

Secrets of native-like Progressive Web Apps



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GDE, MVP & Web Consultant

Slides available at the end

Pillars of native-like PWAs



User Interface



**User Experience
and Performance**



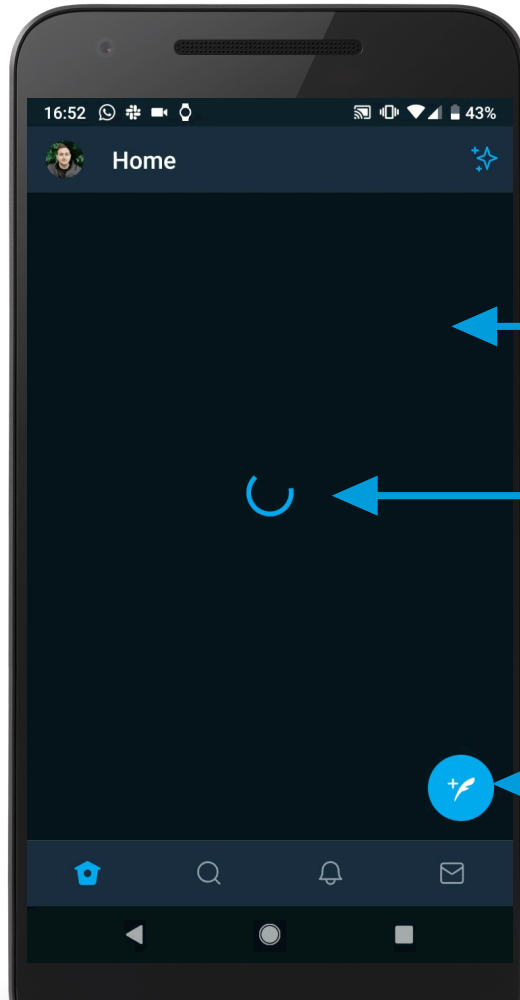
Reliability

A successful PWA is an app built with Web Technologies that satisfies and exceeds user expectations.

0. Design & Build an App Shell

hi I'm Gijs





Navbar

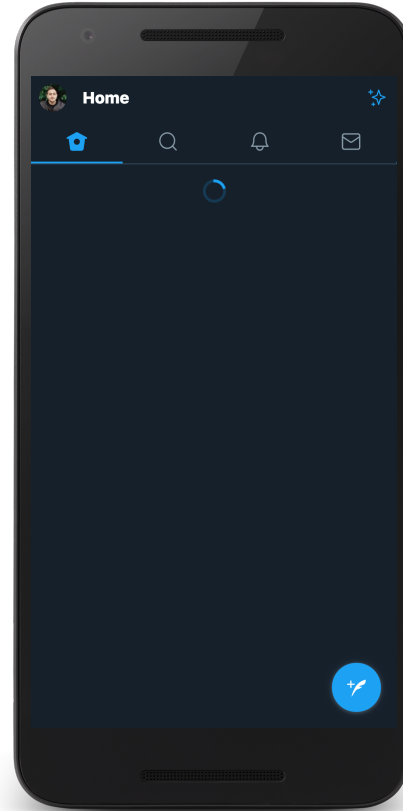
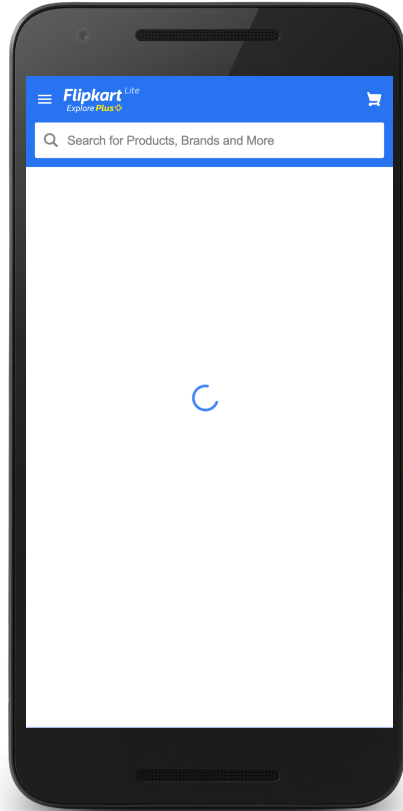
Background

