

AZ-104

Administer Azure Storage



AZ-104 Course Outline

- 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](#)
- [Configure Storage Security](#)
- [Configure Azure Files](#)
- [Lab 07 – Manage Azure Storage](#)

Configure Storage Accounts



Explore Azure Storage Services

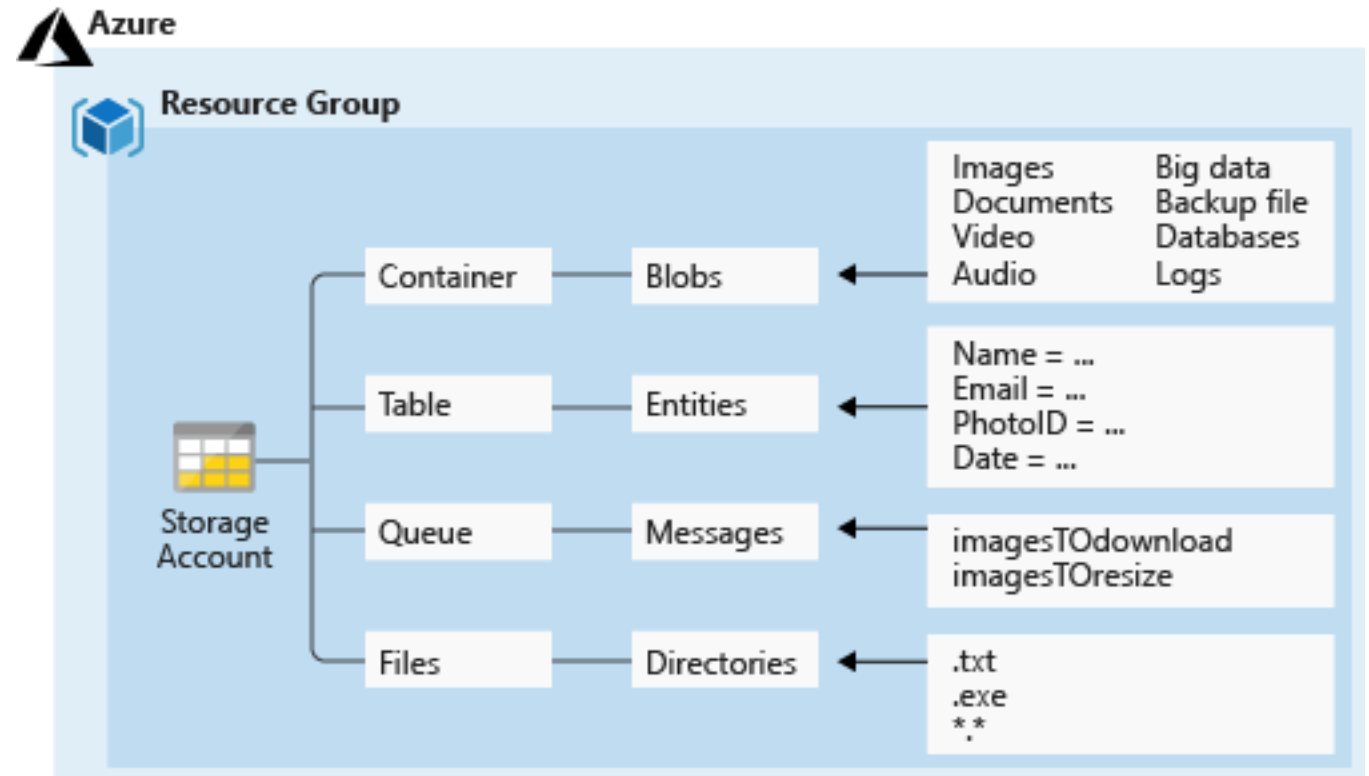
A service that you can use to store files, messages, tables, and other types of information

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



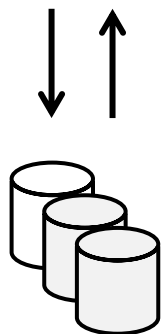
Determine Storage Account Kinds

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

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.

