

# WHY UPGRADE TO PROGRESSIVE WEB APPS?

Why you should make all your web sites Progressive Web Apps and where to get started

LOVE2DEV

# The Progressive Web Application Experts

LOVE2DEV

---



<https://facebook.com/love2dev>



<http://bit.ly/2j3sAlG>



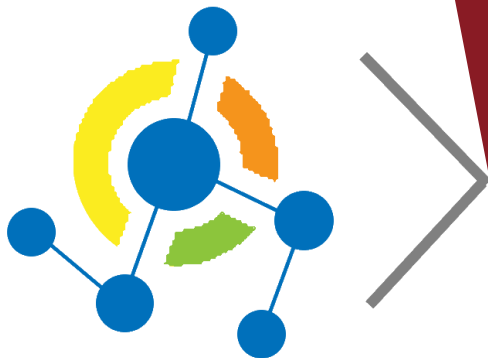
@chrislove

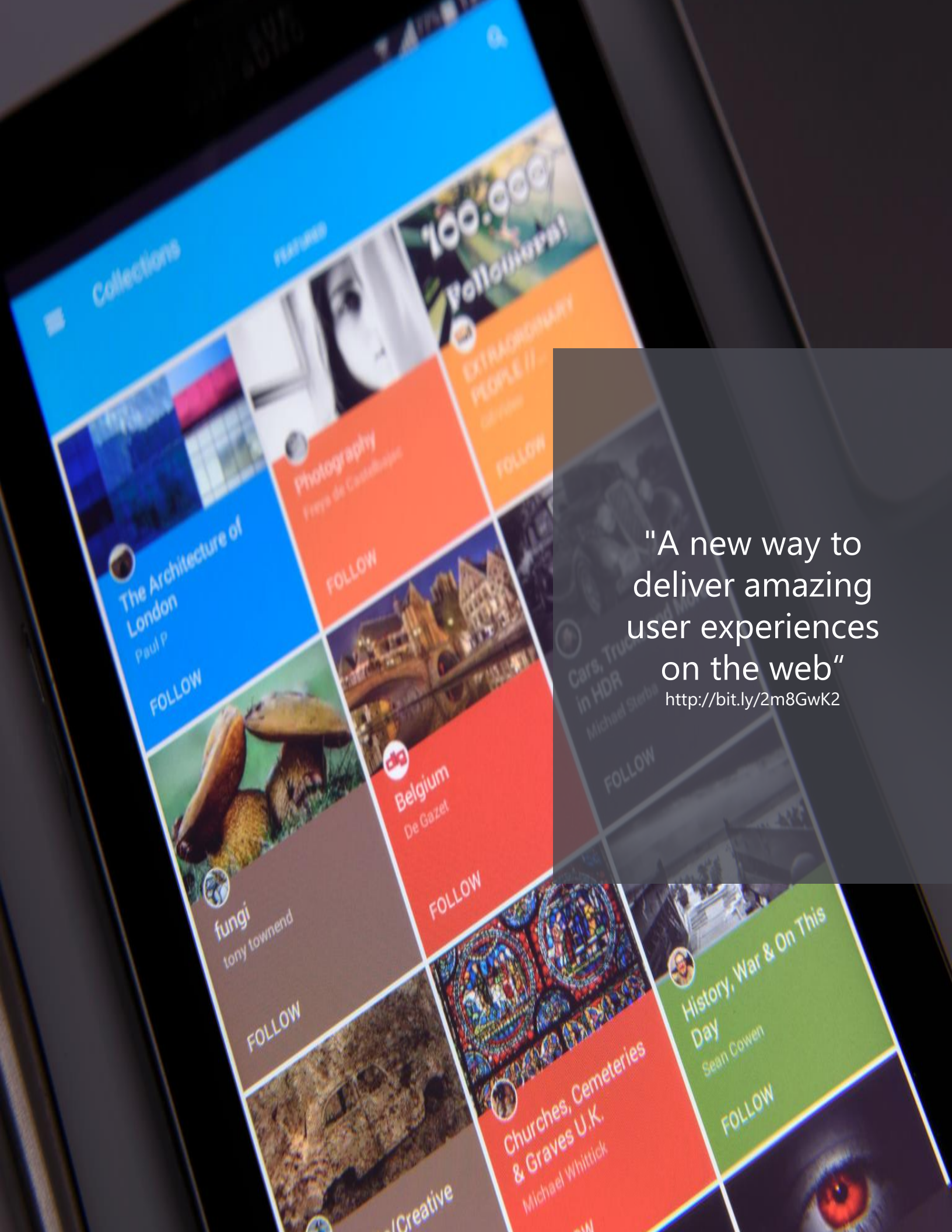


[info@love2dev.com](mailto:info@love2dev.com)



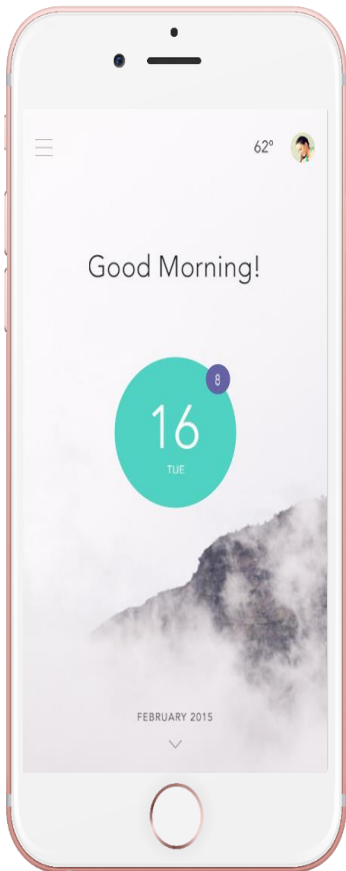
[www.love2dev.com](http://www.love2dev.com)





"A new way to  
deliver amazing  
user experiences  
on the web"

