Serverless na AWS

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Overview of Serverless

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What does the future look like?

ALL THE CODE YOU EVER WRITE IS BUSINESS LOGIC

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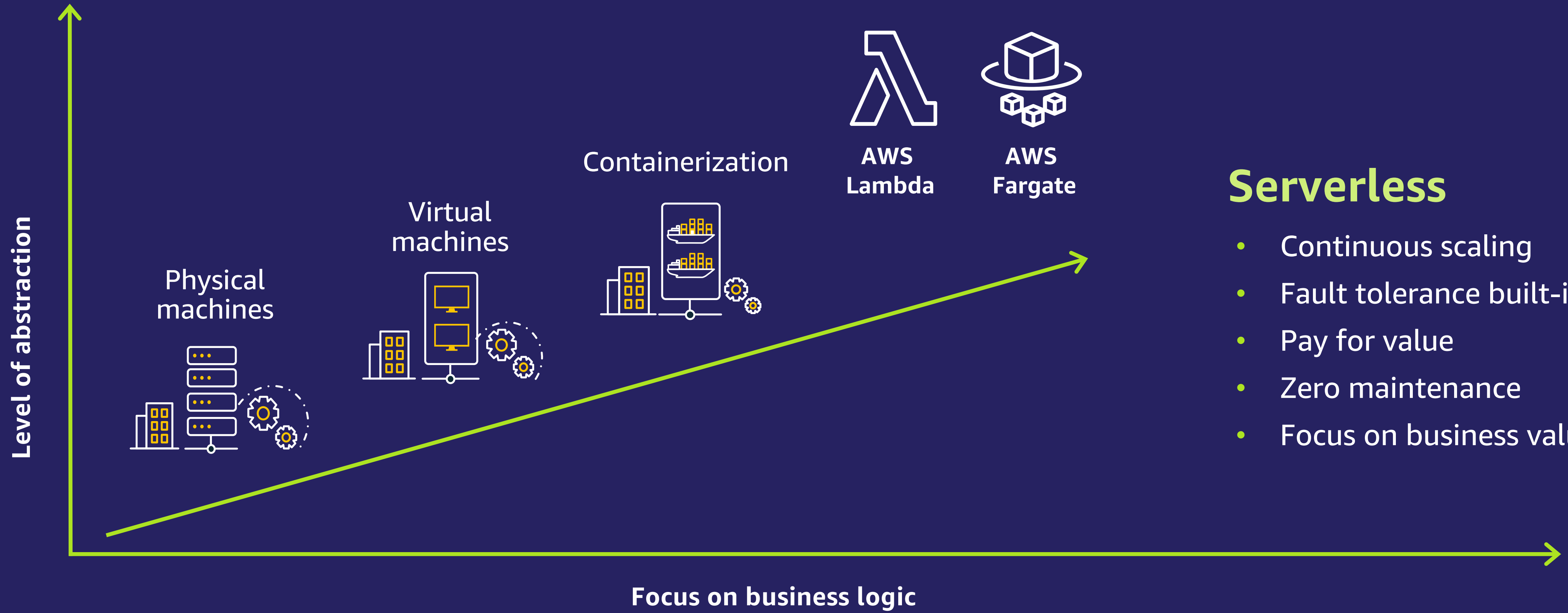
There’s a paradigm shift happening



Serverless

- Continuous scaling
- Fault tolerance built-in
- Pay for value
- Zero maintenance
- Focus on business value

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What is serverless?

No infrastructure provisioning, no management

Automatic scaling

Pay for use

Highly available and secure

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Serverless is 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

Amazon MQ

STREAMING

Amazon Kinesis

Amazon Managed Streaming for Apache Kafka (MSK)

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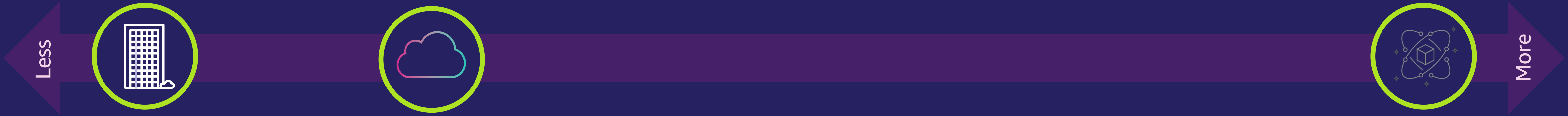
AWS operational responsibility models



Compute	Virtual machine	Amazon EC2	AWS Elastic Beanstalk		Fargate	Lambda
Databases	MySQL	MySQL on Amazon EC2	Amazon RDS for MySQL	Amazon RDS	Amazon Aurora	DynamoDB
Storage	Storage					S3
Messaging	ESBs		Amazon MQ	Amazon Kinesis		EventBridge/SQS/SNS
Analytics	Hadoop	Hadoop on EC2	EMR	Amazon OpenSearch Service		Amazon Athena

