aws SUMMIT

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Grocery delivery goes serverless at More Retail

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What are we going to discuss

- More Retail, an overview

- Business problems

- Business outcomes
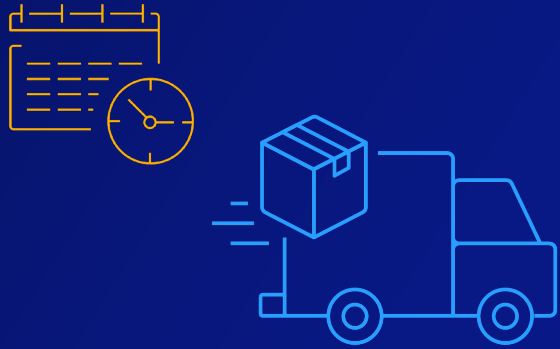
- Architecture choice

- Technical deep dive

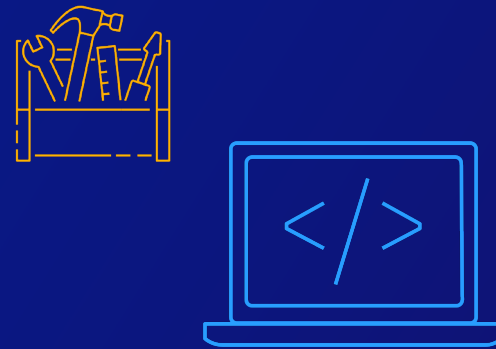Omni channel retailer

Since 1988

1000+ supermarkets

168+ Cities in India

Business problems

Timely delivery is a challenge, requiring precise prediction

Built own platform for last mile delivery

Business outcomes

App metrics in the wild

Over **3,75,000** orders processed

Million subscriptions successfully processed

50% orders were cash on delivery

~200,000 API calls processed per day

Current concurrency **<50**, scope to handle **30x**
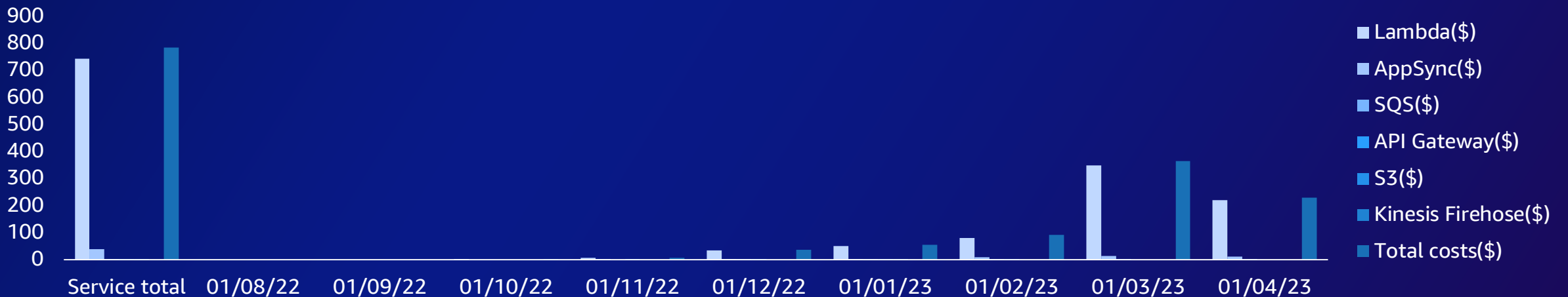
<100ms average API response time

Service costs

~$2.7 Million / ~₹22 Crore
worth of orders processed

$ 784.49
Total cost

$ 87.17
Average monthly cost

6
Services

Services cost over time ($)

Legend:
- Lambda($)
- AppSync($)
- SQS($)
- API Gateway($)
- S3($)
- Kinesis Firehose($)
- Total costs($)

X-axis: Service total, 01/08/22, 01/09/22, 01/10/22, 01/11/22, 01/12/22, 01/01/23, 01/02/23, 01/03/23, 01/04/23

Y-axis: 0, 100, 200, 300, 400, 500, 600, 700, 800, 900

Architecture choice
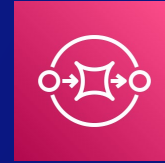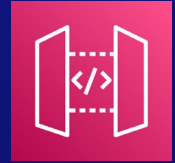
AWS AppSync

AWS Lambda

Amazon Aurora

Amazon Simple Queue Service (Amazon SQS)

