RESEARCH ARTICLE

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Disk Comparison to Achieve a Load-balanced Solution in Azure Cloud Systems

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ABSTRACT

The main goal of this paper is to know and evaluate how to avail various cloud computing services provided to get the best performance cost-effectively and can be used in load balancing. Load balance plays a crucial role in the information acquiring system's performance which helps to get maximum results in minimum response time in the education field and in any business environment. Mainly in the situation of cloud storage, the load balance is well done, which brings to the full consumption of computing resources and reduces the response time of distributed operations. Load balancing can be done only when all the storage nodes are in data sync. This paper mainly focuses on cloud Storage types available in Azure VM and their performances to achieve data replication and load balancing.

Keywords- Cloud computing, Cloud storage, data replication, load balance, Platform, Applications, Azure.

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INTRODUCTION

An application can be defined as anything that supplies developers with a set of in-hand services to develop applications. Applications can inspect cloud services in a variety of various ways.

Distinct cloud platforms are used in different scenarios as per the needs. Azure provides various service platforms where every platform is responsible for providing a particular service to the application. The Azure Services Platform can be used for applications running on the cloud and applications running or on in-house systems [1]. Azure provides cloud services that you require to develop the code, test the code, and deploy the application [2]. To achieve a load-balanced solution, it is very important to have all the data replicated in real-time on all the storage as well as on compute nodes. In data replication and query performance, the disk plays a vital role. In this paper, we have compared different types of storage used in the Azure cloud system and their performance. The azure provided SSDs are nonvolatile to data loss due to power outages. [3], [4], [5], [6], [7]. Cloud computing can inspect millions of servers that are offered in current scenarios. Data and code can retain in the cloud. Some of the applications where someone else is monitoring the different systems they use. Cloud computing is the on-demand delivery of database storage, computing power, and applications through a cloud services platform with a pay-as-you-go service [8] [9]. Cloud computing provides various services in which data storage is the main cloud service, it has become an imminent technology in which the researchers and industries have recently evolved. Various IT companies provide a variety of platforms such as Amazon, and Google app engines to make it easier for end-users to use cloud resources [10]. Cloud storage is composed

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of a large number of network and different storage devices which provides data storage services by using various software applications in computer application clusters and file storage distribution systems to work together [11] [12].

In Load Balancing the distribution of workload on the resources of a node is shifted to the resources on various nodes in a distributed network without disturbing the task [13] [14]. The load balancer assumes the IP address of the web application, so all of the web data after this communication through the web strike the load balancer. Load balancer splits up into software, hardware, and virtual load balancers. Software load balancer software is more affordable than hardware because it's open-source and is installed before using anything. Hardware load balancer handles a large amount of traffic but it again bashes with the huge amount as well with low flexibility. The virtual load balancer is a hybrid solution because it places the software or hardware on a virtual machine. The goals of Load balancing are: to maintain traffic, provide flexibility to handle sudden breakouts in traffic, and have future moderation in the system.

Data replication is the copying same data across the storage or from one instance of the cloud to another. If any node fails it does not affect the system the data is available from replicas which are stored on the server. Data availability is the main feature of data replication. As Relation of the replicas, the required data is easily available. The time to time updating is very necessary because that functioning will be effective [15].

METHODOLOGY USED

To achieve a load-balanced solution, it is very important to have all the data replicated in real- time on all the storage as well as on compute nodes. In data replication and query performance, the disk plays a vital role. In this paper, we have compared different types of storage used in the Azure cloud system and their performance.

While migrating your systems from on-premises to the cloud, there are various storage options are available on the Azure cloud. This very common to get confused in these options available.

Azure offers two different storage disks which are unmanaged and managed [16].

For our Virtual Machines, Unmanaged Disk Storage creates a storage account in resources to hold the disk. In Managed Disk Storage there are no longer storage account limits. We will have the same kind of storage account for different regions. The major benefit of managed disk option provides easy manageability, access time will be less, and high accessibility which provides the following features. Simple abstracts, Security, storage accounts limits, size, and easy availability of data.

In simple abstracts, it eliminates managing storage accounts for infrastructure as a service i.e. Virtual Machines (VM) there are 20,000 disks per region to which we can subscribe. Elasticity or flexibility prevents failures due to the support of storages standard and premiums. The disk cannot choose the custom size, which is fixed and can scale up. Can achieve greater service level agreement when disks are placed on different fault domains.

Azure offers different types of storage disks, Standard HDD Storage disks are designed for low-priority tasks which are based on magnetic drives. Standard HDD is the low-priced solution, Standard SSD is outlined for light to ordinary use. Premium SSDs are better for showing reactivity and for production and will get reserved performance and capacity.

EXPERIMENT RESULT ANALYSIS

As discussed in previous sections about the Azure provided disks and their benefits. Created an Azure cloud setup with different disk types and measured disk performances by performing a heavy read and write operation on disks periodically and measured a sar(System Activity Report)command and dd(disk/data duplicator or, sometimes, disk destroyer) command output.

Figure-1 Comparison of Standard SSD and Premium SSD, The sar command is a standard UNIX command which is used to store quantitative data for the system.

The dd (disk/data duplicator or, sometimes, disk destroyer) allows us to copy raw data from one source to another. It's not used to copy independent files like cp. Instead, it lets us read from and write to block devices — for example, physical hard drives.

On storage, disk testing random read or write won't help because each and every byte is written as-is and which is the same for SSD with the dd command. To really measure disk speed and not memory, synced the filesystem to get rid of the caching effect. Both the instances with standard SSD and Premium SSD measured a disk read and write performance for over 24 hours by writing and reading data. dd command is shown write speed is much better on premium SSD(~216k kbps) than standard SSD(92K kbps). A similar observation

was observed while reading the data for premium SSD (192k kbps) than standard SSD (31k kbps). Took sar output over the last 24 hours which also showed much better performance for premium SSD than standard SSD.

Table-1: Comparison of Standard SSD and Premium SSD

Description	Unit	Standard SSD	Premium SSD
Write Speed (Using dd)	KB/Second	92,467	216,064
Reads Speed (Using dd)	KB/Second	31,334	167,936
Write Speed (Using sar)	KB/Second	30,484	29,696
Read Speed (Using sar)	KB/Second	330	14,330

Comparison is shown in the above table. Can conclude premium SSD has good performance. If a high performance or application throughout is required then premium SSDs have been suggested over standard SSD or HDD Azure's premium disk provided faster read and write performance and this can be used to achieve a better load-balanced solution and data replication.

CONCLUSION

This paper presents the available storage in the Azure cloud system. Cloud storage is more useful than traditional storage because of its, performance, portability, availability, and useful demands. The load balancing and data replication can be achieved if a storage disk provides better performance. Depending upon application requirement and performance a correct disk should be selected so can get better performance and achieve efficient data replication and load balancing.

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