

AWS Lambda & API Gateway



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Introduction to Serverless

What is Serverless?

From IaaS to FaaS

IaaS	CaaS	PaaS	FaaS
Application code	Application code	Application code	Application code
Data Store	Data Store	Data Store	Data Store
Runtime / middleware	Runtime / middleware	Runtime / middleware	Runtime / middleware
Containers	Containers	Containers	Containers
Operating System	Operating System	Operating System	Operating System
Virtualization	Virtualization	Virtualization	Virtualization
Hardware	Hardware	Hardware	Hardware

Serverless or, in other words, FaaS (Function As A Service) is a category of cloud computing services that is derived from PaaS (Platform as a Service) category.

Introduction to Serverless Infrastructure

What is Serverless Infrastructure?



- Serverless infrastructure is a technique by which you can build and run applications and services **without servers**.
- It **eliminates infrastructure management** tasks such as server or cluster provisioning, patching, operating system maintenance, and capacity provisioning.

AWS Lambda

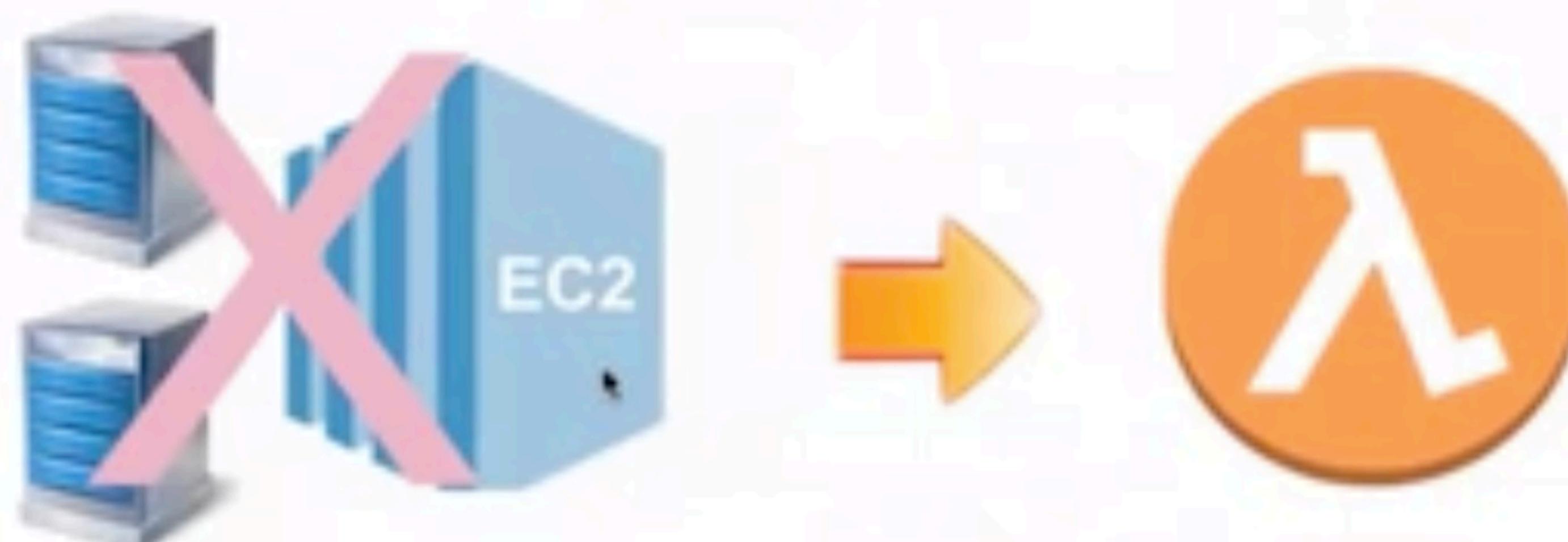
What is Lambda?



- AWS Lambda is the first FaaS service among the global public cloud products.
- It is a serverless compute service that runs your code in response to programmed events.

AWS Lambda

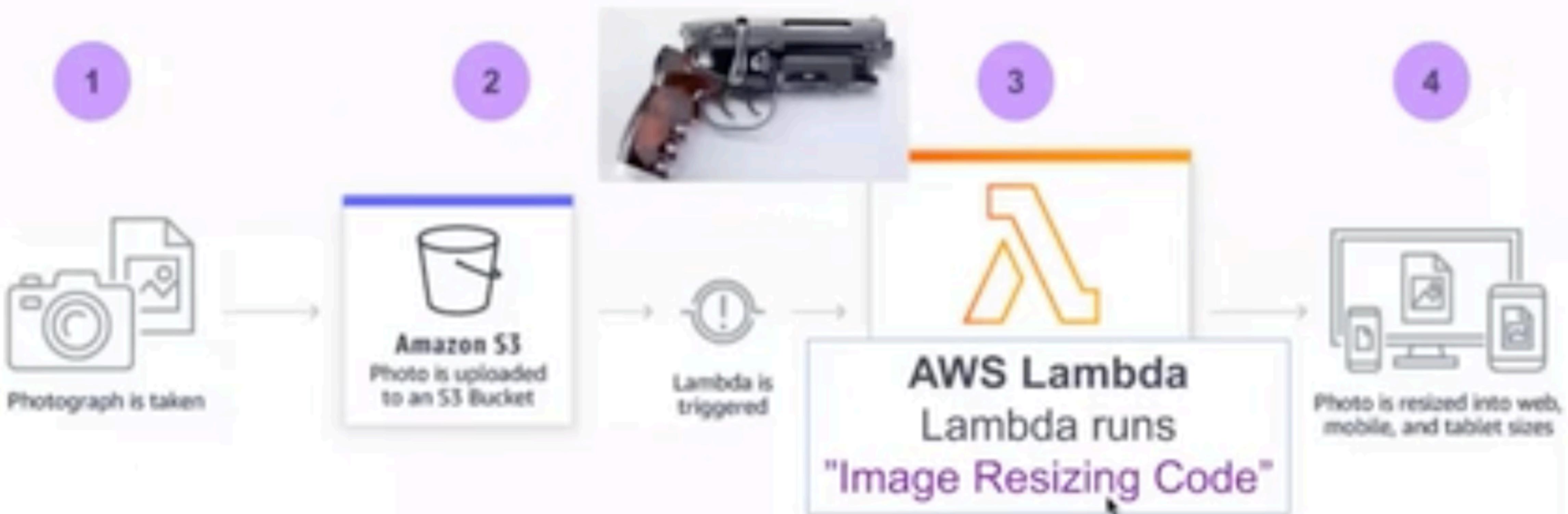
What is Lambda?



