AZ-104

Administer Azure Storage

AZ-104 Agenda

01: Administer Identity

02: Administer Governance and Compliance

03: Administer Azure Resources

04: Administer Virtual Networking

05: Administer Intersite Connectivity

06: Administer Network Traffic Management

07: Administer Azure Storage ←

08: Administer Azure Virtual Machines

09: Administer PaaS Compute Options

10: Administer Data Protection

11: Administer Monitoring

Learning Objectives - Administer Azure Storage

- Configure Storage Accounts
- Configure Blob Storage —— Container
- Configure Storage Security
- Configure Azure Files
- Lab 07 – Manage Azure Storage

Configure Storage Accounts

Standard → HDD

oder

Premium → SSD

Hot

Cool

Cold

Archive

v2

Learning Objectives - Configure Storage Accounts

- Explore Azure Storage Services
- Determine Storage Account Kinds
- Determine Replication Strategies
- Access Storage
- Secure Storage Endpoints
- Demonstration – Configure a storage account
- Learning Recap

Implement and manage storage (15–20%): Configure and manage storage accounts

- Create and configure storage accounts
- Configure Azure Storage redundancy

Implement and manage storage (15–20%): Configure access to storage

- Configure Azure Storage firewalls and virtual networks

Explore Azure Storage Services

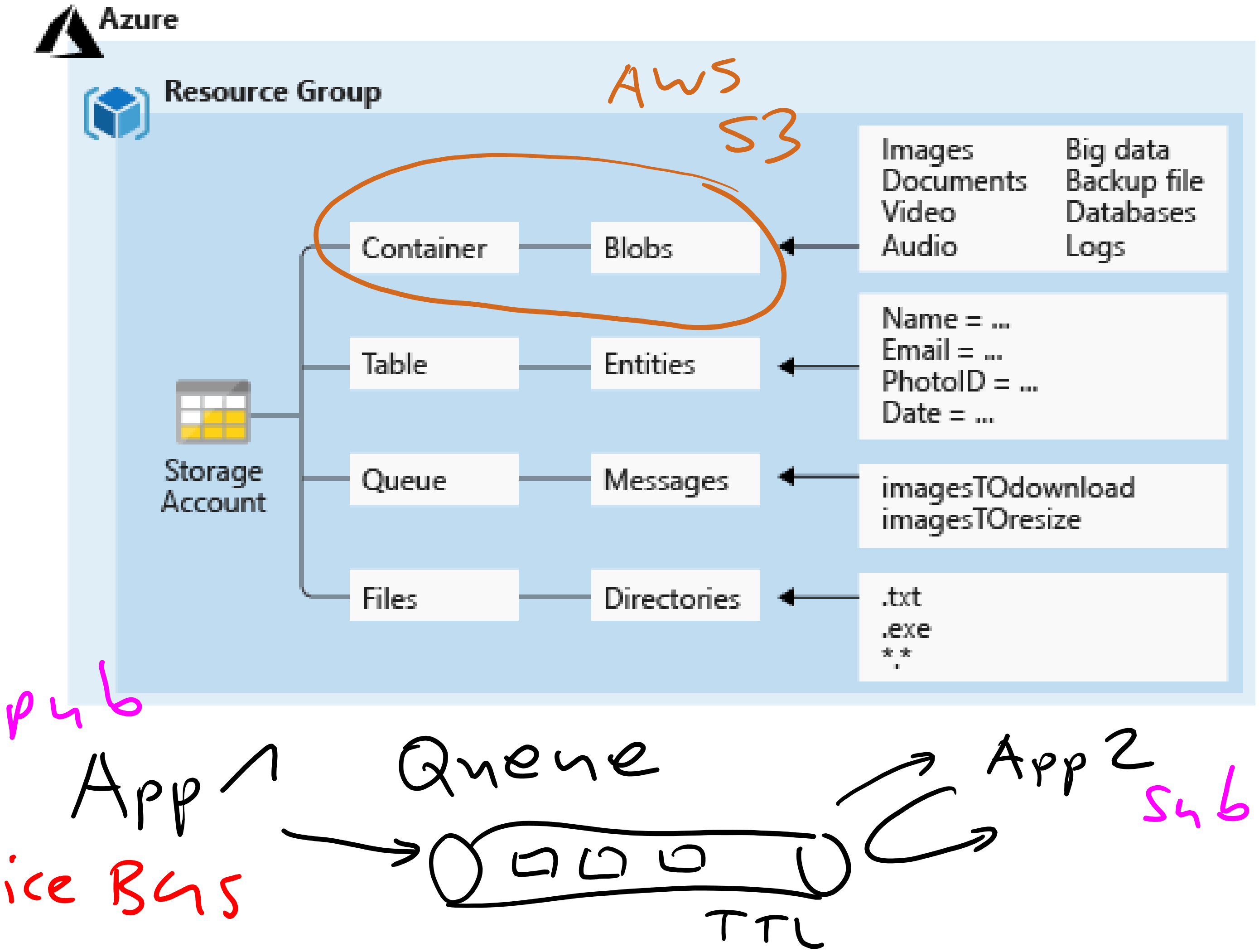
A service that you can use to store files, messages, tables, and other types of information

Azure Containers: A massively scalable object store for text and binary data

Azure Tables: Ideal for storing structured, non-relational data

Azure Queues: A messaging store for reliable messaging between application components

Azure Files: Managed file shares for cloud or on-premises deployments



Determine Storage Account Kinds

LAW

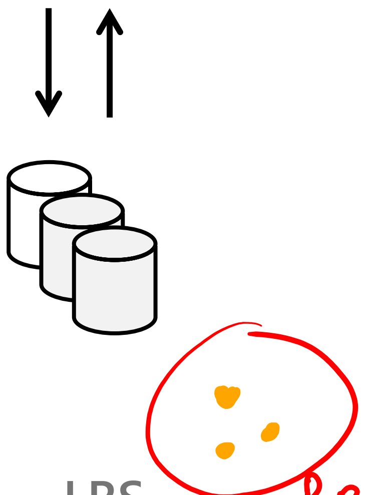
All storage accounts are encrypted using Storage Service Encryption (SSE) for data at rest

Log Analytics WS

Storage Account	Recommended usage
Standard general-purpose v2	Most scenarios including Blob, File, Queue, Table, and Data Lake Storage.
Premium block blobs	Block blob scenarios with high transactions rates, or scenarios that use smaller objects or require consistently low storage latency.
Premium file shares	Enterprise or high-performance file share applications.
Premium page blobs	Premium high-performance page blob scenarios.

Determine Replication Strategies (1 of 2)

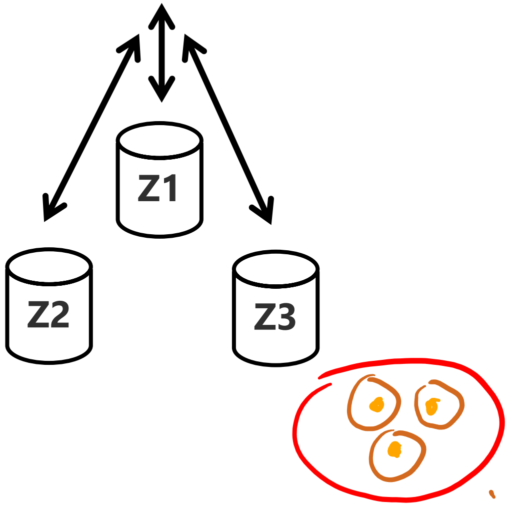
Single region



Region

LRS

- Three replicas, one region
- Protects against disk, node, rack failures
- Write is acknowledged when all replicas are committed
- Superior to dual-parity RAID

