

# Advanced Service Worker / PWA with Google Workbox

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@patrikbo

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# ■ Agenda

Why should I care?

PWA, Service Worker, Manifest

Google Workbox



# ■ Why should I care

Performance



Resilience



Enhance PWA



# ■ Why Web for Apps?

## App: Concerned

- About app permissions
- Amount of storage
- Privacy (what is the app doing?)

## Web

- Low Friction
- Less storage
  - Twitter Light PWA: 1MB
  - Twitter Native app (Android): 28 MB
  - Twitter Native app (IOS): 124 MB
- Privacy on device is not an issue

 25

average apps used  
per month by  
a mobile user

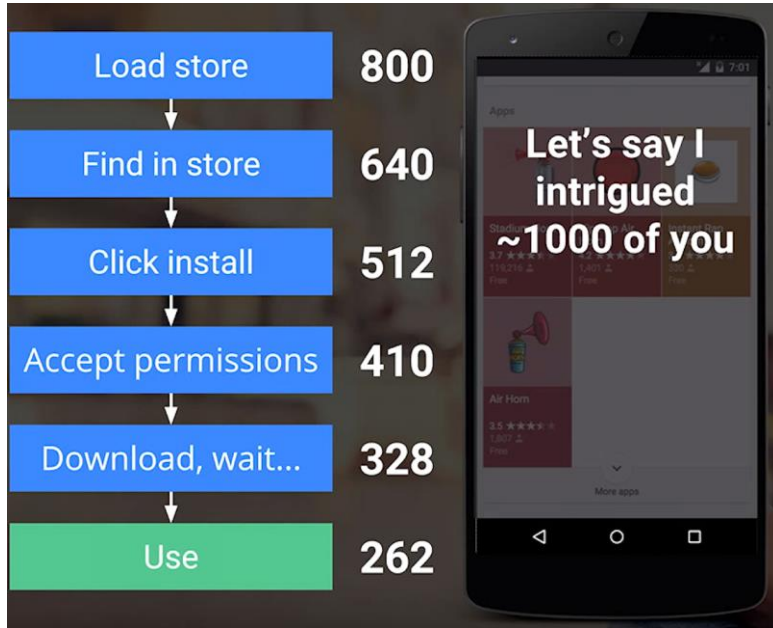
 100+

sites navigated to per  
month by the average  
Chrome for Android user

# ■ Web for Apps means low friction

Lose 20% on each step

Low Friction is the webs secret weapon







<https://airhorner.com/>

# Web App vs. Native App

App type:	Web	Native
Push Notification	Yes	Yes
Full Screen, Icon on Desktop	Yes	Yes
Offline Working	Yes	Yes
Phonebook/Contacts(*), Alarms	No	Yes
System Settings	No	Yes
Runs on Desktop	Yes	maybe
No App store	Yes	No
Installation experience	Yes	No
1 source code for all devices	Yes	No
Web dev knowledge to build app	Yes	No

