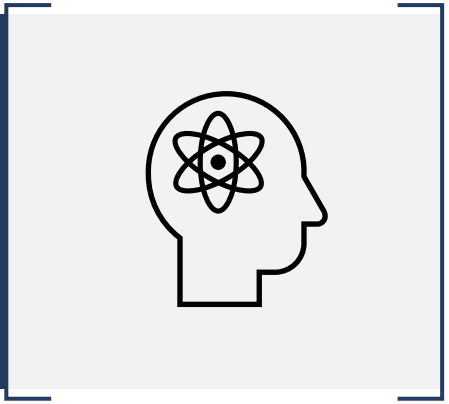
© Copyright Microsoft Corporation. All rights reserved.

FOR USE ONLY AS PART OF VIRTUAL TRAINING DAYS PROGRAM. THESE MATERIALS ARE NOT AUTHORIZED FOR DISTRIBUTION, REPRODUCTION OR OTHER USE BY NON-MICROSOFT PARTIES.

Microsoft

MOD 2: Core Azure Services

Module Outline

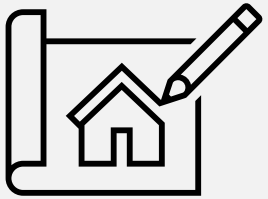


Module 02 – Outline

You will learn the following concepts:

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

Core Azure architectural components



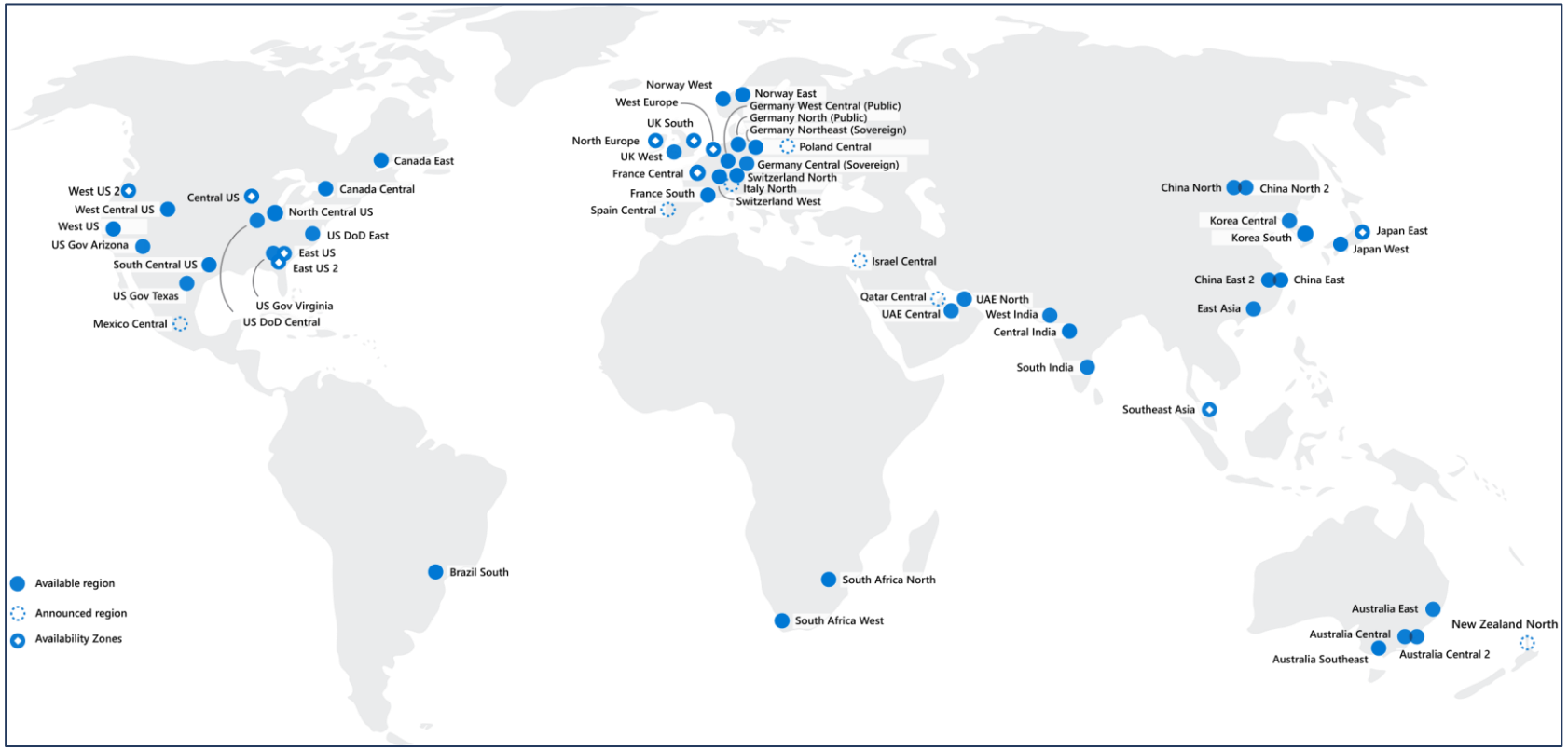
Core Azure architectural components – Objective Domain

Describe the benefits and usage of:

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

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.

