GraphQL

WHAT IS GRAPHQL?

GraphQL is an application layer query language from Facebook.

GraphQL is a specification

Facebook Open Source

MOTIVATION

2012

facebook

MOTIVATION

Lee Byron is an Engineer at Facebook working on GraphQL. He's been making things at Facebook since 2008, including Immutable.js, Mobile & JavaScript.

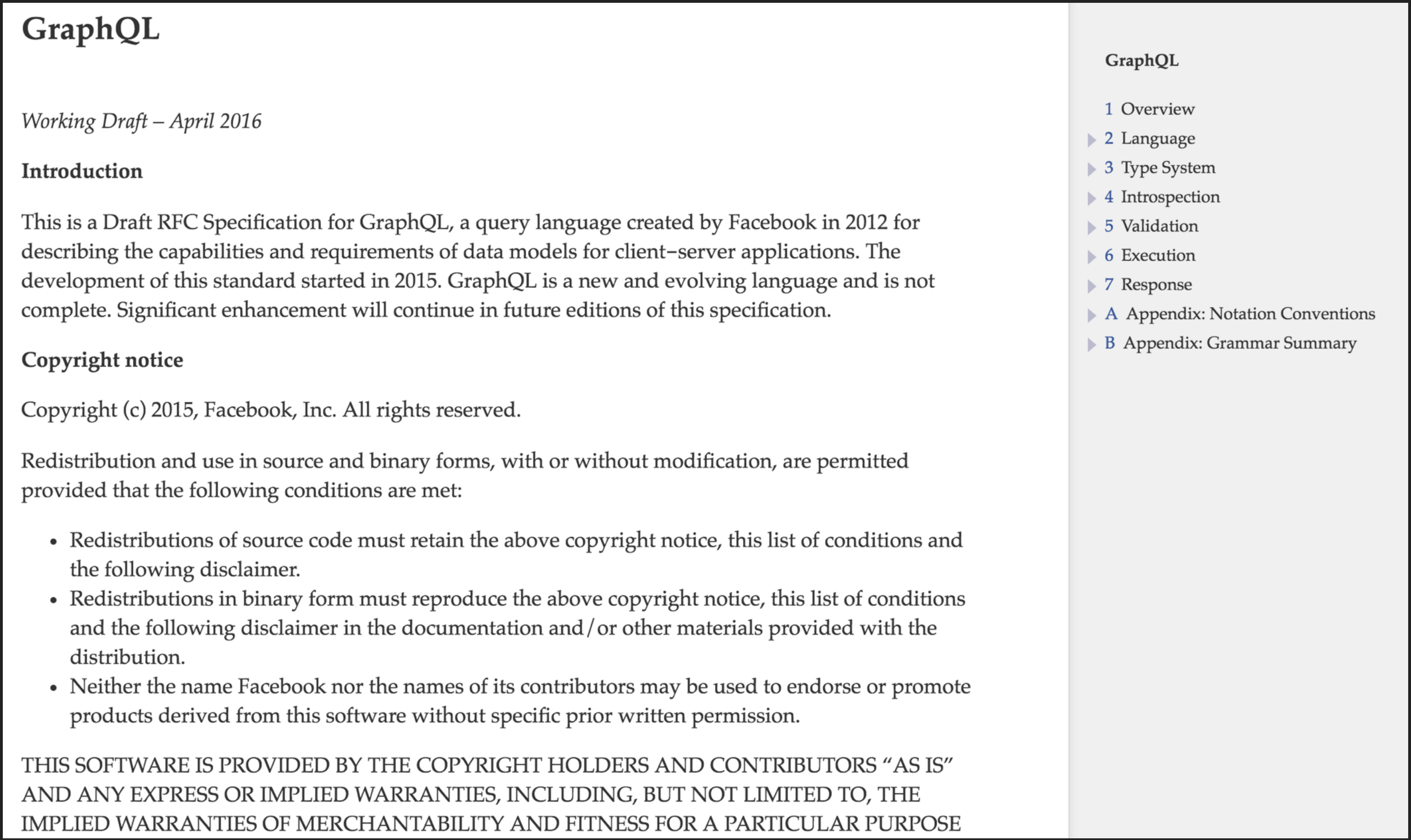
MOTIVATION

UP UNTIL 2012, NEWS FEED COULD ONLY BE REQUESTED AND DELIVERED AS HTML FROM OUR SERVERS. DURING THE EFFORT TO REBUILD NEWS FEED AS A NATIVE IOS VIEW WE HAD TO REVISIT THIS ARCHITECTURE TO GET RAW DATA

Lee Byron

WHAT IS GRAPHQL?

http://facebook.github.io/graphql



GraphQL

Working Draft – April 2016

Introduction

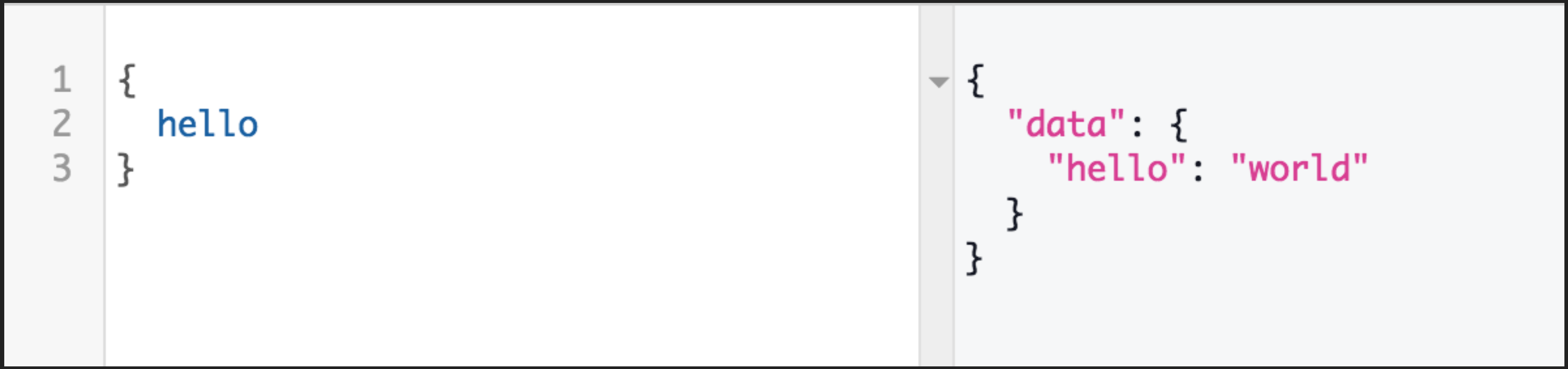
This is a Draft RFC Specification for GraphQL, a query language created by Facebook in 2012 for describing the capabilities and requirements of data models for client‐server applications. The development of this standard started in 2015. GraphQL is a new and evolving language and is not complete. Significant enhancement will continue in future editions of this specification.

Copyright notice

GraphQL

WHAT IS GRAPHQL?

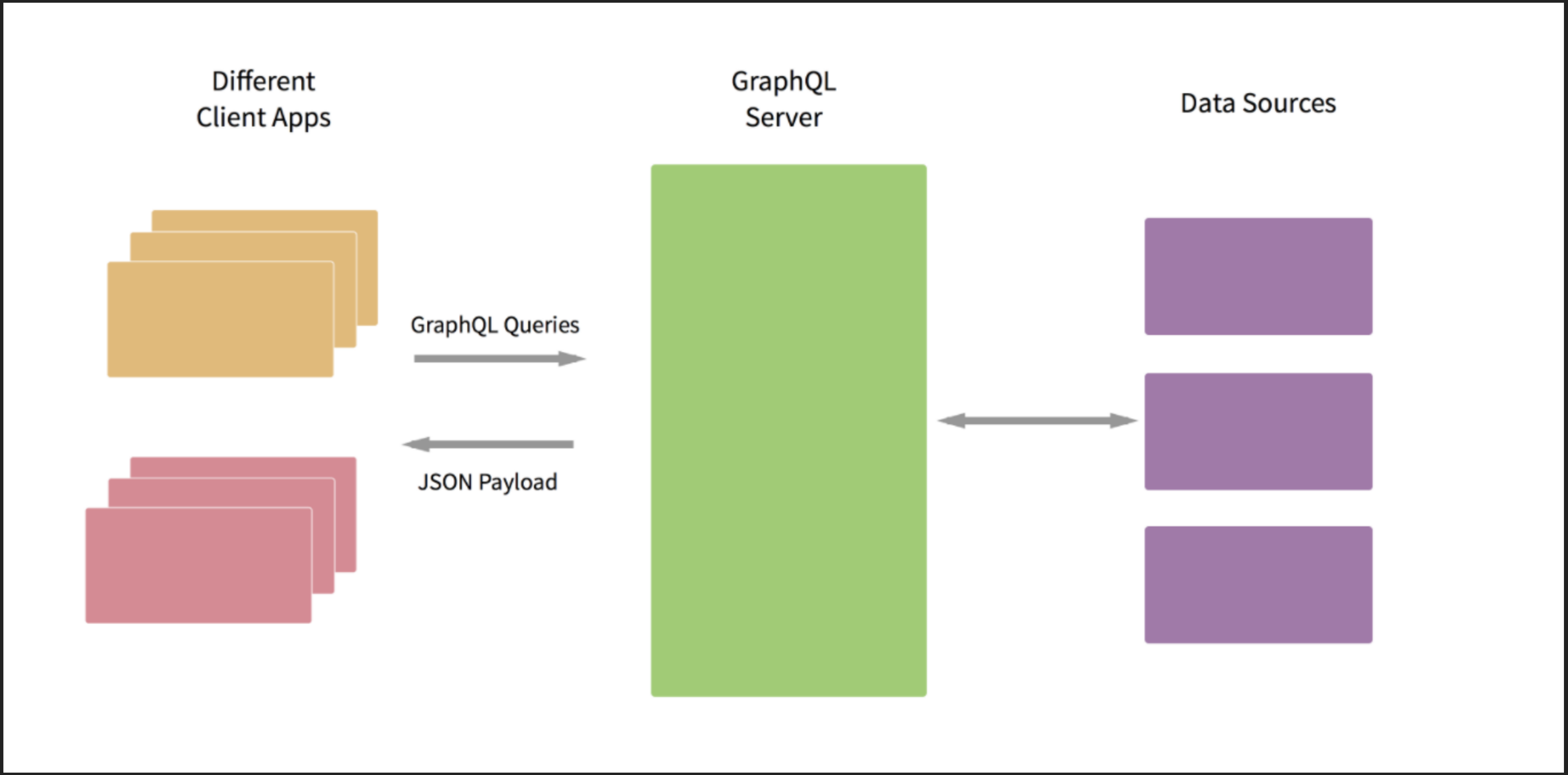
Hello GraphQL



```
{
  hello
}
```

```
{
  "data": {
    "hello": "world"
  }
}
```

WHAT IS GRAPHQL?



WHAT IS GRAPHQL?

With GraphQL, you can define your backend as a well-defined graph-based schema. Then client applications can query your dataset as they are needed.

WHAT IS GRAPHQL?

So, you don't need to change your backend for data requirement changes in client apps. This simply solves one of the biggest problems in managing REST API.

WHY GRAPHQL?

Path

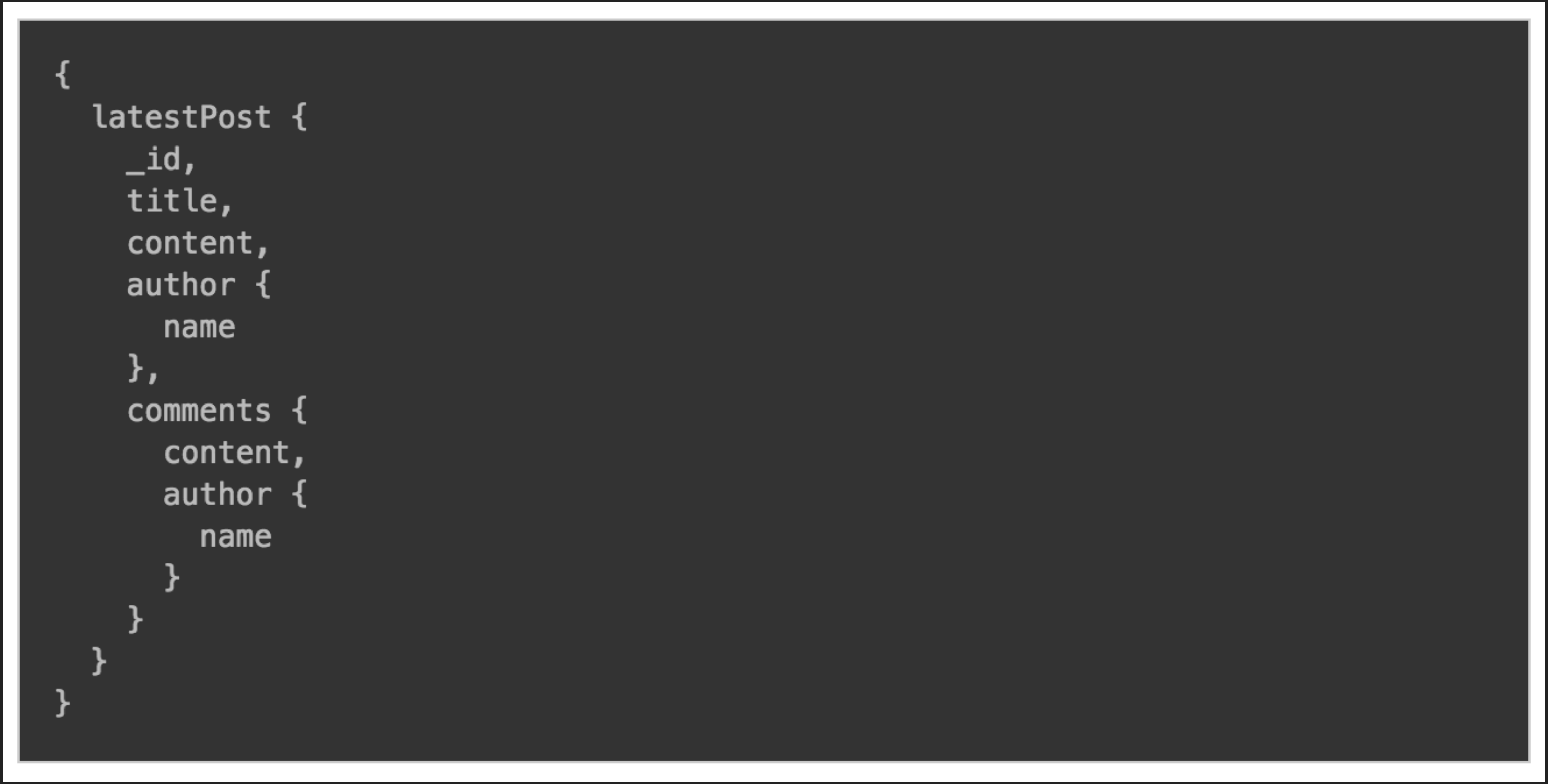
Management

Hell

WHAT IS GRAPHQL?

