**Explore Azure Blob storage**

* Azure Blob storage is Microsoft's object storage solution for the cloud.
* Blob storage is optimized for storing massive amounts of unstructured data.
* Unstructured data is data that does not adhere to a particular data model or definition, such as text or binary data.
* Blob storage is designed for:
  + Serving images or documents directly to a browser.
  + Storing files for distributed access.
  + Streaming video and audio.
  + Writing to log files.
  + Storing data for backup and restore, disaster recovery, and archiving.
  + Storing data for analysis by an on-premises or Azure-hosted service.

**Access tiers for block blob data**

* **Hot**
  + The Hot access tier, which is optimized for frequent access of objects in the storage account.
  + The Hot tier has the highest storage costs, but the lowest access costs.
  + **New storage accounts are created in the hot tier by default.**
* **Cool**
  + The Cool access tier, which is optimized for storing large amounts of data that is infrequently accessed and stored for at least 30 days.
  + The Cool tier has lower storage costs and higher access costs compared to the Hot tier.
* **Archive**
  + The Archive tier, which is available only for individual block blobs.
  + The archive tier is optimized for data that can tolerate several hours of retrieval latency and will remain in the Archive tier for at least 180 days.
  + While a blob is in the Archive tier, it can't be read or modified. To read or download a blob in the Archive tier, you must first rehydrate it to an online tier, either Hot or Cool. Data in the Archive tier can take up to 15 hours to rehydrate, depending on the priority you specify
  + The archive tier is the most cost-effective option for storing data, but accessing that data is more expensive than accessing data in the hot or cool tiers.
  + While a blob is in the archive access tier, it's considered to be offline and can't be read or modified.
* The following considerations apply to the different access tiers:
* The access tier can be set on a blob during or after upload.
* Only the hot and cool access tiers can be set at the account level. The archive access tier can only be set at the blob level.
* Data in the cool access tier has slightly lower availability, but still has high durability, retrieval latency, and throughput characteristics similar to hot data.
* Data in the archive access tier is stored offline. The archive tier offers the lowest storage costs but also the highest access costs and latency.
* The hot and cool tiers support all redundancy options. The archive tier supports only LRS, GRS, and RA-GRS.
* Data storage limits are set at the account level and not per access tier. You can choose to use all of your limit in one tier or across all three tiers.

Blob storage contains 3 resource types

* **The storage account.**
  + A storage account provides a unique namespace in Azure for your data.
  + Every object that you store in Azure Storage has an address that includes your unique account name.
  + The combination of the account name and the Azure Storage blob endpoint forms the base address for the objects in your storage account.
    - For example, if your storage account is named mystorageaccount, then the default endpoint for Blob storage is:
    - http://mystorageaccount.blob.core.windows.net
* **A container in the storage account**
  + A container organizes a set of blobs, similar to a directory in a file system.
  + A storage account can include an unlimited number of containers, and a container can store an unlimited number of blobs.
  + The container name must be lowercase.
* **A blob in a container**
* Azure Storage supports three types of blobs:
  + Block blobs
    - Block blobs store text and binary data, up to about 190.7 TB.
    - Block blobs are made up of blocks of data that can be managed individually.
  + Append blobs
    - 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.
  + Page blobs
    - Page blobs 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.

**Azure Storage encryption**

* Azure Storage automatically encrypts your data when persisting it to the cloud.
* Data in Azure Storage is encrypted and decrypted transparently using 256-bit AES encryption, one of the strongest block ciphers available, and is FIPS 140-2 compliant.
* Azure Storage encryption is similar to BitLocker encryption on Windows.
* Azure Storage encryption is enabled for all new and existing storage accounts and cannot be disabled.
* Because your data is secured by default, you don't need to modify your code or applications to take advantage of Azure Storage encryption.
* Encryption does not affect Azure Storage performance.
* There is no additional cost for Azure Storage encryption.

**Redundancy in the primary region**

* Data in an Azure Storage account is always replicated three times in the primary region. Azure Storage offers two options for how your data is replicated in the primary region.
  + **Locally redundant storage (LRS):** Copies your data synchronously three times within a single physical location in the primary region. LRS is the least expensive replication option, but is not recommended for applications requiring high availability or durability.
  + **Zone-redundant storage (ZRS):** Copies your data synchronously across three Azure availability zones in the primary region. For applications requiring high availability, Microsoft recommends using ZRS in the primary region, and also replicating to a secondary region.

