GraphQL

November 2018

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

November 2018

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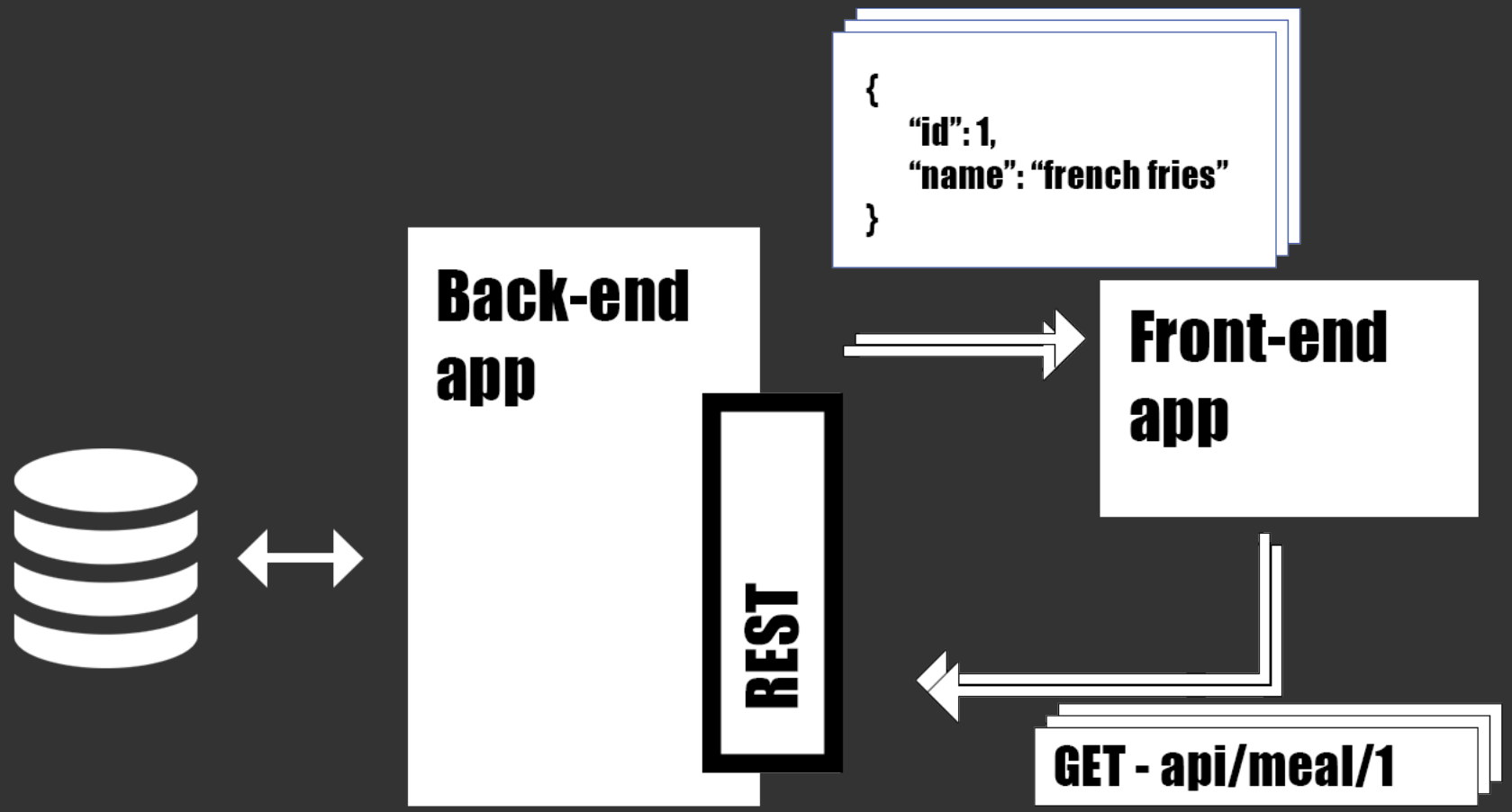
Front-end developer

Current workflow with an API


{
"id": 1,
"name": "french fries"
}
Back-end app
REST
Front-end app
GET - api/meal/1

