DataStax

Developers

Introduction to GraphQL

Query only what you need and when you need it ...

Developer Advocate

@stefano-lottini

@hemidactylus

@rsprrs

- Developer/Architect
- Apache Cassandra™ certified

- Background in computational physics
- Distributed systems
- Love to teach and communicate

dtsx.io/stefano

Stefano Lottini

Director of Developer Relations

clunven

clunven

clun

- Trainer
- Public Speaker
- Developers Support
- Developer Applications
- Developer Tooling

- Creator of ff4j (ff4j.org)
- Maintainer for 8 years+

- Happy developer for 14 years
- Spring Petclinic Reactive & Starters
- Implementing APIs for 8 years

Cédrick Lunven

Cedrick Lunven

David Dieruf

Rags Srinivas

Artem Chebotko

Stefano Lottini

Aleksandr Volochnev

Aaron Ploetz

Jack Fryer

Kirsten Hunter

Gary Harvey

Mary Grygleski

Ryan Welford

David Gilardi

DataStax Developers Crew

01

Housekeeping

Live and Hands-on

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Database Setup

Data model & Astra DB

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GraphQL

Design & Toolings

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What's next?

Quiz, Homework, ...

Agenda

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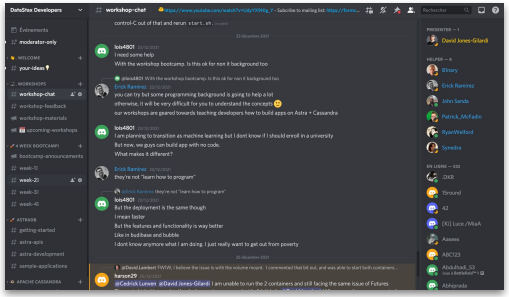
Live and Hands-on

Livestream: youtube.com/DataStaxDevs

YouTube

Twitch

Questions: https://dtsx.io/discord

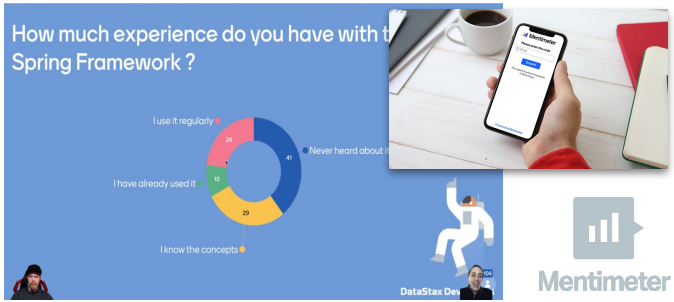


YouTube

Discord

Live and interactive

Games and quizzes: menti.com

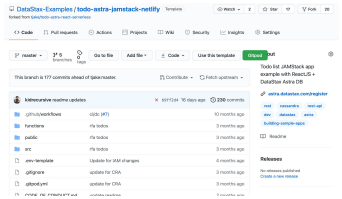


Mentimeter

Live Sessions

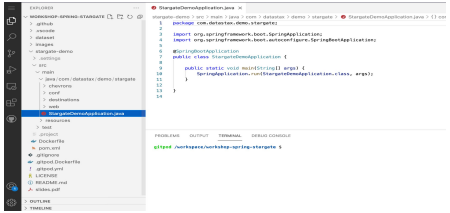
Nothing to install !

Source code, exercises, slides



GitHub

IDE

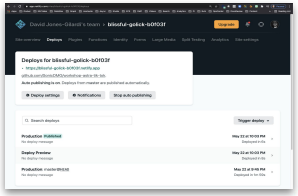


Gitpod

Database + GraphQL + PlayGround

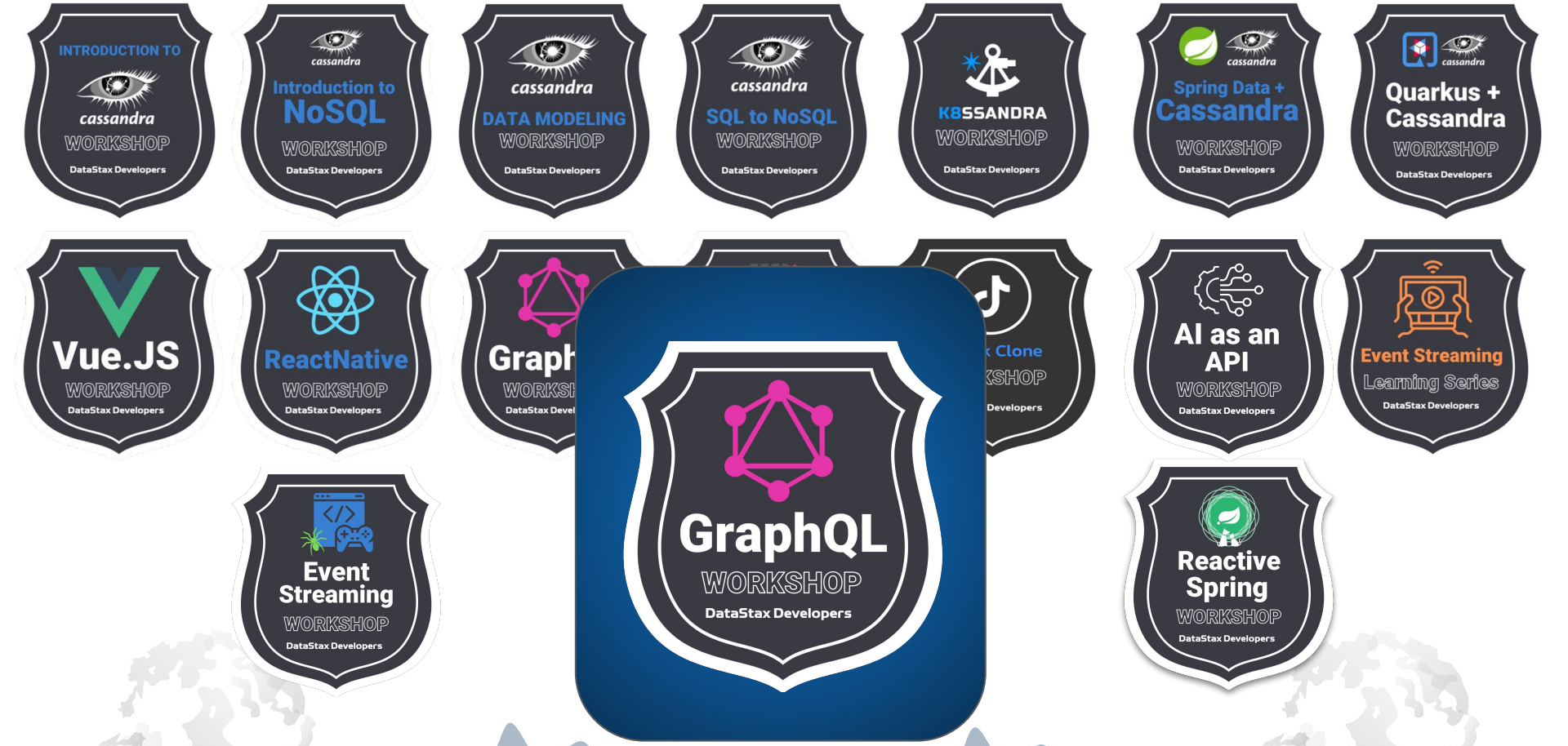
DataStax
Astra DB

Deploy + Run + Host



netlify

Hands-On Housekeeping

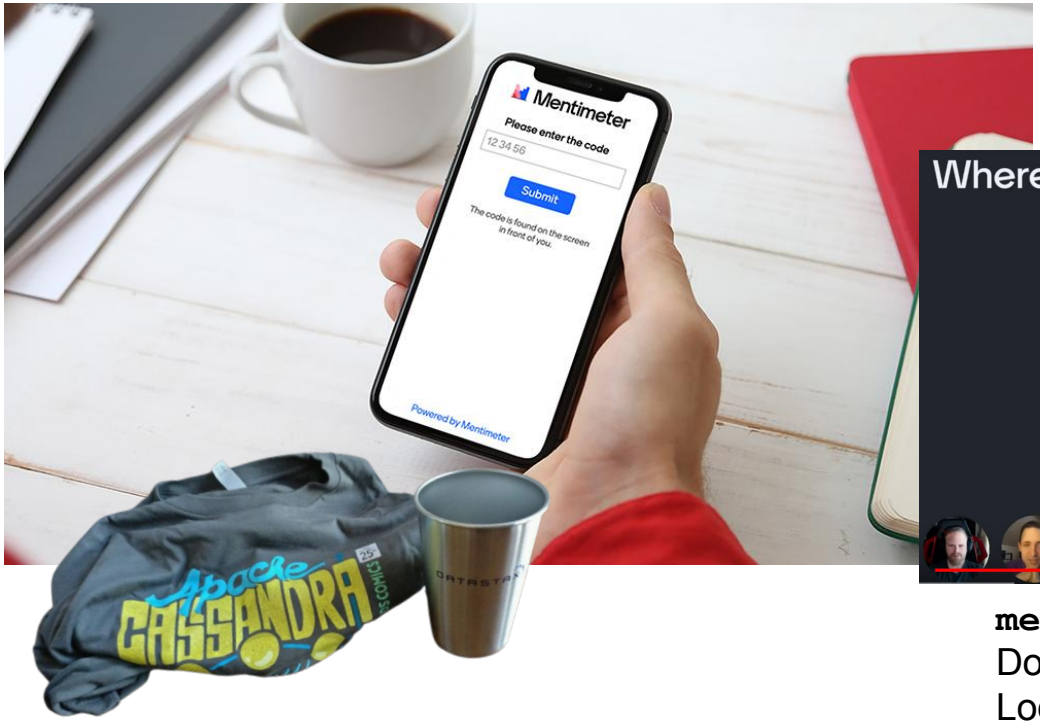


Get your badge for today

DataStax Developers

- **BEGINNERS**
  - Relax, no complex code to write
  - Get the most of if by following what presenters do and ask Questions !
  - Try to improve and develop the application later!
- **INTERMEDIATE**
  - Scroll and do exercises on your own PACE
  - Sample code, ready to go to copy-paste
- **EXPERTS**
  - Run stuff locally
  - Challenge

Choose your path



`menti.com` ⇒ enter code
Don't answer in YT chat
Look at phone (not at YT)
Keep it open for later

"Menti" for survey and quiz !

