**GCP Diagram**

A diagram of a computer

Description automatically generated

**GCP Workflow:**

*\* All prices listed below are in USD   
\* New customers get $300 in free credits for selected GCP resources and services.*

**Step 1: Uploading content to Google Cloud Storage (GCS)**

* **Service:** GCS (equivalent to Amazon S3 bucket)
* **Explanation:** The user uploads content (video) to the source Google Cloud Storage (GCS) bucket, which stores all the raw platform content. An upload to this bucket will act as a trigger for step 2.
* **Cost:**
* **Free Tier**: 5GB of storage and 1GB of egress per month (not including intra-region transfers).
* **Storage**: $0.02 to $0.026 per GB/month (depending on region).
* **Data Transfer**: Free for in-region GCS-to-GCS transfers. For egress (data leaving) to outside the region, about $0.12 per GB.
* **Cost estimate:** If you have 1 TB of raw and transcoded video files a month, you can expect around **$20 per month** for standard storage.

**Step 2: Triggering a Google Cloud Functions (Job Submit)**

**Cloud Function: job-submit-02**

* **Service:** Google Cloud Functions, Google Transcoder API
* **Explanation:** When a video is uploaded to the GCS bucket (my-vod-raw-video), job-submit-02 is triggered. This function submits a job to the Transcoder API to process the video into multiple resolutions (SD, HD, UHD). Upon completion, it publishes a message to a Pub/Sub topic.
* **Cost:**
  + **Google Cloud Functions:**
    - **Free Tier:** First 2 million invocations are free.
    - **Invocation Cost:** $0.40 per million invocations (after the free tier).
    - **Compute Time Cost:** $0.0000025 per 100ms (after the free tier).
  + **Transcoder API:**
    - **SD (≤1280x720):** $0.015 per minute.
    - **HD (1280x720 - 1920x1080):** $0.030 per minute.
    - **UHD (1920x1080 - 4096x2160):** $0.060 per minute.
* **Cost Estimate:** Transcoding 100 hours of HD video per month costs around $180.

**Audio Transcription (Speech-to-Text)**

* **Cloud Function: vod-aud-transcription**
  + **Service:** Google Cloud Speech-to-Text API
  + **Explanation:** Converts audio from the video into text, generating a .vtt file and transcription.json for subtitles and transcription purposes.
  + **Cost:**
    - **Free Tier:** 60 minutes per month free.
    - **Cost per minute:** $0.006 (standard model) and $0.009 (enhanced model).
  + **Cost Estimate:** Transcribing 100 hours of audio per month is around $54 (using the standard model).

**Thumbnail Generation**

* **Cloud Function: vod-function-1-thumbnail**
  + **Explanation:** Generates thumbnails for each video, providing a visual preview. The function extracts and stores images in a designated GCS bucket.
  + **Cost:**
    - **Google Cloud Functions Costs:** Same as outlined in Step 2.

**Audio Extraction**

* + **Cloud Function: vod-vid-to-aud-conversion**
    - **Explanation:** Extracts audio from the video file and converts it to .wav format for further processing or analysis.
    - **Cost:**
      * **Google Cloud Functions Costs:** Same as outlined in Step 2.

**Step 3: Video Transcoding with Google Transcoder API**

* **Service:** Google Transcoder API (equivalent to AWS Elemental MediaConvert)
* **Explanation:** The Google Transcoder API retrieves the raw video file from Google Cloud Storage and transcodes it into various output formats. This step ensures compatibility with multiple media players and devices.
* **Cost:**
* **Free tier**: No dedicated free tier as of now.
* **Price for transcoder API**:
* SD (Less than 1280x720): $0.015 per minute.
* HD (1280x720 to 1920x1080): $0.030 per minute.
* UHD (More than 1920x1080 to 4096x2160): $0.060 per minute.
* Audio output only: $0.005 per minute
* **Cost estimate:** If you transcode 100 hours of HD video per month, the cost will be around **$180**.

