

MO VID INC.

PROPOSAL FOR NEW CLOUD PLATFORM

For SaaS Platforms

OVERVIEW

Mo Vid Inc. has been using on premise virtualization platform by managing four virtual machines to host video software services to its customers. Since it is no longer feasible to sustain the physical infrastructure needed for continuous growth, this proposal will shift the current SaaS software platform to public cloud.

OUR PROPOSAL

This proposal suggests Mo Vid to host it's SaaS platform to Google Cloud Platform's public cloud and its virtual machines. GCP provides flexibility to host our software, gives us autonomy and control over infrastructure and data.

Rationale

- Sustained Use Discounts - Compute Engine offers sustained use discounts on resources that are used for more than 25% of a billing month and are not receiving any other discounts. Whenever you use an applicable resource for more than a fourth of a billing month, you automatically receive a discount for every incremental hour that you continue to use that resource. The discount increases incrementally with usage and you can get up to a 30% net discount off of the resource cost for instances that run the entire month.
- GCP's Transcoder API has evolved from YouTube which is a proven video streaming app and hence it can fit into our use case as well.
- Global Presence of Data Centers and Networks - Good availability of resources
- Relatively secure cloud and guarantee of constant updates
- Simple and easy to use platform with good community support

Execution Strategy

Currently we have four SaaS solutions to be hosted on GCP. We will be using different services for each solution:

- Application Server - The server can be deployed on Google Kubernetes Engine where the containerized software can be hosted in containers using GKE
- Wowza Streaming Engine - Streaming will need a dedicated Compute Engine Virtual Machine.
- Video Transcoder - Transcoder API can be used to transcode video files to be sent to the streaming engine. This will also need its own Compute Engine Virtual Machine.
- Microsoft SQL Server - The database will be stored in Cloud SQL.

So instead of 4 VMs, we only need 2 Virtual Machines to be running for Wowza Streaming and Transcoder jobs while the Application Server can be run on Kubernetes Engine (as containers) which will be helpful in automated load balancing. The database can be stored in SQL Server.

Resources

1. Application Server-
Platform - Google Kubernetes Engine
No of nodes - 1
OS: Windows Server(2019)
CPU: 4 cores, RAM: 15 GB
Storage: 3 X 375 GB
Boot Disk: 100 GB

GKE Standard Node Pool

1 x

Region: Iowa

730 total hours per month

Provisioning model: Spot

| | |
|-----------------------------------|------------|
| Instance type: n1-standard-4 | USD 29.20 |
| Operating System / Software: Paid | USD 134.32 |
| Local SSD: 3x375 GiB | USD 54.00 |

Estimated Component Cost: USD 217.52 per 1 month

2. Wowza Streaming Engine-
Platform - Google Compute Engine
No of instances - 1
OS: Windows Server(2012R2, 2016, 2019)
CPU: 8 cores, RAM: 30 GB, Machine Family- General Purpose
Storage: 2 X 375 GB
Boot Disk: 100 GB

| Compute Engine | |
|--|--|
| 1 x |    |
| Region: Iowa | |
| 730 total hours per month | |
| Provisioning model: Regular | |
| Instance type: n1-standard-8 Sustained Use Discount applied (30%) | USD 194.18 |
| Operating System / Software: Paid Multithreading: 2 thread per core | USD 268.64 |
| Local SSD: 2x375 GiB | USD 60.00 |
| Estimated Component Cost: USD 522.82 per 1 month | |

| Persistent Disk (Accompanying) | |
|--------------------------------------|-----------|
| 1 x boot disk | |
| Product accompanying: Compute Engine | |
| Zonal balanced PD: 100 GiB | USD 10.00 |
| USD 10.00 | |

3. Video Transcoder-
- Platform - Google Compute Engine
- No of instances - 1
- OS: Windows Server(2012R2, 2016, 2019)
- CPU: 8 cores, RAM: 16 GB, Machine Family- Compute Optimized
- Storage: 2 X 375 GB
- Boot Disk: 100 GB

| | | | |
|--|------------|-----------|--|
| 1 x | | | |
| Region: Iowa | | | |
| 730 total hours per month | | | |
| Provisioning model: Regular | | | |
| Instance type: c2-standard-8 Sustained Use Discount applied (20%) | USD 243.95 | | |
| Operating System / Software: Paid Multithreading: 2 thread per core | USD 268.64 | | |
| Local SSD: 2x375 GiB | USD 60.00 | | |
| Estimated Component Cost: USD 572.59 per 1 month | | | |
| Persistent Disk (Accompanying) | | | |
| 1 x boot disk | | | |
| Product accompanying: Compute Engine | | | |
| Zonal balanced PD: 100 GiB | | USD 10.00 | |
| Transcoder API | | | |
| HD minutes: 1000 | | | |
| USD 30.00 | | | |