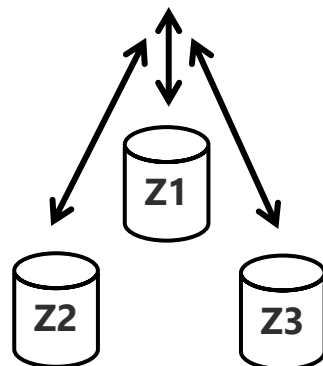
Determine Replication Strategies (1 of 2)

Single region



LRS

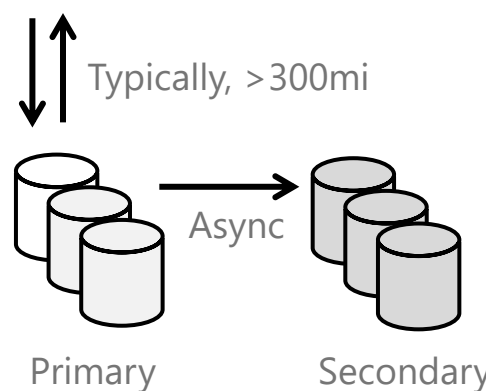
- Three replicas, one region
- Protects against disk, node, rack failures
- Write is acknowledged when all replicas are committed
- Superior to dual-parity RAID



ZRS

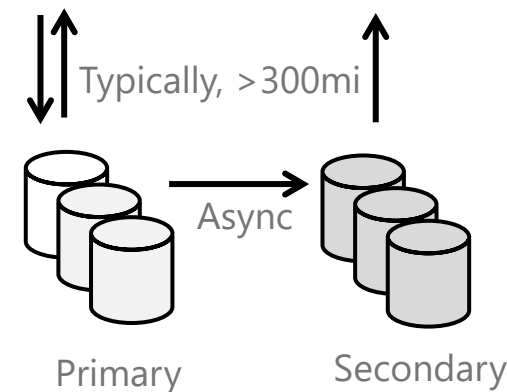
- Three replicas, three zones, one region
- Protects against disk, node, rack, and zone failures
- Synchronous writes to all three zones

Multiple regions



GRS

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



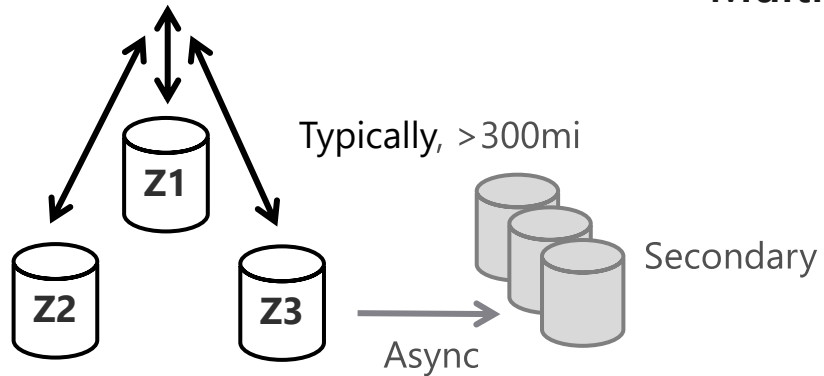
RA-GRS

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



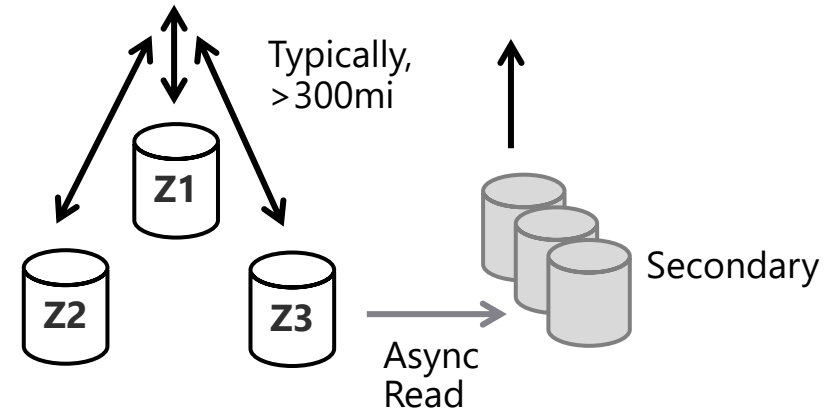
Determine Replication Strategies (2 of 2)

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

Firewalls and virtual networks

Custom domain

 Save  Discard  Refresh

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.

