Adopting GraphQL APIs on AWS

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Agenda

- GraphQL
- AWS AppSync
- Security
- Real-time
- Customer use cases

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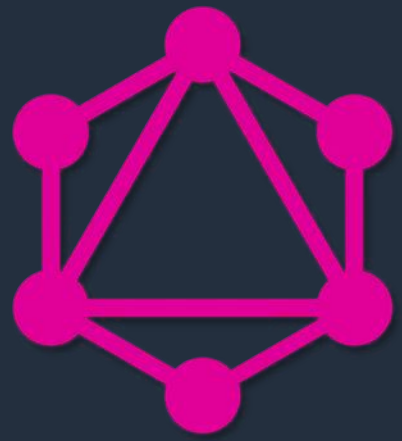

GraphQL

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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"
  }
}
```

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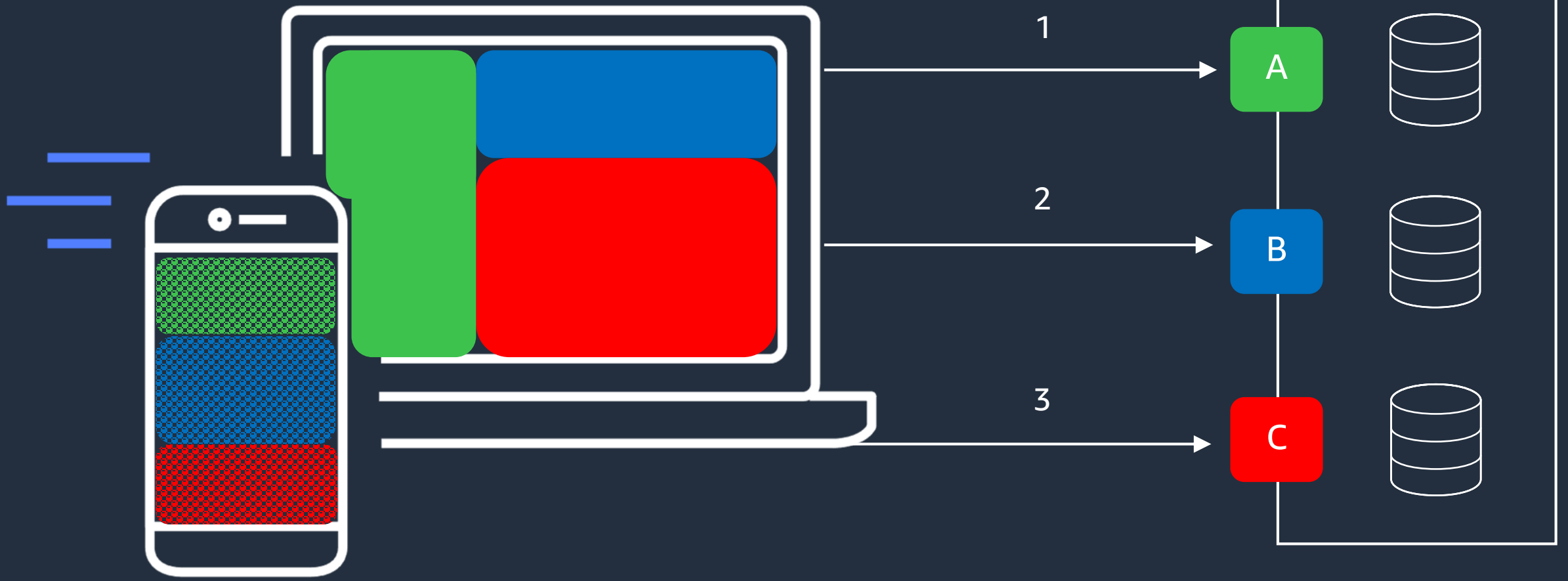
With REST



