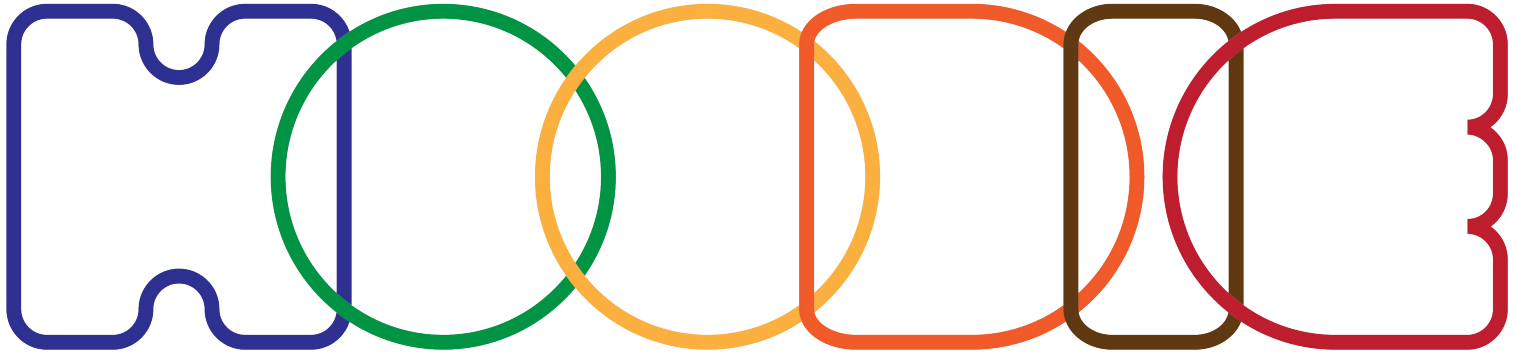
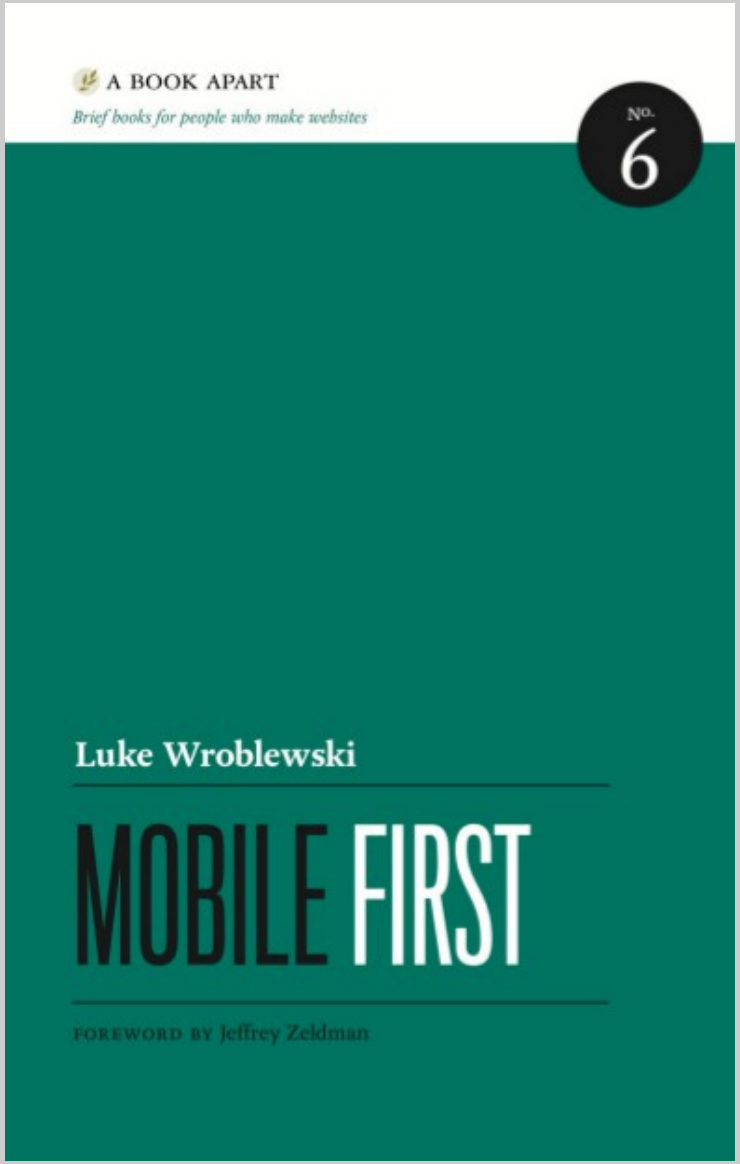
Offline First

@caolan


HOOD.IE

Unlike the always-wired machines of the past, computers are now truly personal, and people move through online and offline seamlessly

...our apps should do the same


A BOOK APART
Brief books for people who make websites
No. 6
Luke Wroblewski
MOBILE FIRST
FOREWORD BY Jeffrey Zeldman

“More often than not, the mobile experience for a Web application or site is designed and built after the PC version is complete. Here's three reasons why Web applications should be designed for **mobile first** instead.”

- Luke Wroblewski (2009)

1. Mobile is exploding

1. Mobile is exploding

2. Mobile forces you to focus

1. Mobile is exploding
2. Mobile forces you to focus
3. Mobile extends your capabilities

Say Hello to Offline First - Iceweasel
Say Hello to Offline F…
blog.hood.ie/2013/11/say-hello-to-offline-first/
DuckDuckGo
THIS WEEK OF HOODIE DEVELOPMENT IS SPONSORED BY SPOTME – SPONSOR US!

SAY HELLO TO OFFLINE FIRST

Prescript: Join the discussion on **offlinefirst.org** and help collecting information on the **Offline First Github Organisation**. And see the two follow up articles **Offline First and the Circle Of Web** and **Offline First and the Circle of Web Part II: Breaking the Circle**.

(**Russian translation** by **@kouprianov**)

The members of **Team Hoodie** are currently travelling around quite a bit, organising, participating in and attending conferences and workshops in various countries, and through all this we've not only made lots of personal experiences with limited network connectivity, but also met many people from all over the world, all with their own related stories and problems.

Frequently not having any data connection in even the wealthiest and most developed cities of the world has led us to conclude that no, the mobile connectivity/bandwidth issue isn't just going to solve itself on a global level anywhere in the near future.

Jan Lehnardt
@janl

Following

We launched offlinefirst.org last night with an introduction at blog.hood.ie/2013/11/say-he…

Join the conversation!

#offlinefirst

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RETWEETS	FAVORITES
35	26

11:22 AM - 6 Nov 2013

Christian Heilmann
@codepo8
Follow
Offline first - blog.hood.ie/2013/11/say-he… - I agree 100% by @hoodiehq
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RETWEETS
9
FAVORITES
14
7:49 PM - 5 Nov 2013

Jeffrey Zeldman
@zeldman

Follow

Offline First is the new progressive enhancement.

Reply Retweet Favorite Buffer ••• More

RETWEETS	FAVORITES
62	37

7:10 PM - 5 Nov 2013

> Offline First Meetup #1, Berlin

“When travelling, I take screenshots of important messages”

“before the release, you turn on flight mode on and check if the app crashes…”

“If it doesn’t, you consider the app 'offline-ready' ...this is not enough”

Offline is not an error

It's a legitimate use-case that isn't going away soon

TECHNOLOGY

1. Delivering the application
2. Detecting connectivity
3. Storing data
4. Syncing data

1. Delivering the application
2. Detecting connectivity
3. Storing data
4. Syncing data

```
<html manifest=”example.appcache”>
    ...
</html>
```

```
CACHE MANIFEST
# 2010-06-18:v2

# Explicitly cached 'master entries'.
CACHE:
/favicon.ico
index.html
stylesheet.css
images/logo.png
scripts/main.js

# Resources that require the user to be online.
NETWORK:
*

# static.html will be served if main.py is inaccessible
# offline.jpg will be served in place of all images in images/large/
# offline.html will be served in place of all other .html files
FALLBACK:
/main.py /static.html
images/large/ images/offline.jpg
```

1. The Application Cache will only update if the contents of the manifest file have changed

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2. It always serves from the cache, even when online (watch out for manifest renames)

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3. Non-cached files will not load on a cached page unless explicitly listed

1. The Application Cache will only update if the contents of the manifest file have changed
2. It always serves from the cache, even when online (watch out for manifest renames)
3. Non-cached files will not load on a cached page unless explicitly listed
4. User sees new content on next visit (requires double refresh)

Service Worker

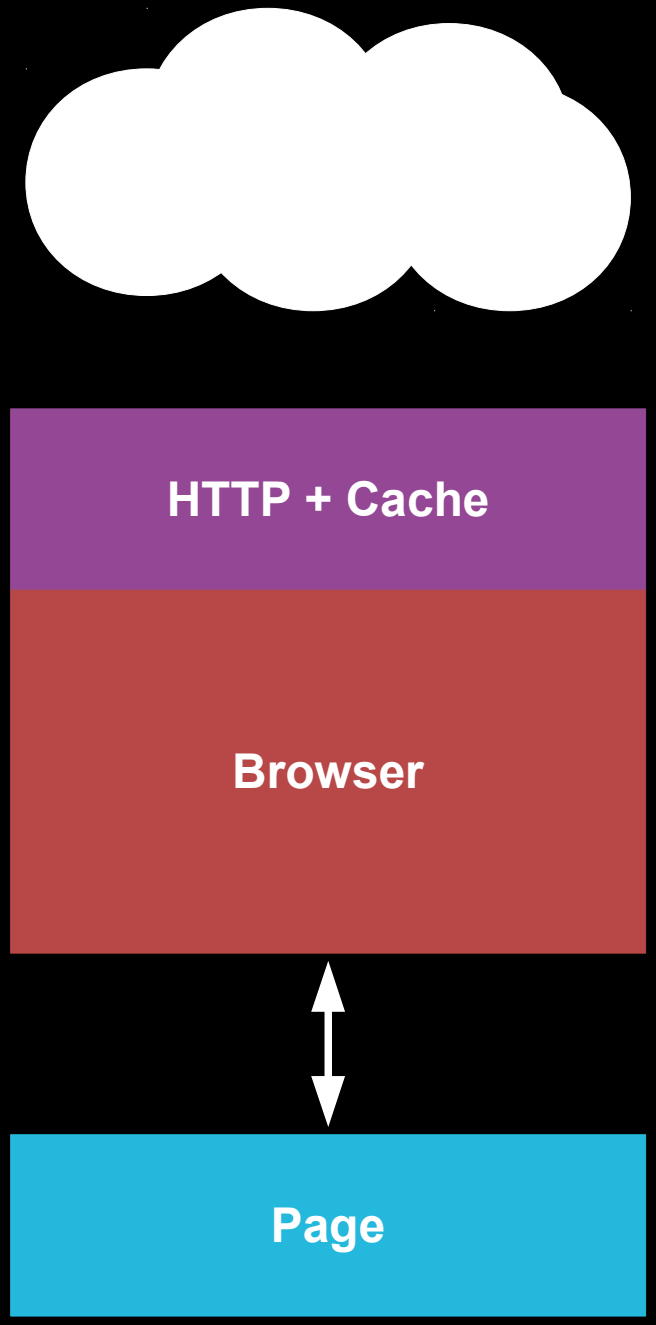
```
<html>
  <head>
    <script>
      navigator.serviceWorker.register("worker.js");
    </script>
  </head>
  ...
</html>
```