Platform - Transcode API

Limits

The following table shows limits per transcoding job.

| Job limits | |
|---|----------|
| Total input size | 400 GB |
| Total output size | 400 GB |
| Maximum EditList duration | 24 hours |
| Maximum number of video streams | 30 |
| Maximum number of audio streams | 50 |
| Maximum number of text streams | 50 |
| Maximum number of mux streams | 100 |
| Maximum number of manifests | 100 |
| Maximum number of spritesheets | 10 |

4. Microsoft SQL Server-
Platform - Cloud SQL
No of instances - 1
Database Version - SQL Server 2017/2019 Standard
CPU: 4 cores, RAM: 15 GB
Storage: 350 GB
Backup size: 100 GB

Cloud SQL for SQL Server

DB-STANDARD-4



Number of instances: 1

Location: Iowa

Total hours: 730

| | |
|------------------------------|------------|
| Instance type: DB-STANDARD-4 | USD 197.25 |
| Database Version: STANDARD | USD 379.60 |
| Storage: 350 GiB | USD 59.50 |
| Backup: 100 GiB | USD 8.00 |
| USD 644.35 | |

SERVICE UPTIMES AND GUARANTEES BY VENDOR

According to Google Kubernetes Engine SLA, Zonal Cluster has 99.5% monthly uptime percentage.

According to Google Compute Engine SLA, Single Instance has $\geq 99.5\%$ monthly uptime percentage.

According to Cloud SQL SLA it has 99.0 % to 99.5% monthly uptime percentage and 10% of service not covered will be added to future bills.

According to Cloud Functions SLA Transcoder API has $\geq 99.95\%$ monthly uptime percentage.

BACKUP METHODOLOGY FOR VIDEO FILES

There are 4 types of backup data storage options given by Google Cloud -

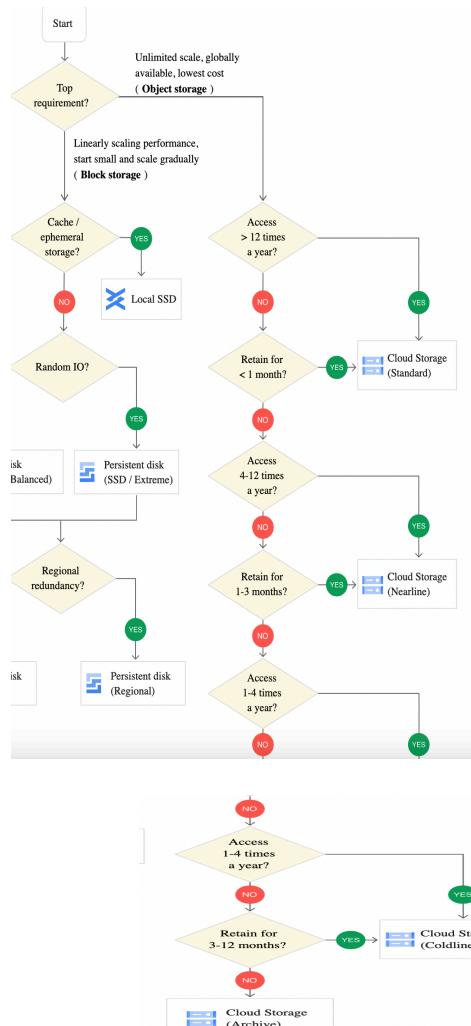
| | | |
|---|--|--|
| <u>Standard Storage</u> | Storage for data that is frequently accessed("hot" data) and/or stored for only brief periods of time. | "Hot" data, including websites, streaming videos, and mobile apps. |
|---|--|--|

| | | |
|---|--|--------------------------------------|
| <u>Nearline Storage</u> | Low cost, highly durable storage service for storing infrequently accessed data. | Data that can be stored for 30 days. |
|---|--|--------------------------------------|

| | | |
|---|---|--------------------------------------|
| <u>Coldline Storage</u> | A very low cost, highly durable storage service for storing infrequently accessed data. | Data that can be stored for 90 days. |
|---|---|--------------------------------------|

| | | |
|---|---|---------------------------------------|
| <u>Archival Storage</u> | The lowest cost, highly durable storage service for data archiving, online backup, and disaster recovery. | Data that can be stored for 365 days. |
|---|---|---------------------------------------|

At first thought, it seemed Standard Storage would be ideal for videos but on further digging I found that Nearline Storage will be much better and cheaper to create backups for 60 days. As seen in the below flowchart:



Nearline storage

Nearline storage is a low-cost, highly durable storage service for storing infrequently accessed data. Nearline storage is a better choice than Standard storage in scenarios where slightly lower availability, a 30-day minimum storage duration, and costs for data access are acceptable trade-offs for lowered at-rest storage costs.

