Azure Storage

Agenda

- Azure offerings
- Azure Storage services
- Features
- Blob Storage & its features

Azure Offerings in Object Storage

- Azure Storage
  - Blob storage
  - File storage
  - Queue storage
  - Table storage
- Azure Data Lake Gen1 → Azure Data Lake Gen2
- Azure Disks

Azure Storage

- Object Storage
- Max storage capacity of 5 PiB (~5.6 PB)
- Multiple data replication options
- Different tiers to store data based on requirements
- REST API compliant
- Multiple client libraries available – .NET, Java, PHP, Python, Ruby, NodeJS

Azure Storage Services

- Blob Storage
  - Used to store massive volumes of unstructured data (raw data, backups etc.)
  - Access files using URL
  - Supports streaming for video & audio files
- File Storage
  - Azure hosted file shares
  - Supports SMB & NFS protocols
  - Supports caching on Windows Servers using File Sync

Azure Storage Services

- Queue Storage
  - Store huge number of messages in a queue up to size of storage account
  - Build asynchronous architecture
  - Limited features – useful in basic scenarios
  - Enterprise Queue/Bus functionality available in Azure Service Bus
- Table Storage
  - Key-value type of NoSQL database
  - Store vast amounts of structured & non-relational data
  - Cosmos DB Table API is similar offering but with many great features

greatlearning
Learning for Life

Azure Storage - Part 2

Agenda

- Access Tiers
- Lifecycle Management
- Redundancy Options
- Failover
- Performance Tiers
- Encryption

Access Tiers

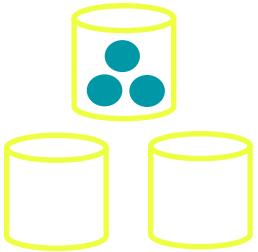
	Hot storage tier	Cool storage tier	Archive storage tier
When to use?	Read & write frequently	Infrequently accessed data	Archival
Availability	99.9%	99%	Offline
Availability (RA-GRS reads)	99.99%	99.9%	N/A
Charges	Higher storage costs, lower access & transaction costs	Lower storage costs, higher access & transaction costs	Lowest storage costs, highest access & transaction costs
Minimum storage duration	N/A	30 days	180 days
Latency (Time to first byte)	milliseconds	milliseconds	Blob rehydration Standard priority – upto 15 hours High – upto 1 hour (for 10GB)

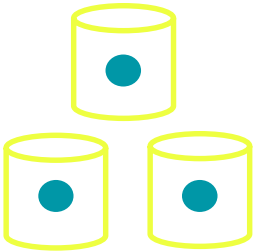
Reference: https://docs.microsoft.com/en-us/azure/storage/blobs/storage-blob-storage-tiers

Redundancy Options

- Locally-redundant storage (LRS)
- Zone-redundant storage (ZRS)
- Geo-redundant storage (GRS)
- Read-Access Geo-redundant storage (RA-GRS)
- Geo-zone-redundant storage (GZRS)
- Read-Access Geo-zone-redundant storage (RA-GZRS)

