

The background features a stylized, low-poly landscape. On the left, there are large, layered mountain ranges in shades of teal and light green. The sky is a clear, bright blue, populated with several white, low-poly clouds of varying sizes. In the bottom right corner, there is a large, smooth, light green circular shape that partially overlaps the blue sky.

Proposal for New Cloud Platform for MoVid Inc.

BASTIN BAJIYO JOB

IST659 Cloud Management

Agenda

1. Introduction
2. Current On-Premise Architecture
3. Proposed Cloud Solution
4. Storage Strategy
5. Backup/Restore Solution
6. Total Cost of Ownership
7. Advanced Cloud Feature
8. Drawbacks
9. Conclusion

Introduction

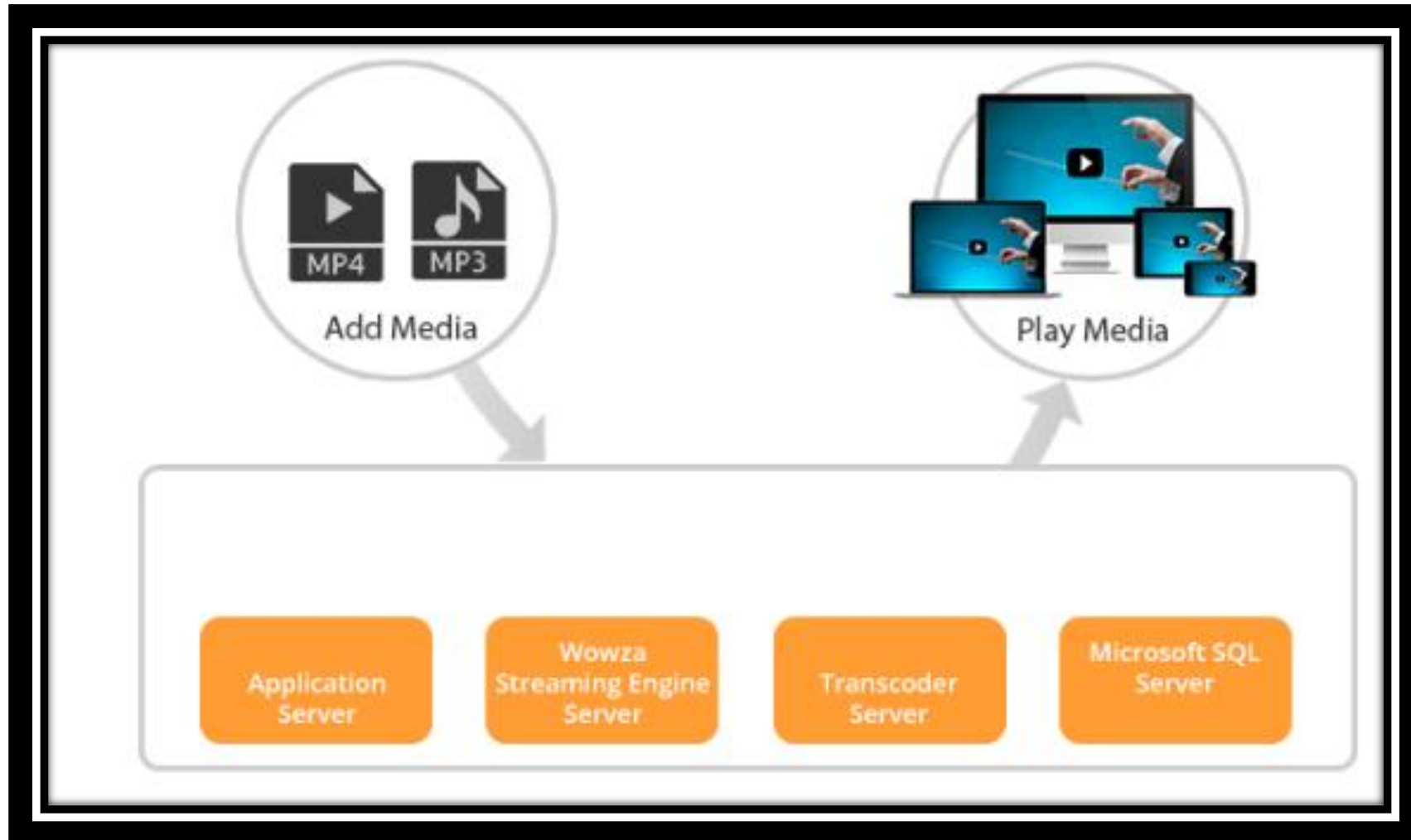
- MoVid Inc.is a company that is focused on developing video technologies.
- Needs to create a new “Cloud-Hosted” MoVid deployment.
- 4 virtual machines in the on-premise virtualization platform for each customer.