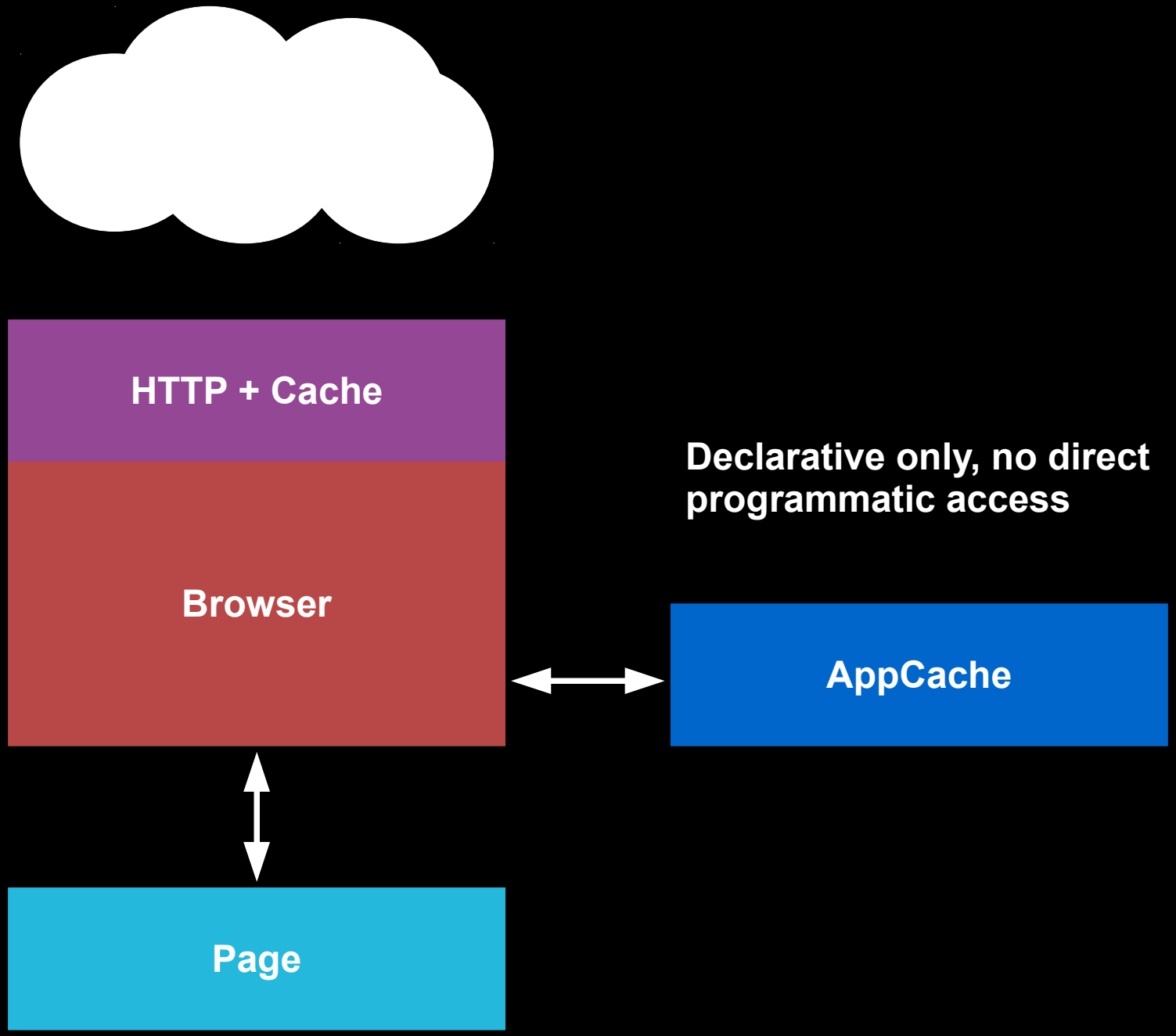
```
// worker.js

this.addEventListener("fetch", function (e) {
  if (e.request.url == “/data.json”) {
    e.respondWith(
      new Response({statusCode: 200, body: …})
    );
  }
});
```

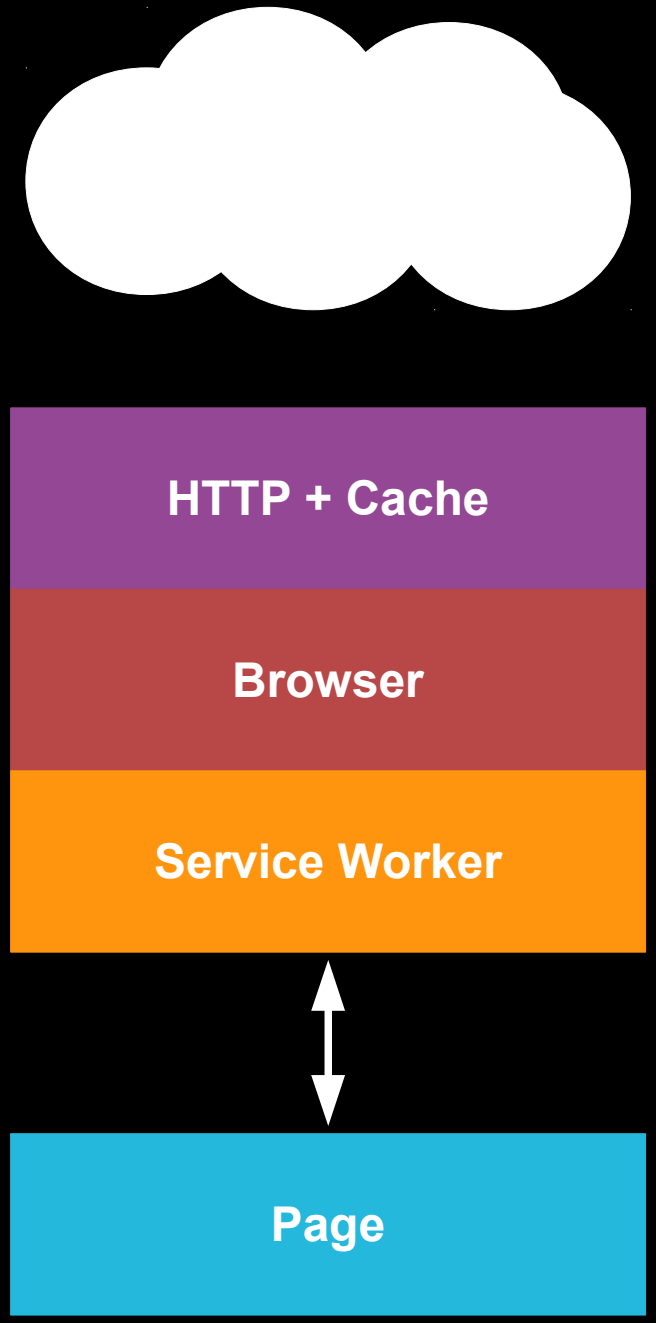
```
this.addEventListener("install", function (e) {
  // Create a cache of resources and fetch them.
  var resources = new Cache(
    “/app.html”,
    “/data.json”
  );
  // Wait until all resources are ready.
  e.waitUntil(resources.ready());
  // Set cache so we can use during onfetch
  caches.set("v1", resources);
});
```

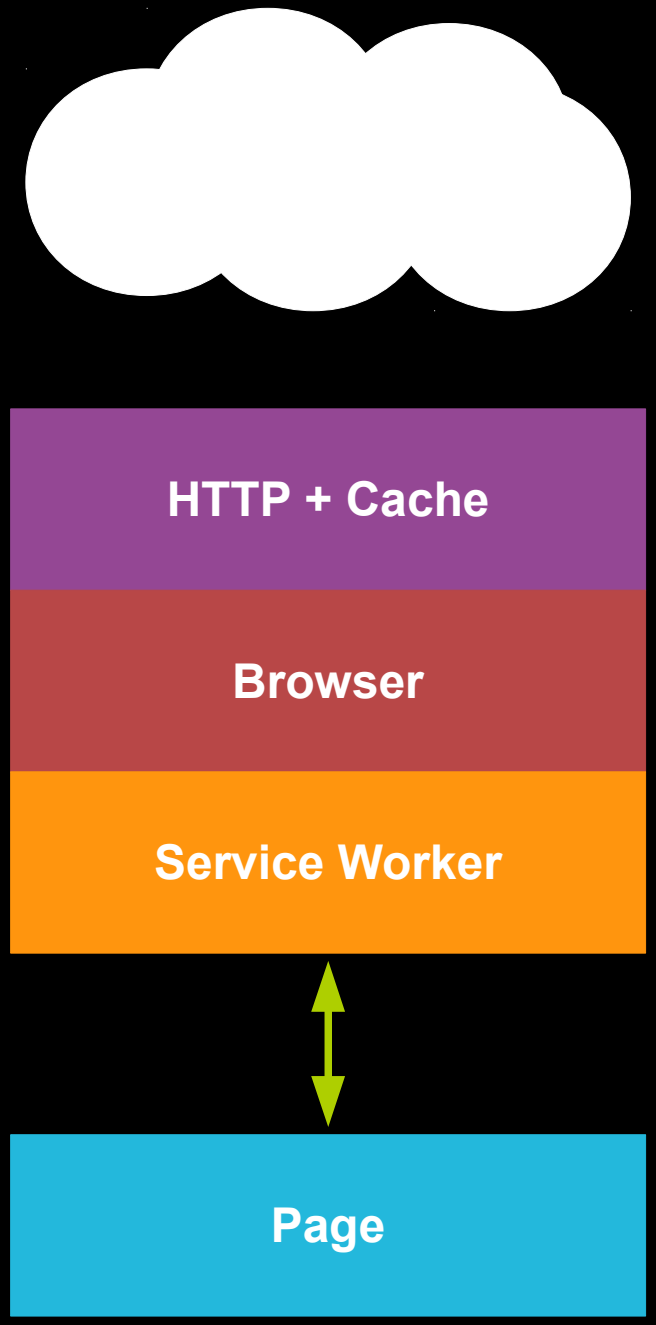
```
this.addEventListener("fetch", function (e) {
  // No "onfetch" events are dispatched to the
  // ServiceWorker until it successfully installs.
  e.respondWith(caches.match(e.request));
});
```


HTTP + Cache
Browser
Page

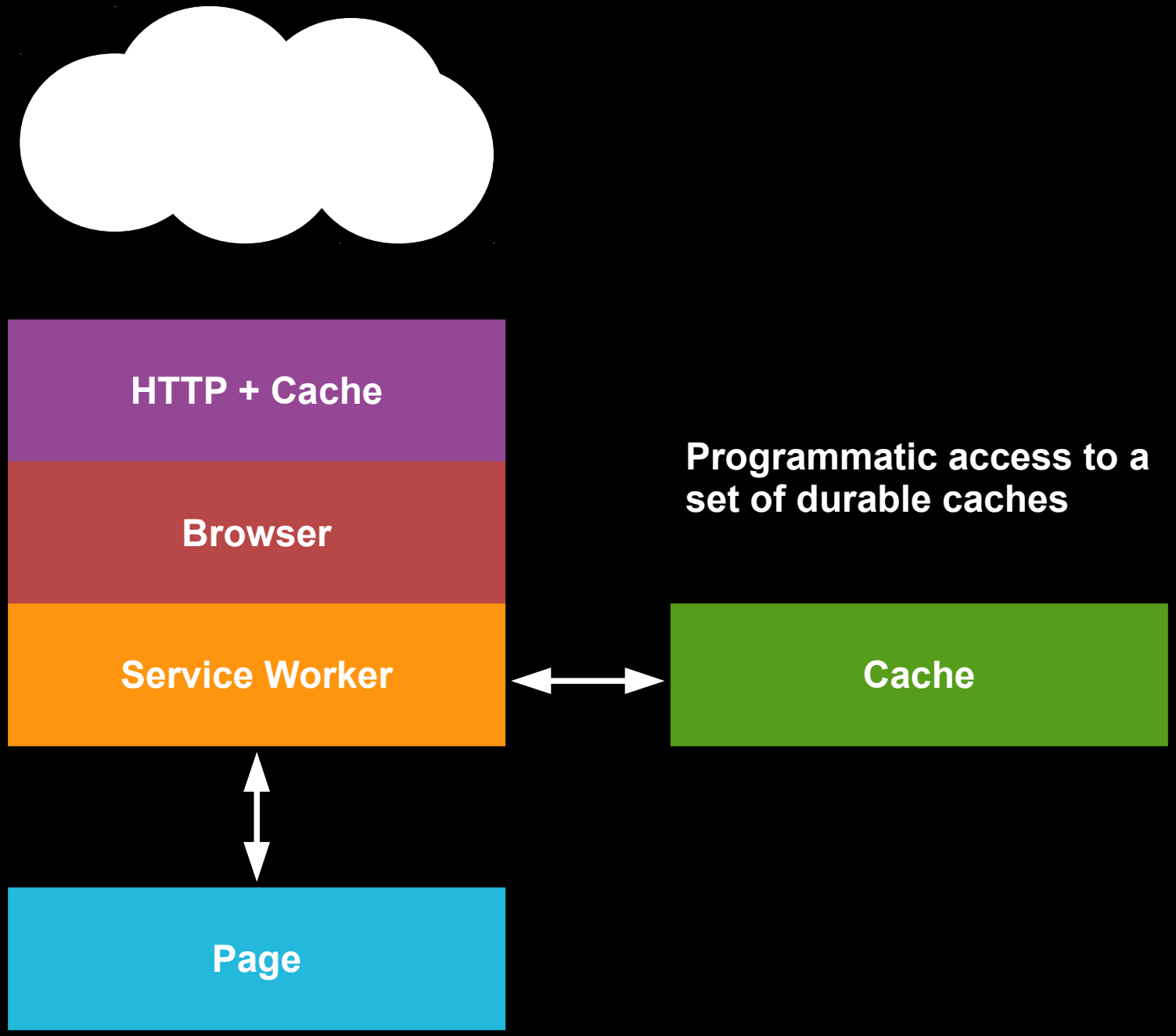

HTTP + Cache
Browser
Page
AppCache
Declarative only, no direct programmatic access

