

## Cloud Fundamentals

- Infrastructure as a Service:
  - Computing deployment category in which the cloud provider delivers infrastructure through the cloud
  - Delivery of IT infrastructure resources like web servers, DB servers, compute storage, networking, computing data centers as service
  - Buy pizza at the store and bake it at home
- Platform as a Service:
  - Cloud model where users can create, build, and deploy applications on the cloud without worrying about IT infrastructure behind it
  - Provides computing services, development, and monitoring tools for application development
  - Provider takes care of physical infrastructures, data centers, hardware, OS
  - User only needs to write and deploy application code on the platform
  - Pizza delivery
- Software as a Service:
  - Software-on-demand cloud model where cloud provider give access to a fully developed application
  - Enables users to access and use applications online without installation
  - Accessible through web browser or servers
  - Pay for the service on a subscription basis
  - Order pizza at a restaurant
- Containers as a Service:
  - Deploy applications in containers (containerization)
  - Container: runtime that contains essential computing resources needed to run an application, including the core part of the host OS (kernel) and its shared resources like storage across a host
- Serverless:
  - Backend services are provided by a cloud service provider
  - Third-party provider manages the infrastructure and automatically provisions and scales resources as needed
  - Provider handles server infrastructure, OS and other low-level components → no need to manage underlying infrastructure

## MS Azure Fundamentals

### Services

- Compute Services:
  - Provide quickly available and on-demand resources like OS, networking, disks, processors, and memory
  - Enables to build web and mobile applications, deploy and manage VMs, build apps in containers in the cloud, create batch jobs, etc.
- Core Azure Storage Services:
  - AZ Blobs: Store scalable binary data, text, or Data Lake Storage Gen2 big data analytics

- AZ Files: Fully manageable file shares for deployments on-premise or cloud. Accessible anywhere through Server Message Block (SMB) protocol
- AZ Queues: Collect large messages that are accessed via authenticated HTTP calls
- AZ Managed Disks: Store block-level volumes for AZ vms
- Core Azure DB Services:
  - AZ SQL DB: Cloud-hosted SQL databases that are fully managed, intelligent, and secure
  - AZ Cosmos DB: Create and migrate NoSQL workloads to the cloud like Cassandra, MongoDB, and other NoSQL databases
  - AZ Cache for Redis DB: Build fast and scalable applications with Redis in-memory data store
  - AZ DB for PostgreSQL, MySQL, and MariaDB: Create fully managed and scalable databases for PostgreSQL, MySQL, and MariaDB
  - AZ SQL Edge: Build IoT edge-optimized SQL database engine with built-in AI

## Core Architecture and Resource Management Concepts

- Management groups:
  - Top level of the core structure
  - Administrators manage everything about user access, compliance, and policies for subscriptions
  - Subscriptions within a management group automatically inherit settings, conditions, and restrictions added in the group
  - AZ RBAC for all resources and role definitions is supported in the root management group
- Azure subscriptions:
  - Are like a big container for all user accounts and resources they have accessed or used within the subscription
  - Every subscription has a limit of resources that a certain user can create and use
  - Use subscriptions to control monthly bill and resource costs
- Resource groups:
  - Group services or resources using resource groups
  - Acts as a logical container where resources like servers, web apps, DBs, storage, and monitoring are deployed, managed, and stored
- Resources:
  - DBs, servers, VMs, or web apps
  - All resources or services must be added to a resource group, which acts like a logical container
- Resource Manager:
  - Management and deployment service that provides users the capability to add, edit, and delete resources in AZ
  - By using ARM, an organization can manage user access control and organize resources securely even after deployment
  - ARM templates are commonly used to automate deployments and implement infrastructure as Code
  - IaC creates a great advantage, and enables deployment automation of the infrastructure in the cloud

- Using IaC, you can automate deployments by generating templates for the same environment every time

## User Identities, Roles, and Active Directories

- Role-Based Access Control:
  - Helps in authorization and user access management of resources
  - Management of identity using RBAC helps in controlling what users can do and cannot do
- Roles:
  - Security principal:
    - \* Object that represents a security identity that can be authenticated and authorized to access resources
    - \* Used to grant or deny resource permissions
    - \* Can be authenticated as user, security group, or process
    - \* When assigning roles to a security principal, you're granting or denying permissions to access specific resources in AZ
  - Role definition:
    - \* Sets permissions for users or security principals to utilize resources
    - \* Each role definition has a set of access controls, or actions, which helps determine which resource activities are permissible
  - Scope:
    - \* Determines the level at which the role assignment applies
    - \* Defines the set of resources the role assignment applies to and can be set at various levels in resource hierarchy (management group, subscription, resource group, and individual resource level)