AWS re:Invent

NOV. 29 – DEC. 3, 2021 | LAS VEGAS, NV

API302-R2

Rapid application development using AWS Step Functions workflows

Sam Dengler (he/him)
Principal Solutions Architect
AWS

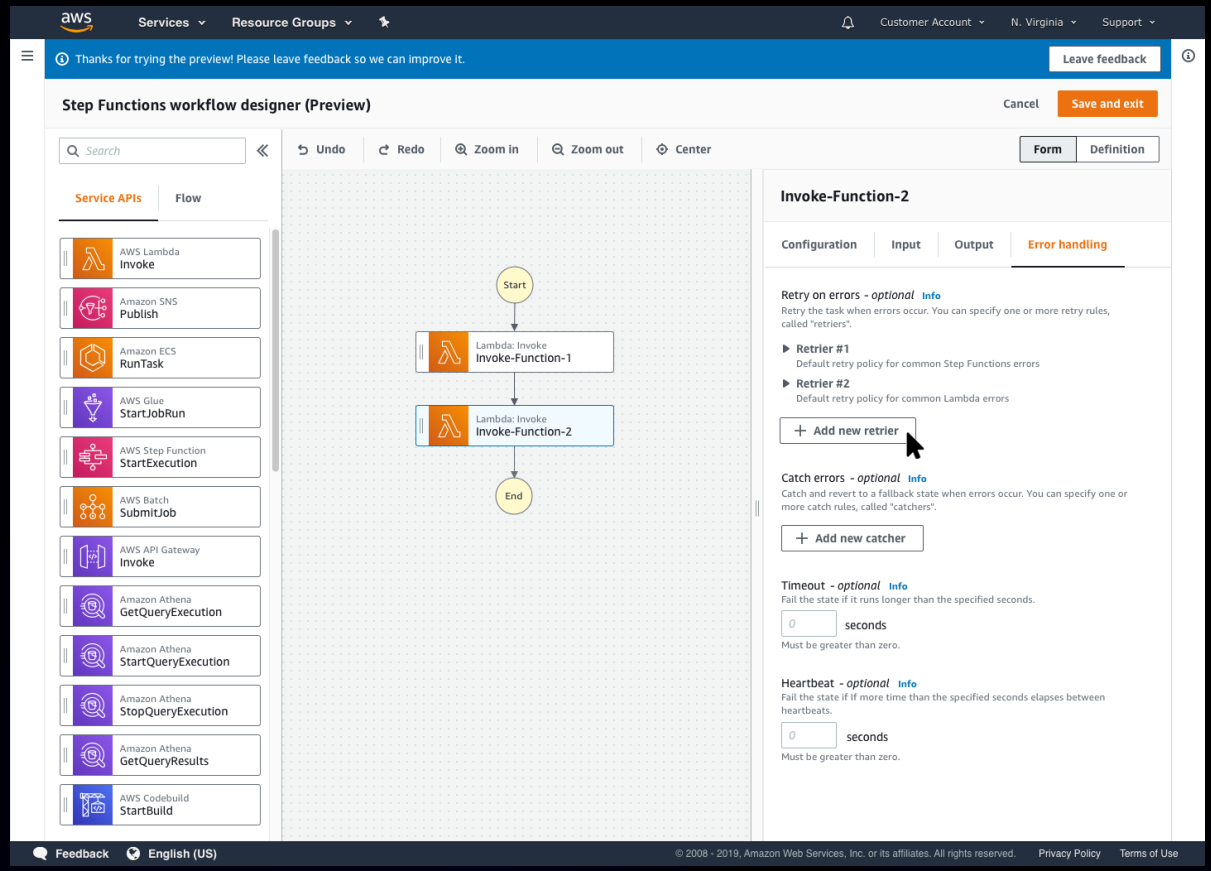
© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

AWS Step Functions

The workflows you build with Step Functions are called state machines, and each step of your workflow is called a state

When you execute your state machine, each move from one state to the next is called a state transition

You can reuse components, easily edit the sequence of steps, or swap out the code called by task states as your needs change



AWS Step Functions workflow studio

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Visual workflows

Define

JSON – Amazon States Language

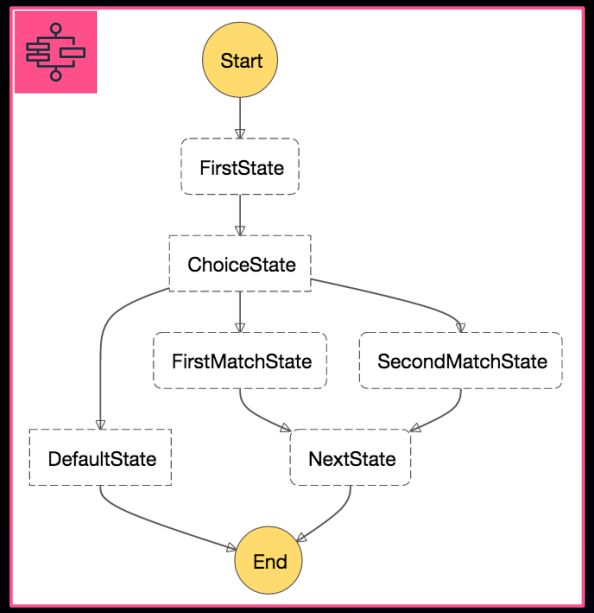
```
Code
{
  "Comment": "An AWL example using a choice state.",
  "StartAt": "FirstState",
  "States": {
    "FirstState": {
      "Type": "Task",
      "Resource": "arn:aws:lambda:REGION:ACCOUNT_ID:function:FUNCTION_NAME",
      "Next": "ChoiceState"
    },
    "ChoiceState": {
      "Type" : "Choice",
      "Choices": [
        {
```

CDK TypeScript, JavaScript, Python, Java, C#

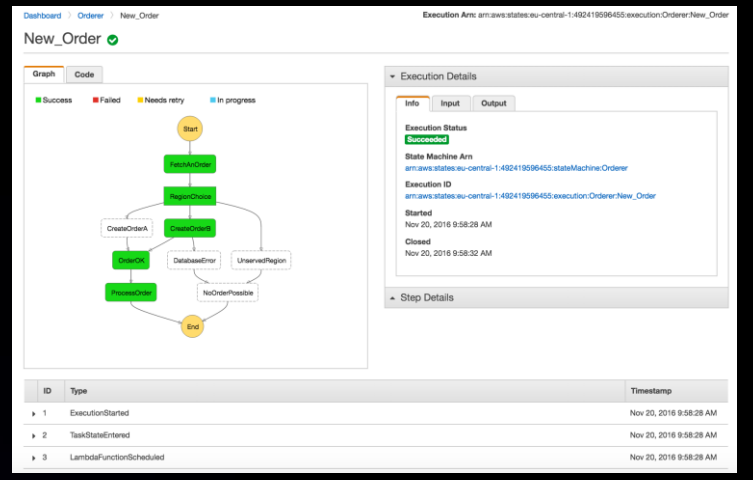
Data Science SDK

Python

Visualize



Execute and monitor





© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Step Functions integration types



Optimized integrations

Customized to simplify the usage of 17 AWS services

Supported integration patterns:

- Request response
- Wait for a callback (.waitForTaskToken)
- Run a job (.sync)



AWS SDK integrations

Call 200 AWS services directly (9,000+ API actions)

Supported integration patterns:

- Request response
- Wait for a callback (.waitForTaskToken)

