# Building Decoupled Architecture

2019

People matter, results count.
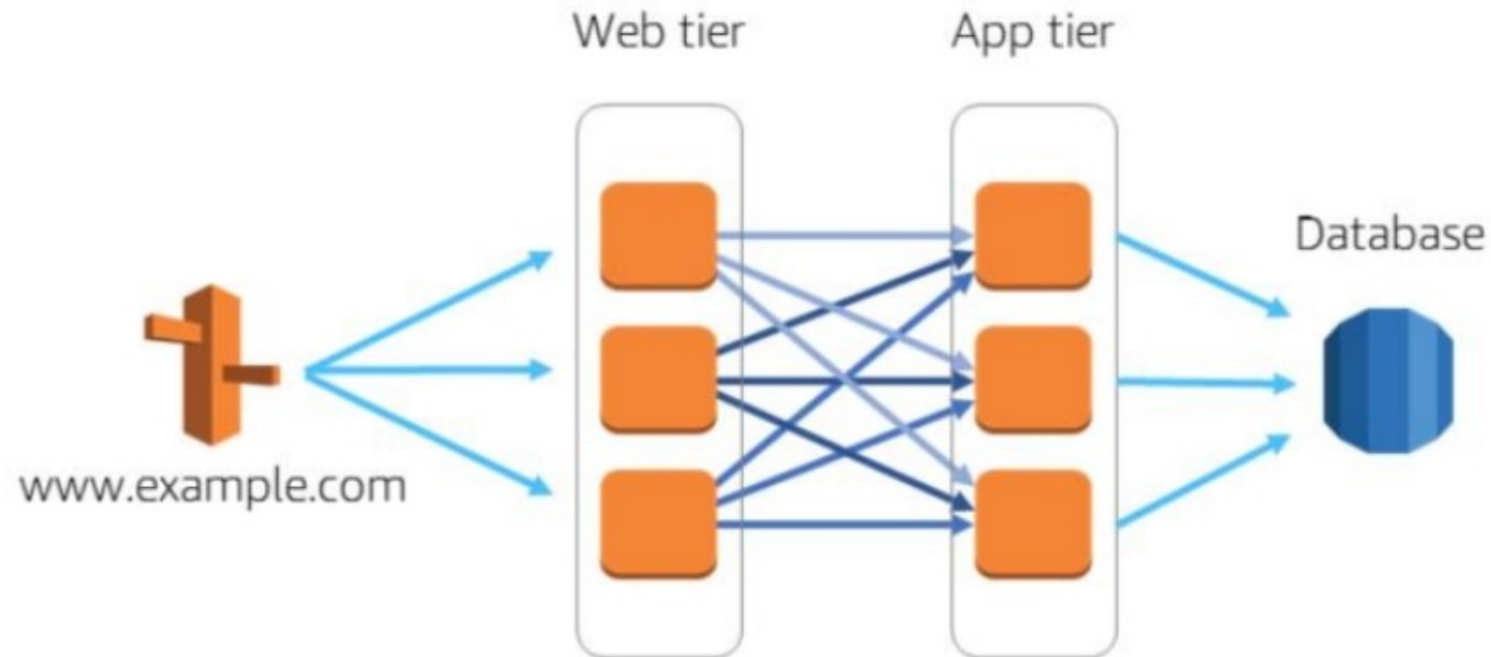
# Agenda

| 1 | Decoupling Your Architecture |
|---|------------------------------|
| 2 | Decoupling with Amazon SQS |
| 3 | Decoupling with Amazon SNS |

# Decoupling Your Architecture

# What Does "Tightly Coupled" Mean?



Web tier     App tier

www.example.com

Database

Components are **strongly tied** to each other.

