

# Aplicación Serverless y Multi-tenant con Arquitectura basada en eventos

## Proyecto Final

### Integrantes:

- Kelvin Andreí Cahuana Condori
- Francko Therey Ccama Guerra



Cloud Computing (CS2032) - Teo. 2 - Lab. 2.01



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# 1. Descripción General

Este proyecto se basa en la implementación de una Aplicación Serverless y Multi-tenant con Arquitectura basada en eventos. El objetivo principal es hacer una aplicación que compare rostros de personas usando el servicio AWS Rekognition.



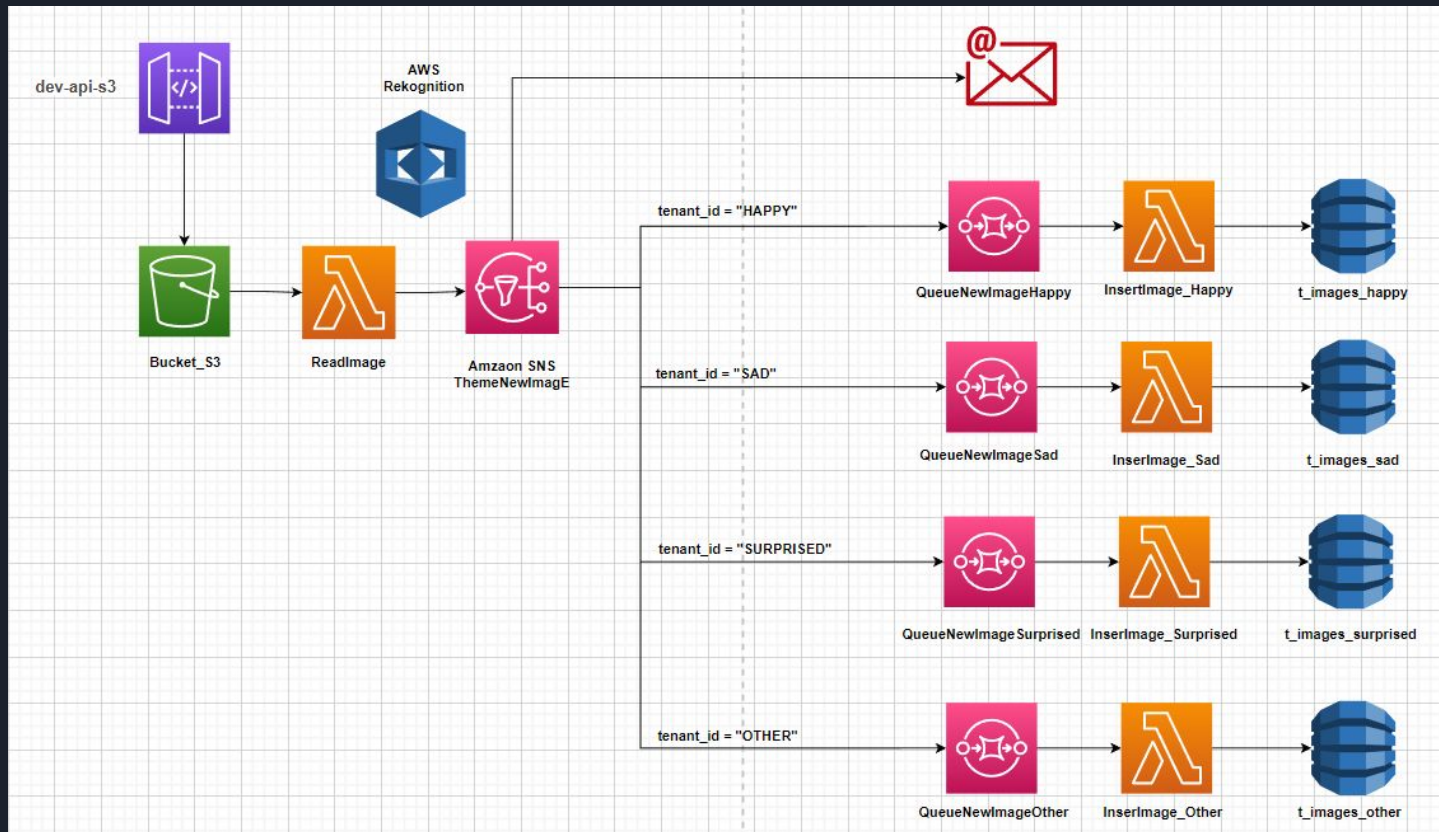


## 1.1 Descripción del problema

Imaginemos que estás desarrollando una aplicación de monitoreo emocional en tiempo real para un evento en particular, como una conferencia o un concierto. El objetivo es capturar las expresiones faciales de los asistentes y proporcionar información sobre su estado emocional durante el evento.

