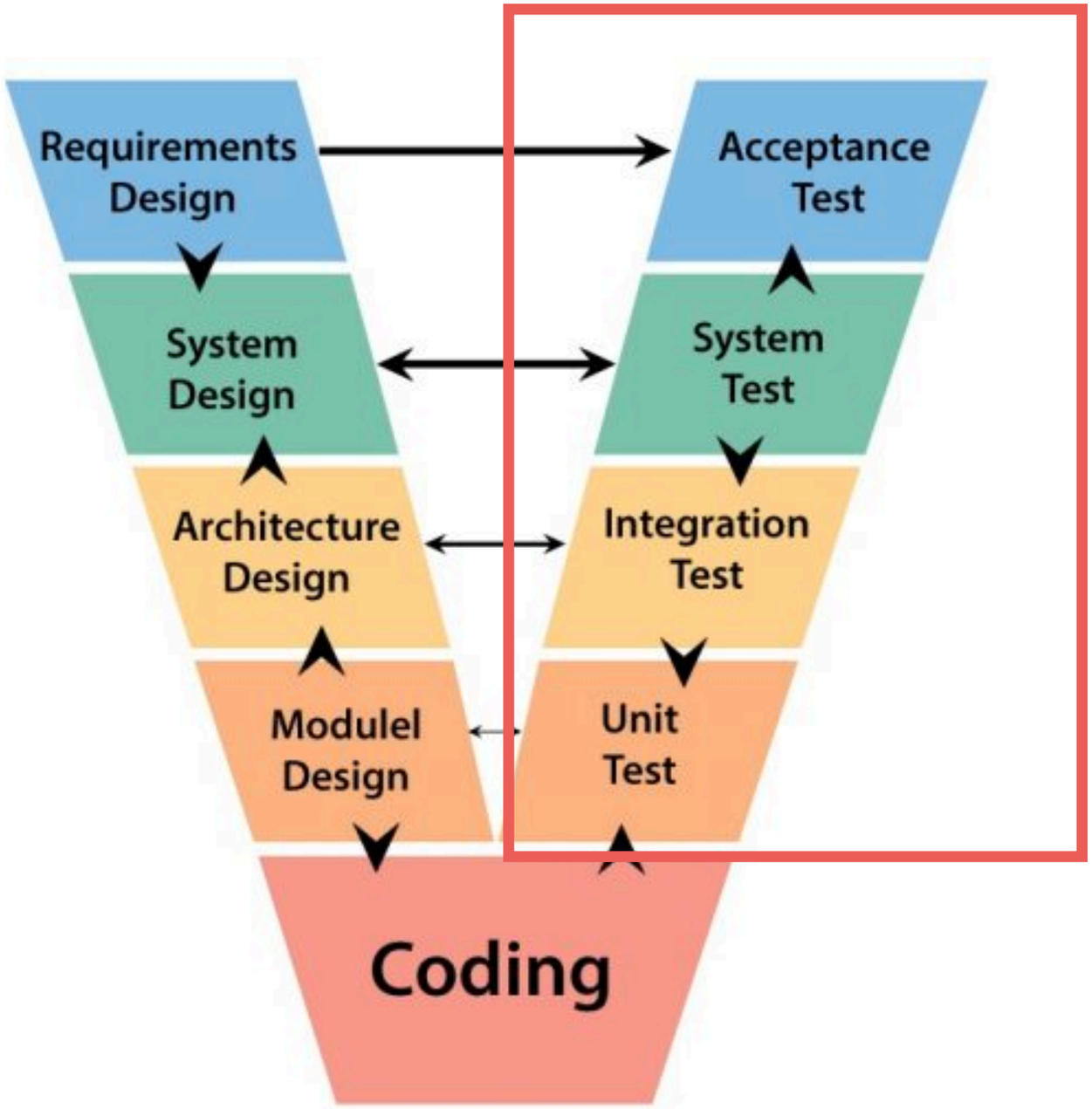
Verification phase



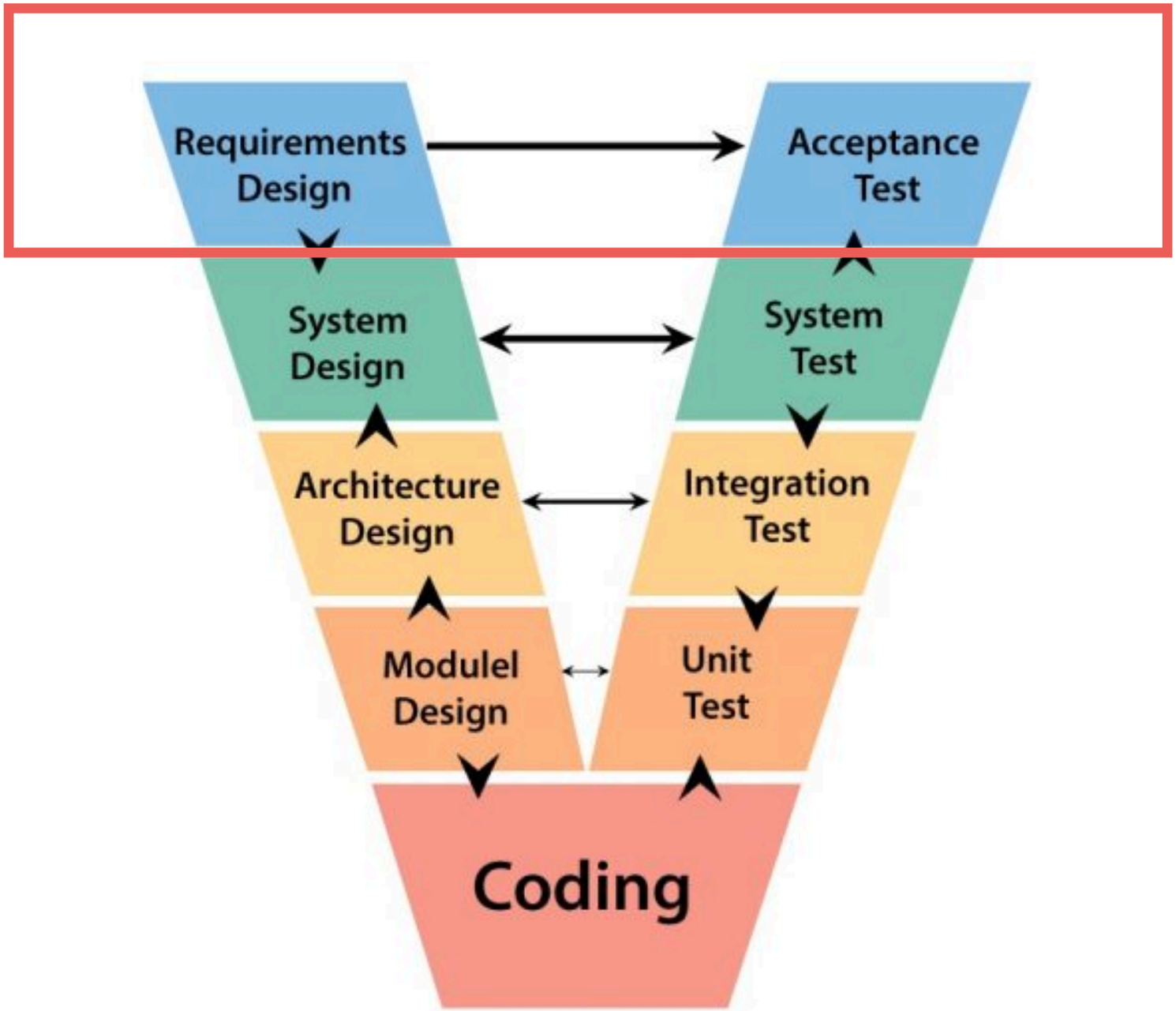
Coding phase



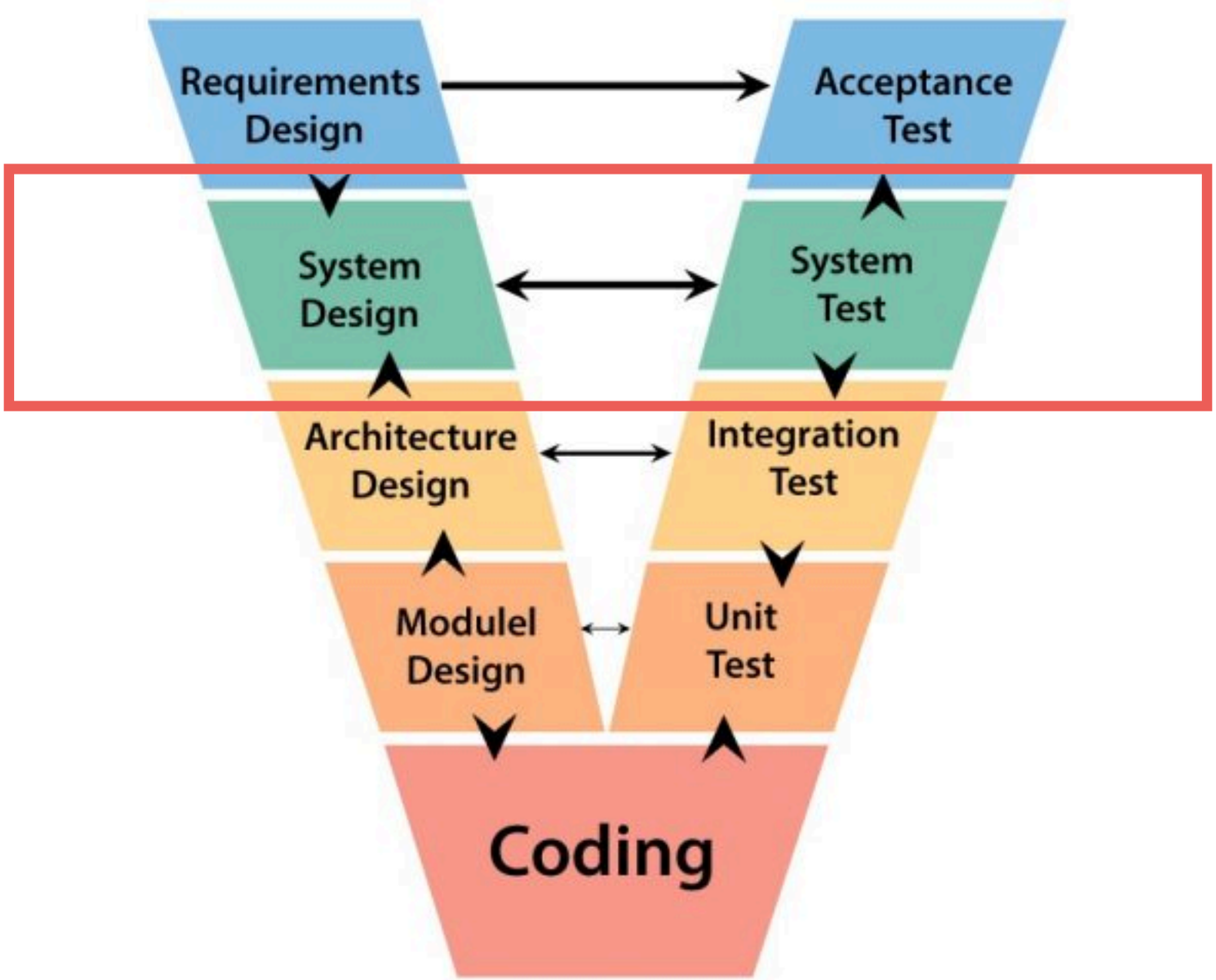
Validation phase



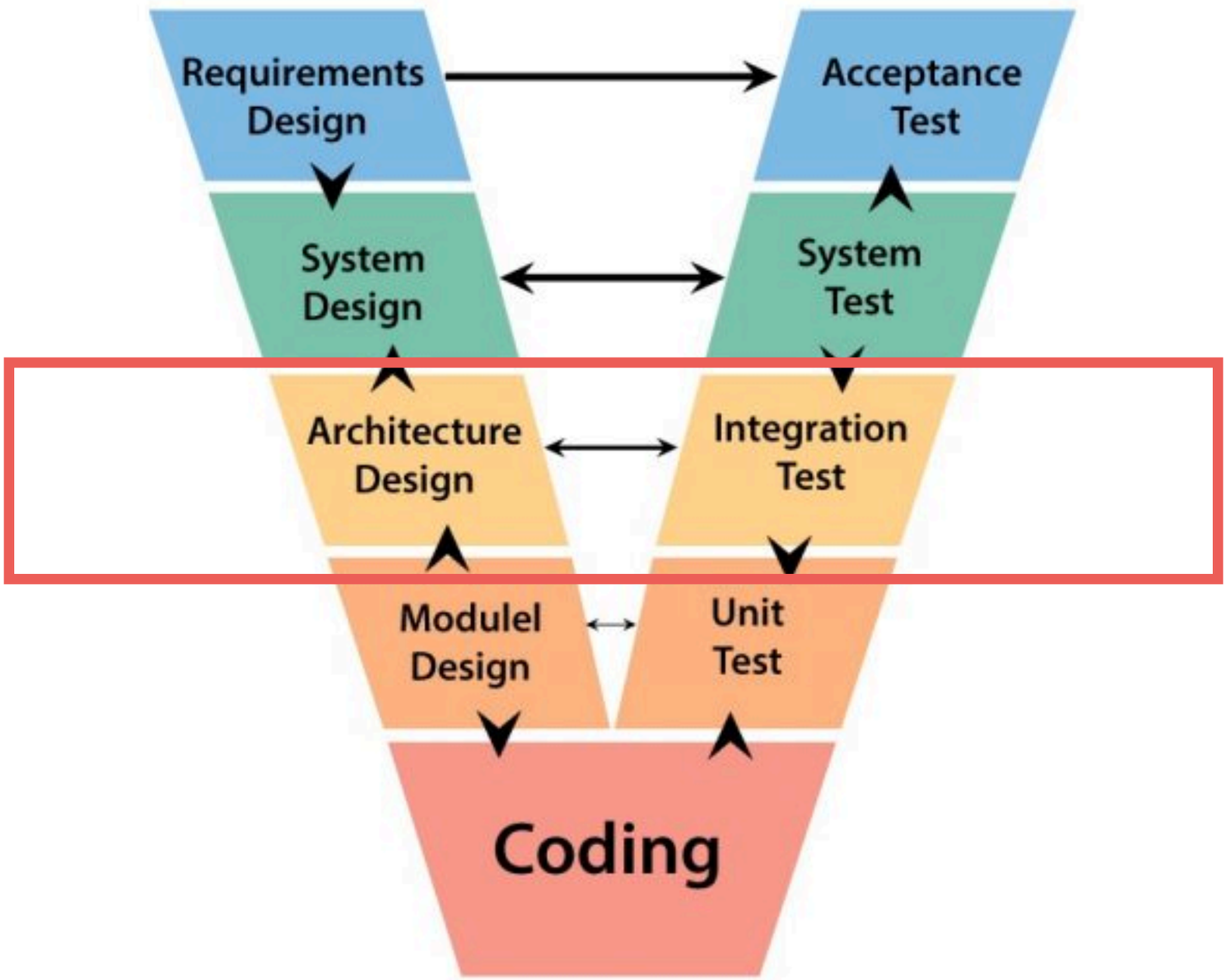
Verification and Validation



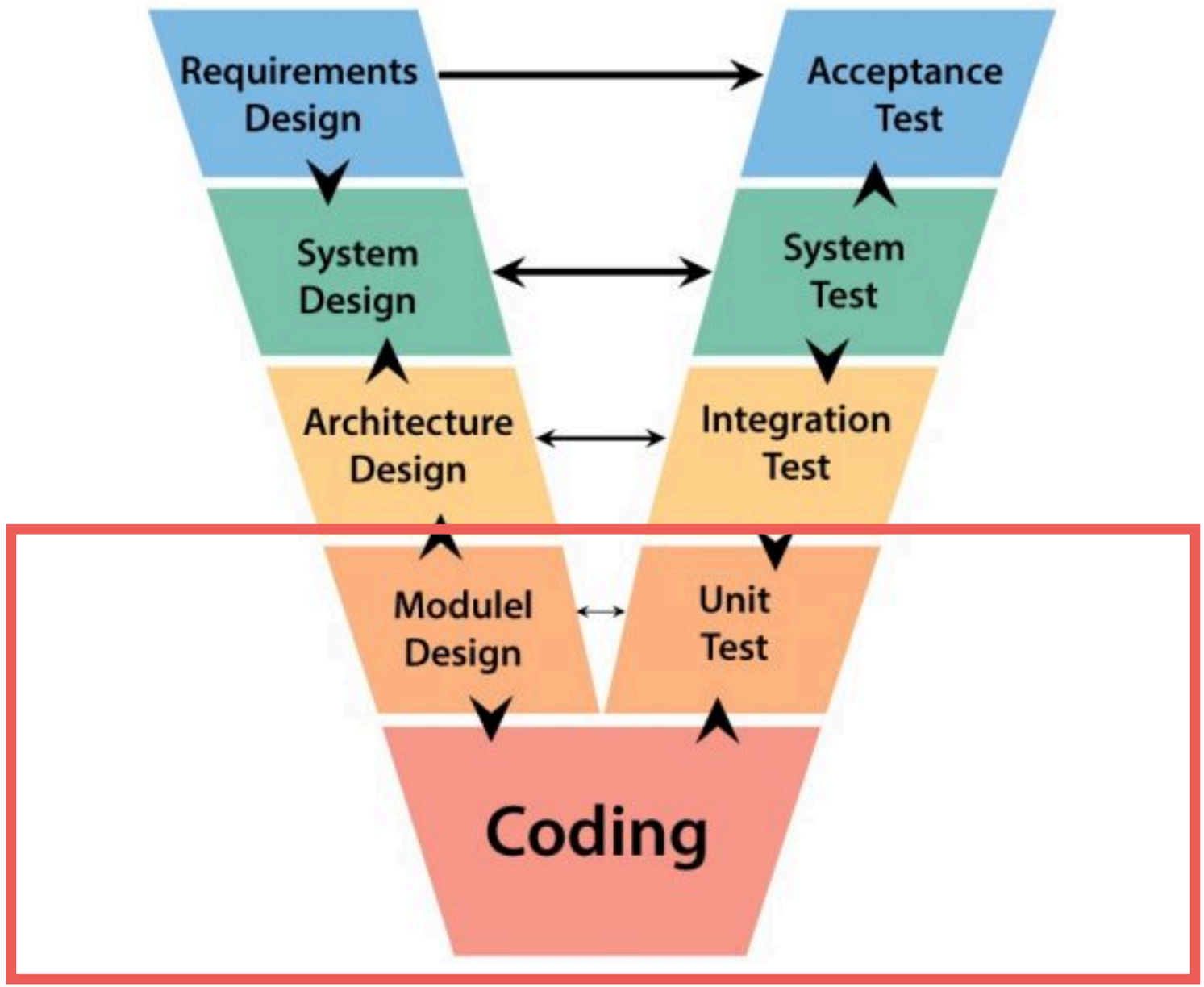
Verification and Validation



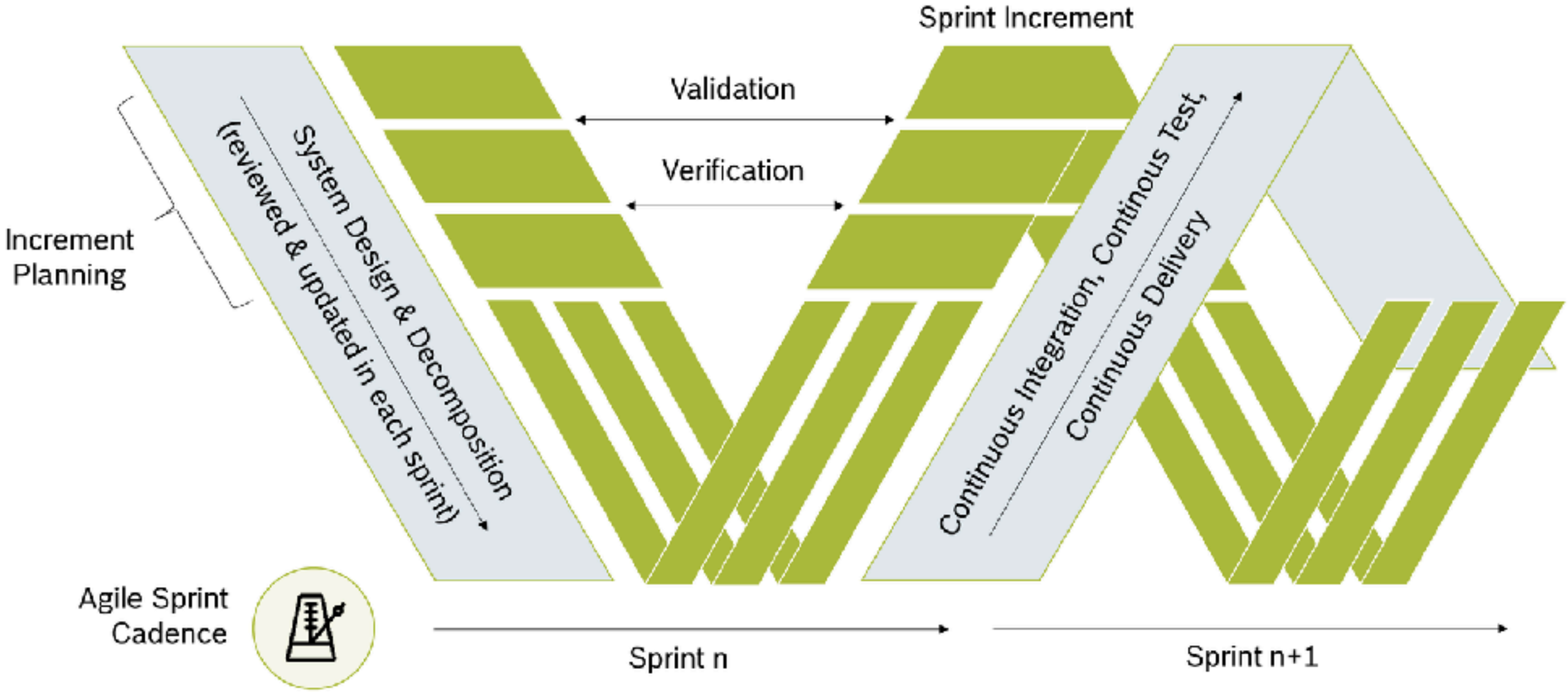
Verification and Validation



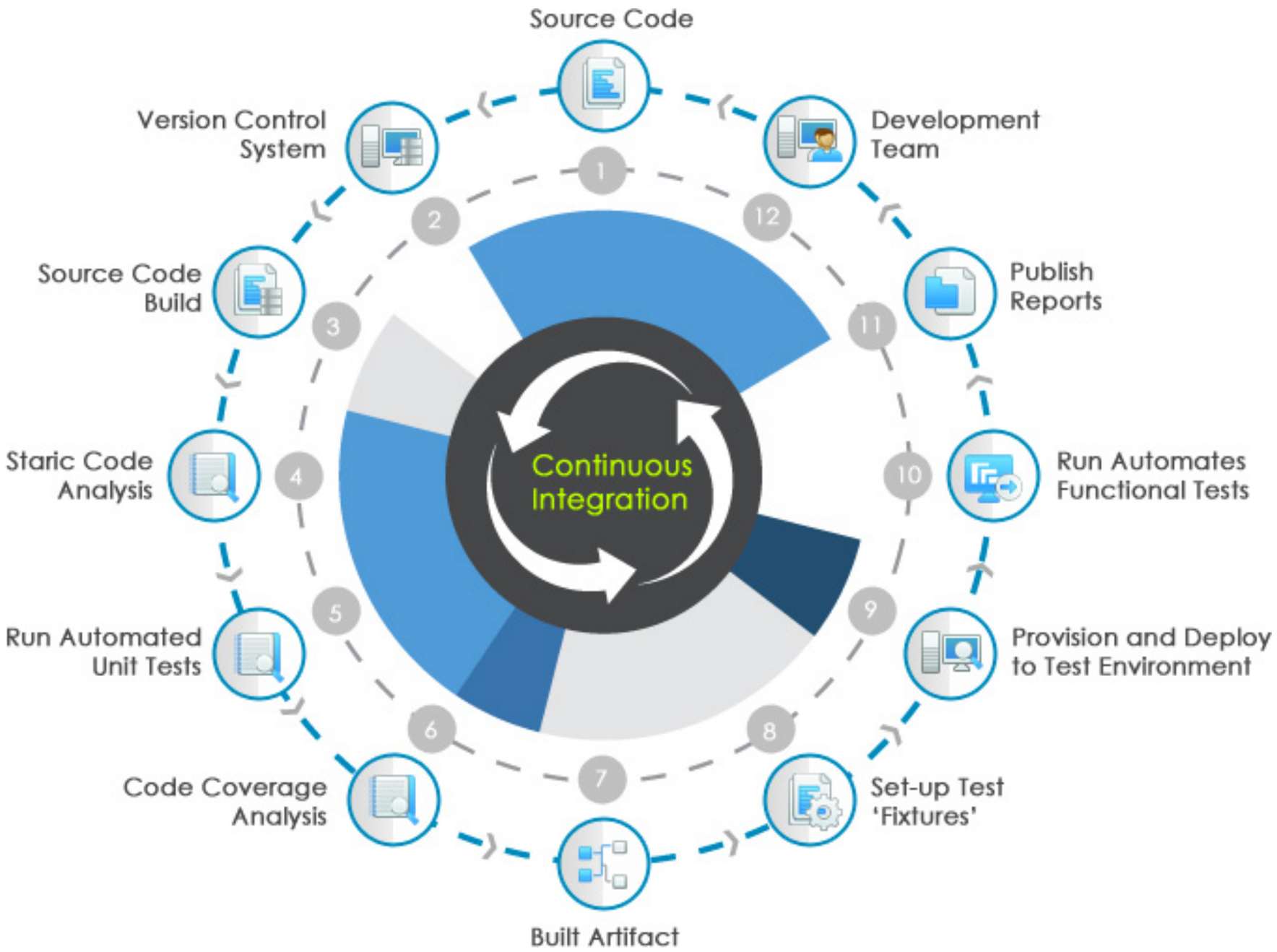
Verification and Validation



Iterative and Incremental

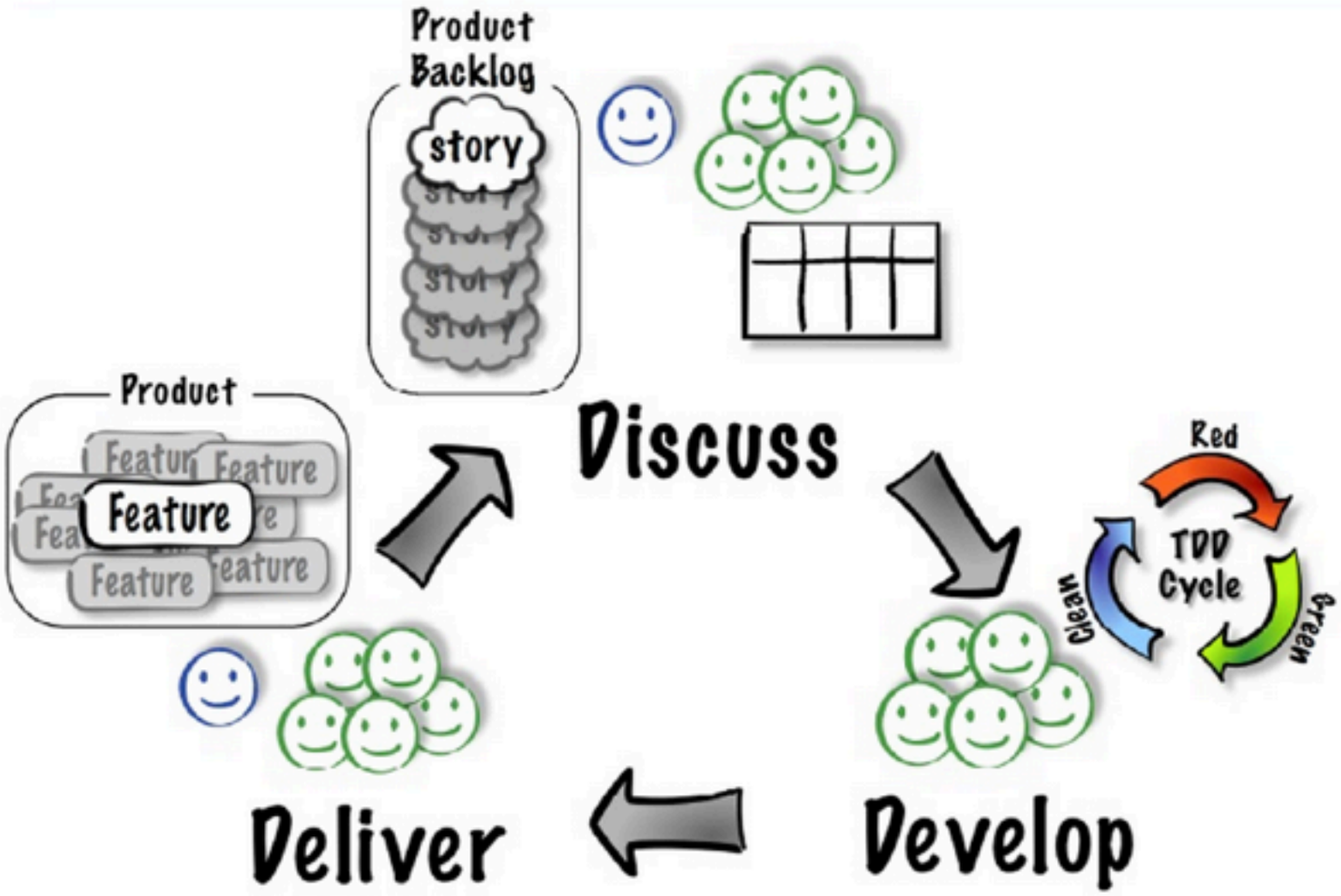


Continuous Integration process



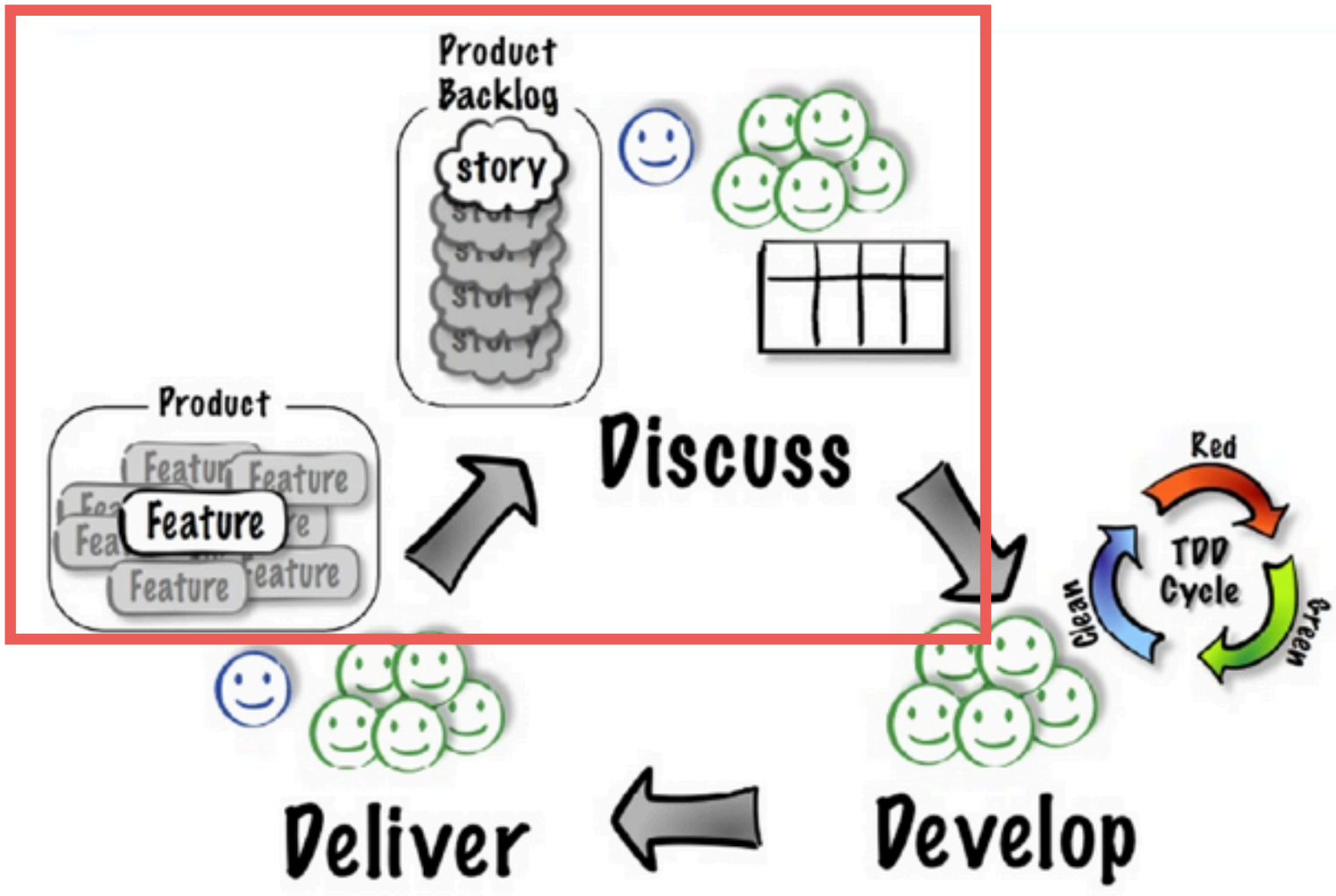
Acceptance Test-Driven Development (ATDD)

Acceptance Test-Driven Development (ATDD)



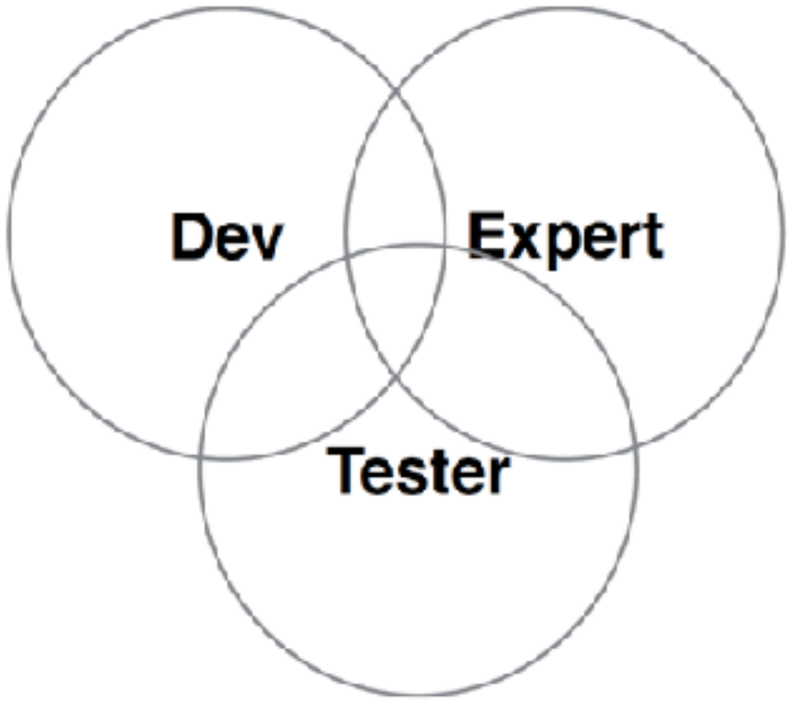
Acceptance Test-Driven Development (ATDD)

Discussion process



Discussion process

Whole team approach
Share understanding
Clarify solution
Concrete example/data



Decompose or Slicing feature

Feature

Feature 1

Feature 2

Feature 3

Decompose or Slicing feature

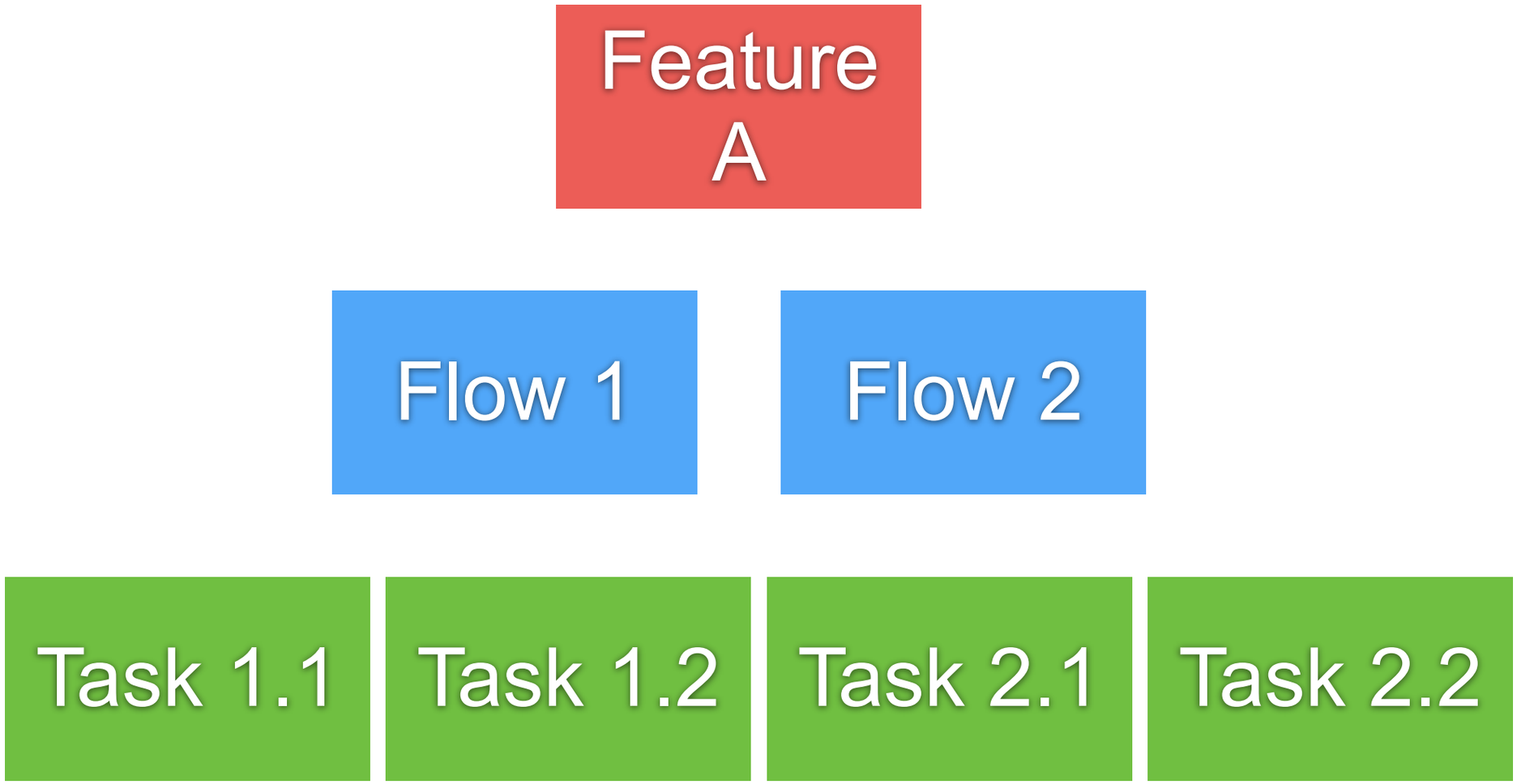
