WebDriverManager vs Selenium Manager

SeleniumConf & AppiumConf
28 March 2025

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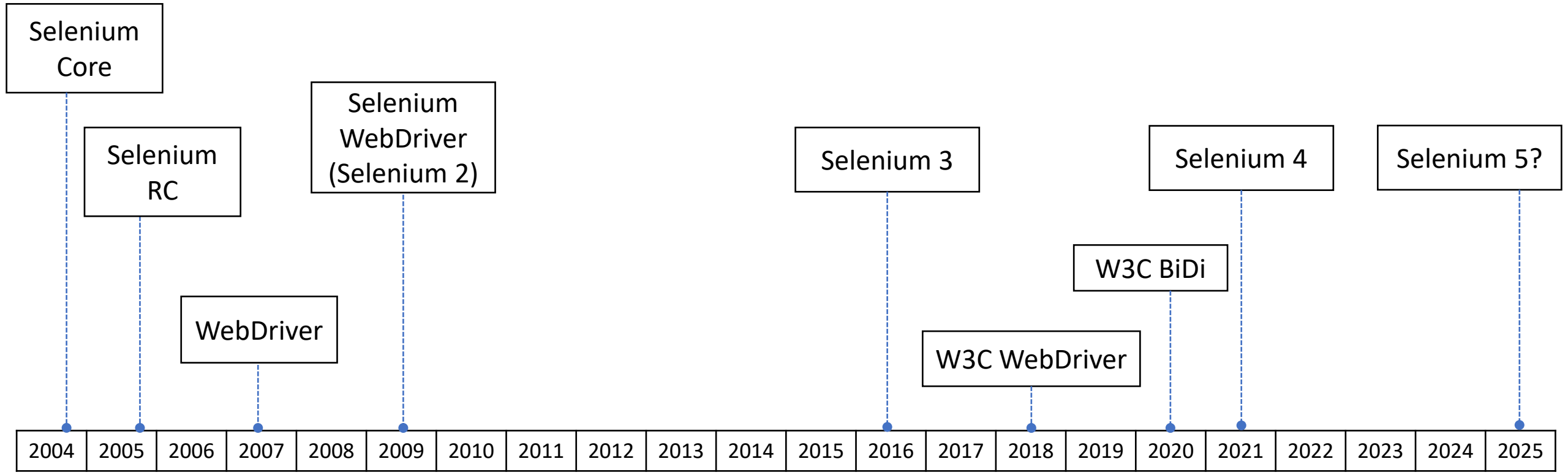
Selenium is 20 years 🎉

