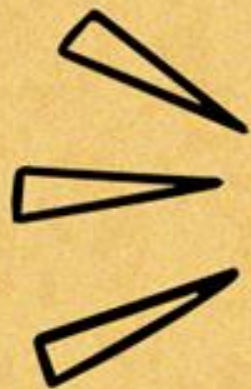


With Graphics, concepts and sample exam questions



Azure Fundamentals

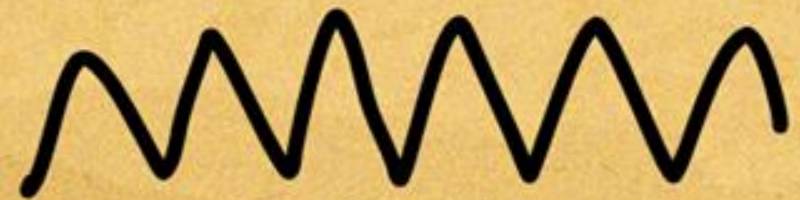
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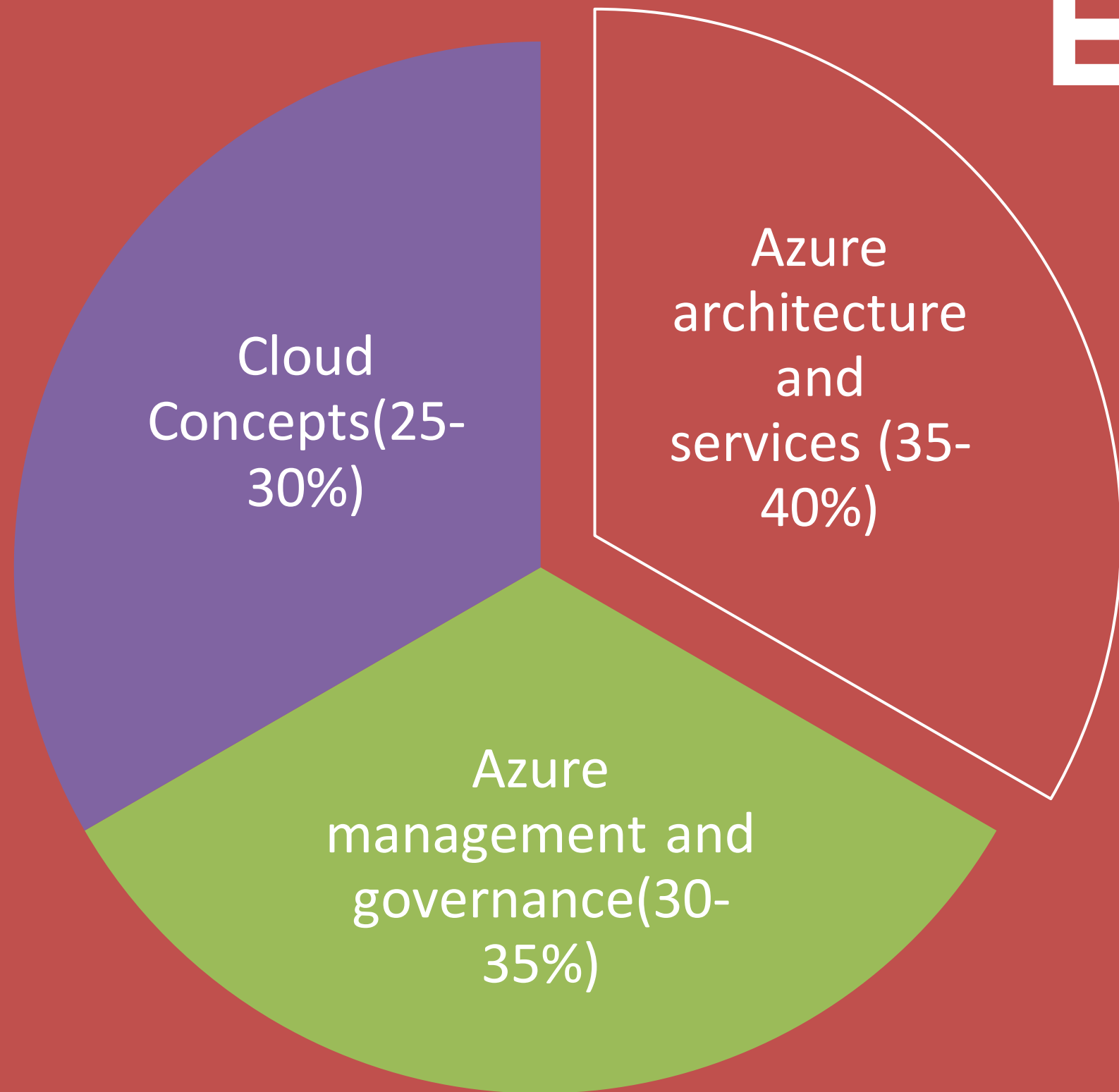
Tech Tutorials With Piyush



Piyush-Sachdeva



Exam Weightage



- Cloud concepts
- Azure Architecture and Services
- Azure Management and Governance

Cloud Concepts (25-30%)

What is Cloud Computing?

Consumption based model

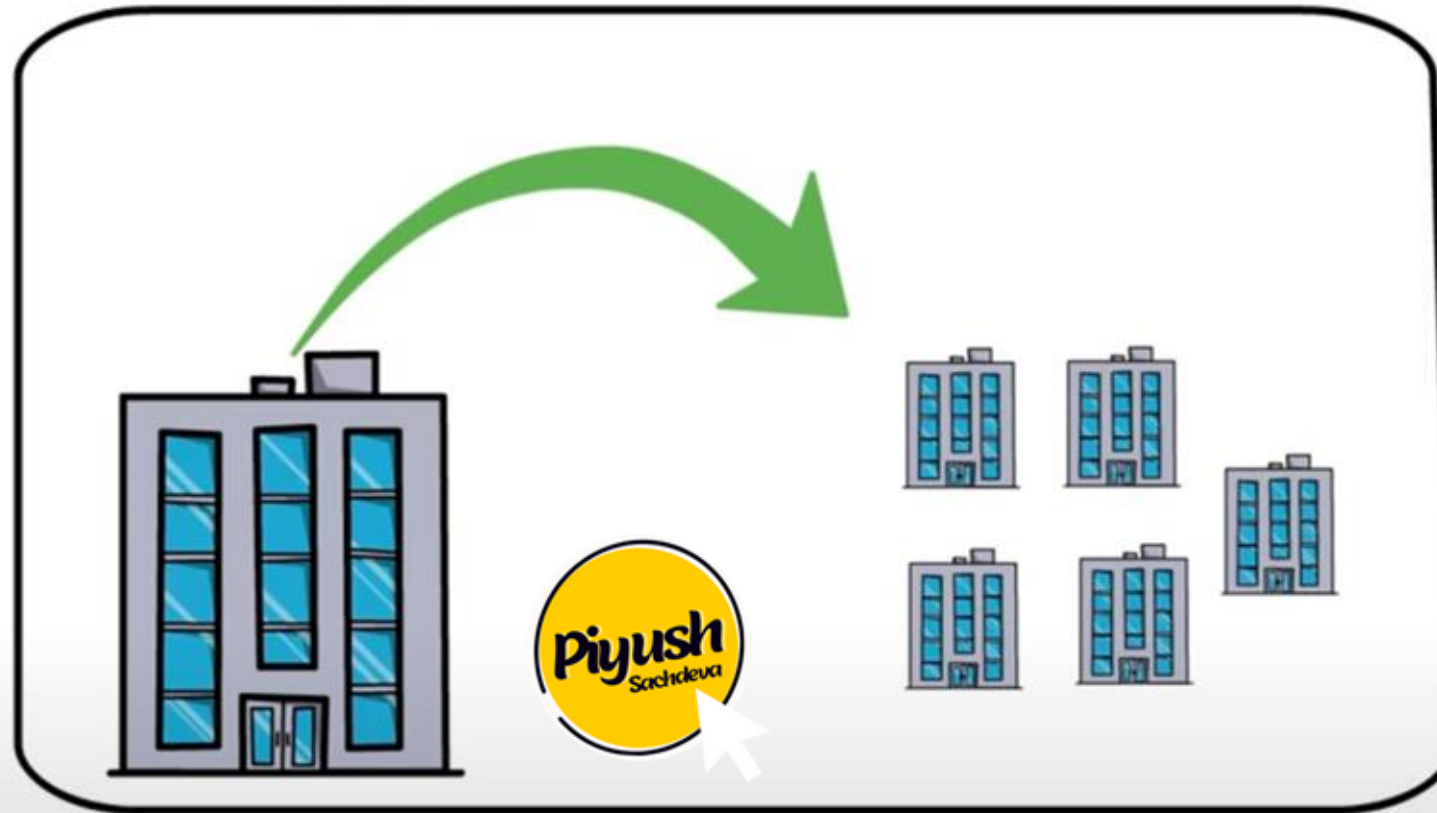
Cloud Services Types : Iaas , PaaS and SaaS

Shared Responsibility Model

Define Cloud models

Benefits of Cloud Computing

Expansion Idea



What Is Cloud Computing?

Before jumping into cloud computing, let's understand why it's necessary. 🙋

Imagine you're the owner of a small IT firm with dreams of scaling your business. However, traditional expansion comes with hefty **upfront costs (CapEx)** and **recurring expenses (OpEx)**, slowing your growth. Here's where cloud computing steps in as a game-changer.



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One-time upfront expenses

**High CapEX
(Capital Expenditure)**



**CAPEX
(CAPITAL
EXPENDITURE)**

- Upfront expenses, like office space, hardware, and salaries, are termed **CapEx**. (Capital Expenditure)
- These expenses are generally huge and could restrict someone from starting or even scaling the existing business.
- These are the upfront investments.



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OPEX (OPERATING EXPENDITURE)



OpEX

(Operating Expenditure)

Recurring Expenses



- Ongoing operational expenses like maintenance and utilities are termed **OpEx**.
- These hurdles hinder scalability and efficiency.
- **Cloud computing** provides access to computing resources and services over the Internet without the need for upfront investment.



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CLOUD COMPUTING

- Cloud computing provides access to computing resources and services over the Internet without the need for upfront investment.
- Cloud computing allows you to rent resources online from a provider instead of buying and maintaining the hardware.



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BENEFITS OF CLOUD COMPUTING



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IaaS

Infrastructure as a Service

Gives full control over infra resources such as virtual machine /storage etc

You must take care of all the Admin tasks such as patching, upgrades, backups.

Pay-per-use, EC2, VM, GCE

Ideal choice for life and shift migration and legacy application.

PaaS

Platform as a Service

Give runtime environment/platform To deploy application and Development tools.

Azure takes care of all the admin tasks including automated backups

Pay-per-service model, Azure web app,

Ideal choice where customer doesn't want to take care of Admin tasks.

SaaS

Software as a Service

Gives application access to the end users

Azure takes care of all the admin tasks.

Pay-per-subscription model, O365, Gmail, Dropbox etc

Ideal choice where customer can use the standard version of a cloud application.



Shared Responsibility Model



ON-PREMISES	IAAS OS ← You	PaaS OS ← Azure	SaaS
Information/Data	Information/Data	Information/Data	Information/Data
Devices(Mobiles/Pcs)	Devices(Mobiles/Pcs)	Devices(Mobiles/Pcs)	Devices(Mobiles/Pcs)
Accounts and Identities	Accounts and Identities	Accounts and Identities	Accounts and Identities SSO / OAuth
Identity and directory infrastructure	Identity and directory infrastructure	Identity and directory infrastructure	Identity and directory infrastructure
Applications ✓	Applications	Applications	Applications
Network Controls ✓	Network Controls	Network Controls	Network Controls
Operating System ✓	Operating System	Operating System	Operating System
Physical Host ✓	Physical Host	Physical Host	Physical Host
Physical network ✓	Physical network	Physical network	Physical network
Physical datacentre ✓	Physical datacentre	Physical datacentre	Physical datacentre



Knowledge Checks

1) When you are implementing a Software as a Service (SaaS) solution, you are responsible for configuring the SaaS solution. Everything else is managed by the cloud provider.

True or False?

2) You plan to migrate a web application to Azure. The web application is accessed by external users. You need to recommend a cloud deployment solution to minimize the amount of administrative effort used to manage the web application. What should you choose?

- IaaS - PaaS - SaaS - DaaS

3) PaaS provides full control over the OS? True/False?

4) Your company plans to deploy custom applications to Azure that will have several prerequisite applications and services installed. Which cloud service should you recommend?

IaaS, PaaS or SaaS

5) In SaaS, customer is responsible for software updates? True/False?

Knowledge Checks

6) You must have physical servers to use in Cloud Computing? **True/False?**

7) Sql server hosted on cloud and updates managed by azure is ____

- **Iaas , Paas , Saas**

8) MSSQL server 2019 installed on vm is PaaS? **True or False?**

9) You plan to use Azure to host two apps named App1 and App2. The apps must meet the following requirements:

- You must be able to modify the code of App1.
- Administrative effort to manage the operating system of App1 must be minimized.
- App2 must run interactively with the operating system of the server.

Which type of cloud service should you use for each app? **Iaas/Paas/SaaS ?**

10) You have an application that uses legacy database, you plan to move the app to cloud, which cloud service you would use? **Iaas/Paas/SaaS ?**



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Public

In a public cloud, resources are shared among multiple users, and customers only pay for the resources they use. Hosted and operated by a third-party cloud service provider, such as AWS, Azure or GCP



No CapEx to scale up

Resources can be provisioned or decommissioned on demand

Private

Resources are not shared with other organizations, providing greater control and security

Operated and maintained by a single organization. A private cloud may be hosted on-premises or in a data center.



High CapEx

Hardware needs to be purchased

Hybrid

Uses both public and private cloud in an inter-connected environment.

Provides extra layer of security, use can choose which resources to keep in private cloud and which resources to deploy in public cloud.



Resources can be added on demand by scaling up in the public cloud environment.



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Knowledge Checks

1) Which cloud computing benefit provides continuous user access to a cloud-based application with minimal downtime?

A. Agility B. scalability C. elasticity D. high availability

2) An organization hosts its infrastructure in _____ cloud, no longer requires a data center.

- Public, - Private, - Hybrid , Hyper-V host

3) What are two characteristics of the public cloud? Each correct answer presents a complete solution.

A. dedicated hardware B. unsecured connections C. limited storage D. metered pricing
E. self-service management.

4) You have an on-premises network that contains 100 servers.

You need to recommend a solution that provides additional resources to your users. The solution must minimize capital and operational expenditure costs.

A. a complete migration to the public cloud

B. an additional data center

C. a private cloud

D. a hybrid cloud



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Knowledge Checks



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5) What is an advantage of using a public cloud service for the servers over an on-premises network?

- A. The public cloud is owned by the public, not a private corporation
- B. The public cloud is a crowd-sourcing solution that provides corporations with the ability to enhance the cloud
- C. All public cloud resources can be freely accessed by every member of the public
- D. The public cloud is a shared entity whereby multiple corporations each use a portion of the resources in the cloud

6) In which type of cloud model are all the hardware resources owned by a third-party and shared between multiple tenants? **A. private B. hybrid C. public**

7) ___ Provides complete control over security? **Public/Private/Hybrid**

8) To implement hybrid cloud, your company must have an internal network?