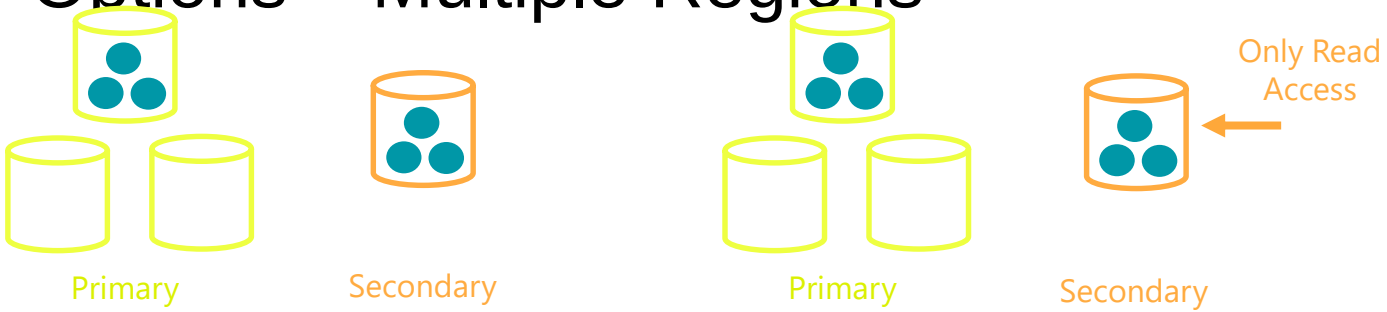
Redundancy Options – Primary Region





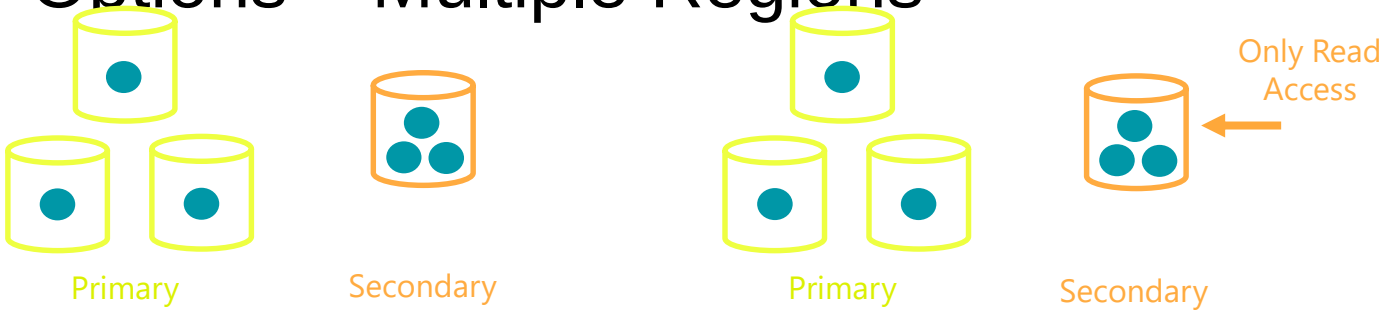
	Locally-redundant storage (LRS)	Zone-redundant storage (ZRS)
Regions	1	1
Datacenters used	1	3
Copies	3 – within same datacenter	3 – one copy in each datacenter
Copy operation	Sync copy	Sync copy
Secondary region access	N/A	N/A
Benefit	Prevents against failure in server racks & drives	Prevents against datacenter failures

Redundancy Options – Multiple Regions



	Geo-redundant storage (GRS)	Read-Access Geo-redundant storage (RA-GRS)
Regions	2	2
Datacenters used	2	2
Copies	3 in primary & 3 in secondary	3 in primary & 3 in secondary
Copy operation	Primary - Sync copy & Secondary - async copy	Primary - Sync copy & Secondary - async copy
Secondary region access	N/A	Read access
Benefit	Prevents against regional failures	Prevents against regional failures + High Availability

Redundancy Options – Multiple Regions



	Geo-Zone-redundant (GZRS)	Read-Access Geo-Zone-redundant (RA-GZRS)
Regions	2	2
Datacenters used	4	4
Copies	3 in primary & 3 in secondary	3 in primary & 3 in secondary
Copy operation	Primary - Sync copy & Secondary - async copy	Primary - Sync copy & Secondary - async copy
Secondary region access	N/A	Read access
Benefit	Prevents against regional & datacenter failures	Prevents against regional & datacenter failures + High Availability

Performance Tiers

- Standard
  - Offers three different storage tiers to store data (Hot, Cool & Archive)
  - Supports all redundancy options
  - Great for most use cases

- Premium
  - Data is stored on SSDs (Solid-state drives). No tiers available
  - Supports only LRS & ZRS

Azure File Storage

Agenda

- What is Azure File Storage?
- Mount File Share
- Azure File Sync

Azure File Storage

- Cloud-based network file share
- Map it as a network drive on client machines

- Server Message Block (SMB) & Network File Share (NFS) protocols
    - SMB file shares are accessible from Windows, Linux & macOS
    - NFS file shares are accessible from Linux & macOS

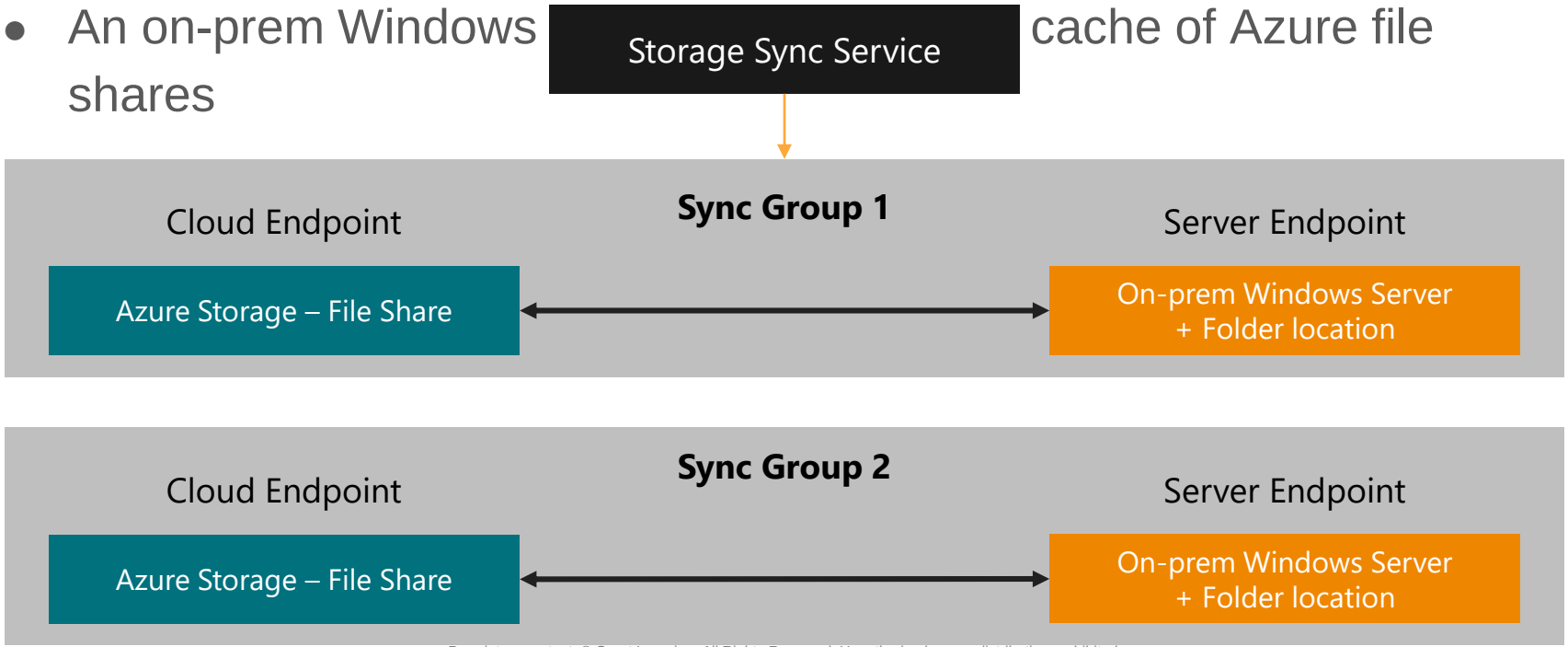
- Ways to mount File Share
    - Direct mount
    - By using Azure File Sync

