
aws
INNOVATE
MODERN APPLICATIONS EDITION
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Implementing GraphQL API security best practices with AWS AppSync

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Production-ready GraphQL requirements

- Protect access
  - Only authorized access
  - Support multiple access patterns
- Protect availability
  - Maintain service uptime
  - Limit availability to trusted sources
  - Block bad actors
- Protect performance
  - Monitor constantly
  - Analyze in real time
  - Improve over time
- Deploy reliably
  - Infrastructure as code
  - Repeatable

AWS AppSync

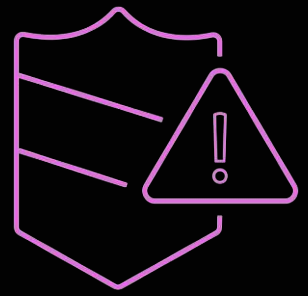
Managed serverless GraphQL service

Connect to data sources in your account

Add data sync, real-time, and offline capabilities for any data source or API

GraphQL facade for any AWS service

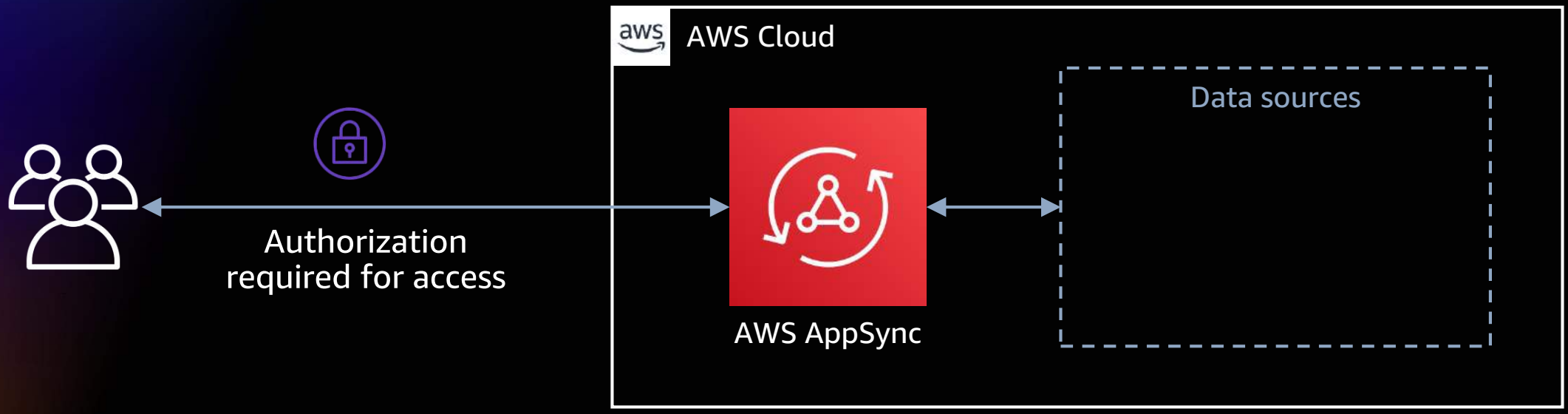
Conflict detection and resolution in the cloud



Enterprise security features: AWS WAF(Web Application Firewall) , AuthZ modes, access controls, monitoring

Protecting access to your API

AWS AppSync: Secure and protected endpoints



All requests must be authorized (no anonymous public access)

AWS AppSync: Authorization modes

API key

OpenID Connect

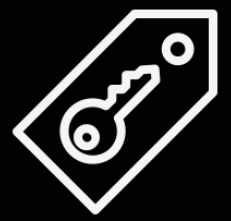
Amazon Cognito
User Pools

IAM

Choose the right AuthZ mode to fit the access use case

AWS AppSync: Authorization modes

API key



- Use HTTP header `x-api-key`
- Hardcoded in application

When to use

- Getting started
- With public APIs
- No specific AuthZ requirements
- B2B, machine to machine

AWS AppSync: Authorization modes

Amazon Cognito user pools

- Granular access control with AWS AppSync directives

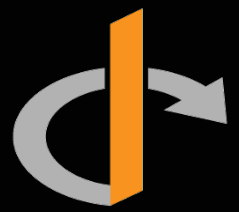
```
type Query {
  posts:[Post!]!
    @aws_auth(cognito_groups:
      ["Bloggers", "Readers"])
}
```

- Sign in with Amazon Cognito User Pools
- Use JSON web tokens (JWTs)

- **When to use**
- Authenticating users in app
- Connecting social identities
- Interacting with other AWS services

AWS AppSync: Authorization modes

Openid connect



- Granular access control based on claims

```
#set( $userGroups =
  ctx.identity.claims.get("oidc:groups”))
#set( $allowedGroups = ["Bloggers", "Readers"] )
#foreach( $userGroup in $userGroups )
  #if( $allowedGroups.contains($userGroup) )
    #set( $isStaticGroupAuthorized = true )
    #break
  #end
#end
#if( !($isStaticGroupAuthorized == true ) )
  $util.unauthorized()
#end
```

- Sign in with OIDC idP
- Use JWTs

- **When to use**
- Existing user directory
- Authenticating users in app
- Not interacting with other AWS services

