



# Playwright enters the stage

End-to-end Oberflächentests für  
Oracle APEX Apps

# Zahlen und Fakten.

Ihr Partner für den digitalen Wandel.  
Individuelle IT-Lösungen aus einer Hand.



**Hauptsitz**

Ratingen

**Niederlassungen**

Frankfurt am Main,  
Köln, München, Hamburg



> 125 Kunden



> 300 Beschäftigte



Zertifizierter Partner  
führender  
Technologiehersteller



ca. 44 Mio. €  
Umsatz in 2021



Gründung 1994



Branchenübergreifend



Herstellerneutral



Ausbildungsbetrieb,  
Partner im dualen  
Studium



Inhabergeführt

# ~\$ whoami

Fabian Neureiter

Berater @ MT AG

ISTQB Certified Tester

Lead Developer LCT (Low Code Testing)

♥ Musik, Kampfsport



# Agenda

1. Warum UIs (automatisiert) testen?

2. Was ist Playwright?

3. (APEX)-Applikationen testen

4. Exkurse

5. Flakiness

6. Demo



Warum UIs (automatisiert) testen?

# Warum überhaupt (automatisierte) UI-Tests durchführen?

Applikation reagiert auf verschiedene User-Rollen

User hat alle nötigen Informationen

Konsistente Gestaltung

Workflows funktionieren

Zeitersparnis



Was ist Playwright?



