tesena
SMART TESTING

Welcome !

Don’t miss the train!

Test automation is finally growing up.

Trends in Test Automation

Test automation is finally growing up!

About me

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tesena
SMART TESTING

IT in change . . .

IT in change . . .

Investments still grow

Spending on SW grows over HW

Competition via quality & speed

Impact on testing?

General Trends in Testing

4 moves

1. Expectations

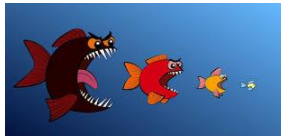
- Responsibilities
- Skills & competencies

2. Organization changes

- Test transformation surges
- Testing centers of excellence
- Adoption of Agile / DevOps

3. Market moves

- Merges & acquisitions (e2e offerings)
- Open source vs vendor tools



4. Disruption & disruptors

- AI / ML
- Blockchain testing
- RPA

The key drivers . . . still same?

Quicker

Cheaper

Better quality

. . . . **Test Automation** might be helpful, see next slides

Current status of Test Automation

Elite DevOps teams perform only

10% of Testing Manually

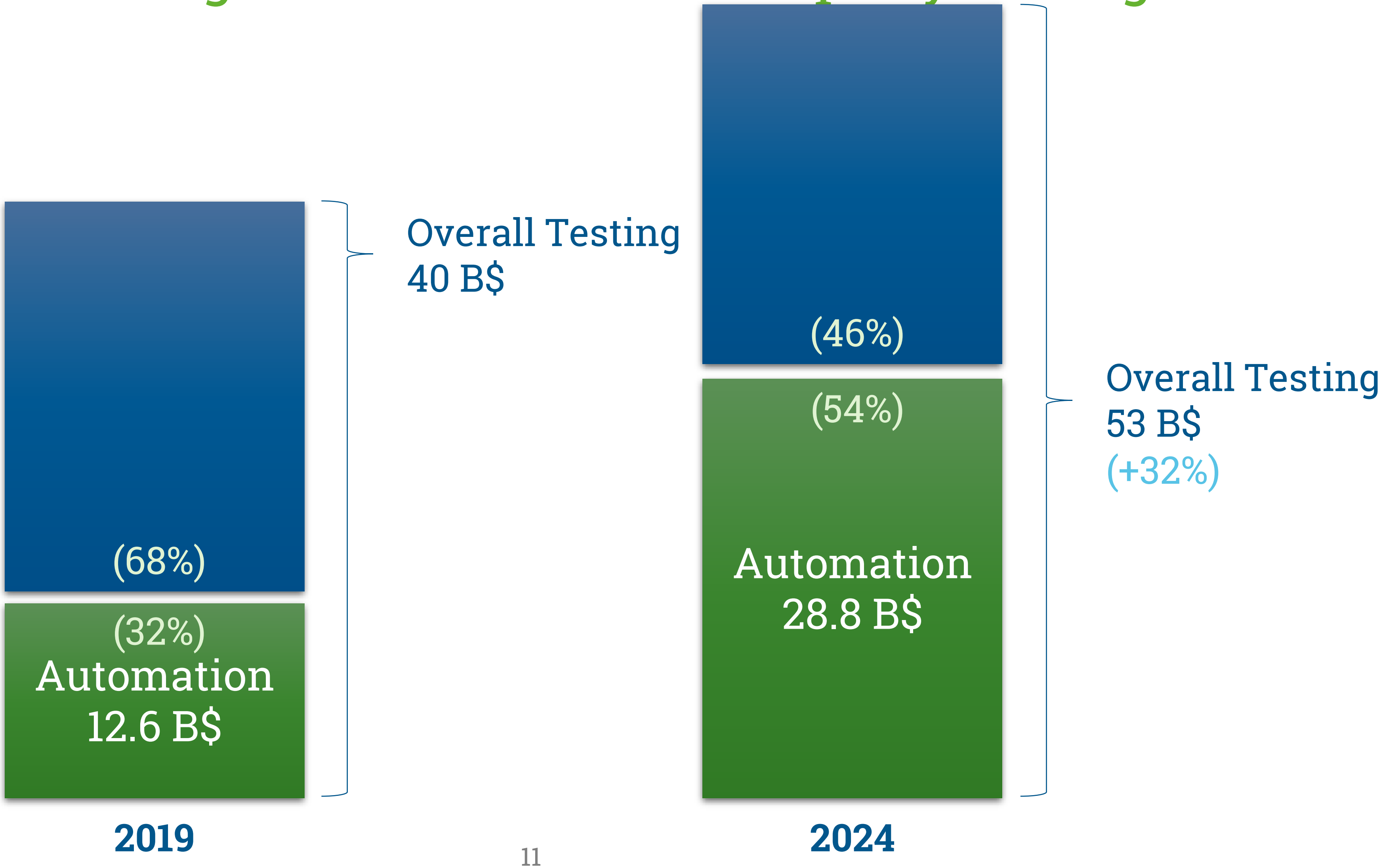
. . . not in future

NOW ! ! !

Source: Accelerate: State of DevOps 2018

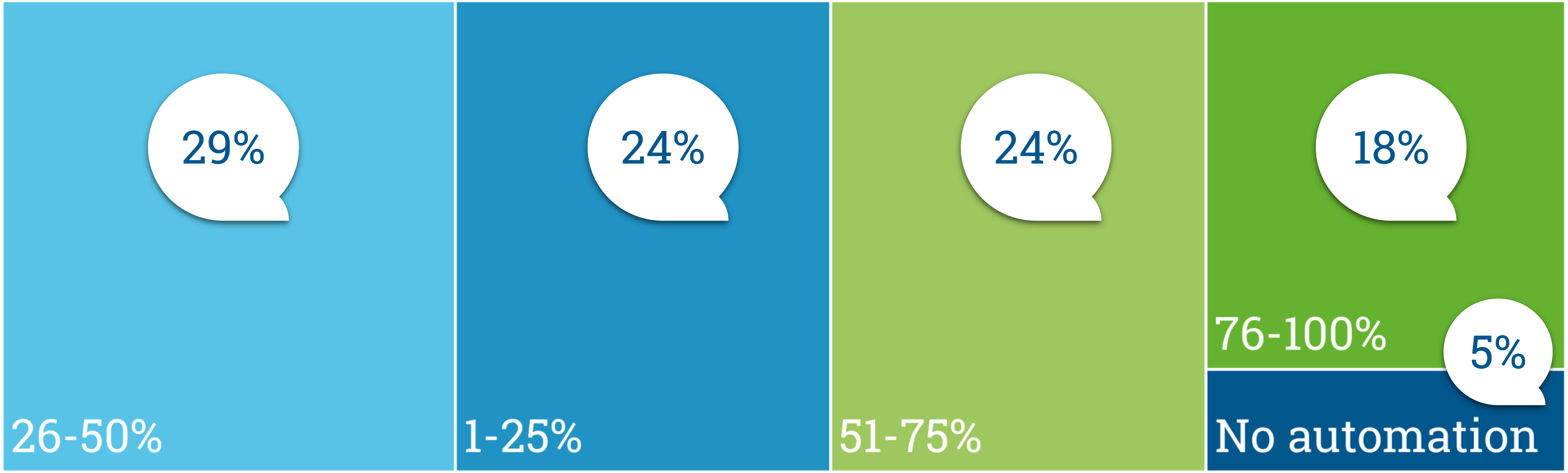
Automation overtakes testing?

Automation Testing will eat 50%+ of company's budgets.



Current Level of Test Automation

Above 50%: in 34% organizations
No automation: (only) in 5% organizations



Source: Survey KPMG & NASSCOM

. . . so what are the

Trends in Test Automation?

Trends in Test Automation

1. Old ideas are coming back

- More tools (support API & microservices, simulation)
- Record & play is back!
- Selenium era is over?

2. Fixing the pain of scale

- Intelligent test execution
- Intelligent maintenance (self-healing)

3. AI & ML

- Top AI/ML opportunities in Automation
- Autonomous Test Automation

4. Other opportunities

- Continuous testing (shift left & right)
- Chaos engineering
- Robotic Process Automation

1. Old ideas are coming back

- More API & microservices; more simulation
- Record & play is back!
- Selenium era is over?