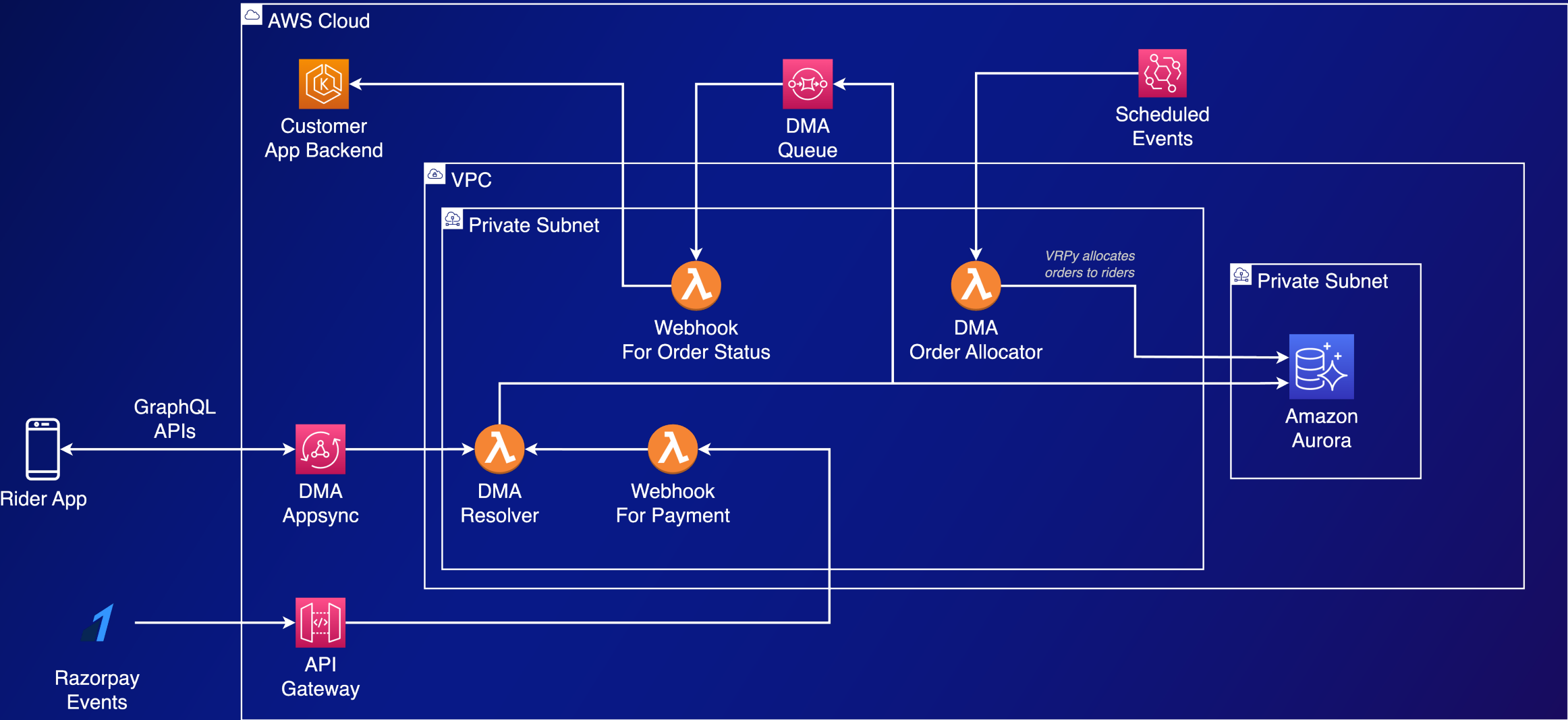**Amazon API Gateway**

React Native

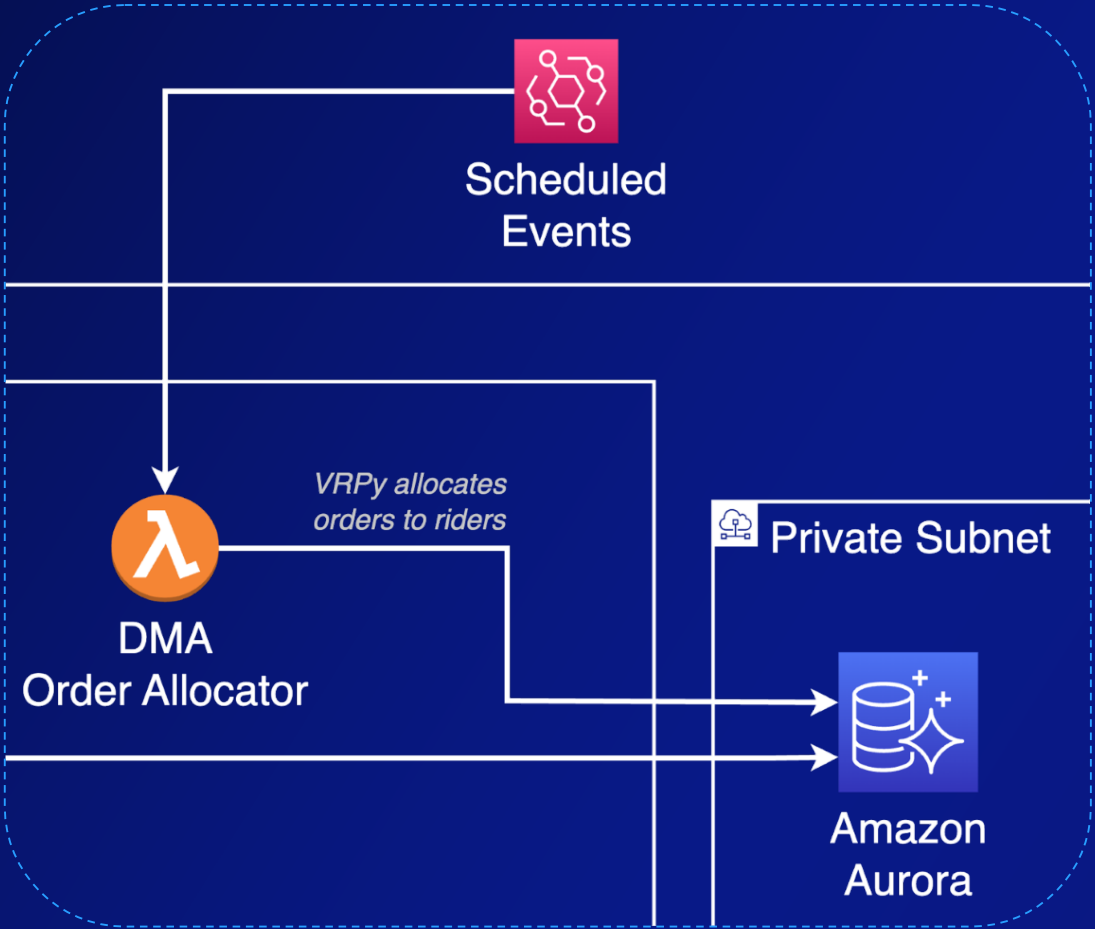*Client application*

Python

Backend APIs

VRPy
Python framework for solving instances of different types of Vehicle Routing Problems (VRP)

