

Progressive Web Apps - for the web, of the web

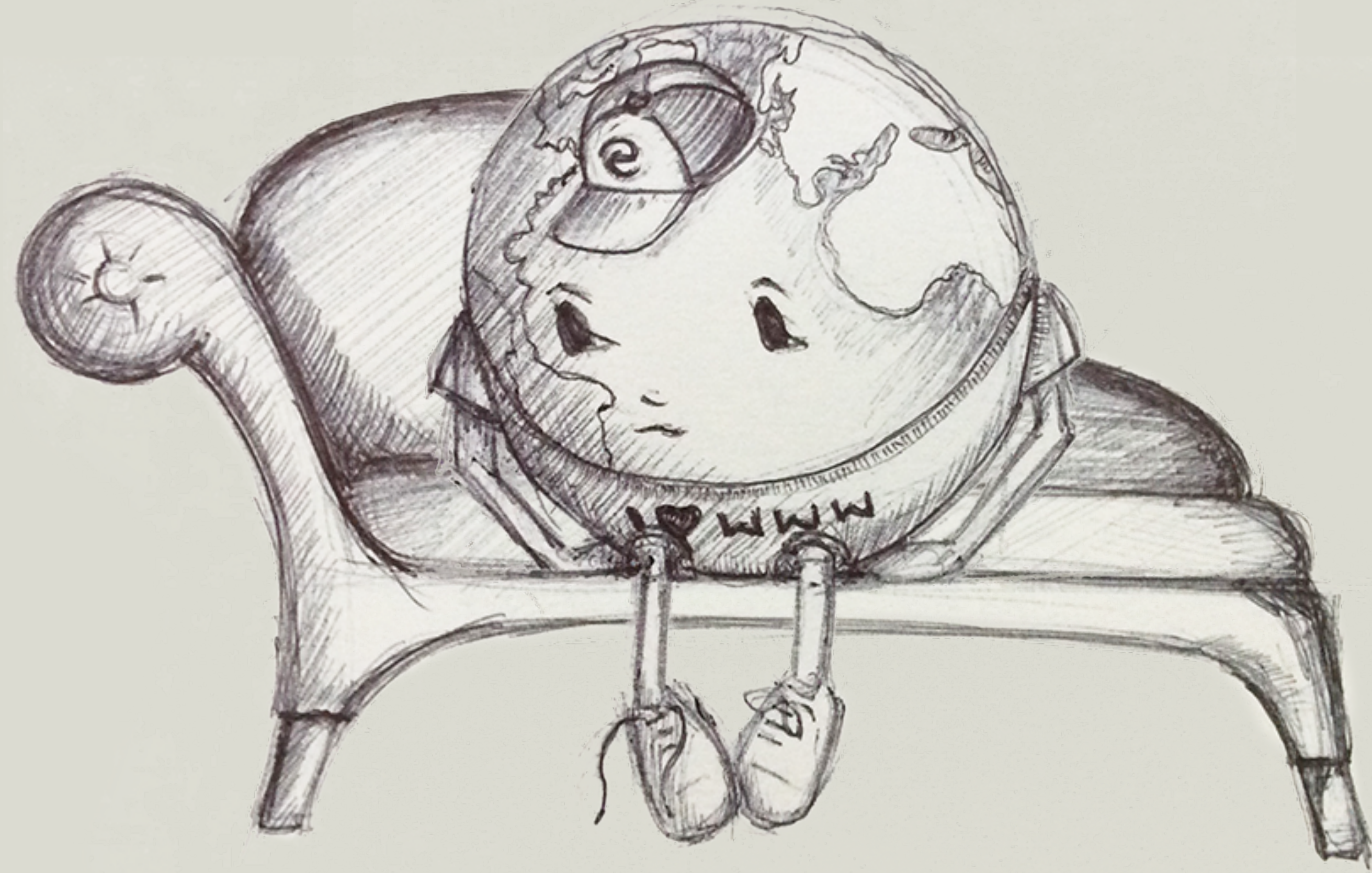


Chris Heilmann @codepo8, GotoCon Chicago, May 2017



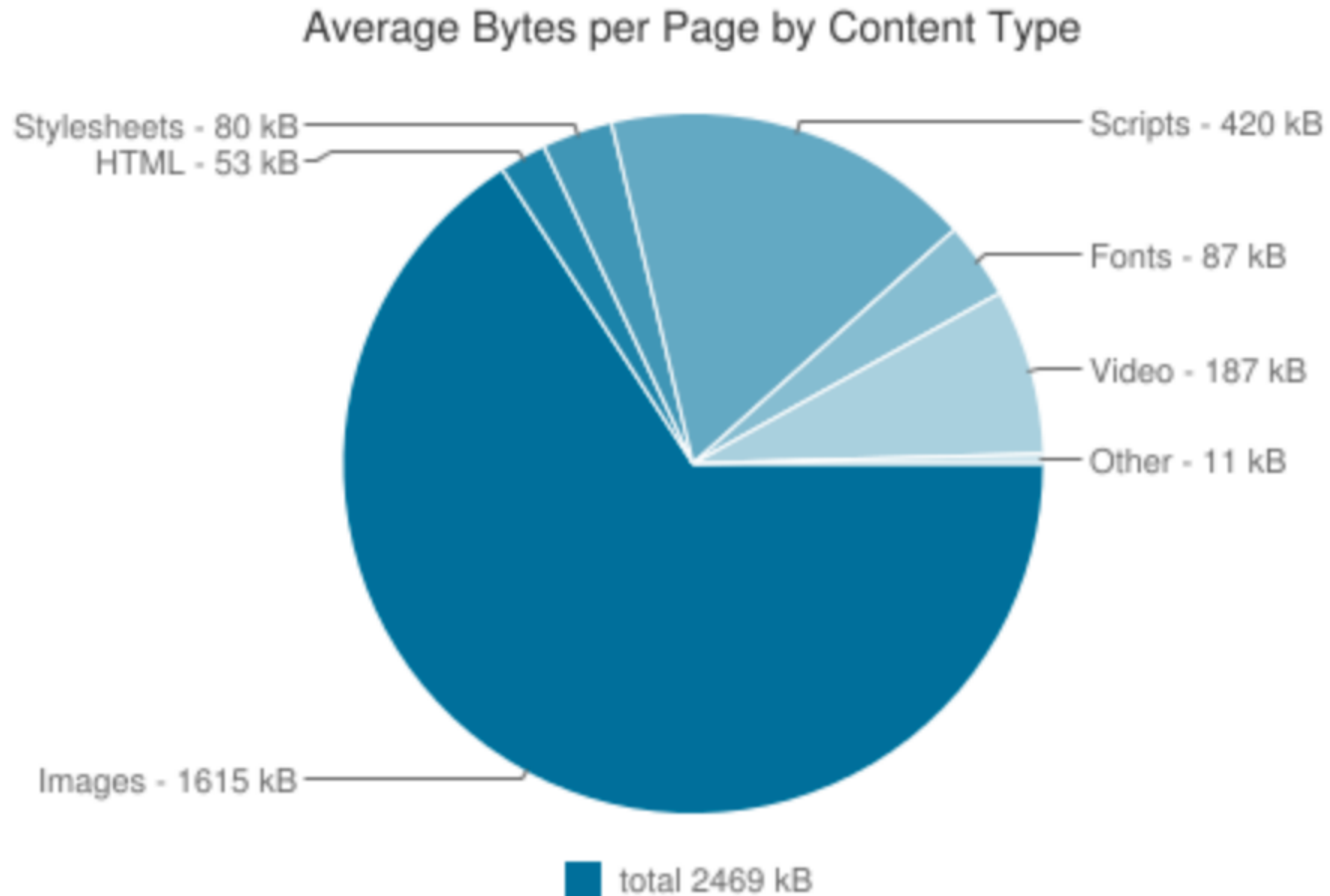
Chris Heilmann
@codepo8

The web is not doing too well...



- ➡ Censorship
- ➡ Bullying
- ➡ Trolling
- ➡ Malware
- ➡ Surveillance
- ➡ Security Issues
- ➡ Obesity

Obesity...



Considering our users...



...this is worrying.



The web wasn't ready for
the mobile form factor.



- ☁️ Mobile was a throwback to the web of old
- ☁️ Small screens, bad connectivity, unreliable browser support
- ☁️ Constantly changing conditions
- ☁️ Hardwired browser and hardware with unpredictable upgrades



It started well, if you
remember....

