

Quality Assurance with Ai Based Automation from IV&V Perspective

Nov 2024





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Introduction



AL AiN Malaysian and 100% Bumiputra, owned testing shared services provider that was founded in 2015 , we are based in Malaysia – Technology Park Malaysia, Bukit Jalil , with a team size of ~50 to 60 staff members.

- A. GLOBAL SHARED SERVICE - We have successfully delivered to projects based in Indonesia, India , USA , Canada and UK, using a shared service remote testing model.
- B. Government IV&V projects – Have completed over 12 IV&V engagements

All our service engagement model is cloud bias and we have used Ai in our service engagements since 2022 with emphasis to test automation and task automation.



Our Services & Products*



Automation Testing

Harness the power of automated tools and scripts to efficiently execute test cases, enhance accuracy, and accelerate testing processes.



Manual Testing

Our skilled testers meticulously validate your software manually, ensuring thorough exploration and verification of functionalities and user experience.



IV&V

Gain an objective assessment of your software's compliance and industry standards through our comprehensive IV&V services.

Ref:

<https://botgauge.com/>
<https://testsigma.com/>
<https://turilytix.ai/power-turilytix-big-ai/>

Our Services & Products*



Crowdsourced Testing

Tap into the collective intelligence of a global network of testers who rigorously evaluate your software across various platforms and configurations.



Performance Testing

Evaluate and optimize your software's performance, scalability, and stability under different load conditions, ensuring optimal user experience and system reliability.



Security Testing

Identify and address vulnerabilities in your software by subjecting it to rigorous security assessments, ensuring robust protection against potential threats and breaches.

Ref:

5 <https://botgauge.com/>
<https://testsigma.com/>
<https://turilytix.ai/power-turilytix-big-ai/>



IV&V in Government Project

- A. RISK Based advisory/Risk Assessment
- B. Test Automation
- C. Quality Assurance Advisor

AI in Quality Assurance

- a. NLP - Basically we train AI to understand requirement and convert use cases to test scripts
- b. ML (learn and Improve)
- c. Computer Vision (OCR) - interpret analyze , visualize and detect anomalies to support visual and automation testing

Given the importance of scripting for test automation assignments, it is also expected that the IV&V Provider have:

- testers with capability for automation scripting as well, and/or*
- make available non-testers functioning as test scripters.*

Page 127 – IVV Handbook Ver 2.01

*b) risk-based approach of functional testing,
Page 96 – IVV Handbook*

Greater visibility into the quality assurance process using systematic and measurable tests. – Page 127 IVV Handbook Ver 2.01

