

# **PROGRESSIVE WEB APPS**

@

## **ANWB DIGITAL CAMPUS**



# DE VOORHOEDE



a team of  
**20+ front-end devs**  
3 project managers

in **Amsterdam**  
and (soon) **Delft**



we keep up with  
the **latest web**  
**technology**



we **share** insights  
and open source  
tools

# OUR WORK



**SITA**  
Create success. Together

**funda**

**Ziggo**

# PROGRESSIVE WEB APPS



# WHAT'S THE DIFFERENCE?



VS



VS



# WHAT'S THE DIFFERENCE?



AND



AND



left-to-right: web, Android app, iOS app

[read voorioede.nl/nl/portfolio/trouw-volkskrant-parool/](http://voorioede.nl/nl/portfolio/trouw-volkskrant-parool/)

Progressive Web Apps  
are websites  
with **super powers**

# THE PWA PROMISE:

**RE-ENGAGEMENT ↑**

**RETENTION ↑**

**CONVERSION ↑**



Progressive



Responsive



Network  
Independent



App-Like



Fresh



Safe



Discoverable



Re-engageable



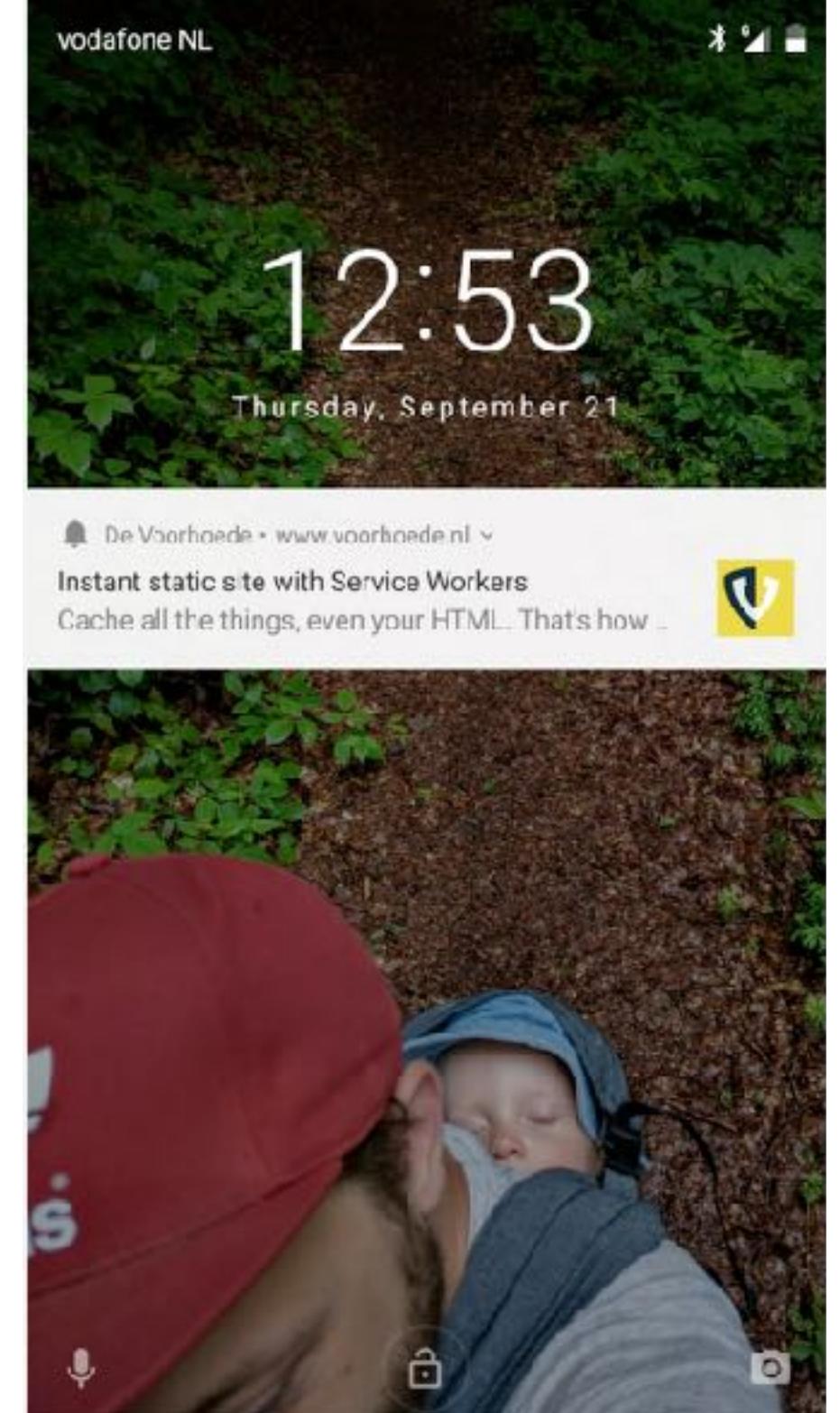
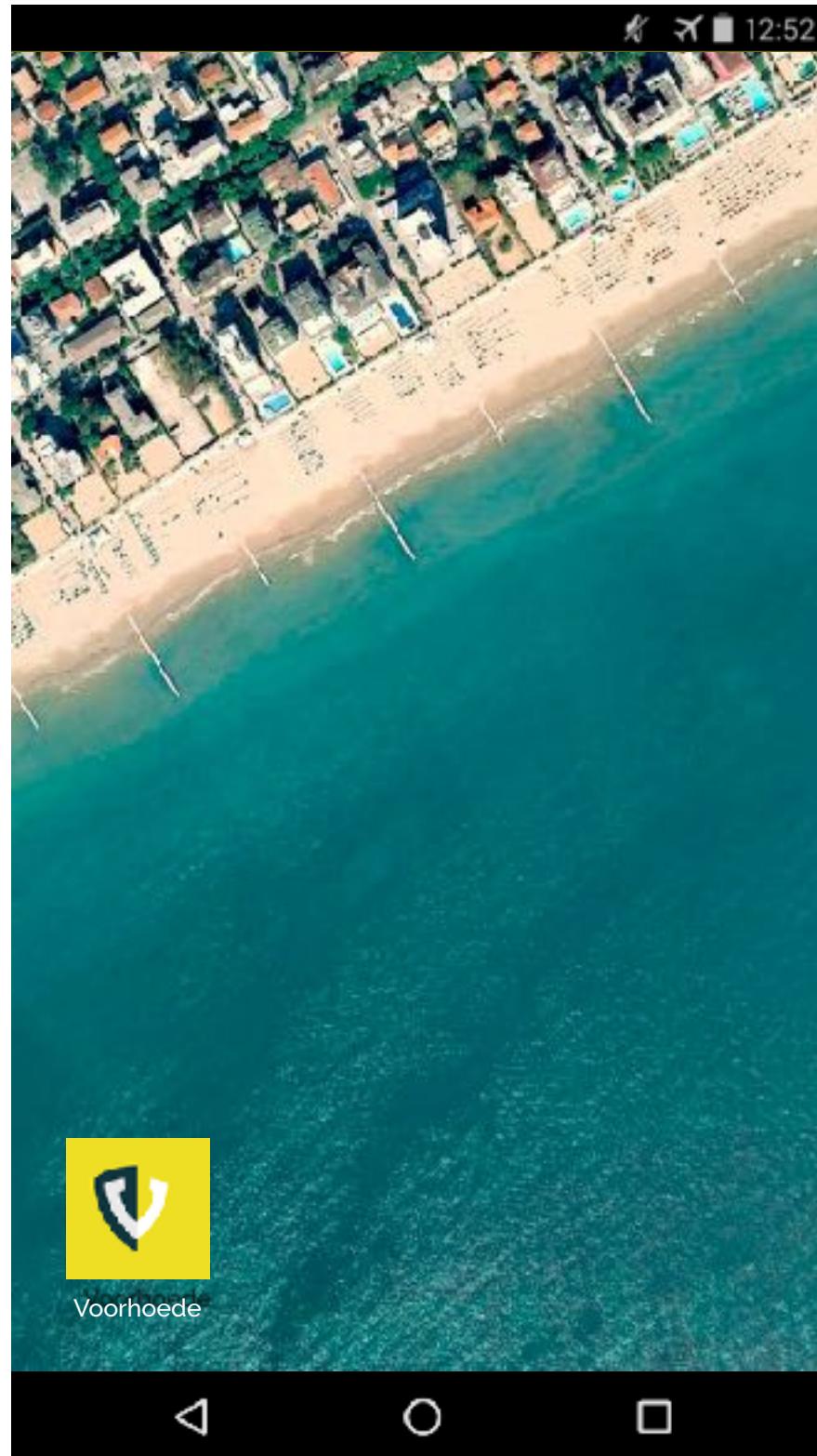
Installable



Linkable

# A PWA is

# FROM SITE TO PWA



[voorhoede.nl](https://www.voorhoede.nl)

use the  
**latest web technologies**  
to create a  
**1st class app experience**

# CHROME, ANDROID (2018-03)

Native Behaviors	Seamless Experience	Surroundings	Input
<ul style="list-style-type: none"><li>LOCAL NOTIFICATIONS ✓</li><li>PUSH MESSAGES ✓</li><li>HOME SCREEN INSTALLATION ✓</li><li>FOREGROUND DETECTION ✓</li><li>PERMISSIONS ✓</li></ul>	<ul style="list-style-type: none"><li>OFFLINE MODE ✓</li><li>BACKGROUND SYNC ✓</li><li>INTER-APP COMMUNICATION ✓</li><li>PAYMENTS ✓</li><li>CREDENTIALS ✓</li></ul>	<ul style="list-style-type: none"><li>BLUETOOTH ✓</li><li>USB ✓</li><li>NFC ✘</li><li>PROXIMITY SENSORS ✘</li><li>AMBIENT LIGHT ✘</li></ul>	<ul style="list-style-type: none"><li>TOUCH GESTURES ✓</li><li>SPEECHrecognition ✓</li><li>CLIPBOARD (COPY &amp; PASTE) ✓</li><li>POINTING DEVICE ADAPTATION ✓</li></ul>

Location & Position	Device Features	Screen & Output	Camera & Microphone
<ul style="list-style-type: none"><li>GEOLOCATION ✓</li><li>GEOFENCING ✘</li><li>DEVICE ORIENTATION ✓</li><li>DEVICE MOTIONS ✓</li><li>PROXIMITY SENSORS ✘</li></ul>	<ul style="list-style-type: none"><li>NETWORK TYPE &amp; SPEED ✓</li><li>ONLINE STATE ✓</li><li>VIBRATION ✓</li><li>BATTERY STATUS ✓</li><li>DEVICE MEMORY ✓</li></ul>	<ul style="list-style-type: none"><li>VIRTUAL &amp; AUGMENTED REALITY ✓</li><li>FULLSCREEN ✓</li><li>SCREEN ORIENTATION &amp; LOCK ✓</li><li>WAKE LOCK ✘</li><li>Presentation FEATURES ✓</li></ul>	<ul style="list-style-type: none"><li>AUDIO &amp; VIDEO CAPTURE ✓</li><li>ADVANCED CAMERA CONTROLS ✓</li><li>RECORDING MEDIA ✓</li><li>REAL-TIME COMMUNICATION ✓</li></ul>



## 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

✓ Feature available in your current browser

✗ Feature not available in your current browser

Operating System
<ul style="list-style-type: none"><li>OFFLINE STORAGE ✓</li><li>FILE ACCESS ✓</li><li>CONTACTS ✘</li><li>SMS ✘</li><li>STORAGE QUOTAS ✓</li><li>TASK SCHEDULING ✘</li></ul>

# PWAS IN PRACTICE



# STARTS AS WEBSITE

The screenshot shows a web browser window with the title 'Blog | De Voorhoede'. The address bar indicates a secure connection to <https://www.voorhoede.nl>. The page has a yellow header featuring the company logo (a stylized 'V' icon) and the text 'DE VOORHOEDE front-end developers'. On the right side of the header are navigation links for 'WERK', 'BLOG', 'TEAM', 'CONTACT', and 'NL|EN'. Below the header is a large yellow background area containing a smartphone icon displaying a user interface. The text 'Wij zijn **DE VOORHOEDE**' is prominently displayed, followed by the subtitle 'We bouwen front-end oplossingen waarmee je jaren vooruit kunt'. A dark blue circular button with a white downward arrow is located at the bottom center of this yellow area.

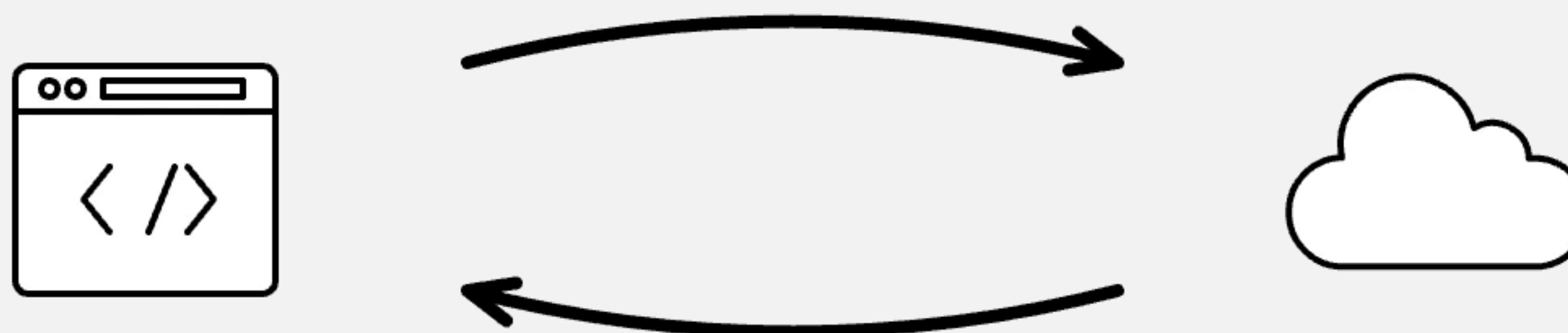
Wij zijn **DE VOORHOEDE**  
We bouwen front-end oplossingen  
waarmee je jaren vooruit kunt

100% web

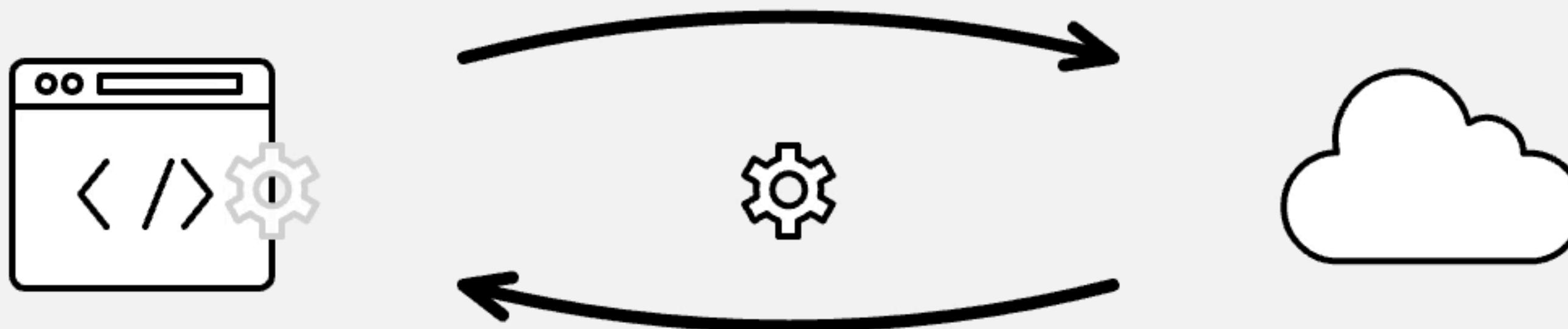
We bouwen websites, mobiele apps en  
user interfaces voor ieder apparaat en

[voorhoede.nl](http://voorhoede.nl)

