Azure Storage

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Important Notes

Identify yourself in Zoom, using your name and last name

Mute your microphone along the course

Use the chat for questions during the Q&A sections

Focus your questions on the presented topic

Turn off your camera in case of connection issues

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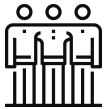
Academy Code of Conduct

Be respectful, there are no bad questions or ideas.



Be welcoming and patient

Be careful in the words that you choose

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Session objectives

At the end of the session you will be able to understand:

- Disk Storage
- Object Storage
- File Storage
- Data transport
- Hybrid storage

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Tabla de contenidos

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Pre-requirements

PC with internet connection

Azure Free tier

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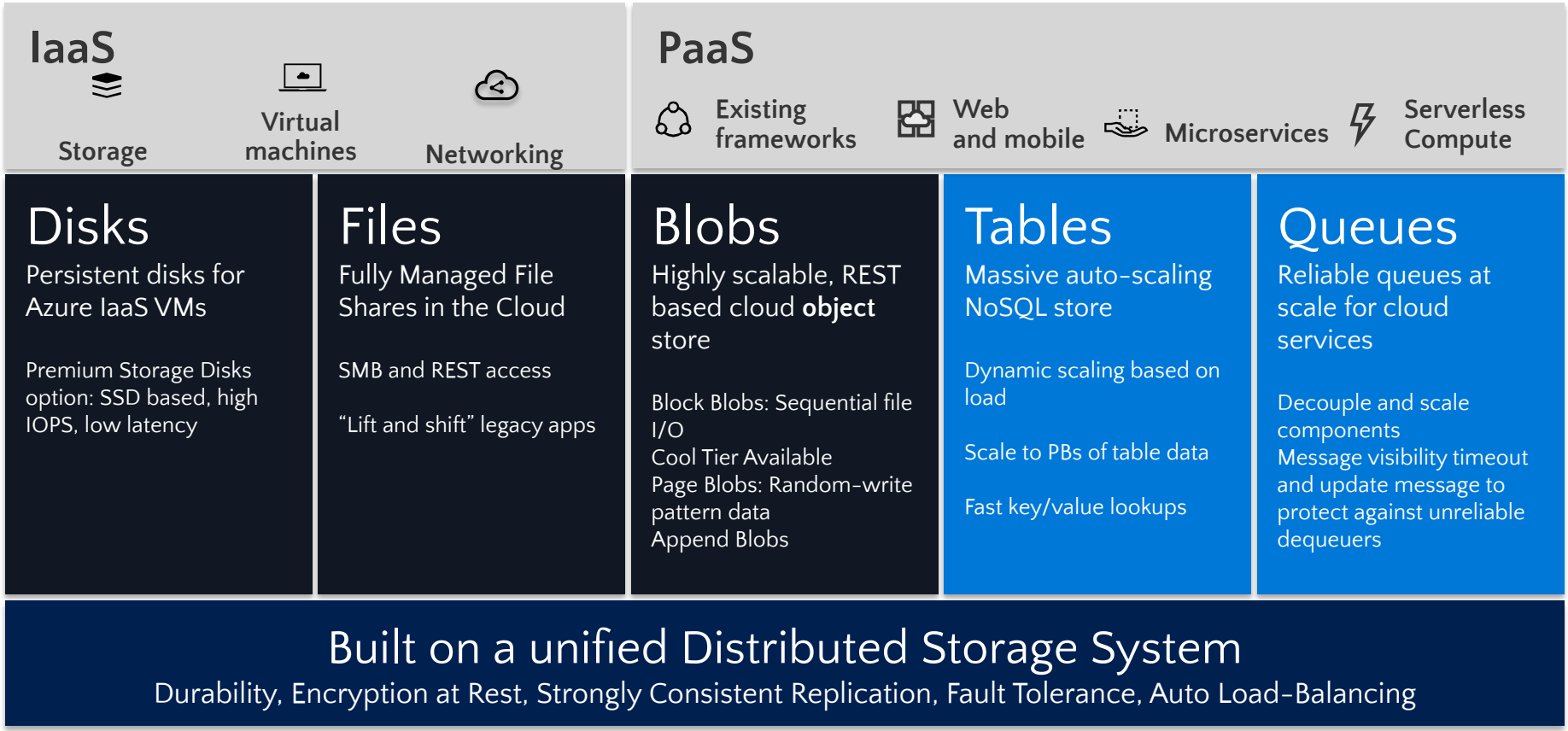
Azure Storage Services



