**QUES 1.1: Create Resource Groups based on different project environment (e.g. Developments, Testing, Production). Explain the organizational benefits of using Resource Groups.**

Resource Groups in an organizational context, such as in cloud computing platforms like Azure or AWS, provide several benefits:

1. **Organization and Structure**: Resource Groups allow you to organize your resources based on lifecycle, ownership, environment, or other criteria. This makes it easier to manage and locate resources.
2. **Access Control**: With Resource Groups, you can manage access permissions at a group level rather than individually. This simplifies the process of managing access rights and ensures consistent application of permissions.
3. **Cost Management**: Resource Groups can help track and manage costs. You can monitor the cost of a group of resources, which can be useful for understanding spending patterns and identifying cost-saving opportunities.
4. **Consistent Policies**: Resource Groups allow you to apply policies consistently across resources. For example, you can enforce a certain naming convention or apply specific network configurations to all resources in a group.
5. **Simplified Management**: If resources that share a lifecycle are placed in a Resource Group, you can manage those resources as a single entity. For example, you can deploy, update, or delete all of the resources in a group in a single operation.

**A computer screen with a message

Description automatically generated**

**QUES 1.2: Explore and document the purpose and usage of Availability Zones and Availability Sets in ensuring application reliability, without creating VMs.**

**Availability Zones**: Availability Zones are physically separate locations within an Azure region. [Each zone is made up of one or more data centers equipped with independent power, cooling, and networking to ensure resilience](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview). Here are some key points:

1. **Fault Isolation**: Availability Zones are designed to protect your applications from data center failures. [They are close enough for low-latency network connections but far enough apart to avoid local outages](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview).
2. [**High Availability**: If one zone experiences an outage, the regional services, capacity, and high availability are supported by the remaining zones](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview).
3. [**Zonal and Zone-Redundant Services**: You can use multiple availability zones together to keep separate copies of your application and data within separate physical data centers in a large metropolitan area](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview). There are two ways that Azure services use availability zones:

* **Zonal resources** are pinned to a specific availability zone. [You can combine multiple zonal deployments across different zones to meet high reliability requirements](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview).
* **Zone-redundant resources** are spread across multiple availability zones. [Microsoft manages spreading requests across zones and the replication of data across zones](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview).

[**Availability Sets**: Availability Sets are logical groupings of VMs that reduce the chance of correlated failures bringing down related VMs at the same time](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview). [They place VMs in different fault domains for better reliability](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview). Here are some key points:

1. [**Fault Isolation**: Availability Sets place VMs in different fault domains for better reliability, especially beneficial if a region doesn’t support availability zones](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview).
2. [**Update Domains**: Each virtual machine in your availability set is assigned an update domain and a fault domain by the underlying Azure platform](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview).
3. [**High Availability**: Using two or more VMs in an availability set helps highly available applications and meets the 99.95% Azure SLA](https://learn.microsoft.com/en-us/azure/virtual-machines/availability-set-overview).
4. [**Cost**: There’s no extra cost for using availability sets, you only pay for each VM instance you create](https://learn.microsoft.com/en-us/azure/reliability/availability-zones-overview)

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated