GraphQL

November 2018

GraphQL or back-end/front-end communication done right

November 2018

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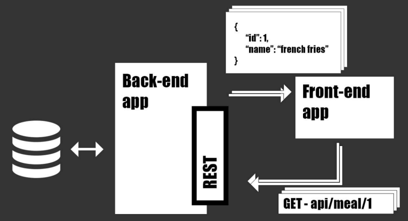
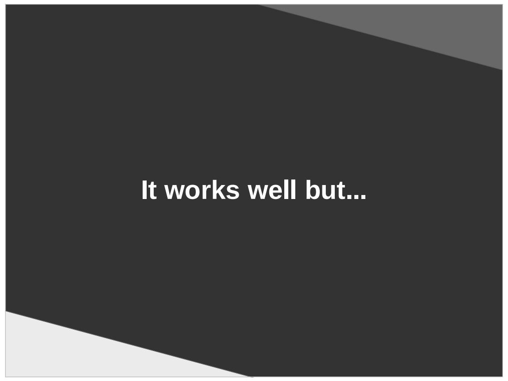
Front-end developer

Current workflow with an API

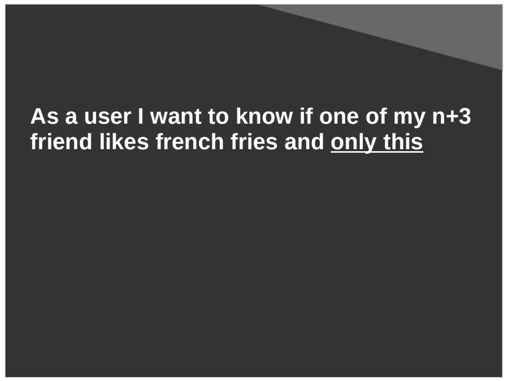


Current workflow with an API

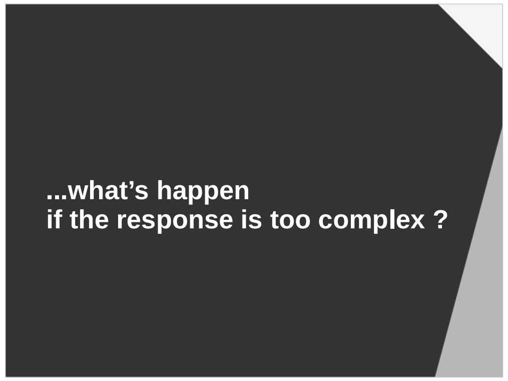
- Front-end asks for a resource
- Backend analyzes the request
- Backend queries the db
- DB returns the data
- Backend returns the resource



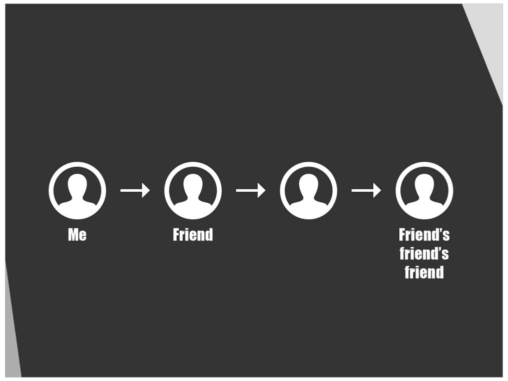
It works well but...

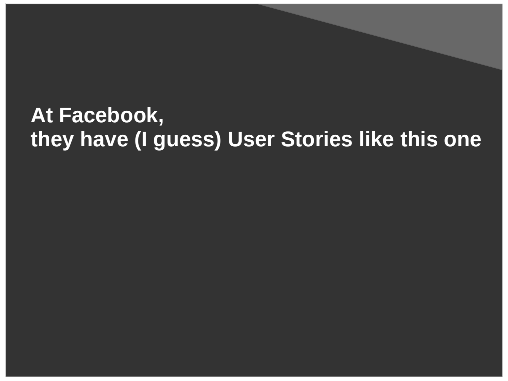


As a user I want to know if one of my n+3 friend likes french fries and only this

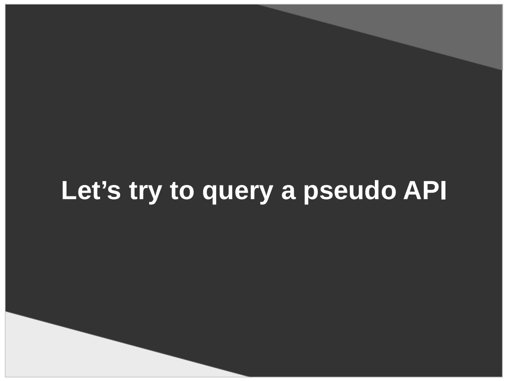


...what’s happen
if the response is too complex ?

