Firebase

Some of examples and definitions are from Firebase docs - https://firebase.google.com/docs .

Hello!

I am Mateusz Choma

I am a scientific mind, passionate of technology, an engineer "squared" - a graduate of two universities in Lublin :)
As well, I am a JS developer, entrepreneur and owner of small software house - Amazing Design.

1.
What is Firebase? Serverless architecture.

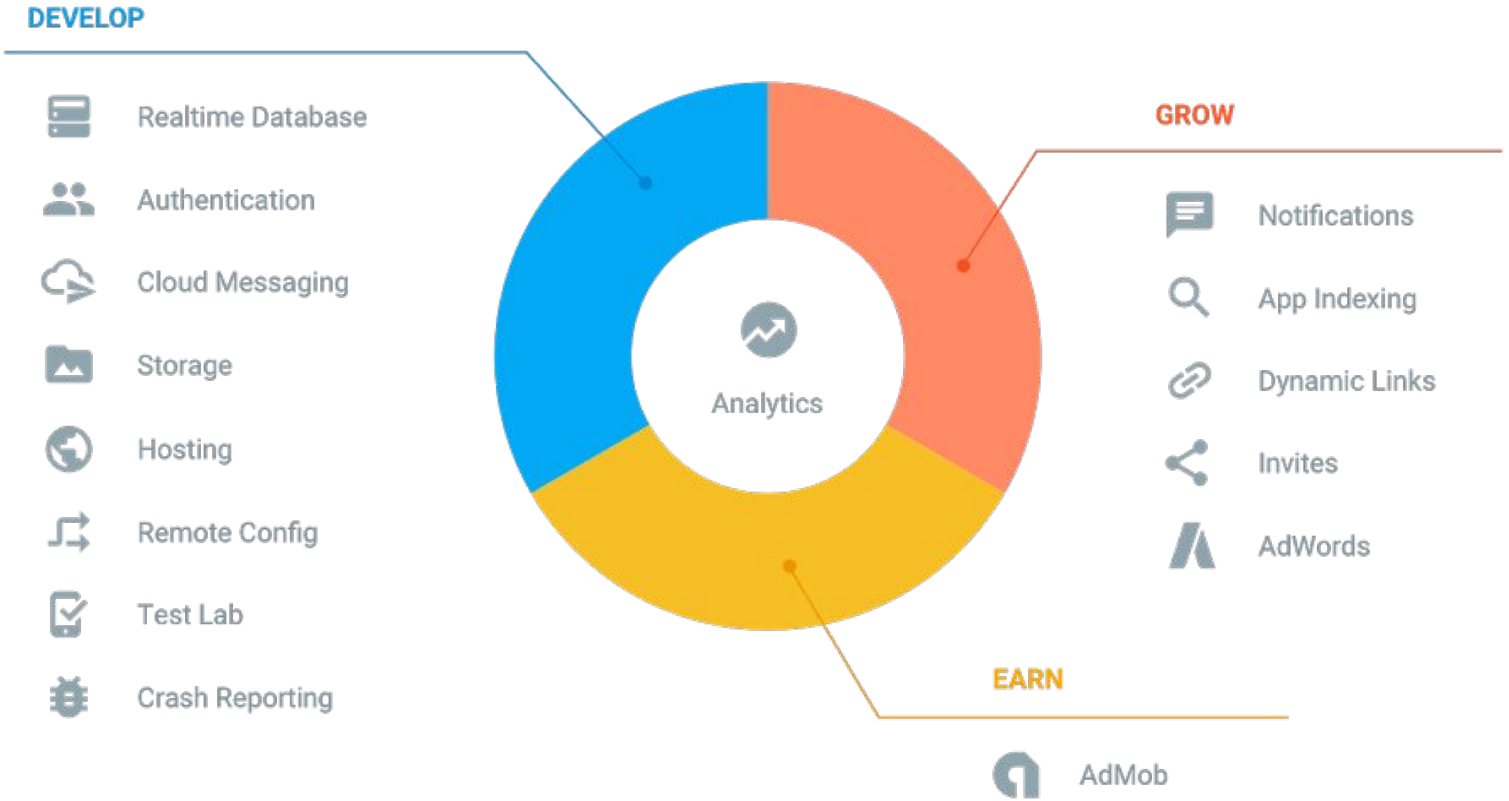
What is Firebase? Serverless architecture.

