AWS Builders Online Series

Getting started with serverless applications

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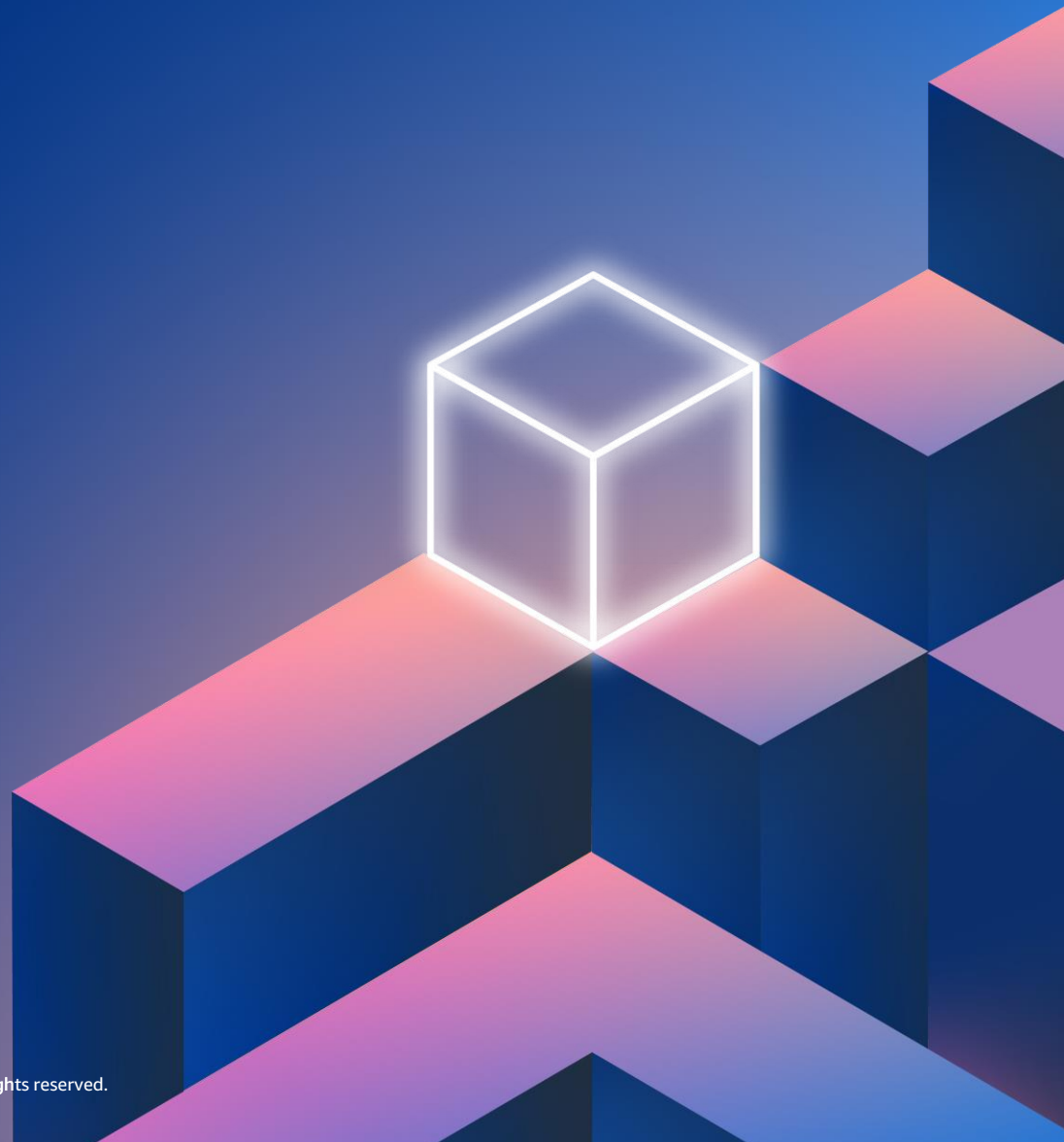
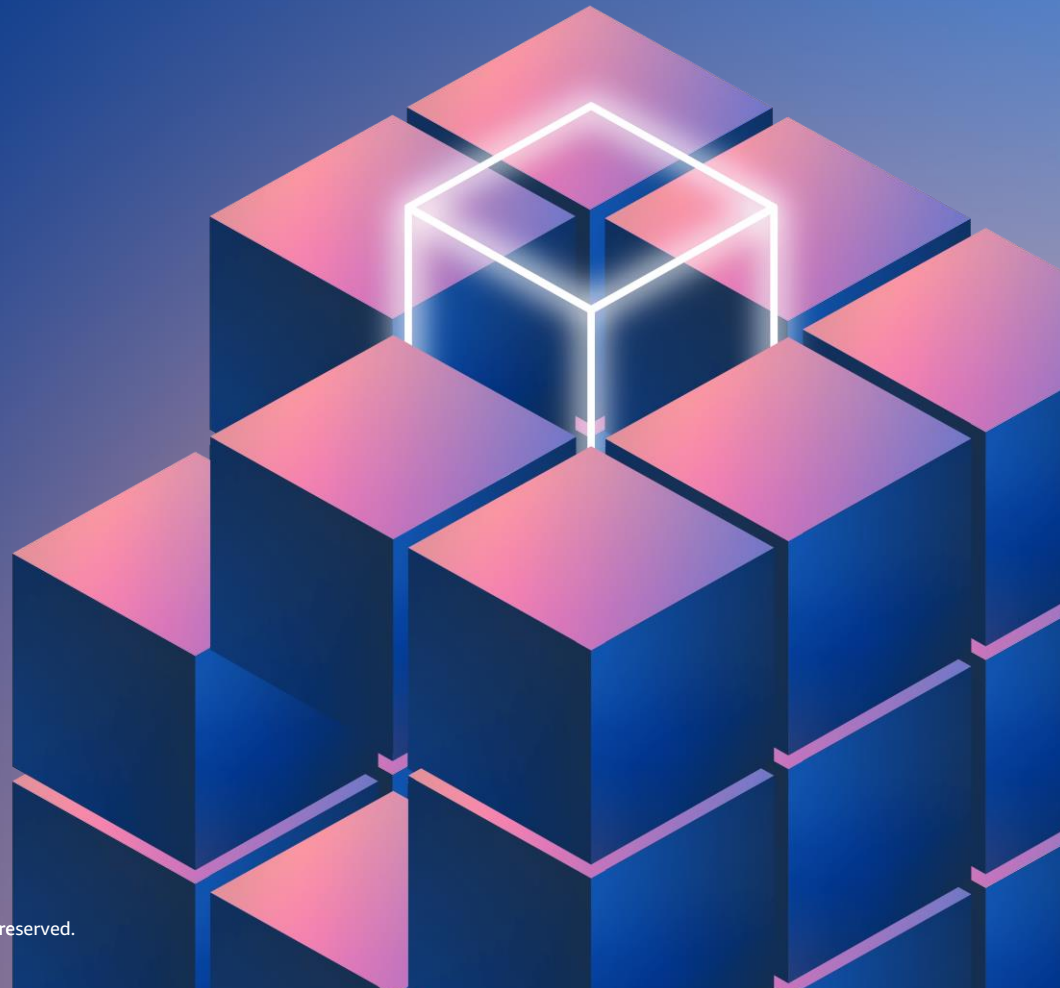
Amazon Web Services

