

## **Taller Pub/Sub con APIs y RabbitMQ**

Martín Vargas y Kevin Rosero

### **Objetivo**

Desarrollar una solución distribuida basada en el patrón Publicador/Suscriptor (Pub/Sub), utilizando RabbitMQ como middleware de mensajería, donde las aplicaciones que publican y consumen mensajes están expuestas como servicios REST independientes.

### **Contexto del Caso**

La empresa StreamEdu está implementando un sistema de procesamiento de tareas estudiantiles. Cada vez que un estudiante sube una tarea, se deben ejecutar varias acciones en paralelo:

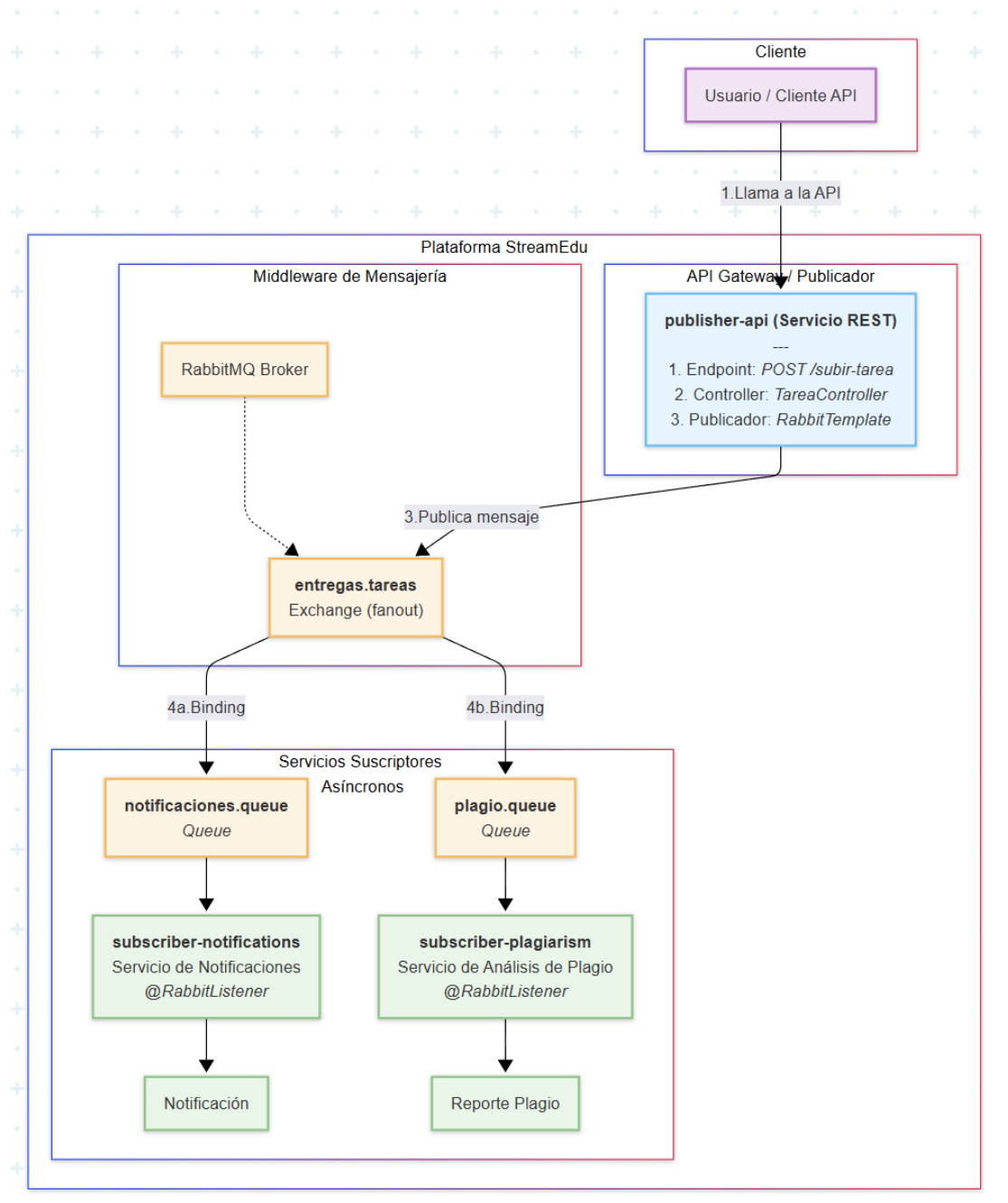
- Notificación al profesor
- Análisis de plagio
- Generación de resumen automático del documento
- Registro del evento en un log audit Trail