- AWS Lambda lets you run code without provisioning or managing servers
- Instead of launching an EC2 instance to run your code on it, you can just deploy your code in Lambda services and you can get the same result.

AWS Lambda

How Lambda function works?



AWS Lambda

Exactly pay as you go



Pay as you go



You will be charged **as long as your instance is running even if your code runs or not.**

You will be **only charged when the functions that you deployed are run.**

AWS Lambda

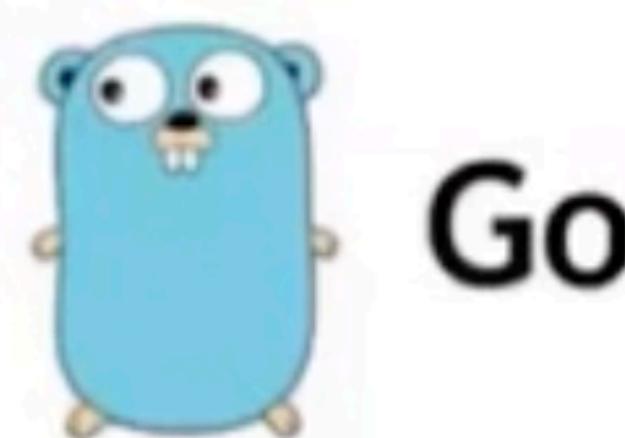
Lambda codes



Ruby
Programming



python
Programming



Go



node
js

Lambda supports Java, Go, PowerShell, Node.js, C#, Python, and Ruby code.

API Gateway

Monolithic Architecture

Monolithic Architecture

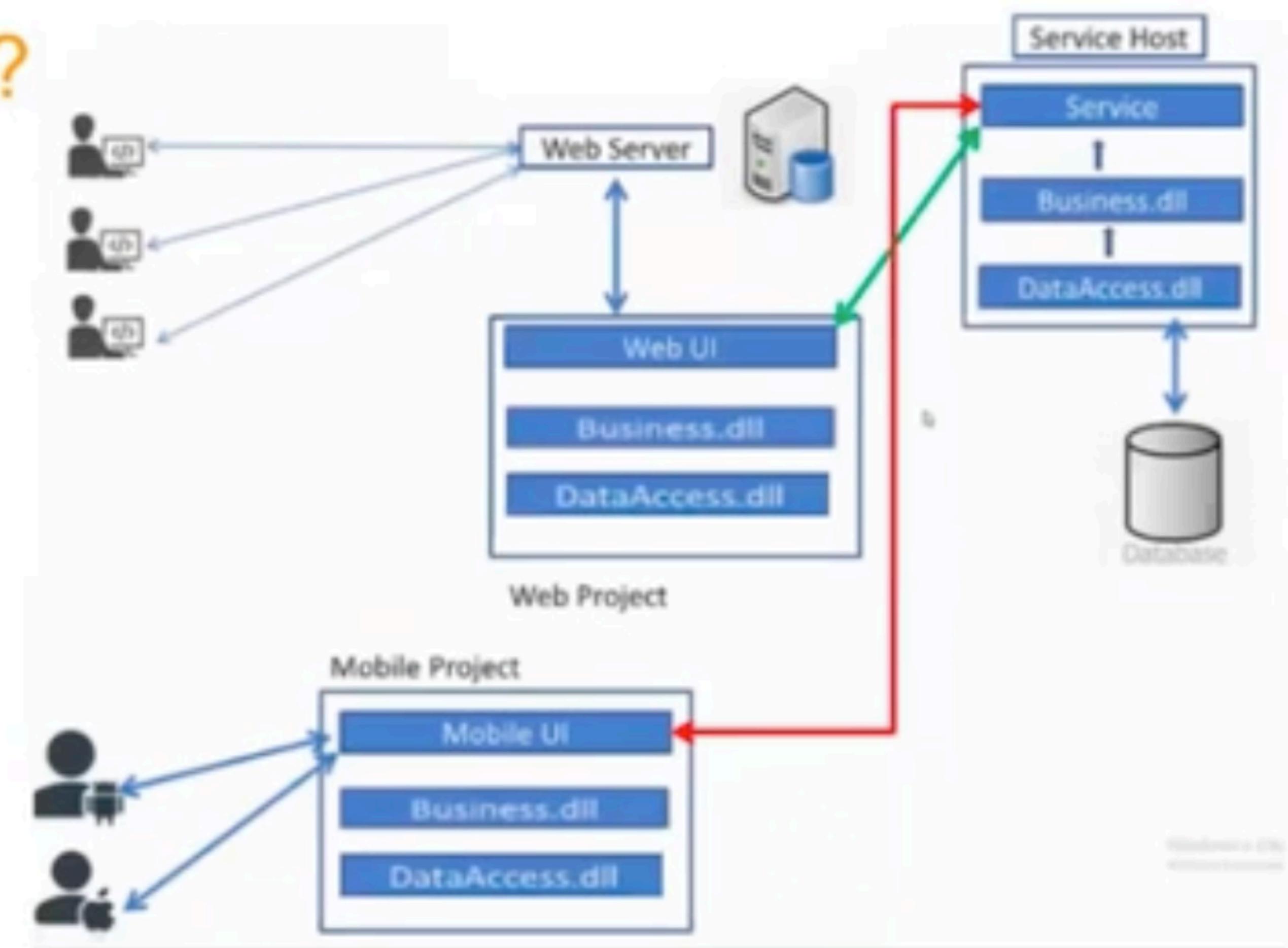


API Gateway

What is SOA and SOAP?