Technical deep dive

Backend architecture
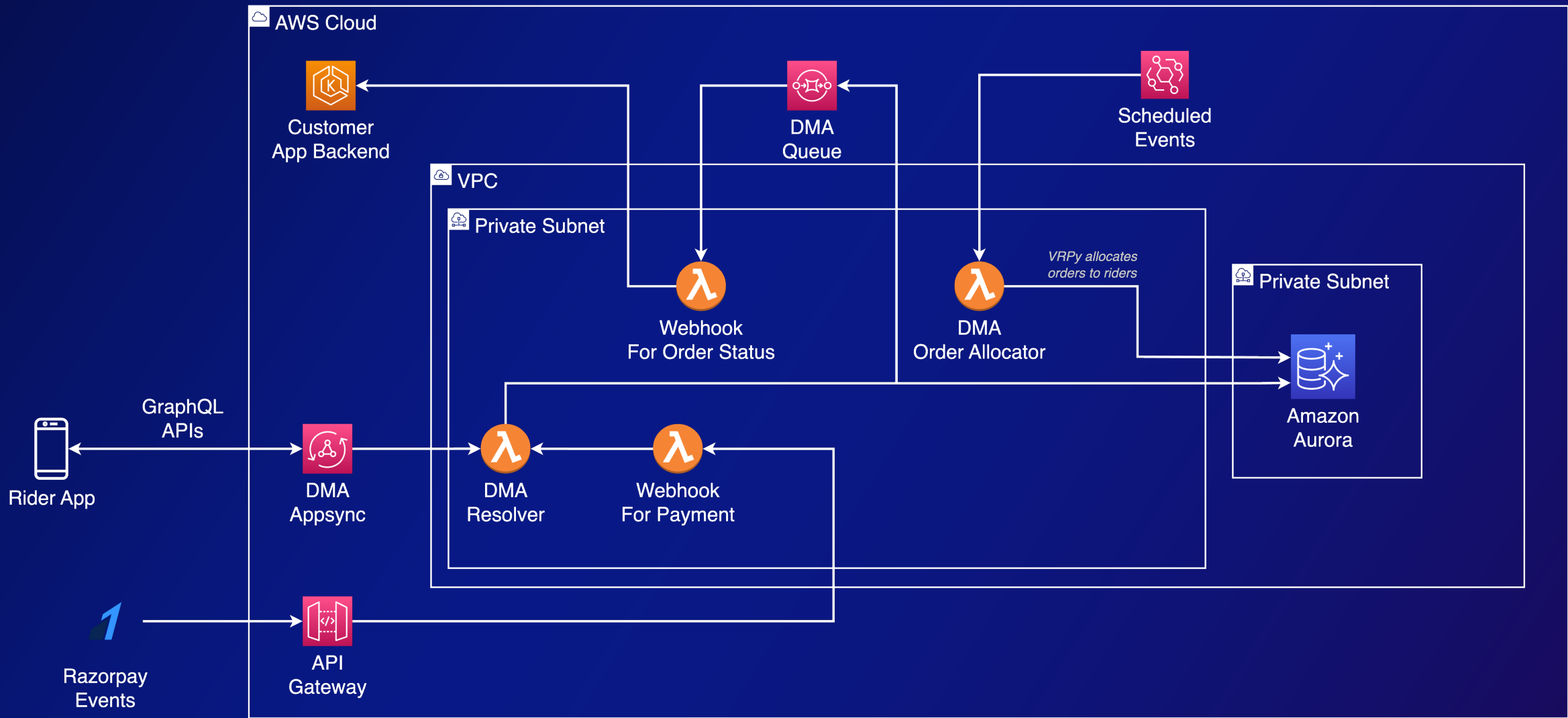
Order allocation

```
{
  "3089": [
    {
      "order_id": 56814,
      "rider_no": 100,
      "ETA": 15,
      "sequence": 1
    },
    {
      "order_id": 56824,
