**Azure fundamental assignment 2**

1. What is serverless computing?

Serverless computing is a cloud computing execution model in which the cloud provider allocates machine resources on demand, taking care of the servers on behalf of their customers. Serverless technologies feature automatic scaling, built-in high availability, and a pay-for-use billing model to increase agility and optimize costs. These technologies also eliminate infrastructure management tasks like capacity provisioning and patching, so one can focus on writing code that serves your customers.

1. Explain Azure subscriptions, management groups and resources.

*Management groups*

Management group is at the top of the hierarchy. All subscriptions in a management group automatically inherit the conditions or settings specified at the management group level. So, a management group is like a container for all your subscriptions. Just like how there can be multiple subscriptions, there can also be multiple management groups in an organisation.

*Subscriptions*

A subscription sits under a management group. It associates user accounts and the resources that were created by those user accounts. Each subscription has limits or quotas on the number of resources you can create and use. Organizations can use subscriptions to manage costs and the resources that are created by users, teams, or projects.

*Resources*

An azure resource is any service instance that you create. For example, virtual machine, Azure SQL database, storage account etc.

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

An *Azure Region* is a set of Datacentres that are connected through a dedicated low-latency network. There are regions of different sizes. A Region could be made up of just 1 datacentre or multiple datacentres. The point is, an Azure Region is a group of one or more Azure Datacentres. You have the flexibility to deploy your applications and data to any Azure region you want. You can even deploy across multiple regions to deliver cross-region resiliency.

An *Azure Availability Zone* is a unique physical location within an Azure region. Each Availability Zone is made up of one or more datacentres with independent power, cooling, and networking. Not all Regions have Availability Zones. Regions that support Availability Zones have a minimum of three separate zones to ensure resiliency.

If one of the Availability Zones has gone down for some reason, we still have our applications and data available from the rest of the two Availability Zones. There is a physical separation between each Availability Zone, and it is this separation that protects our applications and data from Datacentre failures. With Availability Zones, Azure offers industry best 99.99% VM uptime SLA.

*Azure regional pair*, paired regions, or region pair, all these terms are used interchangeably, and they refer to the same thing, i.e., a pair of azure regions. So, in simple terms, a regional pair consists of two regions within the same geography. An Azure geography is an area of the world that contains one or more Azure Regions. For example, India, United States, Europe, Asia Pacific are a few examples of Azure Geographies. An azure region is made up of one or more datacentres. If availability zones are enabled, an azure region contains a minimum of three availability zones. An Availability Zone is made up of one or more datacentres. So, the point is, an Azure region contains one or more datacentres or 3 or more availability zones if enabled. Most regions in a geography are paired to ensure business continuity and disaster recovery. A regional pair consists of two regions within the same geography.

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

*Azure Resource Manager* is at the core of Microsoft Azure. It serves as an essential component of Azure deployment and provides a unified management layer regardless of the tool set used. Whether you use the Azure website, Azure CLI, Azure PowerShell, or one of the many other methods for managing Azure resources, your commands all utilize Azure Resource Manager.

*Azure management groups* help you manage your Azure subscriptions by grouping them together. If your organization has many subscriptions, you might need a way to efficiently manage access, policies, and compliance for those subscriptions. Azure management groups provide a level of scope above subscriptions.

*Azure subscriptions* help you organize access to Azure resources and determine how resource usage is reported, billed, and paid for. Each subscription can have a different billing and payment setup, so you can have different subscriptions and plans by office, department, project, and so on.

*Resource groups* are containers that hold related resources for an Azure solution. A resource group includes those resources that you want to manage as a group. You decide which resources belong in a resource group based on what makes the most sense for your organization.

1. Provide overview of Azure Compute Services.

*Azure compute services* are the hosting services responsible for hosting and running the application workloads. Azure compute service can be divided broadly into three categories -

Infrastructure as a service, Platform as a service and Serverless services.

These include Azure Virtual Machines (VMs), Azure Container Service, Azure App Services, Azure Batch, and Azure ServiceFabric.

The most fundamental building block is the Azure virtual machine. 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.

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 machines.

*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 Machines (VM) is one of several types of on-demand, scalable computing resources that Azure offers. Azure Virtual machine will let us create and use virtual machines in the cloud as Infrastructure as a Service. We can use an image provided by Azure, or partner, or we can use our own to create the virtual machine.

Use VMs when you need control over OS Or when you want to run custom software. You handle Availability, Scalability, Load Balancing, Software/OS Updates.