Azure Blob Storage: Hot, cool, and archive storage tiers

Azure storage offers three storage tiers for Blob object storage so that you can store your data most cost-effectively depending on how you use it. The Azure **hot storage tier** is optimized for storing data that is accessed frequently. The Azure **cool storage tier** is optimized for storing data that is infrequently accessed and stored for at least 30 days. The Azure **archive storage tier** is optimized for storing data that is rarely accessed and stored for at least 180 days with flexible latency requirements (on the order of hours). The archive storage tier is only available at the blob level and not at the storage account level. Data in the cool storage tier can tolerate slightly lower availability, but still requires high durability and similar time-to-access and throughput characteristics as hot data. For cool data, a slightly lower availability SLA and higher access costs compared to hot data are acceptable trade-offs for lower storage costs. Archive storage is offline and offers the lowest storage costs but also the highest access costs.

Today, data stored in the cloud is growing at an exponential pace. To manage costs for your expanding storage needs, it's helpful to organize your data based on attributes like frequency-of-access and planned retention period to optimize costs. Data stored in the cloud can be different in terms of how it is generated, processed, and accessed over its lifetime. Some data is actively accessed and modified throughout its lifetime. Some data is accessed frequently early in its lifetime, with access dropping drastically as the data ages. Some data remains idle in the cloud and is rarely, if ever, accessed once stored.

Each of these data access scenarios benefits from a different storage tier that is optimized for a particular access pattern. With hot, cool, and archive storage tiers, Azure Blob storage addresses this need for differentiated storage tiers with separate pricing models.

Storage accounts that support tiering

You may only tier your object storage data to hot, cool, or archive in Blob Storage or General Purpose v2 (GPv2) accounts. General Purpose v1 (GPv1) accounts do not support tiering. However, customers can easily convert their existing GPv1 or Blob Storage accounts to GPv2 accounts through a simple one-click process in the Azure portal. GPv2 provides a new pricing structure for blobs, files, and queues, and access to a variety of other new storage features as well. Furthermore, going forward some new features and prices cuts will only be offered in GPv2 accounts. Therefore, customers should evaluate using GPv2 accounts but only use them after reviewing the pricing for all services as some workloads can be more expensive on GPv2 than GPv1. See [Azure storage account options](https://docs.microsoft.com/en-in/azure/storage/blobs/storage-account-options) to learn more.

Blob Storage and GPv2 accounts expose the **Access Tier** attribute at the account level, which allows you to specify the default storage tier as hot or cool for any blob in the storage account that does not have the tier set at the object level. For objects with the tier set at the object level, the account tier will not apply. The archive tier can only be applied at the object level. You can switch between these storage tiers at any time.

Hot access tier

Hot storage has higher storage costs than cool and archive storage, but the lowest access costs. Example usage scenarios for the hot storage tier include:

* Data that is in active use or expected to be accessed (read from and written to) frequently.
* Data that is staged for processing and eventual migration to the cool storage tier.

Cool access tier

Cool storage tier has lower storage costs and higher access costs compared to hot storage. This tier is intended for data that will remain in the cool tier for at least 30 days. Example usage scenarios for the cool storage tier include:

* Short-term backup and disaster recovery datasets.
* Older media content not viewed frequently anymore but is expected to be available immediately when accessed.
* Large data sets that need to be stored cost effectively while more data is being gathered for future processing. (*For example*, long-term storage of scientific data, raw telemetry data from a manufacturing facility)

Archive access tier

Archive storage has the lowest storage cost and higher data retrieval costs compared to hot and cool storage. This tier is intended 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 archive storage, it is offline and cannot be read (except the metadata, which is online and available), copied, overwritten, or modified. Nor can you take snapshots of a blob in archive storage. However, you may use existing operations to delete, list, get blob properties/metadata, or change the tier of your blob.

Example usage scenarios for the archive storage tier include:

* Long-term backup, archival, and disaster recovery datasets
* Original (raw) data that must be preserved, even after it has been processed into final usable form. (*For example*, Raw media files after transcoding into other formats)
* Compliance and archival data that needs to be stored for a long time and is hardly ever accessed. (*For example*, Security camera footage, old X-Rays/MRIs for healthcare organizations, audio recordings, and transcripts of customer calls for financial services)

Blob rehydration

To read data in archive storage, you must first change the tier of the blob to hot or cool. This process is known as rehydration and can take up to 15 hours to complete. Large blob sizes are strongly recommended for optimal performance. Rehydrating several small blobs concurrently may add additional time.

During rehydration, you may check the **Archive Status** blob property to confirm if the tier has changed. The status reads "rehydrate-pending-to-hot" or "rehydrate-pending-to-cool" depending on the destination tier. Upon completion, the archive status property is removed, and the **Access Tier** blob property reflects the new hot or cool tier.

