

Data Storage in Azure



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Storing data in the cloud requires flexible solutions to new and old problems

Storage services for specific data types

Benefits to Azure data storage solutions

- Automated backup and recovery
- Replication across the world
- Encryption options
- Security and platform integration
- Development features and support

Categories of Data

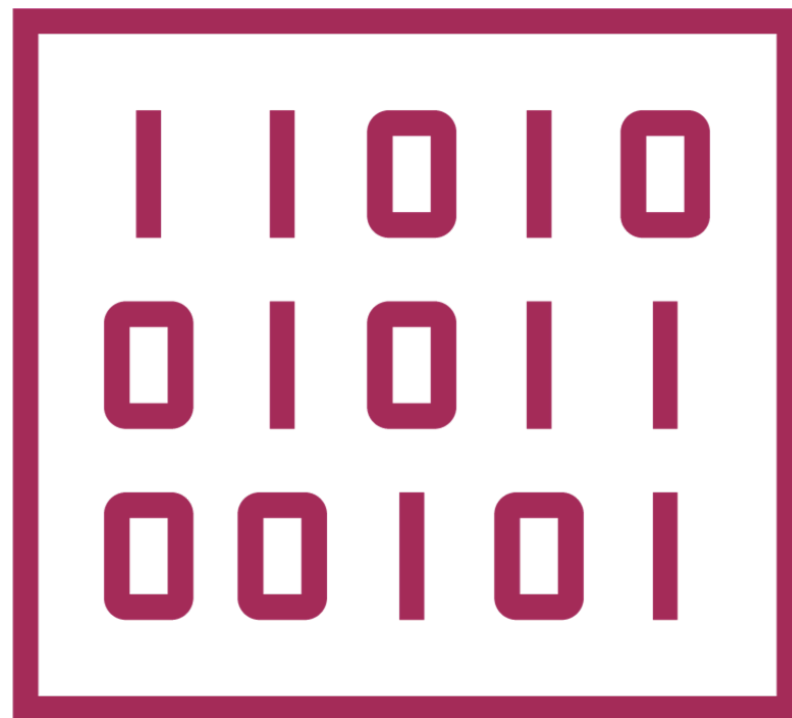


Structured Data

Azure SQL Database

Azure Database for MySQL

Azure Database for
PostgreSQL



Unstructured Data

Azure Blob Storage

Azure File Storage

Azure Disk Storage



Semi-structured Data

Cosmos DB



Module Overview



Understanding storage options in Azure

Azure Storage Accounts

Redundancy options

Create a storage account

Blobs and Files in Azure Storage

Data transfer options

- Online
- Offline

Azure Migrate



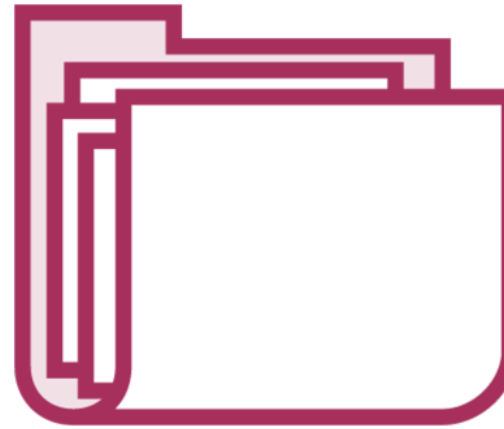
Azure Storage Accounts



Azure Storage Services



Blob Storage



File Storage



Disk Storage

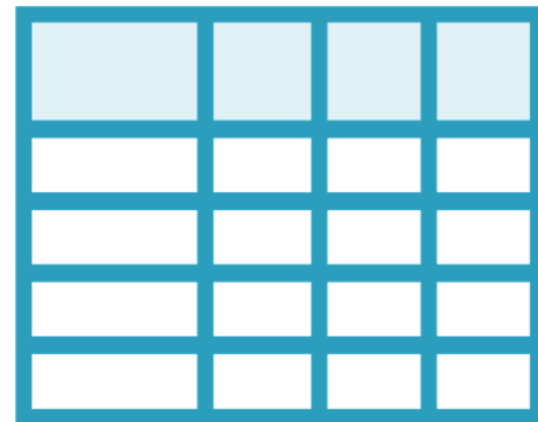
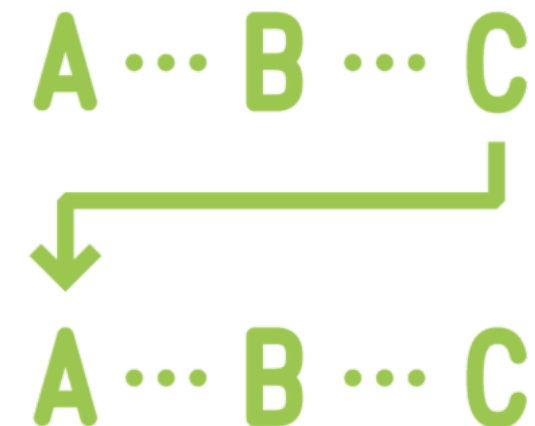


Table Storage



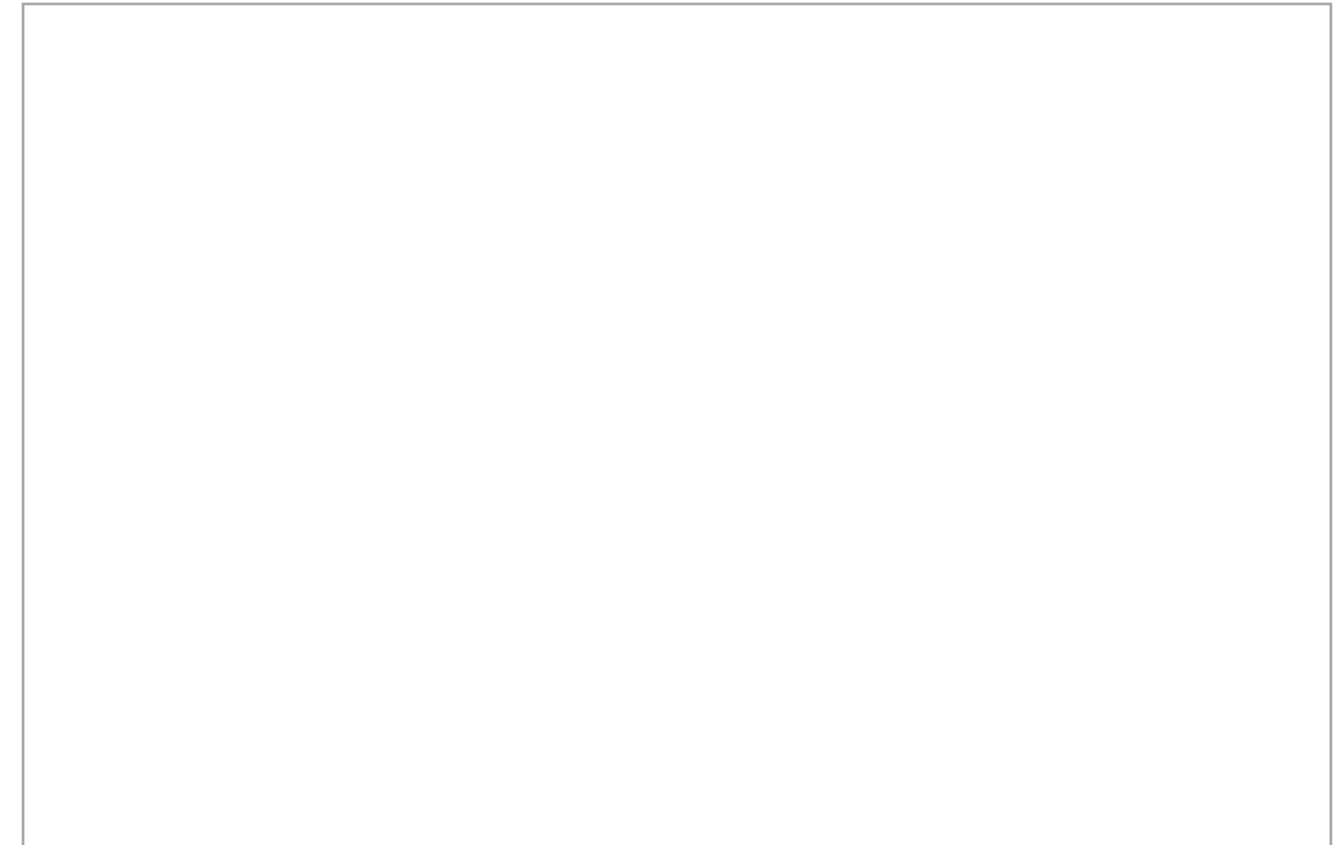
Queue Storage

Locally Redundant Storage (LRS)

