

Cross platform web app development

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Contents

Web development in Spotify

- Why and how
- Benefits and learnings

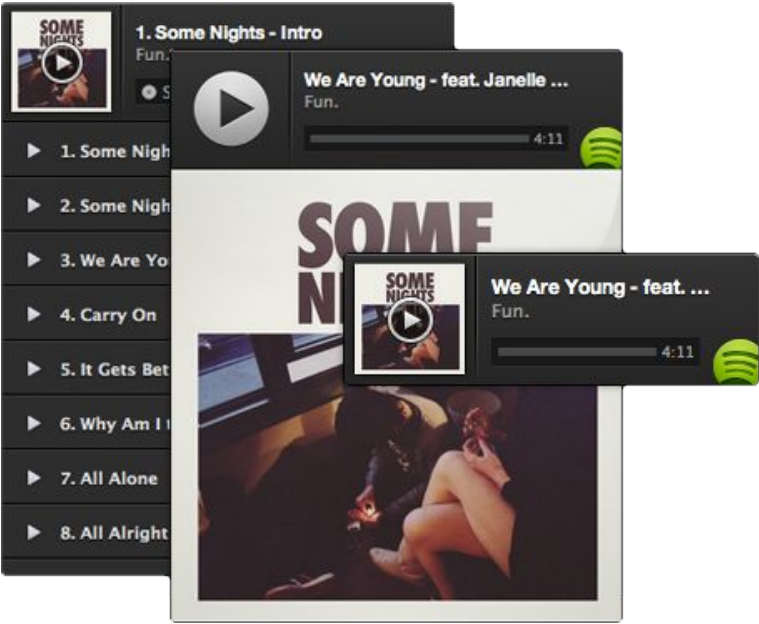
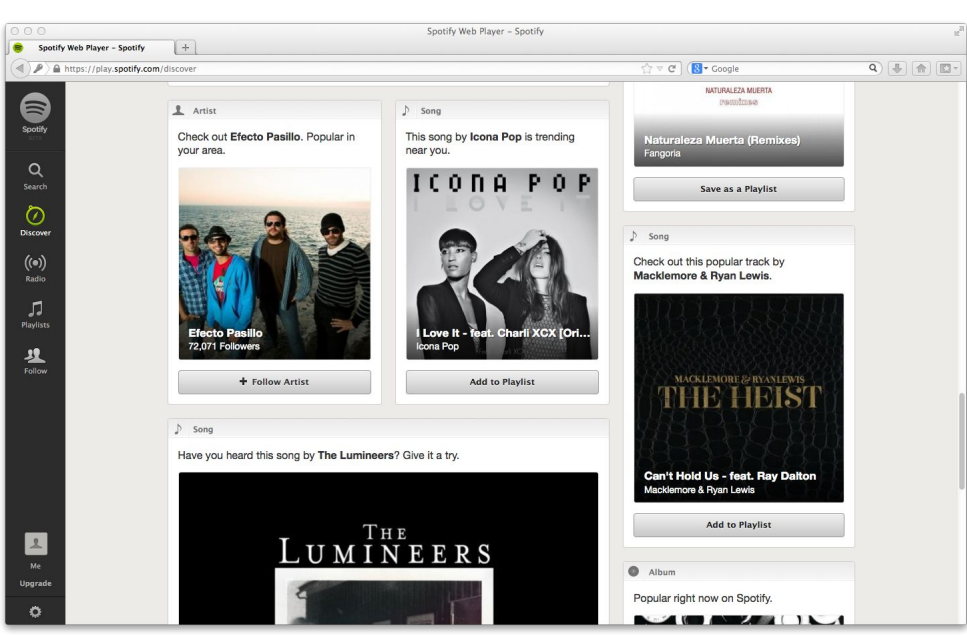
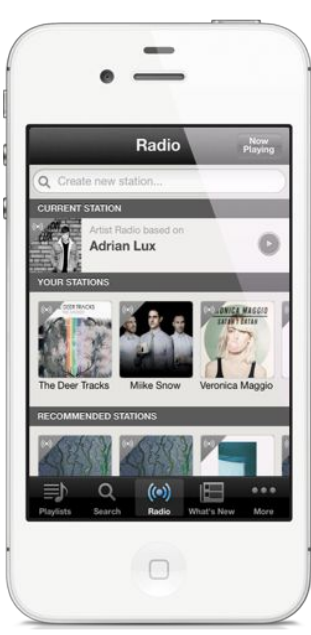
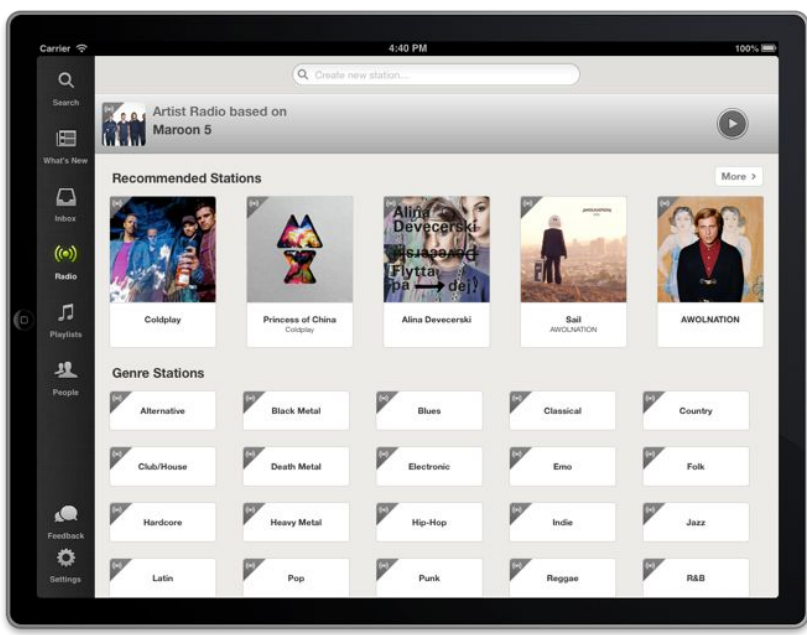
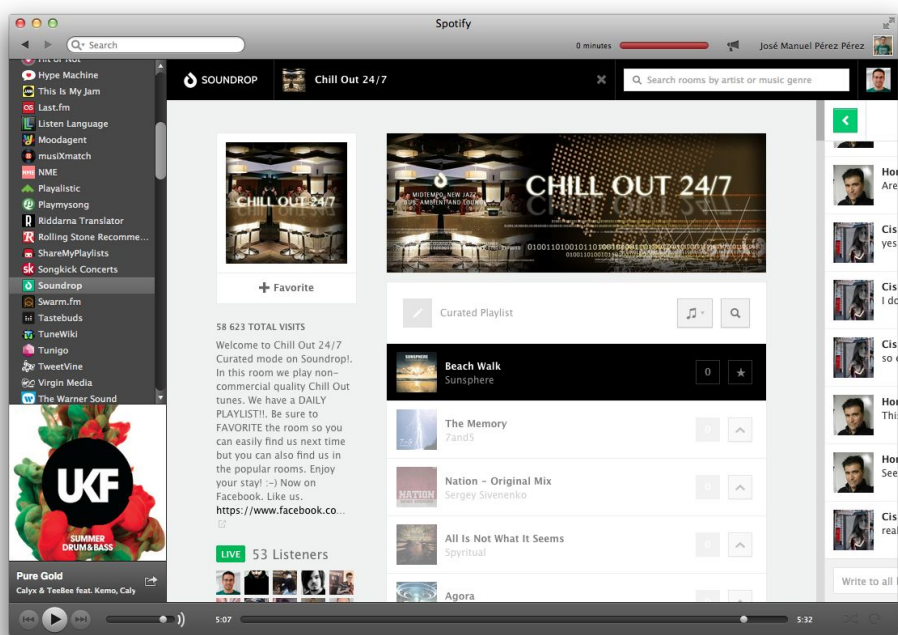
Key web technologies that we use

- IFrames and postMessage: security and performance
- Communication between different tabs

