AWS re:Invent

ARC 316

Deploy and monitor a serverless application

Jon Handler
Principal Search Services SA
AWS

Safeer Mohiuddin
Software Development Engineer
AWS

AWS re:Invent

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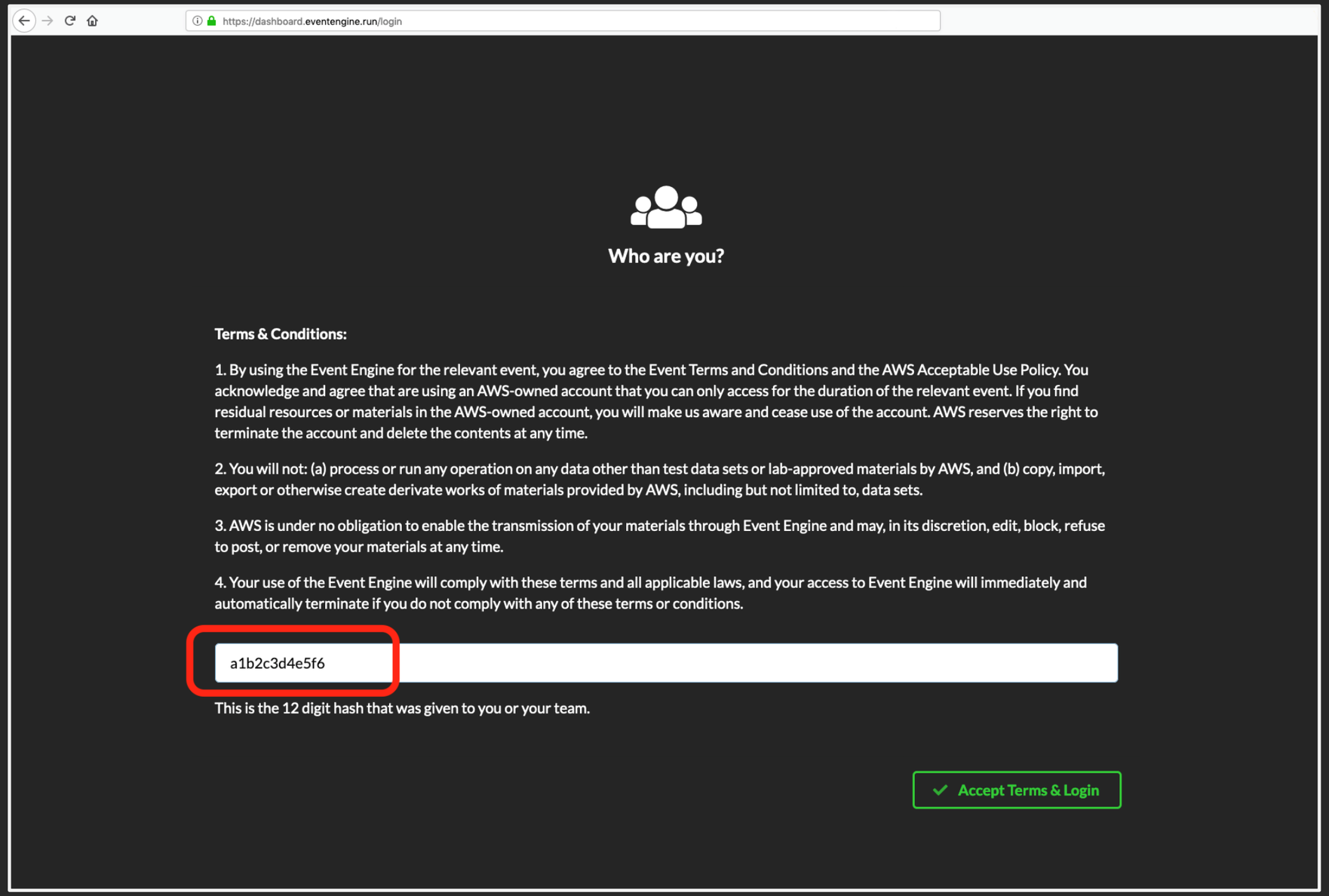
AWS Event Engine

https://dashboard.eventengine.run

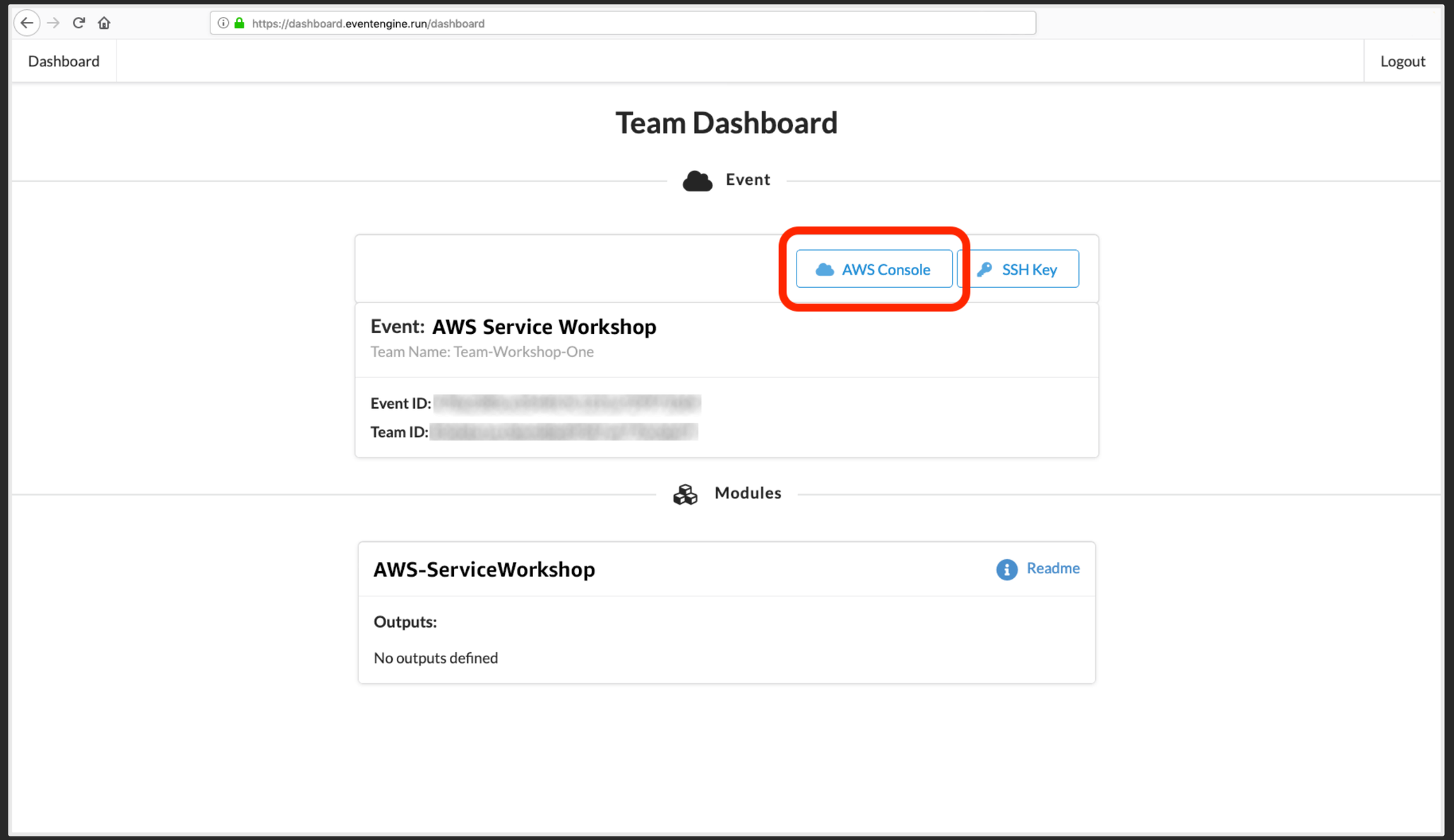
Created to help AWS field teams run:

- Workshops
- GameDays
- Bootcamps
- Immersion Days
- And other events that require hands-on access to AWS accounts