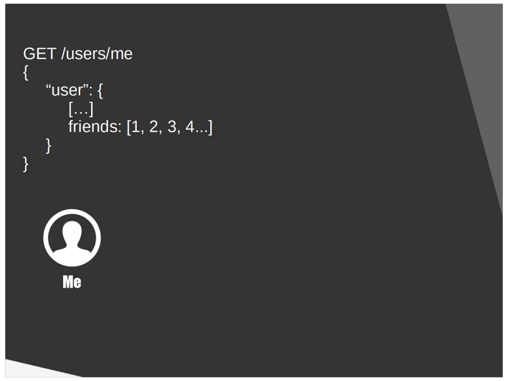




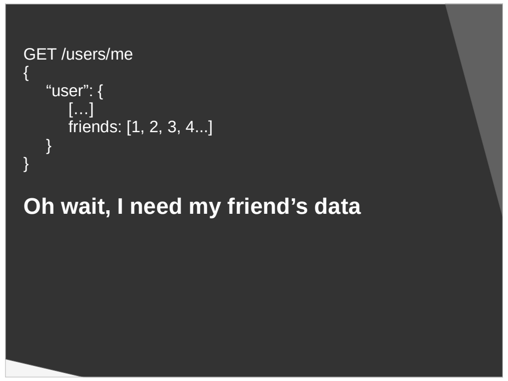
At Facebook,
they have (I guess) User Stories like this one



Let’s try to query a pseudo API

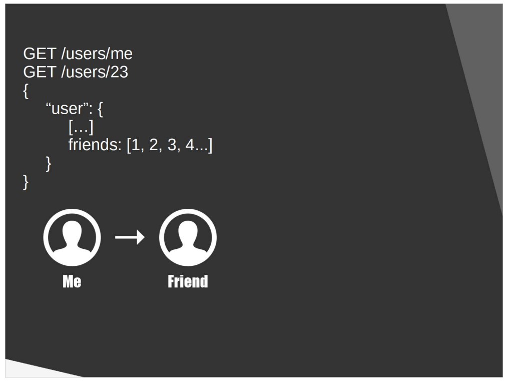


```
GET /users/me
{
    “user”: {
        […]
        friends: [1, 2, 3, 4...]
    }
}
```

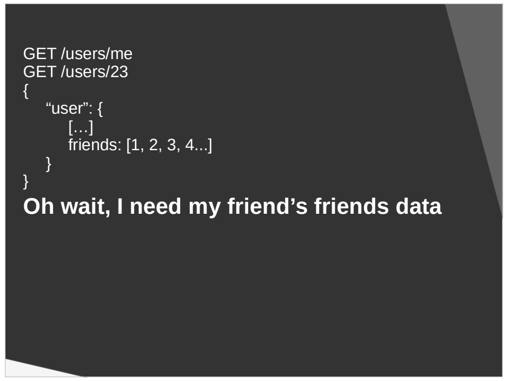


```
GET /users/me
{
    “user”: {
        […]
        friends: [1, 2, 3, 4...]
    }
}
```

Oh wait, I need my friend’s data

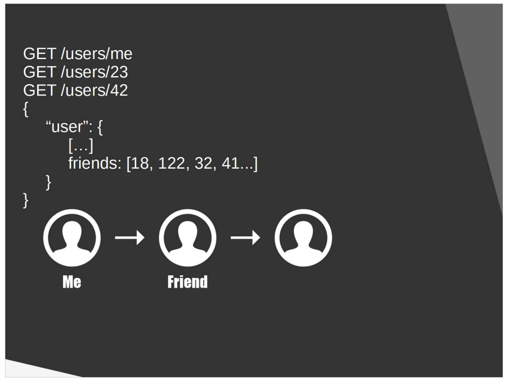


```
GET /users/me
GET /users/23
{
    “user”: {
        […]
        friends: [1, 2, 3, 4...]
    }
}
```

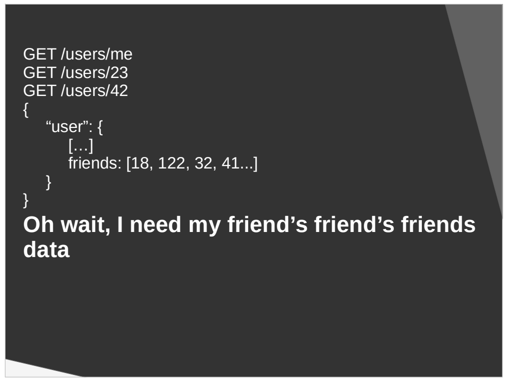


```
GET /users/me
GET /users/23
{
    “user”: {
        […]
        friends: [1, 2, 3, 4...]
    }
}
```

