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# Architecting on AWS

## Overview of Application Services

## Overview of Application Services | What we'll cover

1

**AWS  
application  
services**

2

**Roles of  
application  
services in  
AWS  
architecture**

## Overview of Application Services | AWS Application Services

1

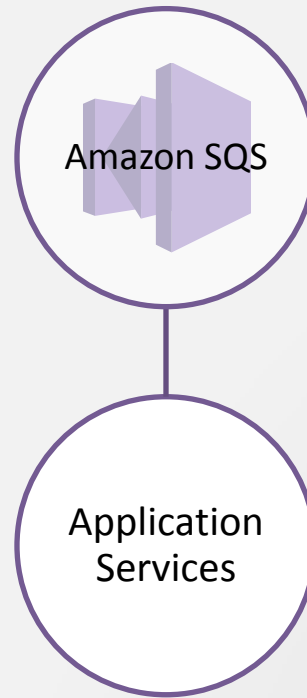
**AWS  
application  
services**

## Overview of Application Services | AWS Application Services

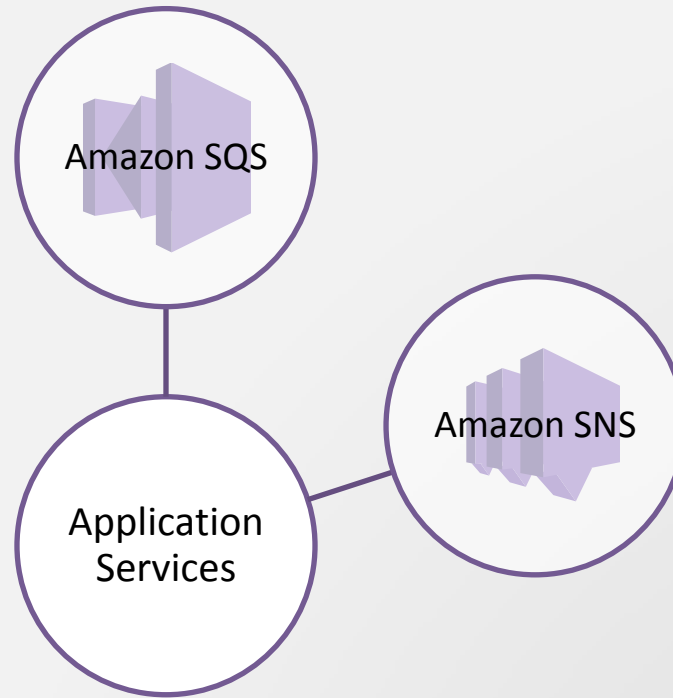
A diagram consisting of a white circle with a thin purple border. Inside the circle, the words "Application Services" are written in a black, sans-serif font, centered vertically and horizontally.

Application  
Services

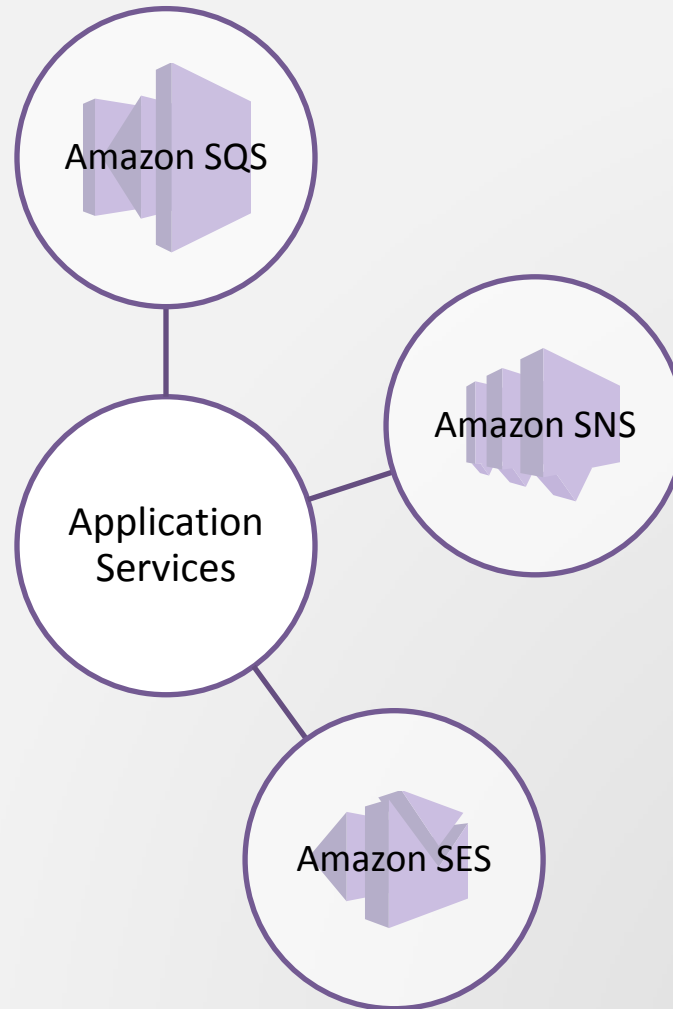
## Overview of Application Services | AWS Application Services



