AWS AppSync
构建数据驱动的应用

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AWS中国（宁夏）区域由西云数据运营
AWS中国（北京）区域由光环新网运营

当前常见是怎么搭建移动应用的？

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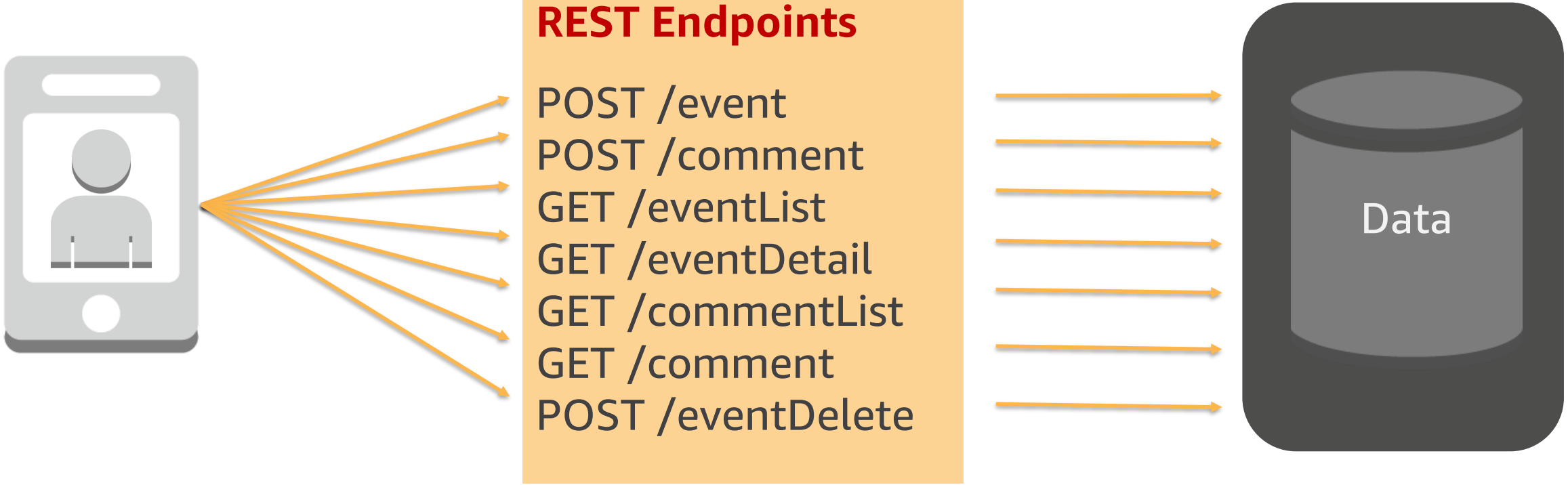
设定一个简单需求

- 一个活动(Event)发布和评论(Comment)的应用
- 可发布新活动通知
- 用户可以进行评论
- 用户可关注某个活动，实时收到更新的评论
- 可删除活动

当前基于REST API的应用设计



- ✓ 碎片化的建链
- ✓ 标准 HTTP Calls

- ✗ Relationships
- ✗ Lists with reduced information
- ✗ Query support
- ✗ Ordering and paging
- ✗ Notifications