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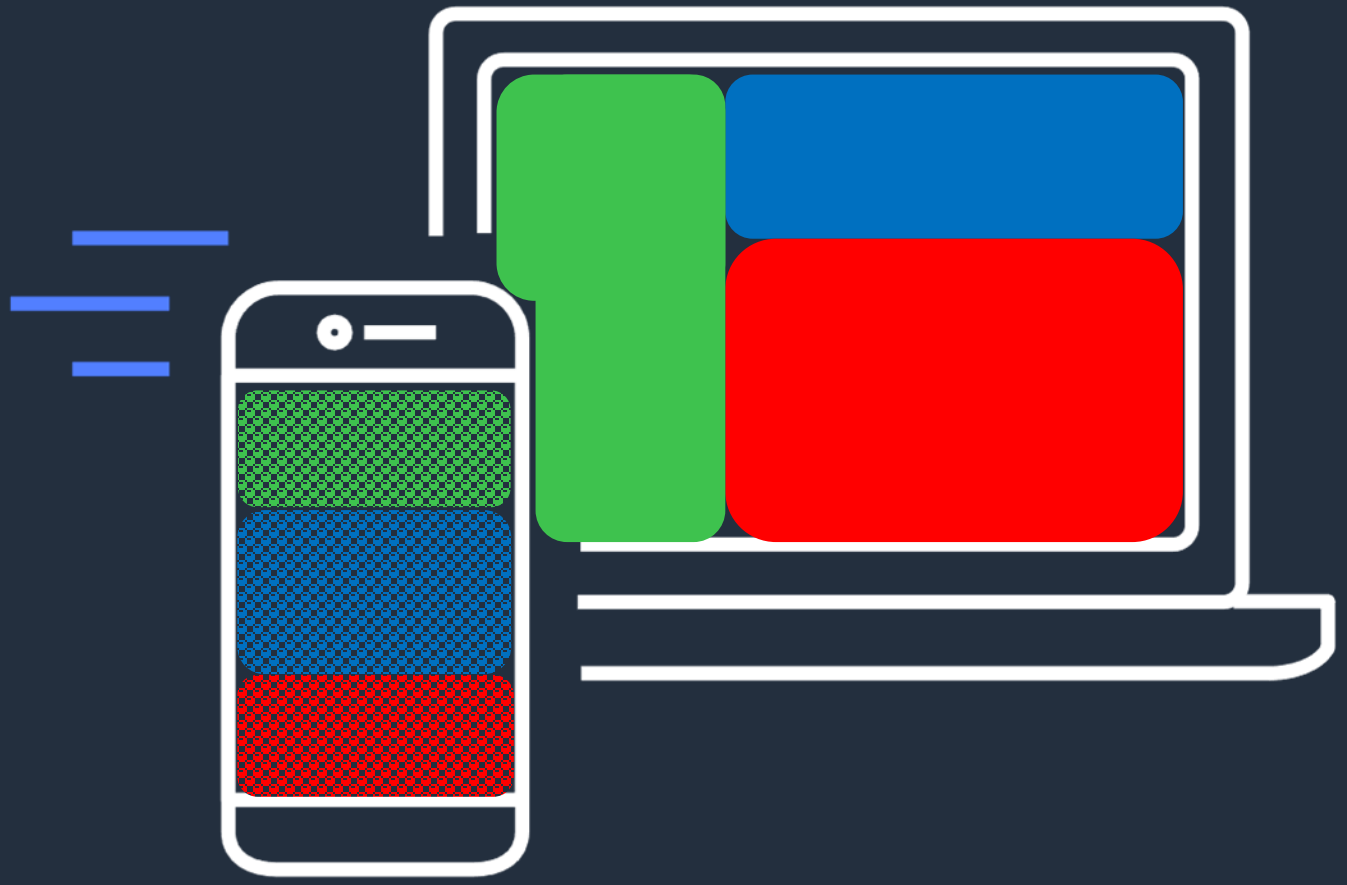
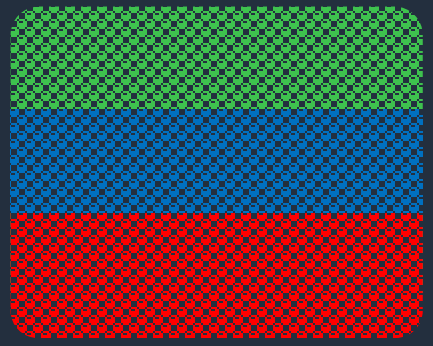
With GraphQL



Data payload

JSON{}

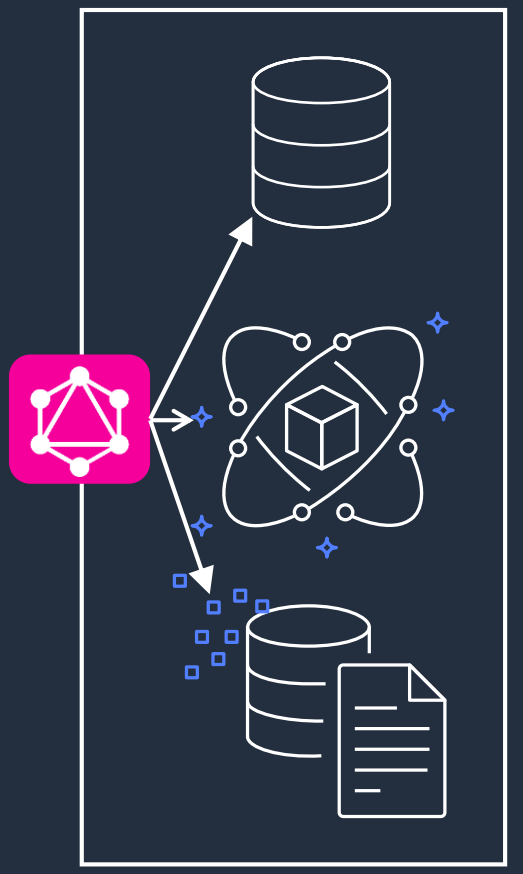
Web



Mobile

API endpoints

(Data sources)



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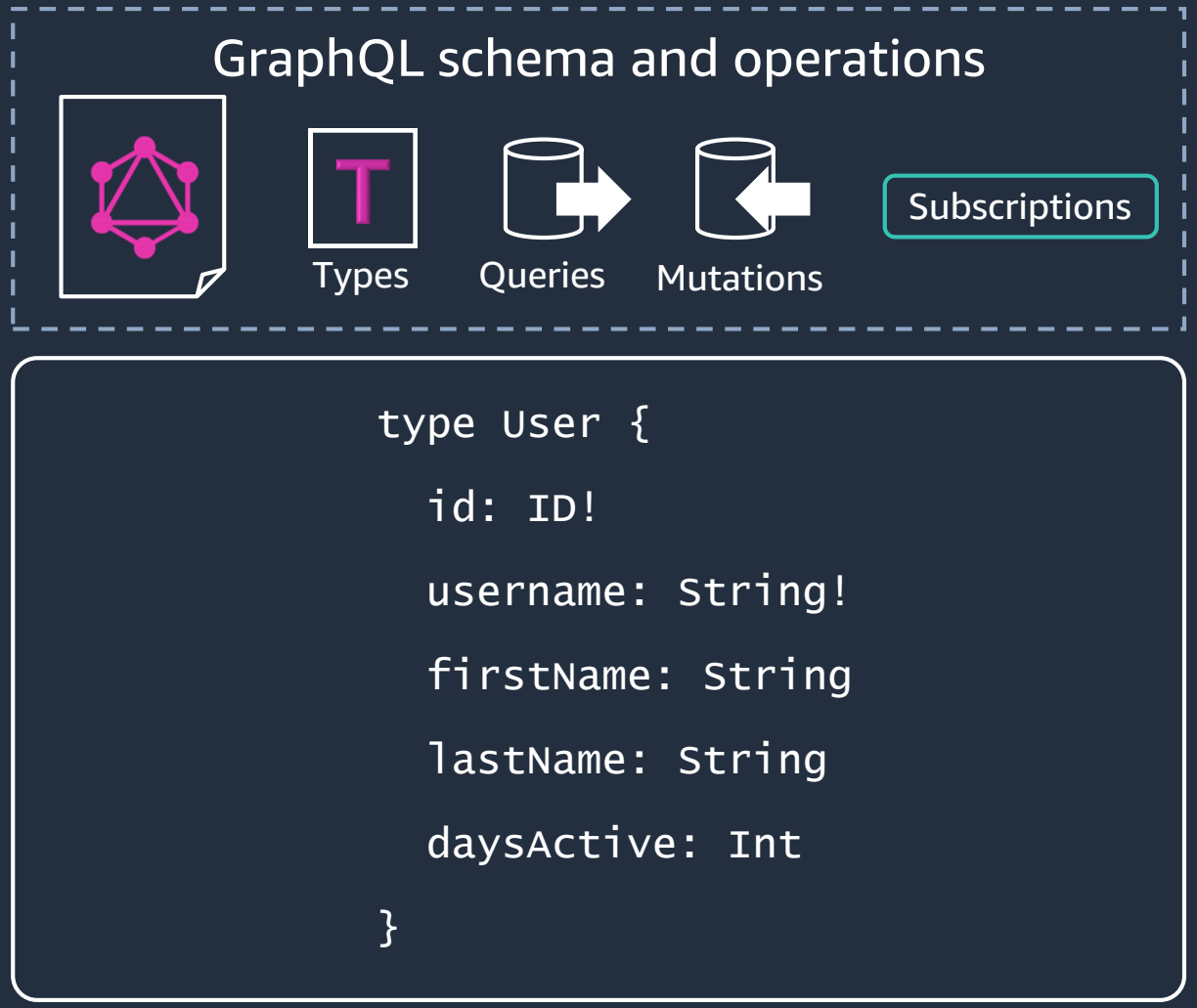
A query language for APIs . . . and a runtime



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A query language for APIs . . . and a runtime

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
  }
}
```

