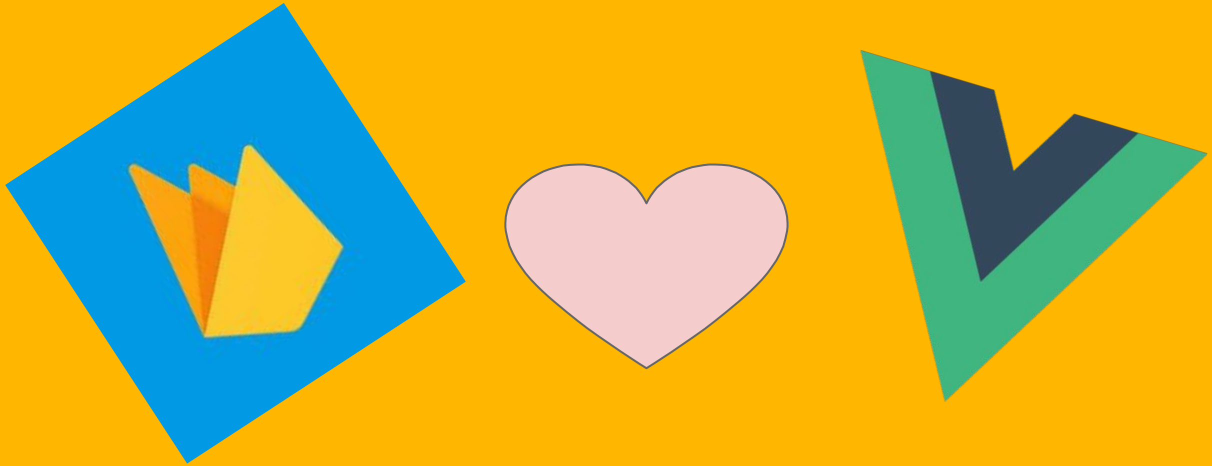
Offline-first PWA con Firebase y Vue.js



About me

Kike Navalon, engineer

Currently working at BICG playing with data

You can find me at @garcianavalon

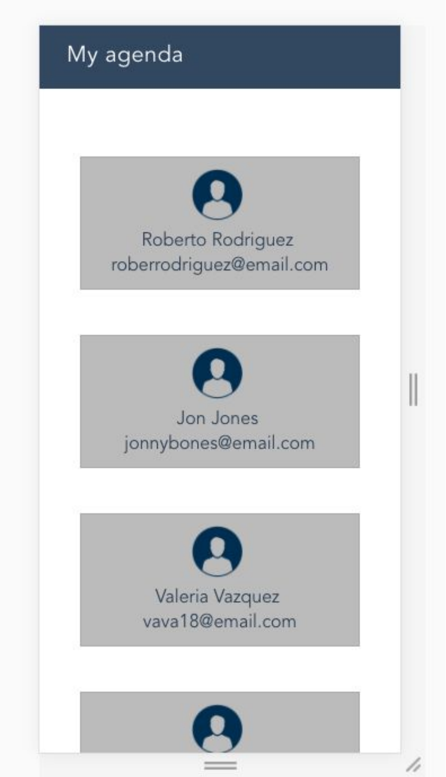
> *We live in a disconnected & battery powered world, but our technology and best practices are a leftover from the always connected & steadily powered past.*

offlinefirst.org

Demo

What are we going to build

t3chfest2018.firebaseapp.com



My agenda

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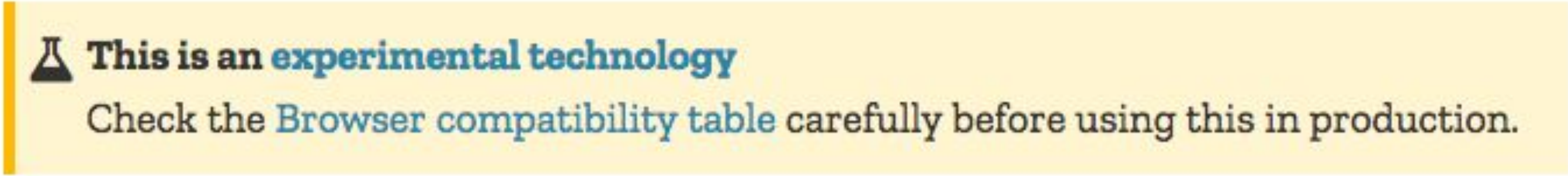
The offline APIs for the web