Sits between your page and the browser's network stack





It can intercept, modify and respond to network requests


HTTP + Cache
Browser
Service Worker
Page
Cache
Programmatic access to a set of durable caches

(Diagram totally stolen from @phuunet)

1. Delivering the application
2. **Detecting connectivity**
3. Storing data
4. Syncing data

```
if (navigator.onLine) {
  alert('online');
}
```

```
window.addEventListener("offline", ...);
window.addEventListener("online", ...);
```

In Chrome and Safari, if the Browser is not able to connect to a local area network (LAN) or a router, it is offline.

In Firefox and Internet Explorer, switching the browser to offline mode sends a false value. All other conditions return true.

```
var appcache = window.applicationCache;
appcache.addEventListener("error", function (e) {
  // probably offline
});
```

```
xhr.status === 0
xhr.readyState === 0
xhr.addEventListener('error', onDown, false);
xhr.addEventListener('timeout', onDown, false);
```

1. Delivering the application
2. Detecting connectivity
3. **Storing data**
4. Syncing data

LocalStorage

```
// The values we want to store offline.
var users = [
  {id: 1, fullName: 'Matt'},
  {id: 2, fullName: 'Bob'}
];

// Let's save it for the next time we load the app.
localStorage.setItem('users', JSON.stringify(users));

// The next time we load the app, we can do:
var users = JSON.parse(localStorage.getItem('users'));
```

1. It's dead simple

1. It's dead simple
2. It's well supported by browsers

Web Storage - name/value pairs - **Recommendation**

Method of storing data locally like cookies, but for larger amounts of data (sessionStorage and localStorage, used to fall under HTML5).

*Usage stats:	Global
Support:	89.04%
Partial support:	0.09%
Total:	89.13%

Show all versions	IE	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Blackberry Browser	IE Mobile
								2.1		
								2.2		
						3.2		2.3		
						4.0-4.1		3.0		
	8.0					4.2-4.3		4.0		
	9.0		31.0			5.0-5.1		4.1		
	10.0	26.0	32.0			6.0-6.1		4.2-4.3	7.0	
Current	11.0	27.0	33.0	7.0	19.0	7.0	5.0-7.0	4.4	10.0	10.0
Near future		28.0	34.0		20.0					
Farther future		29.0	35.0		21.0					
3 versions ahead		30.0	36.0							

Notes | Known issues (0) | Resources (6) | Feedback

Edit on GitHub

In private browsing mode Safari and iOS Safari don't support setting localStorage.

1. It's synchronous (blocks UI)

1. It's synchronous (blocks UI)
2. Only strings, no Blobs

1. It's synchronous (blocks UI)
2. Only strings, no Blobs
3. No clean way to detect reaching the storage limit (~5mb)

IndexedDB

```
var db;
var dbName = "dataspace";

var users = [
  {id: 1, fullName: 'Matt'},
  {id: 2, fullName: 'Bob'}
];

var request = indexedDB.open(dbName, 2);

request.onerror = function (event) {
  // Handle errors.
};
request.onupgradeneeded = function (event) {
  db = event.target.result;
  var objectStore = db.createObjectStore("users", { keyPath: "id" });
  objectStore.createIndex("fullName", "fullName", { unique: false });
  objectStore.transaction.oncomplete = function (event) {
    var userObjectStore = db.transaction("users", "readwrite").objectStore("users");
  }
};

// Once the database is created, let's add our user to it...
var transaction = db.transaction(["users"], "readwrite");

// Do something when all the data is added to the database.
transaction.oncomplete = function (event) {
  console.log("All done!");
};

transaction.onerror = function (event) {
  // Don't forget to handle errors!
};

var objectStore = transaction.objectStore("users");

for (var i in users) {
  var request = objectStore.add(users[i]);
  request.onsuccess = function (event) {
    // Contains our user info.
    console.log(event.target.result);
  };
}
```

1. Asynchronous

1. Asynchronous
2. Transactions

1. Asynchronous
2. Transactions
3. No need to serialize/deserialize

1. Asynchronous
2. Transactions
3. No need to serialize/deserialize
4. Indexes

1. Asynchronous
2. Transactions
3. No need to serialize/deserialize
4. Indexes
5. Higher storage limits
   (browser usually asks >50mb)

1. More complicated API

1. More complicated API
2. Supported by fewer browsers

IndexedDB - Working Draft

Method of storing data client-side, allows indexed database queries. Previously known as WebSimpleDB API.

*Usage stats:	Global
Support:	62.52%
Partial support:	1.54%
Total:	64.06%

Show all versions	IE	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Blackberry Browser	IE Mobile
								2.1		
								2.2		
						3.2		2.3		
						4.0-4.1		3.0		
	8.0					4.2-4.3		4.0		
	9.0		31.0			5.0-5.1		4.1		
	10.0	26.0	32.0			6.0-6.1		4.2-4.3	7.0	
Current	11.0	27.0	33.0	7.0	19.0	7.0	5.0-7.0	4.4	10.0 webkit	10.0
Near future		28.0	34.0		20.0					
Farther future		29.0	35.0		21.0					
3 versions ahead		30.0	36.0							

Notes | Known issues (1) | Resources (5) | Feedback

Edit on GitHub

Partial support in BB10 refers to an outdated specification being implemented. Code targeting the current state of the specification might not work.

Wrappers

localForage: Offline Storage, Improved

on February 12, 2014 by tofumatt, Robert Nyman [Editor] and Angelina Fabbro
in Featured Article IndexedDB localStorage Offline
33 comments Share This

Web apps have had offline capabilities like saving large data sets and binary files for some time. You can even do things like cache MP3 files. Browser technology can store data offline and plenty of it. The problem, though, is that the technology choices for how you do this are fragmented.

`localStorage` gets you really basic data storage, but it's slow and can't handle binary blobs. `IndexedDB` and `WebSQL` are asynchronous, fast, and support large data sets, but their APIs aren't very straightforward. Even still, neither `IndexedDB` nor `WebSQL` have support from all of the major browser vendors and that doesn't seem like something that will change in the near future.

If you need to write a web app with offline support and don't know where to start, then this is the article for you. If you've ever tried to start working with offline support but it made your head spin, this article is for you too. Mozilla has made a library called localForage that makes storing data offline in *any*

ABOUT THE AUTHORS

tofumatt
Matt is a front-end developer from the Mozilla Apps team. He lives in Montreal, where he writes web apps and libraries for developers. Check out his code on GitHub or chat with him about motorcycles on Twitter.

lonelyvegan.com
@tofumatt

Read more articles by tofumatt…

Robert Nyman [Editor]
Channel Marketing Manager for the Mozilla Developer

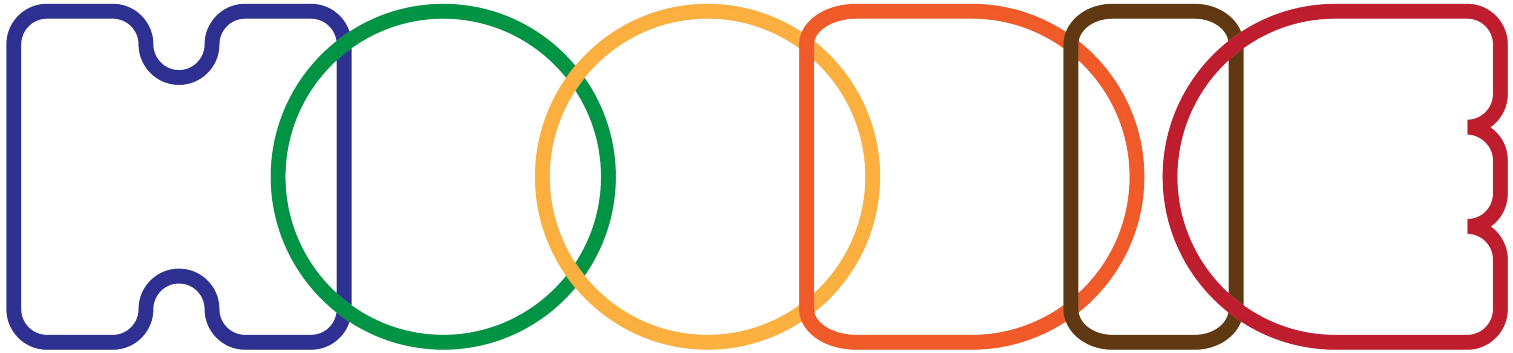
```
// The values we want to store offline.
var users = [
  {id: 1, fullName: 'Matt'},
  {id: 2, fullName: 'Bob'}
];

// save the values
localForage.setItem('users', users, function (result) {
    console.log(result);
});
```

