

AWS Builders Online Series

Modernization with containers and serverless technologies

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Agenda

1. Modern applications overview
2. Choosing a serverless compute strategy: AWS Lambda
3. Choosing a containers strategy

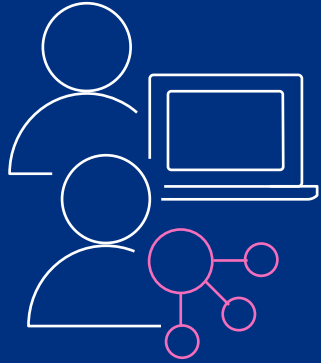




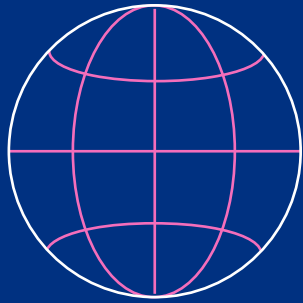
Thank you!



Modern applications



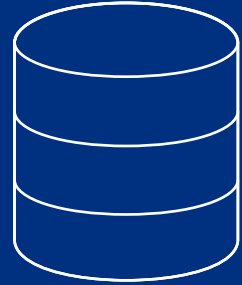
Scale to
millions of users



Global
availability

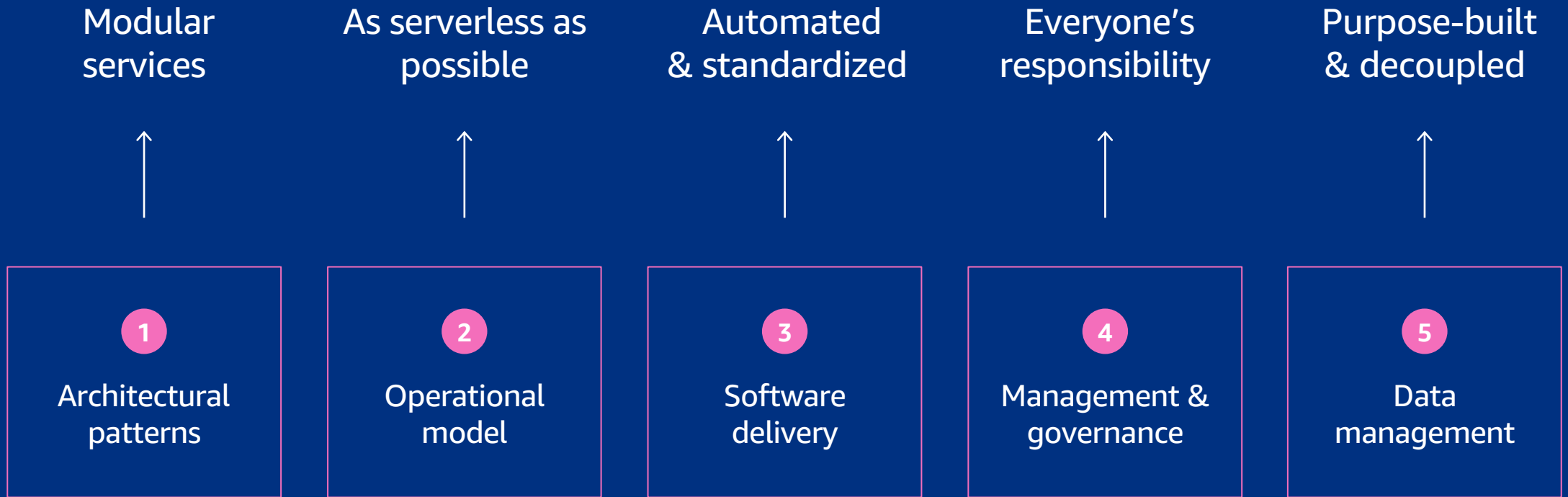


