Microsoft

Microsoft Build 2017

Microsoft

Project Fortis: Accelerating UN humanitarian aid planning with GraphQL

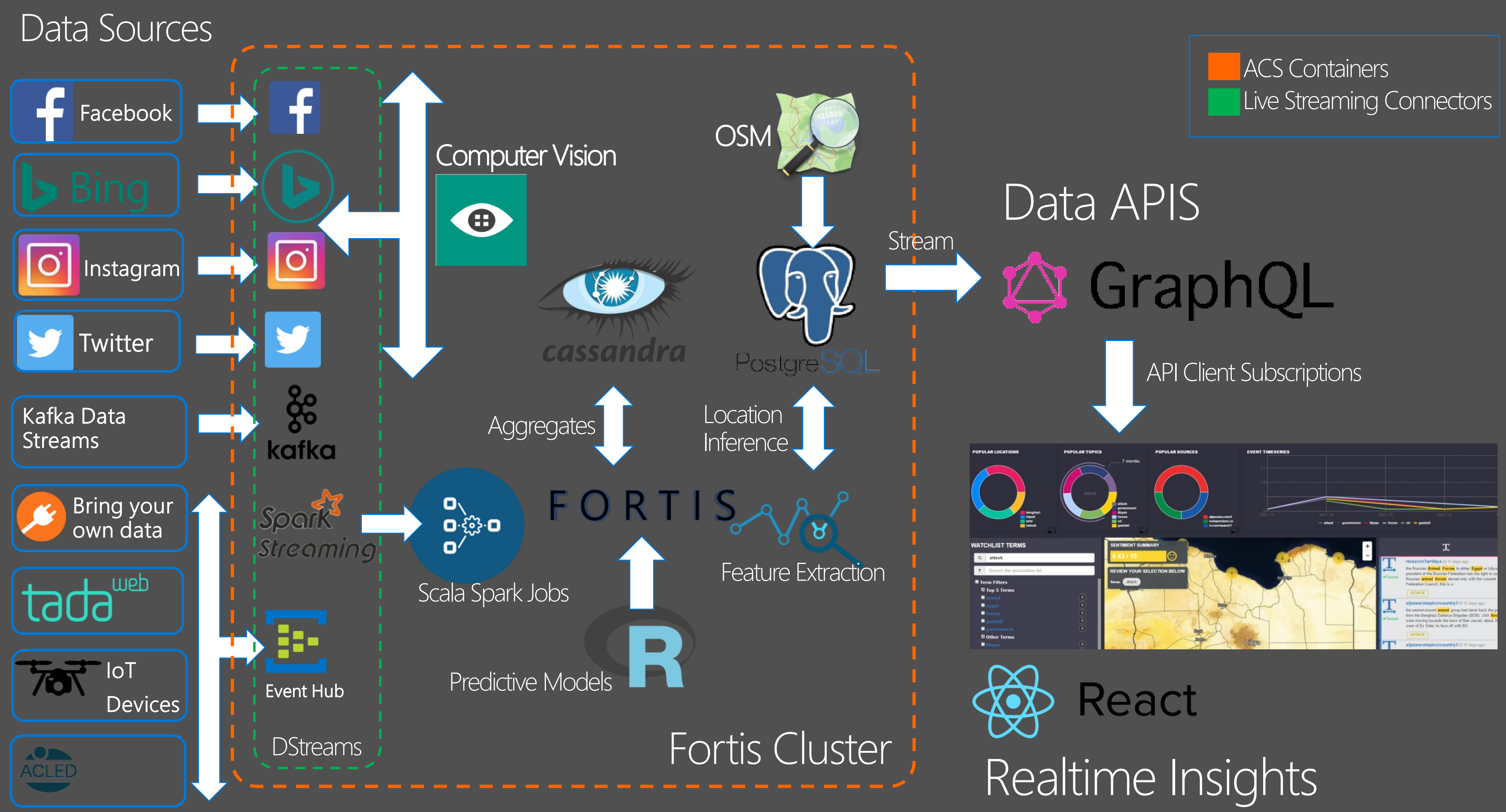
Erik Schlegel
Senior Engineer

#MSBuild

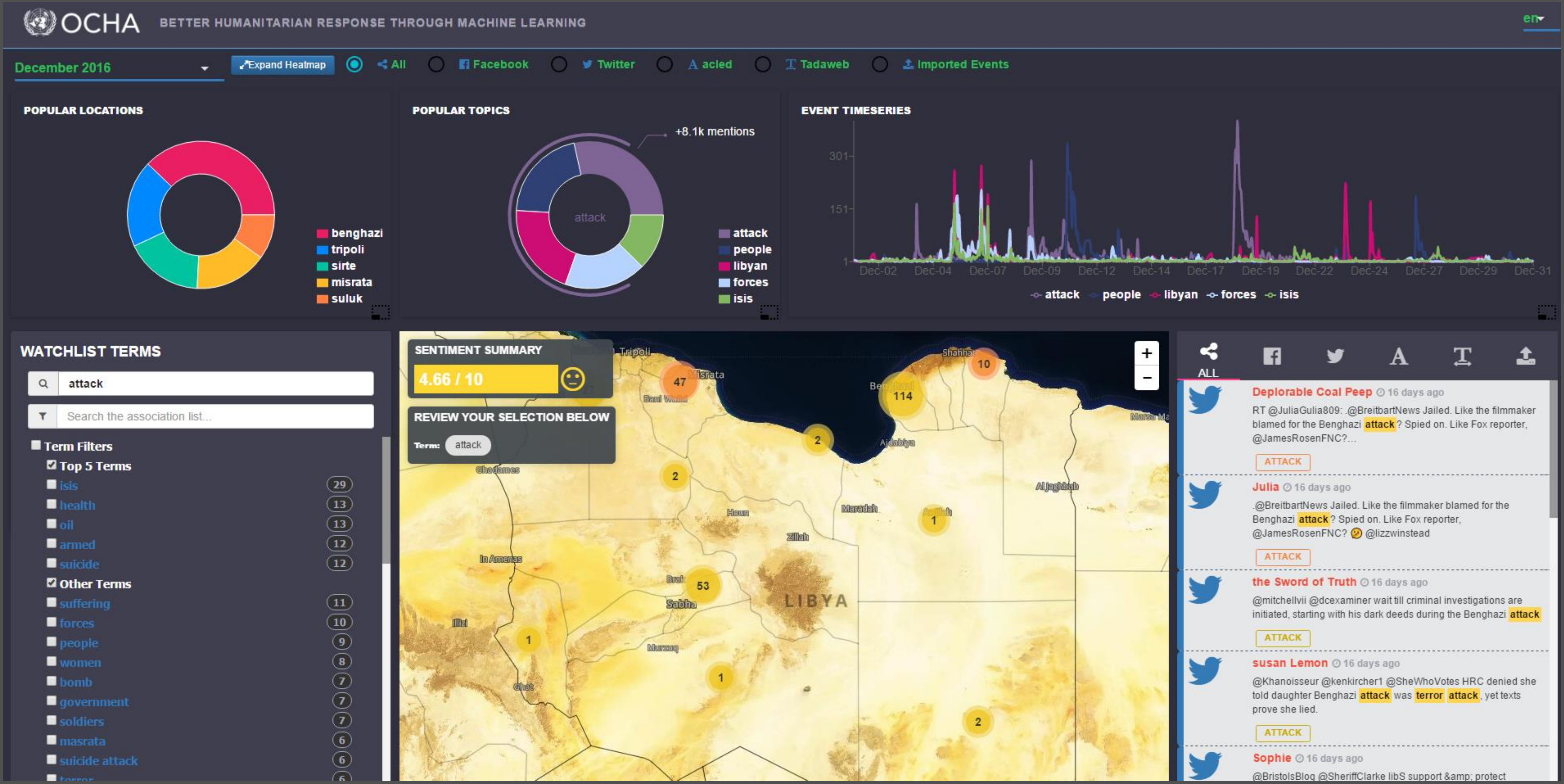
A little about me

Project Fortis: A Collaboration with the UN

Partnering with the humanitarian community


Data Sources
Facebook
Bing
Instagram
Twitter
Kafka Data Streams
Bring your own data
tada web
IoT Devices
ACLED
kafka
Spark Streaming
Event Hub
DStreams
Computer Vision
cassandra
OSM
PostgreSQL
Aggregates
Location Inference
Scala Spark Jobs
FORTIS
Feature Extraction
Predictive Models
Fortis Cluster
ACS Containers
Live Streaming Connectors
Stream
Data APIS
GraphQL
API Client Subscriptions
React
Realtime Insights

Fortis: Demo Time



WATCHLIST TERMS

attack

Search the association list...

Term Filters

☑ Top 5 Terms

isis	29
health	13
oil	13
armed	12
suicide	12

☑ Other Terms

suffering	11
forces	10
people	9
women	8
bomb	7
government	7
soldiers	7
masrata	6
suicide attack	6
terror	6

SENTIMENT SUMMARY

4.66 / 10

REVIEW YOUR SELECTION BELOW

