

Title and Problem Statements

Problem: Cloud platforms like **AWS**, Azure, and GCP have complicated billing systems. Users often have to check dashboards or manually call billing APIs to track their spending. This process is time-consuming and confusing, especially for people who use multiple cloud services.

Who is Affected ?

- . **DevOps Engineers** who is managing cloud infrastructure.
- . **Finance and IT teams who is** responsible for cost control.
- . **Small businesses and startups** using multiple cloud services.
- . **Any cloud user** who wants to reduce unnecessary costs.

Why is This Important?

Cloud spending can **increase quickly** if not managed properly.

Many companies struggle with cost tracking because current tools are difficult to use.

A simple and smart cost management tool can help businesses save money without spending too much time on calculations.

Proposed Solution: AI-Based Cloud Cost Optimizer

This tool will **automatically track** cloud costs in one place and send real-time updates without the need for manual API calls.

It will also provide cost-saving recommendations using AI.

- . Its an AI-powered cloud cost optimizer in which **AWS, AZURE,GCP Billing track in one place.**
- . Real time billing applicable **without** calling API manually.
- . Cost alert **and** AI-based cost prediction **features** are added.

Key Features:

- . Automated cost tracking:

By the help of Webhooks, Event grind, Cloud function
To fetching real data.

- . Cross Platform Support

Multi-cloud Support (AWS, AZURE, GCP).

- . User-friendly Dashboard:

Use graph analytics and alert system.

AI-Powered cost optimizer.

How modern tech helps ?

- . Cloud APIs + Webhooks → Automatic Updates

- . AI-model → For Future cost prediction and Wastage Detection

- . Interactive UI → To present users simplified analytics

Tech Stack and Tools:-

- . Backend : Node.js / Python (flask/ FastAPI)

- . Frontend: Reactjs / Next.js

- . Database : Postgresql / MongoDB

- . Cloud Services: AWS Lambda, Azure Function, GCP Cloud Function

- . APIs: AWS Cost explorer API, AZURE function , GCP cloud function

. Visualization : Grafana and Charts.js

. Security: OAuth 2.0 , API Gateways

Architecture Overview

Billing data AWS, AZURE, GCP would be
fetch. [via API, webhooks, Schedule Job]

Backend API stored in database
[MongoDB and PostgreSQL]

AI-module analyze Cost trends
and Generate recommendations

Frontend dashboard show users
Useful interactive Insights

Alert-System is used for notifications
for un-necessary Cost spike.
[Email, Slack]

Krish Sharma... 2 March 2025

Challenges and Mitigation Strategies

Challenge 1 :- Integration is difficult between APIs

Solution 1 :- Making standardized data processing pipeline

Challenge 2 :- Delay in real-time costs updates

Solution 2 :- Use Webhooks would be beneficial and Caching Mechanism

Challenge 3 :- Accuracy issue comes in AI-based prediction

Solution 3 :- Continuous training between Historical data and ML model (Quite difficult)

Alternative Approaches —

Instead of calling manual APIs use GraphQL API .

To fine AI model use AutoML and Google Vertex AI .