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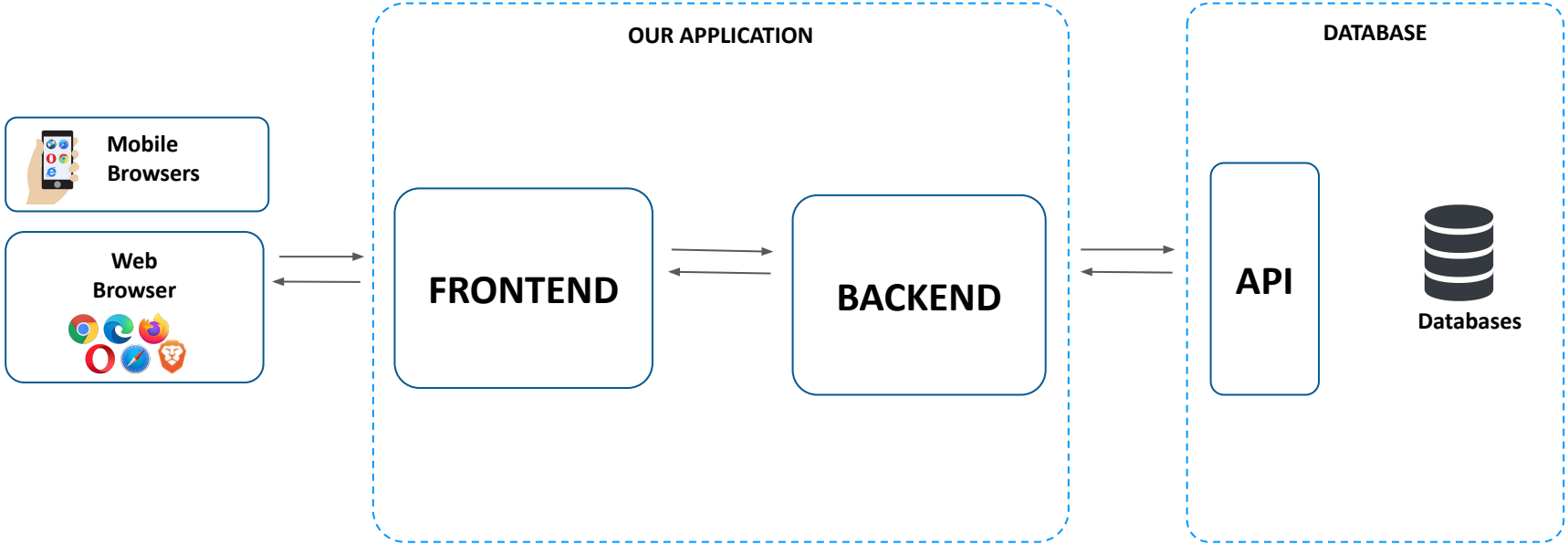
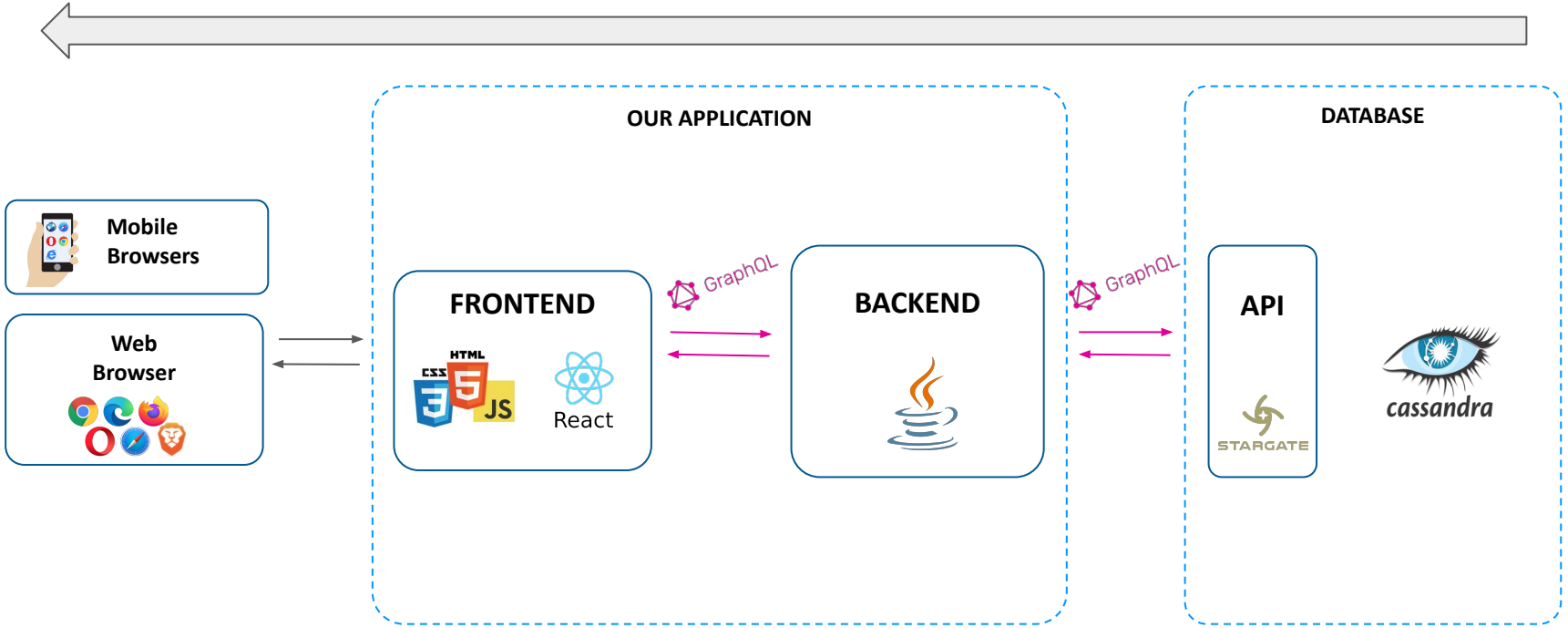
Our Goal