GraphQL also allows client applications to batch and fetch data very efficiently. For an example, have a look at the following GraphQL query:

WHAT IS GRAPHQL?

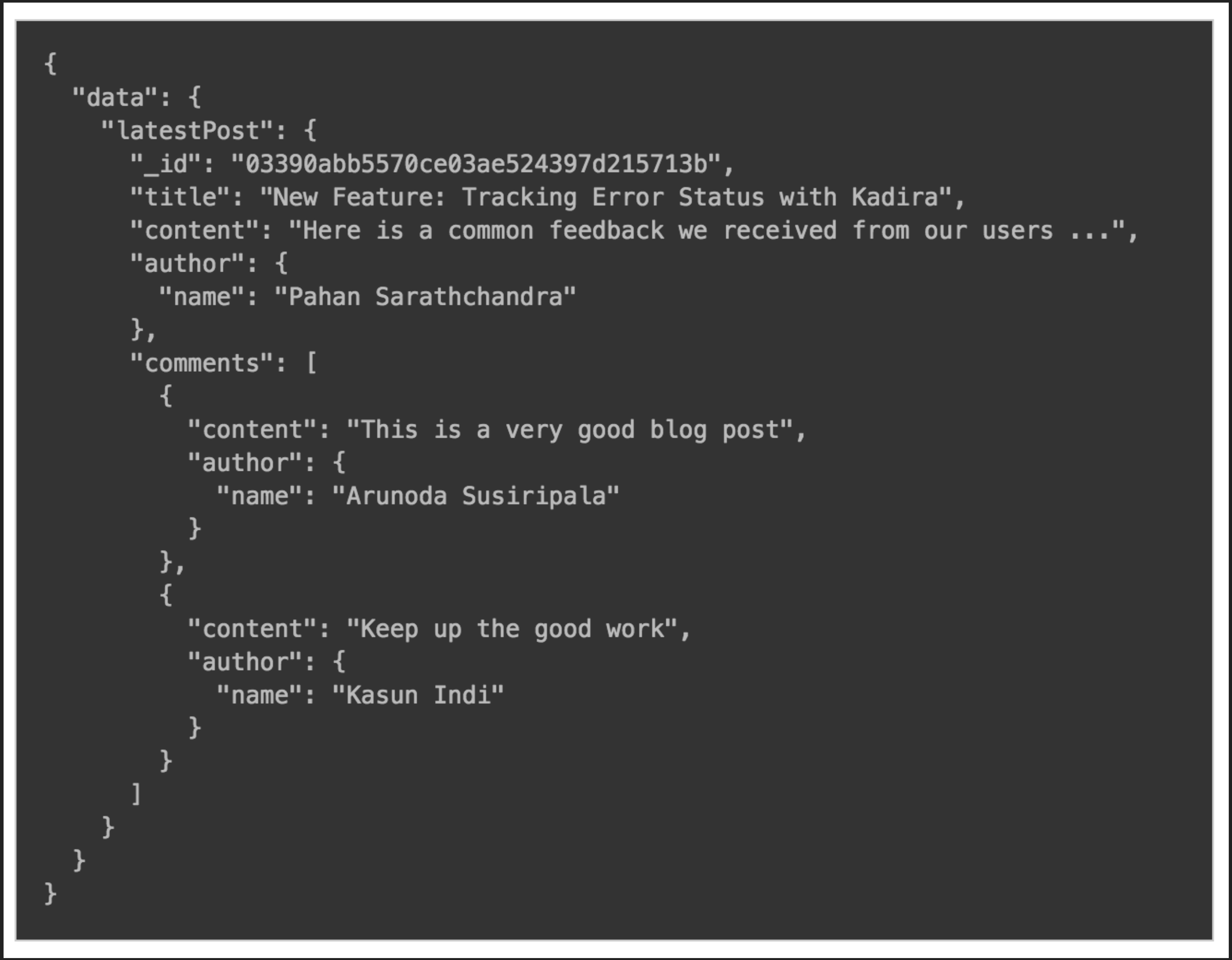


```
{
  latestPost {
    _id,
    title,
    content,
    author {
      name
    },
    comments {
      content,
      author {
        name
      }
    }
  }
}
```

This is a GraphQL query to fetch data for a blog post with comments and author information

WHAT IS GRAPHQL?

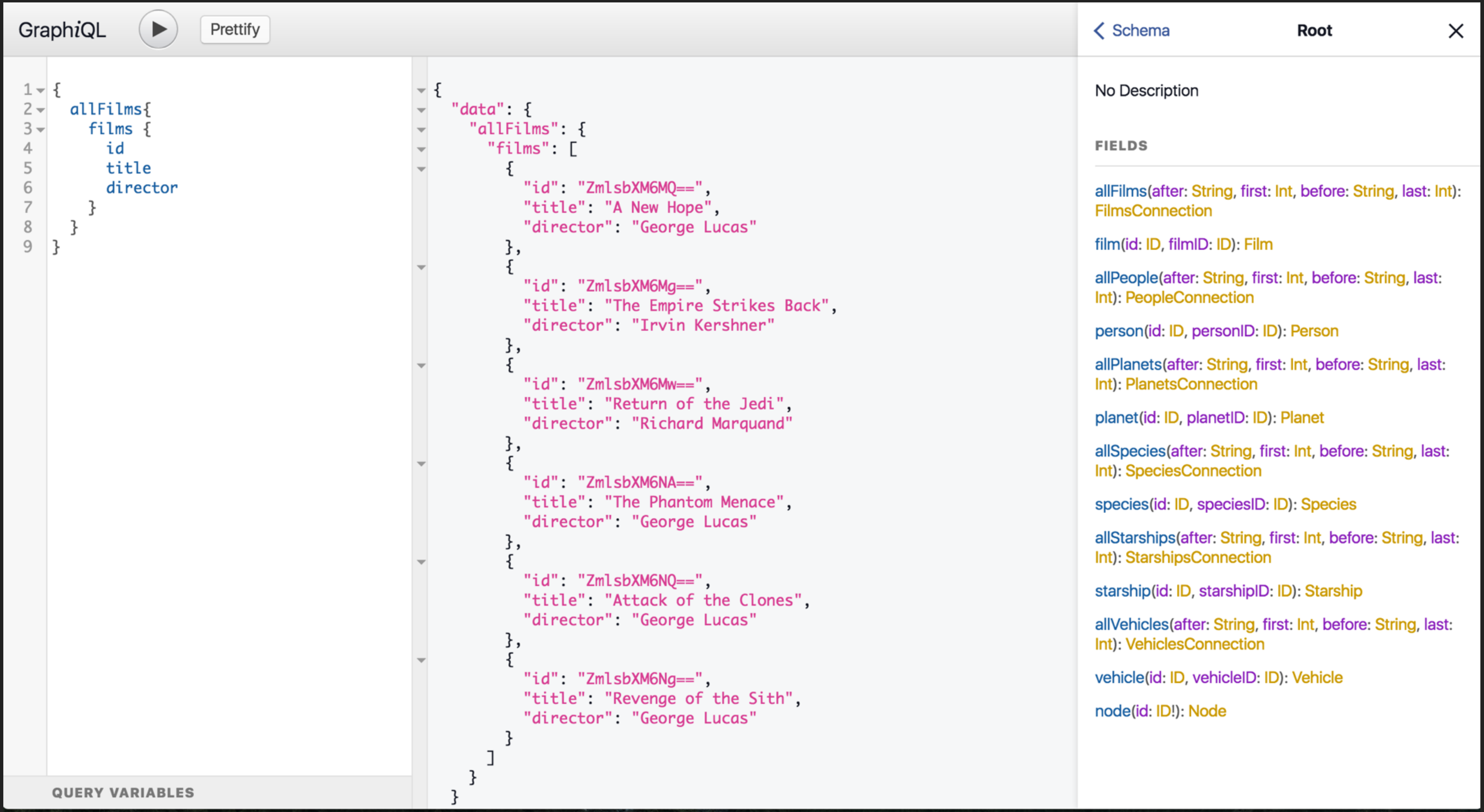
Here's the result of the above query:



```
{
  "data": {
    "latestPost": {
      "_id": "03390abb5570ce03ae524397d215713b",
      "title": "New Feature: Tracking Error Status with Kadira",
      "content": "Here is a common feedback we received from our users ...",
      "author": {
        "name": "Pahan Sarathchandra"
      },
      "comments": [
        {
          "content": "This is a very good blog post",
          "author": {
            "name": "Arunoda Susiripala"
          }
        },
        {
          "content": "Keep up the good work",
          "author": {
            "name": "Kasun Indi"
          }
        }
      ]
    }
  }
}
```

WHAT IS GRAPHQL?

GraphiQL



```
{
  allFilms{
    films {
      id
      title
      director
    }
  }
}
```

```
{
  "data": {
    "allFilms": {
      "films": [
        {
          "id": "ZmlsbXM6MQ==",
          "title": "A New Hope",
          "director": "George Lucas"
        },
        {
          "id": "ZmlsbXM6Mg==",
          "title": "The Empire Strikes Back",
          "director": "Irvin Kershner"
        },
        {
          "id": "ZmlsbXM6Mw==",
          "title": "Return of the Jedi",
          "director": "Richard Marquand"
        },
        {
          "id": "ZmlsbXM6NA==",
          "title": "The Phantom Menace",
          "director": "George Lucas"
        },
        {
          "id": "ZmlsbXM6NQ==",
          "title": "Attack of the Clones",
          "director": "George Lucas"
        },
        {
          "id": "ZmlsbXM6Ng==",
          "title": "Revenge of the Sith",
          "director": "George Lucas"
        }
      ]
    }
  }
}
```

No Description

FIELDS

allFilms(after: String, first: Int, before: String, last: Int): FilmsConnection

film(id: ID, filmID: ID): Film

allPeople(after: String, first: Int, before: String, last: Int): PeopleConnection

person(id: ID, personID: ID): Person

allPlanets(after: String, first: Int, before: String, last: Int): PlanetsConnection

planet(id: ID, planetID: ID): Planet

allSpecies(after: String, first: Int, before: String, last: Int): SpeciesConnection

species(id: ID, speciesID: ID): Species

allStarships(after: String, first: Int, before: String, last: Int): StarshipsConnection

starship(id: ID, starshipID: ID): Starship

allVehicles(after: String, first: Int, before: String, last: Int): VehiclesConnection