Summary

Questions

Spotify <3 web



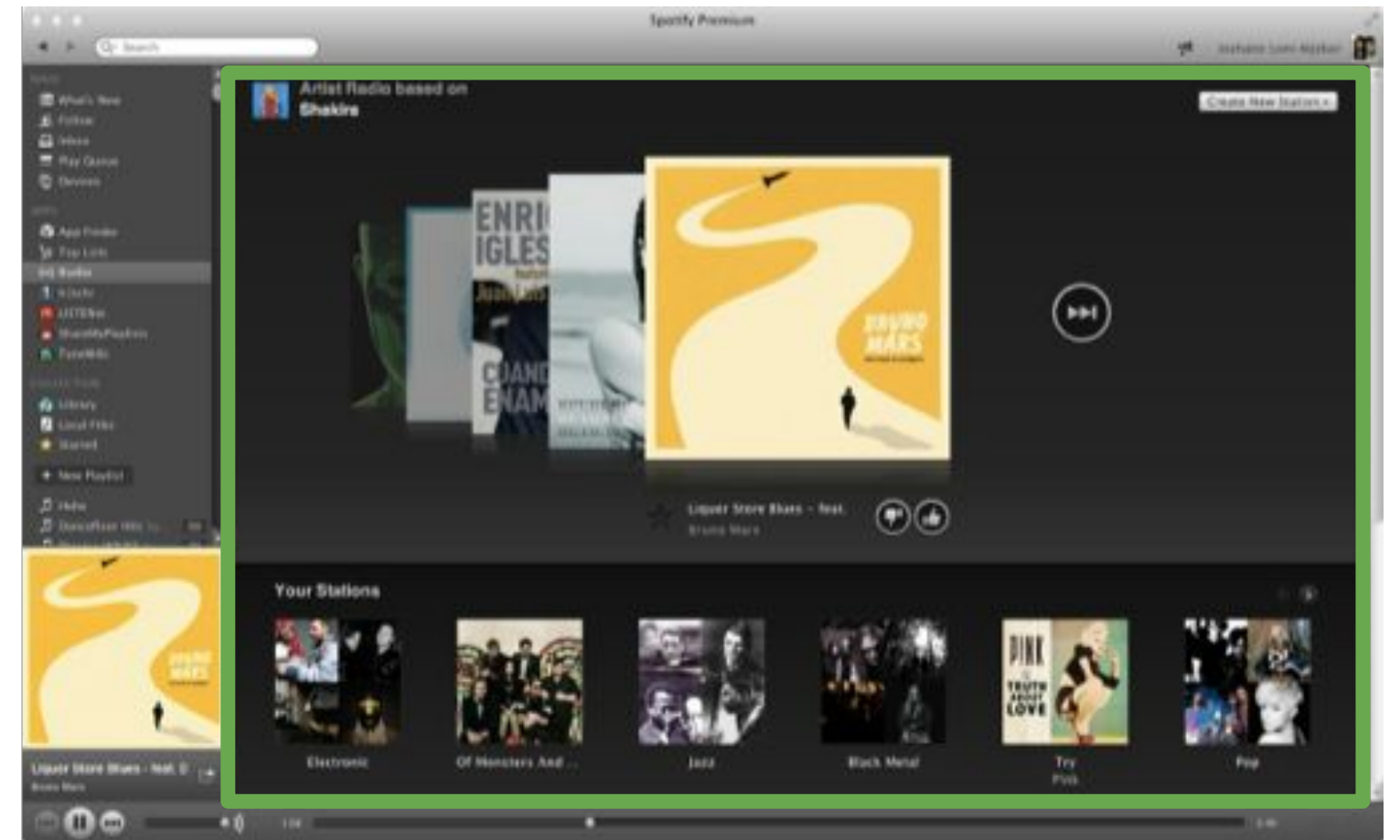
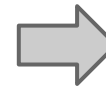
Beginnings of Spotify



Giving web a try

- Using CEF to move features to web
- Write features as webapps
- Sandboxed environment

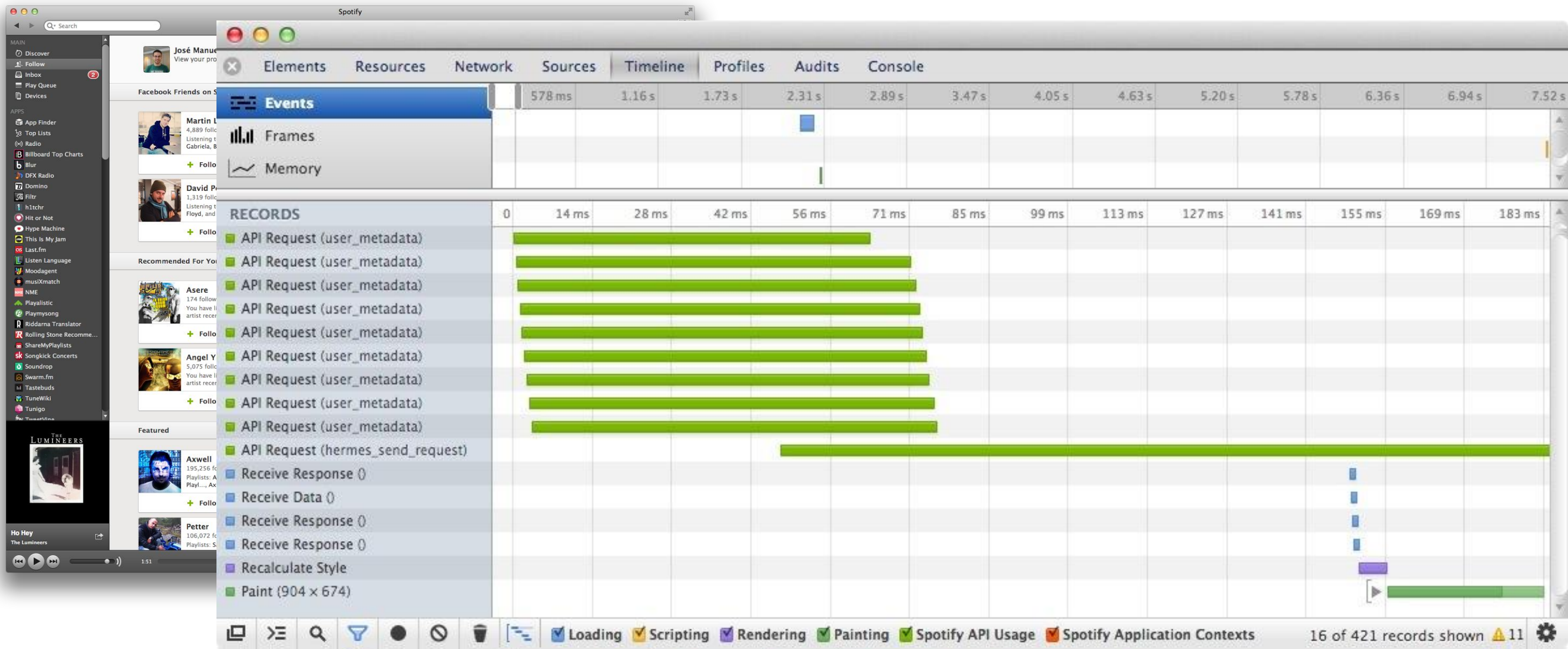
Giving web a try (2)