With a little history



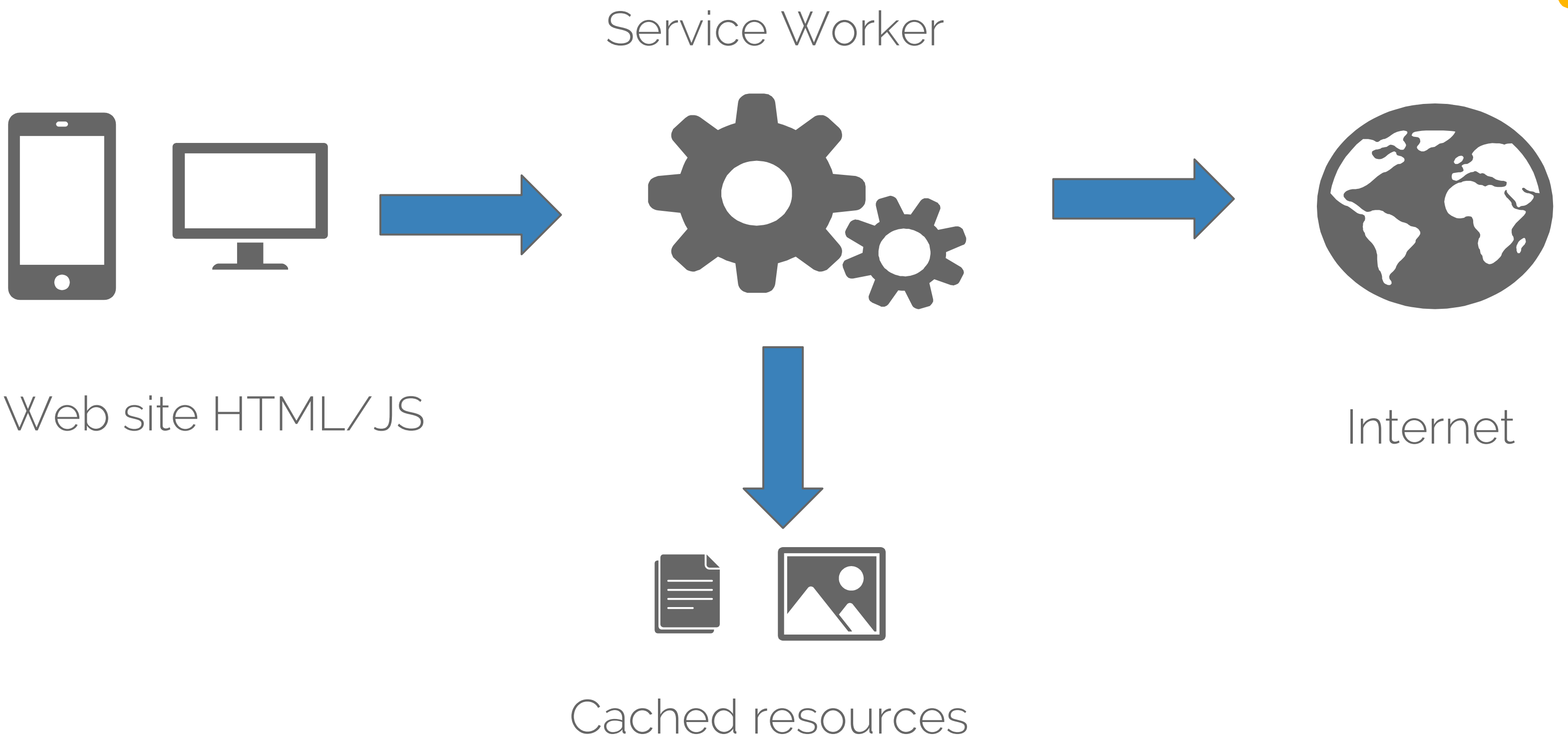
⚗ **This is an experimental technology**

Check the Browser compatibility table carefully before using this in production.