Blob-level tiering

Blob-level tiering allows you to change the tier of your data at the object level using a single operation called [Set Blob Tier](https://docs.microsoft.com/en-us/rest/api/storageservices/set-blob-tier). You can easily change the access tier of a blob among the hot, cool, or archive tiers as usage patterns change, without having to move data between accounts. All tier changes happen immediately except when a blob is rehydrating from archive which can take several hours. The time of the last blob tier change is exposed via the **Access Tier Change Time** blob property. If a blob is in the archive tier, it may not be overwritten, and therefore, uploading the same blob is not allowed in this scenario. You may overwrite a blob in hot and cool, and in this case, the new blob inherits the tier of the old blob that was overwritten.

Blobs in all three storage tiers can co-exist within the same account. Any blob that does not have an explicitly assigned tier infers the tier from the account access tier setting. If the access tier is inferred from the account, you see the **Access Tier Inferred** blob property set to “true”, and the blob **Access Tier** blob property matches the account tier. In the Azure portal, the access tier inferred property is displayed with the blob access tier (for example, Hot (inferred) or Cool (inferred)).

Note

Archive storage and blob-level tiering only support block blobs. You also cannot change the tier of a block blob that has snapshots.

Blob-level tiering billing

When a blob is moved to a cooler tier (hot->cool, hot->archive, or cool->archive), the operation is billed as a write into the destination tier, and the write operation (per 10,000) and data write (per GB) charges of the destination tier apply. If a blob is moved to a warmer tier (archive->cool, archive->hot, or cool->hot), the operation is billed as a read from the source tier, and the read operation (per 10,000) and data retrieval (per GB) charges of the source tier apply.

If you toggle the account tier from hot to cool, you will be charged for write operations (per 10,000) for all blobs without a set tier in GPv2 accounts only. There is no charge for this in Blob Storage accounts. You will be charged for both read operations (per 10,000) and data retrieval (per GB) if you toggle your Blob Storage or GPv2 account from cool to hot. Early deletion charges for any blob moved out of the cool or archive tier may apply as well.

Cool and archive early deletion (effective February 1, 2018)

In addition to the per GB, per month charge, any blob that is moved into the cool tier (GPv2 accounts only) is subject to a cool early deletion period of 30 days, and any blob that is moved into the archive tier is subject to an archive early deletion period of 180 days. This charge is prorated. For example, if a blob is moved to archive and then deleted or moved to the hot tier after 45 days, you will be charged an early deletion fee equivalent to 135 (180 minus 45) days of storing that blob in archive.

Comparison of the storage tiers

The following table shows a comparison of the hot, cool, and archive storage tiers.

|  | **Hot storage tier** | **Cool storage tier** | **Archive storage tier** |
| --- | --- | --- | --- |
| **Availability** | 99.9% | 99% | N/A |
| **Availability**  **(RA-GRS reads)** | 99.99% | 99.9% | N/A |
| **Usage charges** | Higher storage costs, lower access and transaction costs | Lower storage costs, higher access and transaction costs | Lowest storage costs, highest access and transaction costs |
| **Minimum object size** | N/A | N/A | N/A |
| **Minimum storage duration** | N/A | 30 days (GPv2 only) | 180 days |
| **Latency**  **(Time to first byte)** | milliseconds | milliseconds | < 15 hrs |
| **Scalability and performance targets** | Same as general-purpose storage accounts | Same as general-purpose storage accounts | Same as general-purpose storage accounts |

Note

Blob Storage accounts support the same performance and scalability targets as general-purpose storage accounts. See [Azure Storage Scalability and Performance Targets](https://docs.microsoft.com/en-in/azure/storage/common/storage-scalability-targets?toc=%2fazure%2fstorage%2fblobs%2ftoc.json) for more information.

Quickstart scenarios

In this section, the following scenarios are demonstrated using the Azure portal:

* How to change the default account access tier of a GPv2 or Blob Storage account.
* How to change the tier of a blob in a GPv2 or Blob Storage account.

Change the default account access tier of a GPv2 or Blob storage account

1. Sign in to the [Azure portal](https://portal.azure.com/).
2. To navigate to your storage account, select All Resources, then select your storage account.
3. In the Settings blade, click **Configuration** to view and/or change the account configuration.
4. Select the right storage tier for your needs: Set the **Access tier** to either **Cool** or **Hot**.
5. Click Save at the top of the blade.

Change the tier of a blob in a GPv2 or Blob Storage account.

1. Sign in to the [Azure portal](https://portal.azure.com/).
2. To navigate to your blob in your storage account, select All Resources, select your storage account, select your container, and then select your blob.
3. In the Blob properties blade, click the **Access tier** dropdown menu to select the **Hot**, **Cool**, or **Archive** storage tier.
4. Click Save at the top of the blade.