Feature **Flow/User Story**

Feature 1	Flow 1.1
Feature 2	Flow 1.2
Feature 3	Flow 1.3

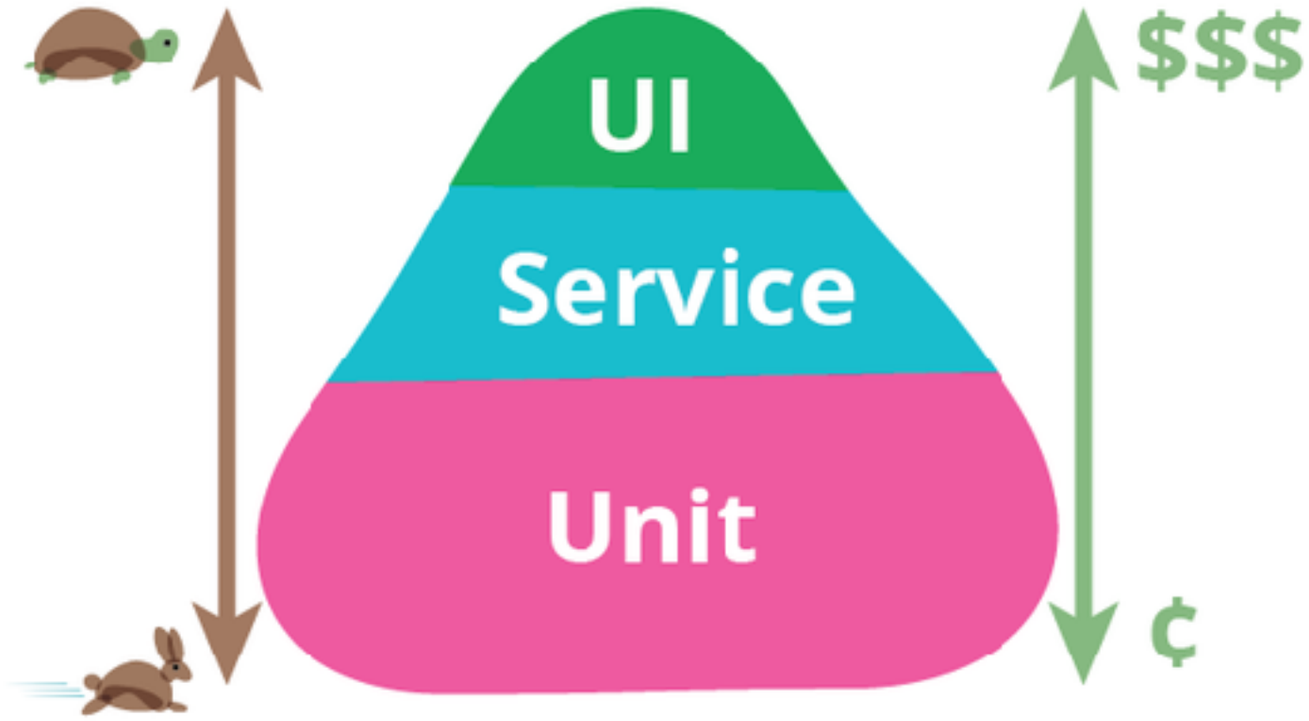
Decompose or Slicing feature

Feature	Flow/User Story	Task	
Feature 1	Flow 1.1	Task 1.1.1	Task 1.1.4
Feature 2	Flow 1.2	Task 1.1.2	Task 1.1.5
Feature 3	Flow 1.3	Task 1.1.3	Task 1.1.6

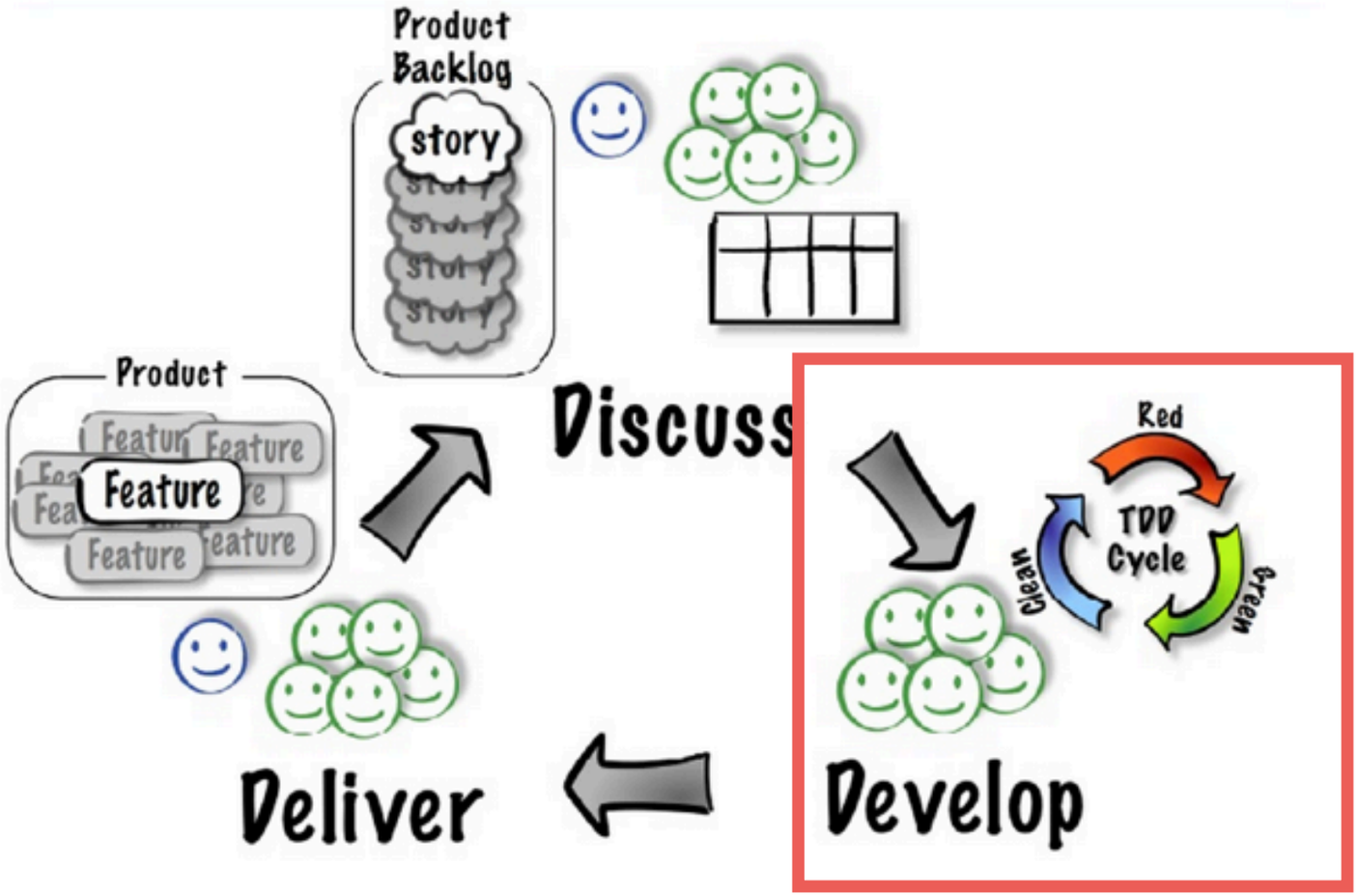
Decompose or Slicing feature



Pyramid Testing



Development process
=
Coding + Testing



Development process

Implementation with example/data
All examples are passed

Re-Test ?
Regression Testing ?

Re-test vs Regression test

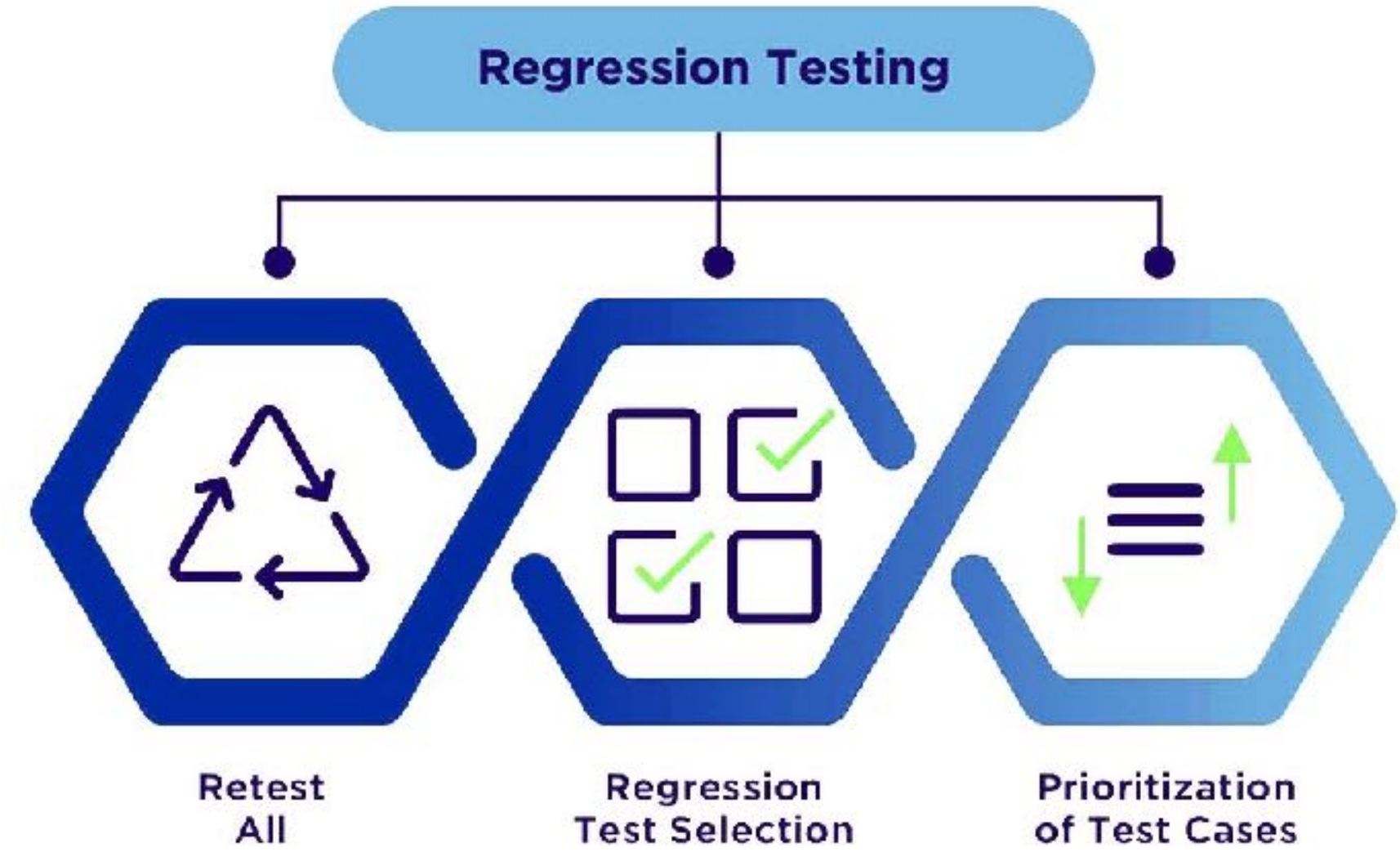
Re-test

Testing code which was not working,
But you believe to have been fixed

Regression test

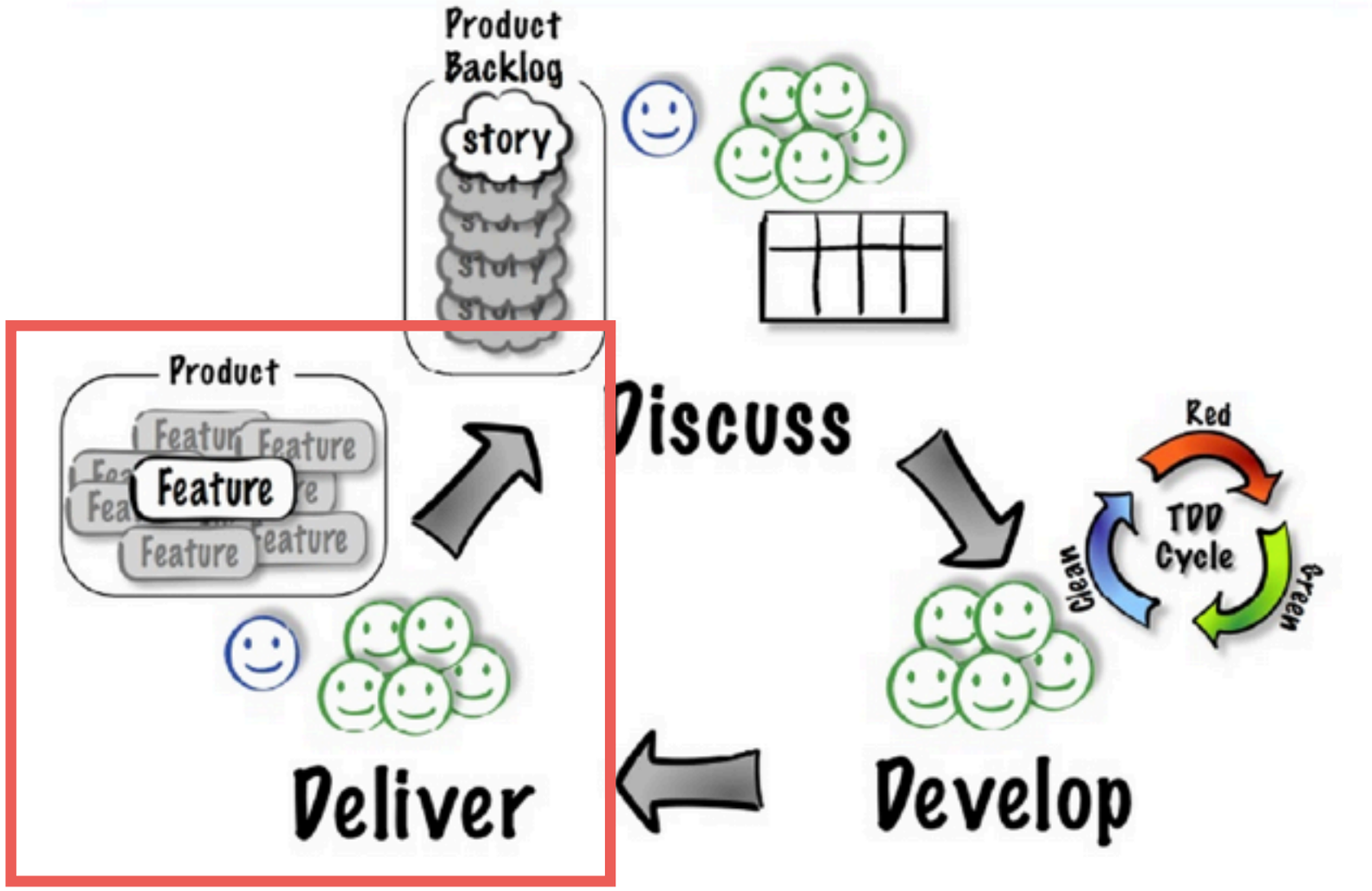
Testing code which was not working,
But now, due to updates, might

Regression Testing



Acceptance Test-Driven Development (ATDD)

Delivery process

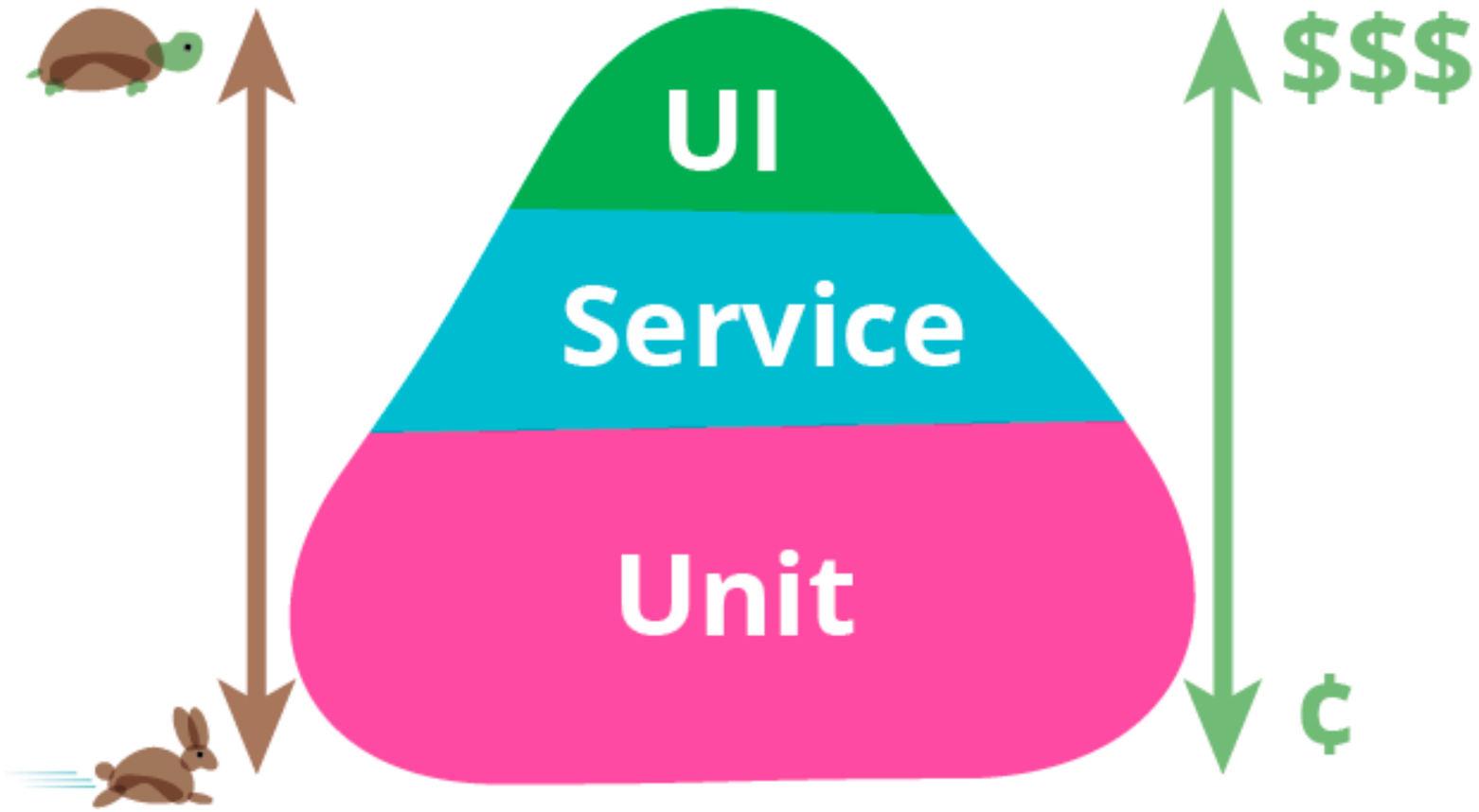


Delivery process

Features are demonstrated to all stakeholders
All examples are passed (new + existed)

