SWE 632 - Design & Development of User Interfaces

Fall 2020

George Mason University

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Google Firebase Tech Talk

What is Firebase?

- Original Feature was Real-time database
- Store & sync JSON format data between clients
- Native clients for Javascript, iOS, Android
- Can build client apps with realtime multi-user interactions with no backend

What is Firebase?

- Since the Firebase was acquired by Google, it has evolved, and has more features:
    - Authentication
    - Hosting
    - Cloud Storage
    - Machine Learning Framework
    - Crashlytics
    - Performance Monitoring
    - etc…

Demo of Firebase Console

console.firebase.google.com

Firebase

Class Sign Up App

Go to docs

Project Overview

Develop

- Authentication
- Cloud Firestore
- Realtime Database
- Storage
- Hosting
- Functions
- Machine Learning

Quality
Crashlytics, Performance, Test Lab,...

Analytics
Dashboard, Events, Conversions, A...

Grow
Predictions, A/B Testing, Cloud Me...

Extensions

Spark
Free $0/month

Upgrade

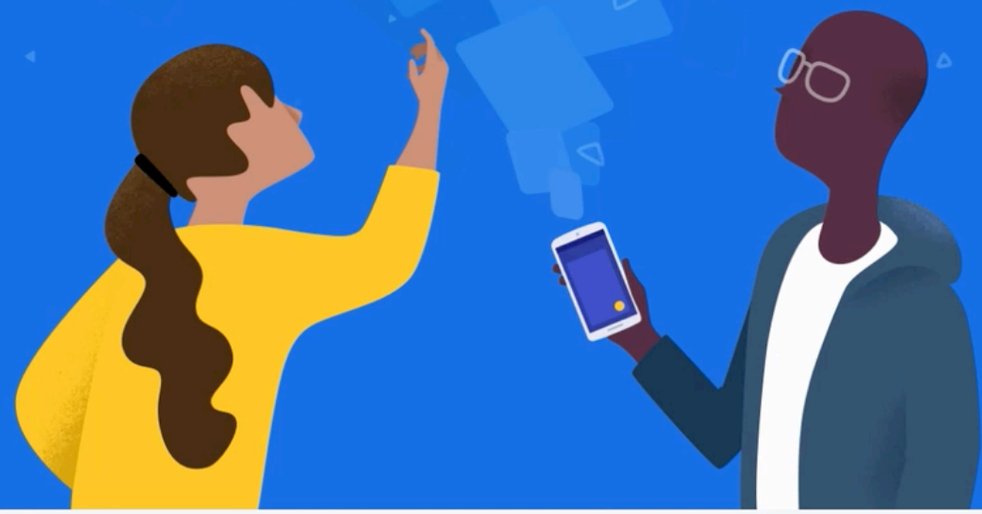
Class Sign Up App

Spark plan

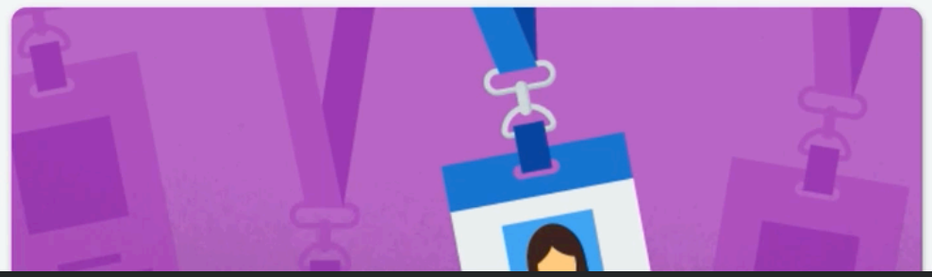
Get started by adding Firebase to your app

iOS

Add an app to get started



Store and sync app data in milliseconds



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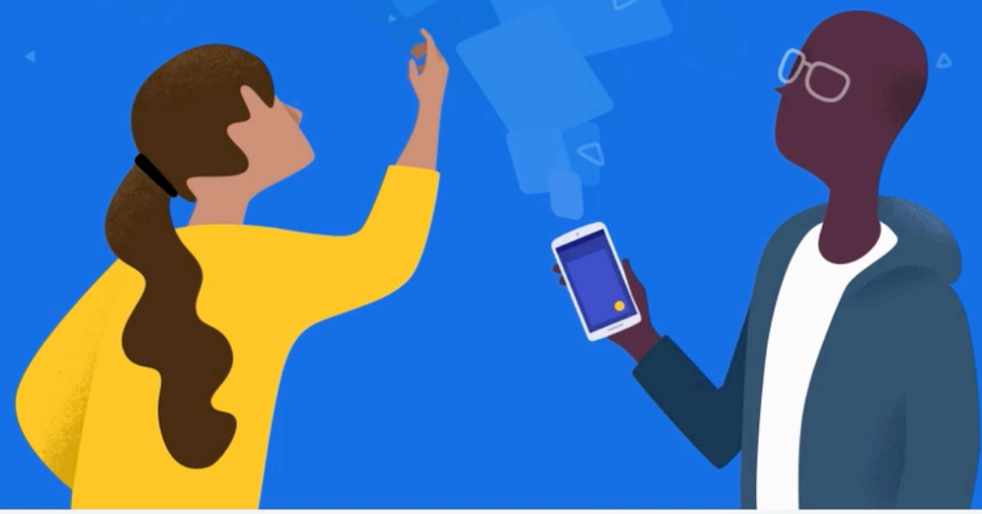