Region A



Region B



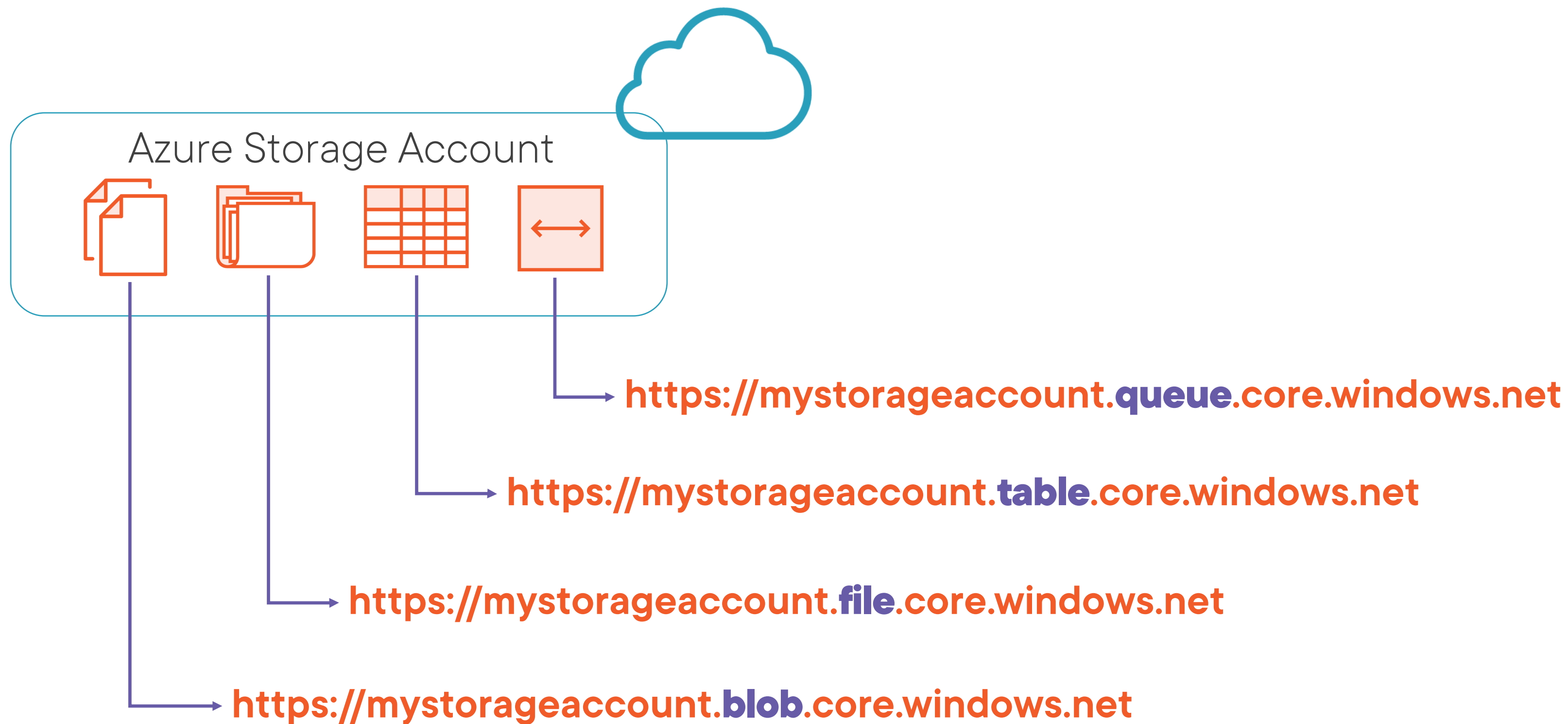
Geo Redundant Storage (GRS)

Region A



Region B





Authorization to Data

RBAC in Azure AD

**Storage Account
Keys**

**Shared Access
Signatures**





Shared Access Signature

Security token string

- “SAS Token”

Scope to

- Storage Account
- Services, i.e. Blob or File
- Individual containers and blobs

Start and end validity period

Contains permissions

Shared Access Signature example

<https://myaccount.blob.core.windows.net/container1/file1.pdf?sv=2017-07-29&st=2018-04-30T19%3A19%3A19Z&se=2018-05-01T19%3A19%3A19Z&sr=b&sp=rl&sip=168.1.5.60-168.1.5.70&spr=https&sig=pk9oGEPqYyu0K4Gutfreq9n0CJqgnjyYgkEwcIEL8l0%3D>



