AWS re:Invent

NOV. 29 – DEC. 3, 2021 | LAS VEGAS, NV

BOA302

Build an app to find your next favorite brew

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Agenda

The problem: Where to find a good beer

The solution: Find My Brew

Recommendations

Locations

Building the demo app

Resources

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The problem: Where to find a good beer

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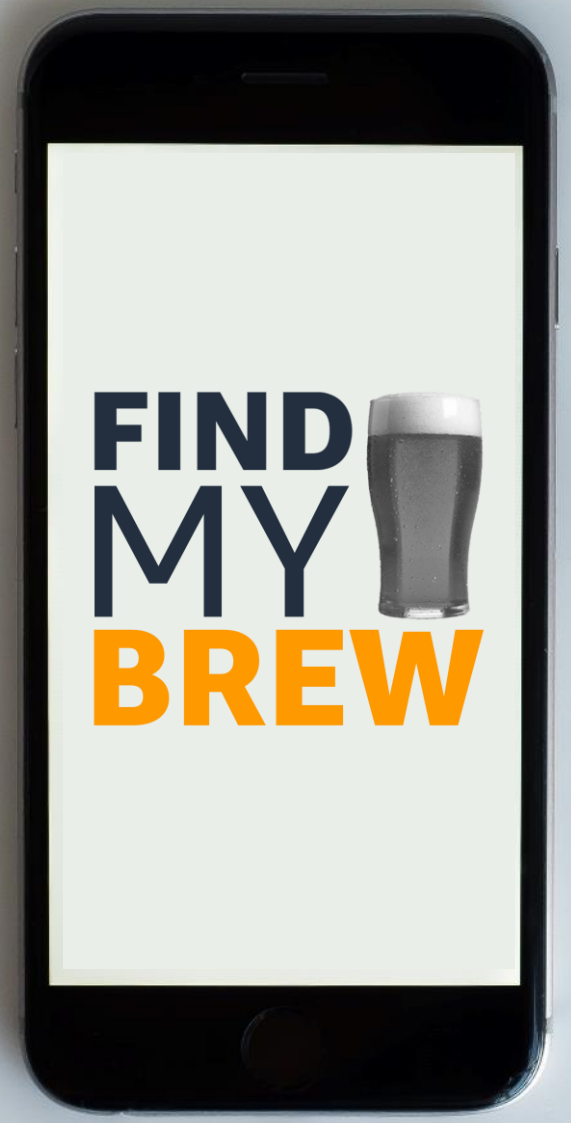
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The solution: Find My Brew

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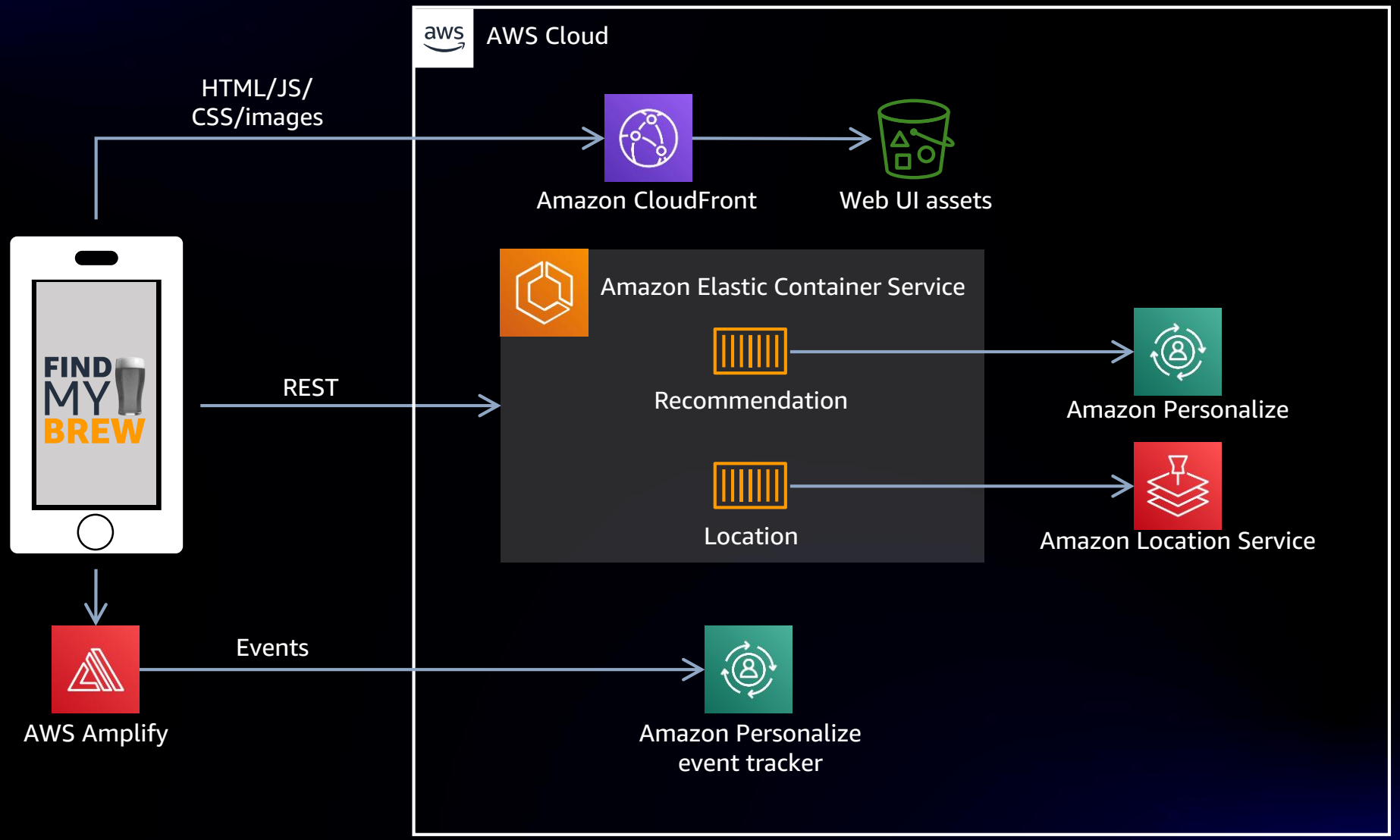
Find My Brew

