

从REST到GraphQL

2017 JavaScript 中国开发者大会

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Jonas Helfer

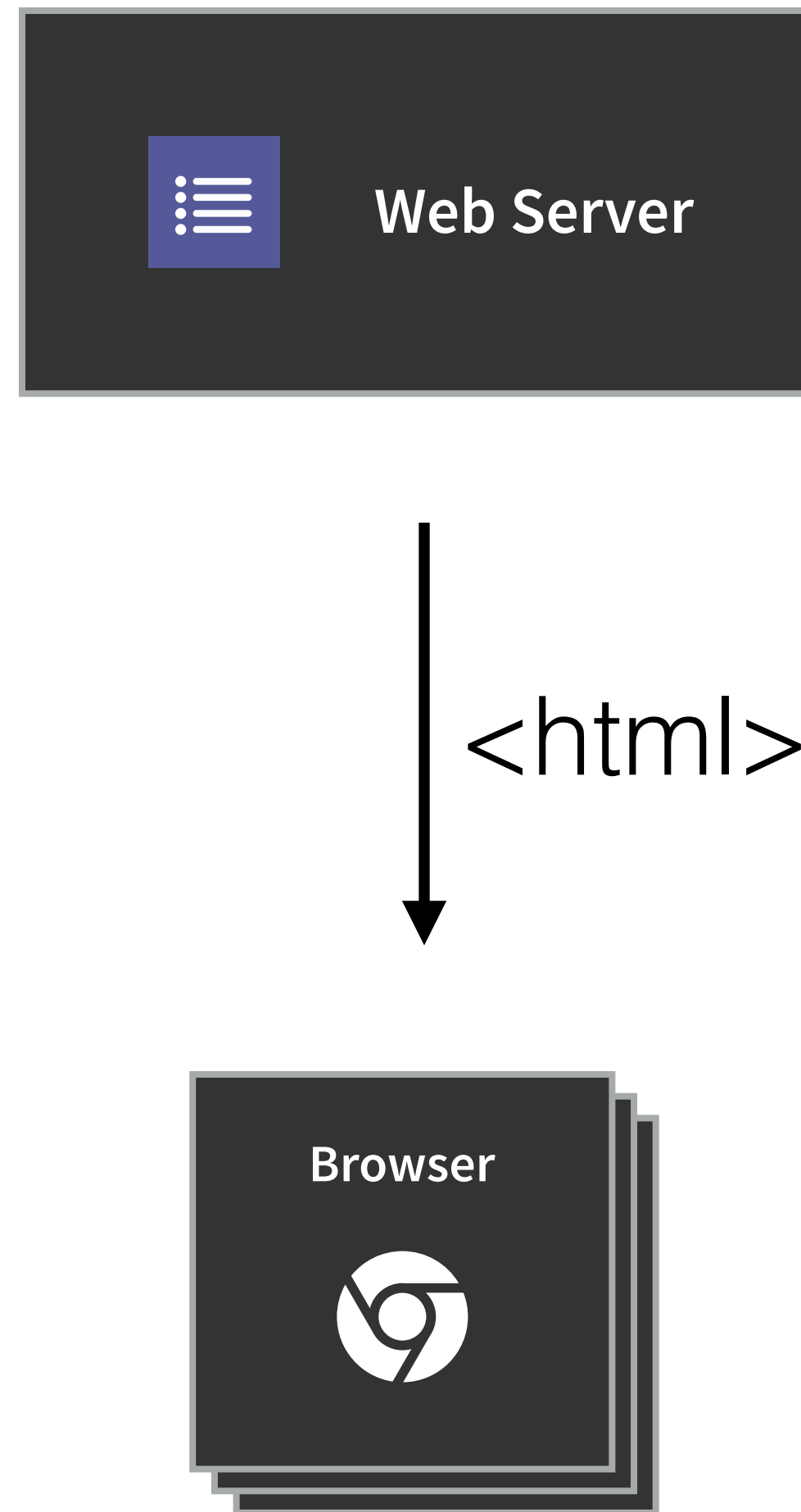
@helferjs

Software Engineer, Databricks

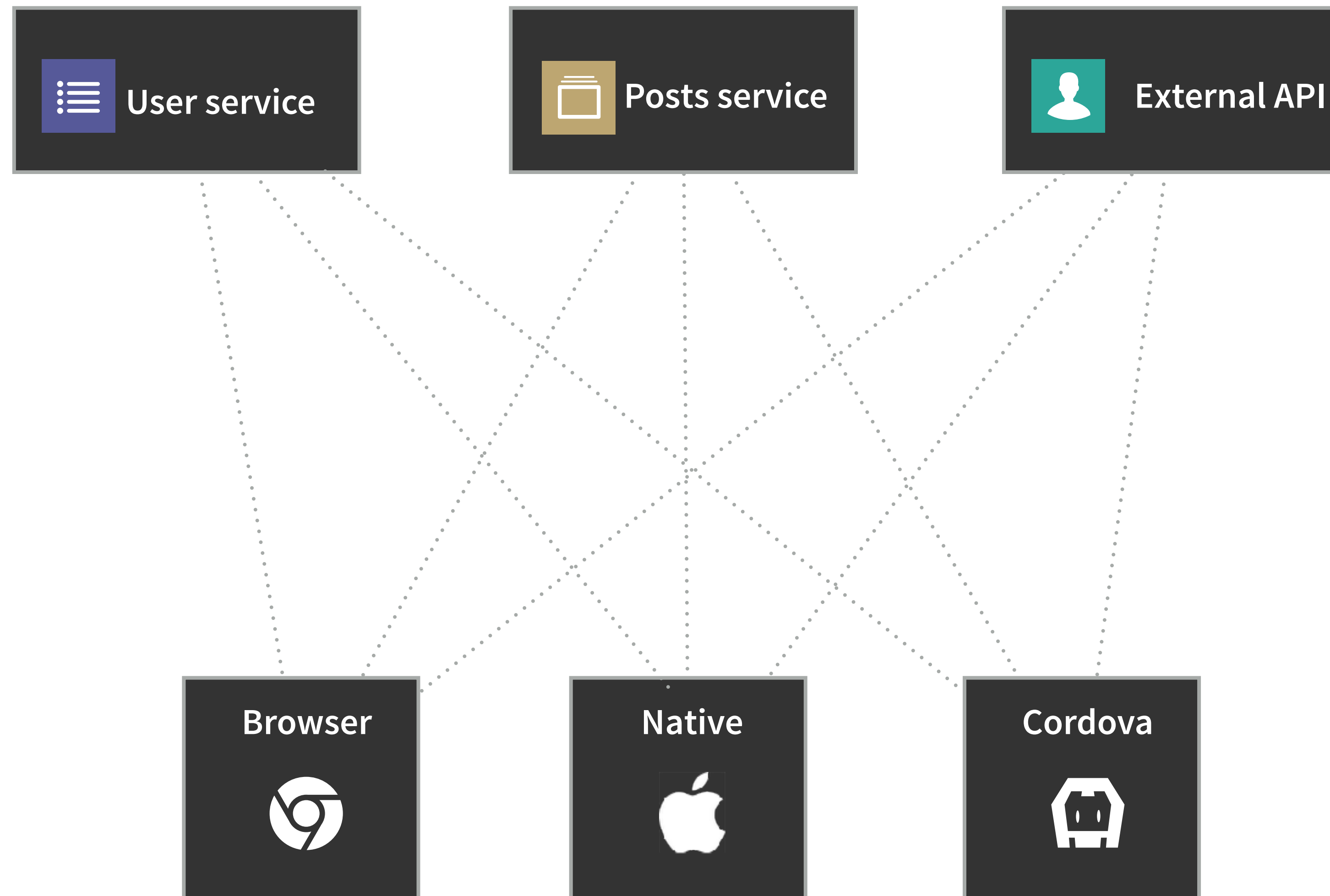
A dark, atmospheric photograph of an astronaut floating in space. The astronaut is wearing a white spacesuit with gold-colored accents and a helmet. They are holding a long, thin, flexible tube or cable that loops through the air. The background shows the Earth's horizon with a blue and white atmosphere against a black sky. The overall tone is dramatic and futuristic.

