

TPAC 2024

# WebDriver and Test Automation, take 3

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# WebDriver and Test Automation?

## Test hardware-dependent APIs...




- Are the right sensor readings being reported?
- Is Device Motion data processed correctly?
- Can a certain posture be passed to the Device Posture API?
- How does the Compute Pressure API react to this CPU pressure reading?

## ... without actual hardware




- No hardware = more predictable, easier to integrate in CI workflows
- Tests should behave identically across browsers

# Testing approaches

## MojoJS

- Replaces part of the API implementation with JS-based mocks
-  Easy to prototype web tests during API implementation phase
-  Reduces test coverage of actual implementation
-  Chromium-specific, not interoperable (see WPT's [rfcs#172](https://www.chromium.org/blink/infrastructure/implementation/rfcs/172))

## WebDriver

- Endpoints to control part of API behavior defined in the spec
- Tests in WPT use endpoints via testdriver.js wrappers
-  Tests exercise larger parts of the implementation
-  Interoperable approach
-  Higher implementation cost
  - Spec, WPT, WebDriver, API implementation
  - Existing tests need to be rearchitected

# Take 3?


- [2018: TPAC in Lyon, France](#)
  - “14:00 WebDriver Extension API for Generic Sensor (preview) (PR, explainer, [slides](#)) - @rakuco & @Honry to lead”
  - The [spec PR](#) did land, but it was not implemented or used in WPT
- [2023: TPAC in Seville, Spain](#)
  - WebDriver for Sensors, take 2
  - Update on changes to Generic Sensors spec and Chromium+WPT work
- 2024: Third time's the charm 🎉
  - Generic Sensor changes have landed
  - Scope expanded to other specs
  - Lessons learned

# WPT and DAS specs: TPAC 2023 vs TPAC 2024

## 2023

- Specs under heavy development lacked web tests
  - Device Posture
- Other specs had tests in WPT but depended on MojoJS
  - Generic Sensors (WebDriver conversion in progress)
  - Device Orientation and Motion
  - Compute Pressure

## 2024

- Specs and web tests written/converted 
  - Device Posture
  - Generic Sensors
  - Device Orientation and Motion
  - Compute Pressure (last patch under review)

# General spec approach

- Main goal is to modify non-automated workflow as little as possible
  - Store data (readings, override information etc) in [top-level traversable](#)
  - Add "Update data/reading/override" WebDriver endpoint
    - Option 1: Trigger spec-specific "data has arrived steps"
    - Option 2: Store new fake data that will be used by existing "process data" steps later
  - When processing data:
    - Check top-level traversable for fake data source and fake data, try to use them before trying real data/HW
- Hooking into top-level traversable allows using the same data for all navigables under it
  - Also mimics real HW flow: all frames get the same readings
  - **Note:** this concerns data *entering processing*, not data *reported to script*

# Learnings and challenges

- WebDriver changes requires (re)thinking parts of the spec
  - For DAS, it often means more precise specification of "data delivery/retrieval". Rewrites can be [big](#).
  - Need to decide between set/clear override endpoints (e.g. [Device Posture](#)) and add/remove override + update readings (e.g. [Compute Pressure](#)). The former is simpler, the latter is required to simulate different conditions for the data source.
- testdriver.js limitations make writing some tests harder
  - Functions can only be called from top-level browsing context: bad for workers and cross-origin iframes (see Compute Pressure hacks for workers [here](#))
- Top-level navigables do not play well with shared workers
- Future work: take WebDriver BiDi into consideration
  - Even if BiDi capabilities are not required, tools like Puppeteer [can use BiDi endpoints instead of e.g. CDP](#)

Thank you

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