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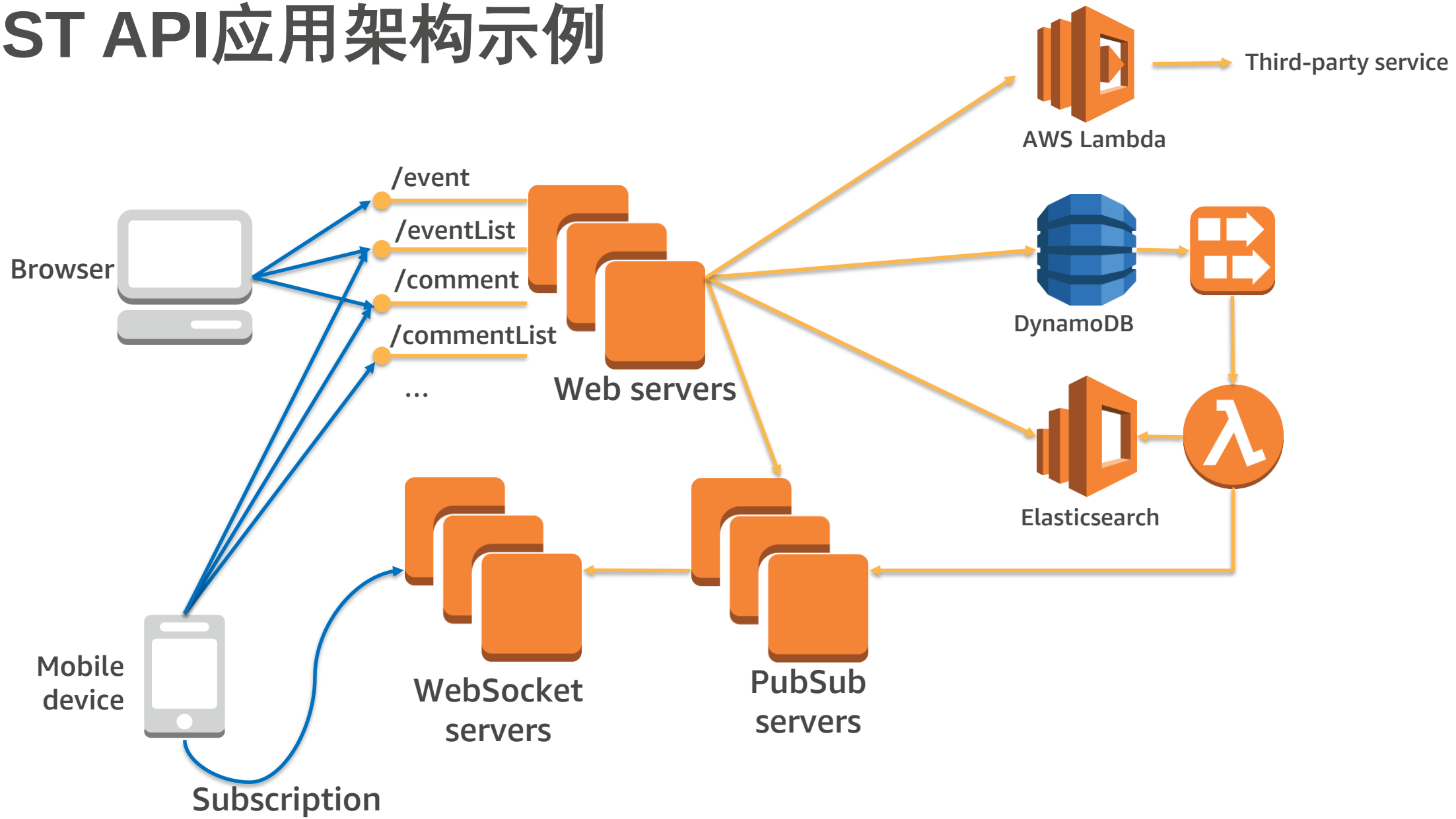
REST API应用架构示例



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有没更好的方式？

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GraphQL 为API而生的查询语言

GraphQL 跟 Graph Database 图数据库没有关系

- 一种 APIs 查询语言
- 查询数据的运行环境 Runtime
- 客户端和服务器之间的强类型合约

非常适合客户端App操作数据

官方网站
graphql.com
graphql.cn

谁在使用 GraphQL

Facebook 的移动应用从 2012 年就开始使用 GraphQL。GraphQL 规范于 2015 年开源，被各种体量的团队所使用。

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GraphQL - 数据操作语言

Query 读数据

```
query {
  post(id: 1) {
    id
    title
  }
}
```

Mutation 写数据然后读数据

```
mutation {
  createPost(title: "Intro to GraphQL") {
    id
    title
  }
}
```

