Build Real-Time Mobile and Web Applications with Modern APIs

Brice Pellé

Principal Mobile Specialist SA
AWS

Modernization Track

Modern Compute

Modern Applications

Modern DevOps

Management & Governance

Agenda

Why Modernization

GraphQL

AWS AppSync

Features, integrations, and security

Real time with subscriptions

Why modernization

Build efficient APIs

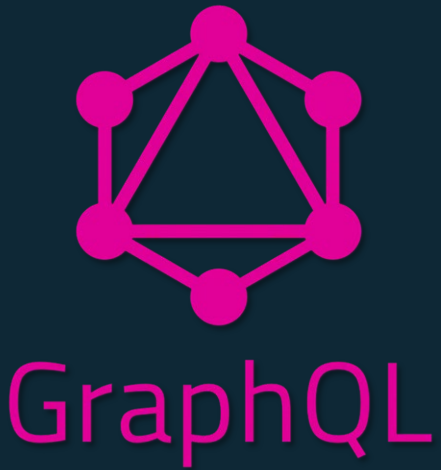
Build reusable and scalable APIs

Engage with customers

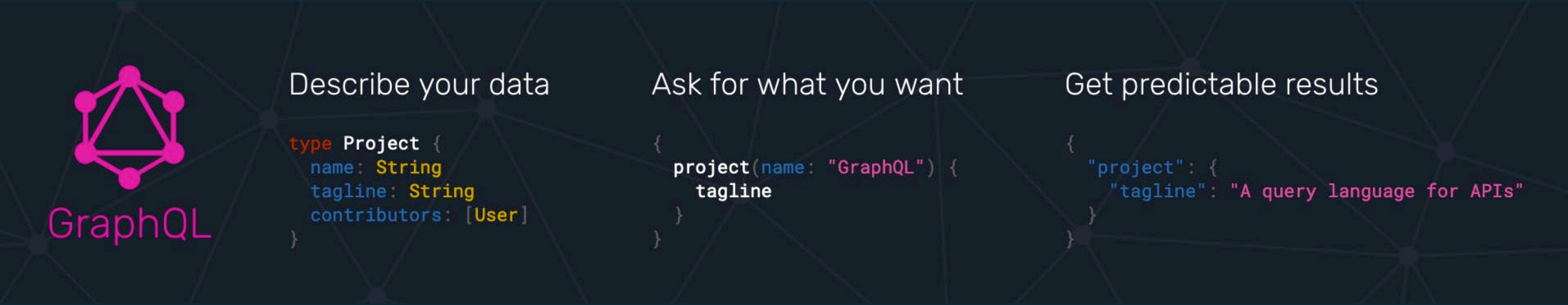
Develop applications faster

Deliver the right data at the right time

Sometimes, REST is not enough


GraphQL

GraphQL is a *query language for APIs* and a *runtime for fulfilling those queries* with *your existing data*



Describe your data

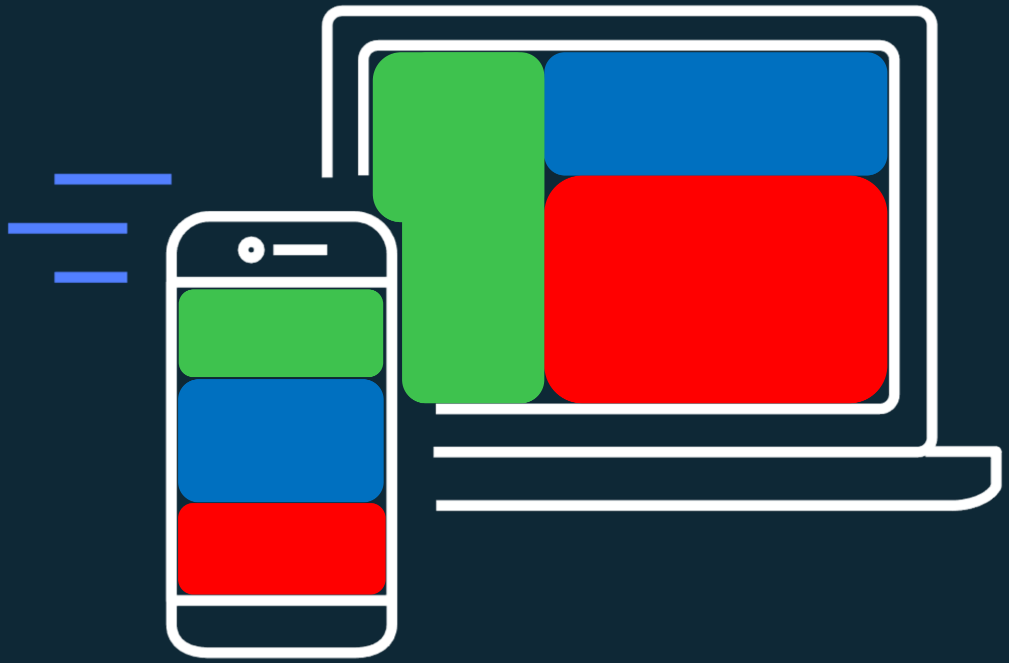
```
type Project {
  name: String
  tagline: String
  contributors: [User]
}
```

Ask for what you want

```
{
  project(name: "GraphQL") {
    tagline
  }
}
```

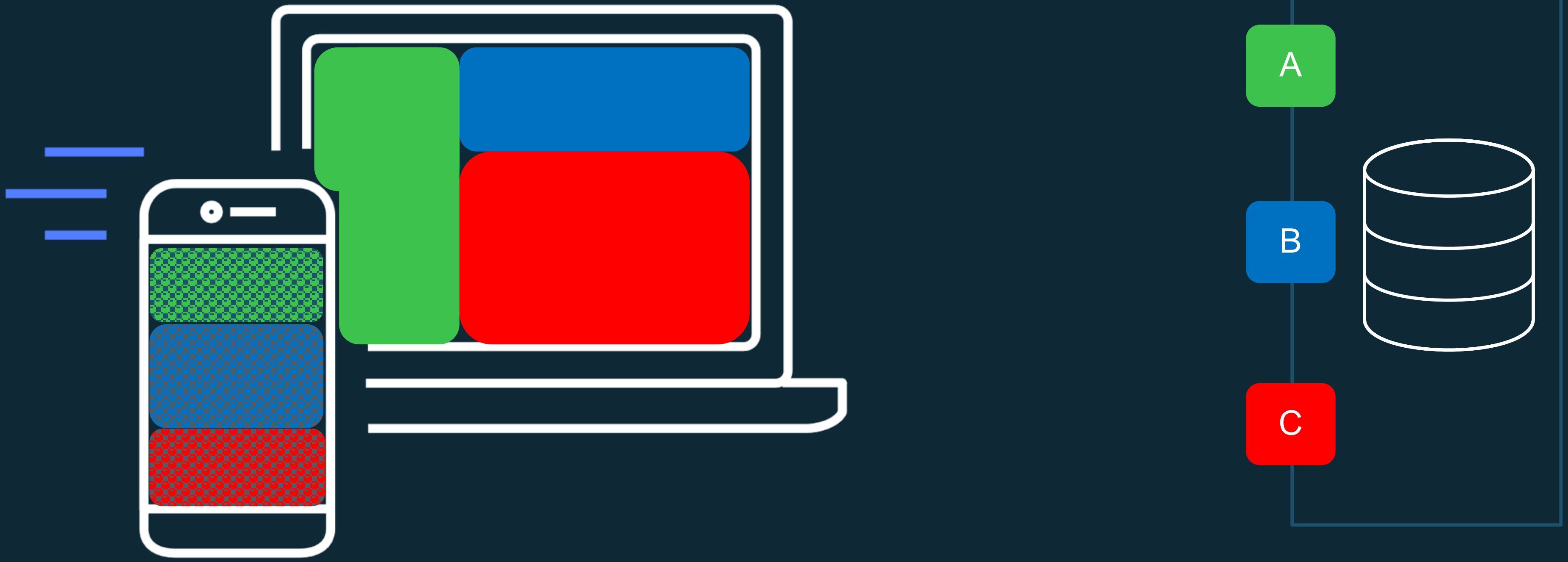
Get predictable results

```
{
  "project": {
    "tagline": "A query language for APIs"
  }
}
```



API endpoints

(Data sources)



API endpoints

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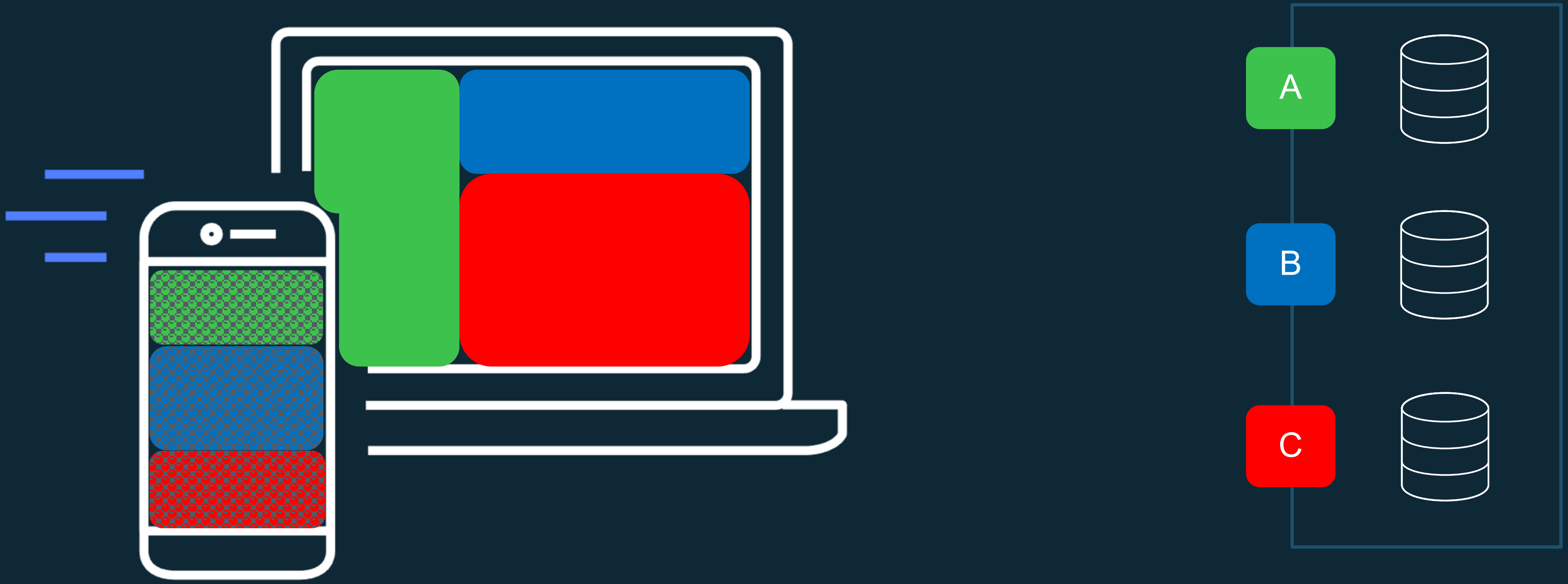

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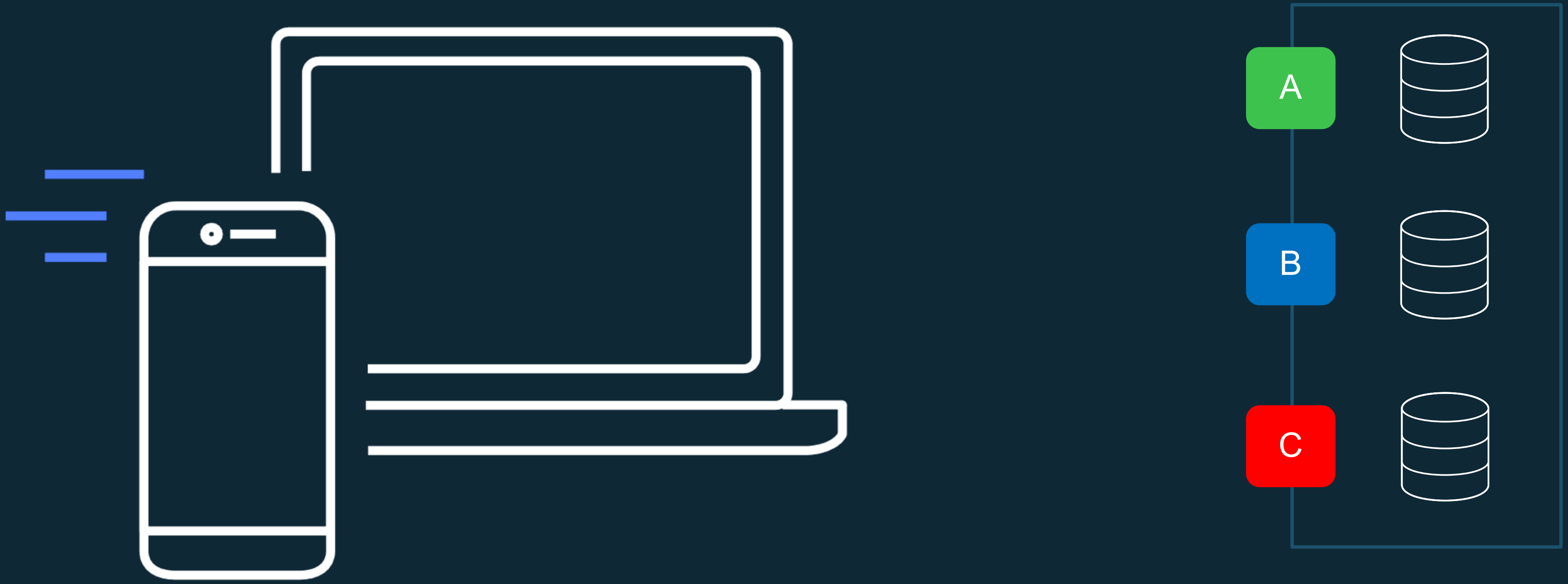
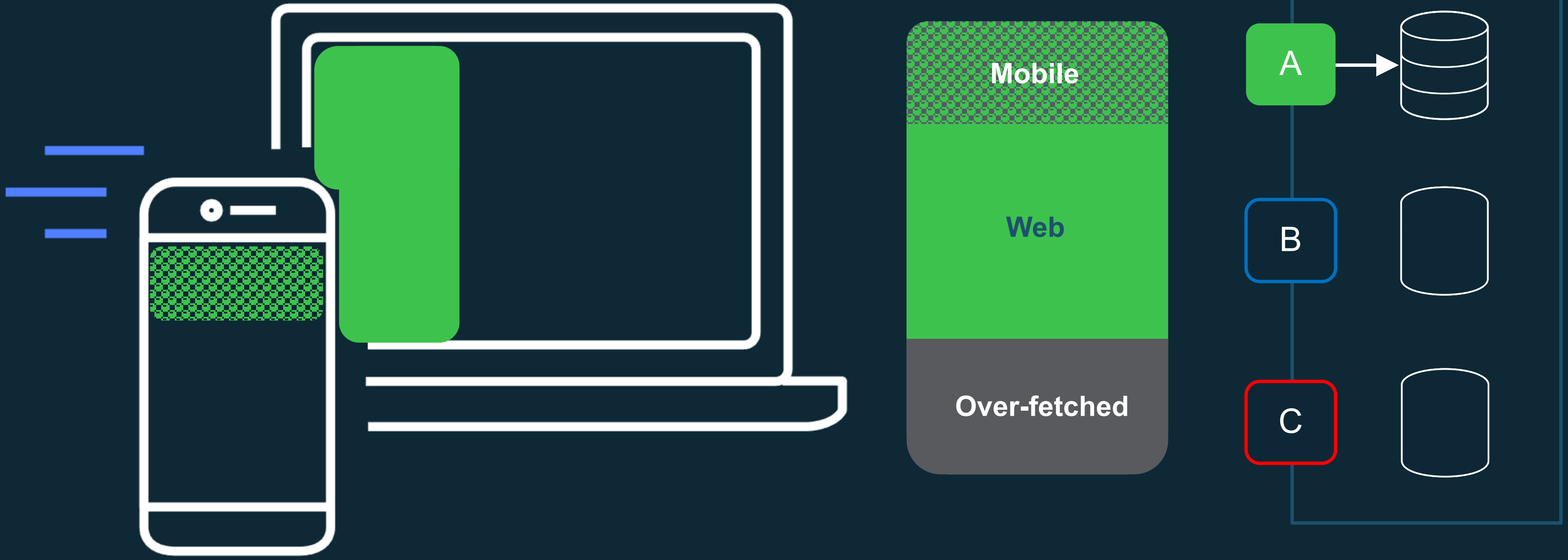


