Getting your Team Passionate About Web Performance to Achieve Performant Web Apps

OUTLINE

- WHY PERFORMANCE MATTERS
- THE LEAN PHILOSOPHY
- THE RIGHT TOOLS
- PERFORMANCE IS A LONG GAME

Why performance matters

OUTLINE

- WHY PERFORMANCE MATTERS
  - THE BUSINESS STANDPOINT
  - THE ETHICS OF WEB PERFORMANCE
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Performance matters for your business

Source: https://wpostats.com/

OUTLINE

Performance matters for your business

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OUTLINE

Performance matters for your business

zalando

trainline

Trainline reduced latency by 0.3 seconds across their funnel and customers spent an extra £8 million (~€9.1 million) a year.

Source: https://wpostats.com/

OUTLINE

Performance matters for your business

zalando

trainline

FINANCIAL TIMES

Tests of the new, faster FT.com showed users were up to 30% more engaged—meaning more visits and more content being consumed.

Source: https://wpostats.com/

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FINANCIAL TIMES

BBC

BBC has seen that they lose an additional 10% of users for every additional second it takes for their site to load

Source: https://wpostats.com/

OUTLINE

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trainline

FINANCIAL TIMES

BBC

Pinterest

Rebuilding Pinterest pages for performance resulted in a 15% increase in SEO traffic and a 15% increase in conversion rate to signup.

Source: https://wpostats.com/

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The ethics of web performance

“Poor performance can, and does, **lead to exclusion**.”

— *Tim Kadlek*

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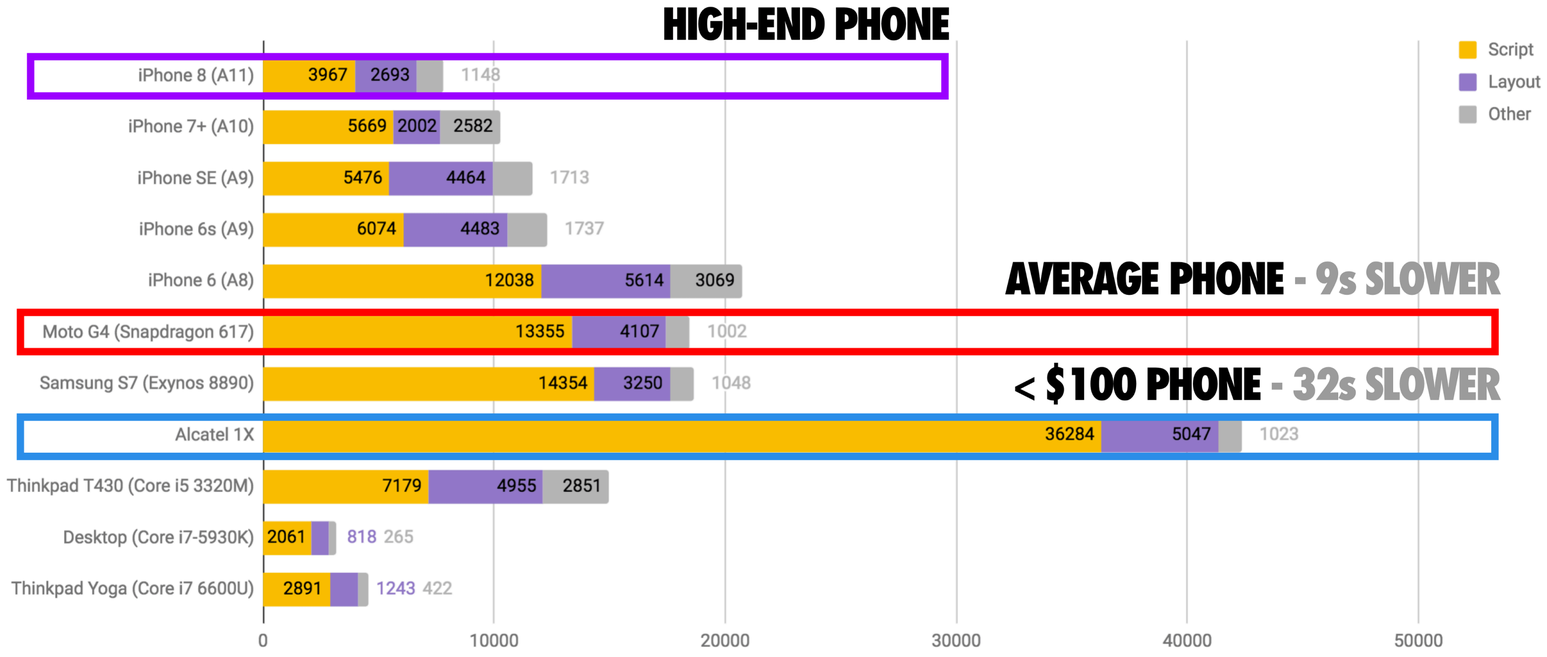
JS PROCESSING FOR CNN.COM



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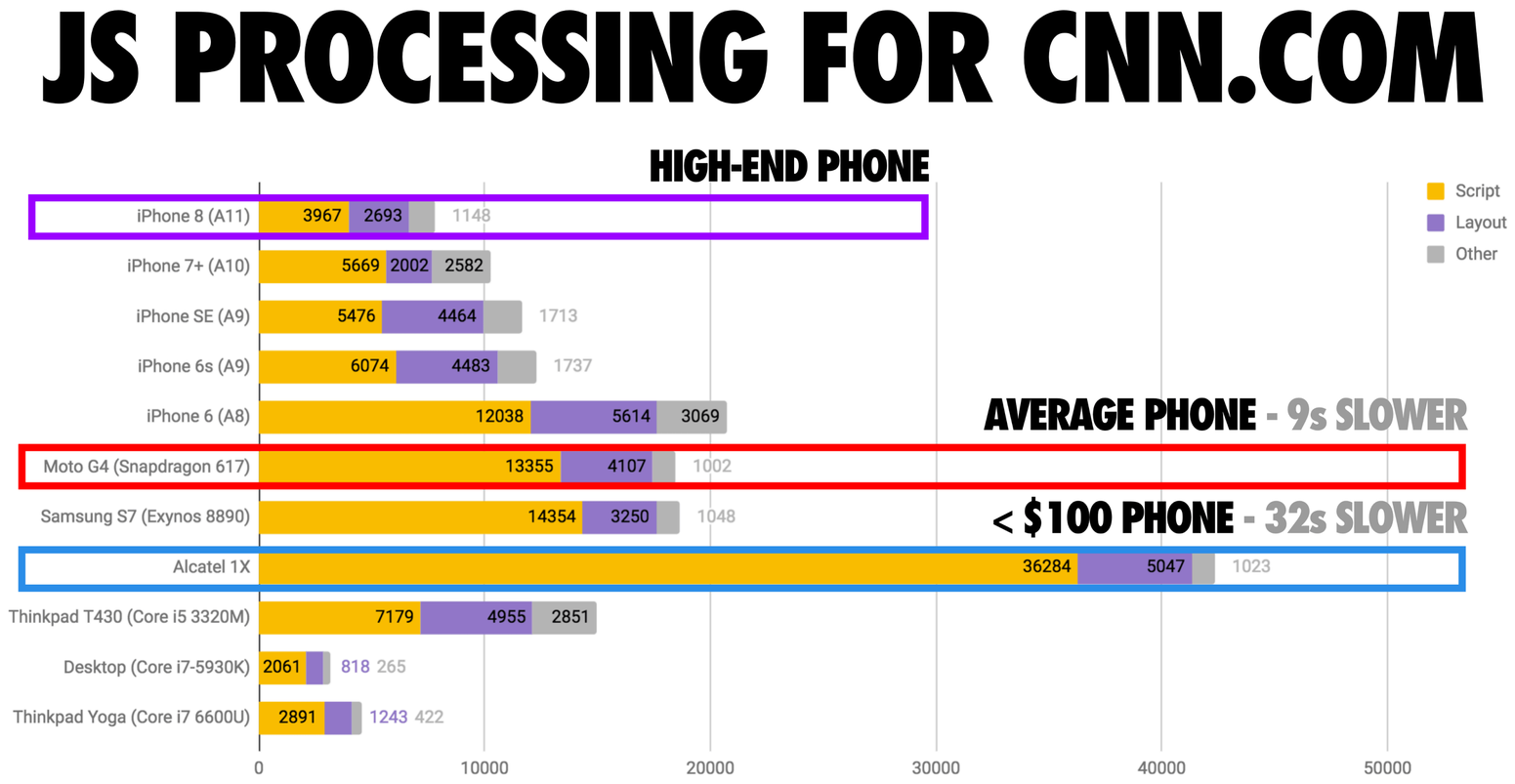

Source: https://v8.dev/blog/cost-of-javascript-2019

OUTLINE

The ethics of web performance

Source: https://blog.chriszacharias.com/page-weight-matters

OUTLINE

The ethics of web performance

*"[Performance good practices] have well-known benefits to usability, but are also **acts of environmental protection**."*

— Cennydd Bowles, Future Ethics

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The ethics of web performance

Source: https://timkadlec.com/remembers/2019-01-09-the-ethics-of-performance/

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The ethics of web performance

“I need to buy a new phone”

Source: https://timkadlec.com/remembers/2019-01-09-the-ethics-of-performance/

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The ethics of web performance

“My battery does not last a full day anymore”

Source: https://timkadlec.com/remembers/2019-01-09-the-ethics-of-performance/

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The ethics of web performance

Web Performance is not a zero-sum game

Source: https://timkadlec.com/remembers/2019-01-09-the-ethics-of-performance/

Nicolas Goutay

Web Performance Evangelist
— Theodo

Twitter: @phacks

W E B P E R F

In the open space, no one can hear you scream.

🗓 Feb. 2018

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🗓️ Feb. 2018

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🗓️ Jan. 2019

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🗓️ Feb. 2018

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🗓️ Jan. 2019

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🗓️ Dec. 2019

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The Lean Philosophy

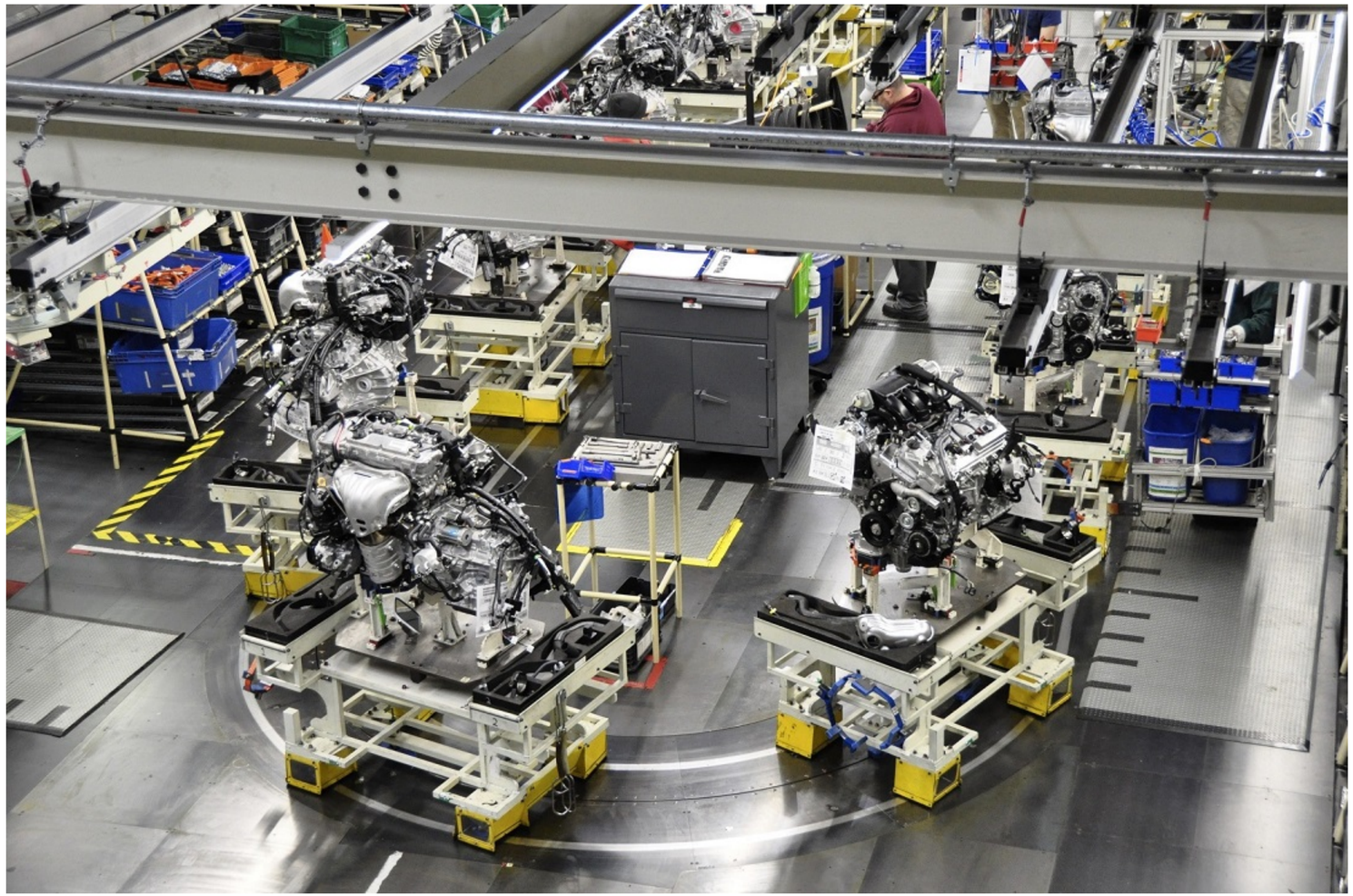
OUTLINE

What is Lean?