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AWS Lambda

Event-driven function-as-a-service

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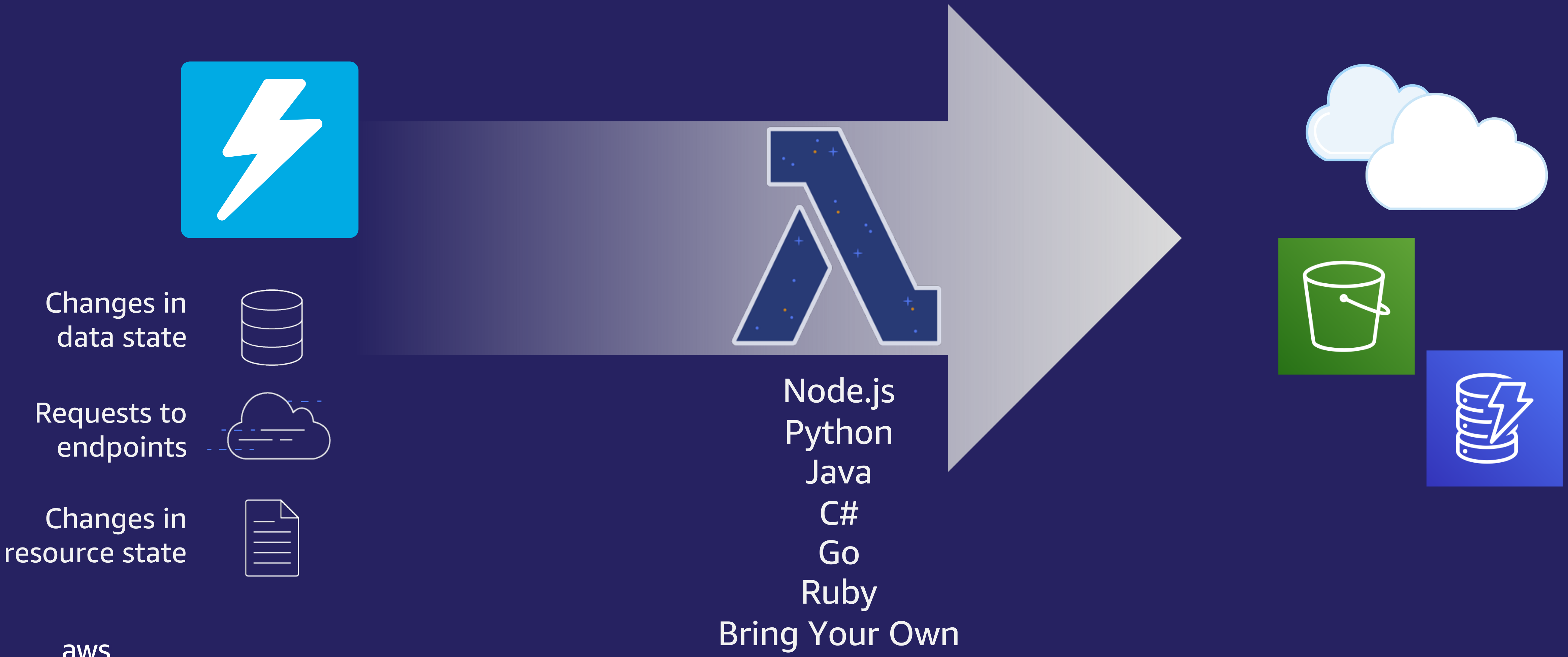
Serverless Architecture

Event Source

Function

Services / Other



Changes in data state

Requests to endpoints

Changes in resource state

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

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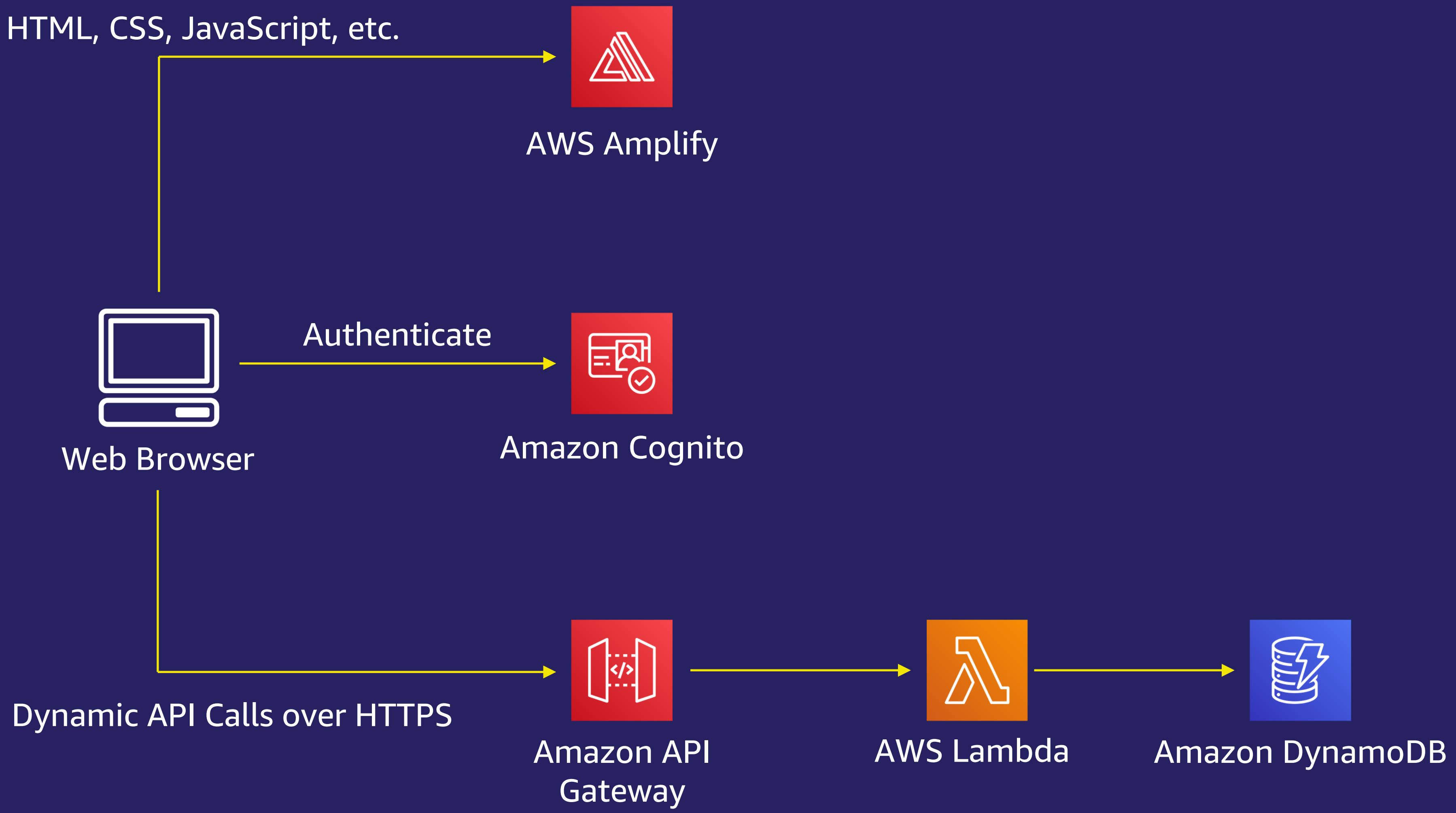
Serverless Web Architecture