## Overview of Application Services | AWS Application Services

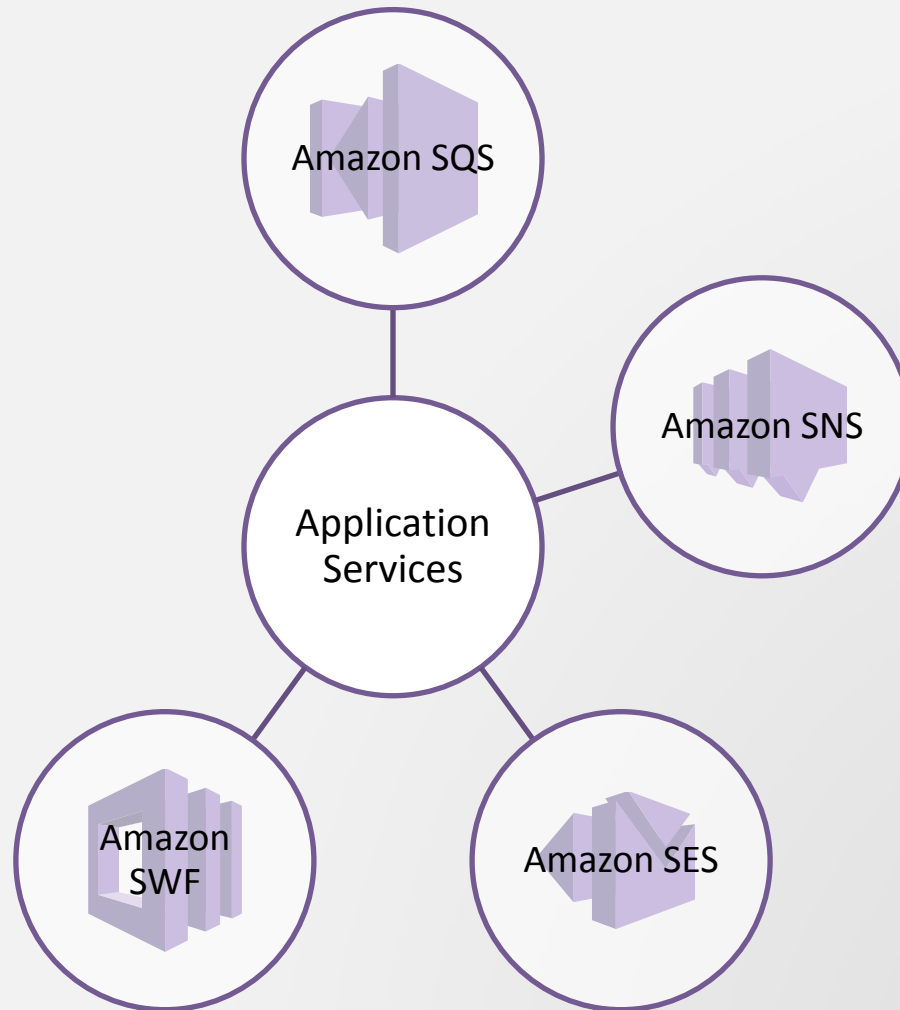


## Overview of Application Services | AWS Application Services

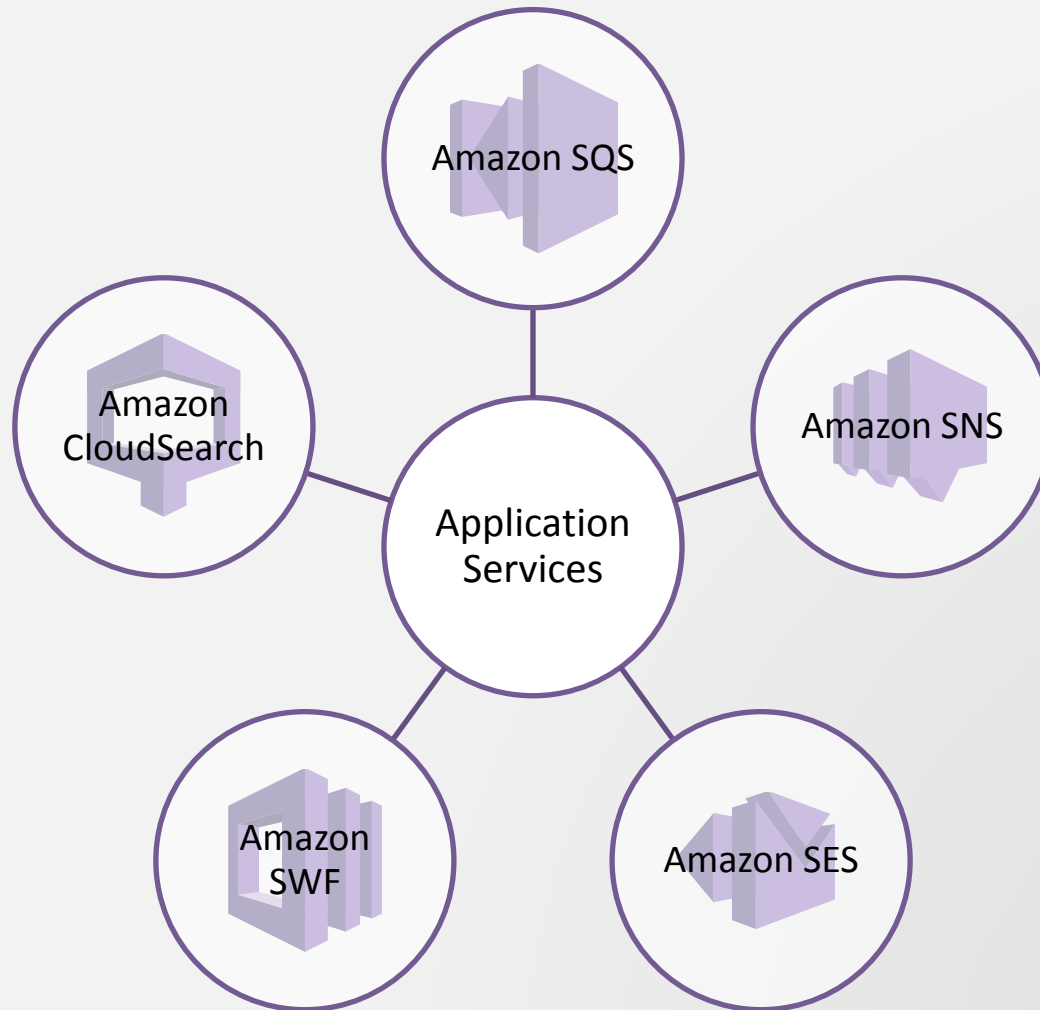




## Overview of Application Services | AWS Application Services



## Overview of Application Services | AWS Application Services

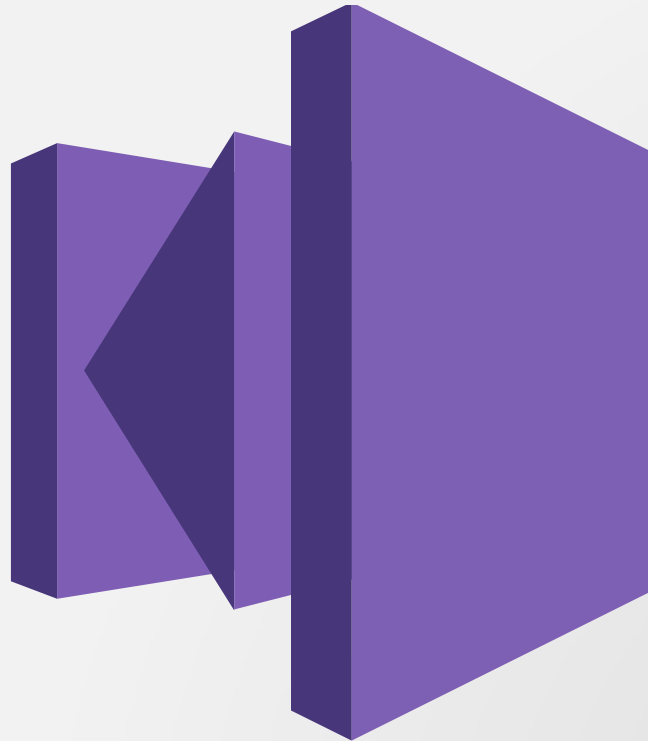


## Overview of Application Services | Roles of application services

2

**Roles of  
application  
services in  
AWS  
architecture**

# Amazon Simple Queue Service



## Simple Queue Service

- Hosted queue for storing messages as they travel between computers or processes
- Move data between distributed components of their applications