# What Does "Tightly Coupled" Mean?



Web tier    App tier    Database

www.example.com
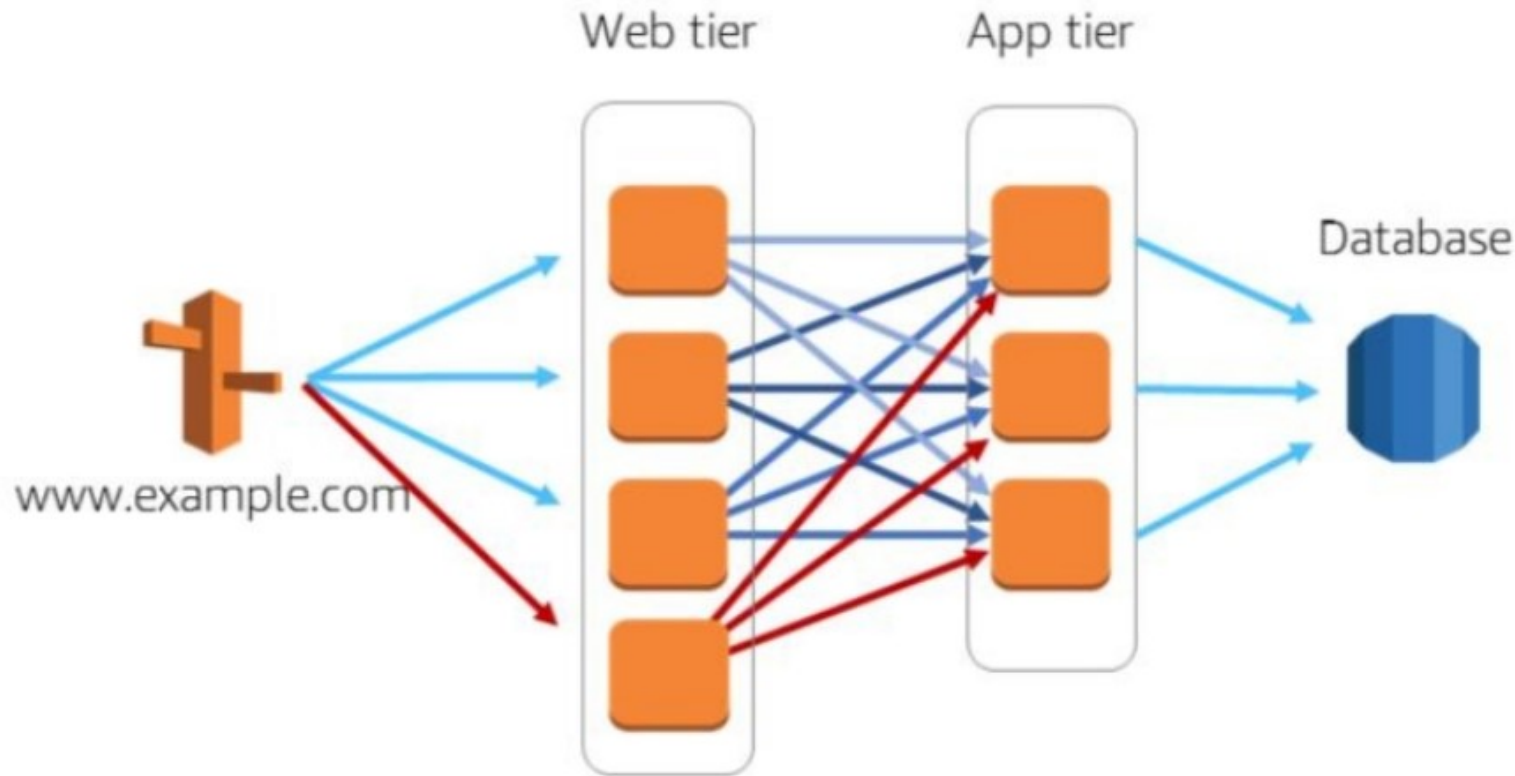
Adding resources greatly increases complexity.

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# What Does "Tightly Coupled" Mean?



Web tier    App tier    Database

www.example.com

This needs to be decoupled.

