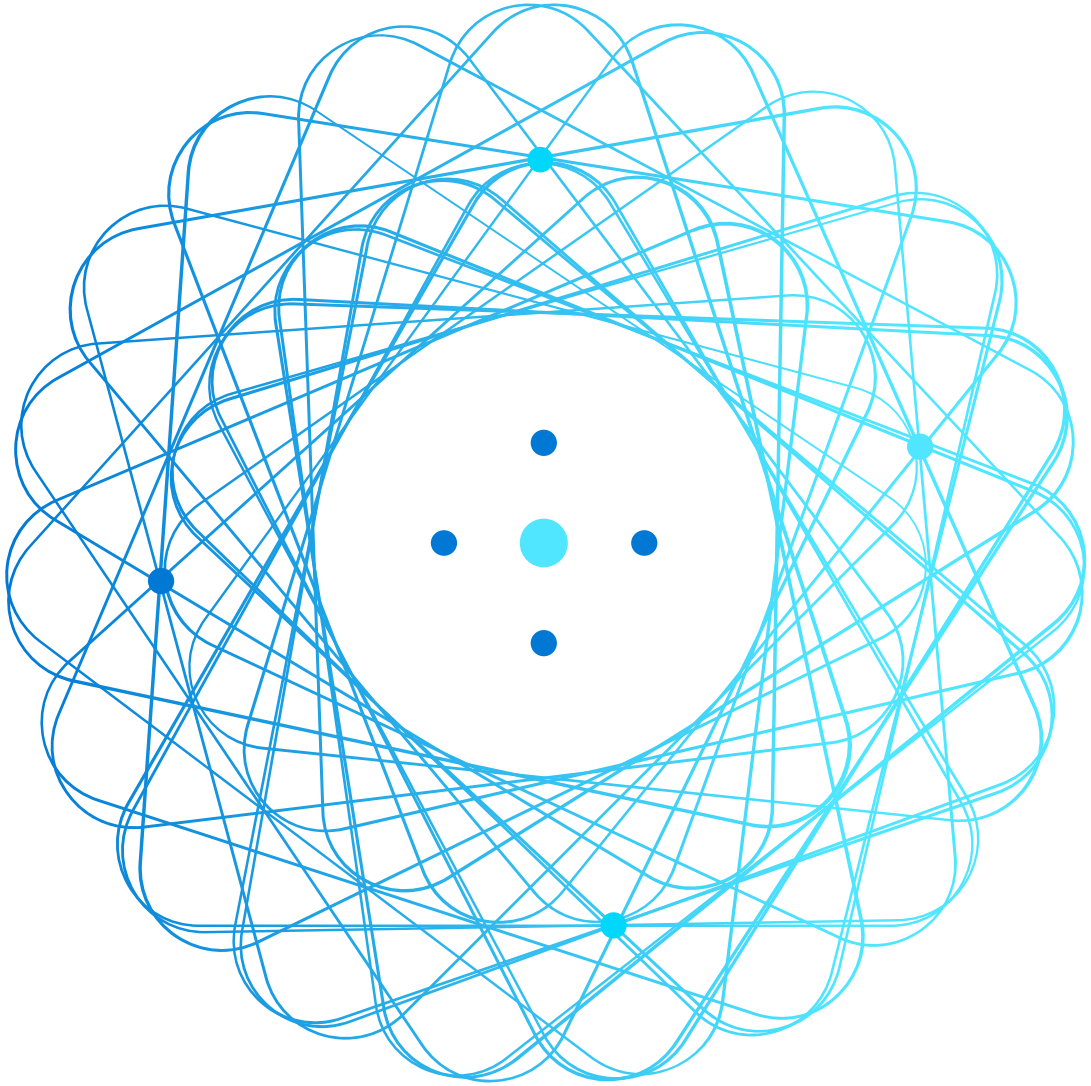
Microsoft Azure

AZ-900T0x Module 02: Core Azure Services



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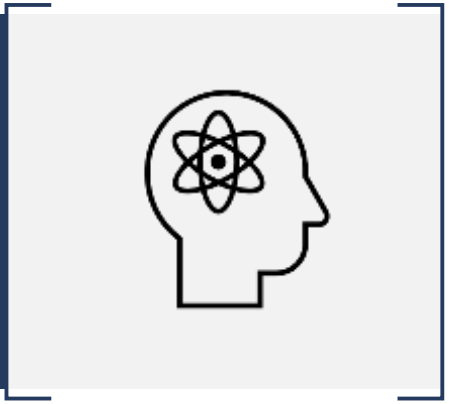
Module Outline



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Module 02 – Outline

You will learn the following concepts:

- **Azure Architectural Components**
  - Regions and Availability Zones
  - Subscriptions and Resource Groups
- **Core Azure Resources**
  - Compute
  - Networking
  - Storage
  - Databases

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Core Azure architectural components

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Core Azure architectural components – Objective Domain

Describe the benefits and usage of:

- Regions and Region Pairs
- Availability Zones
- Azure Resources
- Resource Groups
- Azure Resource Manager
- Subscriptions
- Azure Management Groups

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Regions

Azure offers more global regions than any other cloud provider with 60+ regions representing over 140 countries

- Regions are made up of one or more datacenters in close proximity.
- Provide flexibility and scale to reduce customer latency.
- Preserve data residency with a comprehensive compliance offering.

