# Firebase

*most preferred backend for IoT based applications*

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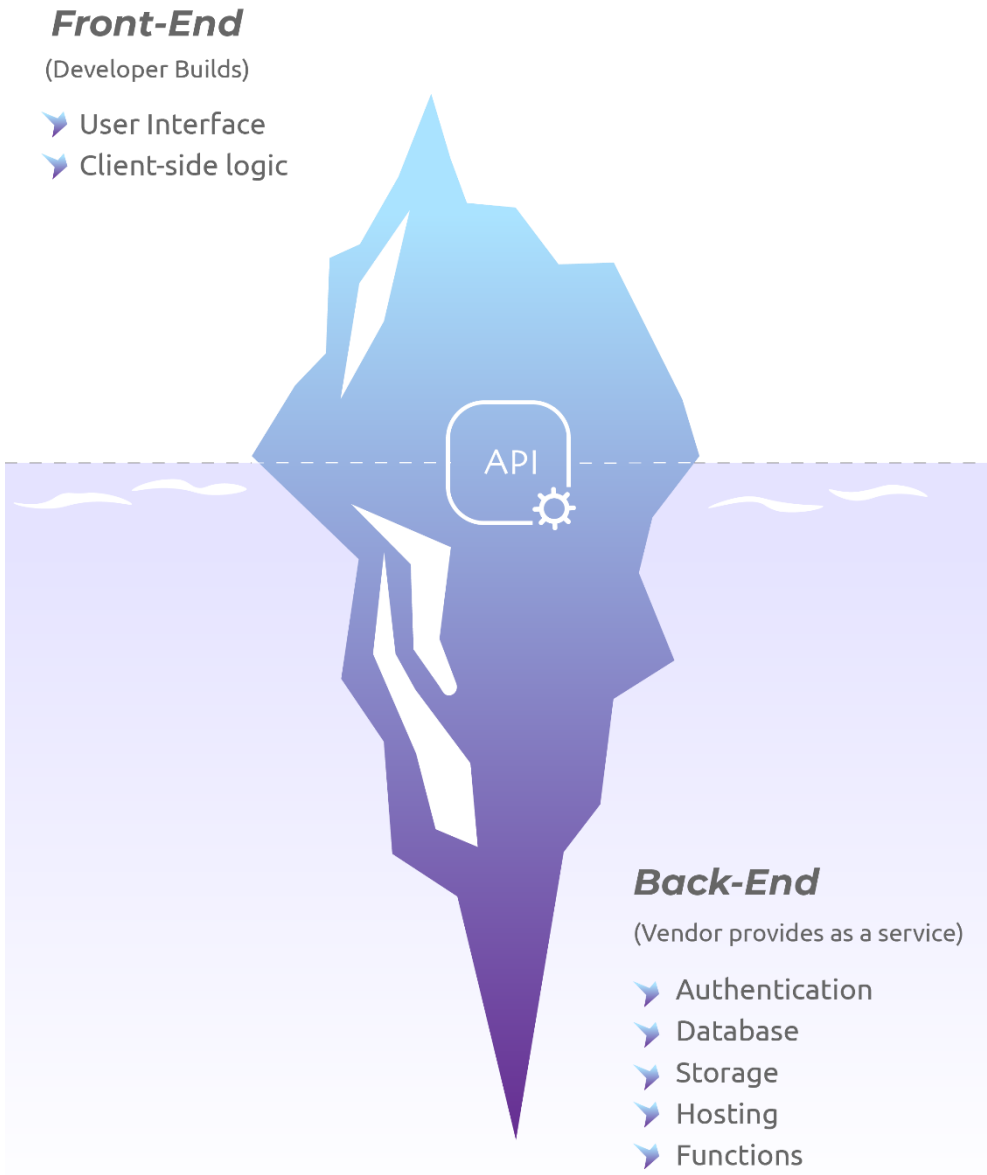
BAAS
(Backend as a service).