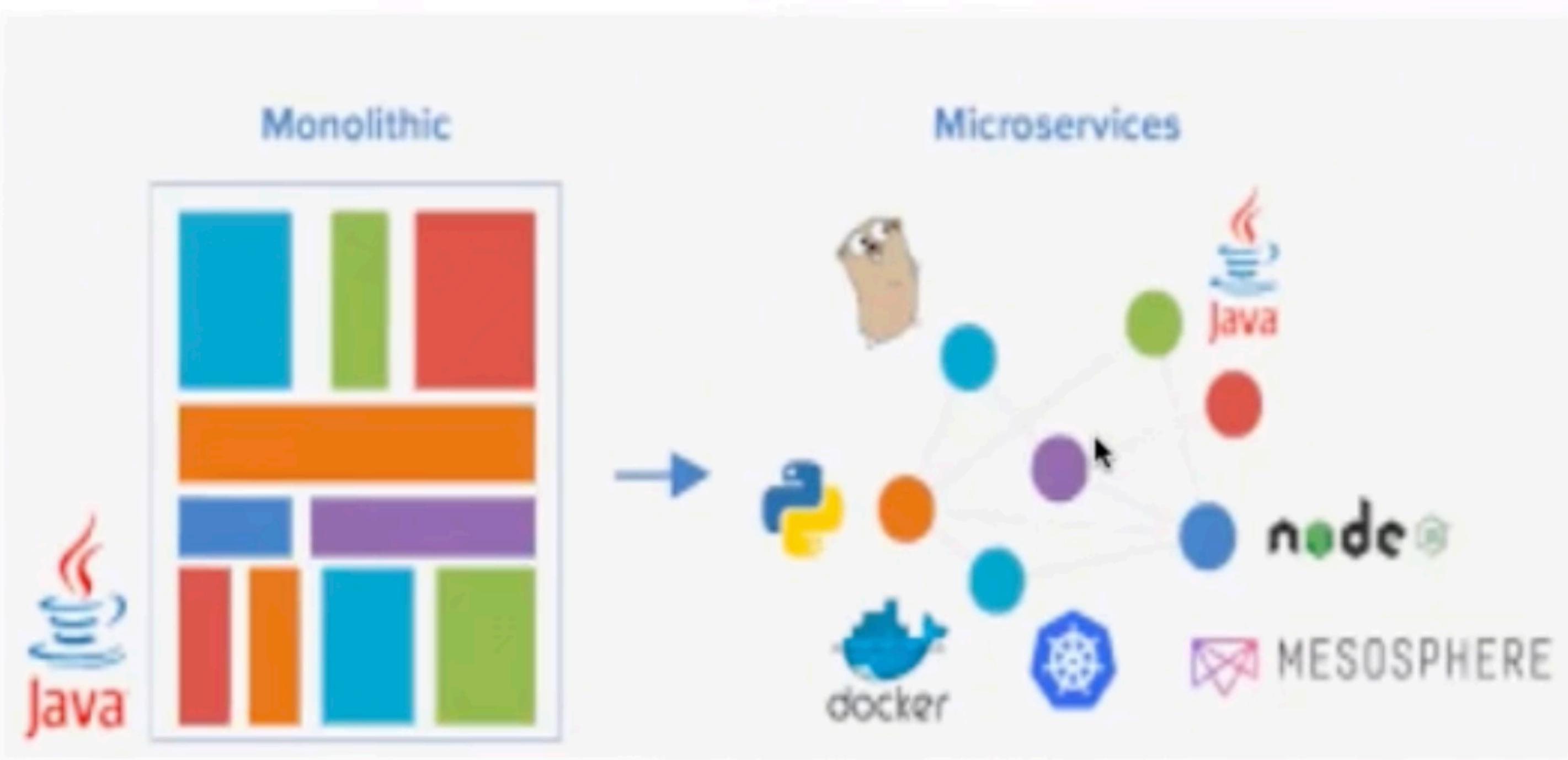
SOA, Service Oriented Architecture, is the Architecture pattern. It is a "Planning" {Blue Print} design method.

SOAP, Simple Object Access Protocol is a defined protocol used for communication. It is a protocol that defines a set of rules for communication using **XML-based** messaging.