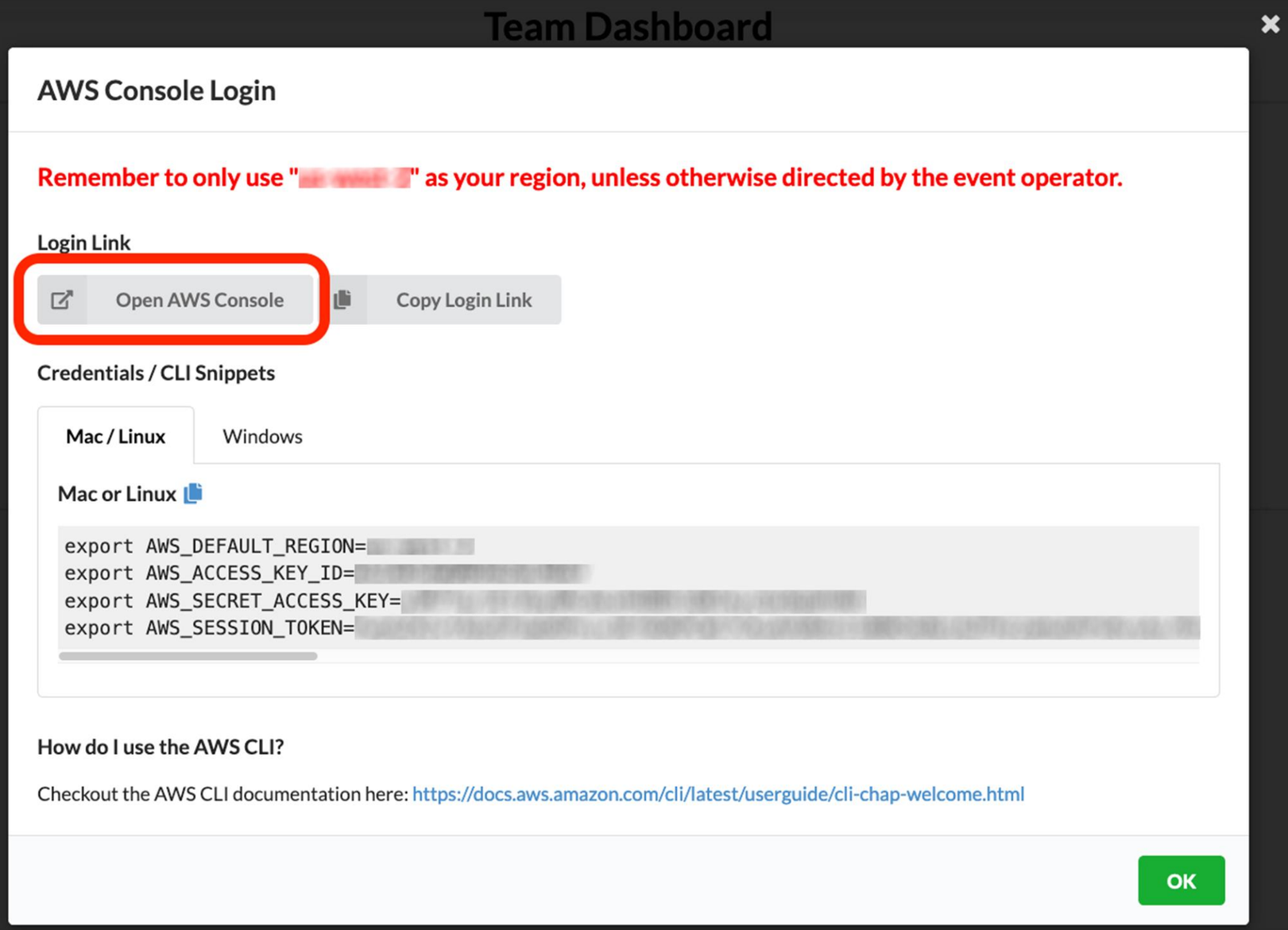
https://dashboard.eventengine.run



https://dashboard.eventengine.run/dashboard



https://dashboard.eventengine.run/dashboard

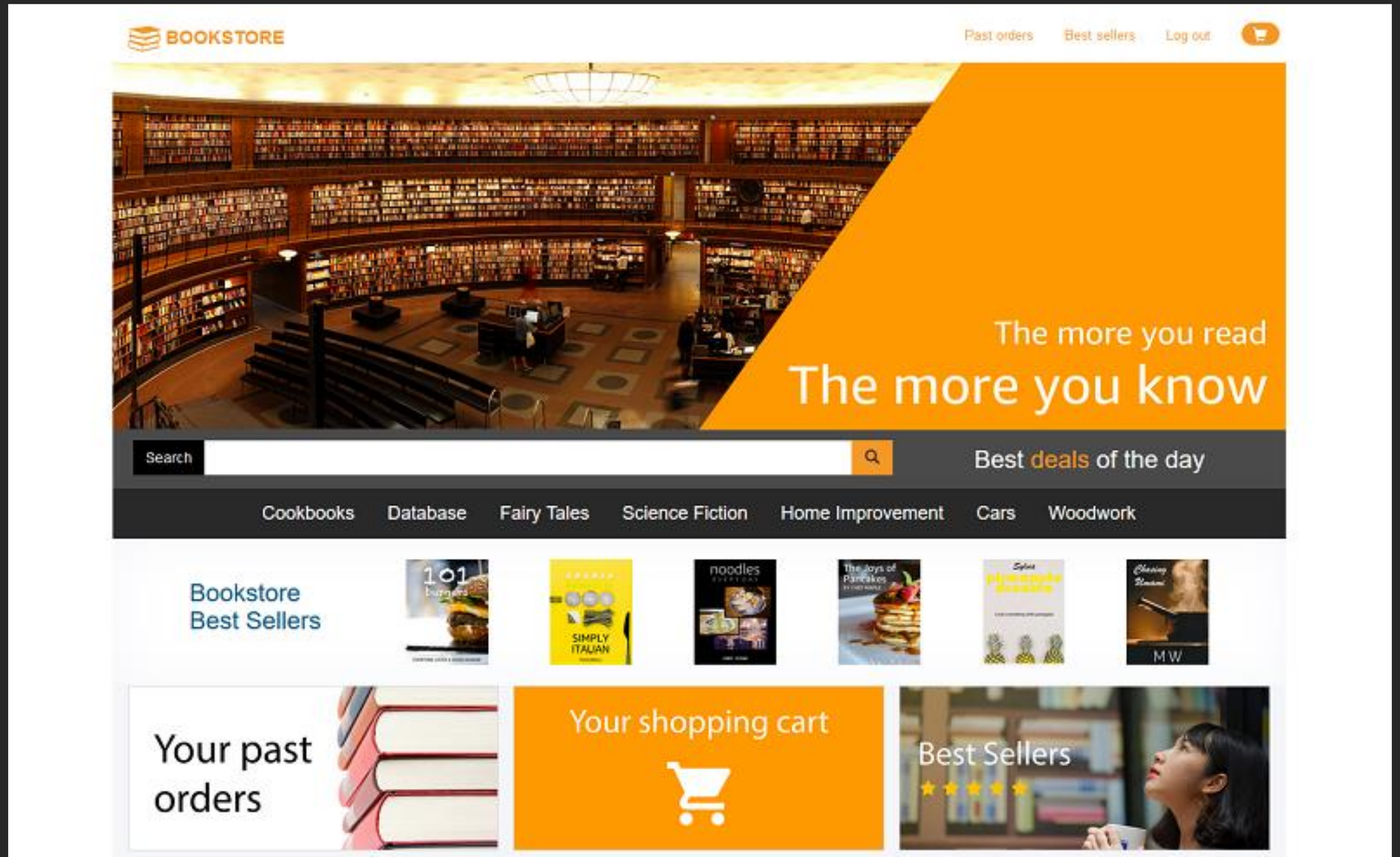


Continue from the lab guide

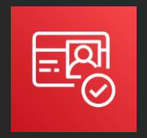
https://reinvent.aesworkshops.com/arc316/

… or if it’s easier: https://tinyurl.com/rvzb7z6

The AWS Bookstore demo



Application components



Amazon Cognito

Amazon CloudFront

Amazon Simple Storage Service (Amazon S3)