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Anatomy of a Lambda Function

Handler function

- Function executed on invocation
- Processes incoming event

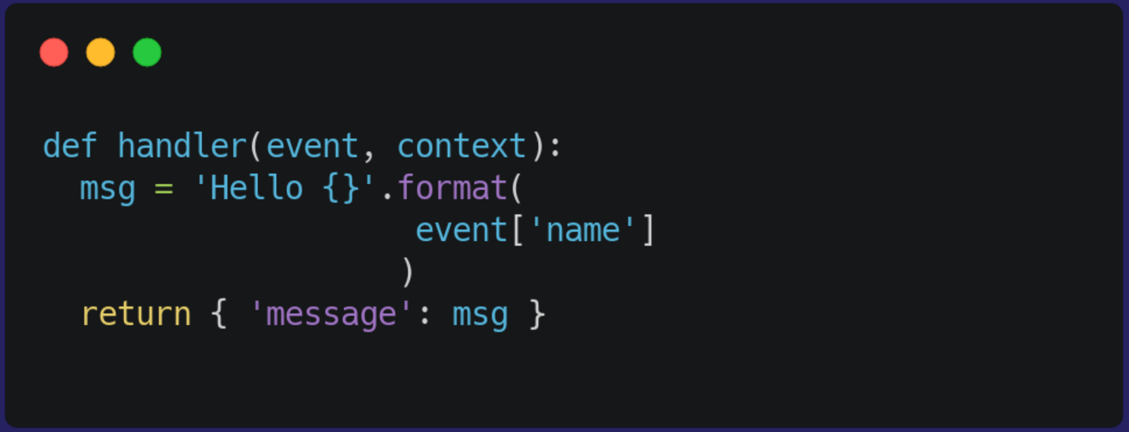
Event

- Invocation data sent to function
- Shape differs by event source

Context

- Additional information from Lambda service
- Examples: request ID, time remaining

app.py



```
def handler(event, context):
  msg = 'Hello {}'.format(
                    event['name']
                   )
  return { 'message': msg }
```

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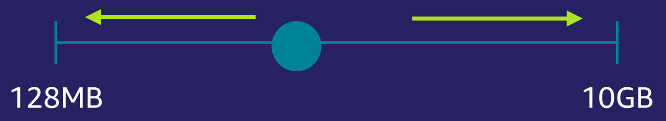
Lambda Function Configuration

Power Rating

- Select between 128MB and 10GB
- CPU and network allocated proportionally
- Power tune to balance cost and speed



Permissions Model

- Execution Role grants function access to resources via IAM
- Function Policy controls invocation

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Lambda Function Configuration

Timeout

- Up to 15 minutes
- Synchronous vs Asynchronous
- API Gateway timeout = 30 sec

Network Access

- Configure access to VPC
- Security Group rules apply
- VPC does not enhance security of function

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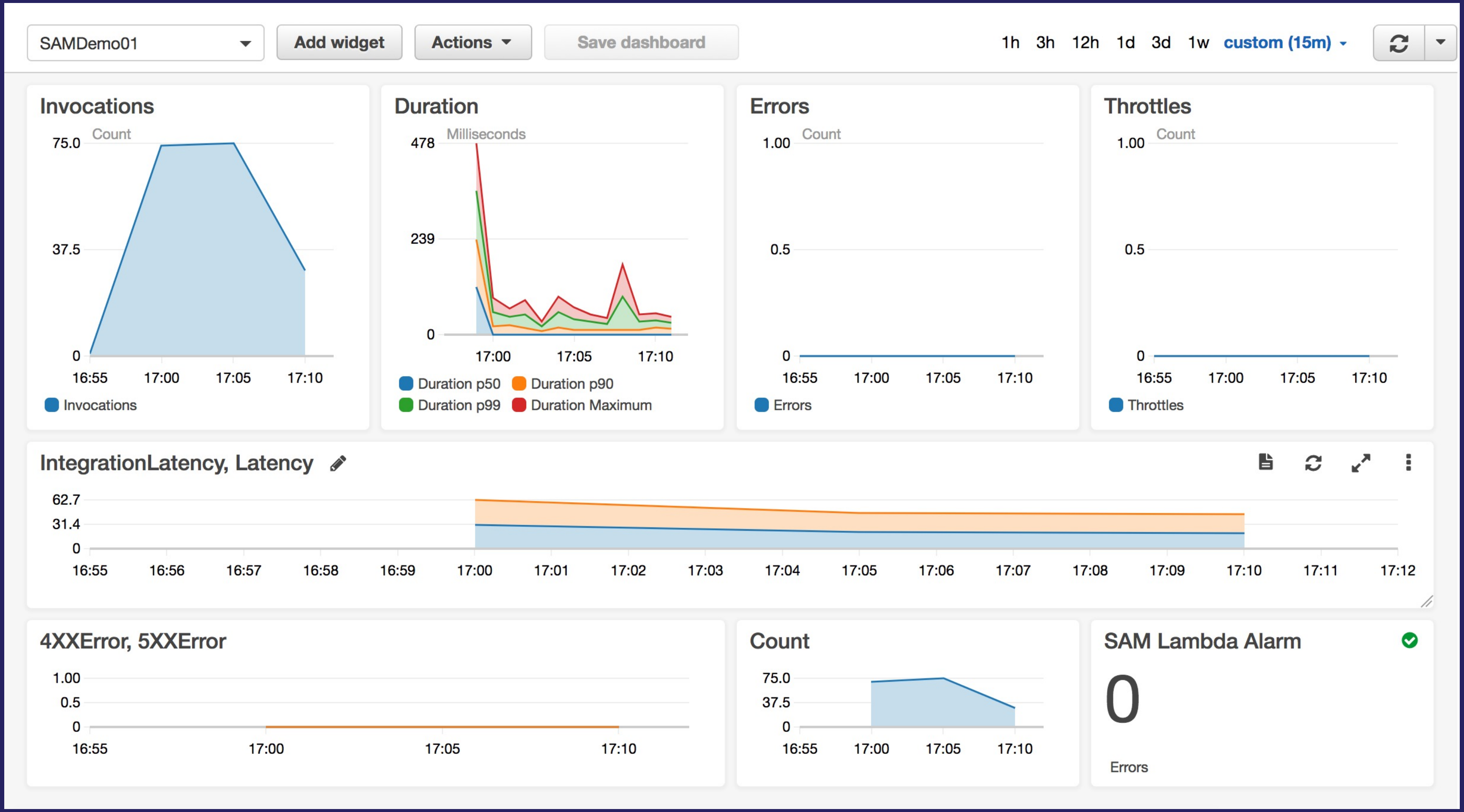
Built in monitoring