API Gateway

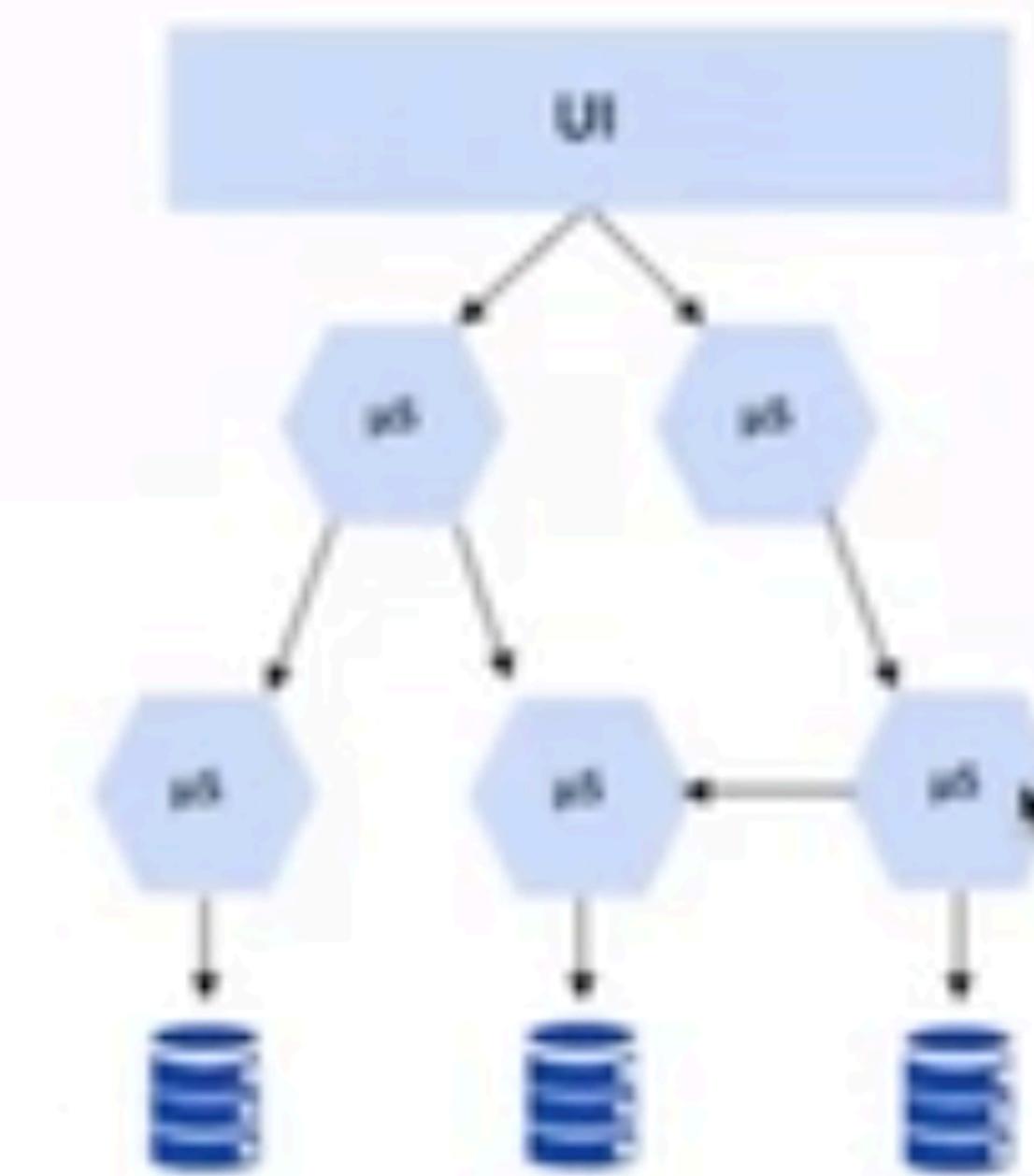
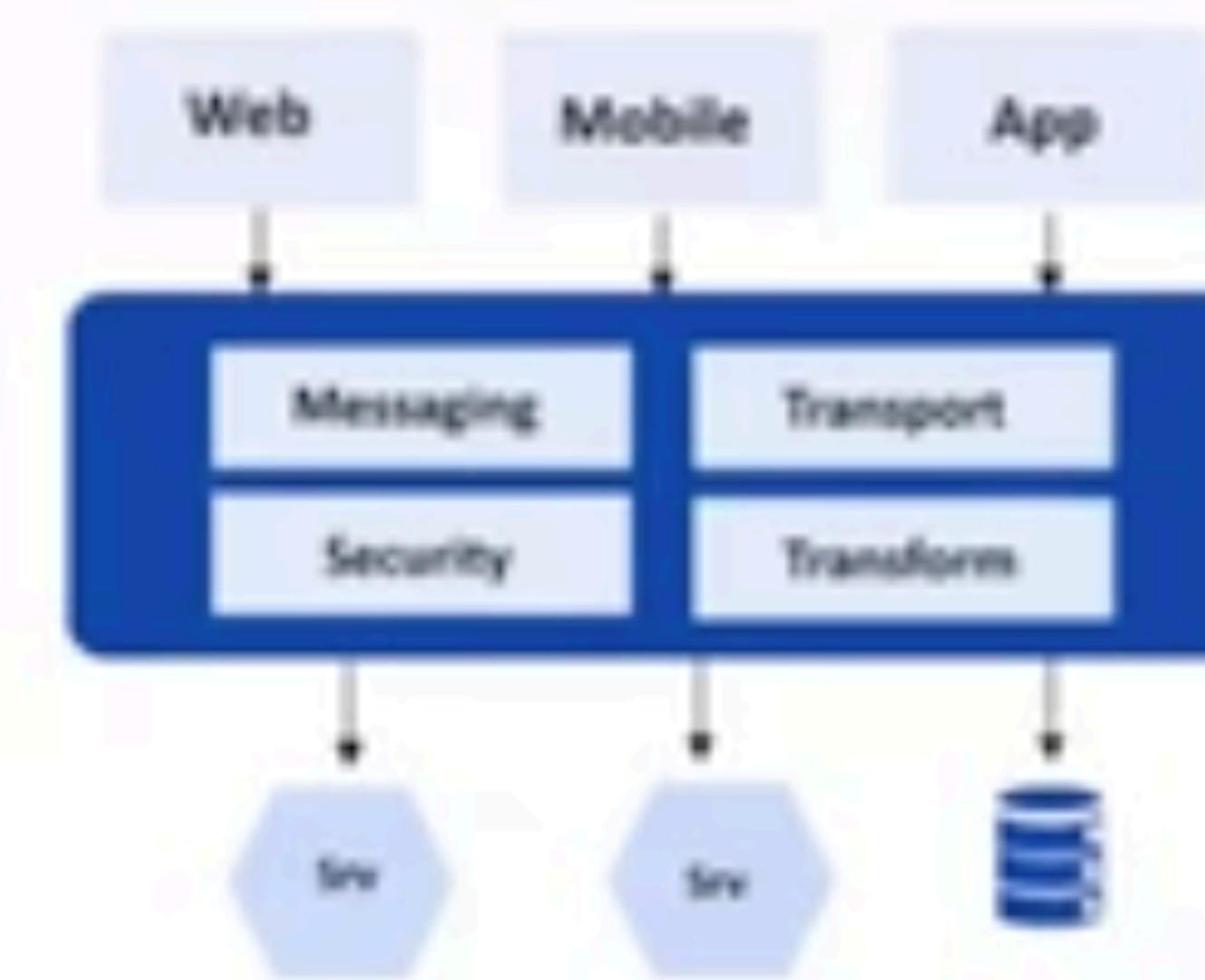