El desafío principal es procesar y analizar las expresiones faciales de manera eficiente y escalable, ya que se espera que haya un alto volumen de imágenes enviadas a la aplicación en tiempo real. Además, se requiere clasificar las expresiones faciales en diferentes categorías, como "feliz", "triste", "sorprendido" y "otros", y almacenar los resultados de manera adecuada para su posterior análisis.

## 2. Diagrama de Arquitectura de Solución



### 3. Uso de servicios adicionales

Servicios utilizados:

- AWS Rekognition
  - `rekognition.recognize_celebrities`
  - `rekognition.detect_faces`





## 4. Funcionalidad

- El usuario utiliza Postman para enviar una imagen a través de API Gateway.
- La imagen se envía al servicio de almacenamiento de objetos S3 y se guarda en un bucket específico.
- Cuando se sube una imagen en el bucket se desencadena un evento. En primer lugar se ejecuta el lambda ReadImage.
- Luego se utilizan el servicio de AWS Rekognition para identificar rostros de famosos y la emoción predominante de la persona en la imagen.
- Dependiendo del estado emocional de la persona (tenan\_id) se envía a través de un SQS respectivo para luego desencadenar un lambda y hacer un insert en una tabla respectiva de DynamoDB.

## 4. Logs

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Filter events

Clear 1m 30m 1h 12h Custom

Display Talking: Franco Thery

Timestamp	Message
No older events at this moment. <a href="#">Retry</a>	
2023-07-08T19:32:11.988-05:00	INIT_START Runtime Version: python:3.10.v5 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:51b59a64d1fa5125d324f5fe7...
2023-07-08T19:32:12.248-05:00	START RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Version: \$LATEST
2023-07-08T19:32:14.085-05:00	-----
2023-07-08T19:32:14.085-05:00	image-bucket-pro mark2.jpg
2023-07-08T19:32:14.085-05:00	-----
2023-07-08T19:32:14.404-05:00	-----
2023-07-08T19:32:14.404-05:00	{'ResponseMetadata': {'RequestId': '368JXMSS6TX2EE4R', 'HostId': 'R1wVqFJ8ETfpmgEYX0RftCKJeiW1vd+TBr8rXpBw9d0s8V64ptxPUngR...
2023-07-08T19:32:14.404-05:00	-----
2023-07-08T19:32:14.404-05:00	-----
2023-07-08T19:32:14.404-05:00	<botocore.response.StreamingBody object at 0x7fa50fbed630>
2023-07-08T19:32:14.404-05:00	-----
2023-07-08T19:32:14.405-05:00	-----
2023-07-08T19:32:14.443-05:00	b'\xff\xd8\xff\xe0\x00\x10JFIF\x00\x01\x01\x01\x00'\x00'\x00\x00\xff\xdb\x00C\x00\x06\x04\x05\x06\x05\x04\x06\x06\x05\x06\x0...
2023-07-08T19:32:14.443-05:00	-----