“ You’ve got everything you need if you know how to write apps using the most modern web standards to write amazing apps for the iPhone today.

– Steve Jobs, 2007

But now...





App Store At 6: How Steve Jobs'
Biggest Blunder Became One Of
Apple's Greatest Strengths

— Forbes, 2014

<http://www.forbes.com/sites/markrogowsky/2014/07/11/app-store-at-6-how-steve-jobs-biggest-blunder-became-one-of-apples-greatest-strengths/#615411fe4874>

Forbes

QUOTE OF THE DAY

"The reason I don't have a plan is because if I have a plan I am limited to today's options."

- Sheryl Sandberg



[CONTINUE TO ARTICLE >](#)

INTERESTING TOPICS

01. **CYBER MONDAY DEALS**

02. **CYBER MONDAY LAPTOP SALES**

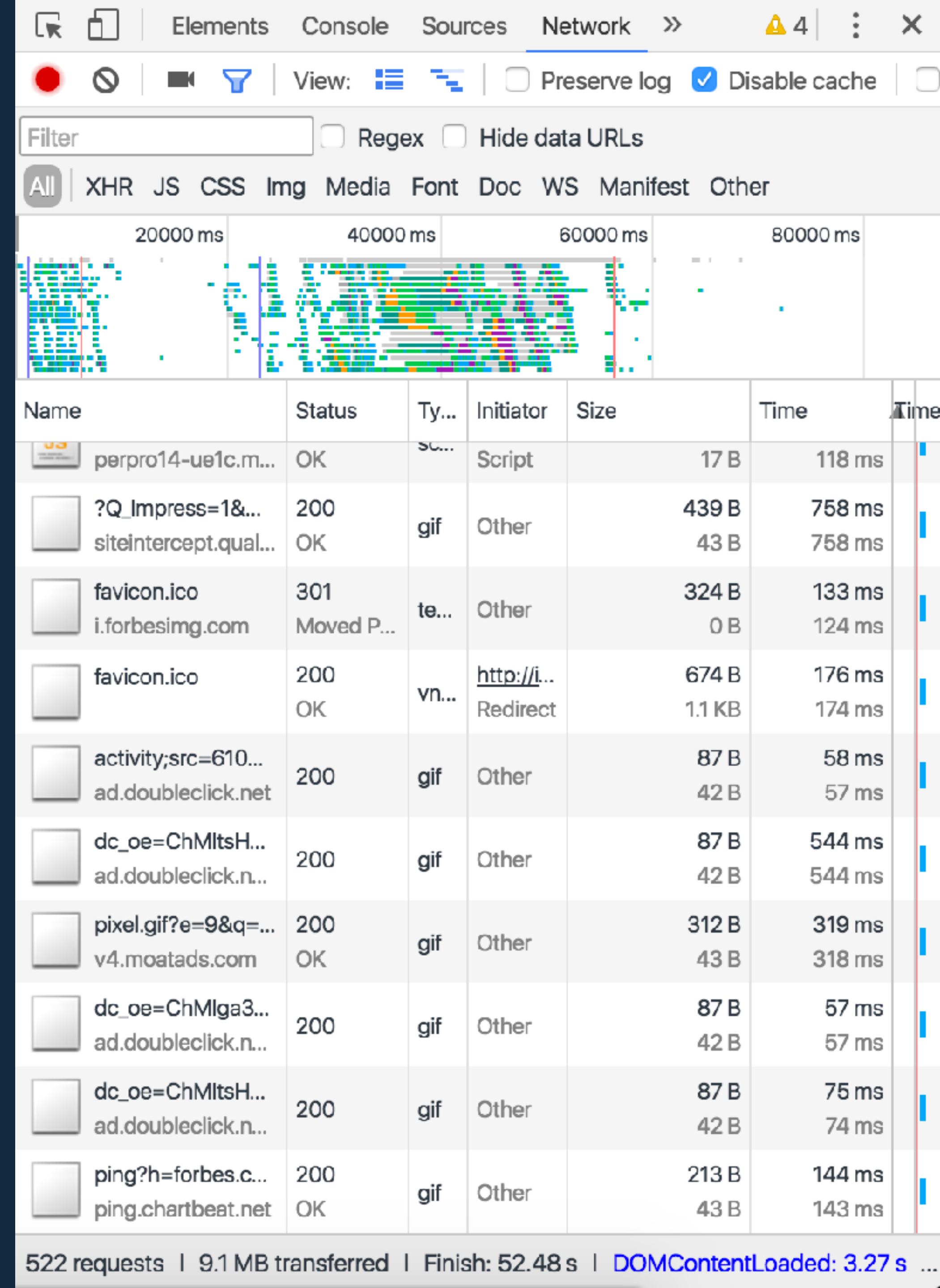
03. **CYBER MONDAY SPECIALS**

04. **SOFTWARE APP DEVELOPMENT**


05. **IPHONE 6 APPS**

06. **MOBILE APP DEVELOPMENT**

- 🙄 902 words article
- 🙄 9.1 MB data
- 🙄 522 requests
- 🙄 52.48 seconds load time



From the Web

Ads by Revcontent 



Morning People in the UK Are Obsessed with This Mattress

EVE MATTRESS



British Mum Makes £11,953 A Month Doing Nothing - You Wont Believe Her Secret

TRENDING COOL



People Are Cancelling Their Netflix Account Because Of This Site

HOW FINANCE DAILY



The Most Addictive Game of the Year! Play with 15 Million Players Now!

FORGE OF EMPIRES



Trump's IQ Will Shock You!

POLLHYPE



Breakthrough: Nurse Discovers A Method To Cure Ringing Ears

TINNITUS TERMINATOR



16 time lotto Winner: Lottery Isn't As Random As You Think

LOTTO DESTROYER



The Most Addictive Game of the Year! Build Your City!

ELVENAR





FILTER

Hide

▲ Watched Sites

／ Cookies

▲ Blocked Sites

Recent Site

Last 10 Sites

Daily

Weekly



forbes.com

FIRST ACCESS Mon, Nov 28, 2016 10:44PM

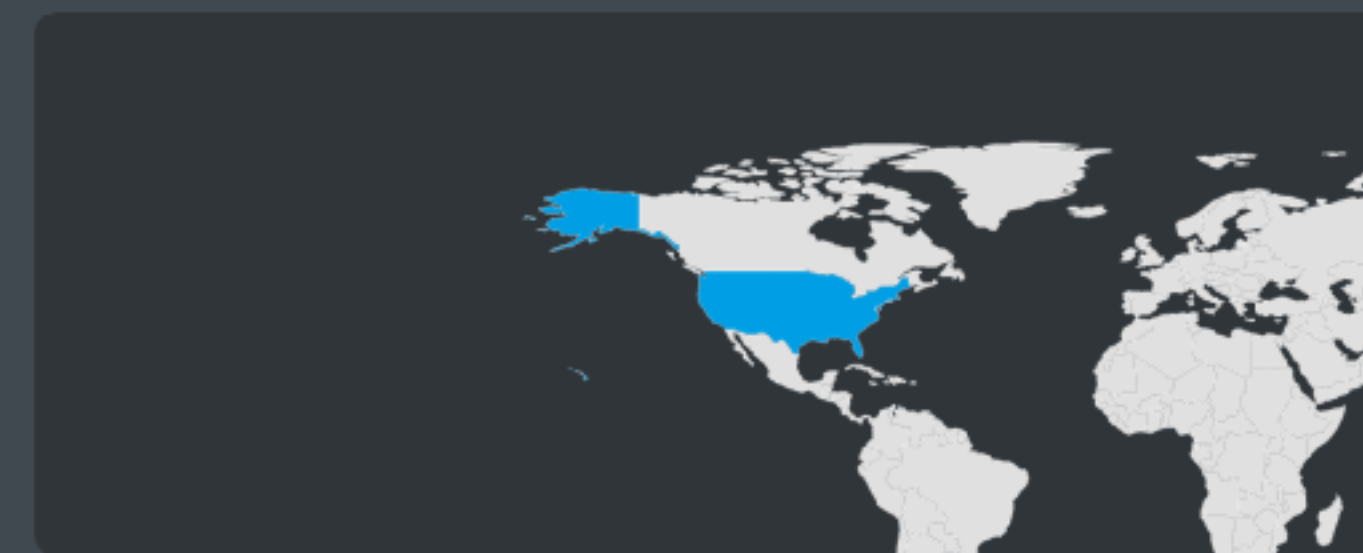
LAST ACCESS Mon, Nov 28, 2016 10:46PM



Block Site

Server Location

United States



Connected to **41 sites** since first access.

chartbeat.net
forbesimg.com
liftdna.com
truste.com
sharethrough.com
media.net
gigya.com
googletagservices.com
amazon-adsystem.com

The publisher's dilemma...



