A Pragmatic Introduction to Microservices

Donnie Prakoso

Sr. Developer Advocate, ASEAN
Amazon Web Services

go.donnie.id/youtube

donnieprakoso

@donnieprakoso

donnieprakoso

Key Takeaway

Understand key differences between monolith and microservices, why and how to implement integration pattern with serverless, and benefits of using microservices

Agenda for Today

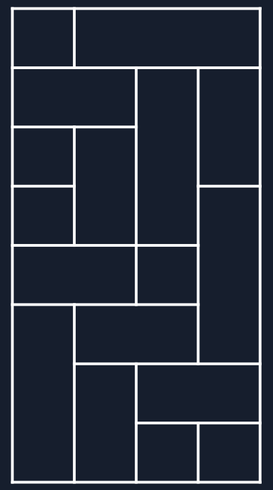
1. Development transformation at Amazon
2. Monolith and Microservices
3. Application Integration Patterns
4. Benefits of using microservices

A Journey.

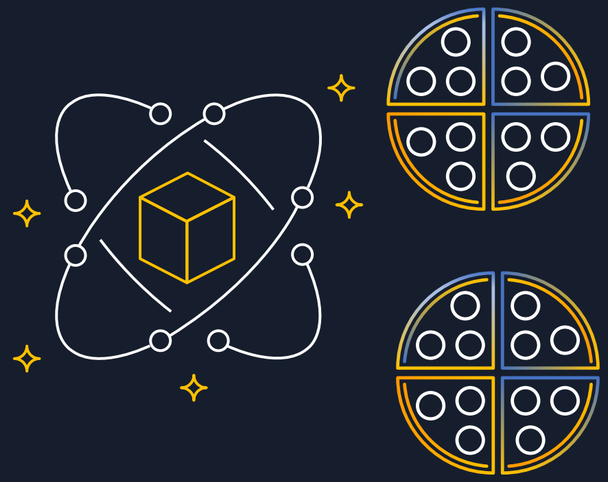
Development transformation at Amazon: 2001–2002

Lesson learned: decompose for agility

2001 ----------> **2002**



monolithic application +
teams

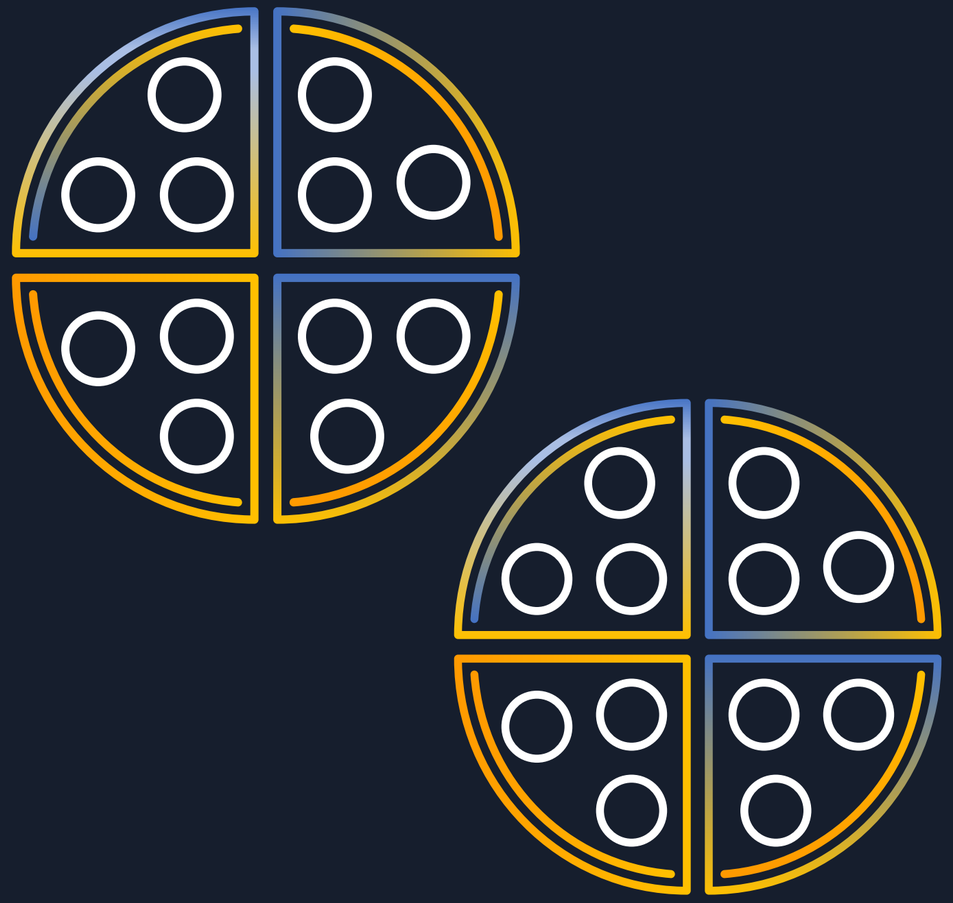


microservices
+ two-pizza teams

2002 - API Mandate

1. *All teams will henceforth expose their data and functionality through service interfaces.*
2. *Teams must communicate with each other through these interfaces.*
3. *There will be no other form of inter-process communication allowed.*
4. *It doesn't matter what technology they use.*
5. *All service interfaces, without exception, must be designed from the ground up to be externalizable.*