Nearline storage is ideal for data you plan to read or modify on average once per month or less. For example, if you want to continuously add files to Cloud Storage and plan to access those files once a month for analysis, Nearline storage is a great choice.

Nearline storage is also appropriate for data backup, long-tail multimedia content, and data archiving. Note, however, that for data accessed less frequently than once a quarter, Coldline storage or Archive storage are more cost-effective, as they offer lower storage costs.

At-rest storage costs for other types:

| North America | South America | Europe | Middle East | Asia | Indonesia | Australia |
|--------------------|---------------|--|--|--|---------------------------------------|-----------|
| Location | | Standard storage (per GB per Month) | Nearline storage (per GB per Month) | Coldline storage (per GB per Month) | Archive storage (per GB per Month) | |
| Iowa (us-central1) | | \$0.020 | \$0.010 | \$0.004 | \$0.0012 | |

For 250GiB backup it costs 5.01\$ per month, so if we configure it for 60 days (2 months) it will be 10.02\$.

Cloud Storage

1x Nearline Storage  

Location: Iowa

| | |
|-----------------------------------|----------|
| Total Amount of Storage: 250 GiB | USD 2.50 |
| Data Retrieval Size: 250 GiB | USD 2.50 |
| Class A operations: 0.001 million | USD 0.01 |
| Class B operations: 0.001 million | USD 0.00 |
| USD 5.01 | |

Total Estimated Cost: USD 5.01 per 1 month

Estimate Currency
USD - US Dollar ▾

If we have to take a backup of the whole Web App hosted on GKE:

The screenshot shows a configuration page for a backup plan. At the top, it says "Backup for GKE". Below that are two icons: a blue pencil for editing and a red circle with a white X for deleting. The configuration details are listed as follows:

- Region: Iowa
- Size of full backup: 500 GiB
- Backup retention period: 60 days
- Number of backup plans: 1
- Average pods per backup plan: 1
- Management cost: USD 1.00
- Storage cost: USD 14.00
- USD 15.00**

Total Estimated Cost: USD 15.00 per 1 month

Below the cost section, there is a "Estimate Currency" dropdown menu set to "USD - US Dollar".

Backup for Cloud SQL Mo Vid Data

Backups help you restore lost data to your Cloud SQL instance. Additionally, if an instance is having a problem, you can restore it to a previous state by using the backup to overwrite it. Enable automated backups for any instance that contains necessary data. Backups protect your data from loss or damage.

Cloud SQL limits the rate for backup operations on the data disk. You are allowed a maximum of five backup operations every 50 minutes per instance per project. If a backup operation fails, it does not count towards this quota. If you reach the limit, the operation fails with an error message that tells you when you can retry.

Cloud SQL backups are incremental. They contain only data that changed after the previous backup was taken. Your oldest backup is a similar size to your database, but the sizes of subsequent backups depend on the rate of change of your data. When the oldest backup is deleted, the size of the next oldest backup increases so that a full backup still exists.

Automated backups are taken daily, within a 4-hour backup window. The backup starts during the backup window. When possible, schedule backups when your instance has the least activity. During the backup window, automated backups occur every day your instance is running. One additional automated backup is taken after your instance is stopped to safeguard all changes prior to the instance stopping. Up to seven most recent backups are retained, by default. Automated backups are halted if your instance has been stopped for more than 36 hours. You can configure how many automated backups to retain, but you can't retain fewer than the default (seven). You can increase the number of days that you can keep automatic backups from seven to 30 days.

On Demand backups :- You can create a backup at any time. This could be useful if you are about to perform a risky operation on your database, or if you need a backup and you do not want to wait for the backup window. You can create on-demand backups for any instance, whether the instance has automatic backups enabled or not. On-demand backups are not automatically deleted the way automated backups are. They persist until you delete them or until their instance is deleted. Because they are not automatically deleted, on-demand backups can have a long-term effect on your billing charges.

To create either an automated or on-demand backup for Cloud SQL we must do it inside the instances, since this is a proposal, we can only find out once we create the instance in cloud console.

Create an on-demand backup

To create an on-demand backup:

The screenshot shows a step-by-step guide for creating an on-demand backup in the Google Cloud SQL Instances page. Step 1: In the Google Cloud console, go to the Cloud SQL Instances page. Step 2: Go to Cloud SQL Instances. Step 3: Open the Overview page of an instance, click the instance name. Step 4: Select Backups from the SQL navigation menu. Step 5: Click Create backup. Step 6: On the Create backup page, add a description, if needed, and click Create.

The screenshot shows the Cloud SQL for SQL Server pricing page for the location Iowa (us-central1). It details storage and HA storage costs. Storage costs are \$0.17 per GB/month for SSD storage capacity and \$0.08 per GB/month for backups (used). HA Storage costs are \$0.374 per GB/month for SSD storage capacity and \$0.08 per GB/month for backups (used). Network costs are Ingress to Cloud SQL: Free.