Respond
in milliseconds

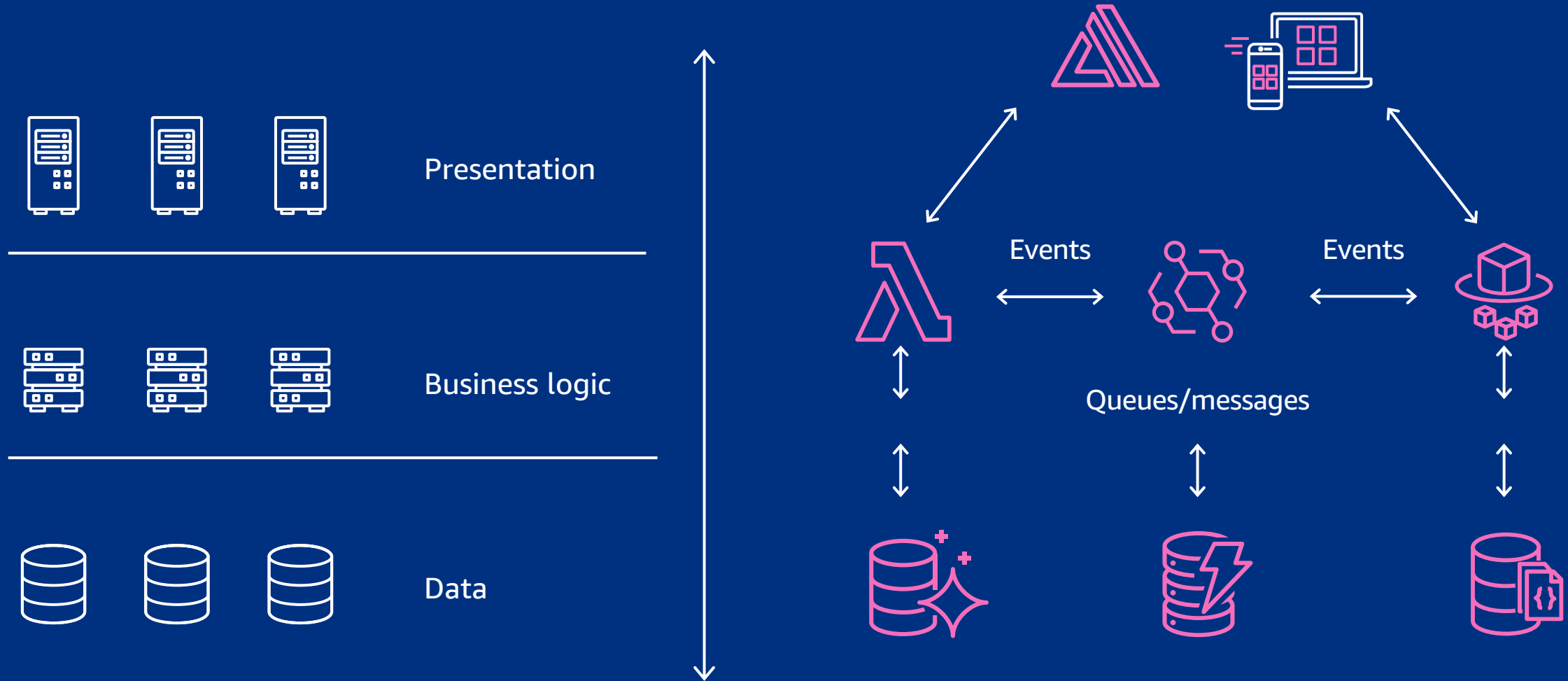


Handle
petabytes of data

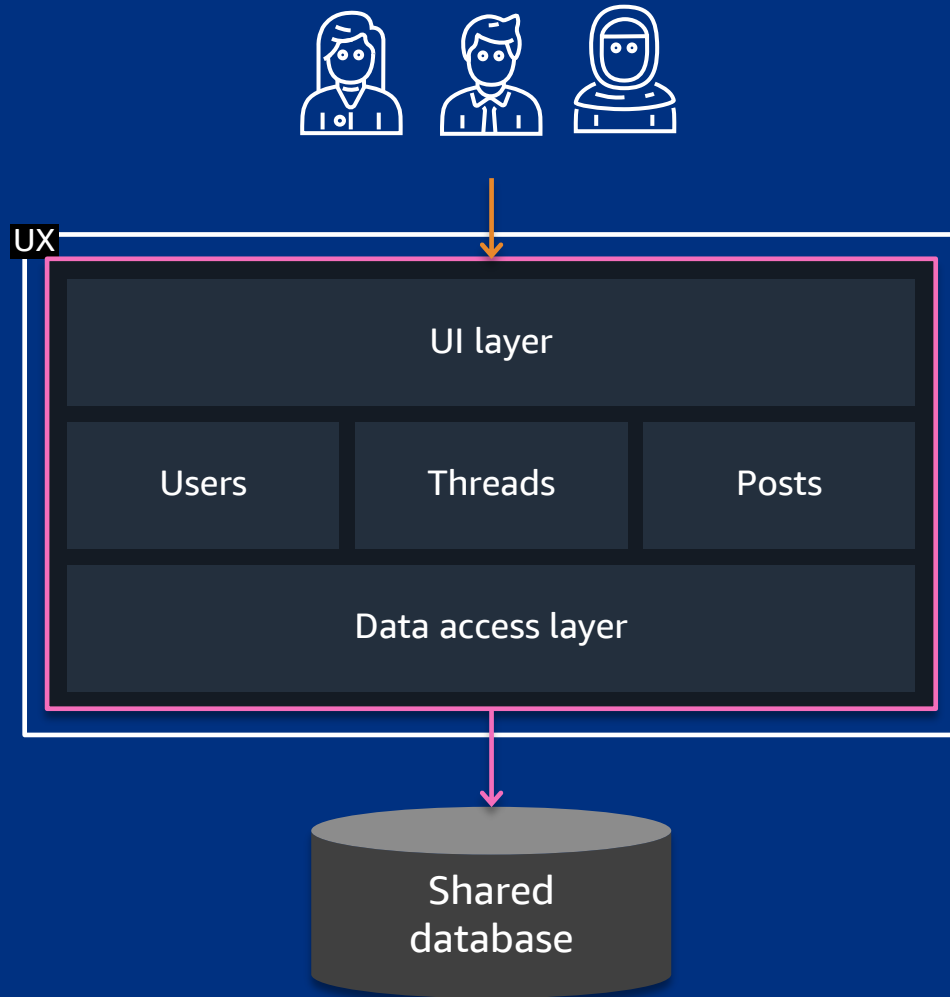
Modern application characteristics



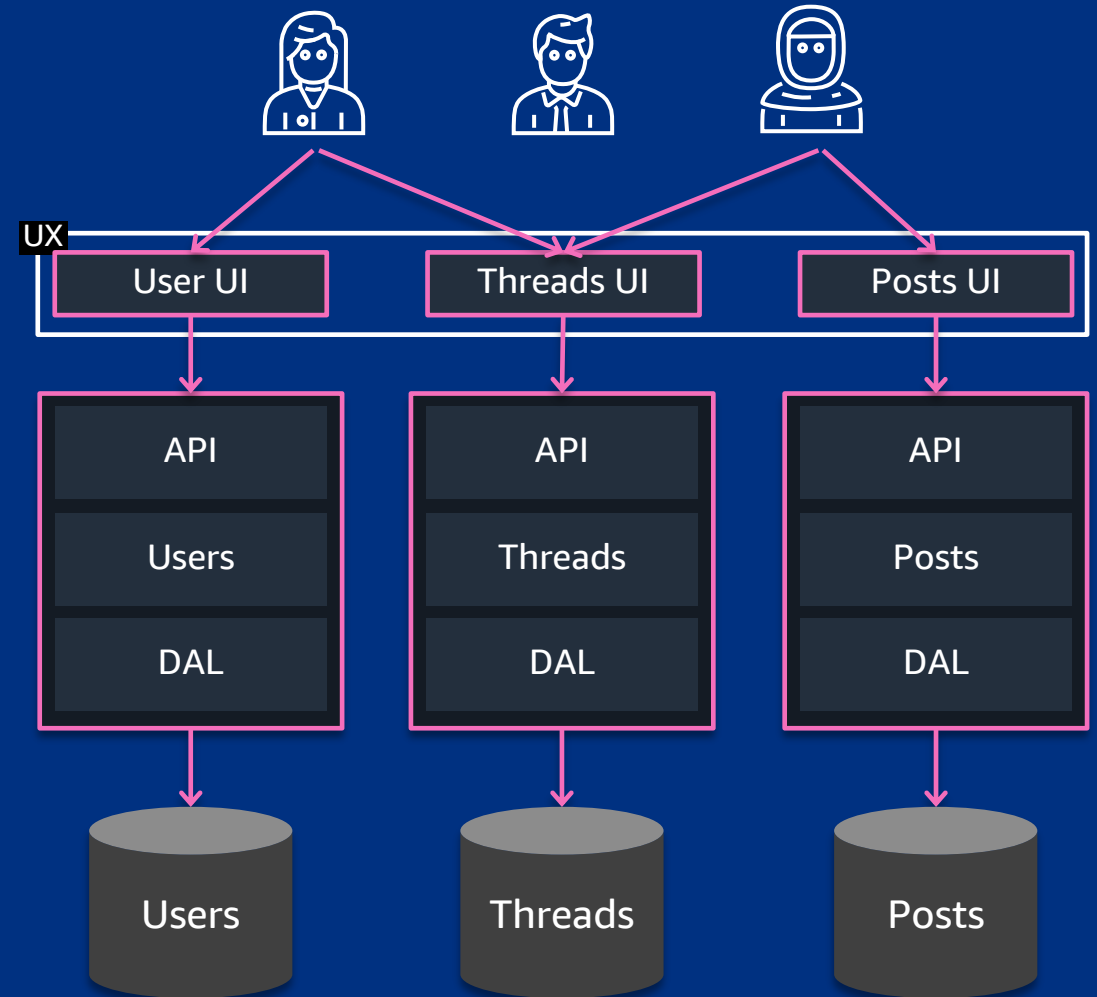
Application architecture: Modular microservices



