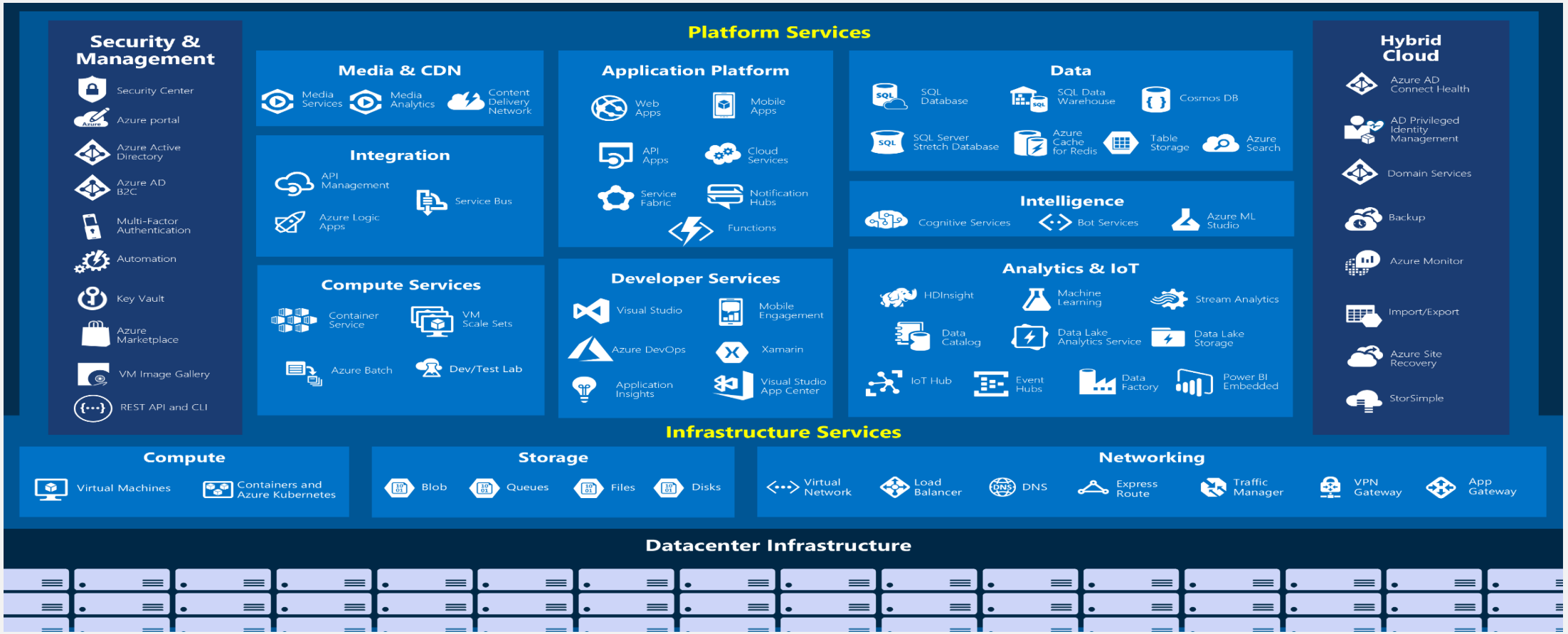
INTRODUCTION

- 90% of Fortune 500 companies run on the Microsoft Cloud?
- Azure is Microsoft's cloud computing platform.
- Azure provides over 100 services that enable you to do a lot of amazing things



AZURE DATACENTRE

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AZURE DATACENTRE

Understand Datacentres and Regions in Azure

Microsoft Azure is made up of datacenters located around the globe

The specific datacenters aren't exposed to end users directly; instead, Azure organizes them into *regions*.

A **region** is a geographical area on the planet containing at least one, but potentially multiple datacenters that are nearby and networked together with a low-latency network. Azure intelligently assigns and controls the resources within each region to ensure workloads are appropriately balanced.

This gives you the flexibility to bring applications closer to your users no matter where they are.

Special Azure regions

Azure has specialized regions that you might want to use when building out your applications for compliance or legal purposes. E.g. US DoD,China East.

