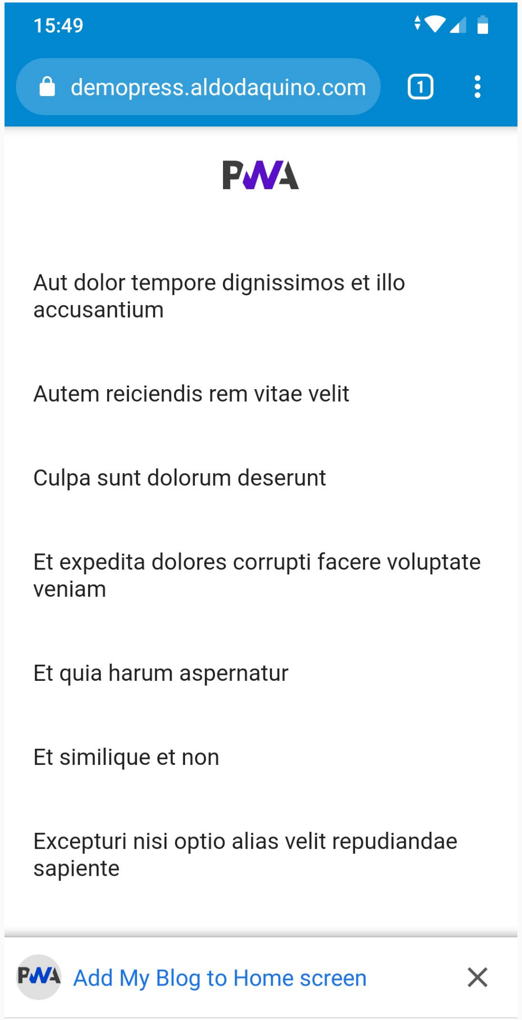
PWA from scratch

Aldo D’Aquino

/daquinoaldo

ald.ooo

GDG Pisa



15:49

demopress.aldodaquino.com

PWA

Aut dolor tempore dignissimos et illo accusantium

Autem reiciendis rem vitae velit

Culpa sunt dolorum deserunt

Et expedita dolores corrupti facere voluptate veniam

Et quia harum aspernatur

Et similique et non

Excepturi nisi optio alias velit repudiandae sapiente

Add My Blog to Home screen

Web

URL

Cross platform

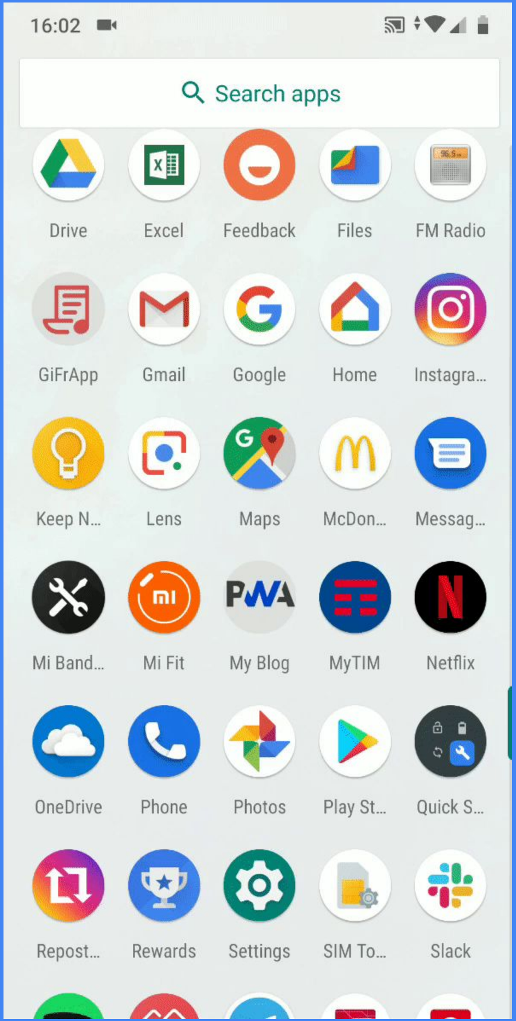
No need for install

App

Handy

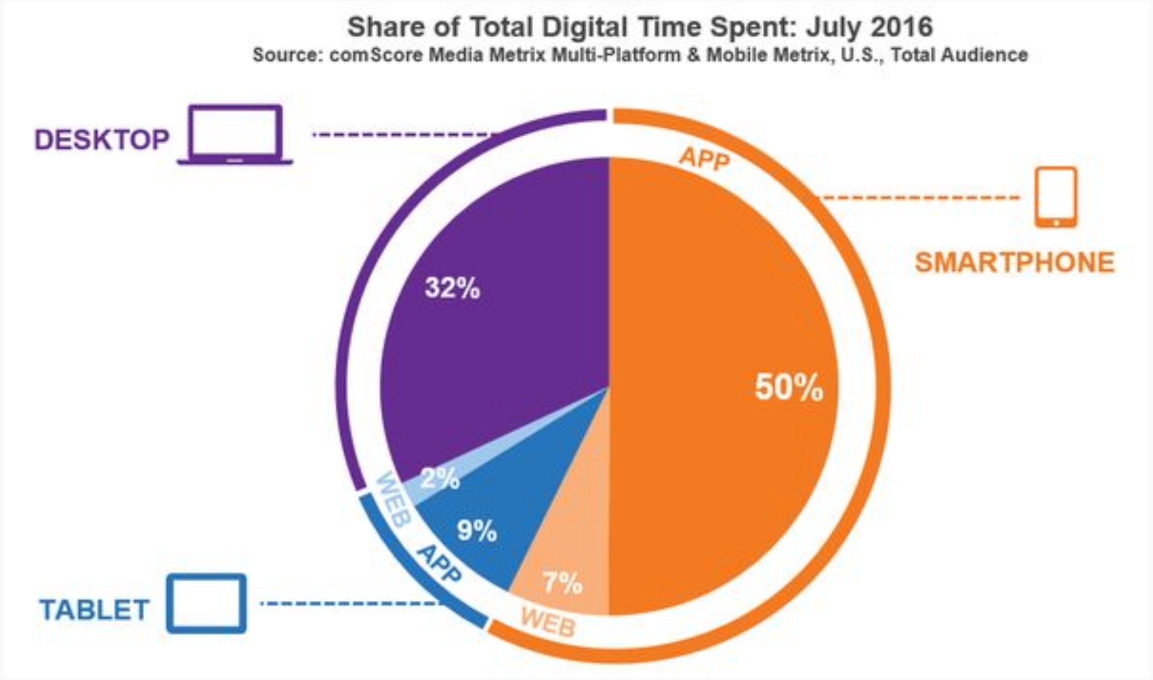
Natural UX on mobile

Fast & Offline



Web + App

Gain twice!