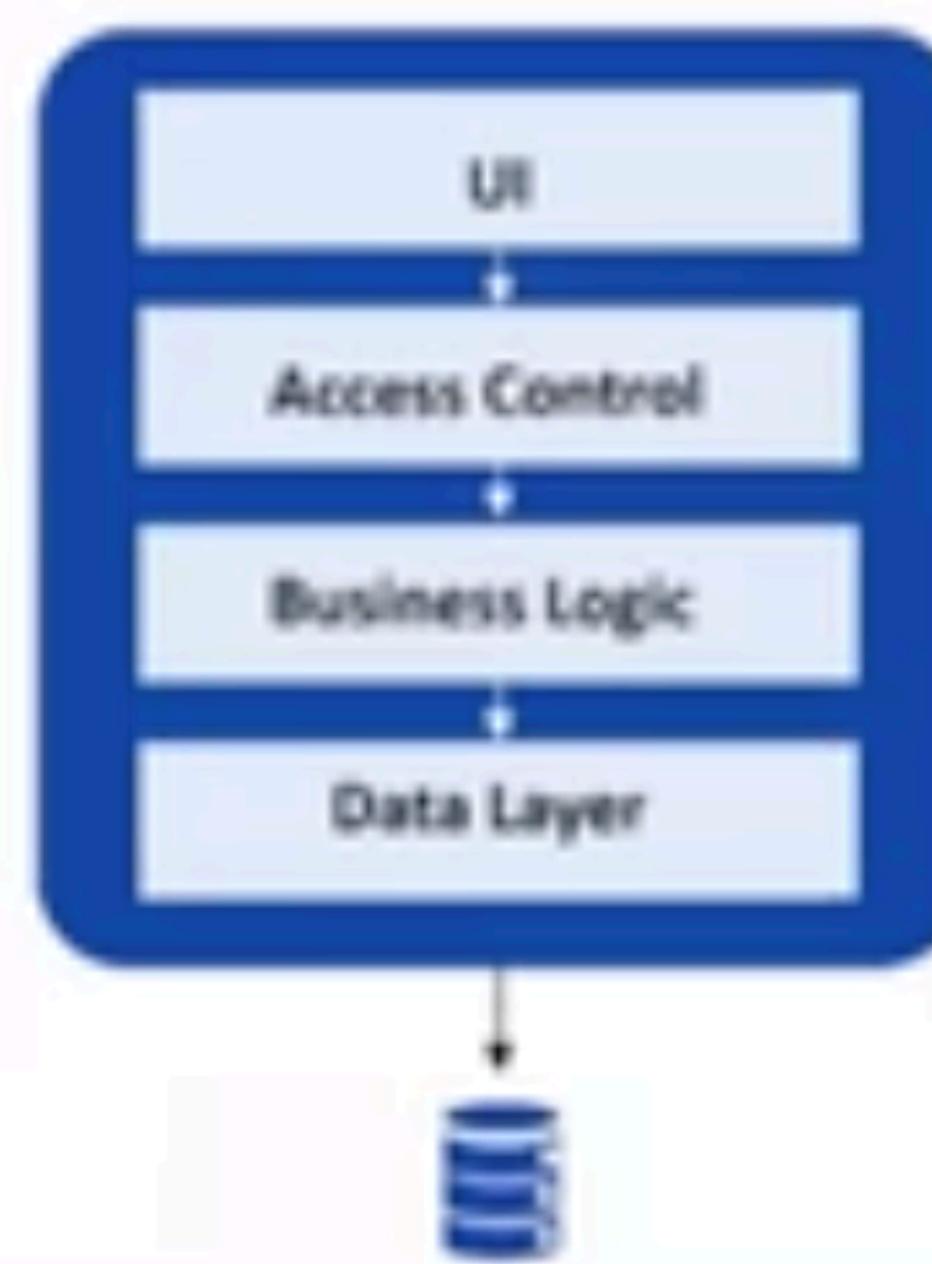
What is microservice?