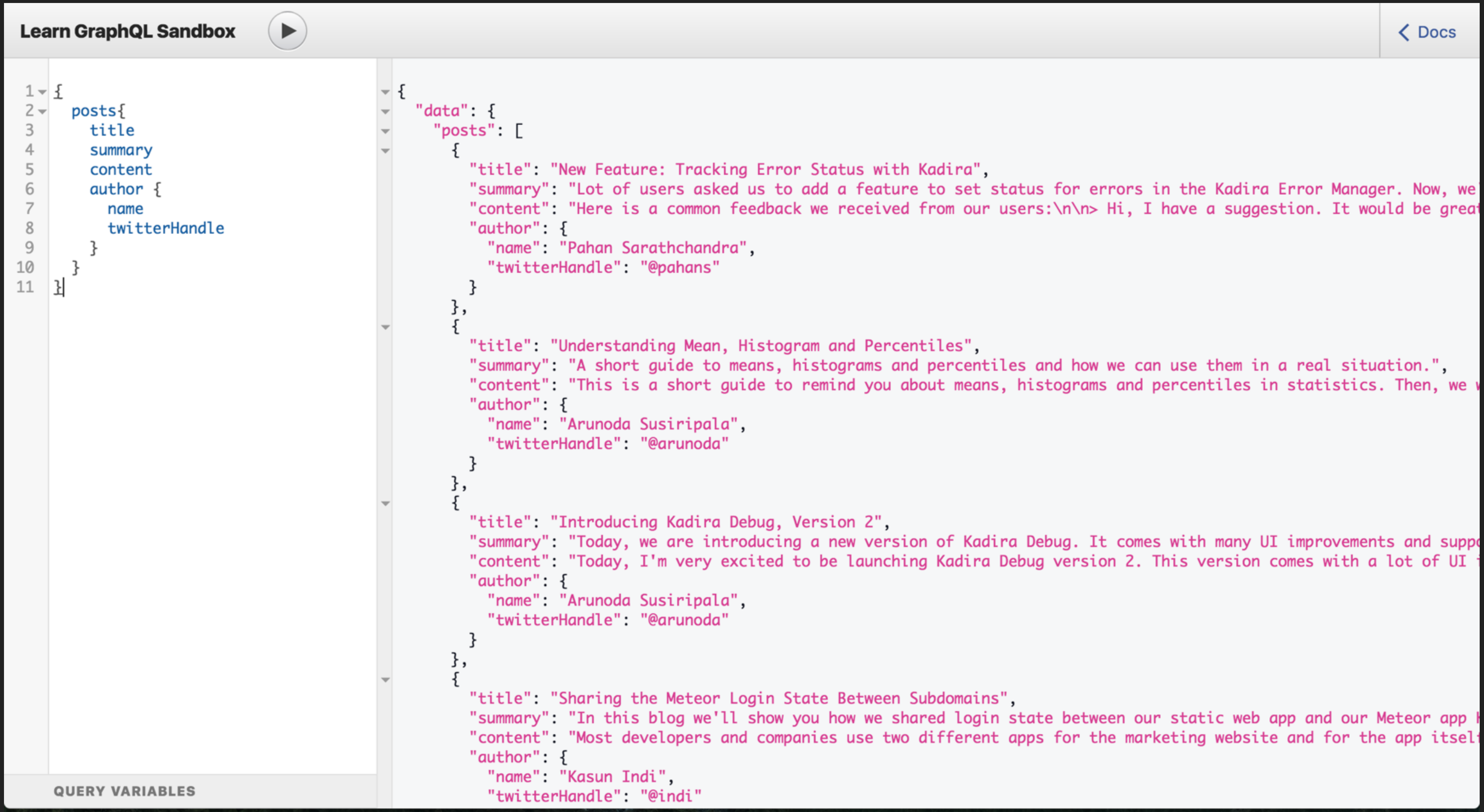
vehicle(id: ID, vehicleID: ID): Vehicle

node(id: ID!): Node

WHAT IS GRAPHQL?

- Declarative Query Language
- Hierarchical
- Product–centric
- Strong–typing
- Client–specified queries

WHAT IS GRAPHQL?



```
{
  posts{
    title
    summary
    content
    author {
      name
      twitterHandle
    }
  }
}
```

```
{
  "data": {
    "posts": [
      {
        "title": "New Feature: Tracking Error Status with Kadira",
        "summary": "Lot of users asked us to add a feature to set status for errors in the Kadira Error Manager. Now, we
        "content": "Here is a common feedback we received from our users:\n\n> Hi, I have a suggestion. It would be great
        "author": {
          "name": "Pahan Sarathchandra",
          "twitterHandle": "@pahans"
        }
      },
      {
        "title": "Understanding Mean, Histogram and Percentiles",
        "summary": "A short guide to means, histograms and percentiles and how we can use them in a real situation.",
        "content": "This is a short guide to remind you about means, histograms and percentiles in statistics. Then, we w
        "author": {
          "name": "Arunoda Susiripala",
          "twitterHandle": "@arunoda"
        }
      },
      {
        "title": "Introducing Kadira Debug, Version 2",
        "summary": "Today, we are introducing a new version of Kadira Debug. It comes with many UI improvements and supp
        "content": "Today, I'm very excited to be launching Kadira Debug version 2. This version comes with a lot of UI
        "author": {
          "name": "Arunoda Susiripala",
          "twitterHandle": "@arunoda"
        }
      },
      {
        "title": "Sharing the Meteor Login State Between Subdomains",
        "summary": "In this blog we'll show you how we shared login state between our static web app and our Meteor app
        "content": "Most developers and companies use two different apps for the marketing website and for the app itsel
        "author": {
          "name": "Kasun Indi",
          "twitterHandle": "@indi"
```

WHAT IS GRAPHQL?

GraphQL is a query language for your API, and a server-side runtime for executing queries by using a type system you define for your data

WHAT IS GRAPHQL?

GraphQL Operations

- Query (GET)
- Mutation (POST/PUT/DELETE)

STORY

A quick story before

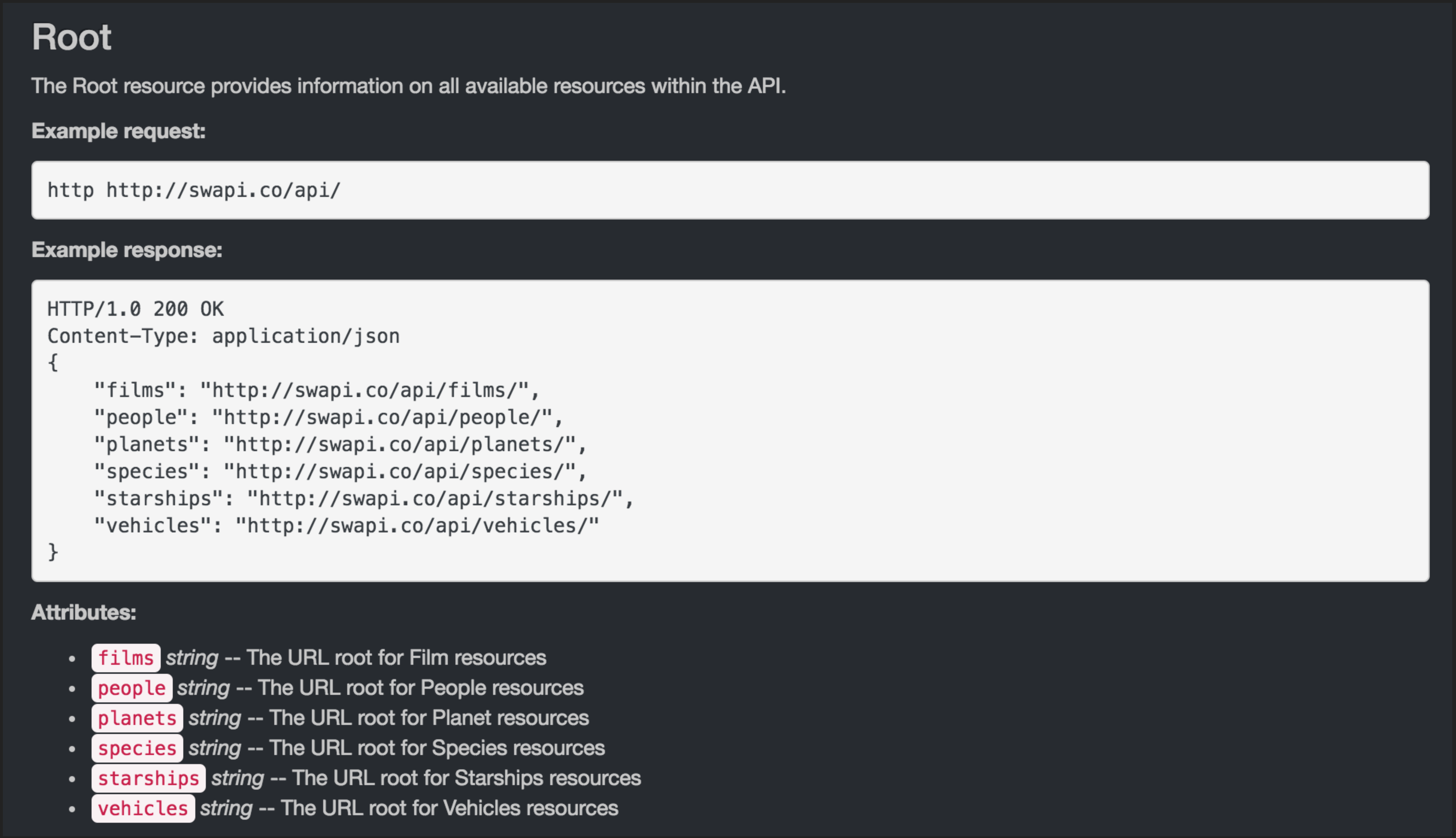
STORY

A Frontend Dev will start a new App and integrate with this REST API

SWAPI

The Star Wars API

STORY



Root

The Root resource provides information on all available resources within the API.

Example request:

```
http http://swapi.co/api/
```

Example response:

```
HTTP/1.0 200 OK
Content-Type: application/json
{
    "films": "http://swapi.co/api/films/",
    "people": "http://swapi.co/api/people/",
    "planets": "http://swapi.co/api/planets/",
    "species": "http://swapi.co/api/species/",
    "starships": "http://swapi.co/api/starships/",
    "vehicles": "http://swapi.co/api/vehicles/"
}
```

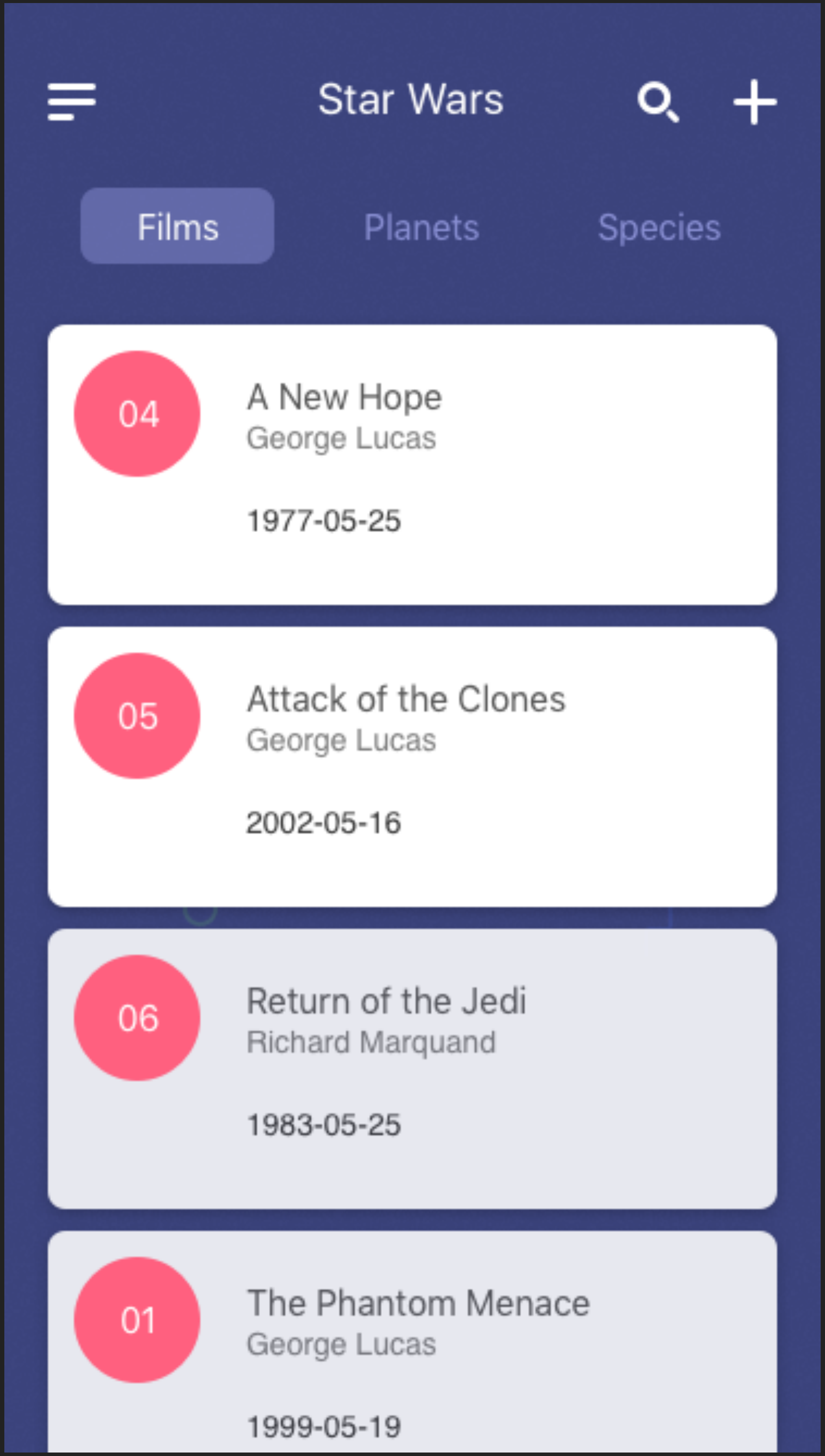
Attributes:

- `films` *string* -- The URL root for Film resources
- `people` *string* -- The URL root for People resources
- `planets` *string* -- The URL root for Planet resources
- `species` *string* -- The URL root for Species resources
- `starships` *string* -- The URL root for Starships resources
- `vehicles` *string* -- The URL root for Vehicles resources

STORY

Design send the first layout for our Frontend Dev

STORY



04 A New Hope
George Lucas
1977-05-25

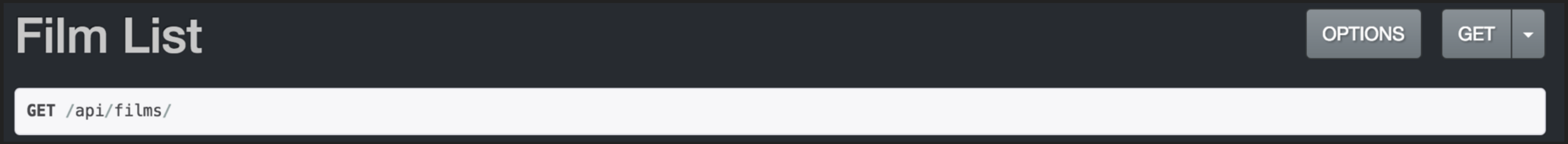
05 Attack of the Clones
George Lucas
2002-05-16