Subscription 订阅实时推送的数据

```
subscription {
  onCreatePost {
    id
    title
  }
}
```


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GraphQL - 工作方式

```
type Query {
    getTodos: [Todo]
}

type Todo {
    id: ID!
    name: String
    description: String
    priority: Int
    duedate: String
}
```

```
query {
  getTodos {
    id
    name
    priority
  }
}
```

```
{
        "id": "1",
      "name": "Get Milk",
        "priority": "1"
},
{       "id": "2",
      "name": "Go to gym",
        "priority": "5"
},…
```

定义数据schema **查询query** **获得数据data**

- 一个 GraphQL 请求就能准确获得你想要的数据，不多不少。
- 一个请求获取多个资源，轻松应对比较慢的移动网络

GraphQL - API 演进无需划分版本

```
type Film {
  title: String
  episode: Int
  releaseDate: String
  openingCrawl: String


}
```

```
type Film {
  title: String
  episode: Int
  releaseDate: String
  openingCrawl: String
+ director: String

}
```

```
type Film {
  title: String
  episode: Int
  releaseDate: String
  openingCrawl: String
  director: String
+ directedBy: Person
}

+ type Person {
+   name: String
+   directed: [Film]
+   actedIn: [Film]
+ }
```

```
type Film {
  title: String
  episode: Int
  releaseDate: String
  openingCrawl: String
  director: String @deprecated(reason: "Use `directedBy`")
  directedBy: Person
}

type Person {
  name: String
  directed: [Film]
  actedIn: [Film]
}
```

GraphQL 特点

- 由数据需求方来决定获取的数据
  - 不是由后台服务端来实现，而是由前端控制请求什么数据
  - 准确获得你想要的数据，不多不少，带宽优化
- 一个请求获取多个资源
  - N次 vs. 1次交互
- 数据操作行为
  - 批量操作，实时操作
- API 演进无需划分版本
  - GraphQL API 添加字段和类型而无需影响现有查询

GraphQL 能做什么

- Real time 实时? YES
- Batching 批量? YES
- Pagination 分页? YES
- Relations 关系? YES
- Aggregations 聚合? YES
- Search 搜索? YES
- Offline 离线? YES

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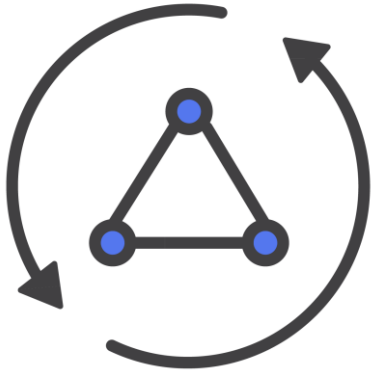

Introducing AWS AppSync

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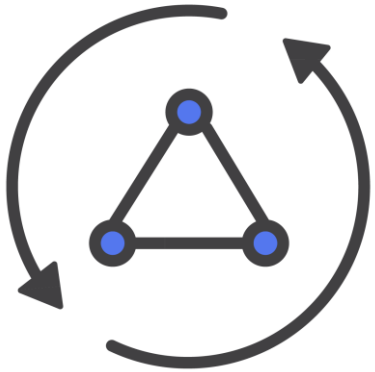
AWS AppSync - 构建强大的数据驱动的APPS