Two-pizza teams are fast & agile



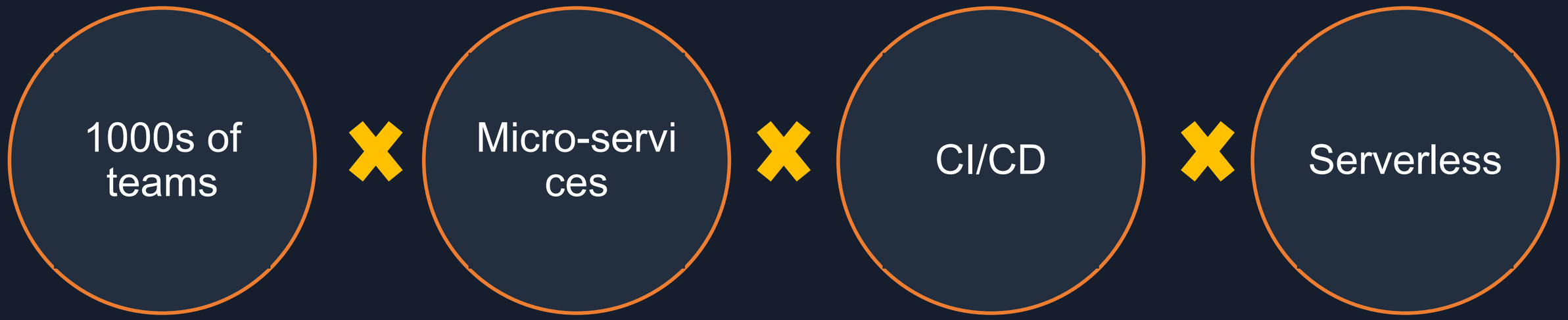
Full ownership & autonomy

You build it, you run it

DevOps – small, nimble teams

Focused innovation

Impact



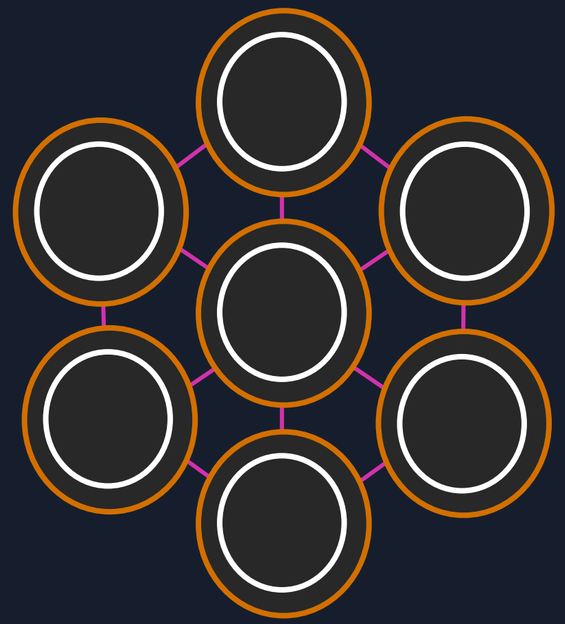
>60 million deployments a year

Microservices.

