



# AZ-305T00A

## Designing Microsoft Azure Infrastructure Architect



# Design a non-relational data storage solution



# Learning Objectives

- Design for data storage
- Design for Azure storage accounts
- Design for data redundancy
- Design for Azure blob storage
- Design for Azure files
- Design an Azure disk solutions
- Design for storage security
- Case study
- Learning recap

## AZ-305: Design Data Storage Solutions (20-25%)

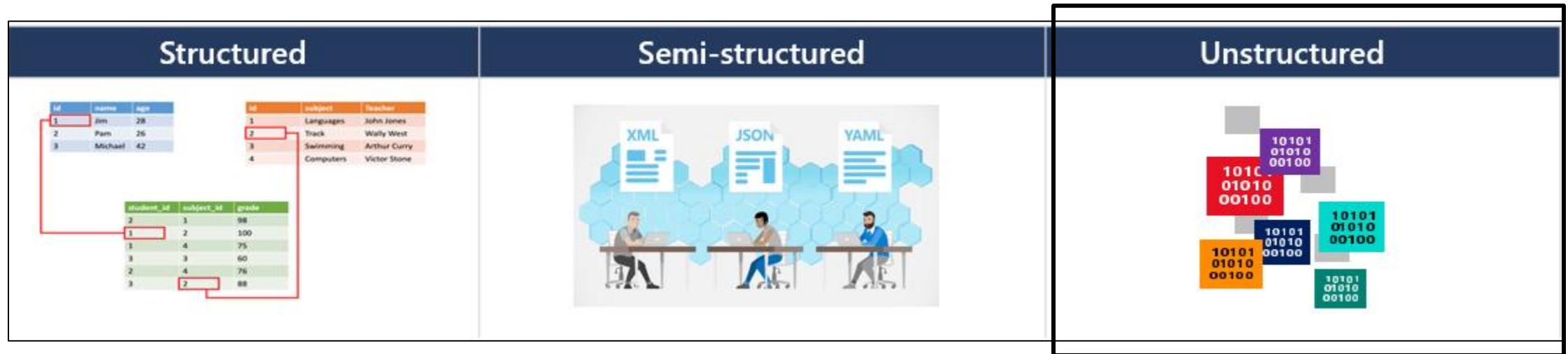
Design data storage solutions for semi-structured and unstructured data

- Recommend a solution for storing semi-structured data
- Recommend a solution for storing unstructured data
- Recommend a data storage solution to balance features, performance, and costs
- Recommend a data solution for protection and durability

# Design for data storage



# Classify your data storage



To design Azure storage, you first must determine what type of data you have.

- **Structured data** includes relational data and has a shared schema
- **Semi-structured** is less organized than structured data and isn't stored in a relational format
- **Unstructured data** is the least organized type of data



# Design for Azure storage accounts



# Determine the best storage account type

Select an account type based on supported services, usage cases, and SLA.

Account Type	Supported services	Usage
Standard general-purpose v2 (default)	Blobs / Data Lake, Queues, Tables, Azure Files	Recommended for most scenarios
Premium block blobs	Blob storage, Data Lake	High transactions rates, single digit storage latency, or large numbers of small transactions
Premium file shares	Azure Files	Enterprise or high-performance scale applications - supports both SMB and NFS file shares
Premium page blobs	Page blobs only	High performance and low latency storage scenarios

# Considerations for storage accounts

It is important to plan your storage accounts.



## Location

For performance reasons locate the data close to users. One storage account for each location.



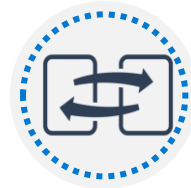
## Compliance

Regulatory guidelines for keeping data in a specific location / Internal requirements for auditing or storing data.



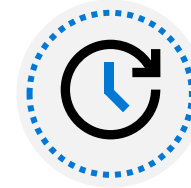
## Cost

The settings for the account do influence the cost of services in the account.



## Replication

Data storage could have different replication strategies.



## Administrative overhead

Each storage account requires some time and attention from an administrator to create and maintain.



## Security - Data sensitivity

Data plane security and data storage security.

