INNOVATE

MODERN APPLICATIONS EDITION

27&28 October 2021

Modern applications design patterns: Implementing microservice architectures

Chris Modica
Principal Solutions Architect
Amazon Web Services

About me

chris_modica_

Background

- Application architecture and software development (CTO, VPoE …)
- Enterprises and scale-ups (ISV, DNBs)
- From Sydney, Australia

Modern application architectures

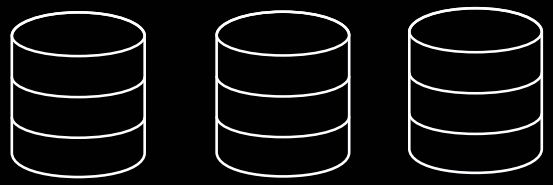
Traditional three-tier application architecture

Web servers

Presentation layers

Application servers

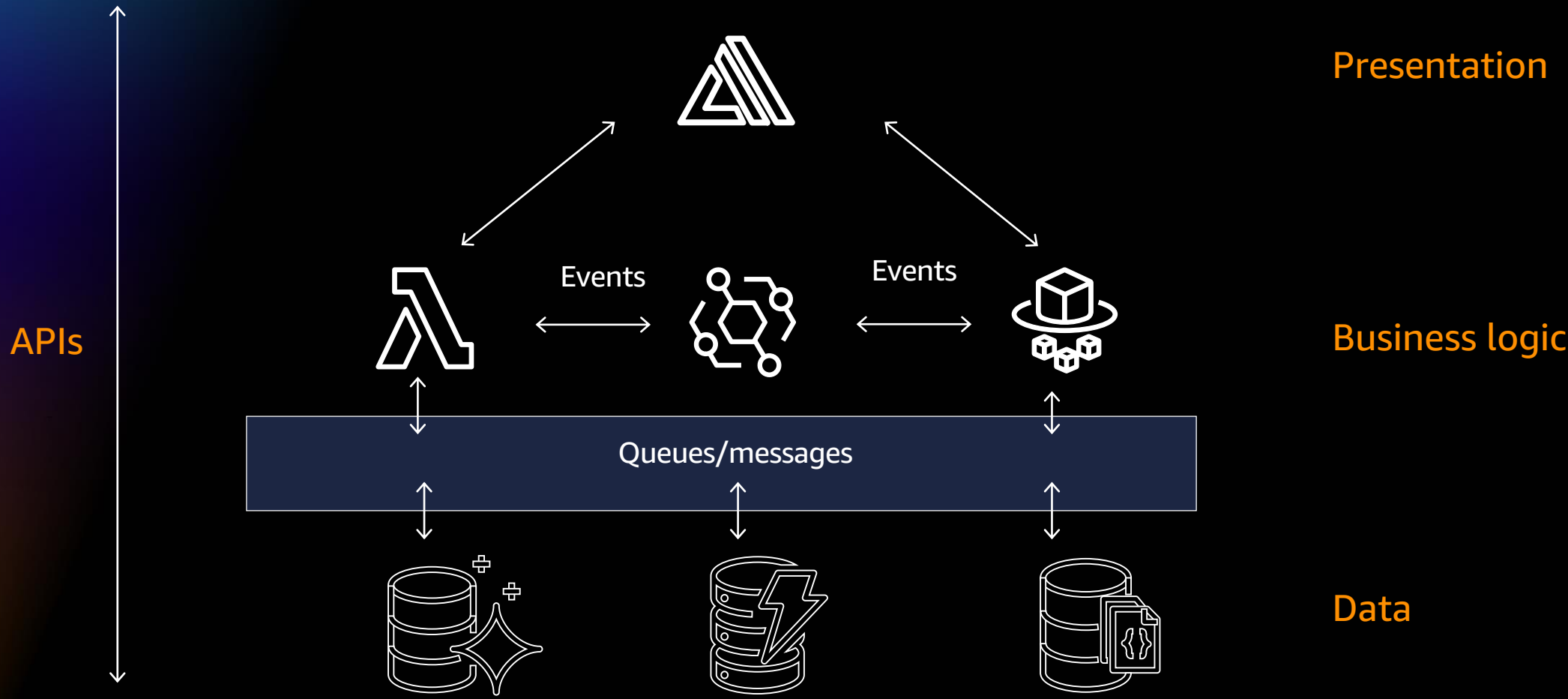
Business logic



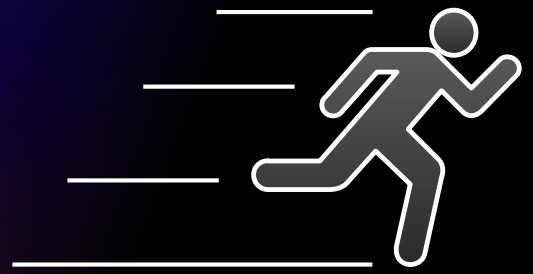
Database servers

Data layer

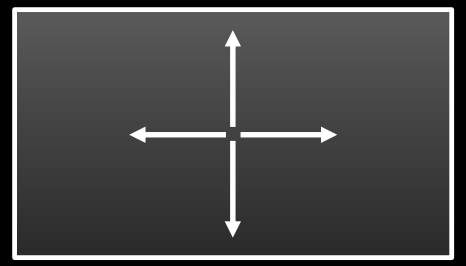
Modern application architecture



Why building cloud native matters



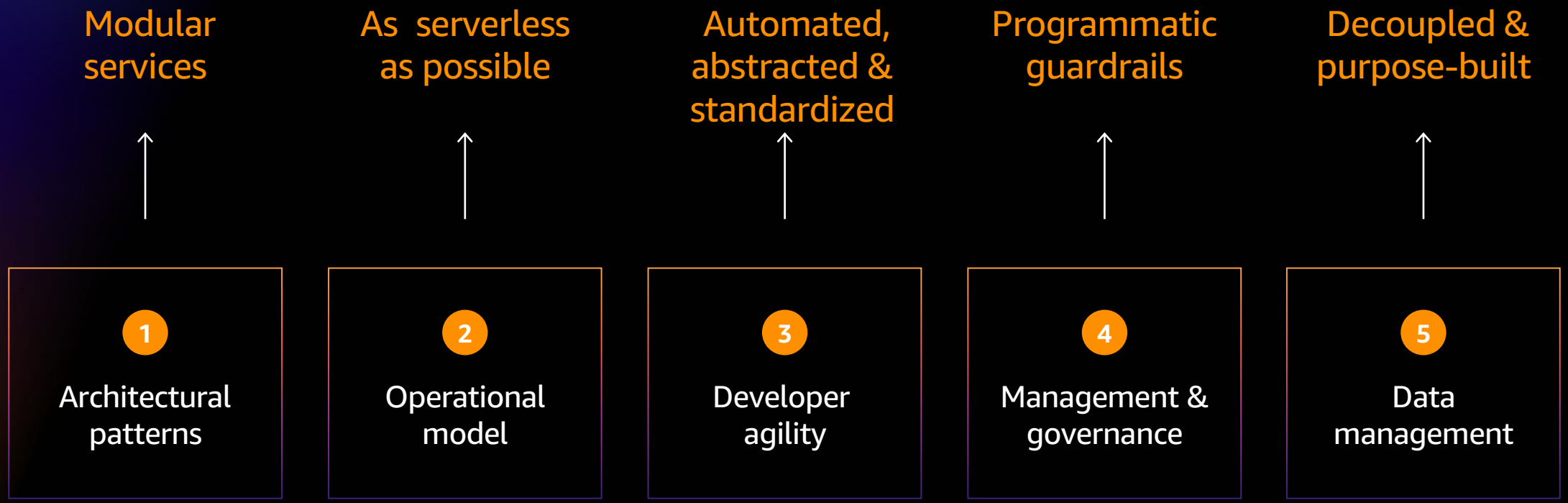
Speed



Scale

Resiliency

What is the best way to build a modern application?



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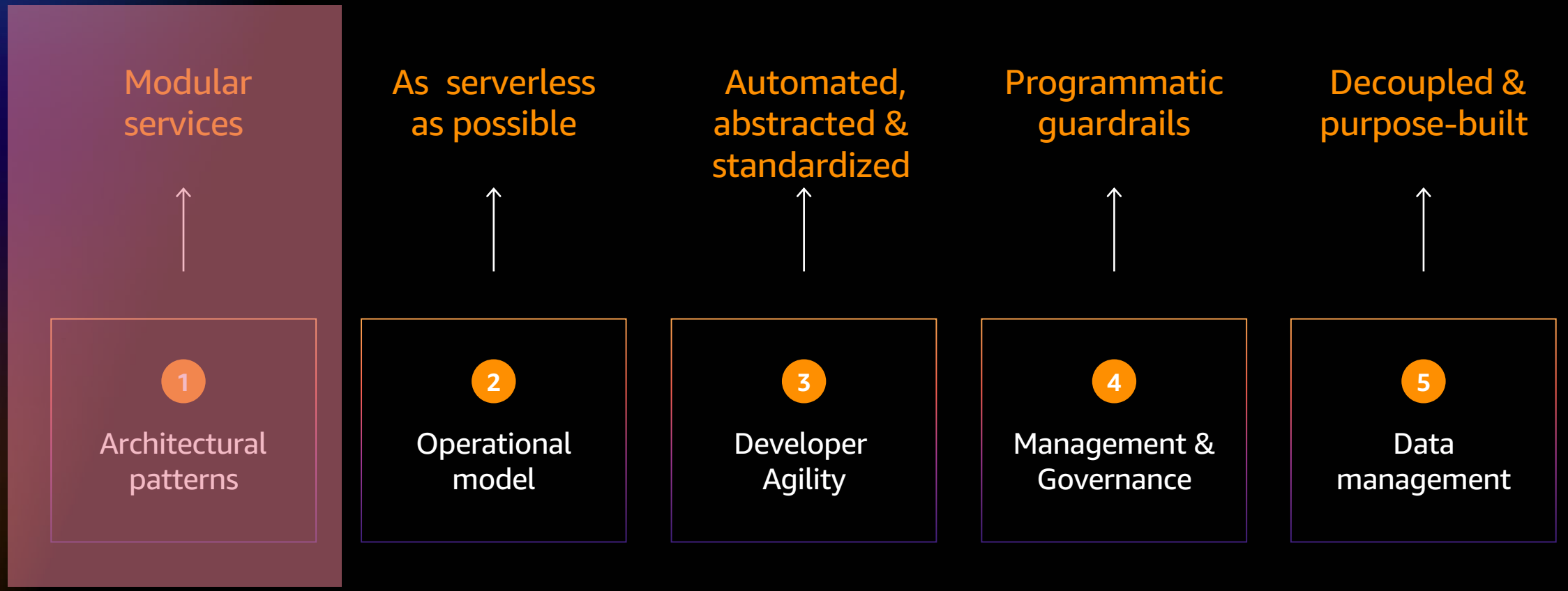


Architectural principles

Divide and conquer

Breaking up the monolith

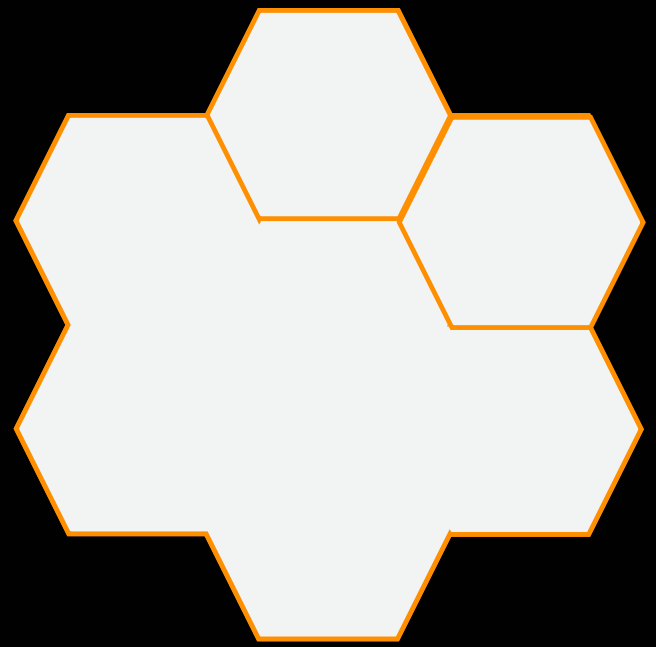
Use AWS cloud native services with legacy applications

Decouple functionality for quicker and safer development

Gradually carve out one component or task at a time to refactor

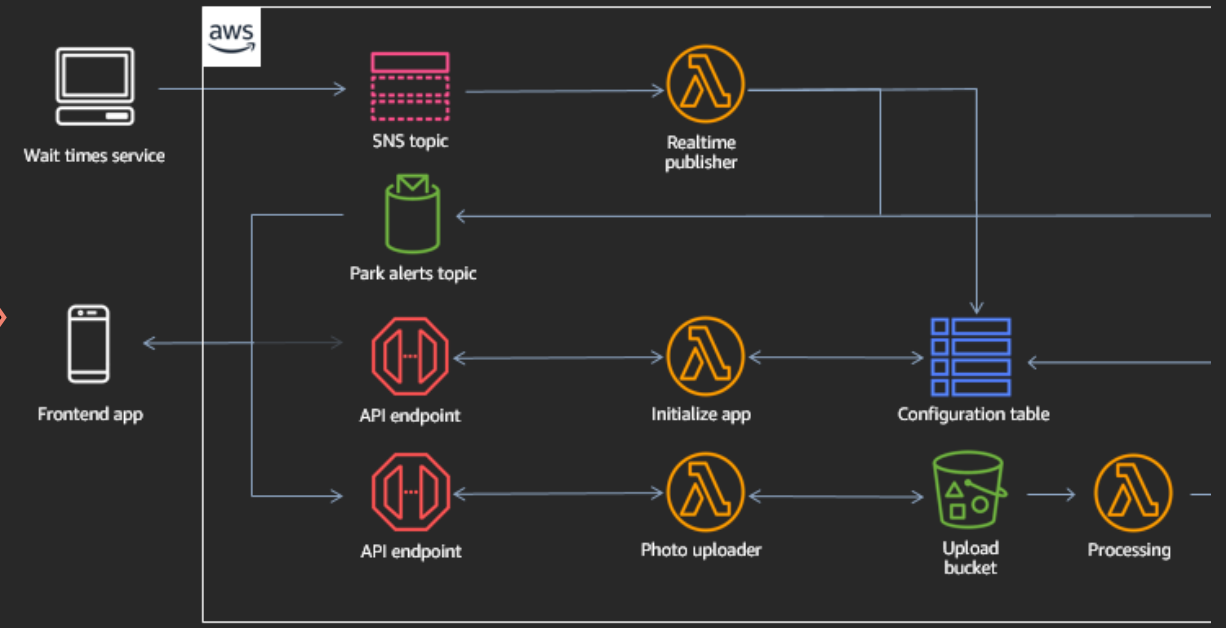
New functionality cloud native, microservice first

Design patterns works with cloud or hybrid applications



Small pieces, loosely joined

Loose coupling



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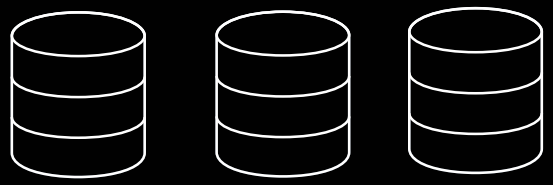

