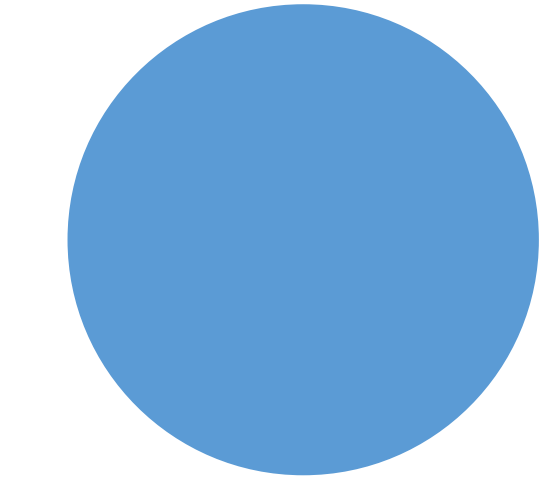
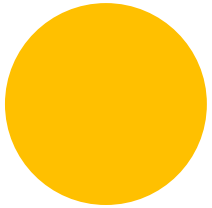

Azure Champ

Azure Champ

Azure Champ

Microsoft

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- https://github.com/oyuksektepeli
- https://notebooks.azure.com/oyuksektepeli/
- http://www.youtube.com/c/onuryuksektepeli
- https://www.facebook.com/onuryuksektepeli/