Azure Storage

Disk Storage

Premium

Standard

Reliable, persistent, high performing storage for Virtual Machines

Object Storage

Azure Blobs

Secure, centralized storage target for backup/disaster recovery

File storage

Azure Files

Azure NetApp Files

Lift and shift of legacy applications that require file shares to the cloud

Data Transport

Azure Import/Export

Azure DataBox

Move or migrate data into Azure

Hybrid Storage

Azure StorSimple

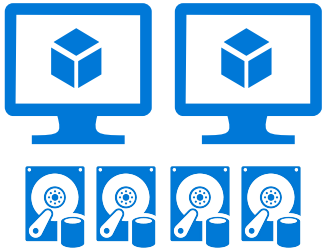
Azure File Sync

Avere

Secure, intelligent data tiering between on-premises and cloud storage

Helping customers choose the right storage

Azure Blobs



Azure Compute + Disks

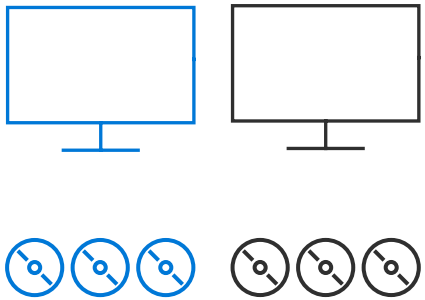
Azure Files

SharePoint Online

On-premises

Azure Disks

Performance Tiers

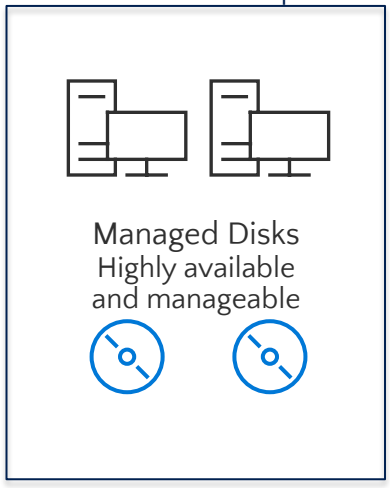


Premium Disks
SSD based, provisioned performance

Standard Disks
HDD based, cost effective

Management Options

Resource Group



Industry leading **ZERO %** Annual Failure Rate

Enterprise grade durability with 3 replicas

< 1ms latency for cached operations

Blob Cache technology
Up to 160,000 IOPS

Best in class High IOPS/BW

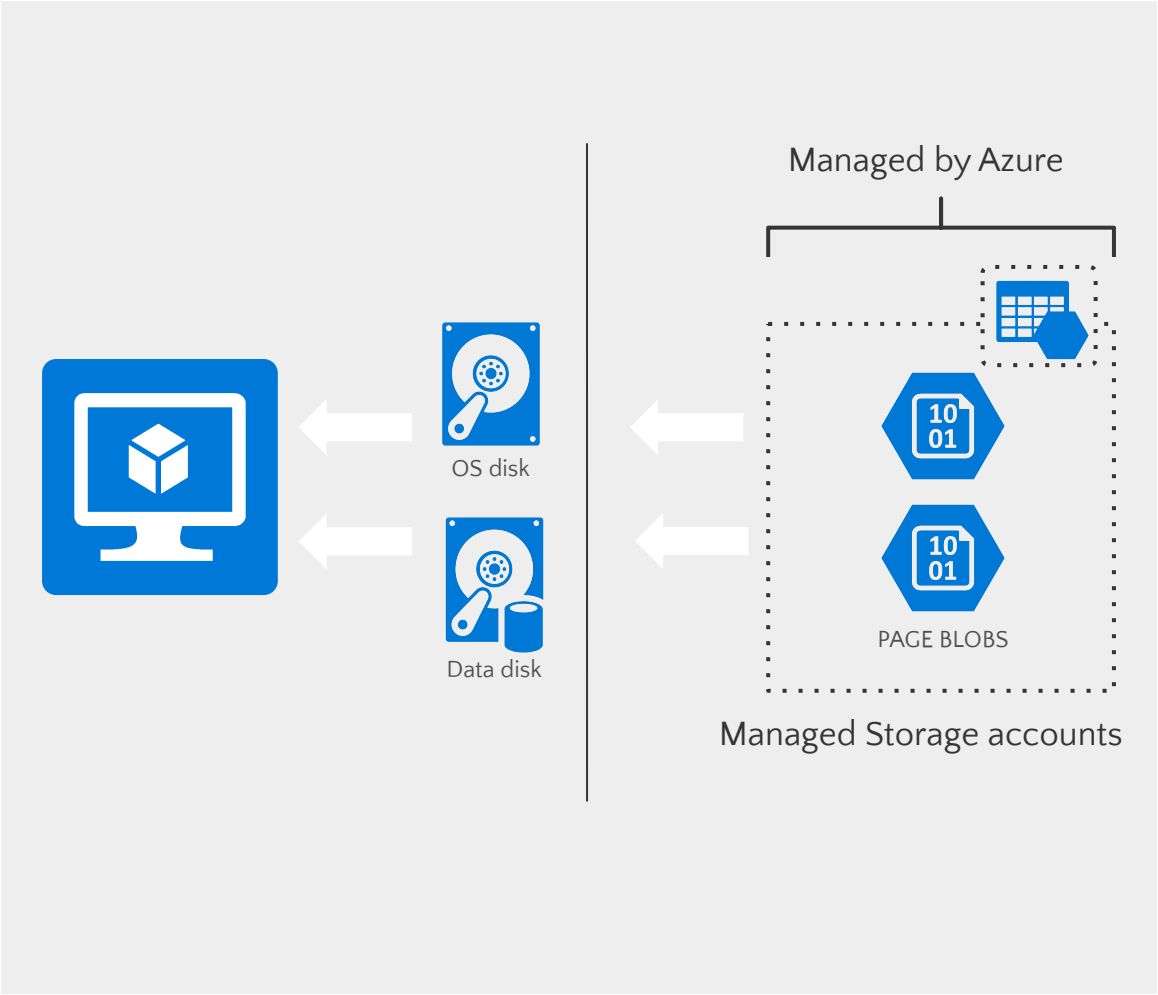
30,000 IOPS & 2,000 MB/s
Disk throughput per VM

Simple - Abstracts storage accounts from customers

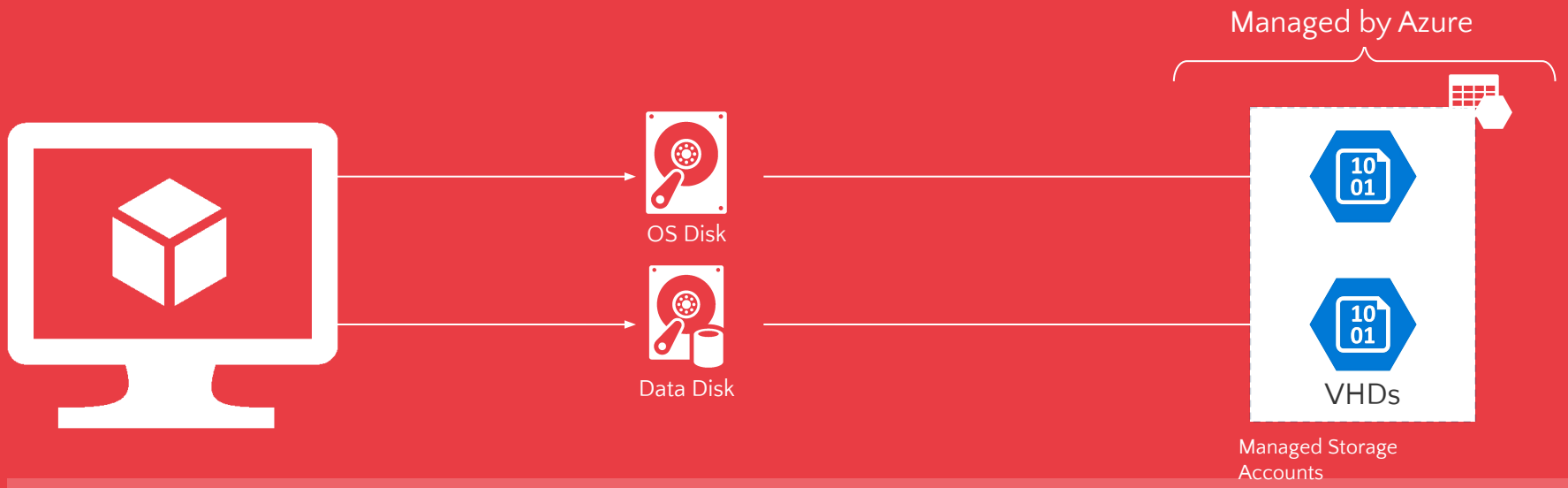
Granular access control – Top level ARM resource, apply Azure RBAC