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# Loosely Coupled



Web Tier · Elastic Load Balancing · Elastic Load Balancing · App Tier · Database

www.example.com
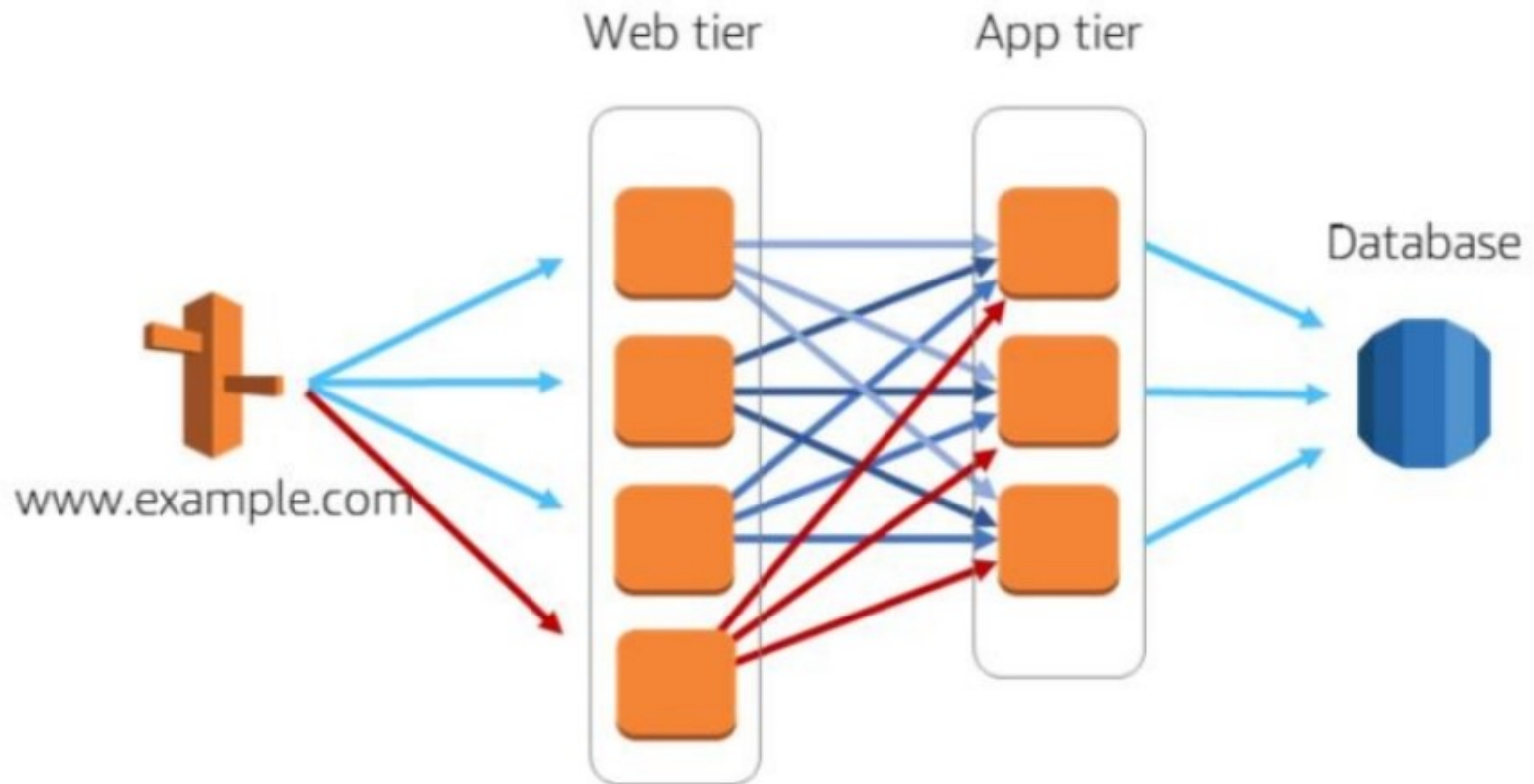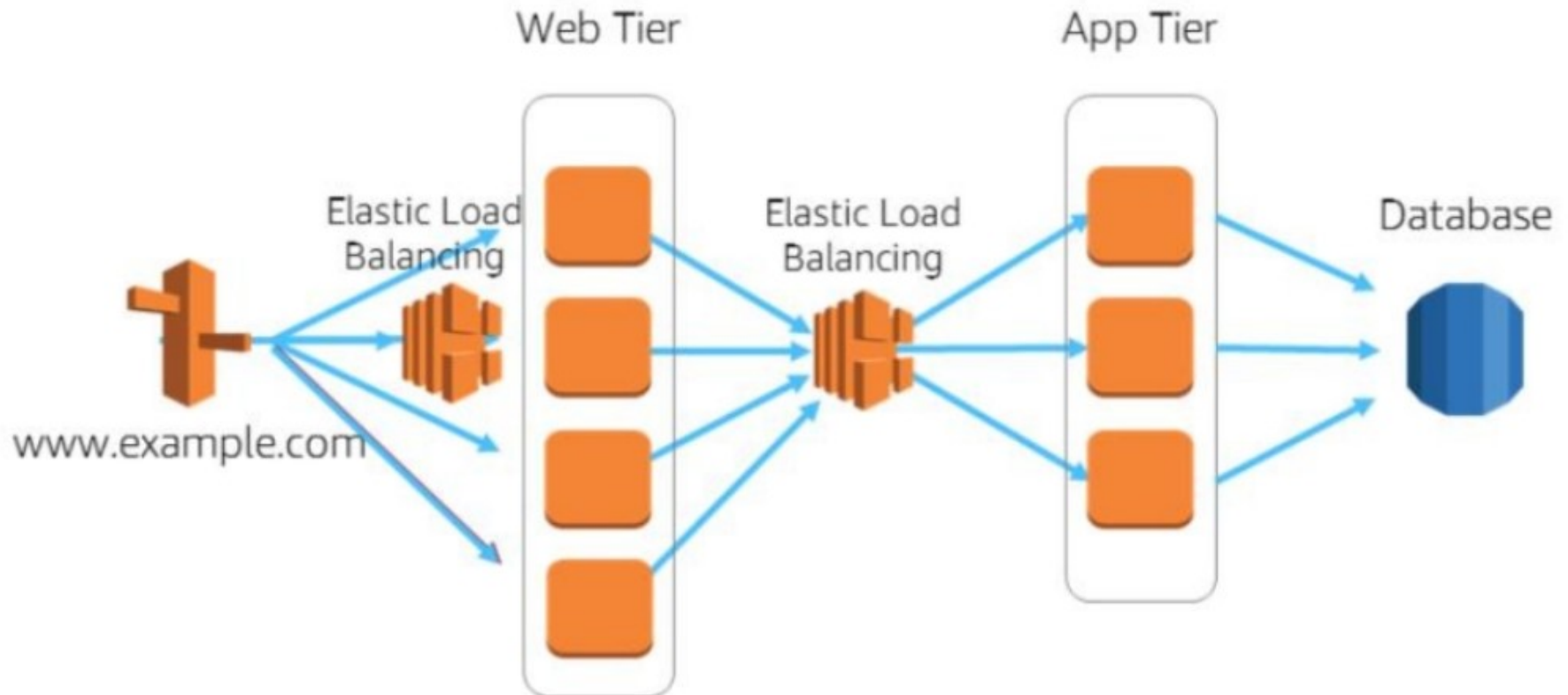
This needs to be decoupled.