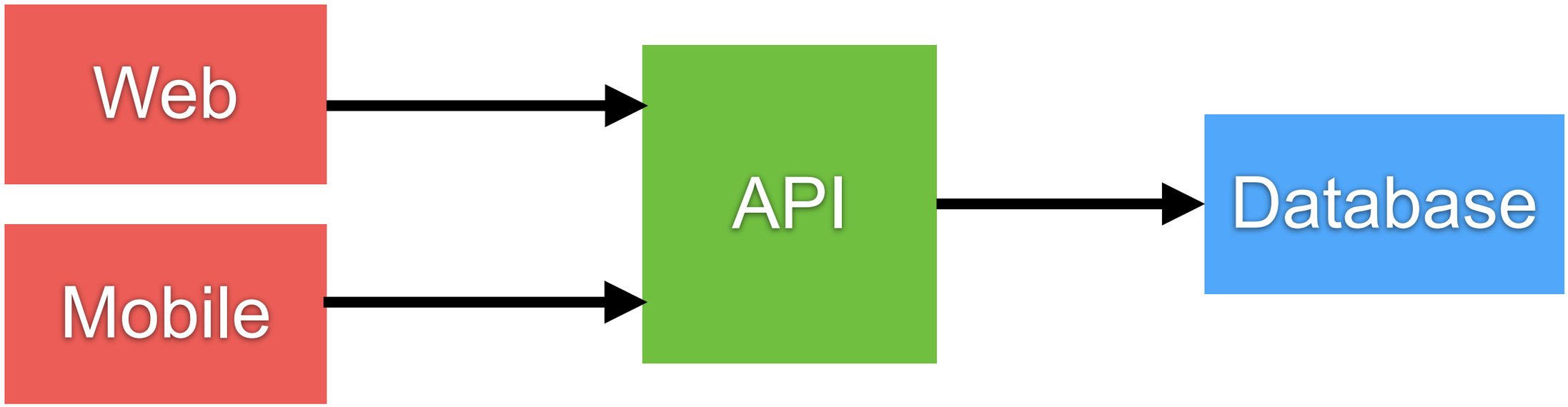
Feedback as input to the next discussion

Test Strategies

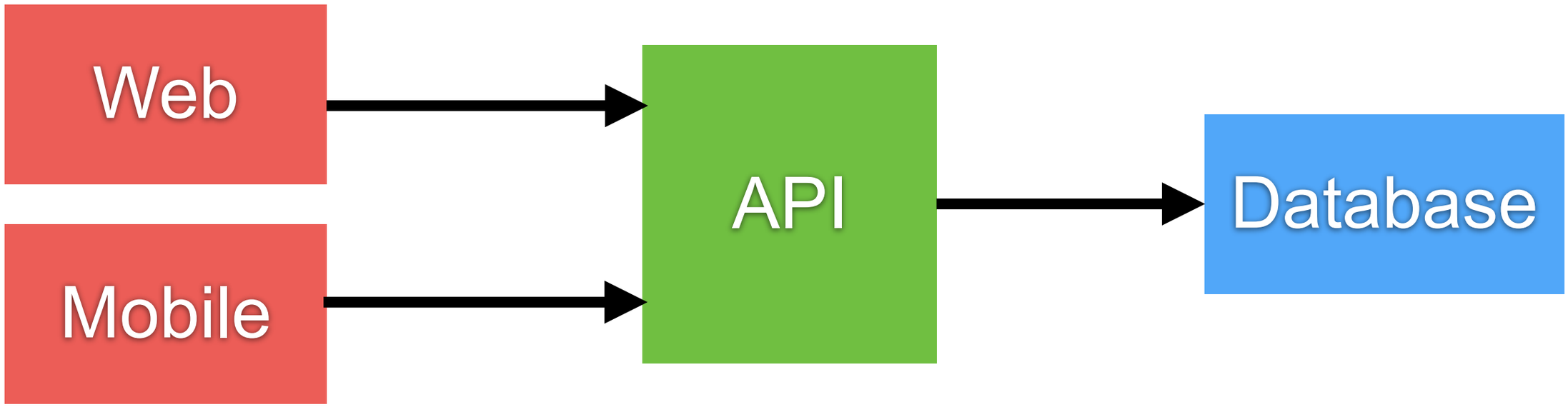


Why -> What -> How to test ?

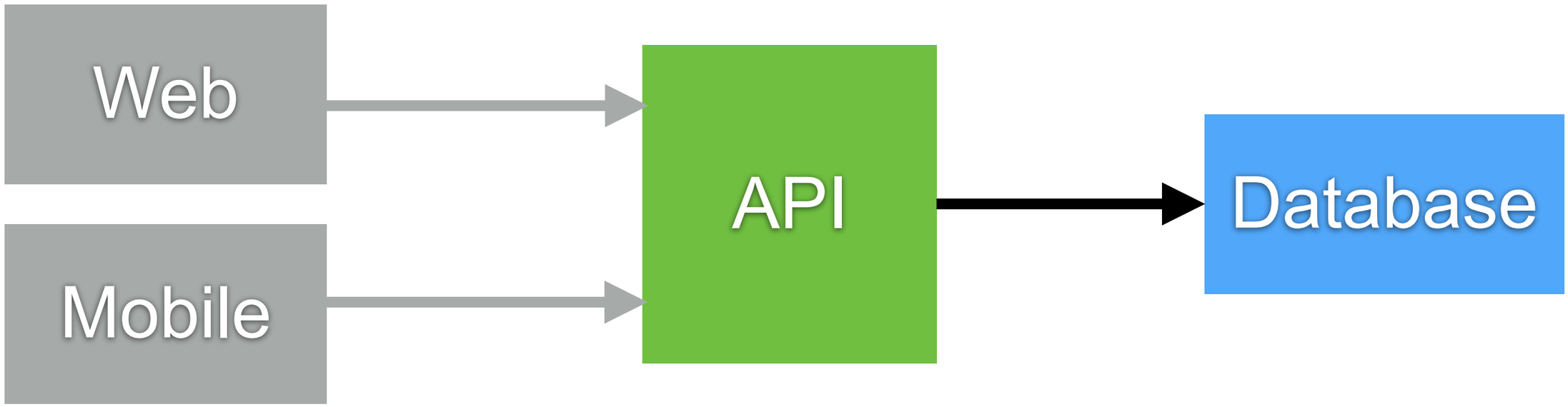
Architecture



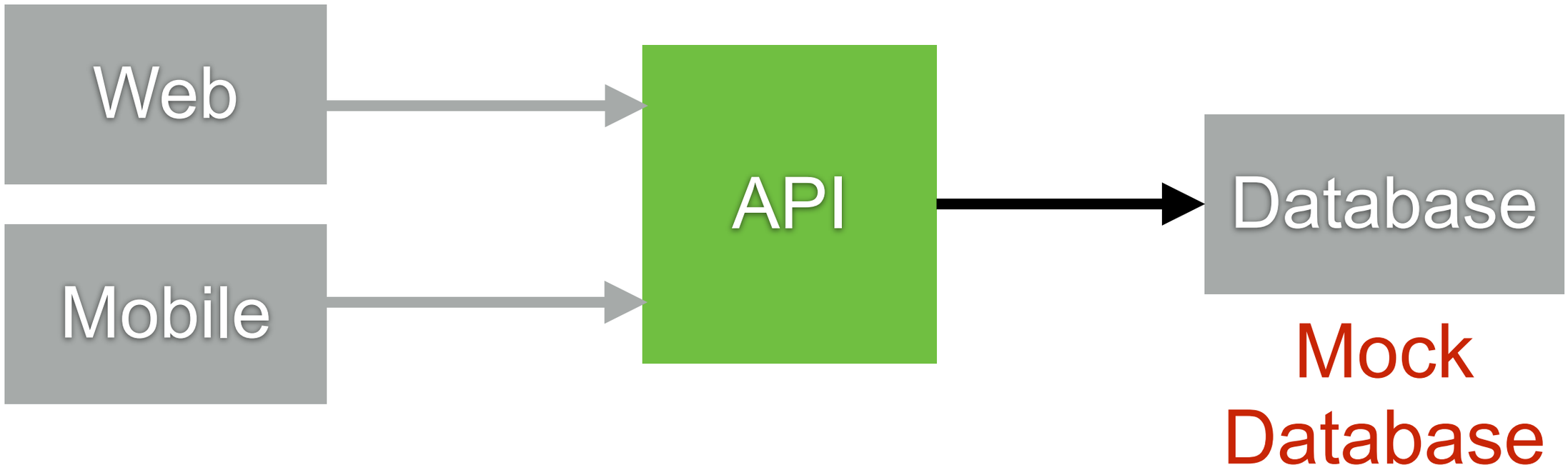
Test ?



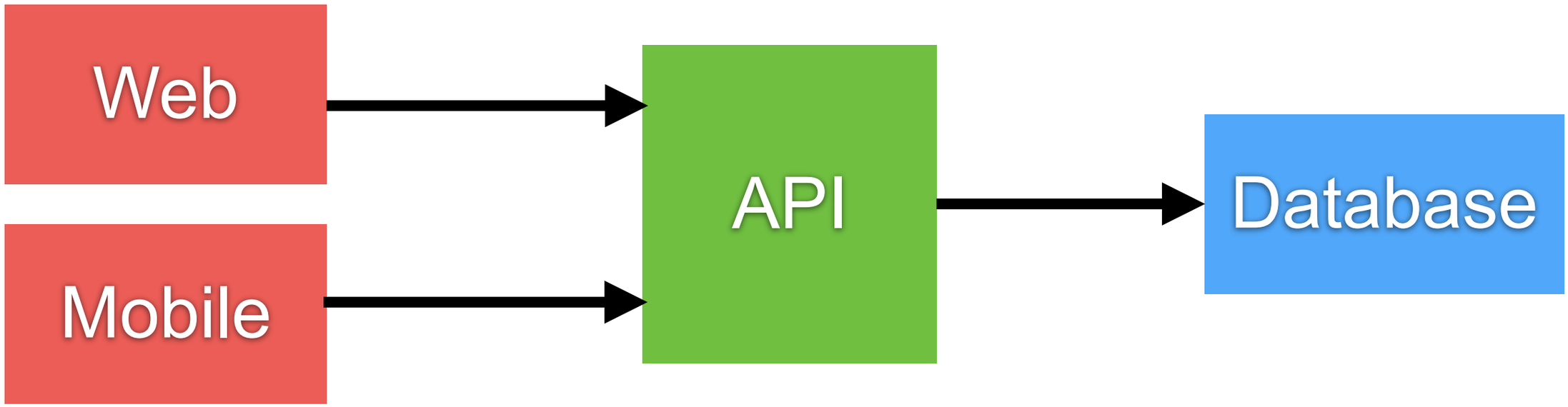
API Testing ?



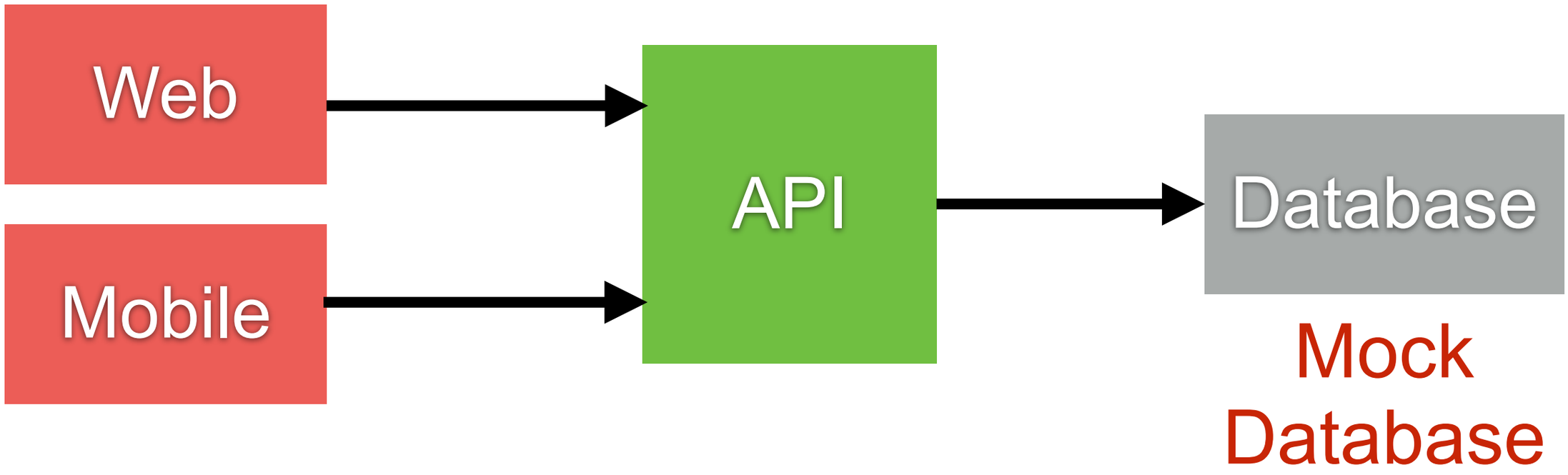
API Testing ?



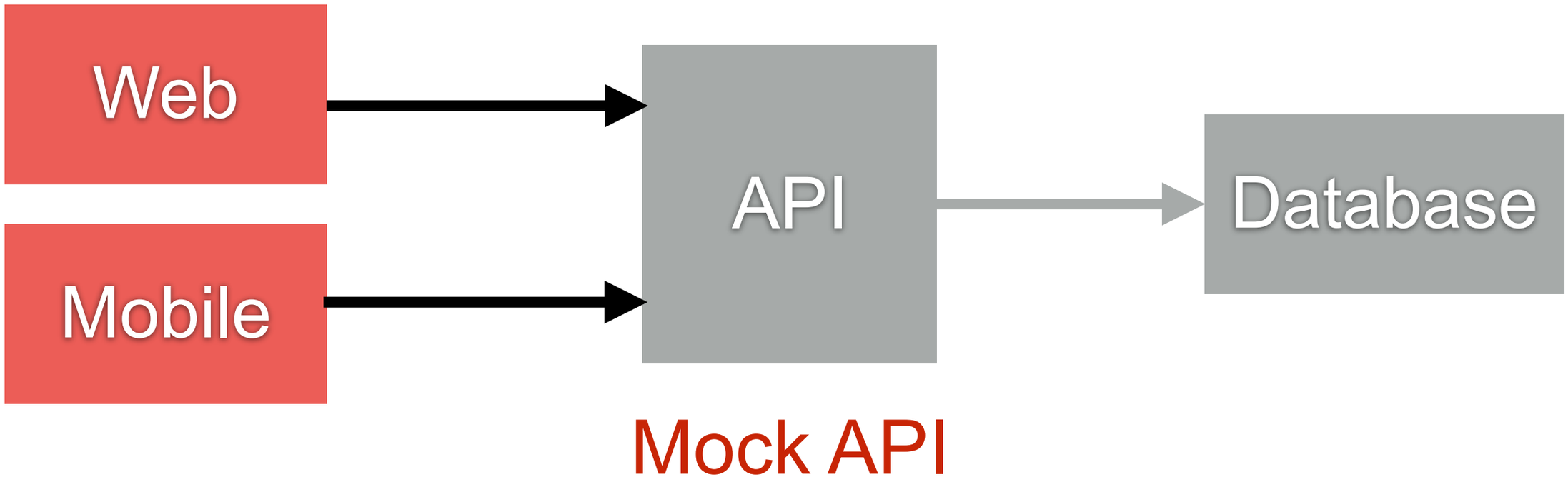
UI Test ?



UI Test ?



UI Test ?



Design Workshop

Example

Login process

Login page

https://demo-login-workshop.vercel.app

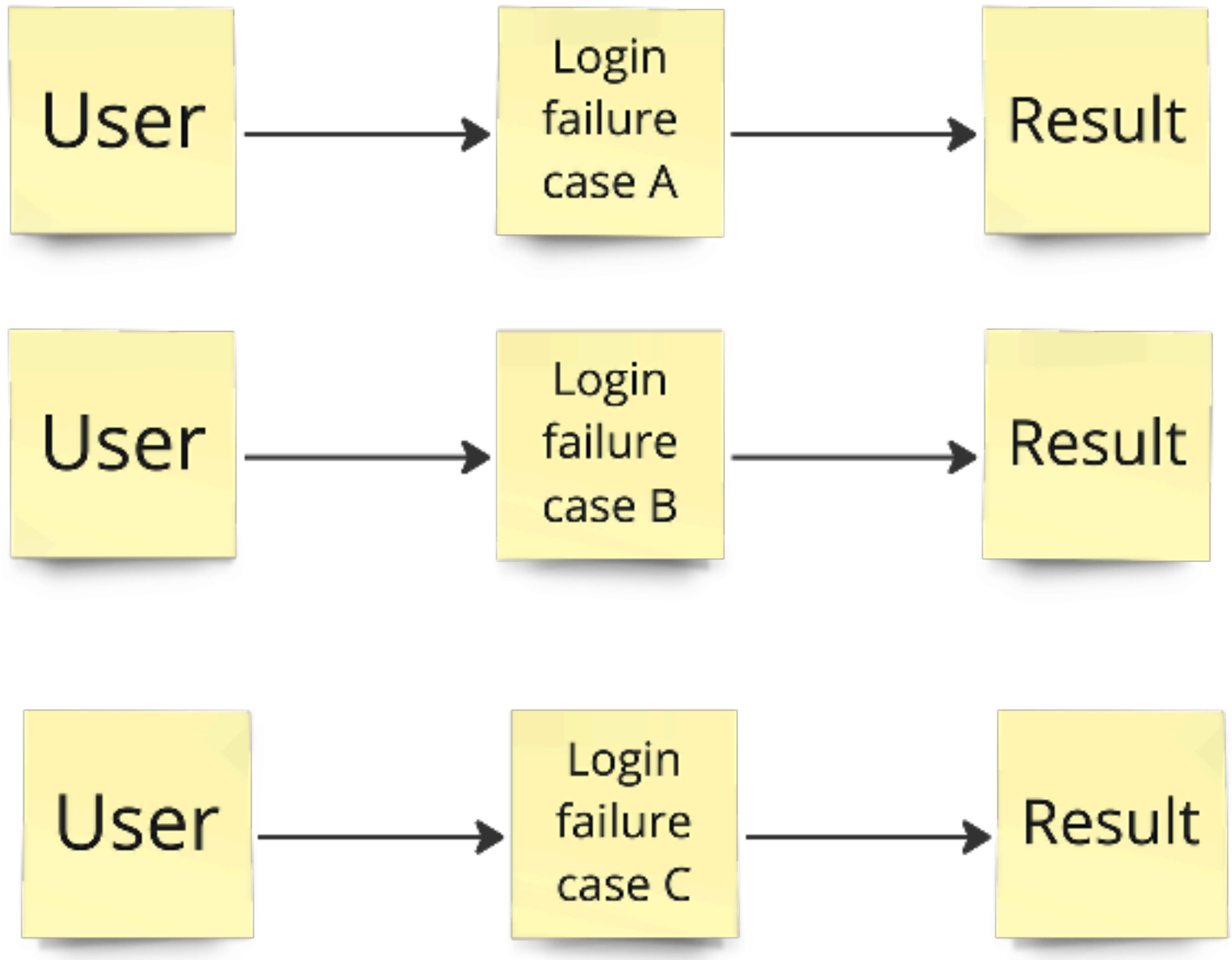
username=**demo**
password=**mode**

Result page

Welcome and Error page

Slicing process

Slicing process for fail case



Test Case =
Business logic + Example Data

Test Cases

Case name	Input		Expected Result
	Username	Password	
Login success	demo	mode	Show welcome page
Login fail case A	demo	mode2	Show error page
Login fail case B	demo2	mode	Show error page
Login fail case C	demo2	mode2	Show error page

More requirement !!

Password Complexity

Password complexity policies are designed to deter brute force attacks by increasing the number of possible passwords. When password complexity policy is enforced, new passwords must meet the following guidelines:

- The password doesn't contain the account name of the user.
- The password is at least eight characters long.
- The password contains characters from three of the following four categories:
  - Latin uppercase letters (A through Z)
  - Latin lowercase letters (a through z)
  - Base 10 digits (0 through 9)
  - Non-alphanumeric characters such as: exclamation point (!), dollar sign ($), number sign (#), or percent (%).

Passwords can be up to 128 characters long. Use passwords that are as long and complex as possible.

https://learn.microsoft.com/en-us/sql/relational-databases/security/password-policy?view=sql-server-ver16

Test Cases ?

Case name	Input		Expected Result
	Username	Password	
Login success	demo	mode	Show welcome page
Login fail case A	demo	mode2	Show error page
Login fail case B	demo2	mode	Show error page
Login fail case C	demo2	mode2	Show error page

Testing Tools

Testing Tools

Selenium

cypress

ROBOT FRAMEWORK

appium

Playwright

POSTMAN

Katalon

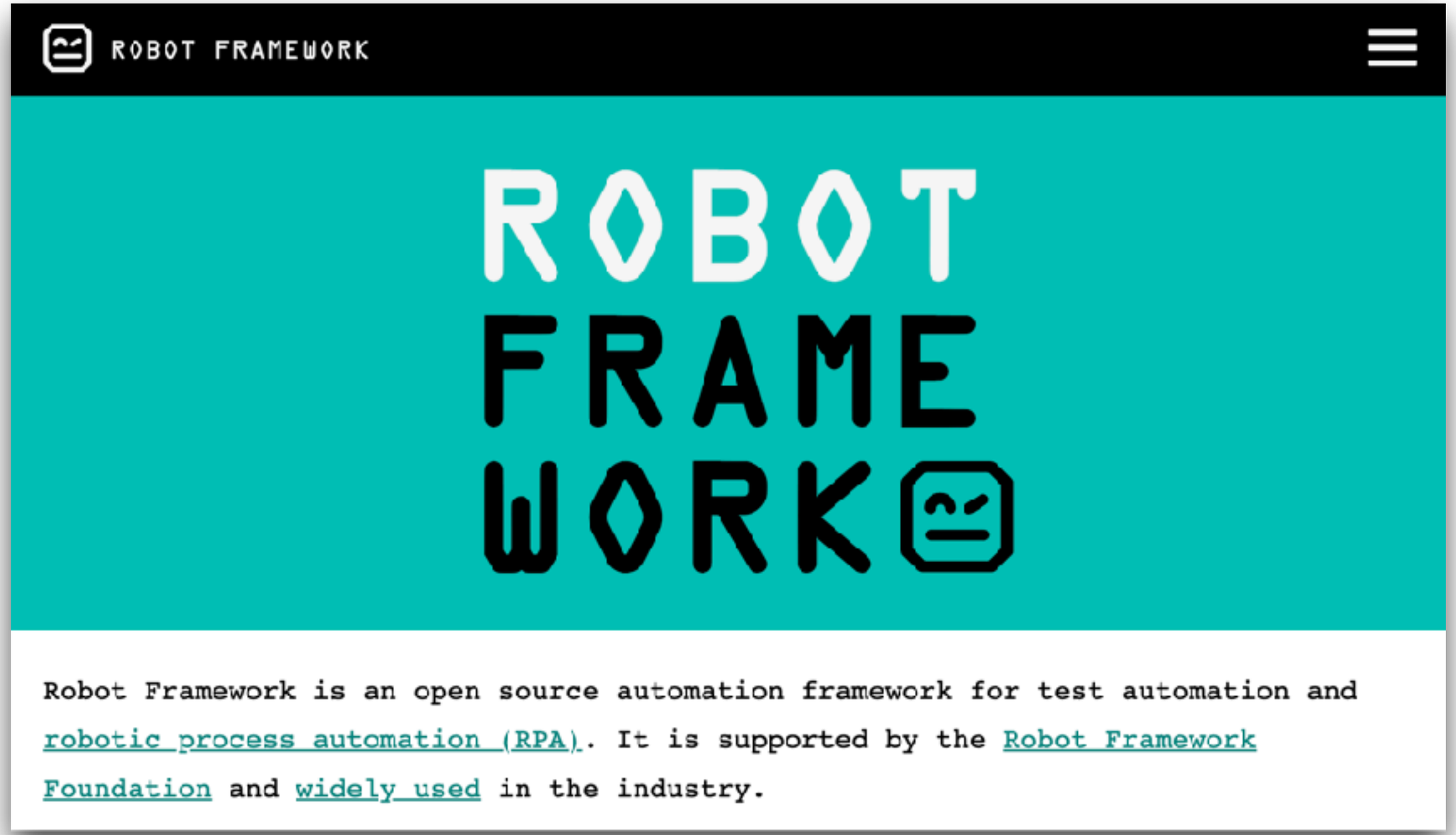
JUnit 5

xUnit.net

Jest

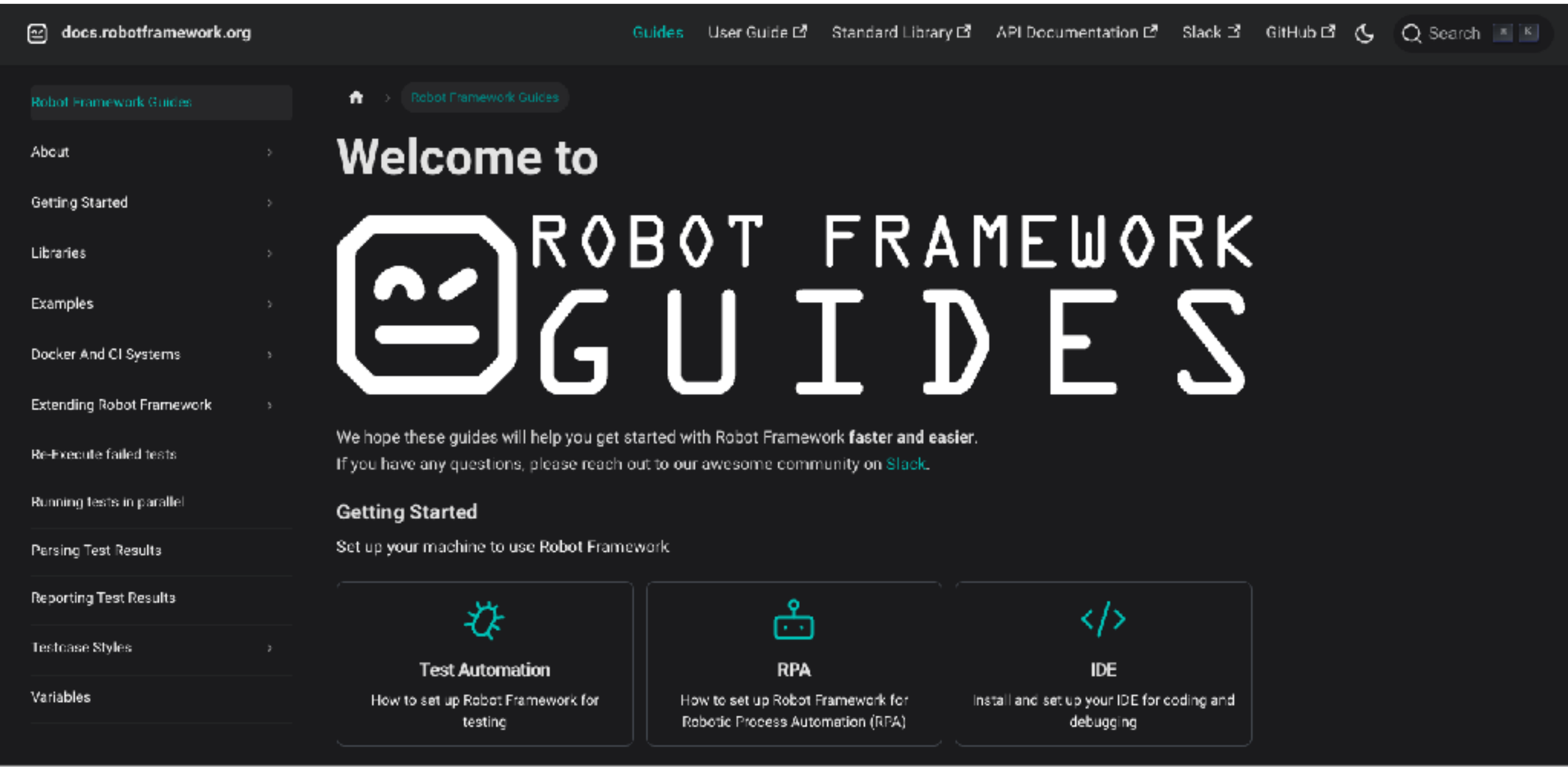
Introduction with Robot Framework

Robot Framework



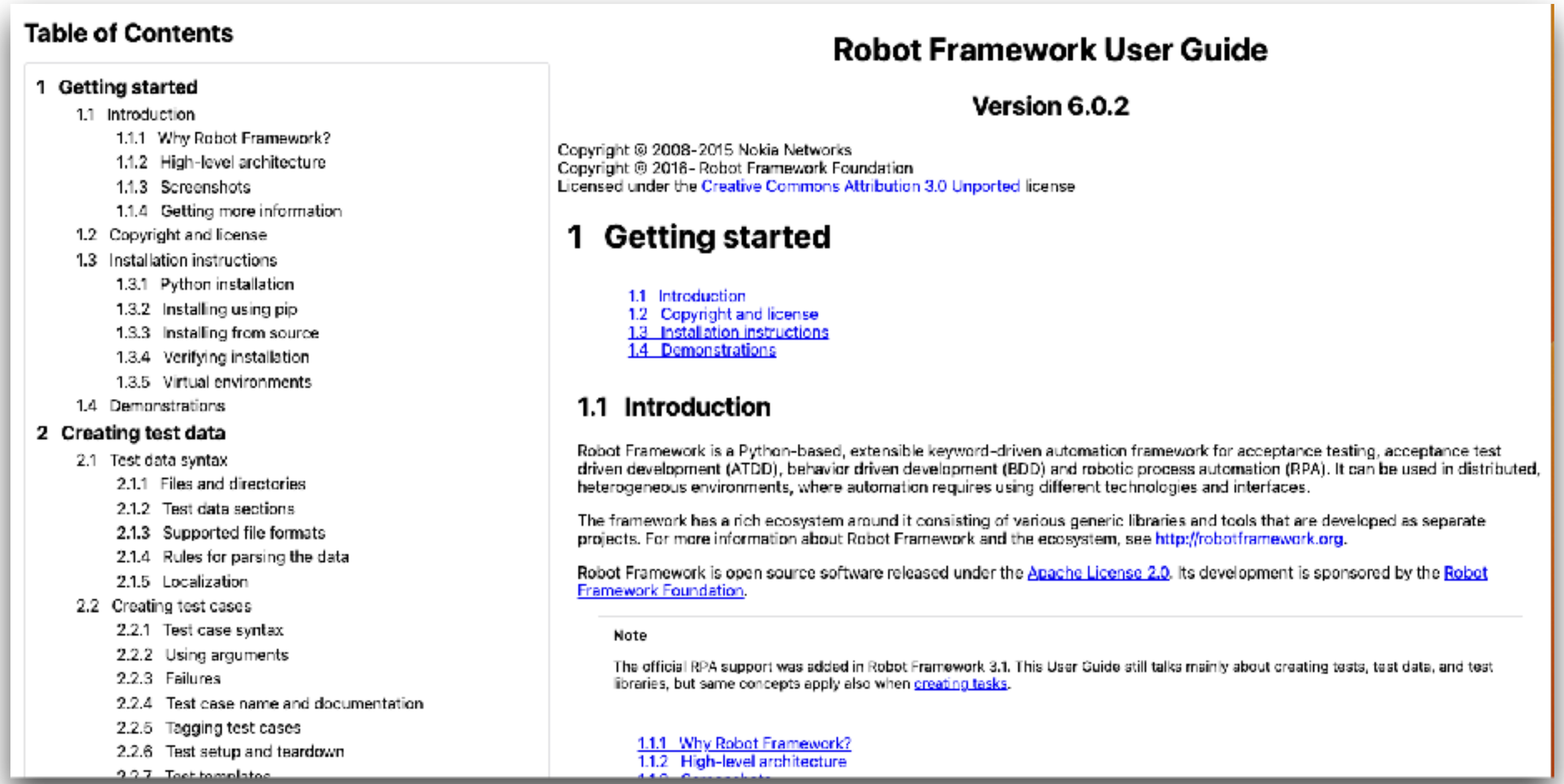
https://robotframework.org/

Guides for beginner



https://docs.robotframework.org/docs

User Guide



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- 1.3 Installation instructions
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Robot Framework User Guide

Version 6.0.2

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1 Getting started

1.1 Introduction
1.2 Copyright and license
1.3 Installation instructions
1.4 Demonstrations

1.1 Introduction

Robot Framework is a Python-based, extensible keyword-driven automation framework for acceptance testing, acceptance test driven development (ATDD), behavior driven development (BDD) and robotic process automation (RPA). It can be used in distributed, heterogeneous environments, where automation requires using different technologies and interfaces.