Region Pairs

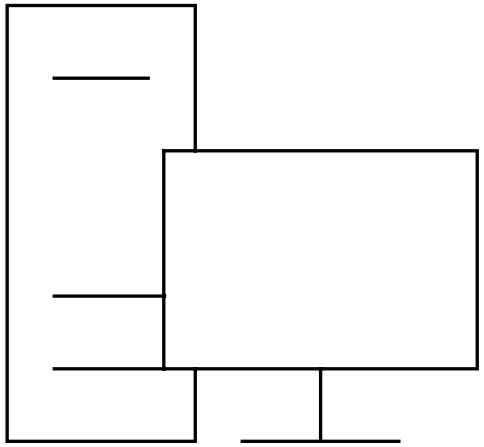
- At least 300 miles of separation between region pairs.
- Automatic replication for some services.
- Prioritized region recovery in the event of outage.
- Updates are rollout sequentially to minimize downtime.

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

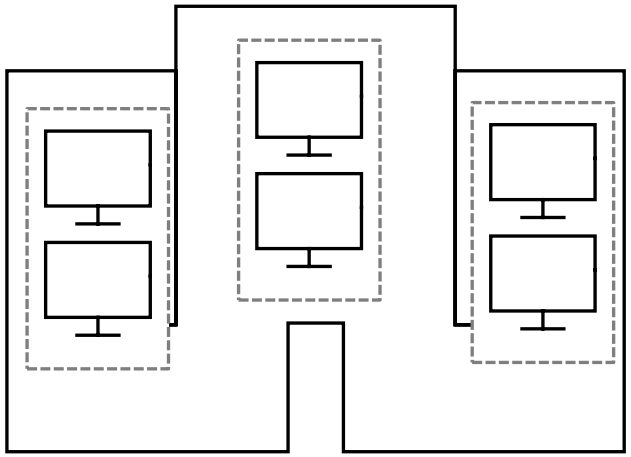
Availability Options

VM SLA
99.9% with Premium Storage



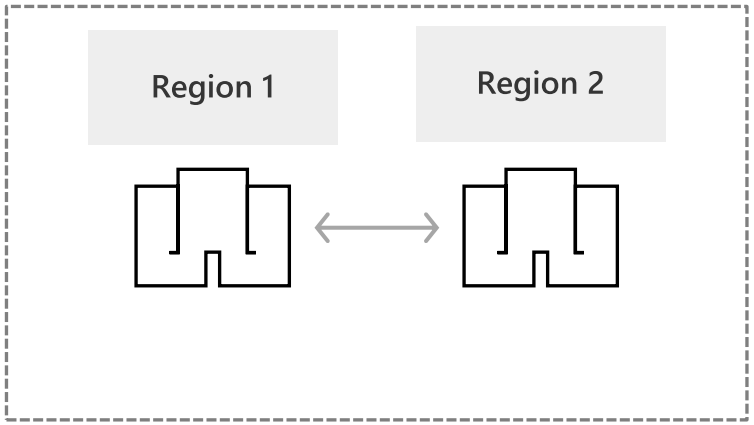
SINGLE VM
Easier lift and shift

VM SLA
99.99%



AVAILABILITY ZONES
Protection from entire datacenter failures

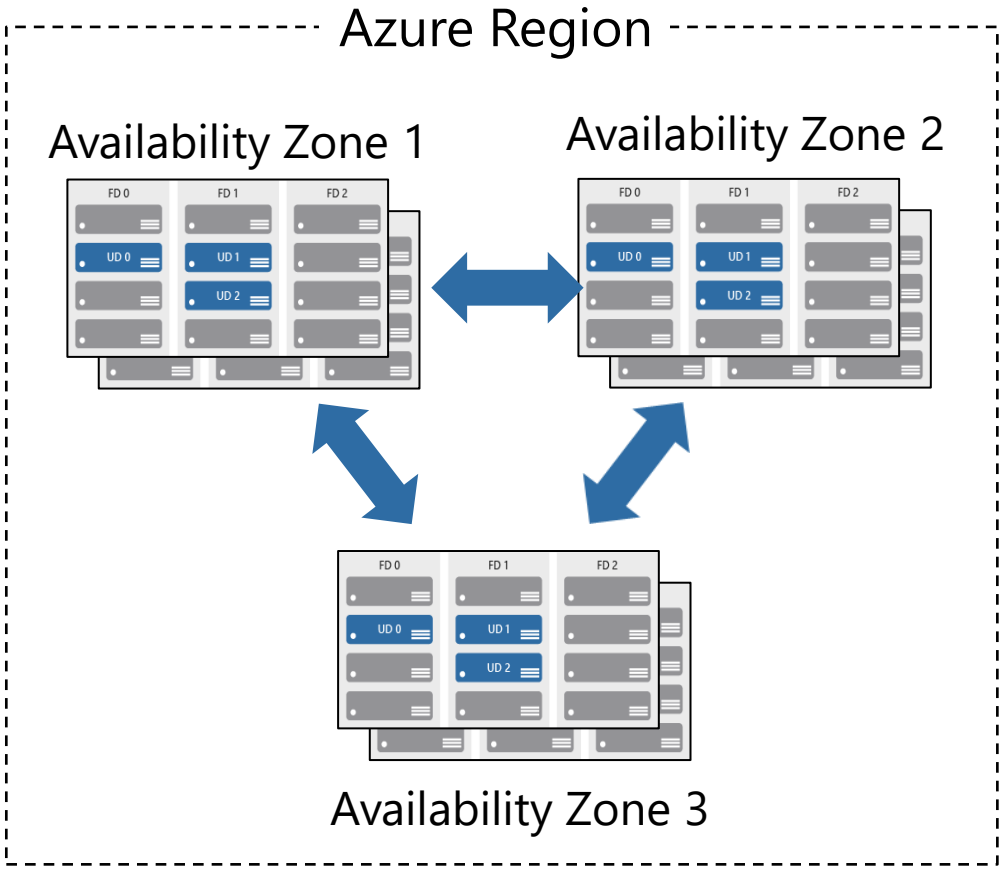
MULTI-REGION DISASTER RECOVERY



REGION PAIRS
Regional protection within Data Residency Boundaries

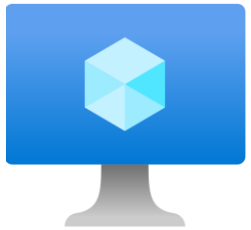
Availability zones

- 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.