Containers, Simulators, Cloud

- Microservices & APIs

GraphQL

- Containers & virtualization

docker kubernetes

- Cloud services

aws Microsoft Azure Google Cloud

- Web & mobile configuration simulators

SAUCELABS

BrowserStack

SMARTBEAR CrossBrowserTesting

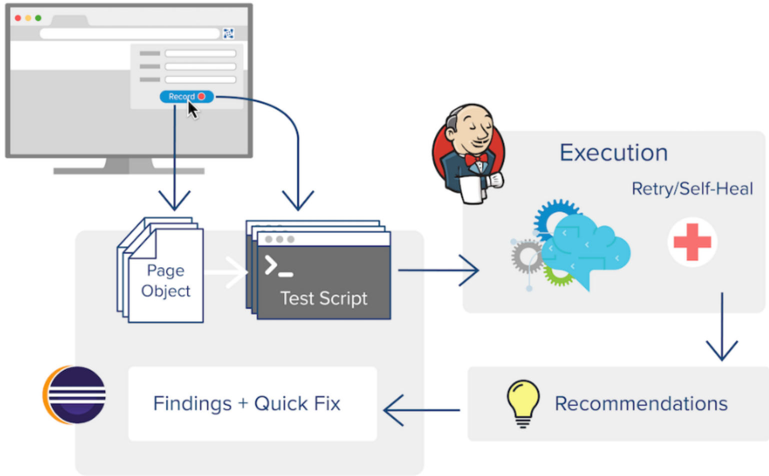
Record & play come back

Example 1: New Selenium IDE

- Better & more complex implementations
- Better stability
- Better Execution
- Extensible with Plugins

Example 2: Parasoft Selenic

- Self-healing implementation
- Generate (both into existing or newly build projects)
  - Page objects and
  - Better code structure



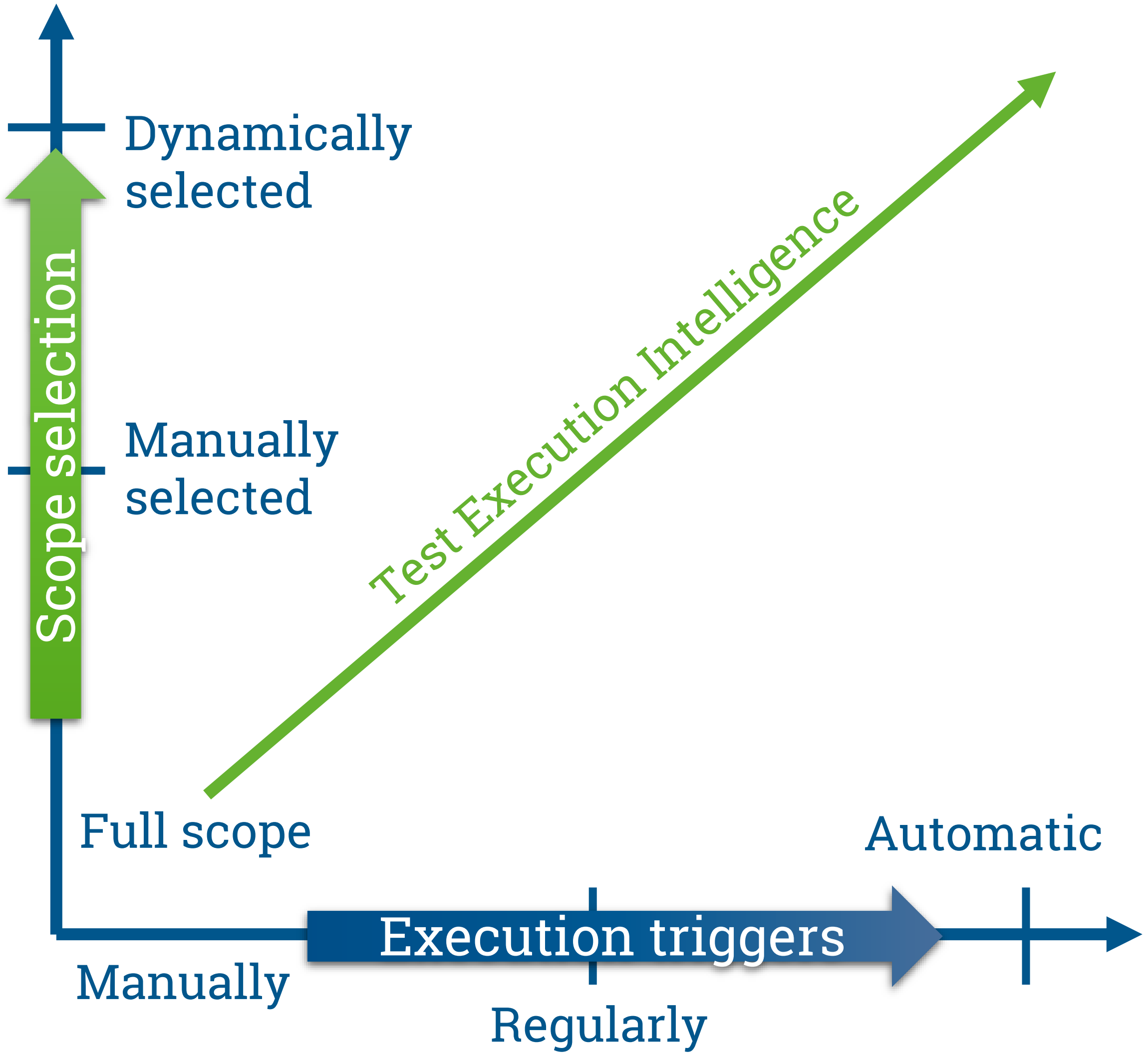
Selenium era is over?