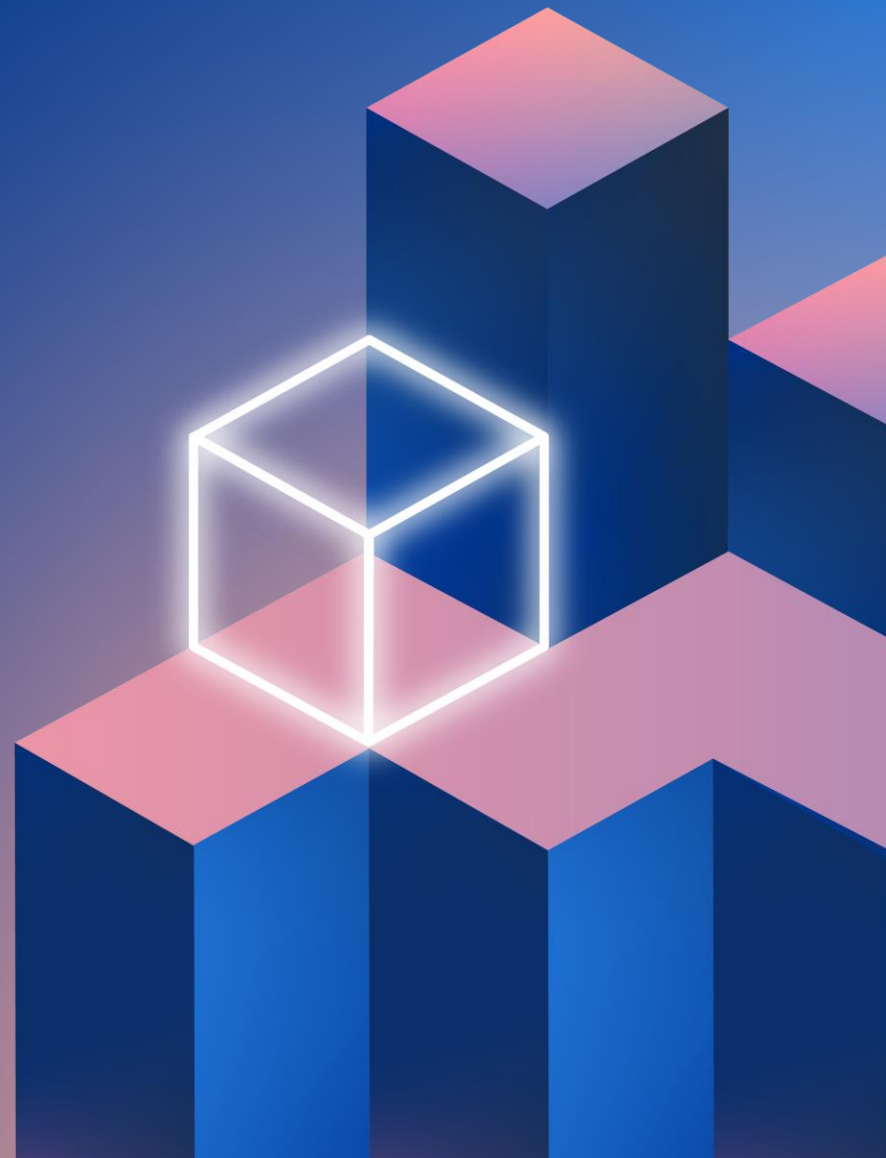


Agenda

- Introduction to Serverless
- AWS Lambda
- AWS Serverless Application Model (SAM)
- Demo: Serverless Application