Lean is a systematic method to maximize customer value while minimizing waste.

OUTLINE

What is Lean?



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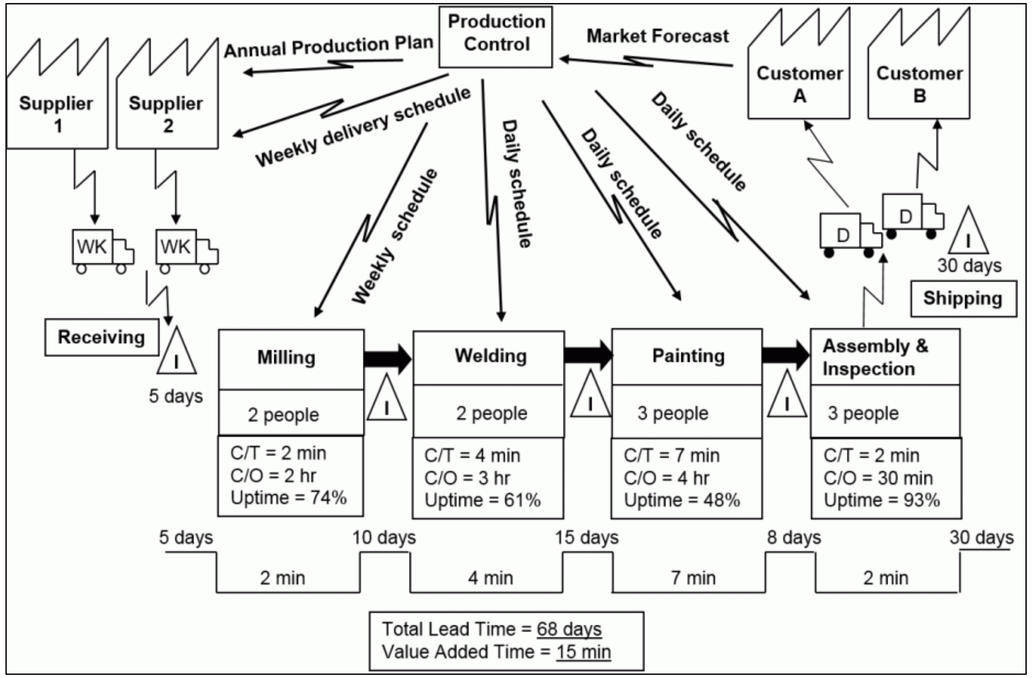
Identifying the Value Stream

Maps the value-added steps to go from the raw materials to the finished product



OUTLINE

Identifying the Value Stream

Rendering a Web Page is a process

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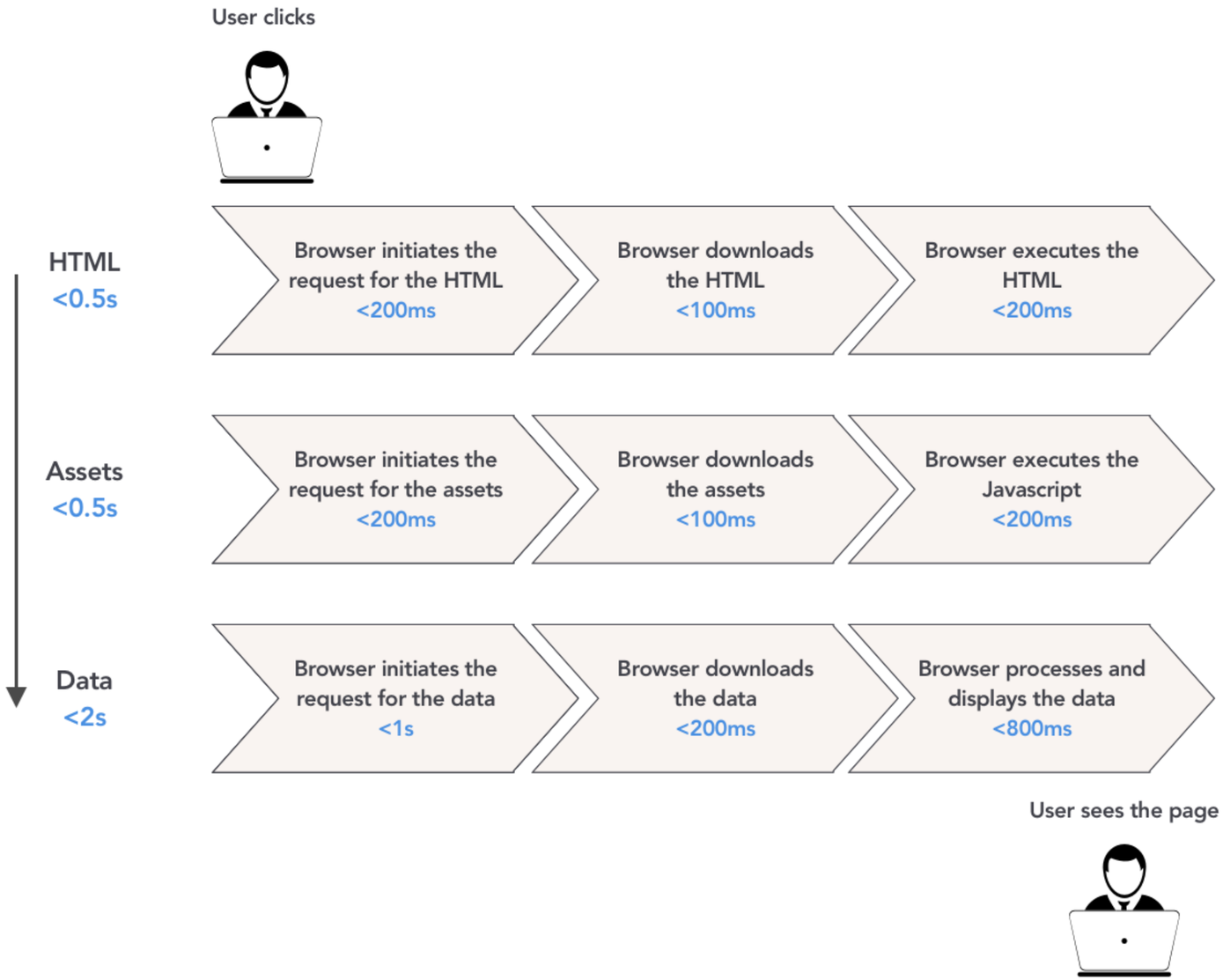
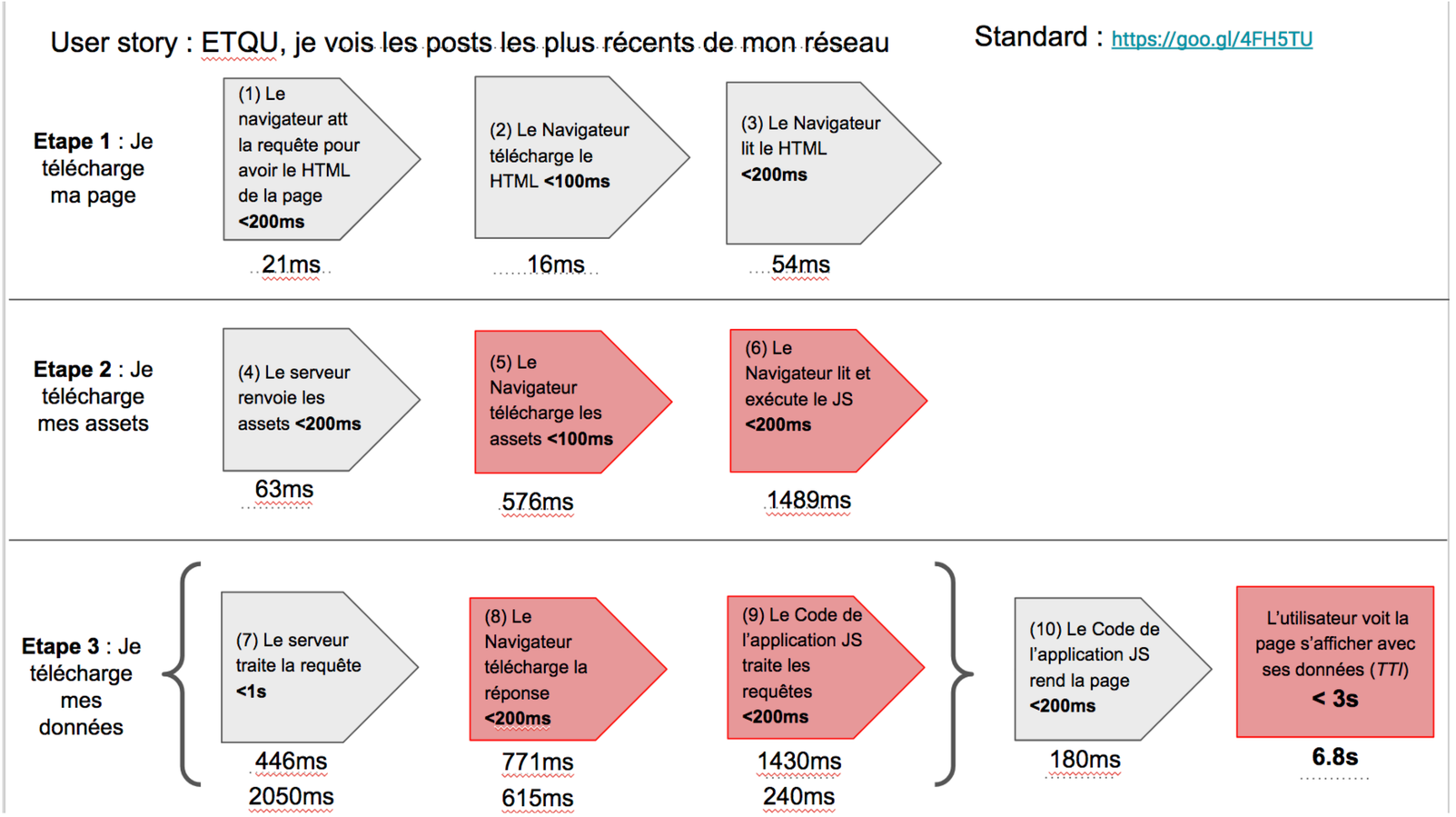


OUTLINE

Identifying the Value Stream



OUTLINE

Identifying the Value Stream

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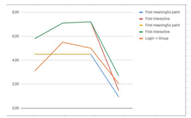
Identifying the Value Stream

🖥️ Ffyn — ⏱️ 6.8s ⇒ 2.5s ✅ — 🗓️ Projet terminé

👨‍💼 ThibautC

> "C'est instantané, ça fait pas pareil en démonstration quand tu montres une application ou demandes d'attendre et une où c'est instantané"
>
> *Richard Jones, PO Ffyn*



Résumé des actions

- Supprimer le fichier `reset.css` **Gain : 0.1s**
- Décaler dans le temps les appels à Piwik et à HotJar. **Gain : 0.5s**
- Suppression de la double boucle réseau. **Gain : 0.5s**
- Arrêter d'utiliser des fonctions anonymes. Gain : ?
- Utiliser `reselect` pour memoiser les résultats des sélecteurs. Gain : ?