Data payload

JSON{}

API endpoints

(Data sources)



Mobile

Web

Over-fetched

A

B

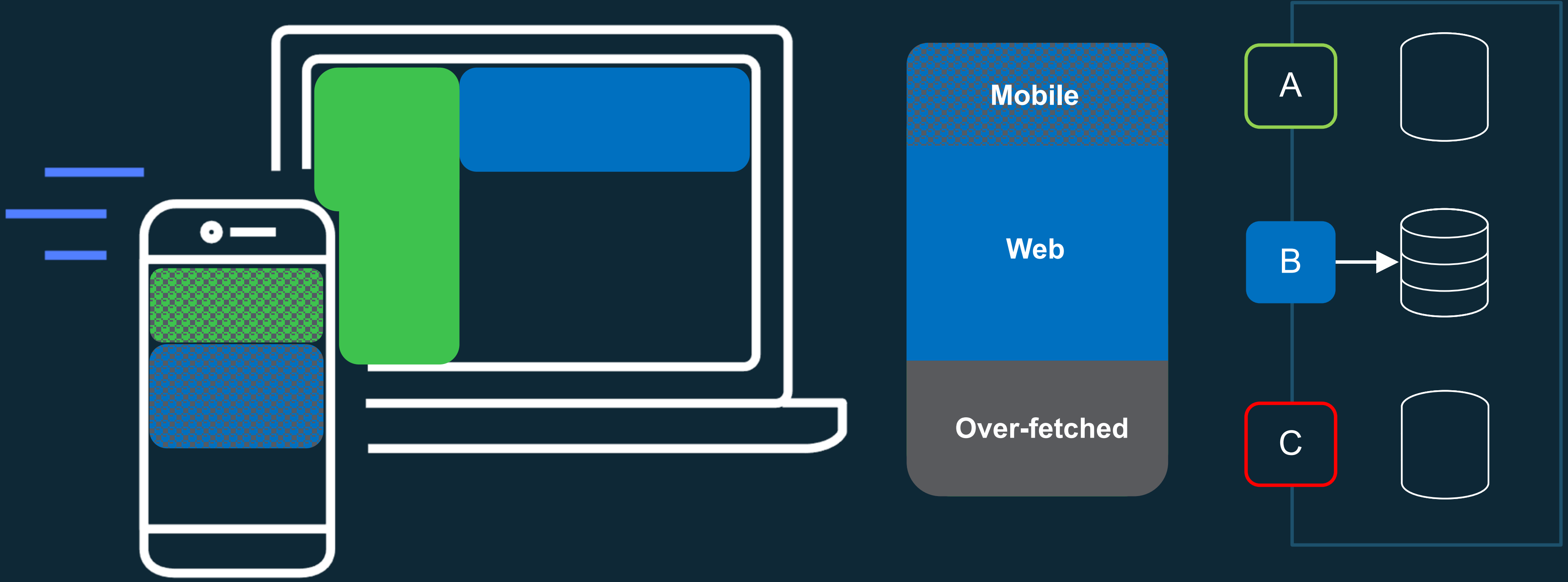
C

Data payload

JSON{}

API endpoints

(Data sources)

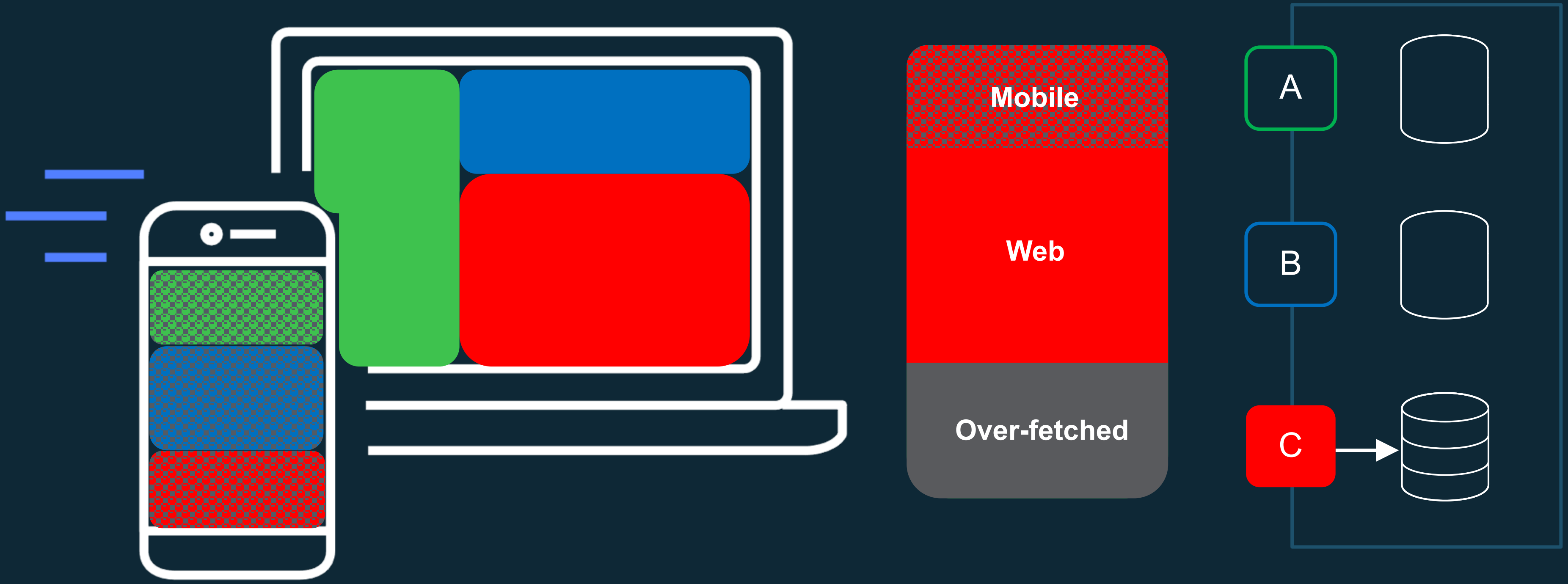


Data payload

JSON{}

API endpoints

(Data sources)



Mobile

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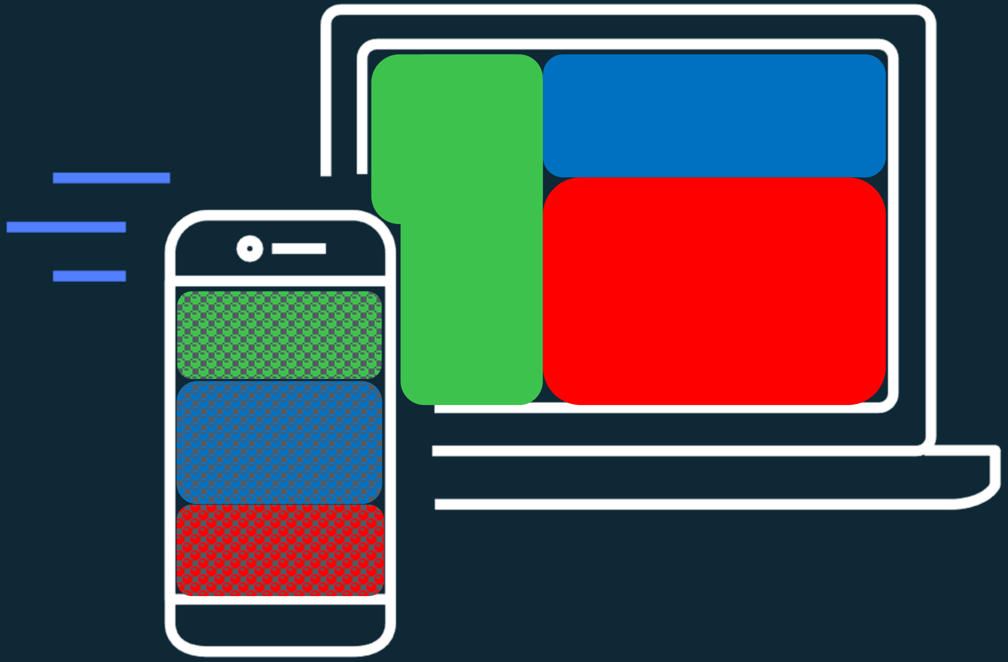
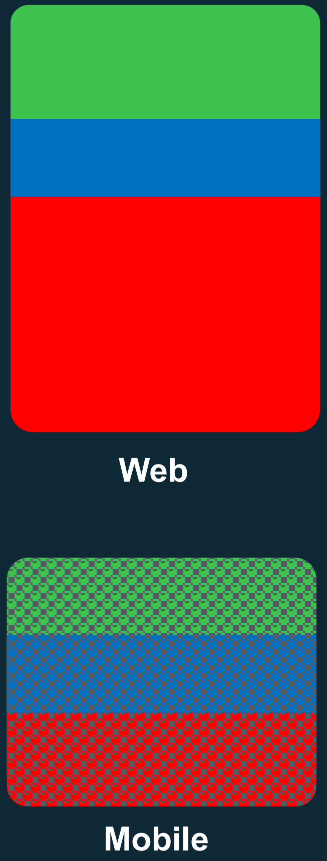


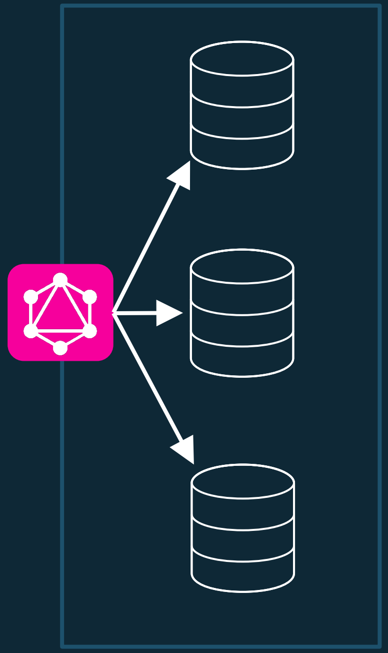
Data payload

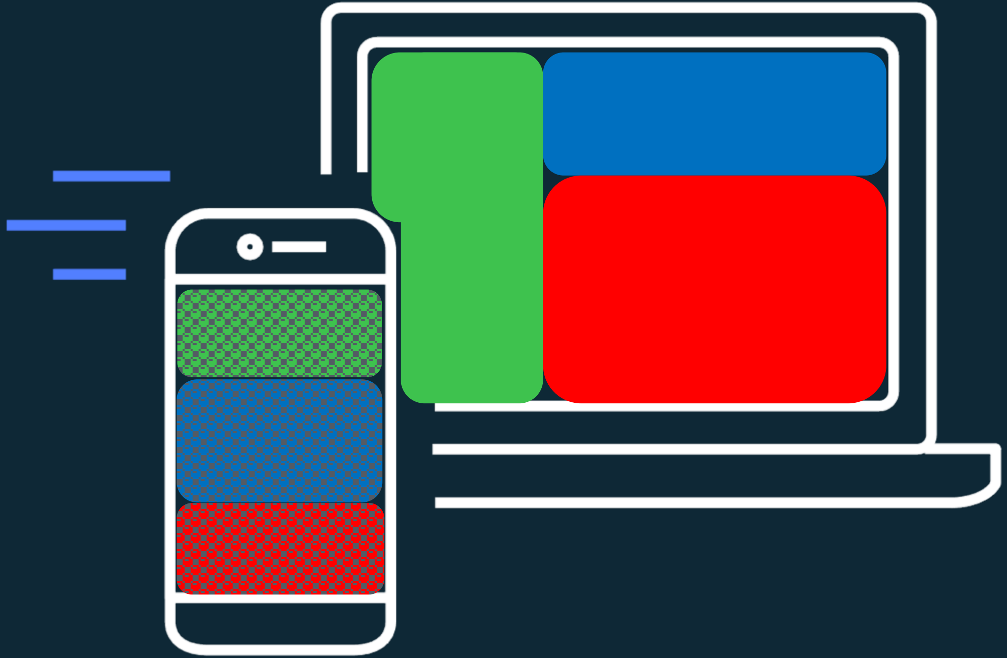
JSON{}



API endpoints

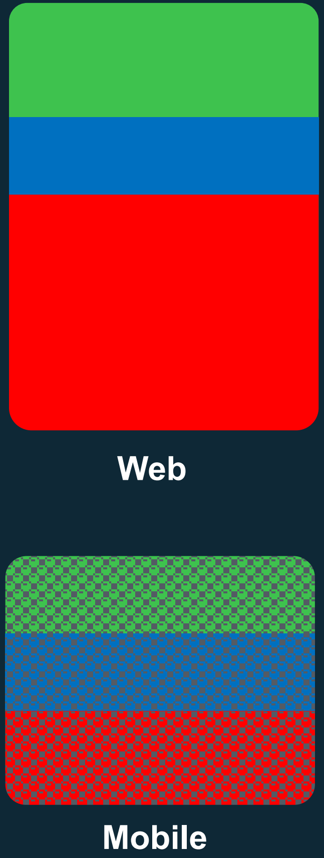
(Data sources)