Resource Hierarchy

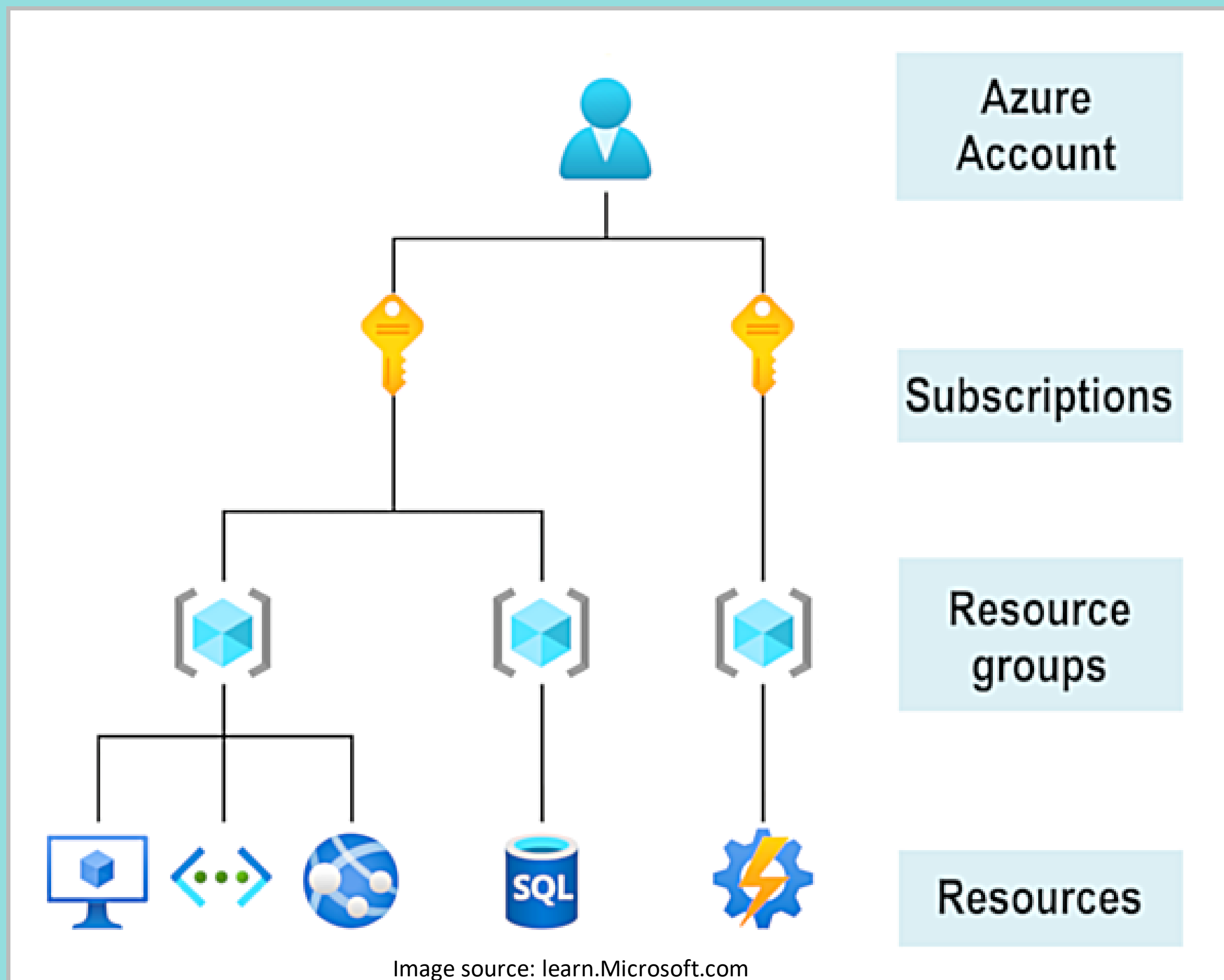




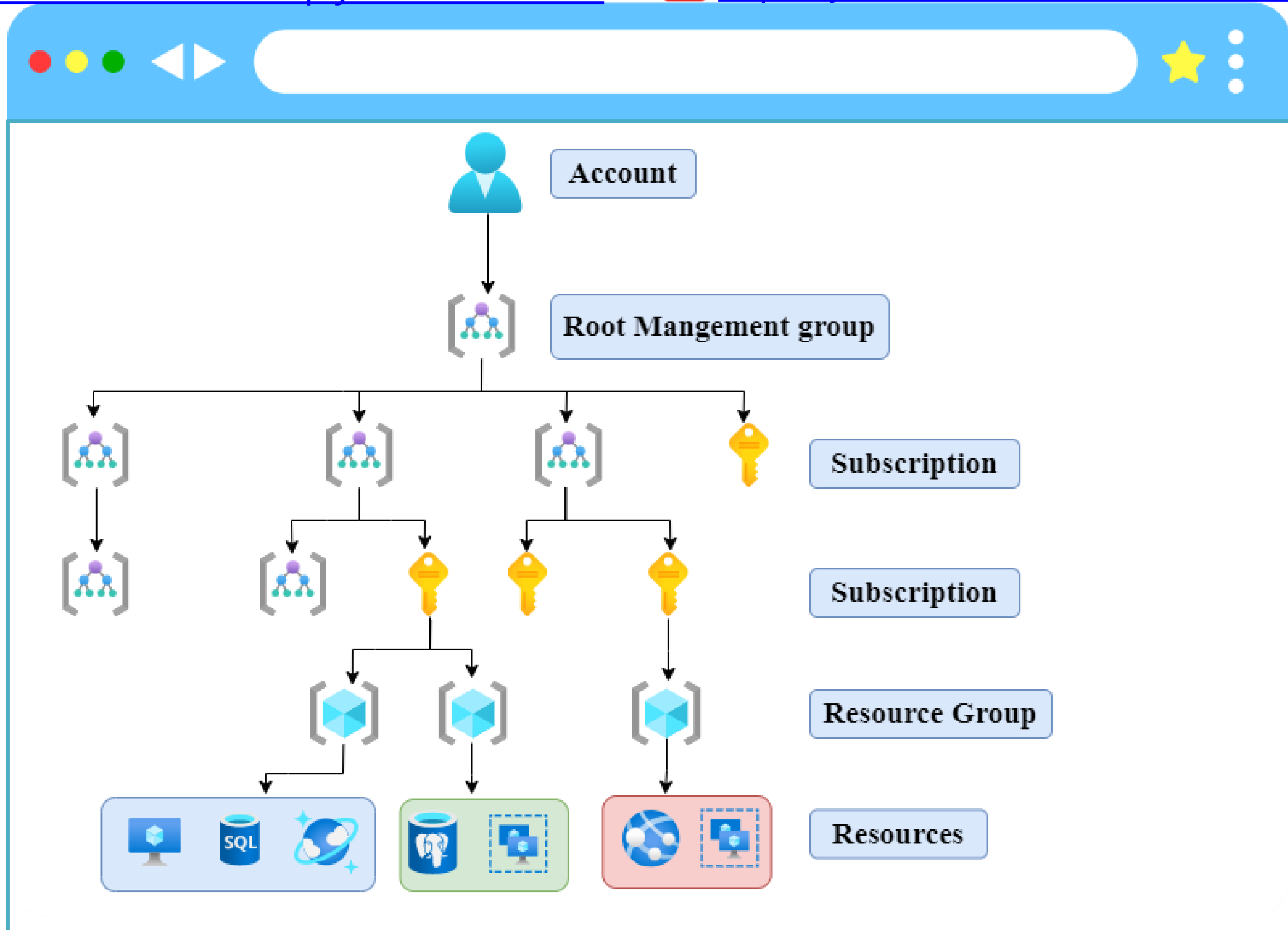
Image source: learn.Microsoft.com



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Knowledge Checks

- 1) You can create resource group inside resource group. True of False?
- 2) A VM can be in multiple resource groups True of False?
- 3) A resource group can contain resources from multiple azure regions? True/False?
- 4) A resource should be part of one resource group True/False?
- 5) You plan to deploy several Azure virtual machines.
You need to ensure that the services running on the virtual machines remain available if a single data center fails.
What are two possible solutions? Each correct answer presents a complete solution.
 - A. Deploy the virtual machines to two or more availability zones.
 - B. Deploy the virtual machines to two or more resource groups.
 - C. Deploy the virtual machines to a scale set.
 - D. Deploy the virtual machines to two or more regions.

Knowledge Checks

6) You must have physical servers to use in Cloud Computing? **True/False?**

7) Sql server hosted on cloud and updates managed by azure is ____

- **IaaS , PaaS , SaaS**

8) MSSQL server 2019 installed on vm is PaaS? **True or False?**

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Which type of cloud service should you use for each app? **IaaS/PaaS/SaaS ?**

10) You have an application that uses legacy database, you plan to move the app to cloud, which cloud service you would use? **IaaS/PaaS/SaaS ?**

Knowledge Checks

- 1) Management groups provide organizations with the ability to manage the compliance of Azure resources across multiple subscriptions. **True or False?**
- 2) Your company plans to migrate to Azure.
The company has several departments. All the Azure resources used by each department will be managed by a department administrator.
What are two possible techniques to segment Azure for the departments? Each correct answer presents a complete solution.
 - A. multiple subscriptions
 - B. multiple Azure Active Directory (Azure AD) directories
 - C. multiple regions
 - D. multiple resource groups
- 3) A single Microsoft account can be used to manage multiple Azure subscriptions? **Yes/No?**
- 4) Two Azure subscriptions can be merged into a single subscription? **Yes/No?**

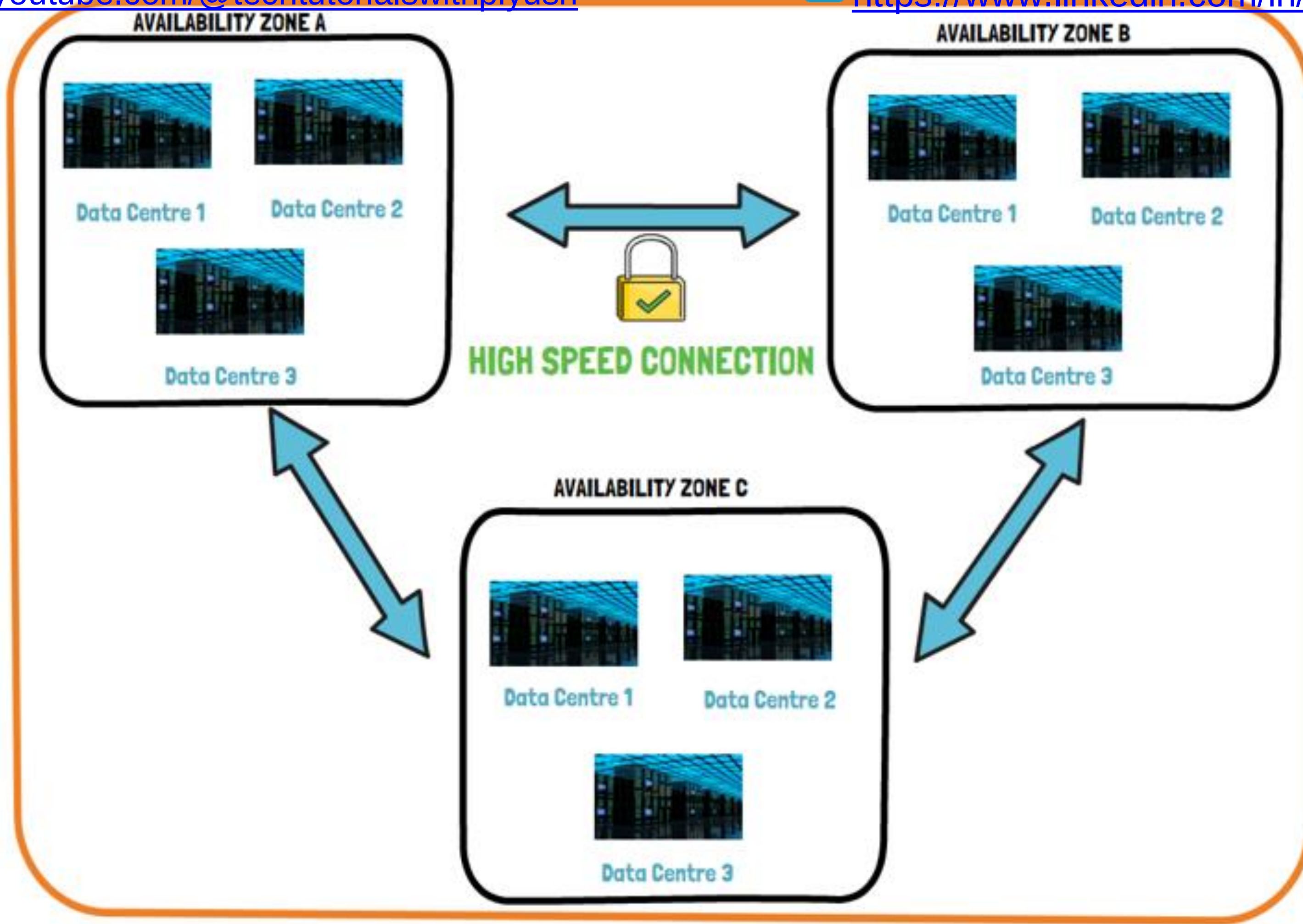
Knowledge Checks

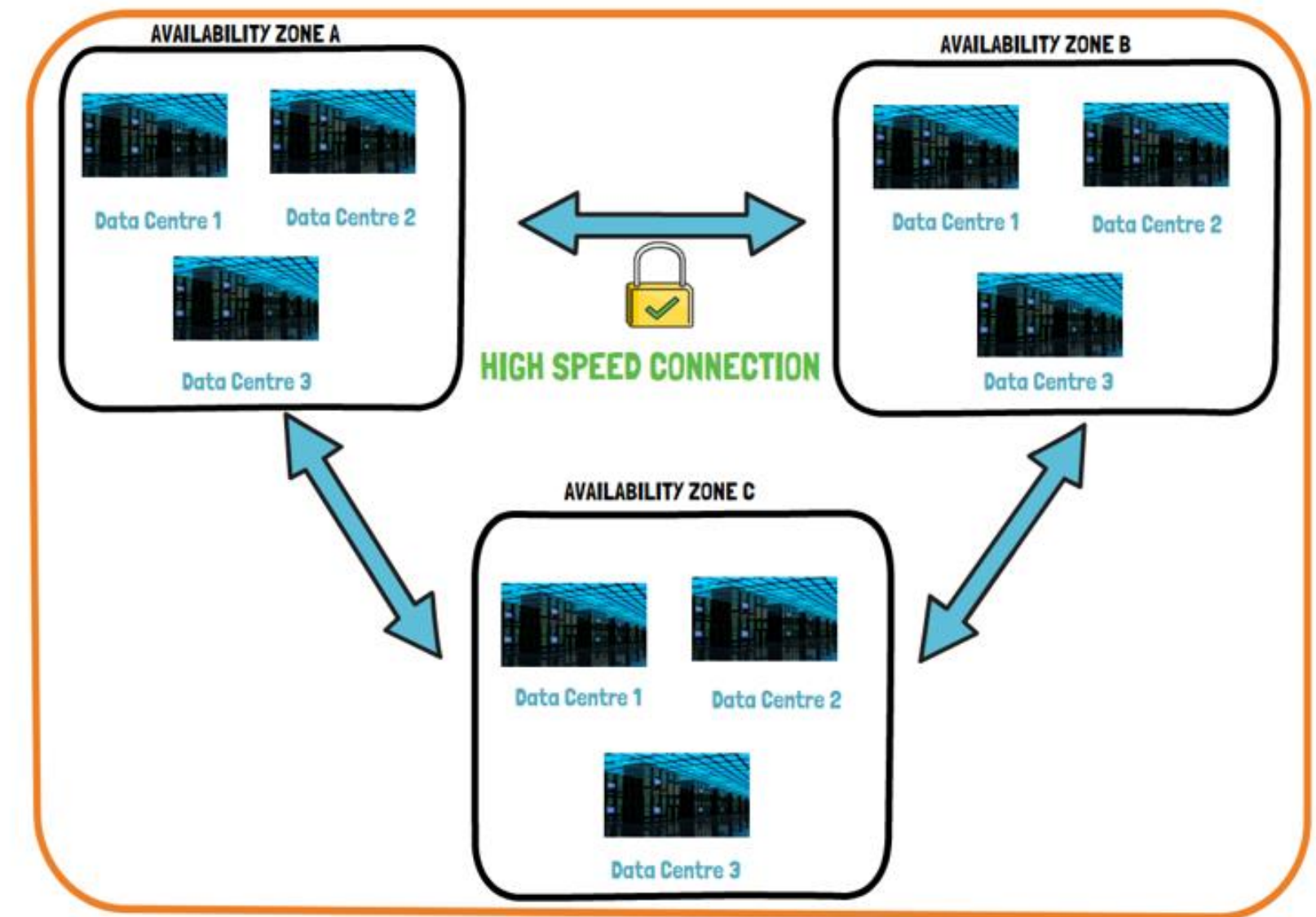
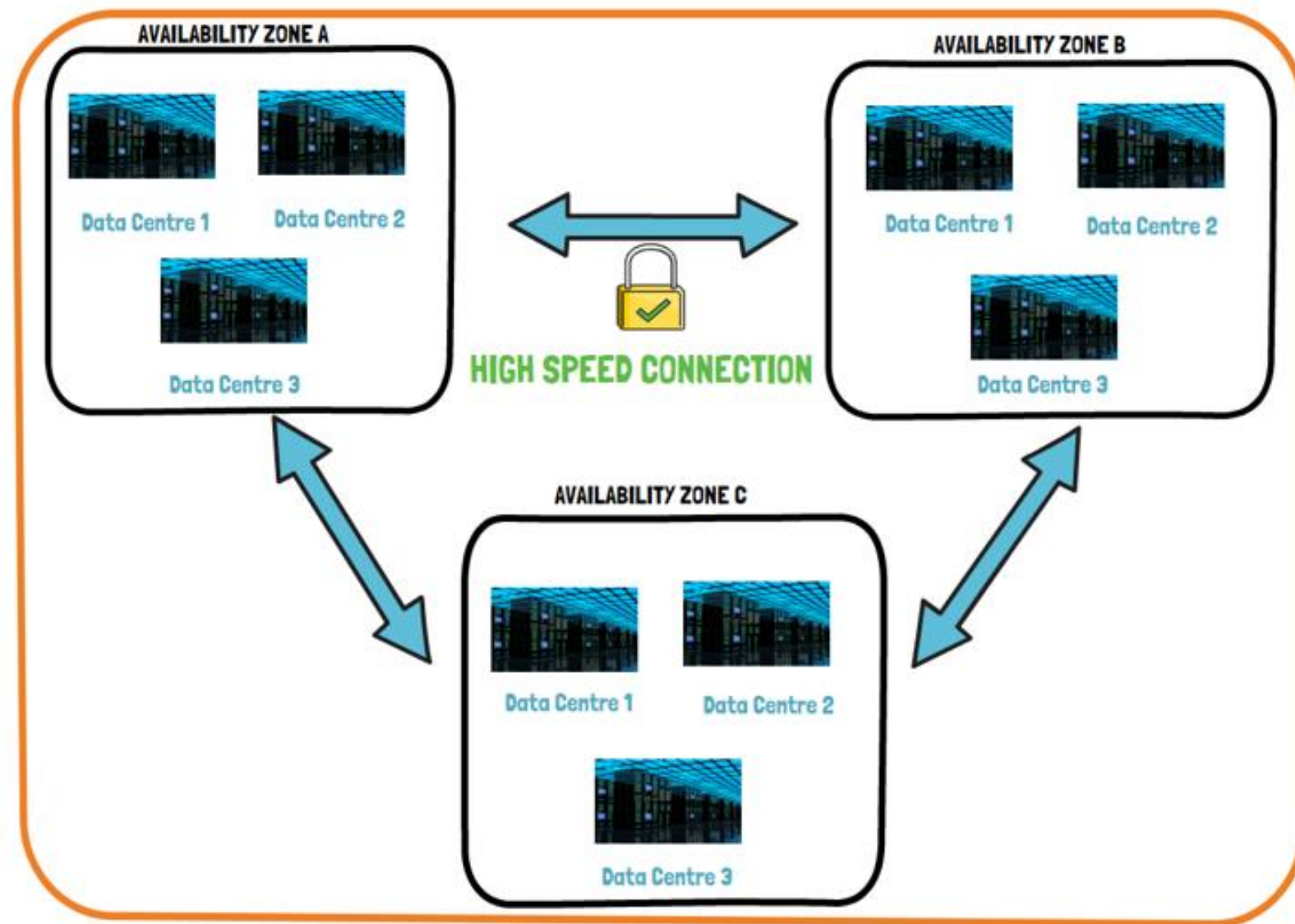
5) You have several virtual machines in an Azure subscription, you created a new subscription.

- VM cannot be moved to a new subscription : **True/False?**
- VM can be moved to a new sub: **True/False?**
- All VM can be moved if they are running in same resource group: **True/False?**
- VM can be moved if they run windows server 2016 : **True/False?**
- An azure resource group contains multiple azure subs? **True/False?**

6) If you assign permissions for a user to manage the resource group, the user can manage all the azure resources in that resource group : **True/False?**

7) If you delete a resource group, all resources inside that RG will be deleted? **True/False?**





Knowledge Checks

1) You need to identify the type of failure for which an Azure Availability Zone can be used to protect access to Azure services. What should you identify?

- A. a physical server failure
- B. an Azure region failure
- C. a storage failure
- D. an Azure data center failure

2) Availability zones can be implemented in all Azure regions? **Yes/No ?**

3) Only windows VM can be created in Availability zones? **Yes/No?**

4) AZ are used to replicate data and application to multiple regions? **Yes/No?**

5) You can use AZ to protect VM from a data center failure: **Yes/No?**



Knowledge Checks

6) An Azure region -----

- Contains one or more data centers that are connected by a low latency network
- Is found in each country where MS has an office
- Can be found in every Europe and Americas country
- Contains one or more data centers that are connected by a high latency network

7) You can use AZ to protect VM from a region failure : **Yes/No ?**



Azure Virtual Machine Scale Sets

let you create and manage a group of load balanced VMs.

The number of VM instances can automatically increase or decrease in response to demand or a defined schedule. The Load Balancer ensures that traffic is distributed evenly across the VMs in the VMSS, whether there are two VMs or hundreds.

Scale sets provide the following key benefits:

- Easy to create and manage multiple VMs
- Provides high availability and application resiliency by distributing VMs across availability zones or fault domains
- Allows your application to automatically scale as resource demand changes
- Works at large-scale

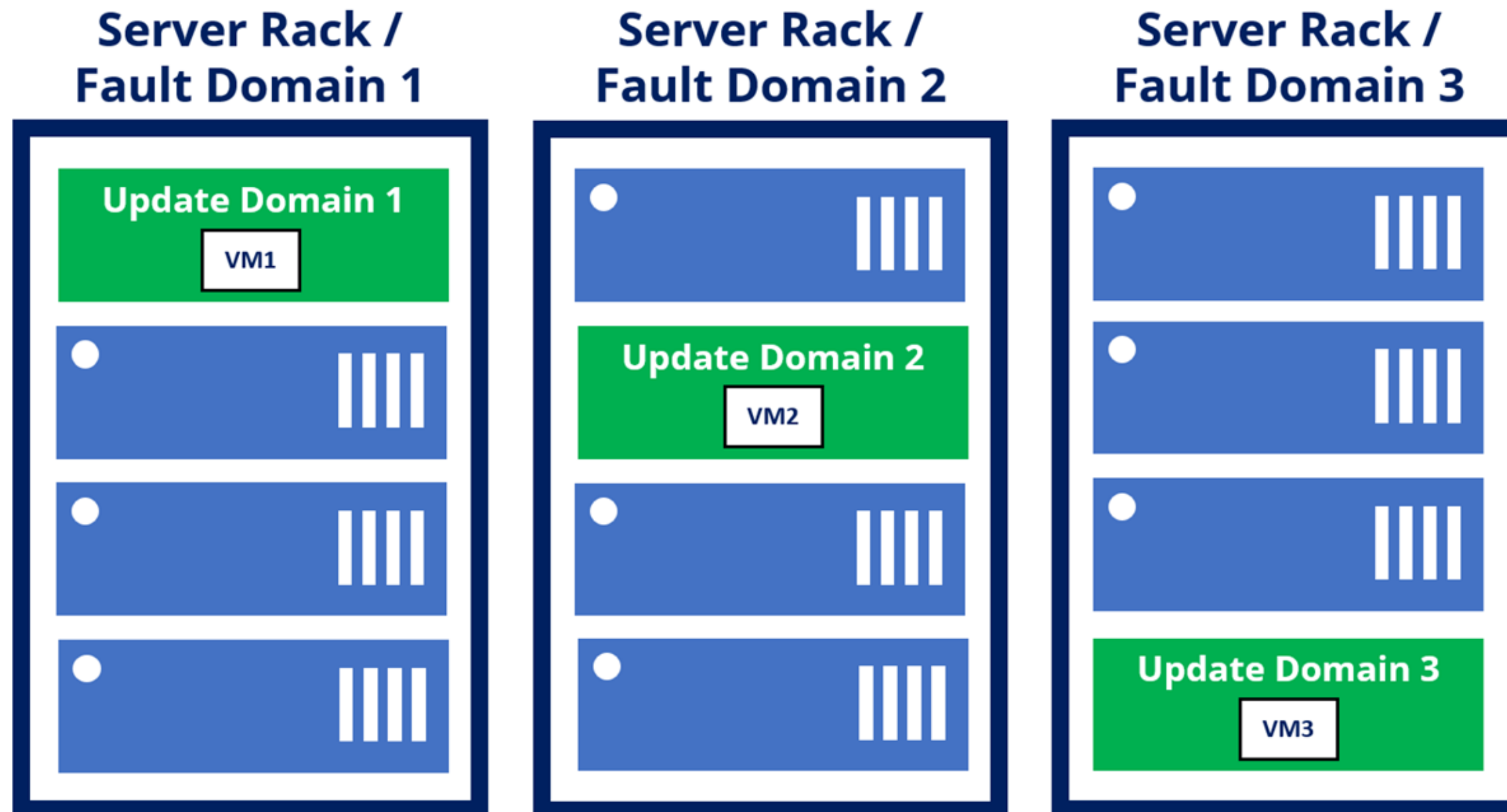
In Azure, an Availability Set is a logical grouping of Virtual Machines (VMs) that are deployed across multiple physical servers in a datacenter. This helps to ensure that if one physical server or hardware component fails, the VMs in the Availability Set are distributed across multiple servers and remain available.

To put it simply, imagine you have two Virtual Machines running the same application. If they were deployed on the same physical server and that server failed, both Virtual Machines would go down. However, if they were deployed in an Availability Set, they would be placed on separate physical servers, so if one server fails, the other Virtual Machine will still be available.

In an Availability Set, Azure ensures that VMs are distributed across multiple fault domains and update domains. Fault domains represent the groups of servers that are subject to the same potential for failures (for example, network hardware failure, power outage, etc.). Update domains represent the groups of servers that are updated or rebooted at the same time.

By placing VMs in different fault and update domains, Azure provides redundancy and availability in case of hardware failures or planned maintenance. This means that your application or service can continue to run even if there are issues with the underlying infrastructure.

Overall, using an Availability Set can help to improve the availability and resilience of your application or service in Azure, by spreading out your VMs across multiple physical servers and domains.



Knowledge Checks

1) You plan to deploy several Azure virtual machines.

You need to ensure that the services running on the virtual machines are available if a single data center fails.

A. You deploy the virtual machines to two or more resource groups.

B. You deploy the virtual machines to a scale set.

C. You deploy the virtual machine to two or more subscriptions

D. All of the above

2) If VMs were deployed in an Availability Set, they would be placed on separate physical servers, so if one server fails, the other Virtual Machine will still be available.

Yes/No ?

3) There are no charges of using Availability sets and VMSS but you pay for the underline resources that it provisions? Yes/No?

AZURE VIRTUAL DESKTOP

Type of managed Virtual machine that enables multiple users to access virtual desktops and applications from anywhere, using any device.

Azure Virtual Desktop is a desktop and application virtualization service that runs on the cloud

It provides a scalable and secure solution for remote work and desktop virtualization.

Secure access through MFA and RBACs



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	Azure Virtual Desktop (AVD)	Azure Virtual Machines (VMs)
Operating System	Uses desktop operating systems like Windows 10 or 11	Can use either desktop or server operating systems
Number of users	Designed for many users to access the same virtual desktop	Typically used for individual user at one time.
Maintenance	Managed by Microsoft, takes care of maintenance tasks like updates and patches	Managed by the customer.
Pricing	Charges per user per month, provides flexibility to organizations with changing needs	Pay per use model
Delivery	Can deliver full desktops or individual applications	Typically used to deliver a single application or service

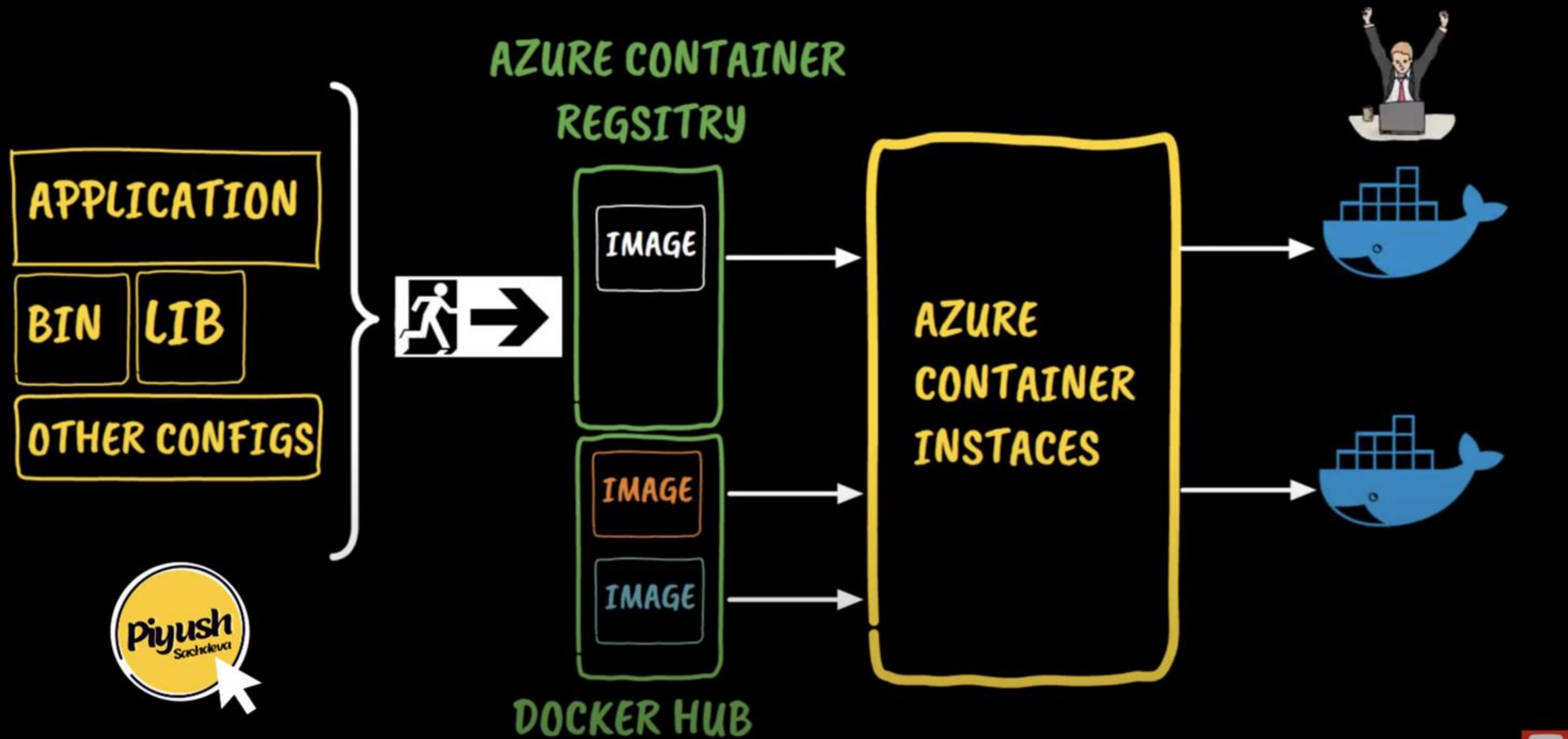
Knowledge Checks

1) A windows Virtual desktop session host can run windows 10 only:
True or False?

1) A windows virtual desktop host pool that includes 20 session host support a max of 20 parallel user connections **True or False?**

1) Windows virtual desktop support desktop and app virtualization :
True or False?

AZURE CONTAINER INSTANCES



Knowledge Checks

1) You need to manage containers. Which two services can you use?

- A. Azure Virtual Desktop
- B. Azure virtual machines
- C. Azure Functions
- D. Azure Container Instances
- E. Azure Kubernetes Service (AKS)

2) Azure container instance is an example of ____?

- Compute service
- Identity service
- Networking service
- Storage service

3) Azure manages your host operating system in case of Azure container instances? **True or False?**

4) Azure container instances is a SaaS offering? **True or False?**



Knowledge Checks

- 1) Azure function is a serverless compute service in which customer manages the underlines infrastructure? True or False?
- 2) In Azure functions, you pay for the number of code executions? True or False?
- 3) Which of the below is an ideal use case of Azure functions(select any 2)?
 - To host a public facing web application
 - To trigger a notification based on certain events in Azure
 - To schedule the stop of a virtual machine after 5 pm everyday
 - To manage the containers in Azure container instances
- 4) You can write the Azure function in PowerShell core as well, True or False?

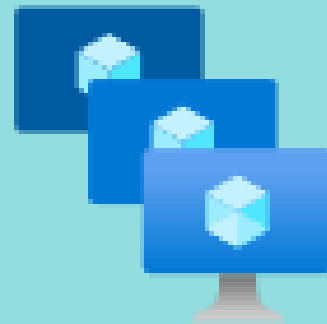


IaaS

Azure Virtual
Machines



Virtual Machine
Scale Sets



PaaS

Azure Virtual
Desktop



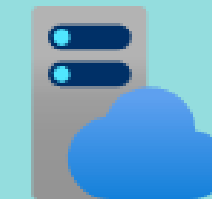
Azure Container
Instances



Azure Functions



Azure App
Services



SaaS



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AZURE APP SERVICES



- Platform As a Service
- To build and host application in any programming language

Web Apps using **Azure Web apps**

Background Jobs using **Azure WebJobs**

Mobile Backends using **Mobile apps**

RESTful APIs using **API apps**

- Supports Automatic Scaling and High Availability



AZURE APP SERVICES



- Supports Linux and Windows



Focus



Build



Maintenance
of applications

Focus



Infrastructure

Environment healthy



AZURE APP SERVICES



Web Apps

Full Support of hosting web apps

ASP .NET Core

ASP .NET

Java

Ruby

Node.js

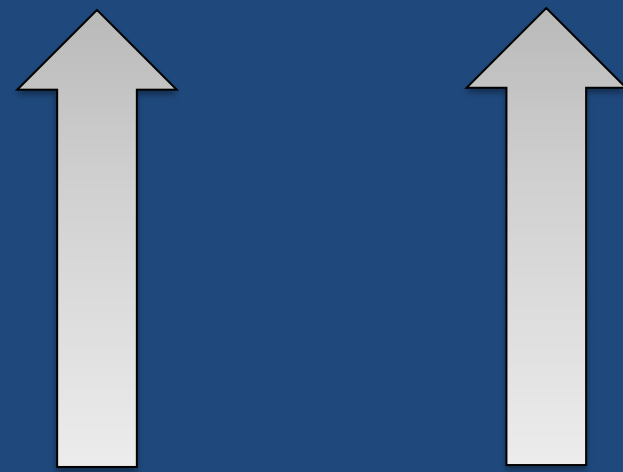
Python

PHP



AZURE APP SERVICES

API Apps



- REST-based web APIs by using your choice of language and framework.
- Full Swagger Support
- Ability to package and publish your API in Marketplace.

HTTP - Based

HTTPS - Based

- Apps can be consumed from any **HTTP/HTTPS** based clients



AZURE APP SERVICES



WebJobs

- Much like a cronjob



- Scheduled / Trigger

- You can use to run a program (.exe, Java, PHP or Node.js)
- Or script (.cmd, .bat, Powershell or Bash)
- Run Background task or jobs.

minute (0-59)
hour (0-23)
day of month (1-31)
month (1-12)
day of week (0-6) (Sunday is 0)
* * * * * <command to execute>



AZURE APP SERVICES




Mobile Apps

- Build a backend for IOS/Android
- Store app data in a cloud-based SQL Database.
- User Authenticate using social providers.
- Send push notifications
- Execute custom backend logic in C# / Node.js



App Service Pricing tiers

Usage Tiers 	Free	Shared	Basic	Standard	Premium	Isolated
Storage	1 GB	1GB	10 GB	50GB	250GB	1TB
Max Instances	N/A	N/A	Up to 3	Up to 10	Up to 30	Up to 100
Customized Domain	✗	✓	✓	✓	✓	✓
Autoscaling	✗	✗	✗	✓	✓	✓
Compute type	Shared	Shared	Dedicated	Dedicated	Dedicated	Dedicated
Hybrid Connectivity	✗	✗	✓	✓	✓	✓



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Knowledge Checks

- 1) Your developers have created 10 web applications that must be hosted on Azure. You need to determine which Azure web tier plan to host the web apps. The web tier plan must meet the following requirements:
- The web apps will use the az900withpiyush.com URL.
 - The web apps each require 10 GB of storage.
 - The web apps must each run in dedicated compute instances.
 - Costs must be minimized.

Which web tier plan should you use?

- A. Standard
- B. Basic
- C. Free
- D. Shared



Knowledge Checks

- 2) Azure App Service is a serverless Azure service? **True or False?**
- 3) Azure App service supports only Linux OS? **True or False?**
- 4) You can use docker containers to build , deploy and scale Your web apps in Azure App Service? **True or False?**



AZURE NETWORKING



Mobile Apps

- Build a backend for IOS/Android
- Store app data in a cloud-based SQL Database.
- User Authenticate using social providers.
- Send push notifications
- Execute custom backend logic in C# / Node.js



Knowledge Checks

- 1) Azure VNETs deployed in the same Azure region are connected by default? **True or False?**
- 2) Each VNET in a single resource group must have a unique name?
True or False?
- 3) Azure VNET address space must be unique within a subscription?
True or False?
- 4) All VMs inside a VNET can talk to each other via their private IP by default? **True or False?**
- 5) What is a feature of an Azure virtual network?
 - A. Resource cost analysis
 - B. Packet inspection
 - C. Geo-redundancy
 - D. Isolation and segmentation



Knowledge Checks



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6) You plan to deploy 20 virtual machines to azure environment , to ensure that VM named VM1 cannot connect to other virtual machines, VM1 must___ ?

- Be deployed to a separate virtual network
- Run a different OS than the other virtual network
- Be deployed to a separate resource group
- Have two NICs

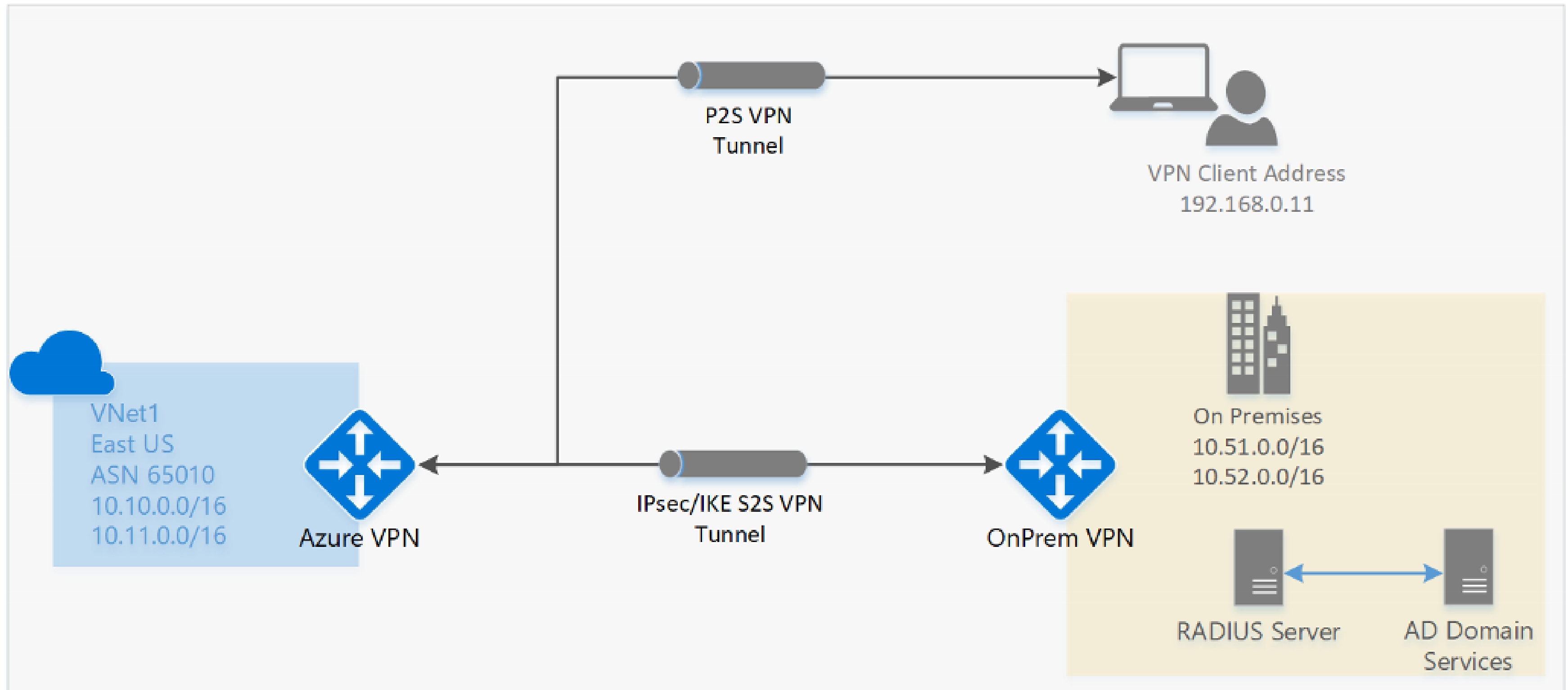
7) Your company plans to move several servers to Azure.

The company's compliance policy states that ServerA must be on a separate network segment. Which Azure solution should you recommend?

- A. A resource group for ServerA and another resource group for all the other servers
 - B. A virtual network for ServerA and another virtual network for all the other servers
- Most Voted

- C. A VPN for ServerA and a virtual network gateway for each other server
- D. One resource group for all the servers and a resource lock for ServerA

VPN Gateway



Knowledge Checks

1) You plan to extend your company's network to Azure.

The network contains a VPN appliance that uses an IP address of 131.107.200.1. You need to create an Azure resource that defines the VPN appliance in Azure.

A: Virtual Network Gateway

B: Local Network Gateway

C: Load Balancer

D: Peered Gateway

2) VNET peering is a feature that allows VMs from different VNETs to communicate with each other over their public Ips. True or False?



Knowledge Checks

3) You have an azure environment that contains multiple VMs , you plan to implement a solution that enables the client computers on your on-prem to communicate with the azure VM. You need to recommend which azure resources must be created for the planned solution:-

- A. a virtual network gateway
- B. a load balancer
- C. an application gateway
- D. a virtual network
- E. a gateway subnet

4) What is the function of Site to site VPN?

