Load Balancing and Data Management in Cloud Computing

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ABSTRACT

Cloud computing is an online storage media where we access, store and manage the data. It stores the data on remote servers rather than a local server and that data can be accessed through the internet. For example Google Drive is personal cloud storage from Google. When there are number of request in cloud computing, then load balancer is used to distribute request between the remote servers and efficiently handle those request. Load balancer distributes client request or network load efficiently across multiple servers. By using cloud infrastructure, we don't have to spend huge amount of money on purchasing and maintaining equipment. Cloud data management is a way to manage data across cloud platforms, either with or instead of on-premises storage.

KEYWORDS: *Load balancing, Cloud computing, Azure Storage, Data Management*

I. INTRODUCTION

Cloud Computing is the on-demand access and delivery of IT resources like storage, network, servers, etc. over the internet by an entity called Cloud Service Provider (CSP). In Cloud Computing, users can access all the resource over the internet all the time and they have to pay only for that resource which is used by them, means it is based on "pay-as-you-go" payment method. The main problem in cloud computing is load balancing and data management. Load balancer is used to distribute or divide the user's request in equal parts and send it to different nodes or remote servers.

In Cloud Computing, Data management is used to manage data.

A. Some of the advantages of cloud computing are:-
- Flexibility
- Disaster recovery
- Cost efficient
- Easy access to information

B. There are many challenges in cloud computing: -
- Security
- Efficient Load balancing
- Configuration and maintenance of storage account
- Resource Scheduling

II. Peering in cloud computing

Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure. Garrison, G., Kim, S., Wakefield, R.L. et al. (2012) proposed a framework of Success Factors for Deploying Cloud Computing. VNet enables many types of Azure resources, such as Azure Virtual Machines (VM), to securely communicate with each other, the internet, and on-premises networks.

VNet is similar to a traditional network that you'd operate in your own data center, but brings with it additional benefits of Azure's infrastructure such as scale, availability, and isolation.

Peering is a facility through which we can connect two or more virtual network.

There are two types of peering:-
1. Local peering: - In local peering, we connect two or more virtual network in same region.
Steps for local peering:-
Step 1:- Create First virtual network.
Step 2:- Create Second Virtual network.
Step 3:- Create virtual machine in every virtual network.
Step 4:- Select any Virtual network.
Step 5:- Add first virtual network to second virtual network.

2. Global peering: -In Global peering, we connect two or more virtual network through gateway in different region.
Steps for Global peering:-
Step 1:- Create two gateways for two different regions.
Step 2:- Merge that two gateway.

III. Azure Storage

Azure Storage is Microsoft's cloud storage solution for modern data storage scenarios. Ferrari Elena et al. (2009)

talked about Challenges and Solutions for Privacy and Security and database as a service in cloud computing. Azure Storage offers a massively scalable object store for data objects, a file system service for the cloud, a messaging store for reliable messaging, and a NoSQL store.

A. Azure Storage Services
➤ Blob storage:-It is used for unstructured data like movie, mp3 audio, and video. It stores binary large object.
➤ File storage:-It is used for sharable data (in multiple virtual machines).
➤ Queue storage:-It stores the request or query for 7 days. Size of query or request is maximum 64 kilobytes.
➤ Table storage:-It is used in database.

B. Azure storage account type
➤ General purpose V2 account
➤ General purpose V1 account.
➤ Blob storage account.

C. Features of Azure storage account
➤ Durable and highly available.
➤ Secure.
➤ Scalable.
➤ Managed.
➤ Accessible.

D. Blob Storage used for
➤ Serving image or documents directly to a browser.
➤ Storing files for distributed access.
➤ Streaming Audio and Video.
➤ Storing data for backup and restore disaster recovery.
➤ Storing data for analysis by on premises or azure host services.

E. Create a storage account
To create a general-purpose v2 storage account in the Azure portal, follow these steps:

Step-1: In the Azure portal, select all services. In the list of resources, type Storage Accounts. As you begin typing, the list filters based on your input. Select Storage Accounts.

Step-2: On the Storage Accounts window that appears, choose Add.

Step-3: Select the subscription in which to create the storage account.