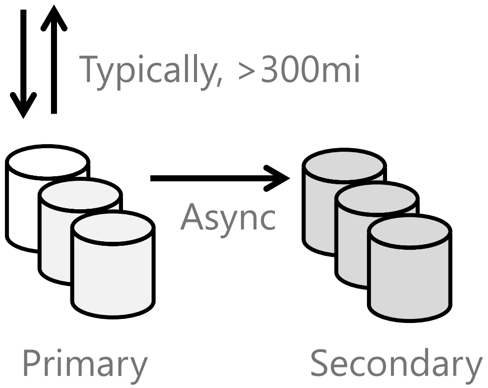


Avail Zone = DC

ZRS

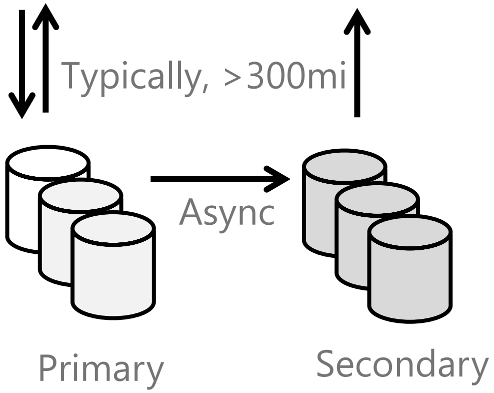
- Three replicas, three zones, one region
- Protects against disk, node, rack, and zone failures
- Synchronous writes to all three zones

Multiple regions



GRS

- Six replicas, two regions (three per region)
- Protects against major regional disasters
- Asynchronous copy to secondary



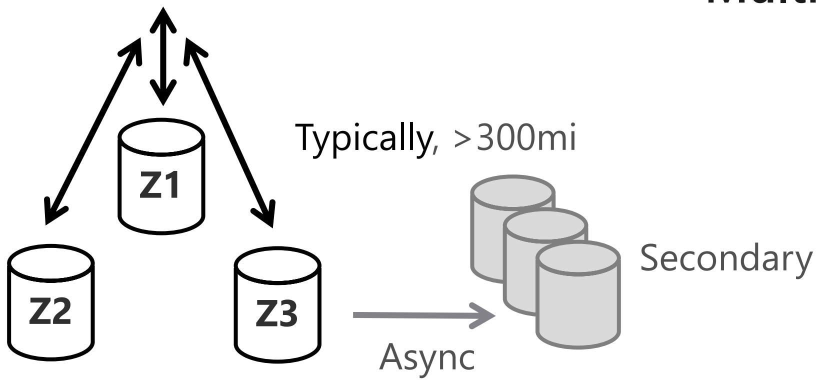
RA-GRS

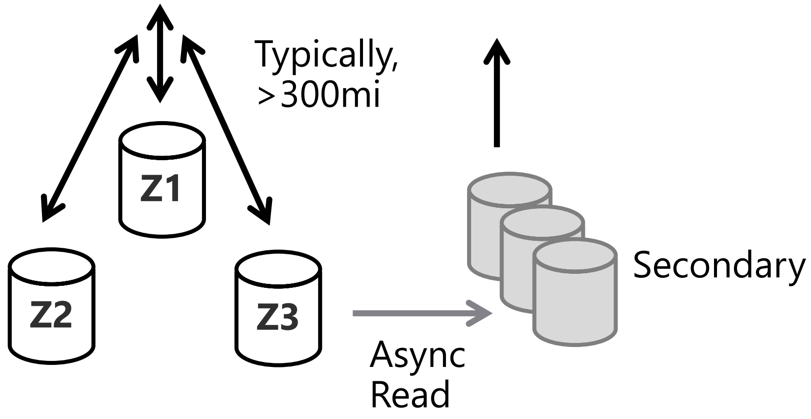
- GRS + read access to secondary
- Separate secondary endpoint
- Recovery point objective (RPO) delay to secondary can be queried

Continued next slide →

Determine Replication Strategies (2 of 2)

Multiple regions





GZRS

- Six replicas, 3+1 zones, two regions
- Protects against disk, node, rack, zone, and region failures
- Synchronous writes to all three zones and asynchronous copy to secondary

RA-GZRS

- GZRS + read access to secondary
- Separate secondary endpoint
- RPO delay to secondary can be queried

Access Storage

Every object has a unique URL address – based on account name and storage type

Container service: https://*mystorageaccount*.blob.core.windows.net
Table service: https://*mystorageaccount*.table.core.windows.net
Queue service: https://*mystorageaccount*.queue.core.windows.net
File service: https://*mystorageaccount*.file.core.windows.net

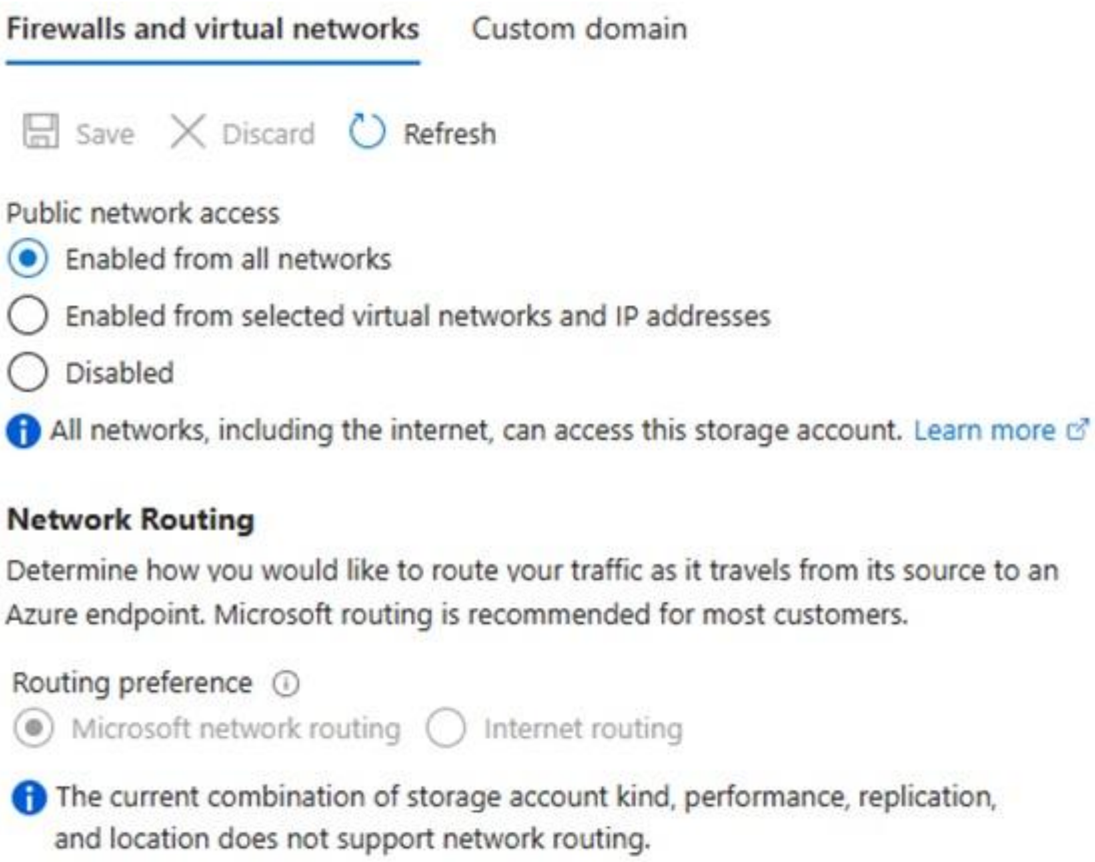
- If you prefer you can configure a custom domain name

CNAME record	Target
blobs.contoso.com	contosoblobs.blob.core.windows.net

Secure Storage Endpoints

Firewalls and Virtual Networks restrict access to the Storage Account from specific Subnets on Virtual Networks or public IP’s

Subnets and Virtual Networks must exist in the same Azure Region or Region Pair as the Storage Account



Public network access

● Enabled from all networks

○ Enabled from selected virtual networks and IP addresses

○ Disabled

All networks, including the internet, can access this storage account. Learn more

Network Routing

Determine how you would like to route your traffic as it travels from its source to an Azure endpoint. Microsoft routing is recommended for most customers.