*Firebase is a platform, not (just) a database*

# Agenda

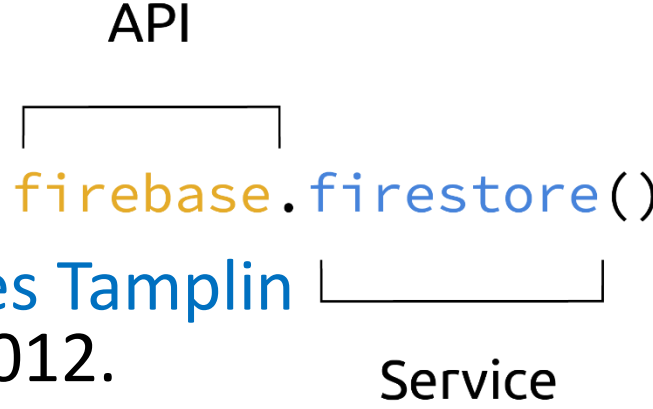
- Firebase – Introduction , History
- IoT application Architecture




# References

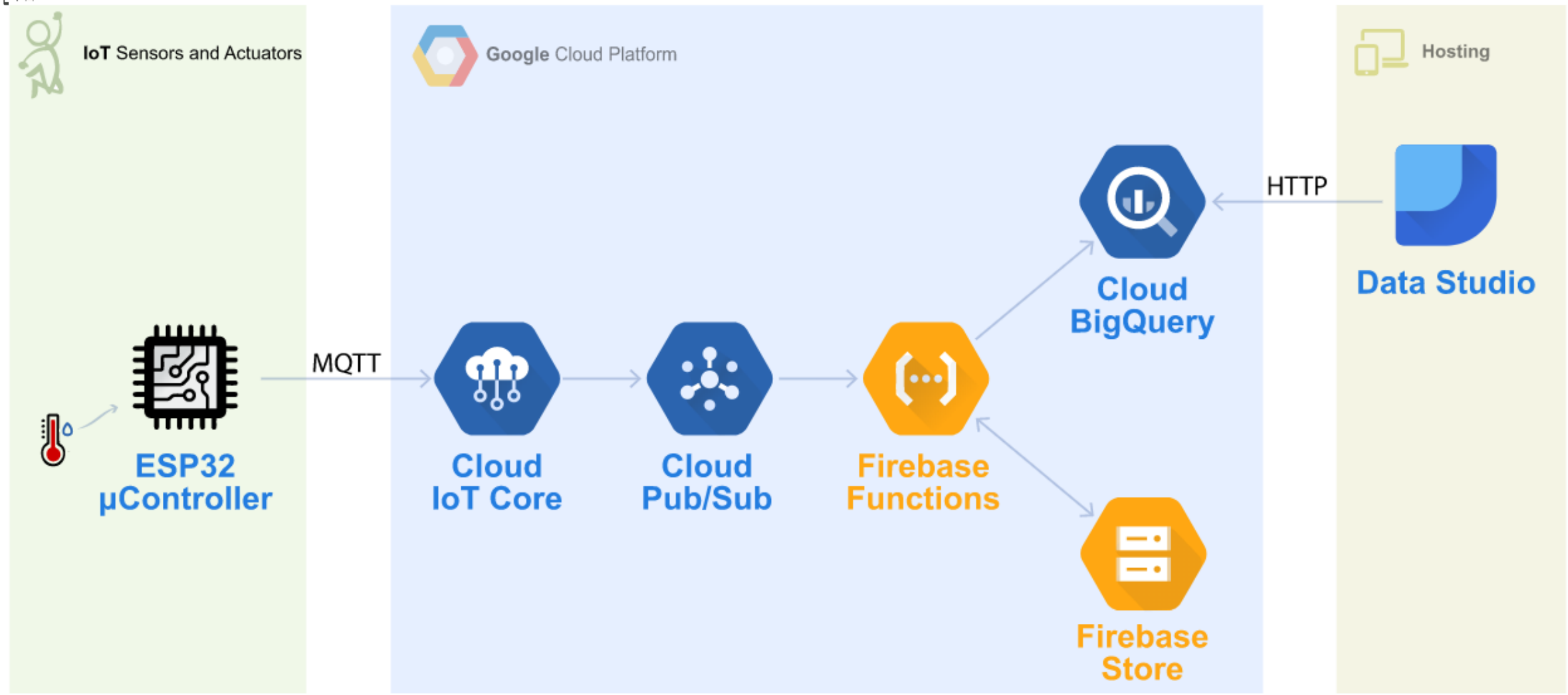
- Hackernoon, Quora, medium, Javapoint, google
- firebase.google.com

