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**Case Problem: New Cloud Platform for Mo Vid Inc.**

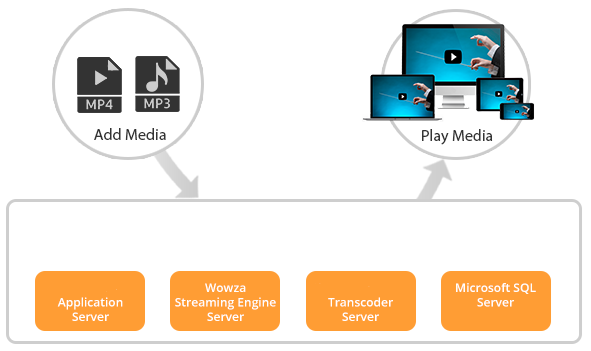
Mo Vid Inc. is a company that is focused on developing video technologies that enable efficient, coordinated, and collaborative video capture, management and delivery in any organization. The Mo Vid Inc. suite of products are flexible, easy to use, and integrate easily with a wide range of complementary video and Web technologies. Some of the features that the Mo Vid Inc. platform offers to its customers is: Lecture Capture, Online Education, Organizational YouTube™, Zoom & WebEx Integrations, Live Events, Marketing, Licensed Content, & Staff Training.

The company is at a point where it needs to create a new version of its “Software as a Service” solution that it sells to its customers as a “Cloud-Hosted” Mo Vid deployment.

Each customer that signs up to use the Mo Vid Cloud-Hosted offering results in the Mo Vid system administrators having to manage 4 virtual machines in their on-premise virtualization platform for that customer. The customer does not have any access to the operating system and only has access to the resulting Mo Vid web service that is a result of the 4 virtual machines.

Mo Vid Inc. is at a crossroads with its SaaS solution and can no longer sustain the physical infrastructure needed for their continued growth. That is why the CEO in consultation with the CTO has decided to hire you as their Cloud Computing consultant. You need to develop a plan to that will successfully allow them to run their SaaS software platform from a Public Cloud. The CTO has been given the authority to have the Mo Vid software developers change aspects of their 4 server design and configuration for their SaaS a platform if that is a requirement of your cloud computing design, but any architectural changes will be counted as part of the overall cost of the switch.

**Currently the SaaS solution is based on this architectural design:**



**Mo Vid Application Server:**

Hosts the web site that the customer uses to mange and offer its video content. All aspects of the customers instance of Mo Vid is managed through this web application.

Base Specs:

**Wowza Streaming Engine Server:**

Hosts the streaming video content and is where the video content is downloaded from when a video is played by a user of the Mo Vid web application. All video content is stored on storage accessible to Wowza application.

**Mo Vid Transcoder Server:**

Used to encode the uploaded videos and make them available for playback when copied to the Wowza server.

**SQL Server:**

All of the data about that is used to create the content on the Mo Vid web application except for the video files themselves are stored in a database. Things like video metadata and also who can access what videos. No customer data is stored on the Mo Vid application server. The Mo Vid Application server can use any standard SQL storage provider to host the database for the Mo Vid application.

When a new customer is setup as a SaaS customer, the Mo Vid system administrators start by deploying server with their published minimum requirements and scale if needed. Also, they use the “Medium” size from the Sizing guide found in the link below.

The technical specifications can be found here:

## ****4 Server Deployment****

### Application Server

* **Platform:** Virtual or Physical
* **CPU:** 4 Cores (Minimum)
* **RAM:** 8 GB (Minimum)
* **OS:** Windows 2012 R2 / Windows 2016 / Windows 2019
* **Storage** (recommended 10K or 15K hard drives for optimum IO):
  + 100 GB (Minimum) System Partition
  + 50 GB MPlayer Data Partition
  + 250 GB (Minimum) WebApp Partition
  + Ports: 80 (HTTP) 443 (HTTPS)

This server will run the Mo Vid software. The software will run on top of IIS.  
The Mo Vid service is officially supported on both physical and virtual servers. It is recommended that Application be loaded on a VM, due to the flexibility the VM offers with adding additional resources such as storage, RAM, CPU.

