KARSTEN SILZ, OCT 4, 2022

FLUTTER FOR JAVA DEVELOPERS: MOBILE, WEB & DESKTOP WITH 1 CODEBASE?

BUILD MOBILE, WEB & DESKTOP FRONTENDS WITH FLUTTER & 1 CODEBASE?

YES, WE CAN...

. . . BUT WE SHOULDN'T!

MOBILE: 👍🏻

WEB: 👎🏻

DESKTOP: 👎🏻

JSF: 👎

JAVAFX: 👎

WHY & HOW CROSS-PLATFORM

HOW FLUTTER WORKS

MY FLUTTER EXPERIENCES

WHEN TO USE WHICH FRAMEWORK

WHO MADE ME THE EXPERT?

FLUTTER APP IN APP STORES

INFOQ JAVA EDITOR, PC QCON LONDON

JAVA DEVELOPER FOR 23 YEARS

USE JAVA, ANGULAR & FLUTTER –
NOT ASSOCIATED

SLIDES & MORE

BPF.LI/FAR

WHY & HOW CROSS-PLATFORM

HOW FLUTTER WORKS

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WHEN TO USE WHICH FRAMEWORK

WHY CROSS-PLATFORM FRONT-ENDS?

USERS ARE
MULTI-PLATFORM

PC

.NET
C#

SWIFTUI
SWIFT

GTK/KDE
C++

MOBILE

SWIFTUI
SWIFT

JETPACK
COMPOSE
KOTLIN

PC

MOBILE

.NET
C#

S
S++

SWIFTUI
SWIFT

JETPACK
COMPOSE
KOTLIN

TOO EXPENSIVE!

PC

MOBILE

1 FRAMEWORK, 1 LANGUAGE
CROSS-PLATFORM

CROSS-PLATFORM FRONT-ENDS: CHEAPER & GOOD ENOUGH

GOOD ENOUGH:
ENTERPRISE & CONSUMER APPS – NOT GAMES

THAT'S WHY CROSS-PLATFORM FRONT-ENDS!

~~WHY~~ & HOW CROSS-PLATFORM

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WHEN TO USE WHICH FRAMEWORK

HOW CROSS-PLATFORM FRONT-ENDS?

BIGGEST SOFTWARE ECOSYSTEM EVER

MANY & CHEAP DEVELOPERS

REACT, ANGULAR, VUE

HARD TO LEARN

WEB

STANDARD JAVA WEB FRONT-END LIBRARY

NO SINGLE PAGE APPLICATIONS (SPA)

UNPOPULAR: VERY FEW JOBS (VUE: 15X , ANGULAR: 27X, REACT: 37X)/ GOOGLE SEARCHES / STACK OVERFLOW QUESTIONS

NO NEW FEATURES FOR FIVE YEARS (UNTIL SEP 2022)

JAKARTA SERVER FACES: 👎

PC

MOBILE

HTML, CSS
JAVASCRIPT/TYPESCRIPT

HARD RESTRICTIONS: NO PUSH NOTIFICATIONS ON IOS, LOCAL STORAGE ABOUT 50 MB, NOT ALL NATIVE FEATURES

MOBILE POWER EASIER TO USE FROM NATIVE APPS

ISSUES: WEB ON MOBILE

TikTok

EDIT VIDEOS!

1:40
FORTNITE

PLAY ONLINE MULTIPLAYER GAMES!

GIGABYTES OF LOCAL STORAGE

LOCAL SQL/NOSQL DATABASE

CPU POWER SIMILAR TO PCS

CALL BACK-ENDS WITH REST/GRPC/GRAPHQL...

NATIVE APP POWER

MORE "DESKTOP APPLICATION", LESS "WEB APPLICATION"

HARD RESTRICTIONS: NO PUSH NOTIFICATIONS ON IOS, LOCAL STORAGE ABOUT 50 MB, NOT ALL NATIVE FEATURES

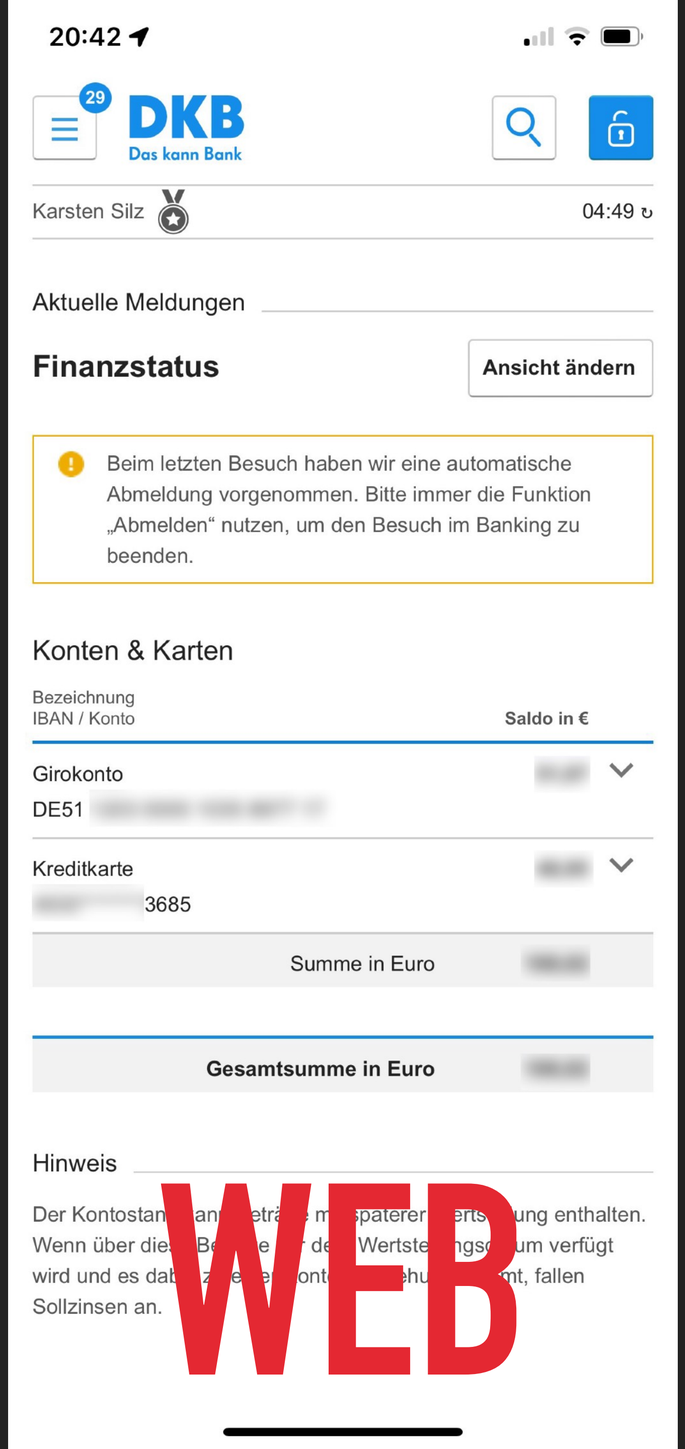
MOBILE POWER EASIER TO USE FROM NATIVE APPS

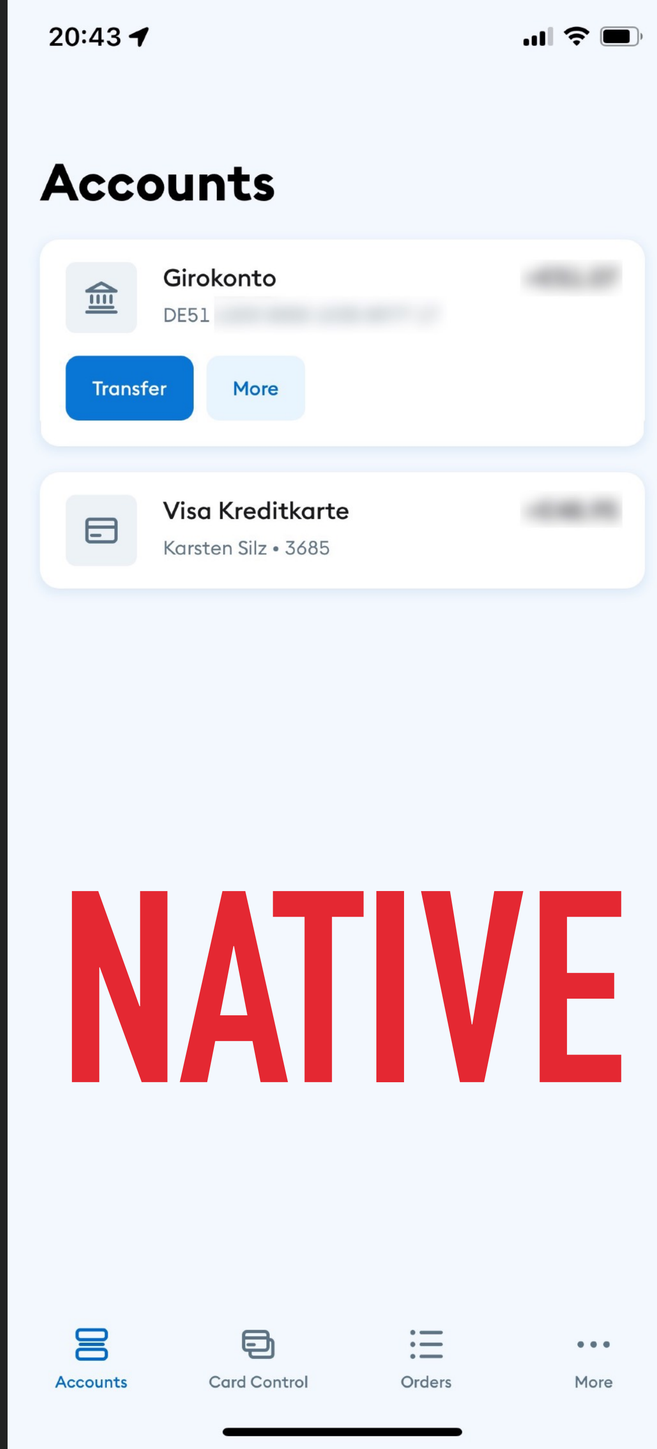
NO NATIVE LOOK & FEEL

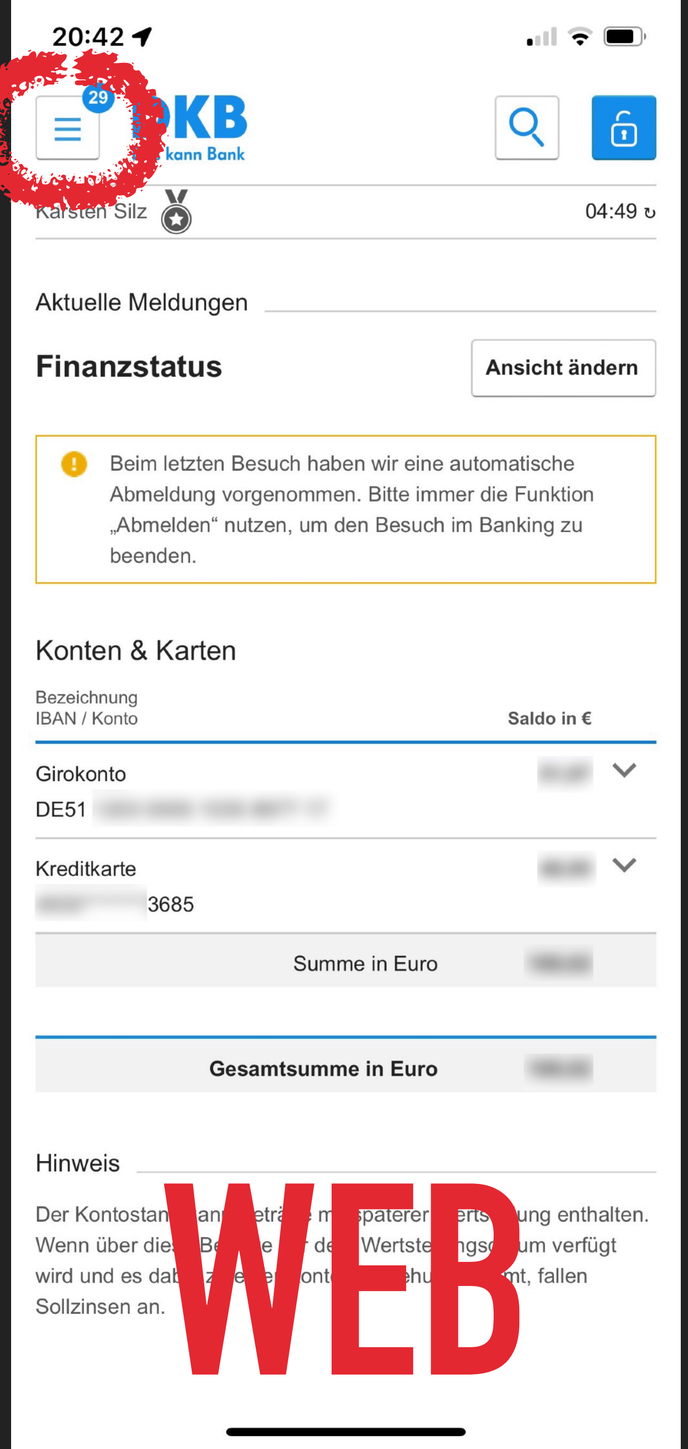
ISSUES: WEB ON MOBILE

WHY NATIVE LOOK & FEEL?

GERMAN ONLINE BANKING APP


20:42
29
DKB
Das kann Bank
Karsten Silz
04:49
Aktuelle Meldungen
Finanzstatus
Ansicht ändern
Beim letzten Besuch haben wir eine automatische Abmeldung vorgenommen. Bitte immer die Funktion „Abmelden“ nutzen, um den Besuch im Banking zu beenden.
Konten & Karten
Bezeichnung
IBAN / Konto
Saldo in €
Girokonto
DE51
Kreditkarte
3685
Summe in Euro
Gesamtsumme in Euro
Hinweis
Der Kontostan an eträ m spaterer erts ung enthalten.
Wenn über dies Be e de Wertste gsc um verfügt
wird und es dab z e e ont ehu nt, fallen
Sollzinsen an.
WEB