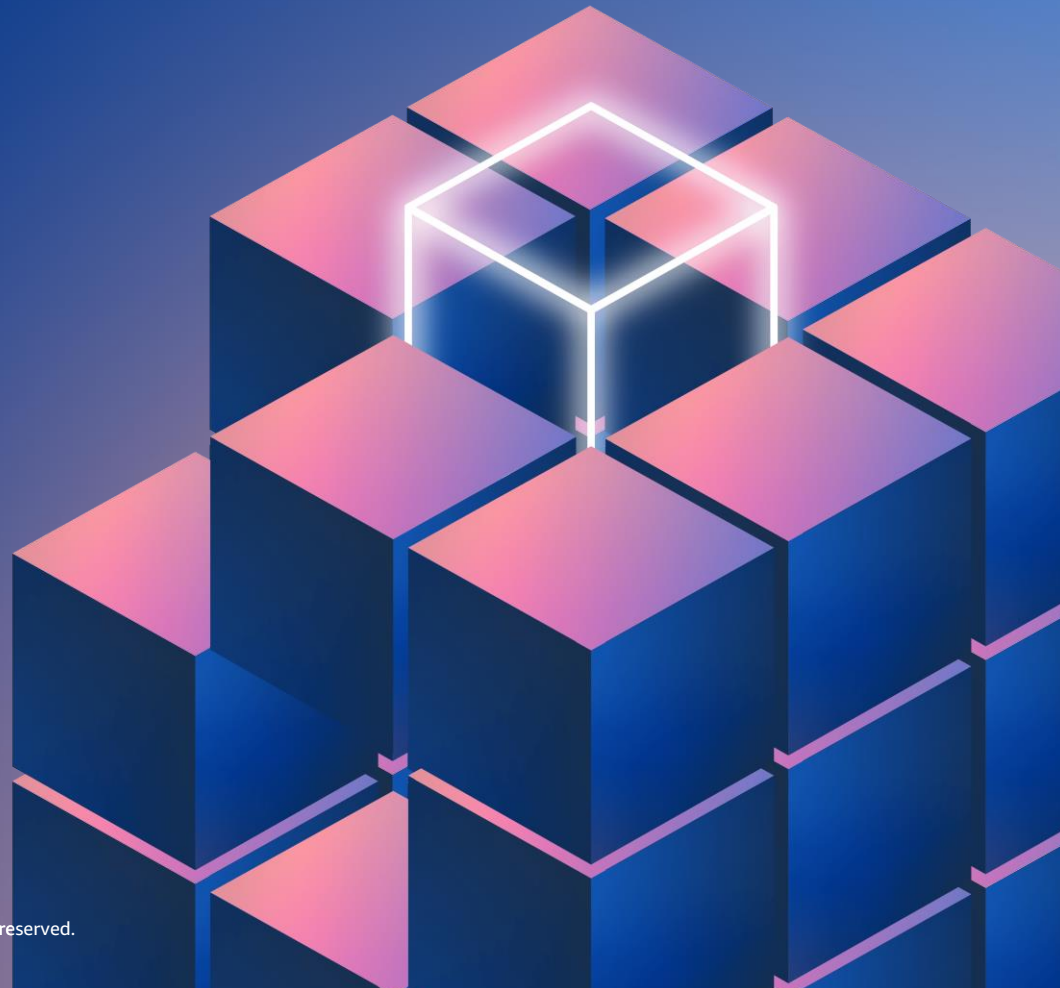


Introduction to Serverless

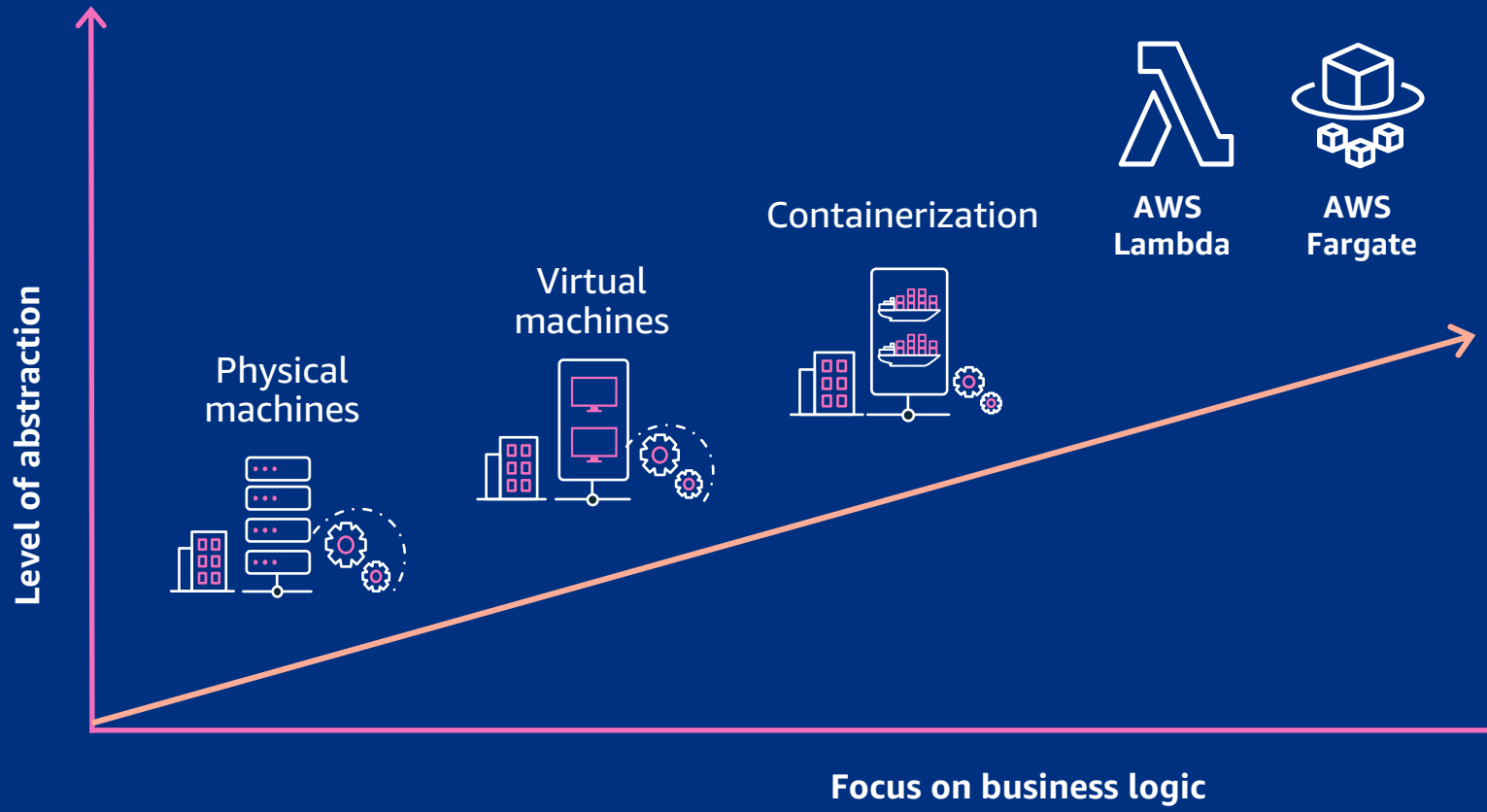


What does the future look like?

