We will compare the hardware cost for our Online Library Application which is actually hosted on the cloud. So the options that will be considered are virtual private servers which include AWS Lightsail and DigitalOcean which are some of the biggest players in this area. Specifically, the cost of their resources and how much it takes to scale as the demand on our service increases. Starting with AWS Lightsail, we can take a look at their virtual private servers pricing which is split into two categories that include IPV4 and IPV6 servers. This is a common pricing configuration with most virtual private server providers. We will be focusing on IPV4, the pricing page data for AWS Lightsail [11] shows:

Windows / Linux

* $8 / $3.50 per month
  + 512 MB Memory
  + 2 vCPUs
  + 30 GB SSD Disk
  + 1 TB Transfer
* $12 / $5 per month
  + 1 GB Memory
  + 2 vCPUs
  + 40 GB SSD Disk
  + 2 TB Transfer
* $20 / $10 per month
  + 2 GB Memory
  + 2 vCPUs
  + 60 GB SSD Disk
  + 3 TB Transfer
* $40 / $20 per month
  + 4 GB Memory
  + 2 vCPUs
  + 80 GB SSD Disk
  + 4 TB Transfer
* $70 / $40 per month
  + 8 GB Memory
  + 2 vCPUs
  + 160 GB SSD Disk
  + 5 TB Transfer
* $120 / $80 per month
  + 16 GB Memory
  + 4 vCPUs
  + 320 GB SSD Disk
  + 6 TB Transfer
* $240 / $160 per month
  + 32 GB Memory
  + 8 vCPUs
  + 640 GB SSD Disk
  + 7 TB Transfer

Managed Databases Standard Plan / High Availability Plan

* $15 / $30 per month
  + 1 GB Memory
  + 1 Core Processor
  + 40 GB SSD Disk
  + 100 GB Transfer
  + No Data encryption
* $30 / $60 per month
  + 2 GB Memory
  + 1 Core Processor
  + 80 GB SSD Disk
  + 100 GB Transfer
  + Data encrypted
* $60 / $120 per month
  + 4 GB Memory
  + 2 Core Processor
  + 120 GB SSD Disk
  + 100 GB Transfer
  + Data encrypted
* $115 / $230 per month
  + 8 GB Memory
  + 2 Core Processor
  + 240 GB SSD Disk
  + 200 GB Transfer
  + Data encrypted

Clearly Linux is a consideration as a less expensive alternative to going with Windows as it is tied to the same exact hardware for the virtual private servers which is affecting its cost. For the managed databases since performance is a must the high availability plan is a consideration worth taking. Also data encryption for security reasons is essential.

Taking a look at what we can scale we see with AWS Lightsail [11] we see taking a snapshot is 5 cents per GB per month and if we need more hard drive space the price per GB added is $0.10:

* $0.80 for 8 GB
* $3.20 for 32 GB
* $6.40 for 64 GB
* $12.80 for 128 GB
* $25.60 for 256 GB

As a migration process from Lightsail to EC2 example [12] shows, if we require scaling everything else such as cpus and even more memory we can use AWS EC2 or AWS lambda via a snapshot in order to expand our operations without too much delay.

Now we will analyze what DigitalOcean offers. It has many pricing options but the main one we will focus on is its application platform and the addons that are relevant for our application to work. This is because the infrastructure and dependencies are handled for us but we still are able to choose certain specifications such as the number of CPUS and RAM. It also specifies the ability to scale which is important. Looking at the pricing page data [13] it shows:

Basic Tier

* $5 per month
  + 1 CPU
  + 512 MiB Memory
* $10 per month
  + 1 CPU
  + 1 GiB Memory
* $20 per month
  + 1 CPU
  + 2 GiB Memory
* $40 per month
  + 2 CPUs
  + 4 GiB Memory

Professional Tier

* $12 per month
  + 1 CPU
  + 1 GiB Memory
* $25 per month
  + 1 CPU
  + 2 GiB Memory
* $50 per month
  + 2 CPUs
  + 4 GiB Memory
* $75 per month
  + 1 CPU (dedicated)
  + 4 GiB Memory
* $150 per month
  + 2 CPUs (dedicated)
  + 8 GiB Memory
* $300 per month
  + 4 CPUs (dedicated)
  + 16 GiB Memory

Since our online library application prioritizes performance the professional tier and choosing the dedicated CPUs is a wise choice as shared hardware does not offer as good performance.

For the managed databases we decided to go with NoSQL which is offered by DigitalOcean in the form of MongoDB. We will be focusing on storage and according to the pricing [14] the optimized storage is:

* $240 per month
  + 2 vCPUs
  + 16 GiB Memory
  + 440 GiB Disk
* $480 per month
  + 4 vCPUs
  + 32 GiB Memory
  + 890 GiB Disk
* $960 per month
  + 8 vCPUs
  + 64 GiB Memory
  + 1.709 TiB Disk
* $1,920 per month
  + 16 vCPUs
  + 128 GiB Memory
  + 3.428 TiB Disk
* $2,880 per month
  + 24 vCPUs
  + 192 GiB Memory
  + 5.137 TiB Disk
* $3,830 per month
  + 32 vCPUs
  + 256 GiB Memory
  + 6.855 TiB Disk

DigitalOcean offers better managed databases than AWS Lightsail and the professional tier has dedicated hardware options while AWS Lightsail does not specify which may point to it being shared due to the lower price. Overall DigitalOcean offers many options in terms of various addons taking into account all sorts of use cases which includes an impressive ability to scale. Therefore, we will go with DigitalOcean instead of AWS Lightsail.

References

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