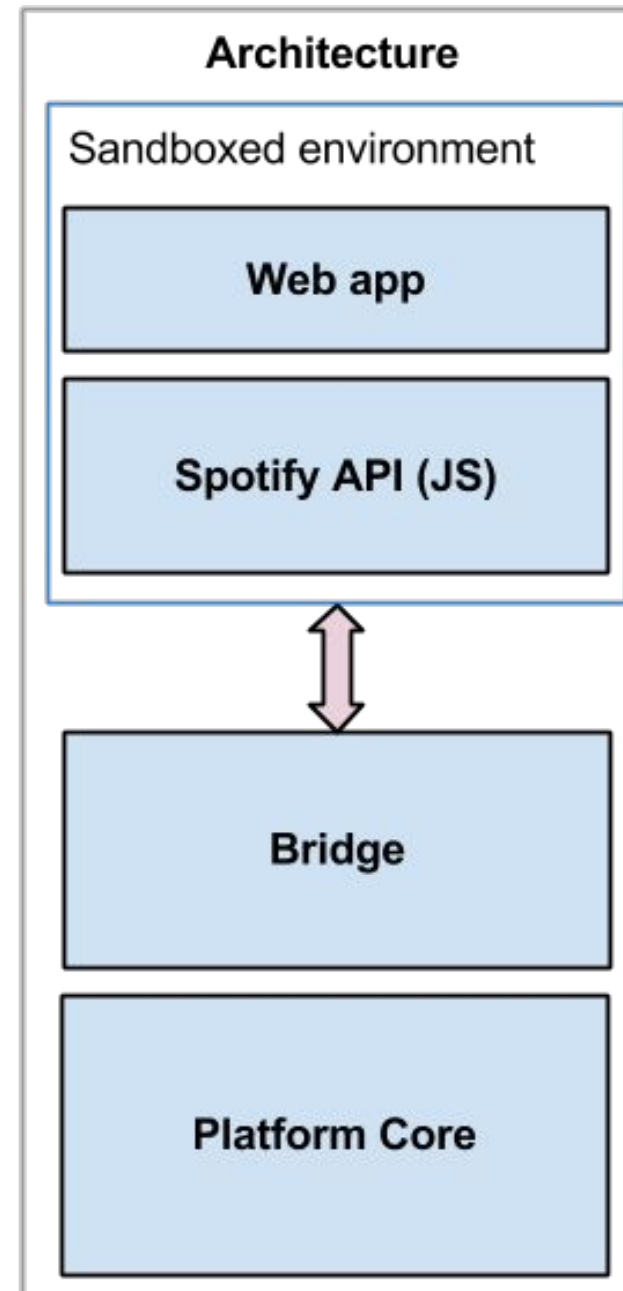
What is a Spotify app?

- HTML
- CSS
- JS
- manifest.json

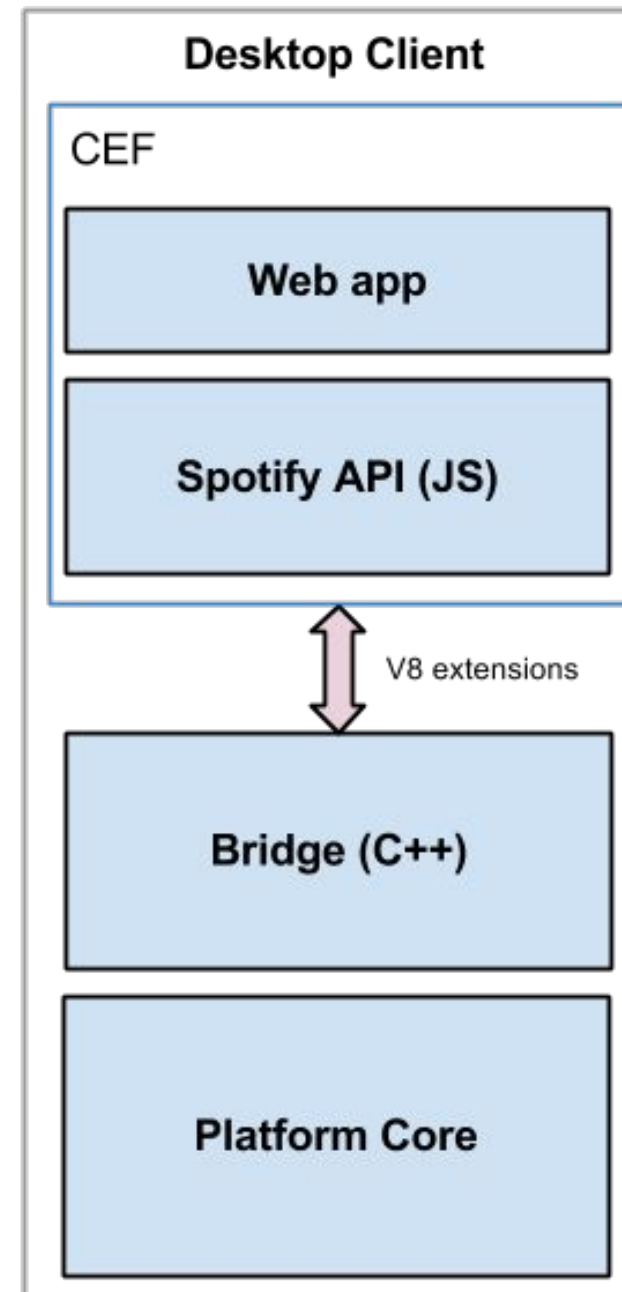
What is a Spotify app? - Developer tools



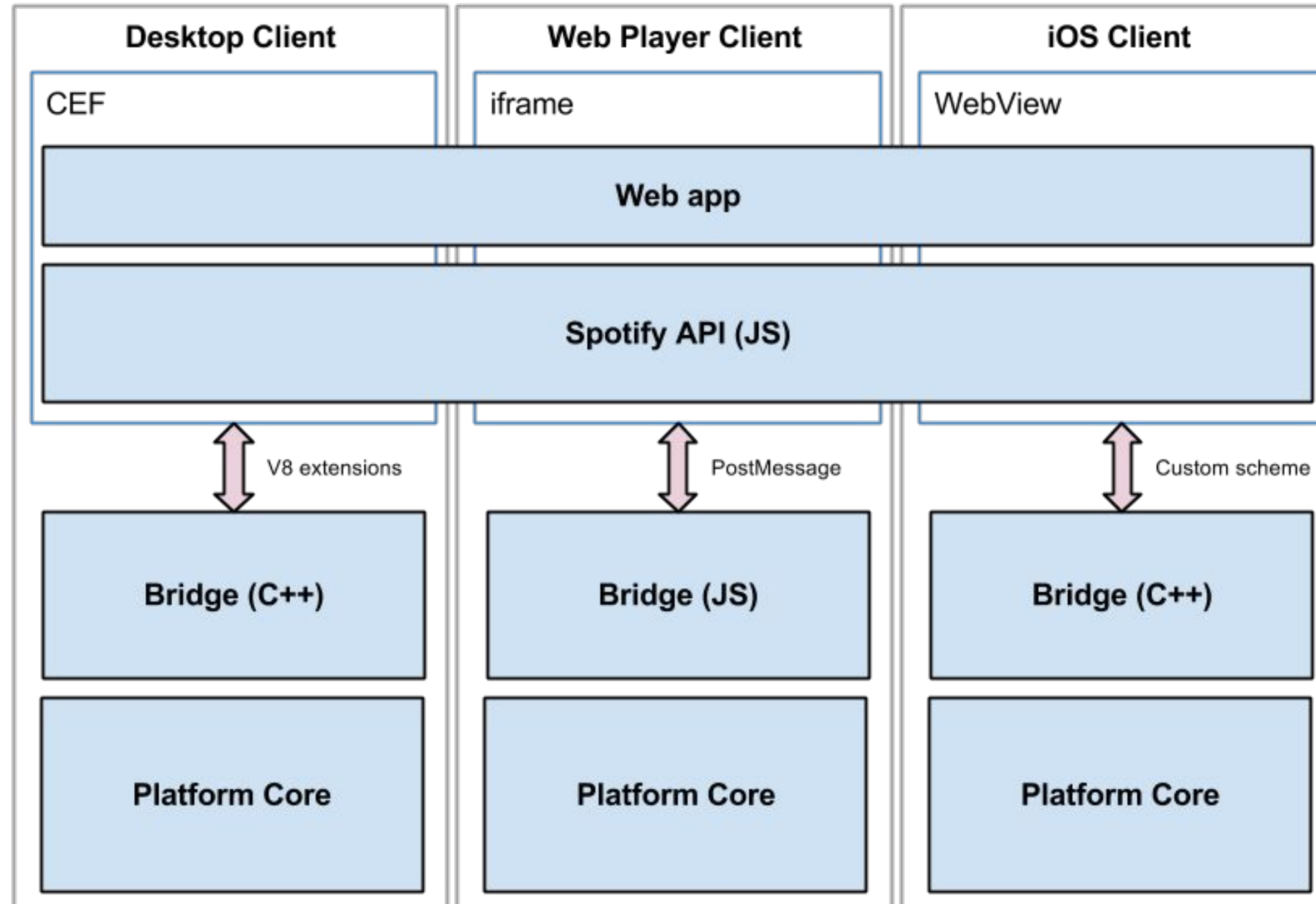
Architecture of the Spotify Apps Platform - overview