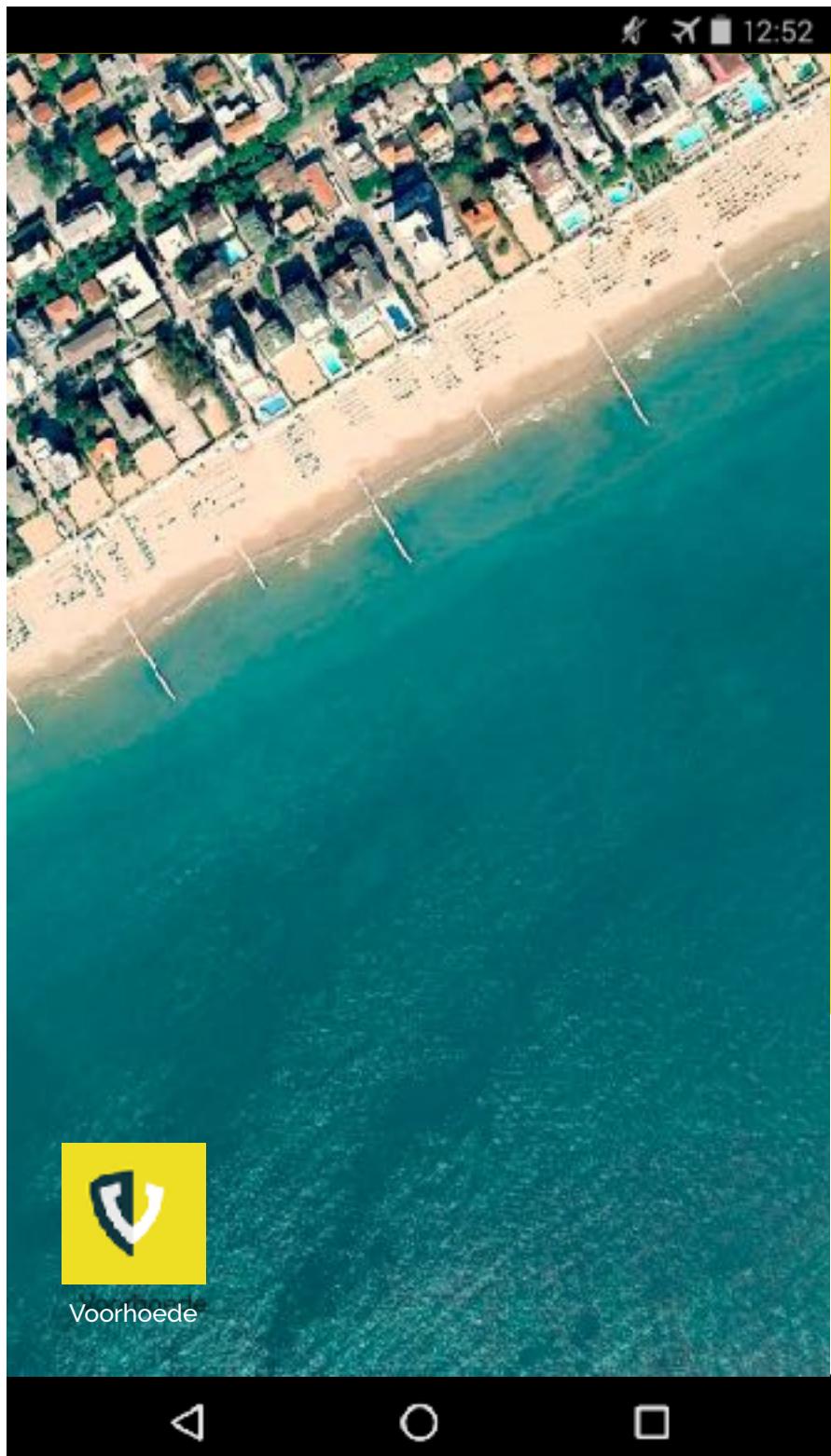
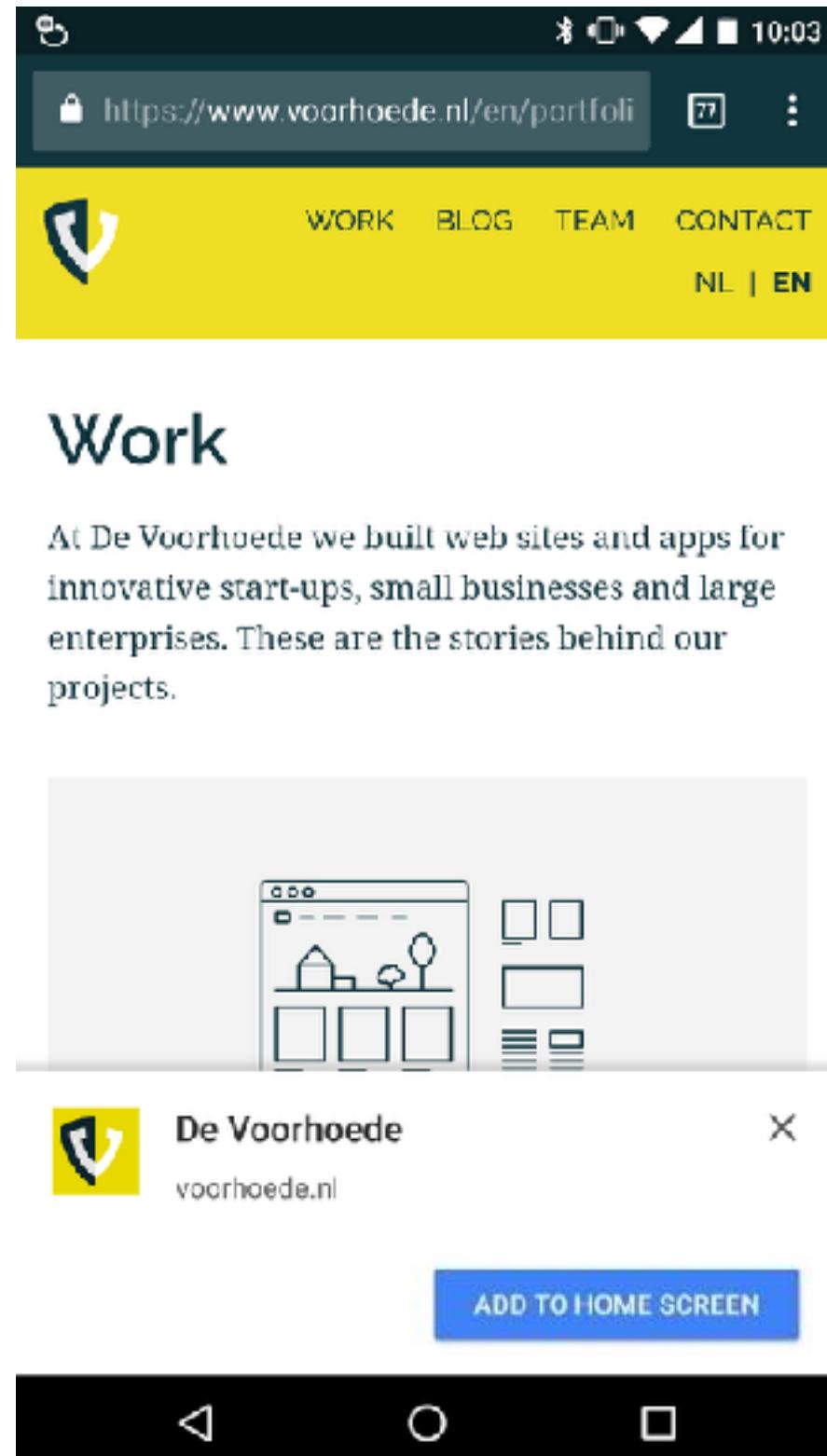
# INITIAL PAGE LOAD



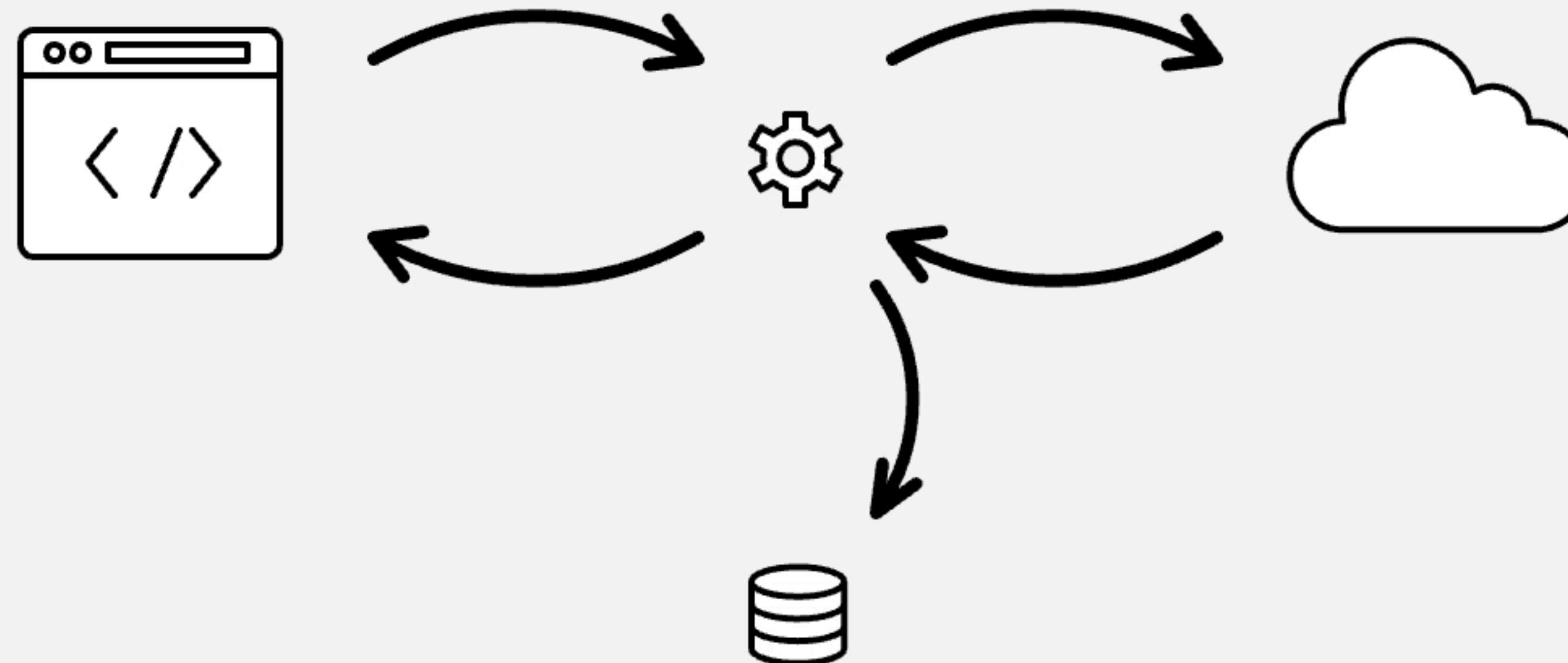
# REGISTER SERVICE WORKER



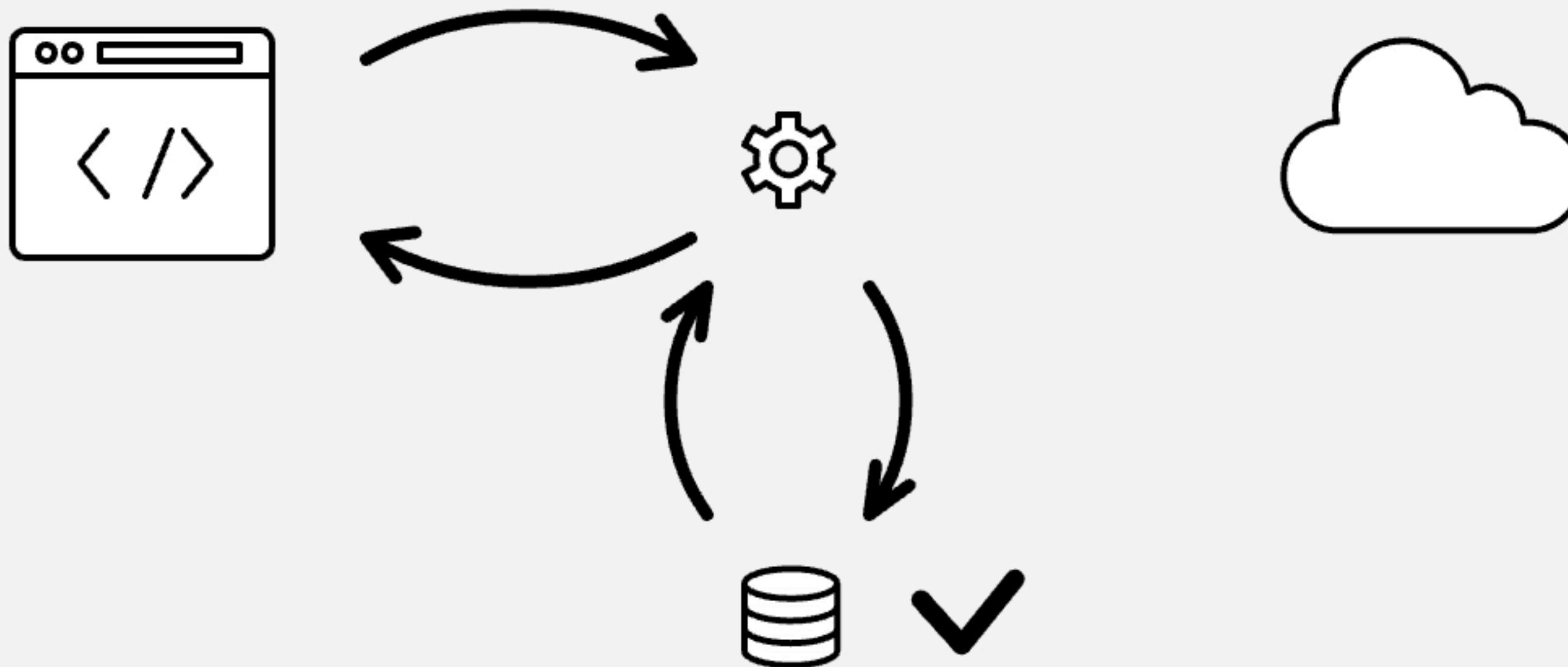
# ADD TO HOMESCREEN



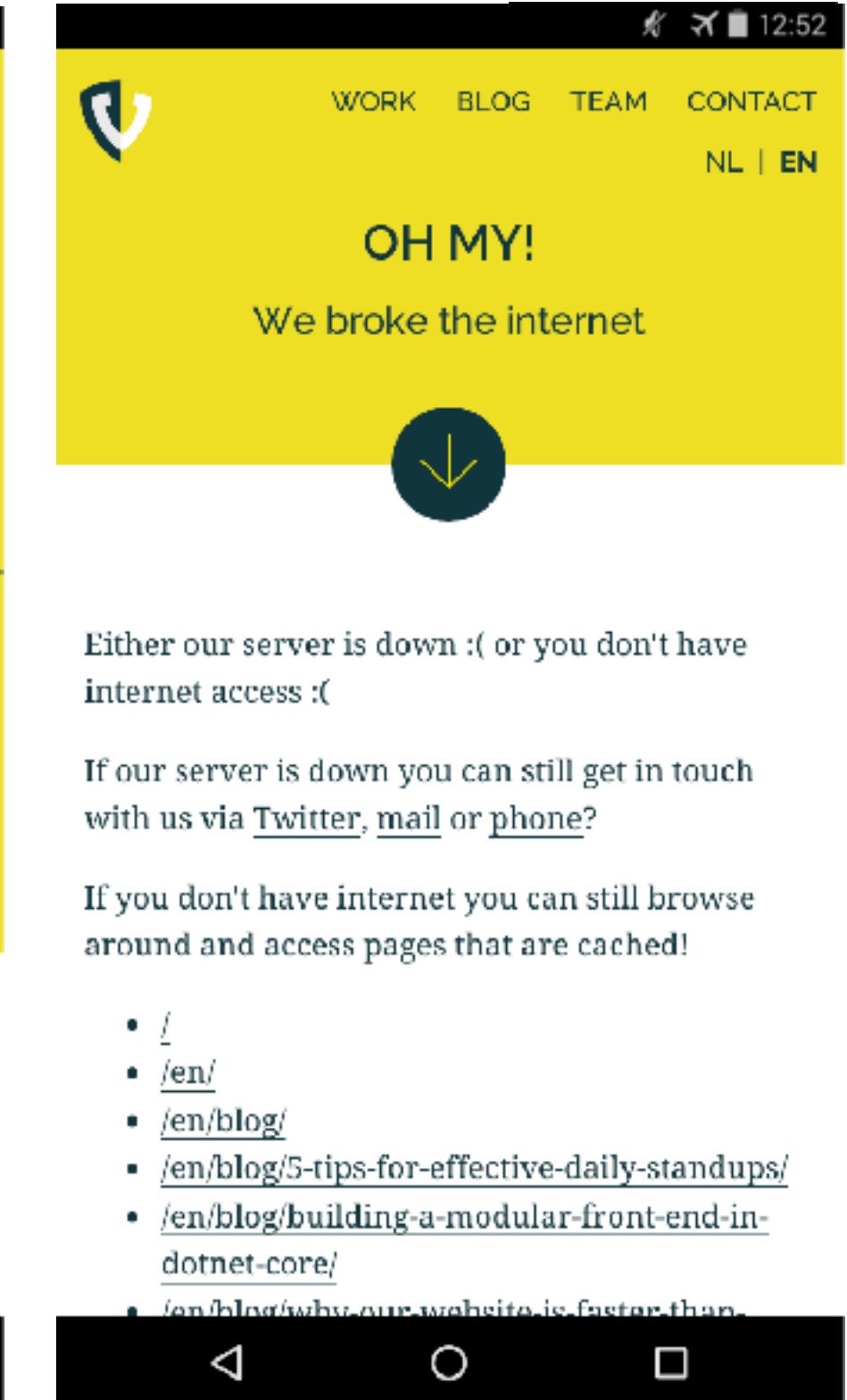
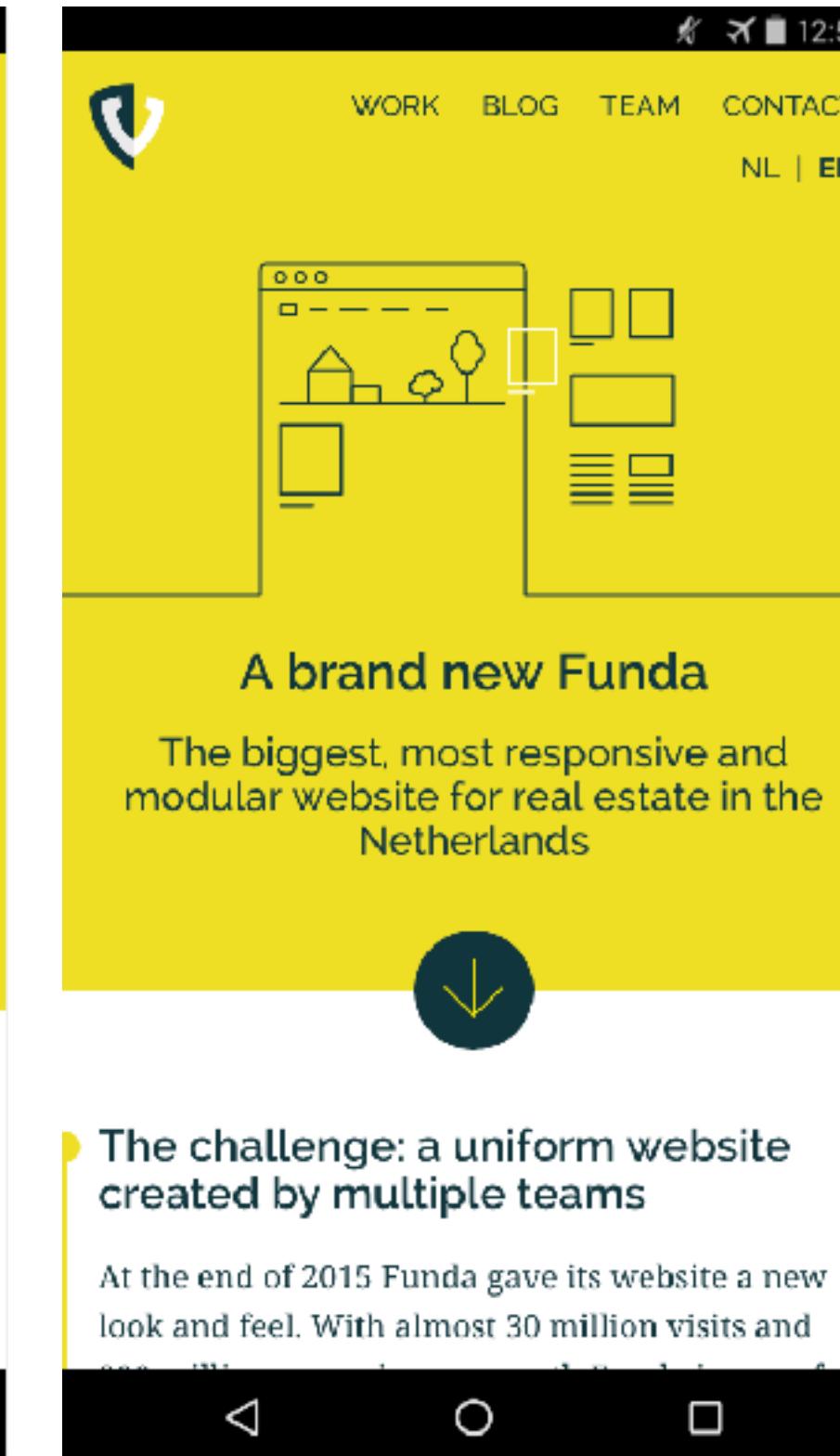
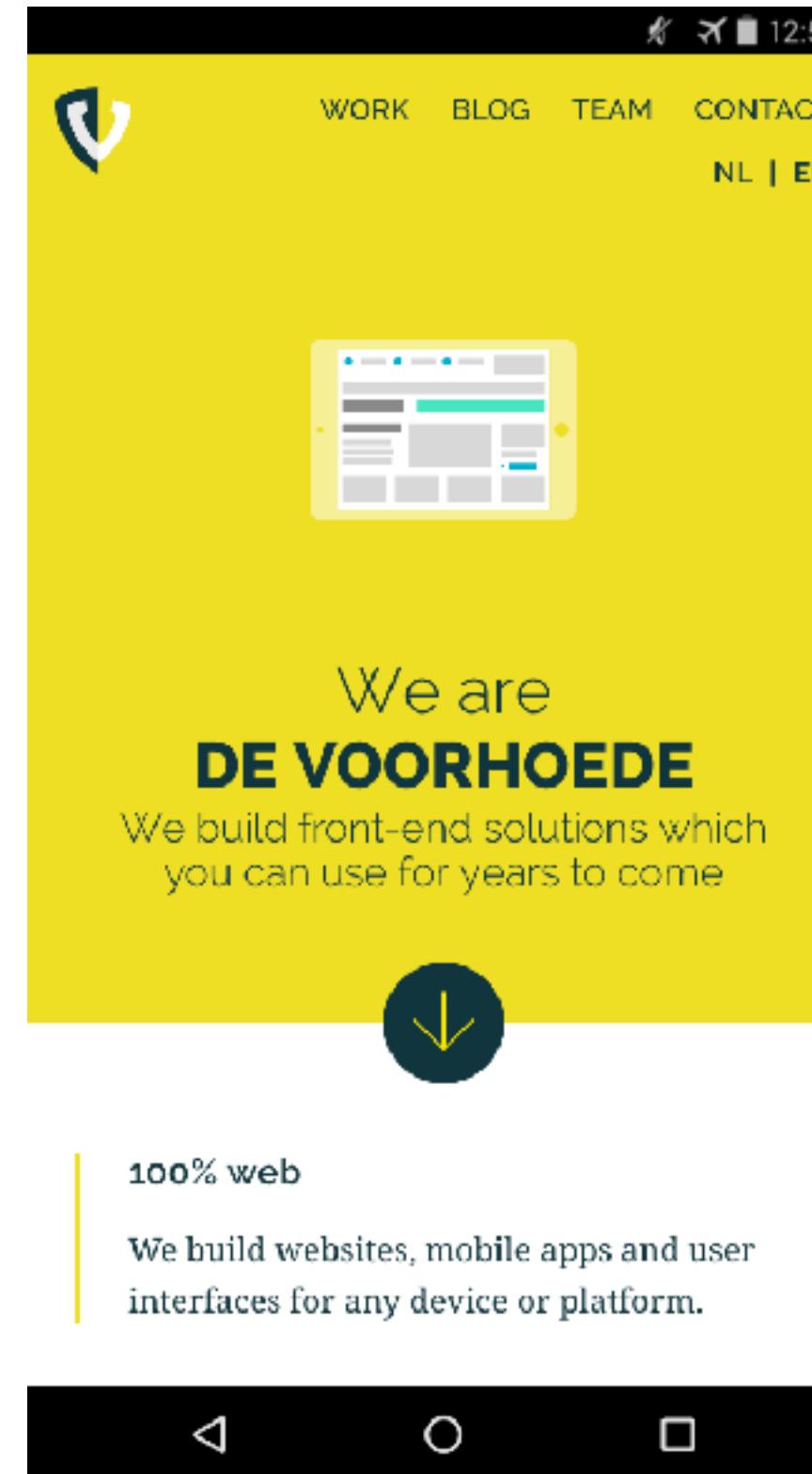
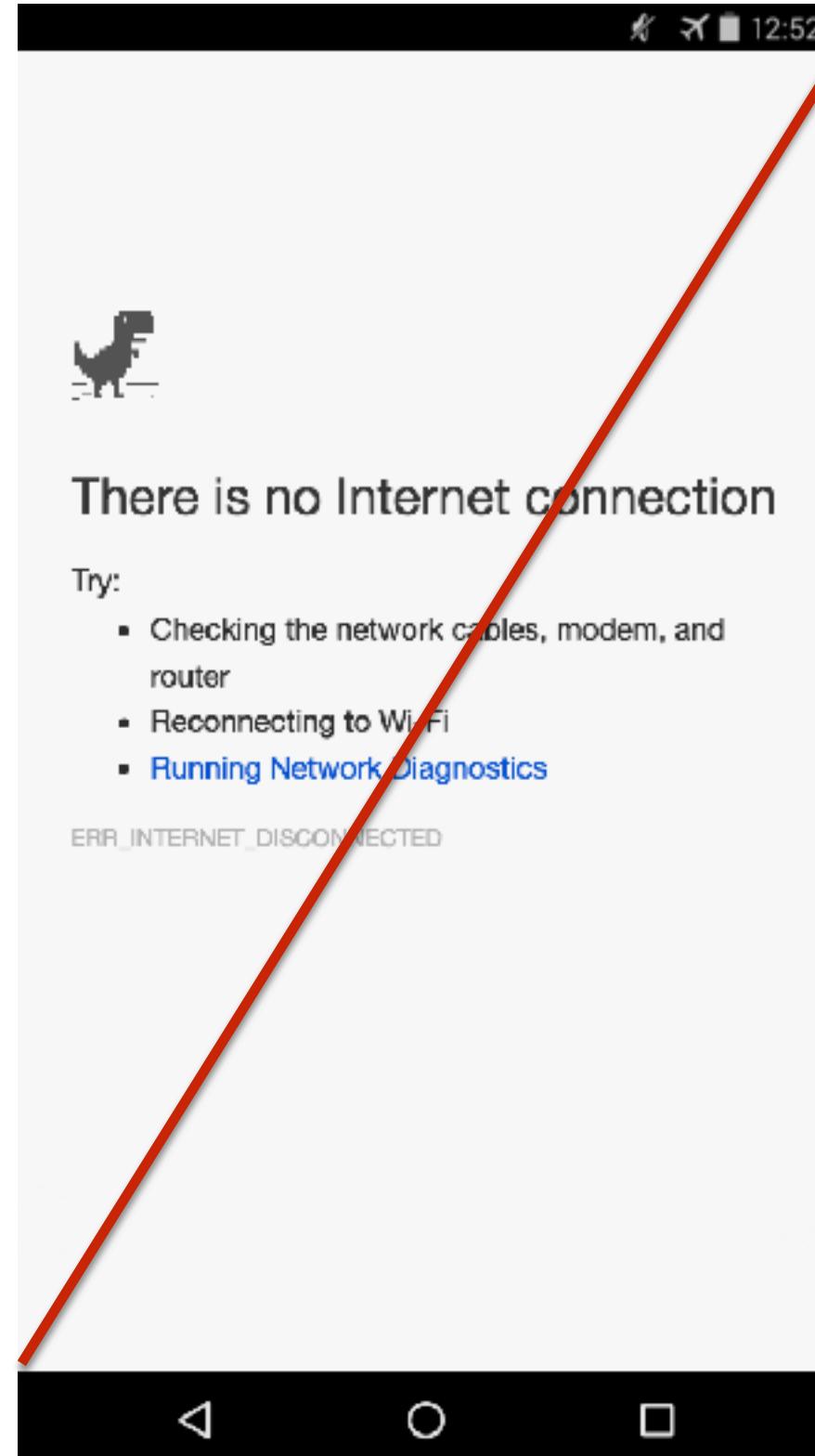
# CACHE ON FETCH



