Capacitor : from PWA to native app in 5 minutes

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NG Rome MMXIX
2019-10-07

Who am I?

Introducing myself and introducing OVH

Horacio Gonzalez

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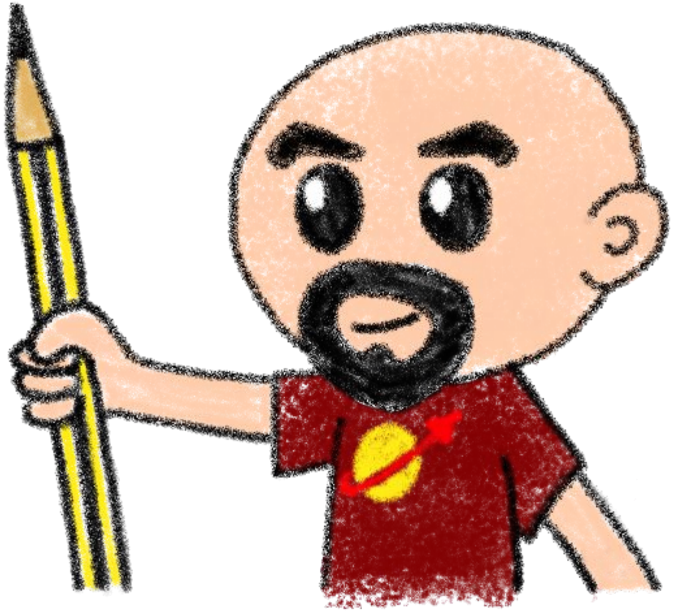
Spaniard lost in Brittany, developer, dreamer and all-around geek

OVH

Team DevRel



DevFest du Bout du Monde

Finist Devs

GDG Finistère

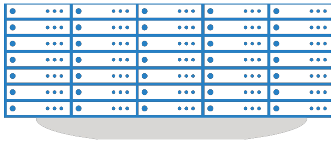
Google Developers Experts 2019

Web Technologies GDE

OVH: A Global Leader on Cloud

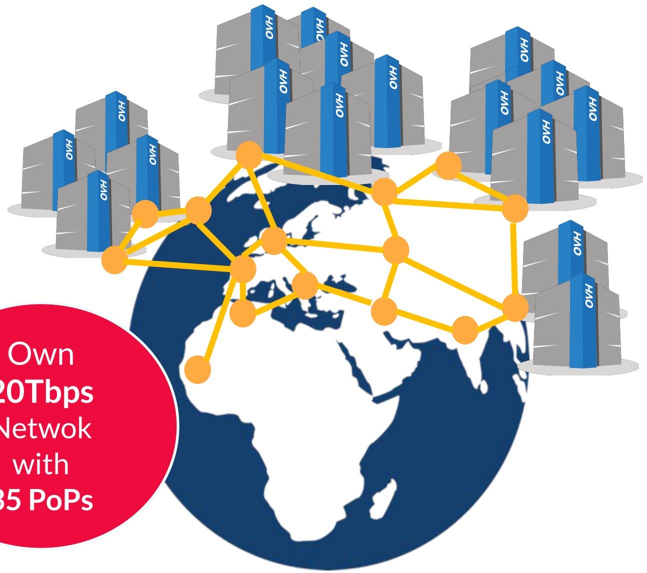
250k Private cloud
VMs running

Dedicated IaaS
Europe



Hosting capacity :
1.3M Physical
Servers

360k
Servers already
deployed



Own
20Tbps
Netwok
with
35 PoPs

30 Datacenters

> **1.3M** Customers in **138** Countries

OVH: Our solutions

Cloud

- VPS
- Public Cloud
- Private Cloud
- Serveur dédié
- Cloud Desktop
- Hybrid Cloud

Mobile Hosting

- Containers
- Compute
- Database
- Object Storage
- Securities
- Messaging

Web Hosting

- Domain names
- Email
- CDN
- Web hosting
- MS Office
- MS solutions

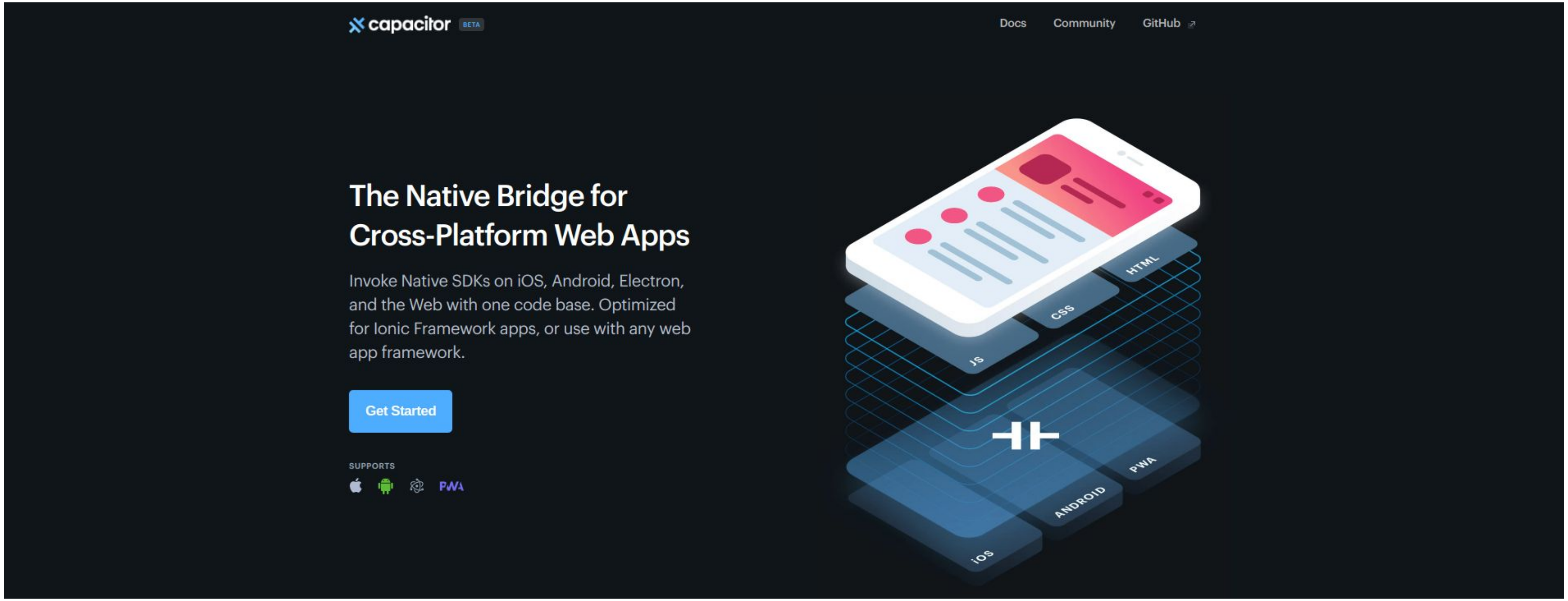
Telecom

- VoIP
- SMS/Fax
- Virtual desktop
- Cloud HubiC
- Over theBox

Capacitor

The Native Bridge for
Cross-Platform Web Apps

What's Capacitor?



The Native Bridge for Cross-Platform Web Apps

Invoke Native SDKs on iOS, Android, Electron, and the Web with one code base. Optimized for Ionic Framework apps, or use with any web app framework.

Cross-platform app runtime making it easy to build web apps that run natively on iOS, Android and web

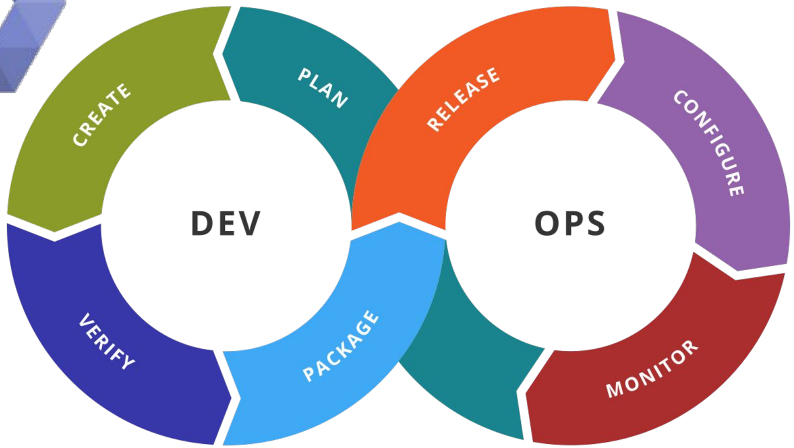
Spiritual heir to Apache Cordova

Evolution, not revolution

Spiritual heir to Apache Cordova

Support for many Cordova plugins

Not opinionated



Easy to use in any framework

Easy to integrate in any dev toolchain

Extensible and evolutif

- Close to web-standards
- Plugin API
  - Swift on iOS
  - Java on Android
  - JavaScript for the web

Developer Friendly

Easy to get started

Works on any framework

You still need the platform tools

Android Studio and/or Xcode
to build the native packages

Weren't you a PWA advocate?

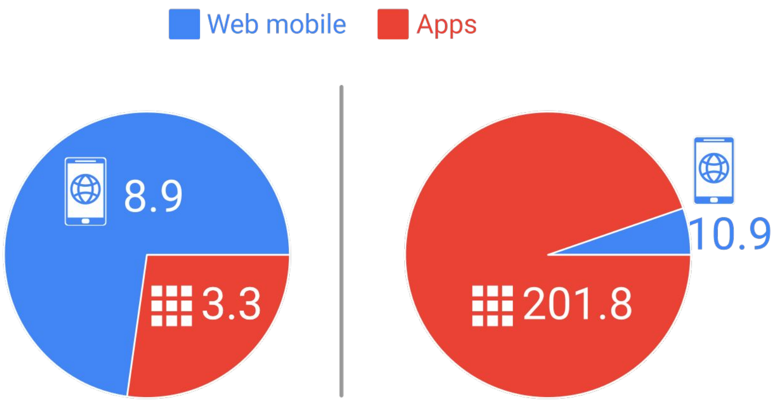
And you are also championing Flutter!
Where is the coherence, guy?

Well, I am a PWA advocate indeed

I rooted for PWA before it was fancy...

And I know the numbers...

