AWS Solutions Architect—Associate Level

Lesson 9: Application Services

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What You'll Learn

AWS Key application services

Amazon SQS workflows

SWF task coordination

SNS notification

Uses of Elastic Transcoder

Best practices for application servers
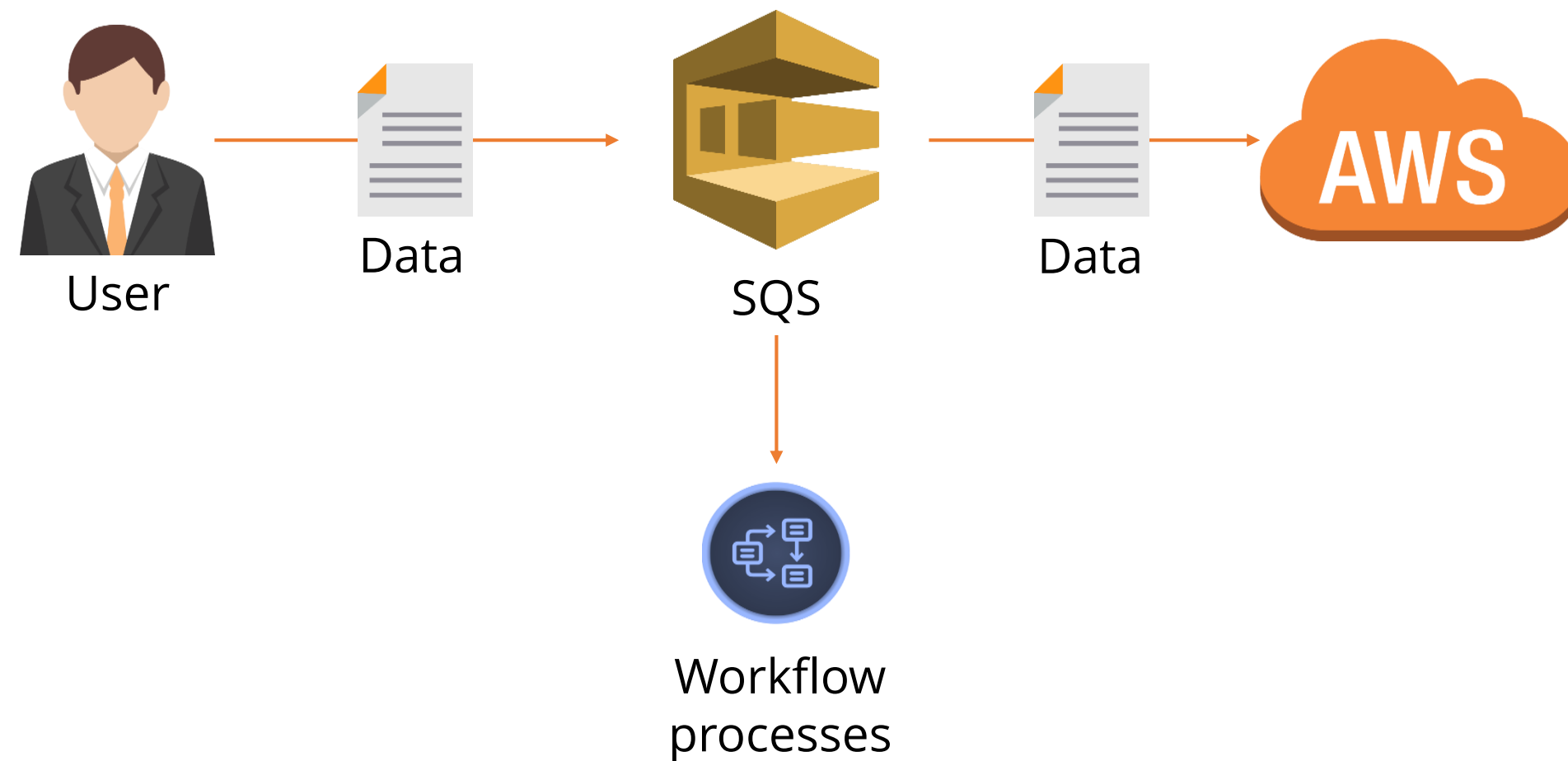
Application service costs

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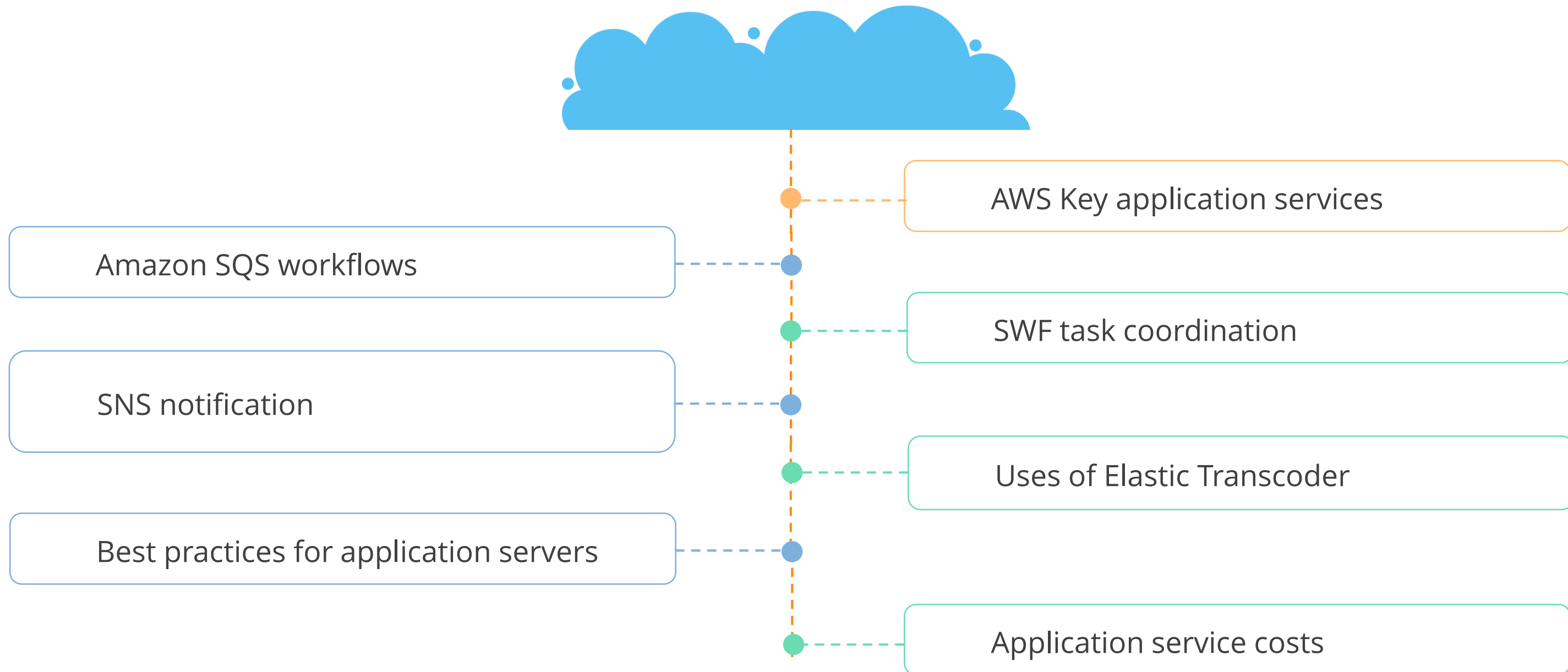
Amazon Simple Queue Service (SQS)

Details about Amazon Simple Queue Service (SQS)

Amazon Simple Queue Service

According to Amazon, "Amazon Simple Queue Service (SQS) is a fast, reliable, scalable, fully managed message queuing service."

User → Data → SQS → Data → AWS

SQS → Workflow processes

Amazon SQS was one of the first services released by AWS.

Amazon SQS Workflow

SQS allows you to decouple the components of a cloud application, which is an important concept of the AWS Well-Architected Framework.


