

Slido: #KEQA11

TEST AUTOMATION IS DEAD

THE FUTURE OF TESTING: FROM AUTOMATION TO AUTONOMY

QAKE Meetup

October 2, 2024

Wopee.io

TEST AUTOMATION IS DEAD

THE FUTURE OF TESTING IS
AUTONOMOUS TESTING



Really?

TEST AUTOMATION IS DEAD

THE FUTURE OF TESTING: FROM AUTOMATION TO AUTONOMY

QAKE Meetup

October 2, 2024

Wopee.io



Marcel Veselka



SW testing & QA leader



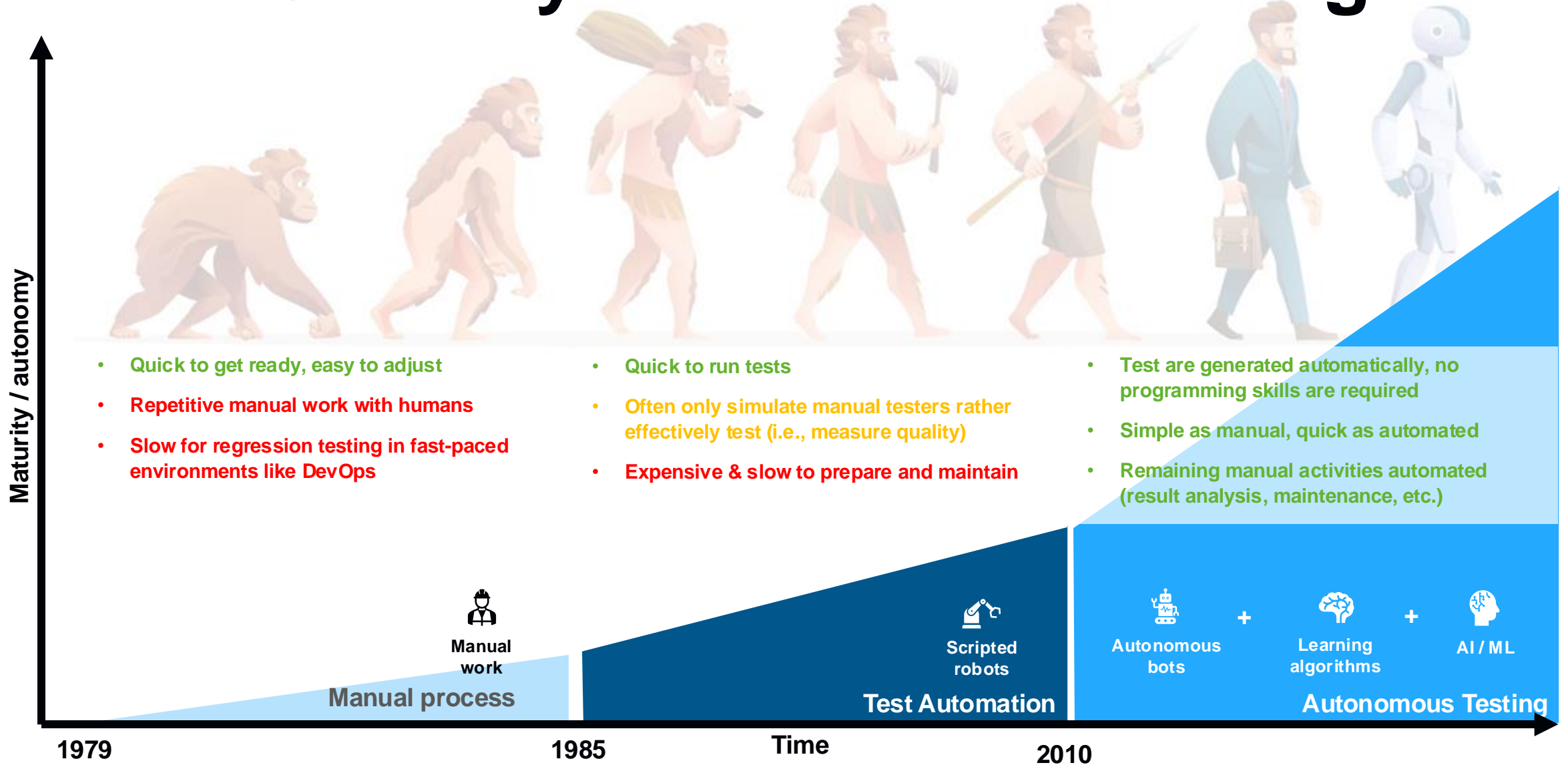
Certifications & partnerships



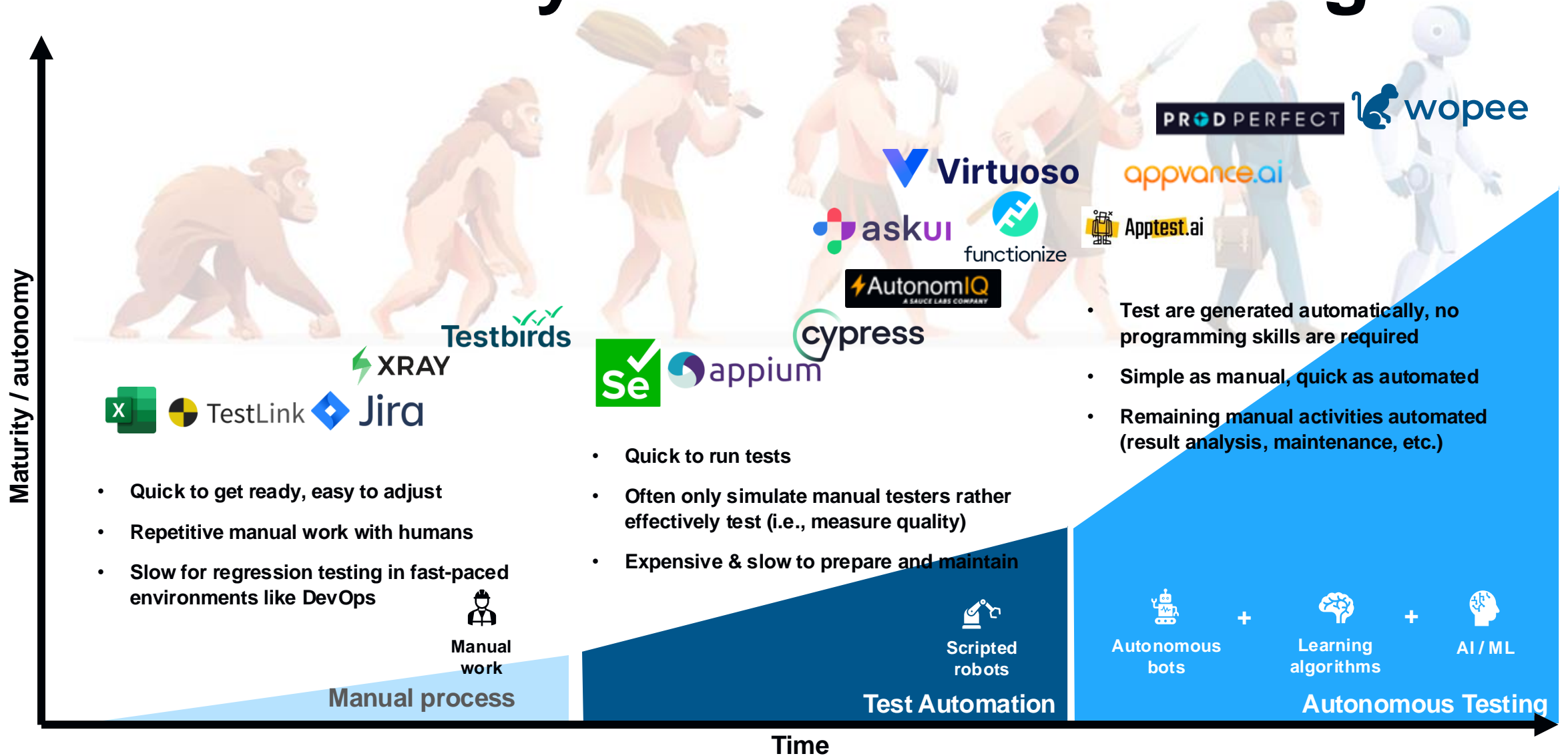
Wopee.io

**Autonomous
Testing Bots**

Journey to the better Testing



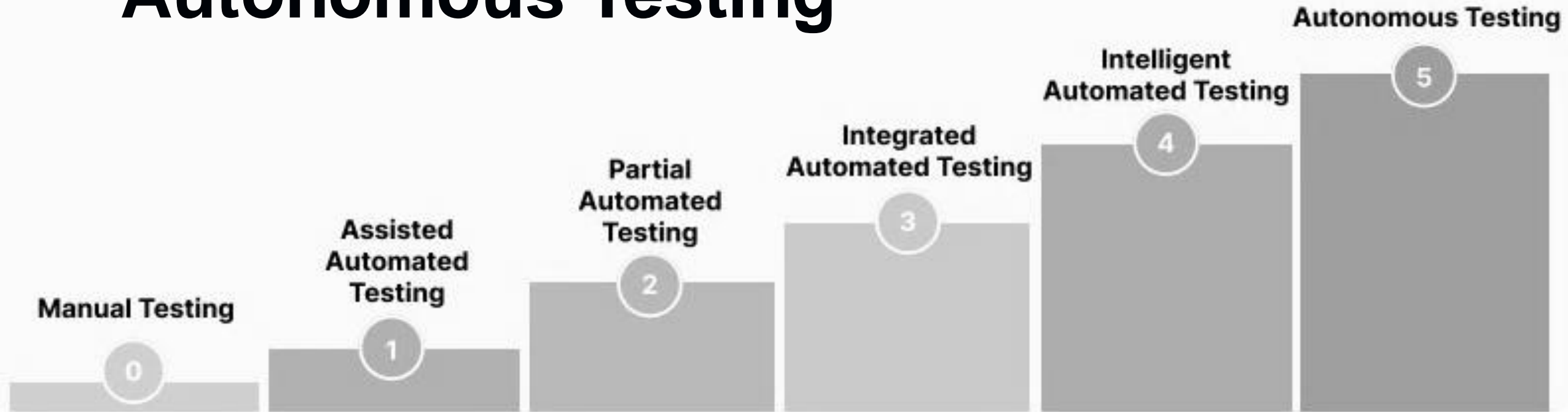
Journey to the better Testing



... so what's the
Autonomous Testing?