1. Delivering the application
2. Detecting connectivity
3. Storing data
4. **Syncing data**

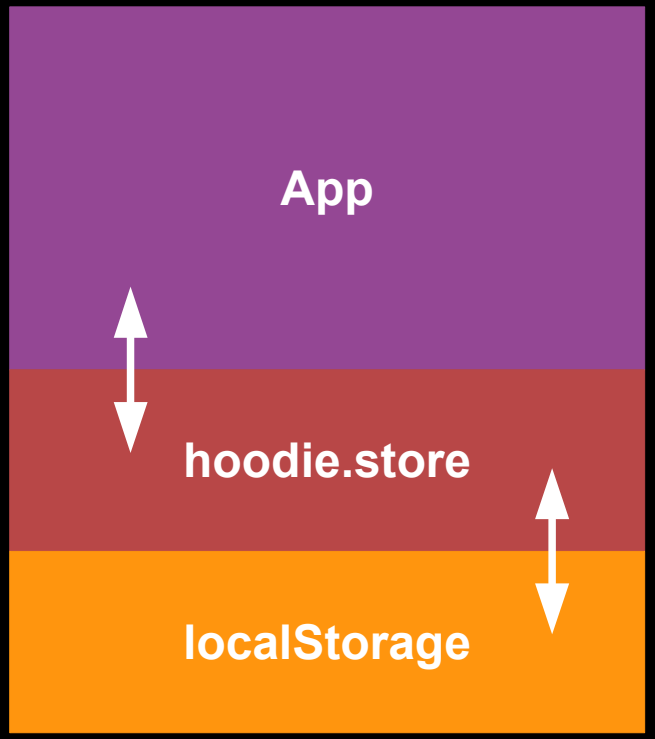
CouchDB

relax

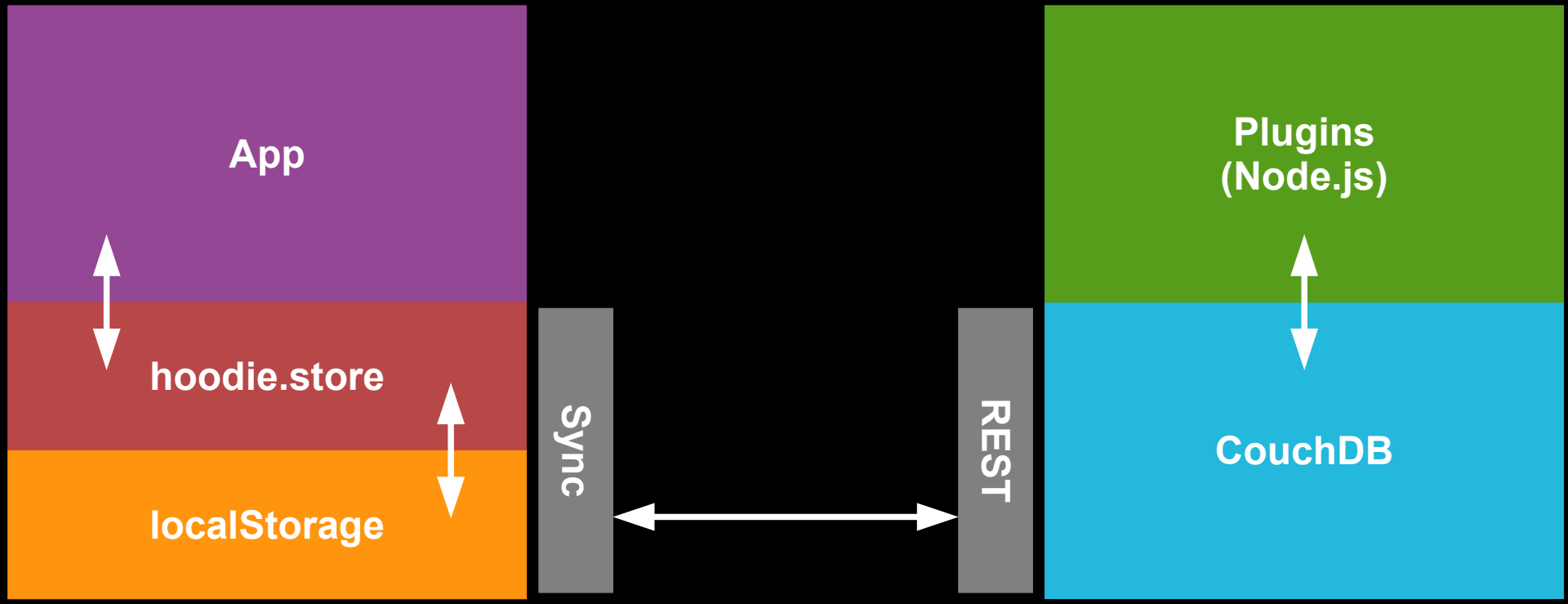

HOOD.IE

Offline by default

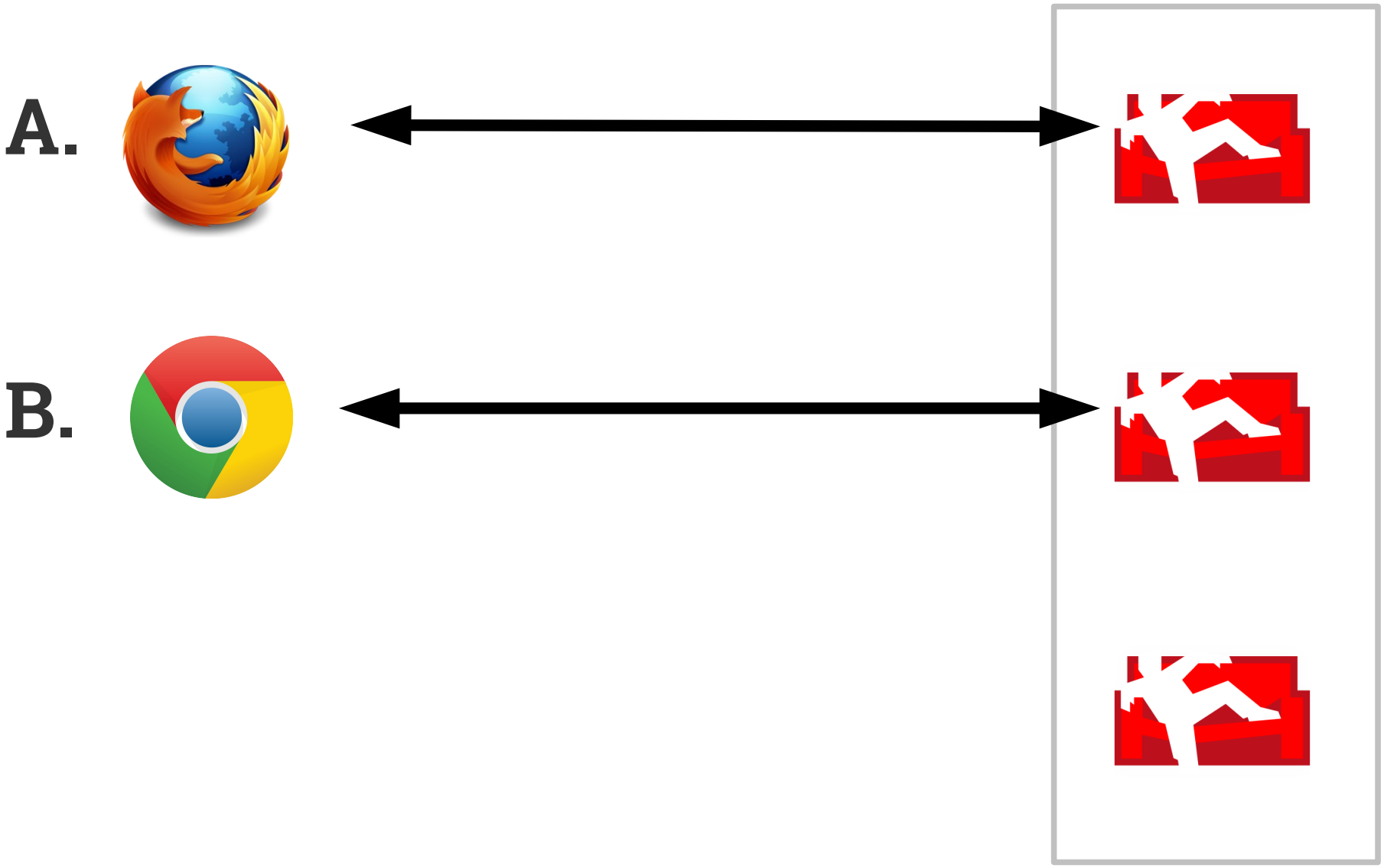
Hoodie Sync

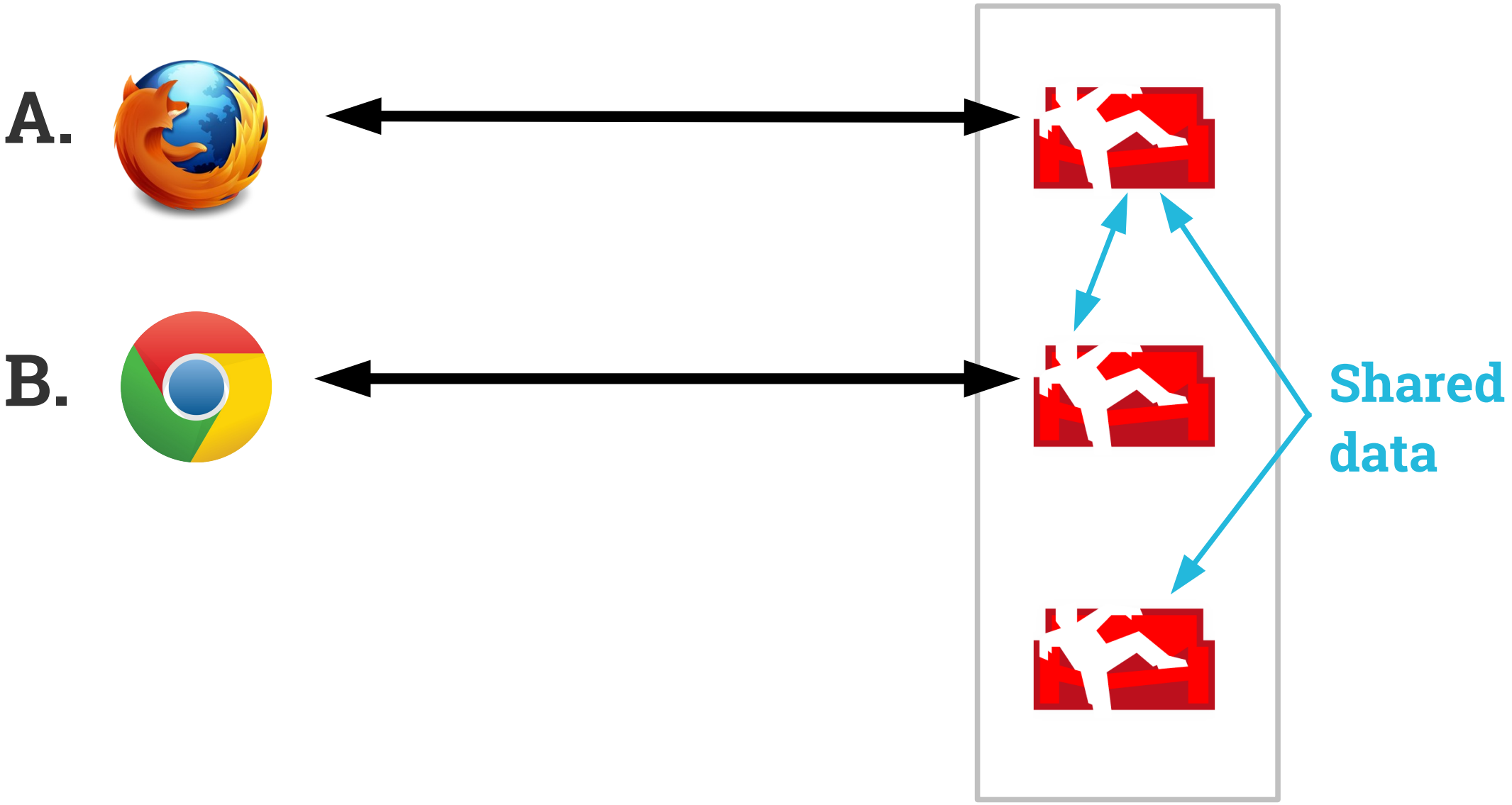


Hoodie Sync


App
hoodie.store
localStorage
Sync
REST
Plugins
(Node.js)
CouchDB

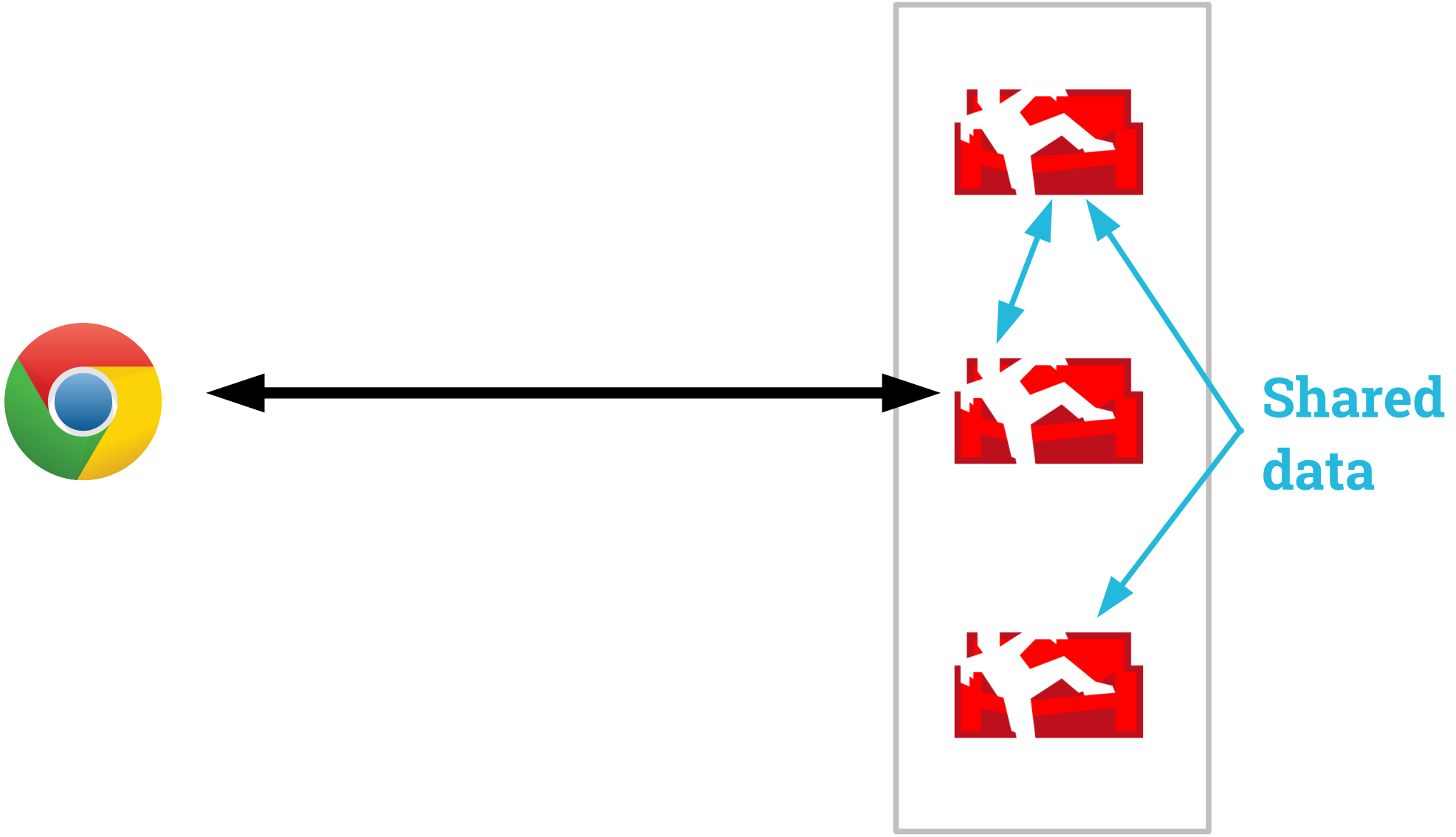
Database per-user

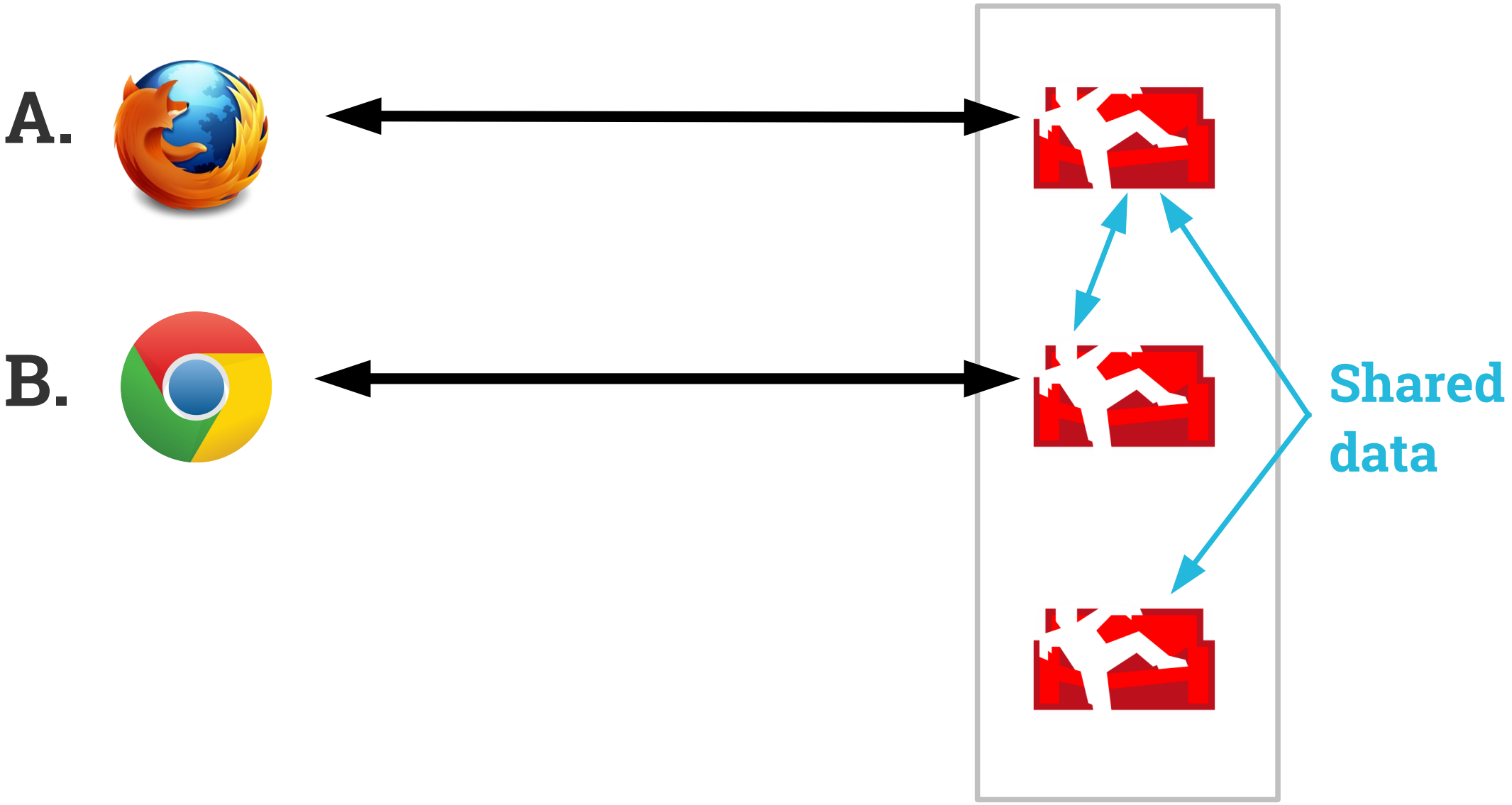

A.
B.


A.
B.
Shared data

A.

B.




A.
B.
Shared data

Sync is hard
(use existing protocols where possible)

Fork me on GitHub

The Database that Syncs!

PouchDB is an Open Source JavaScript Database inspired by Apache CouchDB that is designed to run well within the browser.

PouchDB was created to help web developers build applications that work equally as well offline as they do online. It enables applications to store data locally while offline, and synchronise it with CouchDB and compatible servers when the application is back online, keeping the user's data in sync no matter where they next login.

```
var db = new PouchDB('dbname');