Front end

Amazon API Gateway

AWS Lambda

Serverless app

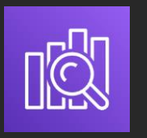
Amazon DynamoDB

Amazon Neptune

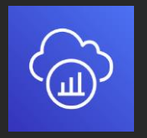
Amazon Elasticsearch Service

Amazon ElastiCache

Backend

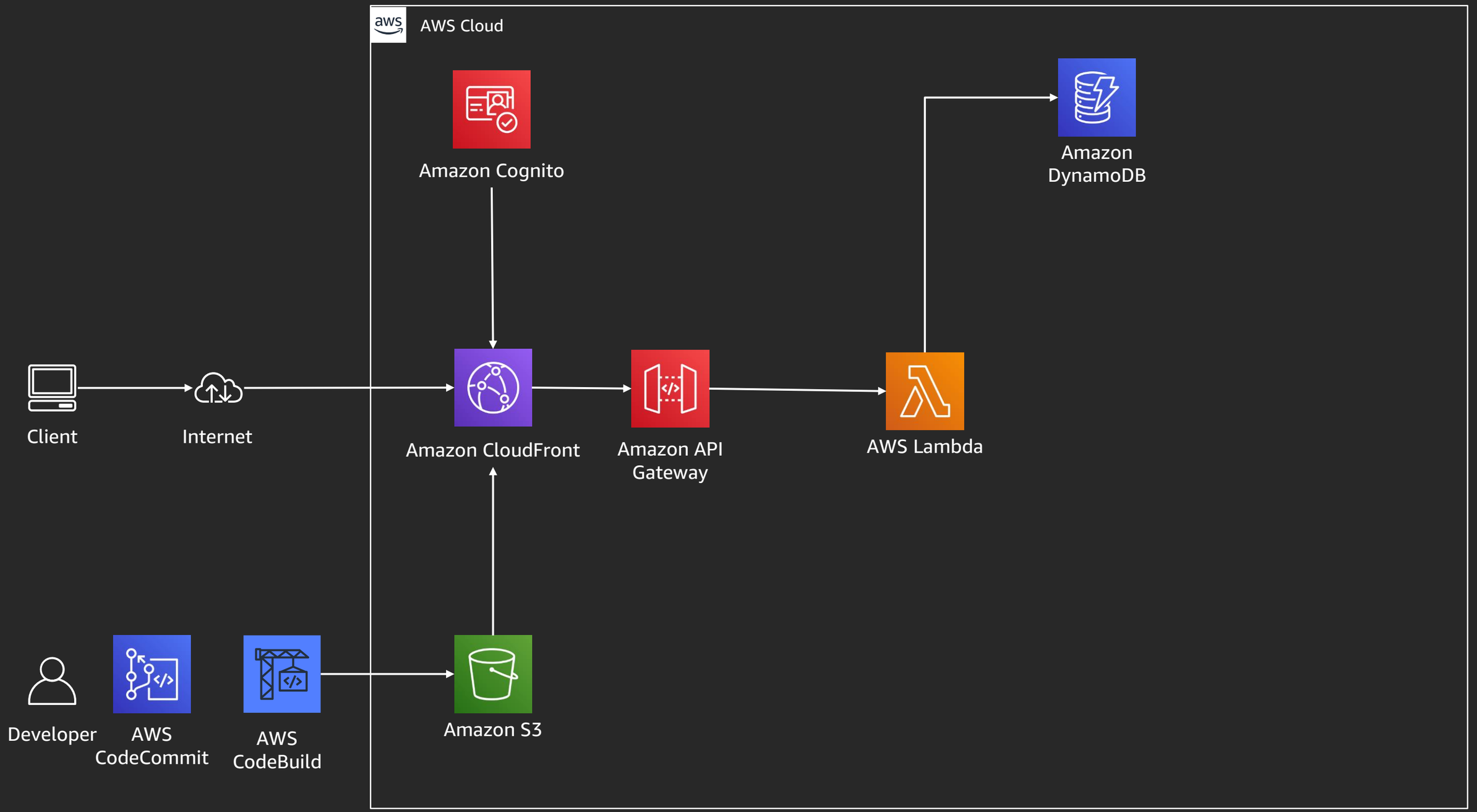


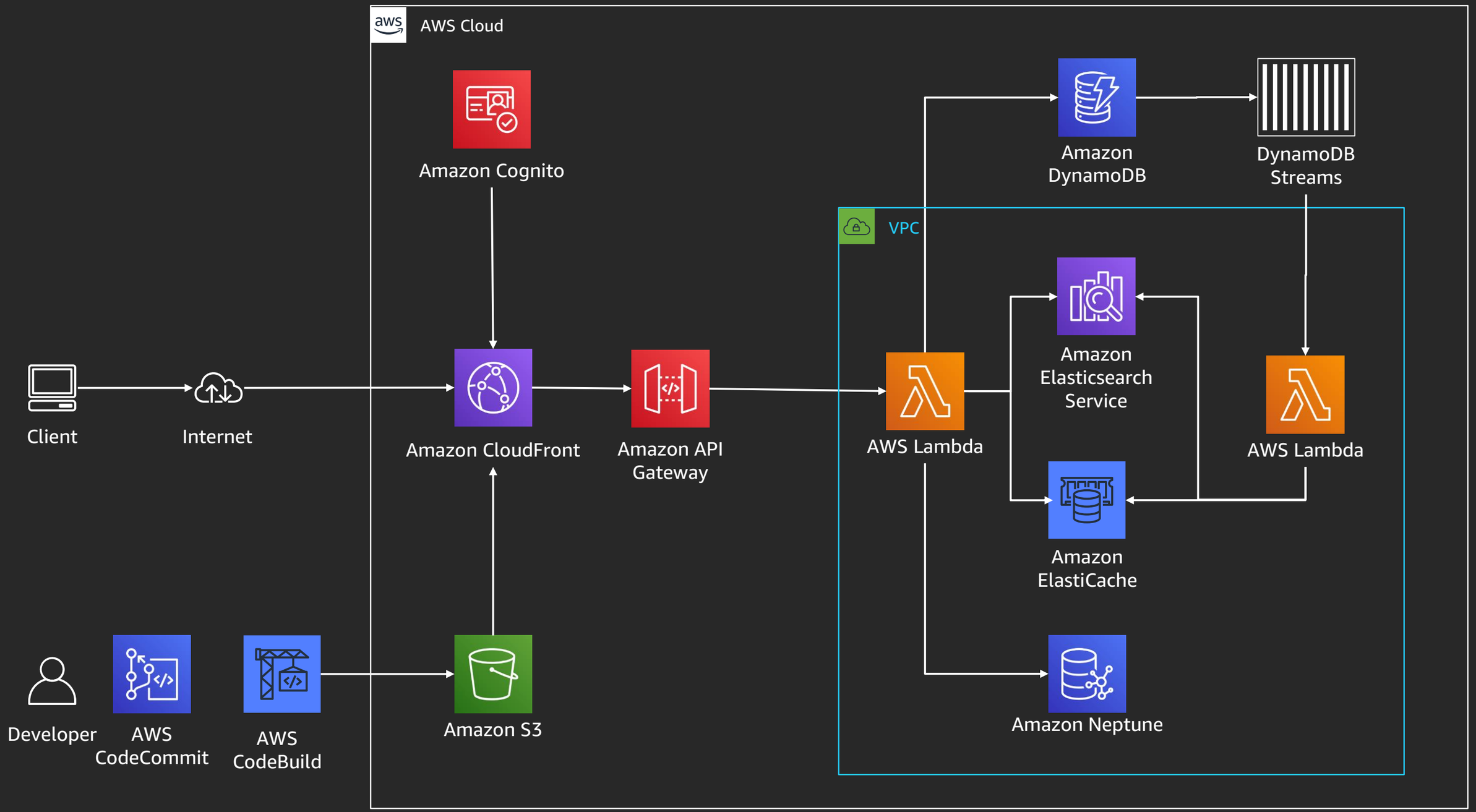
Amazon Elasticsearch Service

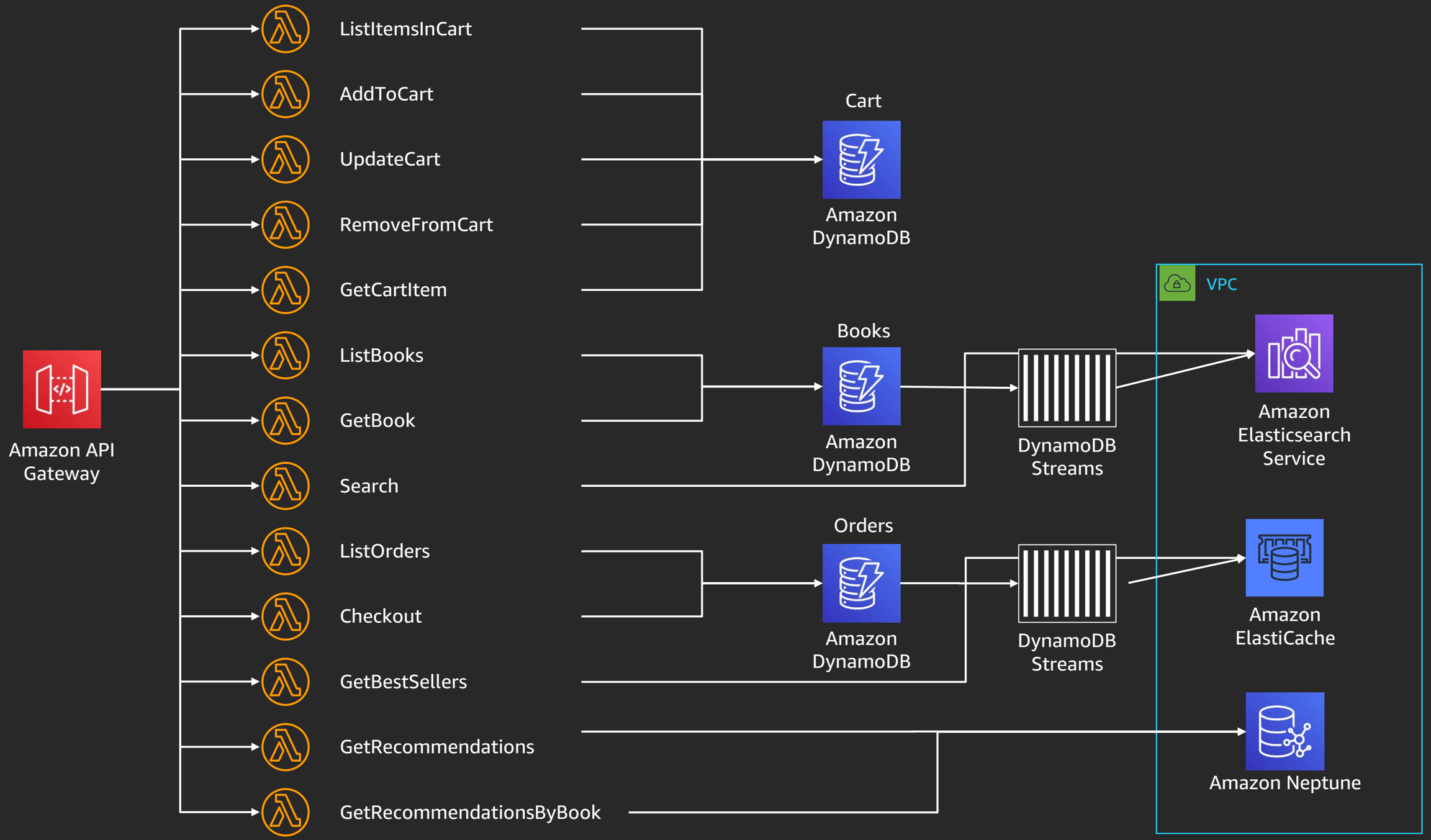


AWS X-Ray

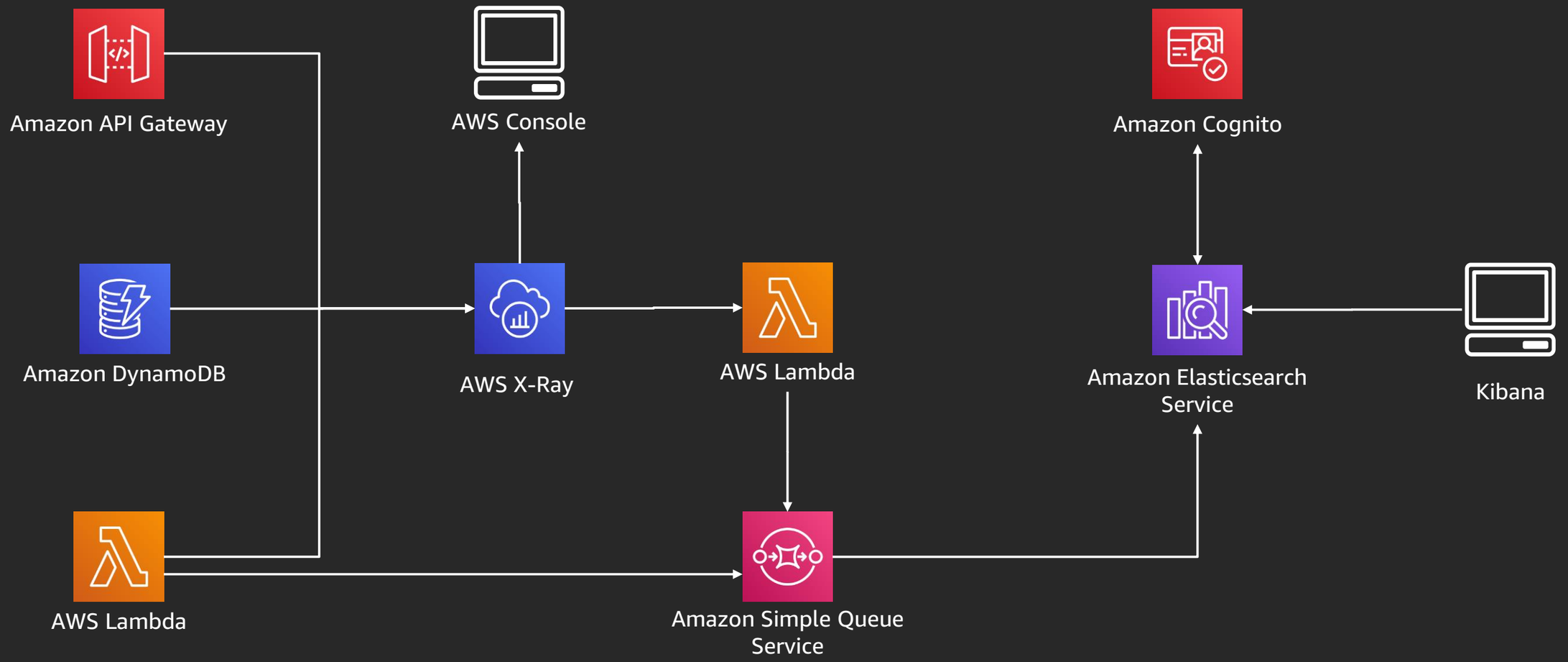
Monitoring


AWS Cloud
Amazon Cognito
Amazon DynamoDB
Client
Internet
Amazon CloudFront
Amazon API Gateway
AWS Lambda
Developer
AWS CodeCommit
AWS CodeBuild
Amazon S3


AWS Cloud
Amazon Cognito
Amazon DynamoDB
DynamoDB Streams
VPC
Client
Internet
Amazon CloudFront
Amazon API Gateway
AWS Lambda
Amazon Elasticsearch Service
AWS Lambda
Amazon ElastiCache
Developer
AWS CodeCommit
AWS CodeBuild
Amazon S3
Amazon Neptune


ListItemsInCart
AddToCart
UpdateCart
RemoveFromCart
GetCartItem
ListBooks
GetBook
Search
ListOrders
Checkout
GetBestSellers
GetRecommendations
GetRecommendationsByBook
Amazon API Gateway
Cart
Amazon DynamoDB
Books
Amazon DynamoDB
Orders
Amazon DynamoDB
DynamoDB Streams
DynamoDB Streams
VPC
Amazon Elasticsearch Service
Amazon ElastiCache
Amazon Neptune

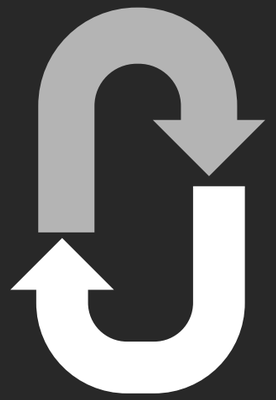
Monitoring


Amazon API Gateway
AWS Console
Amazon Cognito
Amazon DynamoDB
AWS X-Ray
AWS Lambda
Amazon Elasticsearch Service
Kibana
AWS Lambda
Amazon Simple Queue Service