Spinner

FAB

Tab bar

PWA App Shell



Limit to 40kb

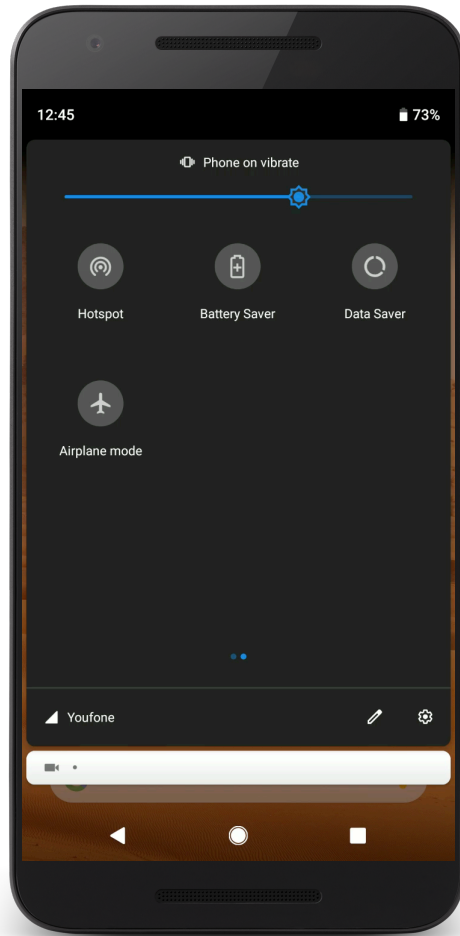
Load in \leq 1s

(Fast 3G)

```
<style>
  #search {
    padding: 50px;
  }
</style>

<header></header>
<div id="fab"></div>

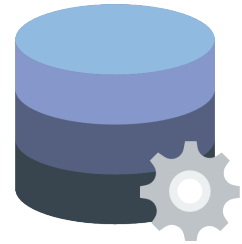
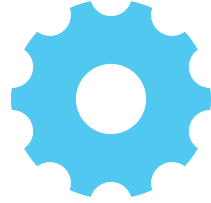
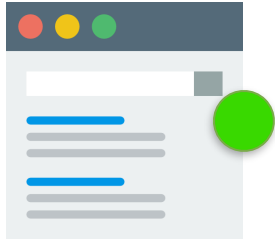
<script>
  document.querySelector("#search-form")
    .addEventListener("submit", () => {
      //
    })
</script>
```



```
//webpack.config.js
const WorkboxWebpack = require("workbox-webpack-plugin");

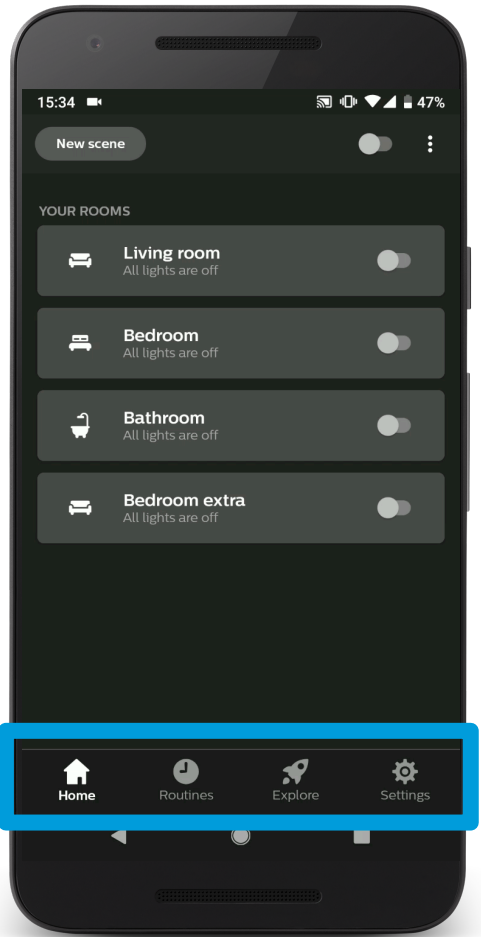
plugins: [
  // ...
  new WorkboxWebpack.InjectManifest({
    swSrc: "./src-sw.js",
    swDest: "sw.js",
  })
]

//src-sw.js
workbox.precaching.precacheAndRoute(self.__precacheManifest);
```