db.put({
  _id: 'dave@gmail.com',
  name: 'David',
  age: 66
});

db.changes({
  onChange: function() {
    console.log('Ch-Ch-Changes');
  }
});

db.replicate.to('http://example.com/mydb');
```

Cross Browser

Works in Firefox, Chrome, Opera, Safari, IE and Node.js

Lightweight

PouchDB is just a script tag and 65KB away in the browser, or `$ npm install pouchdb` away in node.

Learn More »

JS Git by Tim Caswell — Kickstarter - Iceweasel

JS Git by Tim Caswel...

https://www.kickstarter.com/projects/creationix/js-git

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JS Git

by Tim Caswell

Home Updates 6 Backers 405 Comments 7 Texarkana, TX Open Software

Funded! This project was successfully funded on Mar 30, 2013.

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backers

$19,587
pledged of $12,000 goal

0
seconds to go

Project by
Tim Caswell
Texarkana, TX
Contact me

First created · 2 backed

Tim Caswell 243 friends

You need to think about...

Queuing of tasks & events
(resumable sync)

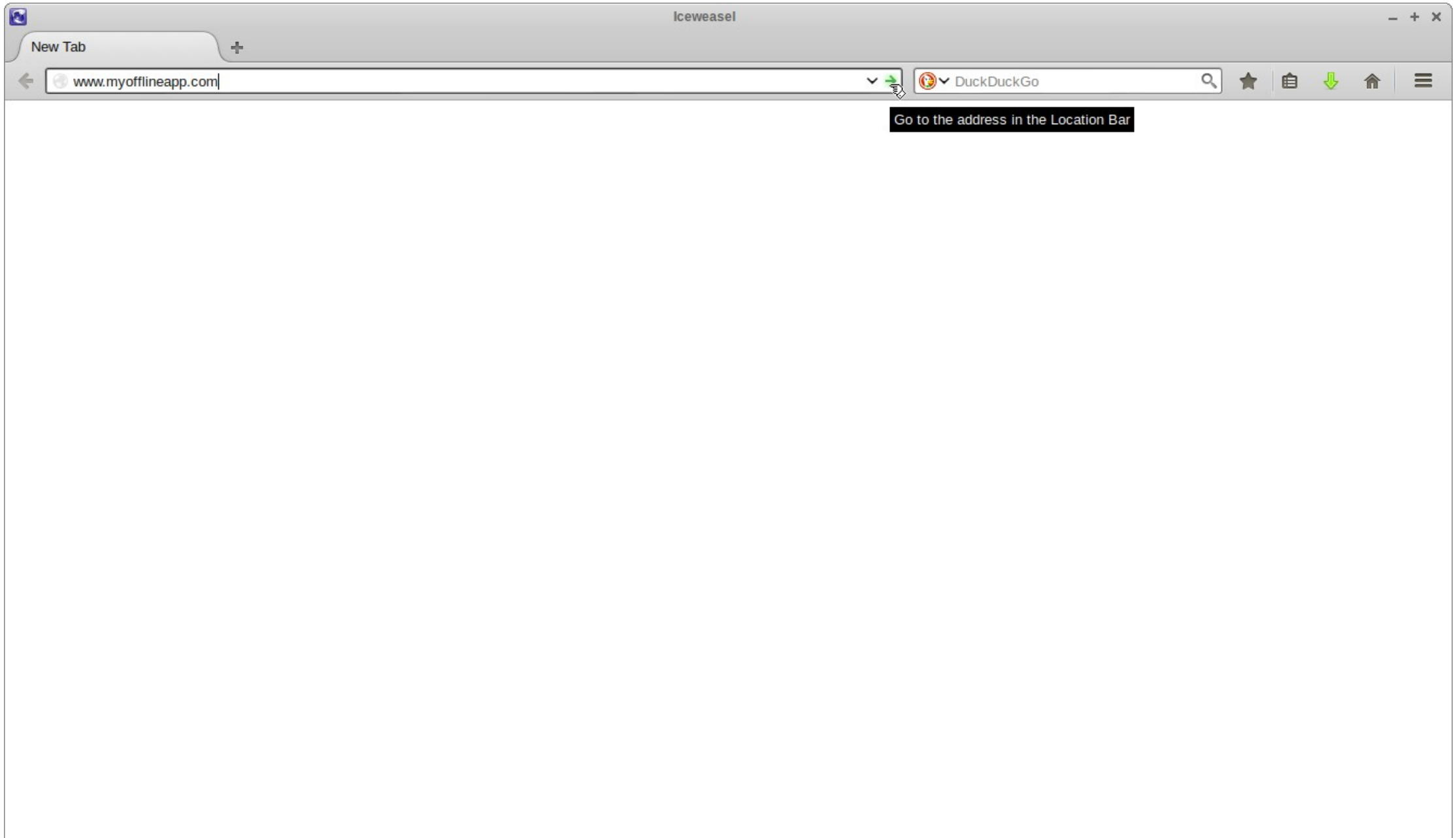
Identity
(sandboxing & access control)

Conflicts

(this affects your data model!)