Part 1: Theory REST vs GraphQL

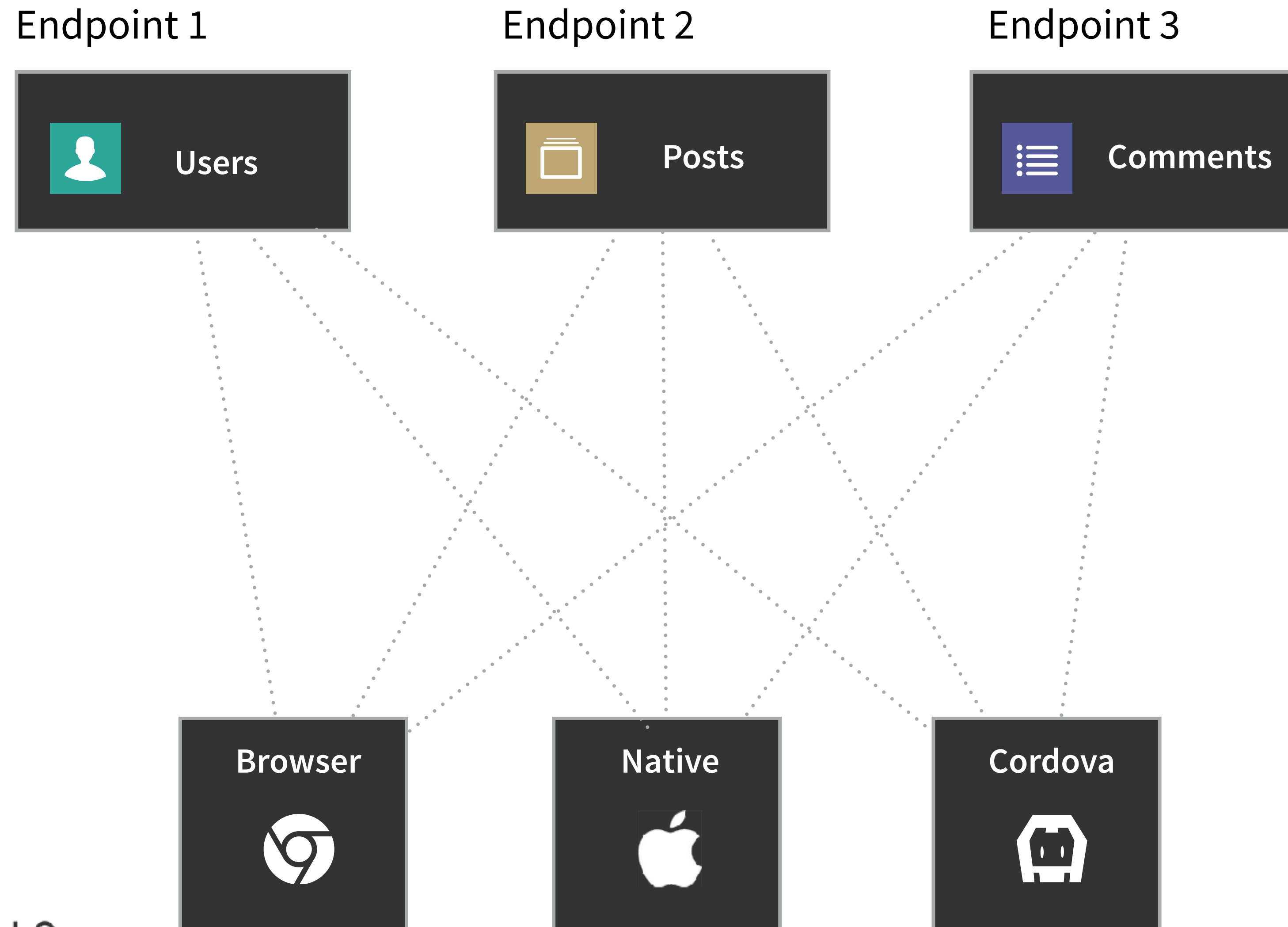
Web development in the early days



Web development in 2017



Pure REST - one endpoint per resource



Pros

- flexible
- decoupled

Cons

- lots of roundtrips
- overfetching
- complex clients

REST-ish - one endpoint per view

Endpoint 1



Endpoint 2



Endpoint 3



Pros

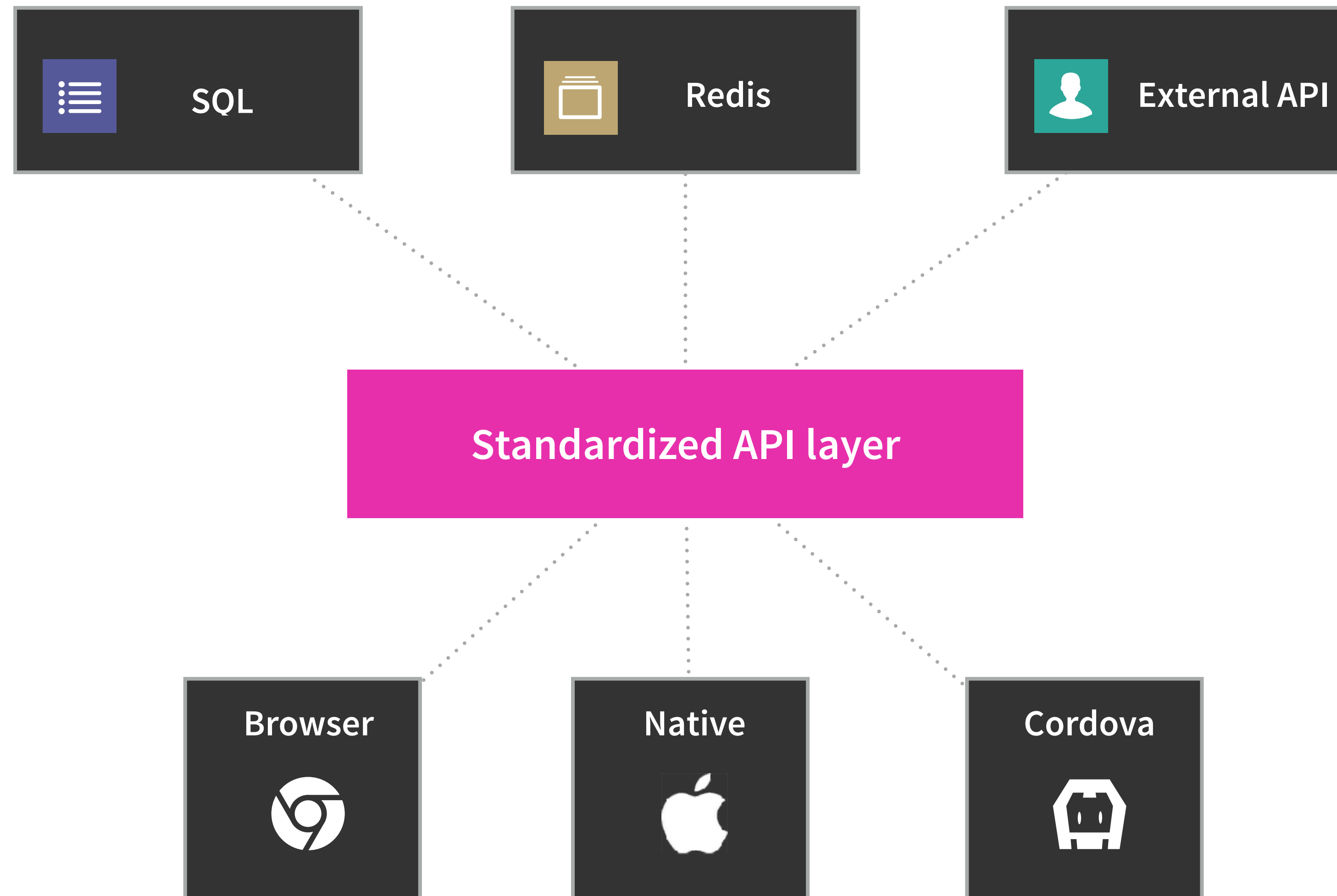
- one roundtrip
- exactly what you need

Cons

- inflexible
- high initial cost
- high maintenance cost
- slow to iterate



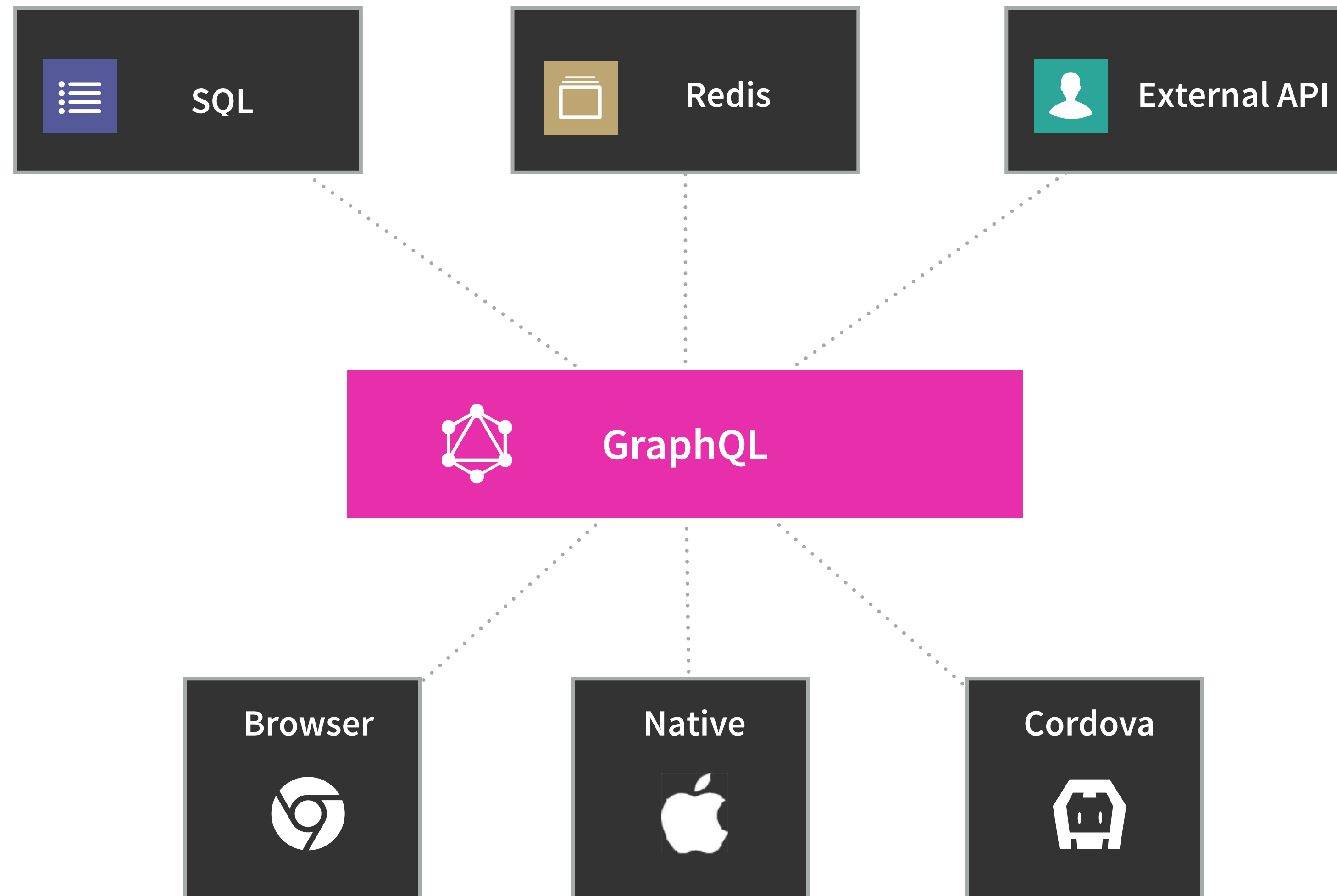
We need a standardized API layer



Requirements

- one roundtrip
- get just what you need
