Azure Storage

Azure Storage is a Microsoft-managed cloud storage service, that provides highly available, durable, scalable, and redundant storage, at a fraction of the cost. It is a service to store files, messages, tables, and other types of information.

Azure storage is generally used in 3 categories:

* Storage for virtual machines (like disks and files)
* Unstructured data (like blobs and data lake stores)
* Structured data (like tables, azure SQL DB and cosmos DB)

Storage Types

Azure provides the storage services with the help of storage account. There are 4 types of storage uses.

* Azure Blob – Blob (Binary Large Object): Azure Blob storage is Microsoft's object storage solution for the cloud. Blob storage is optimized for storing massive amounts of unstructured data, such as text or binary data.

Blob storage is ideal for:

* + Server images or documents directly to a browser.
  + Storing files for distributed access. Storing data for backup and restore, disaster recovery, and archiving. Storing data for analysis by an on-premises or Azure-hosted service.
* Azure File: Azure Files enables you to set up highly available network file shares that can be accessed by using the standard Server Message Block (SMB) protocol from anywhere in the world. That means that multiple VMs can share the same files with both read and write access. Use case for this if you want to migrate the application or the data into azure.
* Azure Queue: The Azure Queue service is used to store and retrieve messages. Queue messages can be up to 64 KB in size, and a queue can contain millions of messages. Queues are generally used to store lists of messages to be processed asynchronously.
* Azure Table: Allow you to store structured NoSQL data in the cloud, providing a key/attribute store with a schema less design.

Azure Storage Account Kinds:

* **General Purpose V2**: Basic and latest storage account type for blobs, files, queues, and tables. Recommended for most scenarios using Azure Storage. And Microsoft recommend to use this type of account.  
  It supports services like Blob, File, Queue, Table, Disk, and Data Lake Gen2 It supports access tiers like Hot, Cool, Archive.

It supports replication like LRS, GRS, RA-GRS, ZRS, GZRS, RA-GZRS. It supports both standard and premium performance tiers.

* **General Purpose V1**: Legacy account type for blobs, files, queues, and tables. Use general-purpose v2 accounts instead when possible and it may not have all the latest features.  
  It supports services only like Blob, File, Queue, Table, and Disk It doesn't support any access tiers like Hot, Cool.  
  It supports only replications like LRS, GRS, RA-GRS It supports both standard and premium performance tiers.
* **Blob Storage account**: The blob storage is used for storing unstructured data.  
  It supports only services of Blob (block blobs and append blobs only).

It supports only standard performance tier. It supports access tiers like Hot, Cool, Archive. It supports only replications like LRS, GRS, RA-GRS.

Features of AZ Storage account:

* **Durable and High Availability**

Azure Storage account is highly available you can access it from anywhere from all over the world with the help of Login ID and Password.

Also, safe in case of hardware failure or natural disaster. This will never happen that during data migration from one place to another your data will never get lost in case any failure occurs azure has backup of your data.

* **Secure**

Data which is placed in azure is totally encrypted nobody can access your data without your credentials.

* **Scalable**

It is Scalable based on your requirements you can increase or decrease resources.

* **Managed**

Azure handles hardware maintenance, and updates.

* **Accessible**

Data is accessible from anywhere in the world over http and https.

Performance tiers:-

Azure storage offers different access tiers, which allow you to store blob object data in the most cost-effective manner. The available access tiers include:  
  
**Hot** - Optimized for storing data that is accessed frequently like virtual machines, files, images, videos that are in regular use. Hot tier has higher storage cost and lower read cost.  
  
**Cool** - Optimized for storing data that is infrequently accessed and stored for at least 30 days like backup data that will be stored in storage and are not used frequently. In this storage cost is lower however read cost is higher than hot tier.  
  
**Archive** - Optimized for storing data that is rarely accessed and stored for at least 180 days with flexible latency requirements (on the order of hours) like you have yearly report or data which is not in use, but you are keeping it safe for long term like 15 or 99 years. In this storage cost is lower than cool tier however access cost is higher than cool storage.

Blob Containers & Categories

**Containers**  
Blobs are used to store unstructured data like unmanaged disks, text files or binary data. You can create multiple blobs under container and multiple containers under one storage account.

Blob storages are categories in 3 types:  
  
**Block blob**:  
Any files, videos, images etc. saved in Blob storage are default saved with the type as "Block Blob". It stores text and binary data. Block blobs are made up of blocks of data that can be managed individually. It is best for high transaction rates or low storage latency.  
  
**Page blob:**  
It store random access files up to 8 TB in size. Page blobs store virtual hard drive (VHD) files and serve as disks for Azure virtual machines. Best for random read and write operations.  
  
**Append blob:**  
Append blobs are made up of blocks like block blobs but are optimized for append operations. Append blobs are ideal for scenarios such as logging data from virtual machines.

Storage replication

Mostly big companies used to keep more than 1 storage devices for redundancy purpose or for high availability or for mirroring if incase one storage device goes down then data can be accessible from other storage device. In same way azure also has same kind of concept with advance version which will replication the storage into multiple regions for mirroring purpose and this replication is managed by MS itself.  
  
There are 6 types of replications in storage.

* Locally Redundant Storage (LRS)  
  If we will select LRS, the 3 copies of the data will be stored in 3 storage boxes within the same datacenter.



* Zone Redundant Storage (ZRS)  
  If we will select ZRS, then 3 copies of the data will be created in multiple datacenters in same region

A picture containing text, first-aid kit, sign

Description automatically generated

* Geo-redundant storage (GRS)  
  If we will select GRS, then 3 copies of the data will be created in primary region and 3 copies will be created in other secondary geo location. It means it creates total 6 copies of your data.

Diagram

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* Read Access Geo-redundant storage (RA-GRS)  
  This option is same like GRS but here we have read only access to the secondary datacenter. We can access the data with the secondary URL any time.
* Geo-zone-redundant storage (GZRS)  
  It copies your data synchronously across three Azure availability zones in the primary region using ZRS. It then copies your data asynchronously to a single physical location in the secondary region.

Diagram

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* Read Access Geo-zone-redundant storage (RA-GZRS)  
  This option is same like GZRS but here we have read only access to the secondary datacenter. We can access the data with the secondary URL any time.

This below table will give a better idea on the difference between these 4 storage redundancy types.

Table

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