FAQ

**Should I use Blob Storage or GPv2 accounts if I want to tier my data?**

We recommend you use GPv2 instead of Blob Storage accounts for tiering. GPv2 support all the features that Blob Storage accounts support plus a lot more. Pricing between Blob Storage and GPv2 is almost identical, but some new features and price cuts will only be available on GPv2 accounts. GPv1 accounts do not support tiering.

Pricing structure between GPv1 and GPv2 accounts is different and customers should carefully evaluate both before deciding to use GPv2 accounts. You can easily convert an existing Blob Storage or GPv1 account to GPv2 through a simple one-click process. See [Azure storage account options](https://docs.microsoft.com/en-in/azure/storage/blobs/storage-account-options) to learn more.

**Can I store objects in all three (hot, cool, and archive) storage tiers in the same account?**

Yes. The **Access Tier** attribute set at the account level is the default tier that applies to all objects in that account without an explicit set tier. However, blob-level tiering allows you to set the access tier on at the object level regardless of what the access tier setting on the account is. Blobs in any of the three storage tiers (hot, cool, or archive) may exist within the same account.

**Can I change the default storage tier of my Blob or GPv2 storage account?**

Yes, you can change the default storage tier by setting the **Access tier** attribute on the storage account. Changing the storage tier applies to all objects stored in the account that do not have an explicit tier set. Toggling the storage tier from hot to cool incurs write operations (per 10,000) for all blobs without a set tier in GPv2 accounts only and toggling from cool to hot incurs both read operations (per 10,000) and data retrieval (per GB) charges for all blobs in Blob Storage and GPv2 accounts.

**Can I set my default account access tier to archive?**

No. Only hot and cool storage tiers may be set as the default account access tier. Archive can only be set at the object level.

**In which regions are the hot, cool, and archive storage tiers available in?**

The hot and cool storage tiers along with blob-level tiering are available in all regions. Archive storage will initially only be available in select regions. For a complete list, see [Azure products available by region](https://azure.microsoft.com/regions/services/).

**Do the blobs in the cool storage tier behave differently than the ones in the hot storage tier?**

Blobs in the hot storage tier have the same latency as blobs in GPv1, GPv2, and Blob Storage accounts. Blobs in the cool storage tier have a similar latency (in milliseconds) as blobs in GPv1, GPv2, and Blob Storage accounts. Blobs in the archive storage tier have several hours of latency in GPv1, GPv2, and Blob Storage accounts.

Blobs in the cool storage tier have a slightly lower availability service level (SLA) than the blobs stored in the hot storage tier. For more details, see [SLA for storage](https://azure.microsoft.com/support/legal/sla/storage/v1_2/).

**Are the operations among the hot, cool, and archive tiers the same?**

Yes. All operations between hot and cool are 100% consistent. All valid archive operations including delete, list, get blob properties/metadata, and set blob tier are 100% consistent with hot and cool. A blob cannot be read or modified while in the archive tier.

**When rehydrating a blob from archive tier to the hot or cool tier, how will I know when rehydration is complete?**

During rehydration, you may use the get blob properties operation to poll the **Archive Status**attribute to confirm when the tier change is complete. The status reads "rehydrate-pending-to-hot" or "rehydrate-pending-to-cool" depending on the destination tier. Upon completion, the archive status property is removed, and the **Access Tier** blob property reflects the new hot or cool tier.

**After setting the tier of a blob, when will I start getting billed at the appropriate rate?**

Each blob is always billed according to the tier indicated by **Access Tier** blob property. When setting a new tier on a blob, the **Access Tier** property will immediately reflect the new tier for all transitions except when rehydrating a blob from archive to hot or cool which can take several hours. In this case you will continue to be billed at archive rates until rehydration is complete at which point **Access Tier** will reflect the new tier. Only then, will you be billed at the new hot or cool rate.

**How do I determine if I will incur an early deletion charge when deleting or moving a blob out of the cool or archive tier?**

Any blob that is deleted or moved out of the cool (GPv2 accounts only) or archive tier before 30 days and 180 days respectively will incur a prorated early deletion charge (effective February 1, 2018). You can determine how long a blob has been in the cool or archive tier by checking the **Access Tier Change Time** blob property which provides a stamp of the last tier change. See [Cool and archive early deletion](https://docs.microsoft.com/en-in/azure/storage/blobs/storage-blob-storage-tiers#cool-and-archive-early-deletion) section for more details.

**Which Azure tools and SDKs support blob-level tiering and archive storage?**

Azure portal, PowerShell, and CLI tools and .NET, Java, Python, and Node.js client libraries all support blob-level tiering and archive storage.

**How much data can I store in the hot, cool, and archive tiers?**

Data storage along with other limits are set at the account level and not per storage tier. Therefore, you can chose to use all of your limit in one tier or across all three tiers. See [Azure Storage Scalability and Performance Targets](https://docs.microsoft.com/en-in/azure/storage/common/storage-scalability-targets?toc=%2fazure%2fstorage%2fblobs%2ftoc.json) for more information.