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A few items to keep in mind...

- Functions are stateless, no affinity to underlying infrastructure
- Event triggers an invocation
- Lambda can handle a wide variety of event sources
    - Depending on event source, payload differs
    - Some event sources are batched (e.g. S3, SQS)
- Lambda service manages scaling, invocation
- Lambda service team manages platform security

Build something!

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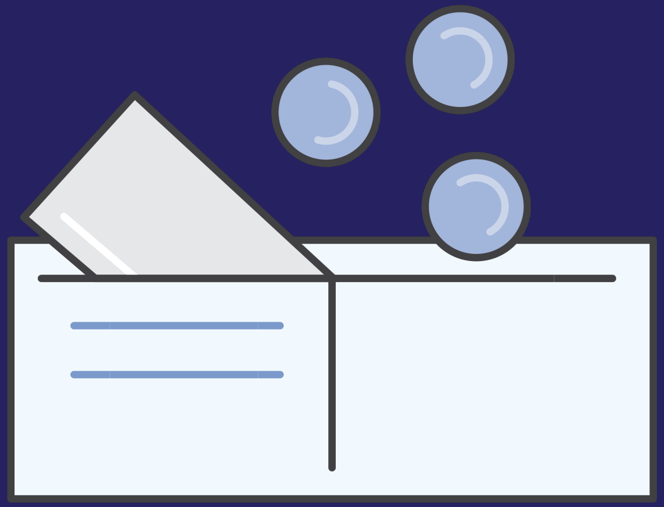
Fine-grained pricing



Free Tier

1M requests and 400,000 GBs of compute.

Every month, every customer.

- Pay for value
  - Priced by power rating
  - Charged in **1ms** increments
  - Low per-request charge
- No minimum
- Never pay for idle

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Amazon API Gateway

Build and manage application interfaces

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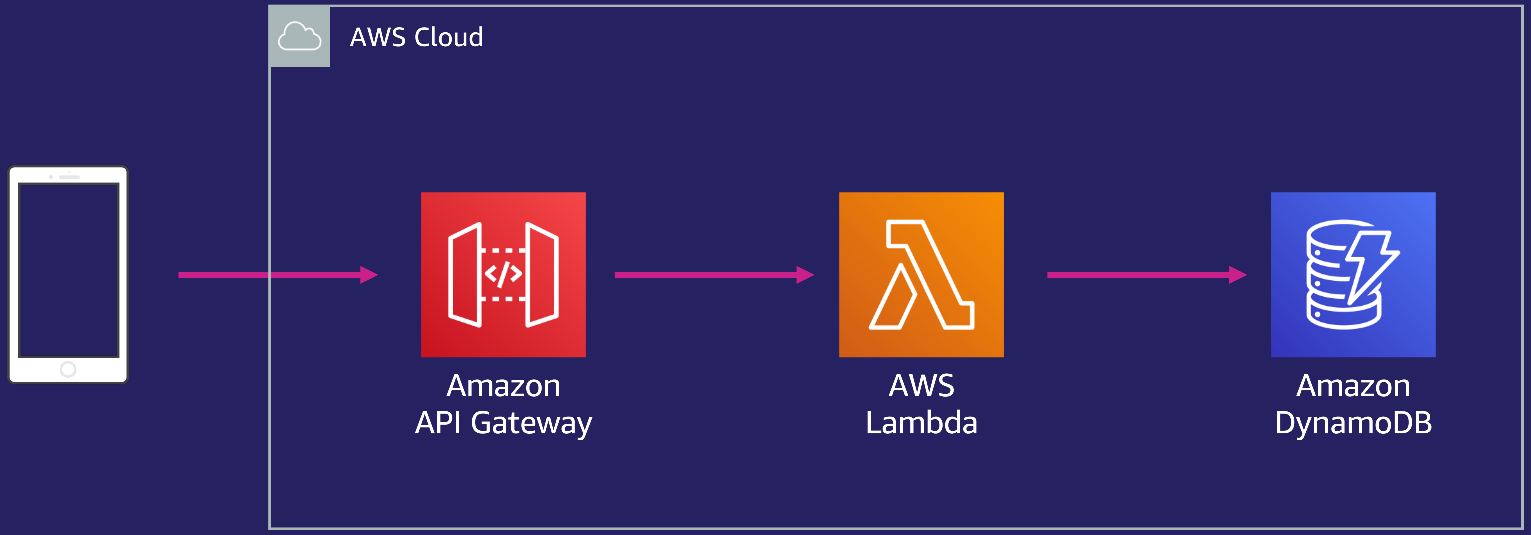
API Gateway is a front door...