# Playwright | Charakteristika

End-to-End Testing Framework

Multi-Browser Unterstützung

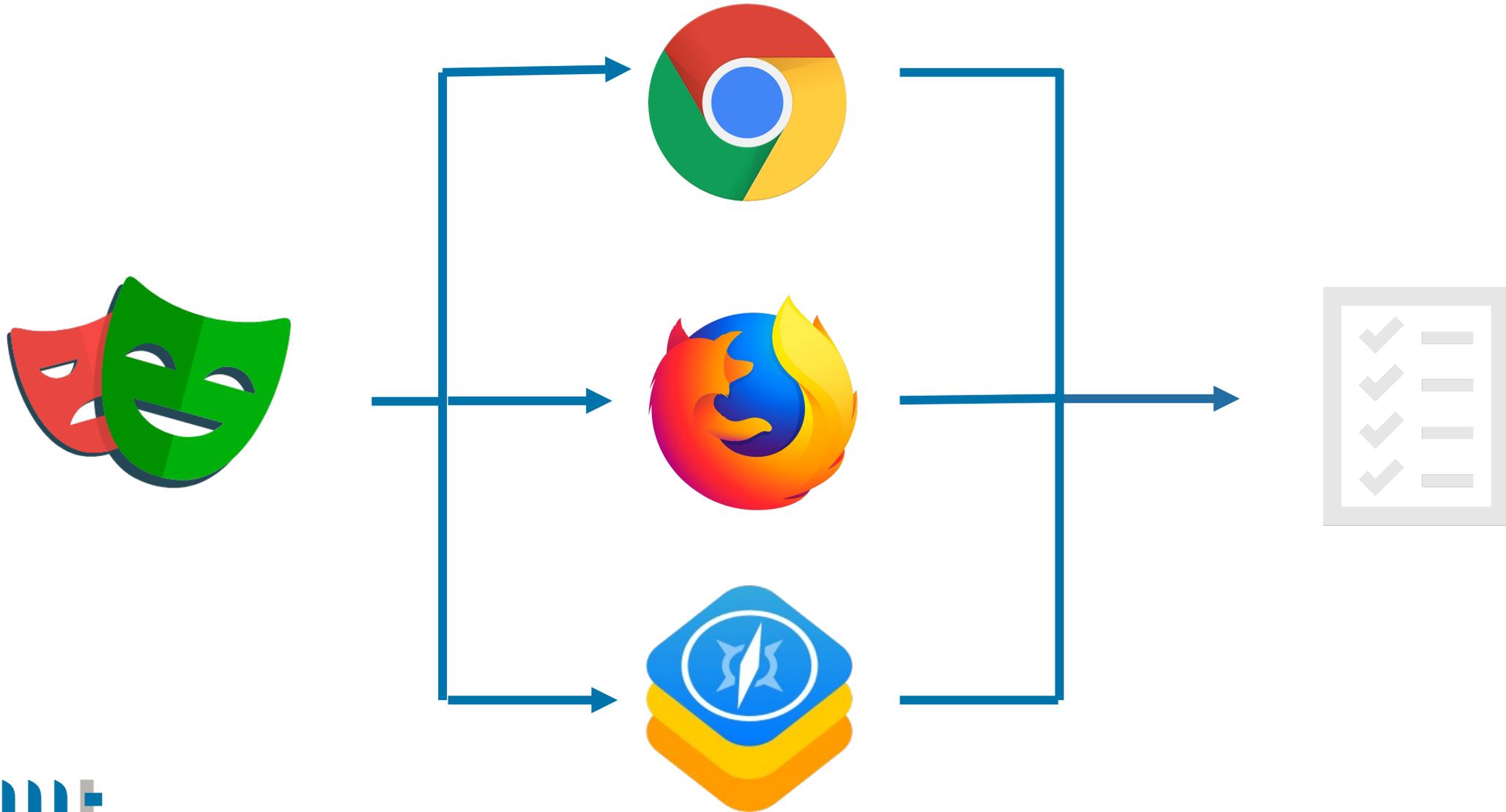
Einheitliche API -> Multi-Language

Multi-Plattform Unterstützung

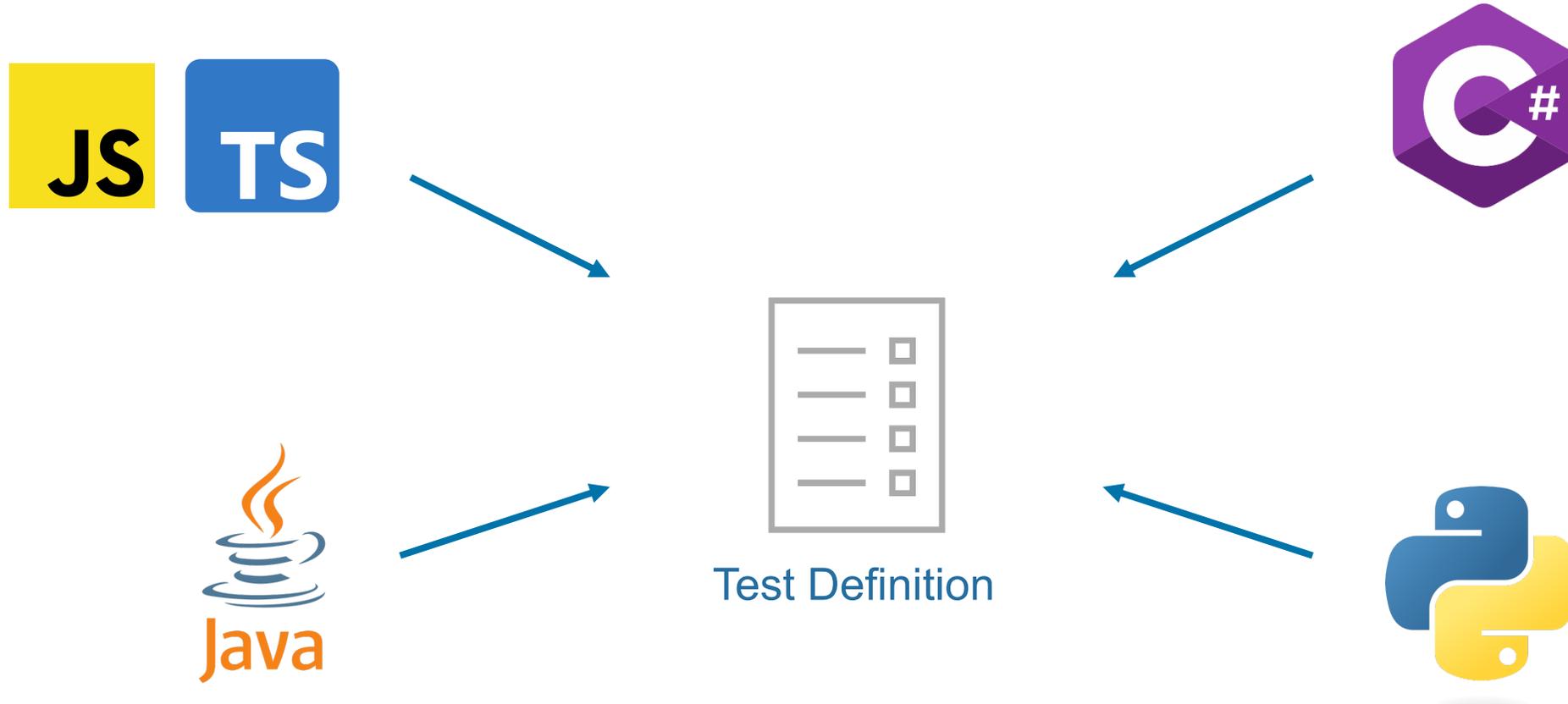
Isolierte Tests



# Playwright | Multi-Browser Unterstützung



# Playwright | Multi-Language Unterstützung



# Playwright | Test-Isolierung

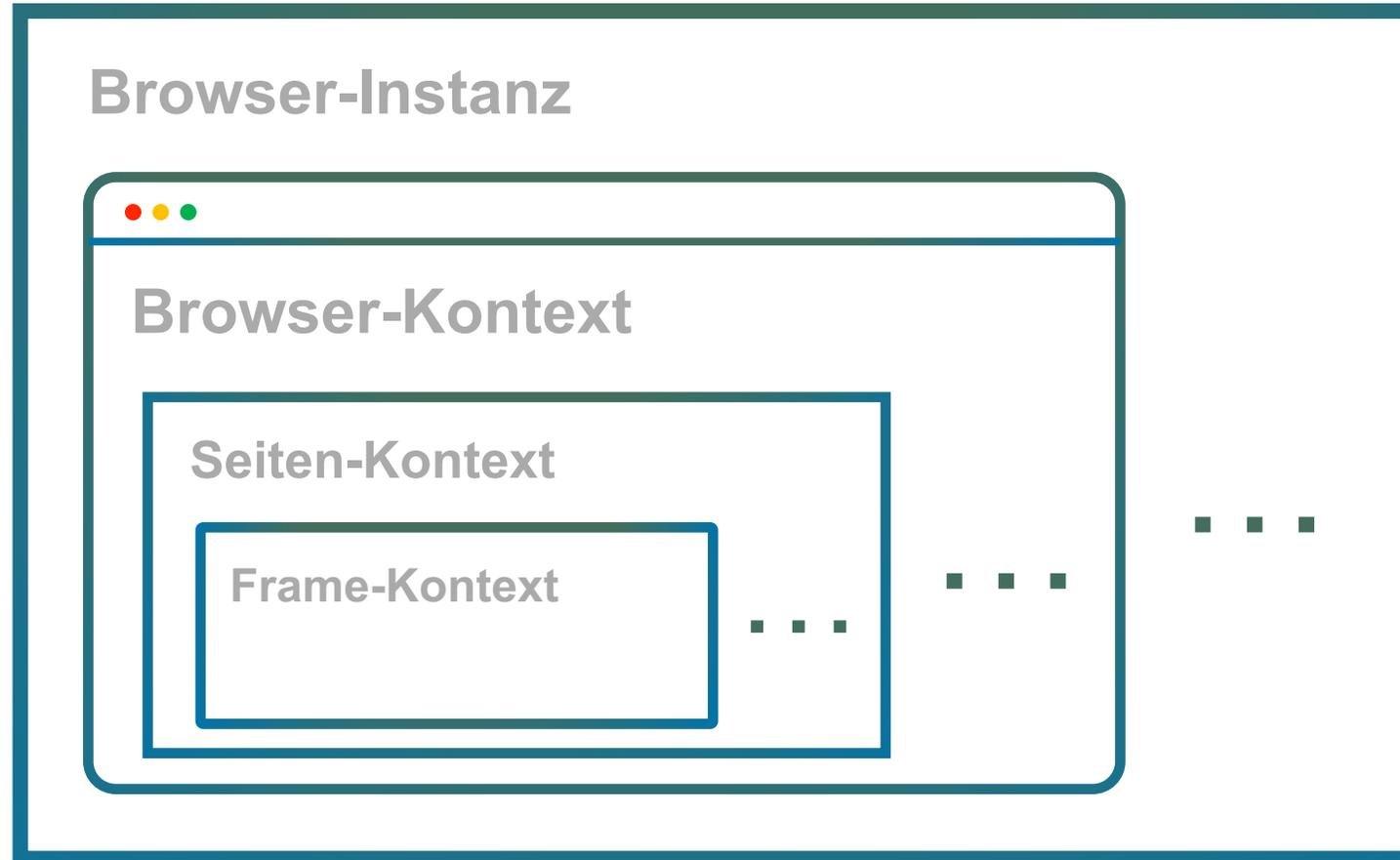


```
test('log in', async ({page}) => {  
  ...  
});
```