- Mobile app with personalized recommendations
- ML algorithm improves as it learns what you like
- Location aware – can direct you to where to try the beer



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Find My Brew architecture



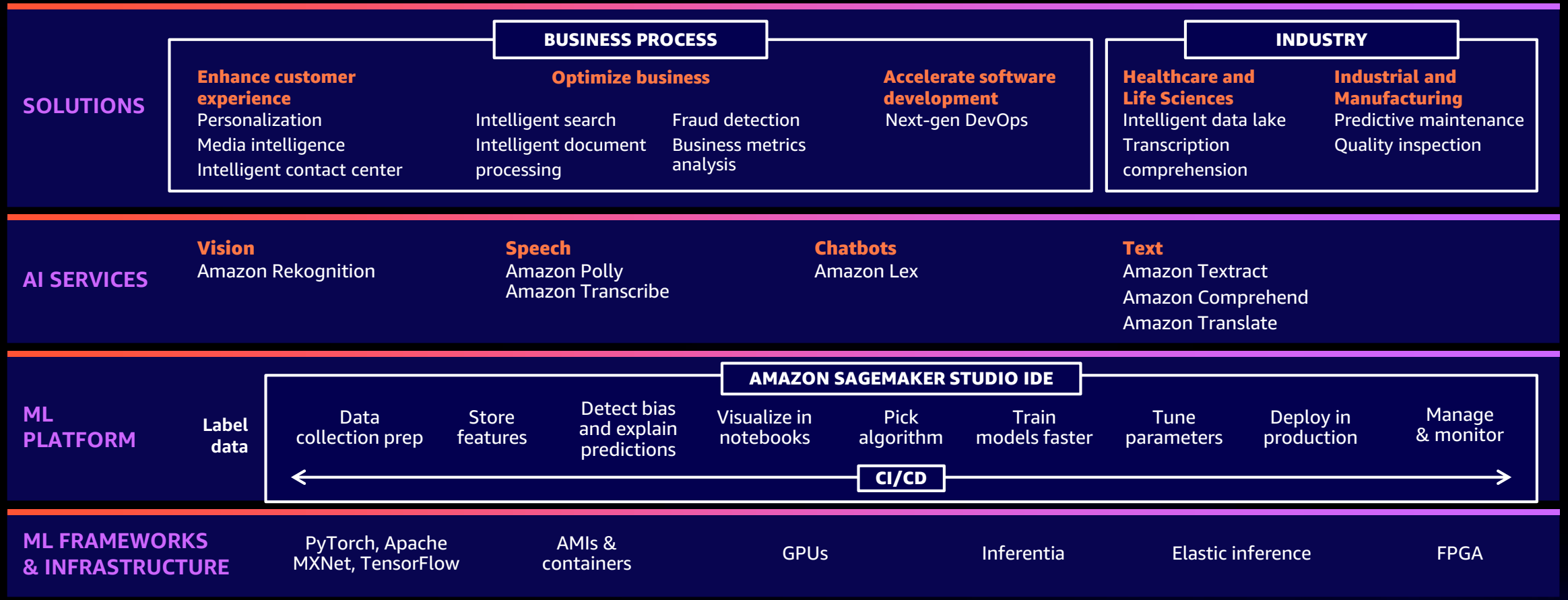
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Amazon Personalize