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Region Pairs

- At least 300 miles of separation between region pairs.
- Automatic replication for some services.
- Prioritized region recovery in the event of outage.
- Updates are rollout sequentially to minimize downtime.

Web Link: https://aka.ms/PairedRegions

Region	Region
North Central US	South Central US
East US	West US
West US 2	West Central US
US East 2	Central US
Canada Central	Canada East
North Europe	West Europe
UK West	UK South
Germany Central	Germany Northeast
South East Asia	East Asia
East China	North China
Japan East	Japan West
Australia Southeast	Australia East
India South	India Central
Brazil South (Primary)	South Central US

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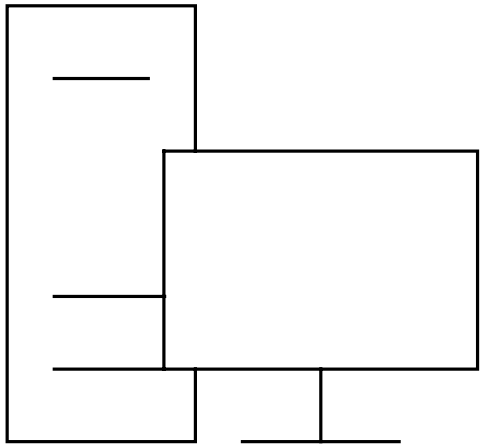
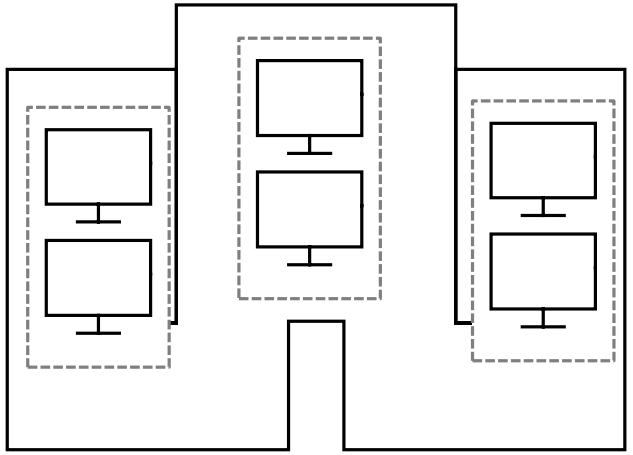
Availability Options

