WEEK 8
INTRODUCTION TO CLOUD COMPUTING AND AZURE Q&A

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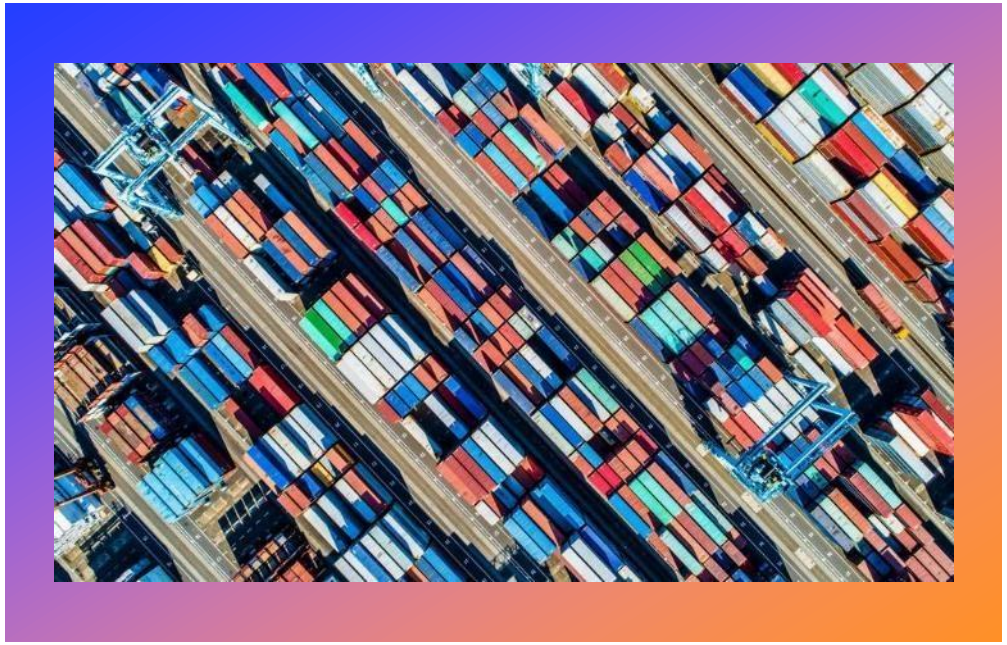