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

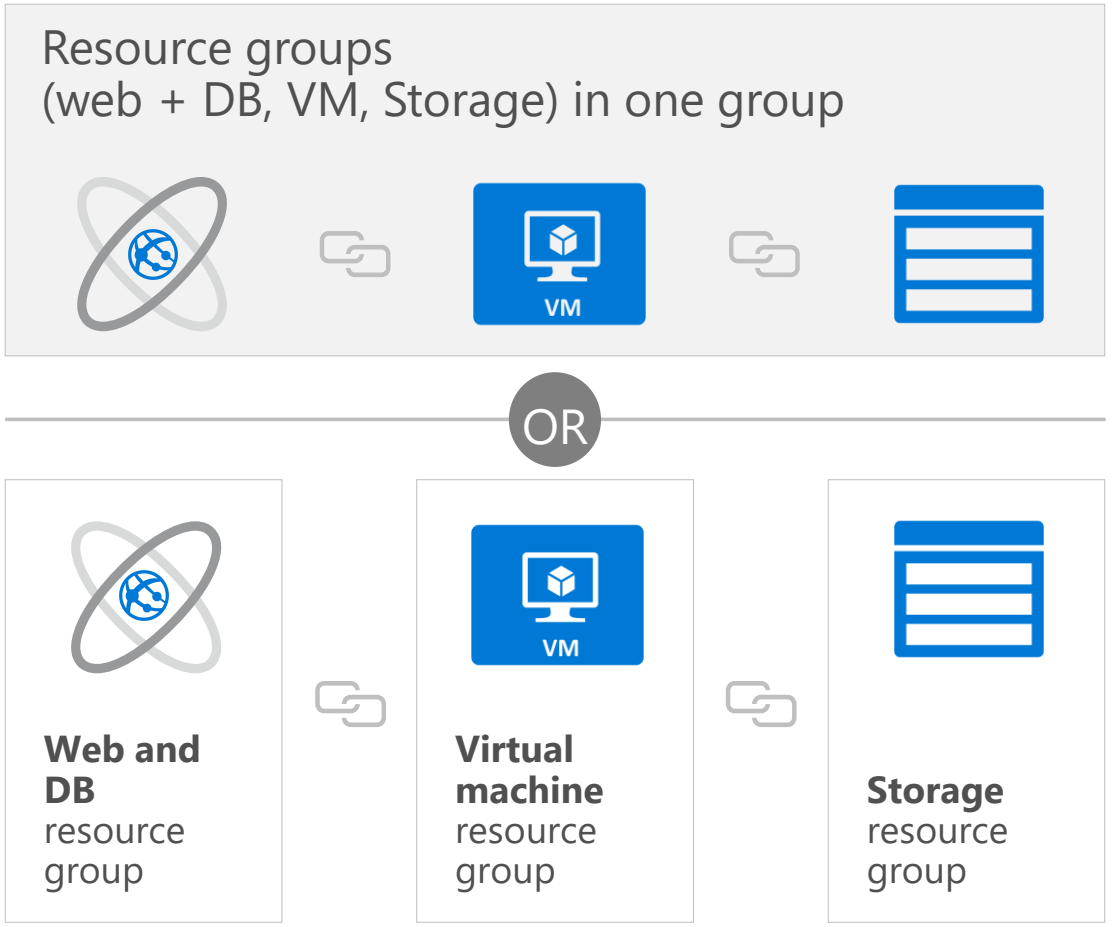
SQL Databases

Functions

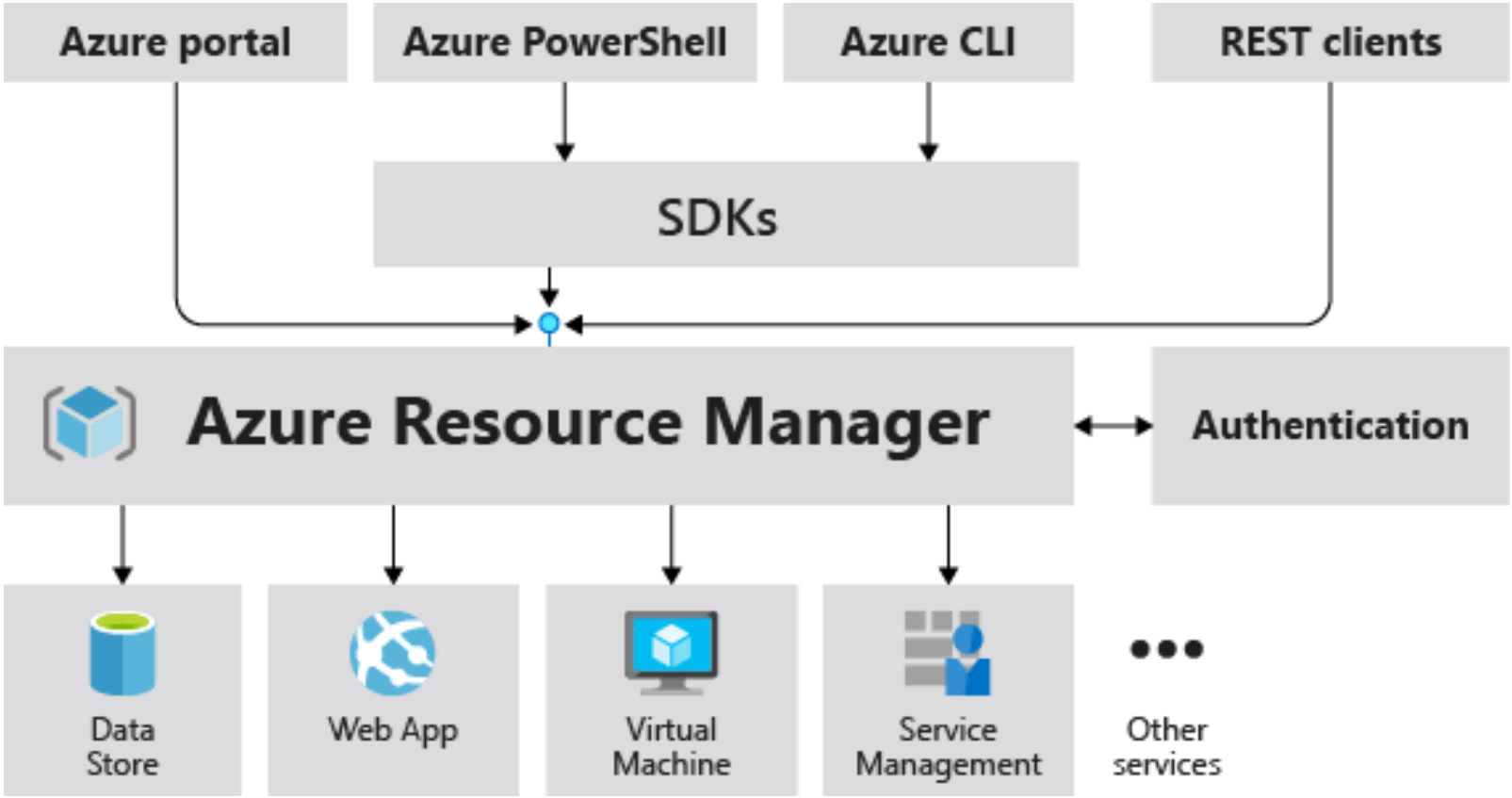
Resource groups

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.