Programmatic Access to Storage Accounts

REST APIs

SDKs

PowerShell

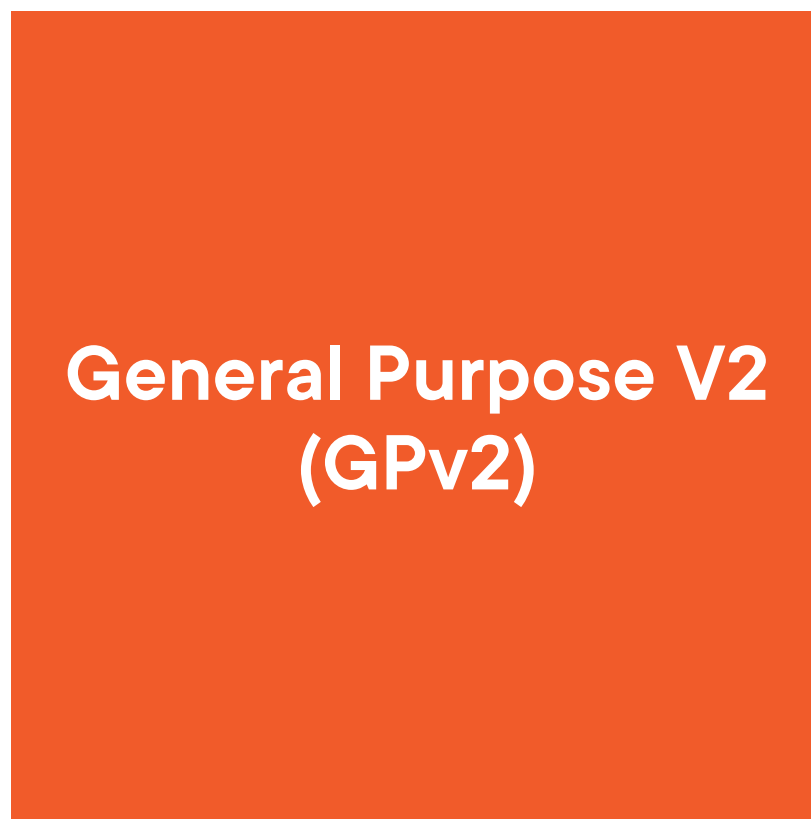
Azure CLI

**Azure Storage
Explorer**

AzCopy



Storage Account Types



**General Purpose V2
(GPv2)**

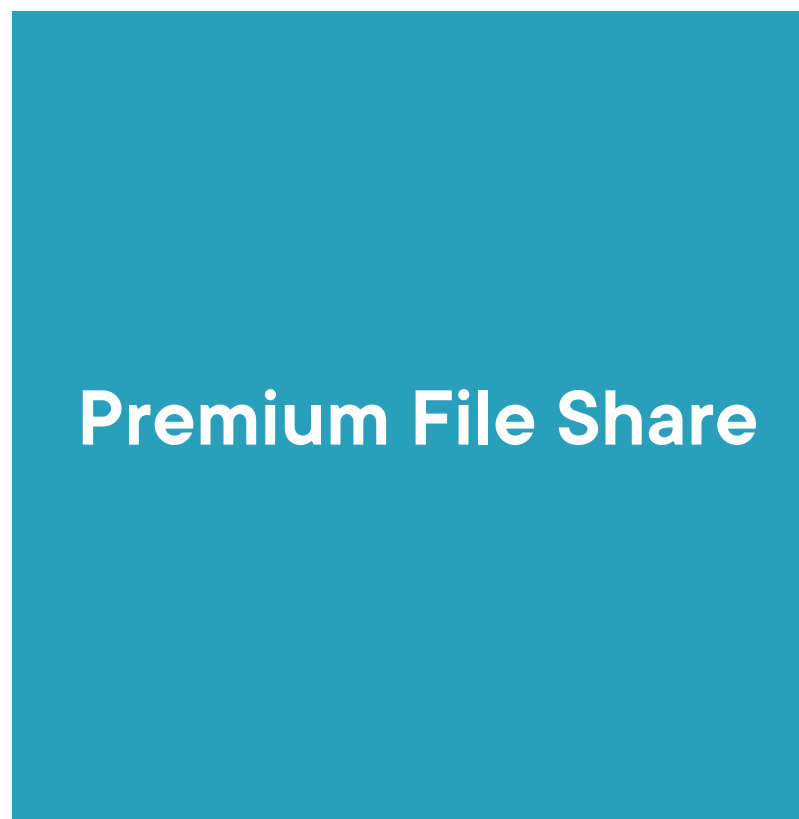
Blobs, Files, Tables,
Queues
Recommended type
Most redundancy options

Solid State Drives



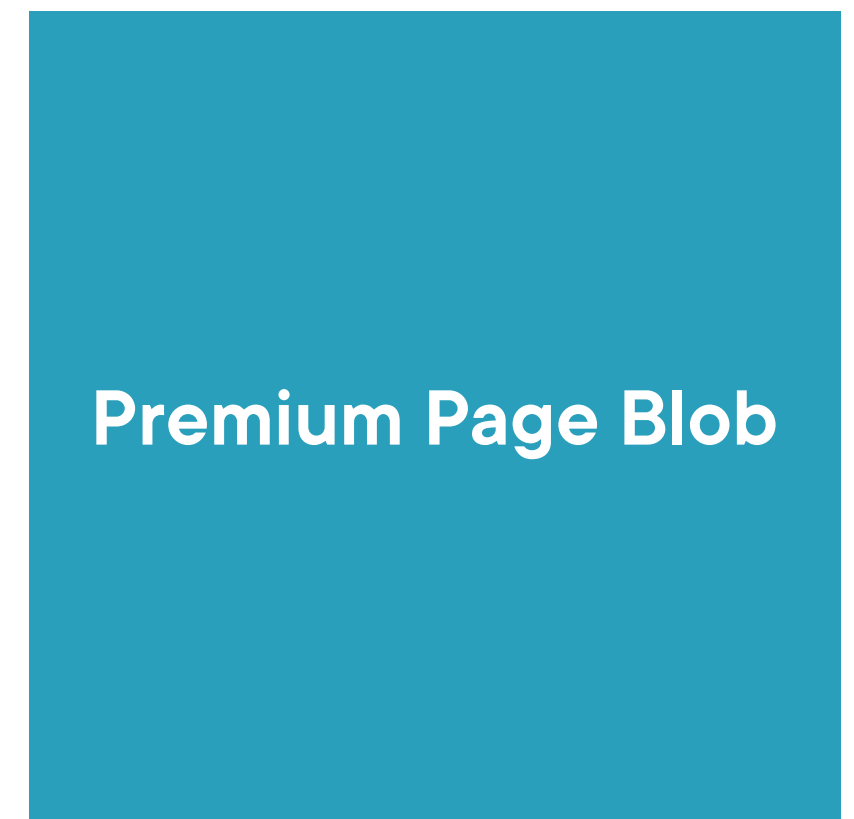
Premium Block Blob

Blobs only
High performance
Locally-redundant and
Zone-redundant storage
only



Premium File Share

Files only
Locally-redundant and
Zone-redundant storage
only



Premium Page Blob

Page blobs only
Locally-redundant
storage only



Storage Account Redundancy Options



Categories of Redundancy Options



Redundancy in the Primary Region

Redundancy in a Secondary Region

Read Access to Data in the Secondary Region

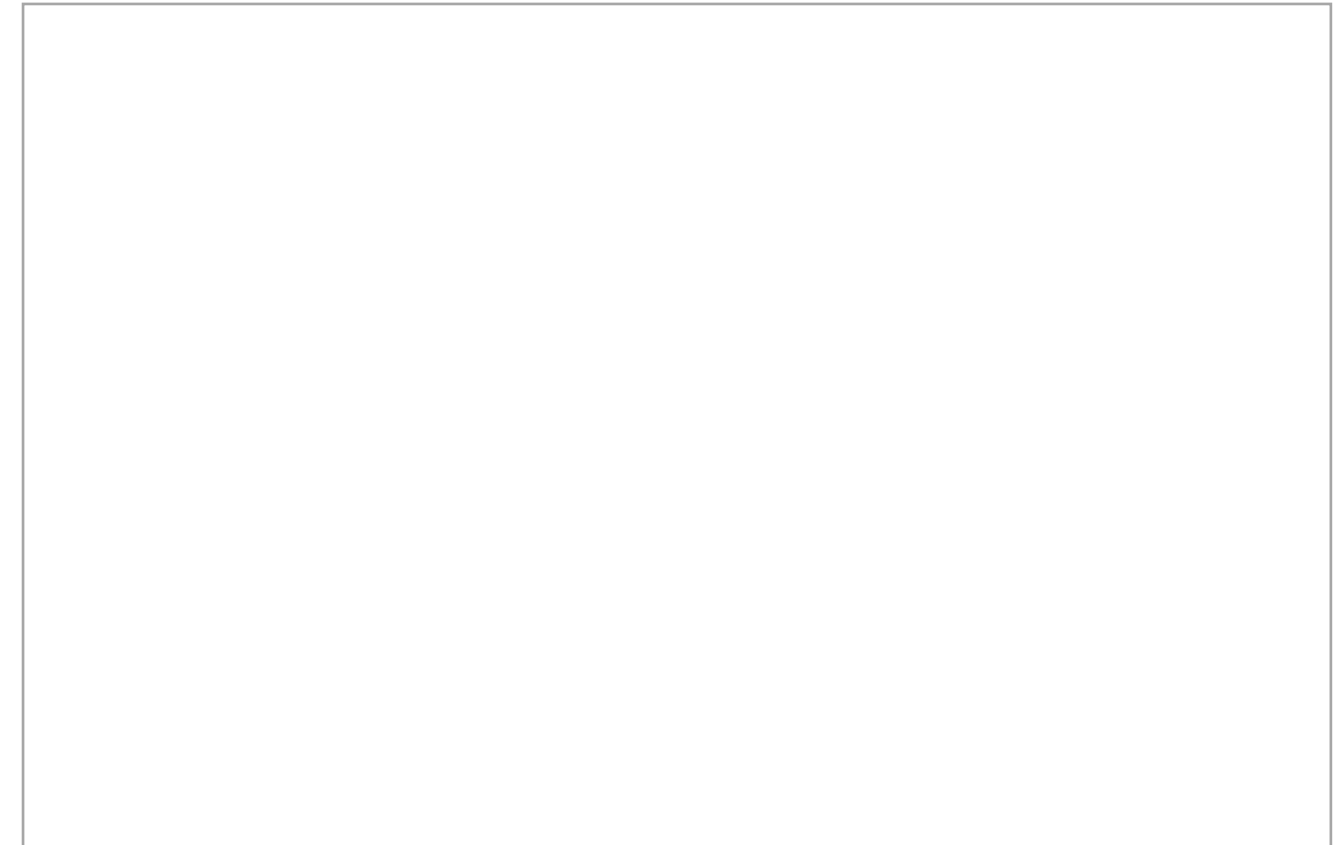


Locally Redundant Storage (LRS)