20:43
Accounts
Girokonto
DE51
Transfer
More
Visa Kreditkarte
Karsten Silz • 3685
NATIVE
Accounts
Card Control
Orders
More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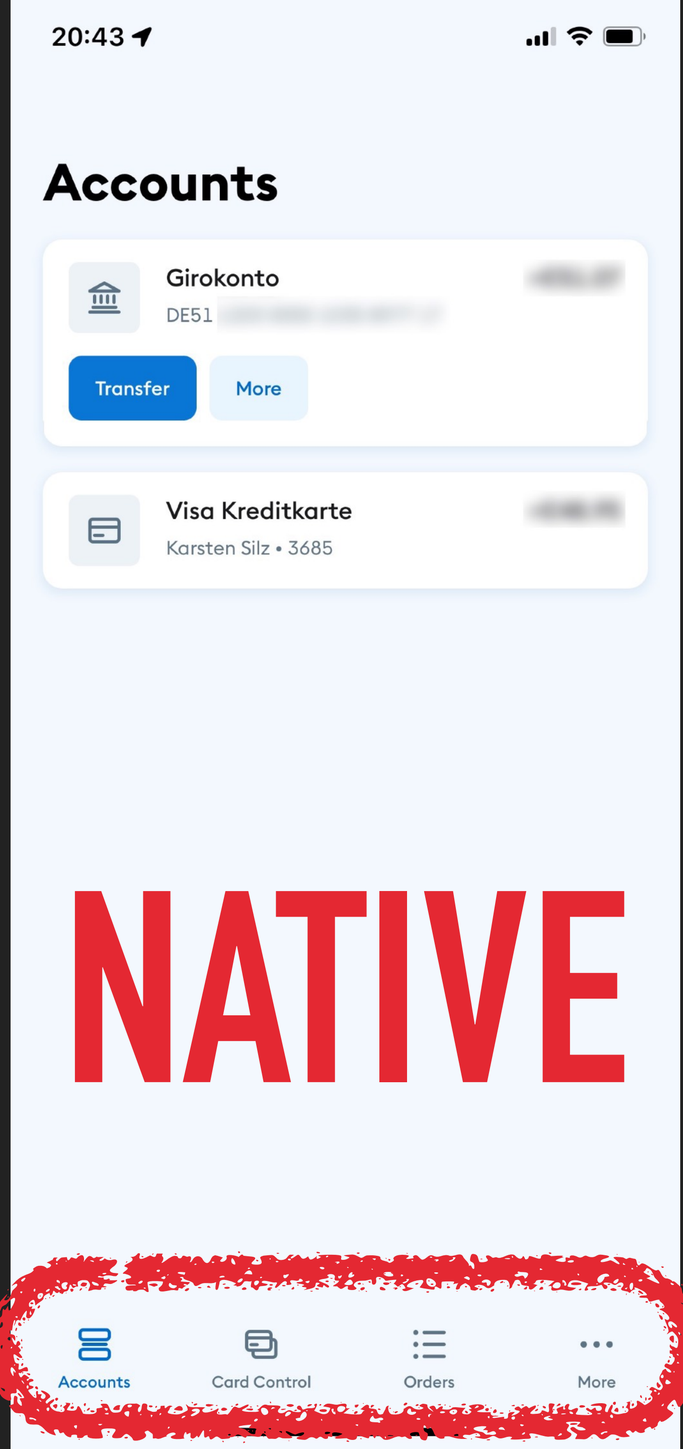
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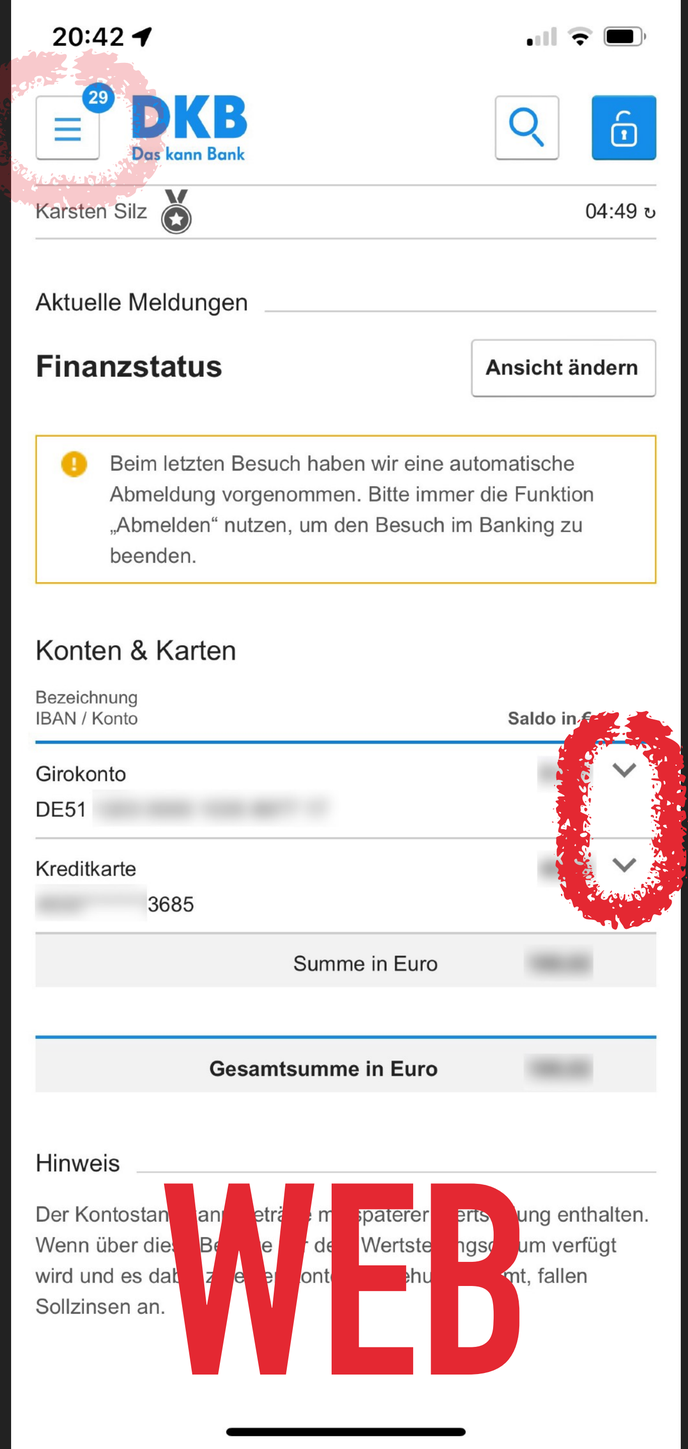
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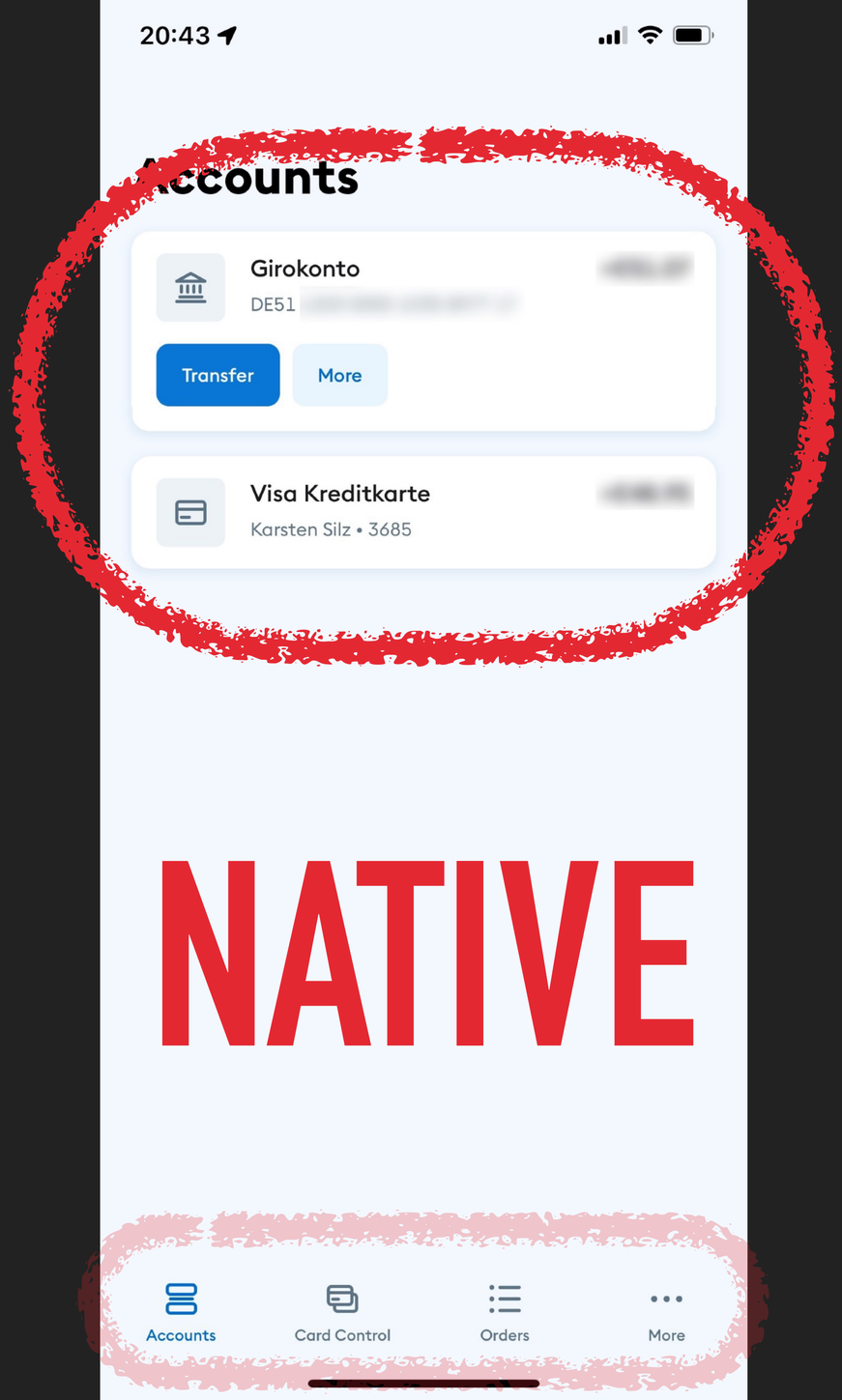
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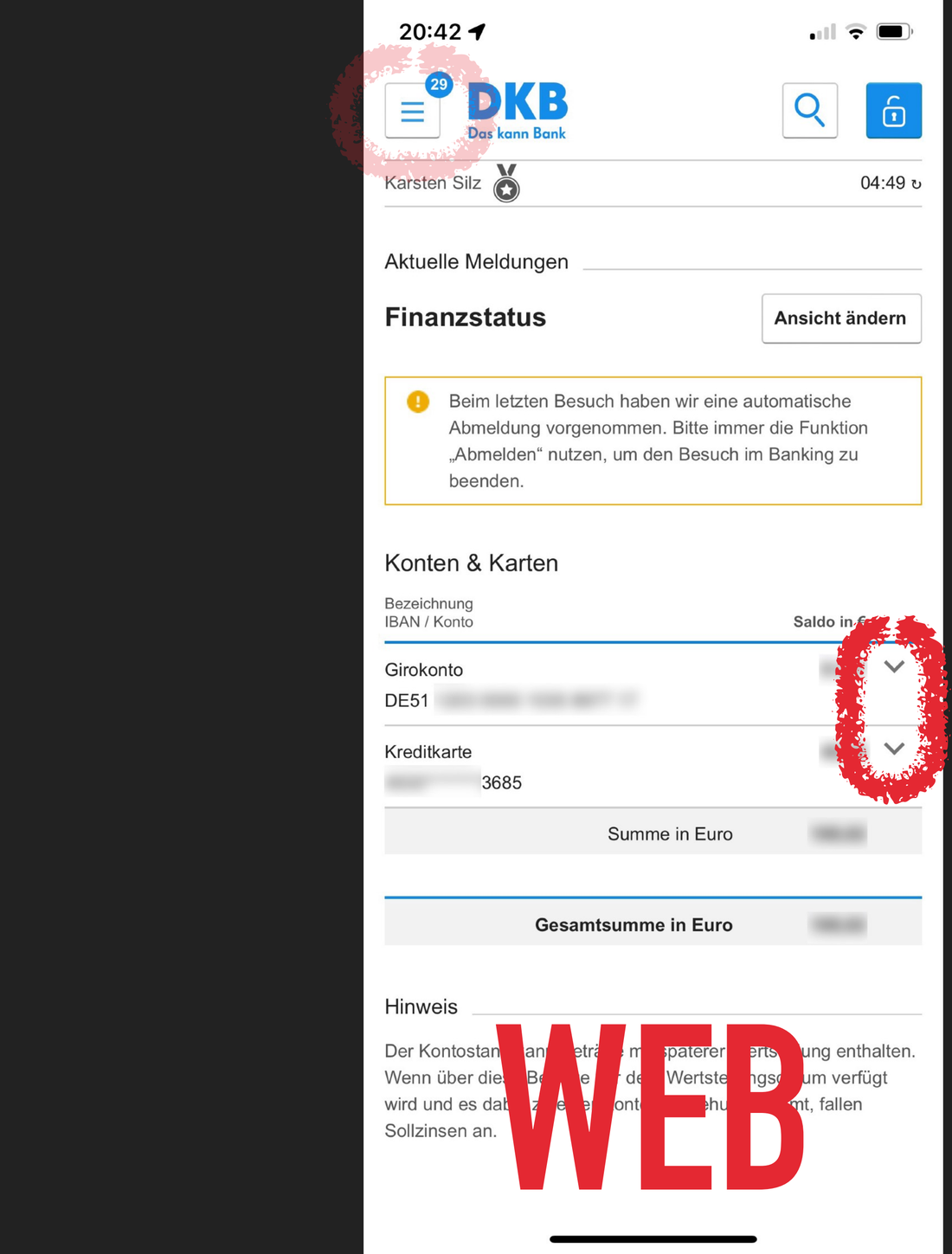
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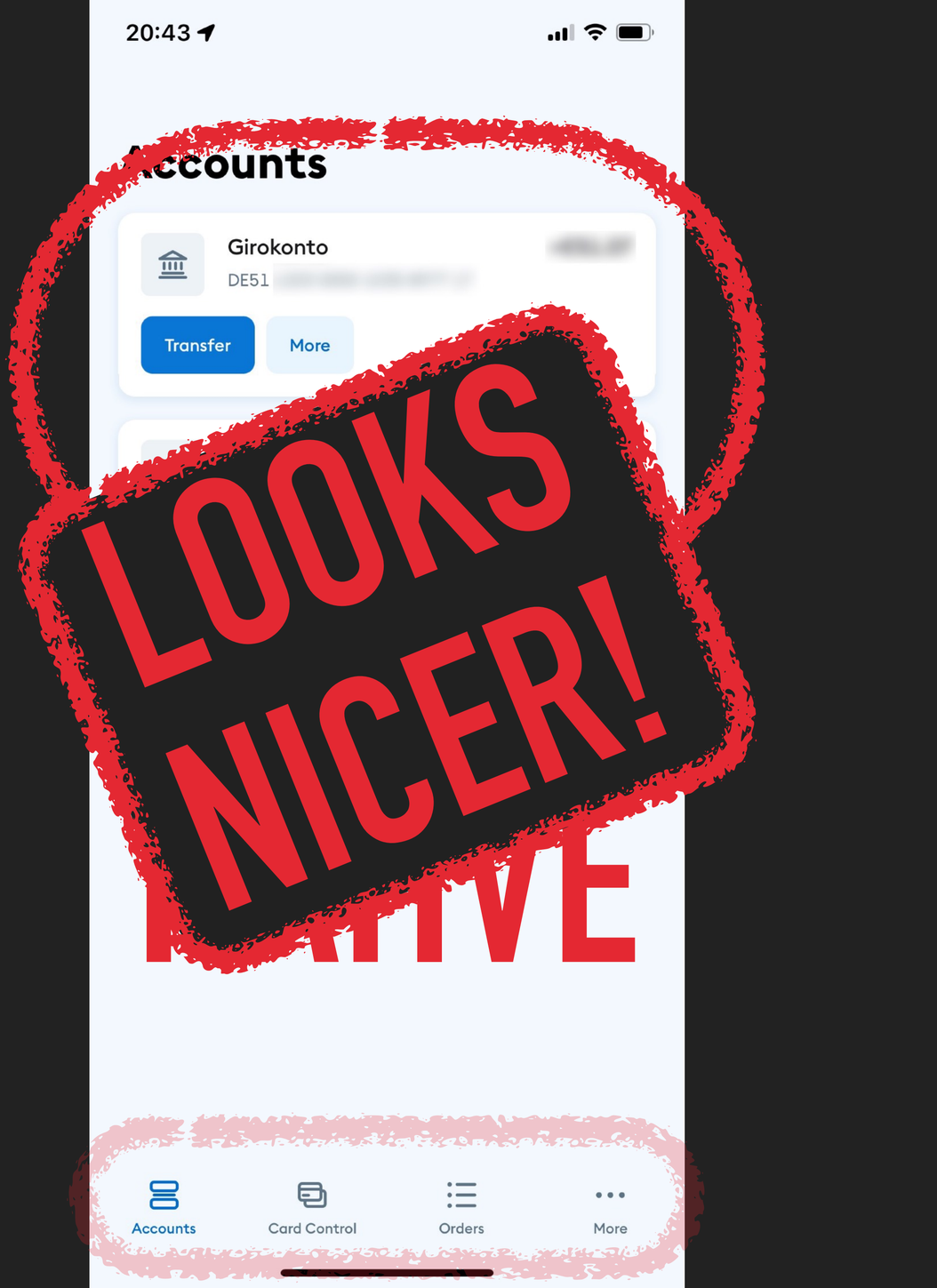
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LOOKS NICER!
NATIVE
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NATIVE LOOK & FEEL:
EASIER TO USE ("LIKE OTHER APPS"), LOOKS NICER

GOOGLE APPS ON IOS:
MATERIAL UI =>
NATIVE IOS UI

"REALLY MAKE PRODUCTS FEEL GREAT ON APPLE PLATFORMS"

JEFF VERKOEYEN, GOOGLE

CROSS-PLATFORM X2:
WEB + NATIVE

PC

HTML, CSS
JAVASCRIPT/TYPESCRIPT

MOBILE

NATIVE CROSS-
PLATFORM

RUNS NATIVELY, IN APP STORES

NATIVE LOOK & FEEL

ACCESS TO NATIVE PLATFORM FEATURES

DEFINE: "NATIVE"

NATIVE CROSS-PLATFORM FRAMEWORKS?

MANY FRAMEWORKS & TOOLS: "1 APP FOR IOS & ANDROID"!

FLUTTER (GOOGLE)

XAMARIN/.NET MAUI (MICROSOFT)

REACT NATIVE (META)

JAVAFX (GLUON)

OPEN-SOURCE & JAVA-LIKE

WHICH FRAMEWORK IS POPULAR?

EASIER TO USE & LEARN

EASIER TO CONVINCE TEAMMATES/BOSSES

ALL ELSE EQUAL: USE MOST POPULAR

VERY UNPOPULAR: DON'T USE IT

WHY POPULARITY?