Routing preference

● Microsoft network routing ○ Internet routing

The current combination of storage account kind, performance, replication, and location does not support network routing.

Learning Recap – Configure Storage Accounts

Check your knowledge questions and additional study

Reference modules

- Configure storage accounts
- Describe Azure storage services

Configure Blob Storage

Learning Objectives - Blob Storage

- Implement Blob Storage
- Create Blob Containers
- Create Blob Access Tiers
- Add Blob Lifecycle Management Rules
- Determine Blob Object Replication
- Demonstration – Configure Blob Storage
- Learning Recap

Implement and manage storage (15–20%): Configure Azure Files and Azure Blob Storage

- Create and configure a container in Blob Storage
- Configure storage tiers
- Configure blob lifecycle management
- Configure blob versioning

Implement Blob Storage

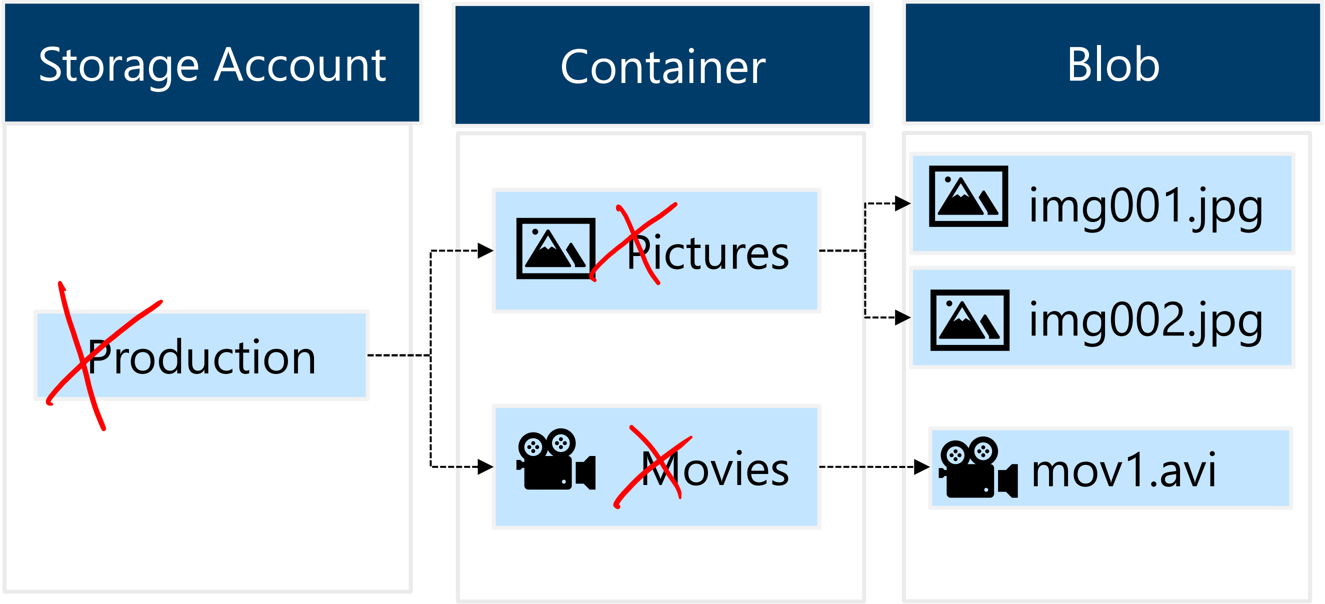
Stores unstructured data in the cloud

Can store any type of text or binary data

Also referred to as *object storage*

Common uses:

- Serving images or documents directly to a browser
- Storing files for distributed access
- Streaming video and audio
- Storing data for backup and restore, disaster recovery, archiving
- Storing data for analysis by an on-premises or Azure-hosted service



Storage Account

Container

Blob

~~Production~~

~~Pictures~~

~~Movies~~

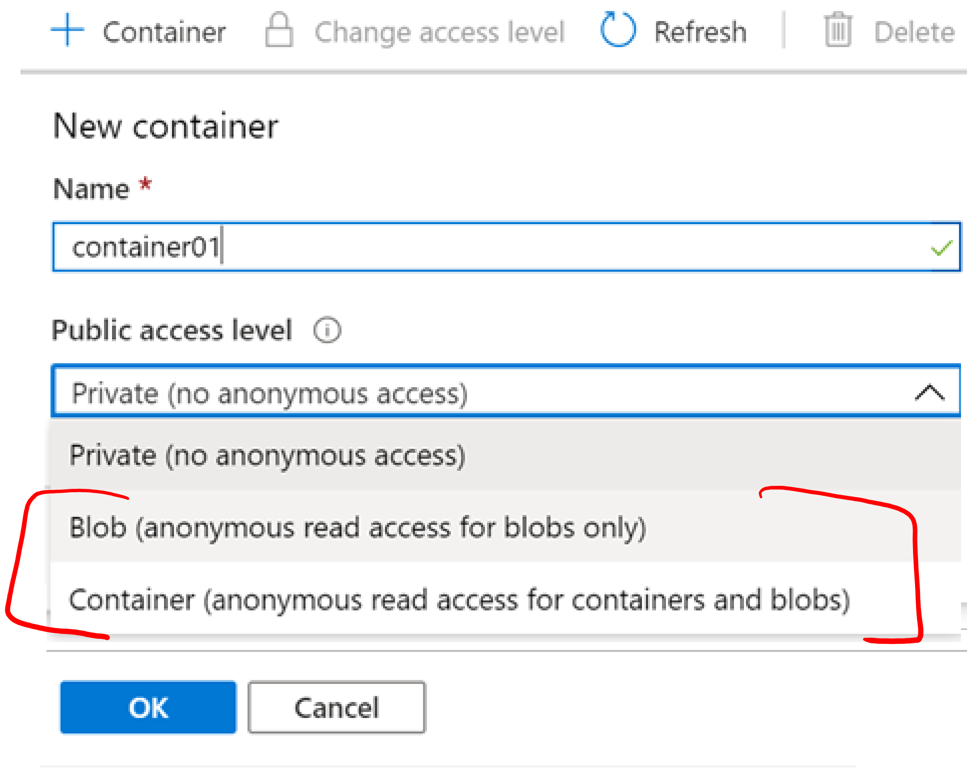
img001.jpg

img002.jpg

mov1.avi

Create Blob Containers

- All blobs must be in a container
- Accounts have unlimited containers
- Containers can have unlimited blobs
- Restrict access using the public access level



New container

Name * container01

Public access level: Private (no anonymous access)

+ Container
Change access level
Refresh
Delete
Private (no anonymous access)
Blob (anonymous read access for blobs only)
Container (anonymous read access for containers and blobs)
OK
Cancel

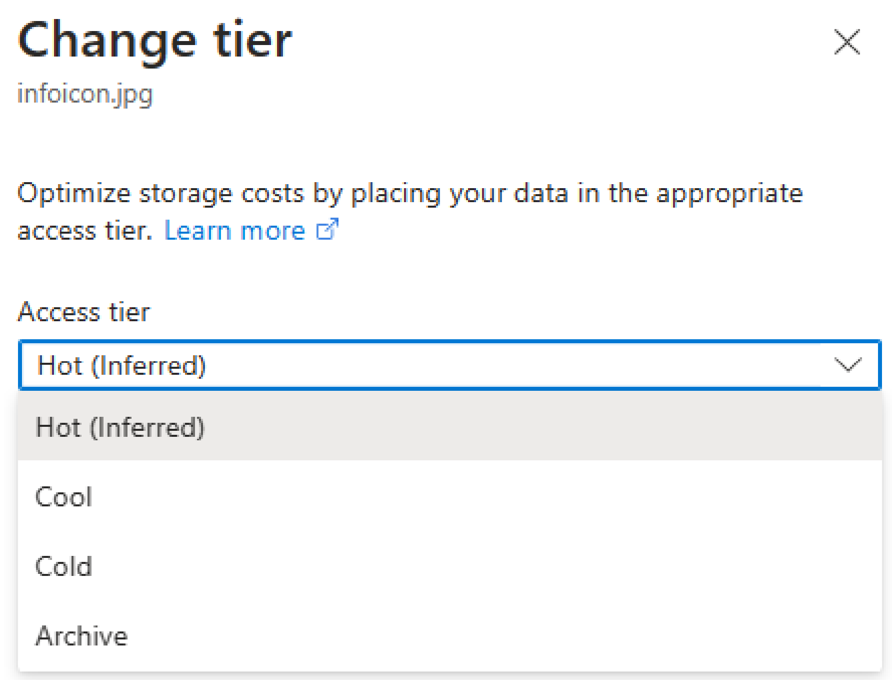
Create Blob Access Tiers

Hot tier – Data that is accessed or modified frequently

Cool tier – Data that is infrequently accessed or modified and stored for at least 30 days