UNDERSTAND GEOGRAPHIES IN AZURE

Azure divides the world into *geographies* that are defined by geopolitical boundaries or country borders

- Geographies allow customers with specific data residency and compliance needs to keep their data and applications close.
- Geographies ensure that data residency, sovereignty, compliance, and resiliency requirements are honored within geographical boundaries.
- Geographies are fault-tolerant to withstand complete region failure through their connection to dedicated high-capacity networking infrastructure.

Geographies are broken up into the following areas:

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

UNDERSTAND AVAILABILITY ZONES IN AZURE

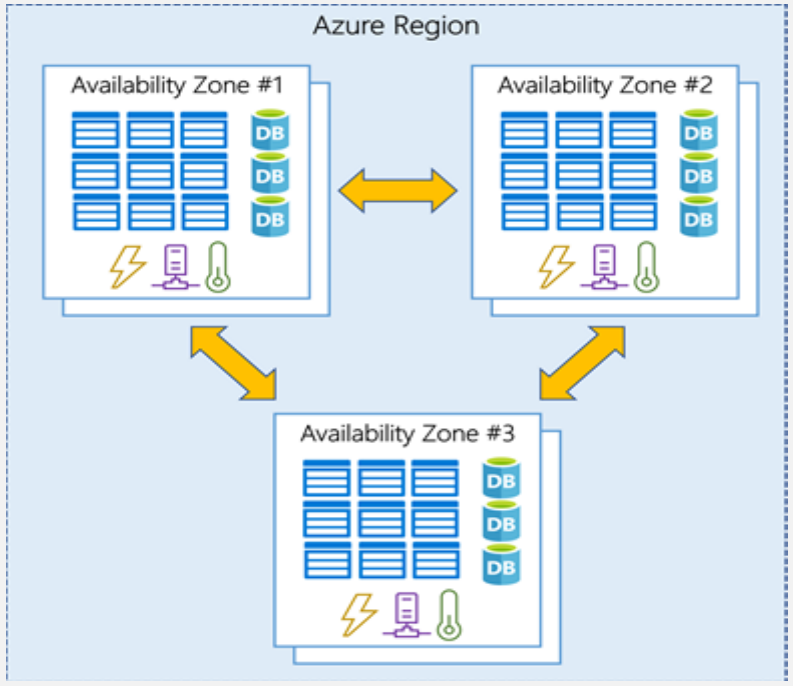
When you are hosting your infrastructure, this requires creating duplicate hardware environments.

Azure helps make your app highly available through *Availability Zones*.

What is an Availability Zone?

Availability Zones are physically separate datacenters within an Azure region.

Each Availability Zone is made up of one or more datacenters equipped with independent power, cooling, and networking. It is set up to be an *isolation boundary*. If one zone goes down, the other continues working. Availability Zones are connected through high-speed, private fiber-optic networks.



Supported regions

Not every region has support for Availability Zones. The following regions have a minimum of three separate zones to ensure resiliency.

- Central US
- East US 2
- West US 2
- West Europe
- France Central
- North Europe
- Southeast Asia