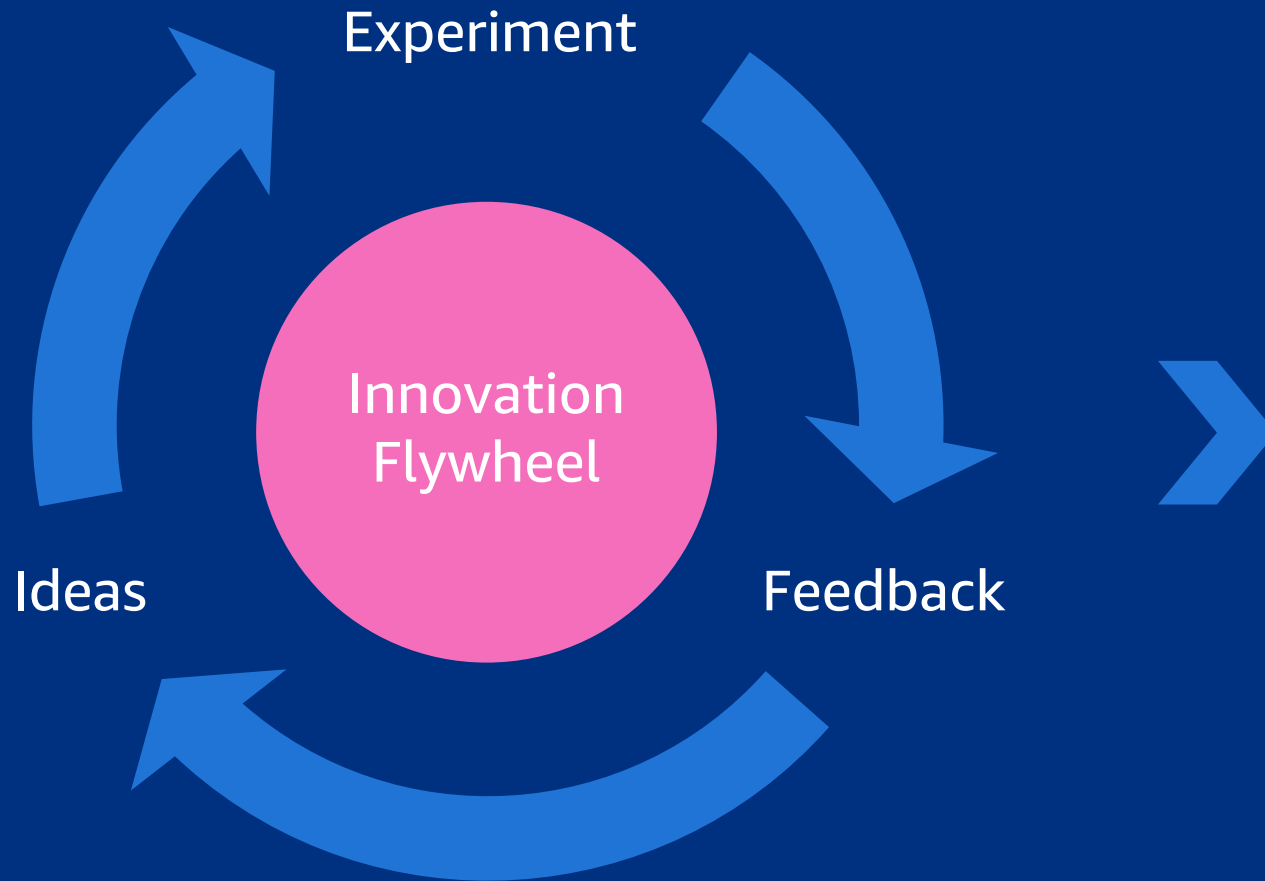
Monolith



Microservices



Microservices advantages



Implications for IT

- Modular architectures
- Faster release cycles
- Smaller units, lower risks
- Continually improving systems
- Data-driven insights
- Automation

Modernize: Refactor and re-platform

Reduce the size of
your estate*



Retire



SaaS

Move to AWS



Lift and
shift

Modernize




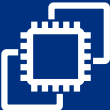


Refactor













Re-
platform

Compute and operations

		AWS manages	Customer manages
<div>More</div> <div>Opinionated</div> <div>Less</div>	<div></div> <div>AWS Lambda Serverless functions</div>	Data source integrations Physical hardware, software, networking, and facilities Provisioning	Application code
	<div></div> <div>AWS Fargate Serverless containers</div>	Container orchestration, provisioning Cluster scaling Physical hardware, host OS/kernel, networking, and facilities	Application code Data source integrations Security config and updates Network config
	<div></div> <div>Amazon ECS/EKS Container-management -as-a-service</div>	Container orchestration control plane Physical hardware software, networking, and facilities	Application code Data source integrations Work clusters Security config and updates, network config, firewall, management tasks
	<div></div> <div>Amazon EC2 Infrastructure-as-a-Service</div>	Physical hardware software, networking, and facilities	Application code Data source integrations Scaling Security config and updates Network config Management tasks

Similarities in approaches

	Containers	Serverless
Abstraction from complexity		
Fully-managed by AWS		
Broad ecosystem of partners		
Support wide range of use cases and workloads		
Deep integration with AWS infrastructure, security, and management services		

Differences in approaches

Containers

- ✓ Compute-oriented
- ✓ More easily manage infrastructure
- ✓ Infrastructure consumption-based pricing

Serverless

- ✓ Event-oriented
- ✓ Abstract away infrastructure
- ✓ Request-based pricing

Many customers run both!

Most customers use a combination

80%

of AWS container services customers
have also adopted AWS Lambda

[Learn more](#)



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Why customers choose AWS Lambda

1

Desire or need get applications and features to market rapidly

2

They have teams that focus primarily on code - not operations

3

No limitations from existing instance or container platforms

What does serverless mean?