Oh wait, I need my friend’s friends data

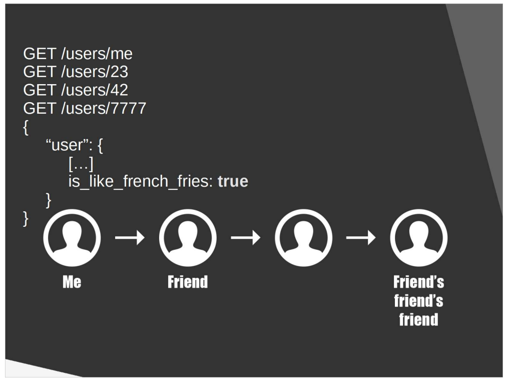


```
GET /users/me
GET /users/23
GET /users/42
{
    “user”: {
        […]
        friends: [18, 122, 32, 41...]
    }
}
```

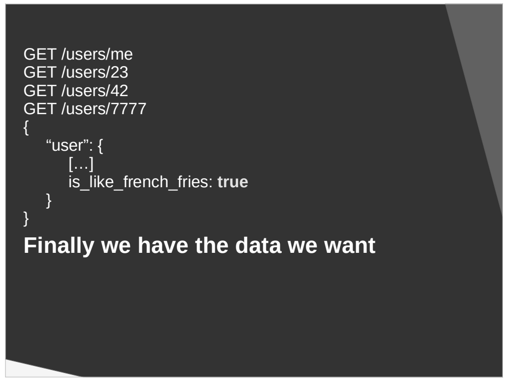


```
GET /users/me
GET /users/23
GET /users/42
{
    “user”: {
        […]
        friends: [18, 122, 32, 41...]
    }
}
```

Oh wait, I need my friend’s friend’s friends data

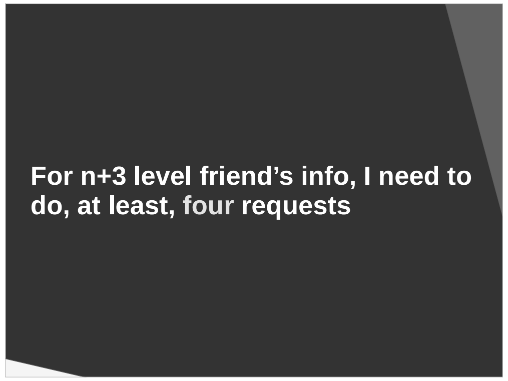


```
GET /users/me
GET /users/23
GET /users/42
GET /users/7777
{
    "user": {
        […]
        is_like_french_fries: true
    }
}
```

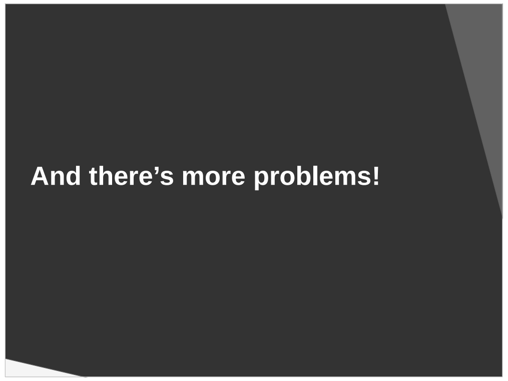


```
GET /users/me
GET /users/23
GET /users/42
GET /users/7777
{
    "user": {
        […]
        is_like_french_fries: true
    }
}
```

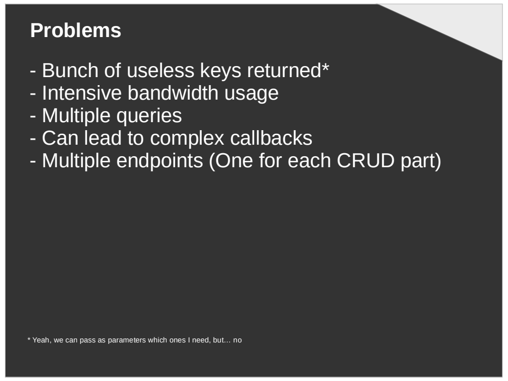
Finally we have the data we want



For n+3 level friend's info, I need to do, at least, four requests



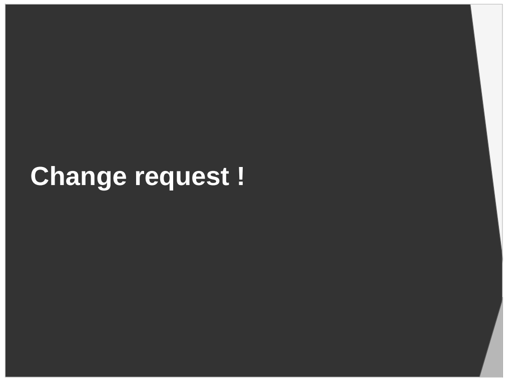
And there's more problems!