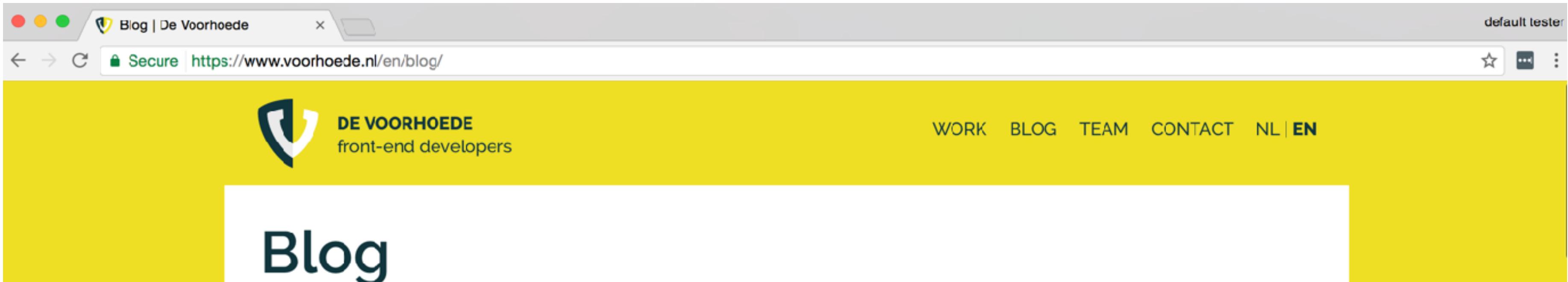
# SERVE FROM CACHE



# OFFLINE SUPPORT



# OFFLINE SUPPORT



17 Mar 2017

[Fighting front-end fatigue with tooling recipes](#) ⚡



by Jasper

 available offline

16 Jan 2017

[The importance of an Interaction Engineer](#)



by Tjerk

27 Dec 2016

[Improving accessibility for the blind: 8 guidelines](#)



by Bas

21 Dec 2016

[Creating HTML email templates from scratch](#)



by Vincent

28 Nov 2016

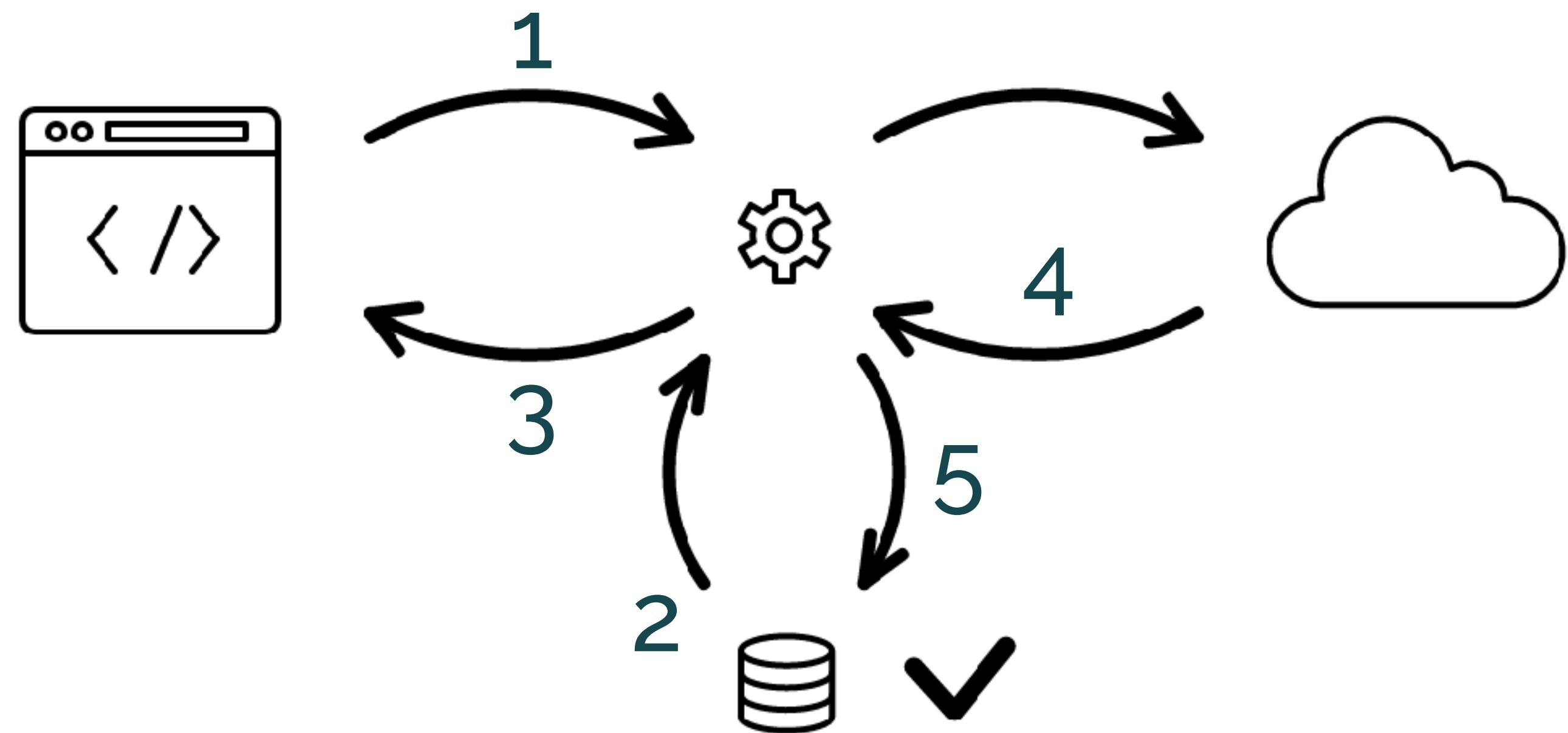
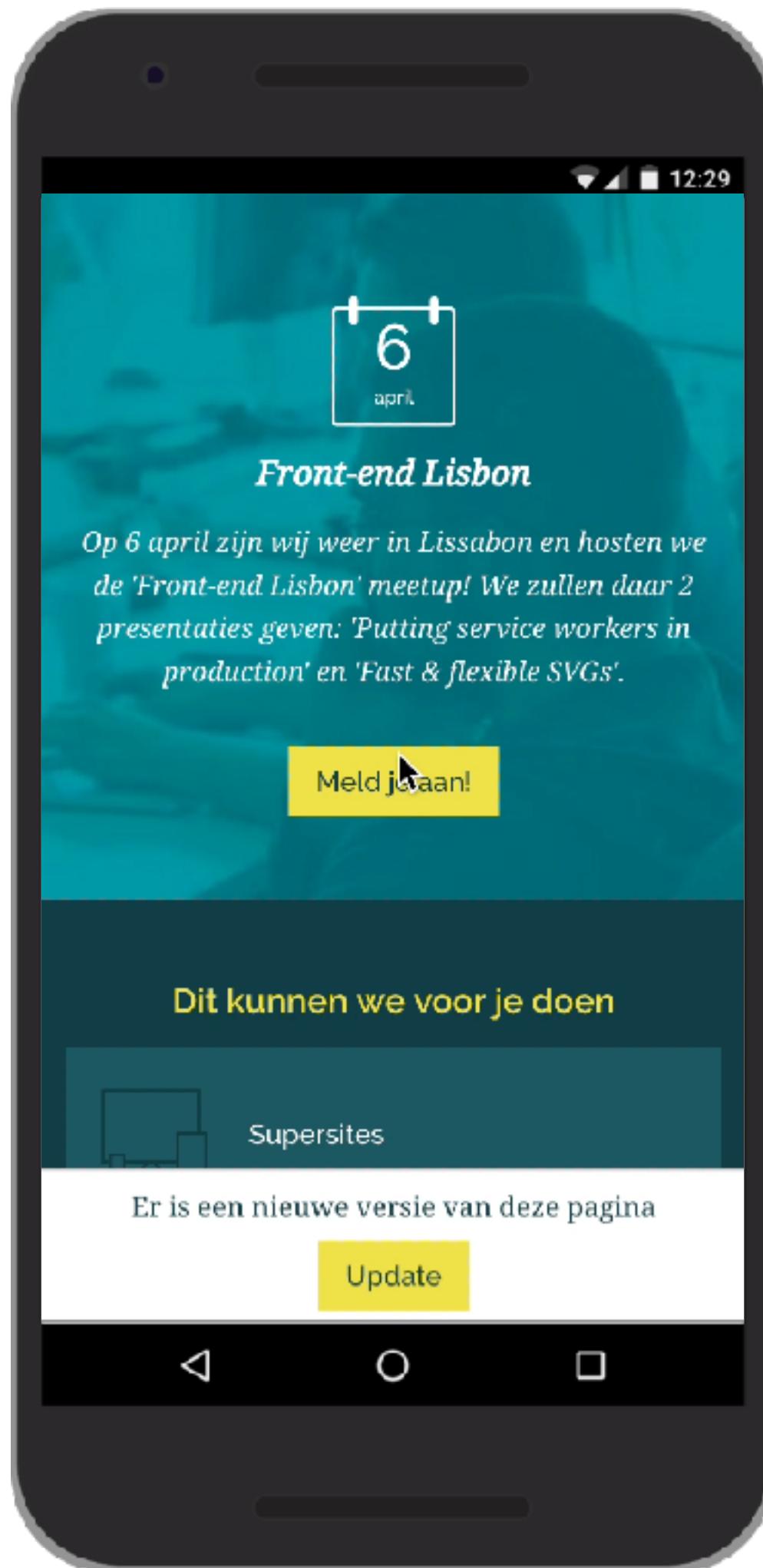
[Static site implosion with Brotli and Gzip](#)



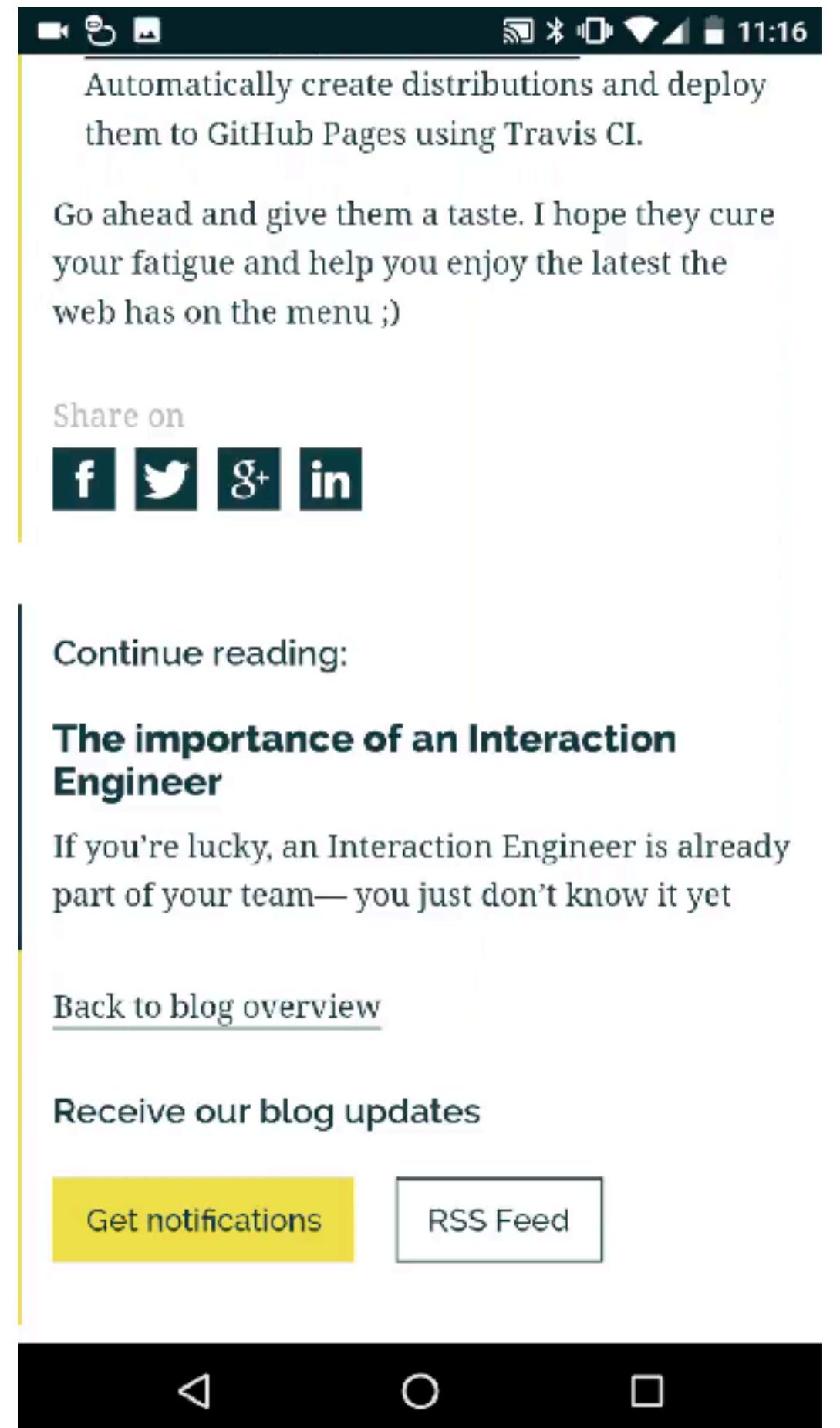
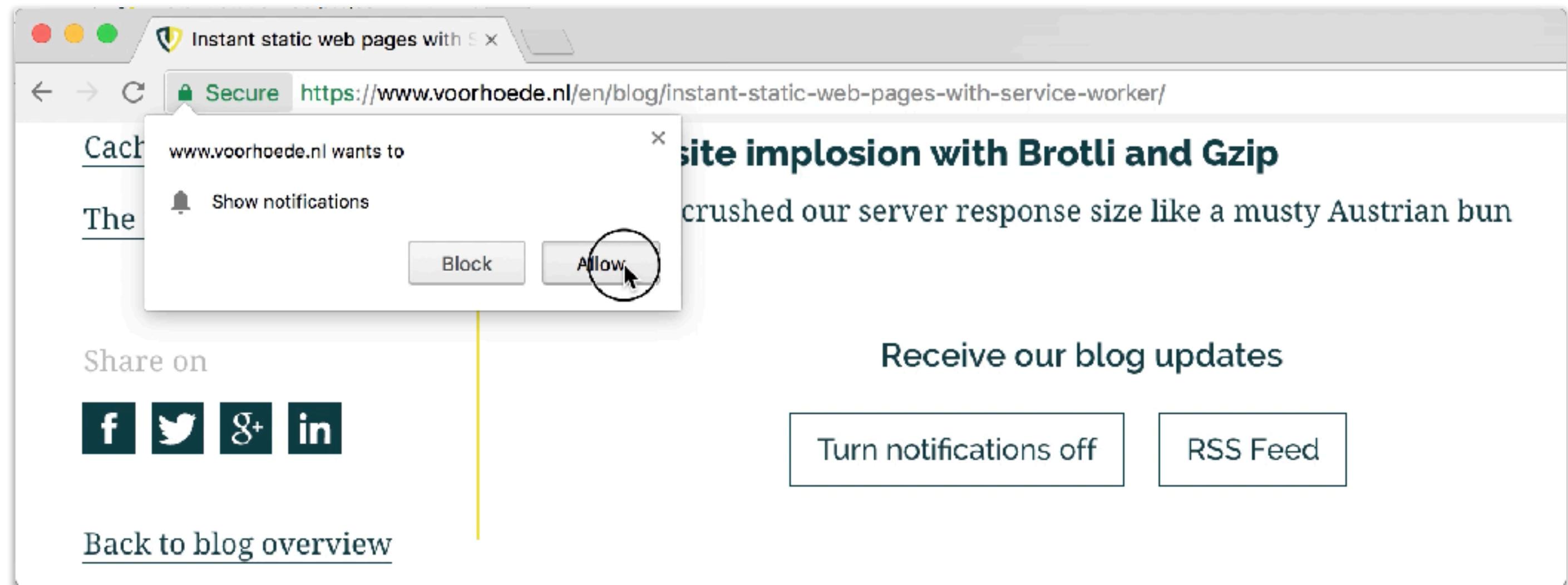
by Thadée