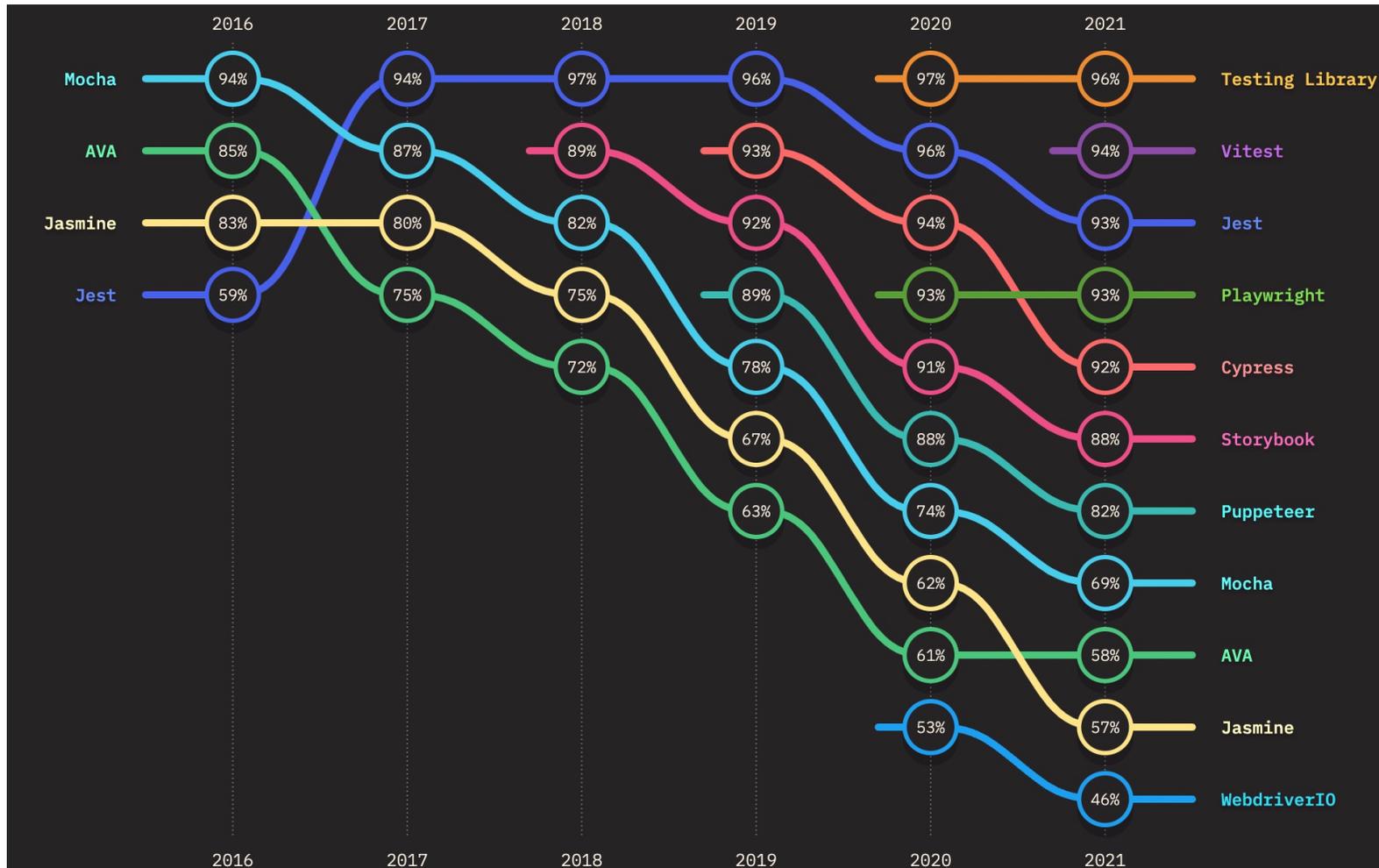
```
test('add cust', async ({page}) => {  
  ...  
});
```



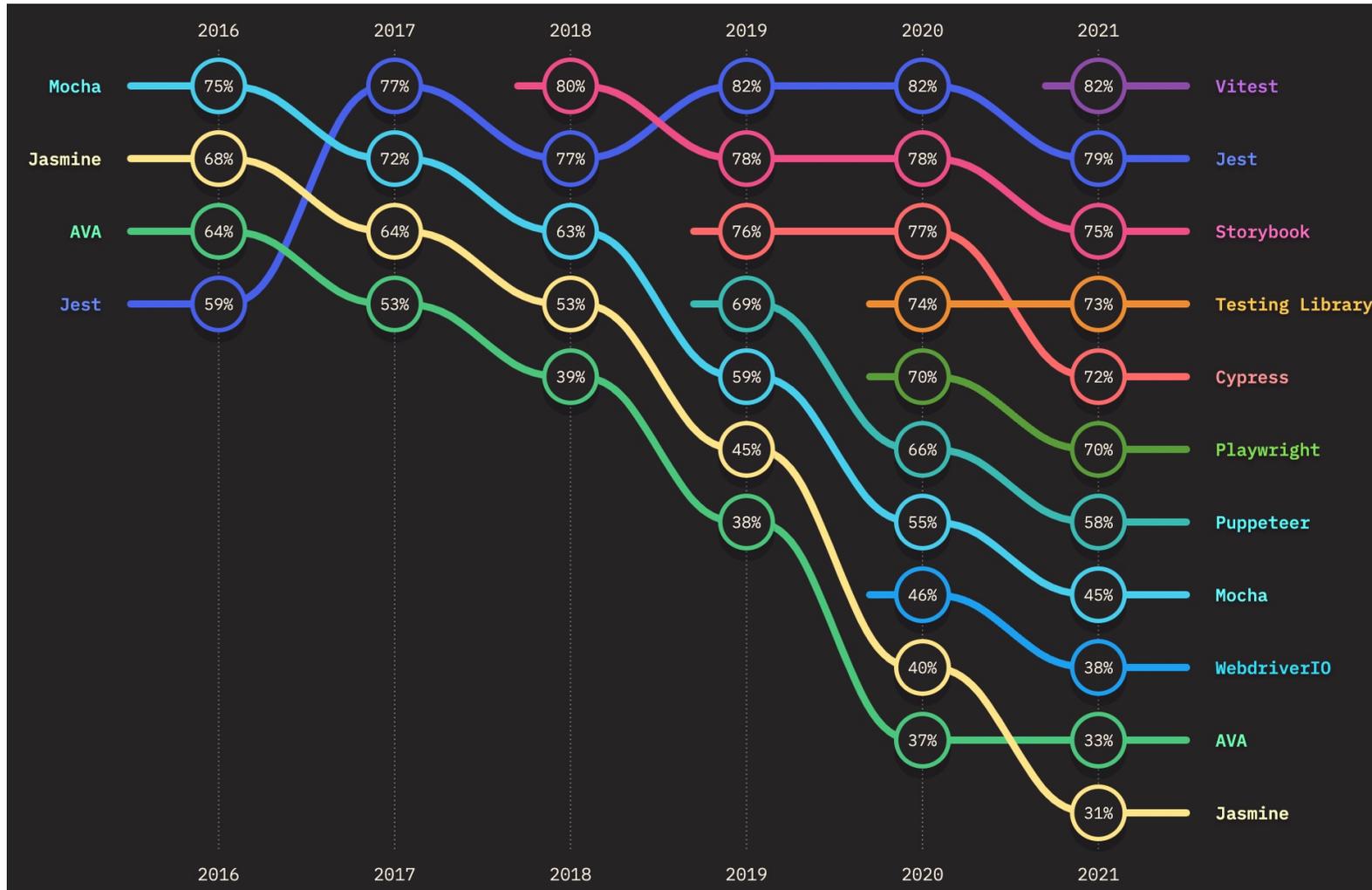
# Playwright | Test-Isolierung - Kontexte