# History

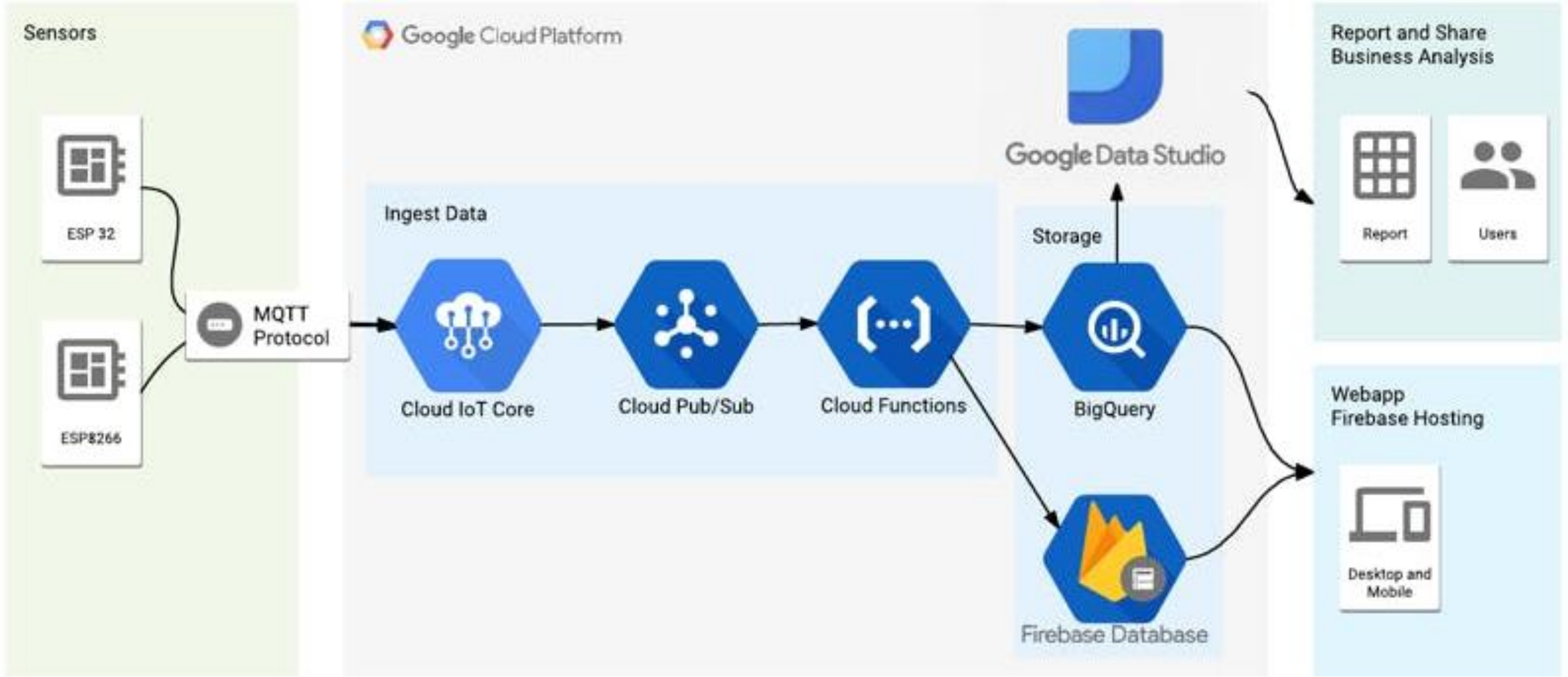



- Firebase was founded in 2011 by Andrew Lee and James Tamplin and launched with a realtime cloud database in April 2012.
- Firebase raised $1.1 million in seed funding in 2012
- June 2013, the company further raised $5.6 million
- In 2014, Firebase launched two products.
  - Firebase Hosting and Firebase Authentication
- In October 2014, Firebase was acquired by Google.
- In October 2015, Google acquired Divshot, an HTML5 web-hosting platform, to merge it with the Firebase team.
- In January 2017, Google acquired Fabric and Crashlytics from Twitter to add those services to Firebase