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…and alleviates common concerns so developers can focus on business logic

- Throttling
- Caching
- Authorization
- API Keys
- Usage Plans
- Request/Response Mapping

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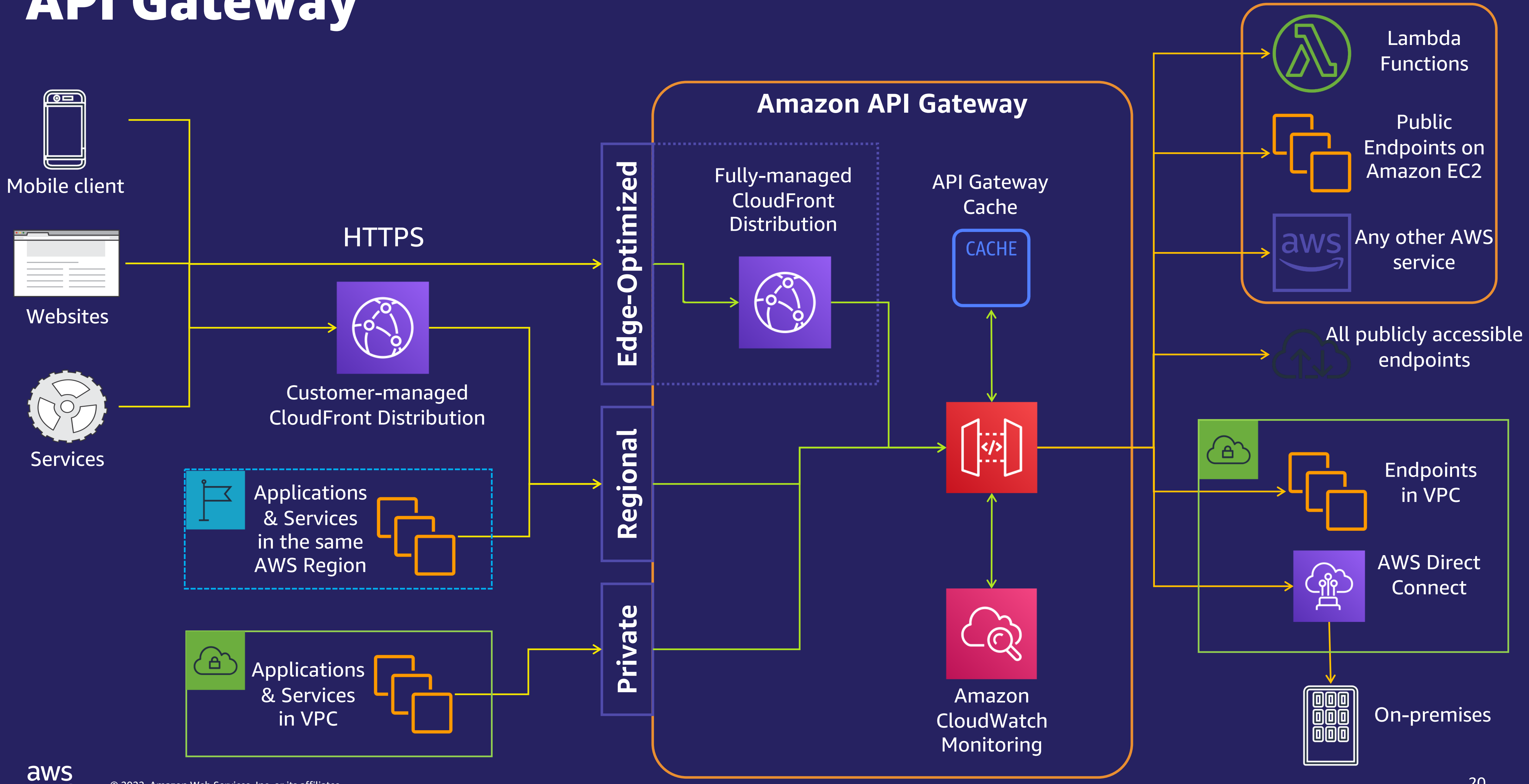
API Gateway


Mobile client
Websites
Services
HTTPS
Customer-managed CloudFront Distribution
Applications & Services in the same AWS Region
Applications & Services in VPC
Edge-Optimized
Regional
Private
Amazon API Gateway
Fully-managed CloudFront Distribution
API Gateway Cache
CACHE
Amazon CloudWatch Monitoring
Lambda Functions
Public Endpoints on Amazon EC2
aws
Any other AWS service
All publicly accessible endpoints
Endpoints in VPC
AWS Direct Connect
On-premises

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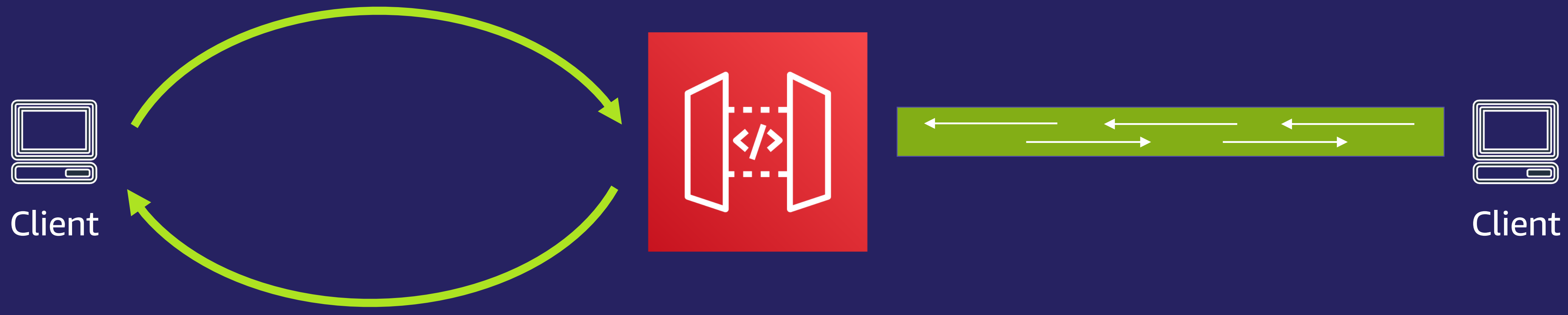
Support for multiple API types