Term: attack

Deplorable Coal Peep 16 days ago

RT @JuliaGulia809: .@BreitbartNews Jailed. Like the filmmaker blamed for the Benghazi attack? Spied on. Like Fox reporter, @JamesRosenFNC?...

ATTACK

Julia 16 days ago

.@BreitbartNews Jailed. Like the filmmaker blamed for the Benghazi attack? Spied on. Like Fox reporter, @JamesRosenFNC? 🤔 @lizzwinstead

ATTACK

the Sword of Truth 16 days ago

@mitchellvii @dcexaminer wait till criminal investigations are initiated, starting with his dark deeds during the Benghazi attack

ATTACK

susan Lemon 16 days ago

@Khanoisseur @kenkircher1 @SheWhoVotes HRC denied she told daughter Benghazi attack was terror attack, yet texts prove she lied.

ATTACK

Sophie 16 days ago

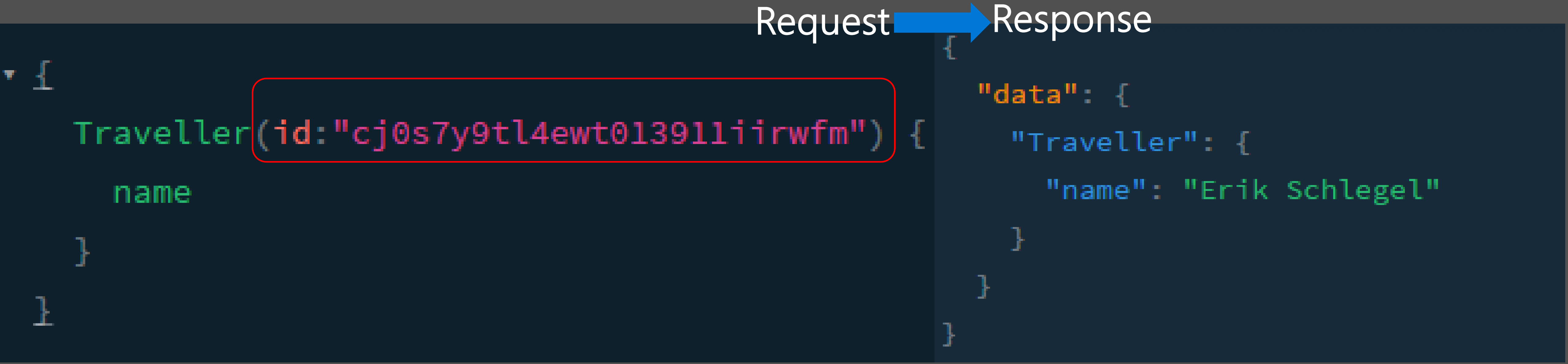
@BristolsBlog @SheriffClarke libS support &amp; protect

GraphQL

A querying framework for APIs and an alternate for REST

Created by Facebook in 2012 to address mobile data latency

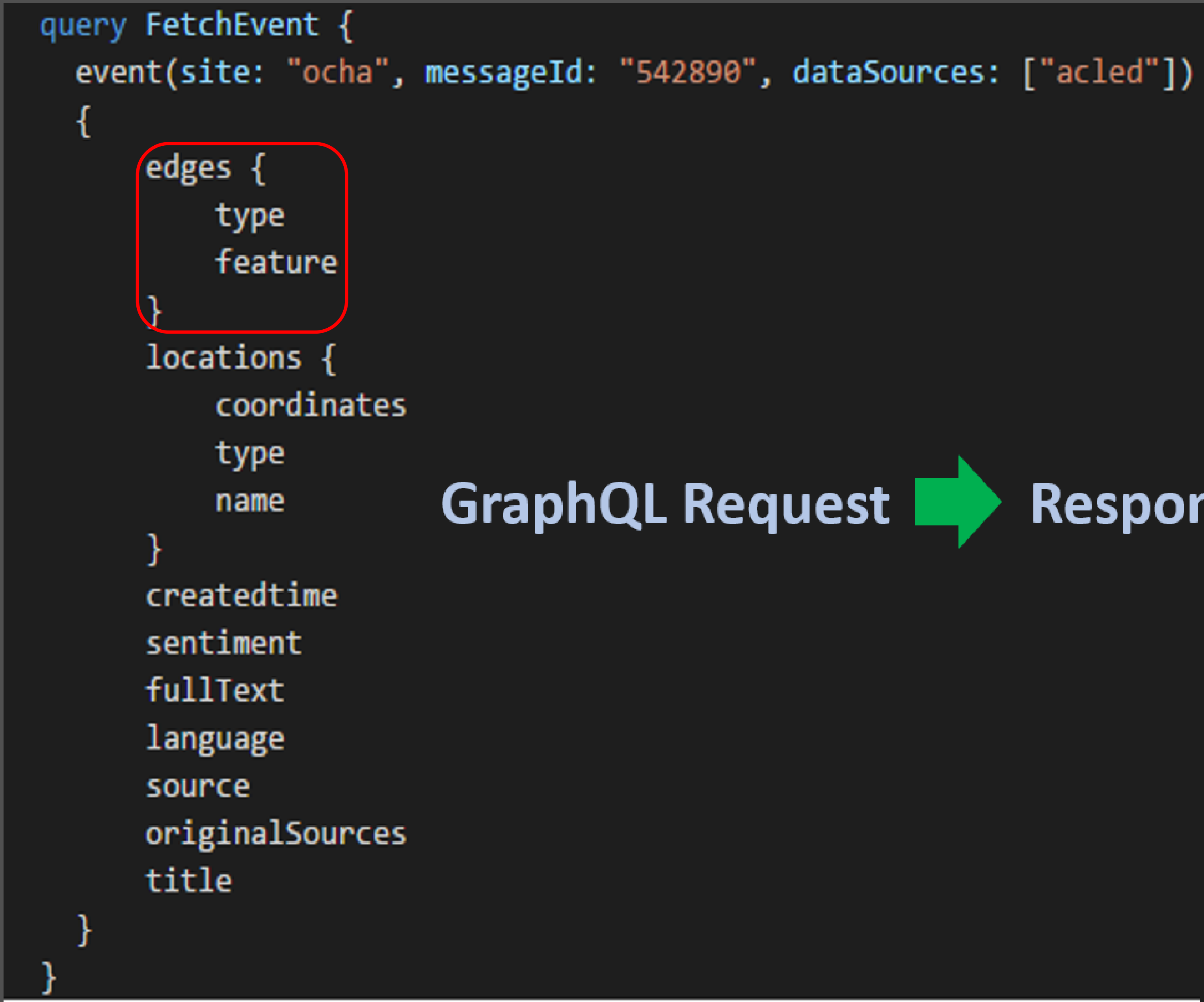
GraphQL Query Structure



```
{
  Traveller(id:"cj0s7y9tl4ewt01391liirwfm") {
    name
  }
}
```