When the impact of change is small, release velocity can increase

Monolith

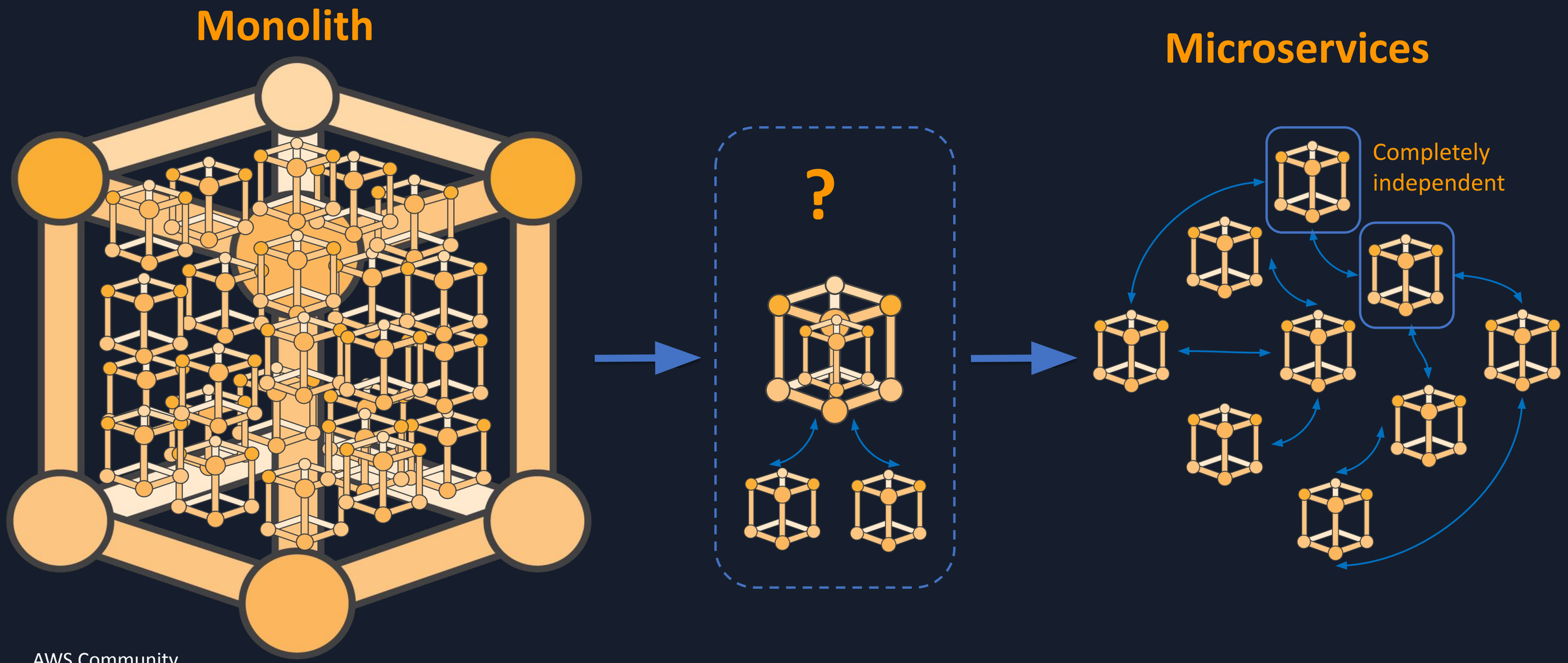
Does everything



Microservices

Does one thing

Basic Concepts and Definitions



AWS Community

Traditional three-tier application architecture

Web servers

Presentation layers

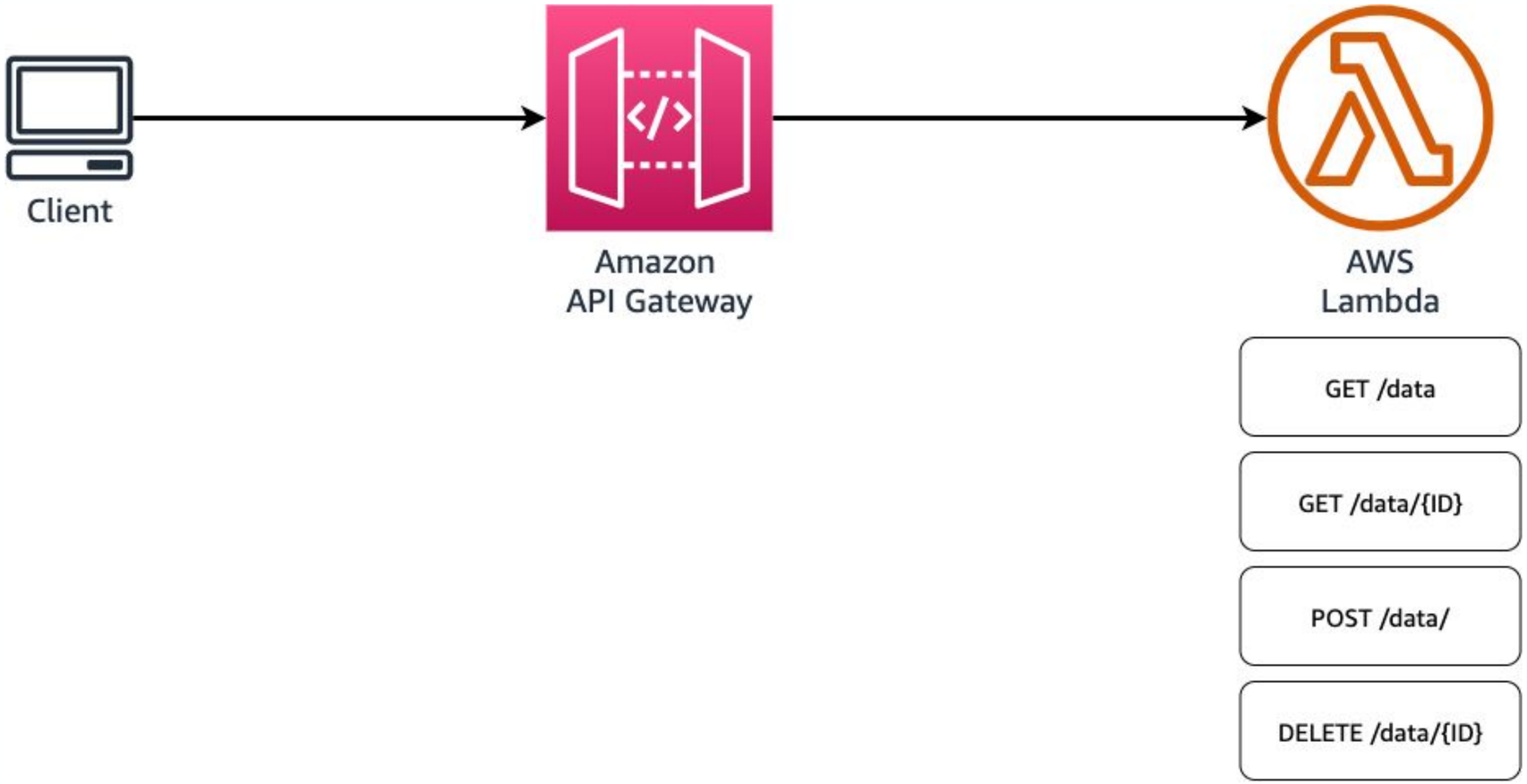
Application servers

Business logic

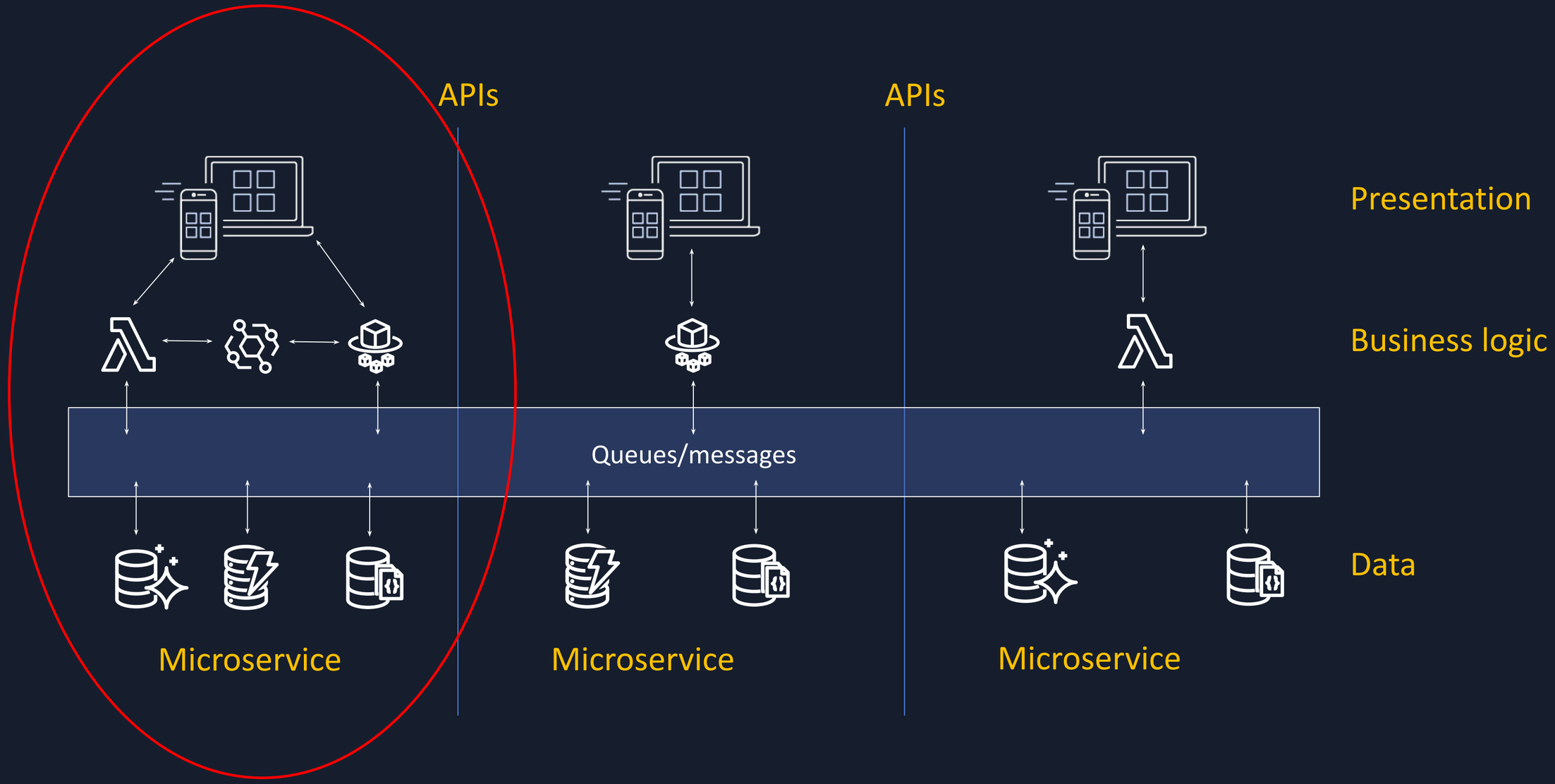
Database servers

Data layer

Use case: Monolith