# Designing IoT based application using GCP



# Designing IoT based application using GCP

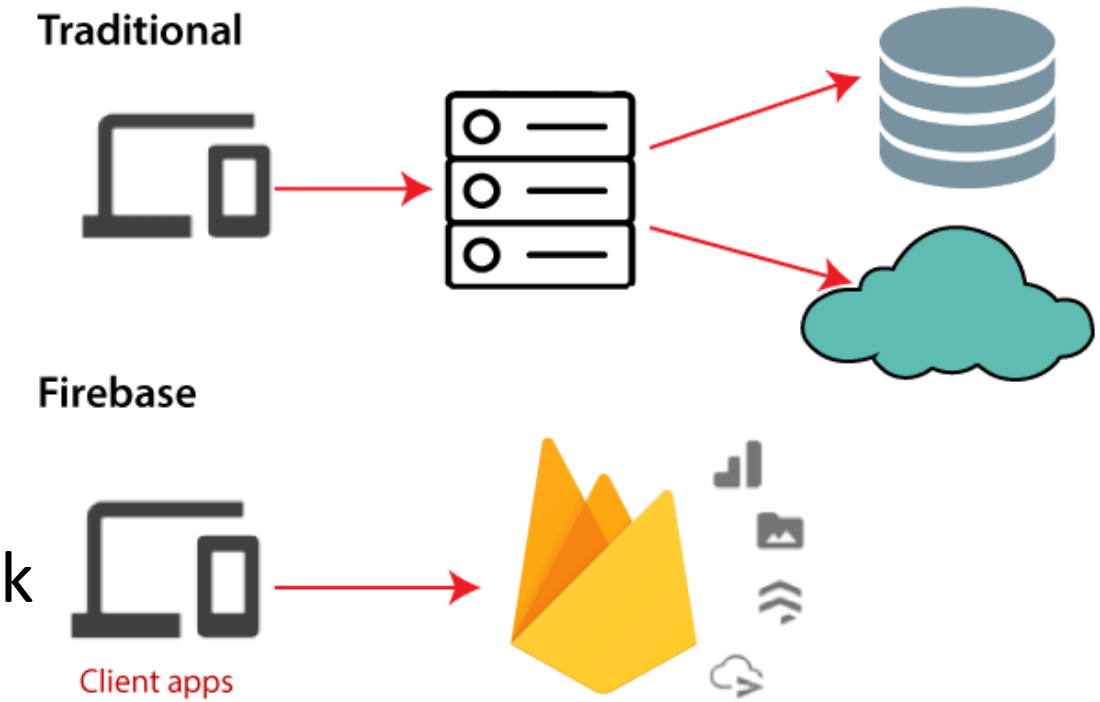


# Introduction

- Firebase is Google's mobile application development platform that helps you build, improve, and grow your app.
- Firebase is a technology that allows you to create web applications without server-side programming, making development faster and easier. It supports Web, iOS, OS X and Android clients.
- Apps that use Firebase can use and control data without thinking about how data is stored and synchronized across different instances of the application in real-time.

