

Azure architecture & services overview

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES



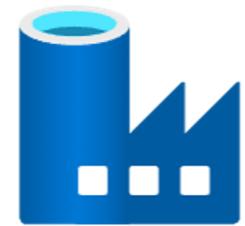
Florin Angelescu
Azure Architect

What is Azure?



- Microsoft's cloud computing platform
- Offers services like:
 - Storage
 - Computing
 - Networking
 - Applications
- Use Microsoft's provided infrastructure over the Internet
- Use computing resources without managing hardware

What can you do with Azure?



- Store data
- Running virtual machines
- Hosting websites and applications
- Machine learning
- Database services

Physical infrastructure



- Global network of data centers located around the world
 - Equipped with servers, storage devices, and networking hardware
 - Grouped into regions or availability zones
 - Designed to ensure redundancy, scalability, and high availability
 - Maintained and managed by Microsoft

¹ Learn more about Azure infrastructure: <https://datacenters.microsoft.com/globe>

Regions



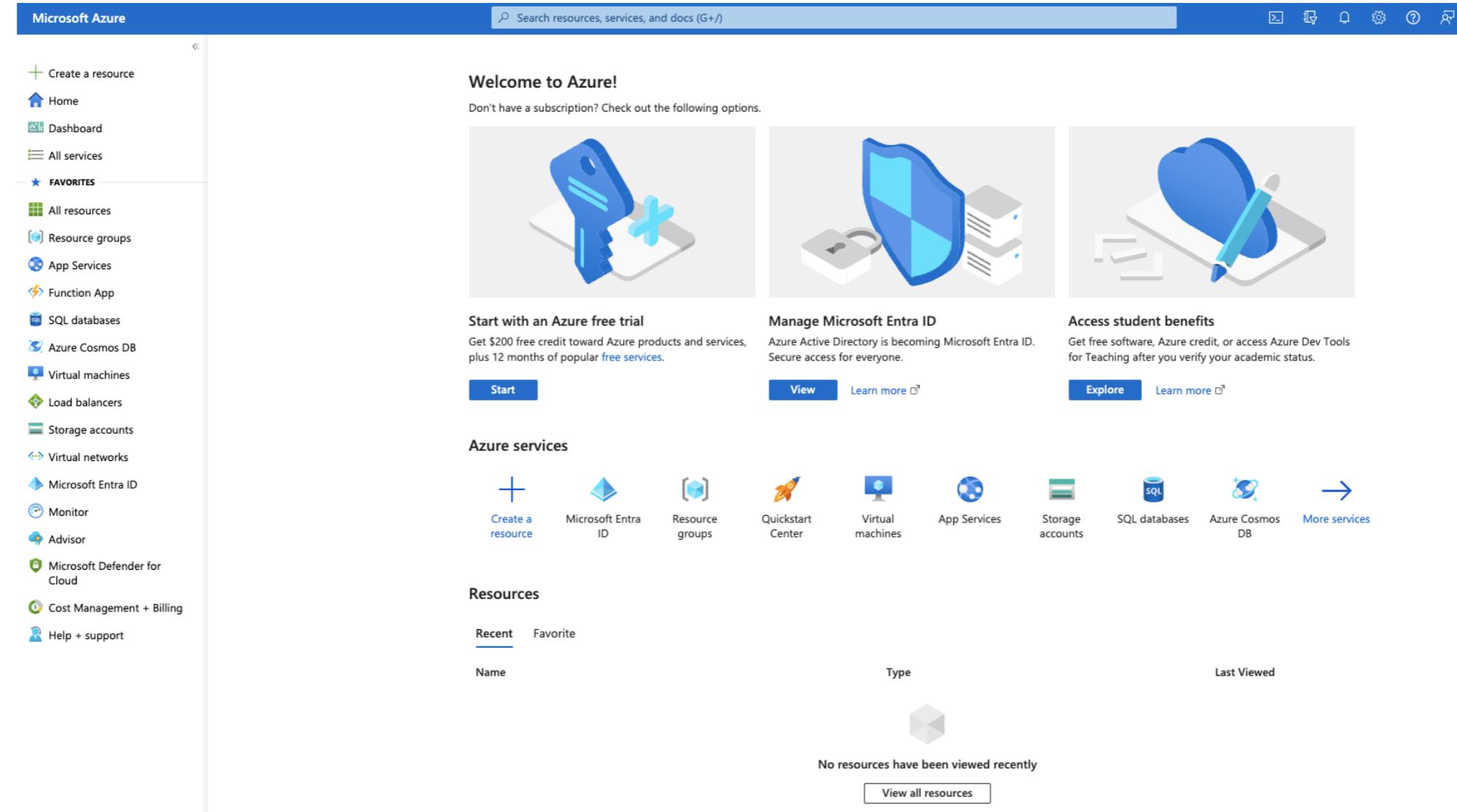
- Geographical areas that contains a group of data centers
- Allow creation of resources in proximity to consumers
- Offer improved performance and compliance with local regulations

Availability zones



- Separate, physically independent data centers within a region
- Azure services stay available even if there are technical issues in one location

Azure portal



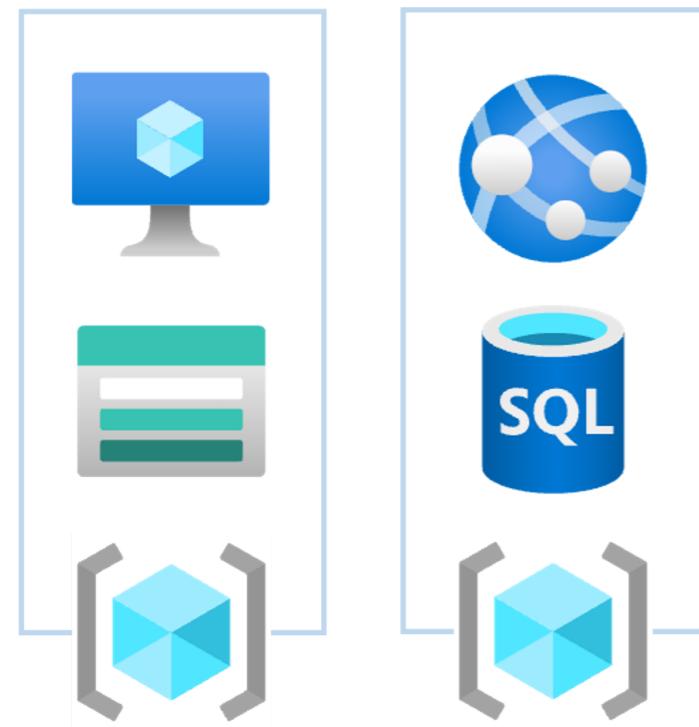
- User-friendly website to access, manage, and control cloud resources
- Azure portal (<https://portal.azure.com>)

Resources



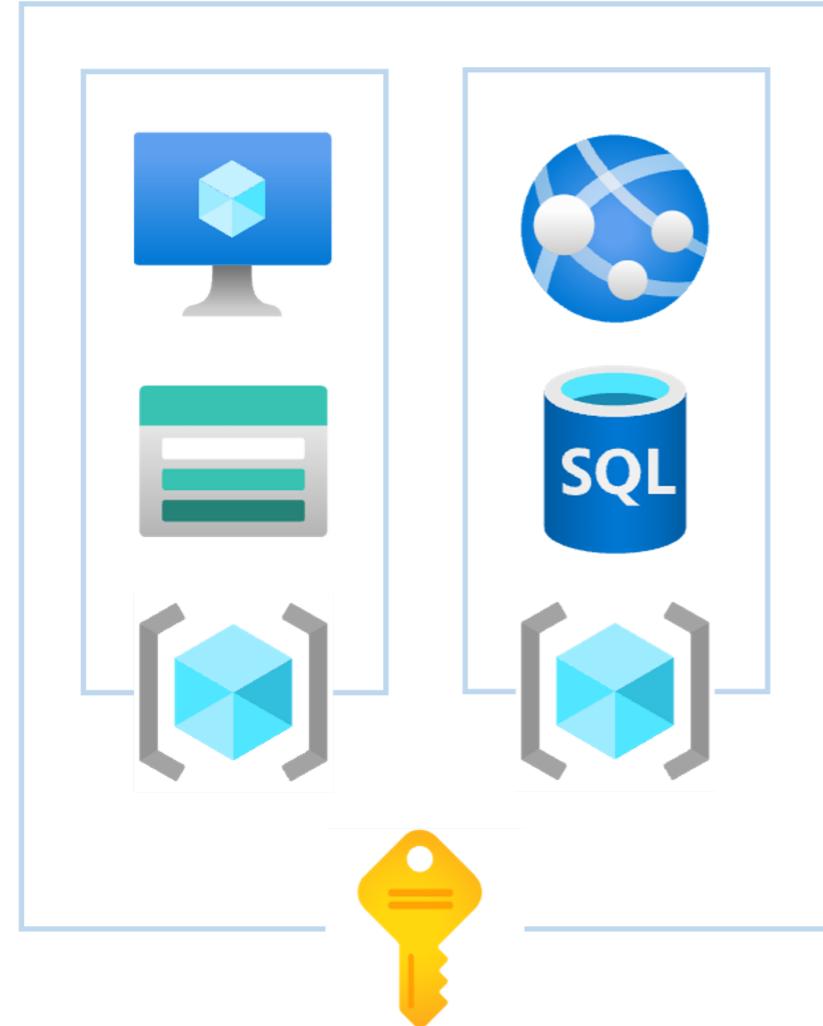
- Building blocks to create and run activities
 - Website
 - Database
 - Virtual machine
 - Other
- Assigned to a resource group