IV&V Project Track Record

5 - 100%
COMPLETED

IV&V Projects
CURRENT
2 QG4 IN FAT

CURRENT 2 IN
QG2 SDS

3 Government
1 Bank (Private)
1 Insurance
(Private)PAST

PAST

2 Government
1 Media monitoring
(Private)
2 Testing Service

CURRENT - LOCAL

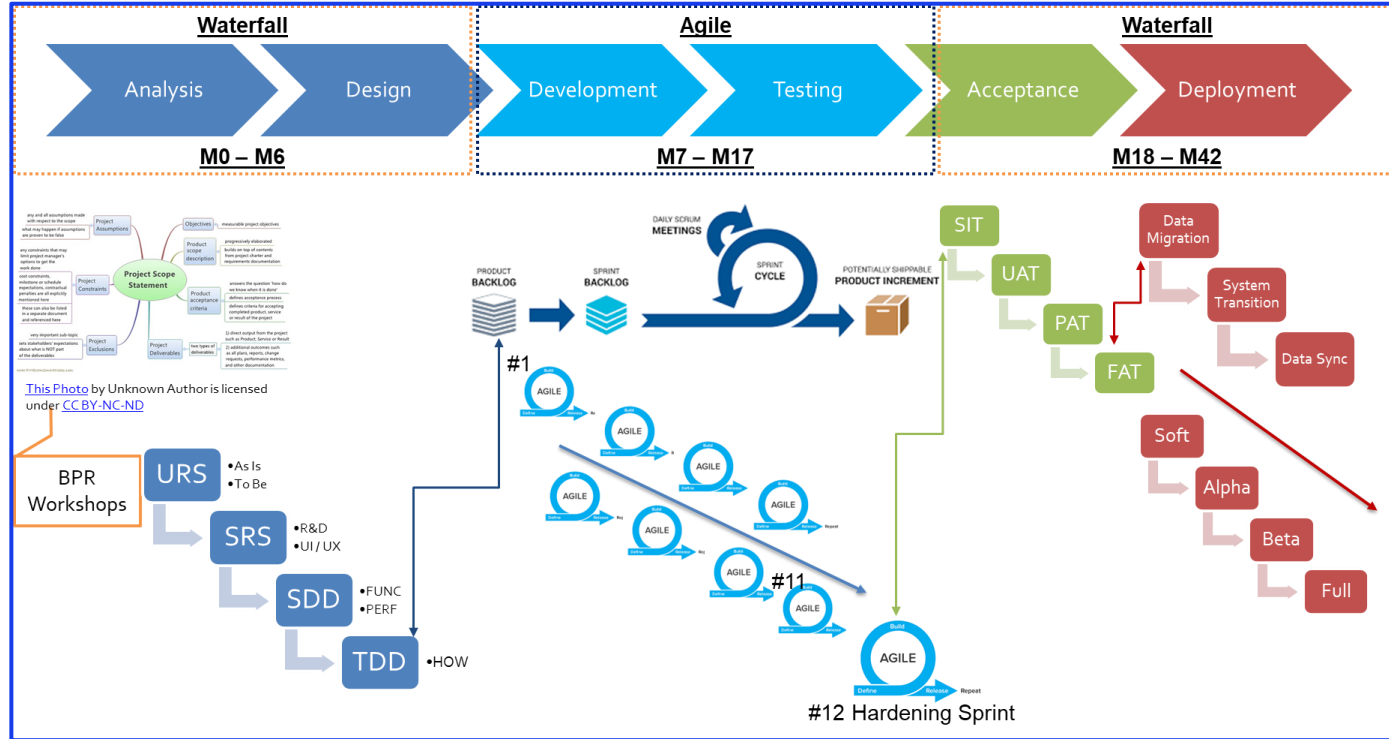
2 Export Service
1 Indonesia
1 Korea
1 USA/Canada/UK

INTERNATIONAL

Project Methodology

A typical project will have the following phases

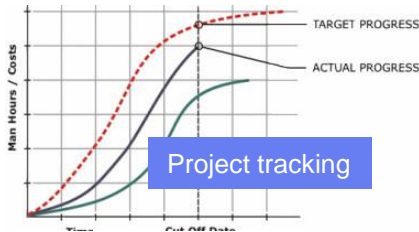
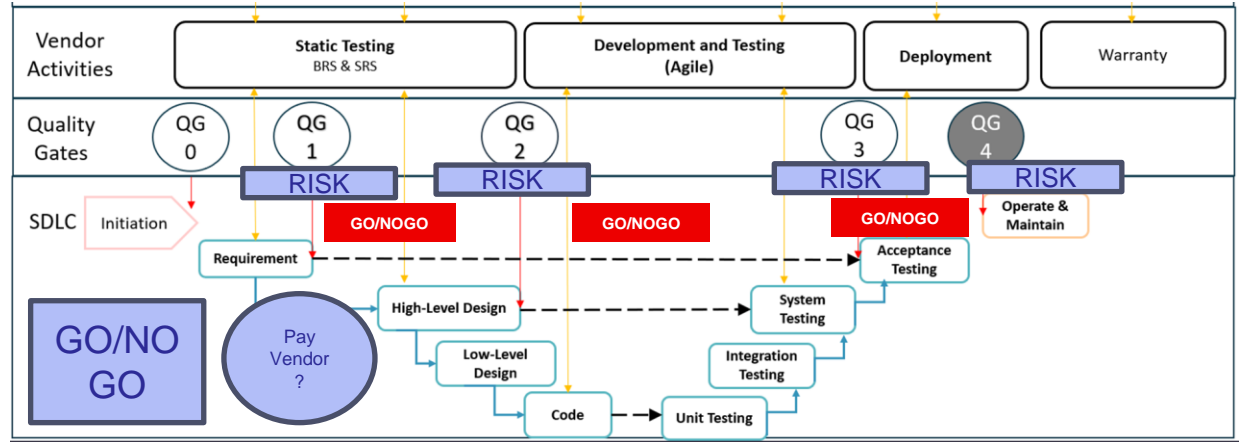
1. Requirement
2. Design
3. Coding
4. Testing (Development & Acceptance Test)
5. Release and Maintenance