Problems

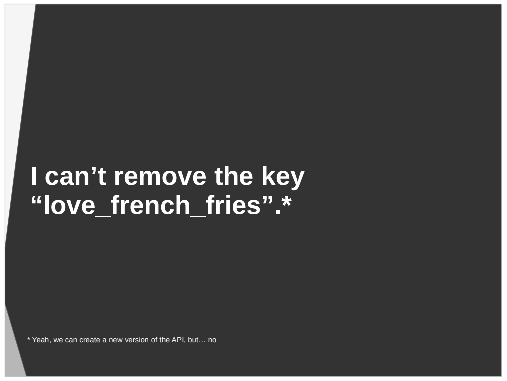
- Bunch of useless keys returned*
- Intensive bandwidth usage
- Multiple queries
- Can lead to complex callbacks
- Multiple endpoints (One for each CRUD part)

* Yeah, we can pass as parameters which ones I need, but… no

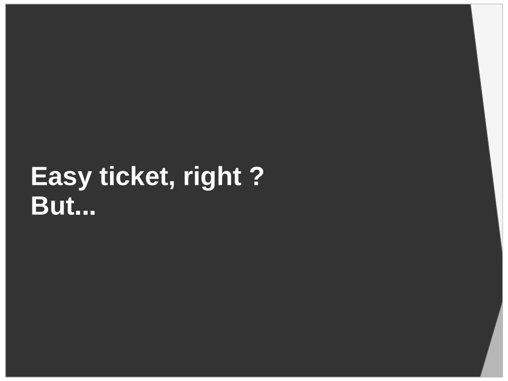


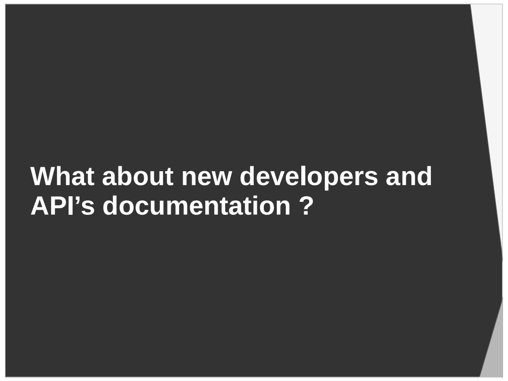
Change request !

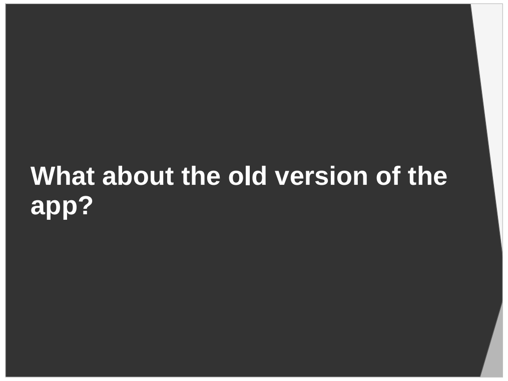
The product owner doesn’t want this feature anymore

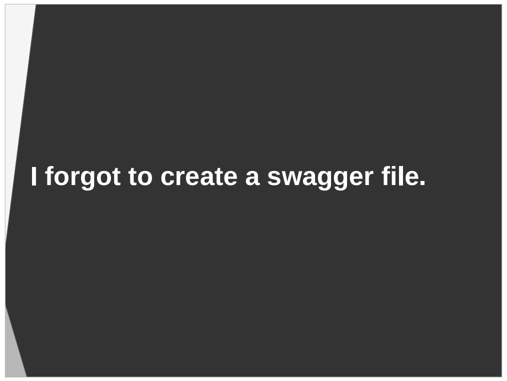

I can’t remove the key “love_french_fries”.*

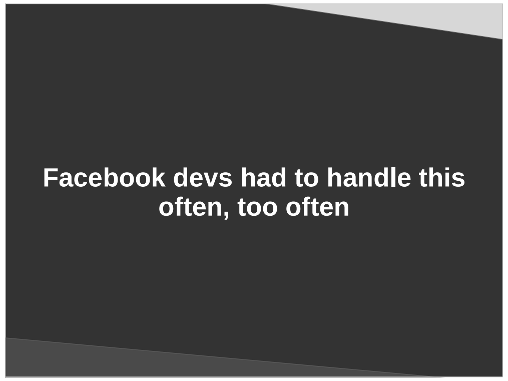
* Yeah, we can create a new version of the API, but… no


Easy ticket, right ? But...