**Redundancy in a secondary region**

* **Geo-redundant storage (GRS)** copies your data synchronously three times within a single physical location in the primary region using LRS. It then copies your data asynchronously to a single physical location in the secondary region. Within the secondary region, your data is copied synchronously three times using LRS.
* **Geo-zone-redundant storage (GZRS)** 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. Within the secondary region, your data is copied synchronously three times using LRS.

**The lifecycle management policy lets you:**

* Transition blobs to a cooler storage tier (hot to cool, hot to archive, or cool to archive) to optimize for performance and cost
* Delete blobs at the end of their lifecycles
* Define rules to be run once per day at the storage account level
* Apply rules to containers or a subset of blobs (using prefixes as filters)

**Blob storage lifecycle policies**

* A lifecycle management policy is a collection of rules in a JSON document.
* Each rule definition within a policy includes a filter set and an action set.
  + The filter set limits rule actions to a certain set of objects within a container or objects names.
  + The action set applies the tier or delete actions to the filtered set of objects.:
* At least one rule is required in a policy. You can define up to 100 rules in a policy.
* A rule name can include up to 256 alphanumeric characters. Rule name is case-sensitive. It must be unique within a policy.

**Rehydration priority**

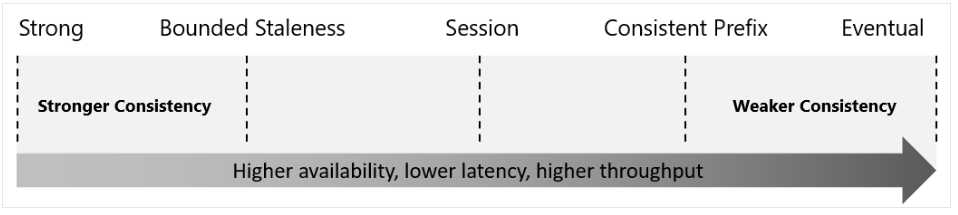
* When you rehydrate a blob, you can set the priority for the rehydration operation via the optional ***x-ms-rehydrate-priority*** header on a Set Blob Tier or Copy Blob/Copy Blob From URL operation. Rehydration priority options include:
* **Standard priority:** The rehydration request will be processed in the order it was received and may take up to 15 hours.
* **High priority:** The rehydration request will be prioritized over standard priority requests and may complete in under one hour for objects under 10 GB in size.
* To check the rehydration priority while the rehydration operation is underway, call Get Blob Properties to return the value of the x-ms-rehydrate-priority header. The rehydration priority property returns either
  + Standard or High.

**Copy an archived blob to an online tier**

* You can use either the Copy Blob or Copy Blob from URL operation to copy the blob.
* When you copy an archived blob to a new blob in an online tier, the source blob remains unmodified in the archive tier.
* You must copy the archived blob to a new blob with a different name or to a different container. You cannot overwrite the source blob by copying to the same blob.
* Copying an archived blob to an online destination tier is supported within the same storage account only.
* You cannot copy an archived blob to a destination blob that is also in the archive tier.

Azure Cosmo DB

* The Azure Cosmos DB account is the fundamental unit of global distribution and high availability.
* Your Azure Cosmos DB account contains a unique DNS name and you can manage an account by using the Azure portal or the Azure CLI, or by using different language-specific SDKs.
* **Azure Cosmos DB offers five well-defined levels. From strongest to weakest, the levels are:**
  + Strong
  + Bounded staleness
  + Session
  + Consistent prefix
  + Eventual



Partitions

* In partitioning, the items in a container are divided into distinct subsets called **logical partitions.**
* A partition key has two components: **partition key path** and the **partition key value**. For example, consider an item { "userId" : "Andrew", "worksFor": "Microsoft" } if you choose "userId" as the partition key, the following are the two partition key components:

**Triggers**

* Azure Cosmos DB supports pre-triggers and post-triggers.
* Pre-triggers are executed before modifying a database item and post-triggers are executed after modifying a database item.
* Triggers are not automatically executed; they must be specified for each database operation where you want them to execute.
* After you define a trigger, you should register it by using the Azure Cosmos DB SDKs.
* Pre-triggers cannot have any input parameters.

**Availability zones**

* Azure services that support Availability Zones fall into two categories:
* **Zonal services**: Where a resource is pinned to a specific zone (for example, virtual machines, managed disks, Standard IP addresses), or
* **Zone-redundant services**: When the Azure platform replicates automatically across zones (for example, zone-redundant storage, SQL Database).
* An availability set is a logical grouping of VMs that allows Azure to understand how your application is built to provide for redundancy and availability.