VM SLA
99.9% with Premium Storage



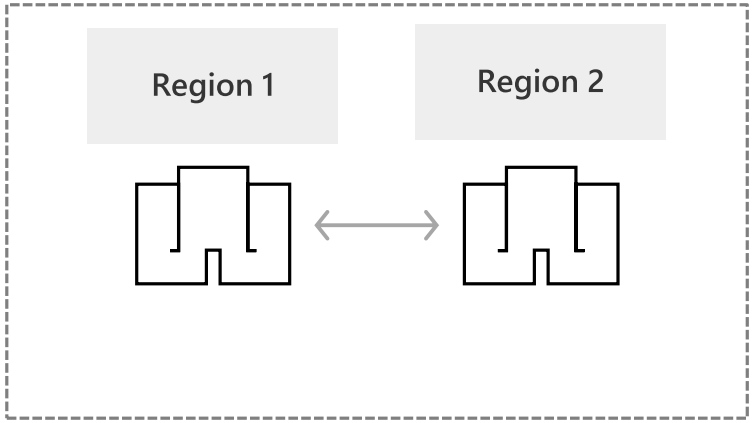
SINGLE VM
Easier lift and shift

VM SLA
99.99%



AVAILABILITY ZONES
Protection from entire datacenter failures

MULTI-REGION DISASTER RECOVERY



REGION PAIRS
Regional protection within Data Residency Boundaries

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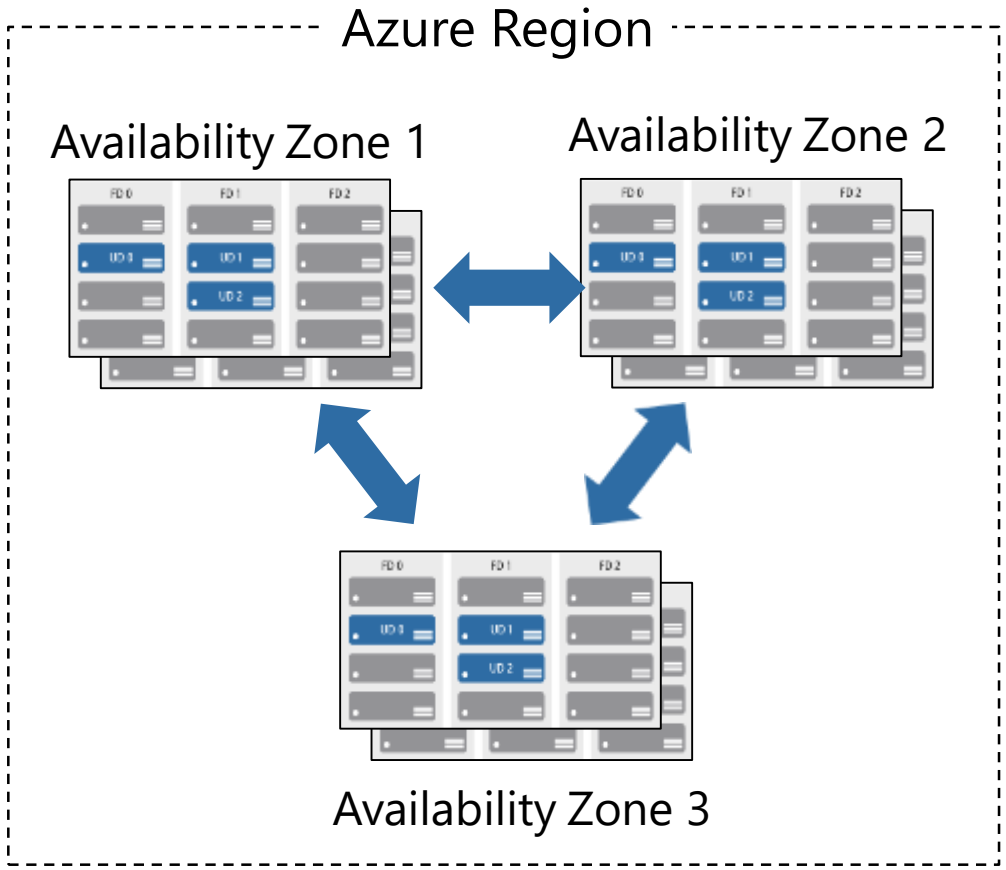
Availability zones

- Provide protection against downtime due to datacenter failure.
- Physically separate datacenters within the same region.
- Each datacenter is equipped with independent power, cooling, and networking.
- Connected through private fiber-optic networks.



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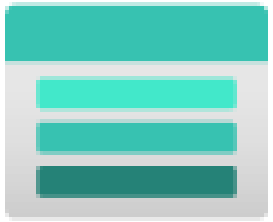
Azure Resources

Azure **resources** are components like storage, virtual machines, and networks that are available to build cloud solutions.

Virtual Machines



Storage Accounts

Virtual Networks

App Services

SQL Databases

Functions

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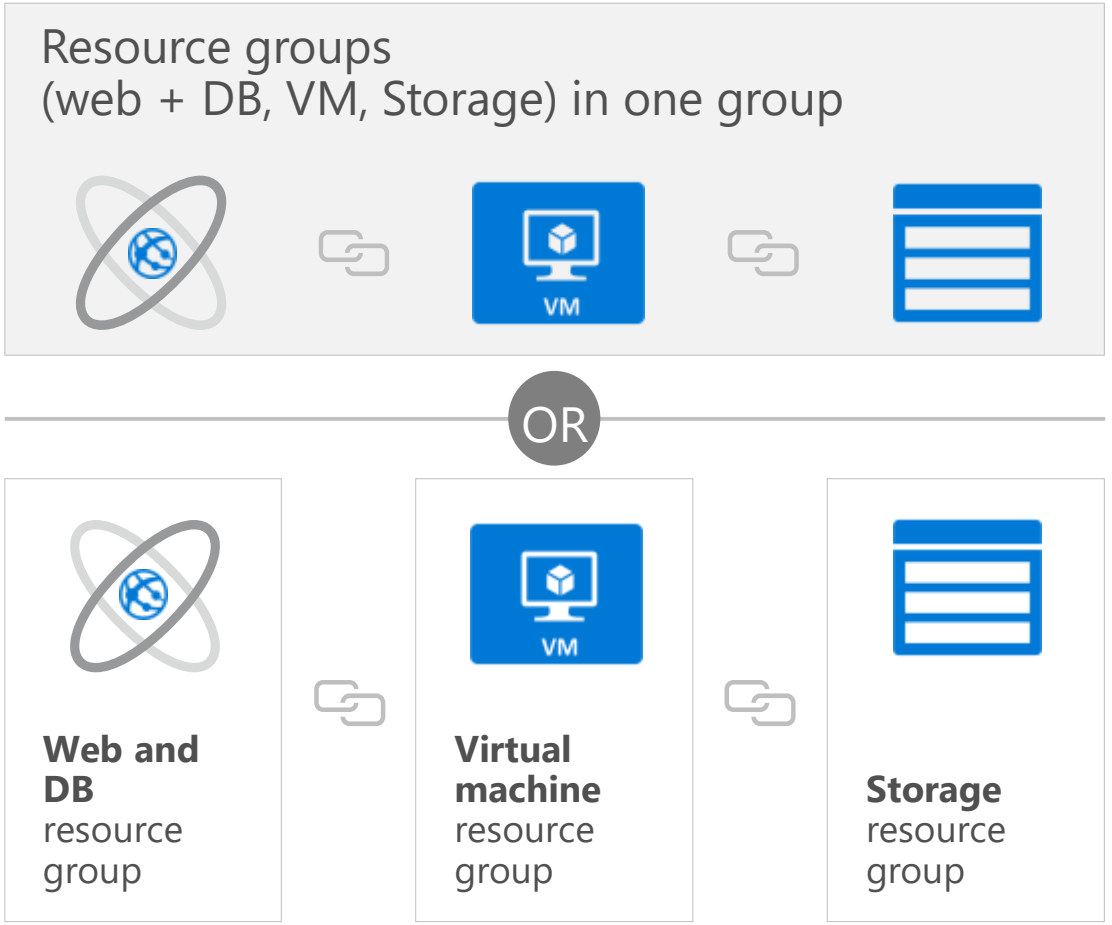
Resource groups