Region A

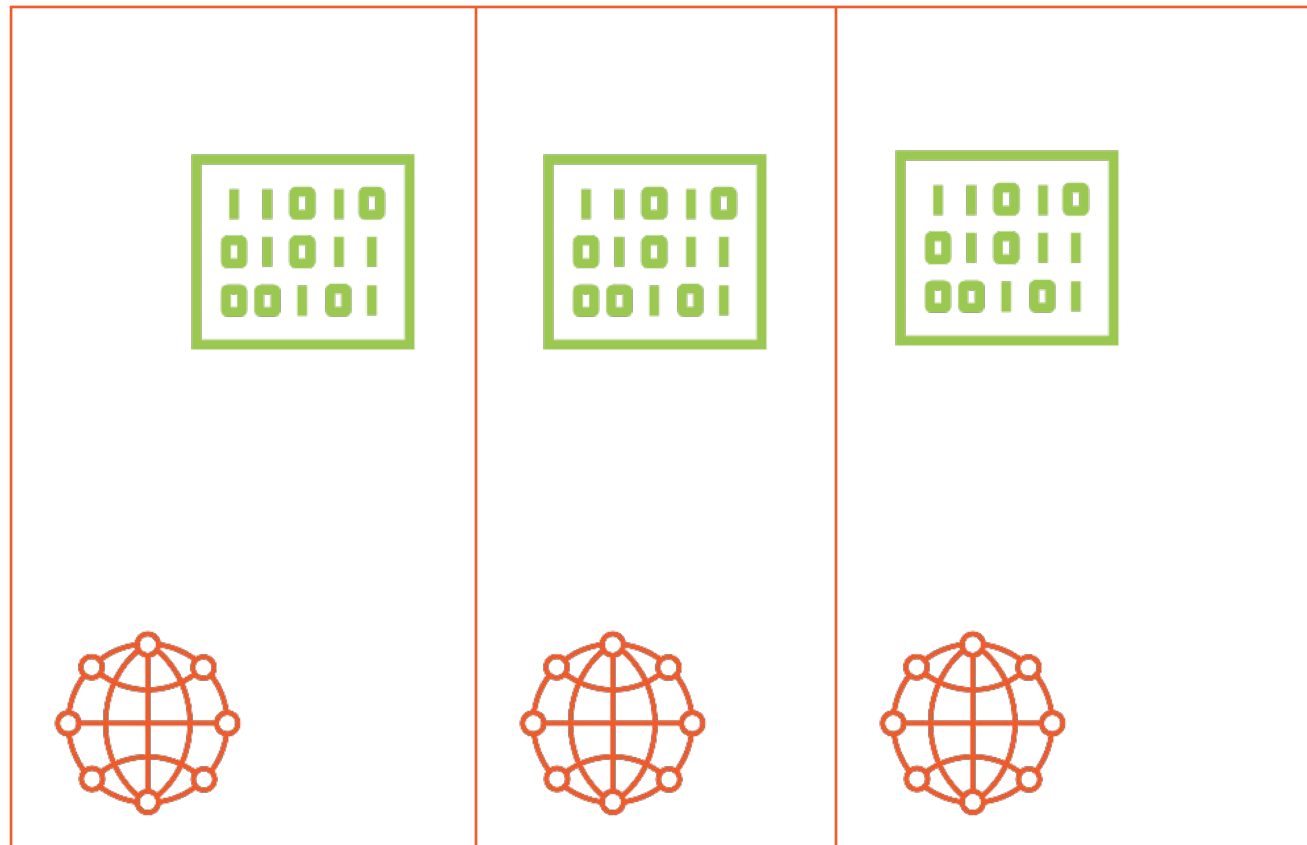


Region B

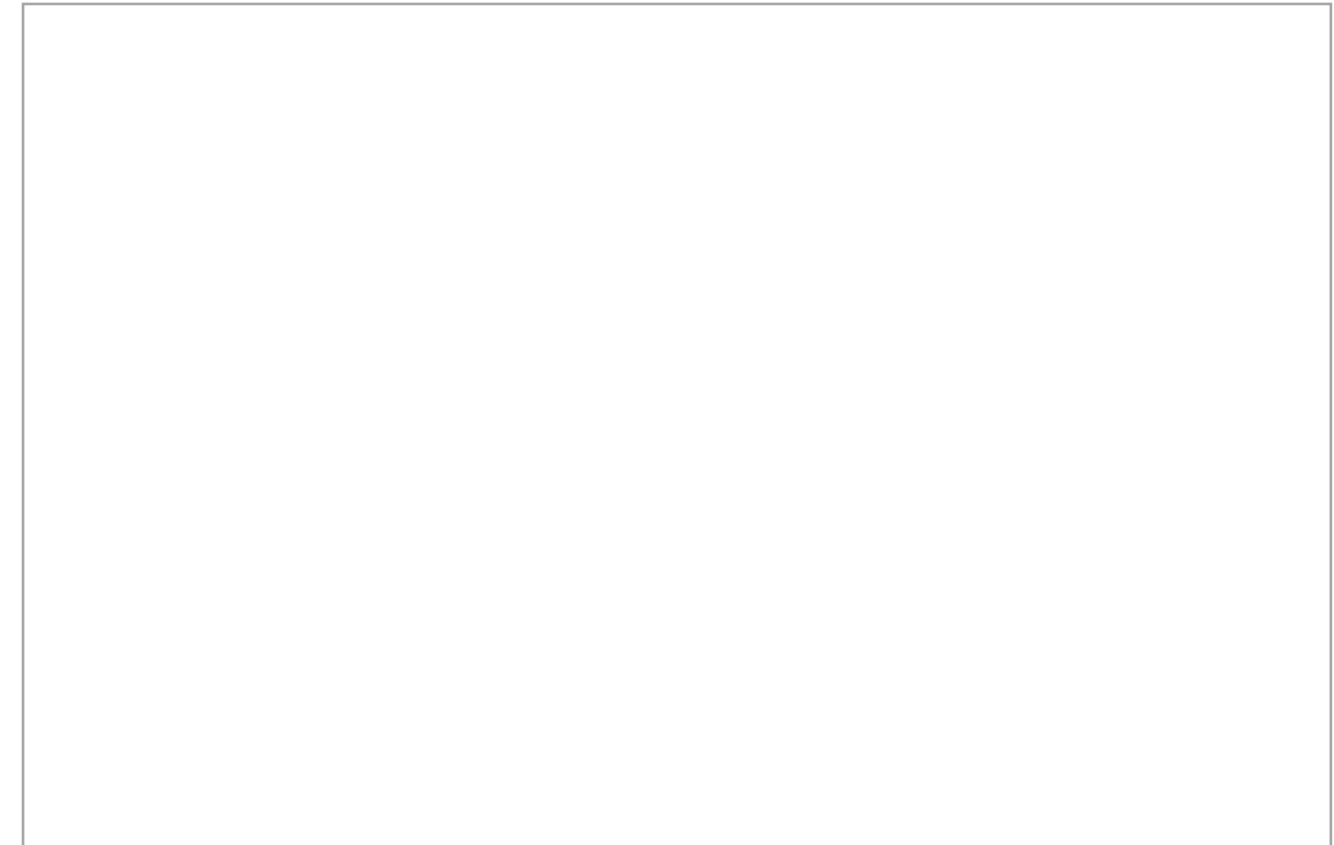


Zone-redundant Storage (ZRS)