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The AWS ML stack

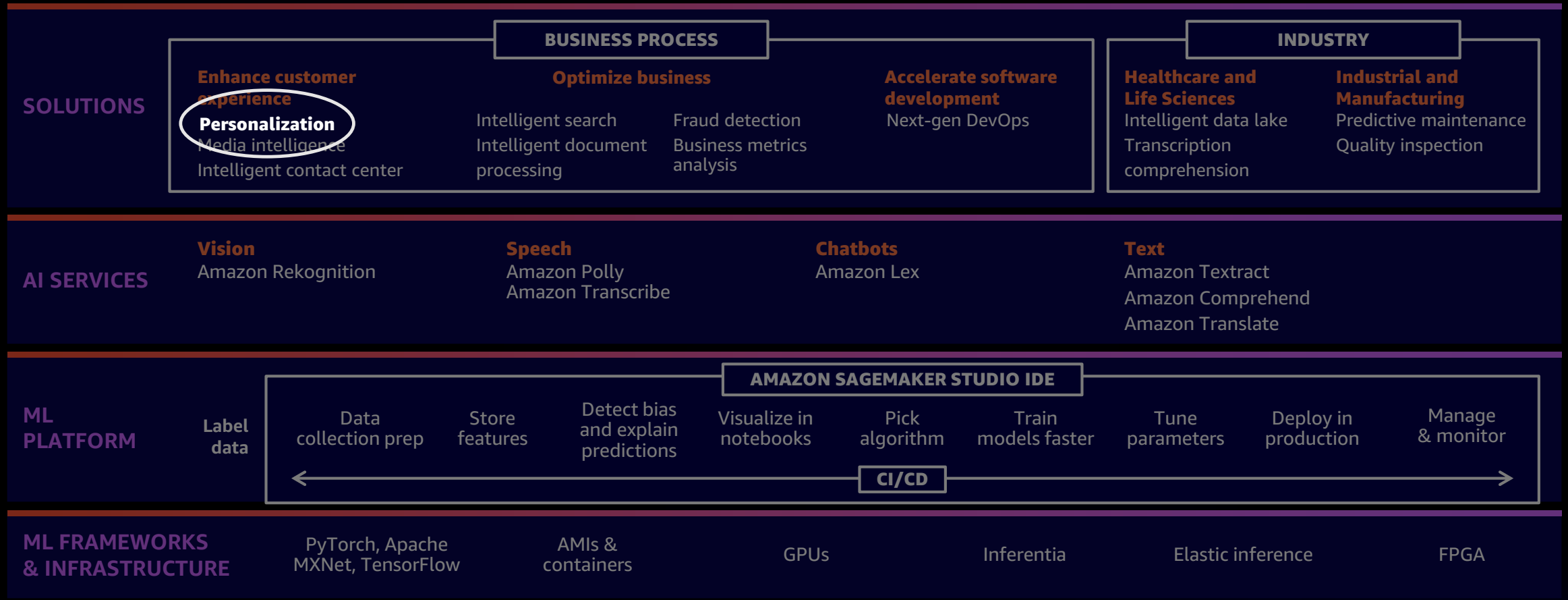
BROADEST AND MOST COMPLETE SET OF MACHINE LEARNING CAPABILITIES



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The AWS ML stack

BROADEST AND MOST COMPLETE SET OF MACHINE LEARNING CAPABILITIES



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Pioneering personalization at Amazon

THE EVOLUTION OVER 20+ YEARS

THEN

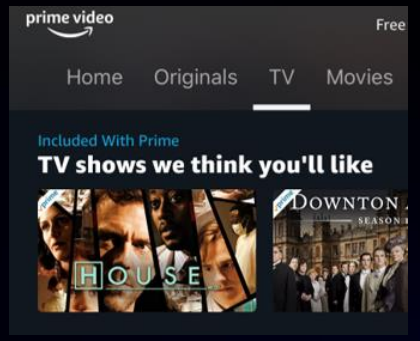
First feature launched for recommendations in 1998



NOW

Delivering sophisticated, unique experiences to customers across channels and devices using machine learning









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How it works

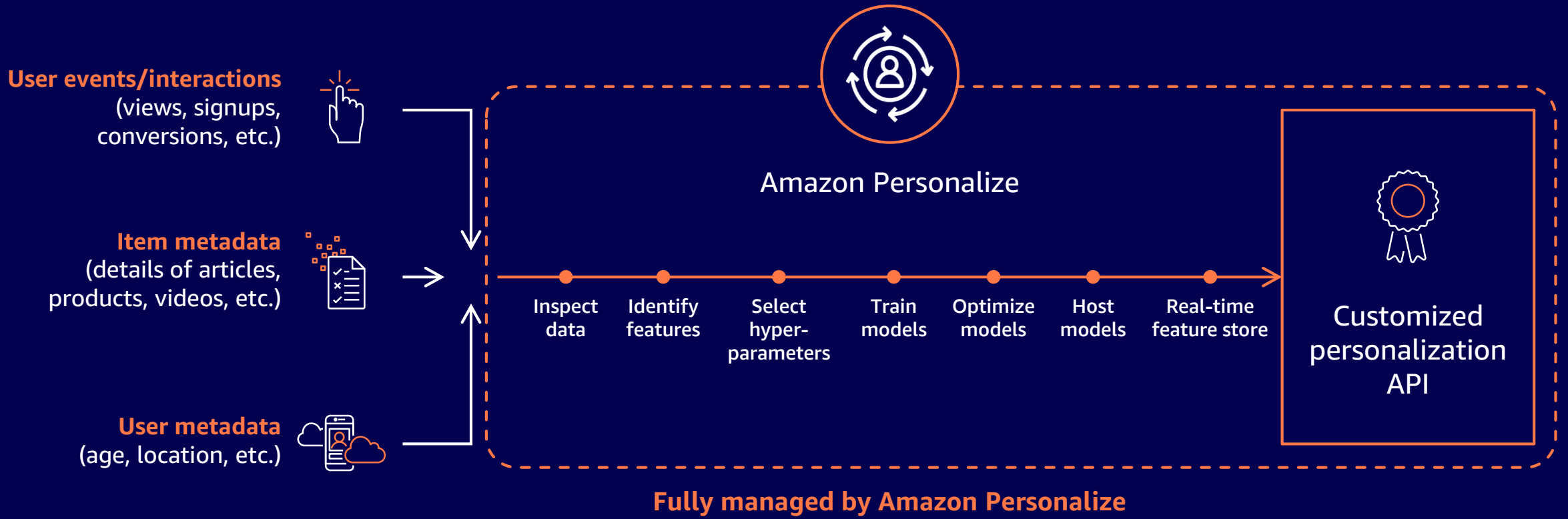
AMAZON PERSONALIZE



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How it works

AMAZON PERSONALIZE



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Getting started with Amazon Personalize

Datasets: Interactions, users, and items

Preparing and importing data

Creating solutions and solution versions

- User personalization
- Related items
- Personalized ranking

Create campaigns

Note: For our demo app, we've used a selection of local Las Vegas craft beer venues and their publicly available tap lists. This list is by no means comprehensive!

aws

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AWS Management Console

AWS services

Recently visited services

- Amazon Personalize
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- Amazon Simple Email Service
- S3
- X-Ray
- CodePipeline
- Amazon AppFlow
- Simple Notification Service

All services

Build a solution

Get started with simple wizards and automated workflows.