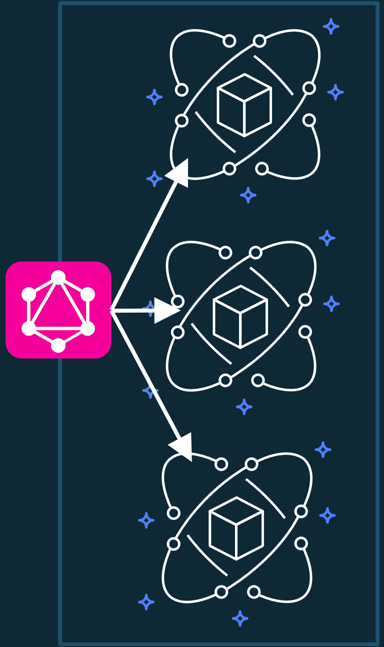
Data payload

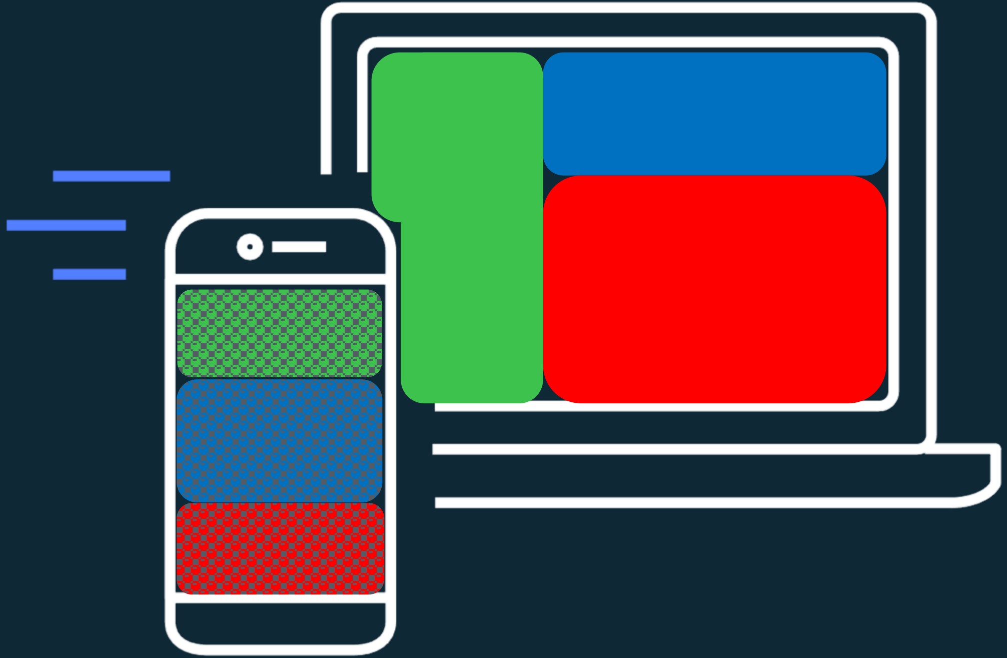
JSON{}



API endpoints

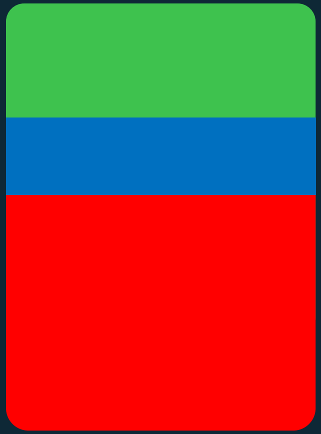
(Data sources)



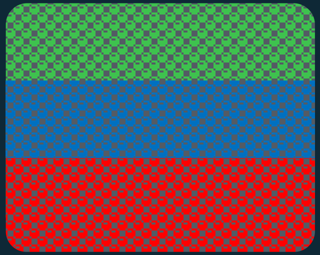


Data payload

JSON{}



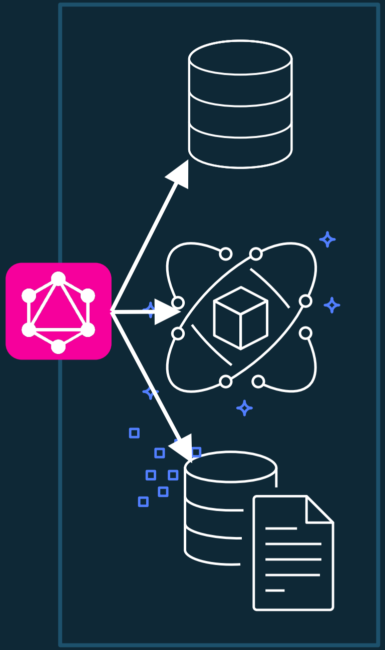
Web



Mobile

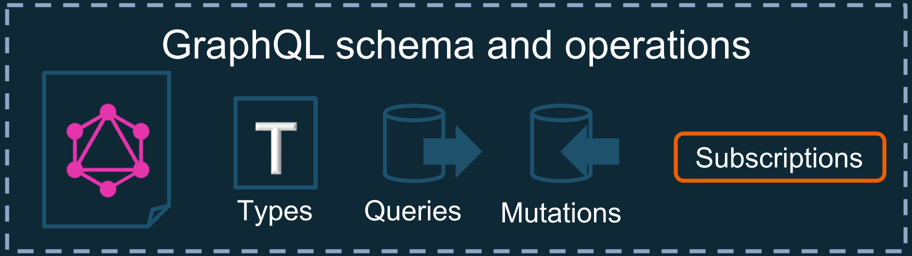
API endpoints

(Data sources)



Get exactly the data you need, nothing more, nothing less

A query language for APIs . . .



GraphQL schema and operations

Types

Queries

Mutations

Subscriptions

```
type Post {
  id: ID!

  title: String!
  author: String!
  date: Int
}
```

A query language for APIs . . .

Queries

```
query GetPost {
  getPost(id: ”1”) {
    id
    title
    author
    date
  }
}
```

Mutations

```
mutation CreatePost {
  createPost(input: {…}) {
    id
    title
    author
    date
  }
}
```

Subscriptions

```
subscription OnCreatePost {
  onCreatePost {
    id
    title
    author
    date
  }
}
```

A query language for APIs . . .

Queries

```
query GetPost {
  getPost(id: ”1”) {
    id
    title
  }
}
```

Mutations

```
mutation CreatePost {
  createPost(input: {…}) {
    id
    date
  }
}
```

Subscriptions

```
subscription OnCreatePost {
  onCreatePost {
    id
    title
    author
  }
}
```

A query language for APIs . . .

And a runtime.

AWS AppSync

Build scalable applications on a range of data sources, including those requiring real-time updates and offline data access

How does AWS AppSync work?

- Enterprise applications
- Web/mobile apps
- Real-time dashboards
- IoT applications
- Offline/Delta Sync

Customers – Innovating at rapid pace

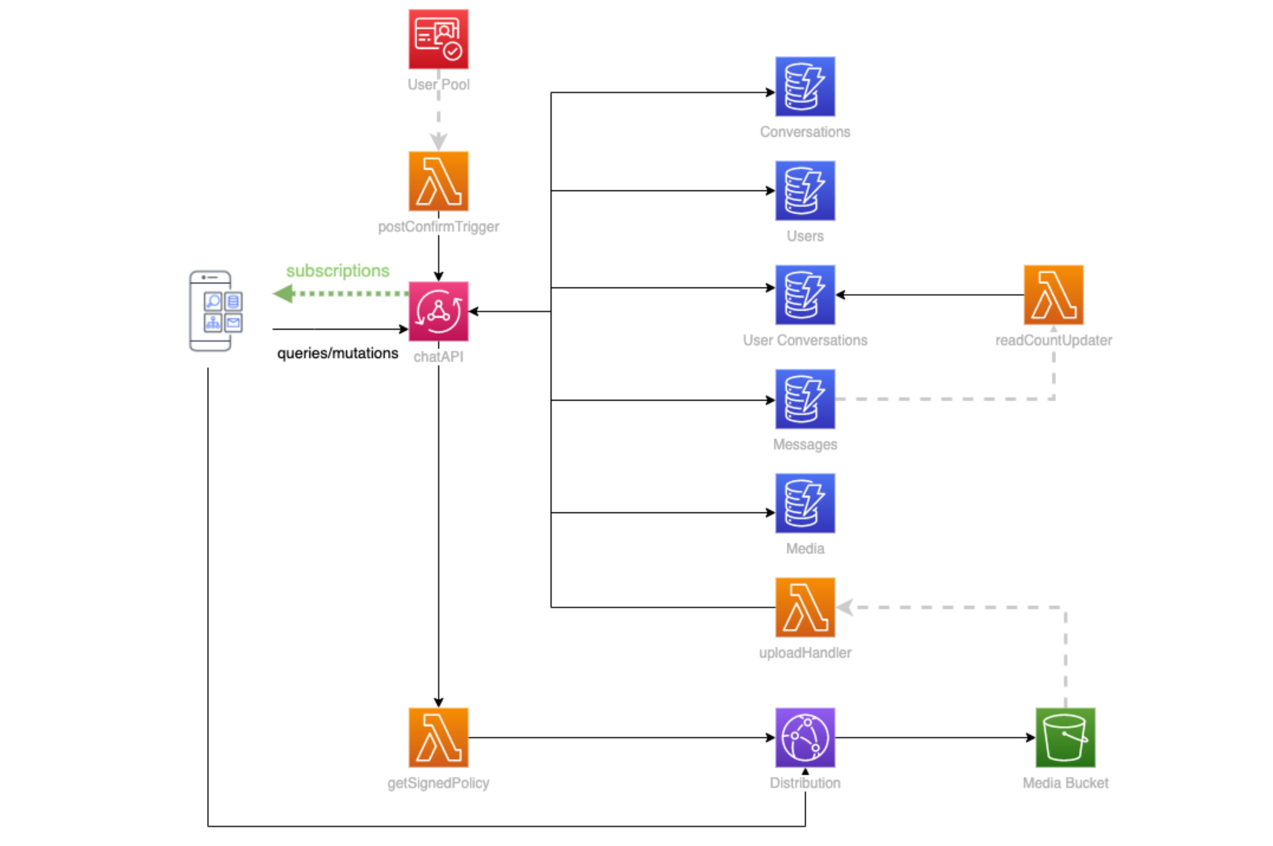
CookpadTV offers live shows put on by famous chefs and celebrities, and during the live broadcast, they allow audiences of thousands to make comments, chat, and “like” content

“We use AWS AppSync for real-time interactions, such as questions, comments, likes, stamps, and viewer count during our live show broadcasts. AWS AppSync is able to automatically scale to support an audience of thousands of viewers who simultaneously connect at the beginning of the live cooking show and send a high volume of messages throughout the program.”

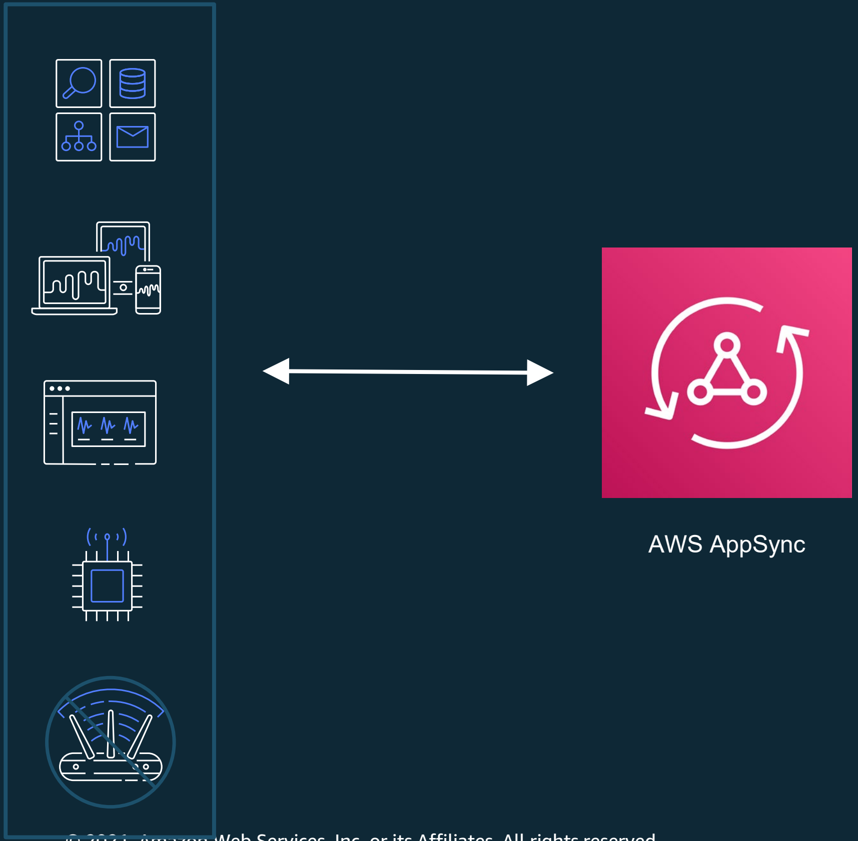
Shinya Watanabe, CTO, CookpadTV Inc.

Demo

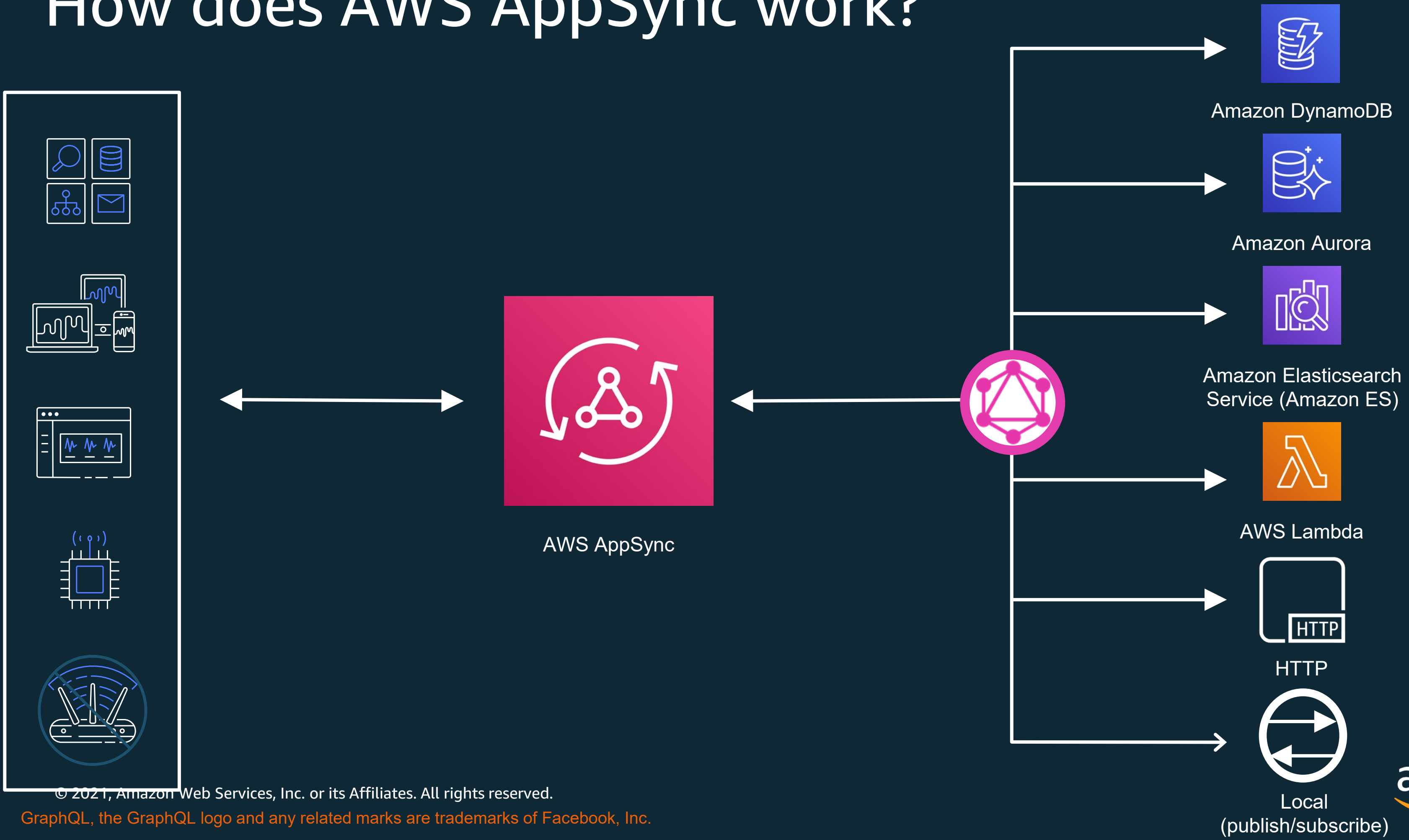
Chat API Architecture (simplified)