Overall Architecture



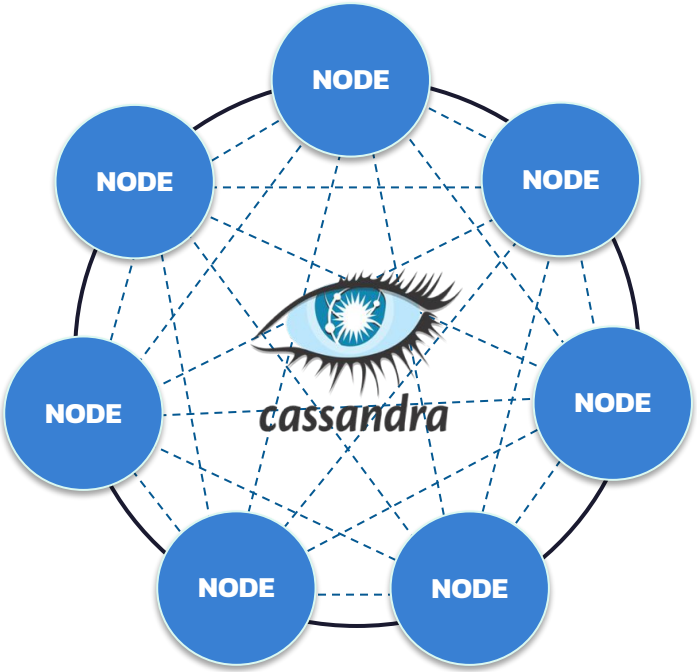
Building a Full-stack application



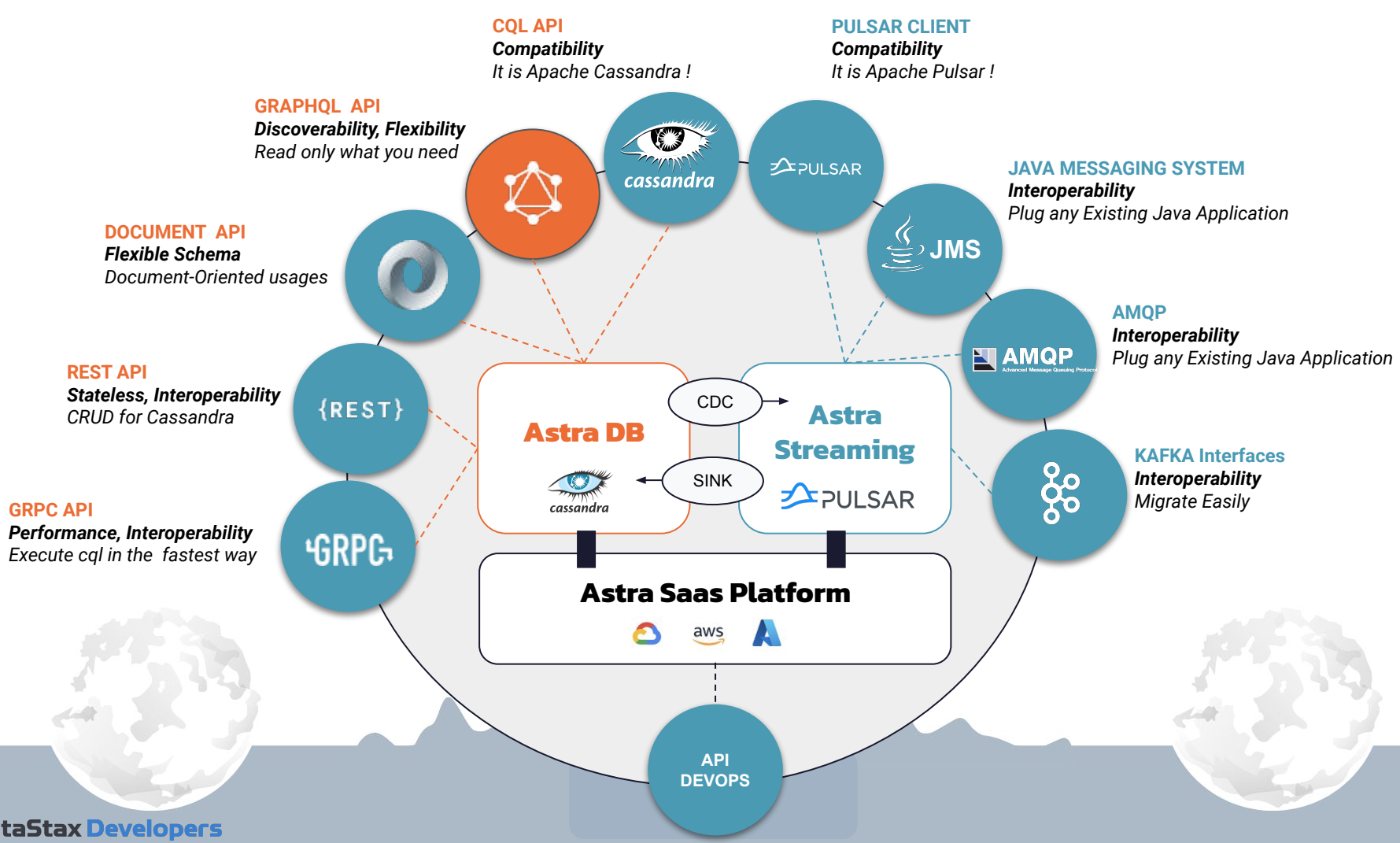
Building a Full-stack application

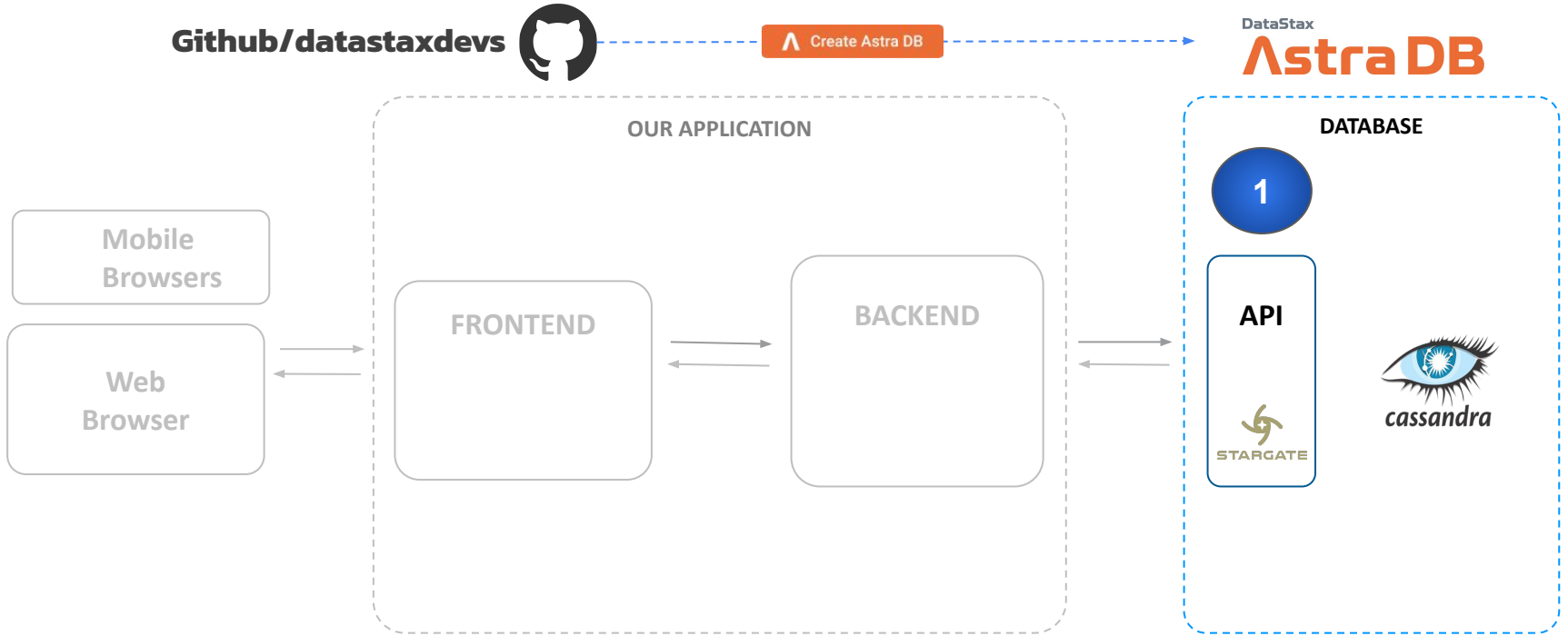
Database setup

Data model & Astra DB

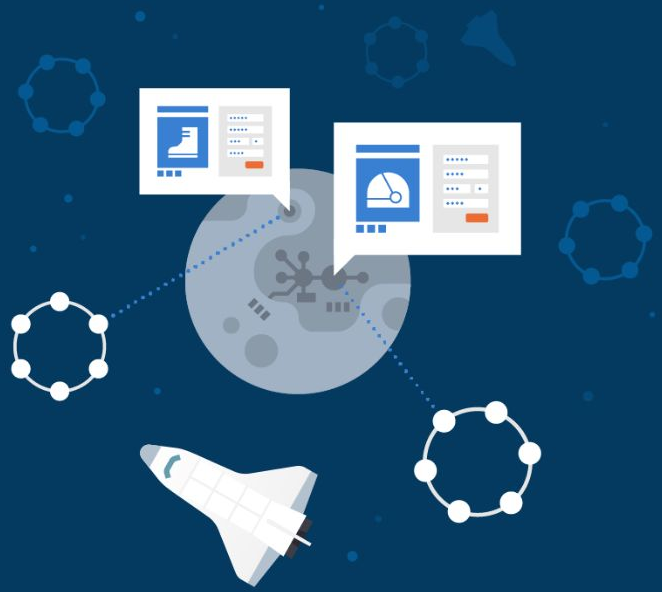


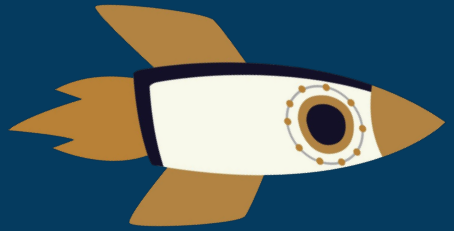
- Big Data Ready
- Read / Write Performance
- Linear Scalability
- Highest Availability
- Self-Healing and Automation
- Geographical Distribution
- Platform Agnostic
- Vendor Independent


CQL API
Compatibility
It is Apache Cassandra !
PULSAR CLIENT
Compatibility
It is Apache Pulsar !
GRAPHQL API
Discoverability, Flexibility
Read only what you need
JAVA MESSAGING SYSTEM
Interoperability
Plug any Existing Java Application
DOCUMENT API
Flexible Schema
Document-Oriented usages
AMQP
Interoperability
Plug any Existing Java Application
REST API
Stateless, Interoperability
CRUD for Cassandra
KAFKA Interfaces
Interoperability
Migrate Easily
GRPC API
Performance, Interoperability
Execute cql in the fastest way
cassandra
PULSAR
JMS
AMQP
{REST}
GRPC
Astra DB
cassandra
CDC
SINK
Astra Streaming
PULSAR
Astra Saas Platform
aws
API
DEVOPS



Setup Database





Hands-on (!github)

#1 DB SETUP

- ✅ Register & Create your Database
- ✅ Create a security token
- ✅ Launch Gitpod

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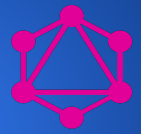

GraphQL

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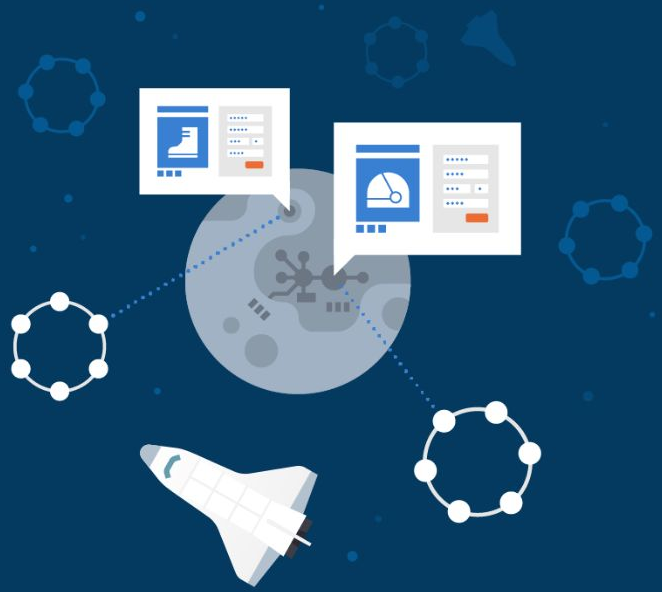


GraphQL

GraphQL

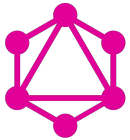
Learn & Design

2012 Created by Facebook
Used internally for mobile apps

2015 Facebook give talk at ReactJs Conf

2015 Facebook open sourced graphQL

2016 Github announced move to GQL



GraphQL

Definition

GraphQL is an application programming interface (API) query language and server-side runtime that prioritises giving customers precisely the data they request.

It is a web protocol (HTTP) that specifies the way we build and query remote APIs using a Tree/JSON Syntax.

```
incomingWorkshops {
    title
    abstract
    speakers
}
```

Based on a **strongly typed** language named GraphQL SDL
(Schema Definition Language)

```
type Workshop {
    title: String!
    abstract: String
    speakers: [Speaker]
    releaseYear: int
}
```

https://graphql.org/learn/schema/#type-language

A protocol that allows the client to specify exactly what data it needs from a model

```
incomingWorkshops {
    title
}
```

It allows one to aggregate data from **multiple relations** in a single query

```
incomingWorkshops {
    title: String!
    abstract: String
    speakers: {
       name
    }
    releaseYear: int
}
```

https://graphql.org/learn/schema/#type-language

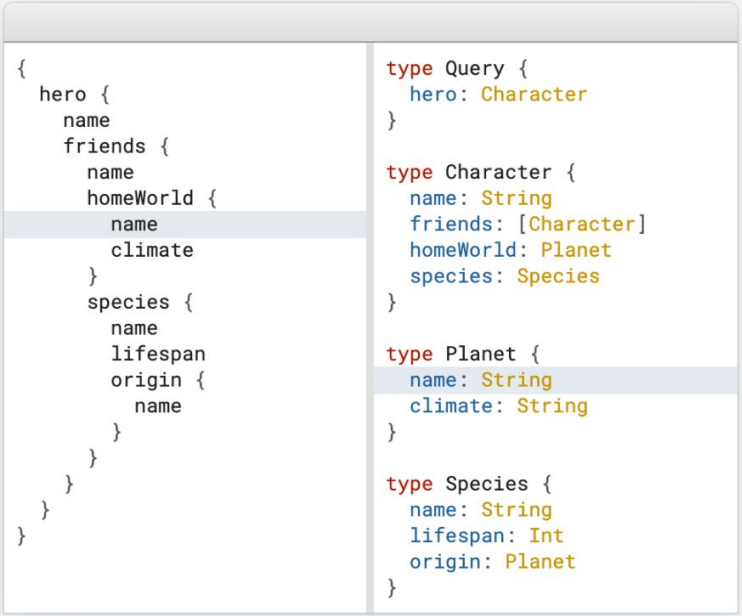
- **Int:** An integer type (example: 10)
- **Float:** Floating point number, example 3.43
- **String:** A sequence of characters (“Hello World”)
- **Boolean:** A boolean example true
- **ID:** An object identifier

- **User Defined types**
  - Create your structure with constraints

```
type Workshop {
    title: String!
    abstract: String
    speakers: [Speaker]
    releaseYear: int
}

type Speaker {
    name: String!
    email: String
}
```