<http://bit.ly/2m8GwK2>



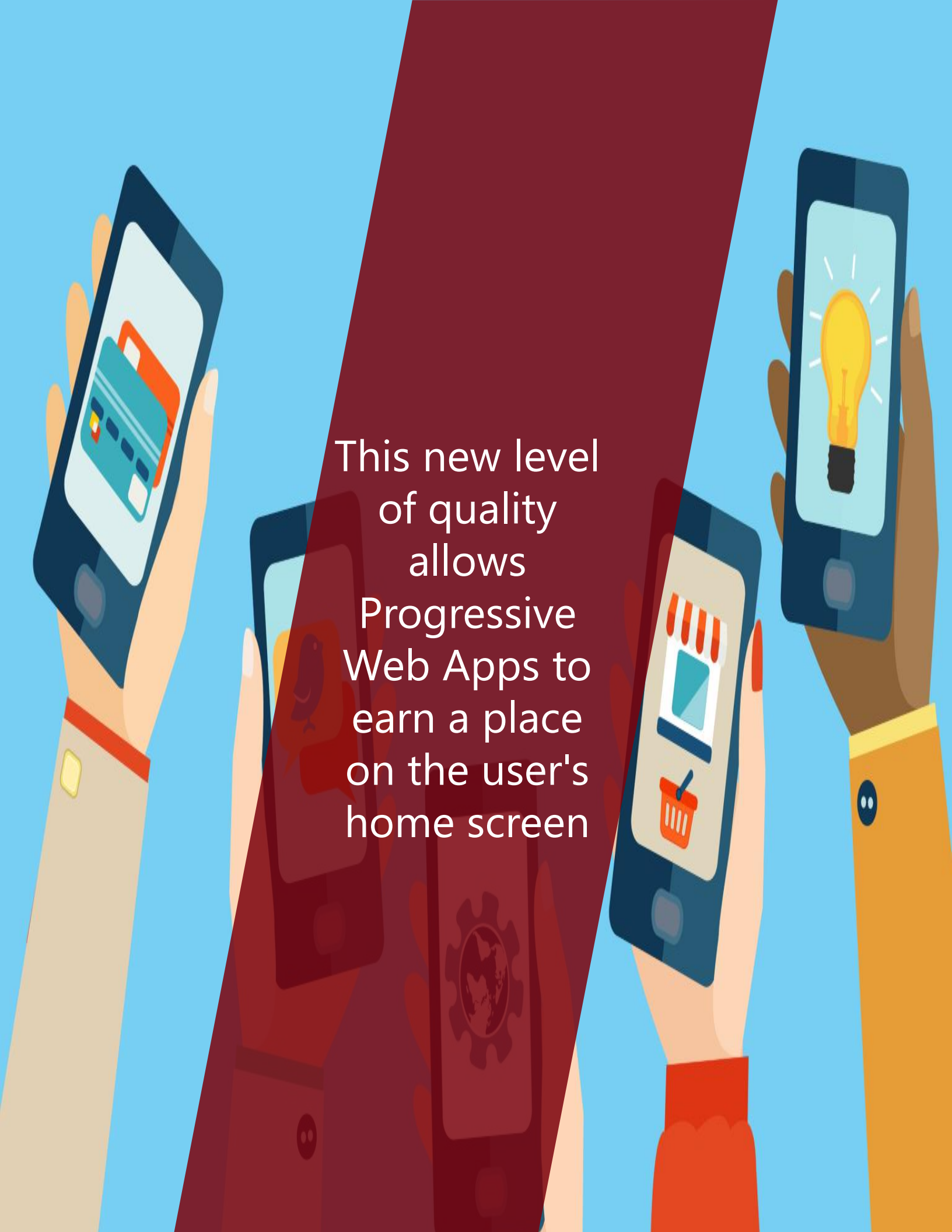
Doesn't need to be maintained separately from a native app; it can replace the app experience

A Progressive Web Application provides an engaging user experience. It starts with pages that load instantly and can work offline.

The sites are secure, so browsers have more confidence in their integrity.

Browsers use their web manifest to understand more about the site and its branding.

As a reward, sites can be added to the device's home screen and launched like a native application.

An illustration featuring several hands holding smartphones against a light blue background. A large, dark red diagonal banner is centered over the image. The banner contains white text. The hands are holding phones with various icons: a credit card, a lightbulb, a storefront with a shopping basket, and a gear with a globe. The hands are wearing different colored sleeves: beige, orange, and yellow.

This new level  
of quality  
allows  
Progressive  
Web Apps to  
earn a place  
on the user's  
home screen



# 3 User Experience Requirement of Progressive Web Apps

## FAST

---

Responds  
Quickly To  
User

## RELIABLE

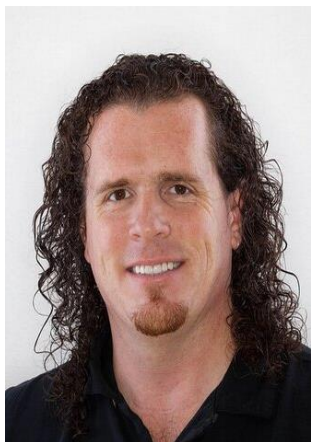
---

Works Online  
Offline  
Poor Connectivity

## ENGAGING

---

Immersive  
User  
Experience



Chris Wilson  
Chrome

*“Progressive Web Applications:  
A New Level of Thinking About the  
Quality of Your User Experience”*

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

“These apps aren’t packaged & deployed through stores, they’re just websites that took the right vitamins.

They progressively become apps...”