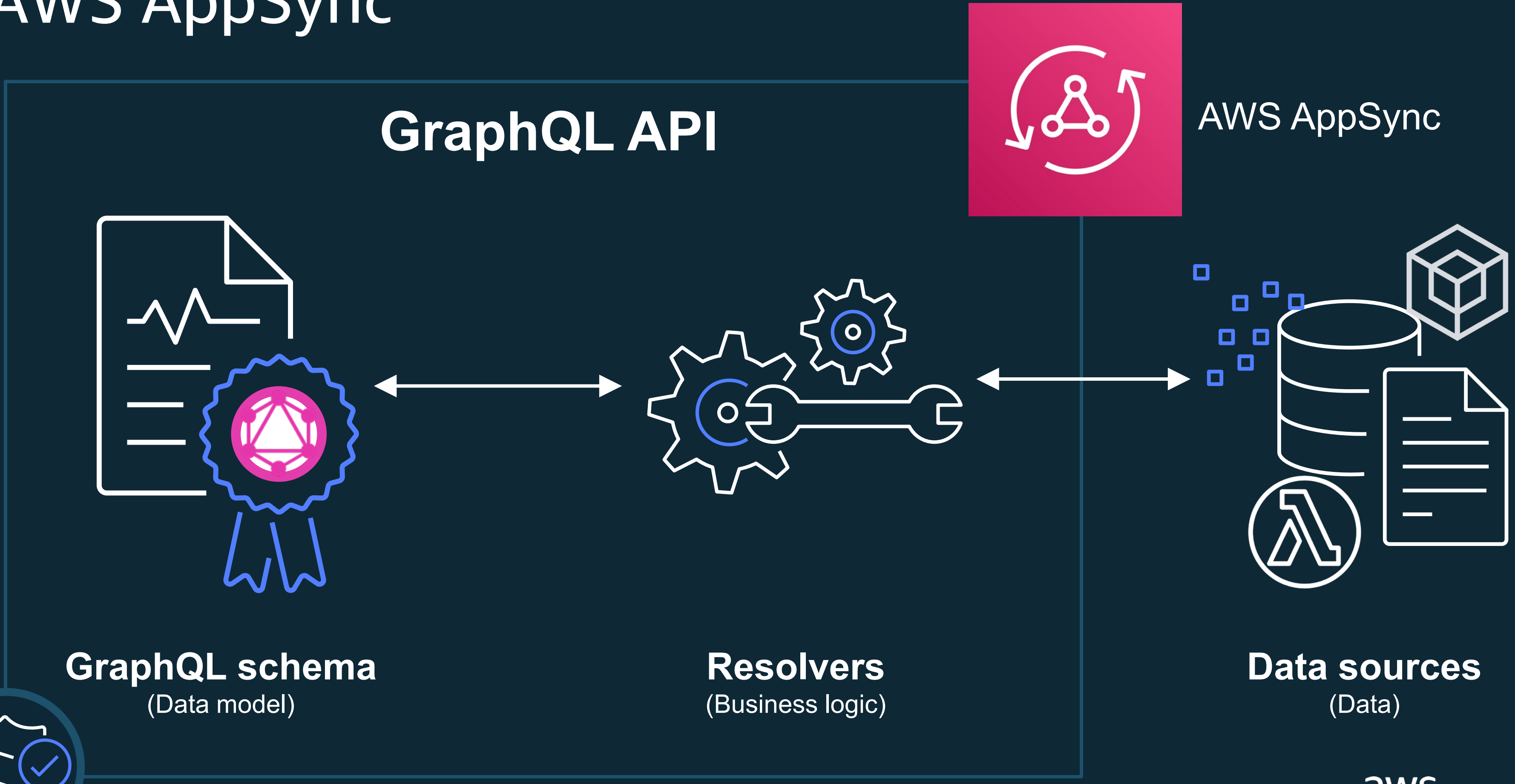
How does AWS AppSync work?



How does AWS AppSync work?

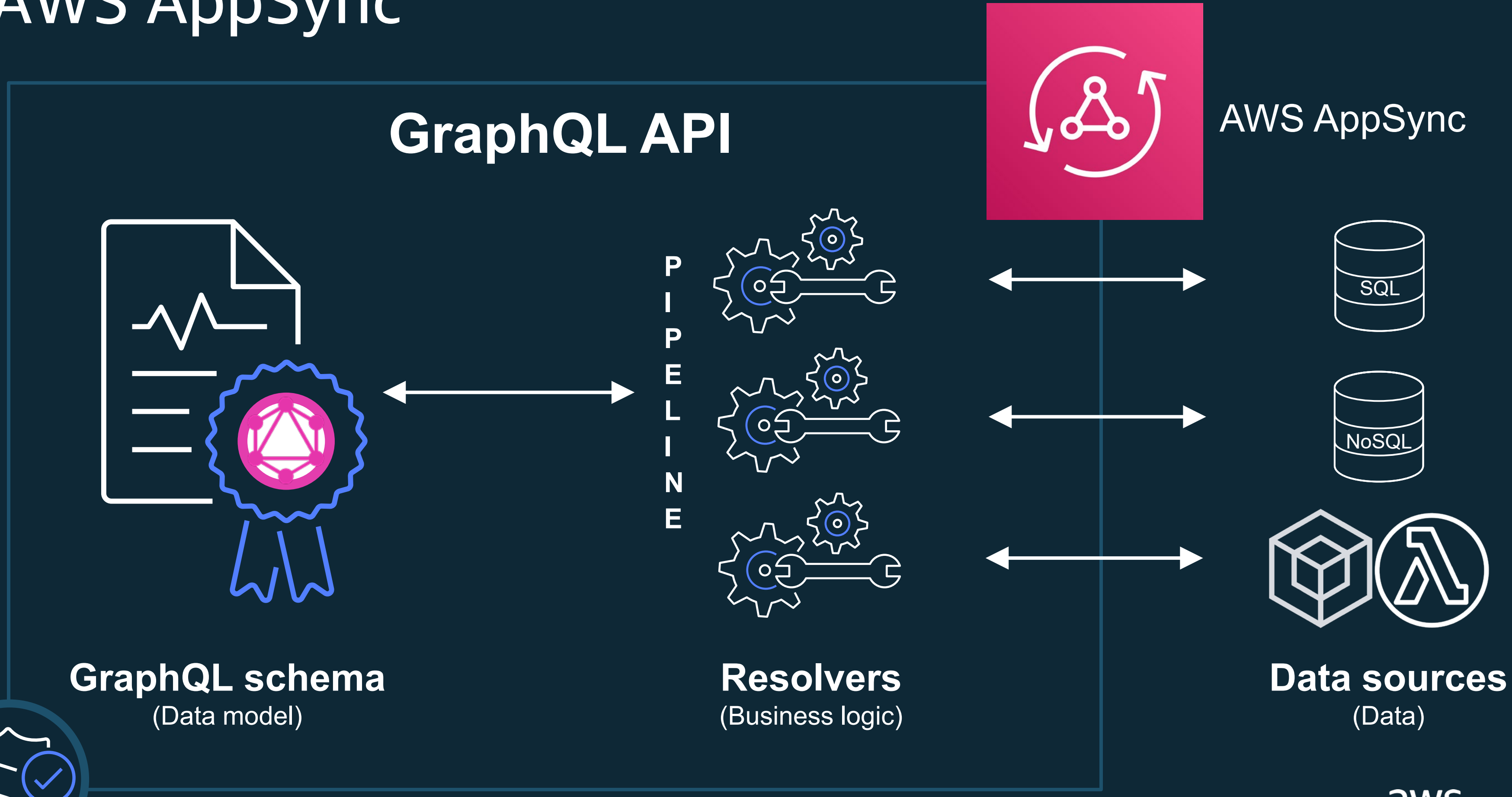

AWS AppSync
Amazon DynamoDB
Amazon Aurora
Amazon Elasticsearch Service (Amazon ES)
AWS Lambda
HTTP
HTTP
Local (publish/subscribe)

AWS AppSync



GraphQL API
AWS AppSync
GraphQL schema
(Data model)
Resolvers
(Business logic)
Data sources
(Data)

AWS AppSync



GraphQL API

AWS AppSync

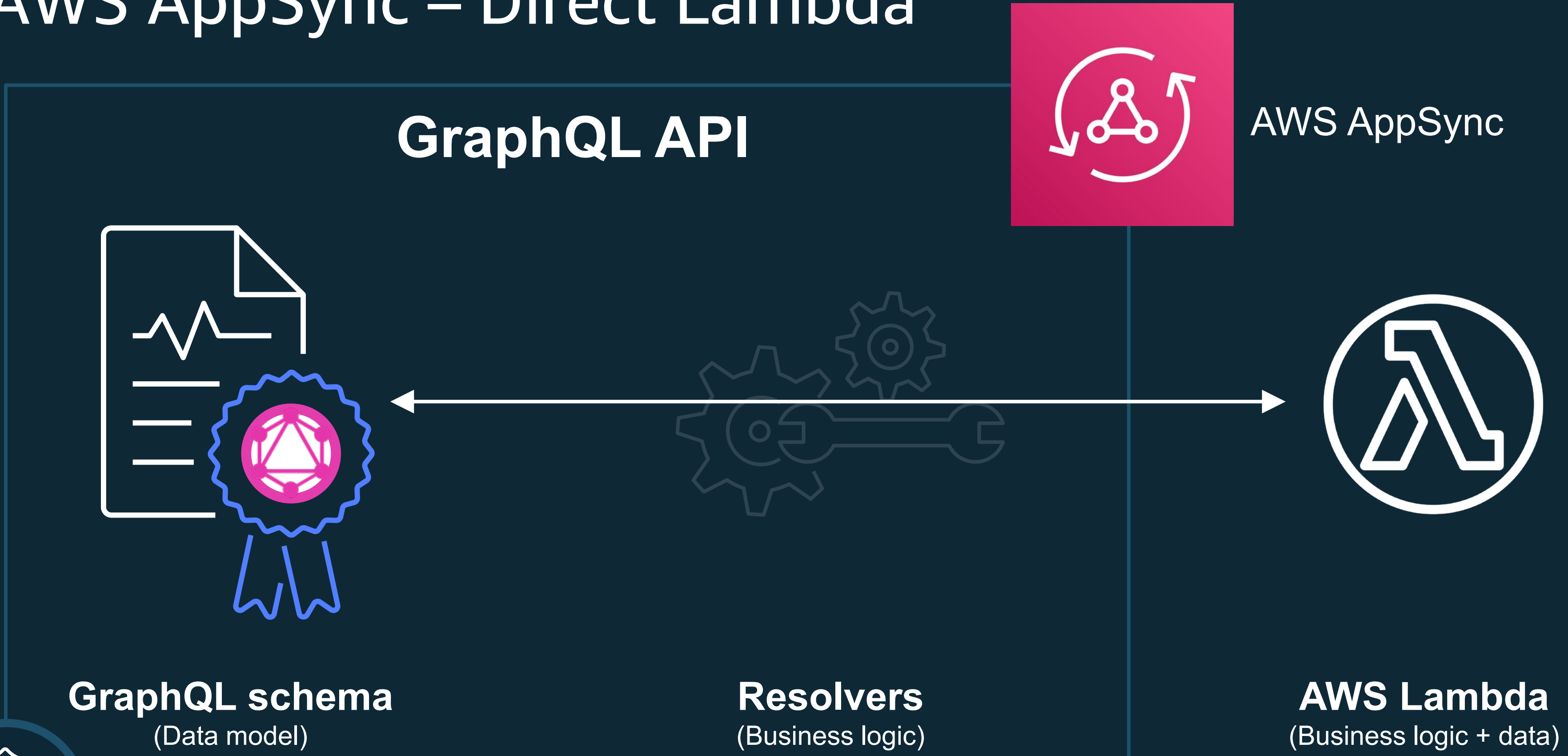
PIPELINE

GraphQL schema
(Data model)

Resolvers
(Business logic)

Data sources
(Data)

AWS AppSync – Direct Lambda



AWS AppSync

GraphQL API

GraphQL schema
(Data model)

Resolvers
(Business logic)

AWS Lambda
(Business logic + data)

Security

API keys

Amazon Cognito User Pools

OpenID Connect

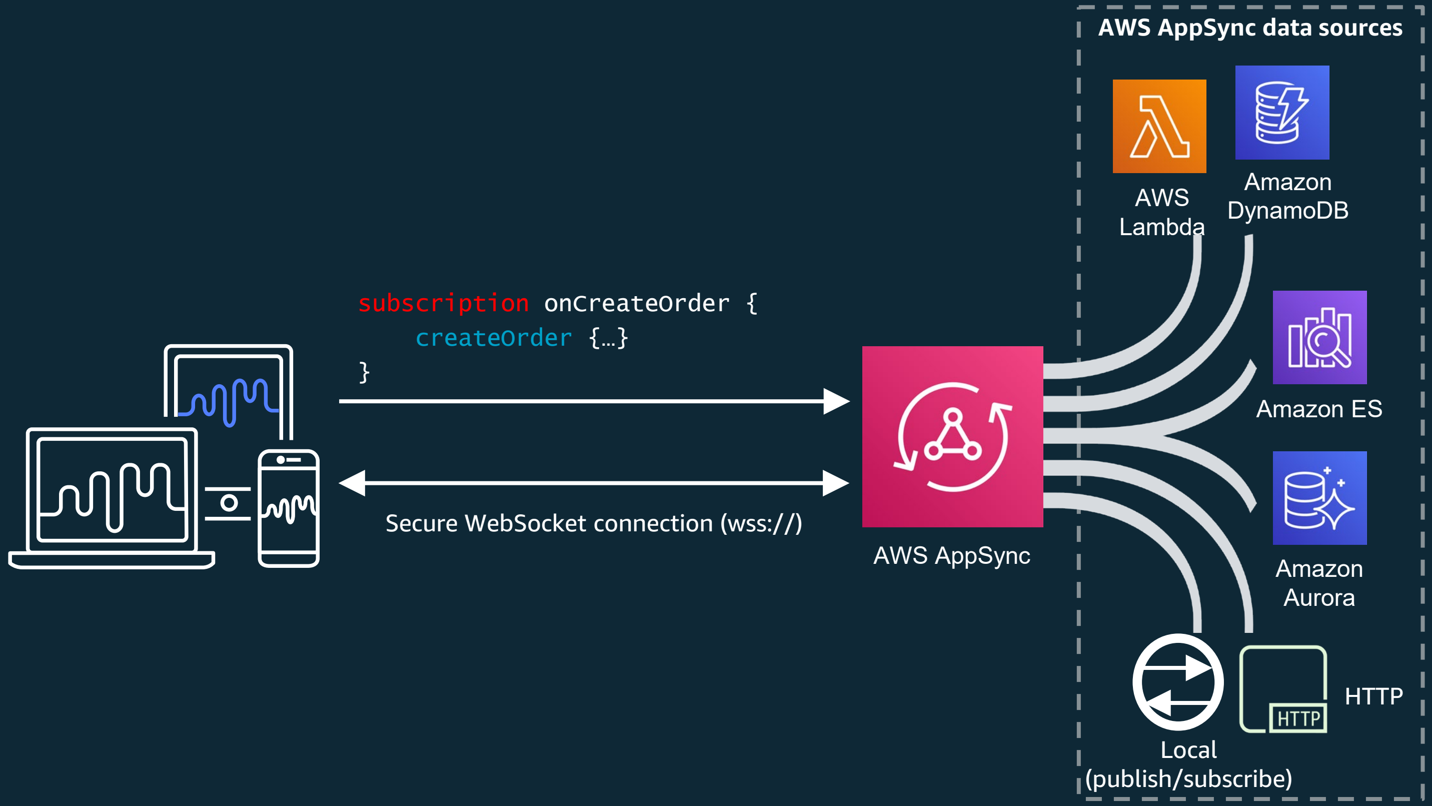
AWS Identity and Access Management

AWS Lambda*

Multi-auth

```
type Flight
@aws_api_key
@aws_cognito_user_pools (cognito_groups: [”FrequentFlyers"])
@aws_iam
{
    id: ID! @aws_api_key @aws_iam
    departureDate: String!
    departureAirportCode: String! @aws_api_key
    departureAirportName: String! @aws_api_key
    departureCity: String!
    departureLocale: String!
    arrivalDate: String!
    arrivalAirportCode: String! @aws_iam
    arrivalAirportName: String! @aws_iam
    arrivalCity: String! @aws_iam
    arrivalLocale: String! @aws_iam
    ticketPrice: Int!
    ticketCurrency: String!
    flightNumber: Int!
    seatAllocation: Int
    seatCapacity: Int!
}
```