GraphQL Type System – Built in scalar type and UDT

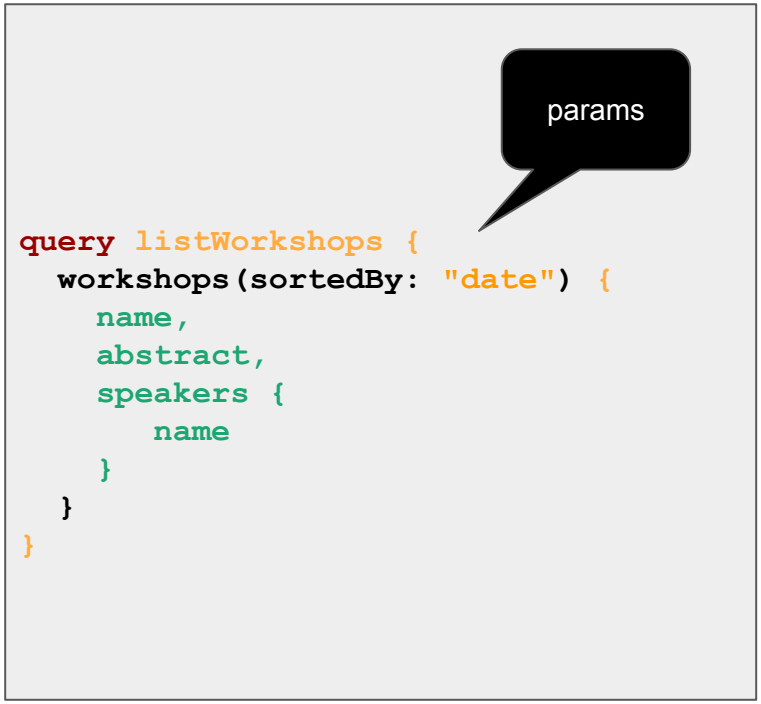


Describe what's possible with a type system

GraphQL APIs are organized in terms of types and fields, not endpoints. Access the full capabilities of your data from a single endpoint. GraphQL uses types to ensure Apps only ask for what's possible and provide clear and helpful errors. Apps can use types to avoid writing manual parsing code.

https://graphql.org

- Used for READ ONLY requests.
- Used to fetch data from the server using the graphQL SDL syntax
- Describe what data the requester wishes to fetch from whoever is fulfilling the GraphQL Query



```
{
  hero {
    name
    height
    mass
  }
}
```

```
{
  "hero": {
      "name": "Luke Skywalker",
      "height": 1.72,
      "mass": 77
  }
}
```

Ask for what you need, get exactly that

Send a GraphQL query to your API and get exactly what you need, nothing more and nothing less. GraphQL queries always return predictable results. Apps using GraphQL are fast and stable because they control the data they get, not the server.

https://graphql.org

Declarative Query

- Used to change resources data or execute actions on the server

- Client specifies the arguments and the action to be executed and then receives a response or a resource updated

```
mutation createWorkshop {
  createWorkshops({
    name: "Intro to GraphQL"
    abstract: "TODO"
    speakers: [
       {name: "Gilardi"},
       {name: "Hunter"}
    ]})
  {
    name
  }
}
```

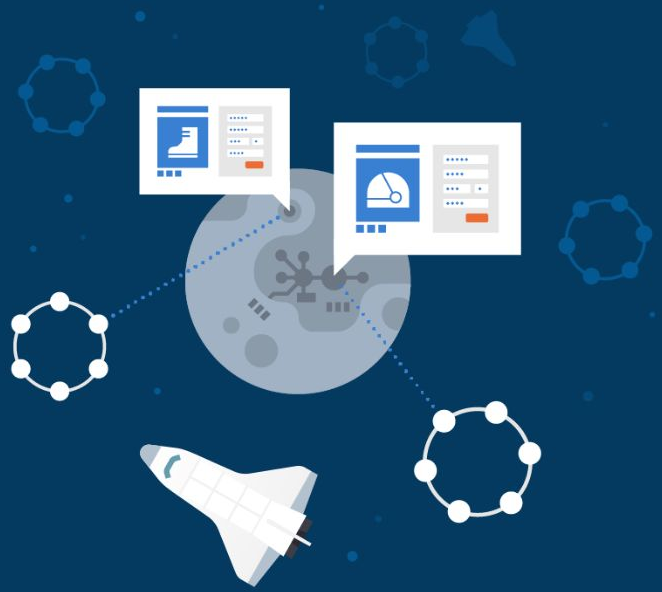

What is a GraphQL Mutation ?

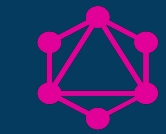
- Discoverability, introspection
- Declarative Data Fetching
- Schema stitching
- Customize responses
- Flexible versioning
- Match standards (Json | Http)

- Single endpoint (*versioning, monitoring, security*)
- Complex implementation (*tooling, still young*)
- Nice for customers, nasty for DB (*N+1 select*)
- Rate limiting is required
- Caching is hard (Apollo is a good solution here https://www.apollographql.com) <- this is what Netflix uses

- BFF : Backend for frontend
- Service aggregation | composition, "federation" (*joins*)
- When bandwidth matters (*mobile phones*)