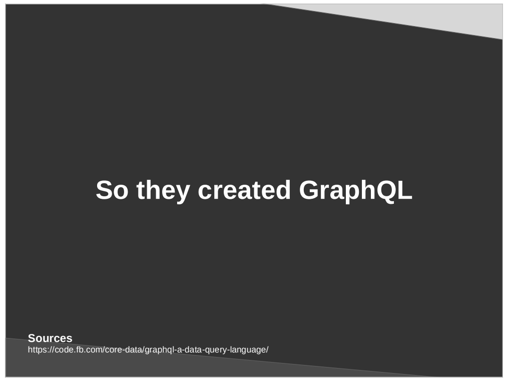

What about new developers and API’s documentation ?


What about the old version of the app?


I forgot to create a swagger file.

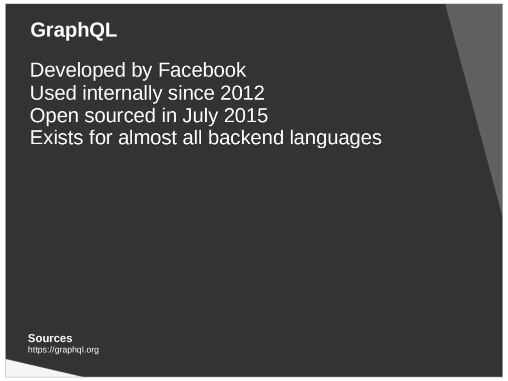


Facebook devs had to handle this often, too often



So they created GraphQL

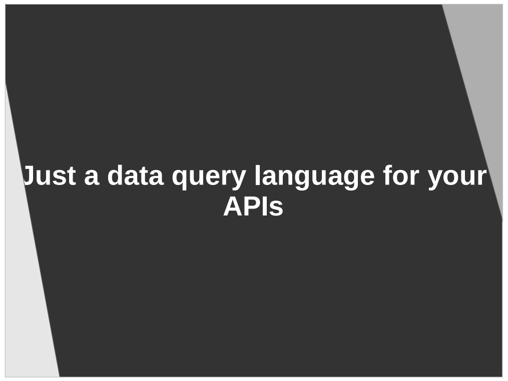
Sources
https://code.fb.com/core-data/graphql-a-data-query-language/



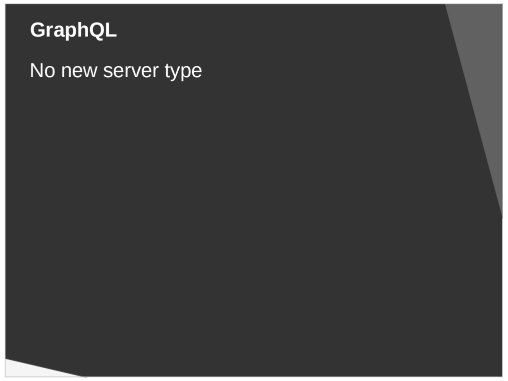
GraphQL

Developed by Facebook
Used internally since 2012
Open sourced in July 2015
Exists for almost all backend languages