Region A



Region B



Geo-redundant Storage (GRS)

Region A

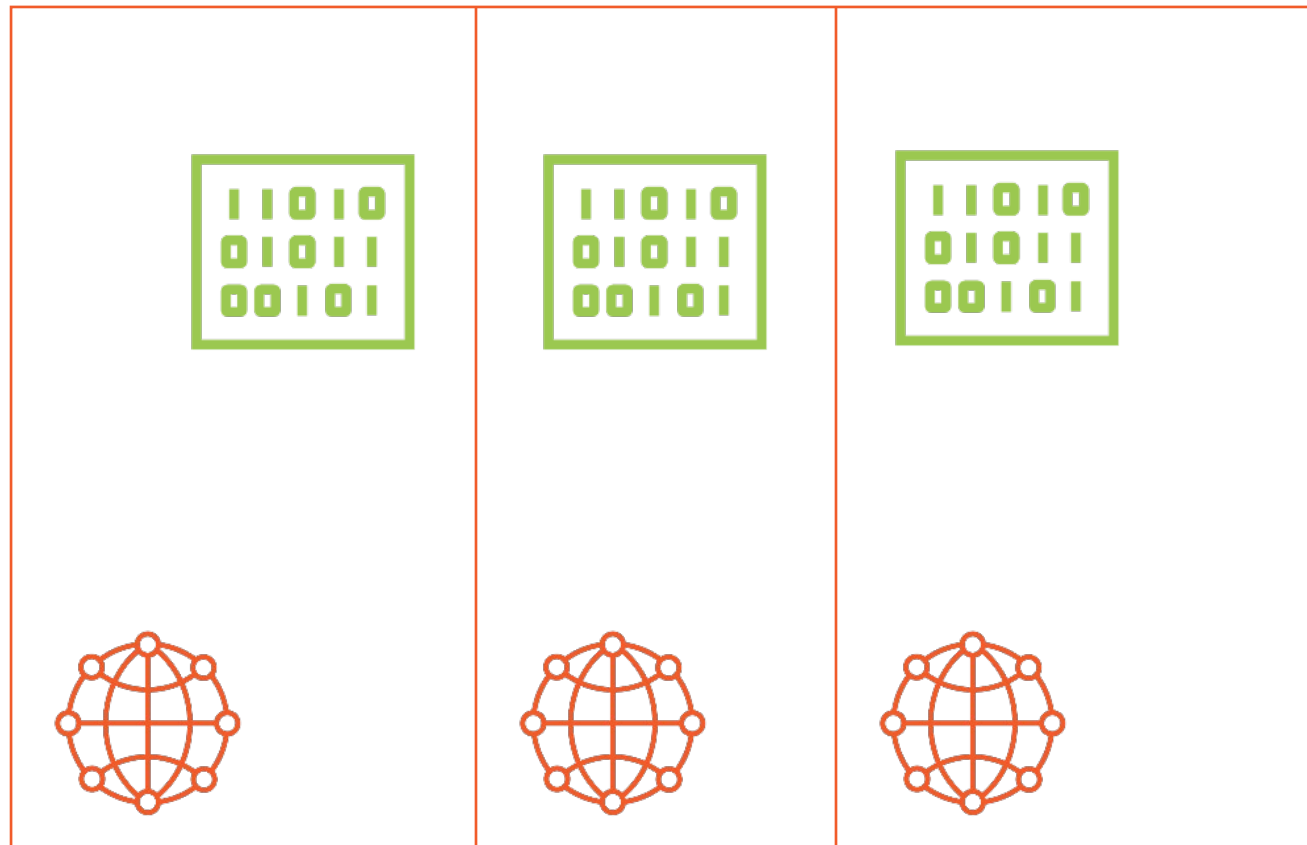


Region B



Geo-zone-redundant Storage (GZRS)

Region A



Region B



Read-access Geo-redundant Storage (RA-GRS)

Region A

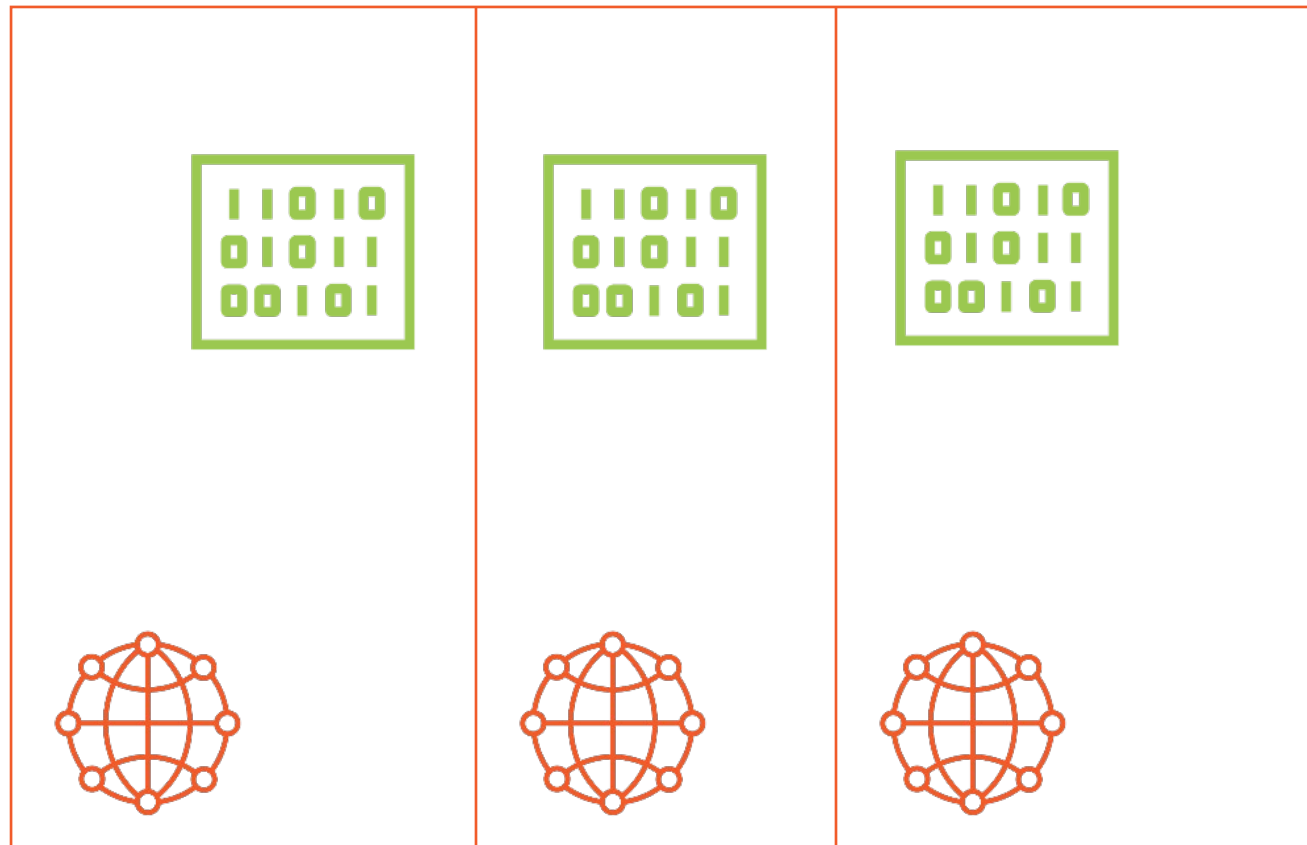


Region B (Read Only)