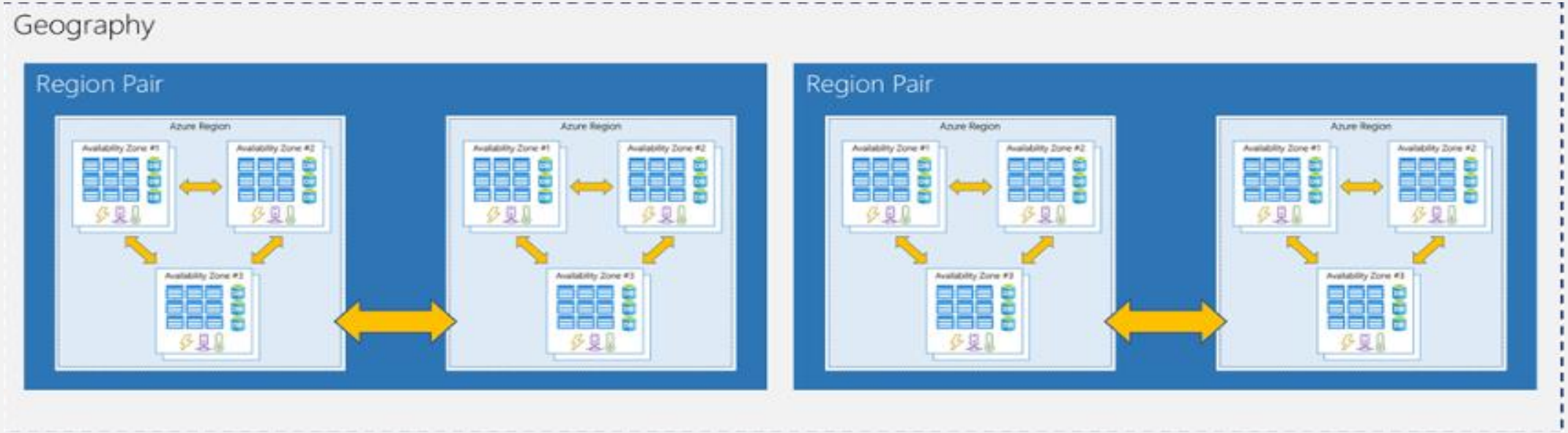
UNDERSTAND REGION PAIRS IN AZURE

Availability zones are created using one or more datacenters, and there is a minimum of three zones within a single region. That's why Azure also creates *region pairs*.

What is a region pair?

- Each Azure region is always paired with another region within the same geography (such as US, Europe, or Asia) at least **300 miles away**.
- This approach allows for the replication of resources (such as virtual machine storage) across a geography that helps reduce the likelihood of interruptions due to events such as natural disasters, civil unrest, power outages, or physical network outages affecting both regions at once.

Examples of region pairs in Azure are West US paired with East US, and SouthEast Asia paired with East Asia.



UNDERSTAND SERVICE-LEVEL AGREEMENTS FOR AZURE

Formal documents called *Service-Level Agreements* (SLAs) capture the specific terms that define the performance standards that apply to Azure.

- SLAs describe Microsoft's commitment to providing Azure customers with specific performance standards.
- There are SLAs for individual Azure products and services.
- SLAs also specify what happens if a service or product fails to perform to a governing SLA's specification.

SLAs for Azure products and services

There are three key characteristics of SLAs for Azure products and services:

- Performance Targets
- Uptime and Connectivity Guarantees
- Service credits

Performance Targets

An SLA defines performance targets for an Azure product or service. The performance targets that an SLA defines are specific to each Azure product and service. For example, performance targets for some Azure services are expressed as uptime guarantees or connectivity rates.

COST AND COMPLEXITY VS. HIGH AVAILABILITY

Availability refers to the time that a system is functional and working. Maximizing availability requires implementing measures to prevent possible service failures.

- As your solution grows in complexity, you will have more services depending on each other. Therefore, you might overlook possible failure points in your solution if you have several interdependent services.

- Most providers prefer to maximize the availability of their Azure solutions by minimizing downtime. However, as you increase availability, you also increase the cost and complexity of your solution.

- Complex solutions can face greater availability challenges
- How critical high-availability is to your requirements will determine how you handle the addition of complexity

UNDERSTAND SERVICE-LEVEL AGREEMENTS FOR AZURE

Uptime and Connectivity Guarantees

A typical SLA specifies performance-target commitments that range from 99.9 percent ("three nines") to 99.999 percent ("five nines"), for each corresponding Azure product or service. These targets can apply to such performance criteria as uptime or response times for services.

SLA %	Downtime per week	Downtime per month	Downtime per year
99	1.68 hours	7.2 hours	3.65 days
99.9	10.1 minutes	43.2 minutes	8.76 hours
99.95	5 minutes	21.6 minutes	4.38 hours
99.99	1.01 minutes	4.32 minutes	52.56 minutes
99.999	6 seconds	25.9 seconds	5.26 minutes

Service Credits

SLAs also describe how Microsoft will respond if an Azure product or service fails to perform to its governing SLA's specification.

MONTHLY UPTIME PERCENTAGE	SERVICE CREDIT PERCENTAGE
< 99.9	10
< 99	25
< 95	100

AZURE PORTAL SERVICES

Compute

Azure provides a range of options for hosting applications and services.