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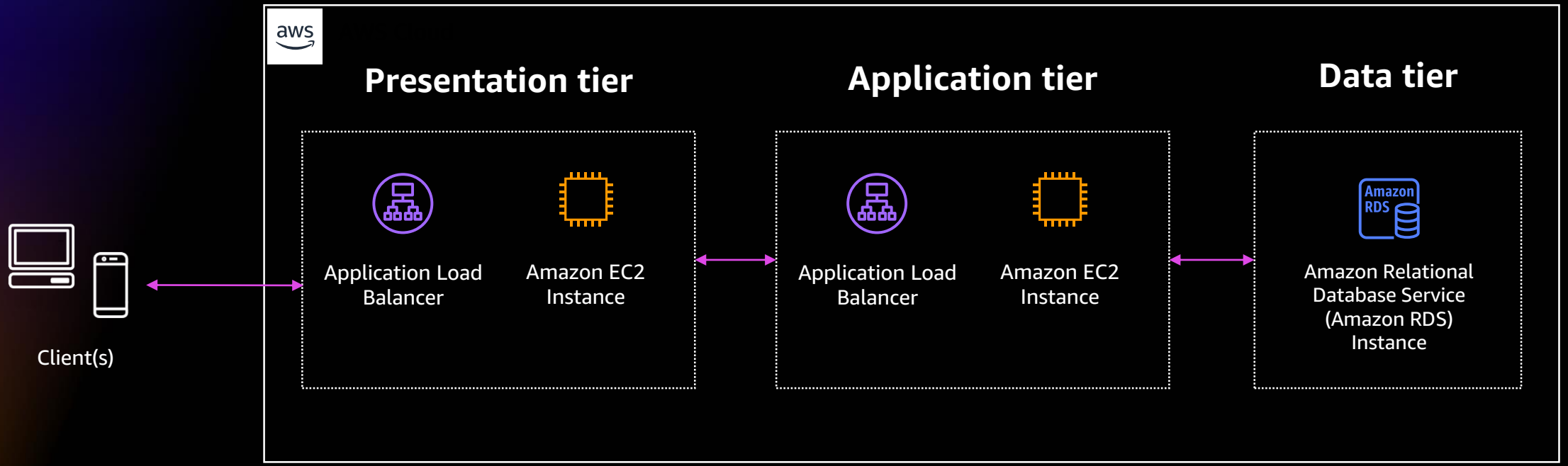
Three-tier architecture

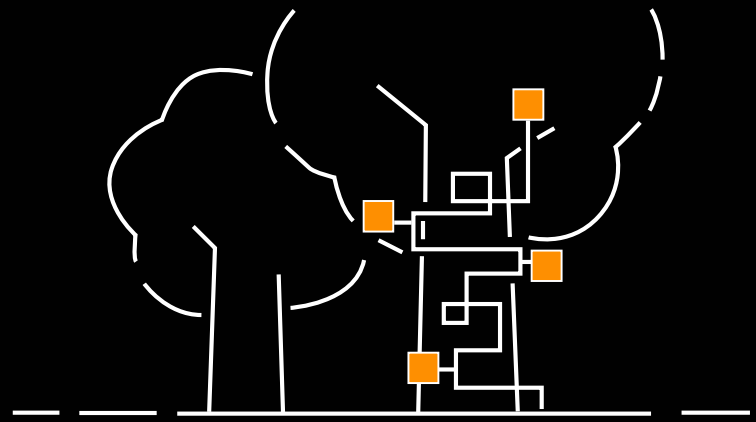


Architectural patterns

Strangler pattern

Typically starts with breaking down the monolith

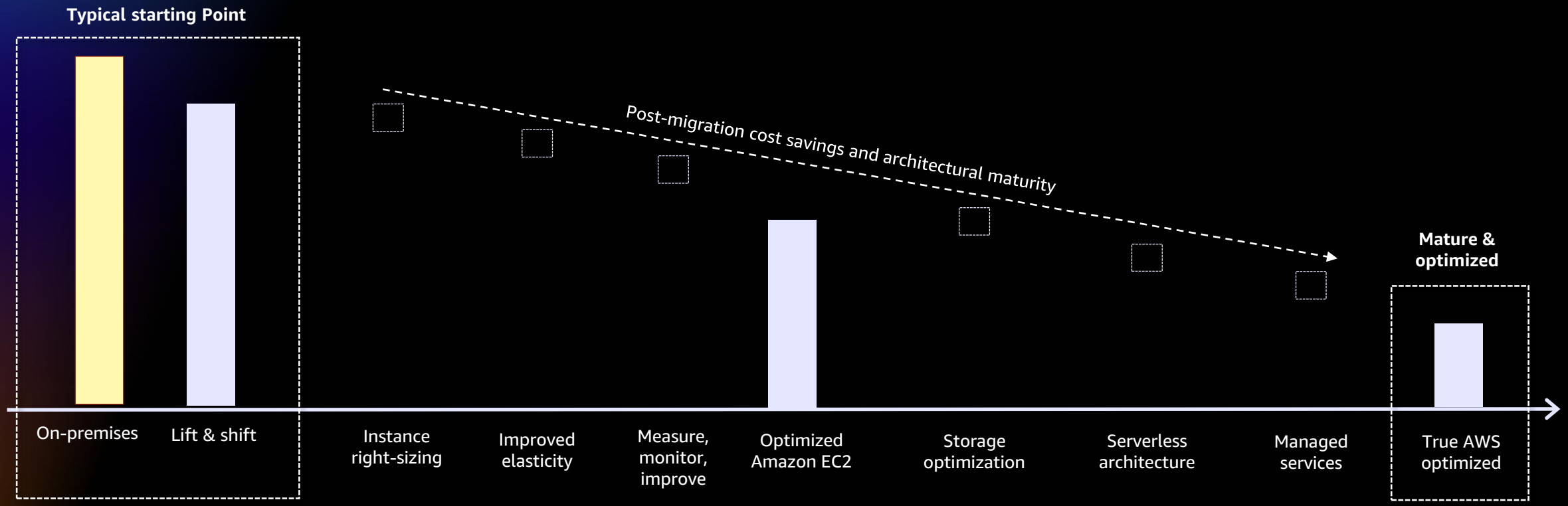
- Moving **monolithic** applications to **microservices** by gradually creating events and **APIs** for various components on of the legacy application



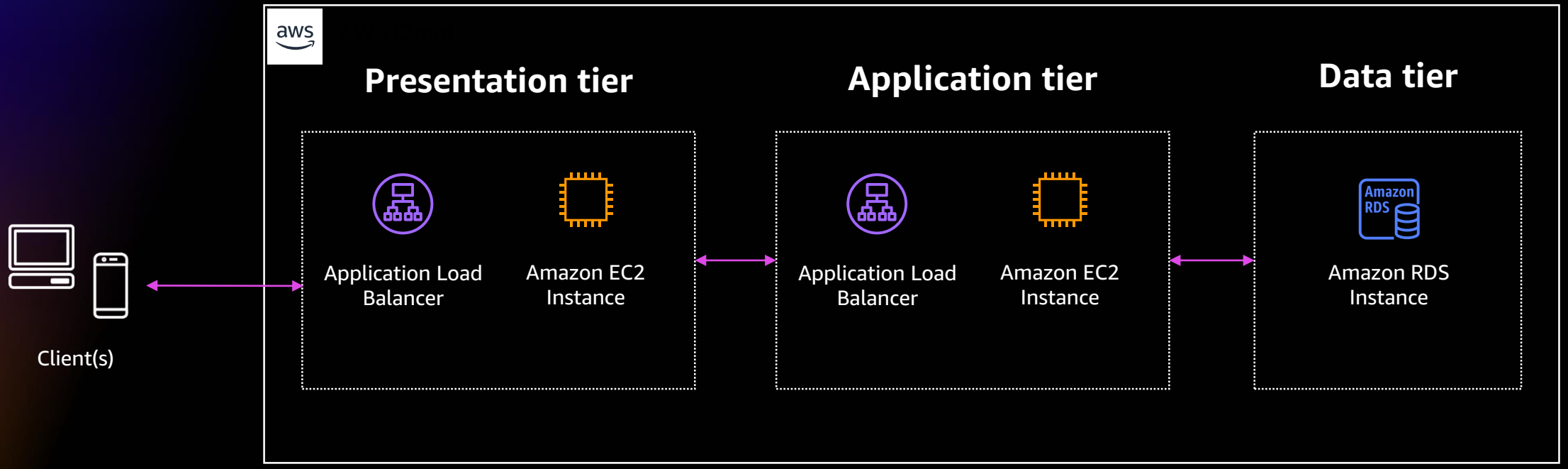
THE STRANGLER PATTERN

https://martinfowler.com/bliki/StranglerFigApplication.html

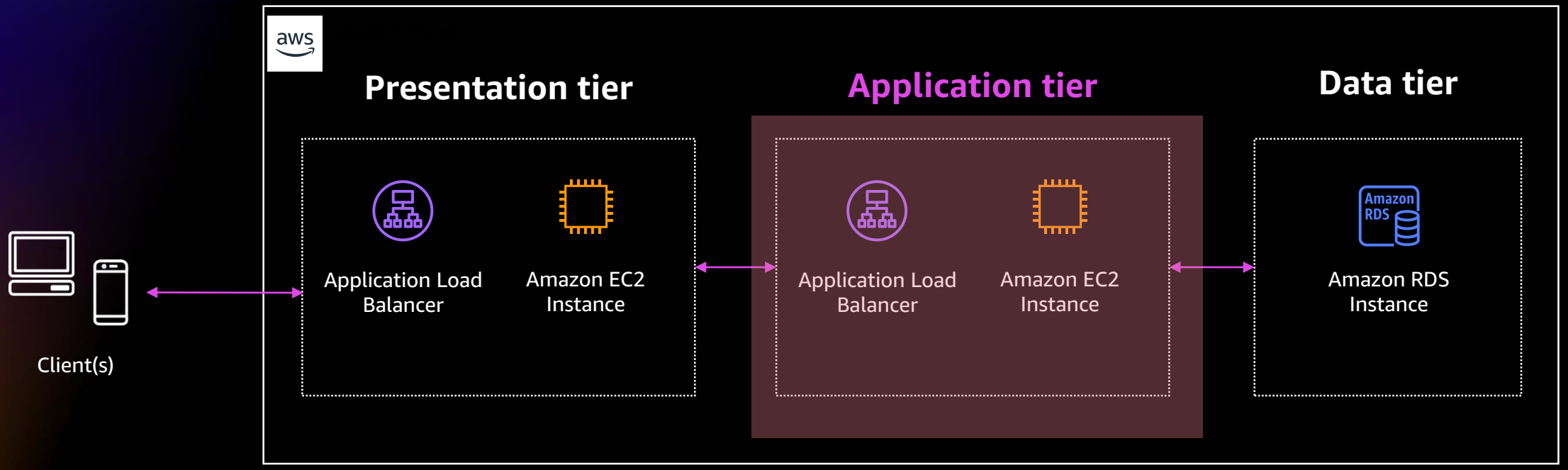
Making improvements along the way



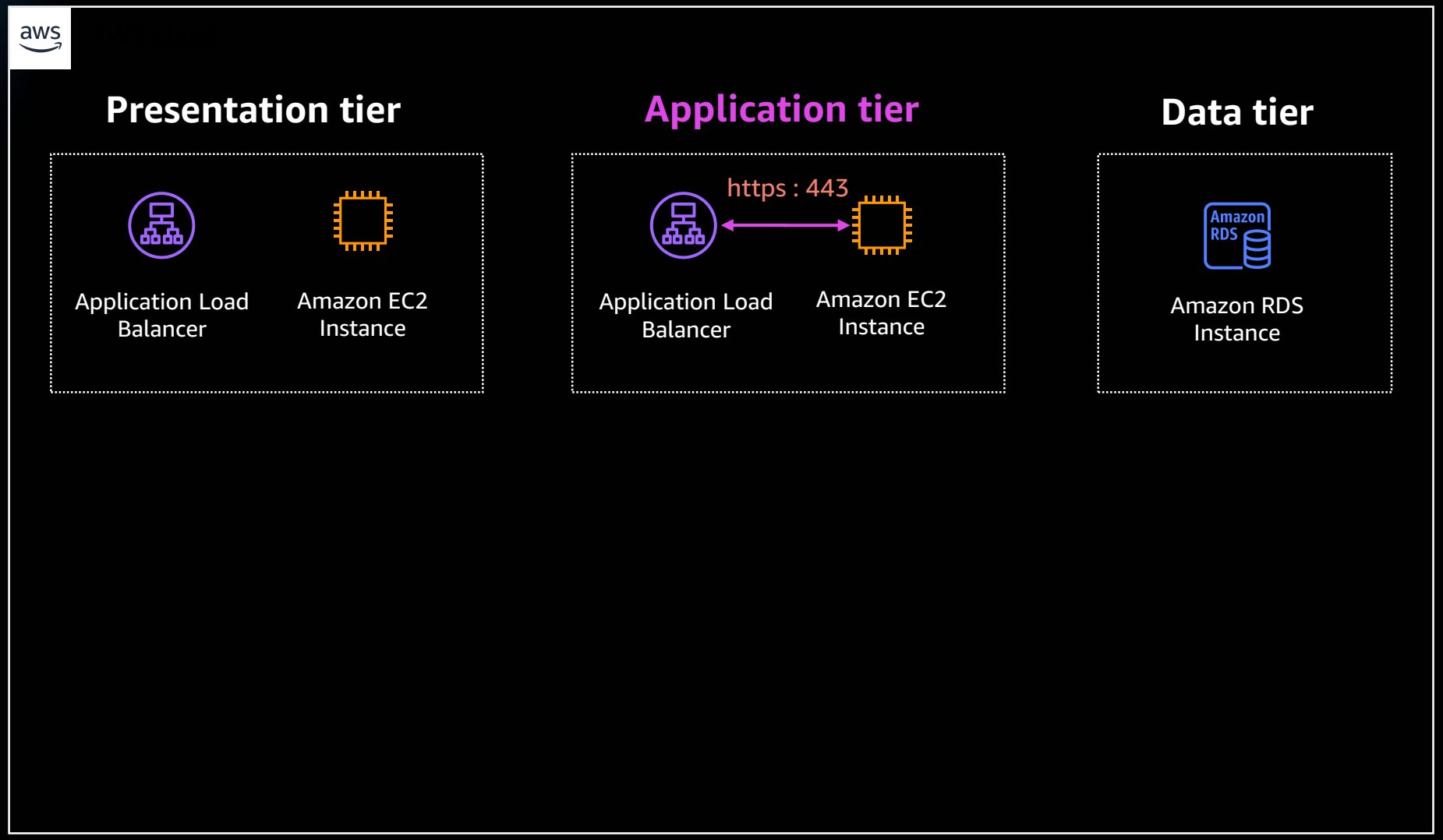
Three-tier architecture



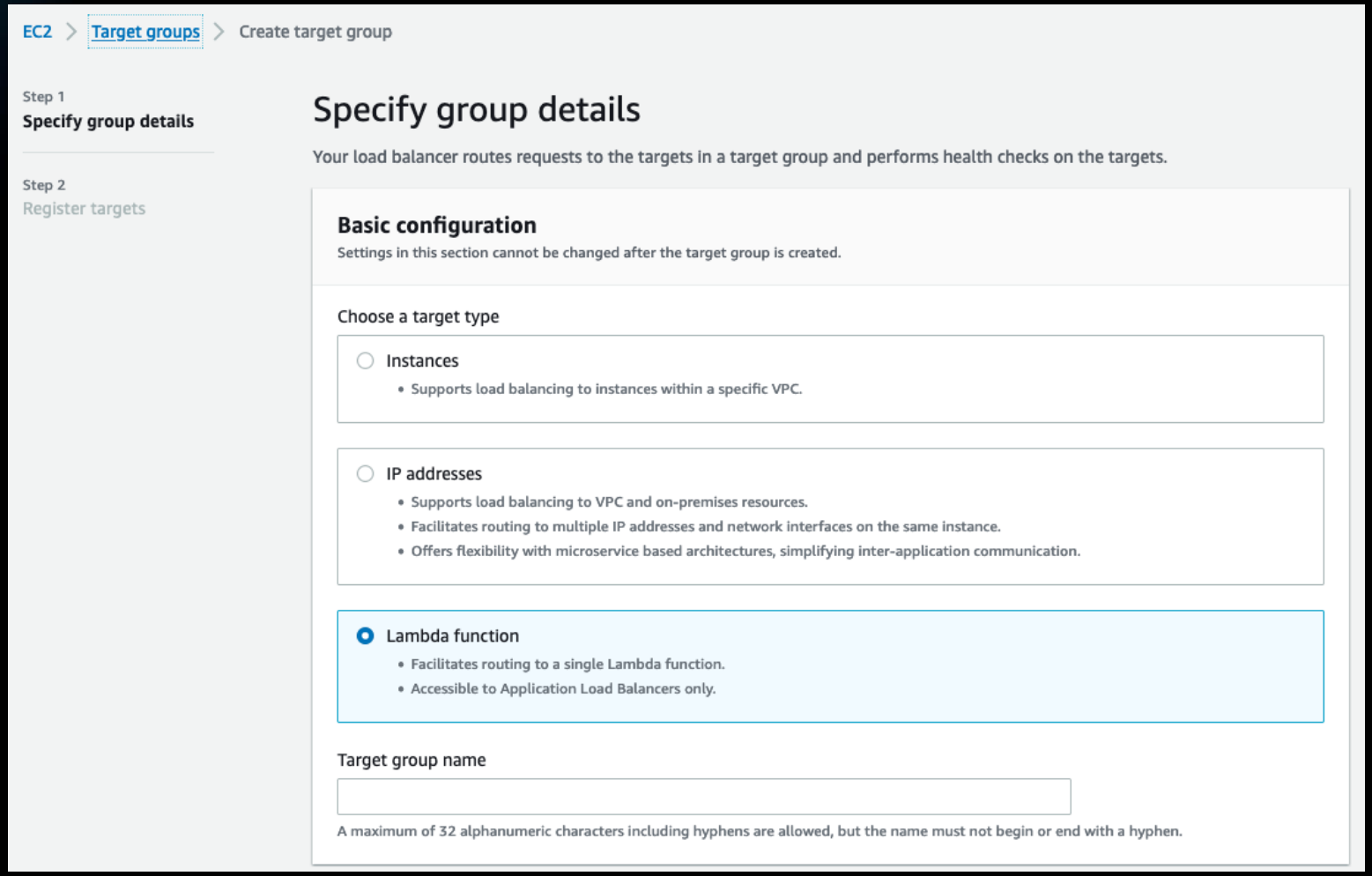
Three-tier architecture : Strangler pattern



