# Automated Budget Alerts with Spend Control on GCP

## Definition:

Automated Budget Alerts with Spend Control on GCP is a cloud-native solution that monitors and manages cloud expenditures by setting budget thresholds and triggering automated notifications or corrective actions. This system uses Google Cloud services to help organizations avoid cost overruns and ensure financial discipline in cloud usage.

## Drawbacks:

May require strict IAM policies to avoid unauthorized changes.

Automated disabling of services can disrupt running workloads.

Accuracy depends on well-defined budget thresholds.

Not applicable for multi-cloud environments; GCP only.

## Abstract:

This project addresses the challenge of unexpected cloud expenses in Google Cloud Platform (GCP) environments. Cloud resources, when left unmanaged, can incur significant costs, especially if developers forget to shut down services. To mitigate this risk, an automated budget alert system is implemented using GCP’s native tools. The system monitors cloud spending in real time, triggers alerts when budget thresholds (e.g., 50%, 90%) are exceeded, and optionally executes automated actions such as sending alerts via email or Slack and disabling non-critical services. By integrating services such as Cloud Billing Budgets, Pub/Sub, Cloud Functions, BigQuery, and optionally Looker Studio, this project provides a scalable and secure solution for cost monitoring and control.

## Proposed Solution:

- Set budgets using Cloud Billing Budgets.

- Use Pub/Sub to receive alerts when spending crosses thresholds.

- Trigger Cloud Functions to send notifications or perform automated actions.

- Store cost data in BigQuery for analysis.

- Visualize trends and forecasts with Looker Studio.

## Use Cases:

- Ideal for startups with limited cloud budgets.

- Helps DevOps teams monitor CI/CD infrastructure costs.

- Useful in educational cloud environments to monitor student usage.

- Supports enterprise teams in testing phases to control experiment costs.

## Keywords & their Purpose:

1. GCP Budget Monitoring

**Purpose:** Track cloud expenses in real time within Google Cloud Platform.

2. Cloud Billing Alerts

**Purpose:** Set thresholds to receive notifications when cloud spend exceeds set limits.

3. Cloud Cost Control

**Purpose:** Implement mechanisms to automate spending governance and cost-saving actions.

4. Google Cloud Functions

**Purpose:** Execute serverless automation actions when budget alerts are triggered.

5. Pub/Sub Notifications

**Purpose:** Enable asynchronous message passing for budget alerts across services.

6. BigQuery Cost Analysis

**Purpose:** Store and analyze historical billing data to track trends and usage patterns.

7. Looker Studio Dashboards

**Purpose:** Visualize cost data through interactive charts and reports for better insights.

8. IAM Policy Management

**Purpose:** Control who can define budgets, access billing data, or disable services securely.

**CONCLUSION:**

This project provides a simple and effective way to monitor and control cloud spending on GCP. By automating budget alerts and actions, it helps avoid unexpected costs and ensures better financial management. The system is scalable, easy to implement, and useful for developers, startups, and organizations using Google Cloud.

# Architecture Diagram:

