U Vid Inc. System Upgrade Project Proposal

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IST 615

**Assignment 01**

Overview of the Project:

U Vid Inc. can no longer sustain the physical infrastructure needed due to the continued growth and provided its SaaS solution. The goal of this project is to help U Vid to develop a plan to enable the company to run SaaS software platforms from a public cloud.

Cloud Vendor: **Microsoft Azure**

Although there are many trusted cloud vendors nowadays, MS Azure remains to be one of the best choices after reading and understanding U Vid’s case problem. One very important requirement of the U Vid web application is that it needs .Net 5 to run. .Net is a Microsoft product, and U Vid does not want to change this requirement. Hence, to minimize the unnecessary problems after adopting the cloud solution, MS Azure is desirable in this situation since Azure functions are supported running on .Net 5.

Resources Needed to Produce SaaS: **Virtual Machines**

To produce U Vid’s SaaS, it is ideal to run the current four servers as VMs. There are many benefits to using VMs. An organization often spend a significant amount of their IT spending on acquiring and maintaining physical servers. Sometimes, unpredictable events like power shortages or natural disasters can cause permanent data losses. Other the other hand, the cost of using VMs is usually flexible, and the providers would also guarantee data security and lost data recovery. Therefore, it is highly recommended that U Vid should run all four servers as VMs.

Changing SaaS architecture to PaaS should be considered since PaaS means that the provider would manage almost everything except for application and data for clients. As for U Vid, changing the video transcoder’s architecture to PaaS with containers is recommended. Containers allows users to easily spawn application on the virtual infrastructure with a few commands. The video data and encoding processes are performed in the video transcoder, and it is possible that some U Vid’s clients might not want their data to be seen by a third-party provider. With PaaS solution, users can run encoding application on provided infrastructure if needed. Also, letting U Vid manage their encoding application is suggested because U Vid’s encoding method should be confidential.

Resources Details from Microsoft Azure:

VM for Application Server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Wowza Streaming Engine

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for MS SQL server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Video Transcoder

B16ms: 16 cores, 64GB RAM, 128GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $601.43

Total Estimated Monthly Cost: $2068.51

Expected Service Uptimes: **24/7**

We should expect clients of U Vid can have access to U Vid applications all the time. A restaurant can have its peak hours but not for video encoding services. People might need to perform video encoding at any time. Thus, the service uptimes should be twenty-four hours a day, seven days a week.

Guarantees that are provided by the vendor:

MS Azure guarantees that all VMs’ connectivity is more than 99.9% at all times.

The firewall will be available more than 99.9% of the time.

MS Azure guarantees at least 99.9% availability of the backup and restore functionality of the Azure Backup service.

Customers will have connectivity between their Microsoft Azure Database for MySQL Server and their Internet gateway at least 99.99% of the time.

End users will be able to create and consume information rights management documents and emails 99.9% of the time.

If downtime happens, how will Microsoft reimburse the downtime cost?

By providing service credits according to the downtime the customers have.

"Service Credit" is the percentage of the Applicable Monthly Service Fees credited to you following Microsoft’s claim approval.

Monthly Uptime % = (Minutes in the Month - Downtime) / Minutes in the Month X 100

**Assignment 01 – Part B**

**Backup Methodologies**

There are three types of backups: full, differential, and incremental. Since the chosen cloud vendor is MS Azure, so UVid can use the Azure Backup service to back up data to the Microsoft Azure cloud platform. We get to know that Azure Backup backs up the data, machine state, and workloads running on on-premises machines and Azure virtual machine (VM) instances. Since UVid will only be using Azure VMs, focusing on how Azure Backup works for Azure VMs does is vital.

**Backup Methodology for the Video Files (Must be able to recover videos for 30 days after they are deleted by a user in the Mo Vid web app)**

For video files, UVid can choose the differential backup method. Azure differential backup stores the blocks that changed since the initial full backup. Uses a smaller amount of network and storage and doesn't keep redundant copies of unchanged data. Although differential backup is not as efficient as increment backup, an initial full backup, daily differential backups, and a monthly full backup should to a good choice. Each full backup will be saved for a year. To recover videos for 30 days after they are deleted, UVid only needs the last full back and last differential backup to restore the file.

**Backup Methodology for the UVid SQL Data (Must be able to restore any database changes for 90 days)**

As for SQL servers’ backup types, Azure full database backup backs up the entire database. It contains all the data in a specific database or a set of file groups or files. A full backup also contains enough logs to recover that data. SQL server’s differential backup captures only the data that’s changed since the full backup. In order to restore any database changes for 90 days, using monthly full backup, daily differential backup, and saving each full backup for a year would be ideal.