      "rider_no": 100,
      "ETA": 30.0,
      "sequence": 2
    },
    {
      "order_id": 56858,
      "rider_no": 100,
      "ETA": 52.0,
      "sequence": 3
    }
  ]
}
```
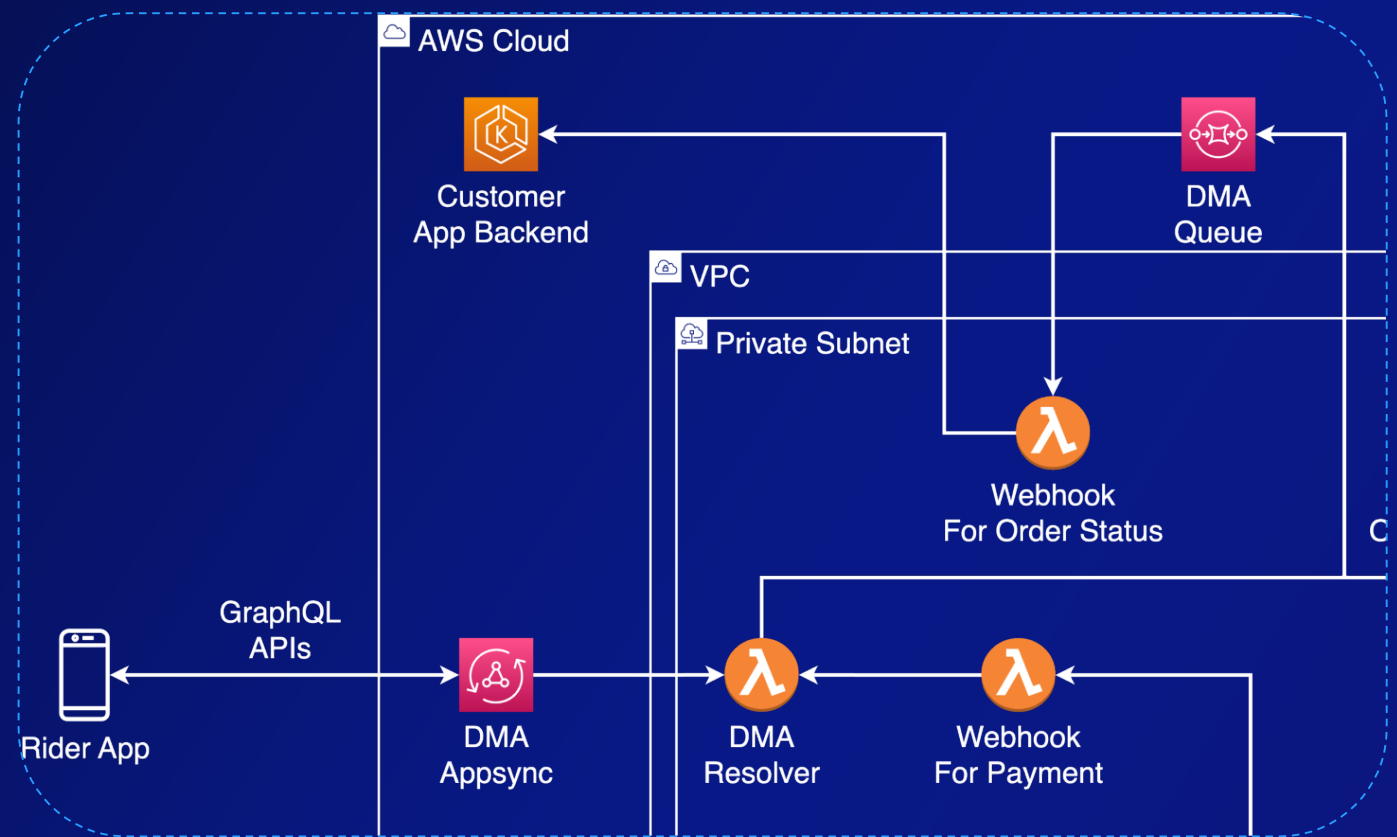
Scheduled Events