Cold tier – Data that is infrequently accessed or modified and stored for at least 90 days

Archive – Data that can tolerate several hours of retrieval latency and will remain in the Archive tier for at least 180 days



Change tier

infoicon.jpg

Optimize storage costs by placing your data in the appropriate access tier. Learn more

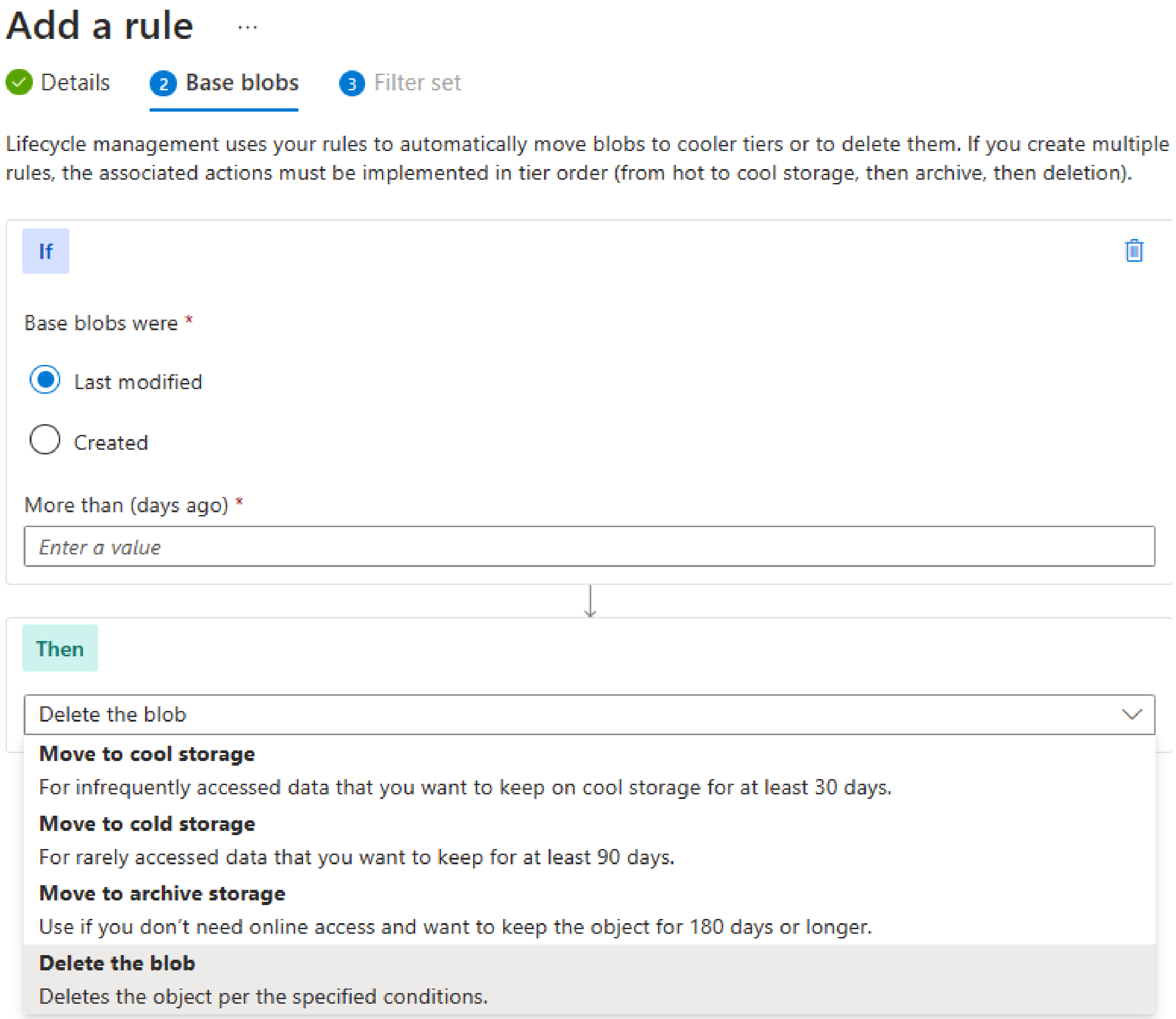
Access tier: Hot (Inferred)

Add Blob Lifecycle Management Rules

Transitioning of blobs to a cooler storage tier to optimize for performance and cost

Delete blobs at the end of their lifecycle

Apply rules to filtered paths in the Storage Account



Add a rule ···

✓ Details ② Base blobs ③ Filter set

Lifecycle management uses your rules to automatically move blobs to cooler tiers or to delete them. If you create multiple rules, the associated actions must be implemented in tier order (from hot to cool storage, then archive, then deletion).

If

Base blobs were *

● Last modified

○ Created

More than (days ago) *

Enter a value

Then

Delete the blob

Move to cool storage
For infrequently accessed data that you want to keep on cool storage for at least 30 days.

Move to cold storage
For rarely accessed data that you want to keep for at least 90 days.

Move to archive storage
Use if you don’t need online access and want to keep the object for 180 days or longer.

Delete the blob
Deletes the object per the specified conditions.

