



BRINGING YOUR FLUTTER APP TO THE WEB

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cellenza

Today's (short) agenda

1. Introduction to our *mobile first* application **Edenred+**
2. Why and how we shifted to web
3. Lessons learned



Edenred+ journey

The Flutter application

A 100% digital platform to grant employee benefits

Flutter application for Android & iOS that allows users to onboard, order plastic/virtual cards and discover deals and stores.



Platforms

Android & iOS

Architecture

BLoC + Clean Architecture,
Modularisation, widgetbook

CI

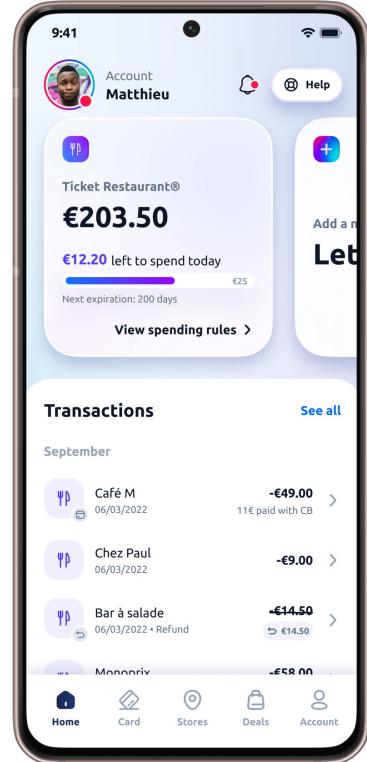
Az DevOps + dedicated OSX runners

Quality

Linters, Sonar, PR validators, tests

Deps

auto_route, dio + retrofit, get_it + injectable,
envied, flutter_secure_storage, etc...



...just like your usual Flutter mobile app!

Why going Web with Flutter?

Some users still prefer desktop web apps

We planned to provide the same user experience

Seemed to fit well with Flutter's web approach

Take a decision

Flutter Web?

Switch to Angular

- ▶ **Top notch** Web experience
- ▶ New codebase, new repos, CI, new pipelines and new developers 🎉
- ▶ Community and web practices are well known

Go with Flutter Web

- ▶ Tailored for **PWA** Web experience
- ▶ **Same team, reuse** of UI/UX, user journeys, codebase, build chain 🚀
- ▶ Time to market



We decided to **experiment** based on our current codebase

First web build outcomes

Build

flutter build **web** --release --source-maps

Time

Takes less than 2 minutes (**including build_runner**) on a Mac mini M2 Pro

UI/UX

Without any edit, **usable but non optimized**

Web support

Most packages were web compatible **out of the box**

Web issues

Moving to web brings out the standard hosting & CORS topics.



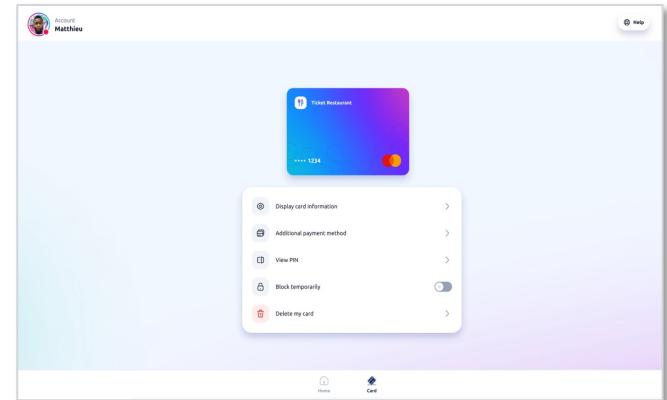
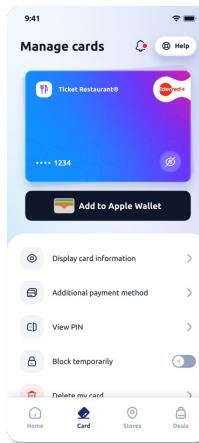
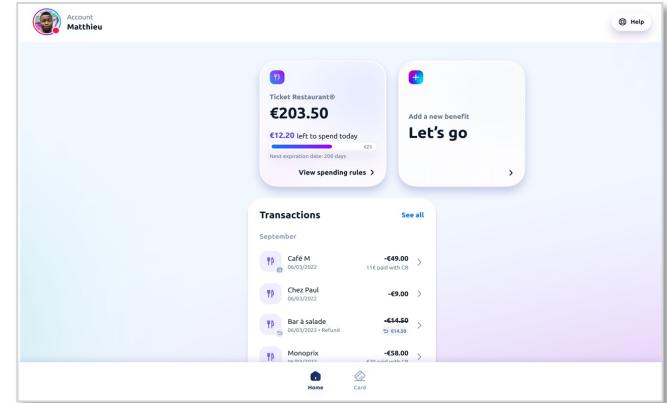
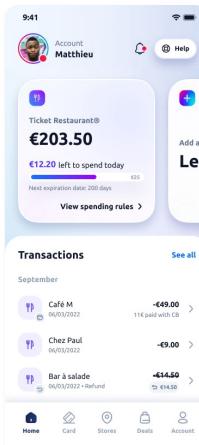
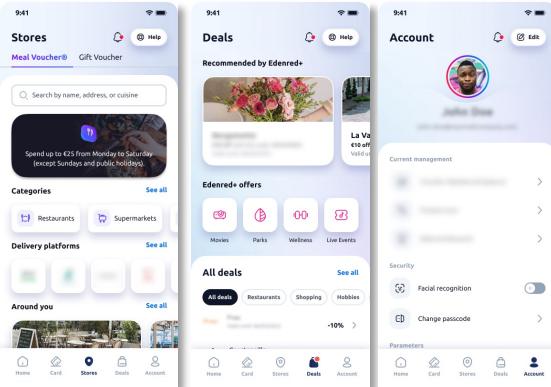
Iteration was fast, first builds in **days**, Delivered to production the following **months**