No infrastructure provisioning,
no management



Automatic scaling

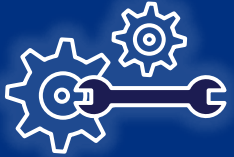


Pay-for-use



Highly available and secure

Common use cases



IT
automation



Data
processing



Event-driven
Architectures



Web
applications



Machine
learning



AWS Lambda

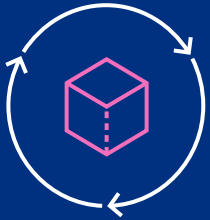
Event-driven
serverless
compute



Event

A signal that
status has
changed

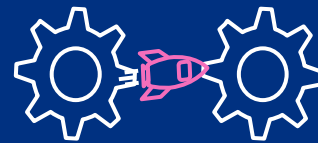
What makes an application “event-driven?”



An ‘event’ is simply
a change in state



Events trigger and
communicate between
decoupled services

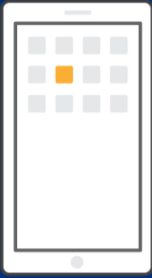


EDAs consist of a
producer, a router, and
a consumer



Decouple services can be
scaled, updated, and
deployed independently

High volume data produced continuously from a large variety of sources at a high velocity



Mobile apps



Web clickstream

```
[Wed Oct 11 14:32:52  
2018] [error] [client  
127.0.0.1] client denied  
by server configuration:  
/export/home/live/ap/htd  
ocs/test
```

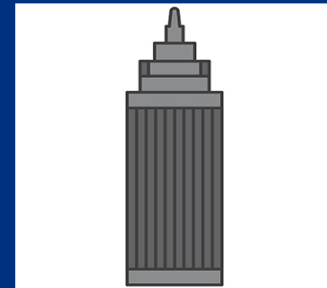
Application logs



Metering records

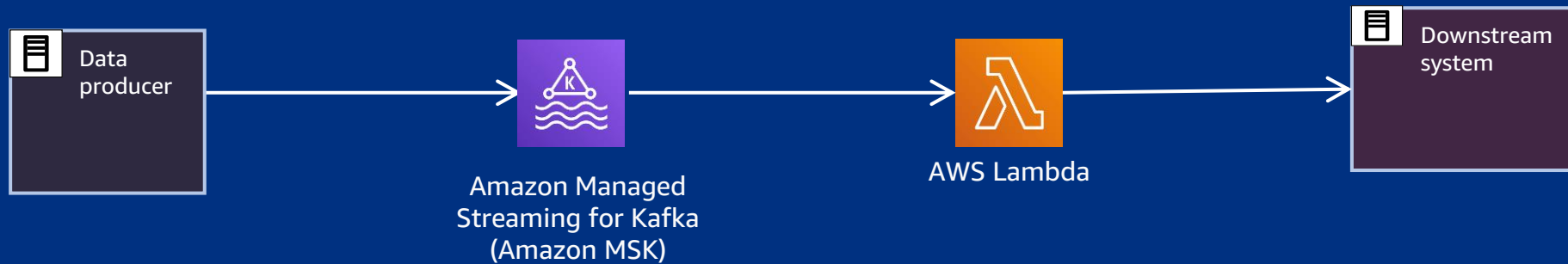
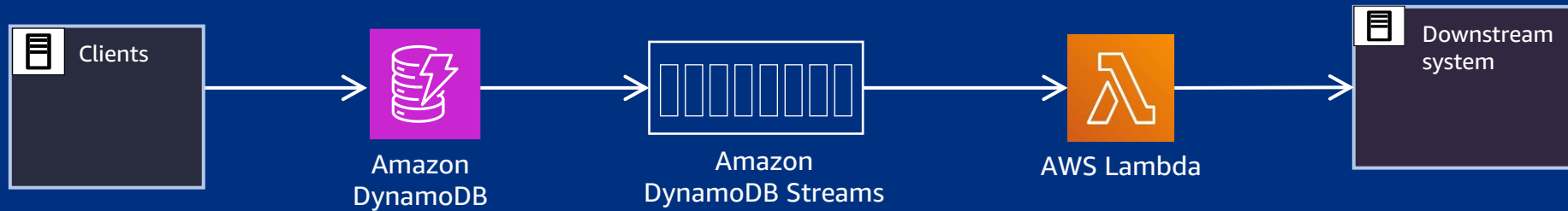