Or you can keep backup size when creating cloud sql instance as given below:

The screenshot shows the Cloud SQL For SQL Server creation form. It includes fields for Number of instances (1), Database Version (SQL Server 2017 / 2019 Standard), SQL Instance Type (db-standard-4), Enable High Availability Configuration (unchecked), Location (Iowa (us-central1)), Storage (Provisioned Amount) (350 GiB), Backup size (500 GiB), Committed usage (1 Year), and an ADD TO ESTIMATE button. A tooltip for the backup size field states: "The amount of data to be backed up for your database instance. Backups are commonly 1.1x to 1.5x of provisioned storage size."

TOTAL COST OF OWNERSHIP FOR ONE YEAR FOR 10 CUSTOMERS

| 1 | name | quantity | region | service_id | sku | product_description | unit_price, U | total_price, USD |
|----|---|----------|-------------|-------------|---------------|--|---------------|------------------|
| 2 | Commitment v1: Cpu in Americas for 1 Year | 29200 | us-central1 | 6F81-5844-4 | 6FDA-DB41-I | CP-COMPUTEENGINE-VMIMAGE-N1-STANDARD-4 | 0.019915 | 581.518 |
| 3 | Commitment v1: Local SSD in Americas for 1 Year | 7500 | us-central1 | 6F81-5844-4 | D612-7A63-7 | CP-COMPUTEENGINE-VMIMAGE-N1-STANDARD-4 | 0.0504 | 378 |
| 4 | Commitment v1: Ram in Americas for 1 Year | 109500 | us-central1 | 6F81-5844-4 | E35D-222F-E | CP-COMPUTEENGINE-VMIMAGE-N1-STANDARD-4 | 0.002669 | 292.2555 |
| 5 | Licensing Fee for Windows Server 2019 Datacenter Edition (CPU cost) | 29200 | us-central1 | 6F81-5844-4 | 9597-C24E-C | CP-COMPUTEENGINE-VMIMAGE-N1-STANDARD-4 | 0.046 | 1343.2 |
| 6 | Commitment: Compute optimized Core running in Americas for 1 Year | 58400 | us-central1 | 6F81-5844-4 | 4F72-F1FE-4 | CP-COMPUTEENGINE-VMIMAGE-C2-STANDARD-8 | 0.021409 | 1250.2856 |
| 7 | Commitment v1: Local SSD in Americas for 1 Year | 3750 | us-central1 | 6F81-5844-4 | D612-7A63-7 | CP-COMPUTEENGINE-VMIMAGE-C2-STANDARD-8 | 0.0504 | 189 |
| 8 | Commitment: Compute optimized Ram running in Americas for 1 Year | 233600 | us-central1 | 6F81-5844-4 | B4E8-3D79-E | CP-COMPUTEENGINE-VMIMAGE-C2-STANDARD-8 | 0.002869 | 670.1984 |
| 9 | Licensing Fee for Windows Server 2019 Datacenter Edition (CPU cost) (SMT) | 58400 | us-central1 | 6F81-5844-4 | 9597-C24E-C | CP-COMPUTEENGINE-VMIMAGE-C2-STANDARD-8 | 0.046 | 1343.2 |
| 10 | Commitment v1: Cpu in Americas for 1 Year | 58400 | us-central1 | 6F81-5844-4 | 6FDA-DB41-I | CP-COMPUTEENGINE-VMIMAGE-N1-STANDARD-8 | 0.019915 | 1163.036 |
| 11 | Commitment v1: Local SSD in Americas for 1 Year | 7500 | us-central1 | 6F81-5844-4 | D612-7A63-7 | CP-COMPUTEENGINE-VMIMAGE-N1-STANDARD-8 | 0.0504 | 378 |
| 12 | Commitment v1: Ram in Americas for 1 Year | 219000 | us-central1 | 6F81-5844-4 | E35D-222F-E | CP-COMPUTEENGINE-VMIMAGE-N1-STANDARD-8 | 0.002669 | 584.511 |
| 13 | Licensing Fee for Windows Server 2019 Datacenter Edition (CPU cost) (SMT) | 58400 | us-central1 | 6F81-5844-4 | 9597-C24E-C | CP-COMPUTEENGINE-VMIMAGE-N1-STANDARD-8 | 0.046 | 1343.2 |
| 14 | Nearline Storage Iowa | 2500 | us-central1 | 95FF-2EF5-5 | 4EE6-EF73-7 | CP-BIGSTORE-NEARLINE | 0.01 | 25 |
| 15 | Nearline Class A Operations | 1000 | us-central1 | 95FF-2EF5-5 | 05B5-EE18-5 | CP-BIGSTORE-NEARLINE | 0.01 | 0.01 |
| 16 | Nearline Class B Operations | 1000 | us-central1 | 95FF-2EF5-5 | D0C7-E6E8-6 | CP-BIGSTORE-NEARLINE | 0.01 | 0.001 |
| 17 | Nearline Data Retrieval | 2500 | us-central1 | 95FF-2EF5-5 | 8D92-97F6-E | CP-BIGSTORE-NEARLINE | 0.01 | 25 |
| 18 | Cloud SQL for SQL Server | 730 | iowa | | | not yet suppr CP-CLOUDFORSQLSERVER-JOB | | 6150.345 |
| 19 | Transcoder API | 500 | us | 4CD4-2F2E-6 | Look up for S | CP-TRANSCODER-API-HD | 0.03 | 15 |
| 20 | SSD backed PD Capacity | 300 | us-central1 | 6F81-5844-4 | B188-61DD-E | CP-COMPUTEENGINE-STORAGE-PD-READONLY | 0.17 | 51 |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| | | | | | | | Total Price: | 15782.7605 |