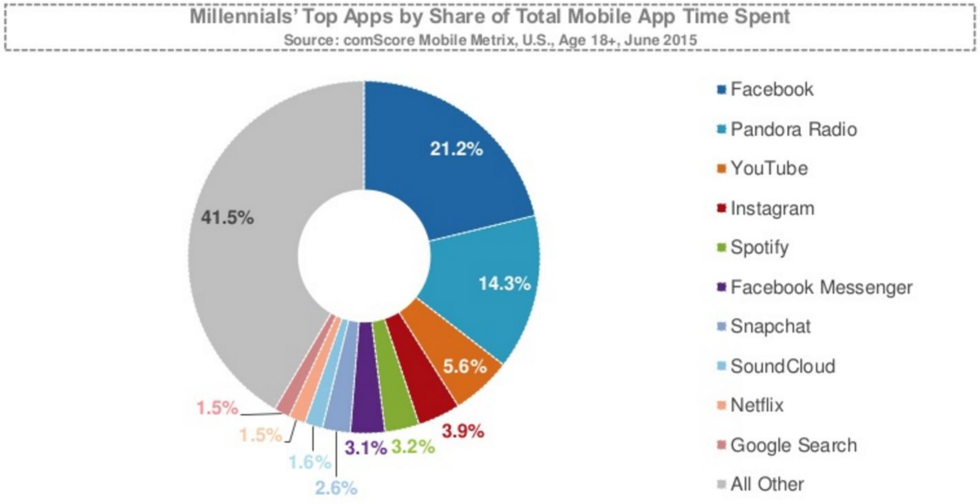
Top 1000 mobile apps vs top 1000 mobile web properties



Monthly unique visitors
(millions)

Average minutes by visitor

Source: comScore Mobile Metrix 2015, U.S., Age 18


Millennials' Top Apps by Share of Total Mobile App Time Spent

Source: comScore Mobile Metrix, U.S., Age 18+, June 2015

Apps drive engagement,
web drive visitors...

20 biggest apps account for 80%
of user time

An engineer role is to choose

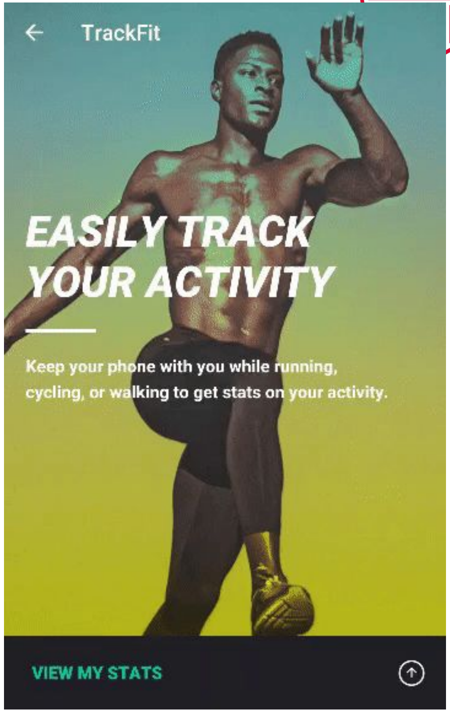
The right tool for the right problem

If you need super fancy UX

60 FPS, slick animations

An experience more than an app

Then go **full native**


TrackFit
EASILY TRACK YOUR ACTIVITY
Keep your phone with you while running, cycling, or walking to get stats on your activity.
VIEW MY STATS

And BTW, do it in **Flutter**

believe me, you will thank me!

For more normal needs

California may have a huge groundwater reserve that nobody knew about

By Chris Mooney • Energy and Environment June 27

The Washington Post

AMP helps the Washington Post increase returning users from mobile search by 23%!

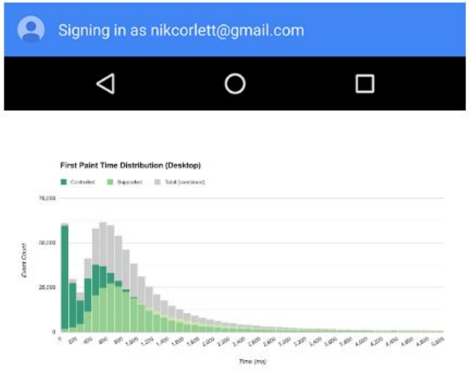
"We are committed to improving speed across the board. If our site takes a long time to load, it doesn't matter how great our journalism is, some people will leave the page before they see what's there"
David Merrell, Senior Product Manager, The Washington Post

READ MORE

AliExpress

"Smarter shopping, better living!" is the motto of AliExpress, a website where shoppers can buy everything from baby clothes to refrigerators directly from China. Part of the Alibaba Group, the global online retail marketplace is now a popular e-commerce site in America, Russia, and Brazil.

READ MORE



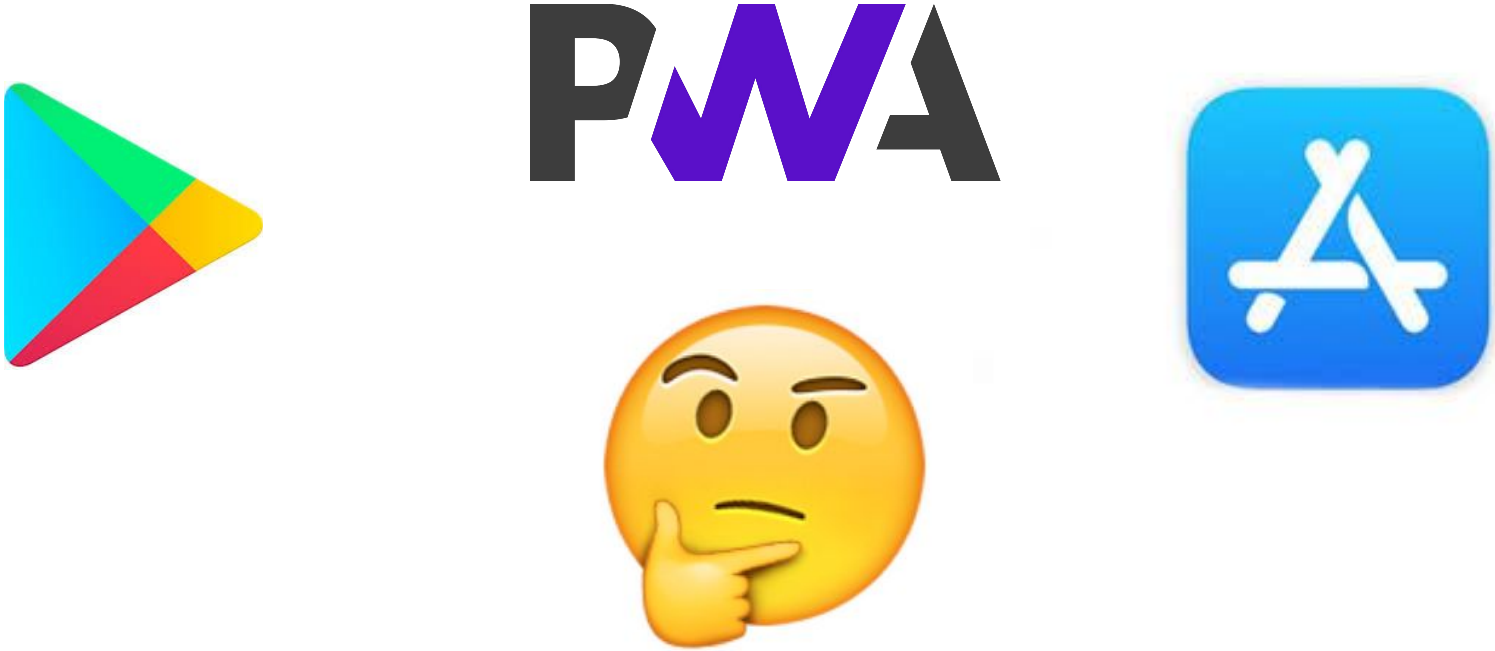
Measuring the Real-world Performance Impact of Service Workers

One of the most significant benefits of service workers (from a performance perspective, at least) is their ability to proactively control the caching of assets. A web application that can cache all of its necessary resources should load substantially faster for returning visitors. But what do these gains actually look like to real users? And how do you even measure this?

READ MORE

A well done PWA is simply enough

But if you need to be in the store?

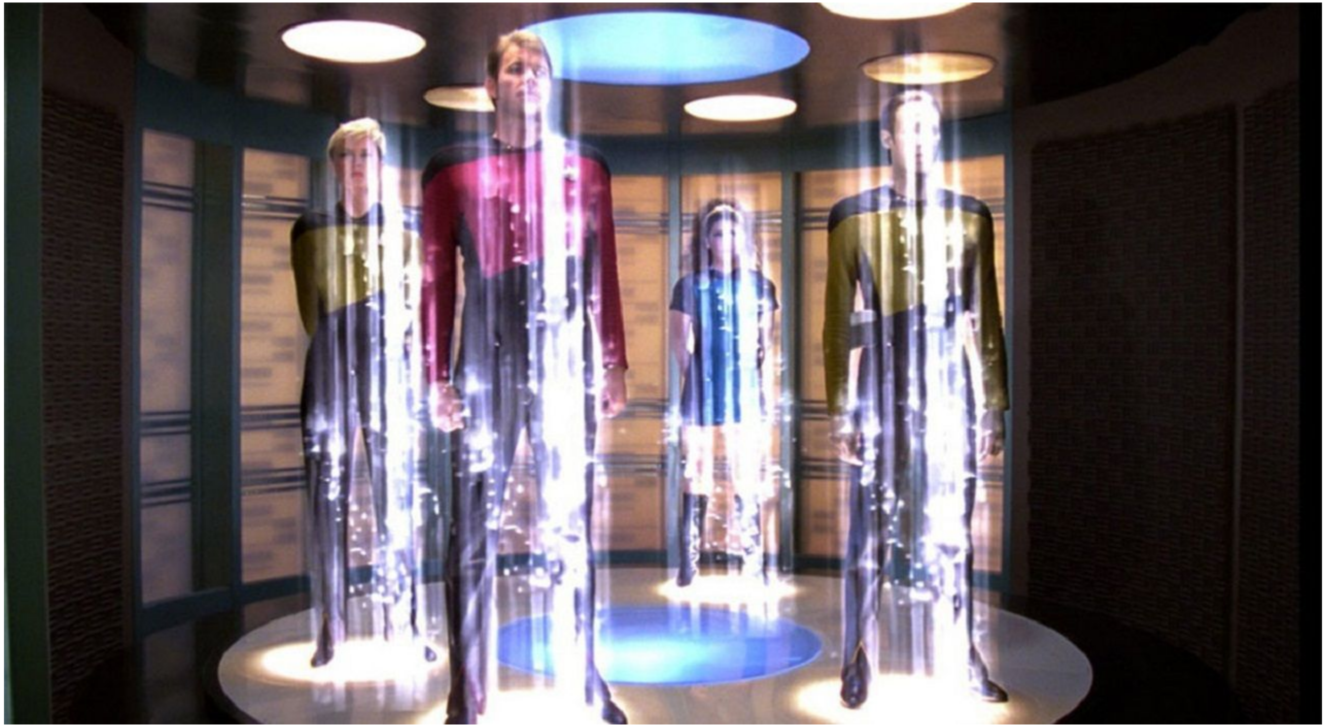


For many reasons, not all objective...