RESTful: HTTP APIs & REST APIs

WebSocket APIs



- Request / Response
- HTTP Methods like GET, POST, etc.
- Short-lived communication
- Stateless

- Serverless WebSocket
- Two-way communication channel
- Long-lived communication
- Stateful

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REST versus WebSocket APIs

REST

- Web services over HTTP
- Flexible
- Stateless
- Two flavors:
  - HTTP API (faster, cheaper)
  - REST API (more features)

WebSocket

- Two-way communication between application and clients
- Persistent connection, stateful
- Useful for:
  - Chat
  - Gaming
  - Data streaming
  - Real-time updates

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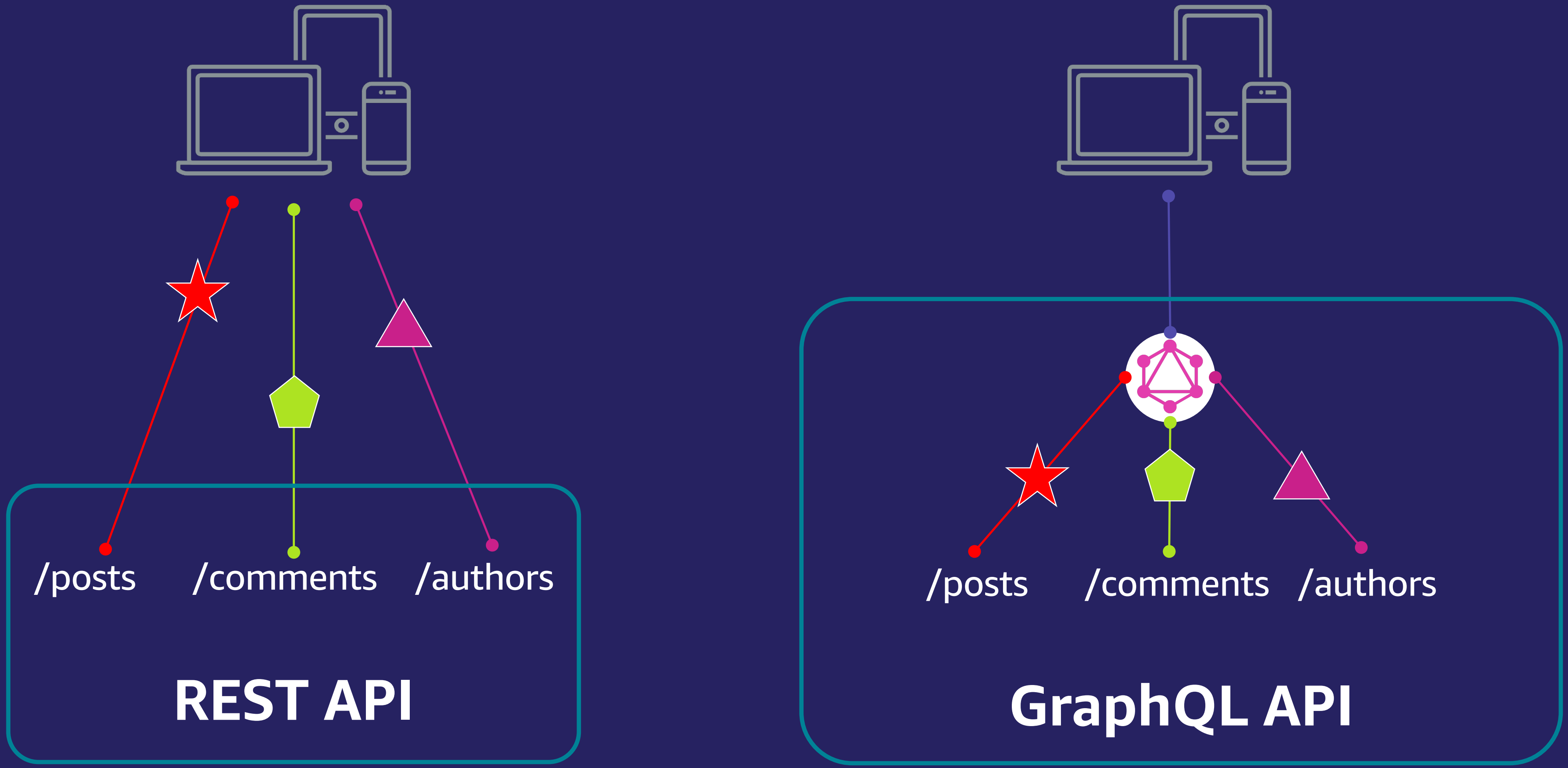
Or consider GraphQL for data-heavy applications