Service Workers

- Javascript worker (no access to DOM)
- Run in the background
- Proxy between web page and network
- Programmatic control of caches and requests

Evolution on top of Application Cache limitations and issues to give control to developers

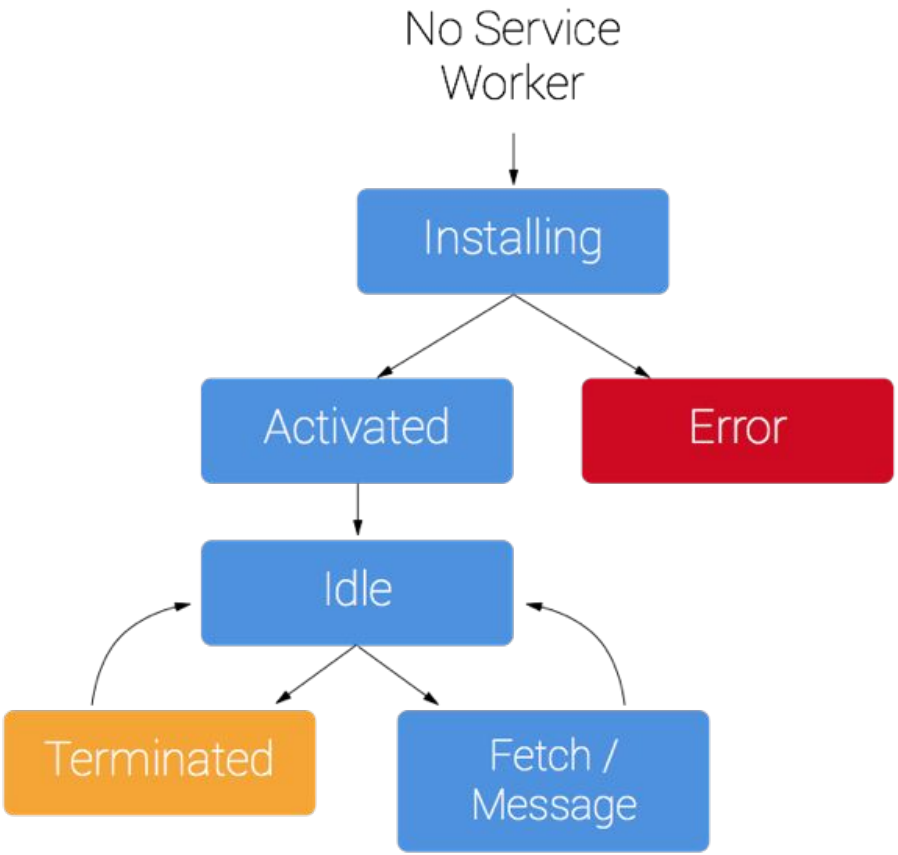


Service Worker

Web site HTML/JS

Internet

Cached resources



No Service Worker

Installing

Activated

Error

Idle

Terminated

Fetch / Message

Web Storage

- Cookies v2.0
- Session storage: cleans when browser closes
- Local storage: persistent after browser closing

Useful for simple key-value pairs but not potent enough for large amount of data plus no Web Worker support

IndexedDB

- Structured data, including files/blobs
- Indexes for performant queries on the data
- Object-oriented DB
- Supports Web Workers

Designed to provide rich queries regardless of network access and to store large amounts of data

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Practice: the offline developer toolkit

1

1. Go to the demo app (t3chfest2018.firebaseapp.com) and open chrome developer tools
2. Use the application tab to view the service worker
   a. Experiment with the offline/online and unregistering the service worker.
   b. How many times do you need to refresh to have offline working?
3. Check the “Clear Storage section”
   a. What is consuming the most storage?
   b. Try clearing storage and reloading
4. Is the app using web storage? What do you think it is stored there?
5. Explore IndexedDB. Can you find where the actual contacts are stored?