I MEASURE POPULARITY WITH 6 DATA POINTS

APPLE & GOOGLE APP STORE ANALYSIS (APPFIGURES, SINCE MAY 2022)

EMPLOYER POPULARITY: MENTIONED IN JOB ADS (INDEED IN 62 COUNTRIES, SINCE AUG 2021)

POPULARITY

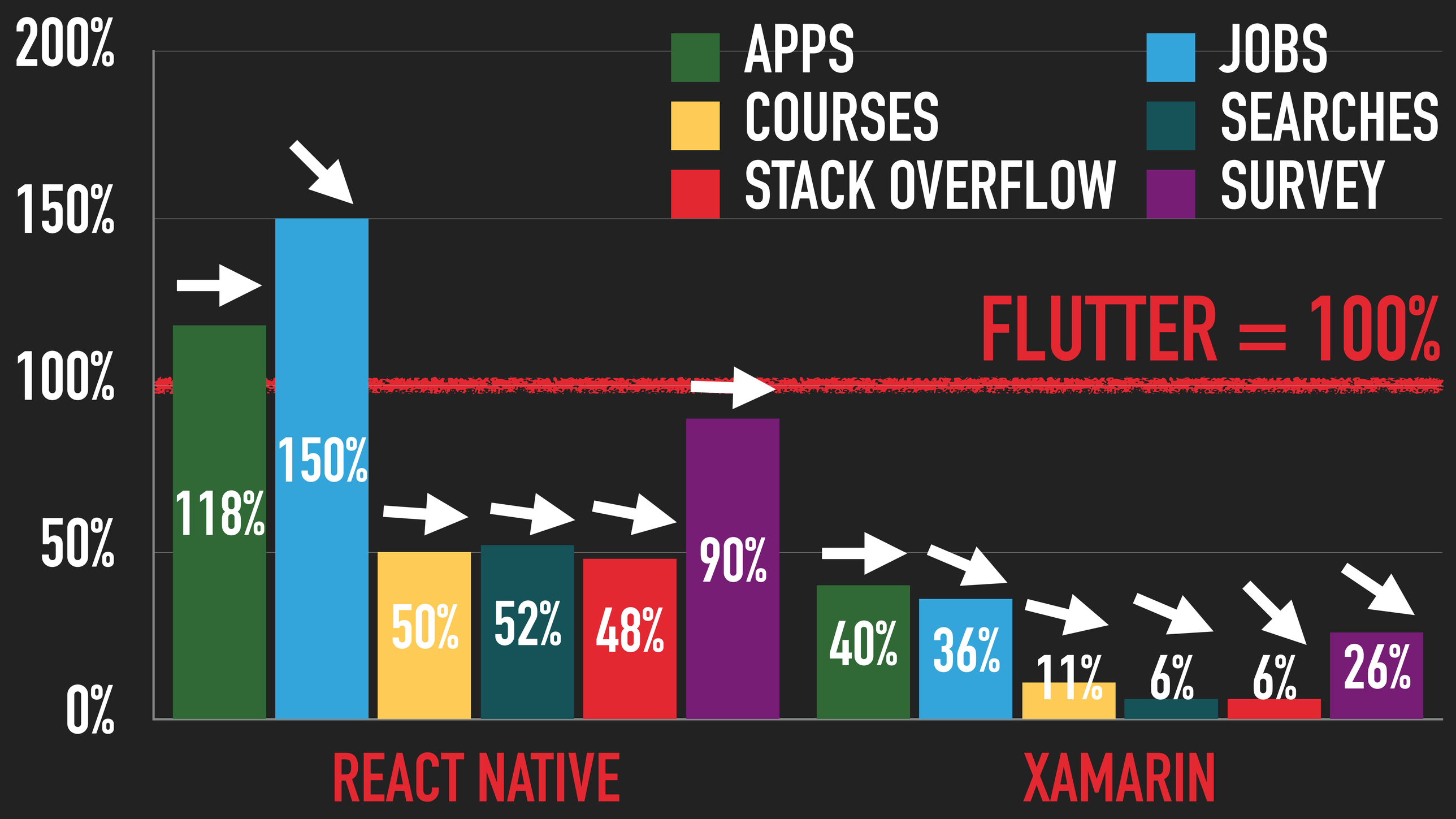
ONLINE TRAINING COURSES BOUGHT (UDEMY, MAR 2021)

GOOGLE SEARCHES

QUESTIONS AT STACK OVERFLOW

DEVELOPER SURVEY (32K RESPONSES, JETBRAINS, JUL 2021)

DEVELOPER POPULARITY


200%
150%
100%
50%
0%
APPS
COURSES
STACK OVERFLOW
JOBS
SEARCHES
SURVEY
FLUTTER = 100%
118%
150%
50%
52%
48%
90%
40%
36%
11%
6%
6%
26%
REACT NATIVE
XAMARIN

EMPLOYER POPULARITY: REACT NATIVE WINS 1.5X, SLIPPING AGAINST FLUTTER

DEVELOPER POPULARITY: FLUTTER WINS UP TO 2X, PULLING AWAY FROM REACT NATIVE

POPULARITY

SAME POPULARITY MEASUREMENTS IN MY NEWSLETTER:

IDE, BUILD TOOLS, JVM LANGUAGES & JAVA FRAMEWORKS, DATABASES, WEB FRAMEWORKS

SECTION SUMMARY

WEB: BIGGEST, MANY DEVS, HARD TO LEARN – REACT, ANGULAR, VUE

NATIVE: RUN/LOOK & FEEL/ACCESS ON MOBILE – FLUTTER (DEVELOPERS), REACT NATIVE (EMPLOYERS), XAMARIN/.NET MAUI, JAVAFX

THAT'S HOW CROSS-PLATFORM FRONT-ENDS!

~~WHY & HOW CROSS-PLATFORM~~

HOW FLUTTER WORKS

MY FLUTTER EXPERIENCES

WHEN TO USE WHICH FRAMEWORK

HOW FLUTTER WORKS

MASCOT DASH

WILL GOOGLE KILL FLUTTER?

Killed by Google

Search

All (274)

August 2023
Service

Google Cloud IoT Core

Turning to ashes in 11 months, Google Cloud IoT Core was a managed service designed to let customers securely connect, manage, and ingest data from globally dispersed devices. It will be over 5 years old.

June 2023
Service

Conversational Actions

Fading into darkness in 8 months, Conversational Actions extended the functionality of Google Assistant by allowing 3rd party developers to create custom experiences, or conversations, for users of Google Assistant. It will be over 6 years old.

March 2023
Service

Google Currents (2019)

Running out of juice in 6 months, Google Currents was a service that provided social media features similar to Google+ for Google Workspace customers. It will be almost 4 years old.

January 2023
Service

Google Stadia

ust in 4 months, Google Stadia was a cloud gaming service combining a WiFi gaming controller and allowed users to stream gameplay through web browsers, TV, mobile apps, and Chromecast. It will be about 3 years old.

December 2022
Service

YouTube Originals

Scheduled to be killed in 3 months, YouTube Originals was a variety of original content including scripted series, educational videos, and music and celebrity programming. It will be over 6 years old.

- IN-HOUSE COMPETITION: ANGULAR, JETPACK COMPOSE
- POPULAR: WINS WITH DEVS, 2ND PLACE IN JOBS
- EXTERNAL COMMITMENT: TOYOTA, UBUNTU

WE DON'T KNOW!

WHICH PLATFORM
STABLE SINCE WHEN?

PC

FEB
2022

MAY
2022

WEB

MAR
2021

MOBILE

DEC
2018

PROGRAMMING LANGUAGE: DART

CAN'T WE USE JAVA?

```
class MyClass extends AnotherClass {
  String firstName = "Karsten";
  int yearsOfJava = 23;
  List<String> myList = List.empty();

  String sayHello(String name) {
    var feedback = "Hello, " + name;
    return feedback;
  }
}
```

THIS IS DART

```
class MyClass extends AnotherClass {
  String firstName = "Karsten";
  int yearsOfJava = 23;
  List<String> myList = new LinkedList<>();

  String sayHello(String name) {
    var feedback = "Hello, " + name;
    return feedback;
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```

THIS IS JAVA

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class MyClass extends AnotherClass {
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    return feedback;
  }
}
```

THIS IS DART

```
class MyClass extends AnotherClass {
  var firstName = "Karsten";
  var yearsOfJava = 23;
  var myList = <String>[];

  sayHello(String name) => "Hello, $name";
}
```

CONCISE DART

```
class MyClass extends AnotherClass {
  String firstName = "Karsten";
  int yearsOfJava = 23;
  List<String> myList = new LinkedList<>();

  String sayHello(String name) {
    var feedback = "Hello, " + name;
    return feedback;
  }
}
```

THIS IS JAVA

ORIGINALLY FOR BROWSER

"SIMPLIFIED JAVA FOR UI DEVELOPMENT"

SOUND NULL SAFETY (LIBRARIES) & ASYNC/AWAIT

1 MAIN THREAD, CREATE THREADS (ISOLATES)

DART

MAJOR RELEASE EVERY 2–3 MONTHS

3–5 MINOR RELEASES IN-BETWEEN

MAJOR FLUTTER RELEASES INCLUDE NEW DART RELEASE

RELEASES

LIBRARIES: PLUGINS

29K PLUGINS, NOT ALL FOR WEB/DESKTOP

MOST ARE OPEN-SOURCE

GOOD "PLUGIN SURVIVAL RATIO"

FORKING PLUGINS IS EASY

PLUGINS

UI ELEMENTS: WIDGETS

```
Column(
  mainAxisAlignment:
    MainAxisAlignment.center,
  children: <Widget>[
    Text('Pushed $_counter times'),
    ElevatedButton(
      onPressed: () ⇒
        setState(() ⇒ _counter++),
      child: Icon(Icons.add),
    )
  ],
)
```