Images from ComScore

Key aspects

Responsive

Secure

Always fresh

Connectivity independent

Immersive

What we need

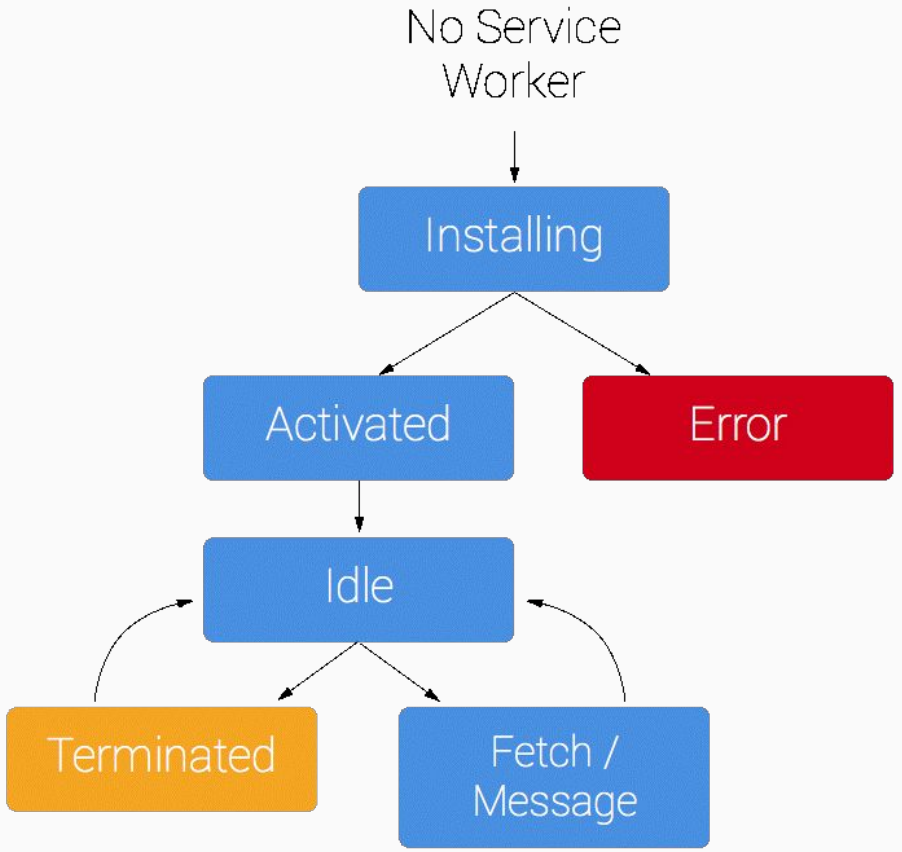
What we need

HTTPS

ServiceWorker.js

Manifest.json

Service Worker life cycle



Images from Google Developer

UX first

How to design a great UI

How to design a great UI

1. Be app

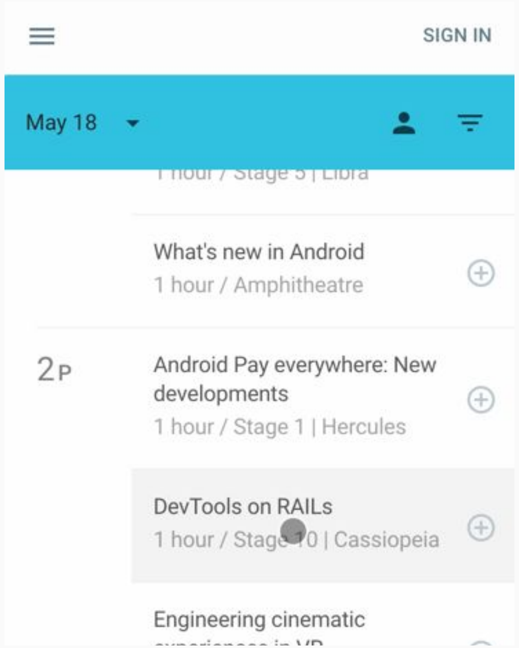
- ➔ App-like design
- ➔ System fonts
- ➔ Non-selectable text in buttons and list items
- ➔ Buttons instead of links

2. Fast and fluid transition

- ➔ Cache first strategy
- ➔ Give a feedback to the user

3. Back arrow should restore the previous scroll position

4. Show taps



SIGN IN

May 18

What's new in Android
1 hour / Amphitheatre

2P

Android Pay everywhere: New developments
1 hour / Stage 1 | Hercules

DevTools on RAILs
1 hour / Stage 10 | Cassiopeia

Engineering cinematic

App… how much?

Permissions available through the browser

Availability of web permissions

Offline (ServiceWorker.js)	✓	✓
Background sync	✓	✗
Home installation	✓	~
Share (intent)	✓	✗
Foreground detection	✓	✓

Availability of web permissions

Geolocation	~	~
Accelerometer, Gyroscope, Magnetometer, Orientation	~	~
Bluetooth	~	✗
USB	✓	✗
Payments	~	~

Availability of web permissions

Browser storage	✓	✓
File access	✓	✓
Network type and speed	✓	✗
Online status	✓	✓
Vibration	✓	✗

Availability of web permissions

	🤖	🍎
Battery status	✓	✗
RAM size	✓	✗
Manage clipboard	~	✓
Mouse integration	✓	✓
Presentation (Chromecast)	✓	✗