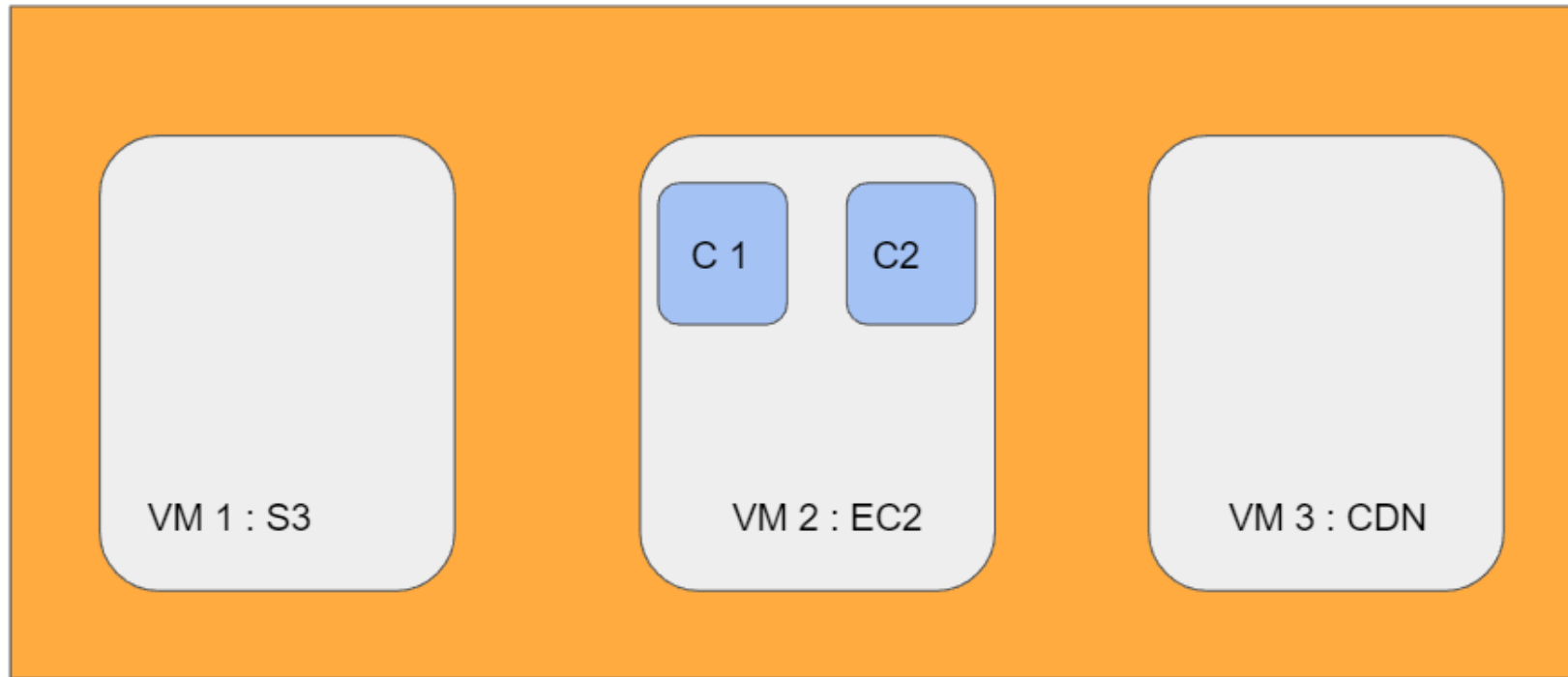
Mo Vid

Most Video Ever!