# ■ Progressive Web App (PWA)

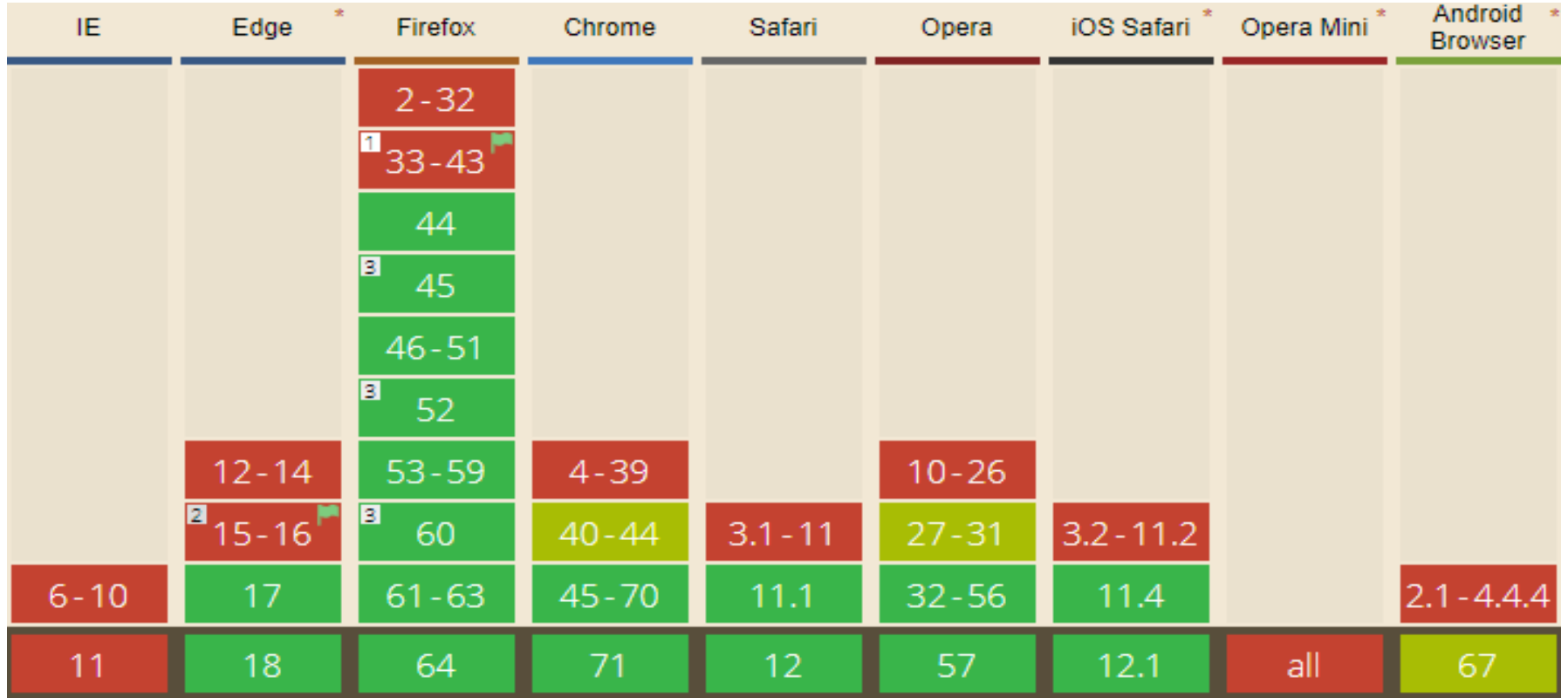
“Combine features offered by most modern browsers with the benefits of a mobile experience.”  
(Wikipedia)

FIRE	
Fast (rendering)	
Integrated (in UI, payment)	
Reliable (slow connection)	
Engaging (push)	

## Progressive Enhancement:



# Service Worker





# ■ Web App Manifest

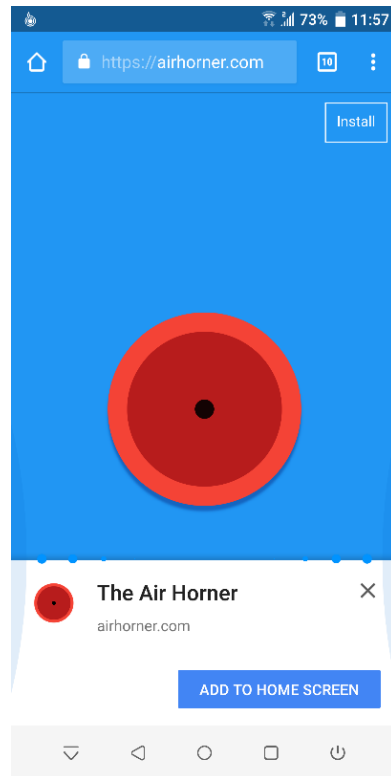
## Metadata for PWA

- Icons
- Description
- Colors
- Related Infos

```
<link rel="manifest"
href="/manifest.json">
```

Useful tools:

- Generator, based on your site: <https://www.pwabuilder.com/>
- Validator: <https://manifest-validator.appspot.com/>



## ■ Web App Manifest (manifest.json)

Check details from

[Mozilla](#)

Or

<https://w3c.github.io/manifest/>

```
{
  "short_name": "Demo",
  "name": "My Demo PWA",
  "icons": [
    {
      "src": "/images/icons-192.png",
      "type": "image/png",
      "sizes": "192x192"
    },
    {
      "src": "/images/icons-512.png",
      "type": "image/png",
      "sizes": "512x512"
    }
  ],
  "start_url": "/maps/?source=pwa",
  "display": "fullscreen",
  "theme_color": "#3367D6",
  "background_color": "#3367D6",
}
```

# ■ Wrap up / Compare Terms

## **PWA: “a set of rules”**

- **Desktop icon**
- **Immediate start**
- **Seamless UI**
- **Push Notifications**