Hybrid PWA apps

The best of two worlds

Capacitor take your PWA to the store



In a simple, quick and painless way

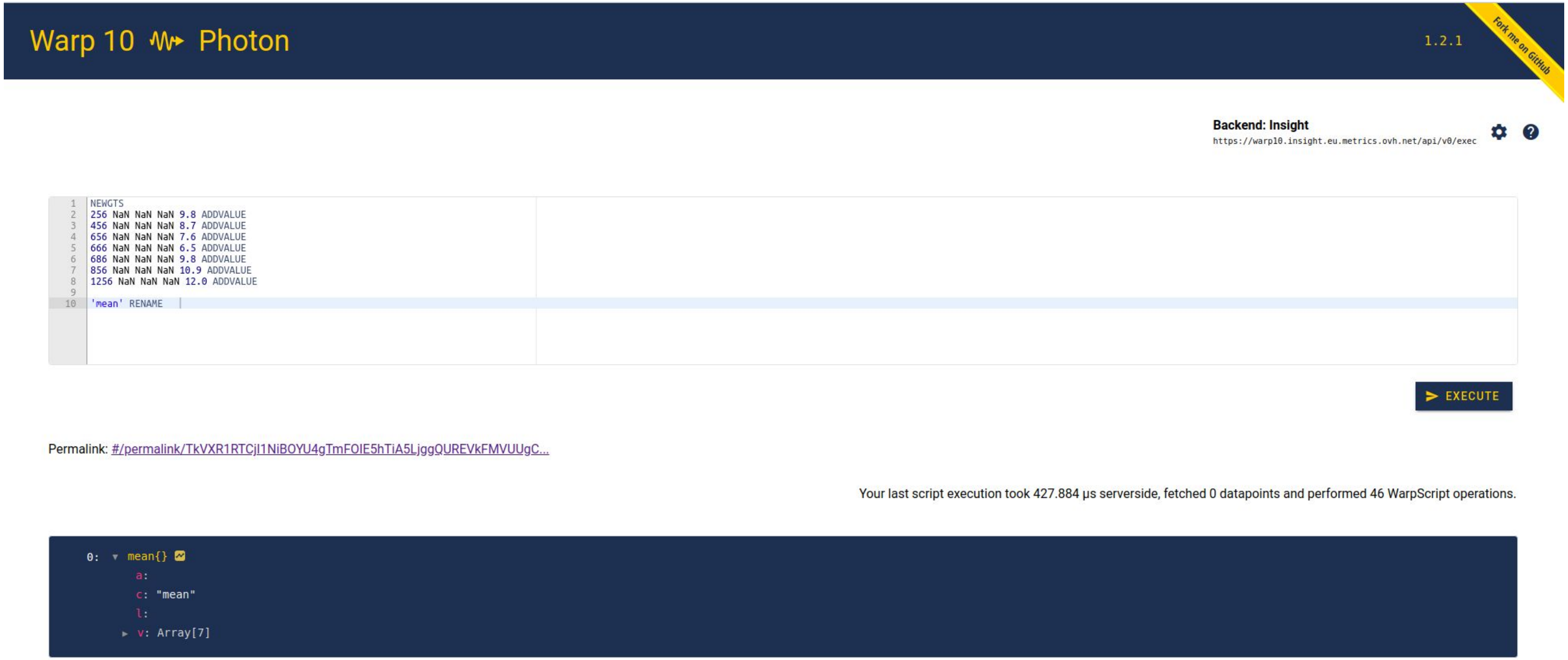
First steps testing Capacitor

Adding Capacitor to an existing app

From web to native

Giving superpowers to you webapp

Testing with a real webapp



Backend: Insight
`https://warp10.insight.eu.metrics.ovh.net/api/v0/exec`

```
NEWGTS
256 NaN NaN NaN 9.8 ADDVALUE
456 NaN NaN NaN 8.7 ADDVALUE
656 NaN NaN NaN 7.6 ADDVALUE
666 NaN NaN NaN 6.5 ADDVALUE
686 NaN NaN NaN 9.8 ADDVALUE
856 NaN NaN NaN 10.9 ADDVALUE
1256 NaN NaN NaN 12.0 ADDVALUE

'mean' RENAME
```

Permalink: #/permalink/TkVXR1RTCjI1NiBOYU4gTmFOIE5hTiA5LjggQUREVkFMVUUgC...

Your last script execution took 427.884 µs serverside, fetched 0 datapoints and performed 46 WarpScript operations.

```
0: ▾ mean{}
       a:
       c: "mean"
       l:
     ▸ v: Array[7]
```

Warp 10 Photon - IDE for Warp 10

Step 1 - Add Capacitor to the app

- Install Capacitor

```
cd my-app
npm install --save @capacitor/core @capacitor/cli
```

- Init Capacitor

```
npx cap init
```

- Add Android and/or iOS and/or Electron support

```
npx cap add android
```

Step 2 - Copy to Android

- Edit `capacitor.config.json` to choose the built folder

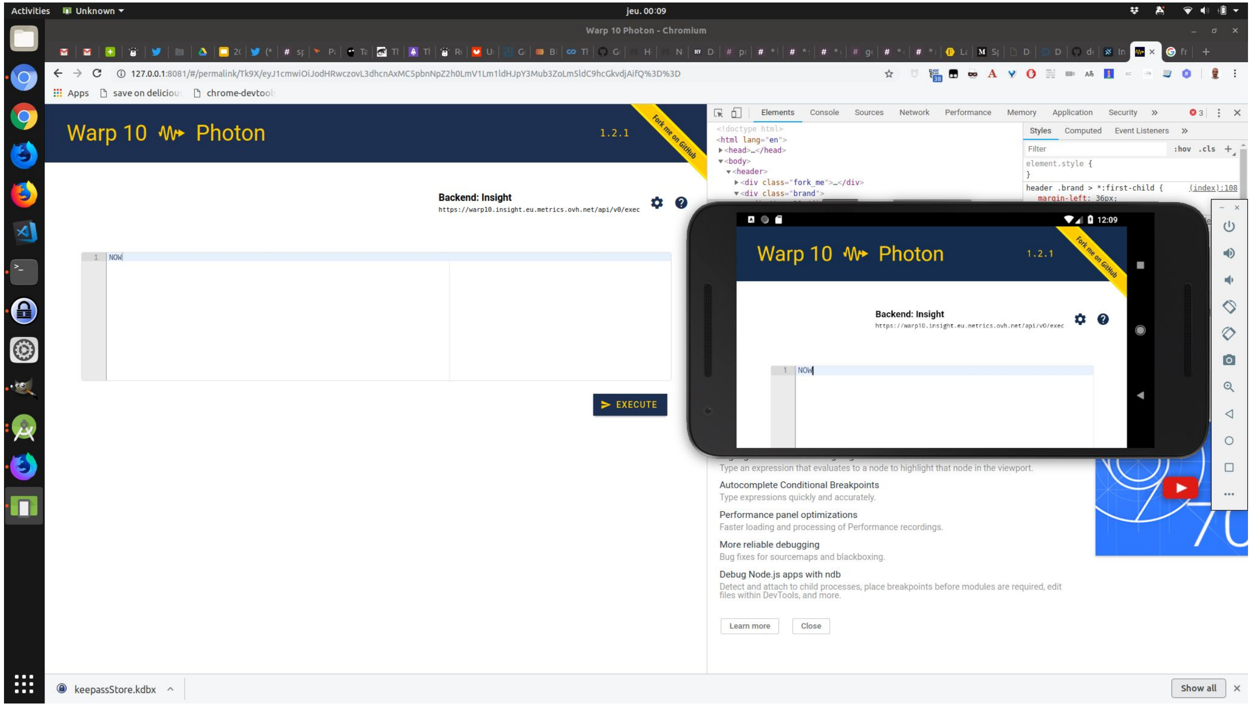
- Copy the built resources to Android

```
npx cap copy
```

- Launch Android Studio

```
npx cap open android
```

Step 3 - Test



```
<!doctype html>
<html lang="en">
▶<head>…</head>
▼<body>
  ▼<header>
    ▶<div class="fork_me">…</div>
    ▼<div class="brand">
```

```
element.style {
}
header .brand > *:first-child {    (index):108
  margin-left: 36px;
```

Type an expression that evaluates to a node to highlight that node in the viewport.

Autocomplete Conditional Breakpoints

Type expressions quickly and accurately.

Performance panel optimizations

Faster loading and processing of Performance recordings.

More reliable debugging

Bug fixes for sourcemaps and blackboxing.

Debug Node.js apps with ndb

Detect and attach to child processes, place breakpoints before modules are required, edit files within DevTools, and more.

And our webapp is now a native app

What about Angular schematics?

Yesterday at Speakers' Dinner,
I got a question I couldn't answer...

And now I can happily do it:
yes, you can also use Angular schematics:

```
ng add @capacitor/angular
```

First test: successful!

