GOOGLE’S FLUTTER: MOBILE, WEB & DESKTOP FRONTENDS WITH 1 CODEBASE?
BUILD MOBILE, WEB & DESKTOP FRONTENDS WITH FLUTTER & 1 CODEBASE?
YES, WE CAN
I’LL SHOW YOU
BUT WE GENERALLY SHOULDN’T
I’LL TELL YOU WHY
FLUTTER ON MOBILE:
I’LL ALSO TELL YOU WHY
WHY CROSS-PLATFORM?

HOW CROSS-PLATFORM?

HOW FLUTTER WORKS

MY FLUTTER EXPERIENCES
WHY AM I HERE?
FLUTTER APP IN APP STORES
INFOQ JAVA EDITOR, PC QCON LONDON
JAVA DEVELOPER FOR 23 YEARS
USE JAVA, ANGULAR & FLUTTER – NOT ASSOCIATED
I GIVE YOU OPTIONS...
...BUT YOU DECIDE!
WHY CROSS-PLATFORM

HOW CROSS-PLATFORM WORKS

MY FLUTTER EXPERIENCES
WHY CROSS-PLATFORM FRONT-ENDS?
Users are multi-platform
TOO EXPENSIVE!
PLATFORM SDK FRONT-ENDS: TOO EXPENSIVE
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 CROSS-PLATFORM

HOW CROSS-PLATFORM

HOW FLUTTER WORKS

MY FLUTTER EXPERIENCES
HOW CROSS-PLATFORM FRONT-ENDS?
BIGGEST SOFTWARE ECOSYSTEM EVER

MANY & CHEAP DEVELOPERS

REACT, ANGULAR, VUE

HARD TO LEARN

WEB
MISSING ON IOS: PUSH NOTIFICATIONS, BACKGROUND SYNC

RESTRICTED: LOCAL STORAGE, NOT ALL NATIVE FEATURES

OFTEN SLOWER & LESS COMFORTABLE

DOESN'T HAVE "PREMIUM FEEL" OF NATIVE APP

ISSUES: WEB ON MOBILE
WHY NATIVE LOOK & FEEL?
NON-NATIVE LOOK & FEEL: SOME USERS CONFUSED, SOME COMPLAIN
GOOGLE APPS ON IOS:
MATERIAL UI =>
NATIVE IOS UI
"REALLY MAKE PRODUCTS FEEL GREAT ON APPLE PLATFORMS"

JEFF VERKOEYEN, GOOGLE
CROSS-PLATFORM X 2: WEB + NATIVE
PC

HTML, CSS
JavaScript/Typescript

MOBILE

NATIVE CROSS-PLATFORM
ADDING MOBILE APP TO EXISTING WEB APP...
OFTEN HAS NO BUSINESS CASE – UNLESS HARD RESTRICTION
DEFINE: "NATIVE"
RUNS NATIVELY, IN APP STORES

NATIVE LOOK & FEEL

ACCESS TO NATIVE PLATFORM FEATURES

NATIVE X 3
NATIVE CROSS-PLATFORM FRAMEWORKS?
<table>
<thead>
<tr>
<th>Developer Tools</th>
<th>Company</th>
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<td>Flutter</td>
<td>Google</td>
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<td>React Native</td>
<td>Meta</td>
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<td>Gluon</td>
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Open-source & Java-like
DECLARATIVE UI MODEL
STANDARD FLUTTER APP (MODIFIED)
Flutter Demo Home Page

Pushed 0 times

+
int _counter = 0;

Column(
  mainAxisAlignment: MainAxisAlignment.center,
  children: 
    Text('Pushed $_counter times'),
    ElevatedButton(
      onPressed: () =>
        setState(() => _counter++),
      child: Icon(Icons.add),
    ),
),
int _counter = 0;

Column(
    mainAxisAlignment: MainAxisAlignment.center,
    children: <Widget>[Text('Pushed $_counter times'),
    ElevatedButton(onPressed: ()
    {setState(() => _counter++),
        child: Icon(Icons.add),
    }]
    ),
)
int _counter = 0;
[...]
Column(
  mainAxisAlignment: MainAxisAlignment.center,
  children: <Widget>[Text('Pushed ${_counter} times'),
    ElevatedButton(
      onPressed: () => setState(() => _counter++),
      child: Icon(Icons.add),
    ),
  ],
)
int _counter = 0;