Alex Russel  
Chrome

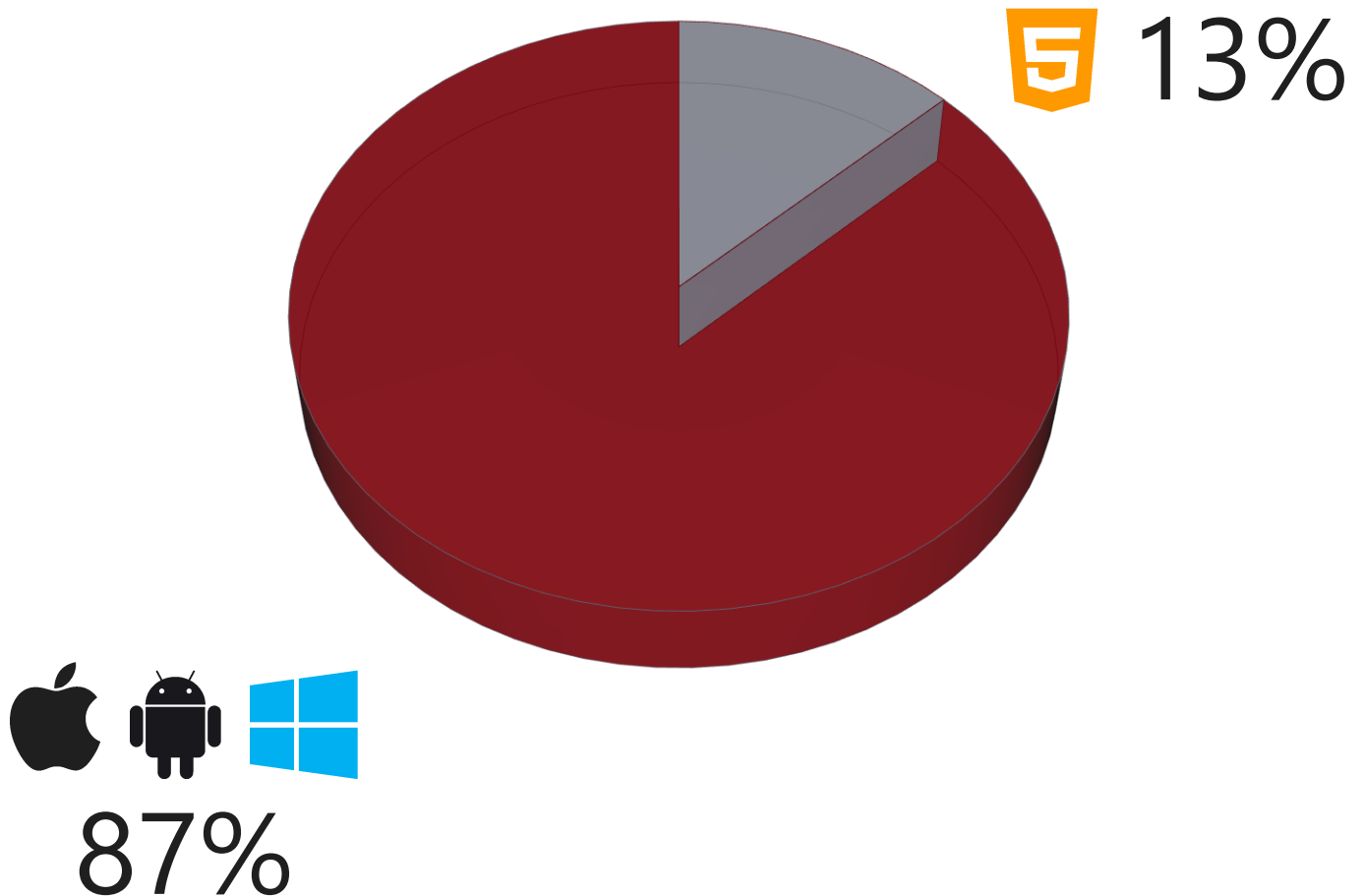


Bruce Lawson  
Former Head Opera

“Native Apps are a bridging technology (like Flash)”

<http://bit.ly/2e5Cgry>

# MOBILE WEB VS. **APP USAGE**



Native applications consume the majority of consumers' screen time. An apparent victory for native applications. But this does not tell the whole story.



# 80%

## OF TIME SPENT IS IN USERS' TOP 3 APPS



Facebook dominates consumer screen time. The remaining app usage is limited to other big brands like Google and Snapchat. This leaves very little time or interest for remaining apps.

Facebook is often considered to be an additional browser with a closed/controlled web of content. Much of the content on Facebook is embedded web pages.

Source: comScore Mobile Metrix June 2015 – US – Age 18+

# WE HAVE PASSED PEAK APP?

Peak app represents a point at which consumers have lost most interest in downloading and engaging with a broad range of native applications. Instead they now focus their time on a few, isolated sources of engagement, predominately controlled by Facebook and a few other large online brands.

# **ZERO**

## **NUMBER OF APPS**

## **AN AVERAGE USER**

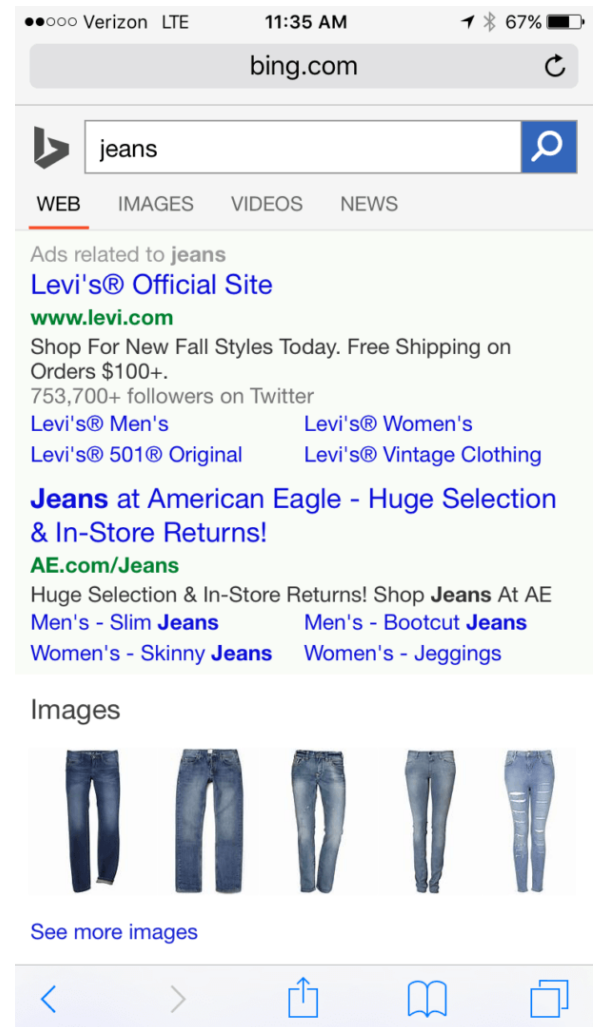
## **INSTALLS**

## **PER MONTH**

Customers have dealt a fatal blow to the promise of native applications by choosing to not bother downloading apps. There are many reasons for this change in behavior including disk space limitations, privacy concerns and app store friction.