The component producing and saving the data

SQS

The component receiving and processing the data

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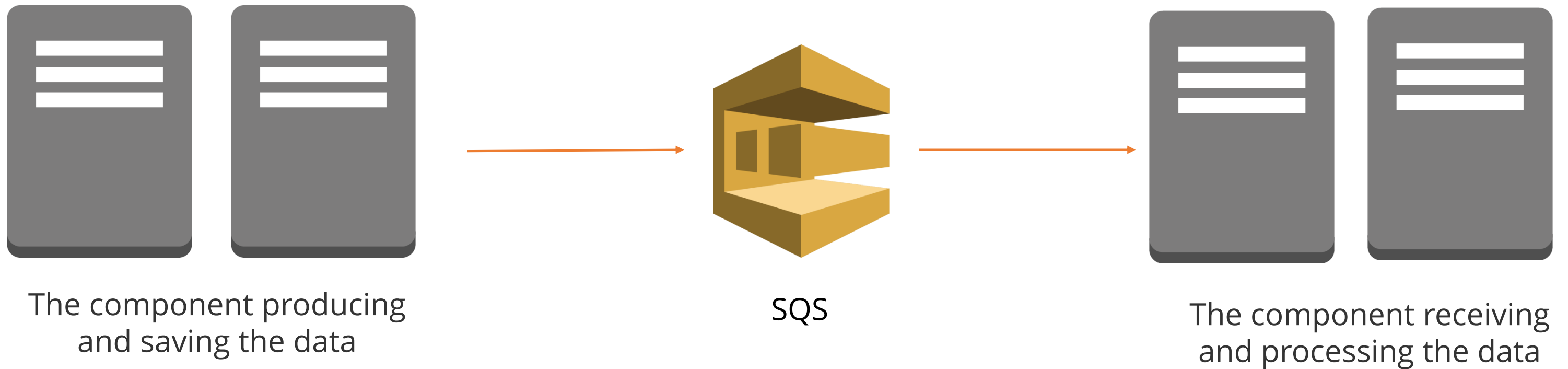
Amazon SQS Availability

● SQS is always available and ensures delivery of each message at least once.

● SQS does not guarantee first in, first out.

● If messages need to be delivered in the order they arrived, you can place sequencing information in each message.
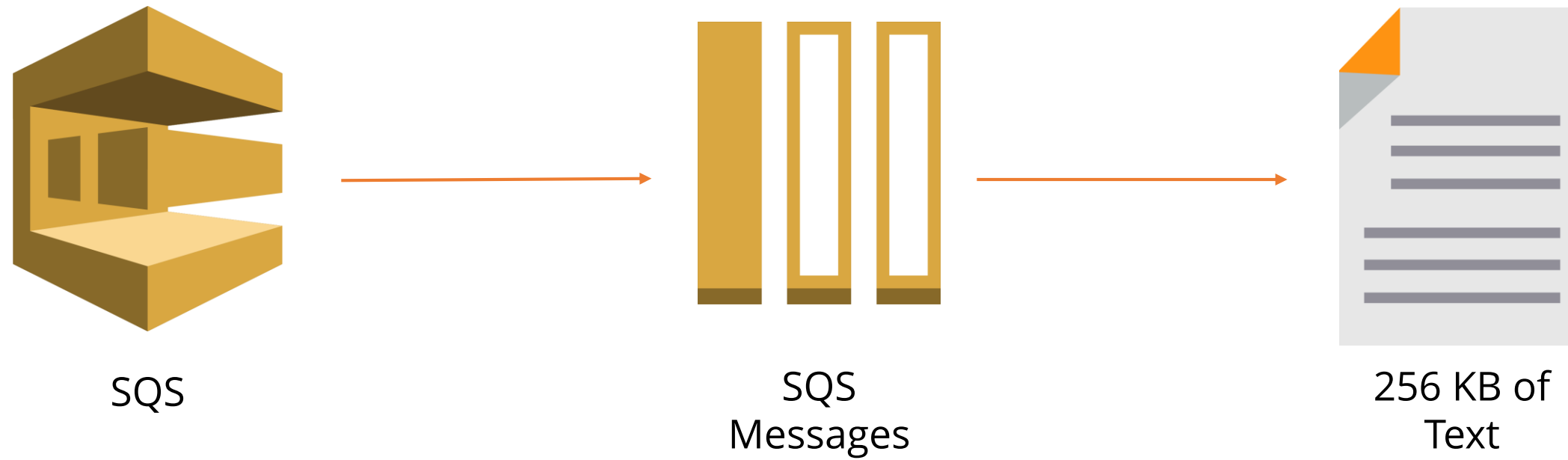
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Pull Model

Resources poll (or pull) messages from SQS. It does not push messages.
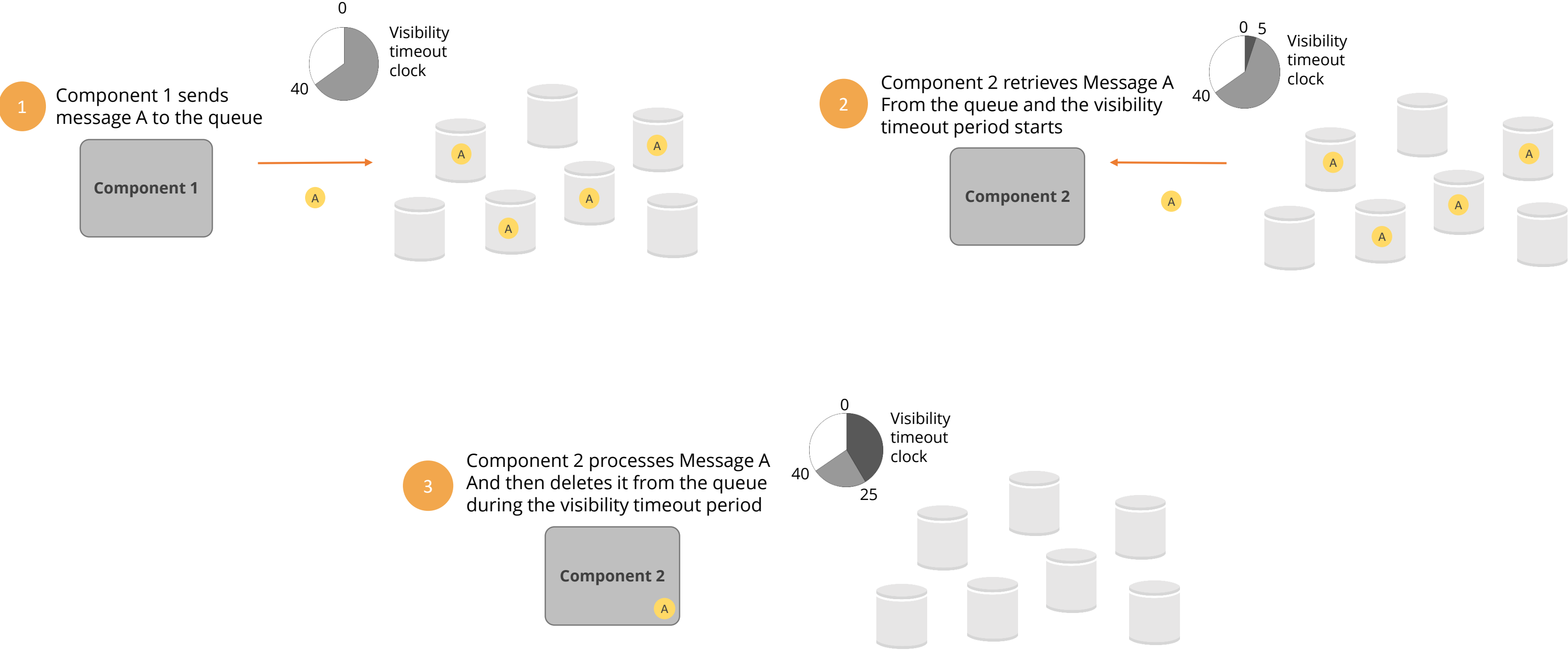
Message Queue