# What If The App Servers Become Overloaded?



Web tier

App tier

Elastic Load Balancing

Elastic Load Balancing

Database

www.example.com
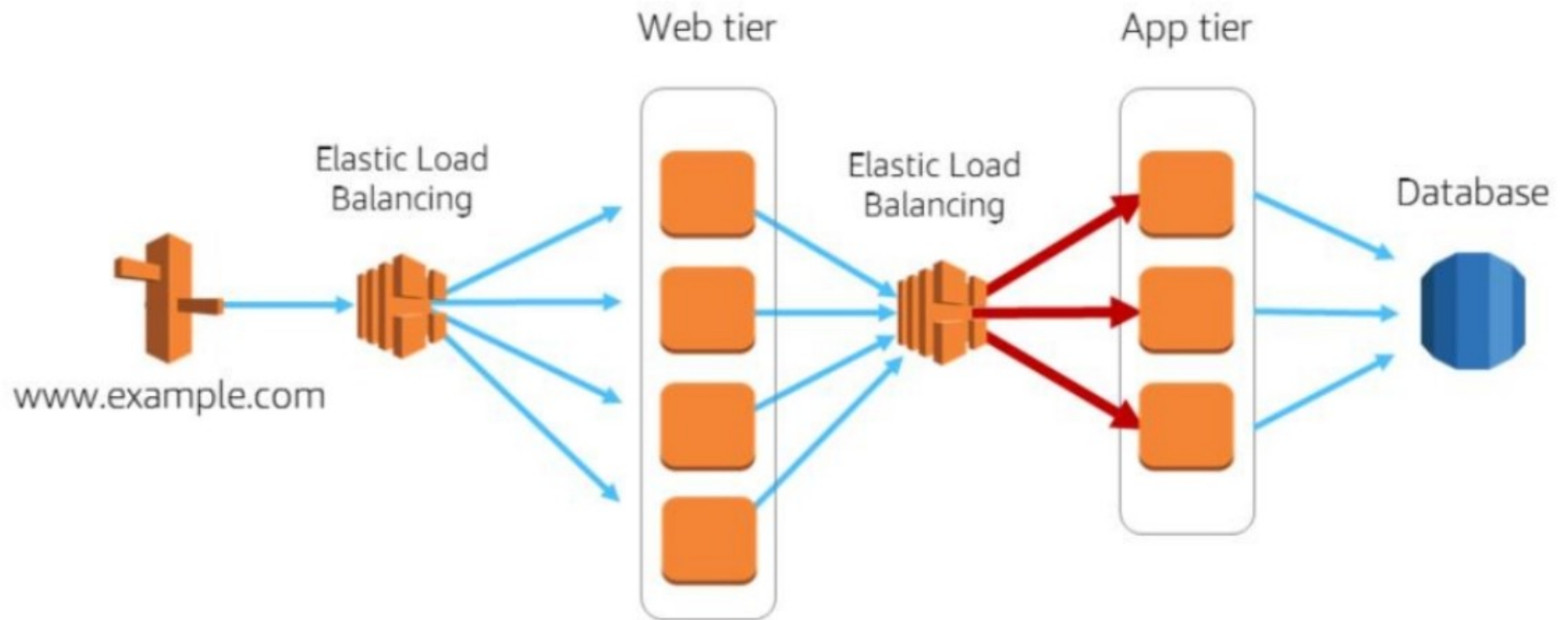
# Decoupling with Amazon SQS
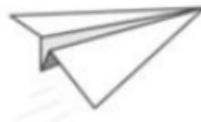
# Amazon Simple Queue Service (Amazon SQS)
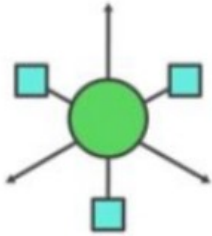
Amazon SQS

Fully managed message queueing service

Messages are stored until they are processed and deleted

Acts as a buffer between senders and receivers
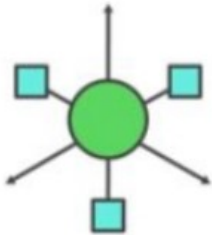
# Achieving Loose Coupling with Amazon SQS
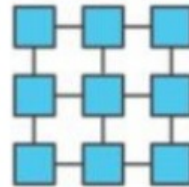
## Using SQS queues, you can:



Use asynchronous processing to get your responses from each step quickly

# Achieving Loose Coupling with Amazon SQS

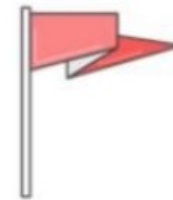## Using SQS queues, you can:

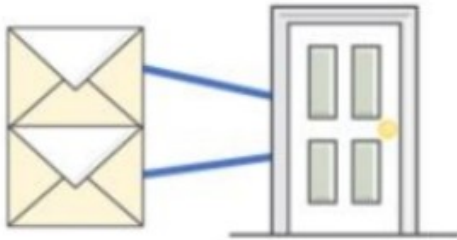Use asynchronous processing to get your responses from each step quickly

Handle performance and service requirements by increasing the number of job instances