Source: comScore Mobile Metrix June 2015 – US – Age 18+

Web is the #1 place customers discover and interact with new services. The web is designed to make word of mouth, search engine optimization or social media marketing easier.



The Web's Super Power is  
Ability to Link



“URL sharing is... what enabled the web to spread and prosper, and ... I call it out as the web's superpower.”

Alex Russell  
<https://infrequently.org/>  
5.31.2016

# PROGRESSIVE WEB APP ADVANTAGES

## LINKABLE

Easily share via DEEP URLs, does not require complex installation.

## DISCOVERABLE

Identifiable as an "application" due to W3C manifest and service worker registration scope.  
Allows search engines to find it.

## “INSTALLABLE”

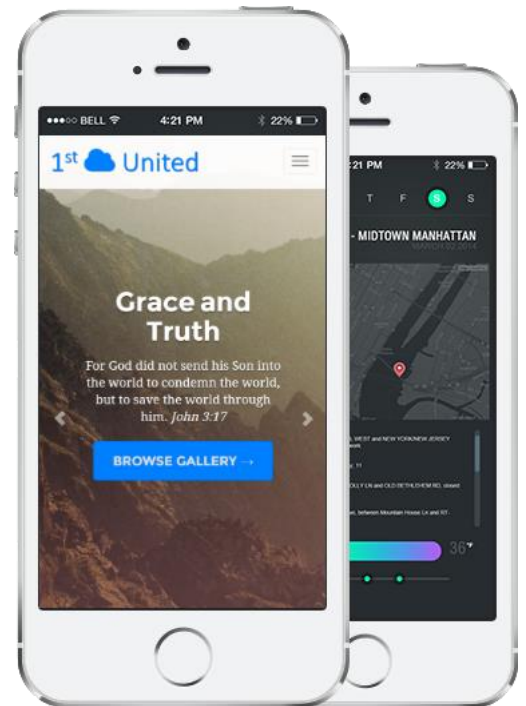
You only need a link and a click.  
Browsers can prompt user to “Install.”  
Allows users to "keep" apps they find most useful on their home screen without the hassle of an app store.

## APP-LIKE FRESH RE-ENGAGEABLE

App-like - App-style interactions and navigation, built on the app shell model.

Fresh - Always up-to-date thanks to the service worker update process.

Re-engageable - Makes re-engagement easy through features like push notifications.



# PWA IS CROSS-PLATFORM



Progressive Web Applications have enthusiastic support from multiple browsers and platforms. Currently over 2 billion consumers world-wide have browsers supporting PWA. This number is growing quickly.





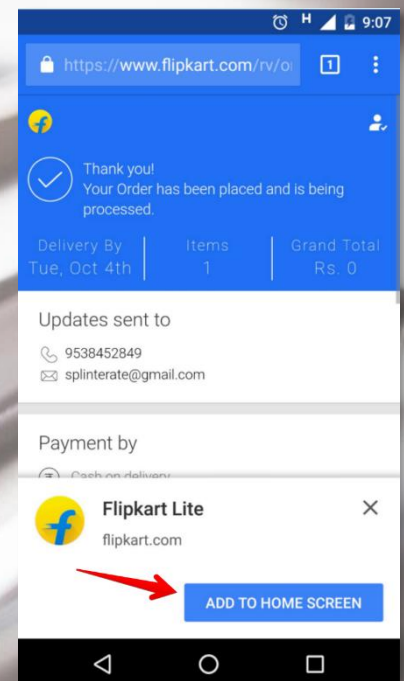
# WHAT ABOUT APPLE?



- 🍏 Many Features Can Be Polyfilled
- 🍏 Progressive Web Apps still work on iOS
- 🍏 Progressive Web Apps perform better on iOS
- 🍏 Apple appears to be warming to Progressive Web App technology
- 🍏 AliExpress saw an 82% increase in iOS conversion after moving to a Progressive Web App
- 🍏 The Washington Post has seen a near 5x increase in user engagement

## Real Results

- 📈 3X more time on site
- 📈 40% higher re-engagement
- 📈 70% greater conversion from home screen
- 📈 3X lower data usage



<http://bit.ly/2ofe8Y8>

# Apps Must Handle Offline

Offline-first should be a first class application requirement. When web sites are created with offline as a primary design requirement they perform faster. You treat the network as an enhancement, not a requirement.

Developers consider the end-user's worst-case scenario and code for it, instead of their fast, optimized desktop environment.