VRPy allocates orders to riders

Private Subnet

DMA Order Allocator

Amazon Aurora

Backend architecture

Order lifecycle
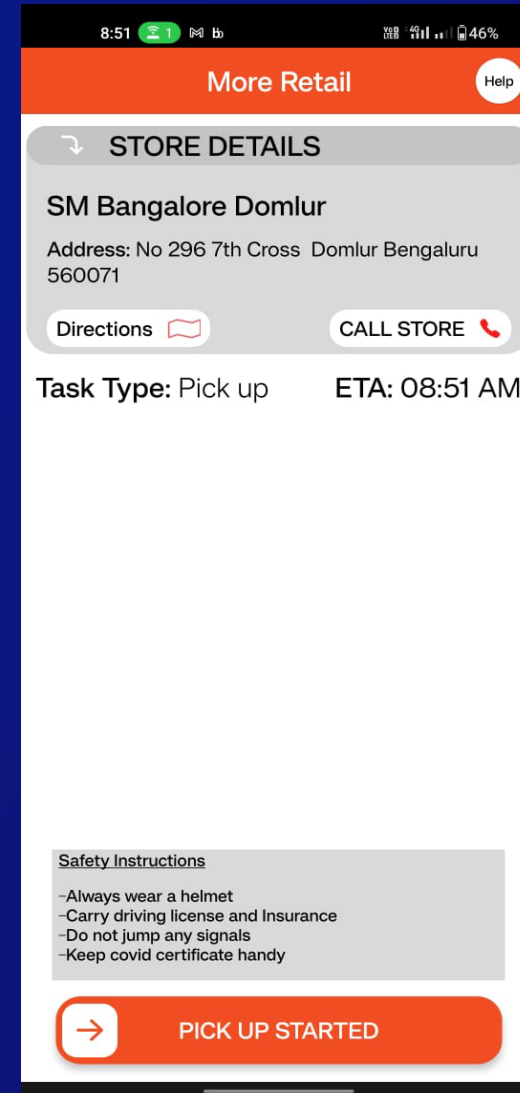
Order status mutation - Example

```
mutation MyMutation {
        orderStatus(
                access_token: "token",
                lat: 1.5,
                long: 1.5,
                status: "pickup_started",
                orders: [13402]) {
                        order_id
                        slot_start
                        slot_end
                        bag {
                          bags
                          code
                        }
                }
}
```
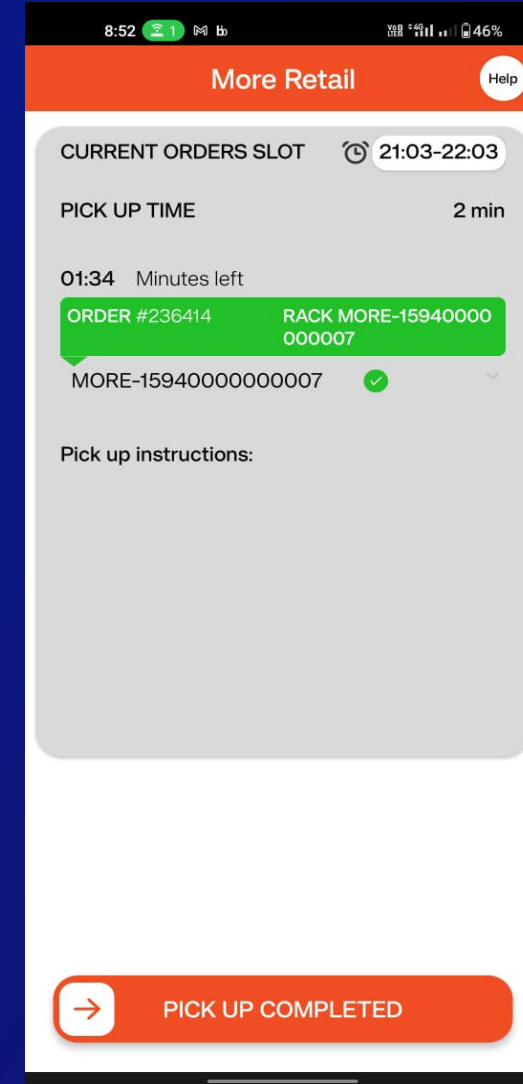
Order status mutation - Example

```
Mutation response
{
  "data": {
    "orderStatus": [
      {
        "order_id": 13402,
        "slot_start": "2022-12-07 14:00:00+05:30",
        "slot_end": "2022-12-07 16:00:00+05:30",
        "bag": [
          {
            "bags": "MORE-15940000000003",
            "code": "MORE-15940000000003"
          }
        ]
      }
    ]
  }
}
```
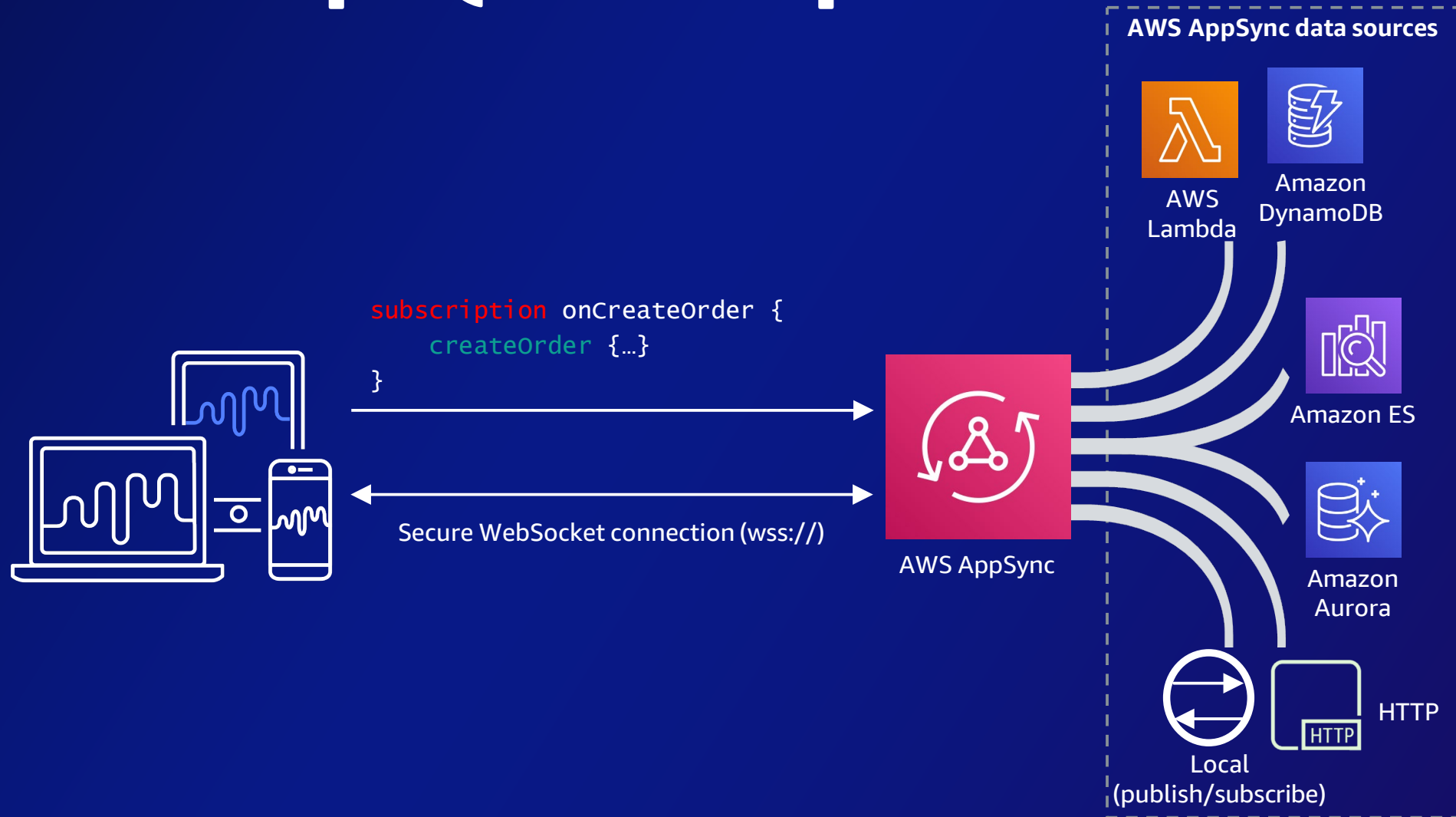
Deployments