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Talking: Francko Therey

2023-07-08T19:32:14.404-05:00	-----
▶ 2023-07-08T19:32:14.404-05:00	{'ResponseMetadata': {'RequestId': '368JXMS6TX2EE4R', 'HostId': 'RlwVqFJ8ETfpmgEYX0RftCKJeiWH1vd+TBr8rXpBw9d0s8V64ptxPUNG...
▶ 2023-07-08T19:32:14.404-05:00	-----
▶ 2023-07-08T19:32:14.404-05:00	-----
▶ 2023-07-08T19:32:14.404-05:00	<botocore.response.StreamingBody object at 0x7fa50fbed630>
▶ 2023-07-08T19:32:14.404-05:00	-----
▶ 2023-07-08T19:32:14.405-05:00	-----
▶ 2023-07-08T19:32:14.443-05:00	b'\xff\xd8\xff\xe0\x00\x10JFIF\x00\x01\x01\x01\x00'\x00'\x00\x00\xff\xdb\x00C\x00\x06\x04\x05\x06\x05\x04\x06\x06\x05\x06\x...
▶ 2023-07-08T19:32:14.443-05:00	-----
▶ 2023-07-08T19:32:15.128-05:00	Celebridad: Mark Zuckerberg (Confianza: 98.43265533447266%)
▶ 2023-07-08T19:32:15.128-05:00	Detección de emociones
▶ 2023-07-08T19:32:15.265-05:00	2023-07-09T00:32:15.265Z 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Task timed out after 3.02 seconds
▶ 2023-07-08T19:32:15.265-05:00	END RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0
▶ 2023-07-08T19:32:15.265-05:00	REPORT RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Duration: 3017.01 ms Billed Duration: 3000 ms Memory Size: 128 MB Ma...
▶ 2023-07-08T19:32:15.364-05:00	INIT_START Runtime Version: python:3.10.v5 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:51b59a64d1fa5125d324f5fe7...
▶ 2023-07-08T19:33:21.581-05:00	START RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Version: \$LATEST
▶ 2023-07-08T19:33:22.926-05:00	-----
▶ 2023-07-08T19:33:22.926-05:00	image-bucket-pro mark2.jpg

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2023-07-08T19:32:14.405-05:00	
2023-07-08T19:32:14.405-05:00	-----
2023-07-08T19:32:14.443-05:00	b'\xff\xd8\xff\xe0\x00\x10JFIF\x00\x01\x01\x01\x00'\x00'\x00\x00\xff\xdb\x00C\x00\x06\x04\x05\x06\x05\x04\x06\x06\x05\x06\x...
2023-07-08T19:32:14.443-05:00	-----
2023-07-08T19:32:15.128-05:00	Celebridad: Mark Zuckerberg (Confianza: 98.43265533447266%)
2023-07-08T19:32:15.128-05:00	Detección de emociones
2023-07-08T19:32:15.265-05:00	2023-07-09T00:32:15.265Z 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Task timed out after 3.02 seconds
2023-07-08T19:32:15.265-05:00	END RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0
2023-07-08T19:32:15.265-05:00	REPORT RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Duration: 3017.01 ms Billed Duration: 3000 ms Memory Size: 128 MB Ma...
2023-07-08T19:32:15.364-05:00	INIT_START Runtime Version: python:3.10.v5 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:51b59a64d1fa5125d324f5fe7...
2023-07-08T19:33:21.581-05:00	START RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Version: \$LATEST
2023-07-08T19:33:22.926-05:00	-----
2023-07-08T19:33:22.926-05:00	image-bucket-pro mark2.jpg
2023-07-08T19:33:22.926-05:00	-----
2023-07-08T19:33:23.219-05:00	-----
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2023-07-08T19:33:23.219-05:00	-----
2023-07-08T19:33:23.219-05:00	-----

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	2023-07-08T19:33:23.219-05:00	{'ResponseMetadata': {'RequestId': '27DX58RDFR614M6G', 'HostId': 'FfnfDrQskyycyh061UyFNnTyn16dzj72DtC/DAu0qn1ywS1x19gZgQk2t...
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	2023-07-08T19:33:23.219-05:00	-----
	2023-07-08T19:33:23.219-05:00	<botocore.response.StreamingBody object at 0x7fb68c671630>
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	2023-07-08T19:33:23.223-05:00	-----
	2023-07-08T19:33:23.224-05:00	b'\xff\xd8\xff\xe0\x00\x10JFIF\x00\x01\x01\x01\x00'\x00'\x00\x00\xff\xdb\x00C\x00\x06\x04\x05\x06\x05\x04\x06\x06\x05\x06\x...
	2023-07-08T19:33:23.224-05:00	-----
	2023-07-08T19:33:23.967-05:00	Celebridad: Mark Zuckerberg (Confianza: 98.43265533447266%)
	2023-07-08T19:33:23.967-05:00	Detección de emociones
	2023-07-08T19:33:24.453-05:00	-----
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	2023-07-08T19:33:24.454-05:00	-----
	2023-07-08T19:33:24.454-05:00	try
	2023-07-08T19:33:24.454-05:00	-----
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	2023-07-08T19:33:24.454-05:00	-----
	2023-07-08T19:33:24.454-05:00	HAPPY