Better performance - Storage account limits do not apply

Big scale - Up to 10,000 disks per region per subscription

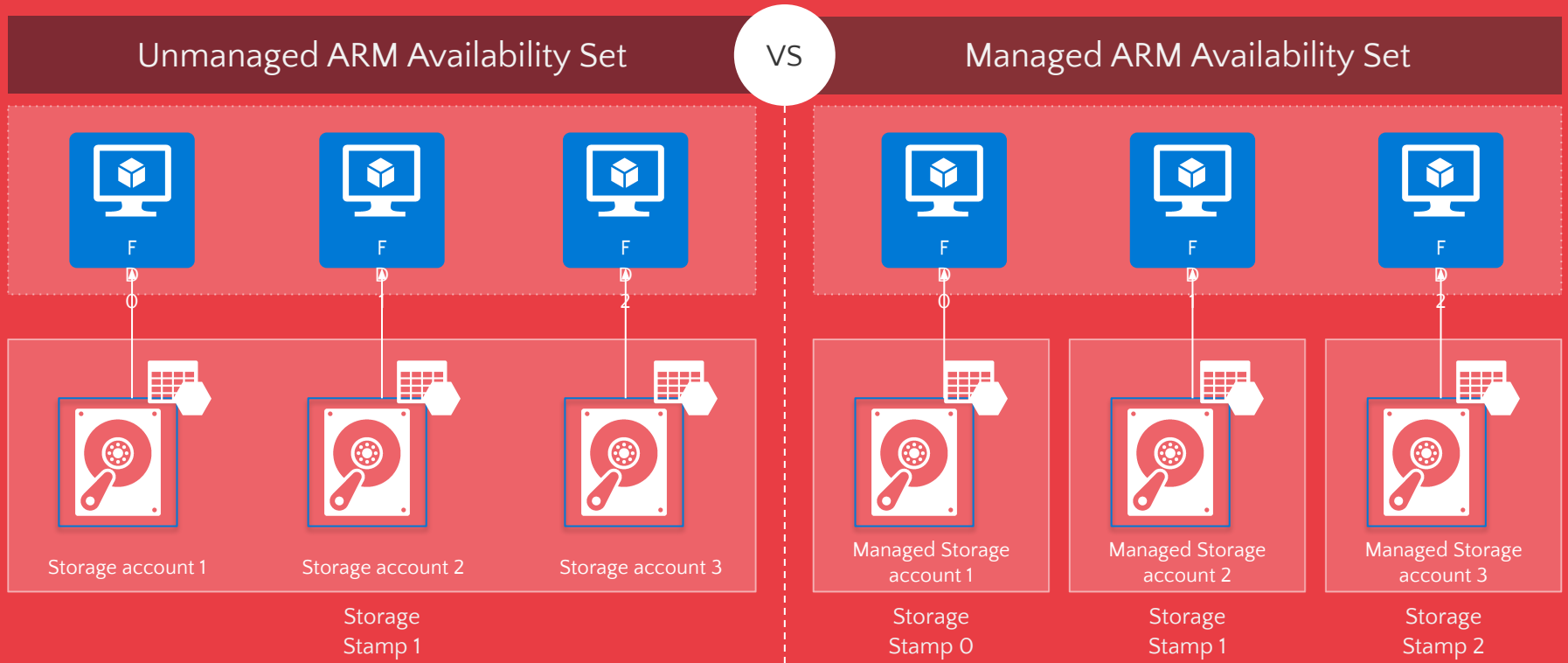


What are Managed Disks



- ✔ Simple – Abstracts storage accounts from customers
- ✔ Granular access control – Top level ARM resource, apply Azure RBAC
- ✔ Storage account limits do not apply – No throttling due to storage account IOPS limits
- ✔ Big scale – 20,000 disks per region per subscription
- ✔ Better Storage Resiliency – Prevents single points of failure