06 Return of the Jedi
Richard Marquand
1983-05-25

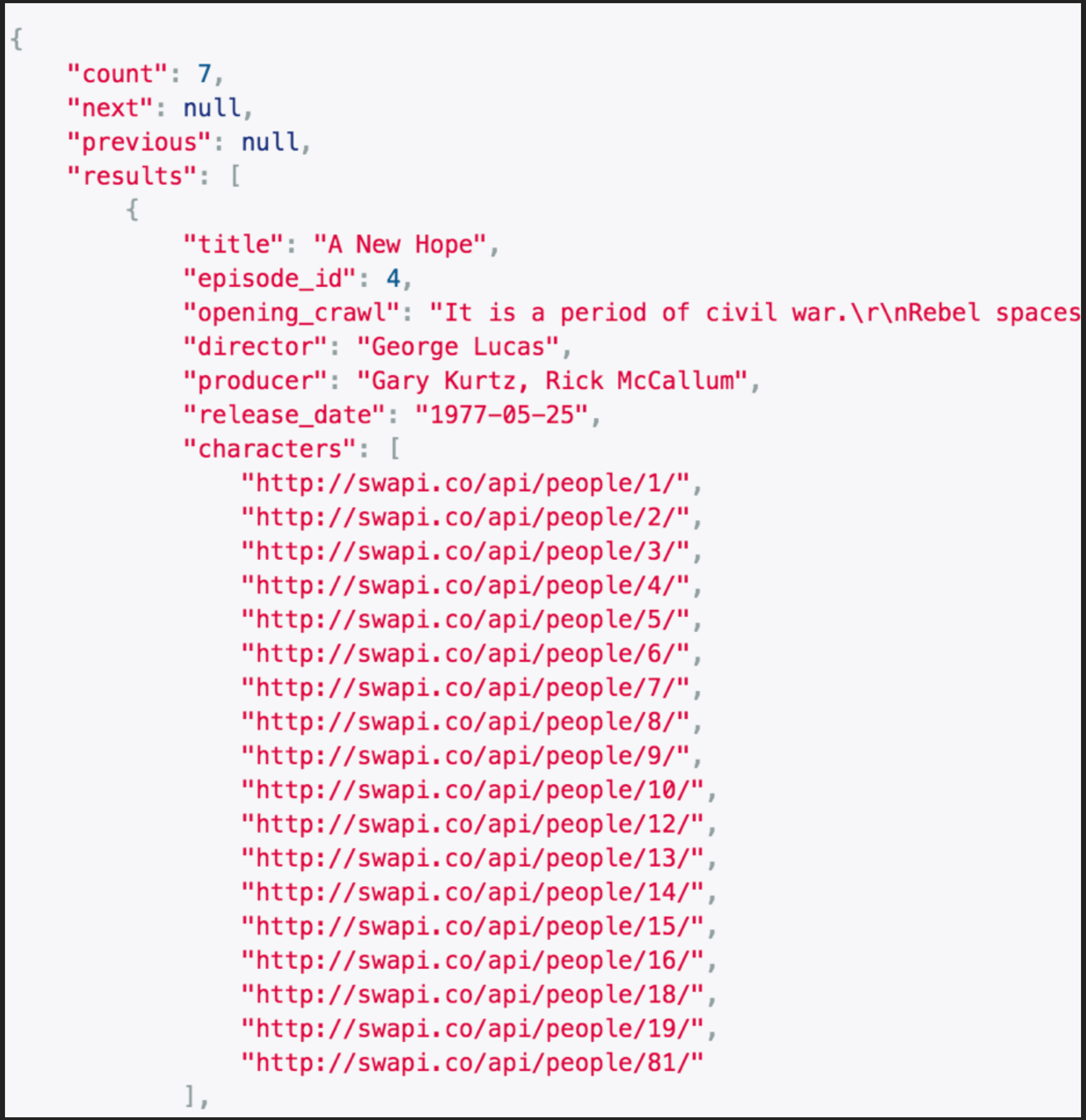
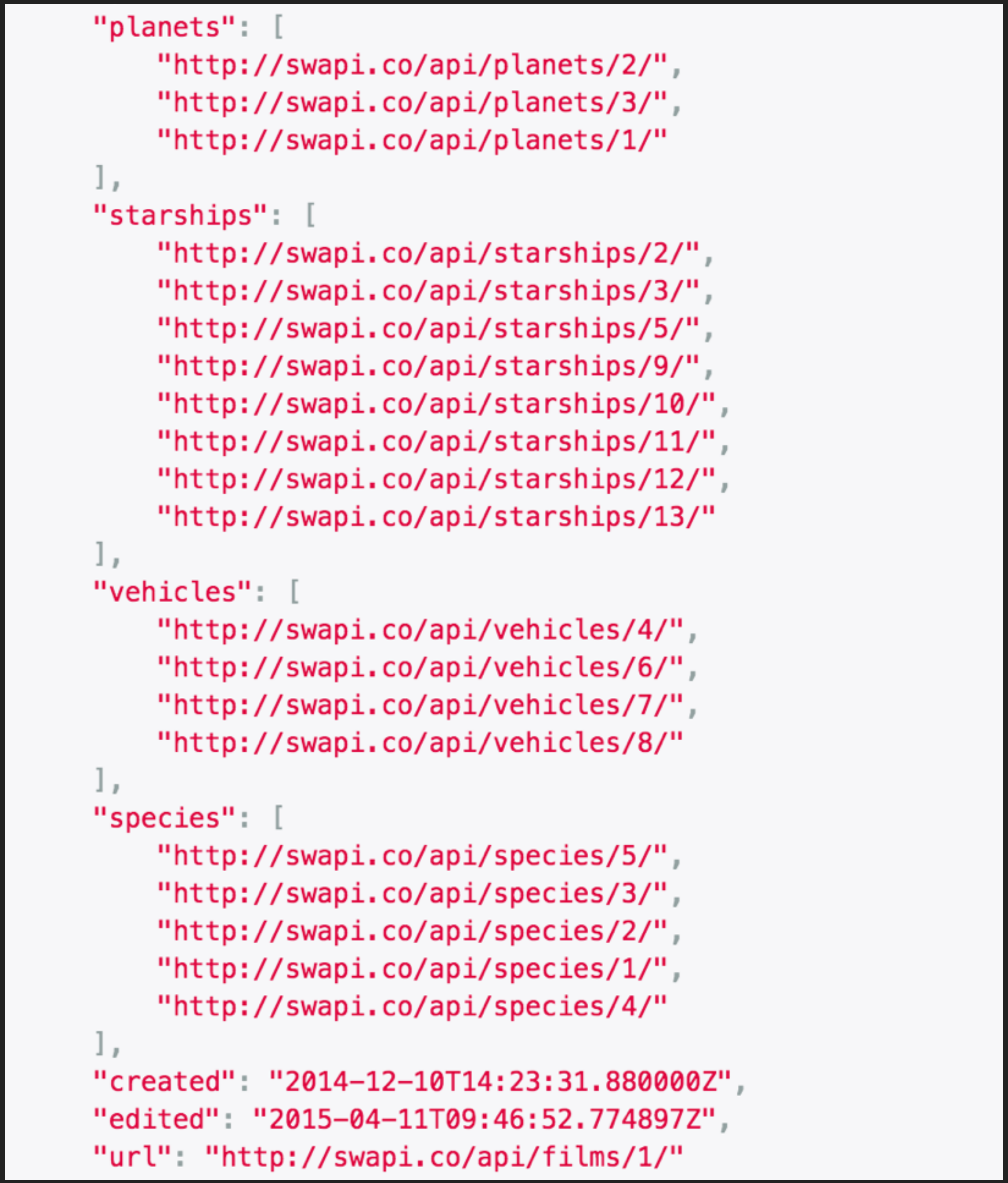
01 The Phantom Menace
George Lucas
1999-05-19

STORY

http://swapi.co/api/films/


Film List

```
GET /api/films/
```

```
{
    "count": 7,
    "next": null,
    "previous": null,
    "results": [
        {
            "title": "A New Hope",
            "episode_id": 4,
            "opening_crawl": "It is a period of civil war.\r\nRebel spaces
            "director": "George Lucas",
            "producer": "Gary Kurtz, Rick McCallum",
            "release_date": "1977-05-25",
            "characters": [
                "http://swapi.co/api/people/1/",
                "http://swapi.co/api/people/2/",
                "http://swapi.co/api/people/3/",
                "http://swapi.co/api/people/4/",
                "http://swapi.co/api/people/5/",
                "http://swapi.co/api/people/6/",
                "http://swapi.co/api/people/7/",
                "http://swapi.co/api/people/8/",
                "http://swapi.co/api/people/9/",
                "http://swapi.co/api/people/10/",
                "http://swapi.co/api/people/12/",
                "http://swapi.co/api/people/13/",
                "http://swapi.co/api/people/14/",
                "http://swapi.co/api/people/15/",
                "http://swapi.co/api/people/16/",
                "http://swapi.co/api/people/18/",
                "http://swapi.co/api/people/19/",
                "http://swapi.co/api/people/81/"
            ],
```

```
            "planets": [
                "http://swapi.co/api/planets/2/",
                "http://swapi.co/api/planets/3/",
                "http://swapi.co/api/planets/1/"
            ],
            "starships": [
                "http://swapi.co/api/starships/2/",
                "http://swapi.co/api/starships/3/",
                "http://swapi.co/api/starships/5/",
                "http://swapi.co/api/starships/9/",
                "http://swapi.co/api/starships/10/",
                "http://swapi.co/api/starships/11/",
                "http://swapi.co/api/starships/12/",
                "http://swapi.co/api/starships/13/"
            ],
            "vehicles": [
                "http://swapi.co/api/vehicles/4/",
                "http://swapi.co/api/vehicles/6/",
                "http://swapi.co/api/vehicles/7/",
                "http://swapi.co/api/vehicles/8/"
            ],
            "species": [
                "http://swapi.co/api/species/5/",
                "http://swapi.co/api/species/3/",
                "http://swapi.co/api/species/2/",
                "http://swapi.co/api/species/1/",
                "http://swapi.co/api/species/4/"
            ],
            "created": "2014-12-10T14:23:31.880000Z",
            "edited": "2015-04-11T09:46:52.774897Z",
            "url": "http://swapi.co/api/films/1/"
```

STORY

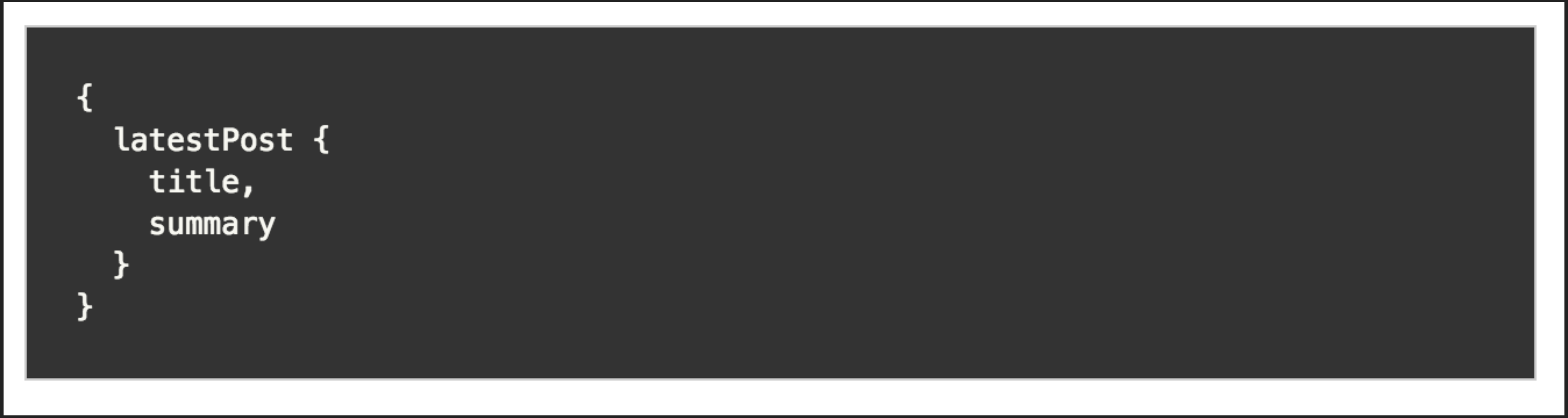
```
{
  allFilms{
    films{
      title
      director
      producers
      releaseDate
    }
  }
}
```

STORY

```

{
  "data": {
    "allFilms": {
      "films": [
        {
          "title": "A New Hope",
          "director": "George Lucas",
          "producers": [
            "Gary Kurtz",
            "Rick McCallum"
          ],
          "releaseDate": "1977-05-25"
        },
```