Message 1

Resources

SQS

Message 2

Resources

Message 3

Resources

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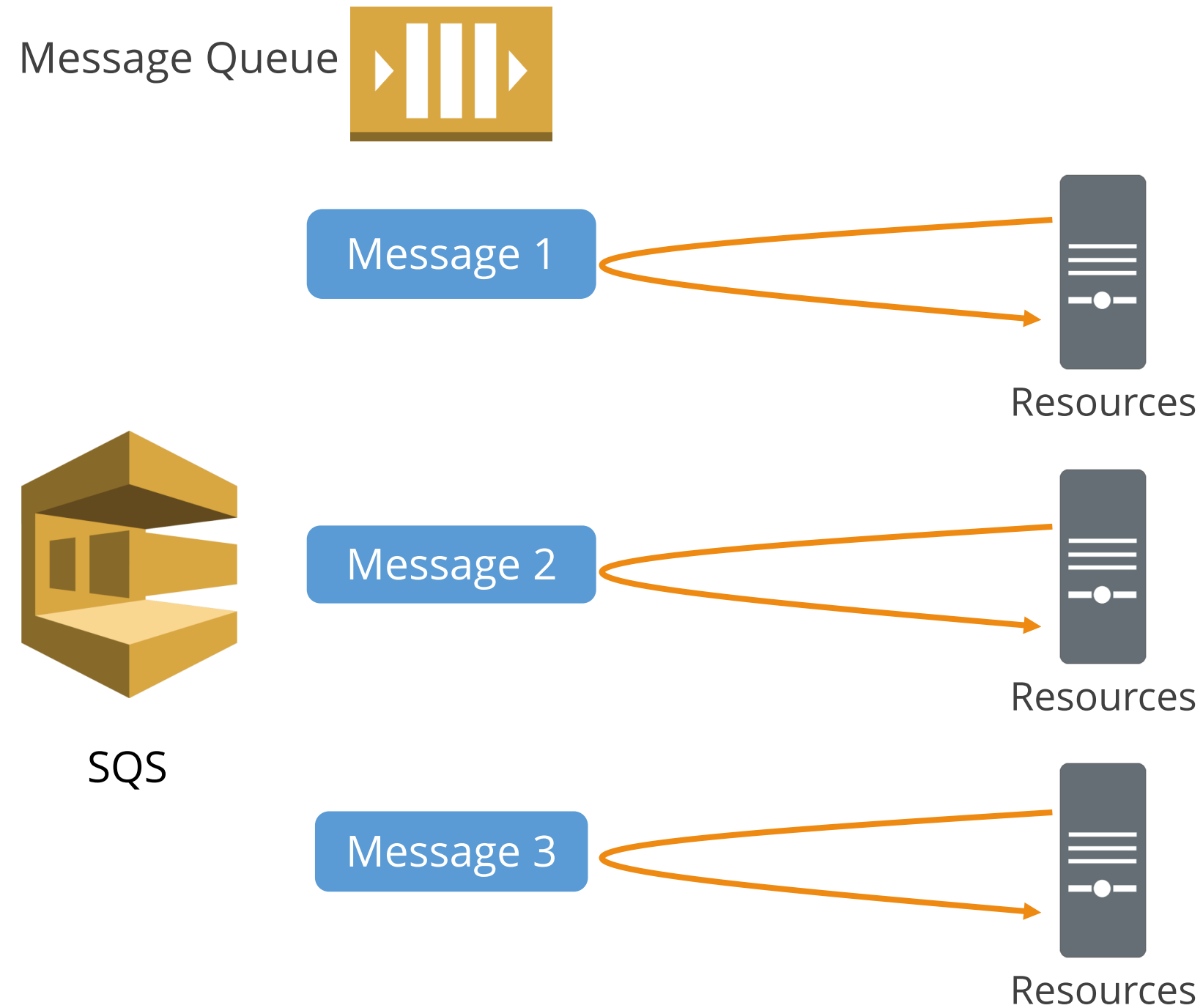
SQS Messages

Messages can contain up to 256KB of text and are billed in 64KB chunks.

SQS

SQS
Messages

256 KB of
Text

SQS Message Lifecycle

Guaranteed delivery is ensured using visibility timeout clock.

1 Component 1 sends message A to the queue

Visibility timeout clock
0
40

Component 1

A

A

A

A

2 Component 2 retrieves Message A From the queue and the visibility timeout period starts

Visibility timeout clock
0 5
40

Component 2

A

A

A

A

A

A

3 Component 2 processes Message A And then deletes it from the queue during the visibility timeout period

Visibility timeout clock
0
40
25

Component 2

A

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SQS Auto Scaling

Amazon SQS provides Auto Scaling. If the queue becomes too large, you can configure SQS to launch more instances.

Message 1

Message 2

SQS

Message 3

Resources

Resources

Message 4

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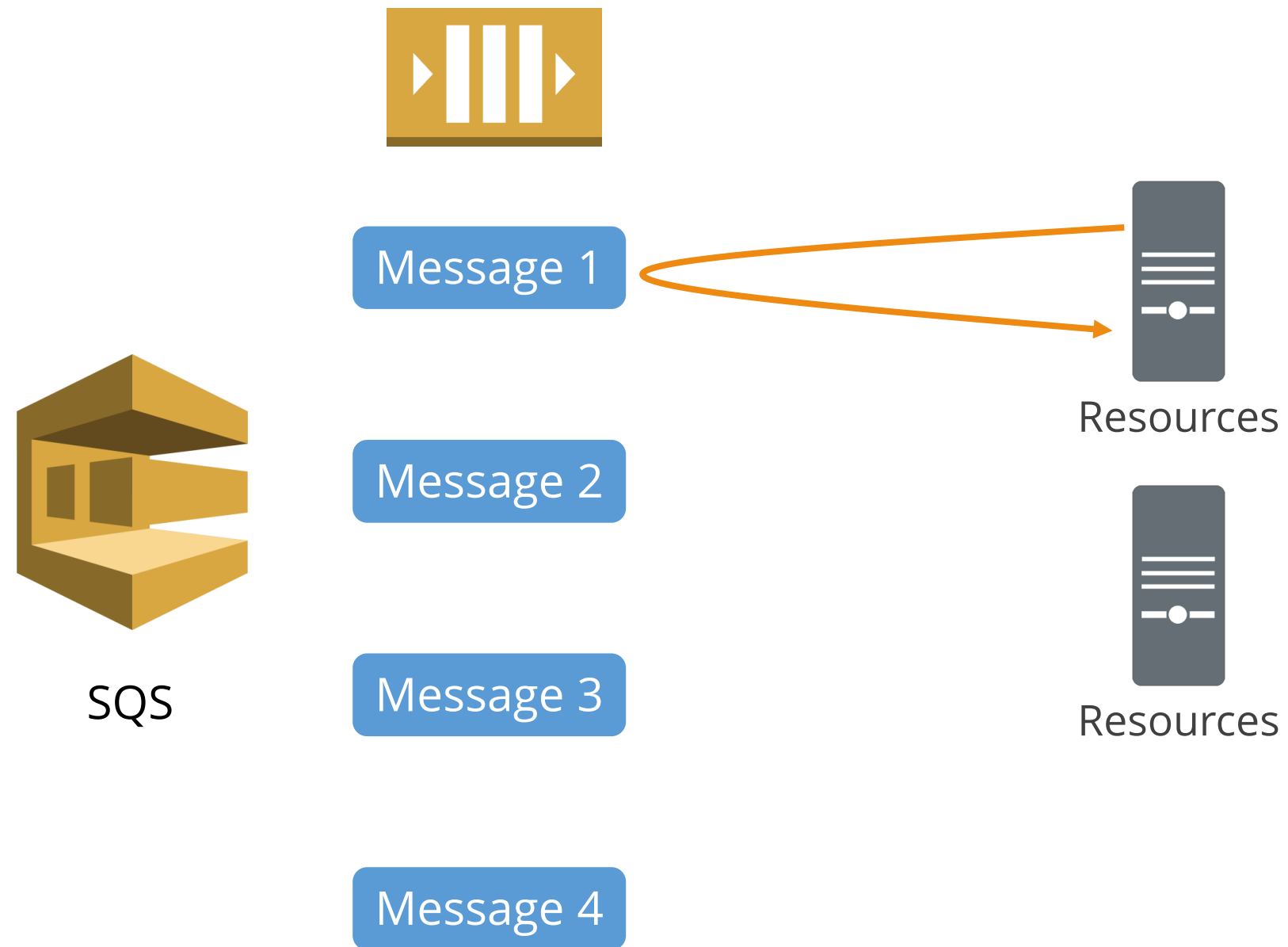
SQS Key Points

The key features of SQS:

01   Does not support First In, First Out

02   Visibility timeout clock is up to 14 days

03   Messages are guaranteed to be delivered at least once

04   Messages are in the size of 256KB, which is billed in 64KB chunks

05   Decouples your infrastructure

Knowledge Check

KNOWLEDGE CHECK	Amazon SQS ensures that each message is _____.

a. Pushed to resources at least once

b. Available to resources on a First In, First Out basis

c. Guaranteed to be delivered at least once

d. Only delivered once to resources

KNOWLEDGE CHECK	Amazon SQS ensures that each message is _____.

a. Pushed to resources at least once

b. Available to resources on a First In, First Out basis

c. Guaranteed to be delivered at least once

d. Only delivered once to resources

The correct answer is   **c**
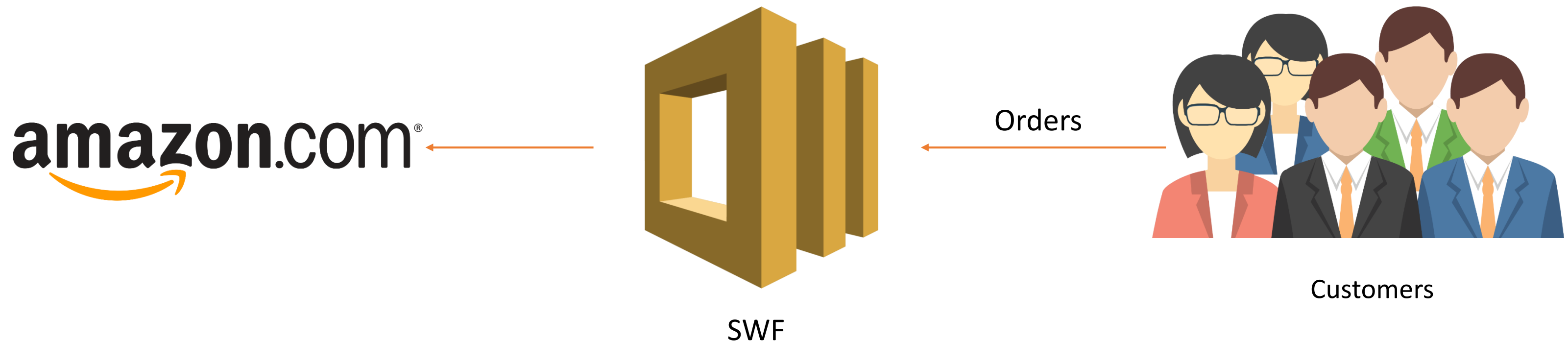
Amazon SQS guarantees that all messages are delivered at least once using a poll based model.