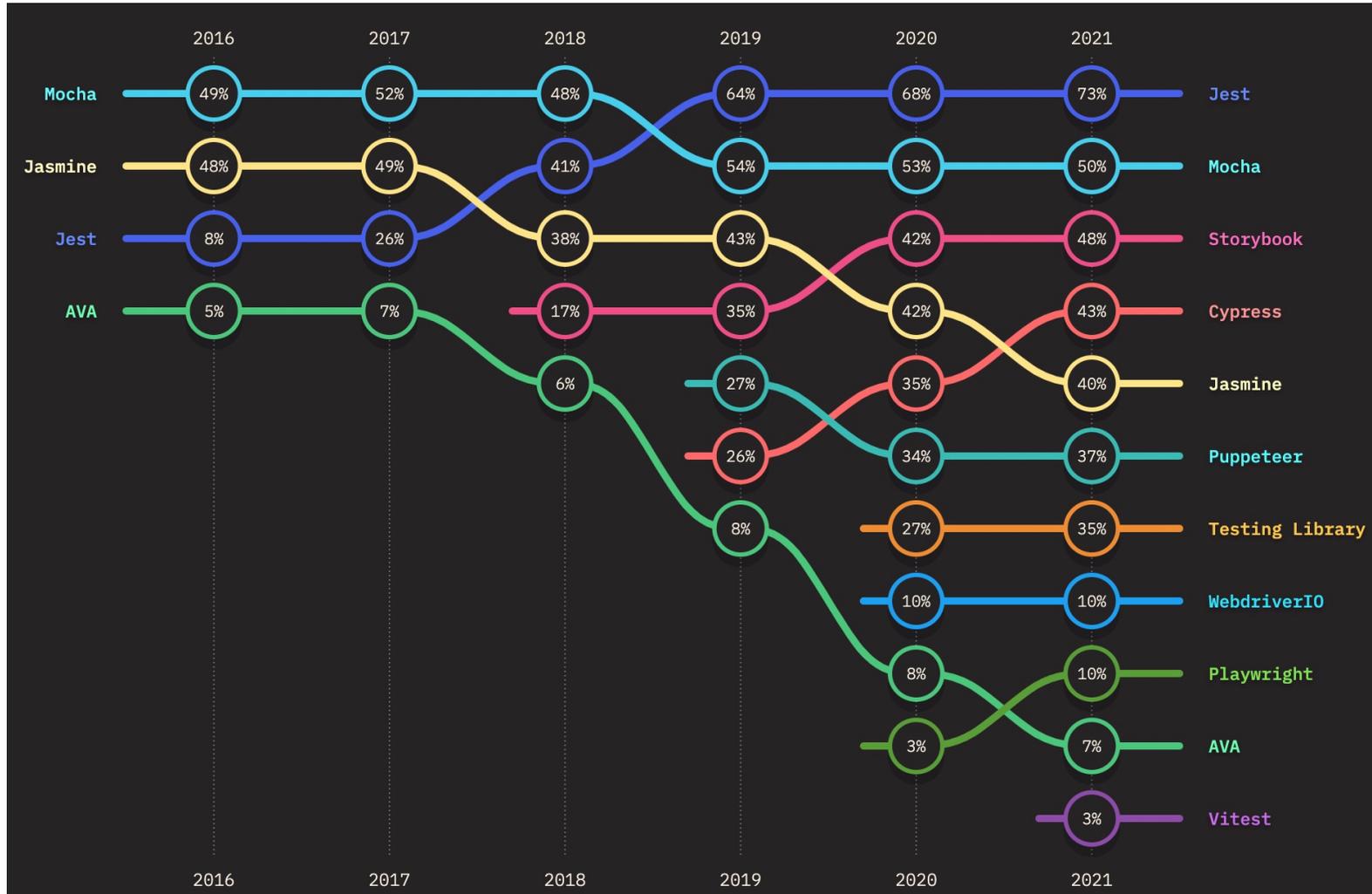
# Playwright | Statistiken - Nutzerzufriedenheit