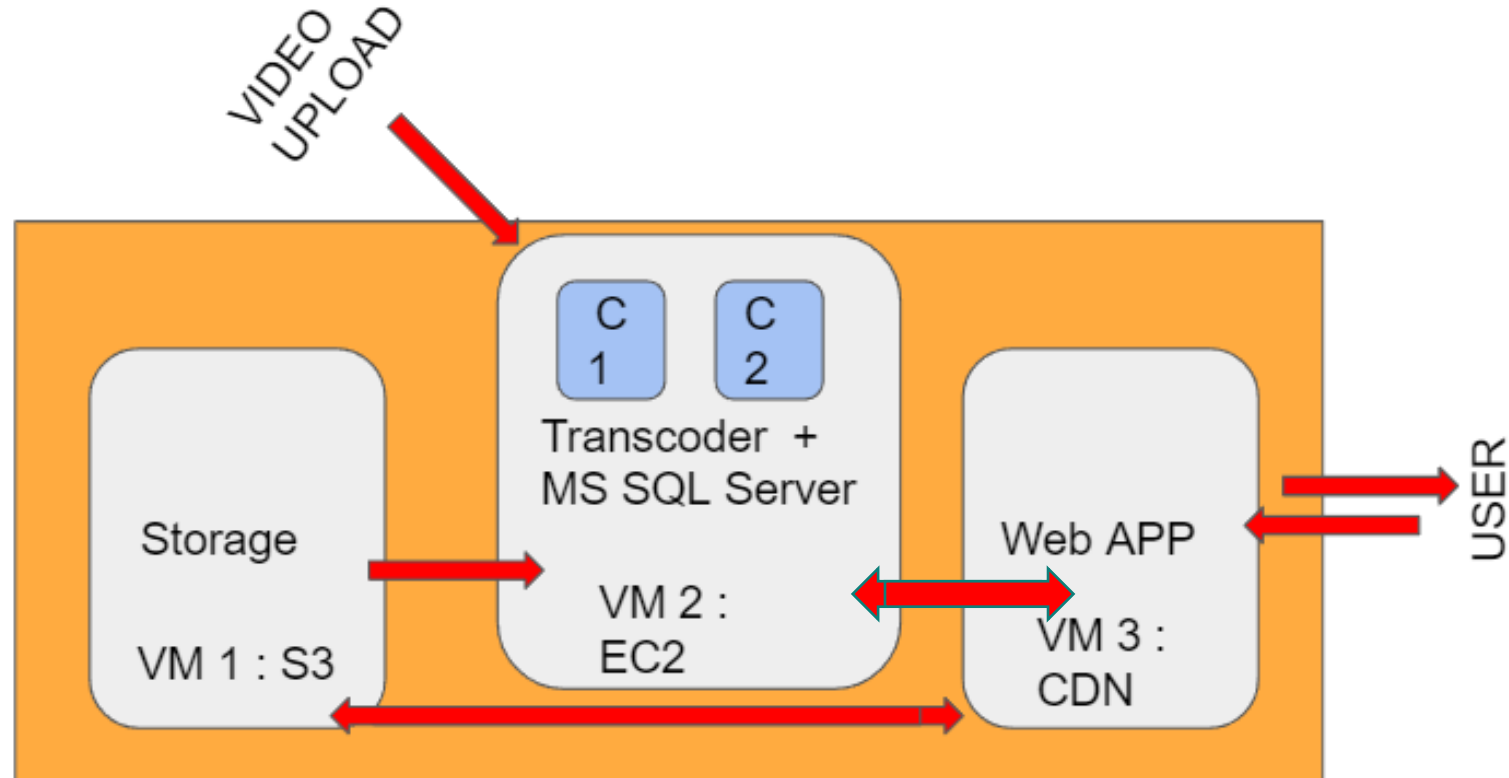
Current architectural design of SaaS solution



Proposed Cloud Architecture



Proposed Cloud Architecture



Amazon Web Services – Pros and Cons : Why AWS ?

Advantages:

- Broad and deep service offering.
- Minimal loss of information during video hosting and start and storage transfer.
- Strong support for BI, analytics and Devops.
- High transfer stability.

Disadvantages:

- General cloud computing issues
- Technical support fees

Sum up : AWS faces the general problems faced by any cloud computing platform having said that the benefits of AWS are pretty great – enough for our use case.

