😊 Storage Access Tiers

Azure Storage Access Tiers offer different levels of pricing and performance optimization to accommodate various data usage patterns and access frequencies. Here's a brief overview of the available access tiers:

1. **Hot Access Tier:** The Hot access tier is optimized for data that is frequently accessed and requires low-latency access times. It offers the highest storage costs but lower access and transaction costs. This tier is suitable for data that is actively read and written to, such as current transactions, frequently accessed files, and working datasets.
2. **Cool Access Tier:** The Cool access tier is designed for data with lower access frequencies and longer retention periods. It offers lower storage costs compared to the Hot tier but slightly higher access and transaction costs. This tier is ideal for data that is accessed less frequently but still needs to be readily available, such as backups, archival data, and disaster recovery copies.
3. **Archive Access Tier:** The Archive access tier is the most cost-effective option for storing data that is rarely accessed and has long-term retention requirements. It offers the lowest storage costs but higher access and transaction costs, as accessing data from the Archive tier requires rehydration, which can take several hours. This tier is suitable for compliance data, regulatory archives, and historical records that need to be retained for extended periods but are rarely accessed.

By leveraging Azure Storage Access Tiers, organizations can optimize their storage costs based on the access patterns and retention requirements of their data. They can tier their data to the appropriate access tier to balance cost-effectiveness with data availability and performance, ensuring efficient storage management in the cloud.

😄 Use cases of Storage Access tiers:

Azure Storage Access Tiers cater to a variety of use cases across different industries and scenarios, enabling organizations to optimize storage costs while meeting their data access and retention requirements. Here are some common use cases for each access tier:

Hot Access Tier:

- **Transactional Workloads:** Storing frequently accessed data such as transactional records, user profiles, and real-time analytics data.
- **Content Delivery:** Hosting web content, media files, and streaming data that require low-latency access for seamless user experiences.

- **Application Data:** Storing application logs, telemetry data, and session state information that need to be readily available for real-time processing.

Cool Access Tier:

- **Backup and Archiving:** Storing backup data, system snapshots, and archival records that are accessed infrequently but require quick recovery.
- **Compliance Data:** Archiving regulatory documents, financial records, and audit logs that must be retained for compliance purposes.
- **Disaster Recovery:** Replicating data for disaster recovery scenarios, allowing organizations to recover critical data without incurring high storage costs.

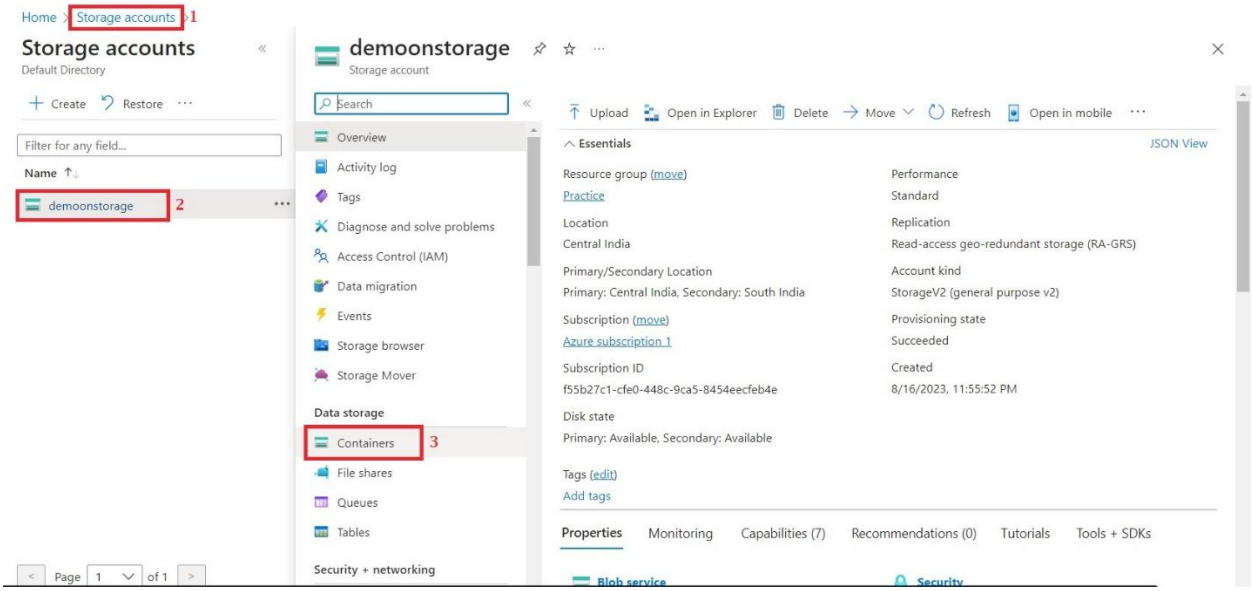
Archive Access Tier:

- **Long-Term Retention:** Archiving historical data, patient records, and legal documents that have long-term retention requirements but are rarely accessed.
- **Regulatory Compliance:** Storing compliance archives, regulatory filings, and industry-specific records that need to be retained for regulatory audits.
- **Data Preservation:** Preserving cultural heritage, scientific research data, and digital assets for future generations, ensuring data durability and accessibility over time.