AWS X-Ray

AWS X-Ray overview

Analyze and debug issues quickly



End-to-end view of individual services

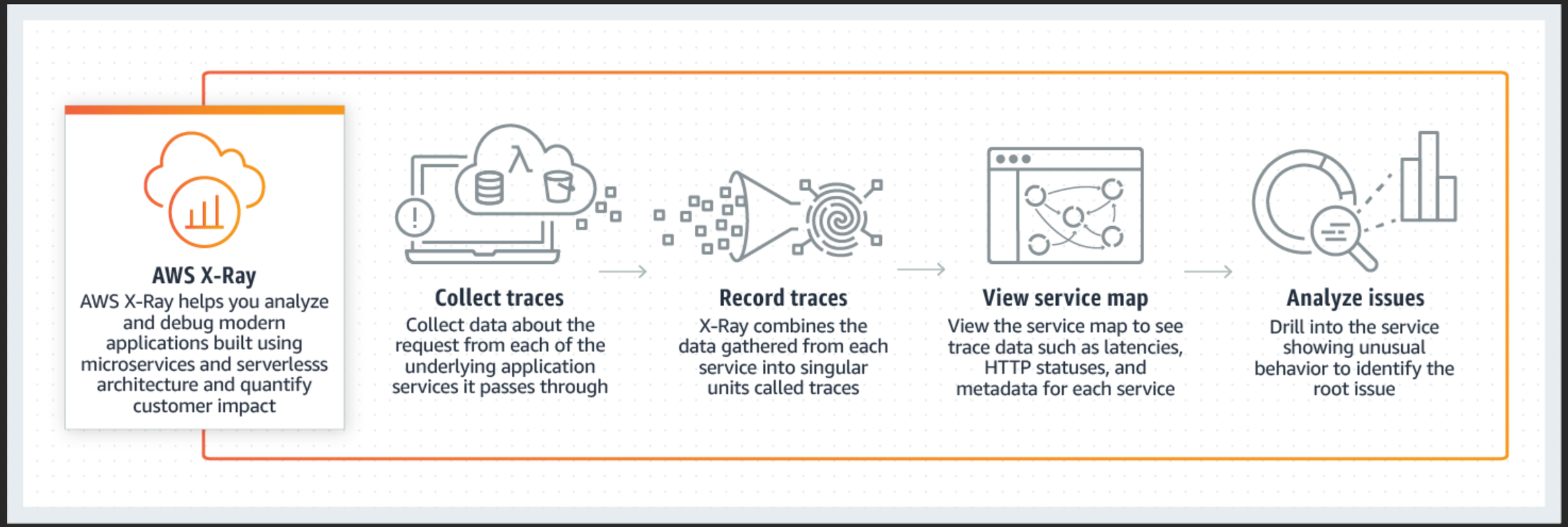
Identify customer impact

Cloud-agnostic

AWS X-Ray overview

AWS X-Ray helps developers
analyze and debug applications
that were built using microservices architecture
to identify the root cause and end-user impact.

How AWS X-Ray works



AWS X-Ray instrumentation

Strong open source community

.NET
(with .NET Core 2.0)

Go (beta)

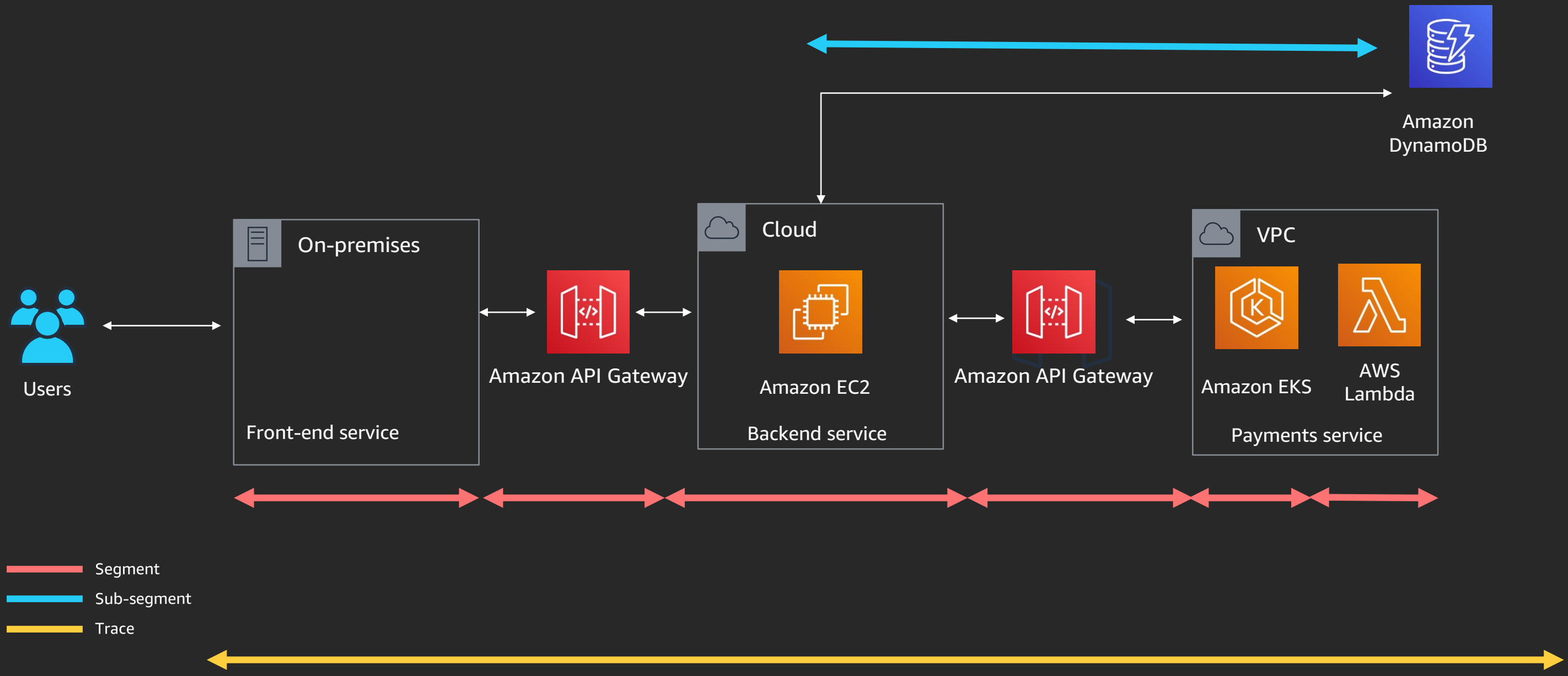
Java

Python

Ruby (beta)

Node.js

AWS X-Ray for your modern applications



Application instrumentation Node.js

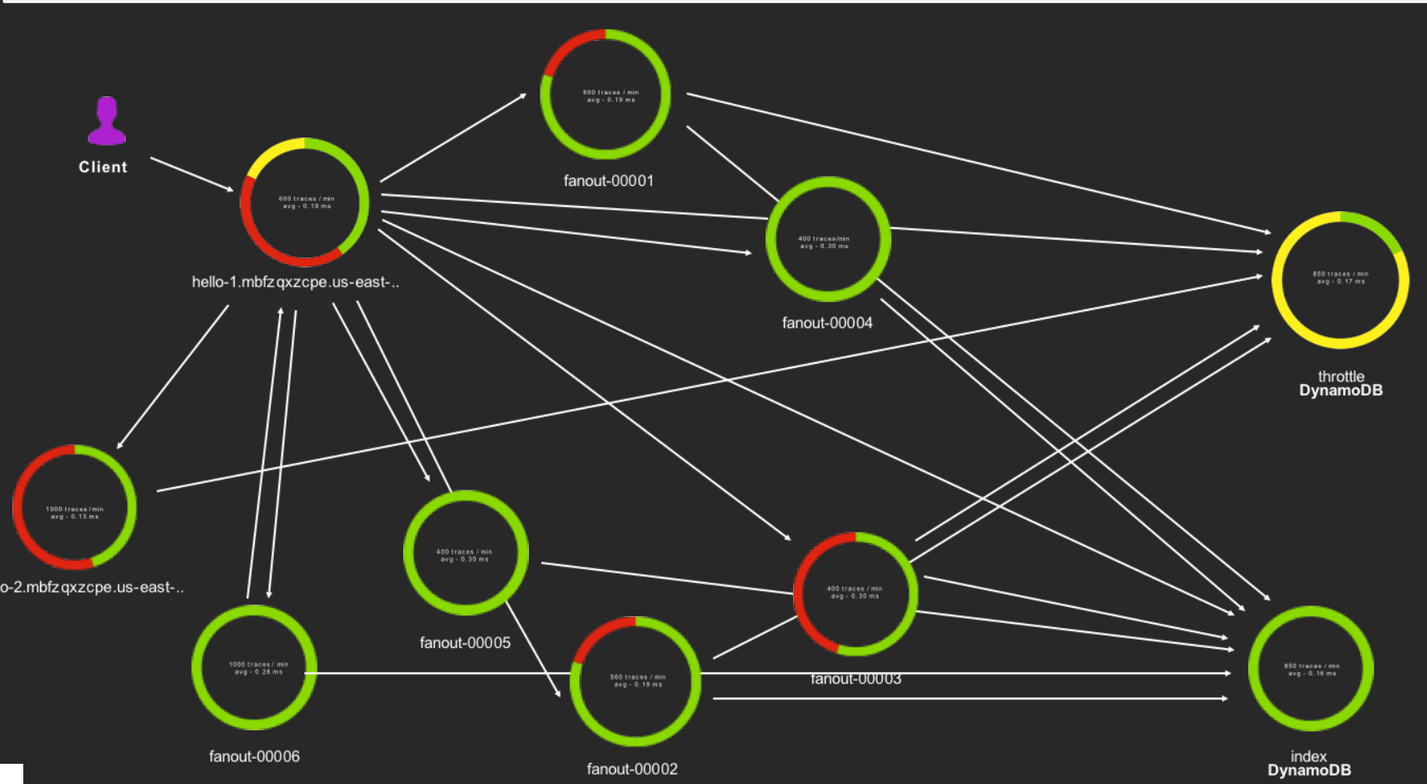
```
1  var AWSXRay = require('aws-xray-sdk-core');
2  var AWS = AWSXRay.captureAWS(require('aws-sdk'));
3  s3 = new AWS.S3({signatureVersion: 'v4'});
4
5  exports.handler = (event, context, callback) => {
6
7      var params = {Bucket: 'tim-example-bucket', Key: 'MyKey', Body: 'Hello!'};
8
9      s3.putObject(params, function(err, data) {});
10 };
```