1. Build an advanced App Shell





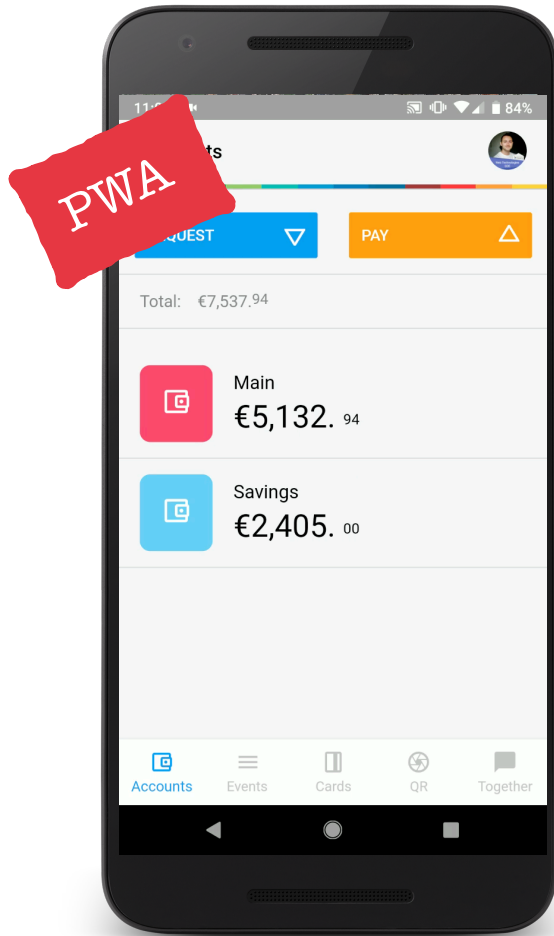
Tab Bar benefits

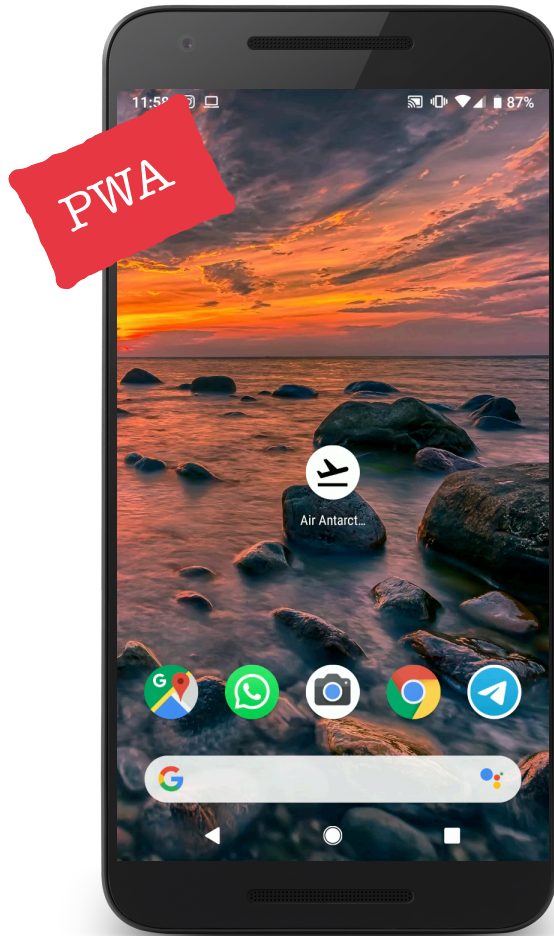
Simplifies navigational UX

Easy to reach on handheld device

Makes it look like a native app

Advanced App Shells are possible on the web today.







```
.container {  
    scroll-snap-type: x mandatory;  
}
```

```
.child {  
    scroll-snap-align: start;  
}
```


2. Reduce JavaScript footprint





```
<script type="module" src="app.js"></script>
```

```
<script nomodule src="app-legacy.js"></script>
```