First web build outcomes

We took the basics

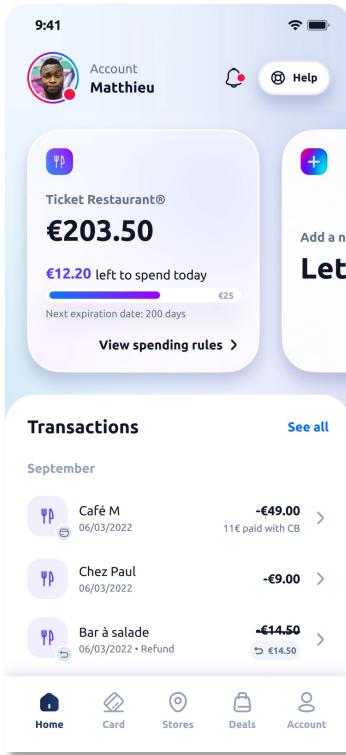
- Onboarding
- Login
- Card ordering
- Balance and transactions

And kept everything else for later
(deals / stores / account)



First web build outcomes

Proper Web design



This web browser interface shows a "My benefits" section with a balance of **€203.50** and a message to "Add a new benefit". Below this is a "Transactions" section for September, listing four entries:

Location	Date	Amount	Notes
Le roi du Burger	06/03/2022	-€49.00	11€ paid with CB
Chez Paul	06/03/2022	-€9.00	
Bar à salade	06/03/2022 • Refund	-€14.50	14.50€
Mono		-€58.00	

The bottom navigation bar includes links for Home, Card, Stores, Deals, and Account.

This mobile application interface displays a summary card at the top with a balance of **€203.50** and a message to "Let's go". Below this is a "Transactions" section for September, listing five entries:

Location	Date	Amount	Notes
Le roi du Burger	06/03/2022	-49.00 €	11€ paid with CB
Chez Paul	06/03/2022	-9.00 €	
Bar à salade	06/03/2022 • Refund	-14.50	14.50
Mono		-58.00 €	
Mu Small Company		-202.50	20€ paid with CB

The bottom navigation bar includes links for Home, Card, Stores, Deals, and Account.

First batch of errors

Fixing issues

3 main issues

- ▶ Many runtime errors (**Platform.is*** / **dart:io**)
- ▶ Few vendors SDKs were not **Flutter** web ready. (Either Flutter Mobile or Web)
- ▶ Some features / sensors are unavailable on web

Solutions

- ▶ Prevent calls to be performed and add more layers and stub/wrap calls
- ▶ Create the missing bindings for your vendors SDKs

```
import 'package:users_app/data/onboarding/phone_number/repository/phone_number_repository_stub.dart'
if (dart.library.io)
'package:users_app/data/onboarding/phone_number/repository/phone_number_repository_mobile.dart'
if (dart.library.html)
'package:users_app/data/onboarding/phone_number/repository/phone_number_repository_web.dart';
```