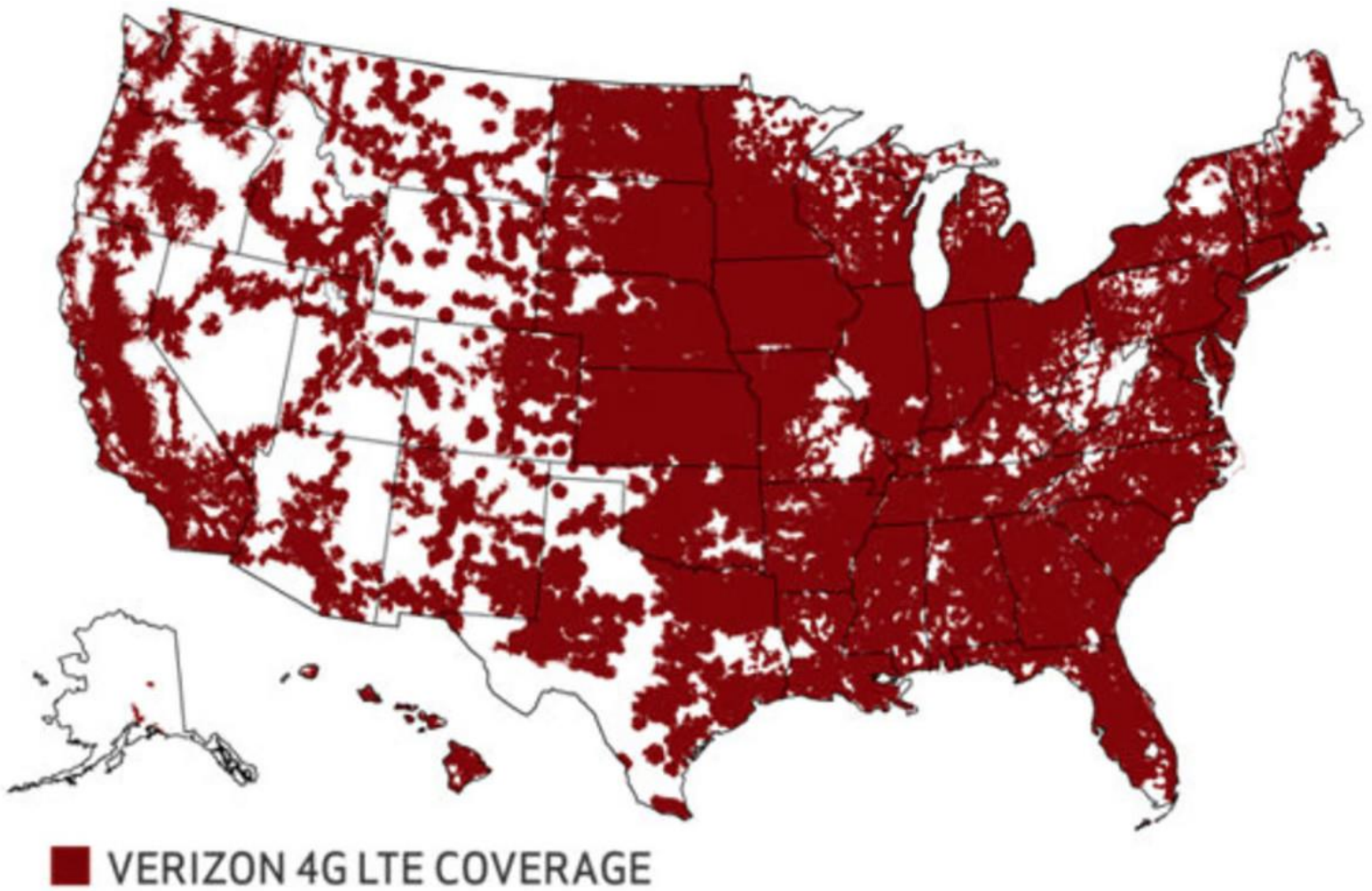
Progressive Web Apps require service workers, which supply a rich content caching environment. Having a local copy of the web site causes it to load faster by eliminating most network requests.



## 5 BARS!

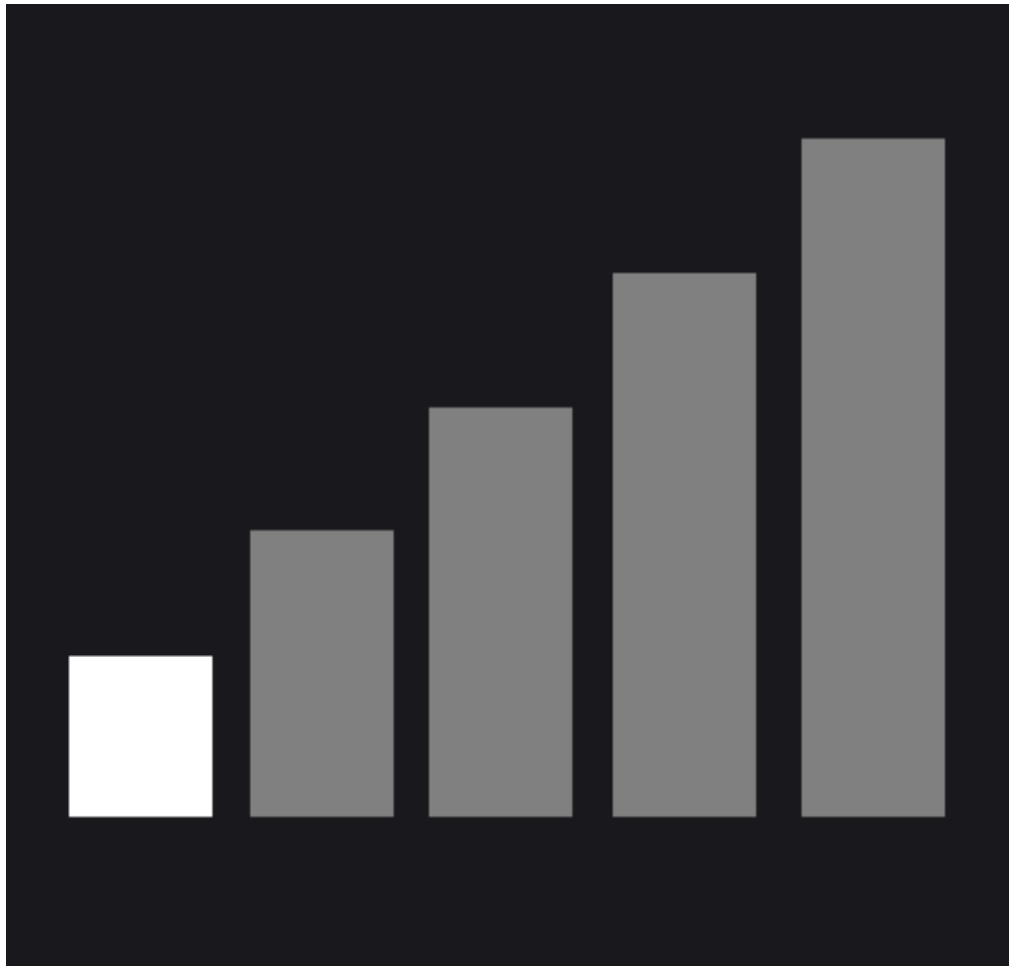
The majority of consumer devices are now mobile, often connecting to the Internet via cellular connectivity. High speed connectivity is ubiquitous in the developed world. However much of the world is still limited to 3G and lower speeds.