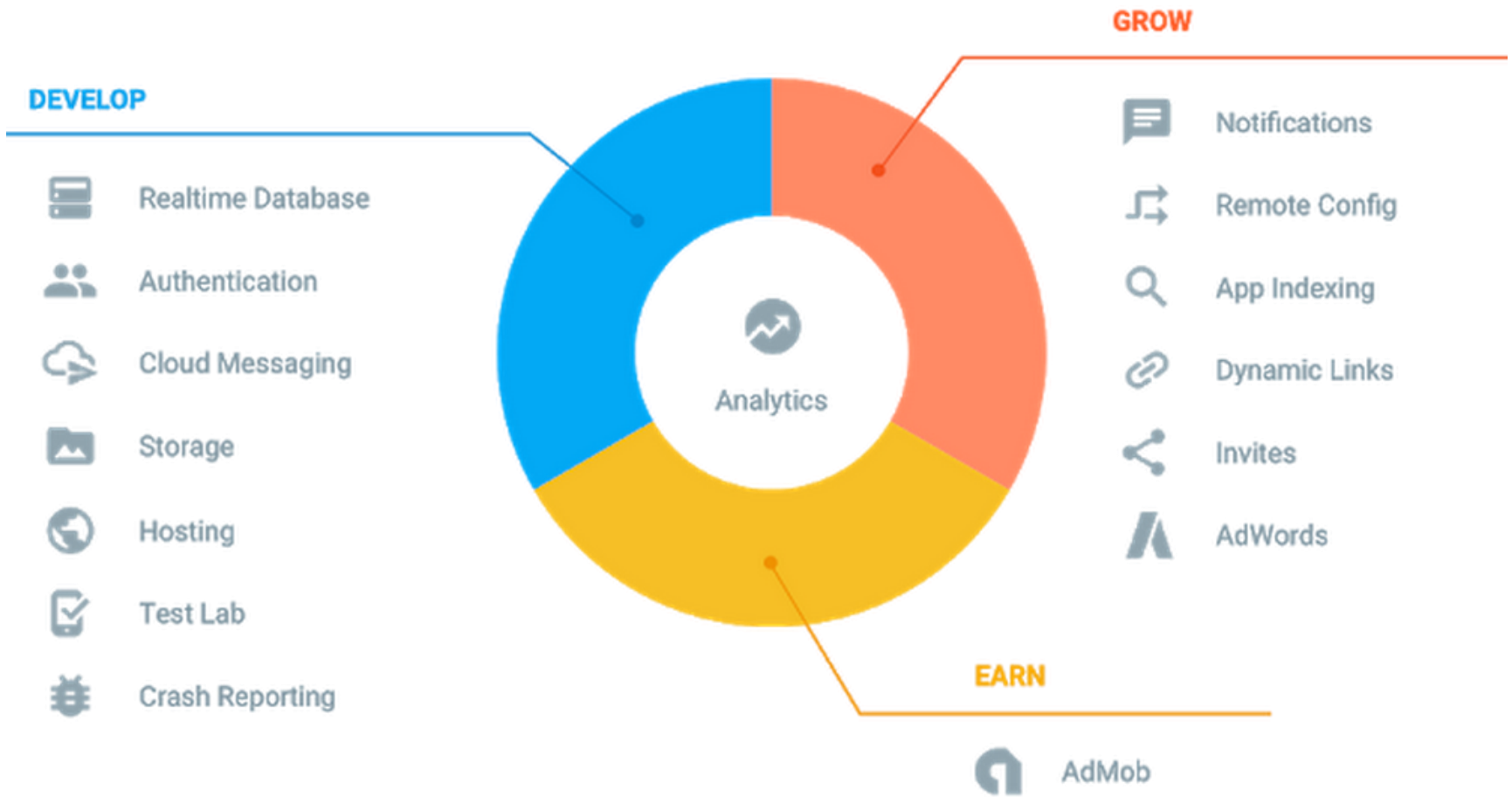
# Traditional vs Firebase

- Traditional app development typically involves writing *both* frontend and backend software.
- The frontend code just invokes API endpoints exposed by the backend, and the backend code actually does the work
- Firebase products, the traditional backend is bypassed, putting the work into the client.
- Administrative access to each of these products is provided by the Firebase console