- A. provides a secure connection between a computer on a public network and the corporate network
- B. provides a connection from an on-premises VPN device to an Azure VPN gateway



Knowledge Checks

- 1) You are working as Azure Admin for an organization and you were tasked to extend your on-premises network to Azure network using the below requirements
- Connection should be encrypted and secure.
 - Traffic should not traverse the public internet.
 - Should be able to support up to 1Gbps speed.

Which option would you recommend?

A) P2S VPN B) S2S VPN C) ExpressRoute

2) A VPN Gateway is costlier than Express Route, **True or False?**

3) You can buy a Domain from Azure DNS? **True or False?**

4) Azure DNS supports Alias records? **True or False?**



AZURE STORAGE

BLOB STORAGE

- Serving images or documents directly to a browser (Static Website Hosting).
- Storing files for distributed access.
- Streaming video and audio.
- Storing data for backup and restore, disaster recovery, and archiving.
- Storing data for analysis by an on-premises or Azure-hosted service.



BLOB STORAGE

CONTAINER A



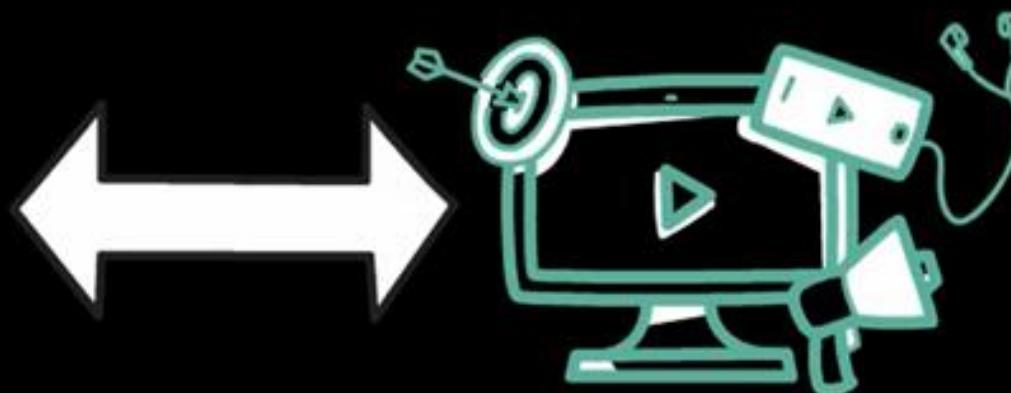
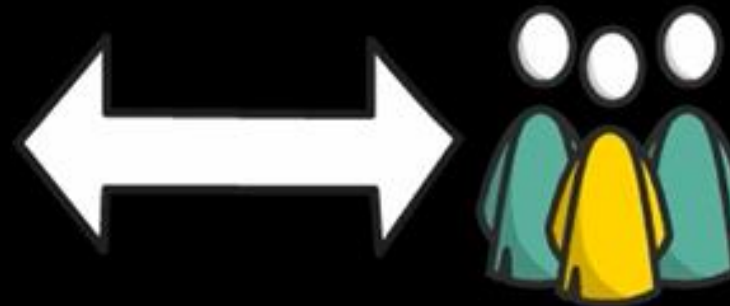
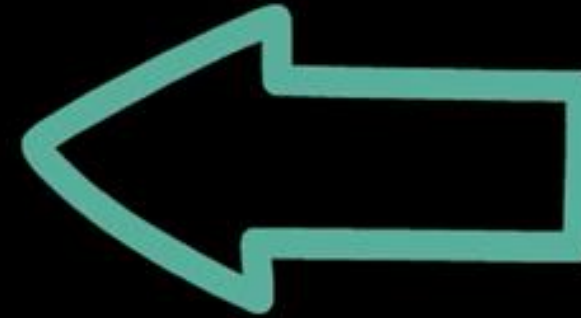
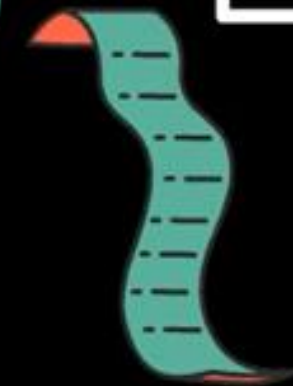
BLOBS

CONTAINER B



BLOBS

BINARY LARGE OBJECTS (BLOBS)



UNSTRUCTURED
DATA



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Azure File Storage

Azure File Storage enables you to create file shares in the cloud and access these file shares from anywhere with an internet connection.

Azure File Storage exposes file shares using the Server Message Block 3.0 (SMB) protocol.

Once you've created a storage account, you can upload files to Azure File Storage using the Azure portal, or tools such as the AzCopy utility.

Attaching a Network drive to multiple computers.

Azure File Storage Performance Tiers

The Standard tier uses hard disk-based hardware in a datacenter

Premium tier uses solid-state disks. The Premium tier offers greater throughput but is charged at a higher rate.

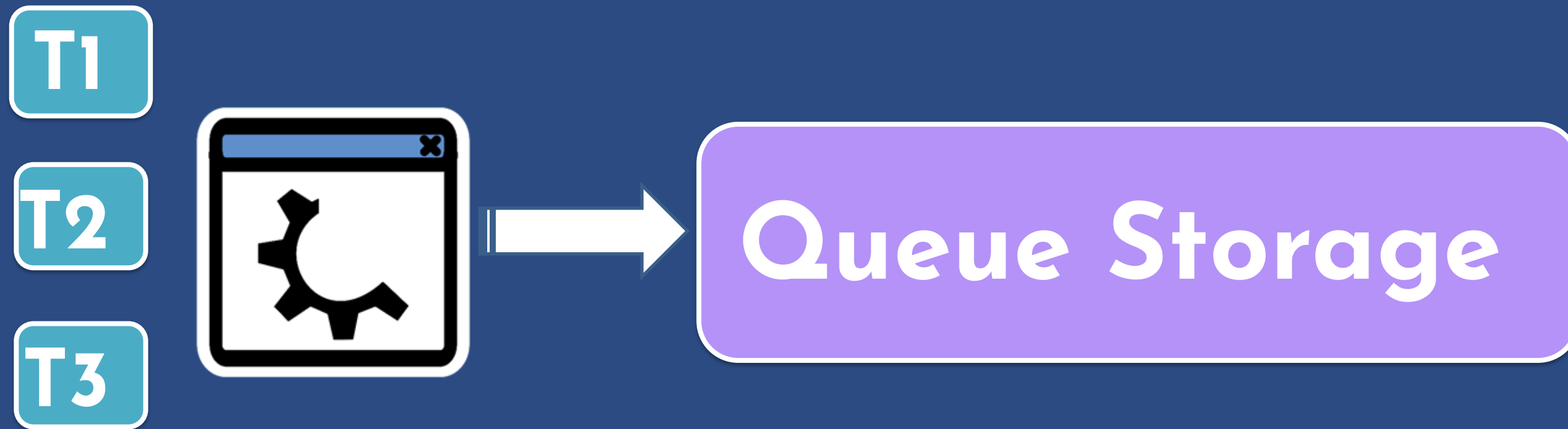


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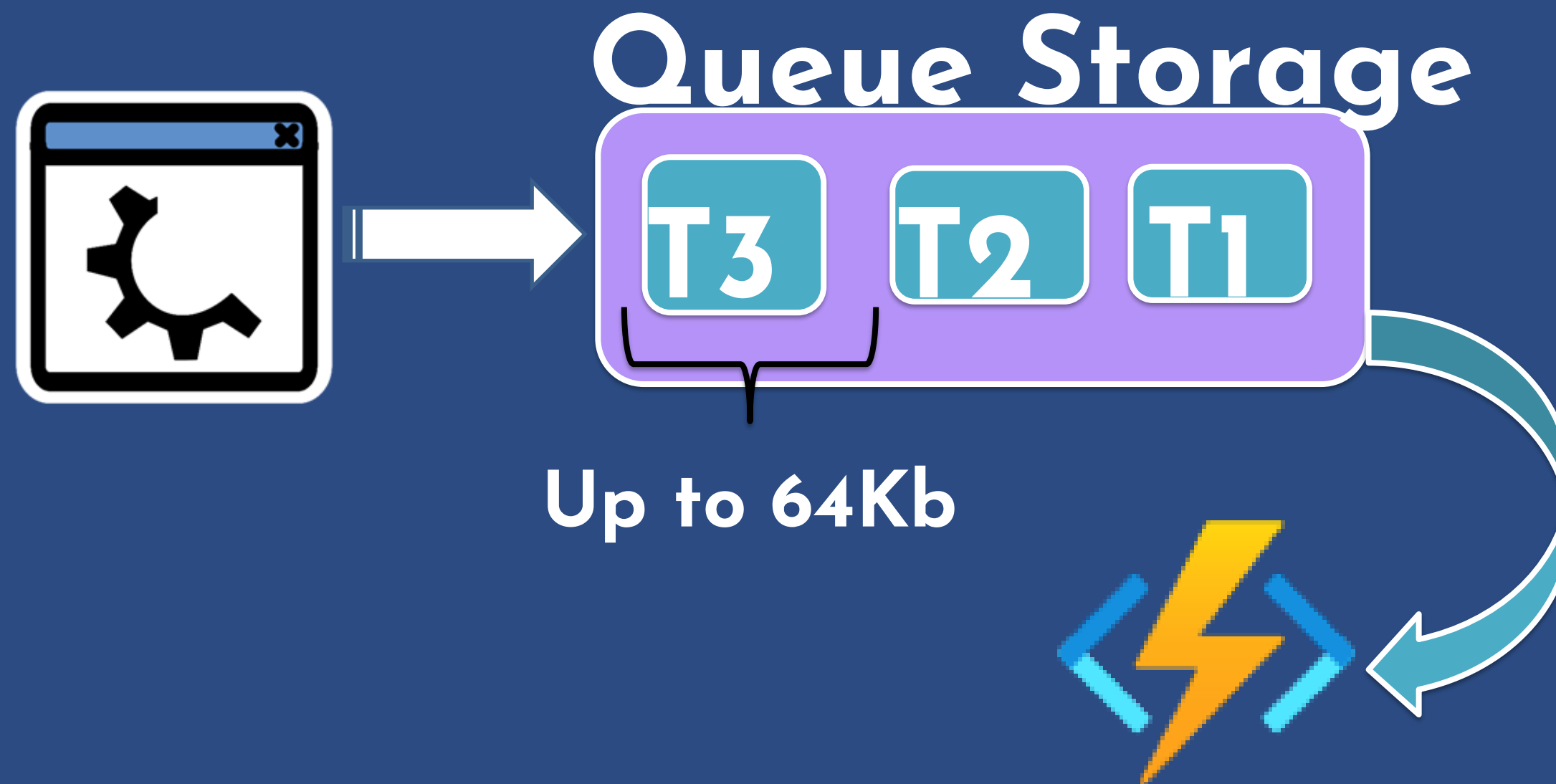


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Azure Queue Storage



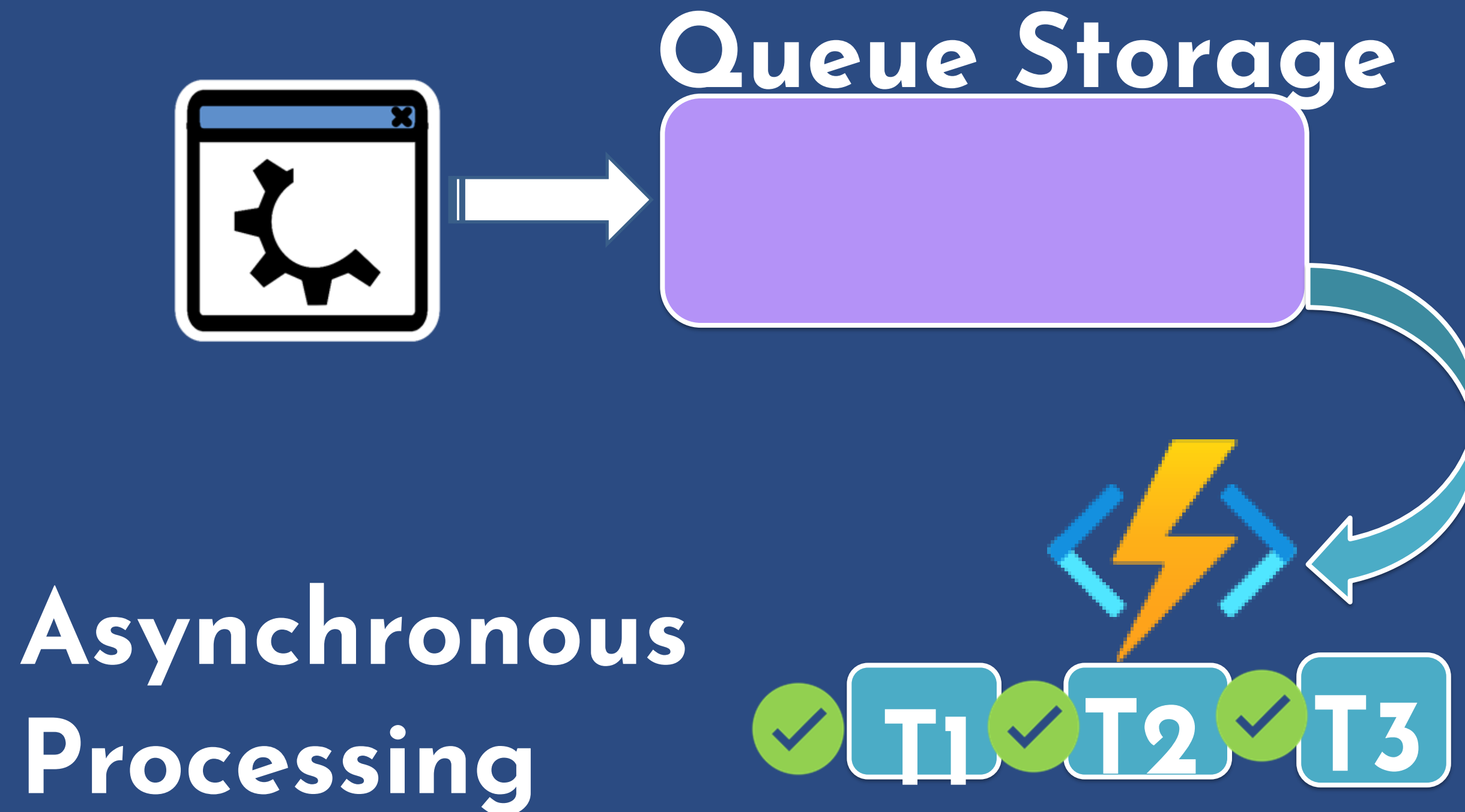
Azure Queue Storage



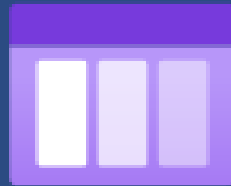
Azure Queue Storage

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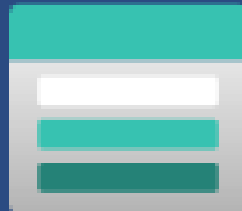
Queue



Files



Blob



Table



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Storage Account

- Used to store
 - Messages
 - Files
 - Unstructured data
 - Semi-structured data
- Highly scalable (Petabytes of data)
- Storage account name must be unique within Azure.



`https://<storage-account-name>.<type>.core.windows.net`

Unique Name

Azure Blob Storage: Access Tiers

Hot Tier

The Hot tier is the default.
Used for Frequently access data.
Provide highest performance
Costliest among three

Cool Tier

Used for infrequent data access,
stored for at least 30 days
Cheaper than hot tier
Lower performance than hot tier

You can migrate your storage from
Hot to cool tier to save storage cost.



Azure Blob Storage: Access Tiers

Archive Tier

Cannot be set at the account level

Used for archival storage, at least 180 days

Highest latency

Take hours for data retrieval

To retrieve a blob from the Archive tier, you must change the access tier to Hot or Cool. The blob will then be rehydrated. You can read the blob only when the rehydration process is complete.

Cheapest among all

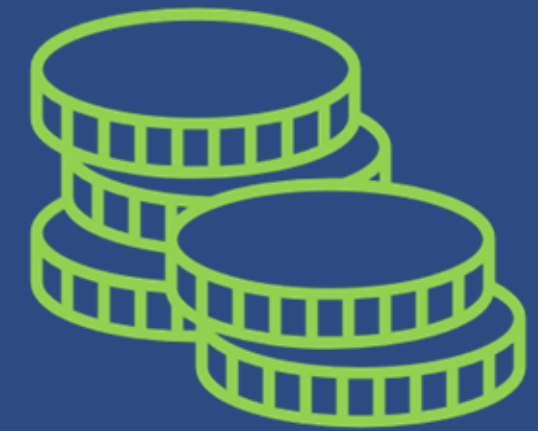
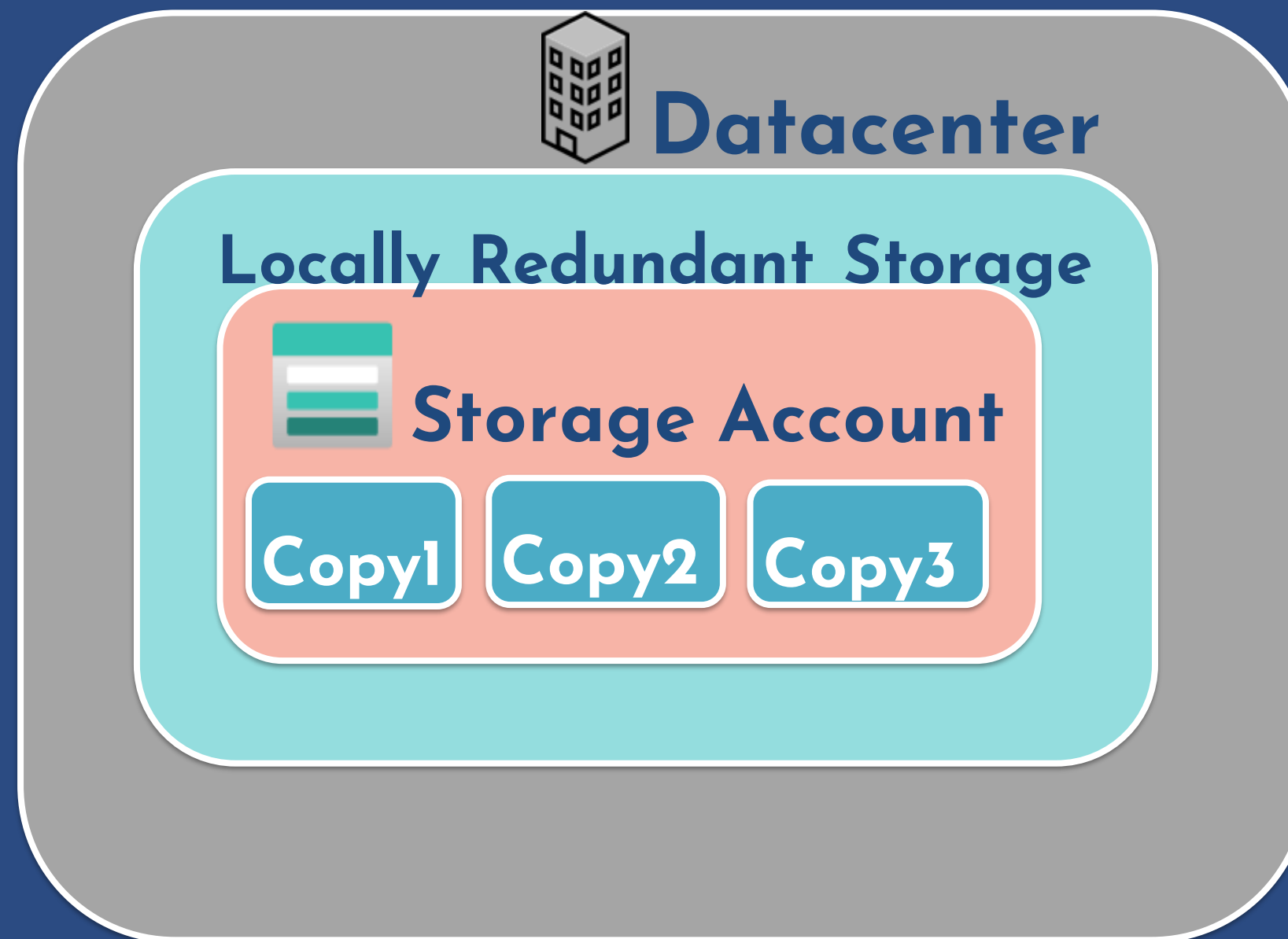