Autonomous Testing



The computer has **full control of the testing process**

including **making decisions and carrying out all testing actions**

The human cannot intervene.

My definition of Autonomous Testing



Manual

Prepare
Execute
Handle results



Automated

Prepare
Execute 🤖
Maintain
Handle results

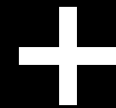


Autonomous

Prepare 🤖
Execute 🤖
Maintain 🤖
Handle results 🤖

What is the Autonomous Testing?








1. Human-less



2. AI-augmented

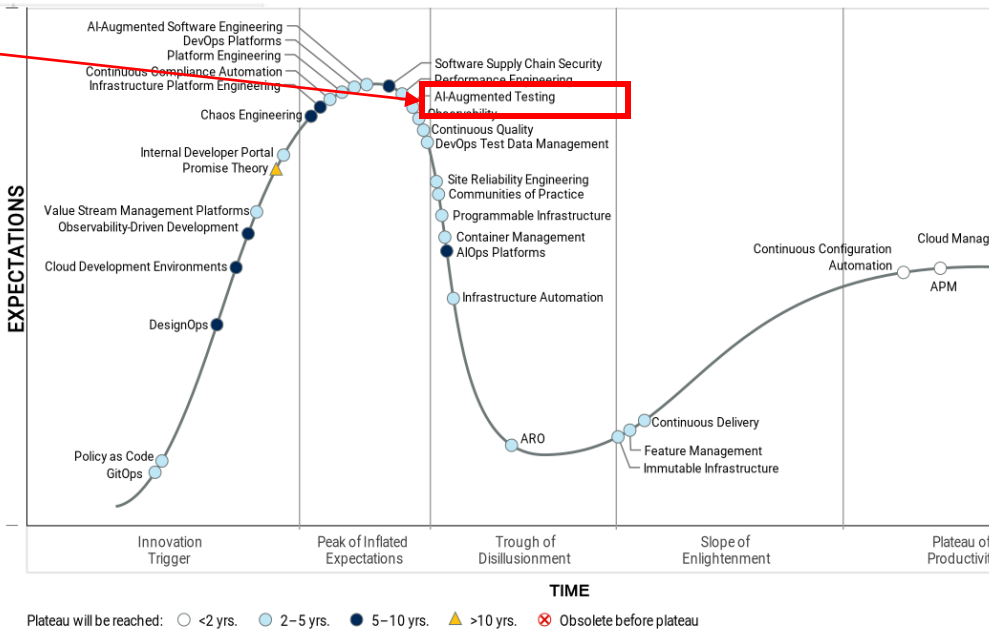


Testing Autonomous Levels >

| | | Planning / Scheduling | Build | Execution | Maintanance | Result Analysis | |
|----------|--|--|---|---|---|---|---|
| 0 | No automation (1979 - 1985) |  eyes on  hands on |  |  |  |  |  |
| 1 | Testers assistance (1985 – 2000) |  eyes on  hands on |  |  |  /  |  |  |
| 2 | Partial automation (2000 - 2010) |  eyes on  temporarily hands off |  |  /  |  |  /  |  /  |
| 3 | Conditional automation (current state) |  eyes on  temporarily hands off |  /  |  |  |  /  |  /  |
| 4 | High automation (estimated by 2025) |  eyes off  hands off |  /  |  |  |  |  /  |
| 5 | Full automation (estimated by 2050) |  eyes off  hands off |  |  |  |  |  |

Autonomous Testing

Gartner's Hype Cycle for Agile and DevOps 2020 vs 2022 vs 2023

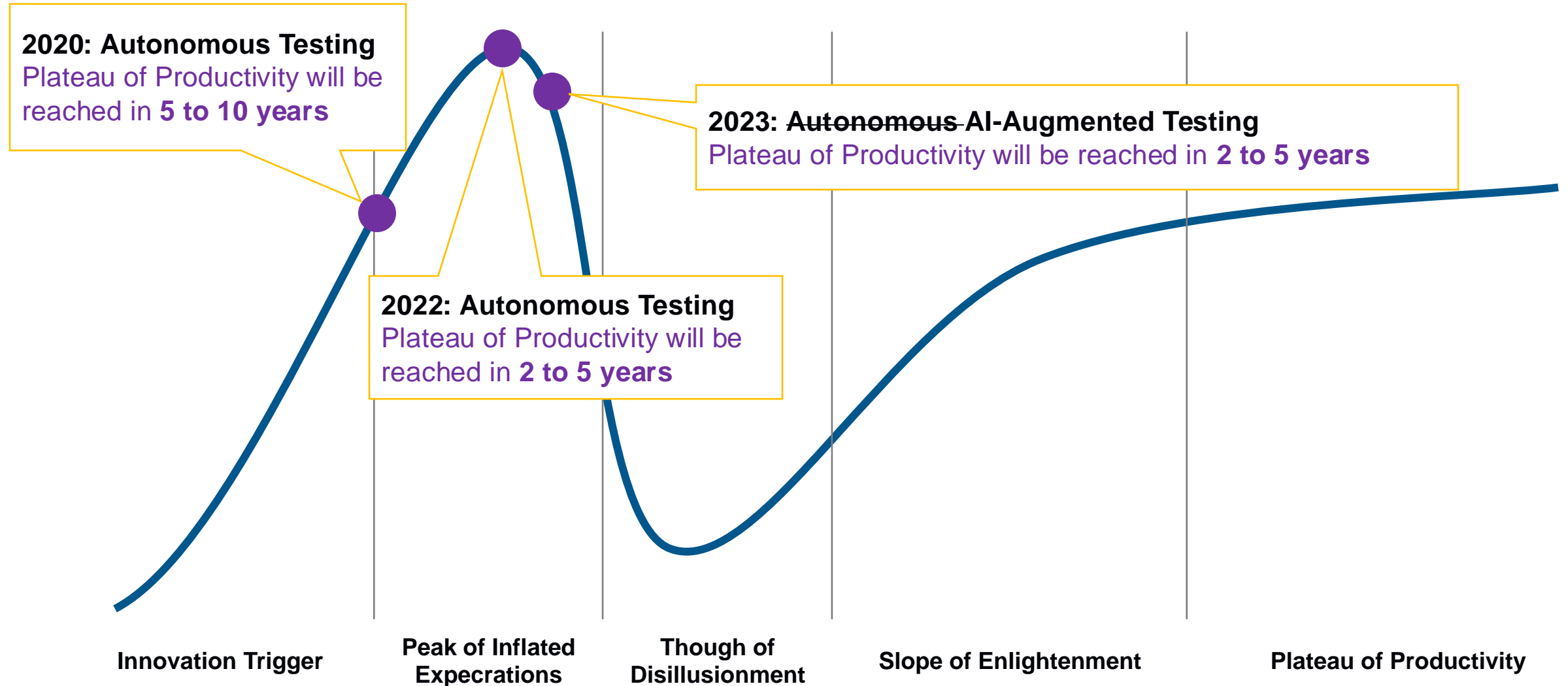


2020: Autonomous Testing
Plateau of Productivity will be reached in 5 to 10 years

2022: Autonomous Testing
Plateau of Productivity will be reached in 2 to 5 years

2023: AI-Augmented Testing
Plateau of Productivity will be reached in 2 to 5 years

Gartner's Hype Cycle for Agile & DevOps



What the market says

We surveyed over 200 industry professionals and asked

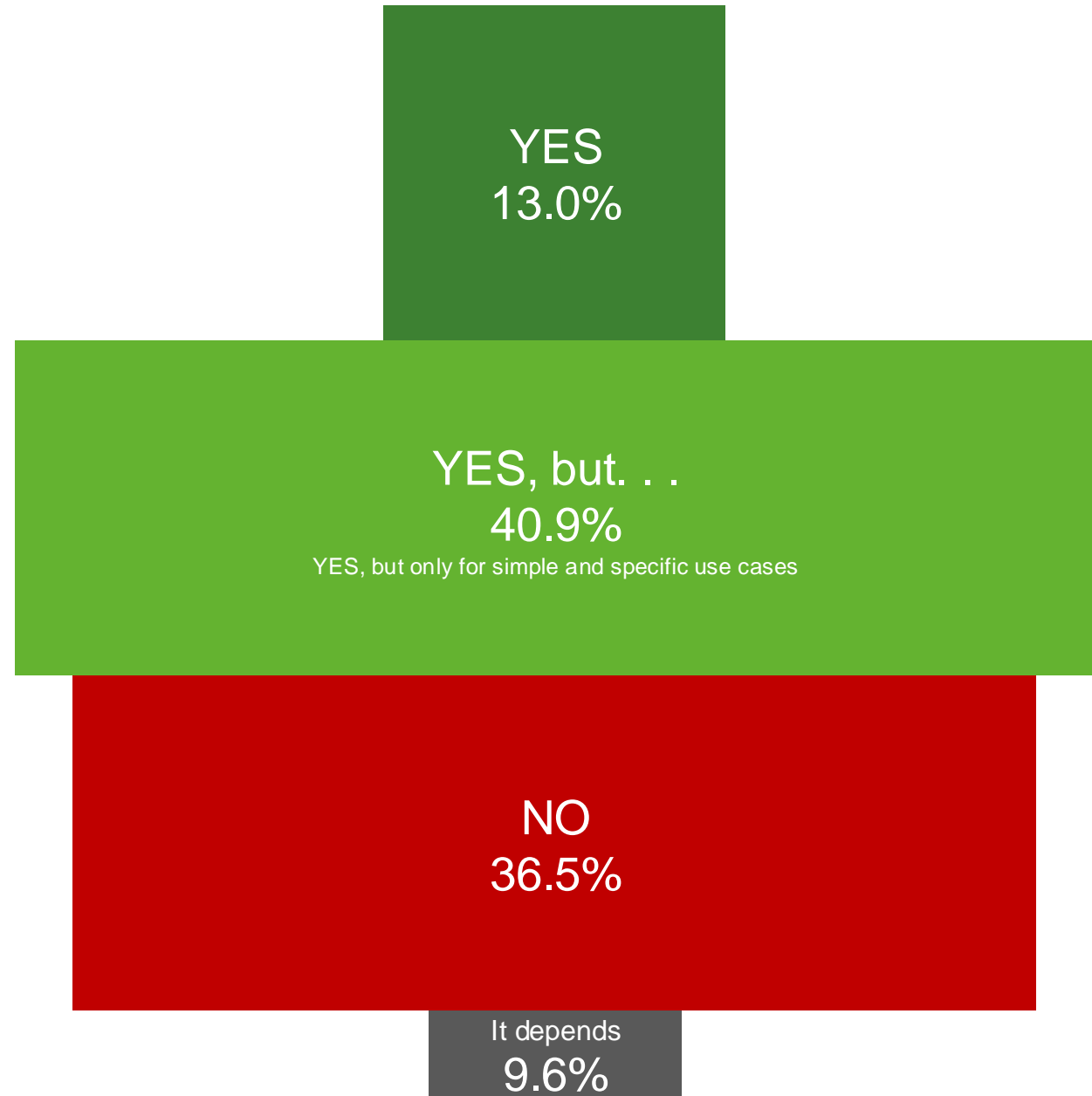
Is **fully autonomous testing**, without
any human involvement, truly
achievable?

