

ANGULAR
ARCHITECTS
INSIDE KNOWLEDGE



Playwright Workshop
Rainer Hahnekamp
24.6.2022

About Me...



- Rainer Hahnekamp
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Goal

You leave this workshop **with the experience** of having it done.



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Agenda

1. Introduction

- a. Theory
- b. Setup
- c. Configuration

2. Basics

- a. Selectors
- b. Actions
- c. Assertions

3. Advanced

- a. Page Objects
- b. Test Fixtures
- c. Network Stubbing
- d. Session Storage

4. Beyond E2E

- a. Visual Regression
- b. Test Design - Dealing with Databases
- c. API Testing
- d. Component Tests



Ask!

(Unanswered questions will be looked up)



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Part 1

Introduction





Selenium RC

2005



Selenium 2

2010

CDP

2015



Cypress

Playwright

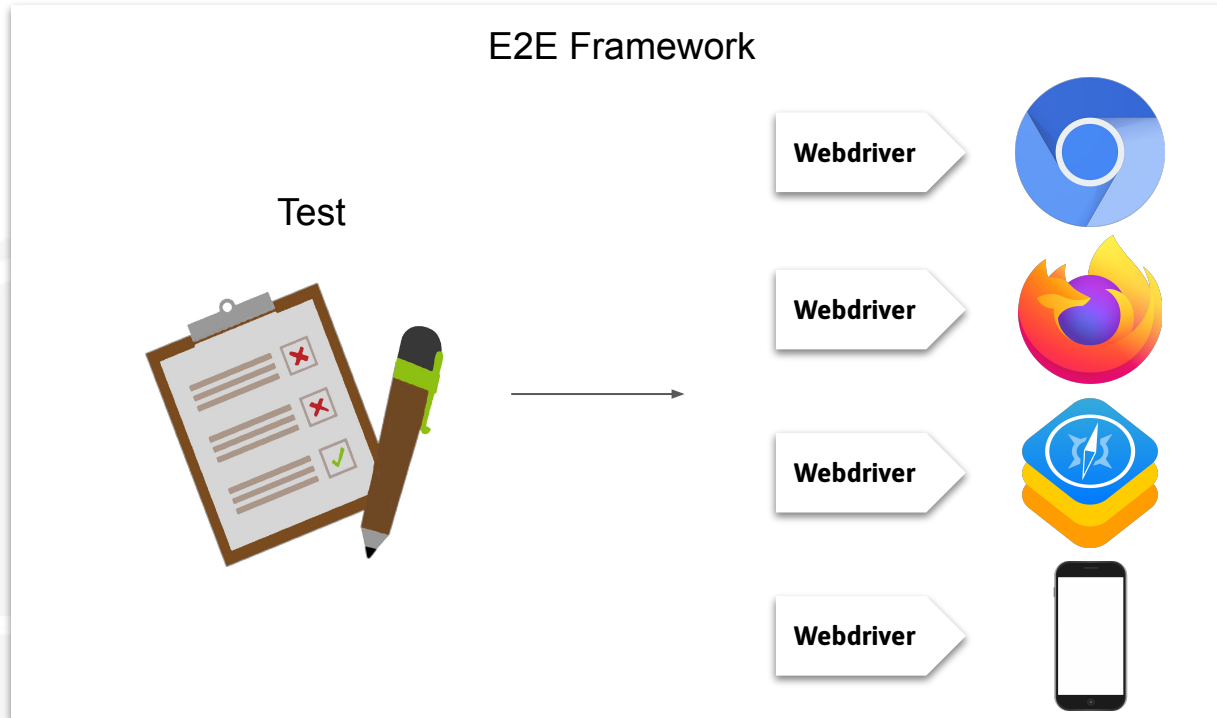
2020

2022

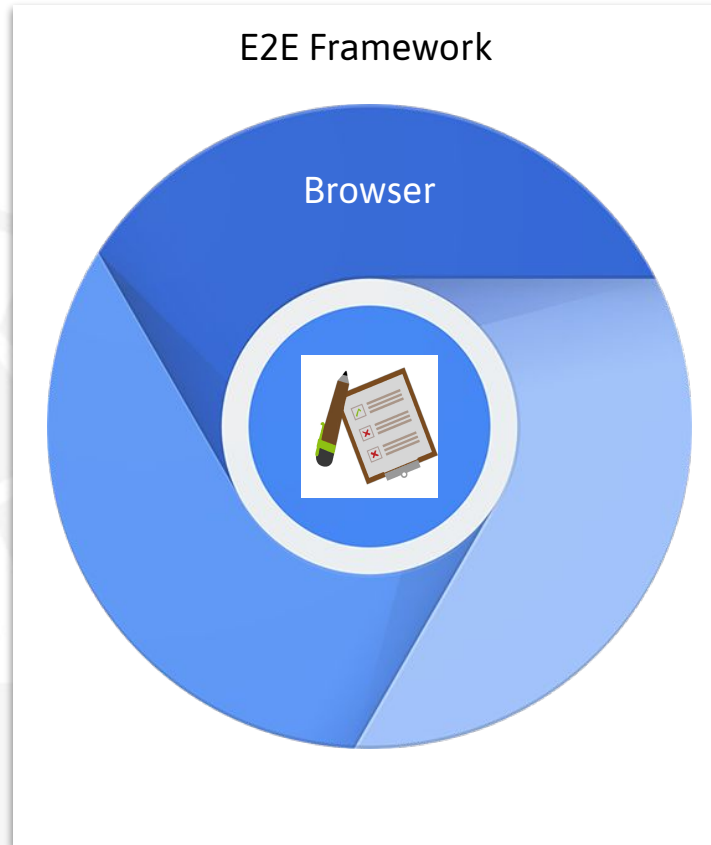


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Selenium: Outside browser testing








Cypress: Inside browser testing







Two extremes

Selenium / Webdriver

-  Full browser access
-  Scalable infrastructure
-  Cross browser testing
-  Developer Experience improvable
-  Flakiness

Cypress

-  Superior developer experience
-  Stable
-  Limited to CDP
-  Limited functionalities
 - Workarounds available
 - Not applicable