[voorhoede.nl/en/blog/](https://www.voorhoede.nl/en/blog/)

# STAY FRESH

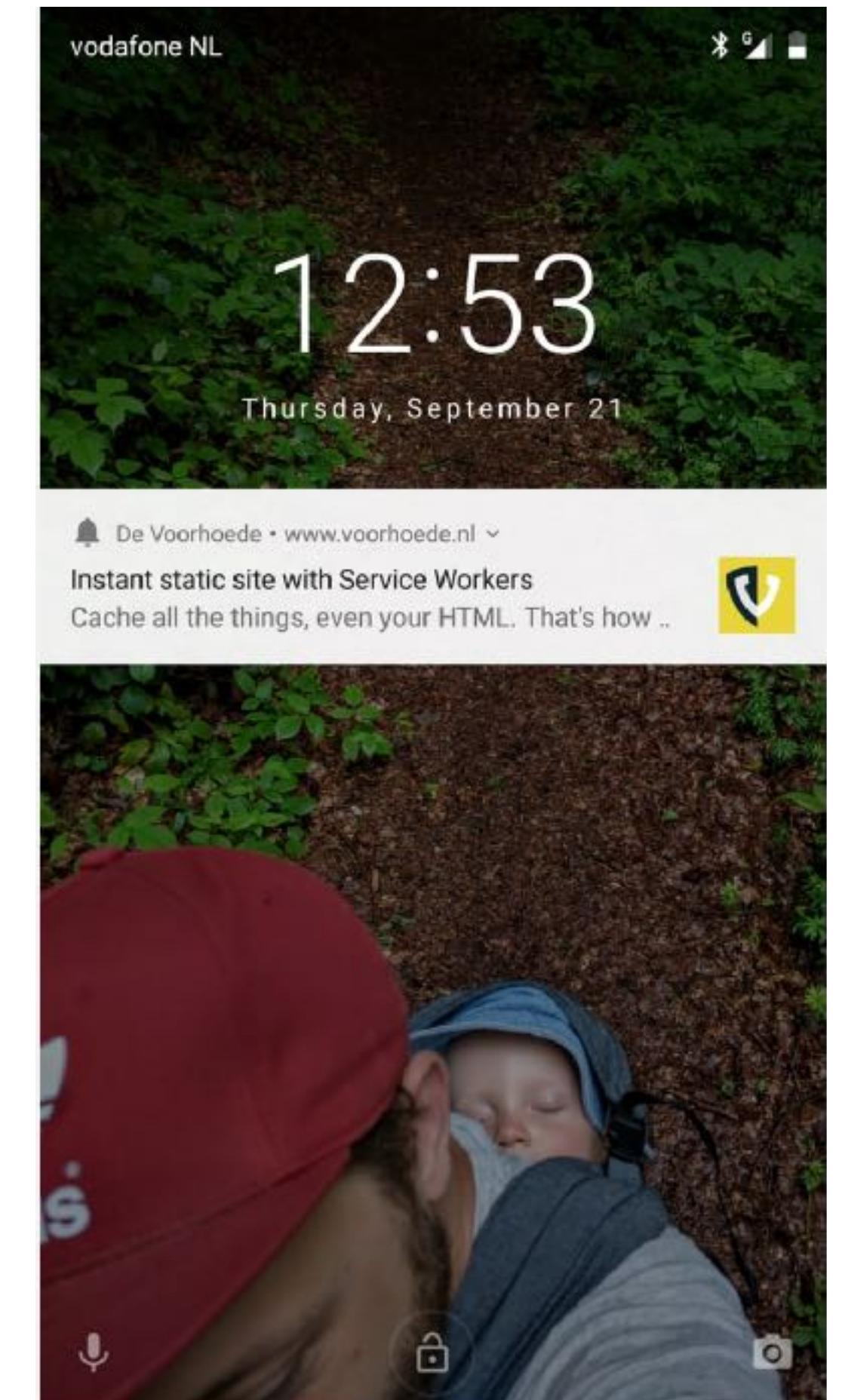
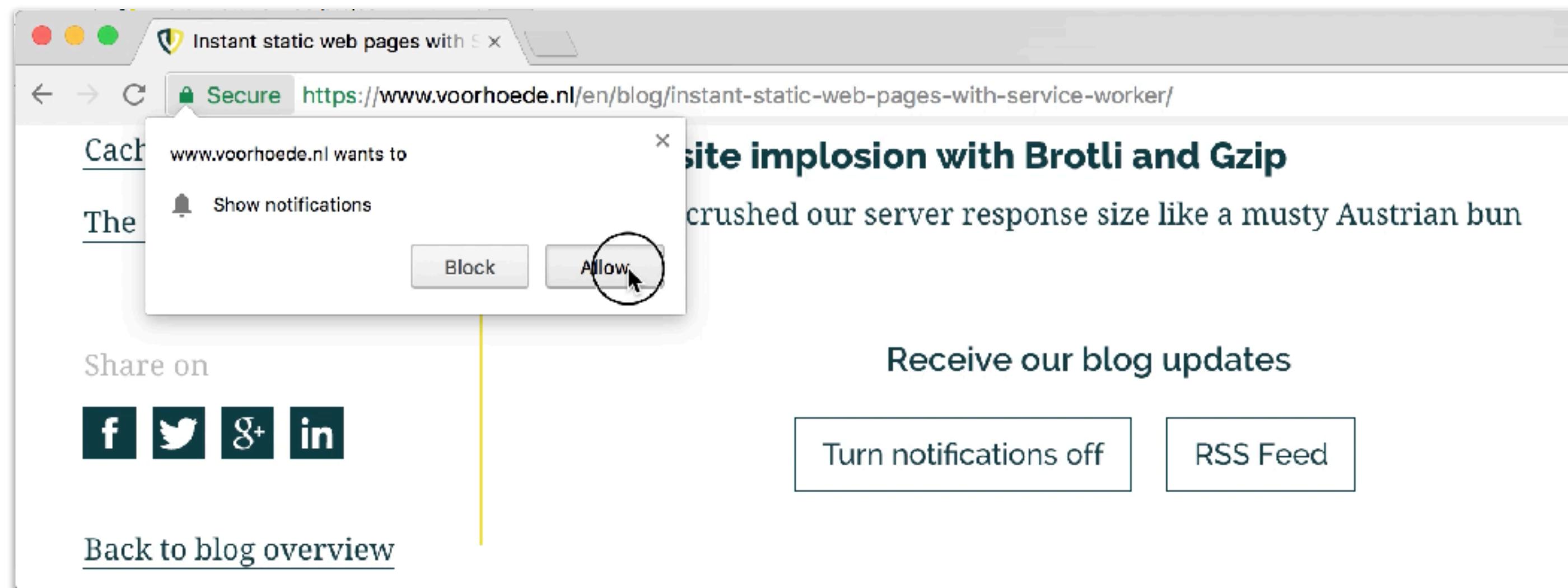


# PUSH NOTIFICATIONS



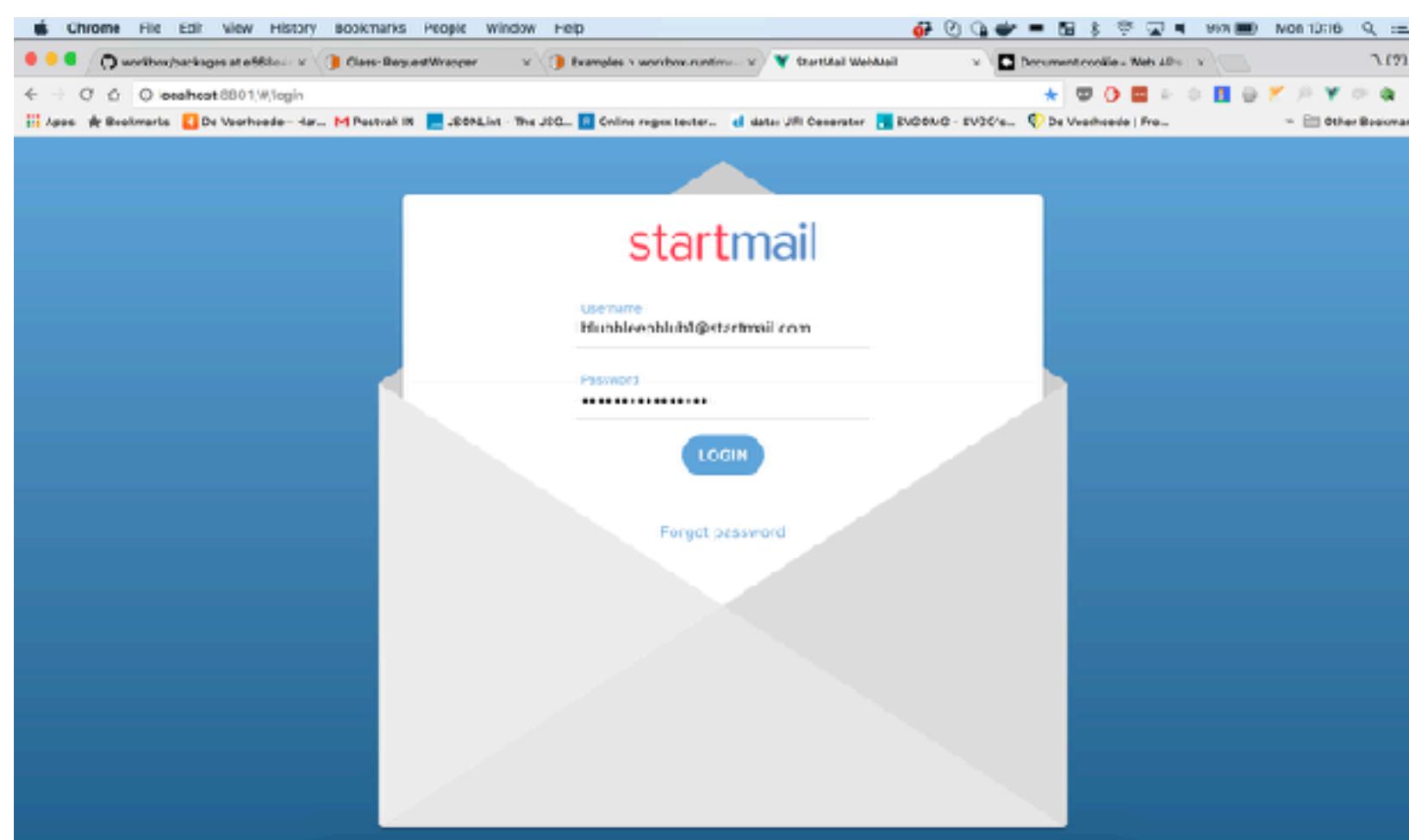
[voorhoede.nl/en/blog/making-our-site-more-app-y/](https://voorhoede.nl/en/blog/making-our-site-more-app-y/)

# PUSH NOTIFICATIONS



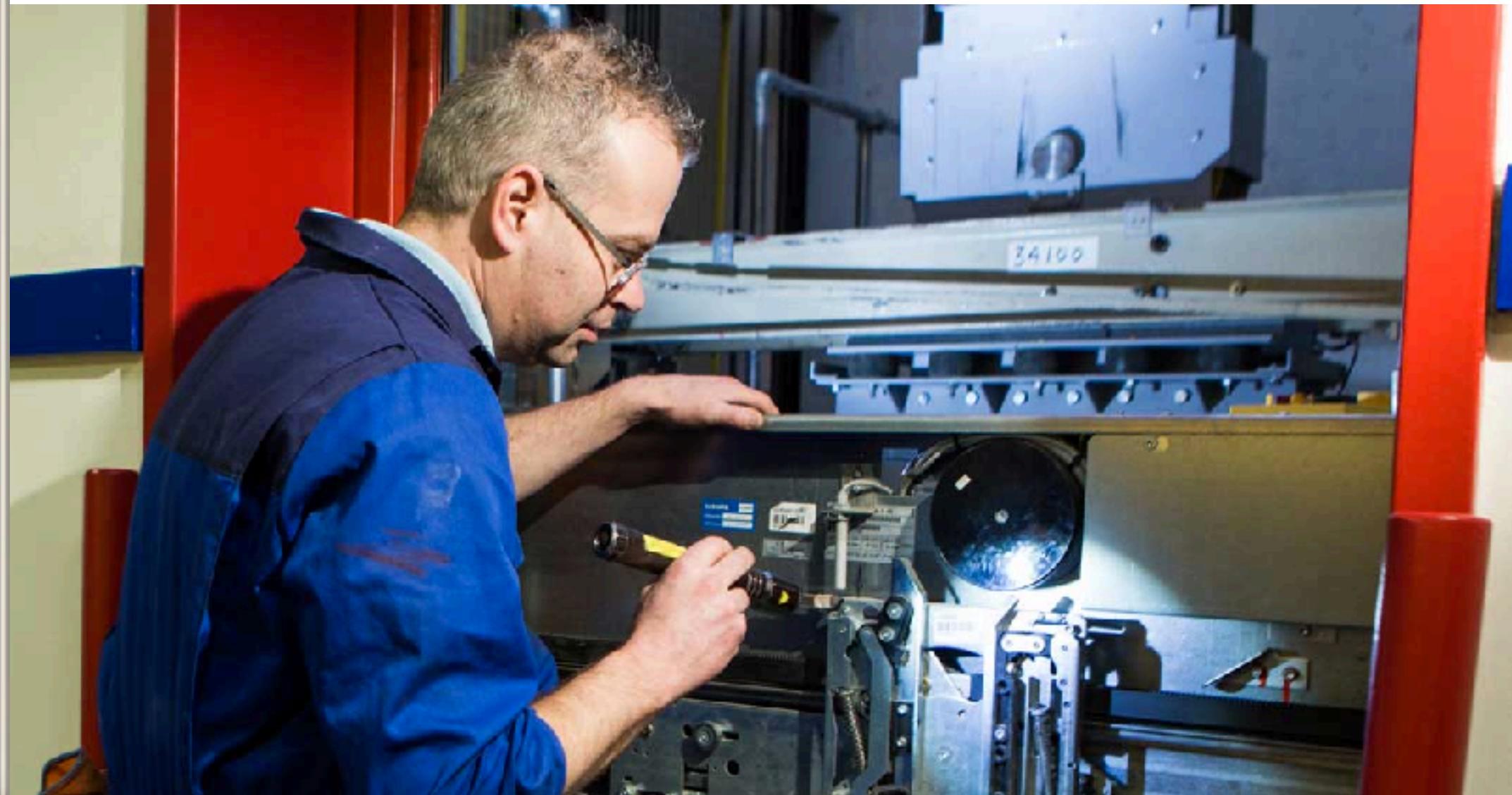
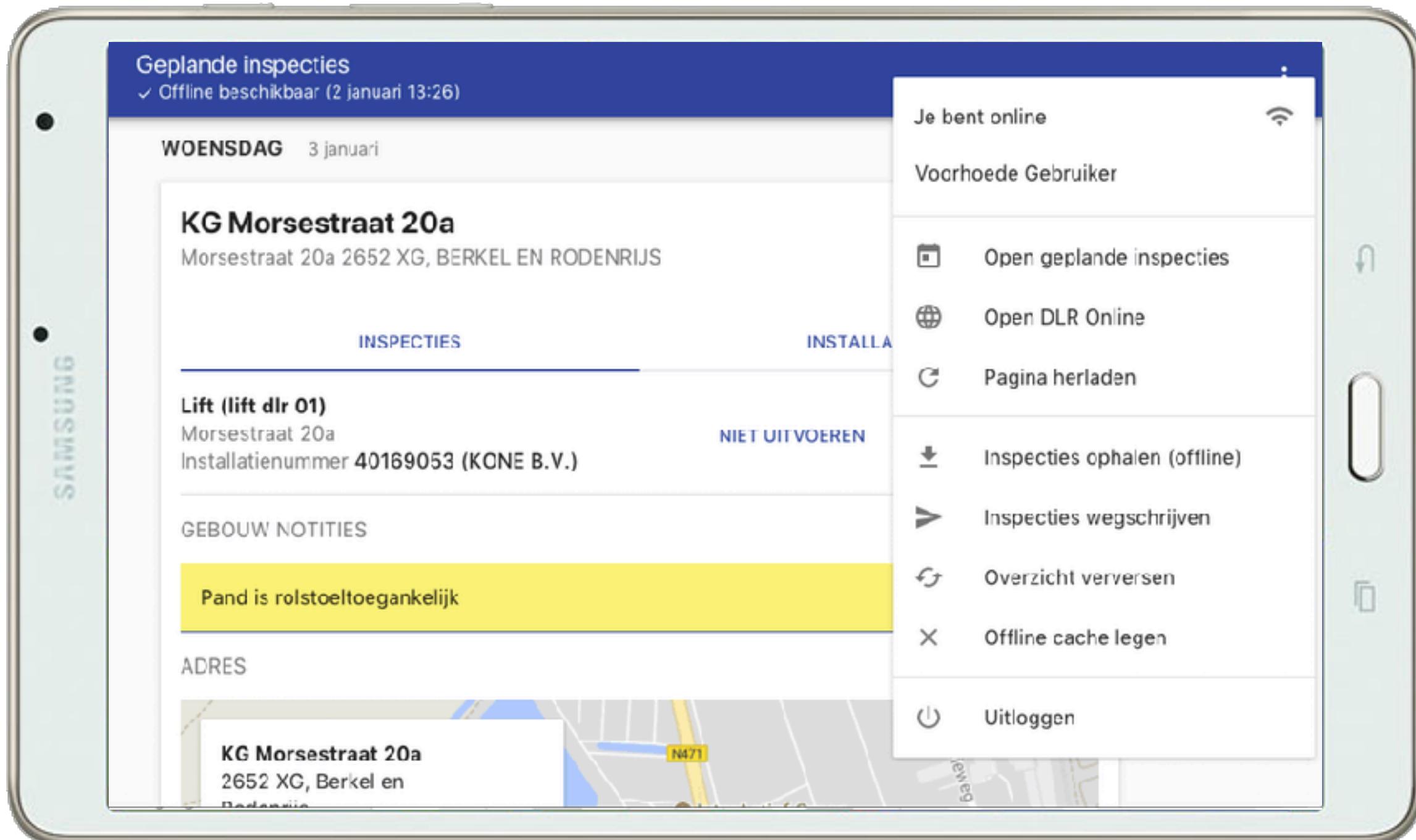
[voorhoede.nl/en/blog/making-our-site-more-app-y/](https://voorhoede.nl/en/blog/making-our-site-more-app-y/)

# EXAMPLE: STARTMAIL WEB CLIENT

A screenshot of a web browser showing the StartMail inbox. The URL in the address bar is 'localhost:8801/#/mail/czt8jkw8j0hjdsd3hxd75x2vu'. The interface includes a sidebar with links for 'Inbox', 'Archive', 'Drafts', 'Sent', 'Spam', 'Trash', 'Fortunes', and 'Notification emails'. The main area displays a list of messages under the heading 'Older'.