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AWS AppSync: Authorization modes

AWS Identity and access management (IAM)

Granular access control with AWS IAM policy

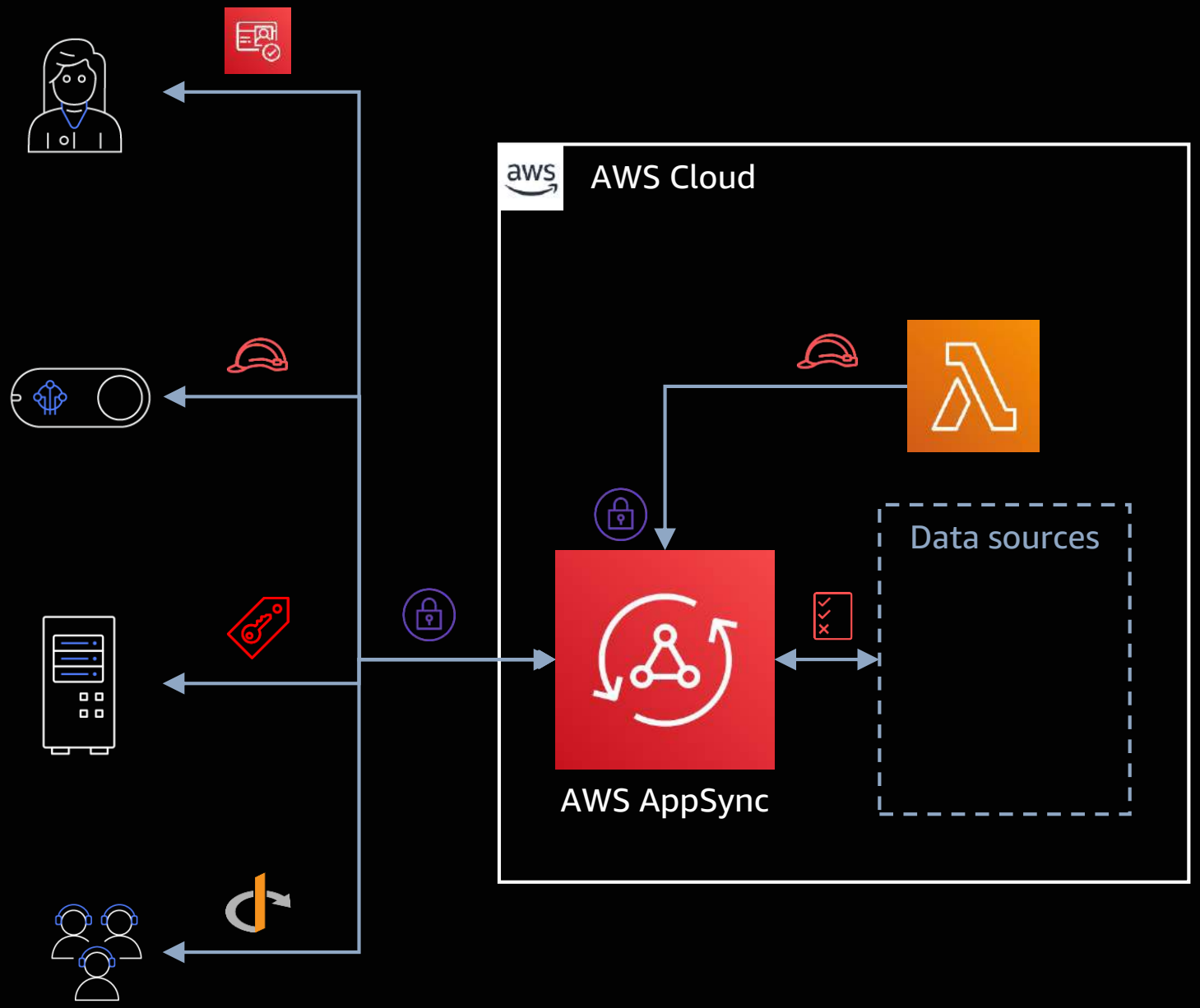
```
{
  "Version": "2012-10-17",
  "Statement": [{
    "Effect": "Allow",
    "Action": ["appsync:GraphQL"],
    "Resource": [
      "arn:*:apis/GraphQLApiId/types/Query/fields/<field>",
      "arn:*:apis/GraphQLApiId/types/Mutation/fields/<field>",
      "arn:*:apis/GraphQLApiId/types/Post/fields/<field>"
    ]
  }]
}
```

- Backend systems
- AWS credentials
- IoT systems

- **When to use**
- Amazon Elastic Container Service (Amazon ECS) instances
- AWS Lambda functions

