AWS re:Invent

DOP315-R1

Build using JavaScript with AWS Amplify, AWS Lambda, and AWS Fargate

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Amazon Web Services

AWS re:Invent

aws

What are our names again?

Tree + Weak + Rum

Tri + vik + ram

What are our names again?

V8 + Node.js

Vi + nod

Agenda

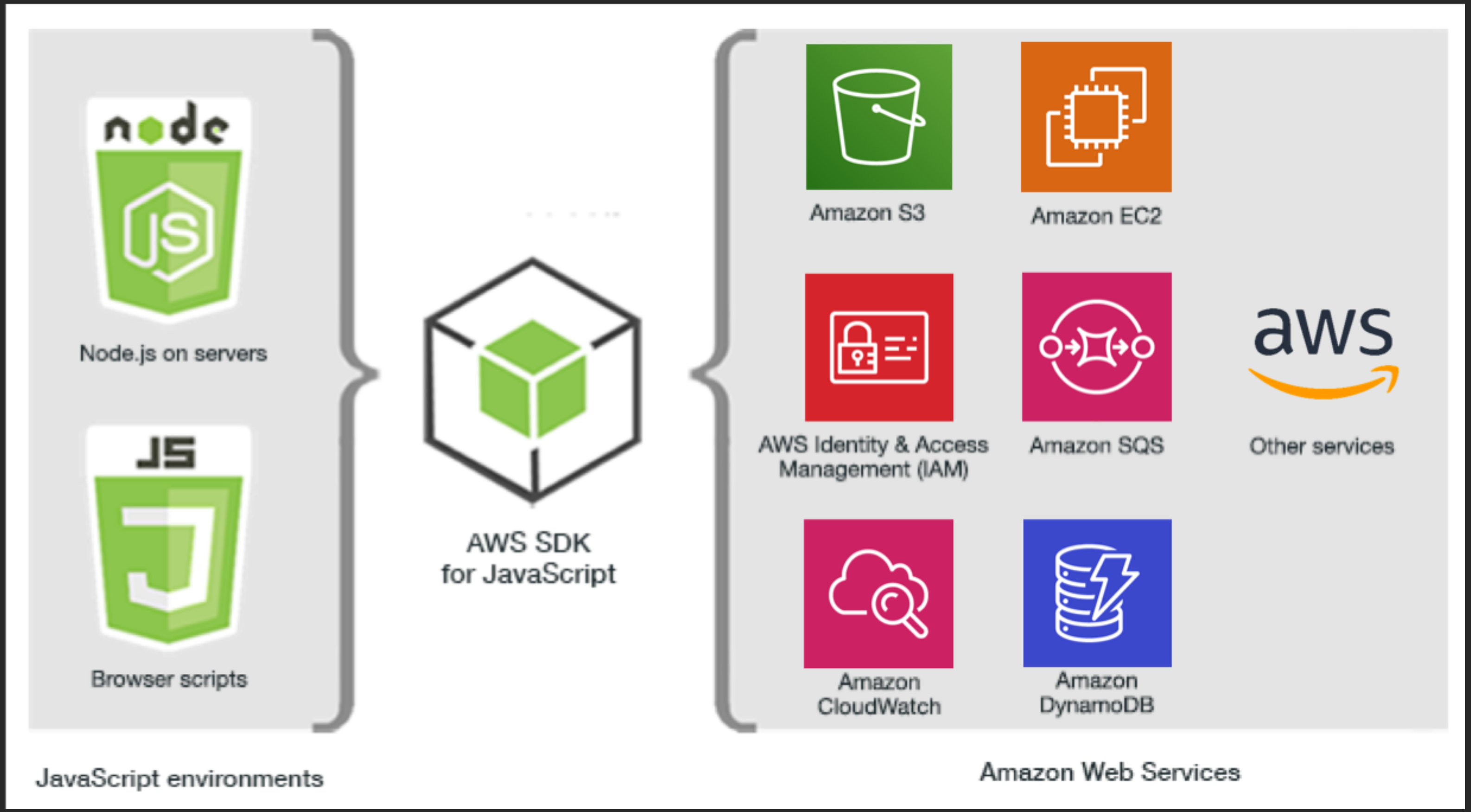
- What is AWS SDK for JavaScript?
- How to use AWS Amplify to build a modern frontend
- How to use JavaScript in AWS Lambda to build a clickstream ingestion pipeline
- How to use JavaScript SDK in containers (e.g., AWS Fargate) to build a service backend
- Compare AWS JS SDK v2 to the v3 dev-preview

What is AWS SDK for JavaScript?