Message	From	Date
Demo today	Tijn Schmits	Last Thursday
Fwd: [SECURITY] [DSA 3944-1] mariadb-10.0 security update	Tijn Schmits	Last Thursday
Fwd: [USN-3392-1] Linux kernel regression	Tijn Schmits	Last Wednesday
Hey, hoe gaat het ermee?	Tijn Schmits	Aug 07, 2017
Sprint Review Today	Tijn Schmits	Jul 27, 2017
HTML in a text message	Aaryn Tonita	Jul 13, 2017
blubleepblub1@startmail.com	Aaryn Tonita	Jul 12, 2017
Re: Reminder to self: Finish NFE	Tijn Schmits	Jun 19, 2017
Test selfsending 01	StartMail Test	Jun 16, 2017
Re: Testing	StartMail Test	Jun 09, 2017

# EXAMPLE: ELEVATOR INSPECTION APP



**start small, incrementally**  
upgrade your existing websites

# APP ECOSYSTEM

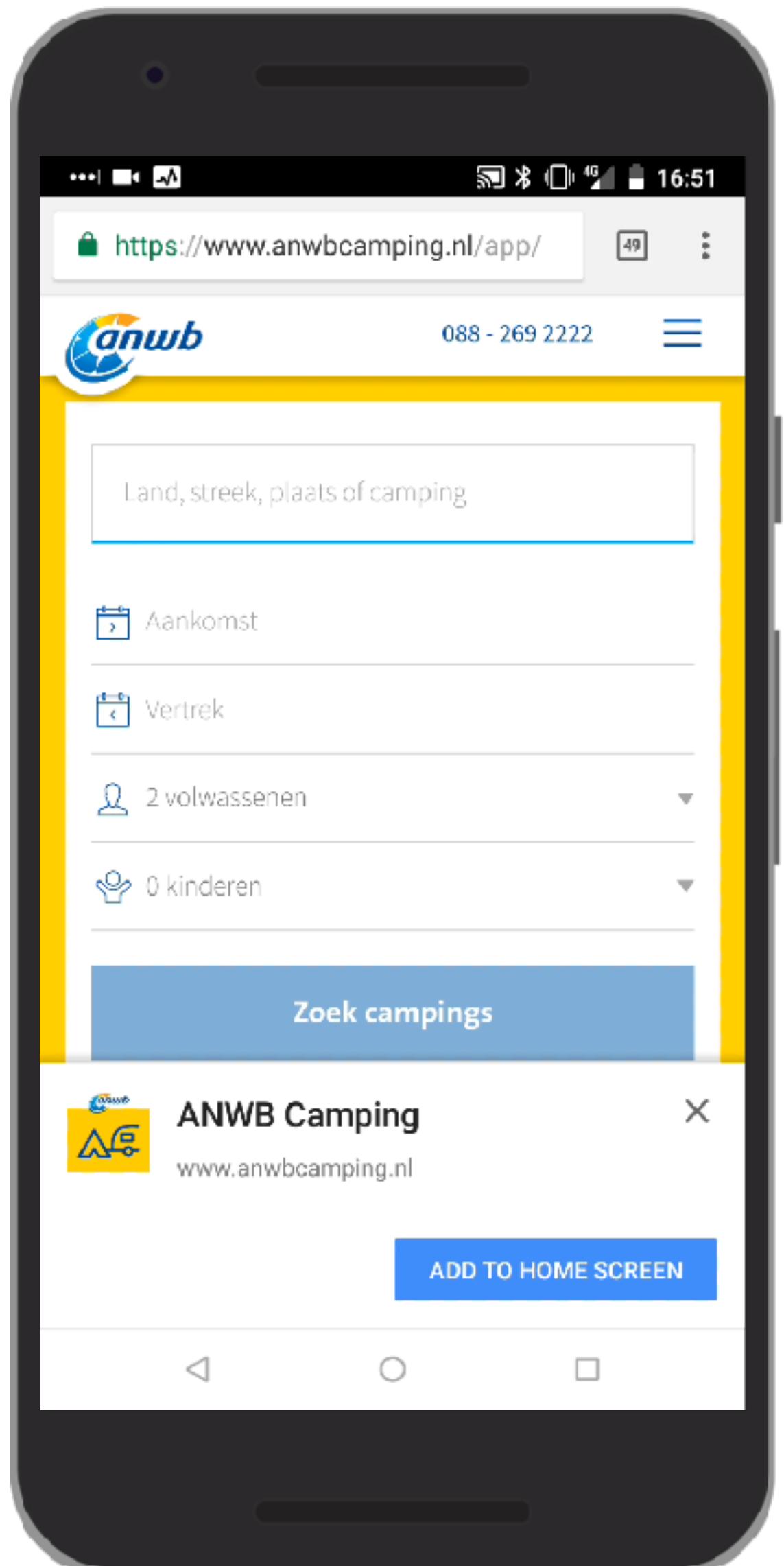


# USE FLOW - NATIVE APP



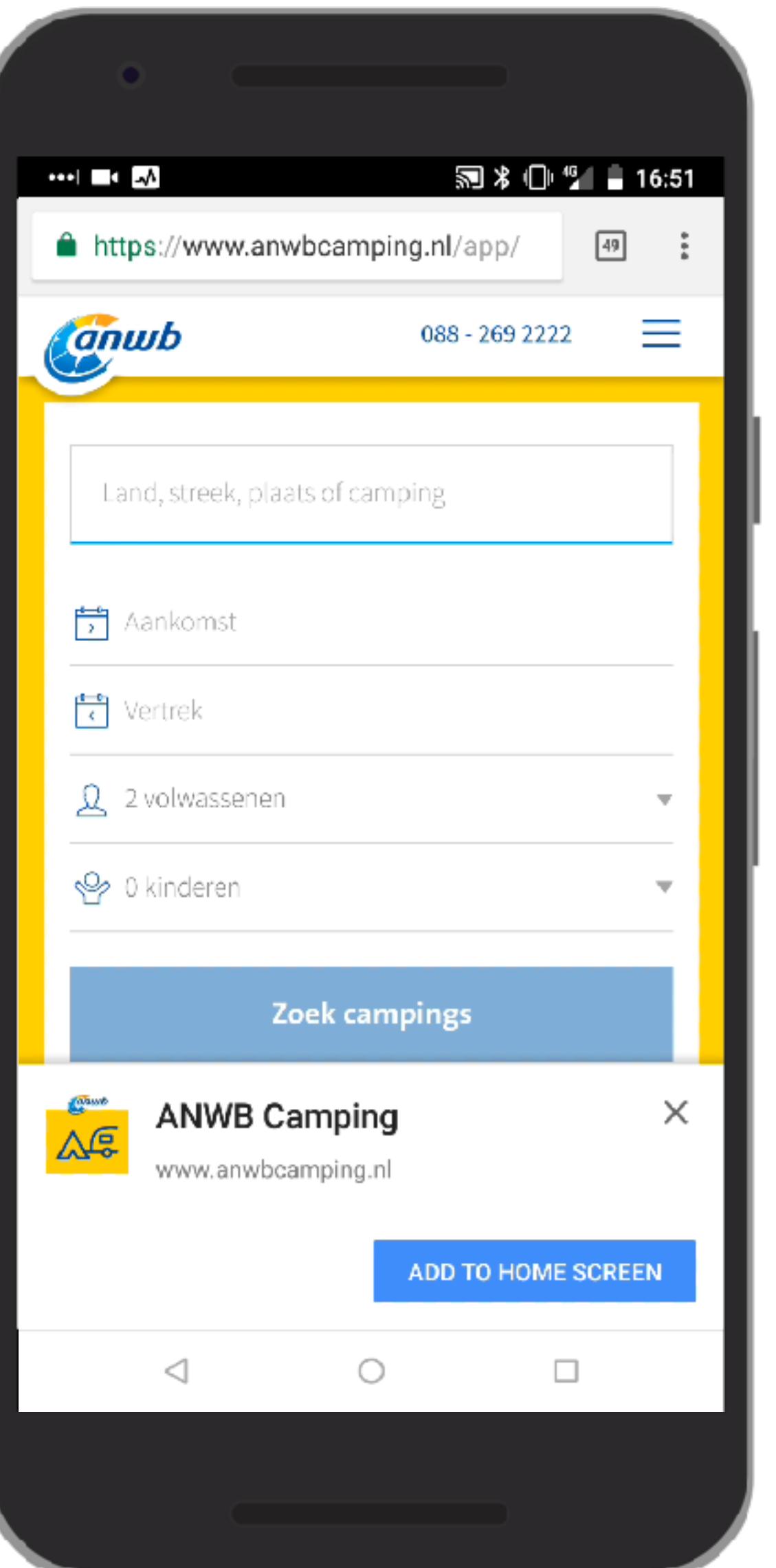
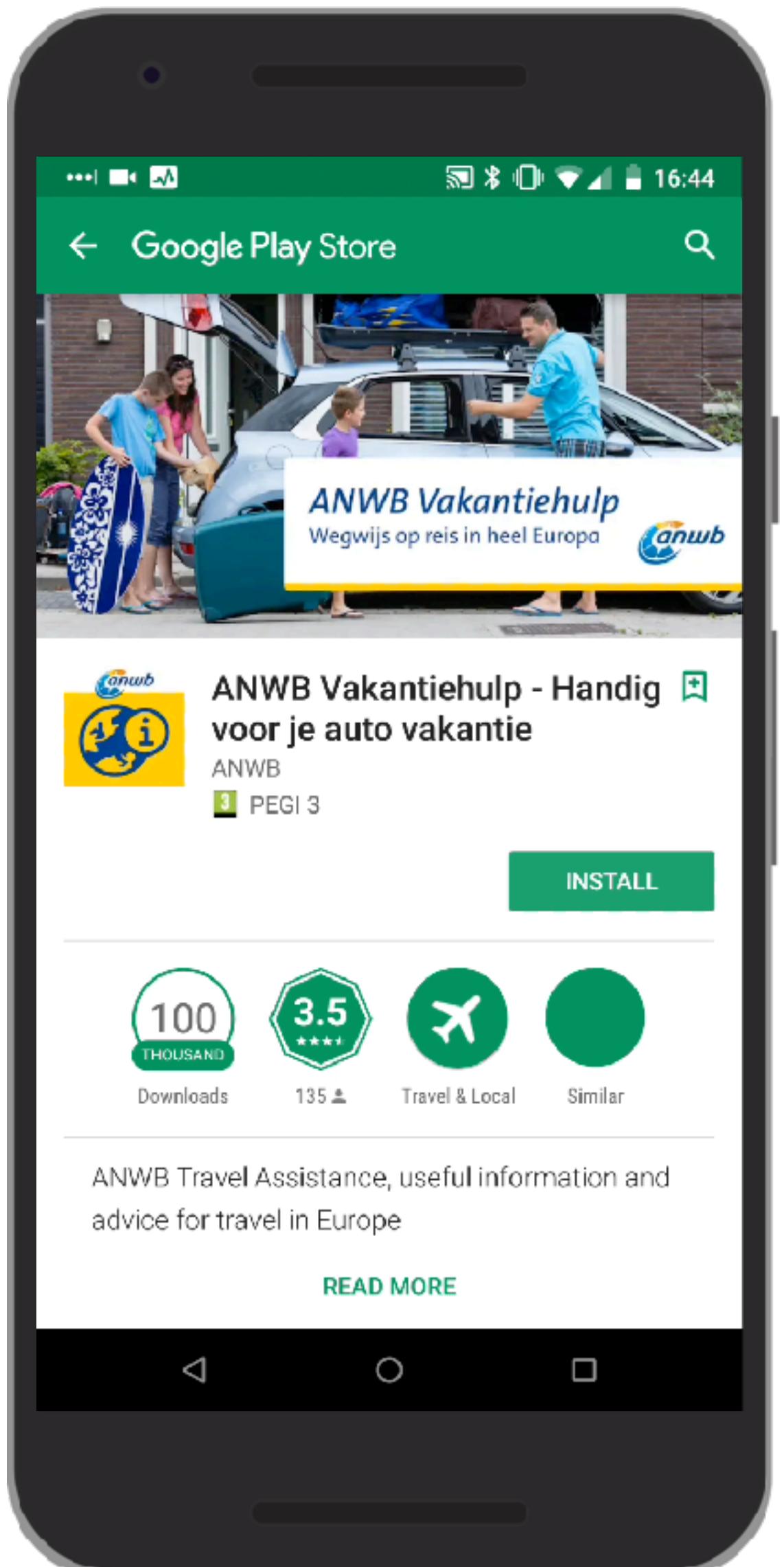
- Visit web page
- Find app install banner
- Open app in app store
- Install app
- Wait for download
- Open app from homescreen
- Wait for installation
- Tour and login
- Use

# USE FLOW - PWA



- Visit web page
- **Use**
- Optionally install
- Open app from homescreen
- **Use**

# NATIVE VS WEB?



- on average users install zero new apps per month
- PWA feature support varies between browsers

# CHROME, ANDROID (2018-03)

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Location & Position	Device Features	Screen & Output	Camera & Microphone
<ul style="list-style-type: none"><li>GEOLOCATION ✓</li><li>GEOFENCING ✘</li><li>DEVICE ORIENTATION ✓</li><li>DEVICE MOTIONS ✓</li><li>PROXIMITY SENSORS ✘</li></ul>	<ul style="list-style-type: none"><li>NETWORK TYPE &amp; SPEED ✓</li><li>ONLINE STATE ✓</li><li>VIBRATION ✓</li><li>BATTERY STATUS ✓</li><li>DEVICE MEMORY ✓</li></ul>	<ul style="list-style-type: none"><li>VIRTUAL &amp; AUGMENTED REALITY ✓</li><li>FULLSCREEN ✓</li><li>SCREEN ORIENTATION &amp; LOCK ✓</li><li>WAKE LOCK ✘</li><li>Presentation FEATURES ✓</li></ul>	<ul style="list-style-type: none"><li>AUDIO &amp; VIDEO CAPTURE ✓</li><li>ADVANCED CAMERA CONTROLS ✓</li><li>RECORDING MEDIA ✓</li><li>REAL-TIME COMMUNICATION ✓</li></ul>



## 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

✓ Feature available in your current browser

✗ Feature not available in your current browser

Operating System
<ul style="list-style-type: none"><li>OFFLINE STORAGE ✓</li><li>FILE ACCESS ✓</li><li>CONTACTS ✘</li><li>SMS ✘</li><li>STORAGE QUOTAS ✓</li><li>TASK SCHEDULING ✘</li></ul>

Help,  
my users have  
an iPhone



*image source: [bloomberg.com](#)*

# SAFARI, IOS (2018-03)

Native Behaviors
LOCAL NOTIFICATIONS ✗
PUSH MESSAGES ✗
HOME SCREEN INSTALLATION ✗
FOREGROUND DETECTION ✓
PERMISSIONS ✗

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

Surroundings
BLUETOOTH ✓
USB ✓
NFC ✗
PROXIMITY SENSORS ✗
AMBIENT LIGHT ✗

Input
TOUCH GESTURES ✓
SPEECHrecognition ✗
CLIPBOARD (COPY & PASTE) ✓
POINTING DEVICE ADAPTATION ✓

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

Operating System
OFFLINE STORAGE ✓
FILE ACCESS ✓
CONTACTS ✗
SMS ✗
STORAGE QUOTAS ✗
TASK SCHEDULING ✗



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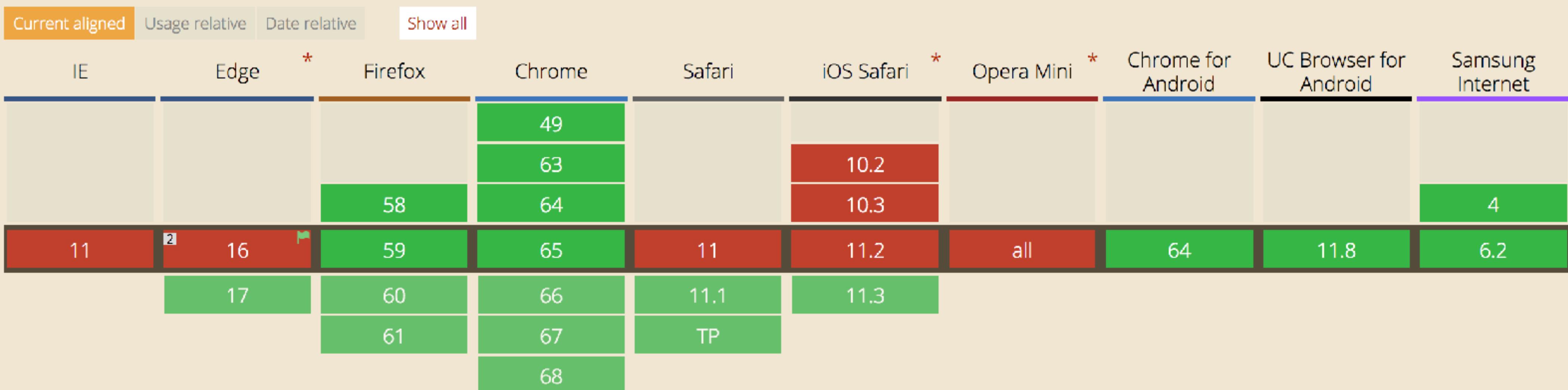
✗ Feature not available in your current browser