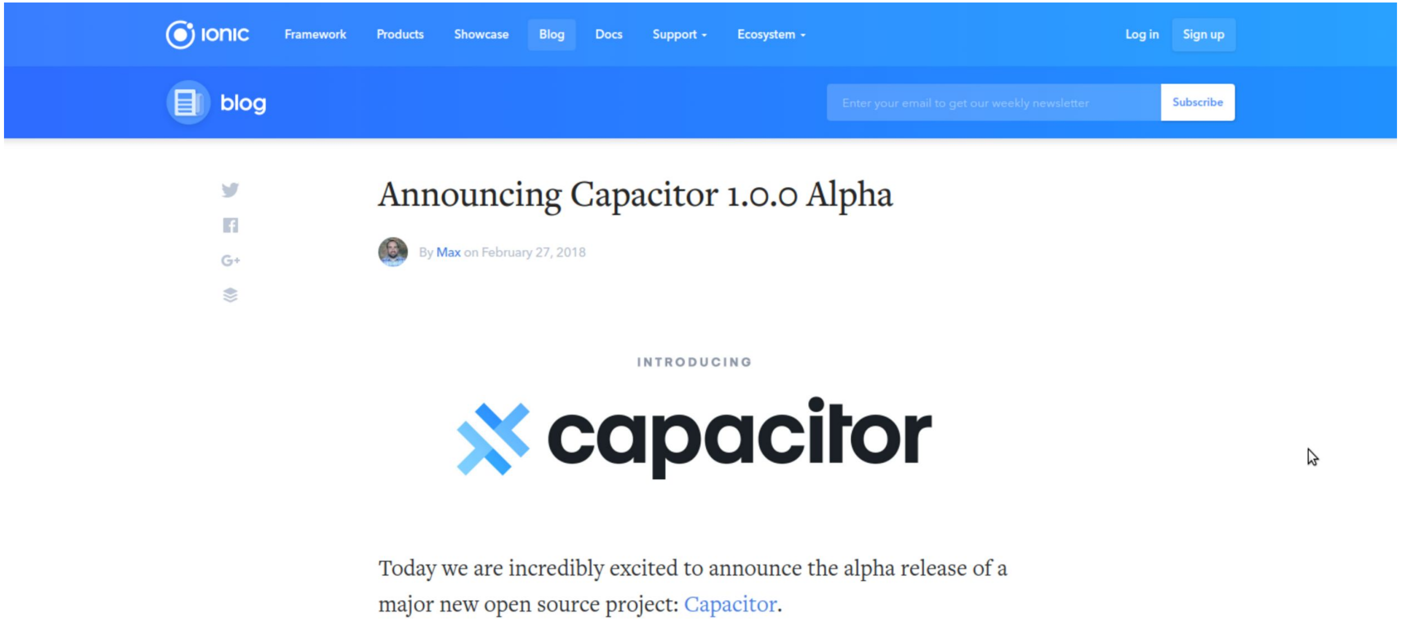
Capacitor 1 - Scepticism 0

The Capacitor example app

Nice to explore Capacitor

Made by the Ionic team

To replace Cordova in Ionic 4



Announcing Capacitor 1.0.0 Alpha

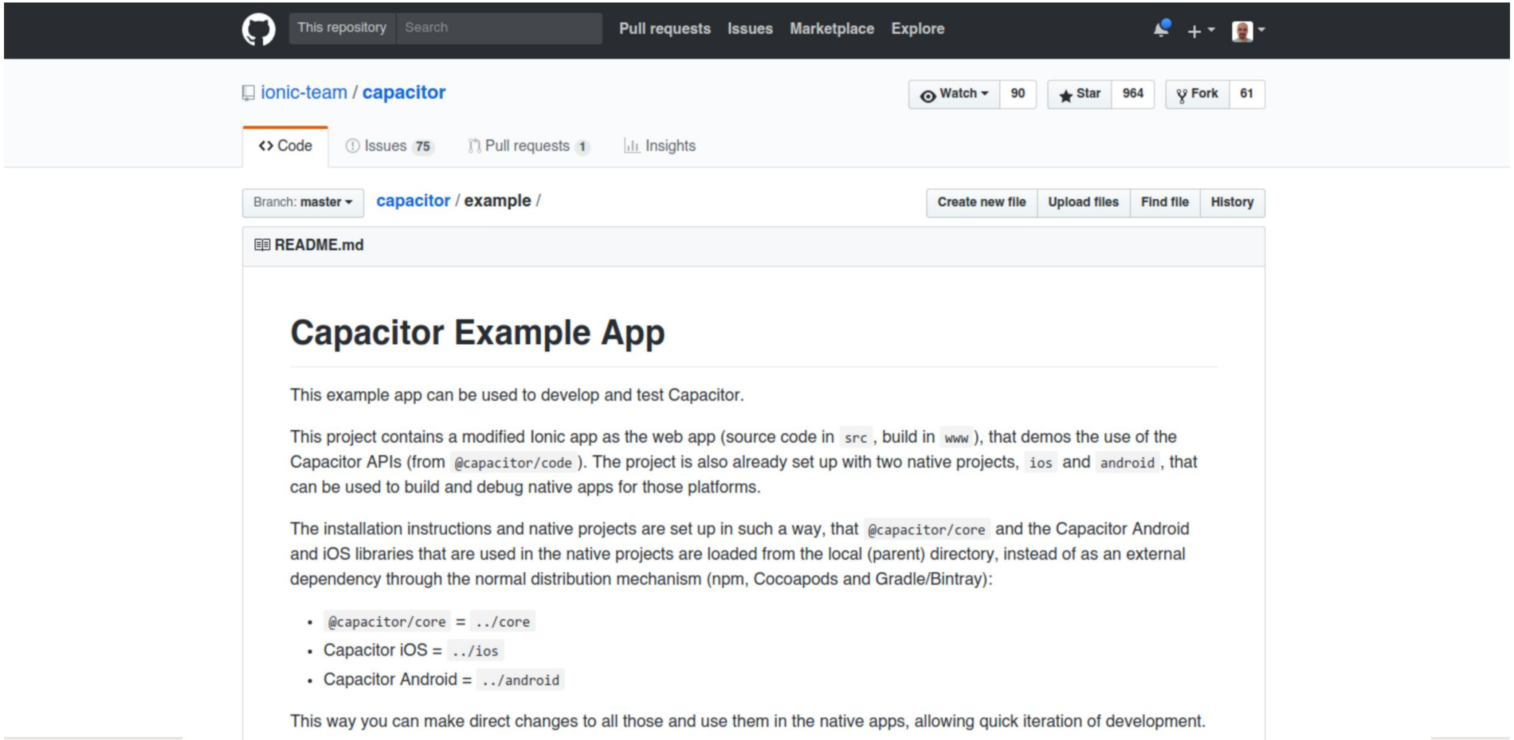
By Max on February 27, 2018

Today we are incredibly excited to announce the alpha release of a major new open source project: Capacitor.

Official example built on Ionic

Showcasing Ionic 4

Let's try the official example



Capacitor Example App

This example app can be used to develop and test Capacitor.

This project contains a modified Ionic app as the web app (source code in `src`, build in `www`), that demos the use of the Capacitor APIs (from `@capacitor/code`). The project is also already set up with two native projects, `ios` and `android`, that can be used to build and debug native apps for those platforms.

The installation instructions and native projects are set up in such a way, that `@capacitor/core` and the Capacitor Android and iOS libraries that are used in the native projects are loaded from the local (parent) directory, instead of as an external dependency through the normal distribution mechanism (npm, Cocoapods and Gradle/Bintray):

- `@capacitor/core` = `../core`
- Capacitor iOS = `../ios`
- Capacitor Android = `../android`

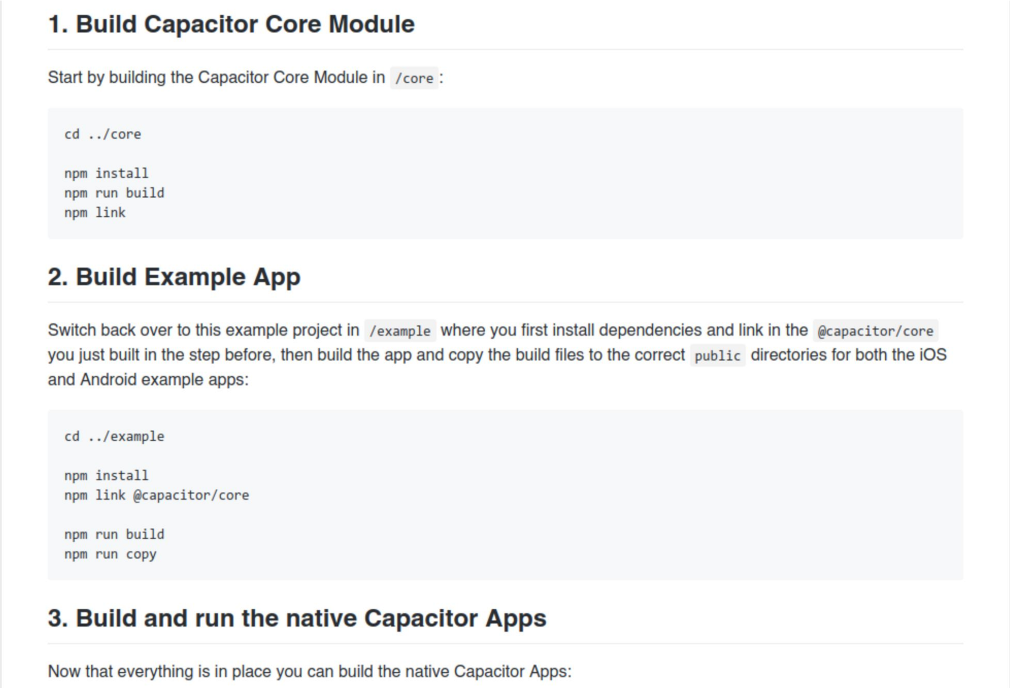
This way you can make direct changes to all those and use them in the native apps, allowing quick iteration of development.