Azure Resource Manager

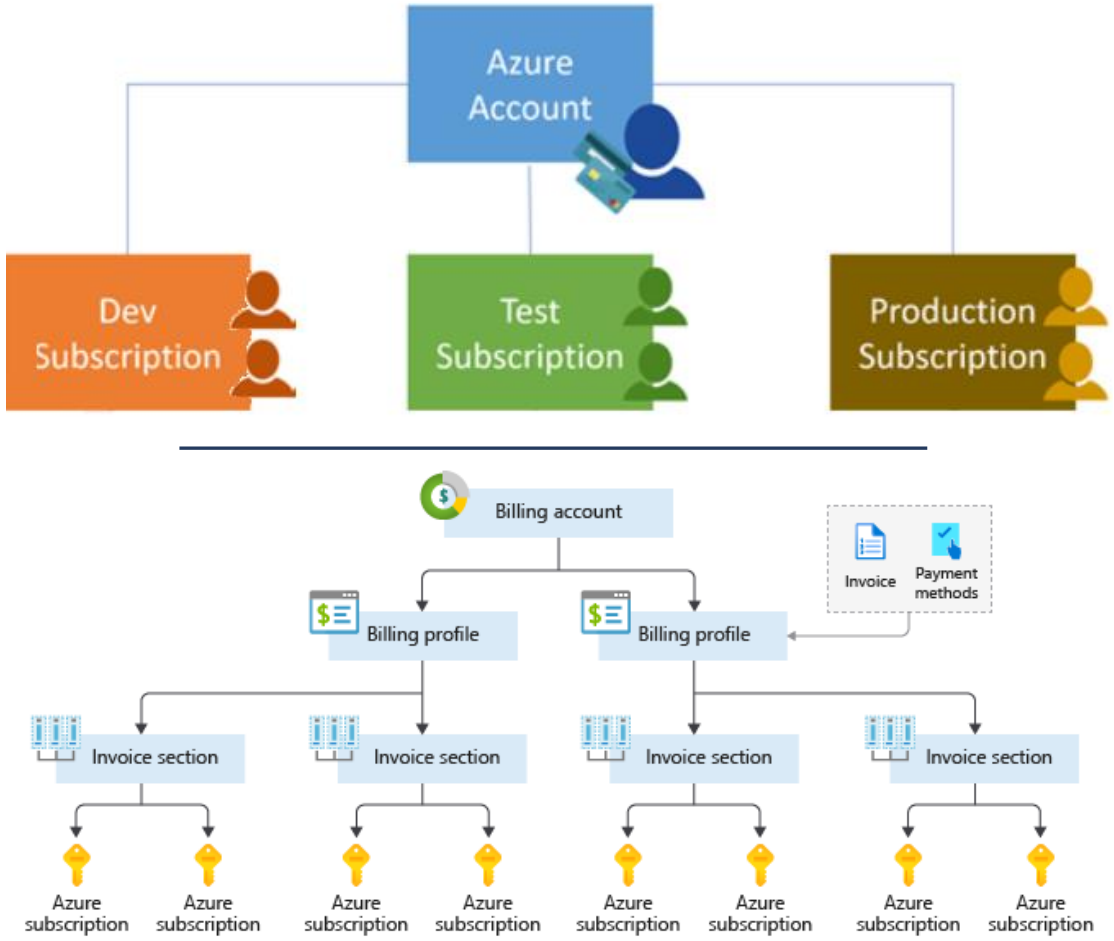


The **Azure Resource Manager (ARM)** provides a management layer that enables you to create, update, and delete resources in your Azure subscription.