GraphQL S.W.O.T. analysis





GraphQL

Tooling

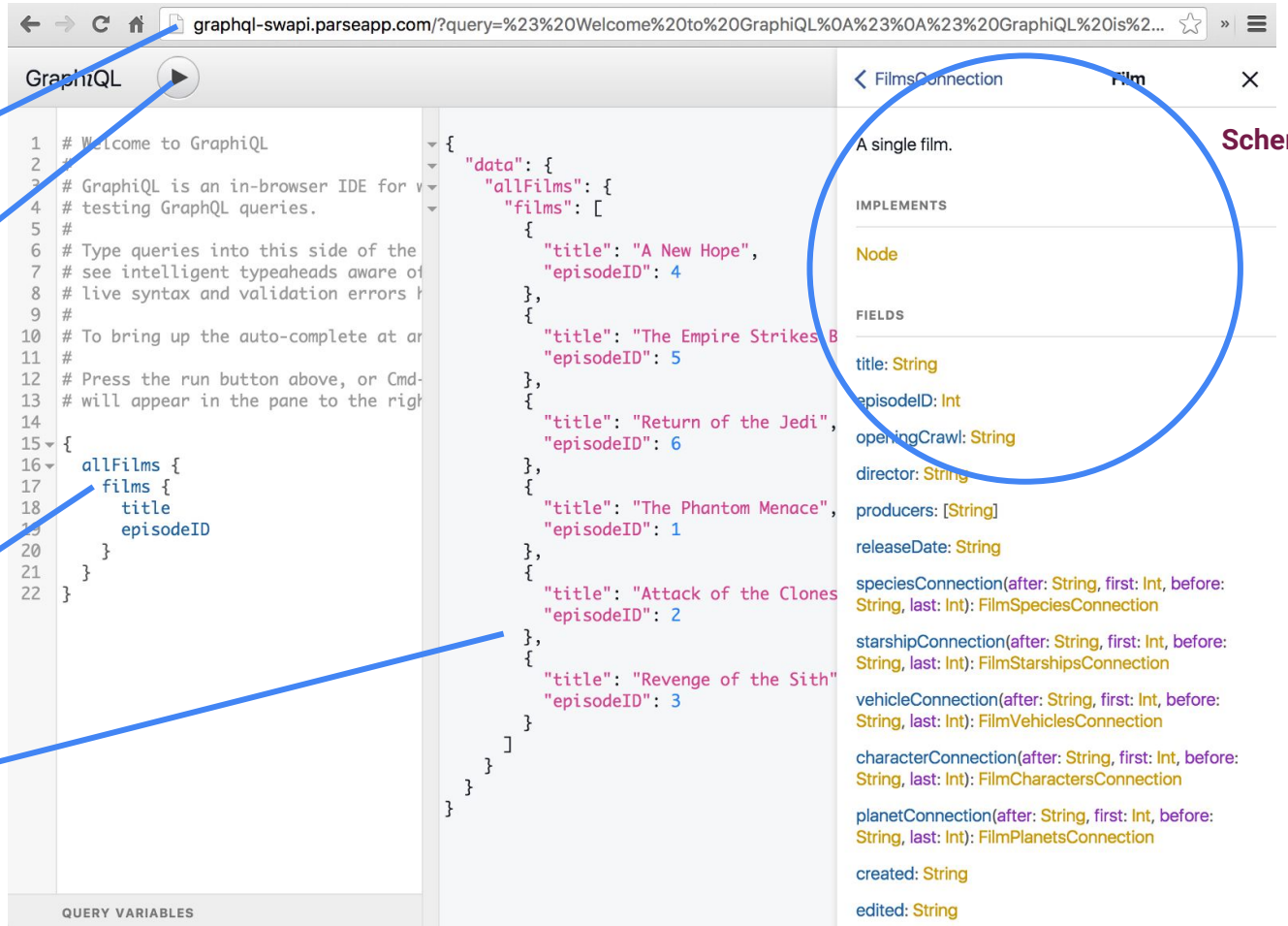
GraphiQL

ENDPOINT URL

EXECUTE

QUERY

RESULTS



Schema

DataStax Developers

GraphQL Playground

DDL: DATA DEFINITION
Create Table
Create Schema

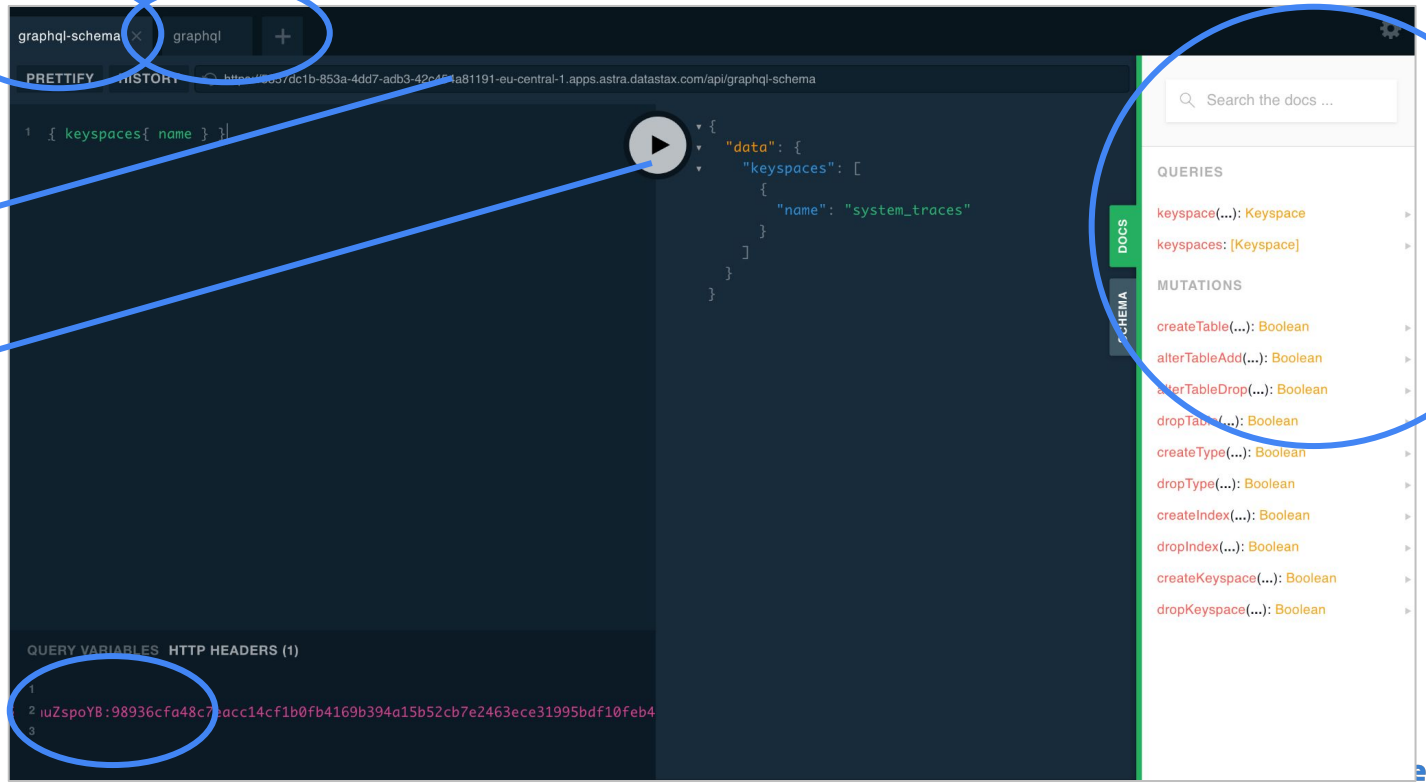
DML: DATA MANAGEMENT
INSERT DATA

Schema

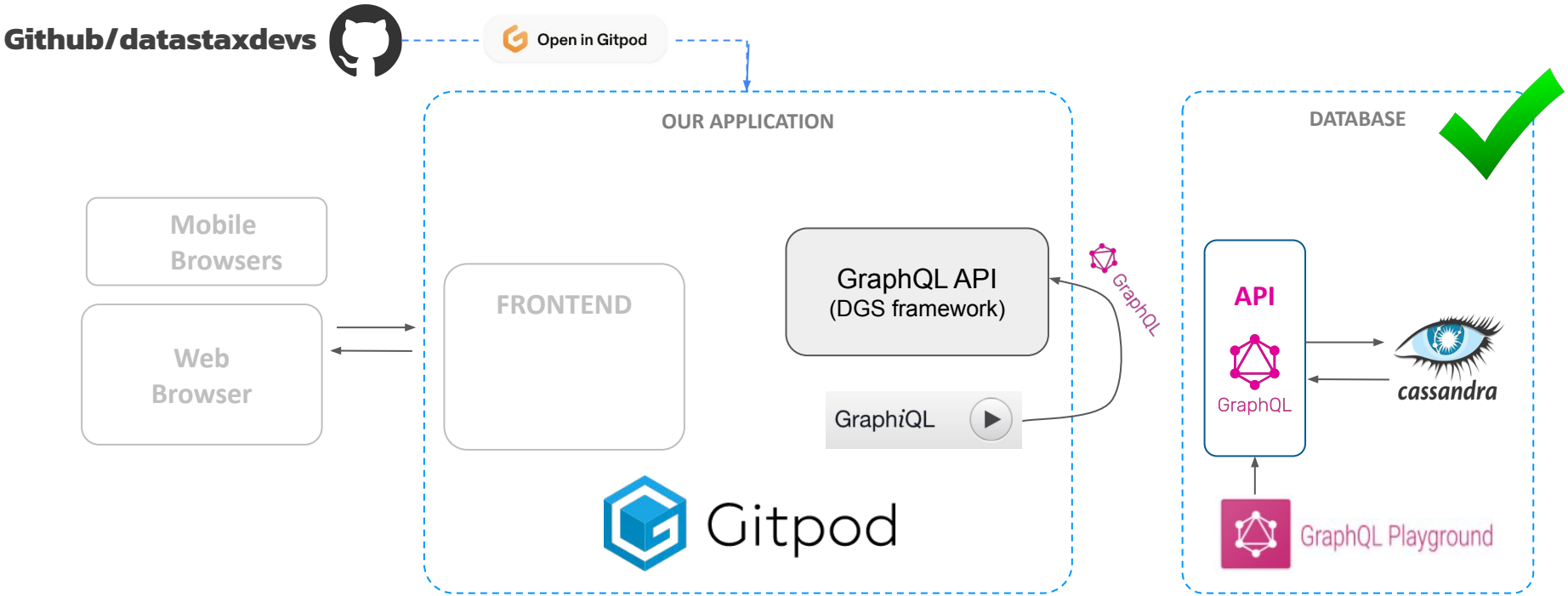
ENDPOINT URL

EXECUTE

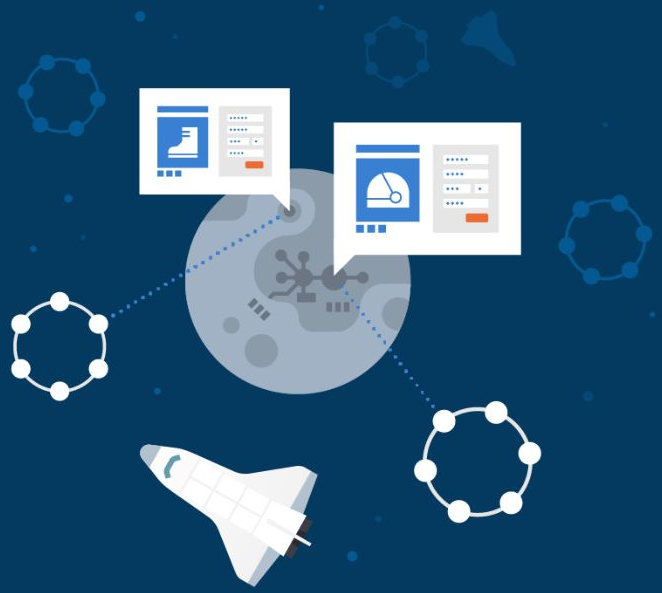
HEADER

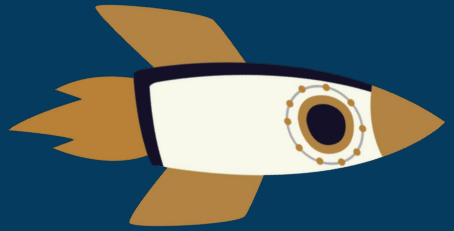


evelopers



What's coming in next Hands-on ?





Hands-on (!github)

#2 First Touch

- ✅ Experiment with Graph*i*QL
- ✅ Demo with GraphQL Playground

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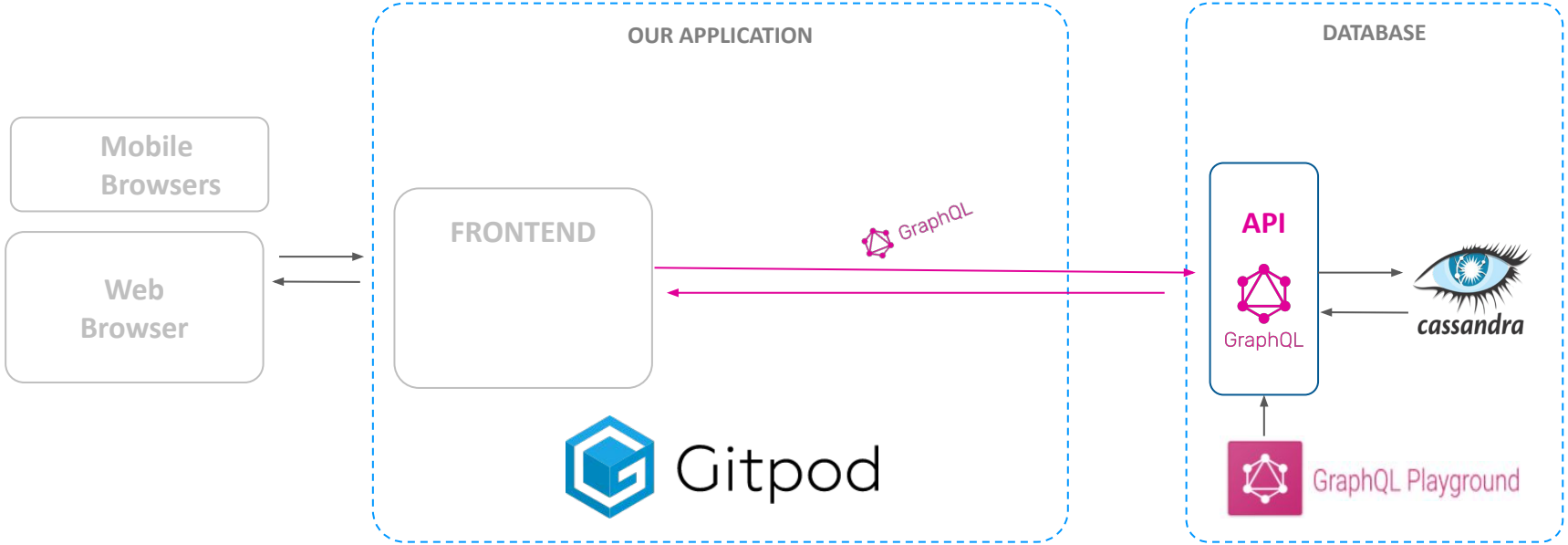
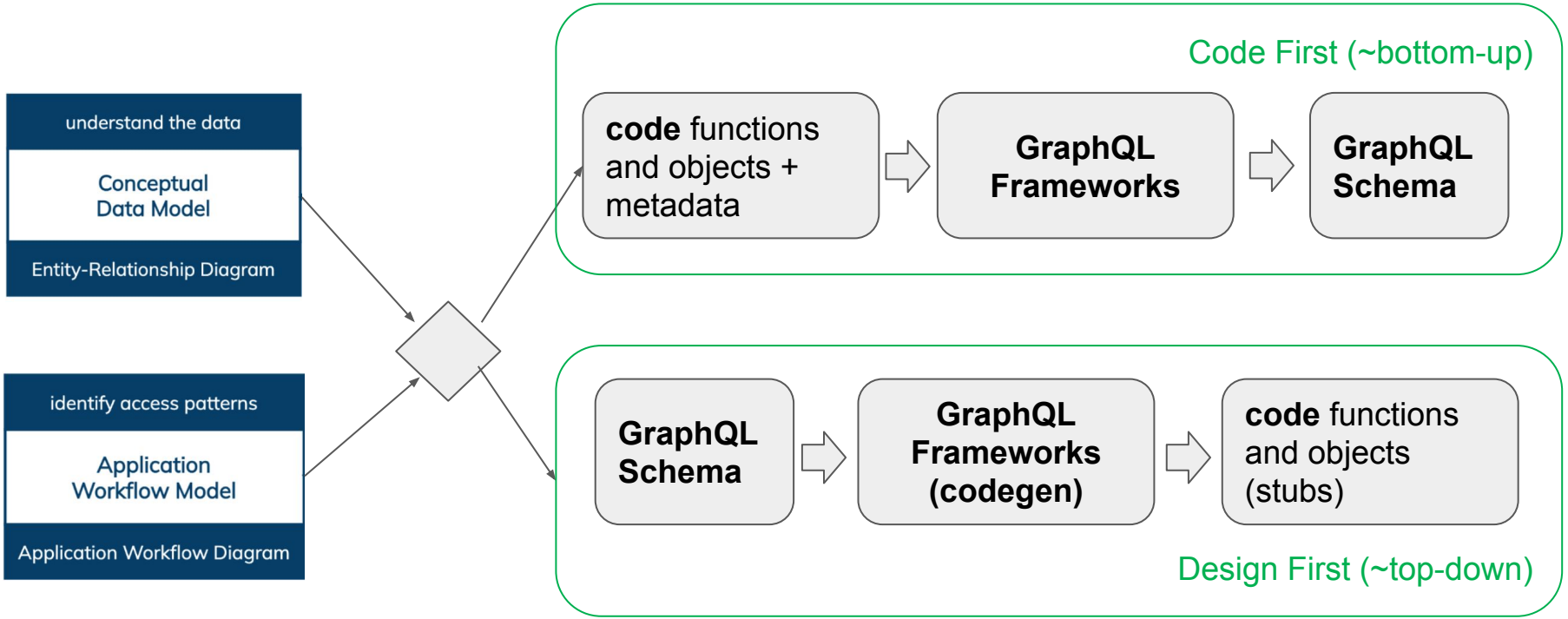
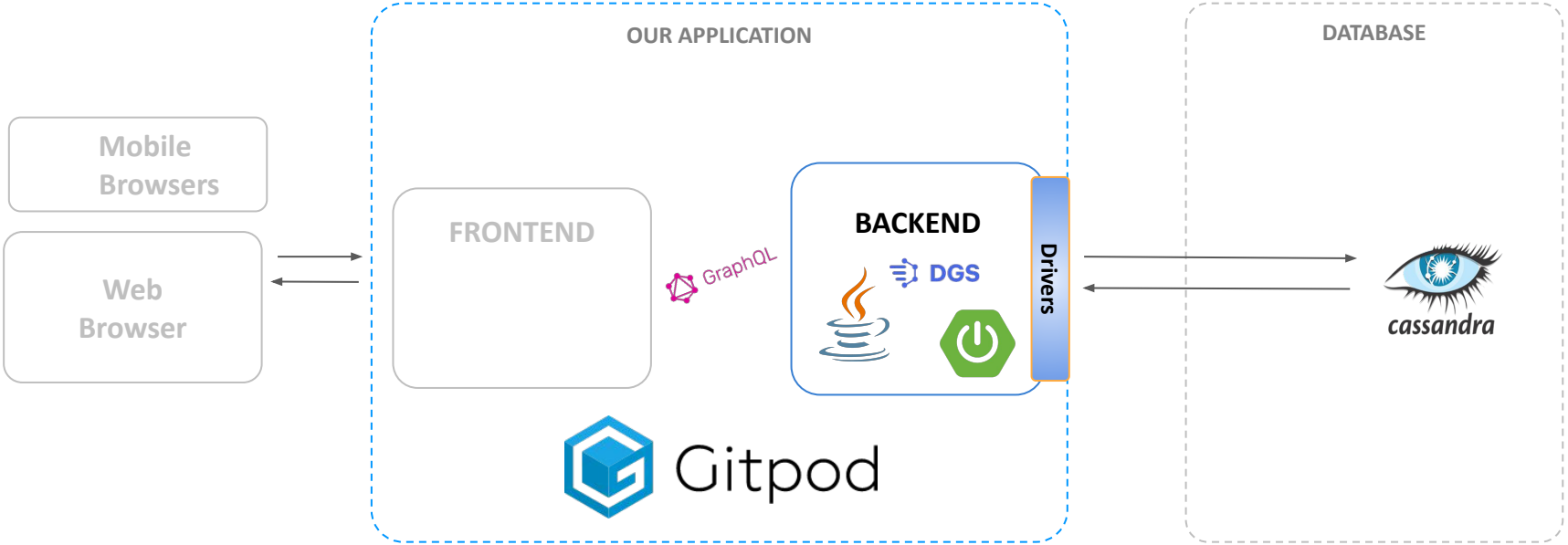