Cypress.io https://cypress.io	cypress.io
Playwrite https://playwright.dev/	Playwright
Nightwatch.js http://nightwatchjs.org	Nightwatch.js End-to-end testing, the easy way.
Puppeteer https://github.com/puppeteer/	Puppeteer
TestCafe https://testcafe-studio.devexpress.com	TestCafé®

2. Pain of scale

- Intelligent test execution
- Intelligent maintenance (self-healing)

Intelligent Test Execution



Self-healing tests

= ability to automatically update scripts / behavior during test execution

Features of self-healing tests

1. Fix locators

Dynamic

Intelligent (powered by AI/ML)

2. Assessments

Improved maintenance

- Advanced reporting
- Dynamic assertions

3. Code update

Automatic script updates

3. AI & ML

- Top AI/ML opportunities in Automation
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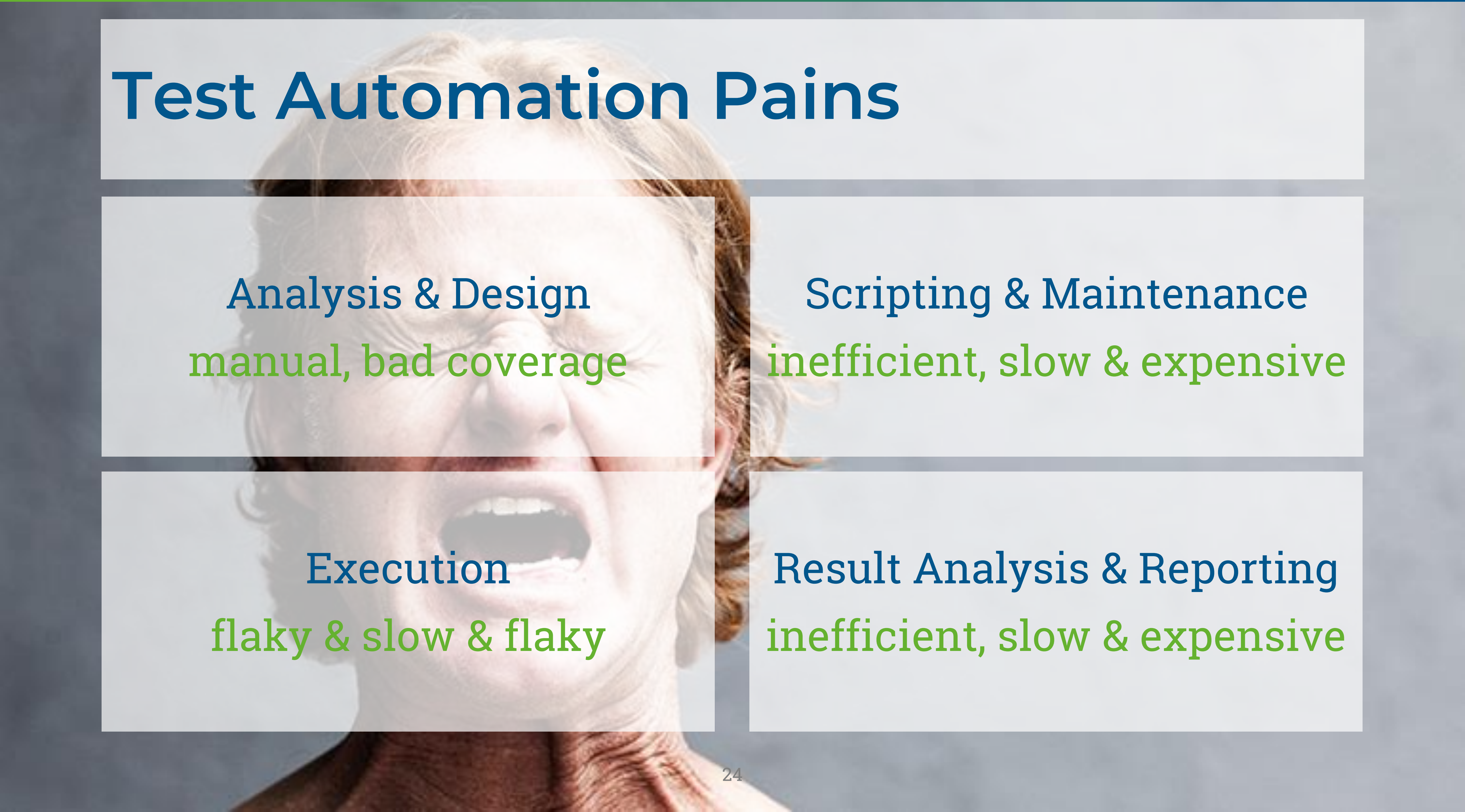
Test Automation Pains