On the web, users are in control.



Users are conditioned to not pay for things but find ways around



Somehow, you have to pay the bills...



Let's try to turn users into products to sell to others...

Out of choice or
necessity, people
fight this....





Apps for publishers...



- 😍 Control over the look and feel
- 😍 Revenue resource (apps cost money)
- 😍 Control over the distribution (remove them from the market or only offer in certain regions)
- 😍 In-built obsolescence (new versions cost more)
- 😍 Control the environment (iOS first, Android maybe...)



=



Reality check for publishers...



- 😞 Pricing race to the bottom (99 cents)
- 😞 Lock-in into the marketplace with its own rules and restrictions
- 😞 Revenue share with marketplace/OS provider
- 😞 Updates are hard and may be delayed by the marketplace rules
- 😞 Turns out, **people don't want to be locked in...**

“ 94% of app revenue comes
from 1% of publishers

<https://sensortower.com/blog/app-store-one-percent>

“ 80% of users who download an app fail to become active users.

“ In app purchases are where the money is at - and these are regulated by the platform or cost a percentage.



60% of apps in the Google Play app store have never been downloaded.



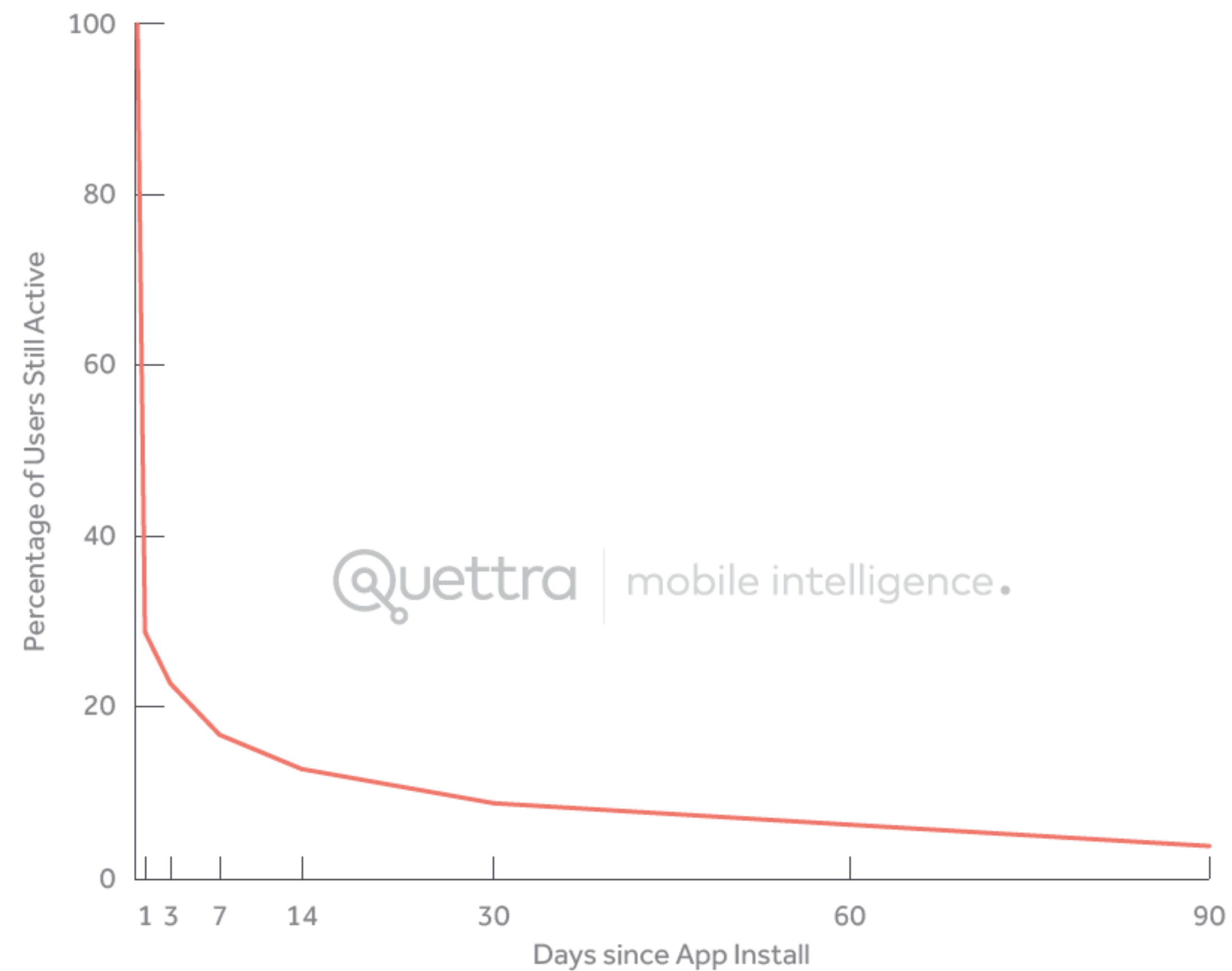
The average user downloads
less than 3 apps per month.
Half of US smartphone users
download **zero apps** per month.

“ Users try out a lot of apps but decide which ones they want to ‘stop using’ within the first 3-7 days.

“ The average app mostly **loses**
its entire userbase within a few
months...

“ ...of the >1.5 million apps in the Google Play store, **only a few thousand** sustain **meaningful** traffic.

Average Retention Curve for Android Apps

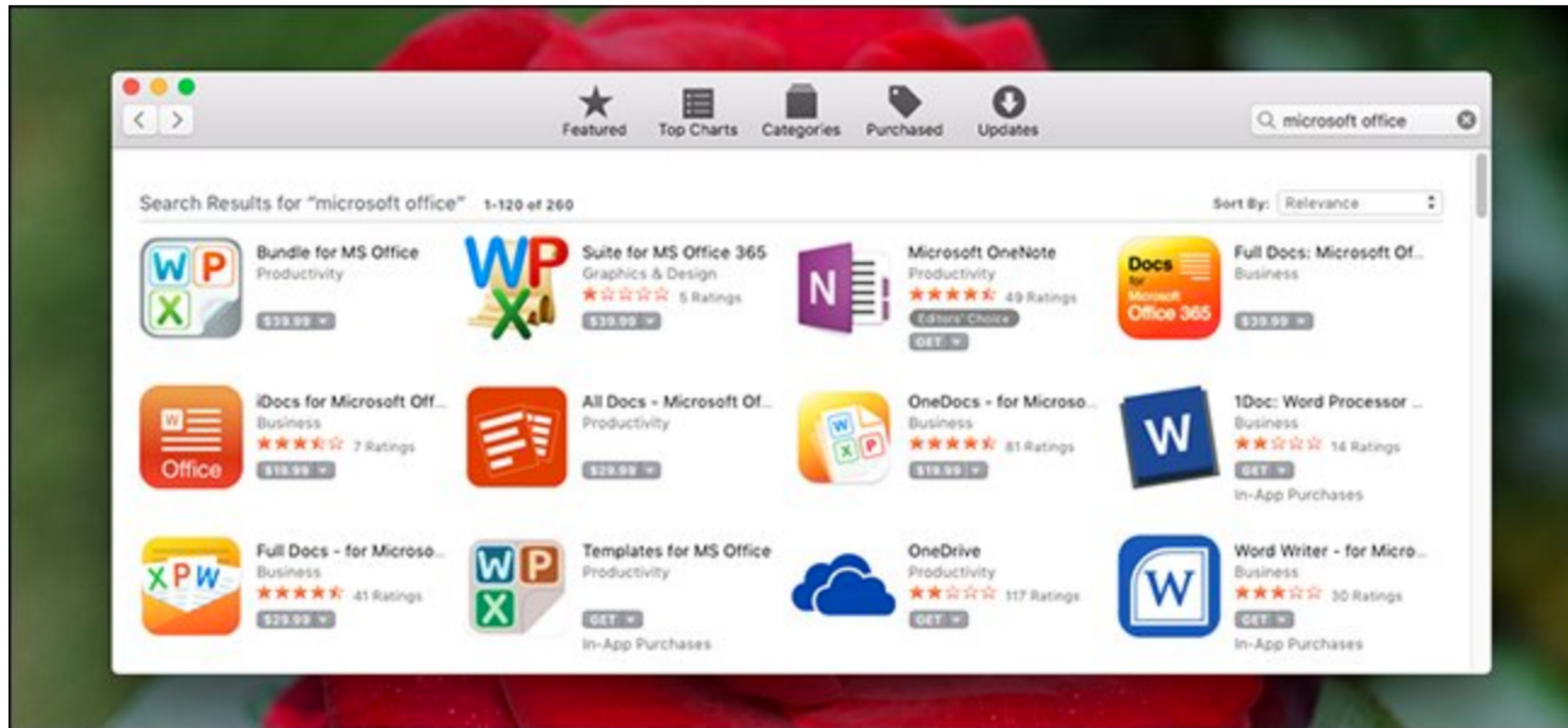




Users spend 80% of their time
using just 5 apps.