# Putting it all together

## User uploads an image

1. Image downsized
2. Image watermarked
3. User e-mailed

## Workers in Auto Scaling Groups



**Downsize Image  
Job Queue**



**Watermark  
Image Job Queue**



**Email User Job  
Queue**



**Downsizers**



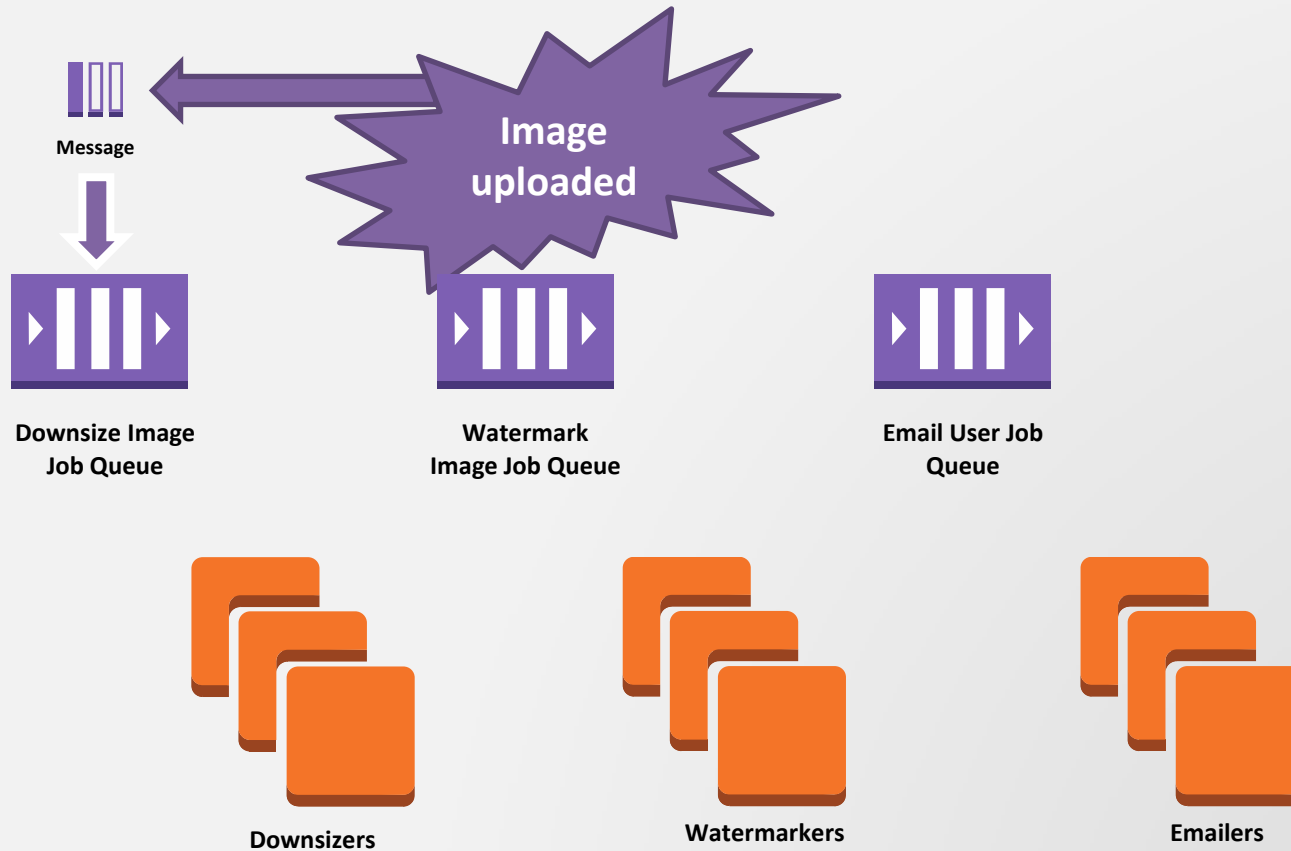
**Watermarkers**



**Emailers**



Message put in queue when user uploads new image



# Message available



**Downsize Image  
Job Queue**



**Watermark  
Image Job Queue**



**Email User Job  
Queue**



**Downsizers**

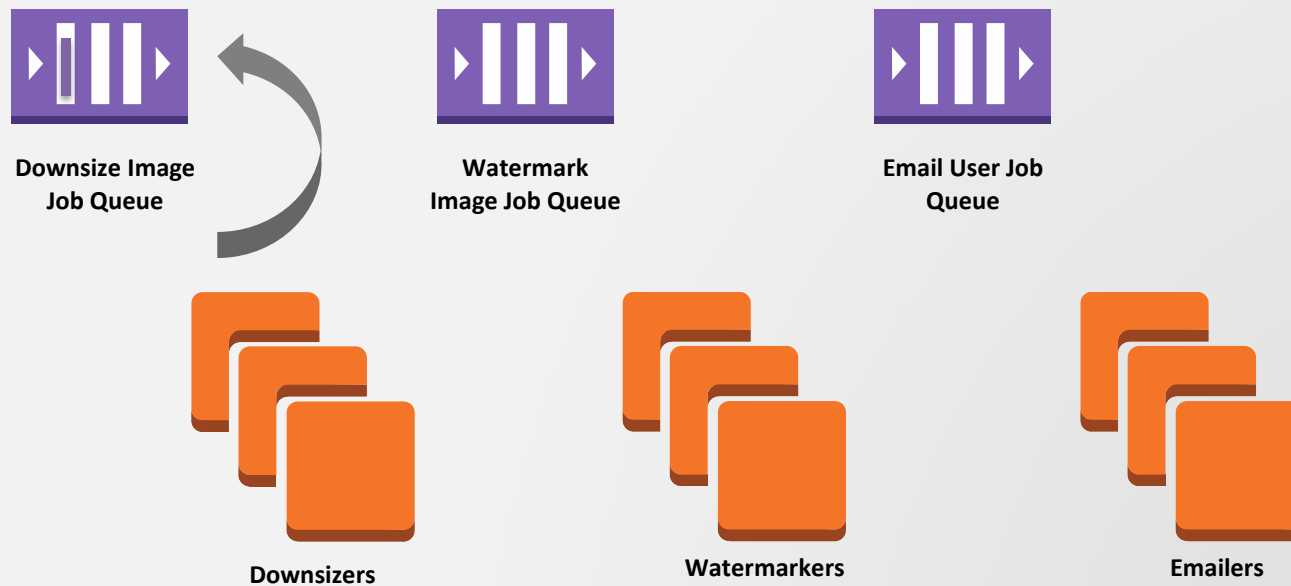


**Watermarkers**



**Emailers**

## Downsizer calls *ReceiveMessage* against queue



Message invisible in queue until deleted or visibility timeout reached