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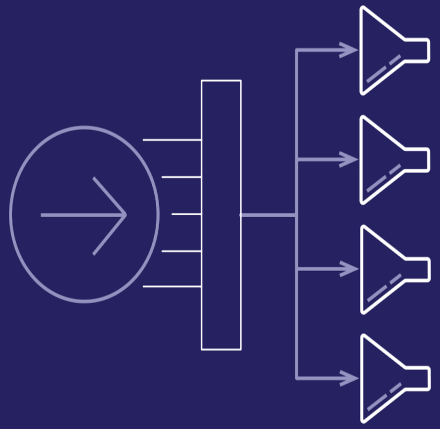
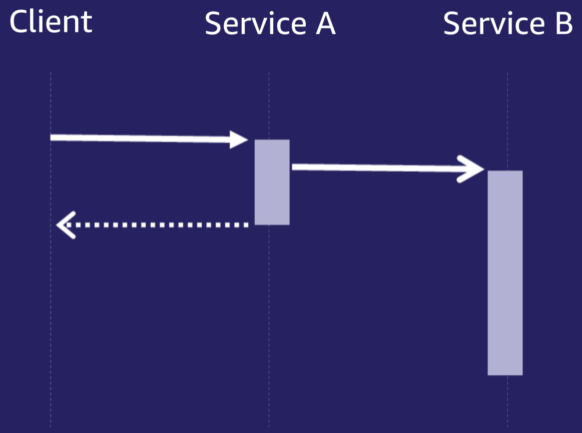
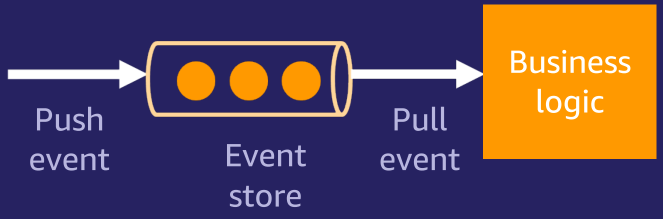
Event-driven architectures drive reliability and scalability







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

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Events enable interaction between services

MANAGED SERVICES PROVIDE ROUTING, STORAGE, AND DISTRIBUTION OF EVENTS

Amazon SQS

Messaging

Durable and scalable
Fully managed
Comprehensive security

Amazon EventBridge

Eventing

Event filtering
Managed and scalable
SaaS integration

Amazon SNS

Eventing

Performance at scale
Fully managed
Enterprise-ready

AWS Step Functions

Orchestration

Sequencing
Parallel execution
State management

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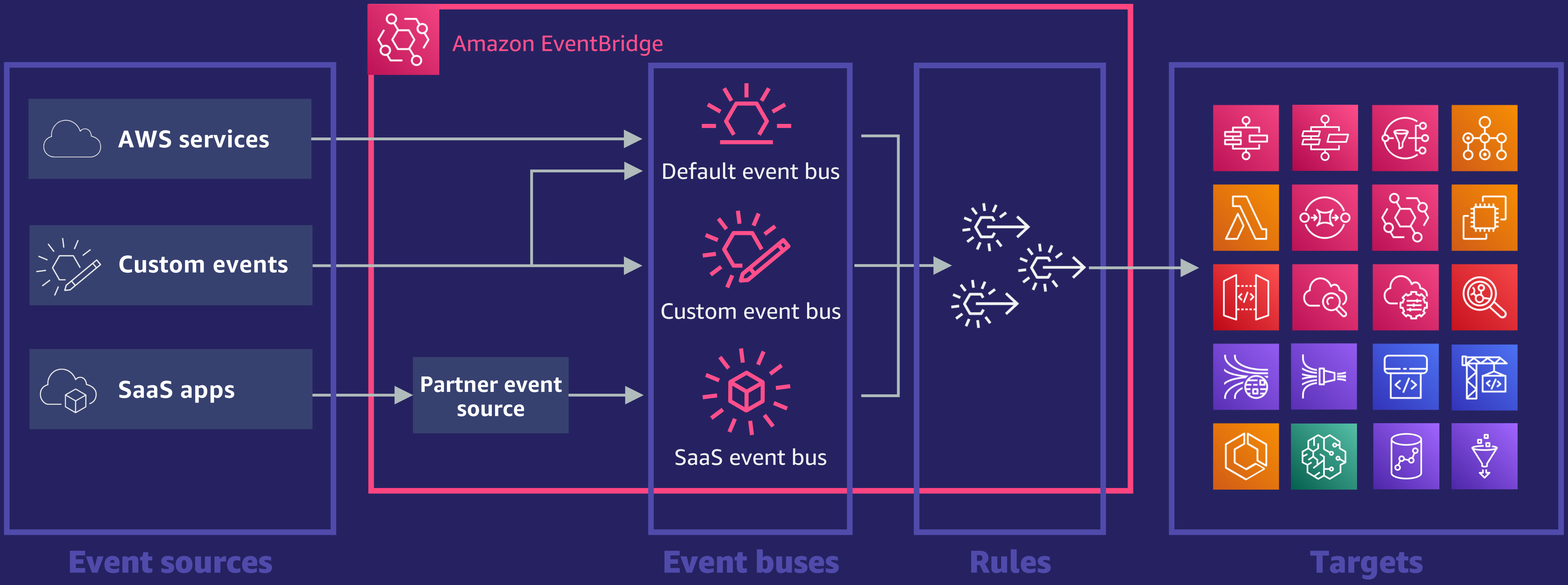
Amazon EventBridge architecture