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Azure Storage Redundancy



Least cost and offers least durability

Data will be lost in case of a datacenter failure



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Primary Region

Availability Zone 1



Datacenter



Storage Account

Copy1

Availability Zone 2



Datacenter



Storage Account

Copy2

Availability Zone 3



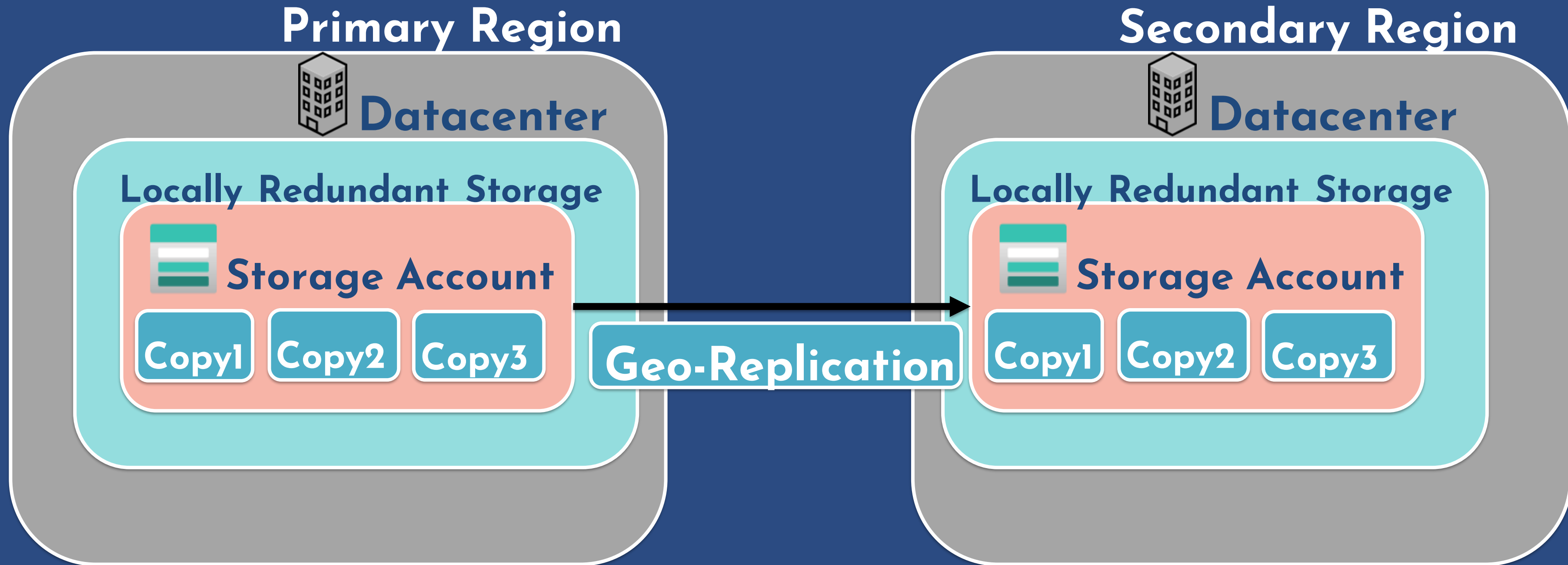
Datacenter



Storage Account

Copy3

Geo-Redundant Storage



Read-access geo-redundant storage (RA-GRS)

Geo-zone-redundant storage (GZRS)

Knowledge Checks

1) You plan to create an azure VM, you need to identify which storage service must be used to store the unmanaged disks of the VM?

A: BLOB , B: File shares , C: Tables , D: Queues

2) You plan to map a network drive from several computers that run Windows 10 to Azure Storage. Which service you would use?

3) Data that is stored in the Archive access tier of an Azure Storage:

- Can be accessed at any time by using azcopy command
- Can only be read by azure backup
- Must be restored before the data can be accessed
- Must be rehydrated before the data can be accessed

4) Data that is stored in an Azure storage account automatically has at least 3 copies ? True or False?

Knowledge Checks

- 5) All the data that is copied to azure storage is backed up automatically to another azure data center ? **True or False?**
- 6) An azure storage account can contain upto 2TB of data and up to 1 million files? **True or False?**
- 7) Archive access tier is set at the storage account level? **True or False?**
- 8) Hot access tier is recommended for data that is accessed frequently? **True or False?**
- 9) You can use the Azure file sync agent to sync on-premises data to an azure ---
- Blob container
 - Data lake storage container
 - File share
 - queue

Knowledge Checks

- 10) Arrange the storage account redundancy options from the least redundant to the most redundant. **ZRS GRS LRS**
- 11) Azure blob storage is a __
- Data store for queuing and reliably delivering messages between applications
 - File share that can be mapped as a network drive
 - Key/attribute store for non-relational, structure data
 - Service optimized for very large objects such as video files and bitmaps
- 12) You plan to deploy a website to Azure. The website will be accessed by users worldwide and will host large video files. You need to recommend which Azure feature must be used to provide the best video playback experience.
- A. an application gateway
 - B. an Azure ExpressRoute circuit
 - C. a content delivery network (CDN)
 - D. an Azure Traffic Manager profile

 ON-PREMISES



2) Server Migration

DB Migration

- ✓ VMWARE
- ✓ Hyper-V
- ✓ Physical

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1) Discovery and Assessment

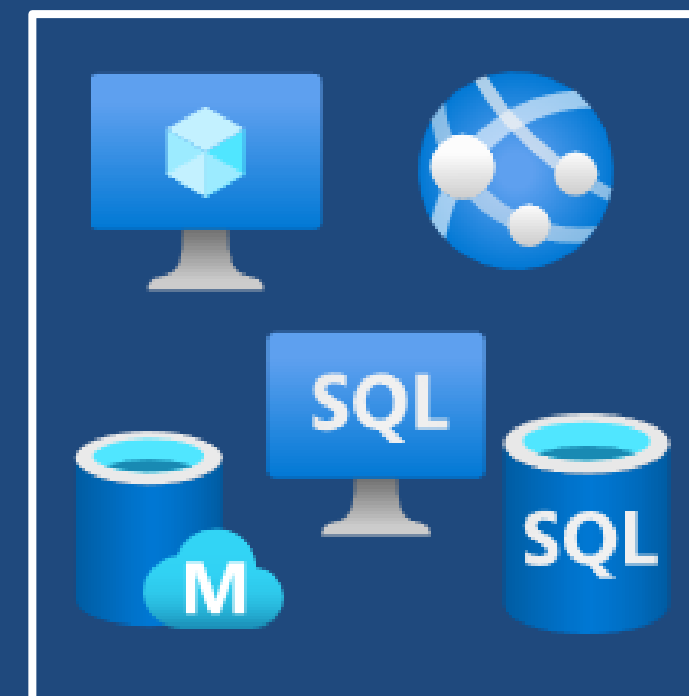
Azure Migrate

Azure Database Migration

Azure Data Box



ON-PREMISES



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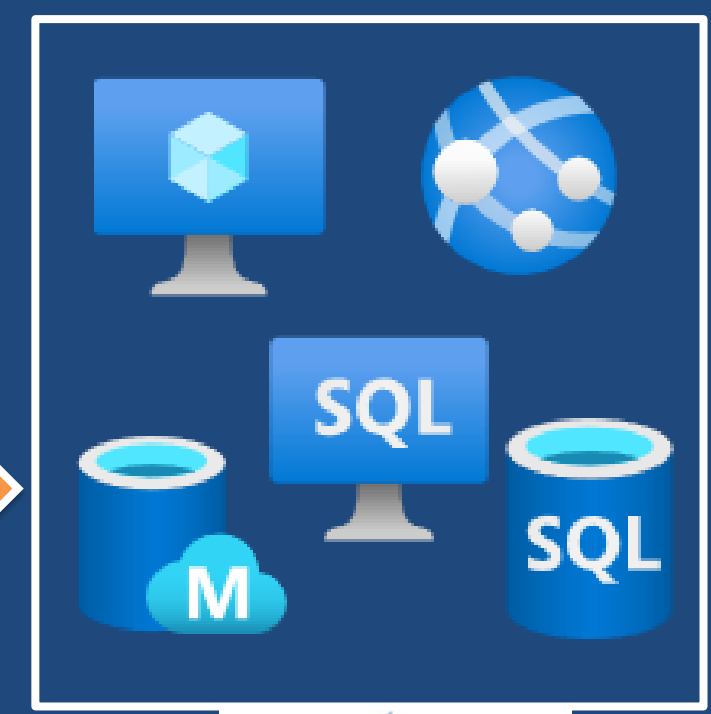
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DATA BOX DISK (5 SSD * 8GB) = 40 TB