Strangler pattern : Application tier

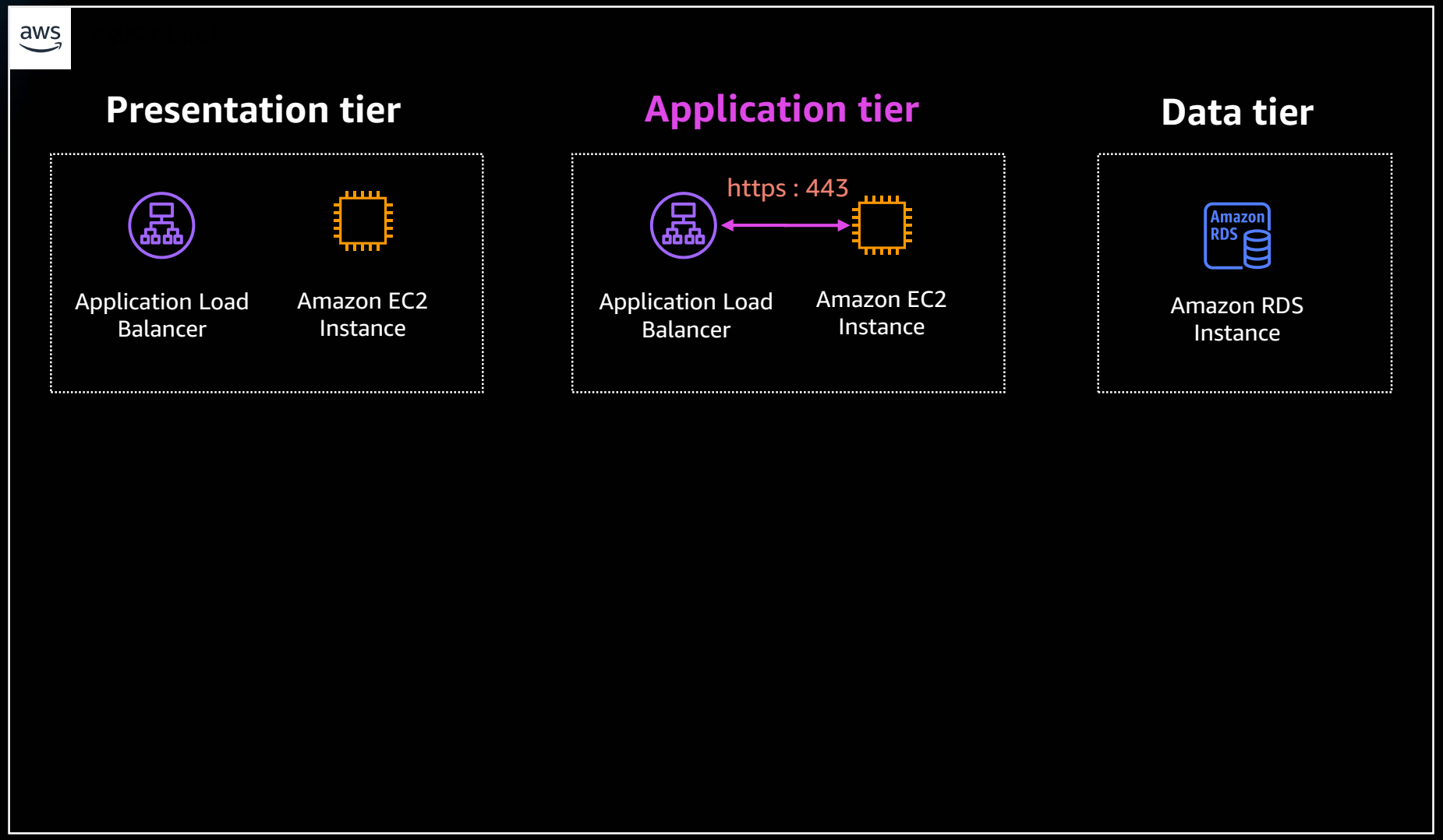


AWS Lambda functions as targets – Application Load Balancers



https://docs.aws.amazon.com/elasticloadbalancing/latest/application/lambda-functions.html

Strangler pattern : Application tier



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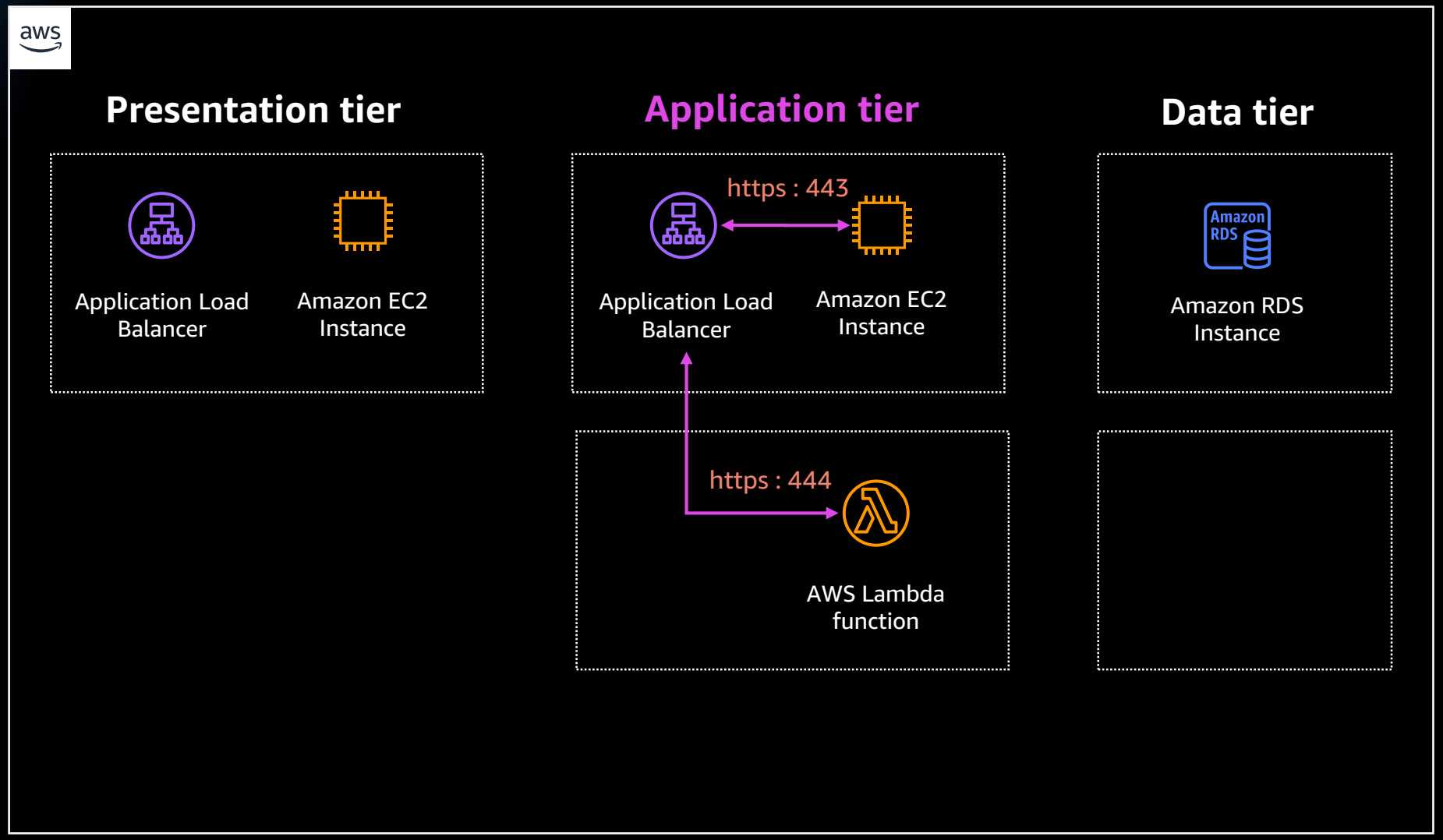

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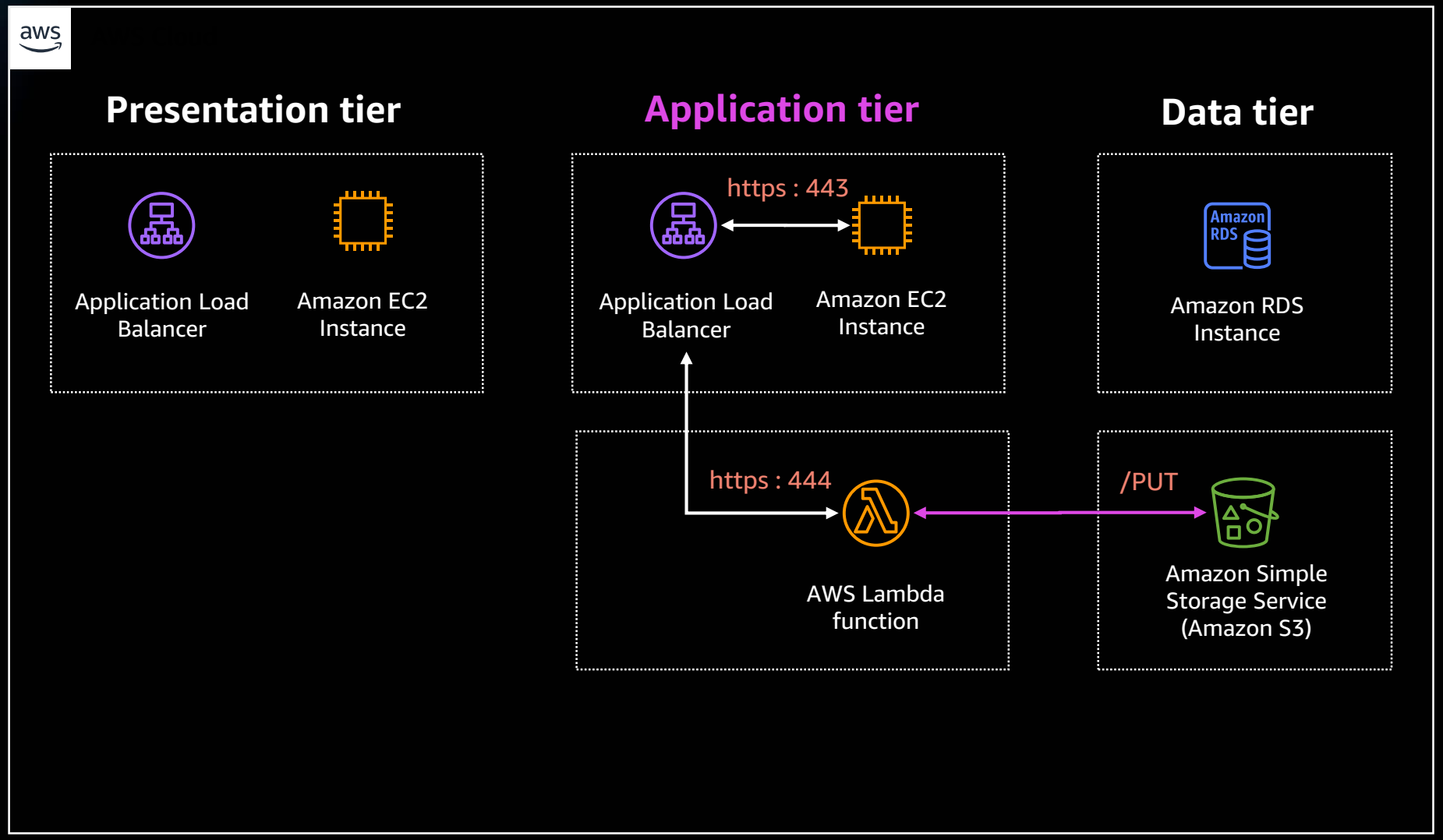
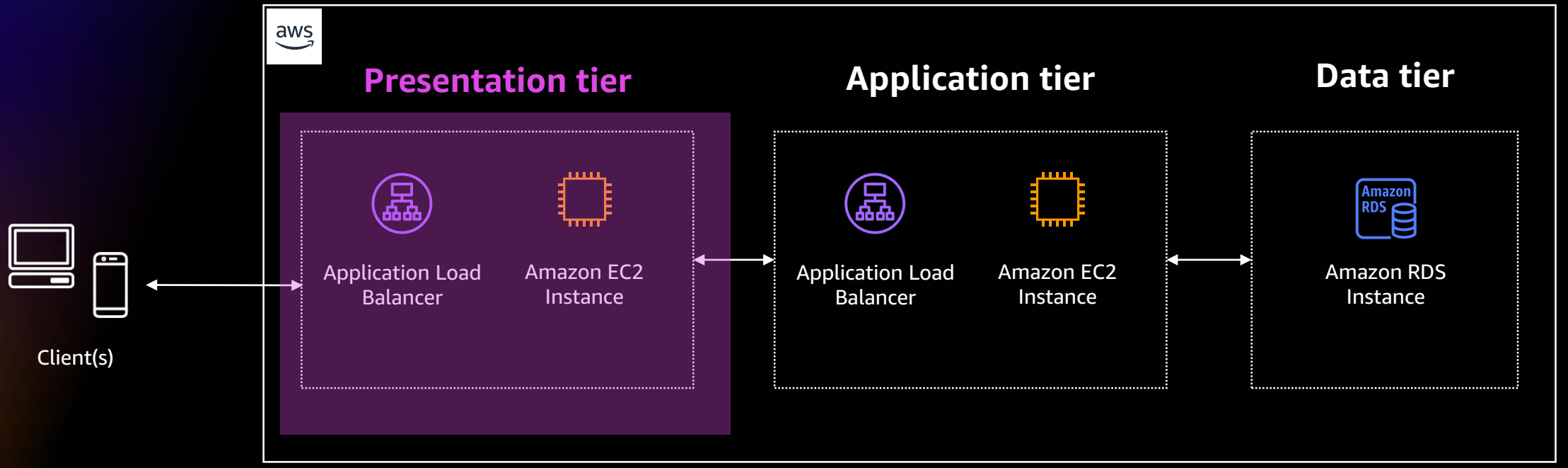
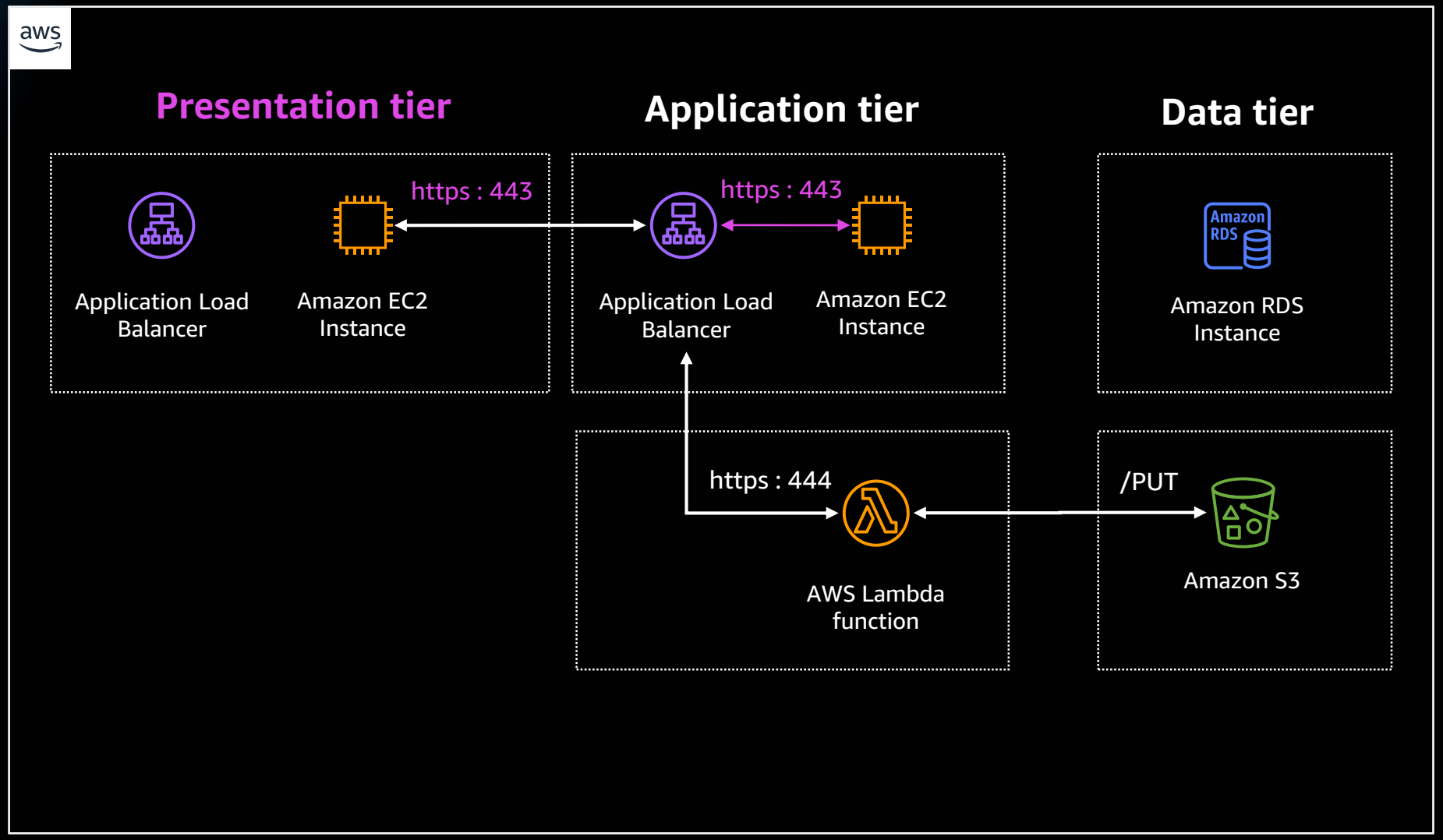