**Additional Workflow Steps:**

**Step 4: Logging Transcoding Jobs with Cloud Monitoring Logging**

* **Service:** Google Cloud Monitoring and Logging (equivalent to AWS CloudWatch)
* **Explanation:** Google Cloud Monitoring and Logging collects and logs metrics related to the Google Transcoder API jobs. It tracks job statuses and performance metrics.
* **Cost:**
* **Free tier**: First 50 GB of logs and 150 MB of metrics data per month free.
* **Beyond free tier**: $0.50 per GB of logs and $0.258 per MiB of metrics data.
* **Cost estimate:** For moderate logging, expect a monthly cost of around **$5–$10**, depending on log volume and how frequently jobs are monitored.

**Step 5: Monitoring Job Status with Eventarc**

* **Service:** Google Eventarc (equivalent to AWS CloudWatch)
* **Explanation:** Eventarc listens for job status updates from the Google Transcoder API. You can configure Eventarc triggers to listen for specific statuses (e.g., "PROGRESSING," "COMPLETE,""ERROR") of the transcoding job in the Transcoder API.
* **Cost:**
* **Free tier**: 2 million events per month are free.
* **Beyond free tier**: $0.50 per million events.
* **Cost estimate:** For moderate usage (e.g., 1 million events per month), expect minimal costs (likely under $5) after the free tier.

**Step 6: Not part of current workflow.**

**Step 7: Notifications with Google Pub/Sub**

* **Service:** Google Cloud Pub/Sub (equivalent to AWS SNS/SQS)
* **Explanation:** In place of SNS and SQS, Google Pub/Sub is used. You can create Pub/Sub topics to send out notifications for transcoding job status changes. The messages can be delivered via email (using an integration) or stored in a Pub/Sub queue for later processing.
* **Cost:**
* **Free tier**: First 10 GB of messages published, and 10 GB of messages retrieved each month
* **Beyond free tier**: $40 per TB of data transfer for both publish and delivery, and $0.60 per million messages
* **Cost estimate:** For basic messaging and notifications (under 1 million messages), costs are likely to remain under $5–$10 per month.

**Step 8: Storing Transcoded Video in Cloud Storage**

* **Service:** Google Cloud Storage (Equivalent to AWS S3)
* **Explanation:** The Transcoder API stores the transcoded output video in the destination Cloud Storage bucket. This bucket will store the different video formats generated by the transcoding job.
* **Cost: *(same as step 1)***

**Step 9: Content Delivery with Cloud CDN**

* **Service:** Google Cloud CDN (Equivalent to AWS CloudFront)
* **Explanation:** Google Cloud CDN caches and delivers transcoded videos to users globally. This service ensures fast delivery with minimal latency.
* **Cost:**
* Cache data transfer out: $0.02-$0.20 per GiB
* Cache fill: $0.01-$0.04 per GiB
* HTTP/HTTPS cache lookup requests: $0.0075 per 10,000 requests
* **Cost estimate:** For a VOD platform serving 1 TB of content per month, expect around $80–$150 per month depending on regions and traffic patterns.

**Total estimated monthly cost:***\* The upper figure of all prince ranges are used for a conservative estimate*

|  |  |
| --- | --- |
| **Resource/service** | **Cost** |
| Storage | $20 (input) + $20 (output) = $40 |
| Google Cloud Functions (Job Submit) | $5 |
| Google Transcoder API | $180 |
| Google Cloud Speech-to-Text API | $54 |
| Google Cloud Monitoring and Logging | $10 |
| Google Eventarc | $5 |
| Google Cloud Pub/Sub | $10 |
| Google Cloud CDN | $150 |
| **Total** | $454 |

**Summary:**

**Work flow:**

1. Cloud Storage – For storing raw and transcoded video content.

2. Cloud Functions – Triggered by video upload to start the transcoding job.

job-submit-02 (Transcoding)

vod-aud-transcription (Audio Transcription)

vod-function-1-thumbnail (Thumbnail Generation)

vod-vid-to-aud-conversion (Audio Extraction)

3. Transcoder API – Handles video transcoding into multiple formats.

4. Cloud Logging – For monitoring and logging transcoding job details.

5. Eventarc – Listens for changes in job status and triggers events based on job progress.

6. *Not currently in workflow.*

7. Pub/Sub – Handles notifications and message queues.

8. Cloud Storage – For storing transcoded video content.

9. Cloud CDN – For content delivery and caching.

**Total monthly cost estimate (using conservative approach)** - $454