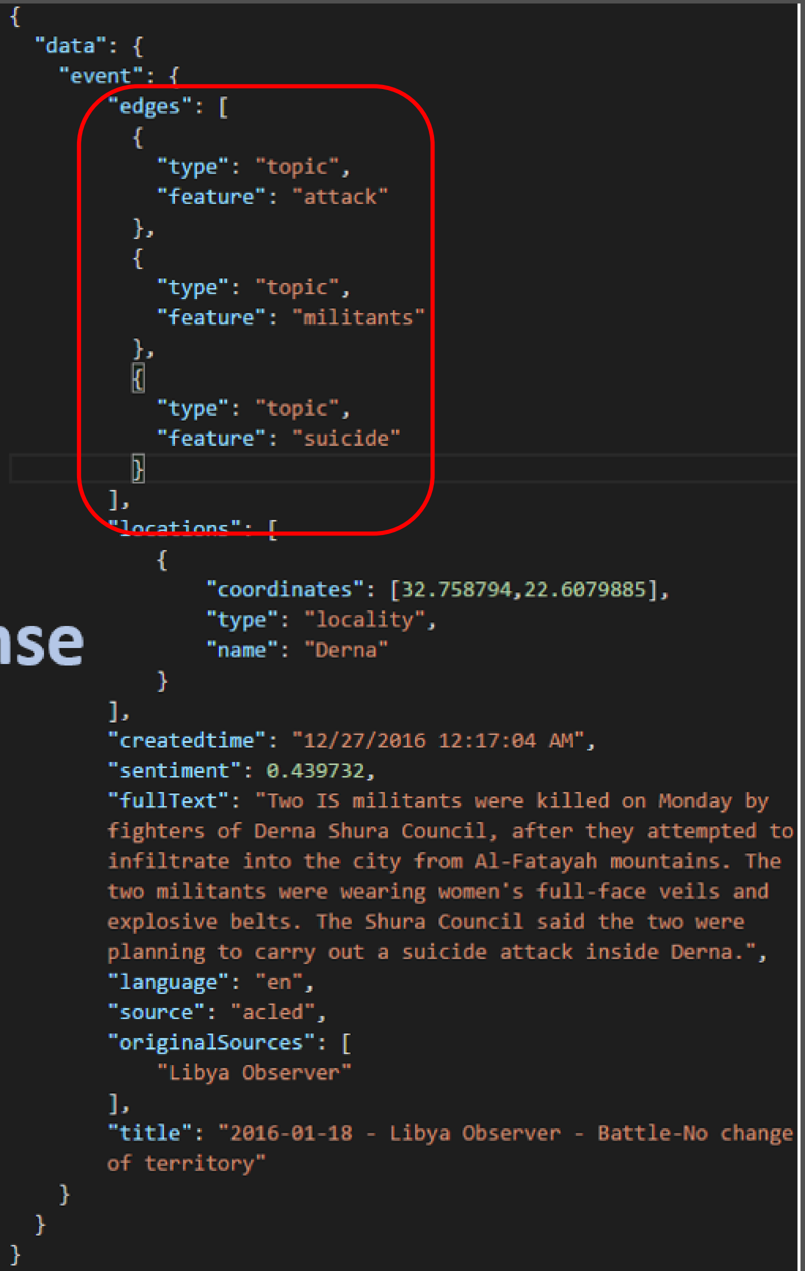
```
{
  "data": {
    "Traveller": {
      "name": "Erik Schlegel"
    }
  }
}
```