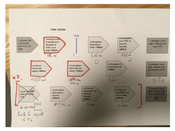
Next Steps

- Supprimer les appels `OPTION` inutiles (cf. standard)
- Le backend a l'air d'avoir des temps de réponse extrêmement variables (~100ms – 2s) pour une même ressource. Vérifier que ça ne vient pas du réseau de Theodo. Si c'est pas le cas, demander conseil à l'infogérant.
- Enquêter sur les rerenders inutiles sur la page des posts

🖥️ GRT Gaz — ⏱️ 2.5s ✅

👨‍💼 AlexAdrienA

Condition réseau : Fast 3G



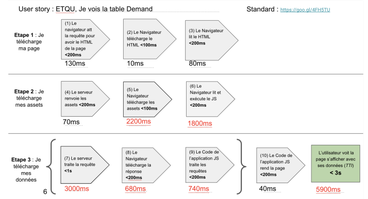
Type '/' for commands

Résumé des actions

- [12/02] Changer les headers sur nginx pour activer le cache coté client : **KO** car le reverse proxy GRT Gaz rajoute les headers "no-store, no-cache"
- [15/02] Mettre en place un service worker pour cacher les assets front + html : **KO** car la librairie utiliser pour générer des services workers avec angular "@angular/service-worker" ne transmet pas les headers d'authentification nécessaires pour passer le reverse proxy
- [28/02] Enquête pour supprimer les 2 boucles réseaux inutiles (3 fois le même call à Prismic) **Gain attendu : 2s ⇒ KO car l'équipe a viré Prismic du projet, du coup plus de boucles réseau**
- [02/03] Retrait du header `Cache Control: Private` avec un des archis GRT Gaz. **Gain : 2.5s**
- Objectif de TTI de 2s (OK) sur desktop et 10s sur mobile **OK**

🖥️ OCP Casa (page modèle) — ⏱️ 5.9s ⇒ 2.4s ✅ — 🗓️ 22/10

👨‍💼 FlorianG

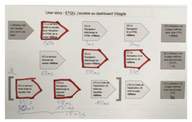


Résumé des actions

- Mise en place de Gzip. **Gain : 1s**
- Identification des librairies inutilisées et priorisation avec *Bundlephobia*
- Suppression de la librairie des drapeaux pour des emojis **KO c'était moche**
  - Chargement dynamique des SVGs : **gain de 700Ko**
- Identification du flux de performance backend :
  - Aujourd'hui on est plus à 6s sur le serveur traite la requête, ~1s pour le download (10Mo de données !!!)
  - Quick fix : Mise en place de Gzip

🖥️ Suez Villagile — ⏱️ 3.5s ❌ — 🗓️ 26/10

👨‍💼 KévinJ



Résumé des actions

- [31/12] Ne plus charger les analyses retro à l'ouverture de l'application **Gain: 14s**
- [09/01] Ne plus charger les demandeurs & les interventions à l'ouverture de l'application **Gain : 14s**
- [23/01] Avoir une prod avec de vrai data
- [26/01] Optimiser la fonction de recherche **Gain : Recherche en moins de 1s**
- [30/01] Réparer ElasticSearch **Gain : 20s**
- [19/02] Retirer du chargement de la page la récupération des données géographiques (SIG) **Gain : 800ms**
- [28/02] Mettre en place un cache côté backend pour conserver les appels au serveur de données **Gain attendu : 8s, Gain réel : 12s**
- [16/03] Priorisation de la mise en place de Gzip **Gain attendu : 1s KO**
- [23/03] Réduction de la taille du bundle en supprimant les libs pas utilisées : **Gain attendu : 0.5s KO**
- Délayer le chargement des configs, donc le HTML part plus vite. **Gain : 1s**
- Supprimer un call API sur les contours des villes (mis à jour une fois par an)
- Preloader les polices : https://developer.mozilla.org/fr/docs/Web/HTML/Pr%C3%A9charger_du_contenu **KO**

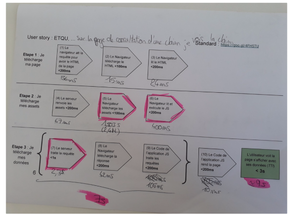
Next Steps

- ~~Mettre en place React Virtualized pour alléger la construction du DOM~~
- Alléger l'import de moment : https://github.com/.../how-to-optimize-momentjs-with-webpack
- Alléger l'import de lodash : utiliser `import { map } from lodash/map` par exemple
- Supprimer / différer le chargement de JQuery
- Minifier le javascript hors-Webpack
- Supprimer le call API pour avoir le contour des communes
- Améliorer la cache policy

🖥️ Sphere — ⏱️ 9s ⇒ 5s ❌ — 🗓️ Projet terminé

👨‍💼 AlbéricT

> "Les outils actuels de nos potentiels clients sont lents, et c'est une opportunité pour nous : si notre produit est rapide on pourra convertir plus de clients"
>
> *Nicolas Gavenard, PO Sphère*



Résumé des actions

- Paralléliser les requêtes faites au backend **Gain : 3s**
- Simplification des requêtes GraphQL
- Mise en place de Tideways (monitoring de performances PHP) sur Heroku
- Activer Gzip d'ici **le 05/09 ⇒ Gain : 1s**

Next Steps

- Cleaner l'import de Moment et de Lodash **KO**
- Mettre en place du Tree Shaking **KO**
- Investigation sur les performances de GraphQL **KO**

Identifying the Value Stream

👀 Takes into account the whole process

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👋 Teams asked for help much sooner

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👥 Collaboration with stakeholders

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💡 Easily point to solutions

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📸 Look at the bigger picture

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Jidoka: catch problems at the earliest

The Andon cord

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Jidoka: catch problems at the earliest

Stops the line of production

OUTLINE

Jidoka: catch problems at the earliest

🛑 Stops the line of production

🧠 Prevents the problem from happening again

OUTLINE

Jidoka: catch problems at the earliest

In the IDE: We use the Import Cost VSCode extension to detect heavy libraries when we add them to our code.

```
import React from 'react';  8K (gzipped: 3.3K)
import { connect } from 'redux';  2.3K (gzipped: 895)
import { Link } from 'react-router';  48.4K (gzipped: 14K)
import Button from '@material-ui/core/Button';  105.6K (gzipped: 27.6K)
```

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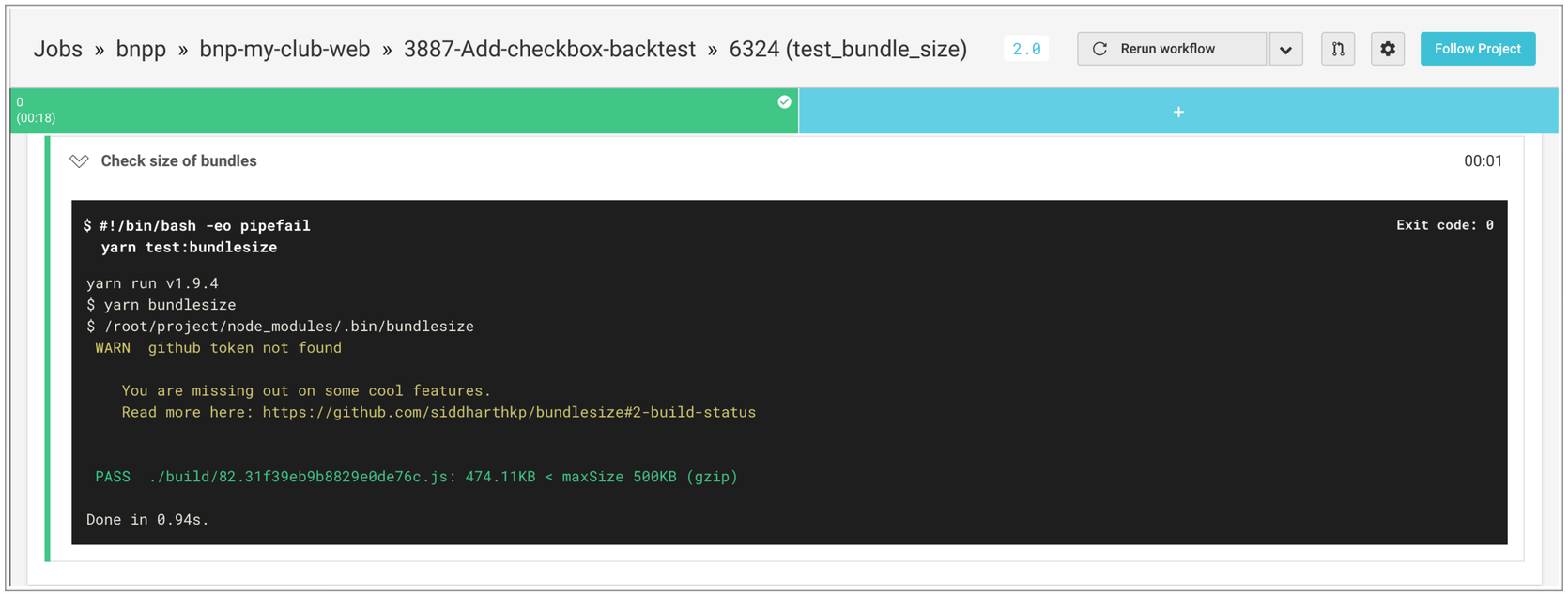
Jidoka: catch problems at the earliest

In the CI: We check on each PR if the bundle size of our web site is under a certain threshold (here, 500Kb).



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The Right Tools

OUTLINE

- WHY PERFORMANCE MATTERS
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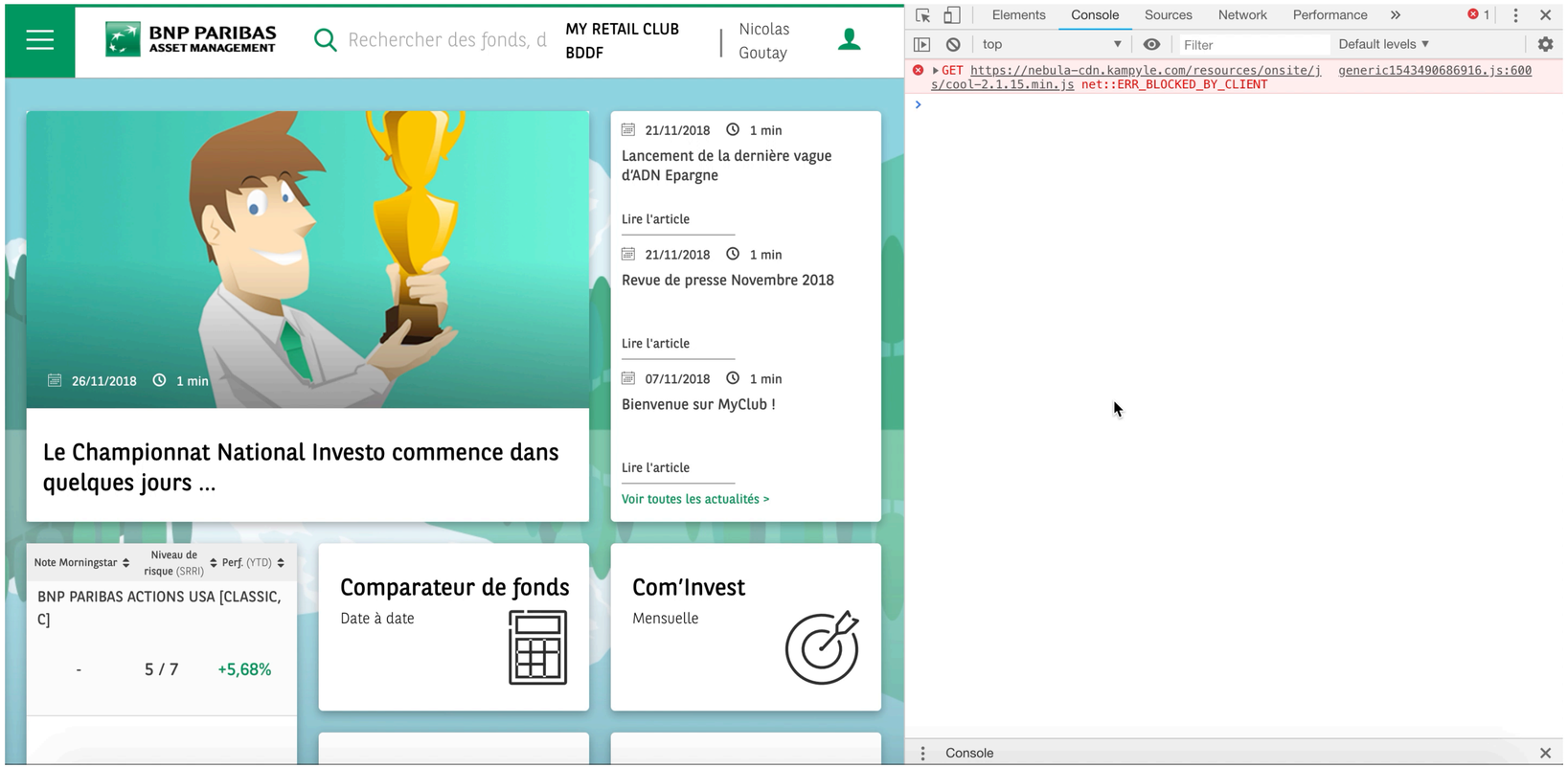
- **THE RIGHT TOOLS**
  - KEEPING IT SMALL
  - KEEPING IT SNAPPY
- PERFORMANCE IS A LONG GAME

Keeping it small

🎨 **Coverage**: Real-time CSS & JS code coverage.

💡 *Helpful for*: detecting unused libraries or dead code.



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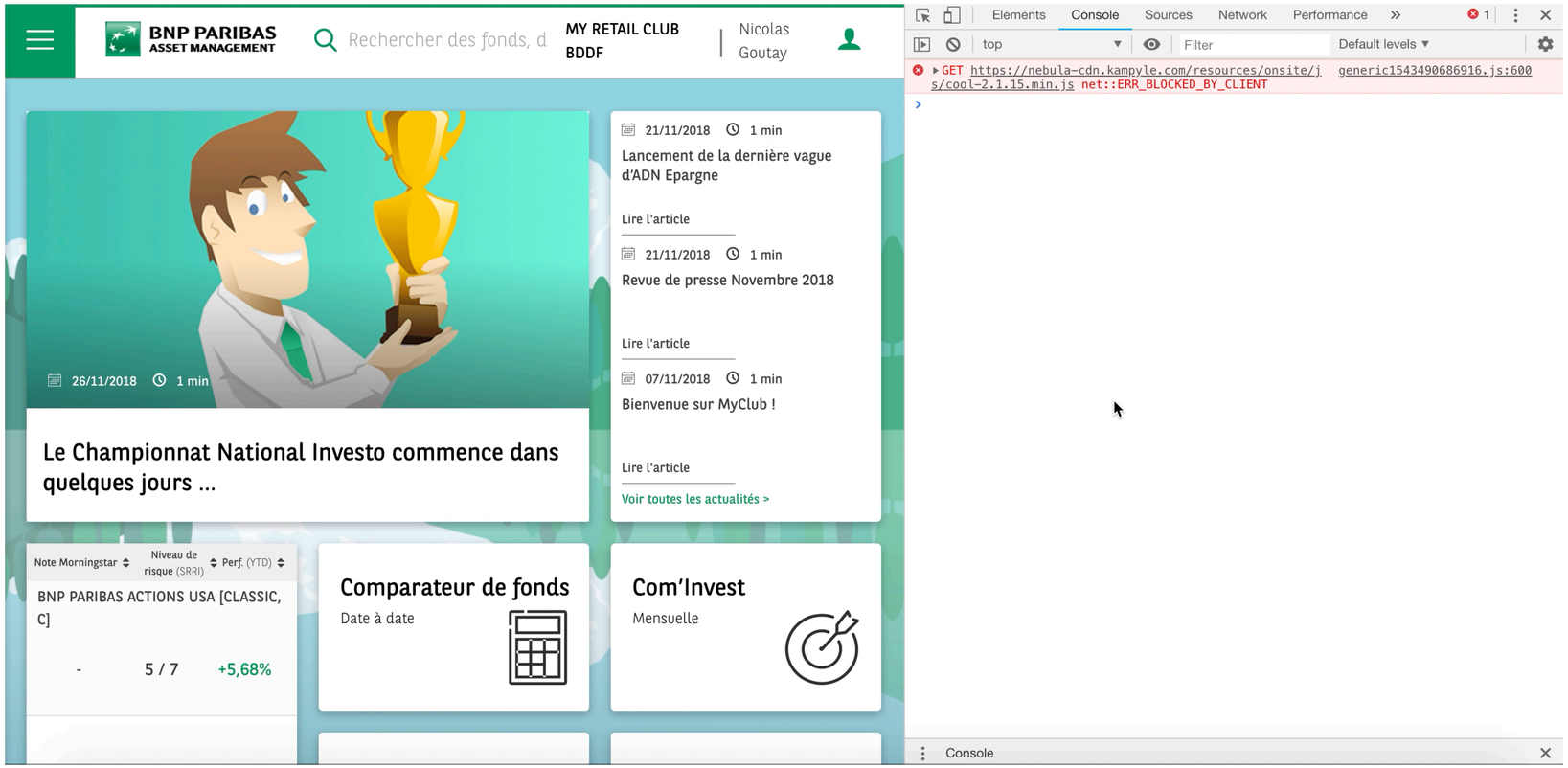
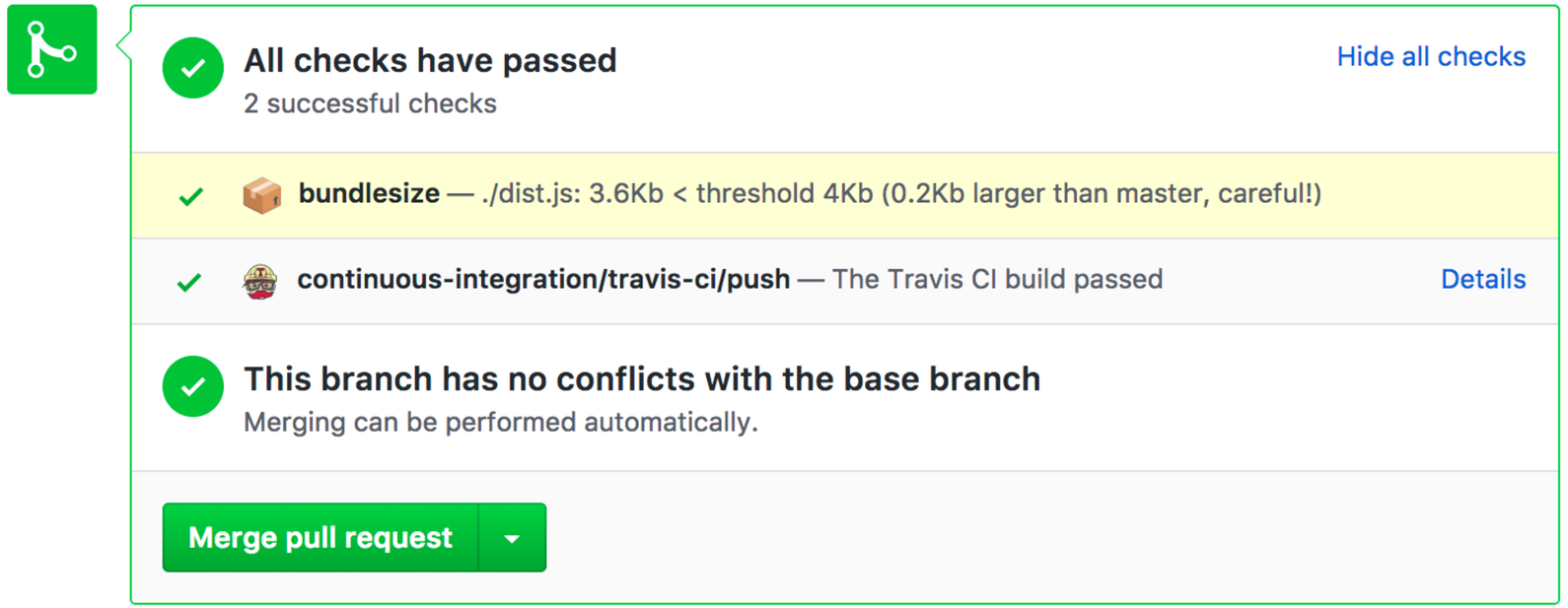


OUTLINE

Keeping it small

📦 **bundlesize**: CI-friendly bundle size checker.

💡 *Helpful for*: detecting if your JS goes over a certain threshold



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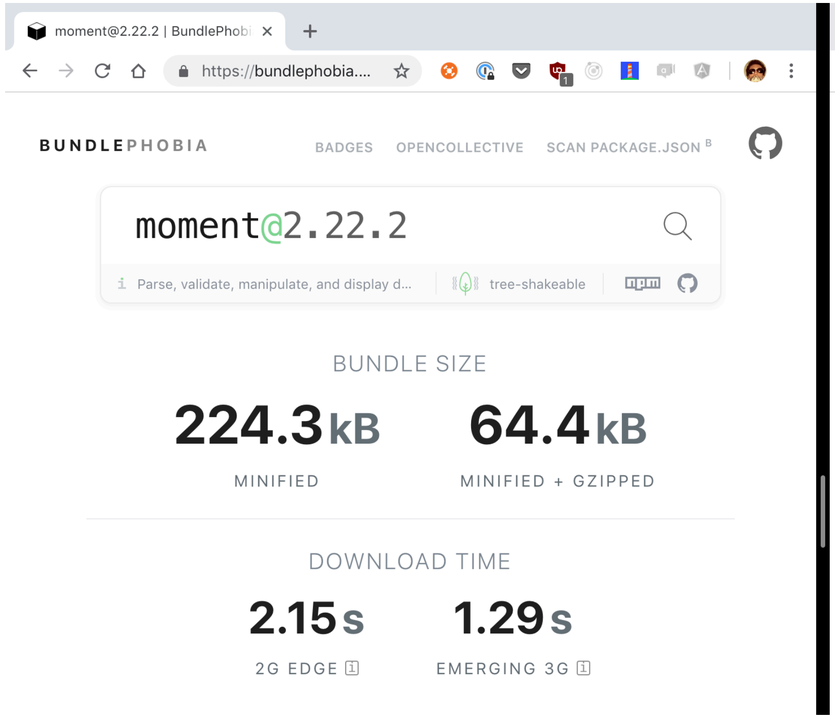
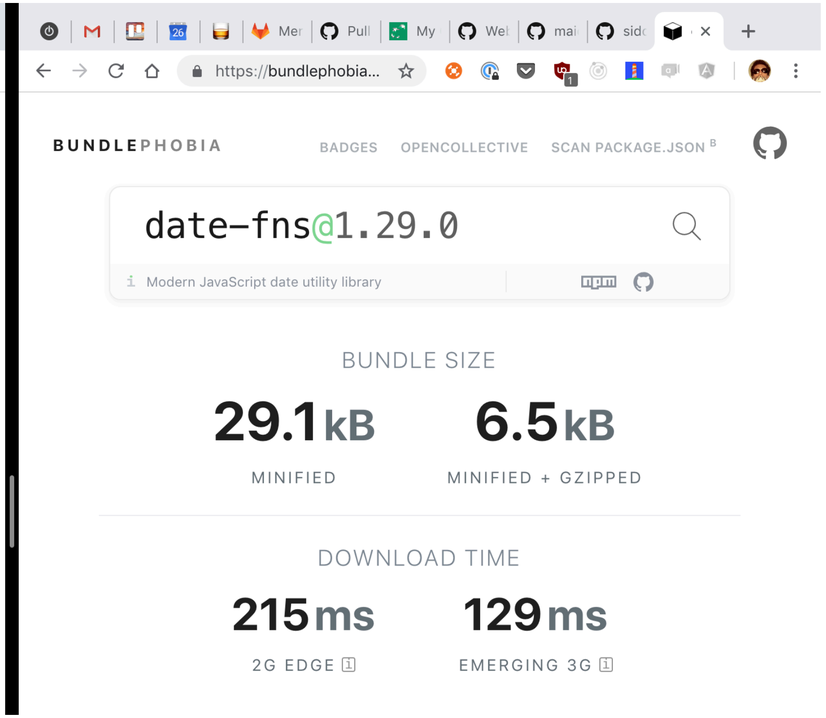
Keeping it small