A **resource group** is a container to manage and aggregate resources in a single unit.

- Resources can exist in only one resource group.
- Resources can exist in different regions.
- Resources can be moved to different resource groups.
- Applications can utilize multiple resource groups.



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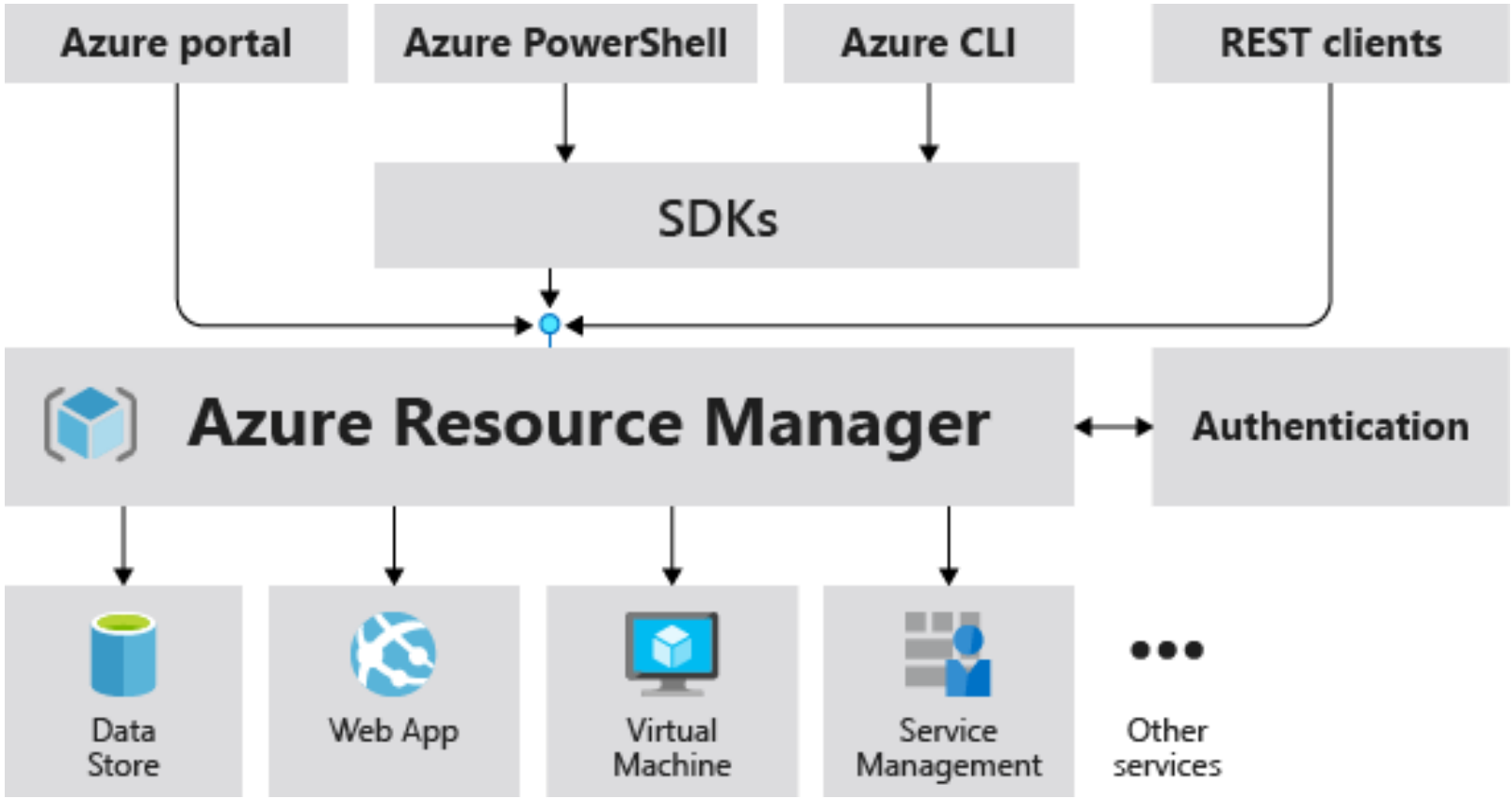
Azure Resource Manager



The **Azure Resource Manager (ARM)** provides a management layer that enables you to create, update, and delete resources in your Azure subscription.