Monolithic application is simply deployed on a set of identical servers. In contrast, a **microservice** application typically consists of a large number of services. Each service will have multiple runtime instances. And each instance need to be configured, deployed, scaled, and monitored.

API Gateway

Evolution of Software Architectures



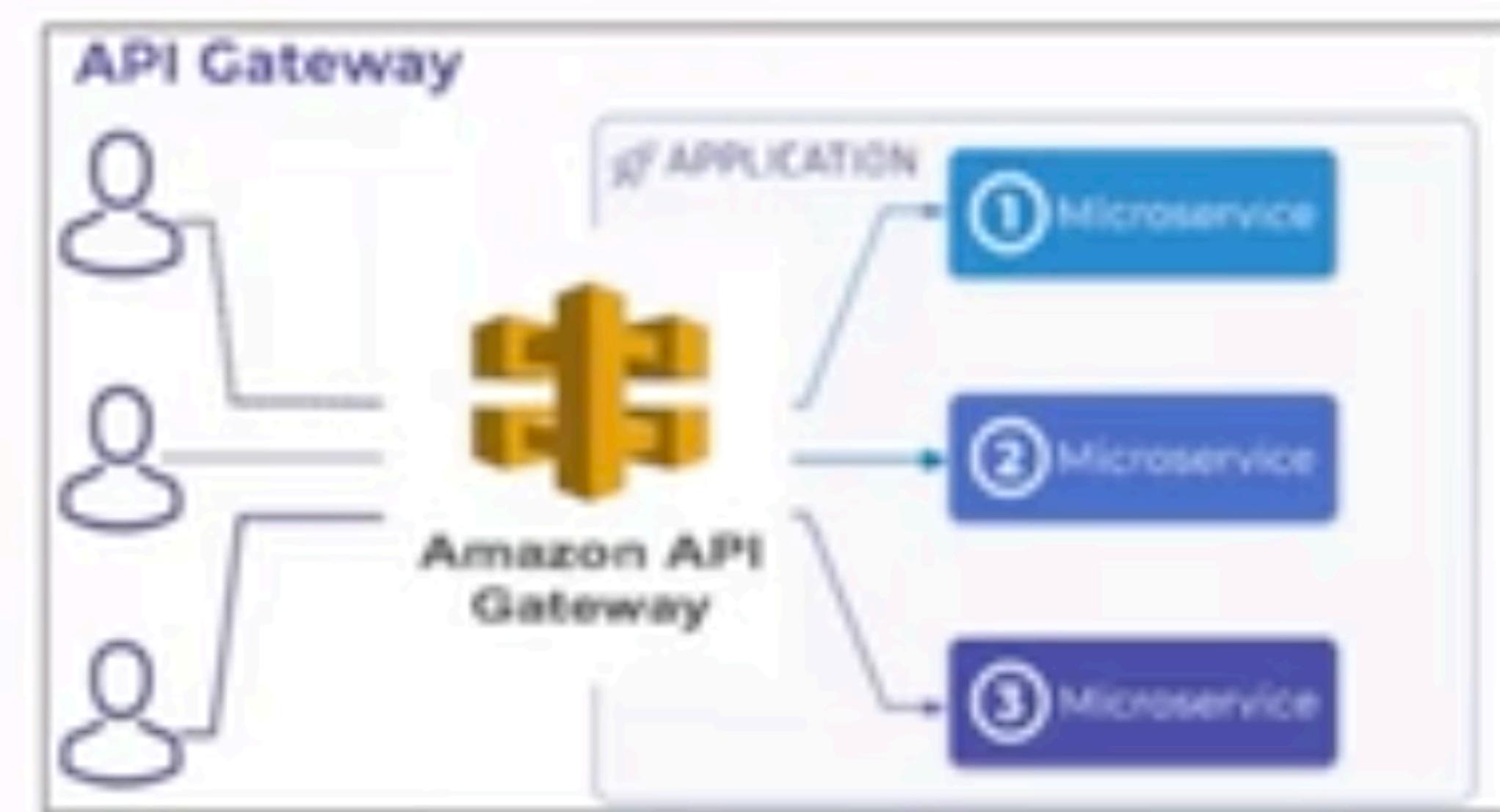
Monolithic

Service-oriented

Microservices

API Gateway

What is API Gateway

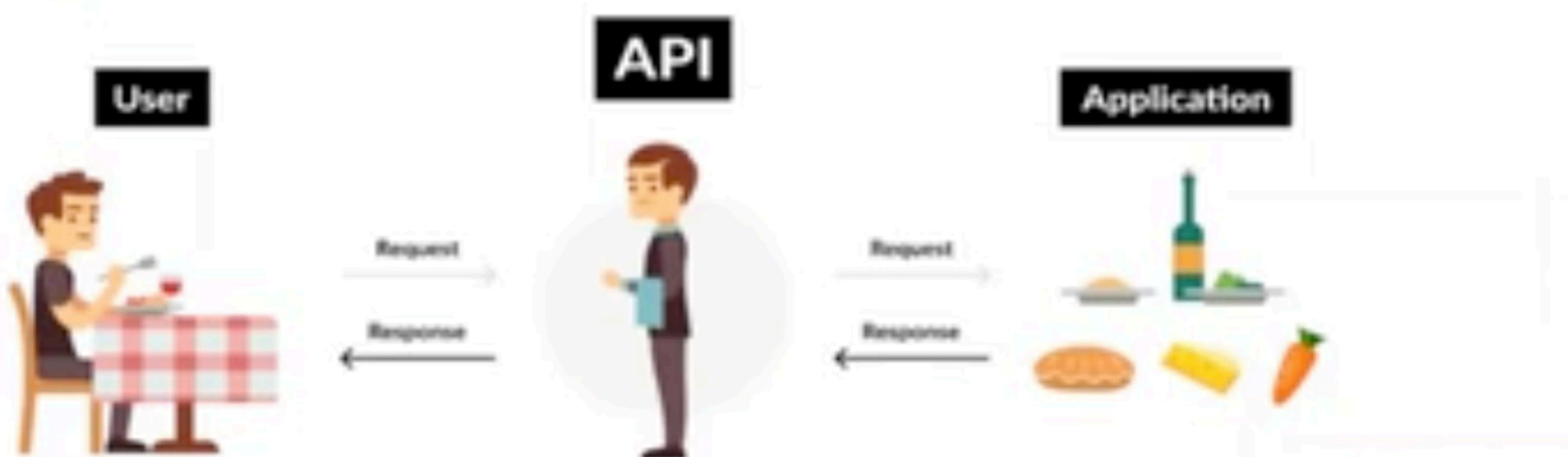


API stands for Application Programming Interface. An API is a software that allows two applications to talk to each other.

An **API gateway** is an API management solution acting as the single entryway into a system that allows APIs or microservices to act cohesively.

API Gateway

What is API?