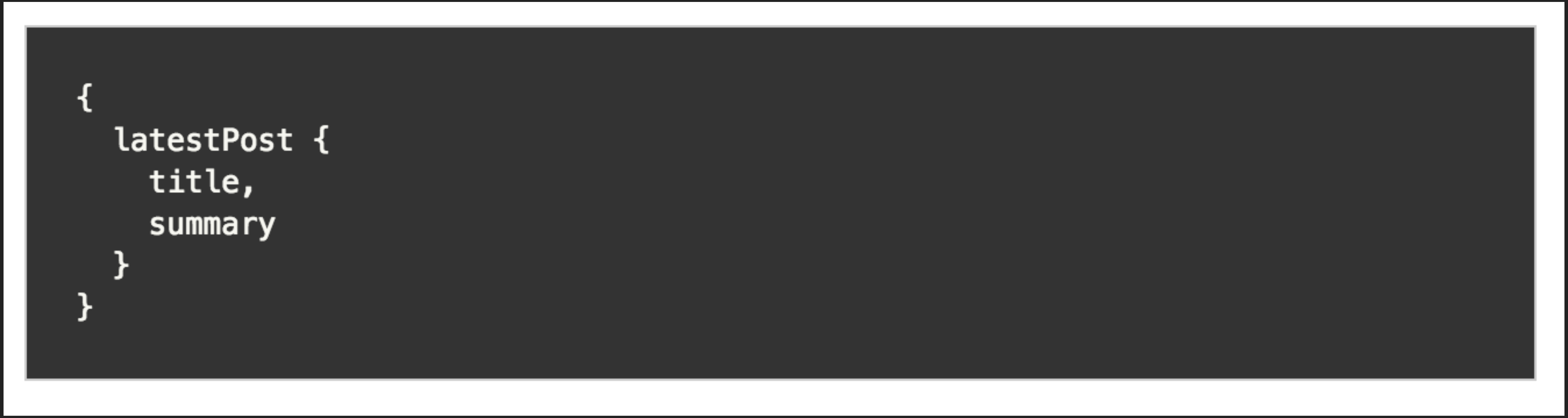
QUERYING GRAPHQL

Let's write our first GraphQL query

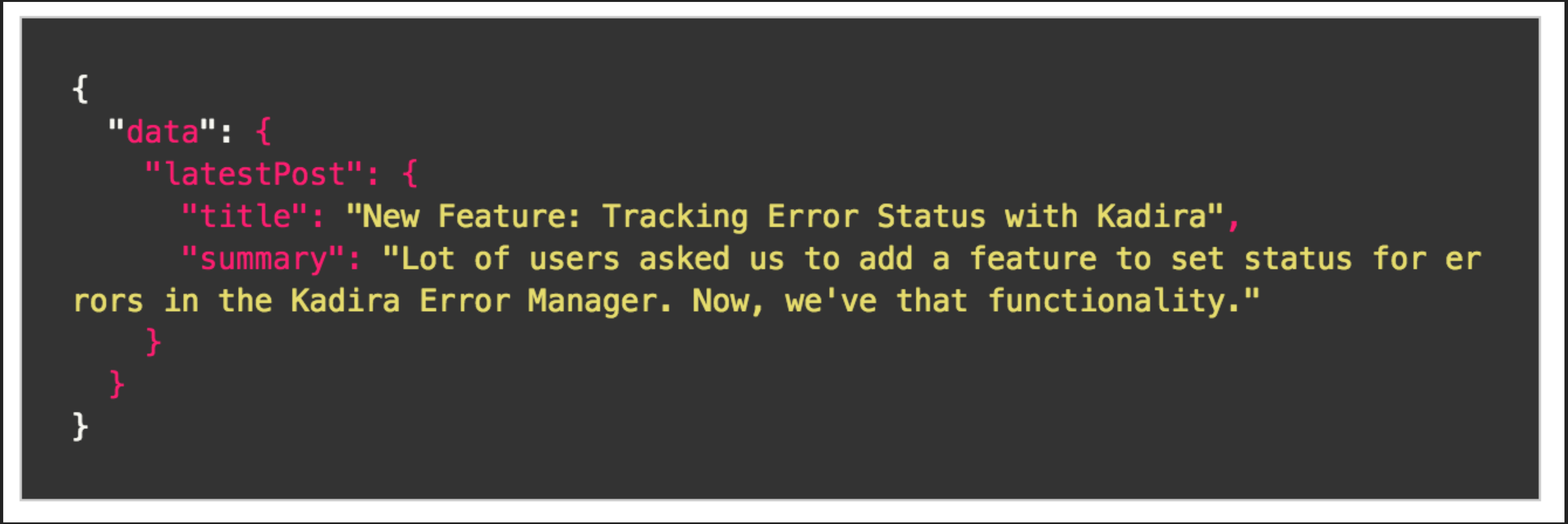


```
{
  latestPost {
    title,
    summary
  }
}
```

QUERYING GRAPHQL



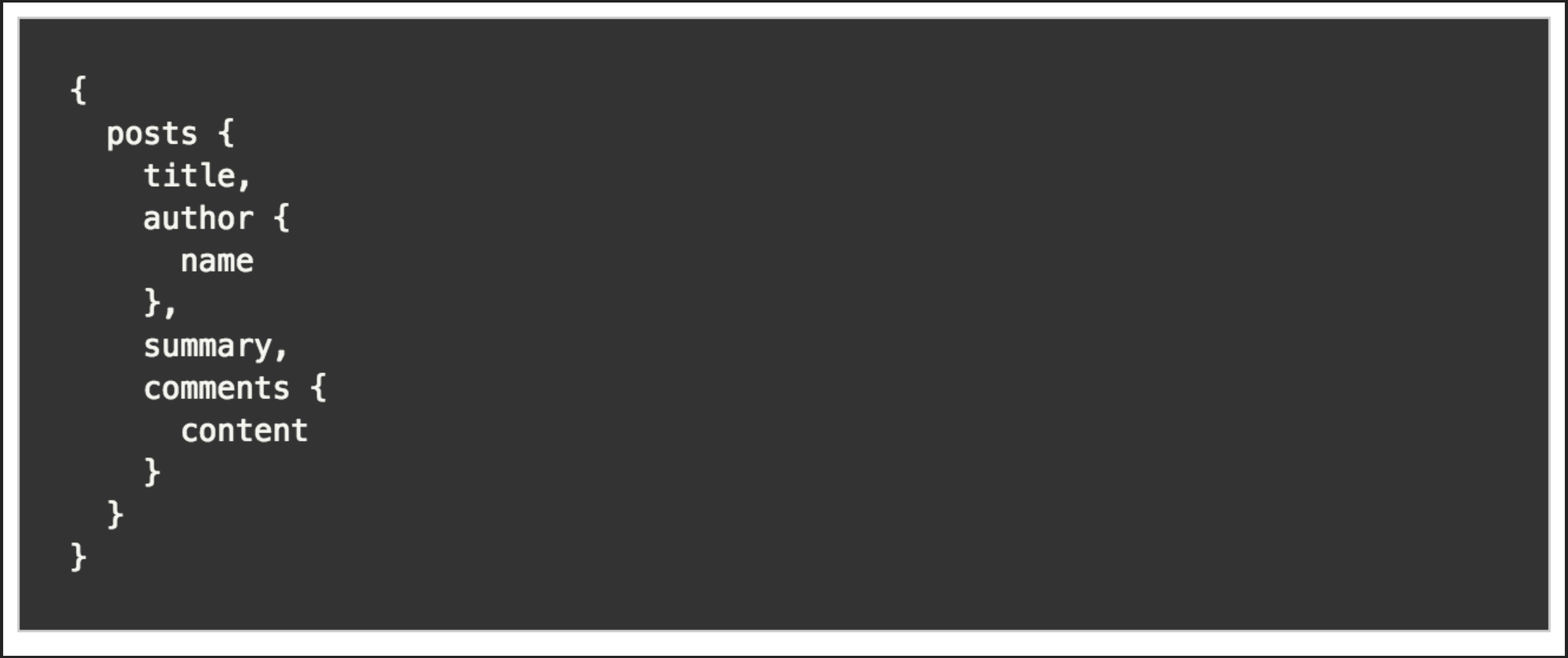
```
{
  latestPost {
    title,
    summary
  }
}
```



```
{
  "data": {
    "latestPost": {
      "title": "New Feature: Tracking Error Status with Kadira",
      "summary": "Lot of users asked us to add a feature to set status for er
rors in the Kadira Error Manager. Now, we've that functionality."
    }
  }
}
```

QUERYING GRAPHQL

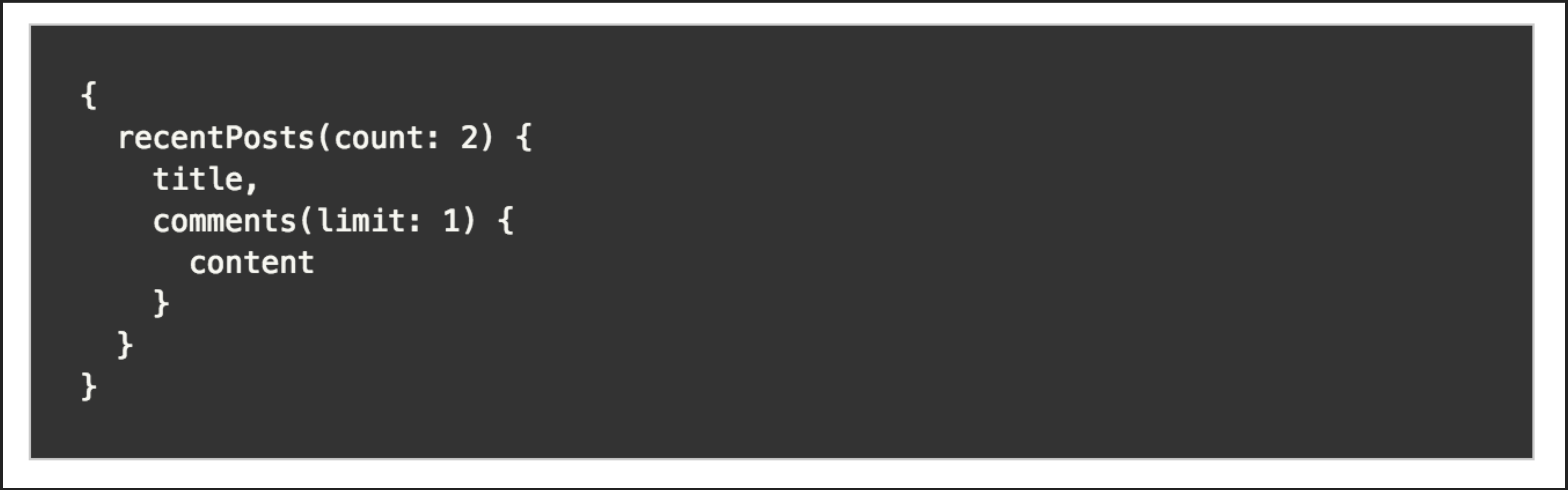
Nested Querying



```
{
  posts {
    title,
    author {
      name
    },
    summary,
    comments {
      content
    }
  }
}
```

QUERYING GRAPHQL

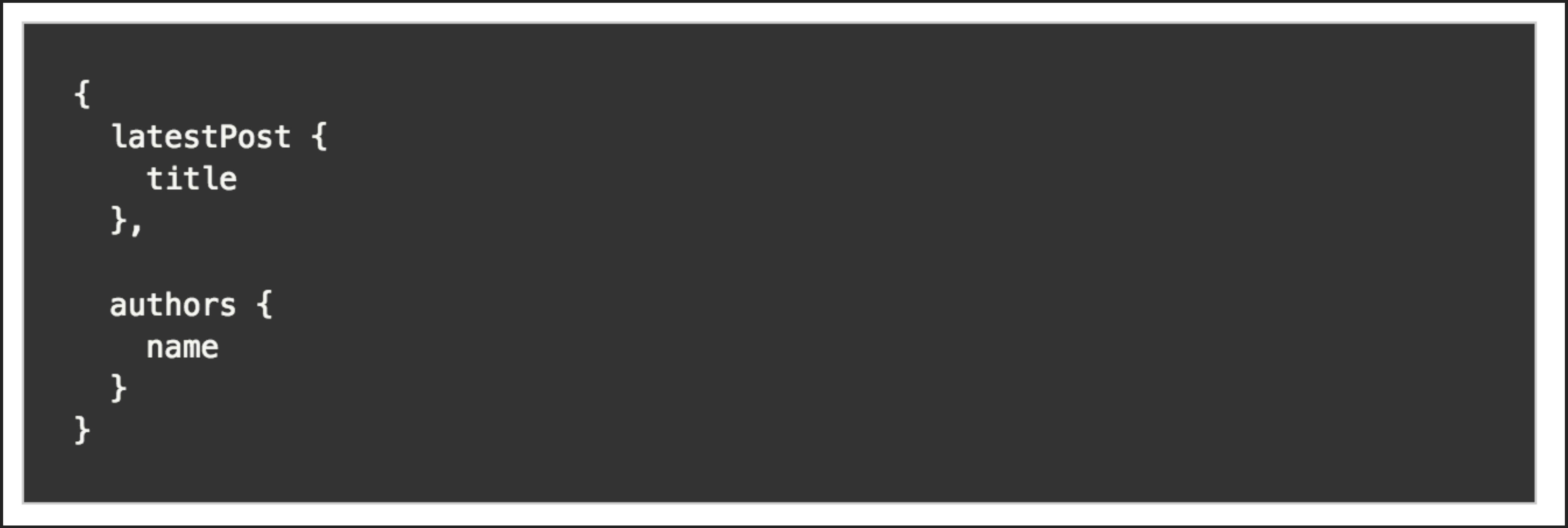
Arguments



```
{
  recentPosts(count: 2) {
    title,
    comments(limit: 1) {
      content
    }
  }
}
```