IoT sensors

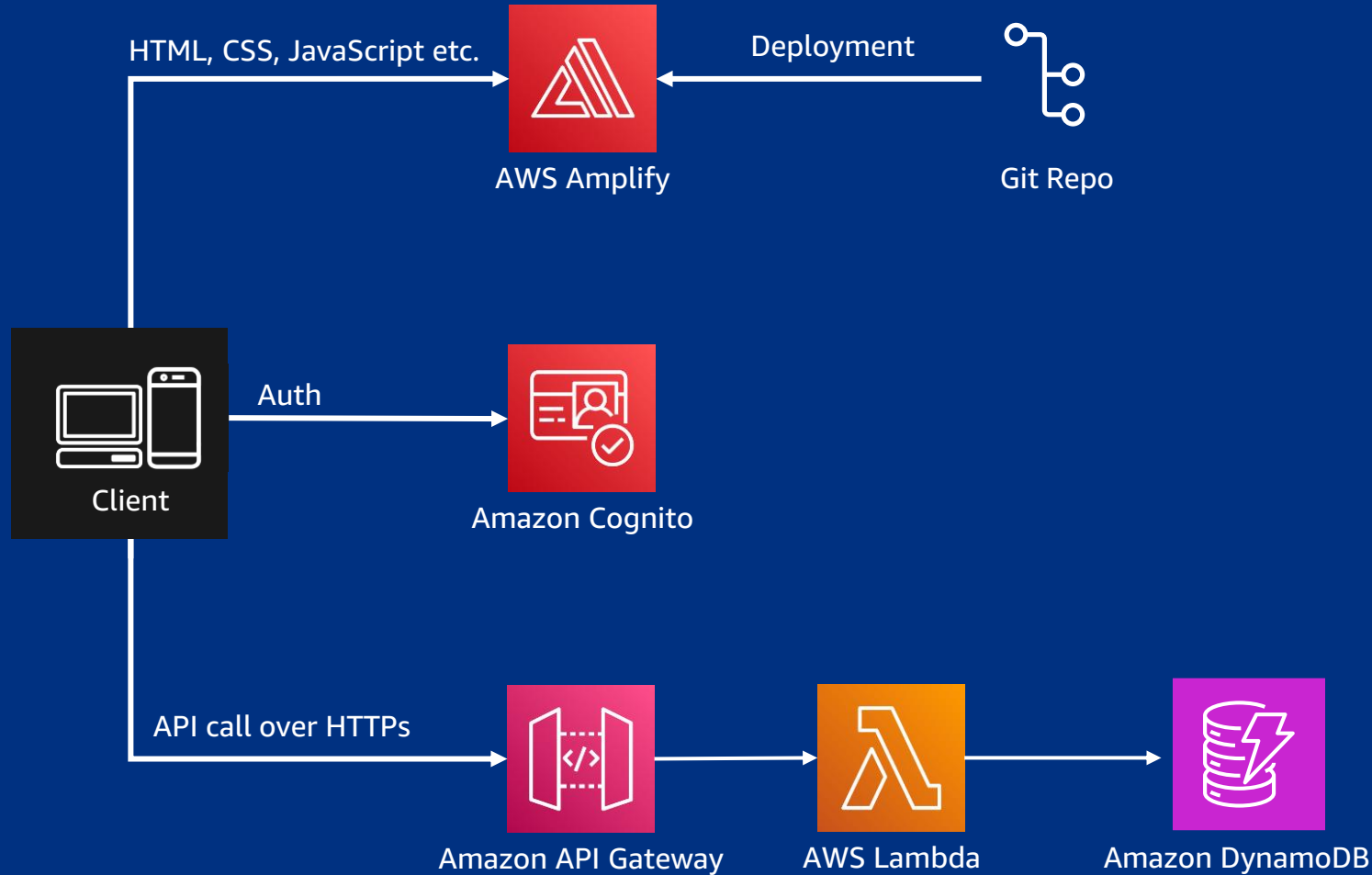


Smart buildings

Serverless stream processing



Serverless web applications



Static web hosting

AWS Amplify

HTML, CSS, JavaScript, and Image
SPA (React, Angular, VUE)
Server-side rendering (Next.js and Nuxt.js)

User management

Amazon Cognito

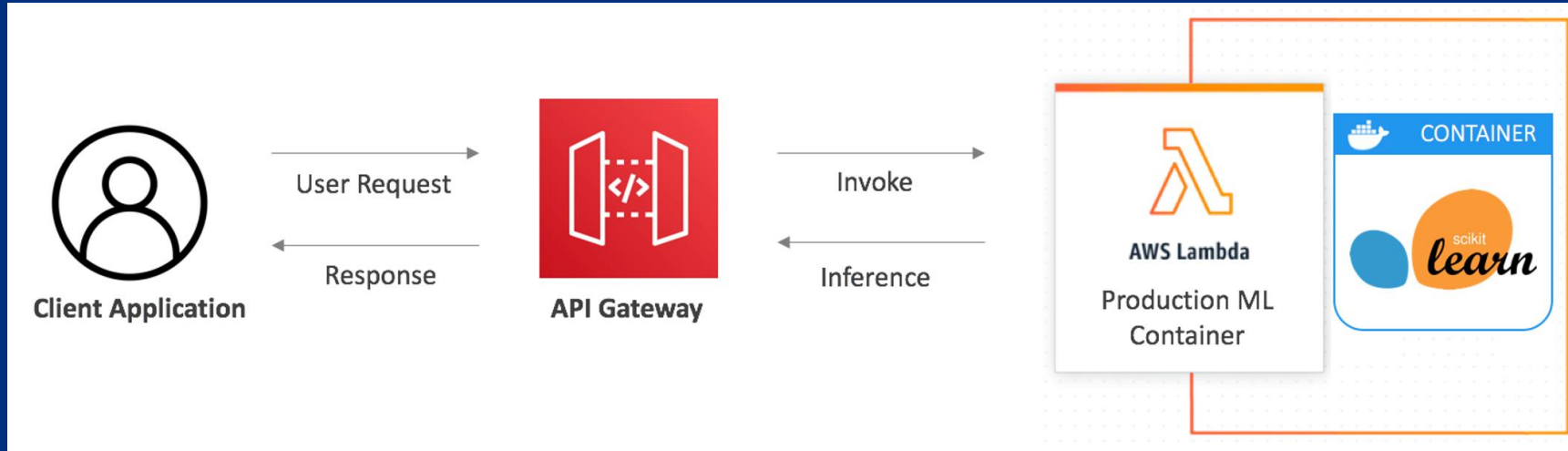
user management
authentication for backend API