The History of Selenium



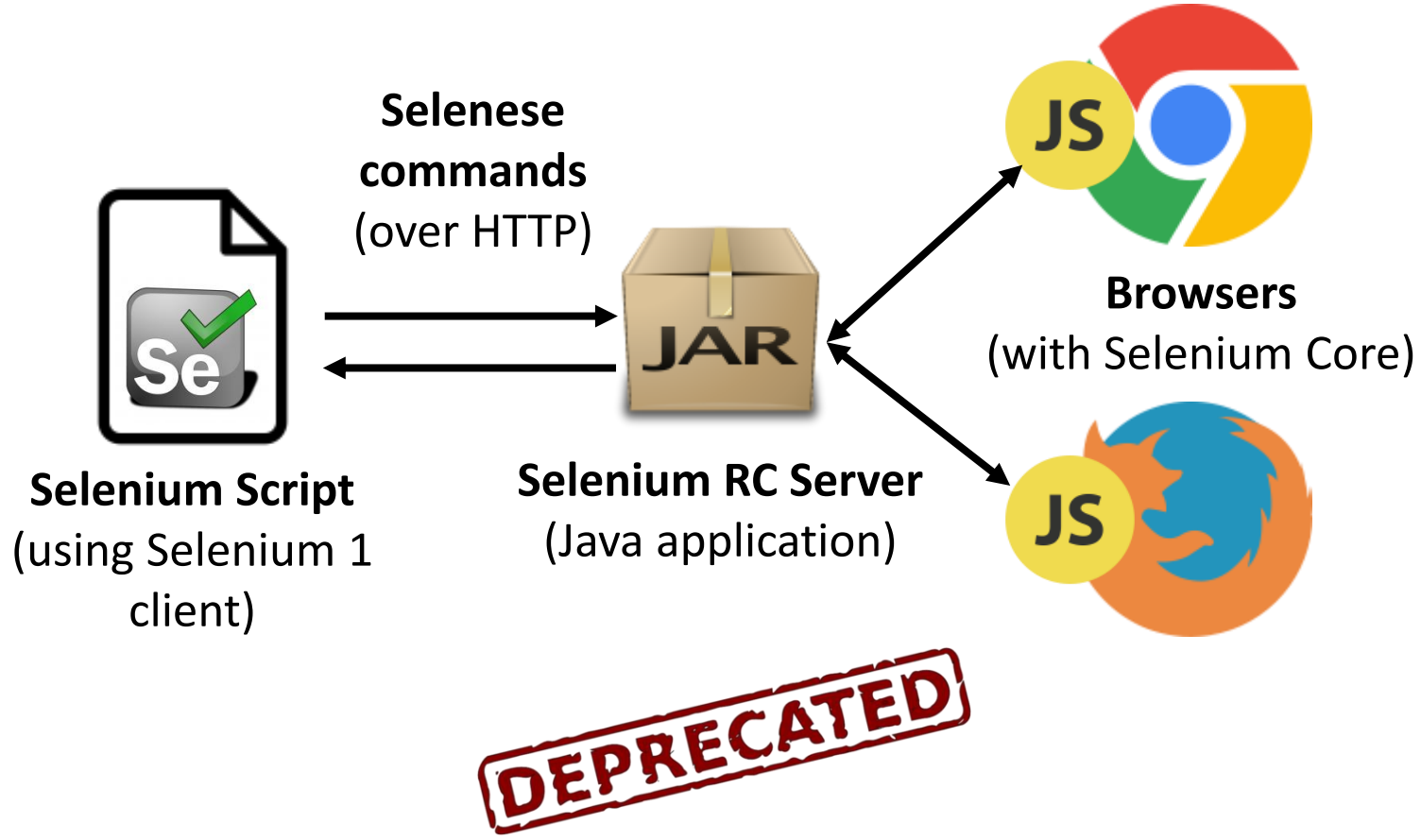
My History with Selenium

POLITÉCNICA

2006-2011

My History with Selenium

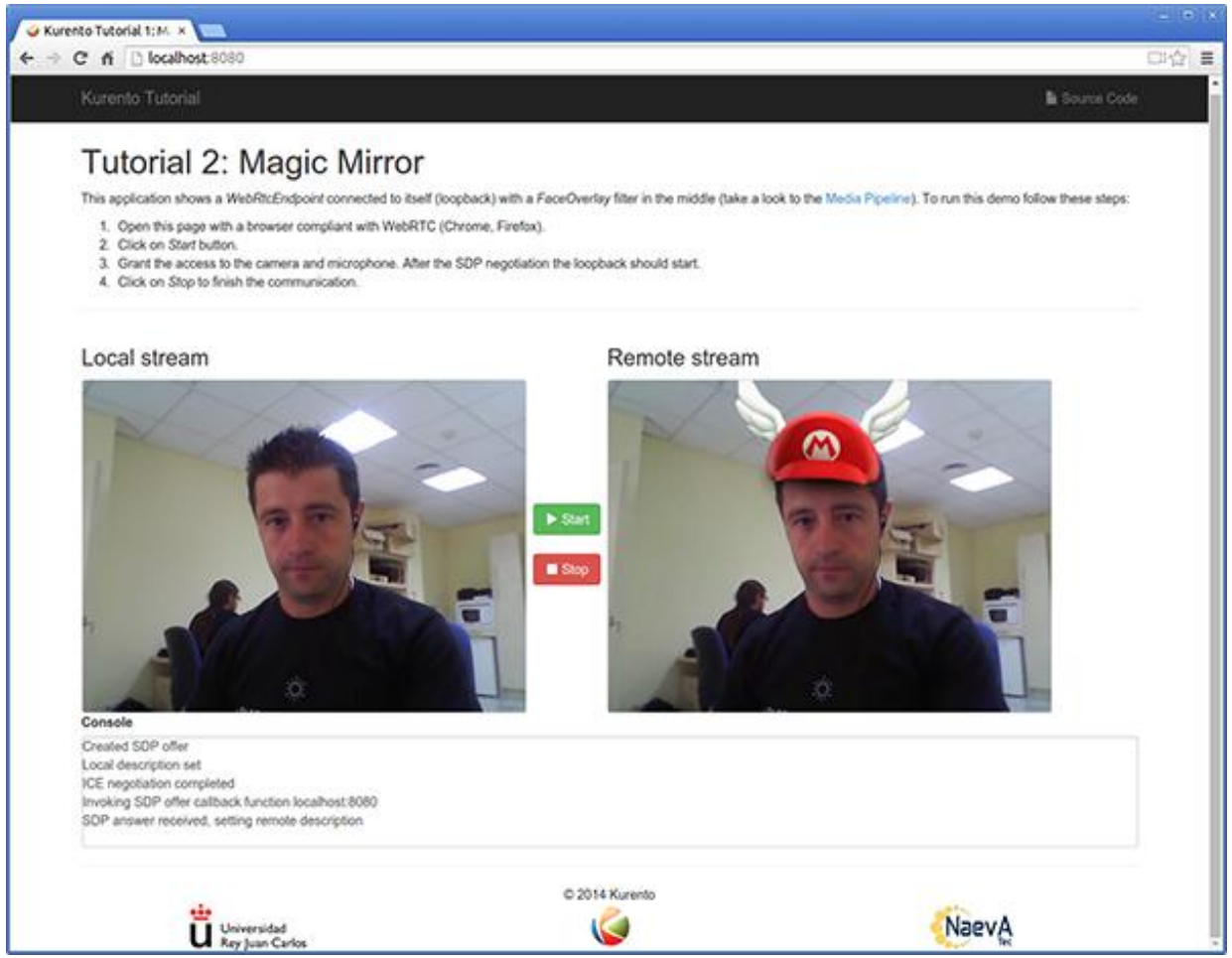
- Selenium Remote Control (RC):