Configure Blob Storage



Implement Blob Storage

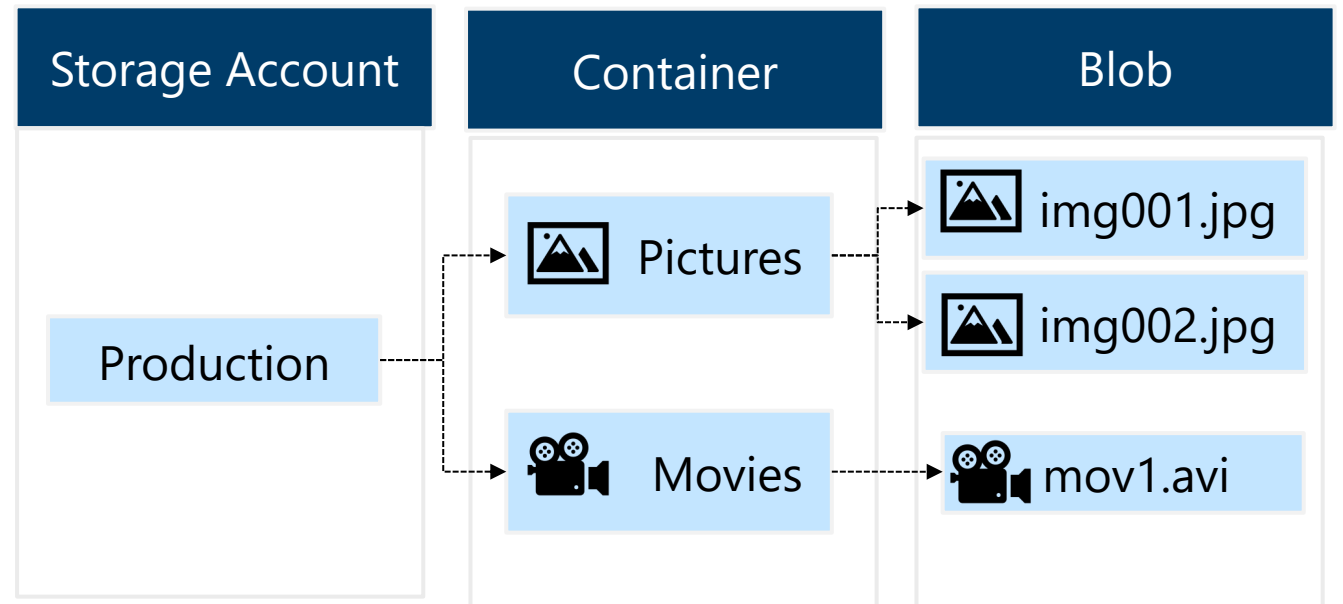
Stores unstructured data in the cloud

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



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

[+ Container](#) [🔒 Change access level](#) [🔄 Refresh](#) | [🗑️ Delete](#)

New container

Name ^{*}

container01 ✓

Public access level ⓘ

Private (no anonymous access) ^

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)

Hot (Inferred)

Cool

Cold

Archive

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

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).

+ Add if-then block

If

Base blobs were *

Last modified

More than (days ago) *

Enter a value

↓

Then

Delete the blob

Move to cool storage
This is the most reliable option if cost is not a priority.

Move to archive storage
Archive storage does not fully delete the blob. However, it cannot be moved back to cool storage.

Delete the blob
This is the most efficient option if backing up a blob is not a priority.