UI AS CODE

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  ],
)
```

UI AS CODE

IOS & MACOS: SWIFT UI (SEP 2019)

ANDROID: JETPACK COMPOSE (JUL 2021)

WINDOWS, MACOS, IOS, ANDROID:
.NET MAUI (AUG 2022)

DECLARATIVE PROGRAMMING

UI AS CODE – NO GRAPHICAL UI BUILDER, NO CSS

CONFIGURE BUILT-IN WIDGETS, CREATE YOUR OWN

EMULATED – NO NATIVE SDK UI ELEMENTS:
"FLUTTER PAINTS PIXELS"

WIDGETS

LOOK & FEEL:
WIDGET SETS

BASE: CONTAINER, ROW, COLUMN, TEXT, IMAGES, SHAPES, . . .

BUILT-IN LOOK & FEEL: MATERIAL DESIGN, IOS

3RD-PARTY LOOK & FEEL: MACOS, WINDOWS, LINUX

WIDGETS SETS

SAMPLE FLUTTER APP: 5 NATIVE LOOK & FEEL WITH 1 CODEBASE

LIVE DEMO
SAMPLE FLUTTER APP

5 NATIVE LOOK & FEEL

SWITCH LOOK & FEEL

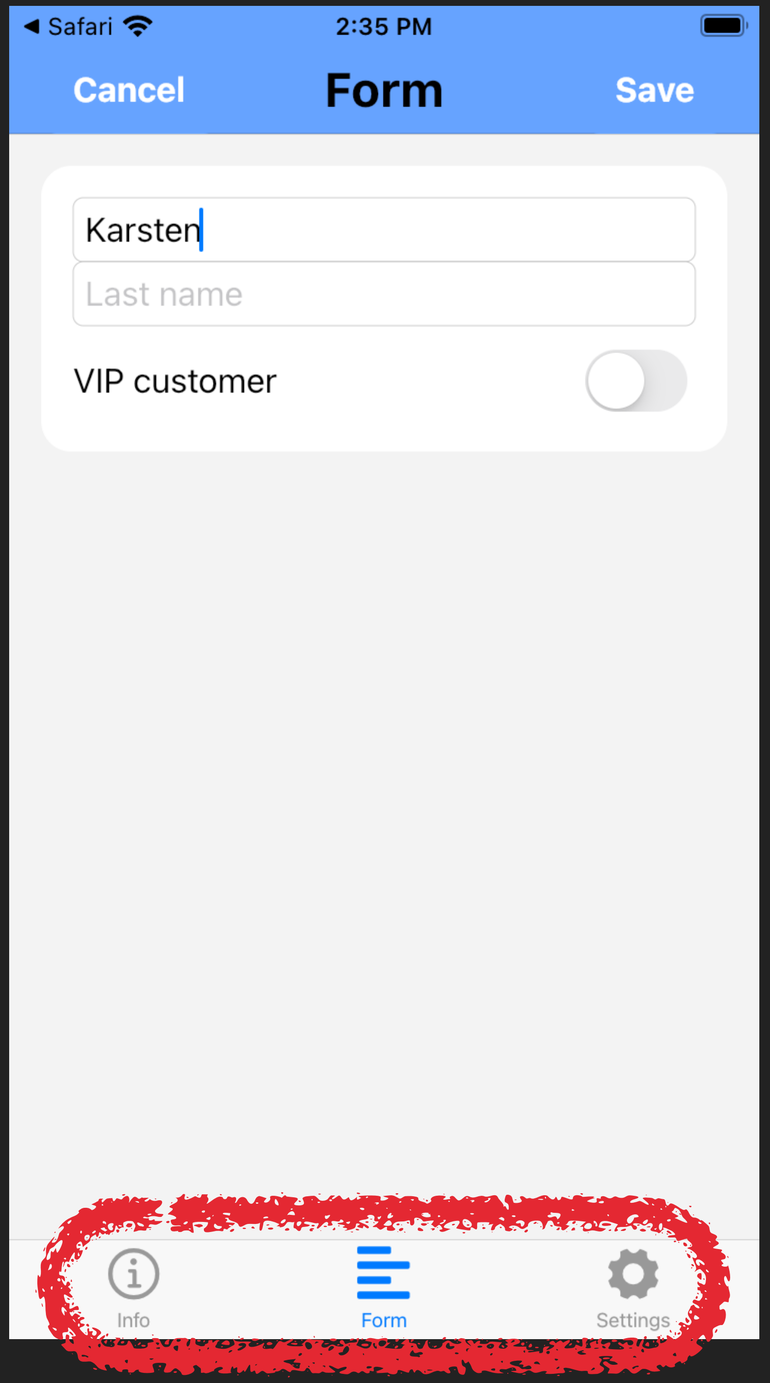
SAMPLE APP ON GITHUB

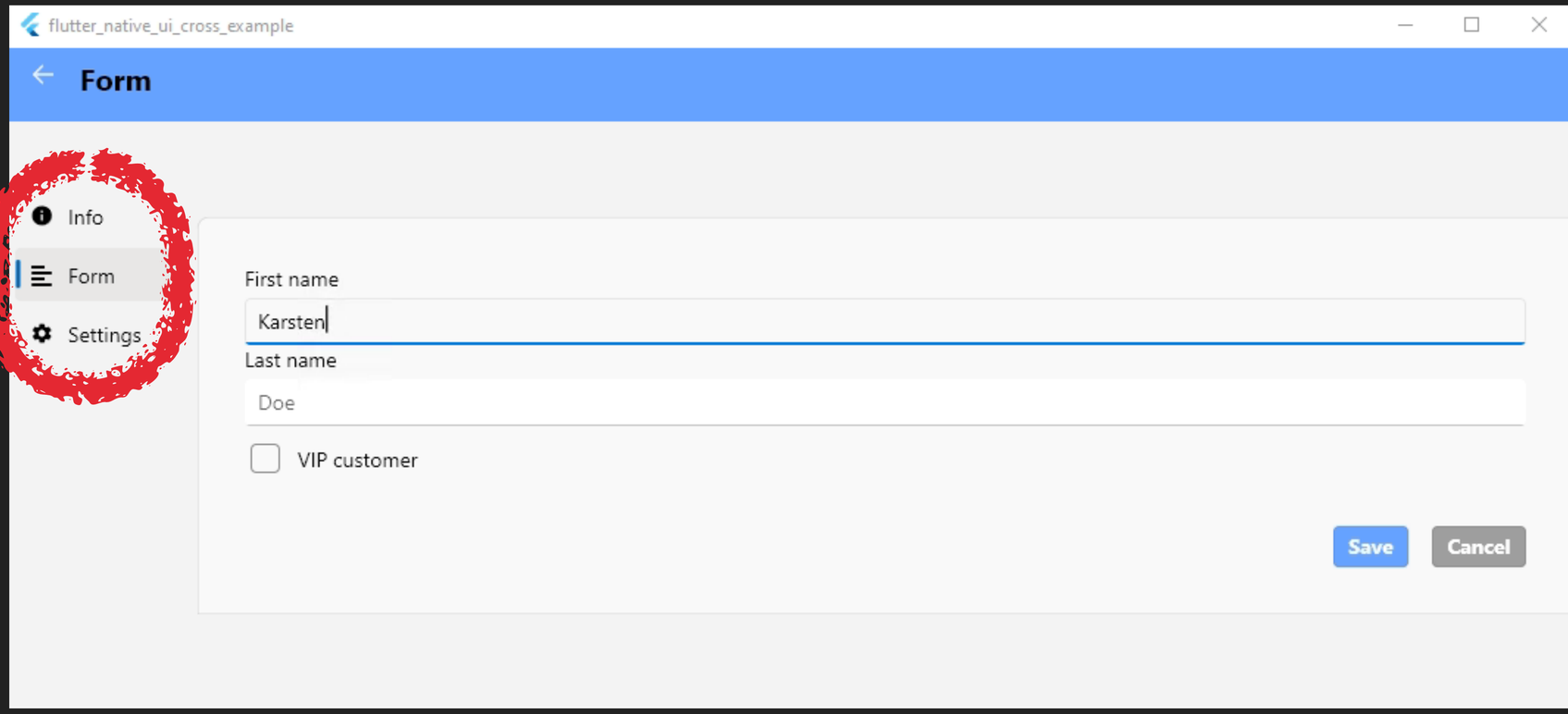
CREATED MY OWN WIDGETS

WIDGETS HAVE SWITCH STATEMENT =>
CREATES WIDGET FOR CURRENT PLATFORM

HOW DOES SWITCH WORK?

1 CODEBASE != 1 UI


Safari
2:35 PM
Cancel
Form
Save
Karsten
Last name
VIP customer
Info
Form
Settings


flutter_native_ui_cross_example
Form
Info
Form
Settings
First name
Karsten
Last name
Doe
VIP customer
Save
Cancel

GLOBAL STATE MANAGEMENT: "PROVIDER"

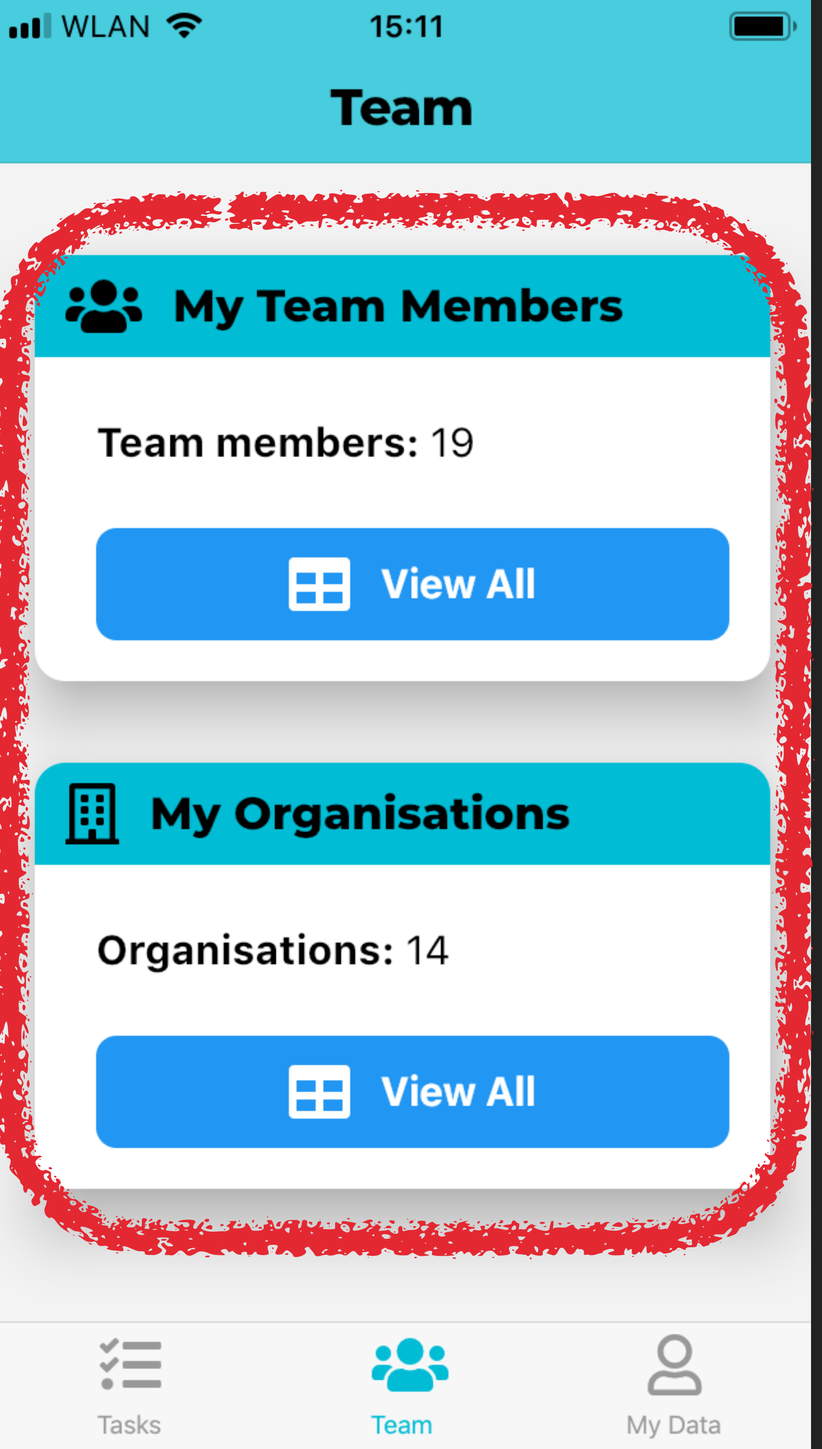
WIDGET SET: MATERIAL/NATIVE/CUSTOM

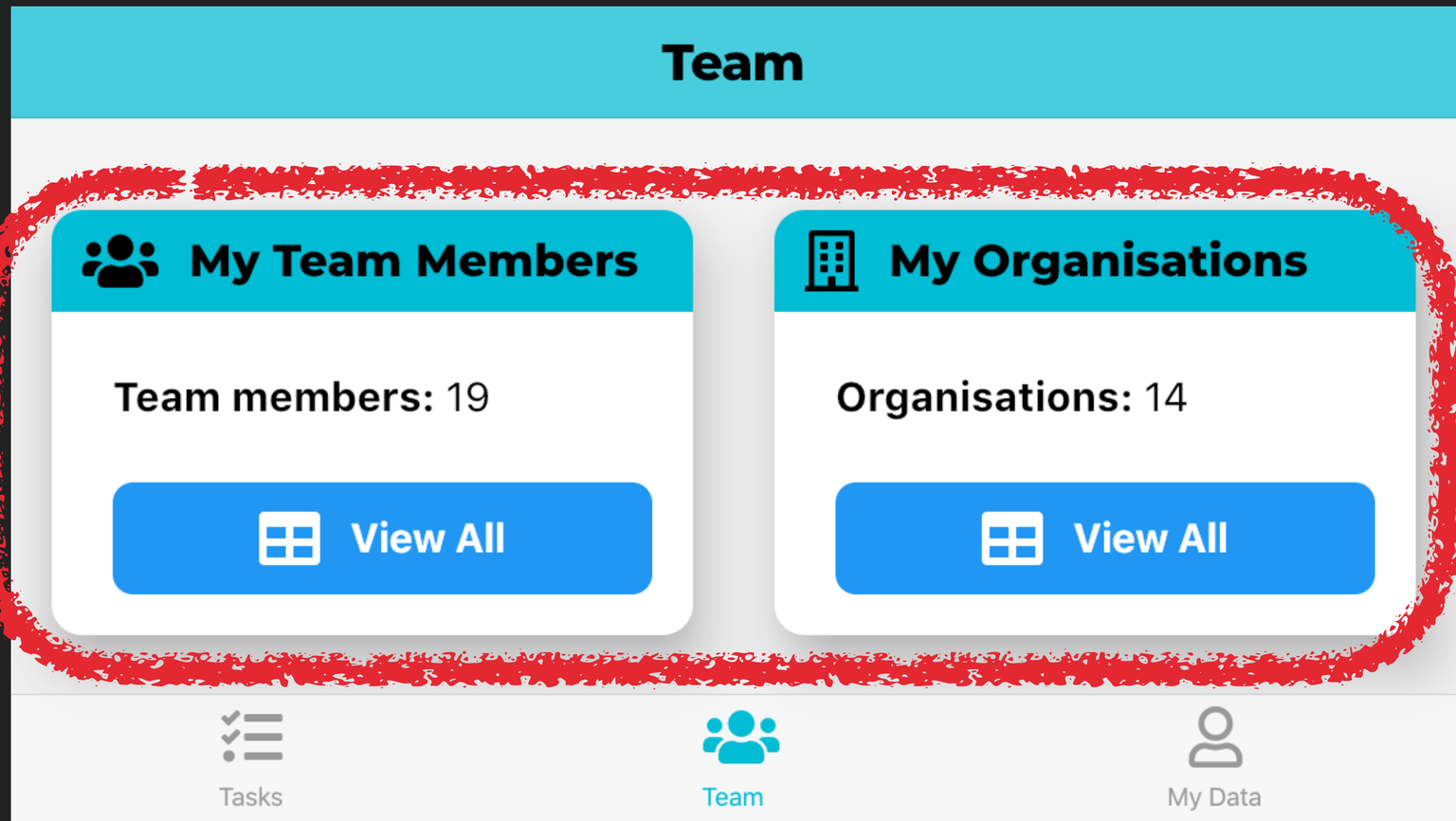
RESPONSIVE LAYOUT: ADAPT TO SCREEN SIZES
& ORIENTATION: NO DEFAULT, 3RD PARTY PLUGIN

ARCHITECTURAL CHOICES

SIZE DIFFERENCES

ORIENTATION CHANGES





NATIVE INTEGRATION

PUT SOME FLUTTER SCREENS INTO NATIVE APPS

IOS/ANDROID: STABLE