## **Web App Manifest**

- **Json Configuration File for app-like behavior**

## **Service workers**

- **Technology to allow this instance experience**

<https://developers.google.com/web/progressive-web-apps/>

# ■ Google Workbox



# Workbox

JavaScript Libraries for Progressive Web Apps

# ■ What is Google Workbox



- **Helper for creating PWA**
  - Build Tools
  - Runtime Libraries
- **Helps to implement Service Worker**
  - Adopt useful cache strategies
  - Avoid implementation errors
  - Avoid boilerplate
- **Cache management**
- **remove complexity → add flexibility**
- **Replaces *sw\_precache* and *sw\_toolbox***

<https://developers.google.com/web/tools/workbox/>

## ■ SW.js

```
importScripts('https://storage.googleapis.com/workbox-cdn/releases/3.6.3/workbox-sw.js');
```

```
workbox.routing.registerRoute(  
  new RegExp('.*\.js'),  
  workbox.strategies.cacheFirst()  
);
```



## ■ sw.js: cache images

```
workbox.routing.registerRoute(  
  // Cache image files  
  /*.*\.(?:png|jpg|jpeg|svg|gif)/,  
  // Use the cache if it's available  
  workbox.strategies.cacheFirst({  
    cacheName: 'image-cache',  
    plugins: [  
      new workbox.expiration.Plugin({  
        // Cache only 20 images  
        maxEntries: 20,  
        // Cache for a maximum of a week  
        maxAgeSeconds: 7 * 24 * 60 * 60,  
      })  
    ],  
  })  
);
```