😱 **Bundlephobia**: Find the performance cost of a npm package

💡 *Helpful for*: Deciding between two libraries w/ similar features





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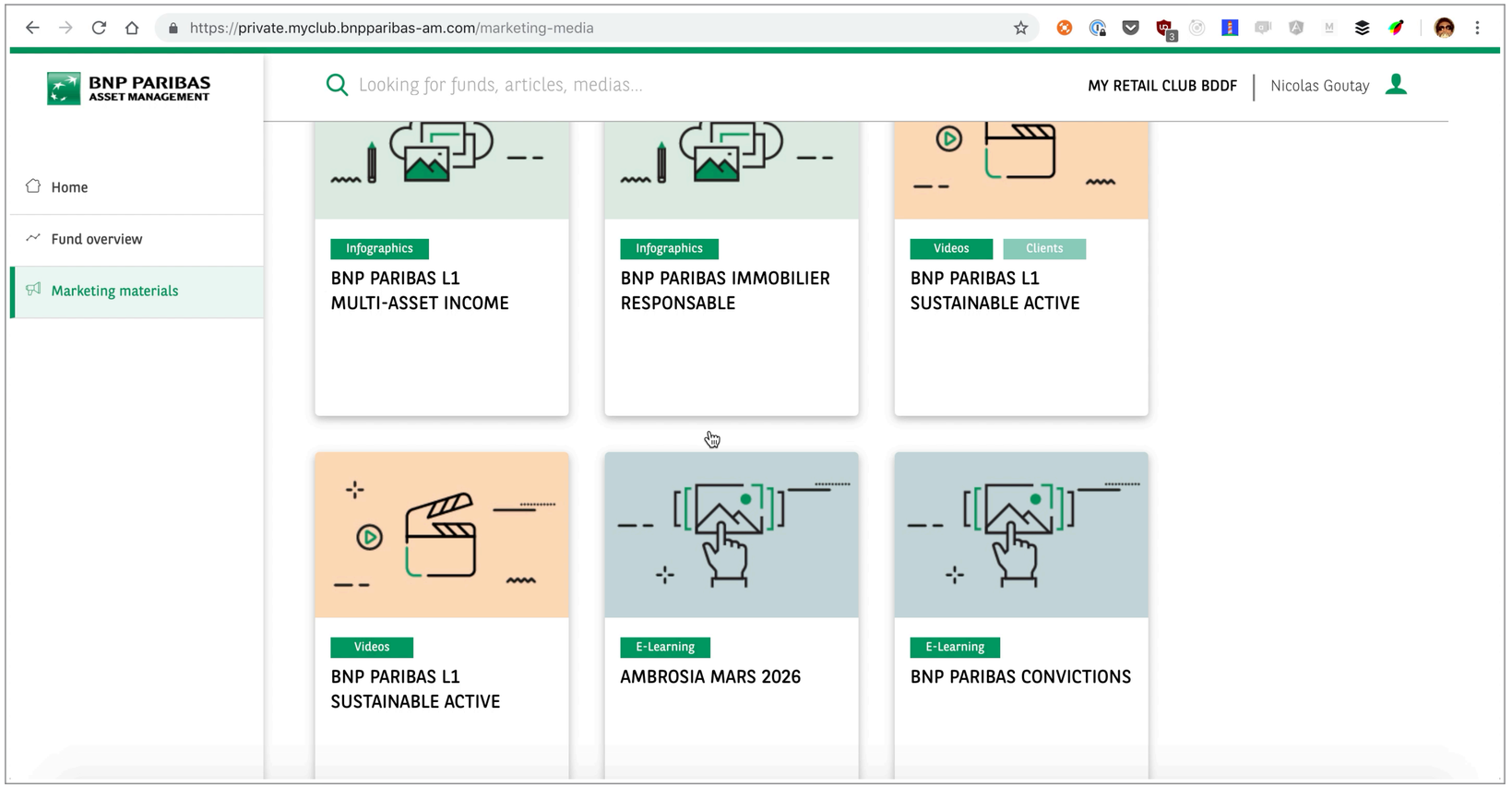
Keeping it snappy

🎨 **Paint Flashing**: Highlight Chrome repaints of parts of your UI

💡 *Helpful for*: detecting useless renders slowing down the UI



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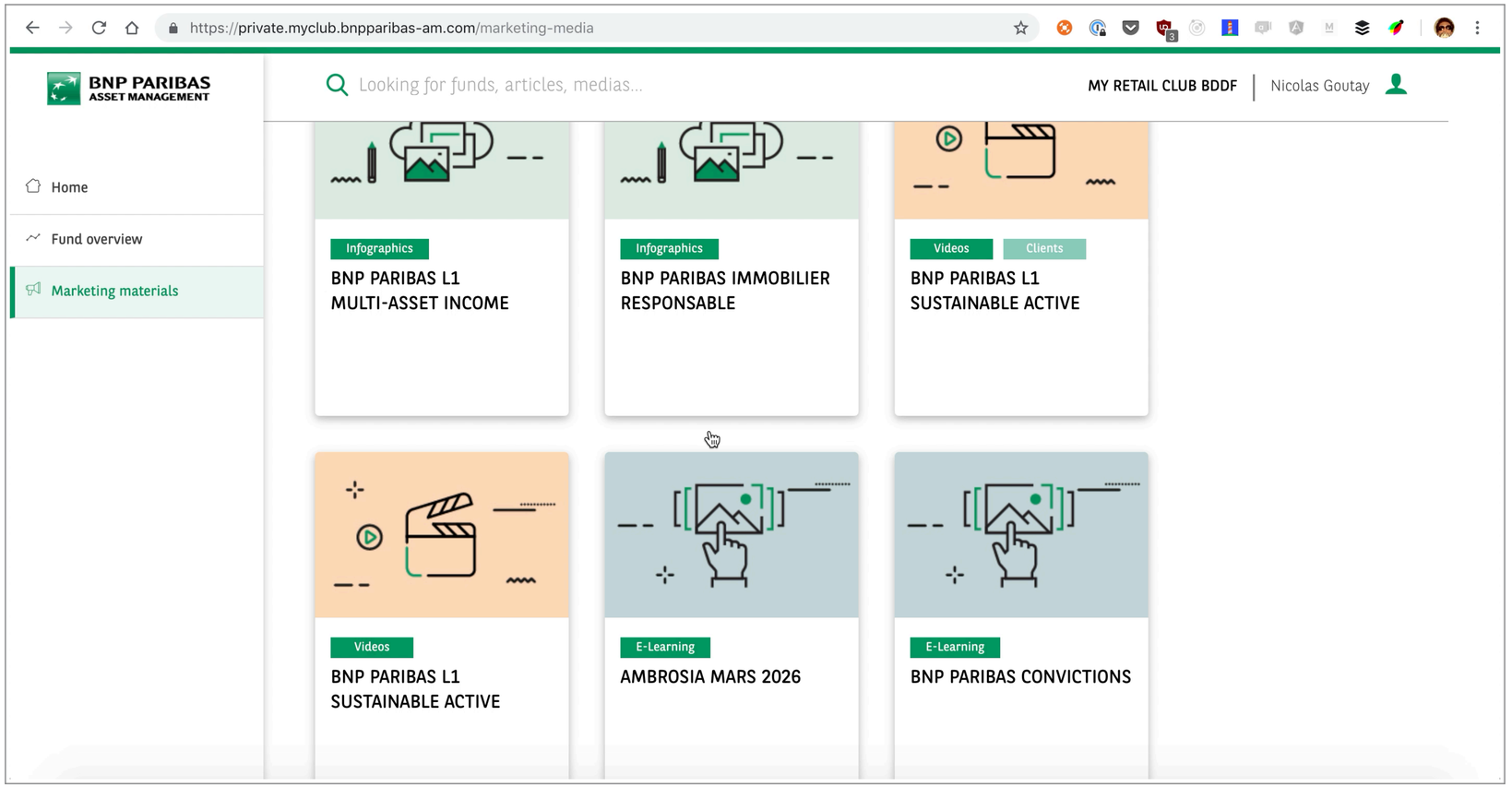

OUTLINE

Keeping it snappy

❓ **why-did-you-update**: Detects React's unnecessary updates

💡 *Helpful for*: detecting useless renders slowing down the UI.

```
⚠ ClassDemo.props: Changes are in functions only. Possibly avoidable re-render?
    Functions before:  ▸Object {fn: function something()}
    Functions after:  ▸Object {fn: function something()}
⚠ ClassDemo.state: Value is the same (equal by reference). Avoidable re-render!
    Value:  null
```

OUTLINE

- WHY PERFORMANCE MATTERS
- THE LEAN PHILOSOPHY
- THE RIGHT TOOLS
- PERFORMANCE IS A LONG GAME

Performance is a long game

OUTLINE

Third party scripts have an impact

Average mobile impact. Source & methodology: https://www.thirdpartyweb.today/

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Google Ad Manager

Google Ad Manager costs 450ms

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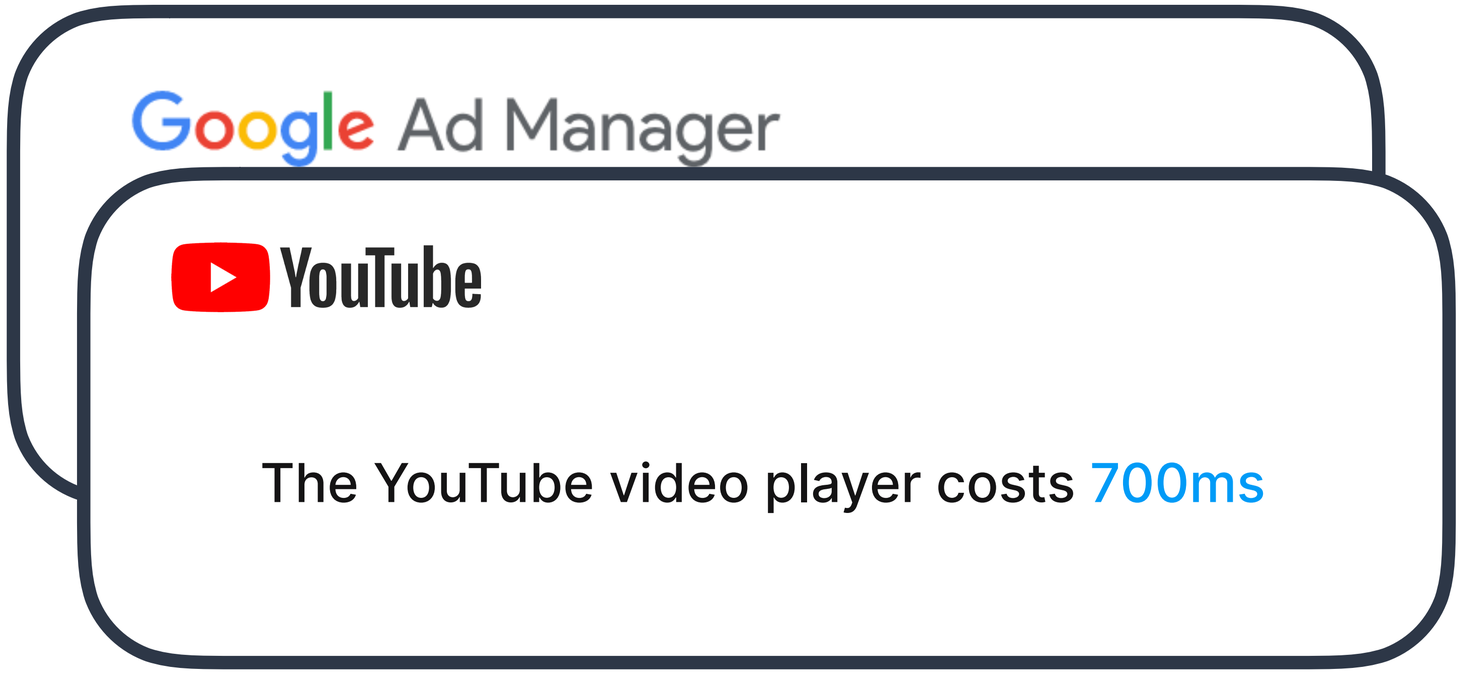