-- source: Future Testing Report 2024, Wopee.io



Fully autonomous testing without human involvement?

-- source: Future Testing Report 2024, Wopee.io



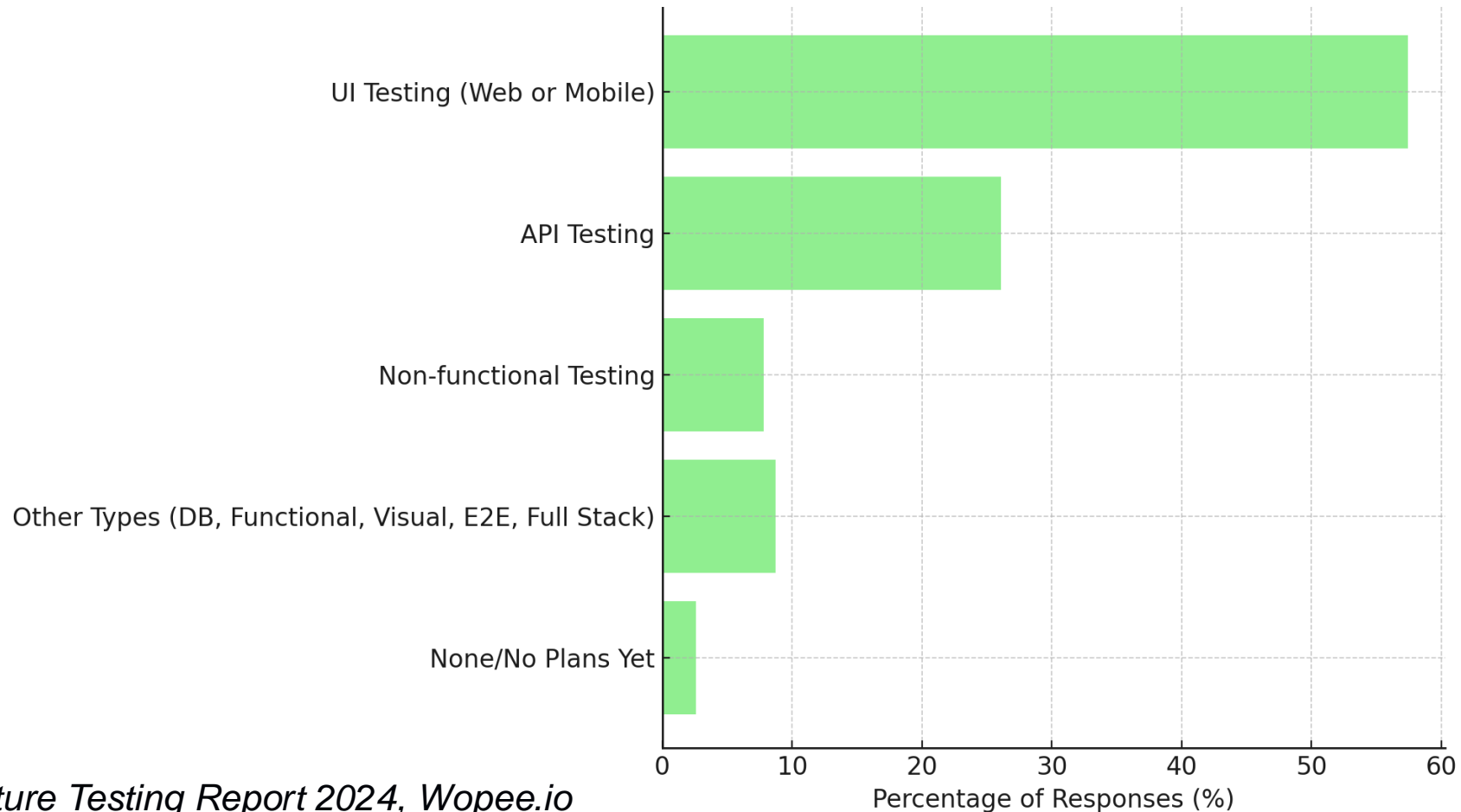
What the market says

We surveyed over 200 industry professionals and asked

**Where do you plan to implement an
autonomous testing** strategy, or have
you already started?

-- source: Future Testing Report 2024, Wopee.io

Where do you plan to implement an autonomous testing strategy, or have you already started?