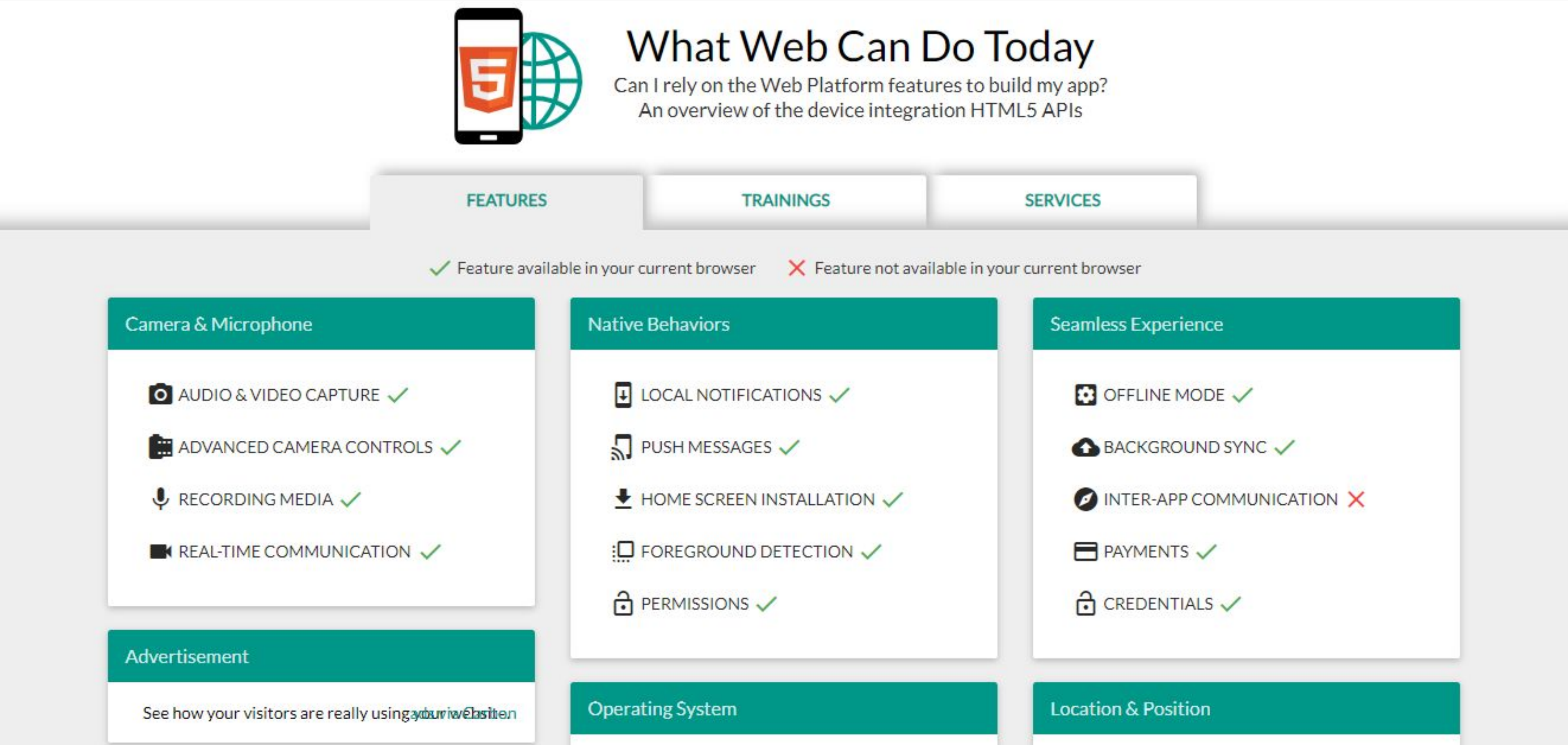
Availability of web permissions

	🤖	🍎
VR	~	✗
Speech recognition	~	✗
Fullscreen	~	~
Screen orientation & lock	✓	✗
Wake lock	✓	✗

Coming soon

- NFC
- Contacts
- SMS
- Ambient light
- Task scheduler in SW

Web permissions: TL;DR?



What Web Can Do Today

Can I rely on the Web Platform features to build my app?
An overview of the device integration HTML5 APIs

FEATURES | TRAININGS | SERVICES

✓ Feature available in your current browser ✗ Feature not available in your current browser

Camera & Microphone

- AUDIO & VIDEO CAPTURE ✓
- ADVANCED CAMERA CONTROLS ✓
- RECORDING MEDIA ✓
- REAL-TIME COMMUNICATION ✓

Native Behaviors

- LOCAL NOTIFICATIONS ✓
- PUSH MESSAGES ✓
- HOME SCREEN INSTALLATION ✓
- FOREGROUND DETECTION ✓
- PERMISSIONS ✓

Seamless Experience

- OFFLINE MODE ✓
- BACKGROUND SYNC ✓
- INTER-APP COMMUNICATION ✗
- PAYMENTS ✓
- CREDENTIALS ✓

Advertisement

See how your visitors are really using your website.