Launch a virtual machine
With EC2
2-3 minutes

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With Elastic Beanstalk
6 minutes

Build using virtual servers
With Lightsail
1-2 minutes

Register a domain

Connect an IoT device

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Code: Recommendations

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Calling Recommendations microservice

```
1  import axios from "axios";
2
3  const serviceDomain = process.env.VUE_APP_RECOMMENDATIONS_SERVICE_DOMAIN;
4  const servicePort = process.env.VUE_APP_RECOMMENDATIONS_SERVICE_PORT;
5  const baseURL = `${serviceDomain}:${servicePort}`;
6
7  const connection = axios.create({
8      baseURL
9  })
10
11 const recommendations = "/recommendations"
12
13 export default {
14     getRecommendationsForUser(userID, currentItemID, numResults, feature) {
15         return connection.get(`${recommendations}?
   userID=${userID}&currentItemID=${currentItemID}&numResults=${numResults}&feature=${feature}&fullyQualifyImageUrls=1`)
16     }
17 }
```

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Calling Amazon Personalize campaign

```python
import boto3
import json
from flask import Flask, request, Response

app = Flask(__name__)

personalize = boto3.client('personalize-runtime')
ssm = boto3.client('ssm')
campaign_arn = ssm.get_parameter(Name='retaildemostore-product-recommendation-campaign-arn')['Parameter']['Value']

@app.route('/recommendations', methods=['GET'])
def recommendations():
    user_id = request.args.get('userID')
    if not user_id:
        raise BadRequest('userID is required')

    response = personalize.get_recommendations(campaignArn=campaign_arn, userId=user_id)

    # Decorate items in response

    return Response(json.dumps(response['itemList']), content_type='application/json')
```

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Streaming events to Amazon Personalize

```
import { Analytics, AmazonPersonalizeProvider } from 'aws-amplify';

Analytics.addPluggable(new AmazonPersonalizeProvider());

const amplifyConfig = {
    Analytics: {
        AmazonPersonalize: {
            trackingId: process.env.VUE_APP_PERSONALIZE_TRACKING_ID,
            region: process.env.VUE_APP_AWS_REGION,
            flushSize: 5,
            flushInterval: 2000, // 2s
        }
    }
}

Analytics.configure(amplifyConfig);
```

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Streaming events to Amazon Personalize

```
1 import AmplifyStore from '@/store/store';
2 import { Analytics as AmplifyAnalytics } from '@aws-amplify/analytics';
3
4 export const AnalyticsHandler = {
5   productLiked(user, product, discount) {
6     AmplifyAnalytics.record({
7         eventType: 'ProductLiked',
8         userId: user.id,
9         properties: {
10            itemId: product.id,
11            discount: discount?"Yes":"No"
12        }
13    }, 'AmazonPersonalize');
14  }
15 }
```

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Challenge: Choosing the right metadata

- Style
- Description
- Price
- Bitterness (IBU)
- Alcohol percentage (ABV)



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Challenge: Adding context to recommendations

- Seasonality
- Weather
- Food pairings



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Challenge: The “cold start” problem

How to provide useful insights to customer as quickly as possible

Ways to resolve

- Start with popular items and learn
- Utilize checklist or questionnaire
- Require ratings as part of onboarding



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Code: Swipe interface

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Swipe cards template

```
<template>
  <div class="card-container">
    <div
      v-else
      class="swipable-card-container"
      v-for="(product, i) in products"
      :key="product.id"
      :style="{ '--card-index': i }"
    >
      <SwipeCard
        :product="product"
        class="swipable-card"
        @swipeLeft="onSwipeLeft(i)"
        @swipeRight="onSwipeRight(i)"
      ></SwipeCard>
    </div>
  </div>
</template>
```

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Swipe cards code

```
methods: {
   onSwipeLeft(i) {
     this.products.splice(i, 1);
   },
   onSwipeRight(i) {
     const [likedProduct] = this.products.splice(i, 1);

     this.likedProducts.push(likedProduct);
   },
   onCompletion() {
     this.recordLikedProductViews();

     this.$emit('complete');
   },
   recordLikedProductViews() {
     this.likedProducts.forEach((product) => AnalyticsHandler.productLiked(this.user, product));
   },
 },
 watch: {
   products(newProducts) {
     if (newProducts.length === 0) this.onCompletion();
   },
 },
}
```