Basic info

- Firebase is a platform for developing apps
- Firebase should be able to replace backend servers
- Their have libs to handle Firebase from web, Android and iOS apps.
- Firebase, Inc. was founded in 2011
- In 2014 was acquired by Google
- In 2015 Google calls Firebase “United app platform” on Google I/O conference

What is Firebase? Serverless architecture.

Unified app platform



2.
Getting started

Task 0

Make a personal and team account in Google Firebase

EXPLORING FIREBASE CONSOLE & FEATURES

EXPLORING FIREBASE DOCS - REFERENCE AND GUIDES

Getting started
Firebase CLI

The Firebase CLI (GitHub) provides a variety of tools for managing, viewing, and deploying to Firebase projects.

```
npm install -g firebase-tools
firebase login
```

Getting started
Firebase Init

```
firebase init
```

The firebase init command does not create a new directory. If you're starting a new project from scratch, you should first make a directory and change directories into it before running the init command.

Getting started
Firebase Hosting

- Free hosting with limited transfer
- Free to connect own domain
- Free and auto SSL certificate
- Deploy from CLI
- Roll-back option from console

Getting started
Firebase Hosting

Testing project locally

```
firebase serve
```

Deploying project

```
firebase deploy
```

Task 1

Deploy your team landing page on your personal Firebase project.

3.
Realtime database

Realtime database
noSQL databases

A **NoSQL** (originally referring to "non SQL" or "non relational") database provides a mechanism for storage and retrieval of data that is modeled in means other than the tabular relations used in relational databases. - Wikipedia

Realtime database
noSQL databases

The **Firebase Realtime Database** is a cloud-hosted database. Data is stored as JSON and synchronized in realtime to every connected client. When you build cross-platform apps with our iOS, Android, and JavaScript SDKs, all of your clients share one Realtime Database instance and automatically receive updates with the newest data.
We can access that database by REST endpoints also.

Realtime database

Database Rules

Firebase Realtime Database Rules determine who has read and write access to your database, how your data is structured, and what indexes exist. These rules live on the Firebase servers and are enforced automatically at all times. **Every read and write request will only be completed if your rules allow it.** By default, your rules are set to allow only authenticated users full read and write access to your database.

Realtime database
Database Rules - default

```
// These rules require authentication
{
  "rules": {
    ".read": "auth != null",
    ".write": "auth != null"
  }
}
```

Realtime database

Database Rules - public

```
// These rules give ANYONE,
// read and write access to your
database
{
  "rules": {
    ".read": true,
    ".write": true
  }
}
```

Realtime database

Database Rules - users access their data

```
// These rules grant access to a node matching the
authenticated
// user's ID from the Firebase auth token
{
  "rules": {
    "users": {
      "$uid": {
        ".read": "$uid === auth.uid",
        ".write": "$uid === auth.uid"
      }
    }
  }
}
```

Task 2

Add public rules to your personal project.

Realtime database
Connecting firebase app to our JS project

We need Firebase library to get all Firebase possibilities like real time database.

In simple website we can use CDN:

```
<script
src="https://www.gstatic.com/firebasejs/4.5.0/firebase.js "></script>
```

In React app we can install it from npm:

```
npm install --save firebase
```

Realtime database
Connecting firebase app to our JS project

```
// Set the configuration for your app
var config = {
    apiKey: "apiKey",
    authDomain: "projectId.firebaseapp.com",
    databaseURL: "https://databaseName.firebaseio.com",
    storageBucket: "bucket.appspot.com"
};
firebase.initializeApp(config);
```

Realtime database

Connecting firebase app to our JS project

We can add and initialise Firebase wherever we want, but the best place for it is separate file firebase.js in ours /src folder. In that file we can import firebase library initialize the app and export the initialized app.

Realtime database
Getnig into Firebase Database

As Firebase offers us many different services we must firstly choose what service we want to use.

If we want to use realtime database we can call:

```
var db = firebase.database();
```

Task 3

Connect firebase to your react app in separate .js file. Export form in firebase.database()

Realtime database

How we store data - some rules

1. Data in Realitme Database is a JSON tree
2. It allows nesting data up to 32 levels deep but nesting isn't recommended. When you fetch data at a location in your database, you also retrieve ALL of its child nodes.
3. Flat data structures (denormalization). If the data is split into parts it can be efficiently downloaded in separate calls, as it is needed.