Azure Subscriptions

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

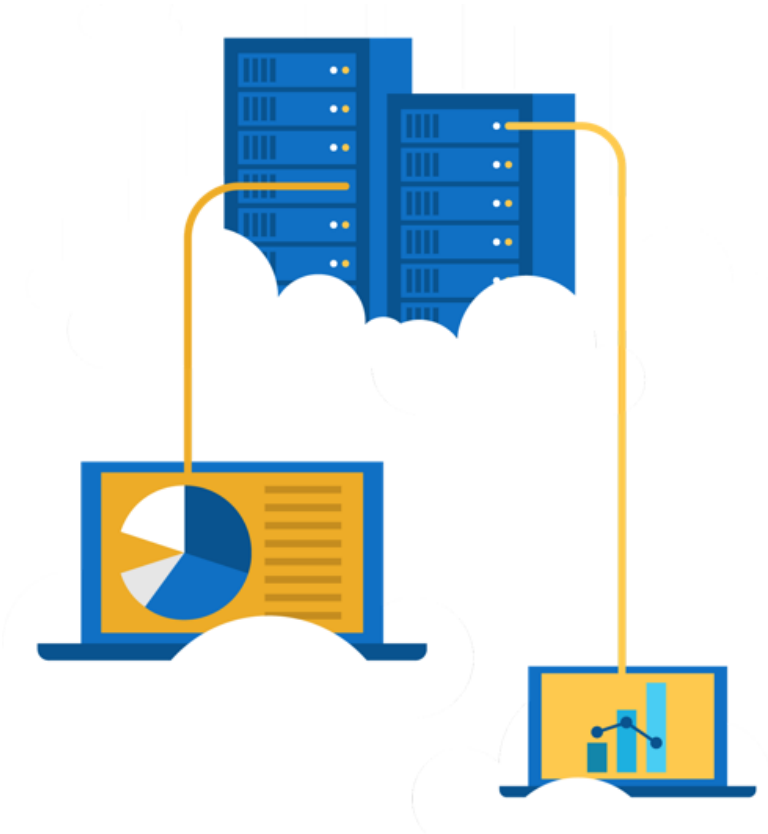
- **Billing boundary:** generate separate billing reports and invoices for each subscription.
- **Access control boundary:** manage and control access to the resources that users can provision with specific subscriptions.



Walkthrough – Explore the Azure Portal

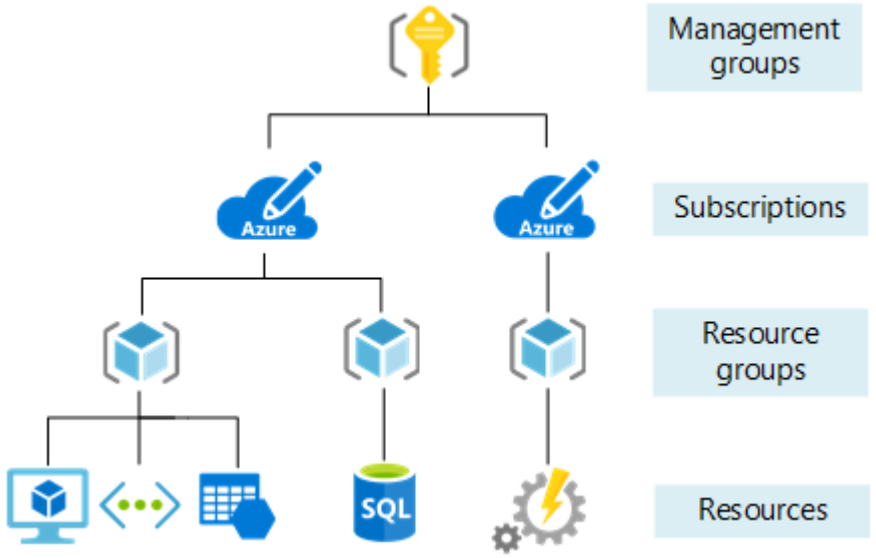
Launch the Azure Portal and have a look at the common components used everyday building cloud solutions

1. Connect to https://portal.azure.com
2. Explore the home screen.
3. Find “All Services” and see what is available.

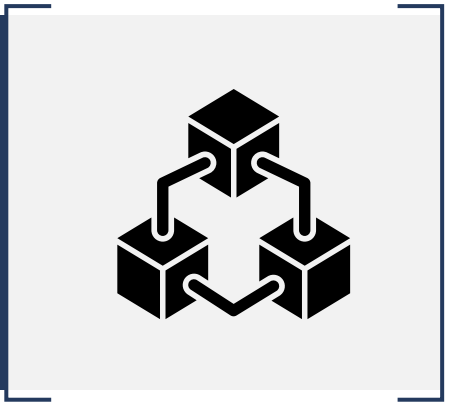


Management Groups

- 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.