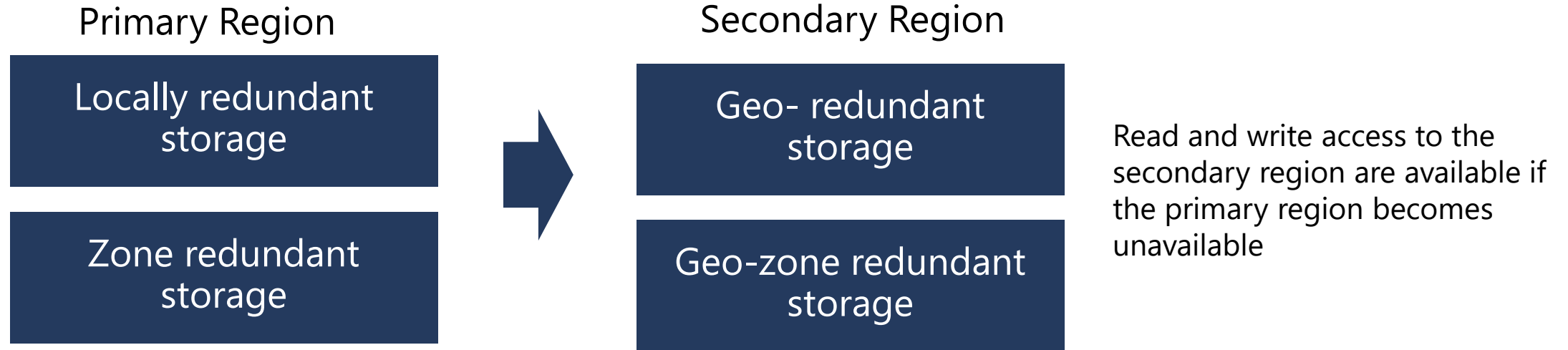


# Design for data redundancy



# Select a storage replication strategy

What level of redundancy do you need?



- A node within a data center becomes unavailable
- An entire data center (zonal or non-zonal) becomes unavailable
- A region-wide outage occurs in the primary region

# Design for Azure blob storage



# Determine the storage tier

Blob storage is an object store used for storing vast amounts of unstructured data.

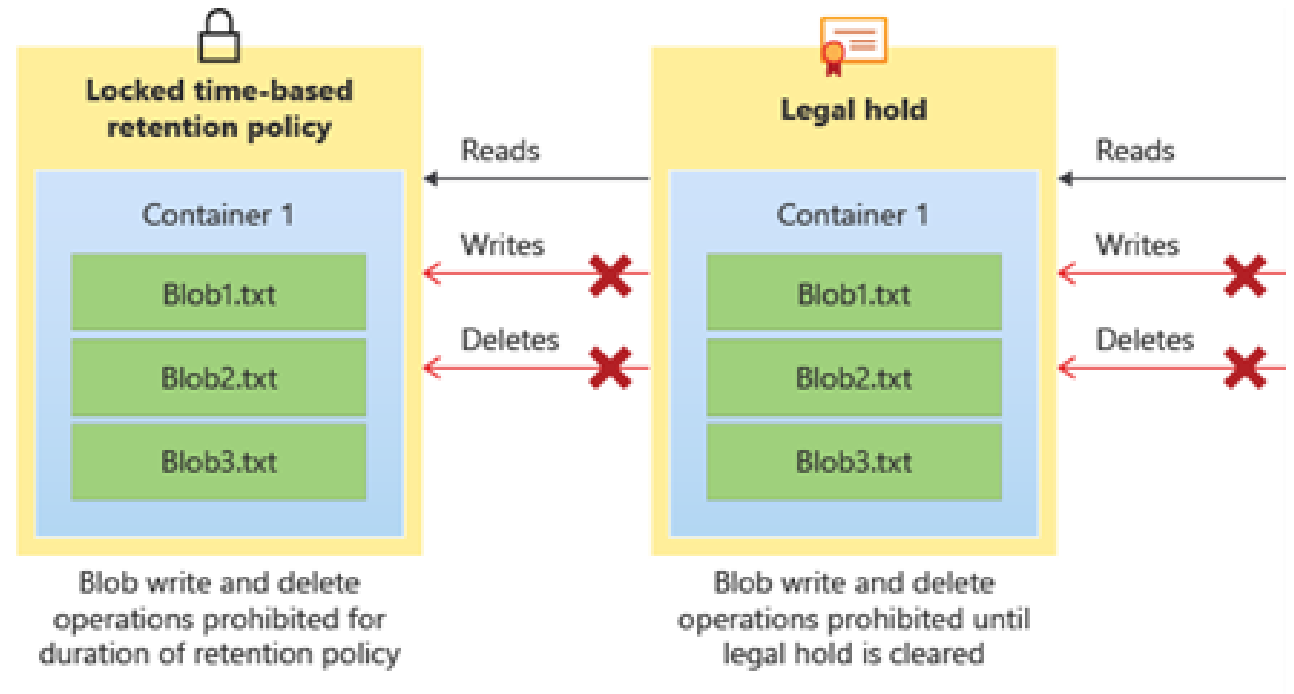
Tier	Storage Duration	Usage cases
Premium	N/A	<ul style="list-style-type: none"><li>• High throughput and large numbers of I/O operations per second</li></ul>
Standard Hot	N/A	<ul style="list-style-type: none"><li>• Active and frequent use</li><li>• Data staged for processing</li></ul>
Standard Cool	> 30 days	<ul style="list-style-type: none"><li>• Short-term backup</li><li>• Older media infrequently viewed</li><li>• Large data sets</li></ul>
Standard Cold	> 90 days	
Standard Archive	> 180 days	<ul style="list-style-type: none"><li>• Long-term backup</li><li>• Original (raw) data</li><li>• Compliance or archival data</li></ul>