Current workflow with an API

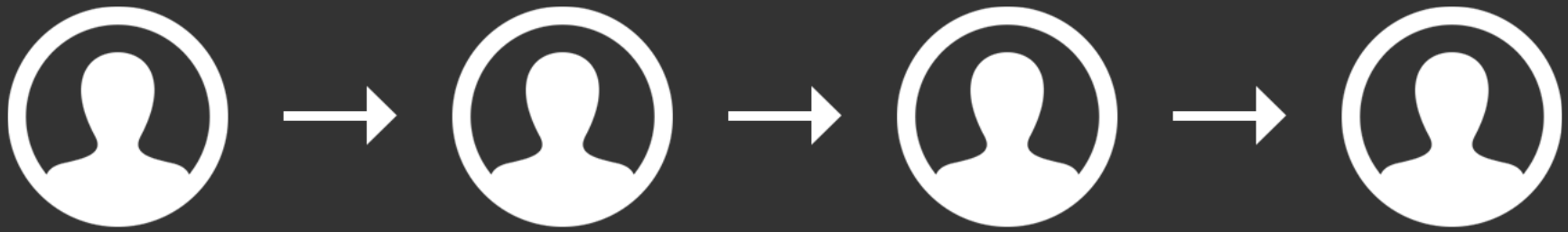
- Front-end asks for a resource
- Backend analyzes the request
- Backend queries the db
- DB returns the data
- Backend returns the resource

It works well but...

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

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

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


Me
Friend
Friend's friend's friend

Let’s try to query a pseudo API

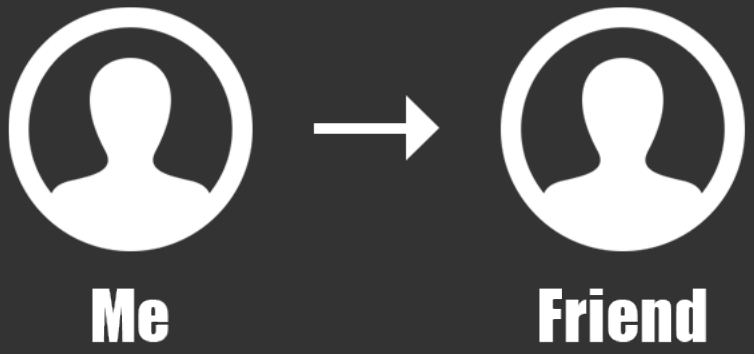
```
GET /users/me
{
    “user”: {
        […]
        friends: [1, 2, 3, 4...]
    }
}
```

```
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...]
    }
}
```