Sooo Connect the Front end to Graphql



Build a GraphQL API



Introduction to DGS by Netflix

```java
public class Genre {
    private final String value;

    public Genre(String value) {
        this.value = value;
    }

    public String getValue() {
        return value;
    }
}
```

DataFetcher as `@DgsComponent`

```java
@DgsComponent
public class GenresDatafetcher {
    Logger logger = Logger.getLogger(GenresDatafetcher.class.getName());

    private final List<Genre> genres = List.of(
            new Genre("Action"),
            new Genre("Anime"),
            new Genre("Award-Winning"),
            new Genre("Children & Family"),
            new Genre("Comedies")
    );

    @DgsQuery
    public List<Genre> genres(@InputArgument String labelFilter) {
        logger.info("QUERY executed - Genres value is: " + genres.get(0).getValue());

        if(labelFilter == null) {
            return genres;
        }

        return genres.stream().filter(s -> s.getValue().contains(labelFilter)).collect(Collectors.toList());
    }
```

Expose query with `@DgsQuery`

Exposing a GQL Endpoint with

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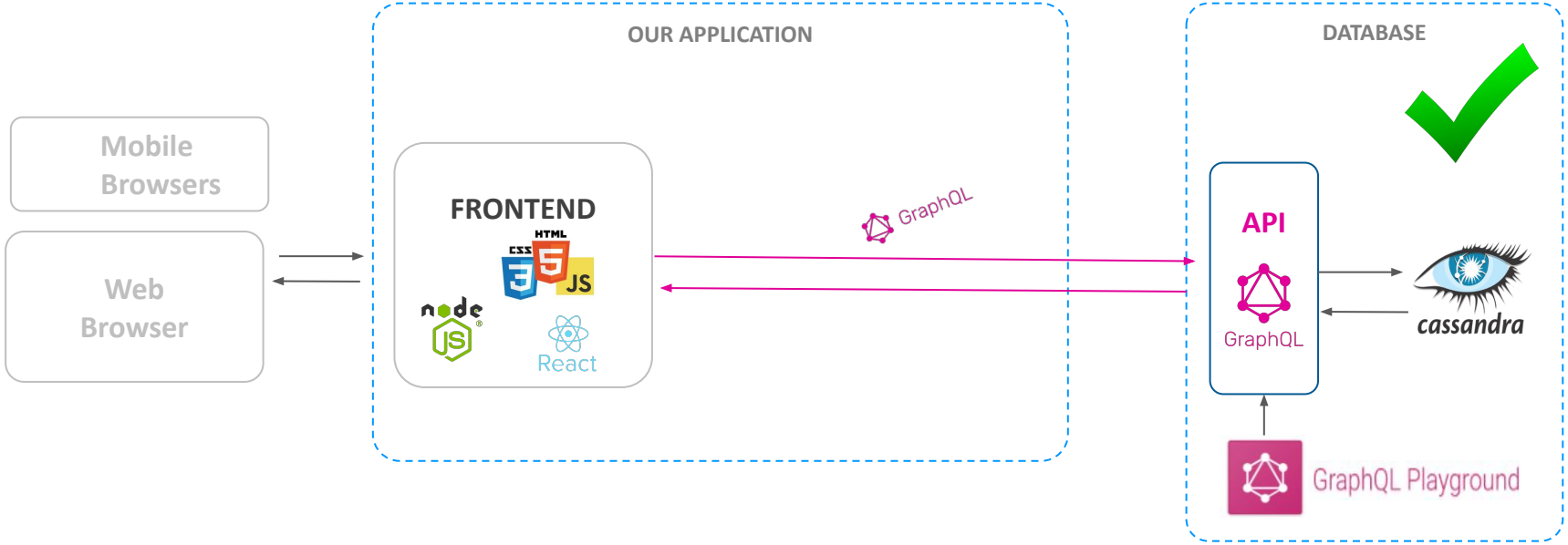

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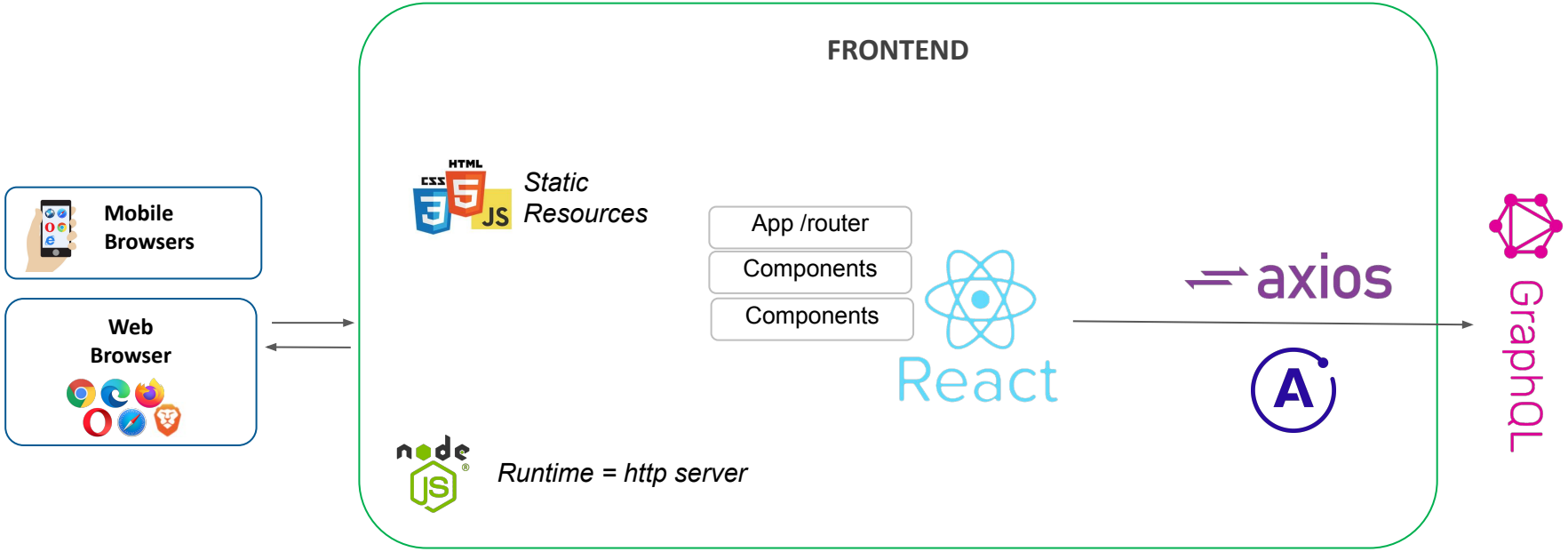
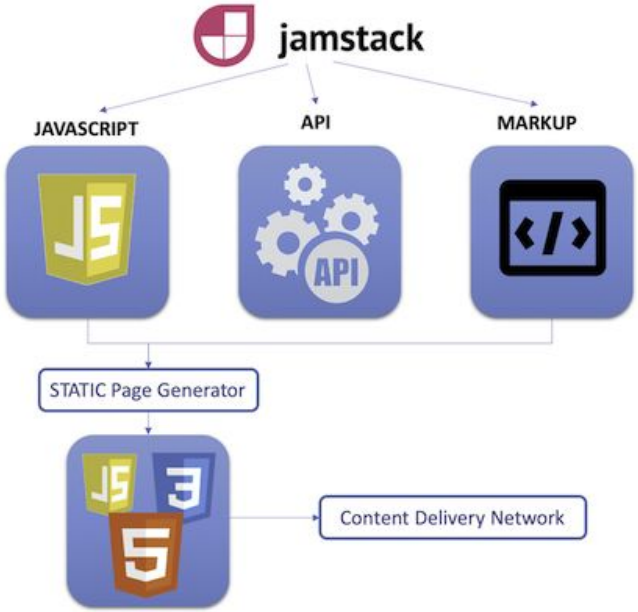
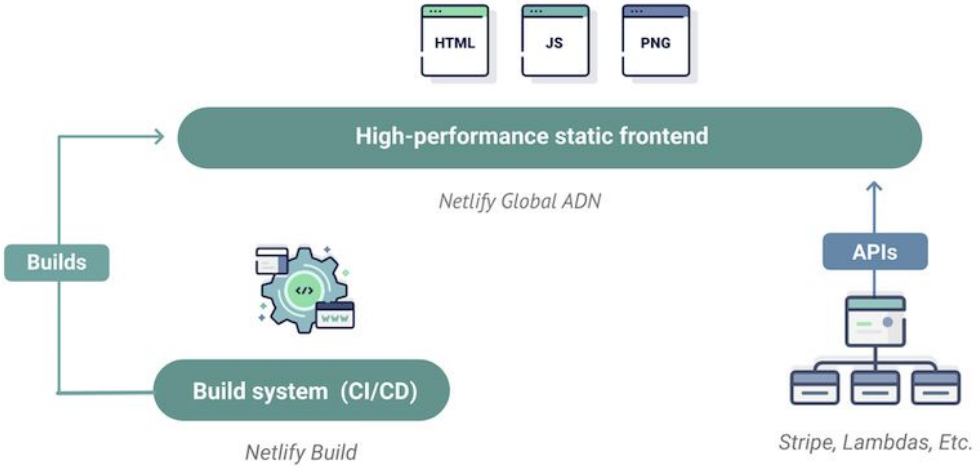