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A query language for APIs . . . and a runtime

Queries

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

Mutations

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

Subscriptions

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

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With GraphQL

- Reduce the number of requests
- Reduce and control the amount of data
- Receive data in expected shape and format
- Reduce onboarding overhead
- Connect to multiple data sources (your data)
- Receive real-time notification, reduce delays, eliminate polling

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

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AWS AppSync

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

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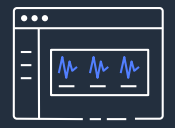
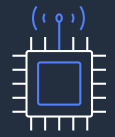
How does AWS AppSync work?

Enterprise applications

Web/mobile apps



Real-time dashboards



IoT applications

Offline/Delta Sync

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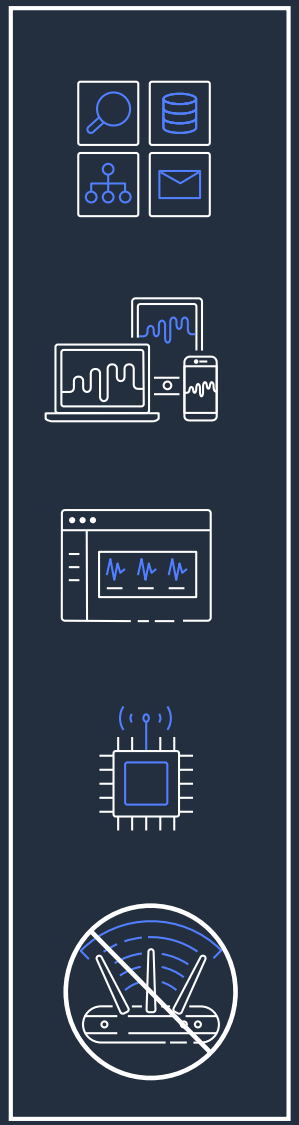
How does AWS AppSync work?



AWS AppSync

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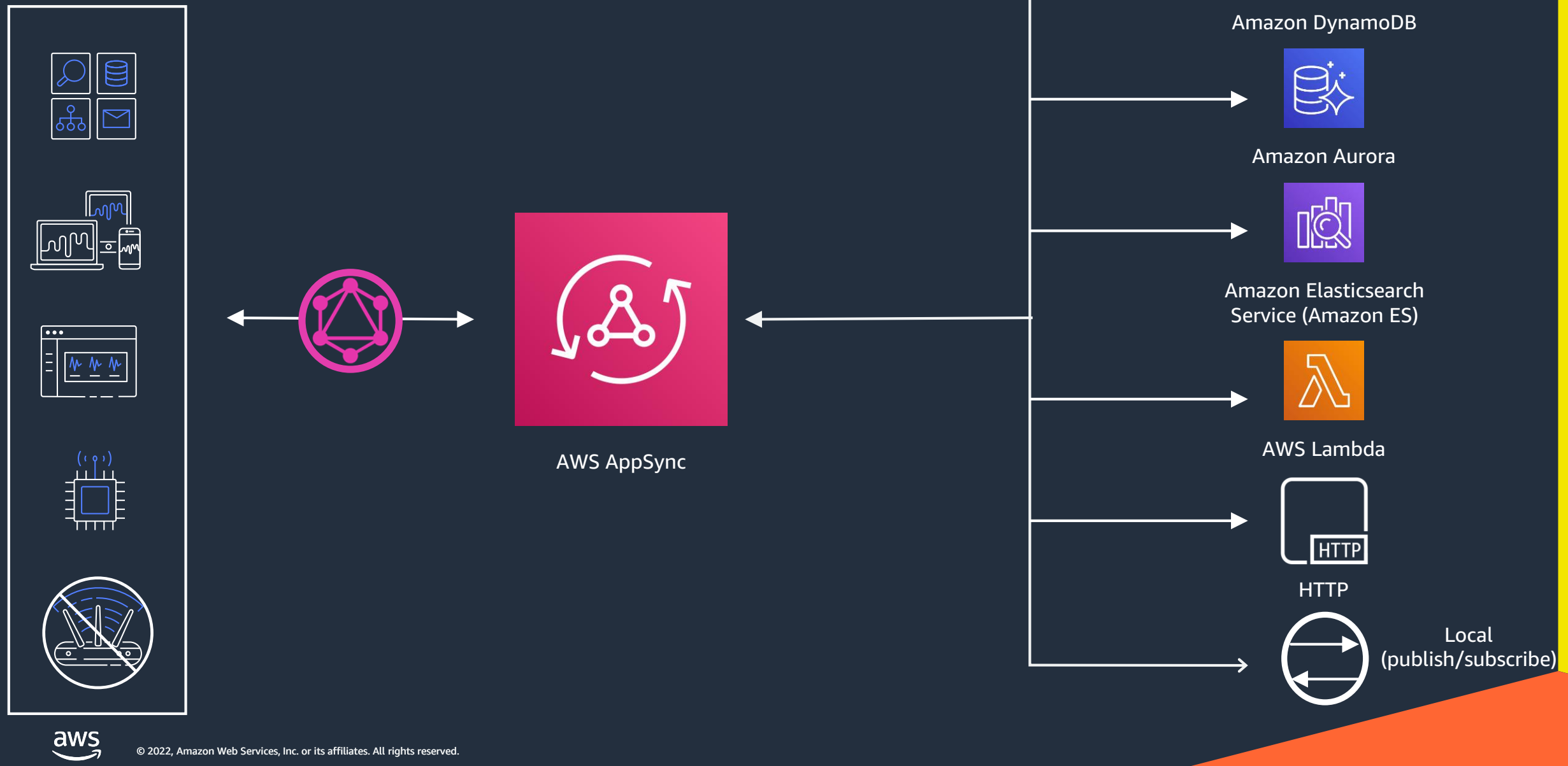
How does AWS AppSync work?