## Service Workers 📁 - WD

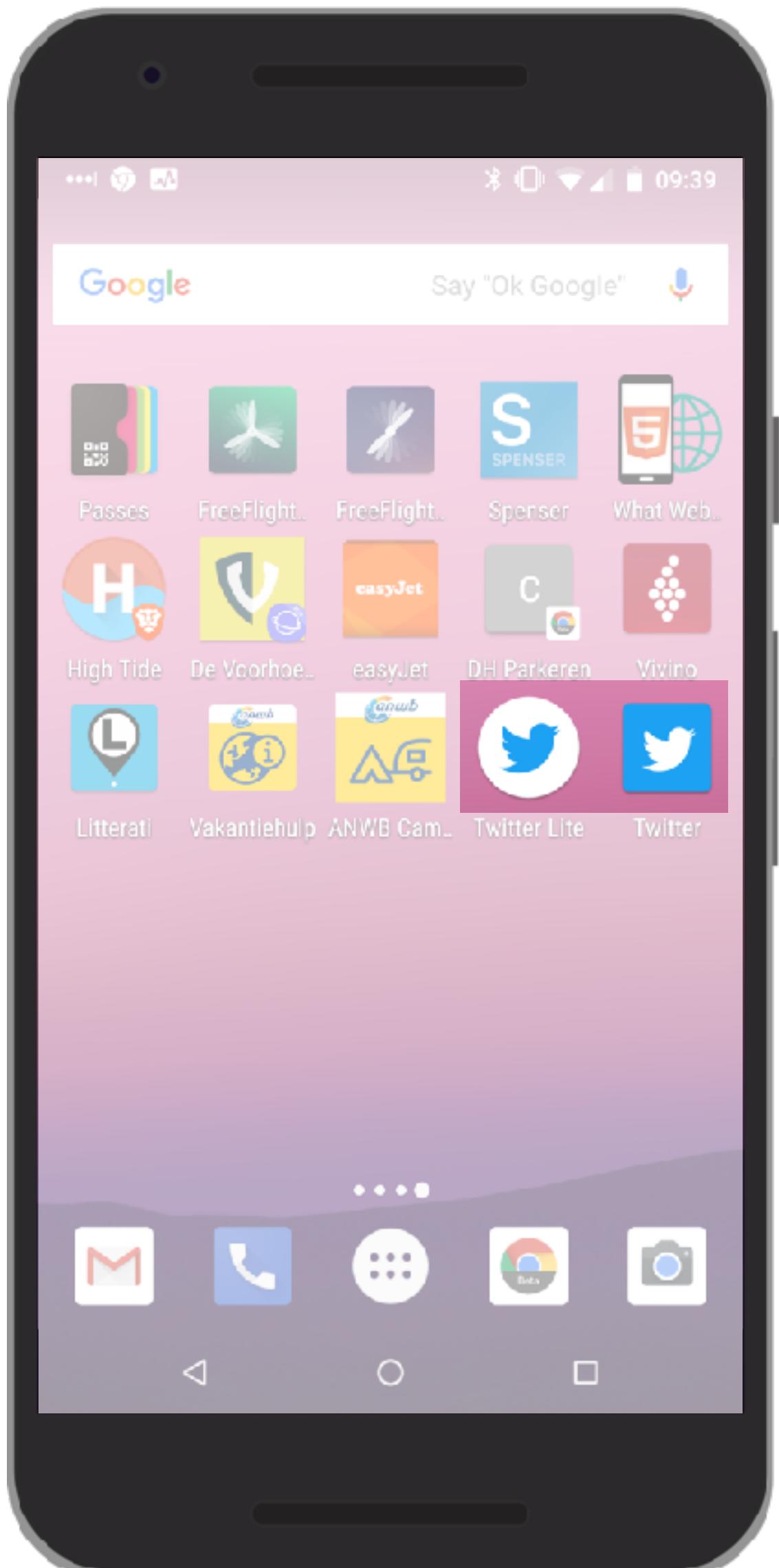
Usage  
Global

% of all users  
75.23% + 0.18% = 75.41%

Method that enables applications to take advantage of persistent background processing, including hooks to enable bootstrapping of web applications while offline.

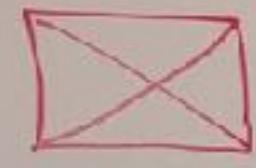


# NATIVE AND WEB?



```
"prefer_related_applications": true,  
"related_applications": [  
    {  
        "platform": "play",  
        "id": "com.google.samples.apps.iosched"  
    }  
]
```

PLATFORM	iOS			ANDROID			DESKTOP		
CONTEXT	APP	WEB	IN-APP	APP	WEB	IN-APP	IE	SAFARI	CHROME AND OTHERS
USAGE	6%	15%	6%	4%	22%	5%	4%	3%	35%
FEATURE									
INSTALLABLE	■	✗	✗	■	■	✗	✗	✗	■
AVAILABLE WITHOUT INSTALL	✗	■	■	■	■	■	■	■	■
APP STORE PRESENCE	■	✗	✗	■	■	✗	✗	✗	✗
ALWAYS LATEST VERSION	✗	■	■	✗	■	■	■	■	■
PUSH NOTIFICATIONS	■	✗	✗	■	■	✗	■	■	■
WORKS OFFLINE	■	■	✗	■	■	■	✗	✗	✗
ACCESS MEDIA AND LOCATION	■	■	?	■	■	?	?	■	■
LINKABLE	✗	■	■	■	■	■	■	■	■
INTER-APP COMM.	■	■	■	■	■	■	■	■	■
APP-LIKE LOOK & FEEL	■	■	■	■	■	■	■	■	■

 NATIVE TECH  
 WEB TECH  
 NOT AVAILABLE

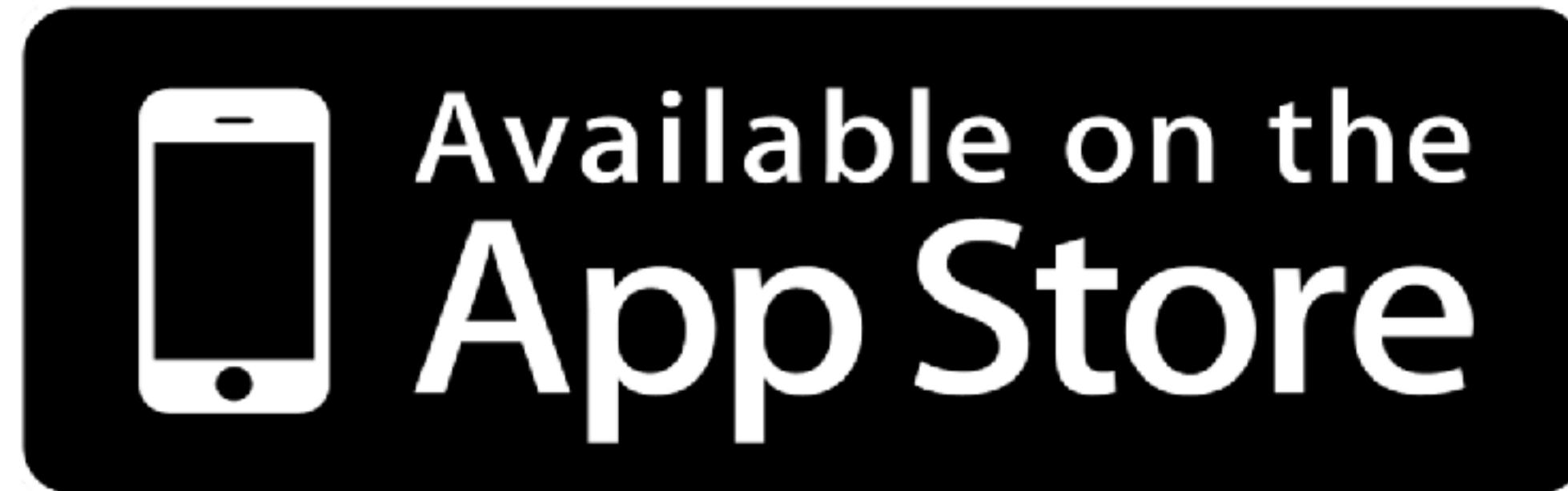
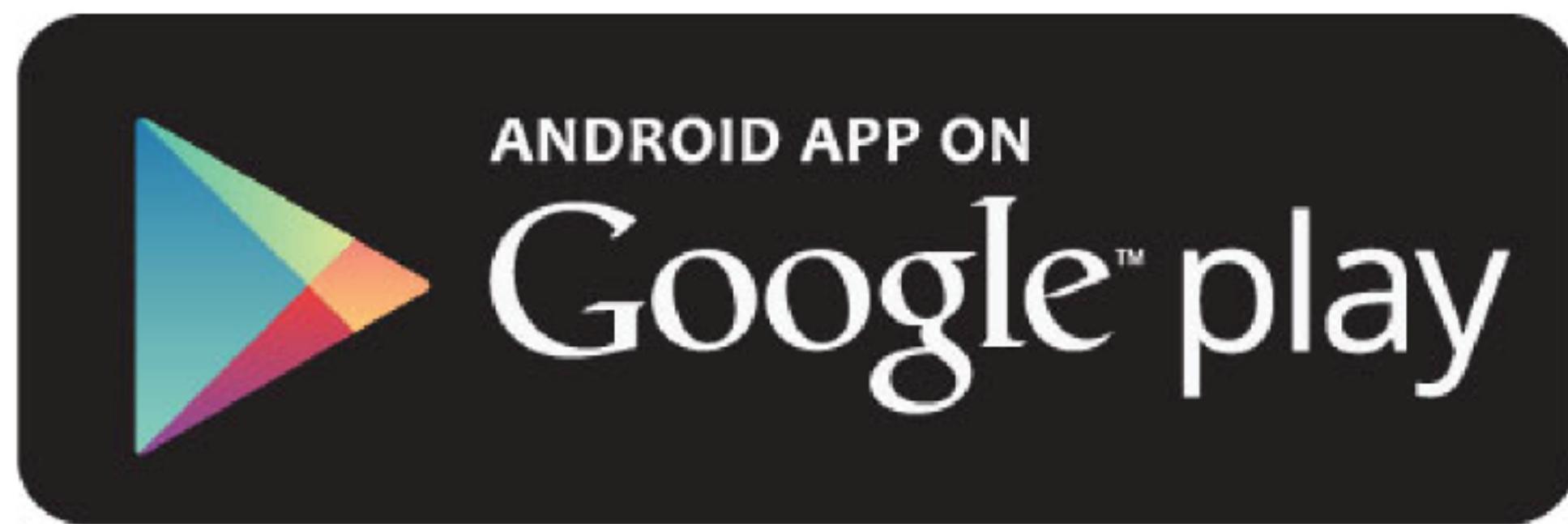
App matrix

make PWAs part of your  
**larger app strategy**

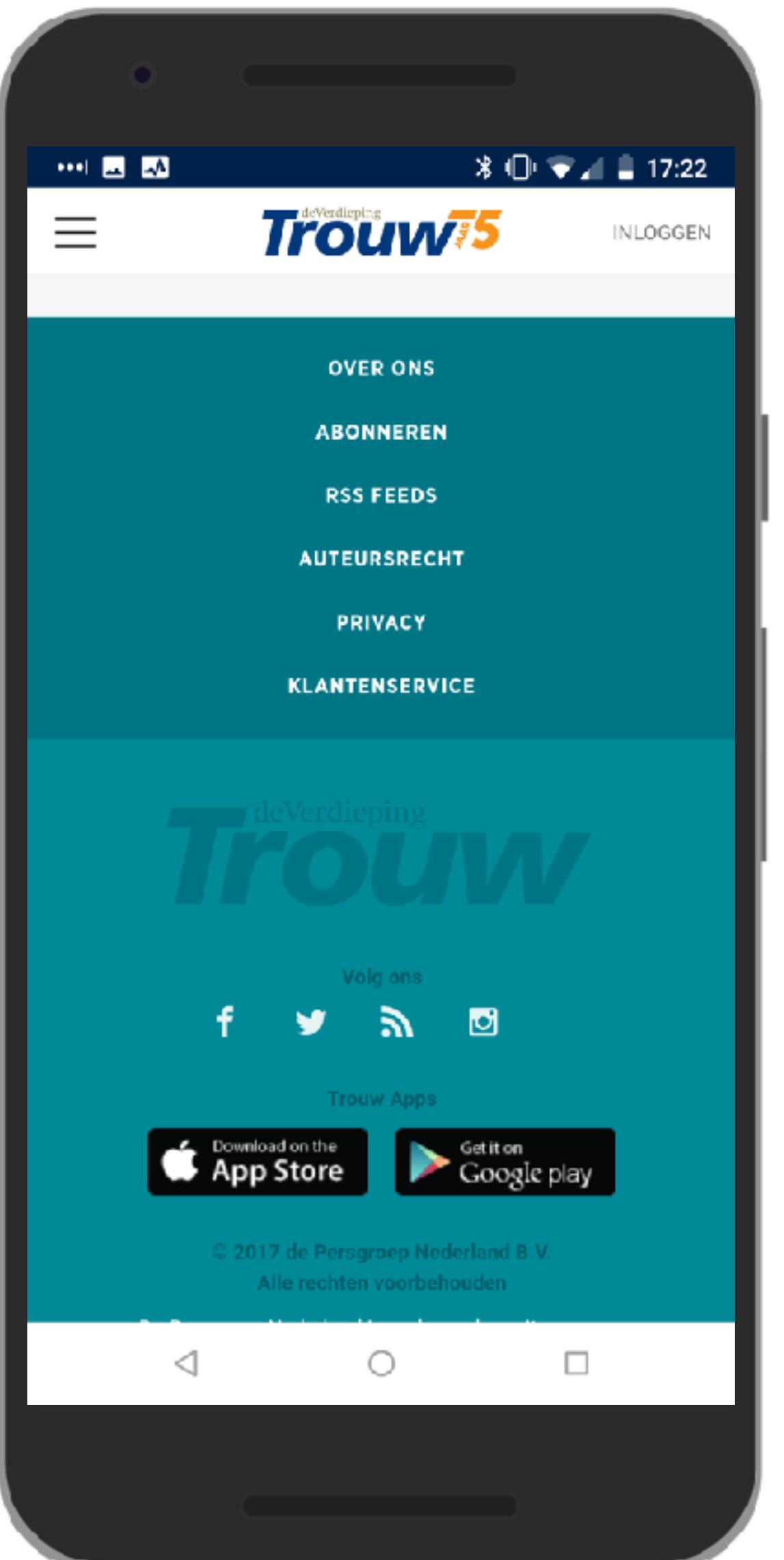
# FEELING APP-Y



# APP STORES



# CONTEXT MATTERS

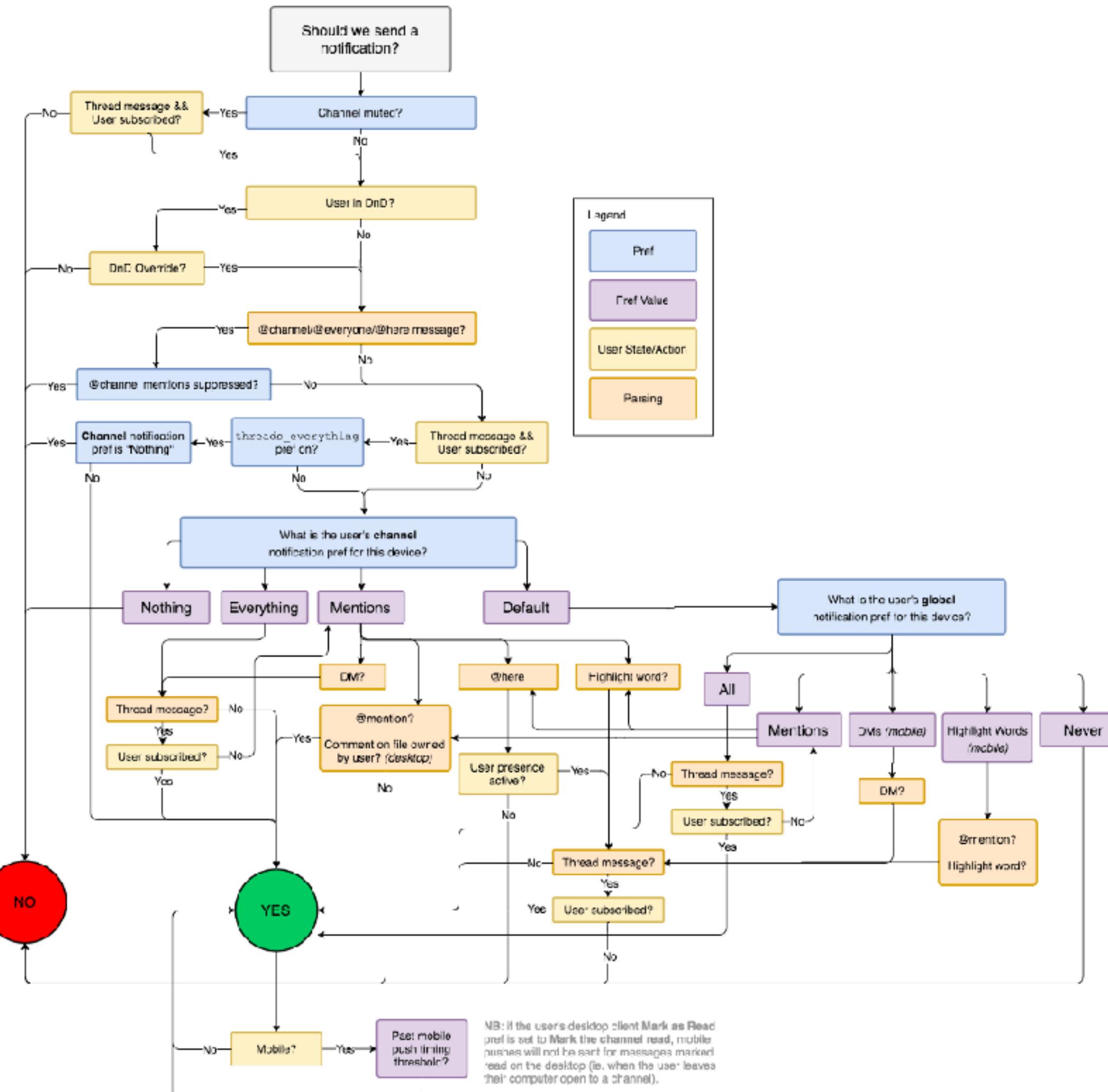


- Interstitials  
(cookie walls,  
ads, ...)
- Fat footers
- App banners
- 3rd party  
pop-ups