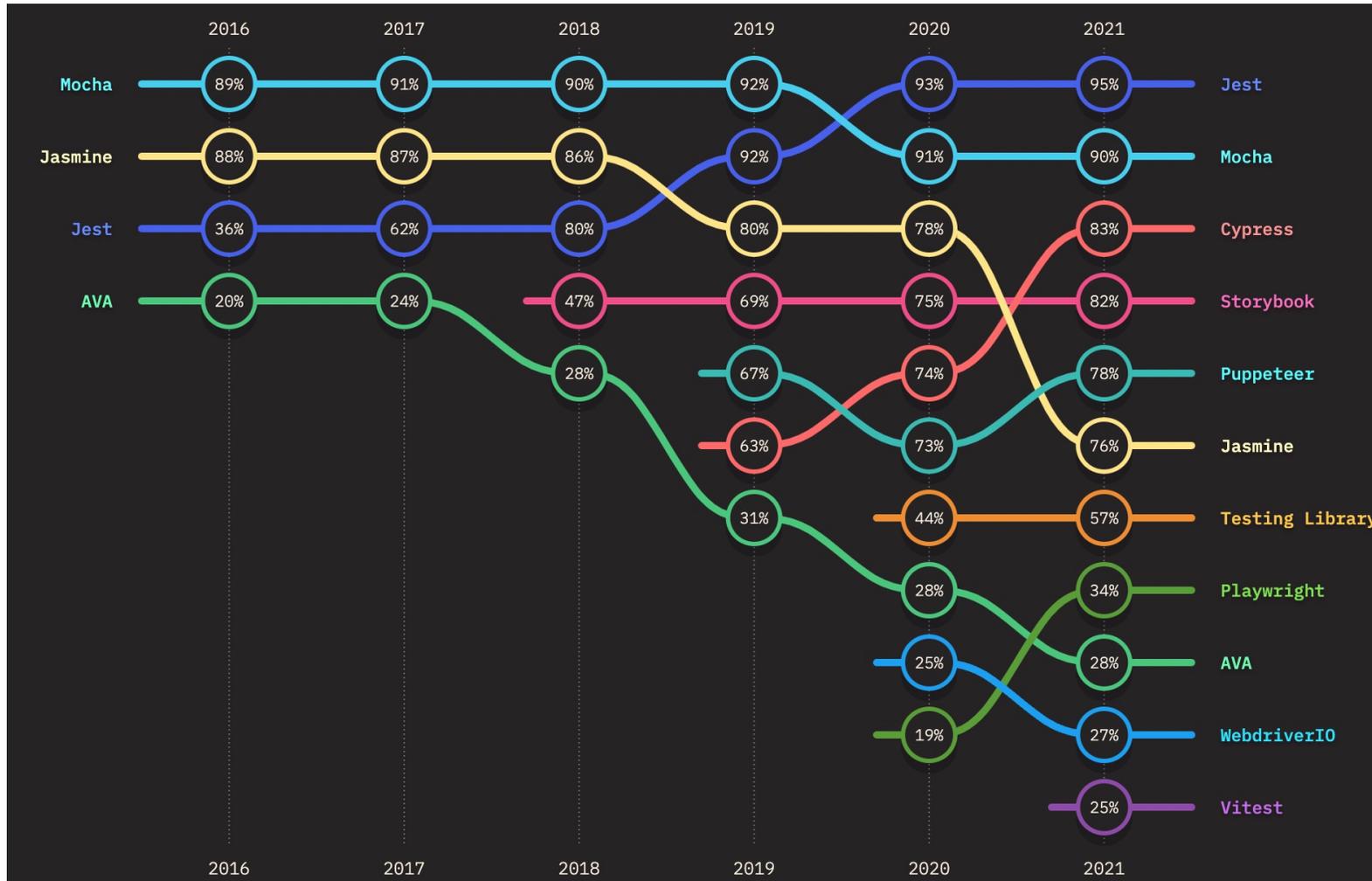
# Playwright | Statistiken - Interesse



# Playwright | Statistiken - Benutzung



# Playwright | Statistiken – Aufmerksamkeit in der Community



## MICROSOFT/PLAYWRIGHT

issue resolution

3 d

open issues

21%

(APEX-) Applikationen testen

OX/0.25  
 $\infty$ /0.17

A close-up photograph of a microscope objective lens. The lens is cylindrical and metallic, with a yellow band near the bottom. It is positioned above a slide of glass with a small amount of red liquid on it. The background is dark and out of focus.

# (APEX-) Applikationen testen – Was brauchen wir?

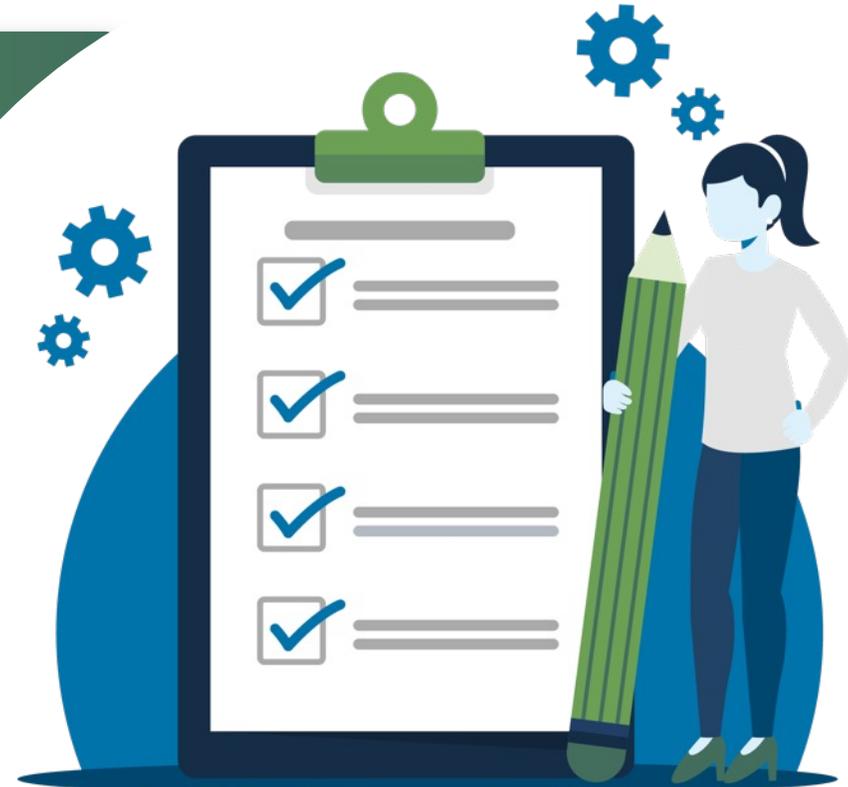
Einfache Interaktion mit Seitenelementen

Möglichkeit mit iFrames umzugehen

Bei Navigationen aktuelle Session berücksichtigen

Aussagekräftige Test-Reports

Möglichkeit mit Flakiness umgehen zu können



# Exkurs | Seitenelemente lokalisieren

Wie finden wir diesen Button?

```
<button id="submit_btn" data-test-id="submit" class="t-Button--hot">Submit</button>
```

Elementtyp

Element-Id

Id für autom. Testen

CSS-Klasse

Text des Elements  
(was der User sieht)