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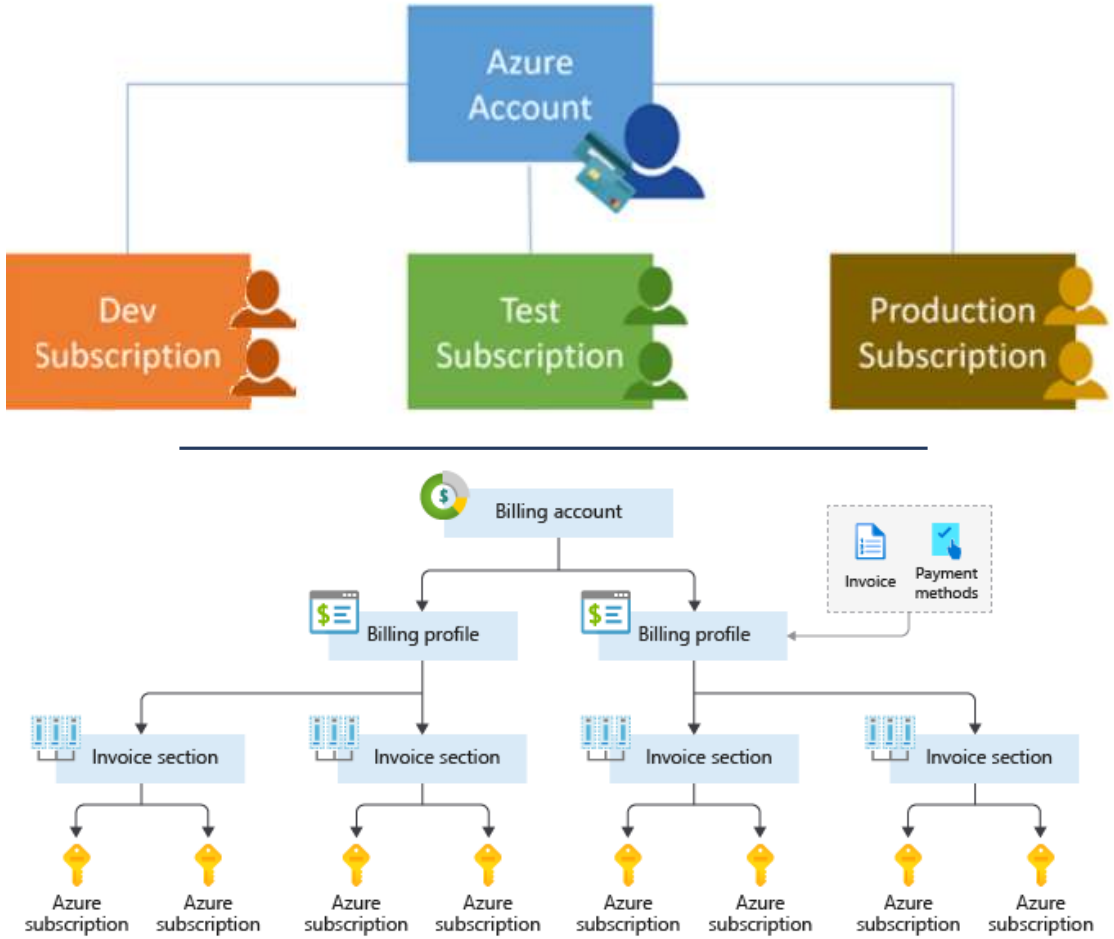
Azure Subscriptions

An Azure subscription provides you with authenticated and authorized access to Azure accounts.

- **Billing boundary:** generate separate billing reports and invoices for each subscription.
- **Access control boundary:** manage and control access to the resources that users can provision with specific subscriptions.



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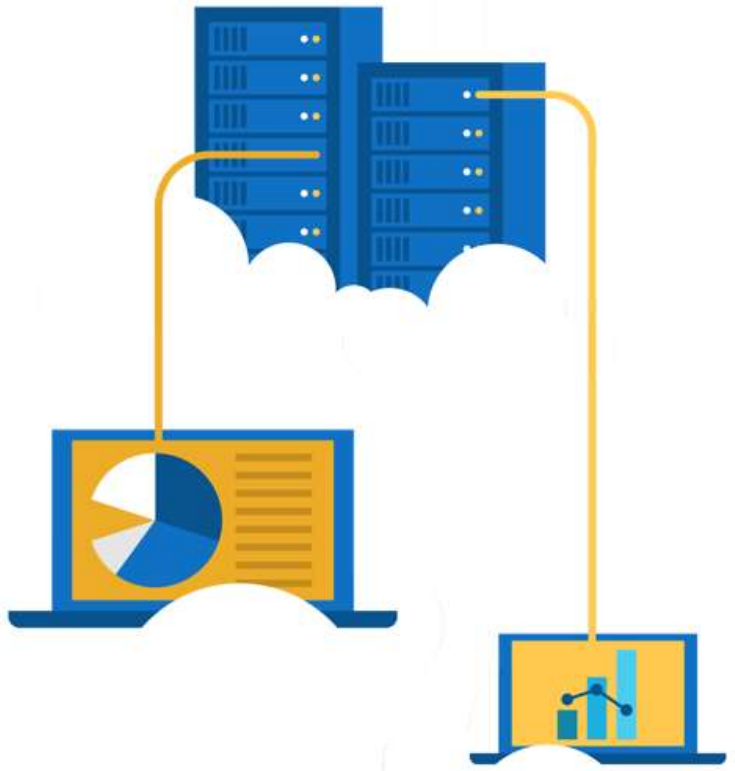
Walkthrough – Explore the Azure Portal