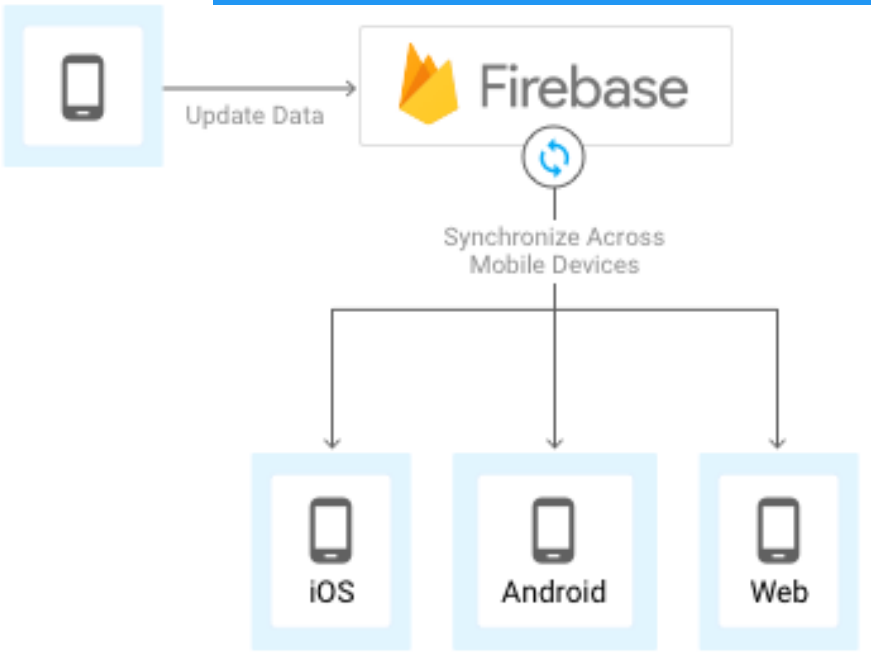
# Firebase

- Firebase a “platform as a service” or a “backend as a service”



# Cross Platform

- primary targets for the Firebase SDKs
  - Android, iOS
- increasing support for
  - web, Flutter, Unity, and C++

# Firebase

## Build better apps

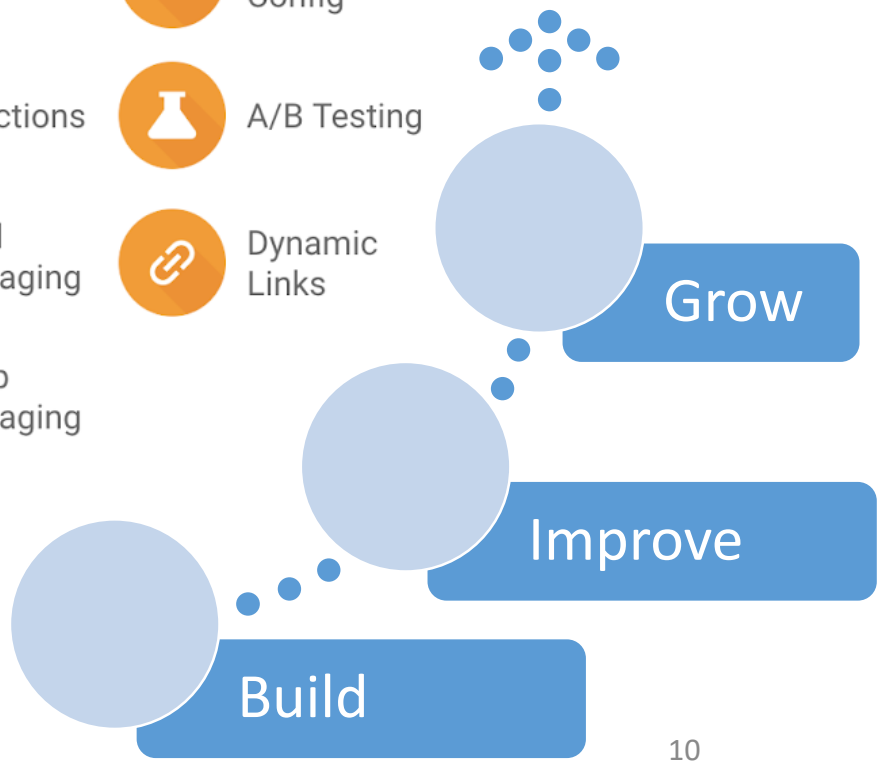
- Auth
- Hosting
- Cloud Functions
- ML Kit
- Cloud Firestore
- Realtime Database
- Cloud Storage

