



PWA

PWA Fundamentals

websites with superpowers

Доброго ранку!



Rowdy Raubow

Rowdy Rabouw



Rowdy Rabouw

Born and raised in Gouda, The Netherlands

Freelance web and app developer

Senior engineer at Nationale-Nederlanden

Lead developer Nationale-Nederlanden Pension App

Progress Developer Expert for Nativescript

@rowdyrabouw

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❤️ superhero movies

PWA

Progressive

Web

App

Reliable

Always load and never show the downasaur

Fast

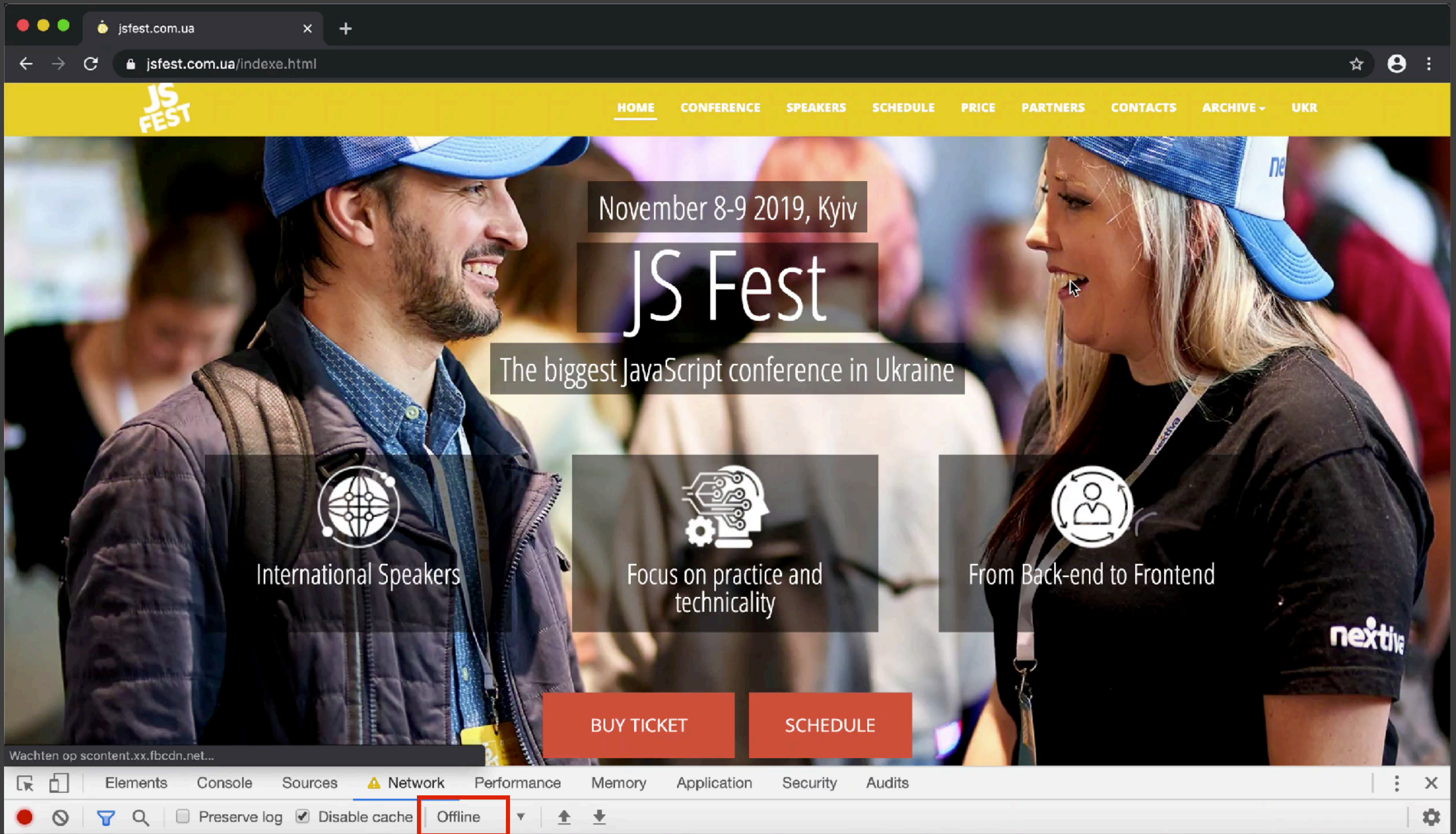
Respond quickly to user interactions

Engaging

Feel like a native app on the device

Key Features

- **Linkable** (*URL's*)
- **Safe** (*https*)
- **Discoverable** (*search engines*)
- **Responsive** (*works on every screen resolution*)
- **Feel like a native app** (*fast loading, look-and-feel*)
- **Always up-to-date** (*fresh from the web; no updates from app store*)
- **Installable** (*home screen, cache data*)
- **Re-engageable** (*home screen, push notifications*)
- **Connectivity-independent** (*can work offline*)



Progressive Web Apps

Modern Browsers



Starter Code


```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta http-equiv="X-UA-Compatible" content="ie=edge" />
    <title>PWA SuperHeroes</title>
    <link rel="icon" type="image/png" href="favicon.png" />
    <link rel="stylesheet" href="css/app.css" />
  </head>
  <body>
    <header>
      
      <h1>PWA SuperHeroes</h1>
    </header>
  </body>
</html>
```

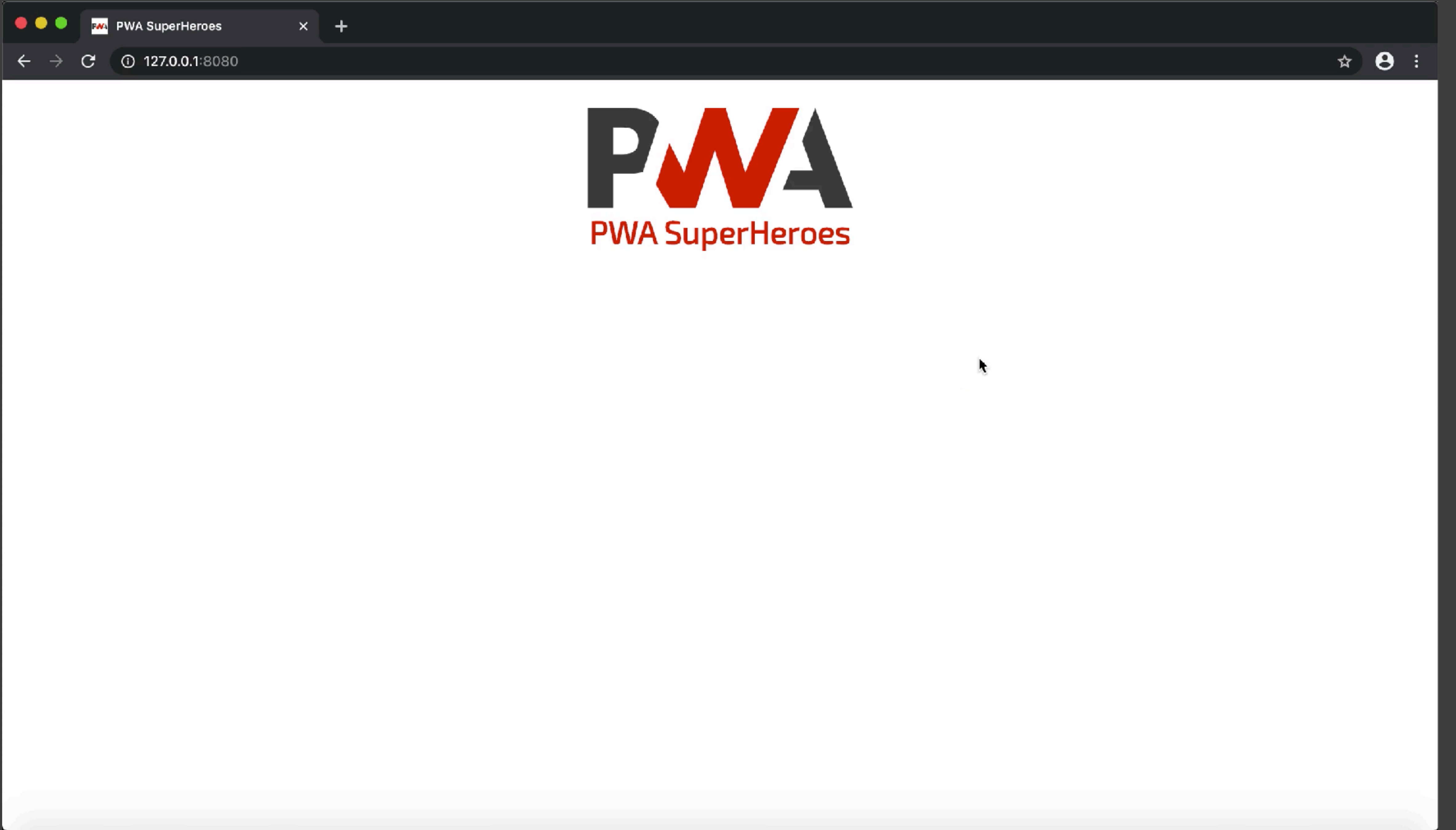


```
@font-face {
  font-family: "Exo 2";
  font-display: swap;
  font-style: normal;
  font-weight: 400;
  src: url("../fonts/exo2.woff2") format("woff2");
}

body {
  padding: 20px;
}

header img {
  max-height: 100px;
}

h1 {
  color: #df2305;
  font-family: "Exo 2", sans-serif;
  margin: 0;
  text-align: center;
}
```





Manifest File

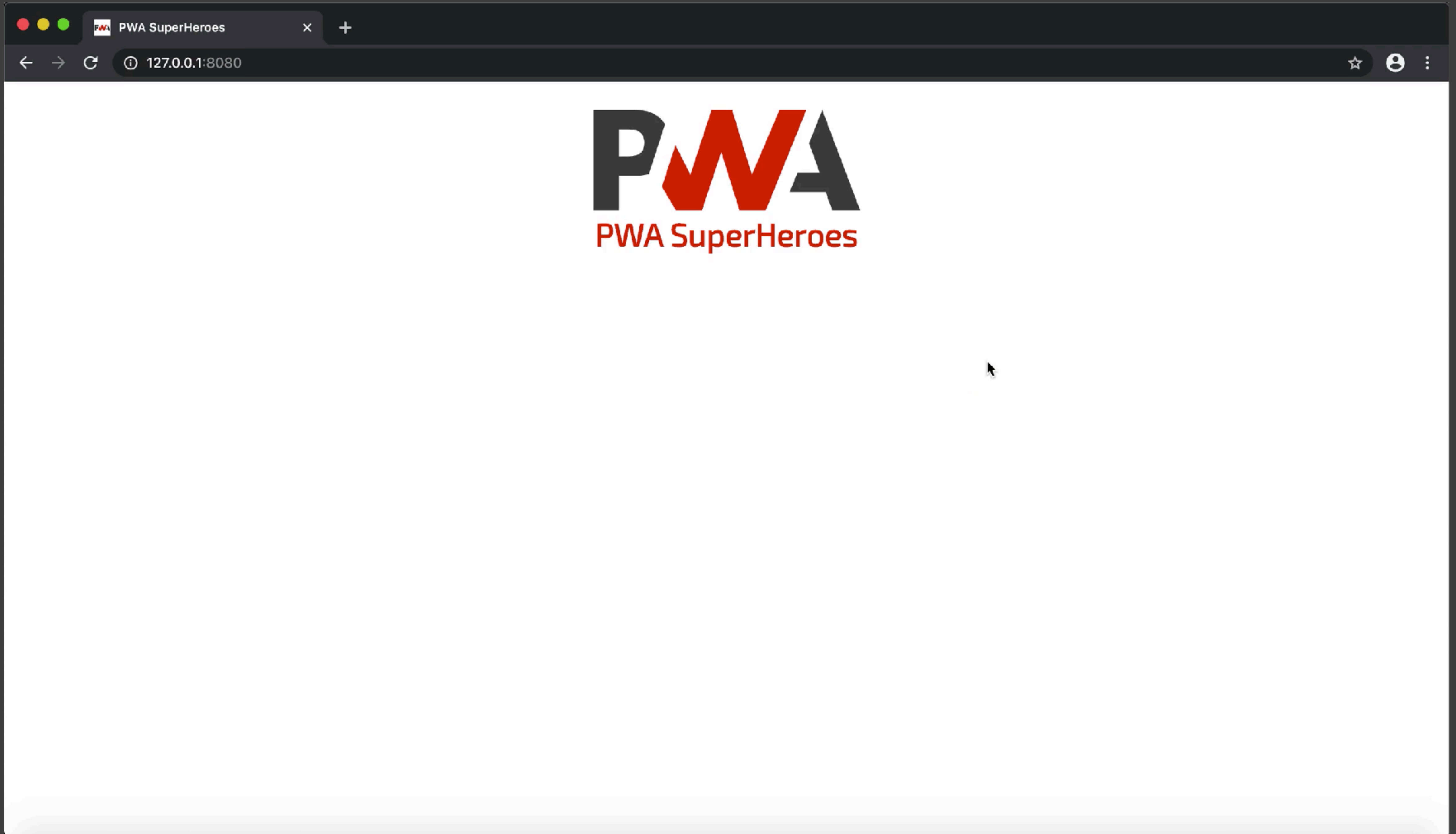
Manifest File

- simple JSON file
- informs the browser about your web application
- tells it how it should behave when “installed”


```
{  
  "name": "PWA Superheroes",  
  "short_name": "PWAS",  
  "lang": "en-GB",  
  "start_url": "/",  
  "scope": ".",  
  "display": "standalone",  
  "orientation": "portrait",  
  "background_color": "#3D3D3D",  
  "theme_color": "#DF2305",  
  "icons": []  
}
```