Realtime database

Getting the path to write

We can reference any path in our database (even that doesn't exists) by calling ref on database reference.

```
var dbRef = firebase.database().ref();

var dbRef =
firebase.database().ref('my/first/path');
```

Realtime database
Simply writing the data

For basic write operations, you can use **set()** to save data to a specified reference, **replacing any existing data at that path**. For example:

```
firebase.database().ref(cats/).set(“Fluffy”);

firebase.database().ref(cats/).set({name: “Fluffy”});
```

Task 4

Write “it works” to “my/first/path” path in your personal Firebase project.

Task 5

Write an object with your personal data (name, surname, age) to “myData” path in your personal Firebase project.

Task 6

Write an array with integers (for example: [1,2,3]) to "array" path in your personal Firebase project.

Realtime database
Deleting the data

The simplest way to delete data is to call **remove()** on a reference to the location of that data.

You can also delete by specifying **null** as the value for another write operation such as **set()**.

Task 7

Write the code that deletes all data that was be written previously to your personal project.

Realtime database
Simply reading the data

In Firebase we can fetch data **once or every time** subscribing to database changes and get notifications on one of these events:

- `child added`
- `child changed`
- `child_removed`
- `value`

Realtime database

Read data once

In some cases you may want a snapshot of your data without listening for changes, such as when initializing a UI element that you don't expect to change. You can use the **once()** method to simplify this scenario: it triggers once and then does not trigger again.

```
var dbRef = firebase.database().ref();
dbRef.once('value', function(snapshot) {
  let value = snapshot.val();
});
```

Realtime database

Read data on each event

In other cases we want to be informed when something happens in database. We can call **on()** instead of **once()**

```
var dbRef = firebase.database().ref();
dbRef.on('value', function(snapshot) {
  let value = snapshot.val();
});
```

Task 8

Read the data once from your database, and explore what snapshot object is.
Pay attention to forEach method.

Realtime database

What is the realtime thing?

LIVE CODING EXAMPLE

Task 9

Subscribe to value event on some path in your personal project. Display it contents. Update it every time it changes.

Realtime database

Reading and writing lists

When we want to add another child to a location in our database we can call **push()** method on that reference.

```
var dbRef = firebase.database().ref();

// Create a new post reference with an auto-generated id
var newPostRef = dbRef.push();
newPostRef.set({...});

// this line do the same as line above
dbRef.push({...});
```

Task 10

Push some random user values fetched from randomuser.me/api to “userList” path in your personal project.

Realtime database

Sorting and filtering data

We can build simple queries to obtain data sorted by key, by value, or by value of a child.

You can also filter the sorted result to a specific number of results or a range of keys or values.

Realtime database
Sort data

- **orderByChild()** - Order results by the value of a specified child key
- **orderByKey()** - Order results by child keys
- **orderByValue()** - Order results by child values

Most useful is **orderByChild()** method**.** We can sort list of user objects by age, for example.

How the data is ordered - https://firebase.google.com/docs/database/web/lists-of-data#data-order

Realtime database

Sort data

LIVE CODING EXAMPLE

Task 11

Order data previously fetched from randomuser.me by firstname.

Realtime database
Filtering data

- **limitToFirst()** - Sets the maximum number of items to return from the beginning of the ordered list of results.
- **limitToLast()**- Sets the maximum number of items to return from the end of the ordered list of results.
- **startAt()** - Return items greater than or equal to the specified key or value, depending on the order-by method chosen.
- **endAt()** - Return items less than or equal to the specified key or value, depending on the order-by method chosen.
- **equalTo()** - Return items equal to the specified key or value, depending on the order-by method chosen.

Task 12

Get the last and first 2 children of previously fetched from randomuser.me user list.