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Adding location

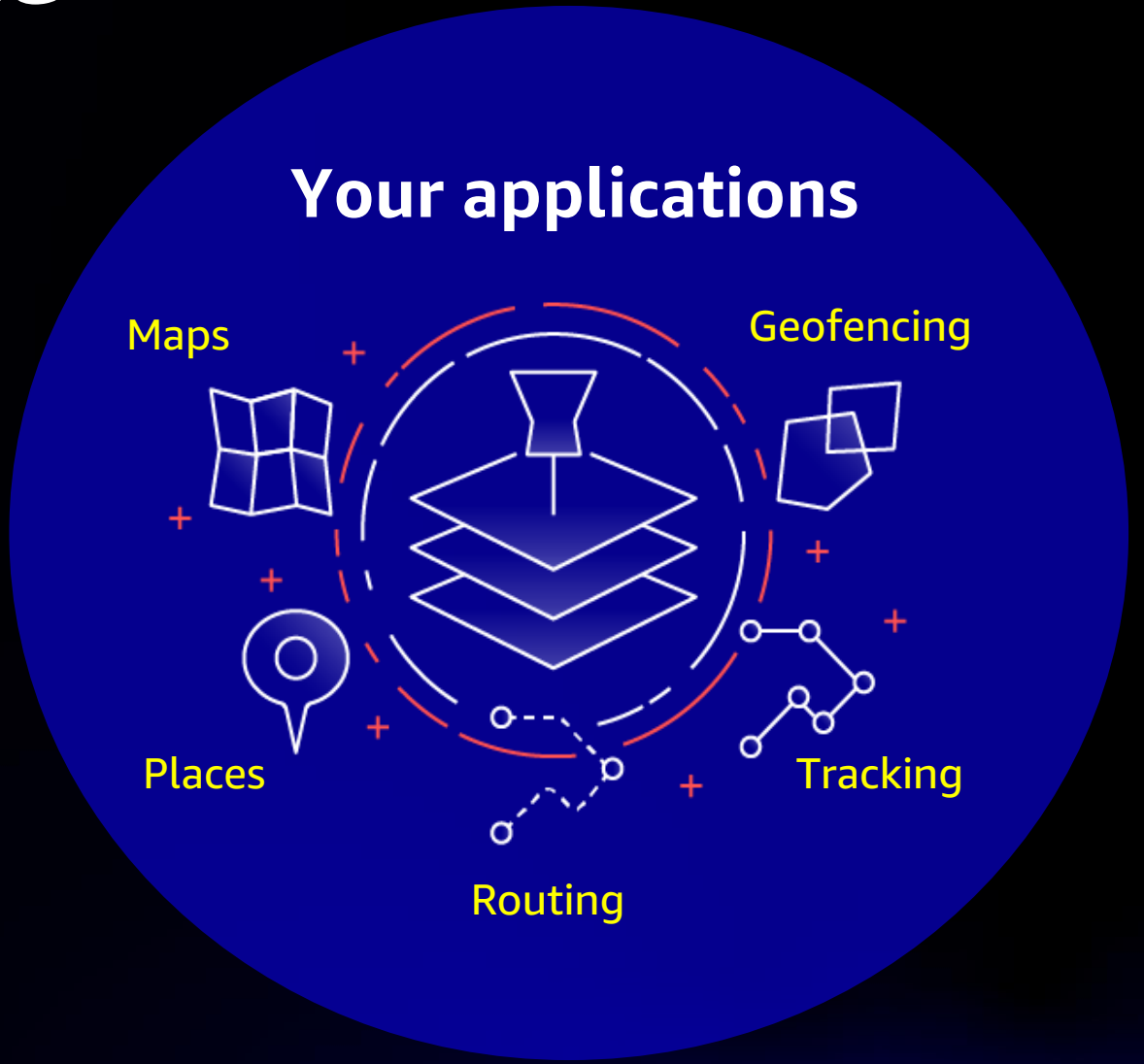
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Amazon Location Service

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Amazon Location Service

- Shorter time to production
- Easy access to high-quality data
- Privacy and security
- Cost-effectiveness