Resource groups



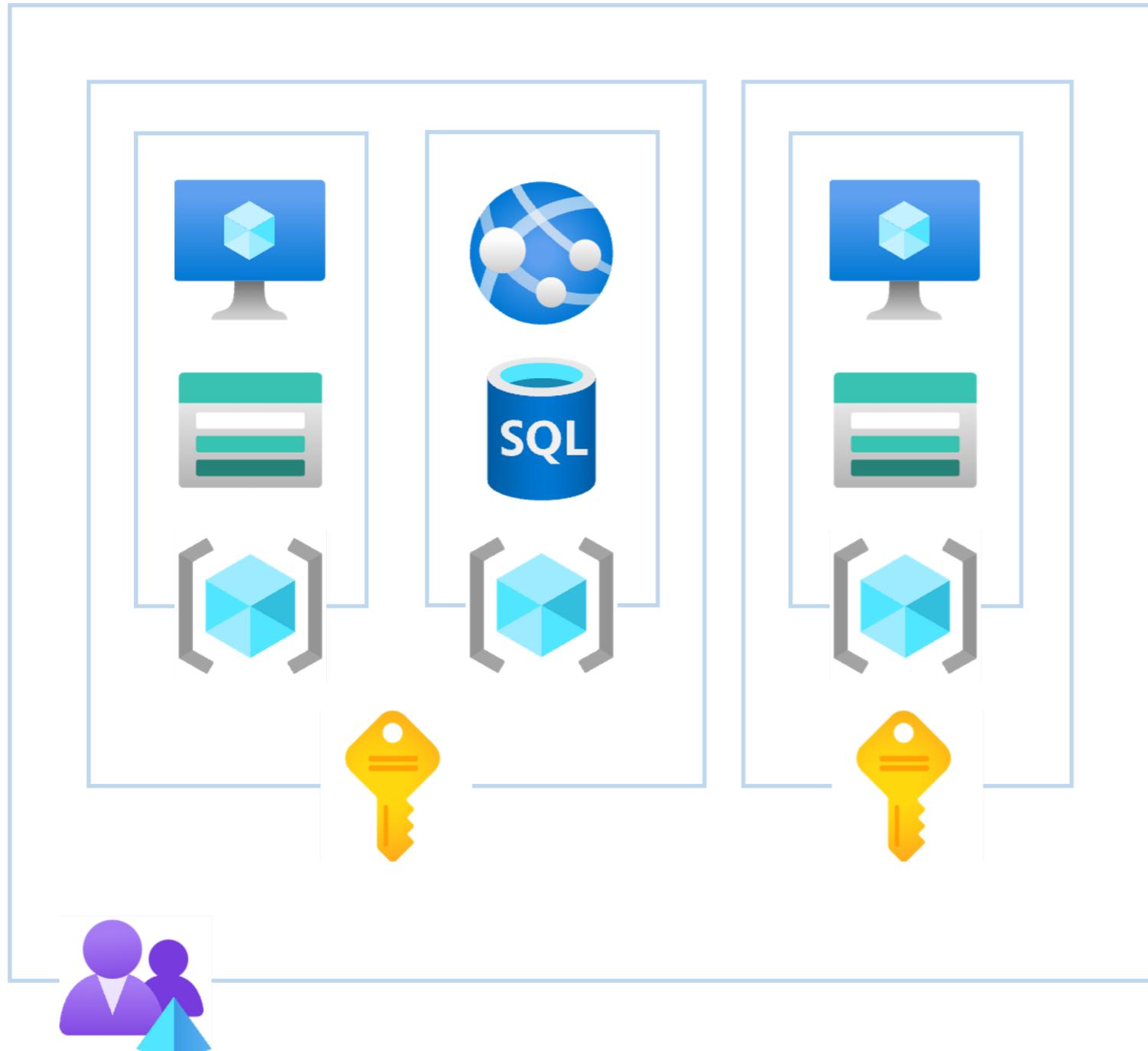
- Virtual folders for organizing resources
- Resources belongs to only one group at a time
- They can be moved between resource groups
- Resource groups can't be nested

Subscriptions



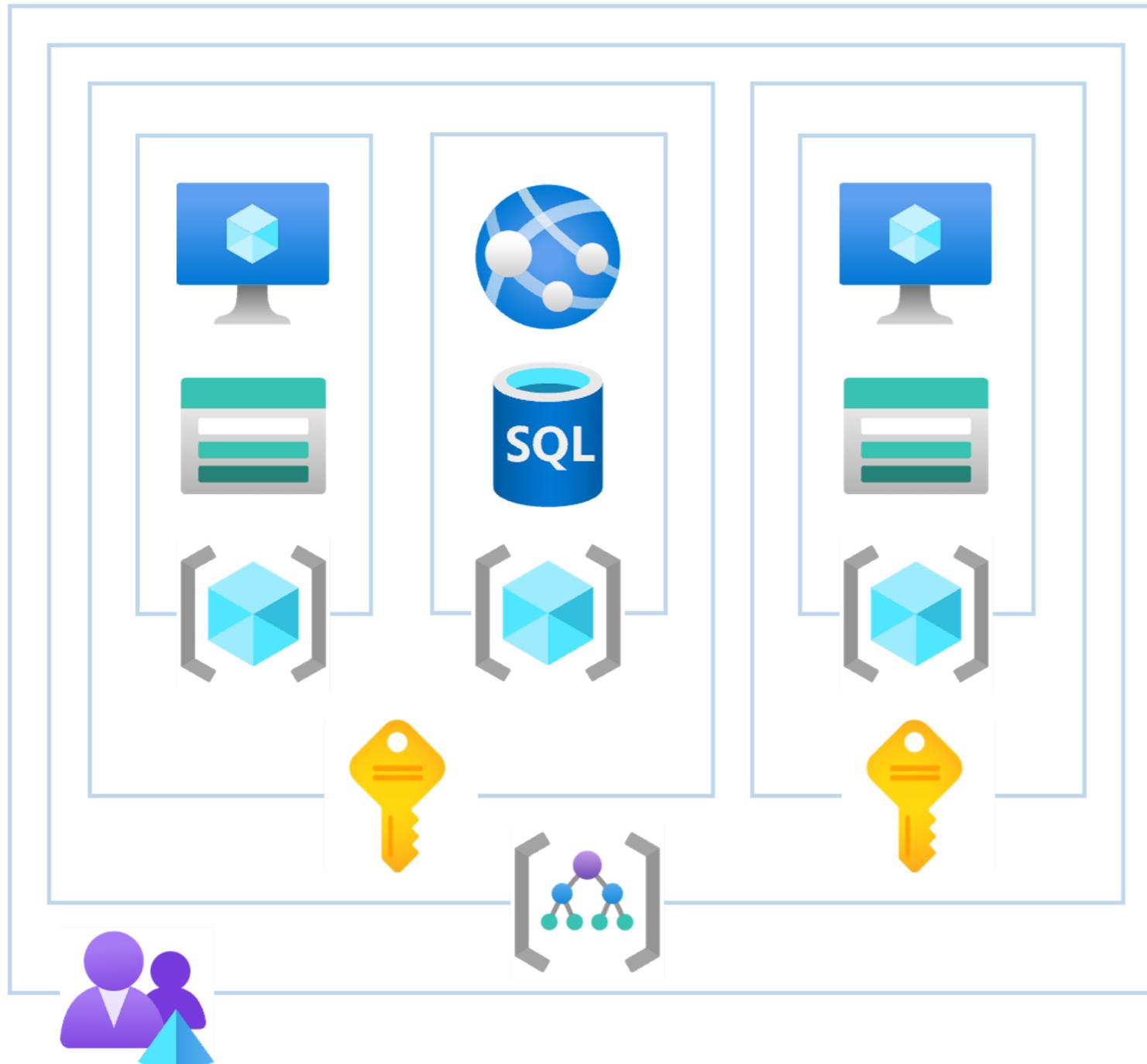
- Organize resource groups
- Simplify the billing process
- Membership to access to cloud resources
- Purposes:
 - Security
 - Cost management
 - Separating environments
- Linked to an Azure account

Azure account



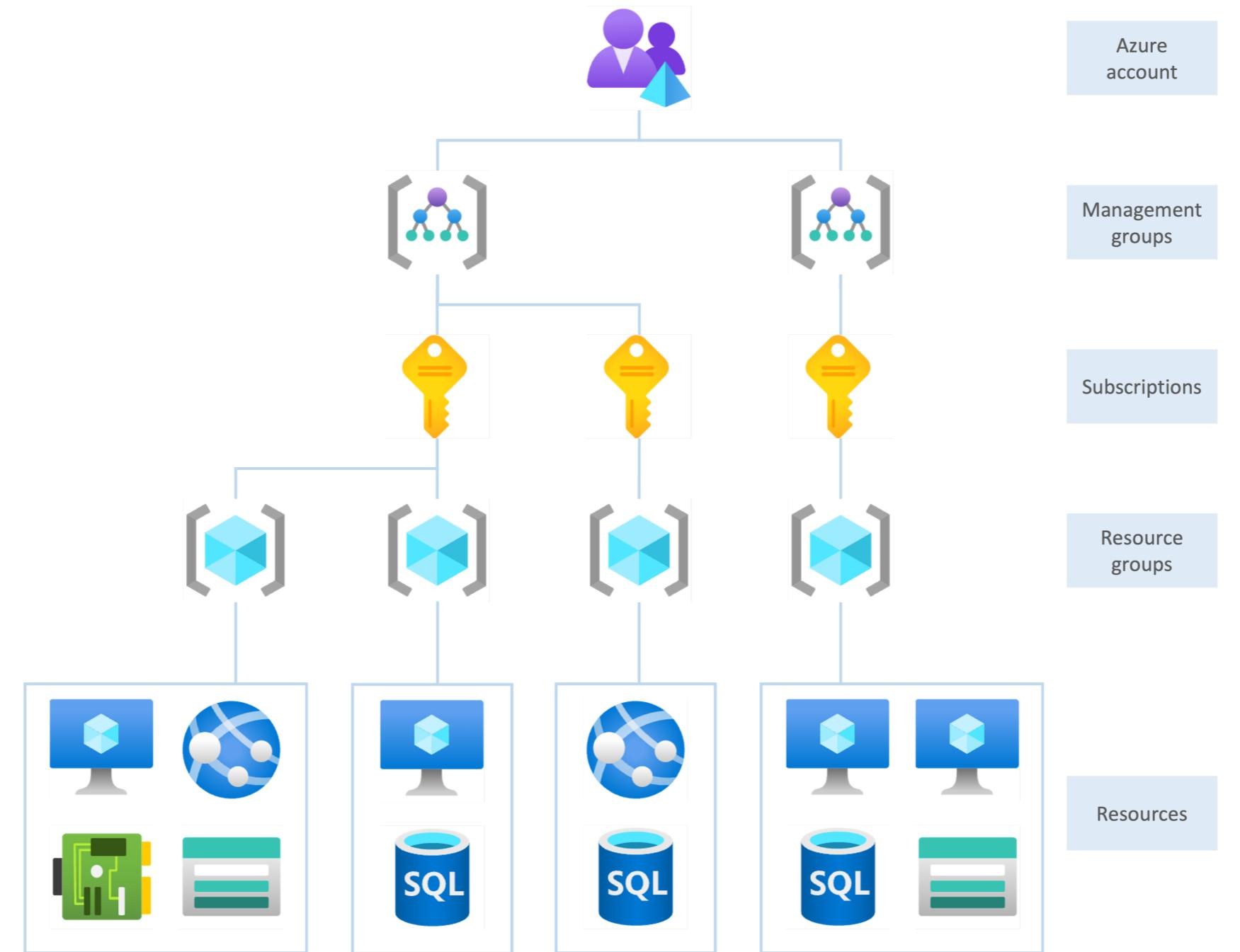
- Access pass to Microsoft's cloud services
- Allows to use and manage all tools and resources provided by Azure