6. Now go to the Cache Storage section
    a. Explore what resources are in the cache
    b. Look closely, do you find anything weird?
    c. Yes, two resources have content-length zero. Which ones? Why do you think it is?
7. Check the frames section
    a. You can see loaded resources by frame.
8. Change to the Network tab
    a. You can see the network requests and times for every resource
    b. Experiment with the throttle/offline option and hard-reloading the page. Can you see any difference in the timing breakdown?
    c. When does the page load faster, online or offline?
9. Finally, use the Audit tab to generate a Lighthouse report

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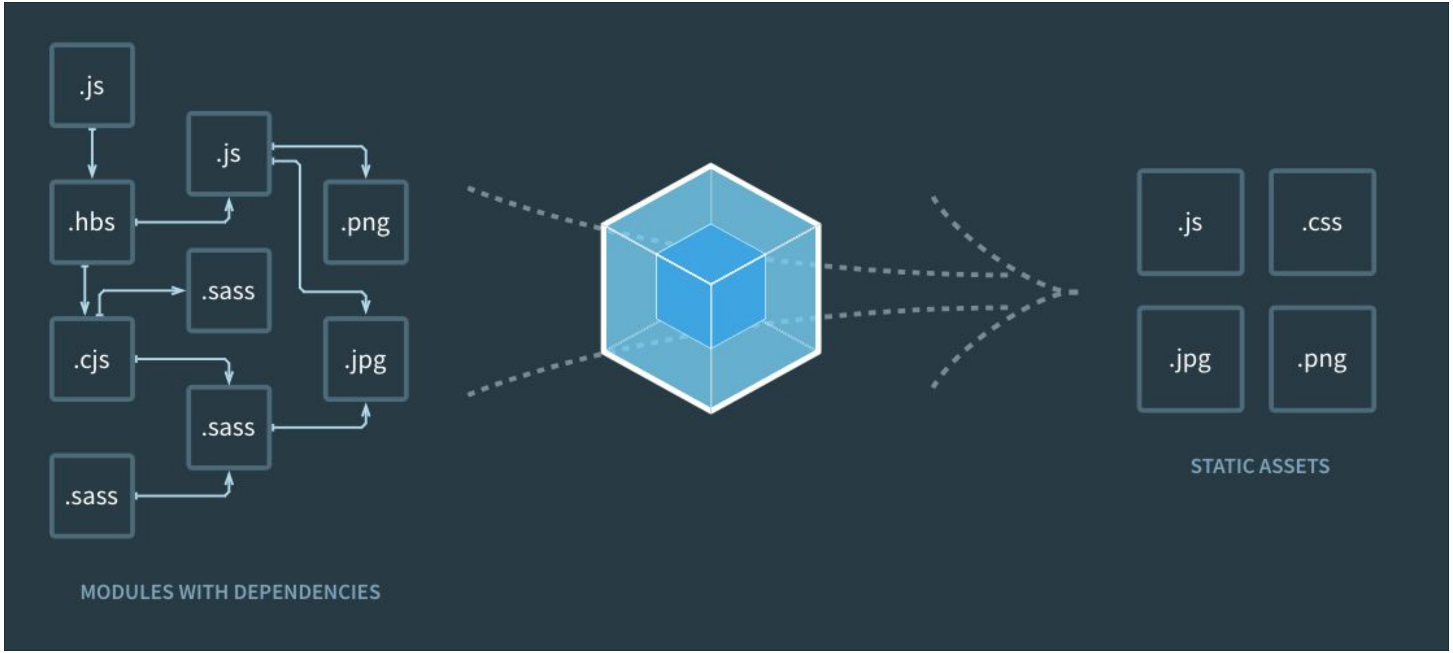
Service Workers the easy way using Vue templates

Webpack, sw-precache and firebase hosting magic!