Keys management

Fixing issues

- .env / assets are **public** and **very easy** to look 



```
await dotenv.load(fileName: "lib/assets/secrets/mysecret.env");
```

Some Flutter code

Name	
main.dart.js	
favicon.png	
Icon-192.png	
canvaskit.js	
FontManifest.json	
MaterialIcons-Regular.otf	
Ubuntu-Regular.ttf	
Ubuntu-Italic.ttf	
Poppins-SemiBoldItalic.ttf	1 ENVIRONMENT=hello
Poppins-Bold.ttf	2 API_KEY=world
Poppins-BoldItalic.ttf	
Poppins-ExtraBold.ttf	
Poppins-ExtraBoldItalic.ttf	
Poppins-Black.ttf	
Poppins-BlackItalic.ttf	
KFOmCnqEu92Fr1Me5WZL...	
mysecret.env	

Browser network traces

Keys management

Fixing issues

- Source obfuscation is not supported by Flutter but minification is.
Have a look at the **envied** package to get .env obfuscation.
- Keep in mind **it's not 100% bulletproof**, but it will **increase the amount of effort needed** to get the values from the source code.

```
import 'package:envied/envied.dart';

part 'env.g.dart';

@Envied(path: '.env')
abstract class Env {
    @EnviedField(varName: 'KEY', obfuscate: true)
    static const key1 = _Env.key; //myenvvalue
}
```

envied usage

```
A.bj4.prototype{
    DR(){return"myenvvalue"},  
}
```

minification

```
$0(){return B.WH},  
$S:1144}  
A.bkJ.prototype={  
$1(a){var s=null, r=a.IJ(new A.bKm(),t.Uu).a  
return A.ck(new A.b2(new A.Zg(A.dZ(!0,s,!0,s,s,!1),$1.ad().$1$0(t.C),r),s,t.tn),a,t.z)},  
$S:6
}
```

Minification + obfuscation

Web packages pitfalls

Fixing issues

- ▶ Some **SDKs** are performing caller verification through platform specific SDKs.
- ▶ Some **multiplatform packages** from the community are relying on **server-to-server APIs** to keep things simpler.
- ▶ Anyone with the key can call the APIs, leading to privacy & costs issues

Set an application restriction

Application restrictions limit an API key's usage to specific websites, IP addresses, Android applications, or iOS applications. You can set one application restriction per key.

- None
- Websites
- IP addresses
- Android apps
- iOS apps

Android restrictions

Restricts API key usage to specified Android apps. Add the package name and SHA-1 certificate fingerprint for each app.

Add application restriction			
Filter	Enter property name or value		
Status	Package name	Fingerprint	Edit
<input type="checkbox"/>	com.edenred.eq.smarter	B1:31:E9:4C:4D:DD:7E:8B:94:	
<input type="checkbox"/>			

Hosting & CORS

Fixing issues

Azure CDN

- ▶ Build creates **static files** that you can push onto your CDN / static hosting provider.
- ▶ In the **web** world, Access-Control-Allow-Origin needs to be configured accordingly with your public facing domain.

✖ close_circle.svg	Request URL:	https://prd.smarter.edenred.io/bff-user-api/v1/tenants?benefit-code=FR10123456
tenants?benefit-code=FR1012...	Request Method:	GET
tenants?benefit-code=FR1012...	Status Code:	200 OK
calendar2.svg	Remote Address:	:443
✖ calendar2.svg	Referrer Policy:	strict-origin-when-cross-origin
metrics	▼ Response Headers	
metrics	Access-Control-Allow-Origin:	https://user.edenredplus.com
frontend?sessionId=5852521...		

Web routing

Fixing issues

- If you want to benefit from universal links with Hash routing, have a look at **URL Rewriting** techniques

Hash (default)

Paths are read and written to the [hash fragment](#). For example, `flutterexample.dev/#/path/to/screen`.

Path

Paths are read and written without a hash. For example, `flutterexample.dev/path/to/screen`.