Management groups



- Optional layer
- Organize and control multiple subscriptions
- Can be nested

Azure hierarchical structure



Let's practice!

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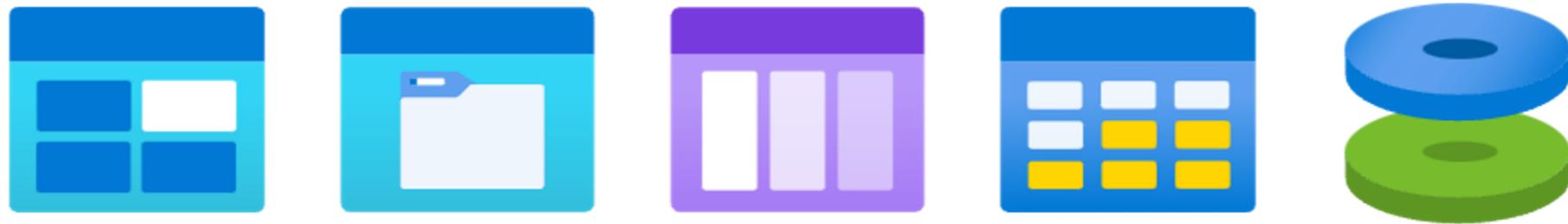
Azure storage services

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES



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What are Azure storage services?



- Cloud storage solutions provided by Azure
- Offer secure storage options for various types of data
- Allow users to store, retrieve, and manage data in Azure cloud
- Provide flexibility and scalability

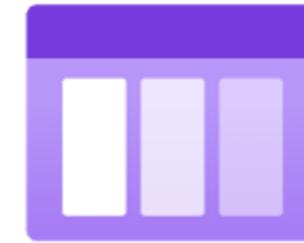
Azure storage services



Blobs



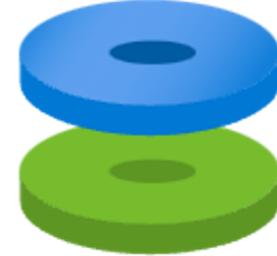
Files



Queues

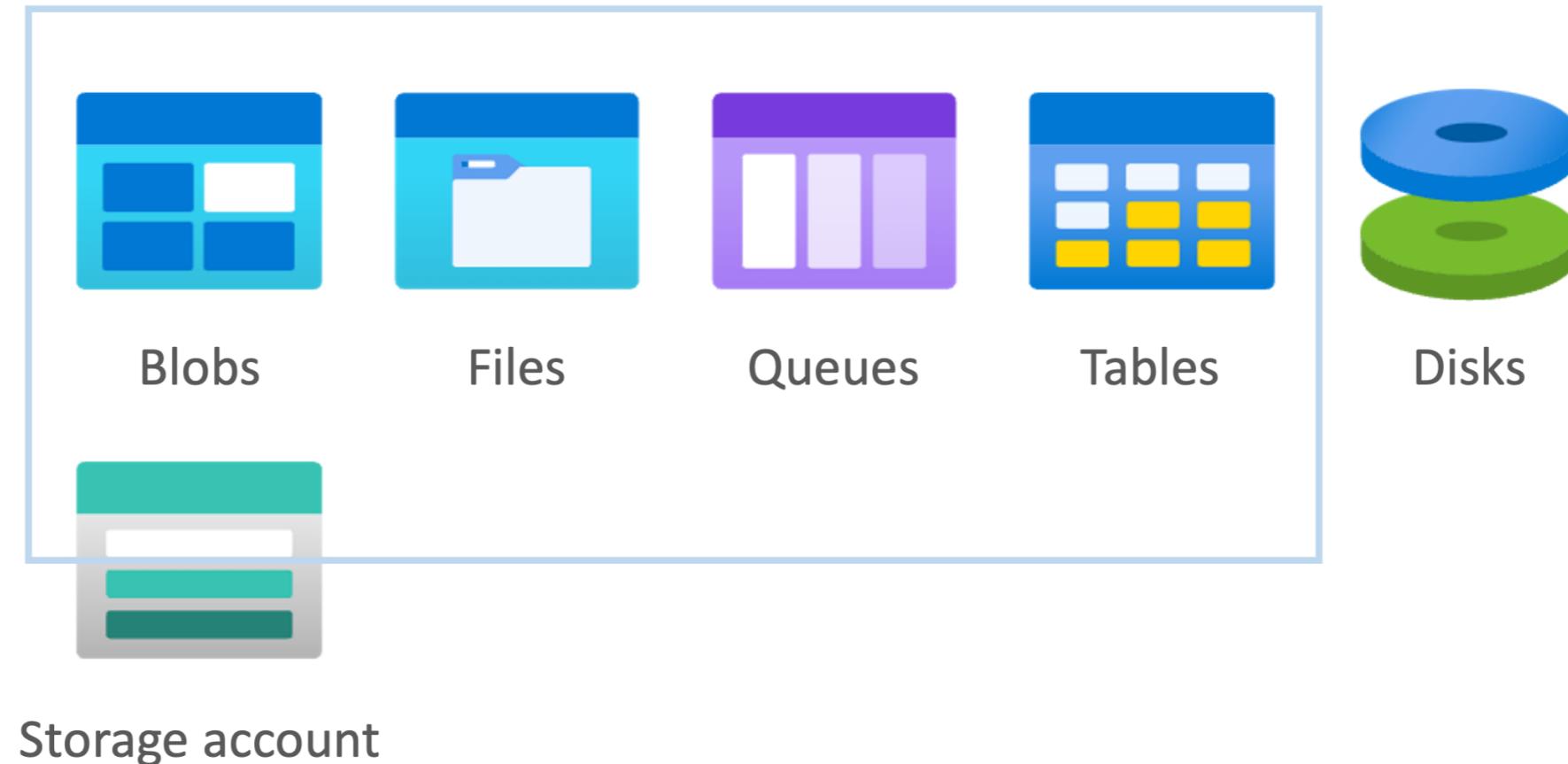


Tables



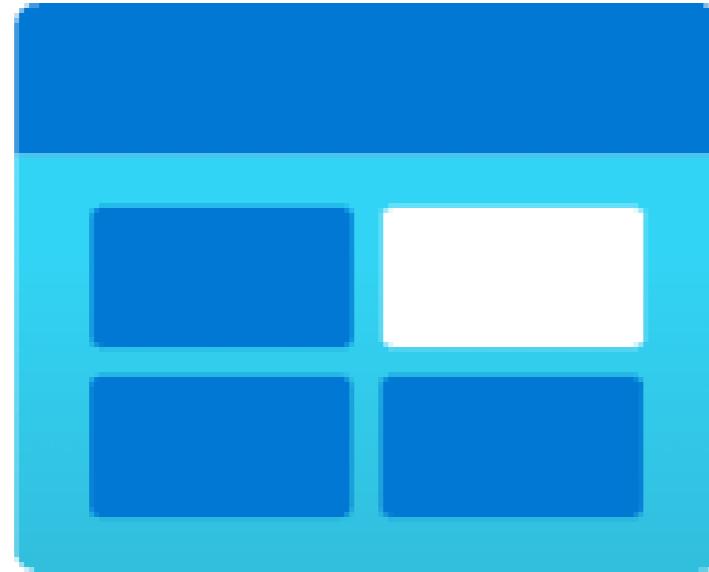
Disks

Storage account

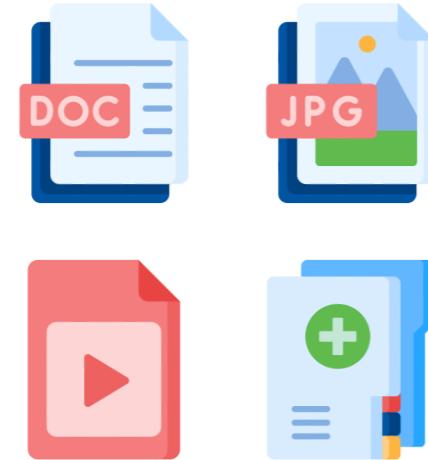


- Required by blobs, files, queues and tables
- Virtual container for your data
- Organize, access and secure data in Azure cloud

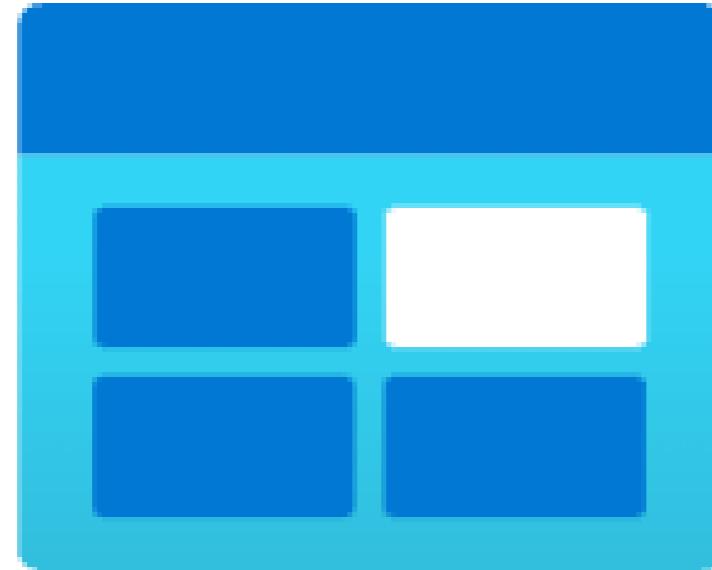
Blobs



- Designed for storing large amounts of unstructured data
- Azure handles the physical storage needs for blobs

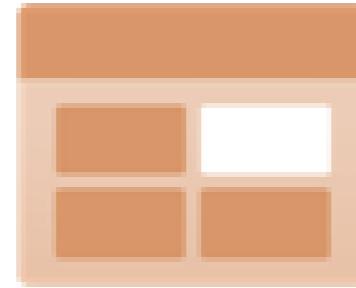


When to use blobs?