**Downsize Image  
Job Queue**



**Watermark  
Image Job Queue**



**Email User Job  
Queue**



**Downsizers**

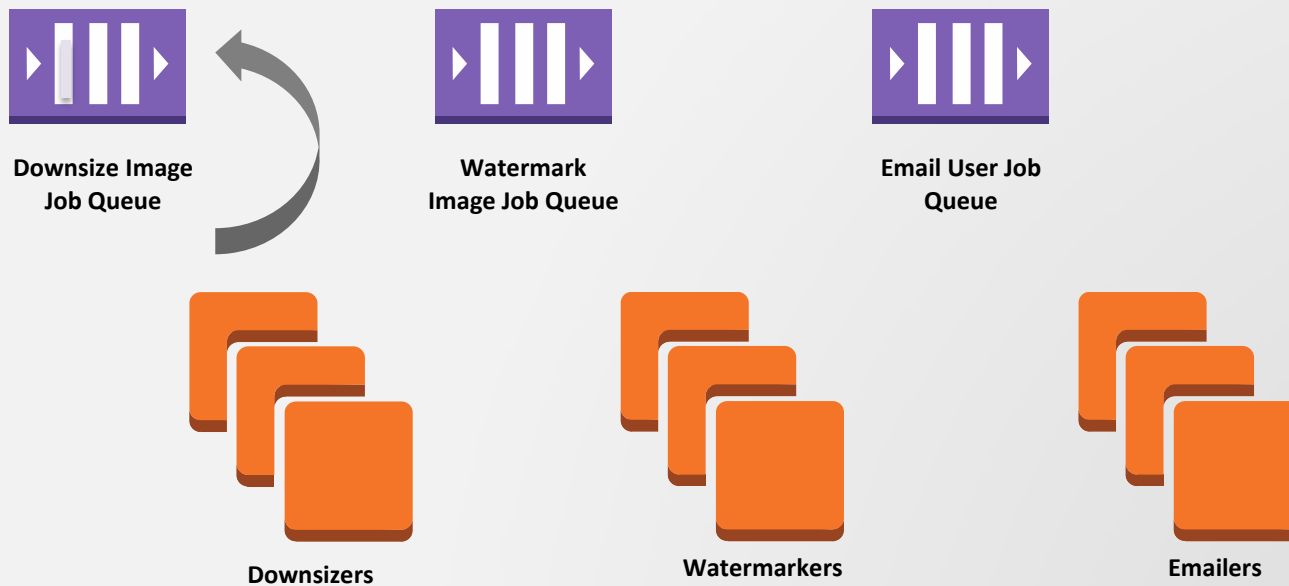


**Watermarkers**

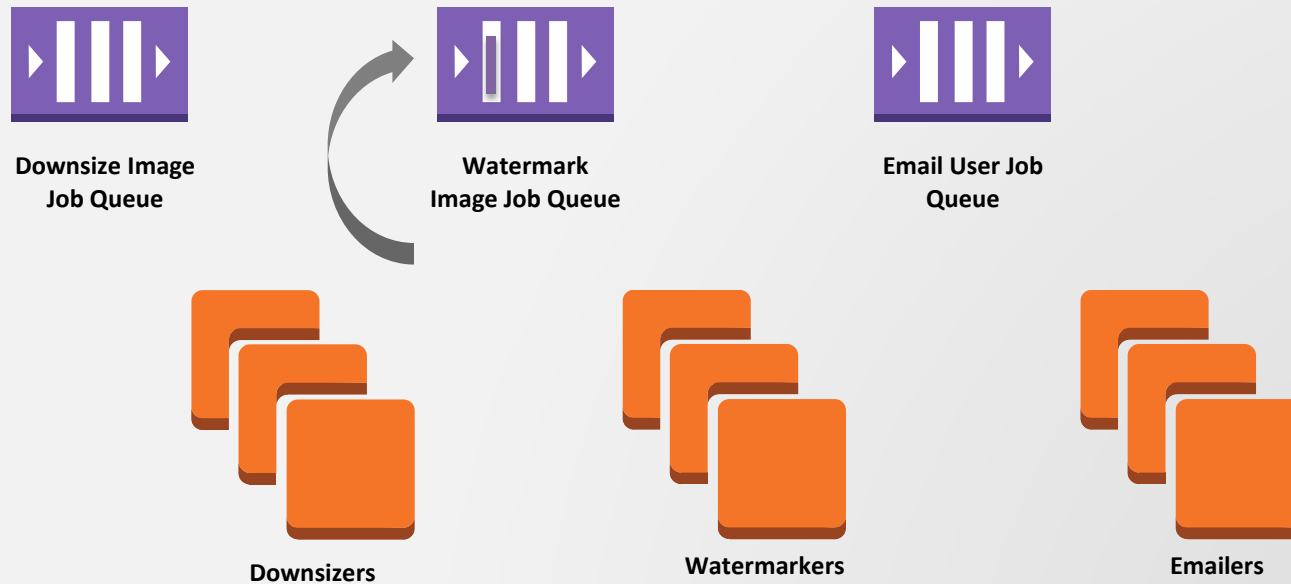


**Emailers**

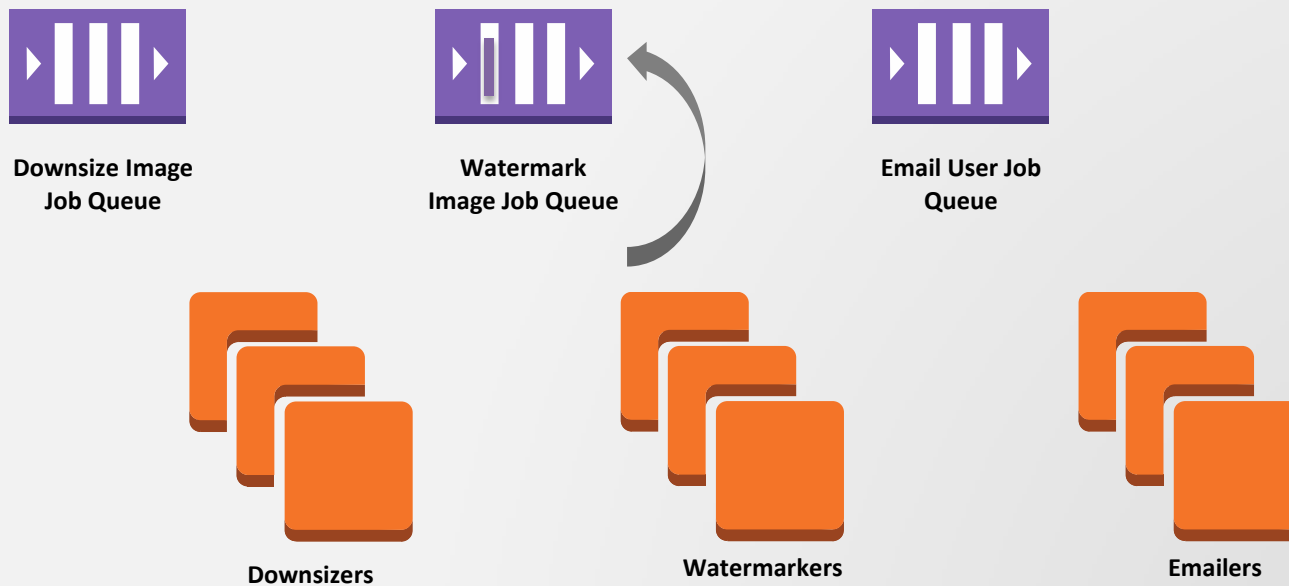
Worker calls *DeleteMessage* when image downsize complete



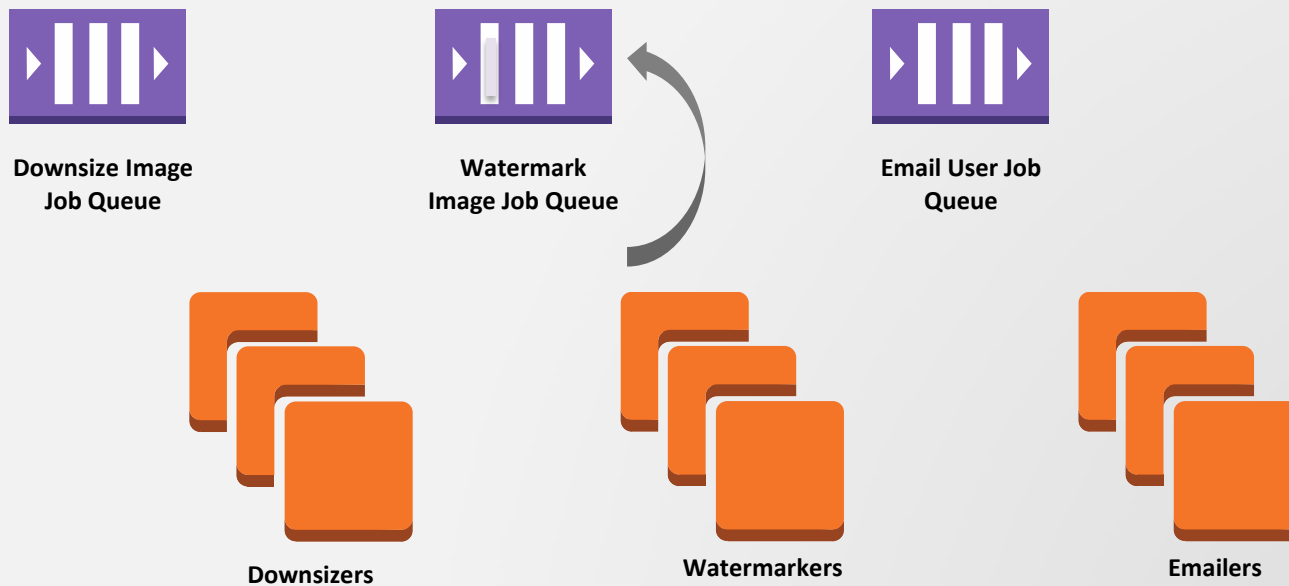
# Worker puts new message in next queue



Watermarker calls *ReceiveMessage* against queue...

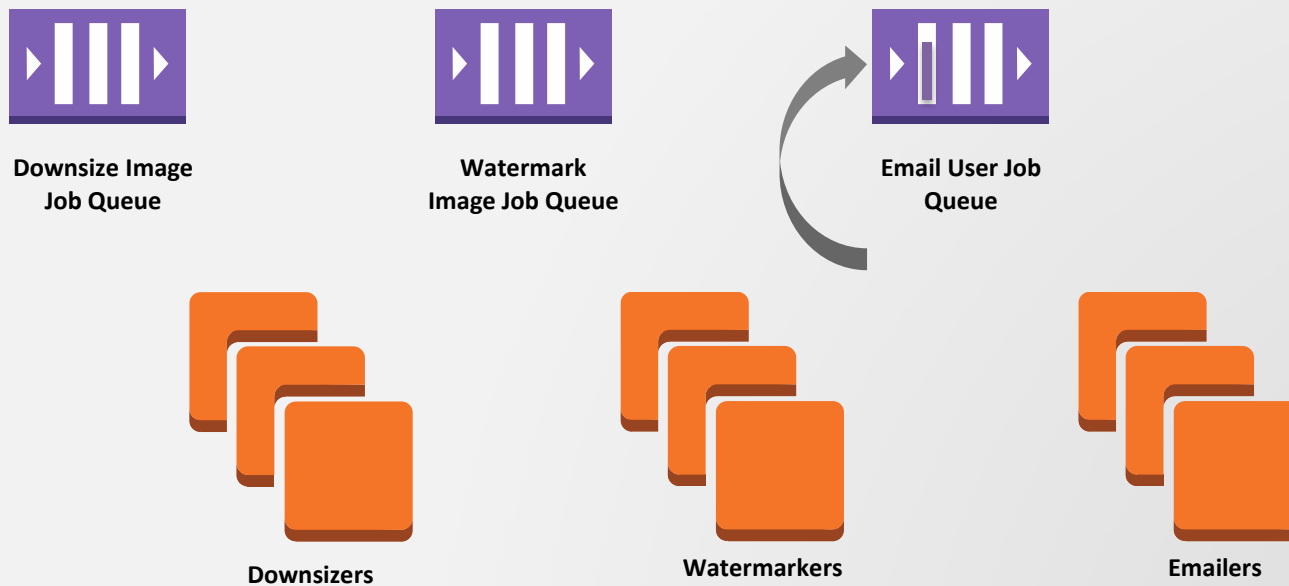


...and deletes the message when finished watermarking.





Finally the watermarker puts a message in the email queue.



Finally the watermarker puts a message in the email queue.