MVP
Microsoft®
Most Valuable
Professional

Azure Resource Groups

Azure Champ

Connect to Azure

Azure Portal

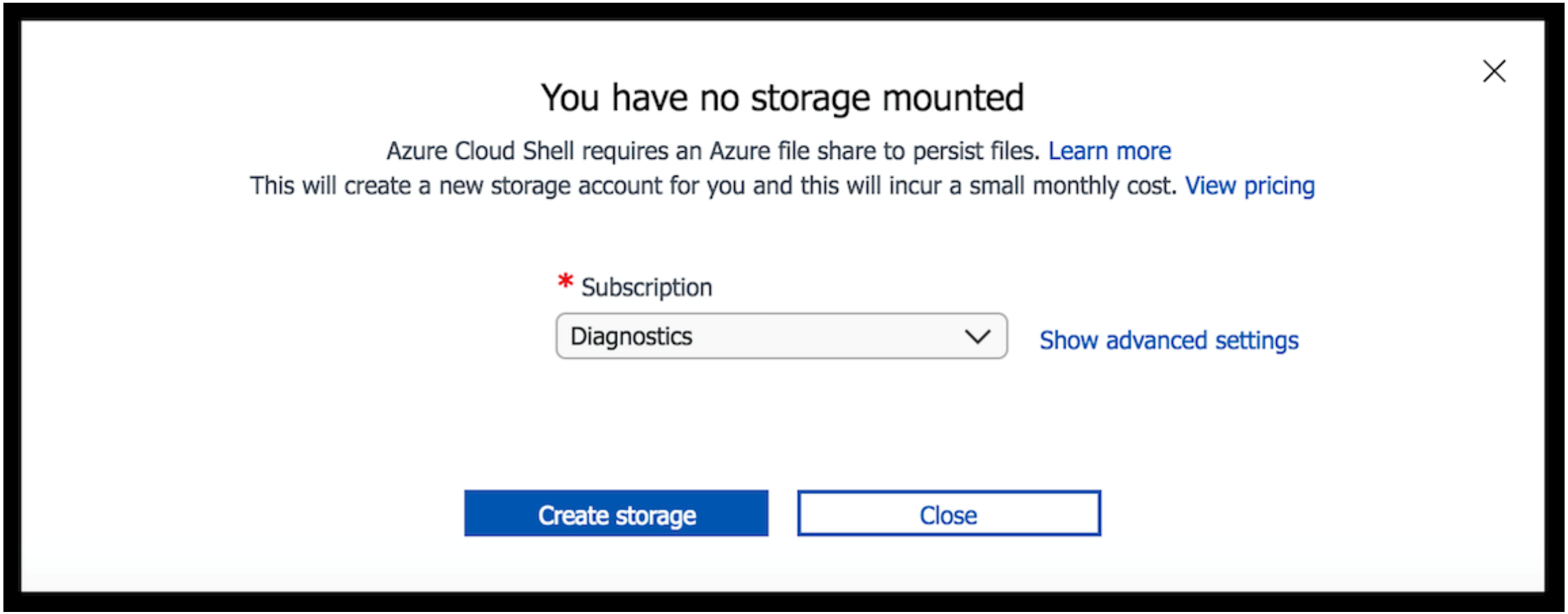
Azure Cloud Shell

Azure Powershell

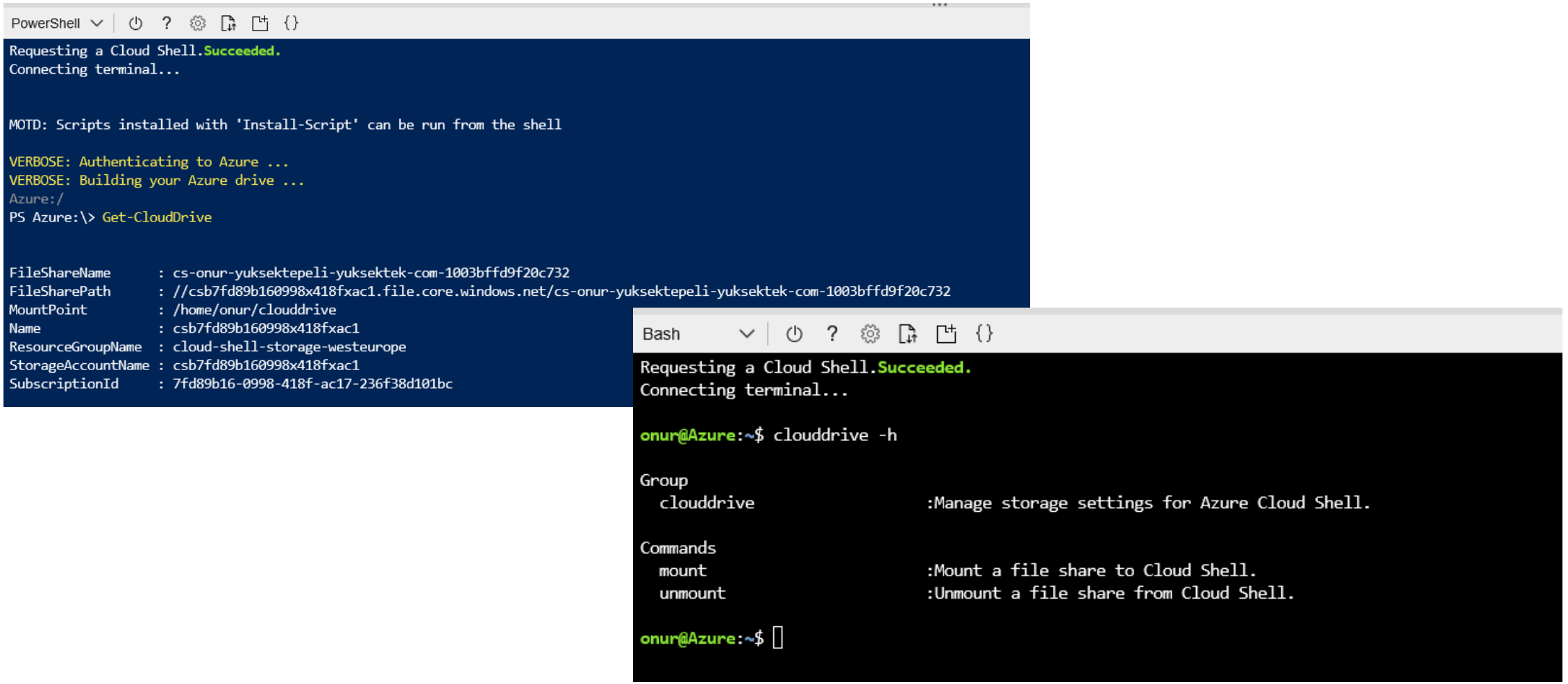
Azure CLI v2.0

Azure SDKs

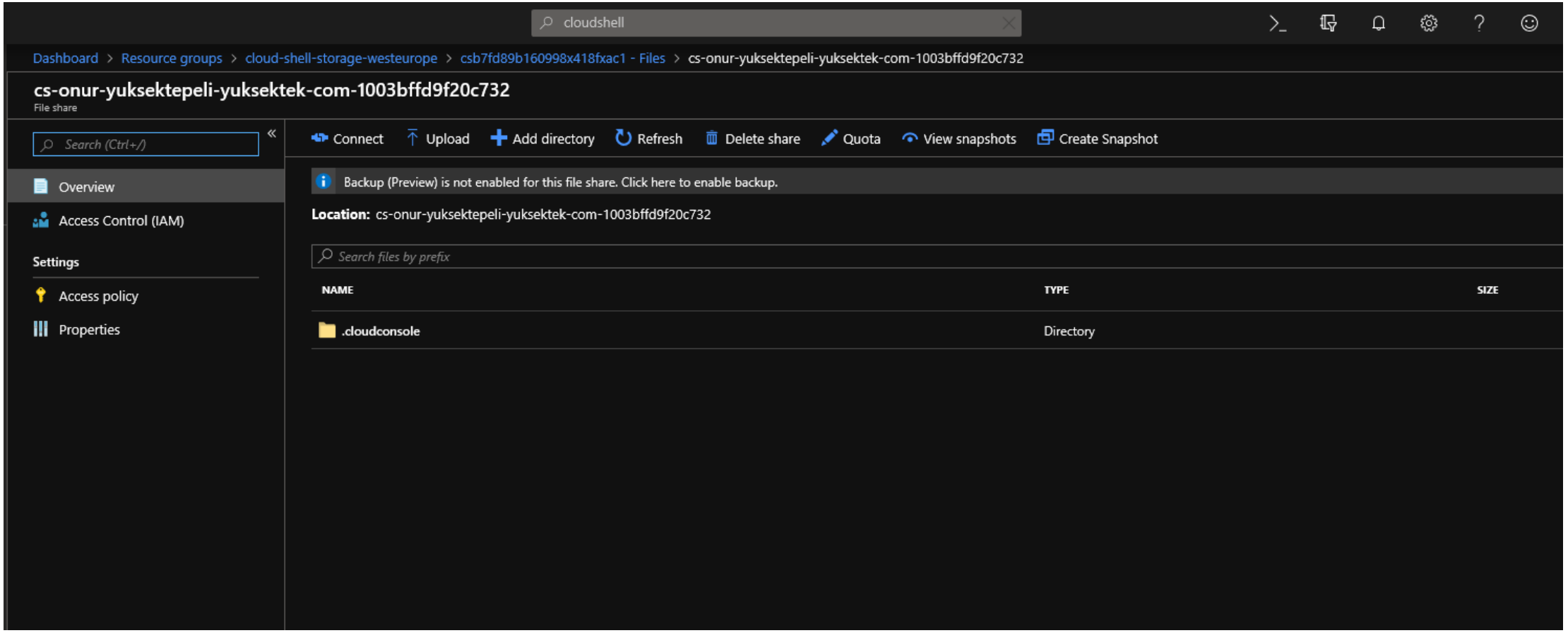
Azure Cloud Shell



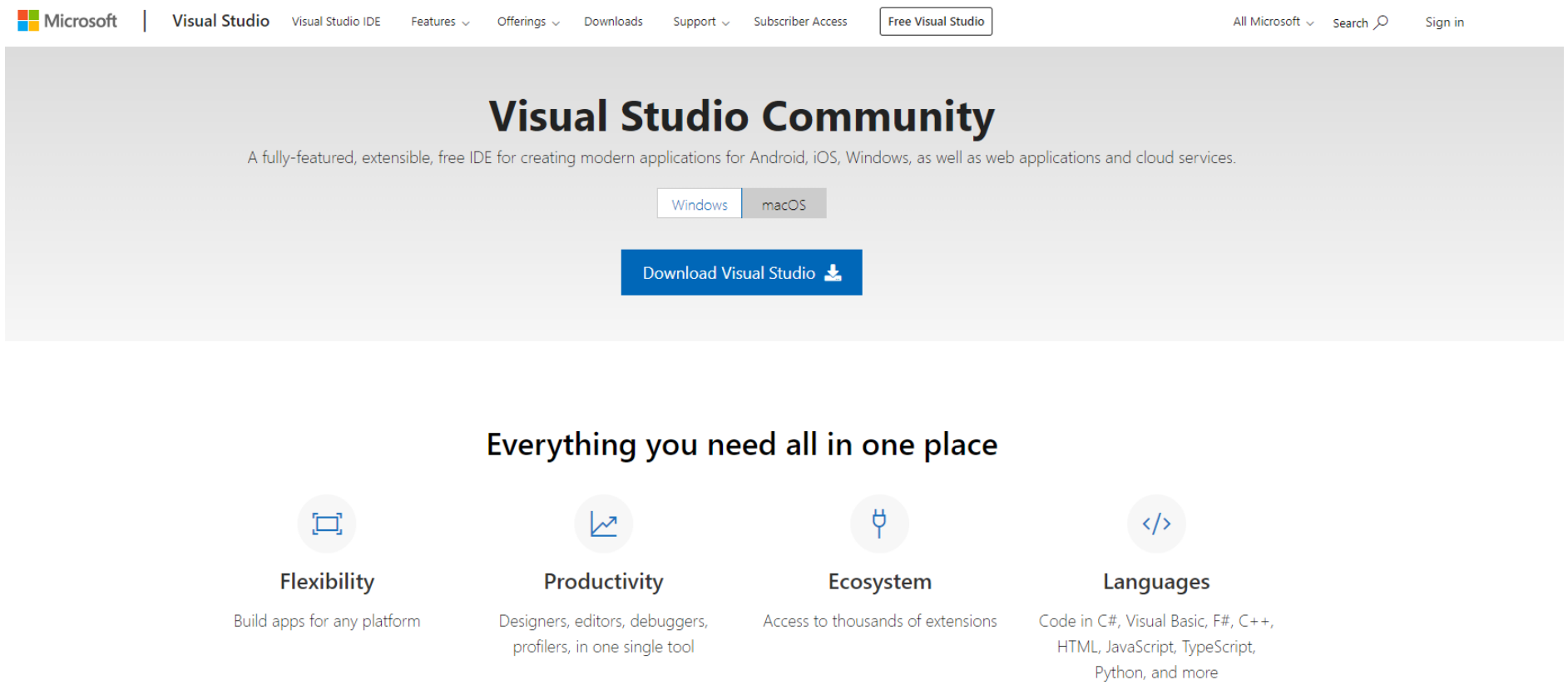
Azure Cloud Shell



Azure Cloud Drive

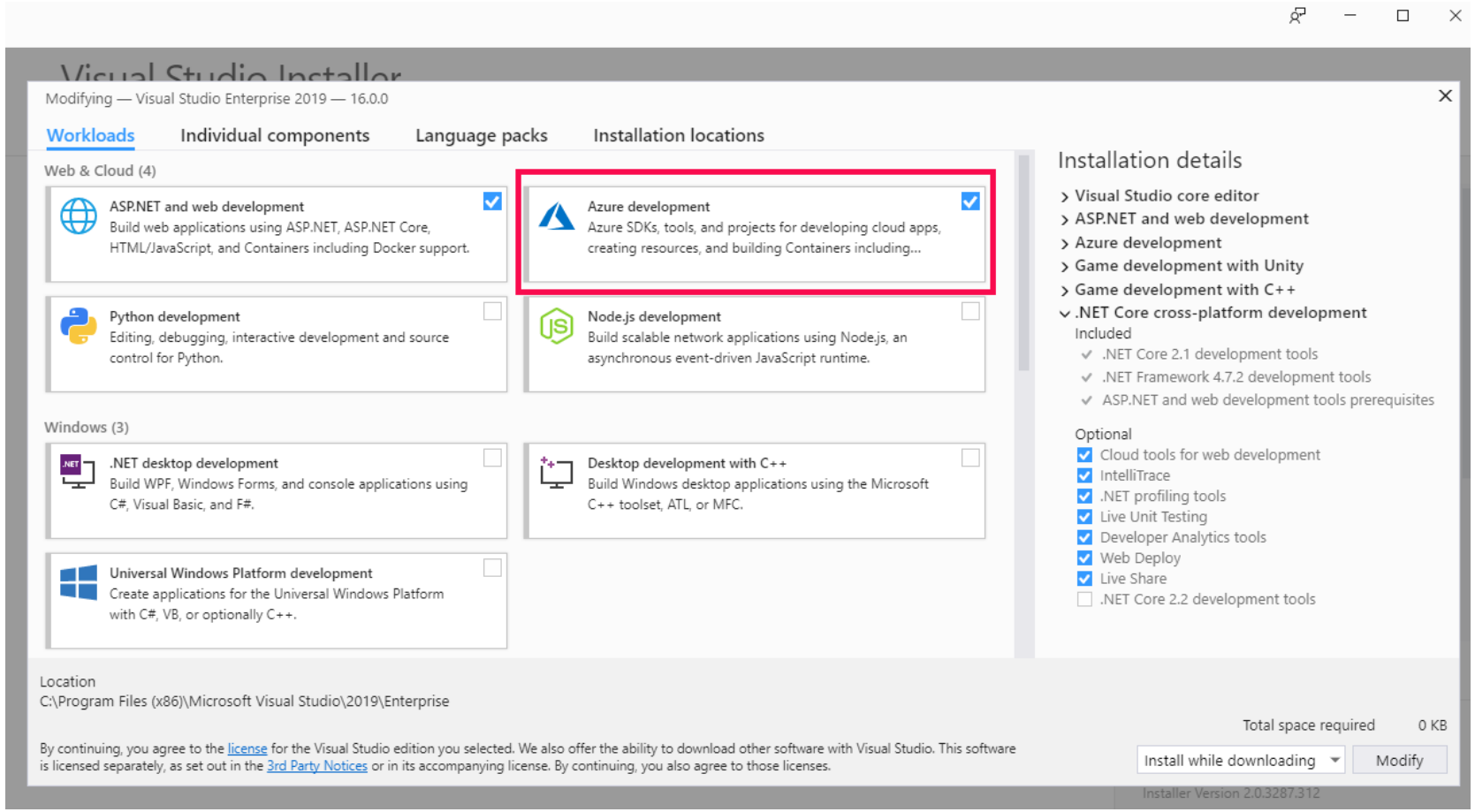


Visual Studio



https://visualstudio.microsoft.com/vs/community/

Azure Development



Azure Resource Groups

- Resources in a resource group should share the same lifecycle
- Each resource can only exist in one resource group
- Resources can be added or removed to a resource group at any time
- Resources can be moved from one resources group to another
- Resource groups can contain resources that reside in different regions
- Resources can interact with resources in other resources groups

Resource Group Management

- Tags
- Locks
- Access Control (IAM)
- Policies

Sample Resource Group

- Ms-net-rg
- Purpose: Isolate the Virtual networks
- Need: Prevent unwanted changes to any of the network resources
- Admin: It will deploy and maintain RG
- Notes: Resources in other RGs will use the resources int this group
- Dept: IT
- Owner: Onur YUKSEKTEPELI

Demo

- Creating a Resource

Azure Resource Tags

- Logically organize resources. Each tag has a name and a value. Allows related resources from different resource groups to be identified. Organize by billing and management.

TAG Rules

- Tags are NOT inherited
- Names can't contain these characters: <,>, %, &, \, ?, /
- Tag name is limited to 512 characters
- Tag value is limited to 256 characters

Demo

- Create Tag

Resource Group Locks

- Prevent accidental deletion or changes to resources in resource groups. Consists of two locks:
  - CanNotDelete
  - ReadOnly

Demo

- Create Resource Locks

Access Control (IAM)

- A system that provides fine-grained access Management of resources in Azure. Grant only the amount of Access to users needed to perform their jobs

Demo

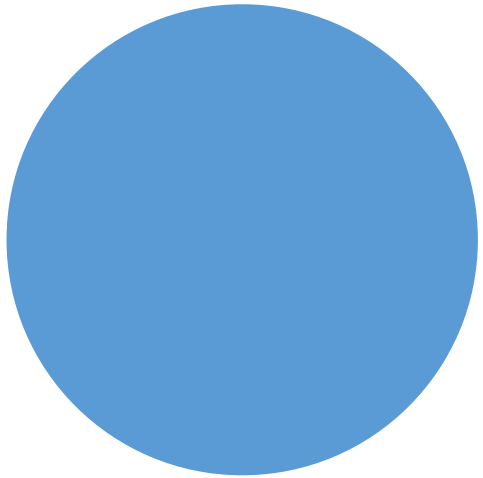
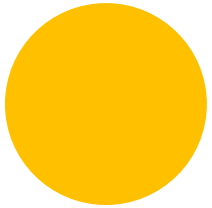
- Access Control (IAM)

Azure Policy

- Allows you to manage and prevent IT issues with policy definitions that enforce rules and effects for your resources. Policies allow you to keep compliant with corporate standards and SLAs.

Demo

- Azure Policy

Azure Compute

Azure Champ

Azure Compute

- Azure Compute Unit

The concept of the Azure Compute Unit (ACU) provides a way of comparing compute (CPU) performance across Azure SKUs. This will help you easily identify which SKU is most likely to satisfy your performance needs. ACU is currently standardized on a Small (Standard_A1) VM being 100 and all other SKUs then represent approximately how much faster that SKU can run a standard benchmark.