Core Azure workload products



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

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

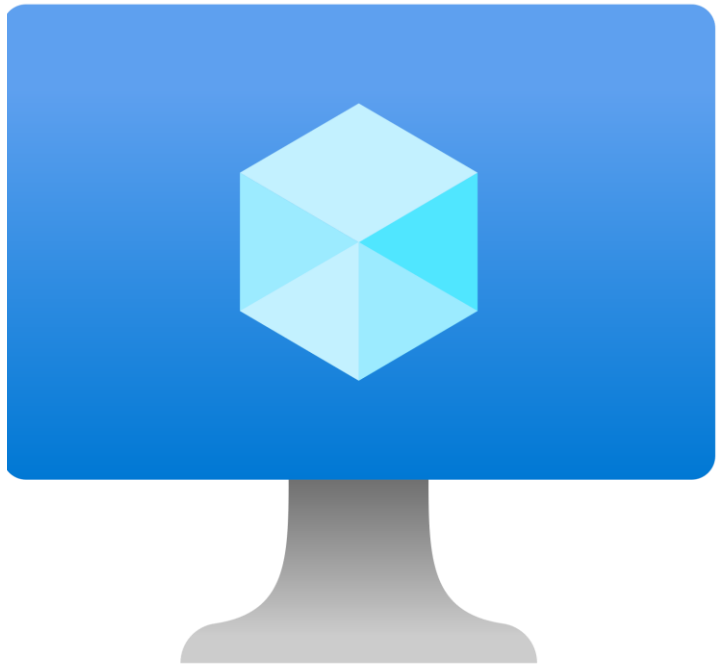
Azure Kubernetes Services (AKS)

Windows Virtual Machines

Azure virtual machines

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

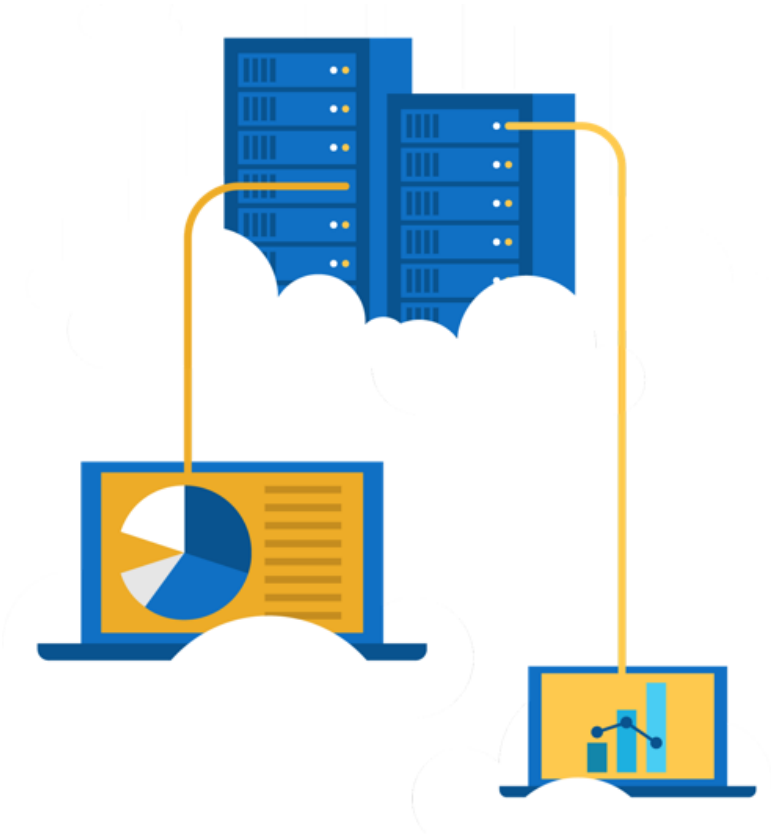
- Includes virtual processor, memory, storage, and networking.
- IaaS offering that provides total control and customization.



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.



Azure App Services

Azure **App Services** is a fully managed platform to build, deploy, and scale web apps and APIs quickly.

- Works with .Net, .NetC Core, Node.js, Java, Phython, or php.
- PaaS offering with enterprise-grade performance, security, and compliance requirements.

Walkthrough – Create an App Service

Create a new Web App by using a Docker image stored in Azure Container Registry.

1. Create a Web App using a Docker image.
2. Test the Web App.

Azure Container Services

Azure **Containers** are a light-weight, virtualized environment that does not require operating system management, and can respond to changes on demand.

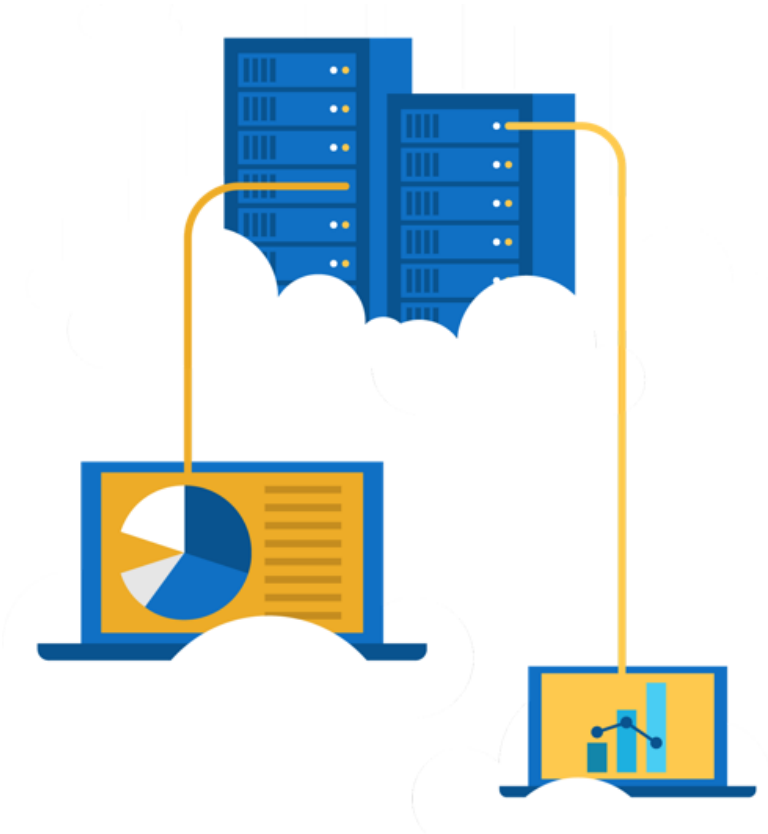
Azure Container Instances: a PaaS offering that runs a container in Azure without the need to manage a virtual machine or additional services.