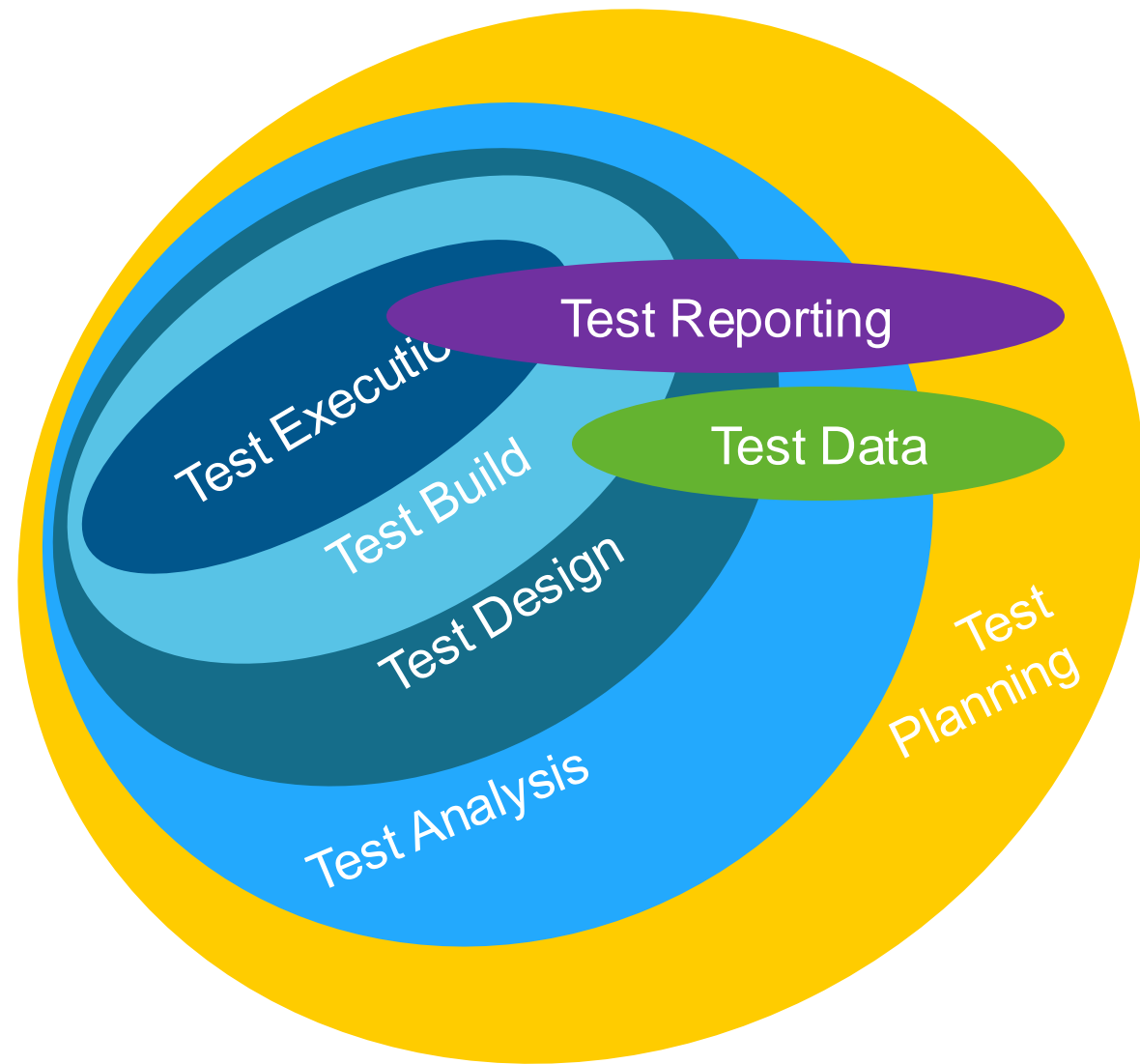


-- source: Future Testing Report 2024, Wopee.io

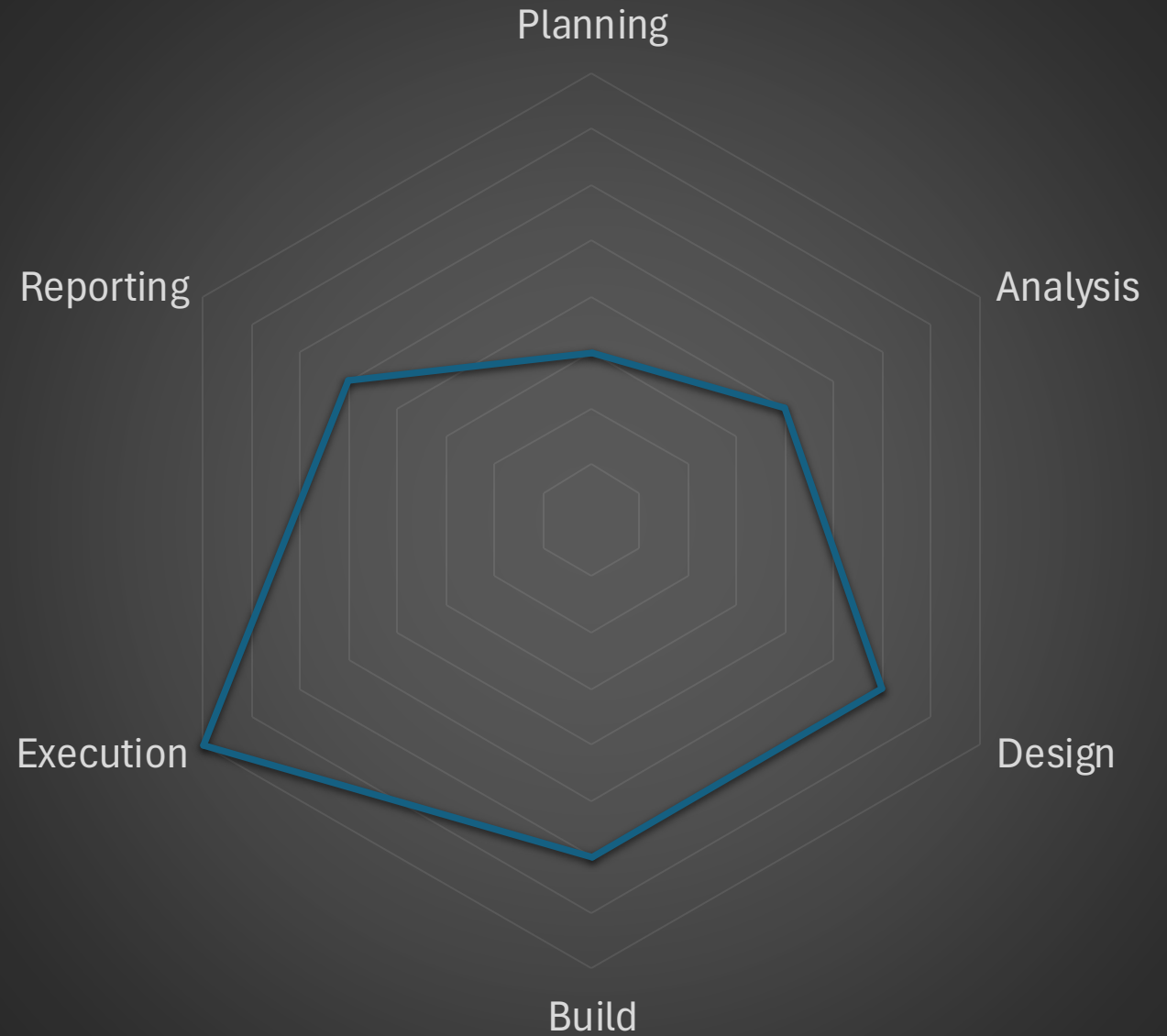
... so how do you apply
this in practice?



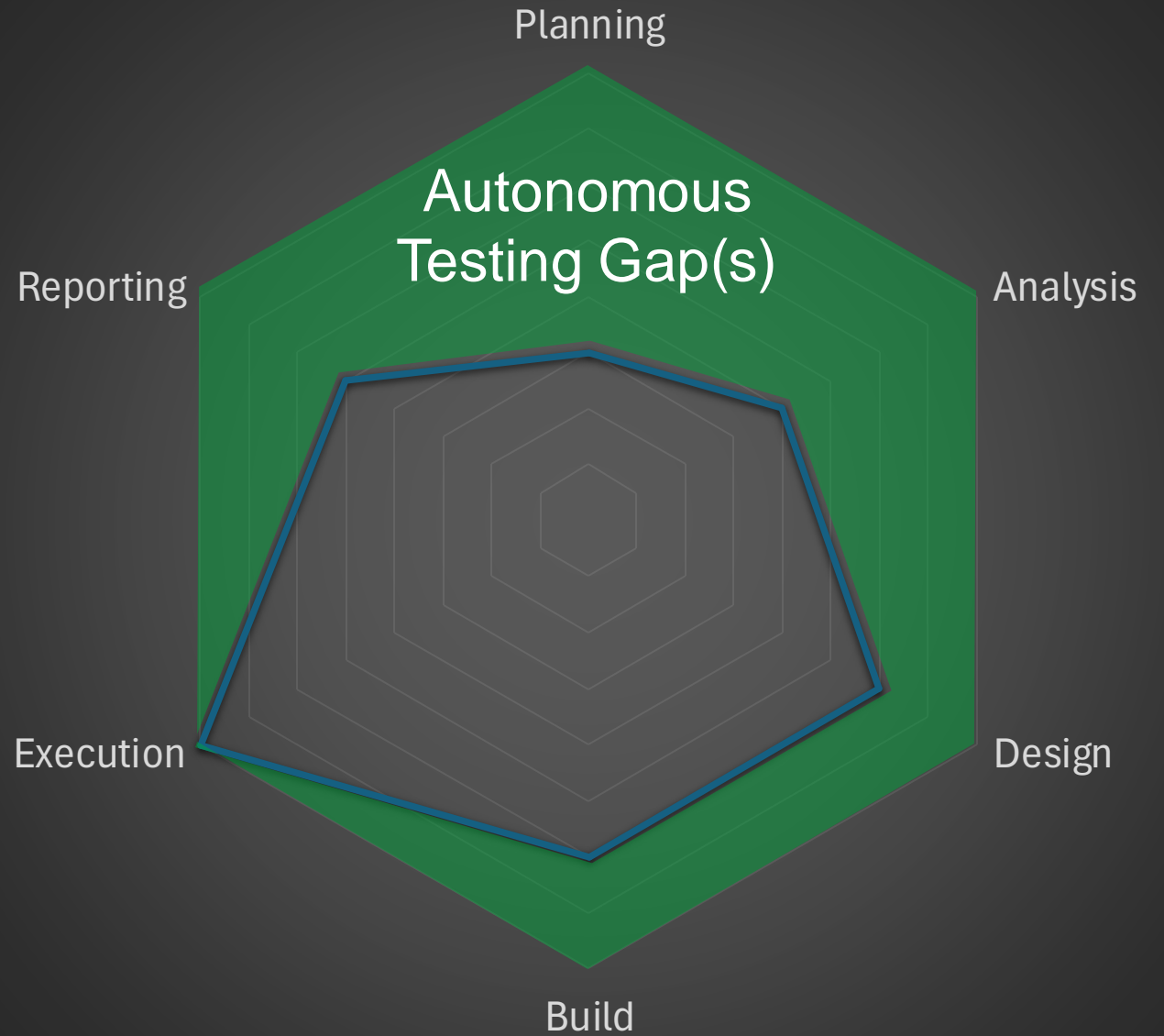
Testing is . . .



[Estimated] Market Adoption of Test Automation . . .



Autonomous Testing Gap(s)