10 Nodes for 10 customers



10 x



Region: Iowa

7,300 total hours per month

Commitment term: 1 Year

Provisioning model: Regular

Instance type: c2-standard-8

USD 1,920.48

Committed Use Discount applied

Operating System / Software: Paid

USD 1,343.20

Multithreading: 1 thread per core

Local SSD: 1x375 GiB

USD 189.00

Committed Use Discount applied

Estimated Component Cost: USD 3,452.68 per 1 month



Region: Iowa

7,300 total hours per month

Commitment term: 1 Year

Provisioning model: Regular

Instance type: n1-standard-8

USD 1,747.55

Committed Use Discount applied

Operating System / Software: Paid

USD 1,343.20

Multithreading: 1 thread per core

Local SSD: 2x375 GiB

USD 378.00

Committed Use Discount applied

Estimated Component Cost: USD 3,468.75 per 1 month

Backup of cloud storage is takes as 250Gib X 10

| GKE Standard Node Pool | |
|---|---|
| 10 x |   |
| Region: Iowa | |
| 7,300 total hours per month | |
| Commitment term: 1 Year | |
| Provisioning model: Regular | |
| Instance type: n1-standard-4 | USD 873.77 |
| Committed Use Discount applied | |
| Operating System / Software: Paid | USD 1,343.20 |
| Local SSD: 2x375 GiB | USD 378.00 |
| Committed Use Discount applied | |
| Estimated Component Cost: USD 2,594.97 per 1 month | |
| Cloud Storage | |
| 1x Nearline Storage |   |
| Location: Iowa | |
| Total Amount of Storage: 2,500 GiB | USD 25.00 |
| Data Retrieval Size: 2,500 GiB | USD 25.00 |
| Class A operations: 0.001 million | USD 0.01 |
| Class B operations: 0.001 million | USD 0.00 |
| USD 50.01 | |

10 instances each customer has own SQL database server with 350GB backup

| Cloud SQL for SQL Server | |
|------------------------------|---|
| DB-STANDARD-4 |   |
| Number of instances: 10 | |
| Location: Iowa | |
| Total hours: 730 | |
| Instance type: DB-STANDARD-4 | USD 147.93 |
| Commitment term: 1 Year | |
| Database Version: STANDARD | USD 379.60 |
| Storage: 350 GiB | USD 59.50 |
| Backup: 350 GiB | USD 28.00 |
| USD 6,150.34 | |

Transcoder API has been given 150 minutes SD video, 150 minutes HD video per customer,

| Transcoder API | | |
|------------------|--|--|
| SD minutes: 1500 | | |
| HD minutes: 1500 | | |
| USD 67.50 | | |

| Persistent Disk (Accompanying) |
|--------------------------------|
|--------------------------------|

10 x boot disk

Product accompanying: GKE Standard

| | |
|----------------------|----------|
| Zonal SSD PD: 10 GiB | USD 1.70 |
| USD 17.00 | |

10 x boot disk

Product accompanying: Compute Engine

| | |
|----------------------|----------|
| Zonal SSD PD: 10 GiB | USD 1.70 |
| USD 17.00 | |

10 x boot disk

Product accompanying: Compute Engine

| | |
|----------------------|----------|
| Zonal SSD PD: 10 GiB | USD 1.70 |
| USD 17.00 | |

Total Estimated Cost: USD 15,835.26 per 1 month

Estimate Currency

USD - US Dollar



The total estimated cost including backups for 10 customers is 15,835.26\$ for 1 month. So, for a year where discounts have been added for 1-year sustained use of GCP, the total comes out to 1,90,023.12\$ per year.

These numbers are taken as peak of peaks usage by customer, the actual price will be lower as per the usage of the customers and can be reduced if resource allocation is done judiciously.

TOTAL COST OF OWNERSHIP FOR 25 SMALL CUSTOMERS

For small customers no major change is needed in the current architecture, some resources may need to be reduced as per the new requirements for small customers.