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Request response

SERVICE INTEGRATION PATTERN

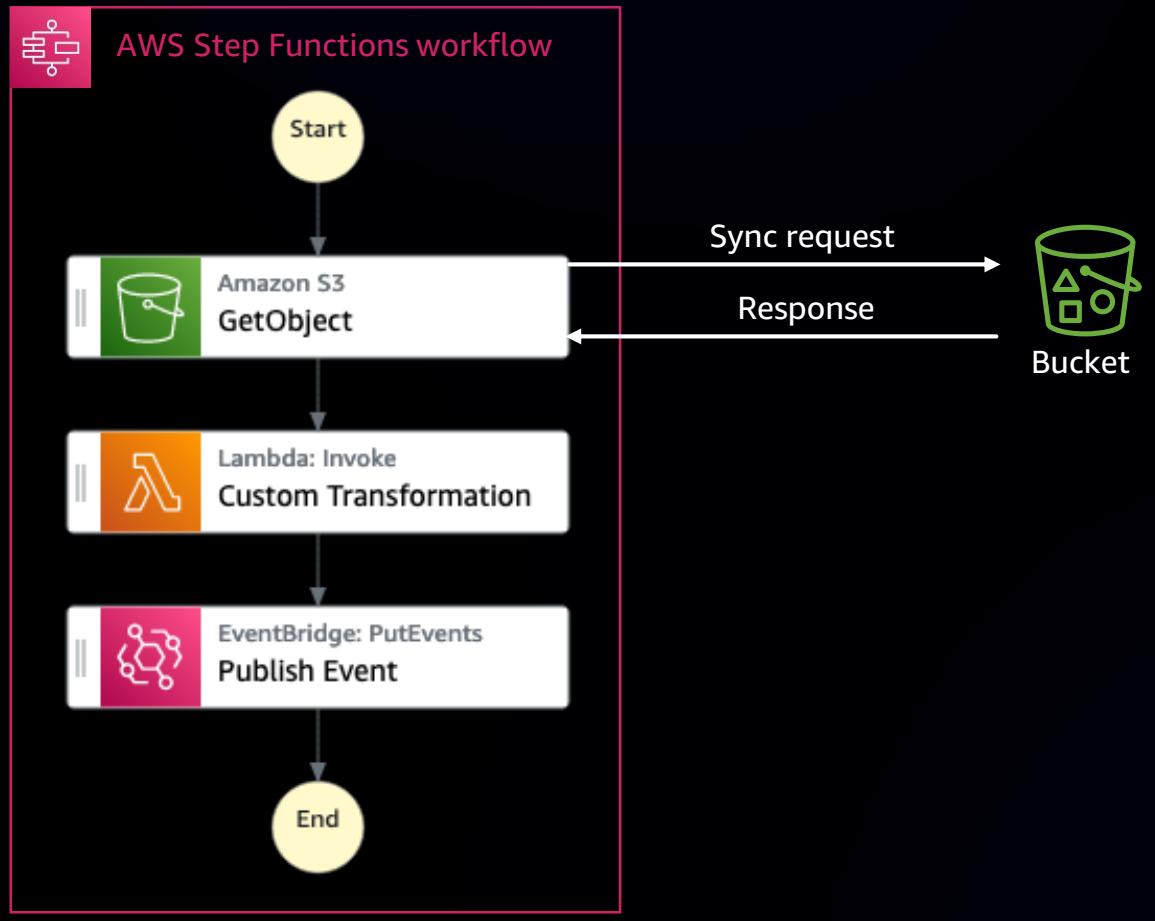


- Amazon EMR
- AWS Lambda
- Amazon SQS
- AWS Glue
- Amazon ECS/AWS Fargate
- Amazon SNS
- Amazon Athena
- Amazon EKS
- AWS Step Functions
- Amazon SageMaker
- AWS Batch
- Amazon EventBridge
- Amazon DynamoDB
- AWS SDK
- Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Request response

SERVICE INTEGRATION PATTERN

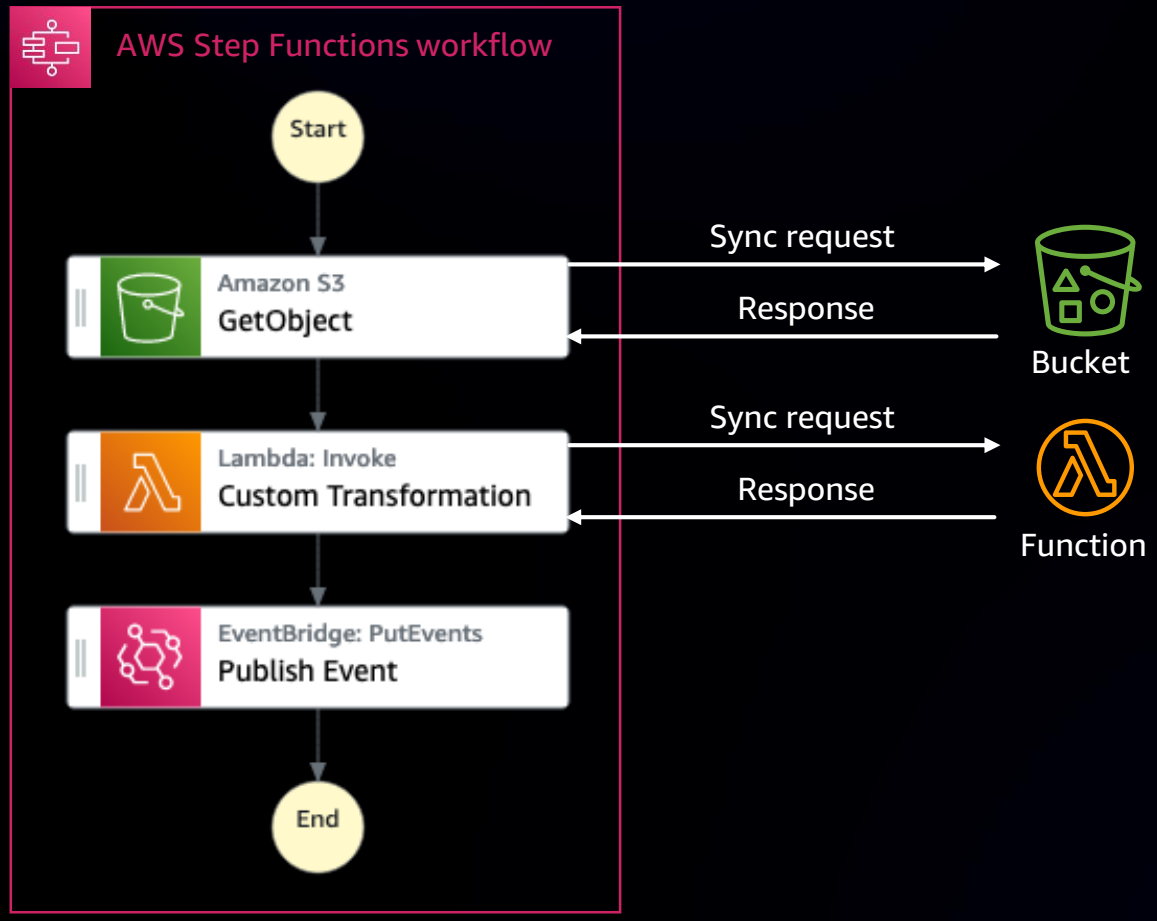


- Amazon EMR
- AWS Lambda
- Amazon SQS
- AWS Glue
- Amazon ECS/AWS Fargate
- Amazon SNS
- Amazon Athena
- Amazon EKS
- AWS Step Functions
- Amazon SageMaker
- AWS Batch
- Amazon EventBridge
- Amazon DynamoDB
- AWS SDK
- Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Request response