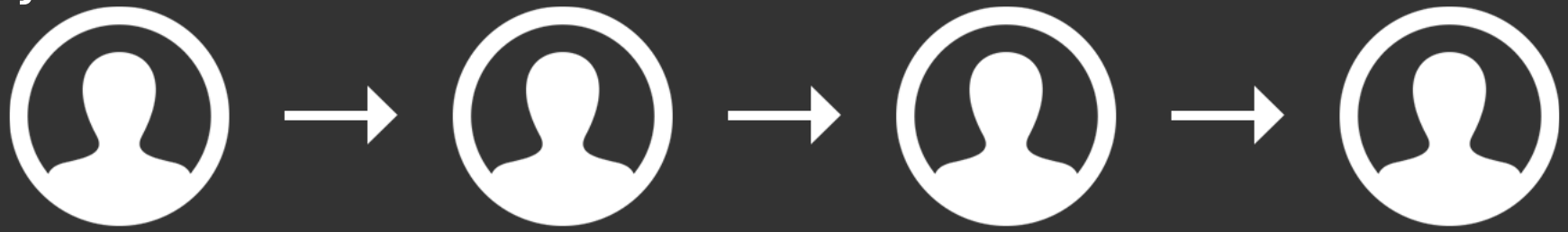
GET /users/me
GET /users/23
GET /users/42

```
{
    “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

Easy ticket, right ?
But...

What about the old version of the app?

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

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

What about new developers and API’s documentation ?

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

GraphQL

No new server type

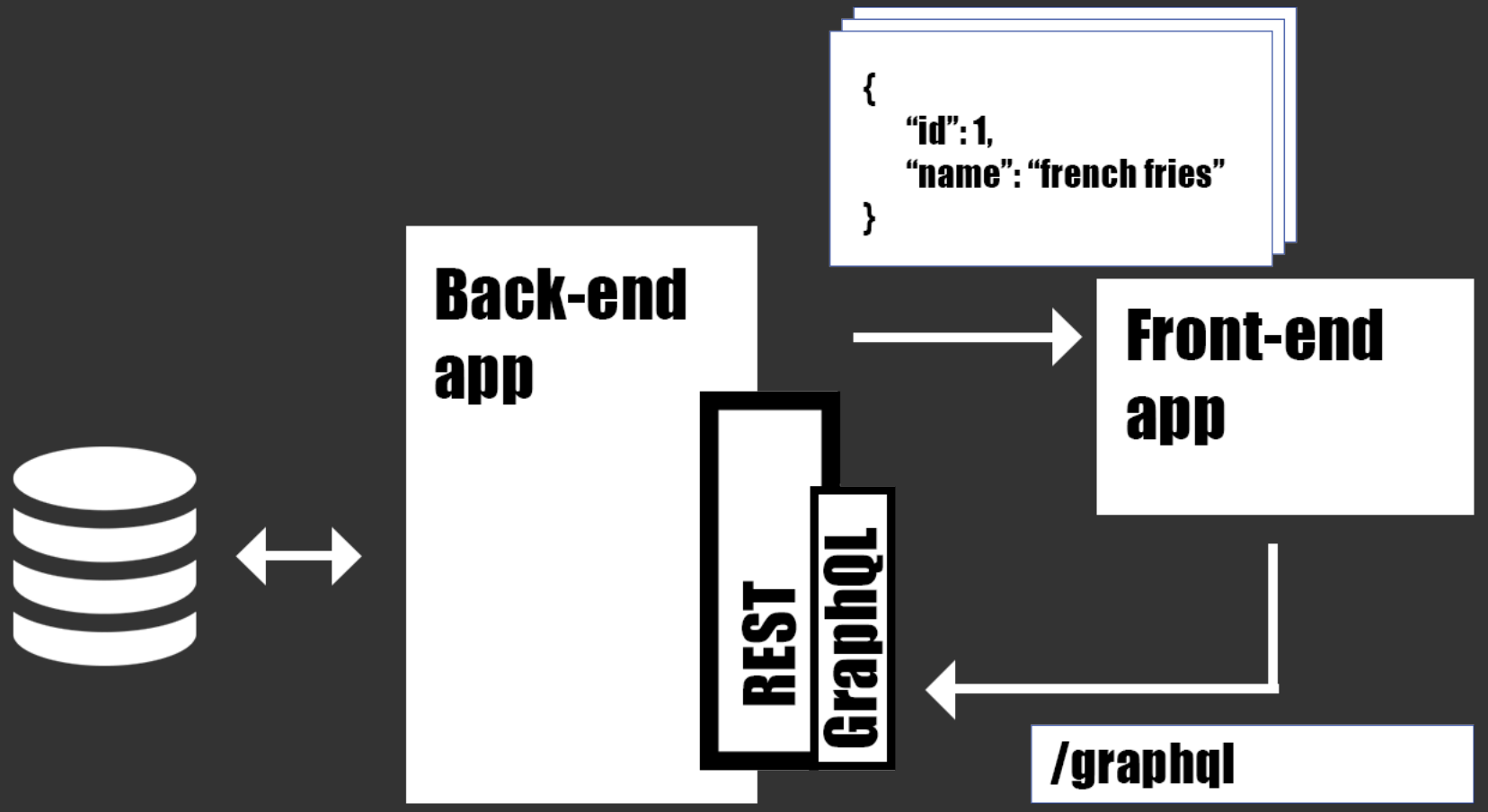
GraphQL

No new server type
No new programming language

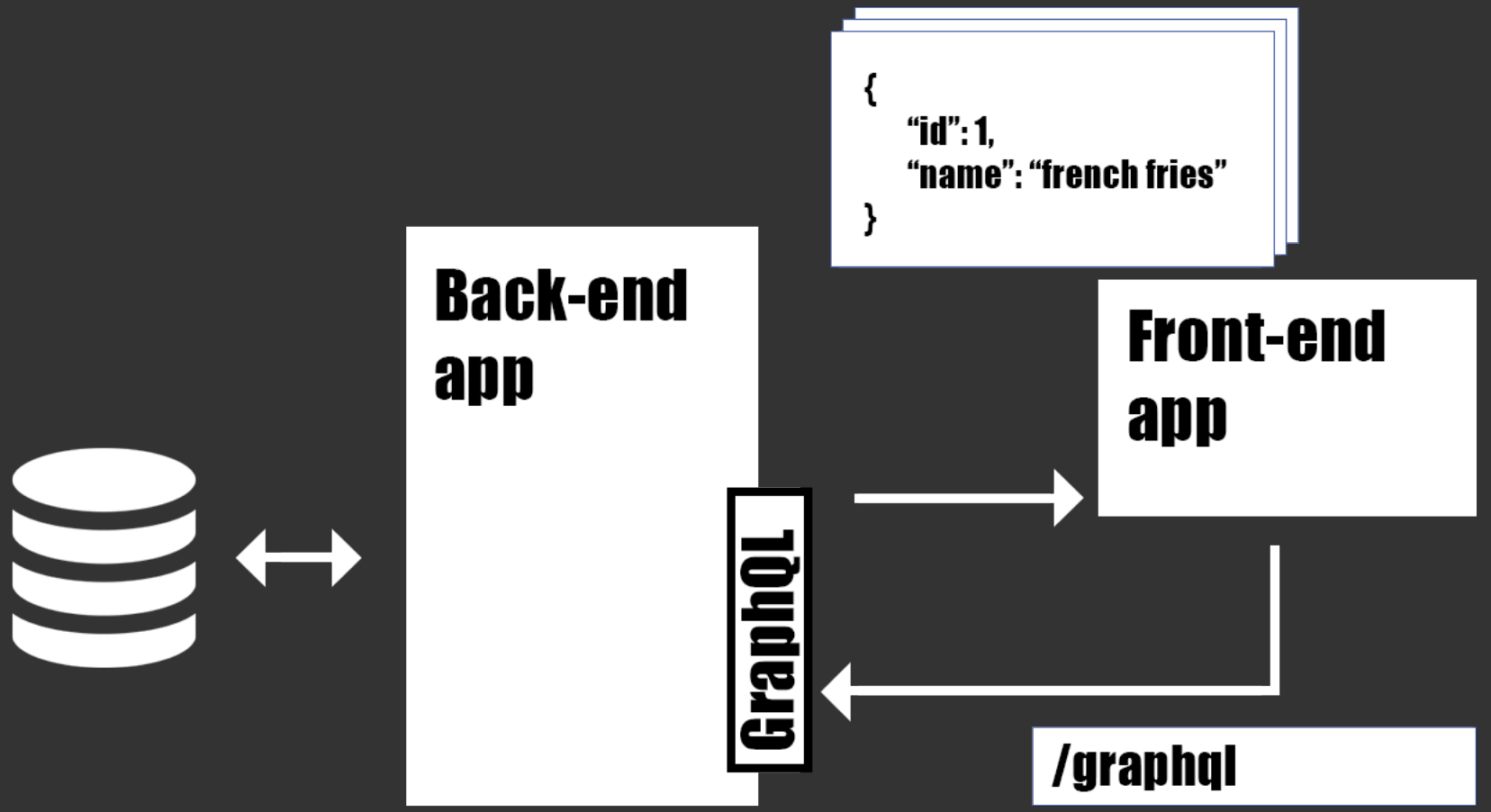
Just a data query language for your APIs

You get only what you want, what you need

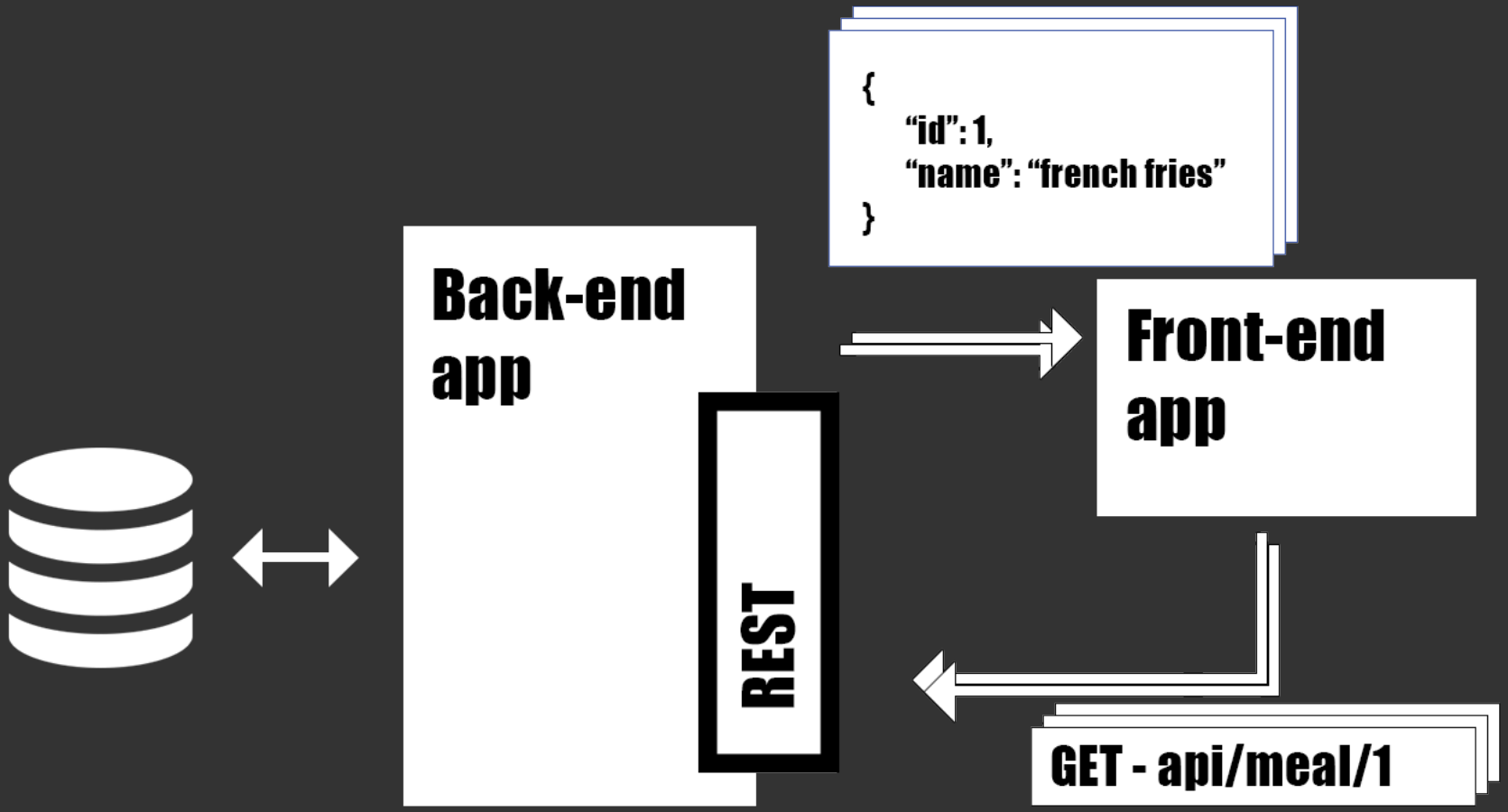
Workflow with GraphQL


{
"id": 1,
"name": "french fries"
}
Back-end app
Front-end app
REST
GraphQL
/graphql

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


{
"id": 1,
"name": "french fries"
}
Back-end app
Front-end app
GraphQL
/graphql

The front-end is now connected to GraphQL


{
"id": 1,
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Back-end app
REST