QUERYING GRAPHQL

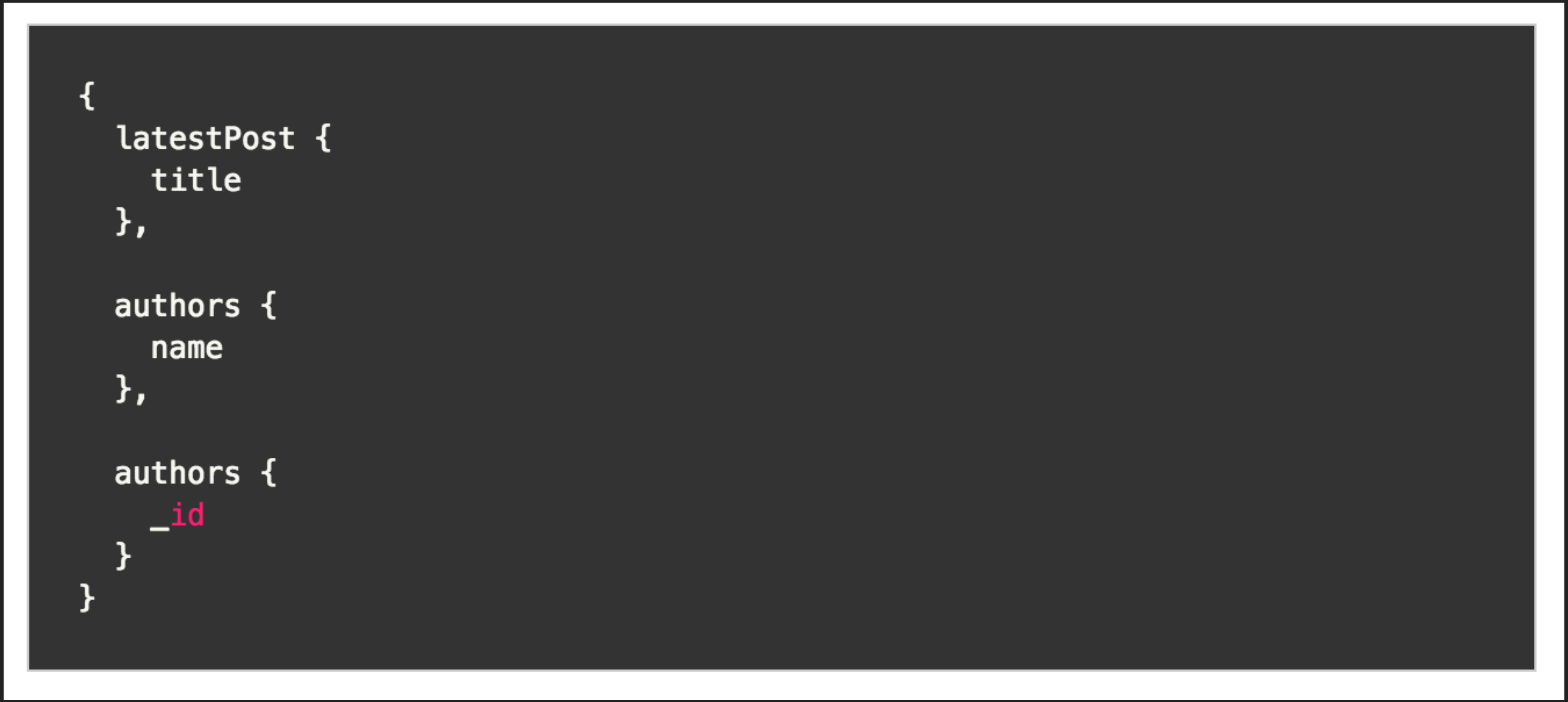
Multiple fields



```
{
  latestPost {
    title
  },

  authors {
    name
  }
}
```

QUERYING GRAPHQL

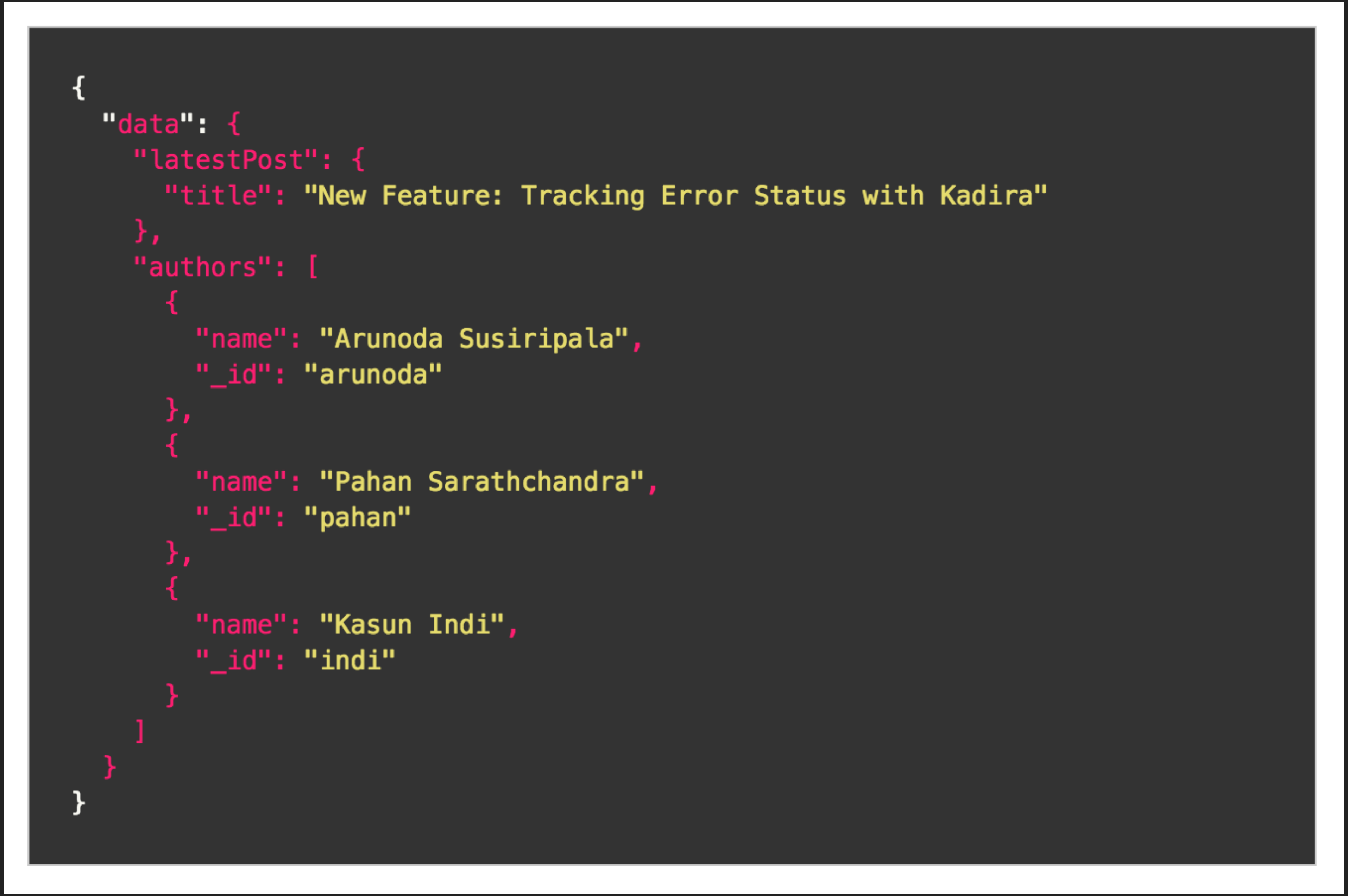
Assigning a result to a variable



```
{
  latestPost {
    title
  },

  authors {
    name
  },

  authors {
    _id
  }
}
```

QUERYING GRAPHQL

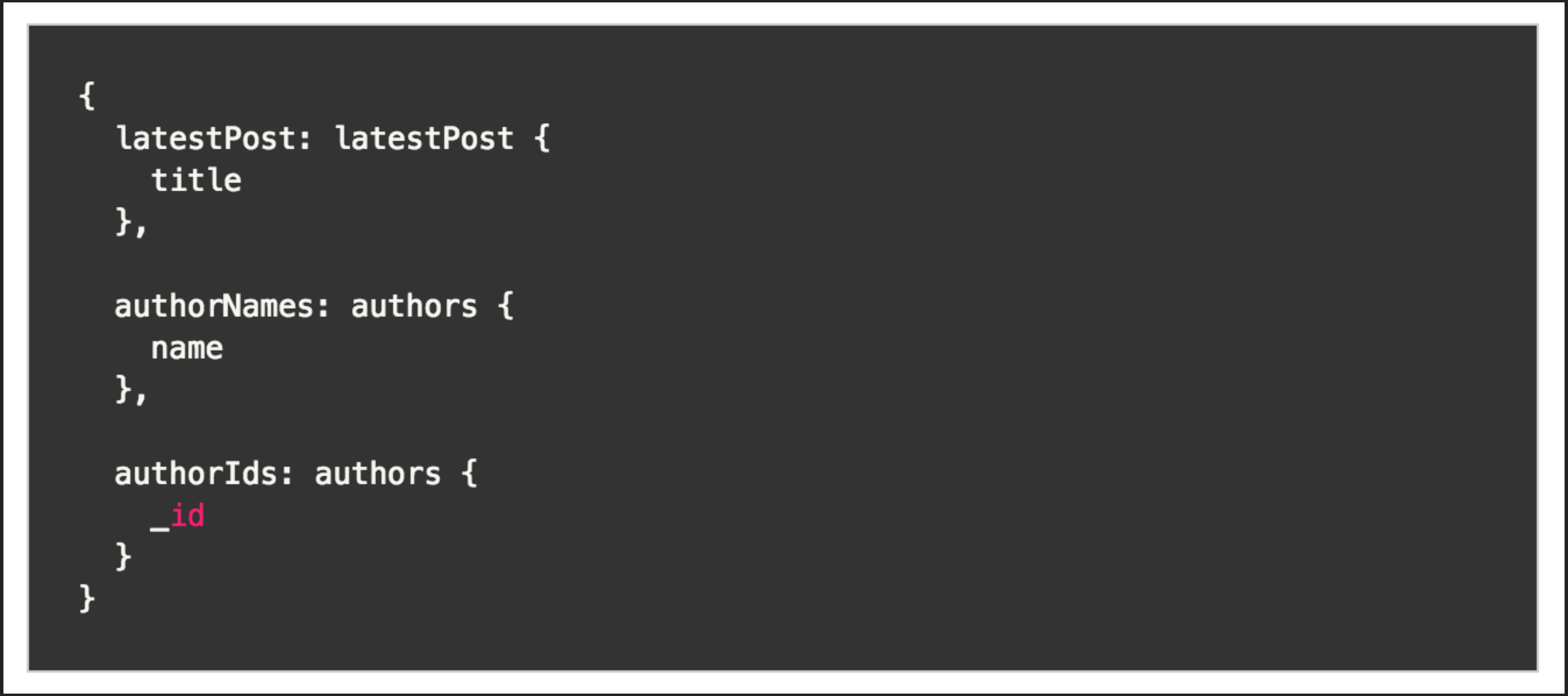
Assigning a result to a variable



```
{
  "data": {
    "latestPost": {
      "title": "New Feature: Tracking Error Status with Kadira"
    },
    "authors": [
      {
        "name": "Arunoda Susiripala",
        "_id": "arunoda"
      },
      {
        "name": "Pahan Sarathchandra",
        "_id": "pahan"
      },
      {
        "name": "Kasun Indi",
        "_id": "indi"
      }
    ]
  }
}
```

QUERYING GRAPHQL

Assigning a result to a variable



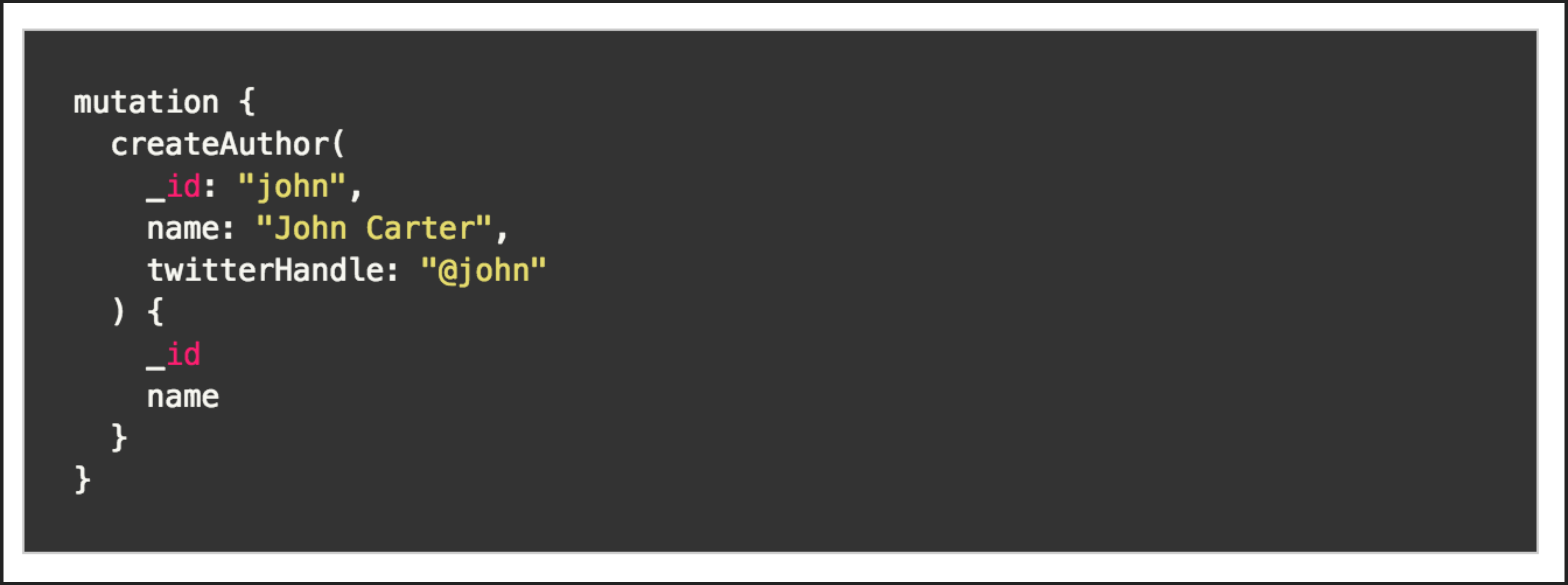
```
{
  latestPost: latestPost {
    title
  },

  authorNames: authors {
    name
  },

  authorIds: authors {
    _id
  }
}
```

INVOKING MUTATIONS

Mutations are the way to change the dataset behind GraphQL. A mutation is very similar to a field in a GraphQL query, but GraphQL assumes a mutation has side effects and changes the dataset behind the schema.