Agenda

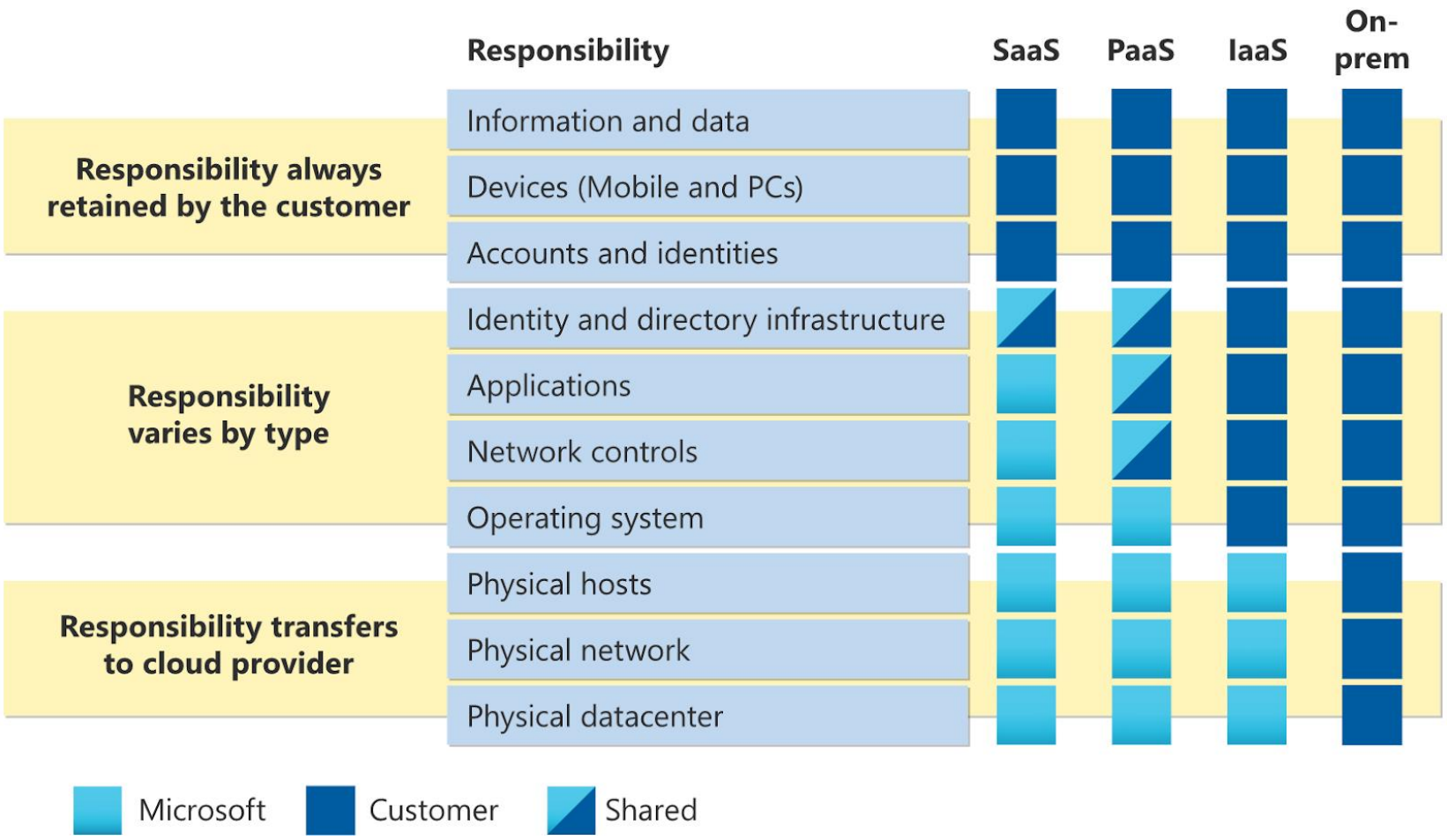
- What is cloud computing?
- Cloud deployment models
- Cloud service types
- Benefits of cloud computing
- Azure Global Datacenter Presence
- Azure Resource Hierarchy

What is Cloud Computing?

Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing[1].

[1]https://aws.amazon.com/what-is-cloud-computing/

Shared Responsibility Model



CLOUD SERVICE TYPES

IaaS, PaaS, SaaS, FaaS

Question - 1

SampleCo, migrates its server infrastructure to the cloud. SampleCo utilizes virtual machines provided Azure to host its website and database. Which of the following is the responsibility of the cloud service provider?

a. Application development
b. Virtual machine security
c. Data encryption at rest
d. Network configuration by the customer

Question - 2

SampleCo creates their architecture using AzureSQL Databases and Azure Web Apps. What is typically the responsibility of the cloud customer?

a. Hypervisor management
b. Database management
c. Physical server maintenance
d. Network infrastructure updates

CLOUD DEPLOYMENT MODELS

Public cloud, Private Cloud, Hybrid Cloud

Comparison of cloud deployment models

Factors	Public Cloud	Private Cloud	Hybrid Cloud
Initial Setup	Easy	Complex, requires a professional team to setup	Complex, requires a professional team to setup
Scalability and Flexibility	High	High	High
Cost-Comparison	Cost-Effective	Costly	Between public and private cloud
Reliability	Low	Low	High
Data Security	Low	High	High
Data Privacy	Low	High	High

Question - 3

What characterizes a public cloud deployment model?

Answer - 3

- Resources being owned and operated by a third-party provider
- Accessible over the internet.
- Organizations benefit from on-demand scalability, cost-effectiveness, and the outsourcing of infrastructure management.

Question - 4

- In a private cloud deployment, what distinguishes it from other deployment models?

Answer – 4

- Resources are used exclusively by one organization.

- Provides greater control, security, and customization, making it suitable for industries with strict regulatory requirements or specific data privacy concerns.