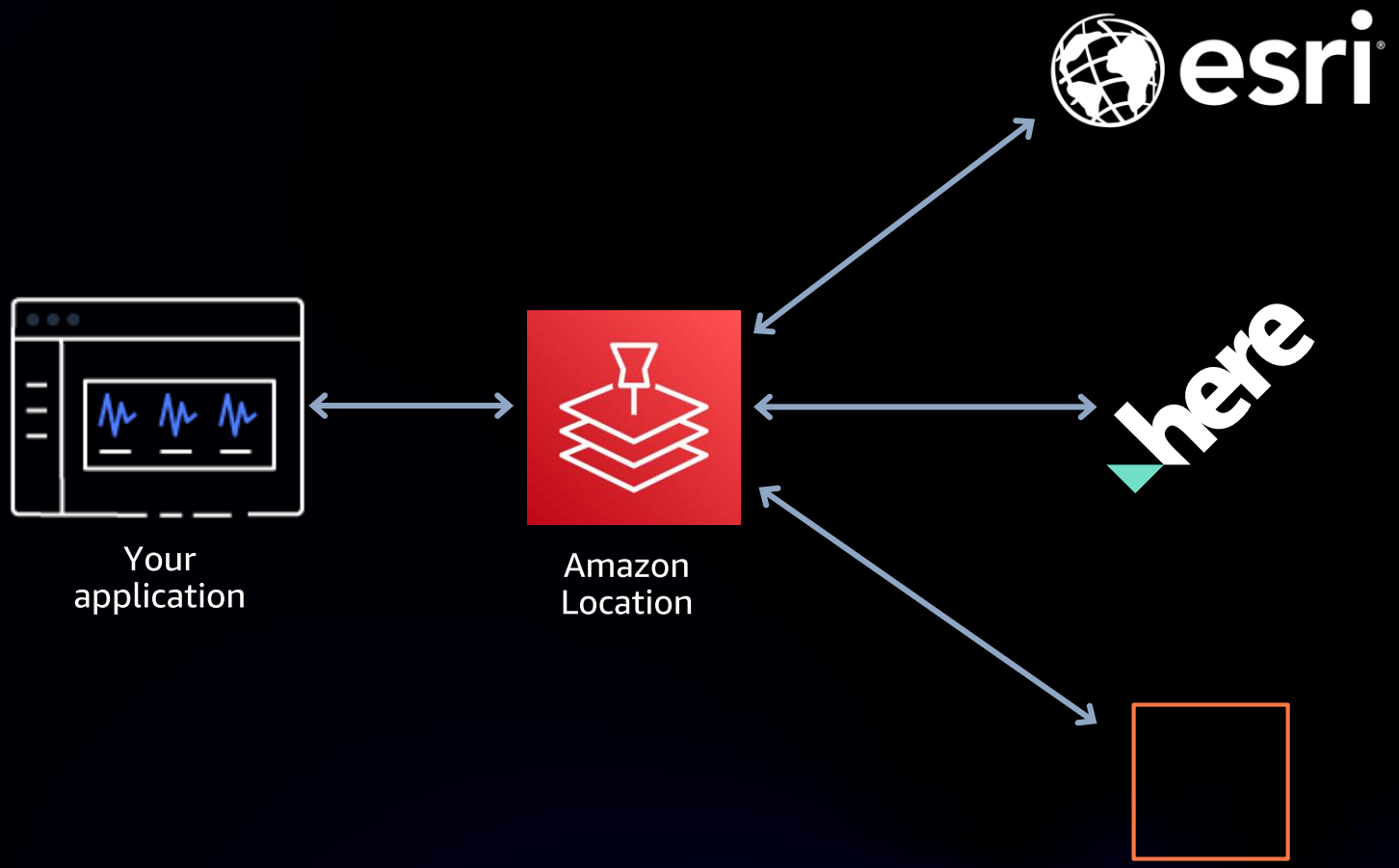


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Easy access to high-quality data

ACCESS DATA FROM ESRI AND HERE THROUGH A CONSISTENT API

- No need for new credentials and no vendor onboarding
- Simplified global coverage
- A single consistent API
- One price, regardless of data provider



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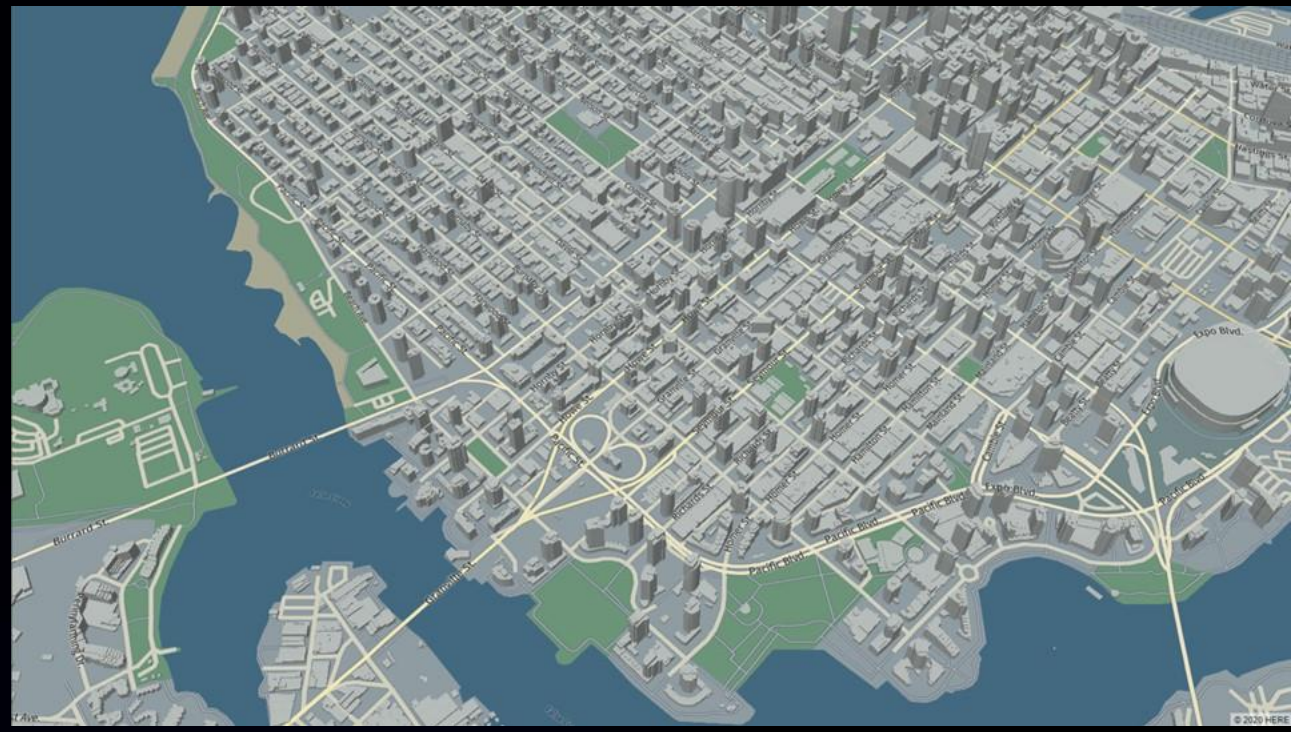
Map visualization

Challenges

- Ease of integration
- Available map styles
- Cost

Results

- Quick integration
- Best-suited visualization
- Lower cost



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Code: Maps and locations

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Create map Info

Name and description

Name

FindMyBrewMap

Use only letters, numbers, hyphens, periods, or underscores with no spaces.