Strangler pattern : Presentation tier



Three-tier architecture



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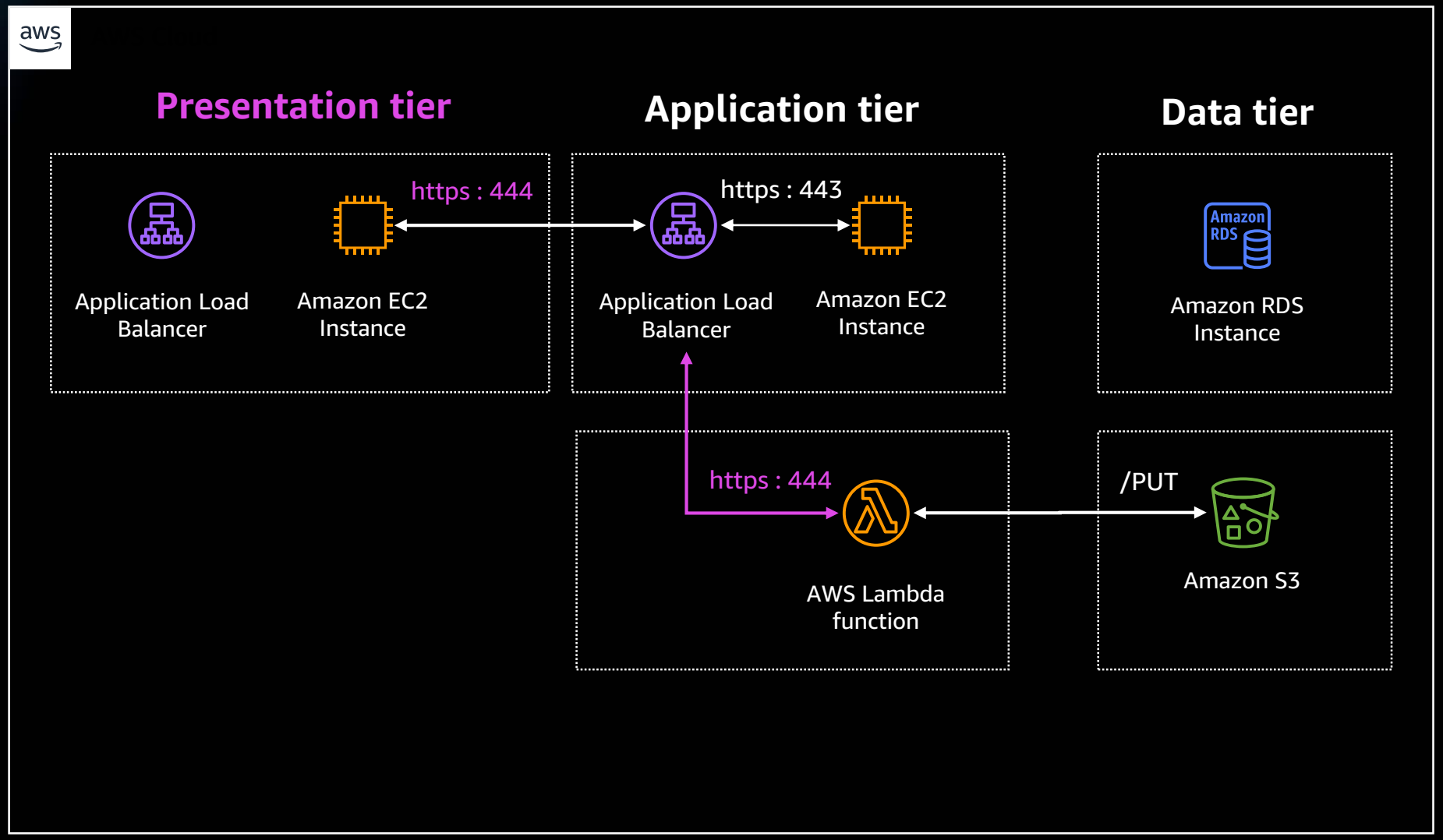

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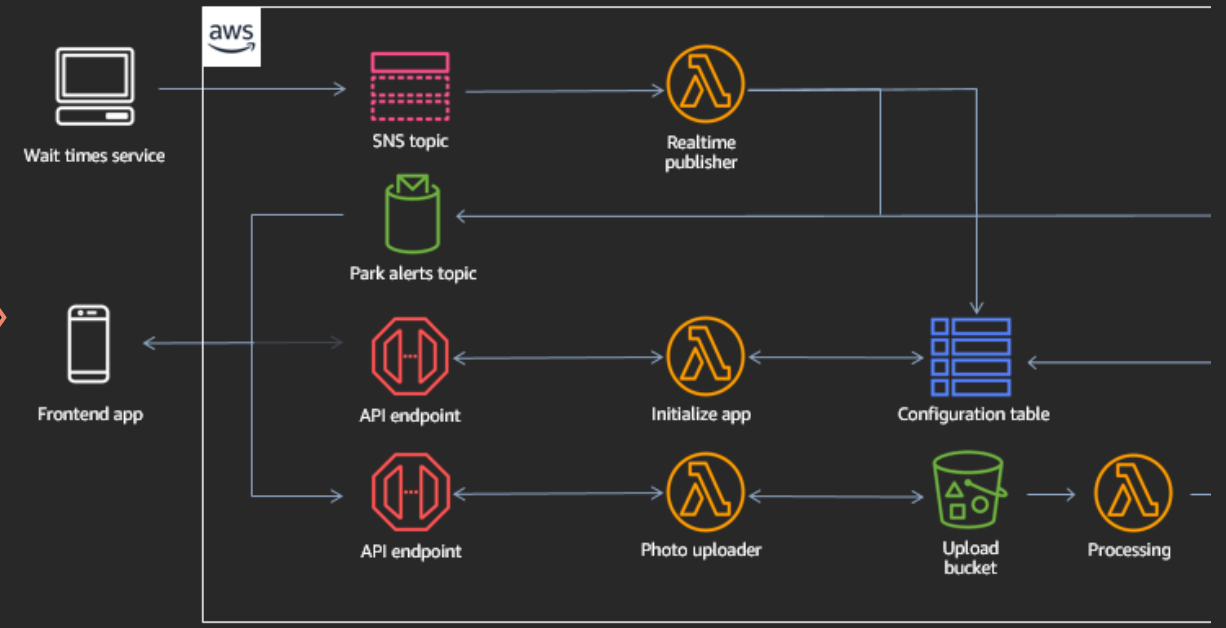
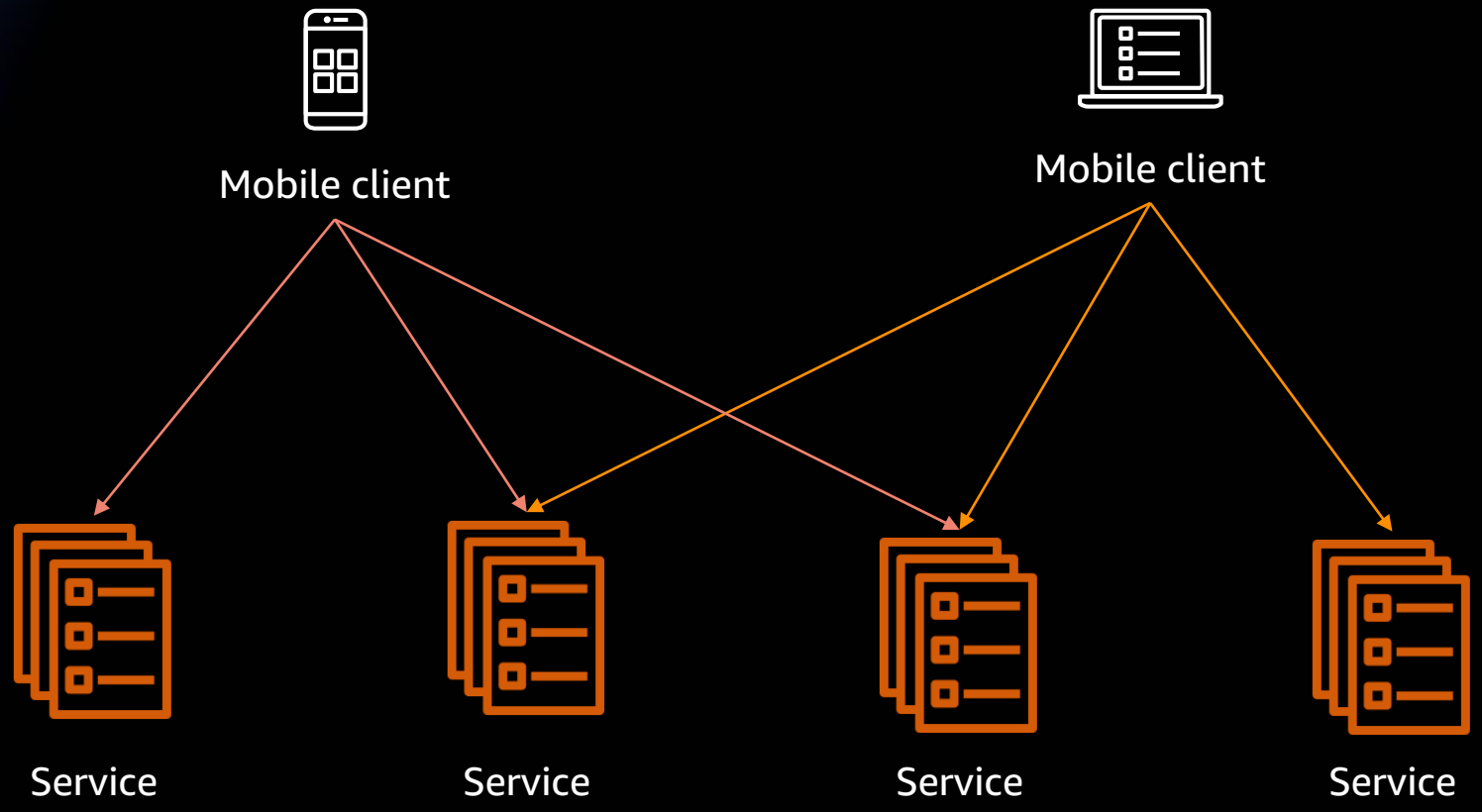


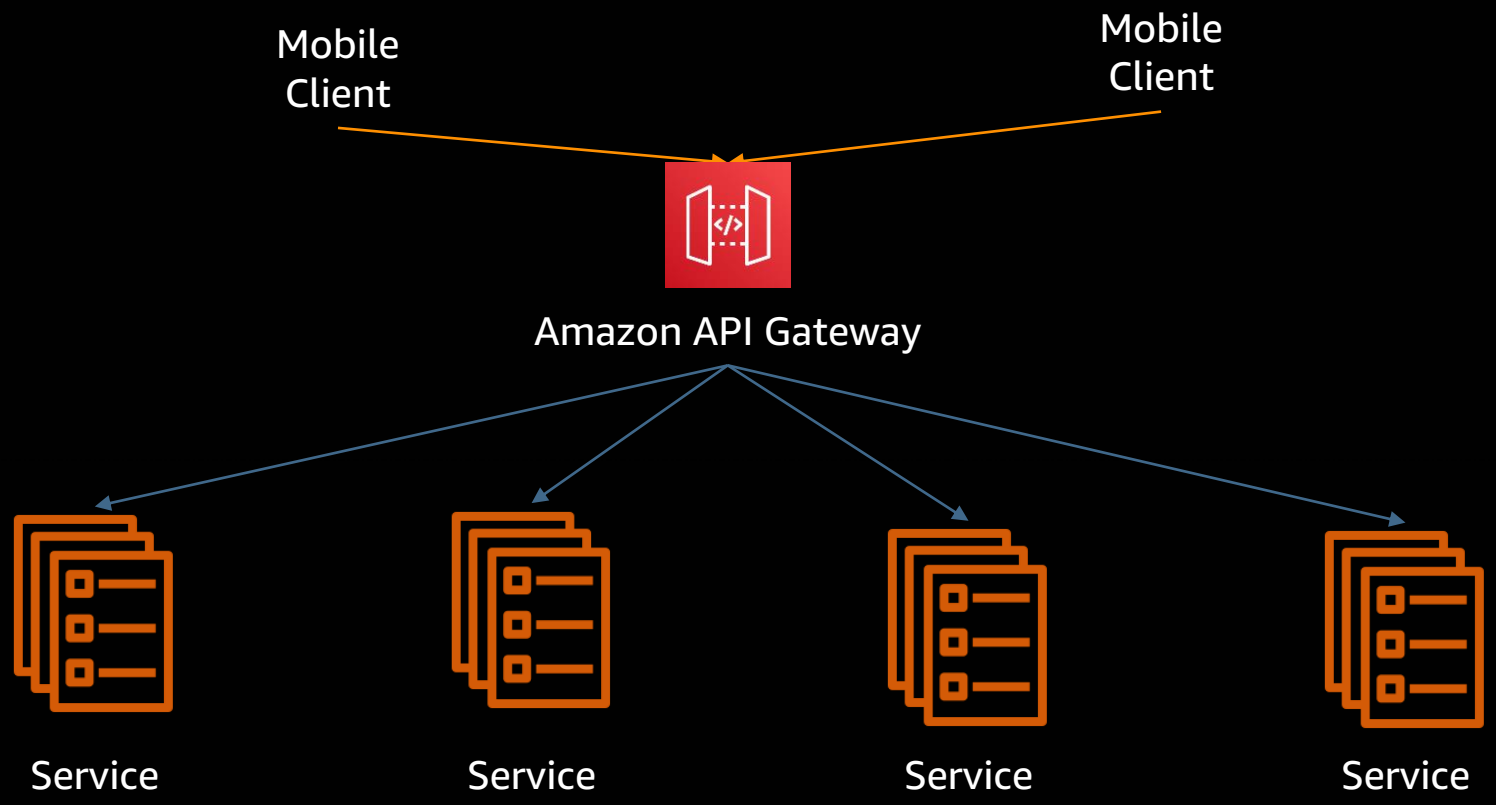
aws

API Gateway pattern

Example: Communication between devices and services (without an API Gateway)



Example: Communication between devices and services (with an API Gateway)