(*) Check out Apollo's `@apollo/client` library as well …

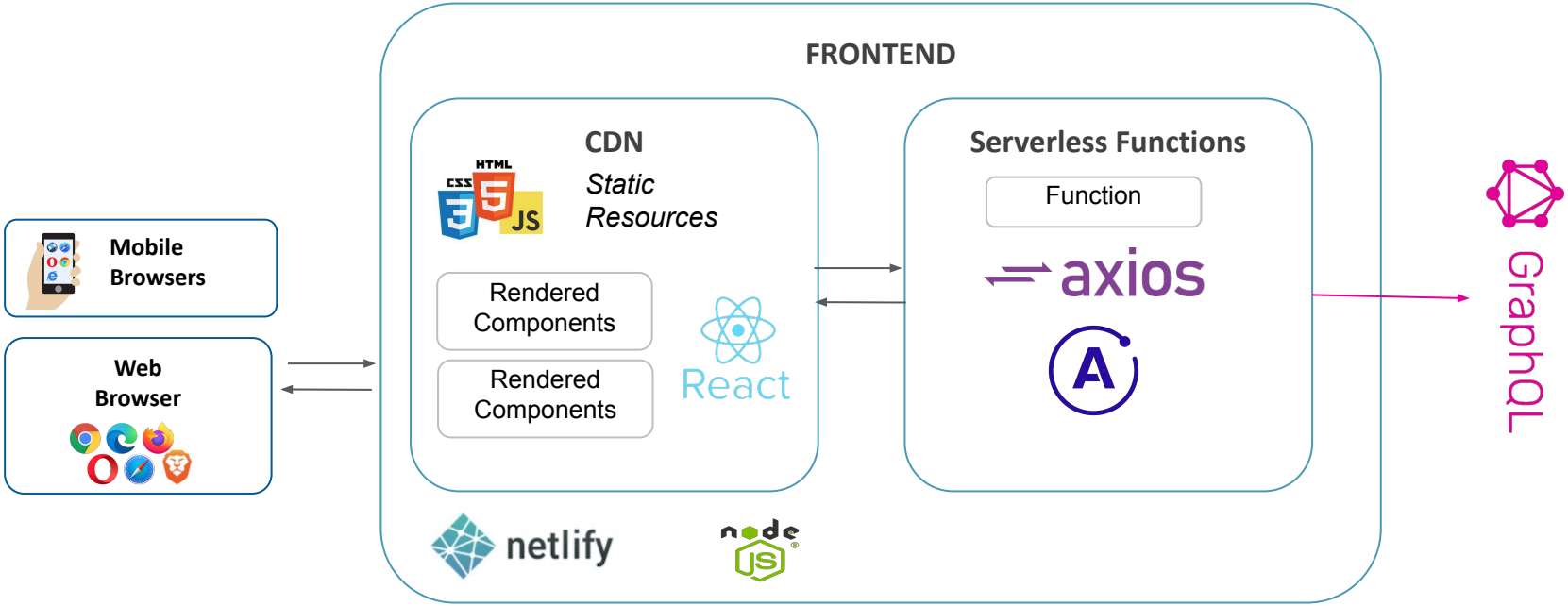
Our Front End

Cops are coming for you

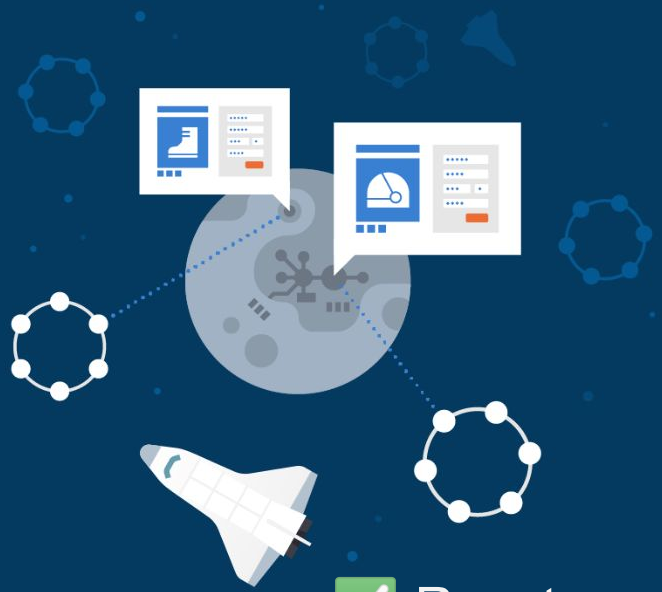


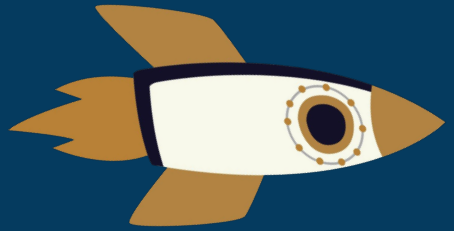


Introduction to Netlify



Our Front End





Hands-on (!github)

#3 Run the app

- ✅ React (start client, examine code)
- ✅ DB Connectivity (link app and DB)
- ✅ Run the final app (connected to DB, last touch)

01

Housekeeping

Live and Hands-on

02

Database Setup

Data model & Astra DB

03

GraphQL

GraphQL

Design & Toolings

04

Backend

Expose GQL endpoint

05

Frontend

Consume GQL Endpoint

06

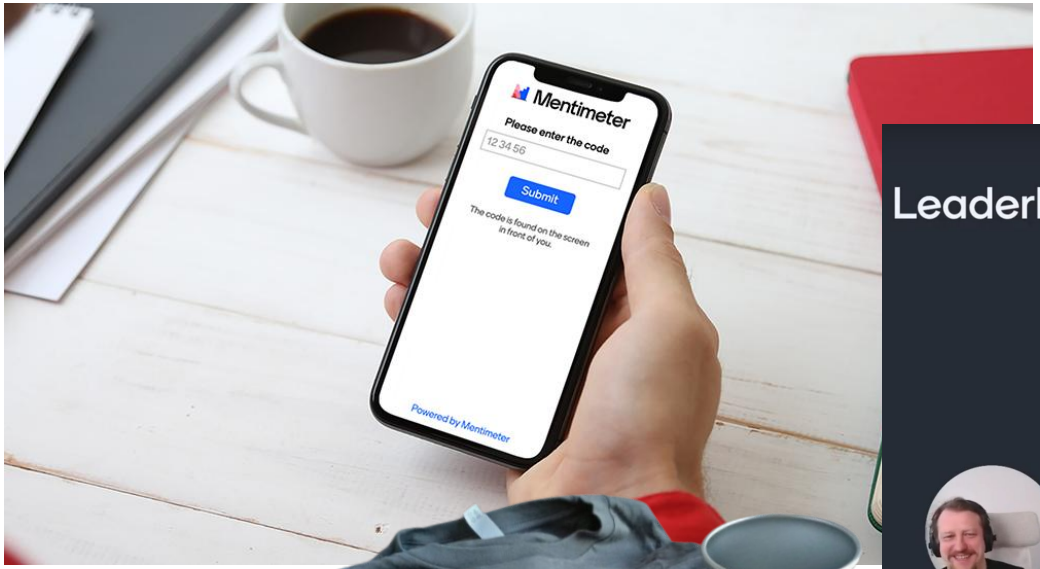
What's next?

Quiz, Homework, ...

Agenda

What's next?

Quiz, Homework, …



`menti.com` ⇒ enter code
Don't answer in YT chat
Look at phone (not at YT)

Quiz on "Menti" !

SWAG WINNERS 🎉

Congratulations to 1st, 2nd and 3rd place on the Menti quiz!