ALL THE CODE YOU EVER WRITE IS BUSINESS LOGIC.



There's a paradigm shift happening



Serverless

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

What is serverless?

No infrastructure provisioning, no management

Automatic scaling

Pay for use

Highly available and secure

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


AWS AppSync


AWS Step Functions

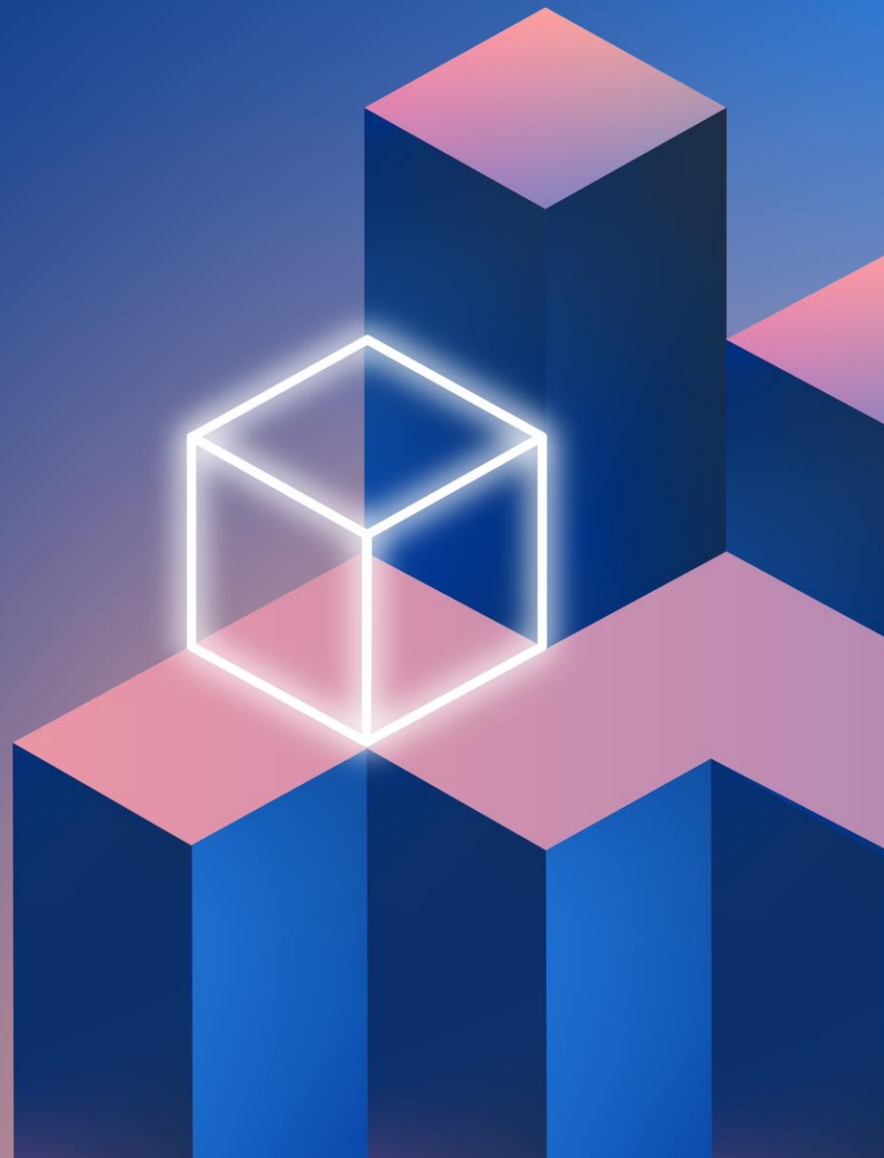
STREAMING


Amazon Kinesis

Amazon Managed Streaming for Apache Kafka (MSK)