It provides a JavaScript API for AWS services

It helps you build libraries or apps in:

- Modern browsers
- Node.js
- Electron (desktop)
- React Native (mobile)



Example applications

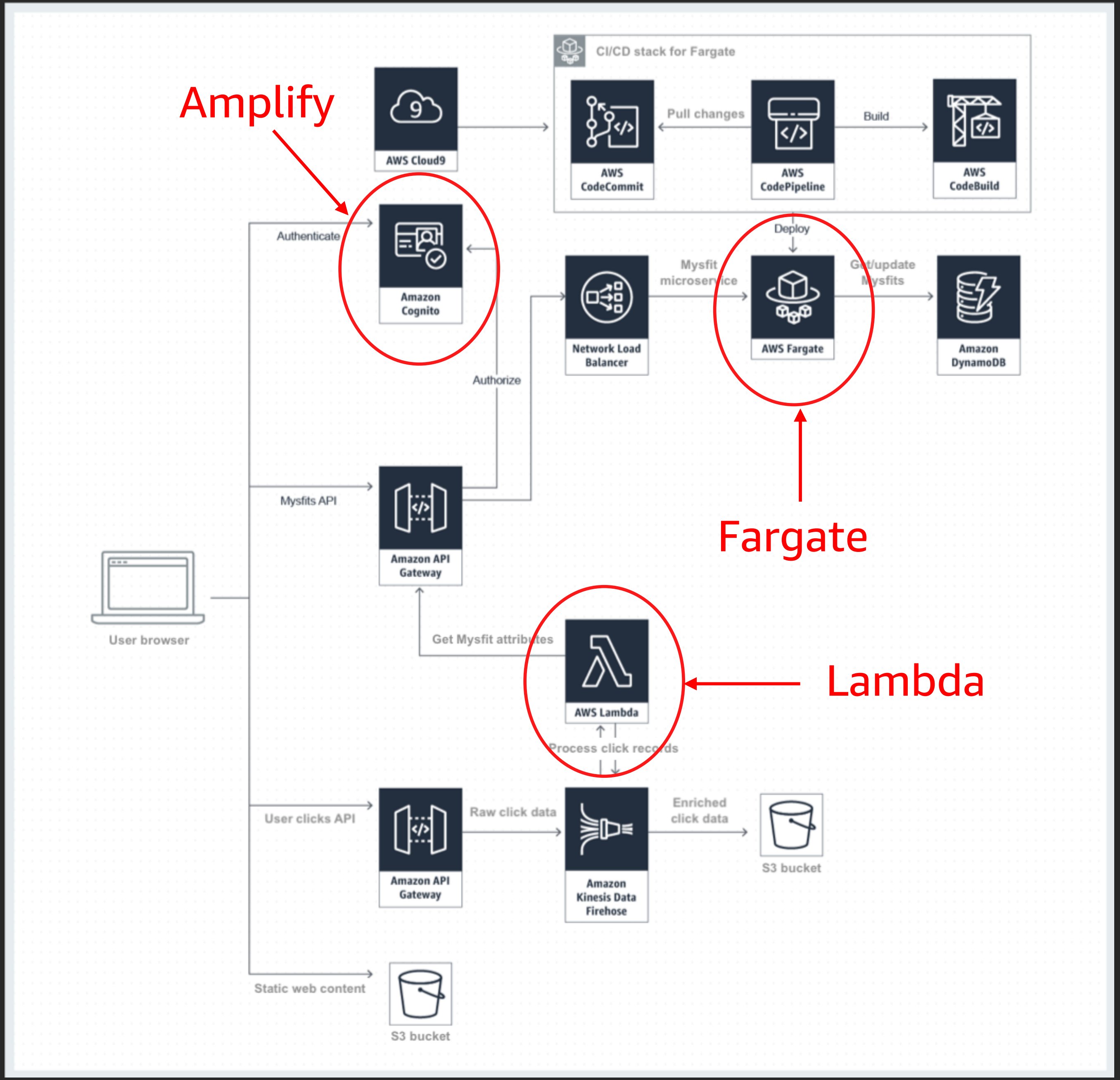
- Mythical Mysfits: An AWS sample application that mirrors common business use cases

https://www.mythicalmysfits.com

- AWS JS SDK v3 Workshop: Todomvc built using v2 and v3 of the SDK, helps compare usability and performance