app.js

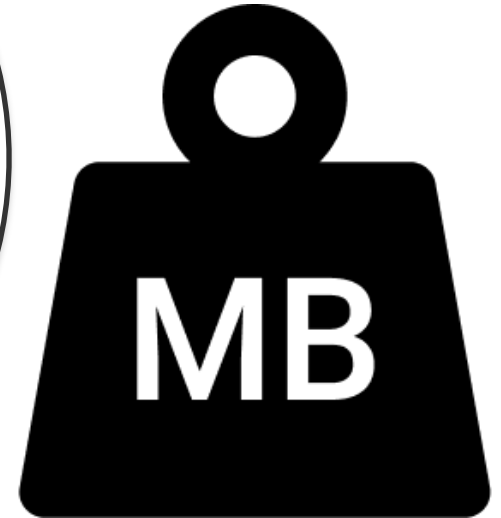
home.js

vendor.js

settings.js

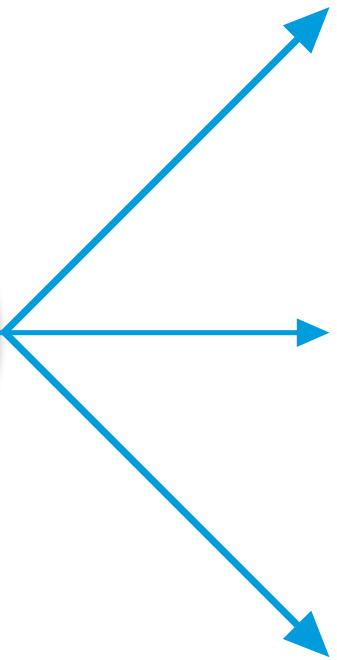
help.js

payment.js





app.js



settings.js



help.js



payment.js



UI considerations

Give feedback while chunk is loading

Show "Still loading" for large chunks

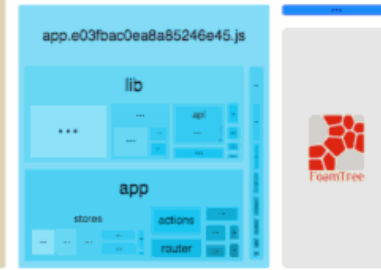
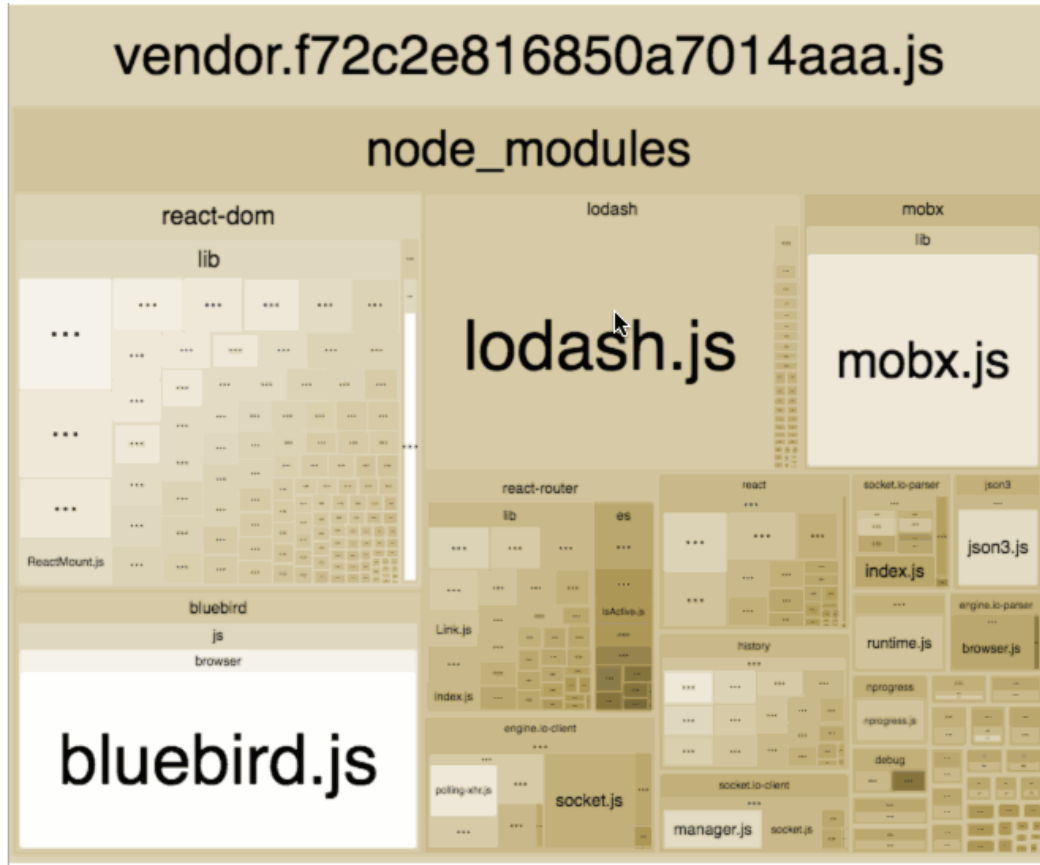
Show retry button for critical chunks

```
import("./settings.js")  
  
.then(module => {  
    module.initSettings();  
});
```