La empresa ha decidido utilizar RabbitMQ para desacoplar estos procesos y mejorar la escalabilidad.

Repositorio Github: <https://github.com/MartinVargas07/Taller-Pub-Sub-con-APIs-y-RabbitMQ-Vargas-y-Rosero.git>

Igualmente se subió el PDF al repositorio, pero pide subir un PDF a la plataforma.

**Diagrama de arquitectura funcional.**



### Capturas de Imágenes:

a. Publicador enviando mensaje.

Consola del publisher-api antes de ejecutar

```
Administrador: Símbolo del sistema - mvn spring:boot:run
C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\publisher-api>mvn spring:boot:run
[INFO] Scanning for projects...
[INFO]
-----< com.streduu.publisher:publisher-api >-----
[INFO] Building publisher-api 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO]
-----[ jar ]-----
[INFO]
>>> spring-boot:2.7.15:run (default-cli) > test-compile @ publisher-api >>>
[INFO]
--- resources:3.3.0:resources (default-resources) @ publisher-api ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Using 'UTF-8' encoding to copy filtered properties files.
[INFO] Copying 1 resource
[INFO] Copying 0 resource
[INFO]
--- compiler:3.10.1:compile (default-compile) @ publisher-api ---
[INFO] Changes detected - recompiling the module
[INFO] Compiling 4 source files to C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\publisher-api\target\classes
[INFO]
--- resources:3.3.0:testResources (default-testResources) @ publisher-api ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Using 'UTF-8' encoding to copy filtered properties files.
[INFO] skip non existing resourceDirectory C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\publisher-api\src\test\resources
[INFO]
--- compiler:3.10.1:testCompile (default-testCompile) @ publisher-api ---
[INFO] No sources to compile
[INFO]
<<< spring-boot:2.7.15:run (default-cli) < test-compile @ publisher-api <<<
[INFO]
--- spring-boot:2.7.15:run (default-cli) @ publisher-api ---
[INFO] Attaching agents: []

Spring Boot (v2.7.15)

2025-07-02 18:35:33.426 INFO 26904 --- [main] c.s.publisher.PublisherApiApplication : Starting PublisherApiApplication using Java 21.0.6 on MARTIN-ROOSTRIX with PID 26904 (C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\publisher-api\target\classes started by marti in C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\publisher-api)
2025-07-02 18:35:33.431 INFO 26904 --- [main] c.s.publisher.PublisherApiApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-02 18:35:33.846 INFO 26904 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8080 (http)
2025-07-02 18:35:33.847 INFO 26904 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-02 18:35:33.847 INFO 26904 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.79]
2025-07-02 18:35:33.904 INFO 26904 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-02 18:35:33.904 INFO 26904 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 455 ms
2025-07-02 18:35:34.130 INFO 26904 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http) with context path ''
2025-07-02 18:35:34.139 INFO 26904 --- [main] c.s.publisher.PublisherApiApplication : Started PublisherApiApplication in 0.893 seconds (JVM running for 1.051)
```