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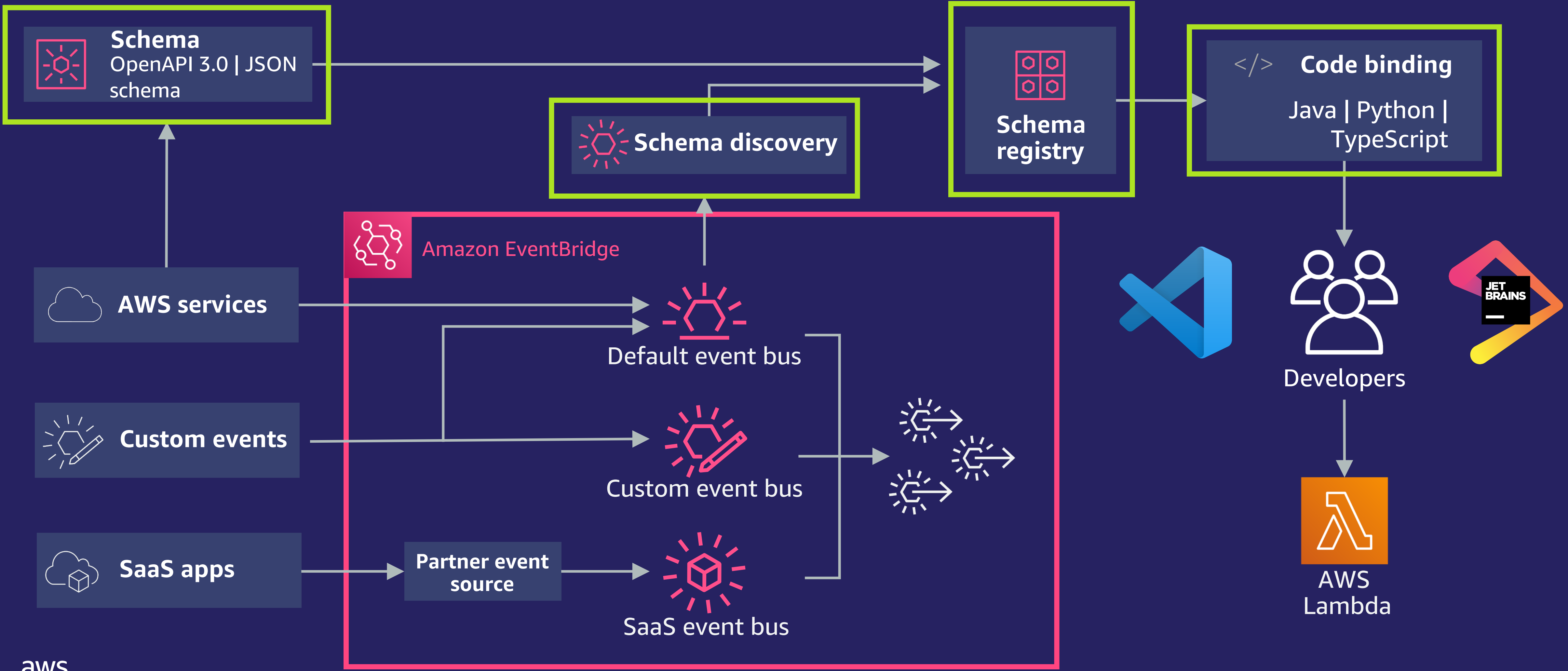
Amazon EventBridge Schema Registry



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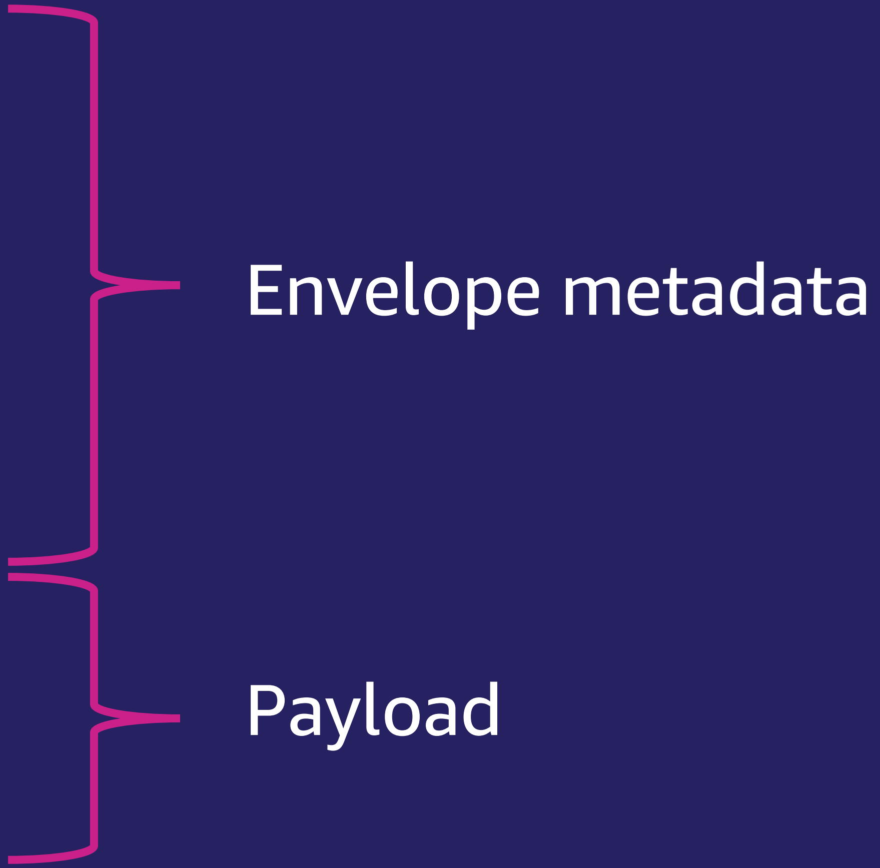
Anatomy of an EventBridge event

```
{
    "version": "0",
    "id": "adeacade-c34c-ce58-c4a0-74f106398c4e",
    "account": "123456789012",
    "region": "us-east-1",
    "time": "2019-12-02T21:46:19Z",
    "source": "order-service",
    "detail-type": "New Order",
    "resources": [],
    "detail": {
        "orderId": "cfb2ae566f9b",
        "customerId": "C12345",
        ...
    }
}
```



Envelope metadata

Payload

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When should I use serverless?

An age old question

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Serverless fits numerous use cases

Typical early serverless uses include:

- IT Automation
- Microservices
- Data processing

If the workload is event-driven, stateless, and can be performed in under 15 minutes … it may be a good fit for serverless

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Keep learning!

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