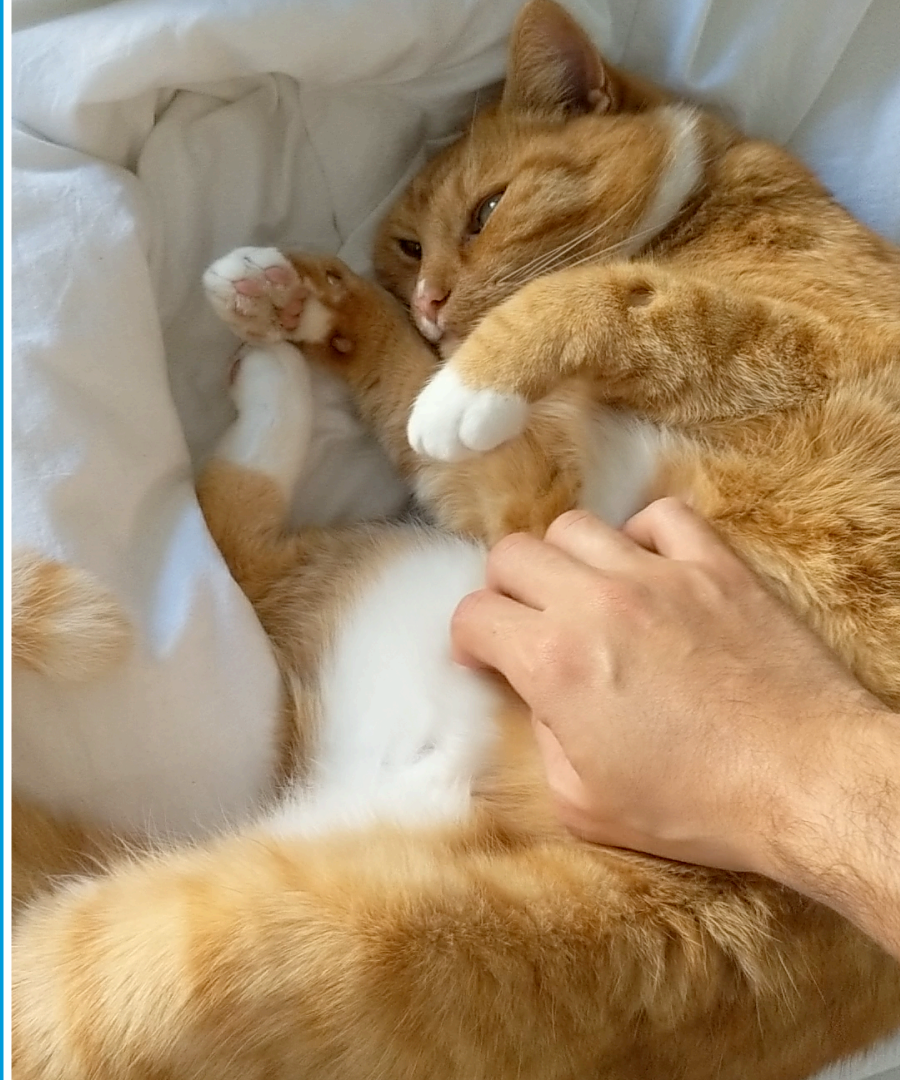
Load smaller chunks on slow connections

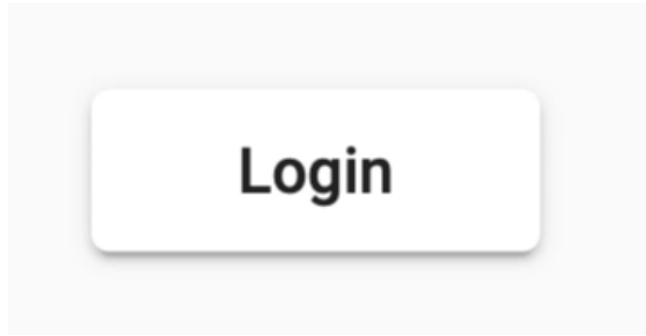
```
export const isSlowConnection = () => {  
  if ("connection" in navigator &&  
      "downlink" in navigator.connection) {  
    return navigator.connection.downlink < 1;  
  }  
  return false;  
};
```

Webpack bundle analyzer



3. React with fast interactions





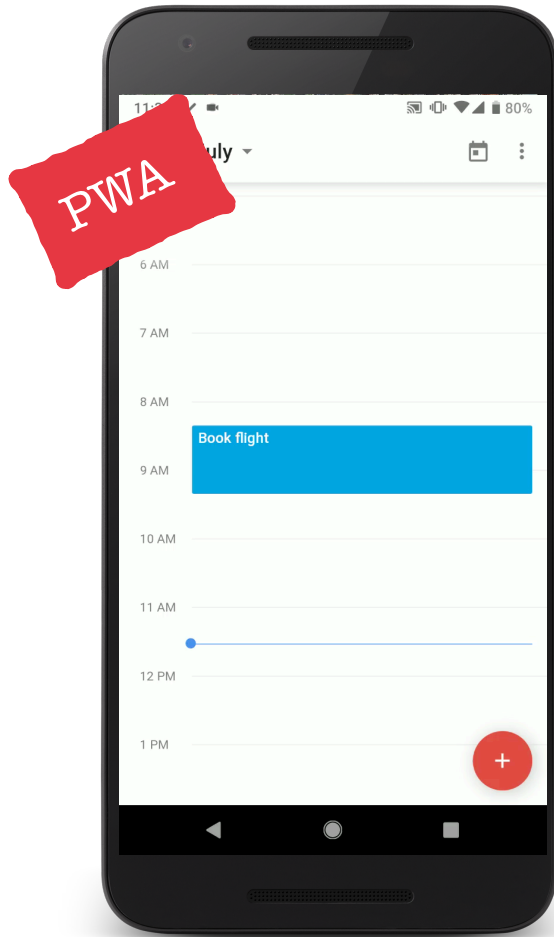
Every action needs a reaction.