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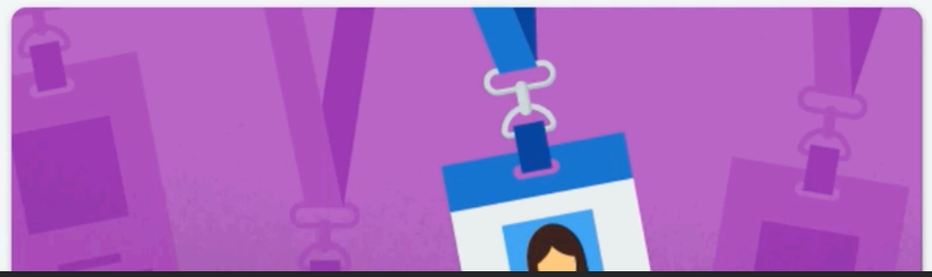


Basic HTML/JS Example

- Create index.html and index.js files

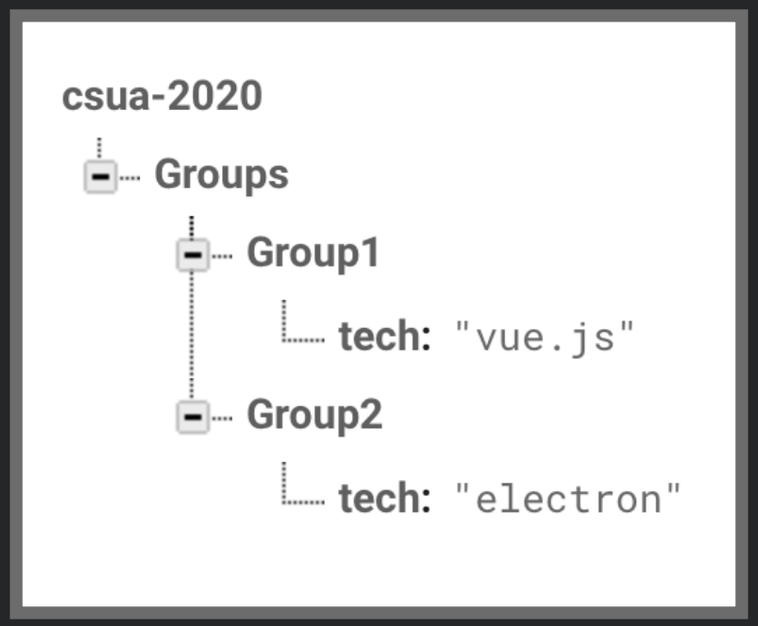
```
<html>
    <head>
        <script src = "https://cdn.firebase.com/js/client/2.4.2/firebase.js"></script>
        <script type = "text/javascript" src = "index.js"></script>
    </head>

    <body>

    </body>
</html>
```

Setting up the Database

- Add entries for your test app
- Represents JSON object(s)



Write Data

- We use the `set()` method

```
var groupsRef = firebase.database().ref("groups/");

groupssRef.set ({
    Group1: {
        tech: "vue.js",
    },

    Group2: {
        tech: "electron",
    }
});
```

Read Data

- We use the **`on()`** method

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

ref.on("value", function(snapshot) {
   console.log(snapshot.val());
}, function (error) {
   console.log("Error: " + error.code);
});
```

JSON Representation

```
{
  "Groups" : {
    "Group1" : {
      "tech" : "vue.js"
    },
    "Group2" : {
      "tech" : "electron"
    }
  }
}
```

Saving Data

- `set()` - sets a location
- `update()` - updates some keys without replacing all data
- `push()` - add a list of data to a reference, generating a uniqueID

Retrieving Data

- Subscribe to a reference location. Any changes generate an event.
- `value`, `child_added`, `child_changed`, `child_removed`

Work Queues

- Supports transactions - can atomically dequeue item for processing
- Enables sharing processing tasks across pool of clients

Technology Status

- Commercial startup from 2011
- >200K users
- Free tier for small scale use, paid tiers for commercial-scale use
- Acquired by Google in Oct 2014
- Now used to build apps at Google

Competitors/Alternatives

- Traditional JSP, .NET, PHP, … backend
- PubNub - provides realtime data streams
- realtime.co - realtime messaging infrastructure
- socket.io - can build directly on top of WebSockets

Summary

- Enables pushing processing from backend to clients
- Enables social, collaborative apps to be built without a backend
- Best suited for shared global data where clients are using same version of data
- Not suitable for processing tasks where clients are untrusted or for complex queries on data