The framework has a rich ecosystem around it consisting of various generic libraries and tools that are developed as separate projects. For more information about Robot Framework and the ecosystem, see http://robotframework.org.

Robot Framework is open source software released under the Apache License 2.0. Its development is sponsored by the Robot Framework Foundation.

Note

The official RPA support was added in Robot Framework 3.1. This User Guide still talks mainly about creating tests, test data, and test libraries, but same concepts apply also when creating tasks.

1.1.1 Why Robot Framework?
1.1.2 High-level architecture

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html

Build-in Library

LIBRARIES | BUILT-IN | TOOLS

Libraries and tools that are bundled with the framework. Libraries provide the actual automation and testing capabilities to Robot Framework by providing keywords.

Filter by tag

Name	Description	Tags
Builtin	Provides a set of often needed generic keywords. Always automatically available without imports.	LIBRARY
Collections	Provides a set of keywords for handling Python lists and dictionaries.	LIBRARY
DateTime	Library for date and time conversions.	LIBRARY
Dialogs	Provides means for pausing the execution and getting input from users.	LIBRARY
Libdoc	Generate keyword documentation for test libraries and resource files.	TCOL

https://robotframework.org/?tab=builtin#resources

3-parties Library

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.	1233	WEB, SELENIUM
RPA framework	Collection of open-source libraries and tools for Robotic Process Automation (RPA), designed to be used both with Robot Framework and Python.	805	RPA
HTTP RequestsLibrary (Python)	HTTP level testing using Python Requests internally.	444	HTTP
Browser Library	A modern web testing library powered by Playwright. Aiming for speed, reliability and visibility.	378	WEB
AppiumLibrary	Android and iOS testing. Uses Appium internally.	345	MOBILE

https://robotframework.org/?tab=libraries#resources

Software Requirement

Software Requirements

3+

Check python

$python -V

$pip -V

Install robot framework

$pip install robotframework

$pip install robotframework-seleniumlibrary

Check robot framework

$pip list

```
redis                                 4.5.3
requests                              2.29.0
robotframework                        6.1a1
robotframework-appiumlibrary          2.0.0
robotframework-pythonlibcore          4.1.2
robotframework-seleniumlibrary        6.0.0
selenium                              4.8.2
setuptools                            58.0.4
```

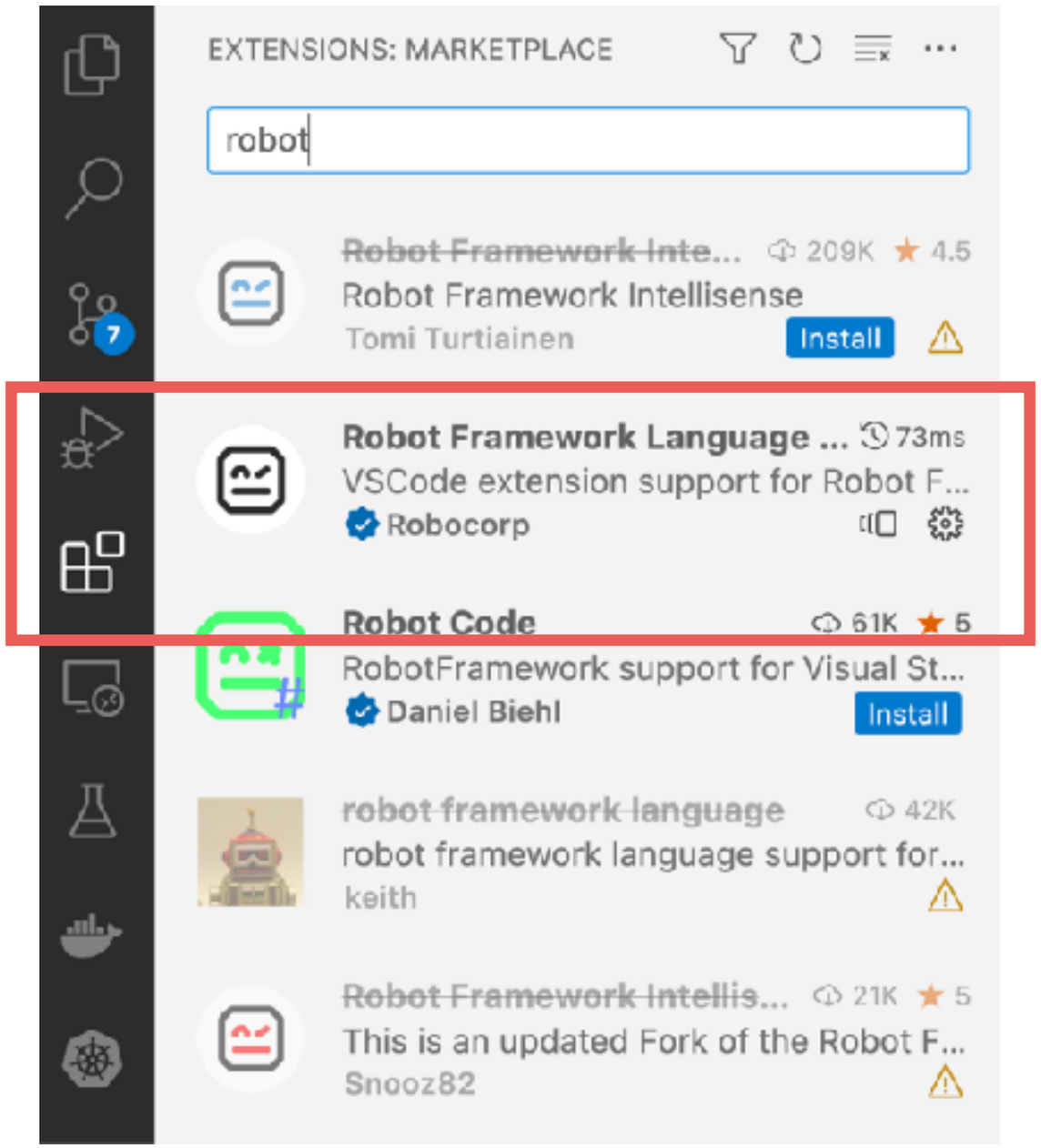
Check Robot Framework

$robot

```
[ ERROR ] Expected at least 1 argument, got 0.

Try --help for usage information.
```

VS Code Extension



Let’ start

Write First Test Case

Good Test ?

F.I.R.S.T - U

Fast
Isolated
Repeatable
Self-verify
Timely, Thought
Understanding

Test Structure

hello.robot

```
*** Settings ***

*** Variables ***


*** Test Cases ***

*** Keywords ***
```

https://docs.robotframework.org/docs/style_guide

Hello Robot Framework

```
*** Settings ***
Library             SeleniumLibrary

*** Variables ***
${URL}              https://www.google.com
${BROWSER}          chrome

*** Test Cases ***
Open Browser
    Open Browser    ${URL}      browser=${BROWSER}
    Maximize Browser Window
    Close Browser
```

Sections

Section Name	Used for
Settings	Import libraries, resource files and variable files Define metadata for test suites and test cases
Variables	Define variables
Test Cases	Create test cases
Tasks	Create tasks
Keywords	Create user keywords

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#test-data-sections

Start with Test Cases

Case name	Input		Expected Result
	Username	Password	
Login success	demo	mode	Show welcome page
Login fail case A	demo	mode2	Show error page
Login fail case B	demo2	mode	Show error page
Login fail case C	demo2	mode2	Show error page

Run test

$robot hello.robot

UI testing
with
Robot Framework

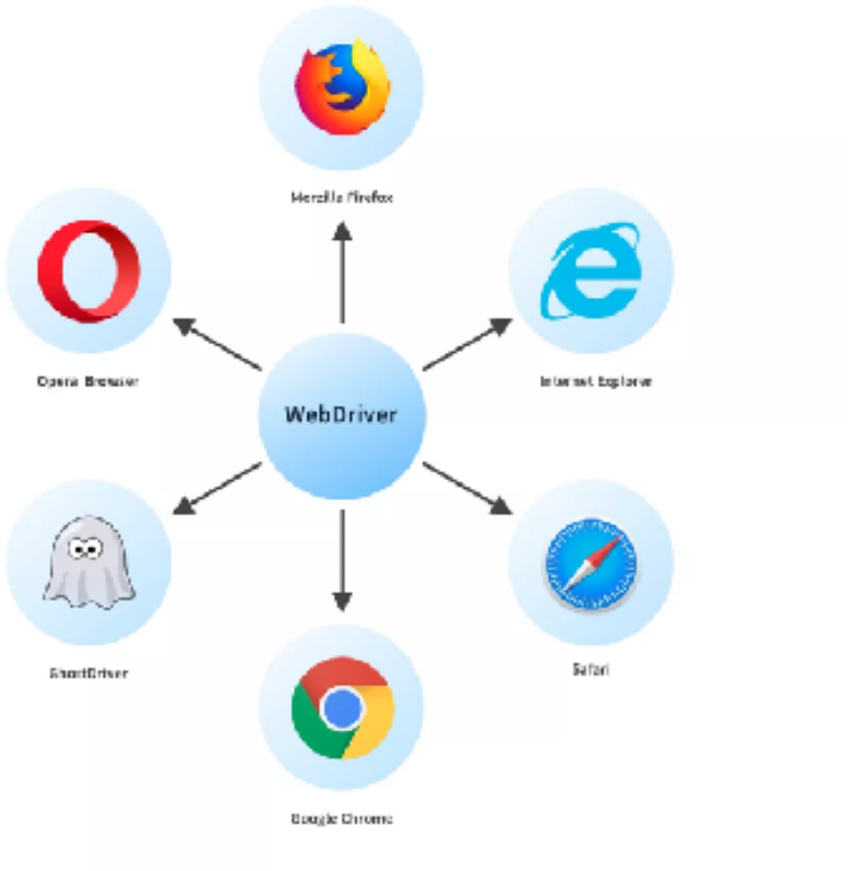
UI Testing (Web)

Selenium Library
Browser Library

https://robotframework.org/?tab=libraries#resources

Selenium Library

Use selenium project
Support multiple web browsers

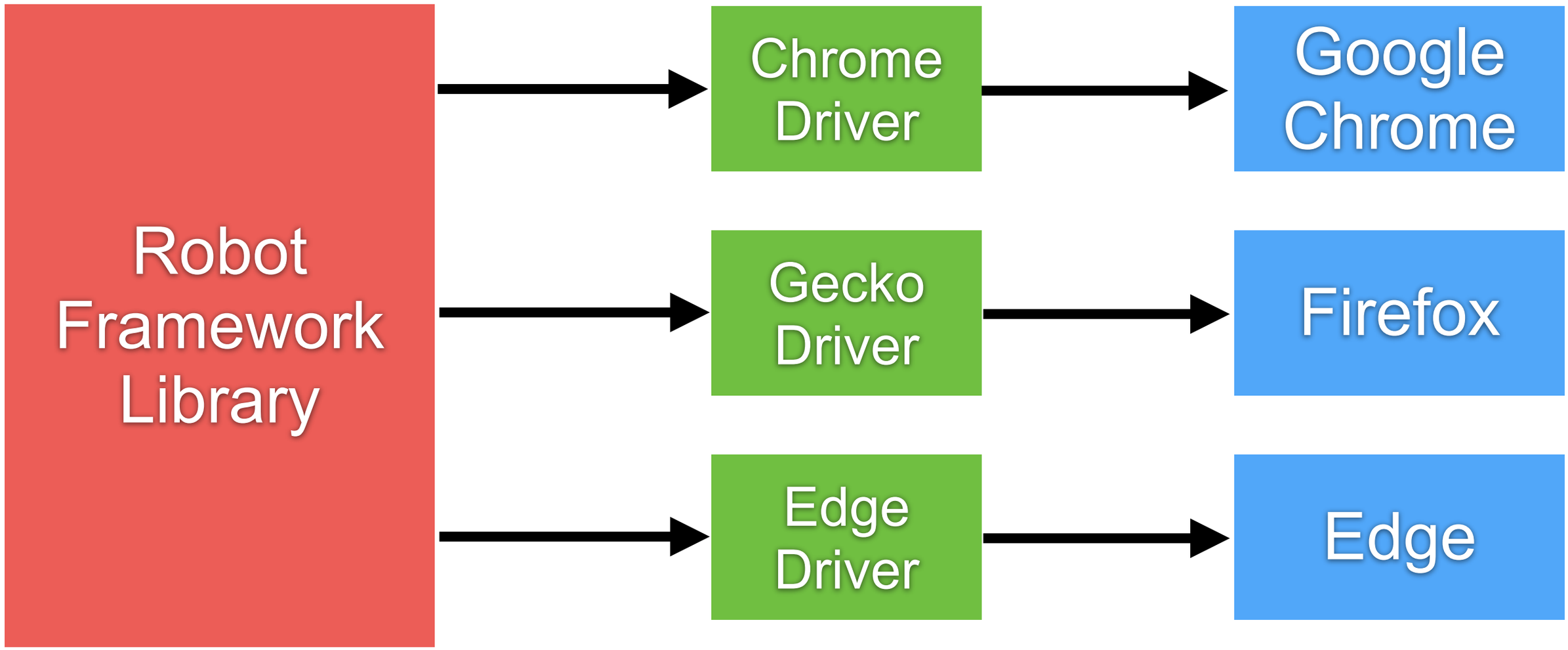


https://github.com/robotframework/SeleniumLibrary

Installation

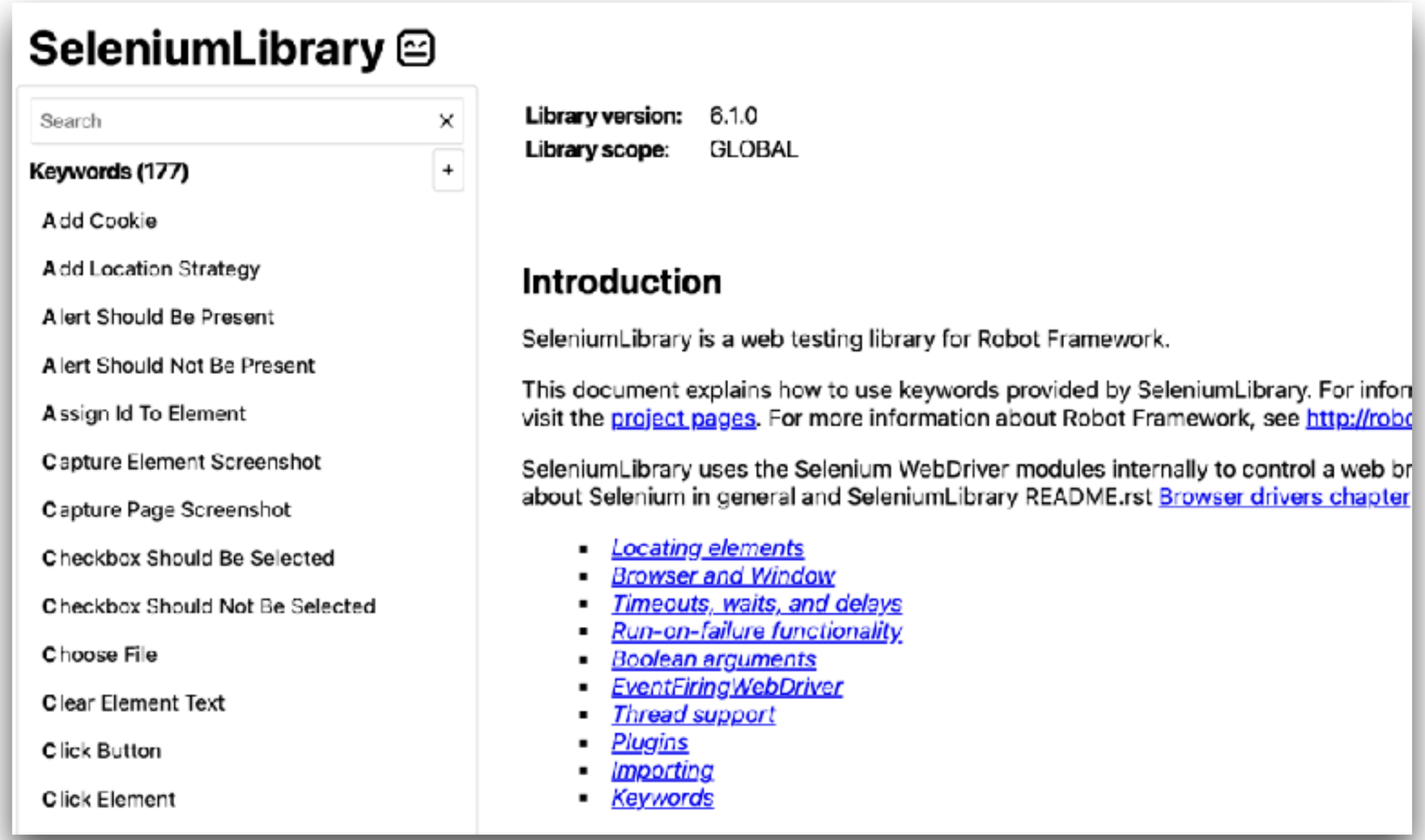
$pip install -U robotframework-seleniumlibrary
$pip list

Selenium Library



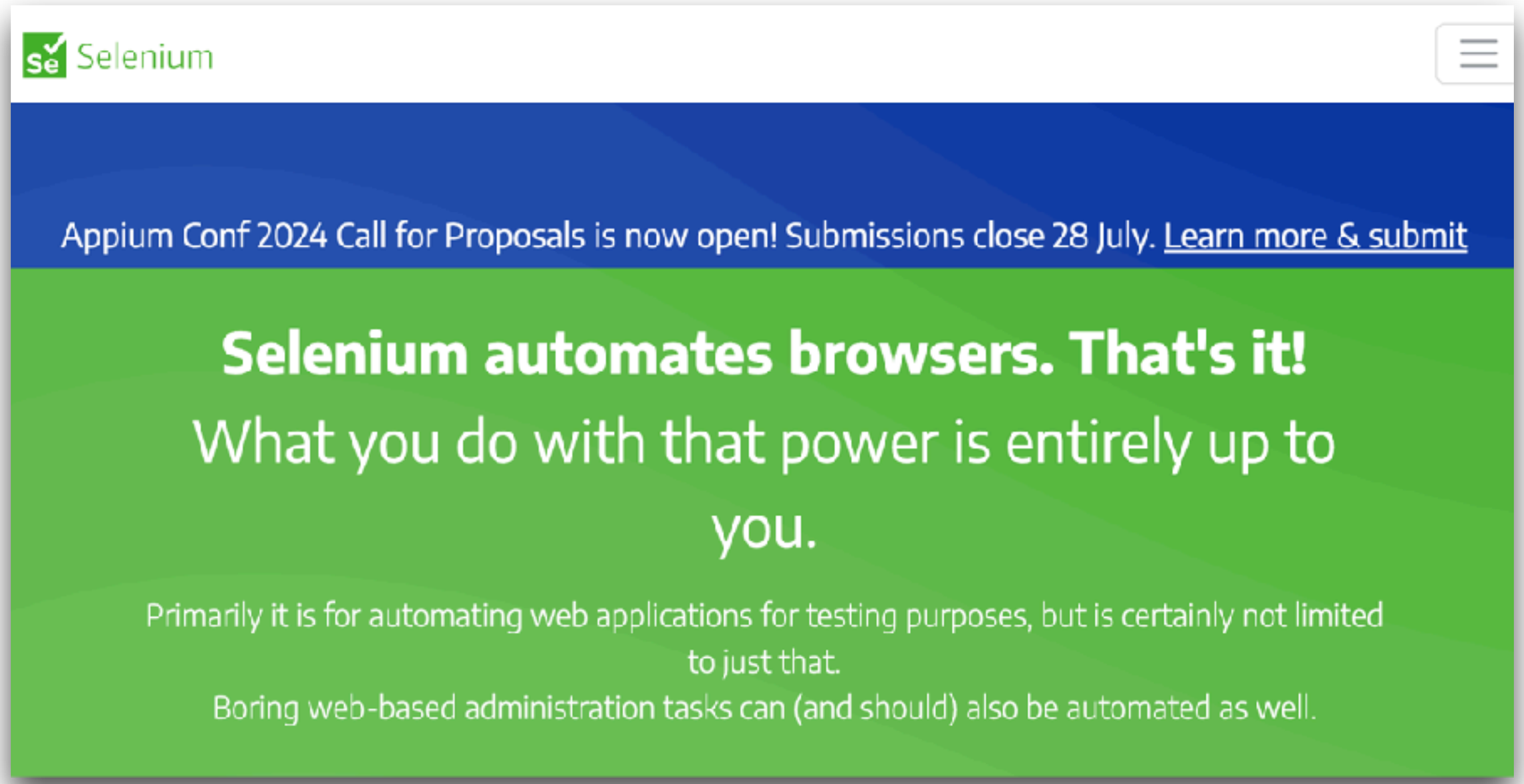
https://github.com/robotframework/SeleniumLibrary

Selenium Library Keywords



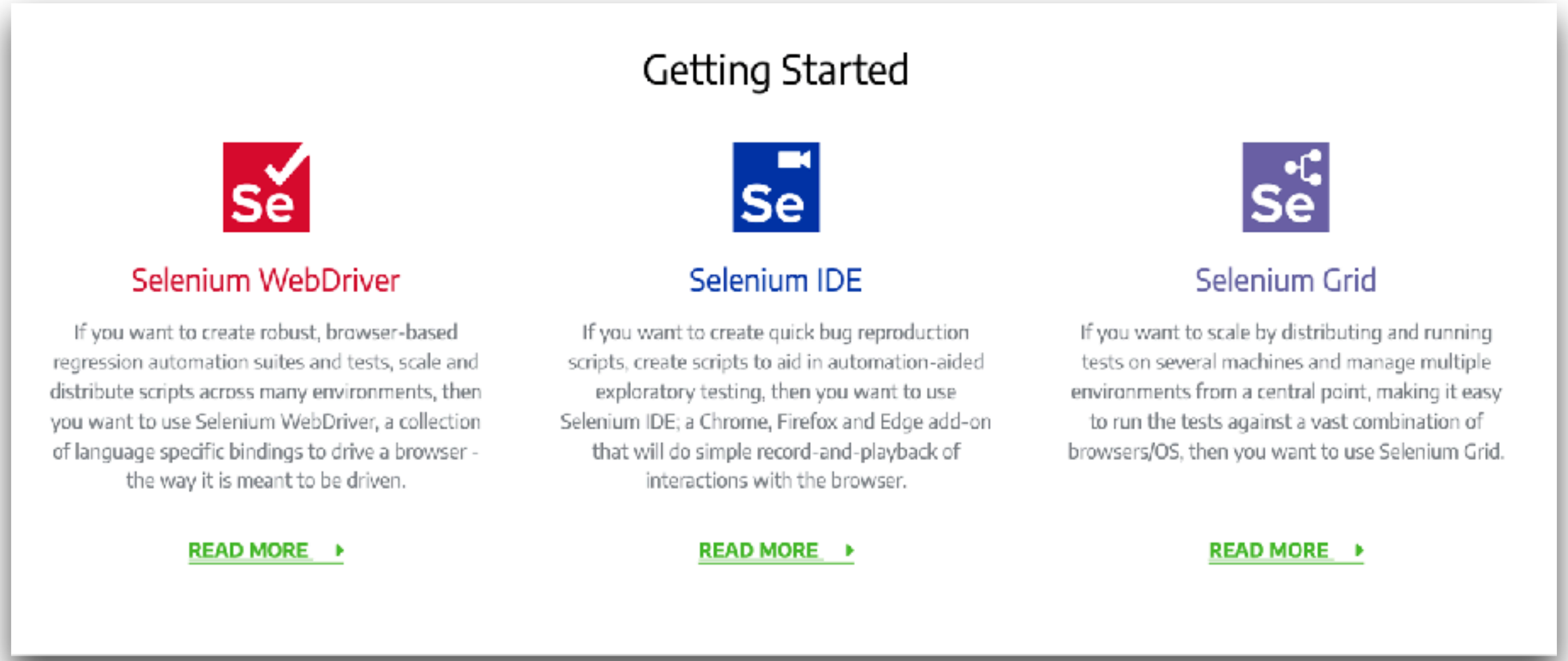
https://robotframework.org/SeleniumLibrary/SeleniumLibrary.html