SERVICE INTEGRATION PATTERN

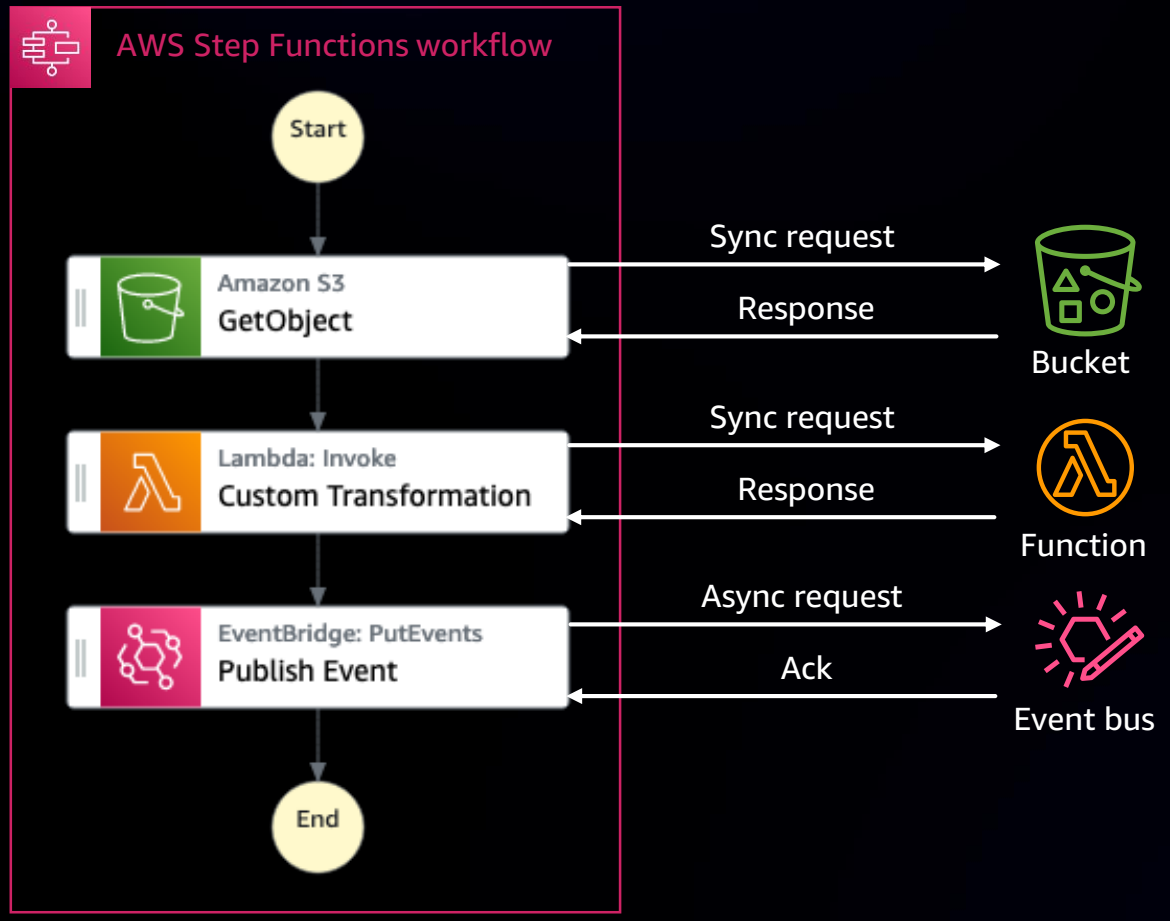


Amazon EMR
AWS Lambda
Amazon SQS
AWS Glue
Amazon ECS/AWS Fargate
Amazon SNS
Amazon Athena
Amazon EKS
AWS Step Functions
Amazon SageMaker
AWS Batch
Amazon EventBridge
Amazon DynamoDB
AWS SDK
Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Request response

SERVICE INTEGRATION PATTERN









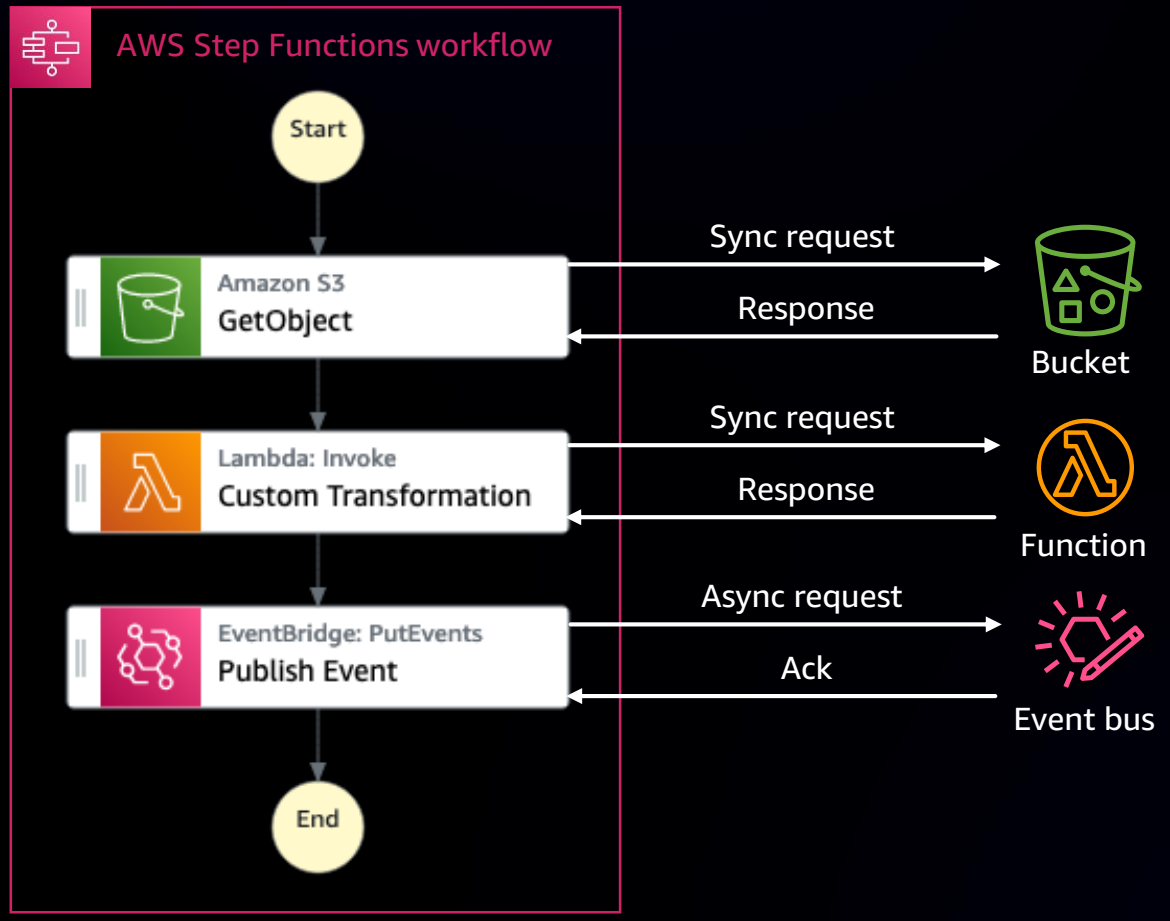




© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Request response

SERVICE INTEGRATION PATTERN



Amazon EMR

AWS Lambda

Amazon SQS

AWS Glue

Amazon ECS/AWS Fargate

Amazon SNS

Amazon Athena

Amazon EKS

AWS Step Functions

Amazon SageMaker

AWS Batch

Amazon EventBridge

Amazon DynamoDB

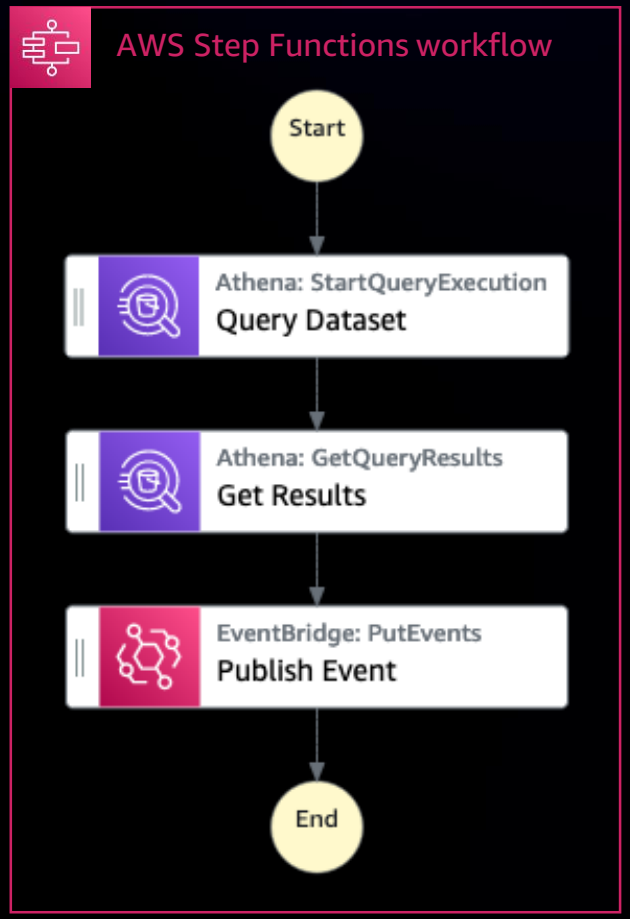
AWS SDK

Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Run a job (.sync)