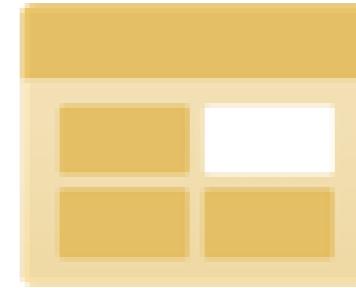


- Storing files for widespread access
- Streaming video and audio content
- Storing backups, disaster recovery, archives
- Delivery of images or documents to web

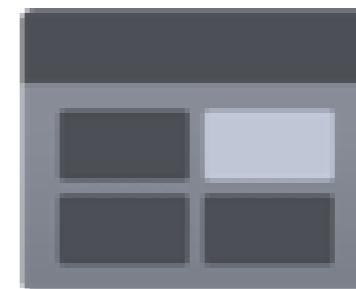
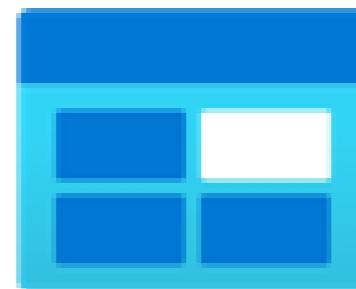
Blob storage tiers



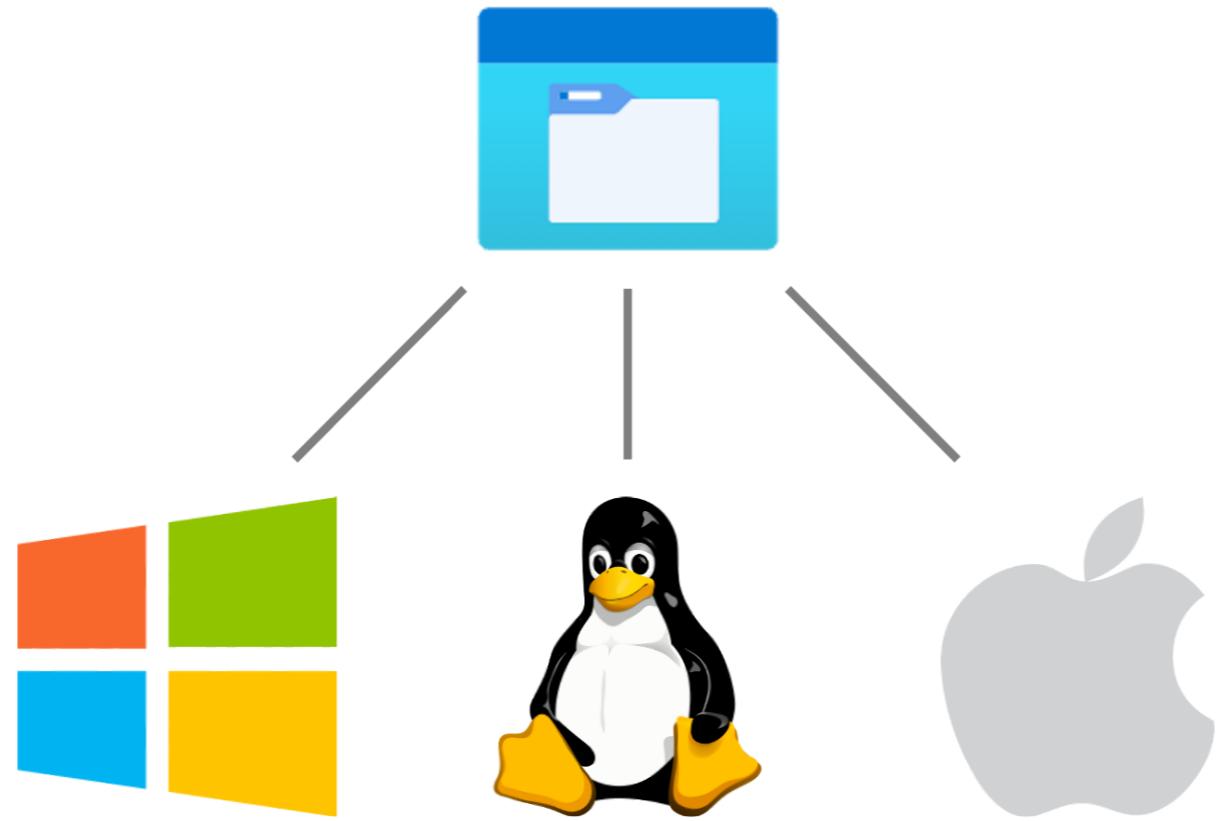
- Hot access tier
 - Frequently accessed data
- Cool access tier
 - Data accessed infrequently



- Cold access tier
 - Rarely accessed data
- Archive access tier
 - Archiving purposes

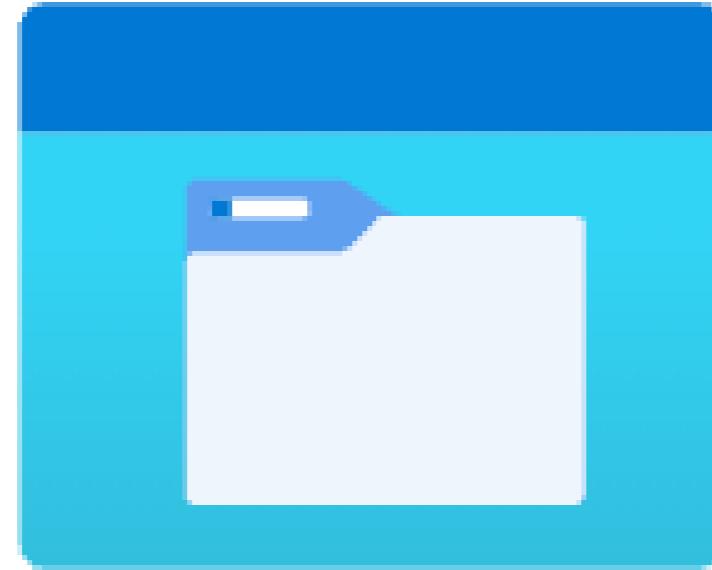


Files



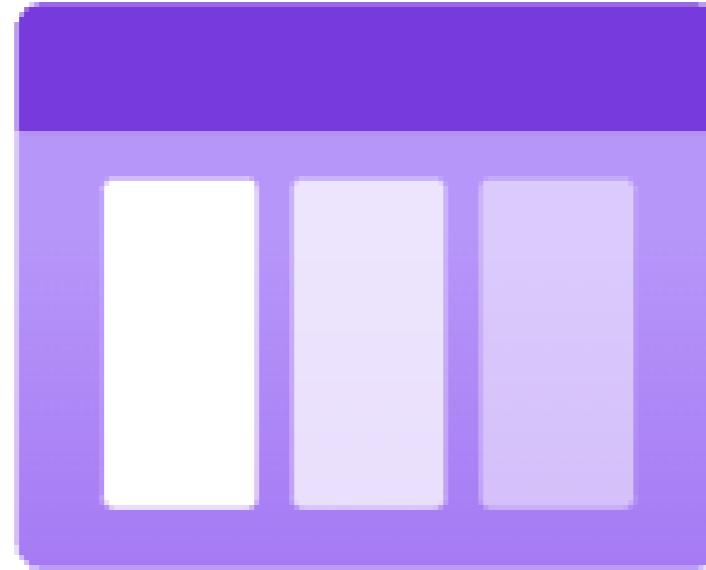
- Provide organized file spaces in the cloud
- Easy access from cloud and on-premises devices
- Can be accessed from most operating systems

When to use files?