- CSS selector syntax
  - #submit\_btn
  - button[data-test-id=submit]
  - .t-Button--hot
- Xpath selector syntax
  - //button[@id='submit\_btn']
  - //button[@data-test-id='submit']
  - //button[@class='t-Button--hot']
  - //button[text()='Submit']

# Exkurs | Iframes in APEX

Sample Database Application Help fabian

Home Customers (13) Products (14) Orders (305) Reports Administration

## Customers

Upload Data Create Customer

Search: All Text Columns Go Actions

Customer Name	Address	City	State	Postal Code	Tags
Dulles, John	45020 Avia		VA	20166	-
Hartsfield, William	6000 North		GA	30320	REP...
Logan, Edward	1 Harborsid		MA	02128	REP...
O'Hare, Frank	10000 Wes		IL	60666	-
LaGuardia, Fiorello	Hangar Cer		NY	11371	-
Lambert, Albert	10701 Lam		MO	63145	-
Bradley, Eugene	Schoephoe		CT	06096	REP...

1 - 7

### - Customer Details

First Name \*  Last Name \*

Street Address  Line 2

City  State \*

Zip Code \*

Credit Limit \*

Phone Number  Alternate Number

Email  URL

Tags

Cancel Add Customer

# Exkurs | Iframes in APEX

### - Customer Details

First Name *	<input type="text"/>	Last Name *	<input type="text"/>
Street Address	<input type="text"/>	Line 2	<input type="text"/>
City	<input type="text"/>	State *	- Choose State -
Zip Code *	<input type="text"/>		
Credit Limit *	<input type="text"/>		
Phone Number	999-999-9999	Alternate Number	999-999-9999
Email	<input type="text"/>	URL	<input type="text"/>
Tags	<input type="text"/>		

```
<div id="apex_dialog_7" class="ui-dialog-content ui-widget-content js-dialogReady" style="width: auto; min-height: 101px; max-height: 101px; height: 101px;">
...
<iframe src="f?p=100:7:6567208140622::N0:7::&cs=3xi8eV0cP50ijjXFDw-Qvvi6iSlqefmyt8_FAKGNHS4laQlCxY55DjStsrEpr6qHnN3T5a3kEdPFYHctJ0swzpwTVTF03P7mVNOuSRXg91pfv" title="- Customer Details" width="100%" height="100%" style="min-width: 95%;height:100%;" scrolling="auto">
= $0
#document
<!DOCTYPE html>
<html class="page-7 app-100" lang="en">
  <head>...</head>
  <body class="t-Dialog-page t-Dialog-page--standard apex-side-nav apex-icons-fontapex apex-theme-vita js-dialogReady" style="touch-action: pan-y; -webkit-user-drag: none; -webkit-tap-highlight-color: rgba(0, 0, 0, 0);">
    <form action="wwv_flow.accept" method="post" name="wwv_flow" id="wwvFlowForm" data-oj-binding-provider="none" novalidate autocomplete="off">
      <input type="hidden" name="p_flow_id" value="100" id="pFlowId">
      <input type="hidden" name="p_flow_step_id" value="7" id="pFlowStepId">
      <input type="hidden" name="p_instance" value="6567208140622" id="pInstance">
      <input type="hidden" name="p_page_submission_id" value="106080029081029813793253340218436216005" id="pPageSubmissionId">
      <input type="hidden" name="p_request" value="" id="pRequest">
      <input type="hidden" name="p_reload_on_submit" value="A" id="pReloadOnSubmit">
      <input type="hidden" value="106080029081029813793253340218436216005" id="pSalt">
      <div class="t-Dialog" role="dialog" aria-label="- Customer Details">
        <div class="t-Dialog-header"></div>
        <div class="t-Dialog-bodyWrapperOut">
          <div class="t-Dialog-bodyWrapperIn"></div>
        </div>
        <div class="t-Dialog-footer"></div>
      </div>
      <input type="hidden" id="pPageFormRegionChecksums" value="[]">
      <input type="hidden" id="pPageItemsRowVersion" value="">
      <input type="hidden" id="pPageItemsProtected" value="XlcJsT08WFDwLagfJXVRfwMumF63BX0a68XT5oyJok">
    </form>
    <script> var apex_img_dir = "/i/", htmlDb_Img_Dir = apex_img_dir; </script>
    <script src="/i/libraries/apex/minified/desktop_all.min.js?v=19.2.0.00.18"></script>
    <script src="wwv_flow.js_messages?p_app_id=100&p_lang=en&p_version=19.2.0.00.18-8478266"></script>
    <script type="text/javascript"></script>
    <script src="/i/libraries/apex/minified/widget.stickyWidget.min.js?v=19.2.0.00.18"></script>
    <script src="/i/themes/theme_42/1.4/js/theme42.min.js?v=19.2.0.00.18"></script>
    <script type="text/javascript"> var htmlDb_delete_message='Would you like to perform this delete action?'; </script>
    <script type="text/javascript"></script>
  </body>
</html>
</iframe>
</div>
```

# Exkurs | Navigation innerhalb der aktuellen Session

- Standard URLs

```
https://hostname:port/ords/f?p=<app_id>:<page_number>:<session_id>
```

- Friendly URLs

```
https://hostname:port/ords/path_prefix/r/app_alias/page_alias?session=13766599855150
```

# Flakiness

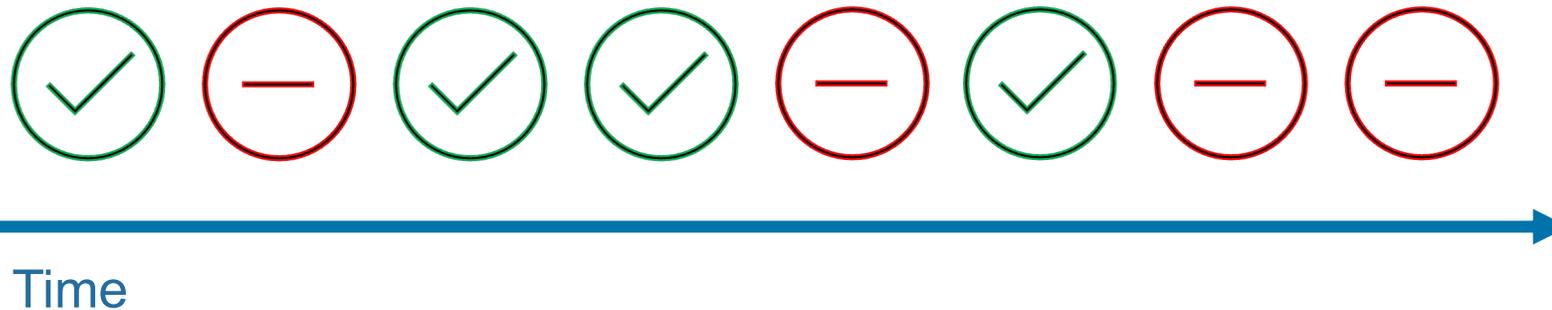
**STRUCTURE  
UNSAFE**

Please stay  
off the dock.