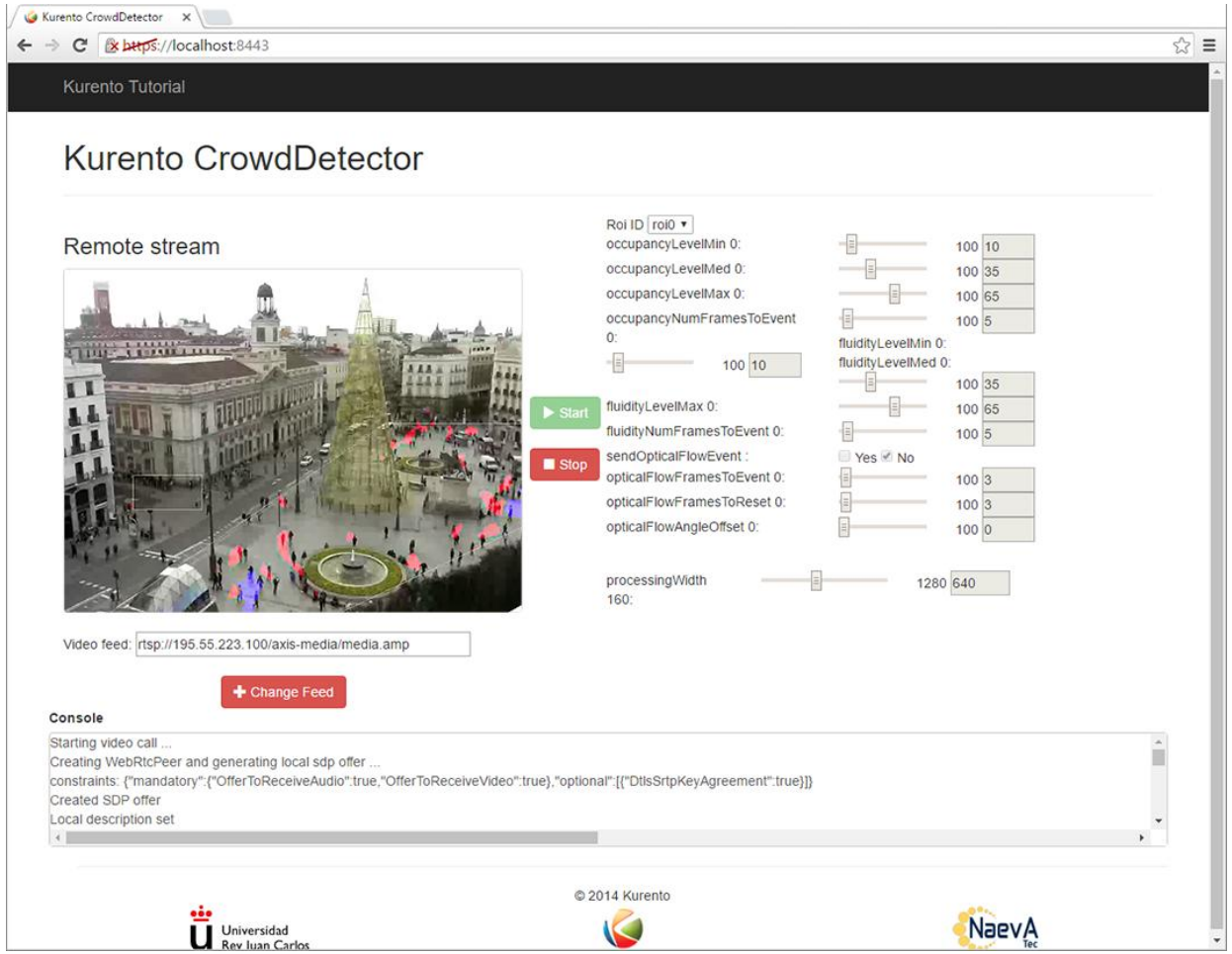


My History with Selenium

Universidad Rey Juan Carlos

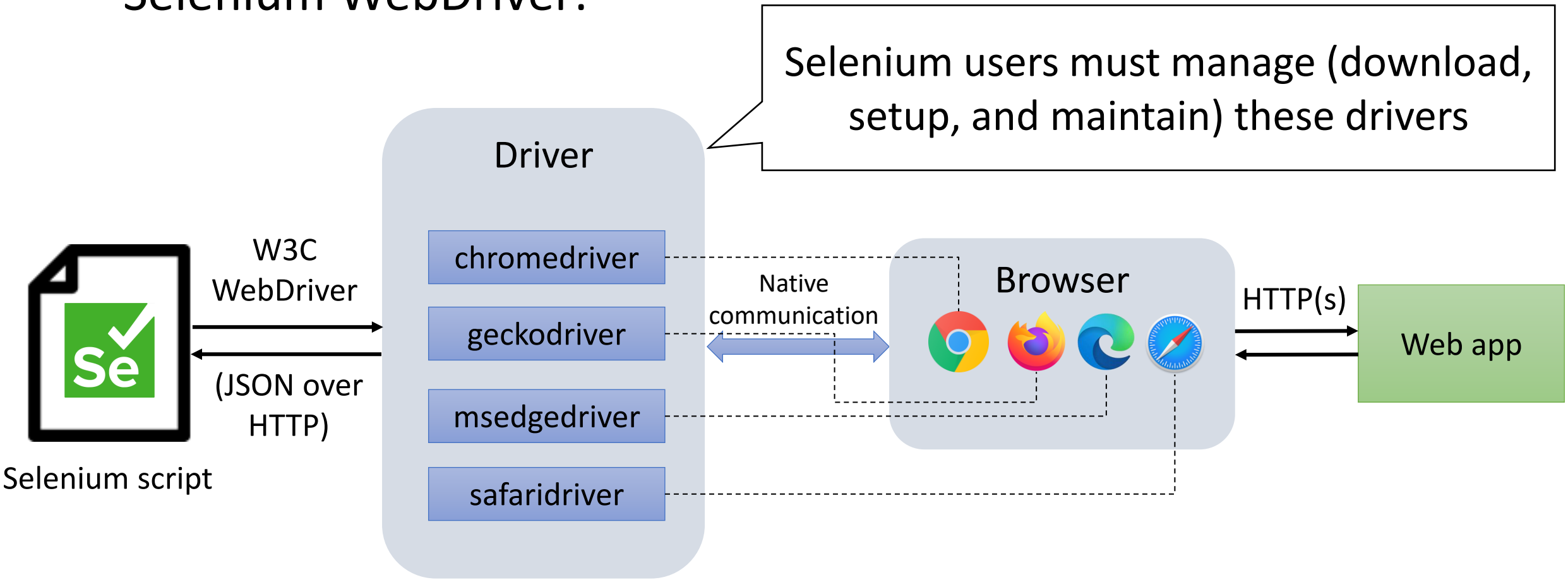
2013-2020





My History with Selenium

- Selenium WebDriver:



My History with Selenium


```java
class ChromeManualTest {

    WebDriver driver;

    @BeforeAll
    static void setupClass() {
        System.setProperty("webdriver.chrome.driver", "/path/to/chromedriver");
    }

    @BeforeEach
    void setup() {
        driver = new ChromeDriver();
    }

    @Test
    void test() {
        driver.get("https://bonigarcia.dev/selenium-webdriver-java/");
        String title = driver.getTitle();
        assertThat(title).contains("Selenium WebDriver");
    }

    @AfterEach
    void teardown() {
        driver.quit();
    }

}
```

https://github.com/bonigarcia/selenium-examples

My History with Selenium

U-tad
CENTRO UNIVERSITARIO
DE TECNOLOGÍA Y ARTE DIGITAL

2014-2018

My History with Selenium

U-tad
CENTRO UNIVERSITARIO
DE TECNOLOGÍA Y ARTE DIGITAL

2014-2018

Selenium

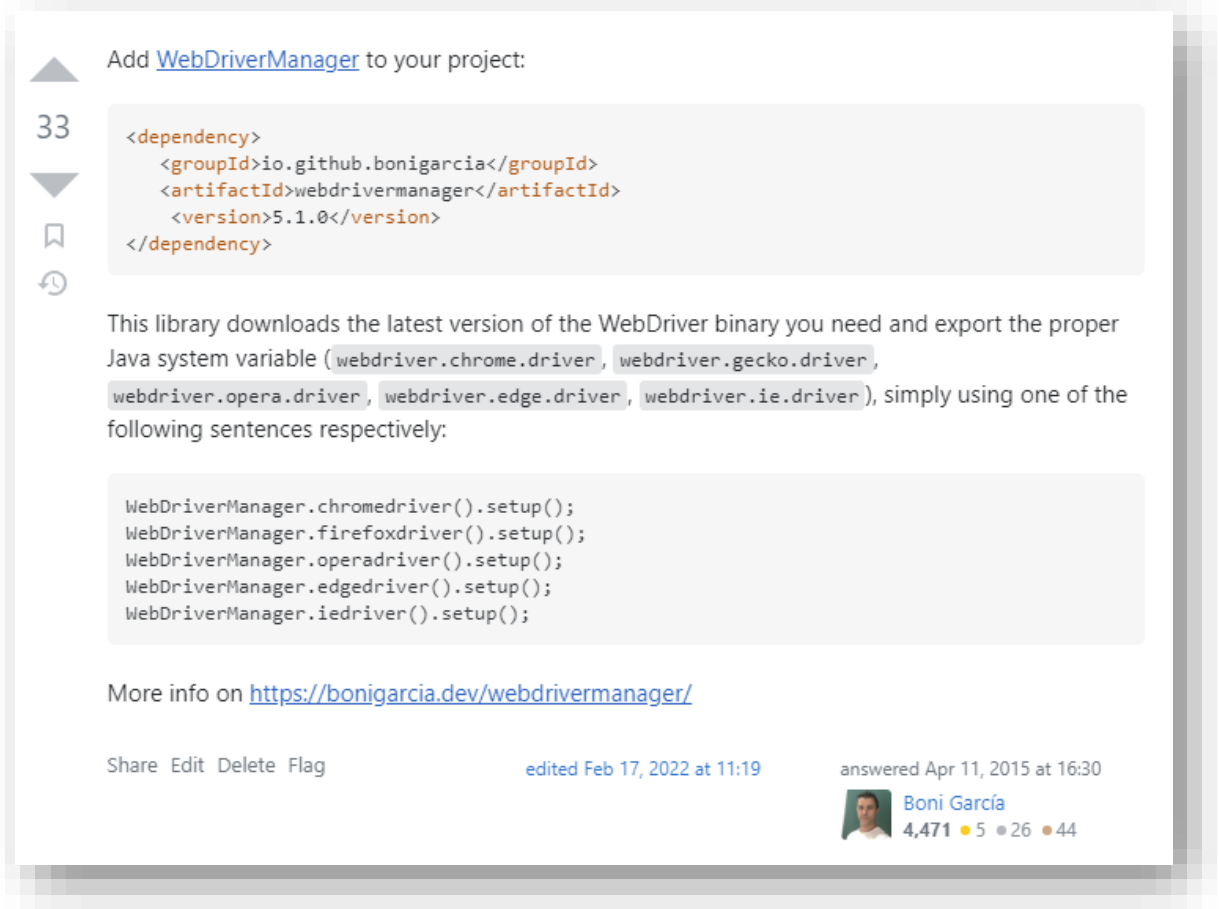
WebDriver

- Ejemplo: Chrome
  - Alternativa: usar **webdrivermanager** (librería que gestiona automáticamente la descarga de la última versión del binario adecuado para la máquina que ejecuta el test)
  - https://github.com/bonigarcia/webdrivermanager

```
<dependency>
    <groupId>io.github.bonigarcia</groupId>
    <artifactId>webdrivermanager</artifactId>
    <version>1.0.0</version>
    <scope>test</scope>
</dependency>
```

```
public class ChromeTest {
    protected WebDriver driver;
    @Before
    public void setup() {
        ChromeDriverManager.setup();
        driver = new ChromeDriver();
    }
    @After
    public void teardown() {
        if (driver != null) {
            driver.quit();
        }
    }
    @Test
    public void test() {
        // Exercise and verify
    }
}
```

My History with Selenium



33

Add WebDriverManager to your project:

```
<dependency>
   <groupId>io.github.bonigarcia</groupId>
   <artifactId>webdrivermanager</artifactId>
    <version>5.1.0</version>
</dependency>
```