A modern three-tier application architecture



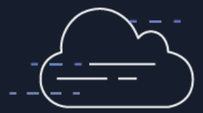
A single microservice

AWS Lambda — Event-driven function

Event Source

Changes in data state

Requests to endpoints



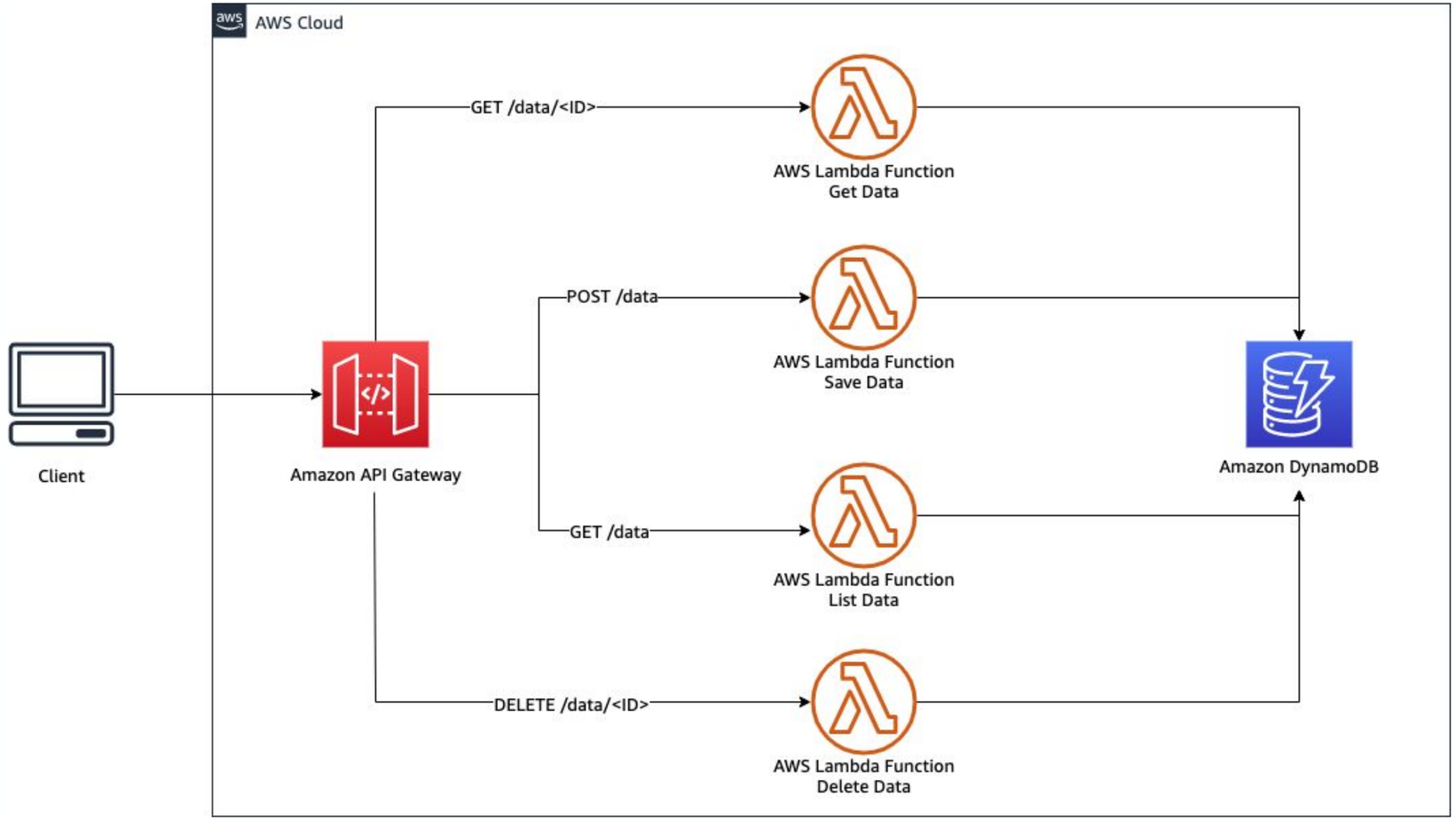
Changes in resource state

Function

Node.js
Python
Java
C#
Go
Ruby
Bring Your Own

Services / Other

Use case: Serverless API Diagram



Serverless is much more than compute

COMPUTE


AWS Lambda


AWS Fargate

DATA STORES