**Downsize Image  
Job Queue**



**Watermark  
Image Job Queue**



**Email User Job  
Queue**



**Downsizers**

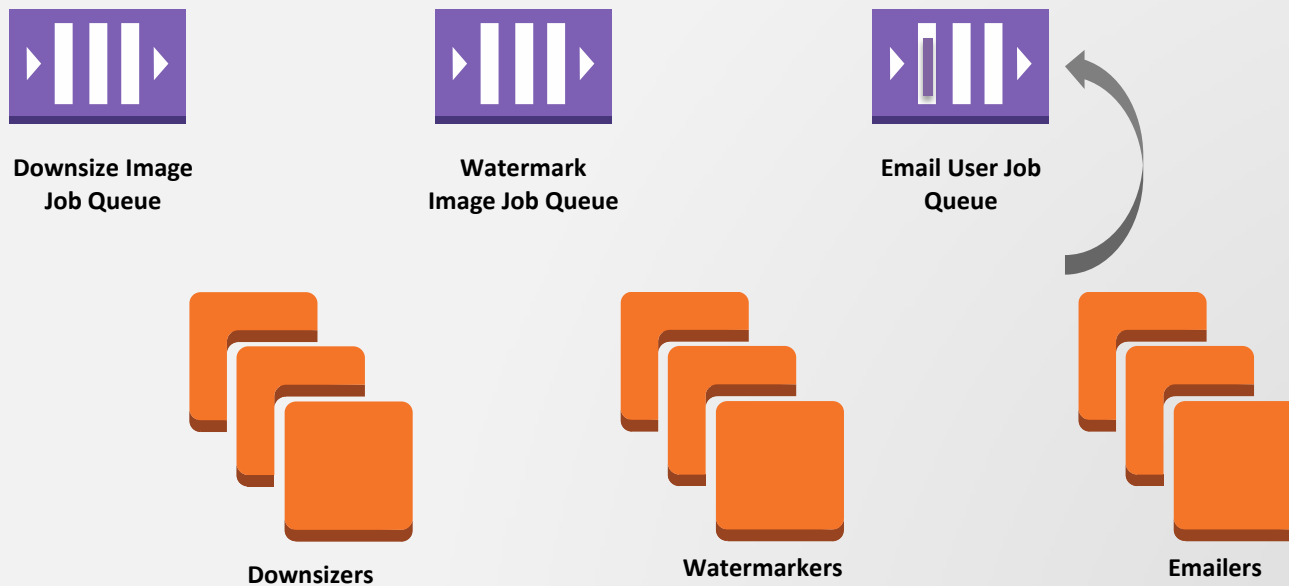


**Watermarkers**

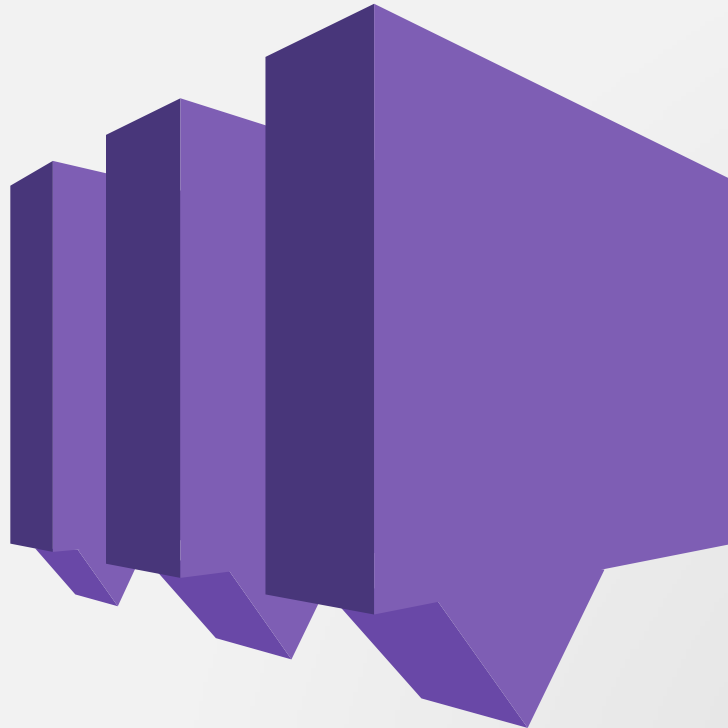


**Emailers**

An emailer receives the message, sends the email, then deletes the message



# Amazon Simple Notification Service

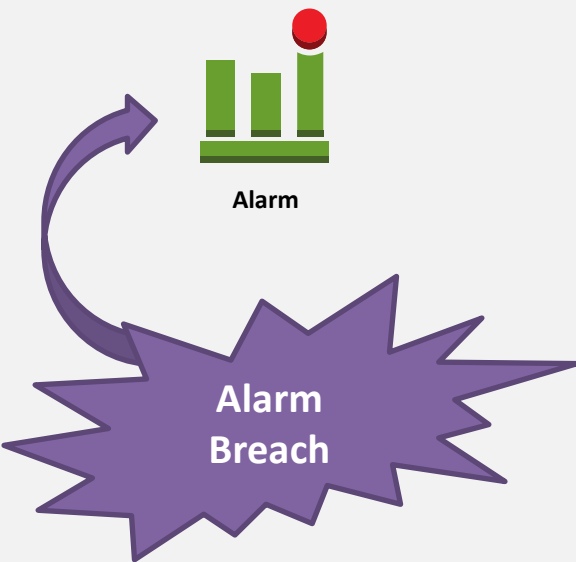


- Set up, operate, and send notifications
- Publish messages from an application and immediately deliver them to subscribers or other applications
- Messages published to topic
- Topic subscribers receive message

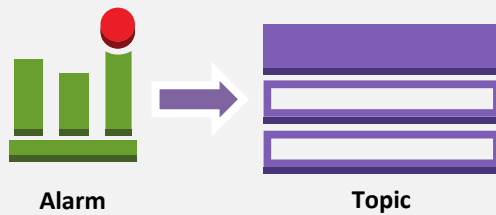
## 4 subscriber types:

- Email (plain or JSON)
- HTTP/HTTPS
- SMS
- SQS

## Overview of Application Services | Roles of application services

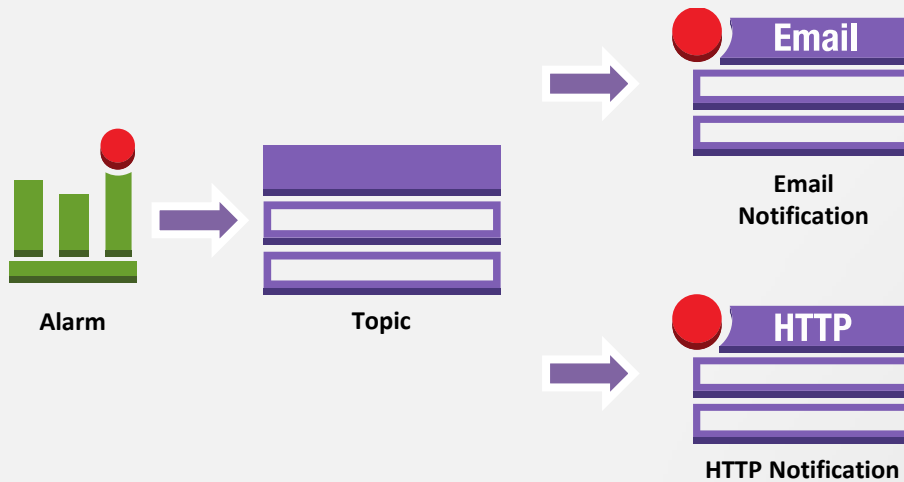


### Overview of Application Services | Roles of application services



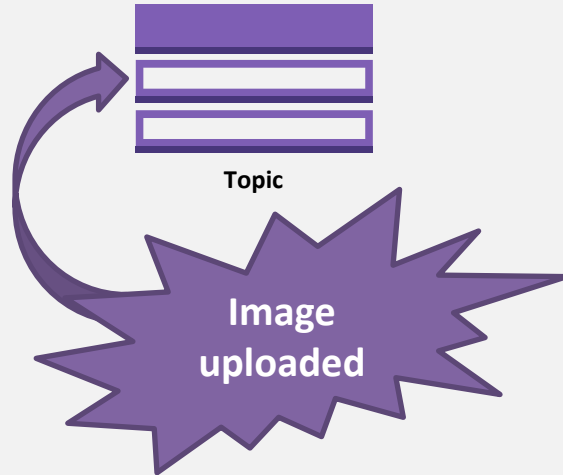


## Overview of Application Services | Roles of application services

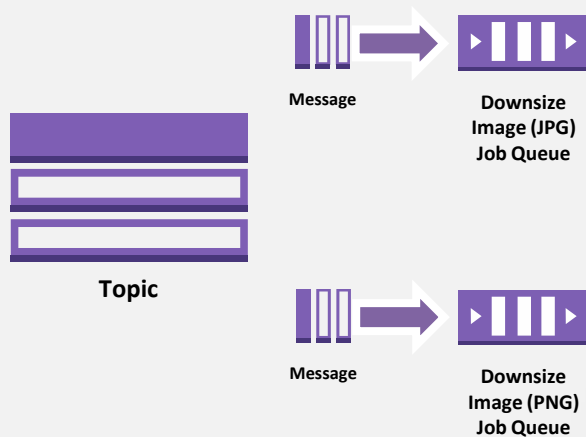


## Fan-out: Schedule work in multiple queues

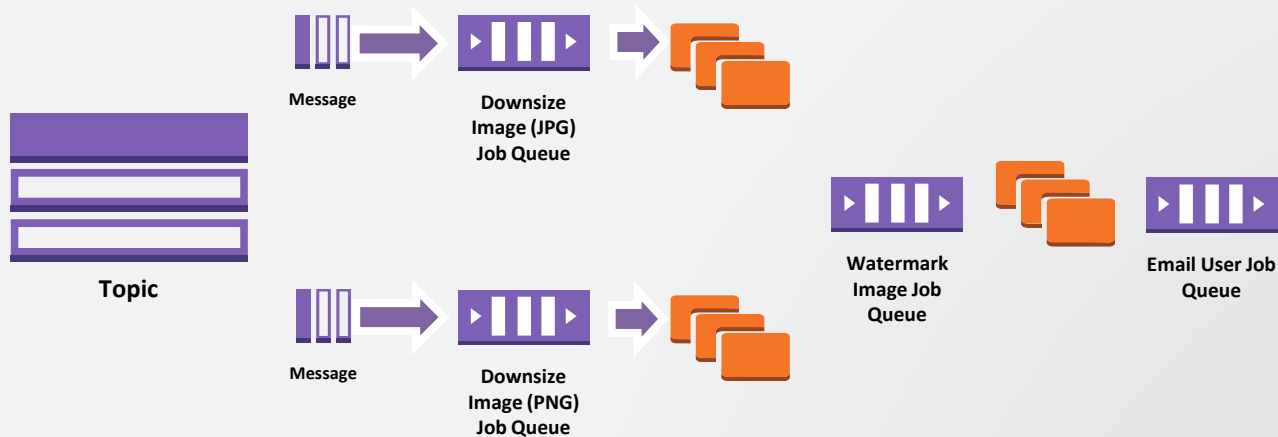
## Fan-out: Schedule work in multiple queues