Better Storage Resiliency with Managed Disks

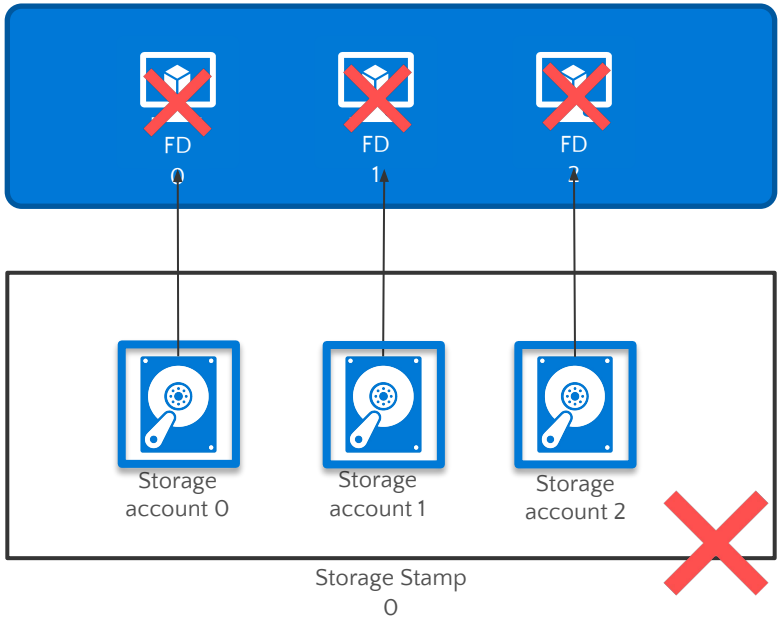


VMs susceptible to single storage stamp failures

Disks on separate storage stamps & aligned with VM fault domains

Managed Disks: Improve availability

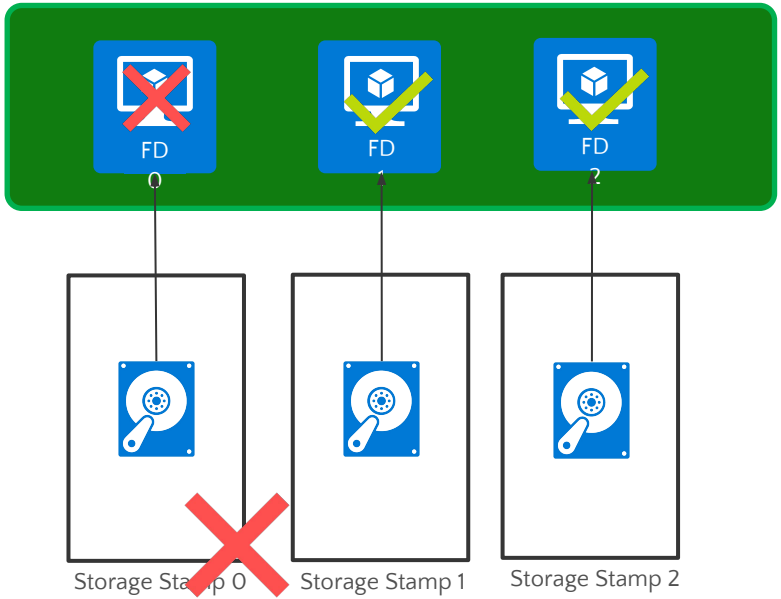
Unmanaged ARM Availability Set



VMs susceptible to single storage stamp failures

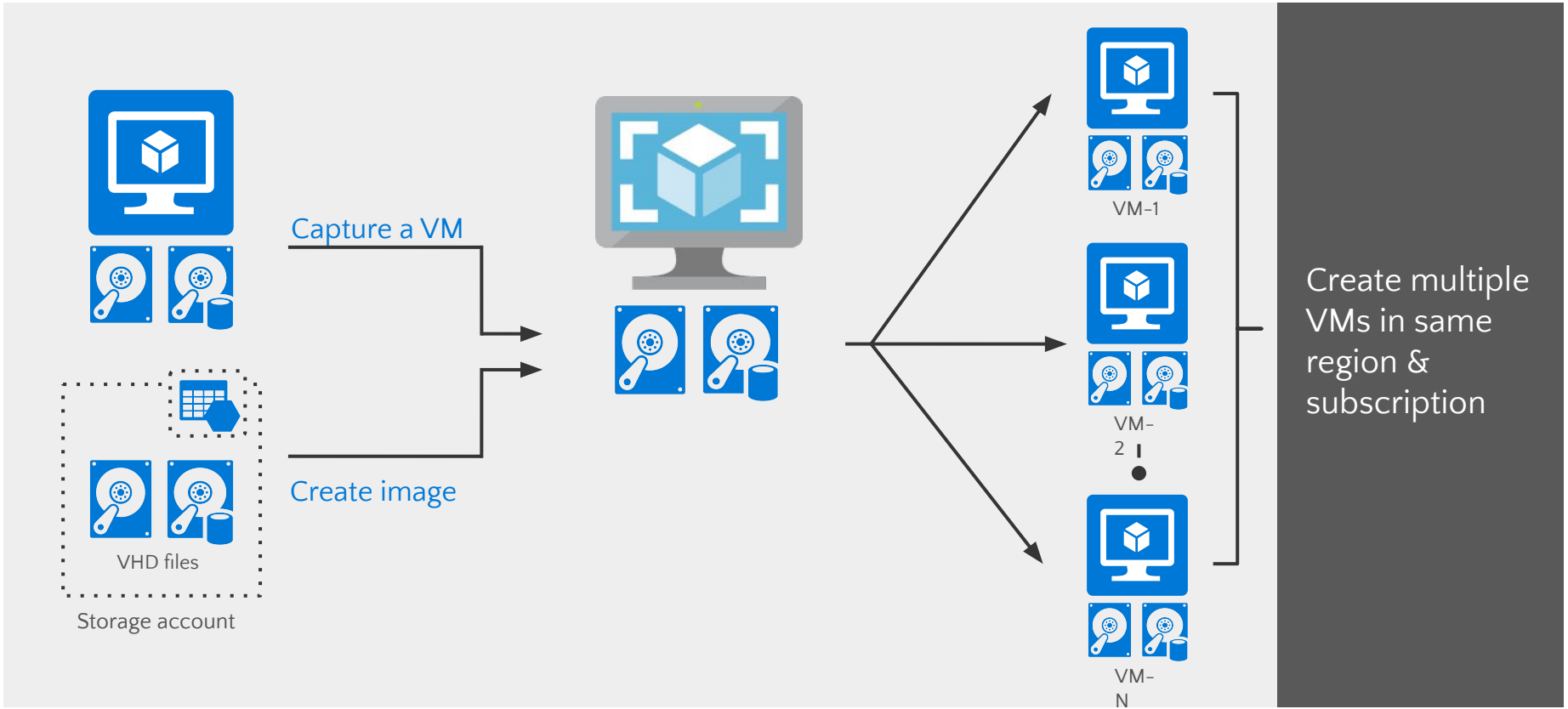
VS

Managed ARM Availability Set



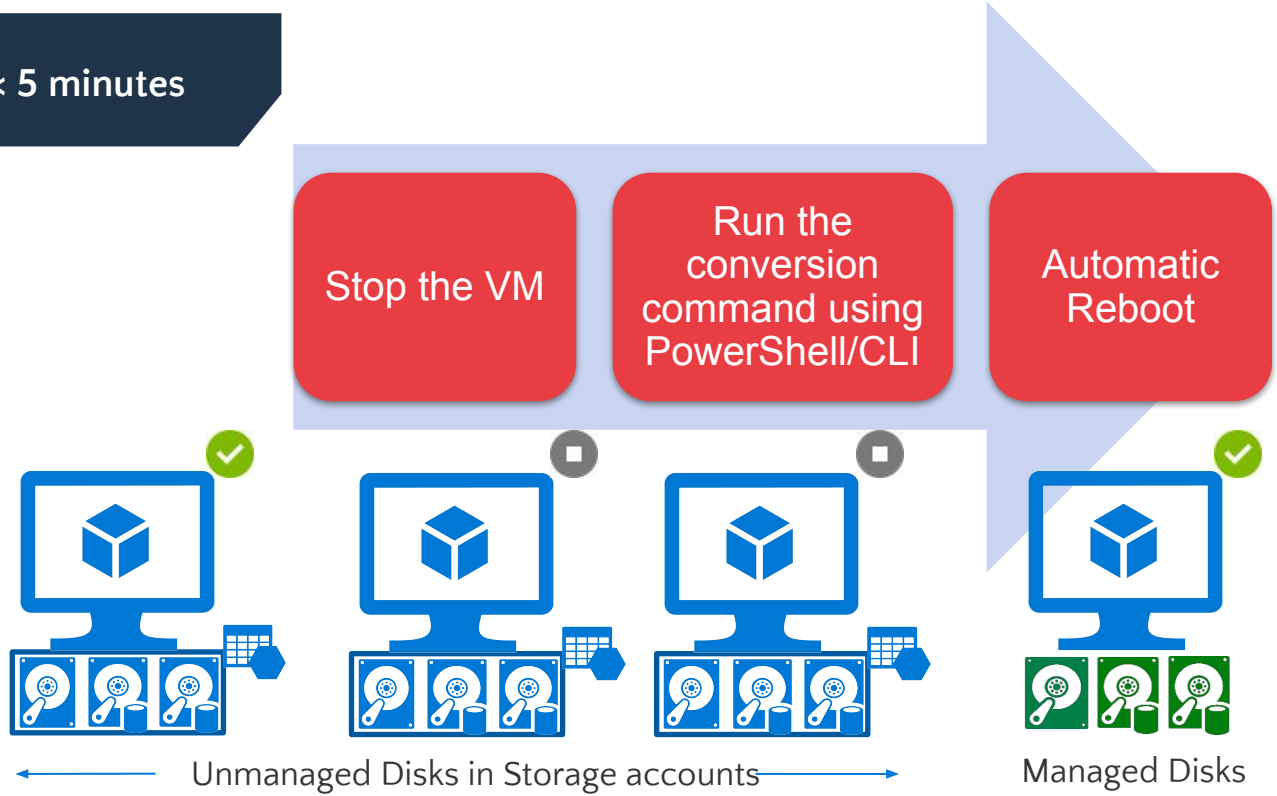
Disks on separate storage stamps & aligned with VM fault domains

Managed Disks: Reusable custom images



Single ARM VM conversion to Managed Disks

< 5 minutes



Supported within same storage type

Standard unmanaged to Standard Managed

Premium unmanaged to Premium Managed

Disks - Best Practices

- Always* use Premium Disks for Production workloads
- Managed Disks only for new workloads
  - Upgrade legacy unmanaged to managed when possible
- RAID for redundancy is **not** necessary
  - RAID for performance as needed
  - Durability doesn't remove the need for backups
- Performance
  - Local ssd is **definitely** temporary, use if you can tolerate loss
  - Enable read caching where appropriate for better perf
  - Understand VM limits vs Disk limits for perf

Azure Files

What is Azure Files?

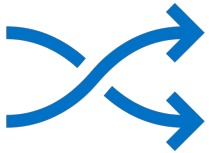
Easily managed

Secure

Data encrypted at rest and in transit

Cross-platform

Mount on Windows, Linux, and macOS



Built for a hybrid world

Access data where you want to, how you want to

Smart

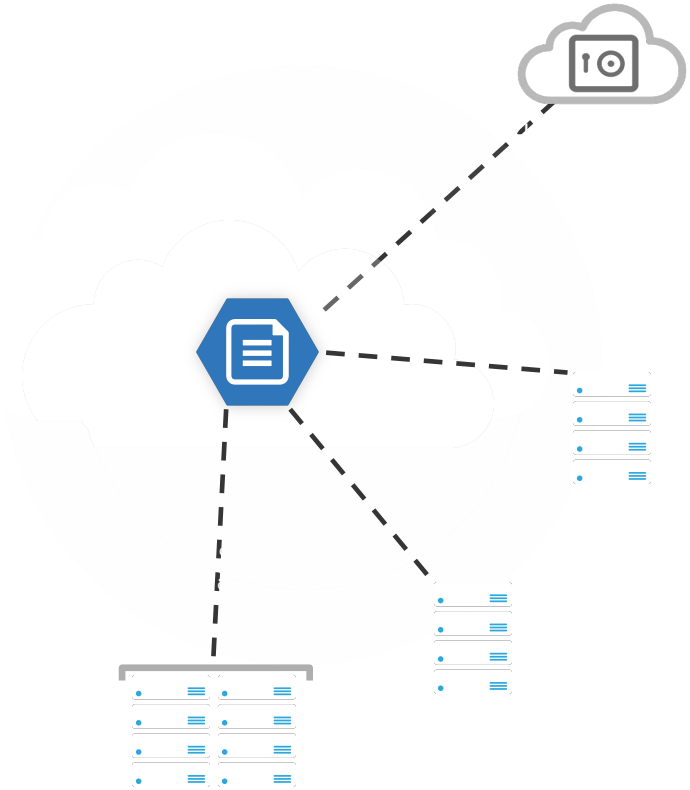
Make the most of limited networks with intelligent caching