- flexible
- decoupled

GraphQL could be that standardized API layer



What GraphQL gives us

- one roundtrip
- get just what you need
- decoupling

GraphQL provides three main things

1. an API definition language to describe types and their relationships
2. a query language to specify exactly what data you need
3. an execution model that allows “resolving” single fields

Let's use an example: Hacker News

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A simple example: schema

```
type Story {  
  title: String  
  author: Author  
  comments: [Comment]  
  score: Int  
}
```

```
type Author {  
  name: String  
}
```

...

A simple example: query

```
query {  
  stories(limit: 3) {  
    title  
    comments {  
      totalCount  
    }  
    author {  
      name  
    }  
  }  
}
```

A simple example: resolver function

```
function stories(root, args) {  
  return StoriesCollection.find()  
    .sort({ score: -1 })  
    .limit(args.limit);  
}
```

GraphQL ~= REST

GraphQL

Schema

Resolvers

Query / Mutation

REST

-

Endpoints

GET / POST request (URL)

GraphQL: a specification, not an implementation

S E R V E R S

- Node.js
- Ruby
- Python
- Scala
- Java
- Erlang

C L I E N T S

- Plain HTTP request
- React
- Angular
- Vue
- Polymer
- Native iOS/Android

T O O L S

- API explorer (GraphiQL)
- Editor autocomplete
- Query validation
- Mocking
- Performance analysis
- Code generation

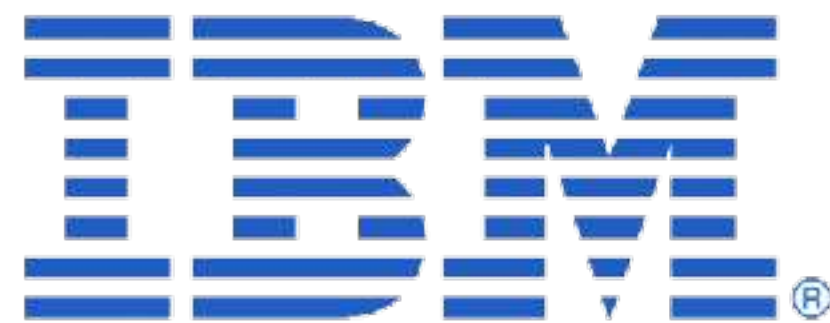
...and more

Who is using GraphQL?

METEOR



The New York Times



intuit.



Walmart



ticketmaster



credit karma



@helperjs

A photograph of an astronaut in a white spacesuit with a red helmet, floating in space. The Earth's blue and white cloud-covered surface is visible in the background, curving around the astronaut. The astronaut's equipment, including a camera and various instruments, is visible on their suit.

Part 2 : Practice

Let's try a real example!