GraphQL query with complex values



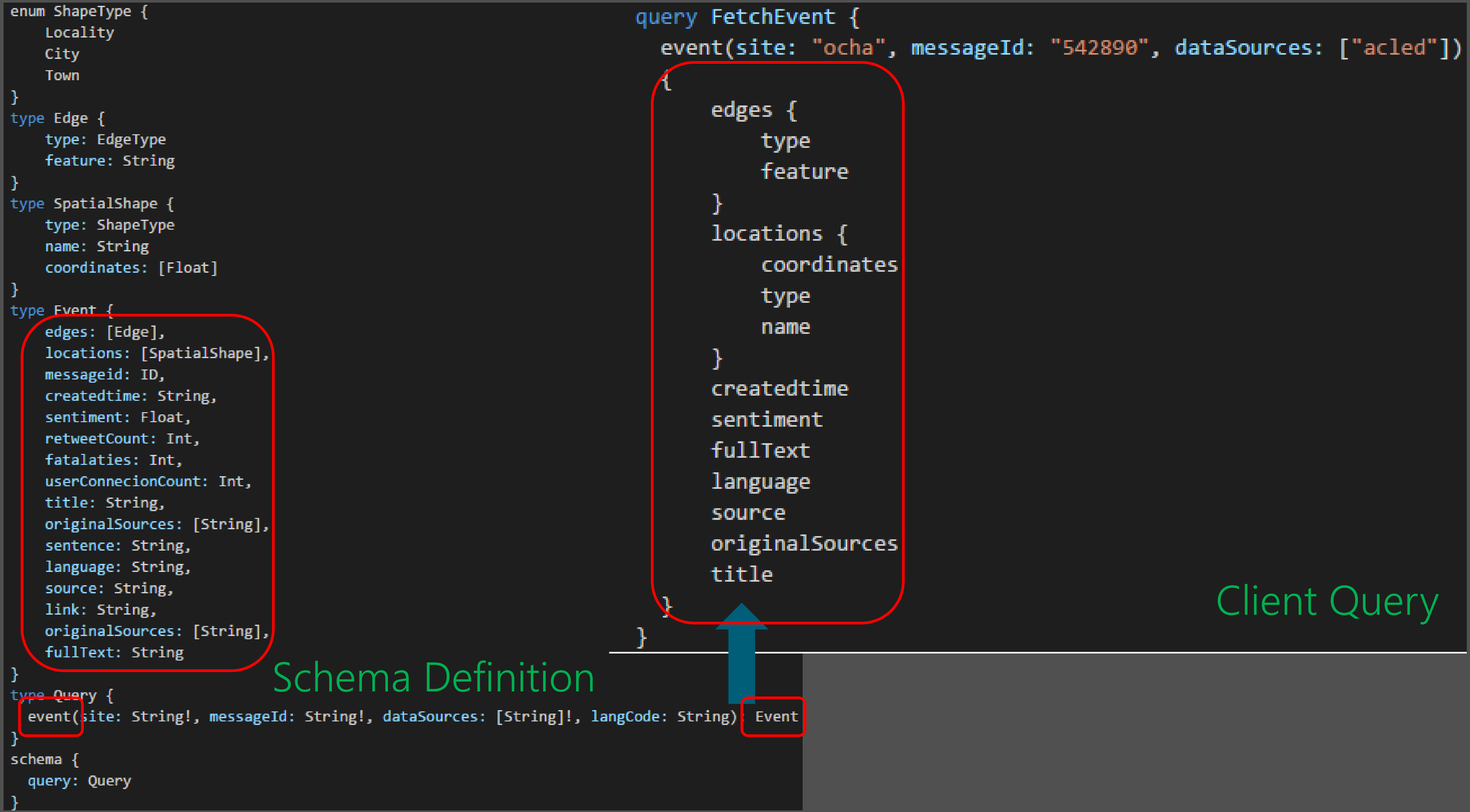
```
query FetchEvent {
  event(site: "ocha", messageId: "542890", dataSources: ["acled"])
  {
      edges {
          type
          feature
      }
      locations {
          coordinates
          type
          name
      }
      createdtime
      sentiment
      fullText
      language
      source
      originalSources
      title
  }
}
```

GraphQL Request ➡ **Response**



```
{
  "data": {
    "event": {
      "edges": [
        {
          "type": "topic",
          "feature": "attack"
        },
        {
          "type": "topic",
          "feature": "militants"
        },
        {
          "type": "topic",
          "feature": "suicide"
        }
      ],
      "locations": [
        {
          "coordinates": [32.758794,22.6079885],
          "type": "locality",
          "name": "Derna"
        }
      ],
      "createdtime": "12/27/2016 12:17:04 AM",
      "sentiment": 0.439732,
      "fullText": "Two IS militants were killed on Monday by
fighters of Derna Shura Council, after they attempted to
infiltrate into the city from Al-Fatayah mountains. The
two militants were wearing women's full-face veils and
explosive belts. The Shura Council said the two were
planning to carry out a suicide attack inside Derna.",
      "language": "en",
      "source": "acled",
      "originalSources": [
        "Libya Observer"
      ],
      "title": "2016-01-18 - Libya Observer - Battle-No change
of territory"
    }
  }
}
```

Flow: Static Type System



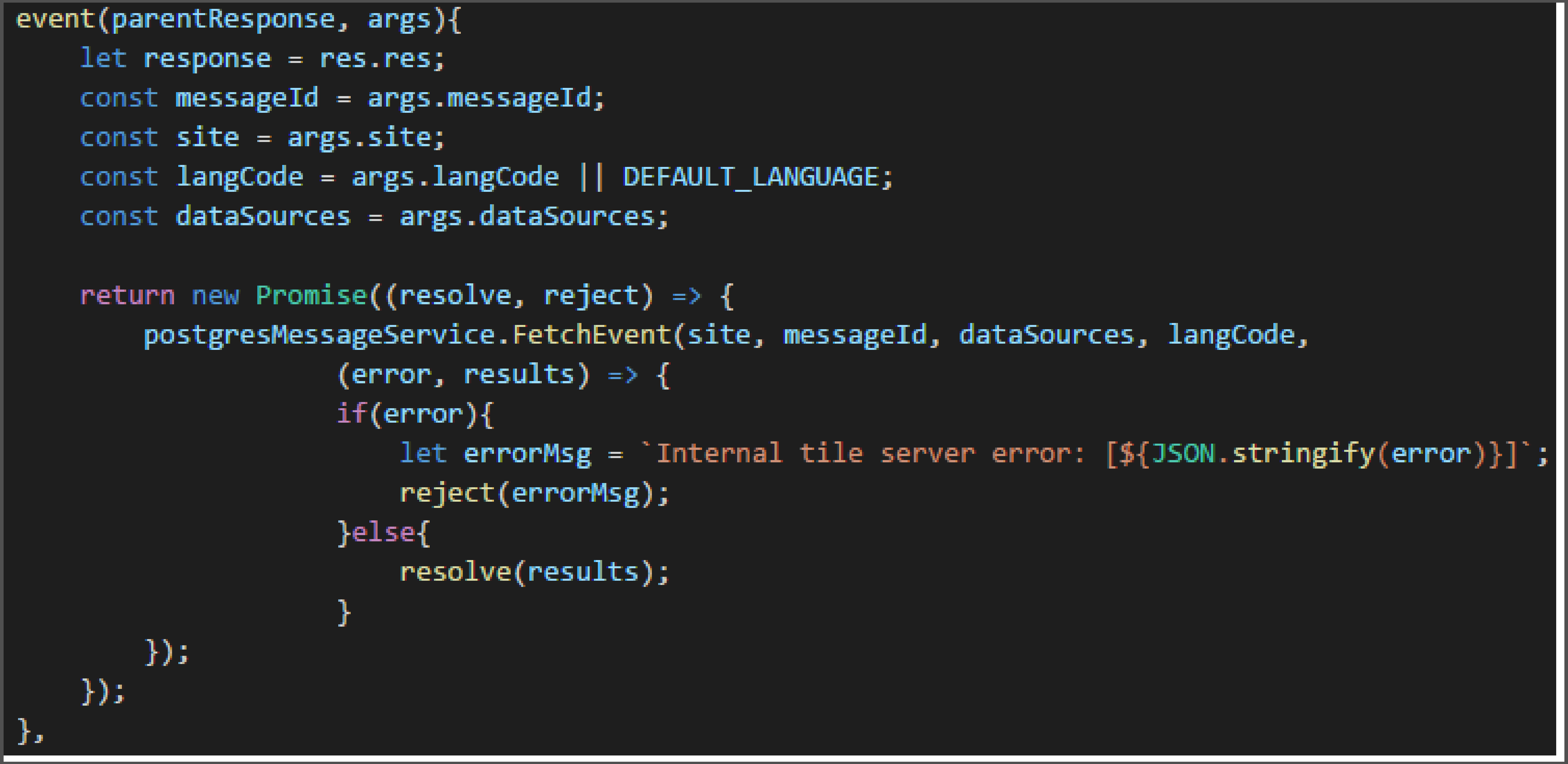
```
enum ShapeType {
    Locality
    City
    Town
}
type Edge {
    type: EdgeType
    feature: String
}
type SpatialShape {
    type: ShapeType
    name: String
    coordinates: [Float]
}
type Event {
    edges: [Edge],
    locations: [SpatialShape],
    messageid: ID,
    createdtime: String,
    sentiment: Float,
    retweetCount: Int,
    fatalaties: Int,
    userConnecionCount: Int,
    title: String,
    originalSources: [String],
    sentence: String,
    language: String,
    source: String,
    link: String,
    originalSources: [String],
    fullText: String
}
type Query {
  event(site: String!, messageId: String!, dataSources: [String]!, langCode: String): Event
}
schema {
  query: Query
}
```