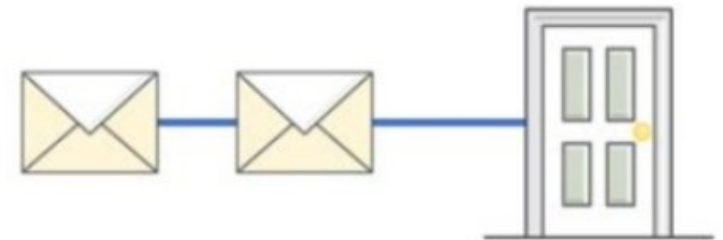Easily recover from failed steps since messages will remain in the queue
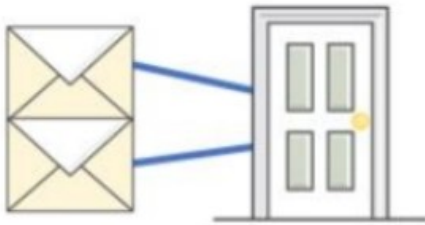
# Queue Types

Standard queues

At-least-once delivery

FIFO queues

Messages are processed exactly once
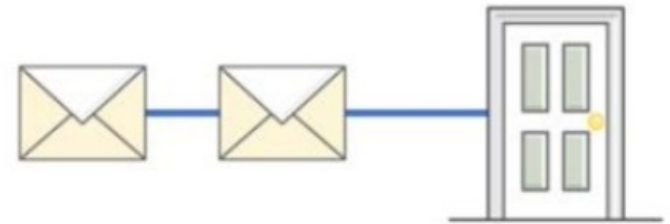
# Queue Types

## Standard queues

At-least-once delivery

Nearly unlimited number of transactions per second (TPS) per API action.

## FIFO queues

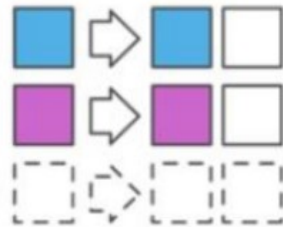Messages are processed exactly once

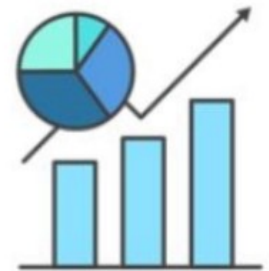Support up to 300 messages per second

# SQS General Use Cases
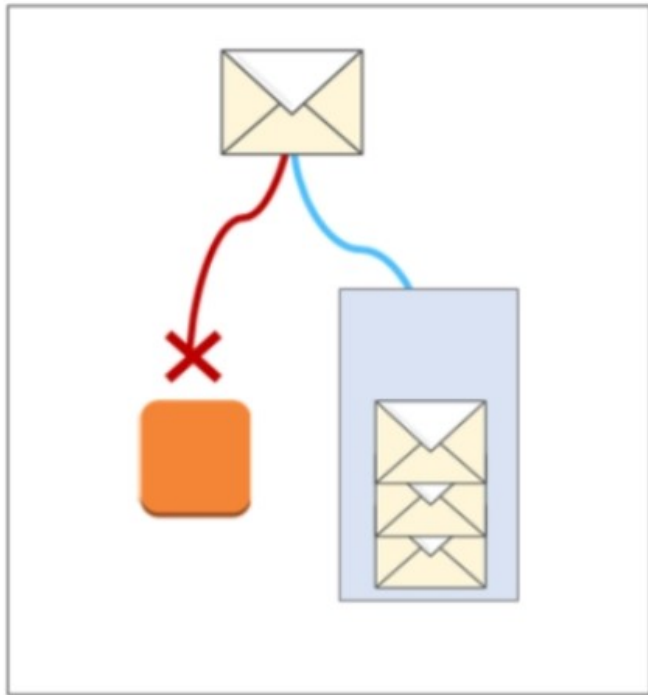
Work queues

Buffer batch operations

Request offloading

Scaling trigger
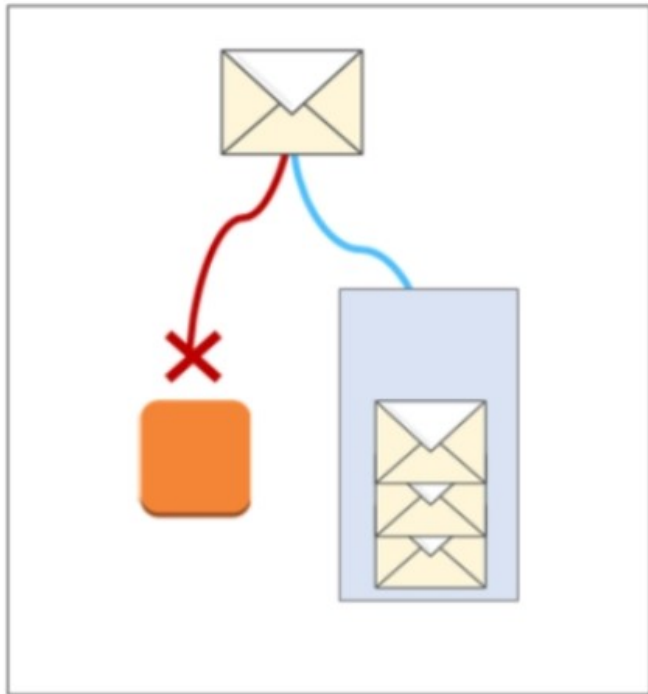
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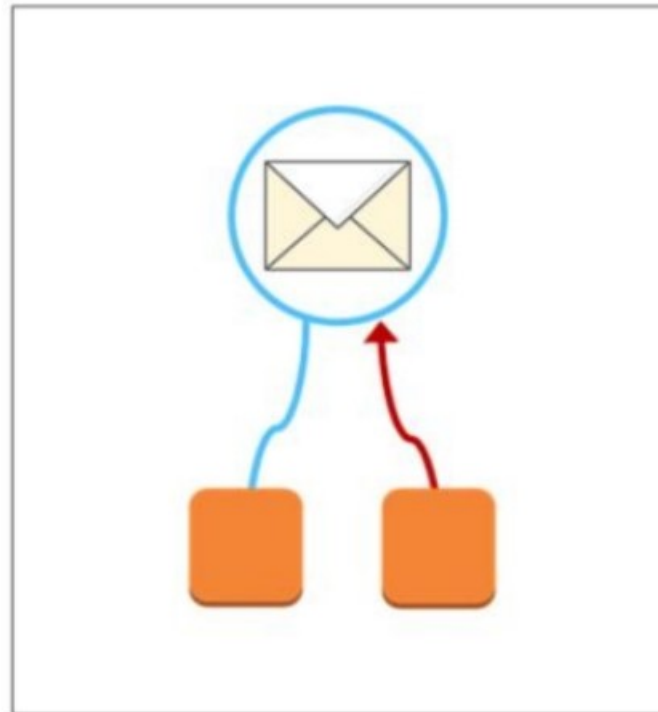# Amazon SQS Features