Scams, spam and senseless cruft...

Don't Be Fooled: The Mac App Store Is Full of Scams



<http://www.howtogeek.com/281849/dont-be-fooled-the-mac-app-store-is-full-of-scams/>



How can we fix this? We want happy users and ethical, good publishers who get paid....

PWAs

Programmers
With
Attitude!



"STRAIGHT OUTTA COBOL"

Native app install friction blocks
“ 74% of your potential
customers before they ever see
your app.



Back to the web



Yes, but with a twist...



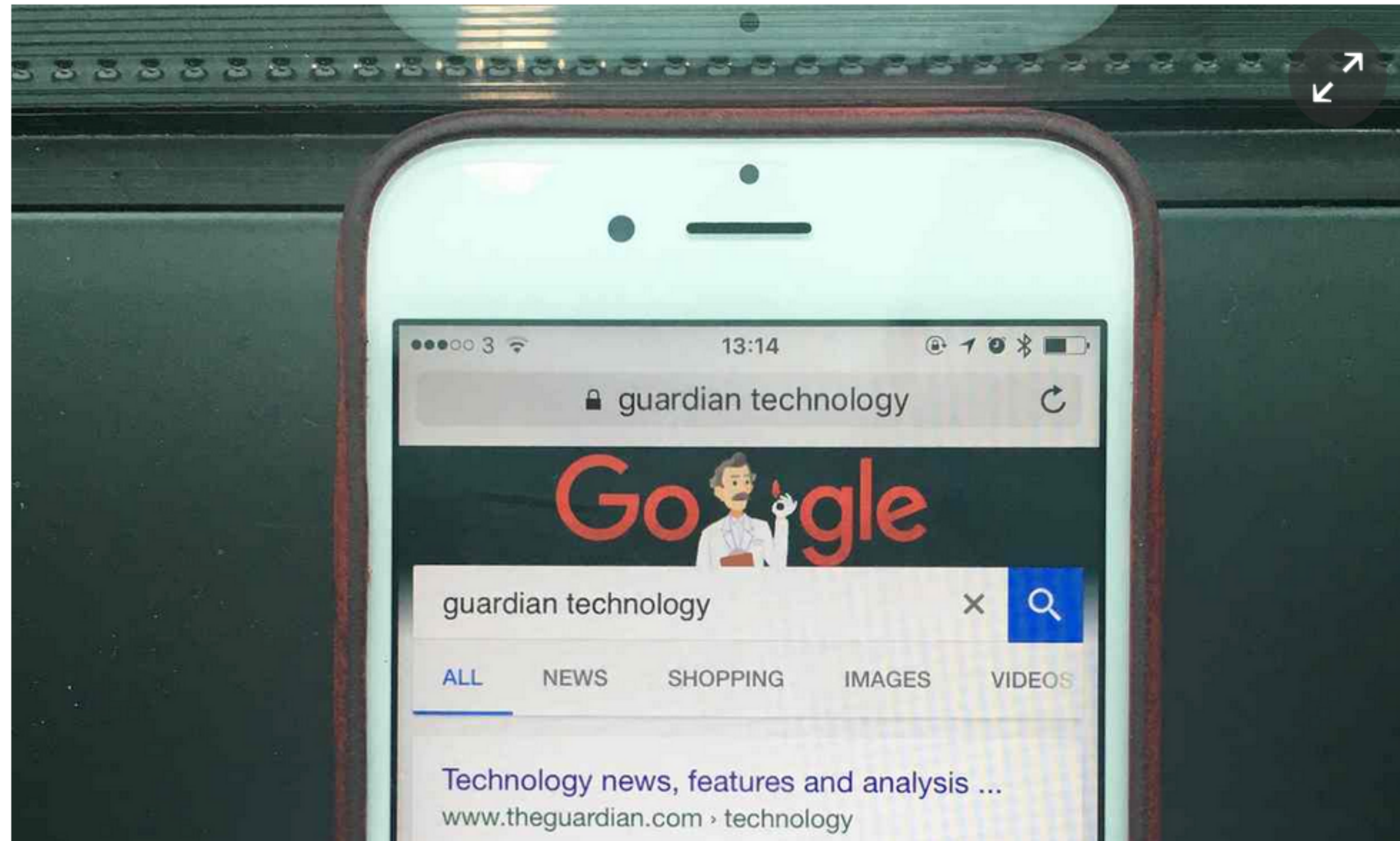
We weren't ready to go all out on web with mobile.



- ☁️ Instead of creating web sites that work well on mobile, we packaged them up and submitted them to market places.
- ☁️ In a 1:1 comparison with native apps, they looked rubbish.
- ☁️ That's because they weren't web products, but native apps built in web technologies.

Mobile web browsing overtakes desktop for the first time

Smartphones and tablets become king as the share of desktop web browsing traffic shrinks to 48.7%, according to data



📷 Mobile web has now overtaken desktop browsing worldwide. Photograph: Sean Anderson for the Guardian

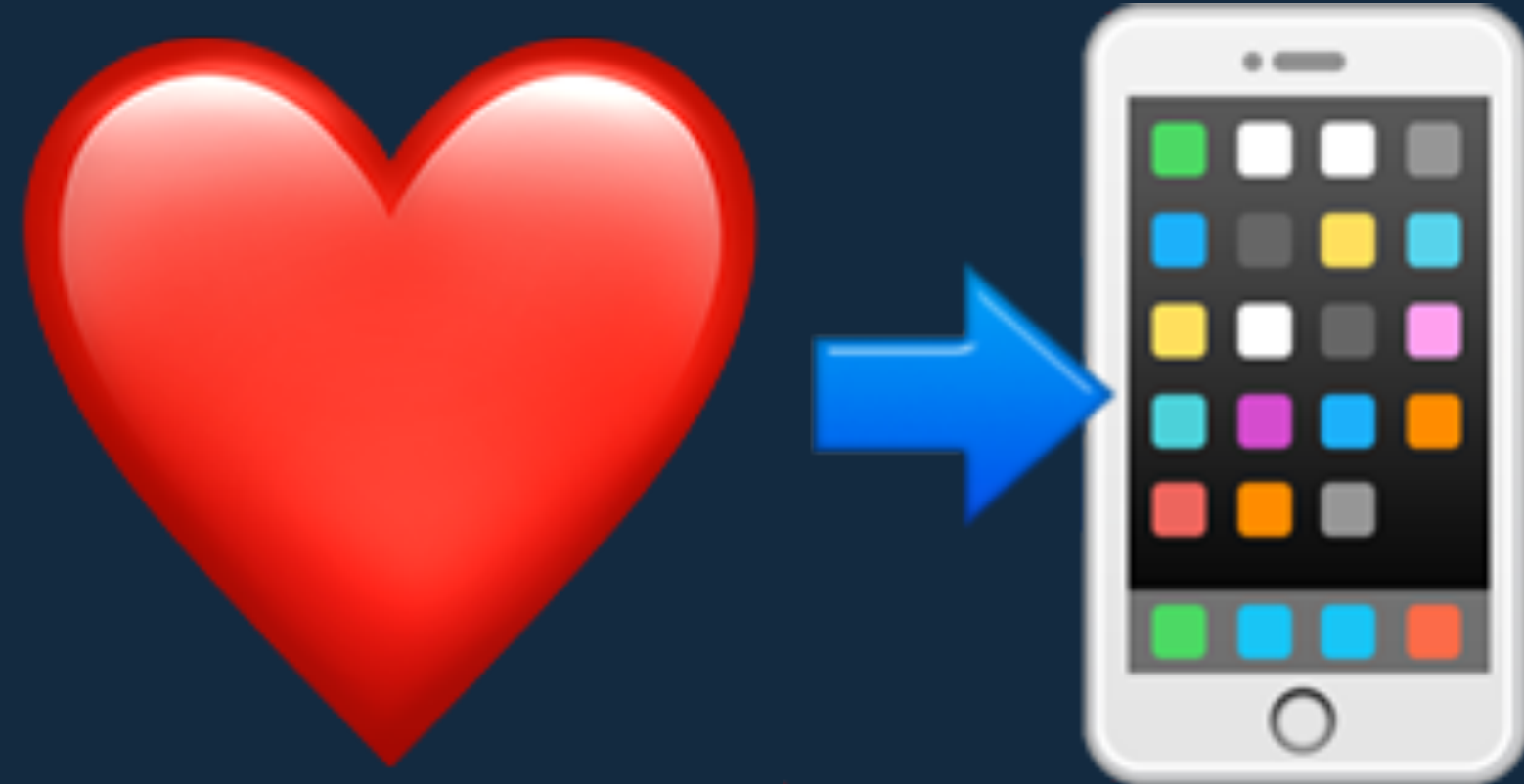
<https://www.theguardian.com/technology/2016/nov/02/mobile-web-browsing-desktop-smartphones-tablets>