Since this section focuses on cost estimation, instead of adding 25 instances of VMs, calculation for one instance is done and then total for others is taken to be similar (Cost for 1 instance X 25)

For one small customer -

| Compute Engine | |
|--|---|
| 1 x Wowza Streaming Engine |   |
| Region: Iowa | |
| 730 total hours per month | |
| Commitment term: 1 Year | |
| Provisioning model: Regular | |
| Instance type: n1-standard-8 Committed Use Discount applied | USD 174.75 |
| Operating System / Software: Paid Multithreading: 2 thread per core | USD 268.64 |
| Local SSD: 3x375 GiB Committed Use Discount applied | USD 56.70 |
| Estimated Component Cost: USD 500.09 per 1 month | |

For VM which hosts the jobs ran by Transcoder API for small customers (< 50 Jobs per day) 8 cores 16 GB RAM has been allocated.

| Compute Engine | |
|--|---|
| 1 x Transcoder VM |   |
| Region: Iowa | |
| 730 total hours per month | |
| Commitment term: 1 Year | |
| Provisioning model: Regular | |
| Instance type: c2d-highcpu-8 Committed Use Discount applied | USD 137.89 |
| Operating System / Software: Paid Multithreading: 2 thread per core | USD 268.64 |
| Local SSD: 1x375 GiB Committed Use Discount applied | USD 18.90 |
| Estimated Component Cost: USD 425.43 per 1 month | |

Transcoder API is given maximum of 250 * 60 minutes of HD streaming.



| | |
|---|---------------|
| Region: | Iowa |
| 730 total hours per month | |
| Commitment term: | 1 Year |
| Provisioning model: | Regular |
| Instance type: | n1-standard-4 |
| | USD 87.38 |
| Committed Use Discount applied | |
| Operating System / Software: | Paid |
| | USD 134.32 |
| Local SSD: | 1x375 GiB |
| | USD 18.90 |
| Committed Use Discount applied | |
| Estimated Component Cost: USD 240.60 per 1 month | |

Minimum option was 10GB size for Cloud SQL



| | | |
|----------------------|---------------|------------|
| SQL Server | | |
| Number of instances: | 1 | |
| Location: | Iowa | |
| Total hours: | 730 | |
| Instance type: | DB-STANDARD-4 | USD 197.25 |
| Database Version: | STANDARD | USD 379.60 |
| Storage: | 10 GiB | USD 1.70 |
| Backup: | 10 GiB | USD 0.80 |
| USD 579.35 | | |

Cloud Storage

1x Nearline Storage



Location: Iowa

Total Amount of Storage: 10,240 GiB USD 102.40

Data Retrieval Size: 10,240 GiB USD 102.40

Class A operations: 1 million USD 10.00

USD 214.80

Below are the boot disks (Space where OS and software is stored for VMs, GKEs)

Persistent Disk (Accompanying)

1 x boot disk

Product accompanying: Compute Engine

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

1 x boot disk

Product accompanying: Compute Engine

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

1 x boot disk

Product accompanying: GKE Standard

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

Total Estimated Cost: USD 2,425.27 per 1 month

Total Estimated Cost for 1 small customer is 2425.27\$ for 1 month.

Total cost for 25 small customers is 60,631.75\$

For one year it comes down to 727,581\$ for 25 small customers.

TOTAL COST OF OWNERSHIP FOR 10 MEDIUM CUSTOMERS

For medium customers more resources need to be allocated than smaller customers.

For VM running Wowza streaming engine 10TB space was needed, since GCP had maximum 24 X 375 Gb ~ 9TB local SSD, we have attached Persistent Disk of 10TB for this Compute Engine.

| | | |
|---|------------|--|
| 1 x Wowza Streaming Engine | | |
| Region: Iowa | | |
| 730 total hours per month | | |
| Commitment term: 1 Year | | |
| Provisioning model: Regular | | |
| Instance type: n1-standard-8 Committed Use Discount applied | USD 174.75 | |
| Operating System / Software: Paid Multithreading: 2 thread per core | USD 268.64 | |
| Estimated Component Cost: USD 443.39 per 1 month | | |
| Persistent Disk | | |
| Iowa | | |
| Zonal standard PD: 10,240 GiB | USD 408.40 | |
| USD 408.40 | | |
| For details on the upcoming price change in April 2023, visit the PD Snapshot Pricing Documentation page. | | |

For VM which hosts jobs run by Transcoder API for medium customers the resources have been increased to 16 cores 32 GB RAM (for 50 to 100 Jobs) with 3TB local SSD data storage

| | | |
|--|------------|--|
| 1 x Transcoder VM | | |
| Region: Iowa | | |
| 730 total hours per month | | |
| Commitment term: 1 Year | | |
| Provisioning model: Regular | | |
| Instance type: c2d-highcpu-16 Committed Use Discount applied | USD 275.79 | |
| Operating System / Software: Paid Multithreading: 2 thread per core | USD 537.28 | |
| Local SSD: 8x375 GiB Committed Use Discount applied | USD 151.20 | |
| Estimated Component Cost: USD 964.27 per 1 month | | |

Transcoder API with 1536 hours or 92160 minutes of HD transcoding.