Harmonious

Migrate applications to the cloud without the headaches

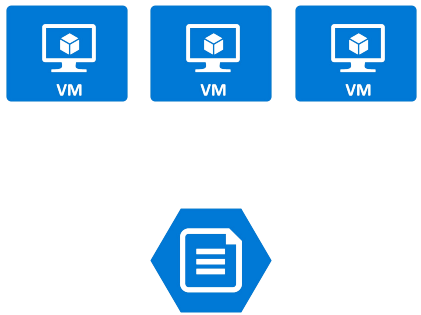
Use Case 1: General Purpose Files as-a-service

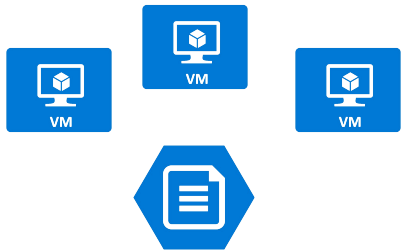
- Centralize General Purpose File Services (GPFS)
- Multi-site sync for distributed access
- Cache for fast, local performance
- Utilize cloud-based backup and fast DR



Use Case 2: Migrate applications to the cloud

- Migrate on-premises file or share based apps often with no code changes
- Test migration in stages – first move data, then move application
- Interact with app data from on-prem securely
- Reuse ISVs existing file based data access layers in your cloud apps





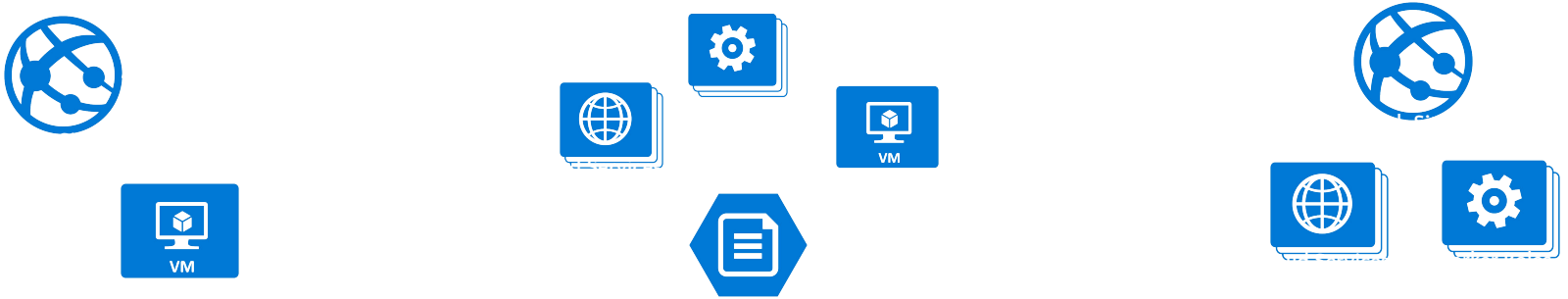
Use Case 3: Integrate modern applications

REST APIs enable integration with modern cloud applications

- Integrate modern cloud applications with legacy applications
- Develop new file system based applications using REST APIs

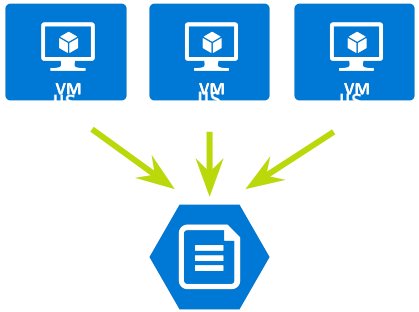
REST APIs support

- Shared access signature (SAS) token support for delegated authorization
- Cross origin resource sharing (CORS) for direct access from browser clients
- Storage Client Library Support in .NET, Java, Node and Python



Use Case 4: Simplify hosting HA workload data

- SMB2.1 well suited for client / server scenarios
- Server applications such as SQL and IIS require greater reliability during network failures
- Using SMB 3.0 persistent handles supports continuous availability
- Applications include
  - Hosting IIS/FTP sites using shared storage
  - SQL Server Failover Cluster Instance