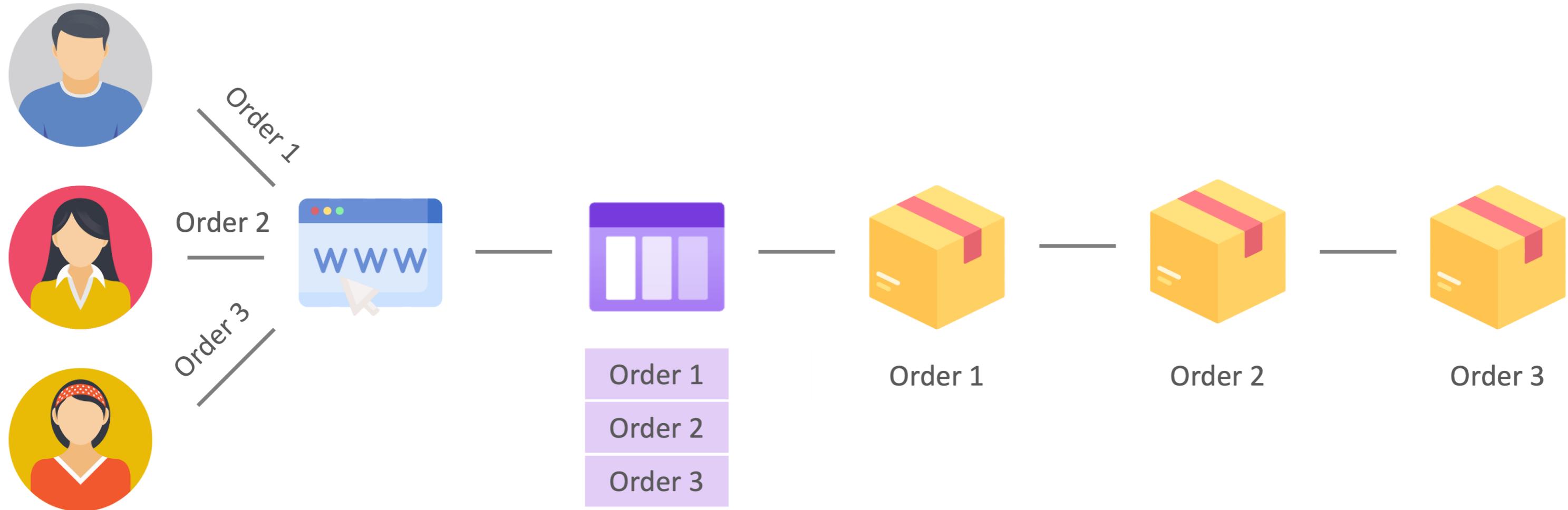
- Shared storage solution is required for multiple users or applications
- Cross-platform access is needed
- Centralized cloud location for file collaboration is required
- Application data sharing between different components of an application

Queues

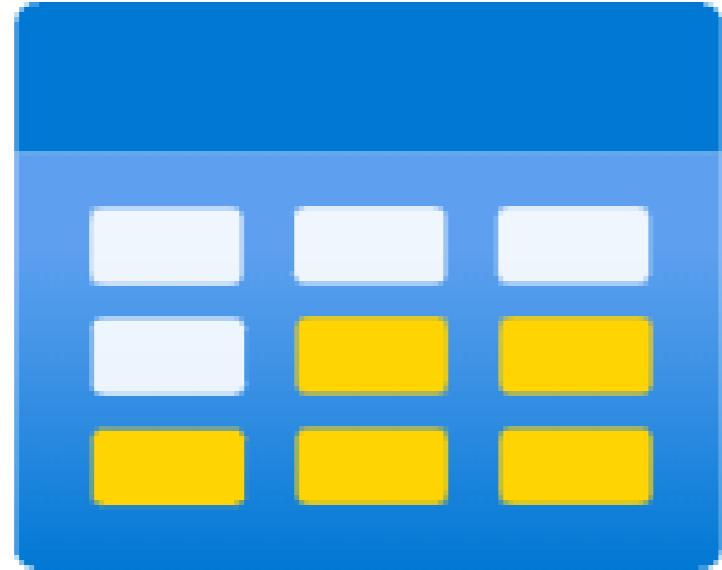


- Digital message service in the cloud
- Enables communication between various components, programs or applications
- Messages are stored, creating a queue of instructions

How queues work

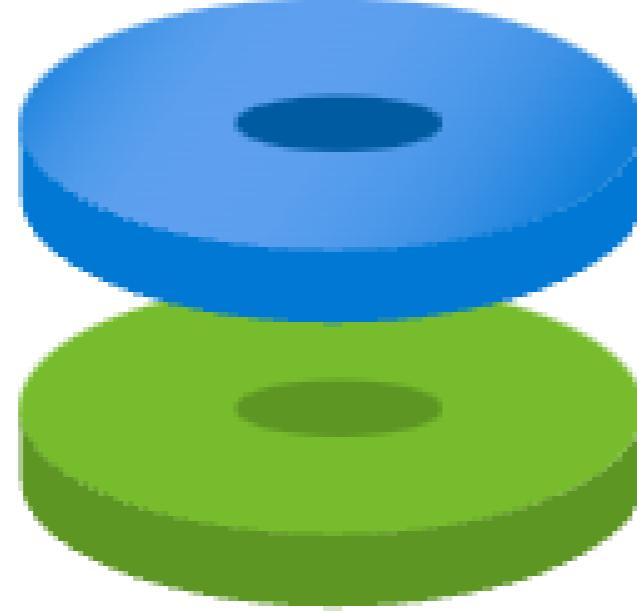


Tables



- NoSQL data store in storage accounts
- Store and retrieve data flexible and schema-less
- Suitable for fast and scalable access to large amounts of unstructured data
- Cost effective and simple to manage

Disks



- Provide scalable and secure persistent storage for virtual machines
- Provide storage space for operating systems, applications, and data
- Play a crucial role in virtual machines functionality

Let's practice!

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Creating and removing storage accounts

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Storage configuration and file management

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Storage redundancy



Original



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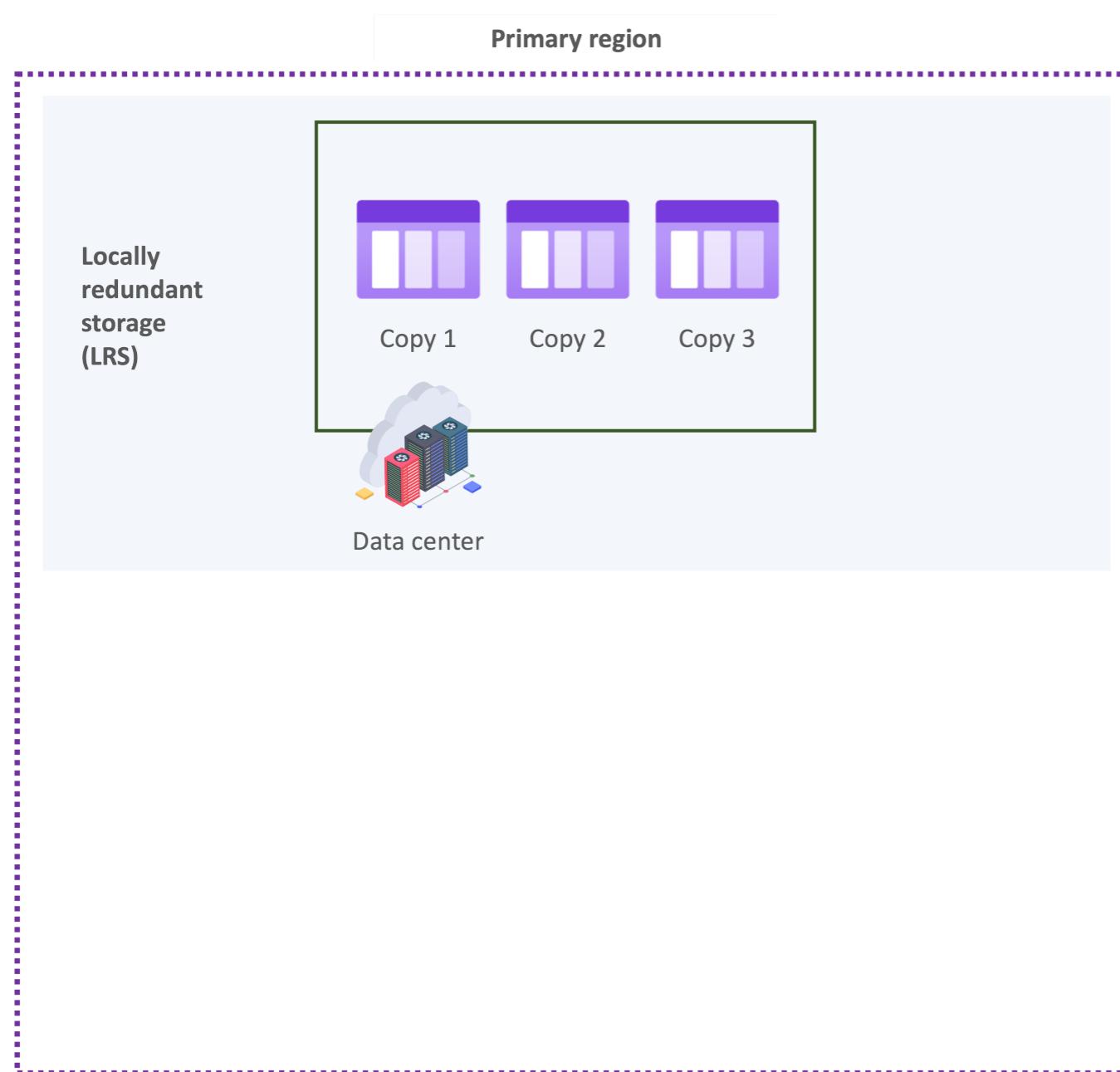
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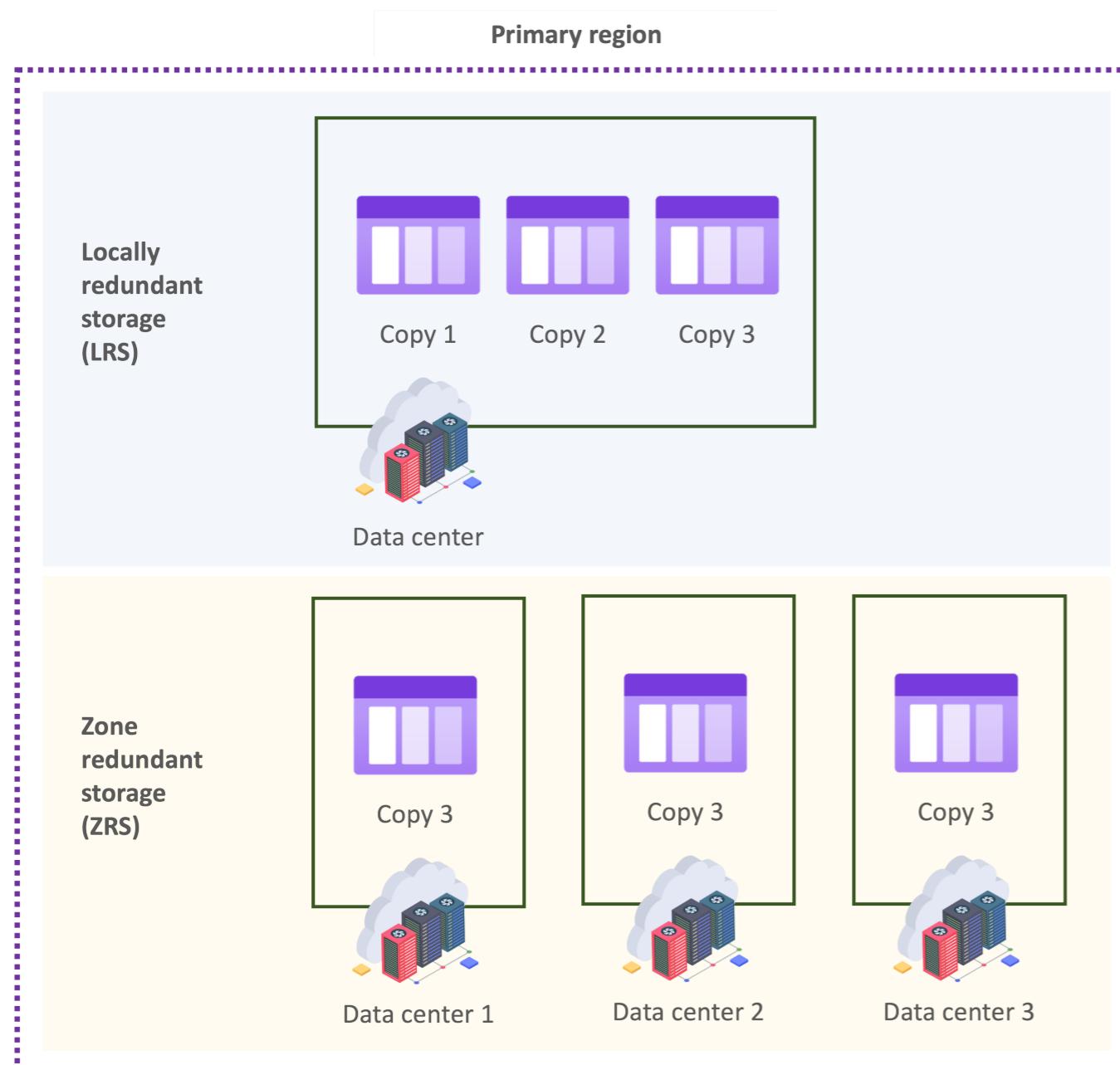
- Duplication or replication of data across multiple locations or devices
- Protects data from hardware problems, power interruptions, and natural disasters
- Ensures data is available even during failures

