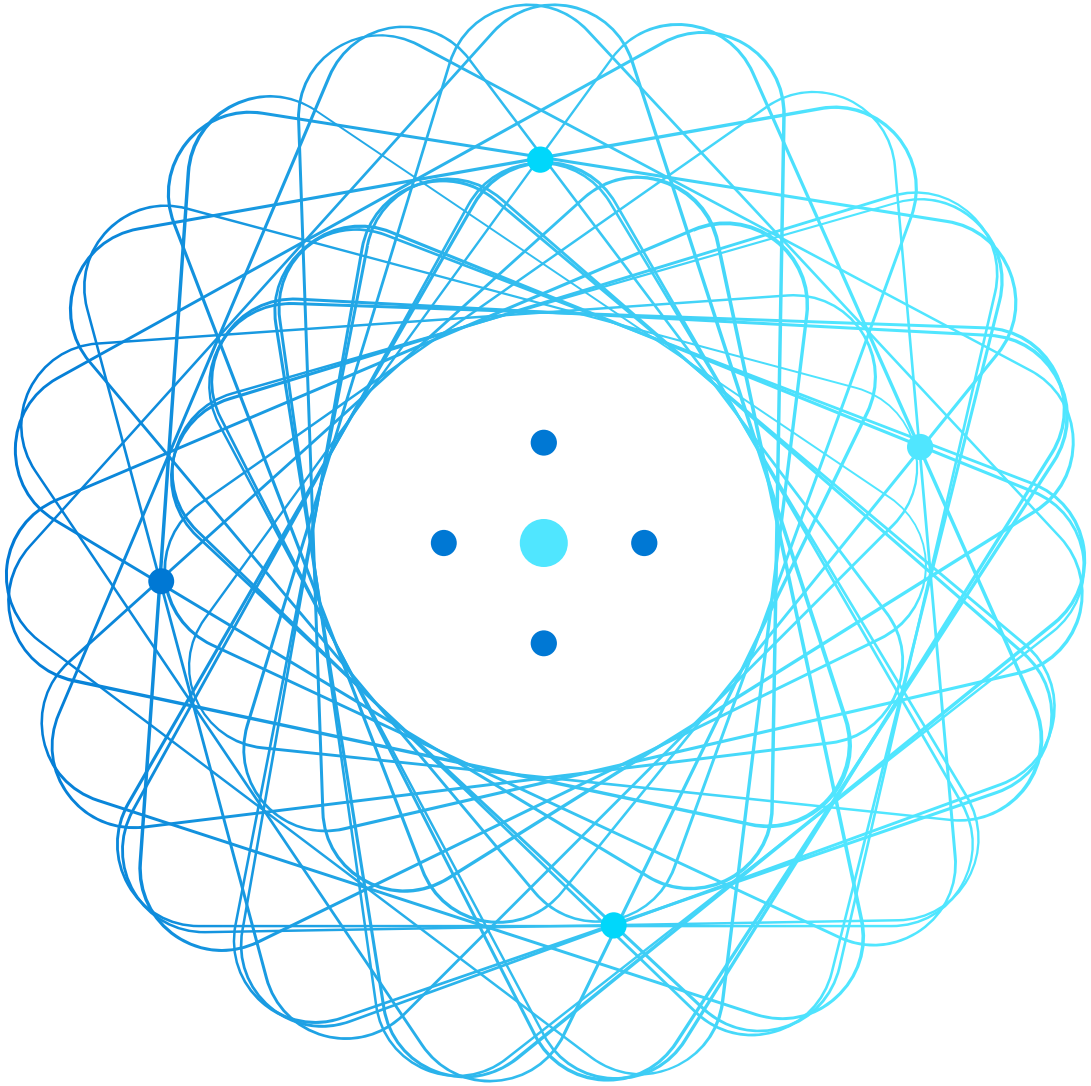
Microsoft Azure

AZ-305

Designing Microsoft Azure Infrastructure Architect



AZ-305 Agenda

Module 01 Design a governance solution
Module 02 Design a compute solution
Module 03 Design a non-relational data storage solution
Module 04 Design a data storage solution for relational data
Module 05 Design a data integration solution
Module 06 Design an application architecture solution
Module 07 Design Authentication and Authorization Solutions
Module 08 Design a solution to log and monitor Azure resources
Module 09 Design a network infrastructure solution
Module 10 Design a business continuity solution
Module 11 Design a migration solution