# ■ PreCache

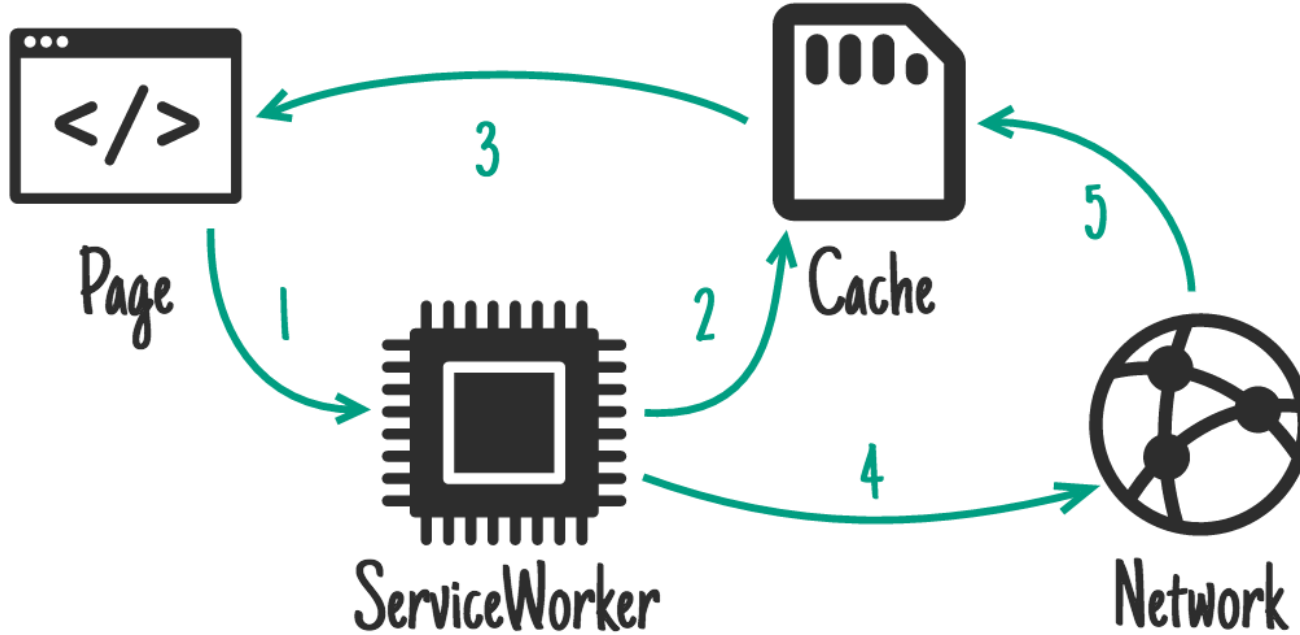


Download files before Service worker is installed

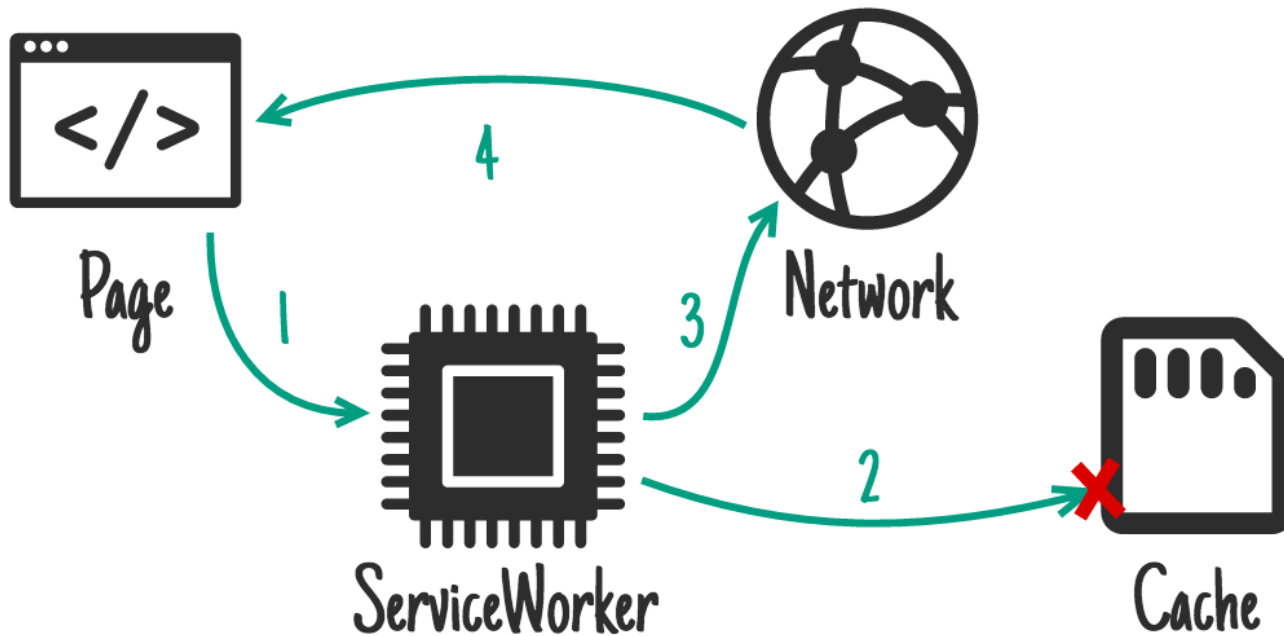
```
workbox.precaching.precacheAndRoute([
  '/styles/index.658245.css',
  '/scripts/main.195241.js',
  {
    url: '/index.html',
    revision: '383676'
  },
]);
```