Launch the Azure Portal and have a look at the common components used everyday building cloud solutions

1. Connect to https://portal.azure.com
2. Explore the home screen.
3. Find “All Services” and see what is available.
4. Connect to https://azure.microsoft.com/en-in/pricing/calculator/



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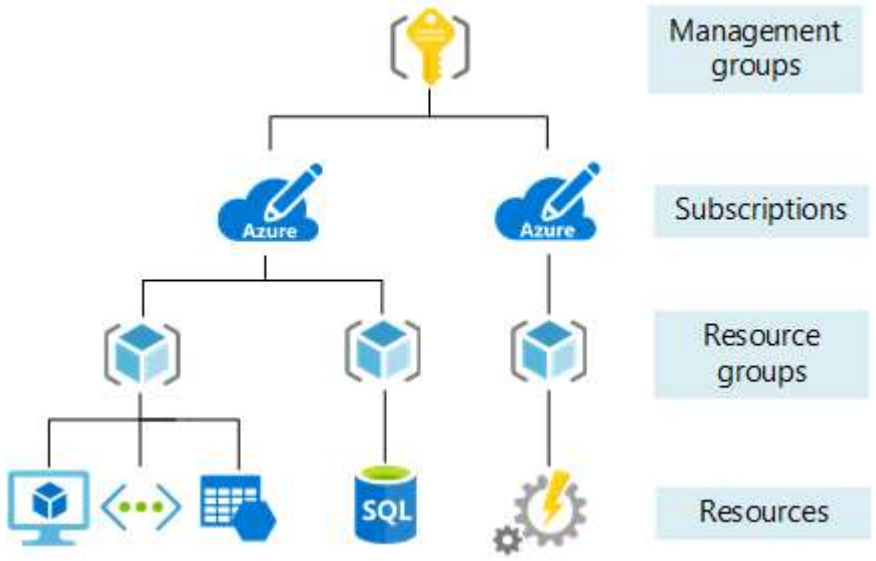
Management Groups

- Management groups can include multiple Azure subscriptions.
- Subscriptions inherit conditions applied to the management group.
- 10,000 management groups can be supported in a single directory.
- A management group tree can support up to six levels of depth.



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Core Azure workload products

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Core Azure Workloads - Objective Domain

Describe the benefits and usage of:

- Virtual Machines, Azure App Services, Azure Container Instances (ACI), Azure Kubernetes Service (AKS), and Windows Virtual Desktop
- Virtual Networks, VPN Gateway, Virtual Network peering, and ExpressRoute
- Container (Blob) Storage, Disk Storage, File Storage, and storage tiers
- Cosmos DB, Azure SQL Database, Azure Database for MySQL, Azure Database for PostgreSQL, and SQL Managed Instance
- Azure Marketplace

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Azure compute services

Azure **compute** is an on-demand computing service that provides computing resources such as disks, processors, memory, networking, and operating systems.

Virtual Machines

App Services

Container Instances

Azure Kubernetes Services (AKS)

Windows Virtual Desktop

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Azure virtual machines

Azure **Virtual Machines (VM)** are software emulations of physical computers.

- Includes virtual processor, memory, storage, and networking.
- IaaS offering that provides total control and customization.