We recommend 10K or 15K drives for this server since the WebApp will be stored on this server. The WebApp will store all the non-video assets such as thumbnails, preview images, attachments, etc.

The MPlayer Data partition is used as a scratch space for MPlayer.exe which is utilized to generate thumbnails for newly uploaded video content. This partition is usually just mounted as an empty folder at C:\ProgramData\MPlayer\Data (no drive letter needs to be assigned).

### Wowza Streaming Engine

* **Platform:** Virtual or Physical
* **CPU:** 8 Cores (Minimum)
* **RAM:** 12 GB (Minimum)
* **OS:** Windows 2012 R2 / Windows 2016 / Windows 2019
* **Storage** (7500 RMP Drives or higher):
  + 60-100GB System Partition
  + 500GB or Greater Video Storage
  + External Ports: 443 (HTTPS) 1935 (RTMP) 554 (RTSP Android Streaming)
  + Internal Ports (Wowza to Application): 8088,8086,8087 (Admin/API Ports)

This server will provide the streaming of video content for the Mo Vid Platform. This server is also the final resting place for the VOD content after transcoding. Because of this fact, the storage requirements for this server will be large. We recommend going no lower than 500GB initially for video storage.

The Wowza service if officially supported on both physical and virtual servers. It is recommended that Wowza be loaded on a VM, due to the flexibility the VM offers with adding additional resources such as storage, RAM, CPU. The Wowza Streaming Engine runs on top of Java SDK, which will be installed as part of the setup.

### Video Transcoder

* **Platform:** Virtual or Physical
* **CPU:** 8 Cores (Minimum)
* **Operating System:** Windows 2012 R2 / Windows 2016 / Windows 2019
* **Processor:** 1.4GHz minimum (2GHz or faster recommended)
* **Memory:** 16 GB RAM minimum (16GB RAM or 2GB per processor core)
* **Available Disk Space:** 150GB minimum (250 GB or greater recommended for large files, and more powerful servers)

The Encoder server uses CPU cores heavily to perform video/audio encoding. The encoder takes in a wide variety of raw file formats (i.e. AVI, MOV, WMV, etc.) and produces a stream-able MP4 file format. When encoding to MP4 H.264 video files, the Video Transcoder uses a “divide and conquer” approach to maximize transcoding throughput. It is highly recommended that you do not attempt to run other applications or services on any system running the Video Transcoder. Adding more CPU and memory will increase transcoder throughput.

**Note:** Source video files are temporarily stored on the computer during compression. The computer will need to have enough free disc space to store the source files, compressed files as well as space for the files that are being uploaded to the server in preparation for compressing.

**Sizing Guide**

Below is a sizing guide to help you design and implement your encoder server.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Size** | **Jobs per day** | **Cores** | **RAM (GB)** | **HD Setup** |
| Small | < 50 | 8 | 16 | 250 GB |
| Medium | < 50 and < 100 | 16 | 24-32 | 350 GB |
| Large | >100 | 24-32 | 32-64 | 500 GB |

**Note:** Transcoding benchmarks are available to roughly guide hardware utilization for various transcoding workflows. Testing typical transcoding to gauge hardware requirements is recommended wherever possible.

**Note HD Setup**: The hard drive on the encoder server provides the temporary storage to perform the encoding work. The original file, as well as the finished product is all stored on the local hard drive until such time it is transferred back to Wowza for streaming. Because the hard drives provide the working space, the encoder will benefit from faster/higher performance drives. While 7500 RPM drives are fully supported, faster 10K or 15K drives would provide faster throughput for transcoding jobs. The space can be one single partition or split between the System and the encoder software. If splitting the HD space, give the system partition 60-100GB and the remainder put into a separate partition.

### Microsoft SQL Server

* **Platform:** Physical or Virtual
* **CPU:** 4 Cores (Minimum)
* **RAM:** 8 GB (Minimum)
* **SQL:** MS SQL 2012 / MS SQL 2014 / MS SQL 2016 / MS SQL 2019
* **OS:** Windows 2012 R2 / Windows 2016 / Windows 2019
* **Storage** (recommended 10K or 15K hard drives for optimum IO):
  + 60-100GB System Partition
  + 250GB Data Partition
* CLR Enabled SQL Server
* SQL Mixed Mode Security

The above hardware requirements are estimates. If you plan to add DB to an existing MS-SQL Server, you will need to enable CLR on the server (it is not enabled by default). More information on CLR and how to enable can be found here:

<http://msdn.microsoft.com/en-us/library/ms254498(v=vs.110).aspx>

**Note:** The Mo Vid Platform utilizes MS SQL Server to store metadata and application data. The database does not require a lot of space. A typical 10TB VOD installation will have a database around 3GB in size.