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta http-equiv="X-UA-Compatible" content="ie=edge" />
    <title>PWA SuperHeroes</title>
    <link rel="icon" type="image/png" href="favicon.png" />
    <link rel="stylesheet" href="css/app.css" />
    <link rel="manifest" href="manifest.json" />
  </head>
  <body>
    <header>
      
      <h1>PWA SuperHeroes</h1>
    </header>
  </body>
</html>
```







 onderceylan / pwa-asset-generator

 Watch

11

 Star

425

 Fork

15

 Code

 Issues 5

 Pull requests 0

 Projects 1

 Security

 Insights

PWA asset generator based on Puppeteer. Automatically generates icons and splash screens guided by Web App Manifest specs and Apple Human Interface guidelines. Updates manifest.json and index.html files with the generated images.

pwa

splash-screen

icon

manifest

launch-image

puppeteer

ios

android

pwa-assets

splash-screens

icons

icon-sizes

manifest-specs

image-generation

progressive-web-apps

progressive-web-app

html-tags

 153 commits

 2 branches

 0 packages

 20 releases

 5 contributors

 MIT

Branch: master ▾

New pull request

Find file

Clone or download ▾



semantic-release-bot chore(release): 2.1.2 [skip ci] ...

Latest commit a963e8b Nov 8, 2019

 .github

ci(actions): temporarily disabled skipping

Nov 2, 2019

 bin

ci(install): added a manual chromium installation step for testing

Oct 25, 2019

 src

fix(cli): updated docs to clarify transparency option

Nov 8, 2019

package.json — pwa-superheroes.com

EXPLORER

OPEN EDITORS

index.html dist

manifest.json dist

package.json

PWA-SUPERHEROES.COM

.vscode

settings.json

dist

css

fonts

img

js

favicon.png

index.html

manifest.json

node_modules

.gitignore

package-lock.json

package.json

OUTLINE

NPM SCRIPTS

index.html

manifest.json

package.json X

package.json > ...

You, October 7th, 2019 3:41pm | 1 author (You)

```
1 {
2   "name": "pwa-superheroes.com",
3   "version": "1.0.0",
4   "description": "",
5   "main": "index.js",
6   "scripts": {
7     "serve": "cd dist && http-server",
8     "generate": "cd dist && pwa-asset-generator ./img/pwa.svg -i ./index.html -m ./manifest.json"
9   },
10  "author": "",
11  "license": "ISC",
12  "dependencies": {
13    "http-server": "^0.11.1",
14    "pwa-asset-generator": "^1.3.1"
15  }
16 }
```

You, October 7th, 2019 3:03pm • Initial commit

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

2: bash

Skynet-2:pwa-superheroes.com rowdy\$

01-initial-state-with-manifest

0 ↓ 1 ↑

0 0

You, October 7th, 2019 3:03pm

Ln 16, Col 2

Spaces: 2

UTF-8

LF

JSON

Prettier: ✓

Formatting: ✓

4