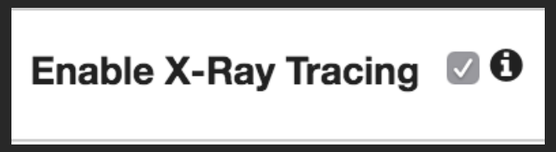
AWS X-Ray

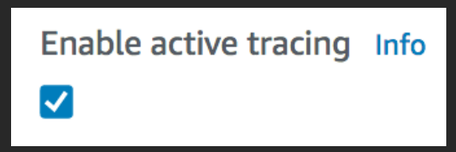
Profile and troubleshoot serverless applications:

- Lambda instruments incoming requests for all supported languages and can capture calls made in code
- API Gateway inserts a tracing header into HTTP calls as well as reports data back to X-Ray itself

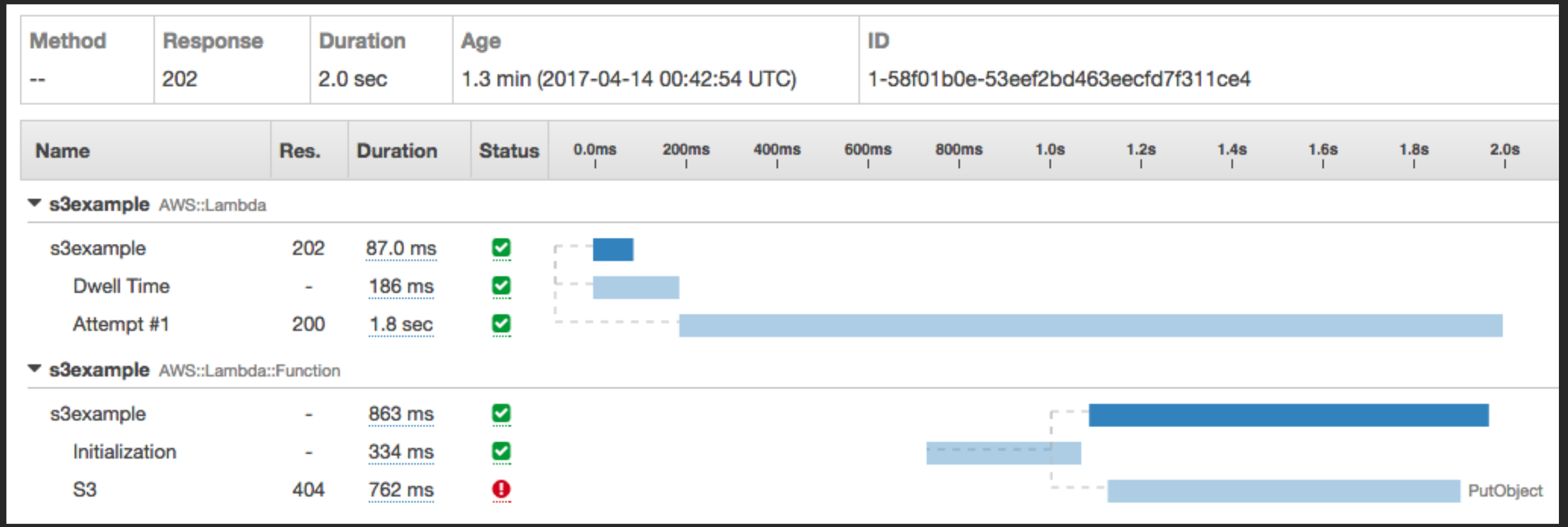
```
var AWSXRay = require('aws-xray-sdk-core');
var AWS = AWSXRay.captureAWS(require('aws-sdk'));
s3client = AWS.S3();
```







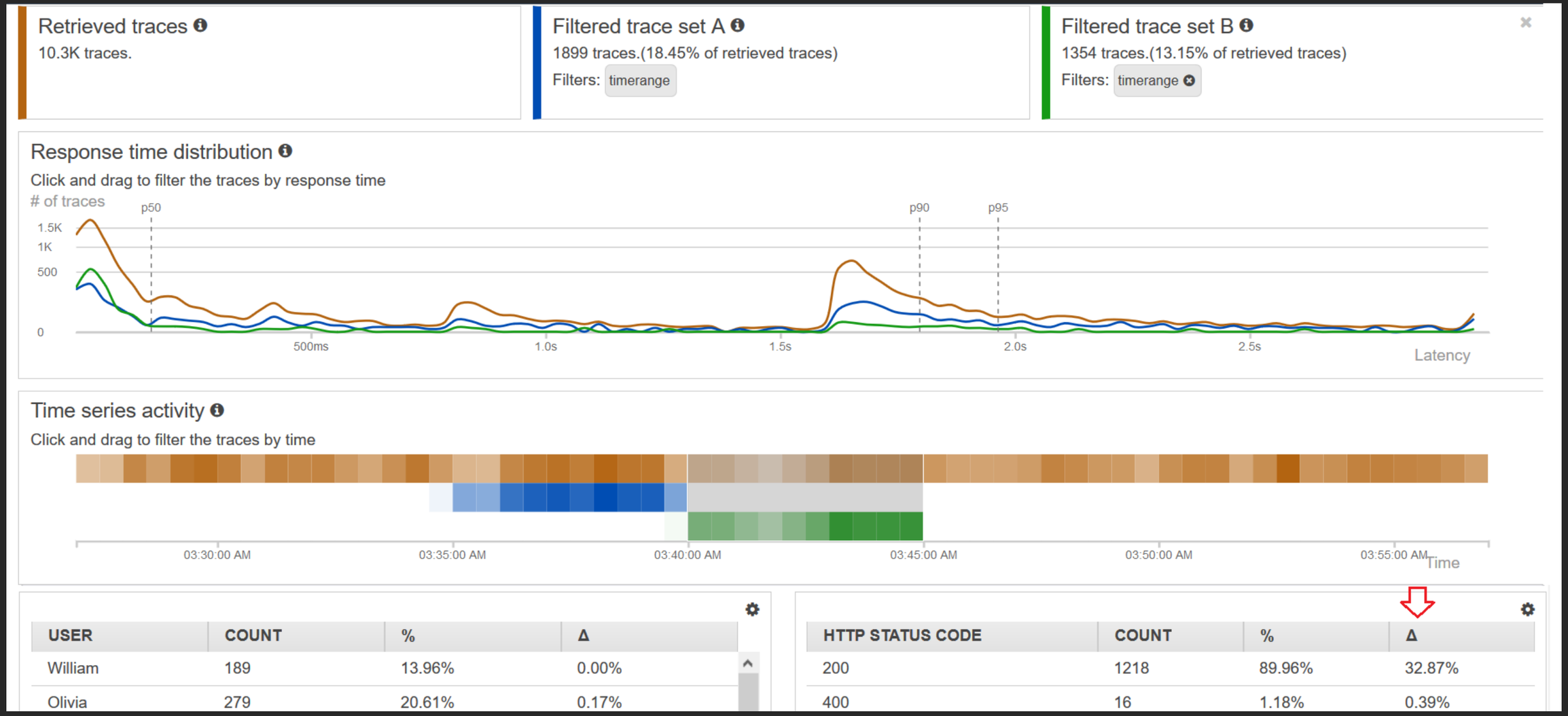
X-Ray trace example



Method	Response	Duration	Age	ID
--	202	2.0 sec	1.3 min (2017-04-14 00:42:54 UTC)	1-58f01b0e-53eef2bd463eecfd7f311ce4

Name	Res.	Duration	Status
s3example AWS::Lambda			
s3example	202	87.0 ms	
Dwell Time	-	186 ms	
Attempt #1	200	1.8 sec	
s3example AWS::Lambda::Function			
s3example	-	863 ms	
Initialization	-	334 ms	
S3	404	762 ms	

AWS X-Ray analytics example



Amazon Elasticsearch Service (Amazon ES)