Defer non-critical work

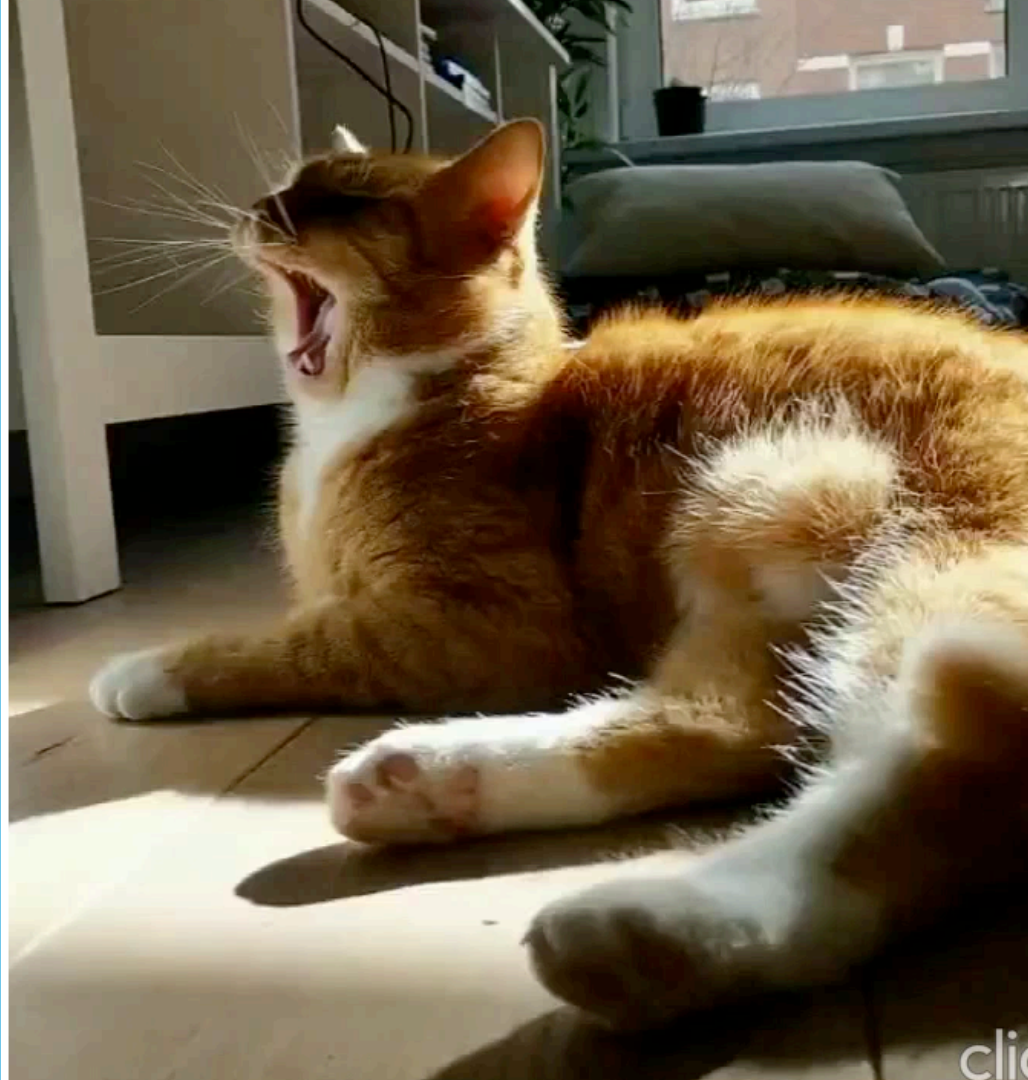
Requires a Polyfill for Safari

Measure before/after using it

```
requestIdleCallback(() => {  
    // deferred work  
});
```



4. Make it work offline



Network & Fallback to Cache

```
workbox.routing.registerRoute(  
  /api\/.*\/,  
  new workbox.strategies.NetworkFirst({  
    networkTimeoutSeconds: 5  
  })  
);  
  
new workbox.strategies.CacheFirst()  
new workbox.strategies.StaleWhileRevalidate()
```

Be mindful of storage

```
new workbox.strategies.NetworkFirst({
  cacheName: "image-cache",
  plugins: [
    new workbox.expiration.Plugin({
      maxEntries: 50,
      maxAgeSeconds: 30 * 86400, // 30 Days
      purgeOnQuotaError: true
    })
  ]
})
```

Clear user cache on Logout

```
// Caches usage in Window scope
const logout = () => {
  caches.delete("api-user").finally(() => {
    // other logout logic
  });
};
```