Analysis & Design

manual, bad coverage

Scripting & Maintenance

inefficient, slow & expensive

Execution

flaky & slow & flaky

Result Analysis & Reporting

inefficient, slow & expensive

My top AI / ML
Opportunities in Automation

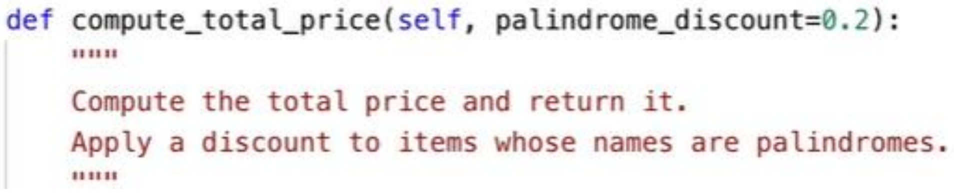
1. Scripting & Maintenance

Generate tests

user story > test script

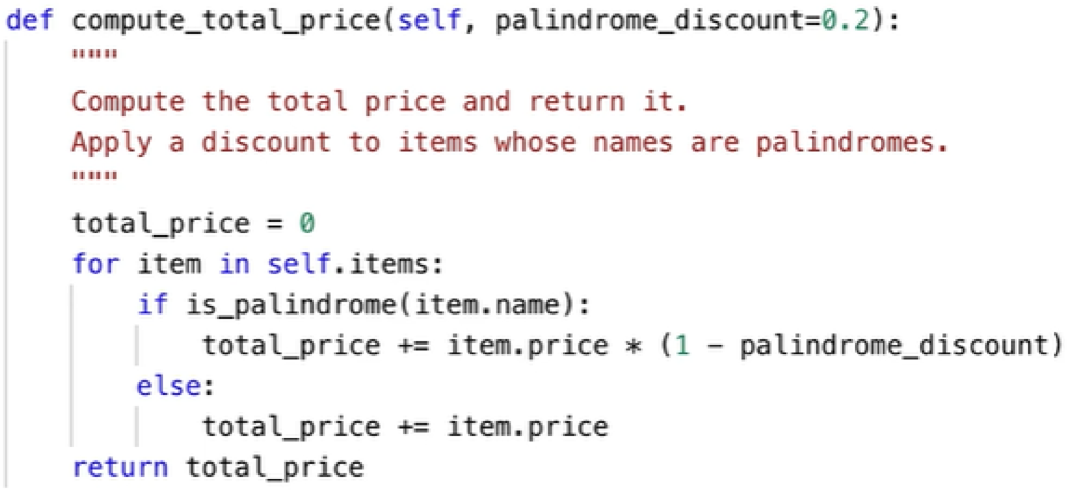
Example with python code

Input



```python
def compute_total_price(self, palindrome_discount=0.2):
    """
    Compute the total price and return it.
    Apply a discount to items whose names are palindromes.
    """
```