Transcoder API



HD minutes: 92160

USD 2,764.80

GKE Standard Node Pool

1 x Web Application Server



Region: Iowa

730 total hours per month

Commitment term: 1 Year

Provisioning model: Regular

Instance type: n1-standard-4 USD 87.38
Committed Use Discount applied

Operating System / Software: Paid USD 134.32

Local SSD: 3x375 GiB USD 56.70
Committed Use Discount applied

Estimated Component Cost: USD 278.40 per 1 month

Cloud SQL for SQL Server

SQL Server



Number of instances: 1

Location: Iowa

Total hours: 730

Instance type: DB-STANDARD-4 USD 197.25

Database Version: STANDARD USD 379.60

Storage: 10 GiB USD 1.70

Backup: 10 GiB USD 0.80

USD 579.35

60 TB maximum Cloud Storage available per medium customer

Cloud Storage

1x Nearline Storage



Location: Iowa

Total Amount of Storage: 61,440 GiB USD 614.40

Data Retrieval Size: 61,440 GiB USD 614.40

Class A operations: 1 million USD 10.00

USD 1,238.80

Persistent Disk (Accompanying)

1 x boot disk

Product accompanying: Compute Engine

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

1 x boot disk

Product accompanying: Compute Engine

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

1 x boot disk

Product accompanying: GKE Standard

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

Total Estimated Cost: USD 6,692.41 per 1 month

Total Estimated Cost for 1 medium customer is 6,692.41\$ for 1 month.

Total cost for 10 medium customers is 66,924.1\$

For one year it comes down to 803,089.2\$ for 10 medium customers.

TOTAL COST OF OWNERSHIP FOR 3 LARGE CUSTOMERS

For large customers much more resources need to be allocated than medium customers.

For Compute Engine running Wowza streaming engine 25TB space was needed, since GCP had maximum 24 X 375 Gb ~ 9TB local SSD, we have attached Persistent Disk of 25TB for this Compute Engine.

1 x Wowza Streaming Engine



Region: Iowa

730 total hours per month

Commitment term: 1 Year

Provisioning model: Regular

Instance type: n1-standard-8
Committed Use Discount applied

USD 174.75

Operating System / Software: Paid
Multithreading: 2 thread per core

USD 268.64

Estimated Component Cost: USD 443.39 per 1 month

Persistent Disk

Iowa



Zonal standard PD: 25,600 GiB

USD 1,022.80

USD 1,022.80

For VM which hosts jobs run by Transcoder API for large customers the resources have been increased to 32 cores 64 GB RAM for better throughput (more than 100 Jobs/day) with 6 TB of persistent disk attached which is shown below added with previous 25TB.

1 x Transcoder VM



Region: Iowa

730 total hours per month

Commitment term: 1 Year

Provisioning model: Regular

Instance type: c2d-highcpu-32
Committed Use Discount applied

USD 551.58

Operating System / Software: Paid
Multithreading: 2 thread per core

USD 1,074.56

Estimated Component Cost: USD 1,626.14 per 1 month

Persistent Disk

Iowa



Zonal standard PD: 31,600 GiB

USD 1,262.80

USD 1,262.80

Transcoder API with 3072 hours or 184320 minutes of HD transcoding.

Transcoder API



HD minutes: 184320

USD 5,529.60

Web Application server effectively remains same but with 2TB local SSD

GKE Standard Node Pool

1 x Web Application Server



Region: Iowa

730 total hours per month

Commitment term: 1 Year

Provisioning model: Regular

Instance type: n1-standard-4 USD 87.38
Committed Use Discount applied

Operating System / Software: Paid USD 134.32

Local SSD: 6x375 GiB USD 113.40
Committed Use Discount applied

Estimated Component Cost: USD 335.10 per 1 month

Cloud SQL server with 16 GB size.

Cloud SQL for SQL Server

SQL Server



Number of instances: 1

Location: Iowa

Total hours: 730

Instance type: DB-STANDARD-4 USD 197.25

Database Version: STANDARD USD 379.60

Storage: 16 GiB USD 2.72

Backup: 16 GiB USD 1.28

USD 580.85

150 TB maximum Cloud Storage for large customer.

Cloud Storage

1x Nearline Storage



Location: Iowa

Total Amount of Storage: 153,600 GiB USD 1,536.00

Data Retrieval Size: 153,600 GiB USD 1,536.00

Class A operations: 1 million USD 10.00

USD 3,082.00

Persistent Disk (Accompanying)

1 x boot disk

Product accompanying: Compute Engine

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

1 x boot disk

Product accompanying: Compute Engine

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

1 x boot disk

Product accompanying: GKE Standard

Zonal balanced PD: 50 GiB USD 5.00

USD 5.00

Total Estimated Cost: USD 12,874.87 per 1 month

Total Estimated Cost for 1 large customer is 12,874.87\$ for 1 month.