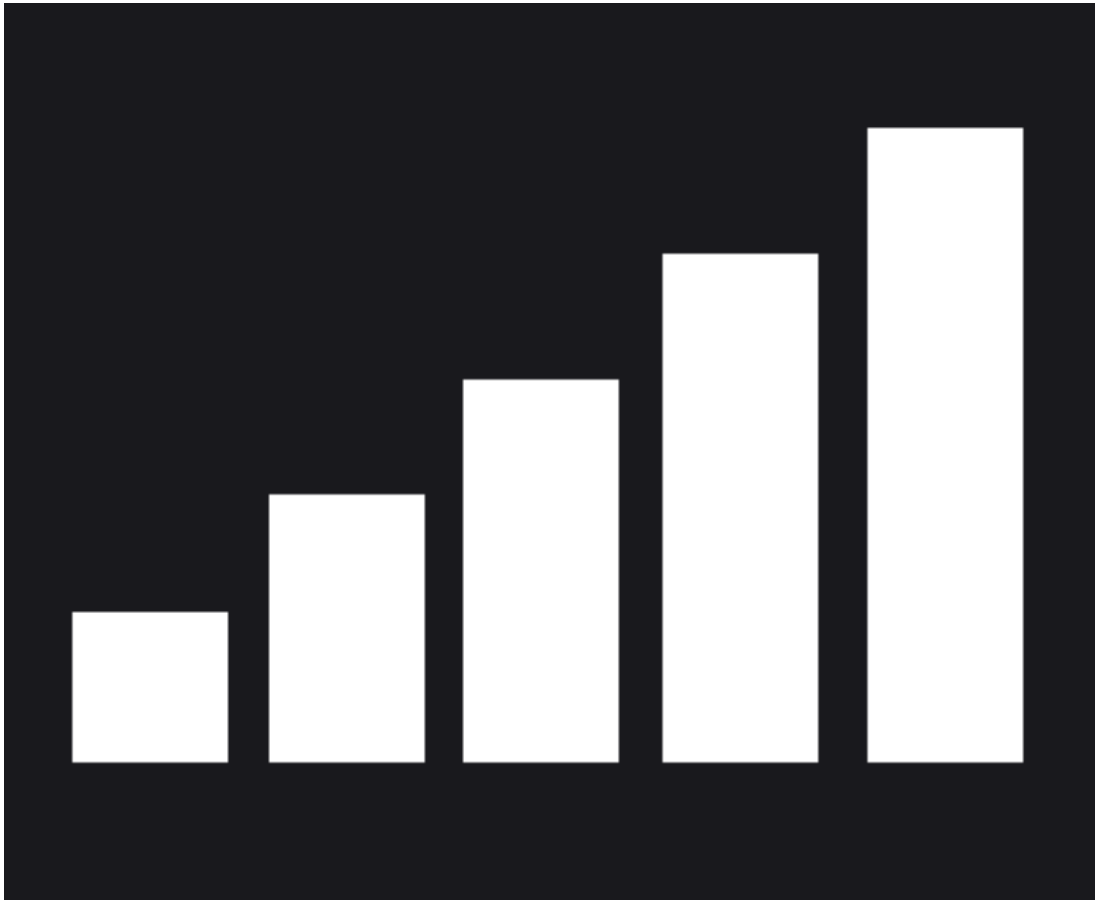
Despite broad, high speed coverage by major carriers in the developed world. There are many times where connectivity is weak or not available.

Think about your own experiences with limited or no connectivity. Approximately 25% of the United States **only** connects to the Internet via cellular. These connections are not as reliable as home or office broadband.



1 BAR 😞

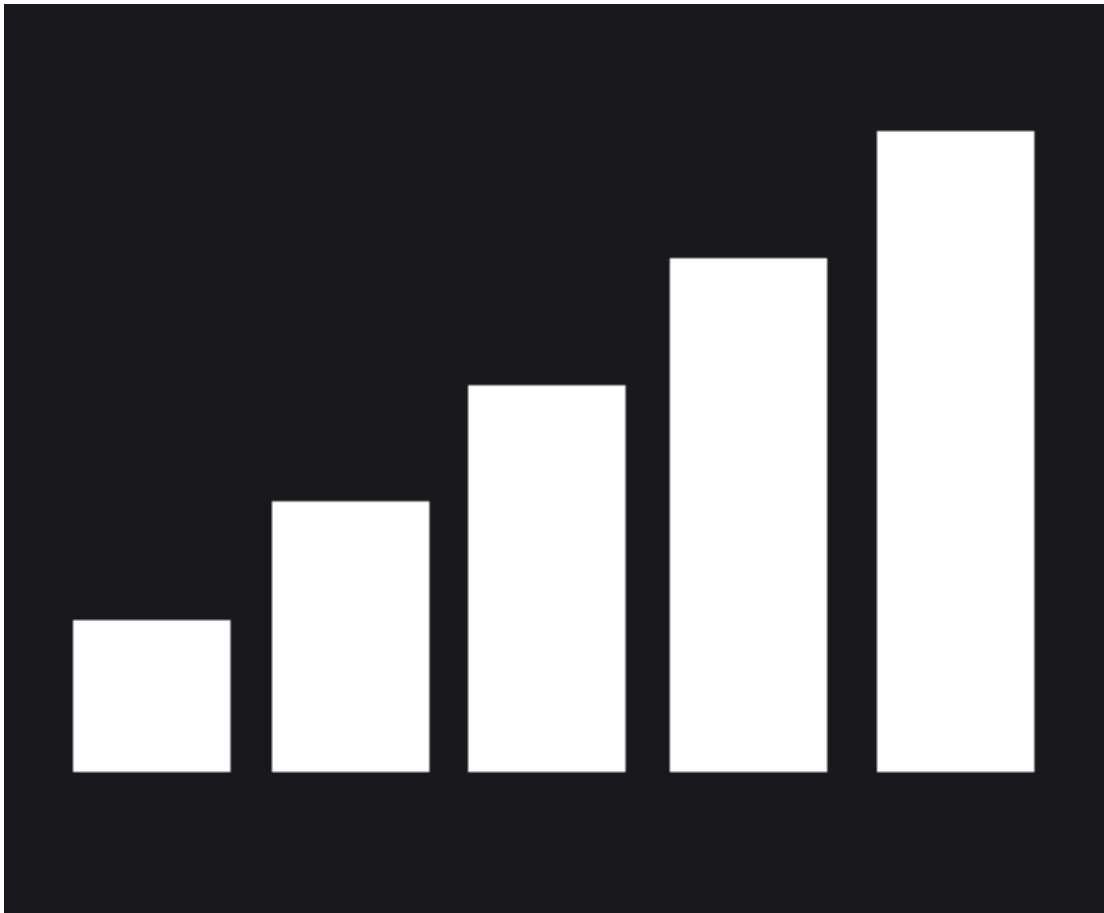
Often these weak connections are represented with fewer connectivity bars, or slower service connections like 4G and Edge networks.