Description - *optional*

Map for FindMyBrew locations

The description can have up to 1000 characters.

Maps

Select one of these maps

- Esri Light

  A detailed basemap for the world, symbolized with a classic Esri map style.



- Esri Street Map

  This comprehensive street map includes highways, major roads, minor roads, railways, water features, cities, parks, landmarks, building footprints, and administrative boundaries.



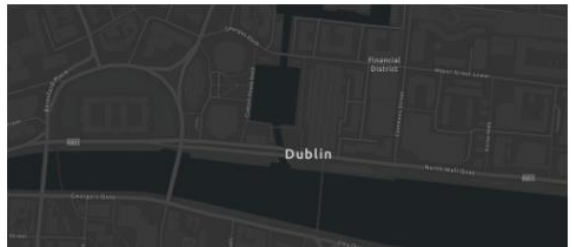
- Esri Navigation

  Designed for daytime navigation on mobile devices. This map emphasizes roads, paths, railways, and other transit features.



- Esri Dark Gray Canvas

  This map is designed to focus attention on your thematic content by providing a neutral dark background with minimal colors, labels, and features.



Import libraries

```
1 import maplibregl from "maplibre-gl";
2 import { Auth } from "aws-amplify";
3 import Location from "aws-sdk/clients/location";
4 import { createMap } from "maplibre-gl-js-amplify";
5
6 <div ref="container" class="location-map"></div>
```

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Create the client location

```
this.service = new Location({
  credentials: this.credentials,
  region: process.env.VUE_APP_AWS_REGION,
});
```

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Initialize the map

```
this.map = await createMap({
  container: this.container,
  center: WYNN_LAS_VEGAS_COORDINATES,
  zoom: 18,
});
```

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Add locations to the map

```
this.markers = this.locations.map((location) => {
  const marker = new maplibregl.Marker({element: markerDom})
    .setLngLat([location.Longitude, location.Latitude]);
  const popup = new maplibregl.Popup().setDOMContent(popupDom);
  popup.on('open', () => this.selectedLocation = location);

  return marker.setPopup(popup);
});

this.markers.forEach((marker, i) => {
  marker.addTo(this.map);
});
```

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Code: Routing

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Create route calculator Info

Name and description

Name

FindMyBrewRouteCalculator

Use only letters, numbers, hyphens, periods, or underscores with no spaces.

Description - *optional*

Route calculator for the FindMyBrew app

The description can have up to 1000 characters.

Data provider

Choose a data provider

- (●) **Esri**
  Esri routing uses the most up-to-date reference data from authoritative sources, including community, commercial, and government data and combines it with 3rd party sources for traffic data to provide routes calculations that are fresh and accurate. Esri routes are limited to 400 km, and Esri is the only provider to serve routes in China and Korea.
- ( ) **HERE**
  HERE routing uses road network, traffic trends, and live traffic data from a combination of validated sources, including its own fleet of vehicles and 3rd party data, updated in near real-time to ensure routing accuracy. HERE routing has no limitation on route length and offers the lowest latency in most regions.

aws

Import libraries



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Update map initialization

```
this.map.on("load", function () {
  theMap.addSource("geojson", {
    type: "geojson",
    data: theGeojson,
  });

  theMap.addLayer({
    id: "measure-lines",
    type: "line",
    source: "geojson",
    layout: {
      "line-cap": "round",
      "line-join": "round",
    },
    paint: {
      "line-color": "#000",
      "line-width": 2.5,
    },
    filter: ["in", "$type", "LineString"],
  });
});
```

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Calculate the route

```
async calculateRoute() {
  const params = {
    CalculatorName: "FindMyBrewRouteCalculator",
    DeparturePosition: [this.currentLocation.longitude, this.currentLocation.latitude],
    DestinationPosition: [this.selectedLocation.Longitude, this.selectedLocation.Latitude],
    IncludeLegGeometry: true,
    DistanceUnit: 'Miles',
    TravelMode: this.travelMode
  };

  return await this.service.calculateRoute(params).promise();
}
```

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Collect route features

```
1 makeLegFeatures(legs) {
2   return legs.map((leg) => {
3     const geom = leg.Geometry;
4
5     const { ...properties } = leg;
6
7     return turf.feature(
8       {
9         type: Object.keys(geom)[0],
10        coordinates: Object.values(geom)[0],
11      },
12      properties
13    );
14  });
15 }
```

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Draw the route

```
this.geojson = {
  'type': 'FeatureCollection',
  'features': route
};

// draw the route
this.map.getSource('geojson').setData(
  this.geojson
);
```