Step-4: Under the Resource group field, select Create new. Enter a name for your new resource group, as shown in the following image.
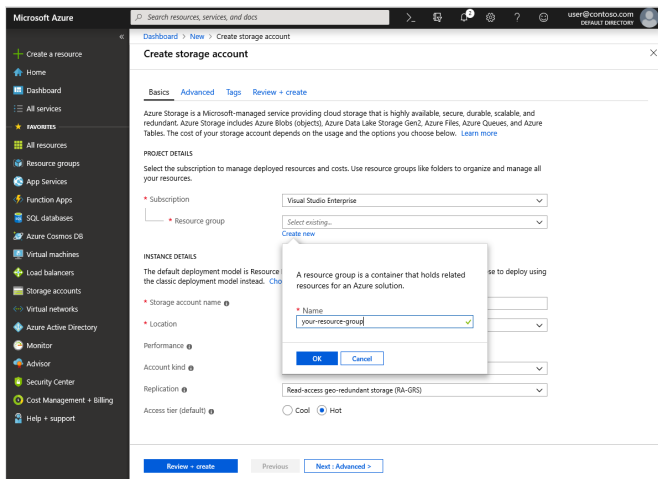

Fig.1 Azure Storage account.

Step-5: Next, enter a name for your storage account. The name you choose must be unique across Azure. The name also must be between 3 and 24 characters in length, and can include numbers and lowercase letters only.

Step-6: Select a location for your storage account, or use the default location.

Step-7: Leave these fields set to their default values:

Step-8: Select Review + Create to review your storage account settings and create the account.

Step-9: Select Create.

IV. Load balancing
There are two types of load balancer:-
1. Public Load balancer:-It works worldwide.
2. Private Load balancer:-It works within a network.

Load balancer uses hash-based algorithm to balance the load between servers. Jiangtao Zhang et al. (2015) talked about the algorithm which is used in cloud computing.

It checks the five contents:-
1. Source internet protocol address
2. Source port
3. Destination internet protocol address
4. Destination port
5. Internet protocol

Load balancer threshold time = 2 time

Checking time = Load balancer checks that server is working properly or not in every 5 seconds.

Idle time = 4 minute is an idle time for load balancer. YashpalsinhJadeja and KiritModi, et al. (2012) talked about architecture of cloud computing and challenges in cloud computing. If we don't work for 4 minute on the system, then Load balancer resend the request to the same server or different server.

V. Experimental Result
When using only an internal Standard Load Balancer, outbound connectivity is not available until you define how you want outbound connections to work with an instance-level public IP or a public Load Balancer.

Communicate between Azure resources
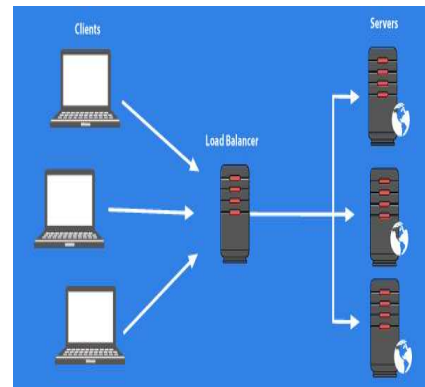Azure resources communicate securely with each other in one of the following ways:

Fig.2. Architecture of a Load balancer

➤ Through a virtual network: You can deploy VMs, and several other types of Azure resources to a virtual

network, such as Azure App Service Environments, the Azure Kubernetes Service (AKS), and Azure Virtual Machine Scale Sets. To view a complete list of Azure resources that you can deploy into a virtual network, see Virtual network service integration.

➤ Through a virtual network service endpoint: Extend your virtual network private address space and the identity of your virtual network to Azure service resources, such as Azure Storage accounts and Azure SQL databases, over a direct connection. Service endpoints allow you to secure your critical Azure service resources to only a virtual network.

➤ Through VNet Peering: You can connect virtual networks to each other, enabling resources in either virtual network to communicate with each other, using virtual network peering. The virtual networks you connect can be in the same, or different, Azure regions.

VI. Conclusion
This paper presents about load balancing and data management in Cloud Computing. It also addresses the issue with balancing the load and with the storage of data. This issue can be resolve using load balancer, it also represent some information about peering and azure blob storage.

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