# PERMISSION FLOW

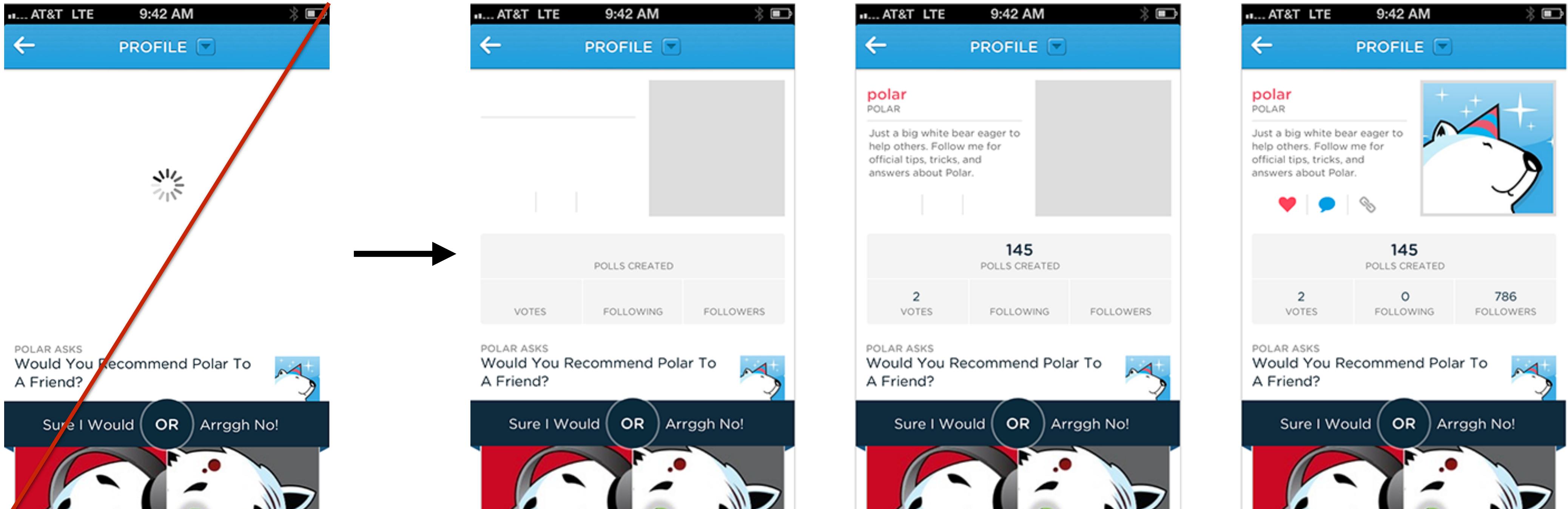


# PUSH NOTIFICATION FLOW

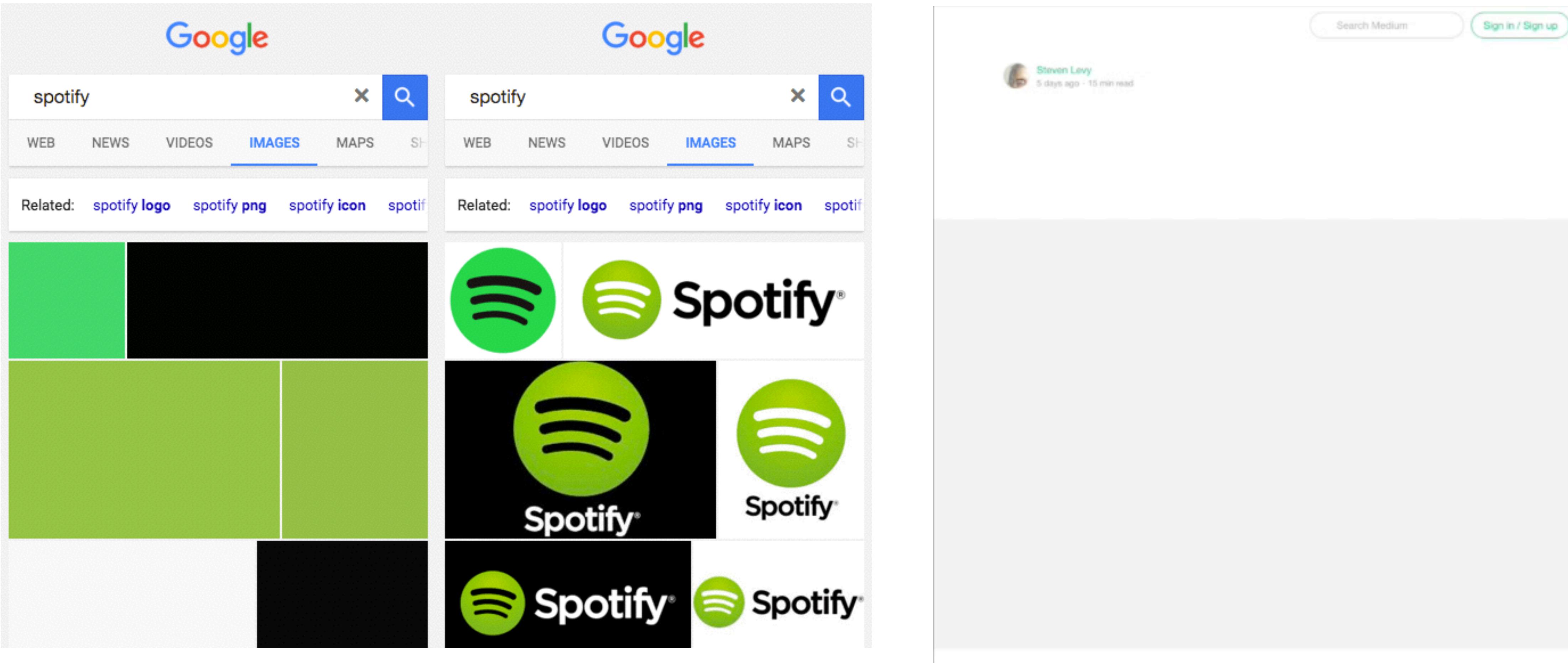


[slack.engineering/reducing-slacks-memory-footprint-4480fec7e8eb](https://slack.engineering/reducing-slacks-memory-footprint-4480fec7e8eb)

# SKELETONS



# IMAGE PLACEHOLDERS



[jmperezperez.com/medium-image-progressive-loading-placeholder/](http://jmperezperez.com/medium-image-progressive-loading-placeholder/)

# SYSTEM FONTS

The quick brown fox jumps over the lazy dog.

Fira Sans Firefox OS

The quick brown fox jumps over the lazy dog.

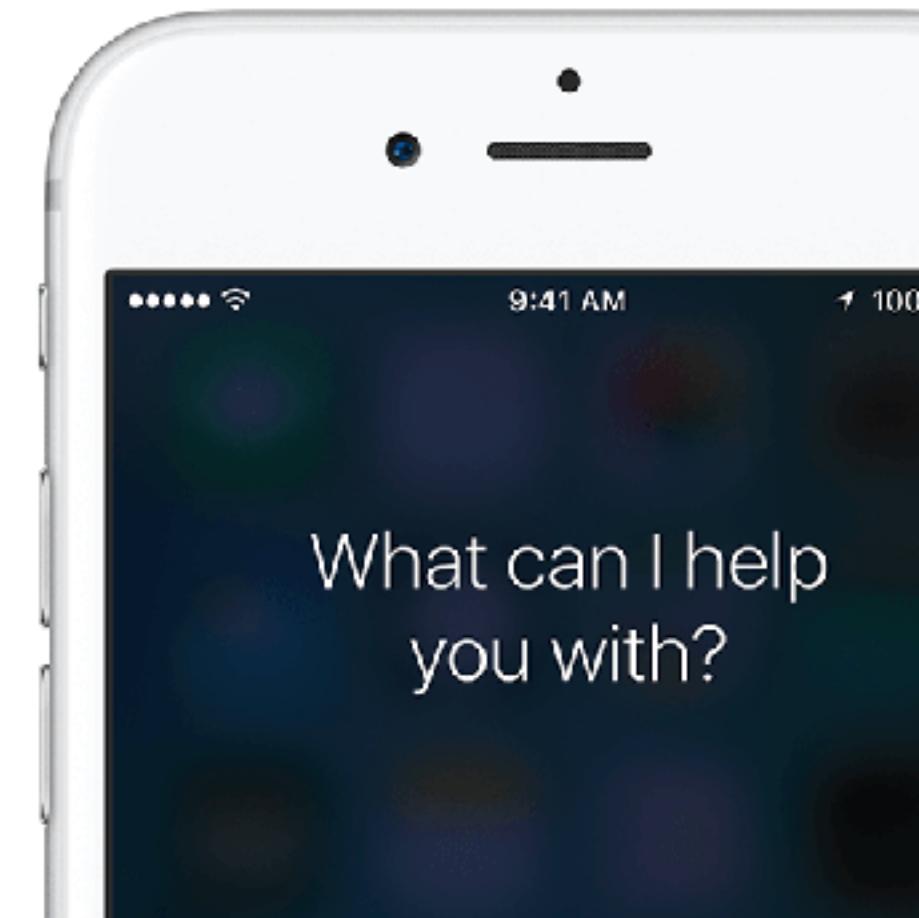
Roboto Android and Chrome OS

The quick brown fox jumps over the lazy dog.

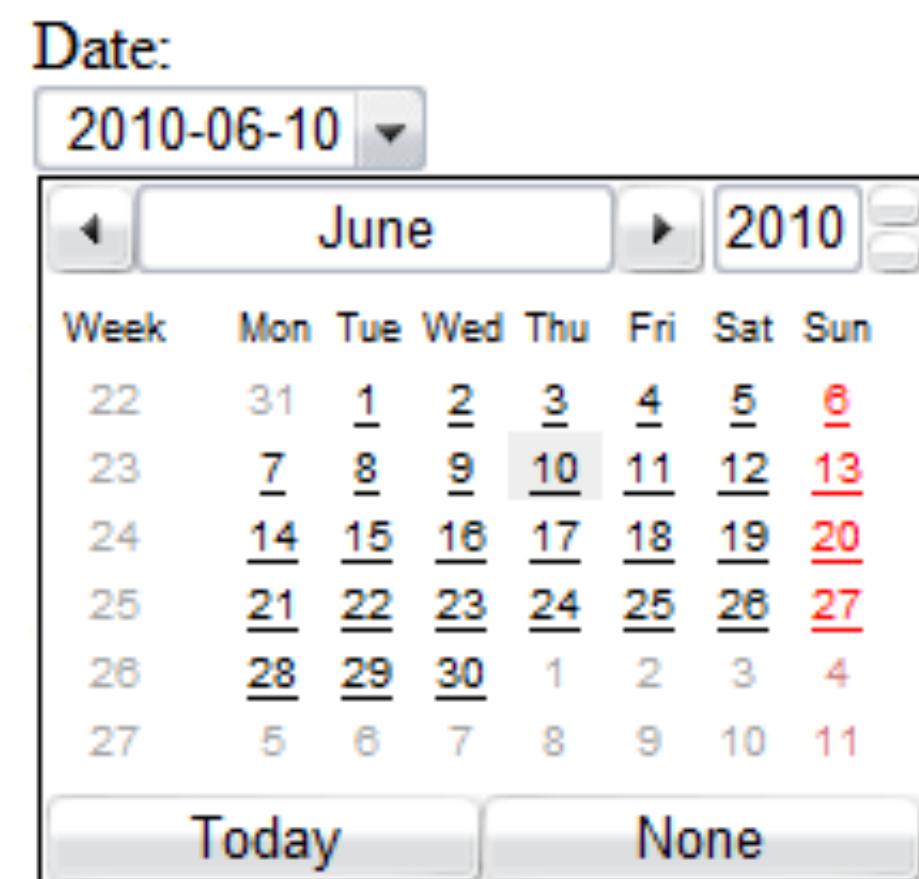
San Francisco iOS and Mac OS

The quick brown fox jumps over the lazy dog.

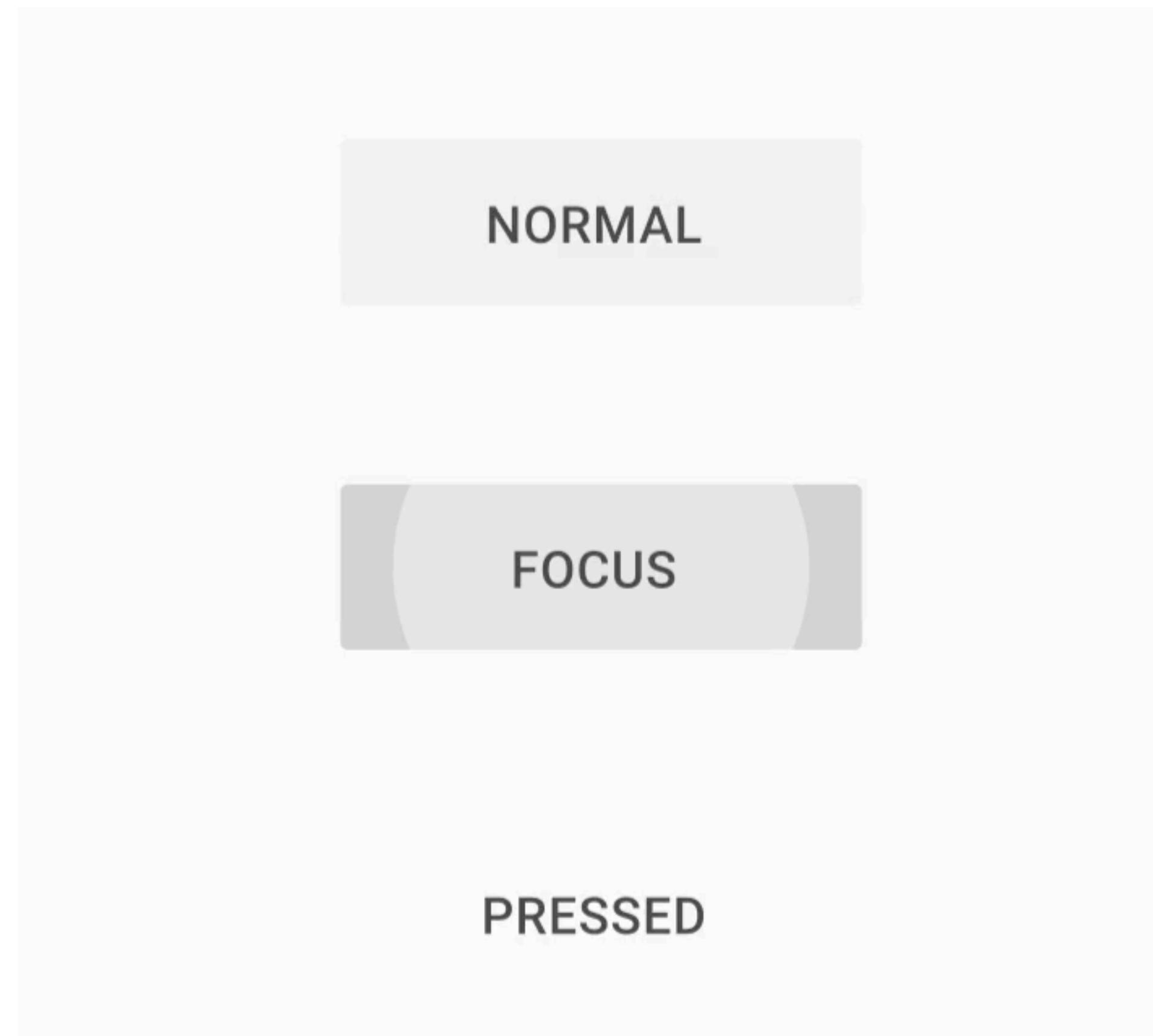
Segoe UI Windows and Windows Phone



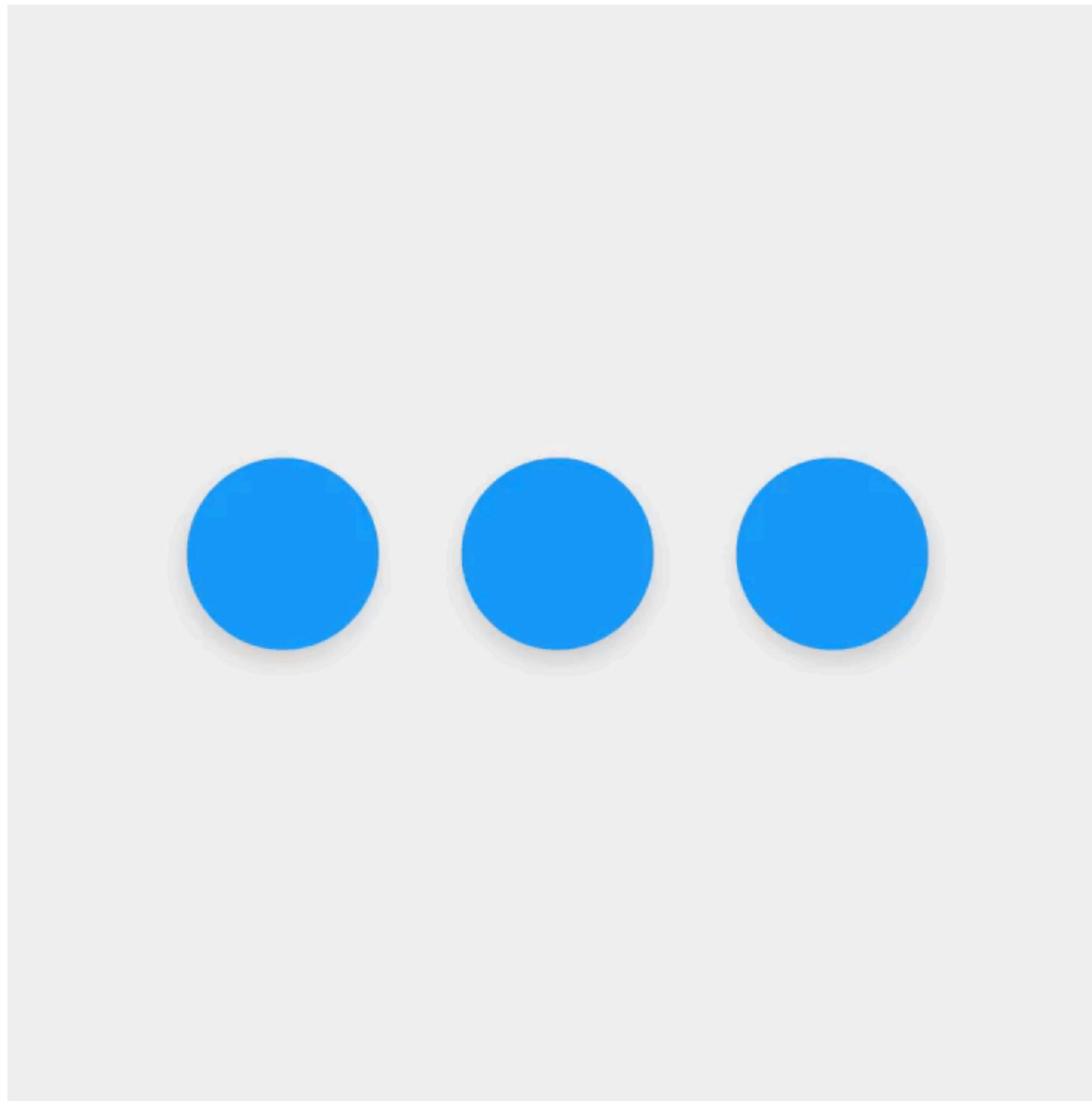
# NATIVE INPUT TYPES



# TOUCH FEEDBACK

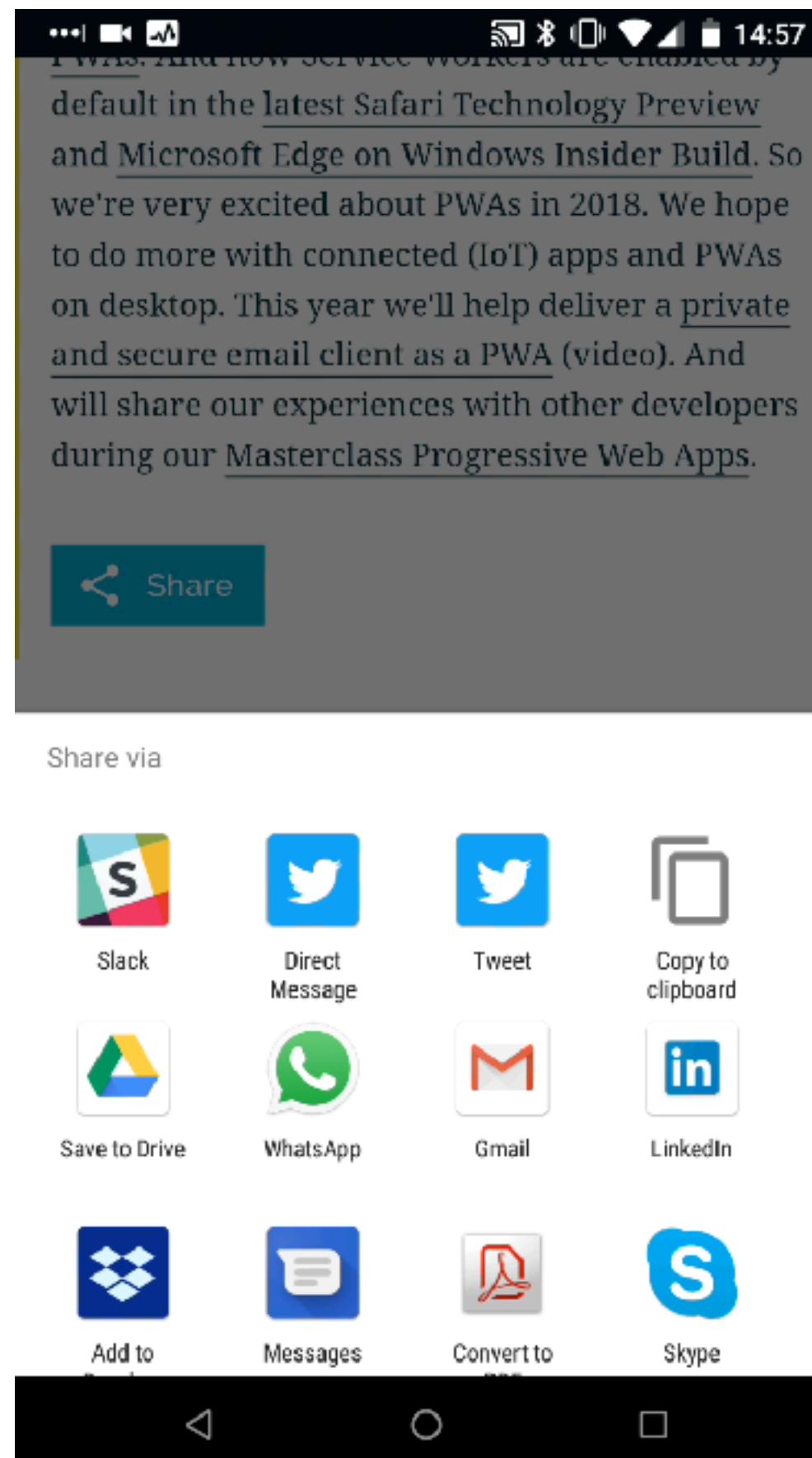


# SMOOTH ANIMATIONS



[material.google.com/motion](https://material.google.com/motion)