DATA BOX 100 TB

DATA BOX HEAVY 1 PB

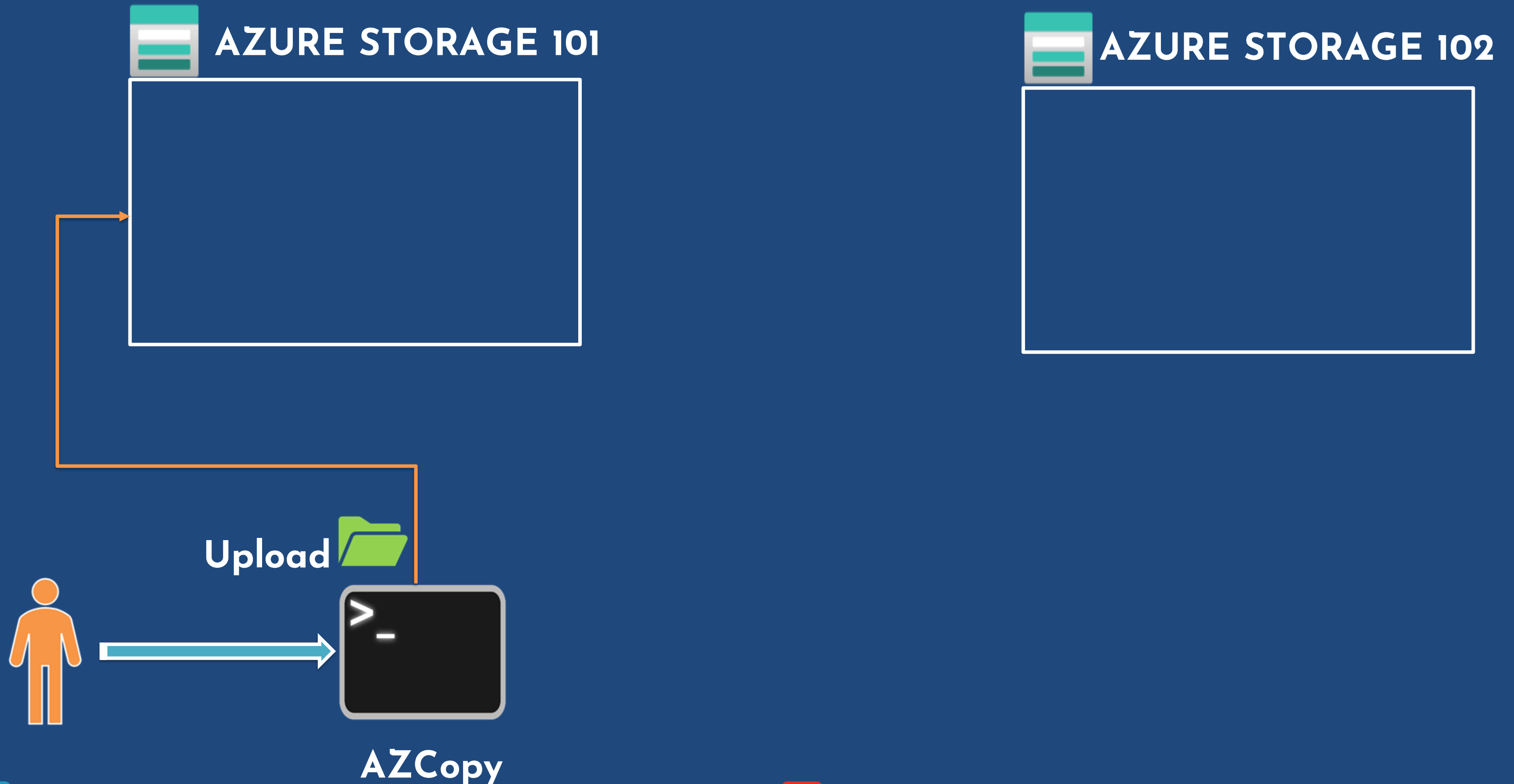
ON-PREMISES



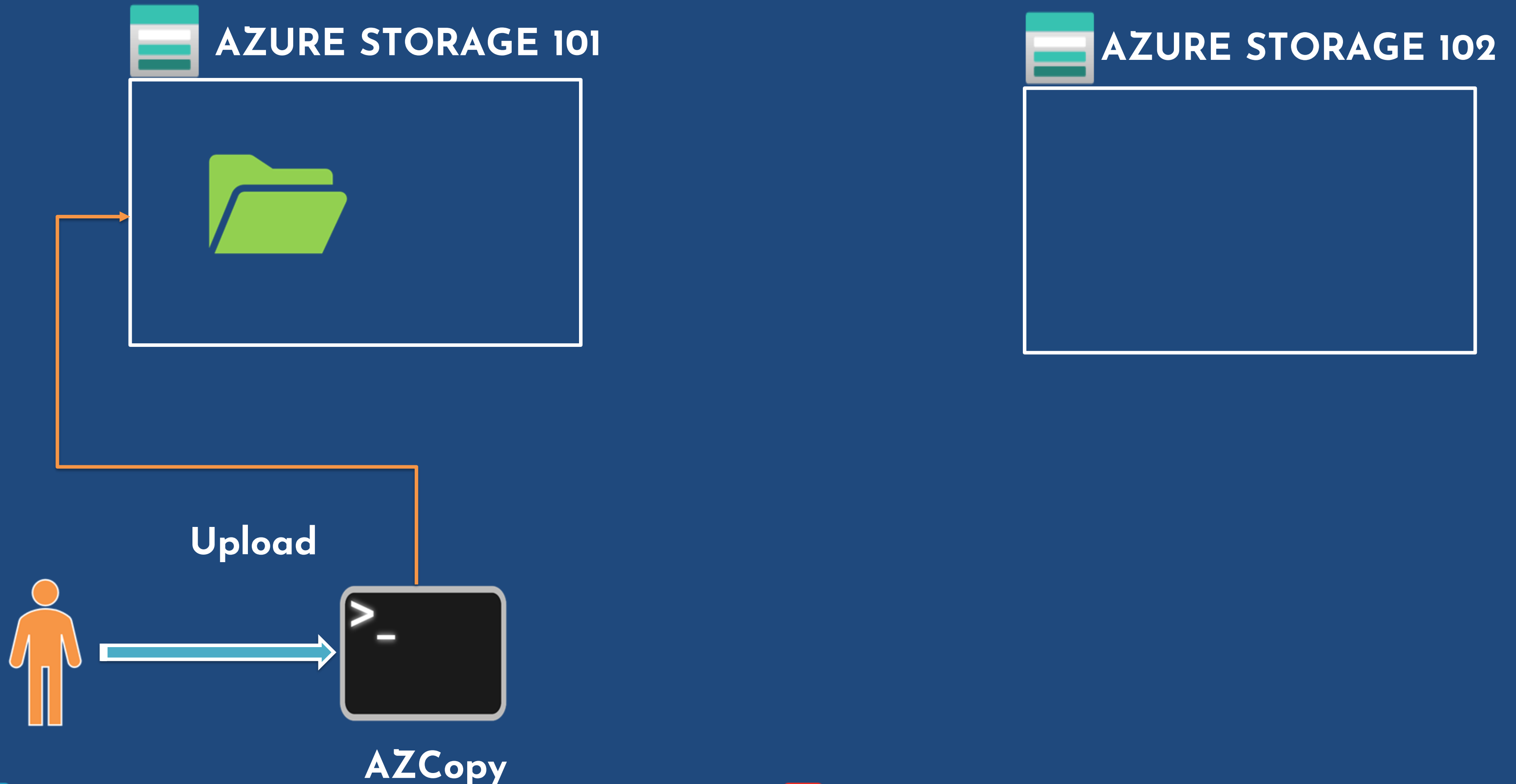
Azure Data Center

>40 TB Bulk Data Transfer Security & Compliance

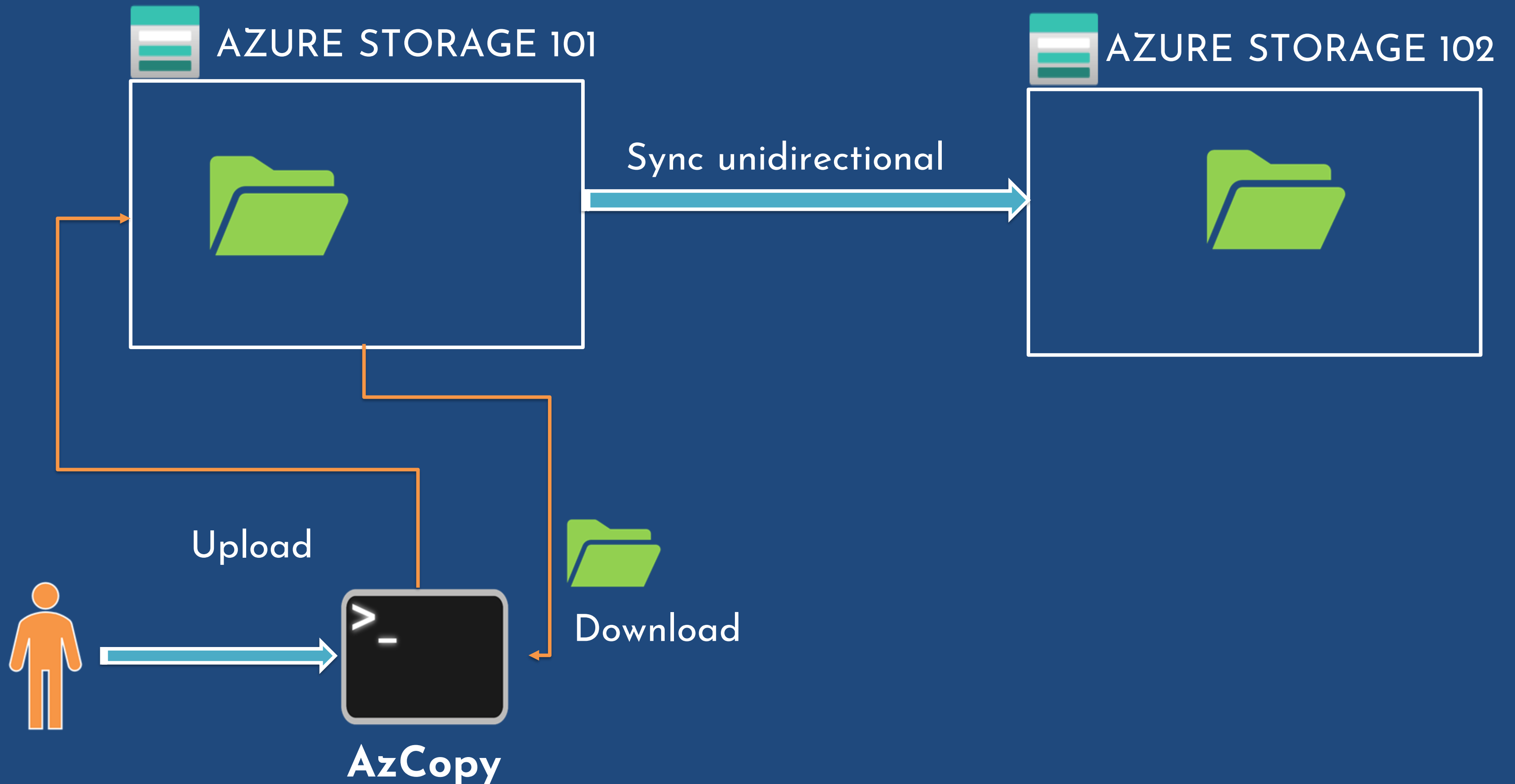
AZURE FILE MOVEMENT OPTION



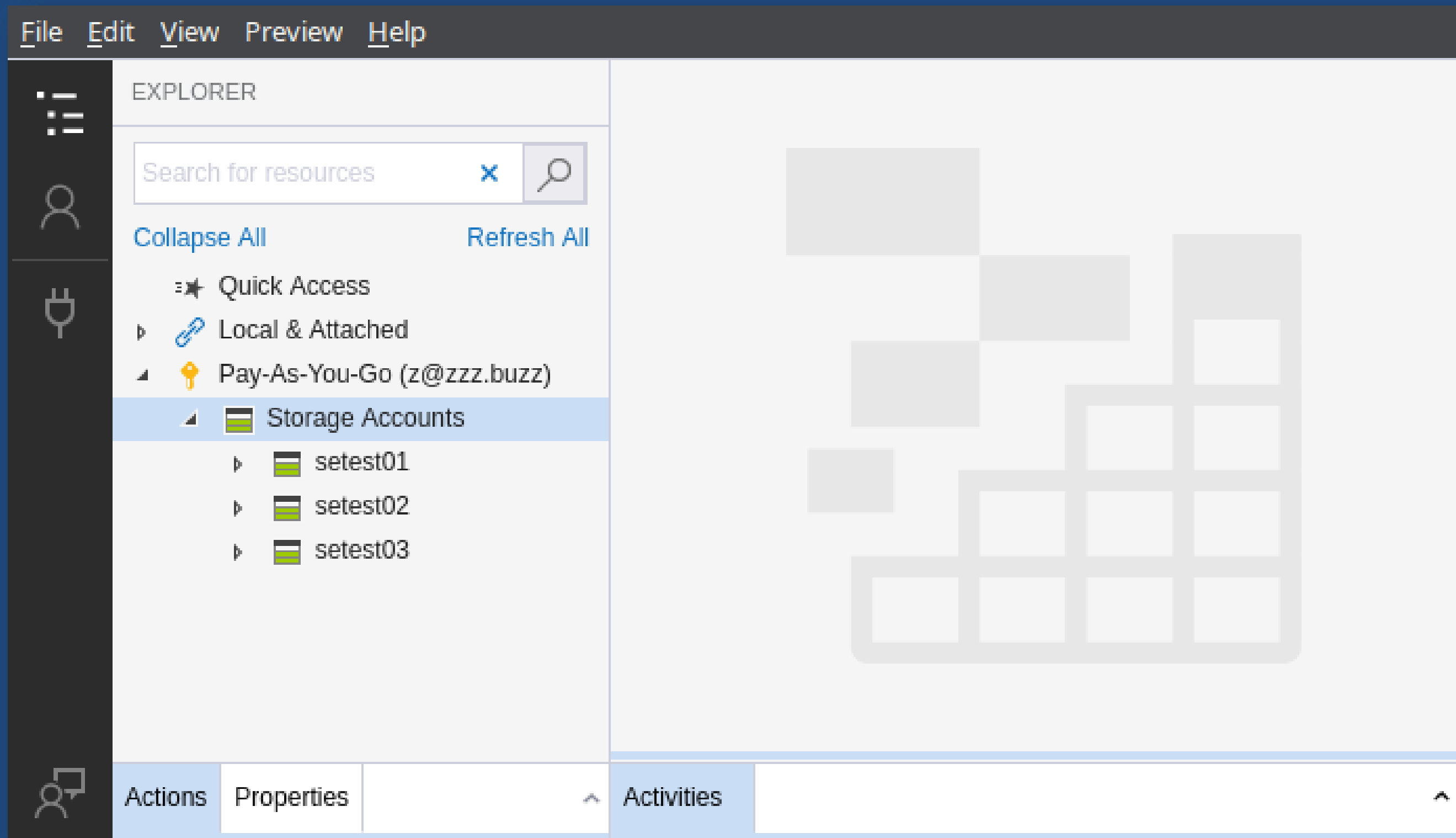
AZURE FILE MOVEMENT OPTION



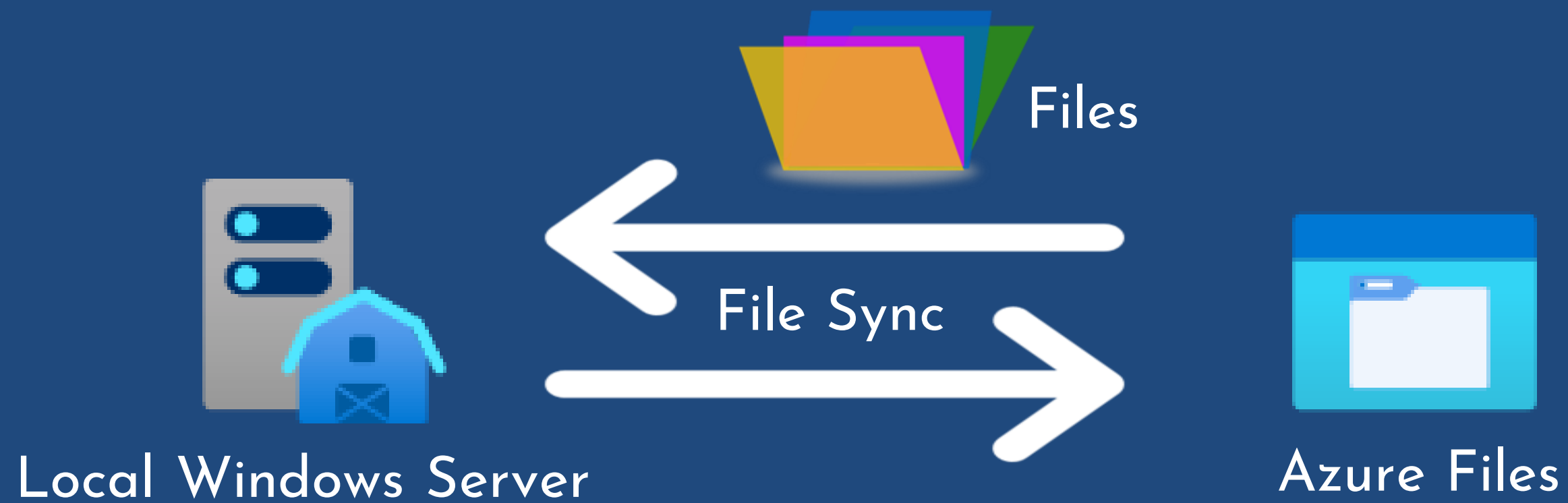
AZURE FILE MOVEMENT OPTION



Azure Storage Explorer



Azure File Sync



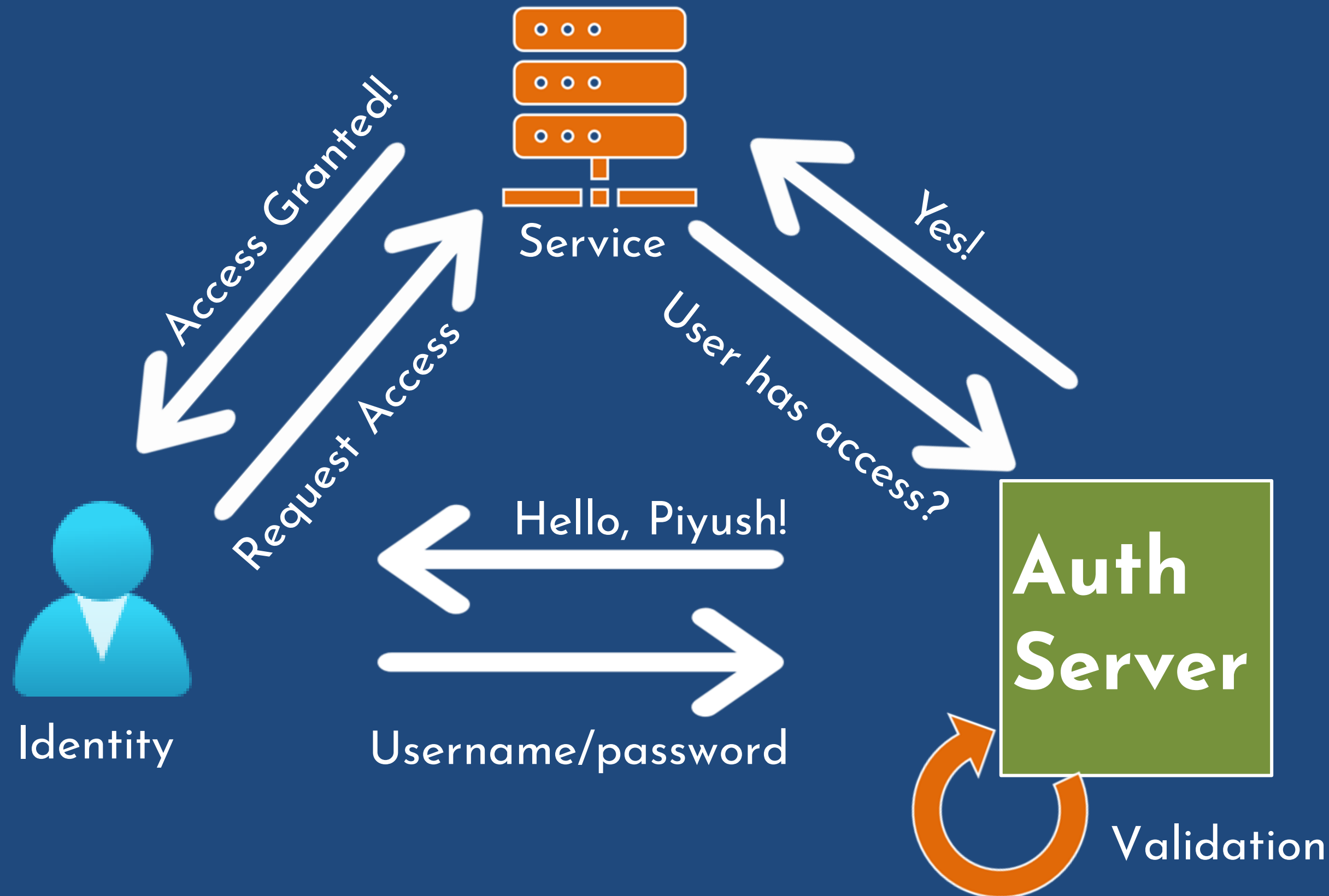
Knowledge Checks

- 1) You can use the Azure file sync agent to sync on-premises data to an azure ____
 - Azure Blob container
 - Azure Data lake storage container
 - Azure File share
 - Azure Queue Storage

- 2) You are a storage admin for an organization, and you were tasked to perform offline data migration of around 50TB from your VMware servers to Azure, which data migration service you would choose?
 - A) Azure file Sync
 - B) Azure Database migration service
 - C) Azure Data box
 - D) AzCopy utility

- 3) You can migrate your On-premises SQL servers to Managed SQL servers in Azure? **True or False?**

Identity, Authentication and Authorization



Azure Active Directory

- Authentication
- Authorization
- Single Sign On (SSO)



Identity



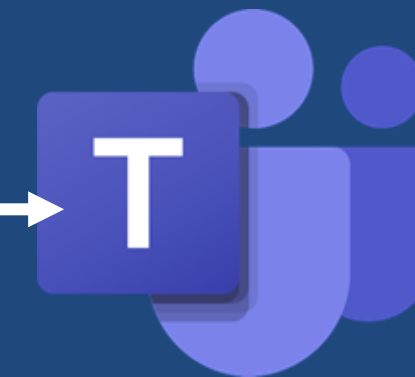
Azure Active Directory

- Self Service Password Reset
- Multi Factor Authentication

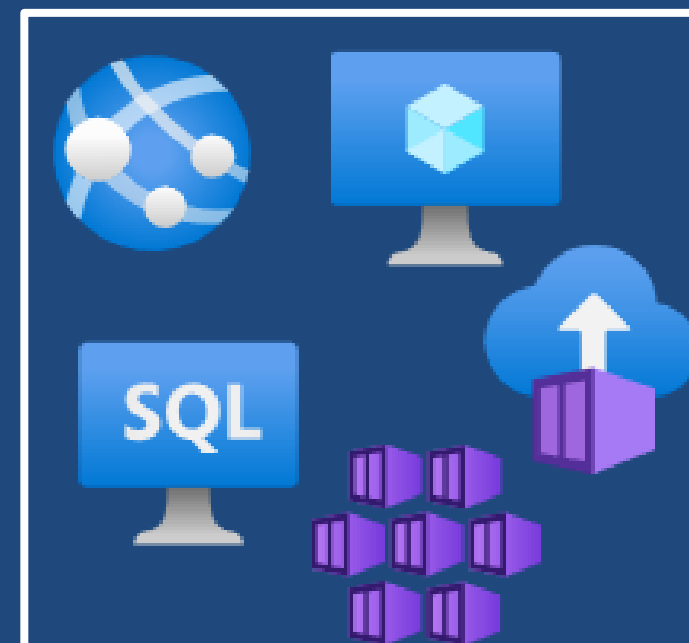
Office 365 Apps



Microsoft Teams



Azure Services



Azure AD Identity Protection

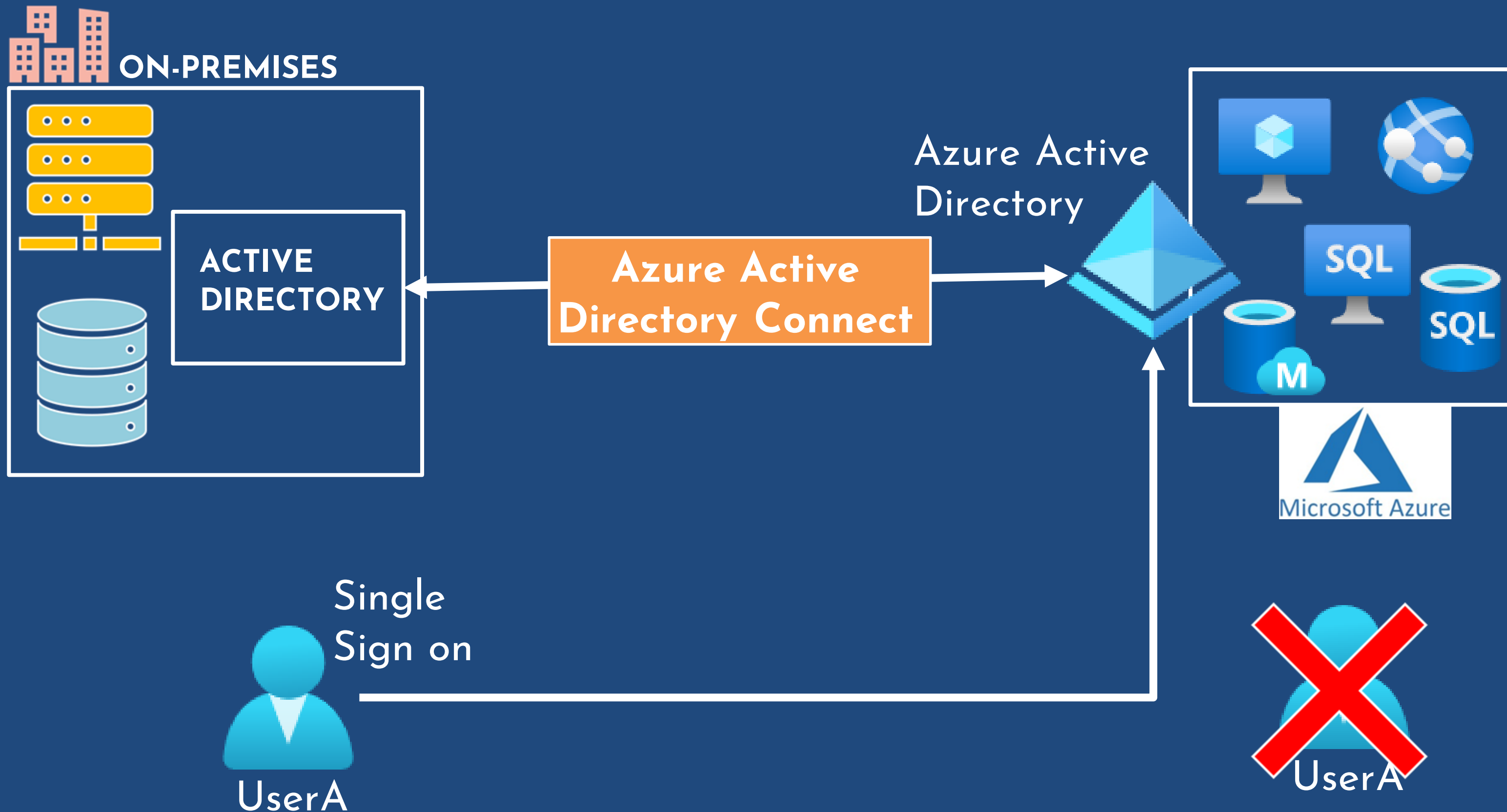


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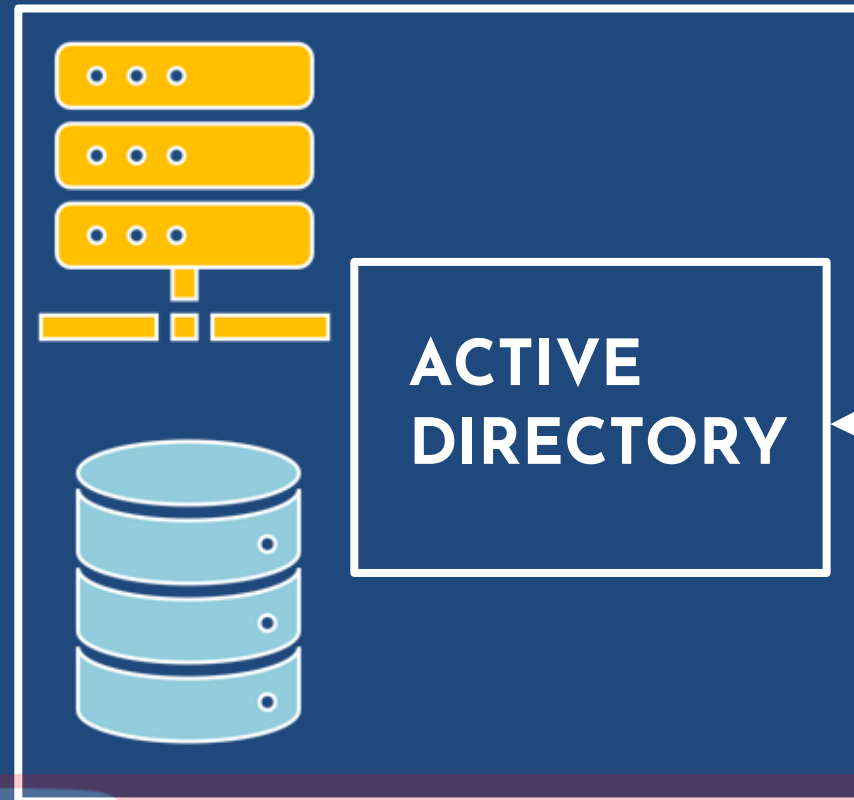
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Azure Active Directory Connect



Azure AD Domain Service

ON-PREMISES



Azure Active
Directory Connect

Azure Active
Directory



Azure AD
Domain Service



Single
Sign on



Identity

- Domain Join
- Group Policy
- LDAP
- Kerberos/NTLM Authentication

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Knowledge Checks

- 1) Your company has an Azure Active Directory (Azure AD) environment. Users occasionally connect to Azure AD via the Internet. You have been tasked with making sure that users who connect to Azure AD via the internet from an unidentified IP address, are automatically encouraged to change passwords. You configure the use of Azure AD Identity Protection, **Yes or No?**
- 2) To use Azure AD credentials to sign in to computer that runs win10, the computer must be joined to AD, **True or False?**
- 3) Azure has built-in authentication and authorization service to provide secure access to Azure resources. **True or False?**



Knowledge Checks

4) Your network contains an Active Directory forest. The forest contains 5,000 user accounts. Your company plans to migrate all network resources to Azure and to decommission the on-premises data center.