实时, 协作 Apps

离线编程模型同步机制



只收取你需要的数据

访问多个数据源

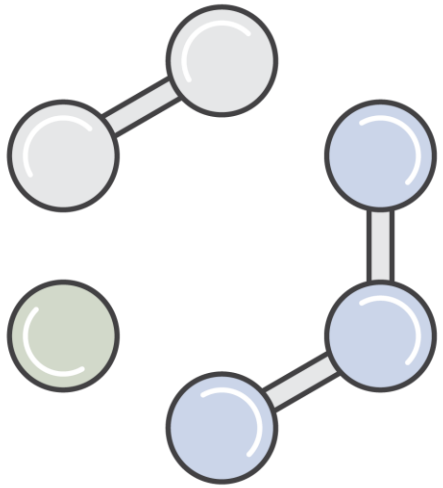
精细的权限控制

AppSync可以构建的APP示例

协作类APP
- 仪表盘
- 排行榜
- 白板
- …

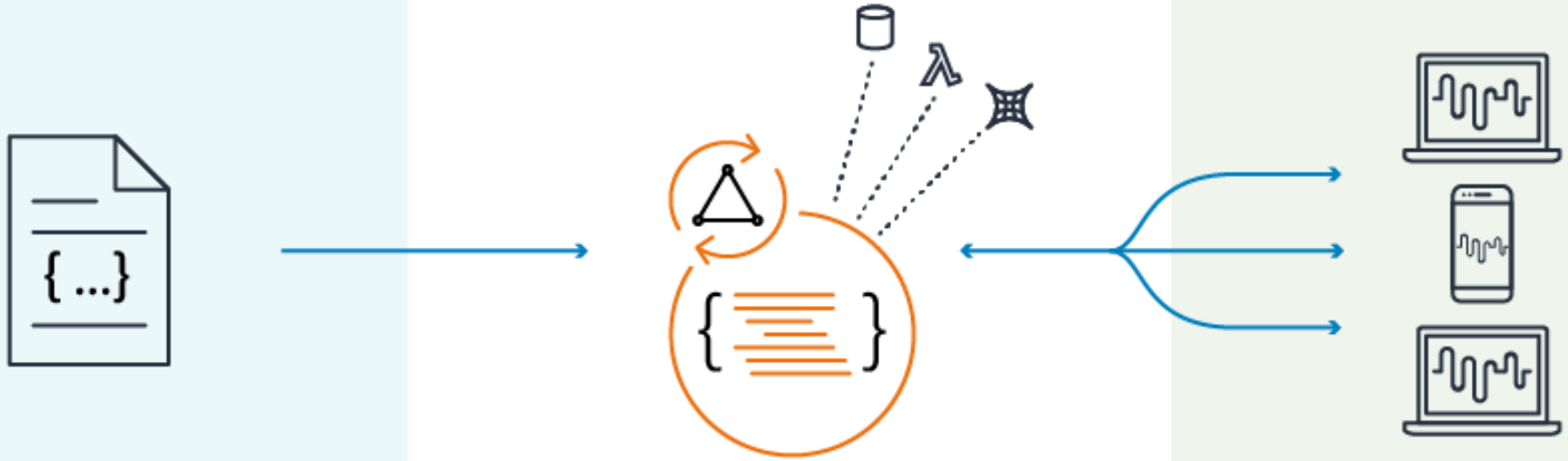
社交、聊天和约会APP

基于地理位置的APP



复杂的数据结构和类型的APP

AWS AppSync 三步构建 GraphQL 应用



Create and Upload Schema

Developers use the console editor to define and deploy a GraphQL API so the application can query and change data and update in real time