AWS Lambda

Event-driven function-as-a-service



Lambda invocation flow

Event Source

Changes in data state

Requests to endpoints

Changes in resource state

Function

Node.js
Python
Java
C#
Ruby
Bring Your Own

Services / Other

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

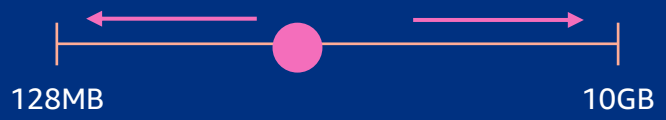
app.py

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

Lambda Function Configuration

Power Rating

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



https://s12d.com/lambda-tuning

Permissions Model

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

Lambda Function Configuration

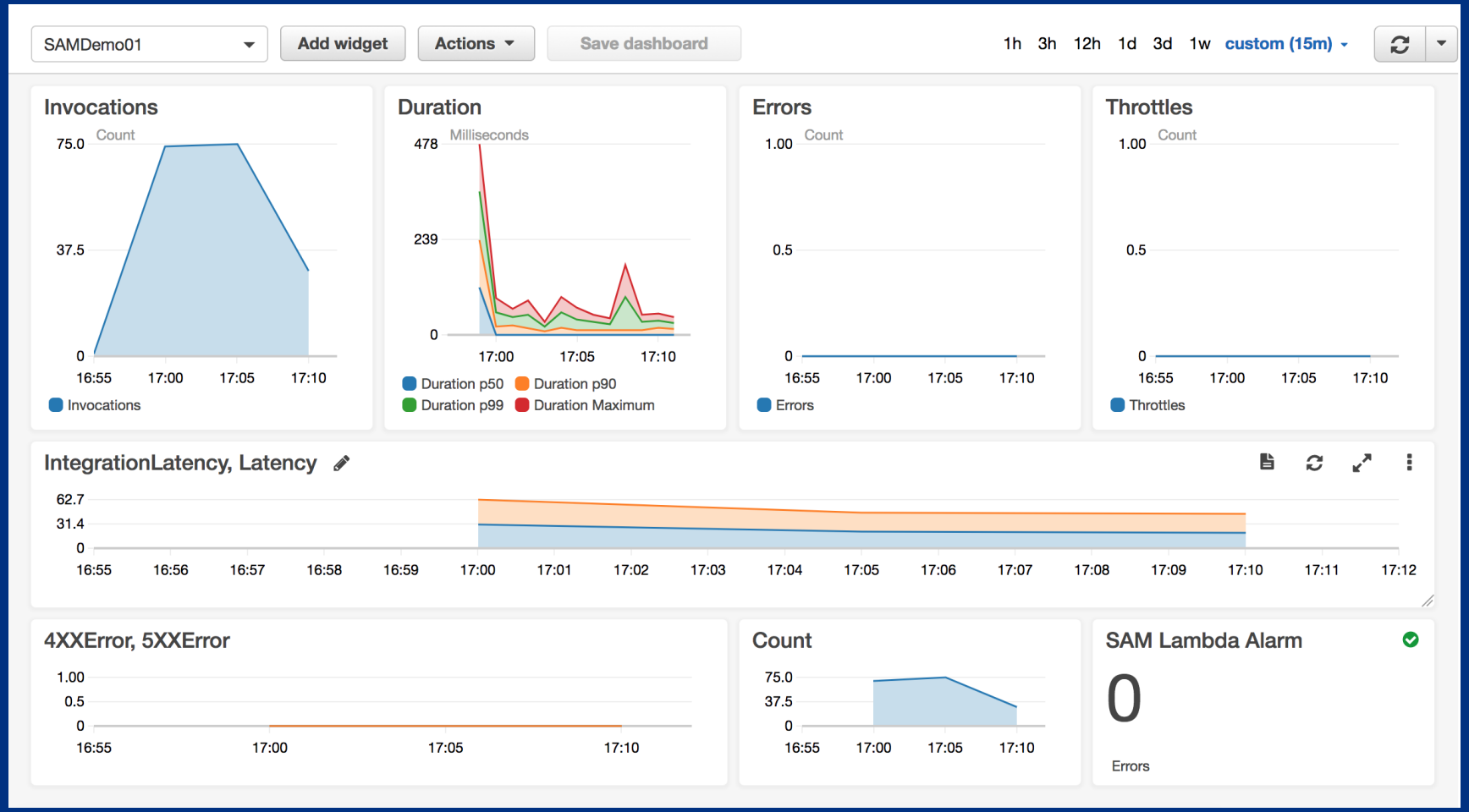
Timeout

- Up to 15 minutes
- API Gateway timeout = 29 sec

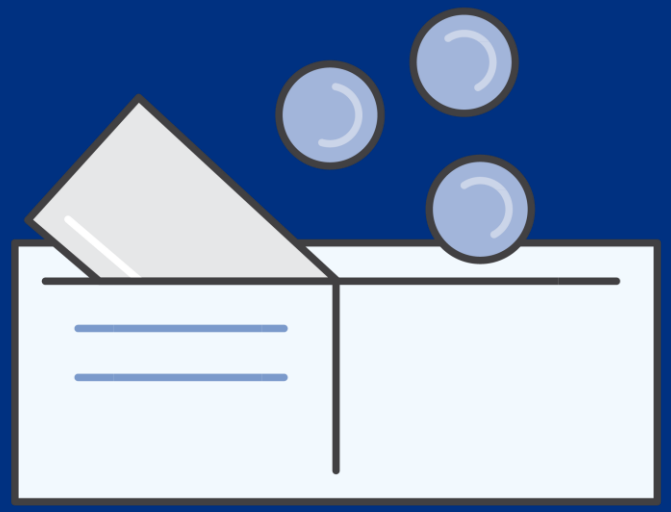
Network Access

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

Built-in monitoring



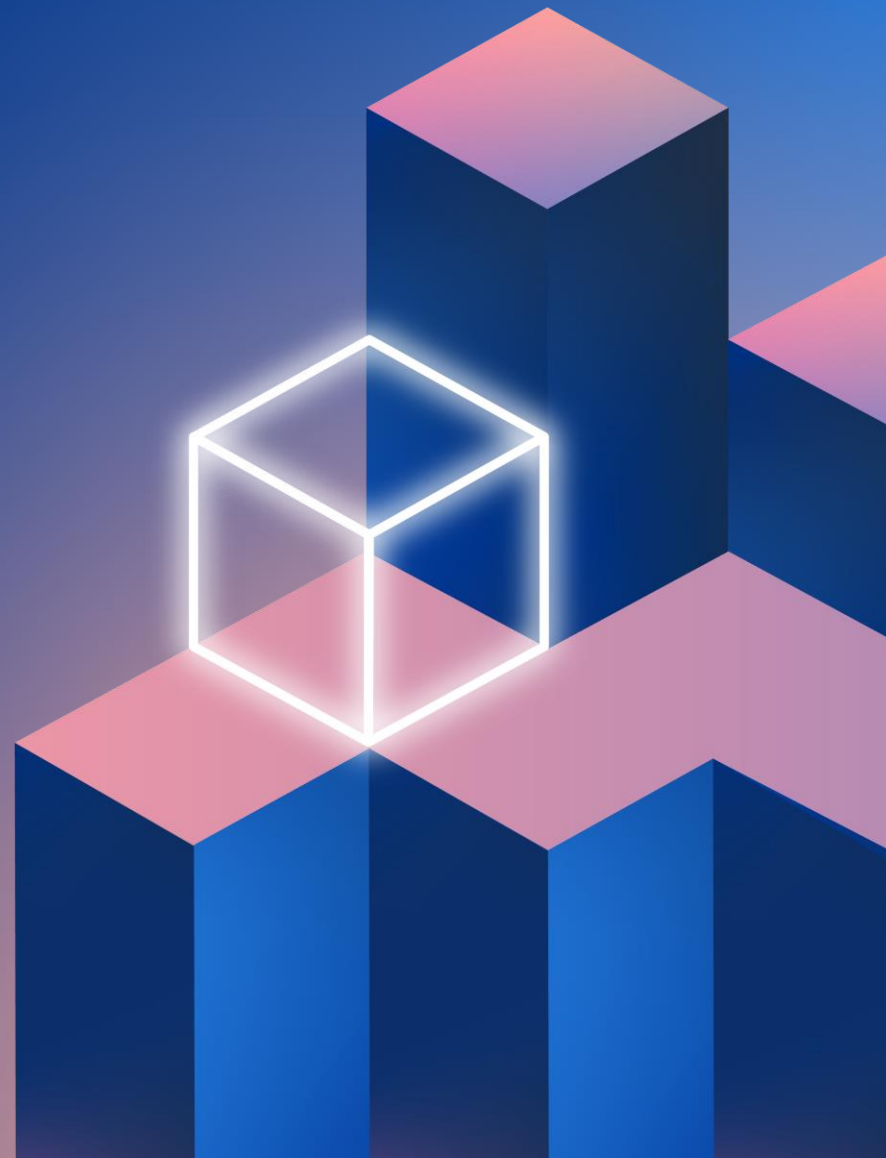
Fine-grained pricing



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

AWS Serverless Application Model (SAM)

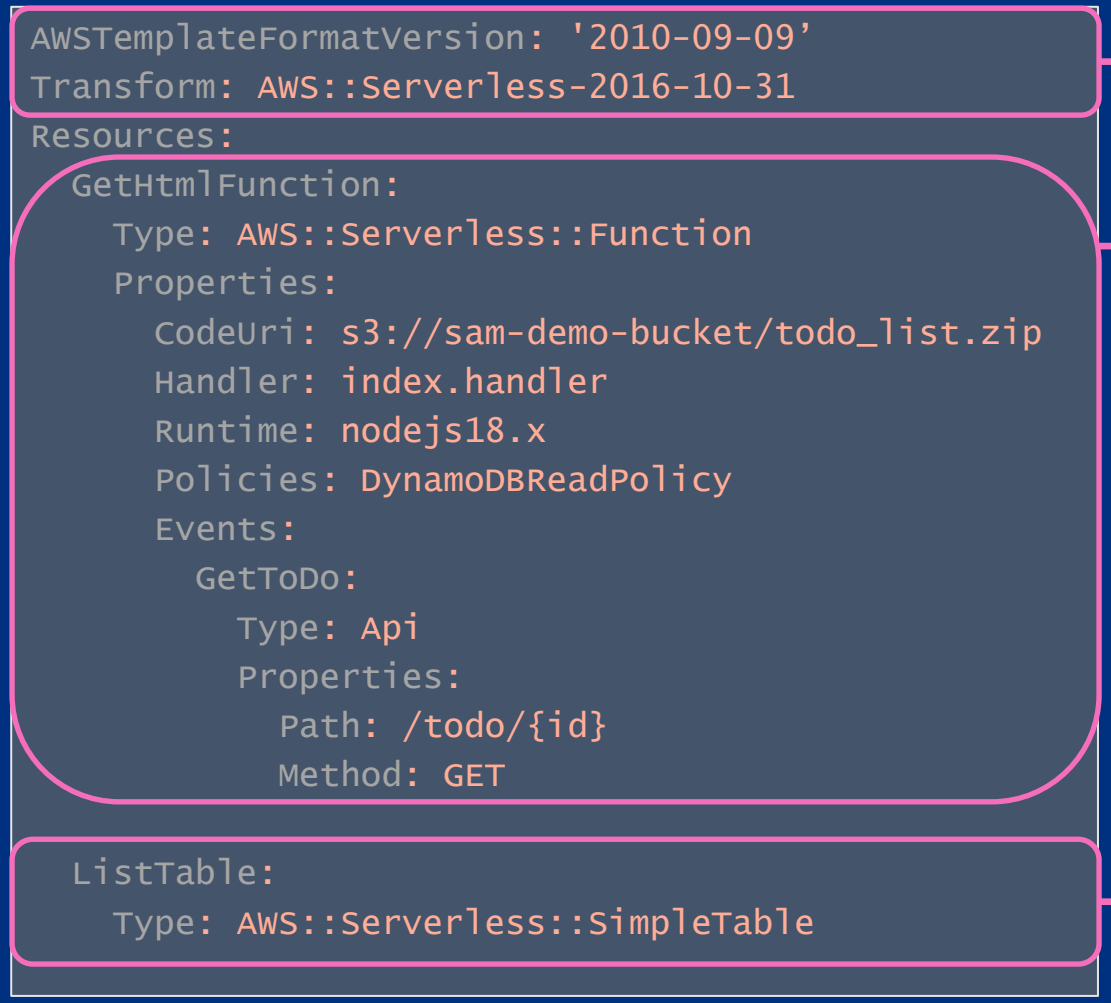


AWS Serverless Application Model (SAM)

- CloudFormation extension optimized for serverless
- Shorthand syntax to express functions, APIs, databases, and event source mappings
- Simplifies IAM policy and Event trigger management
- Model with YAML, deploy using AWS CloudFormation
- Open source!

https://s12d.com/aws-sam

AWS SAM Template



SAM template transform

Creates:

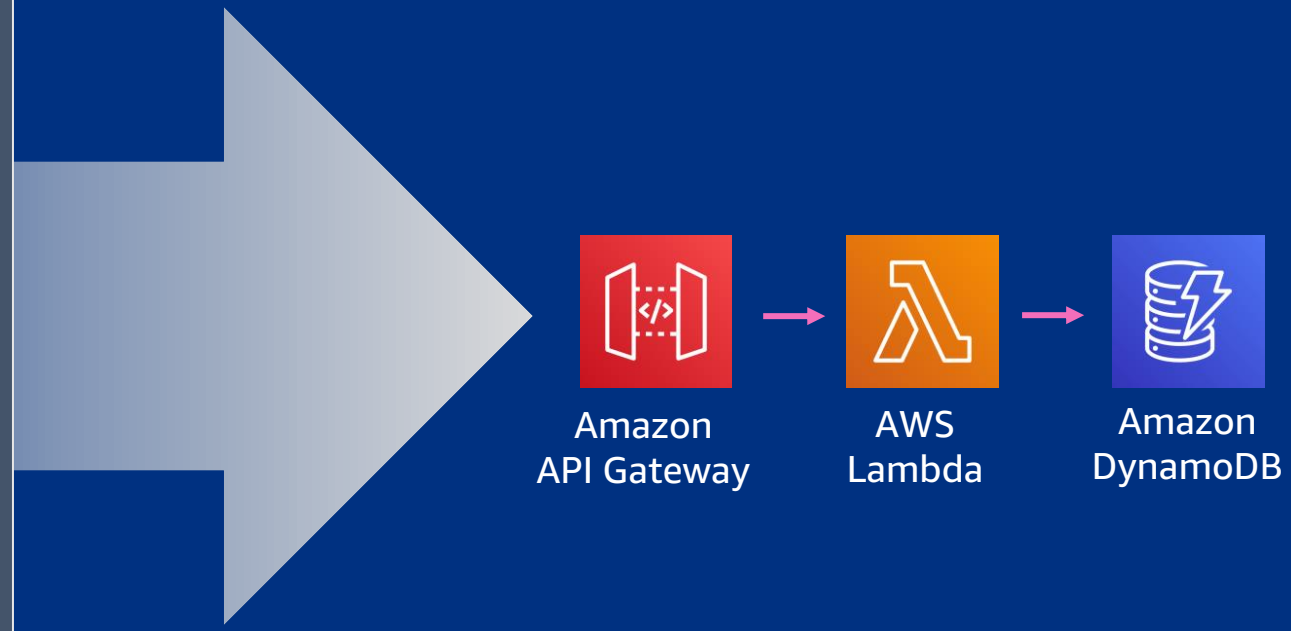
- Lambda function
  - Runtime
  - Execution Policy
  - Code
  - Handler
- API Gateway
  - API endpoint
  - Permissions

Create DynamoDB table with same defaults

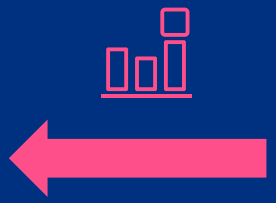
AWS SAM Template

```
AWSTemplateFormatVersion: '2010-09-09'
Transform: AWS::Serverless-2016-10-31
Resources:
  GetHtmlFunction:
    Type: AWS::Serverless::Function
    Properties:
      CodeUri: s3://sam-demo-bucket/todo_list.zip
      Handler: index.handler
      Runtime: nodejs18.x
      Policies: DynamoDBReadPolicy
      Events:
        GetToDo:
          Type: Api
          Properties:
            Path: /todo/{id}
            Method: GET

  ListTable:
    Type: AWS::Serverless::SimpleTable
```



Serverless Function Event source types



Events:
  UploadEvent:
    Type: S3
    Properties:
      Bucket: mybucket

Amazon S3

Amazon EventBridge

Amazon Cognito

Amazon SQS

Alexa Skill

Amazon ApiGateway

Amazon SNS

Amazon Cloudwatch

IoT Rule

Amazon DynamoDB

Amazon Kinesis

Amazon Managed Kafka

AWS SAM CLI

- CLI tool for local building, validating, testing of serverless apps
- Works with Lambda functions and “proxy-style” APIs
- Response object and function logs available on your local machine
- Mimic Lambda’s execution environment with Dockers images
  - Emulates timeout, memory limits, runtimes

https://s12d.com/aws-sam-cli

Getting Started with SAM CLI

sam init

Generates a preconfigured AWS SAM template and example application code in the language that you choose