Multi-auth

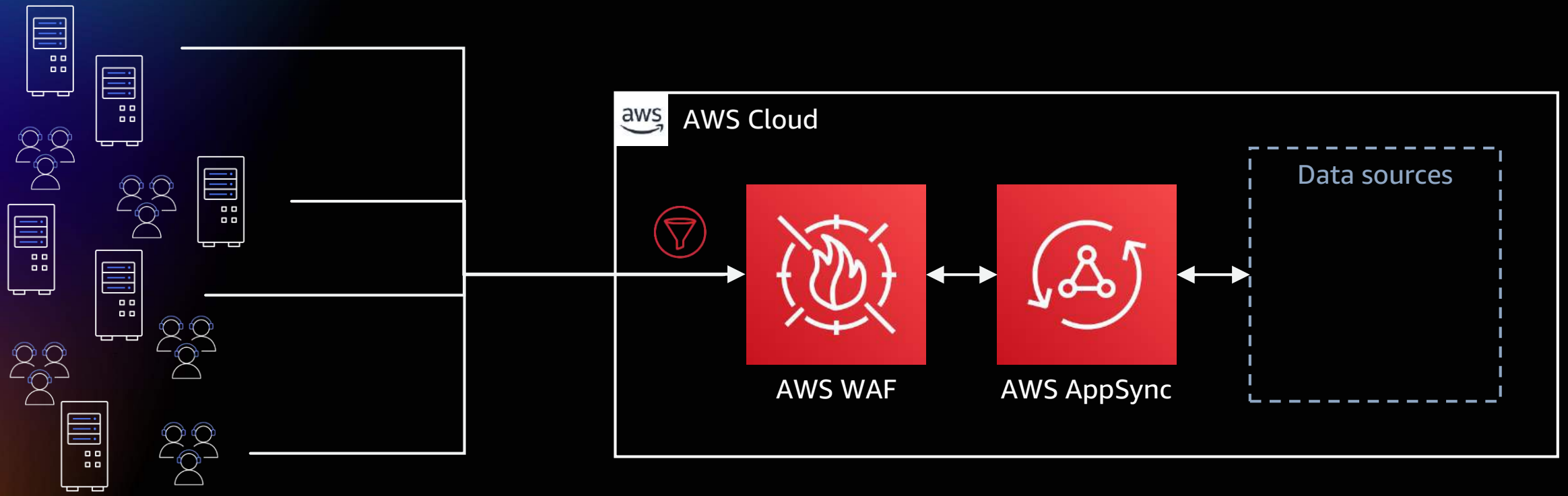
- Do authorization on
  - Type
  - Operation
  - Field
- Select default auth mode
- Specify additional providers



Demo – Implementing AuthZ

Protecting availability of your API

AWS AppSync: Secure and protected endpoints



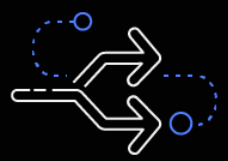
AWS WAF – protects against exploits that impact security, availability

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 AWS 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

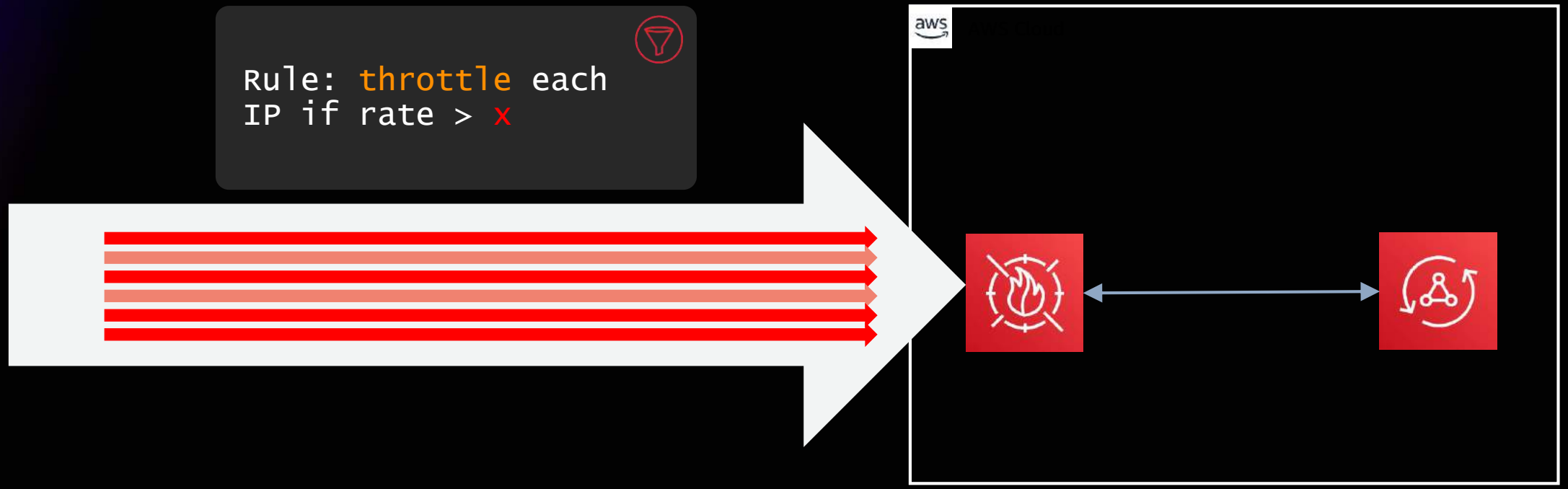


Simply pull in third-party rules – within the WAF console, you can pivot to AWS Marketplace to select industry-leading security vendor rules to pull into AWS WAF

AWS WAF: Use cases with AWS AppSync

- Protect against flooding
- Turn off introspection
- Support B2B APIs using API key
- Limit access to Amazon VPC resources only