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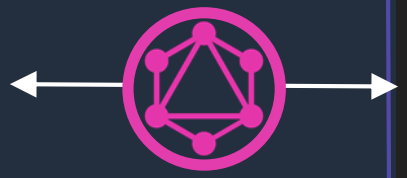
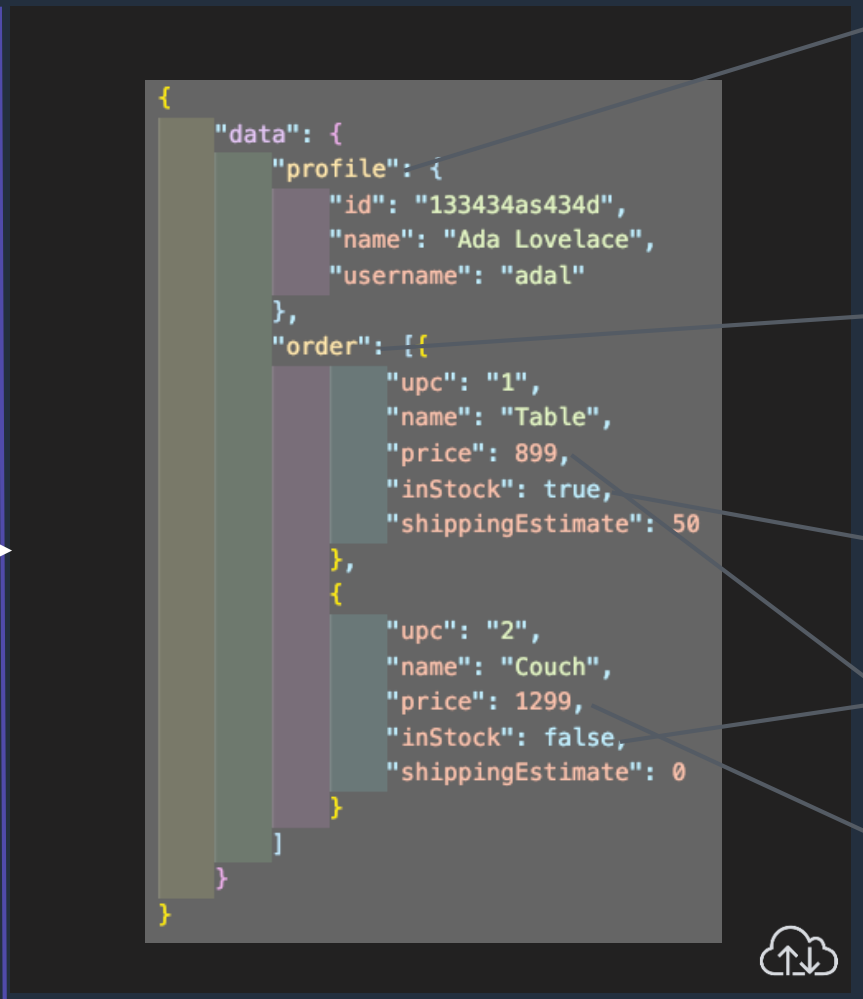
How does AWS AppSync work?





Amazon DynamoDB
(User profiles)

Amazon API Gateway
(Order service)

AWS Lambda
(Inventory service)

Amazon Aurora
(Pricing)