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2023-07-08T19:33:24.454-05:00	{'FaceDetails': [{'BoundingBox': {'Width': 0.23232582211494446, 'Height': 0.5898586511611938, 'Left': 0.291621410071947, ...
2023-07-08T19:33:24.454-05:00	-----
2023-07-08T19:33:24.454-05:00	try
2023-07-08T19:33:24.454-05:00	-----
2023-07-08T19:33:24.454-05:00	{'Type': 'HAPPY', 'Confidence': '99.66937255859375'}
2023-07-08T19:33:24.454-05:00	-----
2023-07-08T19:33:24.454-05:00	HAPPY
2023-07-08T19:33:24.603-05:00	2023-07-09T00:33:24.603Z 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Task timed out after 3.02 seconds
2023-07-08T19:33:24.603-05:00	END RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0
2023-07-08T19:33:24.603-05:00	REPORT RequestId: 86b1d8c9-52f6-4d2a-8ddf-ca894f705dc0 Duration: 3022.58 ms Billed Duration: 3000 ms Memory Size: 128 MB Ma...
2023-07-08T19:33:24.693-05:00	INIT_START Runtime Version: python:3.10.v5 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:51b59a64d1fa5125d324f5fe7...
2023-07-08T19:34:39.329-05:00	START RequestId: 09165cc4-4ec5-404a-9907-2fd882e58737 Version: \$LATEST
2023-07-08T19:34:40.664-05:00	-----
2023-07-08T19:34:40.664-05:00	image-bucket-pro m8.png
2023-07-08T19:34:40.664-05:00	-----
2023-07-08T19:34:40.907-05:00	-----
2023-07-08T19:34:40.907-05:00	{'ResponseMetadata': {'RequestId': '8EMB17G59MMSZVSD', 'HostId': 'vkcz48mk1wE1XGkQAKECZxrjm0uRymDsrxcXNINyaqGMhp1p0aHBsUK1US...
2023-07-08T19:34:40.907-05:00	-----

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2023-07-08T19:34:39.329-05:00	START RequestId: 09165cc4-4ec5-404a-9907-2fd882e58737 Version: \$LATEST
2023-07-08T19:34:40.664-05:00	-----
2023-07-08T19:34:40.664-05:00	image-bucket-pro m8.png
2023-07-08T19:34:40.664-05:00	-----
2023-07-08T19:34:40.907-05:00	-----
2023-07-08T19:34:40.907-05:00	{'ResponseMetadata': {'RequestId': '8EMB17G59MMSZVSD', 'HostId': 'vkcZ48mk1wE1XGkQAKECZxrjm0uRymDsrxXNNyaqGMhp1p0aHBsUK1US...
2023-07-08T19:34:40.907-05:00	-----
2023-07-08T19:34:40.907-05:00	-----
2023-07-08T19:34:40.907-05:00	<botocore.response.StreamingBody object at 0x7f6d68021600>
2023-07-08T19:34:40.907-05:00	-----
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2023-07-08T19:34:40.944-05:00	b'RIFF\x2f#\x02\x00WEBPVP8 \xe6#\x02\x00\x00w\x0c\x9d\x01*\x00\n\xab\x06>m6\x97I\xa4"\xac\xaa\xa1\x938\xa9\x90\r\x89gns\xcc...
2023-07-08T19:34:40.944-05:00	b\xce\xdfy\xa3\x1b\xce\x89\xe01\xcf\xba\xc66n\xc6Z\ 'xb4q3\xc8\xa5c\xf6\x97\xbf\x03\xfc\xb9\xa3\xca3\xdc. \x82\xb7\x05v\xb7 ...
2023-07-08T19:34:40.944-05:00	-----
2023-07-08T19:34:41.424-05:00	[ERROR] InvalidImageFormatException: An error occurred (InvalidImageFormatException) when calling the RecognizeCelebrities ...
2023-07-08T19:34:41.426-05:00	END RequestId: 09165cc4-4ec5-404a-9907-2fd882e58737
2023-07-08T19:34:41.426-05:00	REPORT RequestId: 09165cc4-4ec5-404a-9907-2fd882e58737 Duration: 2097.05 ms Billed Duration: 2098 ms Memory Size: 128 MB Ma...