SERVICE INTEGRATION PATTERN



Amazon EMR

AWS Glue

Amazon ECS/AWS Fargate

Amazon Athena

Amazon EKS

AWS Step Functions

Amazon SageMaker

AWS Batch

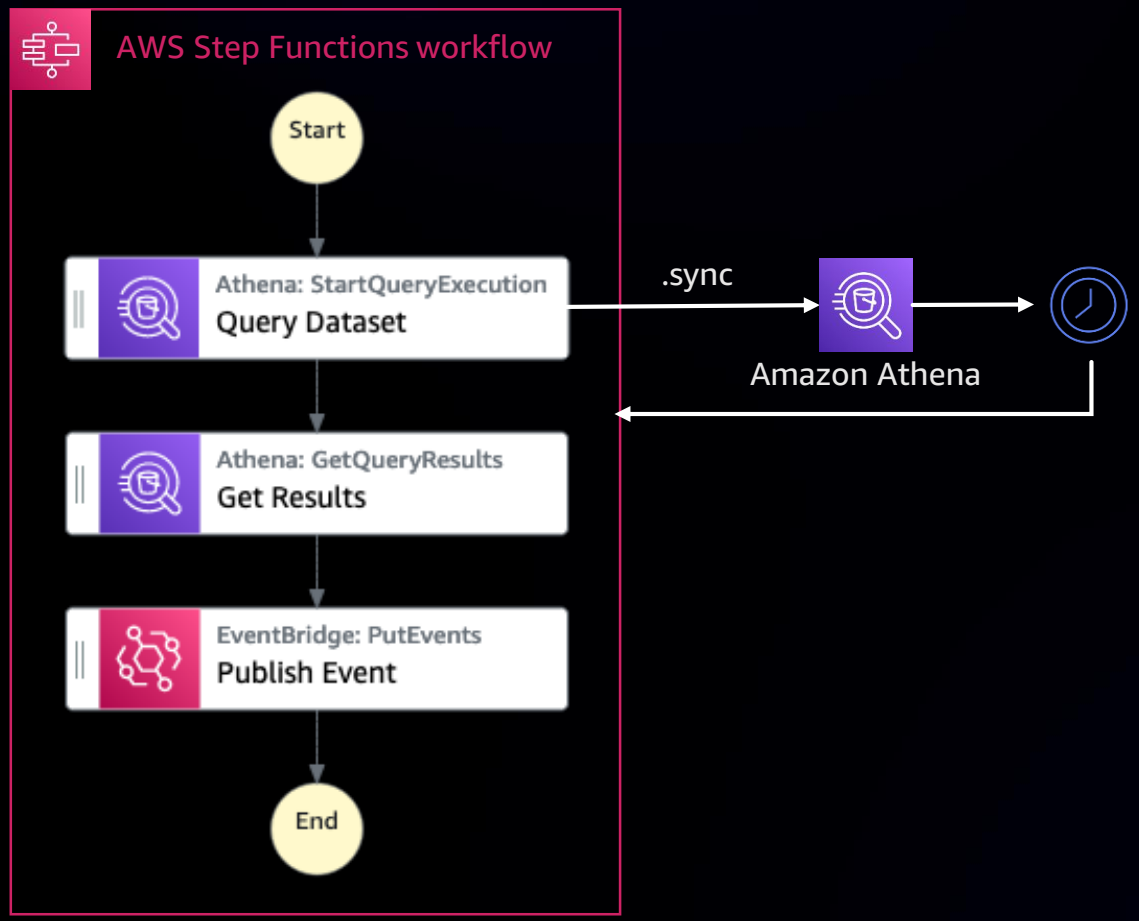
AWS CodeBuild

Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Run a job (.sync)

SERVICE INTEGRATION PATTERN



Amazon EMR

AWS Glue

Amazon ECS/AWS Fargate

Amazon Athena

Amazon EKS

AWS Step Functions

Amazon SageMaker

AWS Batch

AWS CodeBuild

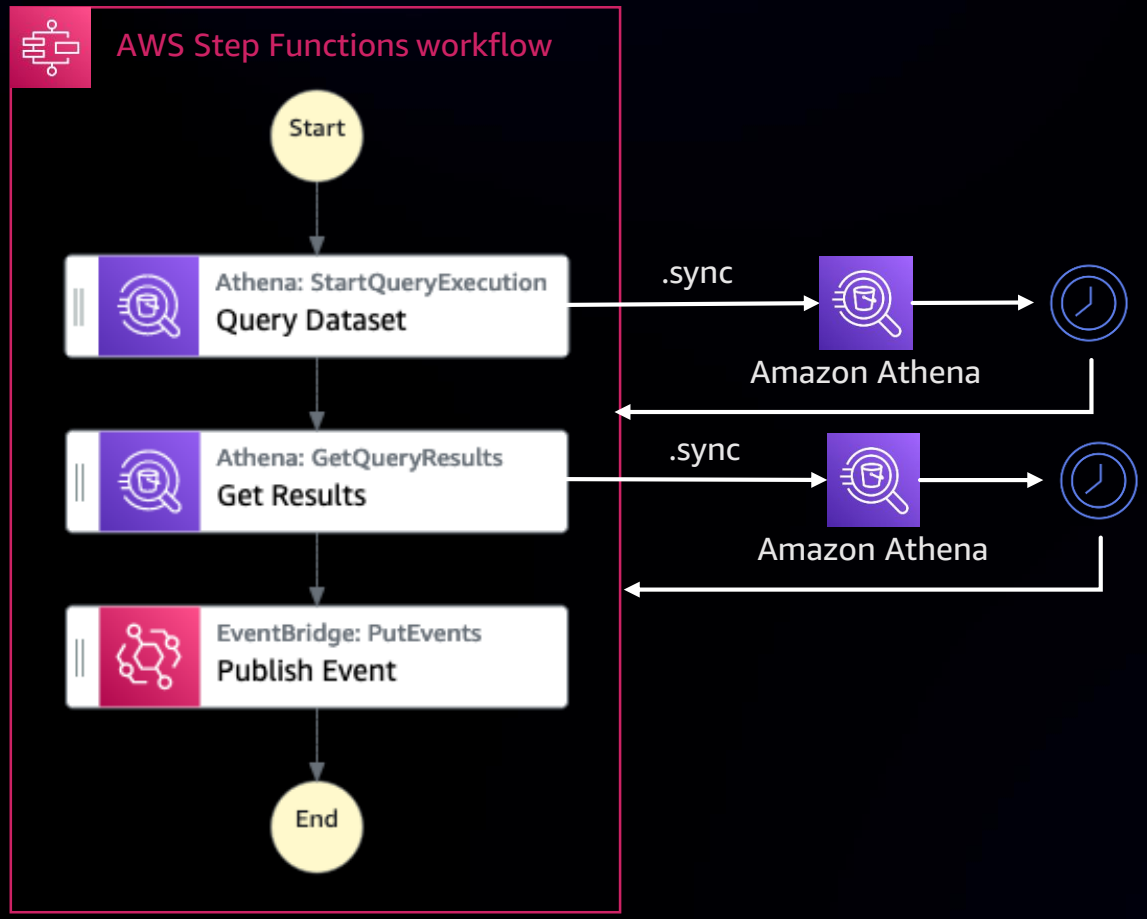
Amazon API Gateway

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Run a job (.sync)

SERVICE INTEGRATION PATTERN



Amazon EMR

AWS Glue

Amazon ECS/AWS Fargate

Amazon Athena

Amazon EKS

AWS Step Functions

Amazon SageMaker

AWS Batch

AWS CodeBuild

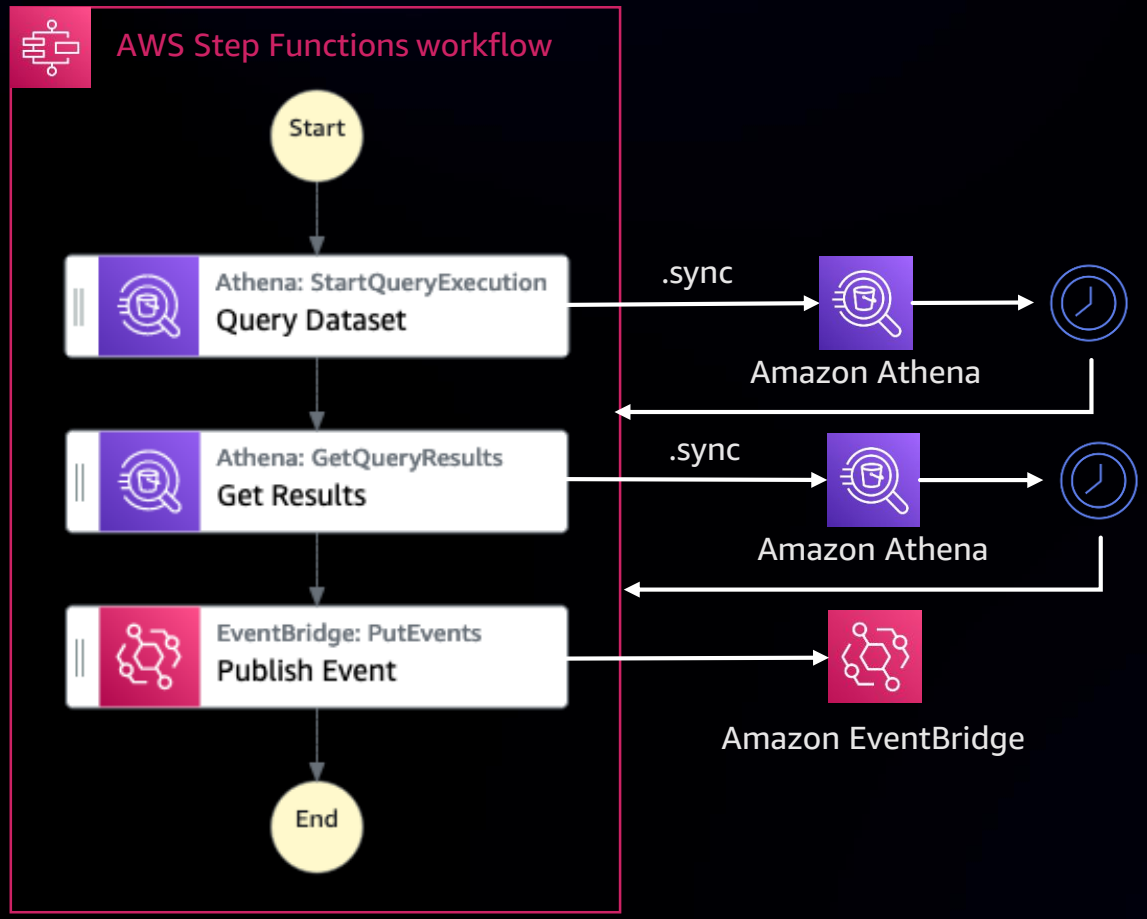
Amazon API Gateway

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Run a job (.sync)

SERVICE INTEGRATION PATTERN



Amazon EMR

AWS Glue

Amazon ECS/AWS Fargate

Amazon Athena

Amazon EKS

AWS Step Functions

Amazon SageMaker

AWS Batch

AWS CodeBuild

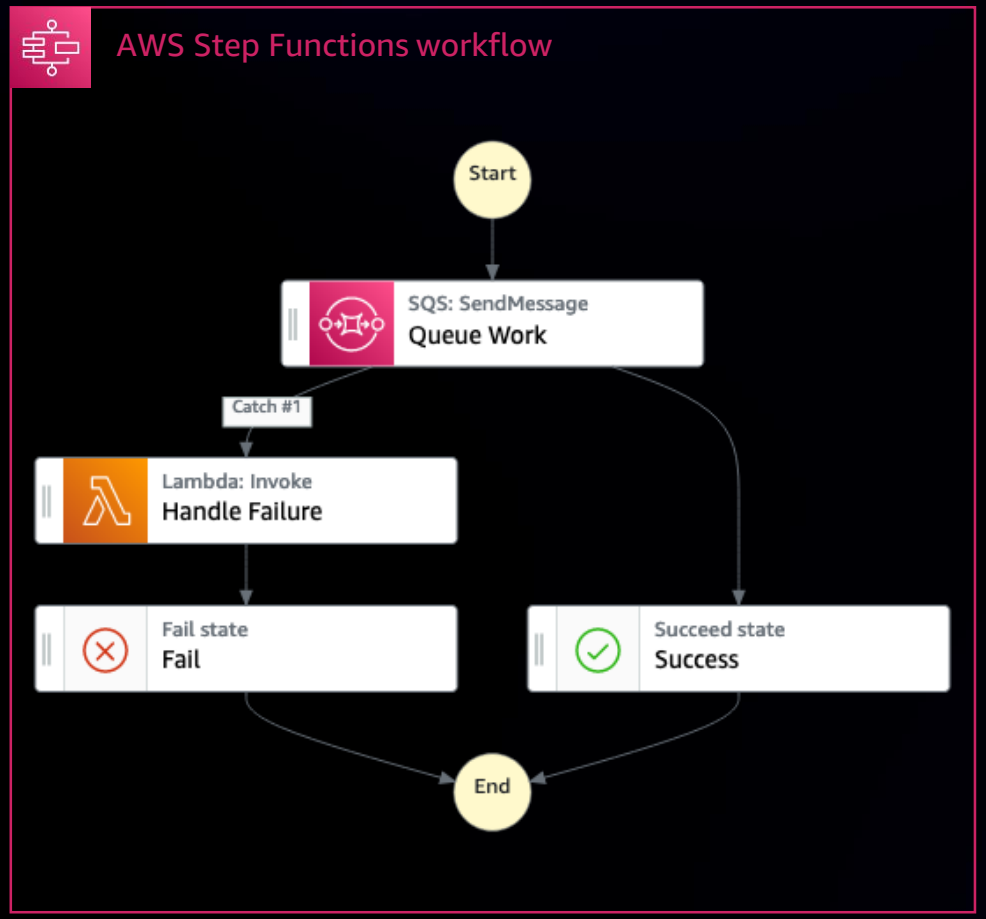
AWS SDK

Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Wait for a callback (.waitForTaskToken)

SERVICE INTEGRATION PATTERN

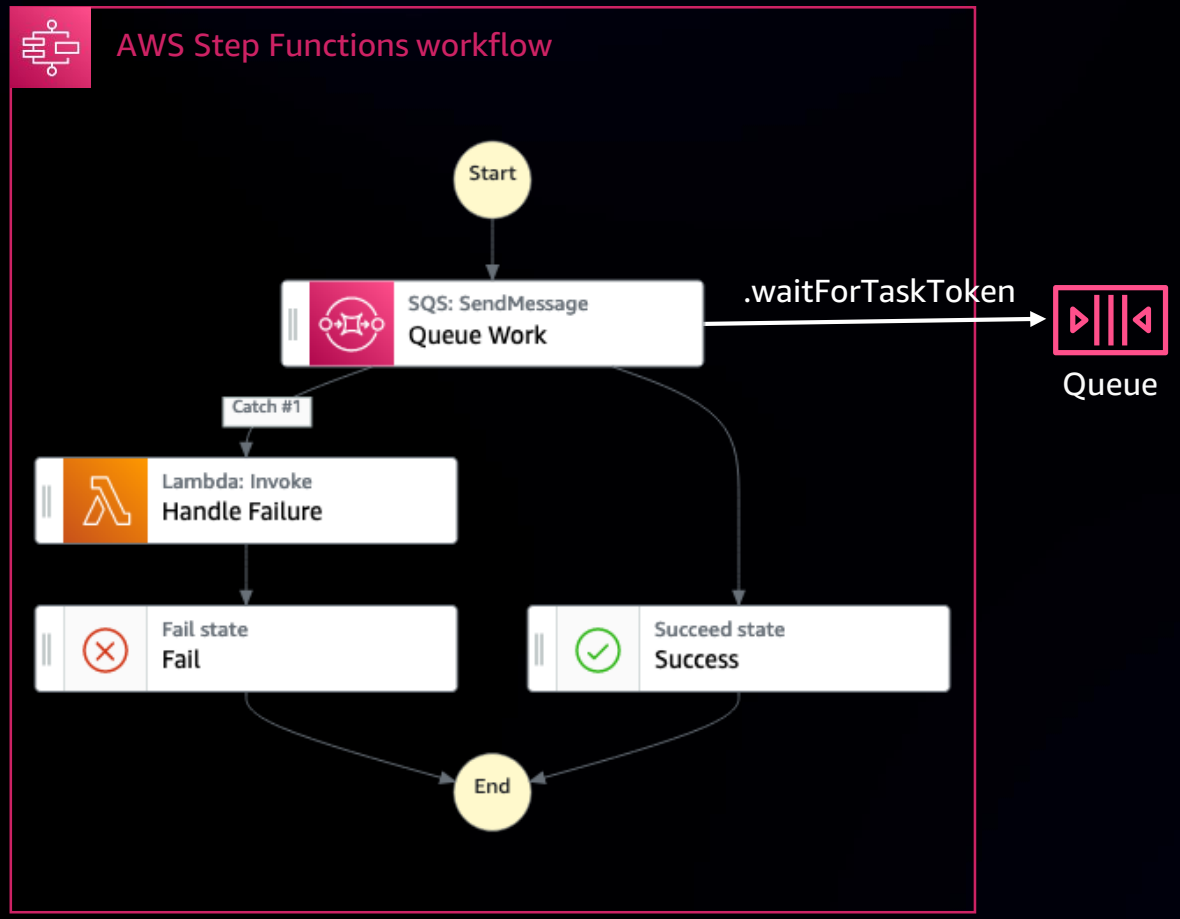


- AWS Lambda
- Amazon SQS
- Amazon ECS/ AWS Fargate
- Amazon SNS
- AWS Step Functions
- Amazon EventBridge
- AWS SDK
- Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Wait for a callback (.waitForTaskToken)