## Dead letter queue support

# Amazon SQS Features


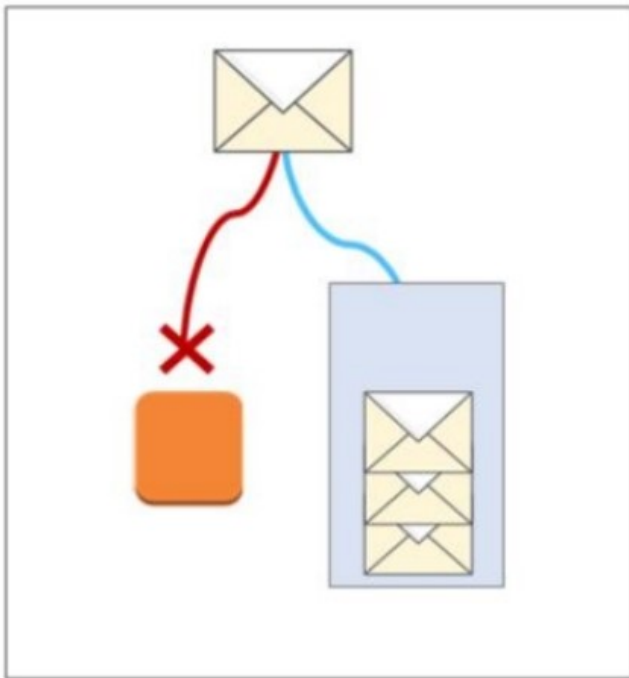
Dead letter queue support

Visibility timeout

# Amazon SQS Features



Dead letter queue support

Visibility timeout
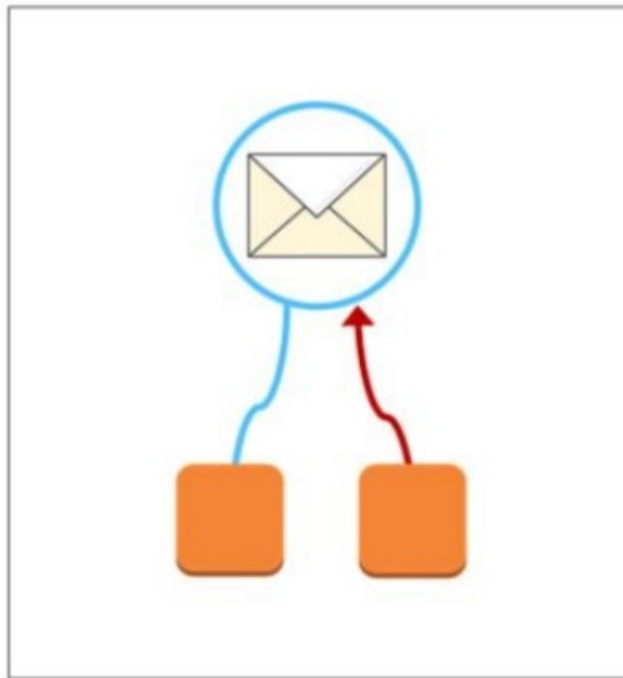
Long polling
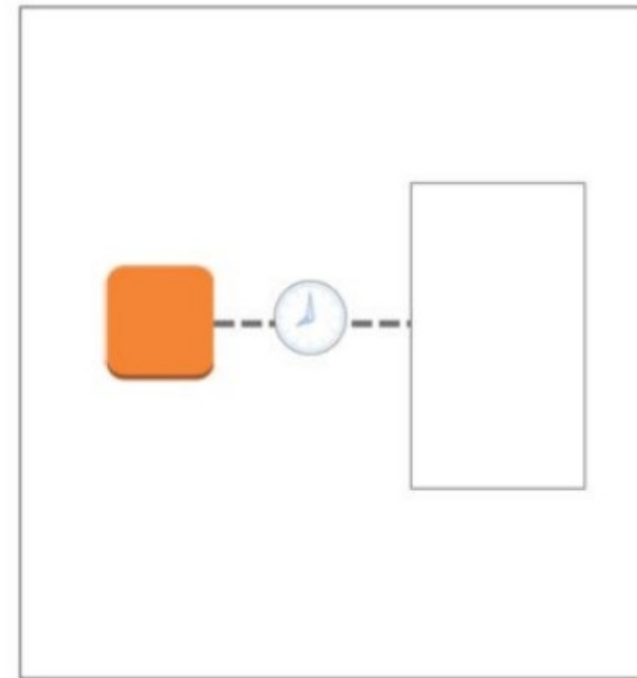
# Amazon SQS Example