Azure Kubernetes Service: an orchestration service for containers with distributed architectures and large volumes of containers.

Walkthrough - Deploy Azure Container Instances

Using the Azure Portal create, configure, and deploy a Docker container to an Azure Container Instance. The container will deploy a Hello HTML page.

1. Create a container instance.
2. Deploy the container and test.



Windows Virtual Desktop

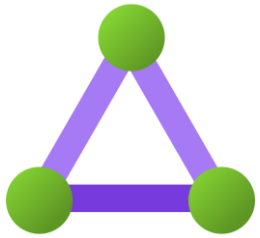
Windows Virtual Desktop is a desktop and app virtualization that runs in the cloud.

- Create a full desktop virtualization environment without having to run additional gateway servers.
- Publish unlimited host pools to accommodate diverse workloads.
- Reduce costs with pooled, multi-session resources.

Azure networking services

Azure Virtual Network (VNet) enables Azure resources to communicate with each other, the internet, and on-premises networks.

Virtual Private Network Gateway (VPN) is used to send encrypted traffic between an Azure virtual network and an on-premises location over the public internet.

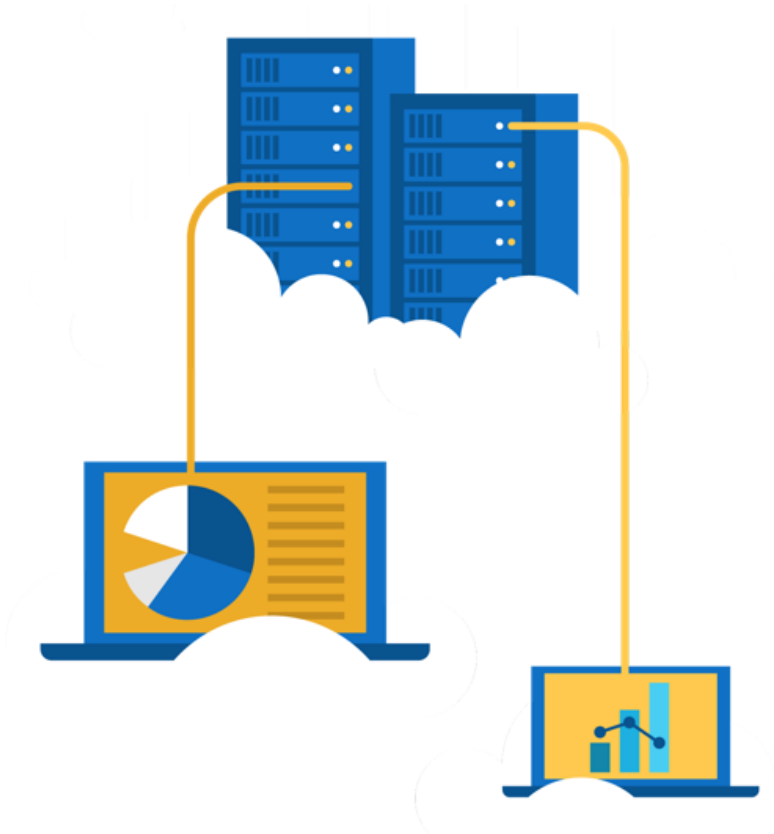


Azure Express Route extends on-premises networks into Azure over a private connection that is facilitated by a connectivity provider.

Walkthrough - Create a virtual network

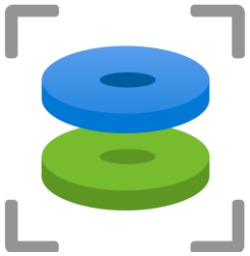
Create a virtual network with two virtual machines and then test connection between the machines.

1. Create a virtual network.
2. Create two virtual machines.
3. Test the connection.



Azure storage services

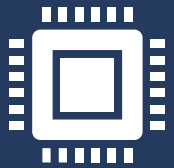
Container storage (blob) is optimized for storing massive amounts of unstructured data, such as text or binary data.



Disk storage provides disks for virtual machines, applications, and other services to access and use.

Azure Files sets up a highly available network file shares that can be accessed by using the standard Server Message Block (SMB) protocol.