CLOUD PRICING

Calculating Cost

Usually, 2 or 3 metrics are used

e.g., Cosmos Db

Operations

+

Consumed Storage

+

Optional dedicated gateway

+

Backup storage

Prices changes between regions!

Free Services

Some services are always free or have a free below a certain limit

- Virtual network
- Private IP address
- Azure Migrate
- Inbound Internet traffic
- 5GB of outbound internet traffic
- Azure Policy
- Azure AD
- 1 Million executions Azure Functions
- Azure App Services (F1, Free)

Pay for Time

Certain services charge by time (minute or hour)

- Virtual machine
- App Services
- Databases
- Load balancers
- Managed storage
- Public IP address

Pay per GB

- Database storage
- Backups
- Unmanaged disk
- Network traffic (between regions)
- Network traffic (more than 5GB/month egress from Azure)

Pay per Operations

Usually charged in bulk - per 10,000 requests, per million requests, etc

- Unmanaged storage (reads, writes, deletes)
- Databases (queries)
- Messaging

Pricing Calculator

https://azure.microsoft.com/en-us/pricing/calculator/

BENEFITS OF CLOUD COMPUTING

High availability

The amount of time that a system is operational.

Four nines, 4 minutes per month down time.

%99.99

Scalability

The ability of a system to handle growth of users or work.

- Vertical scaling (adding more resources to an existing component)
- Horizontal scaling (adding more instances of a component).

Elasticity

The ability of a system to automatically grow and shrink based on application demand.

Reliability

System or service will operate without failures over a specified period.

Predictability

Ability to forecast and control costs, performance, and resource utilization.

Security

Covers measures and protocols to protect data, applications, and infrastructure from unauthorized access, data breaches, and cyber threats.

Governance

Involves the establishment of policies, processes, and controls to ensure that cloud resources and services are used in compliance with organizational policies and industry regulations.

Manageability

Refers to the ease with which IT resources and services can be monitored, configured, and maintained.

Question

How can cloud computing lead to cost savings for businesses?

a. By eliminating the need for security measures

b. By increasing the cost of hardware

c. By optimizing resource usage and adopting a pay-as-you-go model

d. By reducing data accessibility

Question

SampleCorp experiences a sudden surge in website traffic during a sale. Which cloud computing feature allows them to seamlessly handle the increased demand without manual intervention?

a. Load balancing
b. Fixed resource allocation
c. Manual scaling
d. Physical servers

Question

TechSolutions wants to minimize upfront infrastructure costs for a new project. Which cloud computing characteristic allows them to pay only for the computing resources they consume?

a. Fixed resource allocation
b. Pay-as-you-go model
c. On-premises hosting
d. Physical servers

Question

Team members from Different Locations need real-time access to shared project documents. Which cloud computing benefit allows them to collaborate seamlessly regardless of their physical location?

a. Fixed resource allocation
b. Localized data storage
c. On-premises hosting
d. Remote access through the internet

Question

How does cloud computing provide scalability for businesses?

a. By allowing the purchase of physical servers
b. By dynamically adjusting resources based on demand
c. By offering fixed resource allocations
d. By restricting access to resources

Question

- How can organizations benefit from the redundancy and failover mechanisms offered by cloud providers?

  a. By relying on a single server for critical applications

  b. By experiencing frequent downtime

  c. By ensuring continuous service availability through backup systems

  d. By avoiding any measures for data backup

Question

How does cloud computing enhance accessibility to data and applications for remote teams?

a. By limiting access to on-premises locations
b. By increasing latency in data retrieval
c. By centralizing data storage on local servers
d. By providing secure remote access through the internet