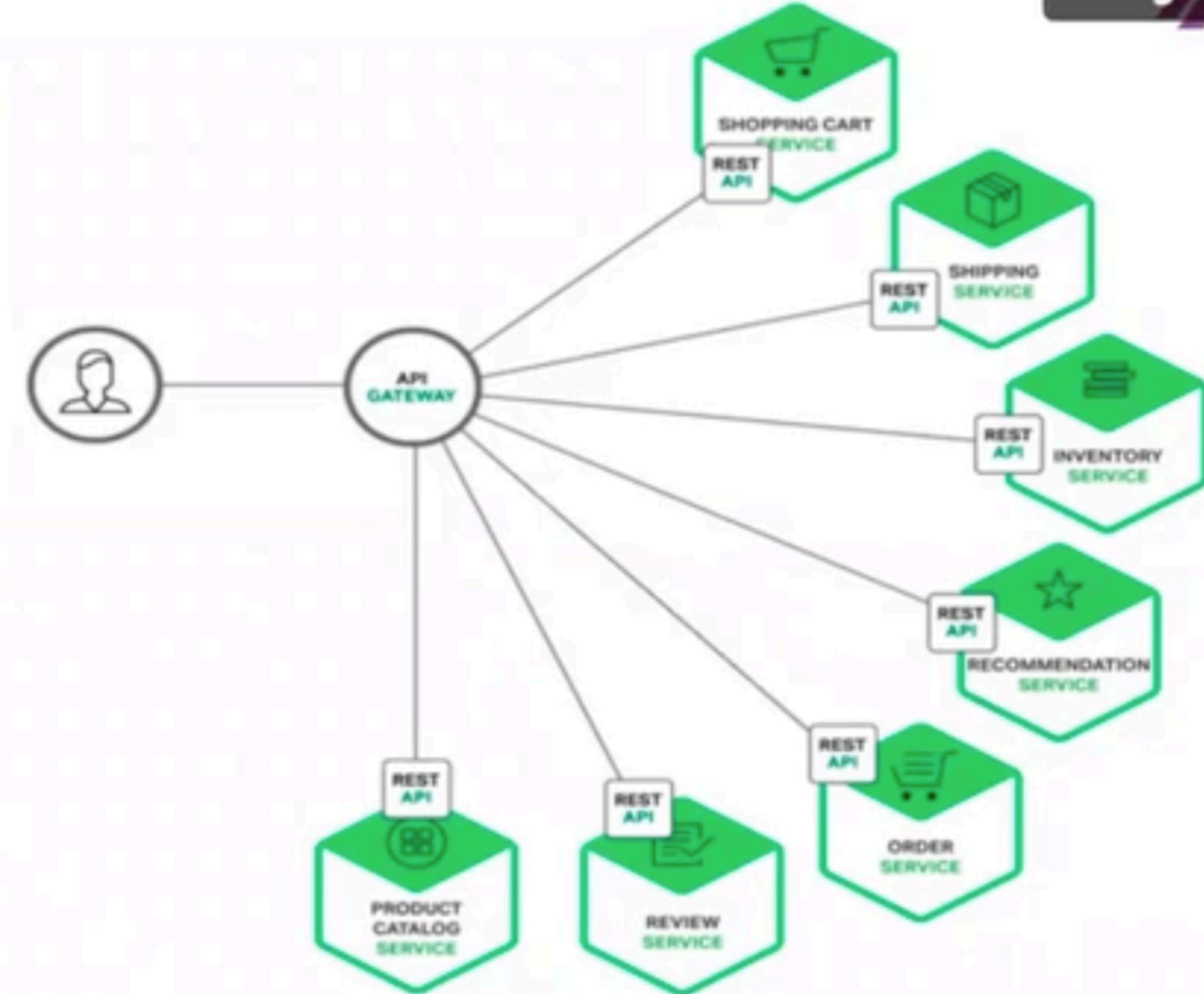
- API stands for **Application Program Interface**. Basically, the API defines how device components can **communicate with each other**.

API Gateway

What is API Gateway?

- The API Gateway is responsible for routing, design, and interface transfer requests.

All application requests first go through the API gateway. It then sends a message to the correct microservice/app



API Gateway

API Gateway in AWS

Amazon API Gateway offers two options to create RESTful APIs, HTTP APIs and REST APIs, as well as an option to create WebSocket APIs.

HTTP API: HTTP APIs are optimized for building APIs that proxy to AWS Lambda functions or HTTP backends, making them ideal for **serverless workloads**. They do not currently offer API management functionality.

REST API: REST APIs offer API proxy functionality and API management features in a single solution. REST APIs offer API management features such **as usage plans, API keys, publishing, and monetizing APIs**.

WebSocket API: WebSocket APIs maintain a persistent connection between connected clients to enable **real-time message communication**. With WebSocket APIs in API Gateway, you can define backend integrations with AWS Lambda functions, Amazon Kinesis, or any HTTP endpoint to be invoked when messages are received from the connected clients.

API Gateway

What is REST?

- REST (Representational State Transfer) is a service structure that enables easy and fast communication between client and server.
- It has been developed as an alternative to SOAP and WSDL based Web services.
- REST runs on HTTP.
- REST enables applications to communicate with each other by carrying JSON or XML type data between client and server.

API Gateway

What is RESTful ?