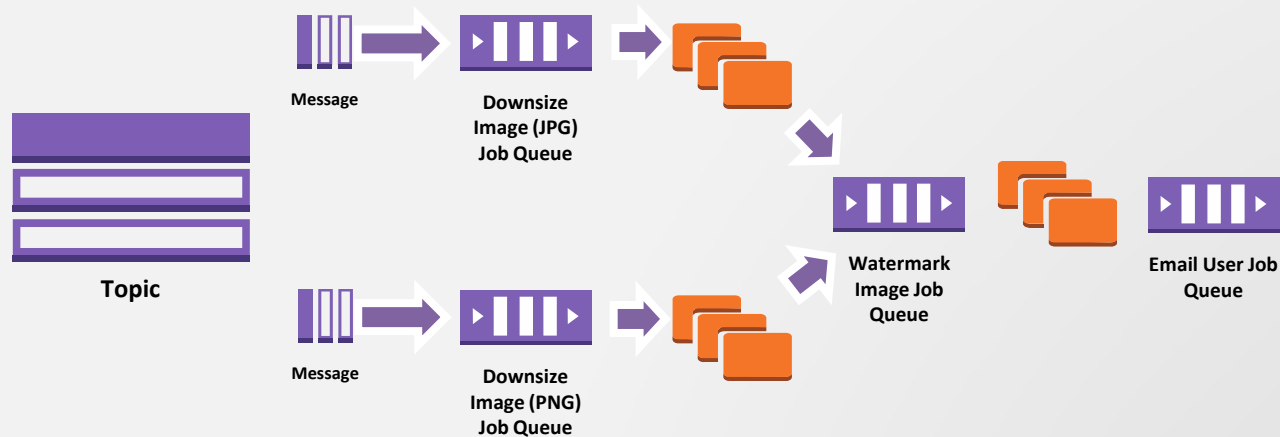
## Fan-out: Schedule work in multiple queues



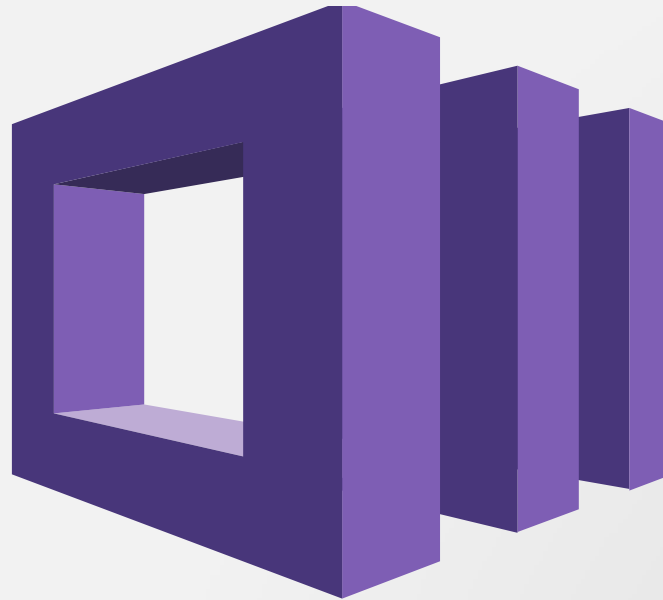
## Fan-out: Schedule work in multiple queues



## Fan-out: Schedule work in multiple queues



# Amazon Simple Workflow Service



## Overview of Application Services | Roles of application services

- Manage workflows, including state, decisions, executions, tasks and logging
- Coordinate processing steps across distributed systems
- Ensure tasks are executed reliably, in order, and without duplication
- HTTP API: executed from code written in any language
- Use from any app that supports HTTP, from EC2 to mobile device in a warehouse



You write **Decider** and **Activity Worker**

## Decider

- Decision logic (i.e., flow control)
- Decoupled from application logic
- Makes decision based on **events** assigned by SWF

## Activity Worker





- Does work assigned by SWF
- Work scheduled by **Decider**
- Run anywhere

# Putting it all together

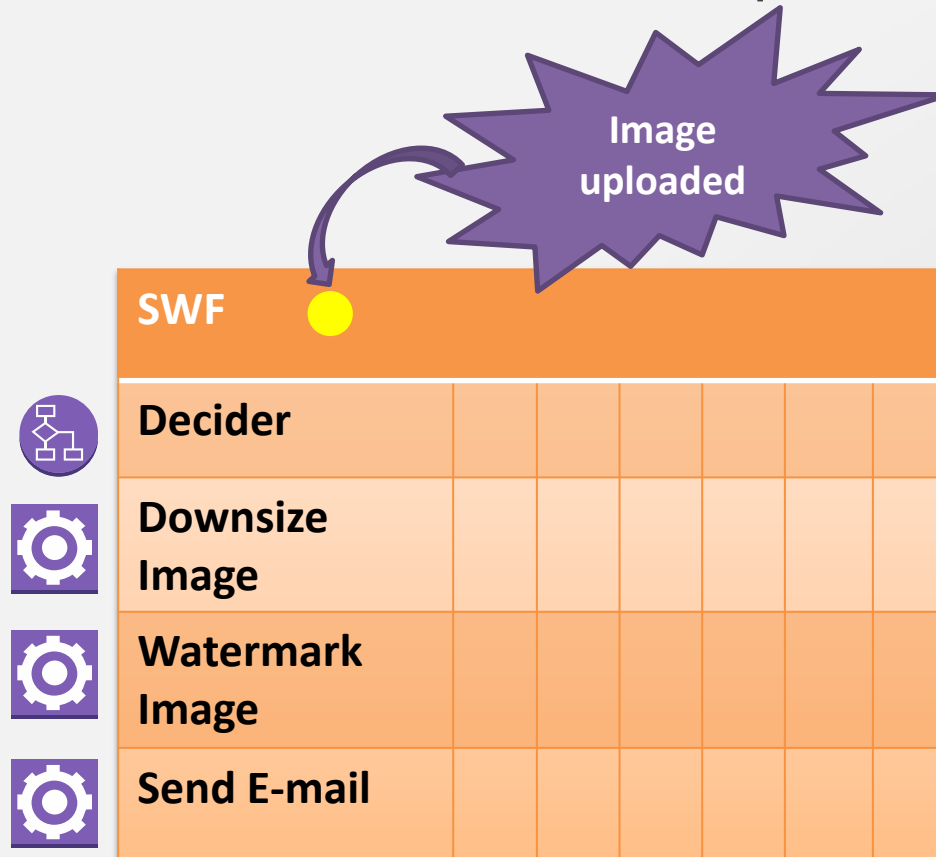
## User uploads an image

1. Image downsized
2. Image watermarked
3. User e-mailed

## One Decider, Four Activity Tasks

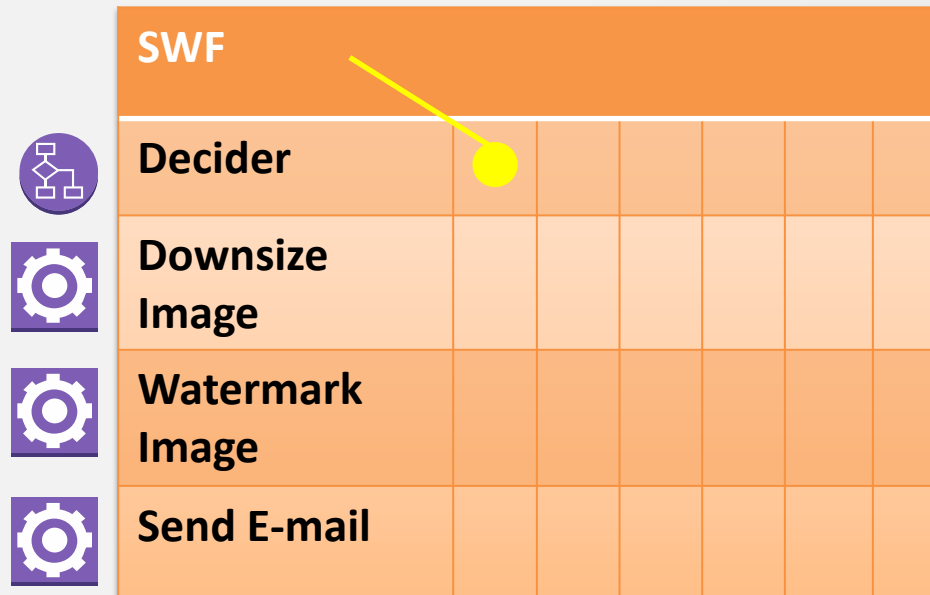
SWF						
	<b>Decider</b>					
	<b>Downsize Image</b>					
	<b>Watermark Image</b>					
	<b>Send E-mail</b>					