Real-time GraphQL subscriptions



```
subscription onCreateOrder {
    createOrder {…}
}
```

Customers – Innovating at rapid pace

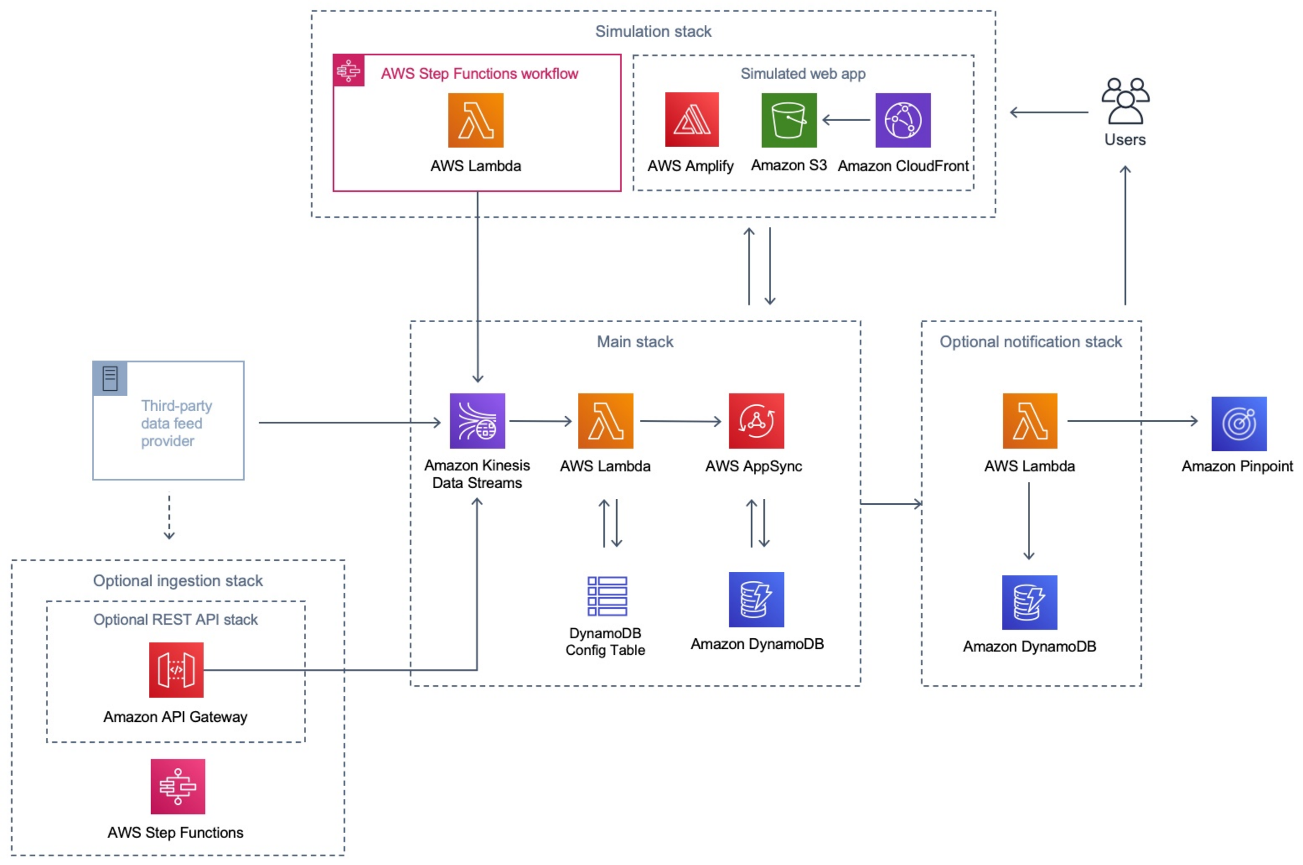
After deploying the first web components on its new serverless architecture, Sky Italia discovered that AWS AppSync decreased the time needed to propagate game data from a few minutes to milliseconds

> “It was important to be able to scale up in a fast and cost-efficient way. Because Sky Italia no longer pays to maintain its on-premises data centers and keep servers up and running during off-peak times, it saw its costs reduced by a factor of 15 and expects even bigger savings in the future. ”

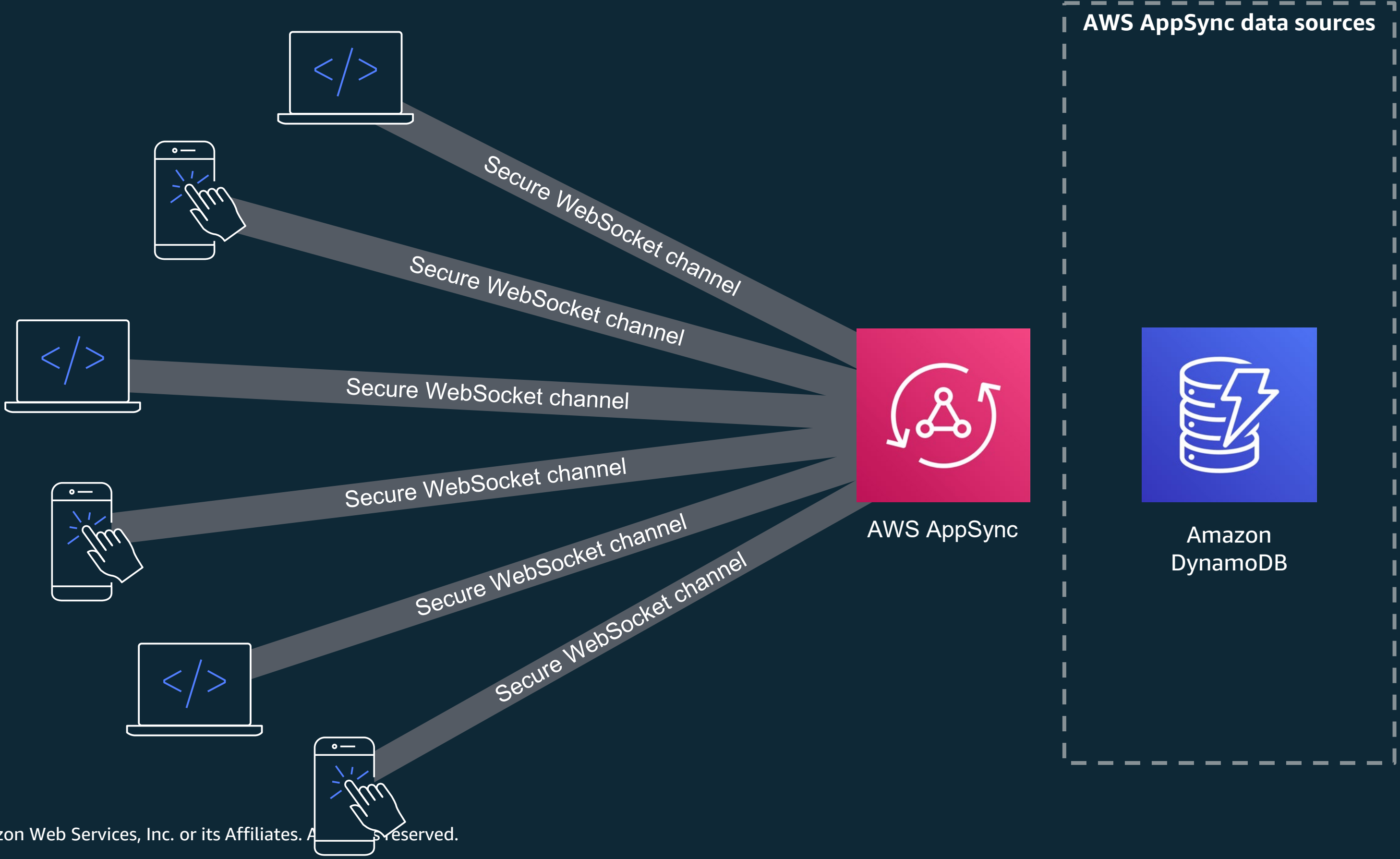
Daniele Mangano, Solutions Architect, Sky Italia

Demo

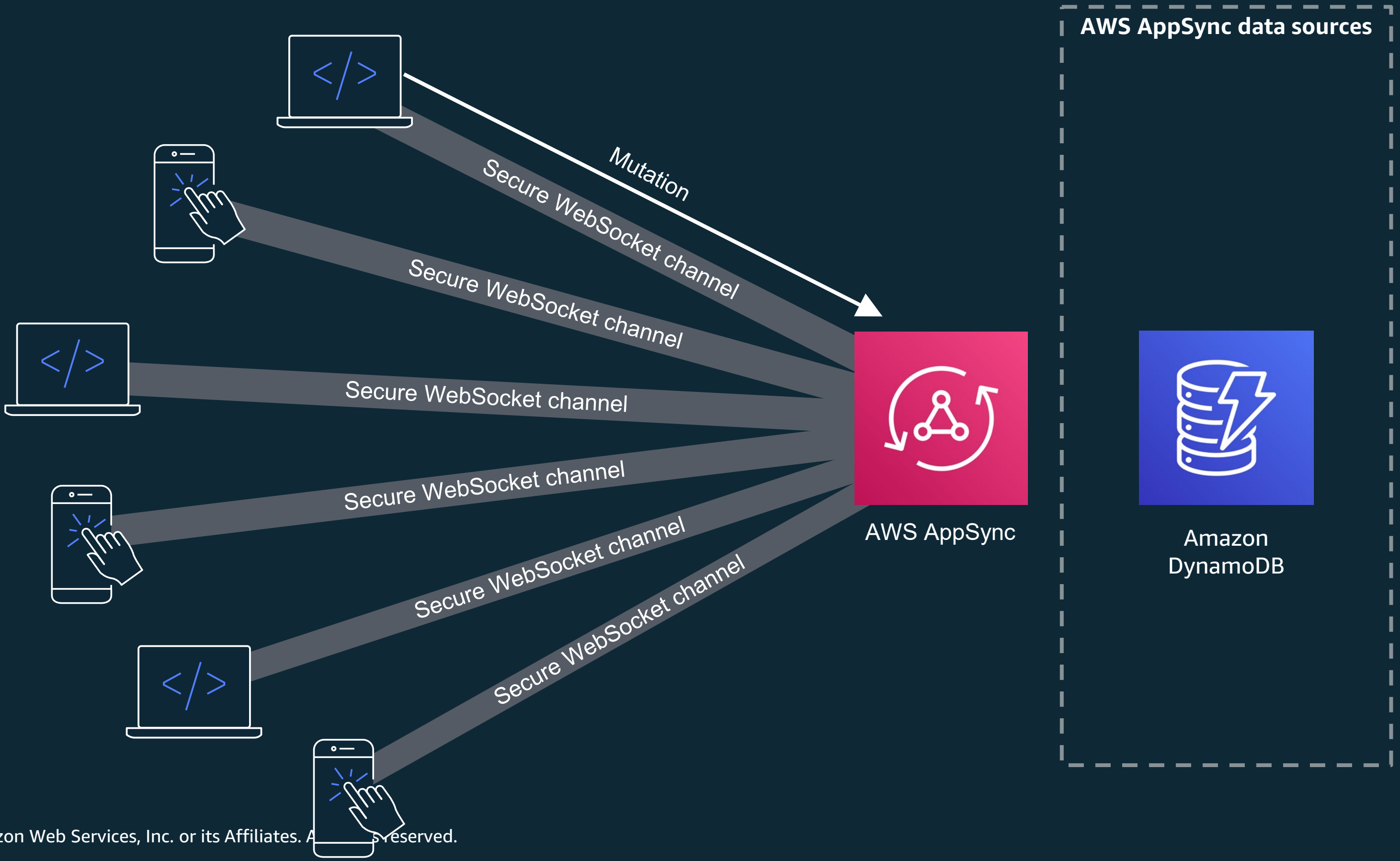
Real-Time Live Sports Updates Using AWS AppSy