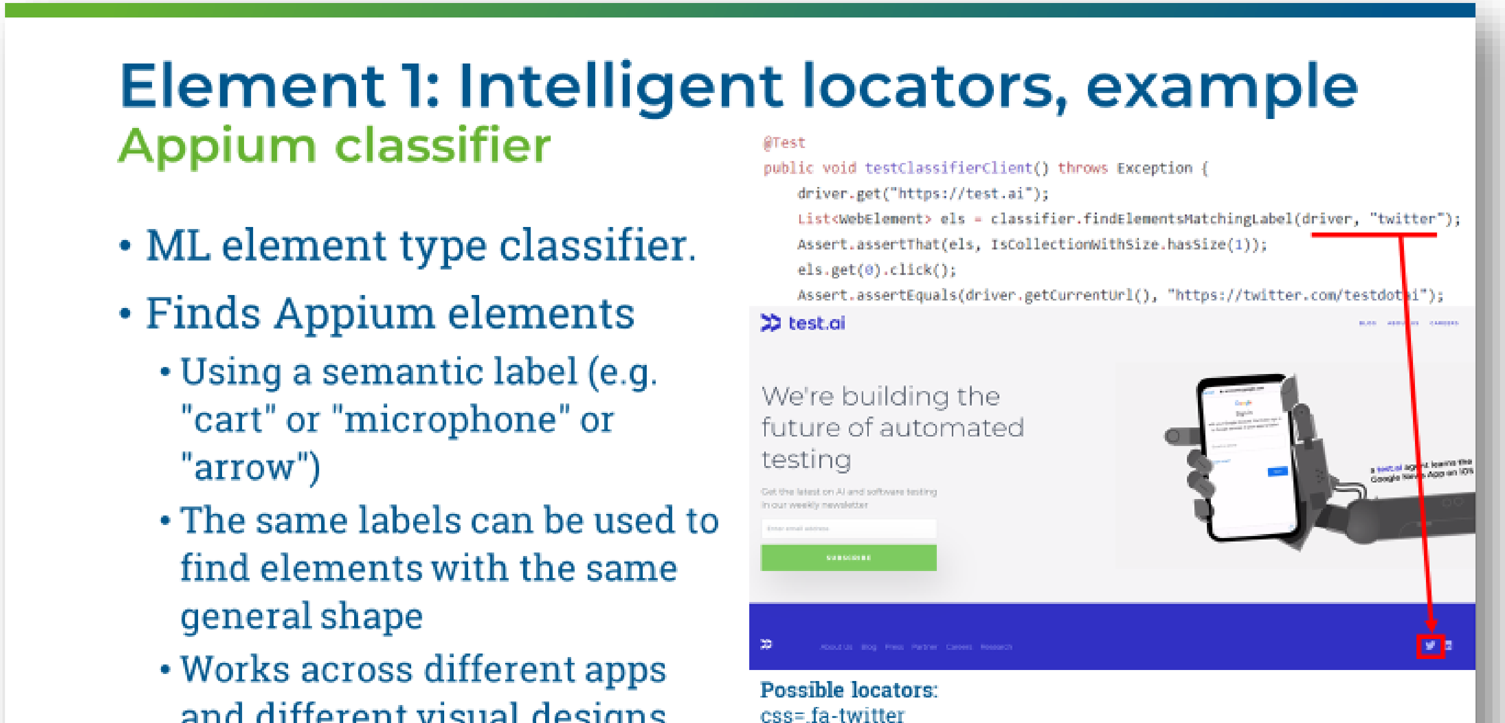
Output



```python
def compute_total_price(self, palindrome_discount=0.2):
    """
    Compute the total price and return it.
    Apply a discount to items whose names are palindromes.
    """
    total_price = 0
    for item in self.items:
        if is_palindrome(item.name):
            total_price += item.price * (1 - palindrome_discount)
        else:
            total_price += item.price
    return total_price
```