3 Ideas to bridge the gap(s)

AI / ML / Gen AI

1. Reporting
2. Analysis & Design
3. Build



**... AND
WHAT ABOUT ML??**



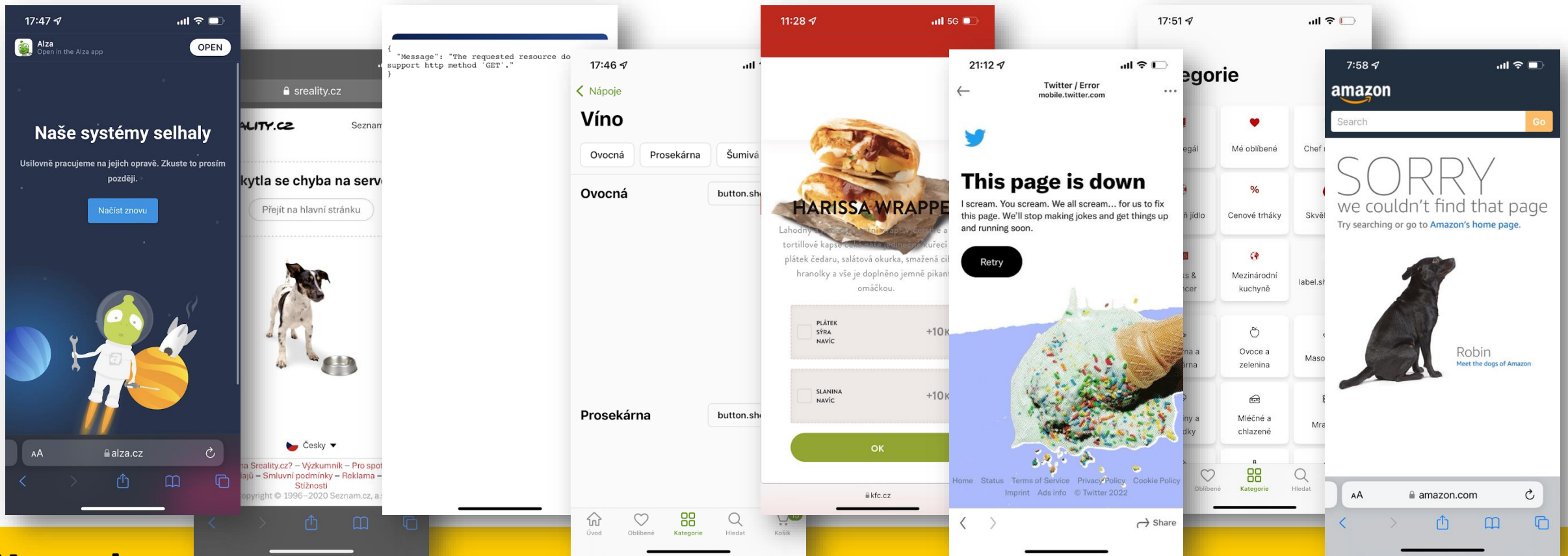
Idea #1: Reporting



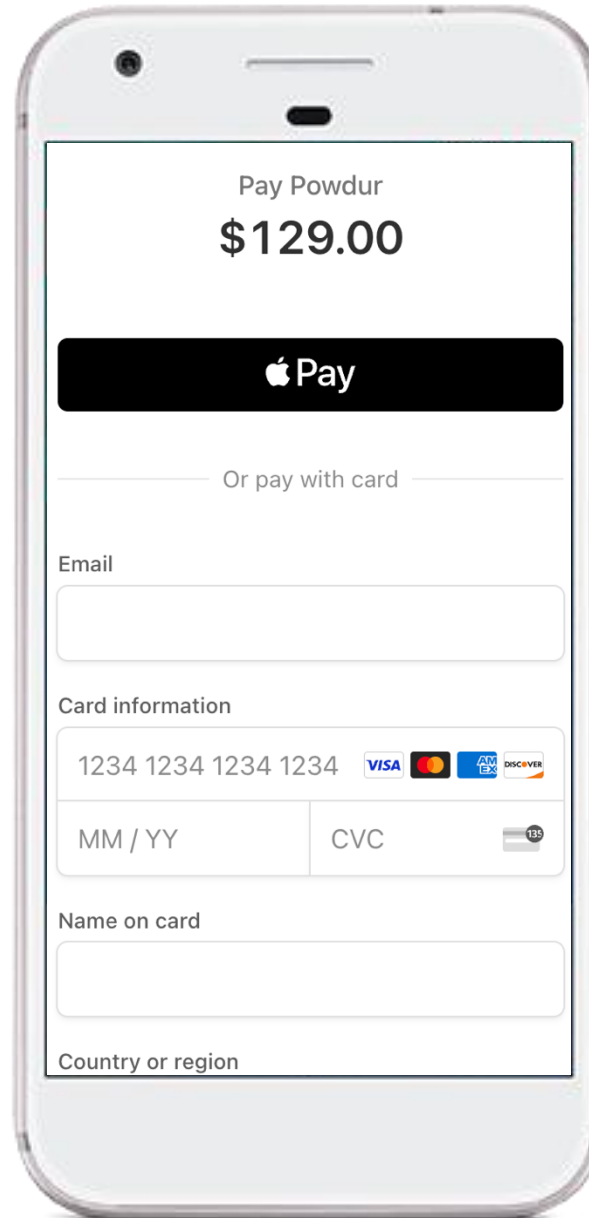
From Screenshots to Bug report



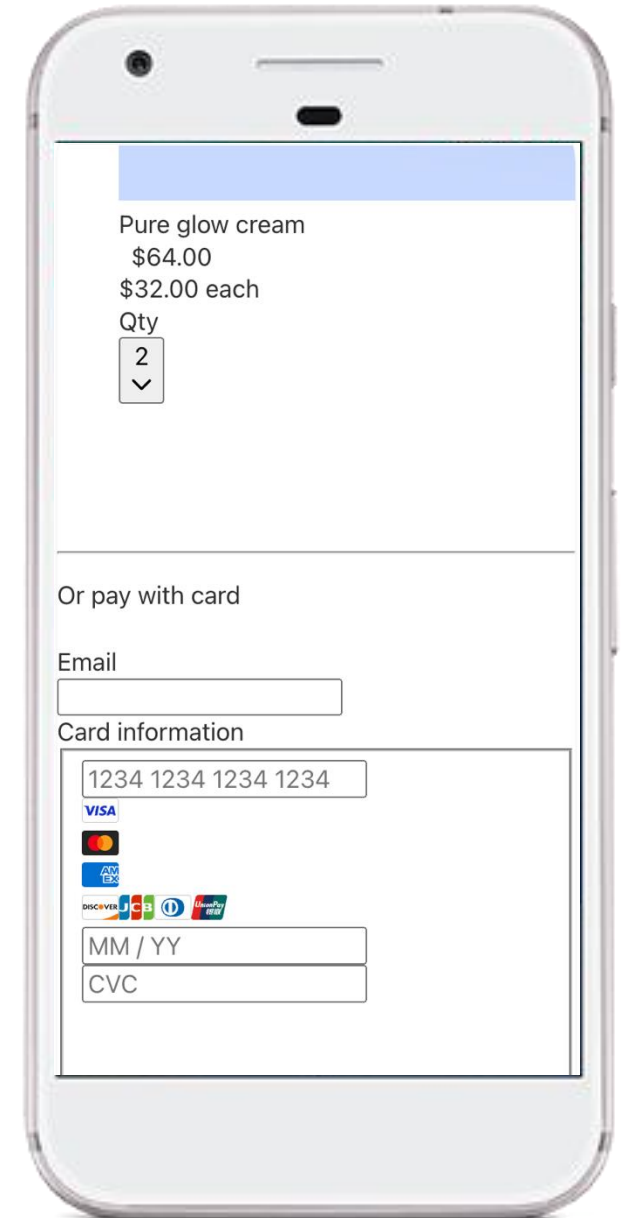
Example buggy screenshots



Test your web apps visually



VS



Visual Regression Test Report Template + Prompt (example)

1. Test Summary:

- **Page Title:** [provide page title]
- **Status:** [OK or NOK – decide based on calculated threshold and difference tolerance provided below]
- **URL:** [provide URL]
- **Confidence:** [provide your level of confidence it is really bug, use values low, moderate, high, very high, absolute]

2. Test Details:

- **Difference Tolerance:** 1% (used to decide about status)
- **Resolution:** [set based on the data I provided]
- **Branch:** [set based on the data I provided]
- **Baseline Branch:** [set based on the data I provided]

3. Visual Comparison:

- **Expected (Baseline) Screenshot:** attached as expected.png
- **Actual Screenshot:** attached as actual.png

4. Description of Differences:

- **Expected Result:** [Describe how the UI was expected to appear based on the baseline, e.g., "The image gallery thumbnails should be evenly spaced, and the buttons should be properly aligned below the images."]
- **Actual Result:** [Describe the visual discrepancy during test execution, e.g., "Thumbnails are misaligned, and the buttons overlap with the images."]

5. Next Steps: [Outline actions to resolve the issue or flag for further investigation]

Actual test result

Random Gallery

your one stop shop for your best drones



DJI Phantom 4 Pro V2.0 is back 1/1

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This helps protect our community. [Learn more](#)

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Expected test result

Random Gallery

your one stop shop for your best drones



DJI Phantom 4 Pro V2.0 is back 1/1

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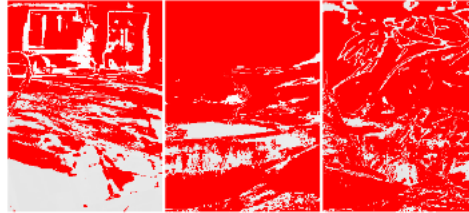
Diff


drone diff your drone using deep learning to detect changes


Home About Us Contact Us


Random Gallery

your new drone flight for your last flight



 DJI Phantom 4 Pro V2.0 is back 1/1

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Gallery — dronjo | your one stop shop for the best drones | Status: ⚠ UNRESOLVED | Difference: 5.44%

Url: <https://dronjo.wopee.io/gallery.html> |  Comment

Difference tolerance: 1% | Resolution: 1920x1396 | Branch: master | Baseline branch: master

Gallery — dronjo | your one stop shop for the best drones | Status: ⚠ UNRESOLVED | Difference: 5.44%

Url: <https://dronjo.wopee.io/gallery.html> |  Comment

Difference tolerance: 1% | Resolution: 1920x1396 | Branch: master | Baseline branch: master


Description: CLICK(OK): xpath=//*[@class='nav-item'] >> xpath=//a[@class='nav-link'] >> text=GALLERY


Current Image

Random Gallery

your one stop shop for your best drones



 DJI Phantom 4 Pro V2.0 is back 1/1

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Comparison view

1/1

13/20  

 APPROVE

 REJECT




Baseline


1 

Random Gallery

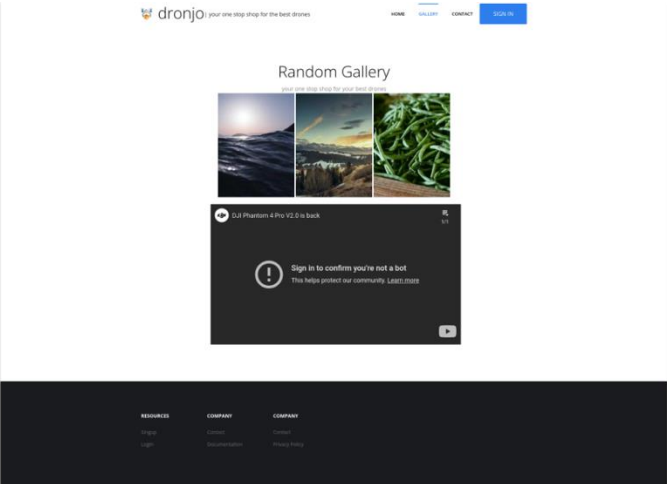
your one stop shop for your best drones



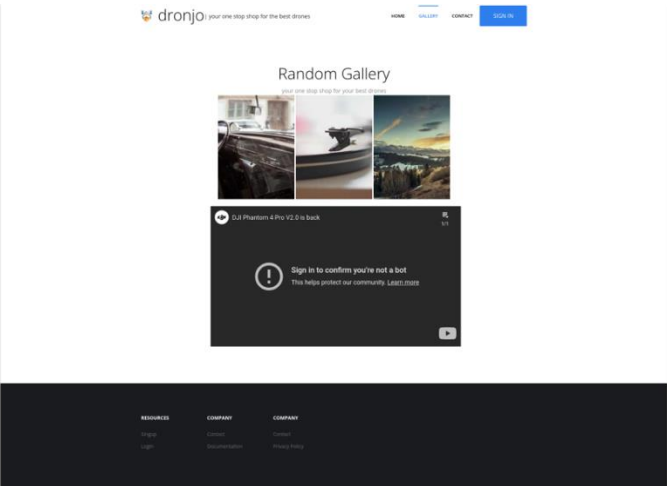
 DJI Phantom 4 Pro V2.0 is back 1/1

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This helps protect our community. [Learn more](#)