Locally redundant storage (LRS)



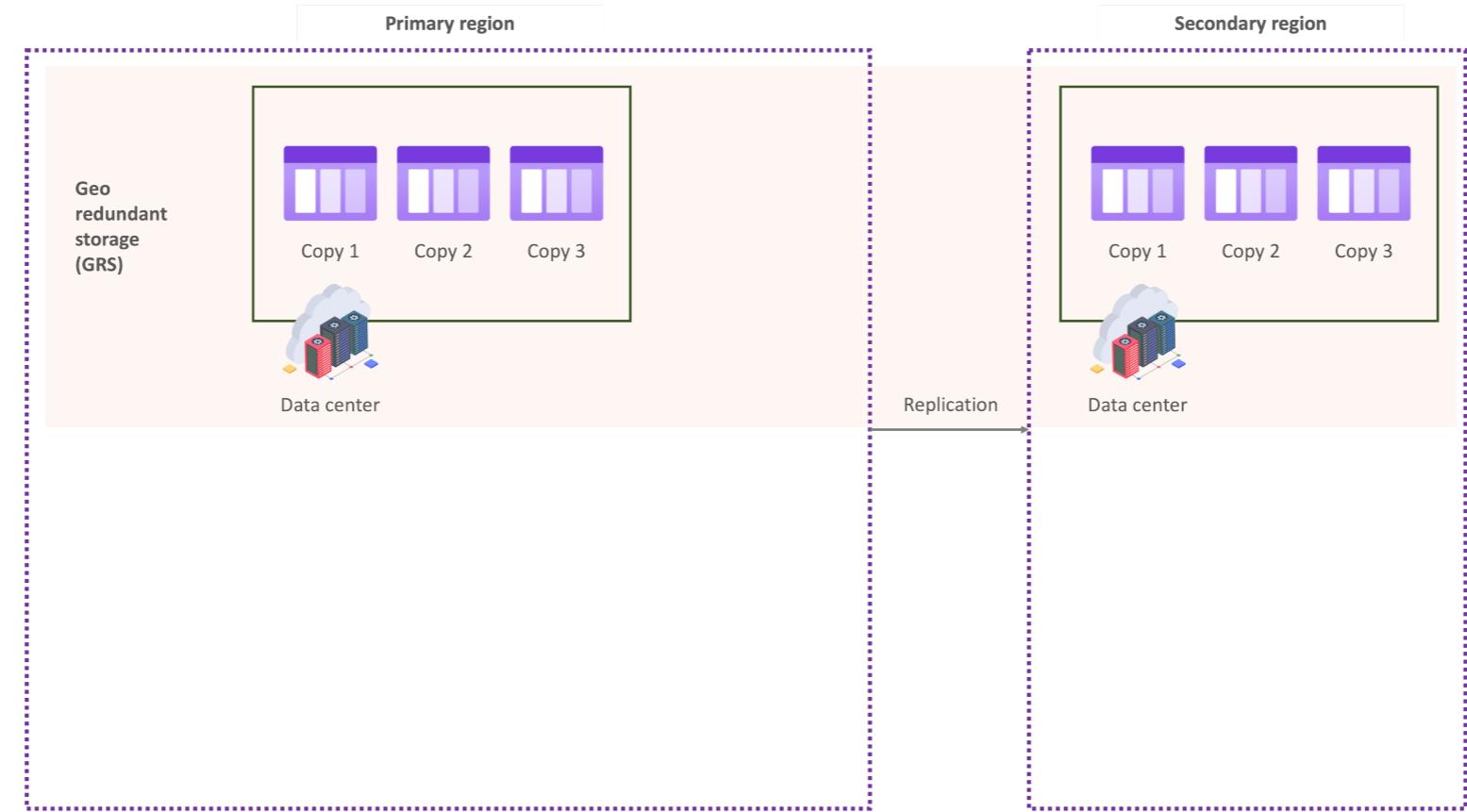
- Three copies in the same data center from the primary region
- All copies may be lost in case of disaster

Zone-redundant storage (ZRS)



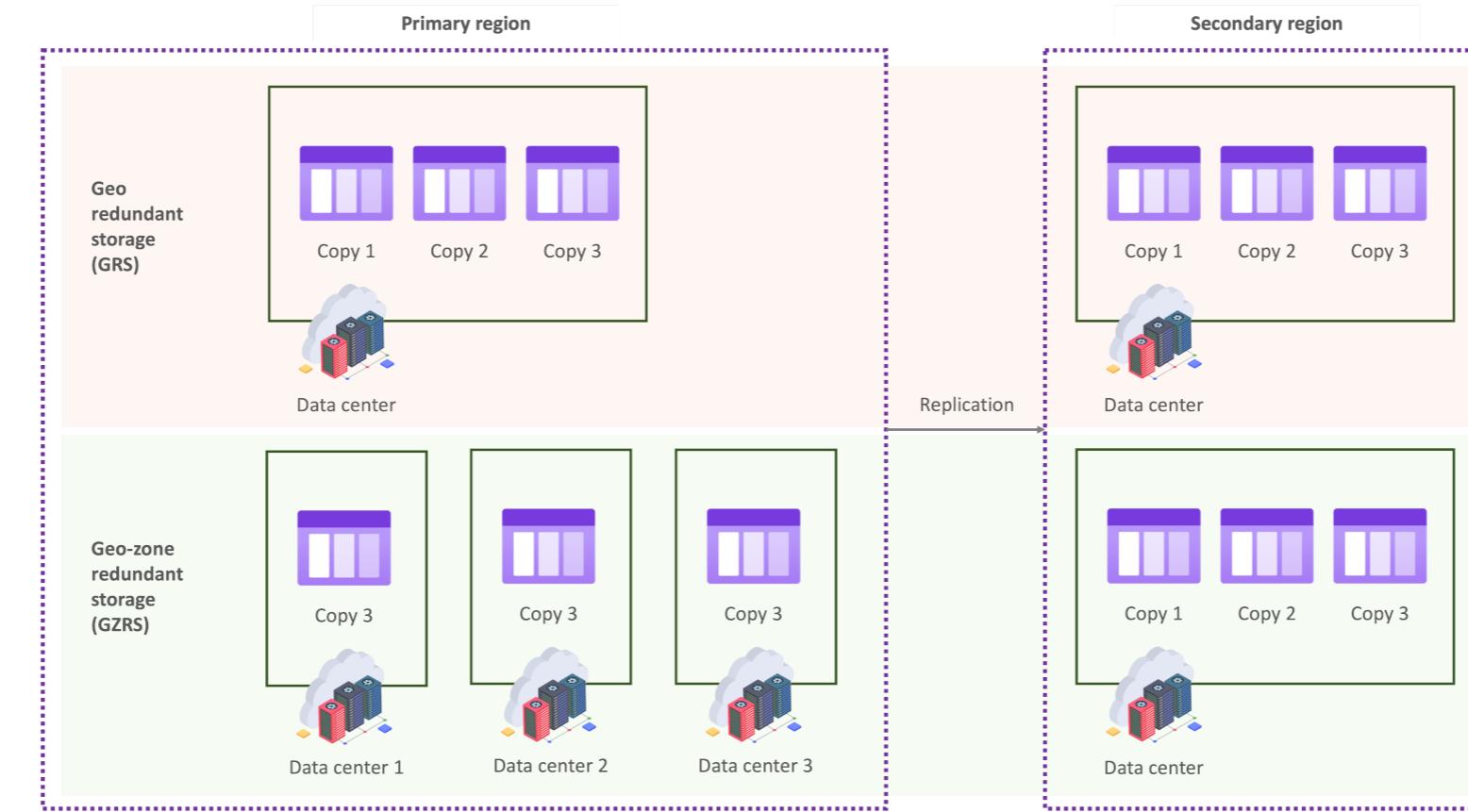
- Three copies across three data centers from the primary region
- Data remains accessible if one zone becomes unavailable