Design a non-relational data storage solution

Introduction

- 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
- Summary and resources

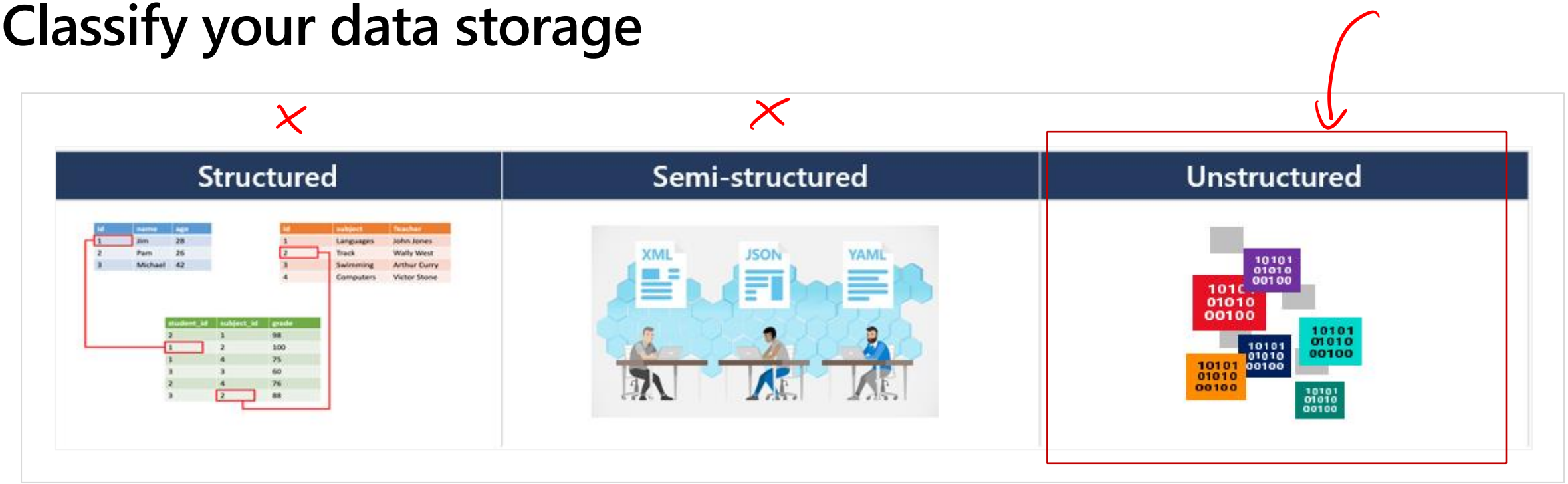
AZ-305: Design Data Storage Solutions (25-30%)

Design a Data Storage Solution for Non-relational Data

- Recommend access control solutions to data storage
- Recommend a data storage solution to balance features, performance, and cost
- Design a data solution for protection and durability