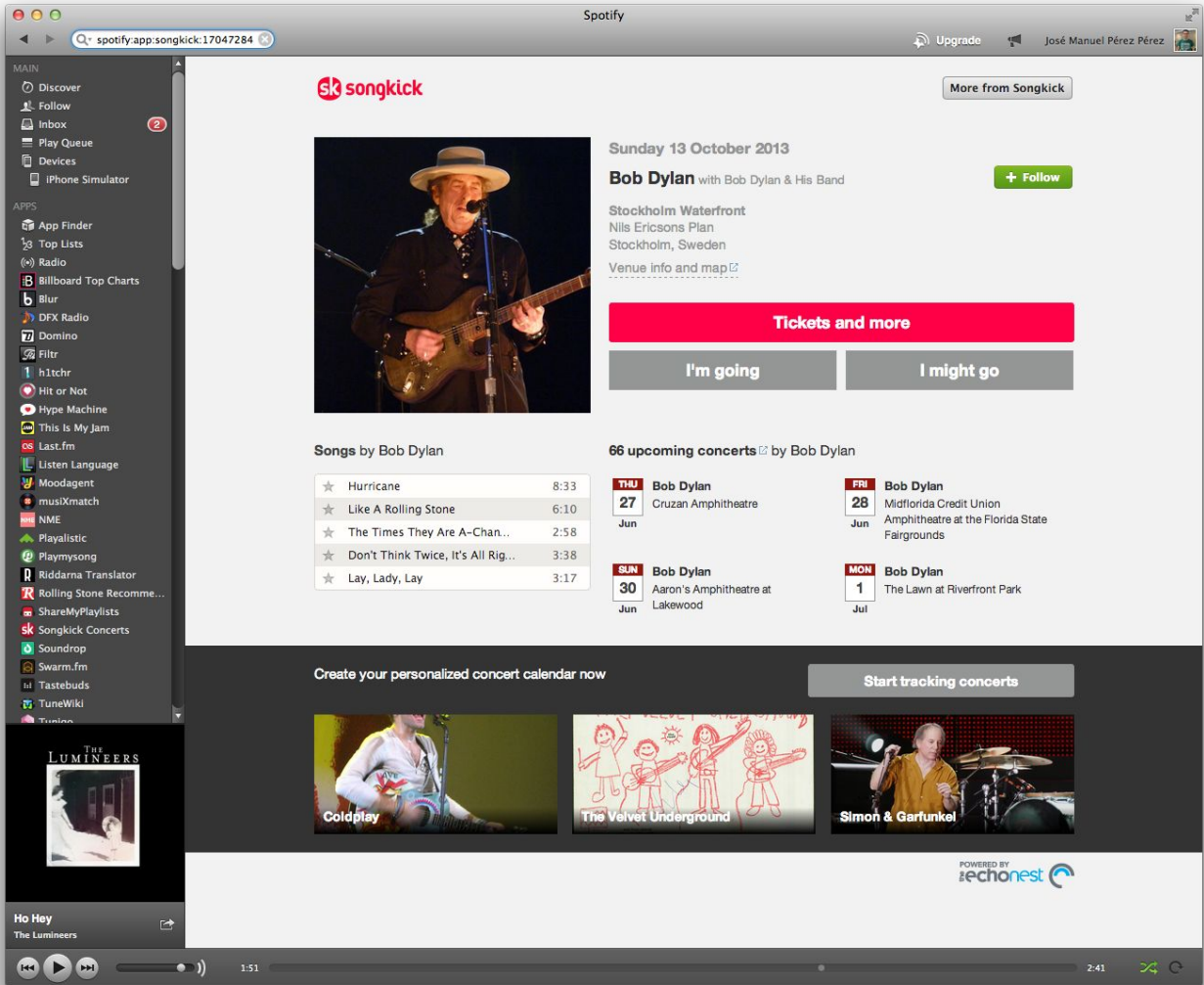
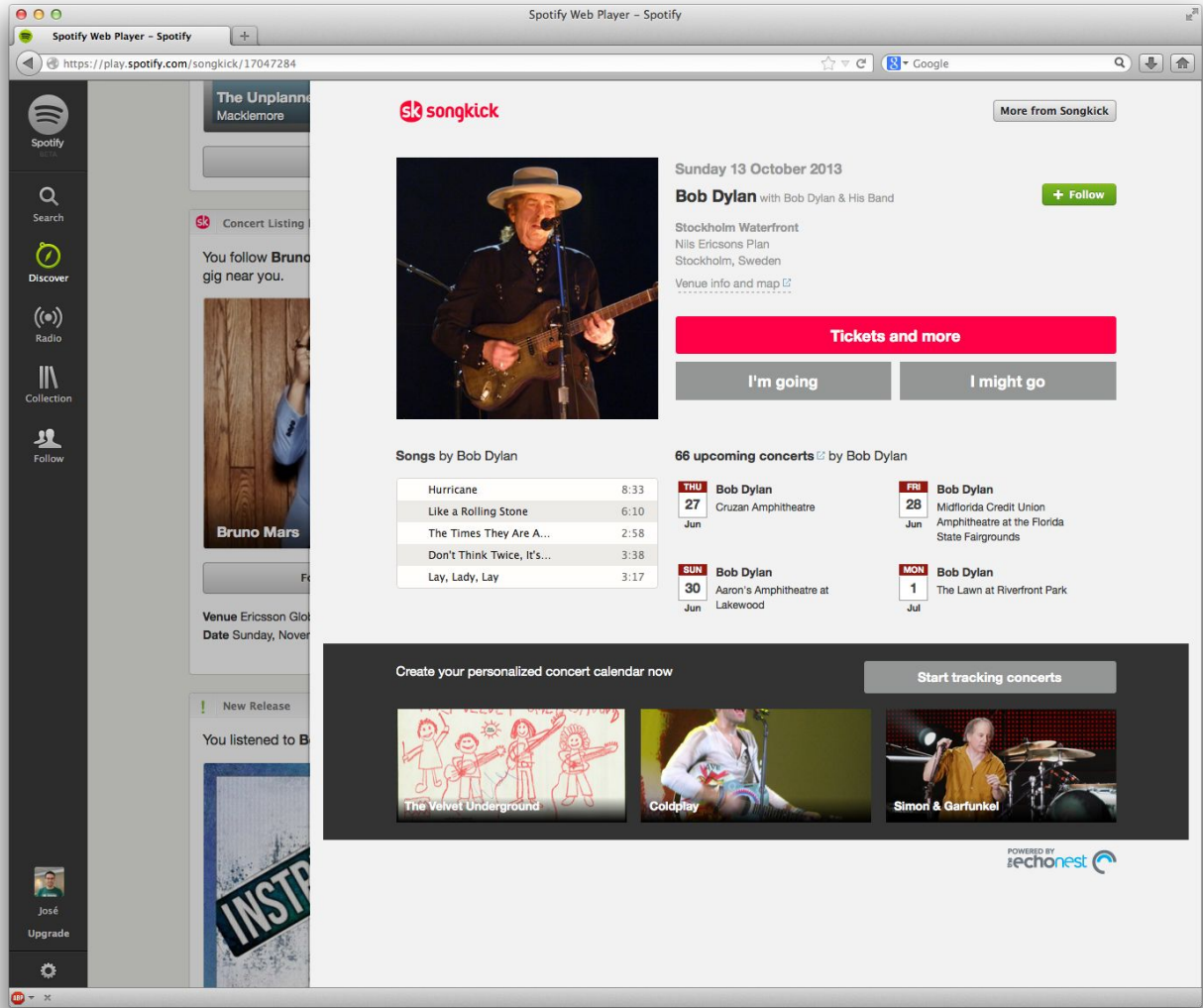
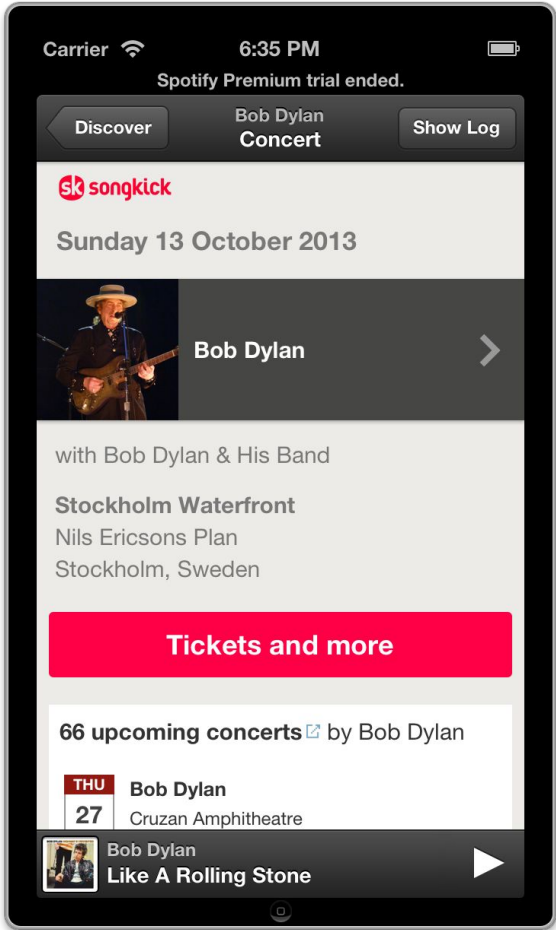
Architecture of the Spotify Apps Platform - desktop



Architecture of the Platform - all clients



Multiple platforms



Releasing Spotify Apps

- Decoupled system
- Provides gradual roll-out, and availability depending on platform and country

Benefits

- Feature ownership by teams
- Fast development pace due to fewer dependencies
- Less hassle to deploy. Makes it easy to tweak a feature after being released
- 3rd party app development

Only benefits?

- Performance in views with a lot of data on mobile
- Time to render

Spotify Embedded Platform

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Spotify Embedded Platform



Content

Platform architecture

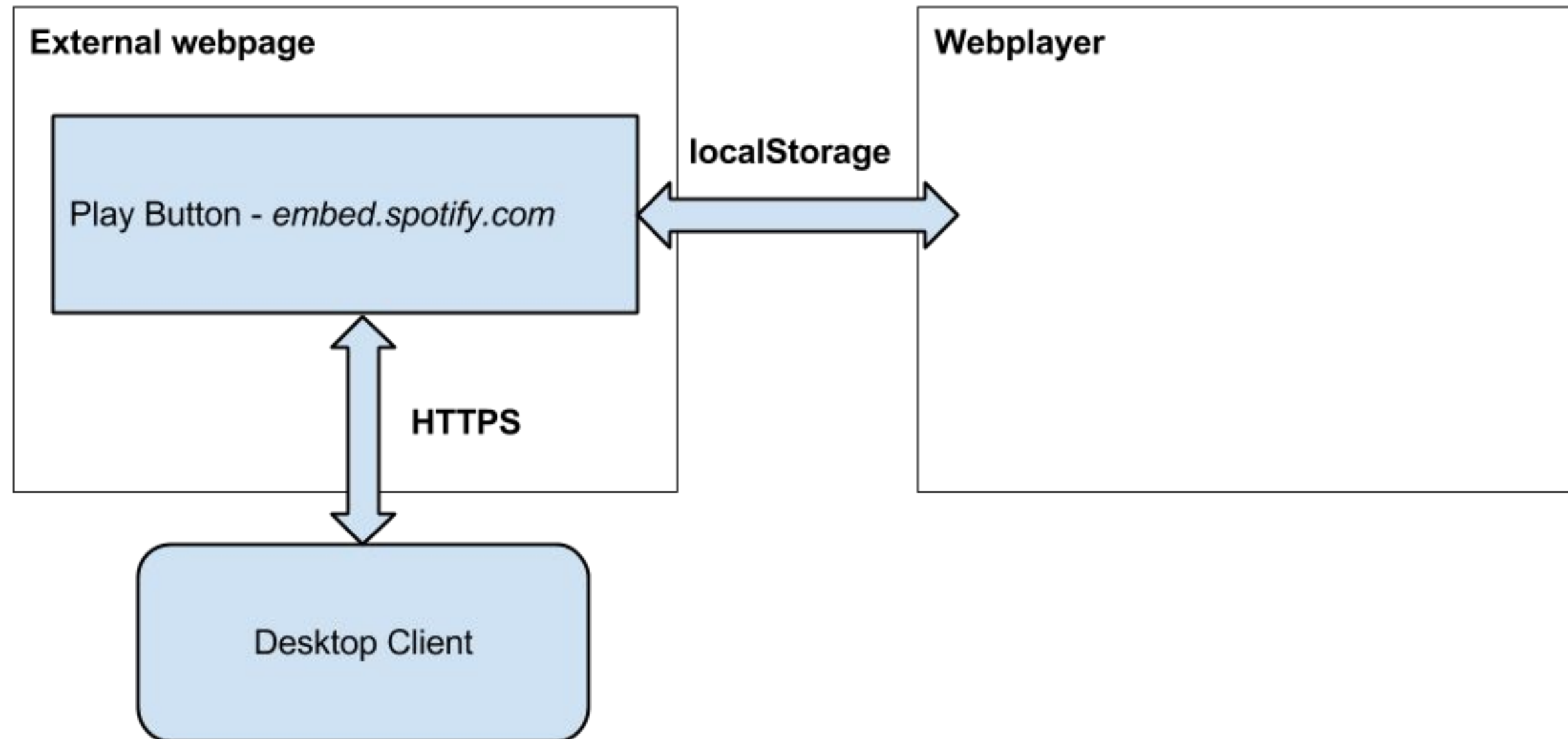
- IFrames and postMessage: security and performance

Remote control technology

- Communication between different tabs
- Performance of the communication channel

Performance improvements

Architecture of the Platform



Sandboxed platform using IFrames

Good

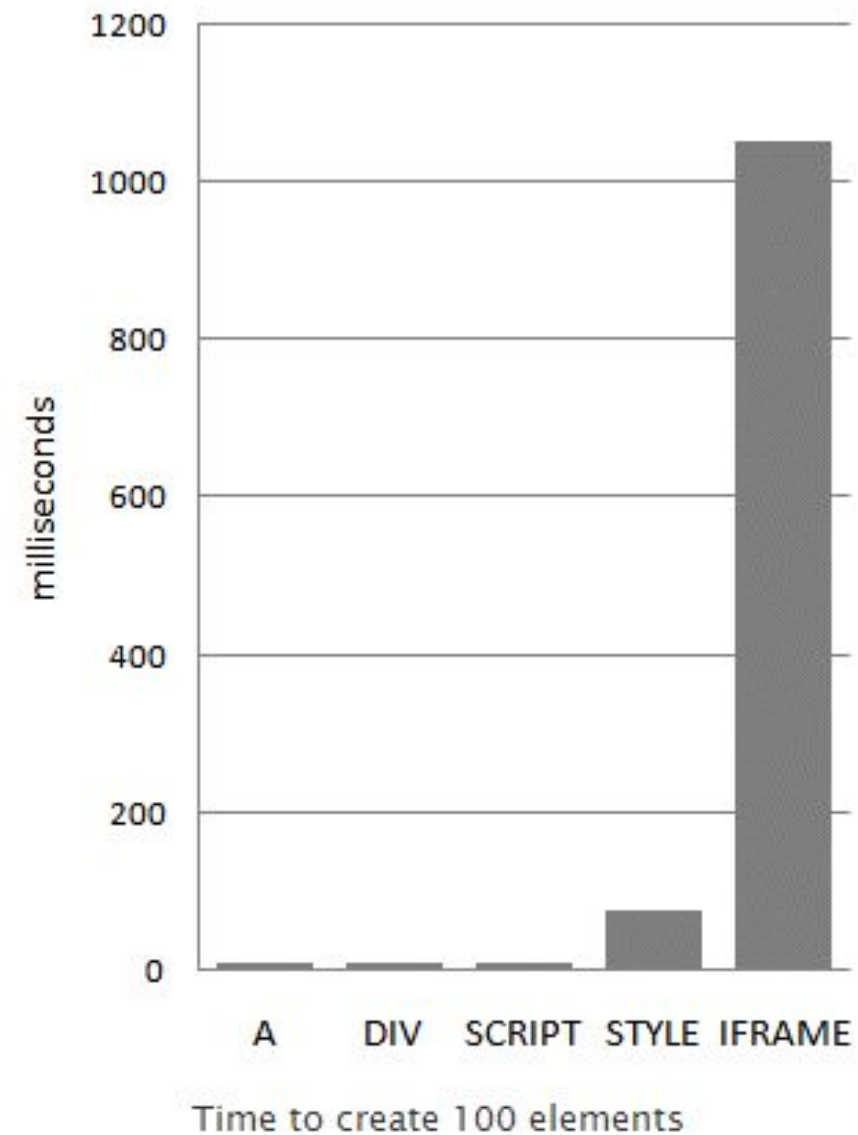
- Separated execution context
- Better security and privacy
- We control the release process

Bad

- More difficult communication
- IFrames are expensive

How expensive are IFrames?