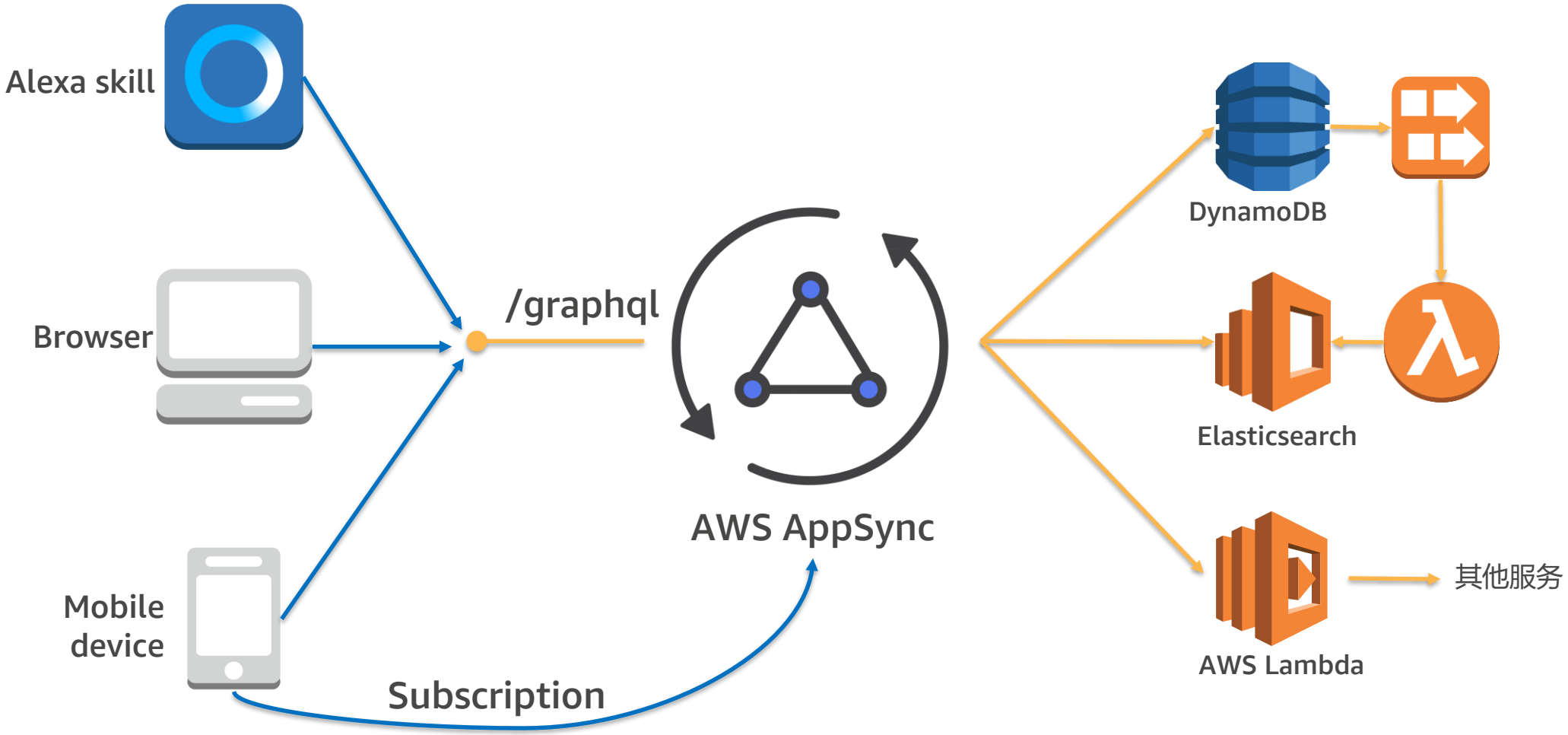
Connect Data Sources

AWS AppSync automatically provisions data sources and compute resources, or uses existing resources, and connects them to your GraphQL API

AppSync updates data in real time and manages data when offline

Client applications make GraphQL API calls to fetch data, make changes, or subscribe to changes in real time from all users and devices. Offline users can continue to access and change app data and get updates when they reconnect

使用 AWS AppSync 的架构示例



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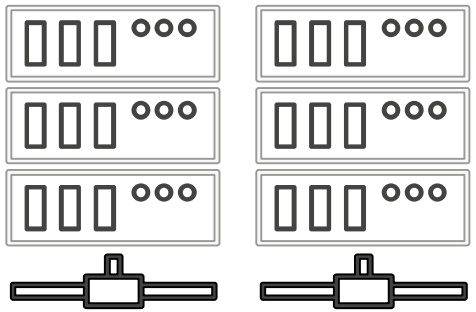
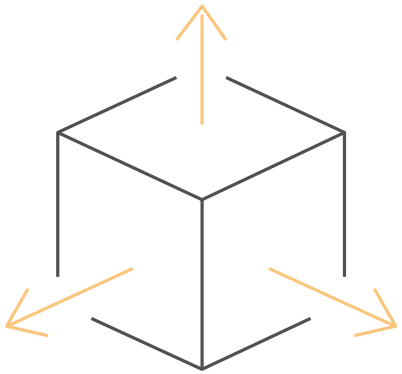
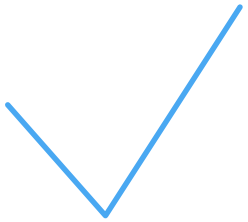
无服务器架构意味着 … …