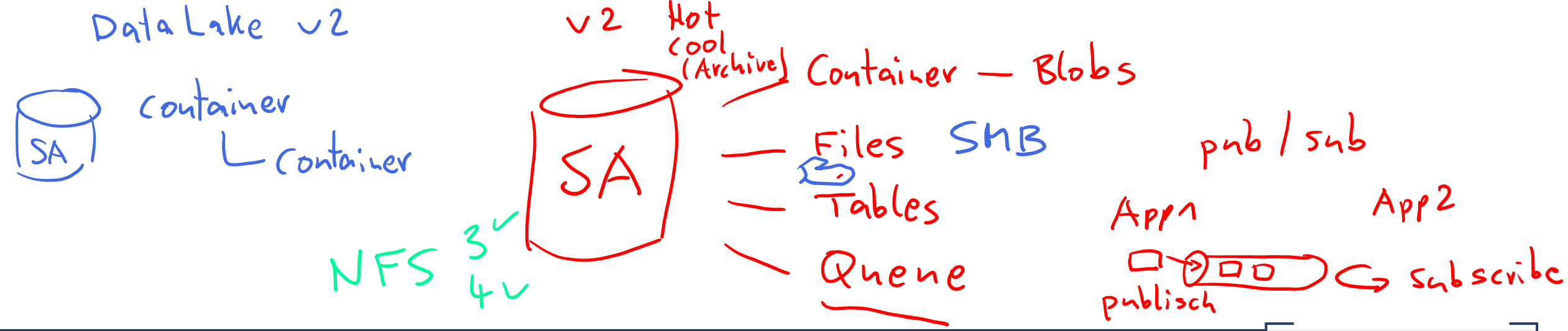
Design for data storage

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

Parse bis 10^{55}

Service Bus = SA Queue + more Fifo

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.

Replication

Data storage could have different replication strategies.

Compliance

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

Administrative overhead

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

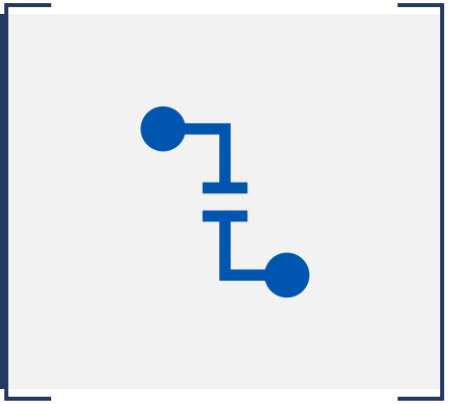
Cost

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

Security - Data sensitivity

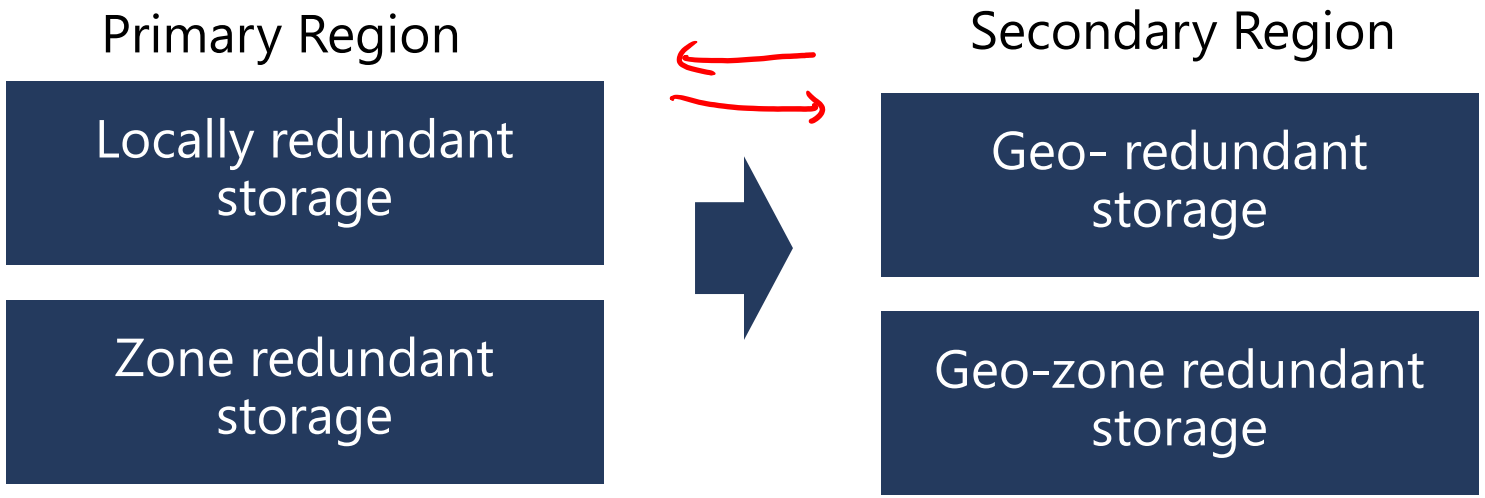
Data plane security and data storage security.