SERVICE INTEGRATION PATTERN



AWS Lambda

Amazon SQS

Amazon ECS/
AWS Fargate

Amazon SNS

AWS Step Functions

Amazon EventBridge

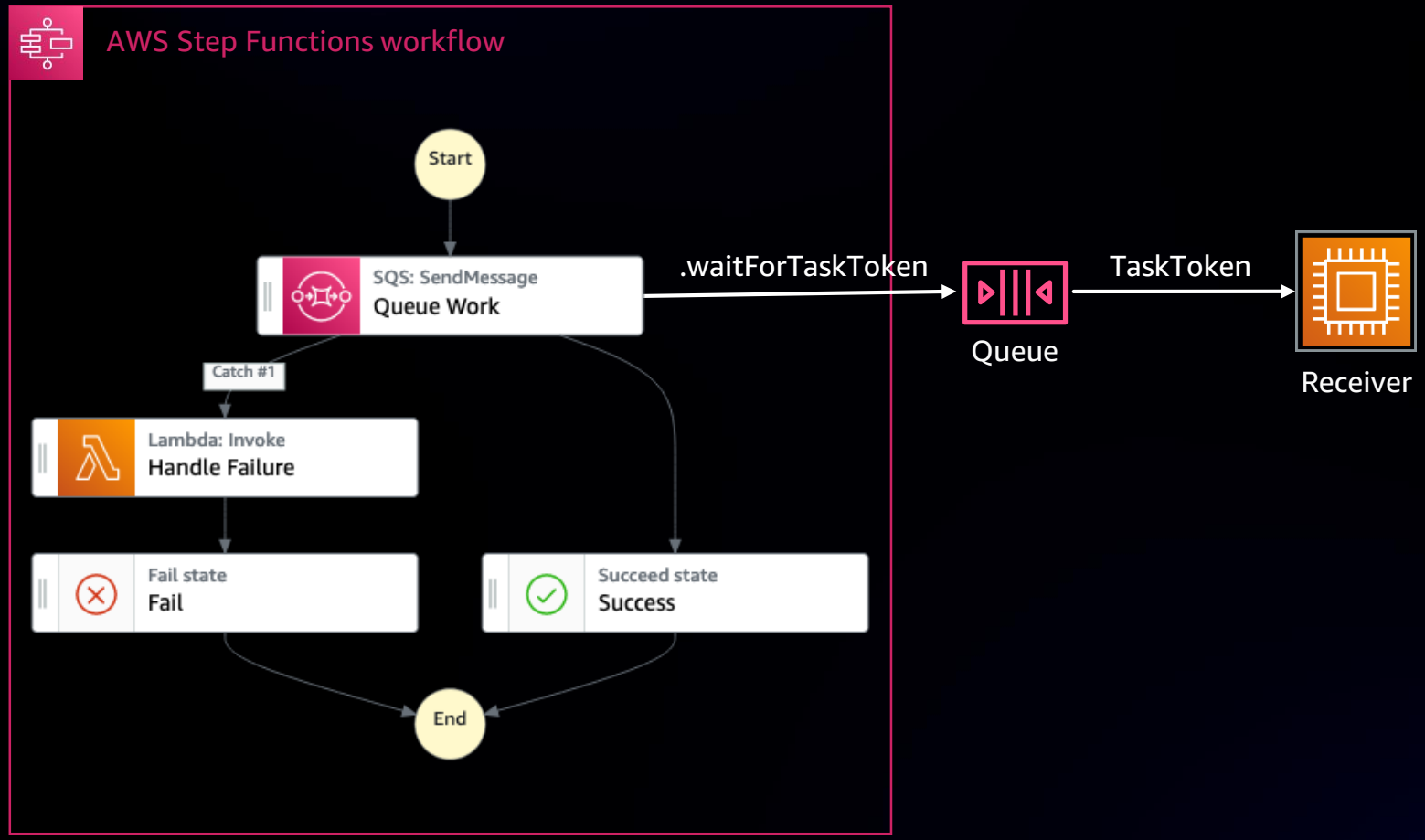
AWS SDK

Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Wait for a callback (.waitForTaskToken)

SERVICE INTEGRATION PATTERN



AWS Lambda

Amazon SQS

Amazon ECS/
AWS Fargate

Amazon SNS

AWS Step Functions

Amazon EventBridge

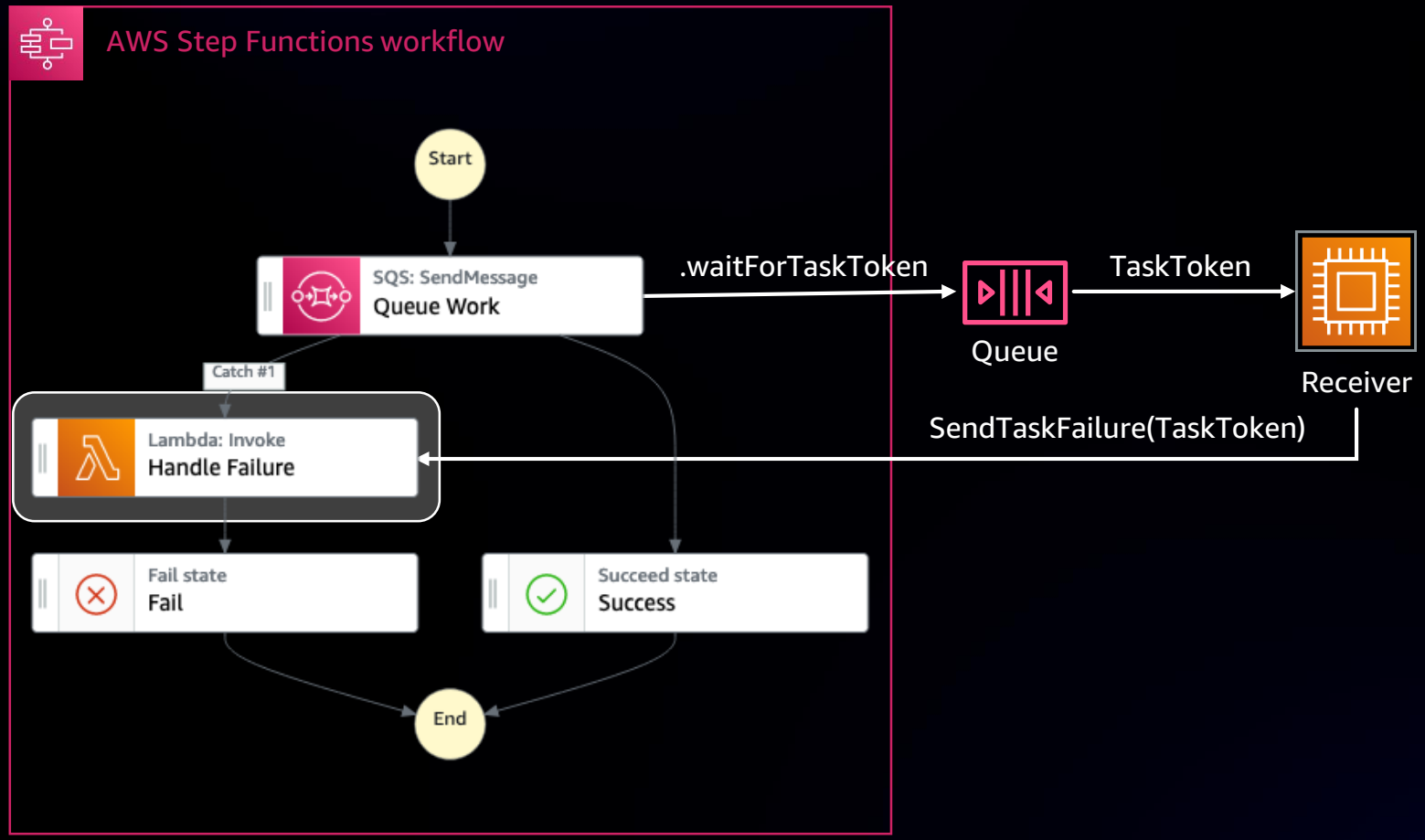
AWS SDK

Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Wait for a callback (.waitForTaskToken)