Service name	Service function
Azure Virtual Machines	Windows or Linux virtual machines (VMs) hosted in Azure
Azure Virtual Machine Scale Sets	Scaling for Windows or Linux VMs hosted in Azure
Azure Kubernetes Service	Enables management of a cluster of VMs that run containerized services
Azure Service Fabric	Distributed systems platform. Runs in Azure or on-premises
Azure Batch	Managed service for parallel and high-performance computing applications
Azure Container Instances	Run containerized apps on Azure without provisioning servers or VMs
Azure Functions	An event-driven, serverless compute service

Networking

Linking compute resources and providing access to applications is the key function of Azure networking

Service name	Service function
Azure Virtual Network	Connects VMs to incoming Virtual Private Network (VPN) connections
Azure Load Balancer	Balances inbound and outbound connections to applications or service endpoints
Azure VPN Gateway	Accesses Azure Virtual Networks through high-performance VPN gateways
Azure DNS	Provides ultra-fast DNS responses and ultra-high domain availability
Azure Content Delivery Network	Delivers high-bandwidth content to customers globally
Azure DDoS Protection	Protects Azure-hosted applications from distributed denial of service (DDOS) attacks
Azure Traffic Manager	Distributes network traffic across Azure regions worldwide
Azure ExpressRoute	Connects to Azure over high-bandwidth dedicated secure connections
Azure Network Watcher	Monitors and diagnoses network issues using scenario-based analysis
Azure Firewall	Implements high-security, high-availability firewall with unlimited scalability

AZURE PORTAL SERVICES

Storage

These services all share several common characteristics:
•**Durable** and highly available with redundancy and replication.
•**Secure** through automatic encryption and role-based access control.
•**Scalable** with virtually unlimited storage.
•**Managed**, handling maintenance and any critical problems for you.
•**Accessible** from anywhere in the world over HTTP or HTTPS.

Service name	Service function
Azure Blob storage	Storage service for very large objects, such as video files or bitmaps
Azure File storage	File shares that you can access and manage like a file server
Azure Queue storage	A data store for queuing and reliably delivering messages between applications
Azure Table storage	A NoSQL store that hosts unstructured data independent of any schema

Web

Having a great web experience is critical in today's business world. Azure includes first-class support to build and host web apps and HTTP-based web services. The Azure services focused on web hosting include:

Artificial Intelligence

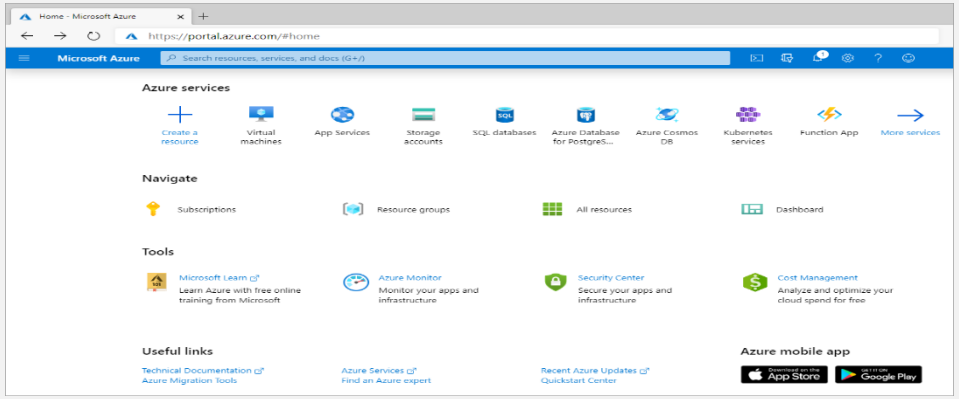
Artificial Intelligence, in the context of cloud computing, is based around a broad range of services, the core of which is Machine Learning. Machine Learning is a data science technique that allows computers to use existing data to forecast future behaviors, outcomes, and trends. Using machine learning, computers learn without being explicitly programmed.

DevOps

DevOps (Development and Operations) brings together people, processes, and technology, automating software delivery to provide continuous value to your users. Azure DevOps Services allows you to create *build* and *release* pipelines that provide continuous integration, delivery, and deployment for your applications.