2. Execution & Maintenance

- Easier navigation through apps
- Intelligent (UI) interaction, dynamic locators
- Re-execution with self-healing



Element 1: Intelligent locators, example

Appium classifier

- ML element type classifier.
- Finds Appium elements
  - Using a semantic label (e.g. "cart" or "microphone" or "arrow")
  - The same labels can be used to find elements with the same general shape
  - Works across different apps and different visual designs

```
@Test
public void testClassifierClient() throws Exception {
    driver.get("https://test.ai");
    List<WebElement> els = classifier.findElementsMatchingLabel(driver, "twitter");
    Assert.assertThat(els, IsCollectionWithSize.hasSize(1));
    els.get(0).click();
    Assert.assertEquals(driver.getCurrentUrl(), "https://twitter.com/testdotai");
```

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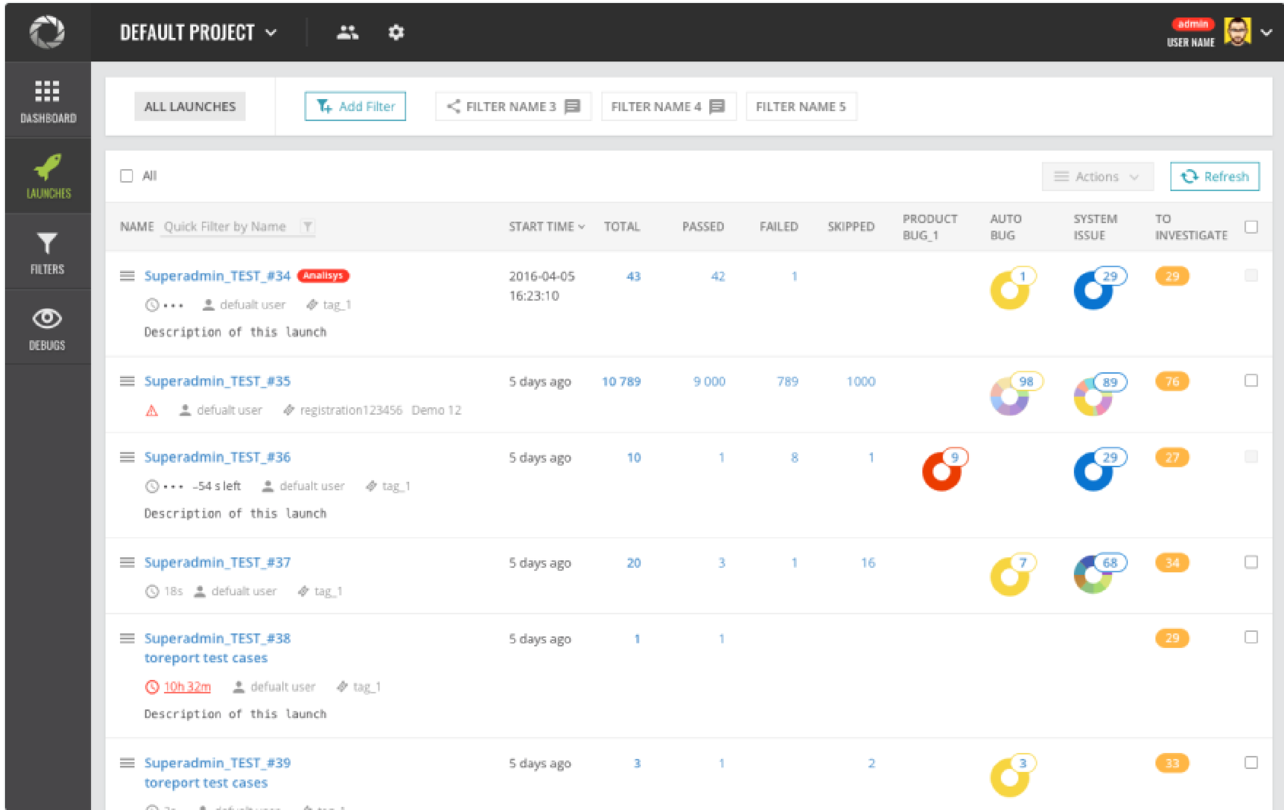
Possible locators:
css=.fa-twitter

3. Result Analysis & Reporting

- Identify / classify results from reports
- Predict quality / result based on code changes