SERVICE INTEGRATION PATTERN



AWS Lambda

Amazon SQS

Amazon ECS/
AWS Fargate

Amazon SNS

AWS Step Functions

Amazon EventBridge

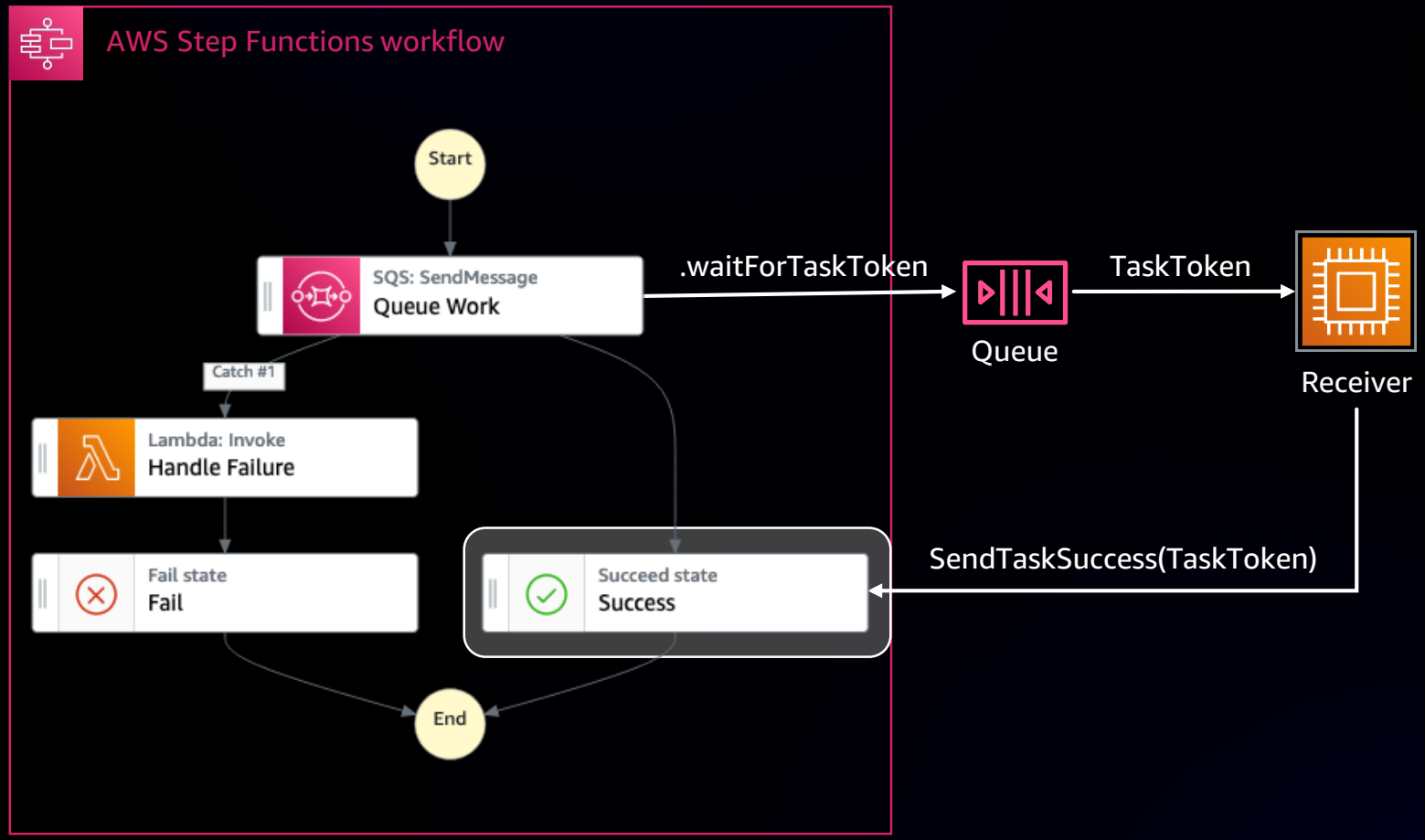
AWS SDK

Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Wait for a callback (.waitForTaskToken)

SERVICE INTEGRATION PATTERN



AWS Lambda

Amazon SQS

Amazon ECS/
AWS Fargate

Amazon SNS

AWS Step Functions

Amazon EventBridge

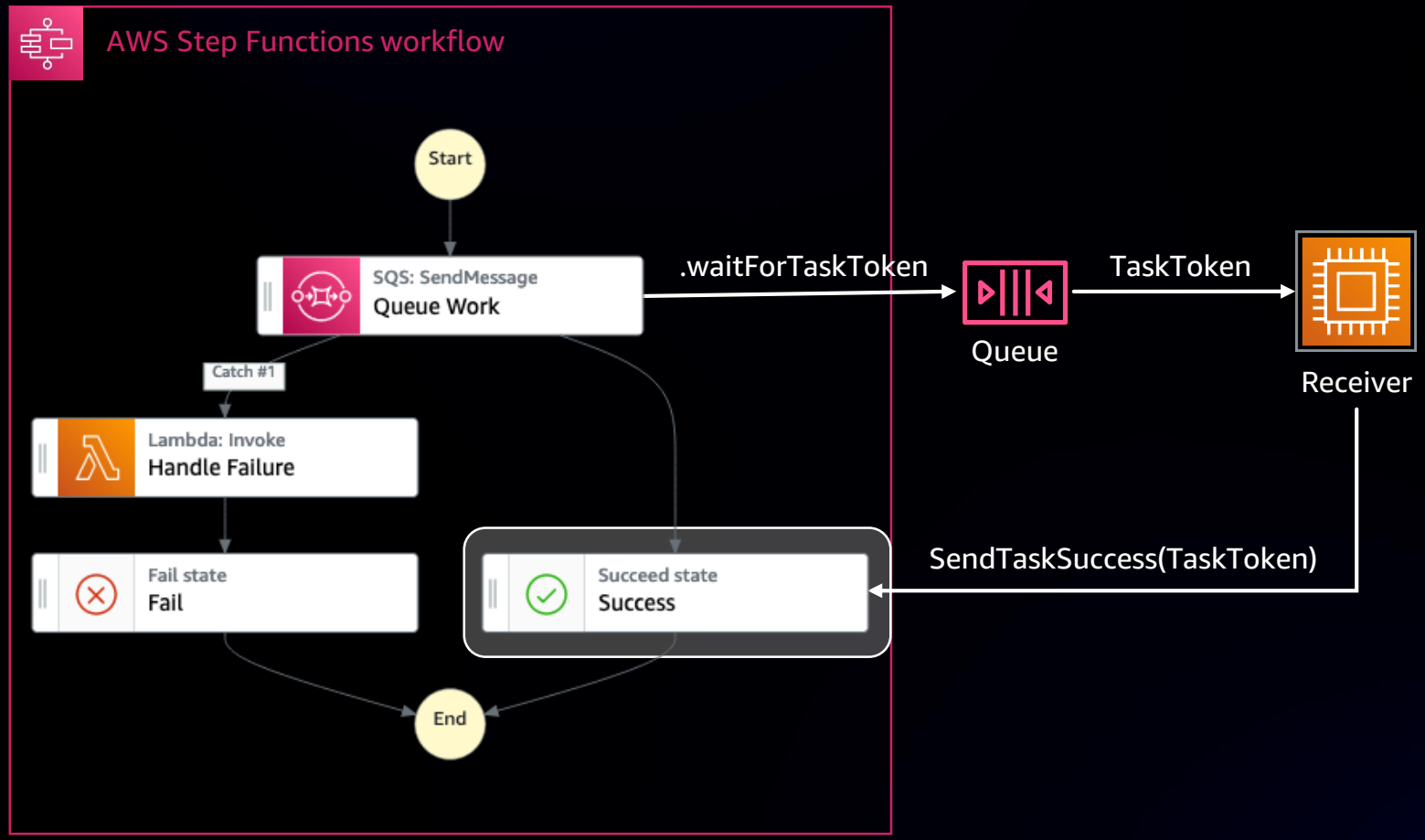
AWS SDK

Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Wait for a callback (.waitForTaskToken)