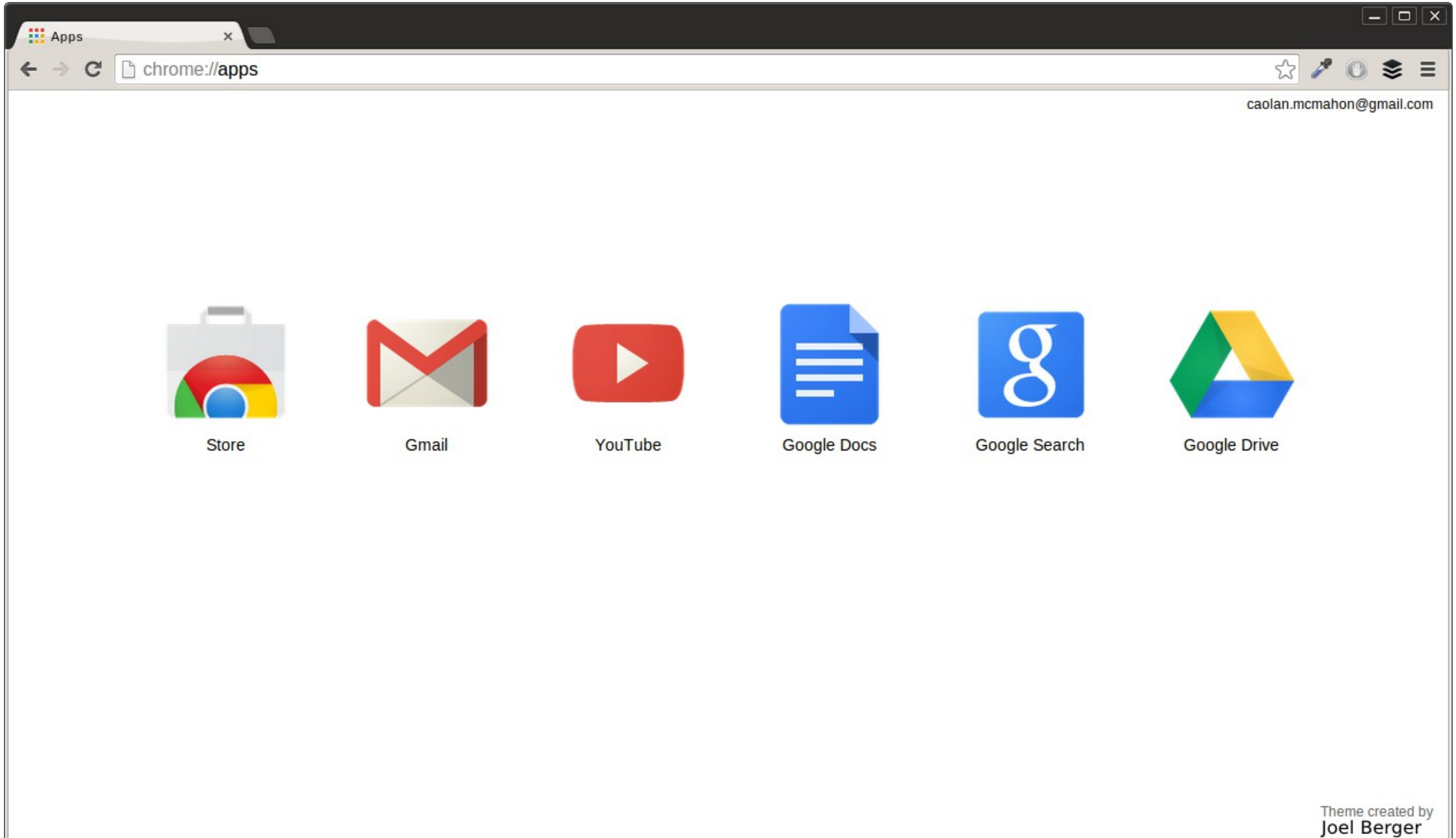
DESIGN

Launching should feel natural


Iceweasel
New Tab
www.myofflineapp.com
DuckDuckGo
Go to the address in the Location Bar

Iceweasel
New Tab
www.myofflineapp.com
DuckDuckGo
Go to the address in the Location Bar

...what, really?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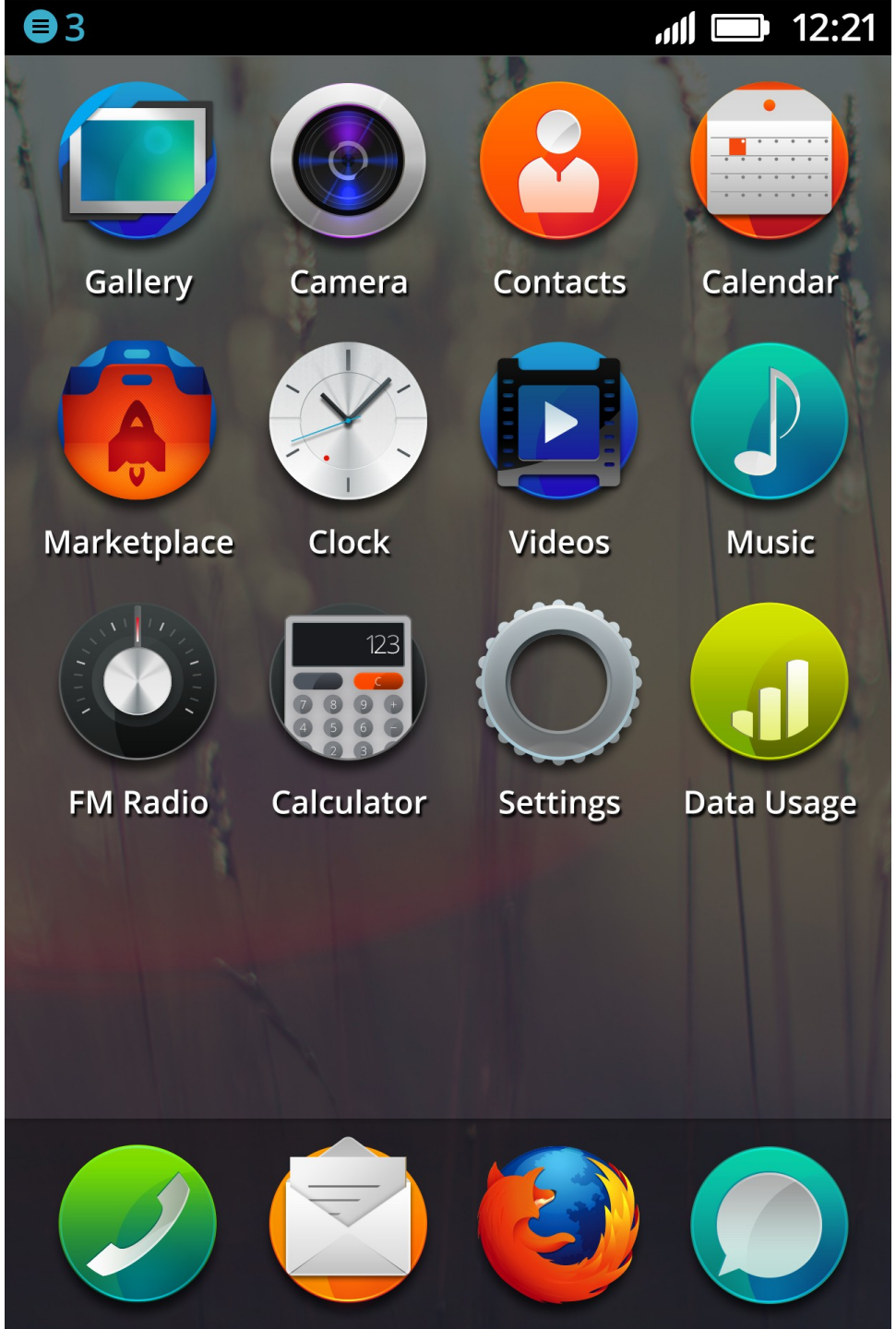
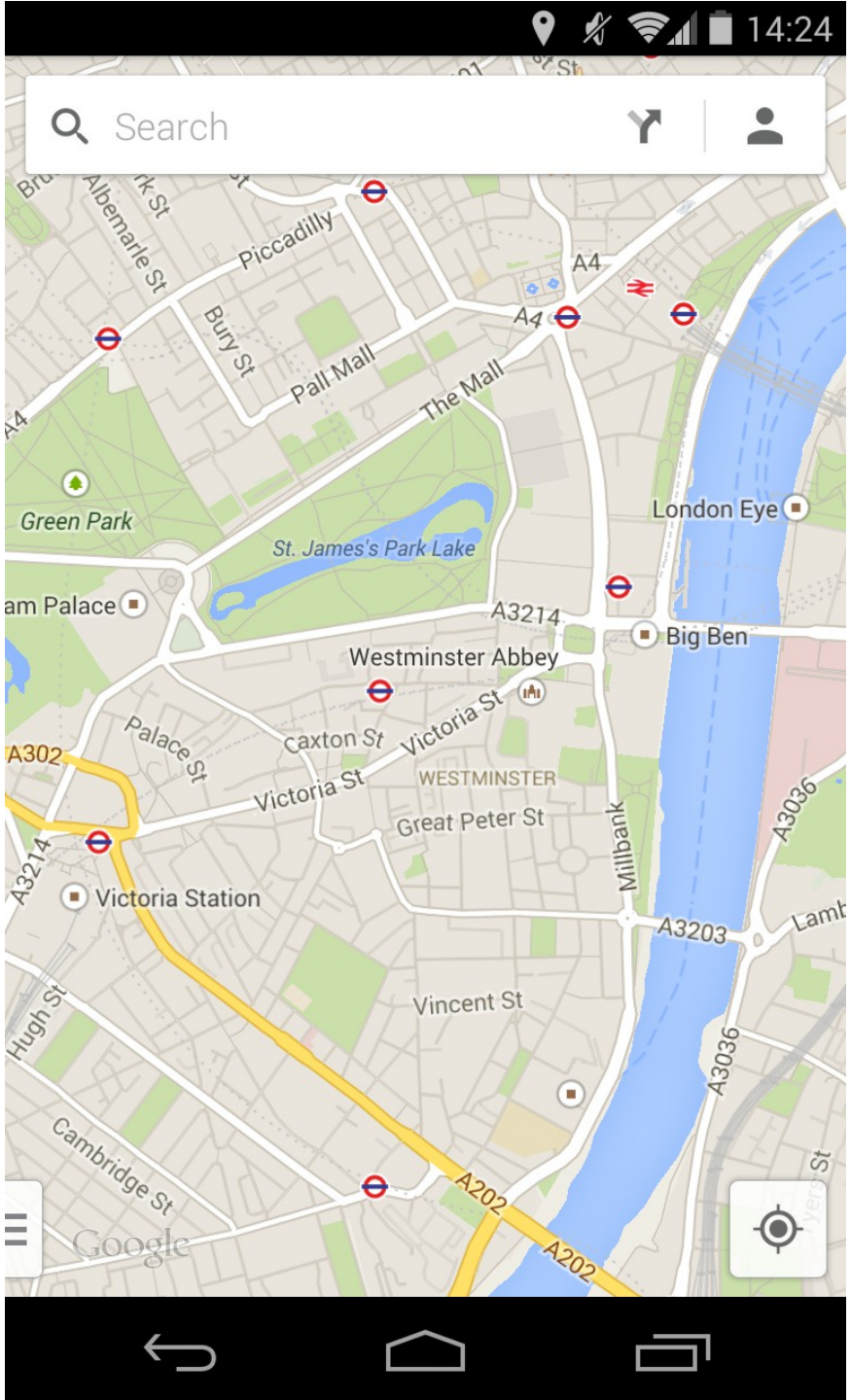
Store
Gmail
YouTube
Google Docs
Google Search
Google Drive
Theme created by
Joel Berger


3
12:21
Gallery
Camera
Contacts
Calendar
Marketplace
Clock
Videos
Music
FM Radio
Calculator
Settings
Data Usage