无需管理服务器



灵活扩展



高可用

只为使用量付费

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Demo

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AWS AppSync 订阅机制

近实时的消息更新

事件驱动模式，由Mutation触发

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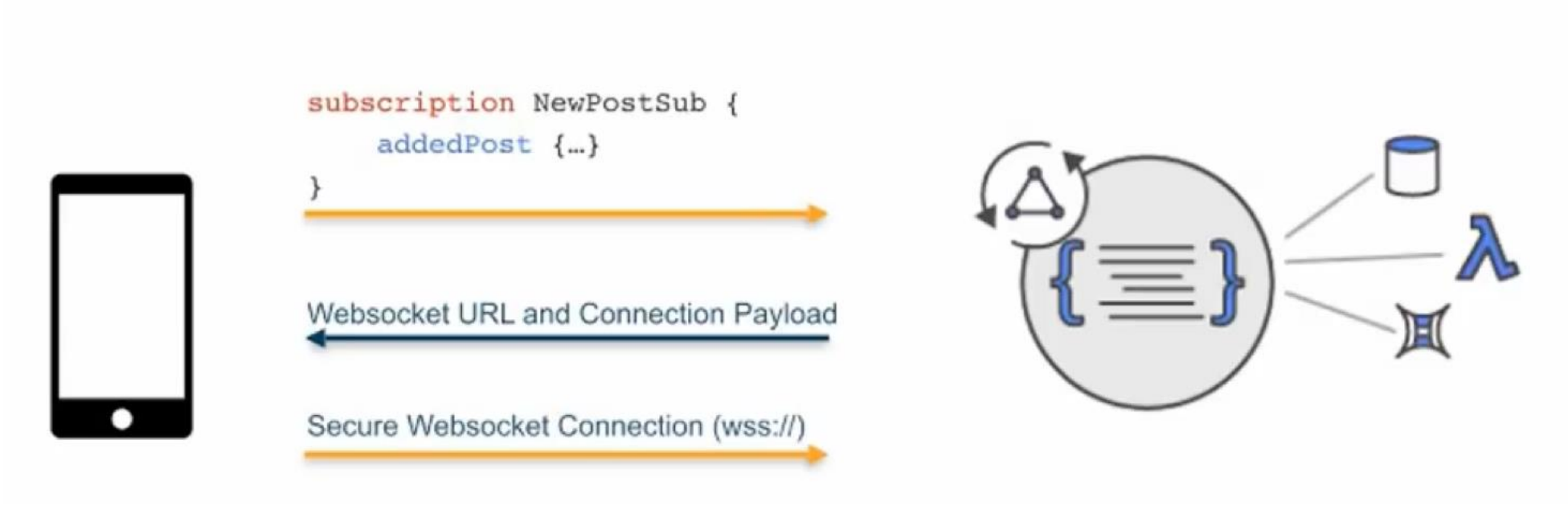
AWS AppSync 订阅的握手流程



由SDK帮你实现，无需自己编写代码

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AWS AppSync 企业级安全性和精细访问控制

AWS AppSync 认证方式

- API Key
- AWS IAM (Identity and Access Management) 使用角色来控制
- Amazon Cognito 用户池，集成了多种社交服务提供商 (Facebook、Google+ 和 Login with Amazon)，并支持使用 SAML 联合身份。
- OpenID Connect

