Serverless Architecture

CSSE6400

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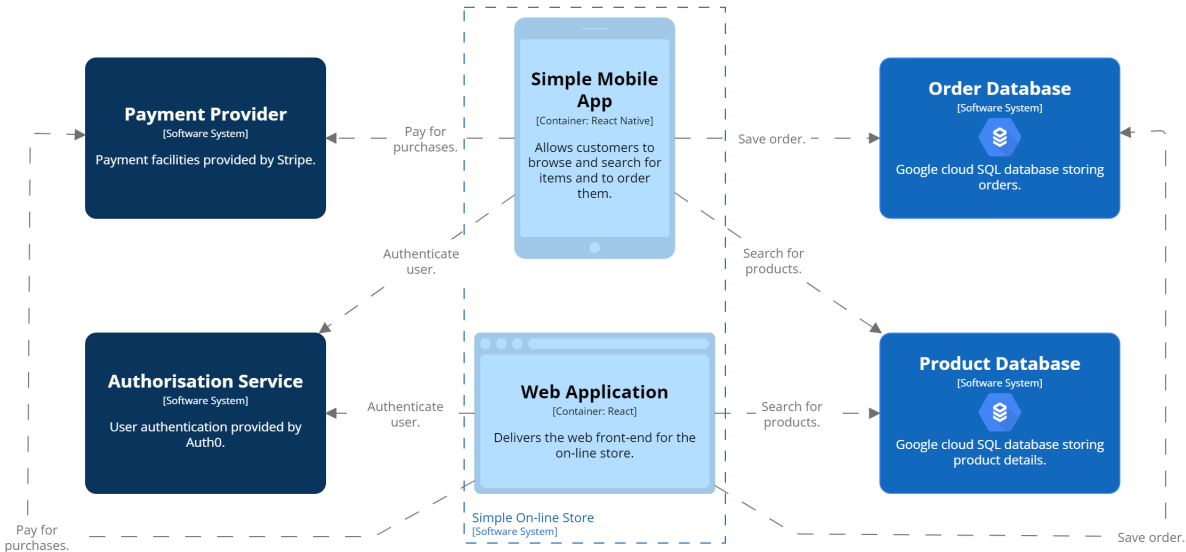May 23, 2022

Oxymoron 1. Serverless

Logic running on someone else's server.

> **Definition 1. Backend as a Service (BaaS)**
>
> Cloud-hosted applications or services that deliver functionality used by an application front-end.

BaaS Example

Payment Provider
[Software System]

Payment facilities provided by Stripe.

Simple Mobile App
[Container: React Native]

Allows customers to browse and search for items and to order them.

Order Database
[Software System]

Google cloud SQL database storing orders.

Authorisation Service
[Software System]

User authentication provided by Auth0.

Web Application
[Container: React]

Delivers the web front-end for the on-line store.

Simple On-line Store
[Software System]

Product Database
[Software System]

Google cloud SQL database storing product details.

Pay for purchases.

Authenticate user.

Save order.

Search for products.