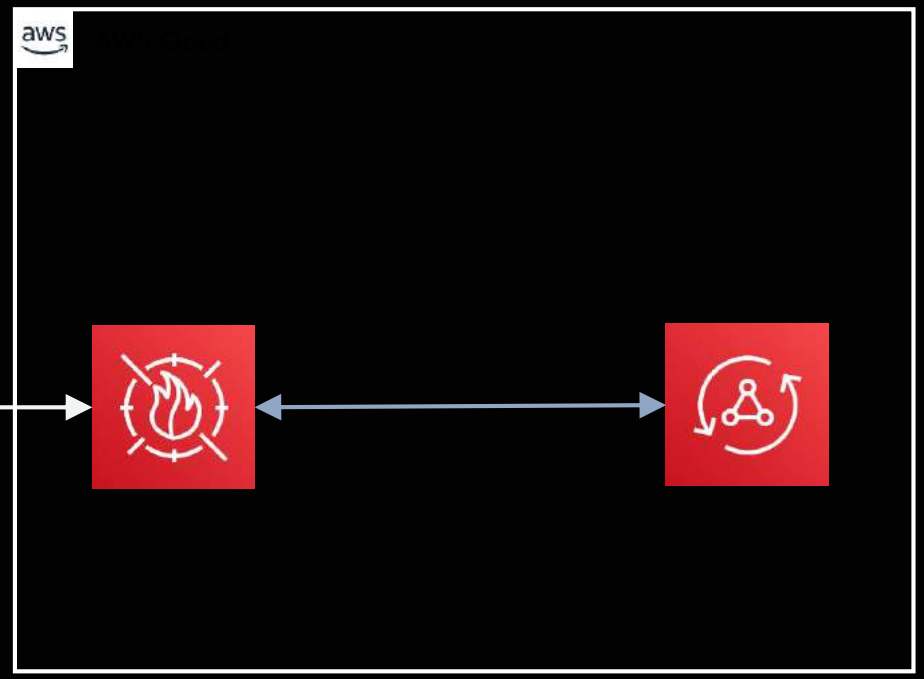
Protect against flooding



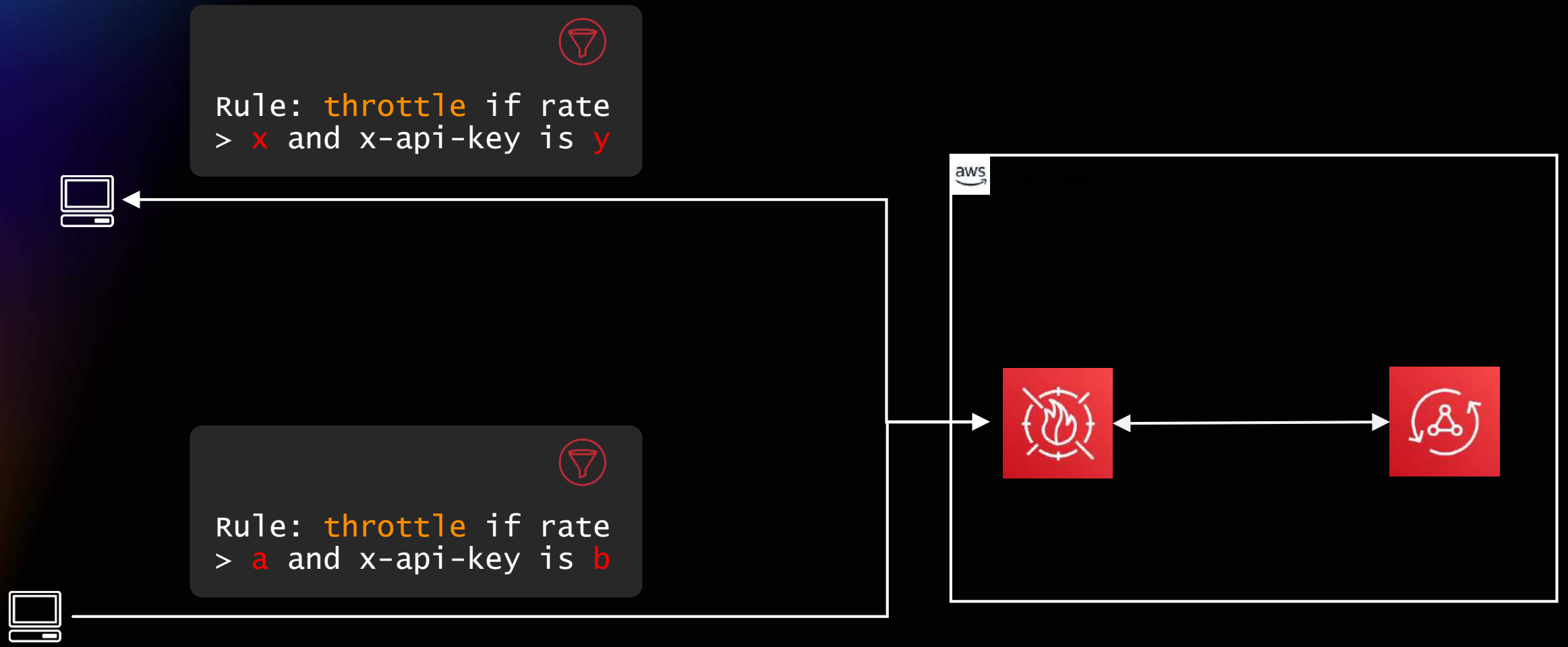
Turn off introspection: Schema not discoverable

```
{
  __schema {
    types {
      name
    }
  }
}
```