AZURE PORTAL

The Azure portal is a public website that you can access with any web browser.



Azure PowerShell

Azure PowerShell is a module that you can install for Windows PowerShell or PowerShell Core, which is a cross-platform version of PowerShell that runs on Windows, Linux, or macOS.

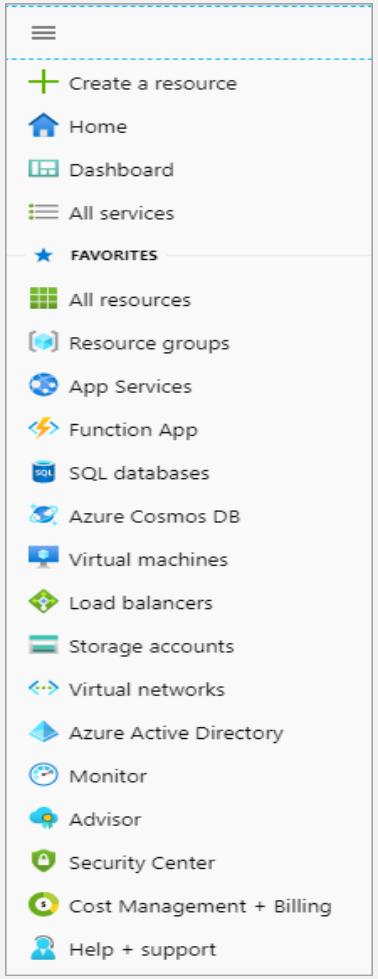
Azure CLI

Azure CLI is a cross-platform command-line program that connects to Azure and executes administrative commands on Azure resources. *Cross-platform* means that it can be run on Windows, Linux, or macOS.

Azure Cloud Shell

Azure Cloud Shell is an interactive, authenticated, browser-accessible shell for managing Azure resources. It provides the flexibility of choosing the shell experience that best suits the way you work, either Bash or PowerShell.

AZURE PORTAL



Resource panel

In the left-hand sidebar of the portal is the resource panel, which lists the main resource types. Note that Azure has more resource types than just those shown. The resources listed are part of your *favorites*.

What is the Azure Marketplace?

The *Azure Marketplace* is often where you start when creating new resources in Azure. The Marketplace allows customers to find, try, purchase, and provision applications and services from hundreds of leading service providers, all certified to run on Azure.

Directory and subscription

On the **Directory + subscription** pane, you can change between subscriptions. Here, you can change your subscription or change to another directory.

Notifications

Selecting the bell icon displays the **Notifications** pane. This pane lists the last actions that have been carried out, along with their status.

Settings

Select the **gear** icon to change the Azure portal settings. These settings include:

Default view when you first sign in

Color and contrast themes

Language and regional format

AZURE PORTAL

Help pane

Select the **question mark** icon to show the **Help** pane. Here you choose from several options, including:
Help + Support
What's new
Azure roadmap
Launch guided tour
Keyboard shortcuts
Show diagnostics
Privacy statement

CREATE AN AZURE ACCOUNT

What is the Azure free account?

The Azure free account includes free access to popular Azure products for 12 months, $200 USD credit to spend for the first 30 days, and access to more than 25 products that are always free.

Azure purchasing options

With flexible purchasing options, you can choose the option that works best for you. Use one of the following three ways to buy Azure:

Azure.com: Buying directly through Azure.com is the fastest and easiest way for organizations of all sizes to get started with Azure. You can manage your Azure deployments and usage yourself and get a monthly bill from Microsoft for the services used.

Microsoft representative: Buying Azure through a Microsoft representative is intended for large organizations or customers who already work with one. You'll also manage your Azure deployments and usage yourself and get a monthly bill from Microsoft for the services used.