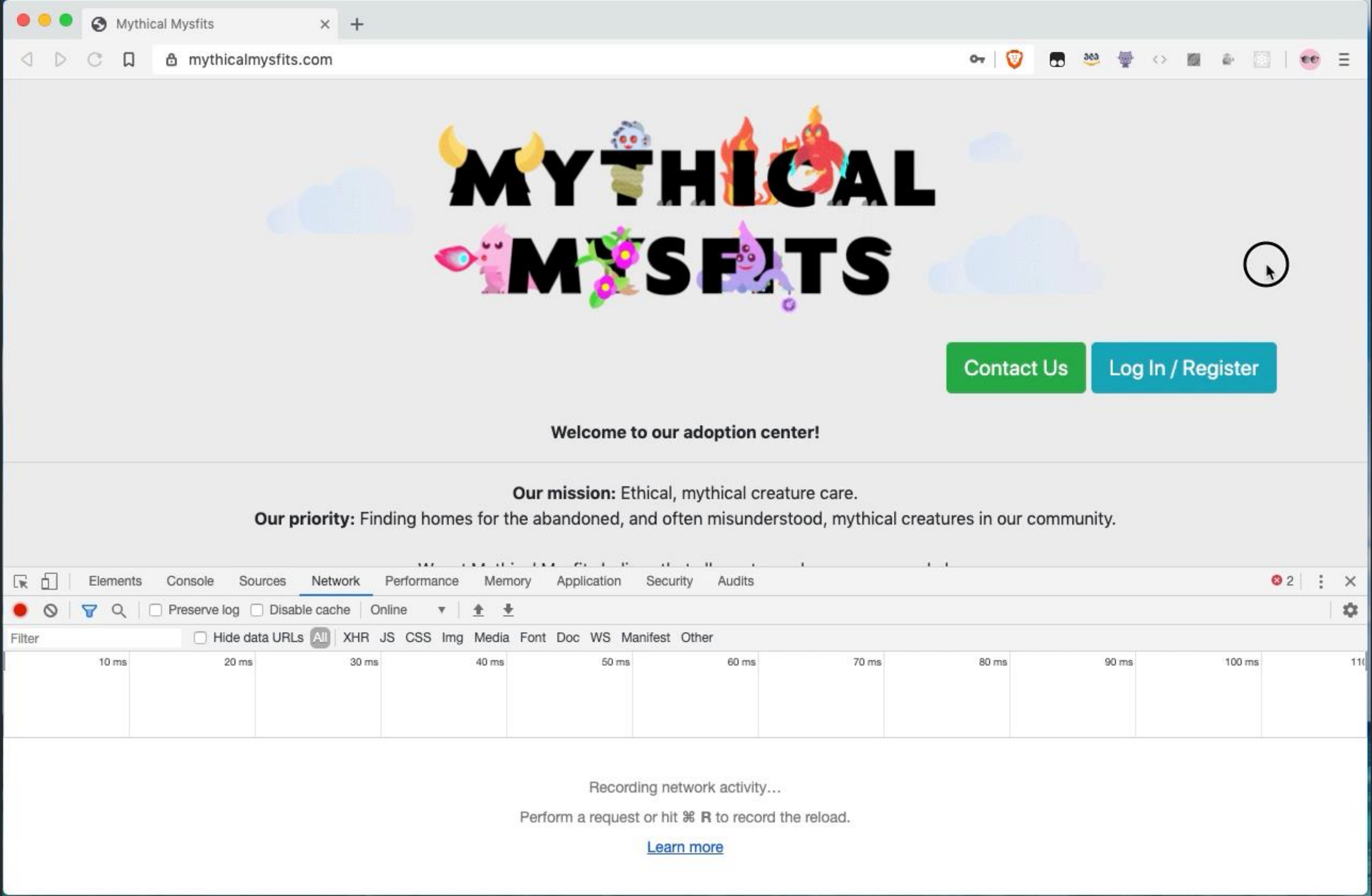
https://github.com/aws-samples/aws-sdk-js-v3-workshop

Mythical Mysfits architecture diagram



- Build a modern frontend
- Build a clickstream ingestion pipeline
- Build a search microservice

Build a modern frontend



Welcome to our adoption center!

Our mission: Ethical, mythical creature care.
Our priority: Finding homes for the abandoned, and often misunderstood, mythical creatures in our community.