No newer events at this moment. Auto retry paused. [Resume](#)

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## 5. Resultados

Items returned (3)



Actions ▼

Create item



1



tenant\_id



image\_id



image\_data



HAPPY

jeff

{"user\_emotion": {"M": {"Confidence": {"S": "99..."



HAPPY

jeff3.png

{"user\_emotion": {"M": {"Confidence": {"S": "99..."



HAPPY

mark2.jpg

{"user\_emotion": {"M": {"Confidence": {"S": "99..."

## 5. Resultados



**ThemeNewImage**

{"tenant\_id": "HAPPY", "image\_id": "gcolchado.png", "image\_data": {"celebrities\_info": [], "user\_emotion": {"Type": "HAPPY", "Confidence": "46.407283782958984"}}



**ThemeNewImage**

{"tenant\_id": "OTHER", "image\_id": "download.jpg", "image\_data": {"celebrities\_info": [{"name": "Emma Stone", "similarity": "99.8042984008789"}], "user\_emotion"



**ThemeNewImage** <no-reply@sns.amazonaws.com>









para mí ▼

{"tenant\_id": "HAPPY", "image\_id": "rock.jpg", "image\_data": {"celebrities\_info": [{"name": "Dwayne Johnson", "similarity": "99.71868133544922"}], "user\_emotion": {"Type": "HAPPY", "Confidence": "98.160484"}}

\*\*\*



## 5. Resultados

ThemeNewImage ➤ Recibidos x	
	<b>ThemeNewImage</b> { "tenant_id": "HAPPY", "image_id": "jeff2.png", "image_data": { "celebrities_info": [ { "name": "Jeff Bezos", "similarity": 98.98633575439453 } ], "user_emotion": {
	<b>ThemeNewImage</b> { "tenant_id": "HAPPY", "image_id": "jeff2.png", "image_data": { "celebrities_info": [ { "name": "Jeff Bezos", "similarity": 98.98633575439453 } ], "user_emotion": {
	<b>ThemeNewImage</b> { "tenant_id": "HAPPY", "image_id": "jeff2.png", "image_data": { "celebrities_info": [ { "name": "Jeff Bezos", "similarity": 98.98633575439453 } ], "user_emotion": {
	<b>ThemeNewImage</b> { "tenant_id": "HAPPY", "image_id": "jeff2.png", "image_data": { "celebrities_info": [ { "name": "Jeff Bezos", "similarity": 98.98633575439453 } ], "user_emotion": {
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	<b>ThemeNewImage</b> { "tenant_id": "HAPPY", "image_id": "mark2.jpg", "image_data": { "celebrities_info": [ { "name": "Mark Zuckerberg", "similarity": "98.43265533447266" } ], "user_emoti
	<b>ThemeNewImage</b> { "tenant_id": "HAPPY", "image_id": "jeff", "image_data": { "celebrities_info": [ { "name": "Jeff Bezos", "similarity": "99.95979309082031" } ], "user_emotion": { "Typ

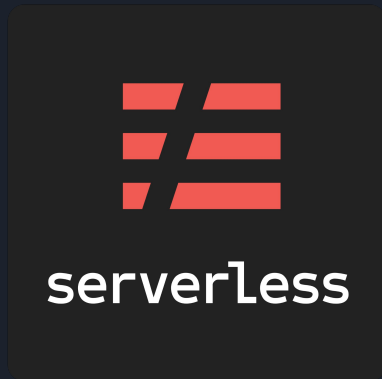


## 6. Conclusiones

Cada componente desempeña un papel clave en la arquitectura serverless y multi-tenant basada en eventos para la comparación de rostros usando el servicio AWS Rekognition. La combinación de los servicios de AWS como API Gateway, S3, Lambda, Rekognition, SNS, SQS y DynamoDB permite implementar esta funcionalidad de manera escalable y sin servidor.



GColchado





GRACIAS