Webpack


.js
.js
.hbs
.png
.sass
.cjs
.jpg
.sass
.sass
MODULES WITH DEPENDENCIES
.js
.css
.jpg
.png
STATIC ASSETS

sw-precache

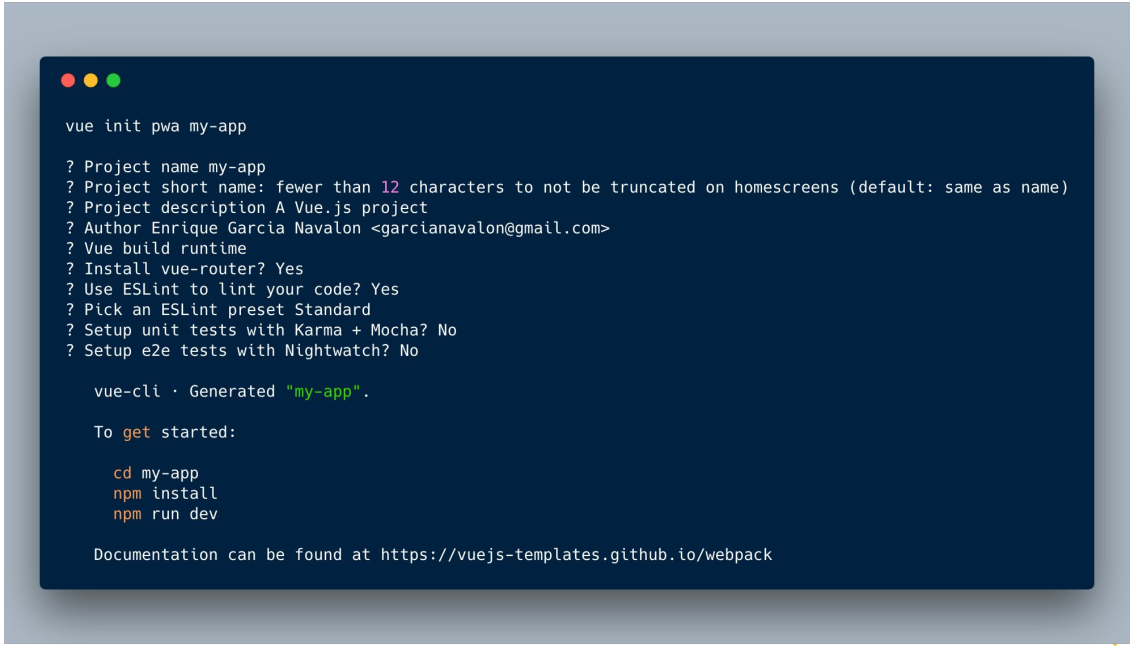
- Module for generating automatically a Service Worker
- Precaches resources: serves them cache-first
- Integrated with build process
- Detects all static resources and generates a hash -> changes in the files create a new hash

Developed by Google Chrome Labs to make easier the App Shell pattern. github.com/GoogleChromeLabs/sw-precache

Vue.js PWA template

Full-featured setup with webpack, sw-precache, hot reloading and linters

github.com/vuejs-templates/pwa



```
vue init pwa my-app

? Project name my-app
? Project short name: fewer than 12 characters to not be truncated on homescreens (default: same as name)
? Project description A Vue.js project
? Author Enrique Garcia Navalon <garcianavalon@gmail.com>
? Vue build runtime
? Install vue-router? Yes
? Use ESLint to lint your code? Yes
? Pick an ESLint preset Standard
? Setup unit tests with Karma + Mocha? No
? Setup e2e tests with Nightwatch? No

   vue-cli · Generated "my-app".

   To get started:

     cd my-app
     npm install
     npm run dev

   Documentation can be found at https://vuejs-templates.github.io/webpack
```

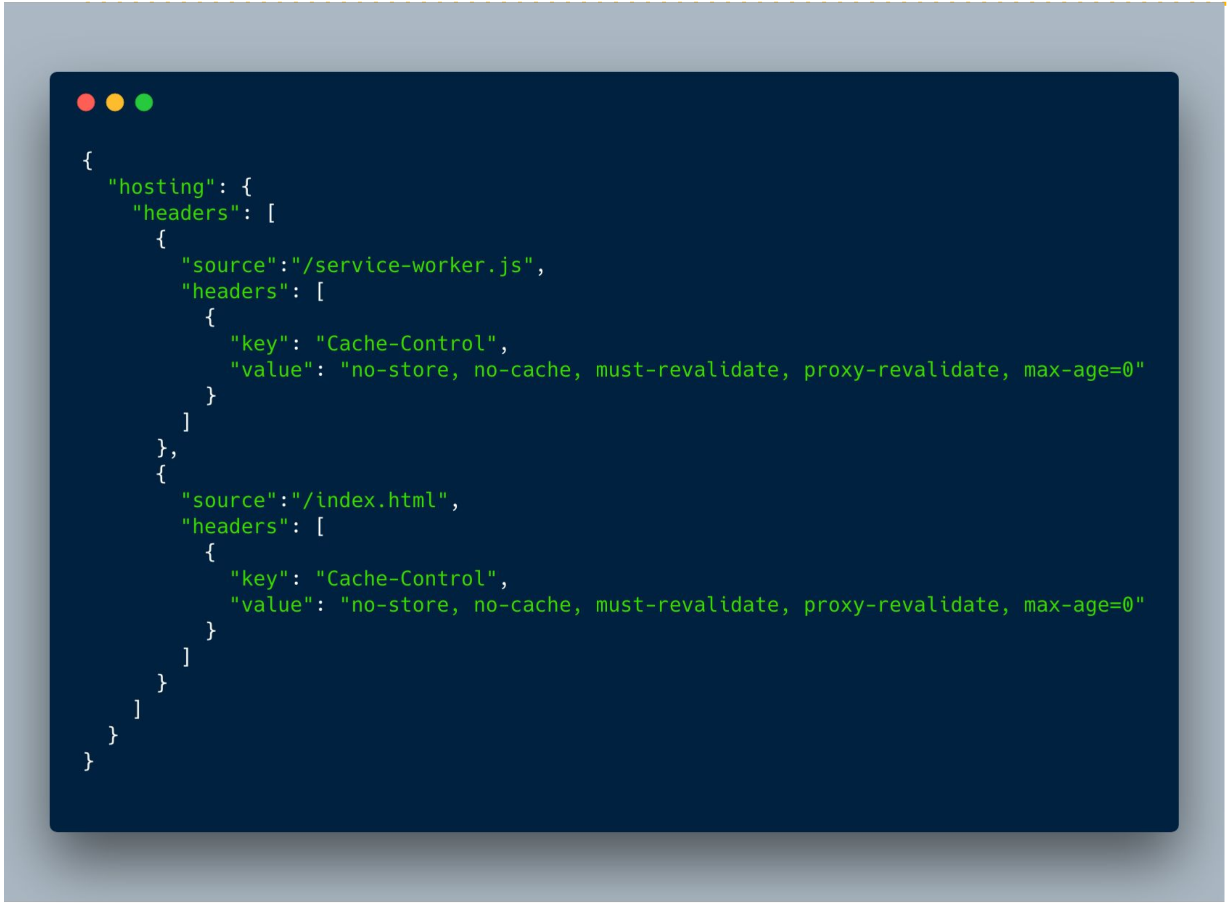
Firebase Hosting

- Full-managed static hosting with version control
- Free domain with SSL
- Production-ready with world-wide CDN
- Configurable
- Free

Easiest and best web server for client-side rendering apps (and server-side rendering too using Cloud Functions)

NEVER CACHE YOUR SERVICE WORKER FILE

Firebase Hosting Conf to prevent sw caching



```
{
  "hosting": {
    "headers": [
      {
        "source":"/service-worker.js",
        "headers": [
          {
            "key": "Cache-Control",
            "value": "no-store, no-cache, must-revalidate, proxy-revalidate, max-age=0"
          }
        ]
      },
      {
        "source":"/index.html",
        "headers": [
          {
            "key": "Cache-Control",
            "value": "no-store, no-cache, must-revalidate, proxy-revalidate, max-age=0"
          }
        ]
      }
    ]
  }
}
```

