

Disks and Storage

At a Glance



Foundational Concepts

Virtual Machines

Disks and Storage

Inside the VM

Scaling and High Availability

Networking

Security

Monitoring

Troubleshooting and Support

Cost Management

Managed Disks

Overview

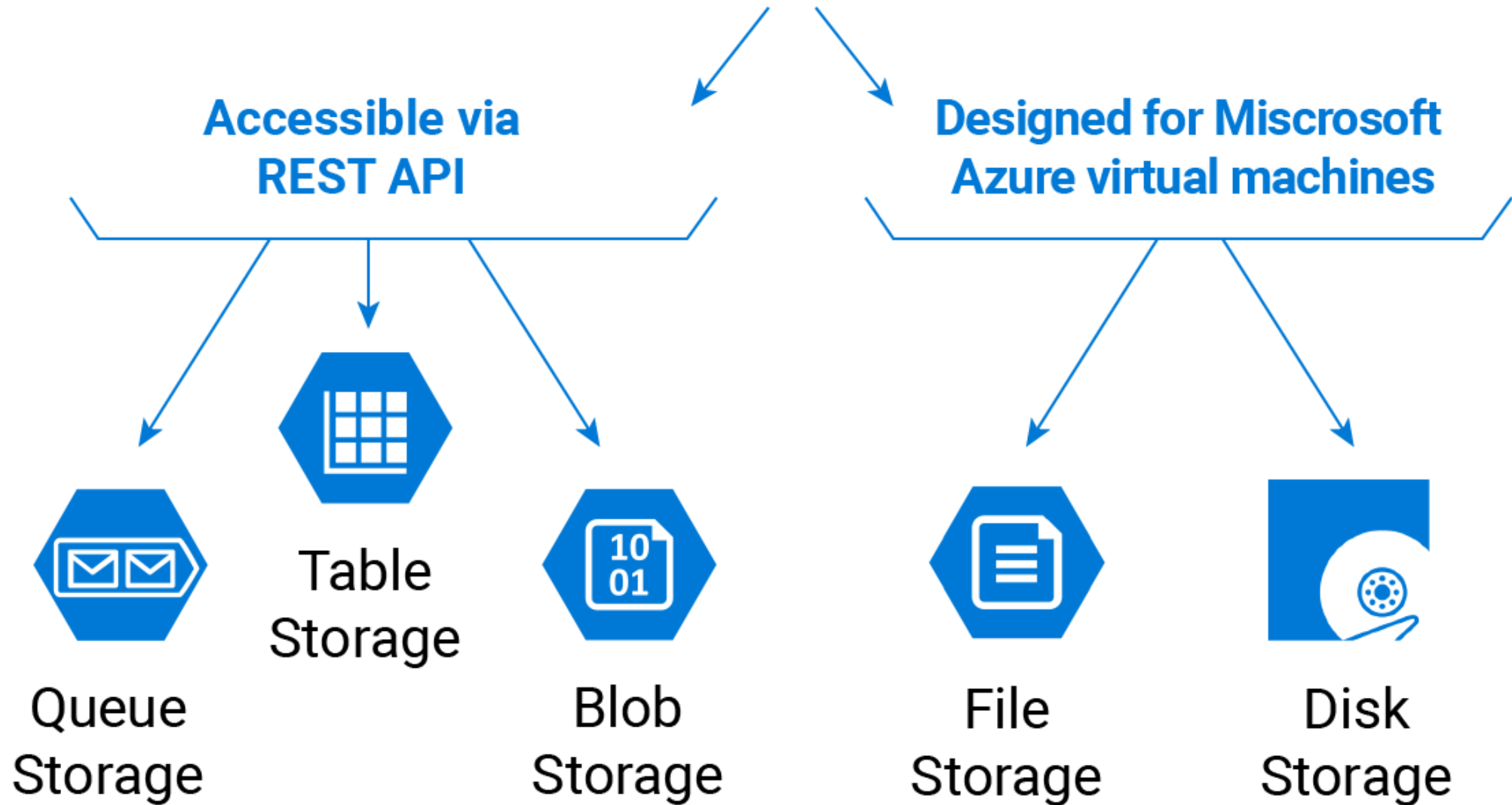
What you need to think about to be successful