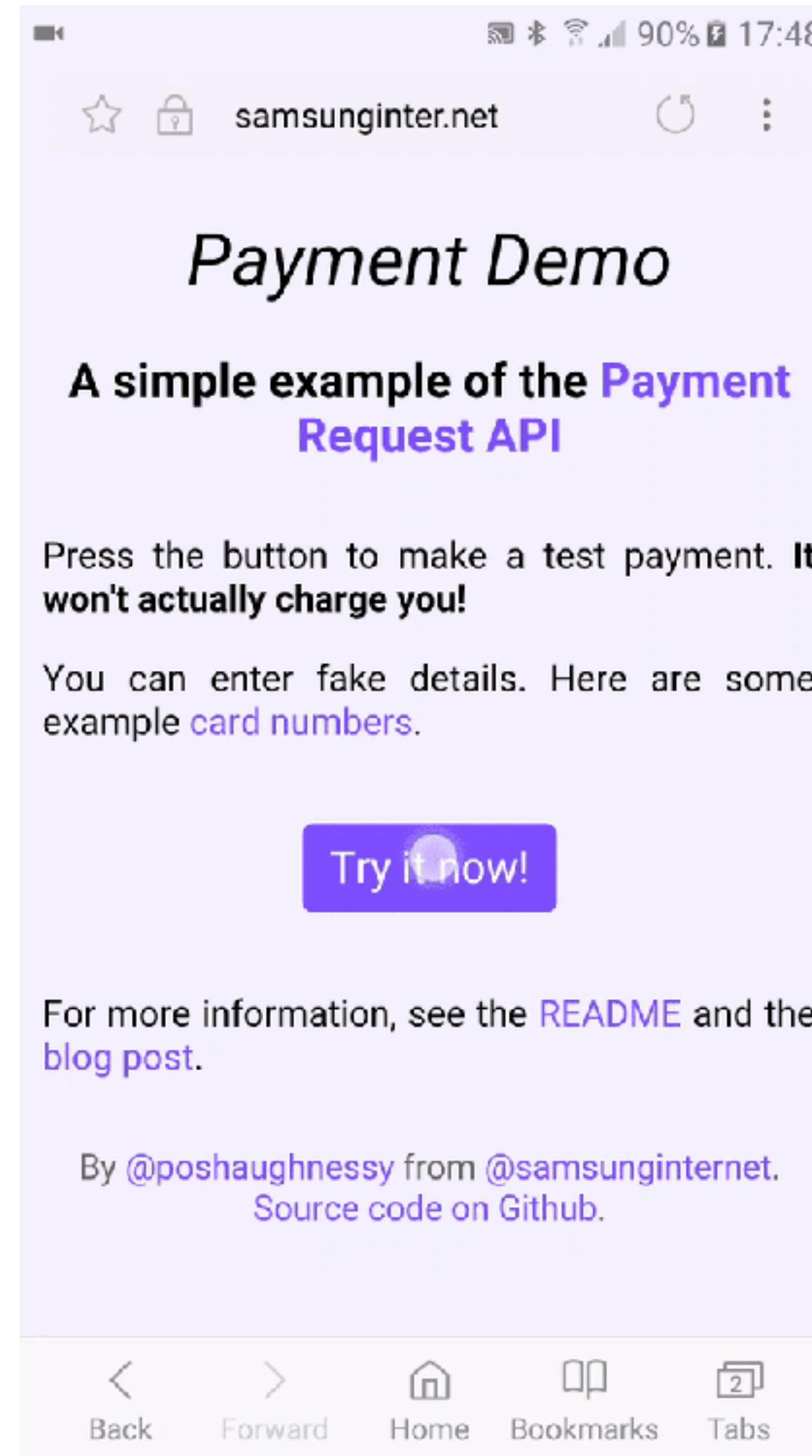
# NATIVE SHARE



A screenshot of a desktop web browser window. The title bar shows the page is titled 'Modular build tasks with Grunt'. To the right of the title is a 'Share a link on Twitter' button. The address bar indicates the page is secure and shows the URL 'https://www.voorhoeede.nl/en/blog/modular-build...'. Below the address bar, there is a 'Secure' icon and a yellow vertical bar. In the center of the page, there is a 'Share on' section with four large social media icons: Facebook (f), Twitter, Google+ (g+), and LinkedIn (in). At the bottom of the page, there is a 'Back to blog overview' link. The overall layout is clean and modern, typical of a professional website.

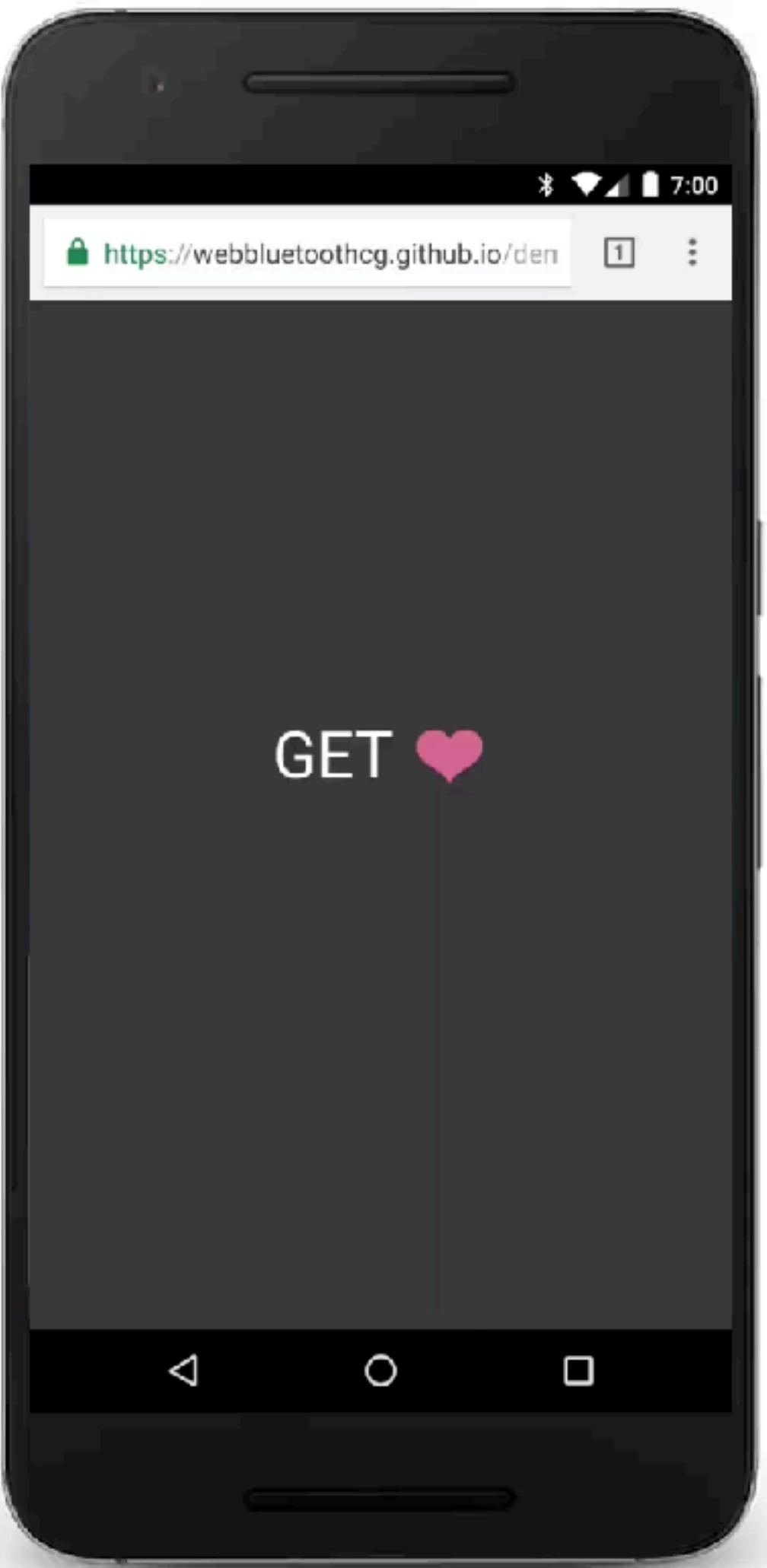
[voorhoeede.nl/en/blog/making-our-site-more-app-y/](https://www.voorhoeede.nl/en/blog/making-our-site-more-app-y/)

# WEB PAYMENTS



[Web Payments](#)

# WEB BLUETOOTH



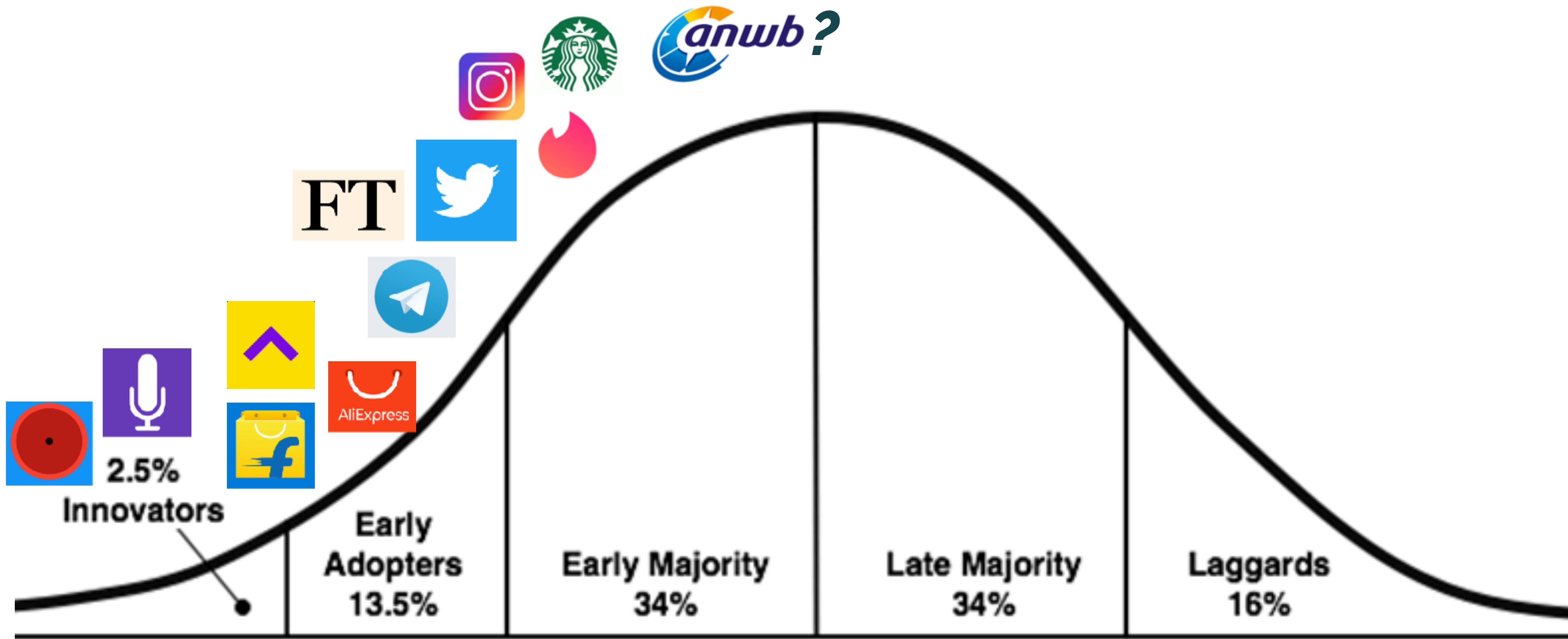
*Bluetooth*

new app features require  
**new design patterns**

**IT'S PRIME TIME**



# ARE YOU READY?



Source: Everett Rogers. Diffusion of innovations model

# TAKEAWAYS



**start small**

design with **context** in mind

make **part of** your **app strategy**

# PWA Stats

A community-driven list of stats and news related to [Progressive Web Apps](#)  
brought to you by  [Cloud Four](#)

**OpenSooq's** new PWA is only **28.3KB** and has improved engagement with a **25%** increase in average time on page resulting in **260%** more leads.



#App Shell #Classified #Engagement  
#Home Screen #Notifications #Service Worker



**Tinder** cut load times from 11.91 seconds to **4.69 seconds** with their new PWA. The PWA is **90%** smaller than Tinder's native Android app. User engagement is up across the board on the PWA.



#Engagement #Home Screen #Notifications  
#Service Worker #Social



**Petlove's** PWA resulted in a **2.8x** increase in conversion and a **2.8x** increase in time spent on site. Using simplified signup and auto sign back in, **2x** more users go to checkout already signed in.



#Conversions #Credential Management  
#E-commerce #Engagement #Home Screen  
#Notifications #Service Worker



**Grand Velas Riviera Maya** resort increased its Black Friday conversion rate by **53%** due to its progressive web app's speed and notifications.



#Conversations #Leisure #Home Screen  
#Notifications #Service Worker #Travel



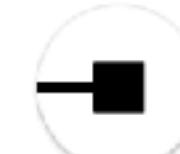
**Trivago** saw an increase of **150%** for people who add its PWA to the home screen. Increased engagement led to a **97%** increase in clickouts to hotel offers. Users who go offline while browsing can continue to access the site and **67%** continue to browse the site when they come back online.



#Conversations #Home Screen #Notifications  
#Offline #Service Worker #Travel



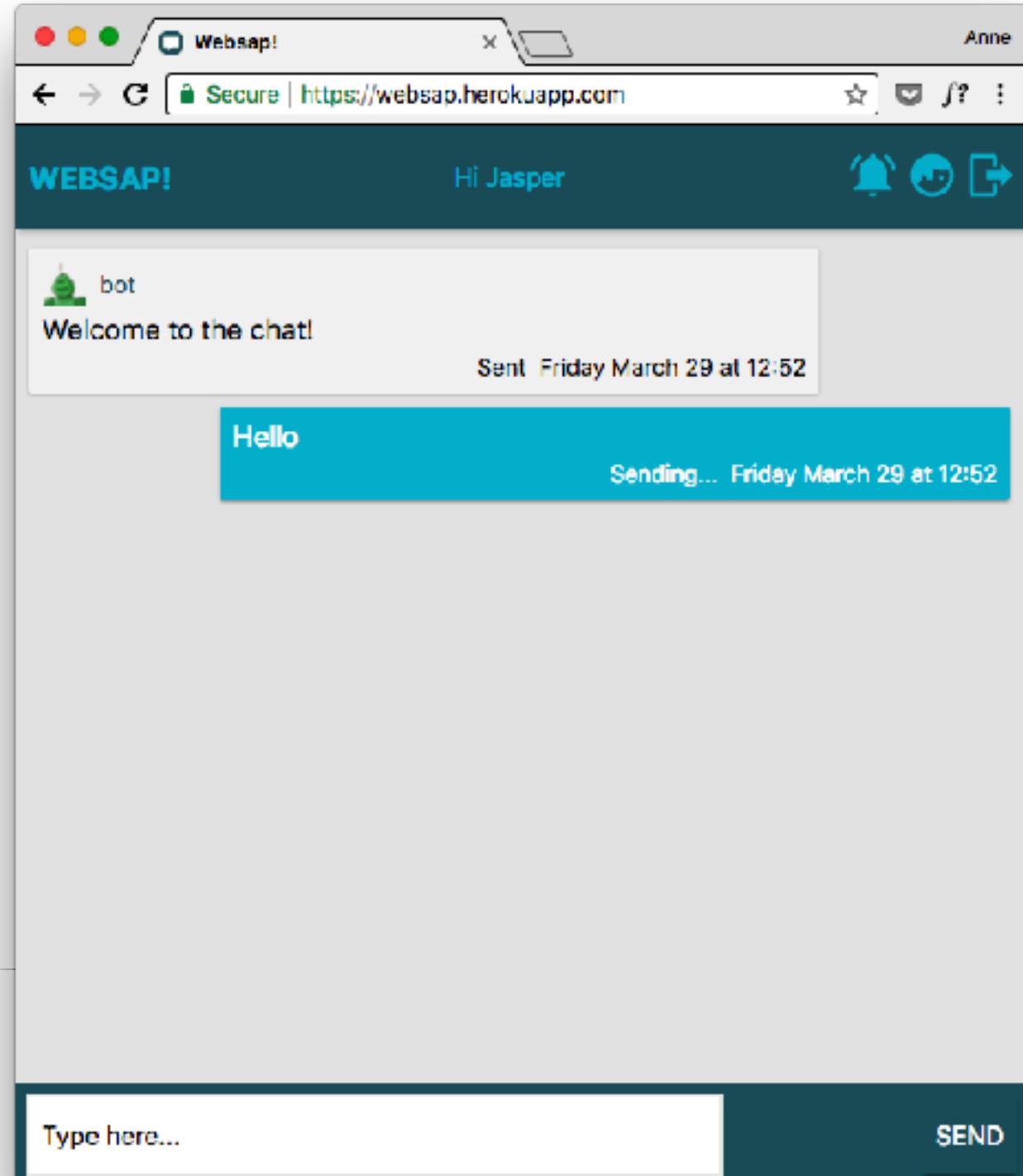
**Uber**'s PWA was designed to be fast even on 2G. The core app is only **50k** gzipped and takes less than **3** seconds to load on 2G networks.



#App Shell #Home Screen #Notifications  
#Service Worker #Travel



# PWA MASTERCLASS



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# THANK YOU





# DE VOORHOEDE

front-end developers