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Amazon ES is a database

1

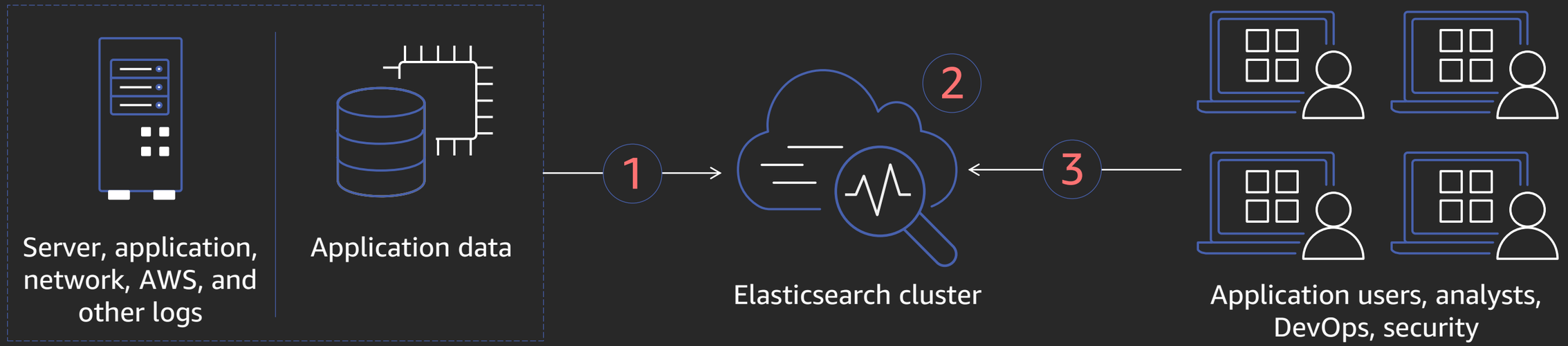
Send data as
JSON via REST APIs

2

Data is indexed—
all fields searchable,
including nested JSON

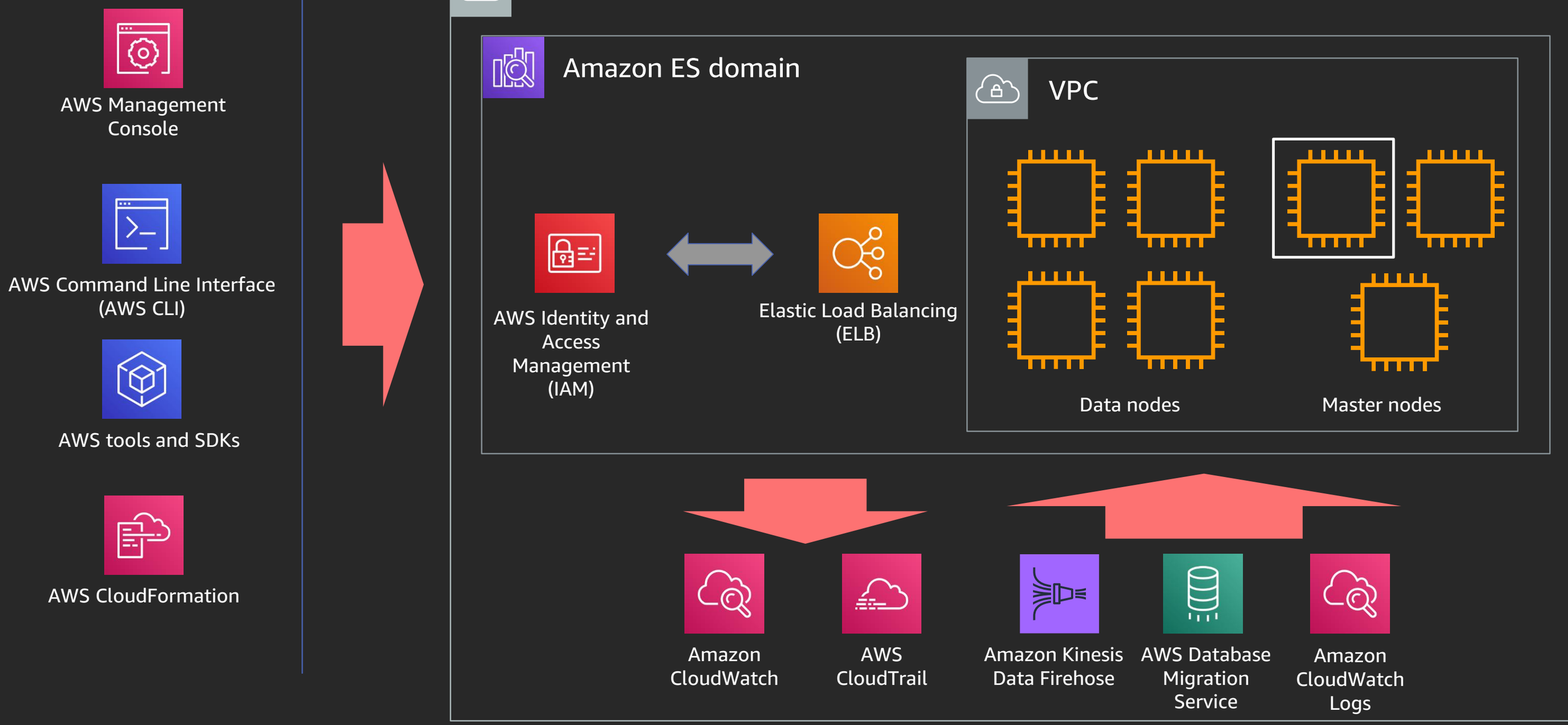
3

Queries, via REST APIs,
allow fielded matching,
Boolean expressions,
include sorting and analysis



Amazon ES is a **fully managed service** that makes it easy to deploy, manage, and scale Elasticsearch and Kibana

Service architecture



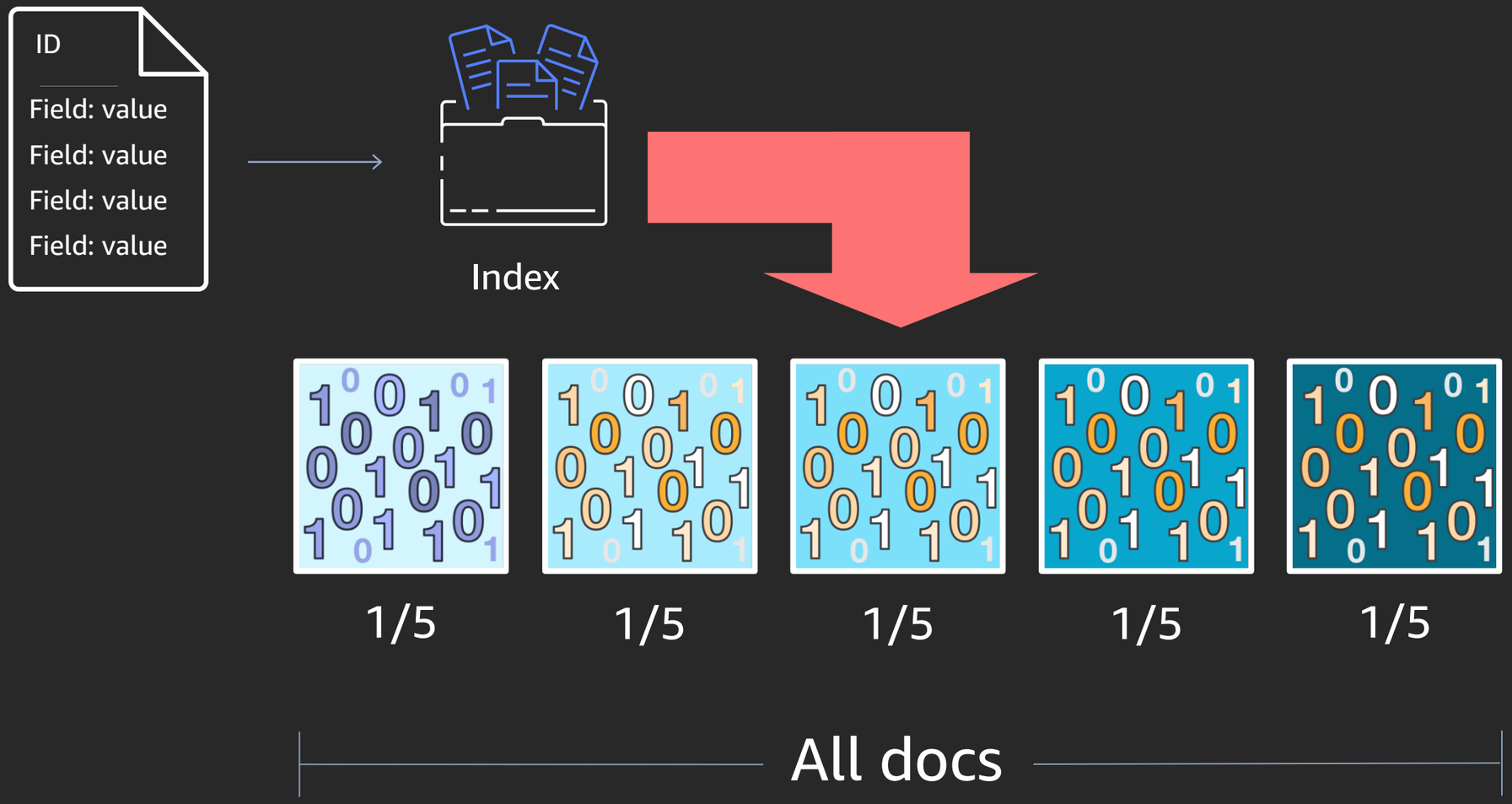
You use the indexing APIs to send data to Amazon ES*

```
POST endpoint/index/type/id
{
     Document
}
```

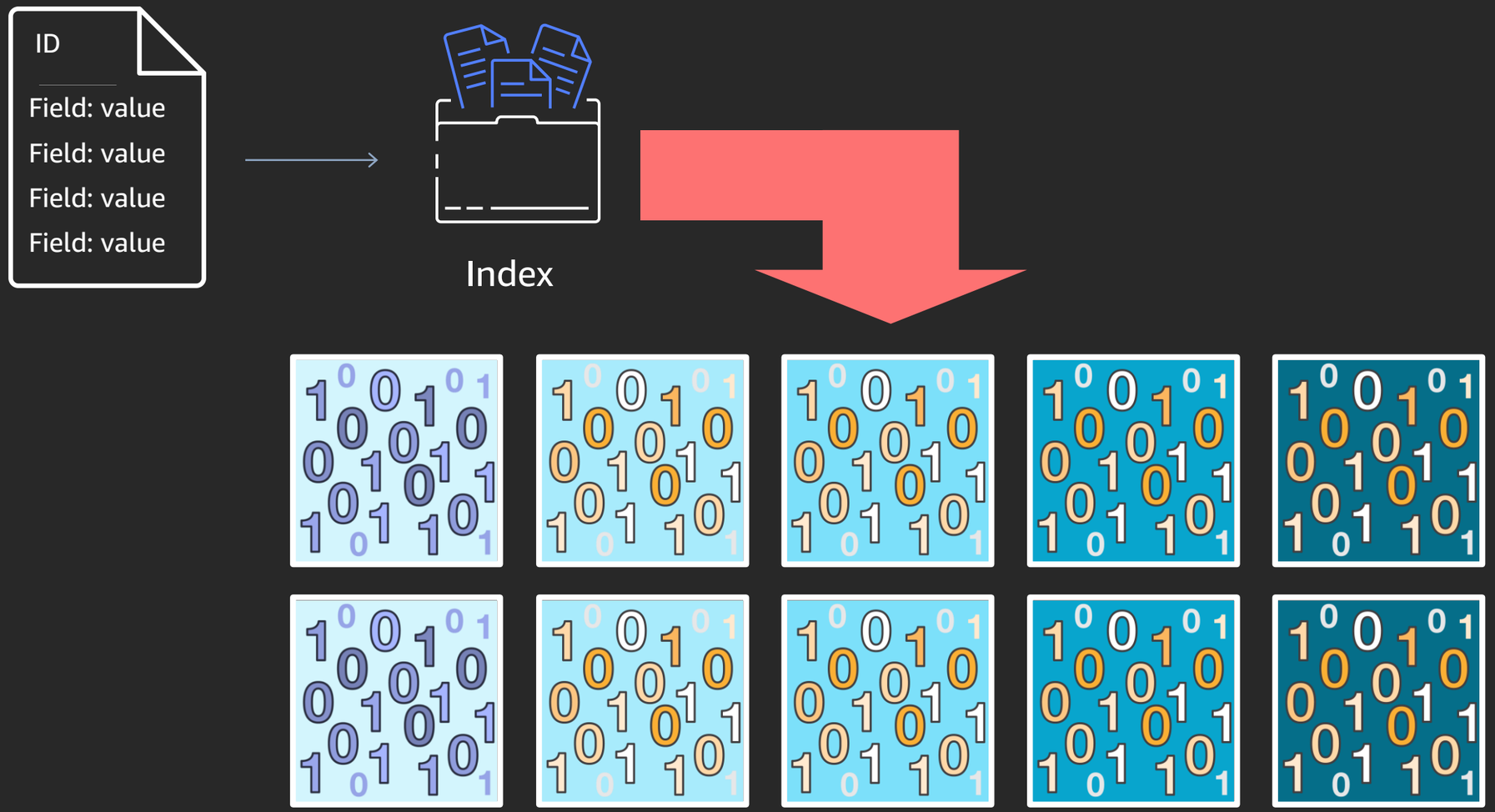
```
POST endpoint/index/_bulk
{ Command }
{ Document }
{ Command }
{ Document }
```