```
{
  "name": "PWA Superheroes",
  "short_name": "PWAS",
  "lang": "en-GB",
  "start_url": "/",
  "scope": ".",
  "display": "standalone",
  "orientation": "portrait",
  "background_color": "#3D3D3D",
  "theme_color": "#DF2305",
  "icons": [
    {
      "src": "manifest-icon-192.png",
      "sizes": "192x192",
      "type": "image/png"
    },
    {
      "src": "manifest-icon-512.png",
      "sizes": "512x512",
      "type": "image/png"
    }
  ]
}
```


PWA SuperHeroes

x

+

127.0.0.1:8080

☆

👤

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iPhone 6/7... 414 x 736 100%

⋮

🔍

📄

Elements

Console

Sources

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Performance

Memory

Application

Security

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✕

Application

📄 Manifest

⚙️ Service Workers

🗑️ Clear storage

Storage

▶️ 🗄️ Local Storage

▶️ 🗄️ Session Storage

🗄️ IndexedDB

🗄️ Web SQL

▶️ 🍪 Cookies

Cache

🗄️ Cache Storage

🗄️ Application Cache

Background Services

↕️ Background Fetch

🔄 Background Sync

🔔 Notifications

💰 Payment Handler

☁️ Push Messaging

Frames

▶️ 🖼️ top

App Manifest

[:8080/manifest.json](#)