Determine Blob Object Replication

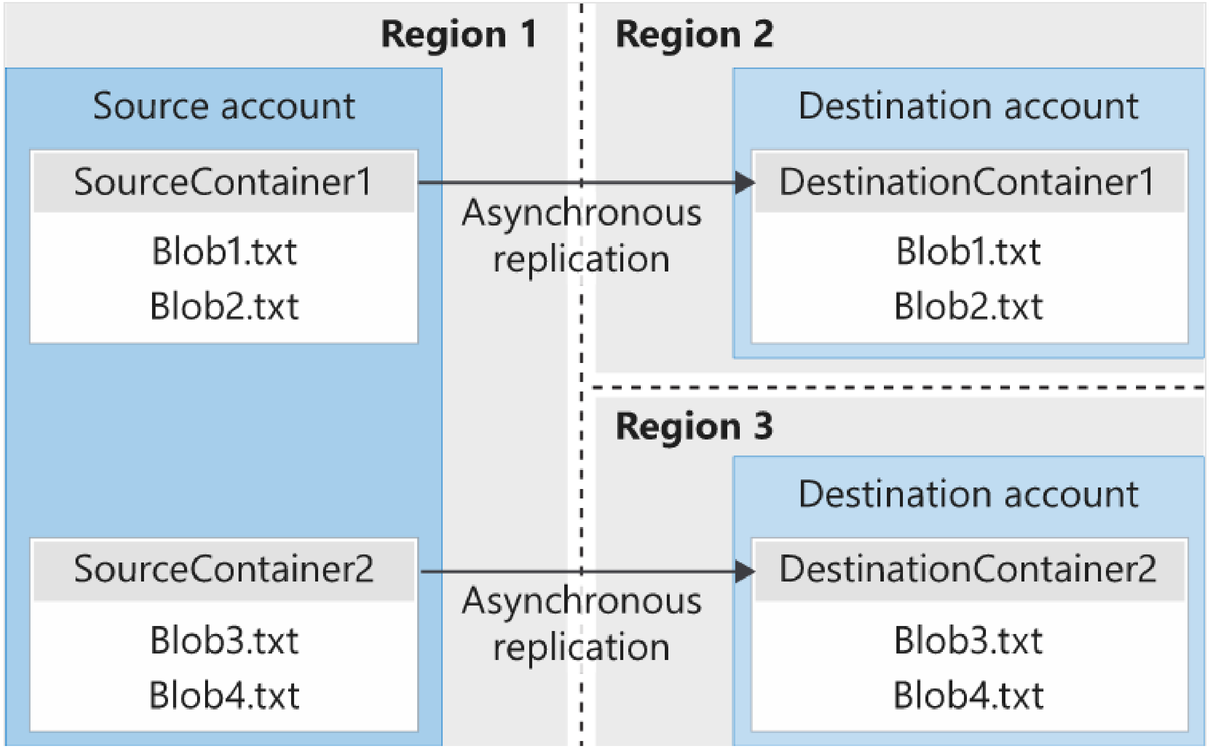
Asynchronous to any other Region

Minimizes latency for read requests

Increases efficiency for compute workloads

Optimizes data distribution

Optimizes costs



Learning Recap - Configure Blob Storage

Check your knowledge questions and additional study

Reference modules

- Configure Azure Blob Storage
- Manage the Azure Blob storage lifecycle
- Guided Project - Azure Files and Azure Blobs

Configure Storage Security

Learning Objectives - Configure Storage Security

- Review Storage Security Strategies
- Create Shared Access Signatures
- Identify URI and SAS Parameters
- Demonstration – Configure Storage Security
- Determine Storage Service Encryption
- Create Customer Managed Keys
- Appy Storage Security Best Practices
- Learning Recap

Implement and manage storage (15 – 20%): Configure access to storage

- Create and use shared access signature (SAS) tokens
- Configure stored access policies
- Manage access keys

Implement and manage storage (15 – 20%): Configure and manage storage accounts

- Configure storage account encryption

Review Storage Security Strategies

- Storage Service Encryption
- Authentication with Entra ID and RBAC
- Client-side encryption, HTTPS, and SMB 3.0 for data in transit
- Azure disk encryption
- Shared Access Signatures – delegated access
- Shared Key – encrypted signature string
- Anonymous access to containers and blobs

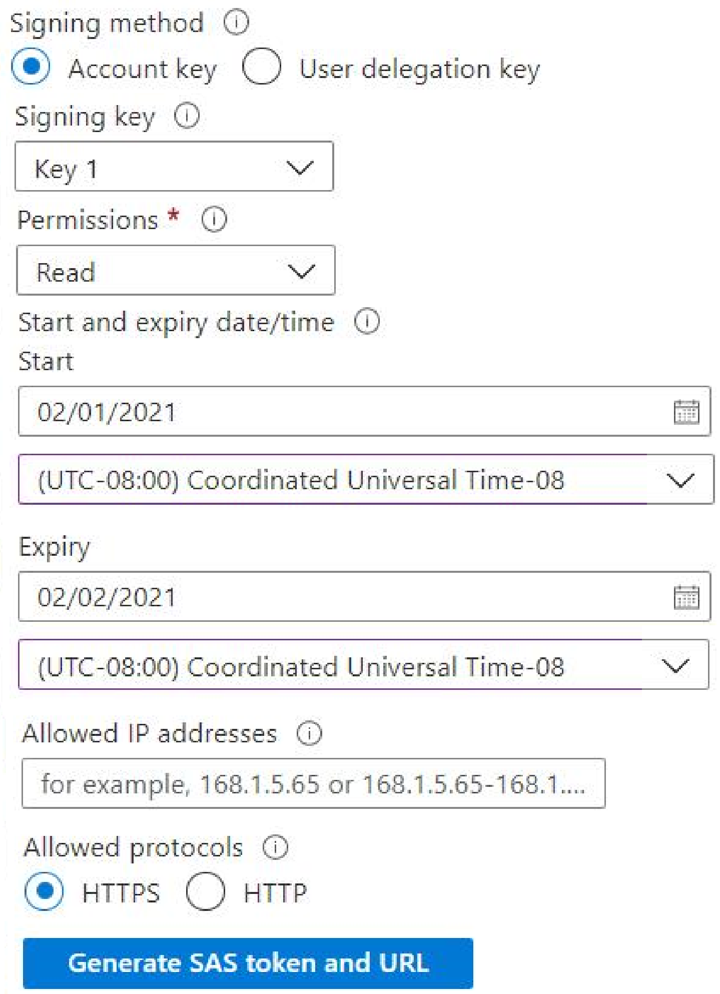
Create Shared Access Signatures

Provides delegated access to resources

Grants access to clients without sharing your storage account keys

The account SAS delegates access to resources in one or more of the storage services

The service SAS delegates access to a resource in just one of the storage services



Signing method ⓘ

● Account key ○ User delegation key

Signing key ⓘ

Key 1

Permissions * ⓘ

Read

Start and expiry date/time ⓘ

Start

02/01/2021

(UTC-08:00) Coordinated Universal Time-08

Expiry

02/02/2021

(UTC-08:00) Coordinated Universal Time-08

Allowed IP addresses ⓘ

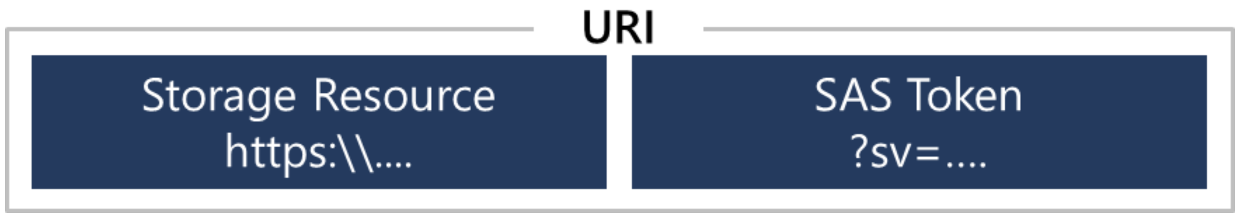
for example, 168.1.5.65 or 168.1.5.65-168.1....

Allowed protocols ⓘ

● HTTPS ○ HTTP

Identify URI and SAS Parameters

- A SAS is a signed URI that points to one or more storage resources
- Consists of a storage resource URI and the SAS token



```
https://myaccount.blob.core.windows.net/?sp=r&st=2020-05-
11T18:31:43Z&se=2020-05-12T02:31:43Z&spr=https&sv=2019-10-
10&sr=b&sig=jOqABJZHfUVeBQ3yVn7kWiCKlO0sxCiK1rzEchfAz8U%3D
```

Includes parameters for resource URI, storage services version, services, resource types, start time, expiry time, resource, permissions, IP range, protocol, signature

Determine Storage Service Encryption

You can use your own key (next topic)