Azure Compute Unit(ACU)

SKU Family	ACU \ vCPU	vCPU: Core
A0	50	1:1
A1 - A4	100	1:1
A5 - A7	100	1:1
A1_v2 - A8_v2	100	1:1
A2m_v2 - A8m_v2	100	1:1
A8 - A11	225*	1:1
D1 - D14	160 - 250	1:1
D1_v2 - D15_v2	210 - 250*	1:1
DS1 - DS14	160 - 250	1:1
DS1_v2 - DS15_v2	210 - 250*	1:1
D_v3	160 - 190*	2:1***
Ds_v3	160 - 190*	2:1***
E_v3	160 - 190*	2:1***
Es_v3	160 - 190*	2:1***
F2s_v2 - F72s_v2	195 - 210*	2:1***
F1 - F16	210 - 250*	1:1
F1s - F16s	210 - 250*	1:1
G1 - G5	180 - 240*	1:1
GS1 - GS5	180 - 240*	1:1
H	290 - 300*	1:1

Azure Virtual Machines

	General Purpose	Compute Optimized	Memory Optimized	Storage Optimized	GPU	High Performance Compute
Type	DC, Av2, Dv2, Dv3, B, Dsv3	Fsv2, F	M, Dv2, G, DSv2, GS, Ev3	Ls	NC, NCv2, ND, BV, NVv2	H
Description	Balanced CPU and memory	High ratio of compute to memory	High ratio of memory to compute	High disk throughput and IO	Specialized with single or multiple NVIDIA GPUs	High memory and compute power – fastest and most powerful
Uses	Testing and dev, small-med databases, low traffic web servers	Medium traffic web servers, network appliances, batch processing, app servers	Relational database services, analytics, and larger caches	Big Data, SQL, NoSQL databases	Compute intensive, graphics-intensive, and visualization workloads	Batch processing, analytics, molecular modeling, and fluid dynamics, low latency RDMA networking

Standard vs. Premium Storage Disks

Standard Disks	Premium Disks
Backed by cost-effective HDDs	Backed by high-speed SSDs
Stored in Azure storage account	IOPS values are predictable, expected performance levels
Standard SSD (Preview) available for managed disks (dev/test/entry level production applications)	Pre-pay for all storage used (fixed disk sizes P10, 128 GB, 500 IOPs, 50 MB/sec
Standard storage provides maximum IOPS values for each VHD	

Managed vs. Unmanaged Disks

Unmanaged Disks	Managed Disks
Original method to store VM VHDs	Azure manages the disks, so you don't have to worry about storage accountlevel IOPS restrictions
VHDs stored as page blobs in an Azure storage account	Pre-pay for disk size (no need for SA) S10, 128 GB, 500 IOPS, 60 MB/sec
Maximum 256 TB of storage per VM	Supports Standard and Premium SSD and Standard HDD
You need to manage storage account availability	
20,000 IOPS limit across all VM disks in a standard storage account	

Ultra SSD – the next generation of Azure Disks technology

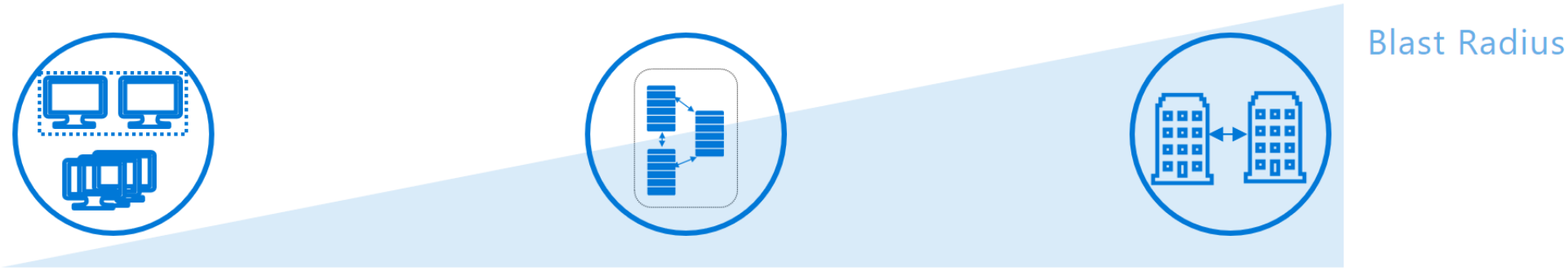
Ultra SSD
supported VM types will be limited
Ultra SSD Disks come in several fixed sizes from 4 GiB up to 64 TiB and feature a flexible performance configuration model that allows you to independently configure IOPS and throughput.
Ultra SSDs support IOPS limits of 300 IOPS/GiB, up to a maximum of 160K IOPS per disk. To achieve the IOPS that you provisioned, ensure that the selected Disk IOPS is less than the VM IOPS.
With Ultra SSD Disks, the throughput limit of a single disk is 256 KiB/s for each provisioned IOPS, up to a maximum of 2000 MBps per disk (where MBps = 10^6 Bytes per second).

Azure Ultra SSD

Ultra SSD Managed Disk Offerings

Disk size (GiB)	4	8	16	32	64	128	256	512	1,024-65,536 (in increments of 1 TiB)
IOPS range	100-1,200	100-2,400	100-4,800	100-9,600	100-19,200	100-38,400	100-76,800	100-153,600	100-160,000
Throughput Cap (MBps)	300	600	1,200	2,000	2,000	2,000	2,000	2,000	2,000