WEB/DESKTOP: UNDER CONSTRUCTION?

FLUTTER IN NATIVE APPS

PLUGINS: CAMERA, PICTURES, LOCATION, . . .

MOBILE: SHOW NATIVE SCREENS + WEB VIEWS

MOBILE: CHANNELS (PUBLISH & SUBSCRIBE) TO NATIVE CODE & C-API

NATIVE CODE IN FLUTTER

RUN NATIVELY

ANDROID: ANDROID STUDIO, IOS/MACOS: MACOS + XCODE,
WINDOWS: WINDOWS + VISUAL STUDIO

FLUTTER ENGINE: JAVASCRIPT + C++ (WEB), C++ (ELSE)

FLUTTER APP: NATIVE ARM LIBRARY (MOBILE), JAVASCRIPT
(WEB), C++ (WINDOWS, LINUX), OBJECTIVE-C (MACOS)

PLATFORM TOOL CHAINS

CODE, BUILD & DEPLOY

"EXCELLENT DEVELOPER EXPERIENCE"

IDE: INTELLIJ/ANDROID STUDIO & VISUAL STUDIO CODE

DEV TOOLS: INSPECTOR, PROFILER FOR MEMORY, CPU & NETWORK, "JANK" DIAGNOSIS, WORK IN TERMINAL

CODE

MONOREPO: CODE FOR ALL PLATFORMS IN 1 GIT PROJECT

1 FOLDER FOR DART, 1 FOLDER PER PLATFORM (SOME PROJECTS – XCODE, ANDROID STUDIO)

PLATFORM: NATIVE SHELLS (`APPDELEGATE.SWIFT`, `MAINACTIVITY.KT`)

PROJECT STRUCTURE

SLOW IOS/ANDROID BUILDS

DART VM DURING DEVELOPMENT

HOT RESTART: APP STARTS OVER IN 3 SECONDS

HOT RELOAD: 1 SECOND FROM "SAVED" TO "RUNNING"

FAST BUILD & DEPLOY

FLUTTER
PLATFORM CHECK

- "2 APPS FOR PRICE OF 1"
- NATIVE LOOK & FEEL
- ACCESS TO NATIVE OS LIBRARIES
- FAST BUILD & DEPLOY

MOBILE: 👍🏻

- ONLY MATERIAL UI
- NO ACCESS TO PLATFORM LIBRARIES (JAVASCRIPT)
- TINY AMOUNT OF LIBRARIES VS. JAVASCRIPT

WEB: 👎

- ⊖ WHY NOT WEB?
- ○ WINDOWS STABLE, MAC & LINUX JUST GOT STABLE
- ⊕ ACCESS TO NATIVE OS LIBRARIES
- ○ WINDOWS & MACOS UI: INCOMPLETE, MAINTAINED?

DESKTOP: 👎

SECTION SUMMARY

DART

PLUGINS

WIDGETS

WIDGETS SETS

NATIVE ACCESS