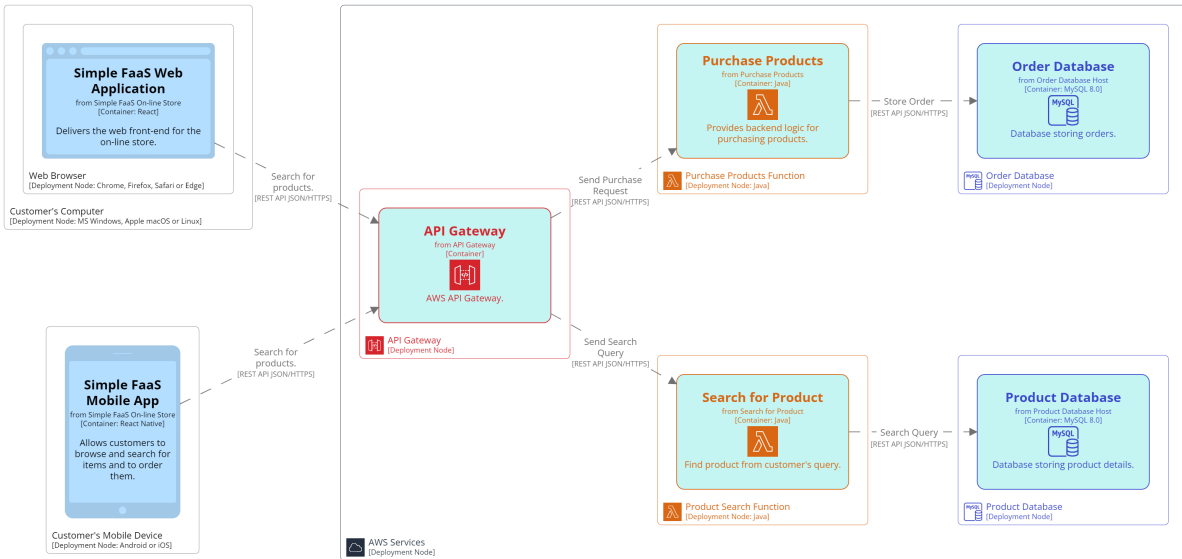Authenticate user.

Search for products.

Pay for purchases.

Save order.

Definition 2. Functions as a Service (FaaS)

Application logic that is triggered by an event and runs in a transient, stateless compute node.

FaaS Example

Customer's Computer
[Deployment Node: MS Windows, Apple macOS or Linux]

Web Browser
[Deployment Node: Chrome, Firefox, Safari or Edge]

Simple FaaS Web Application
from Simple FaaS On-line Store
[Container: React]

Delivers the web front-end for the on-line store.

Customer's Mobile Device
[Deployment Node: Android or iOS]

Simple FaaS Mobile App
from Simple FaaS On-line Store
[Container: React Native]

Allows customers to browse and search for items and to order them.

Search for products.
[REST API JSON/HTTPS]

Search for products.
[REST API JSON/HTTPS]

AWS Services
[Deployment Node]

API Gateway
[Deployment Node]

API Gateway
from API Gateway
[Container]

AWS API Gateway.

Send Purchase Request
[REST API JSON/HTTPS]

Send Search Query
[REST API JSON/HTTPS]

Purchase Products Function
[Deployment Node: Java]

Purchase Products
from Purchase Products
[Container: Java]

Provides backend logic for purchasing products.

Store Order
[REST API JSON/HTTPS]

Product Search Function
[Deployment Node: Java]

Search for Product
from Search for Product
[Container: Java]

Find product from customer's query.

Search Query
[REST API JSON/HTTPS]

Order Database
[Deployment Node]

Order Database
from Order Database Host
[Container: MySQL 8.0]

MySQL

Database storing orders.

Product Database
[Deployment Node]