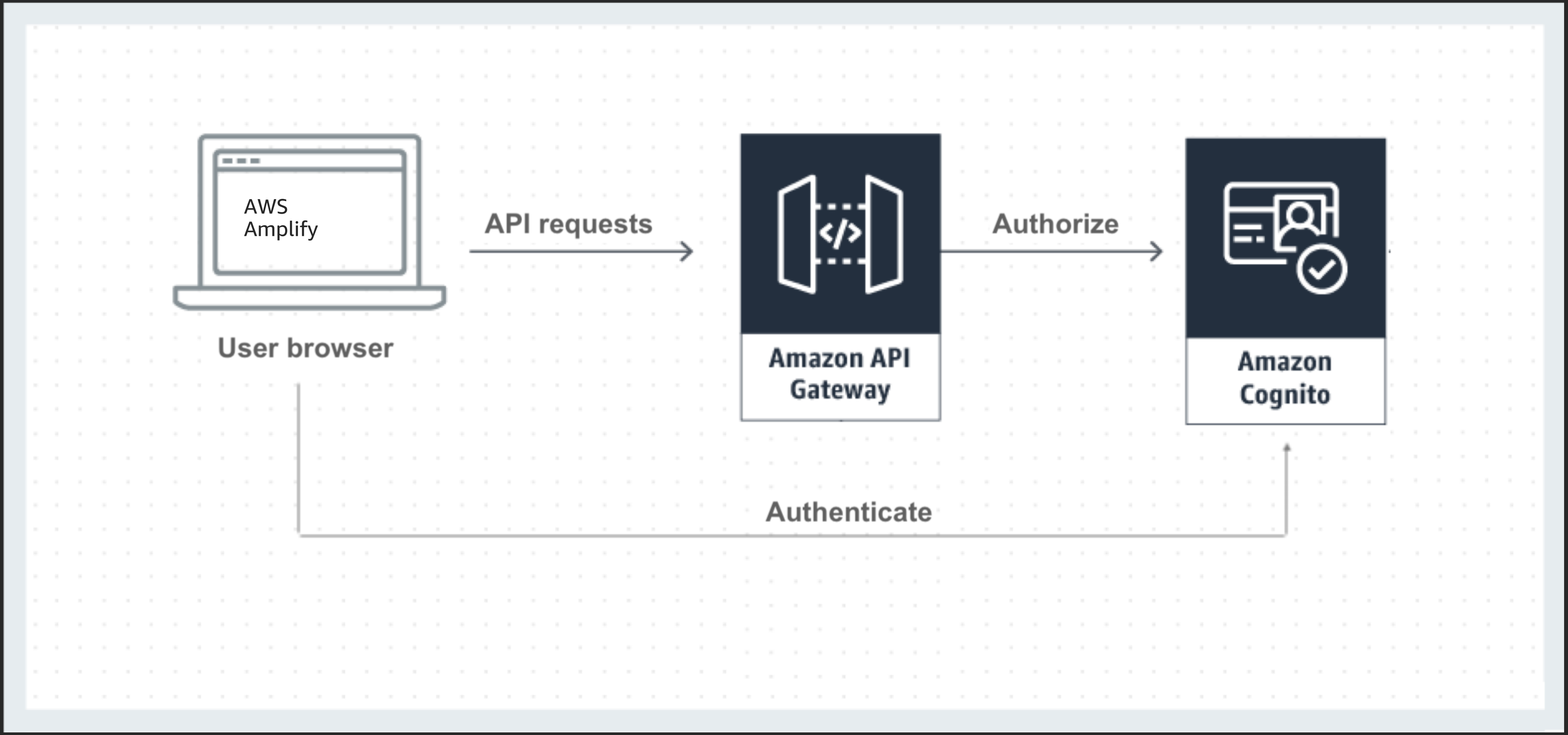
Recording network activity…

Perform a request or hit ⌘ R to record the reload.

AWS Amplify

- What is AWS Amplify?
  - AWS Amplify makes it easy to create, configure, and implement scalable mobile and web apps powered by AWS
- Where do we use Amplify?
  - Amplify is a framework that uses AWS SDK for JavaScript to help you quickly set up authentication, analytics, and offline data sync for your mobile applications
  - We use Amplify in the frontend for registrations and login