AWS Cloud Development Kit (AWS CDK)

Bitbucket CI/CD Pipelines

AWS Lambda Versions

AppSync – Deep dive

Real-time GraphQL subscriptions

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

Secure WebSocket connection (wss://)

AWS AppSync

AWS AppSync data sources

AWS Lambda

Amazon DynamoDB

Amazon ES

Amazon Aurora

Local (publish/subscribe)

HTTP

Direct Lambda

AWS AppSync

GraphQL API

GraphQL schema
(Data model)

Resolvers
(Business logic)

AWS Lambda
(Business logic + data)
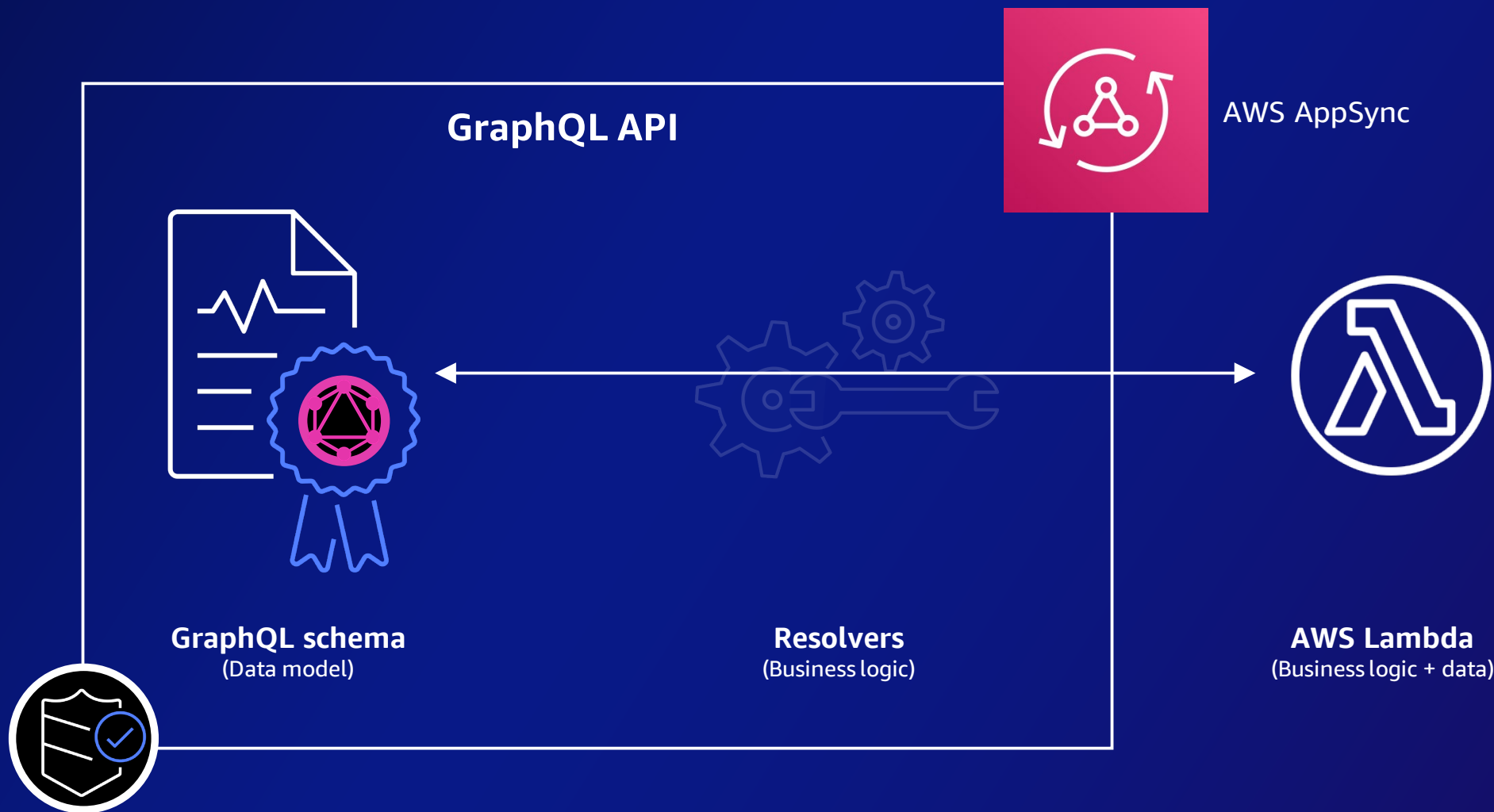
Authentication options