Product Database
from Product Database Host
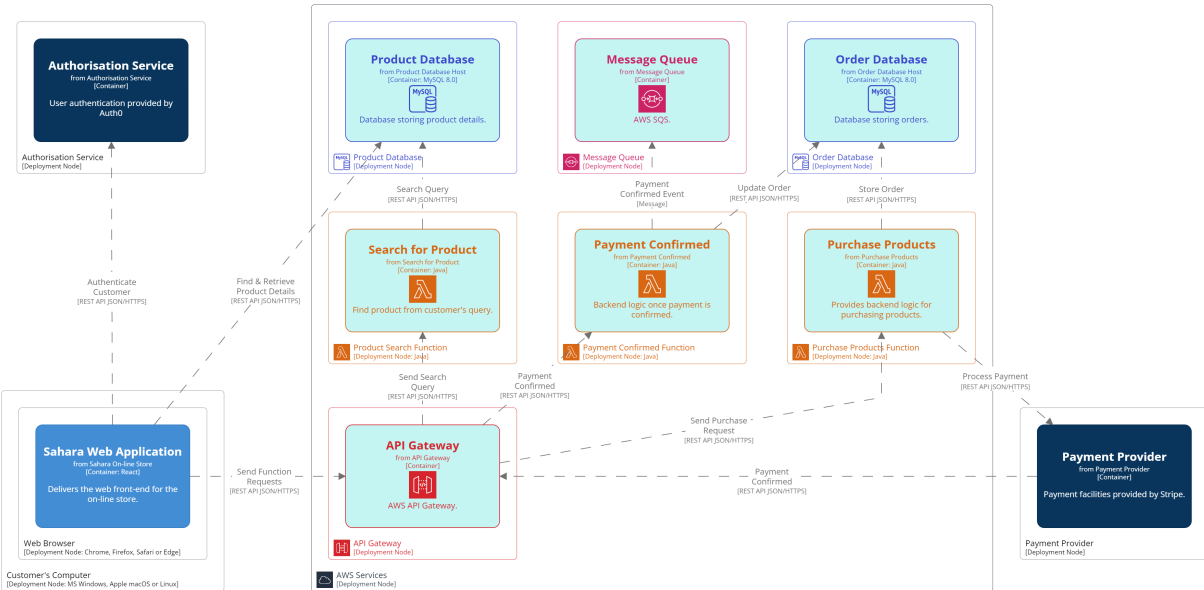[Container: MySQL 8.0]

MySQL

Database storing product details.

Definition 3. Serverless Architecture

Software system delivering functionality through BaaS or FaaS.

Serverless Sahara eCommerce

Authorisation Service
from Authorisation Service
[Container]

User authentication provided by Auth0

Authorisation Service
[Deployment Node]

Product Database
from Product Database Host
[Container: MySQL 8.0]
MySQL
Database storing product details.

Product Database
[Deployment Node]

Message Queue
from Message Queue
[Container]

AWS SQS.

Message Queue
[Deployment Node]

Order Database
from Order Database Host
[Container: MySQL 8.0]
MySQL
Database storing orders.

Order Database
[Deployment Node]

Search for Product
from Search for Product
[Container: Java]

Find product from customer's query.

Product Search Function
[Deployment Node: Java]

Payment Confirmed
from Payment Confirmed
[Container: Java]

Backend logic once payment is confirmed.

Payment Confirmed Function
[Deployment Node: Java]

Purchase Products
from Purchase Products
[Container: Java]

Provides backend logic for purchasing products.

Purchase Products Function
[Deployment Node: Java]

Sahara Web Application
from Sahara On-line Store
[Container: React]

Delivers the web front-end for the on-line store.

Web Browser
[Deployment Node: Chrome, Firefox, Safari or Edge]

Customer's Computer
[Deployment Node: MS Windows, Apple macOS or Linux]

API Gateway
from API Gateway
[Container]

AWS API Gateway.

API Gateway
[Deployment Node]

AWS Services
[Deployment Node]

Payment Provider
from Payment Provider
[Container]

Payment facilities provided by Stripe.

Payment Provider
[Deployment Node]

Search Query
[REST API JSON/HTTPS]

Payment Confirmed Event
[Message]

Update Order
[REST API JSON/HTTPS]

Store Order
[REST API JSON/HTTPS]

Authenticate Customer
[REST API JSON/HTTPS]

Find & Retrieve Product Details
[REST API JSON/HTTPS]

Send Search Query
[REST API JSON/HTTPS]

Payment Confirmed
[REST API JSON/HTTPS]

Process Payment
[REST API JSON/HTTPS]

Send Function Requests
[REST API JSON/HTTPS]

Send Purchase Request
[REST API JSON/HTTPS]

Payment Confirmed
[REST API JSON/HTTPS]

Oi!

Continue Sahara Example with Steps After Diagram Above

Pros & Cons

Modularity

Extensibility

Reliability

Interoperability

Scalability

Security

Deployability

Testability

Simplicity