Architecture diagram



Sample code for signing in user

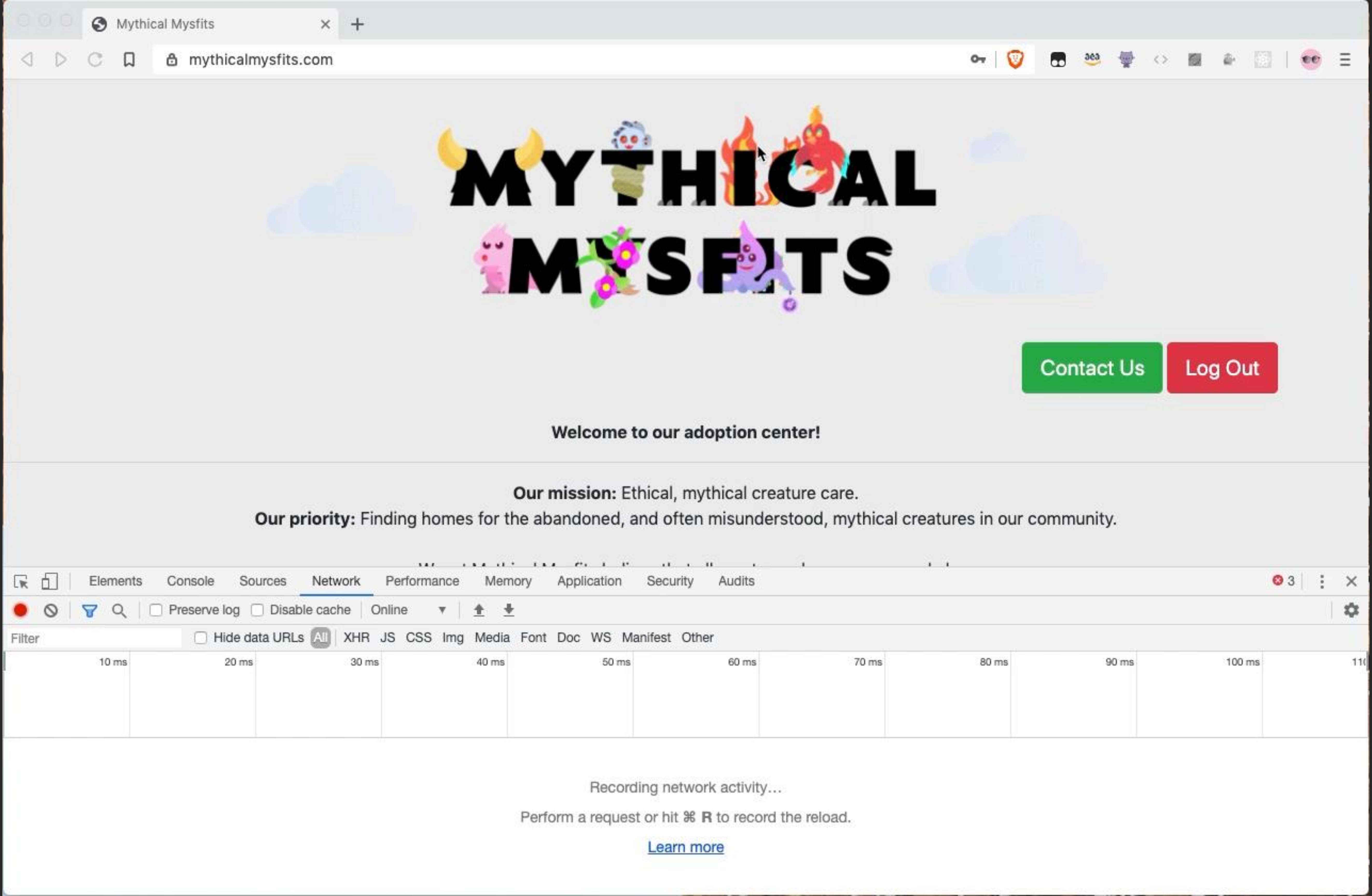
```
// Frontend code in React/Angular/Vue/other components

import { Auth, configure } from "aws-amplify";

configure({
  region: COGNITO_REGION,
  userPoolId: COGNITO_USER_POOL_ID,
  identityPoolId: COGNITO_IDENTITY_POOL_ID
});

const signInUser = (username, password) => {
  try {
    await Auth.signIn(username, password);
    // User successfully signed in
  } catch(e) {
    // Error during sign in
  }
}
```