2

Practice:
Creating the Vue.js PWA

2

1. Install the Vue CLI `npm install -g @vue/cli`
2. Run `vue init pwa {project_name}` and setup your app
3. Run `npm run dev`
    a. Go offline. What is happening?
4. Let's change the app a little
    a. Rename the Hello.vue component to Contacts.vue. Update router file too!
    b. Clean the html template in Contacts.vue
    c. Return an array called contacts in the data function.
    d. Contacts is an array of objects with properties name and email. Make up two or three fake contacts.
    e. Use v-for to go over the array and render the contacts. Use whatever HTML tags you prefer
    f. OPTIONAL: add some CSS to make it look better

2

1. Create firebase project in the firebase web
2. Install the Firebase CLI **`npm install -g firebase-tools`**
3. Configure Firebase hosting
   a. Public directory must be *dist*
   b. Add no-cache headers as explained before
4. Build your app: **`npm run build`**
5. Serve your app: **`firebase serve`**
   a. Is offline working? Use the application tab in the chrome dev tools to check what's going on
6. Now deploy to your hosting: firebase deploy
   a. Visit your app url and verify is all working correctly!
7. Try doing some changes to your app and deploying.
   a. Is your app updating properly?
   b. How many times do you need to refresh the page to see changes?

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Offline data *“sin despeinarte”*

