

## **Pub/Sub Synopsis:**

- 1) Google Cloud Pub/Sub is a fully managed messaging service for real-time event communication.
- 2) A Pub/Sub topic is a central channel to which publishers send messages.
- 3) Publishers and subscribers are loosely coupled and do not depend on each other.
- 4) Multiple subscribers can consume messages from the same topic independently.
- 5) Pub/Sub supports asynchronous message delivery for better system performance.
- 6) It automatically scales to handle high message throughput.
- 7) Messages are stored temporarily and delivered reliably with retries.
- 8) Pub/Sub ensures low latency and global message distribution.
- 9) It is commonly used in event-driven architectures and microservices.
- 10) Pub/Sub eliminates the need for server management and infrastructure handling.

## **Advantages of Google Cloud Pub/Sub:**

1. Fully managed service with no server maintenance.
2. Automatically scales to handle large volumes of messages.
3. Highly reliable and fault tolerant.
4. Supports multiple subscribers for a single topic.
5. Enables loose coupling between systems.
6. Low latency message delivery.

## **Use Cases of Google Cloud Pub/Sub:**

1. Real-time event processing systems.
2. Triggering Cloud Functions using events.
3. User activity and clickstream tracking.
4. Log aggregation and monitoring pipelines.
5. Streaming data to BigQuery for analytics.
6. Microservices communication.
7. Real-time notifications and alerts.
8. IoT device data ingestion.

9. Data pipeline integration between services.
10. Decoupling frontend and backend systems.

### **Pub/Sub gcloud commands Practical Flow:**

- 1) **gcloud services enable pubsub.googleapis.com**  
→ Enables the Google Cloud Pub/Sub API for the current project.
- 2) **gcloud services list --enabled | grep pubsub**  
→ Verifies that the Pub/Sub service is enabled in the project.
- 3) **gcloud pubsub topics create user-events-arun**  
→ Creates a Pub/Sub topic named **user-events-arun** to publish messages.
- 4) **gcloud pubsub topics list**  
→ Displays all Pub/Sub topics available in the project.
- 5) **gcloud pubsub subscriptions create user-event-sub-arun --topic=user-events-arun**  
→ Creates a subscription **user-event-sub-arun** that listens to the **user-events-arun** topic.
- 6) **gcloud pubsub subscriptions list**  
→ Lists all Pub/Sub subscriptions in the project.
- 7) **gcloud pubsub topics publish user-events-arun --message='{"event": "User\_Created", "user": "Arun"}'**  
→ Publishes a JSON message to the **user-events-arun** topic.
- 8) **gcloud pubsub subscriptions pull user-event-sub-arun --limit=5 --auto-ack**  
→ Pulls up to 5 messages from the subscription and automatically acknowledges them.

### **To Trigger in Cloud Function Practical Flow:**

1. **gcloud functions deploy consume\_pubsub-arun \**  
→ Deploys a Cloud Function named **consume\_pubsub\_arun**.
2. **--gen2**  
→ Specifies that the function uses **2nd-generation Cloud Functions**.

3. **--region=asia-south2**  
→ Deploys the function in the **asia-south2** region.
  4. **--runtime=python310**  
→ Sets **Python 3.10** as the runtime environment.
  5. **--source=.**  
→ Uses the current directory as the function source code.
  6. **--entry-point=consume\_pubsub\_arun**  
→ Defines **consume\_pubsub\_arun** as the Python function to execute.
  7. **--trigger-topic="user-events-arun"**  
→ Automatically triggers the function when a message is published to the **user-events-arun** Pub/Sub topic.
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8. **gcloud pubsub topics publish user-events-arun --message**  
**"{\"event\":\"User\_Created\", \"user\":\"arun\"}"**  
→ Publishes a single-user event message to the **user-events-arun** topic.

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9. **gcloud pubsub topics publish user-events-arun \**  
→ Publishes a message to the **user-events-arun** topic.
10. **--**  
**message="{\"event\":\"User\_Created\", \"users\":[\"arun\", \"pooja\", \"rahul\", \"akhil\"]}"**  
→ Sends a JSON message containing **multiple users**, which triggers the Cloud Function once and allows batch processing.

```

vaddearun479@cloudshell:~ (samproject-481503)$ gcloud pubsub topics publish user-events1 --message='{"event": "User_Created", "user": "Arun"}'
messageIds:
- '17281163235744822'

vaddearun479@cloudshell:~ (samproject-481503)$ gcloud pubsub subscriptions pull user-event-sub --limit=5 --auto-ack
DATA: {"event": "User_Created", "user": "Arun"}
MESSAGE_ID: 17281163235744822
ORDERING_KEY:
ATTRIBUTES:
DELIVERY_ATTEMPT:
ACK_STATUS: SUCCESS

```

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Cloud Run Service details Edit and deploy new revision Connect to repo Test Learn Refresh

Overview Services Jobs Worker pools Domain mappings

consume-pubsub-arun Region: asia-south2 URL: https://asia-south2-mazenet-001.cloudfunctions.net/consume\_pubsub\_arun

Observability Revisions Source Triggers Networking Security YAML

Metrics Logs Severity Default Filter Search all fields and values

Severity	Timestamp	Summary
> i	2025-12-23 14:39:53.669 IST	Cloud Run CreateInternalService consume-pubsub-arun {@type: type.googleapis.com/google.cloud.logging.LogEntry}
> i	2025-12-23 14:41:49.554 IST	GET 403 0 B 0 ms Chrome 143 https://asia-south2-mazenet-001.cloudfunct...
> i	2025-12-23 14:48:27.027 IST	POST 200 138 B 64 ms APIs-Google; (+https://developers.google.com/...
> *	2025-12-23 14:48:27.050 IST	PUBSUB MESSAGE RECEIVED
> *	2025-12-23 14:48:27.059 IST	{"event": "User_Created", "user": "arun"}

Release notes

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Observability Revisions Source Triggers Networking Security YAML

Metrics Logs Severity Default Filter Search all fields and values

Severity	Timestamp	Summary
> i	2025-12-23 15:23:20.522 IST	Default STARTUP TCP probe succeeded after 1 attempt for container "worker" o...
> i	2025-12-23 15:23:20.586 IST	Cloud Run ReplaceInternalService consume-pubsub-arun-00005-muv {@type: ...}
> i	2025-12-23 15:23:21.863 IST	Cloud Run ReplaceInternalService consume-pubsub-arun {@type: type.googleapis...
> i	2025-12-23 15:23:51.358 IST	POST 200 130 B 488 ms APIs-Google; (+https://developers.google.com/...
> *	2025-12-23 15:23:51.854 IST	5 users inserted into Firestore

Release notes