# Assignment 02 Requirements

* Due: November 28, 2022 by 11:59pm
* Submission: Via Assignment provided in Teams

#### New Information from the CTO

* The Mo Vid Web application is a .Net based web app and requires the .Net 5 to run. This is a hard requirement and is not something Mo Vid is willing to change.
  + [.NET | Free. Cross-platform. Open Source. (microsoft.com)](https://dotnet.microsoft.com/)

### Submission:

### A document containing your proposal. The format should be one that is professional looking and one you would want to hand to a CTO of a company.

### What are some things that should be included in the document?

* What cloud vendor is going to be used to host the Mo Vid Video SaaS solution?
  + Why is this vendor being chosen?
* What type of resources are going to be used by Mo Vid to produce their SaaS?
  + Are the current 4 servers going to be run as VM, If so why are you choosing this architecture.
  + Is the Mo Vid SaaS architecture going to need to be changed to include any services that specific to the cloud, If so what are they and why are you choosing them.
  + Are containers going to be used as part of the solution, If so what services are going to run in the container(s).
* Itemize out which specific resources are going to be used to host the SaaS and sourced from the vendor above.
  + i.e. VM type, size, memory, cpu, price.
* What are the expected service uptimes offered by the cloud vendor for the resources that were selected?
* What if any guarantees are provided by the vendor?

NEW IN PART B

* Backup methodology for the video files
  + Must be able to recover videos for 60 days after they are deleted by a user in the Mo Vid web app.
* Backup methodology for the Mo Vid SQL data
  + Must be able to restore any database changes for 30 days.
* TCO of one year of costs for running the proposed cloud setup for 10 customers.
  + Each customer will have 250 GB of Videos.

NEW IN ASSIGNMENT 02

Mo Vid has agreed to go forward with your proposal. They are looking to now move not only new customers to the cloud but all of their existing customers. They have broken their customers into three categories small, medium, large. (This information about how much resources are used by each type of customer is listed below).

You need to make sure that each of the new types of Mo Vid customer can fit in your proposed architecture. If they do not, explain how you will change and or scale the architecture design to fit all the types of Mo Vid customers. (For example, different customers can use different VM instance types or have more storage associated with their servers)

Secondly, you need to update the one-year TCO calculation for Mo Vid to include the costs of hosting 3 large customers, 10 medium customers, & 25 small customers in your proposed architecture. Mo Vid has agreed to commit to 1 year of use of the new cloud proposal.

Finally, Mo Vid has asked that you inform them about how they might take advantage of one of the many advanced cloud features they have been reading about. You must choose one of the advanced features we discussed in class and creatively apply it to the Mo Vid offering. Explain to Mo Vid how adopting the advanced feature would improve the product offering they have today.

Small:

* 1TB of Outbound Streaming video per month
* 500GB of Inbound traffic to the video transcoder per month – 250 hours of video
* 250GB of inbound traffic to the Web Application per month
* Web application DB size averages 3GB in size
* Total video storage is less than 10TB

Medium:

* 10TB of Outbound Streaming video per month
* 3TB of Inbound traffic to the video transcoder per month – 1,536 hours of video
* 1TB of inbound traffic to the Web Application per month
* Web application DB size averages 8GB in size
* Total video storage is greater than 10TB less than 60TB

Large:

* 25TB of Outbound Streaming video per month
* 6TB of Inbound traffic to the video transcoder per month – 3,072 hours of video
* 2TB of inbound traffic to the Web Application per month
* Web application DB size averages 16GB in size
* Total video storage is greater than 60TB less than 150TB

The Mo Vid CTO has requested that you produce and give a presentation to the Mo Vid corporate leaders including the CEO, CFO, & CIO.