Actual test result



Expected test result



Data from test execution

Gallery — dronjo | your one stop shop for the best drones | Status: ! UNRESOLVED | Difference: 5.44%
Url: <https://dronjo.wopee.io/gallery.html> | Comment
Difference tolerance: 1% | Resolution: 1920x1396 | Branch: master | Baseline branch: master



1. Test Summary: **Bug report template**

- **Page Title:** [provide page title]
- **Status:** [OK or NOK – decide based on calculated threshold and difference tolerance provided below]
- **URL:** [provide URL]

2. Test Details:

- **Difference Tolerance:** 1% (used to decide about status)
- **Resolution:** [set based on the data I provided]
- **Branch:** [set based on the data I provided]
- **Baseline Branch:** [set based on the data I provided]

3. Visual Comparison:

- **Expected (Baseline) Screenshot:** attached as expected.png
- **Actual Screenshot:** attached as actual.png

4. Description of Differences:

- **Expected Result:** [Describe how the UI was expected to appear based on the baseline, e.g., "The image gallery thumbnails should be evenly spaced, and the buttons should be properly aligned below the images."]
- **Actual Result:** [Describe the visual discrepancy during test execution, e.g., "Thumbnails are misaligned, and the buttons overlap with the images."]

- **Next Steps:** [Outline actions to resolve the issue or flag for further investigation]

Data from test execution

Actual test result

Expected test result

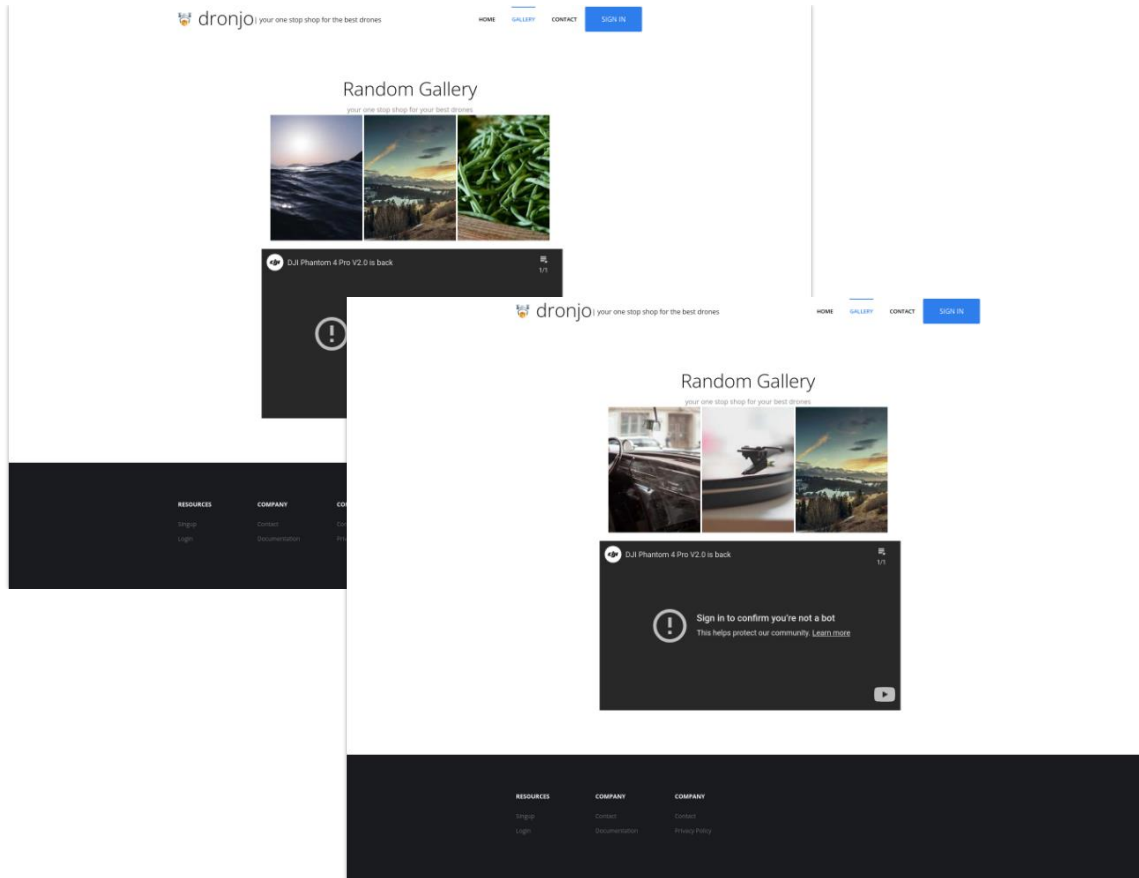


AI/LLM

Bug report template

Bug report

Bug report



LLM output

Description of Differences: Upon comparison, the visual layout in the gallery section shows a significant shift between the expected and actual images. The images in the gallery are misaligned between the two versions:

- The top right image in the gallery has changed from an automobile interior to greenery.
- The overall spacing between the images appears altered, and there's a noticeable difference in image content and positioning between the two test states.

Next Steps:

- Investigate if there was an intentional change in content or layout between test executions.
- Check the data source for the gallery images to ensure consistency between environments.
- Re-run the visual test after confirming if any dynamic content changes are responsible for the differences.
- Review the CSS/HTML layout for potential issues in dynamic loading or asset rendering between the baseline and test execution environments.

Level of Confidence: Very High Confidence

The differences are clear, reproducible, and consistent between the baseline and test execution. The images displayed do not match the expected gallery layout.

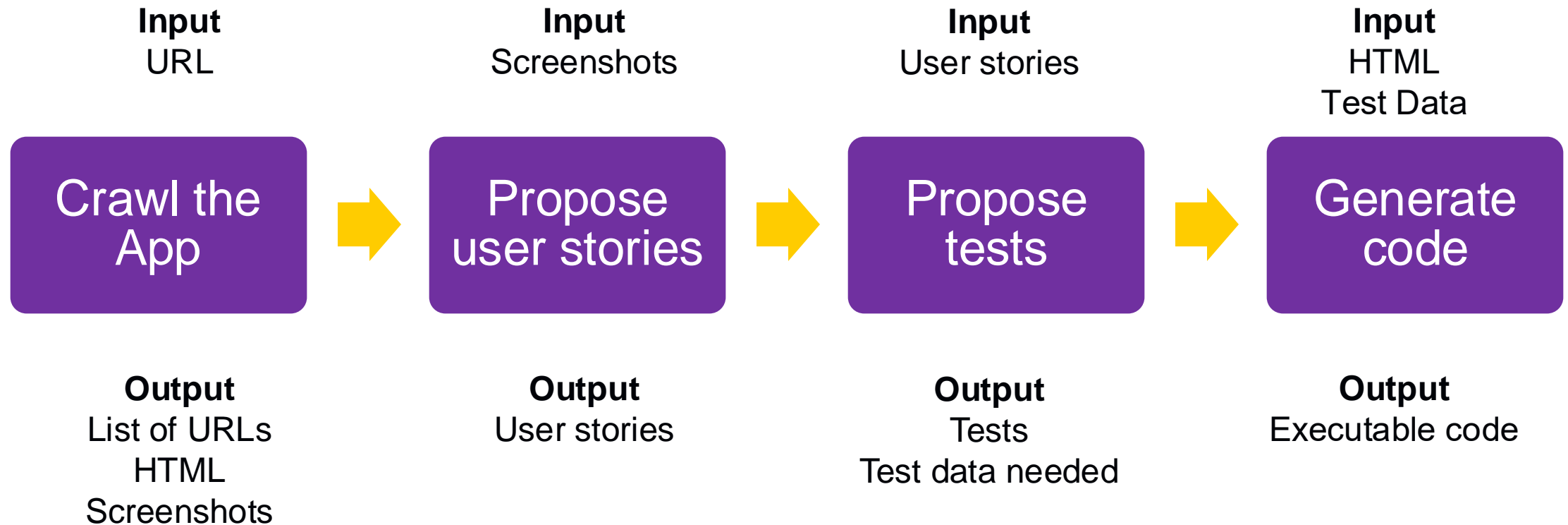
Idea #2: Analysis & Design

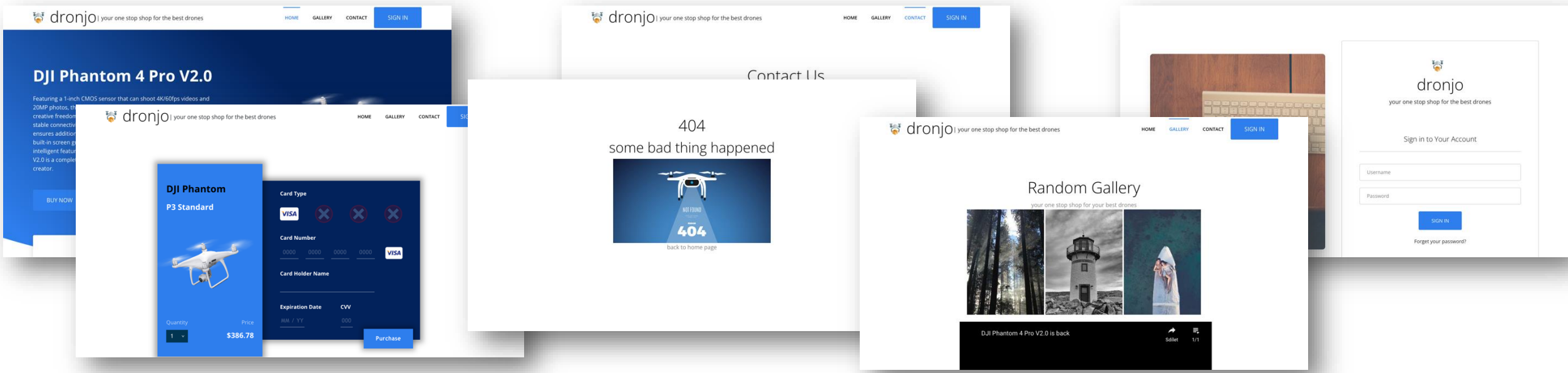


From URL to Test Cases



Test Creation Process (initial run)