Installability

⚠️ No matching service worker detected. You may need to reload the page, or check that the service worker

Identity

Name PWA Superheroes

Short name PWAS

Presentation

Start URL /

Theme color ■ #DF2305

Background color ■ #3D3D3D

Orientation portrait

Display standalone

Icons

192x192

image/png

PWA

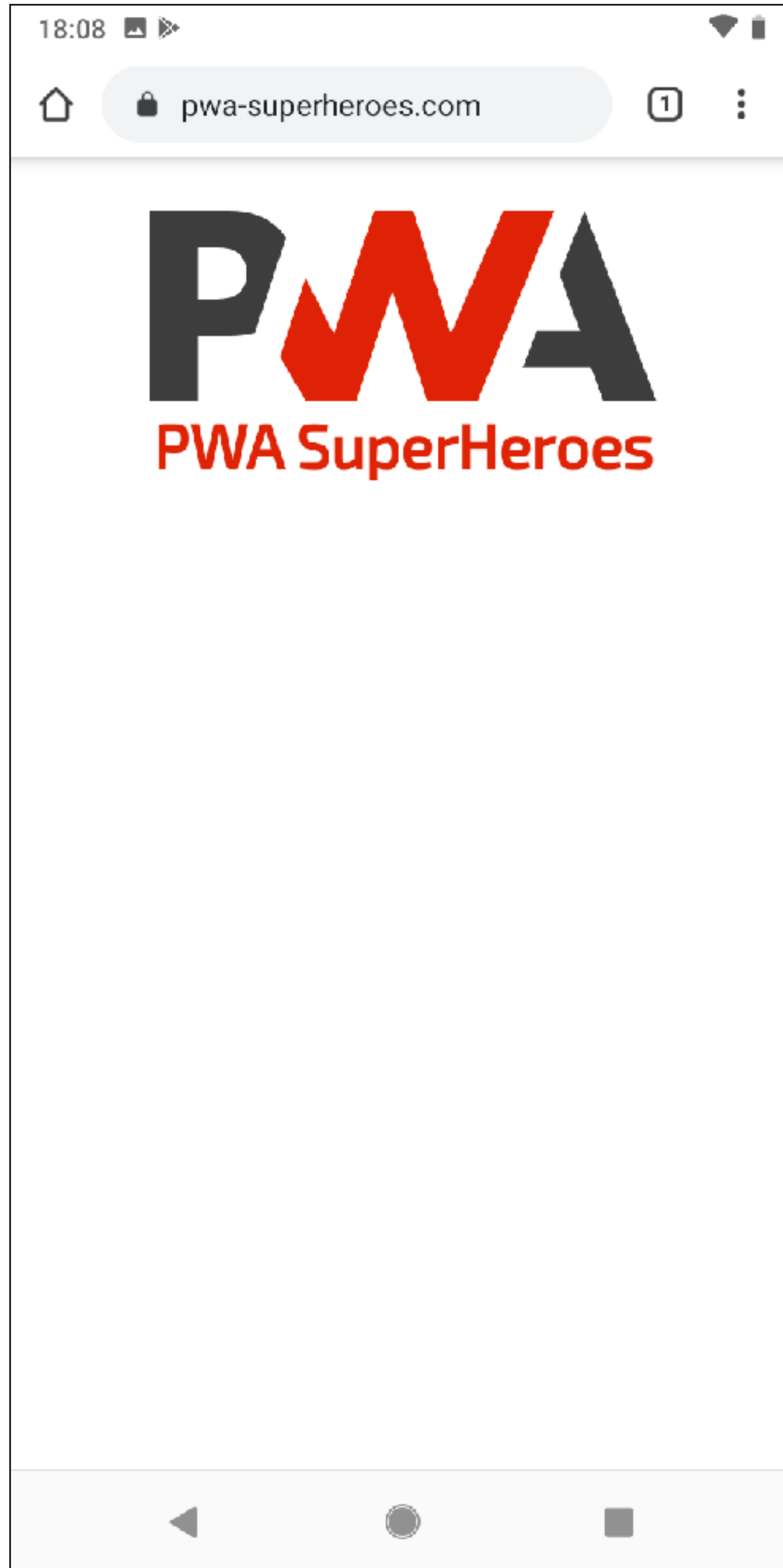
PWA SuperHeroes

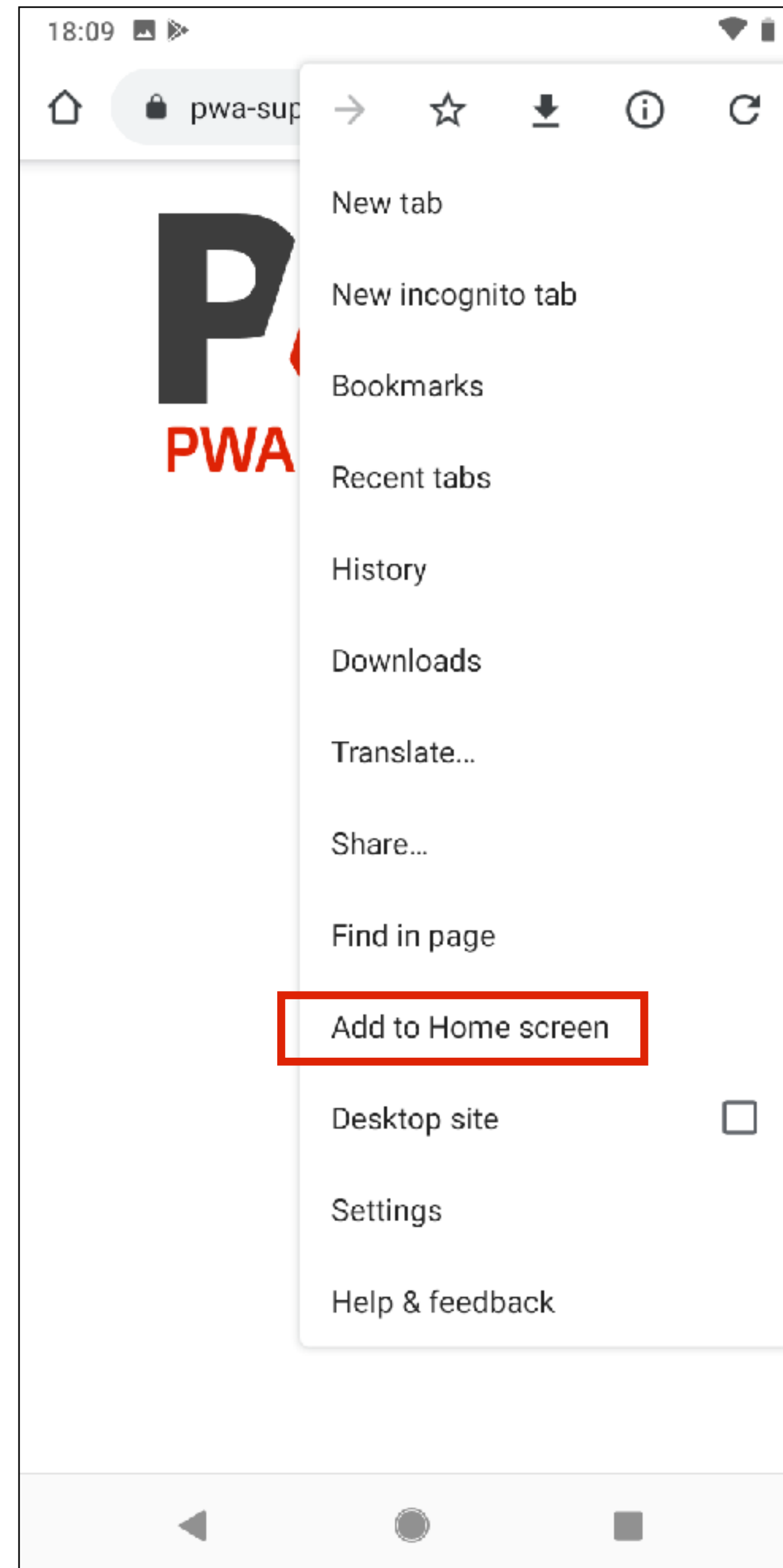


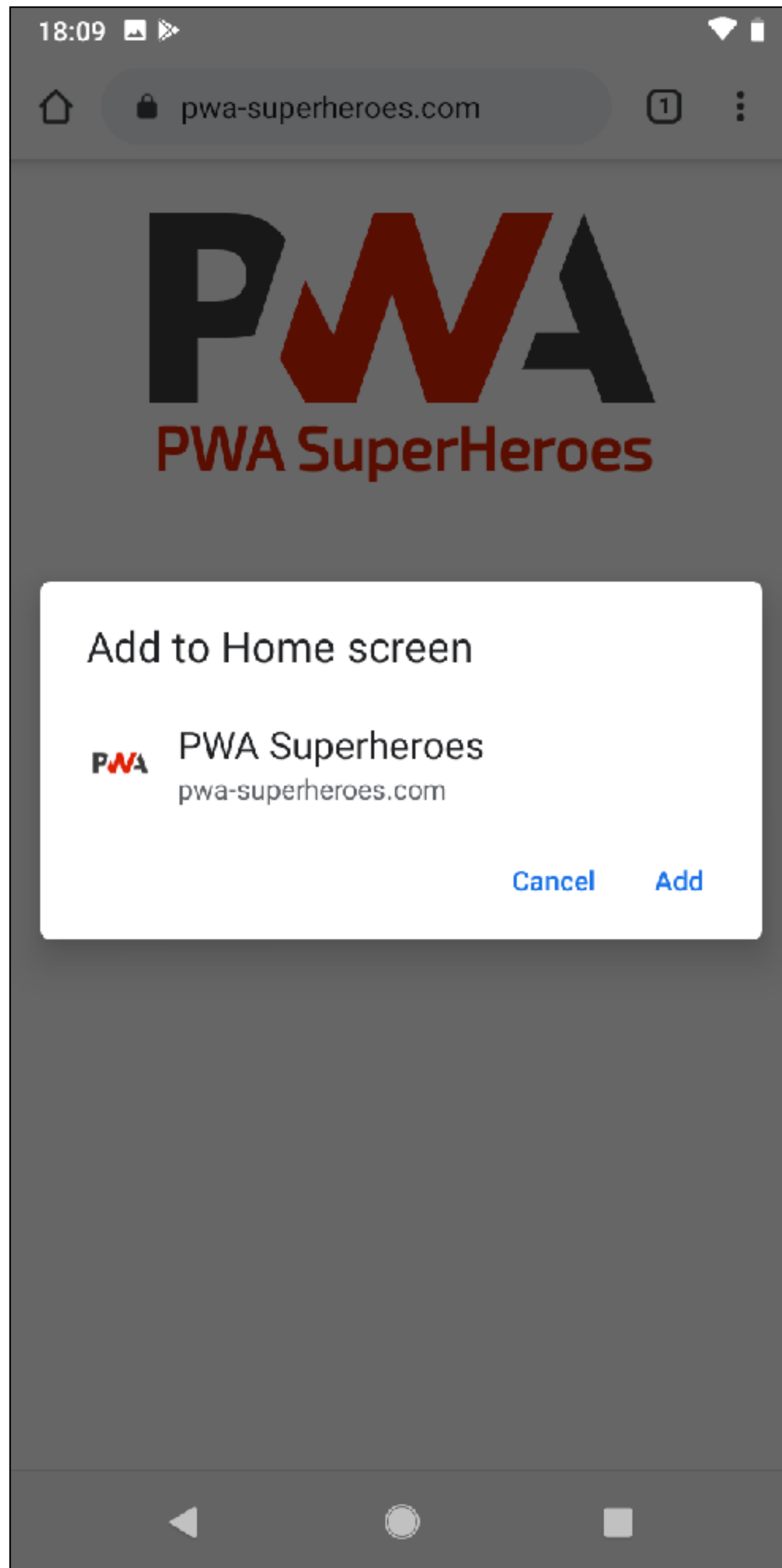
A2HS

A2HS Criteria

- the web app is not already installed
- served over HTTPS
- web app manifest
 - short_name or name
 - start_url
 - display must be one of: fullscreen, standalone, or minimal-ui
 - icons must include a 192px and a 512px sized icons
 - prefer_related_applications is not true
- *registered service worker with a fetch event handler*

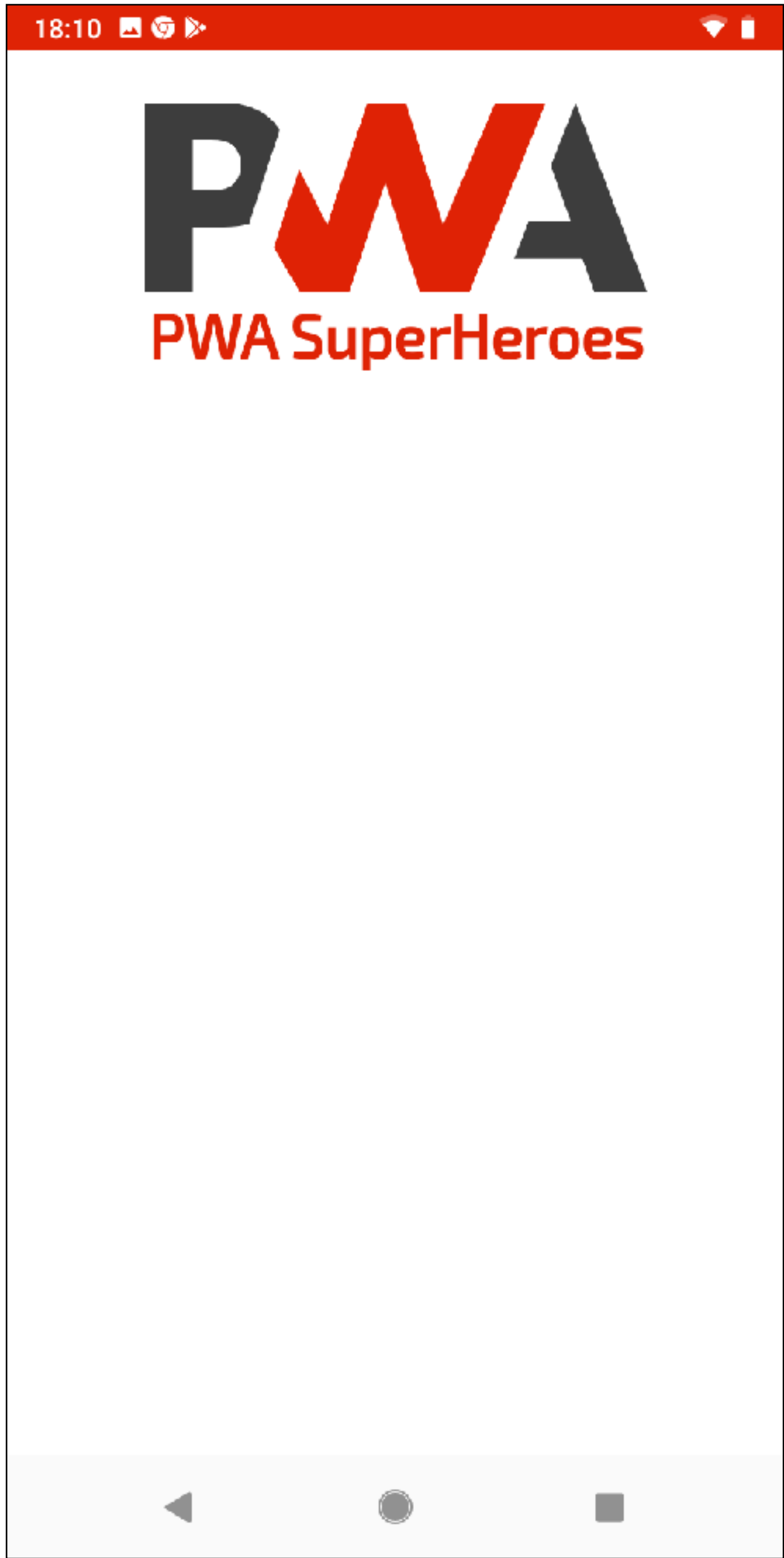


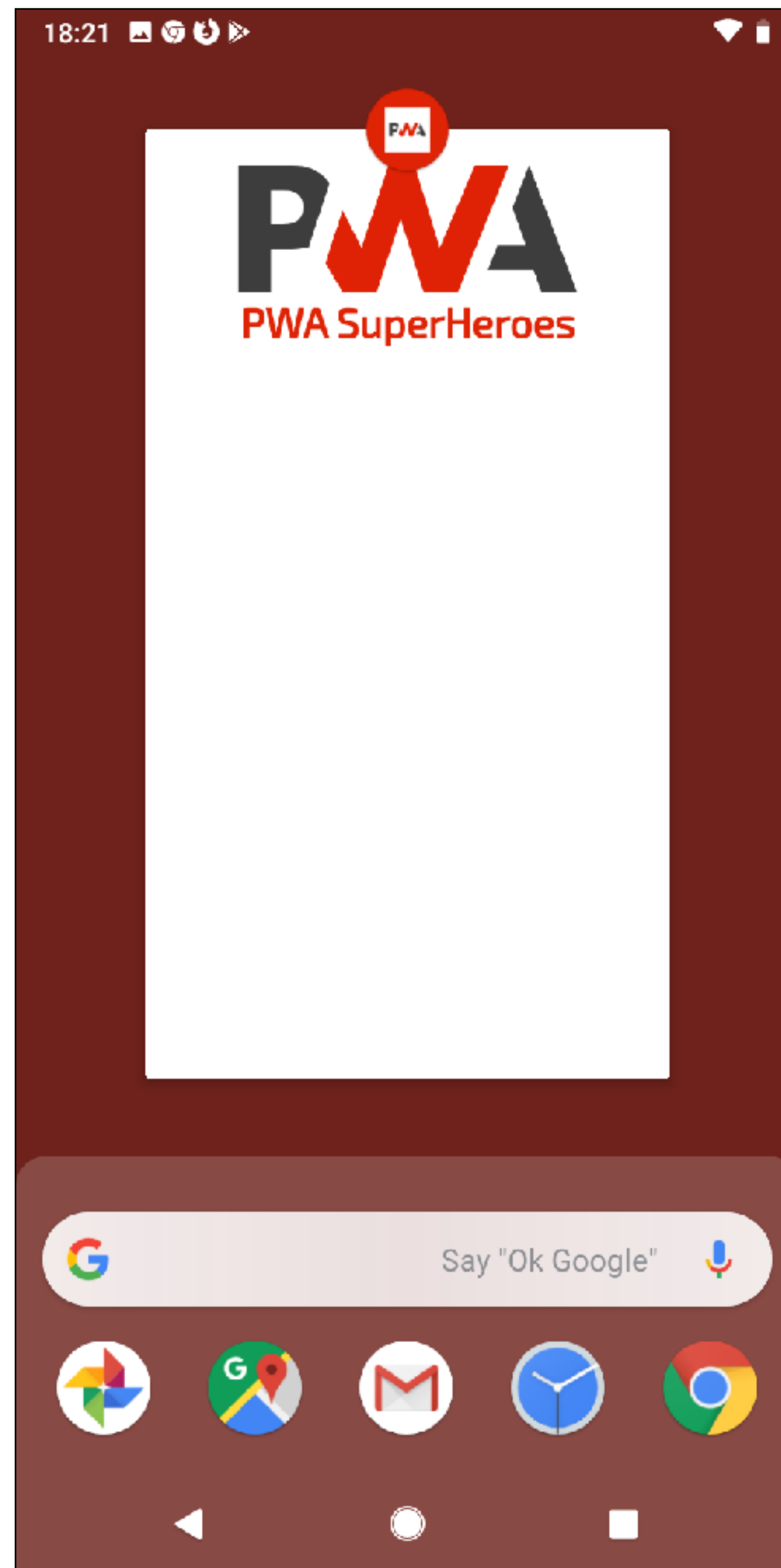


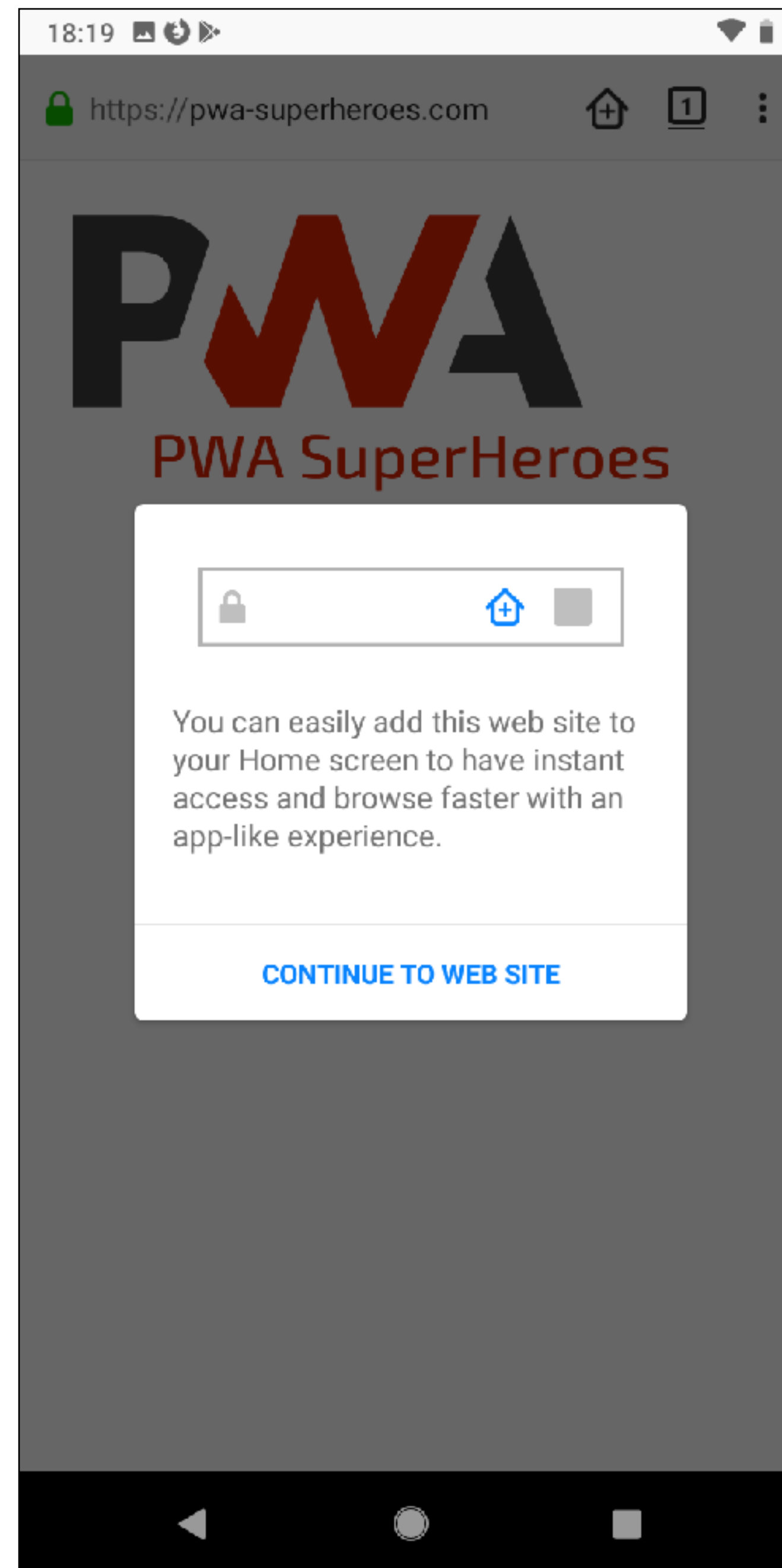


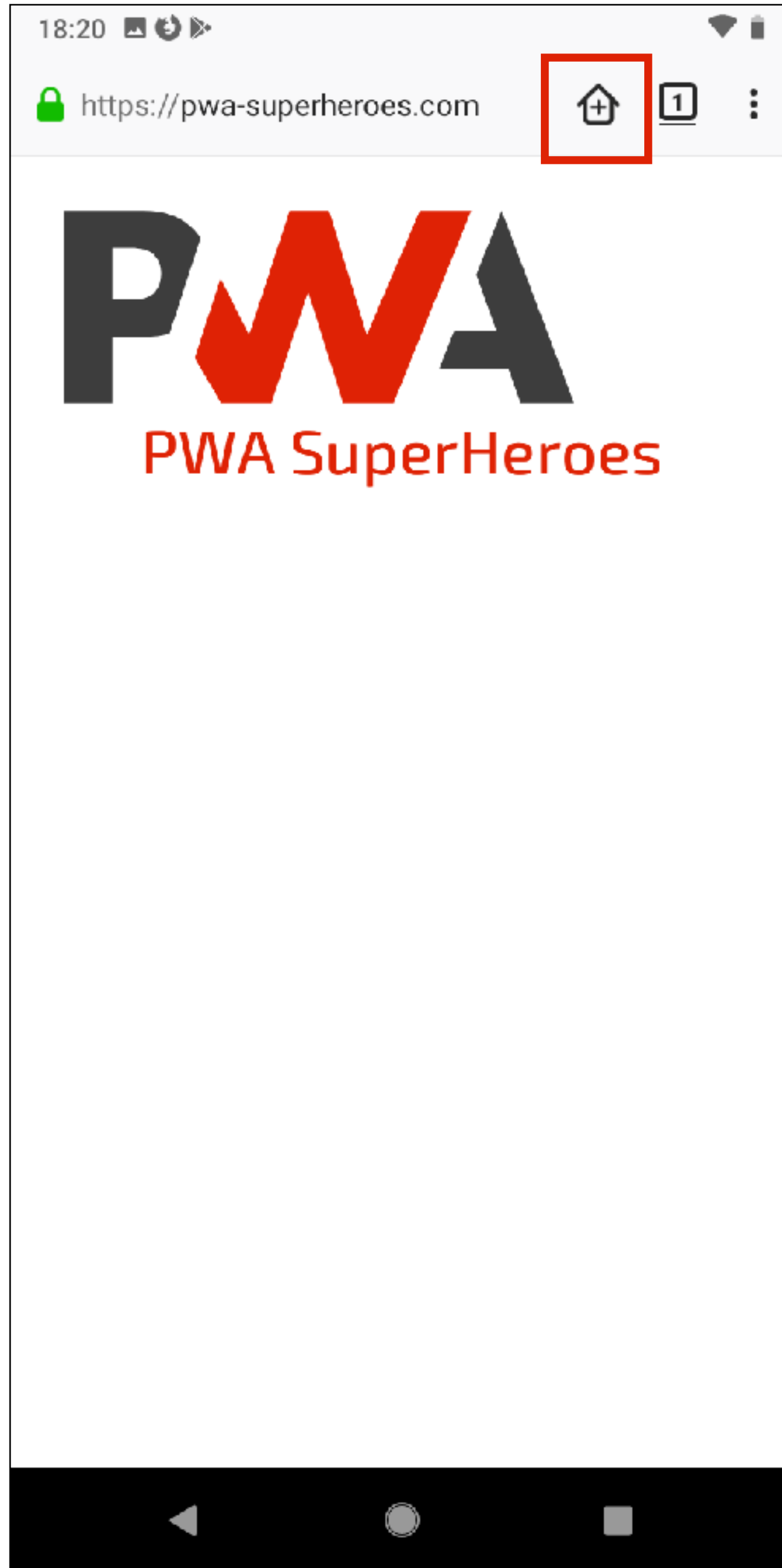


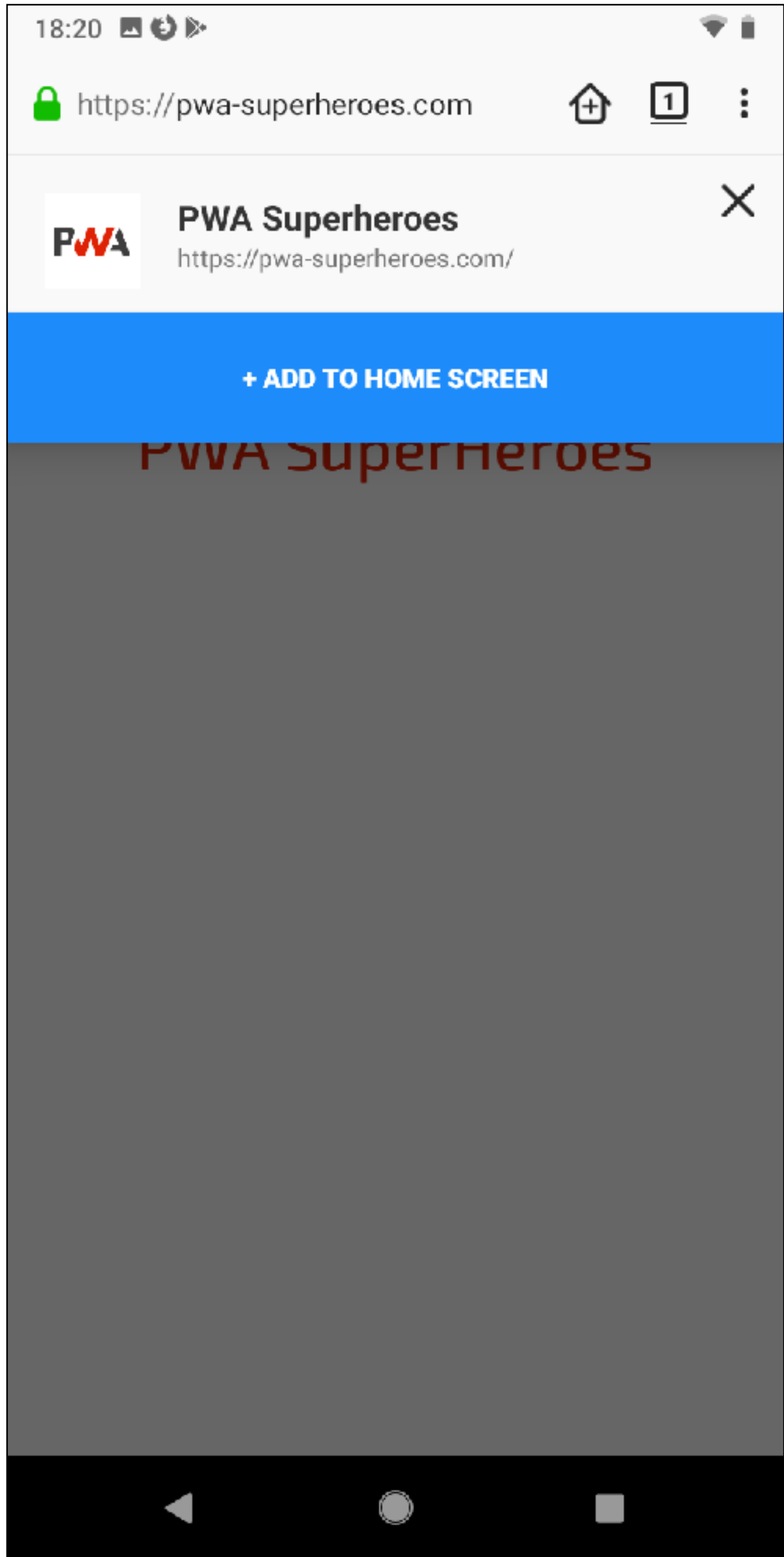






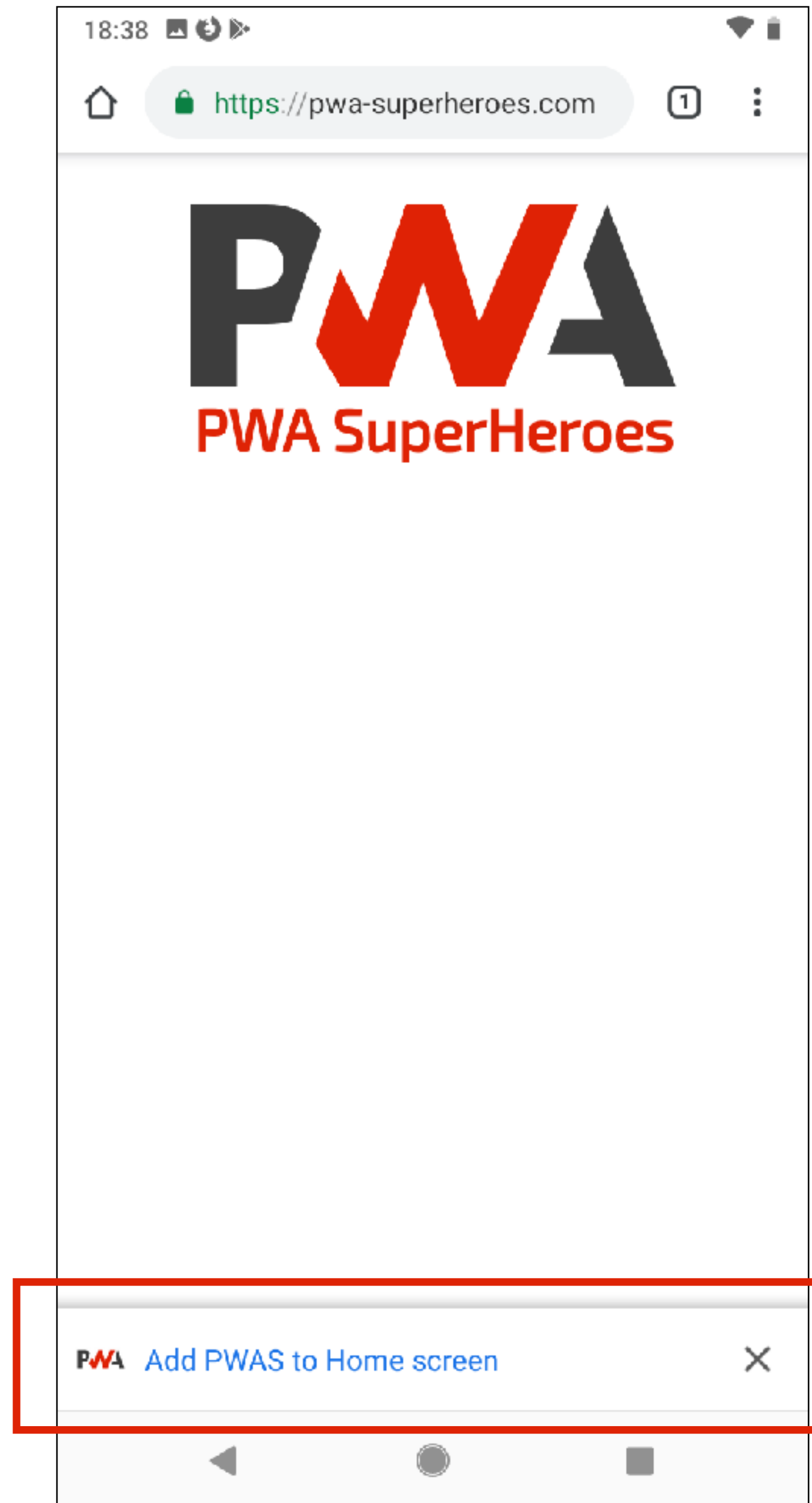


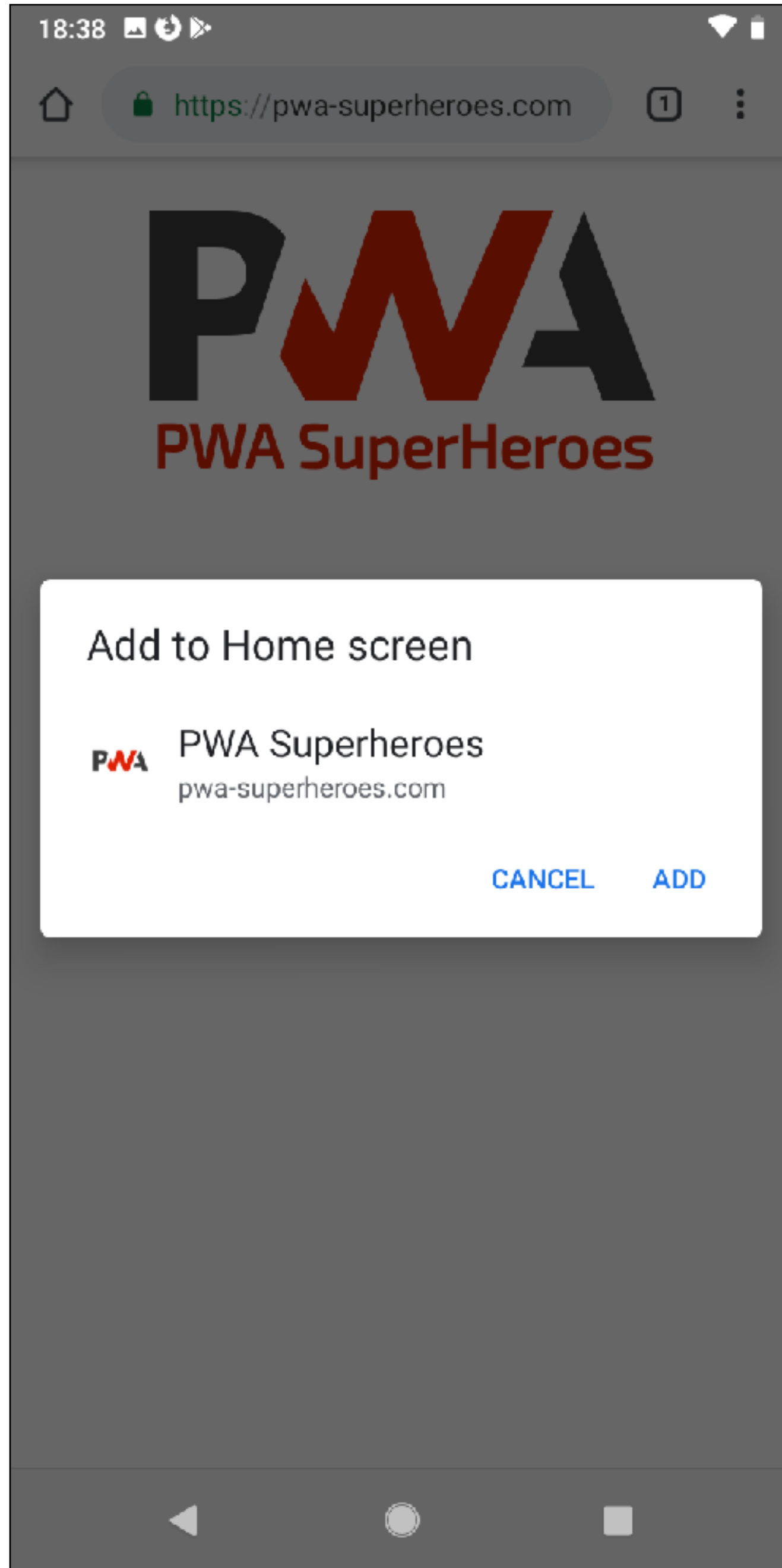






beforeinstallprompt