Schema Definition

```
query FetchEvent {
  event(site: "ocha", messageId: "542890", dataSources: ["acled"])
  {
      edges {
          type
          feature
      }
      locations {
          coordinates
          type
          name
      }
      createdtime
      sentiment
      fullText
      language
      source
      originalSources
      title
  }
}
```

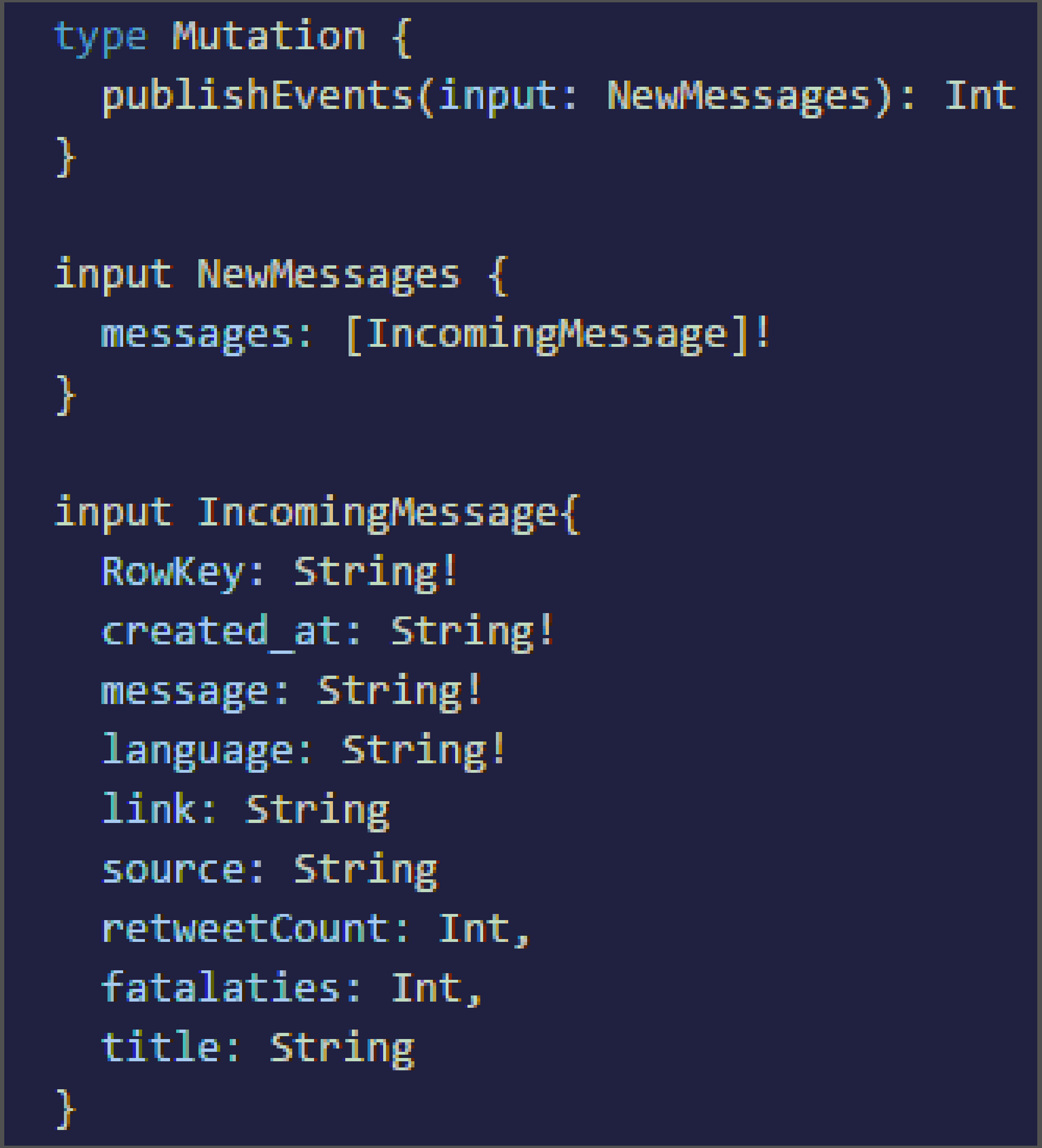
Client Query

Selection Set Resolvers



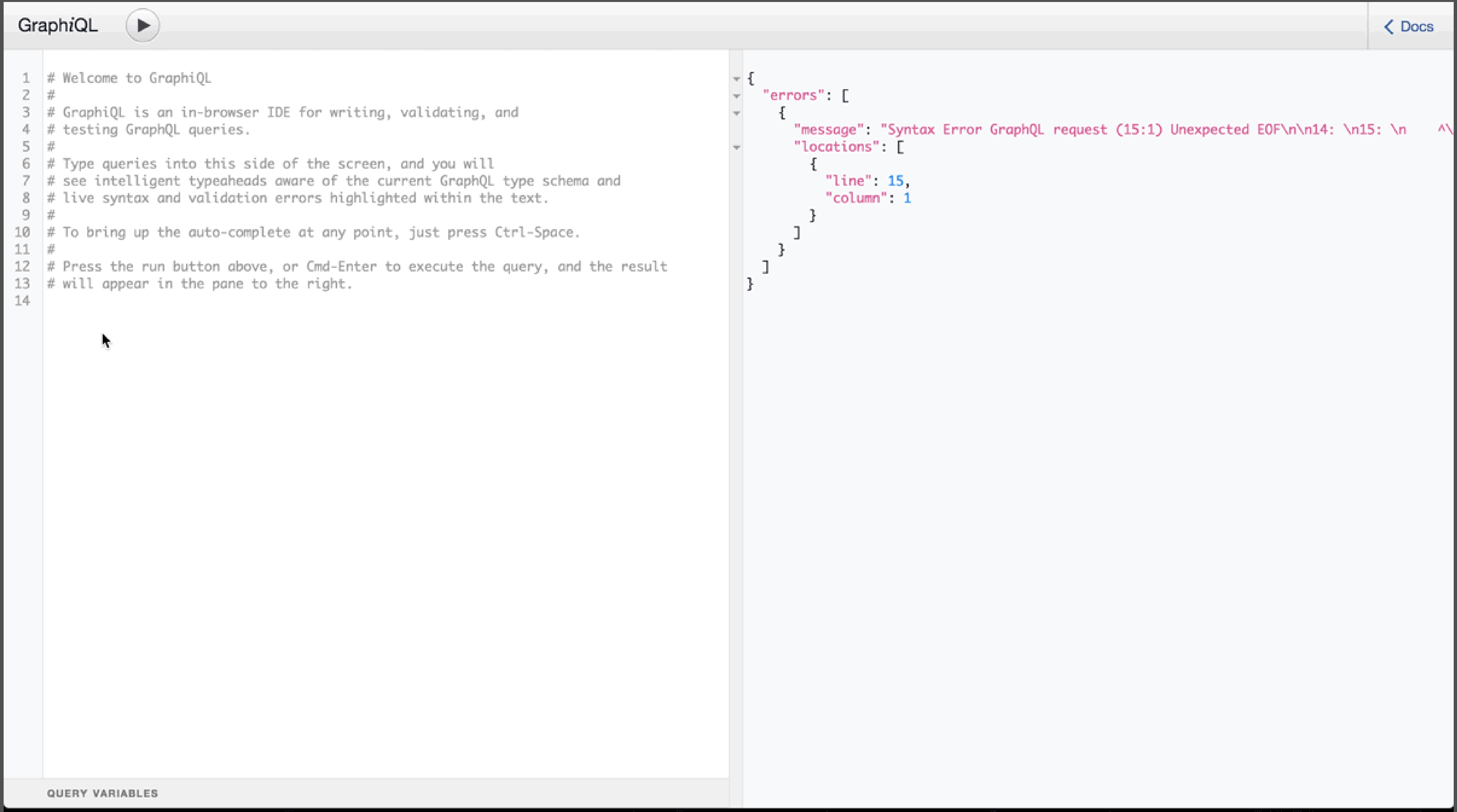
```
event(parentResponse, args){
    let response = res.res;
    const messageId = args.messageId;
    const site = args.site;
    const langCode = args.langCode || DEFAULT_LANGUAGE;
    const dataSources = args.dataSources;

    return new Promise((resolve, reject) => {
        postgresMessageService.FetchEvent(site, messageId, dataSources, langCode,
                    (error, results) => {
                    if(error){
                        let errorMsg = `Internal tile server error: [${JSON.stringify(error)}]`;
                        reject(errorMsg);
                    }else{
                        resolve(results);
                    }
        });
    });
},
```