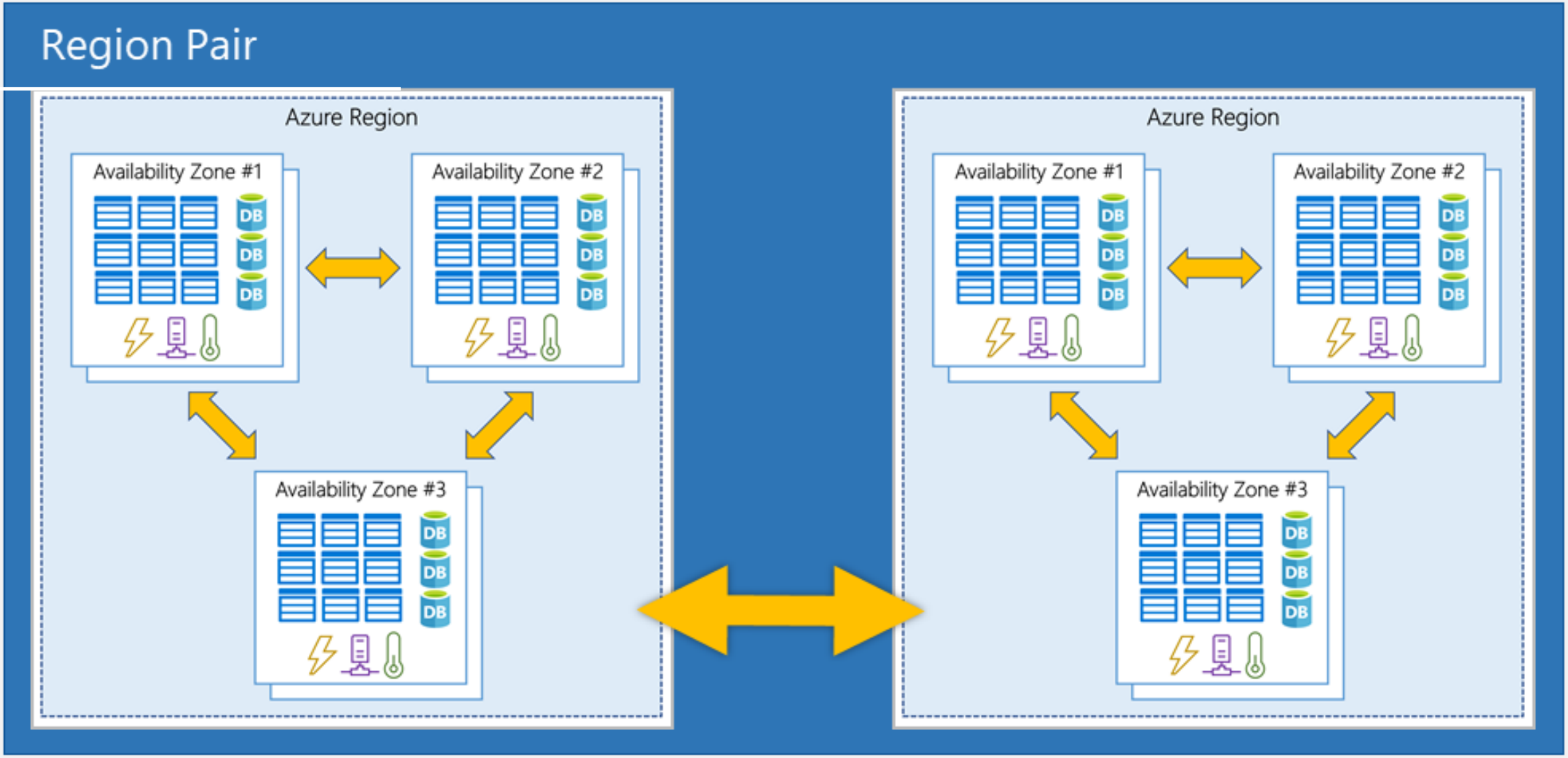
Question

FinanceCorp cannot afford downtime for its online banking services. Which cloud computing feature ensures continuous service availability even if one server fails?

a. No redundancy
b. Regular downtime
c. Redundancy and failover
d. Frequent data backup

AZURE GLOBAL DATACENTER PRESENCE

Geography


Region Pair
Azure Region
Availability Zone #1
Availability Zone #2
Availability Zone #3
DB
DB
DB
Azure Region
Availability Zone #1
Availability Zone #2
Availability Zone #3
DB
DB
DB

Regions

Refers to a specific geographic location where a cloud provider has datacenters.

Each region is essentially a cluster of datacenters that are relatively close to each other, typically within a specific geographic area or country.