Amazon S3


Amazon Aurora Serverless


Amazon DynamoDB

INTEGRATION


Amazon EventBridge


Amazon API Gateway


Amazon SQS


Amazon SNS


AWS Step Functions

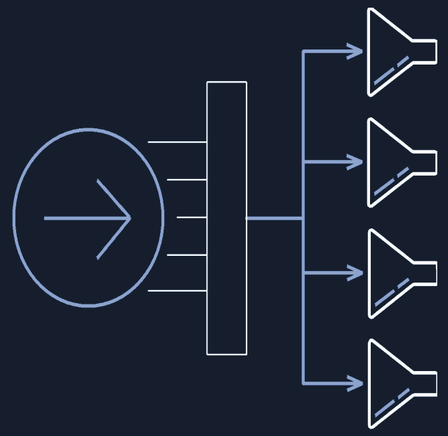

AWS AppSync

Application Integration

Consider how you integrate applications and modular services

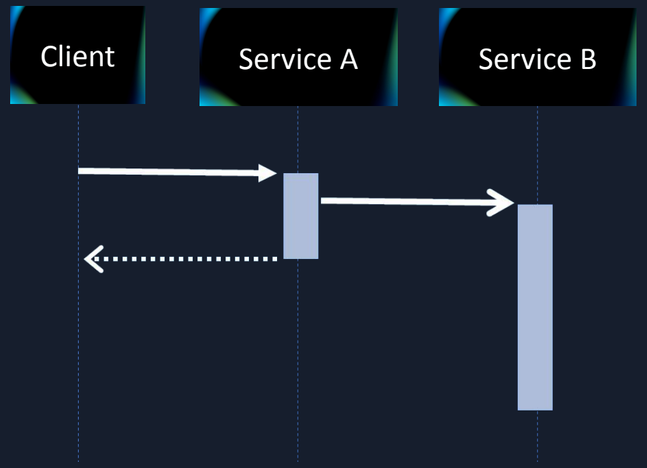
	Synchronous – API based	Asynchronous – event driven
Inter- / intraservice	Common for communication between apps	Common for communication within apps
Scalability	Requires tools to manage point-to-point connections	Is nearly infinitely scalable
Cost	Provisioning for peak use leads to low CPU utilization	Scales to 0 (pay-for-use cost benefits)
Latency	Can be very low	Is higher in theory, but latency requirements are rarely as low as expected (e.g., consider P50, P99)
Agility	Is easy to get started Is hard to use point to point in large scale	Decoupled systems increase agility dramatically