NO BARS ☹️

Sometimes your phone cannot connect at all- representing the sad news with no bars.





## LiFi :/

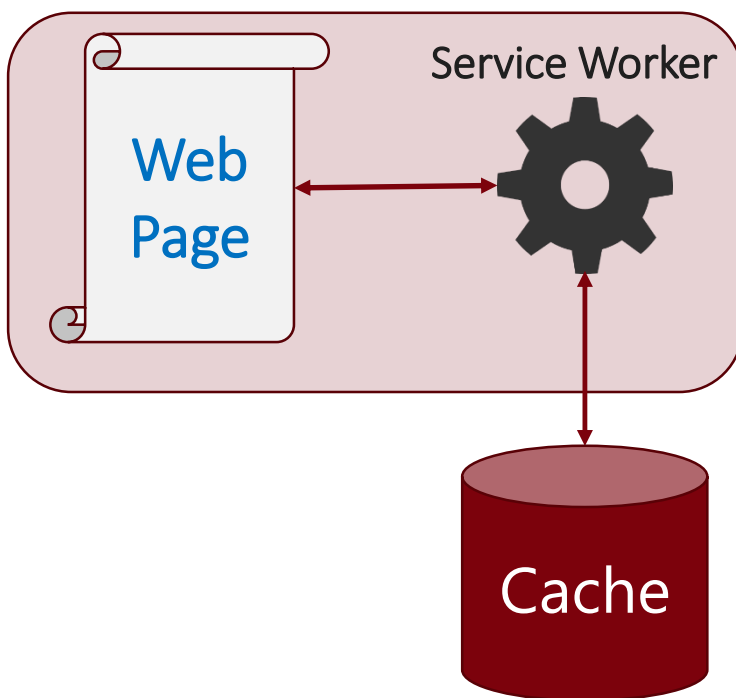
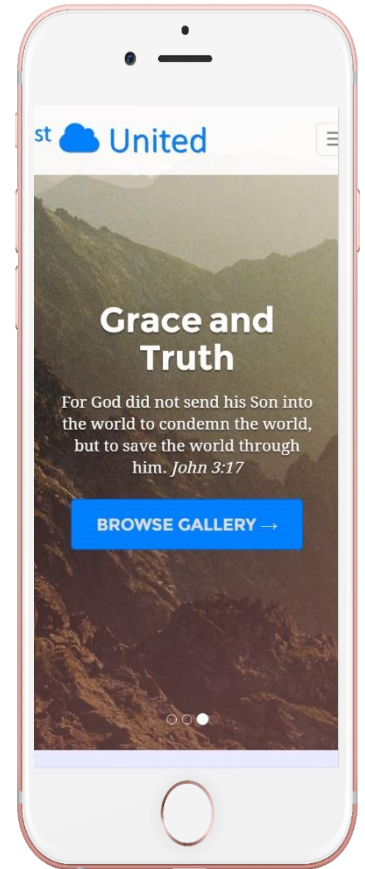
Worst is when the phone appears to be connected, but it isn't. This state, called "LiFi," leads customers to assume they are online, but they really are not. Instead they are connected to a cell tower that has not completed the connection to the outside world.

This frustrates customers, who often blame the web site, not the cellular technology.

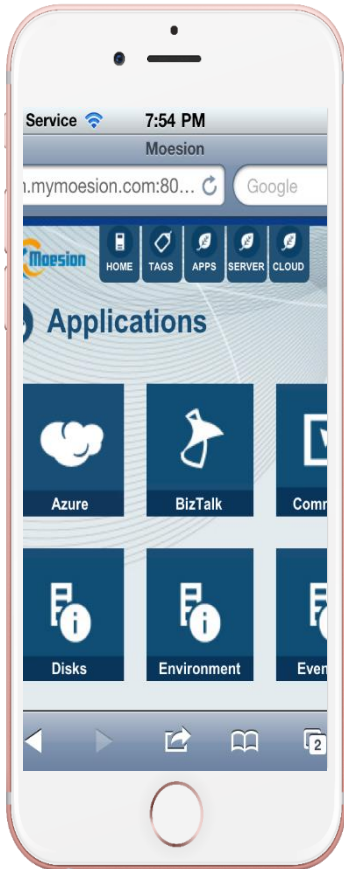
# SERVICE WORKERS ENABLE RELIABLE OFFLINE

Service Workers are a new HTML5 technology enabling a manageable offline experience. Unlike previous attempts with appCache and browser cache, developers and architects are in control of what is cached and how long it is cached.

Web site performance benefits because web assets can now be loaded locally, rather than across the network. This enables “instant” page loads once the web site is “installed.”