Serverless backend

Amazon API Gateway, AWS Lambda

public backend API built using AWS
Lambda and Amazon API Gateway

Machine learning in AWS Lambda



- Package AWS Lambda Functions as container images - this allows for larger code/dependencies: 10Gb
- AWS SAM templates for machine learning make it easy to get started with popular frameworks such as Pytorch, TensorFlow, SciKit-Learn, XGBoost

Why customers choose containers



Familiarity or
preference - you
know what you like!

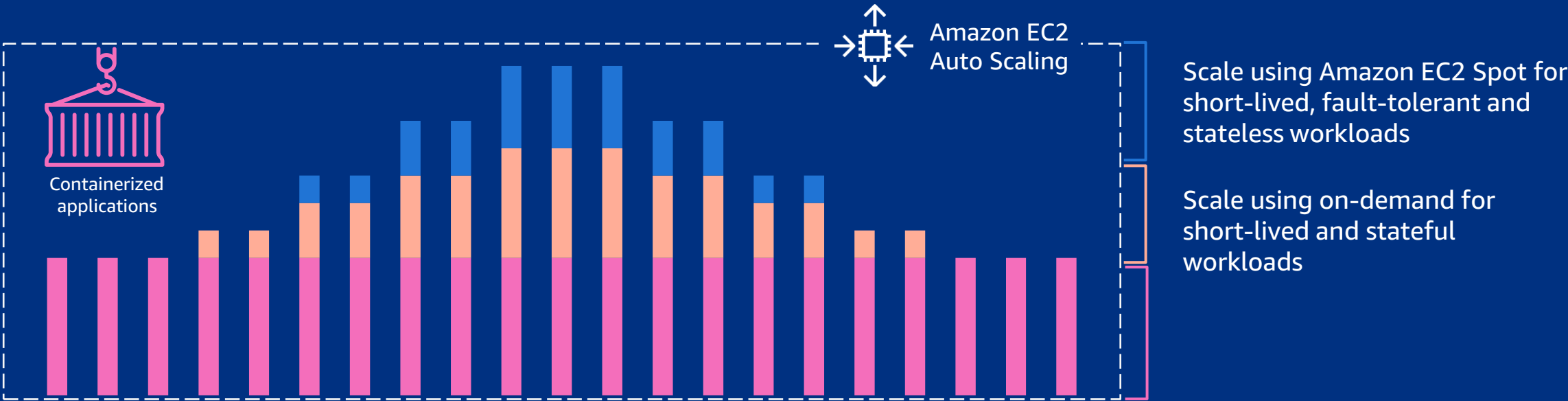


Portability and
community support



Specific requirements
for managing
and configuring
your infrastructure

Scale automatically, on-demand



AWS CONTAINER SERVICES MAKE THIS EASY AND EFFICIENT



Amazon ECS



Amazon EKS



AWS Fargate

Choosing your container environment



Amazon ECS

Powerful simplicity

- Fully managed containers orchestration
- Opinionated solution for containers
- Reduced time to build and deploy
- Fewer decisions needed

Amazon EKS

Open flexibility

- If you are invested in Kubernetes
- Vibrant ecosystem and community
- Consistent open-source APIs
- Easier to run K8s resiliently and at-scale

AWS Fargate

Serverless

- No servers to manage
- Pay only for resources when used
- Eliminate capacity planning
- Supports both Amazon EKS and Amazon ECS

Many customers run a mix of all three!

Powerful simplicity



Amazon
ECS

- AWS-opinionated way to run containers at scale
- Reduce decisions without sacrificing scale or features
- Reduce time to build, deploy, and migrate applications

Open flexibility



Amazon
EKS

- Gain agility and efficiency with AWS-optimized Kubernetes, and standardize operations everywhere
- Secure, highly available, with observability across all Kubernetes deployments
- Build with choice of solutions from the broader community around Kubernetes

Operating containers at scale is challenging

Security

Do we have vulnerabilities on our hosts?

Maintenance

How are we handling ongoing AMI management, logging, & monitoring?

Capacity

Is the size of our cluster properly sized and can we scale as-needed?

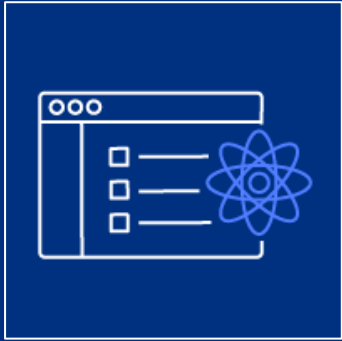
Cost

Are we being efficient with our spend?