AWS Application Services

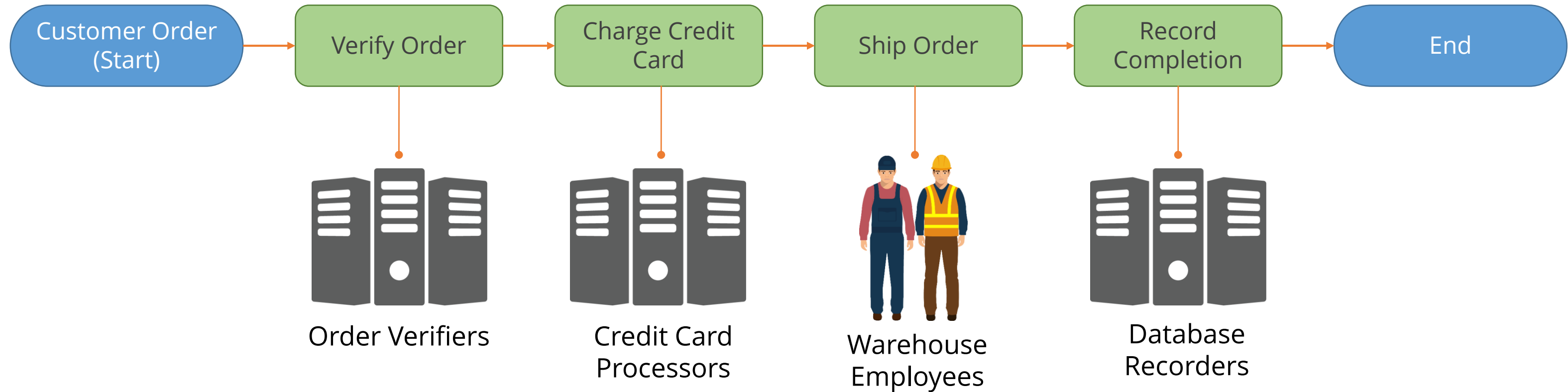Details about Amazon Application Services

Amazon Simple Workflow Service

According to Amazon, "Amazon SWF helps developers build, run, and scale background jobs that have parallel or sequential steps. You can think of Amazon SWF as a fully-managed state tracker and task coordinator in the Cloud."
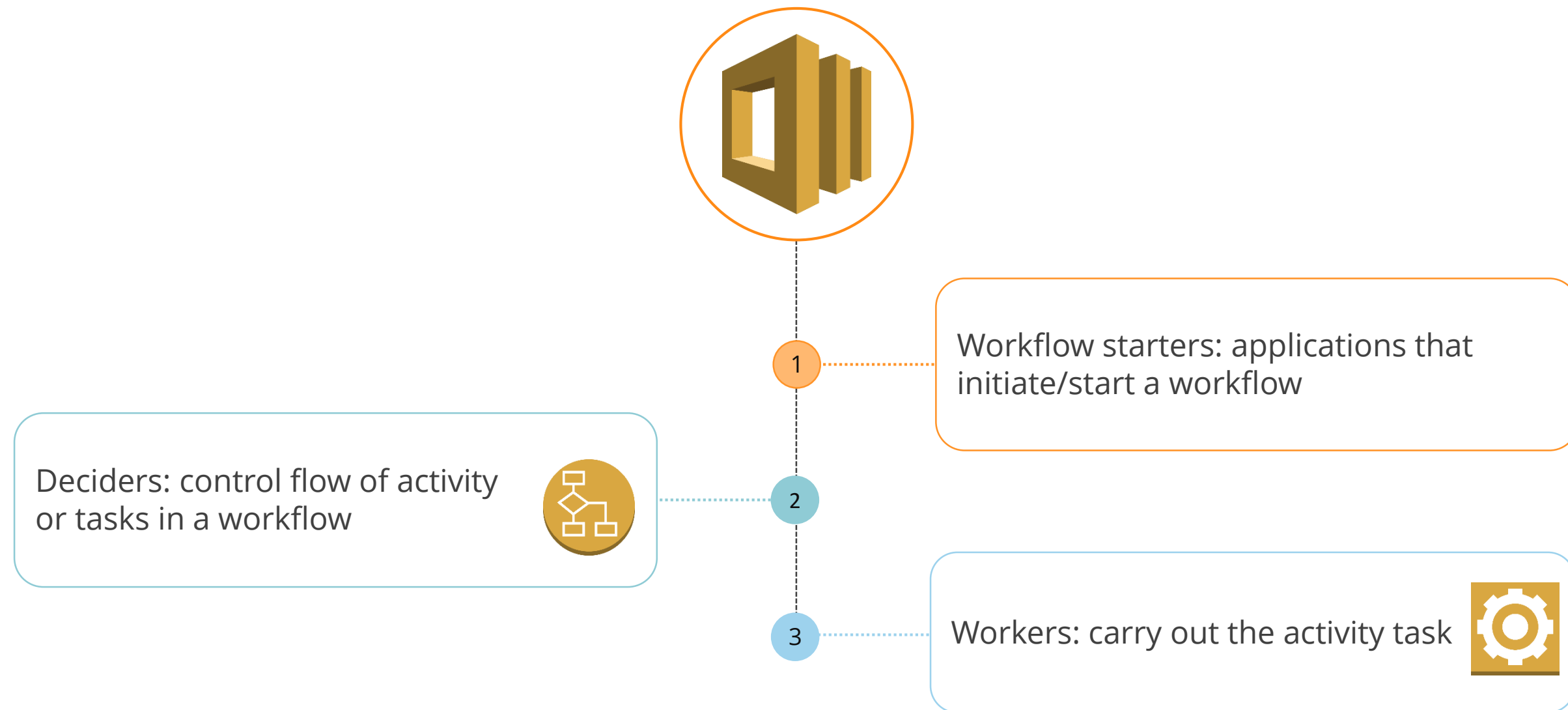
amazon.com®

←

SWF

← Orders

Customers

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Amazon SWF Example

Amazon.com uses SWF to manage its online orders.

SWF Actors

1. Workflow starters: applications that initiate/start a workflow

2. Deciders: control flow of activity or tasks in a workflow

3. Workers: carry out the activity task

SWF versus SQS

A comparison between SWF and SQS:

	SWF	SQS
Message Retention Period	Up to 1 year	Up to 14 days
API	Task oriented	Message oriented
Delivery	Assigned once Never duplicated	Message can be delivered more than once
Tracking	Keeps track of all tasks and events	Need to create your own application-level tracking