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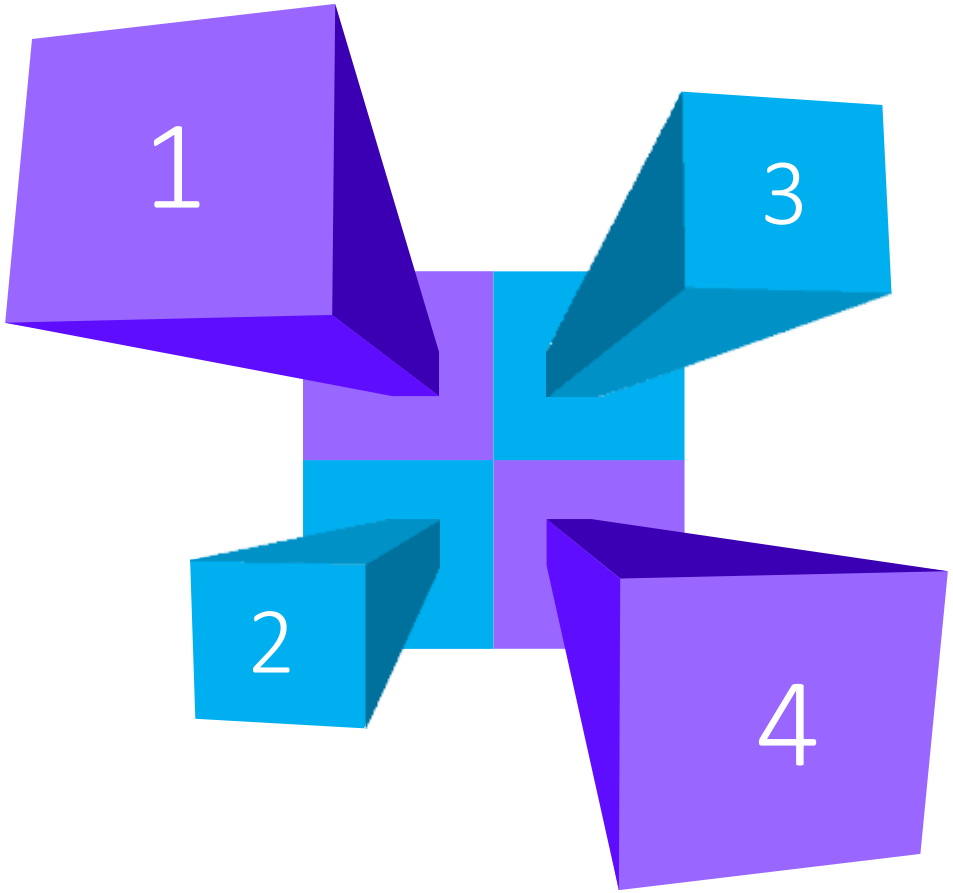
Virtual Machine service

Compute

This is your compute service on the Azure platform. Here you can create compute resources on-demand.



Lifecycle

You can create the machine whenever you want. You can also terminate the machine whenever required.

Operating System

You can choose from operating systems such as Windows Server 2019 and different flavors of Linux.

Workload

You can then install different workloads on the machine.

Azure

Virtual Machines

1	Less management	You don’t manage the infrastructure.
2	Less investment	You only pay for how much you use.
3	Less operations	Don’t need to invest in managing the data center
4	Configure	You can configure various aspects of your virtual machine

Azure virtual machine deployment

Virtual Network	Public IP Address	Network Security Group	OS Disk
Isolated network On the cloud	Allows to contact the machine from the Internet	Filters traffic to and from the machine	Used to store the operating system

Availability options

What are availability sets

- This feature helps to protect your machines against infrastructure level failures.
- An unplanned event wherein the underlying infrastructure fails unexpectedly. The failures could be attributed to network failures , local disk failures or even rack failures
- Planned maintenance events , wherein Microsoft needs to make planned updates to the underlying physical environment. In such cases , a reboot might be required on your virtual machine
- You can increase the availability of your application by making use of availability sets. Each virtual machine that is assigned to the availability set is assigned a separate fault and update domain.

Fault domains

These are used to define the group of virtual machines that share a common source and network switch.

You can create **up to 3 fault domains**

Update domains

These are used to group virtual machines and physical hardware that can be rebooted at the same time.

