1. What is serverless computing?

Serverless is a cloud computing execution model that

* Automatically provisions the computing resources required to run application code on demand, or in response to a specific event.
* Automatically scales those resources up or down in response to increased or decreased demand.
* Automatically scales resources to zero when the application stops running.

Serverless offloads all management responsibility for backend cloud infrastructure and operations tasks - provisioning, scheduling, scaling, patching and more - to the cloud provider. This gives developers more time to develop and optimize their front-end application code and business logic.

And with serverless, customers never pay for idle capacity. They pay only for the resources required to run their applications, and only when those applications are running.

1. Explain Azure subscriptions, management groups and resources.

Azure Management Groups, Subscriptions, and Resource Groups are used together to establish the entire organizational structure in Azure, and they are designed to be flexible to organize Azure resources to meet business needs.

Chart

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Azure provides four levels of management scope:

* Management groups
* Subscriptions
* Resource groups
* Resources

Azure Management Group:

* All management groups in the Azure AD are under the root management group.
* Root management group cannot be moved or deleted.
* We can only have one root management group.
* We can actively control access, policies, and compliance for more than one subscription with ease.
* All subscription objects within a management group receive a copy of the role-based access control and policy settings applied to the management group.
* Management group can contain other management groups or subscriptions, but it cannot contain an Azure Resource.

Azure Subscription

* Azure Subscription is a logical collection of Azure resources.
* Organizations can use subscriptions to manage costs and the resources that are created by users, teams, or projects.
* Each resource (service) in Azure is deployed to a single subscription.
* It is a defined administrative security boundary that supports RBAC.
* It is a deployment construct for the organization and consistency of Azure resources.
* Each subscription has limits or quotas on the number of resources you can create and use.

Different subscription types : Free Trail, Pay as you go, Enterprise Agreement, Cloud Solutions partner

Azure Resource Group

* Resource groups are the lowest level of organizational scope, and are the level that contains almost all Azure Resources.
* Resource groups are containers that hold related Azure resources to be managed as a group.
* Resources groups are logical collections of virtual machines, app services, storage accounts, virtual networks, database servers, etc.
* Resource groups can be utilized to subdivide resources by application or environment, among the many options.
* Resource groups are a useful tool for RBAC. This will allow you to grant user access at the group level.
* Resource Groups can simplify reporting and billing within Subscription.
* They facilitate administrative delegation because resources contained inherit permissions to the resource group level.

1. Explain Azure regions, availability zones, and region pairs.

**Azure Regions**: A region is a set of data centres deployed within a latency-defined perimeter and connected through a dedicated regional low-latency network.

Azure is generally available in 52 regions around the world, with plans announced for 6 additional regions.

**Region Pairs :**

* Each Azure region pairs with another region within the same geography, together making a regional pair.
* Azure serializes platform updates so only one region is updated at a time.
* Azure Regions in a Pair have direct connections that bring additional benefits to use them together.
* Each Azure Region in a pair is always located greater than 300 miles apart when possible.

Availability Zone

* Azure Availability Zones is a high-availability offering that protects your applications and data from datacenter failures.
* These are unique physical locations within an Azure region. Each zone is made up of one or more data centers equipped with independent **power**, **cooling**, and **networking**.
* The physical separation of Availability Zones within a region protects applications and data from data center failures.
* **Zone-redundant** services replicate your applications and data across Azure Zones to protect from single-points-of-failure.
* **Not every region has support for Availability Zone Azure.** The **examples of Availability Zones** are Central US, East US 2, West US 2, West Europe, France Central, North Europe & Southeast Asia
* With Availability Zones, Azure offers industry best 99.99% VM uptime SLA(Service Level Agreement)

Diagram

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1. Explain Azure Resource Manager, Azure subscription and management group.

**Azure Resource Manager** is the service that manages and deploys Azure resources. It has a management layer that allows us to create, update, and delete Azure account resources. After deployment, we employ administration tools like access control, locks, and tags to secure and organize our resources.

**Azure Subscription :** To use Azure's cloud-based services, we must first purchase a subscription. It acts as a single billing unit for Azure resources, with subscriptions billed for services used in Azure.

An Azure subscription is tied to a single account, the one that was used to create it and is also used for billing. Resources can be supplied as instances of the many Azure products and services under the subscription.

**Azure Management group**  : It is a logical container that allow Azure Administrators to manage access, policy, and compliance across multiple Azure Subscriptions

1. Provide overview of Azure Compute Services.

Azure Compute Services refers to the hosting model for the computing resources on which our application runs. Azure compute service can be divided broadly into three categories.

* Infrastructure as a service
* Platform as a service
* Serveless services

### **Azure compute options**

Following are the main compute options available in Azure:

* **Virtual Machine:** It is an IaaS service, allowing us to deploy and manage VMs inside a virtual network (VNet).
* **App Service:** It is a managed PaaS offering for hosting web apps, mobile app back ends, RESTful APIs, or automated business processes.
* **Service Fabric:** It is a platform that can run on any environment, including Azure or on-premises. It is an orchestrator of micro-services across a cluster of machine
* **Azure Kubernetes Services:** It manages a hosted Kubernetes service for running containerized applications.
* **Azure Container Instances:** It offers the fastest and most straightforward way to run a container in Azure without having to provision any virtual machines and without having to adopt a high-level service.
* **Azure Functions:** It is a managed FaaS service.
* **Azure Batch:** It is a managed service for running large-scale parallel and high-performance computing (HPC) applications.
* **Cloud Services:** It is a managed service for running cloud applications. It uses a PaaS hosting model.

1. What is an Azure virtual machine and when to opt for an Azure virtual machine?

Azure virtual machine is a  [scalable computing resources on-demand](https://docs.microsoft.com/en-us/azure/architecture/guide/technology-choices/compute-decision-tree) service provided by Azure. Using Azure virtual machine, we can be able to deploy different services such as Windows, Linux within the Azure cloud. When we implement a virtual machine, every virtual machine will have an associated OS and data disk.

If we require more control over the computing environment than the other computing resources offer, then we should opt for an Azure Virtual Machine.