| User Story Name | Me as | Want to | So that I | Acceptance Criteria | Business Priority |
|---------------------|----------------------|--|---|--|-------------------|
| User Login | As a registered user | I want to log into my account | So that I can access personalized features | <ul style="list-style-type: none"> - The login form is displayed - Users can enter username and password - Successful login redirects to The dashboard - Error message for invalid credentials | High |
| View Drone Details | As a user | I want to view drone details | So that I can make informed purchasing decisions | <ul style="list-style-type: none"> - Drone details (name, price, description) are displayed - Drone image is visible - "Buy Now" button is available | High |
| Purchase Drone | As a user | I want to purchase a drone | So that I can complete my transaction | <ul style="list-style-type: none"> - Payment form appears - Users can input card type, number, expiration date, CVV - Confirmation upon successful purchase | High |
| View Gallery | As a user | I want to view the gallery | So that I can see photos of drones in action | <ul style="list-style-type: none"> - Gallery of images is displayed - Each image related to drones is visible | Medium |
| Contact Support | As a user | I want to find contact information | So that I can reach out for support or inquiries | <ul style="list-style-type: none"> - Contact details (phone number, email) are displayed - Option to send an inquiry or request information is available | Medium |
| View Product Offers | As a user | I want to see current offers | So that I can take advantage of discounted prices | <ul style="list-style-type: none"> - Offers are clearly listed with old and new prices - "Buy Now" button is functional | High |
| Error Handling | As a user | I want to see appropriate error messages | So that I understand what went wrong | <ul style="list-style-type: none"> - 404 error message displayed for non-existent pages - Clear navigation back to home page link is functional | Low |

From User Stories to Test Cases

| Test Case ID | User Story Name | Test Case Description | Preconditions | Test Steps | Expected Result | Priority |
|--------------|----------------------|---|------------------------------------|---|---|----------|
| TC001 | User Login | Verify user can log in with valid credentials | User is registered | <ol style="list-style-type: none"> 1. Open login page 2. Enter valid username 3. Enter valid password 4. Click "Login" button | User is successfully redirected to the dashboard | High |
| TC002 | User Login | Verify error message for invalid credentials | User is registered | <ol style="list-style-type: none"> 1. Open login page 2. Enter invalid username 3. Enter invalid password 4. Click "Login" button | Error message displays indicating invalid credentials | High |
| TC003 | Product Purchase | Verify product details are displayed for a selected drone | User is logged in | <ol style="list-style-type: none"> 1. Navigate to drone product page 2. Check for product title, price, and description | Product details are displayed clearly | High |
| TC004 | Product Purchase | Verify payment form is available when purchasing a drone | User is logged in | <ol style="list-style-type: none"> 1. Select a drone for purchase 2. Click "Buy Now" button | Payment form is displayed | High |
| TC005 | Product Purchase | Verify confirmation message shows after completing a purchase | Payment is successfully processed | <ol style="list-style-type: none"> 1. Complete payment process 2. Check for confirmation message | Confirmation message shows successful purchase | High |
| TC006 | View Product Details | Verify detailed drone information is displayed | None | <ol style="list-style-type: none"> 1. Open the product details page 2. Verify product specifications, images, and price | All relevant product information is displayed | Medium |
| TC007 | Contact Support | Verify contact information is displayed | None | <ol style="list-style-type: none"> 1. Navigate to the "Contact Support" page | Contact information is clearly displayed | Medium |
| TC008 | Contact Support | Verify access to FAQs or support options | None | <ol style="list-style-type: none"> 1. Navigate to the "Contact Support" page 2. Check for FAQ links or support options | FAQs or support options are clearly available | Medium |
| TC009 | Navigate Gallery | Verify the product gallery is accessible and functional | None | <ol style="list-style-type: none"> 1. Open the product gallery page 2. Navigate through gallery images | Images are displayed clearly, and navigation through images works | Medium |
| TC010 | Forgot Password | Verify "Forgot your password?" option is available | User is registered | <ol style="list-style-type: none"> 1. Navigate to login page 2. Check for "Forgot your password?" link | Link is displayed and accessible | High |
| TC011 | Forgot Password | Verify email entry for password reset works | User registered with a valid email | <ol style="list-style-type: none"> 1. Click on "Forgot your password?" 2. Enter registered email 3. Click "Submit" | Notification sent to email for reset link | High |
| TC012 | View Promotions | Verify promotional offers are displayed | None | <ol style="list-style-type: none"> 1. Navigate to homepage or product page 2. Check for promotional banners or icons | Current promotions are clearly displayed | Medium |
| TC013 | Error Handling | Verify proper error messages displayed for 404 error | None | <ol style="list-style-type: none"> 1. Enter a non-existing page URL | Displays a 404 error message | High |
| TC014 | Error Handling | Verify error message shows for payment failure | User is logged in | <ol style="list-style-type: none"> 1. Simulate a payment failure 2. Complete the payment process | Appropriate error message shows payment failure | High |

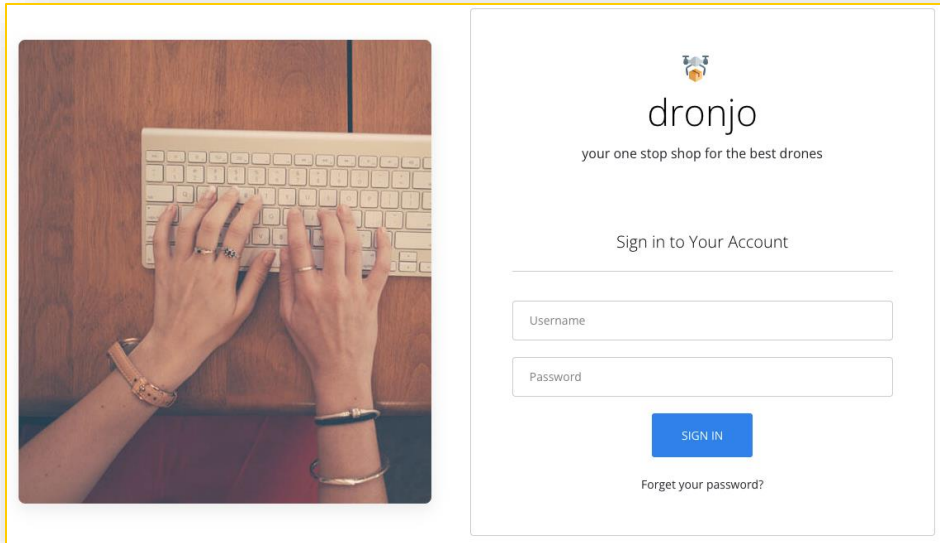
 Idea #3: **Build**



From **Test Cases** to **Executable Code**



<https://dronjo.wopee.io/sign-in.html>



Custom function

Dynamically interact with any HTML form and return steps

Custom function

Dynamically interact with any HTML

```
const baseURL = "https://dronjo.wopee.io/";

test("Login with valid credentials", async ({ page }) => {
  await page.goto(baseURL);
  // await page.click("#sign_in >> text=Sign in");

  await wopeeCopilot.action(page, "Navigate to login page");

  await wopeeCopilot.fillForm(page);
  await page.screenshot({ path: "screenshot.png" });
});
```

```
Step 1: fill //input[@name='user'] = testuser@tesena.com
Step 2: fill //input[@name='password'] = testpassword
Step 3: click //button[text()='sign in']
```

❤️ Wopee.io 🐒

Please wait, it takes a couple of seconds to get results from AI services.



dronjo

your one stop shop for the best drones

Sign in to Your Account

SIGN IN

[Forget your password?](#)

<https://www.saucedemo.com/>

```
const baseURL = "https://www.saucedemo.com/";

test("Login with valid credentials", async ({ page }) => {
  await page.goto(baseURL);
  // await page.click("#sign_in >> text=Sign in");

  await wopeeCopilot.action(page, "Navigate to login page");

  await wopeeCopilot.fillForm(page);
  await page.screenshot({ path: "screenshot.png" });
});
```

Step 1: fill //input[@data-test='username'] = testuser
Step 2: fill //input[@data-test='password'] = testpassword
Step 3: click //input[@data-test='login-button']