```
<!DOCTYPE html>
<html lang="en">
  <head>
    ...
    <script defer src="js/a2hs.js"></script>
  </head>
  <body>
    <header>
      
      <h1>PWA SuperHeroes</h1>
    </header>
    <main>
      <button id="btnInstall" class="hide">Add to Home screen</button>
    </main>
  </body>
</html>
```

```
main {
  margin-top: 10px;
  text-align: center;
}

#btnInstall {
  color: #ffffff;
  background-color: #3d3d3d;
  border-radius: 10px;
  display: none;
  padding: 10px 20px;
}

.show {
  display: inline-block !important;
}
```

```
// a2hs.js

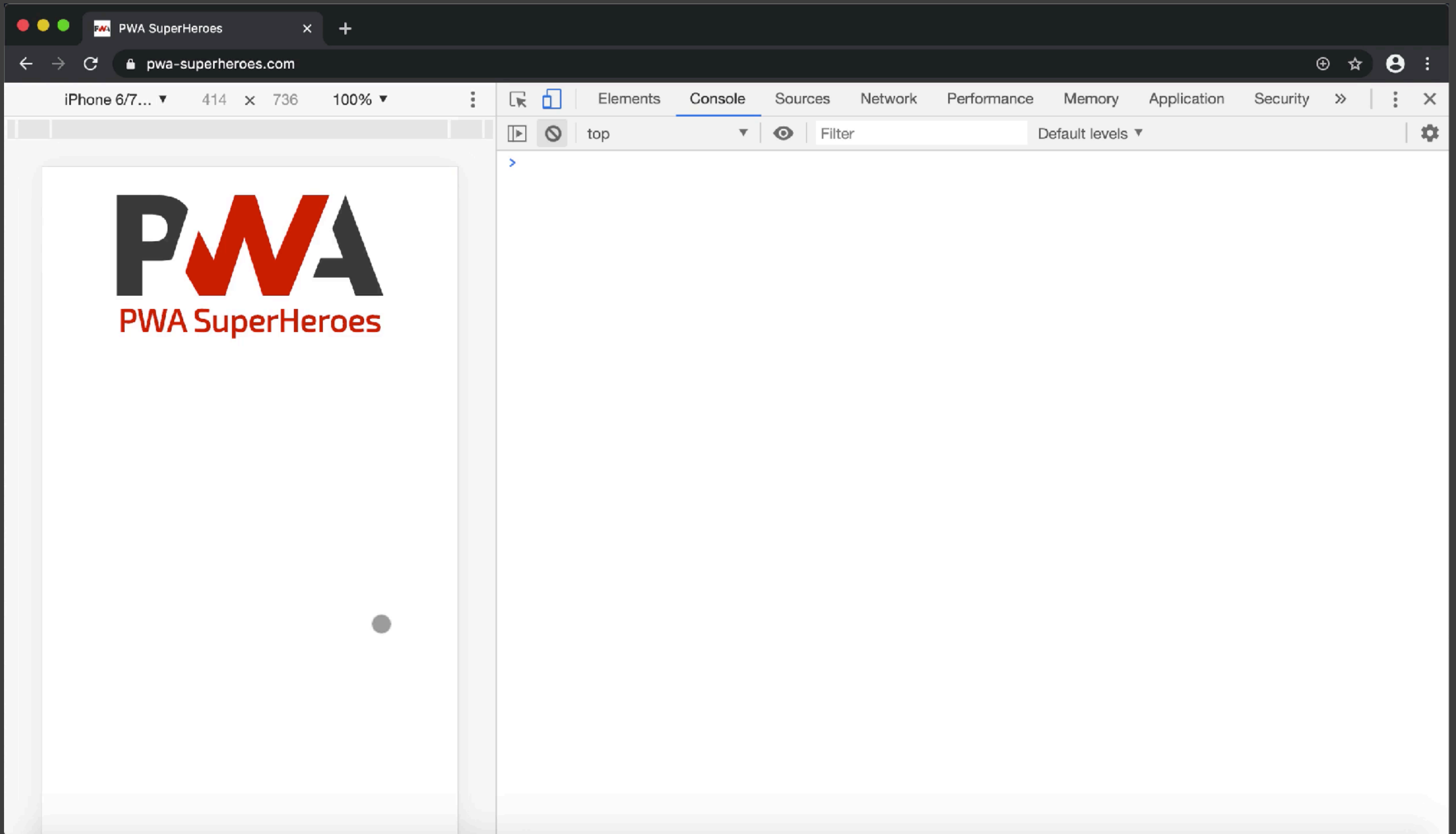
let deferredPrompt;
const btnInstall = document.getElementById("btnInstall");

window.addEventListener("beforeinstallprompt", event => {
  console.log("beforeinstallprompt fired");
  // prevent showing dialog
  event.preventDefault();
  deferredPrompt = event;
  // show button to install PWA
  btnInstall.classList.add("show");
  return false;
});
```



```
// a2hs.js

btnInstall.addEventListener("click", () => {
  if (deferredPrompt) {
    // show native dialog
    deferredPrompt.prompt();
    // act on user choice
    deferredPrompt.userChoice.then(choiceResult => {
      if (choiceResult.outcome === "dismissed") {
        console.log("User cancelled installation");
      } else {
        console.log("User added to home screen");
        // hide button to install PWA
        btnInstall.classList.remove("show");
        deferredPrompt = null;
      }
    });
  }
});
```





Service Workers

Service Workers

- JavaScript file
- runs in the background
- in a separate thread; so non-blocking
- scoped to a website
- can't modify page; no access to DOM
- asynchronous; promises or async/await
- event driven

Man-in-the-middle



Marvel-in-the-middle



```
// sw.js

self.addEventListener("install", event => {
  console.log("[Service Worker] Installing Service Worker ...", event);
});

self.addEventListener("activate", event => {
  console.log("[Service Worker] Activating Service Worker ...", event);
  // ensure that the Service Worker is activated correctly (fail-safe)
  return self.clients.claim();
});
```



```
// app.js

// check for modern browser
if ("serviceWorker" in navigator) {
  navigator.serviceWorker
    .register("/sw.js")
    .then(() => {
      console.log("Service Worker registered!");
    })
    .catch(err => {
      console.log(err);
    });
}
```

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta http-equiv="X-UA-Compatible" content="ie=edge" />
    <title>PWA SuperHeroes</title>
    <link rel="icon" type="image/png" href="favicon.png" />
    <link rel="stylesheet" href="css/app.css" />
    <link rel="manifest" href="manifest.json" />
    <script src="js/app.js"></script>
  </head>
  <body>
    <header>
      
      <h1>PWA SuperHeroes</h1>
    </header>
  </body>
</html>
```



PWA SuperHeroes

x

+

←

→

↺

127.0.0.1:8080

☆

👤

Updaten

⋮

iPhone 6/7...