Geo-redundant storage (GRS)



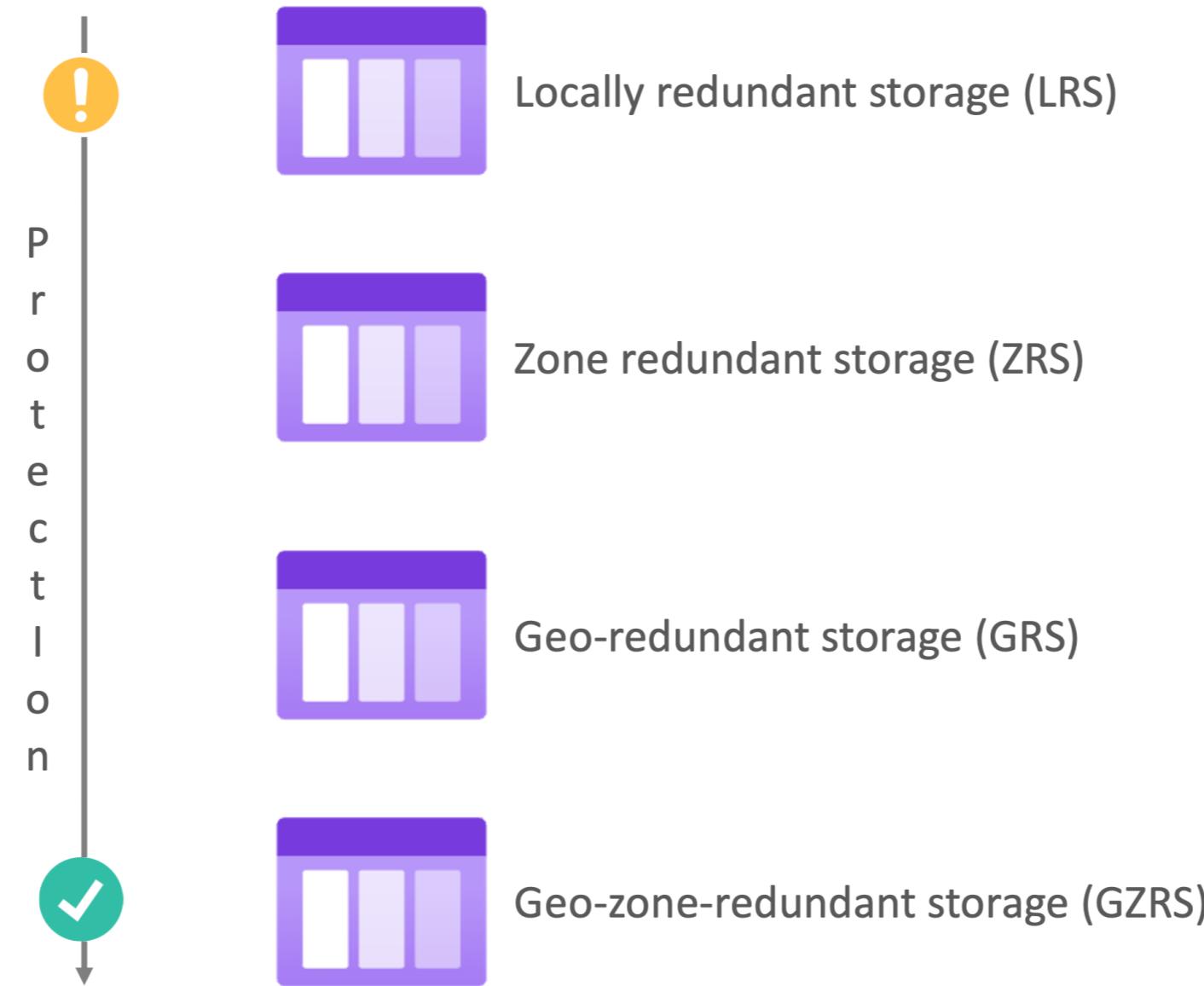
- Copy data to a secondary region for extra protection
- Data is secure when failure prevents recovery in the primary region
- Similar to the use of locally redundant storage in two regions
- Data has three copies of data in a single place for each region

Geo-zone-redundant storage (GZRS)

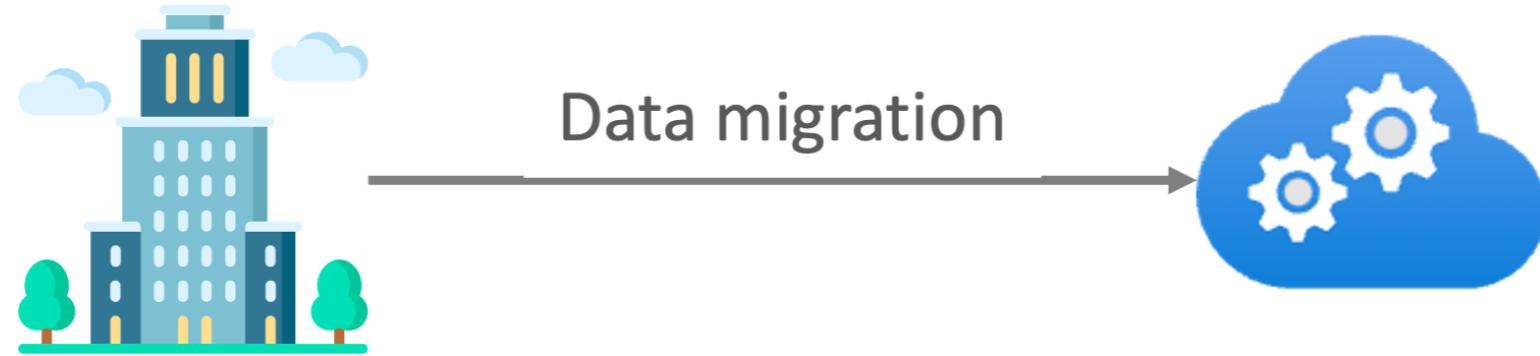


- Offers high availability from redundancy across zones and protection from regional outages
- Data copied in three availability zones in the primary region
- Data is also replicated the secondary region

