

AWS Lambda

<u>AWS Lambda</u> is a serverless compute service that automatically runs code in response to events and manages the underlying compute resources. It allows developers to execute code without provisioning or managing servers.

Key Features

- **Event-driven Execution**: Lambda runs functions in response to triggers from AWS services, HTTP requests, or scheduled events.
- Automatic Scaling: Scales automatically by running code in parallel.
- **Pay-per-use Pricing**: Charges only for compute time consumed (measured in milliseconds).
- Security and Compliance: Provides IAM-based access control and supports encryption.

How AWS Lambda Works

- 1. **Event Trigger**: An event from AWS services (S3, DynamoDB, API Gateway, etc.) or external sources triggers the Lambda function.
- 2. **Execution Environment**: AWS provisions compute resources and runs the function in a secure environment.
- 3. **Function Execution**: The code executes within the defined runtime (Python, Node.js, Java, Go, etc.).
- 4. **Response Handling**: The output is sent back to the calling service or stored in a designated location.
- 5. **Auto-scaling**: AWS handles scaling automatically based on the number of incoming requests.

Supported Languages

AWS Lambda supports multiple languages, including:

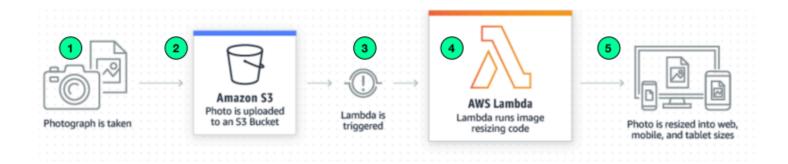
AWS Lambda Language Support 1 Java 2 Go 3 PowerShell 4 Node.js 5 C# 6 Python 7 Ruby 8 Provides a Runtime API which allows you to use any additional programming languages to author your functions

AWS Lambda Architecture

Lambda consists of:

- Function Code: The actual code that runs.
- **Event Source**: Services that trigger the function.
- Execution Role: IAM role defining permissions.
- Environment Variables: Configurable settings for functions.

File Processing Example



Web applications Example



Triggers and Event Sources

AWS Lambda integrates with various AWS services, including:

- Amazon S3 (process file uploads)
- **DynamoDB Streams** (react to database changes)
- Amazon API Gateway (create RESTful APIs)
- AWS Step Functions (workflow automation)
- Amazon SNS & SQS (message-driven functions)
- CloudWatch Events (scheduled tasks)

Deployment and Versioning

- Deployment Packages: Functions are deployed as .zip files or container images.
- Versions: AWS Lambda supports versioning to manage different function versions.
- Aliases: Point to specific function versions for easier management.

Monitoring and Logging

- Amazon CloudWatch Logs: Stores execution logs.
- AWS X-Ray: Traces function execution for debugging.
- Metrics: Monitor function invocations, durations, errors, and throttles.

Security and Permissions

- IAM Roles & Policies: Grant permissions to access AWS services.
- VPC Integration: Run Lambda functions within a VPC for enhanced security.
- Encryption: AWS KMS encrypts function environment variables.

Pricing Model

- Requests Pricing: \$0.20 per 1M requests.
- Compute Time: \$0.00001667 per GB-second.
- Free Tier: 1M requests and 400,000 GB-seconds per month.

Use Cases

- 1. **Data Processing**: Real-time file processing from Amazon S3.
- 2. API Backend: Serve requests via Amazon API Gateway.
- 3. IoT Processing: Handle messages from AWS IoT Core.
- 4. Chatbot & AI: Process chatbot interactions.
- 5. Automated Backups: Create backups in Amazon RDS and S3.

Lambda Integrations

- 1. Amazon Alexa
- 2. Amazon Managed Streaming for Apache Kafka
- 3. Self-managed Apache Kafka
- 4. Amazon API Gateway
- 5. AWS CloudFormation
- 6. Amazon CloudFront (Lambda@Edge)
- 7. Amazon EventBridge (CloudWatch Events)
- 8. Amazon CloudWatch Logs
- 9. AWS CodeCommit
- 10. AWS CodePipeline
- 11. Amazon Cognito
- 12. AWS Config
- 13. Amazon Connect
- 14. Amazon Dynamo DB
- 15. Amazon Elastic File System
- 16. Elastic Load Balancing (Application Load Balancer)
- 17. AWS IoT
- 18. AWS IoT Events
- 19. Amazon Kinesis
- 20. Amazon Data Firehose
- 21. Amazon Lex
- 22. Amazon MQ
- 23. Amazon Simple Email Service
- 24. Amazon Simple Notification Service
- 25. Amazon Simple Queue Service
- 26. Amazon Simple Storage Service (Amazon S3)
- 27. Amazon Simple Storage Service Batch
- 28. Secrets Manager
- 29. Amazon VPC Lattice
- 30. AWS X-Ray

















































Conclusion

AWS Lambda is a powerful serverless computing service that enables developers to build highly scalable, event-driven applications without managing infrastructure. Its seamless integration with AWS services and pay-as-you-go pricing make it an ideal choice for modern cloud-native applications.