* Your ingestion tools will probably automate this

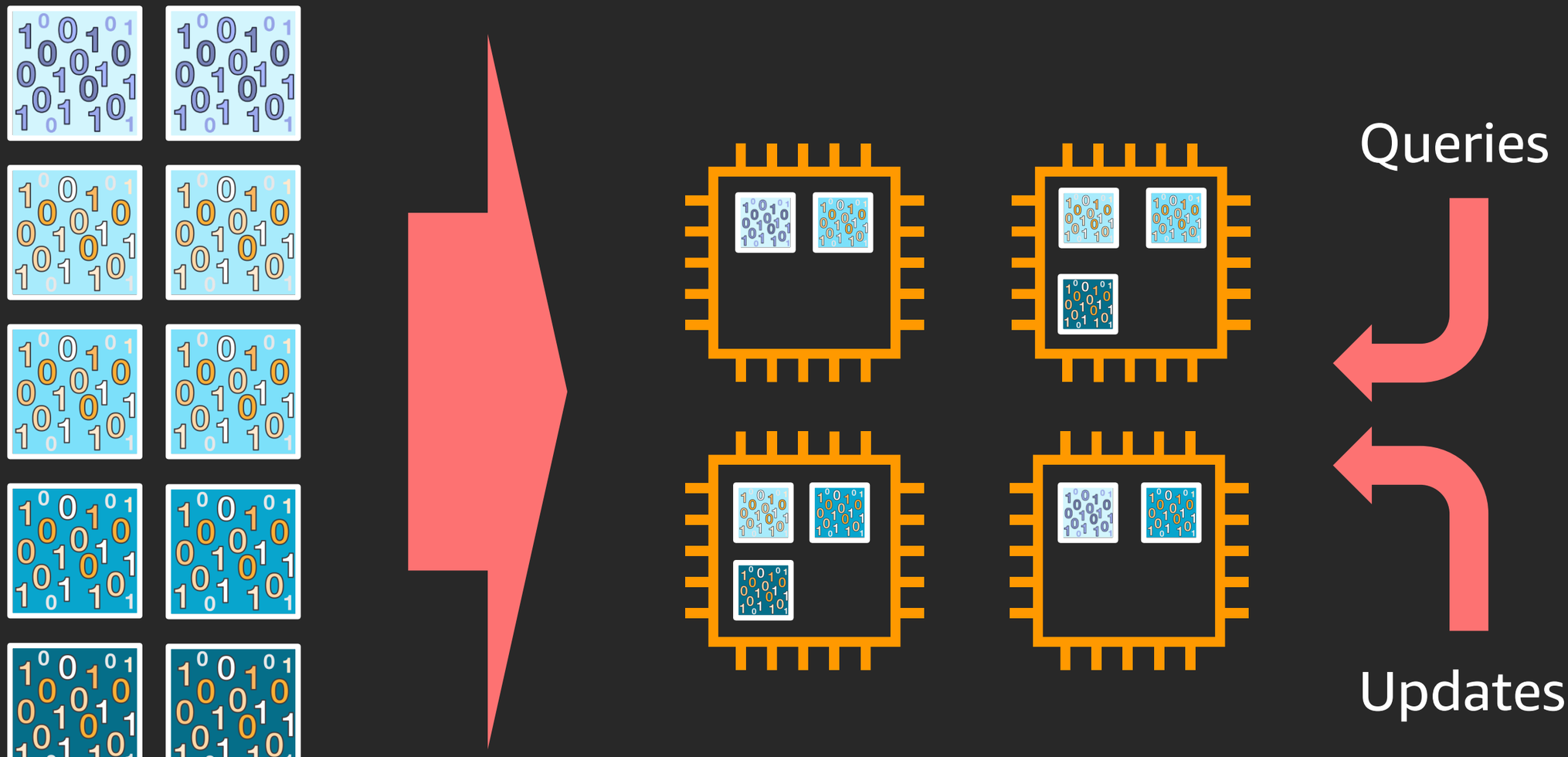
Data is stored in an index comprised of shards



Shards are primary or replica

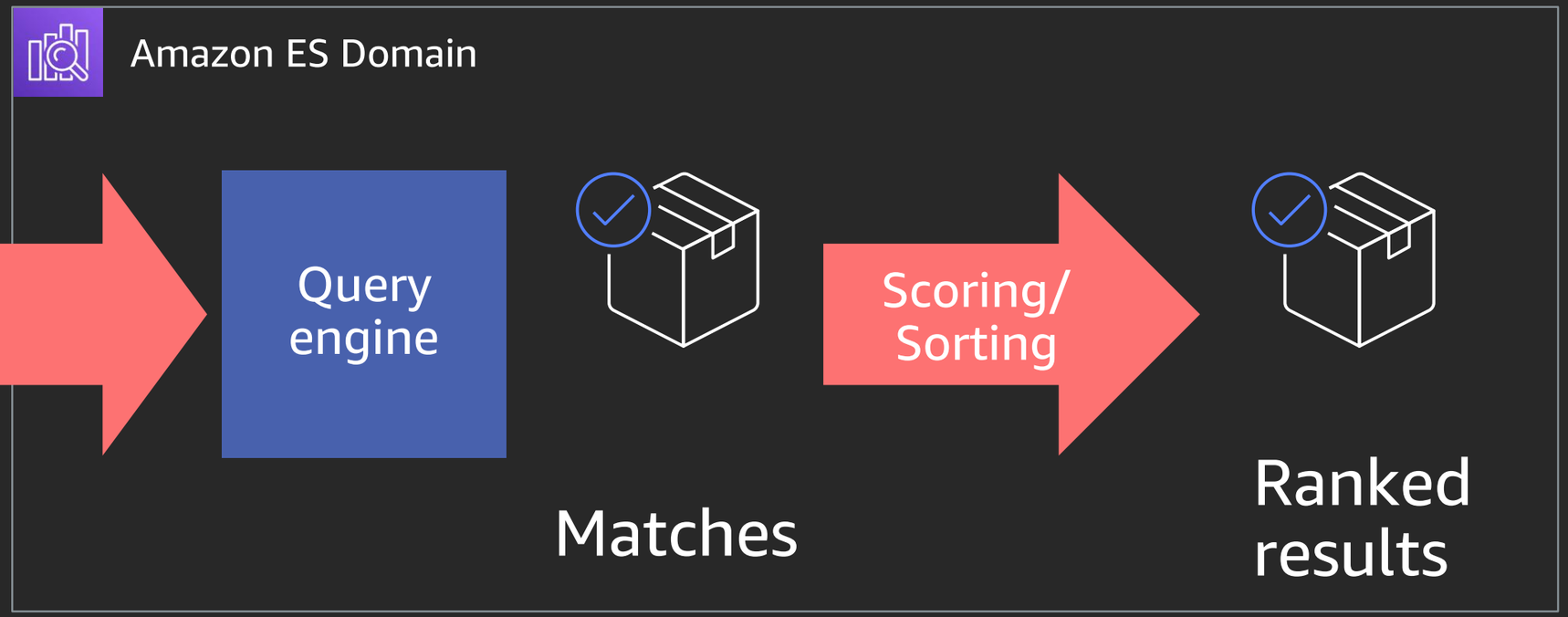


Amazon ES distributes shards to data nodes



You use the query APIs to retrieve data from Amazon ES

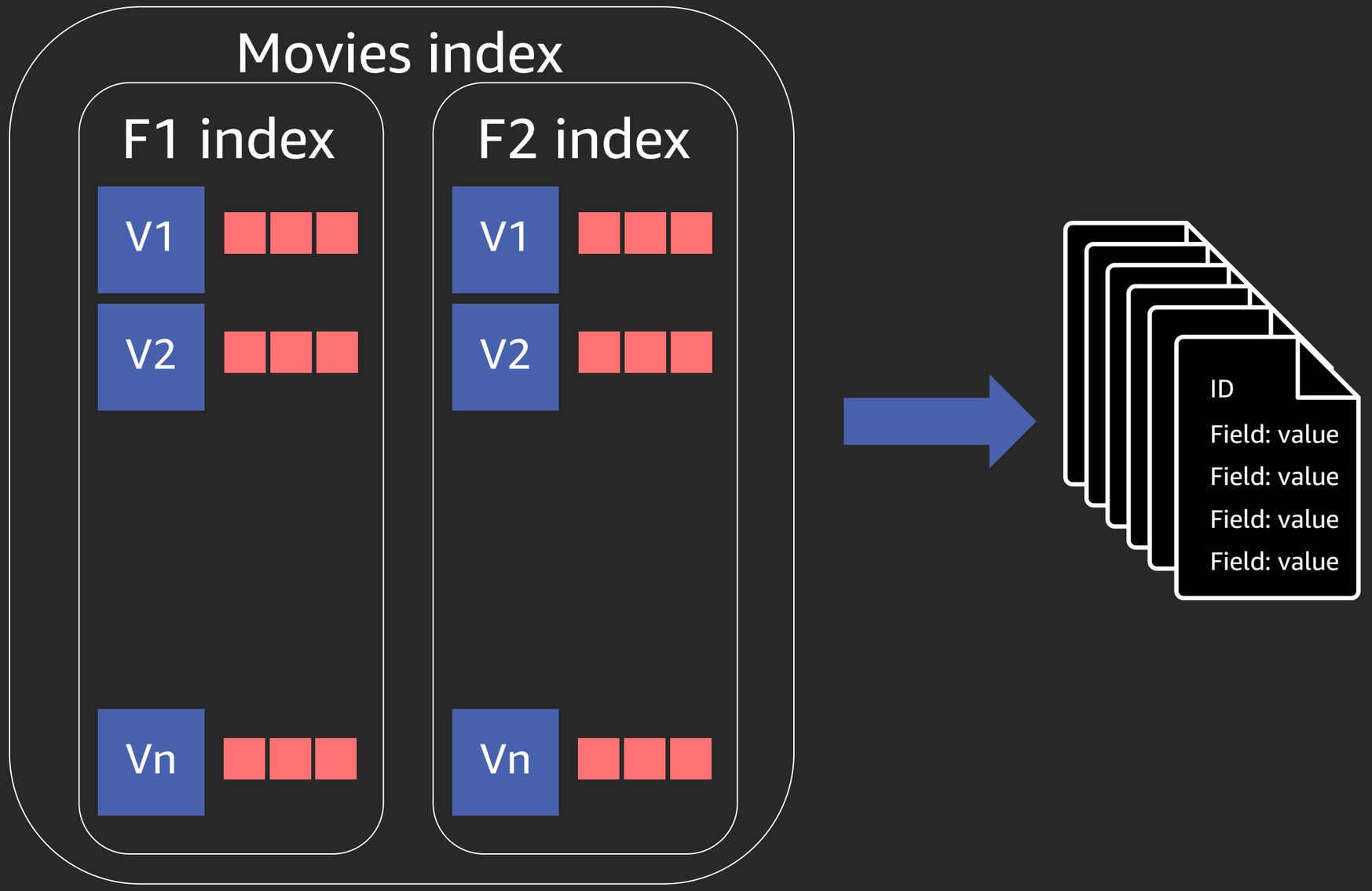
```
GET logs/log/_search
{
  "query": {
    "term": {
      "verb.keyword": {
        "value": "GET"
      }
    }
  }
}
```