Task 13

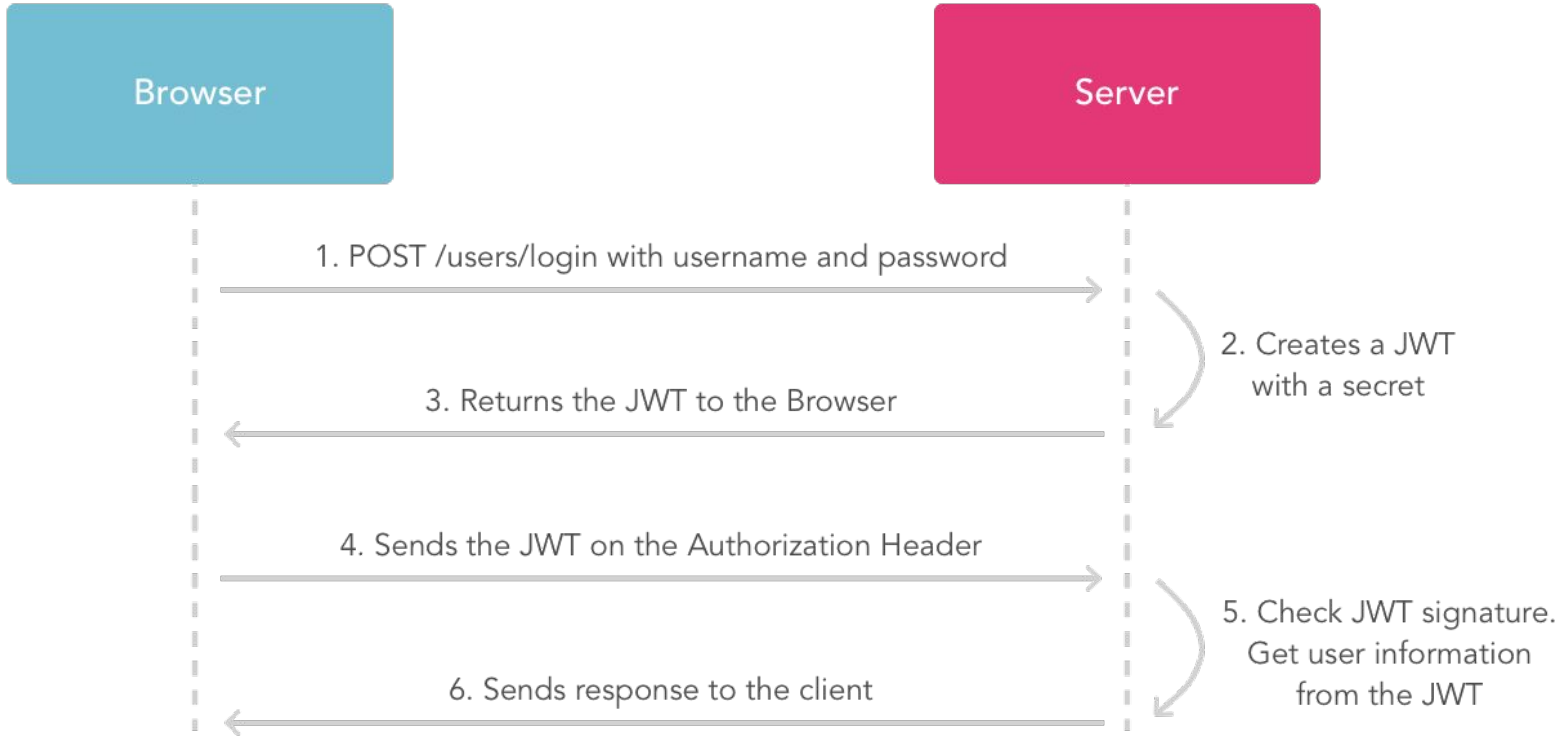
Get the user that have certain email (check in Firebase console to choose one) using the equalTo()

4.
Authentication

Authentication
Possibilities

- Email and password based authentication
- 3rd party - Google, Facebook, Twitter, GitHub
- Phone number (SMS)
- Custom
- Anonymus

Authentication
JWT conception



Grafika pochodzi z auth0.com

Authentication
Step by step

1. Set up sign-in methods

2. Implement UI flows for your sign-in methods

3. Pass the user's credentials to the Firebase Authentication SDK

Authentication
Firebase auth service

```
var auth = firebase.auth();
```

It’s very similar to database service.

Authentication
User creation

```
firebase.auth()
    .createUserWithEmailAndPassword(email, password)
        .catch(function(error) {
          // Handle Errors here.
          var errorCode = error.code;
          var errorMessage = error.message;
        });
```

Task 14

Create first e-mail and password user in Firebase console or by code.