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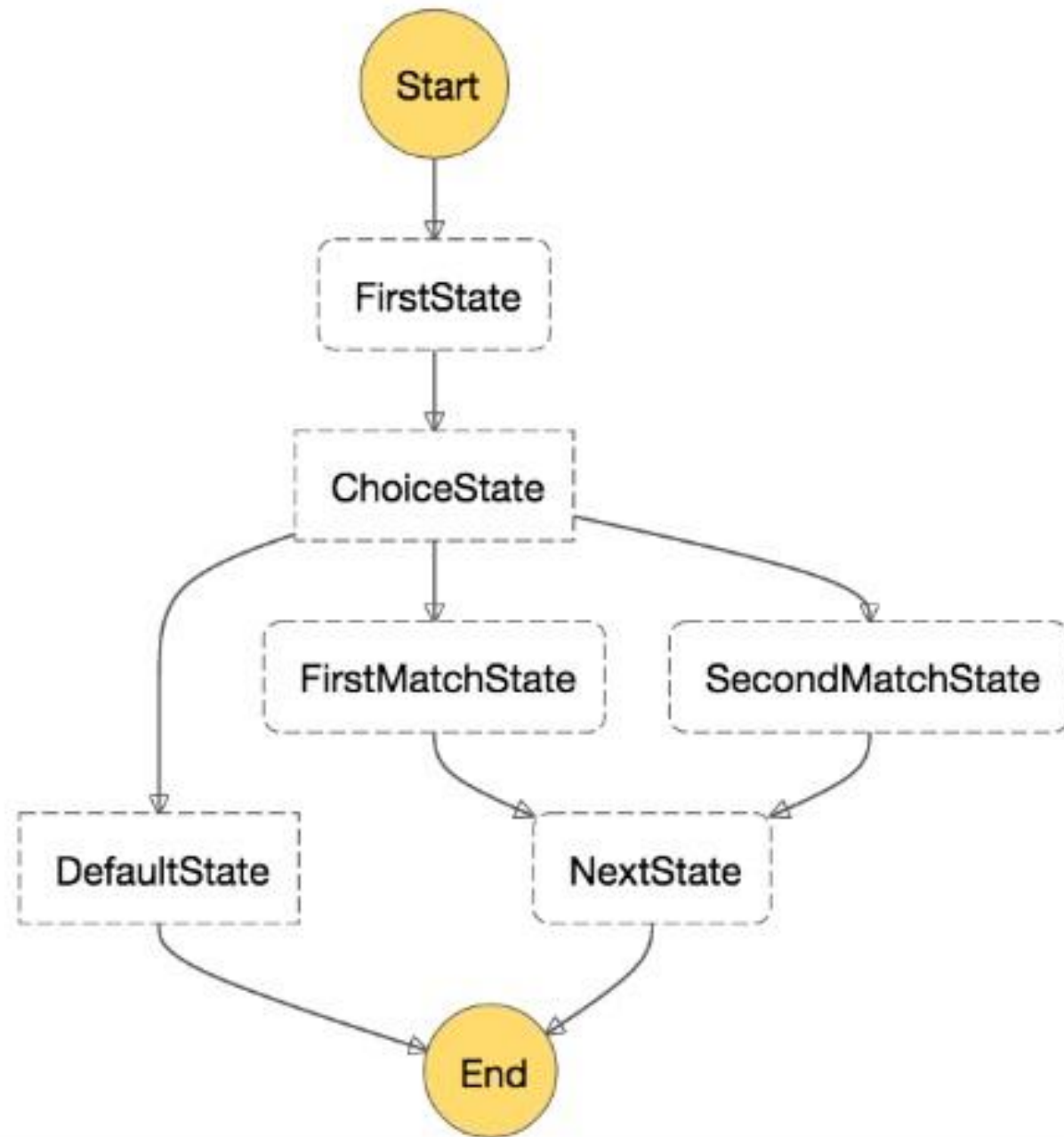
Step Functions

- A fully managed service that makes it easy to coordinate the components of distributed applications and microservices using visual workflows

- Announced in AWS re:Invent 2016.

- AWS recommends using AWS Step Functions for all new applications

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Knowledge Check

| KNOWLEDGE CHECK | How long is an Amazon SWF message valid? |

a. Up to 12 months

b. Up to 14 days

c. 12 months exactly

d. 4 days

How long is an Amazon SWF message valid?

a. Up to 12 months

b. Up to 14 days

c. 12 months exactly
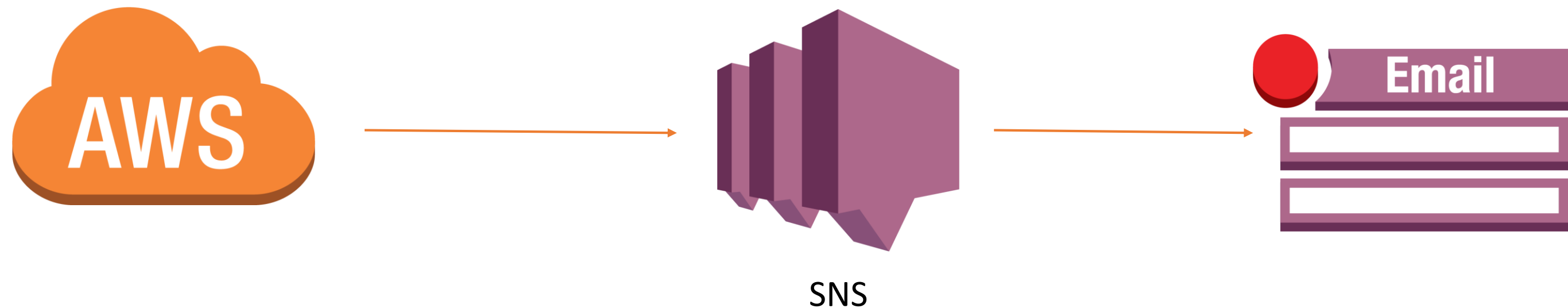
d. 4 days

The correct answer is **a. Up to 12 months**

Amazon SWF messages are valid for up to 12 months.

Amazon Simple Notification Service (SNS)

Details about Amazon SNS

Amazon SNS

According to Amazon, "Amazon SNS is a fully managed publication-subscription based messaging service used to send push notifications, email, and SMS messages."
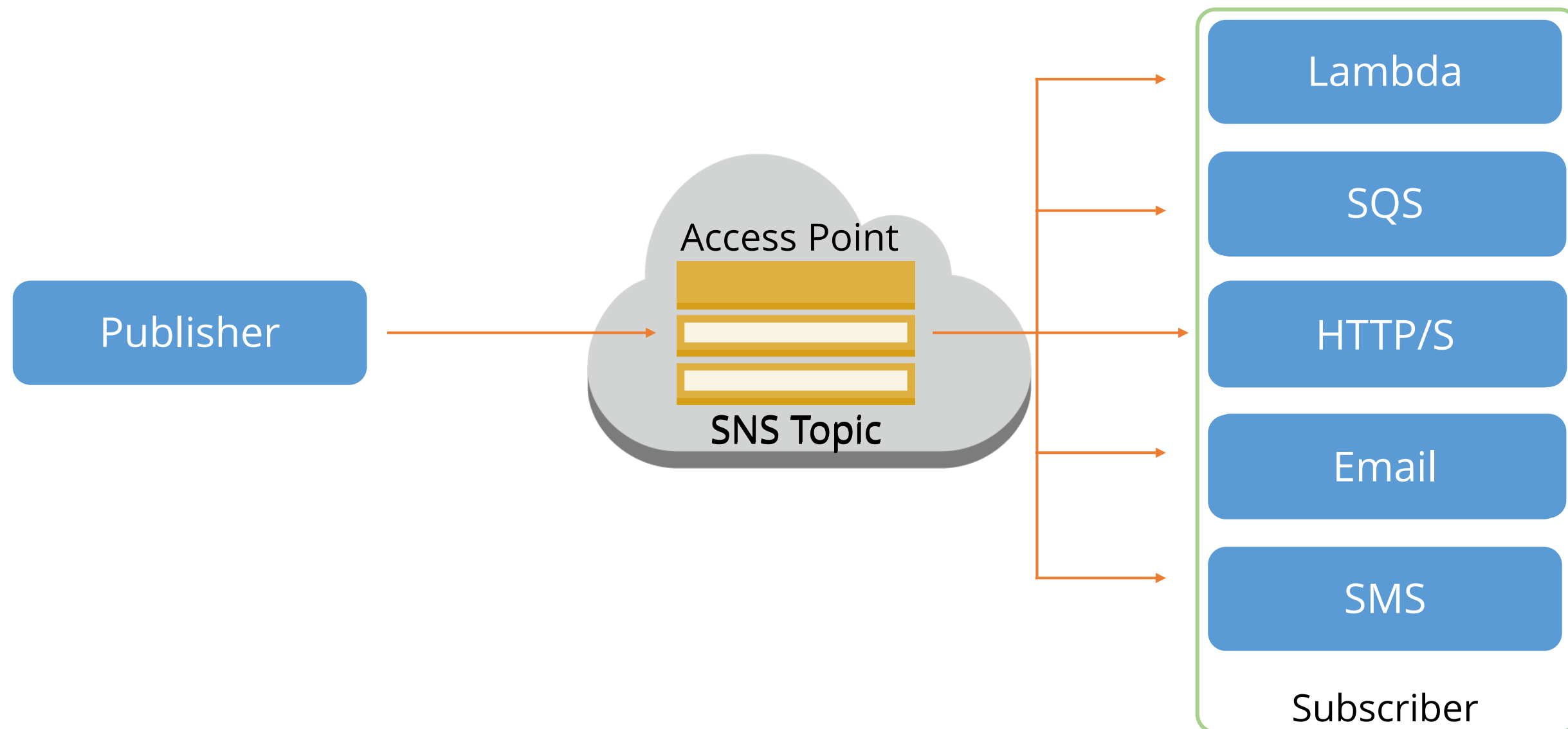

SNS

Push Model

Push notifications can be sent to operating systems running on mobile devices for example, iOS, Android, Firefox, Windows, and so on.
Push notifications can be sent to email, SMS, lambda functions, or to any HTTP endpoint.