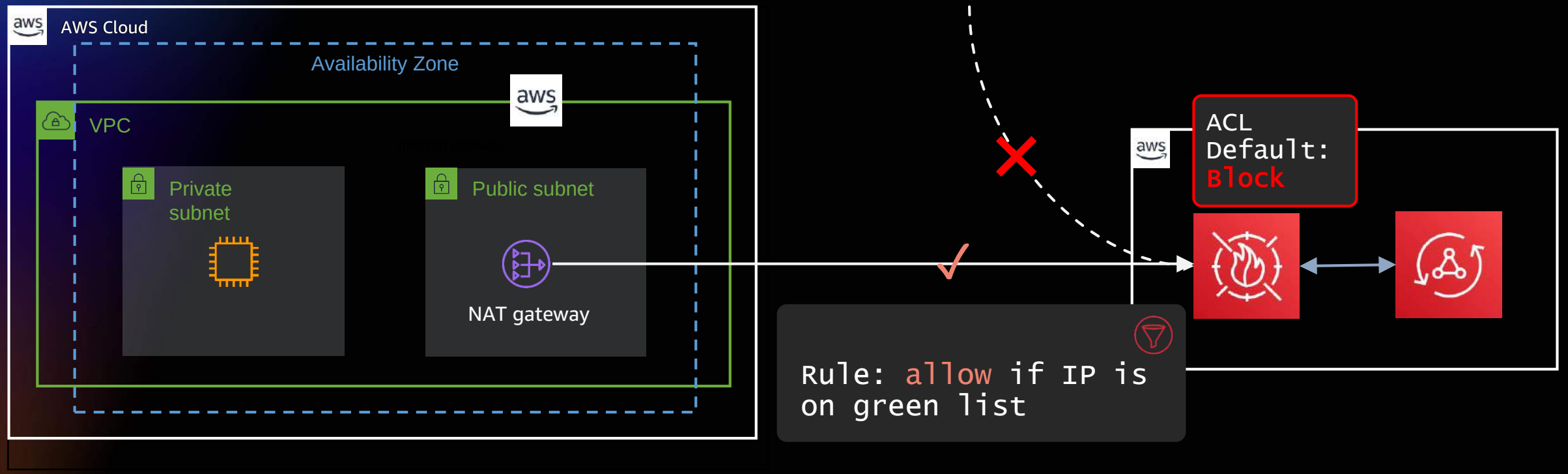
```
Rule: block if body
contains "__schema"
```