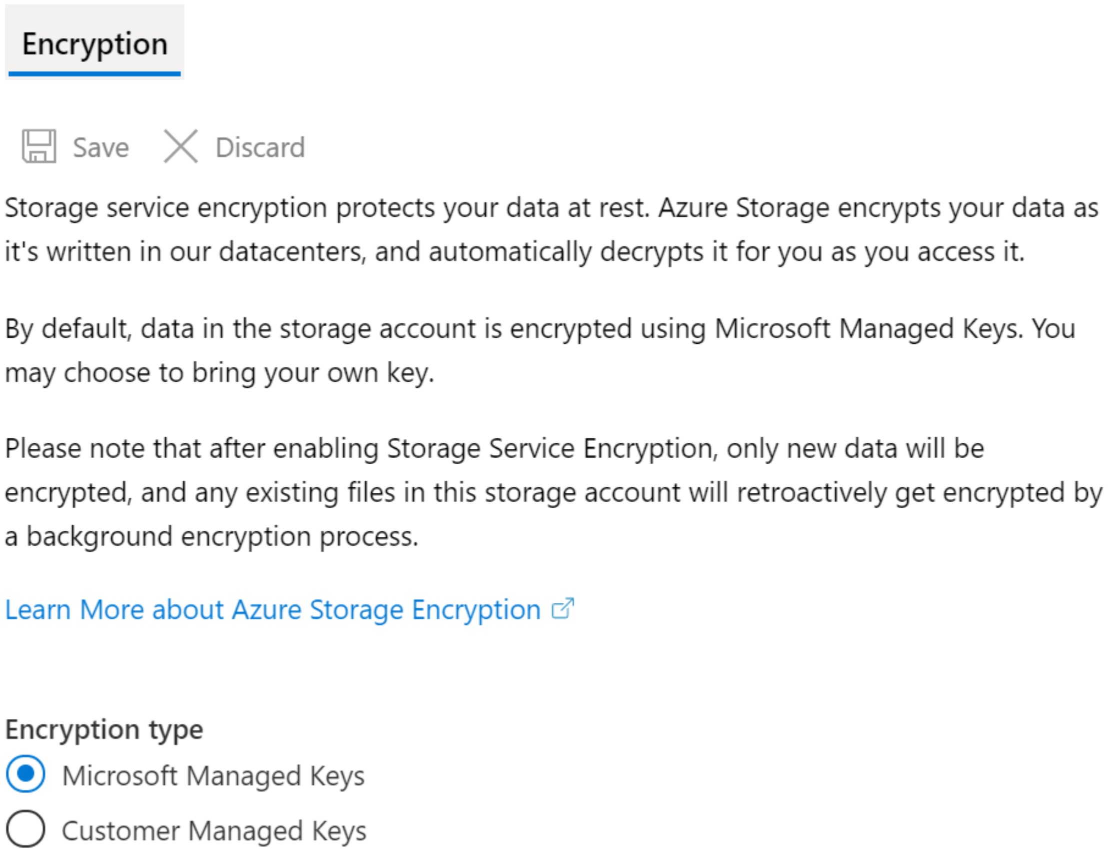
Protects your data for security and compliance

Automatically encrypts and decrypts your data

Encrypted through 256-bit AES encryption

Is enabled for all new and existing storage accounts and cannot be disabled

Is transparent to users



Storage service encryption protects your data at rest. Azure Storage encrypts your data as it's written in our datacenters, and automatically decrypts it for you as you access it.

By default, data in the storage account is encrypted using Microsoft Managed Keys. You may choose to bring your own key.

Please note that after enabling Storage Service Encryption, only new data will be encrypted, and any existing files in this storage account will retroactively get encrypted by a background encryption process.

Learn More about Azure Storage Encryption

Encryption type

● Microsoft Managed Keys

○ Customer Managed Keys

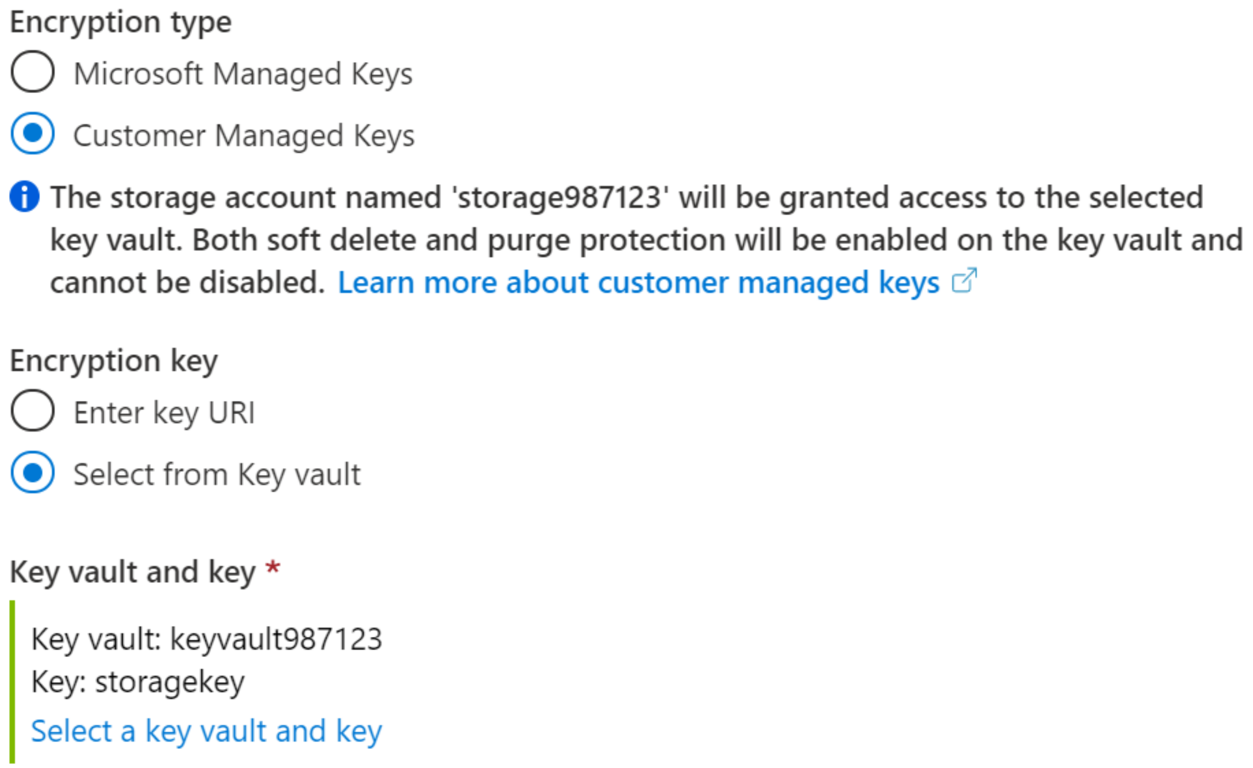
Create Customer Managed Keys

Use the Azure Key Vault to manage your encryption keys

Create your own encryption keys and store them in a key vault

Use Azure Key Vault's APIs to generate encryption keys

Custom keys give you more flexibility and control



Encryption type

○ Microsoft Managed Keys

● Customer Managed Keys

The storage account named 'storage987123' will be granted access to the selected key vault. Both soft delete and purge protection will be enabled on the key vault and cannot be disabled. Learn more about customer managed keys

Encryption key

○ Enter key URI

● Select from Key vault

Key vault and key *

Key vault: keyvault987123
Key: storagekey
Select a key vault and key

Apply Storage Security Best Practices

- Always use HTTPS to create or distribute a SAS
- Reference stored access policies where possible
- Use near-term expiration times on an ad hoc SAS
- Use Storage Analytics to monitor your application
- Be careful with SAS start time
- Be specific with the resource to be accessed
- Understand that your account will be billed for any usage
- Validate data written using SAS
- Don't assume SAS is always the correct choice

Learning Recap - Configure Storage Security

Check your knowledge questions and additional study

Reference modules

- Configure Azure Storage security
- Secure your Azure Storage account
- Plan and implement security for storage
- Implement shared access signatures

net use A \\download65118.core———\foo

Configure Azure Files

Learning Objectives - Configure Azure Files

- Compare storage for file shares and blob data
- Manage File Shares
- Create File Share Snapshots
- Implement soft delete for Azure Files
- Use Azure Storage Explorer
- Demonstration – Configure File Shares
- Learning Recap

Implement and manage storage (15 – 20%): Configure Azure Files and Azure Blob Storage

- Create and configure a file share in Azure Storage
- Configure storage tiers
- Configure snapshots and soft delete for Azure Files

Compare storage for file shares and blob data

Feature	Description	When to use
Azure Files	SMB interface, client libraries, and a REST interface that allows access from anywhere to stored files	• Lift and shift an application to the cloud • Store shared data across multiple virtual machines • Store development and debugging tools that need to be accessed from many virtual machines
Azure Blobs	Client libraries and a REST interface that allows unstructured data (flat namespace) to be stored and accessed at a massive scale in block blobs	• Support streaming and random-access scenarios • Access application data from anywhere