INVOKING MUTATIONS

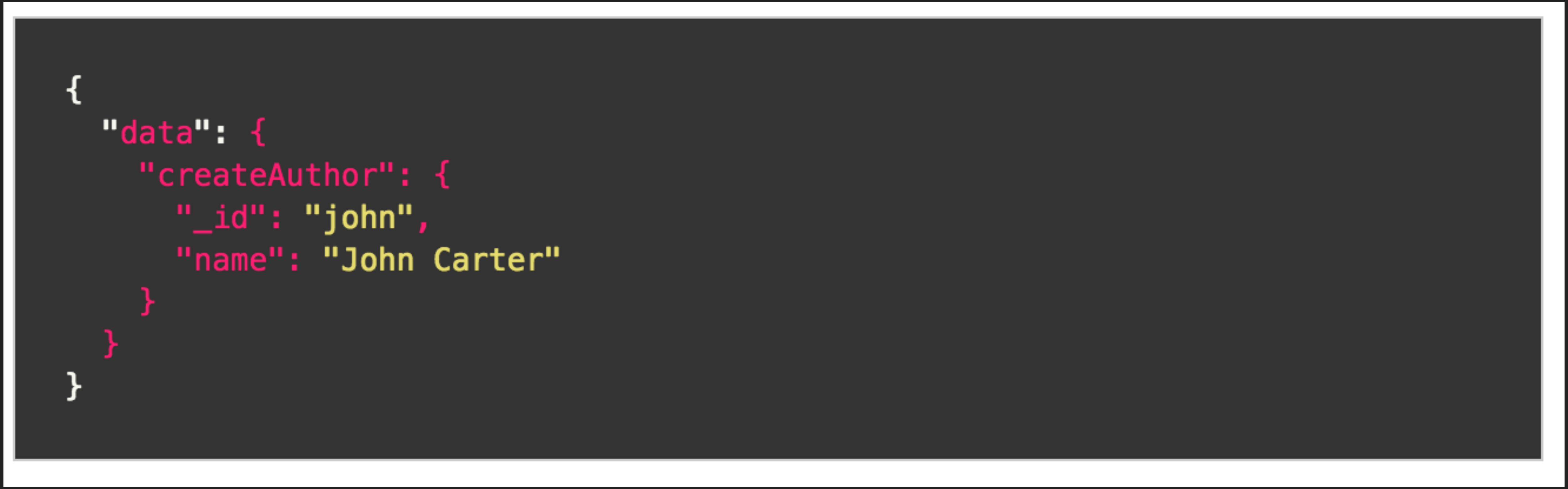
First mutation



```
mutation {
  createAuthor(
    _id: "john",
    name: "John Carter",
    twitterHandle: "@john"
  ) {
    _id
    name
  }
}
```

INVOKING MUTATIONS

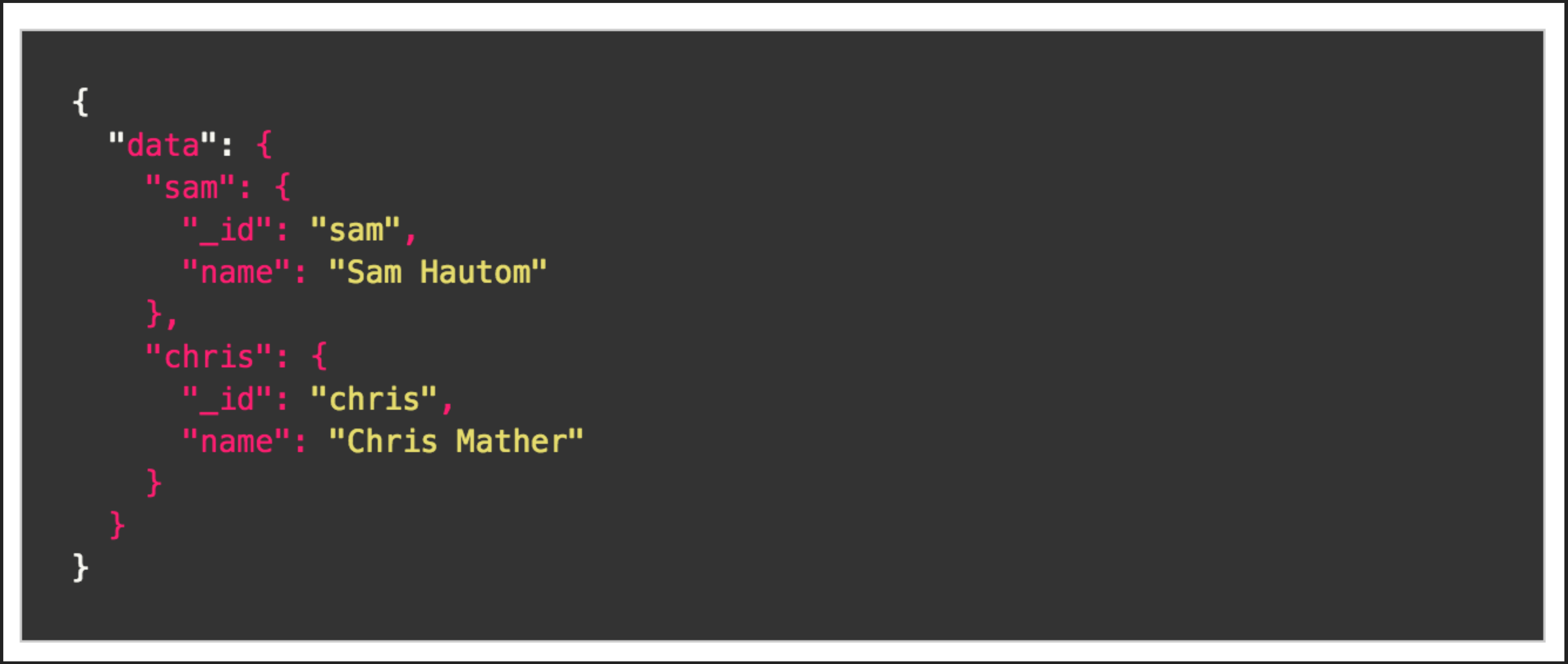
First mutation



```
{
  "data": {
    "createAuthor": {
      "_id": "john",
      "name": "John Carter"
    }
  }
}
```

INVOKING MUTATIONS

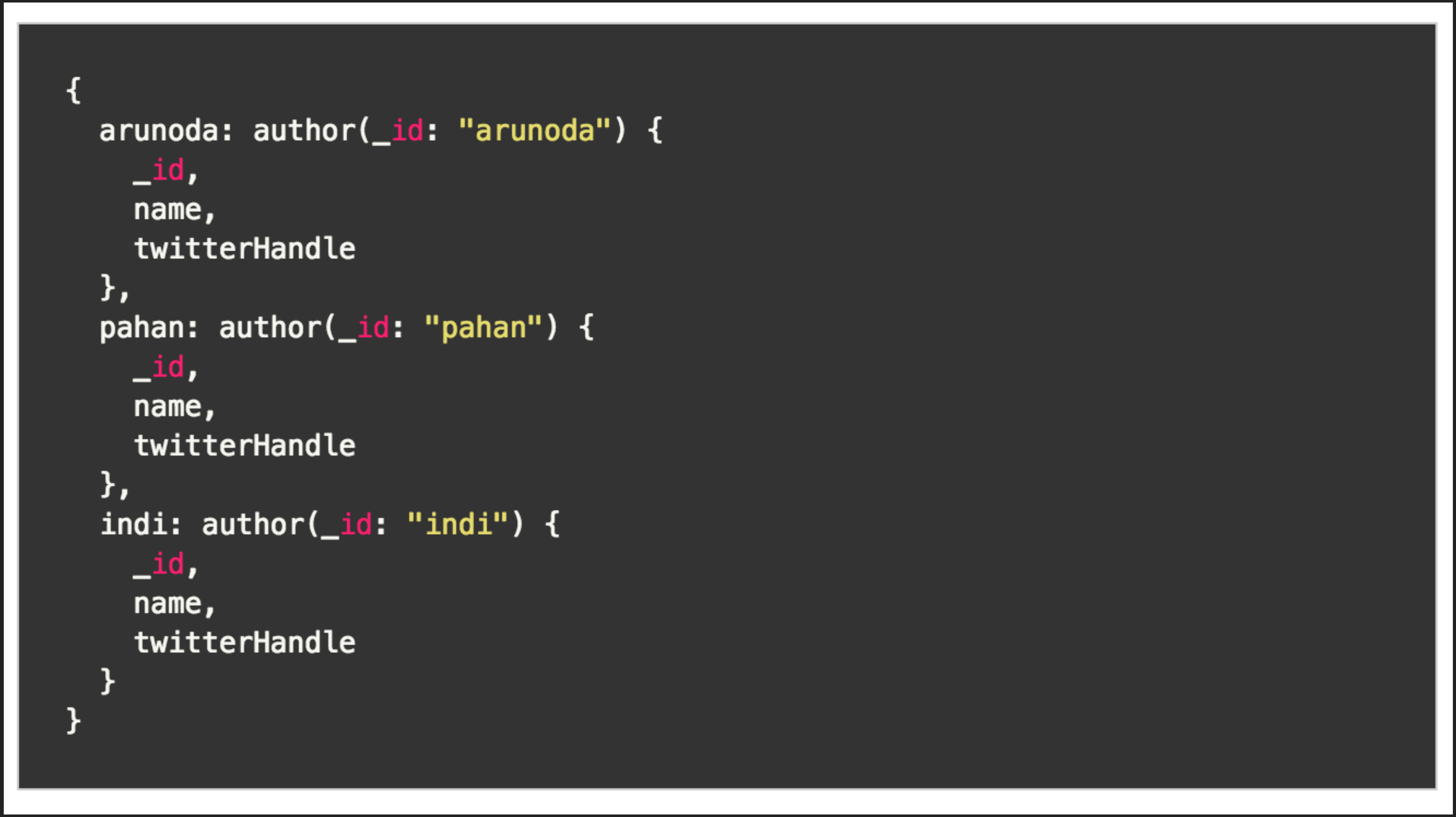
Multiple mutations



```
{
  "data": {
    "sam": {
      "_id": "sam",
      "name": "Sam Hautom"
    },
    "chris": {
      "_id": "chris",
      "name": "Chris Mather"
    }
  }
}
```