**NOT  
RESPONSIBLE  
for injuries**

Meadowlake  
Homeowners Assn.

**Flakiness** = Ein Test ist über die Zeit mal erfolgreich, mal nicht erfolgreich obwohl sich der Testcode nicht geändert hat.



# Wie geht Playwright mit Flakiness um?

## Auto-waiting und Actionability Checks

Vor der Interaktion mit einem Element wird sichergestellt, dass das Element **zur Interaktion bereit ist**.

```
await page.locator("//button//span[text()='Sign In']").click();
```

-  Element wird immer wieder versucht zu finden bis Timeout erreicht ist
-  Actionability checks werden ausgeführt bevor "click"-action is executed

# Flakiness | Actionability Checks

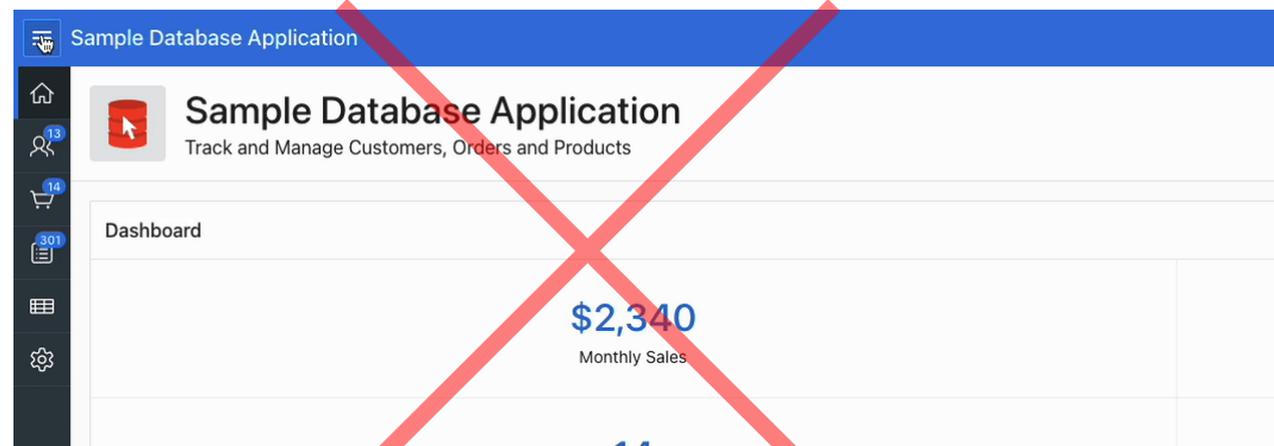
- Element ist **attached** / Teil des DOMs

```
▼ <div class="t-Login-buttons">
  ▼ <button onclick="apex.submit({request:'P101_LOGIN', validate:true});" class="t-Button t-Button--hot lto930604734956910628_0" type="button" id="P101_LOGIN">
    ::before
    <span class="t-Button-label">Sign In</span> = $0
    ::after
  </button>
</div>
```

- Element ist **visible**

```
#sign_in_btn {
  visibility: hidden;
  display: none;
}
```

- Element ist **stable**



Sample Database Application

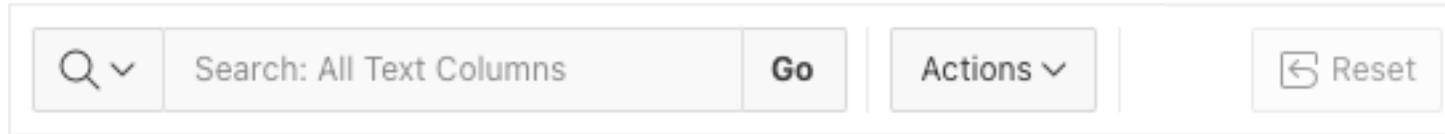
Sample Database Application  
Track and Manage Customers, Orders and Products

Dashboard

\$2,340  
Monthly Sales

# Flakiness | Actionability Checks

- Element ist **enabled** und **editable**



```
<button type="button" class="a-Button" disabled data-action="reset-report">Reset</button>
```

- Element kann **Events entgegennehmen**



# Nützliche Informationen



playwright.dev



github.com/microsoft/playwright



npmjs.com/package/playwright



- Tutorial in Cypress von **Hayden Hudson**:  
[https://www.youtube.com/watch?v=QFzN\\_0soxiQ](https://www.youtube.com/watch?v=QFzN_0soxiQ)
- Offizieller Channel des Playwright-Teams:  
<https://www.youtube.com/c/Playwrightdev>

# Fragen

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# Vorträge Donnerstag, 22.09.2022

Titel	Uhrzeit	Raum	Referent:in
Playwright enters the stage - End-to-end Oberflächentests für Oracle APEX Apps	08.00–08.45 Uhr	Prag	 Fabian Neureiter
Immersive Analytics: Datenvisualisierung mit VR	09.00–09.45 Uhr	Oslo	 Philipp Hartenfeller
Die Dynamic Actions Schulbank	09.00–09.45 Uhr	Stockholm	 Robin Schulz
APEX Visualizer 22.1	11.00–11.45 Uhr	Sydney	 Oliver Lemm
APEX APIs for Everyone - Reloaded	13.00–13.45 Uhr	Sydney	 Moritz Klein

# Haben wir Ihr Interesse geweckt?



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[www.mt-ag.com](http://www.mt-ag.com)