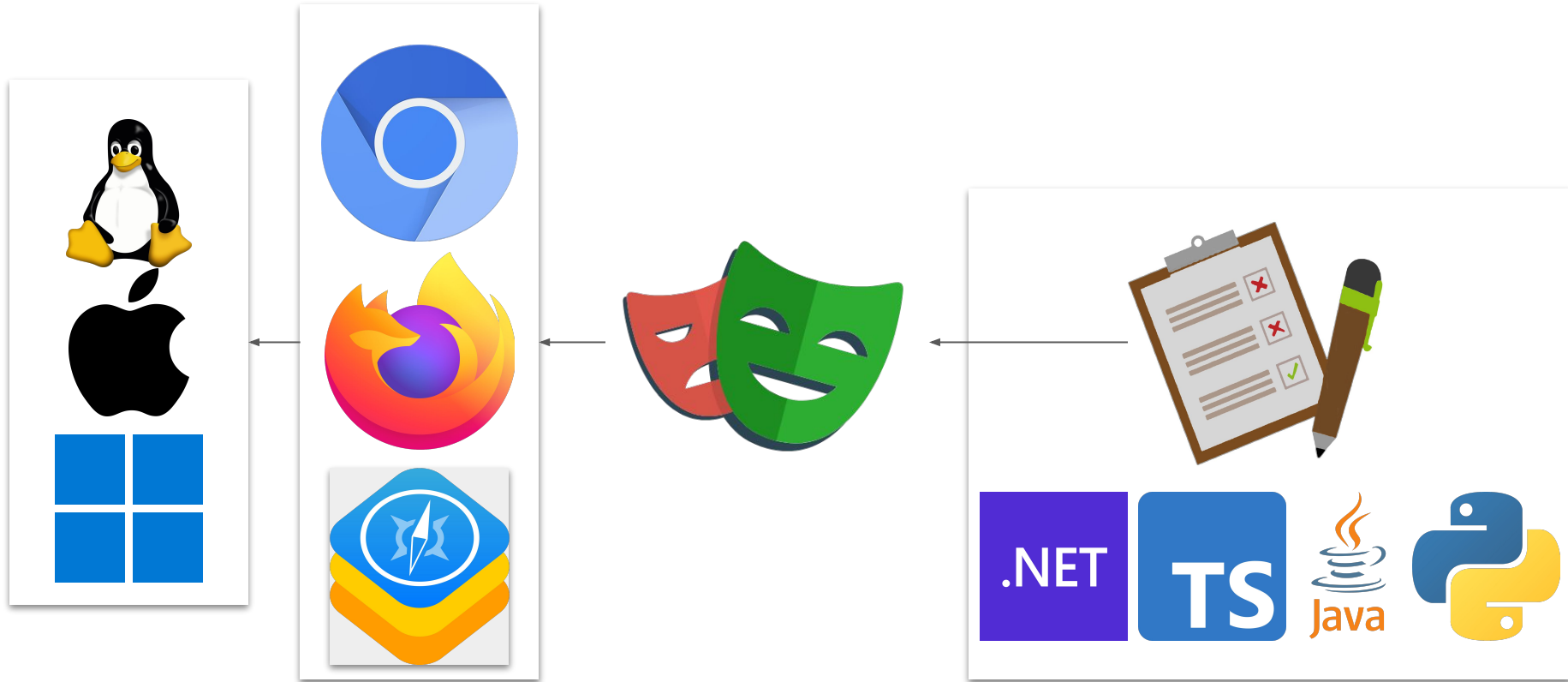


Playwright: Middle way

- Outside browser testing
- Everything from one hand
 - Browsers, Testing Framework, Visual Regression
- Limited to CDP, incl. "Safari"
- Developer experience
- Access existing Selenium Grid via CDP
- Backed by Microsoft



Playwright Architecture



Part 2: Basics



Basic Rules in E2E Testing

- Let your test fail
- Use resilient selectors
 - data-*
 - text
 - role
- Multiple Matchers are allowed
- Stay with locator, not do direct fetching



Playwright's powerhorse: `page.locator`

- Returns a promise of a DOM query
- Chainable for actions
- Argument for assertions (`expect`)
- Different selectors (not just CSS)
 - Text selectors
 - Data-testid
 - Location-based
 - XPath
 - React/Vue experimental
- Nestable
- Shadow DOM "piercing"



Text selectors

- `await page.locator("text=Welcome to Eternal").waitFor(); // partial match`
- `await page.locator("text='Welcome to Eternal']").waitFor(); // exact match`
- `await page.locator("'Welcome to Eternal']").waitFor(); // exact match`
- `await page.locator("*", { hasText: "Welcome to Eternal" }).waitFor(); // fails on strict mode`
- `await page.locator("h2", { hasText: "Welcome to Eternal" }).waitFor(); // right approach`
- `await page.locator("h2:has-text('Welcome to Eternal')").waitFor(); // 👍`
- `await page.locator(":has-text('Welcome to Eternal')").waitFor(); // 👎`



Selectors via data-testid

```
await page.locator("data-testid=greeting").waitFor();
```

```
await page.locator("[data-testid=greeting]").waitFor();
```

```
await page.locator("css=[data-testid=greeting]").waitFor();
```



Engines, combinations & nested selection

```
page.locator("data-testid=holiday-card");
```

Vienna / Wien

Dive into the capital of the Habsburg empire

ON SALE



With a population of almost 2 million, Vienna is the second largest German-speaking city and breathes history in every