Después de ejecutar

```
2025-07-02 19:00:56.612 INFO 23452 --- [main] c.s.p.SubscriberPlagiarismApplication : Starting SubscriberPlagiarismApplication using Java 21.0.6 on MARTIN-ROOSTRIX with PID 23452 (C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\subscriber-plagiarism\target\classes started by marti in C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\subscriber-plagiarism)
2025-07-02 19:00:56.612 INFO 23452 --- [main] c.s.p.SubscriberPlagiarismApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-02 19:00:57.109 INFO 23452 --- [main] o.s.a.r.c.CachingConnectionFactory : Attempting to connect to: [localhost:5672]
2025-07-02 19:00:57.134 INFO 23452 --- [main] o.s.a.r.c.CachingConnectionFactory : Created new connection: rabbitConnectionFactory#10ee04df:0/SimpleConnection@18ad2aa [delegate=amp://admin@127.0.0.1:5672/, localPort=59866]
2025-07-02 19:00:57.164 INFO 23452 --- [main] c.s.p.SubscriberPlagiarismApplication : Started SubscriberPlagiarismApplication in 0.716 seconds (JVM running for 0.877)
[SERVICIO DE PLAGIO] Mensaje recibido: Tarea(estudiante= Juan Perez, curso= Integracion de sistemas, archivo= tarea1.docx, fechaEnvio=2025-07-02T18:30)
[SERVICIO DE PLAGIO] Analizando archivo 'tarea1.docx' en busca de plagio...
```

b. Suscriptores recibiendo y procesando el mensaje.

Consola del subscriber-plagiarism antes de ejecutar

```
Administrador: Símbolo del sistema - mvn spring:boot:run
[INFO] --- resources:3.3.0:testResources (default-testResources) @ subscriber-plagiarism ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Using 'UTF-8' encoding to copy filtered properties files.
[INFO] skip non existing resourceDirectory C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\subscriber-plagiarism\src\test\resources
[INFO]
--- compiler:3.10.1:testCompile (default-testCompile) @ subscriber-plagiarism ---
[INFO] No sources to compile
[INFO]
<<< spring-boot:2.7.15:run (default-cli) < test-compile @ subscriber-plagiarism <<<
[INFO]
--- spring-boot:2.7.15:run (default-cli) @ subscriber-plagiarism ---
[INFO] Attaching agents: []

Spring Boot (v2.7.15)

2025-07-02 18:35:43.451 INFO 25504 --- [main] c.s.p.SubscriberPlagiarismApplication : Starting SubscriberPlagiarismApplication using Java 21.0.6 on MARTIN-ROOSTRIX with PID 25504 (C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\subscriber-plagiarism\target\classes started by marti in C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\subscriber-plagiarism)
2025-07-02 18:35:43.453 INFO 25504 --- [main] c.s.p.SubscriberPlagiarismApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-02 18:35:43.915 INFO 25504 --- [main] o.s.a.r.c.CachingConnectionFactory : Attempting to connect to: [localhost:5672]
2025-07-02 18:35:43.946 INFO 25504 --- [main] o.s.a.r.c.CachingConnectionFactory : Created new connection: rabbitConnectionFactory#108b0bd8:0/SimpleConnection@f985a8e [delegate=amp://admin@127.0.0.1:5672/, localPort=57558]
2025-07-02 18:35:43.978 INFO 25504 --- [main] c.s.p.SubscriberPlagiarismApplication : Started SubscriberPlagiarismApplication in 0.68 seconds (JVM running for 0.831)
```