Redundancy hierarchy

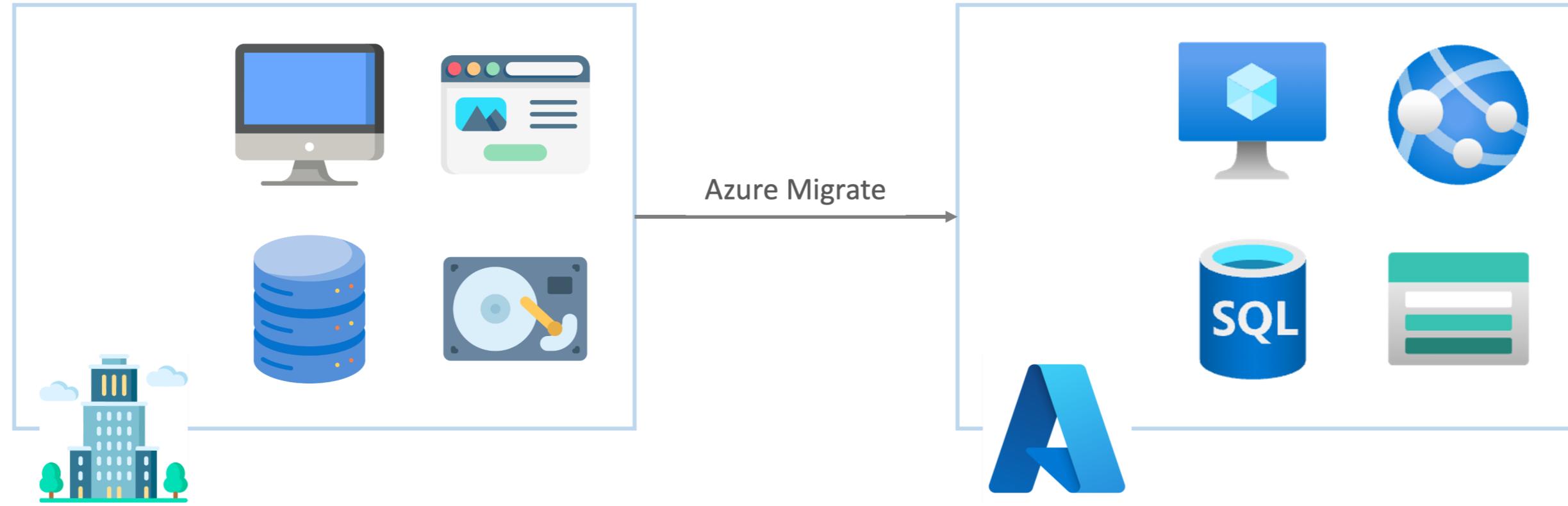


Data migration options



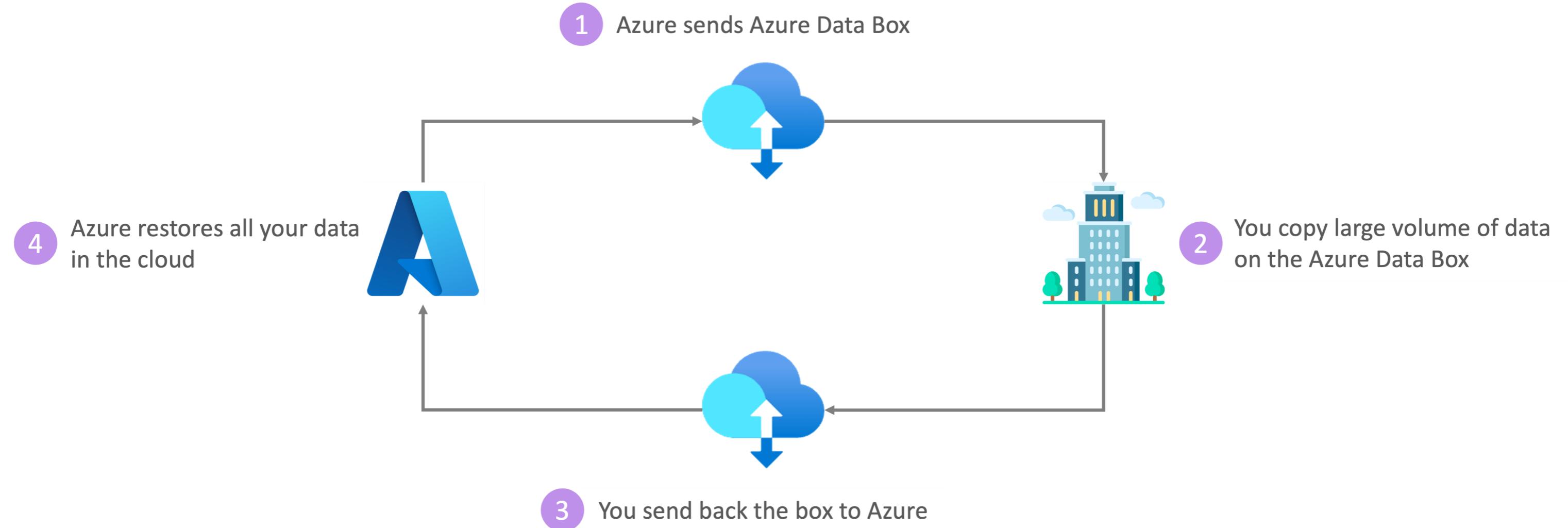
- Move infrastructure, applications, and data:
 - Azure Migrate (real-time)
 - Azure Data Box (conventional)

Azure Migrate

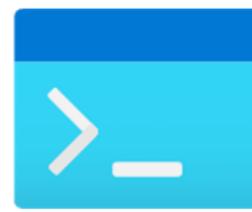


- Service to move from on-premises to the cloud
- Offers a variety of tools for assessing and migrating data
- Helpful when moving data in Azure cloud

Azure Data Box



File operations



AzCopy



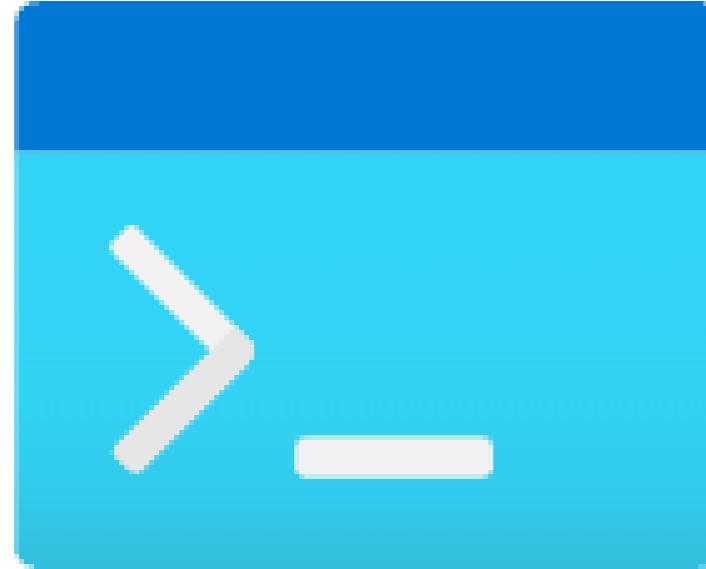
Azure Storage Explorer



Azure File Sync

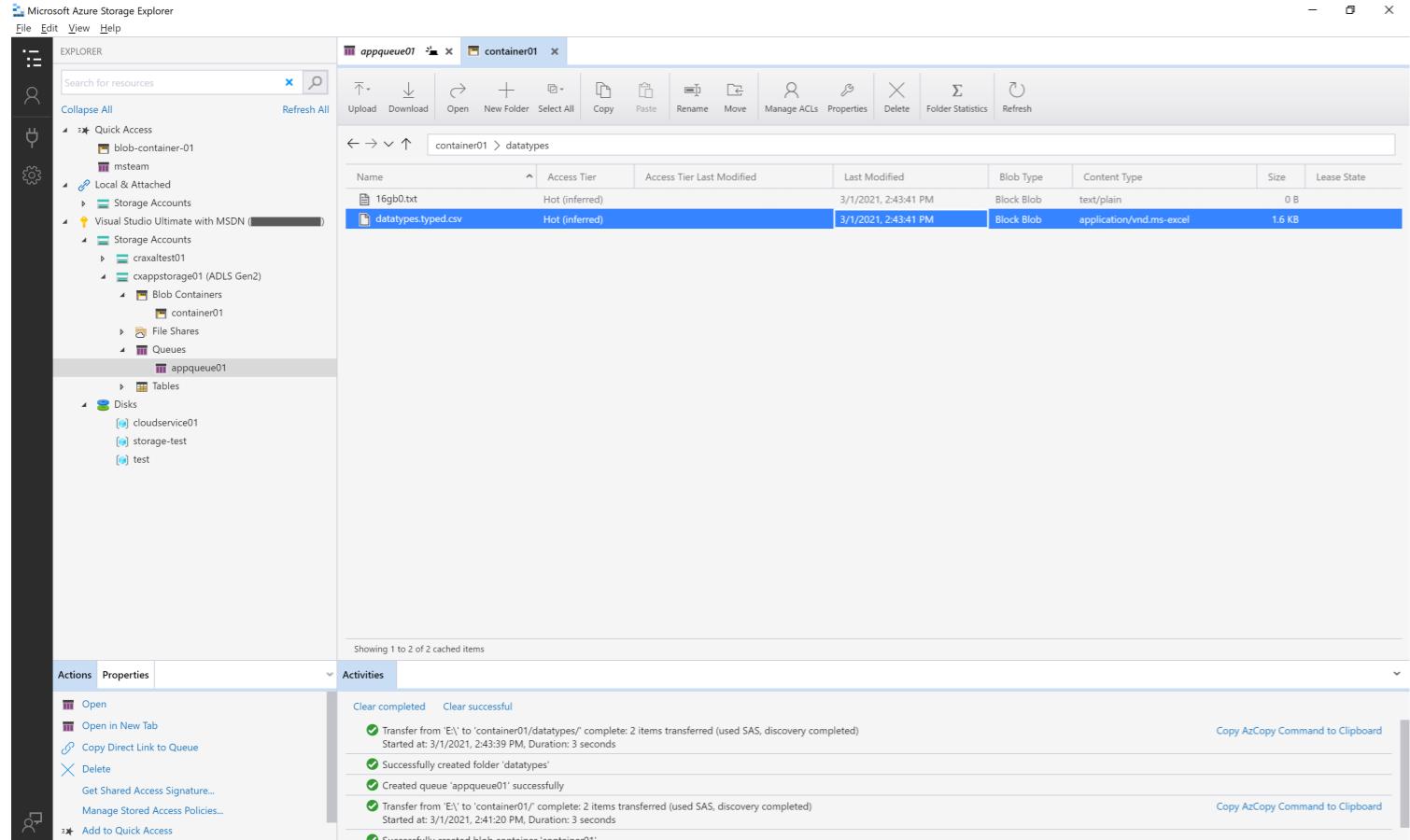
- Azure provides tools designed for moving or interacting with individual files or groups of files

AzCopy



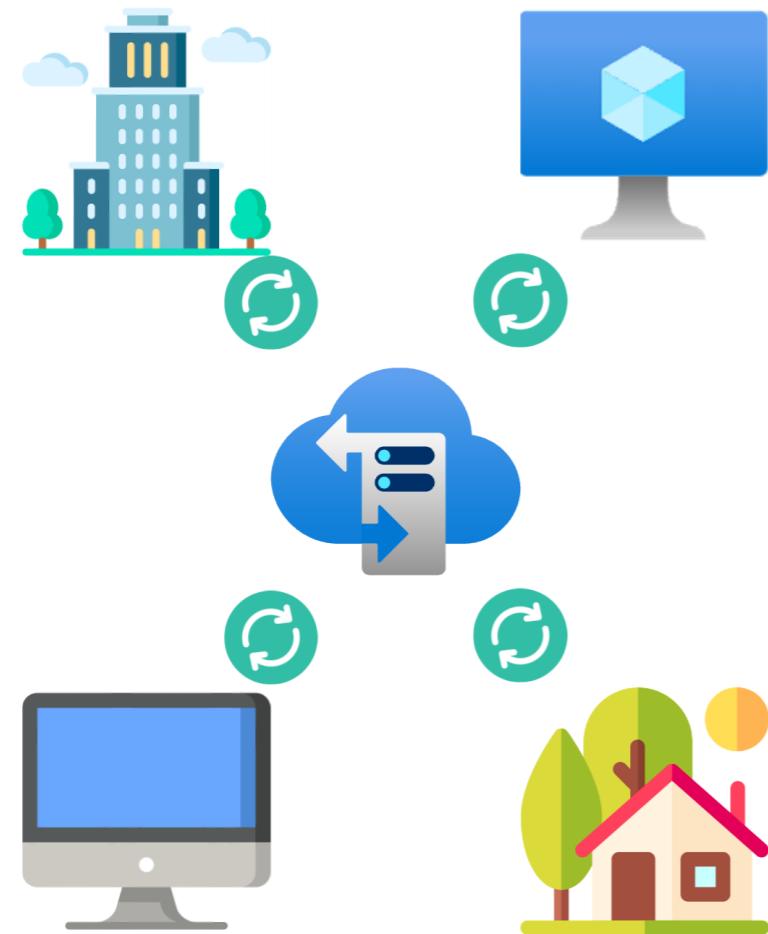
- Command-line tool
- Facilitates file manipulation
- Used for:
 - Storage accounts
 - Local sources
 - Other cloud providers

Azure Storage Explorer



- Application with a graphical interface
- Handle files and blobs in storage accounts
- Same functionality as AzCopy
- User-friendly interface

Azure File Sync



- Synchronize files across different computers and Azure cloud
- Most recent files are accessible from any location

Let's practice!

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Work with blobs in storage accounts

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