A lot(*):



(*) <http://www.stevesouders.com/blog/2009/06/03/using-iframes-sparingly/>

Custom widgets in partner pages

Random Access Memories by Daft Punk



Within Daft Punk

The Game of Love Daft Punk

Lose Yourself to Dance Daft Punk

Get Lucky Daft Punk

She Don't Have To Know John Legend

Get Lucky - Daft Punk - Spotify

https://play.spotify.com/album/4m2880jivSbbyEGAKfITCa

Spotify

Search

Discover

Radio

Collection

Follow

Me

Get Lucky

Here's some great music re

Since you listened to Armin Van Bu

A State Of Tr

You listened to K

Jazz Magnetism

Random Access Memories

+ Add to Collection

Share...

Start Radio

By Daft Punk

1	Give Life Back to Music	4:36
2	The Game of Love	5:22
3	Giorgio by Moroder	9:05
4	Within	3:49
5	Instant Crush	5:38
6	Lose Yourself to Dance	5:54
7	Touch	8:19
8	Get Lucky	6:10
9	Beyond	4:51
10	Motherboard	5:42
11	Fragments of Time	4:40
12	Doin' it Right	4:12
13	Contact	6:24

(P) 2013 Daft Life Limited under exclusive license to Columbia Records, a Division of Sony Music Entertainment

More by Daft Punk

Daft Punk | Ran...

TRON Legacy: R...

TRON: Legacy

Close

Random Access Memories

Get Lucky

Daft Punk Pharrell Williams

Related Music

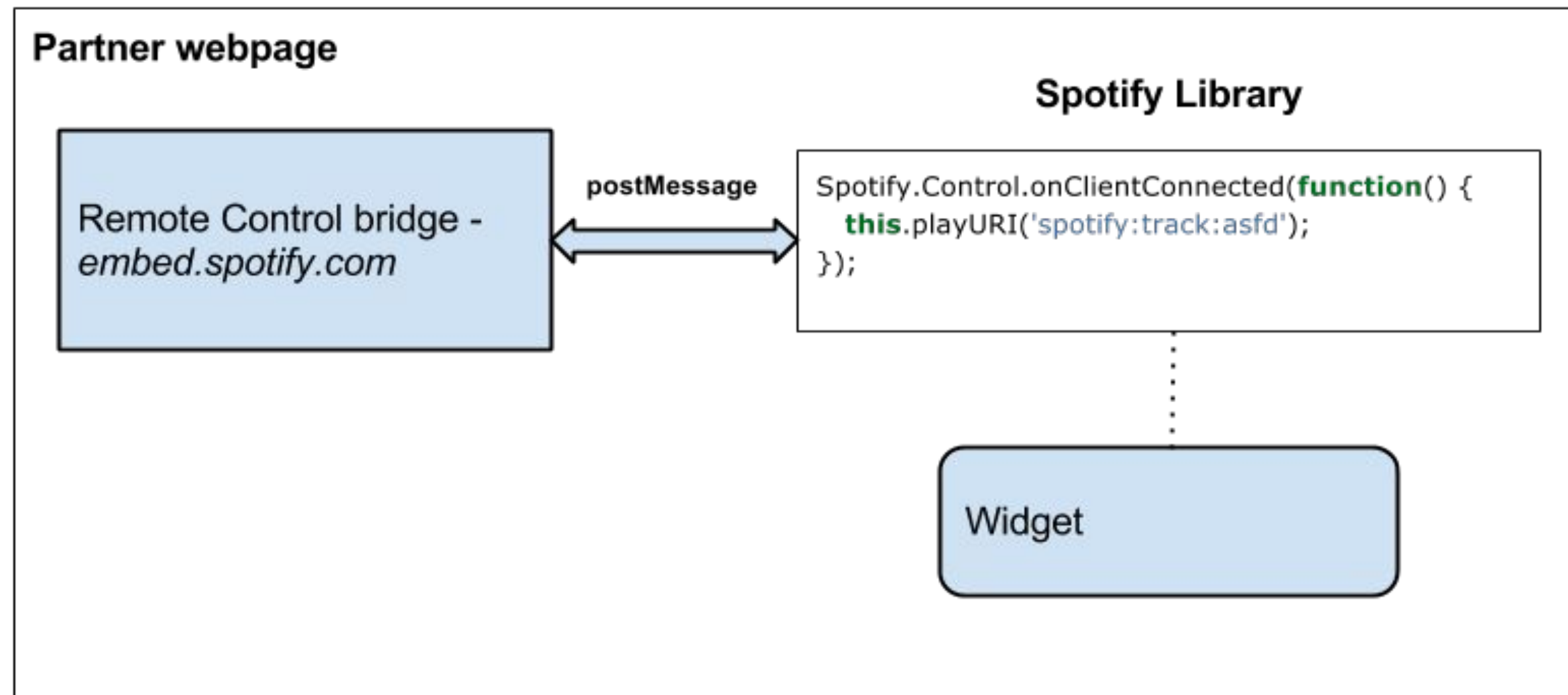
19-2000 - Soulchild R...

Gorillaz

+ Add to Collection

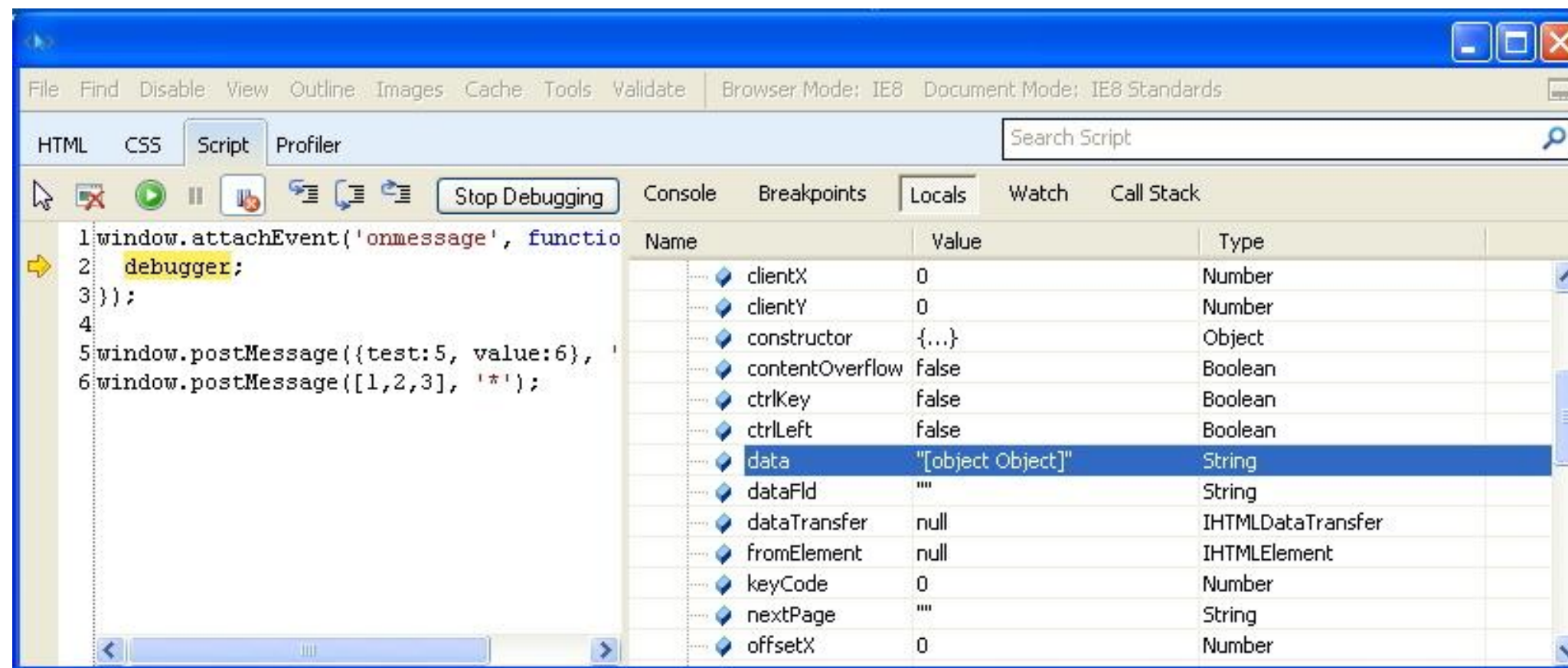
Conceived as the first "virtual hip-hop group," Gorillaz blended the musical talents of Dan "T"