Azure File Sync

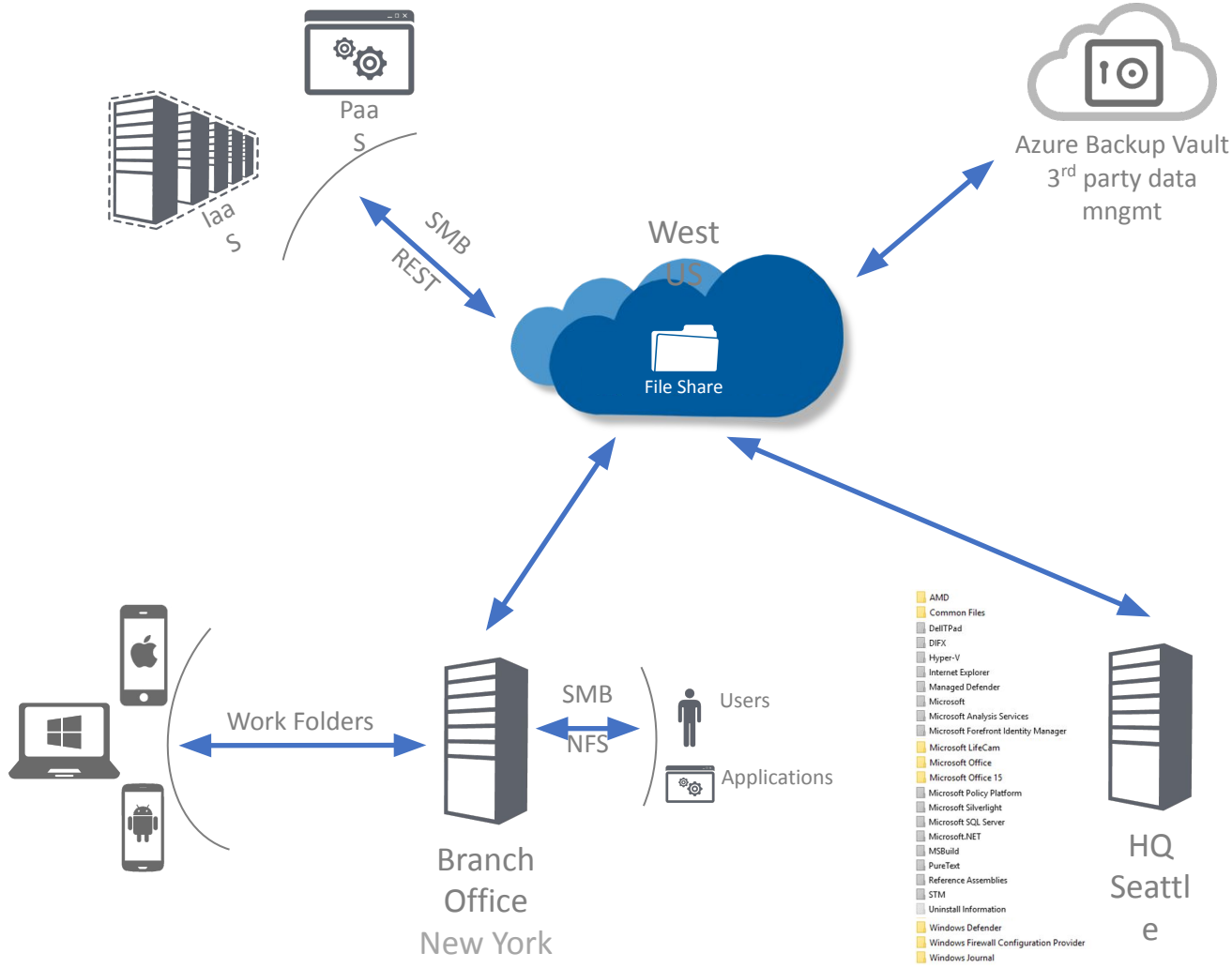
Cloud Tiering

Multi-site sync

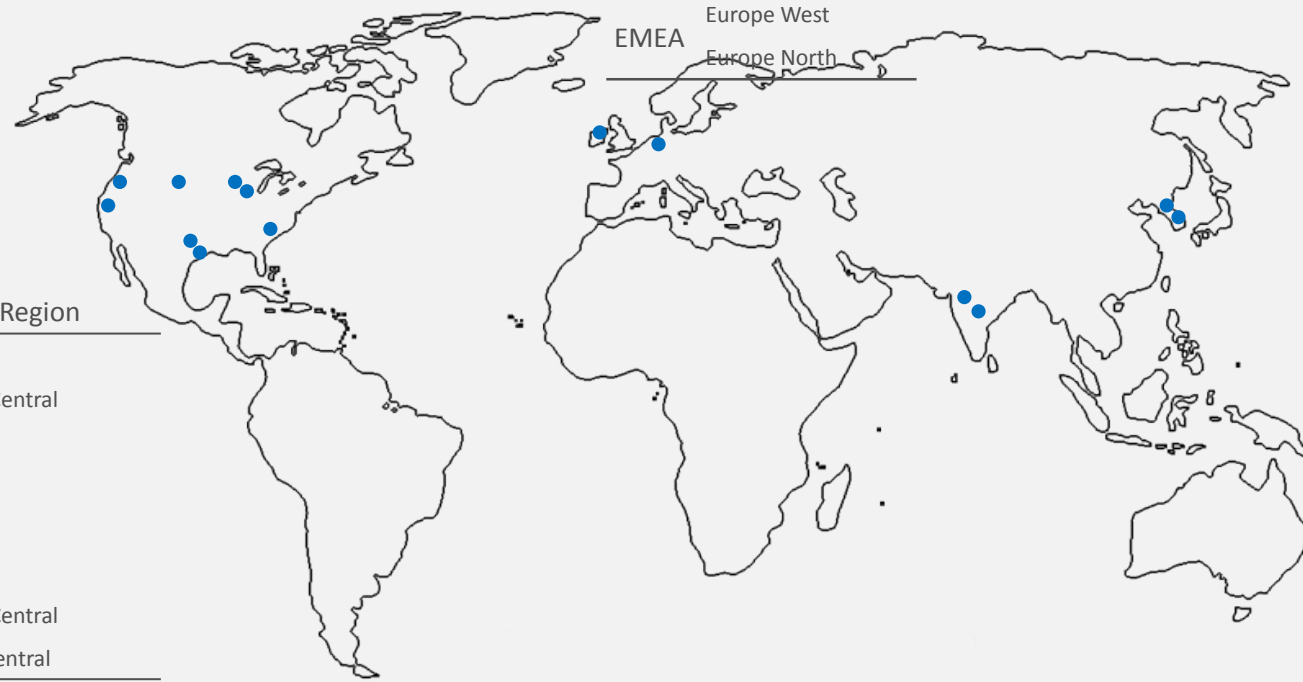
Rapid file server DR

Direct cloud access

Integrated cloud backup



Archive Regional Availability @ GA



Geo	Region
US	East 2
	South Central
	Central
	West
	West2
	East
	North Central
	West Central

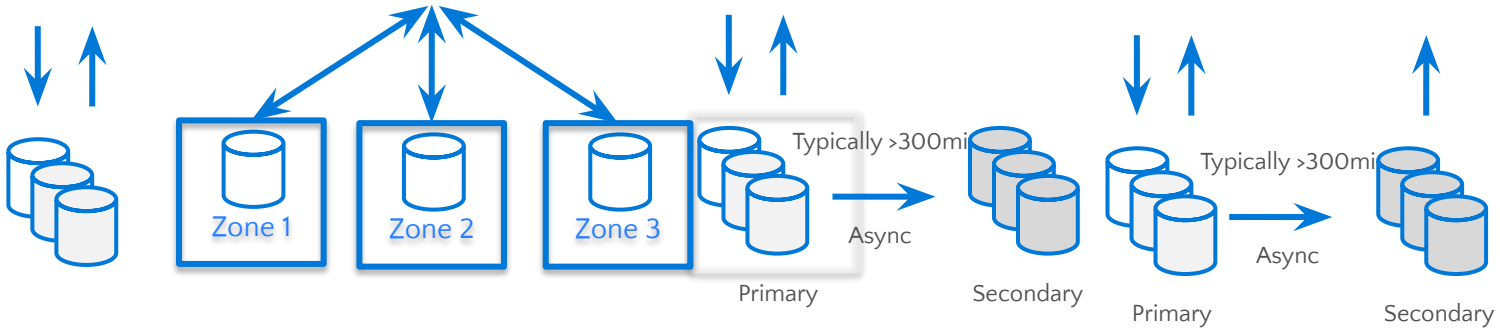
Geo	Region
EMEA	Europe West
	Europe North

Geo	Region
KR	South Central
IN	South Central

Blob-Level tiering will be available in all regions

6 more regions in Q4 CY18: Australia, Asia SE, Asia E, UK, Japan, US Gov

Azure Storage Durability



LRS

3 replicas, 1 region

Protect against disk, node, rack failures

Write is ack'd when all replicas are committed

Superior to dual-parity RAID

ZRS V2

3 replicas **across 3 Zones**

Protect against disk, node, rack and **zone** failures

Synchronous writes to all 3 zones

Private preview now

GA – 3/30 in 6 regions

GRS

6 replicas, 2 regions (3/region)