Operating System

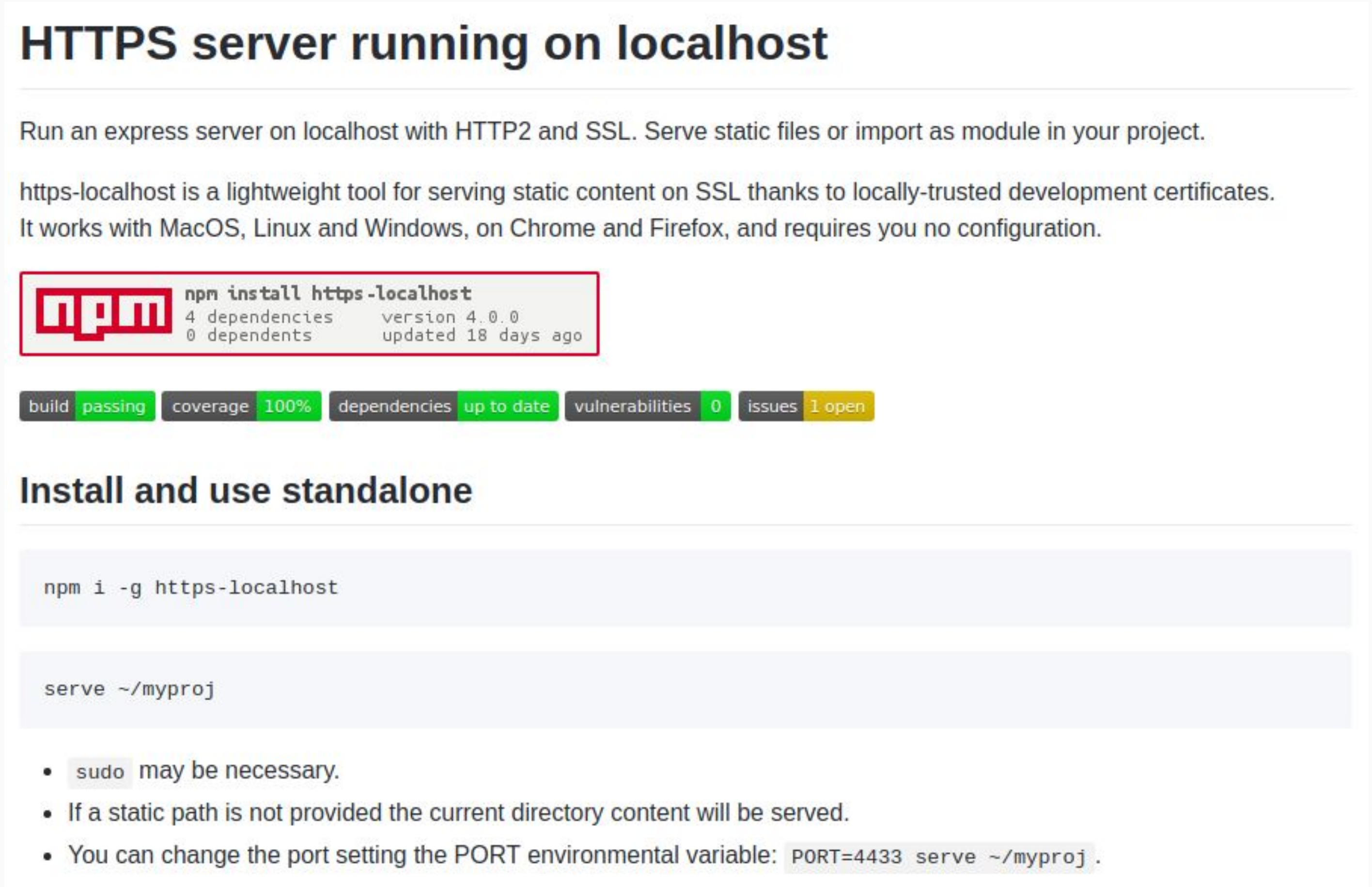
Location & Position

How to test

https-localhost + Lighthouse

How to test

How to test



HTTPS server running on localhost

Run an express server on localhost with HTTP2 and SSL. Serve static files or import as module in your project.

https-localhost is a lightweight tool for serving static content on SSL thanks to locally-trusted development certificates.
It works with MacOS, Linux and Windows, on Chrome and Firefox, and requires you no configuration.

```
npm install https-localhost
4 dependencies     version 4.0.0
0 dependents       updated 18 days ago
```

build passing | coverage 100% | dependencies up to date | vulnerabilities 0 | issues 1 open

Install and use standalone

```
npm i -g https-localhost
```

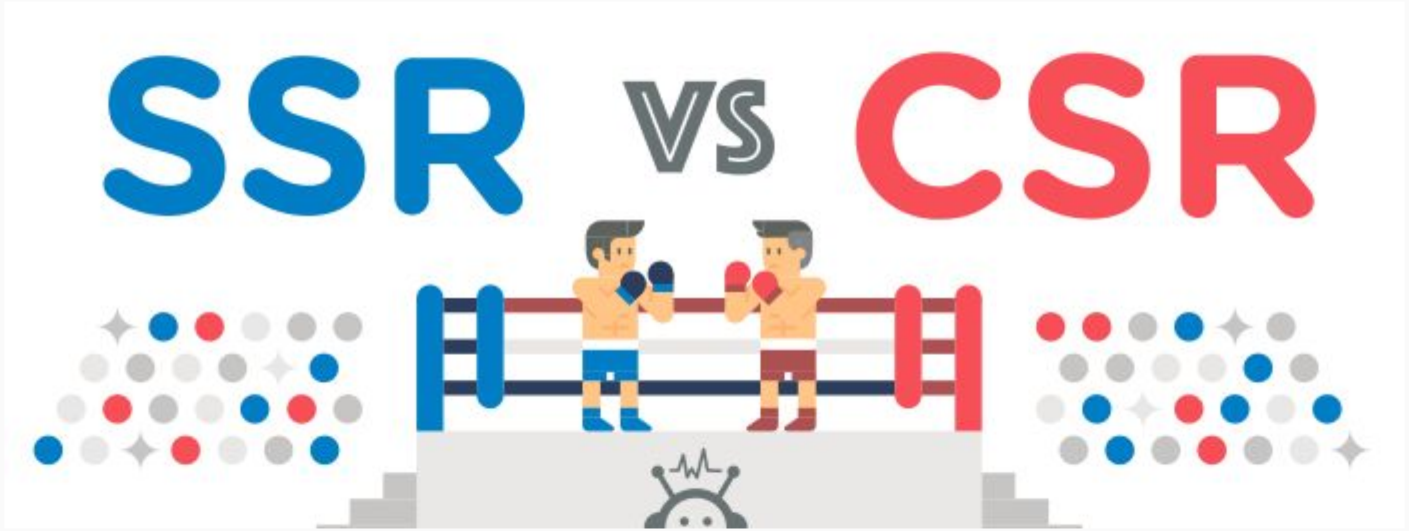
```
serve ~/myproj
```

- `sudo` may be necessary.
- If a static path is not provided the current directory content will be served.
- You can change the port setting the PORT environmental variable: `PORT=4433 serve ~/myproj`.