You need to recommend a solution to minimize the impact on users after the planned migration.

What should you recommend?

- A. Implement Azure Multi-Factor Authentication (MFA)
- B. Sync all the Active Directory user accounts to Azure Active Directory
- C. Instruct all users to change their password
- D. Create a guest user account in Azure Active Directory (Azure AD) for each user

5) You can create group policies in Azure Active Directory Domain Service, **True or False?**



Actions

Stop/start virtual machine

Edit virtual machine

View virtual machine

View database

Assign RBACs to database

View Database

Create function

Execute function

Read function

Create

Webapp

Stop/start

Webapp

View Webapp





Actions

Stop/start virtual machine

Edit virtual machine

View virtual machine

View database

Assign RBACs to database

View Database

Create function

Execute function

Read function

Create

Webapp

Stop/start

Webapp

View Webapp

Reader
Role

Assign



Scope



Role

Reader
Role

Owner
Role

Contributor
Role

Custom
Role



Identity



User



Group



Managed
Identity



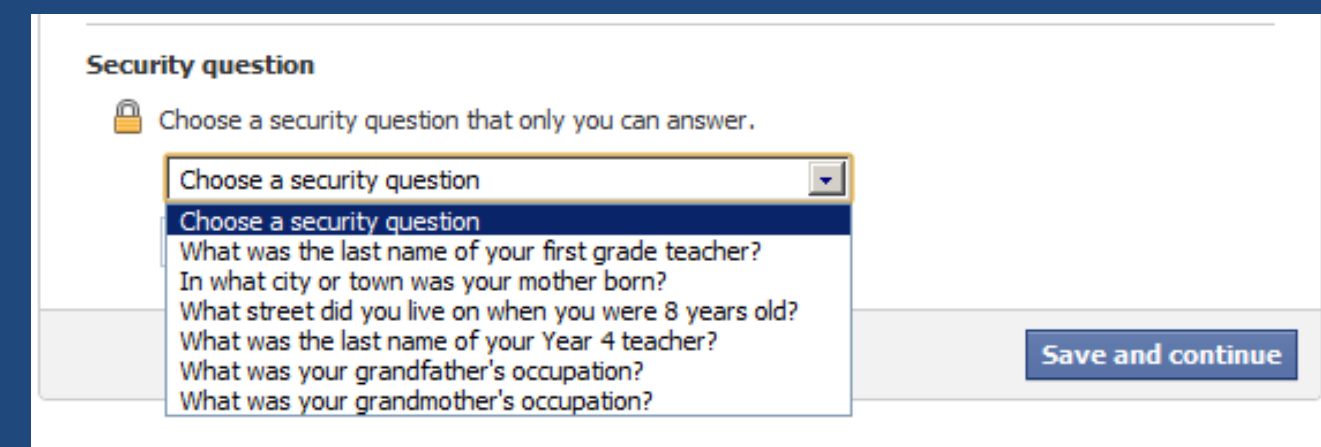
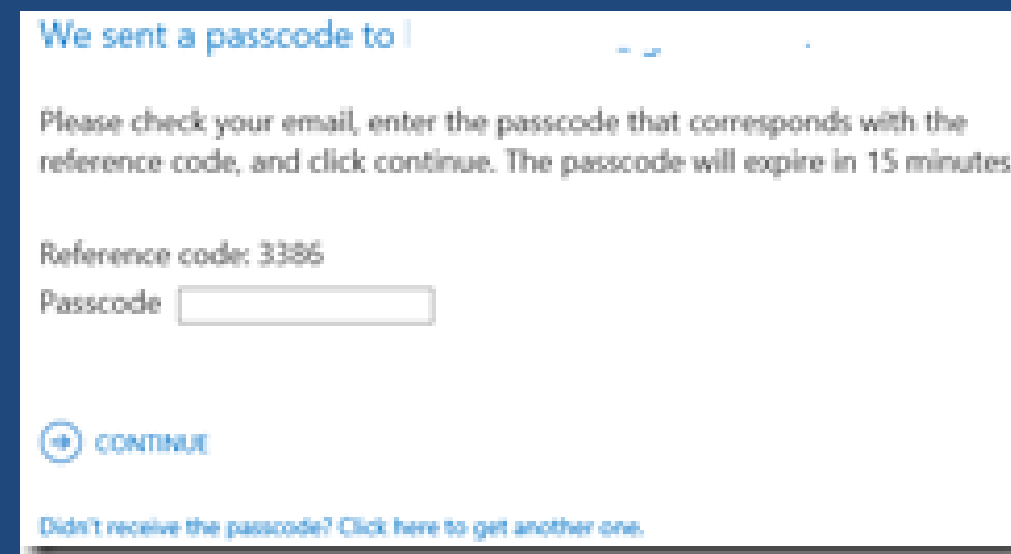
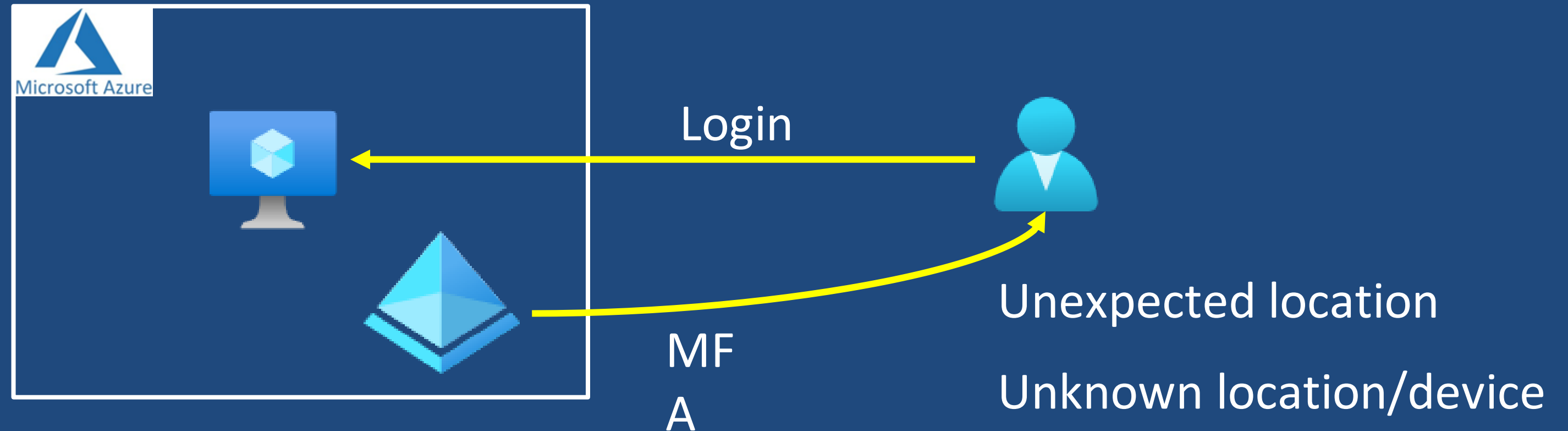
Service
Principal



Role
Assignment



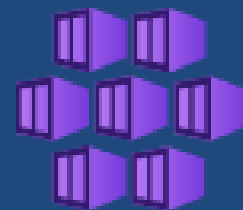
Conditional Access



Cost Management

Capital
Expenditure

Operating
Expenditure



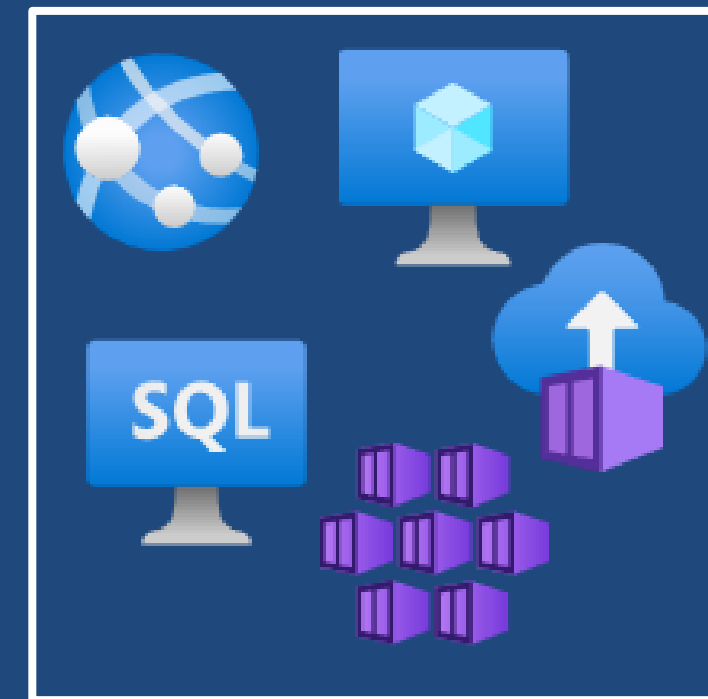
Cost Management

Capital
Expenditure

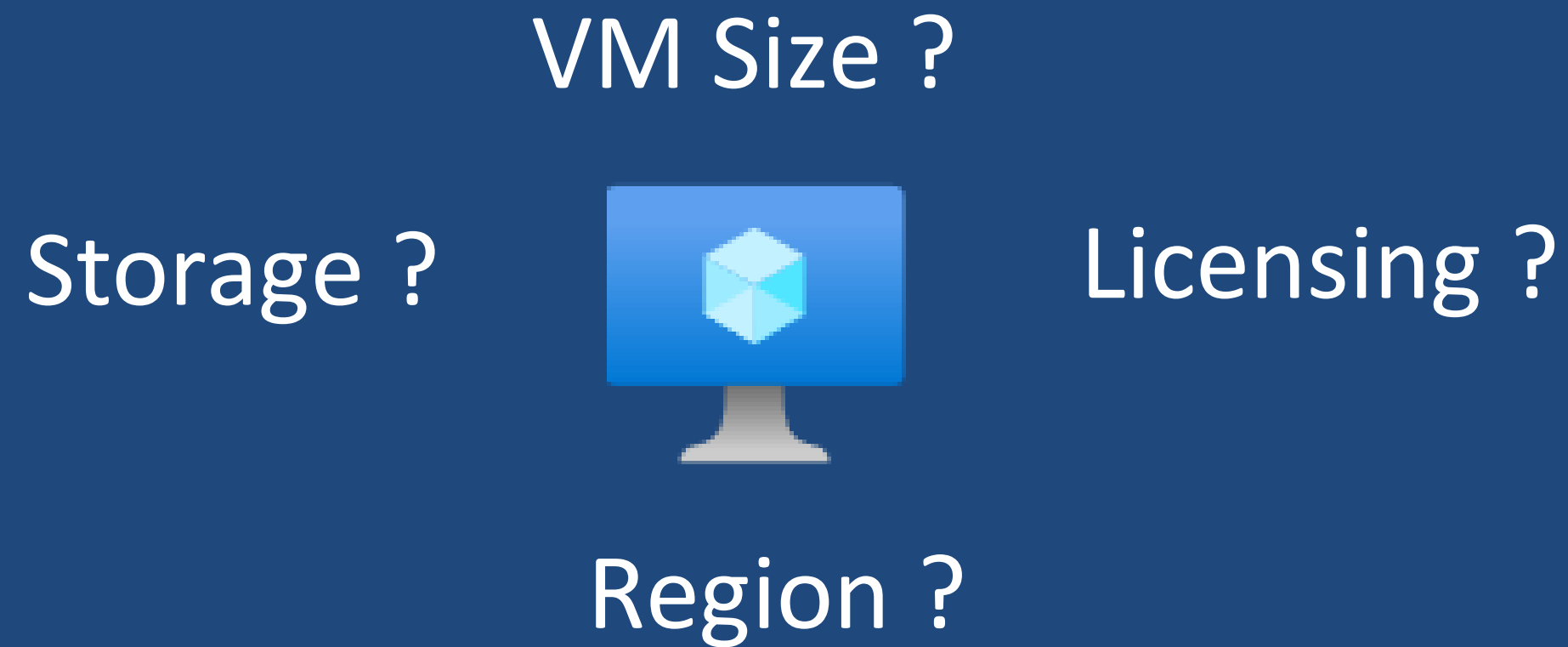
Operating
Expenditure

Type ?
Setting ?
Region ?

Azure Resources



Cost Management



Consumption Model

Pay-as-you-go

Pay what you use



Reserved

Reserve the resources for 1-3 years



50



80GB, 12vCPU



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Azure Marketplace



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Cost Estimations in Azure

Pricing Calculator

Estimated cost of provisioning Azure resources

You can save, export and share the estimates

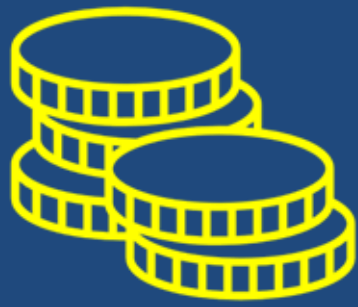
Total Cost of Ownership(TCO)

Cost comparison between on-premises and Azure infra

Before migrating to cloud, you can generate a report to see if there are any potential savings in moving to cloud.



Cost Management Tool



Azure resource cost



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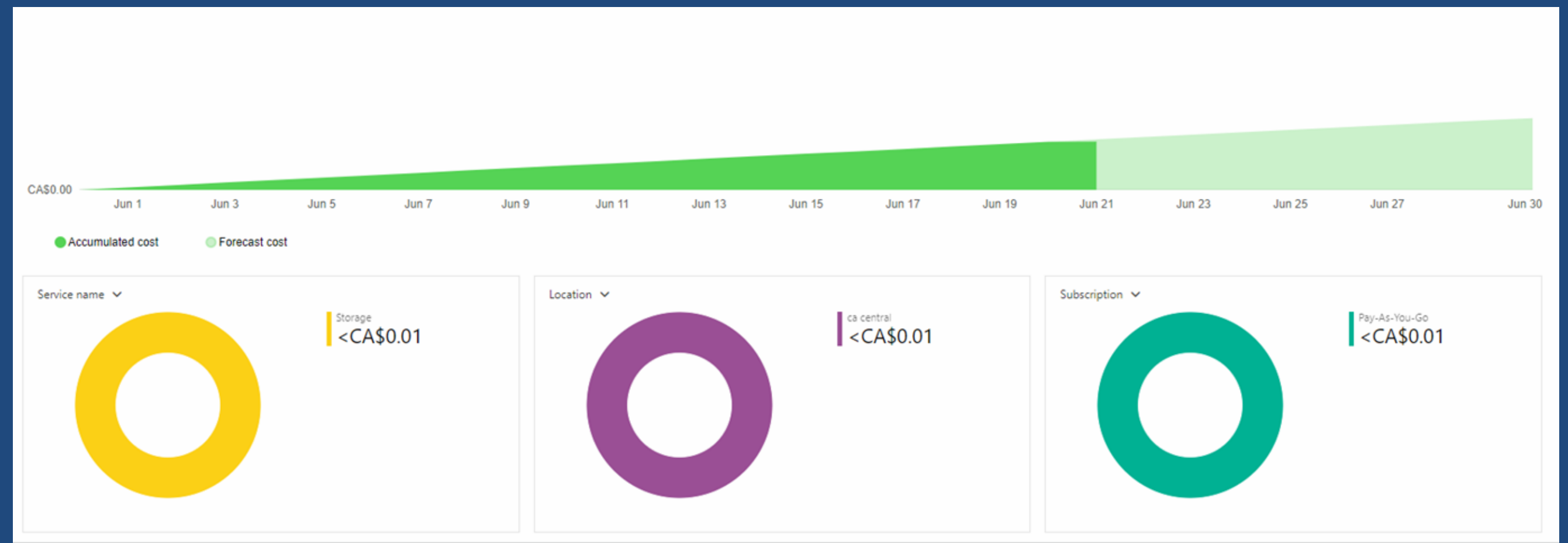


Alerts



Budgets

Cost Analysis



Knowledge Checks

- 1) __ Can calculate the cost savings due to reduced electricity consumption as a result of migrating on-premises MS SQL servers to Azure.
 - A) Azure Migrate : server assessment tool
 - B) Azure Total cost of ownership (TCO) calculator
 - C) Database migration assistant
 - D) Pricing calculator in Azure
- 2) If you create two VMs of same size in two locations, they will always generate the same monthly cost? **True or False?**
- 3) You can use azure cost management to view associated cost to management groups? **True or False?**
- 4) You can use azure cost management to view to view the usage for VM for last 3 months? **True or False?**

Azure Management and Governance



Azure Blueprints

Deploy

Environment

Role Assignment
Policy Assignment
ARM Templates
Resource Groups

Artifacts

Blueprint Definition

Blueprint Assignment



Azure Management and Governance



Azure Resources

Create/assign/manage

Policy 1
Policy 2
Policy 3

Initiative

Only create VM in Canada-central



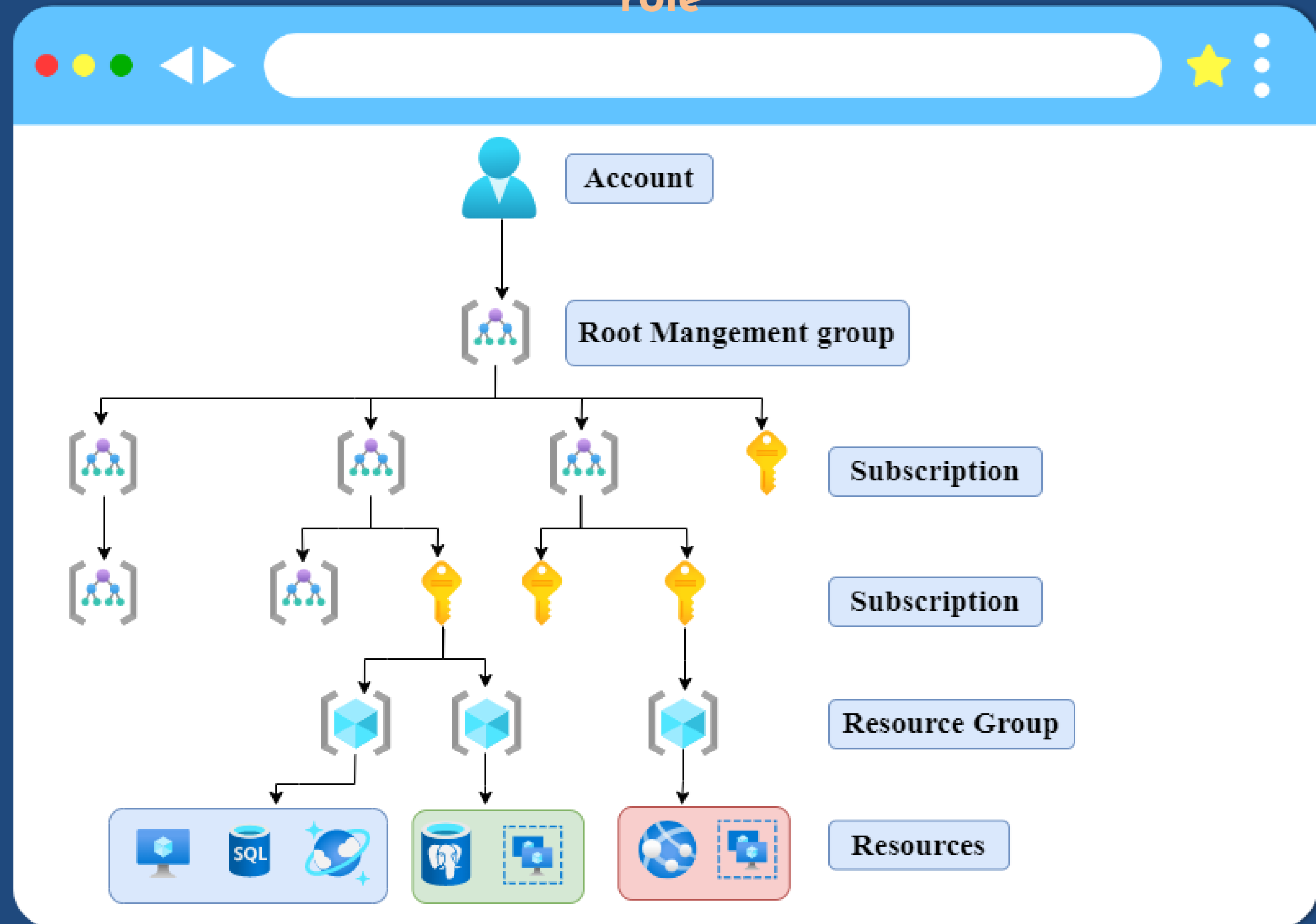
Resource Locks

⇒ Delete Lock
⇒ ReadOnly Lock Like Reader role

Prevents resources from being accidentally deleted or modified

Can be applied at multiple levels

Resource locks are inherited



Service Trust Portal



Service Trust Portal

My Library

All Documents

Search

Sign in

Service Trust Portal

Learn how Microsoft cloud services protect your data, and how you can manage cloud data security and compliance for your organization.