SNS

Alarm

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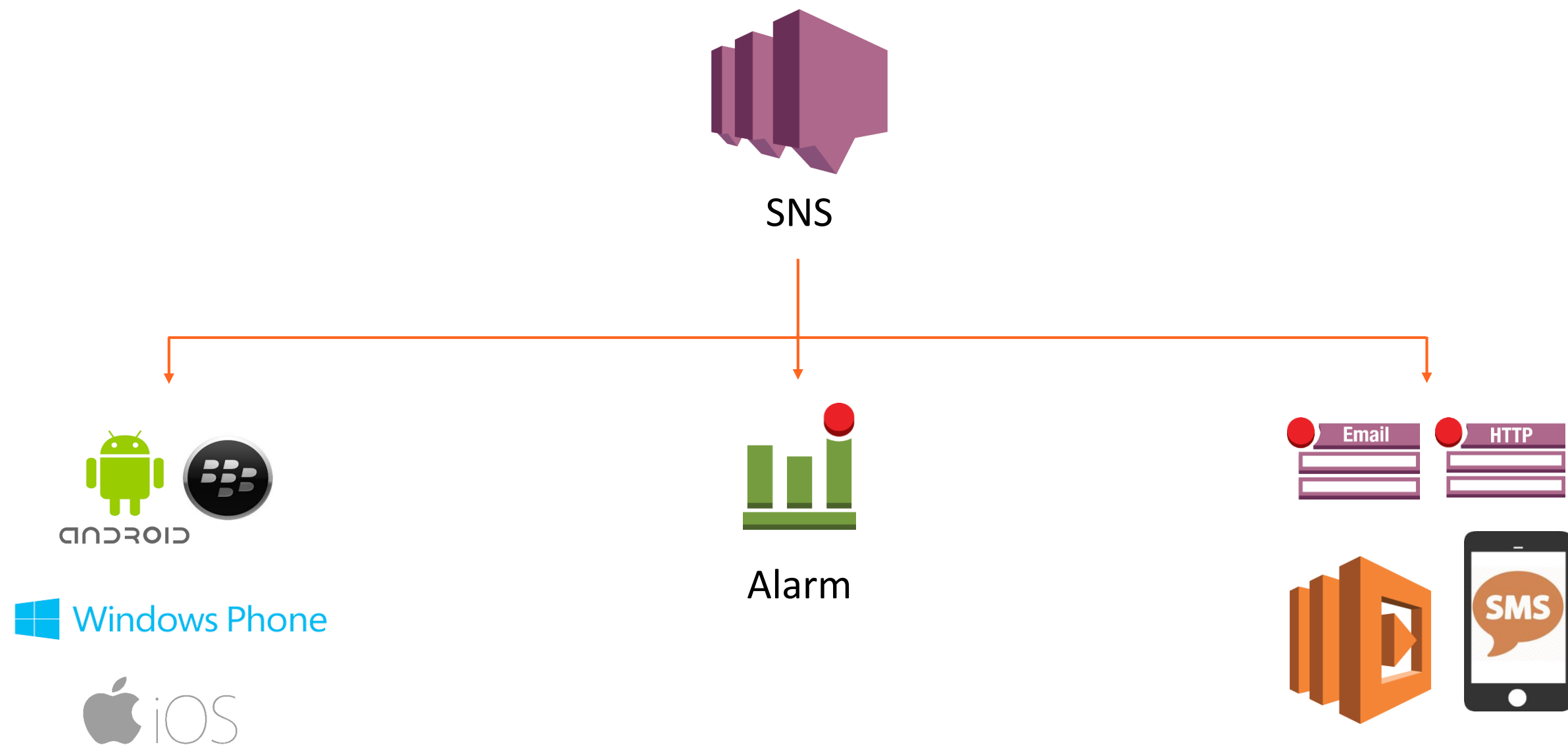
SNS Topics

An SNS topic is a communication channel that allows you to send messages and subscribe to notifications.

SNS Features

The SNS features are:

- Instantaneous push based delivery

- Multiple transfer protocol

- A pay-as-you-go model

- A simple web-based interface

- Messages stored redundantly across multiple availability zones

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SNS versus SQS

A comparison between SNS and SQS:

SNS	SQS
PUSH based	POLL based (PULL)
Allows applications to send time-critical messages to multiple subscribers	A service used by distributed applications to exchange messages

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Demo 1: Amazon SNS

Demonstrate how to configure Amazon SNS to send notifications

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Knowledge Check

To which of the following Amazon services is SNS unable to send messages to?

a. SMS

b. Amazon S3

c. Lambda

d. HTTP Endpoints

To which of the following Amazon services is SNS unable to send messages to?

a. SMS

b. Amazon S3

c. Lambda

d. HTTP Endpoints

The correct answer is   **b**

Amazon SNS can send messages from Amazon S3, but not directly to Amazon S3.

Amazon Elastic Transcoder

Overview of Amazon Elastic Transcoder

Amazon Elastic Transcoder

Amazon Elastic Transcoder is a media transcoding service in the Cloud.

Media files

Amazon Elastic
Transcoder
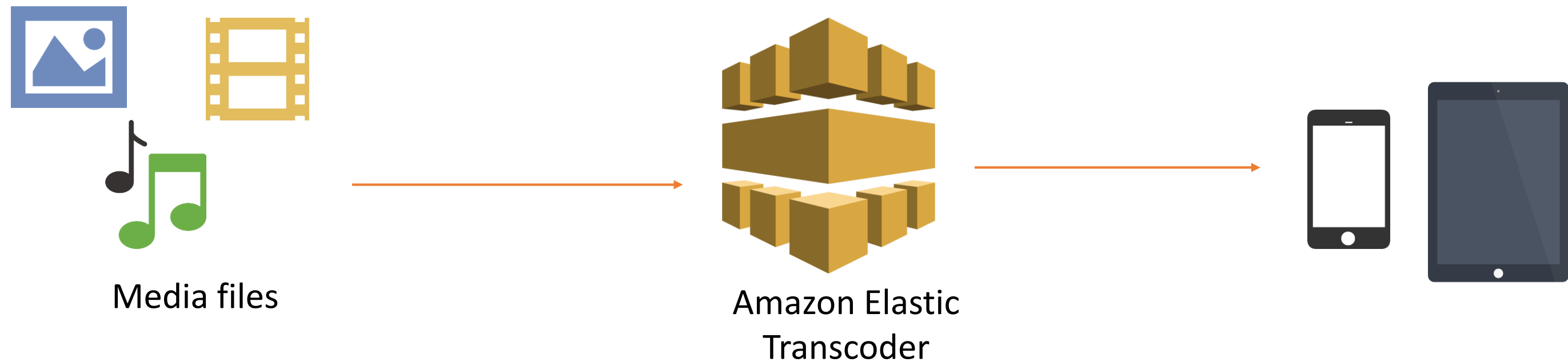
Elastic Transcoder Example

A media company creates a new MP4 video for distribution online. You can upload the video to an S3 bucket and configure Elastic Transcoder to pick it up and convert it into a range of other specified formats. The new formats are saved back into an Amazon S3 bucket.