Después de ejecutar

```
2025-07-02 19:01:15.870 INFO 34320 --- [main] c.s.publisher.PublisherApiApplication : Starting PublisherApiApplication using Java 21.0.6 on MARTIN-ROOSTRIX with PID 34320 (C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\publisher-api\target\classes started by marti in C:\Users\marti\OneDrive\Documents\proyectos\Taller-PubSub-APIs\publisher-api)
2025-07-02 19:01:15.870 INFO 34320 --- [main] c.s.publisher.PublisherApiApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-02 19:01:15.918 INFO 34320 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8080 (http)
2025-07-02 19:01:15.927 INFO 34320 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-02 19:01:15.927 INFO 34320 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.79]
2025-07-02 19:01:15.968 INFO 34320 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-02 19:01:15.968 INFO 34320 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 475 ms
2025-07-02 19:01:15.970 INFO 34320 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http) with context path ''
2025-07-02 19:01:15.937 INFO 34320 --- [nio-8080-exec-1] c.s.publisher.PublisherApiApplication : Started PublisherApiApplication in 0.949 seconds (JVM running for 1.116)
2025-07-02 19:01:15.937 INFO 34320 --- [nio-8080-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'dispatcherServlet'
2025-07-02 19:01:15.944 INFO 34320 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 0 ms
Publicando mensaje: Tarea(estudiante= Juan Perez, curso= Integracion de sistemas, archivo= tarea1.docx, fechaEnvio=2025-07-02T18:30)
2025-07-02 19:01:15.179 INFO 34320 --- [nio-8080-exec-1] o.s.a.r.c.CachingConnectionFactory : Attempting to connect to: [localhost:5672]
2025-07-02 19:01:15.208 INFO 34320 --- [nio-8080-exec-1] o.s.a.r.c.CachingConnectionFactory : Created new connection: rabbitConnectionFactory#2f3ac102:0/SimpleConnection@ae86bec [delegate=amp://admin@127.0.0.1:5672/, localPort=59111]
```

Consola del subscriber-notifications antes de ejecutar

```
Administrador de Símbolos del sistema - mvn spring-boot:run
[INFO] --- resources:3.1.0:testResources (default-testResources) @ subscriber-notifications ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Using 'UTF-8' encoding to copy filtered properties files.
[INFO] skip non existing resourceDirectory C:\Users\marti\OneDrive\Documentos\proyectos\Taller-PubSub-API\subscriber-notifications\src\test\resources
[INFO] --- compiler:3.10.1:testCompile (default-testCompile) @ subscriber-notifications ---
[INFO] No sources to compile
[INFO] <<< spring-boot:2.7.15:run (default-cli) < test-compile @ subscriber-notifications <<<
[INFO] --- spring-boot:2.7.15:run (default-cli) @ subscriber-notifications ---
[INFO] Attaching agents: []

Spring Boot :: (v2.7.15)

2025-07-02 18:35:39.244 INFO 12468 --- [main] c.s.n.SubscriberNotificationsApplication : Starting SubscriberNotificationsApplication using Java 21.0.6 on MARTIN-ROOSTRIX with PID 12468 (C:\Users\marti\OneDrive\Documentos\proyectos\Taller-PubSub-API\subscriber-notifications\target\classes started by marti in C:\Users\marti\OneDrive\Documentos\proyectos\Taller-PubSub-API\subscriber-notifications)
2025-07-02 18:35:39.244 INFO 12468 --- [main] c.s.n.SubscriberNotificationsApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-02 18:35:39.788 INFO 12468 --- [main] o.s.a.r.c.CachingConnectionFactory : Attempting to connect to: [localhost:5672]
2025-07-02 18:35:39.739 INFO 12468 --- [main] o.s.a.r.c.CachingConnectionFactory : Created new connection: rabbitConnectionFactory#108b0bd8:0/SingleConnection@f985a86 [delegate=amqp://admin@127.0.0.1:5672/, localPort=59855]
2025-07-02 18:35:39.772 INFO 12468 --- [main] c.s.n.SubscriberNotificationsApplication : Started SubscriberNotificationsApplication in 0.683 seconds (JVM running for 0.837)
```