- Use lifecycle rules to manage the storage tiers

# Consider immutable storage policies

Determine regulatory compliance, secure document retention, and legal hold policies.

- Apply immutable storage policies at the container level
- Use **time-based retention policies** for business-critical data
- Use **legal-hold policies** for sensitive information to ensure a tamper proof state
- Policies apply to all objects within the container
- Audit logs are available



# Design for Azure files





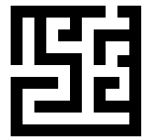
# Compare Azure files to Azure blobs

The technology you choose depends on the use case, protocol, and performance.

Category	Azure Files	Azure Blob Storage
Use cases	<ul style="list-style-type: none"><li>• Replace or supplement traditional on-premises file servers or NAS devices</li><li>• Access files shares from anywhere</li><li>• Lift and shift content to the cloud</li><li>• Replicate and cache with Azure File Sync</li><li>• Share stored application settings</li></ul>	<ul style="list-style-type: none"><li>• Large scale analytical data</li><li>• Throughput sensitive high-performance computing</li><li>• Backup and archive</li><li>• Autonomous driving, media rendering, or genomic sequencing data</li></ul>
Available protocols	<ul style="list-style-type: none"><li>• SMB</li><li>• REST</li><li>• NFS 4.1</li></ul>	<ul style="list-style-type: none"><li>• NFS 3.0</li><li>• REST</li><li>• Data Lake Storage Gen2</li></ul>
Performance (Per volume)	<ul style="list-style-type: none"><li>• Better IOPS</li></ul>	<ul style="list-style-type: none"><li>• Better throughput</li></ul>

# Select a file storage tier (activity)

Tailor your file tiers to the performance and price you need



File storage tiers	
Premium	You have highly I/O-intensive workloads, with high throughput and low latency
Transaction optimized	You need storage optimized for general purpose file sharing scenarios such as team shares and Azure File Sync
Hot	You need cost-efficient storage optimized for online archive storage scenarios
Cool	You have transaction heavy workloads and applications that require file storage and backend storage

# Design for NetApp files

The Azure NetApp Files service is enterprise-class, high-performance, metered file storage.

- Ease of migration
- Workload scale
- Flexibility
- Storage technology

Migration (Windows Apps & SQL Server | Linux OSS Apps & Databases | SAP on Azure)

Specialized workloads (HPC | VDI | AVS)

Azure Platform Services (AKS, Azure Batch, ...)

Azure NetApp Files (Enterprise NAS)

# Design an Azure disk solution



# Select an Azure disk solution

Azure disks are block-level storage volumes used with Azure virtual machines.