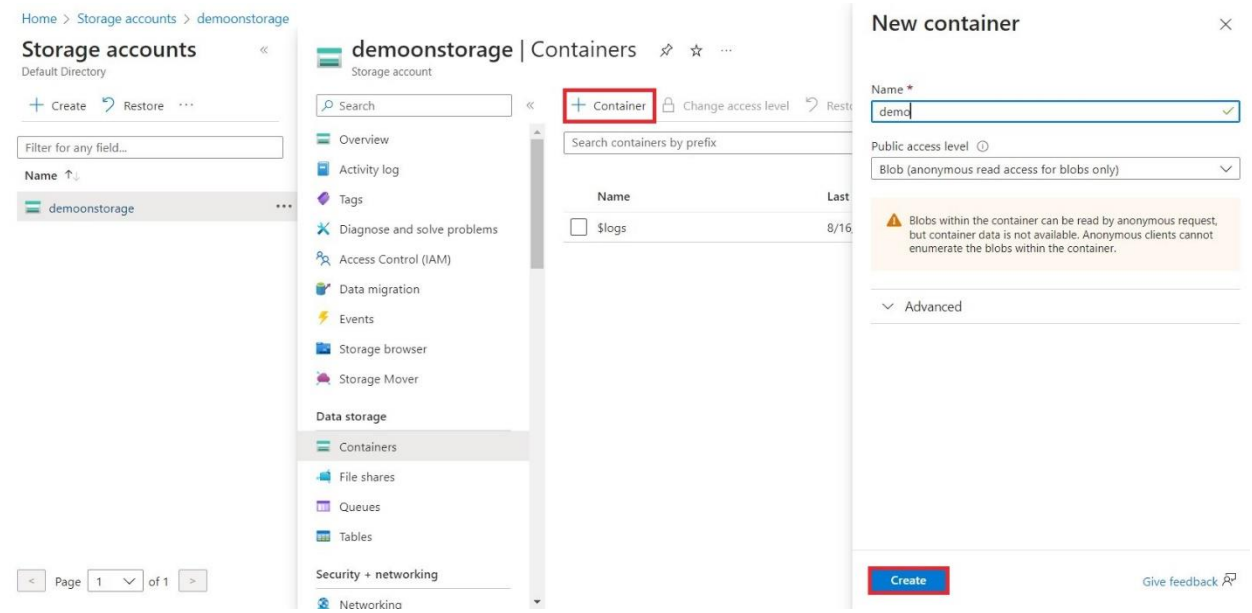
In this guide, we're exploring Azure Storage Access Tiers and their practical applications. The end goal is to help users understand the different tiers available (Hot, Cool, and Archive) and how to leverage them effectively to optimize storage costs while meeting data access and retention requirements. We're also providing step-by-step instructions for setting up access tiers in Azure Storage, along with use cases and important considerations to ensure efficient storage management in the cloud.

😄 To begin with the Lab:

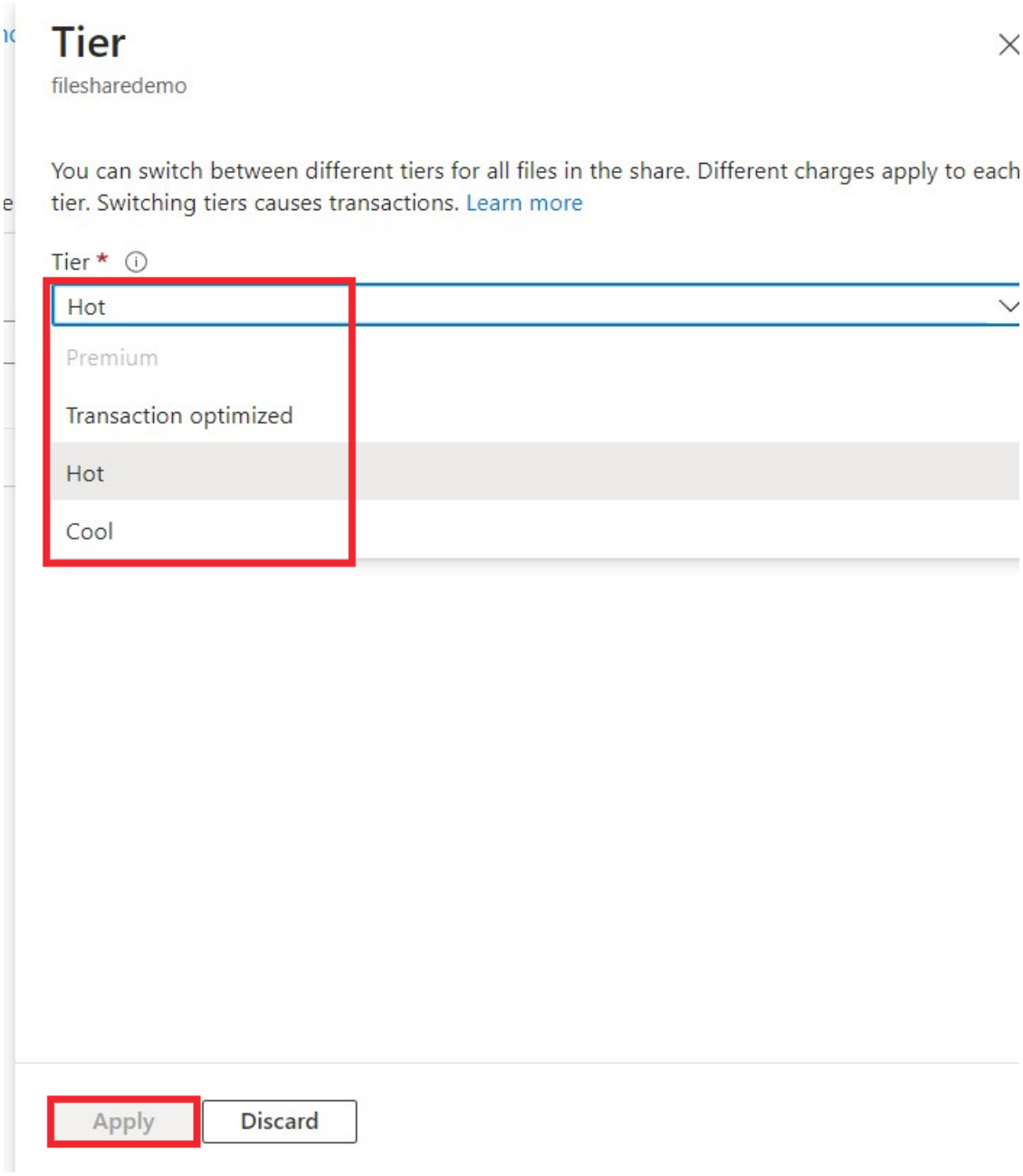
- **Sign in to the Azure portal.**
- Navigate to your storage account, select All Resources, then select your storage account.



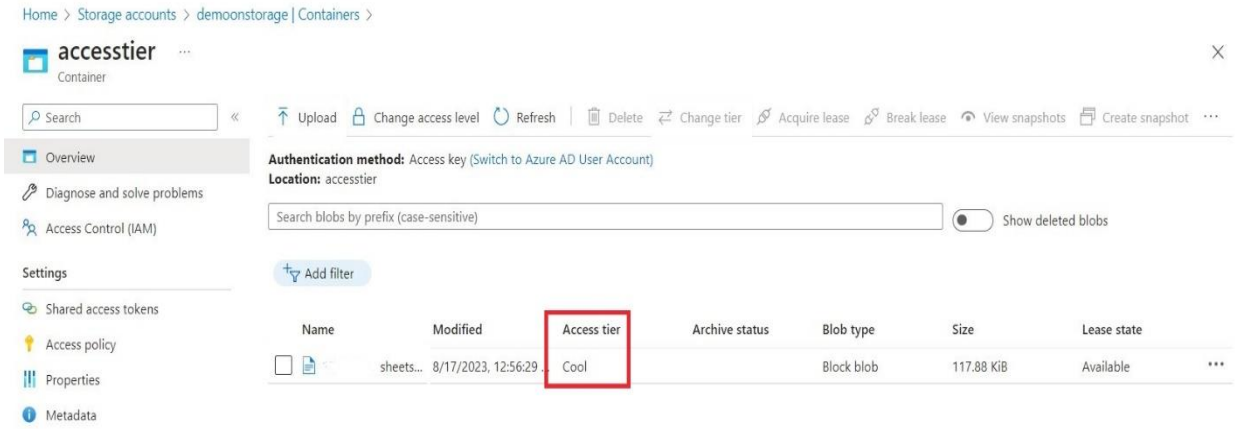
- Click on container and create a new container



- After the creation of the container, upload files on the container, select the files you want to change the access tier, As shown below, and apply changes.