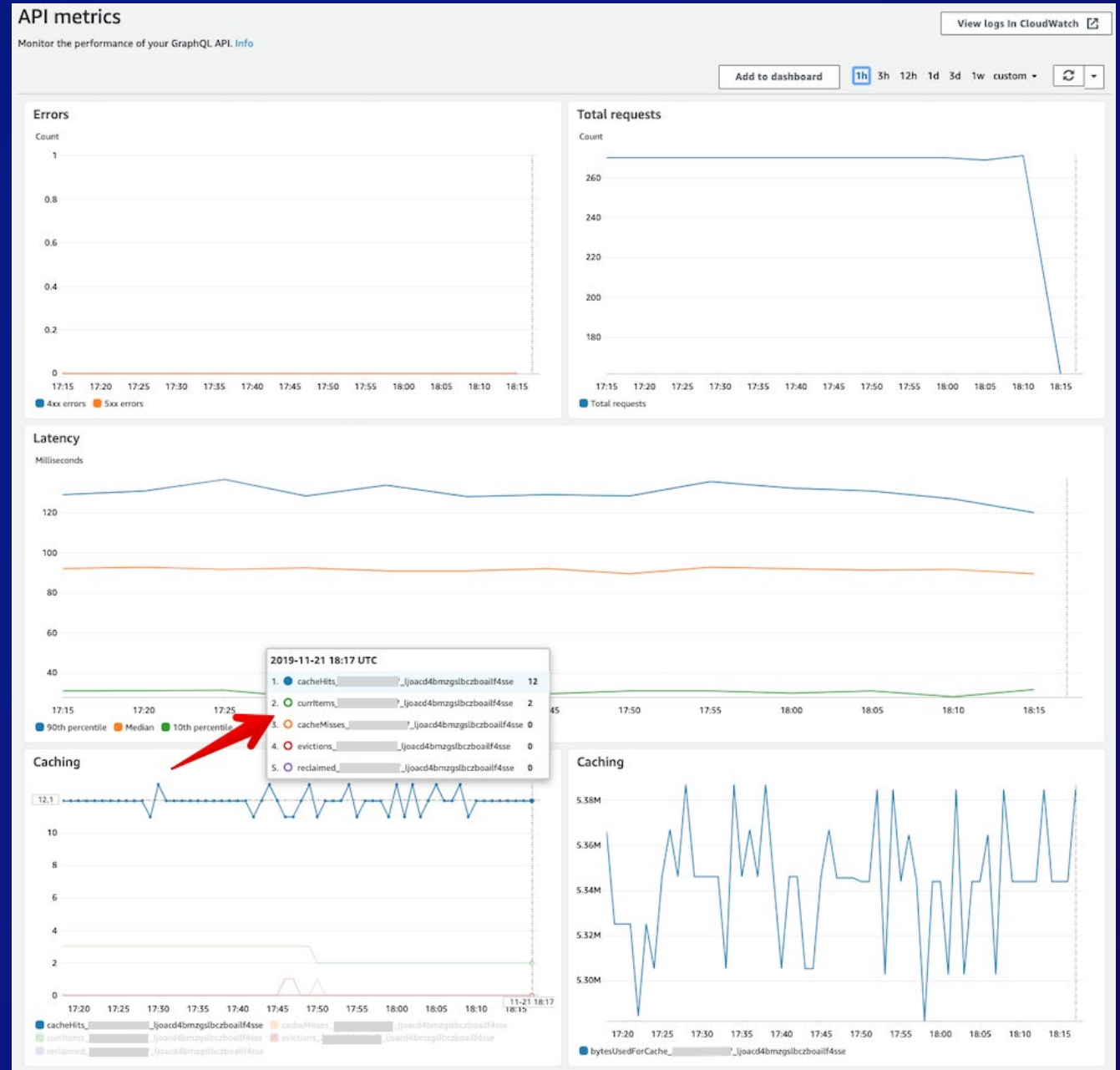| API keys | Amazon Cognito User Pools | OpenID Connect | AWS Identity and Access Management | AWS Lambda |