Single endpoint

Backend complexity

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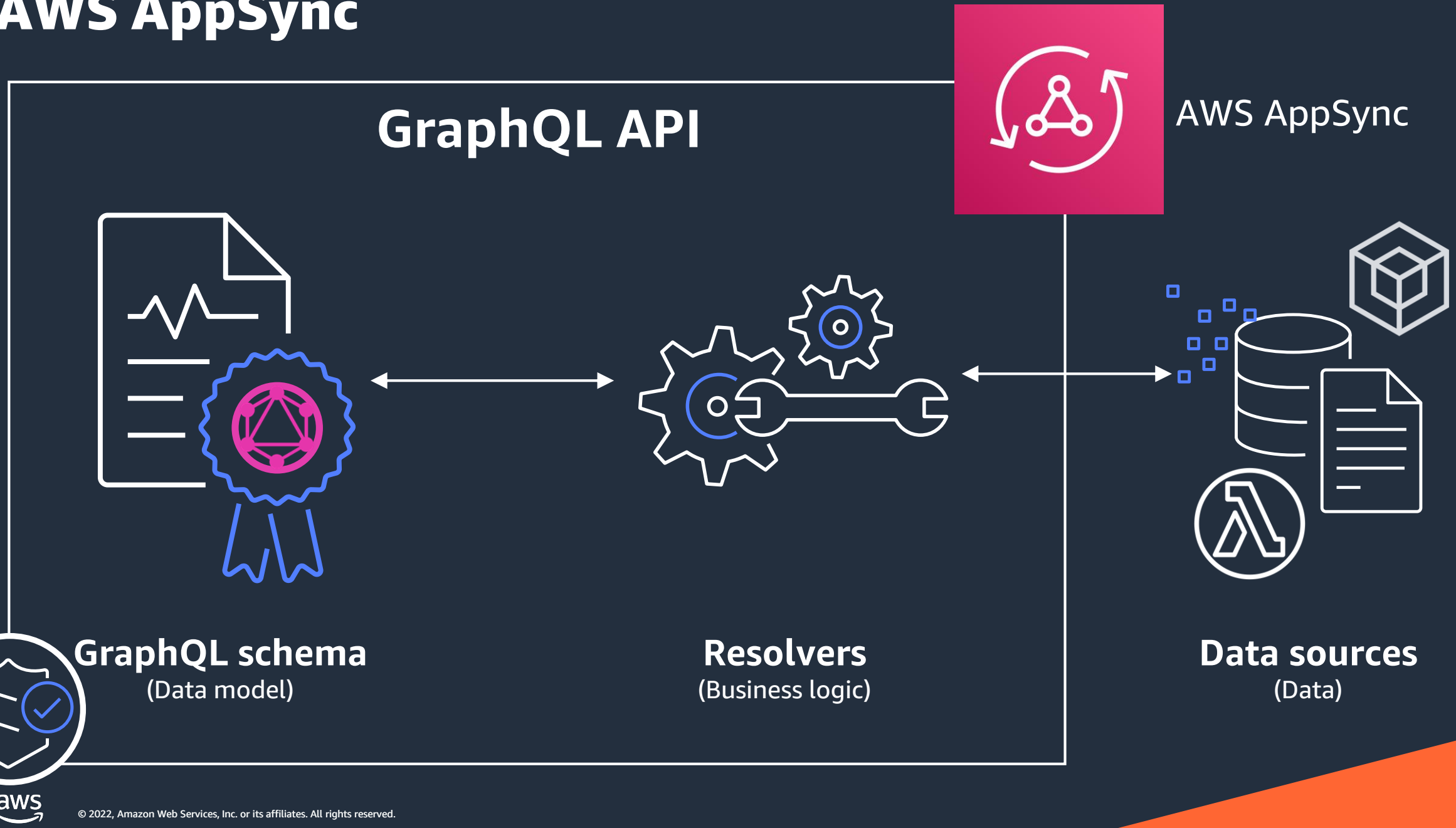
AWS AppSync



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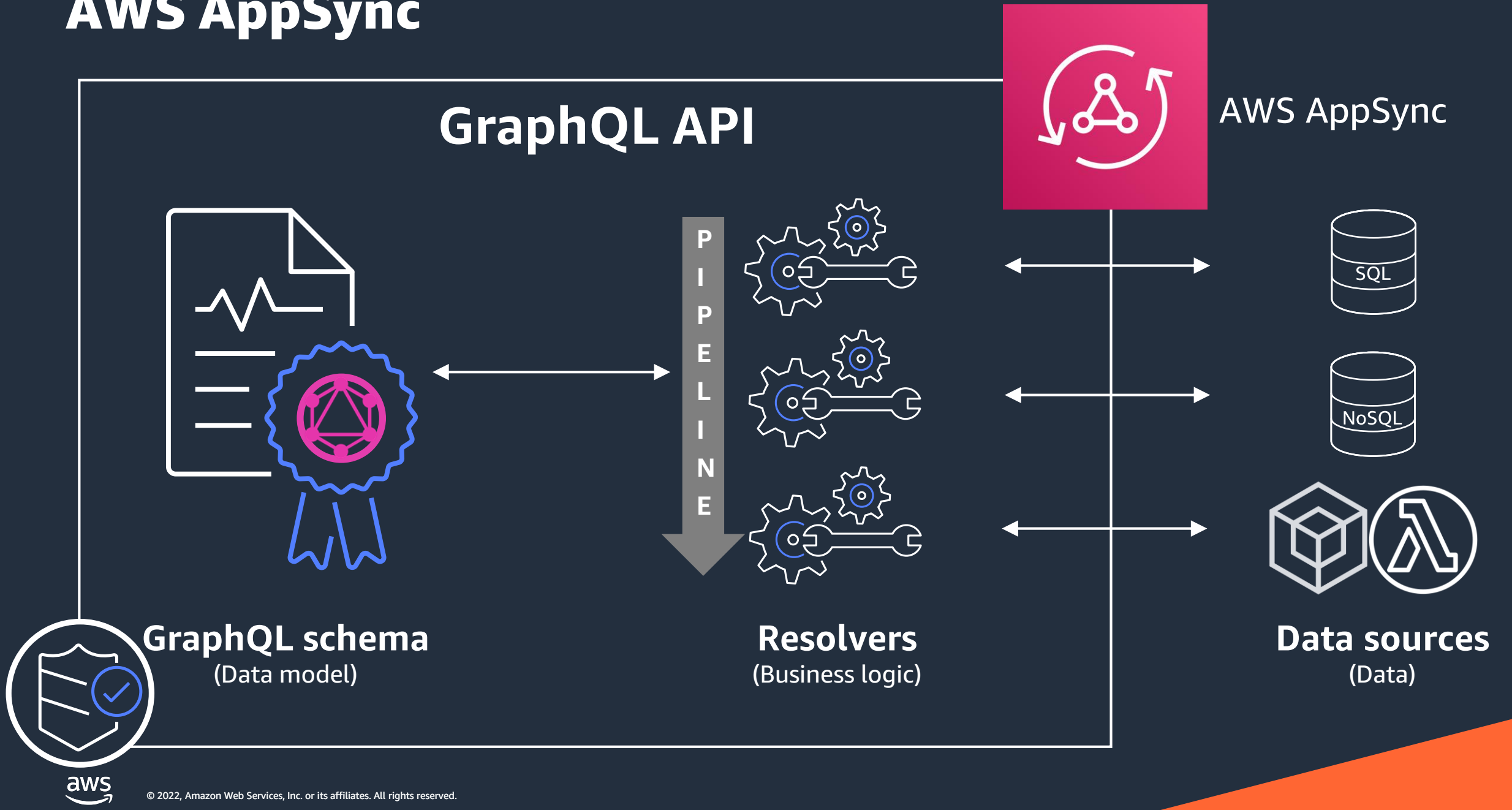
AWS AppSync