Media Company

MP4 Video

S3 Bucket

Amazon Elastic Transcoder

3GP

AAC

AVI

MPEG-2

FLV

S3 Bucket

Users

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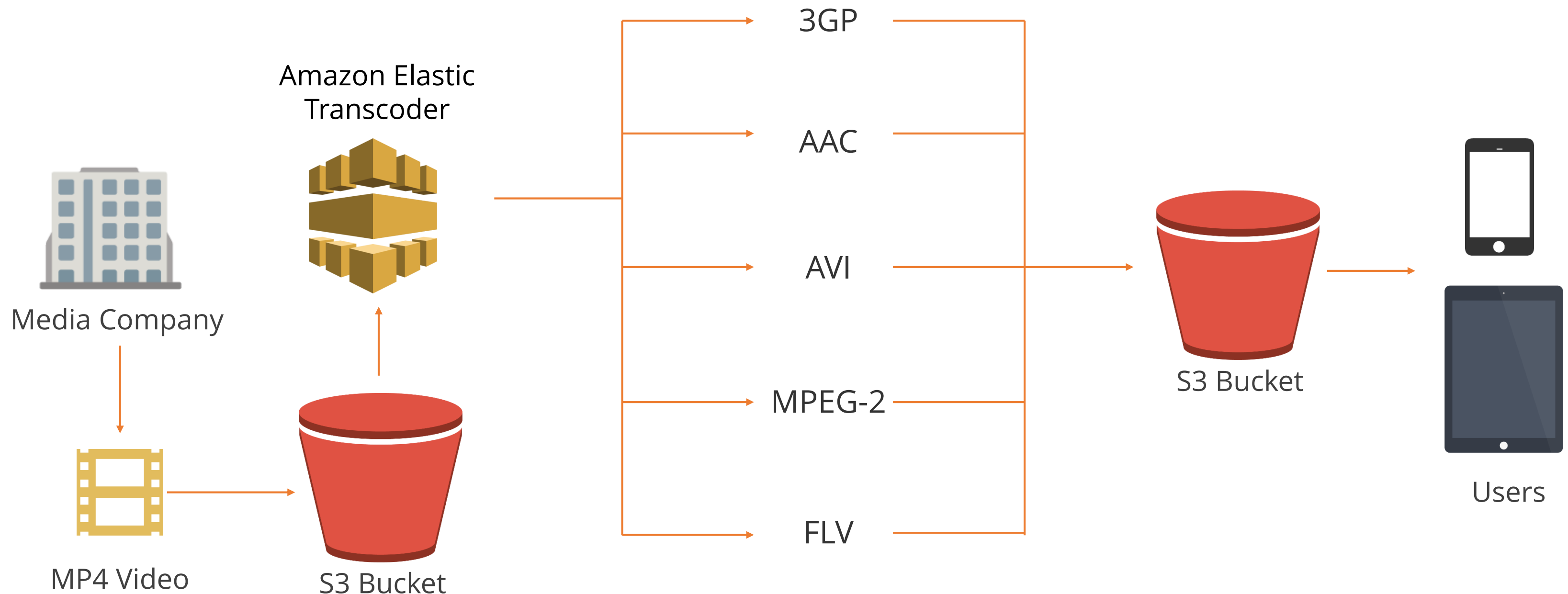
Knowledge Check

KNOWLEDGE CHECK	What is Amazon Elastic Transcoder used for?

a. Streaming real time media

b. Storing media files cost effectively

c. Converting media files to different formats

d. Providing low latency media content to end users

What is Amazon Elastic Transcoder used for?

a. Streaming real time media

b. Storing media files cost effectively

c. Converting media files to different formats

d. Providing low latency media content to end users

The correct answer is   **c**

Elastic Transcoder is used to convert media files from original format into other formats that will play on smartphones, tablets, and so on.

Amazon WorkSpaces

Overview of Amazon WorkSpaces

Amazon WorkSpaces Overview

Amazon WorkSpaces is a fully managed, secure Desktop-as-a-Service solution which runs on AWS.
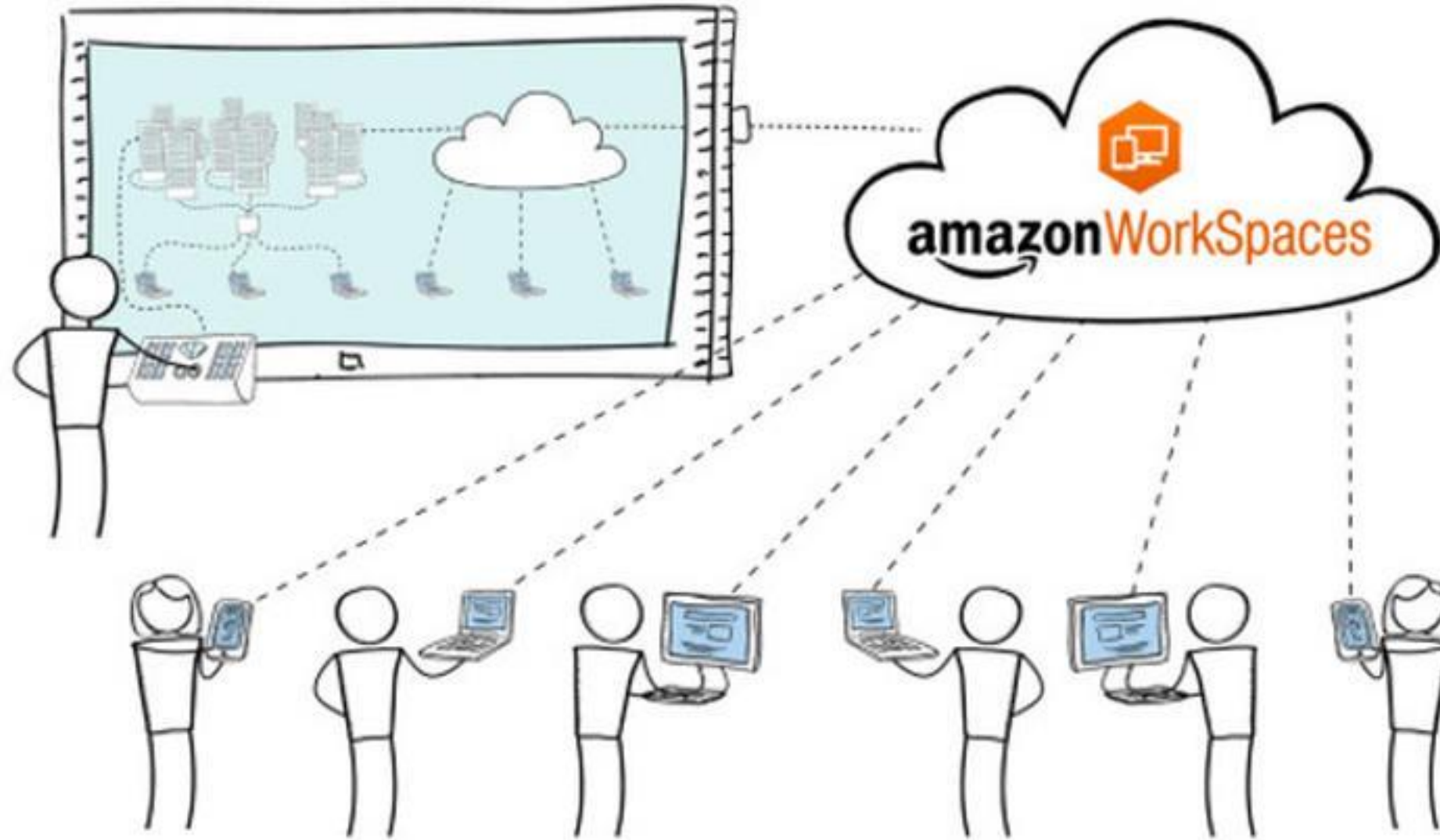
Amazon WorkSpaces Benefits

No need to buy your own hardware

No need to support and manage your own hardware

Fully scalable, can launch and terminate virtual desktops in minutes

Can be accessed from anywhere; from most operating systems and devices

User data backed up every 12 hours

Users do not need an AWS account

Can create your own desktop images for easy deployment

Disk volumes can be encrypted

Amazon WorkSpaces Details

Available in Windows 7 or 10

Bring your own license available

Monthly or hourly pricing available

Variety of different bundles available

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Amazon WorkSpaces Details

Value

- 1 vCPU, 2 GiB memory
- 10 GB storage (SSD)
- Utilities software bundle

Standard

- 2 vCPU, 4 GiB memory
- 50 GB storage (SSD)
- Utilities software bundle

Performance

- 2 vCPU, 7.5 GiB memory
- 100 GB storage (SSD)
- Utilities software bundle

Graphics

- 8 vCPU, 15 GiB memory
- 1 GPU, 4 GiB video memory
- 100 GB storage (SSD)
- Utilities software bundle

Knowledge Check

How often are Amazon WorkSpaces user volumes backed up?

a. Every 24 hours

b. Weekly

c. Every 12 hours

d. Never

The correct answer is

How often are Amazon WorkSpaces user volumes backed up?

a. Every 24 hours

b. Weekly

c. Every 12 hours

d. Never

The correct answer is   **c) Every 12 hours**

Amazon WorkSpaces backups user volumes every 12 hours.

Application Services Best Practices and Costs

Overview of AWS recommended Application Services best practices and the associated costs

SQS Best Practices

The AWS recommended Application Services best practices are:

SQS	• Use SQS to help you architect stateless applications and to use asynchronous integration.
SWF	• Use SQS to create a message queue so that resources can process a task and send the information back to SQS.
SNS	• Asynchronous integration involves the use of an intermediate storage layer like SQS.