AWS AppSync – secure and protected endpoints

AWS Cloud

Data sources

Authorization
required for access
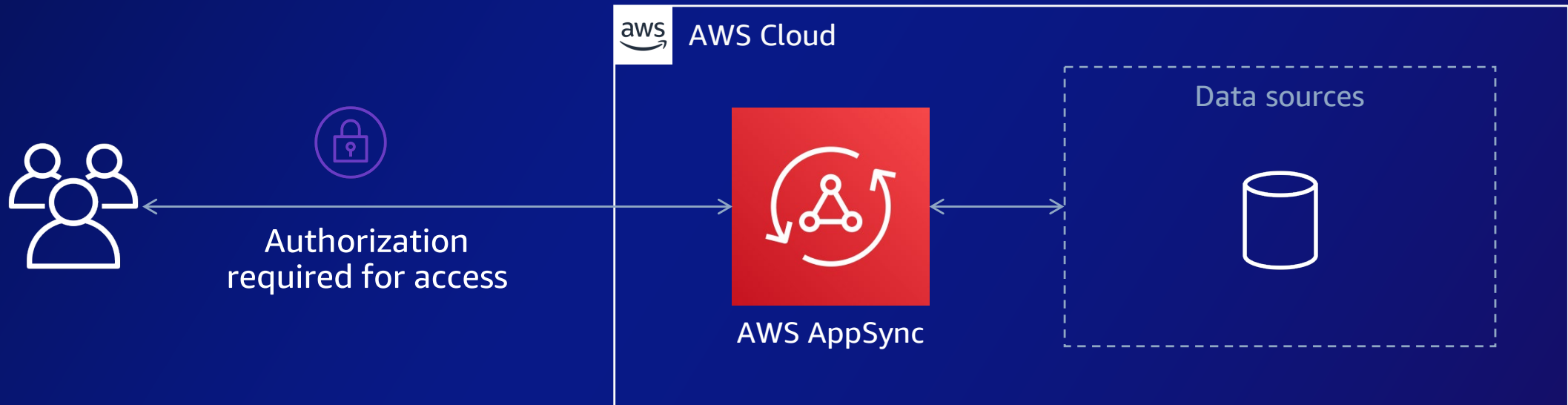
AWS AppSync

AppSync: Operations and Management

Caching

- Managed server-side caching

- Full API caching

- Per resolver caching

- Encryption

Log insights

/aws/appsync/apis/ljoacd4bmzgslbczboailf4sse ▼   15m 30m 1h 6h 12h 1d custom ▼

```
fields ispresent(resolverArn) as isRes
| stats count() as invocationCount by resolverArn
| filter isRes | filter logType = "Tracing"
```
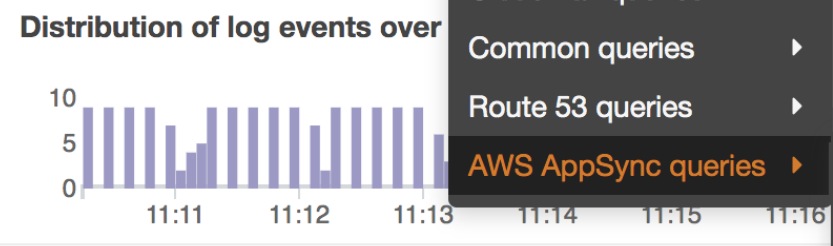...

Run query   Actions ▼   Sample queries ▼   Have feedback? Email us.

Lambda queries	▶
VPC flow log queries	▶
CloudTrail queries	▶
Common queries	▶
Route 53 queries	▶
AWS AppSync queries	▶

Logs   Visualization

Distribution of log events over

Number of unique HTTP status codes
Top 10 resolvers with maximum latency
Most frequently invoked resolvers
Resolvers with most errors in mapping templates
Field latency statistics
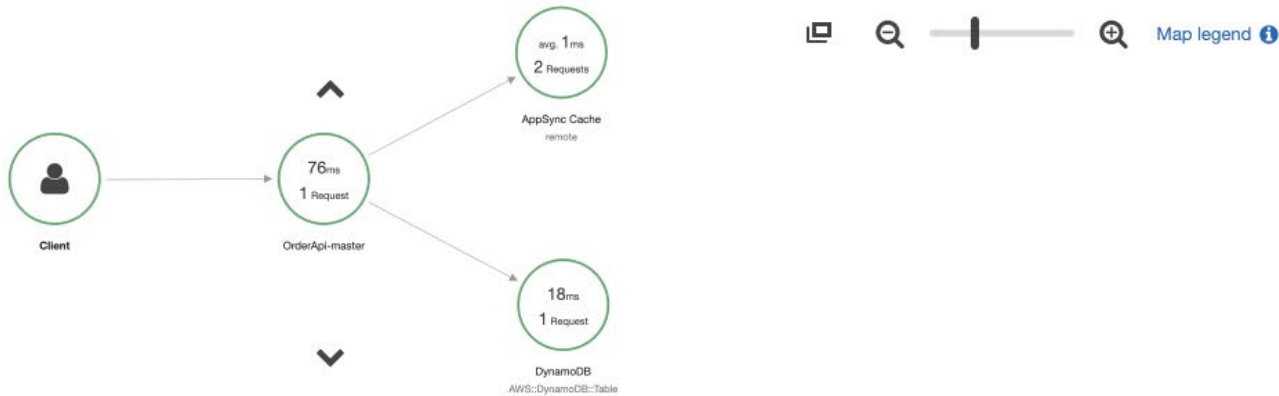Resolver latency statistics
Top 10 requests with maximum latency

10
5
0
11:11 11:12 11:13 11:14 11:15 11:16   1:22 11:23 11:24 11:25

817 records matched | 18,286 records (6.9 MB) scanned in 3.5s

#	resolverArn		invocationCount
1	arn:aws:appsync:us-west-2:	:apis/ljoa updateReviews	475
2	arn:aws:appsync:us-west-2:	:apis/ljoa Reviewss	87
3	arn:aws:appsync:us-west-2:	:apis/ljoa updateMovies	87
4	arn:aws:appsync:us-west-2:	:apis/ljoa Movies	85
5	arn:aws:appsync:us-west-2:	:apis/ljoacd4bmzgslbczboailf4sse/types/Mutation/fields/createMovies	83

X-Ray

Thank you!

Please complete the session survey in the mobile app

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