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AWS AppSync 企业级安全性和精细访问控制 (续)

读数据鉴权的示例

ID	Data	PeopleCanAccess	GroupsCanAccess	Owner
123	{my: data,...}	[Mary, Joe]	[Admins, Editors]	Nadia

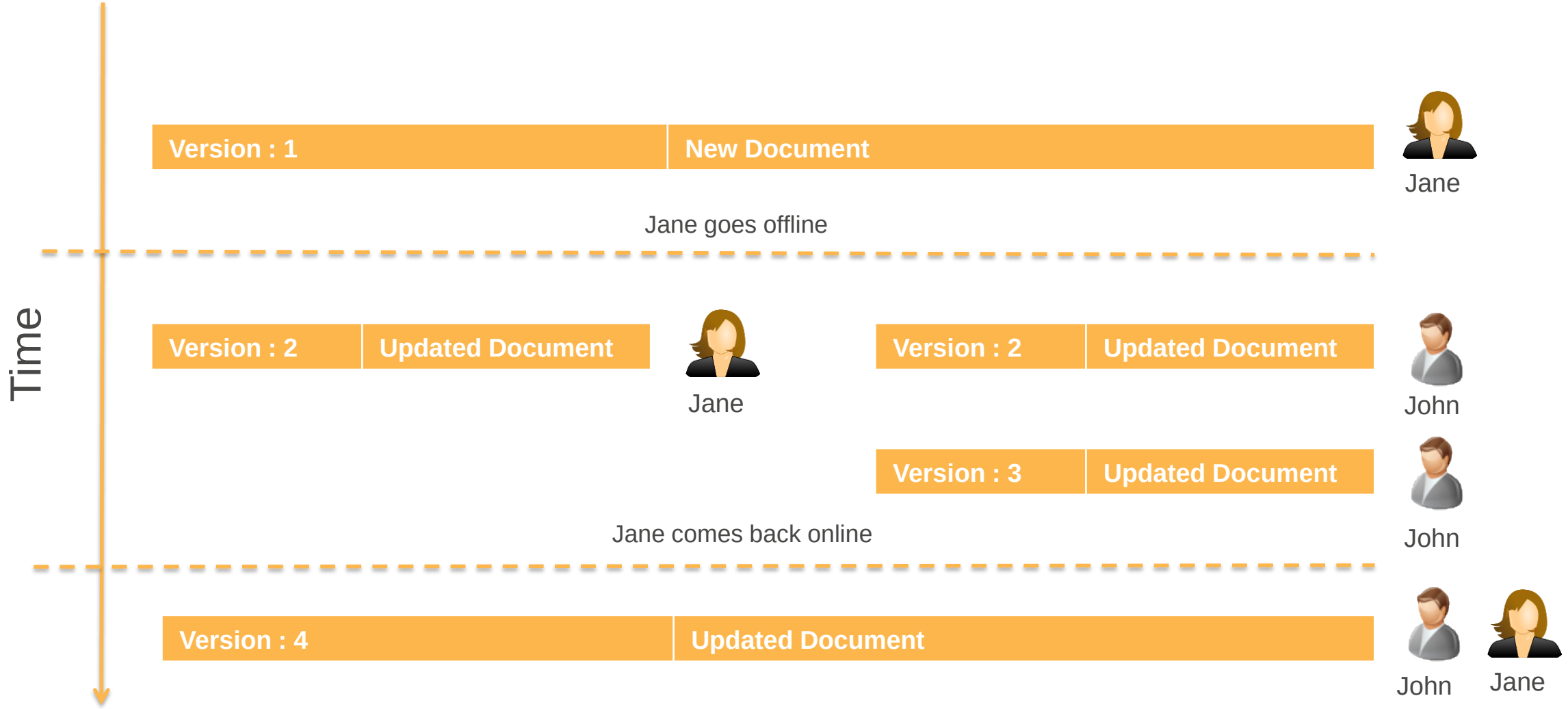
- 数据Owner可读
- 多用户可读
- 用户组可读
- 过滤结果子集
- 只允许特定访问