## PWA LEGACY TECH UPGRADES



### ➤ **appCache -> Service Worker**

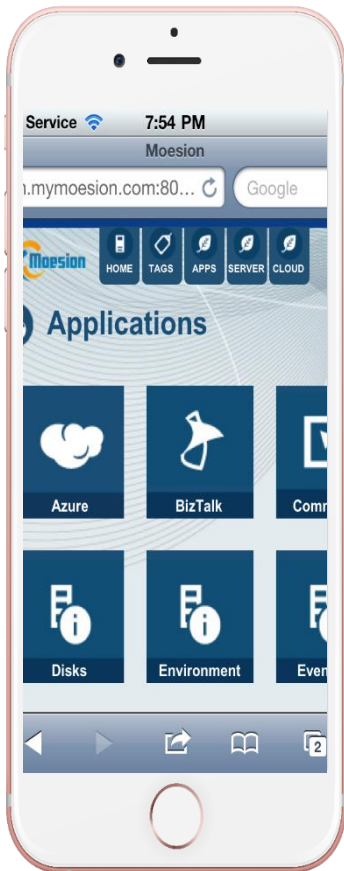
appCache is a web standard, which allowed web sites to work offline, but it's frustrating to debug. Service Worker, a script the browser runs in the background, replaces appCache & enables offline. Service workers include a rich caching capability that provides granular control.

### ➤ **localStorage -> IndexedDB**

localStorage is a browser storage option made available in the IE 8 era. It provides simple key value, synchronous storage.

IndexedDB is a richer browser database based on No-SQL technology. It is event driven, making it asynchronous. All modern browsers support IndexedDB, making it a great choice to persist web site data.

## PWA LEGACY TECH UPGRADES



### ➤ Touch Icons -> Manifest

When Apple introduced the iPhone they also introduced touch icons. Touch icons are defined in META tags. They extend to also allow minimal control over the home screen experience.

A web manifest is a JSON document describing a web site to the browser. The browser uses this information to drive the home screen experience.

### ➤ Save to Homescreen -> Install Banner

In the past you needed to maintain code to prompt the user to add your site to the home screen.

When a browser identifies a progressive web application it will automatically prompt the user to add the site to the home screen based on non-intrusive heuristics.

# TECHNICAL REQUIREMENTS

## SECURE

Site is served over secure connection (HTTPS) & no mixed content



## WORK OFFLINE

The start URL (at least) loads while offline



## WEB MANIFEST

Metadata provided for Add to Home screen



## BE FAST

First load should be fast; time to interactive <10s for first visit on a simulated 3G network.



## SERVICE WORKER

Script the browser runs in the background, separate from a web page; allows for features including push notifications and background sync



# UX REQUIREMENTS

## PROGRESSIVE

Works for every user, regardless of browser choice because it's built with progressive enhancement as a core tenet



## APP-LIKE

Feels like an app to the user with app-style interactions and navigation because it's built on the app shell model



## RESPONSIVE

Fits any form factor: desktop, mobile, tablet, or whatever is next



## FRESH

Always up-to-date thanks to the service worker update process



## CONNECTIVITY AGNOSTIC

Enhanced with service workers to work offline or on low-quality networks



## LINKABLE

Easily share via URL, does not require complex installation



# SERVICE WORKERS

"A service worker is a script that stands between your website and the network, giving you, among other things, the ability to intercept network requests and respond to them in different ways."

Smashing Magazine: <http://bit.ly/2phZM8v>

- ⚙ A service worker is a script that your browser runs in the background
  - ⚙ Manages Tasks & Features That Don't Require User Interaction
  - ⚙ Frees Up the UI Thread for...UI Stuff
  - ⚙ An Extensible Platform For the Web
- 
- ⚙ Includes Rich Cache API
  - ⚙ Enables Native Push Notifications
  - ⚙ Background Synch & Additional Features being created





# WEB MANIFEST



## JSON Document

Creating a manifest and linking it to your page are straightforward processes



## Describes Your App

Control what the user sees when launching from the home screen



## Reference in HEAD

Progressive Enhancement. Ignored by legacy browsers and only downloaded when needed.

```
{  
  "name": "Fast Furniture",  
  "short_name": "Fast Furniture",  
  "icons": [...],  
  "start_url": "/",  
  "display": "standalone",  
  "background_color": "#F99D36",  
  "theme_color": "#55B4F6"  
}
```

Include a reference to the web manifest file in the HTML HEAD element. The browser will read the file to design the home screen experience.

```
<head>
```

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

```
</head>
```

# HTTPS

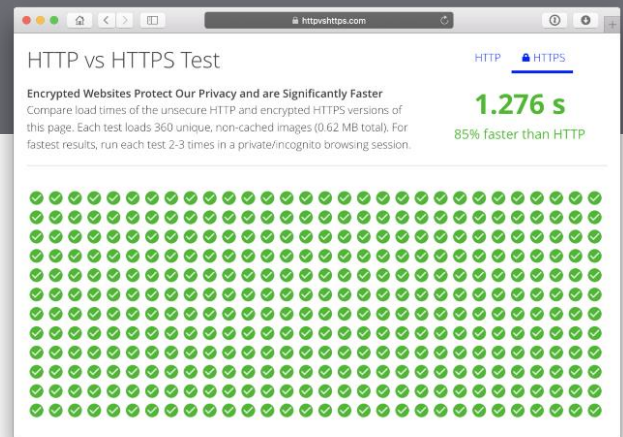
- 🔒 Performance Improvements
- 🔒 Browsers Gating Features Behind HTTPS



- 🔒 Google & Bing Use HTTPS as a Positive Search Signal
- 🔒 Certificates have become a Commodity
- 🔒 Let's Encrypt and others Offer Certificates for Free or \$10/year
- 🔒 Amazon AWS Offers free Certificates for CloudFront and their Network Load Balancer Services

"When we launched [HTTPS], we saw an average of a 50ms hit for negotiation... it was more than offset when we activated HTTP/2... a month later we saw a 250ms drop per pageview"

Weather.com





## Online Training

Stream and download at anytime. You have access to all content anytime you have an internet connection or open your downloaded files.

## Learn From an Expert

With over 25 years experience as a web developer, authoring books and teaching developers, Chris Love is a leader in his industry and an inspiring mentor.

## Stream & Download 24/7

The easy to use online classroom gives you the ability to download or stream all videos and written material on to any computer or mobile device.

## Learn at Your Own Pace

Learn at your own pace and unlimited lifetime access to all course content

**UDEMY.COM OR NOLTRAN.COM**

The Source to Learn How to Build Home Screen  
Worthy Progressive Web Applications

PWACourse.com