This library downloads the latest version of the WebDriver binary you need and export the proper Java system variable (`webdriver.chrome.driver`, `webdriver.gecko.driver`, `webdriver.opera.driver`, `webdriver.edge.driver`, `webdriver.ie.driver`), simply using one of the following sentences respectively:

```
WebDriverManager.chromedriver().setup();
WebDriverManager.firefoxdriver().setup();
WebDriverManager.operadriver().setup();
WebDriverManager.edgedriver().setup();
WebDriverManager.iedriver().setup();
```

More info on https://bonigarcia.dev/webdrivermanager/

Share Edit Delete Flag edited Feb 17, 2022 at 11:19 answered Apr 11, 2015 at 16:30

Boni García
4,471 ● 5 ● 26 ● 44

https://stackoverflow.com/questions/7450416/selenium-2-chrome-driver/29580245

WebDriverManager

https://bonigarcia.dev/webdrivermanager/

> *Automated driver management and other helper features for Selenium WebDriver in Java*

WebDriverManager – Hello World Test

```java
class ChromeWdmTest {

    WebDriver driver;

    @BeforeAll
    static void setupClass() {
        WebDriverManager.chromedriver().setup();
    }

    @BeforeEach
    void setup() {
        driver = new ChromeDriver();
    }

    @Test
    void test() {
        driver.get("https://bonigarcia.dev/selenium-webdriver-java/");
        String title = driver.getTitle();
        assertThat(title).contains("Selenium WebDriver");
    }

    @AfterEach
    void teardown() {
        driver.quit();
    }

}
```

WebDriverManager – Other Managers

- The "*managers*" for Selenium WebDriver:

webdriver-manager

https://www.npmjs.com/package/webdriver-manager

webdriver-manager

https://pypi.org/project/webdriver-manager

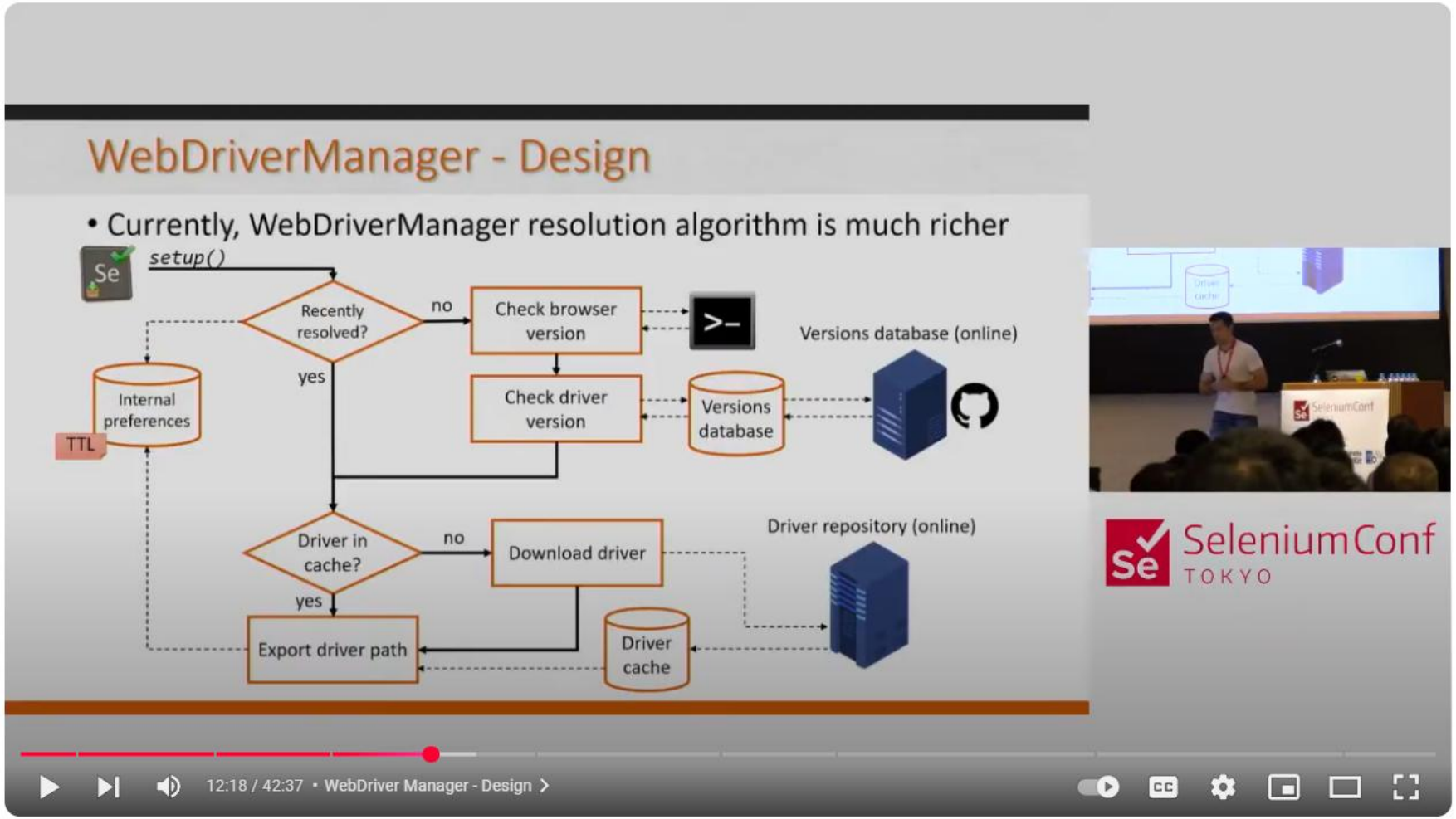
WebDriverManager.Net

https://github.com/rosolko/WebDriverManager.Net

webdrivers

https://github.com/titusfortner/webdrivers

WebDriverManager – SeleniumConf Tokyo 2019



Toolbox for Selenium Tests in Java: WebDriverManager and Selenium-Jupiter - Boni Garcia |SeConfTokyo

https://www.youtube.com/watch?v=-bekd6QByC8

WebDriverManager – Automated Driver Management

Empirical Software Engineering (2021) 26:107
https://doi.org/10.1007/s10664-021-09975-3

Automated driver management for Selenium WebDriver

Boni García[1] · Mario Munoz-Organero[1] · Carlos Alario-Hoyos[1] · Carlos Delgado Kloos[1]

Accepted: 4 May 2021 Published online: 23 July 2021

Abstract
Selenium WebDriver is a framework used to control web browsers automatically. It provides a cross-browser Application Programming Interface (API) for different languages (e.g., Java, Python, or JavaScript) that allows automatic navigation, user impersonation, and verification of web applications. Internally, Selenium WebDriver makes use of the native automation support of each browser. Hence, a platform-dependent binary file (the so-called driver) must be placed between the Selenium WebDriver script and the browser to support this native communication. The management (i.e., download, setup, and maintenance) of these drivers is cumbersome for practitioners. This paper provides a complete methodology to automate this management process. Particularly, we present WebDriverManager, the reference tool implementing this methodology. WebDriverManager provides different execution methods: as a Java dependency, as a Command-Line Interface (CLI) tool, as a server, as a Docker container, and as a Java agent. To provide empirical validation of the proposed approach, we surveyed the WebDriverManager users. The aim of this study is twofold. First, we assessed the extent to which WebDriverManager is adopted and used. Second, we evaluated the WebDriverManager API following Clarke's usability dimensions. A total of 148 participants worldwide completed this survey in 2020. The results show a remarkable assessment of the automation capabilities and API usability of WebDriverManager by Java users, but a scarce adoption for other languages.