Using directly the Capacitor repository

Custom built project, not a production app

`@capacitor/core` and native libs loaded from local directory

Let's build the Android version



1. Build Capacitor Core Module

Start by building the Capacitor Core Module in `/core`:

```
cd ../core

npm install
npm run build
npm link
```

2. Build Example App

Switch back over to this example project in `/example` where you first install dependencies and link in the `@capacitor/core` you just built in the step before, then build the app and copy the build files to the correct `public` directories for both the iOS and Android example apps:

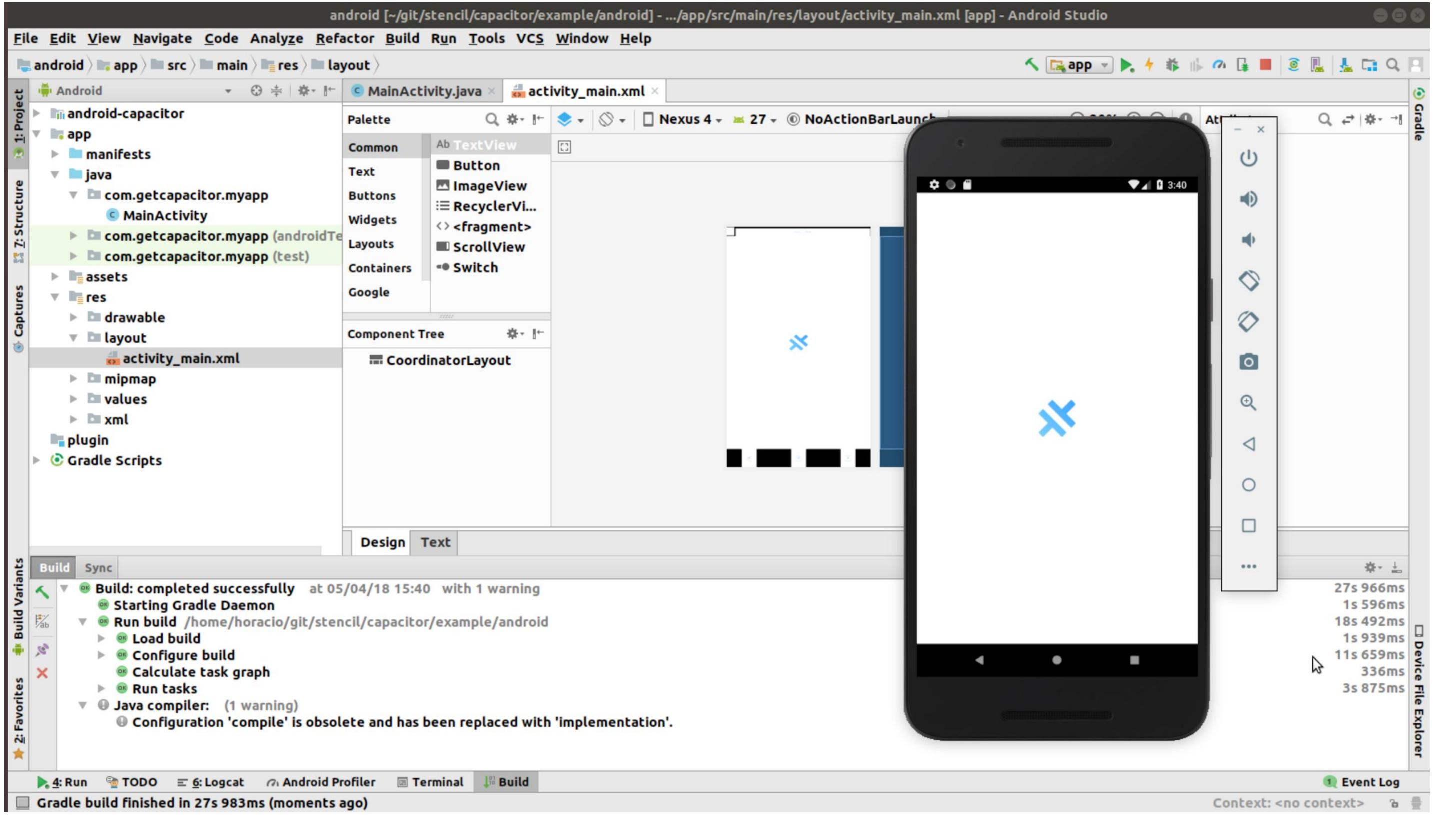
```
cd ../example

npm install
npm link @capacitor/core

npm run build
npm run copy
```

3. Build and run the native Capacitor Apps

Now that everything is in place you can build the native Capacitor Apps:

Some pre-building and building needed...

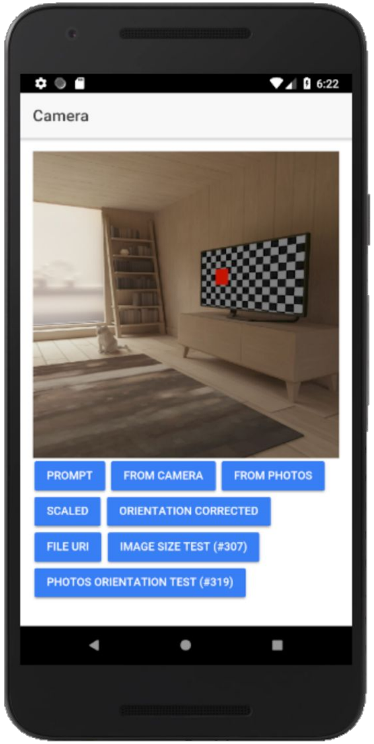
We now have an Android project

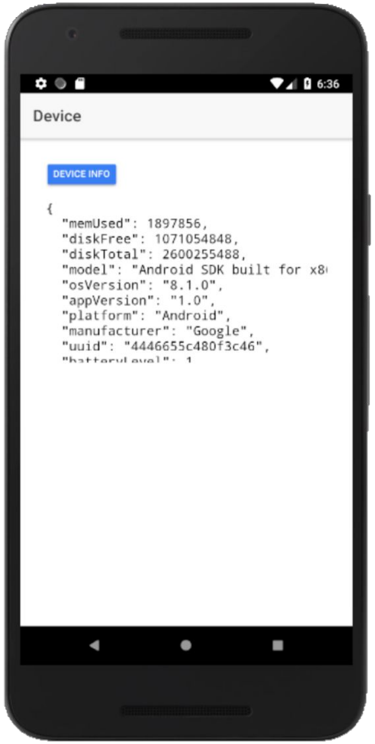


```
Build: completed successfully  at 05/04/18 15:40  with 1 warning    27s 966ms
  Starting Gradle Daemon                                             1s 596ms
  Run build  /home/horacio/git/stencil/capacitor/example/android    18s 492ms
    Load build                                                       1s 939ms
    Configure build                                                  1s 659ms
    Calculate task graph                                               336ms
    Run tasks                                                        3s 875ms
  Java compiler:  (1 warning)
    Configuration 'compile' is obsolete and has been replaced with 'implementation'.
```

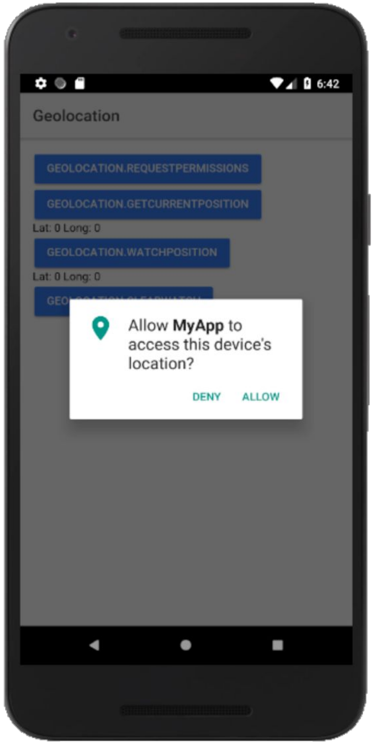
Gradle build finished in 27s 983ms (moments ago)

Easy and painless Android app



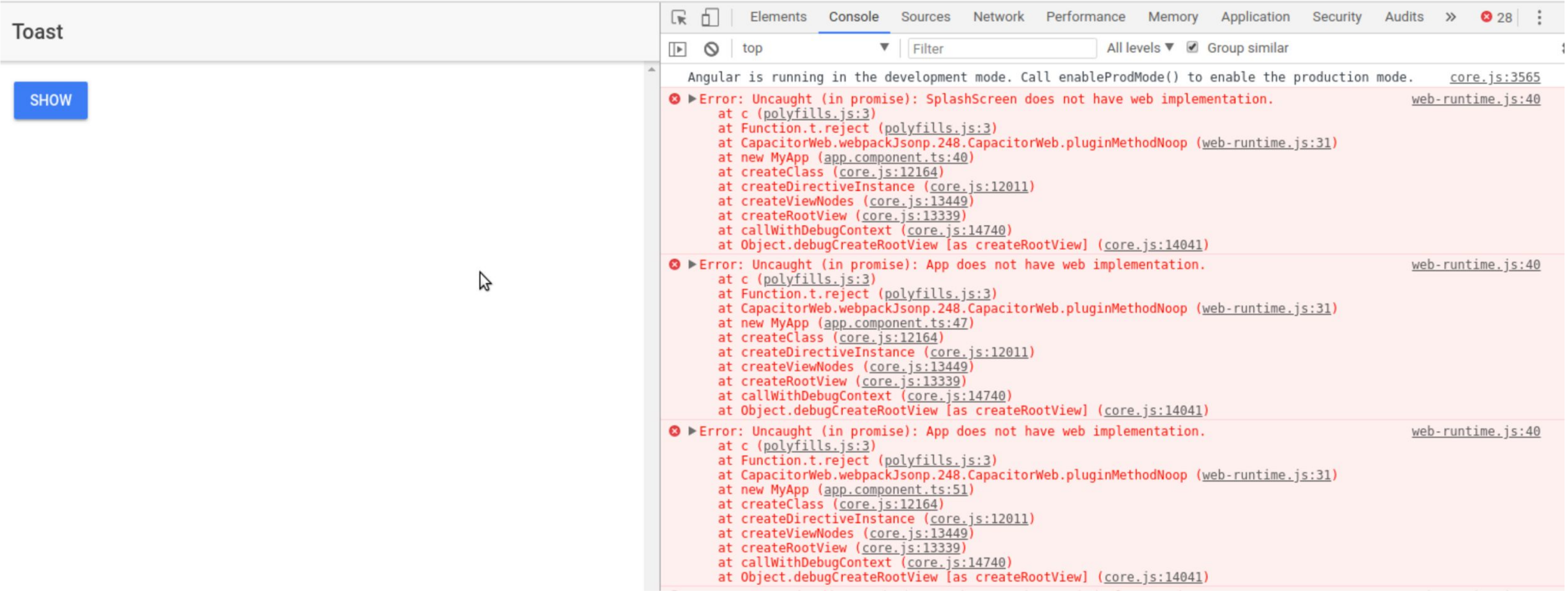


```
{
  "memUsed": 1897856,
  "diskFree": 1071054848,
  "diskTotal": 2600255488,
  "model": "Android SDK built for x8
  "osVersion": "8.1.0",
  "appVersion": "1.0",
  "platform": "Android",
  "manufacturer": "Google",
  "uuid": "4446655c480f3c46",
  "batteryLevel": 1
```


6:42
Geolocation
GEOLOCATION.REQUESTPERMISSIONS
GEOLOCATION.GETCURRENTPOSITION
Lat: 0 Long: 0
GEOLOCATION.WATCHPOSITION
Lat: 0 Long: 0
GEO

Allow **MyApp** to access this device's location?