Read-access Geo-zone-redundant Storage (RA-GZRS)

Region A



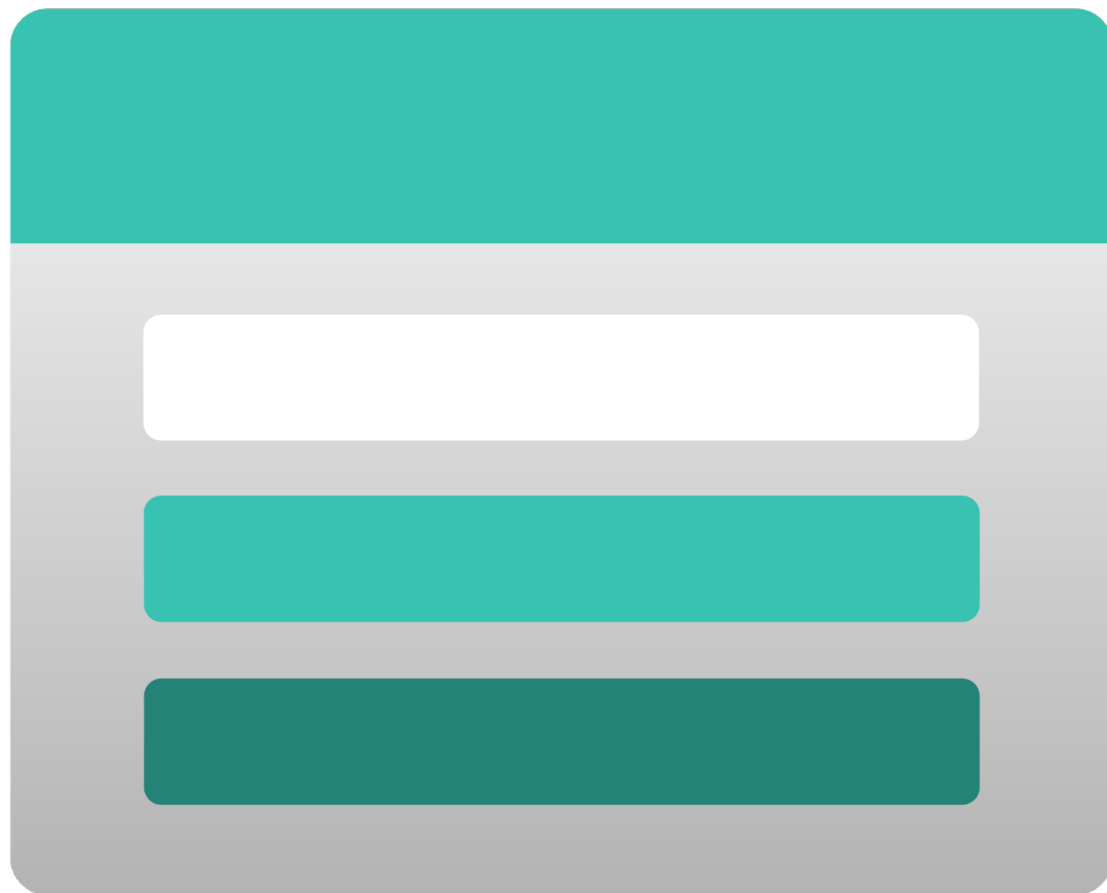
Region B (Read Only)



Blobs and Access Tiers



Azure Blob Storage Service



Binary Large Object

Any type of file

Large amounts of storage

Unstructured data



Blob Types



Block Blob

Composed of blocks



Append Blob

Can only Append Blocks

Ideal for logs



Page Blob

8TB max blob size

VM disks and databases

Frequent random
read/write applications



Cost Factors



Blob Access Tiers



Hot Tier

Highest storage cost
Lowest data access cost



Cool Tier

Lower storage cost
Higher data access cost



Archive Tier

Lowest storage cost
Highest data retrieval cost
Data is offline



Blob Service Features

Blob Snapshots

Blob Leases

Soft Delete

**Static Website
Hosting**

CDN Integration

**Azure Search
Integration**



Azure Files





Azure Files

Supports the SMB protocol

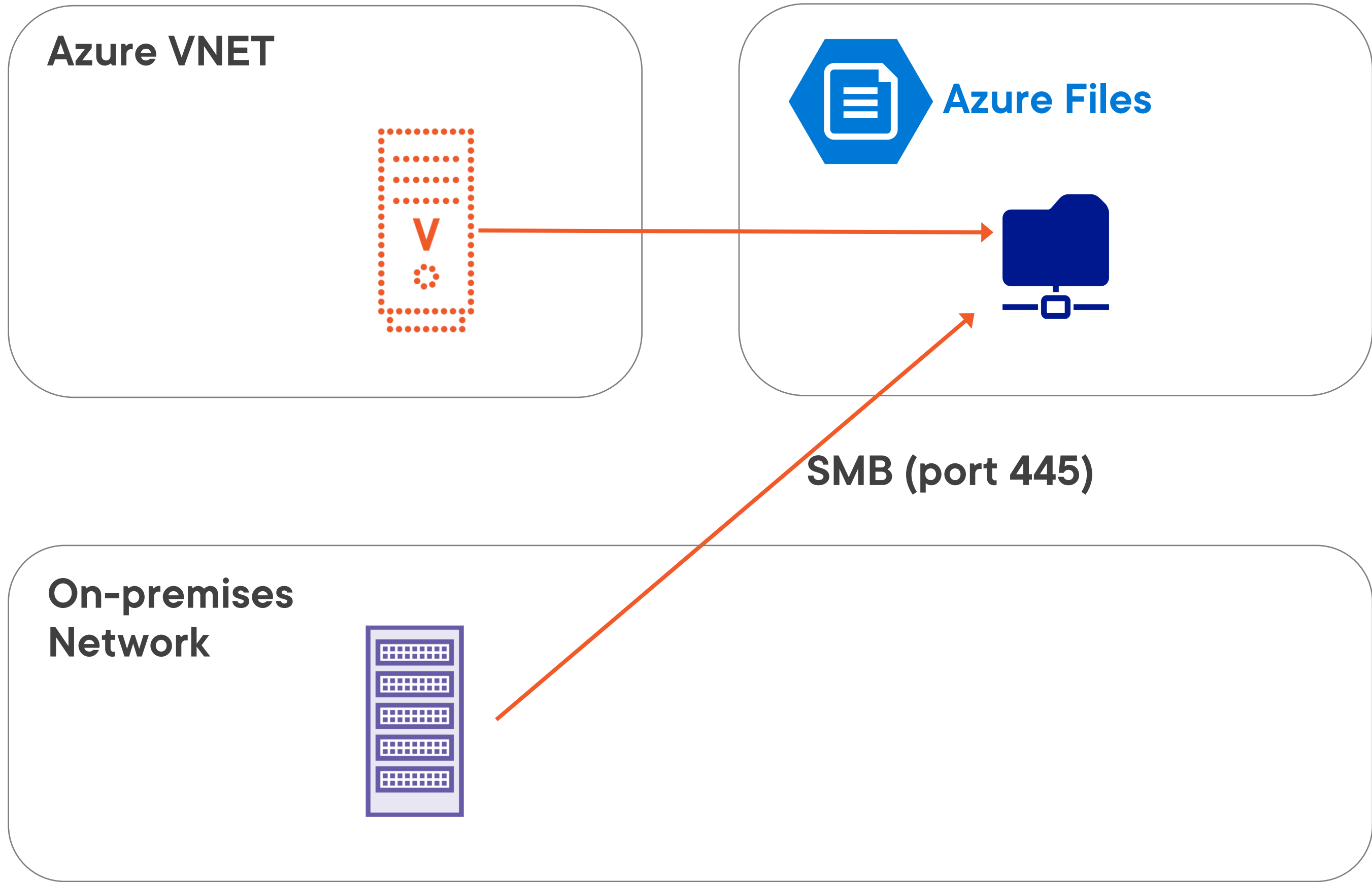
- Attach to multiple VMs
- File share with drive letter