Rendering Strategies

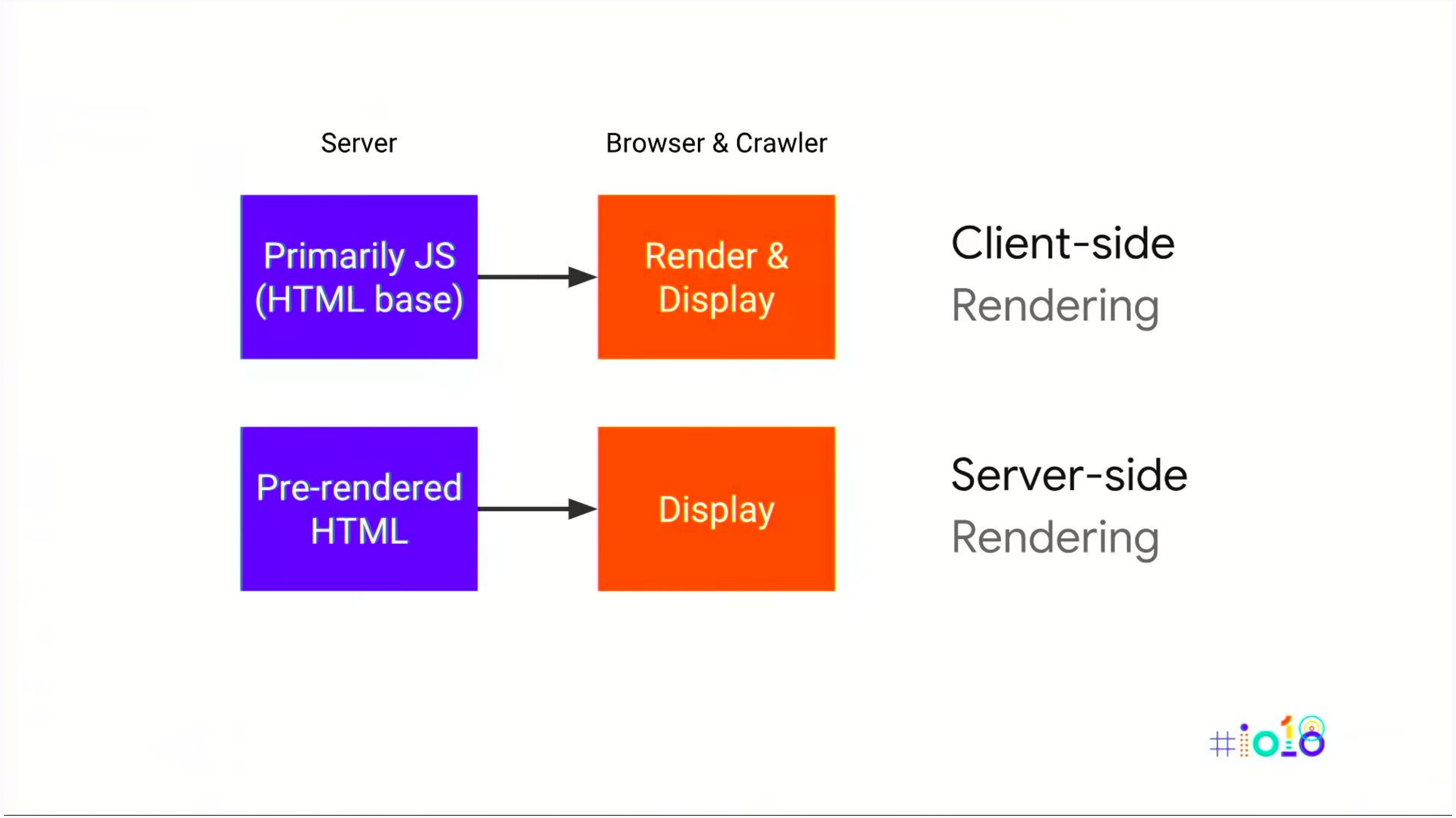
SSR vs CSR vs Hybrid Rendering

Server Side Rendering vs Client Side Rendering

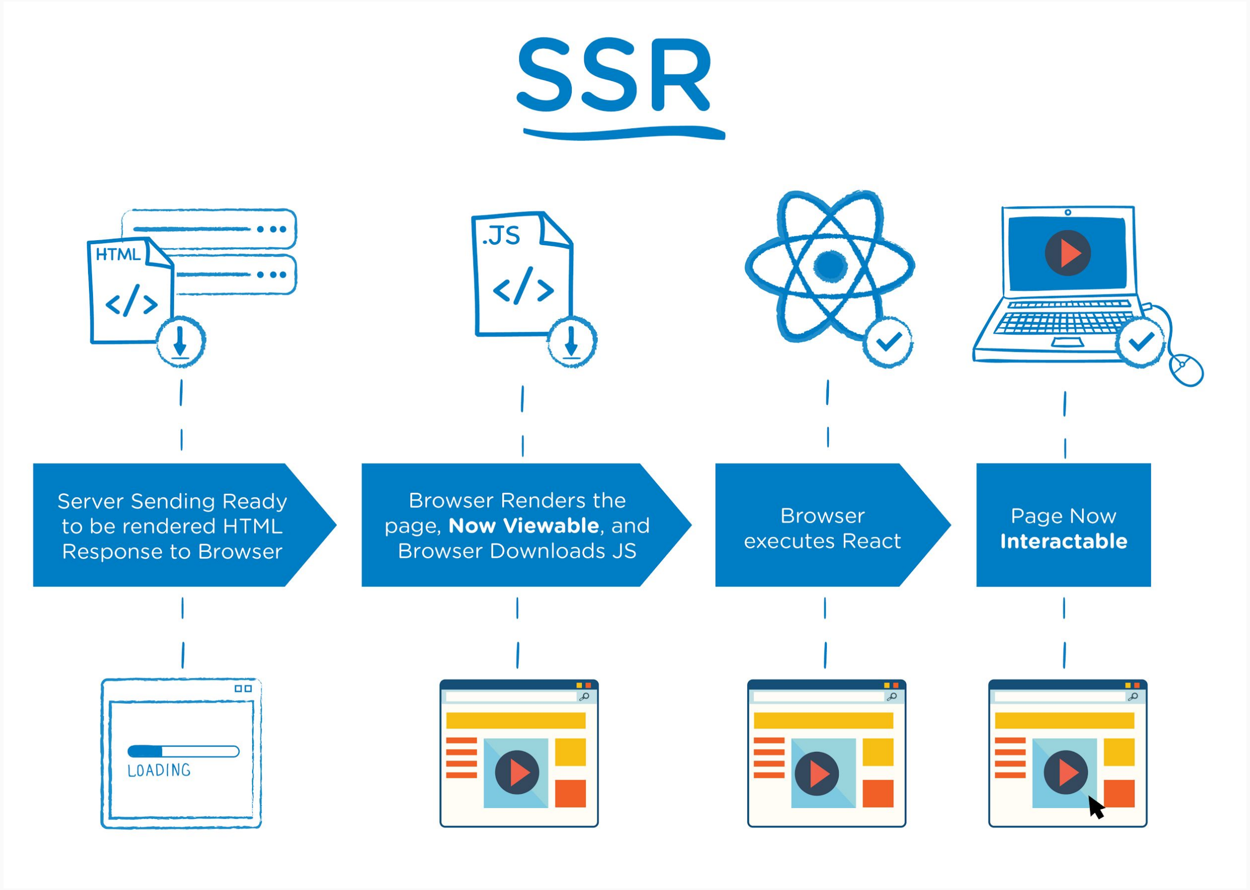


Images from Walmart Labs

Server Side Rendering vs Client Side Rendering