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SWF Best Practices

The AWS recommended Application Services best practices are:

SQS **SWF** **SNS**	• Use SWF when you need to coordinate and track tasks that have parallel or sequential steps and involve more than just AWS resources. • SWF is best used to coordinate tasks without a given framework.

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SNS Best Practices

The AWS recommended Application Services best practices are:

SQS

SWF

SNS

- Use SNS to keep you informed about any events occurring with your AWS resources.

- Use SNS to push notifications to Lambda to create distributed processes that don't rely directly on each other.

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Application Services Costs

Overview of costs associated with Application Services

Application Services Costs

Basic Transcoder → Charge per minute of media to be transcoded

AWS Step Function → Fee per 1000 state transitions

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Application Services Costs

amazonWorkSpaces

Monthly fee

Small monthly charge plus charge per hour

Reduced charge if BYOL

Extra charges for additional software (Microsoft Office Professional)

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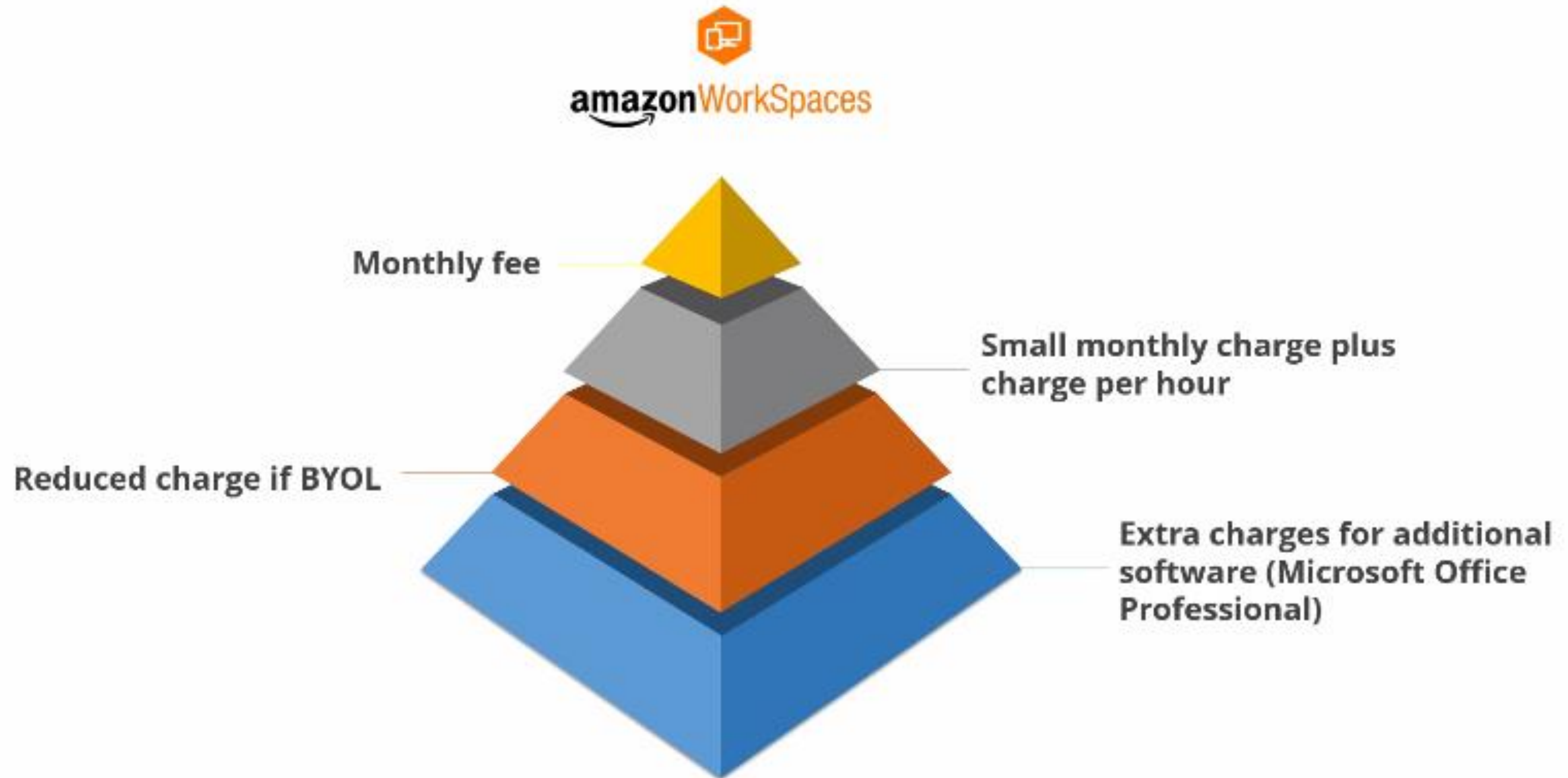
Practice Assignment: Amazon SNS

Configure an SNS topic to send alerts

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Amazon SNS Notifications

Your company wants to be notified when users delete files from their Amazon S3 bucket.

You will need to perform the following steps:

1. Configure an SNS topic

2. Add your email address as a subscriber to the topic

3. Configure the topic policy to allow permissions from other resources

4. Configure an S3 event for the delete

5. Verify that your event notification worked

You can use Demonstration 1 from this lesson as a reference for this Practice Assignment.

Key Takeaways

Key Takeaways

- Amazon Simple Queue Service (SQS) is a fast, reliable, scalable, fully managed message queuing service.

- Amazon SWF is a fully-managed task coordinator and tracker that allows you to build, run, and scale background jobs that have parallel or sequential steps.

- SWF and SQS differ based on the criteria of message retention period, API, delivery, and tracking.

- Amazon SNS is a fully managed publication-subscription based messaging service that can be used to send push notifications, emails, and SMS messages.

- SNS is a PUSH based service whereas SQS is POLL based (PULL).

- Amazon Elastic Transcoder is media transcoding service in the Cloud.

Quiz

QUIZ 1	Which of the following statements is true?

   a.   SQS messages are only delivered once

   b.   SWF messages are delivered multiple times

   c.   SQS messages are valid for up to 14 days

   d.   SNS is a poll based message service

Which of the following statements is true?

a. SQS messages are only delivered once

b. SWF messages are delivered multiple times

c. SQS messages are valid for up to 14 days

d. SNS is a poll based message service

The correct answer is   **c**

Explanations: SQS messages are valid for up to 14 days, all the other statements are incorrect.

QUIZ 2	What is the maximum SQS message size?

a. 64KB

b. 256KB

c. 64MB

d. 256MB

QUIZ 2	What is the maximum SQS message size?

    a.   64KB

    b.   256KB

    c.   64MB

    d.   256MB

The correct answer is   **b**

Explanations: SQS messages can be up to 256KB in size and you are billed in 64KB chunks.

QUIZ 3	How does SQS provide First In, First Out message delivery?

a. It does this by default, you don't need to do anything

b. You can configure SQS to push messages in the order they arrive

c. It's impossible to do this with SQS

d. You have to provide sequencing information in the messages

QUIZ	How does SQS provide First In, First Out message delivery?
3	

a. It does this by default, you don't need to do anything

b. You can configure SQS to push messages in the order they arrive

c. It's impossible to do this with SQS

d. You have to provide sequencing information in the messages

The correct answer is   **d**

Explanations: SQS does not guarantee first in, first out, if you require your messages to be delivered in the order that they arrived you have to place sequencing information in each message.

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QUIZ 4	What are the three SWF actor types?

a.   Workflow Starters, Deciders, and Workers

b.   Workflow Initiators, Determiners, and Operators

c.   Workflow Commencers, Resolvers, and Actors

d.   Workflow Originators, Assessors, and Contractors

What are the three SWF actor types?

a. Workflow Starters, Deciders, and Workers

b. Workflow Initiators, Determiners, and Operators

c. Workflow Commencers, Resolvers, and Actors

d. Workflow Originators, Assessors, and Contractors

The correct answer is   **a**

Explanations: Workflow Starters, Deciders, and Workers are the three types of AWS actors.

QUIZ

5

Which of the following correctly describes an Amazon SNS topic?

a. A fully-managed task coordinator and tracker

b. A communication channel that allows you to send messages and subscribe to notifications

c. A fully managed message queuing service

d. A method of media transcoding in the cloud

QUIZ 5	Which of the following correctly describes an Amazon SNS topic?

a. A fully-managed task coordinator and tracker

b. A communication channel that allows you to send messages and subscribe to notifications

c. A fully managed message queuing service

d. A method of media transcoding in the cloud

The correct answer is   **b**

Explanations: An SNS topic is a communication channel that provides an access point for publishers and subscribers to communicate with each other.

This concludes "Application Services."

The next lesson is "Security Practices for Optimum Cloud Deployment."