Build a clickstream ingestion pipeline



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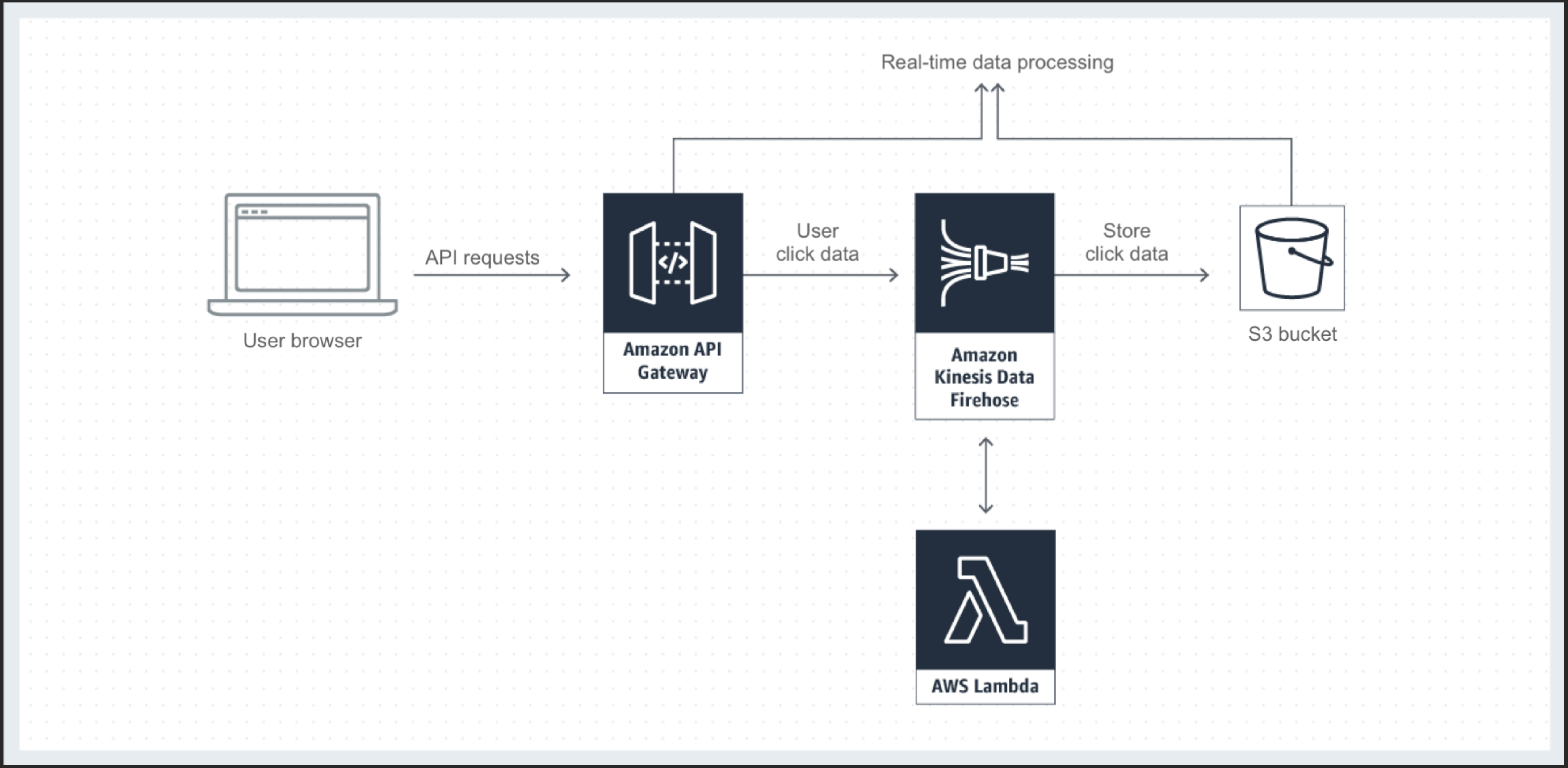
Learn more

AWS Lambda

- What is AWS Lambda?
  - AWS Lambda lets you run code without provisioning or managing servers
  - You pay only for the compute time you consume; there is no charge when your code is not running
  - Just upload your code, and Lambda takes care of everything required to run and scale your code with high availability
- Where do we use Lambda?
  - Lambda is great for event-driven applications that need to respond in real time to changes in data, shifts in system state, or actions by users
  - We use Lambda for processing user clicks on Mysfits