- After applying changes, the access tier status will be changed.



😄 Different storage access tiers

1. **Hot tier —** An online tier optimized for storing data that's in active use or is expected to be accessed and modified frequently. e.g., Static files for web pages.
2. The Hot tier has the highest storage costs, but the lowest access costs.
3. **Cool tier —** An online tier optimized for storing data that is infrequently accessed or modified. e.g., Short-term data backup and disaster recovery.
4. Data in the Cool tier has slightly lower availability but offers the same high durability, retrieval latency, and throughput characteristics as the Hot tier.
5. The Cool tier has lower storage costs and higher access costs compared to the Hot tier.
6. **Archive tier —** An offline tier optimized for storing data that is rarely accessed, and that has flexible latency requirements, on the order of hours. e.g., Long-term backup, secondary backup, and archival datasets stored for Compliance reasons (Call center audio call logs).
7. Data in the Archive tier should be stored for a minimum of 180 days or be subject to an early deletion charge. The Cool tier has lower storage costs and higher access costs compared to the Hot & Cool tier.
8. A blob can't be read or modified while a blob is in the Archive tier.
9. 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 (standard or high rehydration) you specify for the rehydration operation.

😄 Important Points to Note

- As we move from hot -> cool -> archive the cost of storage goes down but the cost of transactions increases.
- The archive access tier can only be set at the blob level and not on the account.
- Hot, cool, and archive tiers can be set at the blob level, during upload or after upload.
- New Storage Accounts are created in the Hot Tier by default.
- Please refer for more information of pricing and Billing for blob access tiers
- Changing a blob's tier from Hot to Cool or Archive & Cool to Hot is instantaneous. Rehydrating a blob from the Archive tier to either the Hot or Cool tier can take up to 15 hours.

Operations and data transfer

	Premium	Hot	Cool	Archive
Write operations (per 10,000)[1]	$0.0245	$0.055	$0.10	$0.12
List and Create Container Operations (per 10,000)[2]	$0.07	$0.055	$0.055	$0.055
Read operations (per 10,000)[3] Archive High Priority Read (per 10,000)[5]	$0.0020	$0.0044	$0.01	$6 $70
All other Operations (per 10,000), except Delete, which is free	$0.0020	$0.0044	$0.0044	$0.0044
Data Retrieval (per GB)[4] Archive High Priority Retrieval (per GB)[5]	Free	Free	$0.01	$0.024 $0.14
Data Write (per GB)[4]	Free	Free	Free	Free
Point-in-time restore Data Processed (per MB)	N/A	$0.028	$0.028	$0.028

[1] The following API calls are considered write operations: PutBlob, PutBlock, PutBlockList, AppendBlock, SnapshotBlob, CopyBlob and SetBlobTier (when it moves a Blob from Hot to Cool, Cool to Archive, or Hot to Archive. Learn more).

[2] The following API calls are considered list and create container operations: ListBlobs, ListContainers, FindBlobsByTags and CreateContainer.

[3] The following API calls are considered read operations: GetBlob and SetBlobTier (when it moves a Blob from Archive to Cool, Cool to Hot, or Archive to Hot. Learn more).

[4] Network costs are charged separately.

[5] High Priority requests are for Archive only and can be used to rehydrate small objects in under 1 hour. Learn more about High Priority Archive rehydrate.

For blobs in Archive, the only valid operations are GetBlobProperties, GetBlobMetadata, ListBlobs, SetBlobTier, SetBlobTags, GetBlobTags, FindBlobsByTags, DeleteBlob, and CopyBlob. Setting the tier from Archive to Hot or Cool typically takes up to 15 hours to complete. Learn more.

For NFS v3 for block blobs operations, we will begin charging above rates on 1st August 2021.

A comparison between premium performance block blob storage and the hot, cold, and archive access levels is shown in the table below.

	Premium performance	Hot tier	Cool tier	Archive tier
Availability	99.9%	99.9%	99%	Offline
Availability(RA-GRS reads)	N/A	99.99%	99.9%	Offline
Usage charges	Higher storage costs, lower access, and transaction cost	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	N/A
Minimum storage duration	N/A	N/A	30 days1	180 days
Latency(Time to first byte)	Single-digit milliseconds	milliseconds	milliseconds	hours2