The query engine matches requested field values

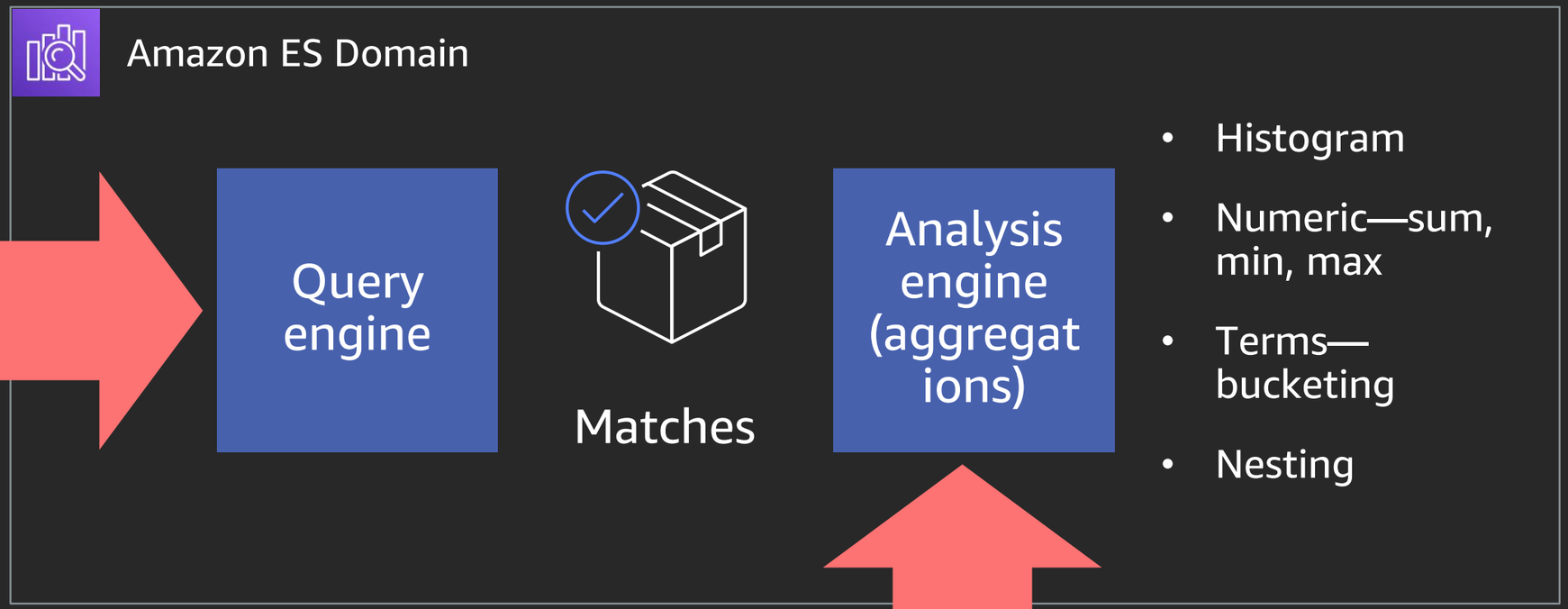
Field1:value1

Field2:value2



You use aggregations to analyze log data

```
GET logs/log/_search
{
  "query": {
    "term": {
      "verb.keyword": {
        "value": "GET"
      }
    }
  }
}
```



Amazon ES analysis with aggregations

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
unicomp6.unicomp.net	[01/Jul/1995:00:00:06	GET	/shuttle/countdown/	HTTP/1.0	200	3985
199.120.110.21	[01/Jul/1995:00:00:09	GET	/shuttle/missions/sts-73/mission-sts-73.html	HTTP/1.0	200	4085
burger.letters.com	[01/Jul/1995:00:00:11	GET	/shuttle/countdown/liftoff.html	HTTP/1.0	304	0
199.120.110.21	[01/Jul/1995:00:00:11	GET	/shuttle/missions/sts-73/sts-73-patch-small.gif	HTTP/1.0	200	4179
burger.letters.com	[01/Jul/1995:00:00:12	GET	/images/NASA-logosmall.gif	HTTP/1.0	304	0
burger.letters.com	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/video/livevideo.gif	HTTP/1.0	200	0
205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

Filter: host="burger*" OR host="199.120*"

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
unicomp6.unicomp.net	[01/Jul/1995:00:00:06	GET	/shuttle/countdown/	HTTP/1.0	200	3985
199.120.110.21	[01/Jul/1995:00:00:09	GET	/shuttle/missions/sts-73/mission-sts-73.html	HTTP/1.0	200	4085
burger.letters.com	[01/Jul/1995:00:00:11	GET	/shuttle/countdown/liftoff.html	HTTP/1.0	304	0
199.120.110.21	[01/Jul/1995:00:00:11	GET	/shuttle/missions/sts-73/sts-73-patch-small.gif	HTTP/1.0	200	4179
burger.letters.com	[01/Jul/1995:00:00:12	GET	/images/NASA-logosmall.gif	HTTP/1.0	304	0
burger.letters.com	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/video/livevideo.gif	HTTP/1.0	200	0
205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

Aggregate: Status histogram

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
unicomp6.unicomp.net	[01/Jul/1995:00:00:06	GET	/shuttle/countdown/	HTTP/1.0	200	3985
199.120.110.21	[01/Jul/1995:00:00:09	GET	/shuttle/missions/sts-73/mission-sts-73.html	HTTP/1.0	200	4085
burger.letters.com	[01/Jul/1995:00:00:11	GET	/shuttle/countdown/liftoff.html	HTTP/1.0	304	0
199.120.110.21	[01/Jul/1995:00:00:11	GET	/shuttle/missions/sts-73/sts-73-patch-small.gif	HTTP/1.0	200	4179
burger.letters.com	[01/Jul/1995:00:00:12	GET	/images/NASA-logosmall.gif	HTTP/1.0	304	0
burger.letters.com	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/video/livevideo.gif	HTTP/1.0	200	0
205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

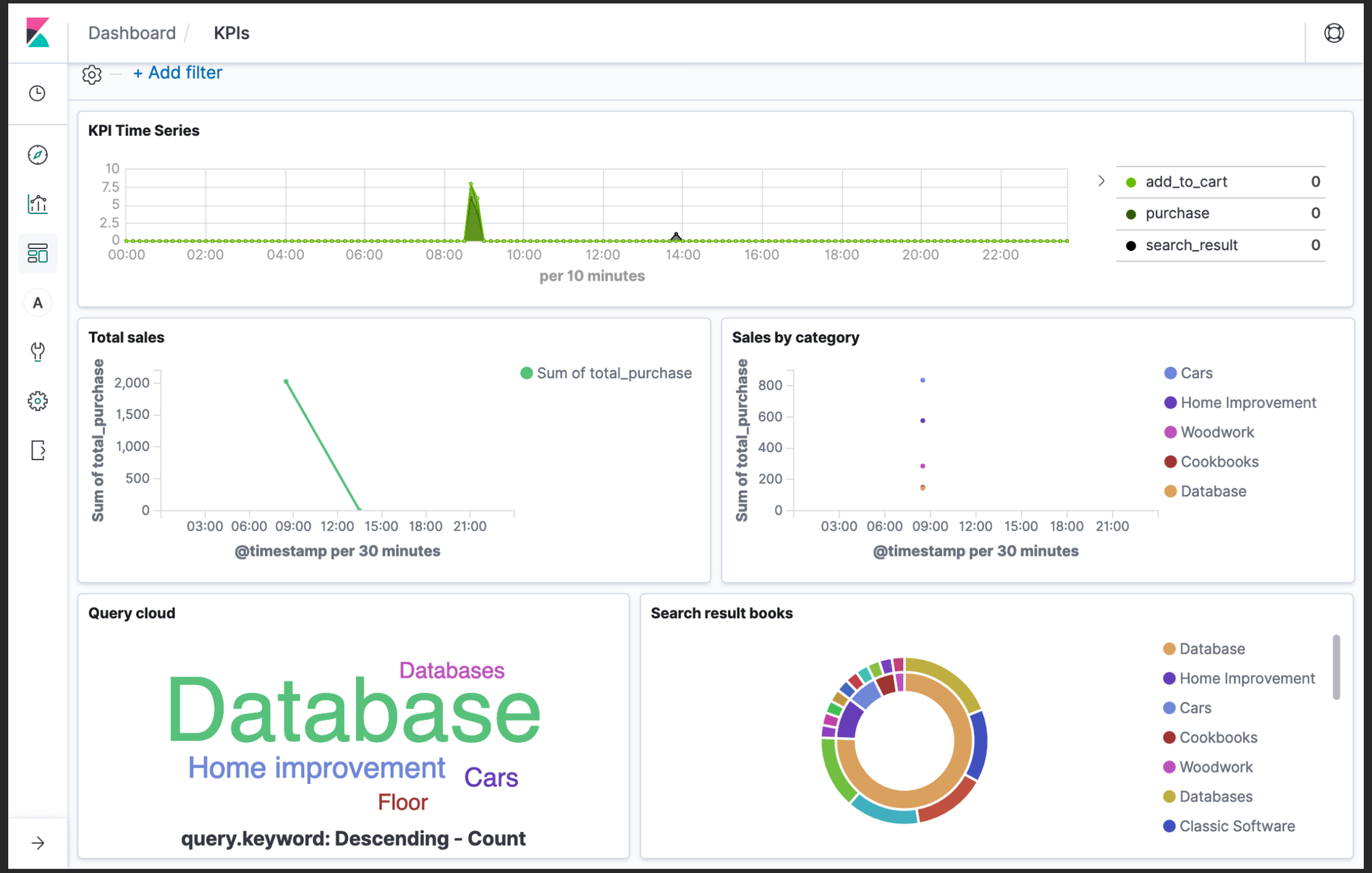
Aggregate: Size sum

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
unicomp6.unicomp.net	[01/Jul/1995:00:00:06	GET	/shuttle/countdown/	HTTP/1.0	200	3985
199.120.110.21	[01/Jul/1995:00:00:09	GET	/shuttle/missions/sts-73/mission-sts-73.html	HTTP/1.0	200	4085
burger.letters.com	[01/Jul/1995:00:00:11	GET	/shuttle/countdown/liftoff.html	HTTP/1.0	304	0
199.120.110.21	[01/Jul/1995:00:00:11	GET	/shuttle/missions/sts-73/sts-73-patch-small.gif	HTTP/1.0	200	4179
burger.letters.com	[01/Jul/1995:00:00:12	GET	/images/NASA-logosmall.gif	HTTP/1.0	304	0
burger.letters.com	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/video/livevideo.gif	HTTP/1.0	200	0
205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

Aggregate: Request terms

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
unicomp6.unicomp.net	[01/Jul/1995:00:00:06	GET	/shuttle/countdown/	HTTP/1.0	200	3985
199.120.110.21	[01/Jul/1995:00:00:09	GET	/shuttle/missions/sts-73/mission-sts-73.html	HTTP/1.0	200	4085
burger.letters.com	[01/Jul/1995:00:00:11	GET	/shuttle/countdown/liftoff.html	HTTP/1.0	304	0
199.120.110.21	[01/Jul/1995:00:00:11	GET	/shuttle/missions/sts-73/sts-73-patch-small.gif	HTTP/1.0	200	4179
burger.letters.com	[01/Jul/1995:00:00:12	GET	/images/NASA-logosmall.gif	HTTP/1.0	304	0
burger.letters.com	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/video/livevideo.gif	HTTP/1.0	200	0
205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

Use dashboards to monitor in real time



Thank you!

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Please complete the session survey in the mobile app.