<https://dronjo.wopee.io/sign-in.html>

```
const baseURL = "https://dronjo.wopee.io/";

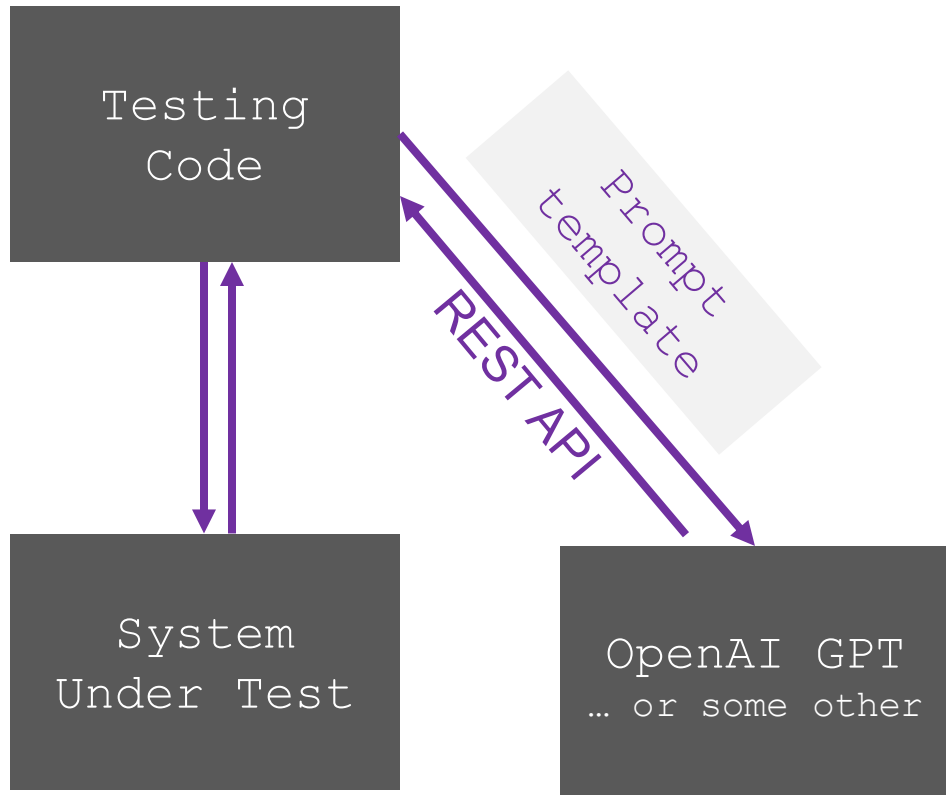
test("Login with valid credentials", async ({ page }) => {
  await page.goto(baseURL);
  // await page.click("#sign_in >> text=Sign in");

  await wopeeCopilot.action(page, "Navigate to login page");

  await wopeeCopilot.fillForm(page);
  await page.screenshot({ path: "screenshot.png" });
});
```

Step 1: fill //input[@name='user'] = testuser@tesena.com
Step 2: fill //input[@name='password'] = testpassword
Step 3: click //button[text()='sign in']

The "magic" behind form filling



Prompt template example

I'm a test engineer writing tests in Playwright using Typescript.

I've opened a web page and I want to fill in and submit (click on a button as a last step) the form on this page.

Use realistic test data (consider defined and typical validations) and locators from this HTML:

```
```html
{{ html }}
```
```

Provide me with steps to accomplish it in JSON format. Example:

```
```json
[
 { "step": 1, "locator": "#name", "value": "Marcel", "action": "fill" },
 { "step": 2, "locator": "#pswd", "value": "abc123", "action": "fill" }
]
```
```

BDD scenario with autogenerated low-level code



```
test("BDD: Login with valid credentials", async ({ page }) => {
  await wopeeCopilot.Given("I am on the login page");
  await wopeeCopilot.When("I fill in valid credentials");
  await wopeeCopilot.Then("I should be logged in");
});
```

Custom BDD method to test any web app

With <https://www.saucedemo.com/>

```
Following steps were proposed by AI:
[]
.
Following steps were proposed by AI:
[
  { "step": 1, "locator": "#user-name", "value": "standard_user", "action": "fill" },
  { "step": 2, "locator": "#password", "value": "secret_sauce", "action": "fill" },
  { "step": 3, "locator": "#login-button", "value": "", "action": "click" }
]
.
Following steps were proposed by AI:
[
  { "step": 1, "locator": "#react-burger-menu-btn", "action": "click" },
  { "step": 2, "locator": "#logout_sidebar_link", "action": "get_text" }
]
```

With <https://dronjo.wopee.io/>

```
Following steps were proposed by AI:
[
  { "step": 1, "locator": "#sign_in a", "value": "", "action": "click" }
]
.
Following steps were proposed by AI:
[
  { "step": 1, "locator": "input[name='user']", "value": "user@tesena.com", "action": "fill" },
  { "step": 2, "locator": "input[name='password']", "value": "password123", "action": "fill" },
  { "step": 3, "locator": "button.btn-main-sm", "value": "", "action": "click" }
]
.
Following steps were proposed by AI:
[
  {
    "step": 1,
    "validation": "The 'Log out' button should be visible indicating that the user is logged in",
    "locator": "#logout",
    "action": "visibility"
  },
  {
    "step": 2,
    "validation": "The 'Sign in' button should not be visible indicating that the user is already logged in",
    "locator": "#sign_in",
    "action": "invisibility"
  }
]
```

Reduce the test automation complexity and keep its benefits 🦾

1. Set up bot execution

Enabling all client's needs for autonomous testing.

Easy to use interface.



2. Teach bot test

Gets more regression testing with same resources.

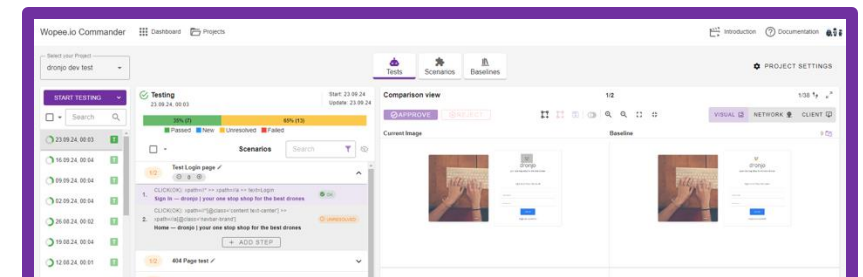
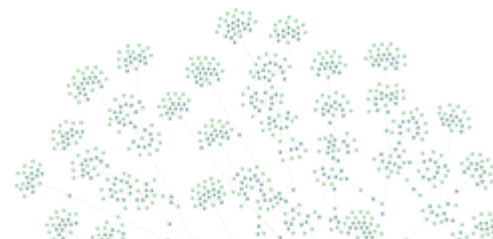
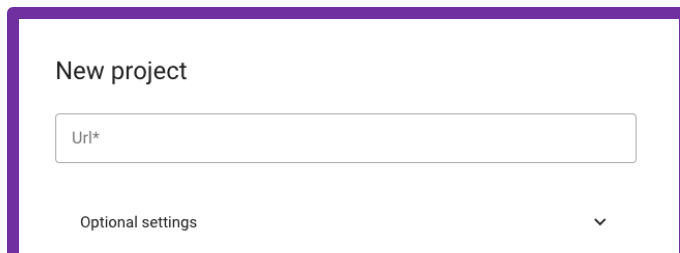
Automatically validates application functionality.



3. Monitor testing results

Finds most relevant bugs always and quickly.

No scripting required and mild learning curve.



TEST AUTOMATION IS DEAD

THE FUTURE OF TESTING IS

AUTONOMOUS TESTING



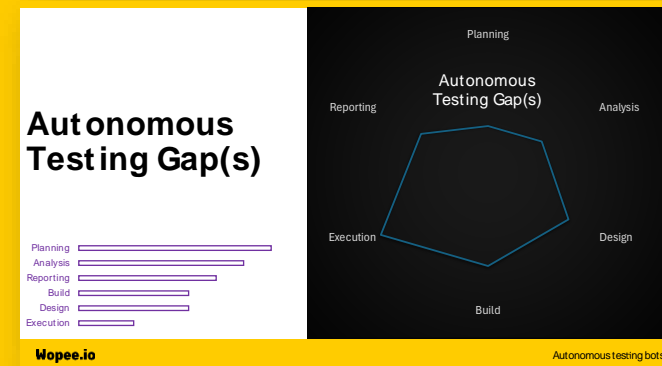
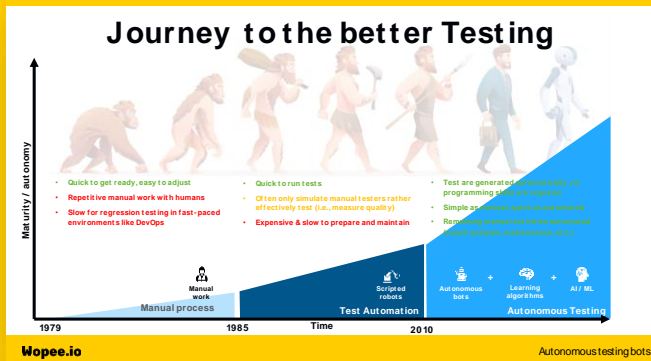
Really?

IS AUTONOMOUS TESTING TRULY THE FUTURE OF SOFTWARE QUALITY?

I believe YES

We haven't found the perfect solution yet, but **human insight** will **always remain** essential.





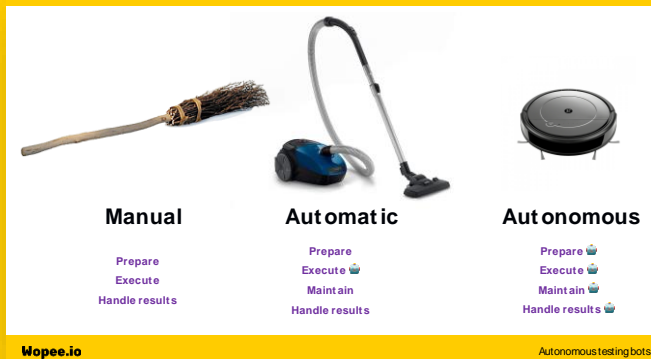
Summary

1. Journey to the better Testing

2. Autonomous Testing

3. Autonomous Testing Gap(s)

4. Ideas bridging the Gap(s)



The time is now!

Autonomous testing is the next big thing

Adopting autonomous testing significantly improves an IT organization's ability to serve its customers. It enables adjusting testing scenarios and overall software quality boosting end-user experience.

Wopee.io makes it happen.
Be part of it.



Let's get in touch

Thank you

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