Azure storage access tiers

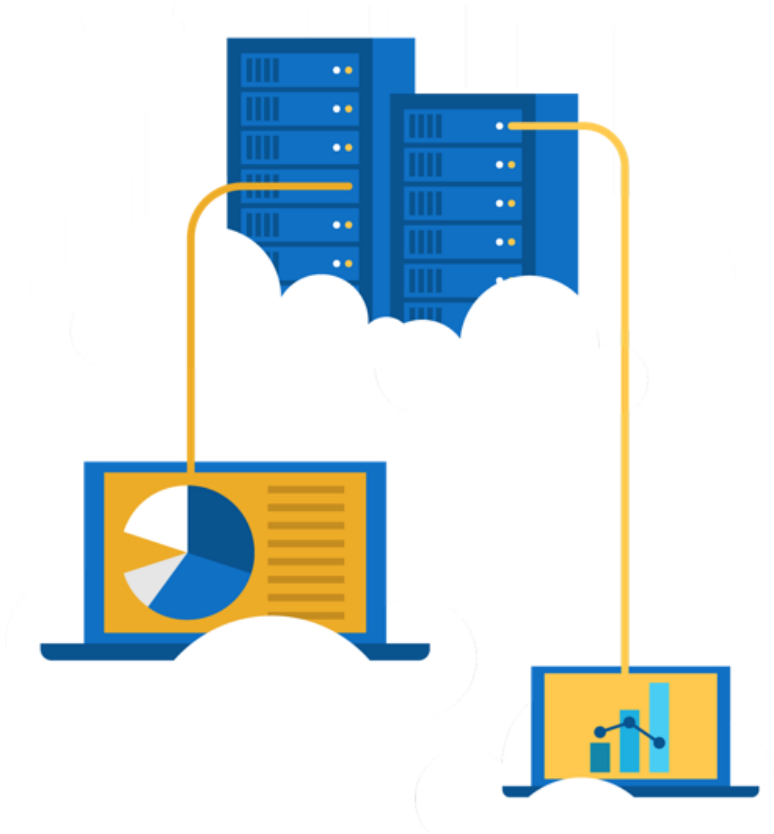
Hot	 Cool	Archive
Optimized for storing data that is accessed frequently.	Optimized for storing data that is infrequently accessed and stored for at least 30 days.	Optimized for storing data that is rarely accessed and stored for at least 180 days with flexible latency requirements.

You can switch between these access tiers at any time.

Walkthrough - Create blob storage

Create a storage account with a blob storage container. Work with blob files.

1. Create a storage account.
2. Work with blob storage.
3. Monitor the storage account.



Azure database services

Azure Cosmos Database is a globally-distributed database service that elastically and independently scales throughput and storage.

Azure SQL Database is a relational database as a service (DaaS) based on the latest stable version of the Microsoft SQL Server database engine.

Azure Database for MySQL is a fully-managed MySQL database service for app developers.

Azure Database for PostgreSQL is a relational database service based on the open-source Postgres database engine.

Azure SQL Managed Instance

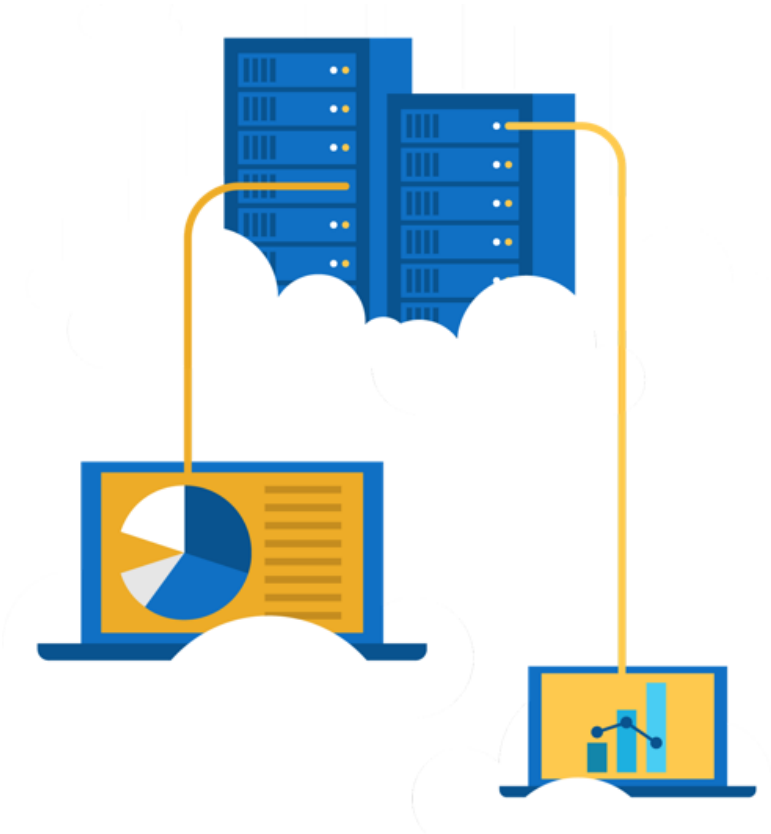
Azure SQL Managed Instance allows existing SQL Server customers to lift and shift their on-premises applications to the cloud with minimal application and database changes.

- Fully managed and evergreen platform as a service.
- Preserves all PaaS capabilities (automatic patching and version updates, automated backups, and high availability)
- Exchange existing licenses for discounted rates on SQL Managed Instance using the Azure Hybrid Benefit

Walkthrough-Create a SQL database

Create a SQL database in Azure and then query the data in that database.

1. Create the database.
2. Query the database.



Explore Azure Marketplace

Azure Marketplace allows customers to find, try, purchase, and provision applications and services from hundreds of leading service providers, which are all certified to run on Azure.

- Open source container platforms.
- Virtual machine and database images.
- Application build and deployment software.
- Developer tools.
- And much more, with 10,000+ listings!

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, networking, storage, and databases)
- Azure Marketplace