Standard vs. premium storage

Managing OS and data disks

Capturing OS images

Microsoft Azure Storage





Blob

- Unstructured
- Large
- Page / Block



Queue

- Queue
- Reliable
- MSMQ



File

- File share
- Legacy
- SMB



Disk

- Premium
- High I/O
- VM Disks



Disk Storage



Premium



Managed

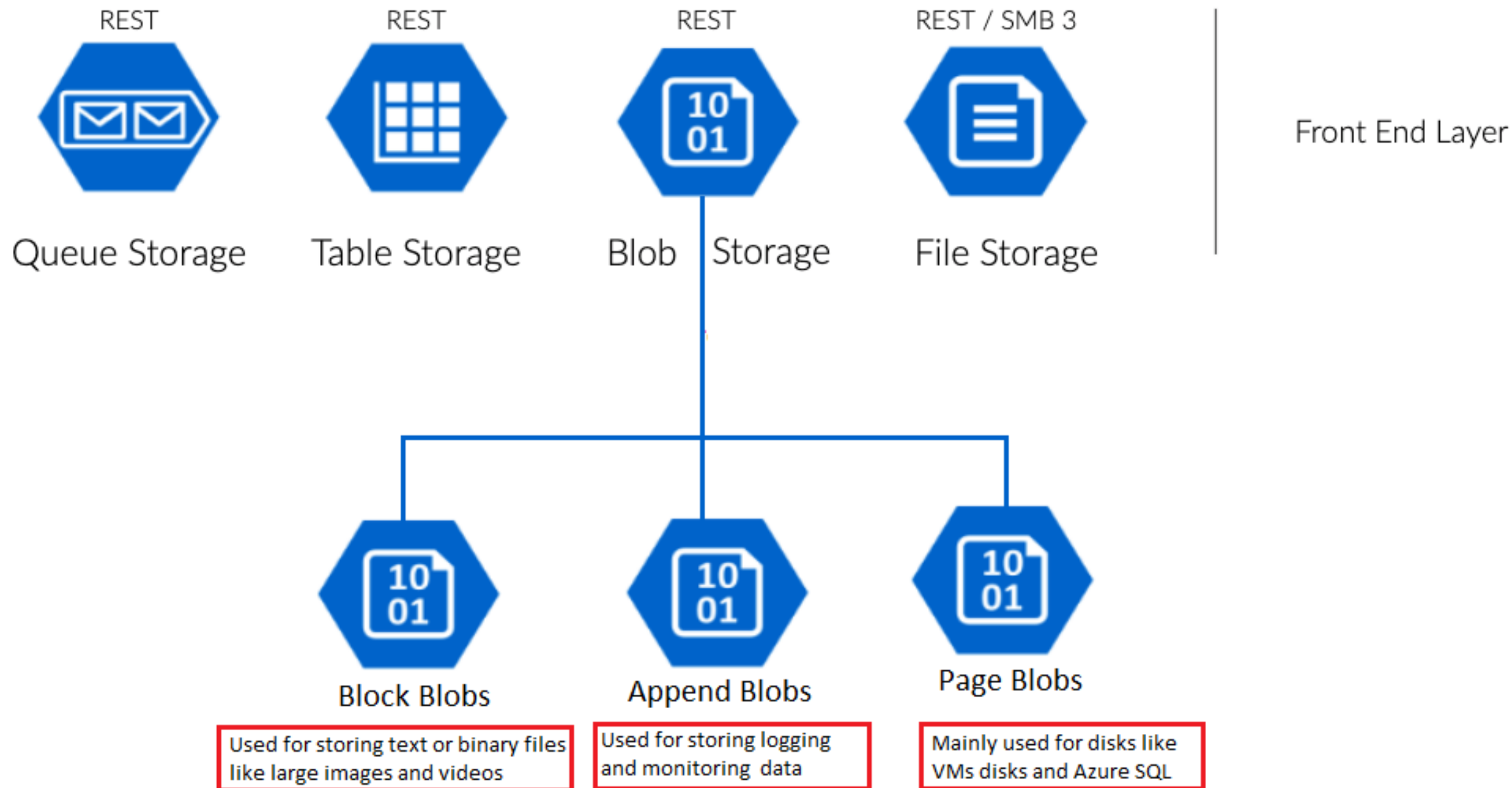
Unmanaged

Standard



Managed

Unmanaged



Storage Account

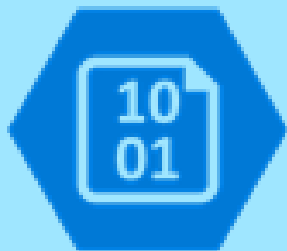
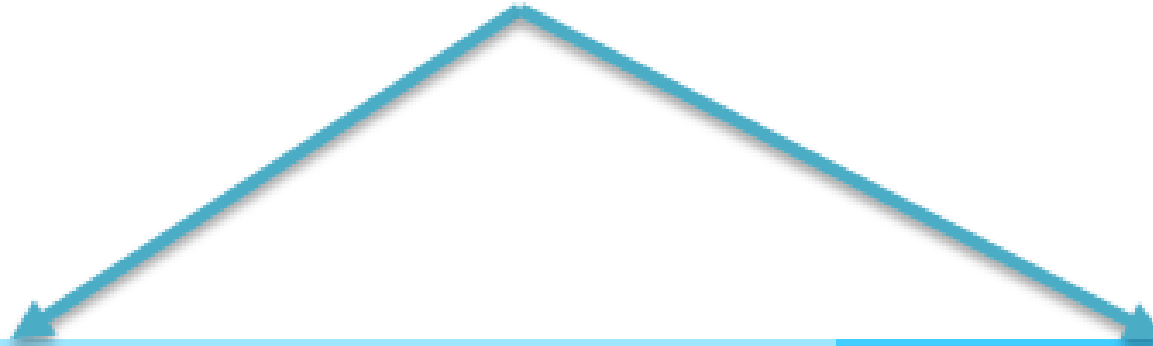
Storage Account

An Azure storage account contains all of your Azure Storage data objects: blobs, file shares, queues, tables, and disks.

The storage account provides a unique namespace for your Azure Storage data that's accessible from anywhere in the world over HTTP or HTTPS. Data in your storage account is durable and highly available, secure, and massively scalable.