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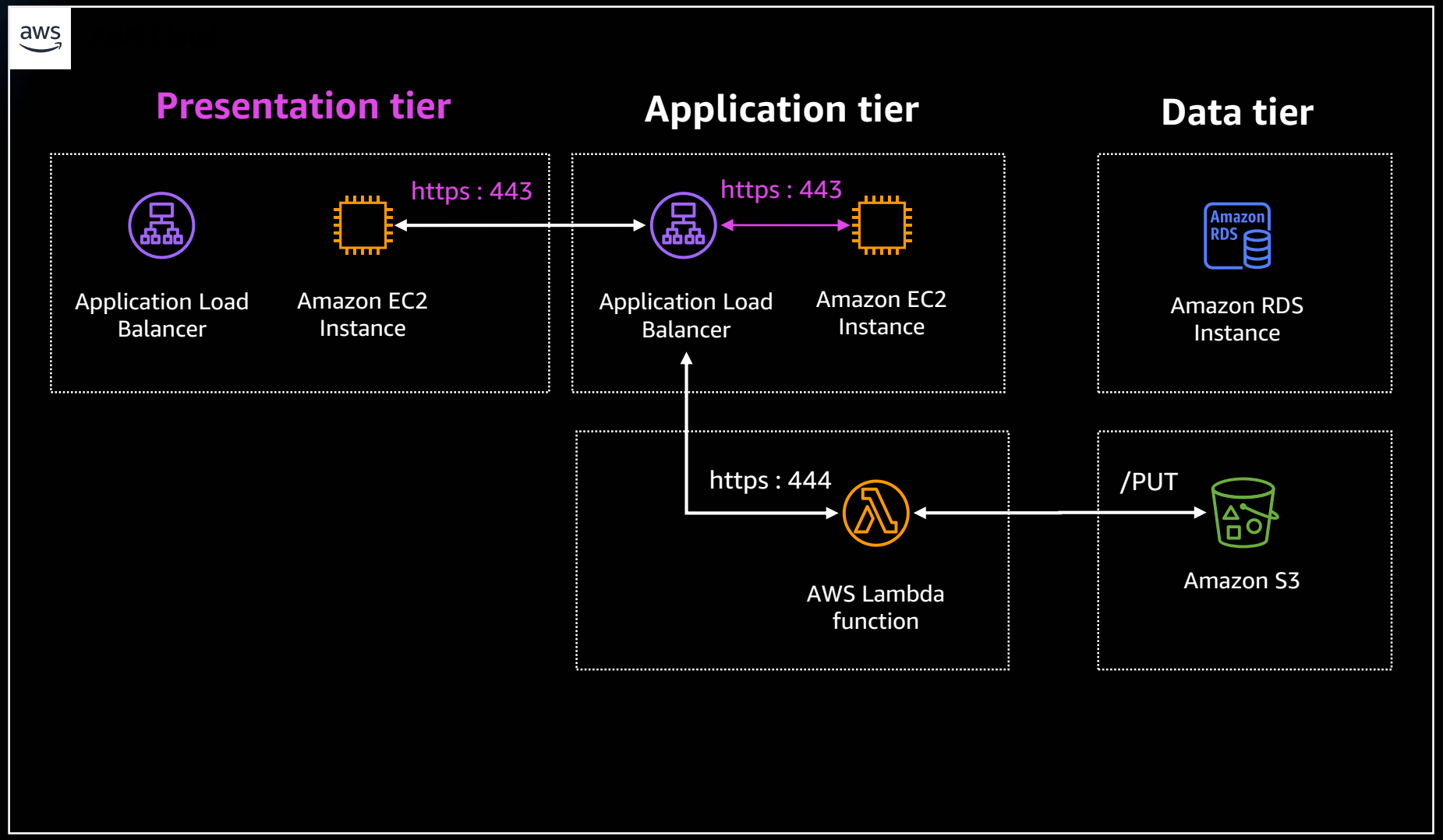

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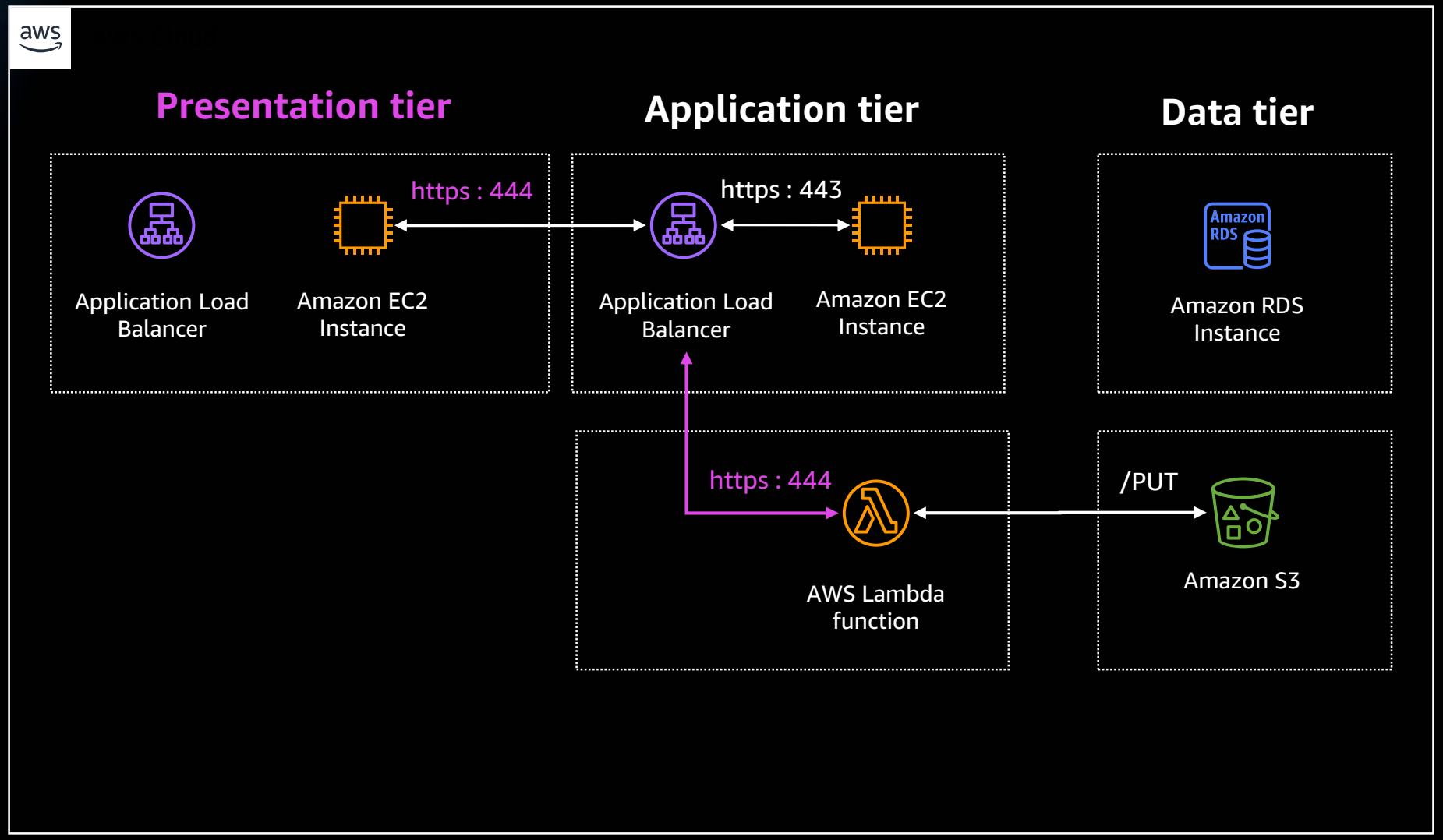
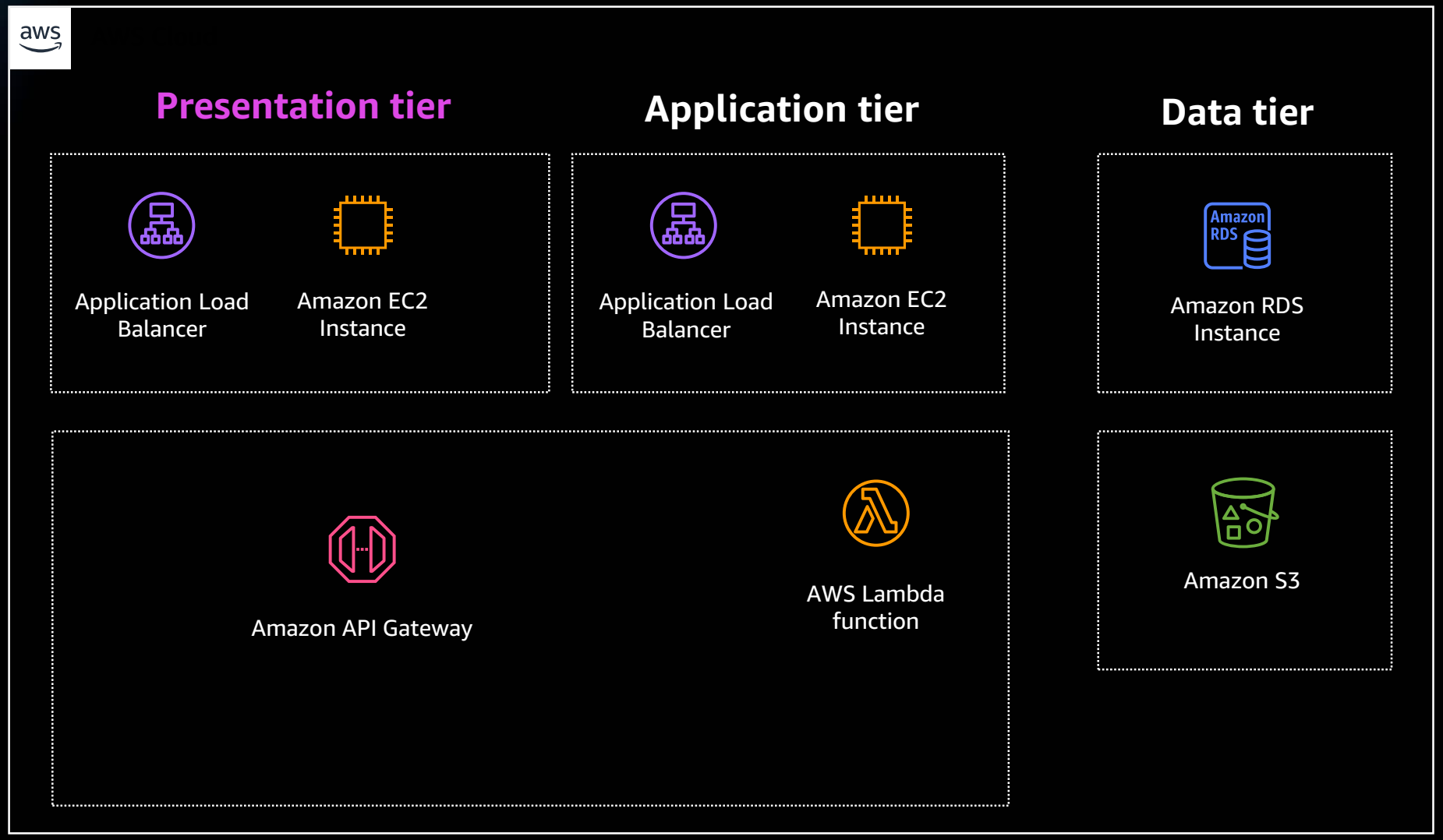


API Gateway pattern



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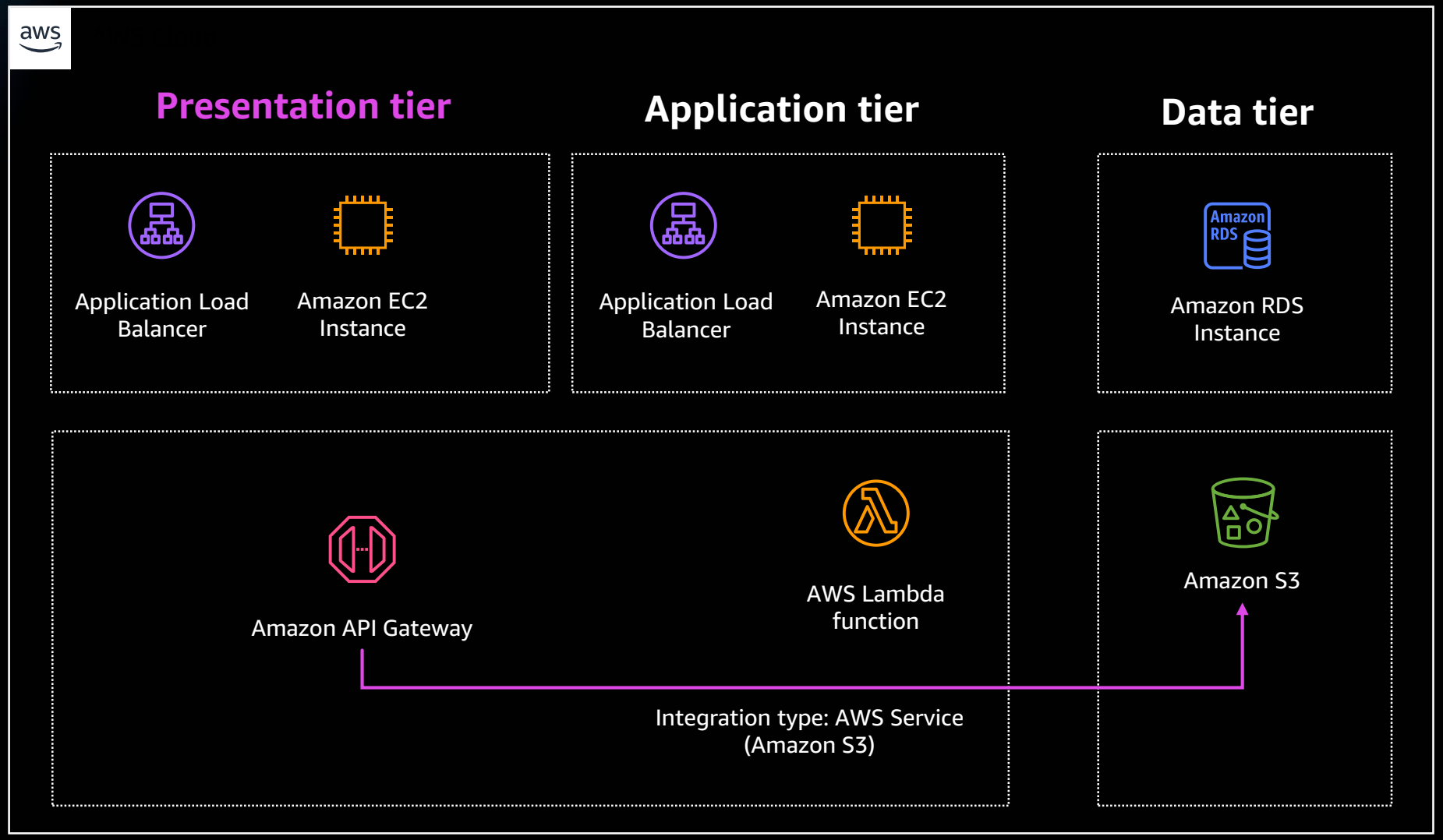