# Amazon SQS Message Lifecycle



Amazon SQS servers

Producer

Queue

Consumer

① Producer sends message to queue, which gets distributed redundantly.

# Amazon SQS Message Lifecycle



Producer

Queue

Amazon SQS servers

Consumer

Message gets picked up for processing by a consumer, and visibility timeout starts.

**2**

0 5

40

Visibility timeout

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# Amazon SQS Message Lifecycle



Amazon SQS servers

Producer

Queue

Consumer

**3** Message gets deleted by the consumer after it has been processed.

Visibility timeout

0

15

40

22

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# Messaging Use Cases

✓ Service-to-service communication

✓ Asynchronous work items

✓ State change notifications

# Messaging Use Cases

✓ Service-to-service communication

✗ Selecting specific messages

✓ Asynchronous work items

✗ Large messages

✓ State change notifications

# Decoupling with Amazon SNS

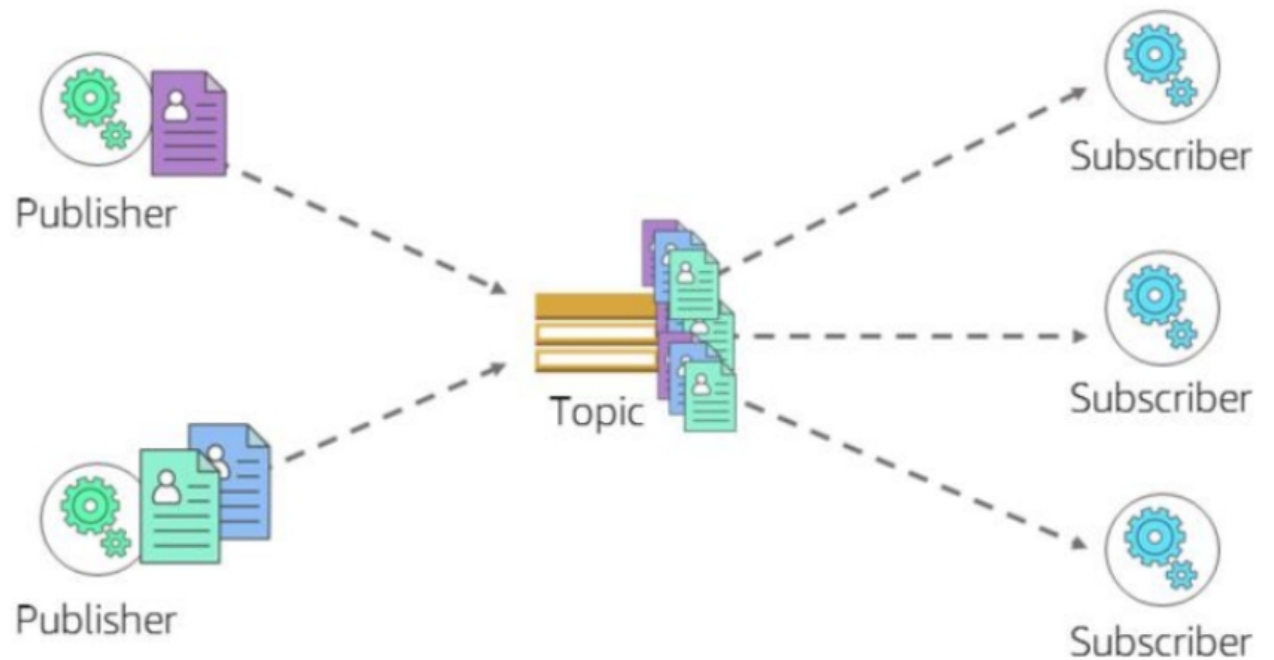# Amazon Simple Notification Service (Amazon SNS)

# Amazon SNS Subscription Types


Amazon SNS

- Email

- HTTP/HTTPS

- Short Message Service(SMS) Client

- Amazon SQS queues

- AWS Lambda functions

# General Use Cases of Amazon SNS

Application and system alerts

Push email and text messaging

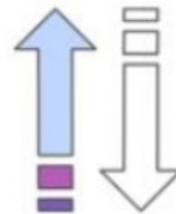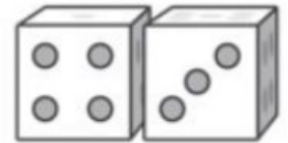Mobile push notifications