Design for data redundancy



Select a storage replication strategy

What level of redundancy do you need?



Read and write access to the secondary region are available if the primary region becomes unavailable

- 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 Costs	Retrieval/Read Costs	Storage Duration	Usage cases
Premium	High	Lowest	N/A	• High throughout and large numbers of I/O operations per second
Standard Hot	Medium	Low	N/A	• Active and frequent use • Data staged for processing
Standard Cool	Low	Medium	> 30 days	• Short-term backup • Older media infrequently viewed • Large data sets
Standard Archive	Lowest	High	> 180 days	• Long-term backup • Original (raw) data • Compliance or archival data

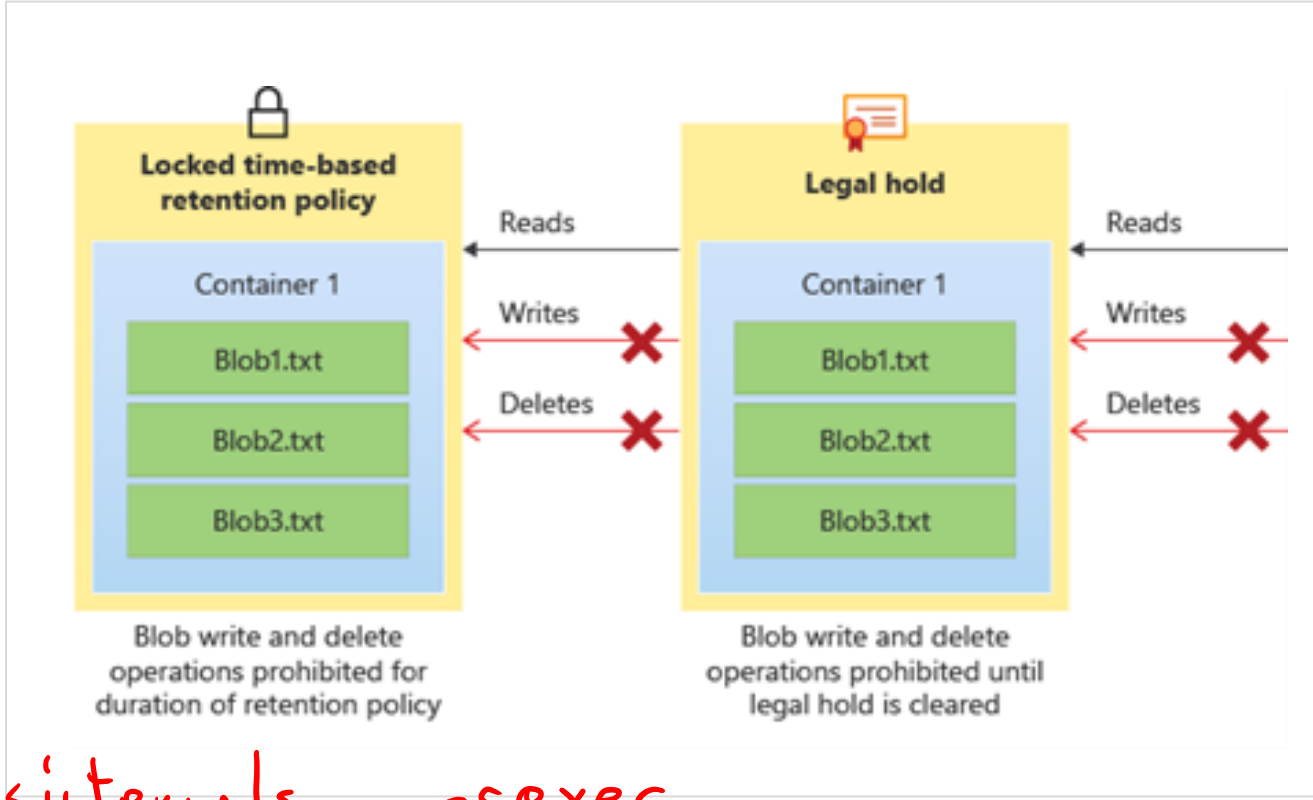
- Use lifecycle rules to transition blob data to the appropriate access tiers
- Consider a data lifecycle rule to expire or delete data