5. Increase A2HS conversion



App Install Banner

Prompt to add to home-screen using JS

Available when you meet some requirements

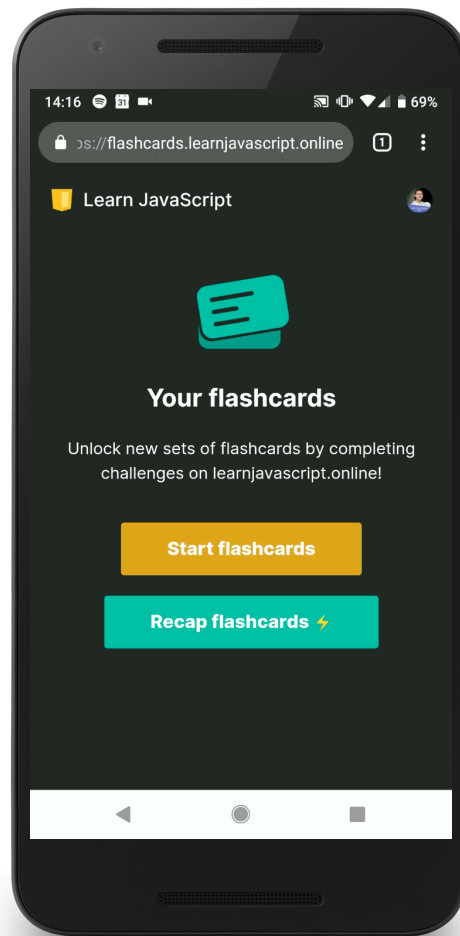


Delaying the prompt

Avoid interrupting signup/sales flow

No point in showing it when user

is not engaged yet



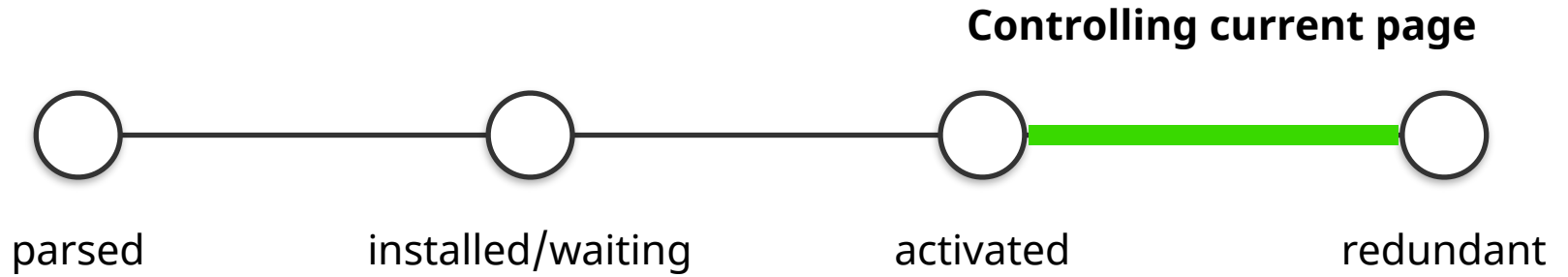
```
window.addEventListener("beforeinstallprompt", event => {
  event.preventDefault();
  // Update UI notify the user they can add to home screen

button.addEventListener("click", () => {
  event.prompt();
  event.userChoice.then(result => {
    // Send result.outcome to analytics
  });
});

});
```

6. Build a smooth update process

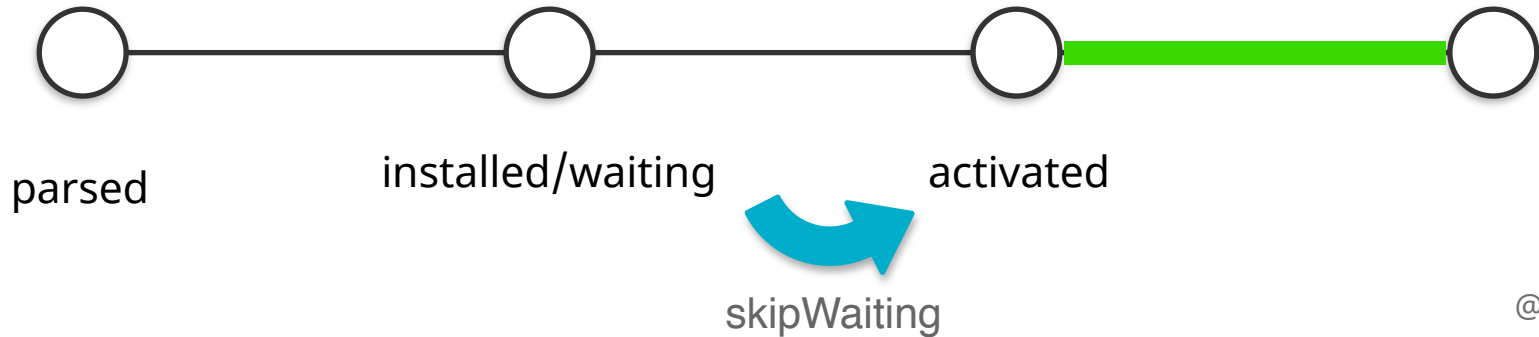




Current version (v4)



New version (v5)



Get inspiration from native desktop apps

The Update Dot

Least obtrusive yet visible

Jad Joubran

- Private Session
- Account
- Settings
- Experimental Features
- Update available. Restart now.**
- Log Out

See what your friends are playing

FIND FRIENDS

Artist	Album	Release Date	Duration
Aquilo	Adventure (Deluxe)		
	Adventure (Deluxe)		
	Adventure (Deluxe)		
	In The Lonely Hour	2018-08-28	3:59
zier	Hylas	2018-07-10	4:06
	Adventure (Deluxe)	2018-08-20	3:45
lvio, Hansie	Beats By Esko	2018-08-17	3:17
nkees	Disorganized Fun	2018-06-05	7:01
	Days Gone By (Part 1)	2018-04-01	5:57
5, Rob Swire, NERO	5 years of mau5	2017-12-26	6:56
Mob	Drink The Sea	2018-06-27	6:23