Support B2B APIs using API key



VPC-only access: Greenlist NAT gateway IP

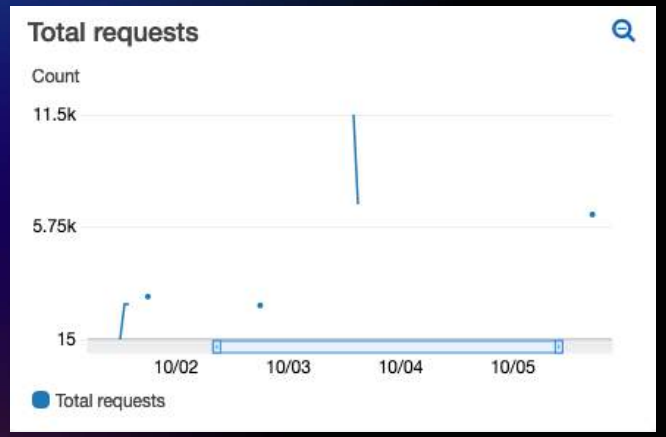


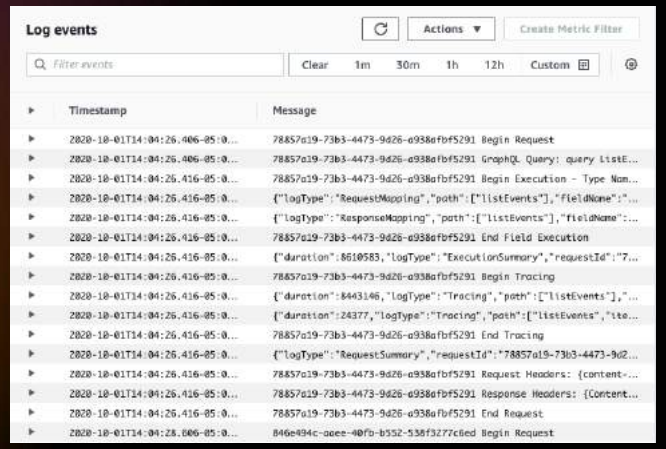
Demo – Implementing Protection

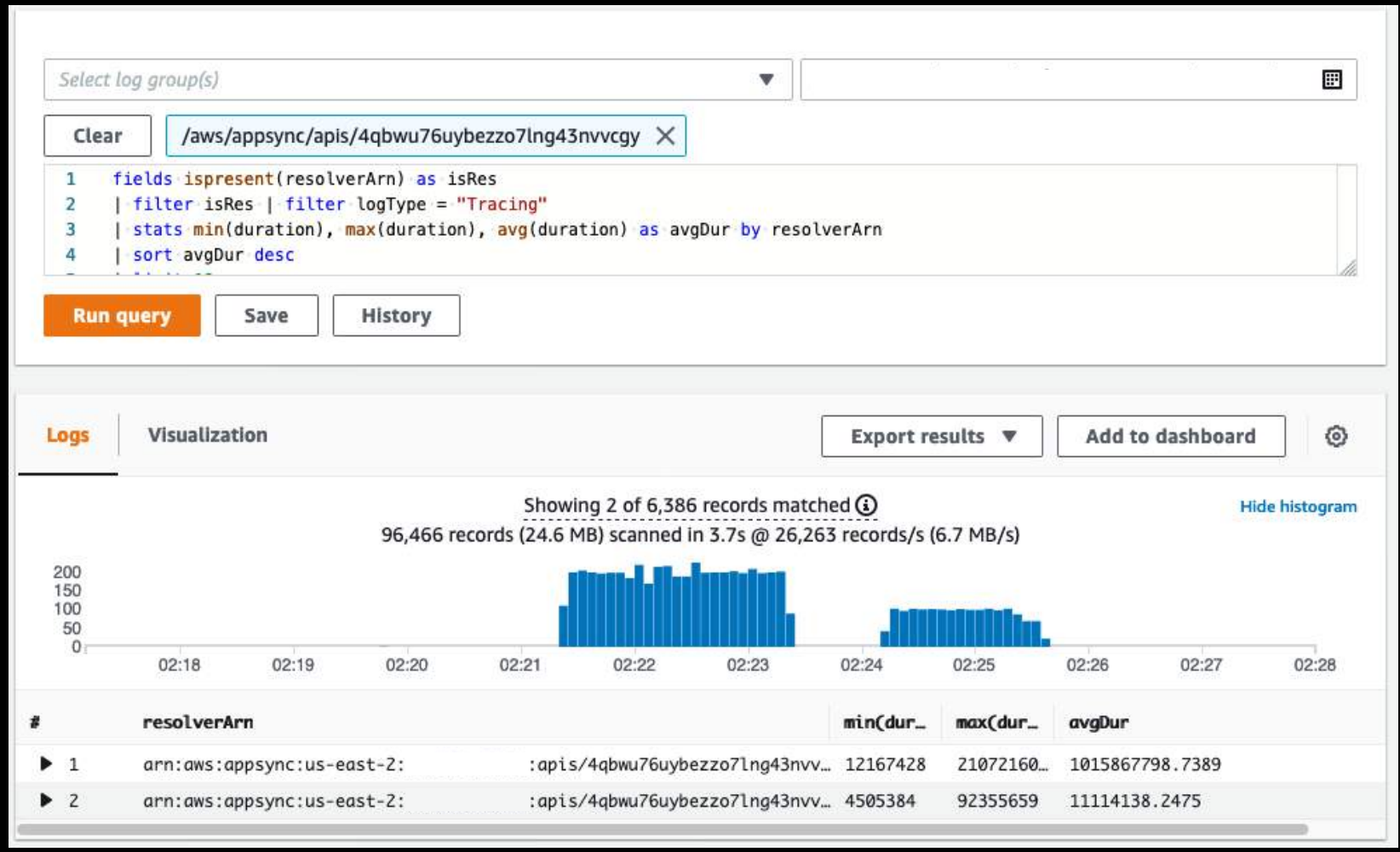
Observing your API

Monitor

Amazon CloudWatch metrics, logs, and log insights

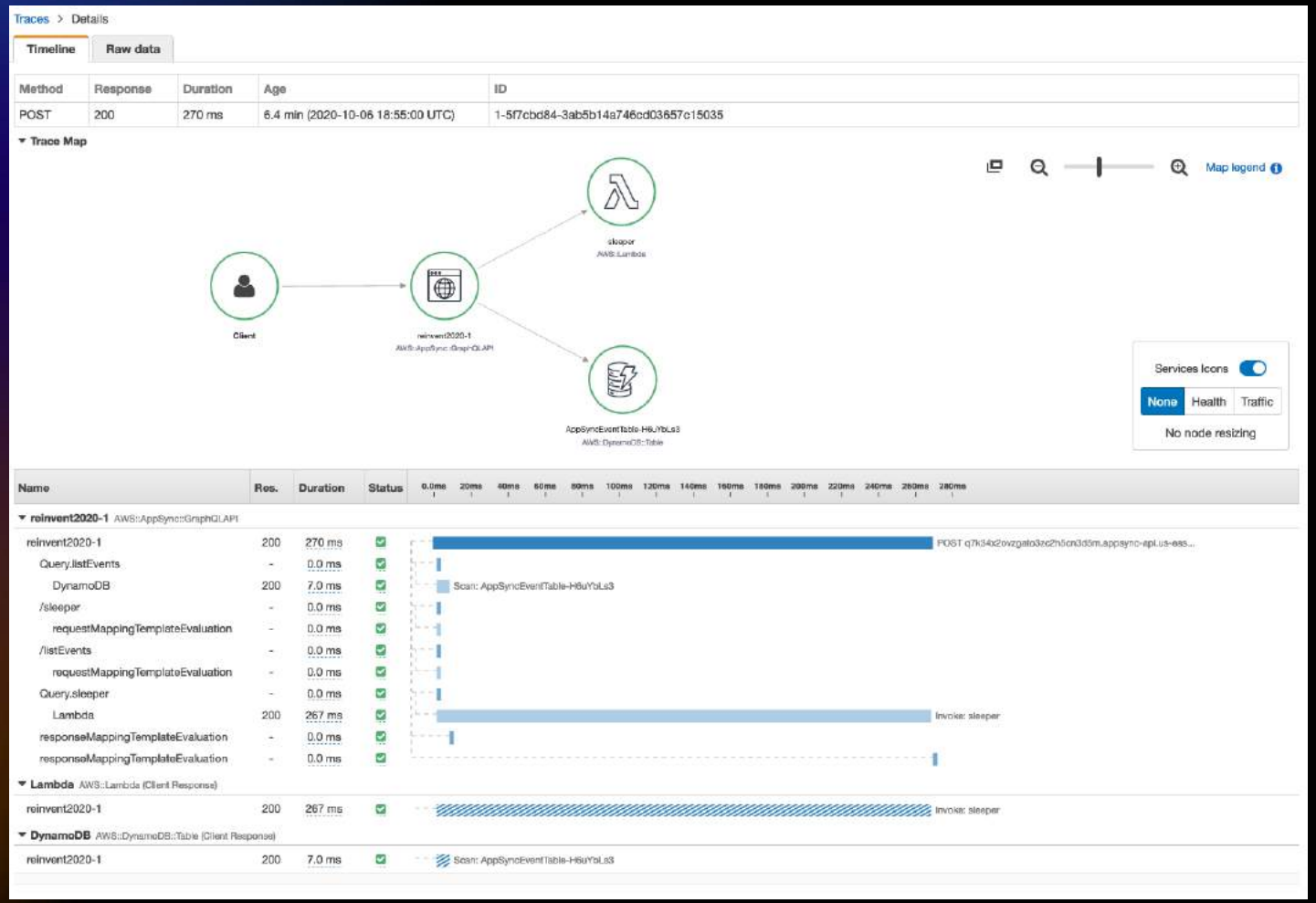






Trace

AWS X-Ray

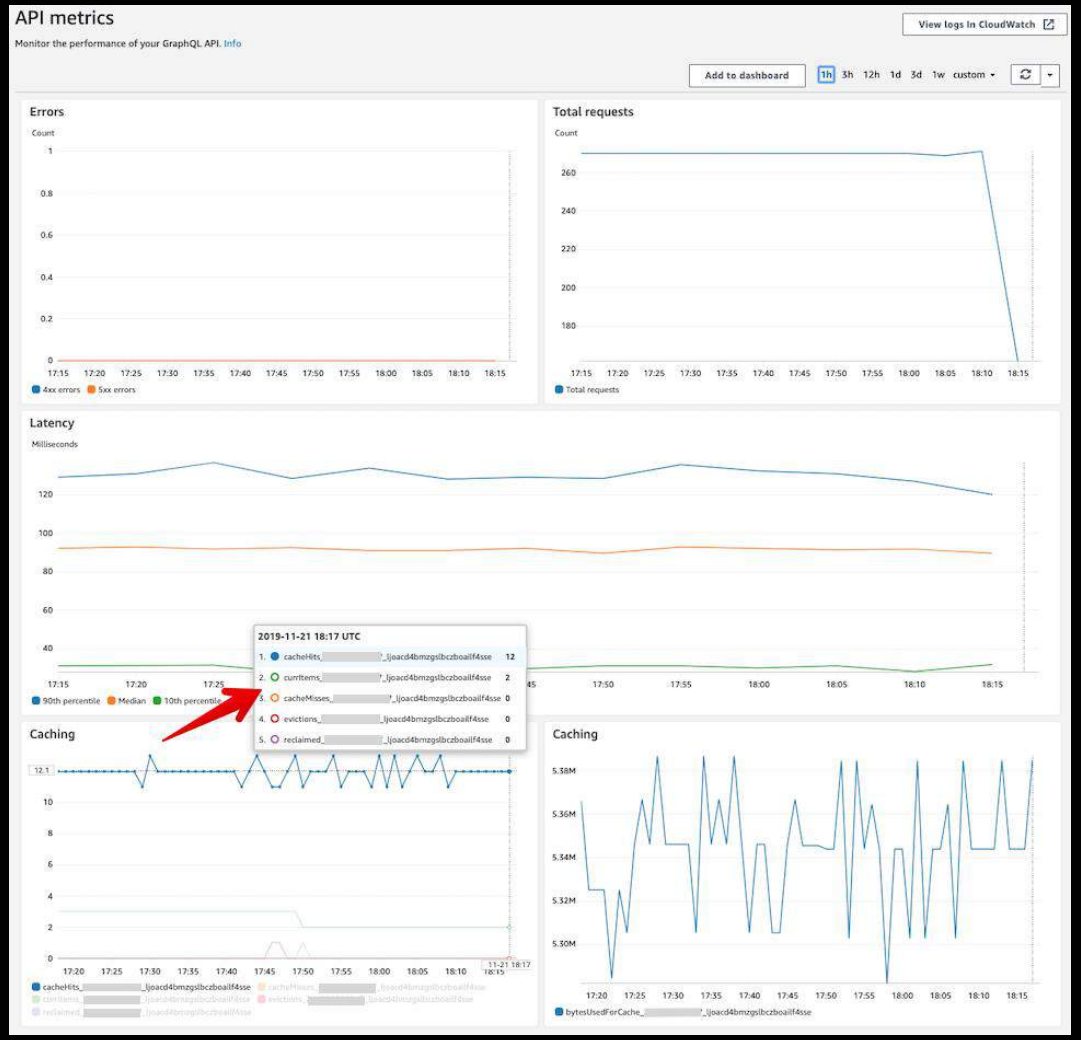