LCT - Low Code Testing

Log Out

- Worksheets
- Queue
- Import/Export
- Test Suites
- Administration

Queue \

Search: All Text Columns  Go

General			Execution				Audit Values		
Act...	Execution Name	Versi...	Execution Point	Stat...	Successful/Total Ca...	(min)	Output Log	Created By	Created On
	test_suite_3 - Oracle Sample DB ...	#8	13.05.22 03:05	🕒		-		LCT	12.05.2022 03:07:05
	test_suite_6 - Sample DB DEMO (...)	#6	12.05.22 15:43	🕒		-		LCT	11.05.2022 15:45:12
	Smaple DB TS - Sample DB DEM...	#6	12.05.22 13:55	🕒		-		LCT	11.05.2022 13:57:35
	test_suite_3 - Testing the Sample...	#10	12.05.22 03:06	🔄	0/2	00:19	👁	LCT	12.05.2022 03:06:27
	test_suite_3 - Oracle Sample DB ...	#8	12.05.22 03:05	🔄	1/2	00:36	👁	LCT	11.05.2022 03:07:28
	test_suite_6 - Place Order Test - ...	#10	11.05.22 15:44	🔄	1/1	00:33	👁	LCT	11.05.2022 15:44:33
	test_suite_6 - Sample DB DEMO (...)	#6	11.05.22 15:43	🔄	3/4	01:07	👁	LCT	10.05.2022 15:46:17
	Smaple DB TS - Sample DB - Plac...	#2	11.05.22 13:56	🔄	1/1	00:32	👁	LCT	11.05.2022 13:56:42
	Smaple DB TS - Sample DB DEM...	#6	11.05.22 13:55	🔄	3/4	01:05	👁	LCT	10.05.2022 13:57:22
	test_suite_3 - Testing the Sample...	#10	11.05.22 03:06	🔄	0/2	00:19	👁	LCT	11.05.2022 03:06:50
	test_suite_3 - Oracle Sample DB ...	#8	11.05.22 03:05	🔄	1/2	00:38	👁	LCT	10.05.2022 03:06:57
	test_suite_6 - Place Order Test - ...	#10	10.05.22 15:45	🔄	1/1	00:32	👁	LCT	10.05.2022 15:45:28
	test_suite_6 - Sample DB DEMO (...)	#6	10.05.22 15:43	🔄	3/4	01:10	👁	LCT	09.05.2022 15:45:58
	Smaple DB TS - Sample DB - Plac...	#2	10.05.22 13:56	🔄	1/1	00:32	👁	LCT	10.05.2022 13:56:34
	Smaple DB TS - Sample DB DEM...	#6	10.05.22 13:55	🔄	3/4	01:08	👁	LCT	09.05.2022 13:58:05
	test_suite_3 - Testing the Sample...	#10	10.05.22 03:06	🔄	0/2	00:19	👁	LCT	10.05.2022 03:06:13
	test_suite_3 - Oracle Sample DB ...	#8	10.05.22 03:05	🔄	1/2	00:37	👁	LCT	09.05.2022 03:07:17
	test_suite_6 - Place Order Test - ...	#10	09.05.22 15:45	🔄	1/1	00:32	👁	LCT	09.05.2022 15:45:12

1 rows selected

< < 1 2 3 4 5 ... > > 1 - 42 of 5013

```

LiveLog - Queue ID: 5620
24 I wait for element ".a-PopupLOV-searchBar input"
25 I fill field ".a-PopupLOV-searchBar input", "Dulles,
    John"
26 I wait for element ".a-PopupLOV-searchBar button"
27 I click ".a-PopupLOV-searchBar button"
28 I wait 3
29 I wait for element "div[class~='a-PopupLOV-results'] ul
    li:first-child span"
30 I click "div[class~='a-PopupLOV-results'] ul li:first-
    child span"
31 I switch to "iframe"
32 I wait for element "#B7496042880055189376"
33 I click "#B7496042880055189376"
34 I wait for element "#R400969685215878798", 15
35 I wait for element "//div[@class='t-Region-
    body']//tr//td//a[text()='Belt']../following-
    sibling::td//select"
36 I select option "//div[@class='t-Region-
    body']//tr//td//a[text()='Belt']../following-
    sibling::td//select", ["2"]
37 I wait for element "#B403162600409924493"
38 I click "#B403162600409924493"
39 I wait for element "//div[@class='t-Region-
    body']//tr//td[text()='Belt']/following-
    sibling::td[@headers='QUANTITY'][text()='2']"
40 I see element "//div[@class='t-Region-
    body']//tr//td[text()='Belt']/following-
    sibling::td[@headers='QUANTITY'][text()='2']"
41 I wait for element "//div[@class='t-Region-
    body']//tr//td[text()='Belt']/following-
    sibling::td[@headers='TOTAL_COST'][text()='$60.00']"
42 I see element "//div[@class='t-Region-
    body']//tr//td[text()='Belt']/following-
    sibling::td[@headers='TOTAL_COST'][text()='$60.00']"
43 I wait for element "//div[@class='t-Region-
    body']//tr//td/b[text()='Report Total']../following-
    sibling::td[@headers='TOTAL_COST']/b[text()='$60.00']"
44 I see element "//div[@class='t-Region-
    body']//tr//td/b[text()='Report Total']../following-
    sibling::td[@headers='TOTAL_COST']/b[text()='$60.00']"
45 I wait for element "#B696563211816239755"
46 I click "#B696563211816239755"
47 I switch to
48 I wait for element "//div[@role='alertdialog']", 15
49 I see "Are you sure you want to place this order?",
    "//div[@role='alertdialog']/p"
50 I wait for element
    
```

# LCT

## Add Value(s)



**click**  
Click on a given element

Step Name  
Click 'Place Order' Btn

### Item

Enter Custom Selector

Yes **No** ?

Application  
100 - Sample Database Application

Page  
Page 4 - Orders

Element  
Place Order

### Parameters and Values

Context

### Audit Fields

Created On  
18.01.2022 14:48:31.22

Created By  
FABIAN

Updated On  
18.01.2022 14:48:31.22

Updated By  
FABIAN

Cancel



Save

## Steps

Search: All Text Columns

Go

Edit

Save

Create Template

+ Add Step

Copy

Move Up



<input type="checkbox"/>			Sequence ↑≡	Type	Name
<input type="checkbox"/>			1		Login Navigation
<input type="checkbox"/>			2		Login P101_USERNAME
<input type="checkbox"/>			3		Login P101_PASSWORD
<input type="checkbox"/>			4		Login Sign In
<input type="checkbox"/>			5		Wait for home page title
<input type="checkbox"/>			6		Go to orders page
<input type="checkbox"/>			7		Wait for Orders IG
<input type="checkbox"/>			8		Click 'Place Order' Btn
<input type="checkbox"/>			9		Check for Wizard heading
<input type="checkbox"/>			10		Switch to iframe context
<input type="checkbox"/>			11		Click Customer ID Input Field

en

# LCT