Event-driven architectures drive reliability and scalability



Event routers

Abstract producers and consumers from each other



Asynchronous events

Improve responsiveness and reduce dependencies

Event stores

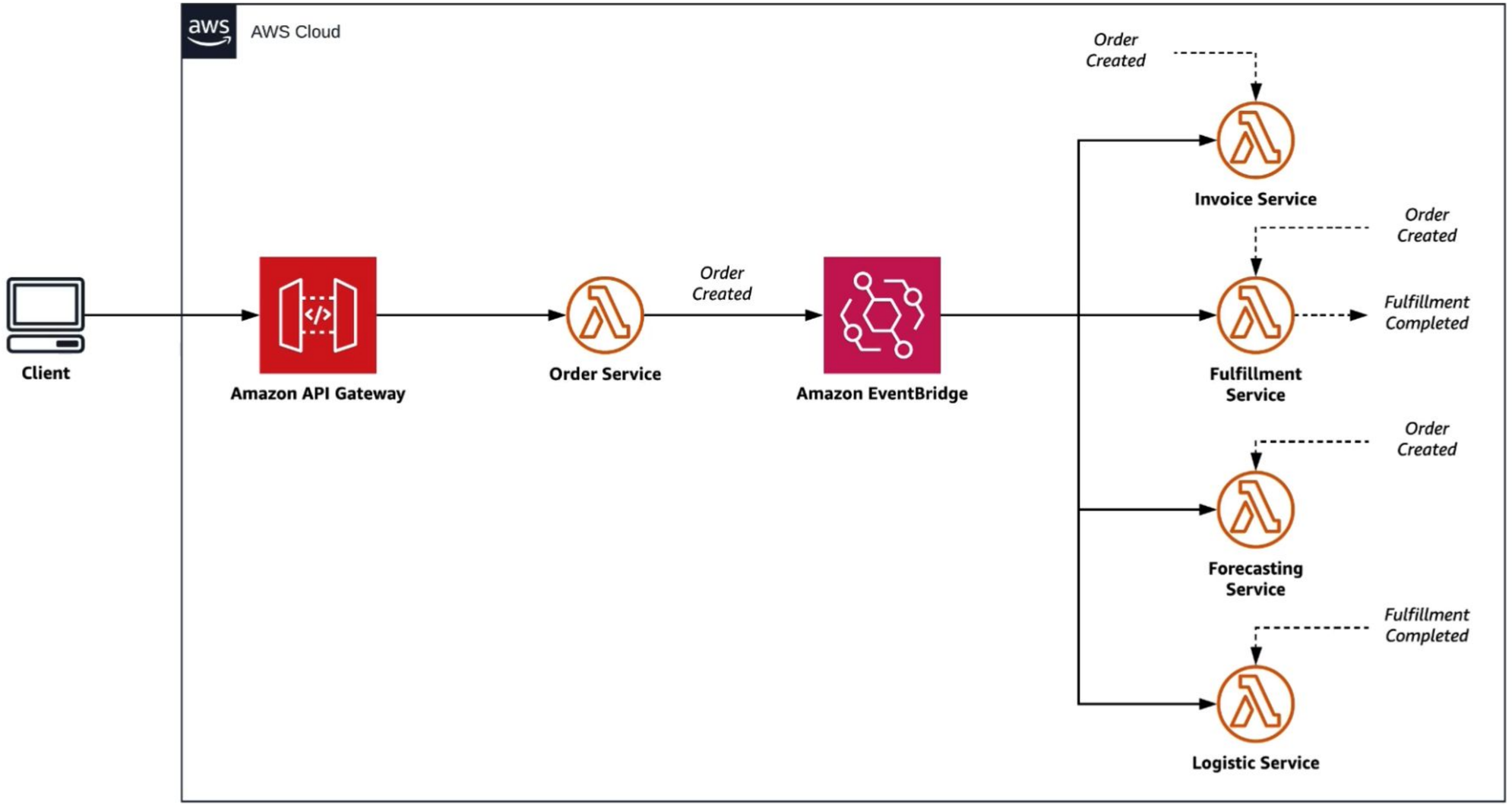
Buffer messages until services are available to process