Keywords Test automation · Testing tools · Selenium WebDriver

Communicated by: Shin Yoo

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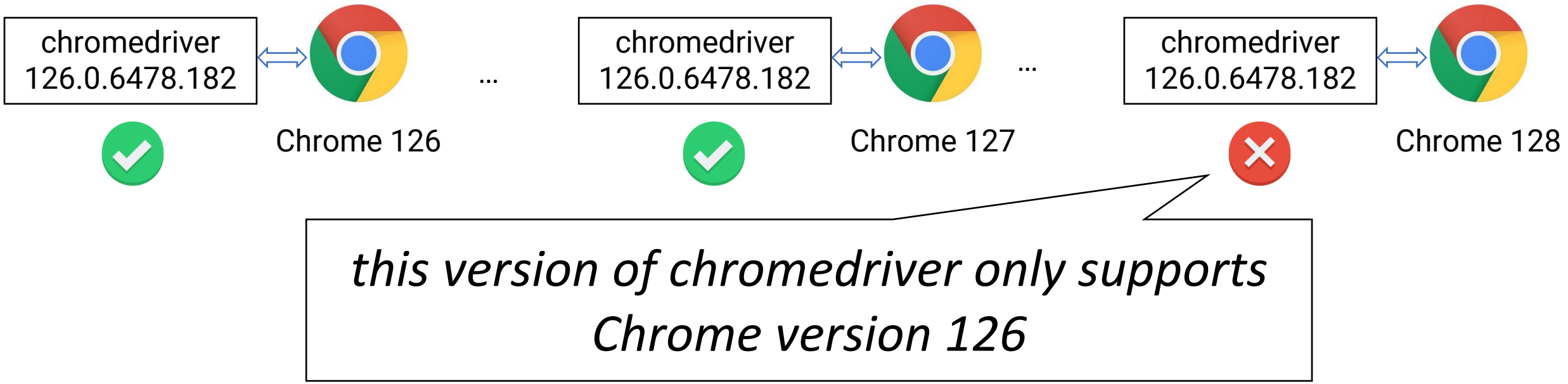
2020-today

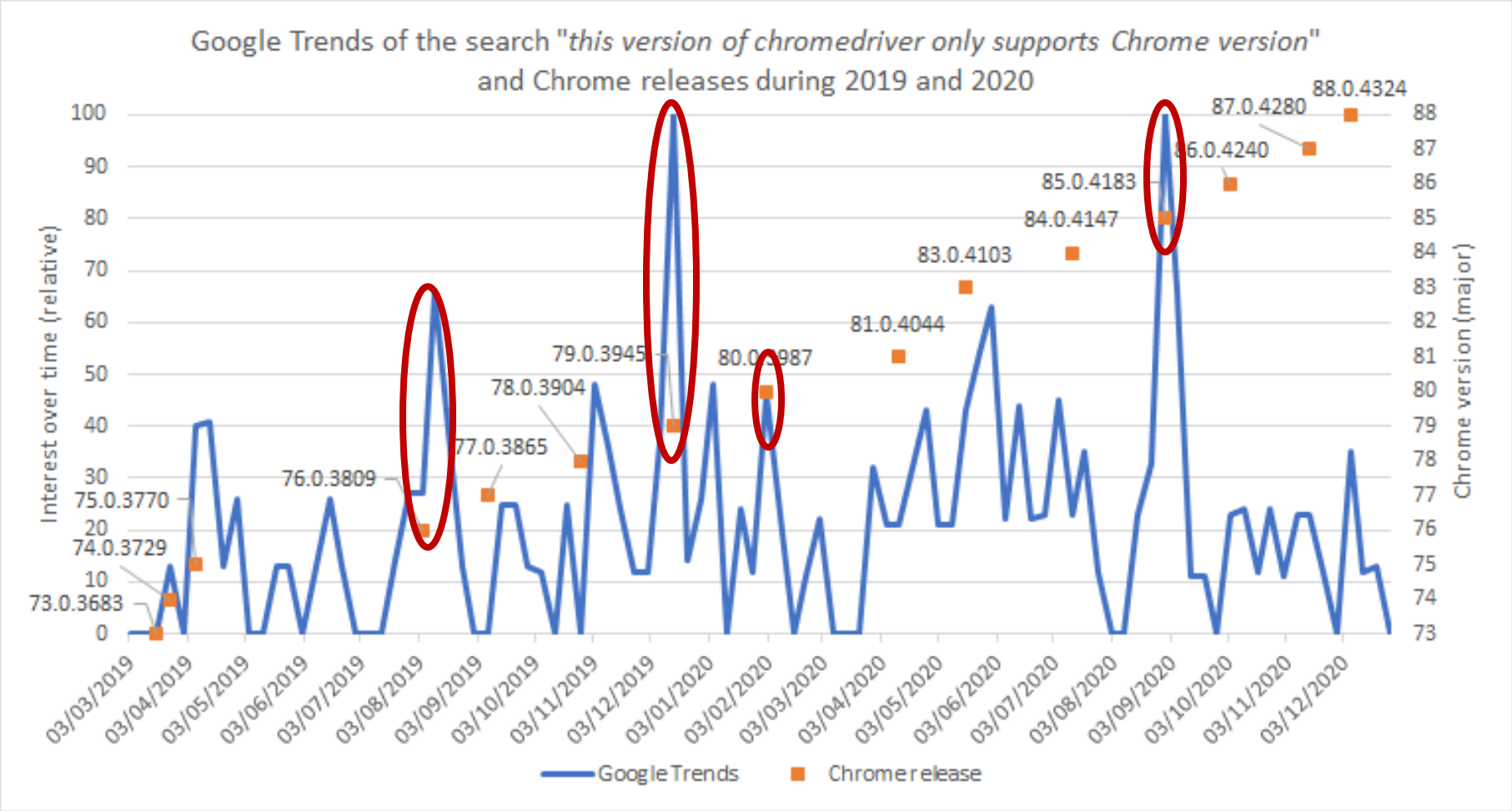
García, B., et al., 2021. Automated Driver Management for Selenium WebDriver. *Empirical Software Engineering*, 26(5), pp.1-51.