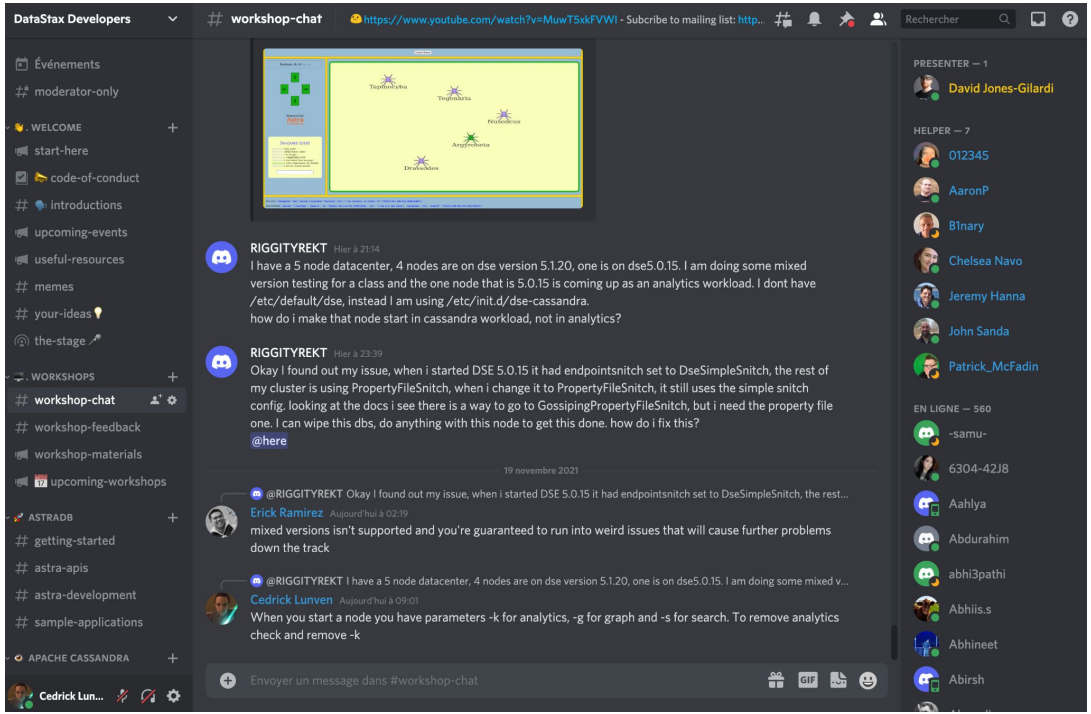
To claim your prize, please send an email to:

gary.harvey@datastax.com

** Include a screenshot of your Menti screen

- **Homework**
  - Complete the practice steps after step #9
  - Insert (mutate) a show or genre of your choice in the database.
  - Submit screenshot to us ... and wait for your **badge**!
- Optionally
  - Watch "Netflix Clone GraphQL" workshop recording
- Do reach us for anything: dtsx.io/discord !

All info on Github - `!homework`



!discord

dtsx.io/discord

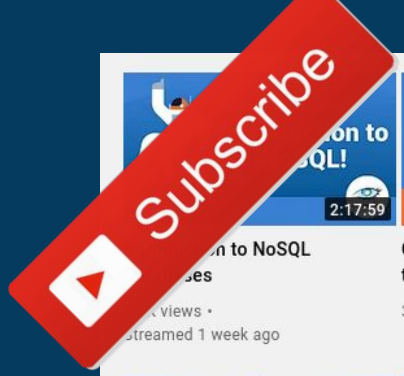
Datastax Developers Discord (19k+)

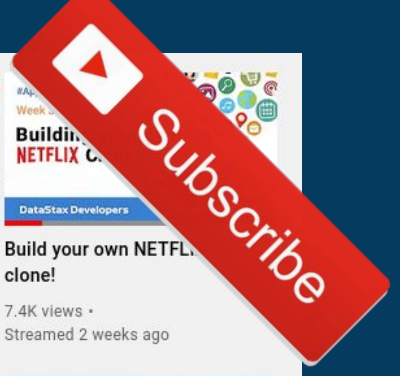
This summer..
Get Certified

7/20 Getting started with your first NoSQL Database: Cassandra Fundamentals	**7/27** Scale like crazy with proper data modelling for Apache Cassandra	**8/3** Build efficient applications for Apache Cassandra.

cassandra

Upcoming live events (*!workshops*)





…n to NoSQL …ses

…k views •
…Streamed 1 week ago

Crash Course | Introduction to Cassandra for Developers

331 views • 1 week ago

Introduction to NoSQL Databases

3.5K views •
Streamed 1 week ago

Introduction to NoSQL Databases

10K views •
Streamed 1 week ago

Build your own NETFLIX clone!

4K views •
Streamed 2 weeks ago

Build your own NETFL… clone!

7.4K views •
Streamed 2 weeks ago

Astra Streaming Demo

177 views • 2 weeks ago

Kubernetes Ingress Management with Traefik…

496 views •
Streamed 2 weeks ago

Build your own TikTok clone!

1.9K views •
Streamed 3 weeks ago

Build your own TikTok Clone!

4K views •
Streamed 3 weeks ago

How to use the Connect Driver in Astra DB

113 views • 4 weeks ago

How to use the CQL Console in Astra DB

39 views • 4 weeks ago

How to create an Authentication Token in…

37 views • 4 weeks ago

How to use the Data Loader in Astra DB

62 views • 4 weeks ago

Astra DB Sample App Gallery

36 views • 4 weeks ago

How to use Secure Connect in Astra DB

42 views • 4 weeks ago

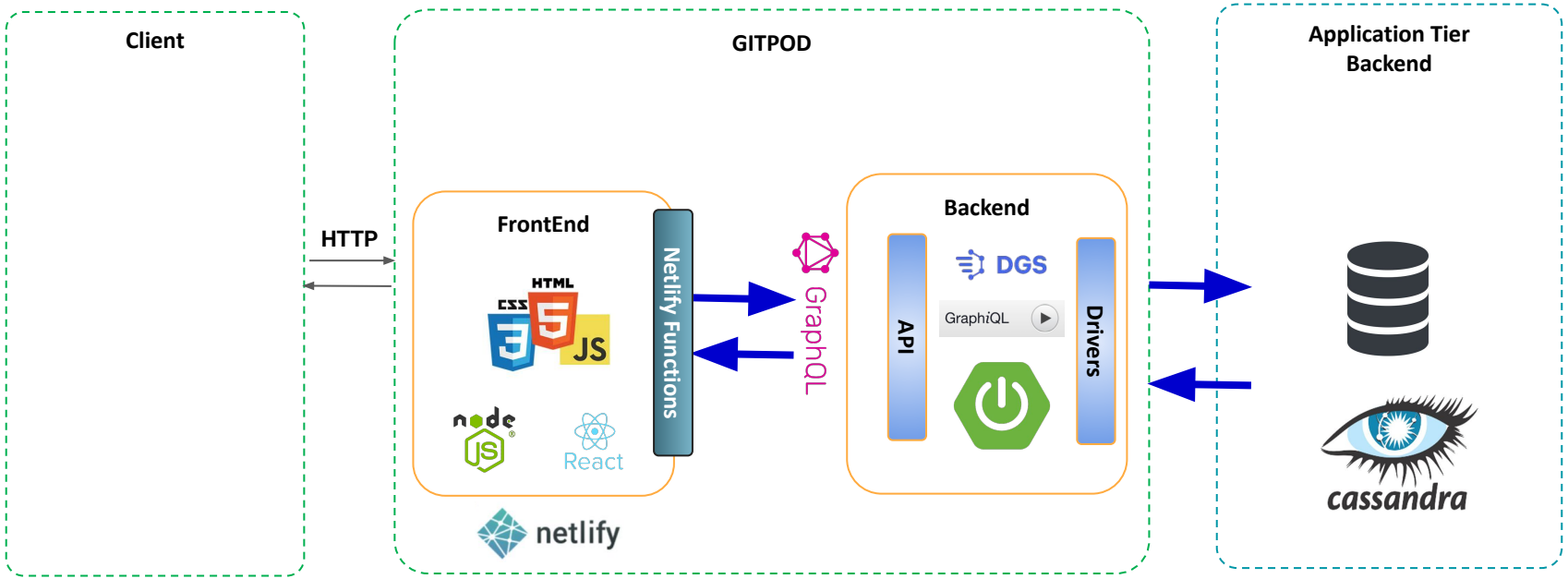
Cassandra Day India: CL Room (Workshops)

2.4K views •
Streamed 4 weeks ago

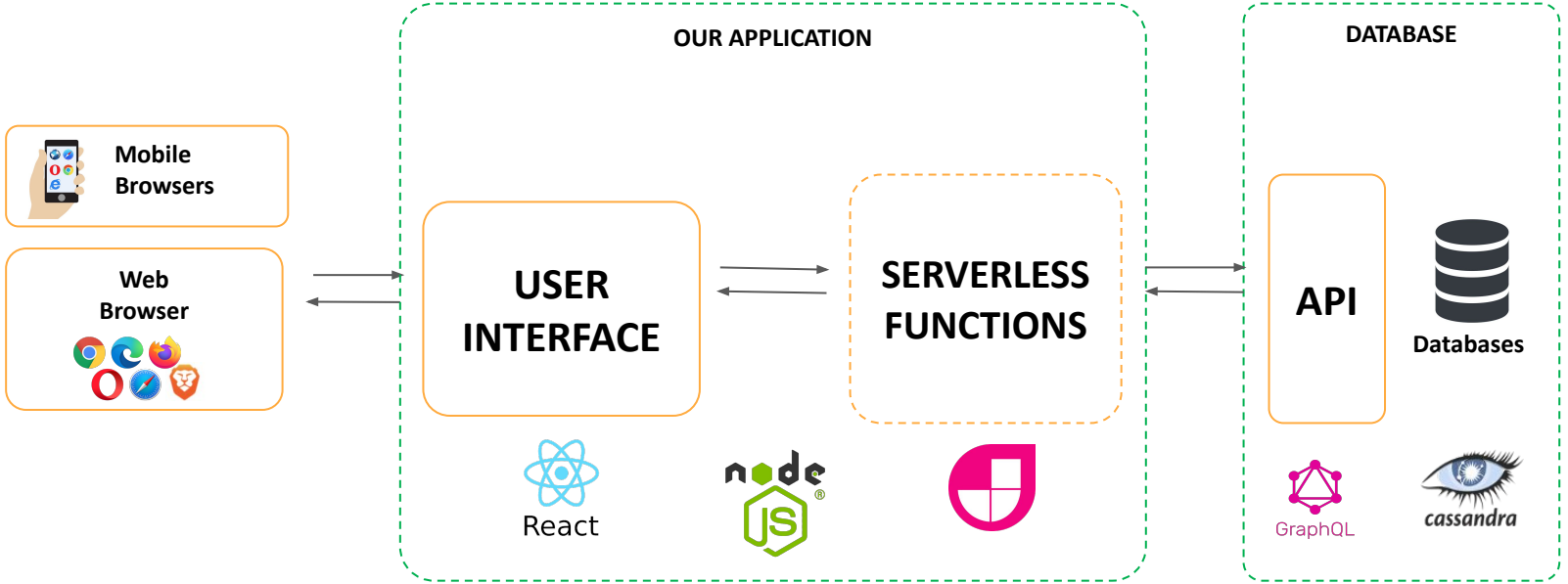
Cassandra Day India: RF Room (Talks)

1.3K views •
Streamed 1 month ago

Thank You!



Our Application Today



Building a Full-stack application

```
[query] [$label] {
  $function_name[(arguments)]]) {
    values_to_retrieve_for_each_type   1...n
  }                                    1...n
}
```


Anatomy of query