Selenium



https://www.selenium.dev/

Selenium projects



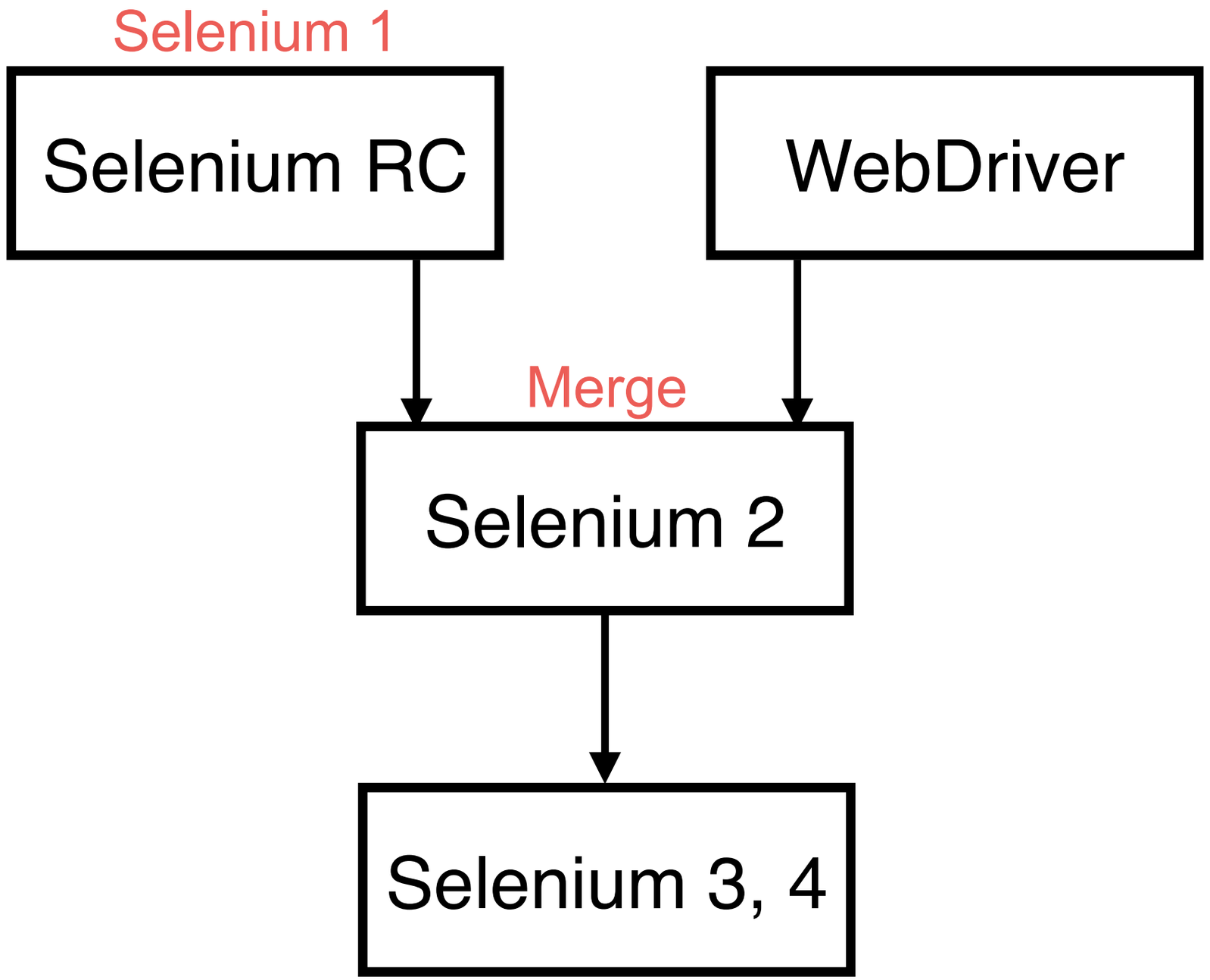
https://www.selenium.dev/

Selenium projects

Selenium WebDriver	Selenium IDE	Selenium Grid

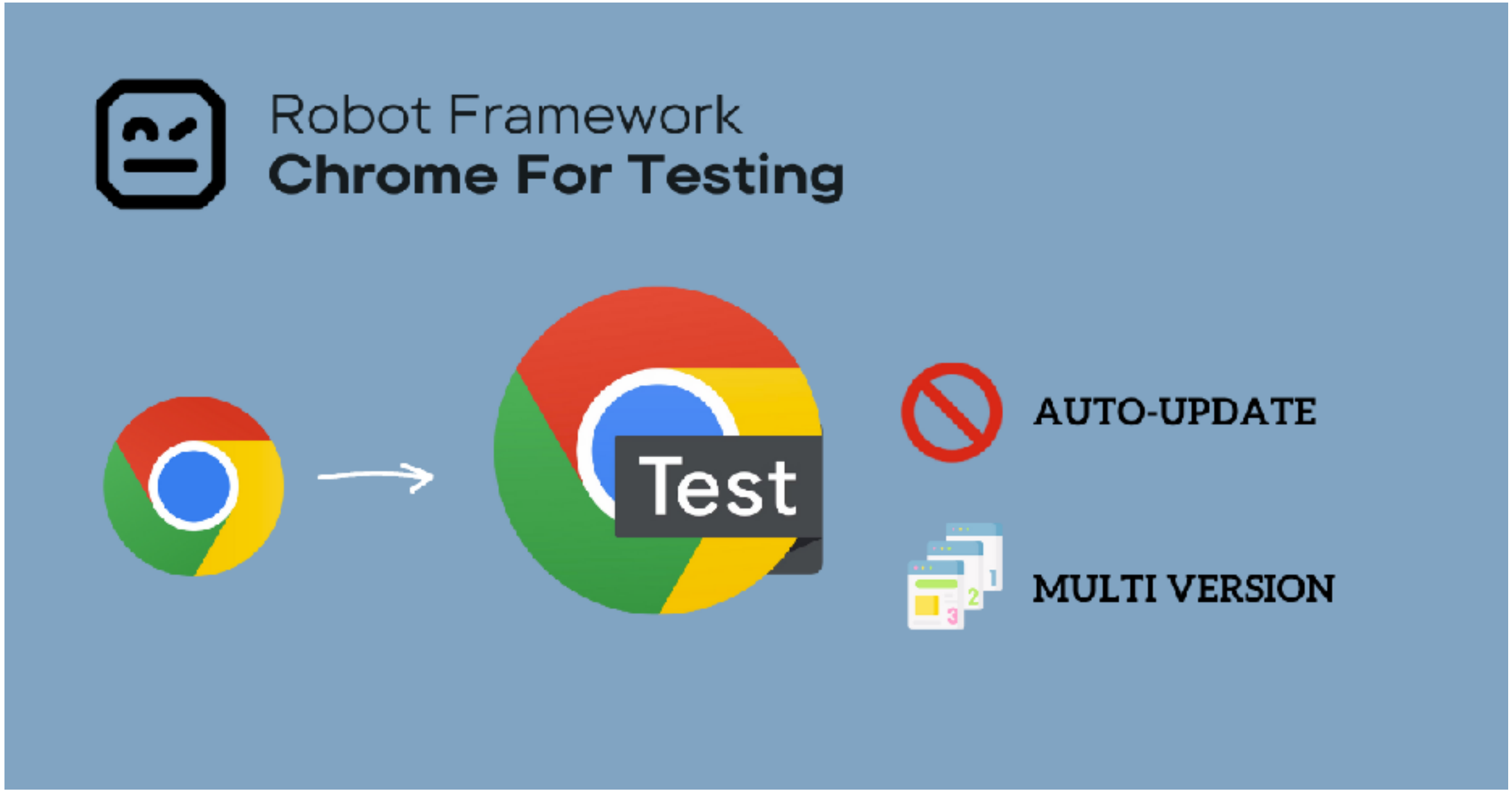
https://www.selenium.dev/

Selenium WebDriver



https://www.selenium.dev/

Chrome for Testing



https://googlechromelabs.github.io/chrome-for-testing/

Working with Chrome for Testing

```
*** Settings ***
Library             SeleniumLibrary

*** Variables ***
${URL}              https://www.google.com
${BROWSER}          chrome
${CHROME_FOR_TEST}    ${CURDIR}/chrome-mac-arm64

*** Test Cases ***
Open Browser
    Open Browser    ${URL}    browser=${BROWSER}
    ...  options=binary_location="${CHROME_FOR_TEST}"
    Maximize Browser Window
    Close Browser
```

Workshop with First test case

$robot hello.robot

Web Element Locators !!

How to access ?

Web Element Location

Identifier
id
name
XPath
CSS Selector
Class name

Web Element Location

Strategy	Match based on	Example
id	Element `id`.	`id:example`
name	`name` attribute.	`name:example`
identifier	Either `id` or `name`.	`identifier:example`
class	Element `class`.	`class:example`
tag	Tag name.	`tag:div`
xpath	XPath expression.	`xpath://div[@id="example"]`
css	CSS selector.	`css:div#example`
dom	DOM expression.	`dom:document.images[5]`
link	Exact text a link has.	`link:The example`
partial link	Partial link text.	`partial link:he ex`
sizzle	Sizzle selector deprecated.	`sizzle:div.example`
data	Element `data-*` attribute	`data:id:my_id`
jquery	jQuery expression.	`jquery:div.example`
default	Keyword specific default behavior.	`default:example`

https://robotframework.org/SeleniumLibrary/SeleniumLibrary.html

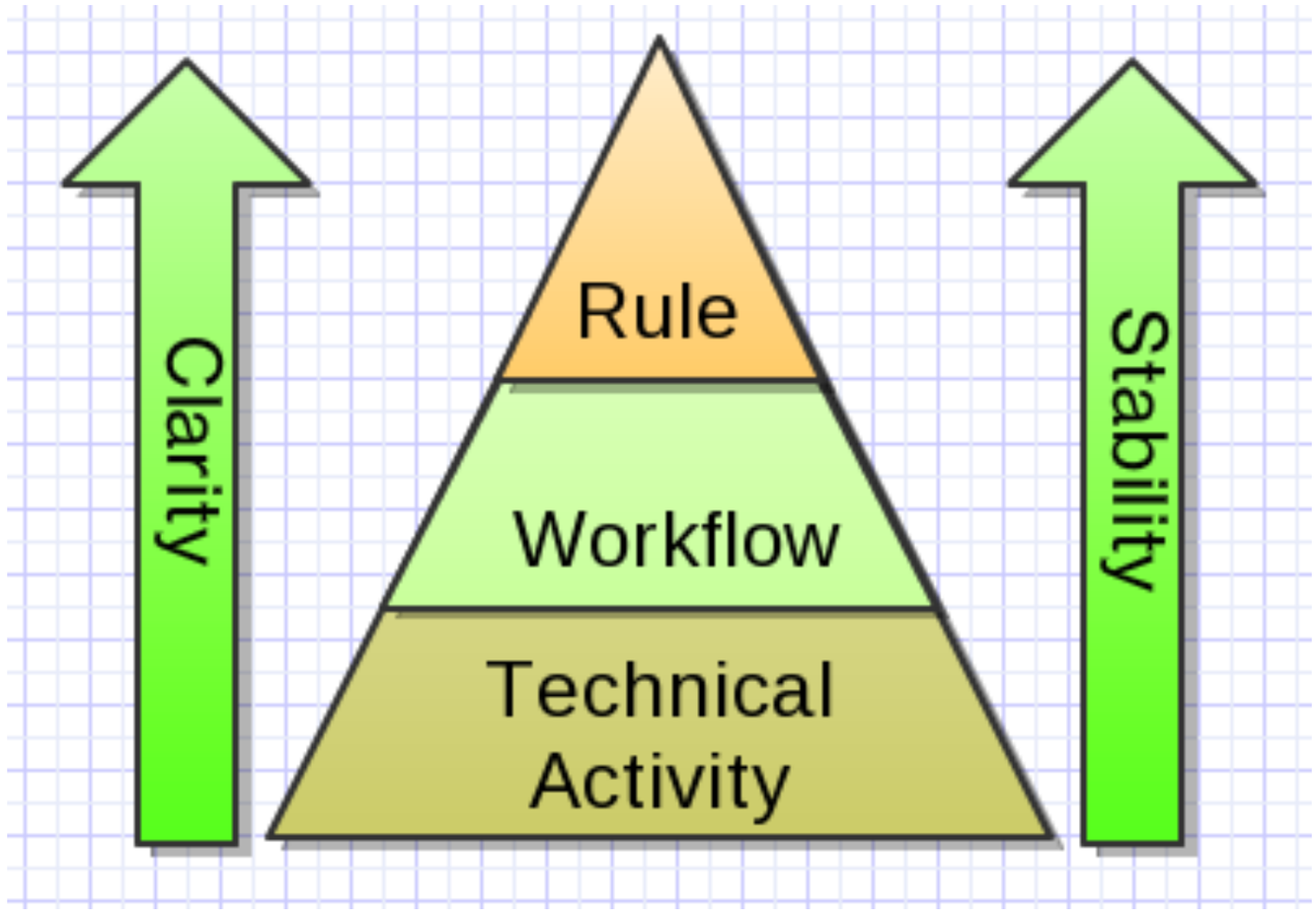
Bad locator === Flaky test

https://testing.googleblog.com/2016/05/flaky-tests-at-google-and-how-we.html

Improve your test case

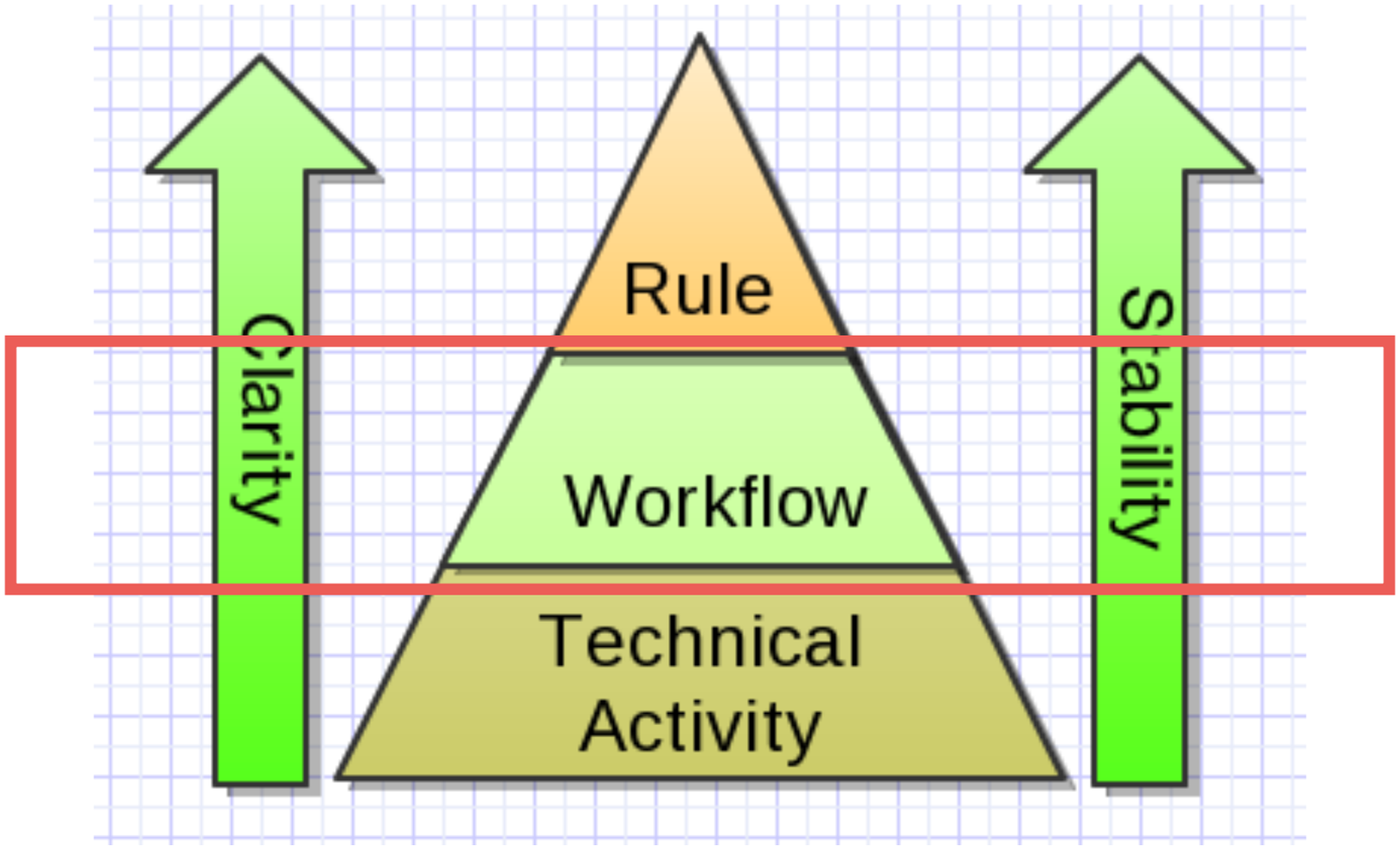
More understanding

3 levels of UI Automation Test



https://gojko.net/2010/04/13/how-to-implement-ui-testing-without-shooting-yourself-in-the-foot-2/

User Interface workflow



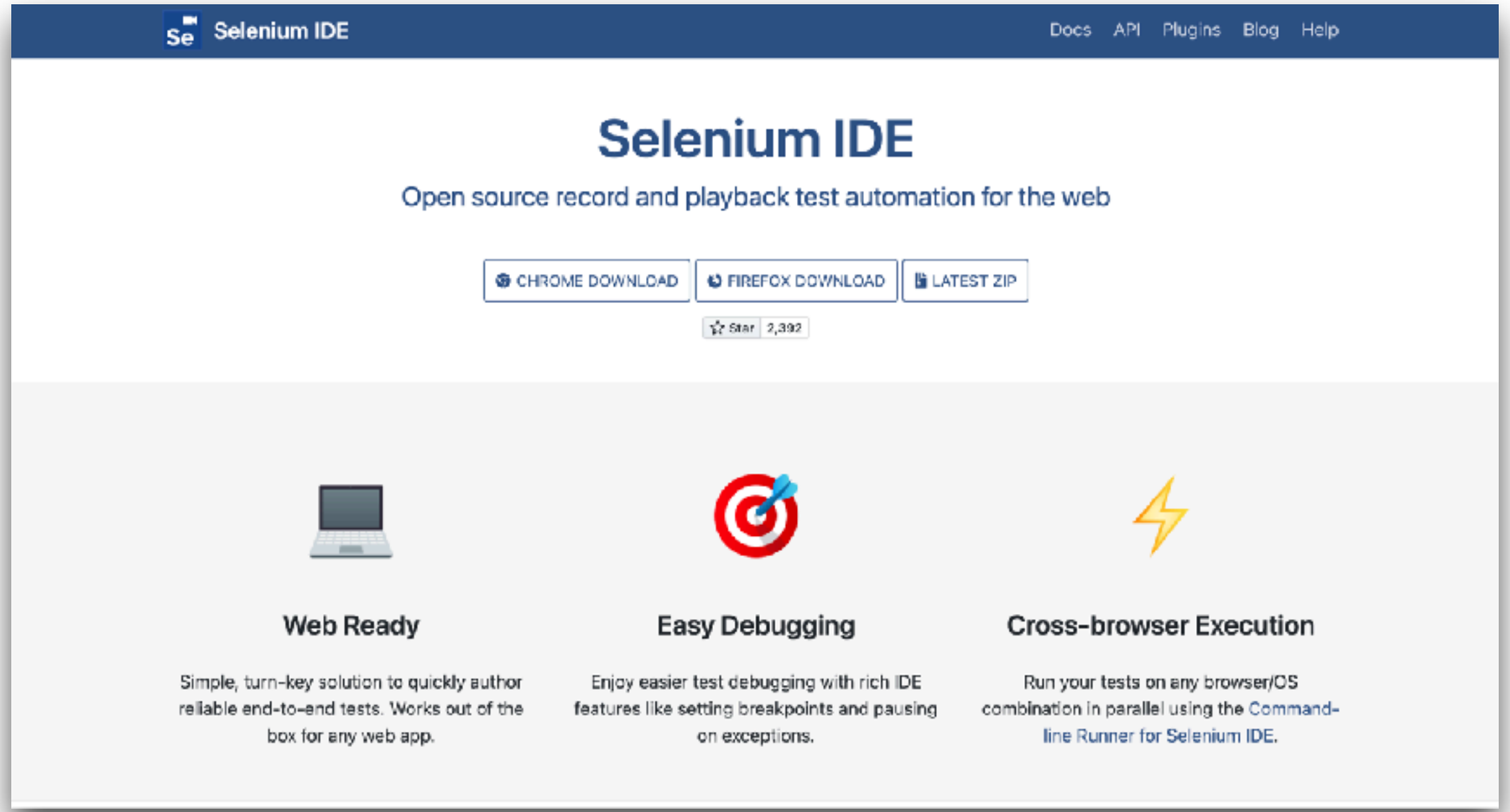
https://gojko.net/2010/04/13/how-to-implement-ui-testing-without-shooting-yourself-in-the-foot-2/

Recording Tools

Recording Tools

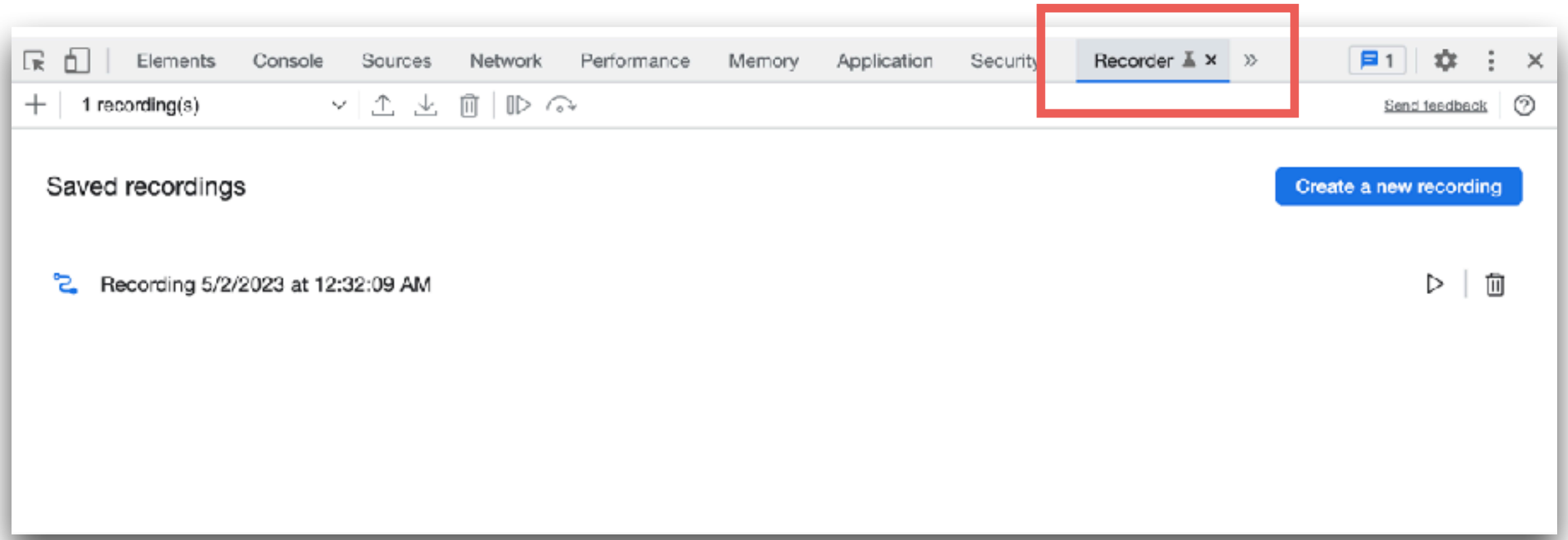
Selenium IDE
Google Chrome Recorder

Selenium IDE



https://www.selenium.dev/selenium-ide/

Google Chrome Recorder



https://developer.chrome.com/docs/devtools/recorder/

Arguments in Keyword

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#creating-user-keywords

Arguments in Keyword

Keyword arguments
Embedding arguments in keyword

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#creating-user-keywords

Keyword arguments

```
*** Settings ***
Library    SeleniumLibrary

*** Test Cases ***
Login fail case with wrong username
    Fill in    demo    mode

*** Keywords ***
Fill in
    [Arguments]    ${username}    ${password}
    Input Text    id=username_field    ${username}
    Input Text    id=password_field    ${password}
```

Embedding arguments

```
*** Settings ***
Library    SeleniumLibrary

*** Test Cases ***
Login fail case with wrong username
    Fill in with user='demo' and password='mode'

*** Keywords ***
Fill in with user='${username}' and password='${password}'
    Input Text    id=username_field    ${username}
    Input Text    id=password_field    ${password}
```

Grouping test case with Tag

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#tagging-test-cases

Use Tag in test case

```
*** Test Cases ***
Login fail case with wrong username
    [Tags]  feature01   done
    Fill in with user='demo2' and password='mode'

Login fail case with wrong password
    [Tags]  feature01   done
    Fill in with user='demo' and password='mode2'

Login fail case with wrong username and password
    [Tags]  feature01   testing
    Fill in with user='demo2' and password='mode2'
```

$robot -i testing hello.robot

$robot -e testing hello.robot

Using Variables

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#variables

Variables

Scalar => ${var}

List => @{var}

Dictionary => &{var}

Environment variable => %{ENV_VAR}

Build-in Variables

${SPACE}
${SPACE*5}

${EMPTY}

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#built-in-variables

Use variables from command line

Try to change value in test case ?

```
*** Keywords ***
Open Login Page
    Open Browser  https://demo-login-workshop.vercel.app/
    ...  browser=chrome
```

Change URL and browser ?