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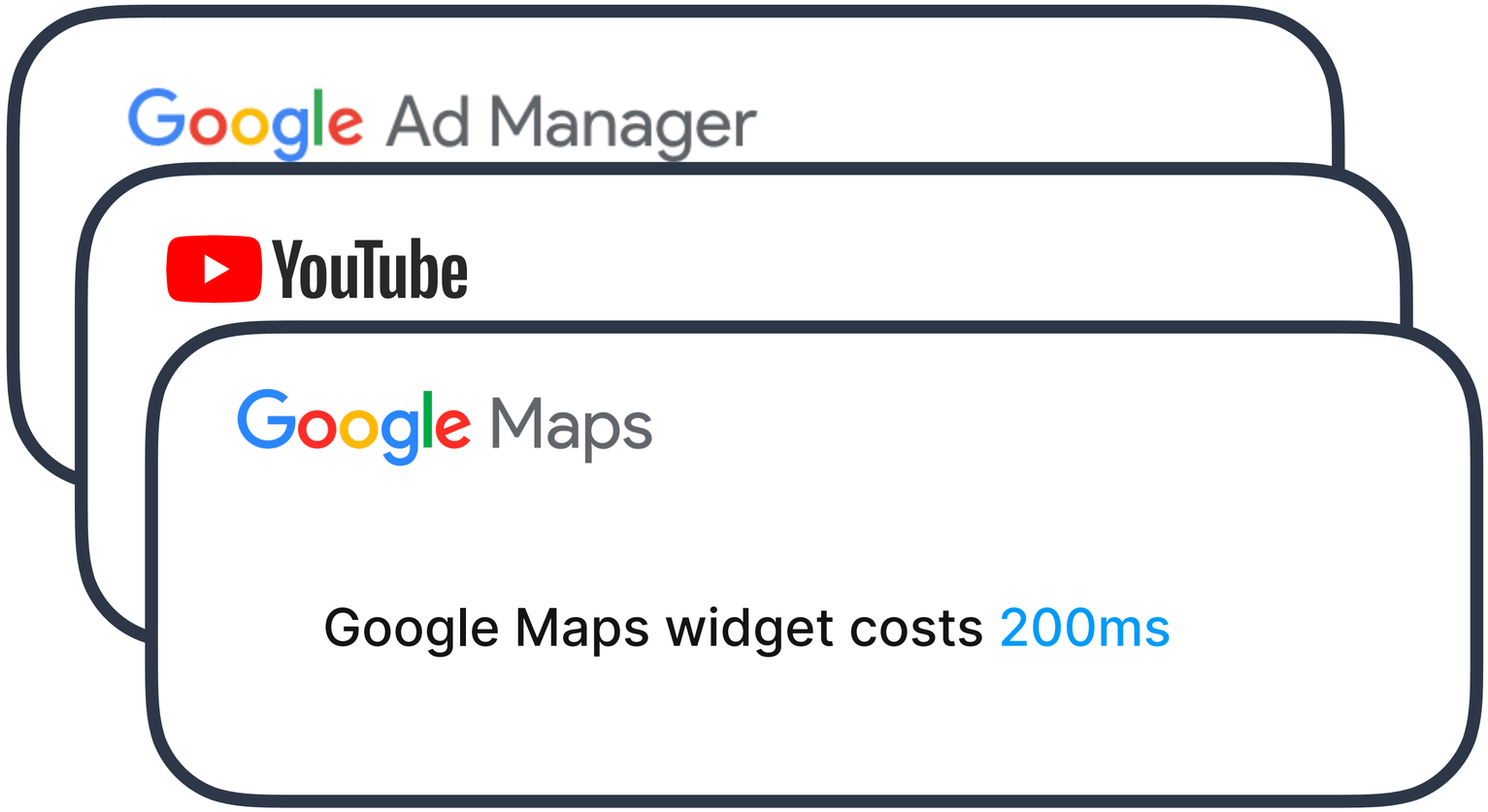

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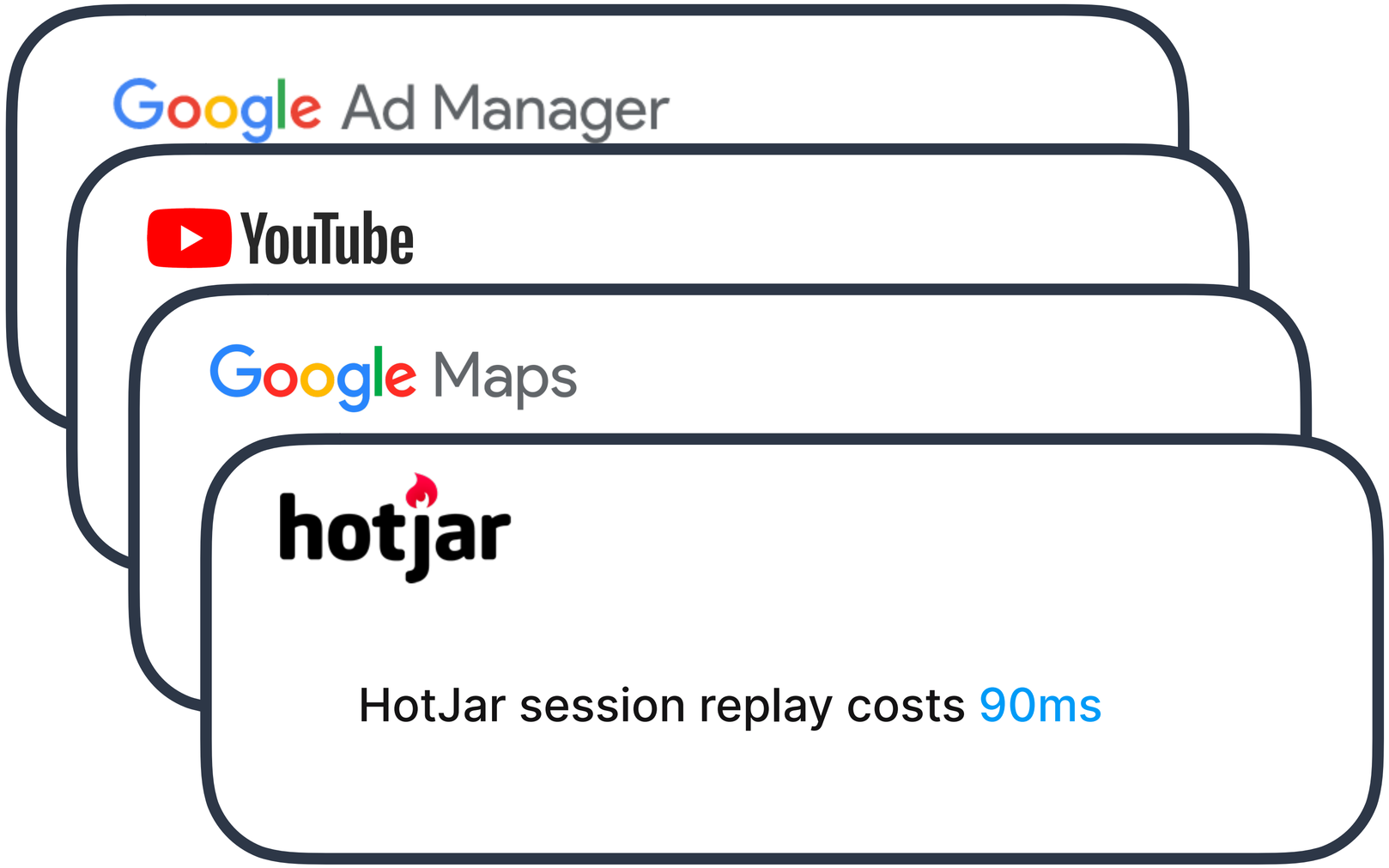

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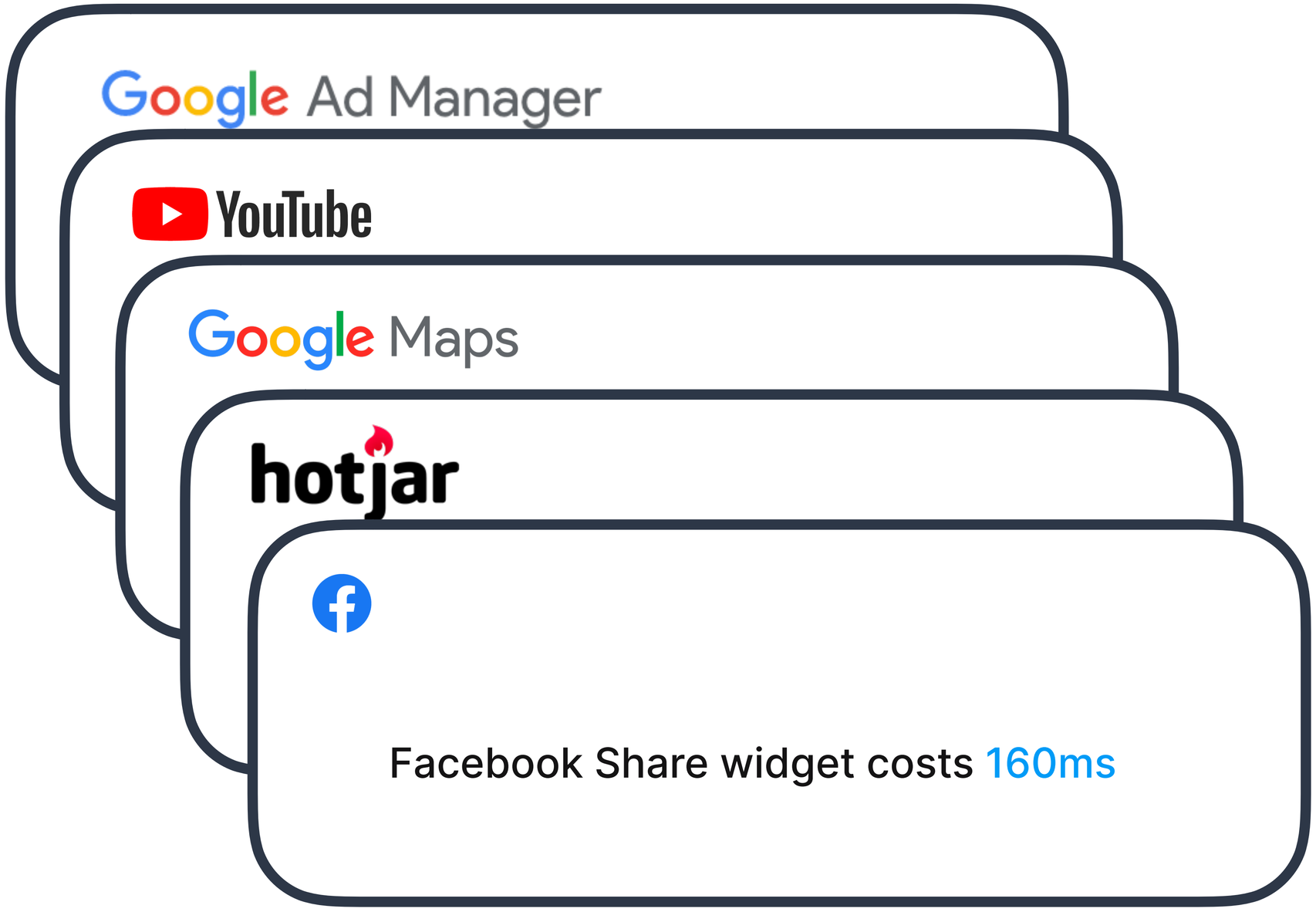