Total cost for 3 large customers is 38,624.61\$

For one year it comes down to 463,495.32\$ for 3 large customers.

ADVANCED CLOUD FEATURE

OVERVIEW

We have seen cloud technology getting a lot of advanced features which we might offer our users and increase customer engagement and offer more features to our customers.

One such advanced cloud feature could be Google Cloud Platform's Video AI.

Video AI gives video analysis to recognize more than 20,000 objects, places and actions in a video using state of the art AI models by utilizing Video Intelligence API that are already available in pre-trained form or our developers could use Vertex AI to create, deploy ML models and extract insights and gain valuable customer engagement data.

Rationale

- It is not enough to give our customers a platform to upload and watch videos. To enhance their experience, we will need to gain real time insights on what kind of videos does a customer watch and based on that recommendations could be given to that user.
- Similarly, it would be helpful for us to annotate all the videos on our platform and create a pipeline to automate this process for every new video uploaded.
- Searching a video can be simplified by extracting metadata from videos that can be used to index, organize and search for video content even if the user does not know the name of the video.

Use Cases

- Content Moderation – It is important to identify inappropriate content shown in a video and conduct it across a lot of data in a fast and efficient manner using the Video Intelligence API.
- Recommendations – Video Intelligence API provides a strong recommendation engine which could boost customer engagement with our software.
- Contextual Advertisements – In this age where we are constantly bombarded with irrelevant ads, we can identify appropriate locations in a video to insert ads that are contextually relevant to the video filtered by matching the auto-generated tags for every video.
- Media Archives – An indexed archive of entire video libraries can be analyzed using AI and the results be made immediately accessible via the API.

Features with Video Intelligence API –

- Annotate video using predefined labels
- Object detection and tracking
- Explicit content detection
- Automated closed captioning and subtitles
- Celebrity recognition with face detection
- Logo detection
- Shot detection

All the above features can be customized to our data using AutoML Video Intelligence where we can build our custom ML models and deploy them on AutoML with simplified MLOps as well.

Pricing

For small customers:

| Video Intelligence API | |
|--|---------------------|
| | |
| Stored Video Annotations | |
| Label Detection: 15,000 minutes | USD 1,399.90 |
| Explicit Content Detection: 15,000 minutes | USD 1,399.90 |
| Speech Transcription: 15,000 minutes | USD 671.95 |
| Object Tracking: 15,000 minutes | USD 2,099.85 |
| Face Detection: 15,000 minutes | USD 1,399.90 |
| | USD 6,971.50 |
| Streaming Video Annotations | |
| Explicit Content Detection: 15,000 minutes | USD 1,679.88 |
| | USD 1,679.88 |
| | USD 8,651.38 |

For medium customers:

| Video Intelligence API | |
|--|----------------------|
| | |
| Stored Video Annotations | |
| Label Detection: 92,160 minutes | USD 9,115.90 |
| Explicit Content Detection: 92,160 minutes | USD 9,115.90 |
| Speech Transcription: 92,160 minutes | USD 4,375.63 |
| Object Tracking: 92,160 minutes | USD 13,673.85 |
| Face Detection: 92,160 minutes | USD 9,115.90 |
| | USD 45,397.18 |
| Streaming Video Annotations | |
| Explicit Content Detection: 92,160 minutes | USD 10,939.08 |
| | USD 10,939.08 |
| | USD 56,336.26 |

For 25 small customers: $25 * 1679.88 = 41,997\$$

For 10 medium customers = $563,362.2\$$

For 3 large customers with 184320 minutes comes to: $1,126,724.4\$$

Total cost for all 38 customers: $1,187,260.2\$$

The total costs for all these 38 customers for one year comes down to:

$727,581 + 803,089.2 + 463,495.32 = 1,994,165.52$ \$ (Almost 2 million USD)

After adding the advanced cloud feature it comes to **3,181,425.72\$** (3 million 181 thousand USD approximately)

(Note that this number is peak of peaks, i.e., if all customers use maximum resources allocated to them)

We look forward to working with GCP VMs and platforms. We are confident that we can meet the challenges ahead and stand ready to partner with GCP in delivering an effective solution to our customers.

If you have questions on this proposal, feel free to contact Piyush Khedkar at your convenience by email at pkhedkar@syr.edu.

We will be in touch with you next week to arrange a follow-up conversation on the proposal.

Thank you for your consideration,

Piyush Khedkar
Cloud Computing Consultant