- Consider disk type, scenario, throughput, and IOPS
- Always use managed disks
- Optimize read and write access with disk caching
- Use Azure Disk Encryption
- Enhance performance with multiple disks
- Use the network acceleration feature
- Share disks across multiple VMs

Disk type	Usage cases
Ultra-disk SSD	IO-intensive workloads such as SAP HANA, top tier databases (SQL, Oracle), and other transaction-heavy workloads
Premium SSD v2	Production and performance-sensitive workloads that consistently require low latency and high IOPS and throughput
Premium SSD	Production and performance sensitive workloads
Standard SSD	Web servers, lightly used enterprise applications and dev/test
Standard HDD	Backup, non-critical, infrequent access

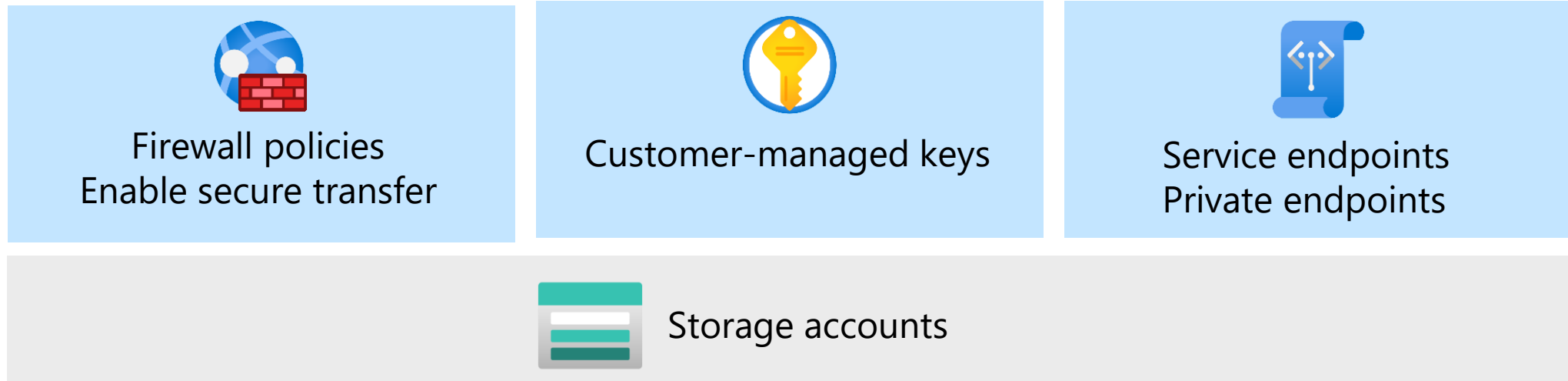
# Design for storage security





# Considerations for storage security

Use a layered security model to secure and control access.

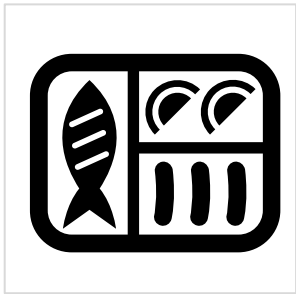
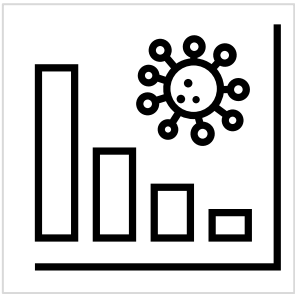


- Grant limited access to Azure Storage resources
- Enable firewall rules to limit access to access - IP addresses or subnets
- Use private endpoints and private links for clients
- Use virtual network service endpoints to provide direct connection
- Use customer managed encryption keys