These days, we're looking much better...

API	PhoneGap	Web capable
Battery Status	👍	👍
Camera	👍	👍
Contacts	👍	✗
Device Info	👍	👍
Device Motion (accelerometer)	👍	👍
Device Orientation (compass)	👍	👍
Dialogs (notification)	👍	👍
File	👍	👍
File Transfer	👍	👍
Geolocation	👍	👍
Globalisation	👍	👍
Media Capture	👍	👍
Network Information	👍	👍
Splash Screen	👍	👍
Status Bar	👍	👍
Vibration	👍	👍



Let's tackle the mobile
form factor...

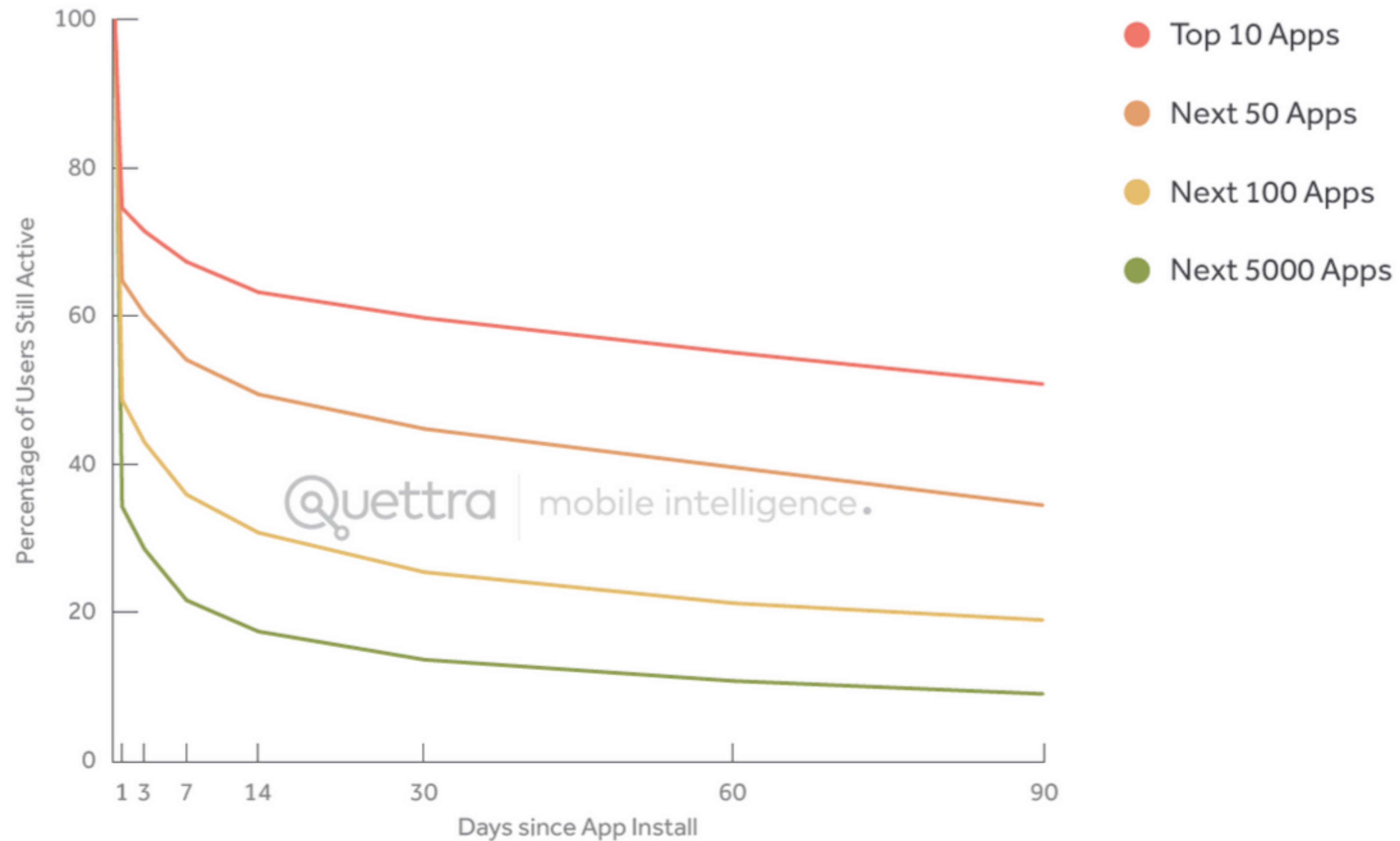


- ✎ Small initial payload
- ✎ Form factor supporting content
- ✎ Form factor supporting interfaces
- ✎ Offline/Flaky connection support
- ✎ Taking advantage of the power of the end user device
- ✎ Avoiding interaction latency



The best way to bend the retention curve is to **target the first few days of usage**, and in particular the **first visit**. That way, users set up themselves up for success.

Retention Curves for Android Apps









Progressive Web Apps



The first step: *App Manifest*

<https://developer.mozilla.org/en-US/docs/Web/Manifest>

The first step: *App Manifest*

-  Describes document as an app
-  Defines look and feel (fullscreen colours, screen orientation)
-  Access to platform-specific functionality
-  Standardised version of older, similar approaches

The first step: *App Manifest*

```
1  {
2    "name": "CSS Colour Names",
3    "short_name": "Colour Names",
4    "icons": [{
5      "src": "icons/90x90.png",
6      "type": "image/png",
7      "sizes": "90x90"
8    }, {
9      "src": "icons/64x64.png",
10     "type": "image/png",
11     "sizes": "64x64"
12   }, {
13     "src": "icons/512x512.png",
14     "type": "image/png",
15     "sizes": "512x512"
16   }],
17   "start_url": "/10kb-CSS-colour-game/",
18   "display": "standalone",
19   "orientation": "portrait",
20   "background_color": "#000000",
21   "theme_color": "#000000"
22 }
```

The first step:

App Manifest



enter a domain to have a W3C Web App Manifest automatically generated from its existing HTML

<https://WebManife.st>



powered by tiny node modules

<https://webmanife.st/>



The big breakthrough: *Service Worker*

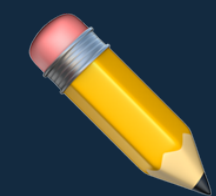
https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API

The big breakthrough: Service Worker

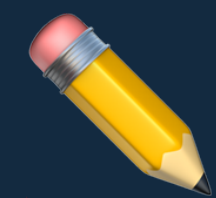


- ✓ Intercept fetch events, respond with cache
- ✓ Intercept push events
- ✓ Intercept sync/periodic events

The big breakthrough: Service Worker



Offline



Push notifications



Background Sync

A progressive web app...



- 🔧 Must be HTTPS
- 🔧 Have a valid manifest with all required properties
- 🔧 Must have a Service Worker
- 🔧 start_url defined in the manifest must always load, including in an offline state
- 🔧 Must supply an own navigation (independent of browser UI)
- 🔧 Responsive to different sizes and form factors.