Determine Blob Object Replication

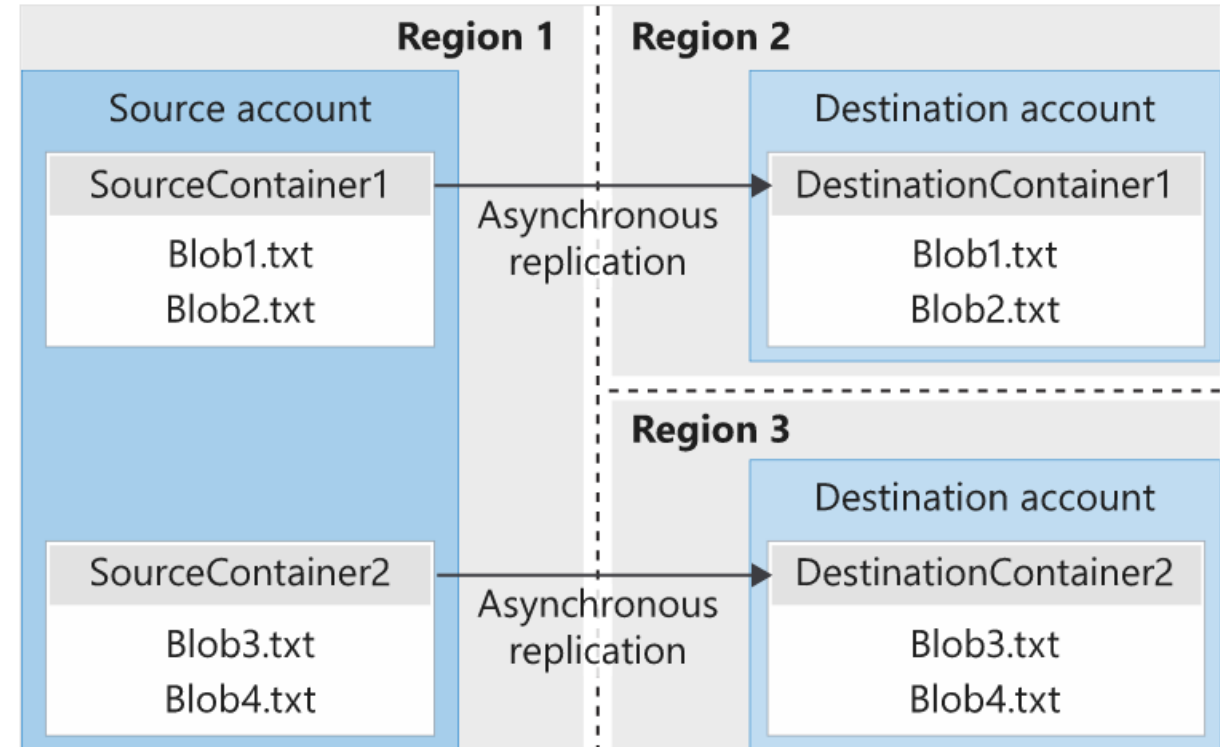
Asynchronous to any other Region

Minimizes latency for read requests

Increases efficiency for compute workloads

Optimizes data distribution

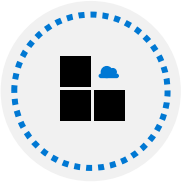
Optimizes costs



Configure Storage Security



Review Storage Security Strategies



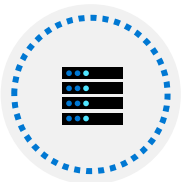
Storage Service Encryption



Authentication with Azure AD
and RBAC



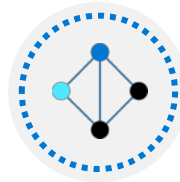
Client-side encryption, HTTPS,
and SMB 3.0 for data in transit



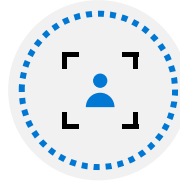
Azure disk encryption



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 ▼

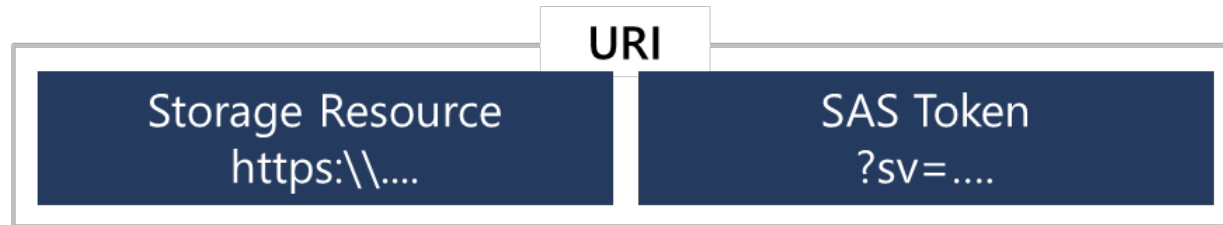
Allowed IP addresses ⓘ
for example, 168.1.5.65 or 168.1.5.65-168.1....