WebDriverManager – Automated Driver Management

- Modern web browsers are ***evergreen***



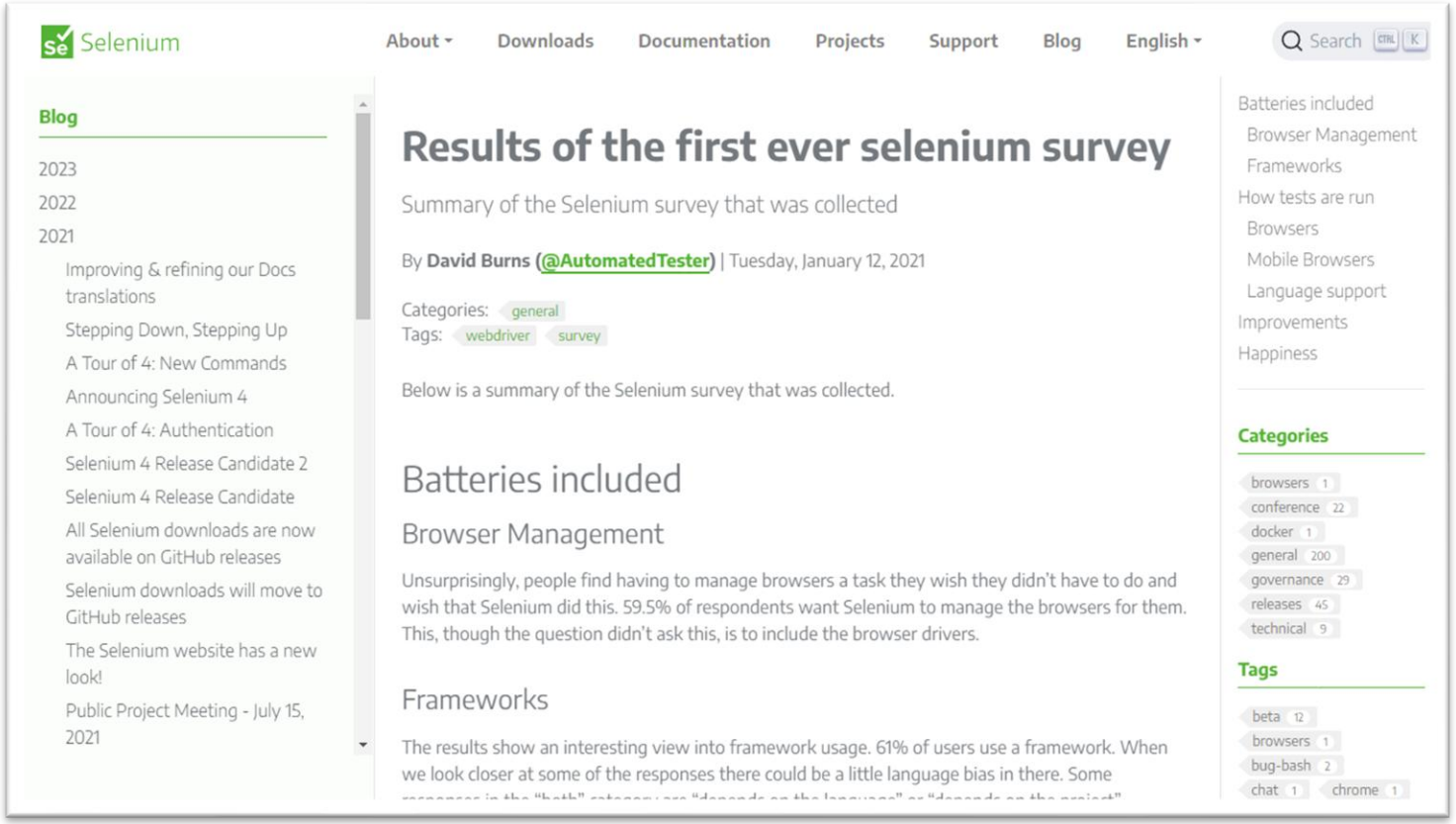
WebDriverManager – Automated Driver Management



https://trends.google.com/trends/

Driver Management in Selenium

- In 2020, the Selenium project surveyed its users:



Selenium users wanted *batteries included*

https://www.selenium.dev/blog/2021/selenium-survey-results/

Selenium Manager

SauceLabs
2022-2023

- I became a Selenium committer in August 2022

Selenium Manager

  - It is a CLI (Command-Line Interface) tool
  - It has been developed in Rust
  - It is shipped in each Selenium release

Selenium Manager – Hello World Scripts


```java
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class HelloWorldJava
    public static void main(String[] args) {
        WebDriver driver = new ChromeDriver();
        driver.get("https://www.selenium.dev/");
        driver.quit();
    }
}
```


```javascript
const { Builder } = require('selenium-webdriver');

async function helloWorldJavaScript() {
    let driver = await new Builder().forBrowser('chrome').build();
    await driver.get('https://www.selenium.dev/');
    await driver.quit();
}
```

```python
from selenium import webdriver

def hello_world_python():
    driver = webdriver.Chrome()
    driver.get("https://www.selenium.dev/")
    driver.quit()
```

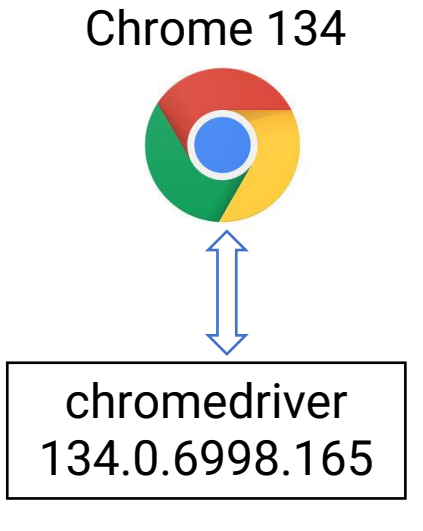

```csharp
using OpenQA.Selenium;
using OpenQA.Selenium.Chrome;

public class HelloWorldCSharp
    static void Main(string[] args) {
        IWebDriver driver = new ChromeDriver();
        driver.Navigate().GoToUrl("https://www.selenium.dev/");
        driver.Quit();
    }
}
```

```ruby
require 'selenium-webdriver'

def hello_world_ruby
    driver = Selenium::WebDriver.for :chrome
    driver.navigate.to 'https://www.selenium.dev/'
    driver.quit
end
```

Selenium Manager – Automated Driver Management

- Selenium Manager automatically discovers, downloads, and caches the drivers required by Selenium

1. Browser version discovery
2. Driver version discovery
3. Driver download and cache



~/.cache/selenium

Selenium Manager – Hello World Test


```
class FirefoxBasicTest {

    WebDriver driver;

    @BeforeEach
    void setup() {
        driver = new FirefoxDriver();
    }

    @Test
    void test() {
        driver.get("https://bonigarcia.dev/selenium-webdriver-java/");
        String title = driver.getTitle();
        assertThat(title).contains("Selenium WebDriver");
    }

    @AfterEach
    void teardown() {
        driver.quit();
    }

}
```

What happens if Firefox is not available the machine running this test?

Selenium Manager – Automated Browser Management

- Selenium Manager automatically discovers, downloads, and caches the browsers driven with Selenium when these browsers are not installed in the local system

			
	✓	✓	✓ *
	✓	✓	✓
	✓	✓	✓

*Requires admin permissions

Selenium Manager – Automated Browser Management

- **Chrome for Testing** (CfT) is a specialized version of Google Chrome designed specifically for browser automation
  - It is not evergreen (no auto-updates)
  - It is lighter that regular Google Chrome (e.g., user-related components, such as the user profile or password manager are not available in CfT)

https://googlechromelabs.github.io/chrome-for-testing/

Selenium Manager – Automated Browser Management

```
class ChromeVersionTest {

    WebDriver driver;

    @BeforeEach
    void setup() {
        ChromeOptions options = new ChromeOptions();
        options.setBrowserVersion("beta");
        driver = new ChromeDriver(options);
    }

    @Test
    void test() {
        driver.get("https://bonigarcia.dev/selenium-webdriver-java/");
        String title = driver.getTitle();
        assertThat(title).contains("Selenium WebDriver");
    }

    @AfterEach
    void teardown() {
        driver.quit();
    }

}
```