Amazon EventBridge

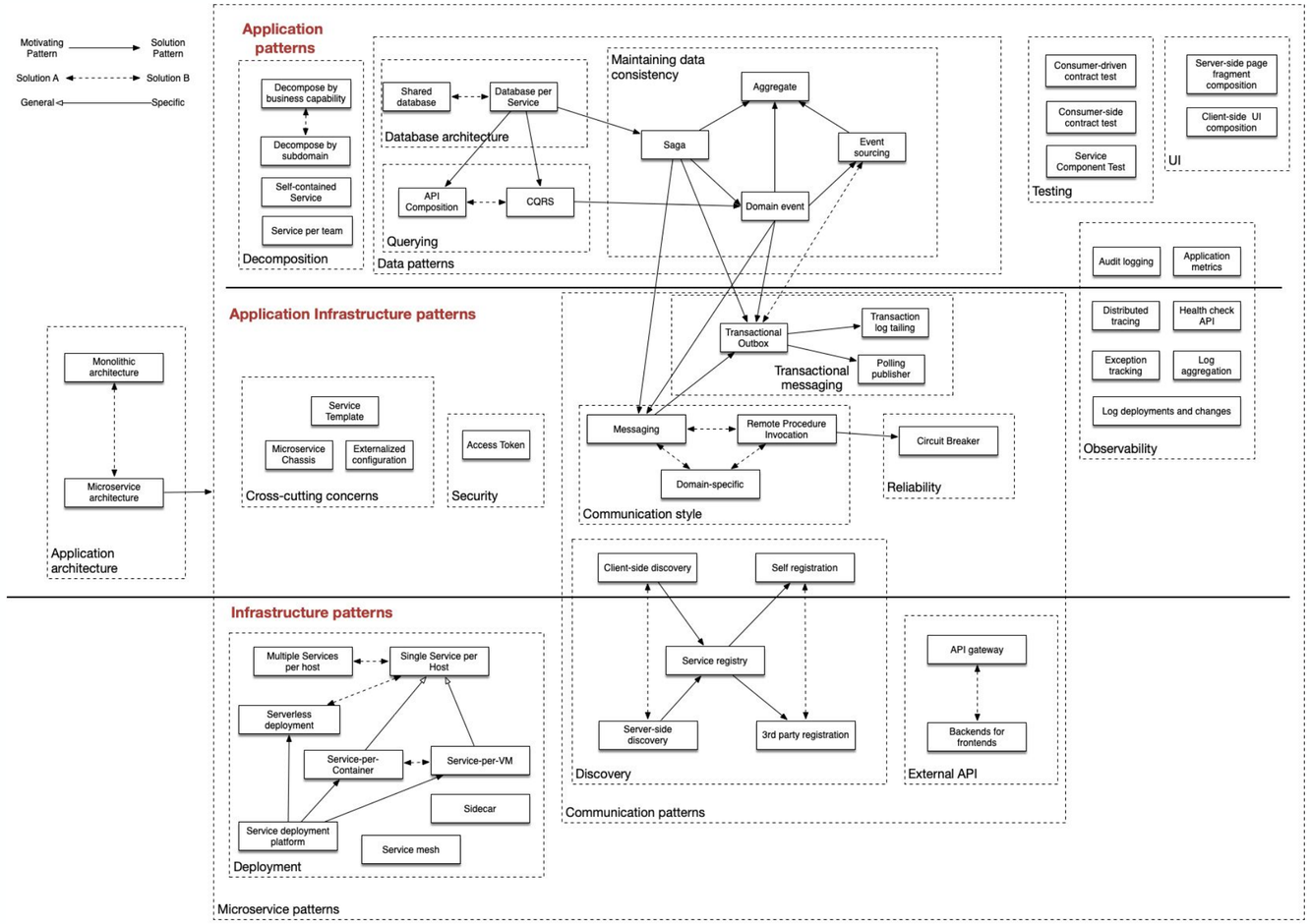
A serverless event bus service for AWS services, your own applications, and SaaS providers.

- Removes friction of writing “point-to-point” integrations
- Works across dozens of AWS and SaaS applications
- Provides simple programming model
- Fully managed; pay-as-you-go

Use case: Event-Driven Architecture



Learn more patterns

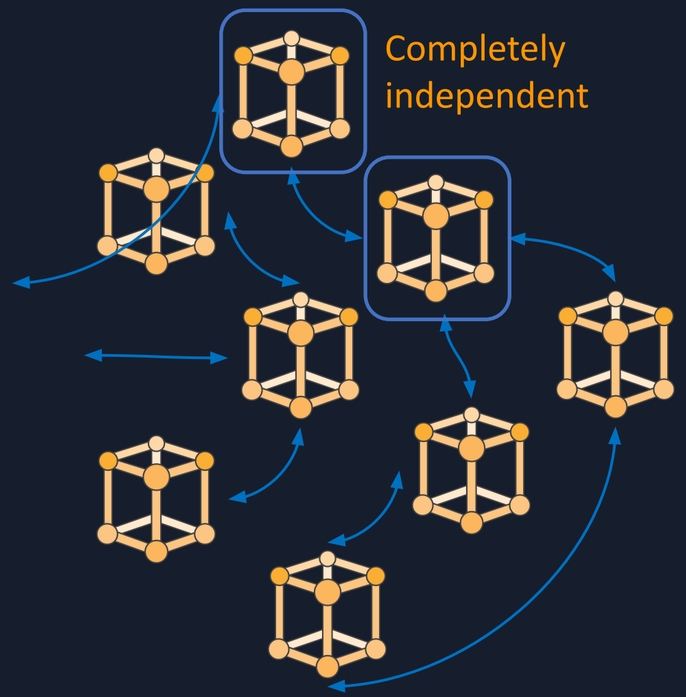


Learn-Build-Assess Microservices http://adopt.microservices.io

Advantages and Why

Advantages of Using Microservices

- Empowers small, independent teams to move at their own pace, shortening the cycle times
- Vertical alignment with the business owners
- Smaller deployments & failure isolation, and allows graceful failure handling
- Fast-feedback loops & low cost of failure
- **F**reedom to choose and replace the technology stack individually (per domain)
- Properly decoupled services can be scaled horizontally and independently from each other
- Appropriate and optimal technologies for a specific service



Thank you

Download the PPT
Code Repo + Demo

https://bit.ly/aws-community-asean-content

Donnie Prakoso

Sr. Developer Advocate, ASEAN
Amazon Web Services

go.donnie.id/youtube
donnieprakoso
@donnieprakoso
donnieprakoso