**TCO of one year of costs for running the proposed cloud setup for 10 customers - Each customer will have 100 GB of videos.**

VM for Application Server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Wowza Streaming Engine

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB 🡪 Greater than 100GB

Monthly Cost: $372.21

VM for MS SQL server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Video Transcoder

B16ms: 16 cores, 64GB RAM, 128GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $601.43

Total Estimated Monthly Cost: $2068.51

10 Customers for One Year: 2068.51\*12\*10 = $248221.2

**Assignment 02**

There are 38 customers in total, and UVid broke their customers into three categories small (25 customers), medium (10 customers), and large (3 customers). The original cloud architecture can no longer fit these customers’ demands. Hence, some adjustments to the cloud architecture must be made aiming to fit different types of customers’ needs. Here are the requirements and adjustments for three types of customers:

**Small:**

**• 1TB of Outbound Streaming video per month**

Azure outbound data transfer pricing details:

Data transfer type: Internet Egress

From East US 🡪 MS Global Network

1024 GB per month

Total price per month: $89.16

**• 500GB of Inbound traffic to the video transcoder per month – 250 hours of video**

It’s free

**• 250GB of inbound traffic to the Web Application per month**

It’s free

**• Web application DB size averages 3GB in size**

Azure Cosmos DB 3 GB – Multi region write: $47.47

**• Total video storage is less than 10TB**

One Standard HDD S40: 2TB

Total price per month: $77.82

**Medium:**

**• 10TB of Outbound Streaming video per month**

Azure outbound data transfer pricing details:

Data transfer type: Internet Egress

From East US 🡪 MS Global Network

10240 GB per month

Total price per month: $894.51

**• 3TB of Inbound traffic to the video transcoder per month – 1,536 hours of video**

It’s free

**• 1TB of inbound traffic to the Web Application per month**

It’s free

**• Web application DB size averages 8GB in size**

Azure Cosmos DB 8 GB – Multi region write: $48.72

**• Total video storage is greater than 10TB less than 60TB**

One Standard HDD S70: 16TB

Total price per month: $491.52

**Large:**

**• 25TB of Outbound Streaming video per month**

Azure outbound data transfer pricing details:

Data transfer type: Internet Egress

From East US 🡪 MS Global Network

25600 GB per month

Total price per month: $2169.39

**• 6TB of Inbound traffic to the video transcoder per month – 3,072 hours of video**

It’s free

**• 2TB of inbound traffic to the Web Application per month**

It’s free

**• Web application DB size averages 16GB in size**

Azure Cosmos DB 16 GB – Multi region write: $50.72

**• Total video storage is greater than 60TB less than 150TB**

Two Standard HDD S80: 32TB

Total price per month: $1907.10

**TCO for small customers:**

VM for Application Server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Wowza Streaming Engine

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S40: 2048GiB

1TB Outbound Traffic

Monthly Cost: $517.44

VM for MS SQL server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Video Transcoder

B16ms: 16 cores, 64GB RAM, 128GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $601.43

Web Application DB: $47.47

Total Estimated Monthly Cost: $2261.21

One year cost for 25 customers: 2261.21\*25\*12= $678363

**Medium customers:**

VM for Application Server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Wowza Streaming Engine

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S70: 16384GiB

10TB Outbound Traffic

Monthly Cost: $1736.48

VM for MS SQL server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Video Transcoder

B16ms: 16 cores, 64GB RAM, 128GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $601.43

Web Application DB: $48.72

Total Estimated Monthly Cost: $3481.49

One year cost for 10 customers: 3481.49\*10\*12= $417778.8

**Large Customers:**

VM for Application Server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Wowza Streaming Engine

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Two Standard HDD disk: S80: 32767GiB \* 2

25TB Outbound Traffic

Monthly Cost: $4426.93

VM for MS SQL server

A4: 8 cores, 14GB RAM, 605GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $372.21

VM for Video Transcoder

B16ms: 16 cores, 64GB RAM, 128GB Temporary storage

Standard HDD disk: S20: 512GiB

Monthly Cost: $601.43

Web Application DB: $50.72

Total Estimated Monthly Cost: $6173.96

One year cost for 3 customers: 6173.96\*3\*12= $222262.56

**One-year TCO for all 38 customers: 678363+417778.8+222262.56=$1318404.36**

**Azure Advanced Features:**

Azure Sphere: The Azure Sphere Security Service runs in Azure, our customers have the choice to connect to any proprietary or public cloud for app data, and a choice in which development tools they use. Leveraging Visual Studio and Azure IoT services, however, allows organizations to develop applications for Azure Sphere more efficiently.

UVid can take advantage of Azure Sphere so that the VMs can get an extra layer of protection. The price for this feature is less than $8.95, and there is no subscription fee.

Project Silica: Microsoft Project Silica uses ultrafast laser optics to store the data, as well as microscopy and artificial intelligence to read the data. It provides a storage medium that can potentially last thousands of years without degradation.

Project Silica is another Azure advanced feature UVid can take advantage of because Project Silica can be an option for some big customers who require large cloud storage space and long storage time.