Azure Storage Account



Blob



Table



File



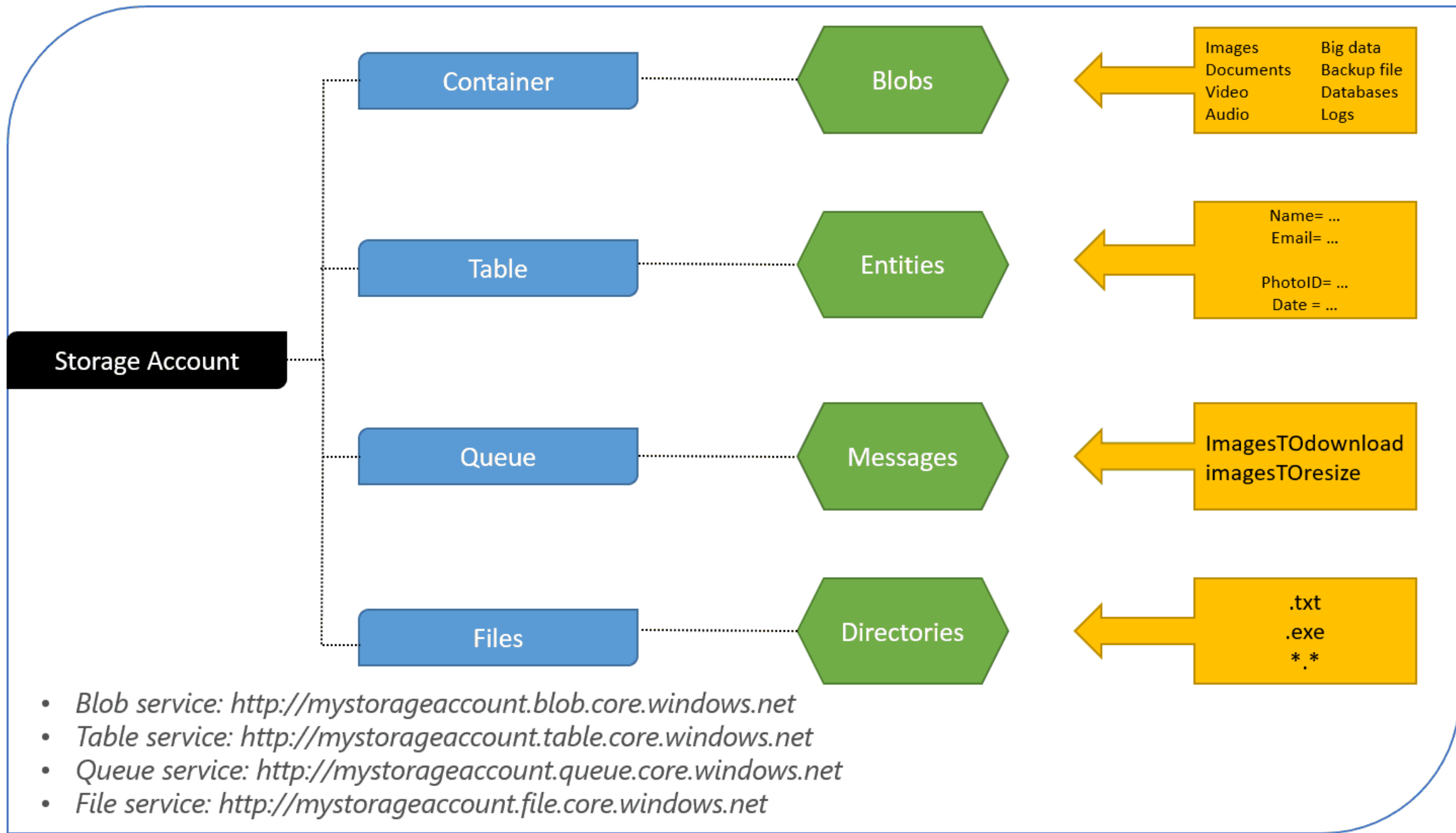
Queue

Standard Storage



VM Disk

Premium Storage



Type of Storage Account

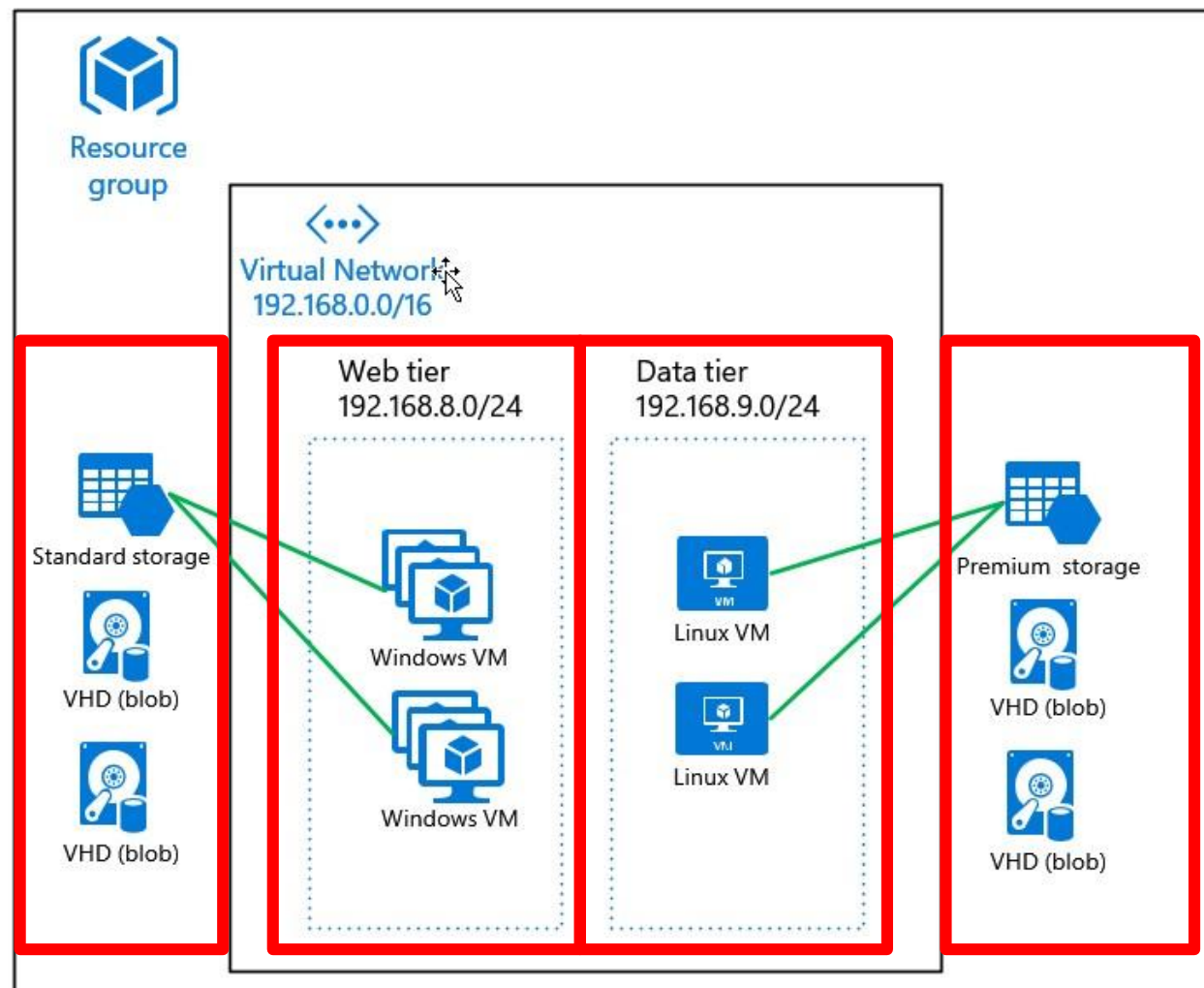
Type of storage account	Supported storage services	Redundancy options	Usage
Standard general-purpose v2	Blob (including Data Lake Storage ¹), Queue, and Table storage, Azure Files	LRS/GRS/RA-GRS ZRS/GZRS/RA-GZRS ²	Standard storage account type for blobs, file shares, queues, and tables. Recommended for most scenarios using Azure Storage. Note that if you want support for NFS file shares in Azure Files, use the premium file shares account type.
Premium block blobs ³	Blob storage (including Data Lake Storage ¹)	LRS ZRS ²	Premium storage account type for block blobs and append blobs. Recommended for scenarios with high transactions rates, or scenarios that use smaller objects or require consistently low storage latency. Learn more about example workloads.
Premium file shares ³	Azure Files	LRS ZRS ²	Premium storage account type for file shares only. Recommended for enterprise or high-performance scale applications. Use this account type if you want a storage account that supports both SMB and NFS file shares.
Premium page blobs ³	Page blobs only	LRS	Premium storage account type for page blobs only. Learn more about page blobs and sample use cases.