IV&V & Quality Assurance Tools

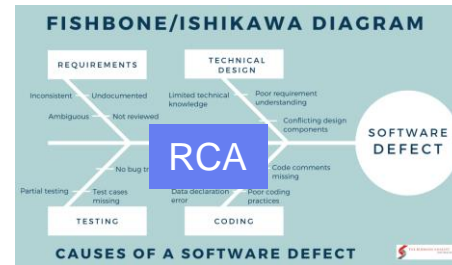
IV&V teams typically use Quality Gate in the participation regardless of Methodology used in the Project.

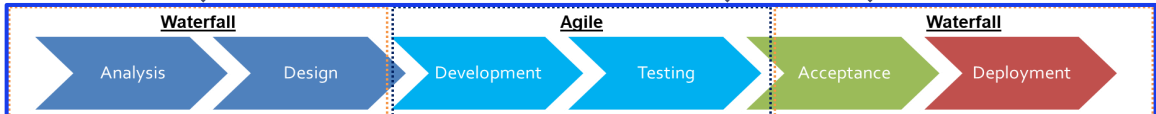
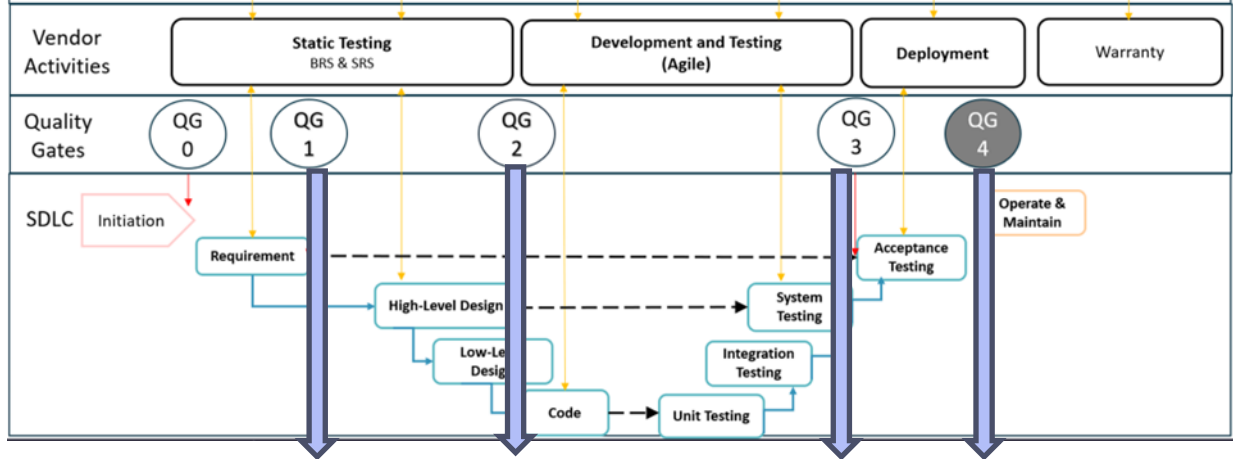
IV&V engagement aims to provide confidence to the project team to progress in the project in key decision making moments.



Application of ODC

Work	Behavior	Start	End	Est	Act	Diff	Impact	Owner	Status
Project Initiation	Define project goals and objectives	2023-01-01	2023-01-15	10	12	2	Low	John Doe	Completed
Requirement Gathering	Identify and document requirements	2023-01-16	2023-02-15	20	18	-2	Medium	Jane Smith	In Progress
System Design	Develop high-level and low-level design	2023-02-16	2023-03-15	30	35	5	High	Mike Johnson	Delayed
Development	Write and test code	2023-03-16	2023-04-15	40	40	0	Medium	Alice Brown	On Track
Testing	Perform unit, integration, and system testing	2023-04-16	2023-05-15	30	32	2	Medium	Bob White	On Track
Deployment	Release the software to production	2023-05-16	2023-05-16	5	5	0	Low	Charlie Black	Completed
Maintenance	Monitor and maintain the software	2023-05-17	2023-06-15	20	20	0	Low	Diana Green	On Track



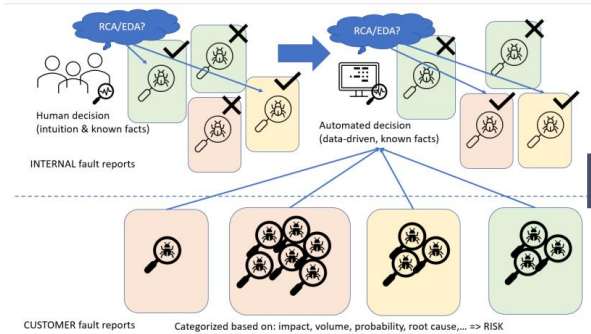


TO REDUCE PROJECT Risk & INCREASE Readiness

KEY GOAL IS TO INCREASE TEST COVERAGE → DEVELOP FASTER → REDUCE DEFECTS

AUTOMATE

Quality Assurance Decision Making

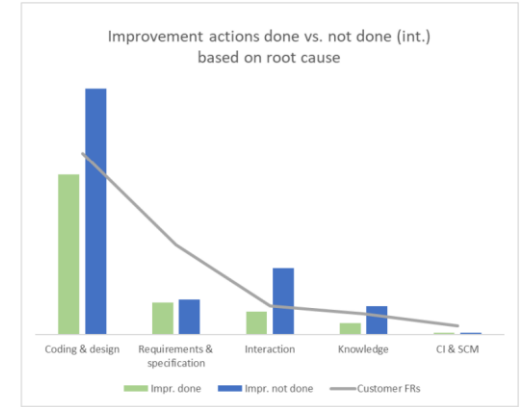


RCA / EDA

Severity Probability	Catastrophic	Critical	Marginal	Negligible
Frequent	HIGH	HIGH	SERIOUS	MEDIUM
Probable	HIGH	HIGH	SERIOUS	MEDIUM
Occasional	HIGH	SERIOUS	MEDIUM	LOW
Remote	SERIOUS	MEDIUM	MEDIUM	LOW
Improbable	MEDIUM	MEDIUM	MEDIUM	LOW

ModErf from: <https://www.zeiss.com>

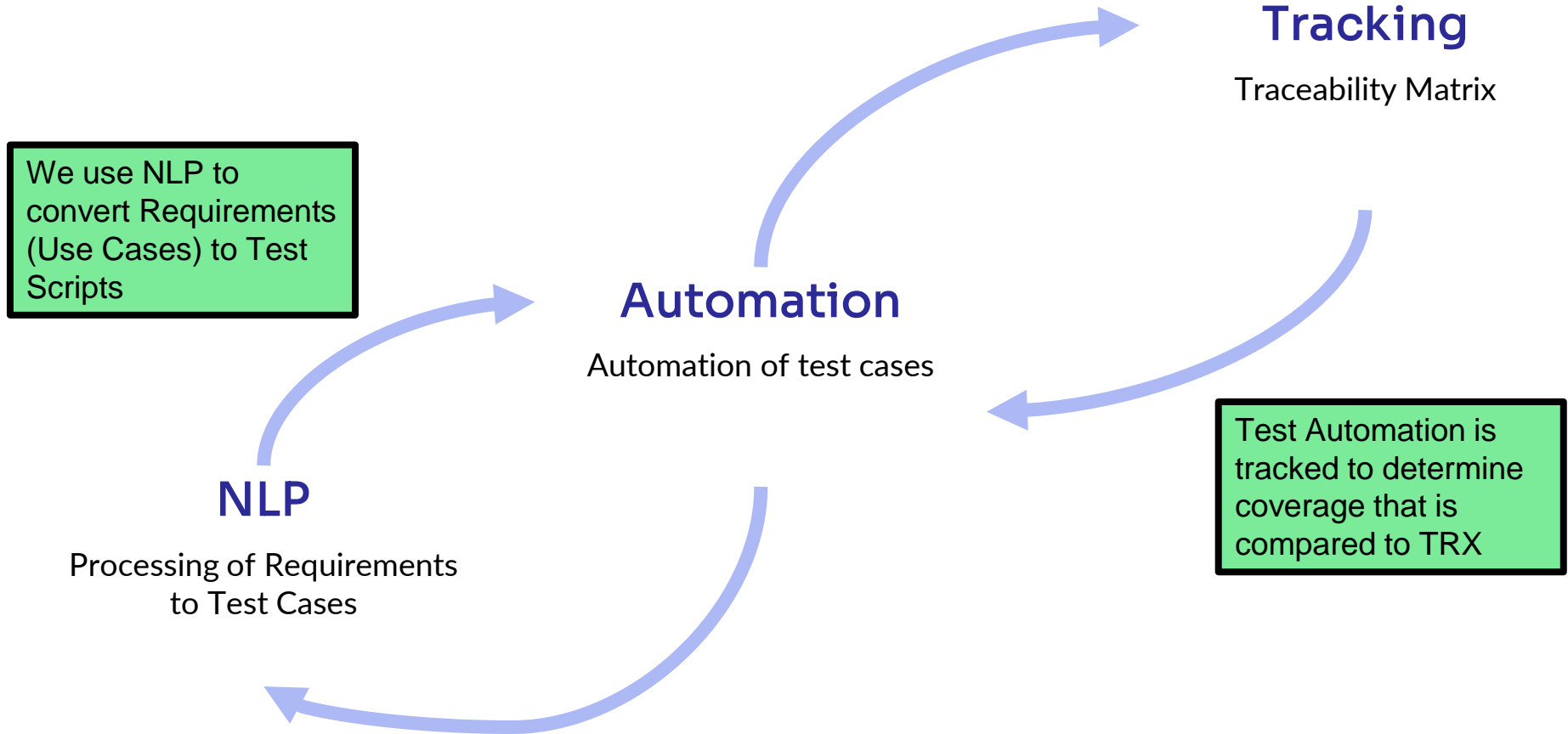
RBT



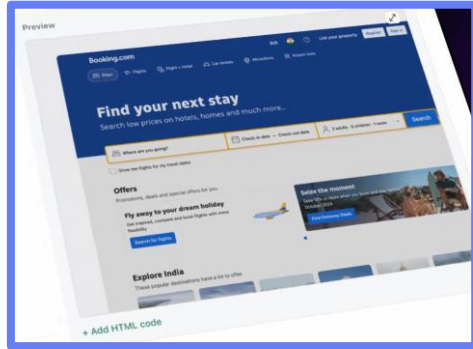
Lessons Learned Tracking

GO/NOGO

Automation Tools

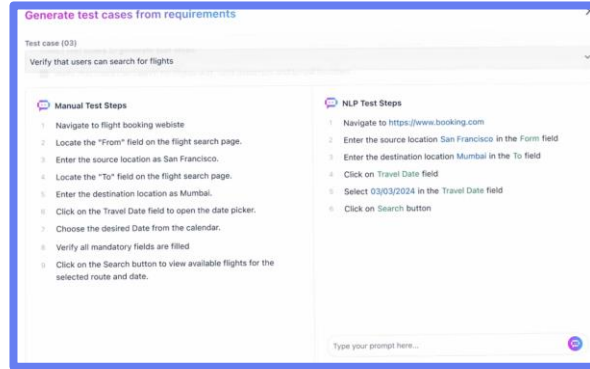


Demo Video (1/2)



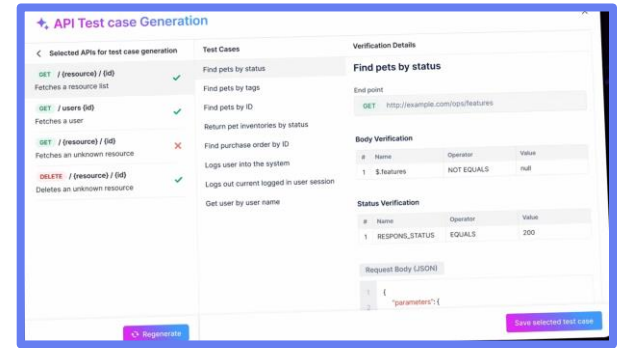
SOURCE

- Create test cases from various sources
- Screen shot/Use Cases/Design



GENERATE SCRIPT

Use chat prompts or user actions such as click and drag to record



ADD ASSERTIONS

Can generate Test Scripts and Automate Test Cases based on Use Case uploads

Demo Video (2/2)



Copilot

NLP – Requirements to Test Script

The screenshot displays the BotGauge web application interface. On the left, a chatbot window titled "Presence Ai" provides instructions for generating test cases. On the right, a "Testcases" tab shows a list of 12 test cases generated from the chatbot's input. The interface includes a navigation sidebar, a chat input field, and a "Push" button.

Presence Ai

Hello! I'm here to help you generate test cases automatically.

You can get started by:

1. Writing your workflow or requirements.
2. Uploading a Business Requirement Document (BRD).
3. Uploading a picture or document.

[Upload File](#)

[Uploaded File/s](#)

Write Message...

Testcases

- Select All
- Simulate an invalid input scenario in the search box to verify the application's error handling and responsiveness.
 - User Login
 - User Registration List
 - Invalid User Search Input
- Check the system's ability to correctly export registration data to an Excel file and verify its integrity.
- Attempt to add a new registration using a form and assess if the operation processes and stores the data accurately.
- Test the functionality of displaying a comprehensive user registration list with proper column headers and visible entries.
- Evaluate the search functionality to ensure advanced filtering options return the correct results for ministry, agency, and state.
- Investigate the behavior of the date range filter by selecting edge dates outside the allowed range.
- Delete a user's registration entry and observe if the changes reflect correctly and the appropriate confirmation message is displayed.
- Assess the application's response to selecting a higher number of records to display from the dropdown menu.
- Ensure the 'Daftar Baharu' button opens the correct registration form and that all inputs are clearly labeled.
- Perform an edit operation on a user's registration and confirm that the updates are saved and displayed correctly.
- Analyze the system's ability to correct and search multiple user names inputs simultaneously.

Compilation: 3 **Execution: 5**

Push

Automation of Test Case

The screenshot displays a software interface for test case automation. On the left, a blue sidebar contains various icons for navigation and settings. The main area is divided into two sections. The top-left section features a chatbot interface with the text: "Hello! I'm here to help you generate test cases automatically. You can get started by: 1. Writing your workflow or requirements. 2. Uploading a Business Requirement Document (BRD). 3. Uploading a picture or document." Below this is an "Upload File" button and a status indicator "Uploaded File/s". The top-right section shows progress bars for "Compilation" (3) and "Execution" (5). The central part of the interface is a list of test cases under the "Groups" tab, with sub-tabs for "Testcases" and "Data". The list includes: "Invalid Registration Date Inputs", "Admin User Registration Management", "Standard User Registration Viewing", "Add New User Registration", "User Login" (with sub-items: "Open website", "Enter Username", "Enter Password", "Click on Log In"), "Navigation to Add New Registration", "User Registration List View", "Print User Registration Report", "Detailed Search in User Registration List", "Perform Detailed Search in User Registration List", and "Simulate User List Updates". A "Push" button is located at the bottom right. A chat input field with a "Write Message..." placeholder and a send button is at the bottom left.

Presence Ai

Compilation 3 Execution 5

Hello! I'm here to help you generate test cases automatically.

You can get started by:

1. Writing your workflow or requirements.
2. Uploading a Business Requirement Document (BRD).
3. Uploading a picture or document.

Upload File

Uploaded File/s

Groups Testcases Data

- Invalid Registration Date Inputs
- Admin User Registration Management
- Standard User Registration Viewing
- Add New User Registration
- User Login
 - Open website
 - Enter Username
 - Enter Password
 - Click on Log In
- Navigation to Add New Registration
- User Registration List View
- Print User Registration Report
- Detailed Search in User Registration List
- Perform Detailed Search in User Registration List
- Simulate User List Updates

Write Message...

Push

Tracking(Coverage)

Use The 'Teruskan' Button After Applying Multiple Filters And Confirm All Filters Are Executed Properly Together.

Compilation 3 Execution 5

Test Steps Data Execution History

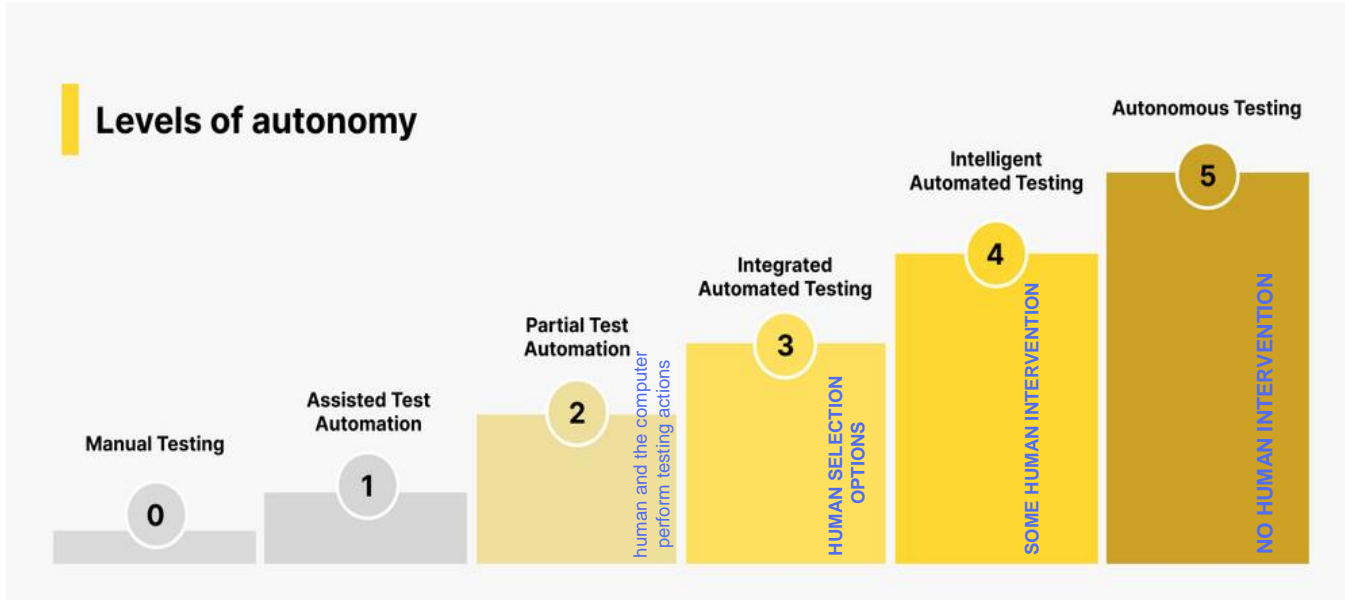
Execute

Start

- 5.2. Enter 'Agensi' agency_example
- 5.3. Click on "Teruskan"
- 6. Placeholder step for navigation
- 7. Select 'Kementre' Ministry of Finai
- 8. Enter 'Agensi' agency_example
- 9. verify 'Filter Verification' is on scre
- 10. verify 'Filter Verification' is on scre
- 11. Click on "Teruskan"

The screenshot displays a software testing interface. At the top, a title bar reads 'Use The 'Teruskan' Button After Applying Multiple Filters And Confirm All Filters Are Executed Properly Together.' To the right of the title bar, there are two progress indicators: 'Compilation 3' and 'Execution 5'. Below the title bar, there are three tabs: 'Test Steps', 'Data', and 'Execution History'. The 'Test Steps' tab is active, showing a list of test steps. Each step is represented by a card with a number, a status icon (a green checkmark), a description, and a data field. The steps are: 5.2. Enter 'Agensi' (agency_example), 5.3. Click on "Teruskan", 6. Placeholder step for navigation, 7. Select 'Kementre' (Ministry of Finai), 8. Enter 'Agensi' (agency_example), 9. verify 'Filter Verification' is on scre, 10. verify 'Filter Verification' is on scre, and 11. Click on "Teruskan". A 'Start' button is located at the top right of the test steps list. On the left side of the interface, there is a vertical blue sidebar with various icons for navigation and settings.

Way forward and future



We are at best at level 4 but level 5 does not look too far.

“ a future where tests are completely created, driven, and managed by AI/ML, eliminating the need for human intervention. ”

Ref : <https://katalon.com/resources-center/blog/ai-in-quality-assurance>

Risk Analysis

Use of BIG-Ai by Trulytixs



Function Point Calculation

We are in the development stage of using a Ai tool to support and generate FPC that can be refined over time

Integrated Project Plan (using eIVV)

Track Quality Assurance and Risk data to support Project Planning.

Thank You!

Do you have any questions?

testing@alaintesting.com.my

+60 3 8992 3160

www.alaintesting.com.my



SAMM 829