## Improve app quality

- Crashlytics
- Performance Monitoring
- Test Lab

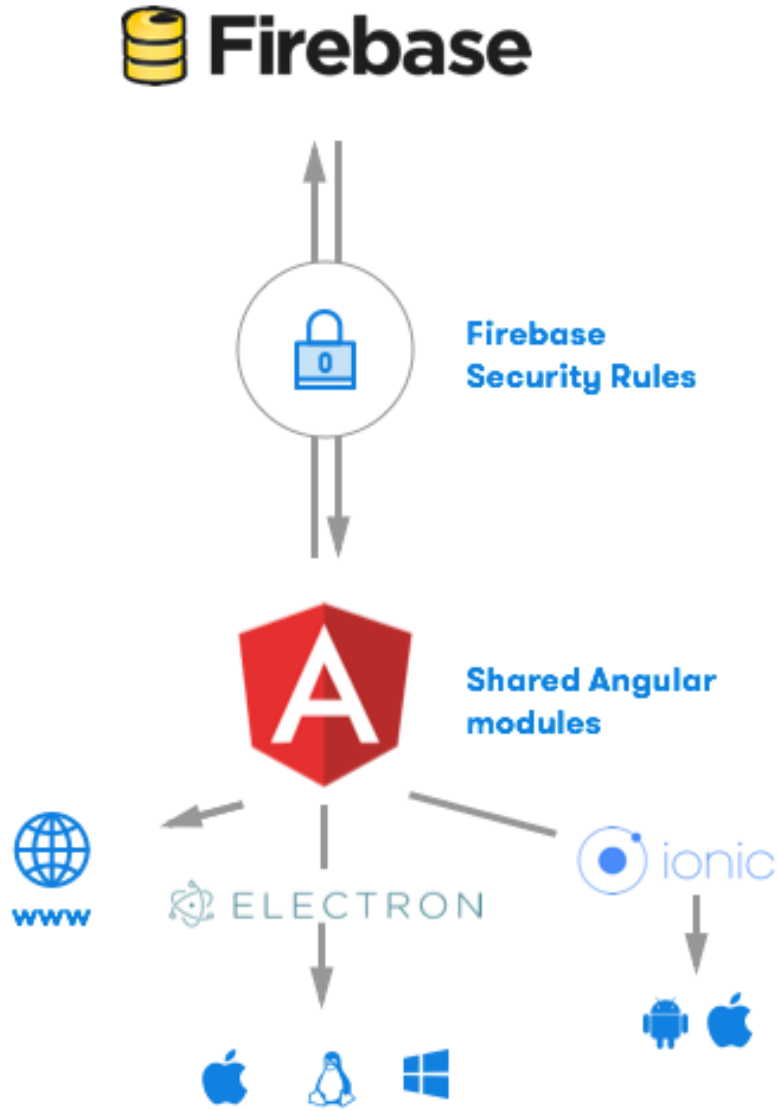
## Grow your app

- Analytics
- Remote Config
- Predictions
- A/B Testing
- Cloud Messaging
- Dynamic Links
- In-app Messaging



# “Build” your app

- **Authentication** — user login and identity
- **Realtime Database** — realtime, cloud hosted, NoSQL database
- **Cloud Firestore** — realtime, cloud hosted, NoSQL database
- **Cloud Storage** — massively scalable file storage
- **Cloud Functions** — “serverless”, event driven backend
- **Firebase Hosting** — global web hosting
  **ML Kit** —SDK for common ML tasks



# Authentication

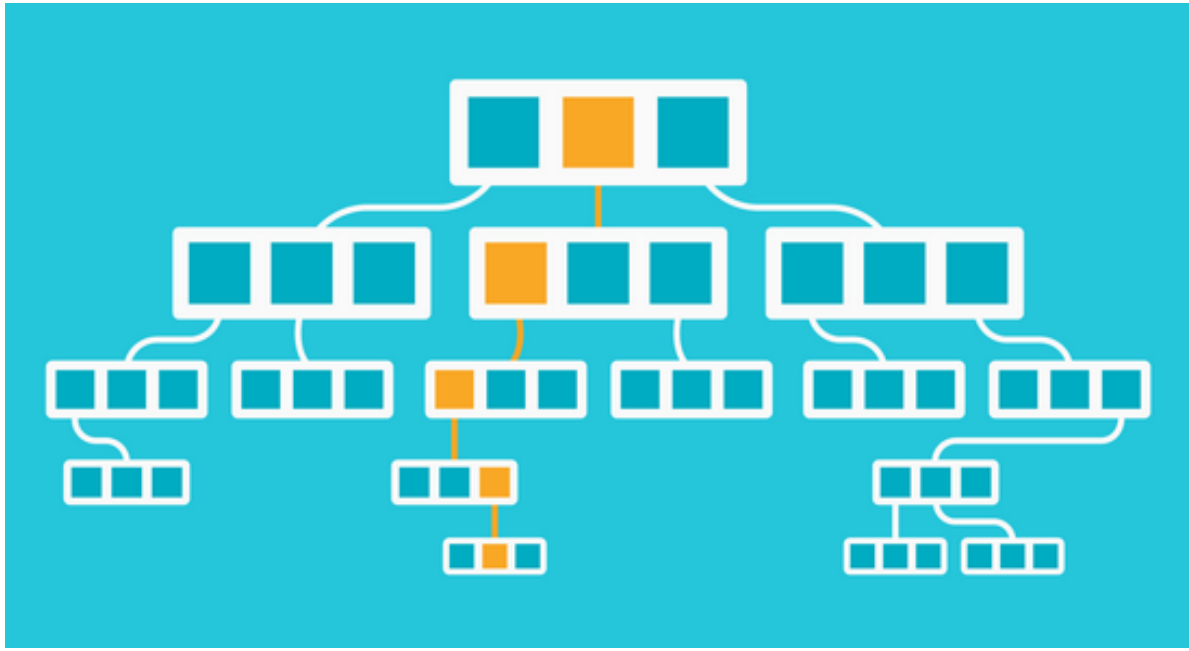
- Authentication. Firebase authentication includes a built-in email/password authentication system.
- It supports OAuth2 for Facebook, Google, Twitter and GitHub. Additionally, the Firebase standard integrates directly into the Firebase database so that you can use it to control access to your data.