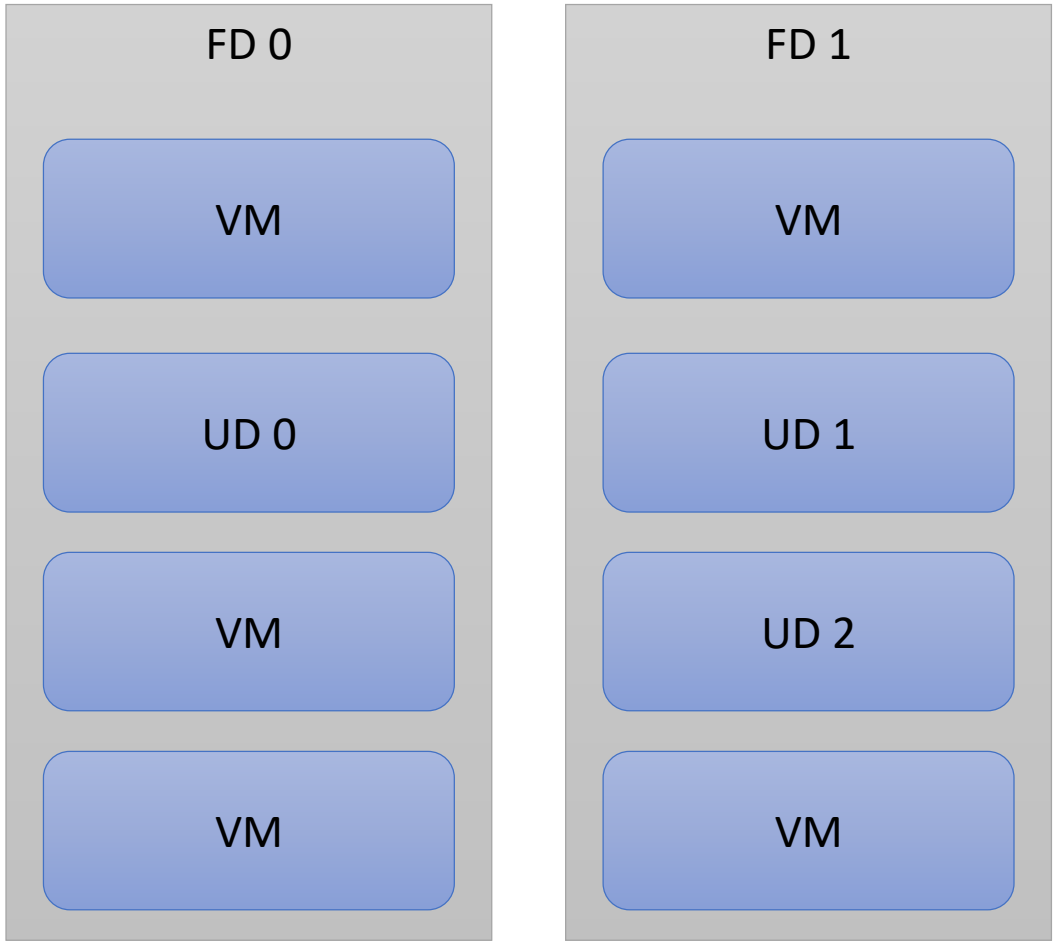
Planning High Availability



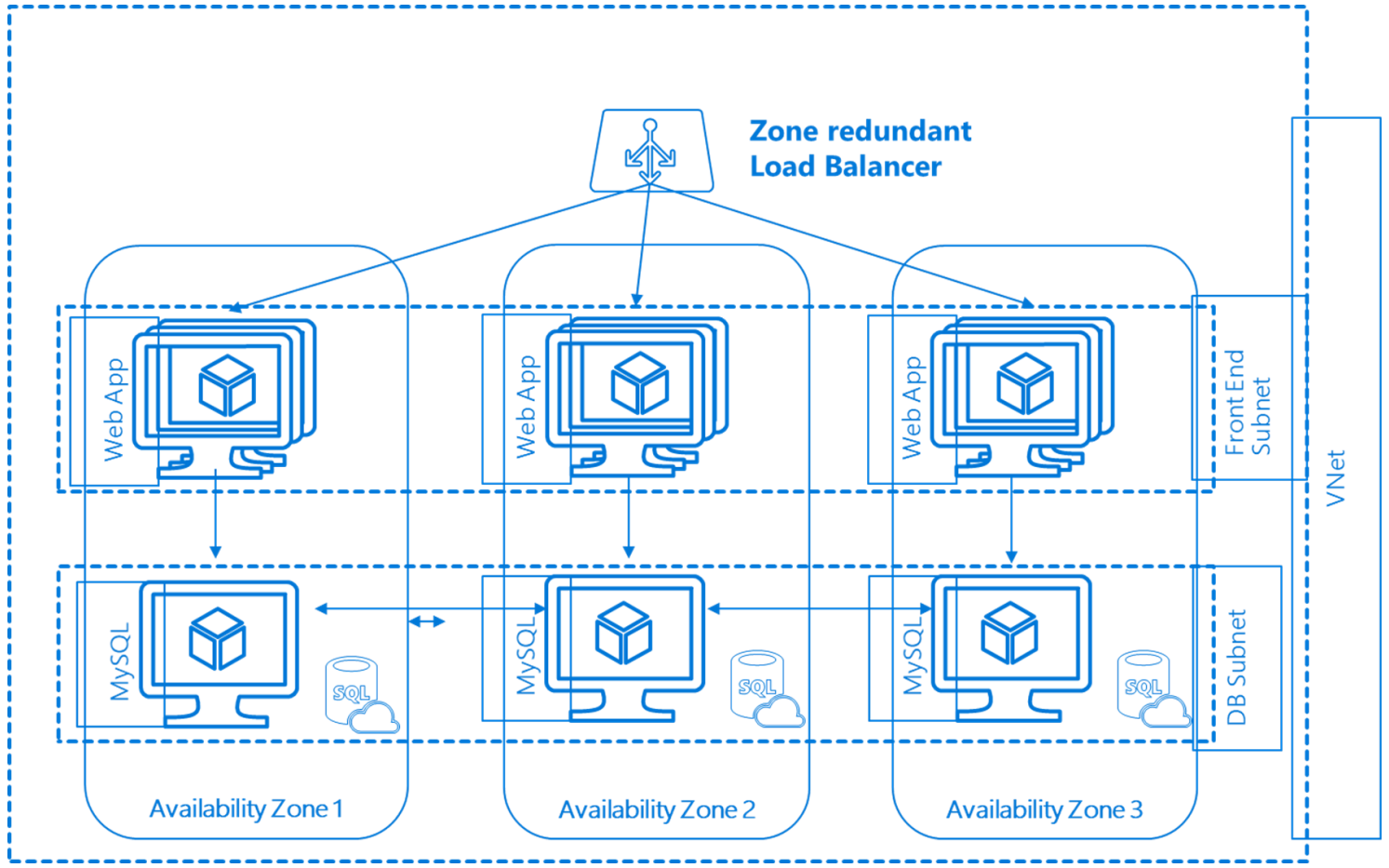
Feature	Capability / Provide
Availability Sets	High-availability **protection from hardware, network, and power failures in a DC**
Availability Zones	High-availability **protection** against the **loss** of **entire DC(s)**
Region pairs	Disaster Recovery that **protects from the loss of an entire region**

Availability Sets

- %99.95 Availability SLA with Availability set
- Must be configured at VM Deployment
- Otherwise %99.9 single instance SLA with Premium storage

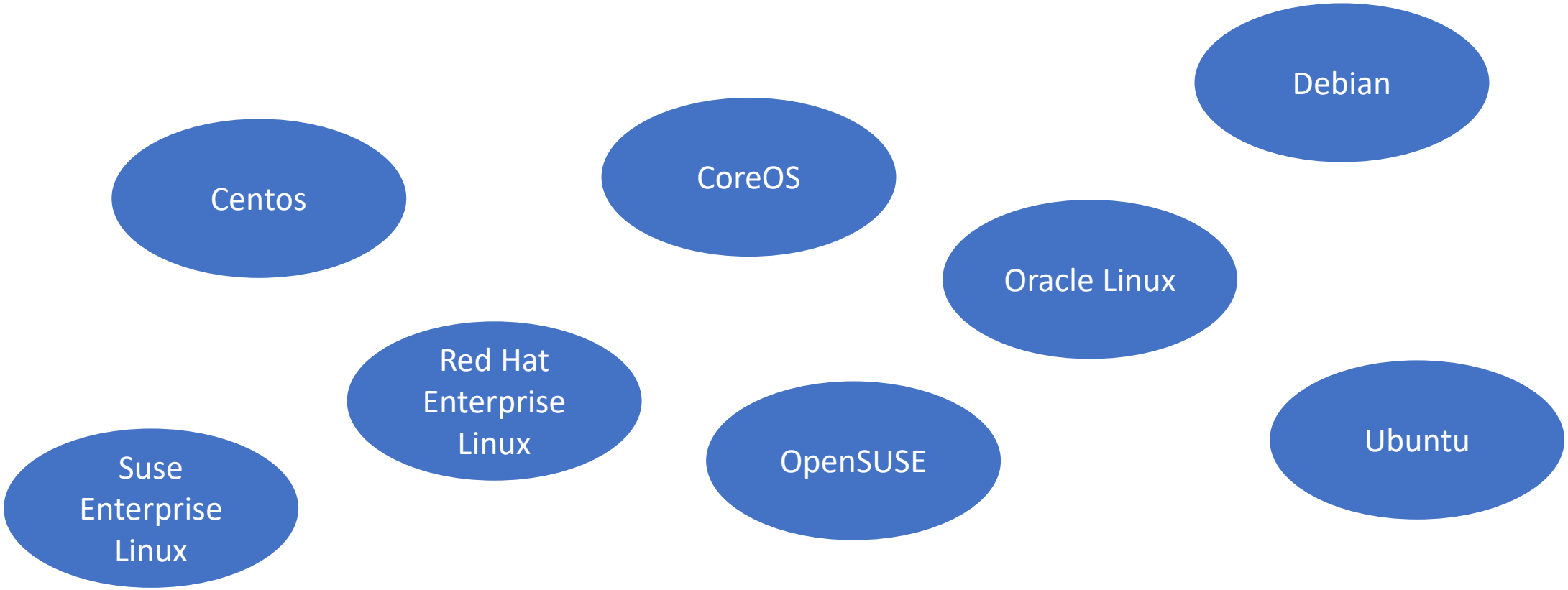


Availability Zone



http://aka.ms/azoverview

Supported Linux Distributions in Azure



https://docs.microsoft.com/en-us/azure/virtual-machines/linux/endorsed-distros

Azure Deployment Tools

Azure Portal

Azure Cloud Shell

Azure Powershell

Azure CLI v2.0

Azure SDKs

ARM Templates

Demo

- Deploy a Linux VM in Azure
- Deploy a Windows VM in Azure with Visual Studio

Demo

Connect Windows VM via Serial

Azure VM Disk Types

OS Disk	Data Disk	Temporary Disk
Generation 1 .VHD	# dependent on VM instance size	D: or /dev/sdb1
Registered as SATA drive	Registered as SCSI disk	Bound to the hardware host
Max capacity 2 TB	Max capacity 4 TB	Do not store permanent data!

https://docs.microsoft.com/en-us/azure/virtual-machines/linux/disks-types

https://docs.microsoft.com/en-us/azure/virtual-machines/windows/disks-types

Demo

- Add Data Disk to VM

Demo

- Deploy VM from Existing Managed Disk

Demo

- Extend the Managed Disk

Demo

- Convert to Managed Disk

Demo

- Azure Disk Encryption

Move Azure Resources

https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-move-resources

Demo

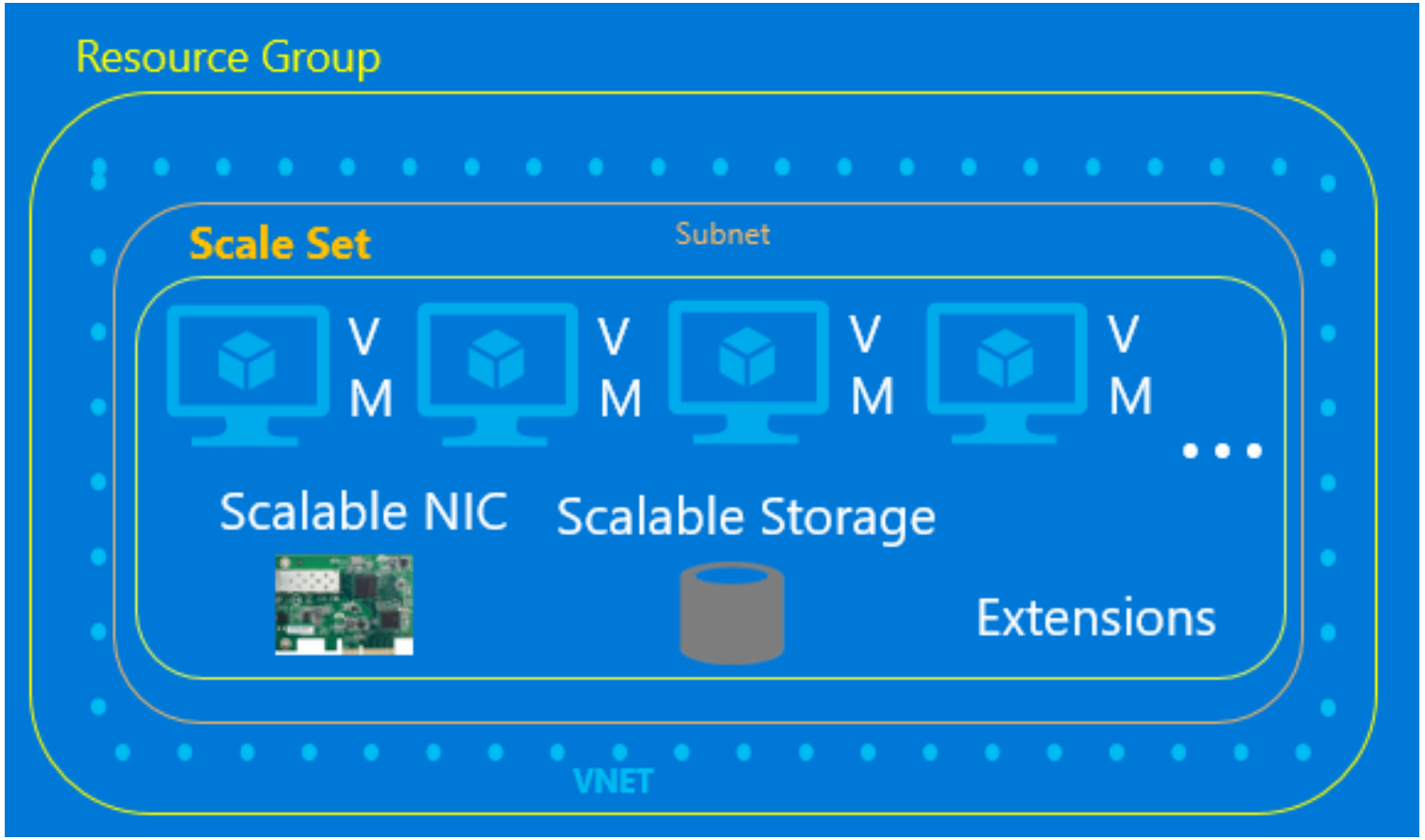
Move Azure Resources

Virtual Machine Scale Set

Azure Champ

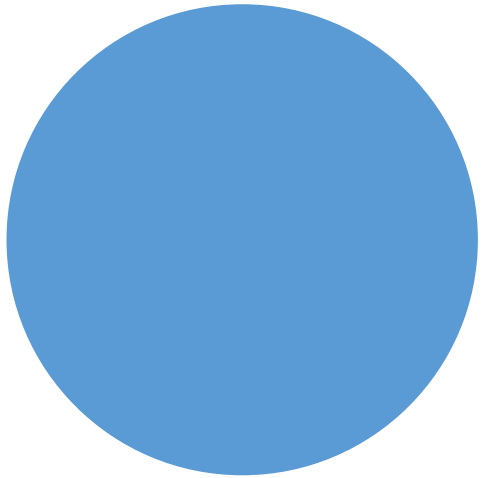
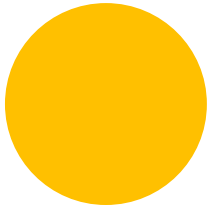
Azure Virtual Machine Scale Set