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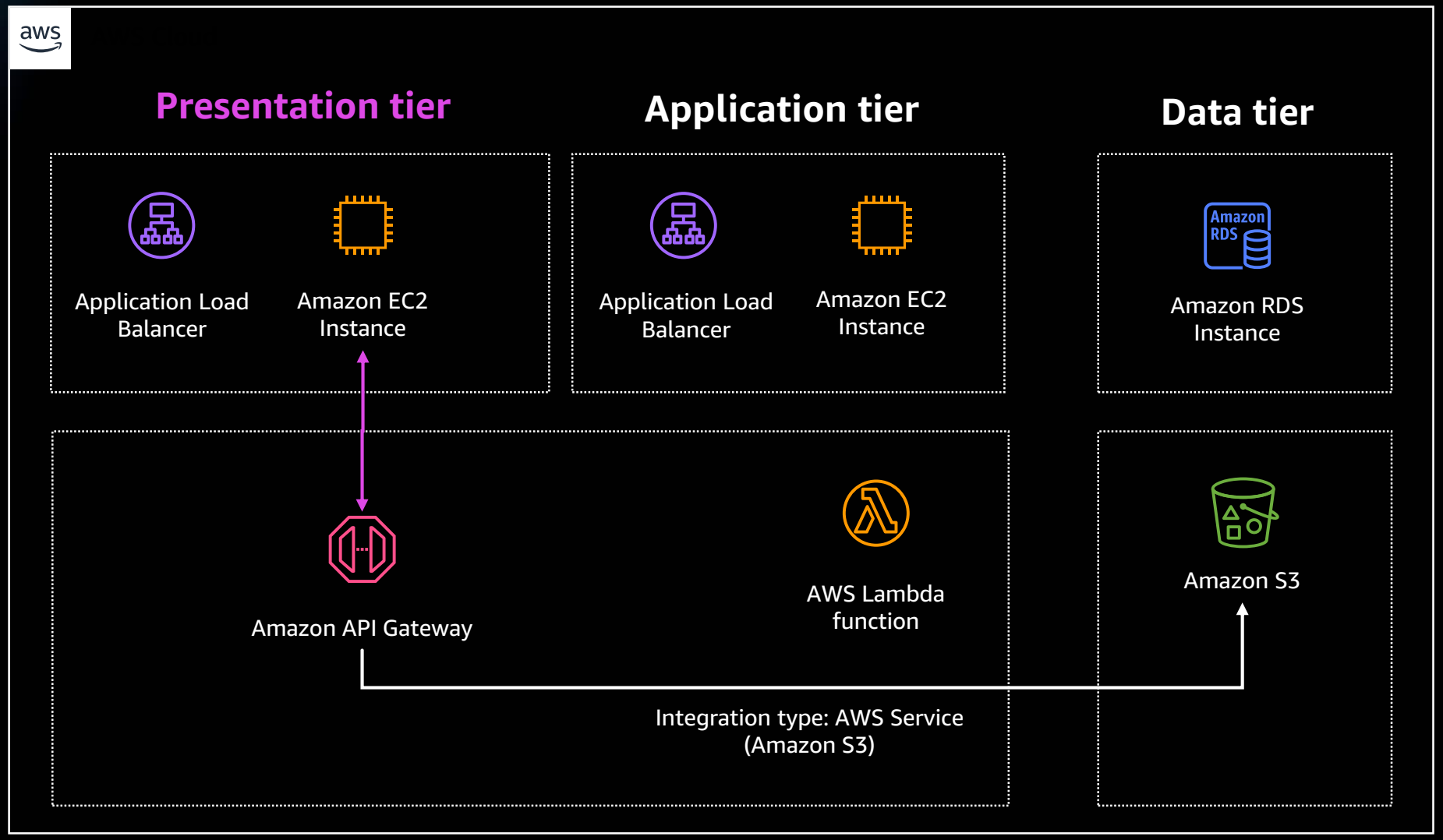

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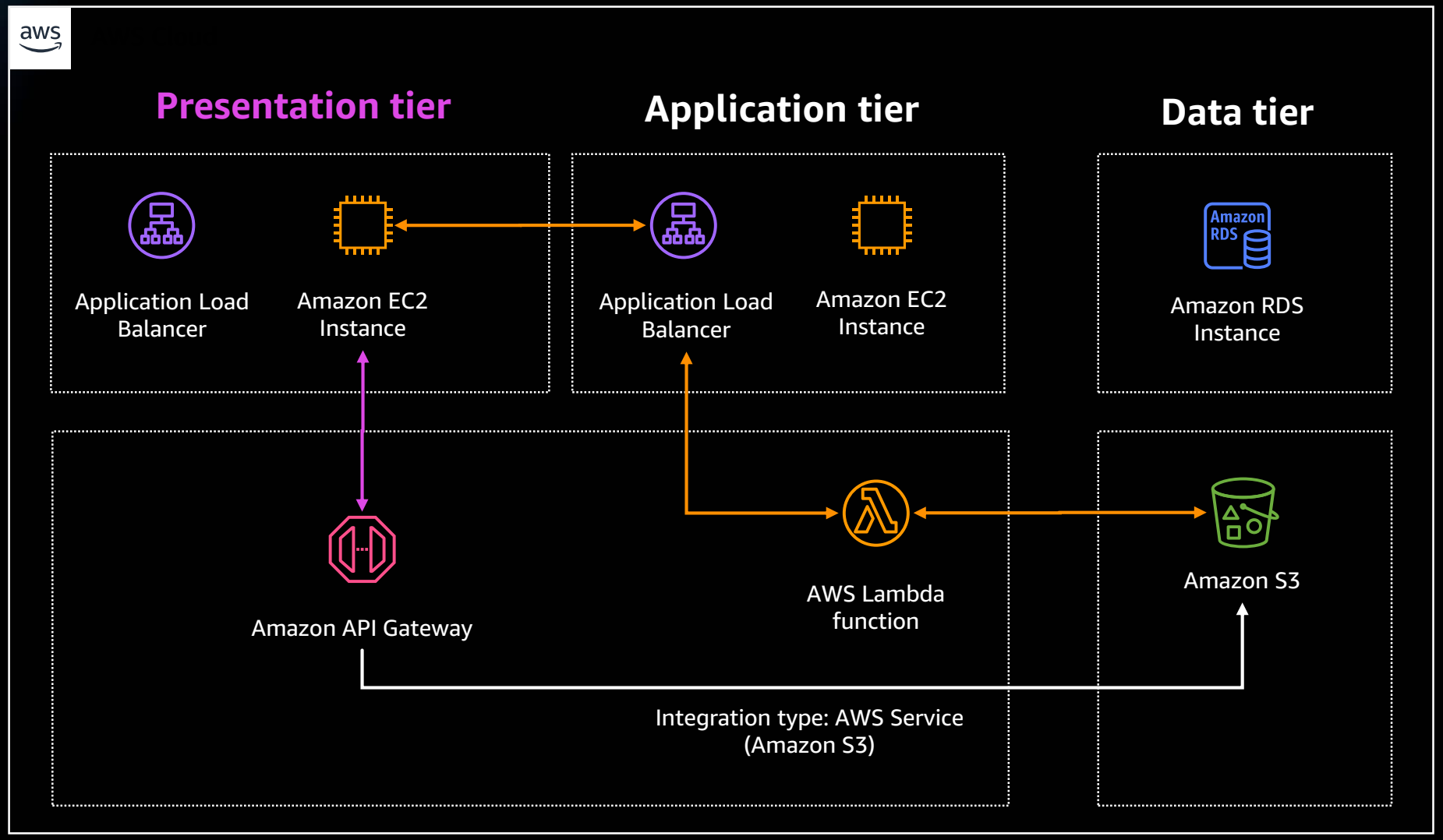

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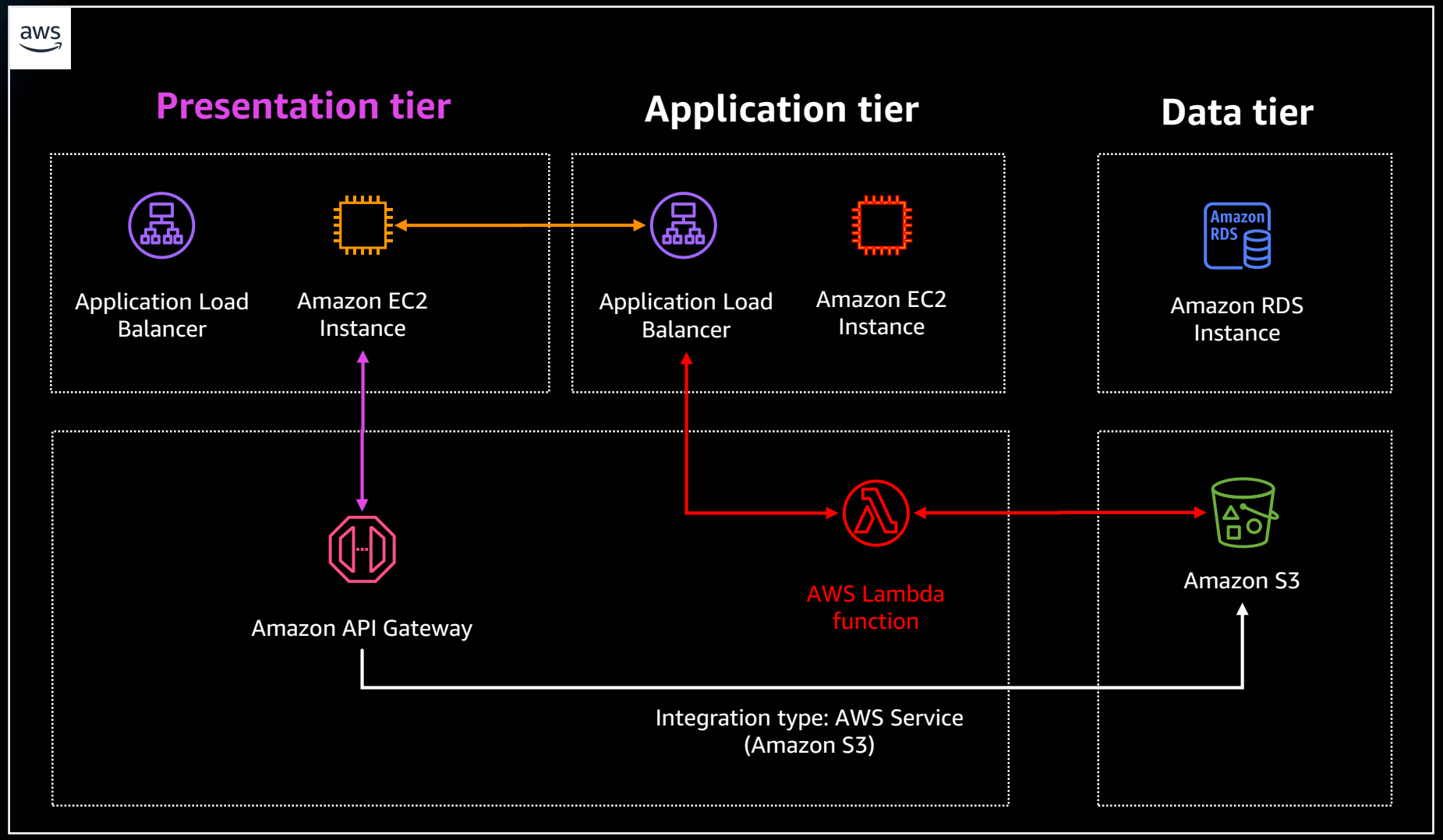

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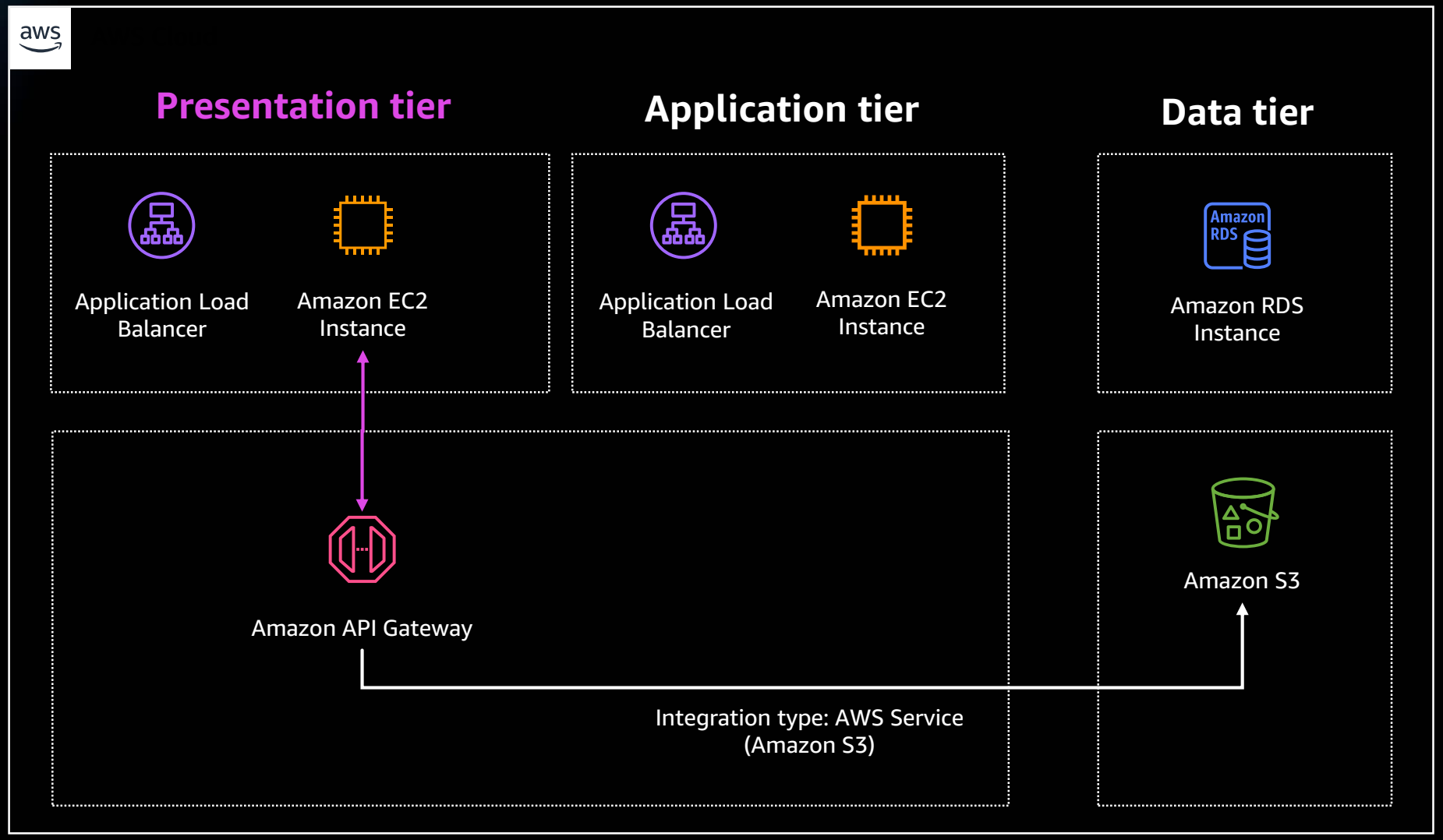

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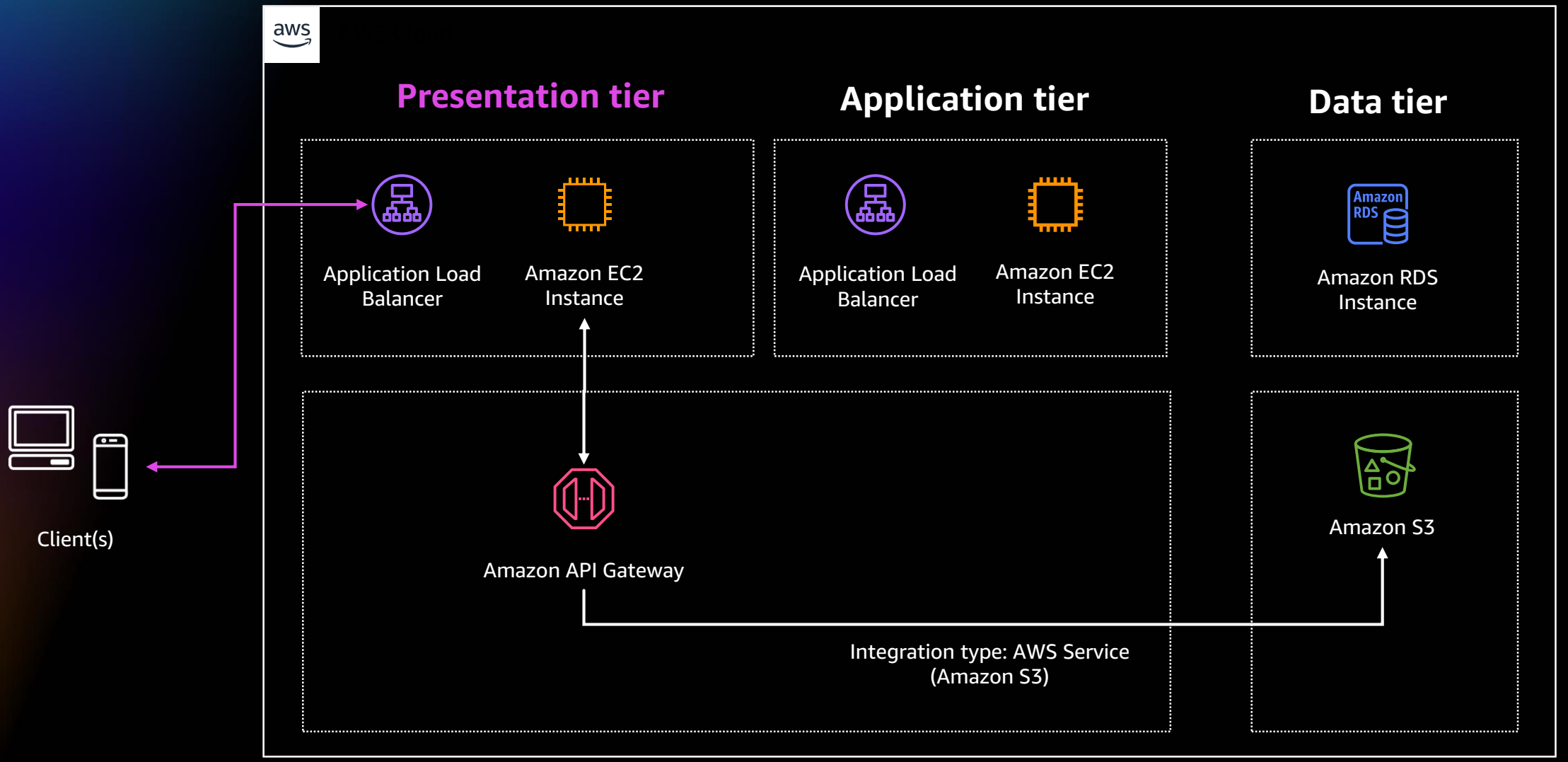