# Database

- Firebase Realtime Database and Cloud Firestore provide database services - “realtime, cloud hosted, NoSQL databases”.
  - Realtime database is originally firebase product.
- Cloud Storage provides massively scalable file storage.
  - It’s also technically a Google Cloud product
  - Cloud Storage scales to *exabytes* of data
  - Something like every person on the planet to store 1000 high quality photos

# Cloud Firestore

- Store and sync data between users and devices — at global scale — using a cloud-hosted, NoSQL database.
- Cloud Firestore gives you live synchronization and offline support along with efficient data queries.
- Its integration with other Firebase products enables you to build truly serverless apps.



# Firebase ML Kit

- Bring powerful machine learning features to your mobile app whether you're new or experienced in ML.
- Get started easily by using our ready-to-use APIs for common mobile use cases, or import your own custom models which can be hosted and served to your apps by Firebase.
- ML Kit APIs can run on-device or in the cloud, depending on the functionality, and some give you both choices.

# Cloud Functions

- Cloud Functions is yet another a Google Cloud product that works well with other Firebase and Cloud products.
- Using the Firebase SDKs for Cloud Functions, you can write and deploy code, running on Google “serverless” infrastructure, that automatically responds to events coming from other Firebase products.
- Firebase products (database, storage, auth, etc) emit events when data changes within the product, and your code deployed to Cloud Functions is triggered in response to those events.

# Firebase Hosting

- *Firebase Hosting* is a secure, global web hosting CDN (Content Delivery Network). It's really good at quickly delivering static content (HTML, CSS, JS, images) using servers that are close to your users. And you can get it set up quickly, with or without your custom domain, along with a provisioned SSL certificate that costs you nothing.
- Firebase Hosting has one important point of integration with the rest of Firebase, and that's through Cloud Functions. Firebase Hosting lets you proxy the request and response to and from Cloud Functions when writing HTTP type functions. And, even better, it'll cache the responses from your functions, if you configure them properly. What a great way to build a "RESTful" API!

# ML Kit for Firebase

- ML Kit for Firebase lets you take advantage of a wealth of machine learning expertise from Google, without having to know anything about ML.
- ML Kit is the ability to recognize things that device camera captures, such as text, faces, and landmarks. And it can work on my mobile device with very limited computing power.
- A TensorFlow model for more sophisticated use cases can be uploaded.
- ML Kit can be used to locate faces in the photos and videos uploaded by the users of his social network, then performs some image manipulation on them

# “Grow” group of products

- **Analytics** — understand your users, and how they use your app
- **Predictions** — apply machine learning to analytics to predict user behavior
- **Cloud Messaging** — send messages and notifications to users
- **Remote Config** — customize your app without deploying a new version; monitor the changes
- **A/B Testing** — run marketing and usability experiments to see what works best
- **Dynamic Links** — enable native app conversions, user sharing, and marketing campaigns
- **App Indexing** — re-engage users with Google Search integration
- **In-App Messaging** — engage your active users with targeted messages

# “Improve” group of products

- **Test Lab** — scalable and automated app testing on cloud-hosted devices
- **Crashlytics** — get clear, actionable insight into your app’s crashes
- **Performance Monitoring** — gain insight into your app’s performance issues