Allowed protocols ⓘ
☒ HTTPS ☐ HTTP

Generate SAS token and URL

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=j0qABJZHfUVEBQ3yVn7kWiCKl00sxCiK1rzEchfAz8U%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

Encryption

 Save  Discard

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

i 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

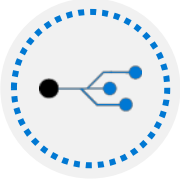
Key vault and key *

Key vault: keyvault987123

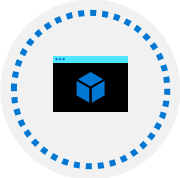
Key: storagekey

[Select a key vault and key](#)

Apply Storage Security Best Practices



Always use HTTPS to create or distribute a SAS



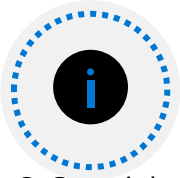
Reference stored access policies where possible



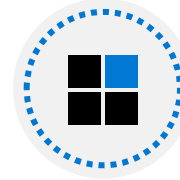
Use near-term expiration times on an ad hoc SAS



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

Configure Azure Files



Compare Files to Blobs

Feature	Description	When to use
Azure Files	SMB interface, client libraries, and a REST interface that allows access from anywhere to stored files	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Support streaming and random-access scenarios• Access application data from anywhere

Manage File Shares

File share quotas

Windows – ensure port 445 is open

Linux – mount the drive

MacOS – mount the drive

Secure transfer required – SMB 3.0 encryption

Connect

Windows

Linux

macOS

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

☒ Storage account key

i Connecting to a share using the storage account key is only appropriate for admin access. Utilizing Active Directory allows to differentiate file and folder access, per AD account, within a share. [Learn more](#)

```
$connectTestResult = Test-NetConnection -ComputerName
exampleaccountnametest.file.core.windows.net -Port 445
if ($connectTestResult.TcpTestSucceeded) {
    # Save the password so the drive will persist on reboot
    cmd.exe /C "cmdkey /add:"exampleaccountnametest.file.core.windows.net"
/user:"Azure\exampleaccountnametest"
/pass:""
```

Create File Share Snapshots

<div><div> Add snapshot</div><div> Refresh</div><div> Delete</div></div>		
Name	Date created	Initiator
<input type="checkbox"/> 2020-03-12T00:58:38.00000000Z	3/11/2020, 8:58:38 PM	-

Incremental snapshot that captures the share state at a point in time

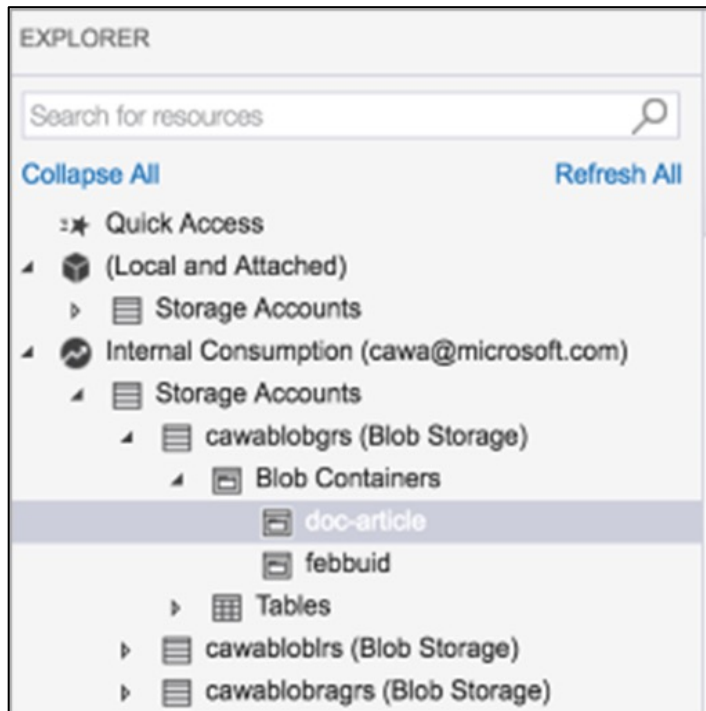
Is read-only copy of your data

Snapshot at the file share level, and restore at the file level

- Protection against application error and data corruption
- Protection against accidental deletions or unintended changes
- General backup purposes

Configure Storage with Tools (optional)

Azure Storage Explorer



The Import and Export service

Create import/export job ...