- Control it like IaaS, scale it like PaaS



Demo

Azure Virtual Machine Scale Test

Microsoft Identity

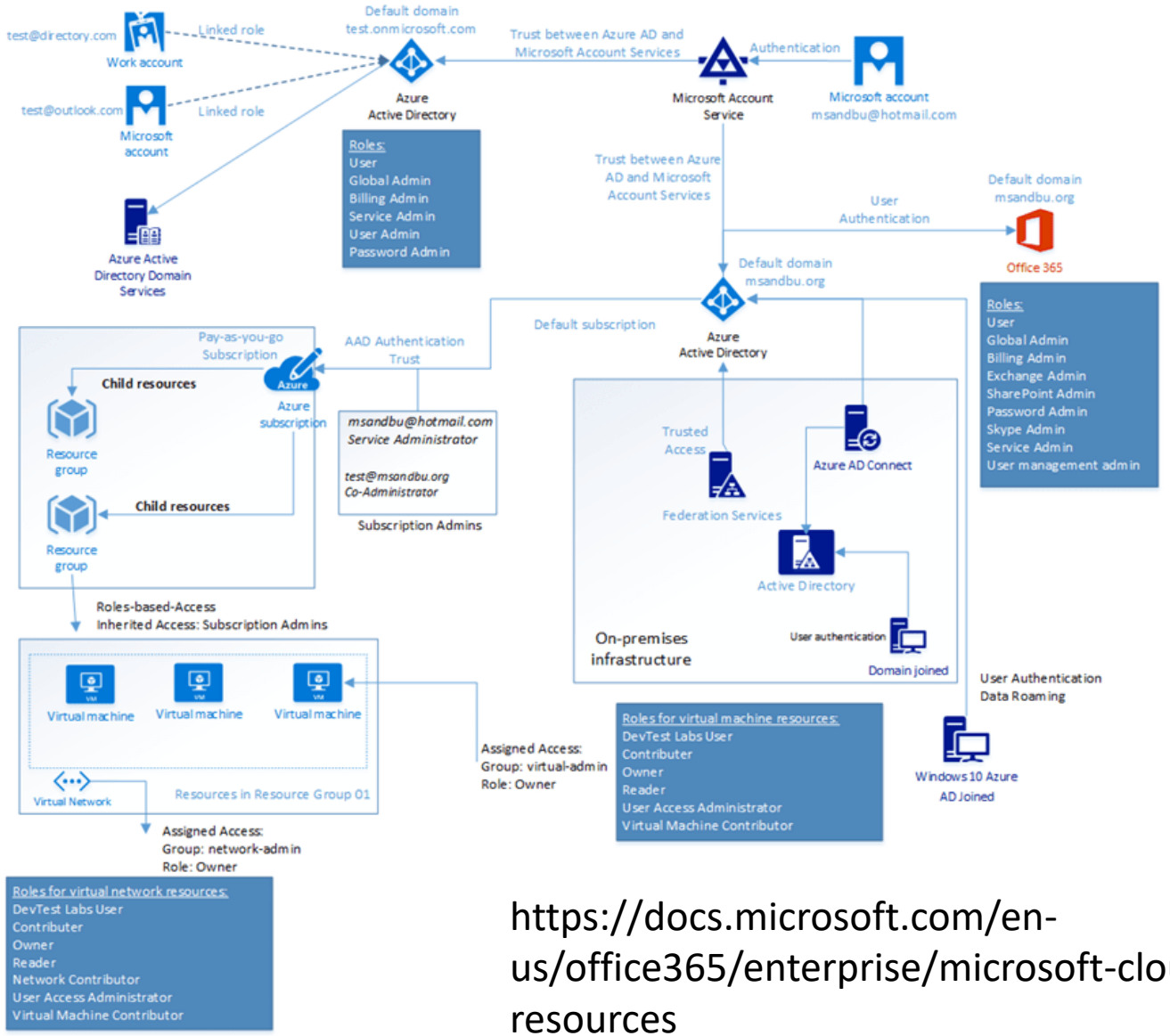
Azure Champ

Terminology

https://docs.microsoft.com/en-us/azure/active-directory/fundamentals/active-directory-whatis

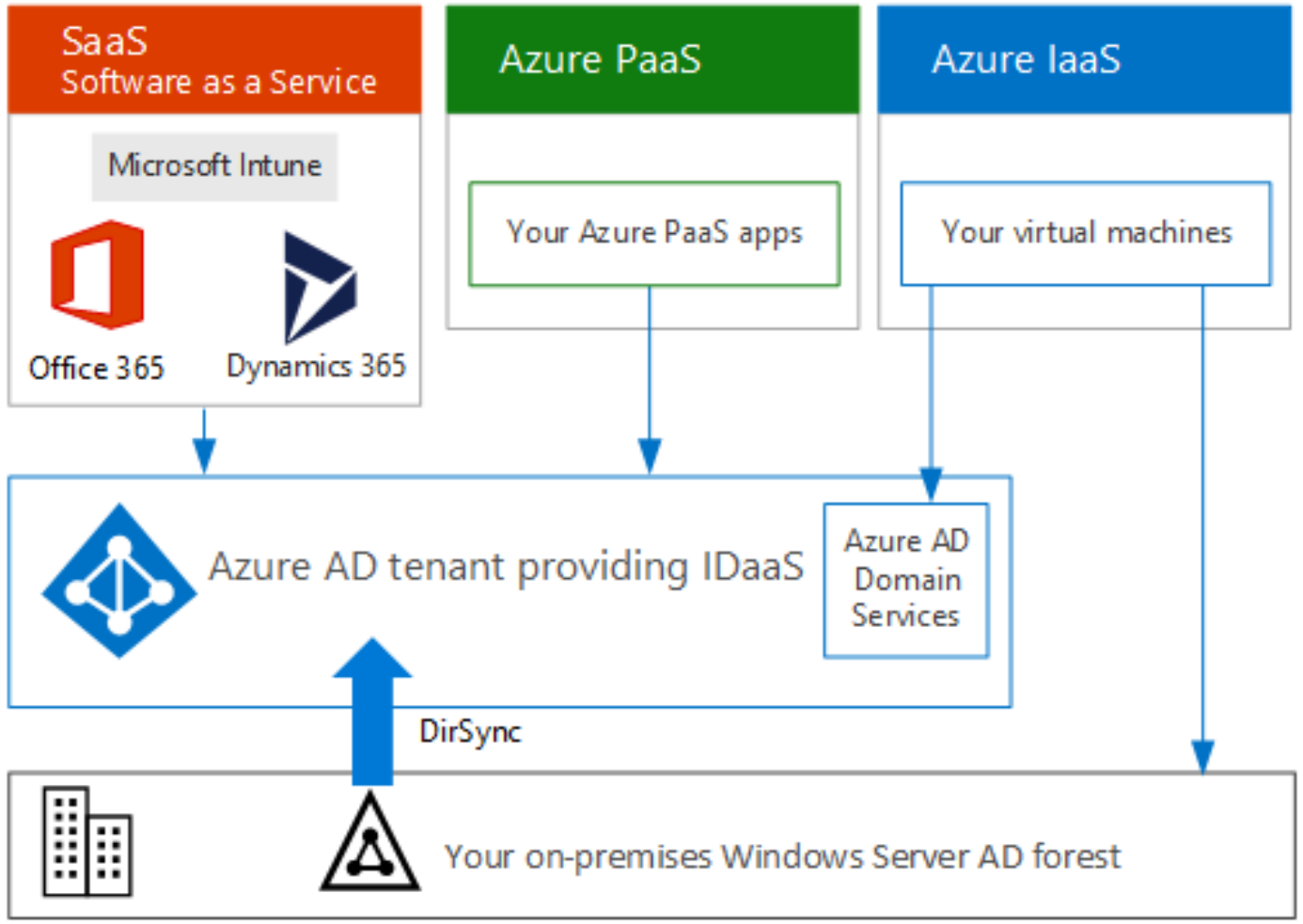
Azure subscription	Used to pay for Azure cloud services. You can have many subscriptions and they're linked to a credit card.
Azure tenant	A dedicated and trusted instance of Azure AD that's automatically created when your organization signs up for a Microsoft cloud service subscription, such as Microsoft Azure, Microsoft Intune, or Office 365. An Azure tenant represents a single organization.
Azure AD directory	Each Azure tenant has a dedicated and trusted Azure AD directory. The Azure AD directory includes the tenant's users, groups, and apps and is used to perform identity and access management functions for tenant resources.
Custom domain	Every new Azure AD directory comes with an initial domain name, domainname.onmicrosoft.com. In addition to that initial name, you can also add your organization's domain names, which include the names you use to do business and your users use to access your organization's resources, to the list. Adding custom domain names helps you to create user names that are familiar to your users, such as alain@contoso.com.