- E2E tracing
- Near real time
- Request visibility
- Identify performance bottlenecks

Optimize

AWS AppSync cache

- Managed server-side caching
- Full API caching
- Per resolver caching
- Encryption

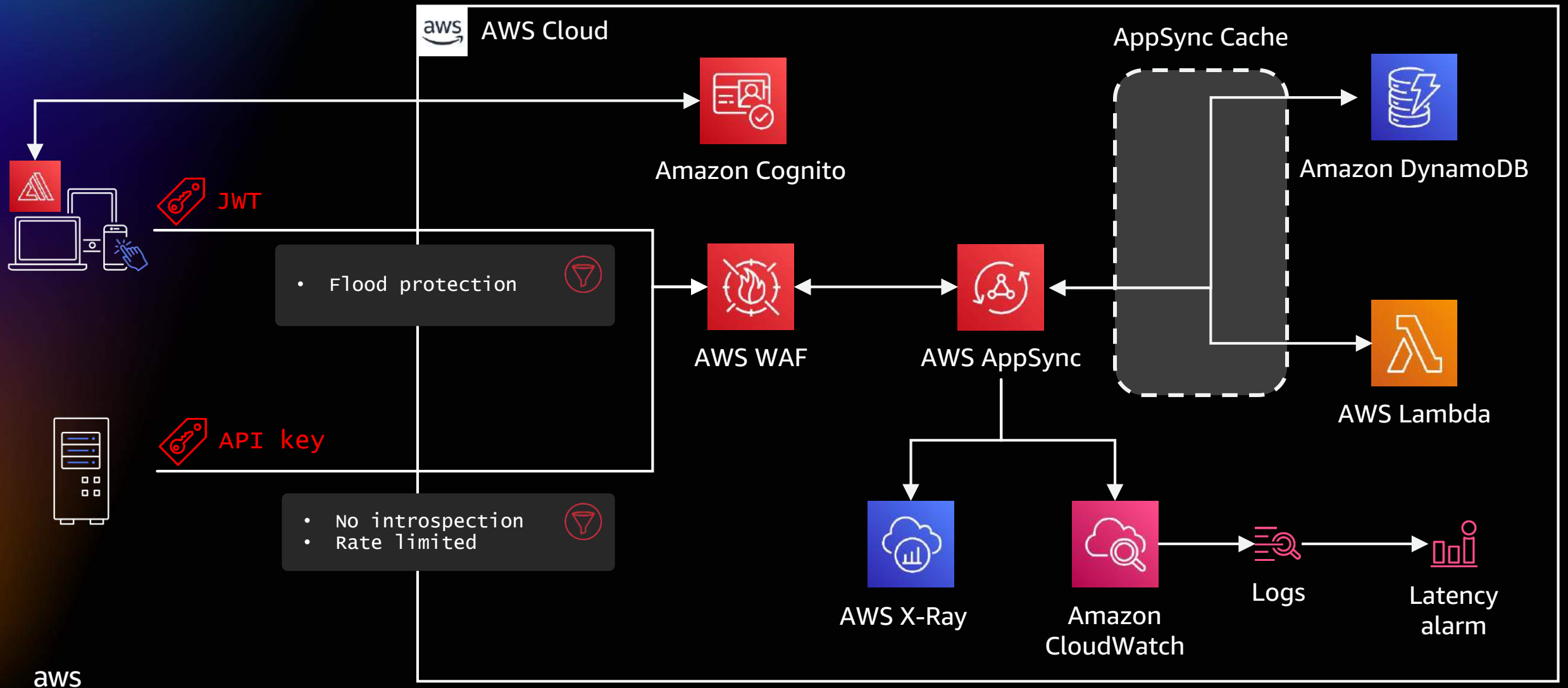


Demo – Implementing Observability

Production looks like…

Production-ready GraphQL with AWS AppSync

Deployed with AWS CDK



Go build!

https://github.com/deekob/appsync_reference

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/

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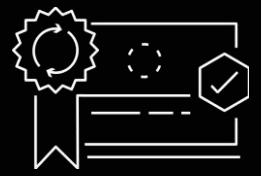

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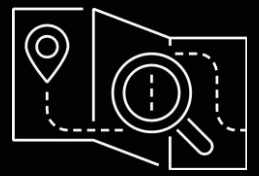

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Thank you!

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