Protects against major regional disasters

Asynchronous to secondary

RA-GRS

GRS + Read access to secondary

Separate secondary endpoint

RPO delay to secondary can be queried

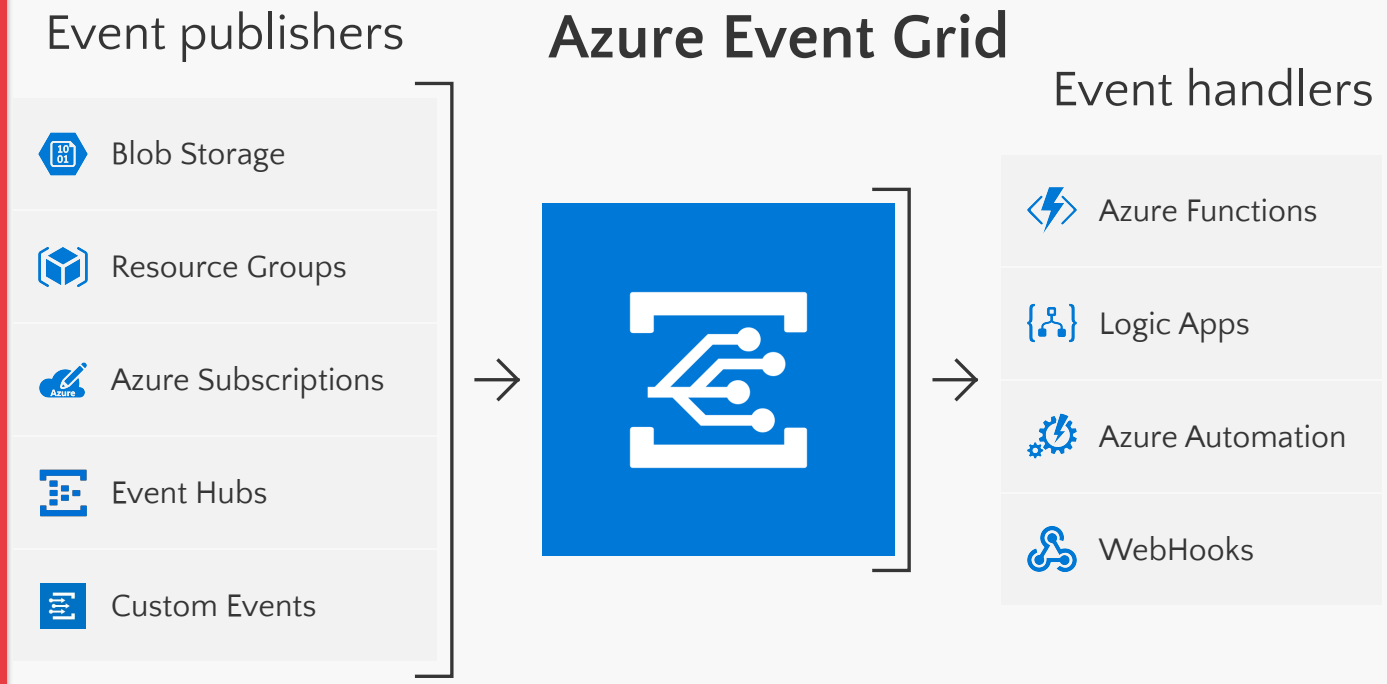
Blob Storage

Serverless Compute

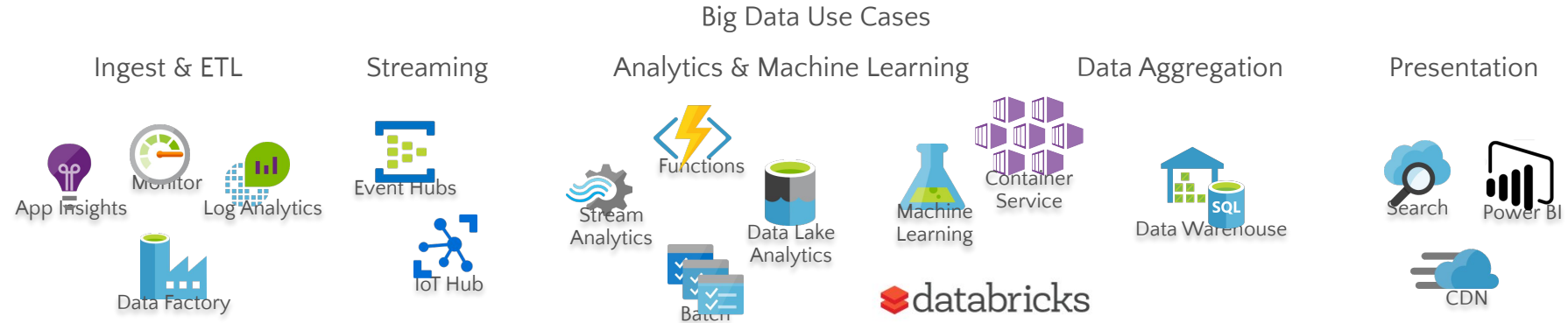
Publish data change event notifications

PutBlob, PutBlockList, DeleteBlob

Future – Change Feed



Contemporary Cloud Data Lake



Azure Files vs. Disks

	Azure Files	Azure Disks
Scenario	Life & Shift applications which leverage native file system	Persistent disks to Azure Virtual Machines
Protocol	SMB 2.1/3.0, REST	VHD, REST
Accessibility	SMB – Worldwide (requires Port 445) REST – Worldwide	VHD – Azure Data Center REST (Page Blob) – Worldwide
Durability	LRS, GRS	LRS, GRS, RA-GRS (for Page Blob)
Object Size	Up to 1 TB file	Up to 4 TB Disks (Can stripe up to 64 disks on G VM)
Max IOPS (8K)	1000	5000 (Premium) 500 (Standard)
Throughput	Up to 60 MB/s per share	Up to 250 MB/s per disks (Premium) Up to 60 MB/s per disk (Standard)

Azure Table Storage Overview

Tables

NOSQL storage
Access via REST

KeyValue Store

Disks
"Persistent disks for Azure IaaS VMs"

Files
"SMB Access to Azure Storage"

Tables
"Massive auto-scaling NoSQL store"

Tables

"Massive auto-scaling NoSQL store"

- User, device and service metadata, structured data
- Schema-less entities with strong consistency
- No limits on number of table rows or table size
- Dynamic load balancing of table regions
- Best for Key/value lookups on partition key and row key
- Entity group transactions for atomic batching
- Endpoint – http://*mystorageaccount*.table.core.windows.net

Azure Queues Overview

Queues

Reliable Messaging Access via REST

Scheduling a sync tasks

Disks	Files	Tables	Queues
"Persistent disks for Azure IaaS VMs"	"SMB Access to Azure Storage"	"Massive auto-scaling NoSQL store"	"Reliable messaging at scale for cloud services"

Queues

"Reliable messaging system at scale for cloud services"

- Decouple components and scale them independently
- Scheduling of asynchronous tasks
- Building processes/work flows
- No limits on number of queues or messages
- Message visibility timeout to protect from component issues
- UpdateMessage to checkpoint progress part way through
- Endpoint – http://*mystorageaccount*.queue.core.windows.net

Azure Blob Storage Overview

Blobs

Object storage
Access via REST

Streaming & random object access scenarios

Disks	Files	Tables	Queues	Blobs
"Persistent disks for Azure IaaS VMs"	"SMB Access to Azure Storage"	"Massive auto-scaling NoSQL store"	"Reliable messaging at scale for cloud services"	"Highly scalable, REST based cloud object store"

Blobs

"Highly scalable, REST based cloud object store"

- Data sharing, Big Data, Backups
- Block Blobs: Read and write data in blocks. Optimized for sequential IO. Most cost effective Storage. Ideal for files, documents & media
- Page Blobs: Optimized for random access and can be up to 8 TB in size. IaaS VM OS & data disks are of this type.
- Append Blobs: Similar to block blobs and optimized for append operations. Ideal for logging scenarios and total size can be upto 195GB
- Endpoint – http://mystorageaccount.blob.core.windows.net/mycontainer/myblob.