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#built-in-variables

Use variables from command line

Create new variables

```
*** Variables ***
${URL}    https://demo-login-workshop.vercel.app/
${BROWSER}    chrome

*** Keywords ***
Open Login Page
    Open Browser  ${URL}
    ...  browser=${BROWSER}
```

Use variables from command line

Change data from command line

$robot -v URL:**new** -v BROWSER:**new**

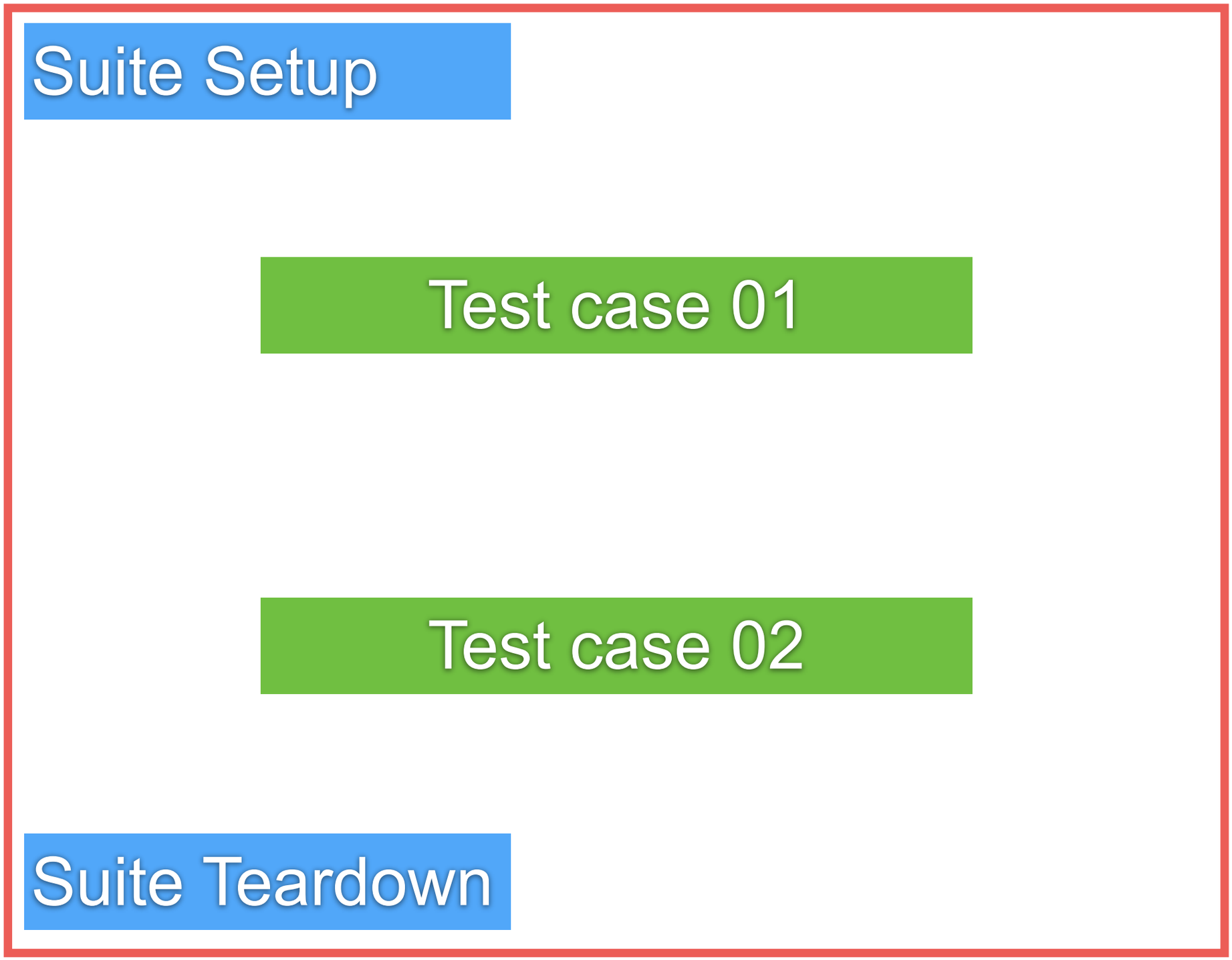
Test Life Cycle

Testing life cycle

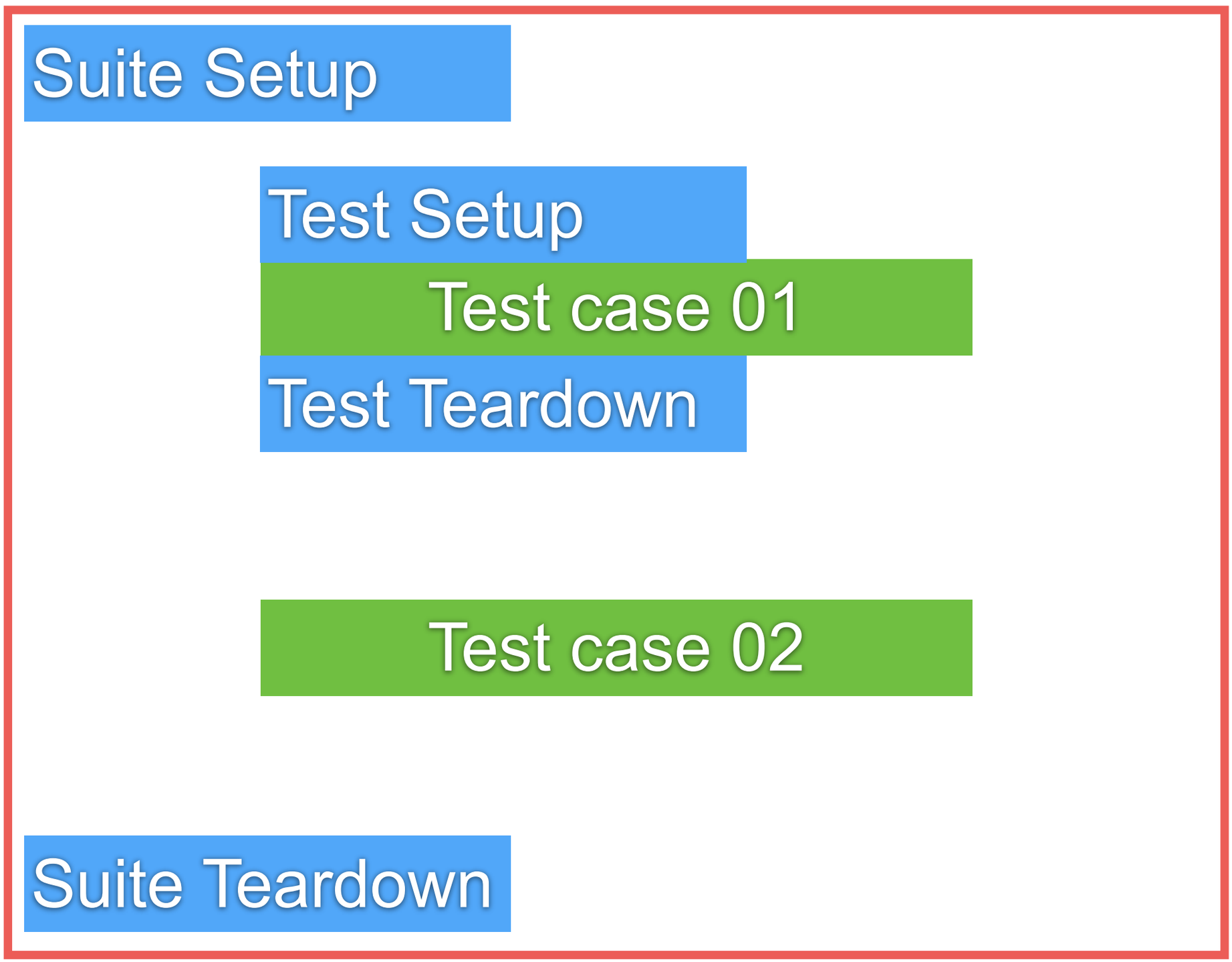
Test case 01

Test case 02

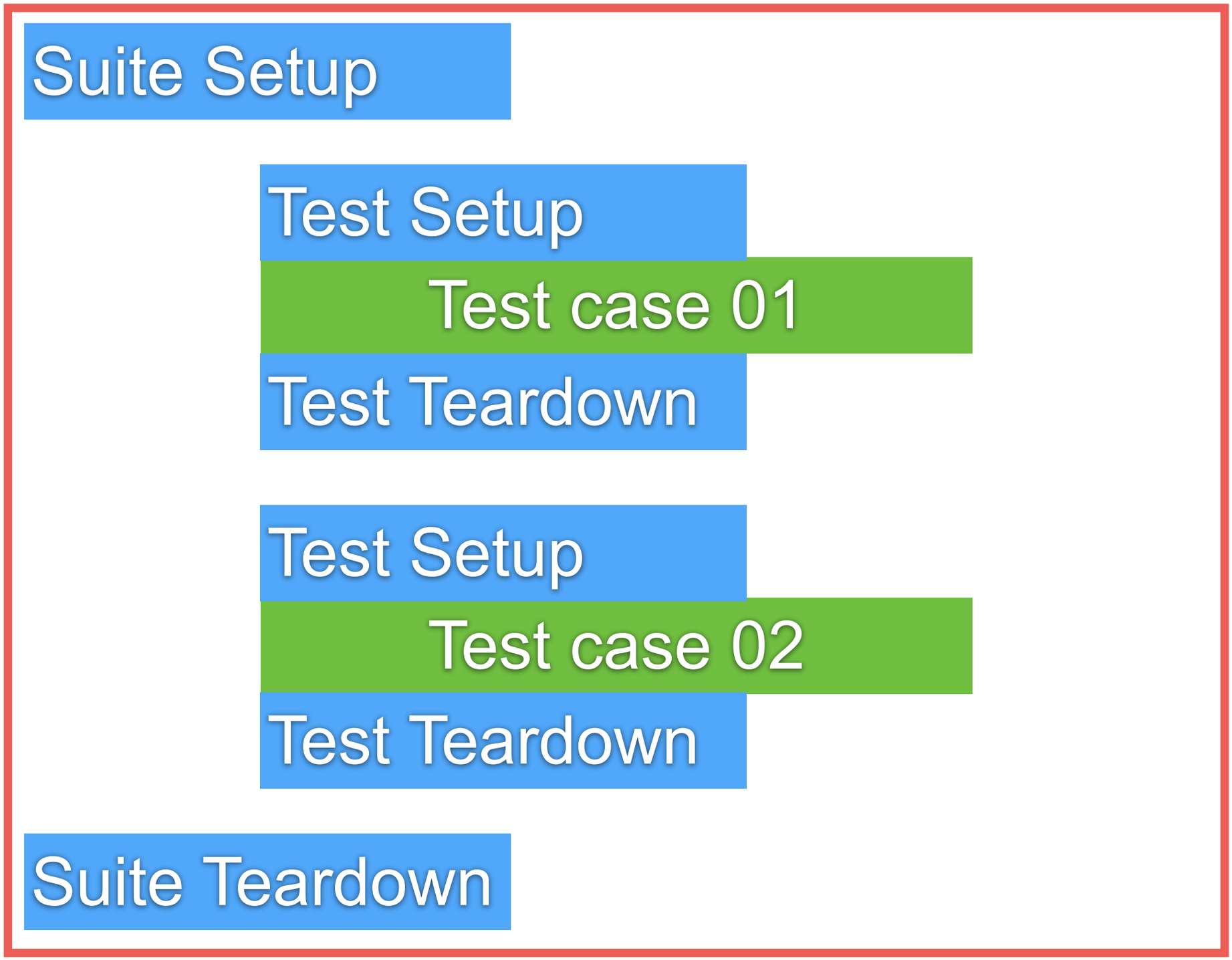
Testing life cycle



Testing life cycle



Testing life cycle



Workshop with Test life cycle

Test Template

Test template

Template per suite
Template per test case

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#test-templates

Template per suite

```
*** Settings ***
Test Template     Flow of login success

*** Keywords ***
Flow of login success
    [Arguments]  ${input}
    Should Be Equal    first    ${input}
```

Template per suite

```
*** Settings ***
Test Template     Flow of login success

*** Keywords ***
Flow of login success
    [Arguments]  ${input}
    Should Be Equal    first    ${input}

*** Test Cases ***
Case 01     data 1
Case 02     data 2
Case 03     data 3
```

Template per test case

```
*** Test Cases ***
Success case
    [Template]    Flow of login success
    data 1
    data 2
    data 3

*** Keywords ***
Flow of login success
    [Arguments]  ${input}
    Should Be Equal    first    ${input}
```

Workshop test template

Working with Resource files

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#resource-files

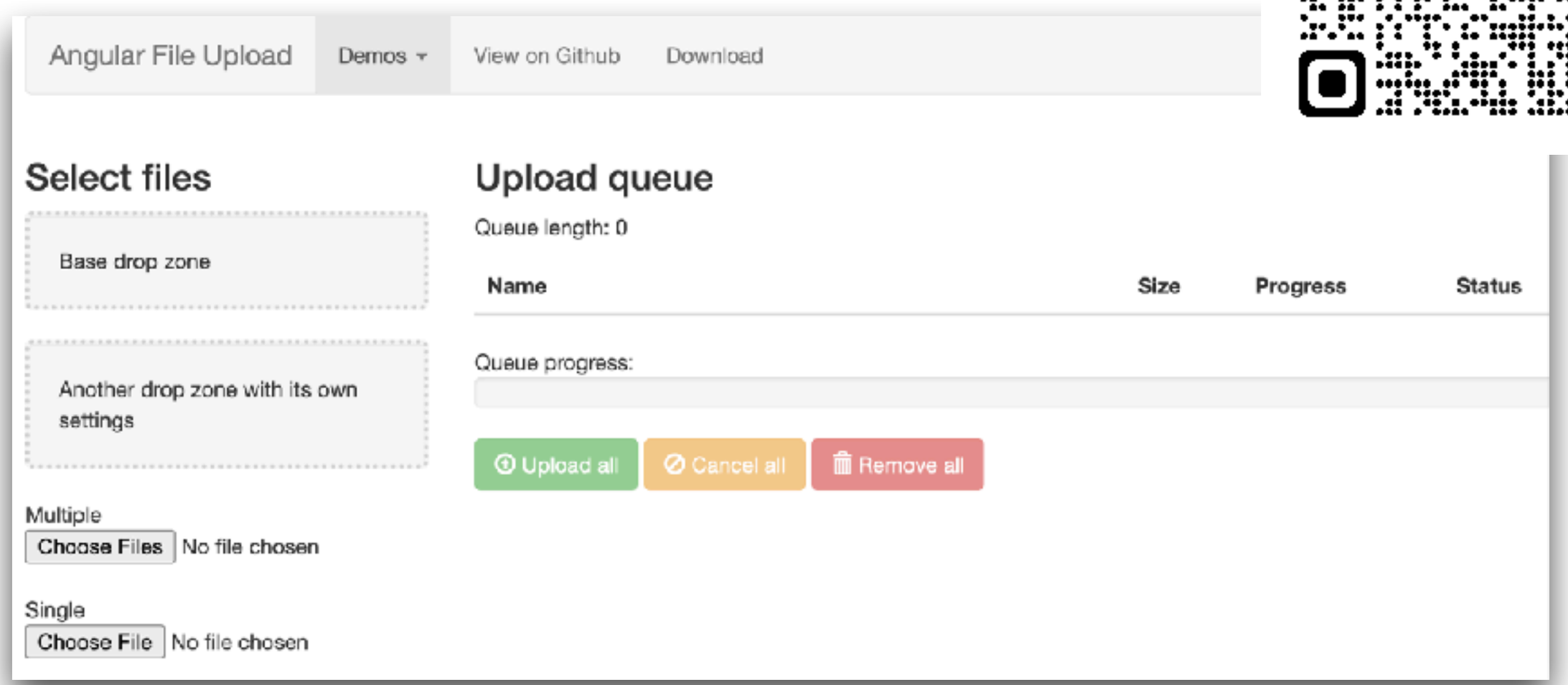
Resource files

Reuse data in settings, variables and keywords
Extension with **.resource** or **.robot**

```
*** Settings ***
Resource  my_keyword.resource
Resource  my_keyword.robot
```

https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html#test-templates

More Workshop

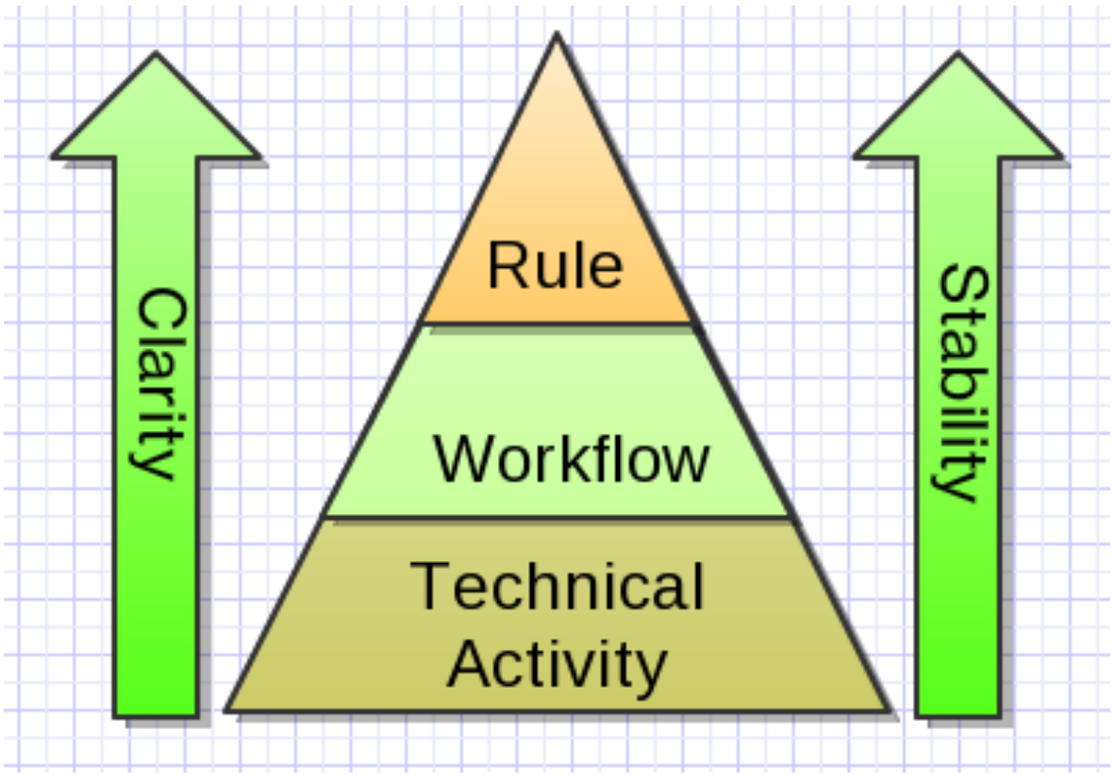


http://nervgh.github.io/pages/angular-file-upload/examples/simple/

Page Object Patterns

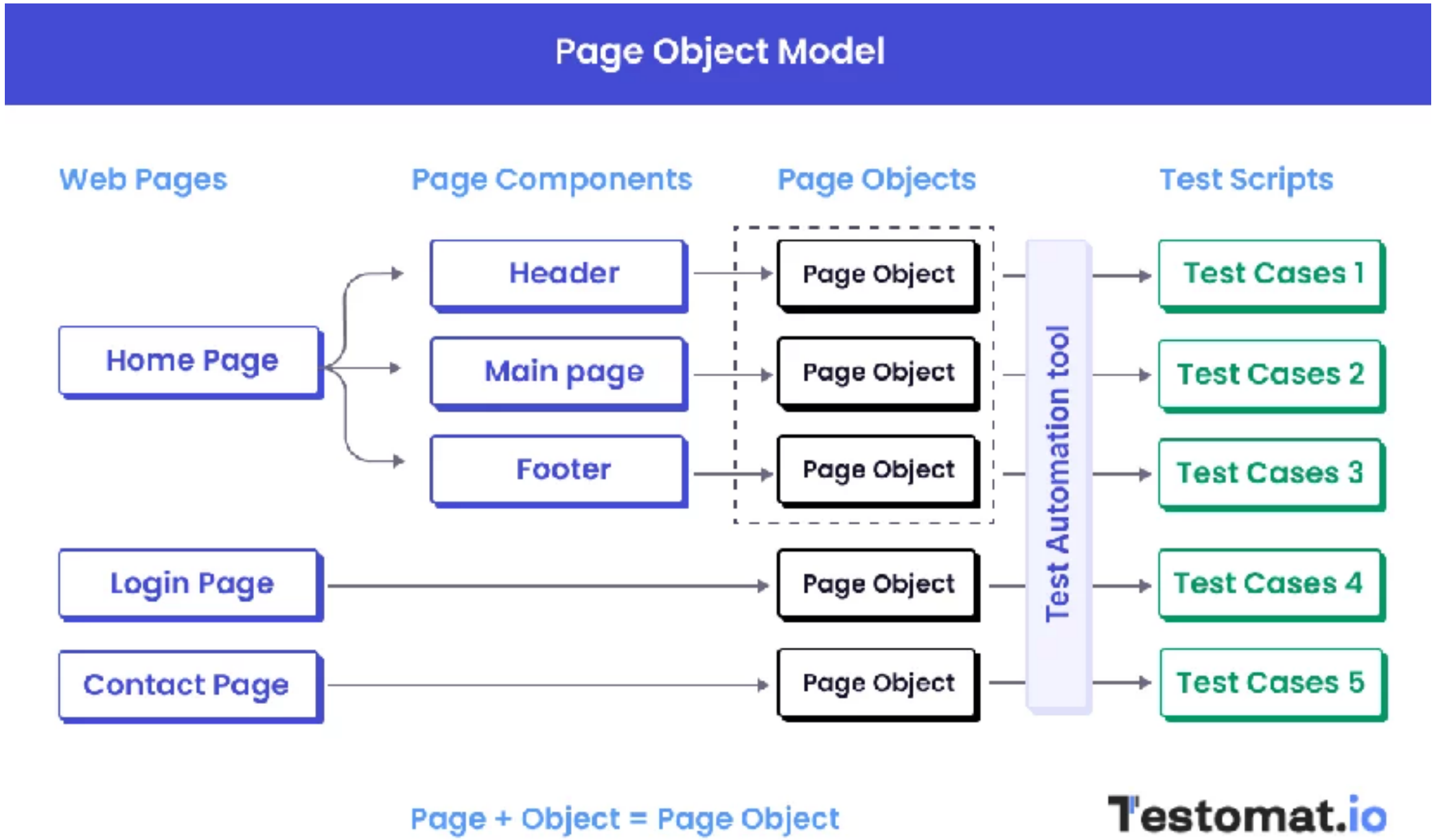
Page Object Patterns

Hide detail/implementation
Reuse keywords
Grouping keywords per page



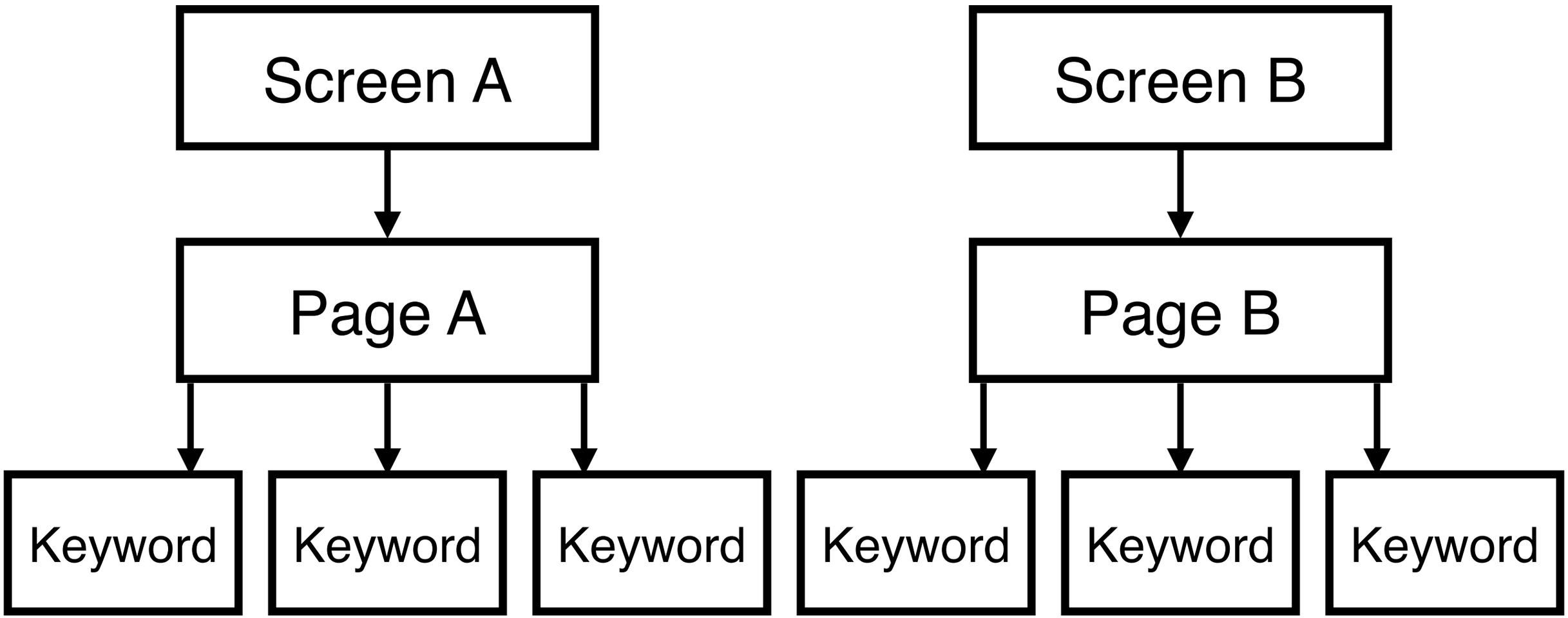
https://www.selenium.dev/documentation/test_practices/encouraged/page_object_models/

Page Object Patterns

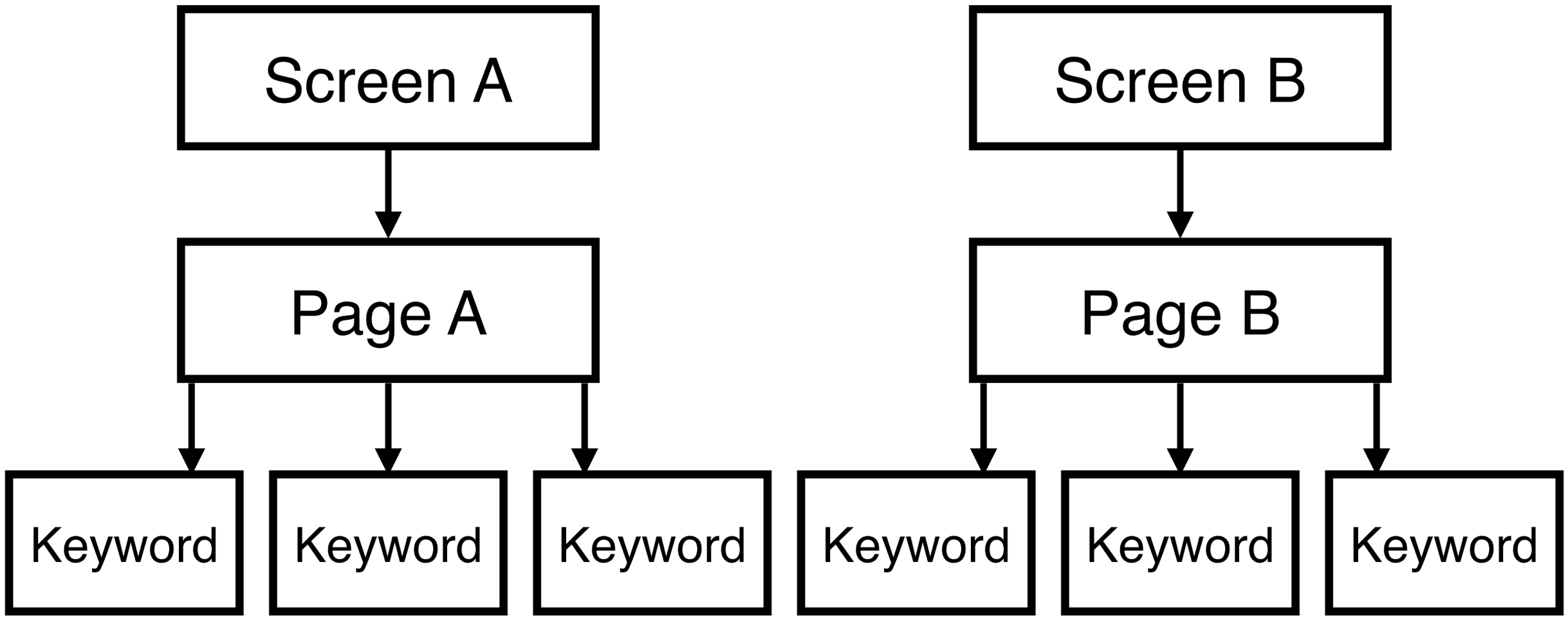


https://testomat.io/blog/page-object-model-pattern-javascript-with-playwright/

Page Object Patterns



Page Object Patterns



Test Cases

Manage Dependencies

Good Test ?

Fast

Isolated

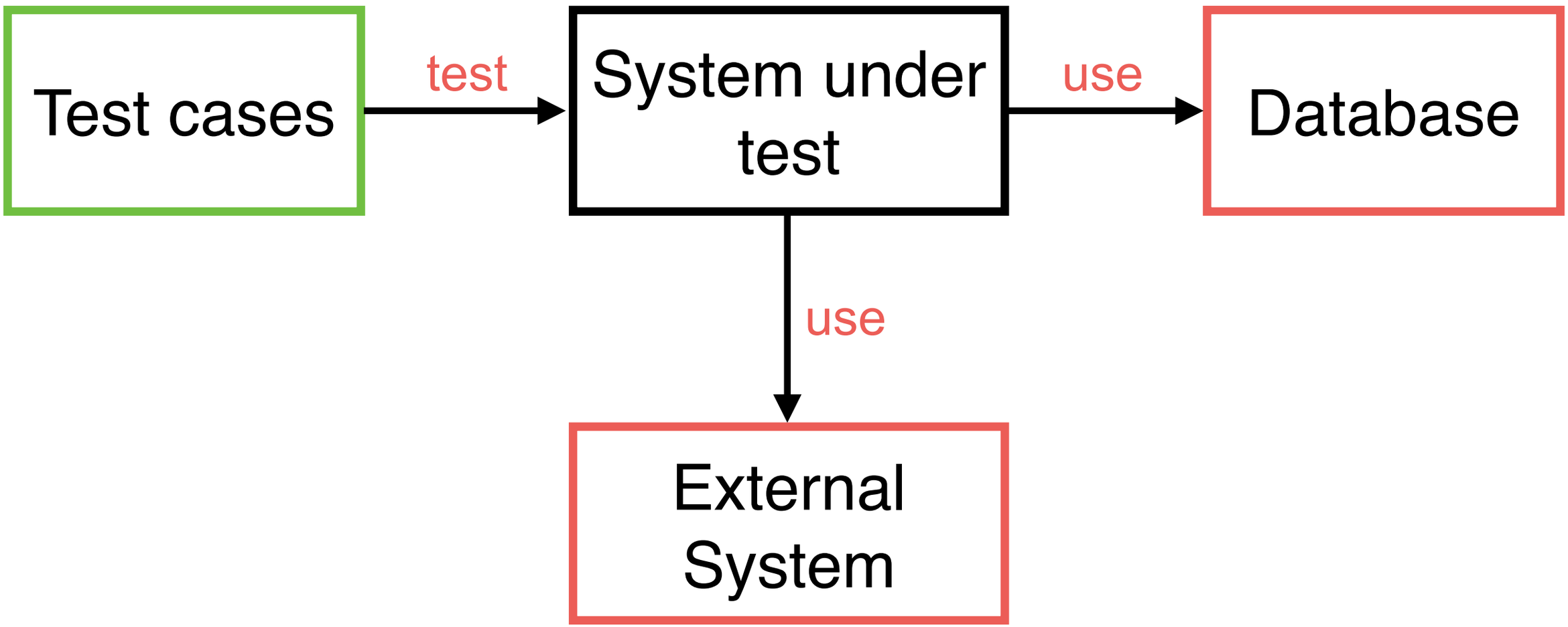
Repeatable

Self-verify

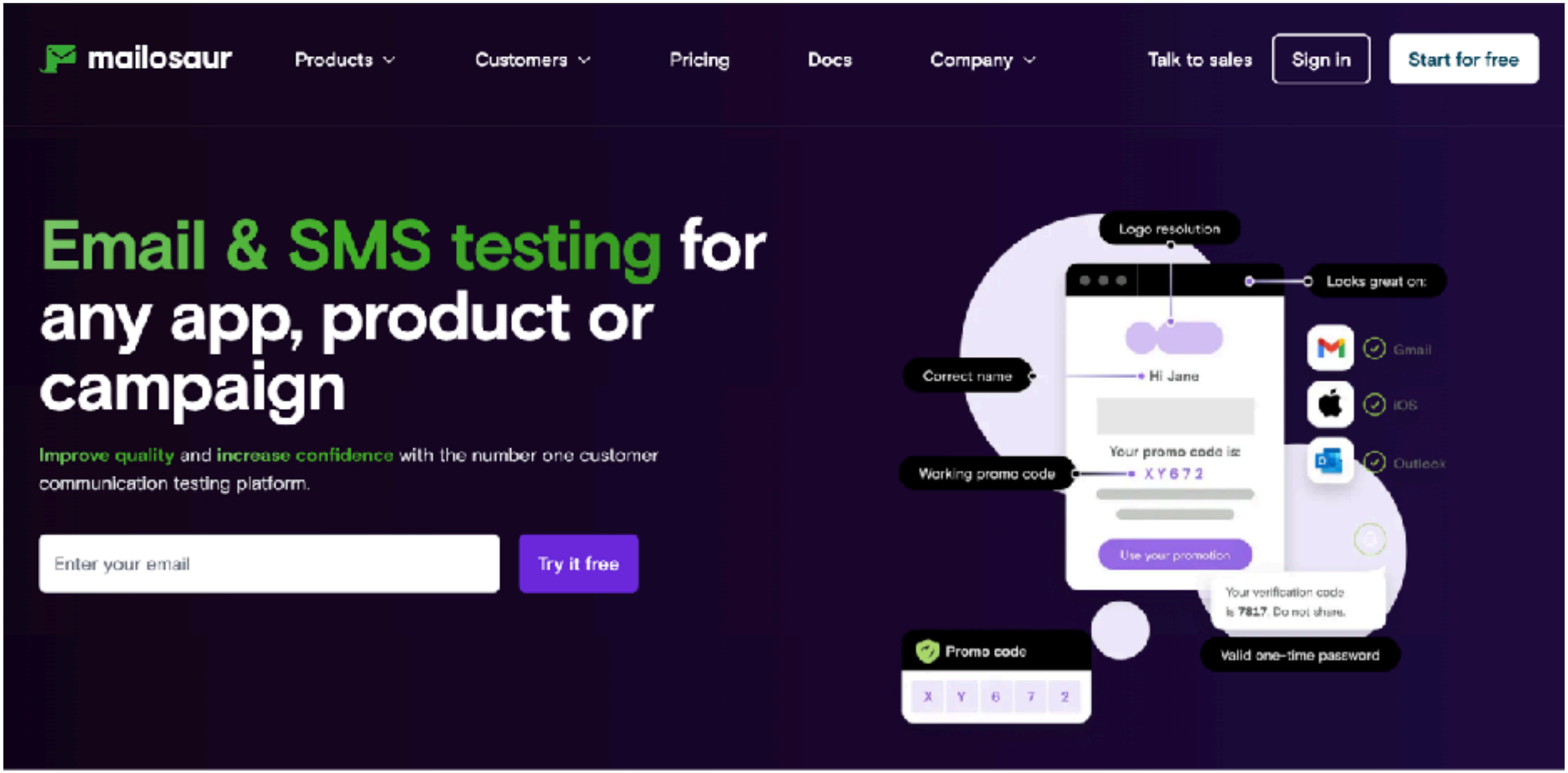
Timely, Thought

Understanding

Dependencies on system

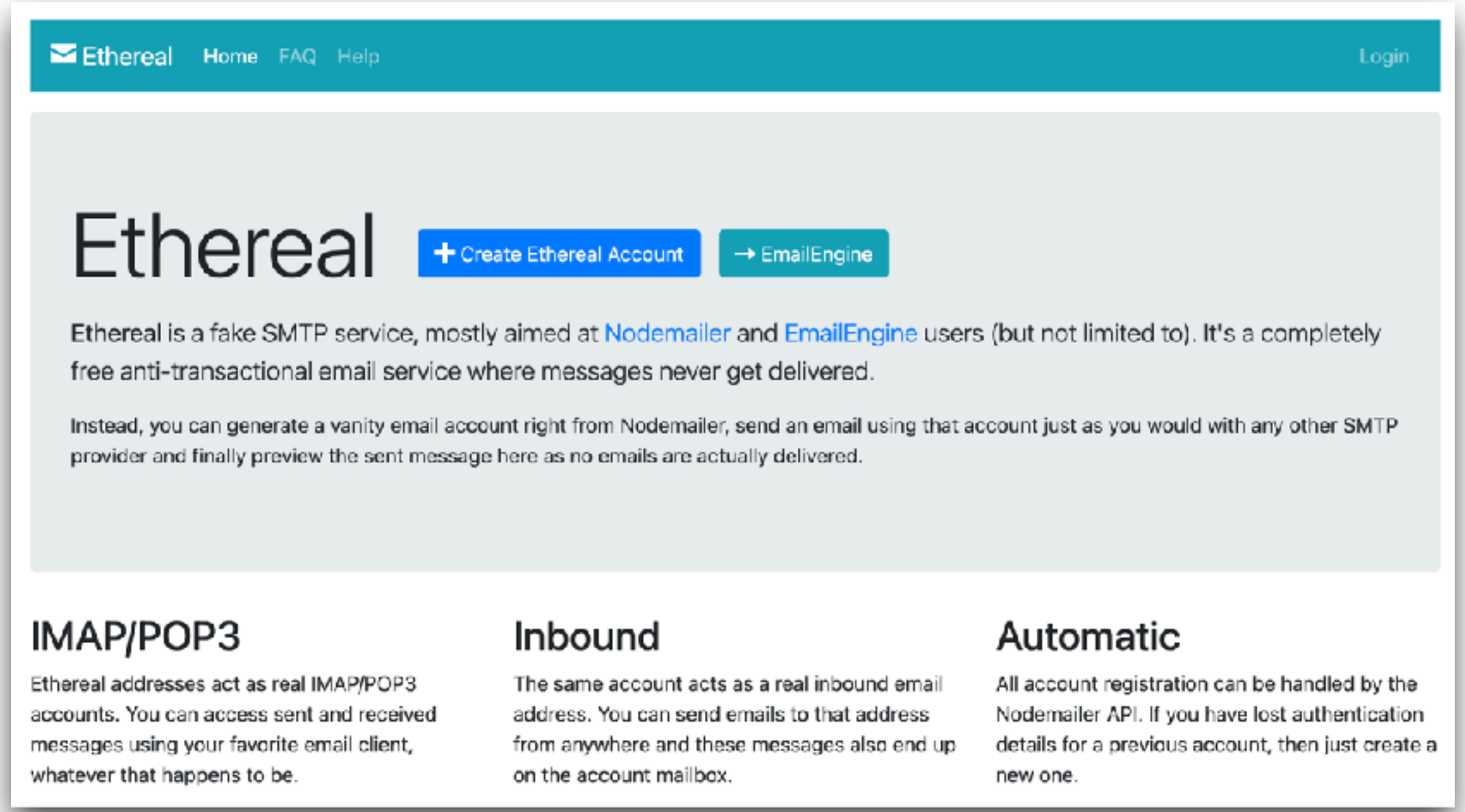


Working with Email



https://mailosaur.com/

Working with Email



https://ethereal.email/

Working with Data files

CSV

Excel

JSON

https://github.com/Snooz82/robotframework-datadriver

RPA framework

Collection of open source libraries

Email	Excel	HTTP
FTP	MFA	OpenAI
PDF	SAP	Database

https://rpaframework.org/

Workshop

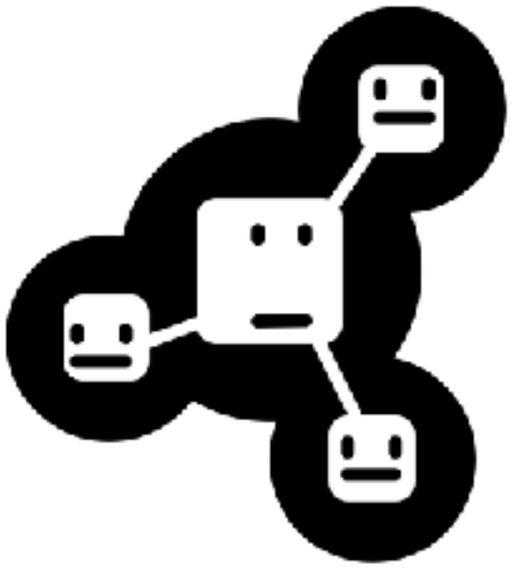
Scaling Testing

Scaling Testing

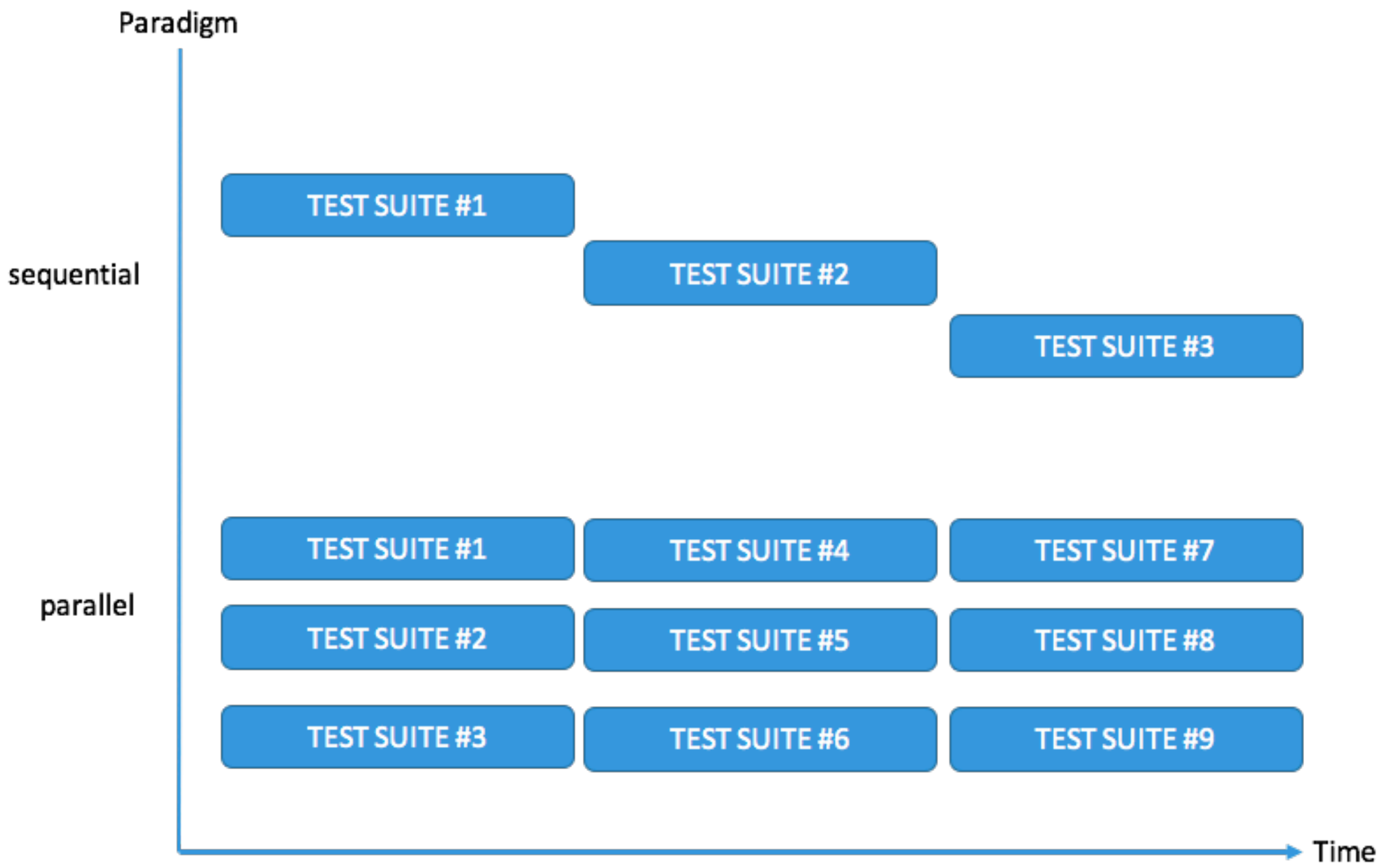
- Pabot
- Selenium Grid

Pabot

Parallel executor for Robot Framework
Split one execution into multiple
https://pabot.org/



Test execution



Using Pabot

$pip install -U robotframework-pabot
$pabot

Parallel test suites

$pabot flow_dress_sorting.robot

Parallel test cases

$pabot **--testlevelsplit**
flow_dress_sorting.robot

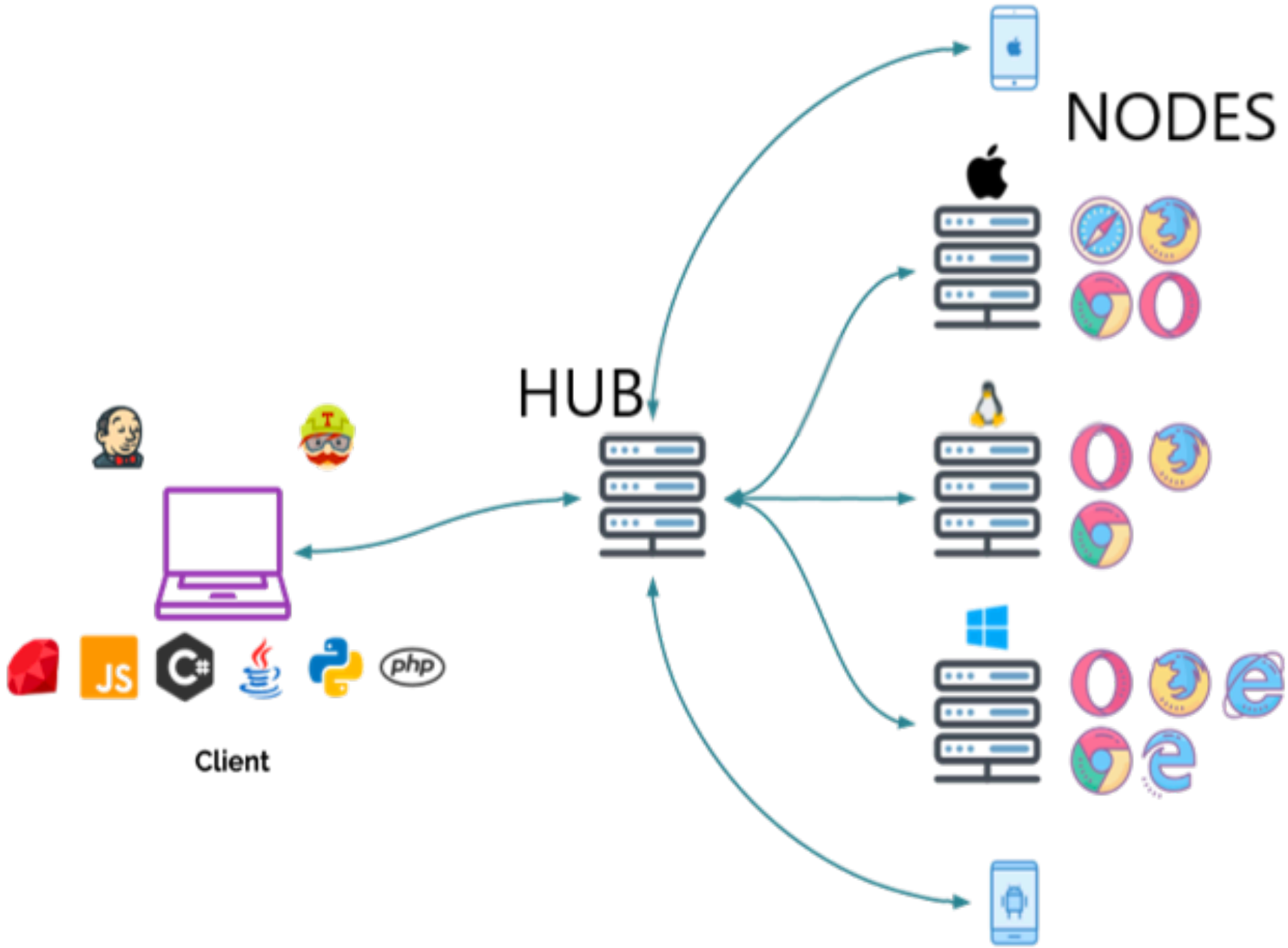
Workshop with Pabot

Selenium grid

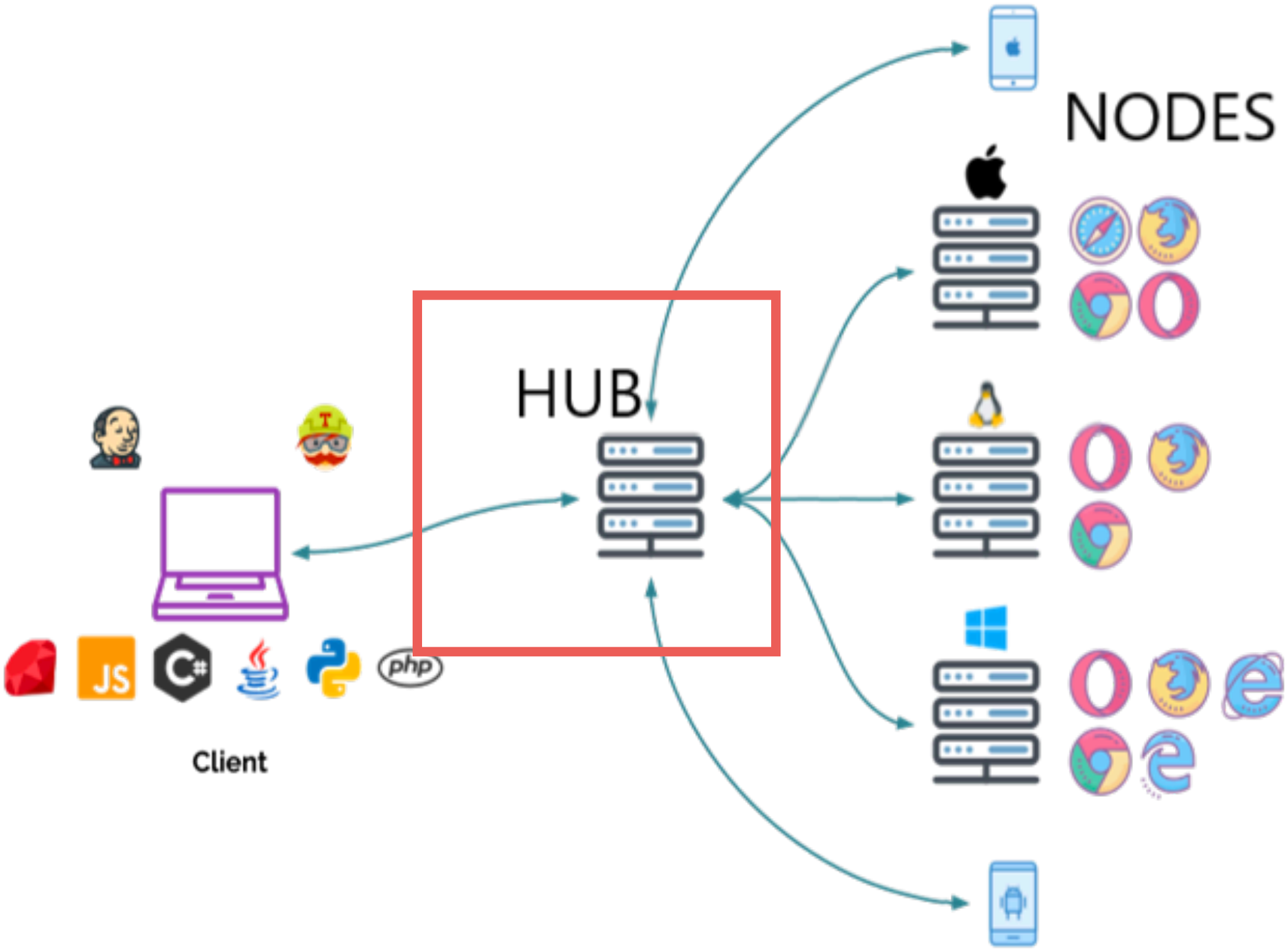
Run test cases on different machines
Distributed testing