Hacker News - news.ycombinator.com

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Live exercise goals

Current API - HN REST API [<https://github.com/HackerNews/API>]

Final API - GraphQL API (on top of HN REST API)

Current App - A simple HN clone [<https://codesandbox.io/s/9n4kMx8x>]

Final App - Simple HN clone with GraphQL (replacing REST requests)



```
1 // Welcome to Launchpad!
2 // Log in to edit and save pads, and run queries in GraphiQL on the right.
3
4
5 import {
6   makeExecutableSchema,
7   addMockFunctionsToSchema,
8 } from 'graphql-tools';
9
10 // Construct a schema the usual way, using GraphQL schema language
11 // This already contains all the information we need to create mocks
12 // of the correct types for any query.
13 const typeDefs = `
14   type User {
15     id: Int!
16     name: String!
17     posts(limit: Int!): [Post!]
18   }
19
20   type Post {
21     id: Int!
22     title: String!
23     views: Int!
24     author: User!
25   }
26
27   type Query {
28     aString: String!
29     aBoolean: Boolean!
30     anInt: Int!
31     author(id: Int!): User!
32     topPosts(limit: Int!): [Post!]
33   }
34 `;
35
36 export const schema = makeExecutableSchema({ typeDefs });
37
38 const mocks = {
```

GraphiQL



Prettify

Save

Reset

Headers

```
1 # Welcome to GraphiQL
2
3 # Click the play button above to run
4 # one of the example queries below.
5
6 query scalars {
7   anInt
8   aString
9   aBoolean
10 }
11
12 query author {
13   author(id: 2){
14     id
15     name
16     posts(limit: 5) {
17       id
18       title
19     }
20   }
21 }
22
23 query topPosts {
24   topPosts(limit: 5) {
25     id
26     title
27     author {
28       id
29       name
30     }
31   }
32 }
```

QUERY VARIABLES

1

```
{
  "data": {
    "topPosts": [
      {
        "id": -55,
        "title": "Hello World",
        "author": {
          "id": 48,
          "name": "Hello World"
        }
      },
      {
        "id": 54,
        "title": "Hello World",
        "author": {
          "id": 51,
          "name": "Hello World"
        }
      }
    ]
  }
}
```

launchpad.graphql.com

CodeSandbox3

Project

Title

HN REST example

Description

Example of loading data from the HN REST API for a React component

Author

[helper](#)

Statistics

0 likes

1 fork

1 view

Files

HN REST example

</> StoriesList.js

</> StoriesListWithData.js

</> index.html

</> index.js

Dependencies

/index.js

Prettify

Save

```
1 import React from 'react';
2 import { render } from 'react-dom';
3 import 'isomorphic-fetch';
4 import StoriesListWithData from './StoriesListWithData';
5
6 const styles = {
7   fontFamily: 'sans-serif',
8   textAlign: 'center',
9 };
10
11 const App = () =>
12   <div style={styles}>
13     <StoriesListWithData />
14   </div>;
15
16 render(<App />, document.getElementById('root'));
```

< > ↺ /

1. [How to make a friend fast](#) by trurl42

2. [Linus: “I no longer feel like I can trust ‘init’ to do the sane thing”](#) by cnst

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19. [How startups such as Dropbox, Airbnb, Groupon acquired their first users](#) by catherinezng

20. [Show HN: Console based email client with Lua scripting](#) by stevekemp

codesandbox.io

Get the links on my GitHub



<https://github.com/helfer/js-conf-china>

Part 3: The future



Advantages of GraphQL

1. No overfetching / underfetching
2. Really easy documentation
3. Strong typing

Open questions

1. No standard caching solutions (REST has HTTP caching)
2. No standard for error handling (REST has HTTP status codes)
3. GraphQL is still evolving

Where to go from here

graphql.com

graphql.org

dev-blog.apollodata.com



www.apolldata.com



Jonas Helfer
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