RUNS NATIVELY

CODE, BUILD & DEPLOY

PLATFORM CHECK

THAT'S HOW FLUTTER WORKS

~~WHY & HOW~~ CROSS-PLATFORM

~~HOW FLUTTER~~ WORKS

MY FLUTTER EXPERIENCES

WHEN TO USE WHICH FRAMEWORK

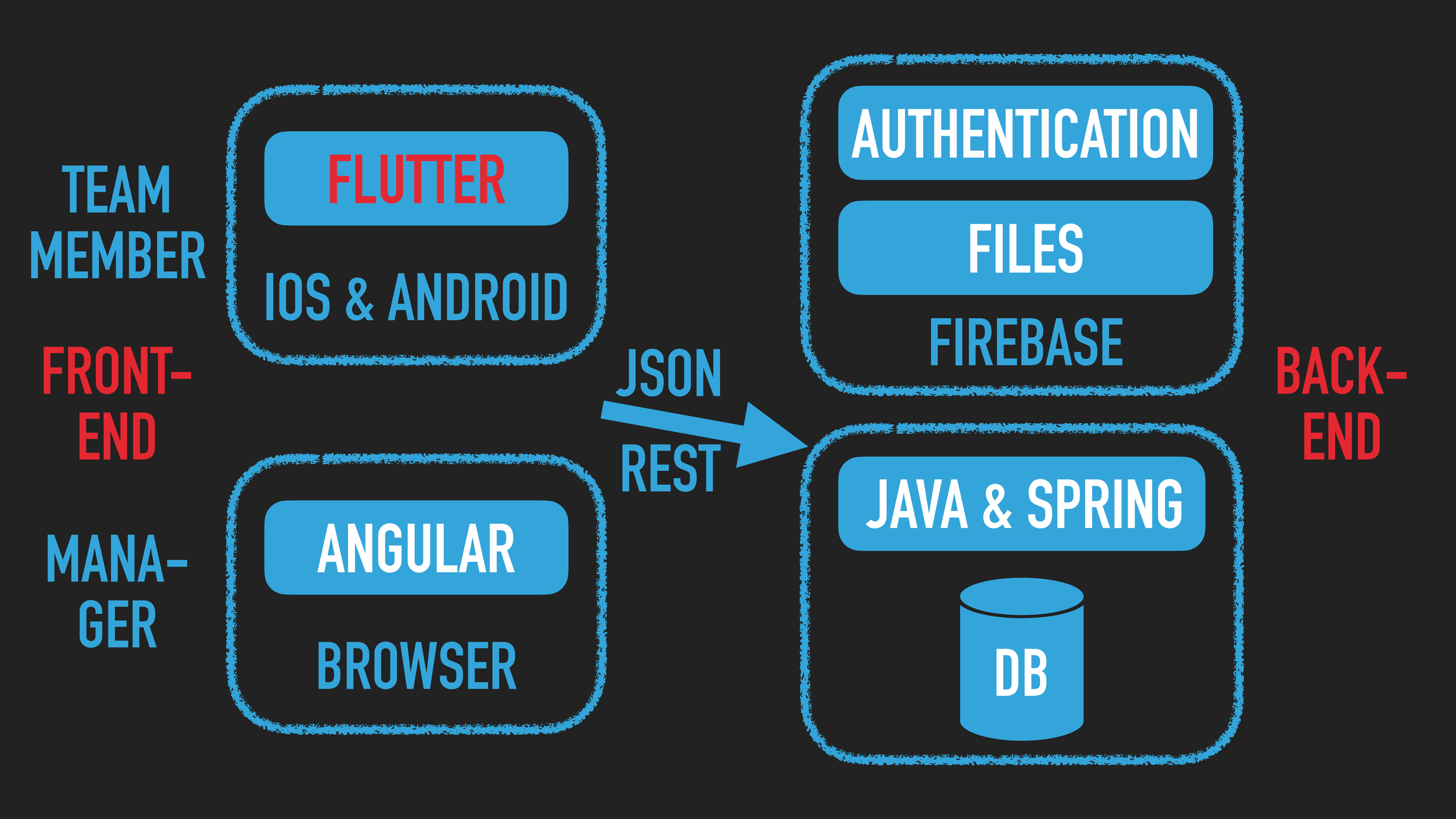
MY FLUTTER EXPERIENCES

B2B SAAS FOR UK COMPANIES
THAT EMPLOY CAT-SITTERS

REMOVE FRICTION & SAVE TIME

I WROTE THE CODE

MY TINY START-UP


TEAM MEMBER
FRONT-END
MANA-GER
FLUTTER
IOS & ANDROID
ANGULAR
BROWSER
JSON
REST
AUTHENTICATION
FILES
FIREBASE
JAVA & SPRING
DB
BACK-END

UNLIMITED STORAGE, PUSH NOTIFICATIONS

AS FAST & EASY TO USE AS POSSIBLE => NATIVE UI

PRODUCTIVITY: DART + FAST CODE, BUILD & DEPLOY

FLUTTER BUSINESS CASE

FLUTTER 👍

NATIVE 👍

FIREBASE 👍

POWER

1 SOURCE

CONSISTENT

BASICS

MORE ON TALK PAGE

MY FLUTTER EXPERIENCES

~~WHY & HOW~~ CROSS-PLATFORM

~~HOW FLUTTER~~ WORKS

~~MY FLUTTER EXPERIENCES~~

WHEN TO USE WHICH FRAMEWORK

WHEN TO USE WHICH MOBILE NATIVE CROSS-PLATFORM FRAMEWORK?

FLUTTER VS. WORLD

JAVASCRIPT	DART
SLOWER	FASTER
NATIVE UI ELEMENTS	EMULATED UI ELEMENTS
SEPARATE PROJECTS	MONOREPO
DESKTOP: UNOFFICIAL	DESKTOP: OFFICIAL

REACT NATIVE VS. FLUTTER

JOB AD MENTIONS UK: 10X

COURSES BOUGHT: 12X

GOOGLE SEARCHES: 24X

STACK OVERFLOW QUESTIONS: 34X

POPULAR: FLUTTER VS. JAVAFX

JAVA

UI BUILDER

NO NATIVE L&F

LIMITED FEATURES

WEB IMMATURE

DART

UI AS CODE

NATIVE L&F

FULL FEATURES

DESKTOP IMMATURE

JAVAFX VS. FLUTTER

WHEN TO USE WHICH MOBILE NATIVE CROSS-PLATFORM FRAMEWORK?

WEB: REACT NATIVE

.NET: .NET MAUI

JAVA + LEGACY JAVA LIBRARY: JAVAFX

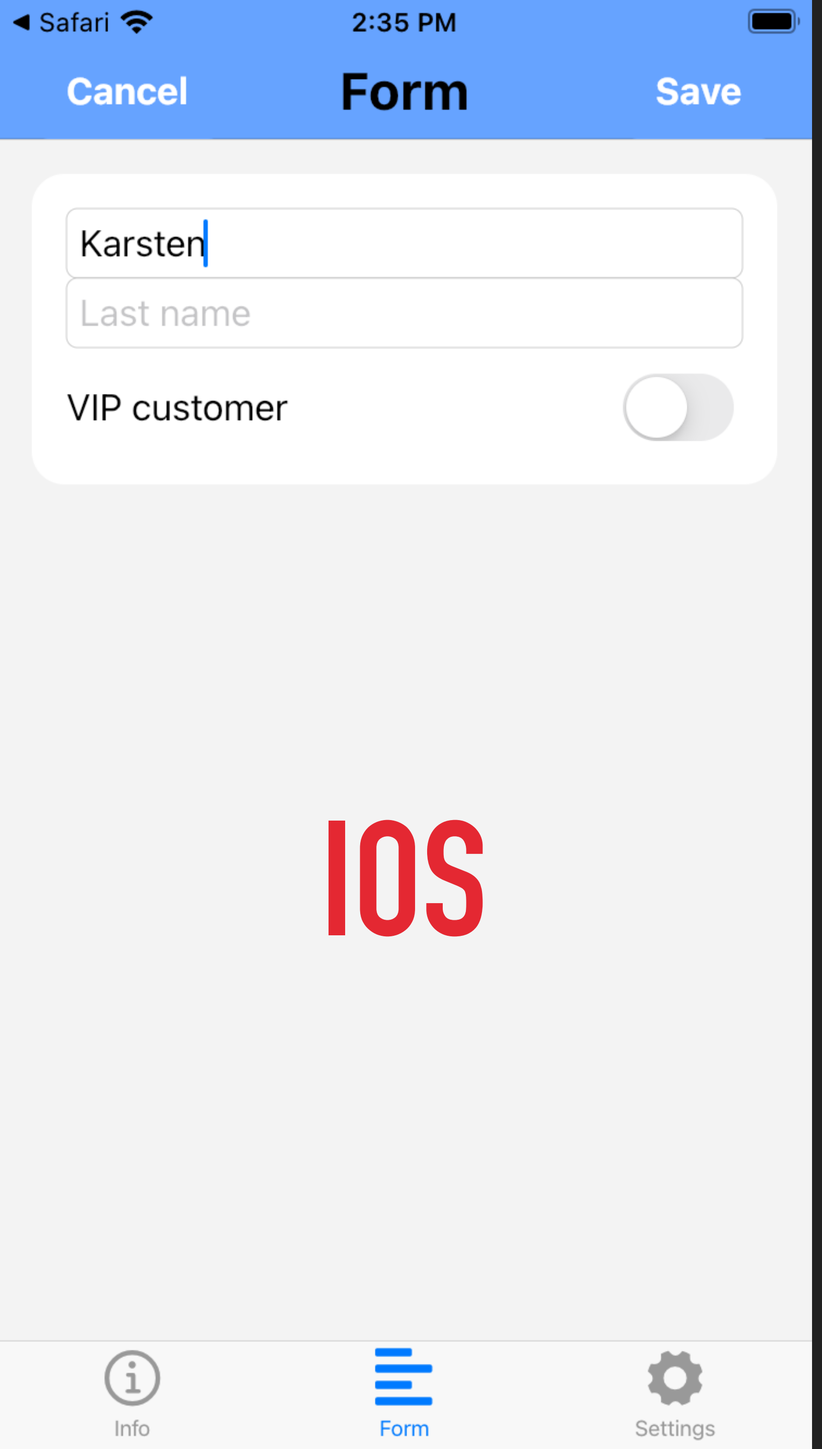
OTHERWISE: FLUTTER

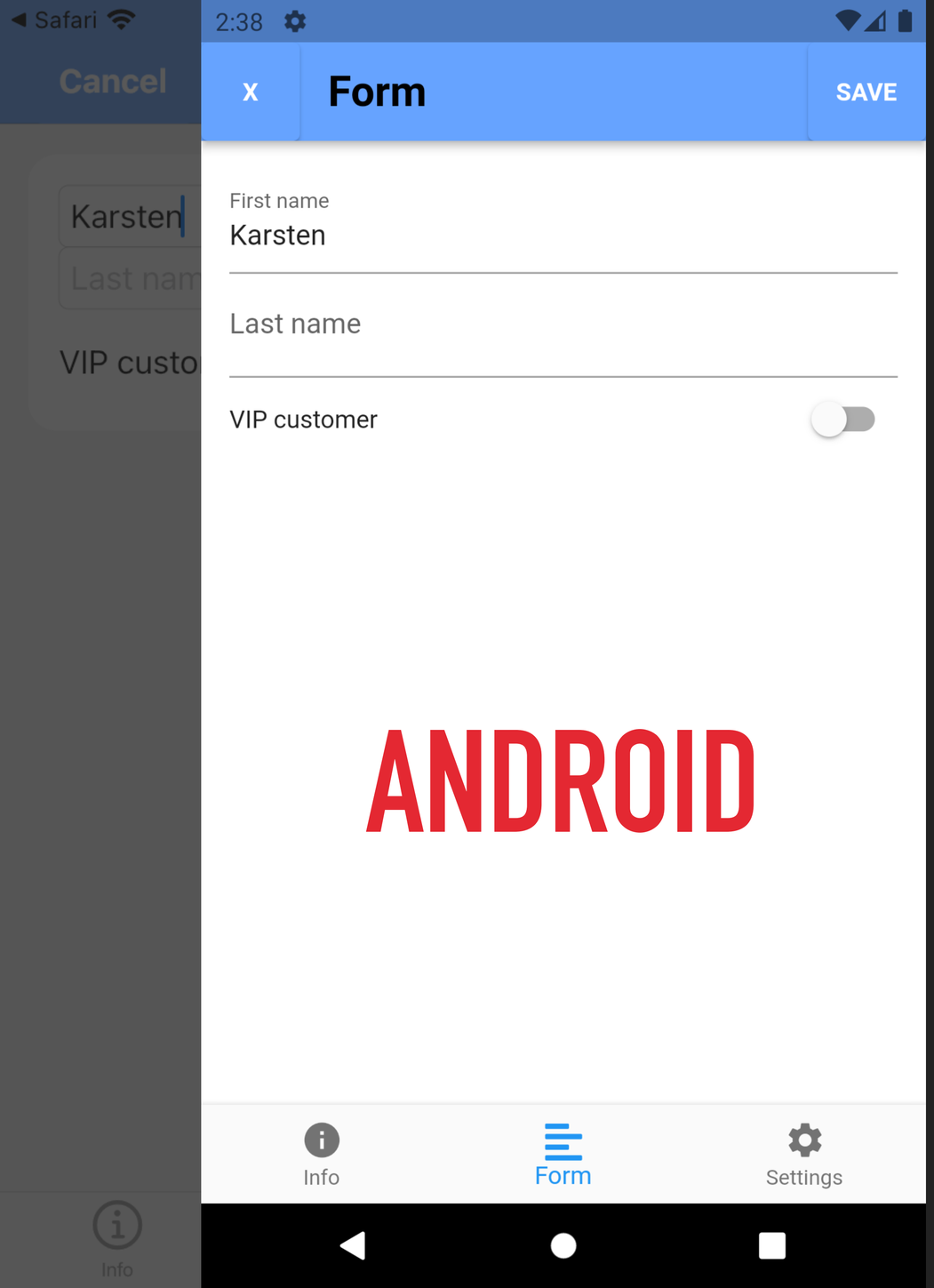
DEVELOPER EXPERIENCE

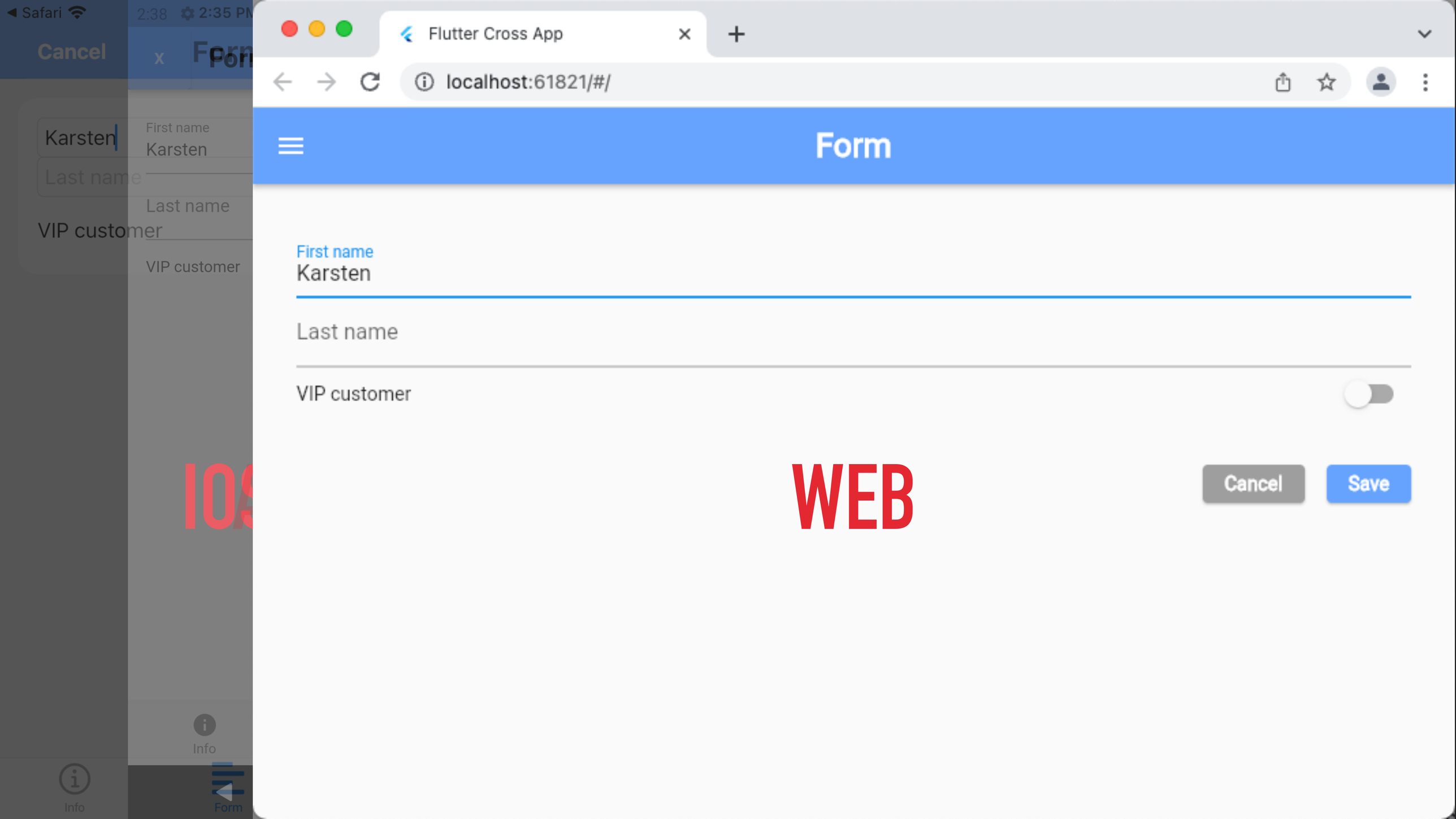
BACK TO THE BIG QUESTION

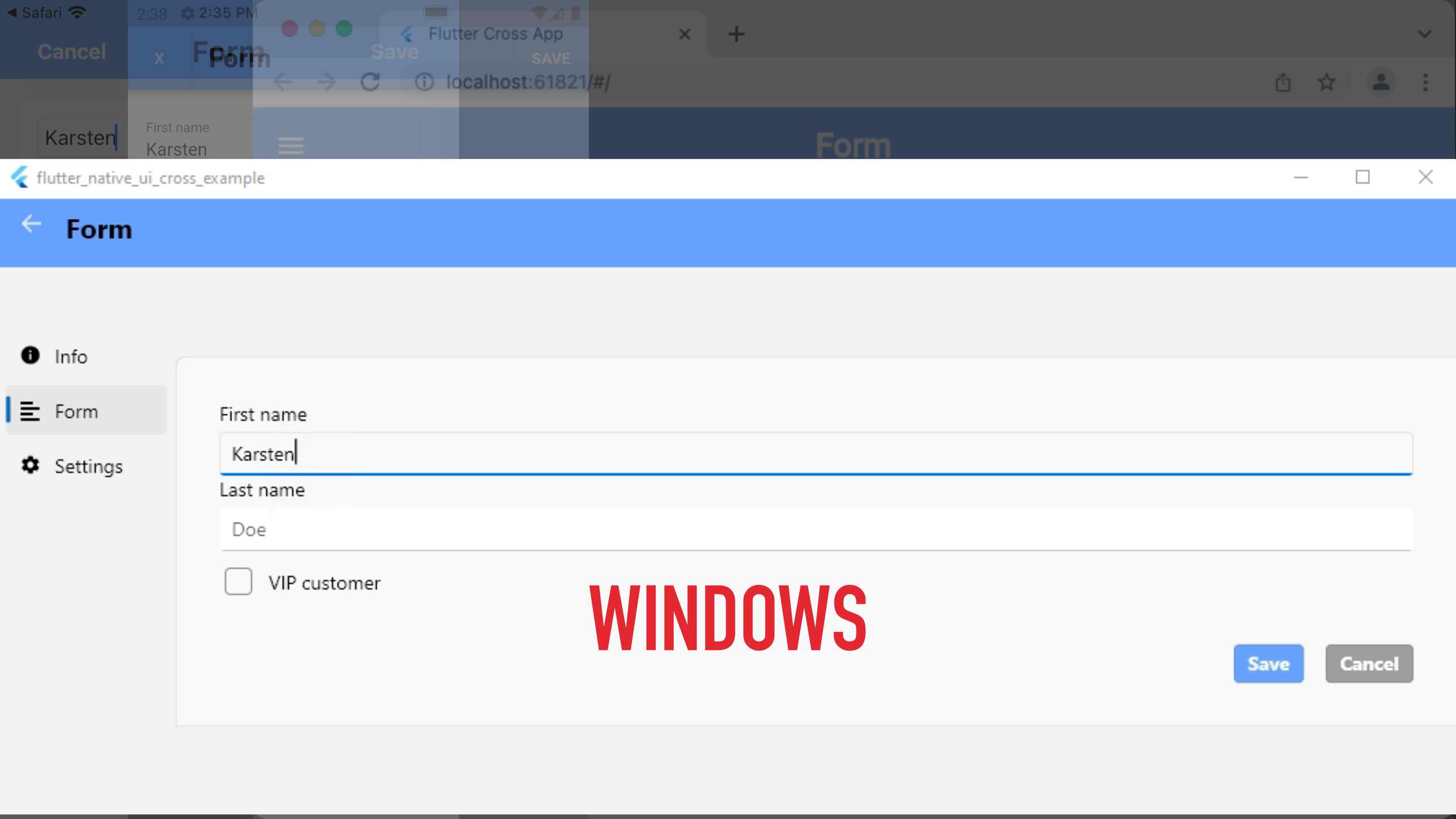
BUILD MOBILE, WEB & DESKTOP FRONTENDS WITH FLUTTER & 1 CODEBASE?

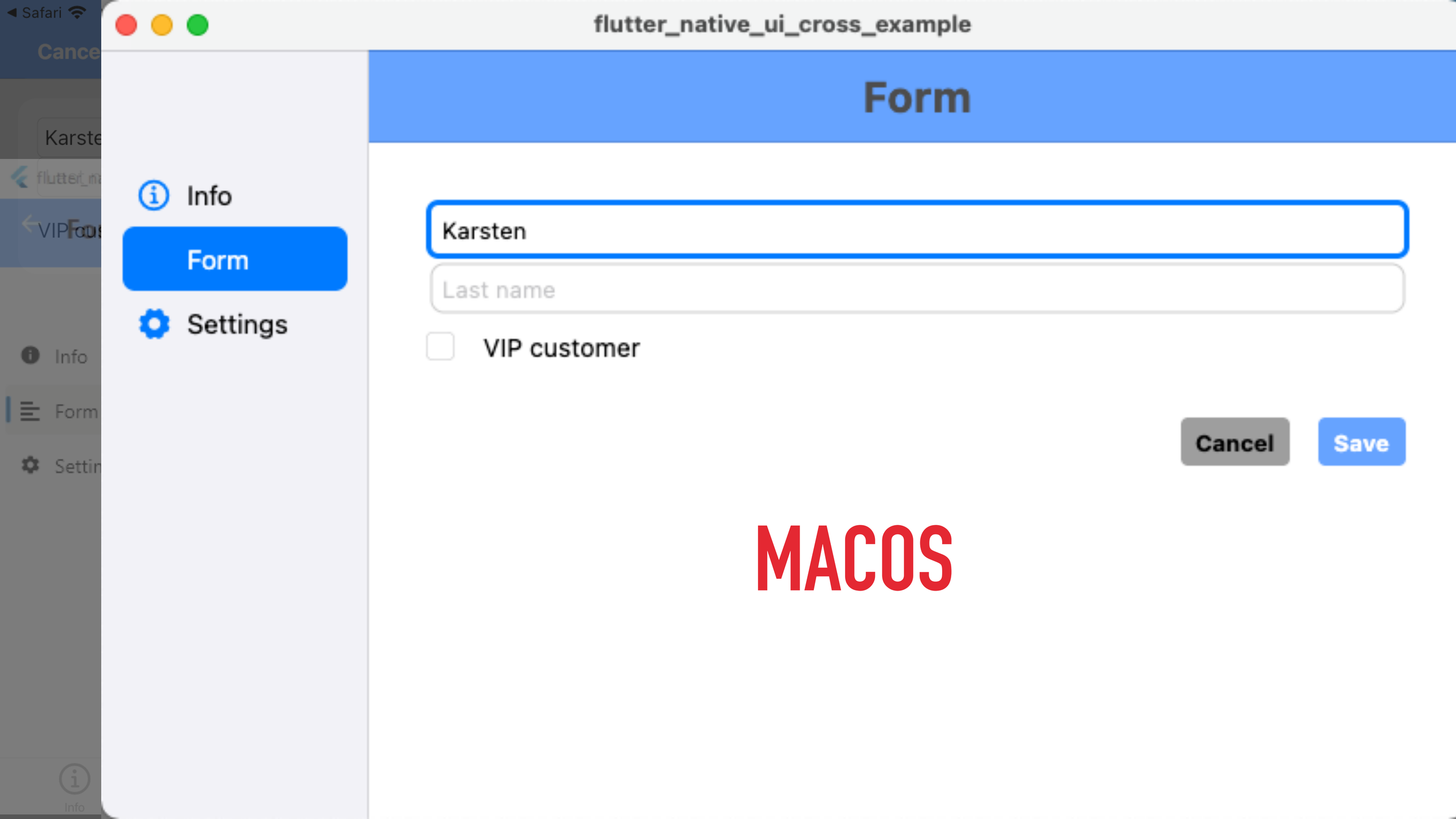
YES, WE CAN


Safari
2:35 PM
Cancel
Form
Save
Karsten
Last name
VIP customer
IOS
Info
Form
Settings


Safari
Cancel
Karsten
Last nam
VIP custo
Info
2:38
X
Form
SAVE
First name
Karsten
Last name
VIP customer
ANDROID
Info
Form
Settings


Safari
2:38
2:35 PM
Cancel
Form
Karsten
Last name
VIP customer
First name
Karsten
Last name
VIP customer
Info
Info
Form
IOS
Flutter Cross App
localhost:61821/#/
Form
First name
Karsten
Last name
VIP customer
WEB
Cancel
Save


Safari
2:38
2:35 PM
Cancel
Form
Save
Karsten
First name
Karsten
Flutter Cross App
SAVE
localhost:61821/#/
Form
flutter_native_ui_cross_example
Form
Info
Form
Settings
First name
Karsten
Last name
Doe
VIP customer
WINDOWS
Save
Cancel


flutter_native_ui_cross_example
Info
Form
Settings
Form
Karsten
Last name
VIP customer
Cancel
Save
MACOS

BUT WE SHOULDN'T

MOBILE: 👍🏻

WEB: 👎🏻

DESKTOP: 👎🏻

JSF: 👎

JAVAFX: 👎

WHEN TO USE WHICH NATIVE CROSS-PLATFORM FRAMEWORK?

WHY & HOW CROSS-PLATFORM

HOW FLUTTER WORKS

MY FLUTTER EXPERIENCES

WHEN TO USE WHICH FRAMEWORK

The End

MY TALK DOESN'T STOP WHEN I STOP TALKING!™

SLIDES & VIDEOS

ADDITIONAL INFORMATION

NATIVE UI SAMPLE APP

GET STARTED WITH FLUTTER

FEEDBACK & NEWSLETTER

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IMAGE SOURCES