Consider immutable storage policies

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

read only

- 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 only to new content
- Audit logs are available



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CTO Azure

Design for Azure files

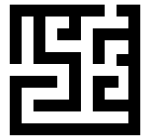
Compare Azure files to Azure blobs

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

Category	Azure Files	Azure Blob Storage
Use cases	• Replace or supplement traditional on-premises file servers or NAS devices • Access files shares from anywhere • Lift and shift content to the cloud • Replicate and cache with Azure File Sync • Share stored application settings	• Large scale analytical data • Throughput sensitive high-performance computing • Backup and archive • Autonomous driving, media rendering, or genomic sequencing data
Available protocols	• SMB • REST • NFS 4.1	• NFS 3.0 • REST • Data Lake Storage Gen2
Performance (Per volume)	• Better IOPS	• Better throughput

Select a file storage tier (activity)

Tailor your file tiers to the performance and price you need

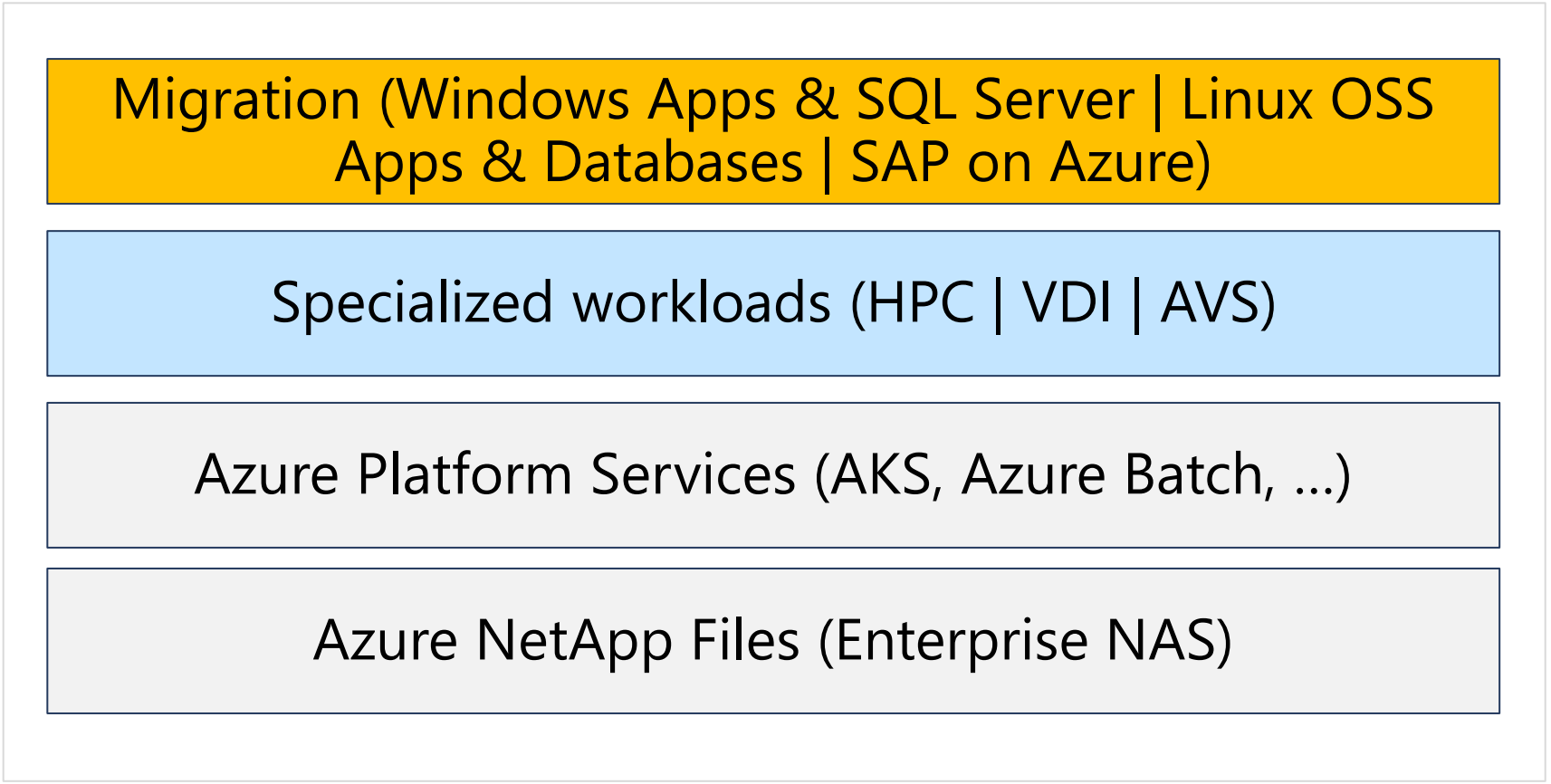


File storage tiers		
Premium	You have highly I/O-intensive workloads, with high throughput and low latency	You need storage optimized for general purpose file sharing scenarios such as team shares and Azure File Sync
Transaction optimized		
Hot	You need cost-efficient storage optimized for online archive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

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



Cost

70%

VM

AKS

OS

30%

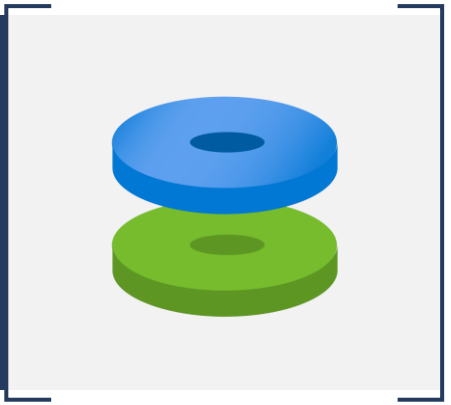
Disk

Disk

Block

Managed IOPS

Design an Azure disk solution



Blob

Log

Lock

Select an Azure disk solution

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

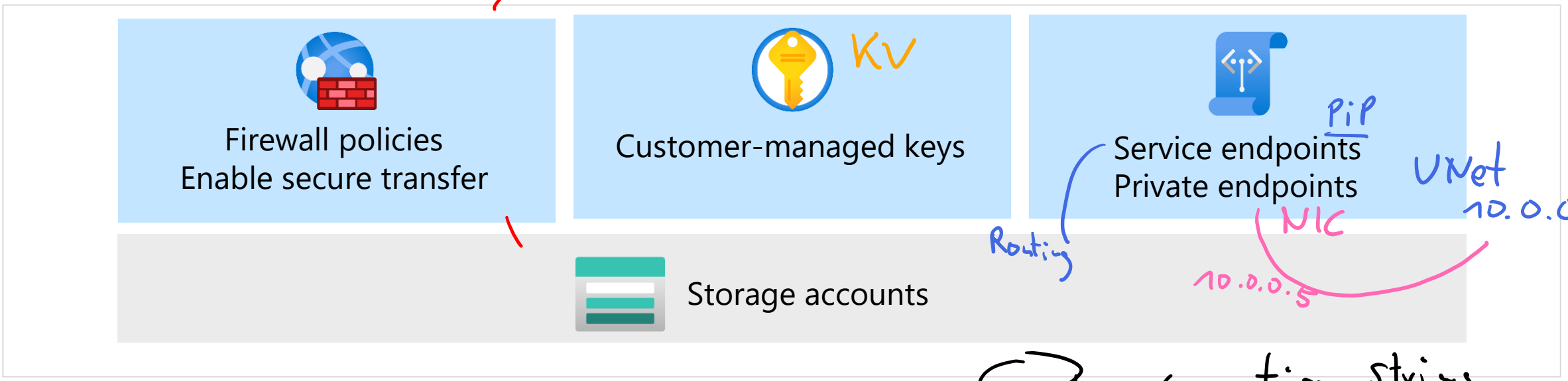
- Consider disk type, scenario, throughput, and IOPS
- Always use managed disks
- Optimize read and write access with disk caching
- Use Azure Disk Encryption
- Enhance performance with multiple disks
- Use the network acceleration feature
- Share disks across multiple VMs