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Detroit

Top 10 of the cosmopolitan cities of the world



This US city is mainly known for the automobile industry. It hosts the GM's headquarters.



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```
page.locator("data-testid=holiday-card >> text=Vienna");
```

Vienna / Wien

data-testid=holiday-card >> text=Vienna
empire



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```
page.locator("*data-testid=holiday-card >> text=Vienna");
```

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```
page.locator("data-testid=holiday-card", {hasText: "Vienna"});
```

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```
page.locator("data-testid=holiday-card", { has: page.locator("text=Vienna") })
```

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Going down - v1

page

```
.locator("data-testid=holiday-card", { has: page.locator("text=Vienna") })  
.locator("data-testid=btn-brochure")
```

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Going down - v2

page.locator("data-testid=btn-brochure >> nth=0")

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Going down - v3 🏆

page

```
.locator(`data-testid=holiday-card`, {  
  has: this.page.locator("mat-card-title", { hasText: "Vienna" })  
})  
.locator("data-testid=btn-brochure")
```

Vienna / Wien

Dive into the capital of the Habsburg empire



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Layout-specific tests

```
test("layout selectors", async ({ page }) => {  
  await expect(  
    page.locator("p:right-of(:has-text('Logout'))")  
  ).not.toBeVisible();  
  await expect(  
    page.locator("p:left-of(:has-text('Logout'))")  
  ).not.toBeVisible();  
  
  await expect(page.locator("p:below(:has-text('Logout'))")).toContainText(  
    "Welcome"  
  );  
});
```