Sources
https://graphql.org

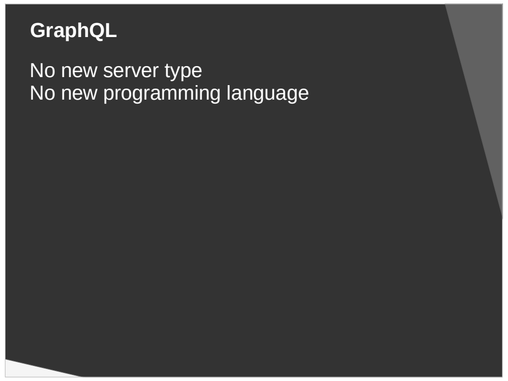


Just a data query language for your APIs



GraphQL

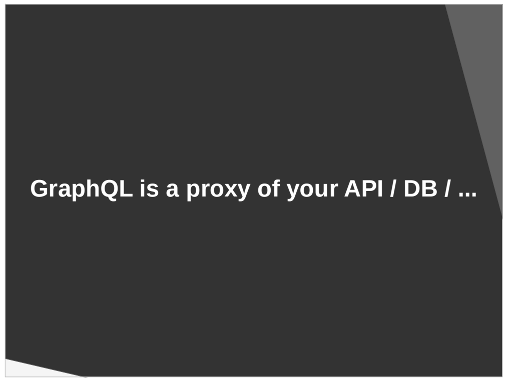
No new server type



GraphQL

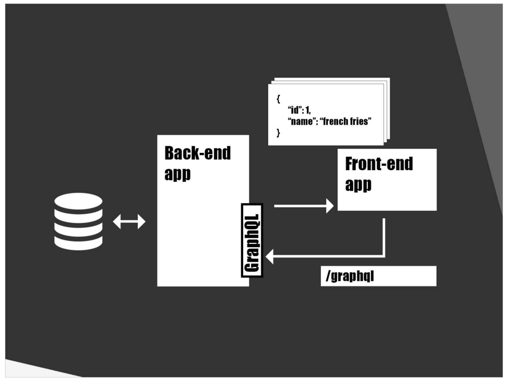
No new server type
No new programming language

You get only what you want, what you need

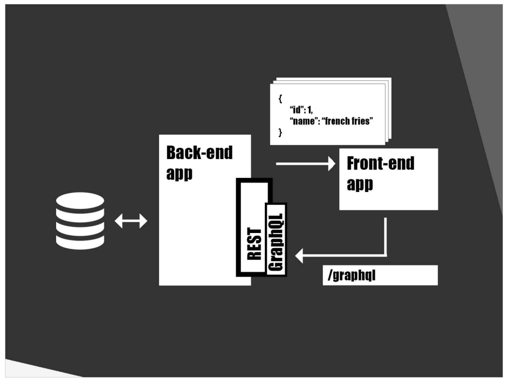


GraphQL is a proxy of your API / DB / ...

Workflow with GraphQL

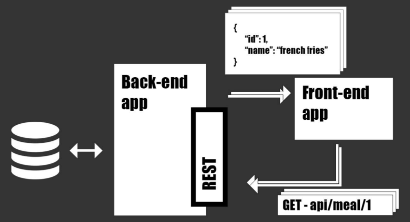


```
{
    "id": 1,
    "name": "french fries"
}
```



```
{
    "id": 1,
    "name": "french fries"
}
```

The front-end is now connected to GraphQL



Let’s summarize our main problems with the old way

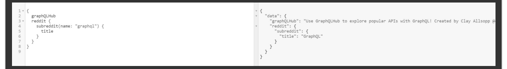
Main problems with the old way

- Over-fetching (useless keys)
- Documentation
- Multiple queries

Over-fetching

With GraphQL you describe to the server which data you need **and only this.**

Over-fetching



```
{
  graphQLHub
  reddit {
    subreddit(name: "graphql") {
      title
    }
  }
}
```

```
{
  "data": {
    "graphQLHub": "Use GraphQLHub to explore popular APIs with GraphQL! Created by Clay Allsopp @
    "reddit": {
      "subreddit": {
        "title": "GraphQL"
      }
    }
  }
}
```

Over-fetching

~~Over-fetching*~~

* It also fixes the issue with the API versioning
https://graphql.org/learn/best-practices/#versioning

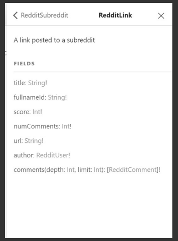
Documentation

Documentation

GraphQL needs a data schema in order to work and to create the documentation **automatically**

~~Documentation~~

Documentation


RedditSubreddit **RedditLink**

A link posted to a subreddit

FIELDS

title: String!
fullnameId: String!
score: Int!
numComments: Int!
url: String!
author: RedditUser!
comments(depth: Int, limit: Int): [RedditComment]!

Multiple queries

- We provide a data schema to GraphQL

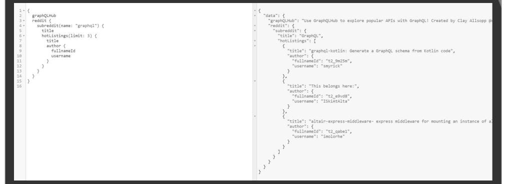
Multiple queries

- We provide a data schema to GraphQL
- The data schema contains entities relationships

Multiple queries

- We provide a data schema to GraphQL
- The data schema contains entities relationships
- And we get in **one query** everything we need