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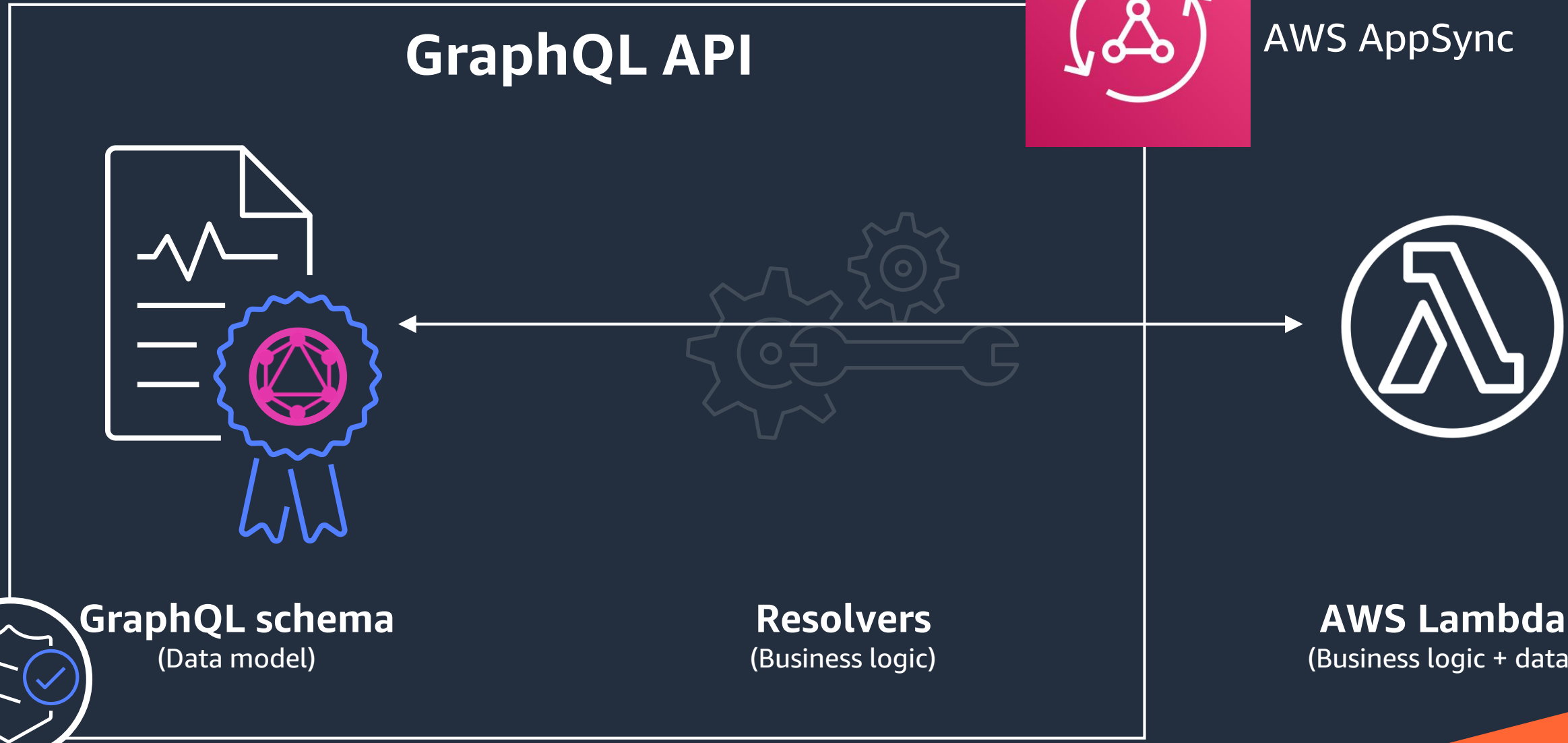
AWS AppSync – Direct Lambda