# Case study and review



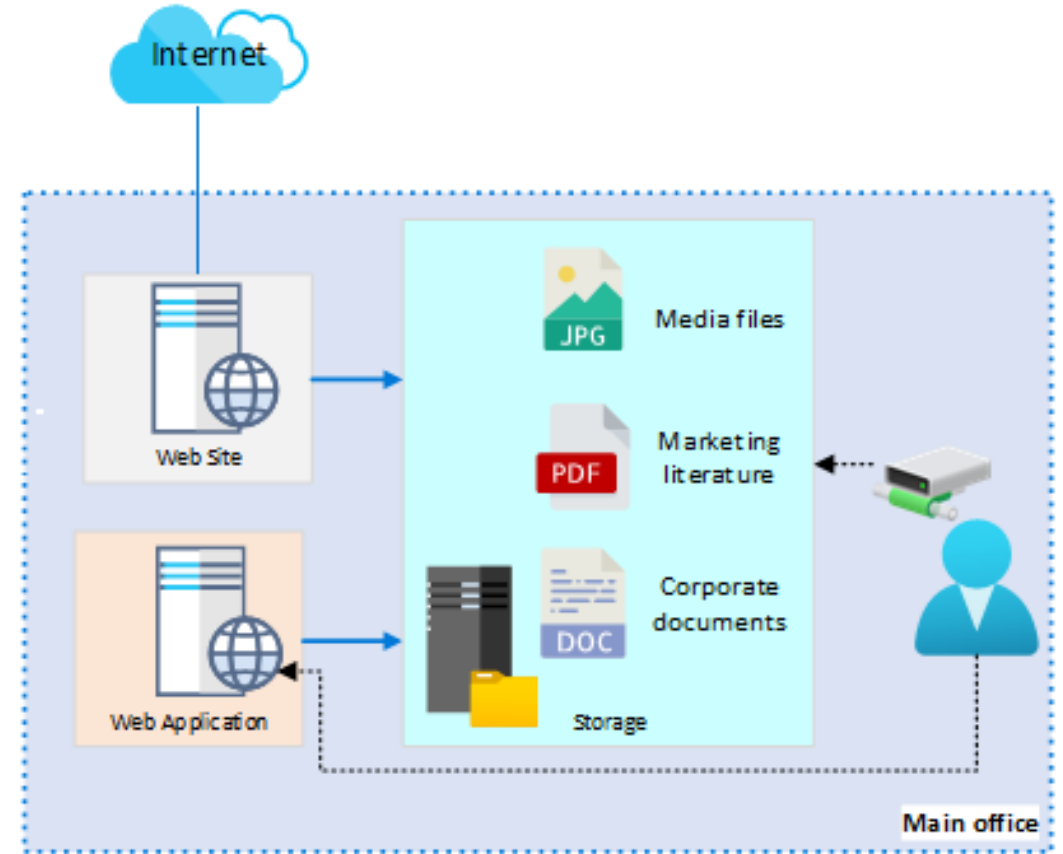
# Case study – Non-relational data



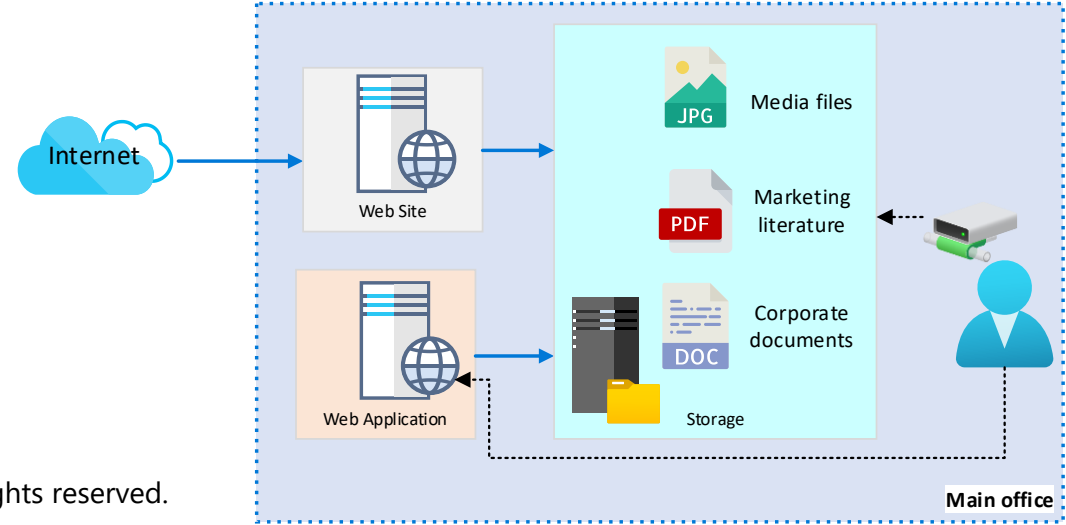
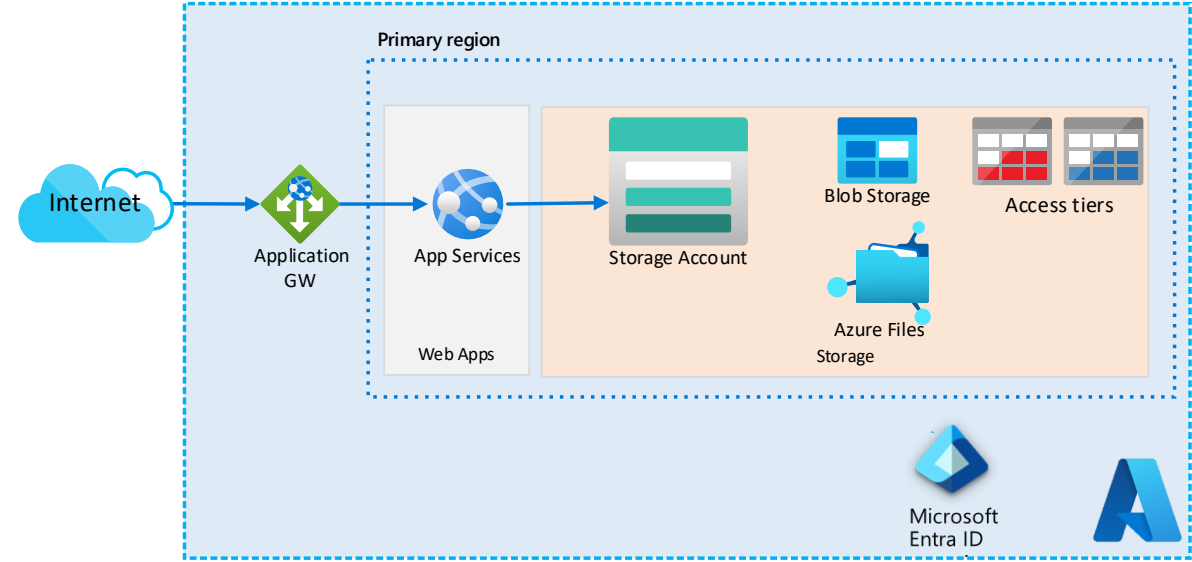
Media files	Marketing literature	Corporate documents
<ul style="list-style-type: none"><li>• Product photos and feature videos</li><li>• JPEG and MP4 are most common formats</li></ul>	<ul style="list-style-type: none"><li>• Customer stories, sales flyers, sizing charts, and eco-friendly manufacturing information</li><li>• PDF format is the most common</li></ul>	<ul style="list-style-type: none"><li>• Internal documents – some sensitive</li><li>• Mostly Office formats like Word and Excel</li></ul>

# Case study discussion

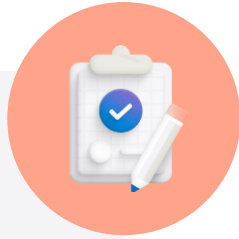
- Design a storage solution for Tailwind Traders.
  - What type of data is represented?
  - What factors will you consider in your design?
  - What type of storage accounts are needed?
  - Will you use blob access tiers?
  - Will you use immutable storage?
  - How will the content be securely accessed?
- Your solution should consider the media, marketing literature, and corporate documents.



# Instructor Solution Diagram - Completed



# Learning recap – Non-relational data solutions



Check your  
knowledge  
questions and  
review

## Reference modules

- [Choose the right disk storage for your virtual machine workload](#)
- [Configure Azure blob storage](#)
- [Optimize performance and costs by using Azure Disk Storage](#)
- [Caching and performance in Azure storage disks](#)
- [Introduction to securing data at rest on Azure](#)

Optional exercises:

- [Create a storage account using the Azure portal](#)



# Instructor resources (hidden)



# End of presentation