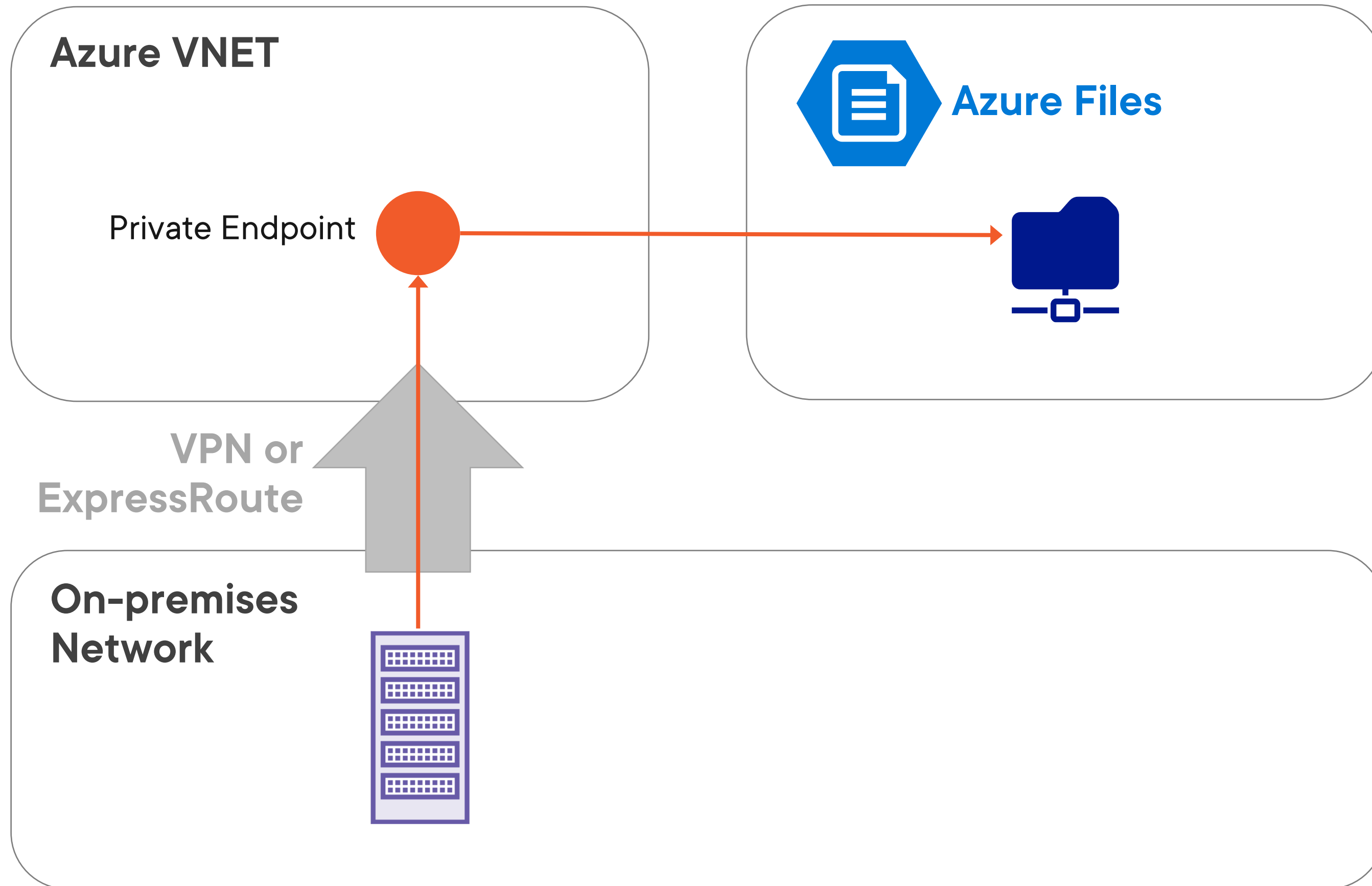
Good for migration scenarios

Files accessible through REST interface

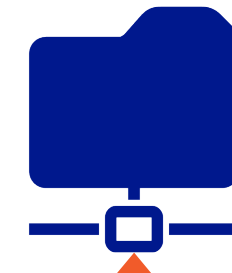
- Mechanisms for restricting access





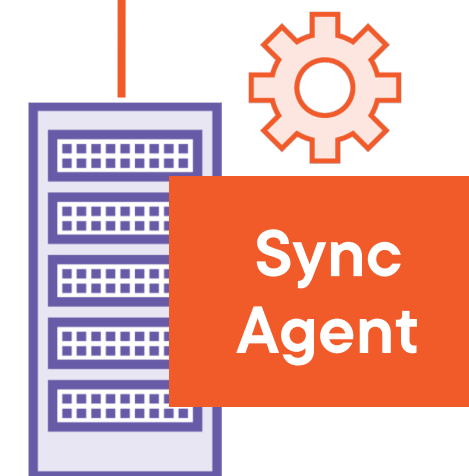


Azure VNET



**On-premises
Network**

Azure File Sync



Azure Files Storage Tiers

Premium File Share

Premium account type
Runs on SSD
High performance
Low latency

Transaction Optimized File Share

General Purpose v2
account type
Runs on HDD
Backend for apps

Hot File Share

General Purpose v2
account type
General file sharing
Azure File Sync

Cool File Share

General Purpose v2
account type
Lower cost
Offline archival



Data Transfer Options



Data Transfer Considerations



Amount of data to transfer



Frequency of data transfer



Available network bandwidth



Online Data Transfer Options

Azure Portal

**Azure Storage
Explorer**

AzCopy

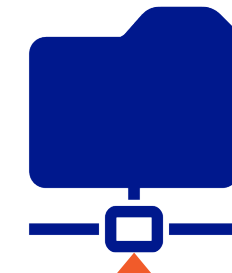
PowerShell

Azure CLI

**Storage Client
Libraries (SDKs)**

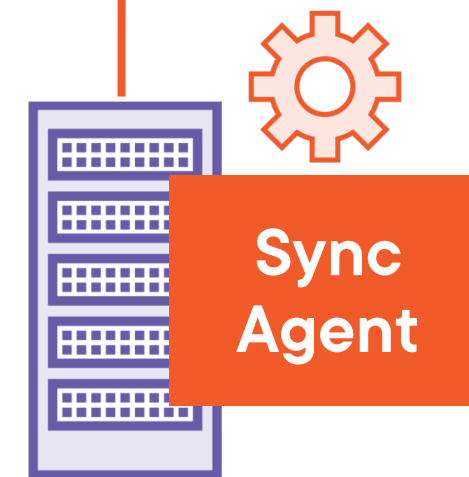


Azure VNET



**On-premises
Network**

Azure File Sync



Online Data Transfer Options

Azure Portal

**Azure Storage
Explorer**

AzCopy

PowerShell

Azure CLI

**Storage Client
Libraries (SDKs)**



Managed Database Products in Azure





**SQL Server on
Virtual Machines**

Full control over the SQL Server

Can provision from the Azure Marketplace

Flexible pricing options

Automated updates scheduling

Managed Backup to Microsoft Azure





Azure SQL Database

Fully managed platform-as-a-service

Always running the latest version of SQL Server

Flexible pricing model

- Vcores
- DTU's

Single database or Elastic Pool

Automatic scaling

Service tiers for different workloads





**Azure SQL
Managed Instance**

Broadest set of SQL Server capabilities

Benefits of managed platform