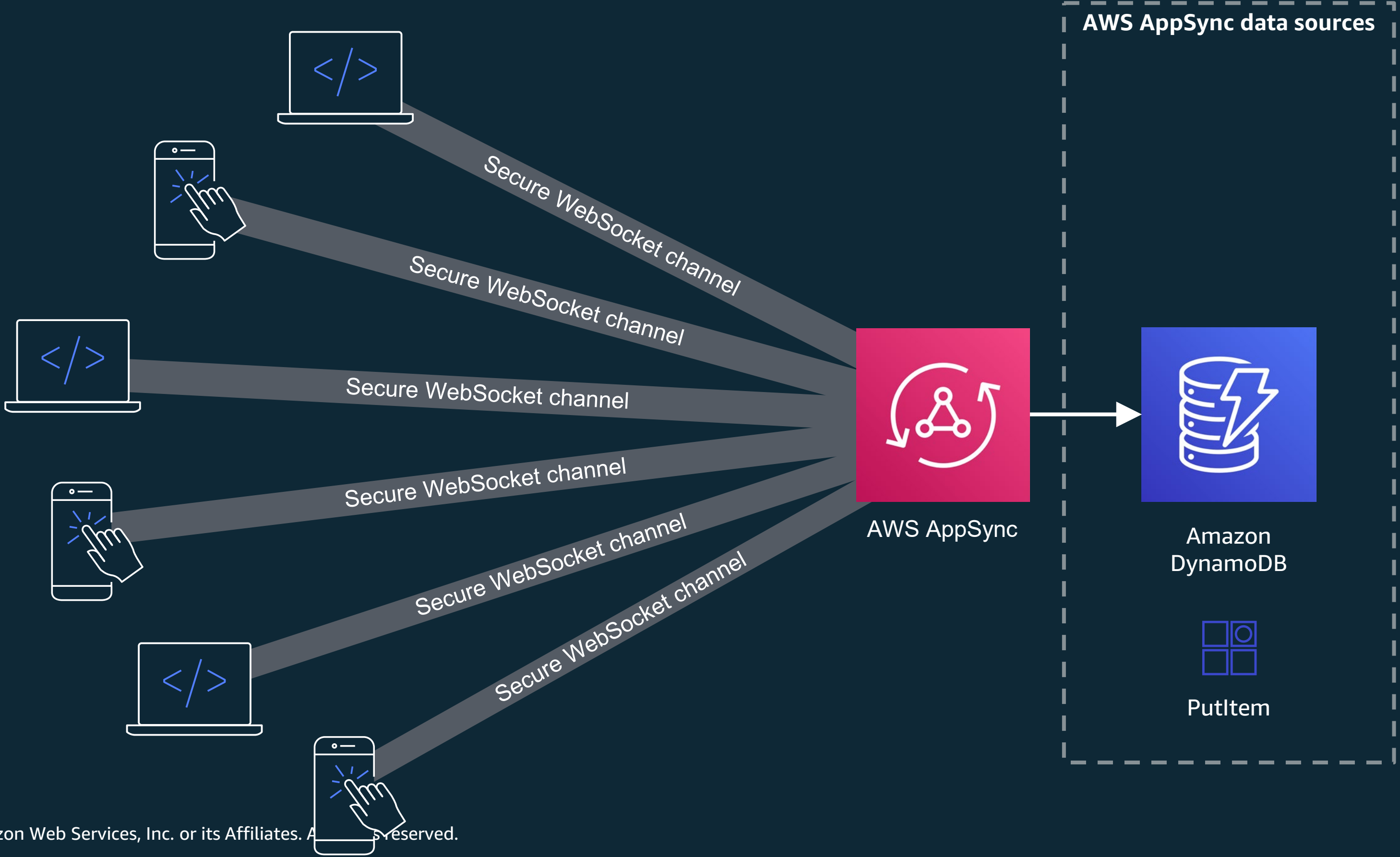
Real-time GraphQL subscriptions



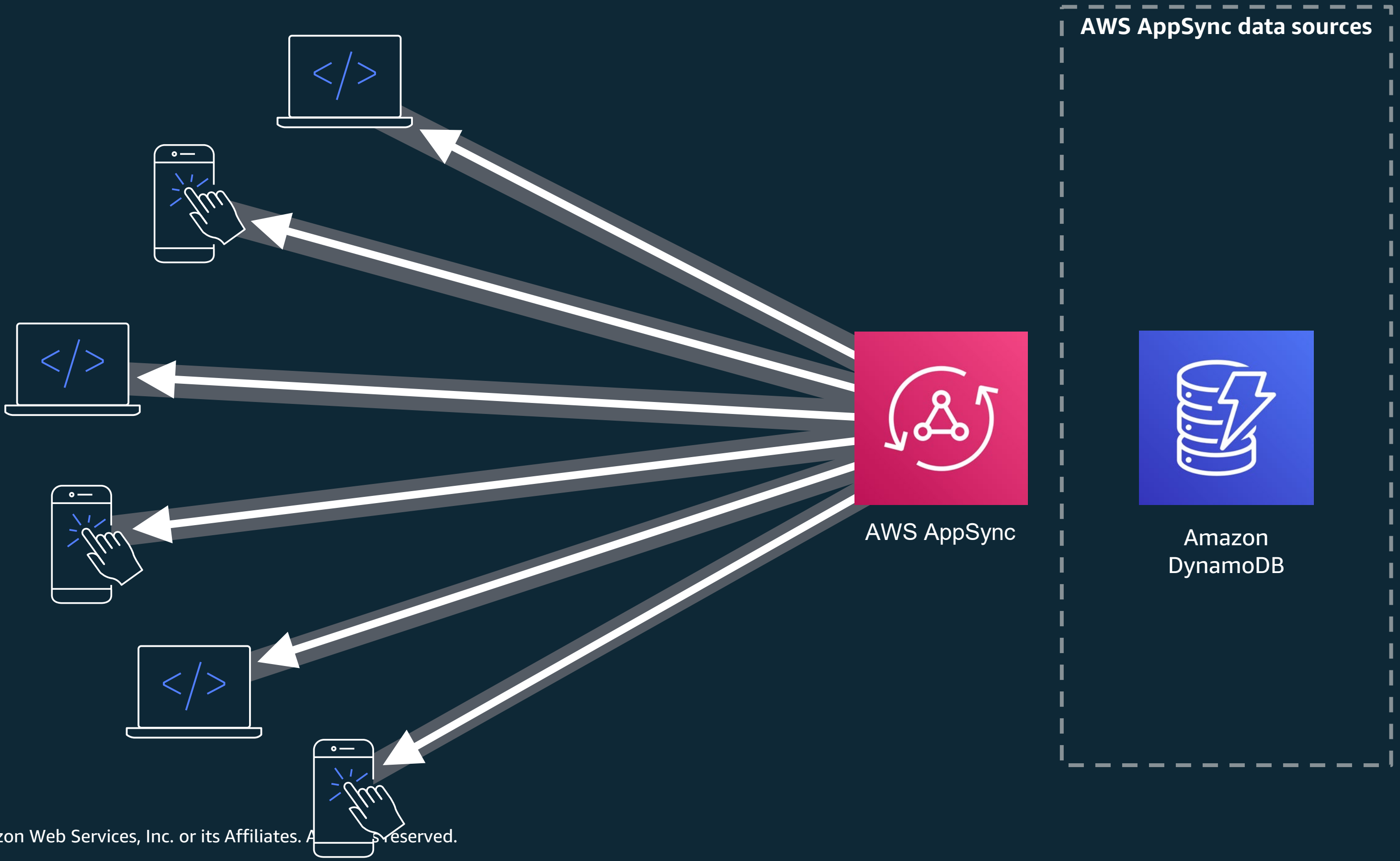
Real-time GraphQL subscriptions



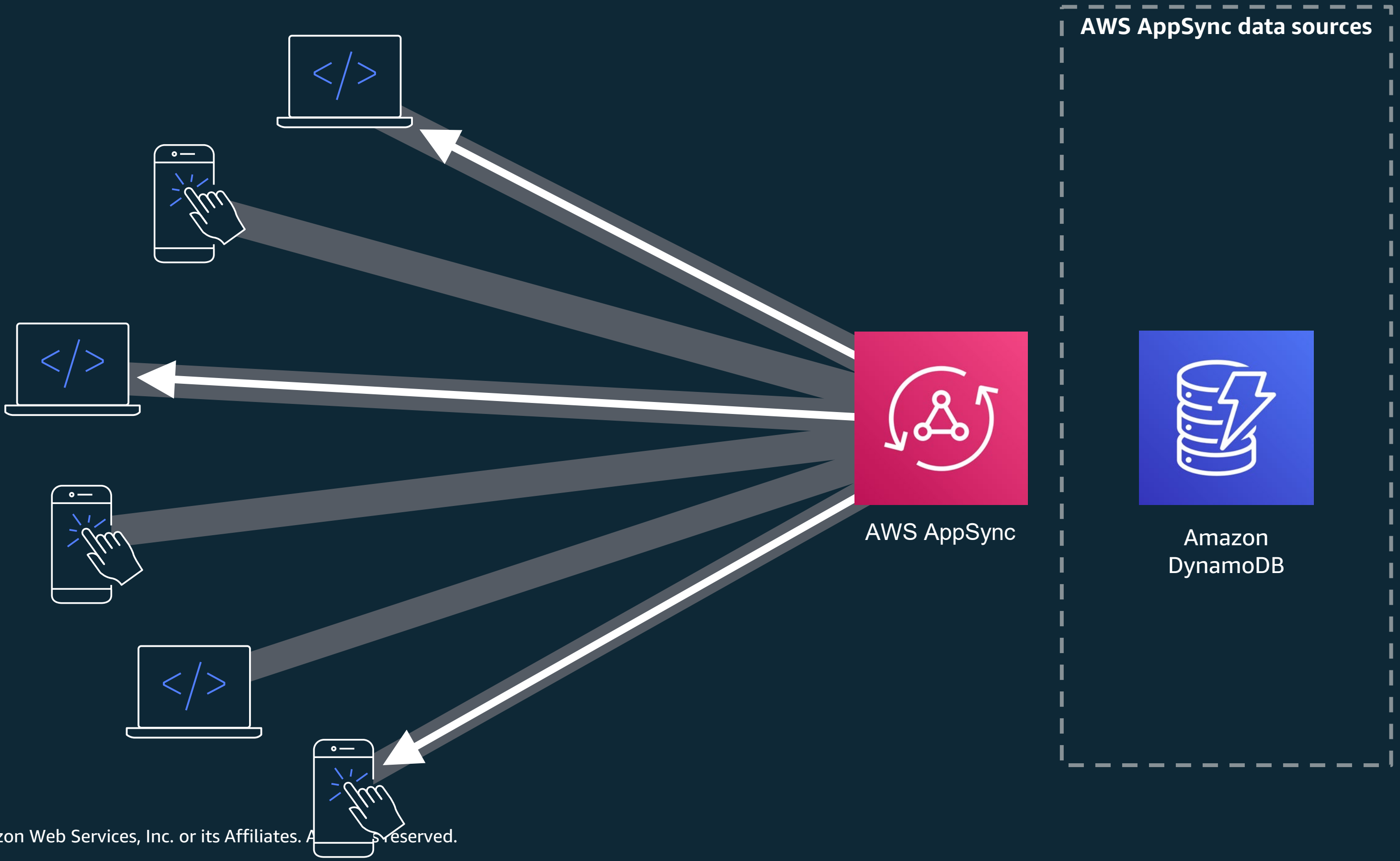
Real-time GraphQL subscriptions



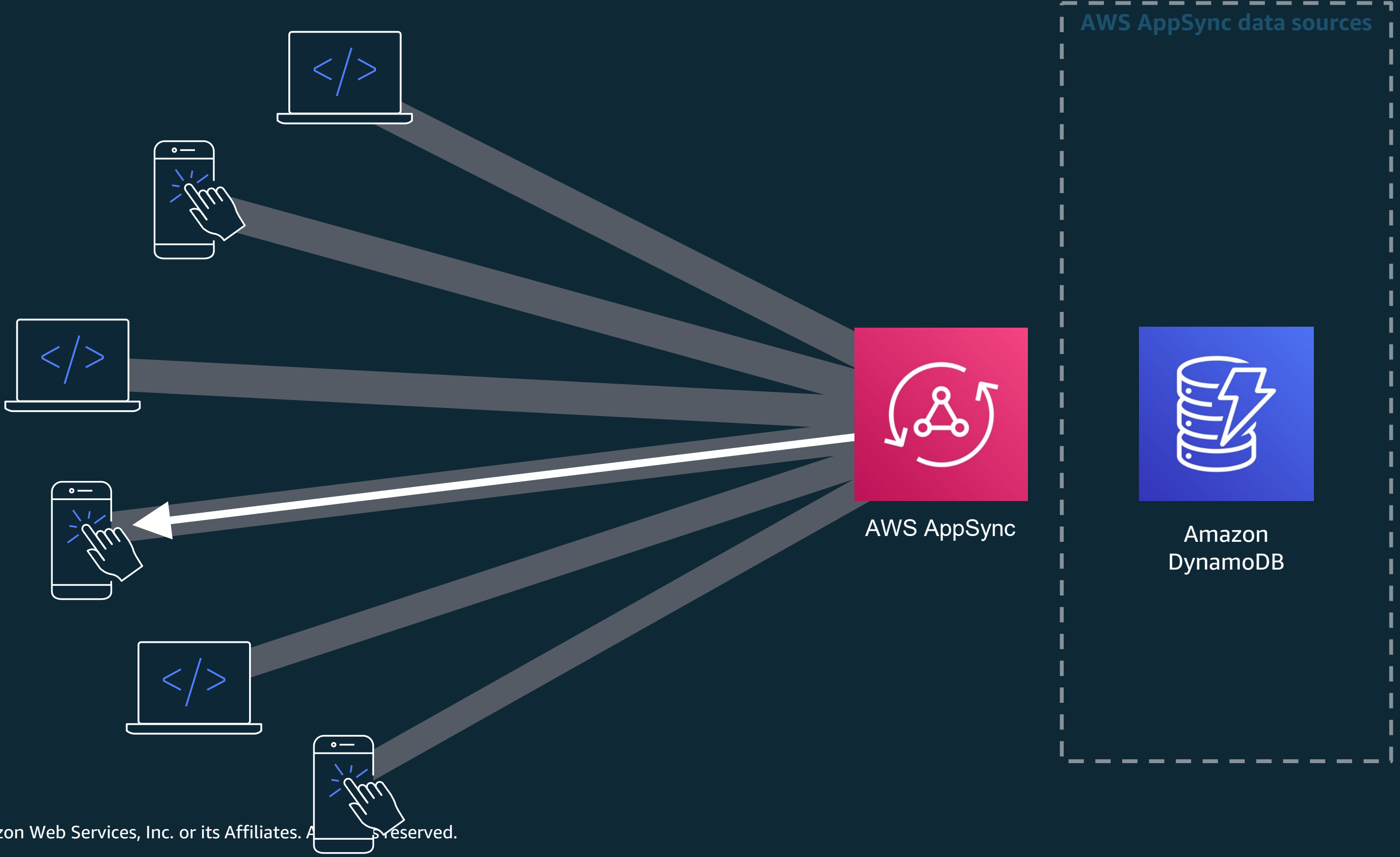
Real-time GraphQL subscriptions



Real-time GraphQL subscriptions



Real-time GraphQL subscriptions