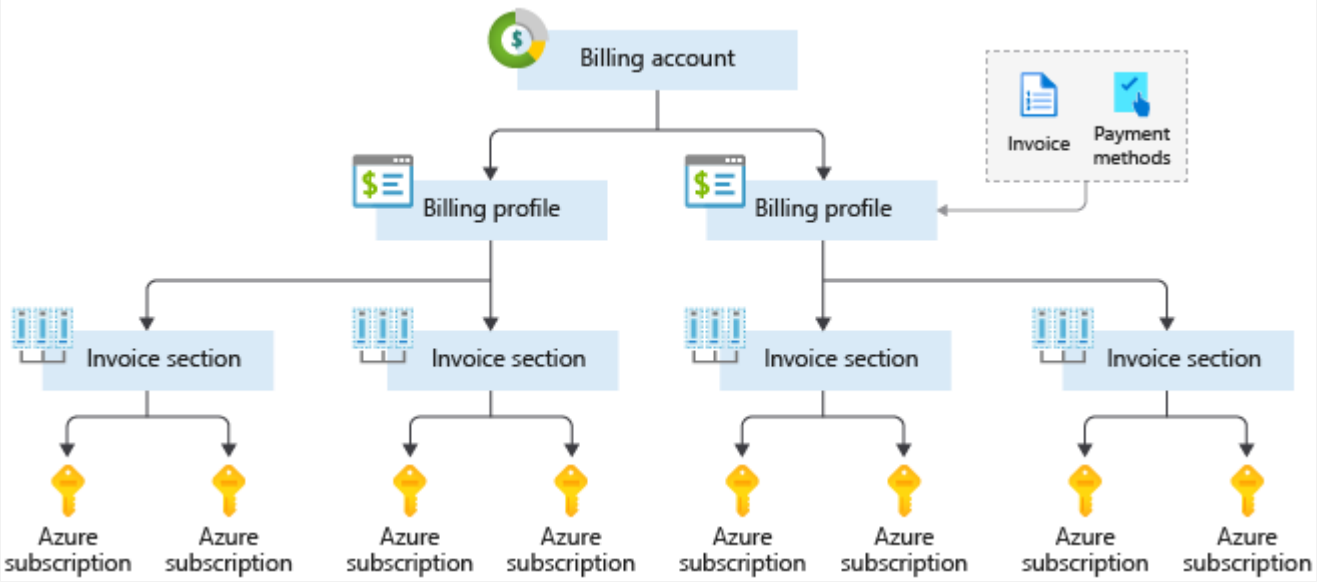
Microsoft partner: If you buy Azure as a managed service through your partner, your partner will provide you with access to Azure, manage your billing, and provide support.

UNDERSTAND AZURE BILLING

Subscription limits: Subscriptions are bound to some hard limitations. For example, the maximum number of Express Route circuits per subscription is 10. Those limits should be considered as you create subscriptions on your account. If there is a need to go over those limits in particular scenarios, then you might need additional subscriptions.

Customize billing to meet your needs

If you have multiple subscriptions, you can organize them into invoice sections. Each invoice section is a line item on the invoice that shows the charges incurred that month. For example, you might need a single invoice for your organization but want to organize charges by department, team, or project.



AZURE SUPPORT OPTIONS

Azure offers customers reactive and proactive technical support. Choose the support plan that best meet your needs. You can purchase the support plan on the Azure website or Azure portal. If you are working with a Microsoft representative or partner, you can purchase a support plan from them. Microsoft also provides support plans that cover Azure, Office 365 and Dynamics 365. Talk to your Microsoft representative or partner for more details.

	Developer	Standard	Professional Direct
Best for	Non-critical workloads	Production workloads	Business-critical workloads
Reactive technical support	1 business day response	1-hour response for critical cases	1-hour response + priority tracking of critical cases
Proactive technical support	Not applicable	Not applicable	Access to a pool of technical experts

AZURE SUPPORT OPTIONS

Azure community support

Ask questions, get answers, and connect with Microsoft engineers and community experts.

Channel	Description
Azure Knowledge Center	The Azure Knowledge Center is a searchable database that contains answers to common support questions.
Microsoft Tech Community	Get support by reading responses to Azure technical questions from Microsoft's developers and testers.
Stack Overflow	You can review answers to questions from the development community.
Server Fault	Review community responses to questions about System and Network Administration in Azure.
Azure Feedback Forums	Read ideas and suggestions for improving Azure made by Azure users.
Twitter	Tweet @AzureSupport to get answers and support from the official Microsoft Azure Twitter channel.

DEMO

https://docs.microsoft.com/en-gb/learn/modules/tour-azure-portal/4-exercise-work-with-blades