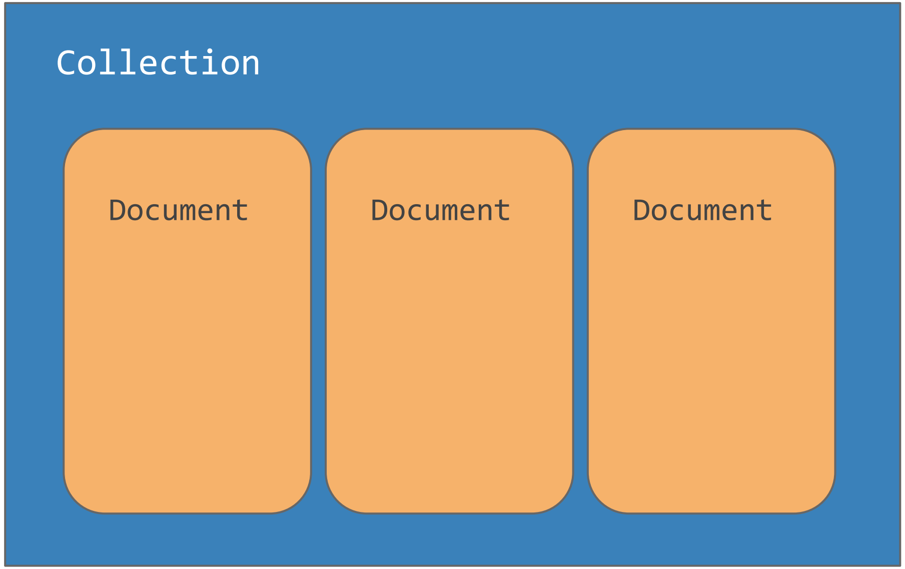
Cloud Firestore to the rescue

Cloud Firestore

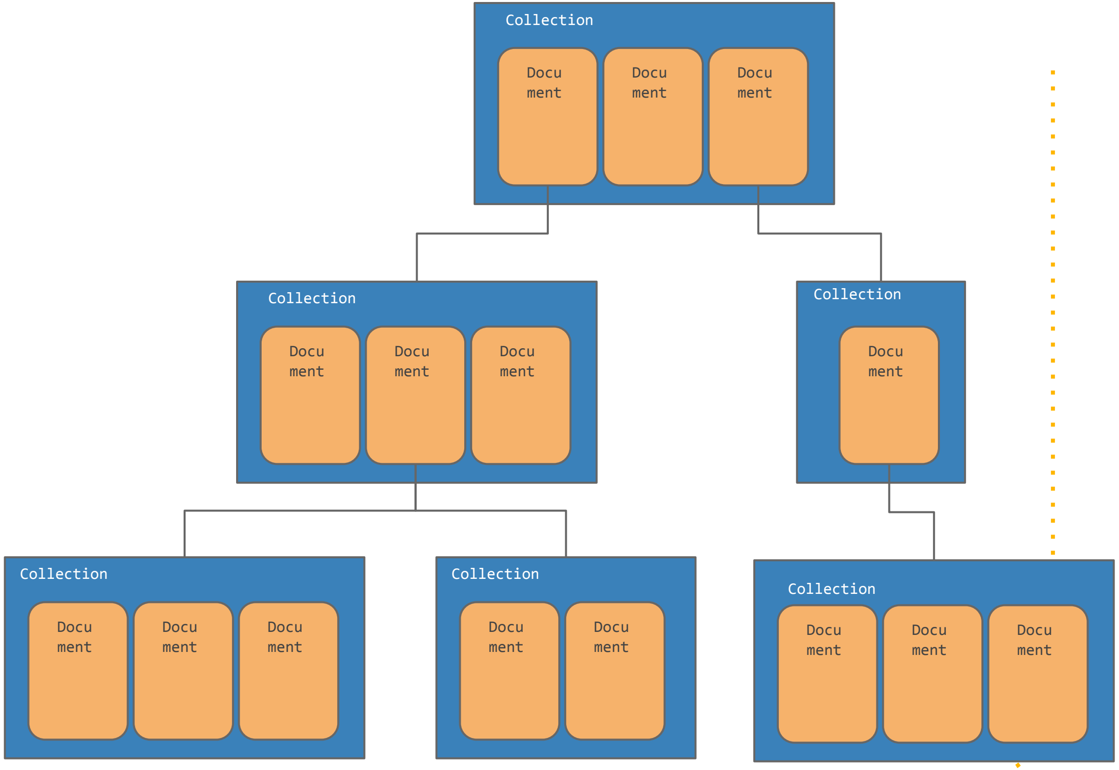
- Fully managed, NoSQL DB of hierarchical documents
- Expressive querying with indexing
- Flexible security rules
- Real-time events
- Automatic multi-region replication
- Easy offline data

Evolution of famous Firebase Real-time database

More **structured** data



With hierarchic relations



3

Practice: Add Cloud Firestore for offline data

3

1. Create data in Cloud Firestore using the firebase web
   a. Create a contacts collection
   b. Add some documents using auto-id and with name and email string fields
2. Prepare the app
   a. Leave the contacts array empty
   b. Add a “loading” message using v-if if the contacts array is empty
3. Add firebase to your PWA
   a. `npm install -s firebase`
   b. Use main.js and follow firebase docs
   c. Remember that we are using a bundler!

3

4. Query the data
    a. Use the mounted lifecycle method
    b. Get all docs in contacts collection
    c. For every doc, add doc.data() to the component contacts list
    d. Vue reactivity system will render the list
5. Build and verify everything is working
6. Enable offline for firebase
    a. In main.js, after initialization
    b. Follow the firebase docs
7. Build and deploy.
    a. Is it working offline?
    b. Inspect IndexedDB, can you find your docs?

4

Closing thoughts

TL;DL

Further work

- Offline write using Cloud Firestore
- Offline caching of “media files”
- Offline navigation inside app
- Performance: App shell and dynamic imports
- Push notifications
- App manifest
- ...

> *Offline-first is a long road, with challenges and still under active development, but there are production-ready tools to help you. There are plenty of Offline-first PWAs success stories. Will yours be the next?*

Thanks!

Any questions?

You can find me at @garcianavalon & garcianavalon@gmail.com

Special thanks to all the people who made and released these awesome resources for free. Presentation template by SlidesCarnival