Create import/export job

Basics Job details Shipping Tags Review + create

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ASC DEMO

Resource group * [Create new](#)

Name *

Type ☒ Import into Azure ☐ Export from Azure

Destination Azure region *

AzCopy

```
azcopy copy [source]
[destination] [flags]
```

Lab – Manage Azure Storage



Lab 07 – Manage Azure Storage



You need to evaluate the use of Azure Storage. You would like to minimize cost of storage by placing less frequently accessed files in lower-priced storage tiers. You also plan to explore different protection mechanisms that Azure Storage offers, including network access, authentication, authorization, and replication. Finally, you want to determine how the Azure Files service might be used.

Objectives

Task 1: Provision the lab environment

Task 2: Create and configure Azure storage accounts

Task 3: Manage blob storage

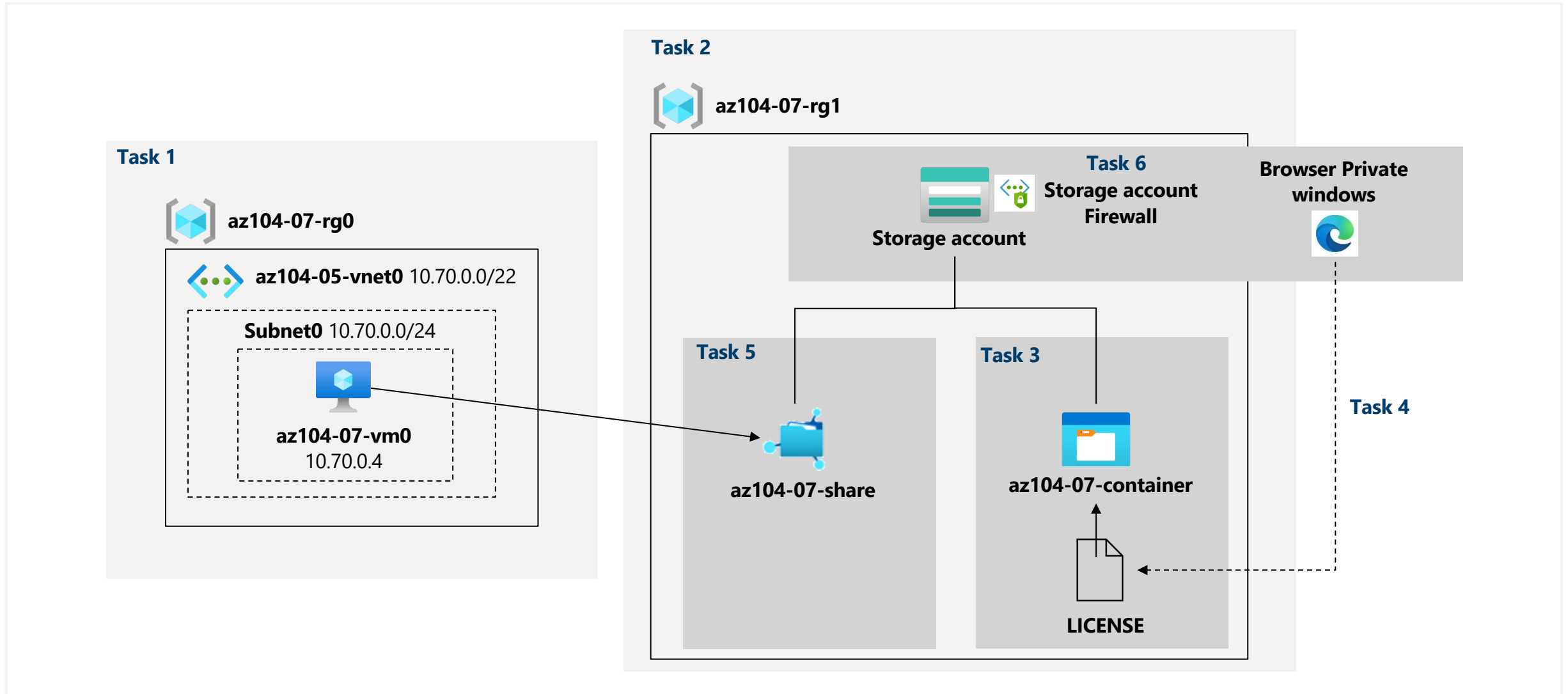
Task 4: Manage authentication and authorization for Azure Storage

Task 5: Create and configure an Azure Files shares

Task 6: Manage network access for Azure Storage

Next slide for an architecture diagram 

Lab 07 – Architecture diagram



End of presentation