sam build

Prepares it for subsequent steps like deploy or local testing

sam deploy

Deploys your serverless application to the AWS Cloud

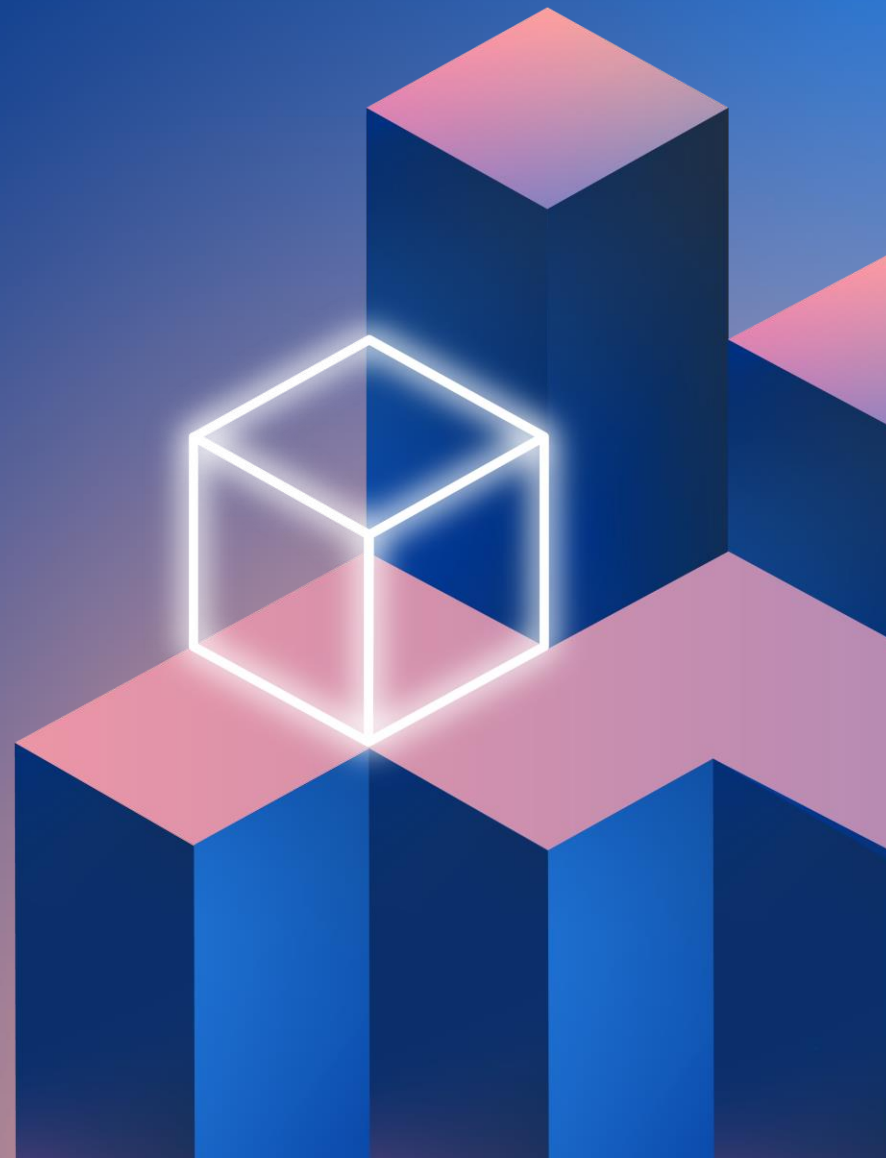
sam local

Test your application code locally

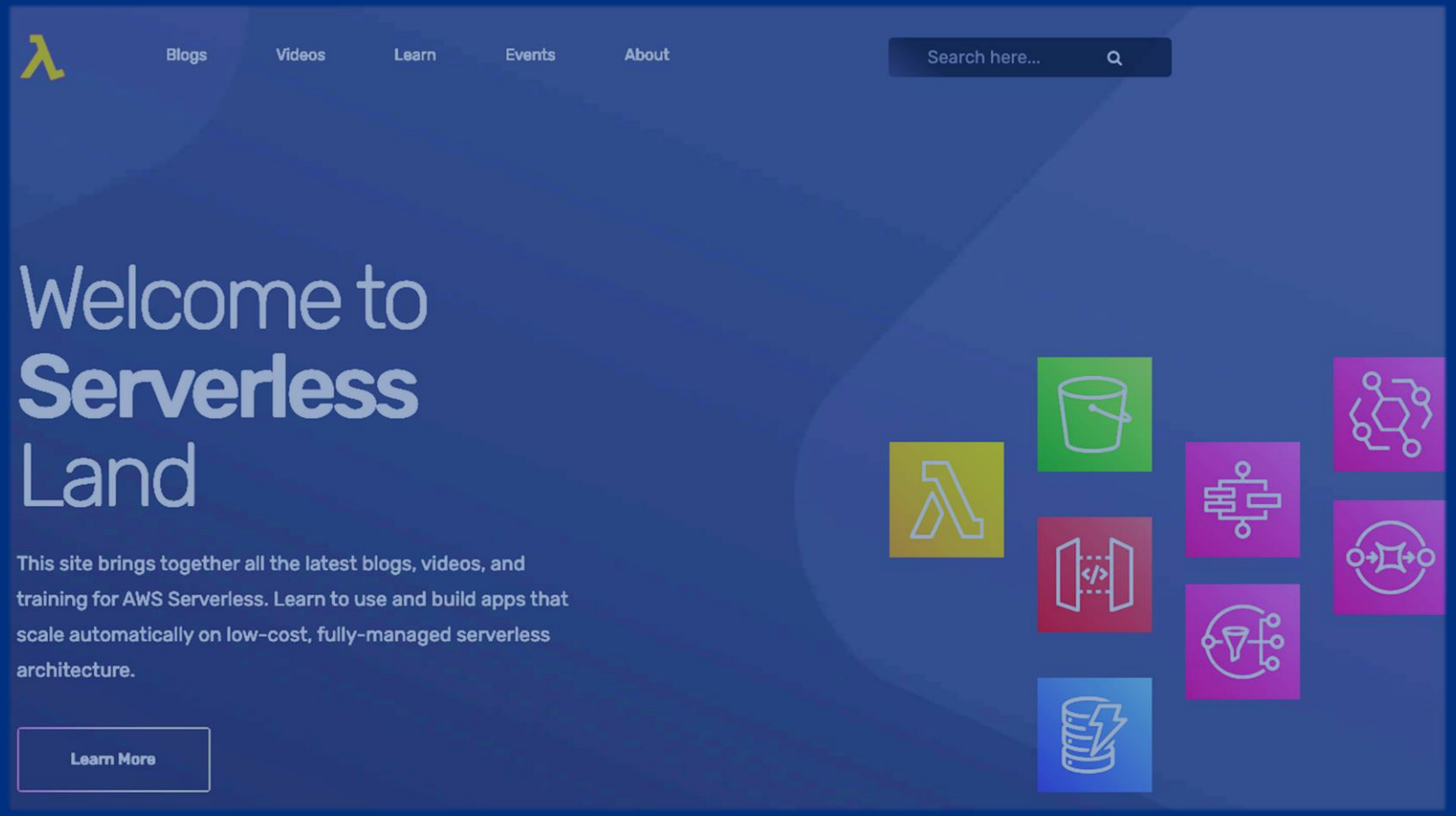
sam delete

Deletes all your application components including CloudFormation Stack and S3 bucket with its artifacts

Demo:
Serverless Application



More serverless resources



https://serverlessland.com

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Thank you!

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