Cross-origin communication using postMessage



Sending: content of the message

```
frame.contentWindow.postMessage(message, ...);
```



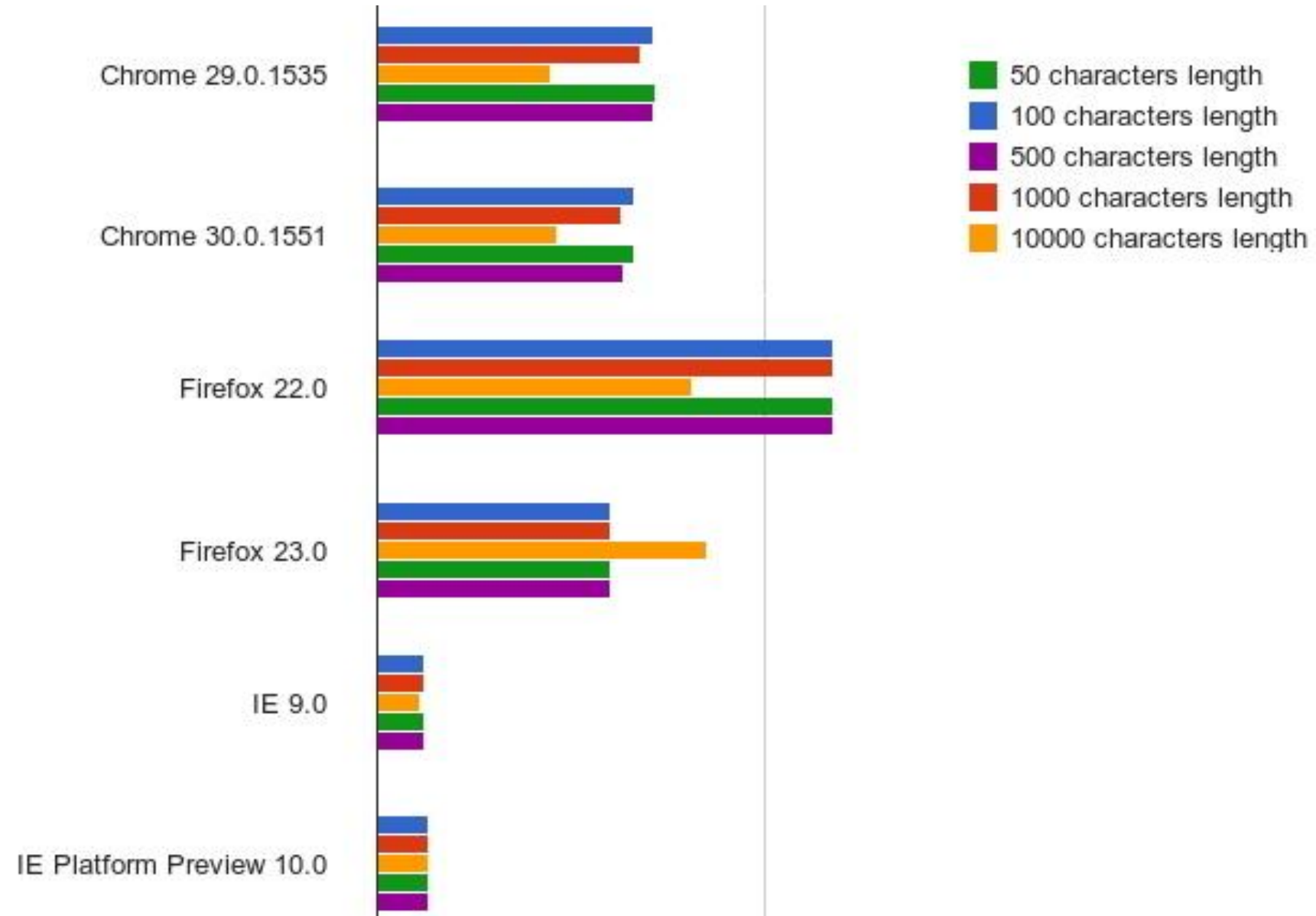
(*)[object Object]

Security

```
frame.contentWindow
    .postMessage(..., 'https://embed.spotify.com');
```

```
window.addEventListener('message', function(messageEvt) {
    if (messageEvt.origin === 'https://valid-domain.com') {
        ...
    }
}));
```

postMessage transfer rate



Remote controlling Spotify Clients

Client Desktop: based on long polling + https

Webplayer: communication with another browser window or tab

- server side
- postMessage
- Cookies
- **localStorage**

Is localStorage always available?

```
window.localStorage('key', 'value')
```

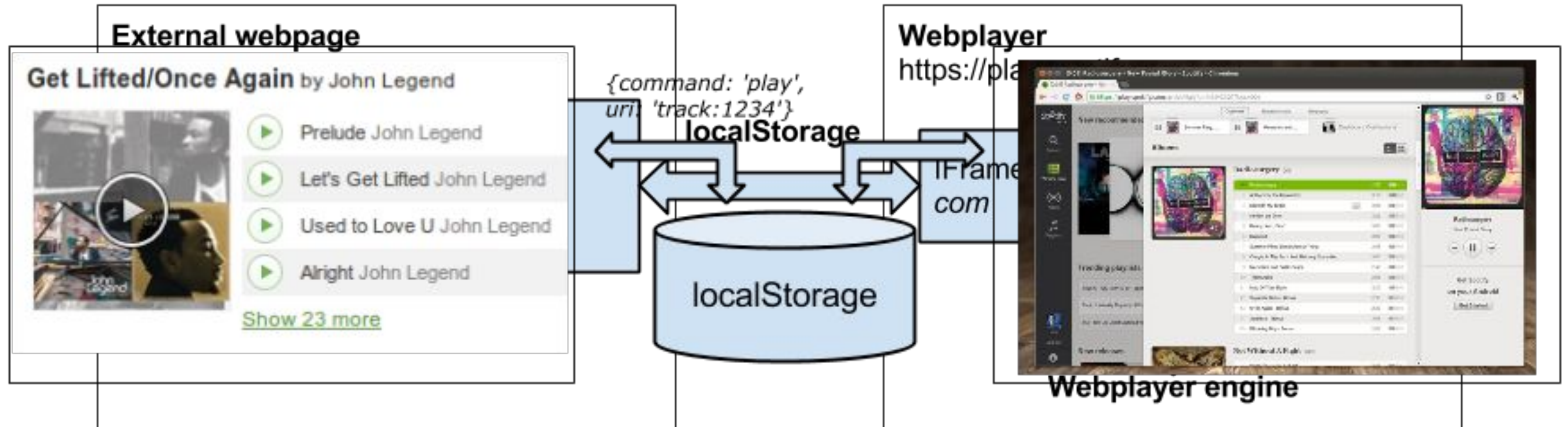
```
StorageException
```

```
constructor: StorageConstructor
```

```
length: 0, or: DOMExceptionConstructor
```

```
message: "QUOTA_EXCEEDED_ERR: DOM Exception 22"
```