Actions

- click
- fill
- waitFor
 - can be used instead of matcher
- first
 - Required for strict mode
- locator
 - Nested selections



Actionability build-in

- Based on action, Playwright runs checks before the action
- Checks
 - Attached
 - Visible
 - Stable
 - Receive Events (no overlay)
 - Enabled
 - Editable



Assertions

```
await expect([Locator]).[matcher]
```



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Assertions 1/2

- Assertions are build-in (Part of Playwright)
- Apply matchers to element
 - Always use locator
 - Don't forget about the await
- Verify that element(s) can be found
 - use `waitFor()` instead expect



Assertions 2/2 - Common Matchers

- `toBeVisible`
- `toHaveCount`
- `toHaveText`
- `toContainText`
- `toBeVisible`
- `not.[otherMatcher]`



Part 3: Advanced



Agenda

- Page objects
- Test fixtures
- Network stubbing
- Session storage



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Page Objects

- Contains logic for actions and selectors
- Encapsulates (proportionate) selectors
- Exposes actions
- Heavily debated in other E2E frameworks
- Patterns after Christian Dangl:
 - Page Object < Actions < Repositories < Scenarios
 - <https://www.youtube.com/watch?v=mNcz2nEn1co>



Page Object - holidays

```
import { Page } from "@playwright/test";

export class HolidaysPage {
  constructor(private page: Page) {}

  async getBrochureFor(holidayName: string) {
    await this.page
      .locator(`data-testid=holiday-card`, {
        has: this.page.locator("mat-card-title", { hasText: "Vienna" }),
      })
      .locator("data-testid=btn-brochure")
      .click();
  }
}
```



Page Object - Usage

```
import { test } from "@playwright/test";
import { HolidaysPage } from "../page-objects/holidays-page";

test.describe("Basics", () => {
  test("test selectors", async ({ page }) => {
    await page.goto("");
    await page.click("data-testid=btn-holidays");
    const holidayPage = new HolidaysPage(page);
    await holidayPage.getBrochureFor("Vienna");

    await page.locator("data-testid=address").waitFor();
  });
});
```



Test fixtures

- Adds the possibility to "inject" additional elements into a test
- Can be combined
- Can be overwritten
- Are activated lazily
- Common use case for page objects



Test fixtures for holidays

```
import { HolidaysPage } from "../page-objects/holidays-page";
```

```
export interface HolidaysFixtures {  
  holidaysPage: HolidaysPage;  
}
```

```
export const holidaysFixtures = {  
  holidaysPage: async ({ page }, use) => {  
    const holidaysPage = new HolidaysPage(page);  
    await use(holidaysPage);  
  },  
};
```



Test fixtures in action

```
import { test as base } from "@playwright/test";
import {
  holidaysFixtures,
  HolidaysFixtures,
} from "../fixtures/holidays-fixture";

const test = base.extend<HolidaysFixtures>(holidaysFixtures);

test.describe("Basics", () => {
  test("test selectors", async ({ page, holidaysPage }) => {
    await page.goto("");
    await page.click("data-testid=btn-holidays");
    await holidaysPage.getBrochureFor("Vienna");

    page.locator("data-testid=address").waitFor();
  });
});
```



Network stubbing

- Intercept the network
- Verify requests
- Abort them
- Modify them
- Response: main use case



Use case: logging

- No impact on the application at all
- `page.on("request", (req) => console.log(req.url()));`



Use case: stubbing

```
page.route("https://api.eternal-holidays.net/holidays", (route) =>
  route. fulfill({
    status: 200,
    contentType: "application/json",
    body: JSON.stringify([
      {
        id: 1,
        title: "Cambodia",
        teaser: "Discover old temples and the old Khmer Empire",
        imageUrl:
          "https://eternal-app.s3.eu-central-1.amazonaws.com/assets/AngkorWatSmall.jpg",
        description:
          "Cambodia is known for Angkor Wat which is the most visited attraction in whole Asia. Started out
as an Hindu temple, it was gradually transformed to a Buddhist one. Beware, it can be very humid there.",
      },
    ]),
  })
);
```



Caching authentication

1. Global script that runs once at the start
2. Signs in
3. Persists localStorage, cookies in a file
4. Activate session via `test.use({storagePath: [filename]})`



Part 4: Beyond E2E