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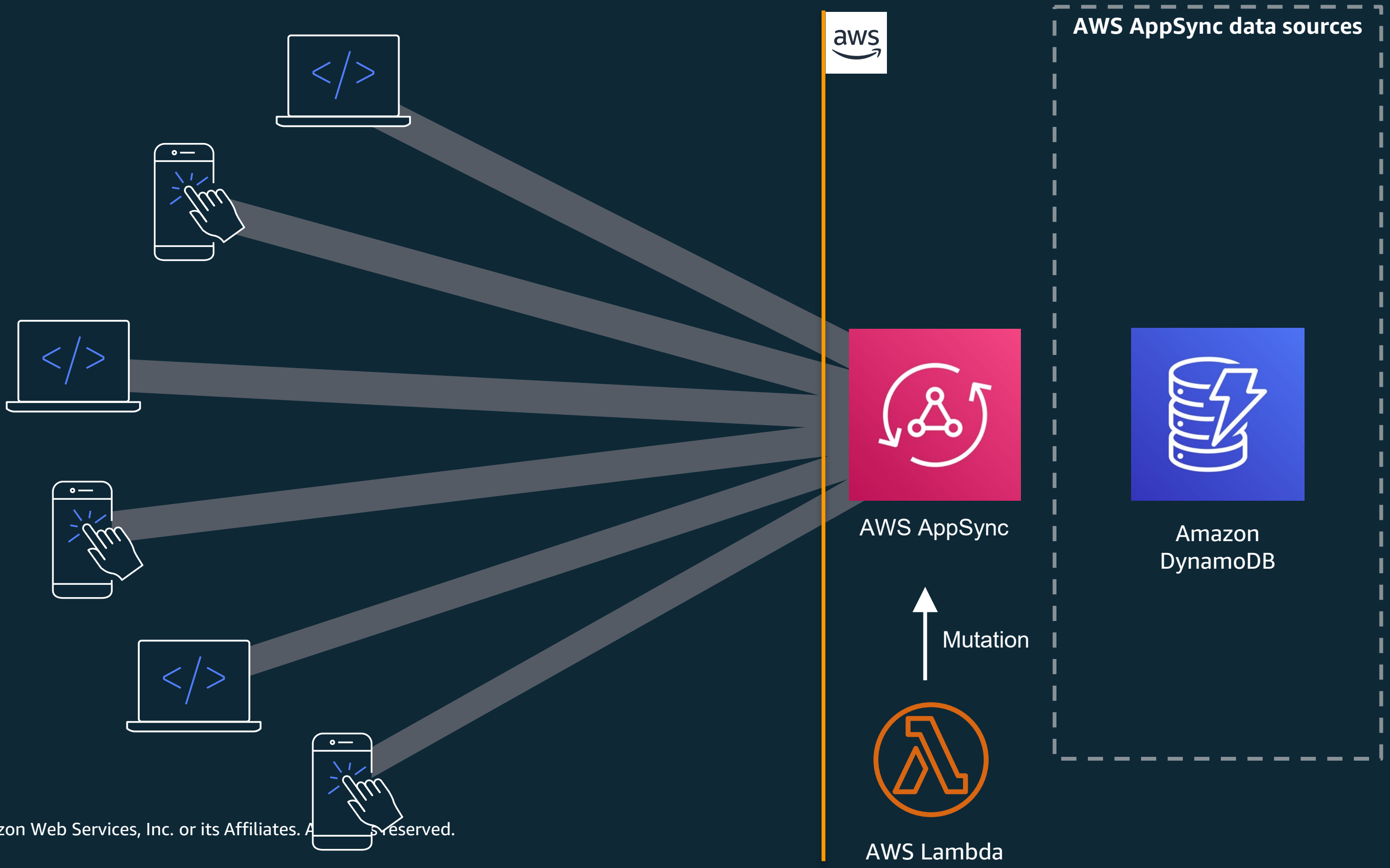
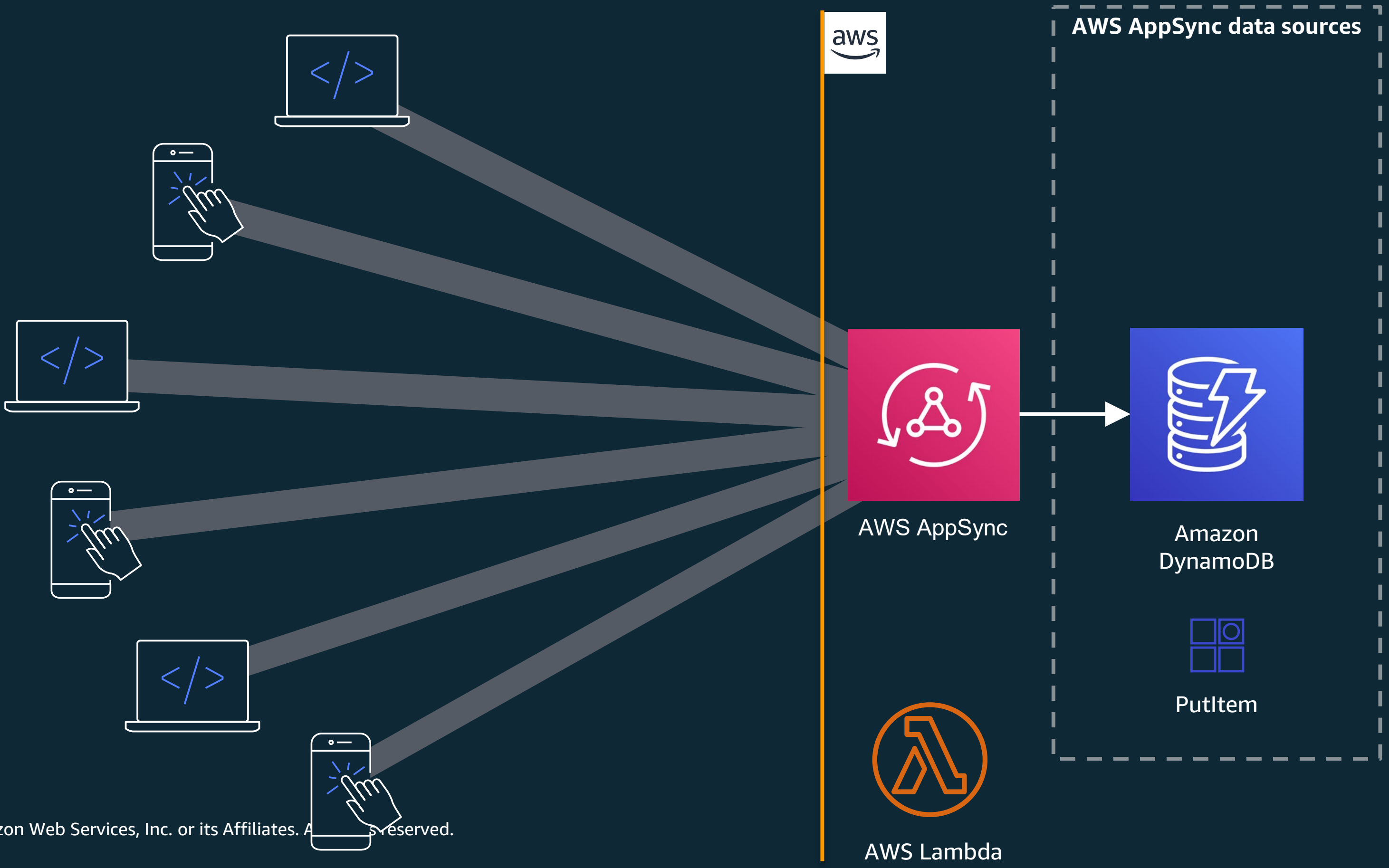


Real-time GraphQL subscriptions



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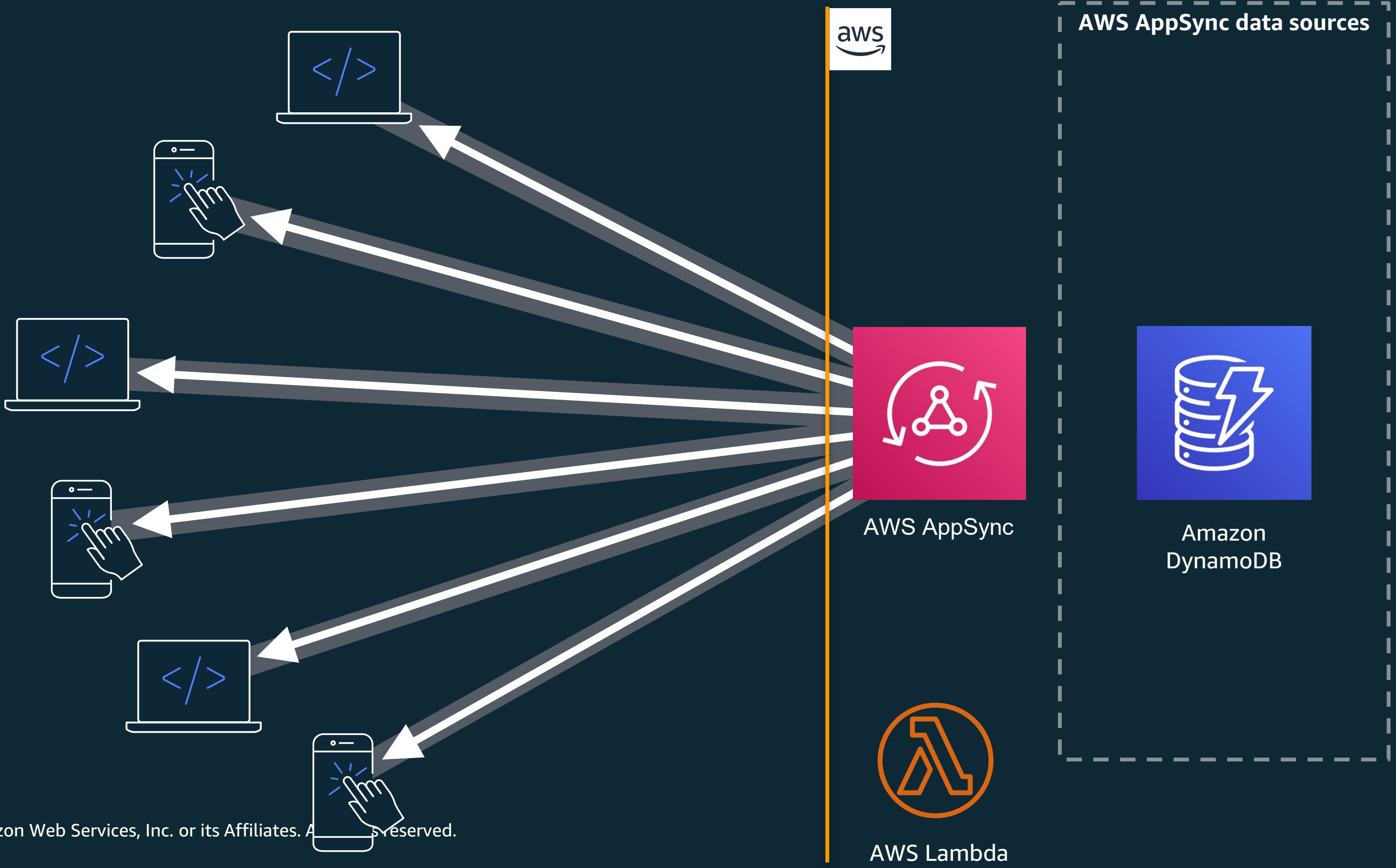

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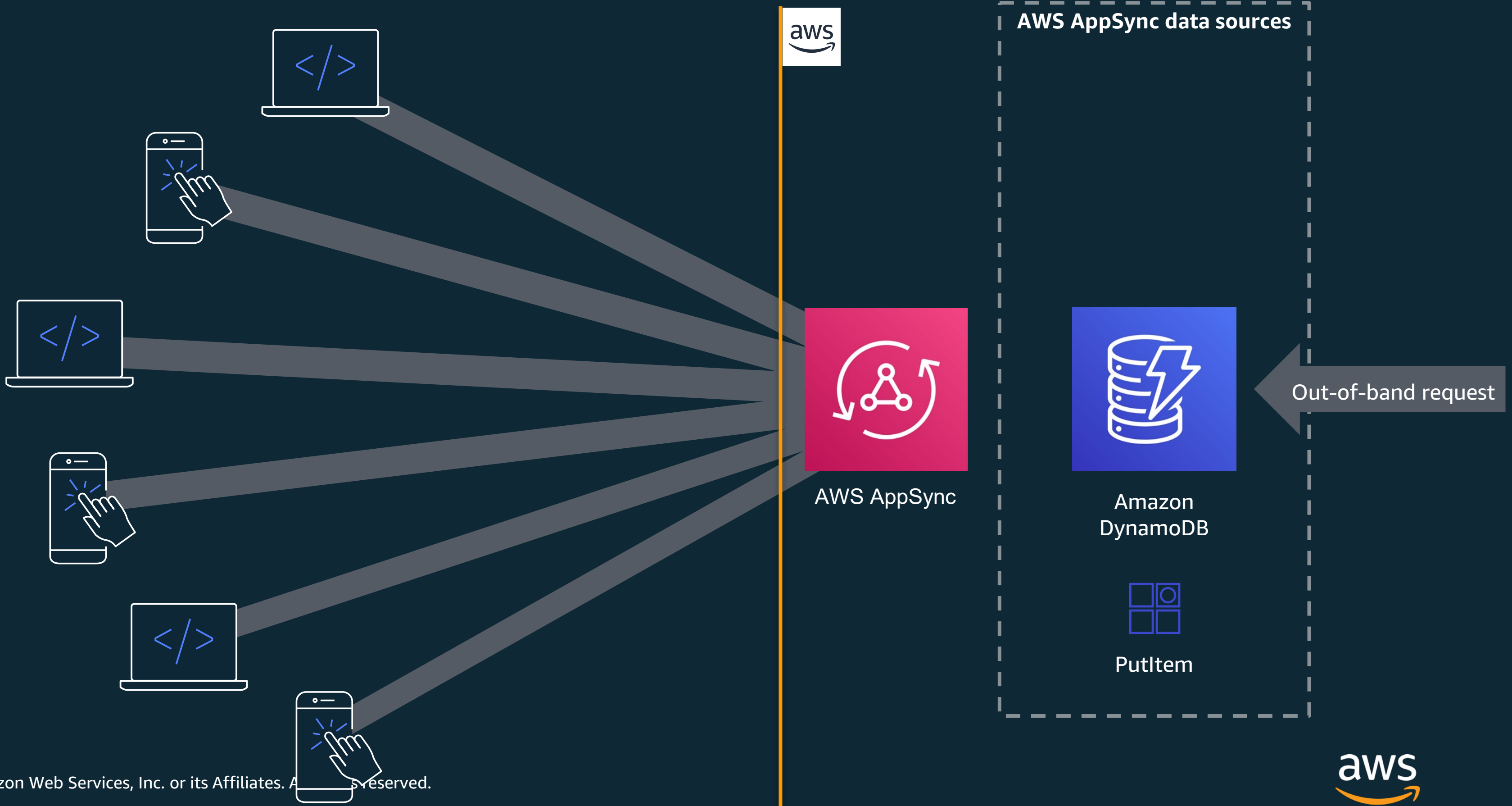
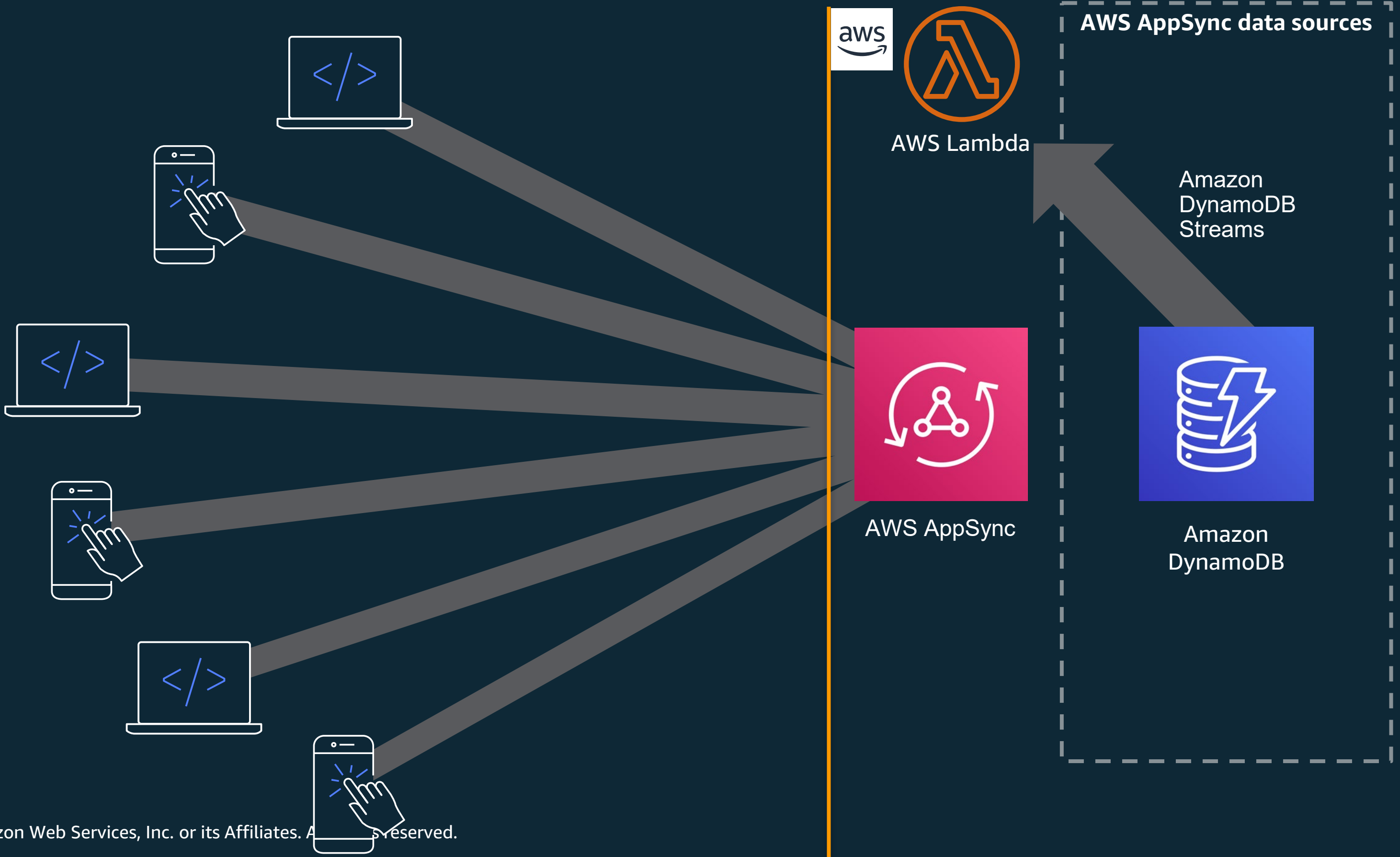