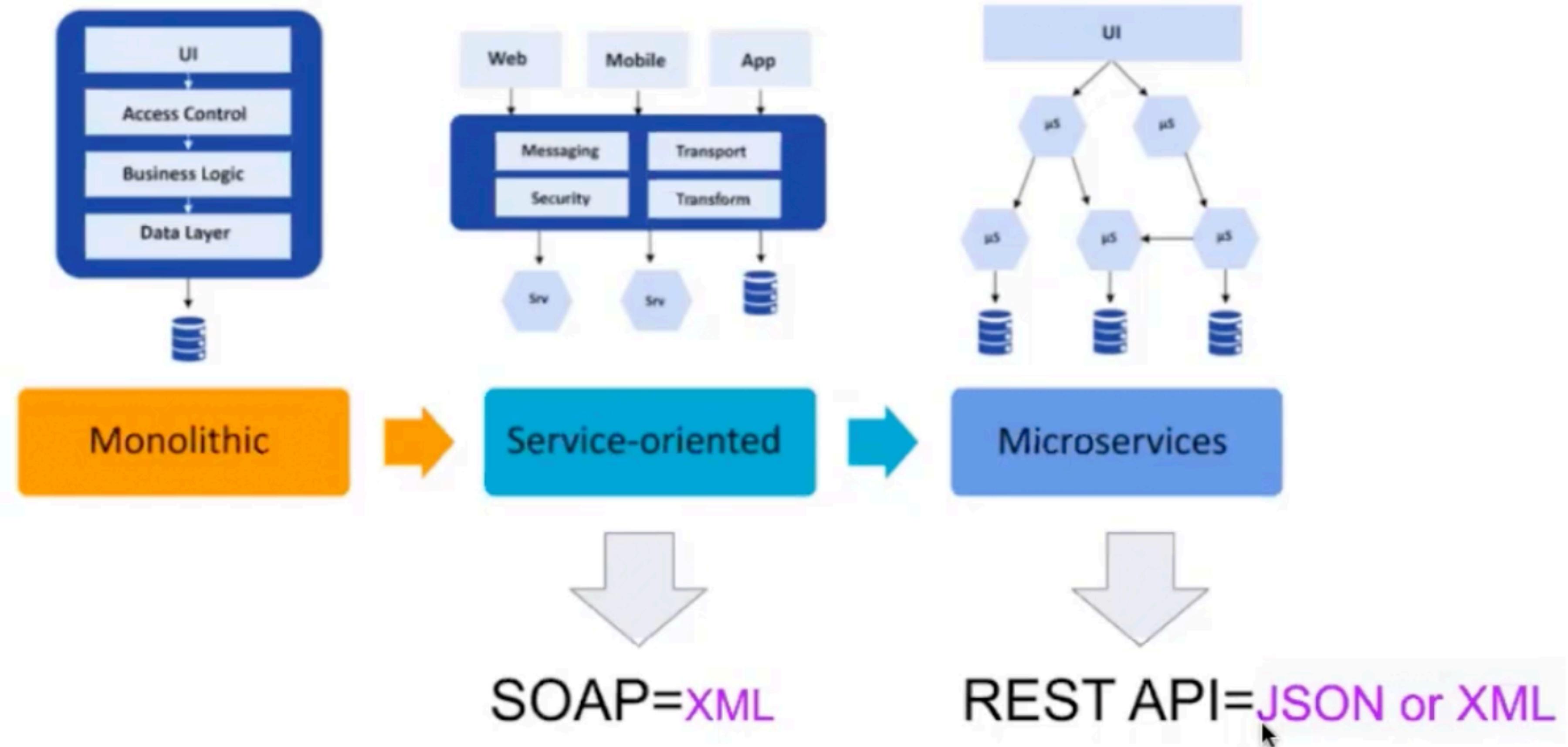
- Web services that use REST architecture are called RESTful services.
- RESTful systems usually communicate over HTTP protocol with HTTP methods (GET, POST, PUT, DELETE etc.) used by Web Browsers (Safari, Google, Mozilla etc.) to transfer pages.



RESTful API
DELETE POST PUT GET

API Gateway

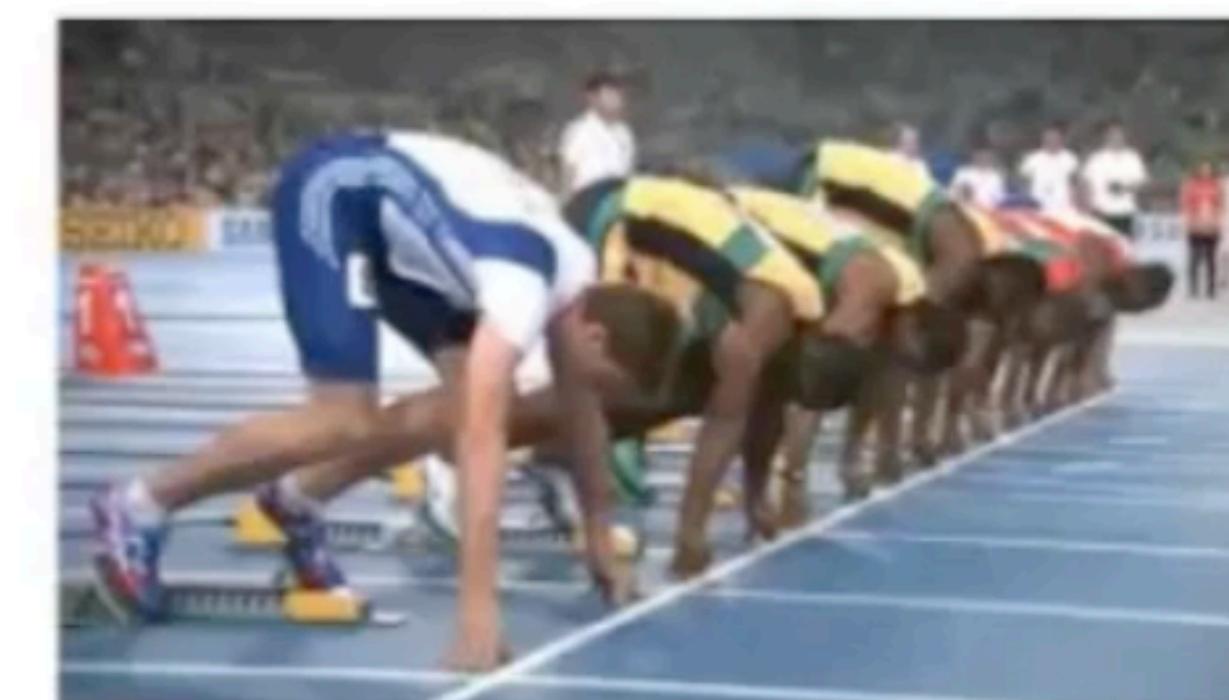
Evolution of Software Architectures



AWS Lambda

Lambda and API Gateway

- Alexa
- **API Gateway**
- CloudTrail
- CloudWatch Events
- CloudWatch Logs
- CloudFormation
- CloudFront
(Lambda@Edge)
- CodeCommit
- CodePipeline
- Cognito
- Config
- DynamoDB
- EC2
- ElastiCache
- Elastic Load Balancing
- EFS
- IoT
- IoT Events
- Kinesis Firehose
- Kinesis Streams
- Lex
- RDS
- S3
- S3 Batch
- SES
- SNS
- SQS
- Step Functions
- X-Ray



Although you can trigger Lambda function in different way, the most common trigger of the Lambda function is **API Gateway**

Thanks to Lambda and API Gateway combination you can create fully automated system.



AWS Lambda

Lambda and API Gateway