Storage account endpoints

Storage service	Endpoint
Blob storage	<code>https://<storage-account>.blob.core.windows.net</code>
Data Lake Storage Gen2	<code>https://<storage-account>.dfs.core.windows.net</code>
Azure Files	<code>https://<storage-account>.file.core.windows.net</code>
Queue storage	<code>https://<storage-account>.queue.core.windows.net</code>
Table storage	<code>https://<storage-account>.table.core.windows.net</code>

<https://www.msp360.com/resources/blog/microsoft-azure-storage-types-explained/>

Our Solution



Things to Keep in Mind Regarding Azure Storage for IaaS VMs

Standard disks
cost per
transaction and
per GB

Azure holds an
infinite lease on
page blobs

Premium storage
supports only LRS

Premium disks
aren't charged by
transaction

Blob storage
namespace is flat

99.9% read/write
availability SLA

Azure Storage Types

Azure Storage Types

Blob storage: Unstructured file data

Table storage: NoSQL semi-structured data

Queue storage: Pub/sub messaging data

File storage: SMB file shares

Binary Large Object (Blob)

A collection of binary data stored as a single entity in a storage system. Blobs are typically images, audio or other multimedia objects, or binary executable code. VM VHDs are stored as page blobs.

Replication Options

Locally
Redundant
Storage
(LRS)

3 copies within single data center

Premium storage

Zone-
Redundant
Storage
(ZRS)

3 copies across 2-3 data centers

Block blobs only; available only during SA creation

Geo-
Redundant
Storage
(GRS)

3 copies in primary region

3 copies in secondary region

Read-Access
Geo-
Redundant
Storage (RA-
GRS)

RO access to secondary region data

OS and Data Disks

Azure VM Disk Types

OS Disks

Fixed disk VHD files stored as page blobs

Generation 1

Registered as SATA

Maximum size 1023 GB (1TB)

Data Disks

D: is a temporary disk that holds pagefile/swapfile

Attached VHD

Registered as SCSI

Maximum size 1023 GB

Azure Storage Account Types

Standard

HDD

Default for some instancesizes; others use SSD

IOPS values represent maximum values

Can use any redundancy option
(Premium is LRS only)

Premium

SSD

IOPS values represent expected performance levels

Great for I/O intensive workloads like Dynamics, Exchange Server, SQL Server, SharePoint Server

Not available in all Azure regions

Need a DS-, DSv2-, GS-, orFS-series VM

Available in 3 sizes (128 GB, 512 GB, or 1024 GB)

Host Caching

None

Default

Disable on IaaS DCs

Good for random I/O

Read only

Write-through

Stored on disk and RAM
of host OS

Read/write

Write-back

Stored in memory of
host OS

Demo



1

Hit pricing page quickly

Show existing storage accounts

Select the azurestorage2 account

Show essentials, settings (esp keys)

Click Open in Explorer and explain the tool

Back to the portal, show blobs

Access policy - explain containers

Show properties - copy URL field

Demo



2

Add data disk to a VM (caching)

Go into VM

- Disk Management
- Storage Spaces, striping,

Demo



3

PowerShell

Explain sysprep and sudo waagent -
deprovision+user (SHUT DOWN VM)

Show VHD download

do VHD capture to a container

Create VM from captured image

<https://azure.microsoft.com/en-us/resources/templates/101-vm-from-user-image/>

Click edit to explain