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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

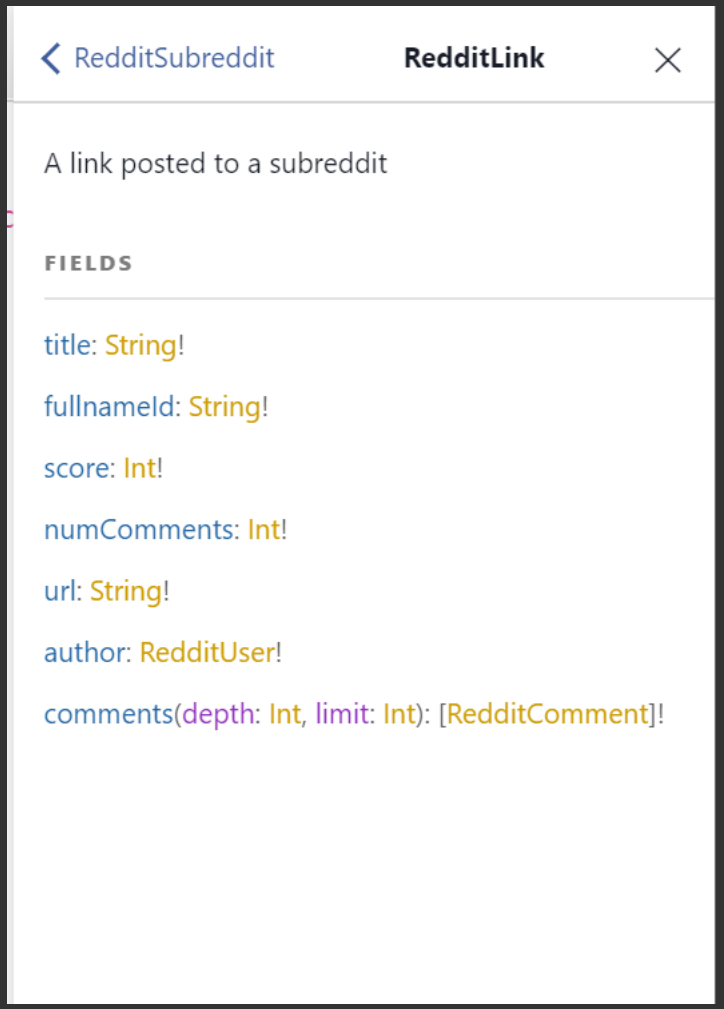
~~Over-fetching*~~

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

Documentation

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

Documentation



Documentation

~~Documentation~~

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 al
            "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?

- Facebook
- GitHub
- Pinterest
- Allocine
- Shopify

...

- 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