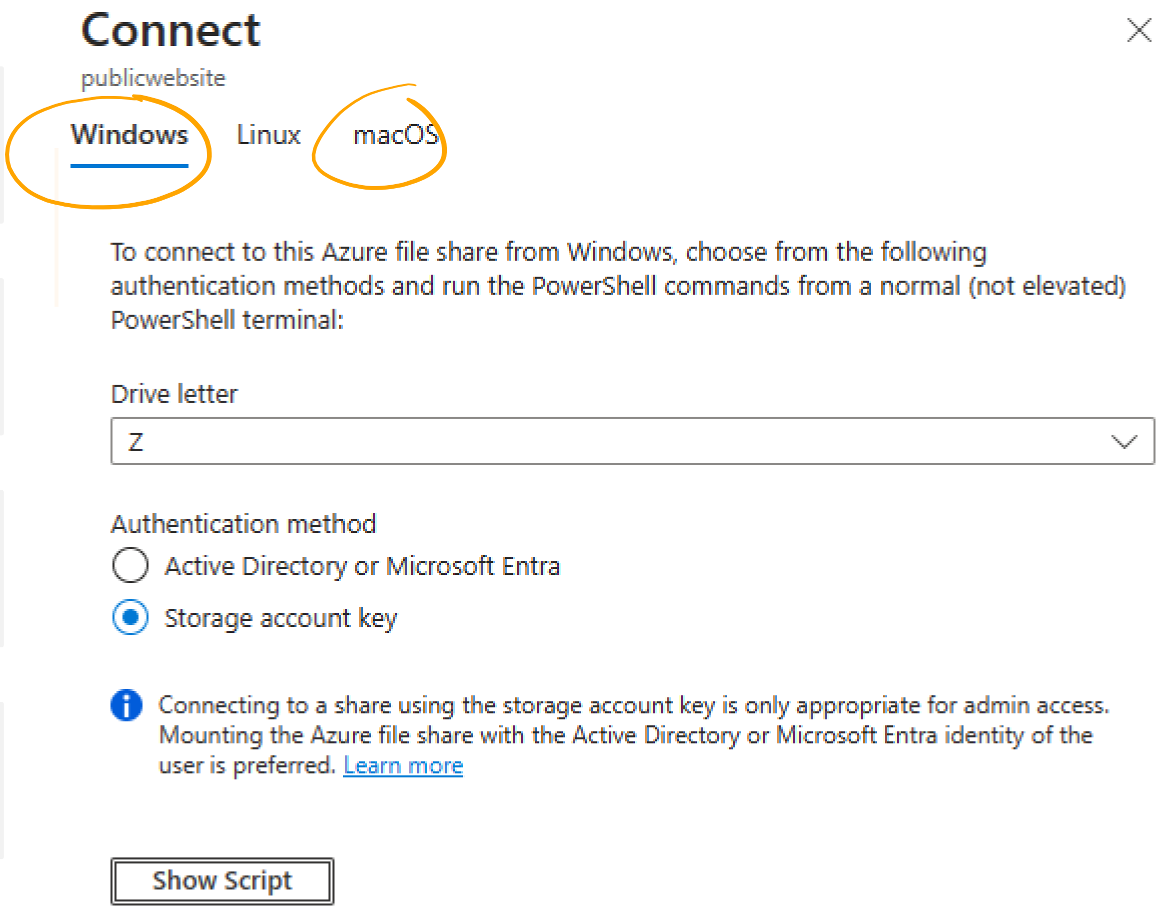
Manage File Shares

Windows – ensure port 445 is open

Linux – mount the drive

MacOS – mount the drive

Secure transfer required – SMB 3.0 encryption



Connect

publicwebsite

To connect to this Azure file share from Windows, choose from the following authentication methods and run the PowerShell commands from a normal (not elevated) PowerShell terminal:

Drive letter: Z

Authentication method

○ Active Directory or Microsoft Entra

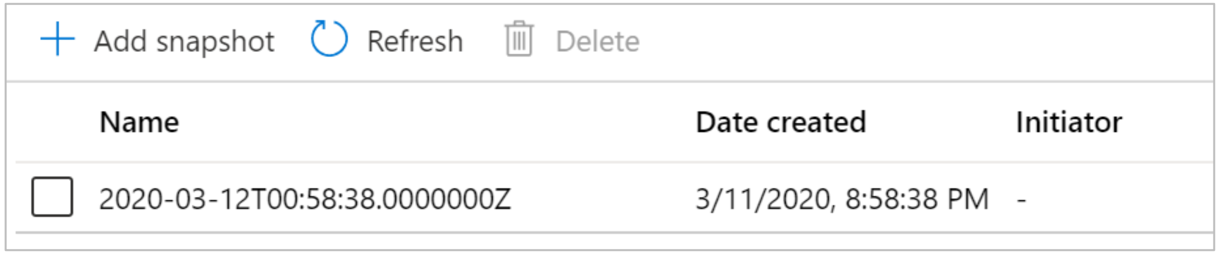
● Storage account key

Connecting to a share using the storage account key is only appropriate for admin access. Mounting the Azure file share with the Active Directory or Microsoft Entra identity of the user is preferred. Learn more

Create File Share Snapshots

- Protection against application error and data corruption
- Protection against accidental deletions or unintended changes
- Support backup and recovery

- Incremental snapshot that captures the share state at a point in time
- Snapshot at the *file share level,* and restore at the *file level*
- Is read-only copy of your data

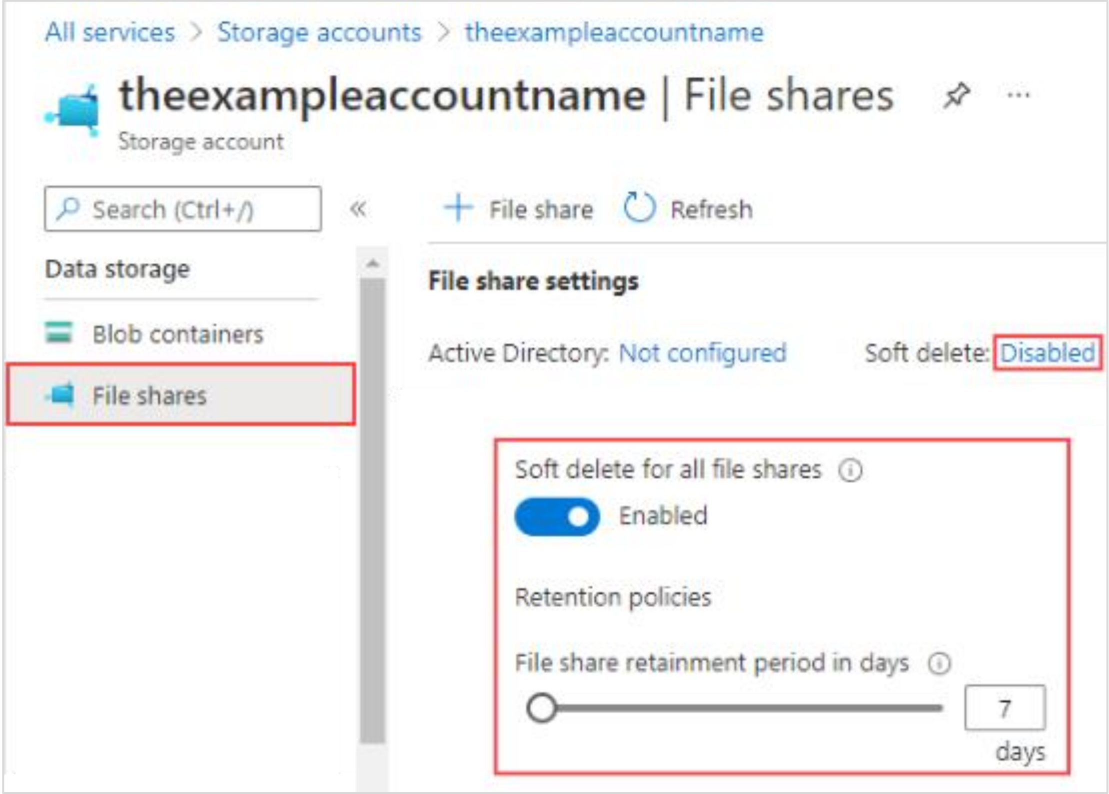


	Name	Date created	Initiator
□	2020-03-12T00:58:38.0000000Z	3/11/2020, 8:58:38 PM	-