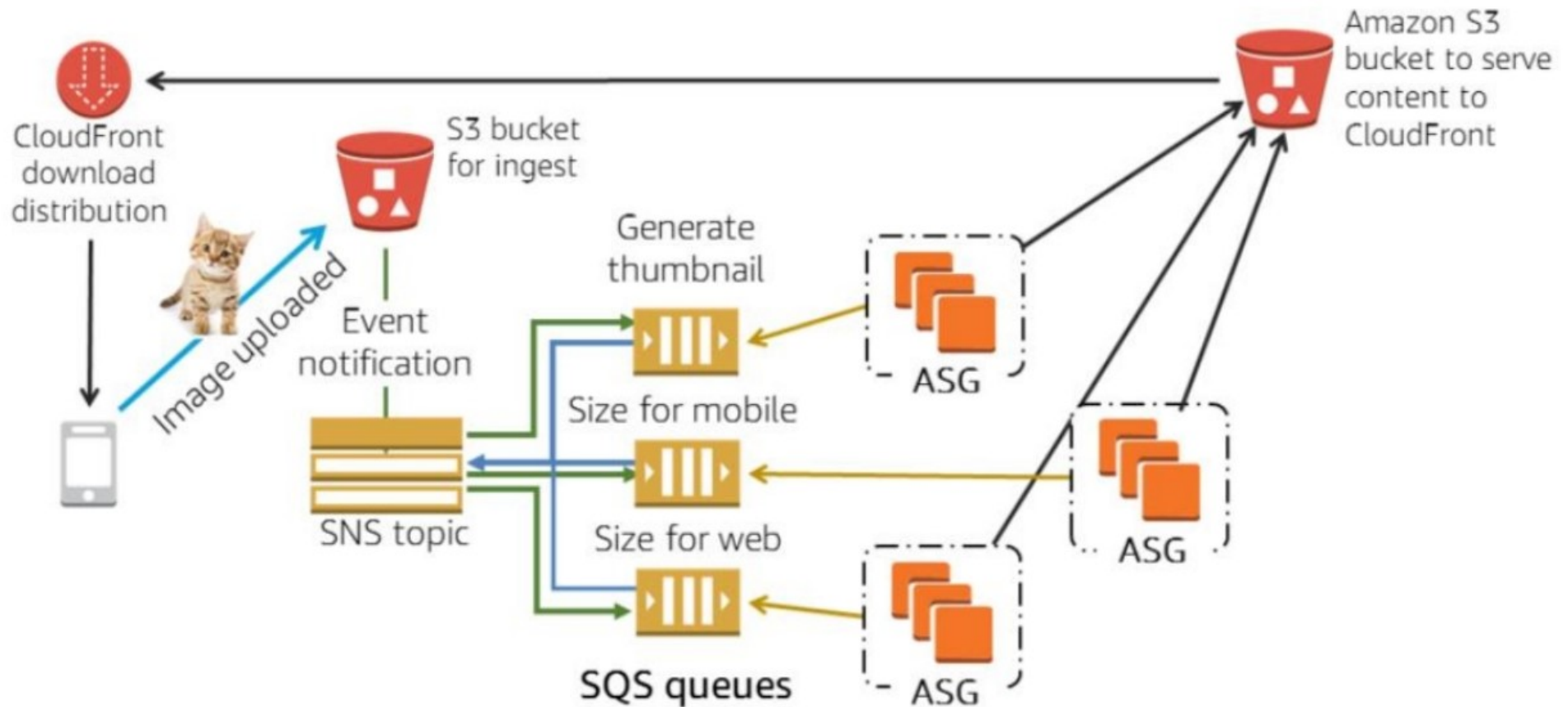# Characteristics of Amazon SNS

Single published message

No recall options

HTTP/HTTPS retry

Order and delivery not guaranteed

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# Achieving Loose Coupling with Amazon SNS and Amazon S3

# How is Amazon SNS Different from Amazon SQS

| | Amazon SNS | Amazon SQS |
|---|---|---|
| Message persistence | No | Yes |
| Delivery mechanism | Push (passive) | Poll (active) |
| Producer/consumer | Publish/subscribe | Send/receive |
| Distribution model | One to many | One to one |

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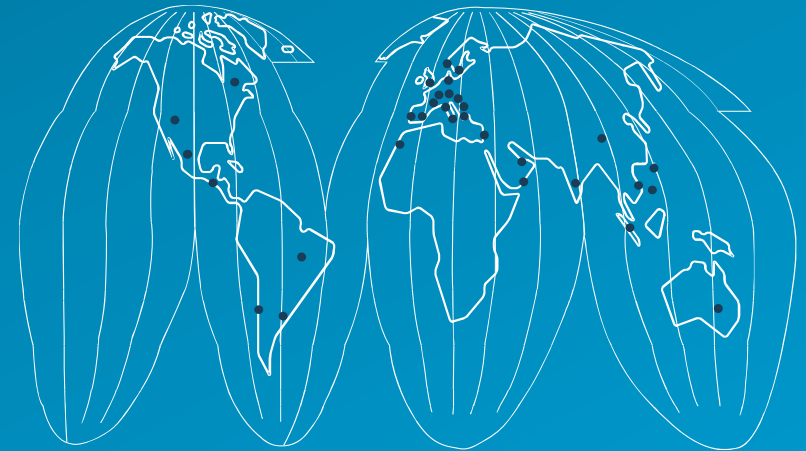## People matter, results count.

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