Después de ejecutar

```
2025-07-02 19:00:54.819 INFO 32472 --- [main] c.s.n.SubscriberNotificationsApplication : Starting SubscriberNotificationsApplication using Java 21.0.6 on MARTIN-ROOSTRIX with PID 32472 (C:\Users\marti\OneDrive\Documentos\proyectos\Taller-PubSub-API\subscriber-notifications\target\classes started by marti in C:\Users\marti\OneDrive\Documentos\proyectos\Taller-PubSub-API\subscriber-notifications)
2025-07-02 19:00:54.830 INFO 32472 --- [main] c.s.n.SubscriberNotificationsApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-02 19:00:55.352 INFO 32472 --- [main] o.s.a.r.c.CachingConnectionFactory : Attempting to connect to: [localhost:5672]
2025-07-02 19:00:55.378 INFO 32472 --- [main] o.s.a.r.c.CachingConnectionFactory : Created new connection: rabbitConnectionFactory#10ee04df:0/SingleConnection@618ad2aa [delegate=amqp://admin@127.0.0.1:5672/, localPort=59855]
2025-07-02 19:00:55.411 INFO 32472 --- [main] c.s.n.SubscriberNotificationsApplication : Started SubscriberNotificationsApplication in 0.765 seconds (JVM running for 0.938)
[SERVICIO DE NOTIFICACIONES] Mensaje recibido: Tarea(estudiante='Juan Perez', cursor='Integracion de Sistemas', archivo='tarea1.docx', fechaEnvio='2025-07-02T18:30:00')
[SERVICIO DE NOTIFICACIONES] Notificando al profesor del curso 'Integracion de Sistemas' sobre la entrega de 'Juan Perez'.
```

c. en la consola de curl

```
C:\Windows\System32>curl -X POST http://localhost:8080/subir-tarea -H "Content-Type: application/json" -d "{\"estudiante\": \"Juan Perez\", \"curso\": \"Integracion de Sistemas\", \"archivo\": \"tarea1.docx\", \"fechaEnvio\": \"2025-07-02T18:30:00\"}"
Tarea enviada para procesamiento!
C:\Windows\System32>
```

En RabbitMQ, después de ejecutar:

Overview					Messages			Message rates			+/-
Virtual host	Name	Type	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
/	notificaciones.queue	classic	D	running	0	0	0	0.00/s	0.00/s	0.00/s	
/	plagio.queue	classic	D	running	0	0	0	0.00/s	0.00/s	0.00/s	

### Queue notificaciones.queue

Overview

Queued messages last minute ?

Ready: 0  
Unacked: 0  
Total: 0

Message rates last minute ?

Publish: 0.00/s  
Deliver (manual ack): 0.00/s  
Deliver (auto ack): 0.00/s  
Consumer ack: 0.00/s  
Redelivered: 0.00/s  
Get (auto ack): 0.00/s  
Get (empty): 0.00/s

Details

Features	State	idle
durable: true	1	
queue storage version: 1	100%	
Policy	Consumers	
Operator policy	Consumer capacity ?	
Effective policy definition	Messages ?	
	Message body bytes ?	
	Process memory ?	

Consumers (1)

Channel ?	Consumer tag	Ack required	Exclusive	Prefetch count	Active ?	Activity status	Consumer Timeout	Arguments
172.17.0.1:48082 (1)	amq.ctag-GVz4XD3x6yZZGq_U3jNwng	•	o	250	•	up	1800000	

Queue plagio.queue

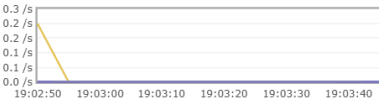
Overview

Queued messages last minute ?



Ready	0
Unacked	0
Total	0

Message rates last minute ?



Publish	0.00/s	Consumer ack	0.00/s	Get (auto ack)	0.00/s
Deliver (manual ack)	0.00/s	Redelivered	0.00/s	Get (empty)	0.00/s
Deliver (auto ack)	0.00/s	Get (manual ack)	0.00/s		

Details

Effective policy definition	Features	durable: true	State	<div><div></div> idle</div>						
		queue storage version: 1	Consumers	1						
	Policy		Consumer capacity ?	100%						
	Operator policy			Total	Ready	Unacked	In memory	Persistent	Transient, Paged Out	
			Messages ?	0	0	0	0	0	0	
			Message body bytes ?	0 B	0 B	0 B	0 B	0 B	0 B	
			Process memory ?	10 KiB						

Consumers (1)

Channel ?	Consumer tag	Ack required	Exclusive	Prefetch count	Active ?	Activity status	Consumer Timeout	Arguments
172.17.0.1:54298 (1)	amq.ctag-xVv7yEtCr8FDvkW-be7ALQ	•	◦	250	•	up	1800000	

Bindings (2)