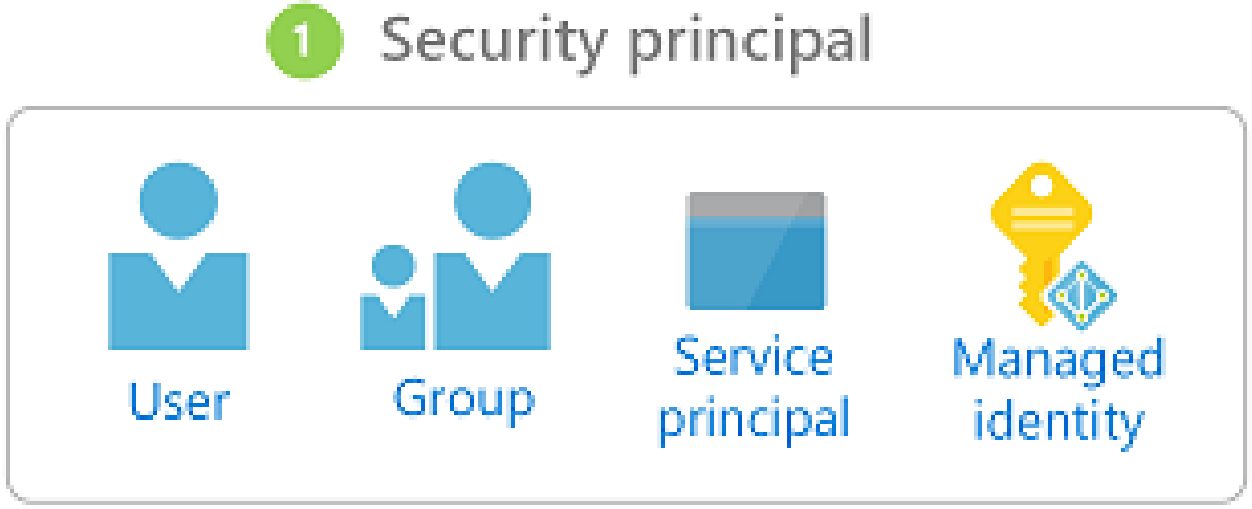
Microsoft Identity



https://docs.microsoft.com/en-us/office365/enterprise/microsoft-cloud-it-architecture-resources

Cloud-based Identity as a Service (IDaaS)

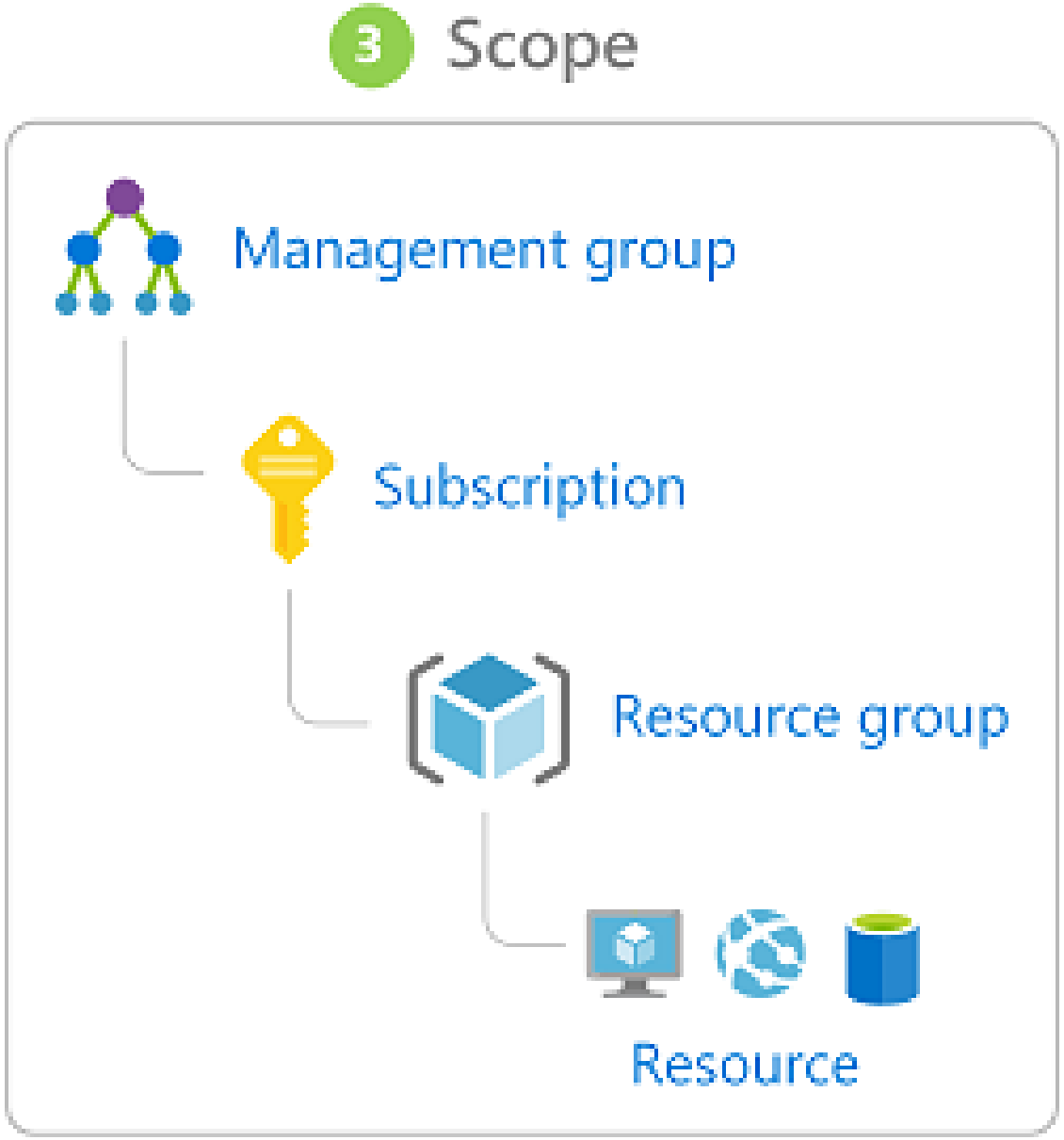




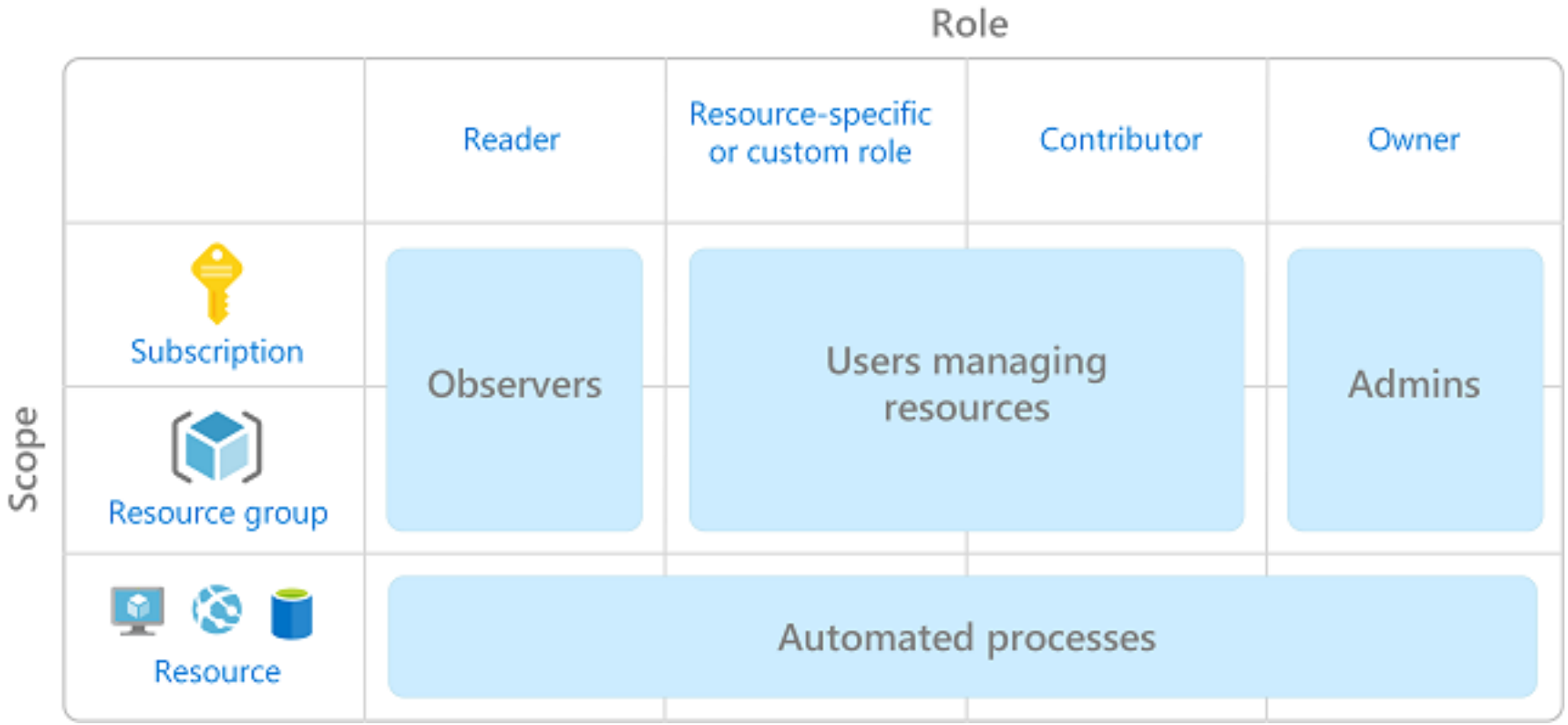
- A security principal is an object that represents a user, group, service principal, or managed identity that is requesting access to Azure resources.