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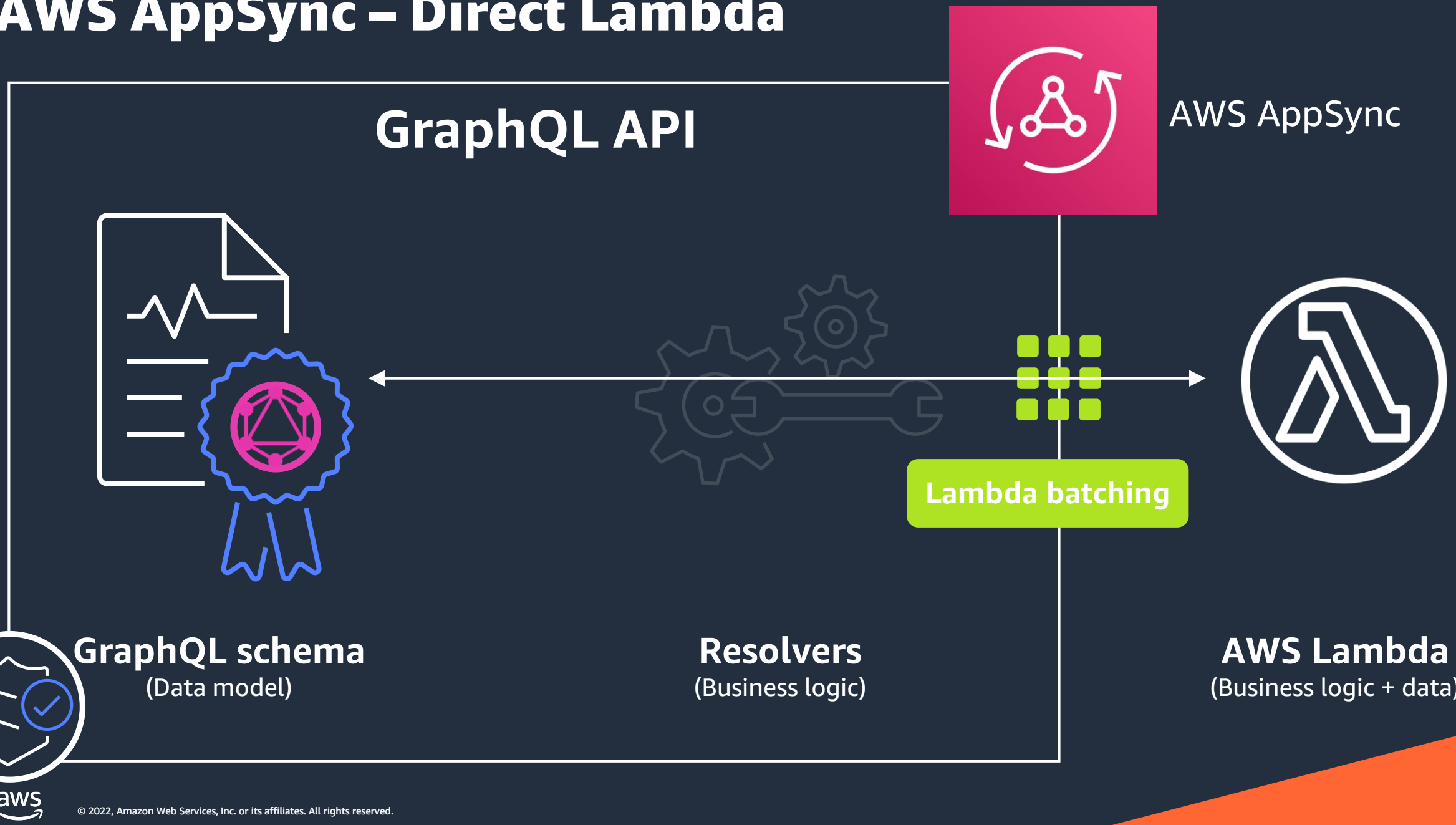
AWS AppSync – Direct Lambda



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Security

API keys

Amazon Cognito User Pools

OpenID Connect

AWS Identity and Access Management

AWS Lambda

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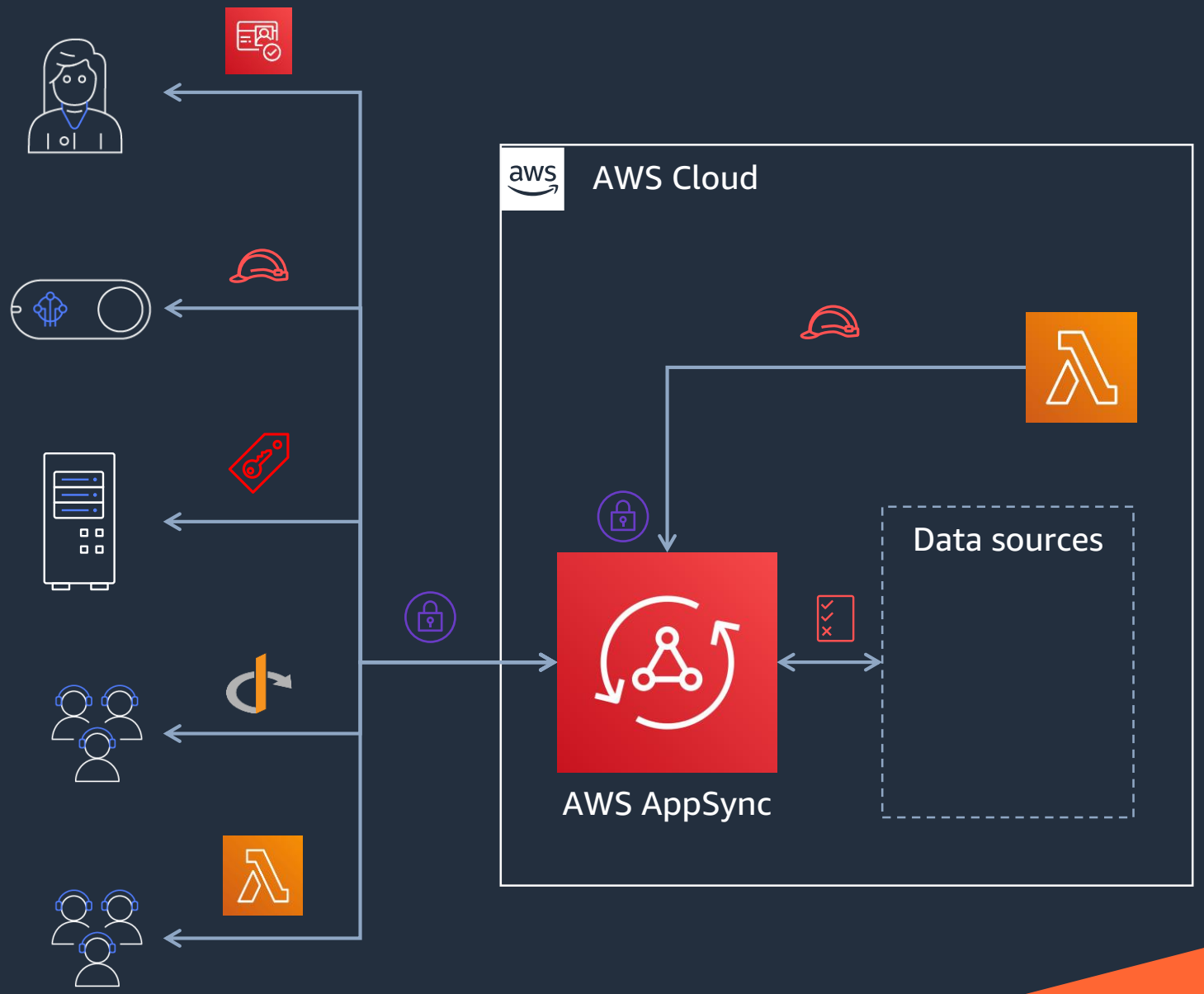
Multi-auth