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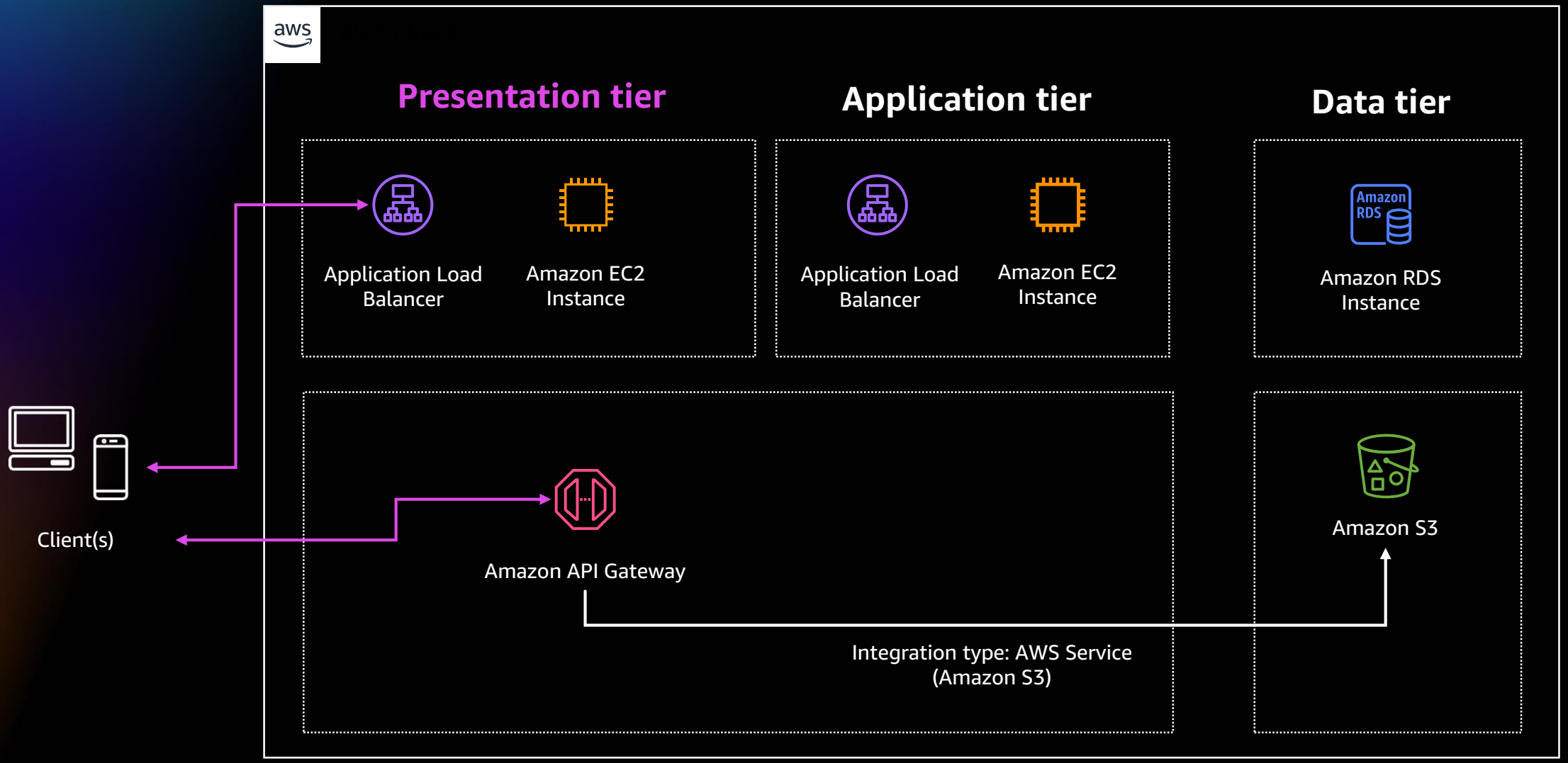
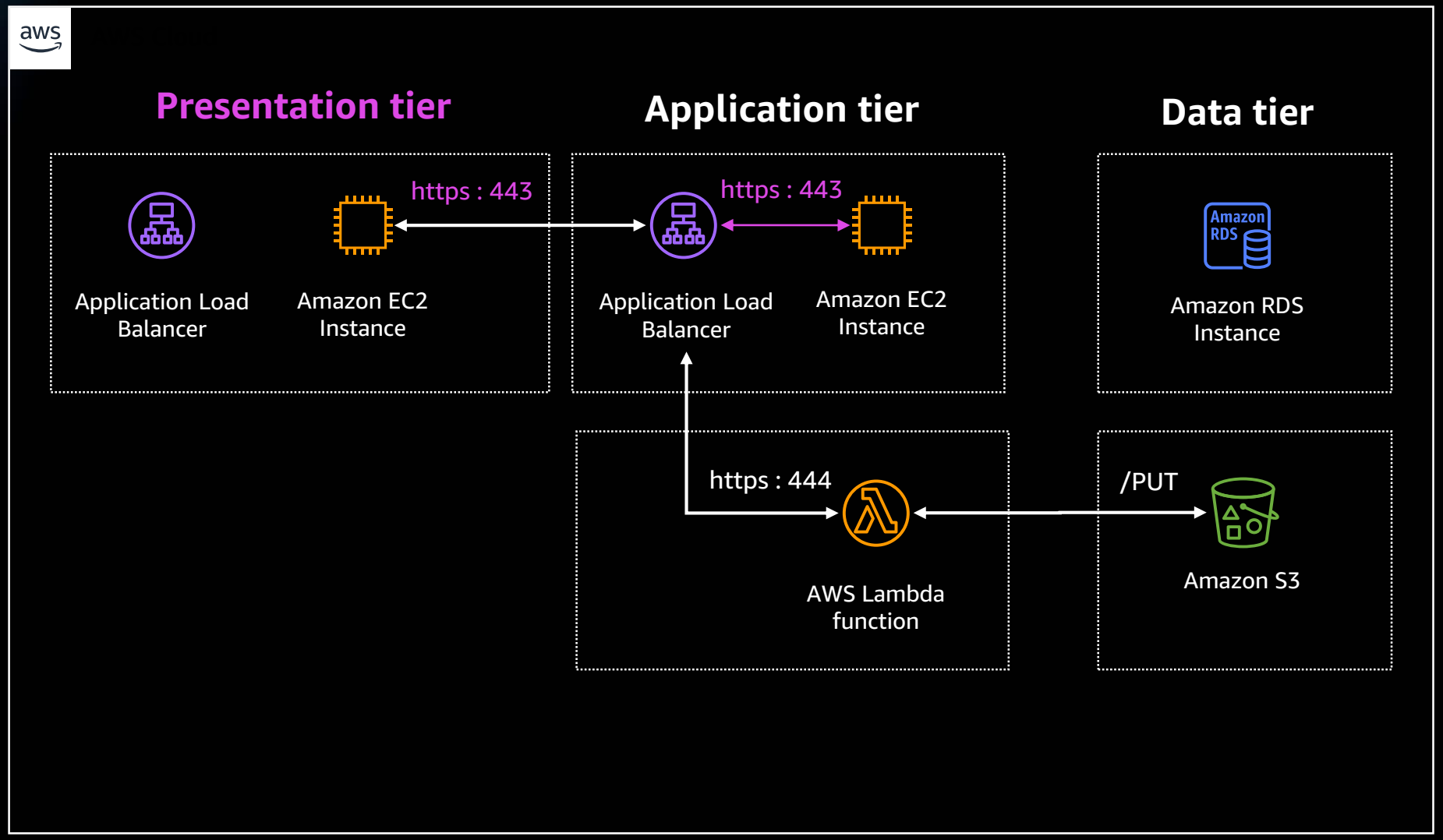


Coupling concern



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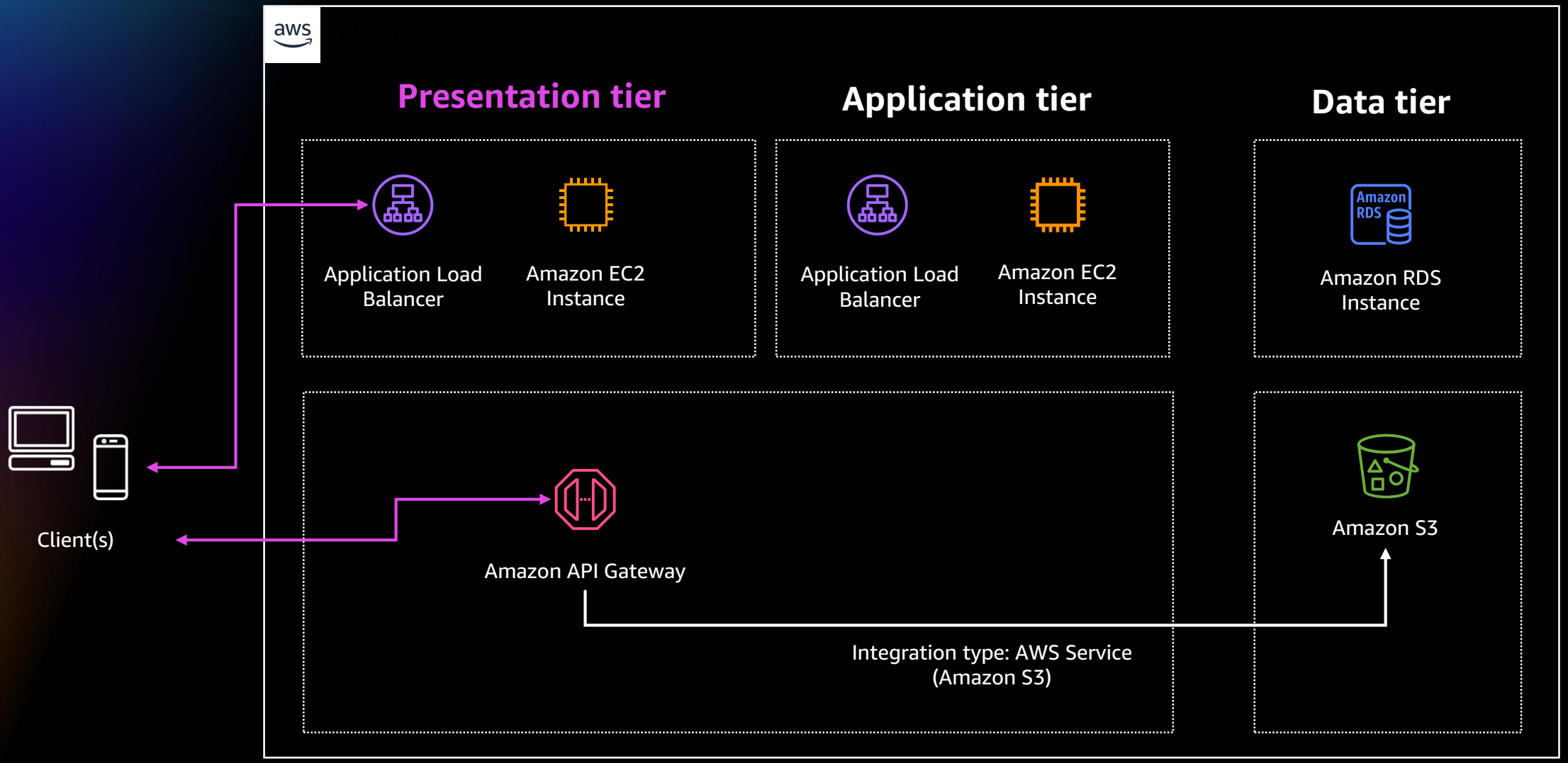

Event Sourcing pattern

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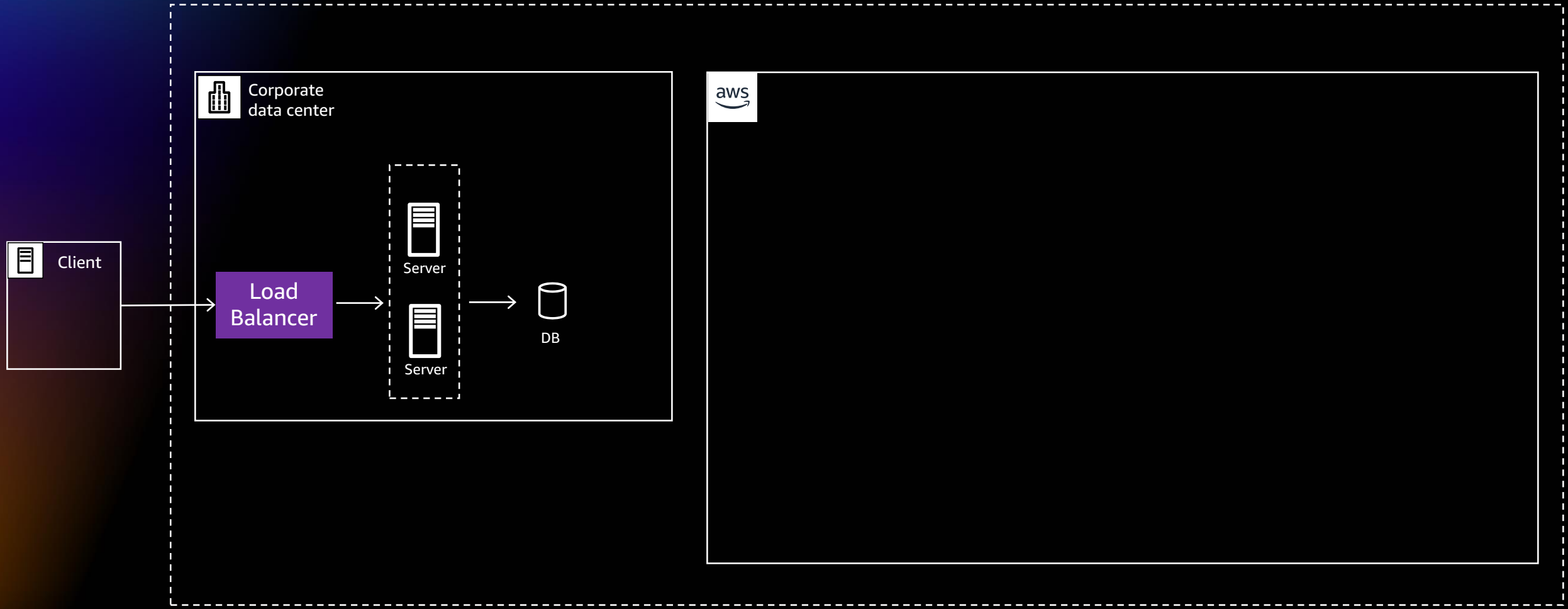