Multiple queries



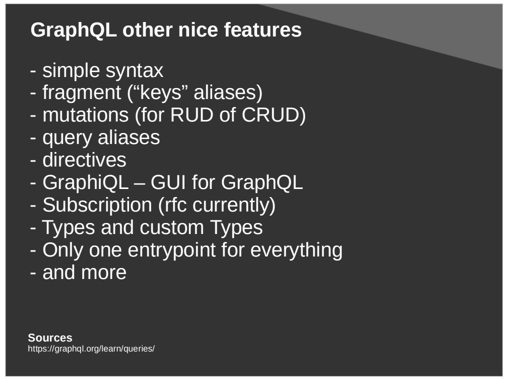
```
{
  graphQLHub
  reddit {
    subreddit(name: "graphql") {
      title
      hotListings(limit: 3) {
        title
        author {
          fullnameId
          username
        }
      }
    }
  }
}
```

```
{
  "data": {
    "graphQLHub": "Use GraphQLHub to explore popular APIs with GraphQL! Created by Clay Allsopp @c
    "reddit": {
      "subreddit": {
        "title": "GraphQL",
        "hotListings": [
          {
            "title": "graphql-kotlin: Generate a GraphQL schema from Kotlin code",
            "author": {
              "fullnameId": "t2_9m25m",
              "username": "smyrick"
            }
          },
          {
            "title": "This belongs here:",
            "author": {
              "fullnameId": "t2_e9vd8",
              "username": "ISkiAtAlta"
            }
          },
          {
            "title": "altair-express-middleware- express middleware for mounting an instance of a
            "author": {
              "fullnameId": "t2_qabe1",
              "username": "imolorhe"
            }
          }
        ]
      }
    }
  }
}
```

Multiple queries

~~Multiple queries~~

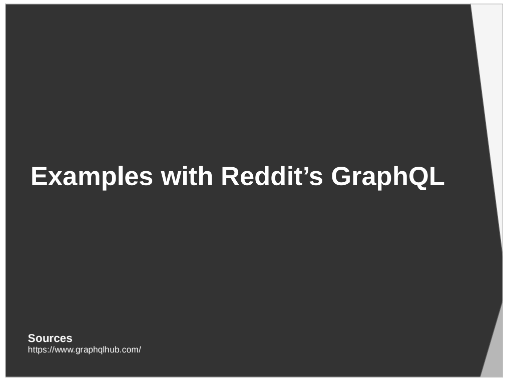
All of our problems are fixed!



GraphQL other nice features

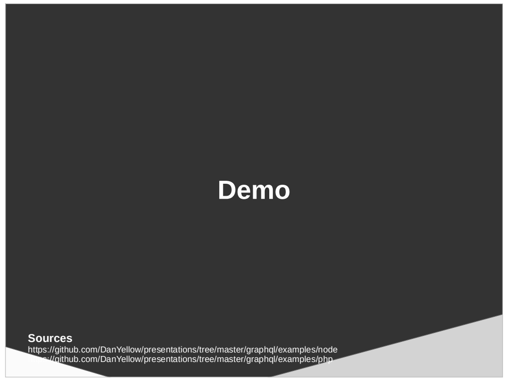
- simple syntax
- fragment (“keys” aliases)
- mutations (for RUD of CRUD)
- query aliases
- directives
- GraphiQL – GUI for GraphQL
- Subscription (rfc currently)
- Types and custom Types
- Only one entrypoint for everything
- and more

Sources
https://graphql.org/learn/queries/



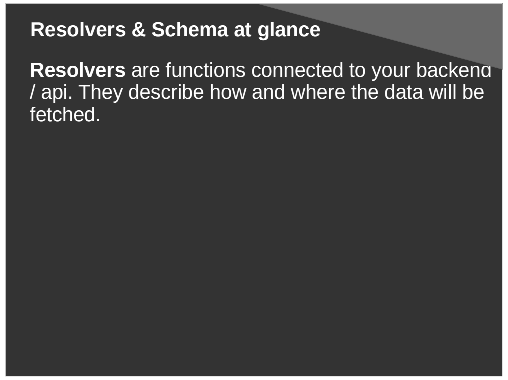
Examples with Reddit’s GraphQL

Sources
https://www.graphqlhub.com/



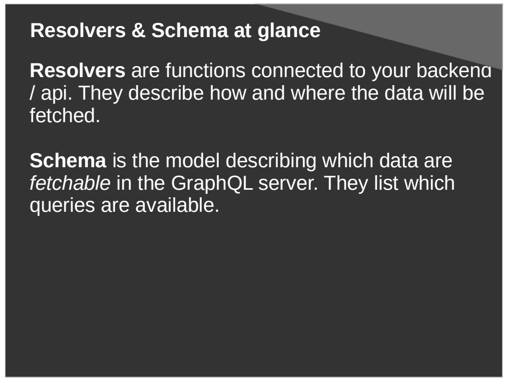
Demo

Sources
https://github.com/DanYellow/presentations/tree/master/graphql/examples/node
https://github.com/DanYellow/presentations/tree/master/graphql/examples/php