Regions Key Points

- Regions are strategically located around the world to provide cloud services to users in different geographic locations.
- Each region is independent and has its own set of datacenters, networking infrastructure, and resources.
- Regions are designed to be isolated from each other to ensure data sovereignty, compliance, and redundancy.

Region Pairs

- A region pair is a concept related to disaster recovery and high availability.
- It involves pairing two regions, typically within the same geographic area but separated by a considerable distance.
- One region in the pair is designated as the primary region, and the other is the secondary region.

Region Pairs Key Points

- The primary purpose of region pairs is to provide redundancy and business continuity. If one region in the pair experiences an outage or disaster, services can failover to the secondary region to minimize downtime.
- Region pairs are carefully chosen to ensure geographic separation, so they are less likely to be affected by the same natural disasters or other events.
- Data replication and synchronization mechanisms are used to keep data consistent between the primary and secondary regions.

Question

Why are region pairs important in cloud infrastructure planning?

a. To maximize costs by using two neighboring regions
b. To ensure data residency requirements are met
c. To provide fault tolerance and disaster recovery capabilities
d. To limit the global reach of cloud services

Question

Example Scenario: CompanyX wants to ensure data resilience and low-latency access for its global customer base. Which cloud feature allows them to strategically deploy resources in different geographic locations?

a. Load balancing
b. Cloud regions
c. On-premises hosting
d. Physical servers

Question

HealthcareCorp needs a robust disaster recovery plan for patient data. Which cloud feature allows them to replicate data and workloads to a geographically distant region to ensure data recovery in case of a regional outage?

a. Load balancing
b. Cloud regions
c. Region pairs
d. Physical servers

Question

What is the primary purpose of dividing cloud infrastructure into regions?

a. To increase latency for users
b. To separate on-premises and cloud environments
c. To provide geographic redundancy and improve performance
d. To limit the scalability of cloud services

AZURE RESOURCE HIERARCHY

Subscription

- Billing and licensing container
- It represents an agreement with Microsoft to use Azure services and resources.
- When you create an Azure subscription, you gain access to a set of Azure resources and services that you can use based on your subscription type and payment plan.

Resource Groups

- Logical container for organizing and managing Azure resources.
- Help you organize resources for a specific project, application, or department.

Resource Groups

- Resources can be moved between resource groups or deleted together by managing the resource group.

- Access control for resources within a resource group is often set at the resource group level, making it easier to manage permissions.

The resource hierarchy

- Azure Account: Represents your entire Azure environment, including all subscriptions.
- Subscription: Contains one or more resource groups.
- Resource Group: Contains one or more resources.
- Resource: Represents individual Azure services or components (e.g., virtual machines, databases, storage accounts).

Question

Example Scenario: TechStart is a startup that wants to manage its cloud costs and resource usage effectively. Which cloud feature allows them to consolidate billing and manage access to their cloud resources under a single umbrella?

a. Virtual networks

b. Cloud subscriptions

c. Resource groups

d. Physical servers

Question

EducationCorp is deploying a new web application on the cloud. What types of entities, such as servers, databases, or storage, would be considered cloud resources in this deployment?

a. Only physical servers

b. Any entity that can be managed in the cloud, such as virtual machines or databases

c. Cloud subscriptions only

d. On-premises hardware

Question

In the context of cloud computing, what does the term "resource" typically refer to?

a. Only physical servers

b. Any entity that can be managed in the cloud, such as virtual machines or databases

c. Cloud subscriptions only

d. On-premises hardware

Question

RetailCo operates multiple online stores and wants to simplify the management of resources for each store separately. Which cloud feature allows them to group resources like virtual machines, databases, and storage in a logical container for efficient administration?

a. Virtual networks

b. Cloud subscriptions

c. Resource groups

d. Physical servers

Question

What is the primary purpose of using resource groups in a cloud environment?

a. To create physical boundaries between different cloud services

b. To isolate resources based on geographical locations

c. To organize and manage related resources for easier administration

d. To restrict user access to specific resources

Question

What is the primary purpose of a cloud subscription in a cloud service provider's environment?

a. To limit the number of users accessing cloud resources

b. To manage and organize billing and resource usage

c. To provide a secure connection to on-premises servers

d. To restrict the geographical locations of cloud resources

THANK YOU

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