First success stories...

Alibaba is the global leader in B2B trade.
Recently, they upgraded to a PWA:


- ✓ 76% more web conversions
- ✓ 30% more monthly active users on Android, 14% more on iOS
- ✓ 4X higher interaction rate from Add to Homescreen

Housing.com is one of the leading real estate platforms in India. After implementing their PWA:


- ✓ 38% more conversions
- ✓ 40% lower bounce rate
- ✓ 10% longer average session
- ✓ 30% faster page load

PWA Stats - Case Studies


PWA Stats

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


Voot.com increased session time by **39%**, daily views by **15%**, and conversion by **77%** resulting in similar user engagement to its native app.




#Home Screen #Service Worker #Media




Wego reduced page load time from **12** seconds to between **½** to **3** seconds.




#App Shell #Home Screen #IndexedDB #Offline
#Service Worker #Travel



Twitter Lite is interactive in less than **5** seconds over 3G on most devices, with average load times reduced by over **30%**.




#App Shell #Home Screen #IndexedDB #Notifications
#Offline #Service Worker #Social



Since launching their PWA, **Lancôme's** mobile sales have increased **16%** year over year with overall speed increases of **50%**.



#App Shell #Cosmetics #Notifications #Offline
#Service Worker

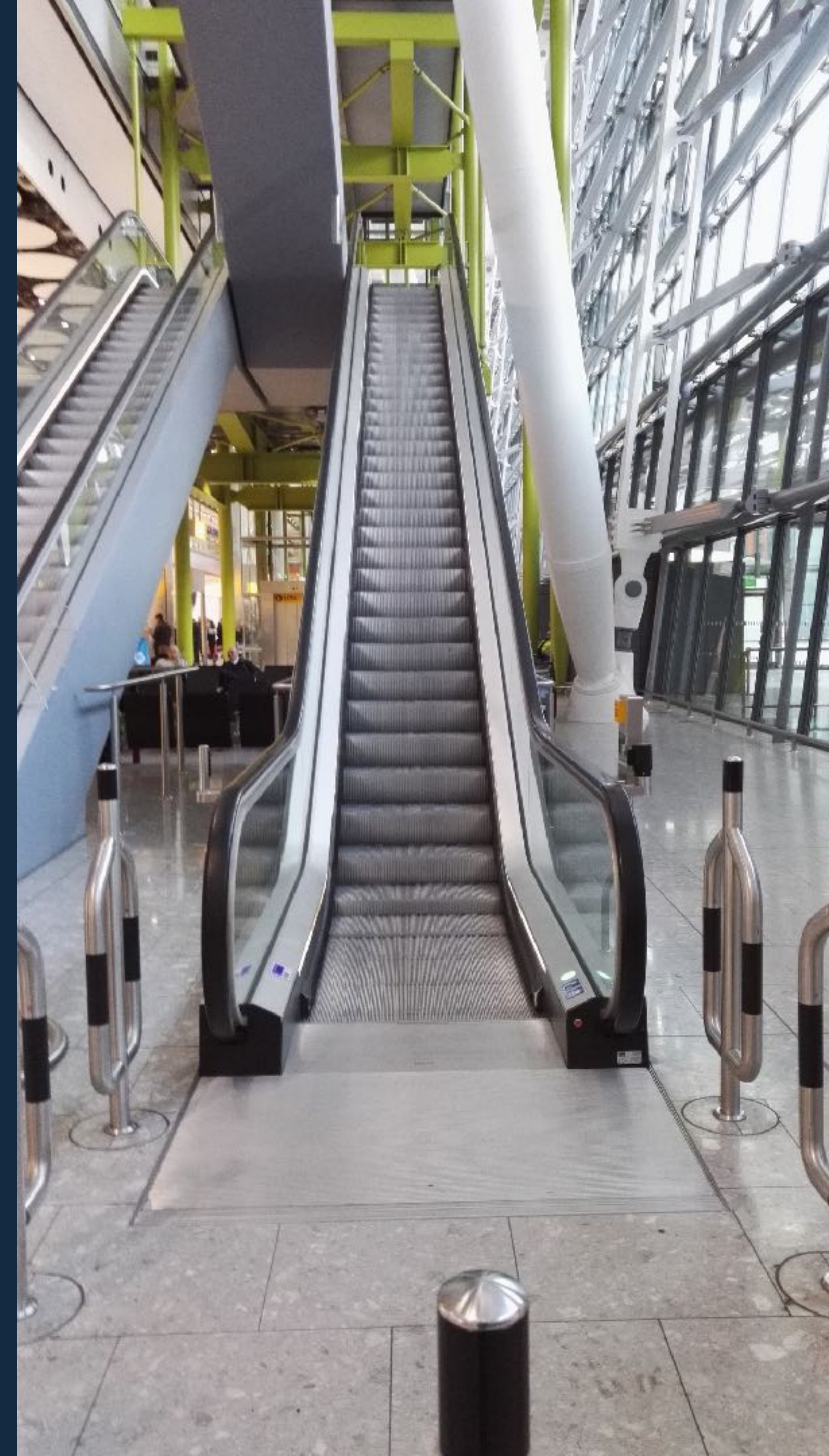


<https://www.pwastats.com/>



Great, but what about
support?

What we're talking about
here is *progressive
enhancement*



Using this, we can support the past...



And we can support
current edge cases...



And after some checking, all the
current browsers and what they
support...





Let's talk about iOS...



There is no official
timeline when or if
ServiceWorker will be in
iOS...

“ iOS has 45% of the US smartphone market, and iOS users spend \$1.08 per user per app per user vs \$.43 on Android.

“ Android has 86% global market share.



```
<meta name="apple-mobile-  
web-app-capable"  
content="yes">
```

```
https://github.com/  
MobileChromeApps/cordova-  
plugin-service-worker
```




What about desktop or
other form factors?



The existing PWA implementations still leave web apps as second-class to native apps in many ways. We want to fix that.

– "The Progress of Web Apps", Jacob Rossi (2016)

Edge plans...



- 🔧 Runs as a Windows service
- 🔧 Can wake up the browser even when the browser is closed
- 🔧 May spawn multiple Service Workers at once for performance (under debate)

Windows plans...



- 🔧 Bing crawls web sites
- 🔧 Sites with a manifest go into the Windows Store
- 🔧 These webapps are real apps: Windows Desktop, Windows Phone, XBox, Hololens, SurfaceHub...

“Websites that
have taken all
the right
vitamins”

— Alex Russel?

Google Webmaster Central Blog

Official news on crawling and indexing sites for the Google index

Building Indexable Progressive Web Apps

Wednesday, November 09, 2016

[Progressive Web Apps](#) (PWAs) are taking advantage of new technologies to bring the best of mobile sites and native applications to users -- and they're one of the most exciting new ideas on the web. But to truly have an impact, it's important that they're indexable and linkable. Every recommendation presented in this article is an existing best practice for indexability -- regardless of whether you're building a Progressive Web App or a simple static website. Nonetheless, we have collated these best practices to provide a checklist to guide you:



- ✎ Any web product can become a Progressive Web App, not all have to be.
- ✎ You'll reap the rewards of simple maintenance and upgrade paths in the form factor mobile users expect.
- ✎ Apps can hibernate and wake up on demand - no need to have the browser open.



- 😊 The great thing here is that progressive web apps bring back the power of the link
- 😊 You don't need to play by the rules of a closed marketplace
- 😊 You can send people a link and by the time they looked at the app it is ready to use - it is real try before you buy.

“ In app purchases are where the money is at, and you can do that in your own app without splitting costs with Apple or Google.



For all intents and purposes, PWAs are a good opportunity to slim down the web.



...without reinventing
the great distribution
model that is the web.