基于GraphQL Resolver 实现数据访问控制（例子：Owner可读）

```
#if($context.result["Owner"] == $context.identity.username)
    $utils.toJson($context.result);
#else
    $utils.unauthorized()
#end
```

参考文档: https://docs.aws.amazon.com/appsync/latest/devguide/security-authorization-use-cases.html

AWS AppSync 离线同步示例



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冲突解决与同步机制

云上的冲突解决

1. 服务器优先
2. 静默拒绝
3. 自定义逻辑 (AWS Lambda)

- 优化的版本检查
- 自定义检查方式

可选

- 回传到客户端进行冲突处理

例子：检查一个ID是否已存在:

```
{
   "version" : "2017-02-28",
   "operation" : "PutItem",
   "key" : {
      "id" : { "S" : "1" }
   },
   "condition" : {
      "expression" : "attribute_not_exists(id)"
   }
}
```

例子：如果版本错误则运行Lambda

```
"condition" : {
    "expression" : "someExpression"
    "conditionalCheckFailedHandler" : {
        "strategy" : "Custom",
        "lambdaArn" : "arn:..."
    }
}
```


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AWS Amplify 开发包

AWS Amplify

- 针对前端和移动端开发的JavaScript Library
  - JavaScript (frameworks)
  - React + React Native
- 功能
  - Authentication
  - Analytics，app用户行为分析
  - API， 支持AWS Signature Version 4
  - GraphQL Client
  - Storage，管理S3存储数据
  - Push Notifications，Amazon Pinpoint
  - Interactions，Amazon LEX
  - PubSub
  - Internationalization，语言国际化方案
  - Cache， LRU(Least Recently Used) Cache

- Open Source (Apache)
  - github.com/aws/aws-amplify/

npm install aws-amplify
11 dependencies version 0.4.8
5 dependents updated 2 days ago
2 ★

Amplify + Apollo + AppSync 前端示例代码

```
const client = new AWSAppSyncClient({
    url: awsconfig.ENDPOINT,
    region: AWS.config.region,
    auth: { type: AUTH_TYPE.AWS_IAM, credentials: Auth.currentCredentials() }
});

const WithProvider = () => (
    <ApolloProvider client={client}>
        <Rehydrated>
            <AppWithData />
        </Rehydrated>
    </ApolloProvider>
);
```

https://aws.github.io/aws-amplify/

这么简单就完成了终端配置，认证集成，离线缓存集成

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AWS AppSync 特点

- 使用 GraphQL 实现快速原型设计和开发
- 构建实时的协作移动和 Web 应用程序
    - 使用多个来源的数据构建应用程序
    - 自动Websocket连接
    - 自动管理离线用户的数据
    - 云上的数据冲突处理
- 精细的数据安全控制
- AWS Amplify开发包与流行的Apollo GraphQL Client集成 (github.com/apollographql)
    - 支持多种平台与开发框架

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AWS AppSync服务已在以下区域发布

- US East (N. Virginia),
- US East (Ohio),
- US West (Oregon),
- Asia Pacific (Sydney),
- Asia Pacific (Tokyo),
- Asia Pacific (Mumbai),
- Asia Pacific (Singapore),
- EU (Ireland),
- EU (Frankfurt).

AWS AppSync 示例代码与文档资源

amazonaws-china.com/appsync/resources/

AWS AppSync | Overview | Features | Pricing | Resources

Documentation & Videos

AWS AppSync developer guide

AWS AppSync API reference

AWS AppSync re:Invent 2017 session video

Starter applications

Learn more and jump start your AWS AppSync development of data-driven applications with real-time updates and offline capabilities by using these starter applications tailored to your programming language or platform.

iOS Starter App

React Starter App

React Native Starter App

Android App

AWS Amplify

React.js GraphQL Photo Sample

Angular Chat App

Thank you!

huangzb@amazon.com