Use Cases

- Migrate apps to cloud that uses network file share
- Replace on-prem file servers to Azure
- Attach file share to multiple VMs to share common configuration files, store log files in one place etc.

Azure File Sync

- Cache multiple Azure file shares on a Windows Server
- An on-prem Windows cache of Azure file shares



greatlearning
Learning for Life

Azure App Services - 1

Agenda

- What are Azure App Services?
- App Service Plan
- Deploy apps to App Service Plan
- Features of Web App
- Deployment Center

Azure App Services

- PaaS environment for hosting web apps, APIs & mobile back-ends
- Based on HTTP
- Supports Windows & Linux environments
- Multiple language & framework support
    - .NET, .NET Core, Java, Python, Ruby, Node JS, PHP
- Supports deployment of Docker containers
- Built-in DevOps support
- Auto-scale infrastructure
- Pre-built templates are available in Marketplace

greatlearning
Learning for Life

Azure App Services - 2

Agenda

- Deployment Slots
- Authentication
- Scaling App Service Plan
    - Vertical scaling
    - Horizontal scaling
- Integrated Development Tools

Azure App Services

- PaaS environment for hosting web apps, APIs & mobile back-ends
- App Service Plan is the underlying infrastructure
- Supports Windows & Linux environments
- Multiple language & framework support
    - .NET, .NET Core, Java, Python, Ruby, Node JS, PHP
- Supports deployment of Docker containers
- Built-in DevOps support
- Auto-scale infrastructure
- Pre-built templates are available in Marketplace

greatlearning
Learning for Life

Azure Functions

Agenda

- What are Azure Functions?
- Use Cases
- Hosting Plans
- Components
- Create Functions
    - With HTTP, Timer, Blob Storage triggers
    - With Input & Output Bindings
- Security

Azure Functions

- Serverless environment to write & deploy APIs and functions
- Multiple language & framework support
    - C# (.NET Core), Java, Python, Node JS, Powershell, Javascript
- Supports Windows & Linux environments
- Supports deployment of Docker containers
- Multiple hosting options
- Built-in DevOps support
- True infrastructure scaling
- Great for building microservices

Use Cases

- Utility functions to be shared across projects
    - Clean up files at the end of day/week, archive data, send reminder email etc.
- Build a REST API
- Immediate execution once a file is placed in Blob Storage
- Run job every few hours
- Real-time data processing from IoT devices
- *And lots more…*

Hosting Plans

- App Service Plan
  - Dedicated infrastructure (PaaS)
  - Use any existing App Service Plan instances
- Consumption Plan
  - No dedicated infrastructure (serverless)
  - Pay only when function is executed
- Premium Plan
  - Pre-warmed workers with no delay in execution

Hosting Plans

	Consumption	Premium	App Service Plan
Default Timeout (mins)	5	30	30
Max Timeout (mins)	10	Unlimited	Unlimited
Instance Size	100 ACUs 1.5 GB memory	210-840 ACUs 3.5-14 GB memory	100-840 ACUs 1.75-14 GB memory
Scaling	Auto-scale (Max 200 instances)	Auto-scale (Max 100 instances)	Auto/Manual scale (Depends on plan -10/20)
Cold-start	Yes (scale to zero)	No (scale to one, warmed up)	No (Run continuously)
Billing	Executions, Execution Time, Memory used	Number of instances running	Number of instances running

Source: https://docs.microsoft.com/en-in/azure/azure-functions/functions-scale