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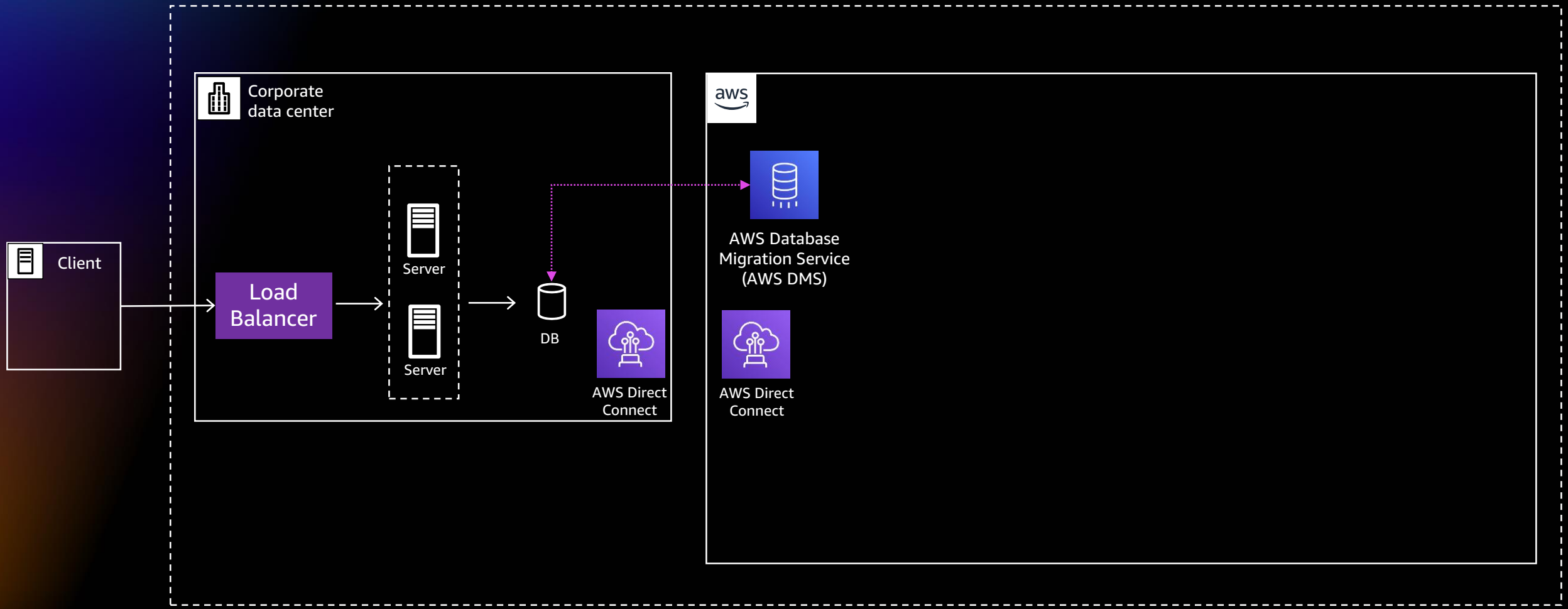

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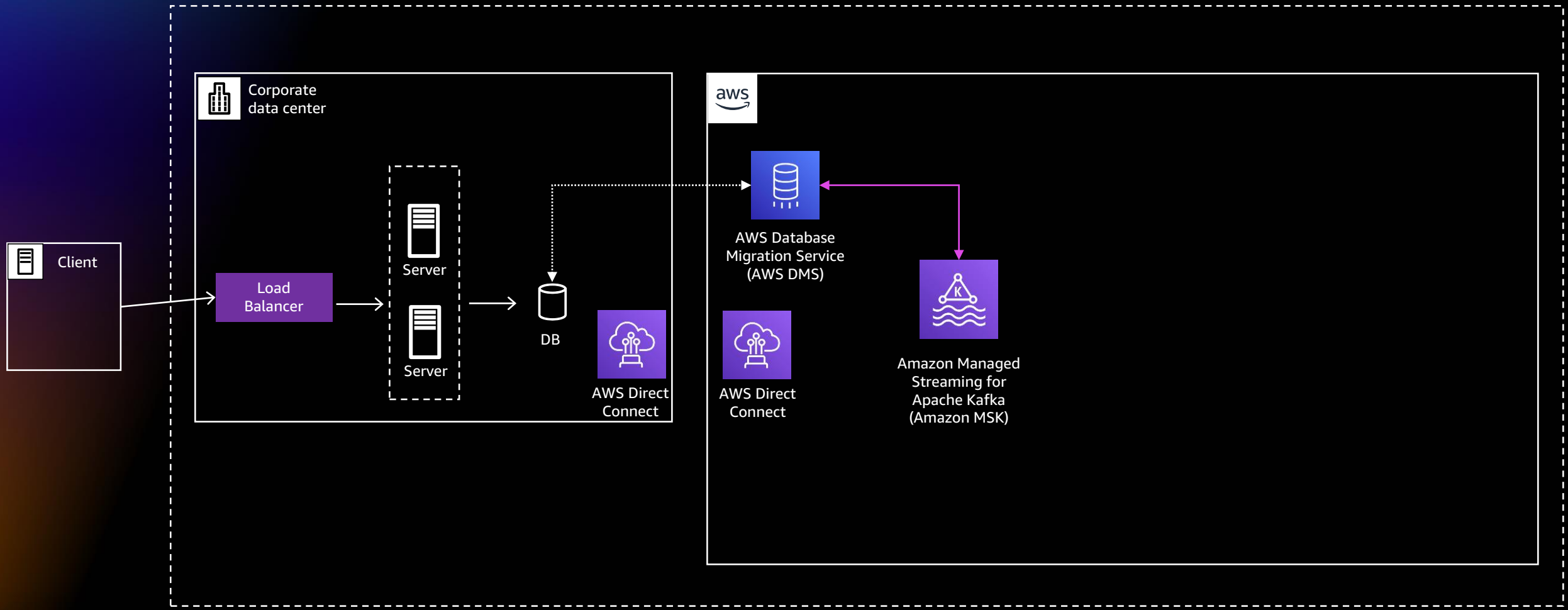
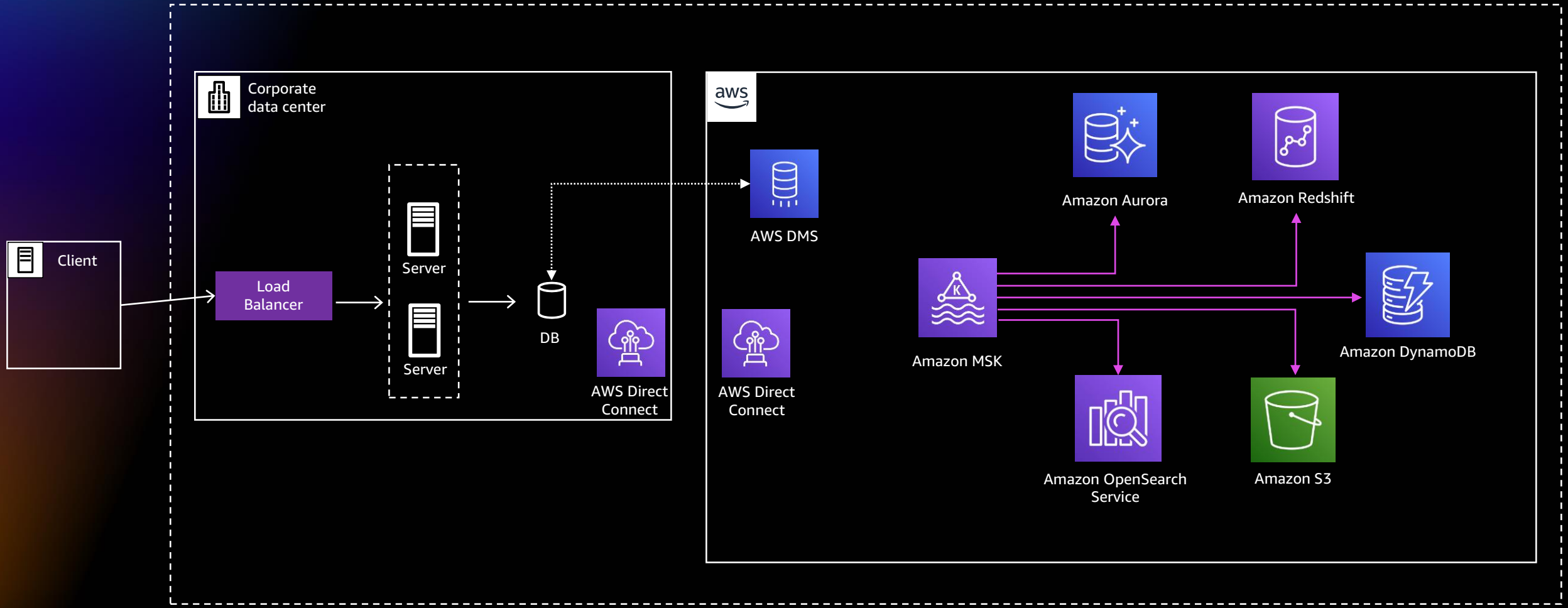
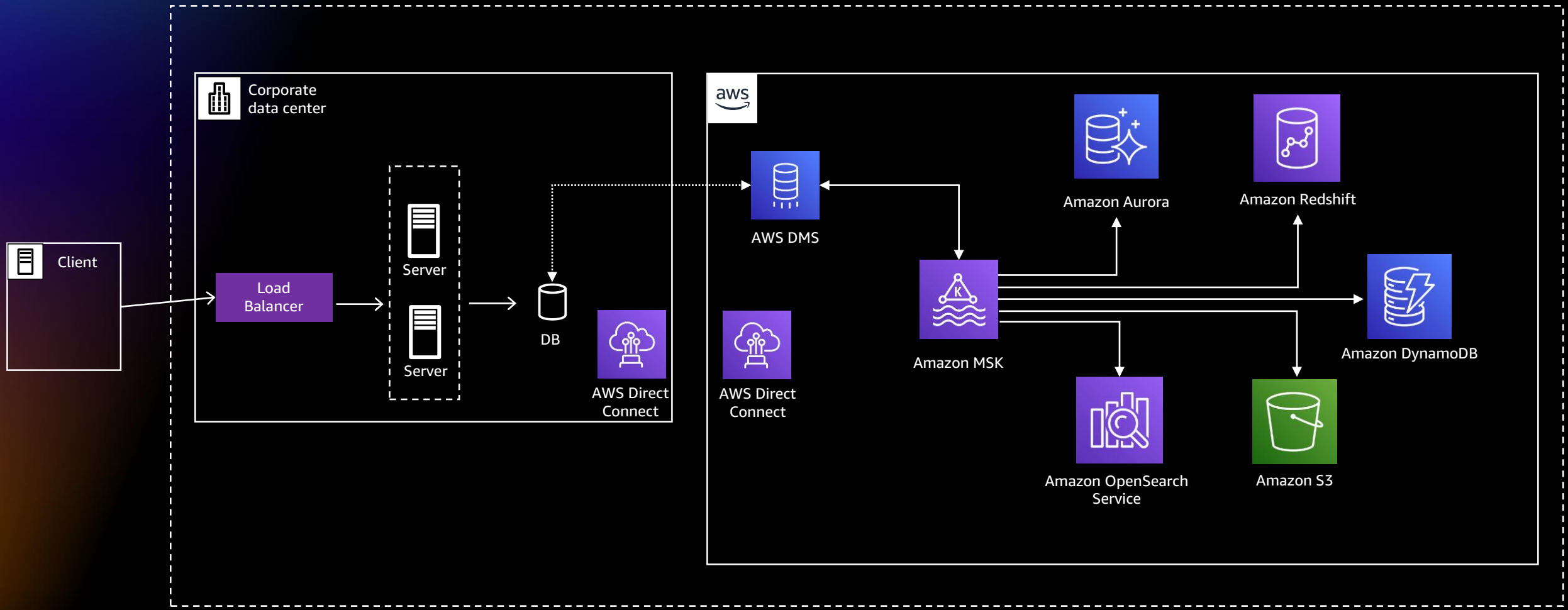


Fan-Out pattern



Event Sourcing and Fan Out patterns



Other resources – Messaging and patterns

Modern Application Development on AWS : Cloud-native Modern Development and Design Patterns on AWS whitepaper

AWS Blog - messaging

AWS re:Invent 2020: Application integration patterns for microservices

AWS Asynchronous messaging workshop

Other resources – AWS Solutions Constructs

AWS Solutions Constructs patterns

Getting started with AWS Solutions Constructs

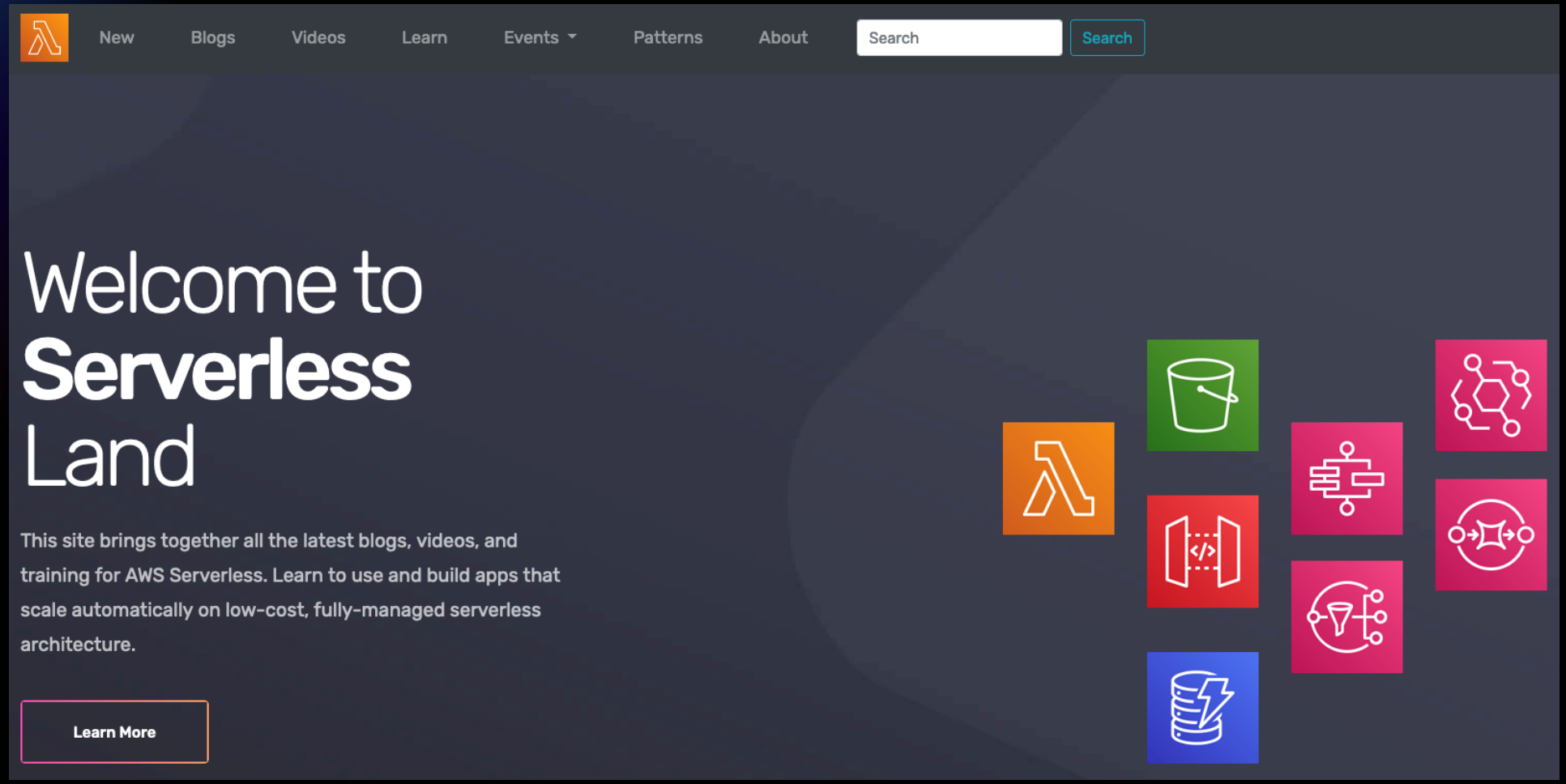
AWS labs – AWS Solution Constructs

AWS Construct Hub *(Developer Preview)*

Beyond prototypes: Real world applications with AWS Solutions Constructs

Other resources : AWS Serverless Land

https://serverlessland.com/



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Dive deeper with these resources to help you develop an effective plan for your modernization journey.

- Build modern applications on AWS e-book
- Build mobile and web apps faster e-book
- Modernize today with containers on AWS e-book
- Adopting a modern Dev+Ops model e-book
- Modern apps need modern ops e-book
- Determining the total cost of ownership: Comparing Serverless and Server-based technologies paper
- Continuous learning, continuous modernization e-book
- … and more!

https://bit.ly/3yfOvbK

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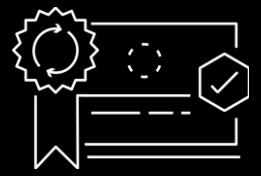

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