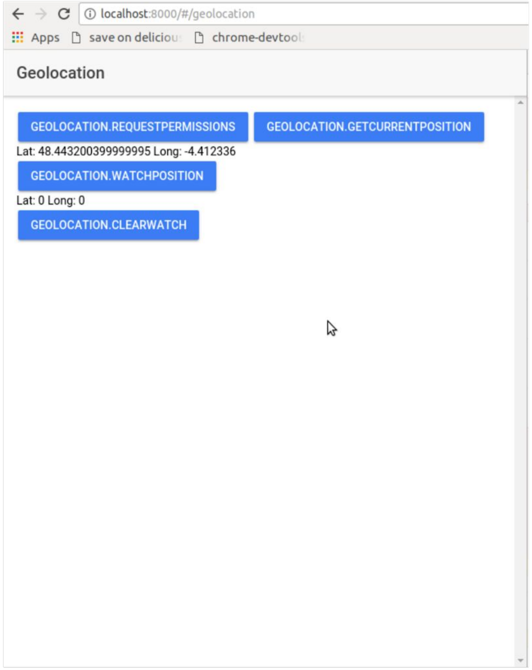
And in PWA mode?



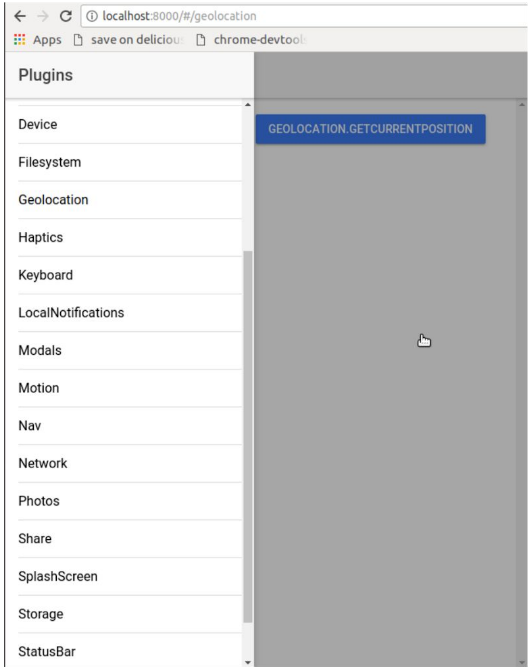
```
Angular is running in the development mode. Call enableProdMode() to enable the production mode.   core.js:3565
▶Error: Uncaught (in promise): SplashScreen does not have web implementation.          web-runtime.js:40
    at c (polyfills.js:3)
    at Function.t.reject (polyfills.js:3)
    at CapacitorWeb.webpackJsonp.248.CapacitorWeb.pluginMethodNoop (web-runtime.js:31)
    at new MyApp (app.component.ts:40)
    at createClass (core.js:12164)
    at createDirectiveInstance (core.js:12011)
    at createViewNodes (core.js:13449)
    at createRootView (core.js:13339)
    at callWithDebugContext (core.js:14740)
    at Object.debugCreateRootView [as createRootView] (core.js:14041)
▶Error: Uncaught (in promise): App does not have web implementation.                   web-runtime.js:40
    at c (polyfills.js:3)
    at Function.t.reject (polyfills.js:3)
    at CapacitorWeb.webpackJsonp.248.CapacitorWeb.pluginMethodNoop (web-runtime.js:31)
    at new MyApp (app.component.ts:47)
    at createClass (core.js:12164)
    at createDirectiveInstance (core.js:12011)
    at createViewNodes (core.js:13449)
    at createRootView (core.js:13339)
    at callWithDebugContext (core.js:14740)
    at Object.debugCreateRootView [as createRootView] (core.js:14041)
▶Error: Uncaught (in promise): App does not have web implementation.                   web-runtime.js:40
    at c (polyfills.js:3)
    at Function.t.reject (polyfills.js:3)
    at CapacitorWeb.webpackJsonp.248.CapacitorWeb.pluginMethodNoop (web-runtime.js:31)
    at new MyApp (app.component.ts:51)
    at createClass (core.js:12164)
    at createDirectiveInstance (core.js:12011)
    at createViewNodes (core.js:13449)
    at createRootView (core.js:13339)
    at callWithDebugContext (core.js:14740)
    at Object.debugCreateRootView [as createRootView] (core.js:14041)
```

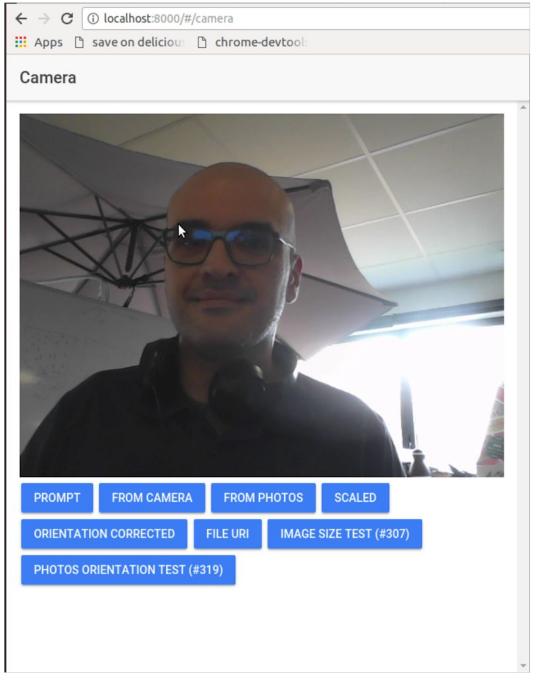
Some elements haven't web implementation (yet?)

But it still works!


localhost:8000/#/geolocation
Apps
save on deliciou
chrome-devtool
Geolocation
GEOLOCATION.REQUESTPERMISSIONS
GEOLOCATION.GETCURRENTPOSITION
GEOLOCATION.WATCHPOSITION
GEOLOCATION.CLEARWATCH

```
Lat: 48.443200399999995 Long: -4.412336
Lat: 0 Long: 0
```





It fails gracefully for unsupported plugins

Second test: successful!

Capacitor 2 - Scepticism 0

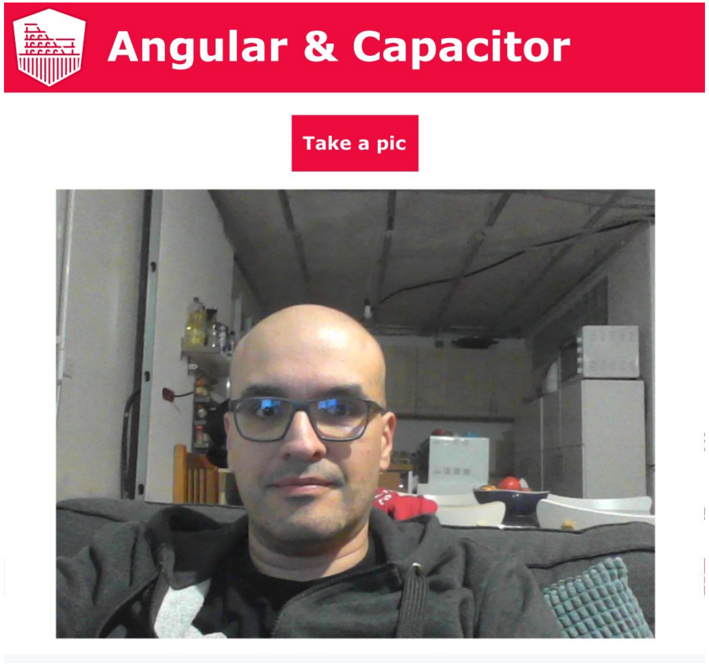
Let's try something harder

How about using native capabilities in my app?

Capacitor without Ionic

I want to use it Capacitor
with my own toolset

Let's begin with a simple example



A Camera app, working well on web mode

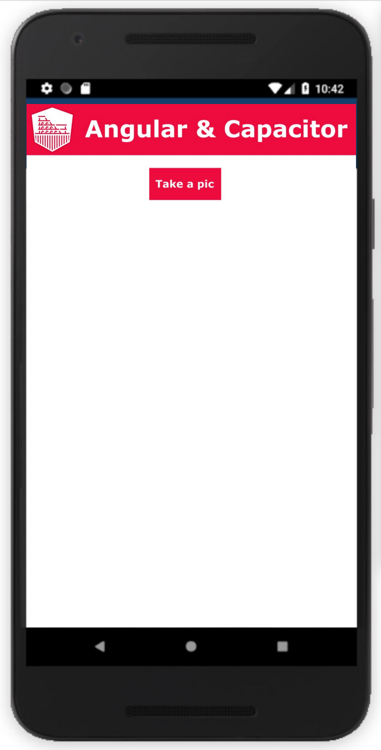
Using standard Media Capture and Streams API

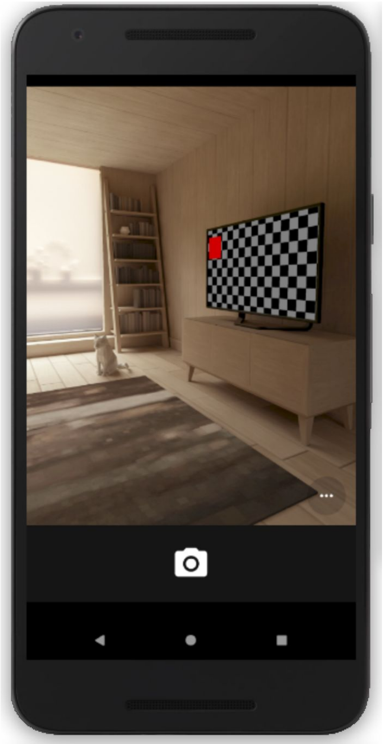
Let's charge it with Capacitor

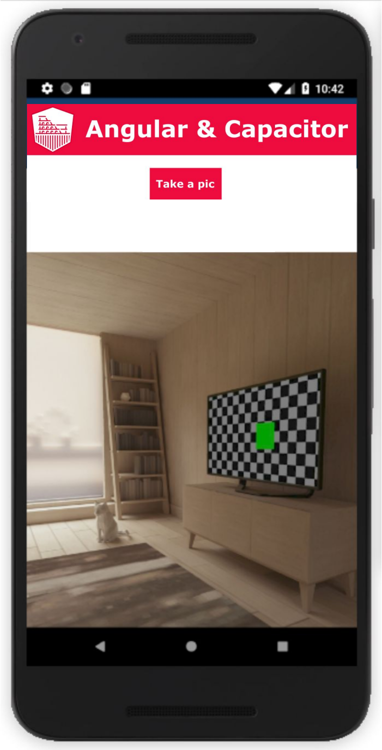
We want the same behavior

But now in Android, iOS, Electron AND web

And does it work?