Column(
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        ),
    ],
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FRAMEWORK UPDATES UI
UI AS CODE

STATUS & EVENTS

FRAMEWORK UPDATES UI

DECLARATIVE MODEL
XAMARIN – OLD: OLD .NET, C#, UI WITH PLATFORM SDKS

.NET MAUI – NEW: NEW .NET, C#, UI IN MAUI
WHICH FRAMEWORK IS POPULAR?
WHY POPULARITY?

EASIER TO USE

EASIER TO CONVINCE TEAMMATES/BOSSES

ALL ELSE EQUAL: USE MOST POPULAR

VERY UNPOPULAR: DON’T USE IT

WHY POPULARITY?
I MEASURE TECHNOLOGY POPULARITY
TALK PAGE: GOOGLE SEARCHES & QUESTIONS @ STACK OVERFLOW
JOB MARKET - DEMAND & SUPPLY?
TEAMMATES & BOSSES LOOK THERE!
DEVELOPER SUPPLY PROXY: COURSES BOUGHT @ UDEMY
TECHNOLOGY DEMAND PROXY: MENTIONED IN JOB ADS @ INDEED (62 COUNTRIES)
FLUTTER: +2.5K
REACT NATIVE: +3.6K
GOOGLE, STACK OVERFLOW, DEVELOPER SUPPLY: FLUTTER WINS, PULLING AWAY FROM REACT NATIVE

TECHNOLOGY DEMAND: REACT NATIVE WINS, HOLDING STEADY AGAINST FLUTTER

POPULARITY
NEWSLETTER: ALSO JVM LANGUAGES & FRAMEWORKS, DATABASES, WEB FRAMEWORKS
SECTION SUMMARY
WEB: BIGGEST, MANY DEV'S, HARD TO LEARN – REACT, ANGULAR, VUE

NATIVE: MOBILE, DECLARATIVE, FLUTTER (DEVELOPERS), REACT NATIVE (EMPLOYERS), XAMARIN
THAT'S HOW CROSS-PLATFORM FRONT-ENDS!
WHY CROSS-PLATFORM

HOW CROSS-PLATFORM

HOW FLUTTER WORKS

MY FLUTTER EXPERIENCES
HOW FLUTTER WORKS
WILL GOOGLE KILL FLUTTER?
Google OnHub

Expiring in 9 months, Google OnHub was a series of residential wireless routers manufactured by Asus and TP-Link that were powered by Google software, managed by Google apps, and offered enhanced special features like Google Assistant. It will be over 7 years old.

Google Currents (2019)

Running out of juice in 12 months, Google Currents was service that provided social media features similar to Google+ for Google Workspace customers. It will be almost 4 years old.

YouTube Originals

Dead as a doorknob in 9 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.

Google Chrome Apps

Off to the glue factory in 3 months, Google Chrome Apps were hosted or packaged web applications that ran on the Google Chrome browser. It will be over 11 years old.

G Suite (Legacy Free Edition)

Expiring in 29 days, G Suite (Legacy Free Edition) was a free tier offering some of the services included in Google's productivity suite. It will be over 15 years old.
IN-HOUSE COMPETITION: ANGULAR, JETPACK COMPOSE

POPULAR: WINS WITH DEV'S, 2ND PLACE IN JOBS

EXTERNAL COMMITMENT: TOYOTA, UBUNTU

WE DON'T KNOW!
WHICH PLATFORM STABLE SINCE WHEN?
PROGRAMMING LANGUAGE: **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;
    }
}
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 {
  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
DART

ORIGINALLY FOR BROWSER

"SIMPLIFIED JAVA FOR UI DEVELOPMENT"

SOUND NULL SAFETY & ASYNC/AWAIT

1 MAIN THREAD, CREATE THREADS (ISOLATES)
GOOGLE TUNES
DART FOR FLUTTER
return Column(
  children: [
    Text("First name: $firstName"),
    Text("Last name: $lastName"),
    if (isAdmin) Text("Password: $password"),
  ],
);
return Column(
    children: [
        Text("First name: $firstName"),
        Text("Last name: $lastName"),
        if (isAdmin) Text("Password: $password"),
    ],
);  