Resolvers & Schema at glance

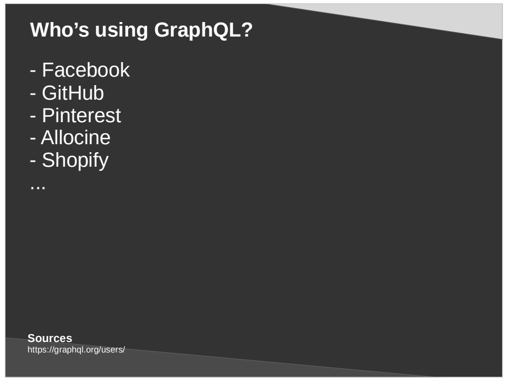
Resolvers are functions connected to your backend / api. They describe how and where the data will be fetched.



Resolvers & Schema at glance

Resolvers are functions connected to your backend / api. They describe how and where the data will be fetched.

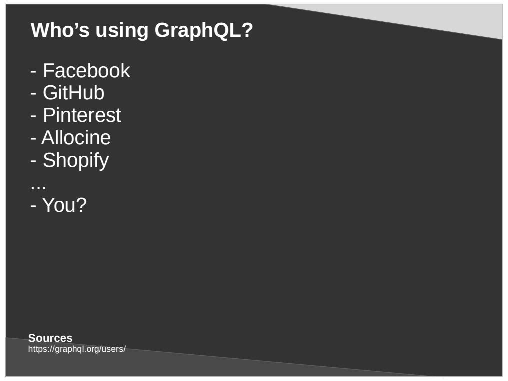
Schema is the model describing which data are *fetchable* in the GraphQL server. They list which queries are available.



Who’s using GraphQL?

- Facebook
- GitHub
- Pinterest
- Allocine
- Shopify
...

Sources
https://graphql.org/users/



Who’s using GraphQL?

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- GitHub
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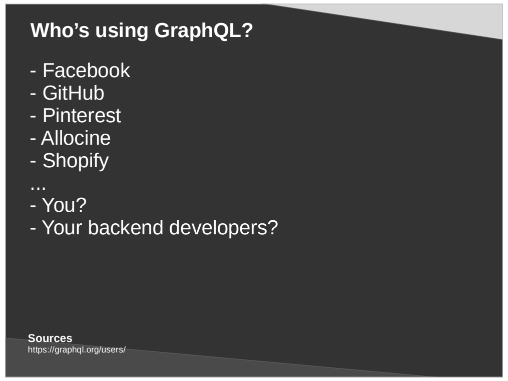
...

- You?

Sources
https://graphql.org/users/



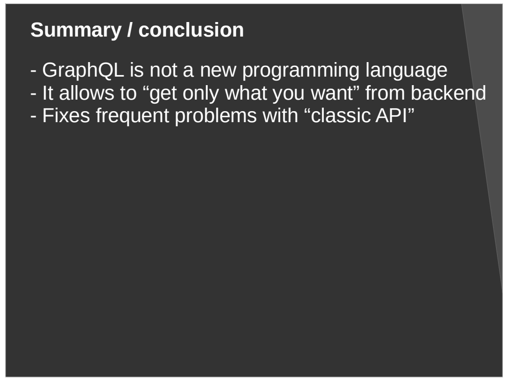
Who’s using GraphQL?

- Facebook
- GitHub
- Pinterest
- Allocine
- Shopify

...

- You?
- Your backend developers?

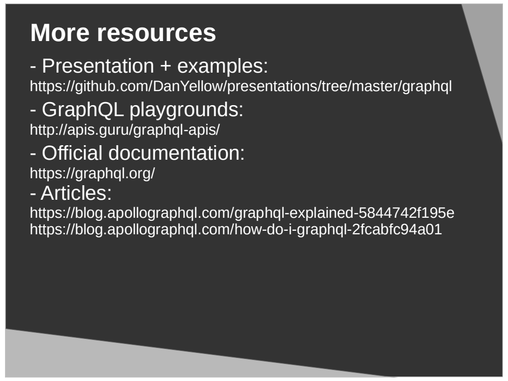
Sources
https://graphql.org/users/



Summary / conclusion

- GraphQL is not a new programming language
- It allows to “get only what you want” from backend
- Fixes frequent problems with “classic API”

Questions ?



More resources

- Presentation + examples:
https://github.com/DanYellow/presentations/tree/master/graphql
- GraphQL playgrounds:
http://apis.guru/graphql-apis/
- Official documentation:
https://graphql.org/
- Articles:
https://blog.apollographql.com/graphql-explained-5844742f195e
https://blog.apollographql.com/how-do-i-graphql-2fcabfc94a01