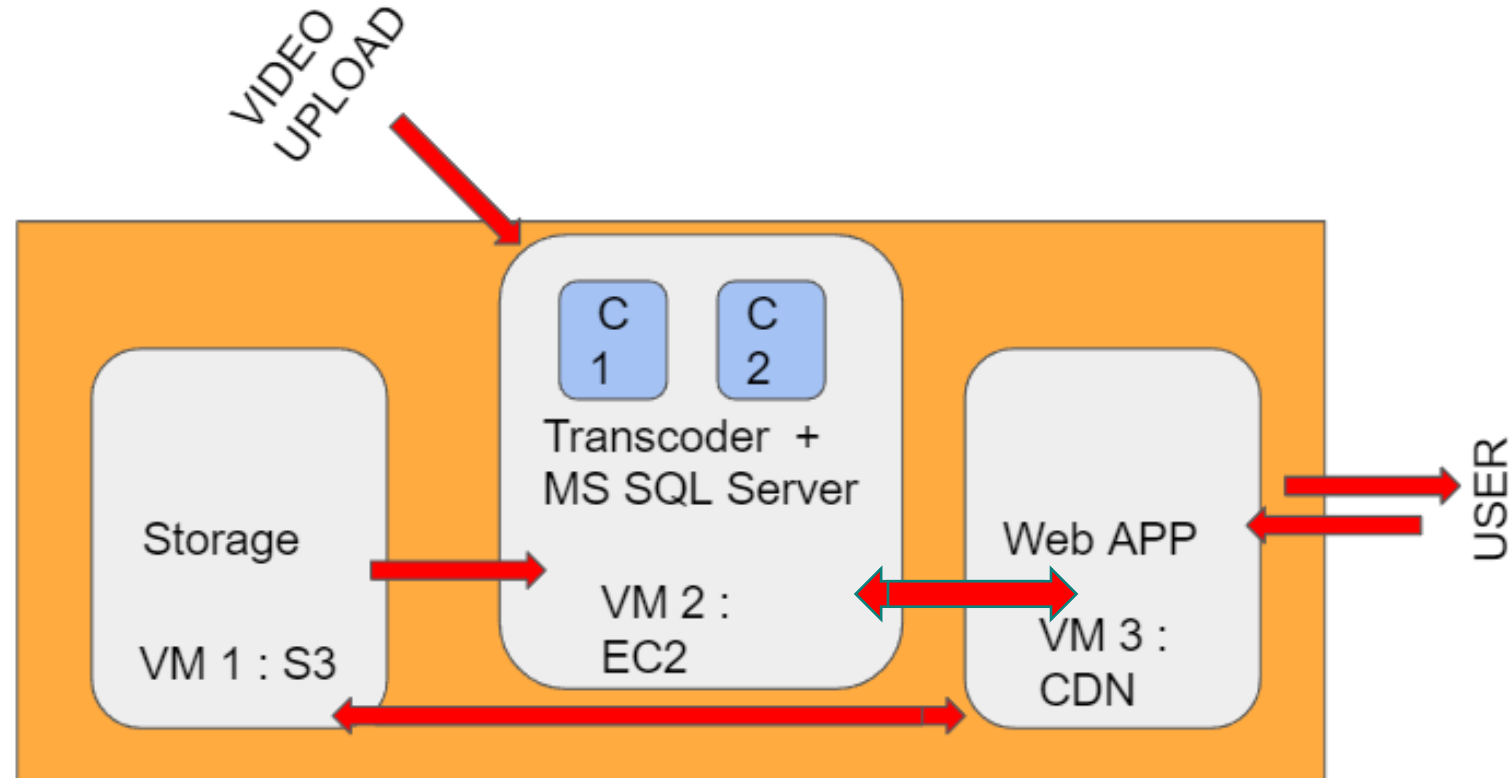
Specific Cloud Services chosen from AWS

For our use case we will be using three main cloud services offered by AWS :

- Amazon Elastic Cloud Compute (EC2)
- Amazon Simple Storage Service (S3)
- Amazon cloudfront Content Delivery Network (CDN)

<u>On-Premise</u> App/Server	Cloud-hosted Service
Application Server	AWS CloudFront CDN
<u>Wowza</u> Streaming Engine	AWS S3
Transcoder Server	AWS EC2 (C1)
MS SQL Server	AWS EC2 (C2)

Proposed Cloud Architecture



VM specifications and guarantees by vendor

VM Specifications :

- Windows Based VM's
- VM2 will have 8 core CPU, 16 GB RAM , 150+ GB 15k RPM Hard drive
- VM1 Will have 8 core CPU, 12 GB RAM, 1TB+ GB 7500 RPM Hard drive
- VM 3 will have 4 core CPU, 8 GB RAM, 500 GB 15k RPM Hard drive

Guarantees by the Vendor :

- SLA 99.99%
- 98% reduction in unplanned downtime
- 71% faster deployment
- 26% higher developer productivity

Compensation promised by the vendor in case of excess down-time:

AMAZON CLOUDFRONT

Monthly Uptime Percentage	Service Credit Percentage
Less than 99.9% but greater than or equal to 99.0%	10%
Less than 99.0% but equal to or greater than 95.0%	25%
Less than 95.0%	100%

AMAZON ELASTIC COMPUTE CLOUD (EC2)

Monthly Uptime Percentage	Service Credit Percentage
Less than 99.99% but equal to or greater than 99.0%	10%
Less than 99.0% but equal to or greater than 95.0%	30%
Less than 95.0%	100%

AMAZON SIMPLE STORAGE SERVICE (S3)

Monthly Uptime Percentage	Service Credit Percentage
Less than 99.9% but greater than or equal to 99.0%	10%
Less than 99.0% but equal to or greater than 95.0%	25%
Less than 95.0%	100%

Storage Strategy

- Videos after transcoding are stored in the streaming engine. Outbound streaming also happens here. So, the S3 instance should be able to accommodate both outbound streaming and video storage.
- The two EC2 instances – Transcoder and SQL Server can use the same Amazon S3 bucket storage.
- Application Server uses CDN which has its own storage specifications and plans.
- CDN's can have an on demand availability of storage, S3 buckets have storage in the range 0-5TB
- Thus, in this architecture, we will use S3 instances as storage for outbound video streaming, video storage, inbound traffic to the video transcoder and Web app Database.
- CDN will store the inbound traffic to the web application alone.