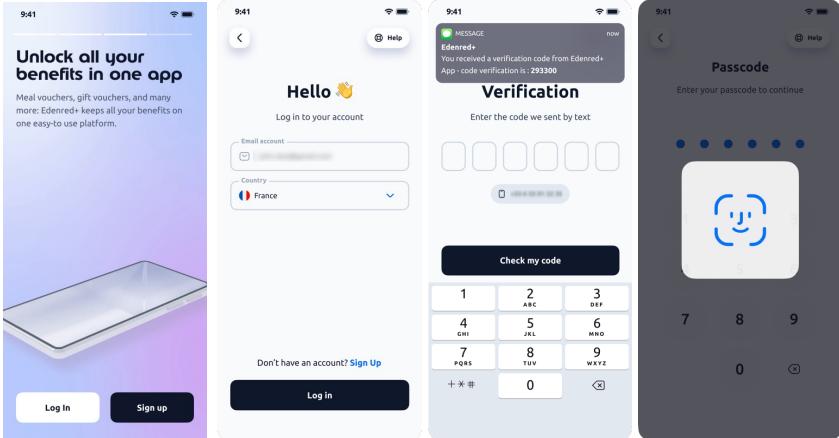
<https://docs.flutter.dev/ui/navigation/url-strategies>

- Because anyone can decide to do a page reload or open links, **any route can be directly accessed** leading to **business and runtime issues**.
 - State / data restoration can help you to handle some of those use cases
 - Route Guards** allows to redirect from unplanned route navigation

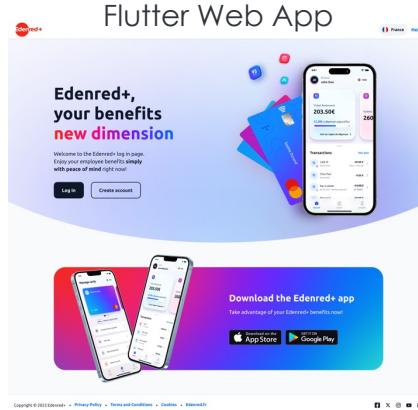
Code sharing limitations

Strong Customer Authentication

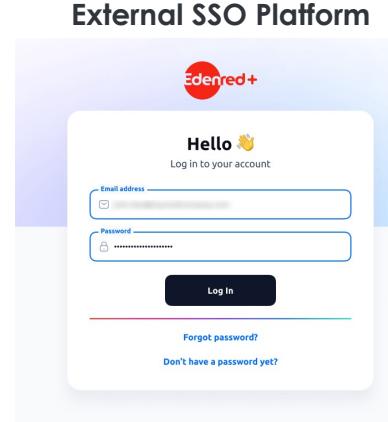
Combination of multiple factors including platform specifics fingerprinting and storage.



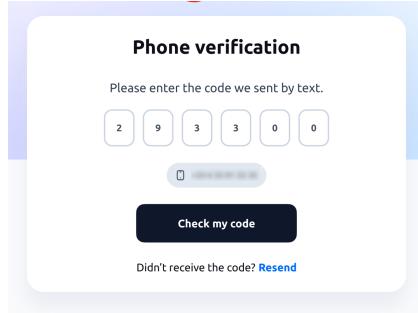
Mobile App



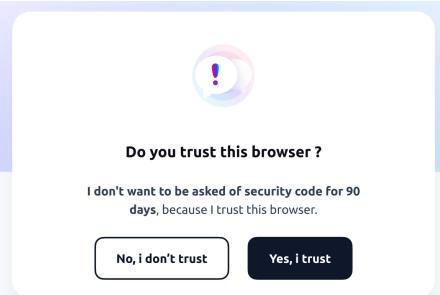
Flutter Web App



External SSO Platform



Web



A few concerns to have in mind

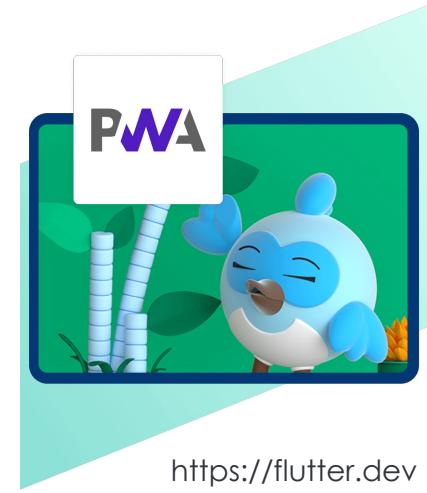
- ▶ Performance is a bit behind JS frameworks but mostly on the **very first** page load
- ▶ SEO requires to split your app and marketing content
- ▶ You may have to write your own web wrappers for some vendors SDKs
- ▶ Going web without a design system or adaptive / responsive first may be a bit challenging

But all of those may not be blockers depending on your use case!

Lessons learned

- ▶ Edenred+ Web is live in multiple countries 
- ▶ Time to market was good
- ▶ It's the **same app**, most of the codebase is shared, new features are both web & mobile.

Will you join the Flutter Web journey?



Thanks!