Offline should not be an after-thought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Search
Piccadilly
Albemarle St
Bury St
Pall Mall
The Mall
A4
A4
Green Park
St. James's Park Lake
London Eye
Big Ben
A3214
Westminster Abbey
Victoria St
Caxton St
Palace St
A302
Victoria St
WESTMINSTER
Great Peter St
Millbank
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Victoria Station
A3203
Vincent St
Hugh St
Cambridge St
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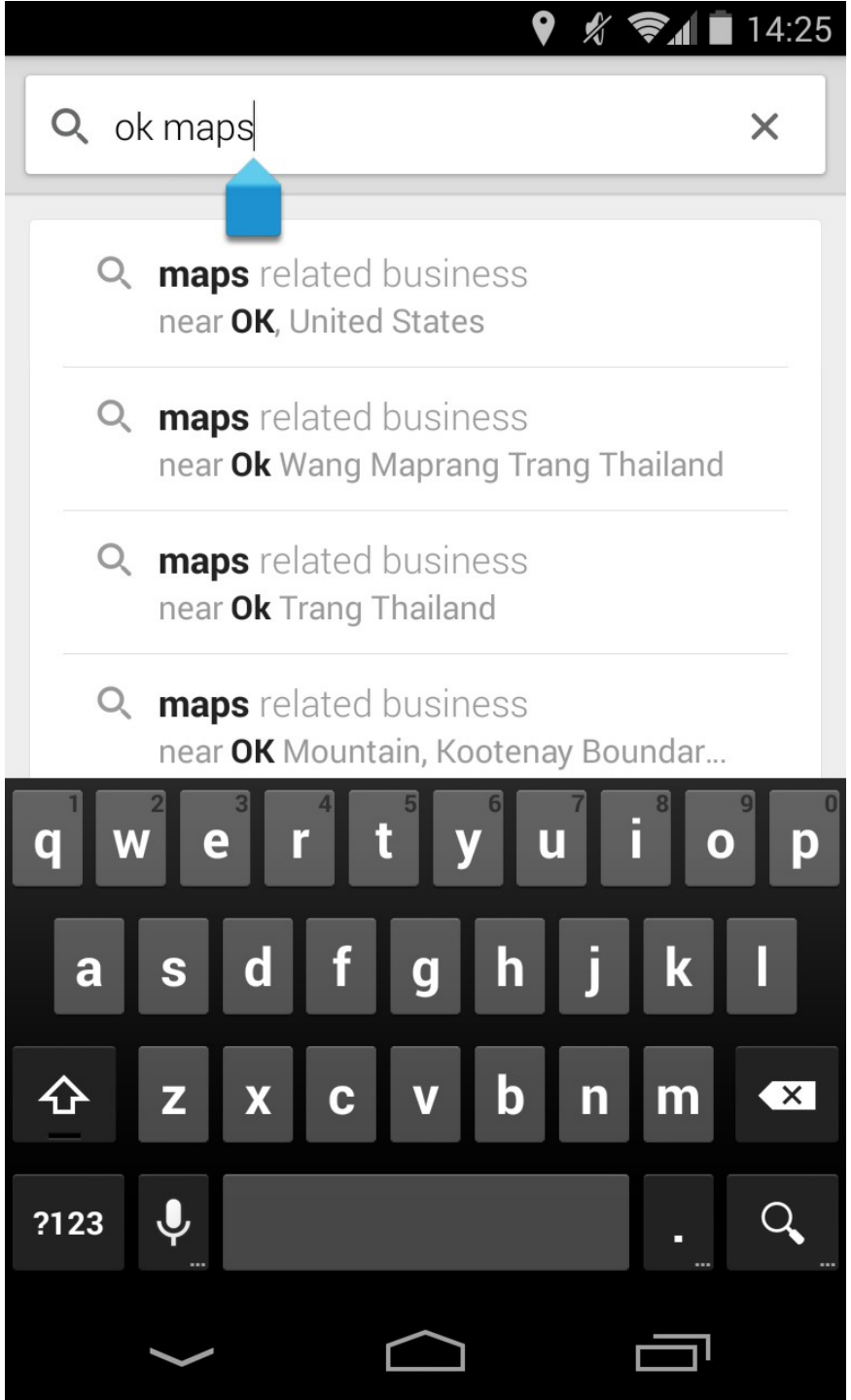
Google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ok maps
maps related business
near OK, United States
maps related business
near Ok Wang Maprang Trang Thailand
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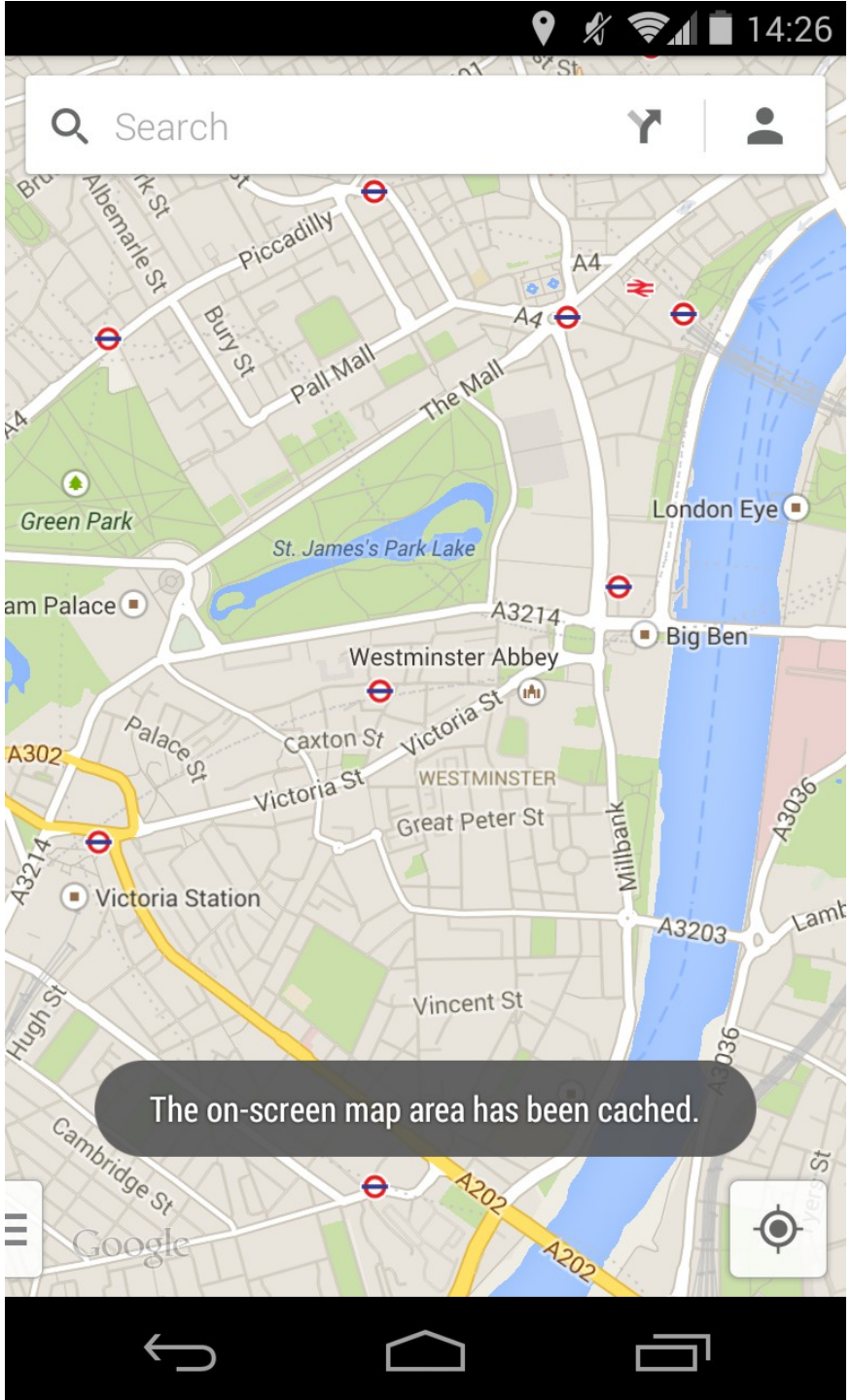
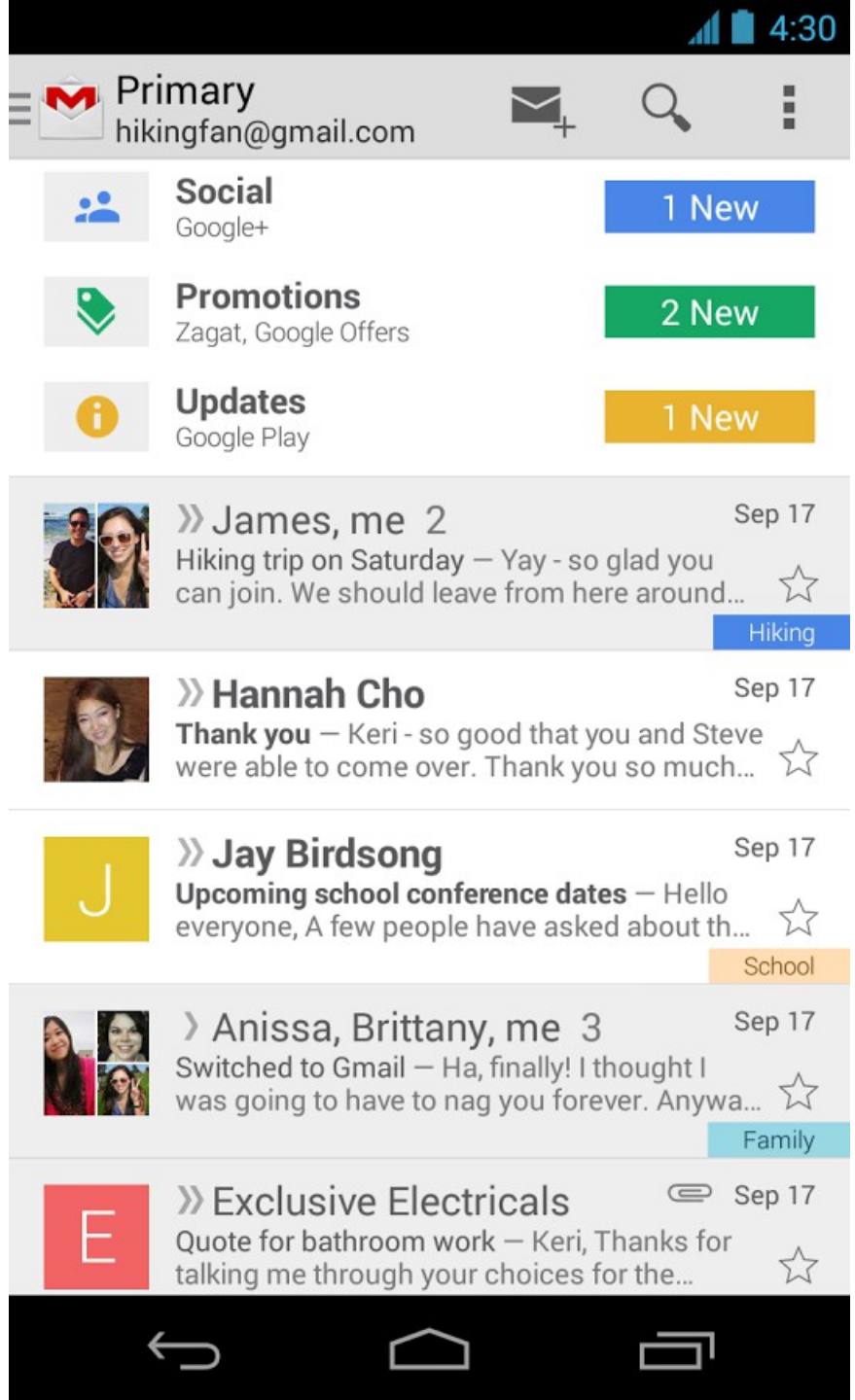
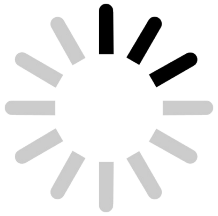
maps related business
near OK Mountain, Kootenay Boundar...
?123


14:26
Search
Piccadilly
Albemarle St
Bury St
Pall Mall
The Mall
A4
Green Park
St. James's Park Lake
London Eye
Big Ben
A3214
Westminster Abbey
Victoria St
Caxton St
Palace St
A302
WESTMINSTER
Great Peter St
Millbank
A3036
Victoria Station
A3203
Vincent St
Hugh St
Cambridge St
A202
Google
The on-screen map area has been cached.