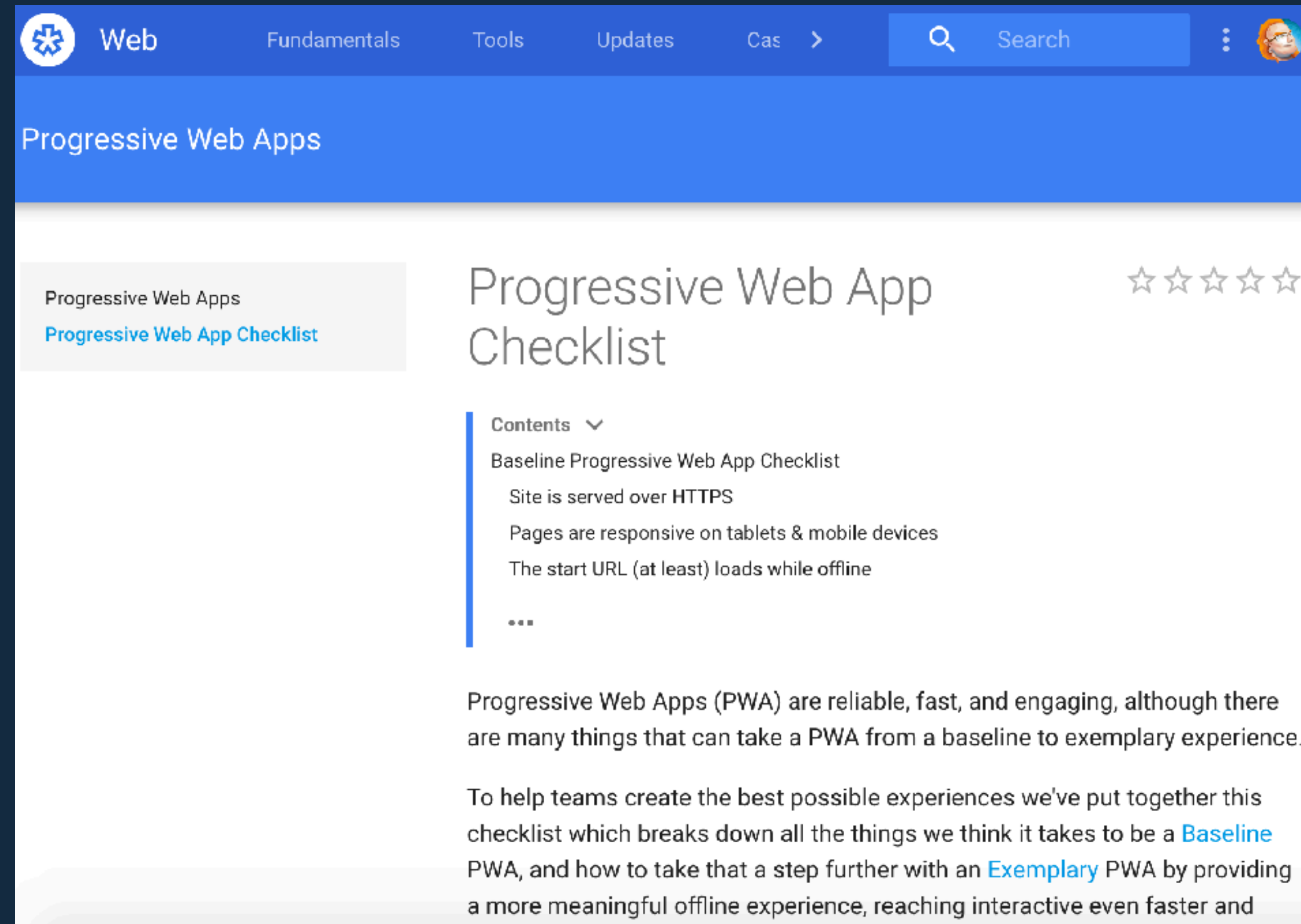
Resources...

Lots of great resources...



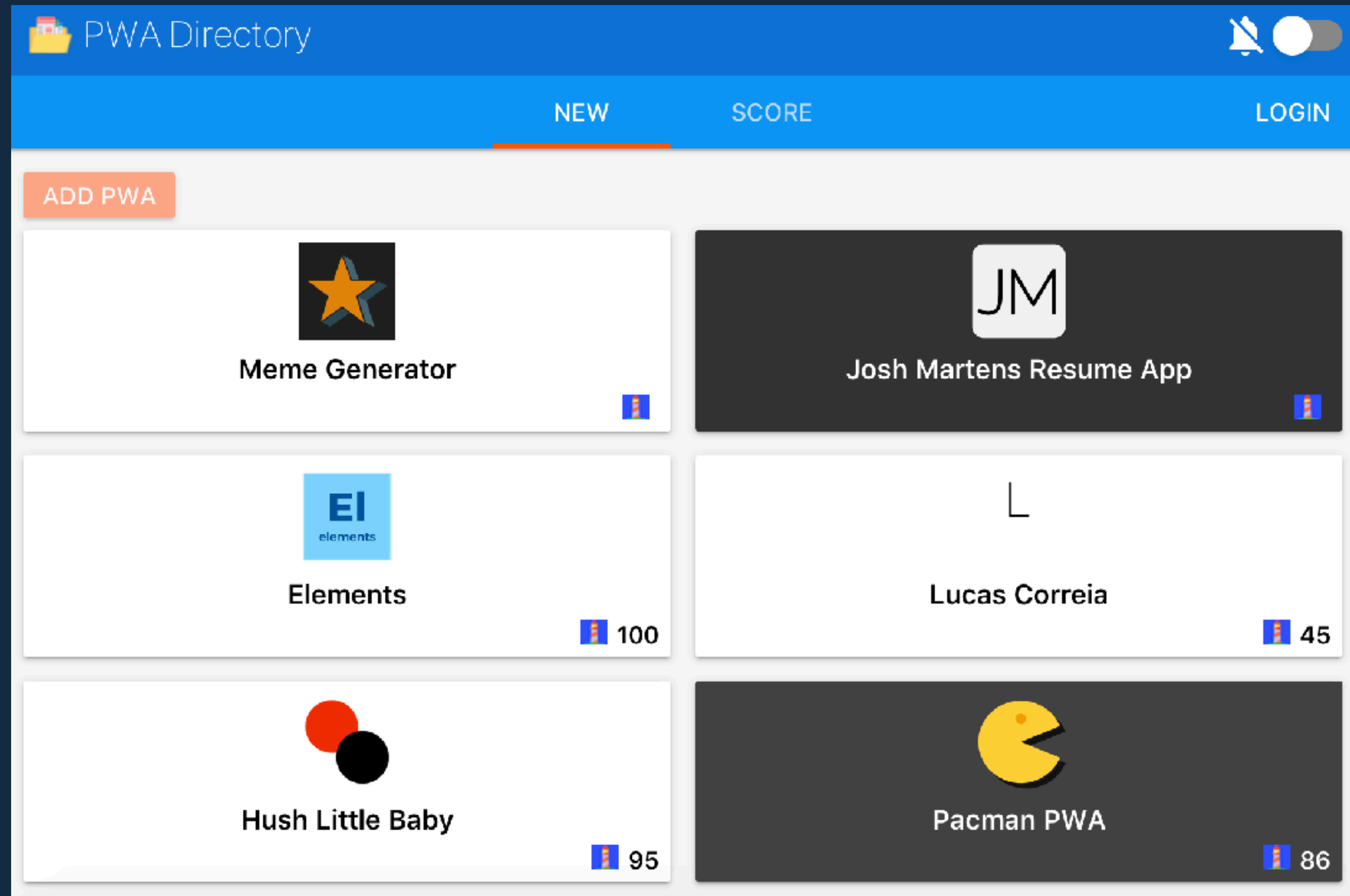
- 🔧 <https://serviceworker.rs/>
- 🔧 <https://www.udacity.com/course/offline-web-applications--ud899>
- 🔧 <https://events.withgoogle.com/progressive-web-app-dev-summit/agenda/>