Julia Eger 

 Heartbeats
José González
🎵 The Indie Mix

Ben Khan 

 Night Changes
One Direction
🎵 One Direction

Sean Aquilina 12m

 Flashing Lights
Kanye West
🎵 Graduation

Learn JavaScript

Practice

Basic sum

Calculate the sum of a & b

Tests (0 / 4)

function returns a number

adds numbers

doesn't break for negative numbers

doesn't break for edge cases

Console



index.js

```
1  /**
2   * @param {number} a
3   * @param {number} b
4   */
5  function sum(a, b){
6     return ;
7  }
8
9  //sample usage
10 console.log(sum(1, 3));
11 console.log(sum(2, 5));
```

Run



1. Basic Functions



Free Trial

< Back

Next



ad

Practice

Get average age

Complete the function such that it returns the average age





Tests (0 / 1)


returns average age

Console

index.js

```
1  const getAverageAge = users => {
2      let total = 0;
3      users.forEach(user => total += user.age);
4      return total / users.length;
5  }
6
7  //sample usage
8  const users = [{
9      joined_on: "2018-12-13",
10     age: 14
11 }, {
12     joined_on: "2018-12-15",
13     age: 18
14 }];
15 console.log(getAverageAge(users));
```

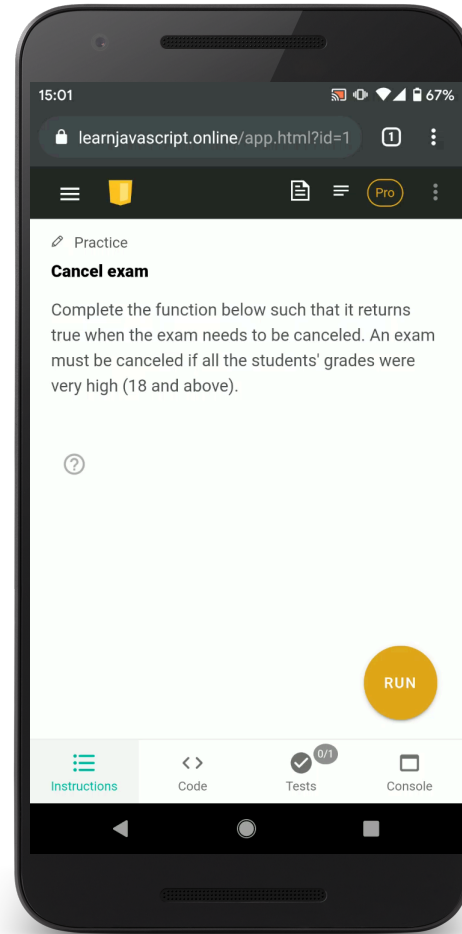
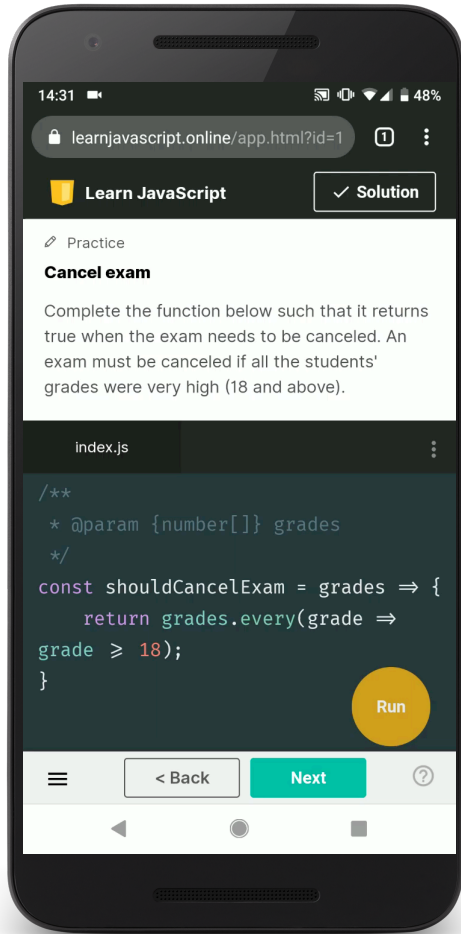
-  Restart this challenge
-  Replay random challenge
-  View achievements
-  Update app

 SOLUTION RUN

```
// index.js
import { Workbox } from "workbox-window";
const workbox = new Workbox("/sw.js");
if ('serviceWorker' in navigator) {
  workbox.register();
}
workbox.addEventListener("waiting", event => {
  // show update button dot & button
  updateButton.addEventListener("click", () => {
    wb.addEventListener("controlling", event => {
      window.location.reload();
    });
    wb.messageSW({ type: "SKIP_WAITING" });
  });
});
```

```
// sw.js
addEventListener("message", event => {
  if (event &&
    event.data === "SKIP_WAITING") {
    skipWaiting();
  }
});
```

It's all about attention to detail



Let's build PWAs our users will love 😊

Get the slides: jadjoubran.io/fronteers19

@JoubranJad