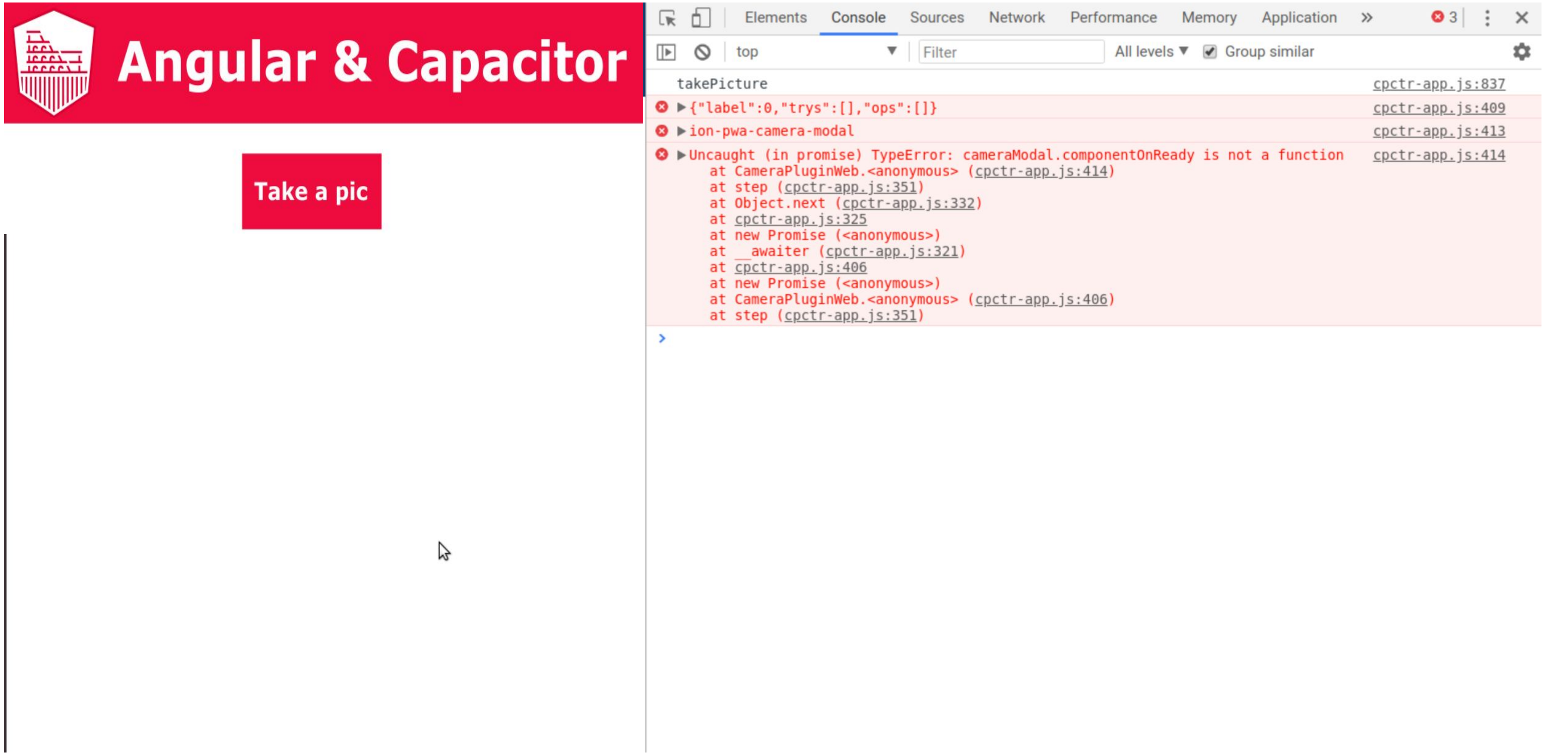






Yes it does... in native mode only!

But not in PWA mode :(



```
takePicture                                                                                   cpctr-app.js:837
▶{"label":0,"trys":[],"ops":[]}                                                               cpctr-app.js:409
▶ion-pwa-camera-modal                                                                         cpctr-app.js:413
▶Uncaught (in promise) TypeError: cameraModal.componentOnReady is not a function              cpctr-app.js:414
    at CameraPluginWeb.<anonymous> (cpctr-app.js:414)
    at step (cpctr-app.js:351)
    at Object.next (cpctr-app.js:332)
    at cpctr-app.js:325
    at new Promise (<anonymous>)
    at __awaiter (cpctr-app.js:321)
    at cpctr-app.js:406
    at new Promise (<anonymous>)
    at CameraPluginWeb.<anonymous> (cpctr-app.js:406)
    at step (cpctr-app.js:351)
```

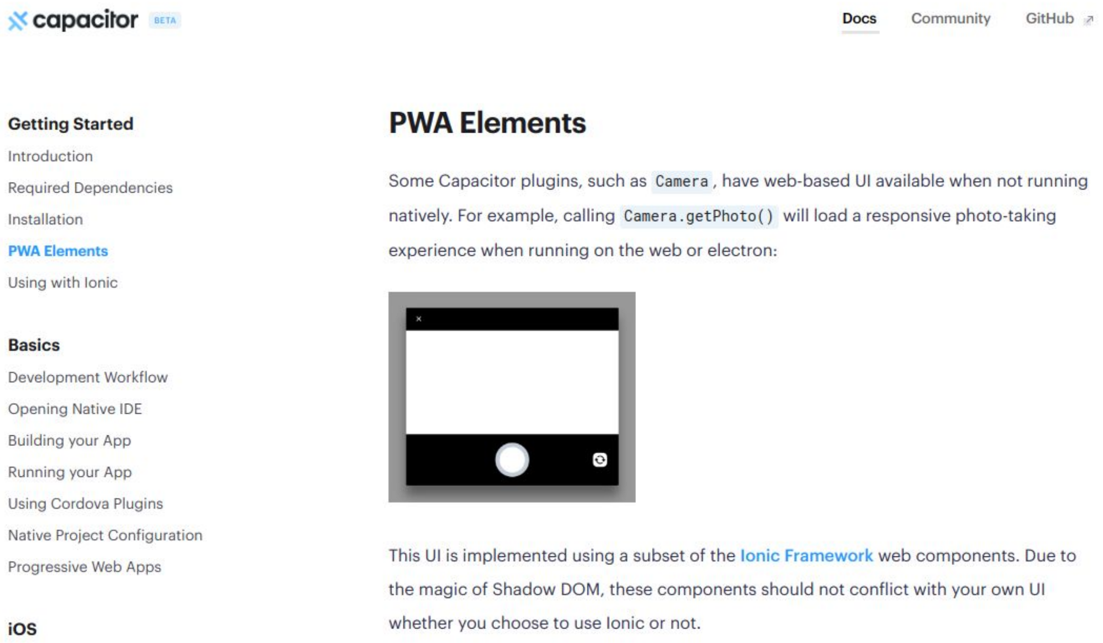
And a big question: why?

Well, let's spot the differences...

Searching on the example code

hmmmm, `@ionic/pwa-elements`, what's that?

@ionic/pwa-elements



PWA Elements

Some Capacitor plugins, such as `Camera`, have web-based UI available when not running natively. For example, calling `Camera.getPhoto()` will load a responsive photo-taking experience when running on the web or electron:

This UI is implemented using a subset of the Ionic Framework web components. Due to the magic of Shadow DOM, these components should not conflict with your own UI whether you choose to use Ionic or not.

Web-based alternatives for some Capacitor plugins

Adding @ionic/pwa-elements

Simply install them:

```
npm install @ionic/pwa-elements
```

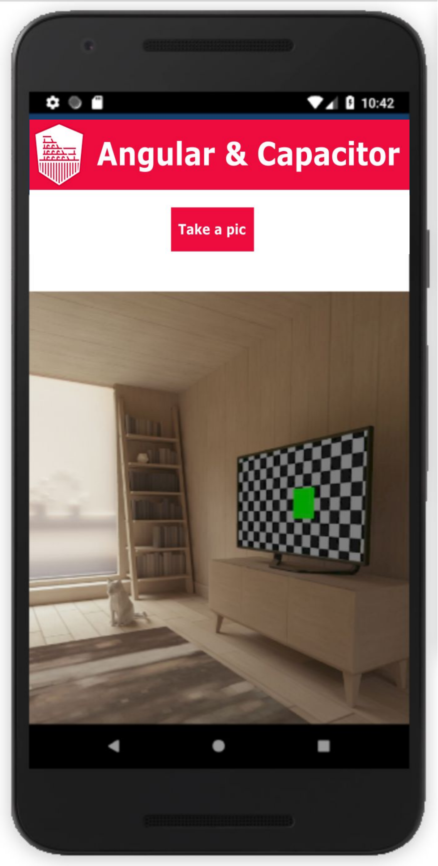
And then import them:

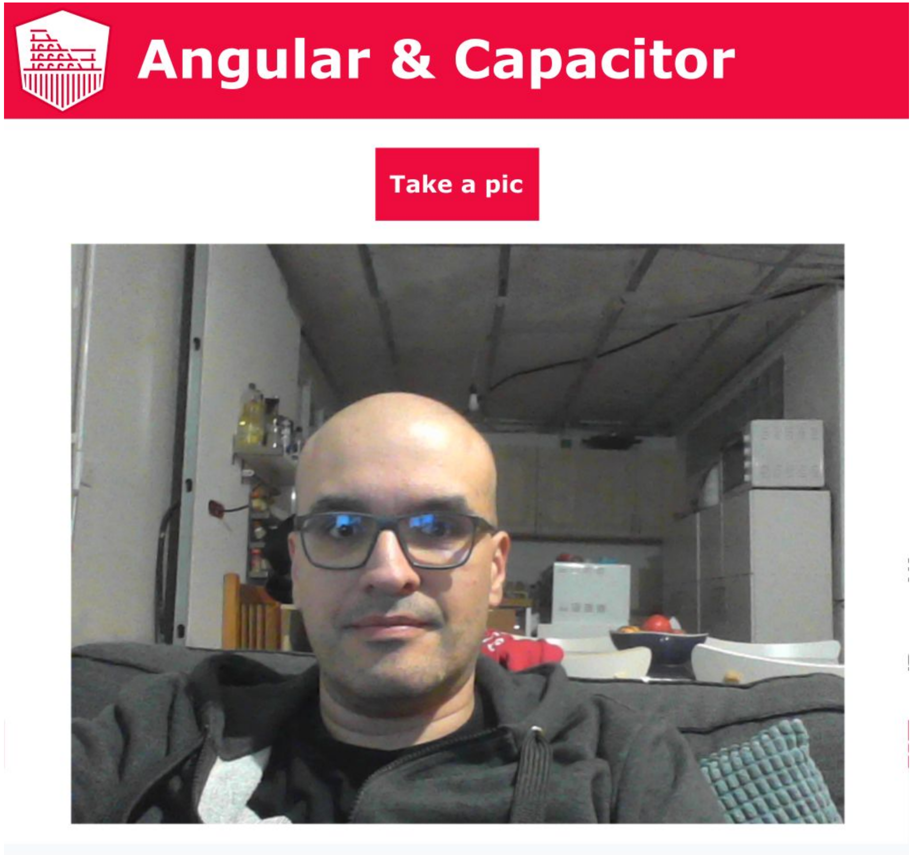
```
import '@ionic/pwa-elements';
```

And then...