SERVICE INTEGRATION PATTERN



AWS Lambda

Amazon SQS

Amazon ECS/
AWS Fargate

Amazon SNS

AWS Step Functions

Amazon EventBridge

AWS SDK

Amazon API Gateway

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

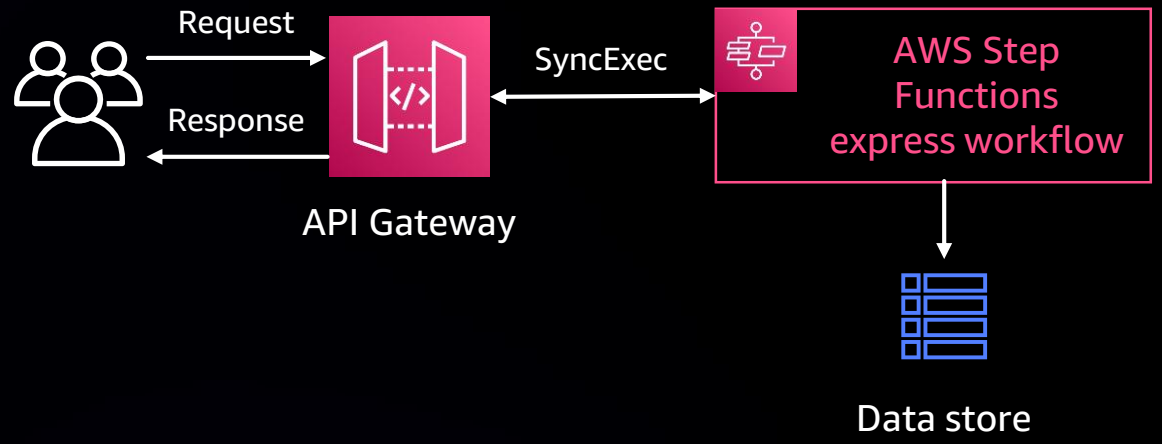
API-driven demo application orchestration

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

API-driven demo

Requirements

- CRUD application
- REST API interface
- Synchronous API response
- Event notification



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

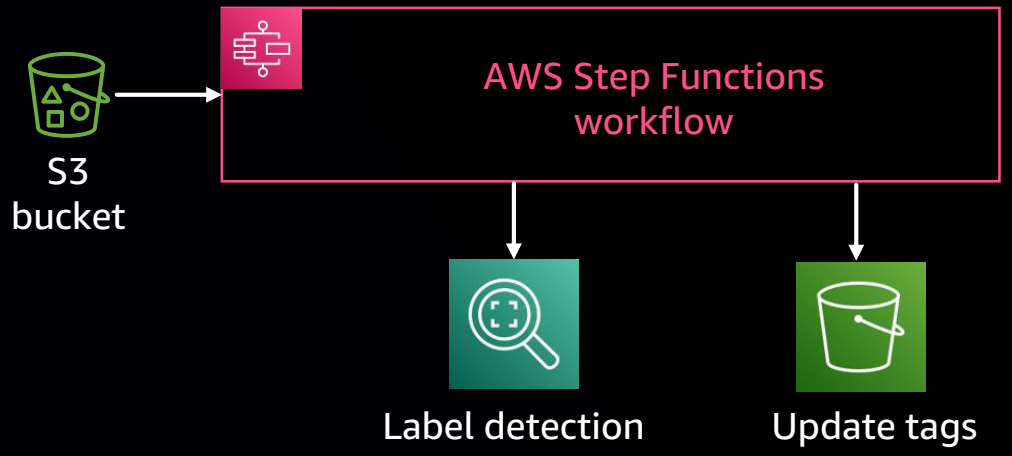
Data-driven demo data orchestration

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Data-driven demo

Requirements

- Client uploads image
- Extract labels from image
- Update image with label tags
- Publish enriched event



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

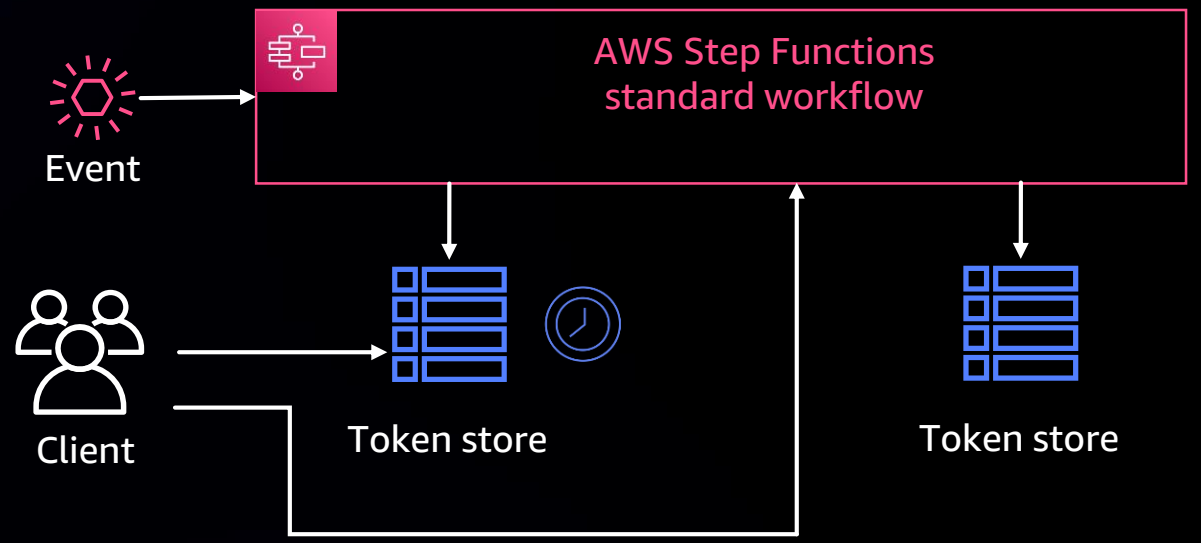
Manual approval callback demo

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Manual approval callback demo

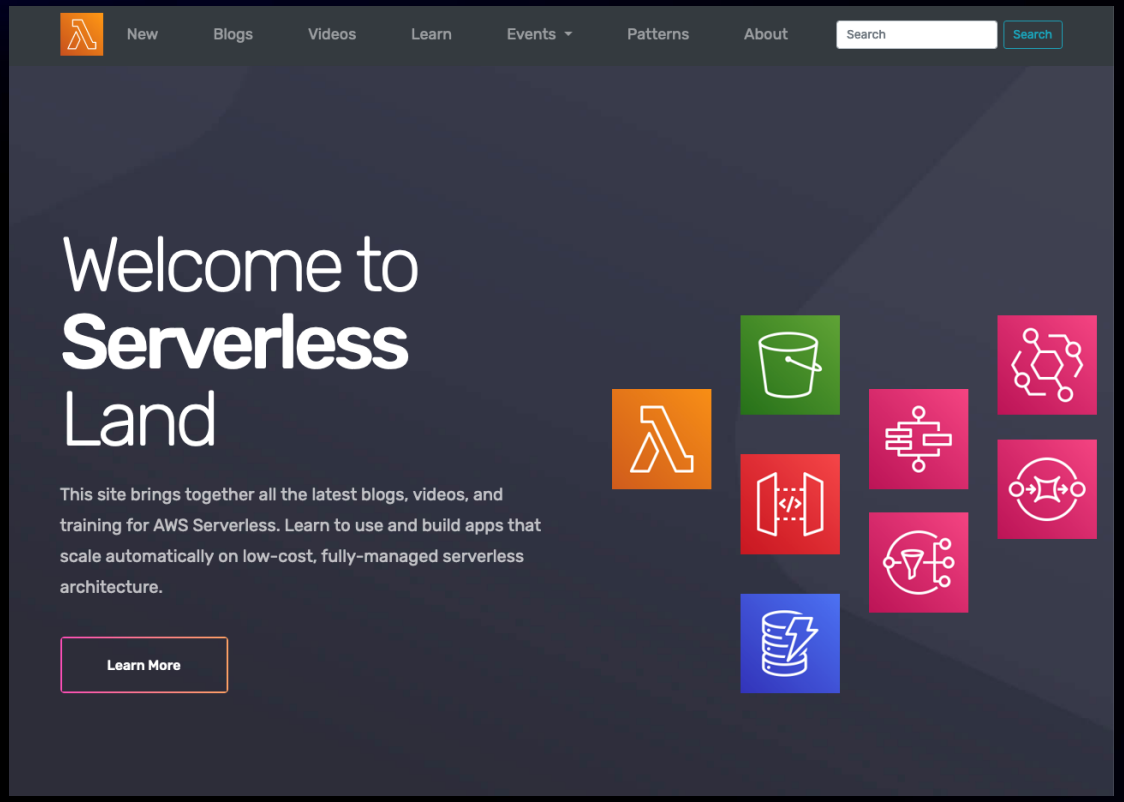
Requirements

- Pause workflows for human approval
- Support business application integration



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Want to learn more?



https://serverlessland.com/reinvent2021/

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Related sessions

API201 – Application integration patterns for microservices

API308 – Building modern cloud applications? Think integration

API304 – Building next-gen applications with event-driven architectures

API306-R1/R2 – Build data pipelines or automate processes with the right workflow orchestrator

SVS306-R1/R2 – Serverless image processing workflows at scale

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Thank you!

Sam Dengler

@samdengler

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.