Handling Data Writes in GraphQL



```
type Mutation {
  publishEvents(input: NewMessages): Int
}

input NewMessages {
  messages: [IncomingMessage]!
}

input IncomingMessage{
  RowKey: String!
  created_at: String!
  message: String!
  language: String!
  link: String
  source: String
  retweetCount: Int,
  fatalaties: Int,
  title: String
}
```

GraphQL: a tool to build other tools



```
# Welcome to GraphiQL
#
# GraphiQL is an in-browser IDE for writing, validating, and
# testing GraphQL queries.
#
# Type queries into this side of the screen, and you will
# see intelligent typeaheads aware of the current GraphQL type schema and
# live syntax and validation errors highlighted within the text.
#
# To bring up the auto-complete at any point, just press Ctrl-Space.
#
# Press the run button above, or Cmd-Enter to execute the query, and the result
# will appear in the pane to the right.

```

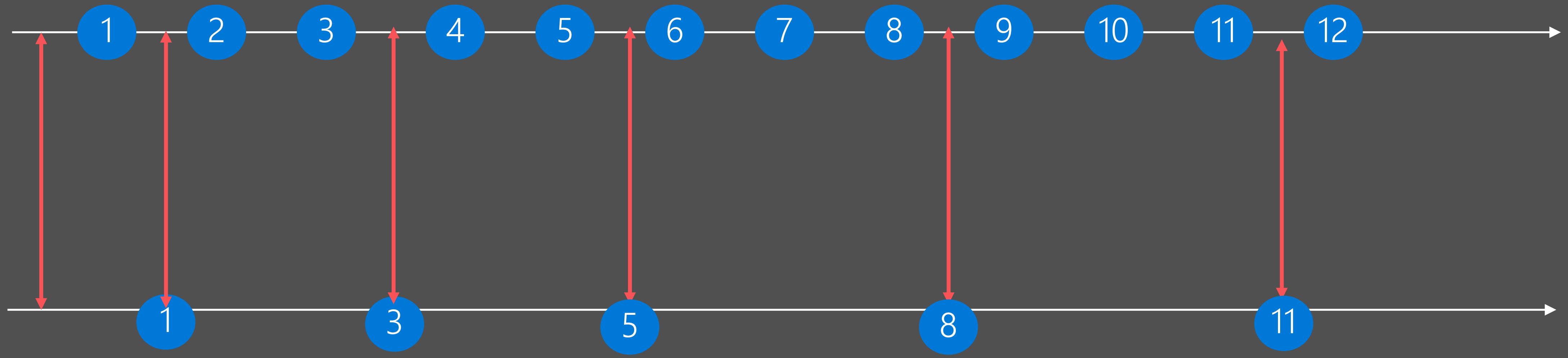
```
{
  "errors": [
    {
      "message": "Syntax Error GraphQL request (15:1) Unexpected EOF\n\n14: \n15: \n    ^\
      "locations": [
        {
          "line": 15,
          "column": 1
        }
      ]
    }
  ]
}
```

Why are real-time apps interesting?