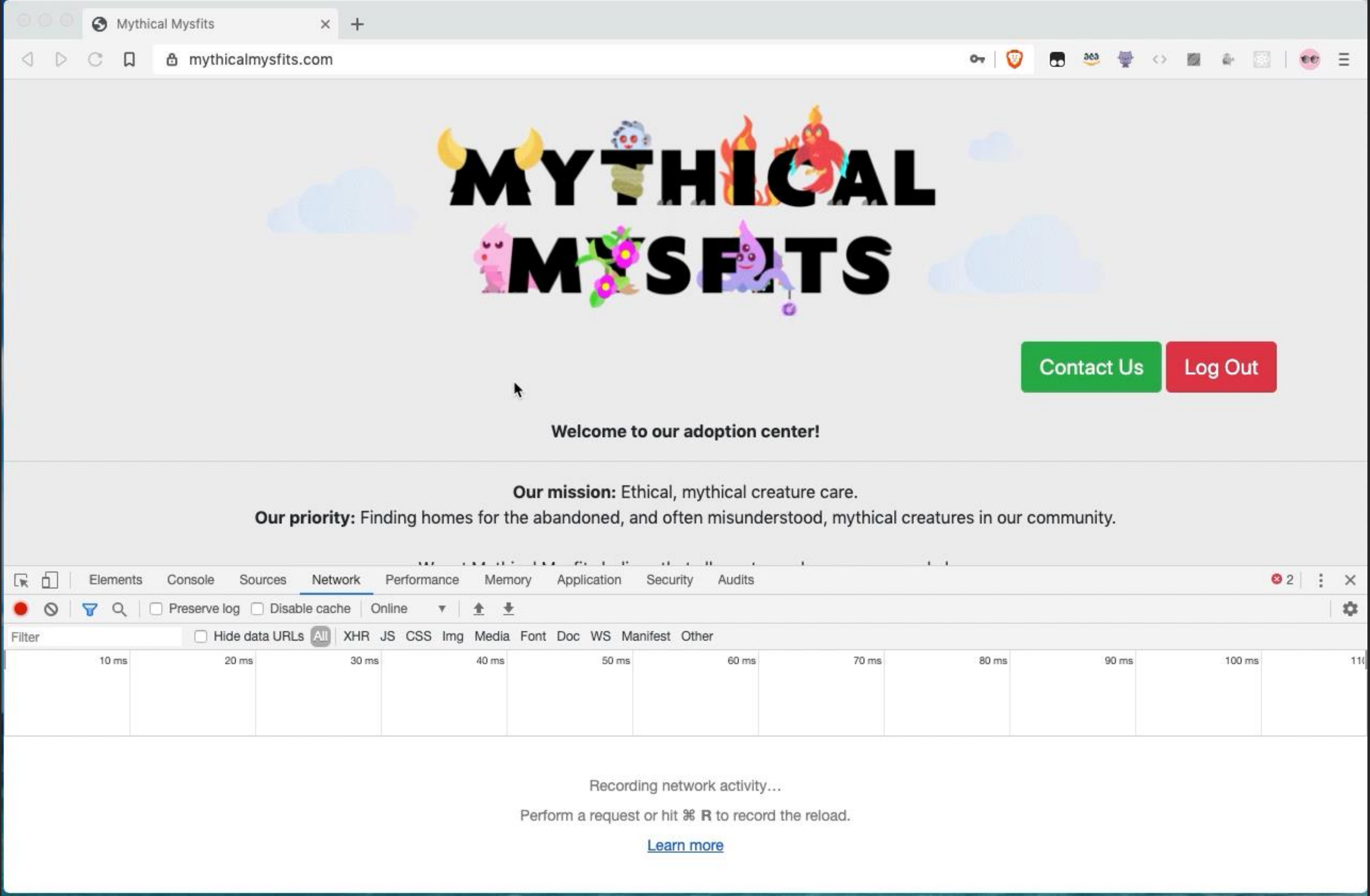
Architecture diagram



Sample code for processing clicks

```
const processRecord = async (event) => {
  let output = [];

  // retrieve the list of records and loop through them
  for (let record in event.records) {
    const enrichedClick = {
              'userId': click['userId'],
              'mysfitId': mysfitId,
              //other data from click here
        }

    output.push(enrichedClick);
  }

  return output;
};

export processRecord;
```

Build a search microservice



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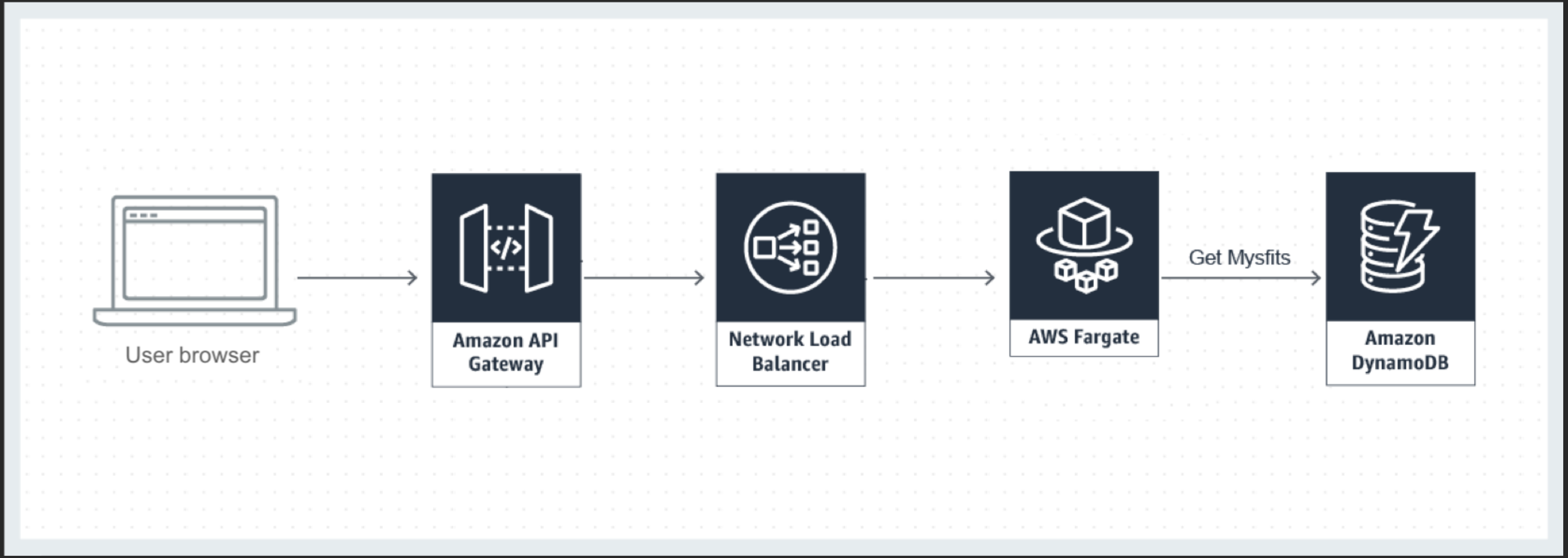
Learn more