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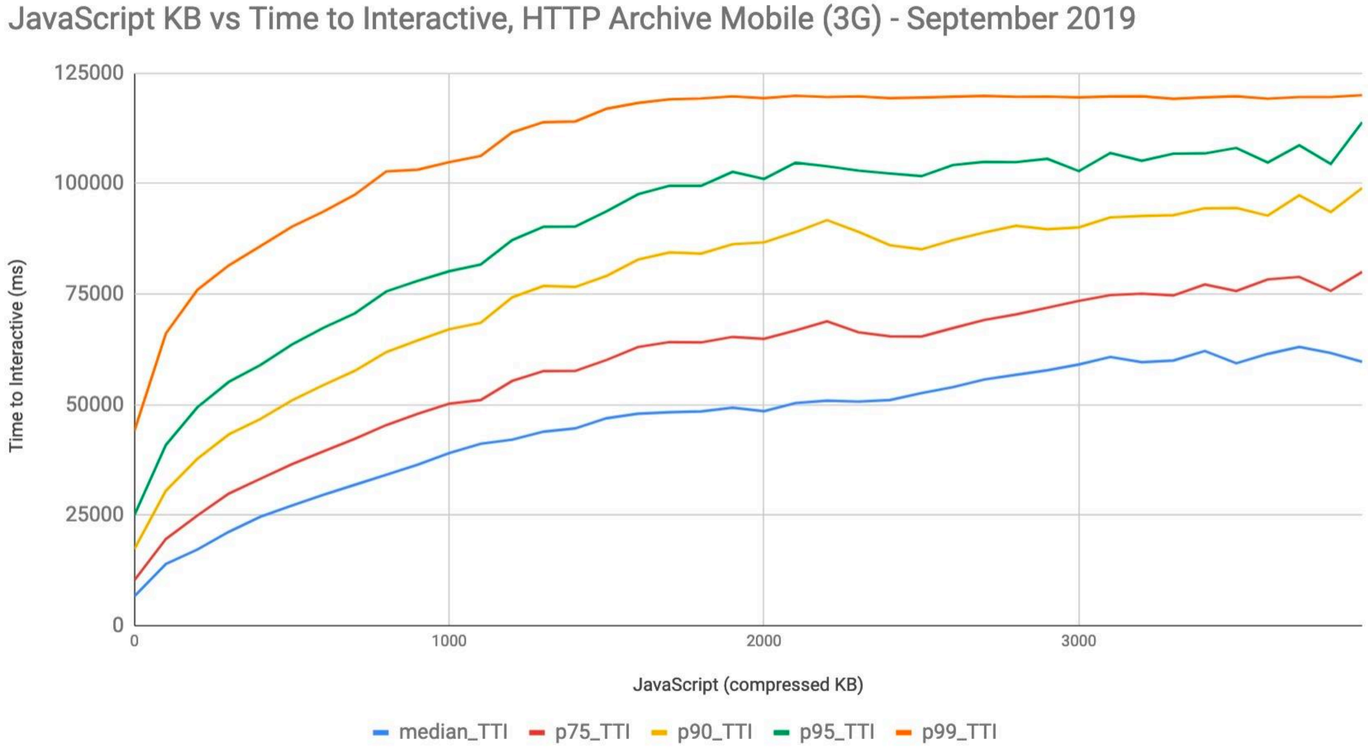
OUTLINE

JavaScript bloat has an impact

*"Every **100KB** of compressed JS results in a **3-4 second increase in Time to Interactive** on a 3G connection"*

— Paul Calvano



Source: https://twitter.com/paulcalvano/status/1179192810727186433

OUTLINE

Open Source performance auditing tools

Lighthouse

Performance

Metrics

First Contentful Paint	1.5 s	First Meaningful Paint	4.3 s
Speed Index	5.8 s	First CPU Idle	4.3 s
Time to Interactive	4.0 s	Max Potential First Input Delay	400 ms

Values are estimated and may vary. The performance score is based only on these metrics.

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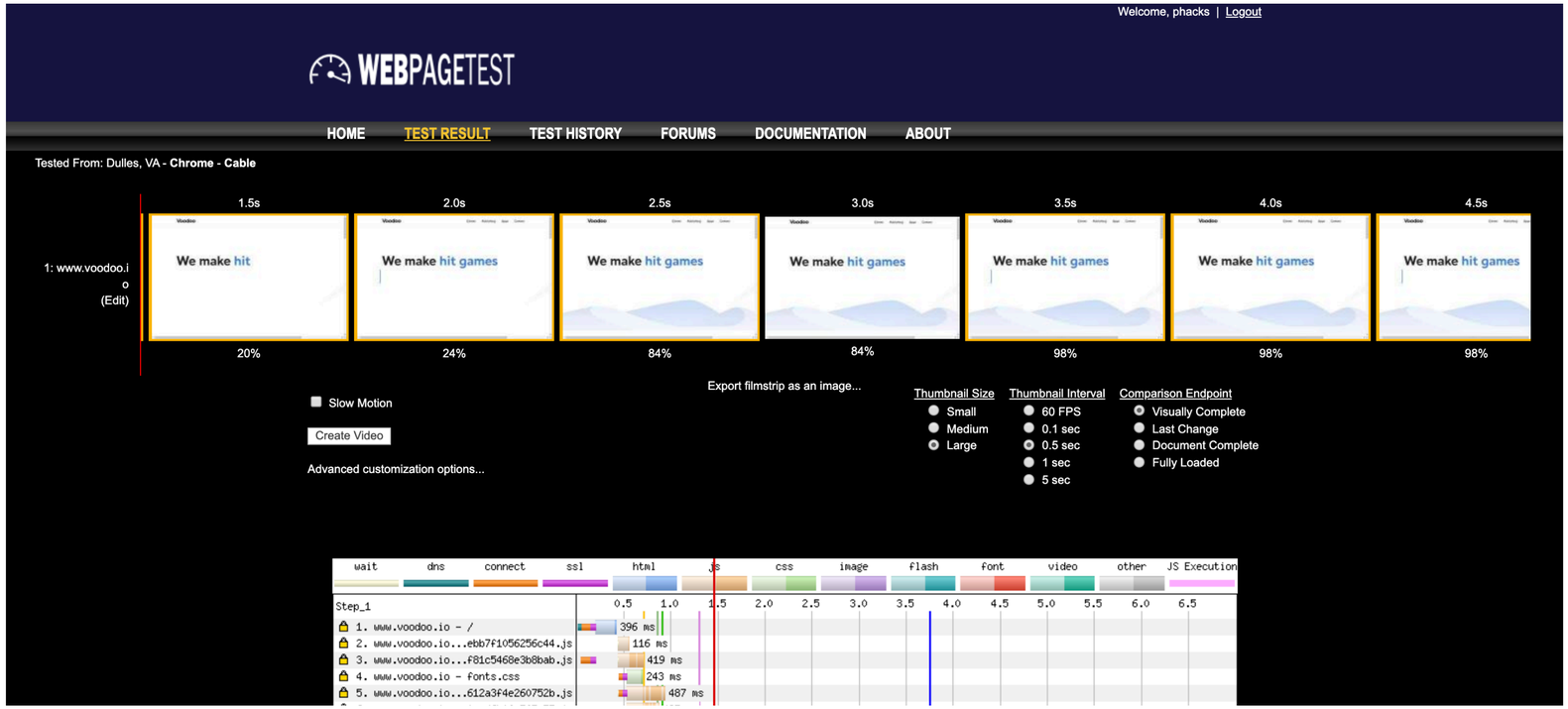
Open Source performance auditing tools

WebPageTest



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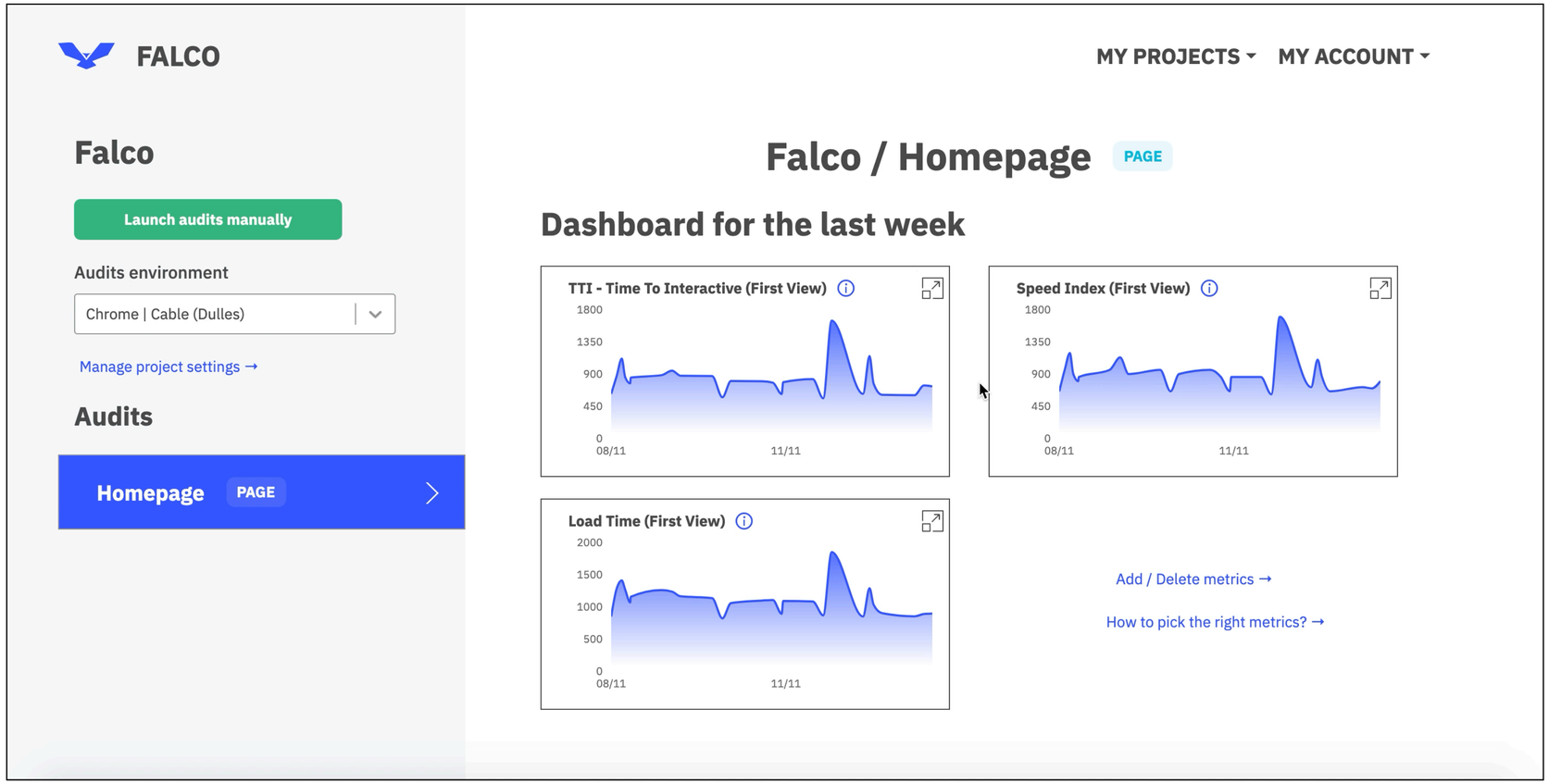
Falco, our WebPageTest runner