# Workflow execution starts when user uploads image



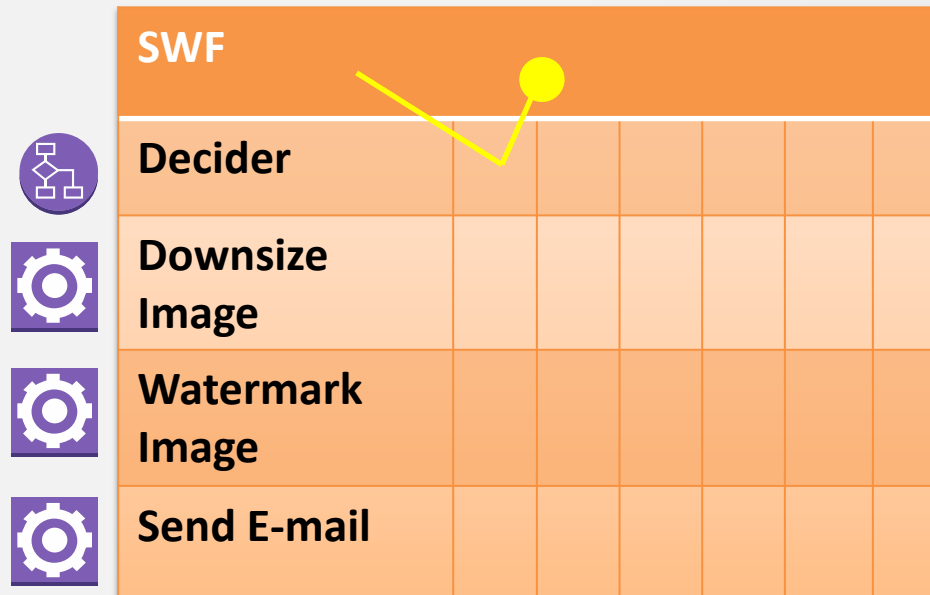
Decider receives decision task

**Status = *WorkflowExecutionStarted***

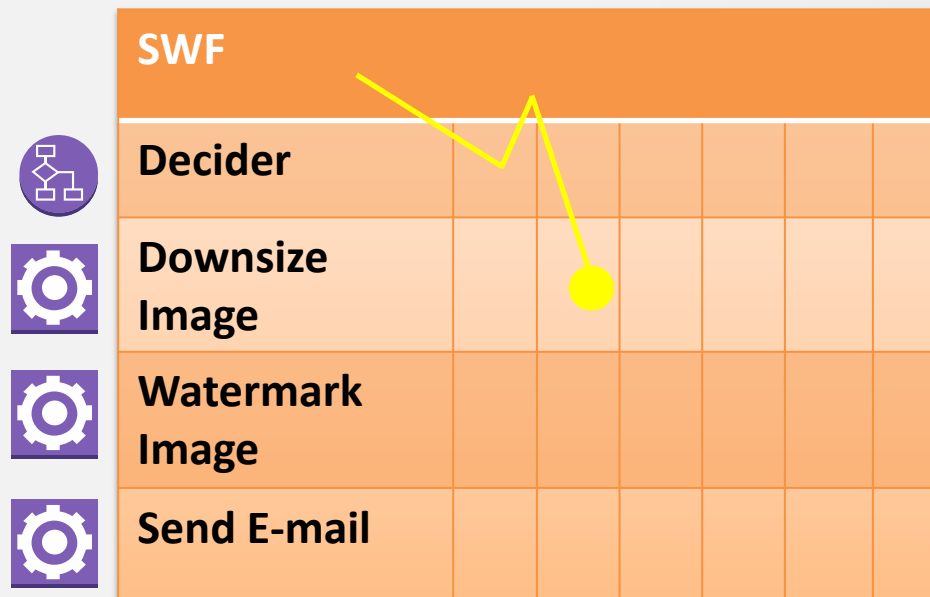




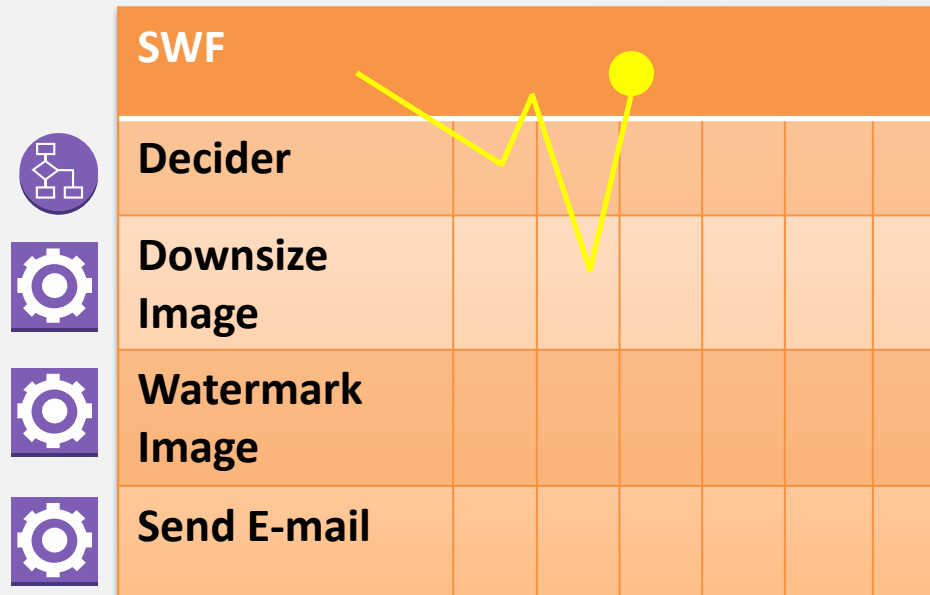
Decider schedules first activity, ***Downsize Image***, with SWF



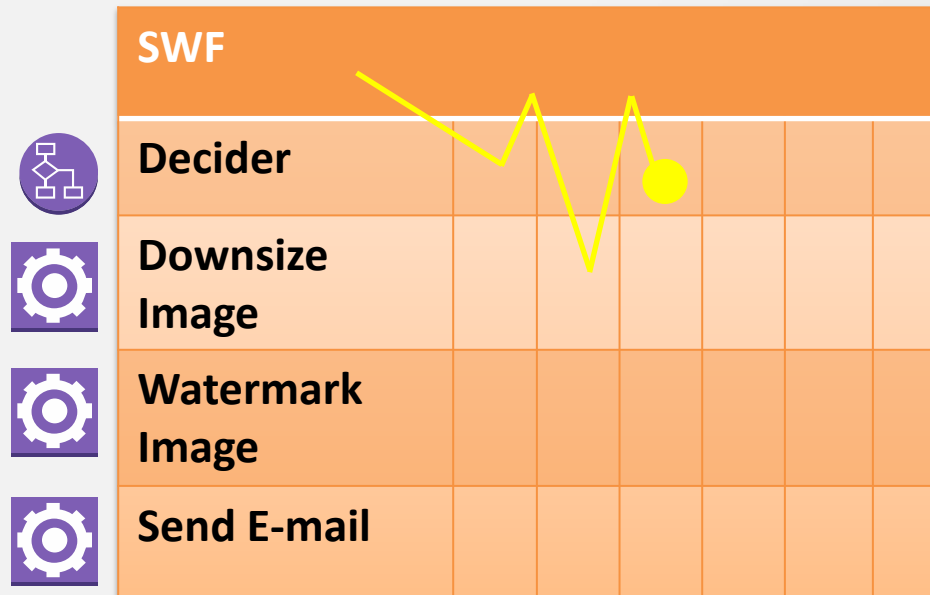
Activity Worker receives task, downsizes image, and returns results to SWF