NAME	START TIME	TOTAL	PASSED	FAILED	SKIPPED	PRODUCT BUG_1	AUTO BUG	SYSTEM ISSUE	TO INVESTIGATE	□
Superadmin_TEST_#34 Analisys ••• defualt user tag_1 Description of this launch	2016-04-05 16:23:10	43	42	1			1	29	29	
Superadmin_TEST_#35 ⚠ defualt user registration123456 Demo 12	5 days ago	10 789	9 000	789	1000		98	89	76	□
Superadmin_TEST_#36 ••• -54 s left defualt user tag_1 Description of this launch	5 days ago	10	1	8	1	9		29	27	
Superadmin_TEST_#37 18s defualt user tag_1	5 days ago	20	3	1	16		7	68	34	□
Superadmin_TEST_#38 toreport test cases 10h 32m defualt user tag_1 Description of this launch	5 days ago	1	1						29	□
Superadmin_TEST_#39 toreport test cases	5 days ago	3	1		2		3		33	□

Test Autonomy Level Definitions

0. Manual Testing (“Unassisted”)	• Manual exploratory and regression testing physically carried out by people.
1. Scripted Automation (“Hands On”)	• Handcrafted test automation scripts that can repeatedly execute a test case, sometimes with basic self-healing attributes if the application structure changes.
2. Exploratory Bots (“Hands Off”)	• Automated semi-intelligent exploration of apps and some measurement of performance/stability without human intervention.
3. Human-Directed Regression (“Eyes Off”)	• Humans describe the high-level intent of a test case e.g. “Add two items to shopping cart, delete one, and make sure there isn’t a crash.” Automated machines autonomously decide out how to execute the intent of the regression test case on one or more applications.
4. Generative (“Mind Off”)	• Machines generate and execute most test coverage across exploration, and regression testing efforts.
5. Fully Autonomous (“Human Tester Optional”)	• Without human assistance, machines are able to evaluate an application, decide what, when, where and how testing should be performed, and summarize the results for humans (or machines) to make a release/no-release decision based on test results.

4. Other opportunities

- Continuous testing (shift left & right)
- Chaos engineering
- RPA

Automate **entire Testing** NOT just **Test Execution!**

Even better: automate whole development process.

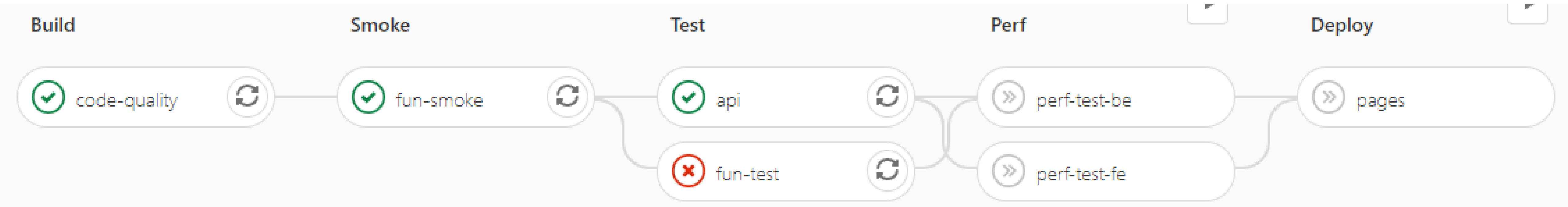
// continuous testing: . . . integrate testing into your DevOps pipelines

Continuous testing

(shift left & right approach)

- Automate all testing stages
  - Static analysis & scanners
  - Dynamic Testing
    - Test automation
    - Exploratory testing
  - Monitoring & phased (canary) deployment

- Continuous testing Workshop(s)
  - follow us @ tesena.com



Chaos engineering

- Experimenting on a software system in production
- Goal: to build confidence in the system's capability to withstand turbulent and unexpected conditions
- Effective (testing) method for modern microservice architecture
- **Chaos Monkey**: tool invented in 2011 by Netflix to test the resilience of its IT infrastructure

Robotic Process Automation (RPA)

- Automating processes in production
- Tools we use for test automation could be used in RPA
- Tools: UIPath, Robot framework, Blueprism or RPA Studio

UiPath™ blueprism® TRICENTIS RPA Studio

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World is changing

Don't miss the train!

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Thank You!

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