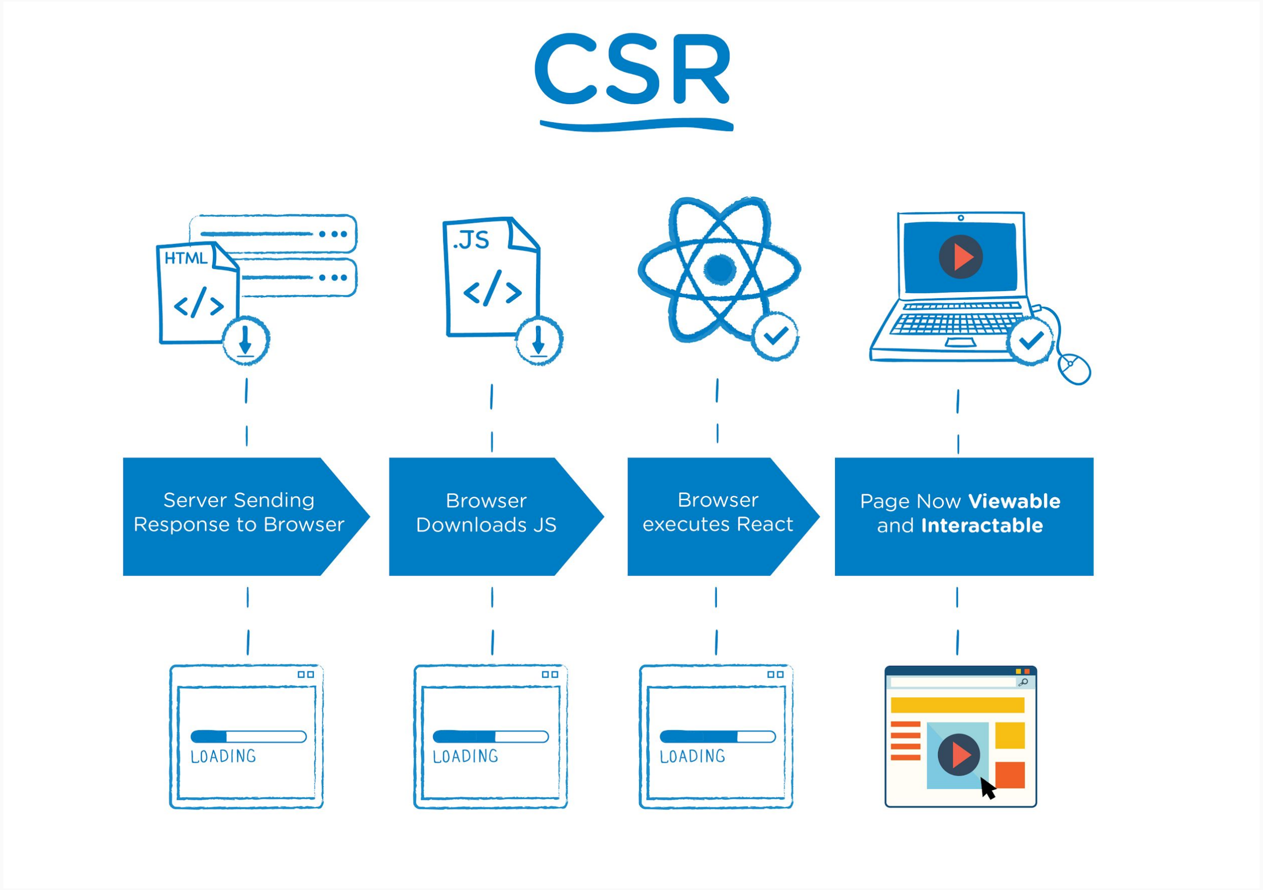


Server Side Rendering


SSR
HTML
.JS
Server Sending Ready to be rendered HTML Response to Browser
Browser Renders the page, **Now Viewable**, and Browser Downloads JS
Browser executes React
Page Now **Interactable**
LOADING