AWS Fargate

- What is AWS Fargate?
  - AWS Fargate is a compute engine for deploying and managing containers, which frees you from having to manage any of the underlying infrastructure
  - With AWS Fargate, you no longer have to provision, configure, and scale clusters of virtual machines to run containers
- Where do we use Fargate?
  - It’s a great choice for building long-running processes, such as microservices backends for web, mobile, and PaaS platforms
  - With Fargate, you get the control of containers and the flexibility to choose when they run without worrying about provisioning or scaling servers
  - We deploy our backend returns information about Mysfits on AWS Fargate

Architecture diagram



/mysfits?filter=GoodEvil&value=Good

$\downarrow$

queryMysfitItems(“GoodEvil”, “Good”)

Sample code to query Mysfits (v2)

```
import AWS from "aws-sdk";
import express from "express";

const app = express();
const client = new AWS.DynamoDB();

app.get("/mysfits?filter=:filter&value=:value", (req, res) => {
  const { filter, value } = req.params;
  const params = getQueryParams(filter, value);
  const result = await client.query(params).promise();
  return res.send(result.Items);
});
```

Sample code to query Mysfits (v3 dev-preview)

```
import { DynamoDBClient, QueryCommand } from "@aws-sdk/client-dynamodb";
import express from "express";

const app = express();
const client = new DynamoDBClient();

app.get("/mysfits?filter=:filter&value=:value", (req, res) => {
  const { filter, value } = req.params;
  const params = getQueryParams(filter, value);
  const result = await client.send(new QueryCommand(params));
  return res.send(result.Items);
});
```

AWS JavaScript SDK v2 vs v3

The v3 SDK:

- Is modular
- Has cold/warm start improvements
- Has customizable middleware
- Is typescript-based

	Bundle size	AWS Lambda cold start (90th)	AWS Lambda warm start (90th)
AWS JS SDK v2	~470 KB	1.2 s	139 ms
AWS JS SDK v3 - DynamoDB Client	~76 KB		
AWS JS SDK v3 - DynamoDB Command	~26 KB	776 ms	136 ms

Recap

- Overview of AWS SDK for JavaScript
- AWS Amplify to build a modern frontend
- JavaScript in AWS Lambda to build a clickstream ingestion pipeline
- JavaScript SDK in containers (e.g., AWS Fargate) to build a service backend
- Compare AWS JS SDK v2 to the v3 dev-preview

Demo

Q&A

Starter questions/topics

1. Got a JavaScript problem?
2. When to use Serverless vs containers?
3. AWS JS SDK v2 vs v3

Resources

- AWS JS SDK v3 https://github.com/aws/aws-sdk-js-v3
- AWS JS SDK v3 workshop https://github.com/aws-samples/aws-sdk-js-v3-workshop
- Amplify https://aws.amazon.com/amplify/
- AWS Lambda https://aws.amazon.com/lambda/
- AWS Fargate https://aws.amazon.com/fargate/
- Mythical Mysfits https://mythicalmysfits.com/

Related talks

- Amplify
  - [MOB303] Build and ship full-stack serverless apps with AWS Amplify
  - [DOP334] Set up a serverless app using React and AWS Amplify
- Lambda
  - [SVS343] Building microservices with AWS Lambda
  - [DAT306] Implement microservice architectures with Amazon DynamoDB & AWS Lambda
  - [DAT335] Build serverless applications with Amazon DynamoDB and AWS Lambda
  - [SVS322] Best practices for CI/CD with AWS Lambda and Amazon API Gateway
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Thank you!

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