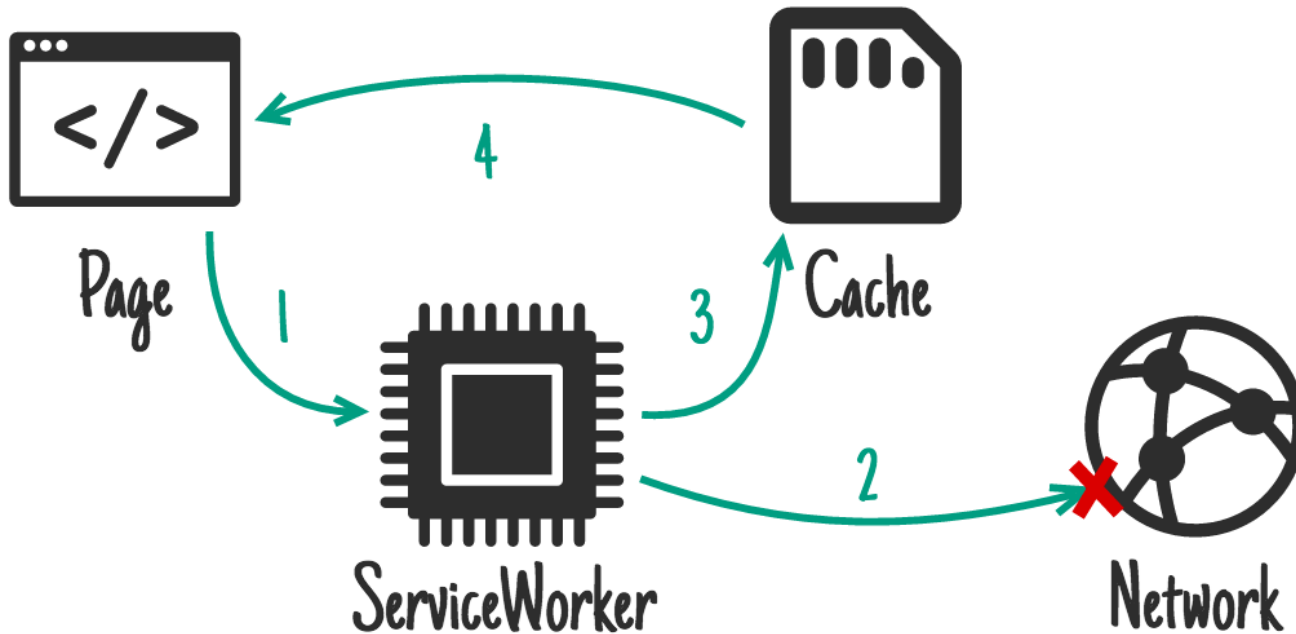
# ■ Strategy: Stale-While-Revalidate



# Cache First (Cache Falling Back to Network)



# ■ Strategy: Network First (Network Falling Back to Cache)



## ■ Other Strategies

- Network Only
- Cache Only



<https://developers.google.com/web/tools/workbox/modules/workbox-strategies>

## ■ Configuration file



```
module.exports = {
  globDirectory: ".",
  globPatterns: ["**/*.{css,js,html}"],
  swDest: "sw.js",
  runtimeCaching: [
    {
      urlPattern: /http:\/\/localhost\:3000\/users/,
      handler: "networkFirst"
    }
  ]
};
```

## ■ Generated ServiceWorker (sw.js)



```
importScripts(  
  "https://storage.googleapis.com/workbox-cdn/releases/3.6.3/workbox-  
  sw.js");  
  
self.__precacheManifest = [  
  {  
    "url": "index.html",  
    "revision": "3cc9ceb28924598f87bdc6ea0bfa23ef"  
  },  
  {  
    "url": "workbox-config.js",  
    "revision": "79289b03d935e54b891fb3134aa3b33d"  
  }  
].concat(self.__precacheManifest || []);  
  
workbox.precaching.precacheAndRoute(self.__precacheManifest, {});
```

## ■ Working modes

- **Workbox CLI**
- **Webpack Plug-In**
- **Node module**



## ■ Node module



```
"build-prod": "ng build --prod  
               && node workbox-build-inject.js"
```

```
// We will use injectManifest mode  
const {injectManifest} = require('workbox-build')  
  
// Sample configuration with the basic options  
var workboxConfig = {...}  
  
// Calling the method and output the result  
injectManifest(workboxConfig).then(({count, size}) => {  
  console.log(`Generated ${workboxConfig.swDest},  
              which will precache ${count} files, ${size} bytes.`)  
})
```



# ■ Angular ServiceWorker vs. Workbox



## Angular CLI

- **Pros:**
  - Install is easy: `ng add @angular/pwa`
- **Cons:**
  - Angular  $\geq 5$  only
  - Website changes must be handled manually

## Workbox

- **Pros:**
  - Easy to install, Easy to use
  - Automatically handle web site changes
  - Know-how protection: Works in every web project
  - Debugging, bug hunting

# ■ Demo Time



# ■ Demo

## 1. Implement workbox

- Installation CLI
- Create scripts in 2 steps:
  1. Wizard → Config-file
  2. Config-file → Service Worker
- Implement Service Worker

## 2. Activate Proxy

## 3. WebPack Plugin

## 4. Workbox with Angular or Ionic



## ■ Lessons learnt



- **Workbox warnings**
- **Use localhost, not IP address (or use https)**
- **Do not reuse DNS/ports**
- **Firefox “work offline”: localhost is never offline**
- **Do not use “ng serve”**
- **Restart browser**


# ■ PWA analysis with Google Lighthouse

Auditing, performance metrics, and best practices for Progressive Web Apps

Standalone or in Chrome

Run on mobile device (via remote debugging)



	Lab Data	Field Data
Pros	Easy, Reproducible 	Real world data
Cons	Not real world	Limited result set

Speed Tools overview: <https://g.co/dev/SpeedToolsOverview>

# ■ Save the World

“We live in a disconnected & battery powered world, but our technology and best practices are a leftover from the always connected & steadily powered past.”

Maureen McElaney, JSConf EU 2017

<https://www.youtube.com/watch?v=GOdmPaBJqWA>



## Offline First

<http://offlinefirst.org/>



## ■ Summary



### Implement Service Workers With Workbox

- Fast and easy to implement
- Flexible configuration
- Less copy paste
- Guides through the modern web experience
- Encourage to use new features

## ■ Key takeaways

- PWA “a set of rules”
- For PWA use Google Workbox
- To save the world can be fun





# Thank you! Questions ?

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