Deploy VM onto your own VNET

Lift-and-shift with minimal changes



Managed Database Services in Azure



**Azure
Database for
MySQL**



**Azure
Database for
PostgreSQL**

Azure Migrate



Azure Migrate

Servers

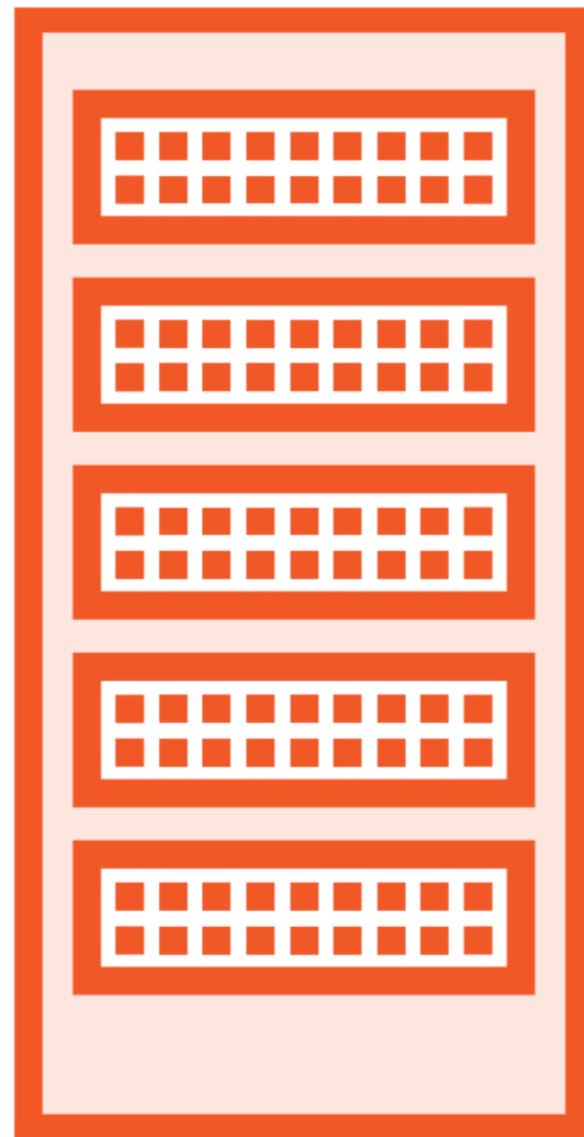
SQL Servers

Web Apps

Unstructured Data

**Virtual Desktop
Infrastructure**





Physical and Virtual
Servers

Azure Migrate: Discovery and Assessment tool

- Assesses readiness to migrate
- Estimates size and costs of Azure servers
- Identifies dependencies
- Virtual appliance installed locally

Azure Migrate: Server Migration tool

- Replicates servers to Azure
- Install replication appliance locally
- Install mobility service agent on server
- Incremental updates after initial migration



SQL Server Database

Data Migration Assistant

- Detects compatibility issues with cloud
- Recommends performance and reliability improvements

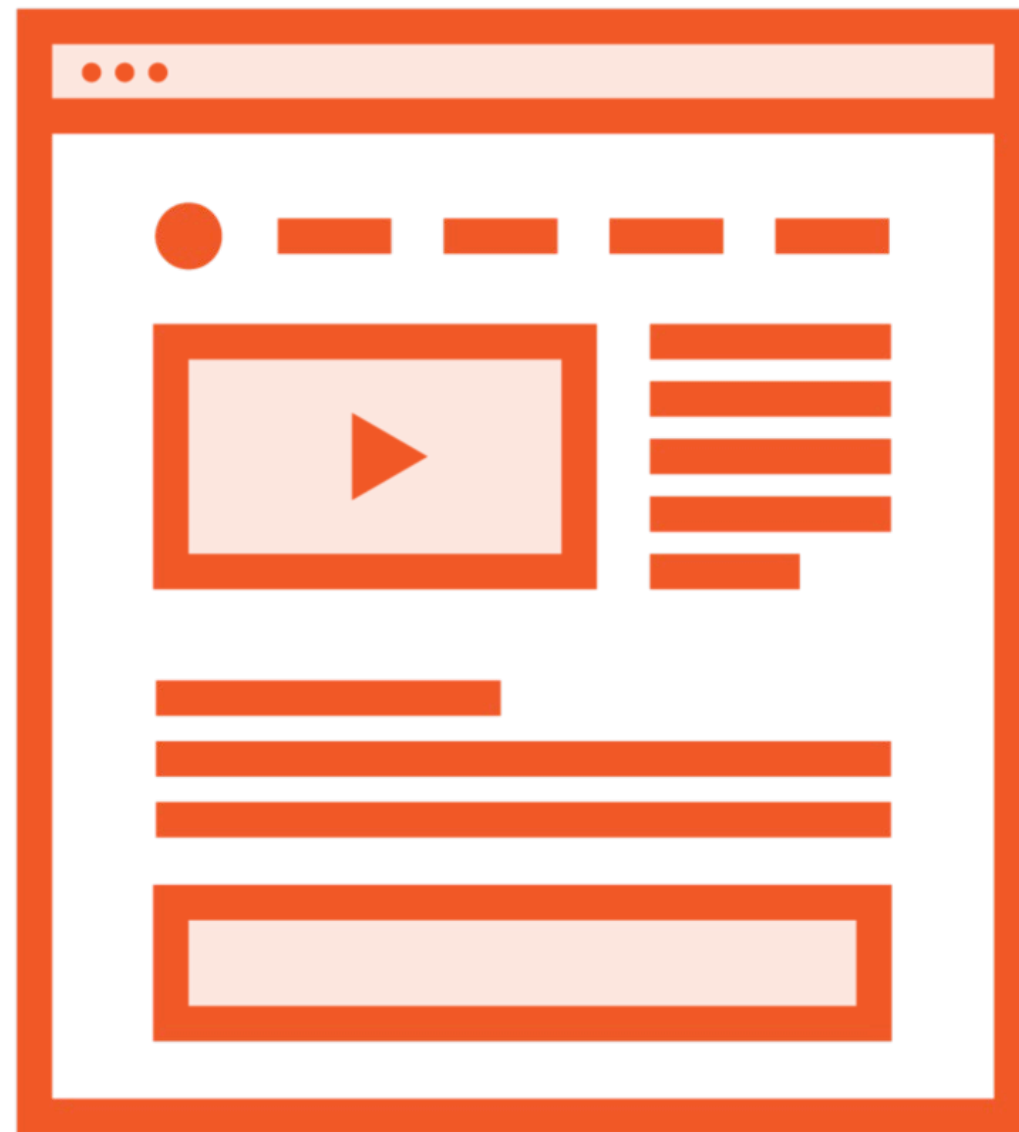
Azure Database Migration Service

- For large database migrations

Targets in Azure

- SQL Server on virtual machines
- Azure SQL Database
- Azure SQL Managed Instances





Web Applications

.NET and Java web applications hosted on-premises

Azure App Service

- Containers
- Code deployment

Azure Kubernetes Service (AKS)

- Docker file created
- Azure Container Registry



Azure Data Box for Migrating Data to Azure





Azure Data Box
Gateway

Virtual device hosted on-premises

Use it like a file share

Transfers data over the internet to Azure

Could use Data Box for initial transfer

Use Data Box Gateway for ongoing transfers



Module Summary



Overview of storage options

Azure Storage Accounts

Created and explored Storage Account

Data migration options

- Storage Explorer
- Azure Data Box

Azure Migrate



Up Next:
Azure Management and Monitoring