Blob Tiered Storage

Two Tiers
- Hot – for commonly used data
- Cool – for rarely used data
- Archive – Cannot be read, copied, overwritten, or modified or snapshotted.
- Rehydration first (change tier to hot or cool) that take up to 15 hours to complete for blobs less than 50 GB.

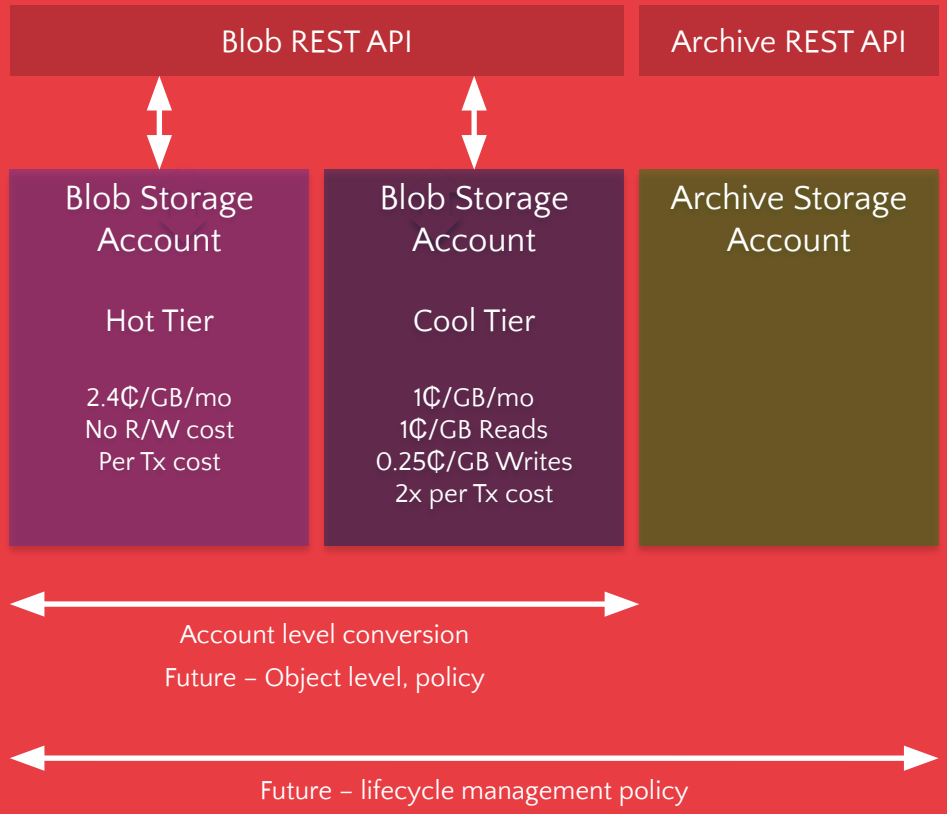
API is 100% identical; similar throughput and latency

Durability options: LRS, GRS, RA-GRS

Availability: Cool – 99%, Hot – 99.9%. Higher for RA – GRS reads

Pricing to match your workload
- Hot: Lower access prices for frequent use
- Cool: Lower storage prices for high volume

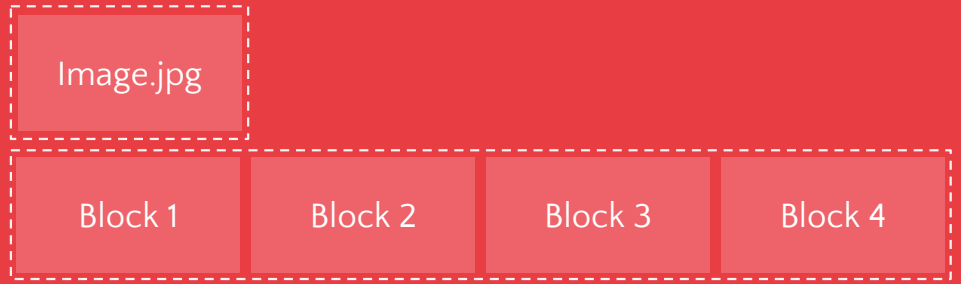
Switch account tiers as needed
- No charge for Hot to Cool switch
- Future – Object level switch with automatic policy based management



Types of Blobs

Block Blobs

- Most object storage scenarios
- Documents, images, video, etc.

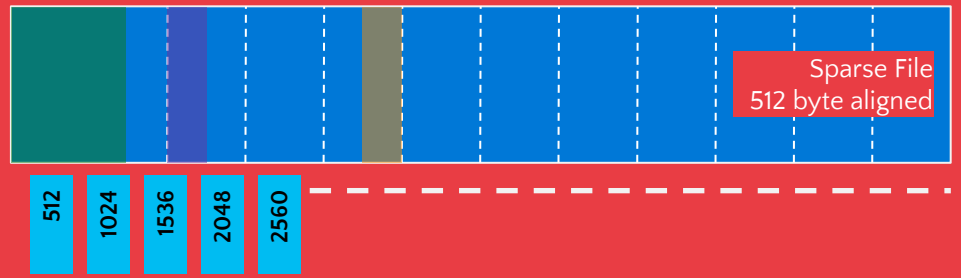


Append Blobs

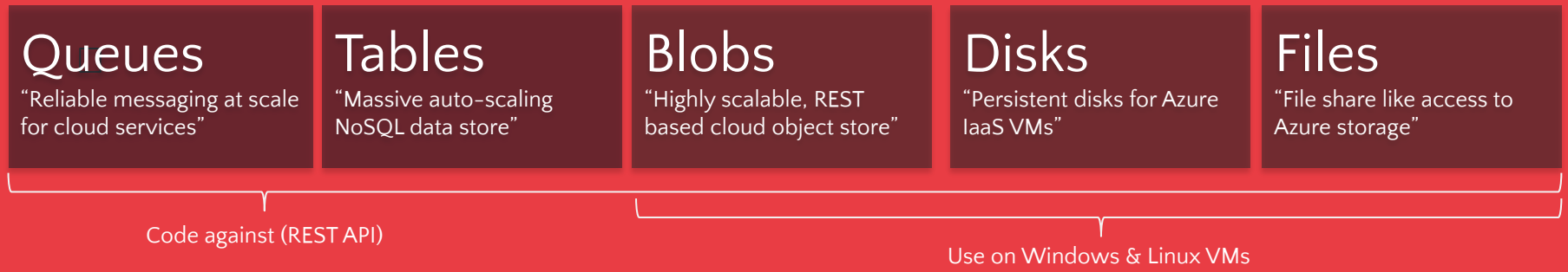
- Multi-writer append only scenarios
- Logging, Big Data Analytics output

Page Blobs

- Page aligned random reads and writes
- IaaS Disks, Event Hub, Block level backup



Azure Storage Offerings



- Foundational building block of the Azure Cloud – Cloud – Azure Data Lake, Azure SQL Data Warehouse, Azure HDInsight, OneDrive, Skype, Xbox,...
- All storage types are encompassed under the **Storage Account** service offering.
  - General Purpose Storage (Magnetic Tape)
  - Premium Storage (SSD/Low Latency/High IOPS/ Better performance)
- Hyper Scale: >60 trillion objects, >7 million transactions per second
- REST based API, multi-platform, open sourced client libraries for many languages (e.g. Java, Python, Node.js, PHP, Ruby, Android, etc.)
- Strong hybrid story - Azure Stack support and integration with StorSimple, Azure Backup and 3rd party storage vendors

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Thank you

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