Storage Strategy

<u>On-Premise</u> App/Server	Cloud-hosted Service	Storage Method
Application Server	AWS CloudFront CDN	CDN Storage
<u>Wowza</u> Streaming Engine	AWS S3	S3 bucket
Transcoder Server	AWS EC2 (C1)	S3 bucket
MS SQL Server	AWS EC2 (C2)	S3 bucket

Storage requirement for different customer types

Customer Type	Storage required on S3 instance (maximum)	Storage required on CDN instance
Small	11503 GB	250 GB
Medium	23008 - 73008 GB	1 TB
Large	91016 - 181016 GB	2 TB

Backup/Recovery Solution

- We have chosen AWS backup to provide backup and restore functionality to the video storage and SQL data.
- Pricing is based on the amount of storage space your backup/restoration consumes.

Backup/Restore Pricing Details

- Backup and Recovery for Video Storage (S3) :

Service	Price (per month per GB)
Amazon S3 Backup	\$0.05 per GB-Month
Amazon S3 Backup-Restore	\$0.02 per GB-Month

- Backup and Recovery for SQL data (EC2) :

Service	Price (per month per GB)
Amazon EBS Volume Snapshot	\$0.05 per GB-Month
Amazon EBS Volume Snapshot -Restore	Free

Total Cost of Ownership

Calculation of TCO for a year with 250 GB per customer :

- No: of customers : 10
- Storage available to each customer : 250 GB
- Cost of back up per month per GB : \$0.05
- No: of months : 12
- Total cost of ownership (TCO) of backup (videos): $0.05 * 12 * 250 * 10 = \text{\$1500 per year}$
- The cost of recovery depends on the amount of data recovered per month, and since it is on a usage basis, recovery cost has not been included in the total TCO.

Total Cost of Ownership

- **TCO Calculation of a hypothetical case : 25 small, 10 medium and 3 large customers :**
- No: of small customers : 25
- Storage available to small customer : $11503 + 250 = 11753$ GB
- No: of medium customers : 10
- Storage available to small customer : $73008 + 1000 = 74008$ GB
- No: of small customers : 3
- Storage available to small customer : $181016 + 2000 = 183016$ GB
- Cost of back up per month per GB : \$0.05 (same for both S3 and CDN)
- No: of months : 12
- Maximum total cost of ownership (TCO) of backup (videos): $0.05 \times (25 \times 11753 + 10 \times 74008 + 3 \times 183016) = \textbf{\$79147.65 per year}$
- The cost of recovery depends on the amount of data recovered per month, and since it is on a usage basis, recovery cost has not been included in the total TCO.

Advanced Cloud Feature

- MoVid is a streaming platform. As is the case with any content-on-request platform, a major constraint is **Latency**. A good video streaming platform should:
 - Stream videos real time, without interruptions.
 - Have buffering time as low as possible.
 - Minimize compromise in streaming quality due to slow network.

This is where we use **AWS Wavelength**.

- AWS Wavelength boosts AWS services to nearly 5G network speeds.
- Latency will be minimized when accessing the cloud through any kind of device.
- Application traffic can reach application servers running in Wavelength Zones without leaving the mobile provider's network.

Introducing AWS Wavelength can set the quality standard of MoVid apart from the competition. Seamless connectivity and nearly zero latency will be a business game changer.

Drawback of this model and a solution

Drawback :

- Effective sharing of resources on VM2 where the transcoder and SQL server run in separate containers.
- Transcoder being computationally heavy, can saturate the CPU cores unless a deliberate usage limit is set.
- This can effectively slow down the website.

Solution :

- **Amazon Elastic Transcoder.**
- Using amazon's transcoding service which is better optimised to run on AWS instances would reduce/optimize the CPU demand.
- This would mean letting go of the native transcoder.

Conclusion

- A viable cloud migration model has been proposed.
- Drawbacks have been investigated and rectified.
- Further development by using advanced cloud features were also investigated.

THANK YOU !