Implement soft delete for Azure Files

- Recovery from accidental data loss
- Major change or upgrade scenarios
- Business continuity – ransomware situations
- Data compliance retention

- Enabled at the storage account level
- Transitions content to a soft deleted state
- Provides a retention period of 1 and 365 days
- Works on new or existing file shares
- Doesn't work for NFS shares


All services > Storage accounts > theexampleaccountname
theexampleaccountname | File shares
Storage account
Search (Ctrl+/)
+ File share
Refresh
Data storage
Blob containers
File shares

File share settings

Active Directory: Not configured

Soft delete: Disabled

Soft delete for all file shares

Enabled

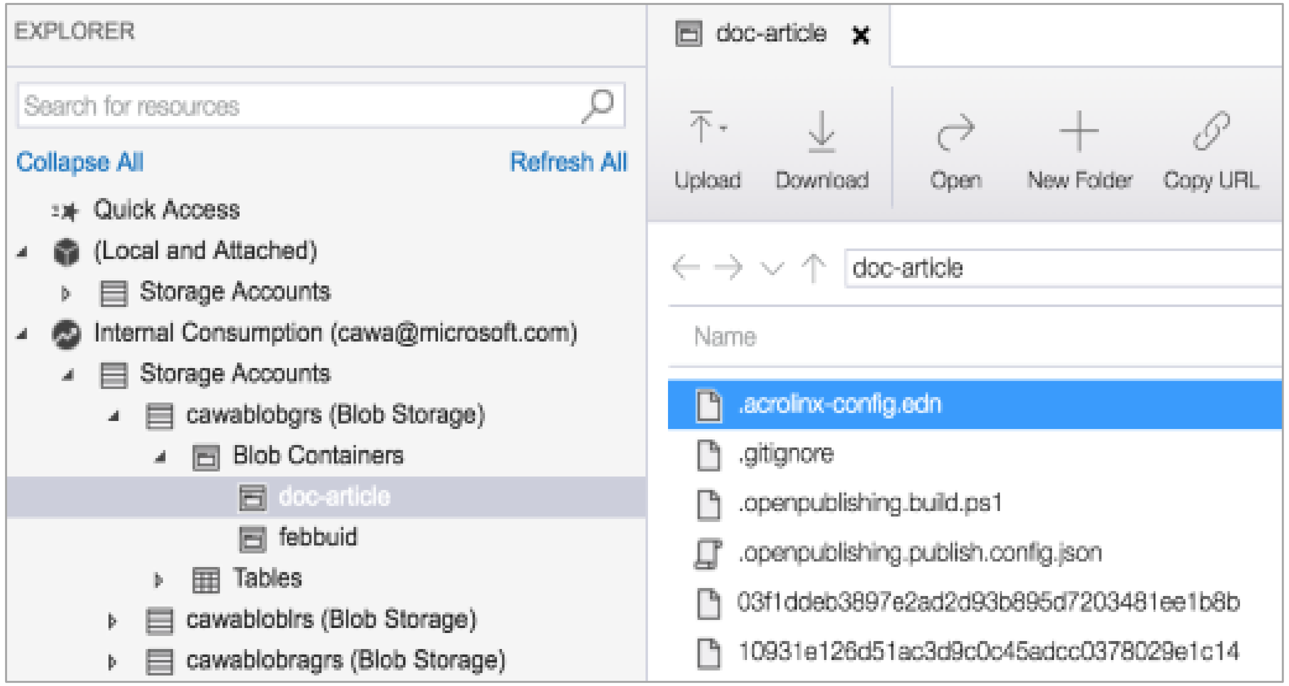
Retention policies

File share retainment period in days

7 days

Use Azure Storage Explorer

- Download and install
- Access multiple accounts and subscriptions
- Create, delete, view, edit storage resources
- View and edit Blob, Queue, Table, File, Cosmos DB storage and Data Lake Storage
- Obtain shared access signature (SAS) keys
- Available for Windows, Mac, and Linux


EXPLORER
Search for resources
Collapse All
Refresh All
Quick Access
(Local and Attached)
Storage Accounts
Internal Consumption (cawa@microsoft.com)
Storage Accounts
cawablobgrs (Blob Storage)
Blob Containers
doc-article
febbuid
Tables
cawabloblrs (Blob Storage)
cawablobragrs (Blob Storage)
doc-article
Upload
Download
Open
New Folder
Copy URL
doc-article
Name
.acrolinx-config.edn
.gitignore
.openpublishing.build.ps1
.openpublishing.publish.config.json
03f1ddeb3897e2ad2d93b895d7203481ee1b8b
10931e126d51ac3d9c0c45adcc0378029e1c14

Also consider portal-based Azure Storage Browser and Azure Storage Mover

Learning Recap - Configure Azure Files

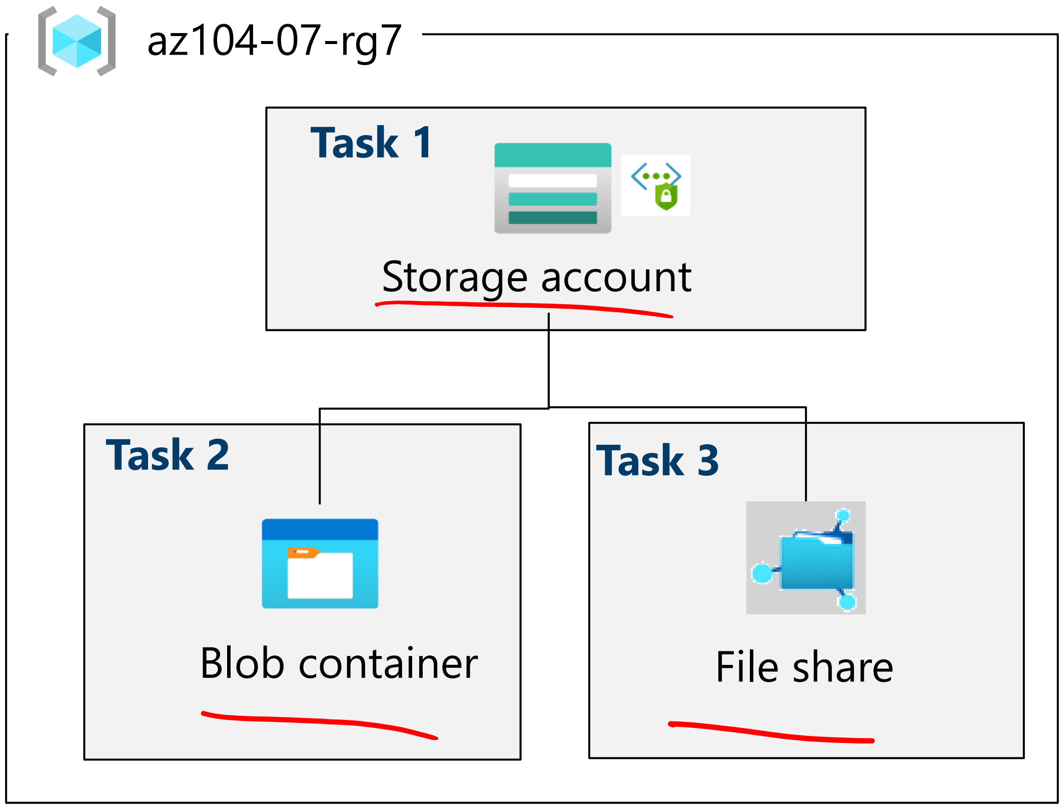
Check your knowledge questions and additional study

Reference modules

- Configure Azure Files
- Introduction to Azure Files
- Implement a hybrid file server infrastructure

Lab – Manage Azure Storage

Lab 07 – Architecture diagram



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Task 1

Storage account

Task 2

Blob container

Task 3

File share

End of presentation