Security Principal

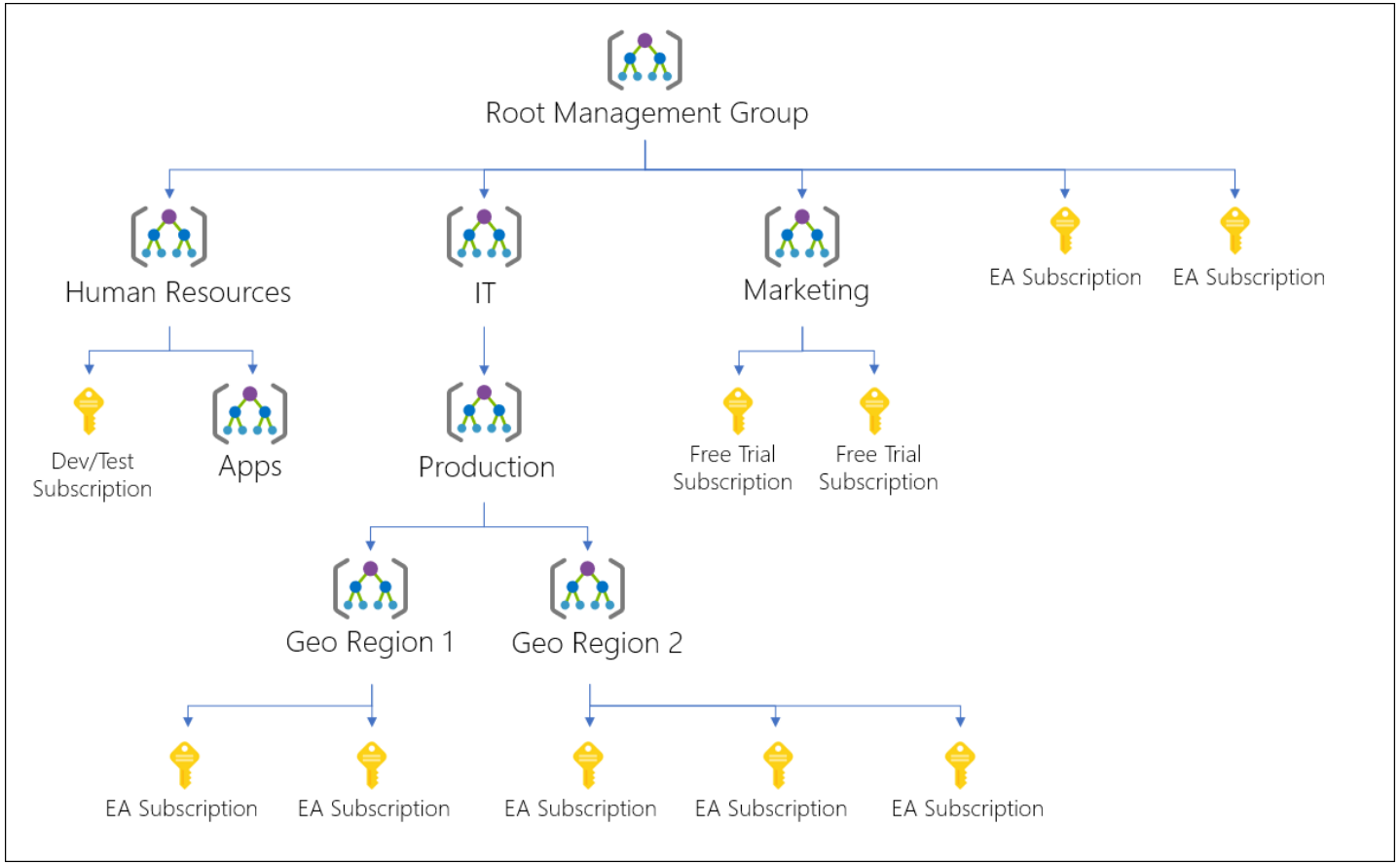
Scope


3
Scope
Management group
Subscription
Resource group
Resource

(RBAC) for Azure resources

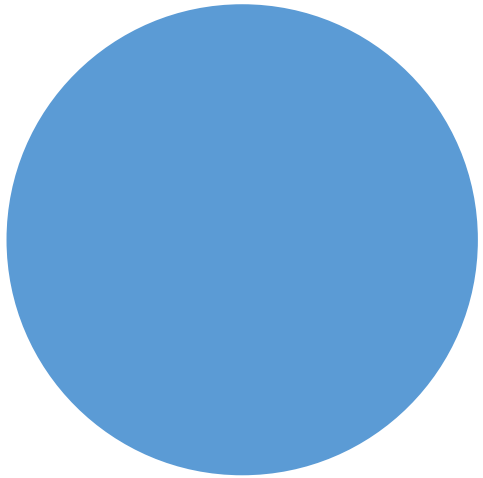
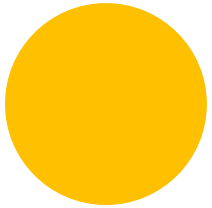


Management Groups



Demo

IAM in Resources

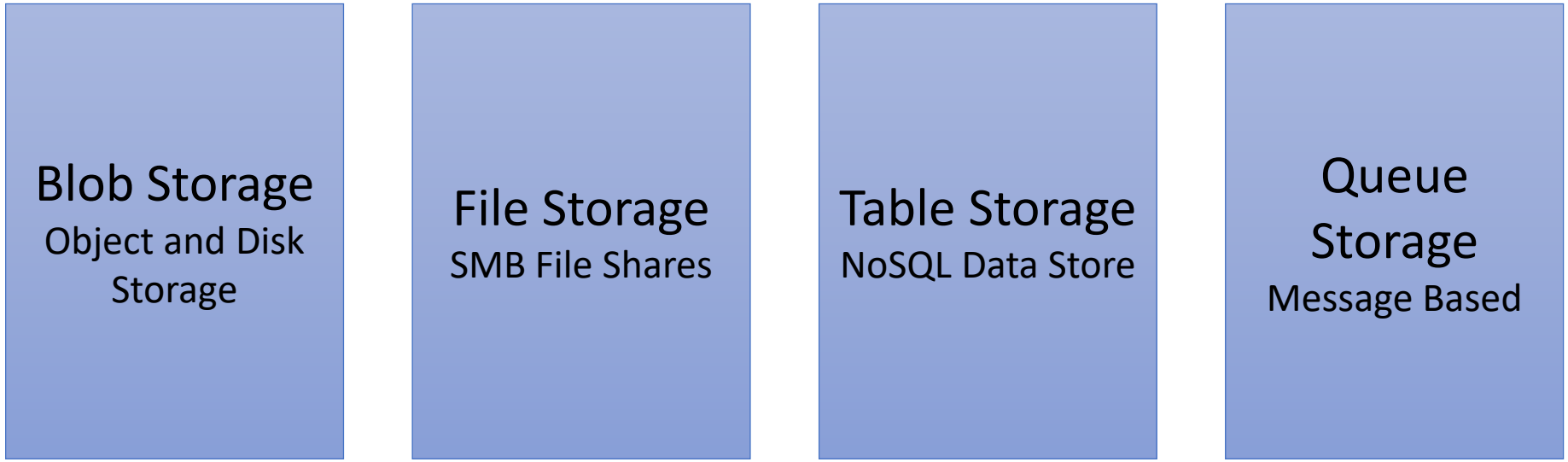



Azure Blob Storage

Azure Champ

Azure Storage Accounts

- Storage Account is parent container for storage types.



Azure Storage Account Links

- http://mystorageaccount.**blob**.core.windows.net
- http://mystorageaccount.**file**.core.windows.net
- http://mystorageaccount.**table**.core.windows.net
- http://mystorageaccount.**queue**.core.windows.net

Storage HA Levels

- Locally redundant storage (LRS): Low-cost data redundancy for Azure Storage

Locally redundant storage (LRS) provides at least 99.999999999% (11 nines) durability of objects over a given year. LRS provides this object durability by replicating your data to a storage scale unit.

https://docs.microsoft.com/en-us/azure/storage/common/storage-redundancy-lrs?toc=%2fazure%2fstorage%2fblobs%2ftoc.json

Storage HA Levels

- Zone-redundant storage (ZRS): Highly available Azure Storage applications

Zone-redundant storage (ZRS) replicates your data synchronously across three storage clusters in a single region. Each storage cluster is physically separated from the others and is located in its own availability zone (AZ).

https://docs.microsoft.com/en-us/azure/storage/common/storage-redundancy-zrs?toc=%2fazure%2fstorage%2fblobs%2ftoc.json

Storage HA Levels

- Geo-redundant storage (GRS): Cross-regional replication for Azure Storage

Geo-redundant storage (GRS) is designed to provide at least 99.99999999999999% (16 9's) durability of objects over a given year by replicating your data to a secondary region that is hundreds of miles away from the primary region. If your storage account has GRS enabled, then your data is durable even in the case of a complete regional outage or a disaster in which the primary region isn't recoverable.

https://docs.microsoft.com/en-us/azure/storage/common/storage-redundancy-grs?toc=%2fazure%2fstorage%2fblobs%2ftoc.json

Storage HA Levels

- Read-access geo-redundant storage (RA-GRS) is based on GRS. RA-GRS replicates your data to another data center in a secondary region, and also provides you with the option to read from the secondary region.

https://docs.microsoft.com/en-us/azure/storage/common/storage-redundancy-grs?toc=%2fazure%2fstorage%2fblobs%2ftoc.json

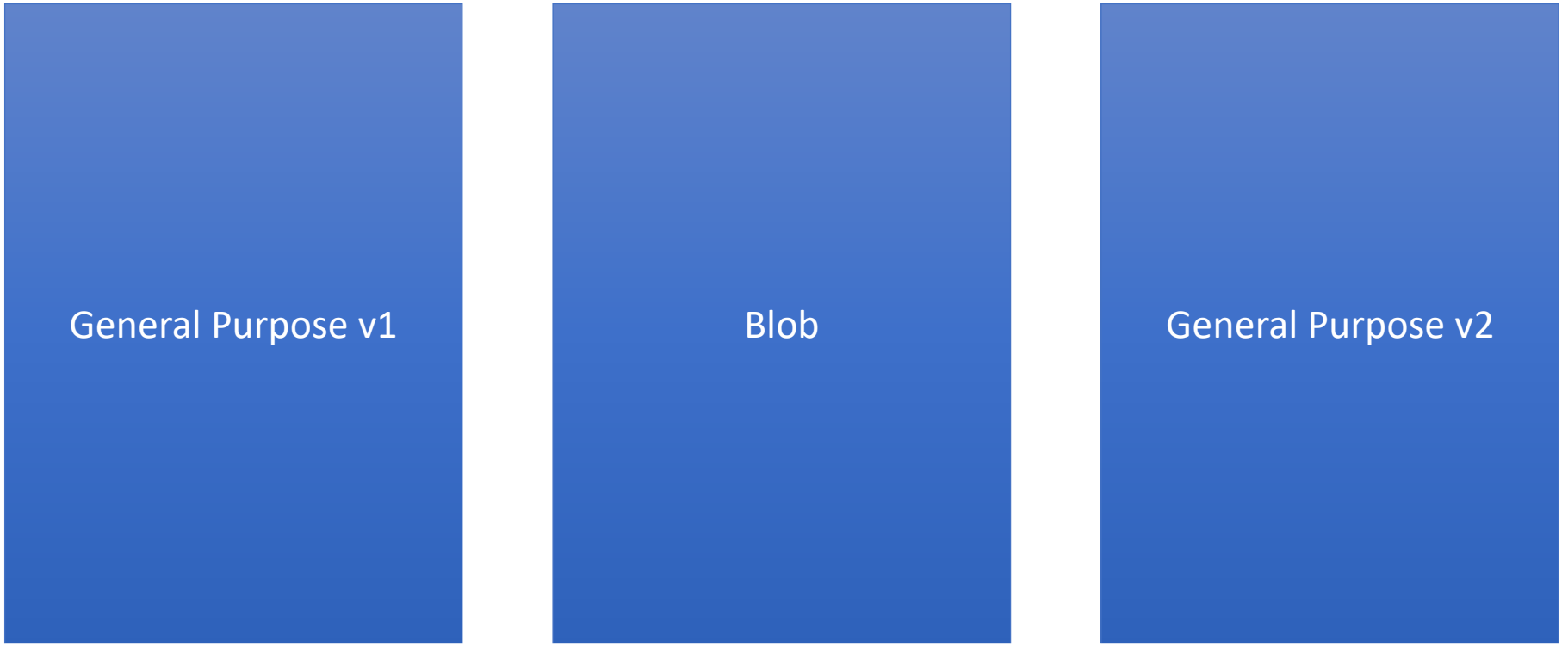
What is the RPO and RTO with GRS?

- The RPO indicates the point in time to which data can be recovered. Azure Storage typically has an RPO of less than 15 minutes, although there's currently no SLA on how long geo-replication takes.