Specific browser versions (including "beta", "dev", or "nightly") are supported

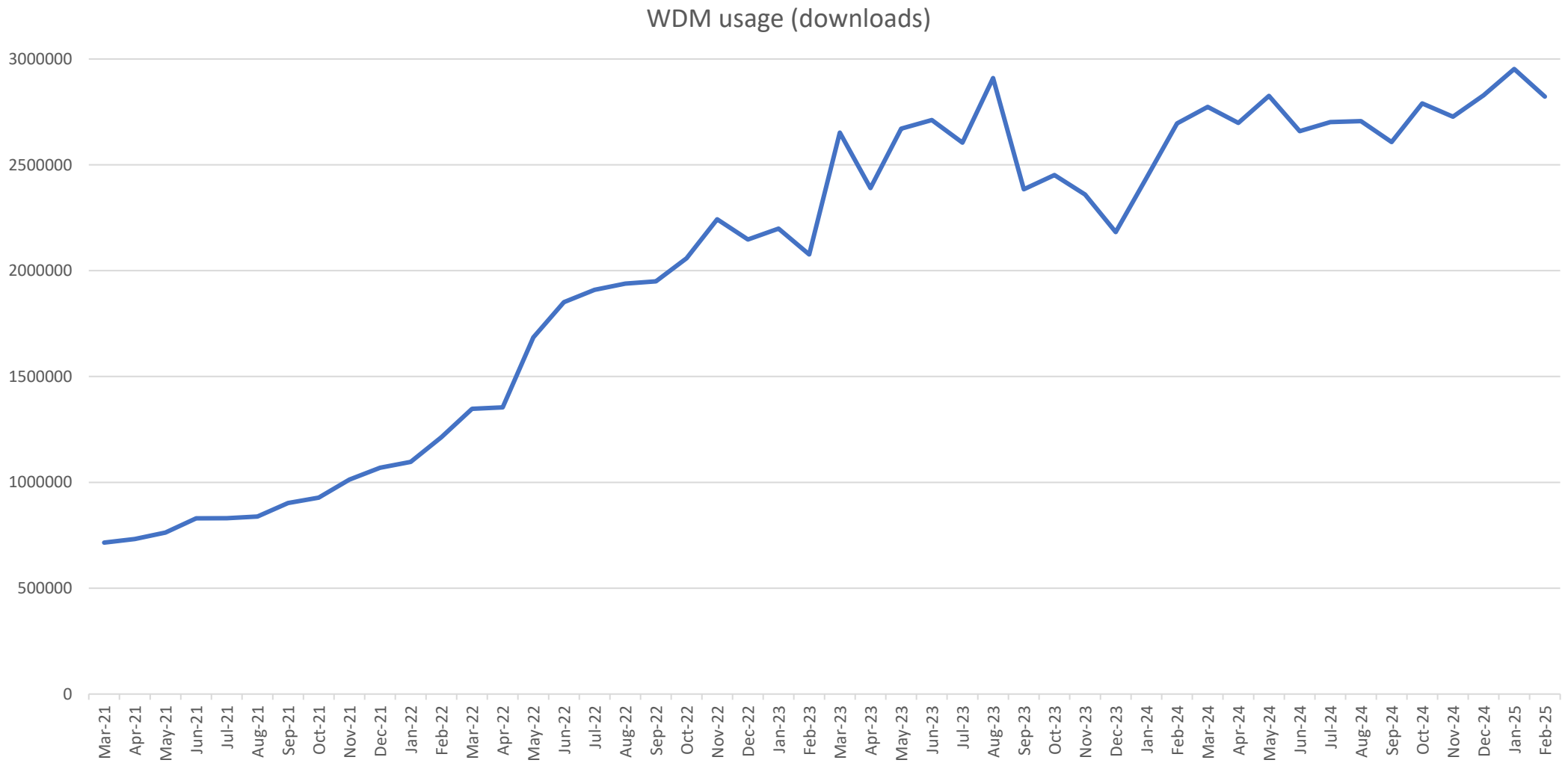
Selenium Manager – Other Uses

- Another uses of Selenium Manager include:
  - Advanced configuration (with envs or global configuration file)
  - As a standalone CLI tool

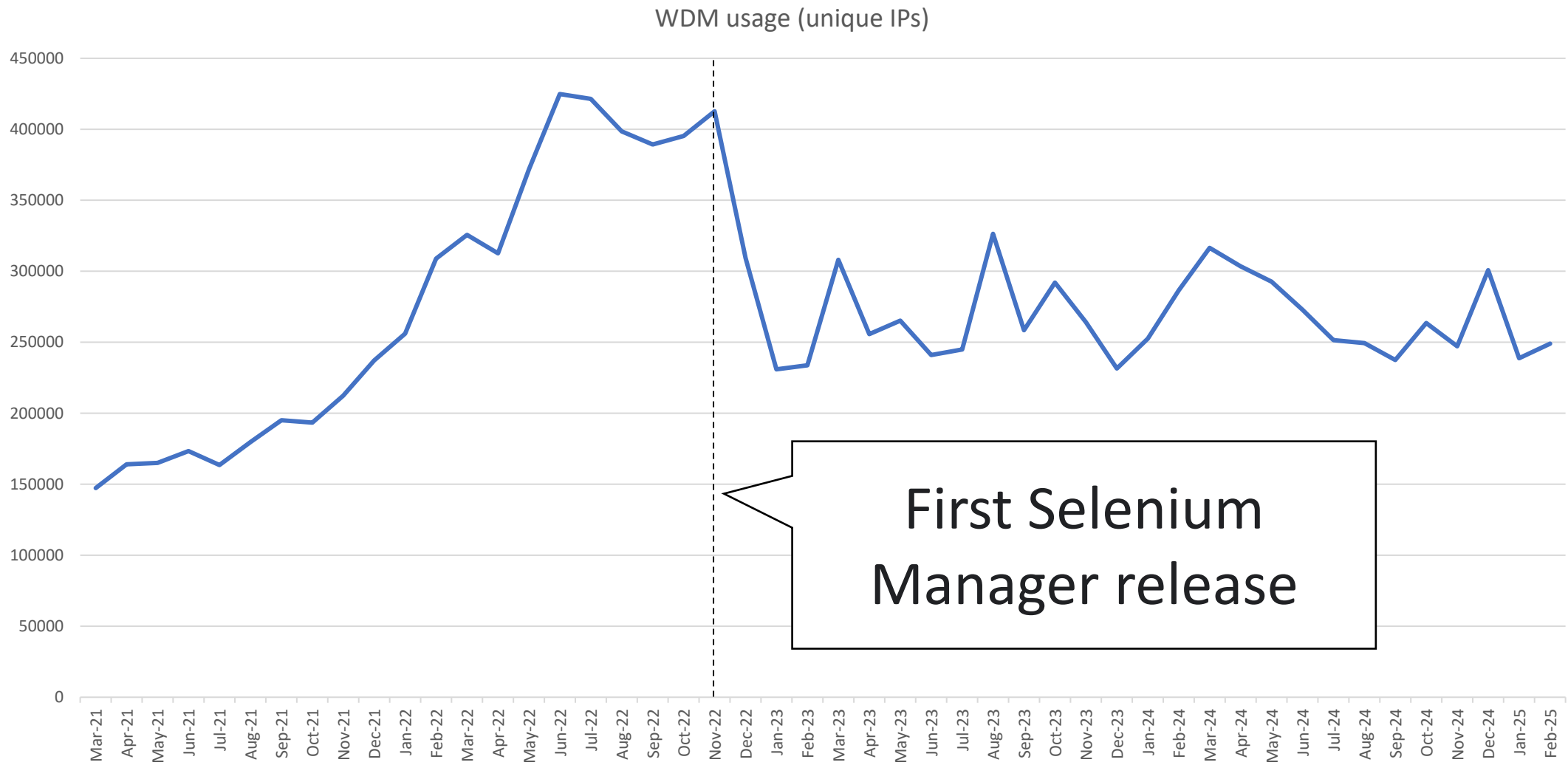
```
C:\Users\boni\.cache\selenium\manager\0.4.30>selenium-manager.exe --debug --browser chrome
[2025-03-27T23:08:23.478Z DEBUG] chromedriver not found in PATH
[2025-03-27T23:08:23.479Z DEBUG] chrome detected at C:\Program Files\Google\Chrome\Application\chrome.exe
[2025-03-27T23:08:23.479Z DEBUG] Running command: wmic datafile where name='C:\\Program
Files\\Google\\Chrome\\Application\\chrome.exe' get Version /value
[2025-03-27T23:08:23.757Z DEBUG] Output: "\r\r\n\r\r\nVersion=134.0.6998.166\r\r\n\r\r\n\r\r\n\r"
[2025-03-27T23:08:23.759Z DEBUG] Detected browser: chrome 134.0.6998.166
[2025-03-27T23:08:23.771Z DEBUG] Discovering versions from https://googlechromelabs.github.io/chrome-for-testing/known-good-
versions-with-downloads.json
[2025-03-27T23:08:24.447Z DEBUG] Required driver: chromedriver 134.0.6998.165
[2025-03-27T23:08:24.449Z DEBUG] chromedriver 134.0.6998.165 already in the cache
[2025-03-27T23:08:24.450Z INFO ] Driver path: C:\Users\boni\.cache\selenium\chromedriver\win64\134.0.6998.165\chromedriver.exe
[2025-03-27T23:08:24.450Z INFO ] Browser path: C:\Program Files\Google\Chrome\Application\chrome.exe
```