FRAGMENTS

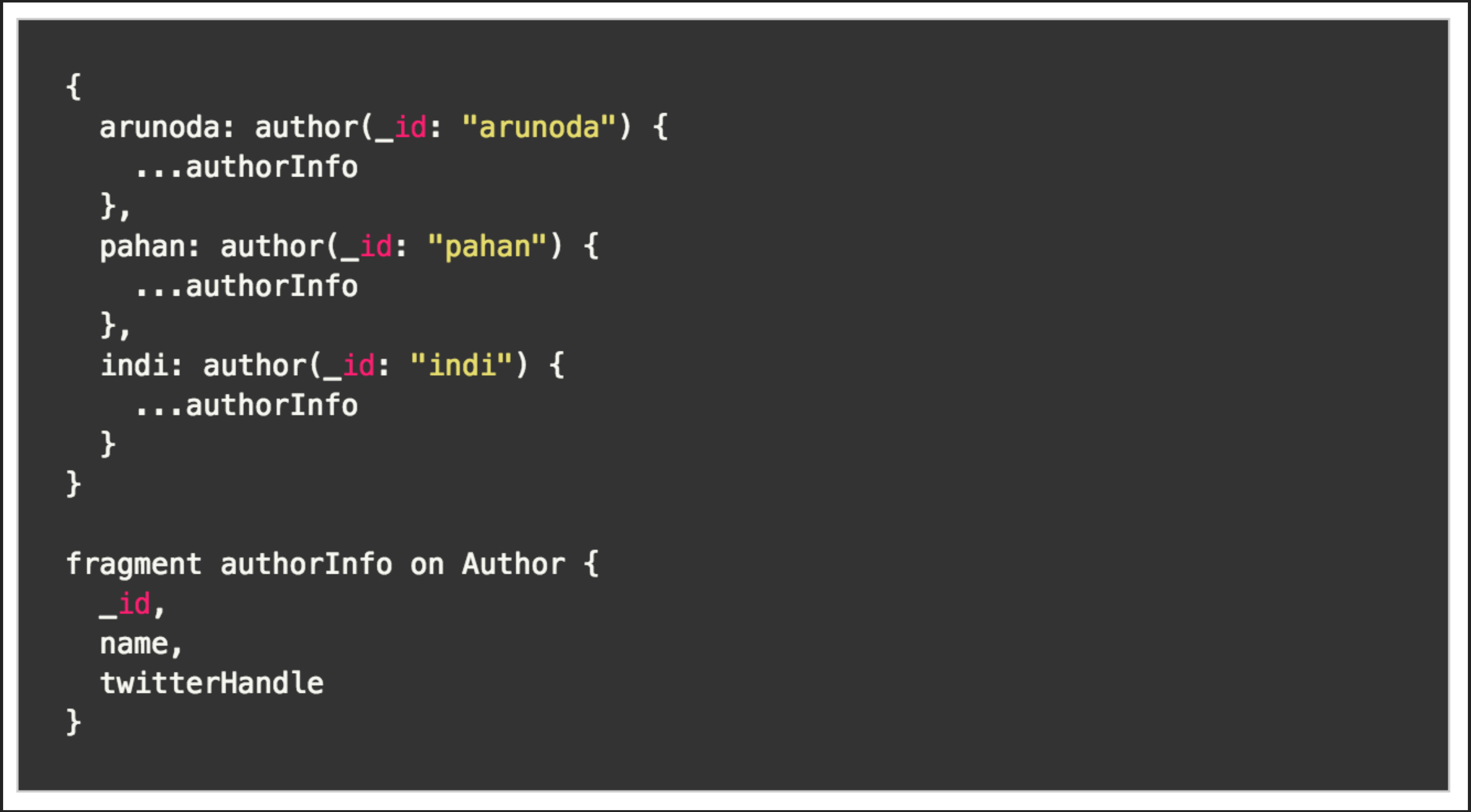
Fragments are the way to group commonly used fields and reuse them.



```
{
  arunoda: author(_id: "arunoda") {
    _id,
    name,
    twitterHandle
  },
  pahan: author(_id: "pahan") {
    _id,
    name,
    twitterHandle
  },
  indi: author(_id: "indi") {
    _id,
    name,
    twitterHandle
  }
}
```

FRAGMENTS

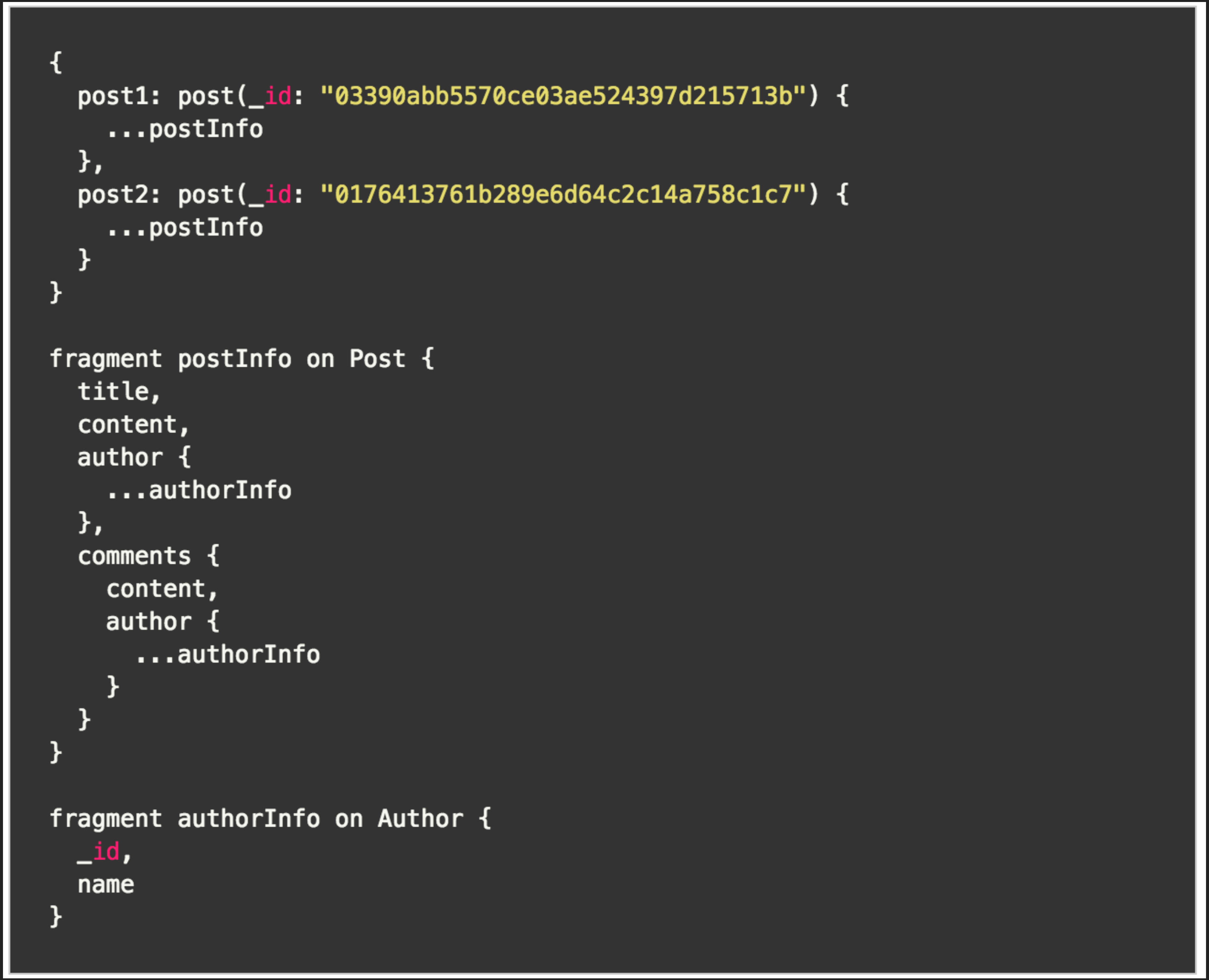
So check this query. It's the same as above, but with fragments:



```
{
  arunoda: author(_id: "arunoda") {
    ...authorInfo
  },
  pahan: author(_id: "pahan") {
    ...authorInfo
  },
  indi: author(_id: "indi") {
    ...authorInfo
  }
}

fragment authorInfo on Author {
  _id,
  name,
  twitterHandle
}
```

FRAGMENTS

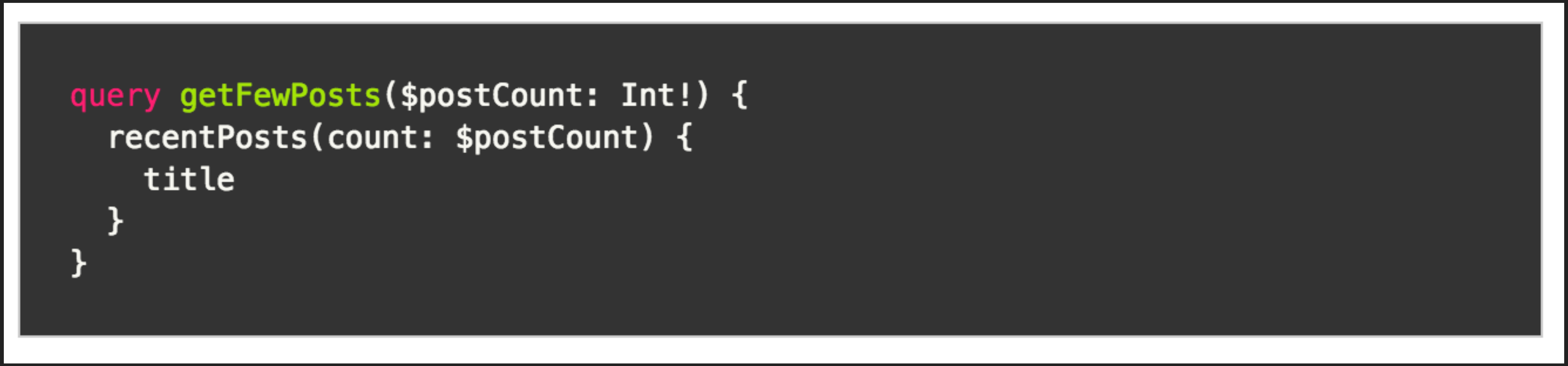
Fragments with nested fragments



```
{
  post1: post(_id: "03390abb5570ce03ae524397d215713b") {
    ...postInfo
  },
  post2: post(_id: "0176413761b289e6d64c2c14a758c1c7") {
    ...postInfo
  }
}

fragment postInfo on Post {
  title,
  content,
  author {
    ...authorInfo
  },
  comments {
    content,
    author {
      ...authorInfo
    }
  }
}

fragment authorInfo on Author {
  _id,
  name
}
```

QUERY VARIABLES

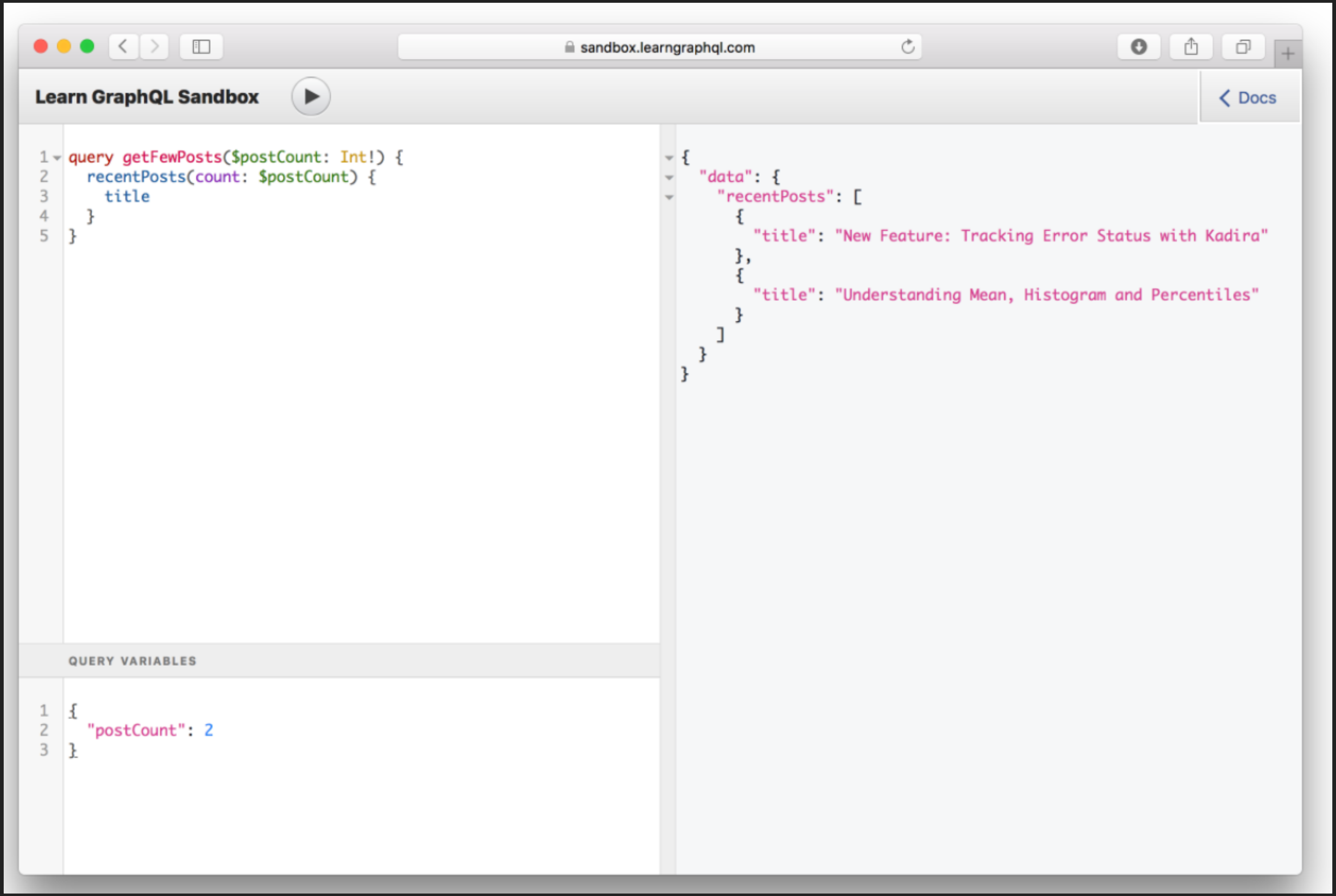
Using query variables



```
query getFewPosts($postCount: Int!) {
  recentPosts(count: $postCount) {
    title
  }
}
```

QUERY VARIABLES

Using query variables



```
query getFewPosts($postCount: Int!) {
  recentPosts(count: $postCount) {
    title
  }
}
```

QUERY VARIABLES

```
{
  "postCount": 2
}
```

```
{
  "data": {
    "recentPosts": [
      {
        "title": "New Feature: Tracking Error Status with Kadira"
      },
      {
        "title": "Understanding Mean, Histogram and Percentiles"
      }
    ]
  }
}
```