Authentication
User creation

```
firebase.auth()
    .signInWithEmailAndPassword(email, password)
        .catch(function(error) {
          // Handle Errors here.
          var errorCode = error.code;
          var errorMessage = error.message;
        });
```

Authentication
User creation

```
firebase.auth()
    .signOut()
        .then(function() {
          // Sign-out successful.
        }, function(error) {
          // An error happened.
        });
```

Task 15

Create simple form to log in and out users.

Authentication
Check login/logout state

```
firebase.auth().onAuthStateChanged(function(user) {
  if (user) {
    // User is signed in.
  } else {
   // User is NOT signed in.
  }
});
```

Task 16

Log user in and checkout information provided in user object from onAuthStateChanged() method.

Task 17

Display information if the user is logged in or not.

Make login panel from that.

Authentication
3-rd party login - Google

Before begin!

Enable Google Sign-In in the Firebase console:

1. In the Firebase console, open the Auth section.
2. On the Sign in method tab, enable the Google sign-in method and click Save.

Authentication
3-rd party login - Google

First we must choose provider:

```
var provider = new firebase.auth.GoogleAuthProvider();
```

Code below is identical to all providers! Configuration differs!

```
firebase.auth().signInWithPopup(provider)
    .then(function(result) {
      // This gives you a result
      console.log(result);
    }).catch(function(error) {
      // Handle Errors here.
    });
```

Task 18

Log yourself in by Google, check the result object and find and decode auth token (jwt.io).

Task 19

Create login form that logs an user and push current date (timestamp) to “log/userLogins/$userId”.

Authentication
Current user

We can access current user from every place we can access firebase object by calling:

```
var user = firebase.auth().currentUser;
```

Authentication
Easy updating profile

You can update a user's basic profile information —the user's display name and profile photo URL—with the **updateProfile()** method. For example:

```
var user = firebase.auth().currentUser;
user.updateProfile({
  displayName: "Jane Q. User",
  photoURL: "https://example.com/jane-q-user/profile.jpg"
}).then(function() {
  // Update successful.
}).catch(function(error) {
  // An error happened.
});
```

Task 20 - put it all together

“

Create an app that:
- displays login box if no user logged
- logs user by Google or email/pass
- displays a txt input that user can pushed under “tasks/$userId/” path
- displays a list of items saved in “tasks/$userId/”

5.
Storage

Storage
Getting started

Cloud Storage for Firebase lets you upload and share user generated content, such as images and video, which allows you to build rich media content into your apps. Your data is stored in a Google Cloud Storage bucket.

Cloud Storage lets you securely upload these files directly from mobile devices and web browsers, handling spotty networks with ease.

Storage
Storage rules

```
// Anyone can read or write to the bucket,
   even non-users of your app.

service firebase.storage {
  match /b/{bucket}/o {
    match /{allPaths=**} {
      allow read, write;
    }
  }
}
```

Storage
Gettnig into Firebase Storage

If we want to use storage service we can call:

```
var storage = firebase.storage();
```

We can create references to certain paths in storage the same way as in database:

```
var storageRef = storage.ref();
```

Storage
Downloading data

```
storageRef.child('images/stars.jpg')
    .getDownloadURL()
    .then(function(url) {
      // `url` is the download URL for
      // 'images/stars.jpg'

      // here we can set this URL
      // as img src attribute (if it is an image)

    });
```

Storage
Simple upload

```
var file = ... // use the file from eg. file input

ref.put(file).then(function(snapshot) {
  console.log('Uploaded a blob or file!');
});
```

Storage
Simple upload

LIVE CODING EXAMPLE

Storage
Simple upload

The put() method return an uploadTask.

```
var uploadTask =
    storageRef.child('images/rivers.jpg').put(file);
```

We can monitor state of upload by callon on() method of uploadTask.

Storage

Upload with progress monitoring

```
uploadTask.on('state_changed', function(snapshot){
    var progress =
        (snapshot.bytesTransferred /
        snapshot.totalBytes) * 100;

    console.log('Upload is ' + progress + '% done');
}, function(error) {
    console.log(‘error’);
}, function() {
        var downloadURL =
            uploadTask.snapshot.downloadURL;
});
```

Storage

Upload with progress monitoring

LIVE CODING EXAMPLE

THANKS!