INSTEAD OF SEPARATE ARRAY 
WITH IF STATEMENT

SYNTACTIC SUGAR
LIBRARIES:  PLUGINS
PLUGINS – FLUTTER: 16K, DART: 14K

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),
    ),],
)

CONFIGURE BUILT-IN WIDGETS, CREATE YOUR OWN

EMULATED WITH GRAPHIC ENGINE SKIA (CHROME, FIREFOX)

NO NATIVE SDK UI ELEMENTS: "FLUTTER PAINTS PIXELS"
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
5 Native Look & Feel Switch Look & Feel
SWITCH LOOK & FEEL BECAUSE "FLUTTER PAINTS PIXELS"
SAMPLE APP ON GITHUB
HOW DOES IT WORK?

CREATED MY OWN WIDGETS

WIDGETS HAVE SWITCH STATEMENT =>
CREATES WIDGET FOR CURRENT PLATFORM

HOW DOES IT WORK?
ARCHITECTURAL CHOICES

GLOBAL STATE MANAGEMENT: "PROVIDER"

WIDGET SET: MATERIAL/NATIVE/CUSTOM

ROUTING: SIMPLE ("NAVIGATOR")/COMPLEX ("ROUTER")

LAYOUT: NO DEFAULT – 3RD PARTY PLUGIN
NATIVE INTEGRATION
FLUTTER IN NATIVE APPS

IOS/ANDROID: STABLE

WEB/DESKTOP: UNDER CONSTRUCTION?
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
**Platform Tool Chains**

**Android:** Android Studio, **iOS/MacOS:** MacOS + Xcode, **Windows:** Windows + Visual Studio

**Flutter Engine:** C/C++

**Flutter App:** Native ARM Library (Mobile), JavaScript (Web), C++ (Windows, Linux), Objective-C (MacOS)
CODE, BUILD & DEPLOY
"EXCELLENT DEV 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
PLATFORM CHECK
FLUTTER VS. WORLD
+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?

ONLY WINDOWS STABLE, MAC & LINUX NOT

ACCESS TO NATIVE OS LIBRARIES

WINDOWS & MACOS UI: INCOMPLETE, MAINTAINED?

DESKTOP: 👎
REACT NATIVE VS. FLUTTER

- Javascript vs. Dart
- Slower vs. Faster
- Native UI Elements vs. Paints Pixel
- Separate Projects (Windows & Macos) vs. Monorepo (Windows, Mac, Linux)
NO NEED TO LEARN WEB STACK

DART = SIMPLER JAVA

UI AS CODE WITH CLASSES

USE 2 OF THE 3 TOP JAVA IDES

FLUTTER FITS JAVA
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WHY CROSS-PLATFORM

HOW CROSS-PLATFORM

HOW FLUTTER WORKS

MY FLUTTER EXPERIENCES
MY FLUTTER EXPERIENCES
B2B SAAS FOR COMPANIES WITH CAT-SITTERS

REMOVE FRICTION & SAVE TIME

I WROTE THE CODE

MY START-UP
UNLIMITED STORAGE, PUSH NOTIFICATIONS

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

PRODUCTIVITY: DART + FAST CODE, BUILD & DEPLOY

FLUTTER BUSINESS CASE
WORKS AS DESIGNED: “2 APPS FOR PRICE OF 1.2”

MINOR QUIBBLES (E.G. SIMULATOR DOESN’T STOP)

APPLE TROUBLE (E.G., NO PASTE INTO SIMULATOR)

FLUTTER LISTENS (BUG FIXES, DEV SURVEYS)

FLUTTER ON MOBILE 🙌
WORKS WELL ON IOS & ANDROID

IOS QUIBBLES (NO LIST TILE)

FLUTTER TEAM: "CUSTOMIZE MATERIAL"

FLUTTER PAINTS PIXELS
GOOGLE’S “BACK-END AS A SERVICE” FOR MOBILE, WEB, SERVER

MOSTLY FREE SERVICES, SOME PAID

1 SERVICE INSTEAD OF 2 (IOS + ANDROID): CRASH LOGGING, TEST VERSIONS, . . .

FIREBASE 👍
MOBILE POWER
EDIT VIDEOS ON PHONES!
THINK MORE
"DESKTOP CLIENT"...
...AND LESS
"SIMPLE WEB BROWSER"
Sign up for Last.fm

Desired username: lukew

Try another name
(max 15 characters, no spaces)

Email: mail@mail.com

The occasional newsletter to keep me up-to-date.