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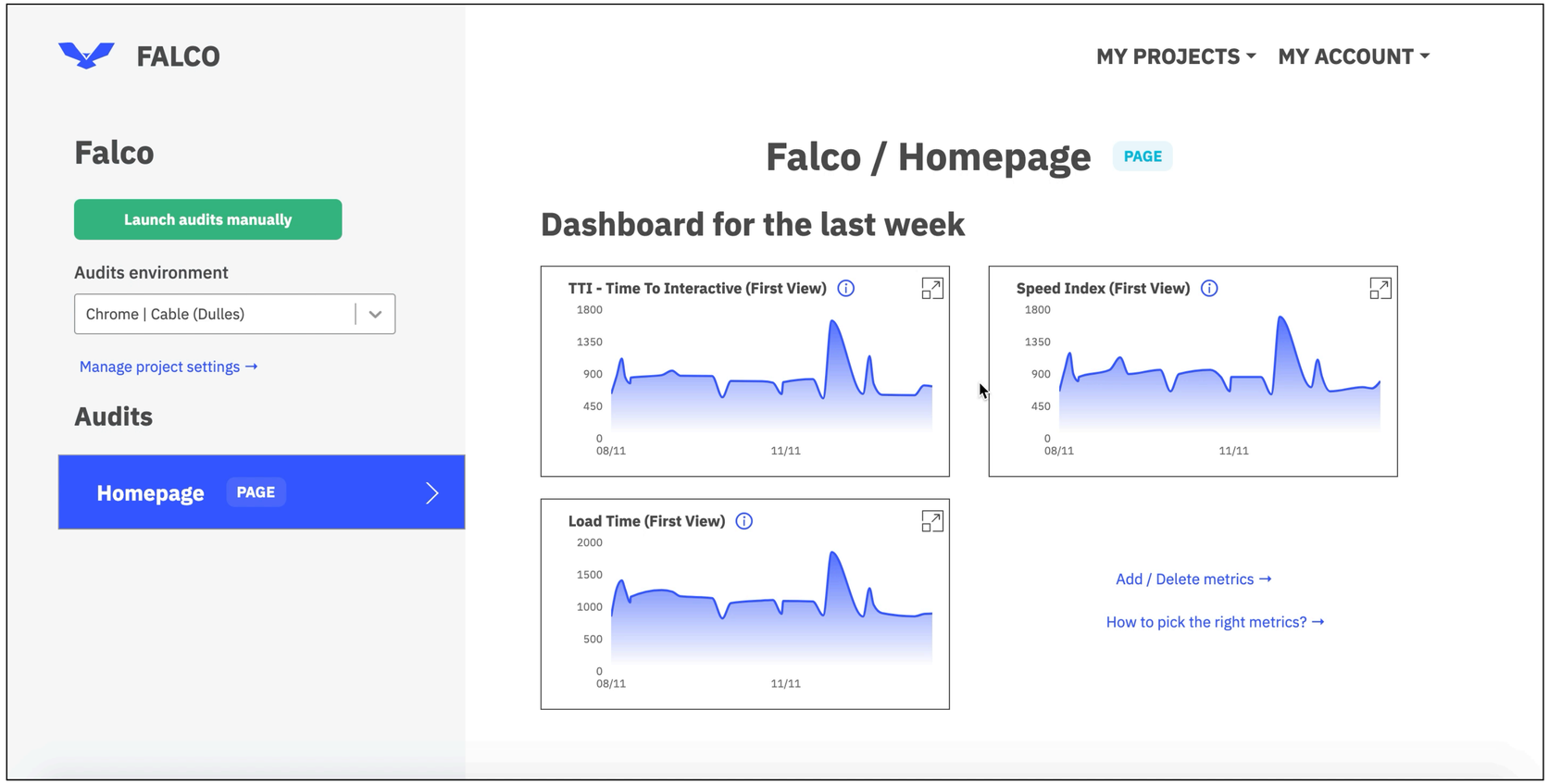

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Falco is Open Source

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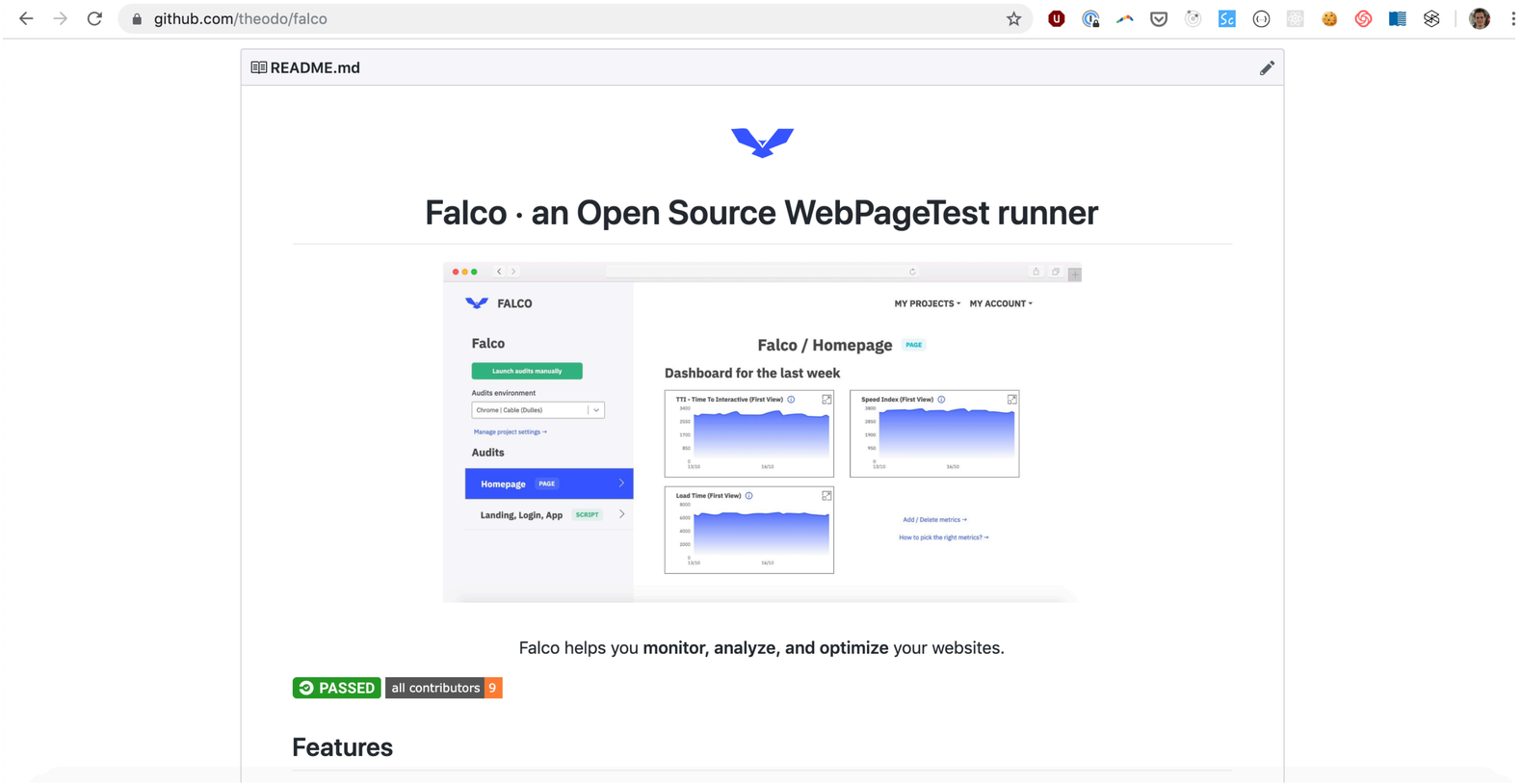

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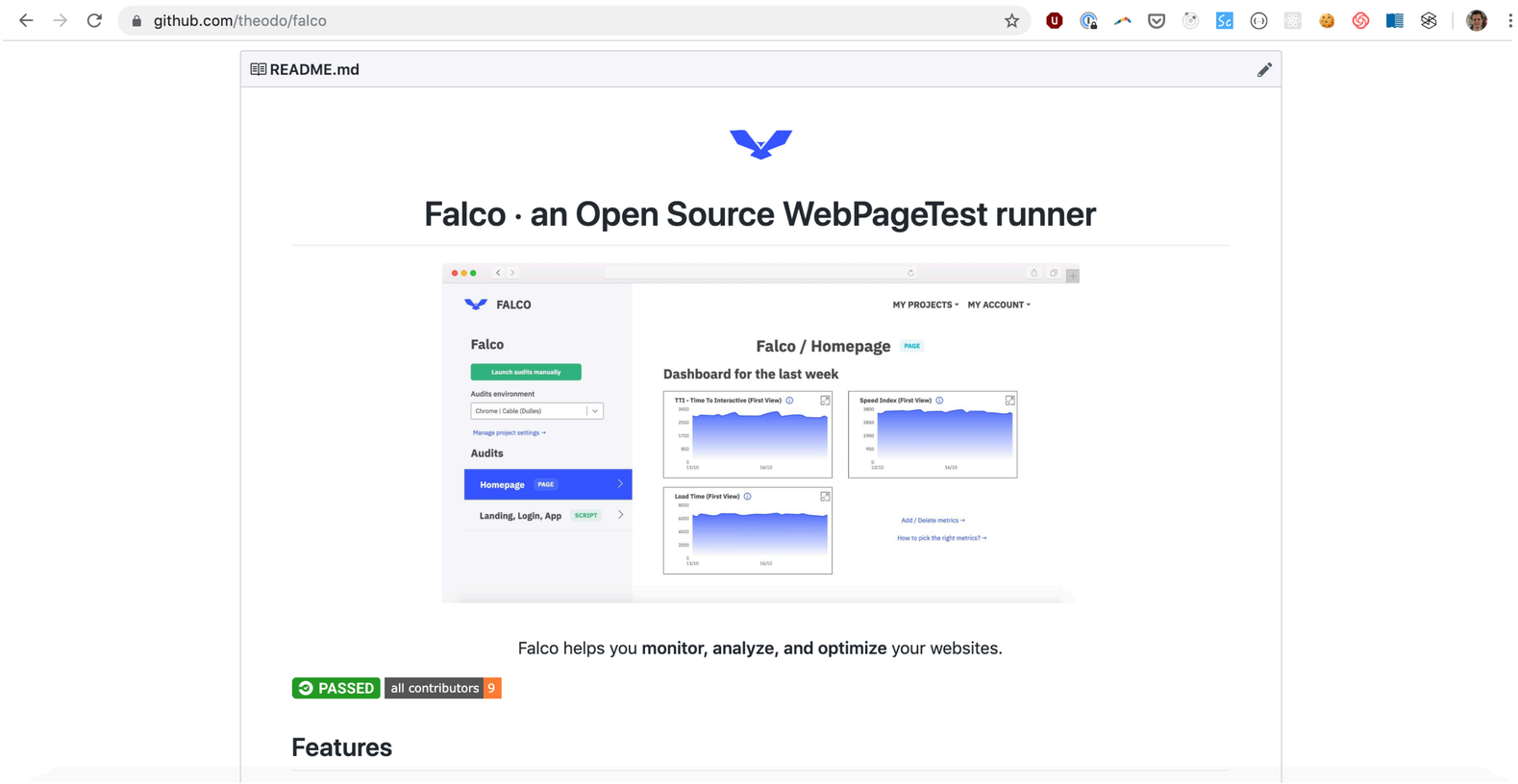

https://github.com/theodo/falco
https://getfal.co

Thank you!

Slides will be available later today on my Twitter: @phacks

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