PWA Checklist



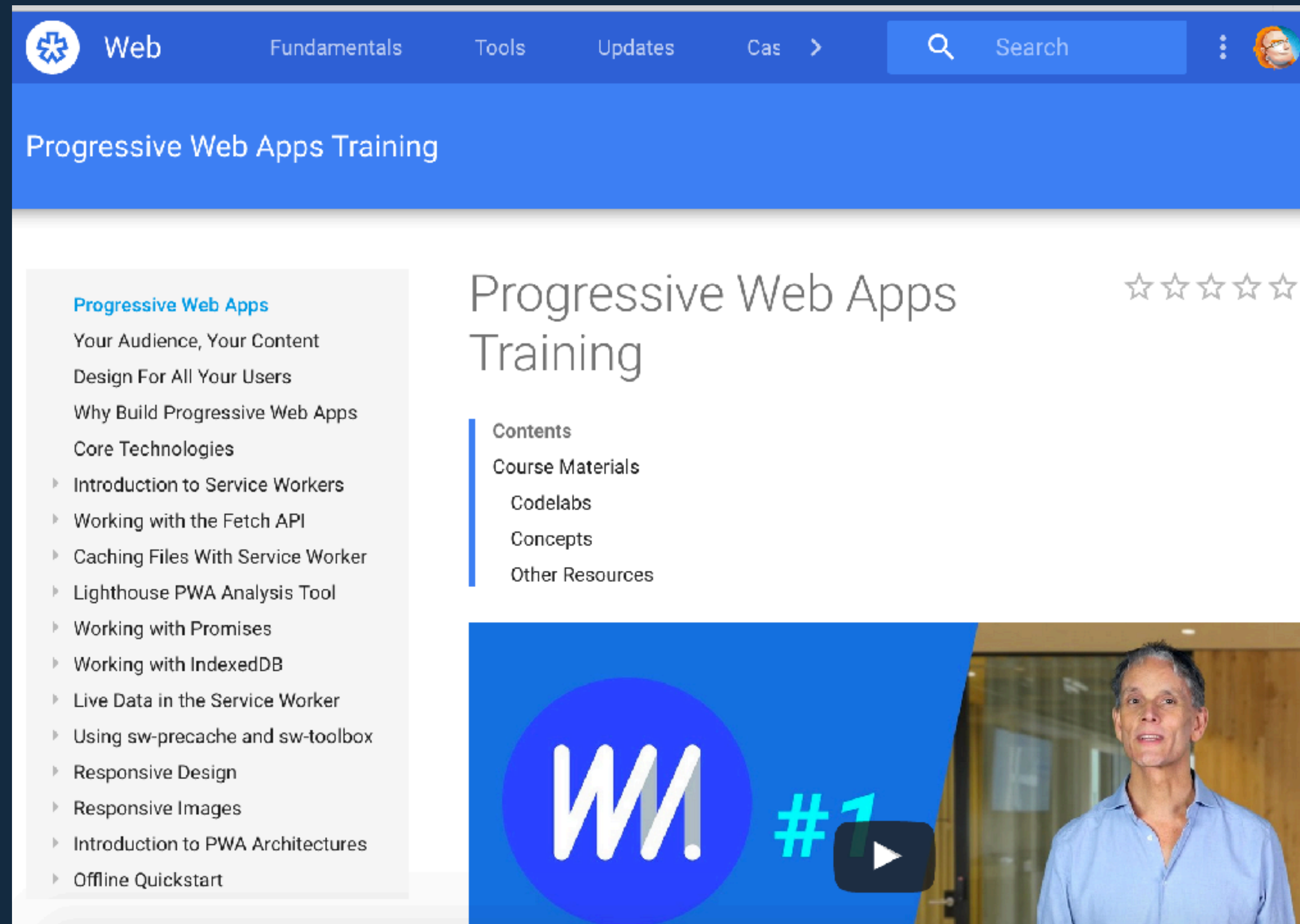
<https://developers.google.com/web/progressive-web-apps/checklist>

PWA directory



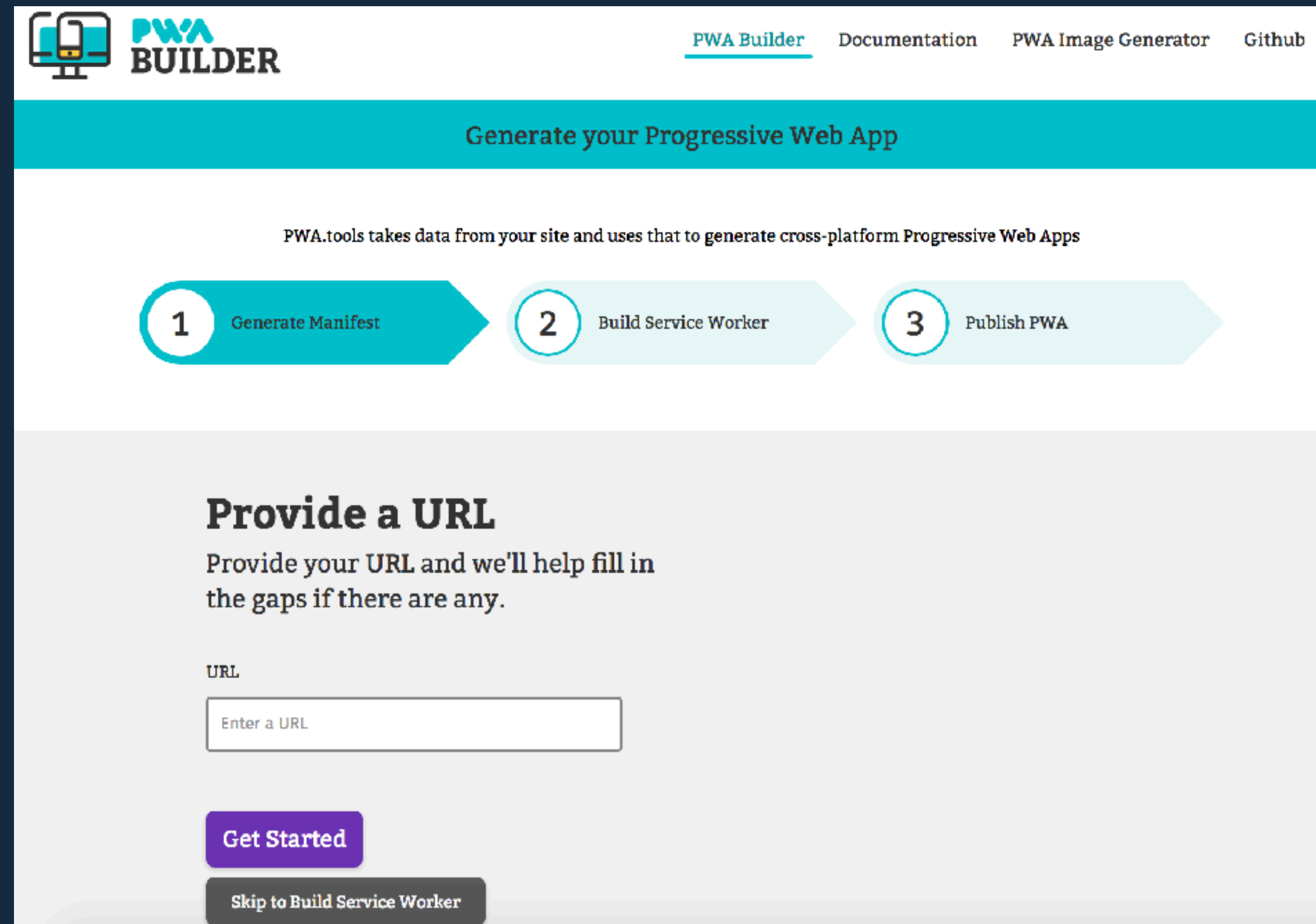
<https://pwa-directory.appspot.com/>

PWA Training Course



<https://developers.google.com/web/ilt/pwa/>

PWA Builder



The screenshot shows the PWA Builder website. At the top, there is a navigation bar with the PWA Builder logo on the left and links for 'PWA Builder', 'Documentation', 'PWA Image Generator', and 'Github' on the right. Below the navigation bar is a teal banner with the text 'Generate your Progressive Web App'. Underneath the banner, a description states: 'PWA.tools takes data from your site and uses that to generate cross-platform Progressive Web Apps'. A three-step process is shown with numbered arrows: 1. Generate Manifest, 2. Build Service Worker, and 3. Publish PWA. The first step is highlighted in teal. Below the process steps, the section 'Provide a URL' is displayed. It includes the text 'Provide your URL and we'll help fill in the gaps if there are any.' and a label 'URL' above a text input field with the placeholder 'Enter a URL'. At the bottom of this section, there are two buttons: a purple 'Get Started' button and a grey 'Skip to Build Service Worker' button.

PWA BUILDER

[PWA Builder](#) [Documentation](#) [PWA Image Generator](#) [Github](#)

Generate your Progressive Web App

PWA.tools takes data from your site and uses that to generate cross-platform Progressive Web Apps

- 1 Generate Manifest
- 2 Build Service Worker
- 3 Publish PWA

Provide a URL

Provide your URL and we'll help fill in the gaps if there are any.

URL

[Get Started](#)

[Skip to Build Service Worker](#)

<http://preview.pwabuilder.com/generator>

THANKS!

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