You can create **up to 20 update domains**

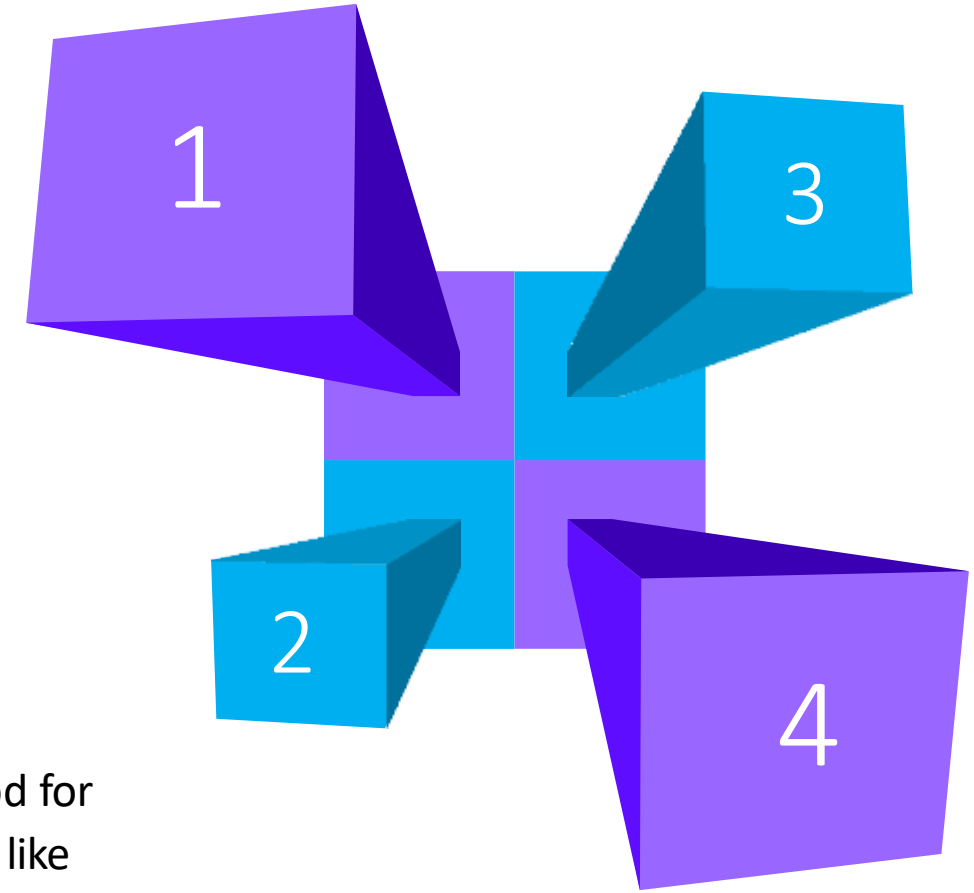
What are availability zones

- This features help provides better availability for your application by protecting them from datacenter failures
- Each Availability zone is a unique physical location in an Azure region
- Each zone comprises of one or more data centers that has independent power, cooling, and networking
- Hence the physical separation of the Availability Zones helps protect applications against data center failures
- Using Availability Zones, you can be guaranteed an availability of 99.99% for your virtual machines. You need to ensure that you have 2 or more virtual machines running across multiple availability zones.

Virtual Machine types

General Purpose

This provides a balanced CPU-to-memory ratio. This is great for test and development environments.



Memory Optimized

This provides a good memory-to-CPU ratio. This is good for database-related workloads.

Compute Optimized

This has a high CPU-to-memory ratio. This is good for medium-sized workloads like web servers.

Storage Optimized

This provides high disk throughput which is ideal for Big Data workloads.

Virtual Machine Disks

- The Virtual machine gets allocated an OS level disk. This is a managed disk.
- The VM could also get a temporary disk. This is not a managed disk.
- The data on the temporary disk could get lost in the case of a maintenance event or if the machine is redeployed.
- You can also add new data disks to the virtual machine.

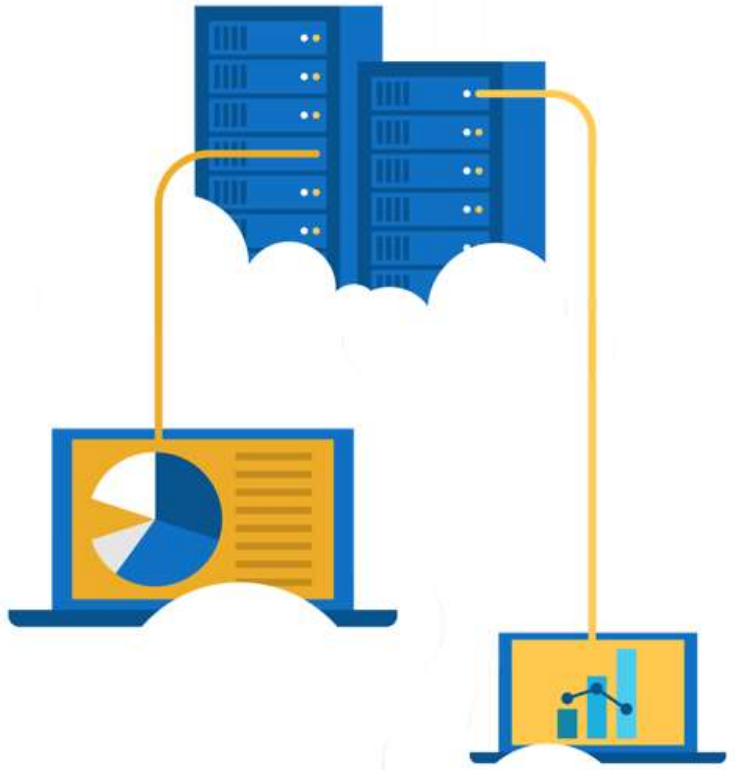
Virtual Machine IP Address

- Private IP addresses allow communication between resources in Azure.
- The private IP address gets allocated from the subnet that the virtual machine is hosted in.
- The public IP address allows Internet resources to communicate inbound into the Azure virtual machine.

Walkthrough – Create a Virtual Machine

Create a virtual machine in the Azure Portal, connect to the virtual machine, install the web server role, and test.

1. Create the virtual machine.
2. Connect to the virtual machine.
3. Install the web server role and test.



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Module 02 Review

Microsoft Learn Modules
(docs.microsoft.com/Learn)

- Microsoft provides more global presence than any other cloud provider with over 60 regions distributed worldwide
- Azure Management tools
- Azure's multiple services (compute)

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