Password: ....

Confirm password: ....
MOBILE POWER

IOS & ANDROID POWERFUL

STORE DATA LOCALLY – HELPS OFFLINE

LOAD & SAVE DATA IN BACKGROUND

WEB: LIMITED & HARDER

MOBILE POWER
ONE SOURCE OF UI TRUTH
AVOID "UI OUT OF SYNC"
GERMANY BIGGEST SPORTS APP "KICKER"
1:0 - OR 0:0?
MACOS APP STORE
$113 - OR $38?
HOW TO AVOID "UI OUT OF SYNC"?
ONE GLOBAL DATA STORE

DATA STORE CHANGES $\Rightarrow$ ENTIRE UI UPDATES

NO "STATUS DUPLICATES" IN DATA STORE

ONE SOURCE OF UI TRUTH
INITIALLY: TWO DIFFERENT OBJECTS => OUT OF SYNC

NOW: CHART = REAL-TIME CALCULATION OVER LIST
"STATUS DUPLICATES" \Rightarrow \text{REAL-TIME CALCULATION}
MOBILE POWER
AVOID UI SYNC ISSUES: ONE GLOBAL DATA STORE

DATA STORE CHANGES => ENTIRE UI UPDATES

NO "STATUS DUPLICATES" IN DATA STORE

WORKS OFFLINE – BUT DUPLICATES SERVER CODE

ONE SOURCE OF UI TRUTH
BE CONSISTENT
Your Home in Good Hands

Please look at your content below. Or access your account by clicking on your name in the top right.

- Visits
- Customers
- Team
- Sys Admin

Customers

Active: 407

Manage Customers + Create

Veterinaries

Total: 42

View Veterinaries

Tasks

- My Open Tasks
  - Finished Visits
    - Today: 1/2
    - This week: 11/12

- My Finished Tasks
  - My Finished Visits
RESPECT PLATFORM PARADIGMS
SHARE COLORS (BRAND & BOOTSTRAP)
SHARE FONTS (GOOGLE FONTS)
SHARE ICONS (FONTAWESOME)
BE CONSISTENT
REUSE CODE: USE FLUTTER PLUGINS

DRY: WRITE YOUR OWN COMPONENTS

STRUCTURE: VERTICAL & HORIZONTAL LAYERS

BACK TO BASICS
SECTION SUMMARY
BUSINESS CASE

FLUTTER

FLUTTER PAINTS PIXELS

FIREBASE

MOBILE POWER

1 SOURCE OF UI TRUTH

BE CONSISTENT

BACK TO BASICS
MY FLUTTER EXPERIENCES
WHY CROSS-PLATFORM

HOW CROSS-PLATFORM

HOW FLUTTER WORKS

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BUSINESS CASE

FLUTTER 👍

FLUTTER PAINTS PIXELS

FIREBASE 👍

MOBILE POWER

1 SOURCE OF UI TRUTH

BE CONSISTENT

BACK TO BASICS
BACK TO THE BIG QUESTION
BUILD MOBILE, WEB & DESKTOP FRONTENDS WITH FLUTTER & 1 CODEBASE?
YES, WE CAN
BUT WE GENERALLY SHOULDN'T
WEB: ONLY MATERIAL UI, NO NATIVE LIBRARIES, FEW PLUGINS

DESKTOP: WHY NOT WEB, ONLY WINDOWS STABLE, WIDGET SETS MAINTAINED

FLUTTER VS. WORLD
FLUTTER ON MOBILE: 👍👍
"2 APPS FOR THE PRICE OF 1.2"

ALL NATIVE CAPABILITIES

FAST BUILD & DEPLOY

FLUTTER ON MOBILE
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

BPF.LI/QCN