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

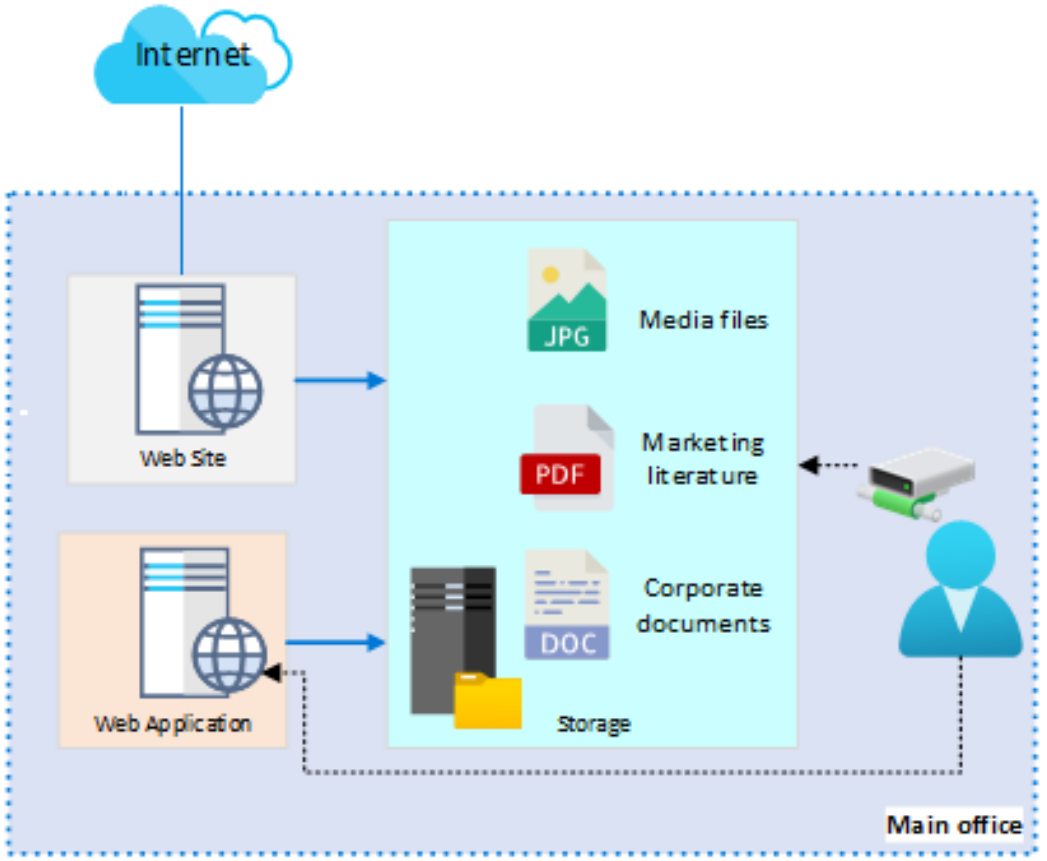
Case study and review

Case study – Non-relational data

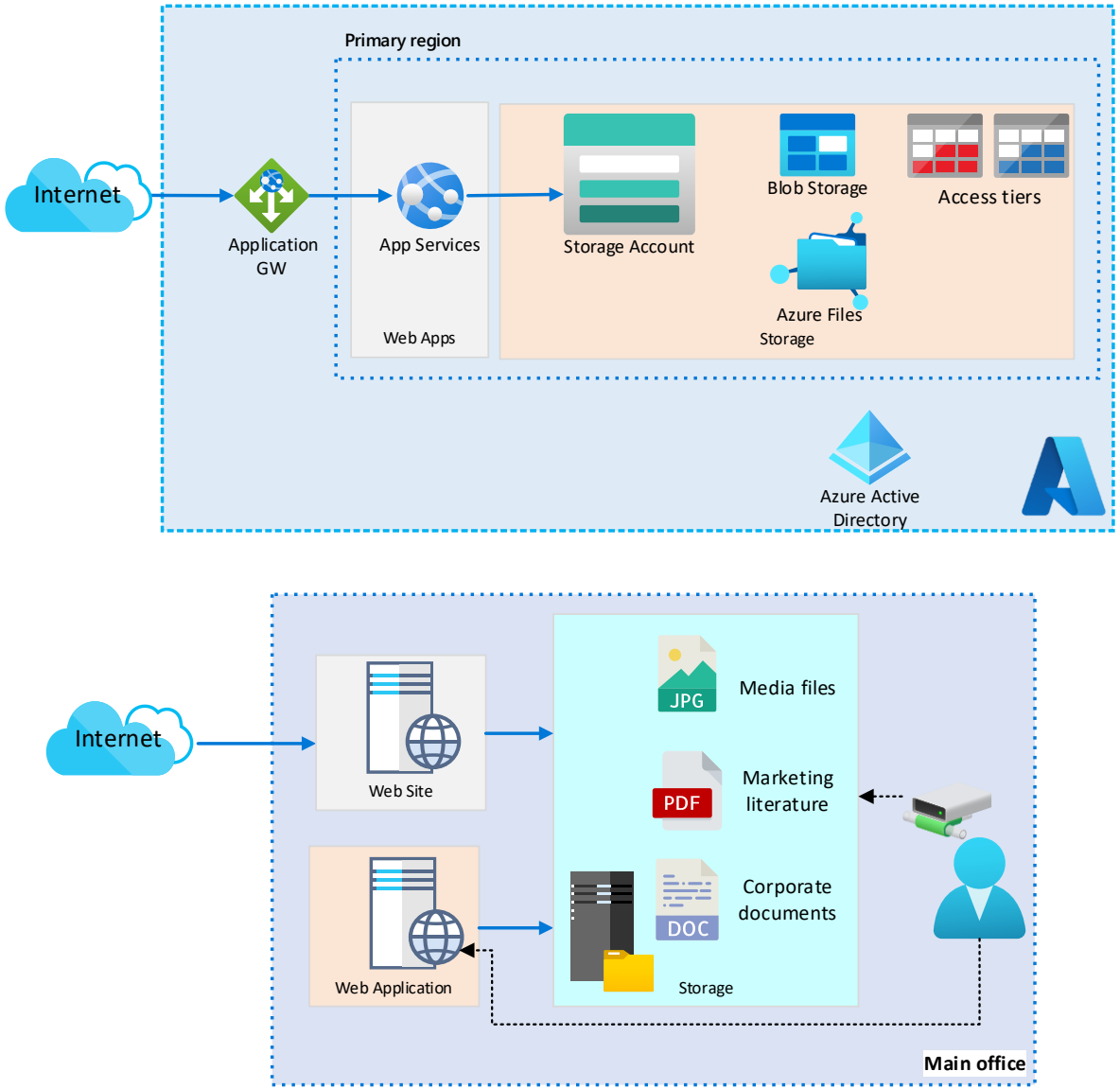
Media files	Marketing literature	Corporate documents
• Product photos and feature videos • JPEG and MP4 are most common formats	• Customer stories, sales flyers, sizing charts, and eco-friendly manufacturing information • PDF format is the most common	• Internal documents – some sensitive • Mostly Office formats like Word and Excel

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



Summary and resources

Check your knowledge

Microsoft Learn Modules (docs.microsoft.com/Learn)

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

Optional hands-on exercise - Create a storage account using the Azure portal

Instructor resources (hidden)

End of presentation