Communication between different tabs

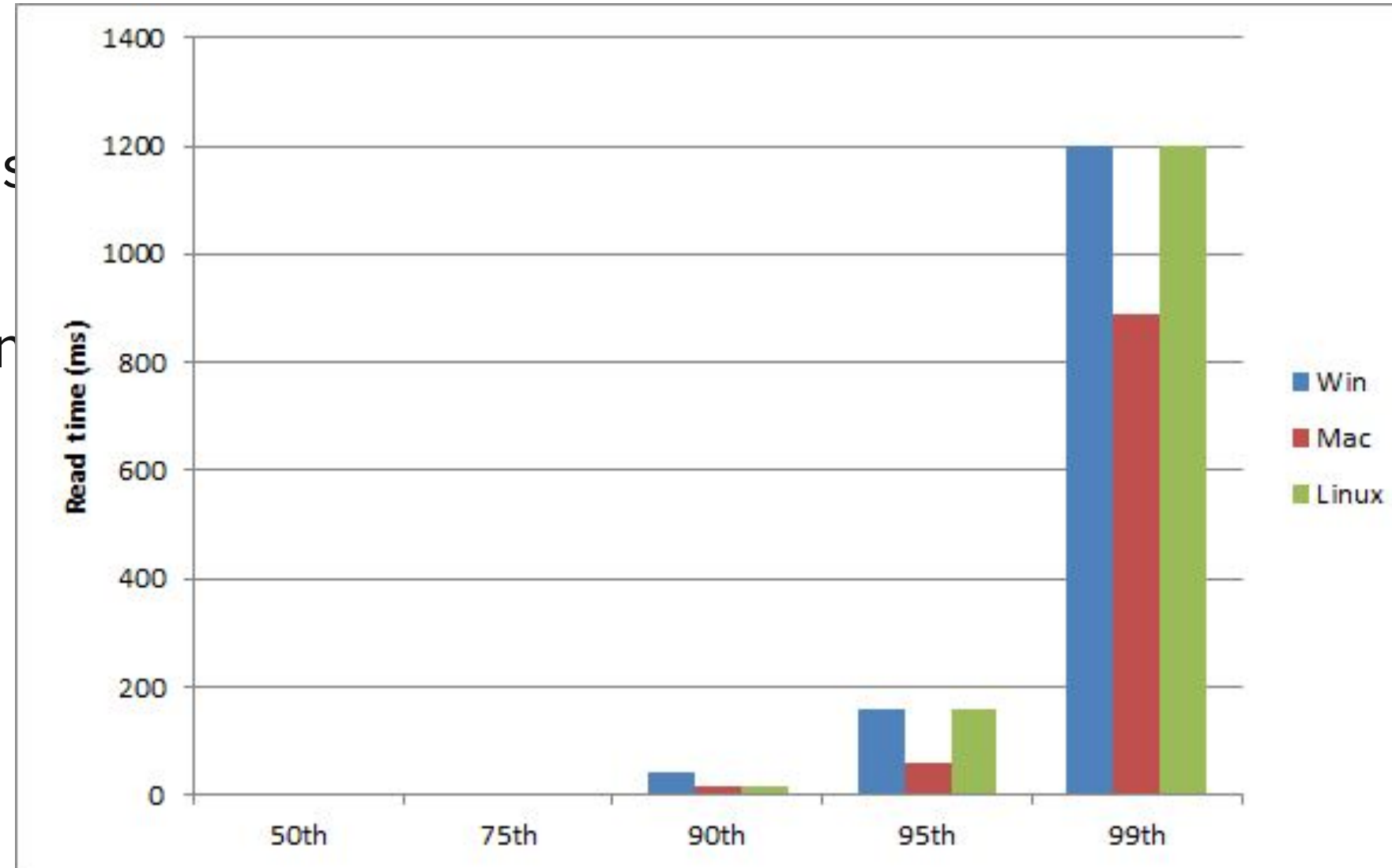


localStorage locks

The UI Thread is s

Firefox and Chron

l the items



localStorage notifications via the storage event

```
window.addEventListener('storage', function() {}, false);
```

The event change is only emitted when the values actually change: use a timestamp if needed.

```
{key: 'command', value: 'play', timestamp: 1373021690574}
```

Can we trigger the event manually?

```
var evt = document.createEvent('StorageEvent');  
evt.initStorageEvent('storage', ...);  
window.dispatchEvent(evt);
```

Yes...although not to communicate between different windows.

localStorage communication strategies

Options:

- A) Create a new item every time, but remove it once it's received.
- B) New item, don't remove once it's received, instead do it regularly.
- C) Reuse always the same item (use timestamp)

Notification delay

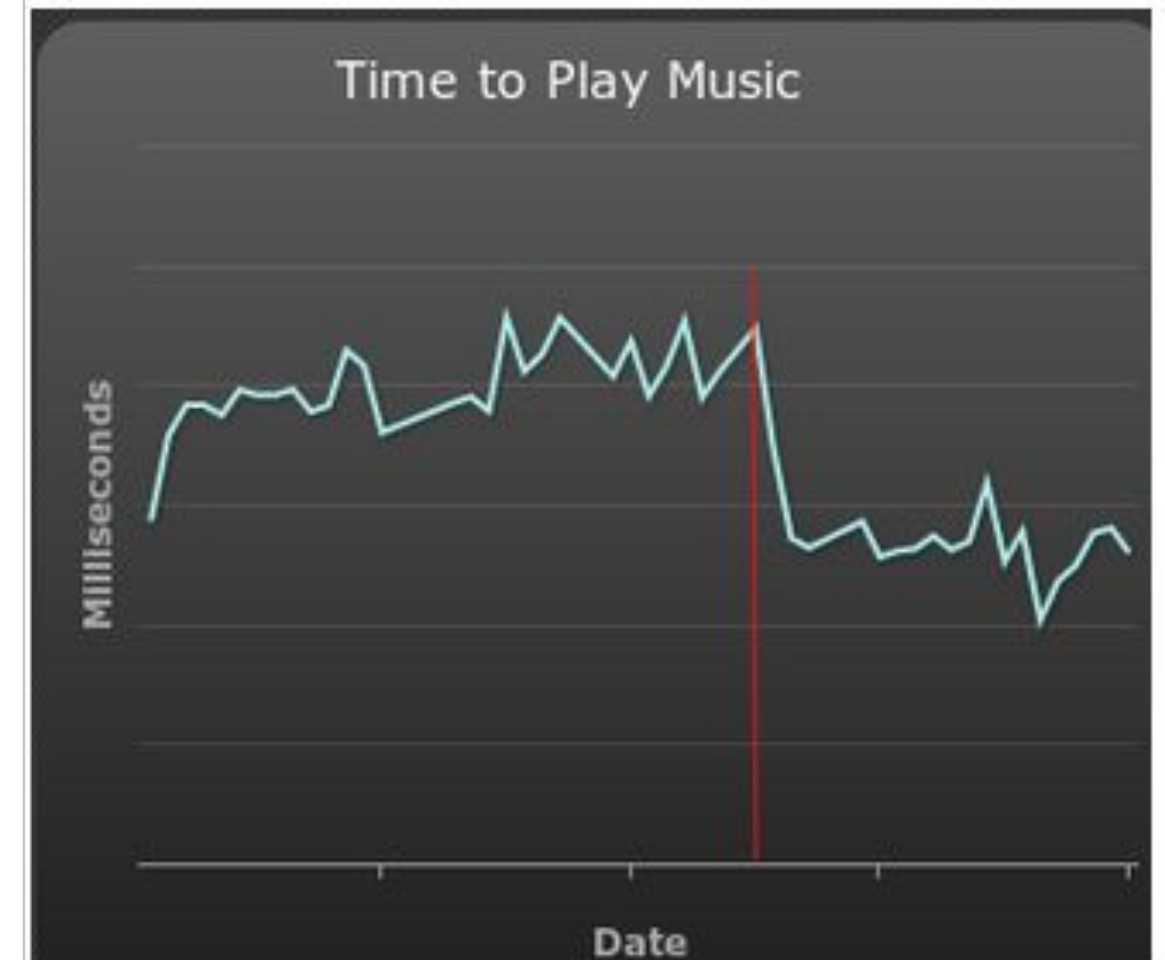
Chrome ~2 milliseconds

IE10 ~34 milliseconds

Performance improvements

Prefetch / Prerender

- Rendering pages
`<link rel="prerender" href="...">`
- Fetching static resources
`<link rel="prefetch" href="...">`



Potential improvements

Batching postMessages

Webworkers

Conclusions

- Web apps have been a good choice to extend our functionality in multiple platforms.
- Web technologies make relatively easy to create complex integrations to improve the user experience.
- It is very important to monitor and analyze carefully the performance.



Questions?

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Slides, code examples and reference

github.com/tomasperezv/spainjs-2013



Thanks!