Real-time GraphQL subscriptions



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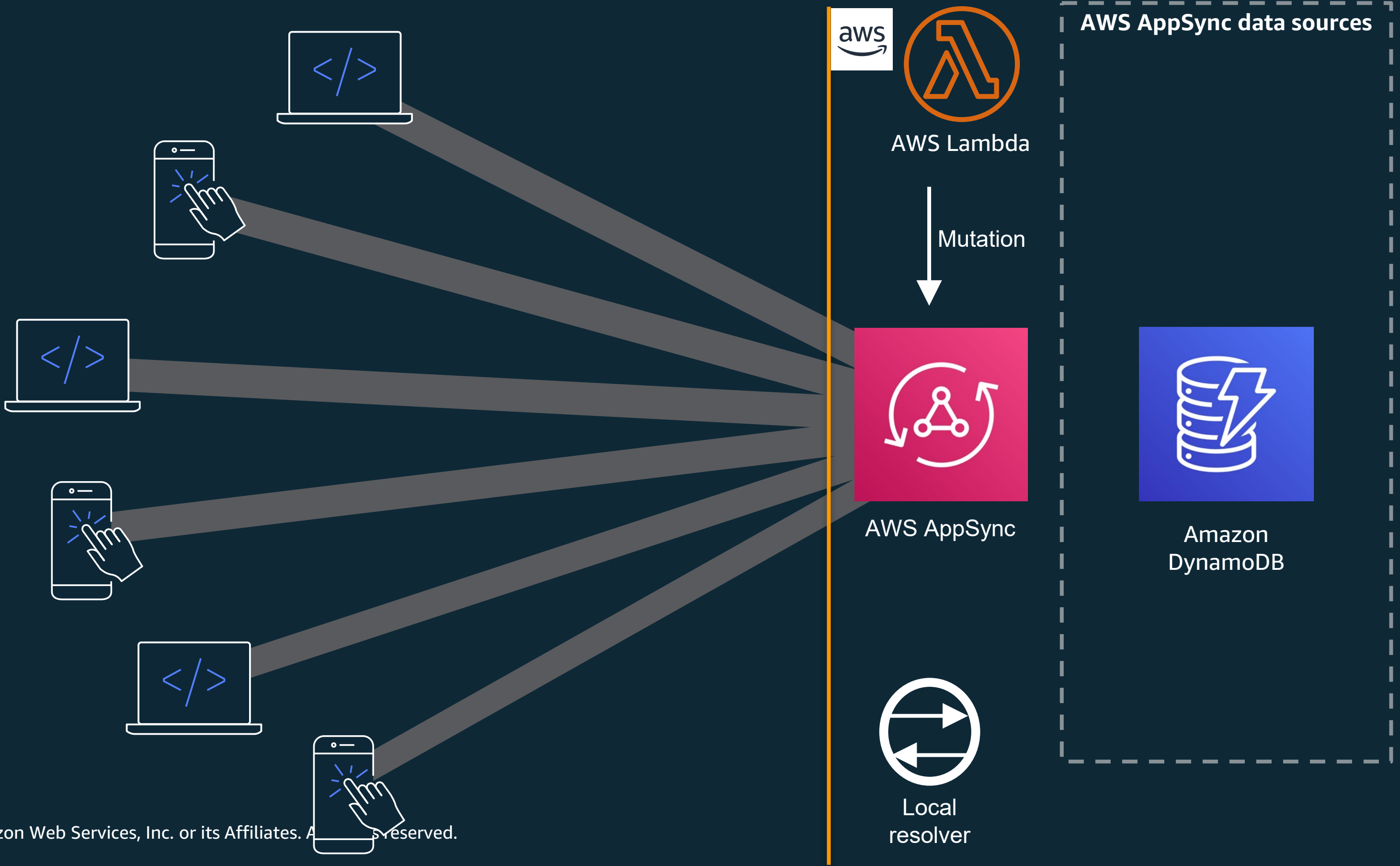

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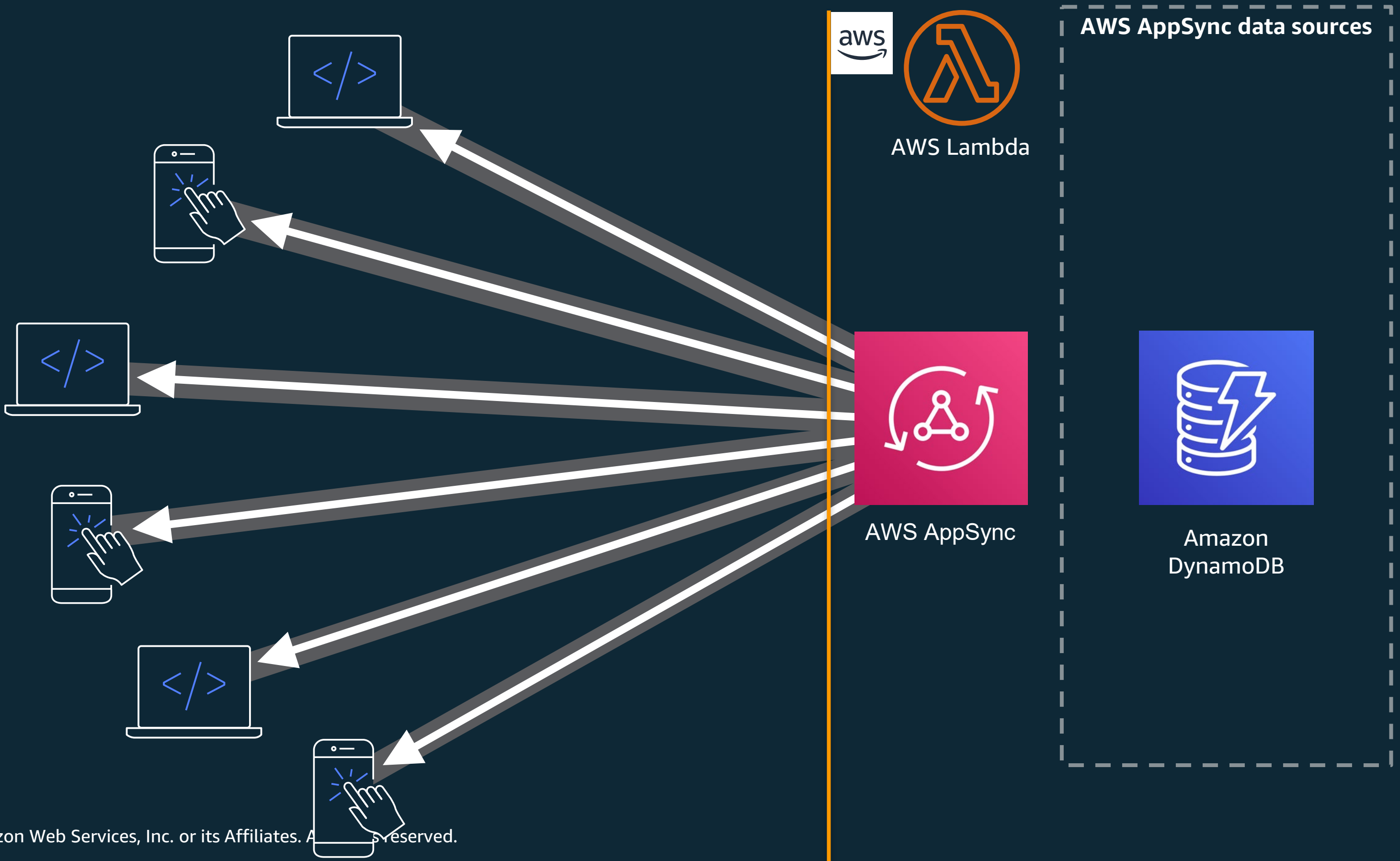


AWS AppSync real-time WebSockets

Connection management

Scalability

Fan-out

Broadcasting

Metrics

AWS AppSync Across Industries

BMW GROUP

BMW leverages GraphQL via AWS AppSync to build scalable and universal APIs for data providers and consumers alike, increasing development flexibility. This helps them build applications significantly faster than before.

peacock

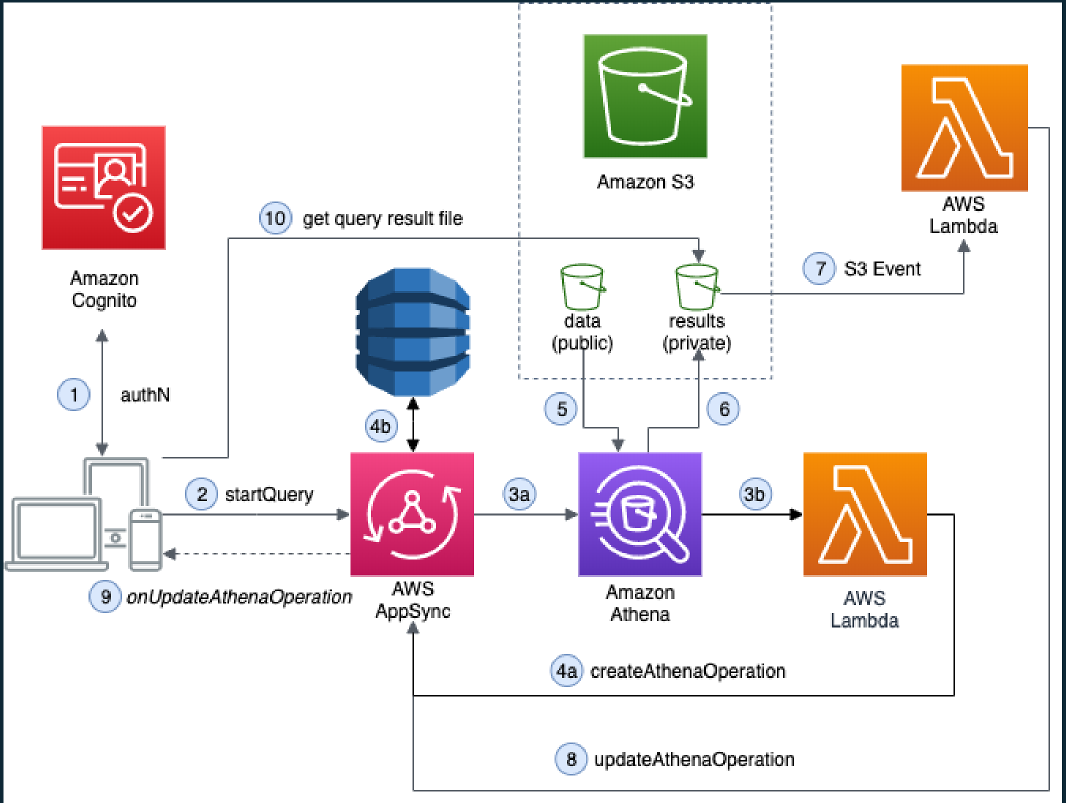
The streaming service Peacock—launched by Comcast Corporation —has already amassed over 26 million sign-ups. The Peacock development team built a fully scalable system using several AWS services, including AWS AppSync, a fully managed service that helps companies develop applications faster through scalable GraphQL APIs.

ALDO

AWS AppSync allowed Aldo to focus on implementing features in their application instead of managing their system and its infrastructure, adding development velocity and accelerating time to market. With AppSync Aldo creates new applications in less than three months instead of the 6–12 months it would have taken previously using multiple APIs.

Demo

Orchestration API example



Offline and sync

AWS Amplify DataStore

- Local store
- Amazon DynamoDB data sources
- Abstracts GraphQL on the client side
- JavaScript, React Native, iOS, Android
- Local storage (web browser) and SQLite on native platforms

AWS AppSync SDKs

- Local cache
- Any supported AWS AppSync data source
- GraphQL programming model
- JavaScript, React Native, iOS, Android
- Local storage (web browser) and SQLite on native platforms

Custom implementation

- Custom real-time WebSocket client
- Follow AWS AppSync-provided spec/protocol
- Write in any language with WebSocket support
- Implement custom requirements
- Deploy where you need it

- Start effortlessly
- Scale with your business
- Real time and offline
- Unify and secure access to your distributed data and services
- AWS Amplify integrations – DataStore, GraphQL Transform, local mocking, and codegen
- Powerful choices – schema-first or code-first with the AWS CDK

AWS AppSync resources

Website
https://aws.amazon.com/appsync/

Docs
https://docs.aws.amazon.com/appsync/

GitHub
https://github.com/aws/aws-appsync-community

Blog
https://aws.amazon.com/appsync/blog/

More resources
https://aws.amazon.com/appsync/resources/

Modernization Track

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Modern Applications

Modern DevOps

Management & Governance

Thank you!

Brice Pellé (🐦 @BricePelle)