Polling vs Subscription Pattern

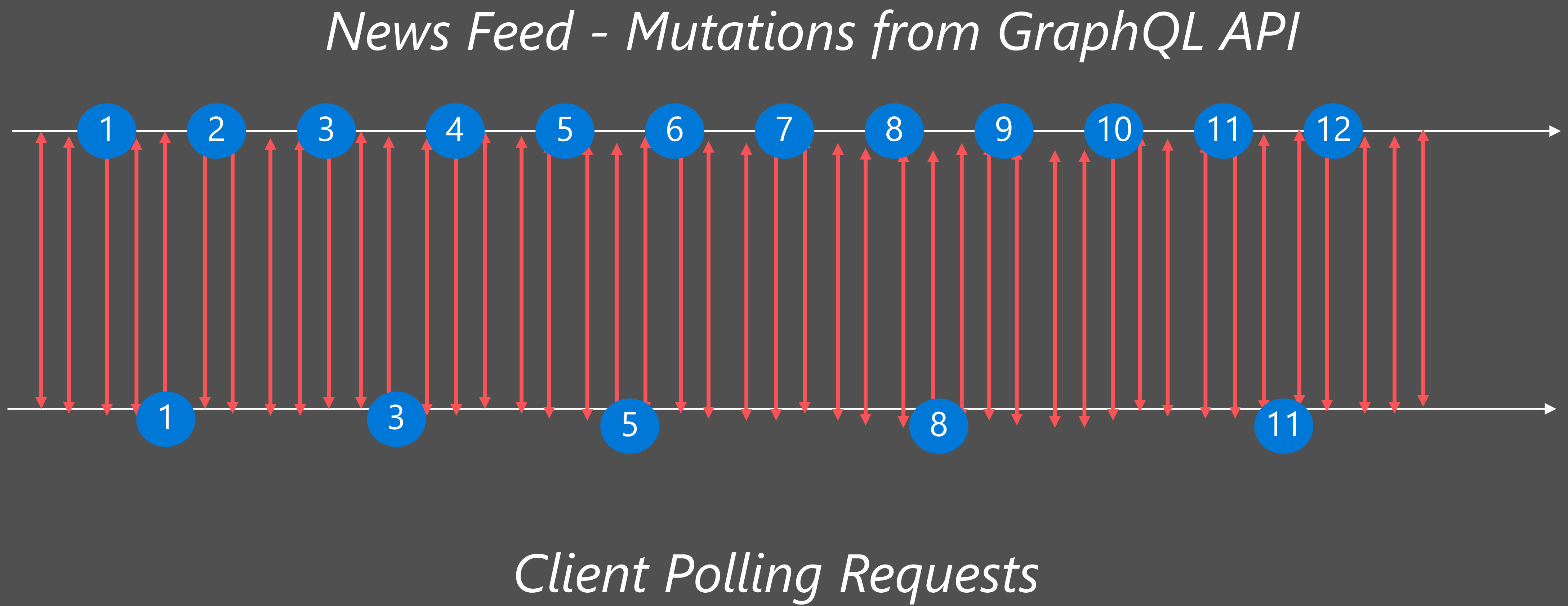
Polling – News Feed

News Feed - Mutations from GraphQL API



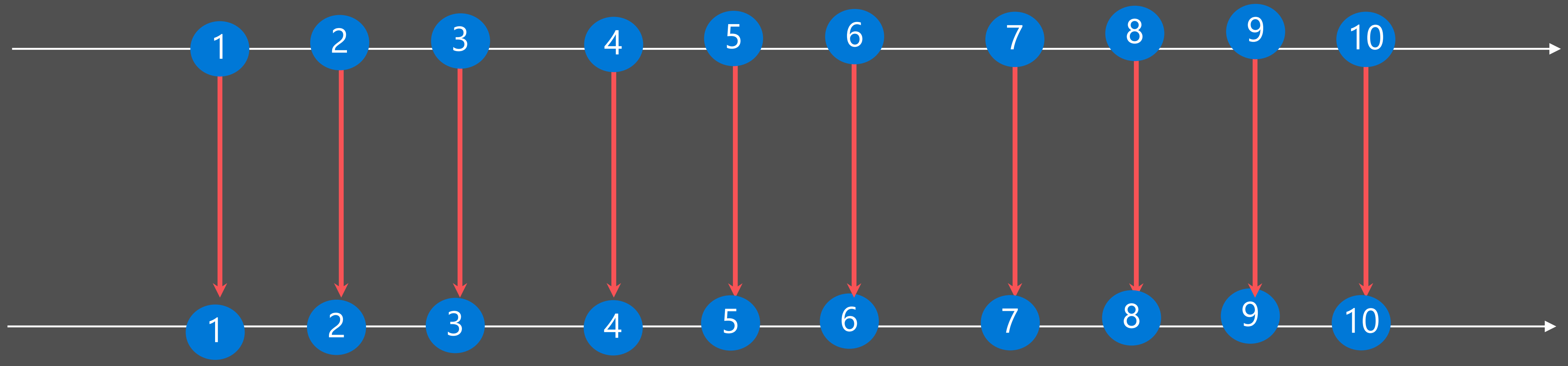
Client Polling Requests

Polling – News Feed


News Feed - Mutations from GraphQL API
1
2
3
4
5
6
7
8
9
10
11
12
1
3
5
8
11
Client Polling Requests