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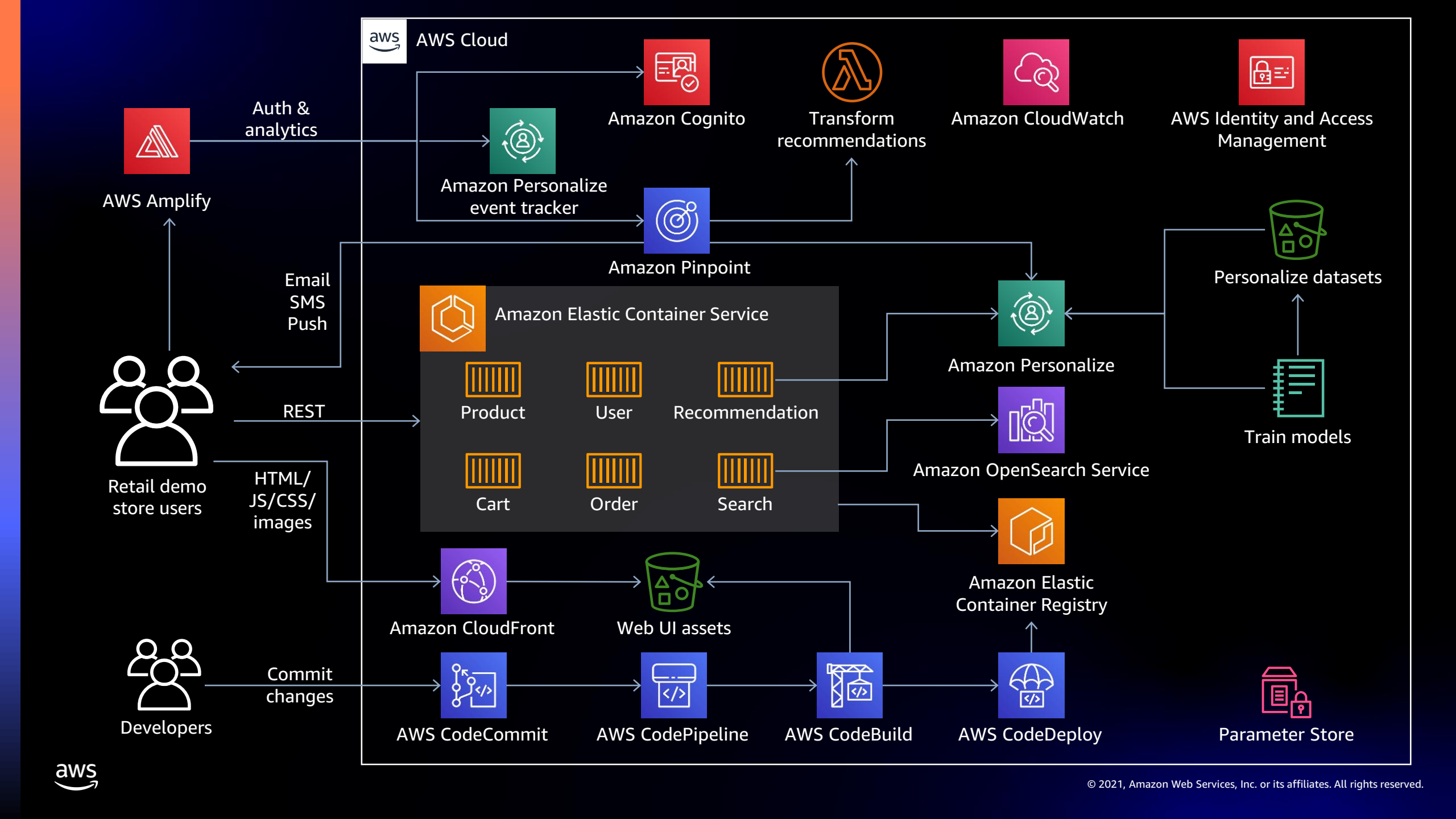
Challenge: Geo-aware recommendations

- Amazon Personalize can’t recommend items near me with distance as weighting for recommendations
- Use geospatial search (Amazon OpenSearch Service, Amazon DocumentDB) to find beers nearby
- Then use Amazon Personalize personalized ranking to rerank nearby beers by interest



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aws-samples / retail-demo-store

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james-jory Product multi-item fetch optimization (#269) ... 365d8d4 12 days ago 200 commits

.github	Initial commit	2 years ago
aws/cloudformation-templates	Product multi-item fetch optimization (#269)	12 days ago
documentation	Imagesupdate (#198)	8 months ago
generators	Add additional staging regions (#268)	27 days ago
location_services	Delivery Amazon Location Service Integration (#162)	2 months ago
src	Product multi-item fetch optimization (#269)	12 days ago
videos	IVS integration fixes (#202)	8 months ago
workshop	Clone GitHub repo for workshop content, fixed screenshot...	last month
.gitignore	Update Amazon Pay sign-in + UI stub (#262)	last month

About

AWS Retail Demo Store is a sample retail web application and workshop platform demonstrating how AWS infrastructure and services can be used to build compelling customer experiences for eCommerce, retail, and digital marketing use-cases

aws elasticsearch ecommerce vuejs workshops ecs cognito pinpoint cloudfront amplify codepipeline personalize fargate

Resources

Amazon Personalize: aws.amazon.com/personalize

- AIM204 – Enhancing customer experience with Amazon Personalize
- AIM302 – Tips and tricks to boost your personalized recommendations

Amazon Location Service: aws.amazon.com/location

- FWM202 – Build a real-time serverless application to drive fan engagement
- GPS203 – Building spatial computing experiences on AWS

Retail Demo Store: github.com/aws-samples/retail-demo-store

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The Find My Brew team













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Thank you!

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twitter.com/mcunhaana

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