- Do authorization on
  - Type
  - Operation
  - Field
- Select default auth mode
- Specify additional providers



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Multi-authorization

```
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!
}
```

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AWS WAF – Web Application Firewall

Frictionless setup: deploy without changing your existing architecture, and no need to configure TLS/SSL or DNS

Low operation overhead: managed rules from AWS and AWS Marketplace, ready to use CloudFormation templates, and built-in SQLi/XSS detection

Customizable security: highly flexible rule engine that can inspect any part of incoming request under single-millisecond latency

Simply pull in third party rules: Within the WAF counsel, you can pivot to our Marketplace to select Industry Leading Security vendor rules to pull into AWS WAF

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Custom Domain Names

- Bring Your Own Domain
- Single endpoint for queries, mutations, and subscriptions
- Change domain name association at any time
- No client side change required

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Server-side data caching

- Make data available in a high speed, in-memory cache
- Improve performance and latency
- Offload backend data sources
- Specify you own keys
- Flush entire cache or evict specific entries on-demand

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Real-time

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Real-time Use Cases

- Sports scores, odds, game updates
- Audience participation
- Breaking news
- Stock quotes
- Flight updates
- Document collaboration
- Student and teacher interaction
- Agent status in call center app
- Second screen audience participation
- Chat

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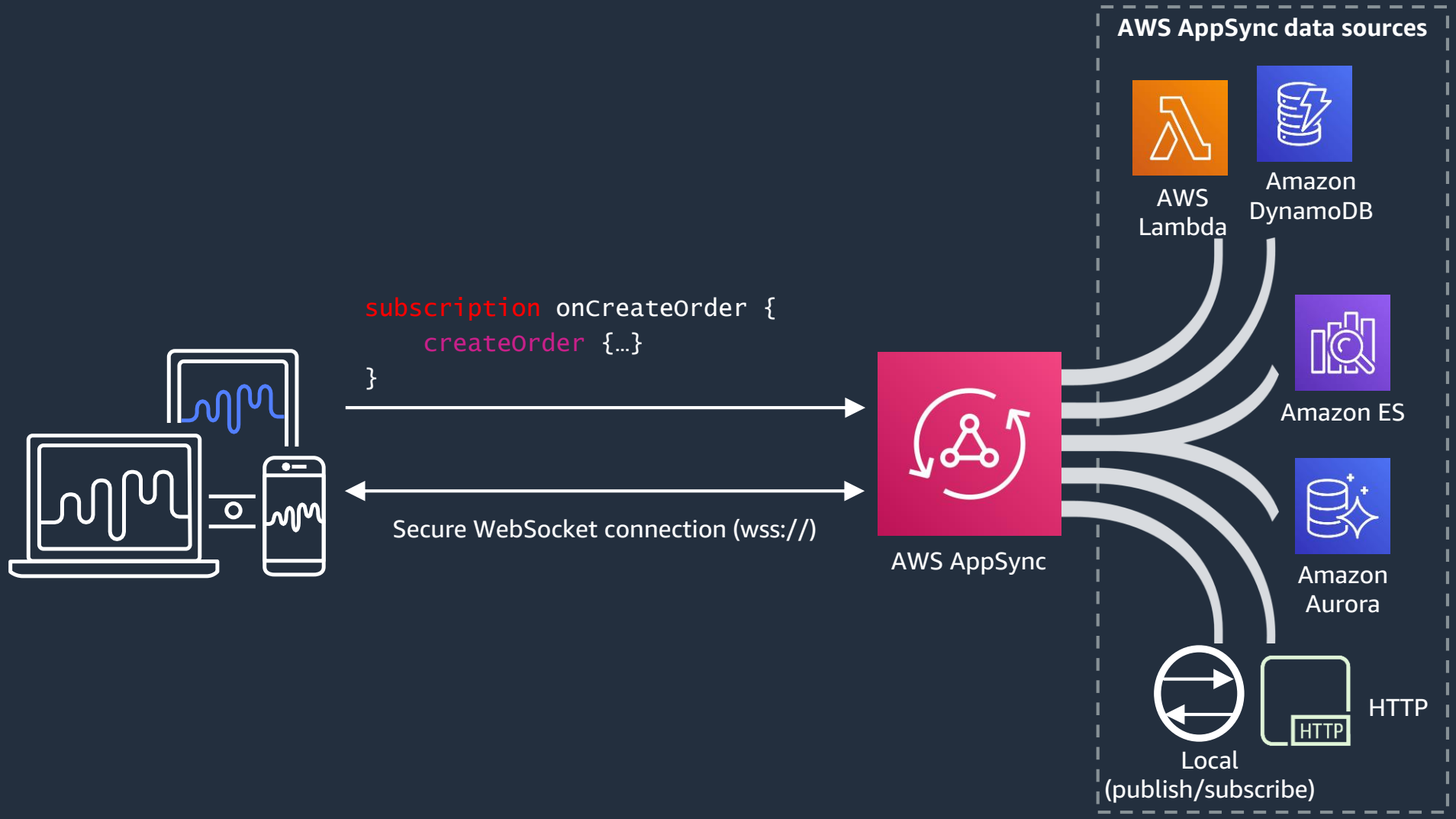
Real-time GraphQL subscriptions



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Real-time with AppSync WebSockets

Connection management

Scalability

Fan-out

Broadcasting

Metrics

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Why modernization with GraphQL

Build reusable and scalable APIs

Develop applications faster

Engage with customers

Deliver the right data at the right time

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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

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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.

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AWS AppSync across industries

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

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

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

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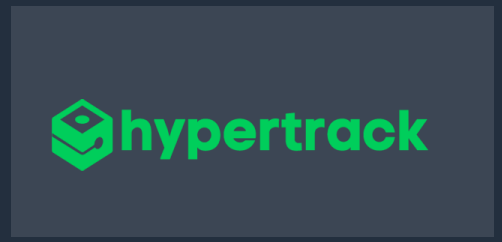
Customer case studies and testimonials



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

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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/

Serverless Land patterns
https://serverlessland.com/patterns?services=appsync

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