Focus

Do we spend more time on our infrastructure than our applications?

Containers are used for a wide variety of use cases



Web applications



Data processing



Machine learning



CI/CD



Mobile applications



Gaming platforms

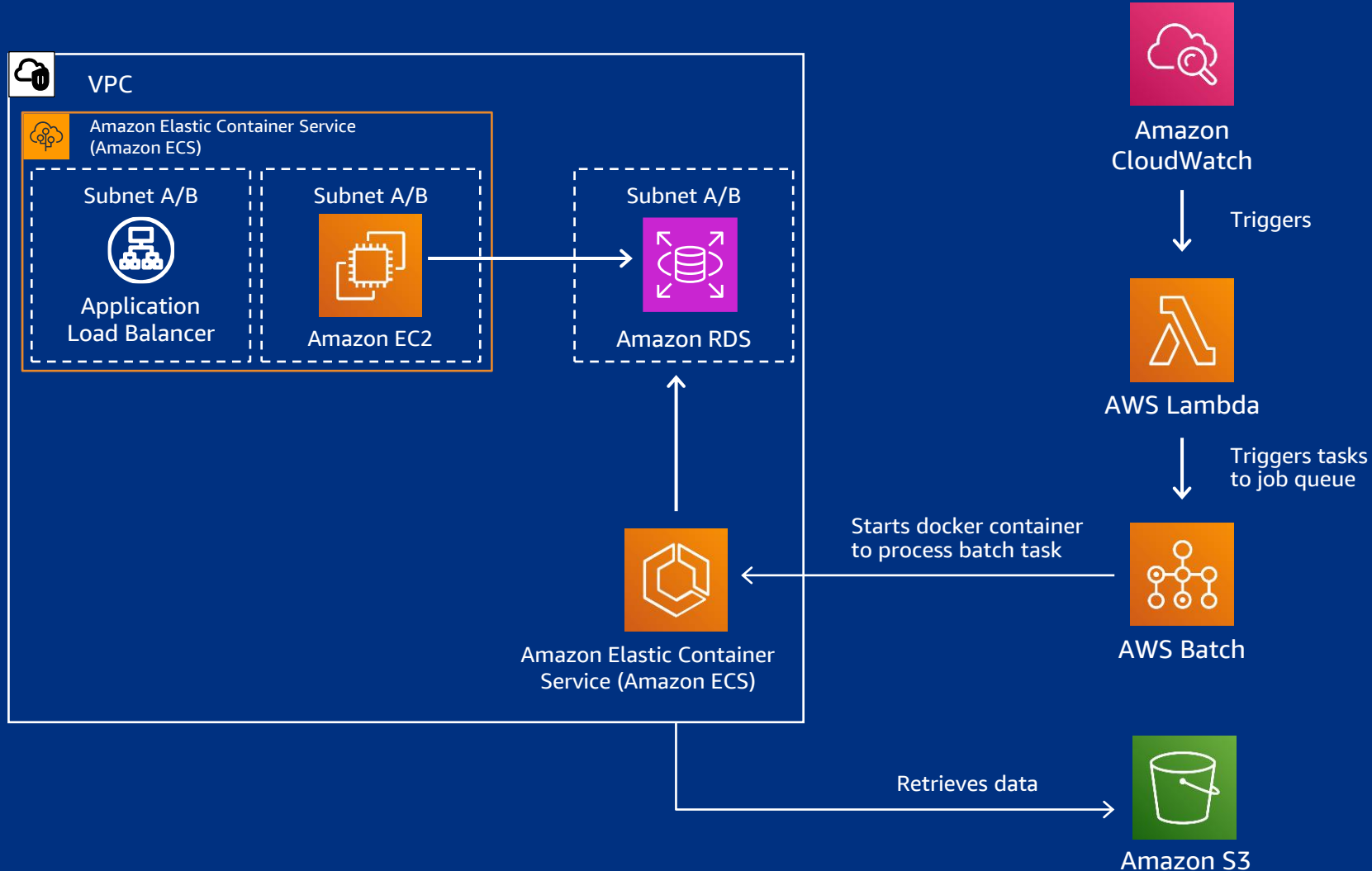


Platform as a
Service (PaaS)



Internet of Things
(IoT)

Bigger benefits when working together!





**The only constant
is change**

Businesses today face
unprecedented
business challenges
BUT they also have
incredible opportunities
to reinvent themselves

Visit the AWS Modern Applications Resource Hub

Dive deeper with these resources to help you innovate fast, reduce risk, and accelerate time to market

- Build modern applications on AWS
 - Building event-driven architectures on AWS
 - Seamless Kubernetes on premises and in the cloud
 - Unlock digital transformation by modernizing with containers
 - Unleash the power of modern apps with generative AI on AWS
 - Accelerate full-stack web and mobile app development on AWS
 - Determining the total cost of ownership: Comparing serverless and server-based technologies
- ... and more!



<https://tinyurl.com/modern-apps-aws>

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Thank you!

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