- **Recovery Time Objective (RTO):** The RTO is a measure of how long it takes to perform the failover and get the storage account back online. The time to perform the failover includes the following actions:
  - The time until the customer initiates the failover of the storage account from the primary to the secondary region.
  - The time required by Azure to perform the failover by changing the primary DNS entries to point to the secondary location.

https://docs.microsoft.com/en-us/azure/storage/common/storage-redundancy-grs?toc=%2fazure%2fstorage%2fblobs%2ftoc.json

Azure Storage Account Types



Azure Storage Account Limits

- https://docs.microsoft.com/en-us/azure/storage/common/storage-scalability-targets

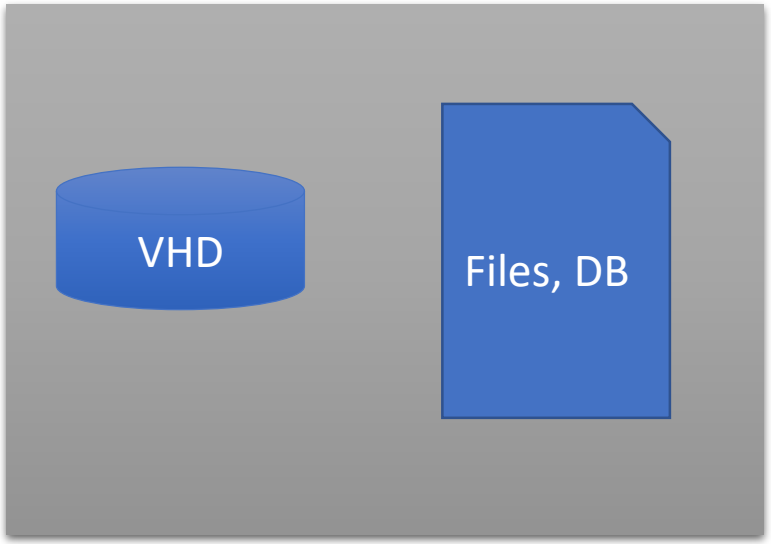
Contact Azure Support if you need more!

Azure Storage Blob Service

- BLOB (Binary Large Object)
  - File,document,image,video,VM Disk, database etc.

https://docs.microsoft.com/en-us/rest/api/storageservices/understanding-block-blobs--append-blobs--and-page-blobs

Blob Types



Block Blob

- Block blobs are comprised of blocks
- Each of which is identified by a block ID
- Each block can be a different size, up to a maximum of 100 MB
- Block blob can include up to 50,000 blocks
- Insert,replace,delete blocks supported
- MAX 4.77 TB

Append Blob

- is optimized for append operations
- blocks are added to the end of the blob only
- Updating or deleting of existing blocks is not supported
- append blob does not expose its block IDs.
- Each block in an append blob can be a different size, up to a maximum of 4 MB
- Ideal for logging, auditing
- MAX 195 GB

Page Blob

- collection of 512-byte pages optimized for random read and write operations
- Azure virtual machine disks are backed by page blobs
- Azure offers two types of durable disk storage: premium and standard
- MAX 8TB

Azure Storage Pricing

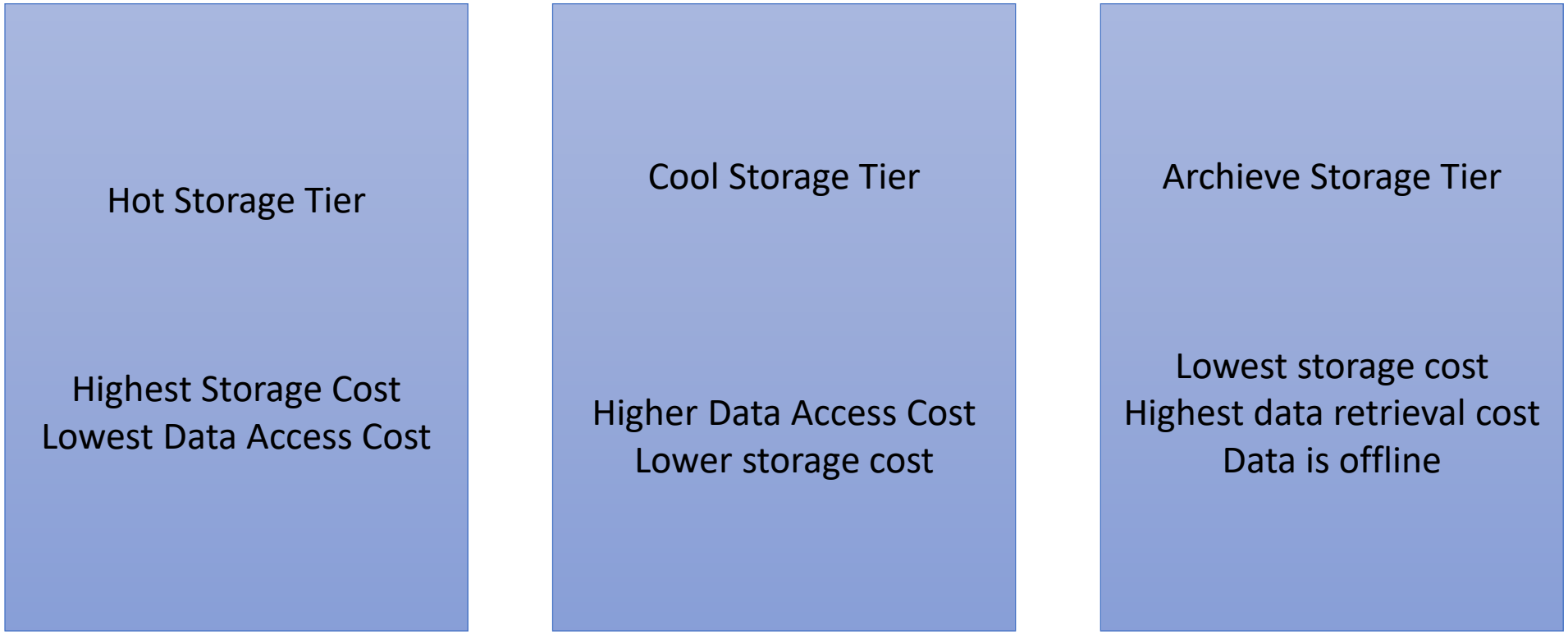
Data Storage (Capacity)

Data Operations

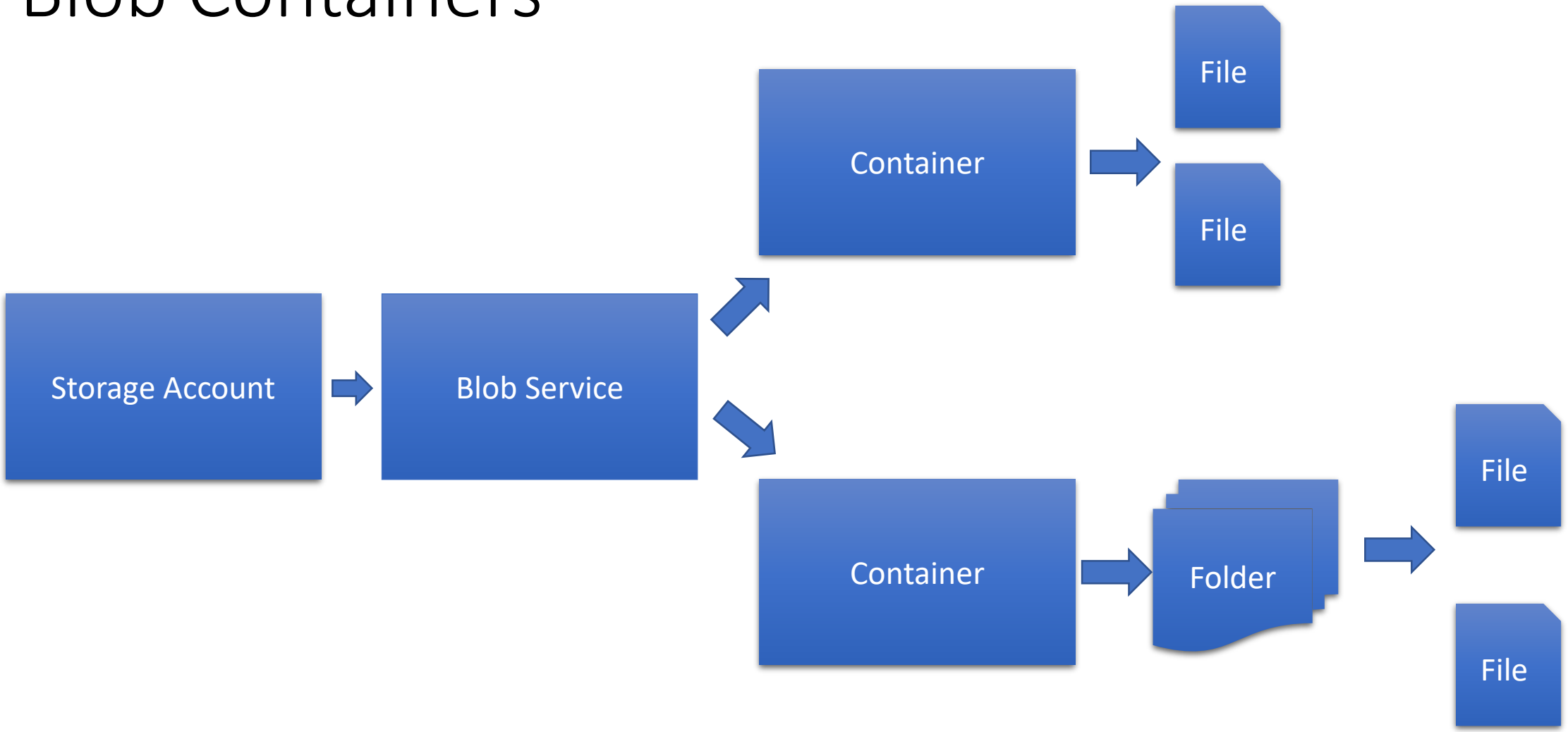
Output Data Transfer

Geo-Replication Data Transfer

Blob Storage Tiers



Blob Containers



Public Access Level Container

- Private Access Level (by default)

  Requires Authentication

- Public read access for blobs only: Blobs within the container can be read by anonymous request, but container data is not available. Anonymous clients cannot enumerate the blobs within the container.
- Full public read access: All container and blob data can be read by anonymous request. Clients can enumerate blobs within the container by anonymous request, but cannot enumerate containers within the storage account.

https://docs.microsoft.com/en-us/azure/storage/blobs/storage-manage-access-to-resources

Demo

Create a Storage Account from portal

Demo

Create a Storage Account from command line

Demo

Blob properties and create blob snapshot