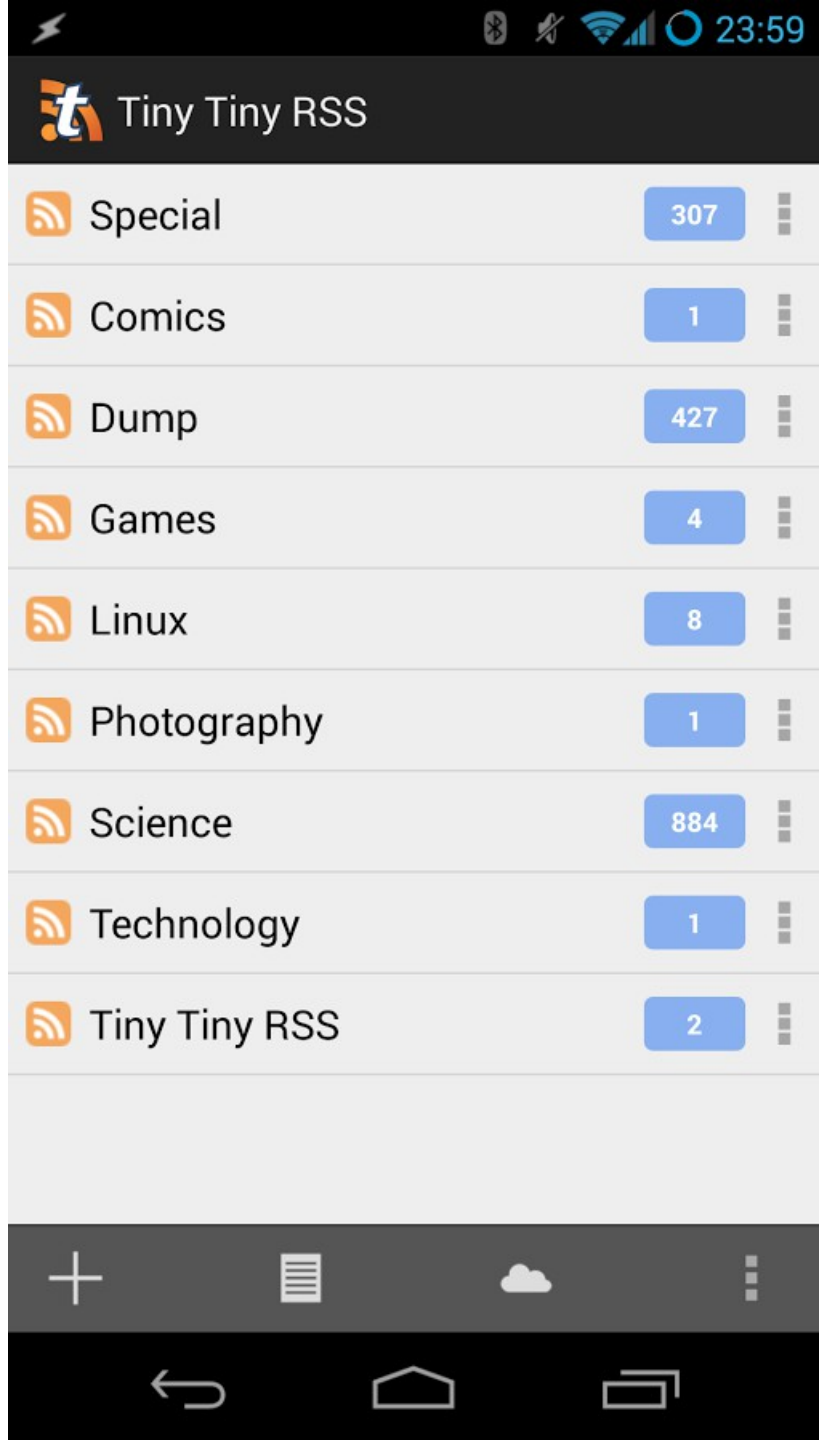
Offline content should be trust-worthy


4:30
Primary
hikingfan@gmail.com
Social
Google+
1 New
Promotions
Zagat, Google Offers
2 New
Updates
Google Play
1 New
James, me 2
Sep 17
Hiking trip on Saturday — Yay - so glad you can join. We should leave from here around...
Hiking
Hannah Cho
Sep 17
Thank you — Keri - so good that you and Steve were able to come over. Thank you so much...
J
Jay Birdsong
Sep 17
Upcoming school conference dates — Hello everyone, A few people have asked about th...
School
Anissa, Brittany, me 3
Sep 17
Switched to Gmail — Ha, finally! I thought I was going to have to nag you forever. Anywa...
Family
E
Exclusive Electricals
Sep 17
Quote for bathroom work — Keri, Thanks for talking me through your choices for the...



The spinner is a lie

I shouldn't have to plan ahead


23:59
Tiny Tiny RSS
Special 307
Comics 1
Dump 427
Games 4
Linux 8
Photography 1
Science 884
Technology 1
Tiny Tiny RSS 2

Oh ...and docs should be on the device, not just a link to your website!

IMPACT

Mobile is huge, offline first ensures great mobile experiences

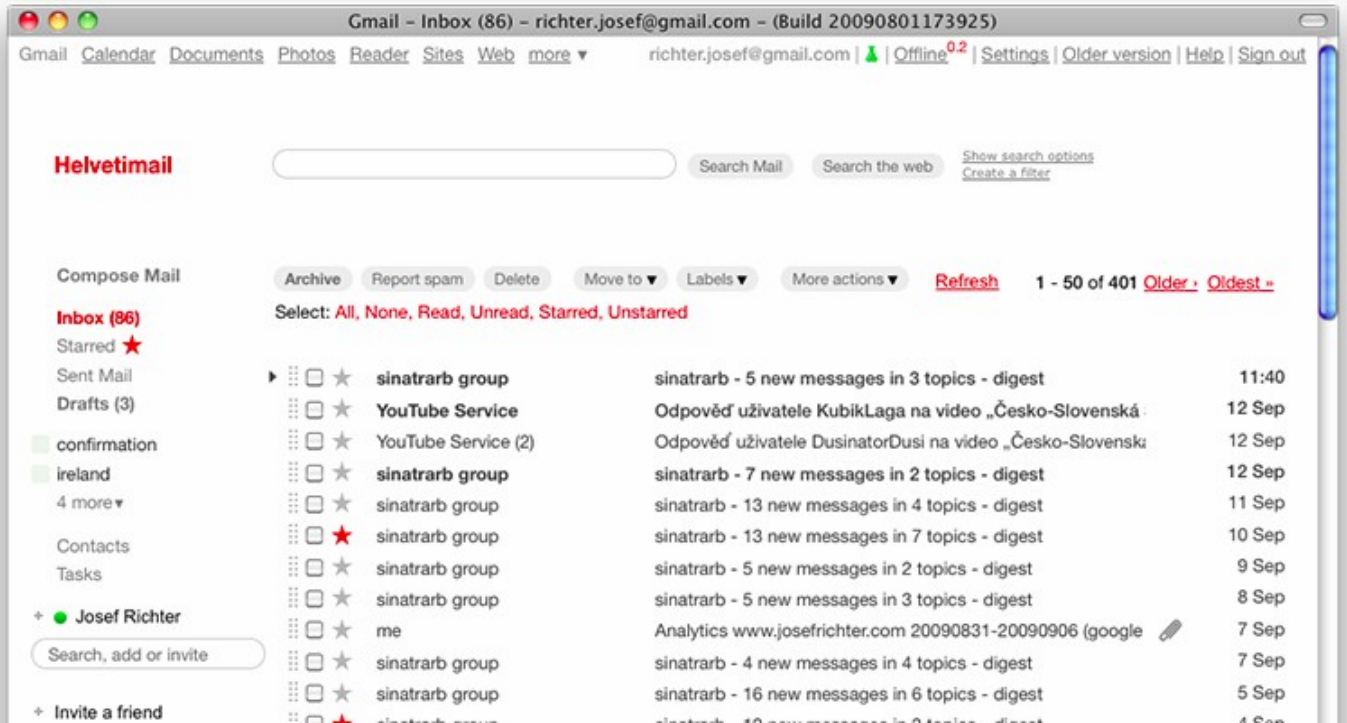
It gives users control

Helvetimail

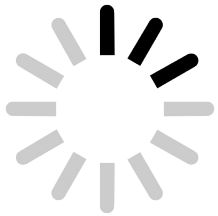
a minimalist Gmail skin

Update: Maintaining Helvetimail is not easy, because Google's CSS is a mess and keeps changing. It demands more time than I am able to regularly devote. I've never meant to make Helvetimal a paid upgrade. But now I would like to kindly ask you for even a tiny donation, so that I can spend a few more hours/days on Helvetimal, fix what's still unfixed, maybe prepare an **iPad version**, etc. Please note this is not to make me rich, but just to cover at least a part of the time cost needed to maintain Helvetimal. The economic downturn makes me do more work for less money, so spare time for hobbies like Helvetimail is scarce. Thank you very much!

Donate



It's about trust



Forces you to consider the relationship between your users and their data

You don't need to deliver all data all the time, just the right data at the right moment

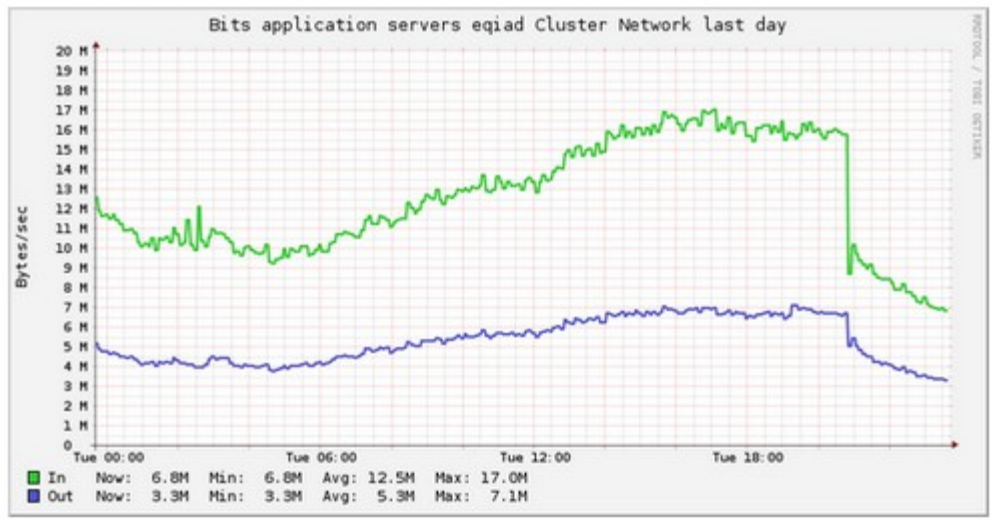
It's the final hurdle in performance

Roan Kattouw
@catrope

Follow

Today @Wikipedia started storing JavaScript in localStorage, saving quite a lot of bandwidth :)

Reply Retweet Favorite Buffer ••• More



RETWEETS 826 FAVORITES 347

11:41 PM - 3 Dec 2013

Flag media

Offline-first means zero latency UX.
We live in the age of experiences,
this is the #1 priority - @janl

It protects from service interruptions.
Users may not even notice if your server is down.

Scalability – perhaps you don't even need a backend?

“Offline First” is an ongoing discussion…

How do we create a modern design language for offline?

What does offline first mean for business models?

How can we make offline first development easier?

Let's talk!

Offline First! - Iceweasel

Offline First!

offlinefirst.org

DuckDuckGo

FIRST!

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

This website is starting a discussion about mobile first app development that goes beyond shrinking content to phone and tablet screen sizes.

Read the introduction

Read the follow up on *A List Apart*

Join a local event

We are interested in:

- UI Conventions for Offline Apps

Thanks!

@caolan