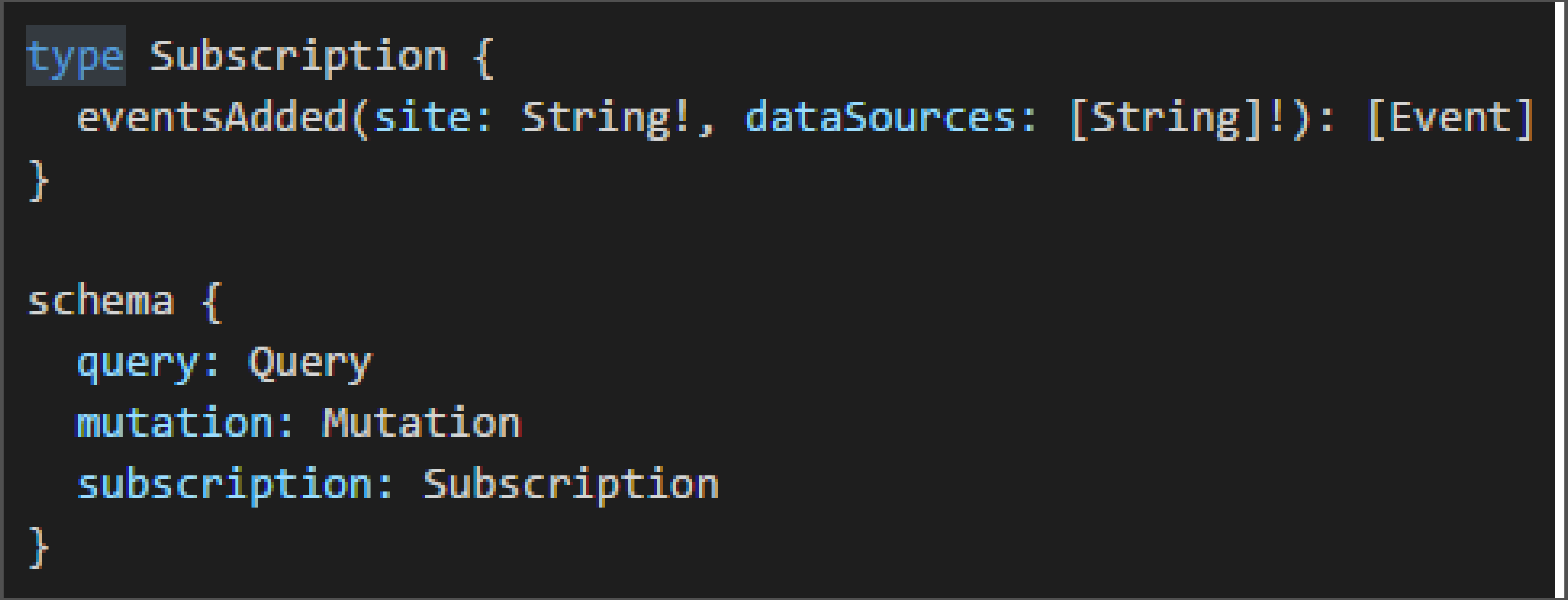
Subscriptions– News Feed

News Feed - Mutations from GraphQL API



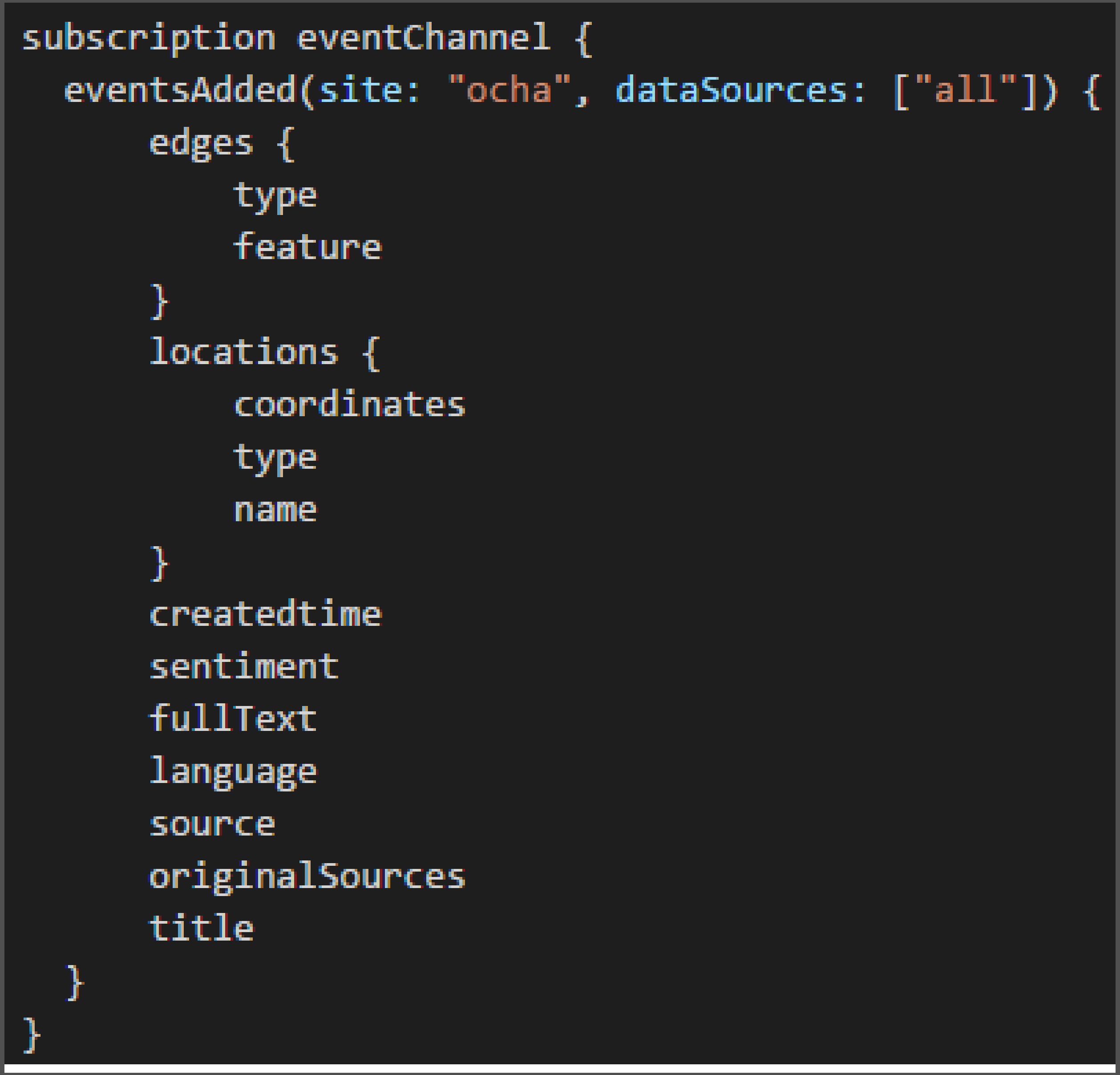
Client Side - Incoming state mutations(pushed)

Defining Subscriptions in GraphQL



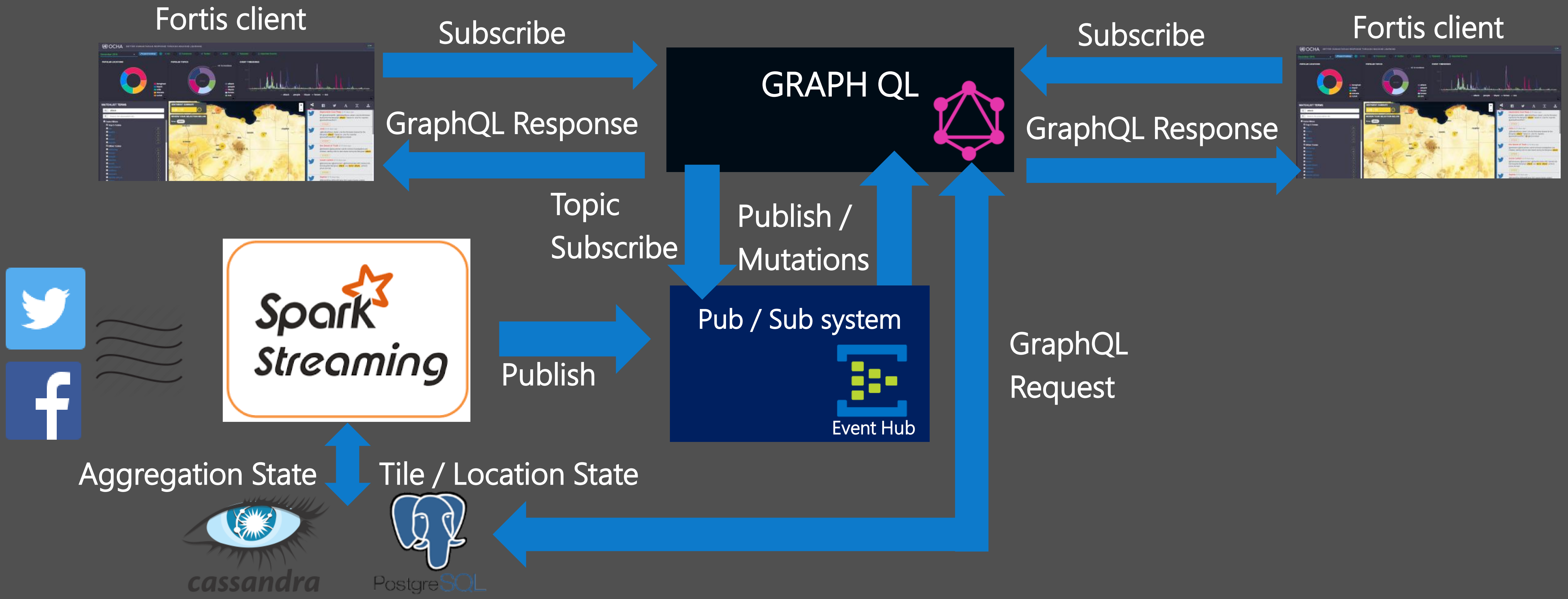
```
type Subscription {
  eventsAdded(site: String!, dataSources: [String]!): [Event]
}

schema {
  query: Query
  mutation: Mutation
  subscription: Subscription
}
```

Using Subscriptions in GraphQL



```
subscription eventChannel {
  eventsAdded(site: "ocha", dataSources: ["all"]) {
      edges {
          type
          feature
      }
      locations {
          coordinates
          type
          name
      }
      createdtime
      sentiment
      fullText
      language
      source
      originalSources
      title
  }
}
```

Fortis Realtime Event Flow



Call to Action

Demo Video: https://aka.ms/fortis-demo

Source Code: https://aka.ms/fortis-code

Code Story: https://aka.ms/fortis-story

Thank You!

Erik Schlegel
@erikschlegel1