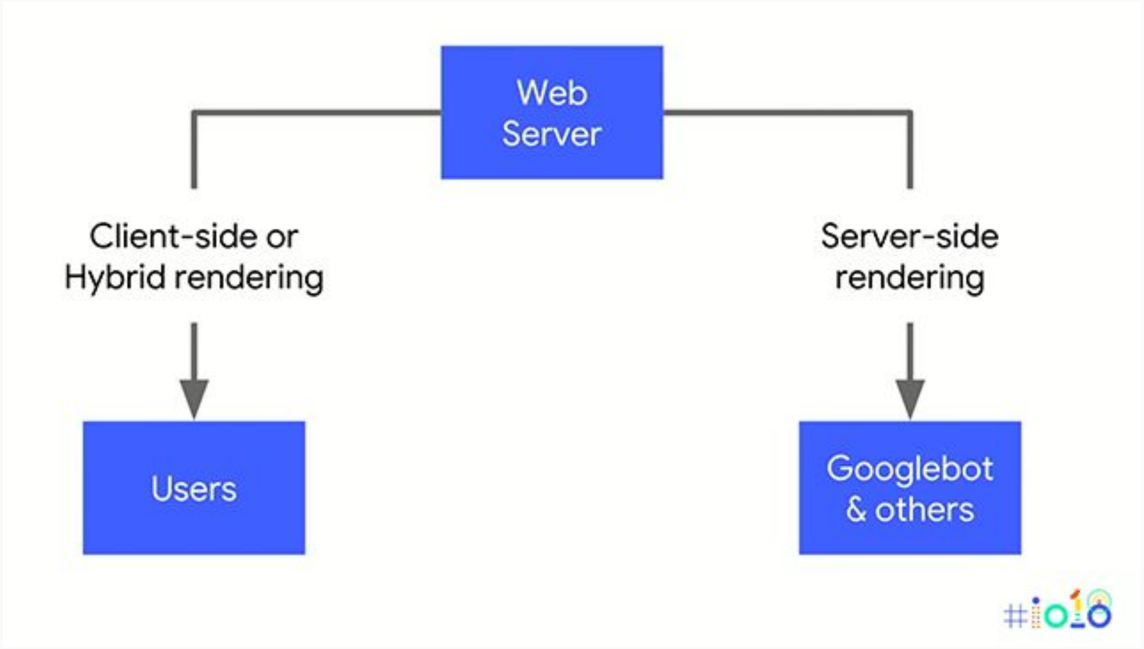
Images from Walmart Labs

Client Side Rendering



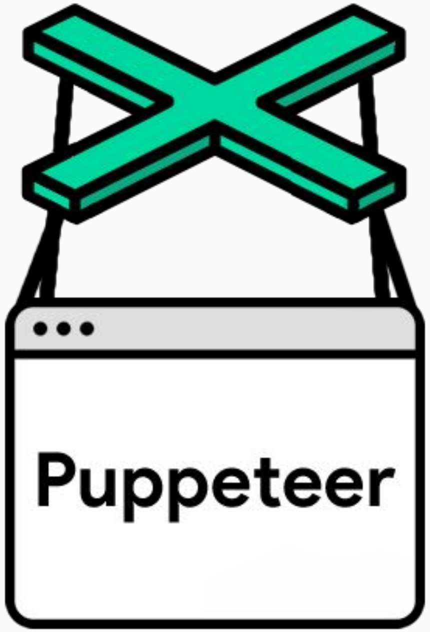
Images from Walmart Labs

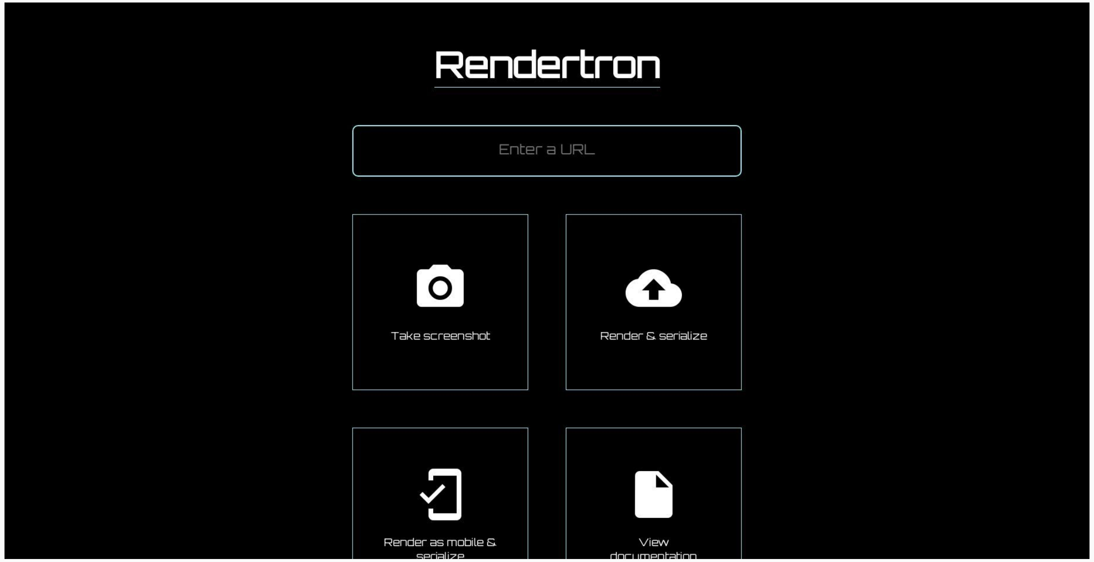
How to crawl a PWA correctly



How to crawl a PWA correctly

AKA how robots see your website

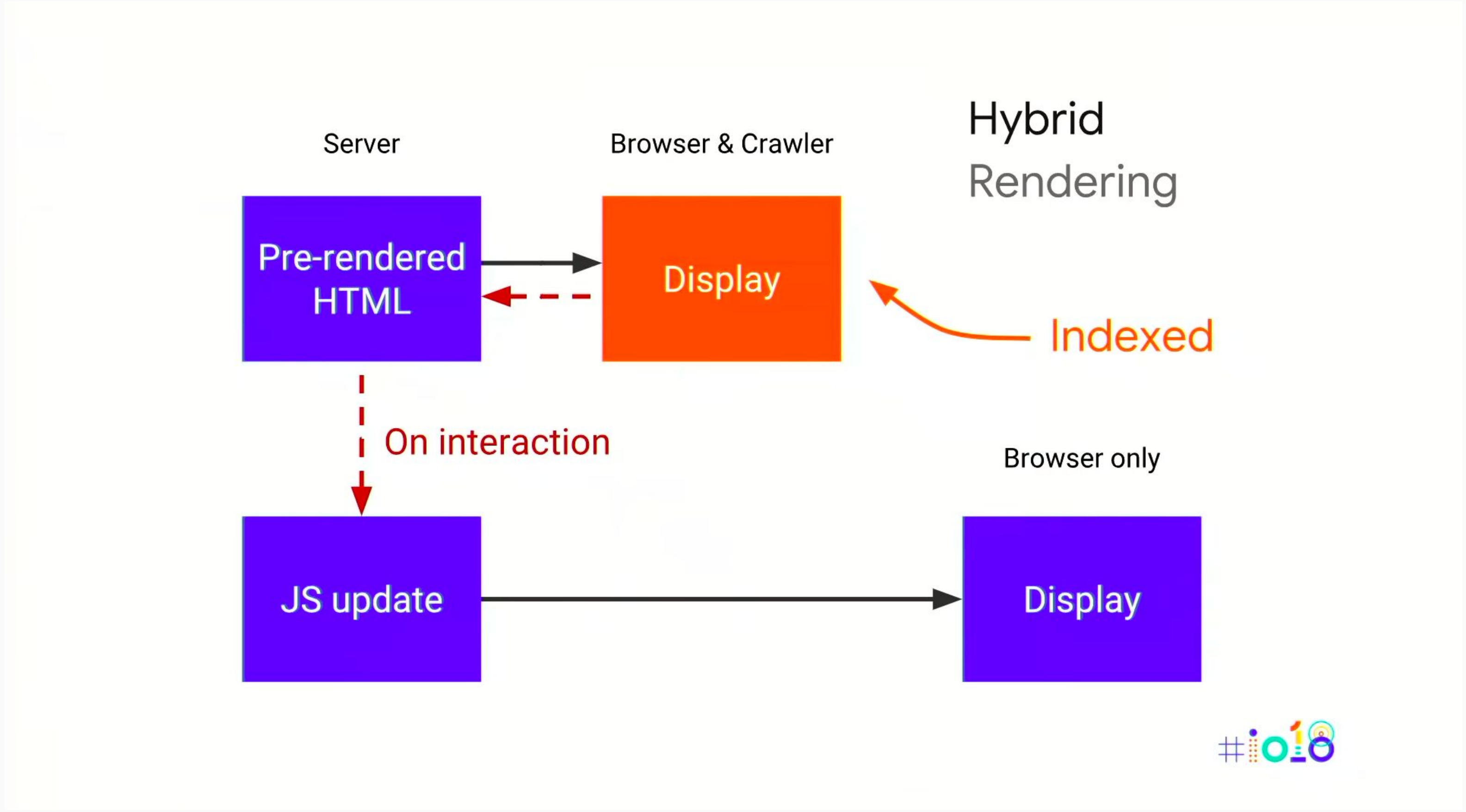




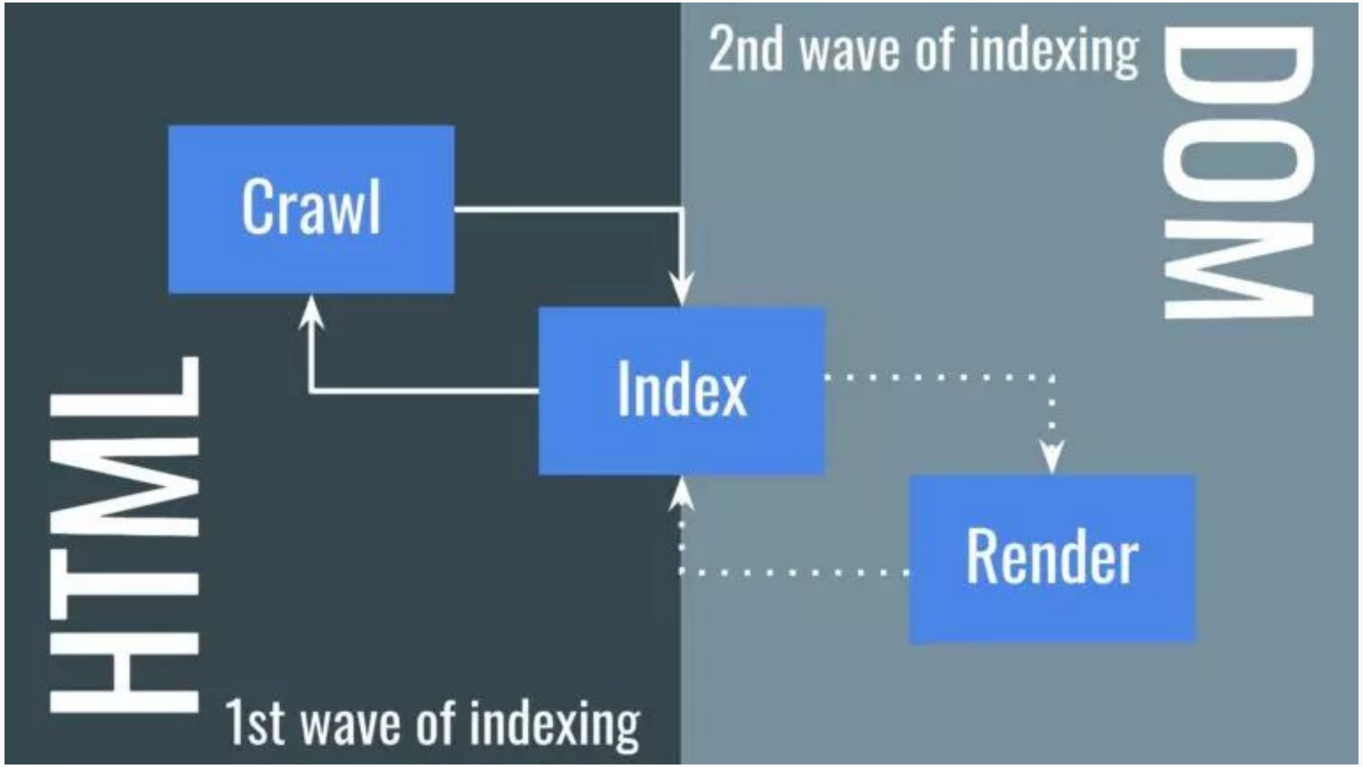
Hybrid rendering

- Server Side Rendering for first page
  - Fast
  - Ready to display
  - Fine for crawlers
- Client Side Rendering for subsequent pages
  - Less data transferred
  - No need for a new app shell
  - If JavaScript is not available use SSR as fallback

Hybrid Rendering



2 waves of indexing



Crawled
immediately

Crawled “later”
(sometimes)

To deepen the topic

Deliver search-friendly JavaScript-powered websites (Google I/O '18)

Let’s code

“Mani in pasta” - cit. grandma’

Let’s code

“Mani in pasta” - cit. grandma’

You will need

- An IDE: VSCode or whatever you like
- https-localhost: *https://sserve.dev* or
  ```
  npm i -g https-localhost
  ```
- GitHub repository for this workshop: download or
  ```
  git clone https://github.com/daquinoaldo/pwa-workshop
  ```

Further reading

- Introduction to Progressive Web App Architectures
  Official Google Developers documentation
- The Offline Cookbook
  Google Developers - A curated list of caching strategies examples for the ServiceWorker.js
- Caching strategies
  Vaadin.com - A short and effective overview of caching strategies
- SEO & Progressive Web Apps: Looking to the Future
  Moz blog - SSR, CSR and Hybrid Rendering strategies for a correct crawling
- SPAs, PWAs and SSR
  Marco Otte-Witte, Simplabs - SSR on PWA that are Single Page Applications
- jsdom
  NPM - SSR the ~~wrong~~ fast way
- Upgrading a create-react-app project to a SSR + code splitting setup
  Andrei Duca, Medium - SSR with React, the right way
- Avoid notches in your PWA with just CSS
  Mario Nachbaur, dev.to - The notch problem in PWAs
- Web Payments Overview
  Google Developers - In-PWA payments