It's a kind of magic!

On Android and Web





Second test: successful!

Capacitor 3 - Scepticism 0

And in Real Life?

Because examples are examples...

Use case 1: Putting PWA into store

It simply works, easy and painless!

Use case 2: Progressive enhancing

Giving your PWA an extra P when going native

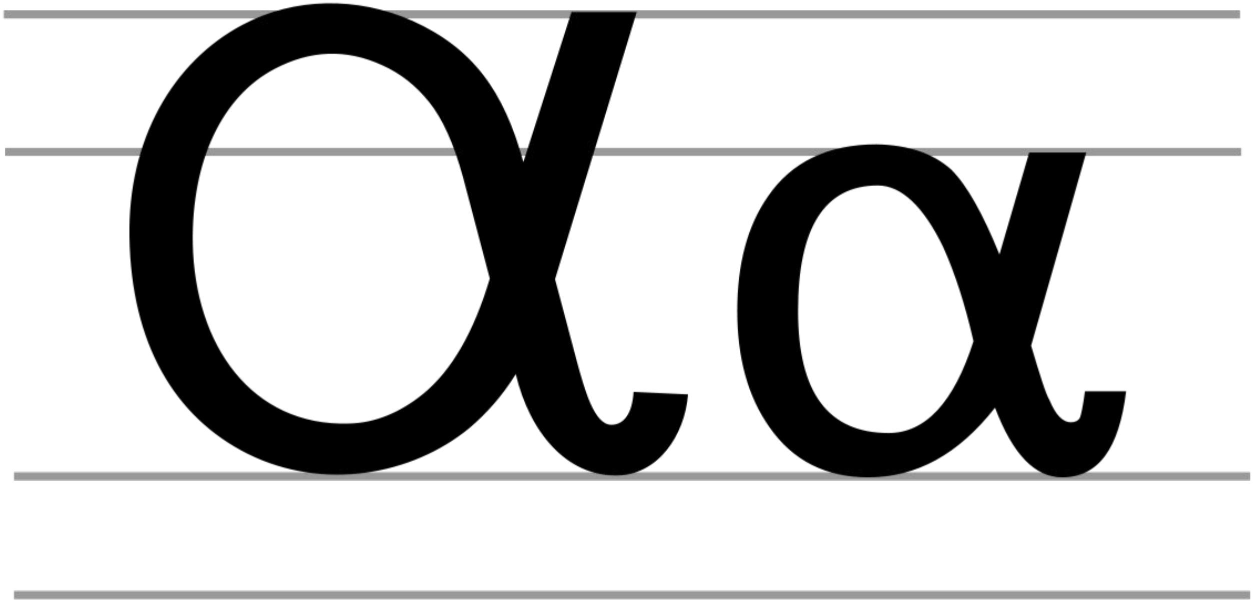
And Capacitor already works

A true winner

Conclusions

Capacitor or not?

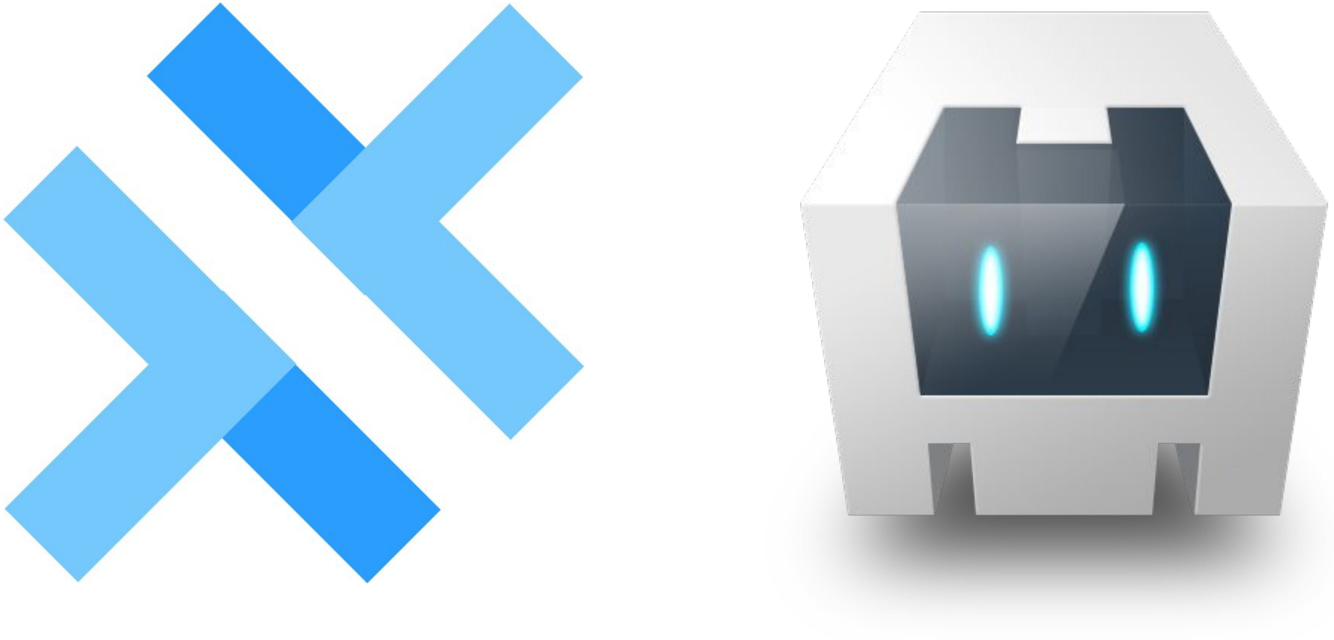
Still fairly recent



There are small glitches

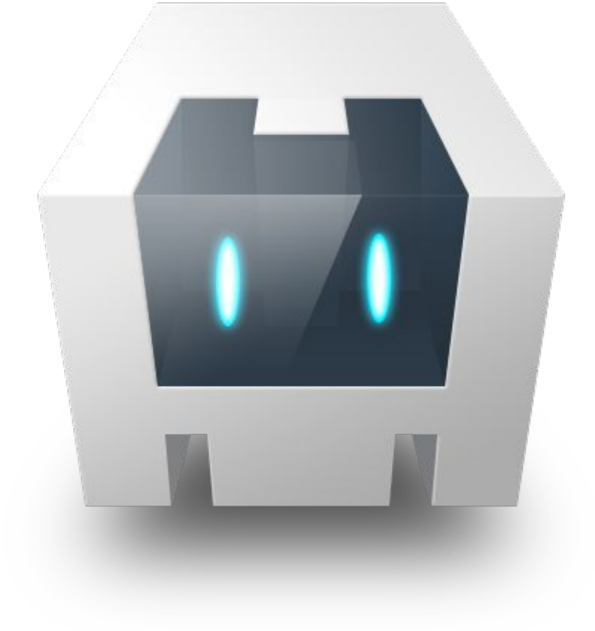
Doc could be more detailed, with more examples

Easy to use



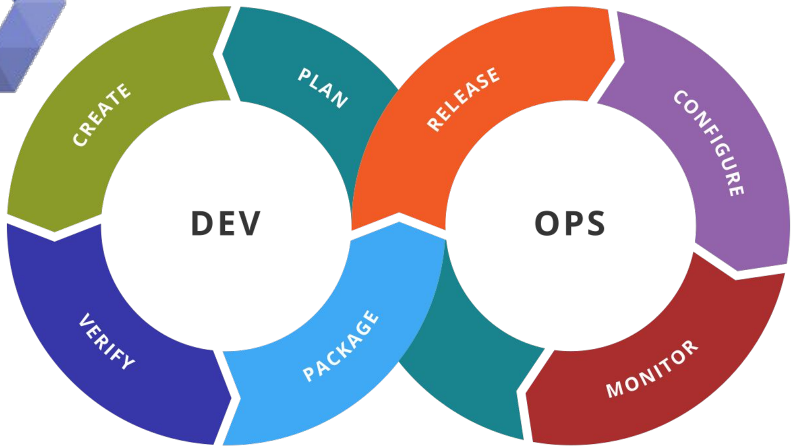
Friendlier than Cordova

Yet extensible



You can use existing Cordova plugins

Not opinionated



Easy to use in any framework

Easy to integrate in any dev toolchain

Thank you!

thank you
danke
рахмат
謝謝
ngiyabonga
شكراً جزيلاً
teşekkür ederim
Баярлалаа
спасибо
gracias
merci
obrigado
bedankt
dziękuje
sukriya
kop khun krap
go raibh maith agat
mochchakkeram
tapadh leat
dank je
hvala
maururu
grazie
arigatô
dakujem
terima kasih
감사합니다
ありがとう
ευχαριστώ
তোমাকে ধন্যবাদ
мерси
хвала
дякую
спасибі
mersi
barka
welalin
tack
spas
kia ora
vinaka
blagodaram
misaotra
matondo
paldies
grazzi
mahalo
faafetai lava
kiitos
dankie
dhanyavad
nanni
nandri
köszönöm
akun dankon aciu
enkosi
bayarlalaa
gràcie
asante
manana
obrigada
tenki
murakoze
djiere dieuf
tau
mamnun
chokrane
chnorakaloutioun
gratias ago
gràcies
sulpáy
taiku
sobodi
dėkuji
mèsi
sagolun
didi madloba
najis tuke
kam sah hamnida
rahmat
tanemirt
rahmet
diolch
dhanyavadagalu
shukriya
mercé
takk
trugarez
xièxie