Certifications, Regulations and Standards



ISO/IEC

International Organization for Standardization (ISO) / International Electrotechnical Commission (IEC)



SOC

System and Organization Controls (SOC) 1, 2, and 3 Reports



GDPR

General Data Protection Regulation



FedRAMP

Federal Risk and Authorization Management Program



PCI

Payment Card Industry (PCI) Data Security Standards (DSS)



CSA Star

Cloud Security Alliance (CSA) Security, Trust and Assurance Registry (STAR)



Australia IRAP

Australia Information Security Registered Assessors Program (IRAP)



Singapore MTCS

Multi-Tier Cloud Security (MTCS) Singapore Standard



Spain ENS

Spain Esquema Nacional de Seguridad (ENS)

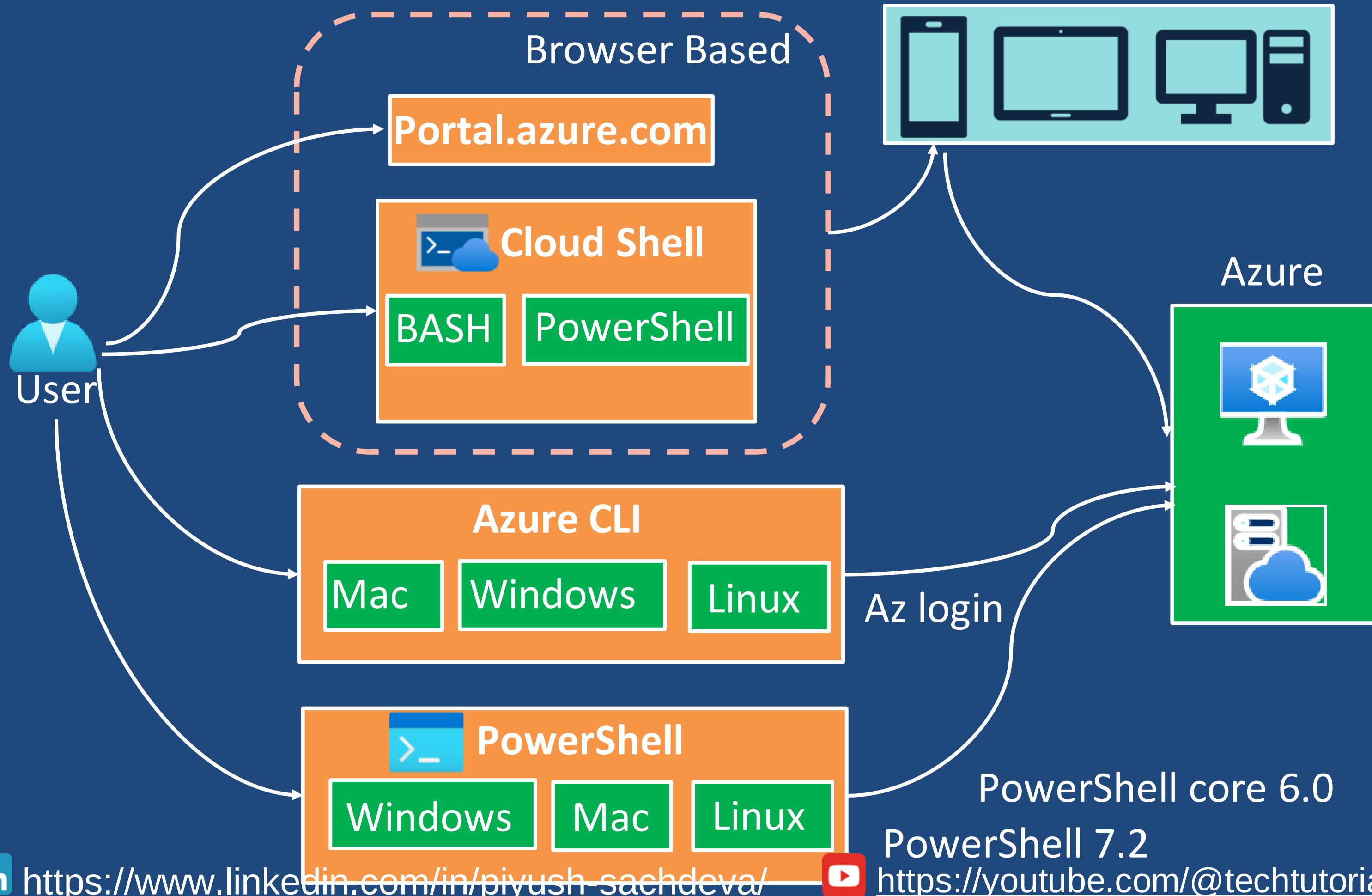
Knowledge Checks

- 1) Your company has an Azure subscription that contains resources in several regions. You need to ensure that administrators can only create resources in those regions. What should you use?
 - A. A Read-only lock
 - B. An Azure policy
 - C. A Management group
 - D. A Reservation

- 2) Azure blueprints are used to deploy a complete azure app environment including resource configs and role assignments? **True or False?**

- 3) Which type of resource lock would you choose to restrict users from deleting the resource but they should be able to read and modify?
 - A. ReadOnly
 - B. Delete
 - C. Read

Tools to interact with Azure



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Azure Arc

Manage multi-cloud and hybrid virtual machines, Kubernetes clusters, and databases as if they are running in Azure.

Manage on-premises resources as an Azure resource

Services supported by Azure Arc:

- Physical Servers
- Kubernetes Clusters
- Azure Data Services
- SQL Server
- Virtual Machines



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ARM Templates

Infrastructure as a code service for Azure

Knowledge Checks

1) Your company has several business units.

Each business unit requires 20 different Azure VMs for daily operation. All the business units require the same type of Azure VMs. Which Azure service you should use to automate the VM provisioning?

A) Azure Arc B) ARM Template C) Terraform

2) To run PowerShell on Windows, you need to have PowerShell Module Installed?
True or False?

3) You have an Azure web app. You need to manage the settings of the web app from an iPhone. What are two Azure management tools that you can use?

A. Azure CLI

B. The Azure portal

C. Azure Cloud Shell

D. Windows PowerShell

E. Azure Storage Explorer

Knowledge Checks

4) You need to create a new Azure virtual machine from a tablet that runs the Android operating system.

What are three possible solutions?

- A. Use Bash in Azure Cloud Shell.
- B. Use PowerShell in Azure Cloud Shell.
- C. Use the PowerApps portal.
- D. Use the Security & Compliance admin center.
- E. Use the Azure portal.

5) You can run PowerShell on MacOS? **True or False?**

6) An Azure administrator plans to run a PowerShell script that creates Azure resources. Which two computer can run the script?

- A. a computer that runs Linux and has the Azure PowerShell module installed.
- D. a computer that runs Linux and has the Azure CLI tools installed.
- C. a computer that runs Chrome OS and uses Azure Cloud Shell.

Monitoring Tools in Azure



Evaluates your Azure resources and provides you **recommendations** to help improve

- Reliability
- Security
- Performance
- Achieve operational excellence
- And helps you reduce costs



Monitoring Tools in Azure



Azure Service Health

Dashboard to show the service health and health of your deployed resources

Azure Status : Show the status of Azure services globally, outages etc

Service Health: It focuses on the Azure services and regions you're using

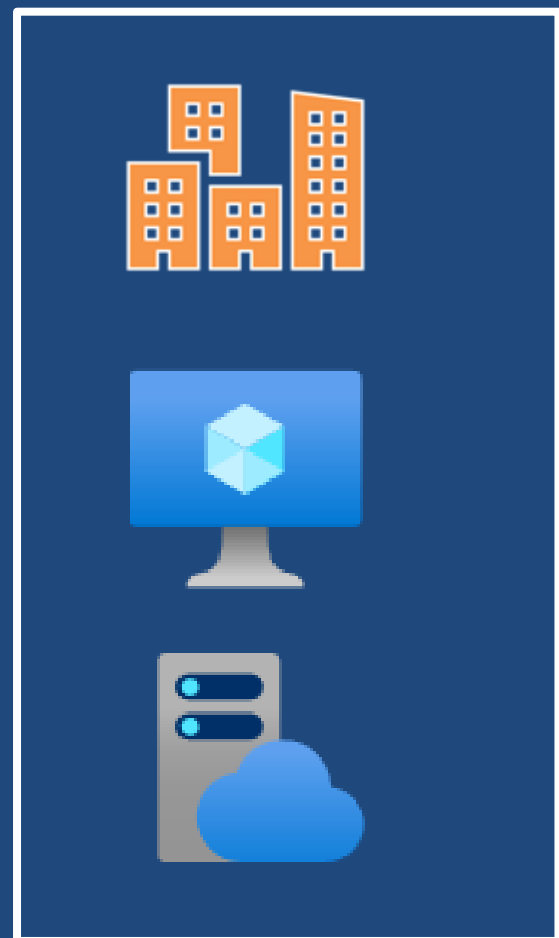
Resource Health: Shows health of your cloud resources such as VMs.





Azure Monitor

Data Sources



Data Platform

Metrics

Logs

Traces



Visualize



Analyze



Respond



Integrate



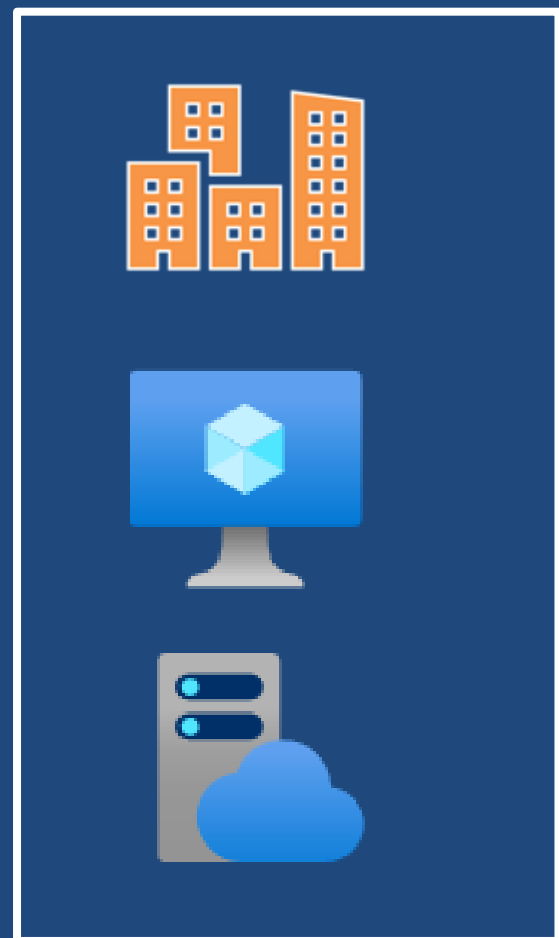
e





Azure Monitor

Data Sources



Data Platform

Metrics

Logs

Traces



Visualize



Analyze



Respond



Integrate



e



Knowledge Checks

1) You need to be notified when Microsoft plans to perform maintenance that can affect the resources deployed to an Azure subscription.

What should you use?

- A. Azure Monitor
- B. Azure Service Health
- C. Azure Advisor
- D. Microsoft Trust Center

2) Event hub processes millions of data from IOT sensors, **True or False?**

3) Application insights is a feature of Azure Monitor? **True or False?**

4) What can you use to automatically send an alert if an administrator stops an Azure virtual machine?

- A. Azure Advisor
- B. Azure Service Health
- C. Azure Monitor
- D. Azure Network Watcher

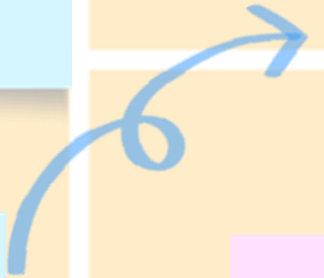
AZ900 Cheat Sheet

Azure Responsibility

Physical
Infrastructure
Security



IaaS



Access to
underlying
OS:

High bandwidth,
dedicated network
b/w on-prem and
Azure



Express
Route

Production ready server
Isolated environment,
Fewer possible steps

IaaS for Azure,
Launch infra
using reusable
templates:



ARM Templates,
Biceps

Azure Marketplace



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AZ900 Cheat Sheet

Multi-cloud
Resource
Management

Azure Arc

Minimize
Administrative
Efforts

PaaS/SaaS

IAM permissions
And policies can
be applied at



Any level of resource
hierarchy



AZ900 Cheat Sheet

Multi-cloud
Resource
Management

Azure Arc

Minimize
Administrative
Efforts

PaaS/SaaS

IAM permissions
And policies can
be applied at

Any level of
resource hierarchy

Connect Virtual Network
With On-premises(
Lowest Cost)

VPN Gateway



AZ900 Cheat Sheet

Cost estimation

Pricing Calculator

Static website
hosting and
static content
storage

Azure Blob Storage

Tools to
interact with
Azure

Azure CLI,
Cloud Shell,
Azure Portal

Container based
Services in Azure

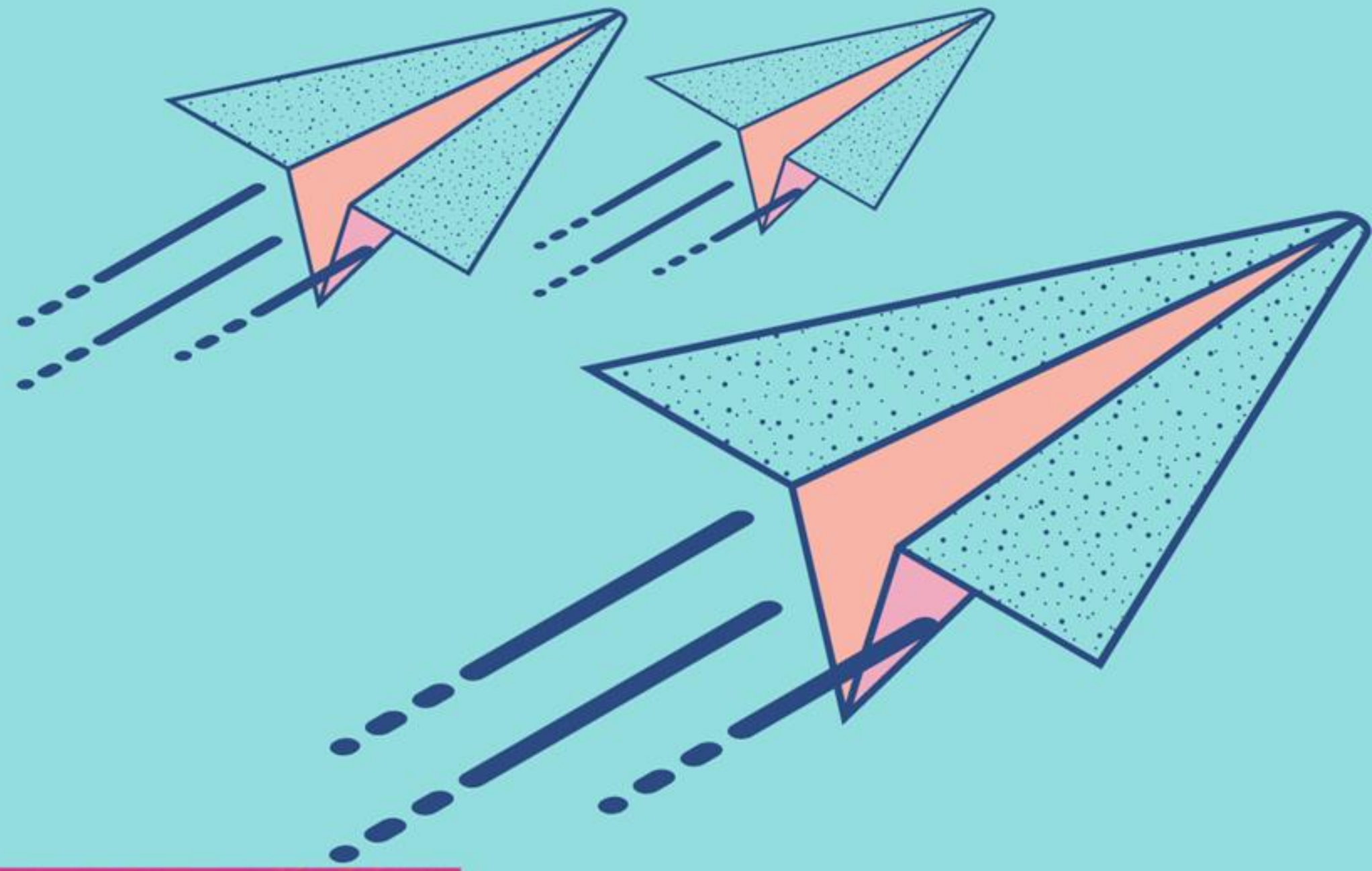
ACI, AKS



Knowledge Checks

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 - D) Pricing calculator in Azure
- 2) If you create two VMs of same size in two locations, they will always generate the same monthly cost? **True or False?**
- 3) You can use azure cost management to view associated cost to management groups? **True or False?**
- 4) You can use azure cost management to view to view the usage for VM for last 3 months? **True or False?**

Thank You For Your Patience



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