https://www.selenium.dev/documentation/selenium_manager/

What about WebDriverManager?



What about WebDriverManager?



WebDriverManager is 10 years

WebDriverManager 6

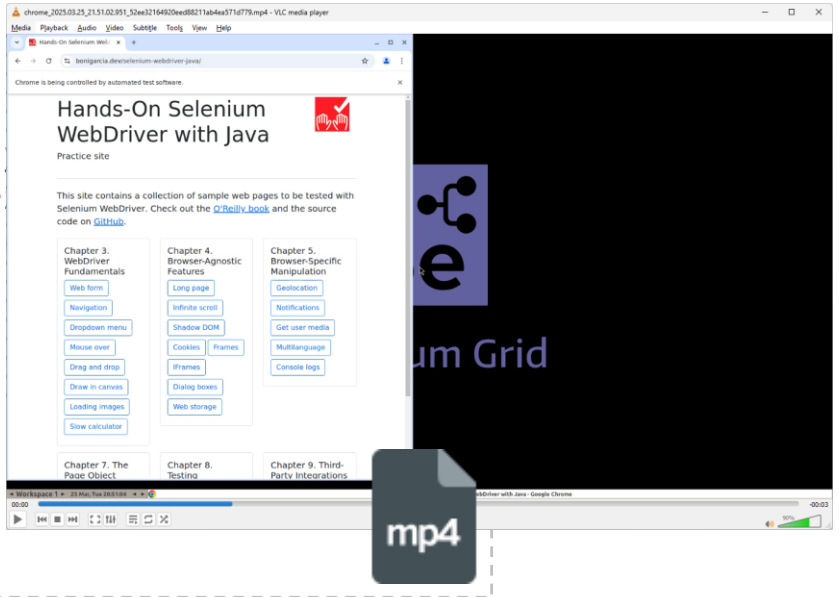
WebDriverManager – Automated Browser Management

```
class DockerChromeTest {

    WebDriver driver;
    WebDriverManager wdm;

    @BeforeEach
    void setupTest() {
        wdm = WebDriverManager.chromedriver().browserInDocker();
        driver = wdm.create();
    }

    @Test
    void test() {
        driver.get("https://bonigarcia.dev/selenium-webdriver-java/");
        assertThat(driver.getTitle()).contains("Selenium WebDriver");
    }

    @AfterEach
    void teardown() {
        wdm.quit();
    }

}
```

https://github.com/SeleniumHQ/docker-selenium

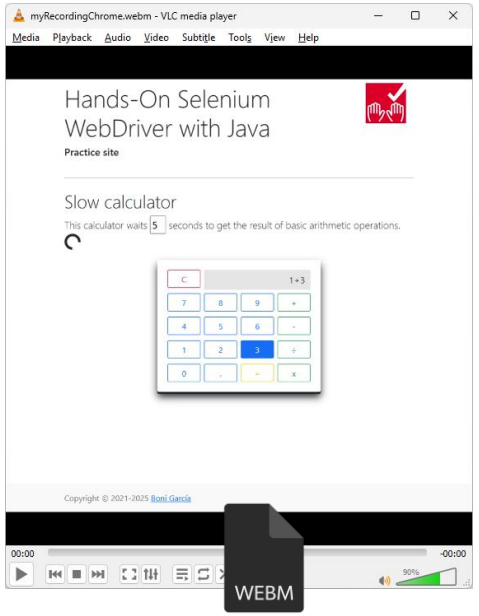
WebDriverManager – Video Recording (I)

```
class DockerChromeRecordingTest {

    WebDriver driver;
    WebDriverManager wdm;

    @BeforeEach
    void setupTest() {
        wdm = WebDriverManager.chromedriver().browserInDocker().enableRecording();
        driver = wdm.create();
    }

    @Test
    void test() {
        driver.get("https://bonigarcia.dev/selenium-webdriver-
        assertThat(driver.getTitle()).contains("Selenium WebDr
    }

    @AfterEach
    void teardown() {
        wdm.quit();
    }

}
```



WebDriverManager – Video Recording (II)

```
class RecordEdgeTest {

    WebDriver driver;
    File targetFolder;
    WebDriverManager wdm;

    @BeforeEach
    void setup() {
        wdm = WebDriverManager.edgedriver().watch();
        driver = wdm.create();
    }

    @Test
    void test() {
        driver.get(
                "https://bonigarcia.dev/selenium-webdriver-java/slow-calculator.html");
        wdm.startRecording();
        // test logic
        wdm.stopRecording();
    }

    @AfterEach
    void teardown() {
        driver.quit();
    }

}
```



BrowserWatcher

https://bonigarcia.dev/browserwatcher/

WebDriverManager – Console Logs Gathering


```
class GatherLogsFirefoxTest {

    WebDriverManager wdm;
    WebDriver driver;

    @BeforeEach
    void setup() {
        wdm = WebDriverManager.firefoxdriver().watch();
        driver = wdm.create();
    }

    @Test
    void test() {
        driver.get(
                "https://bonigarcia.dev/selenium-webdriver-java/console-logs.html");
        List<Map<String, Object>> logMessages = wdm.getLogs();

        // handle logs
    }

    @AfterEach
    void teardown() {
        driver.quit();
    }

}
```

More info and examples on:
https://bonigarcia.dev/webdrivermanager/

WebDriverManager vs Selenium Manager

- Is Selenium Manager a replacement for WebDriverManager?
  - For the sole use case of automated driver management, yes
- What are the differences between both tools?

WebDriverManager	Selenium Manager
Java library	Rust CLI application – used by default in all bindings languages (Java, JavaScript, Python, Ruby, .Net) since Selenium 4.6
Automated driver management • Based on Docker	Automated browser management • Based on browser binary releases
Other features: • Video recording • Monitoring	Other features: • Standalone CLI tool

What is next?

- The development and maintenance of WebDriverManager and Selenium Manager continues
- The backlog of WebDriverManager is currently empty
- There are some open issues in Selenium Manager, such as:
  - Digitally sign selenium-manager.exe (for Windows)
  - Replace WMIC commands (deprecated) by PowerShell (for Windows)
  - Support Electron
- Selenium Manager will be out of beta for Selenium 5

Test Automation with Selenium: A Survey

Please share your experience about Selenium here!

WebDriverManager vs Selenium Manager

Participate in the survey here

Thank you very much!

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https://bonigarcia.dev/