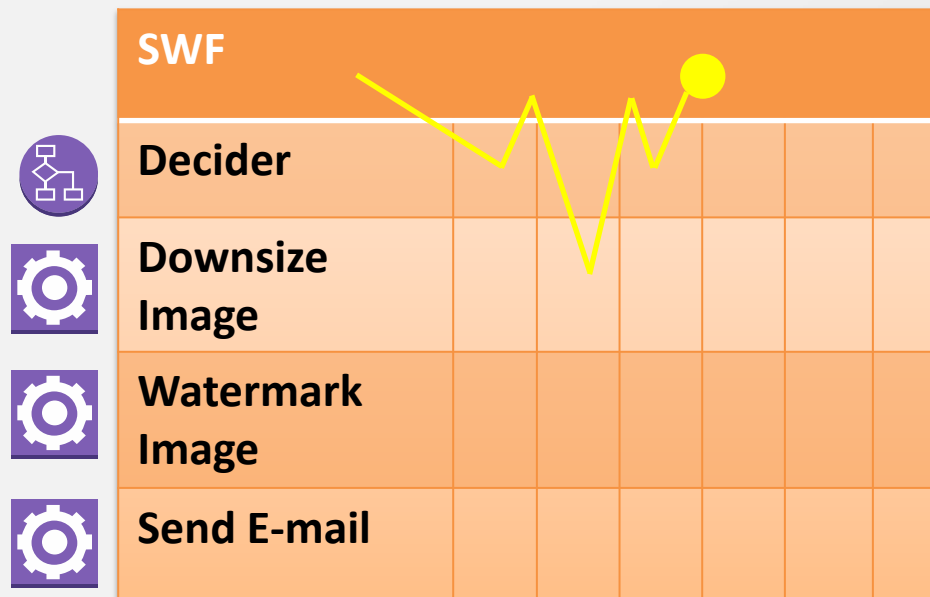
## Overview of Application Services | Roles of application services



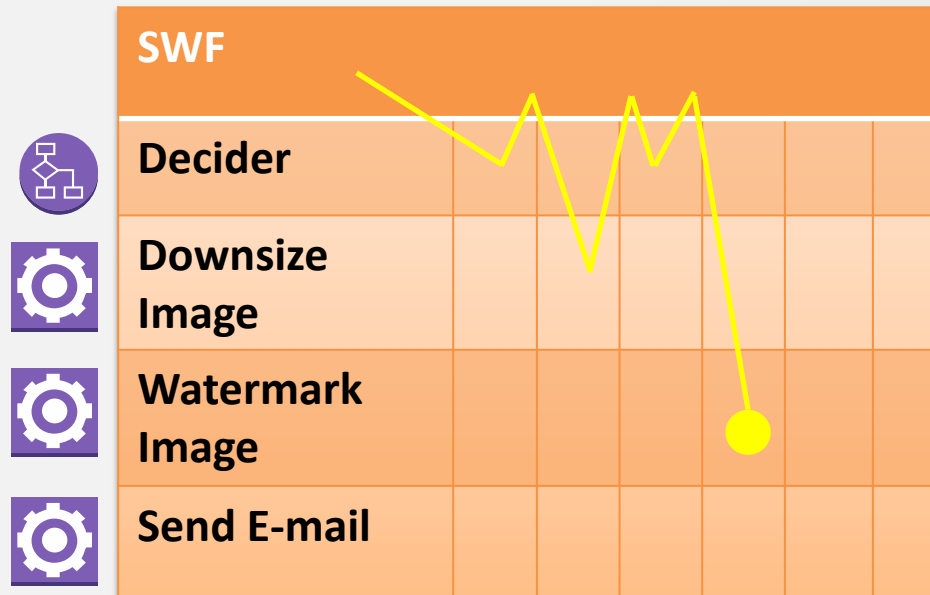
Result of ***DownsizeImage*** activity task is delivered to  
Decider



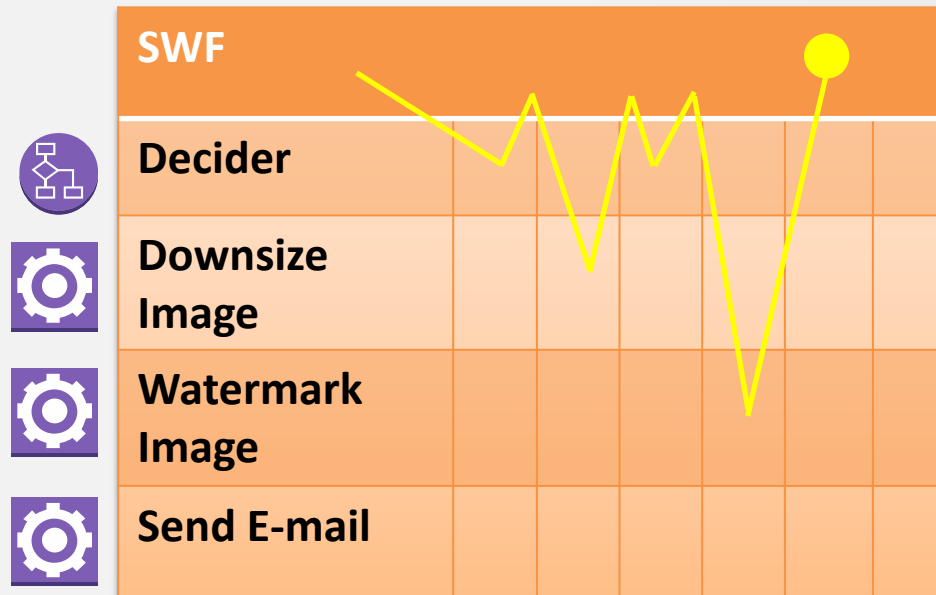
## Decider schedules second task



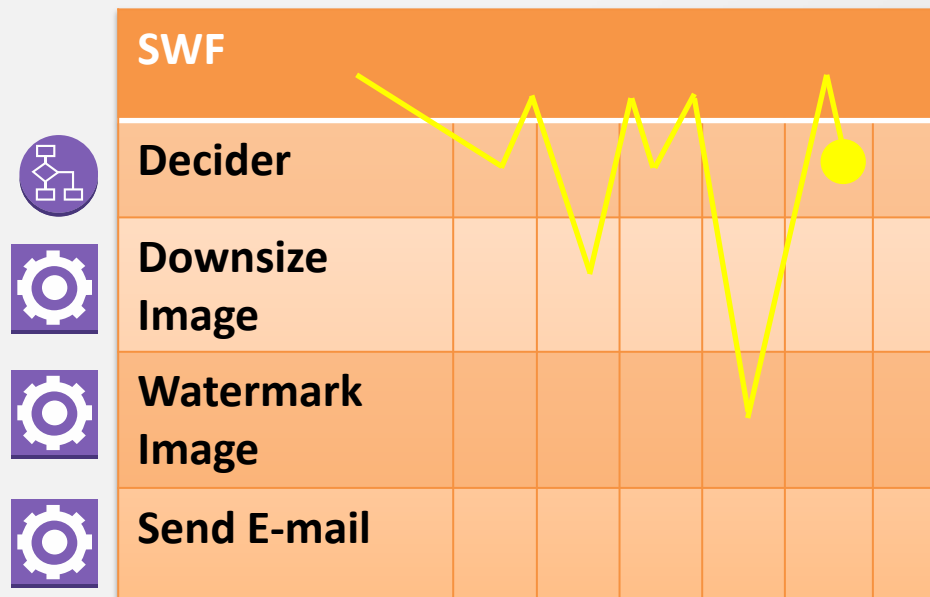
# Image watermarked by Activity Worker and result delivered to SWF



And so on...



...until the workflow completes





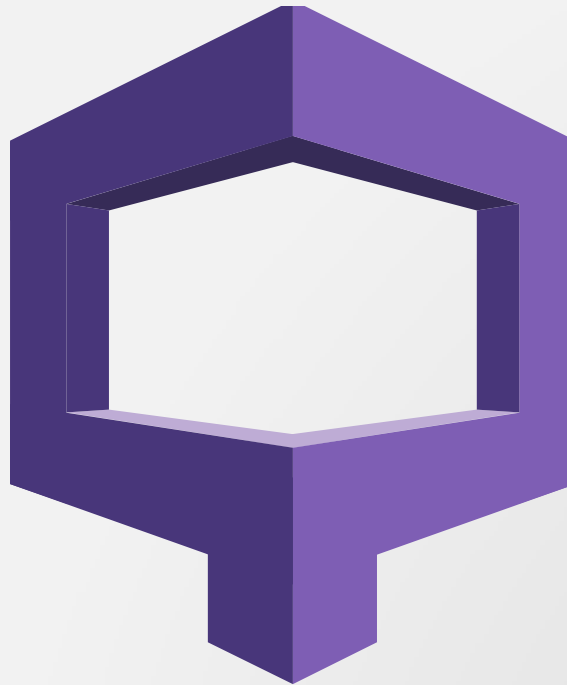
## Amazon Simple Email Service (beta)



- Bulk and transactional email-sending service
- Eliminates the hassle of email server management, network configuration, and meeting rigorous Internet Service Provider (ISP) standards
- Provides a built-in feedback loop, which includes notifications of bounce backs, failed and successful delivery attempts, and spam complaints

# Overview of Application Services

## Amazon CloudSearch (beta)



# Overview of Application Services

- Fully-managed search service
- Integrate fast and highly scalable search functionality into applications
- Scales automatically: with increases in searchable data *or* as query rate changes
- AWS manages hardware provisioning, data partitioning, and software patches

# Overview of Application Services

For review:

- List the five main AWS application services
- What role does SQS play in designing loosely-coupled systems?
- What subscriber types does SNS support?
- What are the two components of SWF?