https://www.selenium.dev/documentation/grid/

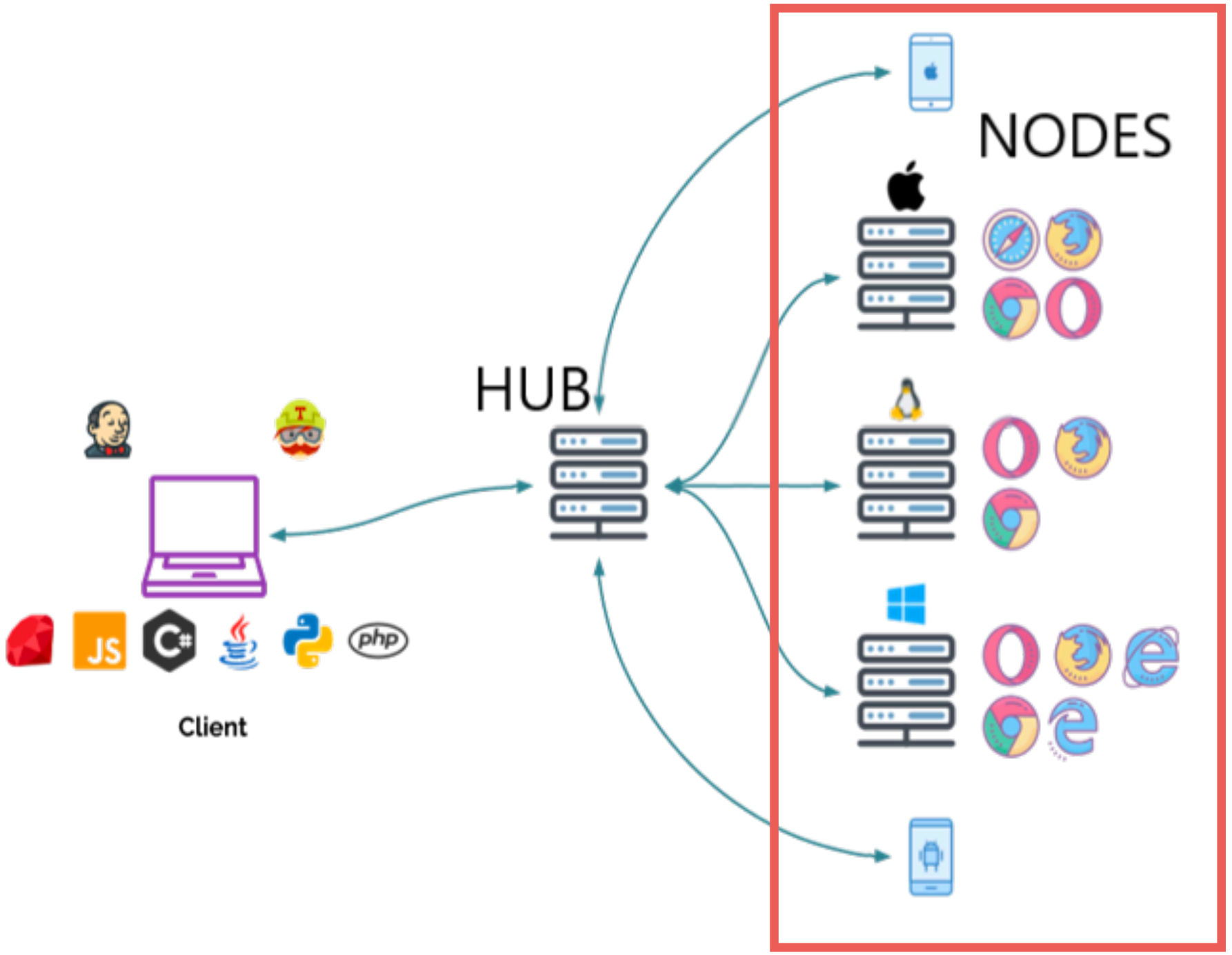
Selenium grid architecture



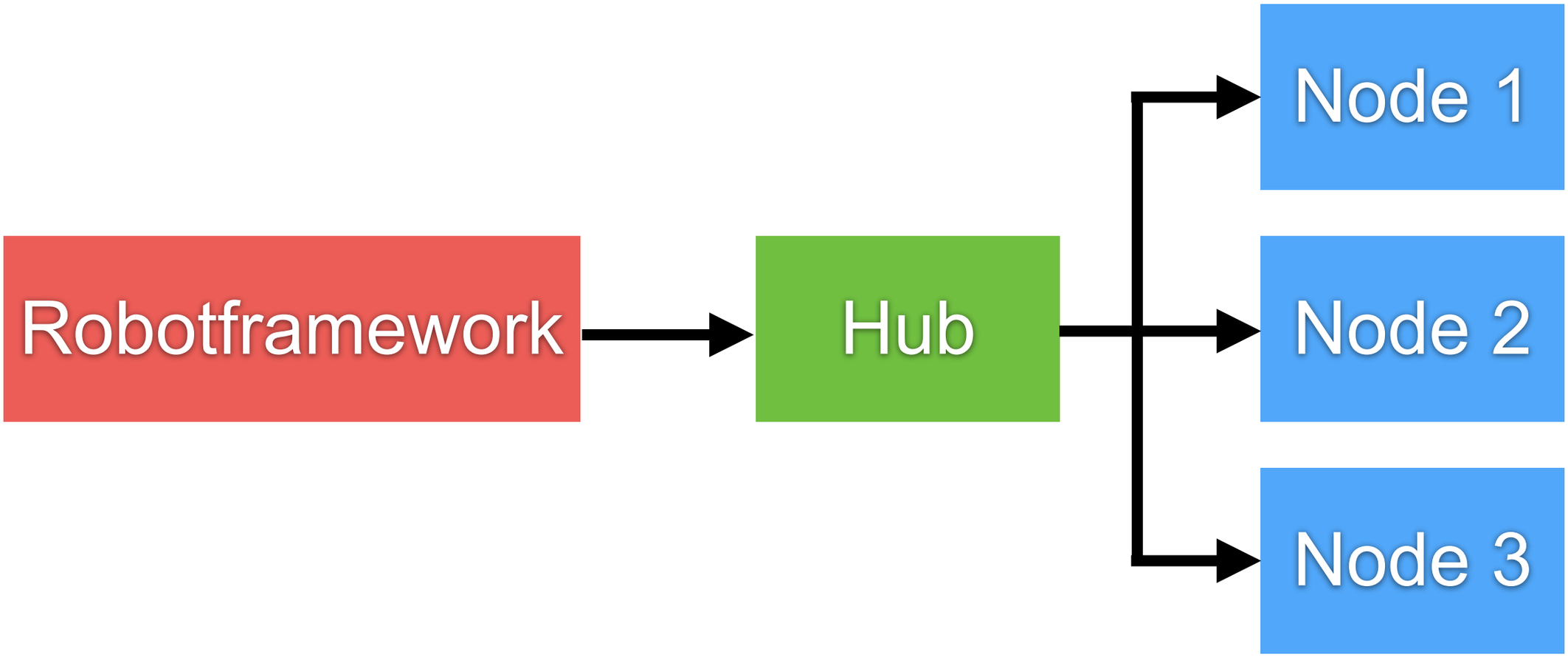
Selenium grid architecture



Selenium grid architecture



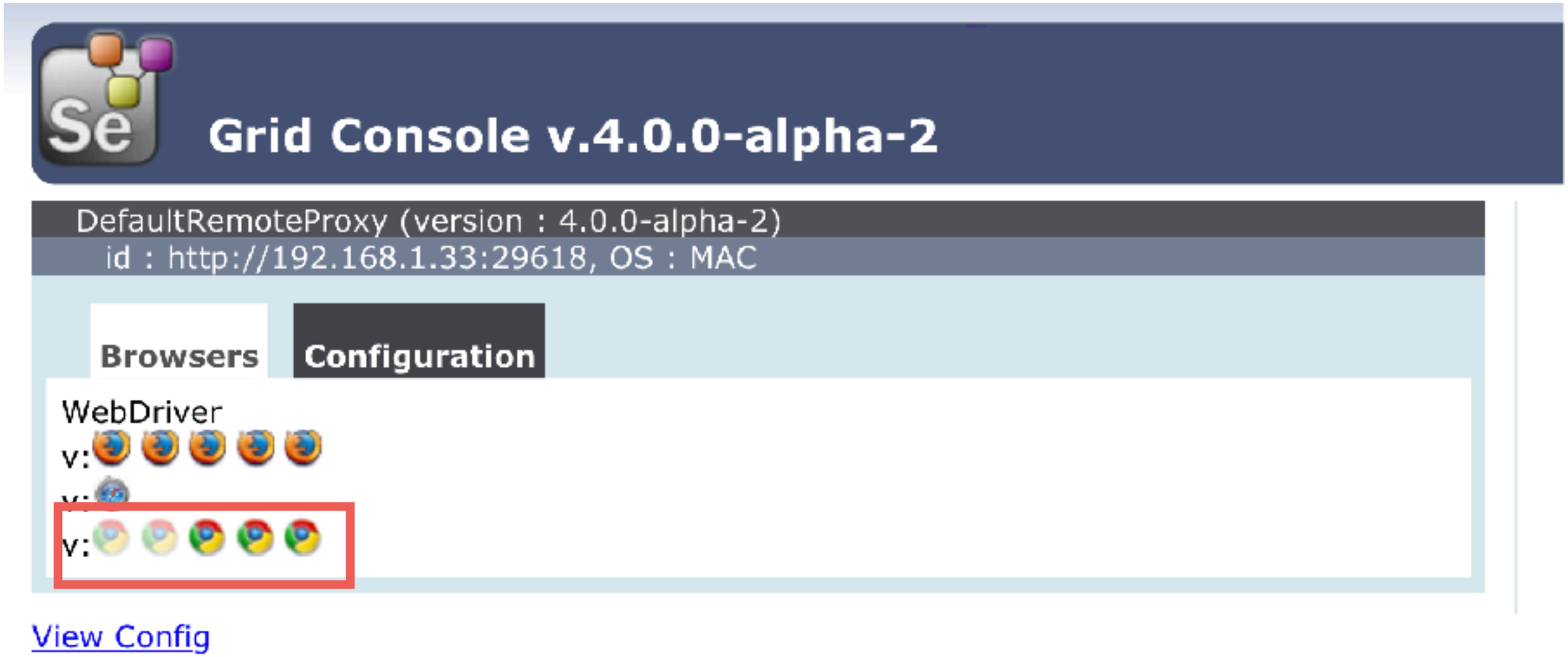
Testing with Robotframework



Testing with Robotframework

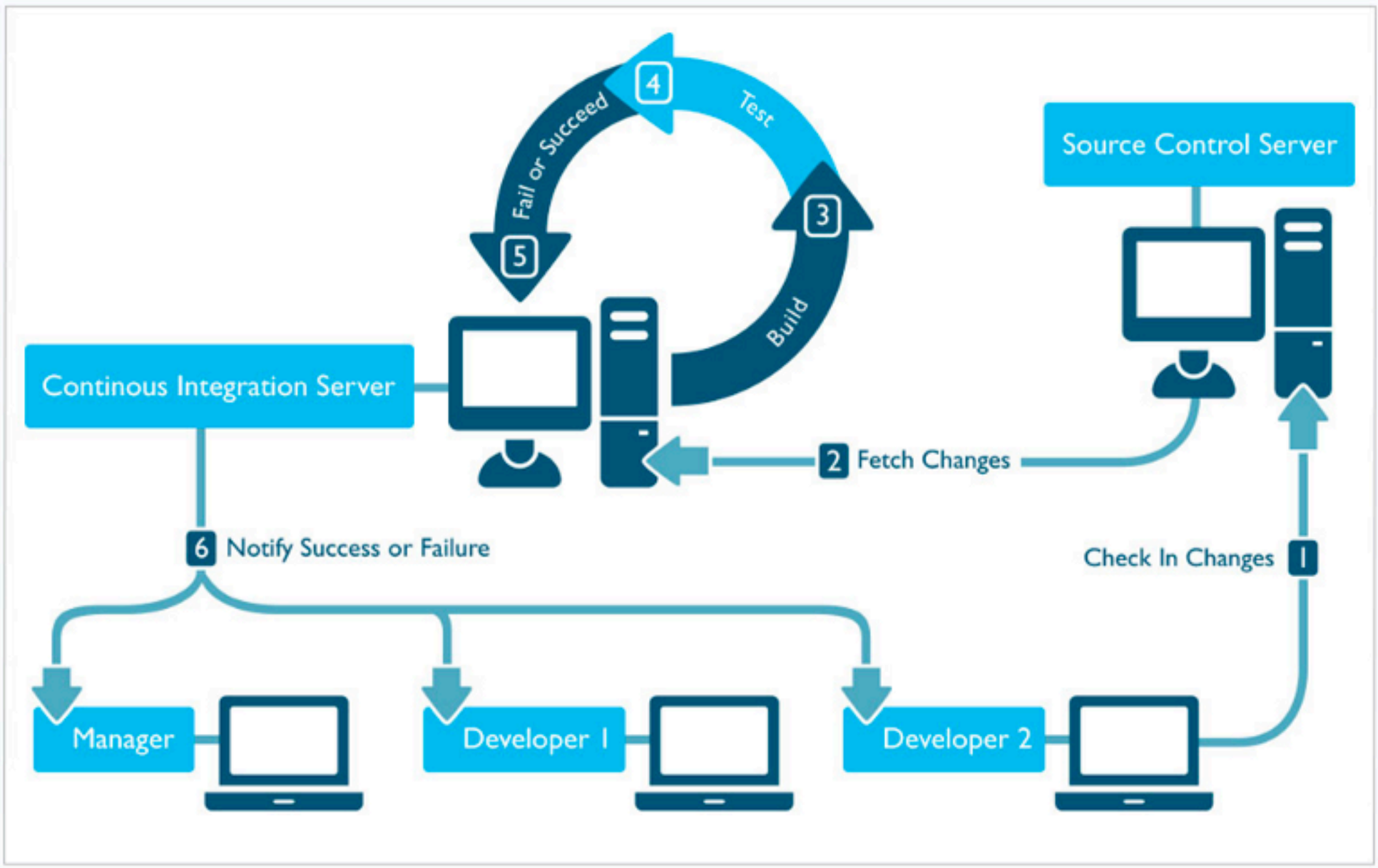
```
*** Keywords ***
Open with selenium grid
    Open Browser    ${URL}
    ...   browser=${BROWSER}
    ...   remote_url=http://localhost:4444/wd/hub
    ...   desired_capabilities=browserName:chrome
```

State of nodes in selenium grid

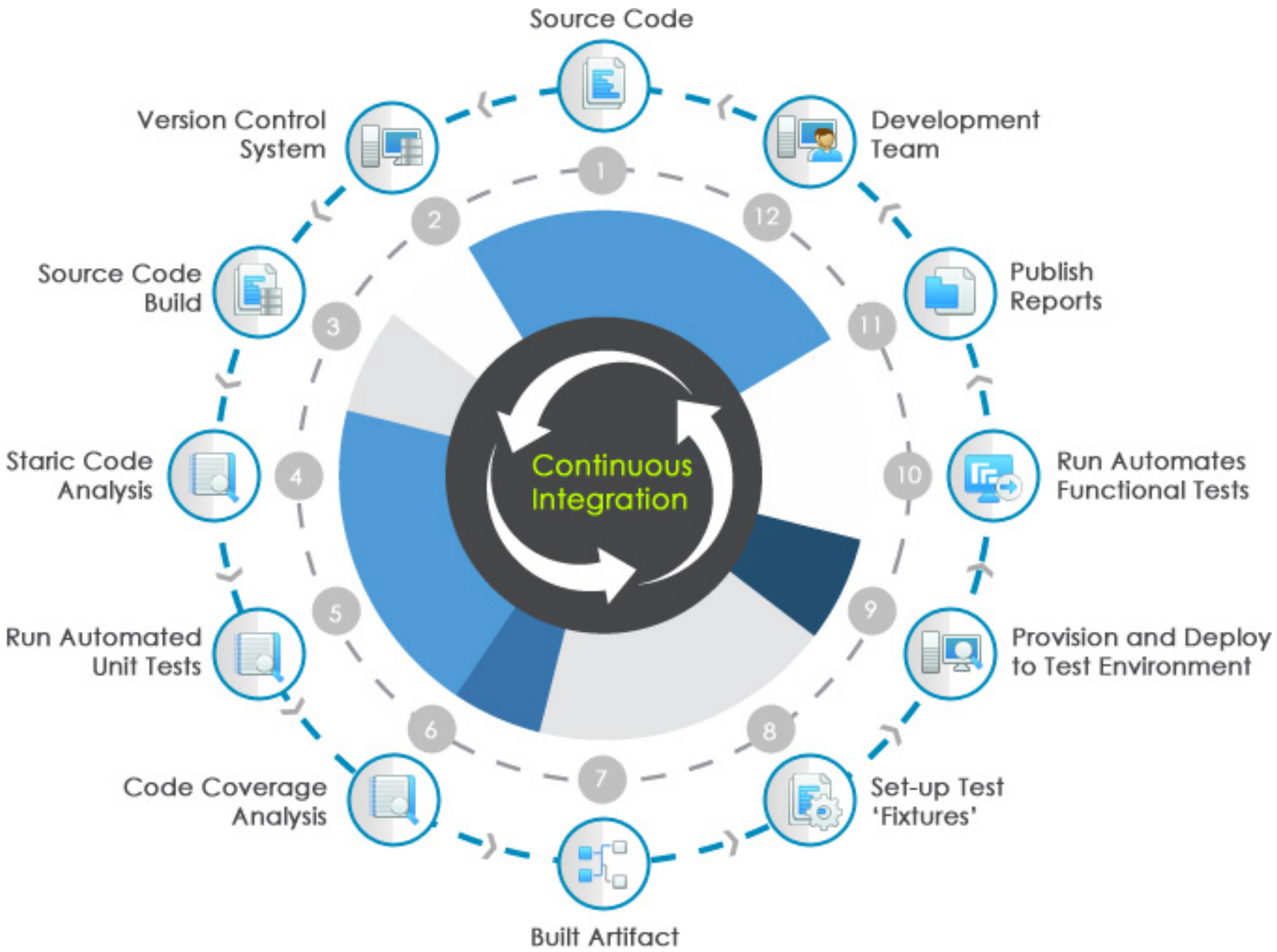


Continuous Integration

Continuous Integration process



Continuous Integration process



Close browser in each test case

```
*** Settings ***
Resource  ./pages/welcome.robot
Resource  ./pages/catalog.robot
Test Teardown  Close Browser
```

Workshop with Selenium grid

API testing

API testing

Robot framework
Postman

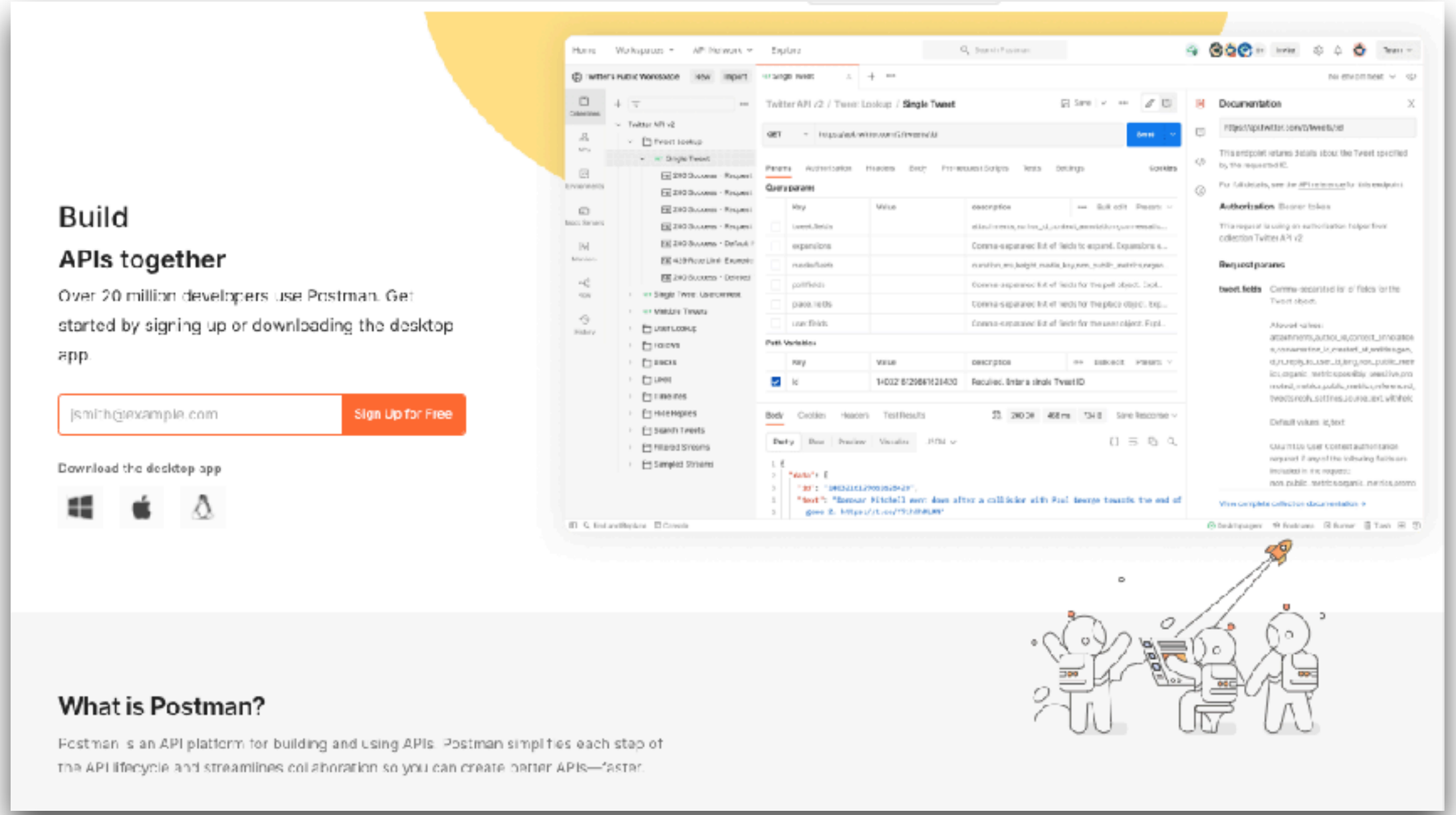
API testing with Robot

Using RequestsLibrary

$pip install -U requests
$pip install -U robotframework-requests

https://github.com/bulkan/robotframework-requests

API testing with Postman



https://www.postman.com/

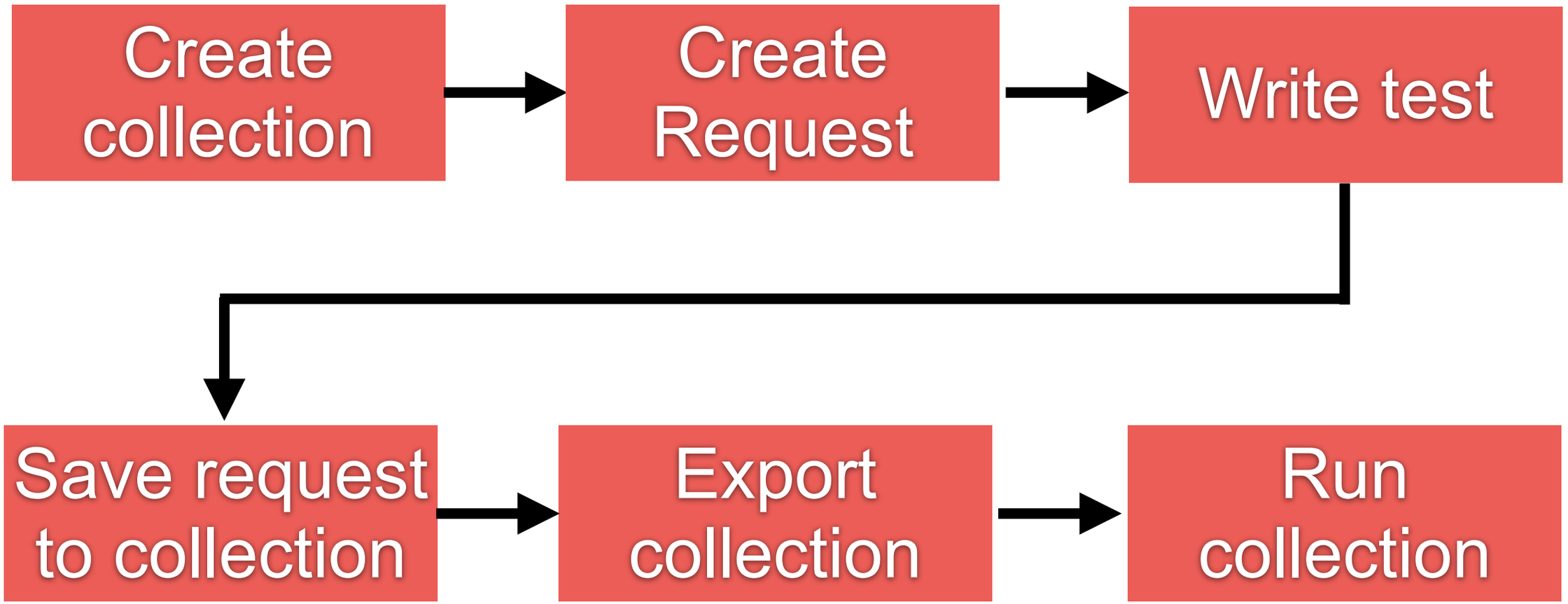
Postman in command line

$npm install -g newman
$newman run <collection file>
$newman run <collection file> **-r cli,junit**

$newman run <collection file> **-r cli,junit**
--reporter-junit-export outputfile.xml

https://www.npmjs.com/package/newman

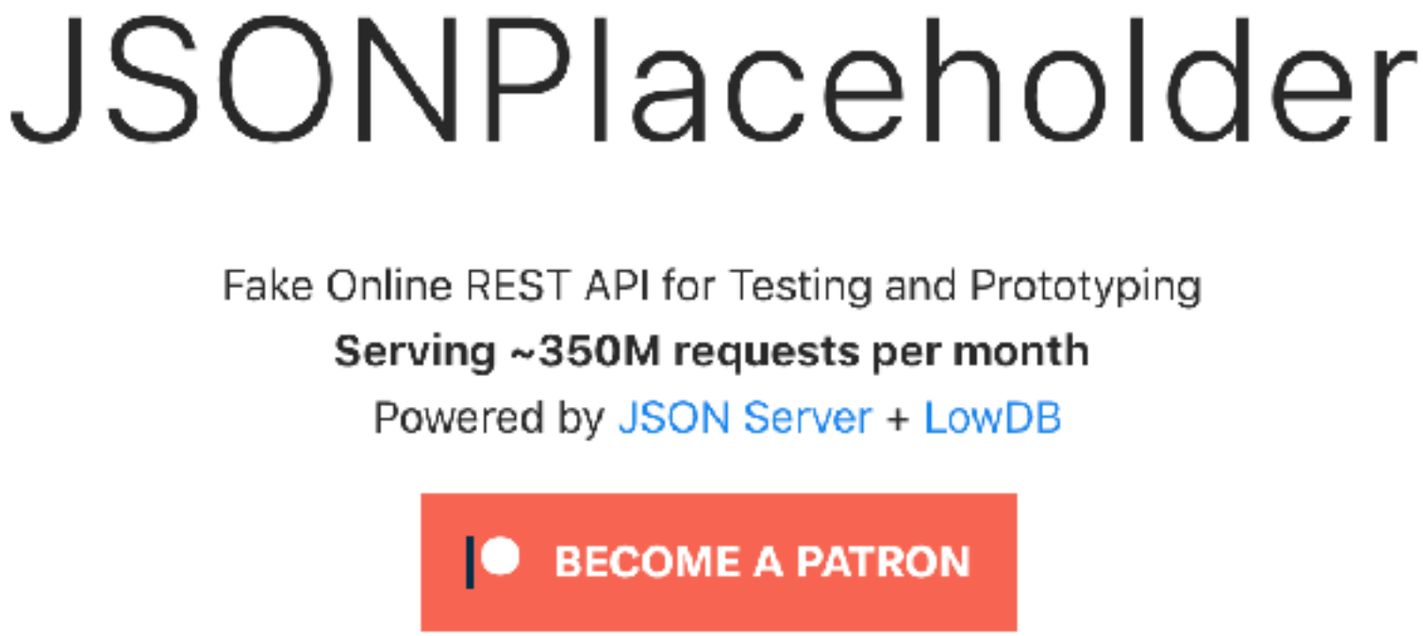
Testing Flow



Workshop API testing

Workshop API testing

https://jsonplaceholder.typicode.com/



Workshop API testing

https://jsonplaceholder.typicode.com/users


```
[
  - {
        id: 1,
        name: "Leanne Graham",
        username: "Bret",
        email: "Sincere@april.biz",
    - address: {
        street: "Kulas Light",
        suite: "Apt. 556",
        city: "Gwenborough",
        zipcode: "92998-3874",
      - geo: {
            lat: "-37.3159",
            lng: "81.1496"
        }
    },
```


Tips and Tricks

Google Chrome

Auto closed browser !!
Disabled notification
Disabled camera and audio (media)

Disabled Auto closed browser

```
*** Settings ***
Library   SeleniumLibrary

*** Variables ***
${url}   http://localhost:3000/demo.html
${browser}   chrome

*** Test Cases ***
Disable Camera and Media devices
    Open Browser   ${url}    ${browser}
    ...    options=add_experimental_option("detach", True)
```

Disabled notification

```
*** Settings ***
Library   SeleniumLibrary

*** Variables ***
${url}   http://localhost:3000/demo.html
${browser}   chrome

*** Test Cases ***
Disable Noti
    Open Browser   ${url}    ${browser}
    ...   options=add_argument("--disable-notifications")
```

Disabled camera and audio (media)

```
*** Settings ***
Library   SeleniumLibrary

*** Variables ***
${url}   http://localhost:3000/demo.html
${browser}   chrome

*** Test Cases ***
Disable Camera and Media devices
    Open Browser   ${url}    ${browser}
    ...   options=add_argument("--use-fake-ui-for-media-stream")
```

Working with CSV file

Working with CSV file

Using csv library from Python 3
Read and Write

https://docs.python.org/3/library/csv.html

Working with CSV file

Design first with (Robot keyword)

```
1    *** Settings ***
2    Library     csv_library.py
3
4    *** Test Cases ***
5    Design process
6        ${result}=     Read        users.csv
7        Write          $result     new.csv
```

Working with CSV file

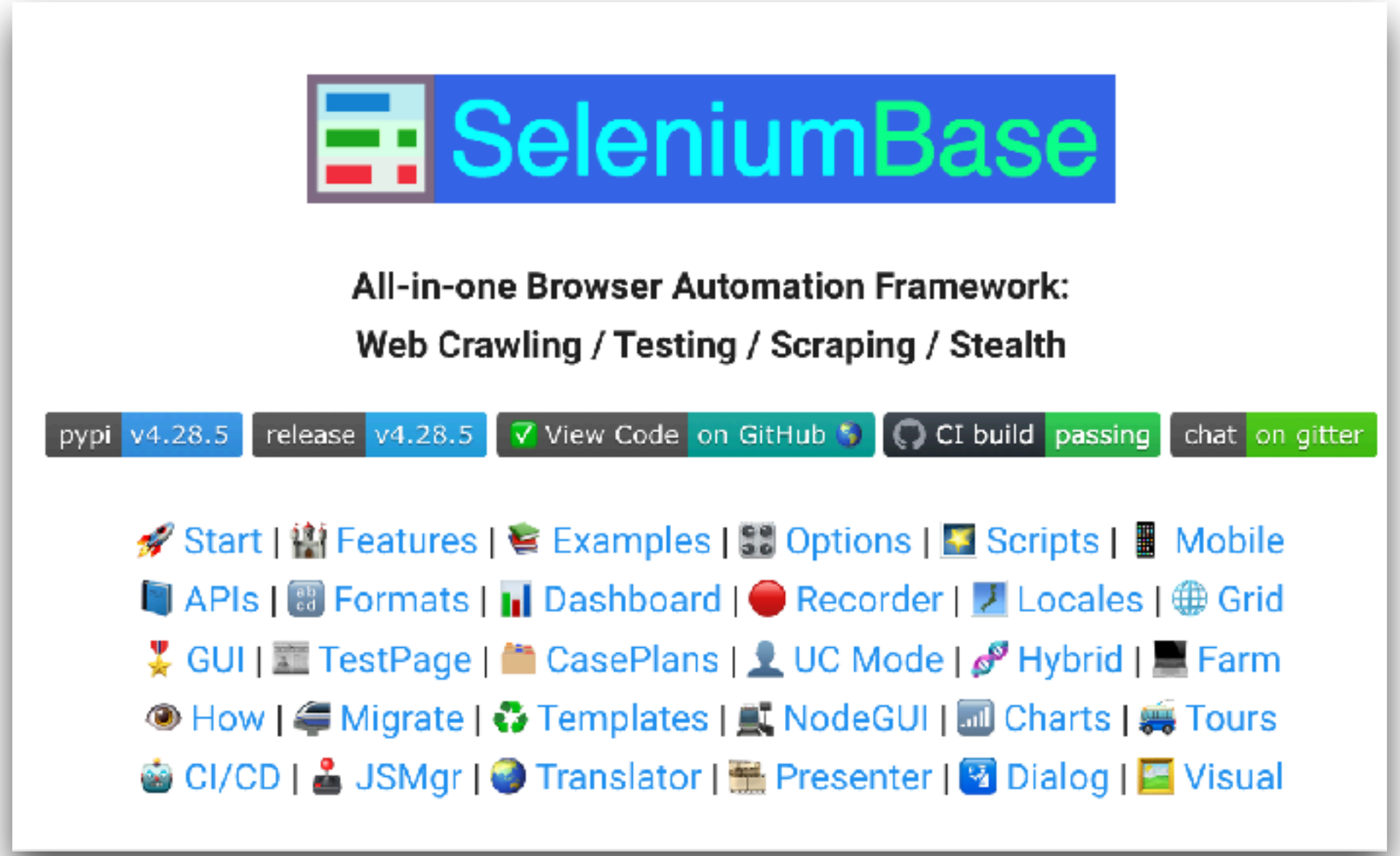
Coding with Python (read and write)

```python
import csv

def read(filename):
    with open(filename) as csvfile:
        spamreader = csv.reader(csvfile)
        for row in spamreader:
            for c in row:
                print(c, end='-')
            print()
```

Practice ....

SeleniumBase

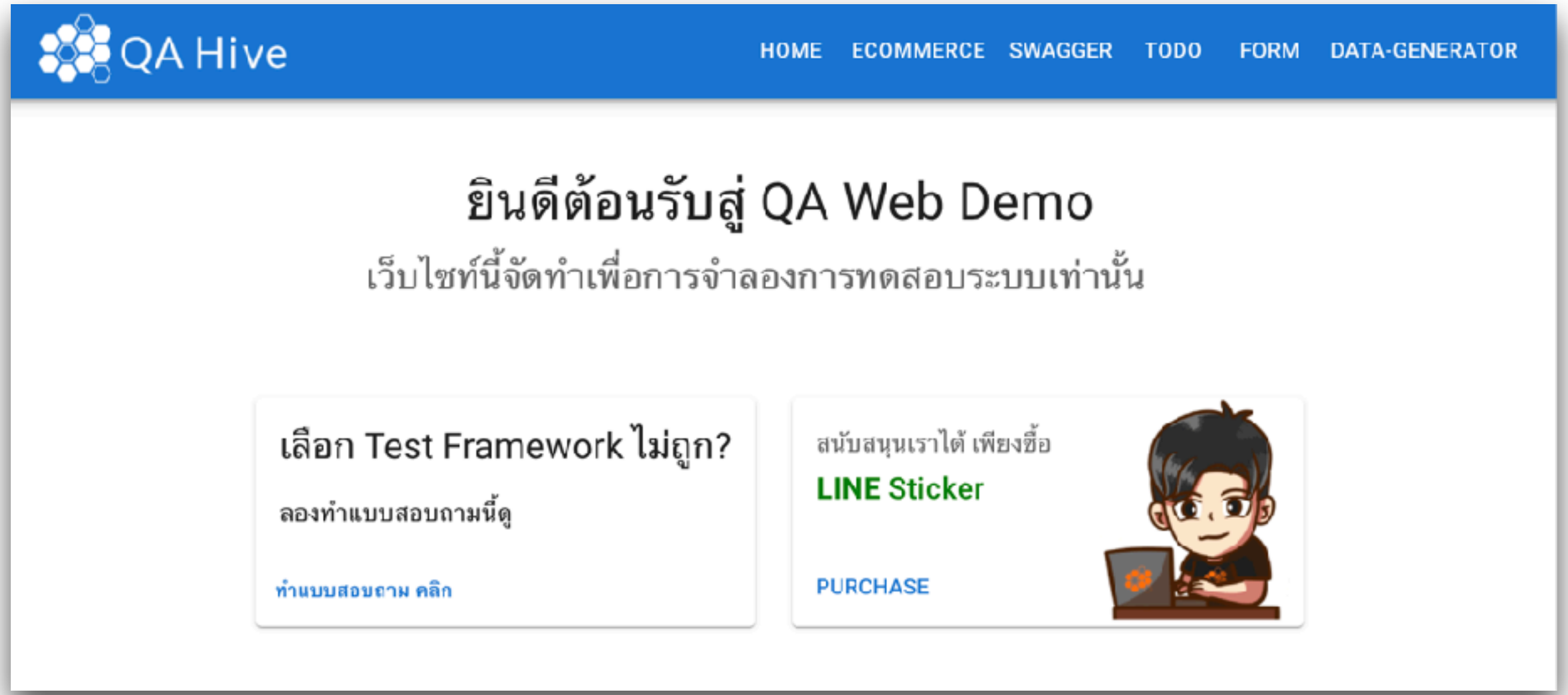


https://seleniumbase.io/

Selenium demo

https://www.selenium.dev/selenium/web/index.html

QA Hive



https://web-demo.qahive.com/

Q/A

How to use in your current project ?
Development and Delivery process ?
Testing process ?