▼

414 x 736

100%

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⋮

🔍

📄

Elements

Console

Sources

Network

Performance

Memory

Application

Security

»

⋮

✕

Application

Manifest

Service Workers

Clear storage

Storage

Local Storage

Session Storage

IndexedDB

Web SQL

Cookies

Cache

Cache Storage

Application Cache

Background Services

Background Fetch

Background Sync

Notifications

Payment Handler

Push Messaging

Frames

top

App Manifest

[manifest.json](#)

Installability

⚠️ No matching service worker detected. You may need to reload the page, or check that the service worker

Identity

Name

PWA Superheroes

Short name

PWAS

Presentation

Start URL

/

Theme color

■

#DF2305

Background color

■

#3D3D3D

Orientation

portrait

Display

standalone

Icons

192x192

image/png



Cache API



```
// sw.js

self.addEventListener("install", event => {
  // without waiting the SW will continue without caching
  event.waitUntil(
    // opens the existing `static` cache or creates it
    caches.open("static").then(cache => {
      console.log("[Service Worker] Precaching Files");
      cache.add("/");
      cache.add("index.html");
      cache.add("css/app.css");
      cache.add("fonts/exo2.woff2");
      cache.add("js/app.js");
      cache.add("img/pwa.svg");
      cache.add("favicon.png");
      cache.add("manifest.json");
      cache.add("manifest-icon-192.png");
    })
  );
});
```



```
// sw.js
```

```
const STATIC_CACHE = "static-v1";  
const STATIC_FILES = ["/", "index.html", "css/app.css",  
    "fonts/exo2.woff2", "js/app.js",  
    "img/pwa.svg", "favicon.png",  
    "manifest.json", "manifest-icon-192.png"];
```

```
self.addEventListener("install", event => {  
    event.waitUntil(  
        caches.open(STATIC_CACHE).then(cache => {  
            cache.addAll(STATIC_FILES);  
        })  
    );  
});
```

PWA SuperHeroes

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127.0.0.1:8080

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⋮

iPhone 6/7...

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414 × 736

87%

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⋮

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Application

📄 Manifest

⚙️ Service Workers

🗑️ Clear storage

Storage

▶️ 🗄️ Local Storage

▶️ 🗄️ Session Storage

🗄️ IndexedDB

🗄️ Web SQL

▶️ 🍪 Cookies

Cache

▶️ 🗄️ Cache Storage

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↕️ Background Fetch

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Service Workers

☐ Offline

☐ Update on reload

☐ Bypass for network

http://127.0.0.1:8080/

[Update](#) [Unregister](#)

Source

[sw.js](#)

Received

10-10-2019 20:33:19

Status

● #26 activated and is running

[stop](#)

Clients

http://127.0.0.1:8080/ [focus](#)

Push

Test push message from DevTools.

Push

Sync

test-tag-from-devtools

Sync

PWA SuperHeroes

×

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←

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127.0.0.1:8080

☆

👤

⋮

iPhone 6/7... ▾414 × 73687% ▾⋮

🔍📄

Elements

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Application

📄 Manifest

⚙️ Service Workers

🗑️ Clear storage

Storage

▶️ 🗄️ Local Storage

▶️ 🗄️ Session Storage

🗄️ IndexedDB

🗄️ Web SQL

▶️ 🍪 Cookies

Cache

▼ 🗄️ Cache Storage

🗄️ static-v1 - http://127.0.0.1:8080

🗄️ Application Cache

Background Services

↕️ Background Fetch

🔄 Background Sync

🔔 Notifications

💳 Payment Handler

☁️ Push Messaging

Frames

▶️ 🖼️ top

Service Workers

☐ Offline☐ Update on reload☐ Bypass for network

http://127.0.0.1:8080/

Update

Unregister

Source

sw.js

Received

10-10-2019 20:33:19

Status

● #26 activated and is running

stop

● #27 waiting to activate

skipWaiting

Received

10-10-2019 20:34:50

Clients

http://127.0.0.1:8080/

focus

Push

Test push message from DevTools.

Push

Sync

test-tag-from-devtools

Sync



Fetch API

PWA SuperHeroes

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127.0.0.1:8080

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⋮

iPhone 6/7...

▼

414 × 736

87%

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🖱️

📄

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🔍

☐ Preserve log

☒ Disable cache

Online

▼

⬆️

⬇️

⚙️

Filter

☐ Hide data URLs

All

XHR

JS

CSS

Img

Media

Font

Doc

WS

Manifest

Other

10 ms

20 ms

30 ms

40 ms

50 ms

60 ms

70 ms

80 ms

90 ms

100 ms

110 ms

Recording network activity...

Perform a request or hit ⌘ R to record the reload.

[Learn more](#)



```
// sw.js

self.addEventListener("fetch", event => {
  event.respondWith(
    // look at all caches for a match on the key (= request)
    caches
      .match(event.request)
      // you will always get a response; null if not found
      .then(response => {
        if (response) {
          // if found: return from cache
          return response;
        } else {
          // fetch it from the server
          return fetch(event.request);
        }
      })
  )
});
```

PWA SuperHeroes

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127.0.0.1:8080

☆

👤

⋮

iPhone 6/7... ▾414 × 73687% ▾⋮

🔍📄

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Service Workers

☐ Offline☐ Update on reload☐ Bypass for network

http://127.0.0.1:8080/

UpdateUnregister

Source

sw.js

Received

10-10-2019 20:34:50

Status

● #27 activated and is running

stop

Clients

http://127.0.0.1:8080/

focus

Push

Test push message from DevTools.

Push

Sync

test-tag-from-devtools

Sync

ШВИДКІСТЬ

PWA SuperHeroes

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127.0.0.1:8080

☆

👤

⋮

iPhone 6/7...

▼

414 × 736

87%

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⋮

×

●

🚫

🔍

🔍

☐ Preserve log

☒ Disable cache

Online

⬆

⬇

⚙

Filter

☐ Hide data URLs

All

XHR

JS

CSS

Img

Media

Font

Doc

WS

Manifest

Other

20 ms

40 ms

60 ms

80 ms

100 ms

120 ms

140 ms

160 ms

180 ms

200 ms

Name	Status	Type	Initiator	Size	Time	Waterfall
127.0.0.1	200	document	Other	870 B	30 ms	
app.css	200	stylesheet	(index)	650 B	62 ms	
app.js	200	script	(index)	525 B	38 ms	
pwa.svg	200	svg+xml	(index)	1.8 KB	38 ms	
manifest.json	200	manifest	Other	747 B	7 ms	
favicon.png	200	png	Other	20.7 KB	13 ms	
manifest-icon-192.png	200	png	Other	4.4 KB	9 ms	

7 requests

29.6 KB transferred

27.6 KB resources

Finish: 175 ms

DOMContentLoaded: 140 ms

Load: 145 ms

PWA

PWA SuperHeroes





Cache Cleanup

...

```
<main>
```

```
  <button id="btnInstall" class="hide">Add to Home screen</button>
```

```
  <a href="about.html">about</a>
```

```
</main>
```

...


```
// about.html
```

```
<!DOCTYPE html>
```

```
<html lang="en">
```

```
  <head>
```

```
    ...
```

```
  </head>
```

```
  <body>
```

```
    <header>
```

```
      ...
```

```
    </header>
```

```
    <main>
```

```
      <p>This is a demo website a for Progressive Web App  
      talk by Rowdy Rabouw.</p>
```

```
      <a href="https://noti.st/rowdy" target="_blank">more info</a>
```

```
    </main>
```

```
  </body>
```

```
</html>
```



```
a, p {  
  color: #3d3d3d;  
  font-family: "Exo 2", sans-serif;  
  font-size: 20px;  
  text-decoration-color: #df2305;  
}
```

```
// sw.js
```

```
const STATIC_CACHE = "static-v2";  
const STATIC_FILES = ["/", "index.html", "css/app.css",  
  "fonts/exo2.woff2", "js/app.js",  
  "img/pwa.svg", "favicon.png",  
  "manifest.json", "manifest-icon-192.png"];
```





```
// sw.js

self.addEventListener("activate", event => {
  event.waitUntil(
    // will return an array of cache names
    caches.keys().then(keys => {
      return Promise.all(
        // go over all available keys
        keys.map(key => {
          if (key !== STATIC_CACHE) {
            return caches.delete(key);
          }
        })
      );
    })
  );
  return self.clients.claim();
});
```



Dynamic Caching

```
// sw.js
```

```
const DYNAMIC_CACHE = "dynamic-v1";  
const STATIC_CACHE = "static-v3";  
const STATIC_FILES = ["/", "index.html", "css/app.css",  
  "fonts/exo2.woff2", "js/app.js",  
  "js/a2hs.js", "img/pwa.svg",  
  "favicon.png", "manifest.json",  
  "manifest-icon-192.png"];
```



```
// sw.js
```

```
self.addEventListener("fetch", event => {  
  event.respondWith(  
    caches.match(event.request).then(response => {  
      if (response) { return response; }  
      else {  
        return fetch(event.request);  
      }  
    })  
  );  
});
```



```
// sw.js
```

```
self.addEventListener("fetch", event => {  
  event.respondWith(  
    caches.match(event.request).then(response => {  
      if (response) { return response; }  
      else {  
        return (  
          fetch(event.request).then(res => {  
            return caches.open(DYNAMIC_CACHE).then(cache => {  
              cache.put(event.request.url, res.clone());  
              return res;  
            });  
          });  
        );  
      }  
    })  
  );  
});
```

```
// sw.js

self.addEventListener("activate", event => {
  event.waitUntil(
    caches.keys().then(keys => {
      return Promise.all(
        keys.map(key => {
          if (key !== STATIC_CACHE) {
            return caches.delete(key);
          }
        })
      );
    })
  );
  return self.clients.claim();
});
```

```
// sw.js

self.addEventListener("activate", event => {
  event.waitUntil(
    caches.keys().then(keys => {
      return Promise.all(
        keys.map(key => {
          if (key !== STATIC_CACHE && key !== CACHE_DYNAMIC_NAME) {
            return caches.delete(key);
          }
        })
      );
    })
  );
  return self.clients.claim();
});
```


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🖼️ 📄 🔍 ⚙️

Elements Console Sources Network Performance Memory Application Security ⌵

⛔ 🔍 ☐ Preserve log ☒ Disable cache Online ⌵ ⬆️ ⬇️ ⚙️

☐ Hide data URLs All XHR JS CSS Img Media Font Doc WS Manifest Other

20 ms 40 ms 60 ms 80 ms 100 ms 120 ms 1

Name	Status	Type	Initiator	Size	Time	Waterfall
📄 pwa-superheroes.com	200	document	Other	(ServiceWorker)	9 ms	
📄 app.css	200	stylesheet	(index)	(ServiceWorker)	26 ms	
📄 app.js	200	script	(index)	(ServiceWorker)	25 ms	
📄 a2hs.js	200	script	(index)	(ServiceWorker)	68 ms	
📄 pwa.svg	200	svg+xml	(index)	(ServiceWorker)	25 ms	
⚙️ a2hs.js	200	fetch	sw.js:30	516 B	33 ms	
📄 manifest.json	200	manifest	Other	(ServiceWorker)	5 ms	
📄 favicon.png	200	png	Other	(ServiceWorker)	5 ms	
📄 manifest-icon-192.png	200	png	Other	(ServiceWorker)	7 ms	

9 requests | 516 B transferred | 29.0 KB resources | Finish: 115 ms | DOMContentLoaded: 94 ms | Load: 93 ms

PWA

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[about](#)



Offline Fallback



```
// offline.html

<!DOCTYPE html>
<html lang="en">
  <head>
    ...
  </head>
  <body>
    <header>
      ...
    </header>
    <main>
      <p><b>We're sorry, this page hasn't been cached yet :-( </b></p>
      <p>But why don't you try one of our <a href="/">other pages</a>?</p>
    </main>
  </body>
</html>
```



```
// sw.js
```

```
const DYNAMIC_CACHE = "dynamic-v1";  
const STATIC_CACHE = "static-v4";  
const STATIC_FILES = ["/", "index.html", "offline.html",  
  "css/app.css", "fonts/exo2.woff2",  
  "js/app.js", "js/a2hs.js", "img/pwa.svg",  
  "favicon.png", "manifest.json",  
  "manifest-icon-192.png"];
```



```
// sw.js
```

```
self.addEventListener("fetch", event => {  
  event.respondWith(  
    caches.match(event.request).then(response => {  
      if (response) { return response; }  
      else {  
        return (  
          fetch(event.request).then(res => {  
            return caches.open(DYNAMIC_CACHE).then(cache => {  
              cache.put(event.request.url, res.clone());  
              return res;  
            });  
          });  
        );  
      }  
    })  
  );  
});
```

```
// sw.js

...
return fetch(event.request)
  .then(res => {
    ...
  })
  .catch(err => {
    return caches.open(STATIC_CACHE).then(cache => {
      return cache.match("/offline.html");
    });
  });
...

