# Core Azure Architectural Components

## Regions

A **Region** is a geographical area containing one or more data centers that are connected through a low-latency network. Azure regions allow customers to deploy resources close to their users for better performance and compliance with data residency requirements.

- Americas
- Europe
- Asia Pacific
- Middle East and Africa

## Availability Zone

An **Availability Zone** is a physically separate location within an Azure region, each with its own power, cooling, and networking. Availability Zones protect applications and data from data center failures, ensuring higher availability.

## Region Pairs

A **Region Pair** consists of two Azure regions within the same geography, paired together to enable data replication, disaster recovery, and updates. Azure ensures that updates are rolled out to one region at a time, maintaining continuity and resilience.

## Resource Groups

A **Resource Group** is a container that holds related Azure resources, such as virtual machines, storage accounts, and virtual networks. It allows for easy management, monitoring, and access control of grouped resources. Deleting a resource group deletes all resources within it.

## Azure Resource Manager (ARM)

**Azure Resource Manager (ARM)** is the deployment and management service for Azure. It provides a consistent management layer that enables users to create, update, and delete resources in their Azure account using templates, the Azure portal, PowerShell, or CLI. ARM ensures resources are deployed in an organized, repeatable, and secure way.

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# Core Products Available in Azure

Azure services are grouped into four main categories known as **Core Products**:

## Compute

**Compute** services provide processing power and resources to run applications. This includes virtual machines, containers, and serverless computing. **Examples:** Azure Virtual Machines, Azure Functions, Azure Kubernetes Service (AKS).

## Networking

**Networking** services connect Azure resources and on-premises infrastructure securely and efficiently. These include virtual networks, load balancers, and gateways. **Examples:** Azure Virtual Network (VNet), Azure Load Balancer, Azure VPN Gateway.

## Storage

**Storage** services allow you to store, manage, and access data in the cloud securely and at scale. Azure offers different storage options for various needs, such as files, blobs, and queues. **Examples:** Azure Blob Storage, Azure Files, Azure Disk Storage.

- **Blob Storage:** Optimized for storing massive amounts of unstructured data such as images, videos, backups, and logs. Ideal for data without a fixed schema.
- **Disk Storage:** Provides persistent block-level storage for Azure Virtual Machines. Acts like a physical disk in the cloud and supports both HDD and SSD options.
- **File Storage:** Enables fully managed file shares that use the SMB protocol, allowing shared access across multiple machines. Useful for lift-and-shift migrations and file sharing between applications.
- **Archive Storage:** A low-cost storage tier for rarely accessed data. Used for long-term backups, compliance data, or archival purposes, with longer retrieval times but significant cost savings.

## Database

**Database** services provide managed database solutions for structured and unstructured data. They reduce the need for manual maintenance, backups, and scaling. **Examples:** Azure SQL Database, Azure Cosmos DB, Azure Database for PostgreSQL.

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# Windows Enterprise Rollout

## Pilot Machine

A **Pilot Machine** is a test system used to validate an image or deployment process before rolling it out to production. It ensures all configurations, drivers, and updates work as expected in a controlled environment.

## DISM (Deployment Image Servicing and Management)

**DISM** is a Microsoft command-line tool used to service and manage Windows images (.wim) or virtual hard disks (.vhd/.vhdx). It can add, remove, or update Windows features, packages, drivers, and updates both offline and online.

**DISM Commands:** - /Add-Driver - /Get-CurrentEdition - /Get-Drivers - /Get-Driversinfo - /Get-Help /? - /Get-TargetEditions - /Remove-Driver - /Set-ProductKey:

## Sysprep (System Preparation Tool)

**Note:** Sysprep is often used before capturing an image with tools like MDT or SCCM for enterprise deployment. **Sysprep** is a Microsoft utility used to prepare a Windows installation for duplication, auditing, and deployment. It removes system-specific data so that the Windows image can be safely deployed on multiple machines.

### *Sysprep Rules*

- Restarts the activation clock.
- Requires workgroup membership (not domain-joined).
- Uses a product key for all installations.
- Requires an image capture tool (such as DISM or MDT).
- Must use the latest version of Sysprep for the OS.
- Supports only Plug and Play hardware.
- Encrypting File System (EFS) encrypted files will be lost during the process.

## Windows Autopilot

**Windows Autopilot** is a collection of technologies used to set up and pre-configure new devices, getting them ready for productive use. It simplifies device provisioning by allowing IT departments to deploy Windows devices with minimal user interaction, often integrating with Azure AD and Microsoft Intune for management. **More Info:** aka.ms/WindowsAutoPilot