```

```
// sw.js

...
return fetch(event.request)
  .then(res => {
    ...
  })
  .catch(err => {
    return caches.open(STATIC_CACHE).then(cache => {
      if (event.request.headers.get("accept").includes("text/html")) {
        return cache.match("/offline.html");
      }
    });
  });
});
...
```


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Elements

Console

Sources

Network

Performance

Memory

Application

Security

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✕

Application

📄 Manifest

⚙️ Service Workers

🗑️ Clear storage

Storage

▶ 🗄️ Local Storage

▶ 🗄️ Session Storage

🗄️ IndexedDB

🗄️ Web SQL

▶ 🍪 Cookies

Cache

▼ 🗄️ Cache Storage

🗄️ static-v3 - https://pwa-superheroes.com/

🗄️ Application Cache

Background Services

↕️ Background Fetch

🔄 Background Sync

🔔 Notifications

💳 Payment Handler

☁️ Push Messaging

Frames

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Service Workers

☐ Offline ☐ Update on reload ☐ Bypass for network

https://pwa-superheroes.com/

[Update](#) [Unregister](#)

Source [sw.js](#) 18

Received 4-11-2019 14:29:59

Status ● #60 activated and is running [stop](#)

Clients [https://pwa-superheroes.com/](#) [focus](#)

Push [Push](#)

Sync [Sync](#)

▶ Service workers from other origins

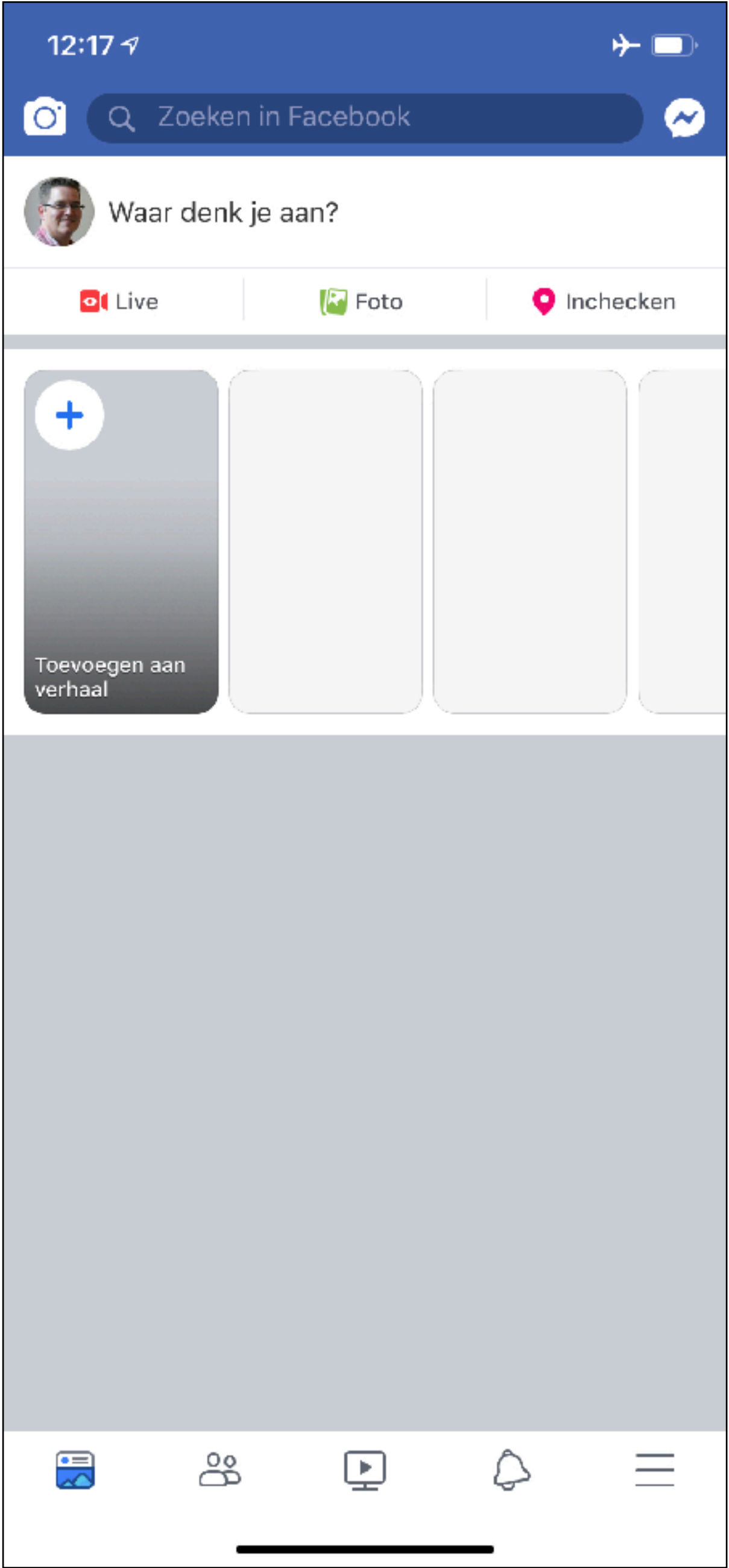
PWA

PWA SuperHeroes

[about](#)



Application Shell



```
...
<main>
  <button id="btnInstall" class="hide">Add to Home screen</button>
  <a href="about.html">about</a>
  <div class="container">
    <div class="placeholder">
      <h2 id="name">&nbsp;</h2>
    </div>
    <div class="placeholder">
      <p id="details">&nbsp;<br />&nbsp;</p>
    </div>
    <div class="placeholder img-placeholder" id="image"></div>
  </div>
</main>
...
```



```
h2 {  
  font-family: "Exo 2", sans-serif;  
  margin-bottom: 0;  
}  
  
.container {  
  width: 240px;  
  margin: auto;  
}  
  
.placeholder {  
  background-color: #f3f3f3;  
  margin-bottom: 10px;  
  animation: colorchange 2.5s cubic-bezier(0.36, 0.07, 0.19, 0.97) both;  
  animation-iteration-count: infinite;  
}
```



```
.img-placeholder {  
  height: 320px;  
}  
  
img {  
  max-width: 100%;  
  border-top-left-radius: 70px;  
  border-bottom-right-radius: 70px;  
}  
  
@keyframes colorchange {  
  0% { background: #f3f3f3; }  
  50% { background: #d1d1d1; }  
  100% { background: #f3f3f3; }  
}
```

```
// sw.js
```

```
const STATIC_CACHE = "static-v5";
```





Dynamic Data


```
// api.js
```

```
const url = "https://www.superheroapi.com/api.php/3251184438288441/213";
```

```
fetch(url)  
  .then(res => {  
    return res.json();  
  })  
  .then(data => {  
    console.log("Retrieved from web", data);  
    updateUI("web", data);  
  });
```

```
// api.js
```

```
function updateUI(updateBy, data) {  
  console.log(`Update UI by ${updateBy}`);  
  document.getElementById("name").innerHTML = data.name;  
  const details = `${data.biography["full-name"]}, ${data.biography["place-  
of-birth"]}<br/>${data.appearance.height[1]} / ${data.appearance.weight[1]}  
`;  
  document.getElementById("details").innerHTML = details;  
  document.getElementById("image").innerHTML = ``;  
  const all = document.getElementsByClassName("placeholder");  
  for (let i = 0; i < all.length; i++) {  
    all[i].style.backgroundColor = "transparent";  
    all[i].style.animation = "none";  
  }  
}
```

```
<!DOCTYPE html>  
<html lang="en">  
  <head>  
    ...  
    <script defer src="js/api.js"></script>  
  </head>  
  <body>  
    ...  
  </body>  
</html>
```



```
// sw.js
```

```
const STATIC_CACHE = "static-v6";  
const STATIC_FILES = ["/", "index.html", "offline.html", "css/app.css",  
  "fonts/exo2.woff2", "js/app.js", "js/a2hs.js",  
  "js/api.js", "img/pwa.svg", "favicon.png",  
  "manifest.json", "manifest-icon-192.png"];
```


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🖱️ 📄 Elements Console Sources Network Performance Memory Application Security >> ⌵ ✕

Application

📄 Manifest

⚙️ Service Workers

🗑️ Clear storage

Storage

▶ 🗄️ Local Storage

▶ 🗄️ Session Storage

🗄️ IndexedDB

🗄️ Web SQL

▶ 🍪 Cookies

Cache

▼ 🗄️ Cache Storage

🗄️ static-v5 - https://pwa-superheroes.com

🗄️ Application Cache

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🔄 Background Sync

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Service Workers

☐ Offline ☐ Update on reload ☐ Bypass for network

https://pwa-superheroes.com/

[Update](#) [Unregister](#)

Source

[sw.js](#)

Received

6-11-2019 07:30:17

Status

● #65 activated and is running [stop](#)

Clients

https://pwa-superheroes.com/ [focus](#)

Push

Push

Sync

Sync

▶ Service workers from other origins

PWA

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IndexedDB

IndexedDB

An asynchronous transactional key-value database in the browser for data that changes frequently and is typically in JSON format.

Transactional means that if one of the actions within an operation fails, none of those actions are applied to keep database integrity.

IndexedDB

An asynchronous transactional key-value database in the browser for data that changes frequently and is typically in JSON format.

Transactional means that if one of the actions within an operation fails, none of those actions are applied to keep database integrity.



 [jakearchibald](#) / [idb](#)

 Watch

53

 Star

2.3k

 Fork

214

 Code

 Issues 19

 Pull requests 4

 Projects 0

 Security

 Insights

IndexedDB, but with promises <https://www.npmjs.com/package/idb>

 105 commits

 2 branches

 0 packages

 17 releases

 [Fetching contributors](#)

 ISC

Branch: master ▾

New pull request

Find file

Clone or download ▾



NotWoods and **jakearchibald** Return void instead of undefined (#128)

Latest commit 12f14cb Oct 9, 2019

 build	Return void instead of undefined (#128)	Oct 9, 2019
 lib	Return void instead of undefined (#128)	Oct 9, 2019
 test	Prettier	Sep 27, 2019
 .gitignore	4.0.0 (#93)	Mar 15, 2019
 .prettierrc.json	Prettier	Sep 27, 2019
 LICENSE	Update license to be inline with package.json	Nov 29, 2016

```
<!DOCTYPE html>
<html lang="en">
  <head>
    ...
    <script src="idb.js"></script>
    <script src="utils.js"></script>
  </head>
  <body>
    ...
  </body>
</html>
```

```
// sw.js
```

```
importScripts("idb.js");  
importScripts("utils.js");
```

```
const DYNAMIC_CACHE = "dynamic-v1";  
const STATIC_CACHE = "static-v7";  
const STATIC_FILES = ["/", "index.html", "offline.html", "css/app.css",  
    "idb.js", "utils.js", "fonts/exo2.woff2", "js/app.js",  
    "js/a2hs.js", "js/api.js", "img/pwa.svg",  
    "favicon.png", "manifest.json", "manifest-icon-192.png"];
```



```
// utils.js
```

```
const DYNAMIC_DB = "dynamic";  
const DYNAMIC_DB_VERSION = 1;  
const DYNAMIC_DB_STORE = "heroes";  
const API_URL = "https://www.superheroapi.com/api.php/3251184438288441/213";
```

```
// open database and get a callback after it is opened  
const IDB = idb.open(DYNAMIC_DB, DYNAMIC_DB_VERSION, db => {  
  // create a store if it doesn't exist already  
  if (!db.objectStoreNames.contains(DYNAMIC_DB_STORE)) {  
    // name the store and set the primary key  
    db.createObjectStore(DYNAMIC_DB_STORE, { keyPath: "id" });  
  }  
});
```



```
// utils.js
```

```
function writeData(storeName, data) {  
  console.log("Write data to cache", data);  
  return IDB.then(db => {  
    const tx = db.transaction(storeName, "readwrite");  
    const store = tx.objectStore(storeName);  
    store.put(data);  
    return tx.complete;  
  });  
}
```

```
// utils.js
```

```
function clearAllData(storeName) {  
  return IDB.then(db => {  
    const tx = db.transaction(storeName, "readwrite");  
    const store = tx.objectStore(storeName);  
    store.clear();  
    return tx.complete;  
  });  
}
```

```
// utils.js
```

```
function readAllData(storeName) {  
  return IDB.then(db => {  
    const tx = db.transaction(storeName, "readonly");  
    const store = tx.objectStore(storeName);  
    return store.getAll();  
  });  
}
```



```
// sw.js
```

```
self.addEventListener("fetch", event => {  
  if (event.request.url.indexOf(API_URL) > -1) {  
    event.respondWith(  
      fetch(event.request).then(res => {  
        const clonedRes = res.clone();  
        clearAllData(DYNAMIC_DB_STORE)  
          .then(() => {  
            return clonedRes.json();  
          })  
          .then(data => {  
            writeData(DYNAMIC_DB_STORE, data);  
          });  
        return res;  
      })  
    );  
  }  
});
```

```
// sw.js

self.addEventListener("fetch", event => {
  if (event.request.url.indexOf(API_URL) > -1) {
    ...
  } else {
    event.respondWith(
      caches.match(event.request).then(response => {
        ...
      })
    );
  }
});
```



```
// api.js
```

```
const url = "https://www.superheroapi.com/api.php/3251184438288441/213";  
let networkDataReceived = false;
```

```
fetch(API_URL)  
  .then(res => {  
    return res.json();  
  })  
  .then(data => {  
    networkDataReceived = true;  
    console.log("Retrieved from web", data);  
    updateUI("web", data);  
  });
```

```
// api.js
```

```
readAllData(DYNAMIC_DB_STORE).then(data => {  
  if (!networkDataReceived) {  
    console.log("Retrieved from cache", data[0]);  
    if (typeof data[0] !== "undefined") {  
      updateUI("cache", data[0]);  
    }  
  }  
});
```

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Application

📄 Manifest

⚙️ Service Workers

🗑️ Clear storage

Storage

▶ 🗄️ Local Storage

▶ 🗄️ Session Storage

▶ 🗄️ IndexedDB

🗄️ Web SQL

▶ 🍪 Cookies

Cache

▶ 🗄️ Cache Storage

🗄️ Application Cache

Background Services

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Service Workers

☐ Offline ☐ Update on reload ☐ Bypass for network

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[Update](#) [Unregister](#)

Source

[sw.js](#)

Received

8-11-2019 07:41:22

Status

●

#147 activated and is running

[stop](#)

●

#148 waiting to activate

[skipWaiting](#)

Received 8-11-2019 07:45:42

Clients

https://pwa-superheroes.com/ [focus](#)

Push

[Push](#)

Sync

[Sync](#)

▶ Service workers from other origins

PWA

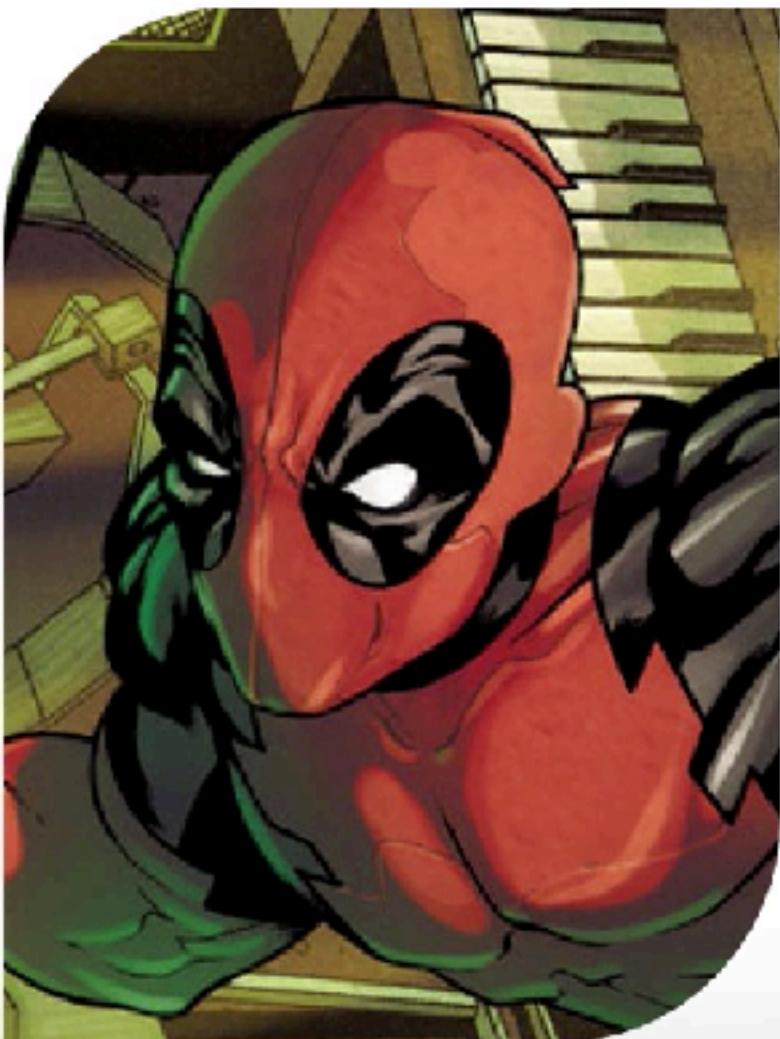
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[about](#)

Deadpool

Wade Wilson, Canada

188 cm / 95 kg





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



Background Sync API

Background Sync API

- defer actions until the user has stable connectivity
- ensure that whatever the user wants to send is sent when they regain connectivity
- behaves similar to the outbox on an email client
- messages are queued up in the outbox (indexedDB) and as soon as there's a connection, they're sent
- make sure to notify the user

Can I use

? ⚙ Settings

x Feature: Background Sync API

#

Background Sync API - UNOFFUsage % of all users  ?
Global 73.09%

Provides one-off and periodic synchronization for Service Workers with an onsync event.

Current aligned

Usage relative

Date relative

Apply filters

Show all

?

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Opera Mobile *	Chrome for Android	Firefox for Android	UC Browser for Android	Samsung Internet	QQ Browser	Baid Browser
			4-48		10-35								4		
6-10	12-17	2-69	49-77	3.1-12.1	36-63	3.2-12.4		2.1-4.4.4	12-12.1				5-9.2		
11	18	70	78	13	64	13.2	all	76	46	78	68	12.12	10.1	1.2	7.1
	76	71-72	79-81	TP											

Notes

Known issues (0)

Resources (7)

Feedback

MS Edge status: In Development

Firefox status: in-development



Periodic Sync API

Periodic Sync API

- sync data on a regular basis; update the PWA
- while the user is sleeping for instance!
- PeriodicSync API will take into account the battery level and network state of the device it's running on
- `powerState`: 'auto' or 'avoid-draining'
- `networkState`: 'avoid-cellular'

Periodic Sync API

- sync data on a regular basis; update the PWA
- while the user is sleeping for instance!
- PeriodicSync API will take into account the battery level and network state of the device it's running on
- `powerState: 'auto'` or `'avoid-draining'`
- `networkState: 'avoid-cellular'`

EXPERIMENTAL FEATURE

Can I use

?

Settings

x

Feature: (MDN feature)

#

ServiceWorkerRegistration API: periodicSync

Usage % of

all users

?

Global

0%

Current alignedUsage relativeDate relativeApply filtersShow all?

IE	Edge	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Opera Mobile	Chrome for Android	Firefox for Android	UC Browser for Android	Samsung Internet	QQ Browser	Baid Browser
6-10	12-17	2-69	4-77	3.1-12.1	10-63	3.2-12.4		2.1-4.4.4	12-12.1				4-9.2		
11	18	70	78	13	64	13.2	all	76	46	78	68	12.12	10.1	1.2	7.1
	76	71-72	79-81	TP											

Notes

Feedback

This feature is non-standard and **should not be used** without careful consideration.

See full reference on [MDN Web Docs](#).

Support data for this feature provided by:

MDN browser-compat-data



New version available!

```
<div id="snackbar">A new version of this app is available.  
Click here to update.</div>
```



```
#snackbar {  
  visibility: hidden;  
  background-color: #e02205;  
  color: #ffffff;  
  text-align: center;  
  padding: 16px;  
  position: fixed;  
  z-index: 1;  
  left: 0;  
  top: 0;  
  font-family: "Exo 2", sans-serif;  
  font-size: 20px;  
  border: 3px solid #000000;  
}
```

```
#snackbar.show {  
  visibility: visible;  
}
```

```
// sw.js

const STATIC_CACHE = "static-v8";

self.addEventListener("message", event => {
  if (event.data.action === "skipWaiting") {
    self.skipWaiting();
  }
});
```



```
// app.js
```

```
let newWorker;
```

```
function showUpdateBar() {  
  let snackbar = document.getElementById("snackbar");  
  snackbar.className = "show";  
}
```

```
document.getElementById("snackbar").addEventListener("click", () => {  
  newWorker.postMessage({ action: "skipWaiting" });  
});
```

```
// app.js
```

```
navigator.serviceWorker
  .register("/sw.js")
  .then(reg => {
    reg.addEventListener("updatefound", () => {
      newWorker = reg.installing;
      newWorker.addEventListener("statechange", () => {
        switch (newWorker.state) {
          case "installed":
            if (navigator.serviceWorker.controller) {
              showUpdateBar();
            }
            break;
        }
      });
    });
  });
});
```

```
// app.js
```

```
navigator.serviceWorker.addEventListener("controllerchange", () => {  
  window.location.reload();  
});
```


PWA SuperHeroes

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🔒 pwa-superheroes.com

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iPhone 6/7... 414 x 736 100% ⌵

Elements

Console

Sources

Network

Performance

Memory

Application

Security

Audits

⋮

✕

Application

📄 Manifest

⚙️ Service Workers

🗑️ Clear storage

Storage

▶ 🗄️ Local Storage

▶ 🗄️ Session Storage

▶ 🗄️ IndexedDB

🗄️ Web SQL

▶ 🍪 Cookies

Cache

▶ 🗄️ Cache Storage

🗄️ Application Cache

Background Services

↕ Background Fetch

↻ Background Sync

🔔 Notifications

💳 Payment Handler

☁ Push Messaging

Frames

▶ 🖼️ top

Service Workers

☐ Offline ☐ Update on reload ☐ Bypass for network

https://pwa-superheroes.com/

[Update](#) [Unregister](#)

Source

[sw.js](#)

Received

8-11-2019 23:33:53

Status

● #177 activated and is running [stop](#)

Clients

https://pwa-superheroes.com/ [focus](#)

Push

[Push](#)

Sync

[Sync](#)

▶ Service workers from other origins

PWA

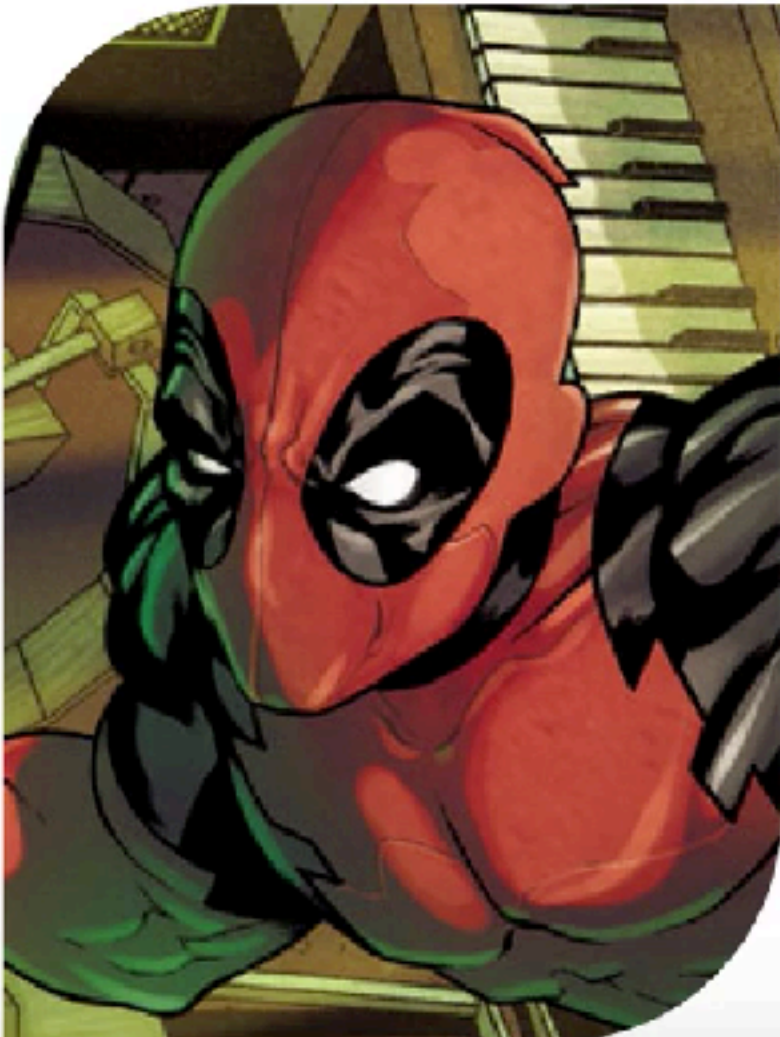
PWA SuperHeroes

[about](#)

Deadpool

Wade Wilson, Canada

188 cm / 95 kg



<https://noti.st/rowdy>

<https://github.com/rowdyrabouw/pwa-superheroes.com>



Rowdy Rabouw

Born and raised in Gouda, The Netherlands

Freelance web and app developer

Senior engineer at Nationale-Nederlanden

Lead developer Nationale-Nederlanden Pension App

Progress Developer Expert for Nativescript

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❤️ superhero movies