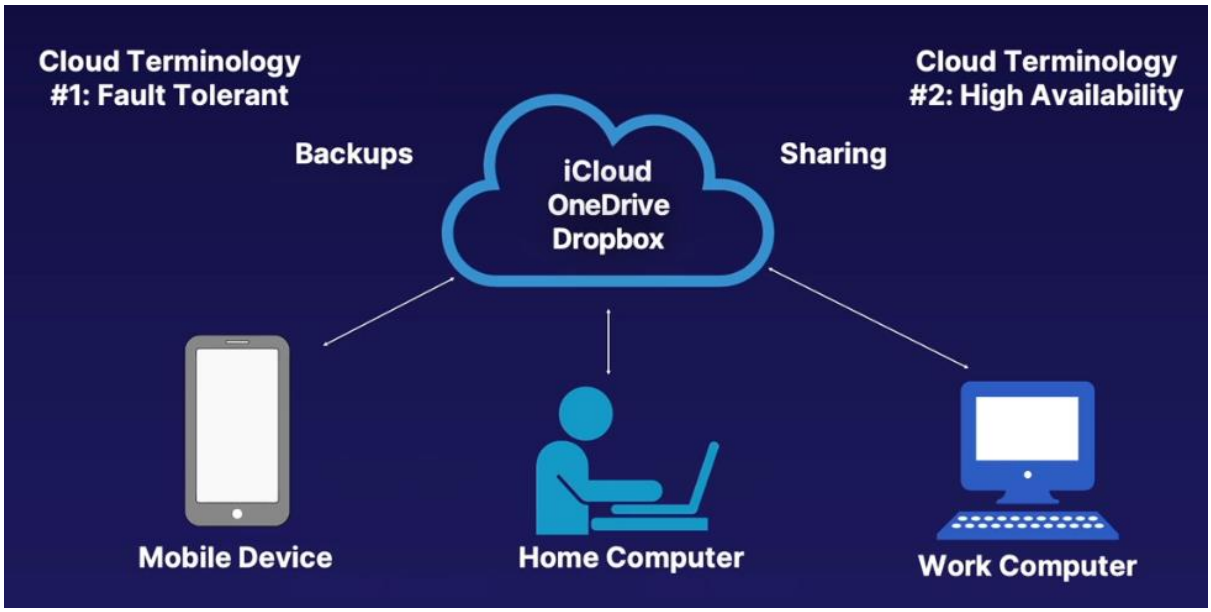
Introduction to Azure

Cloud Terminology

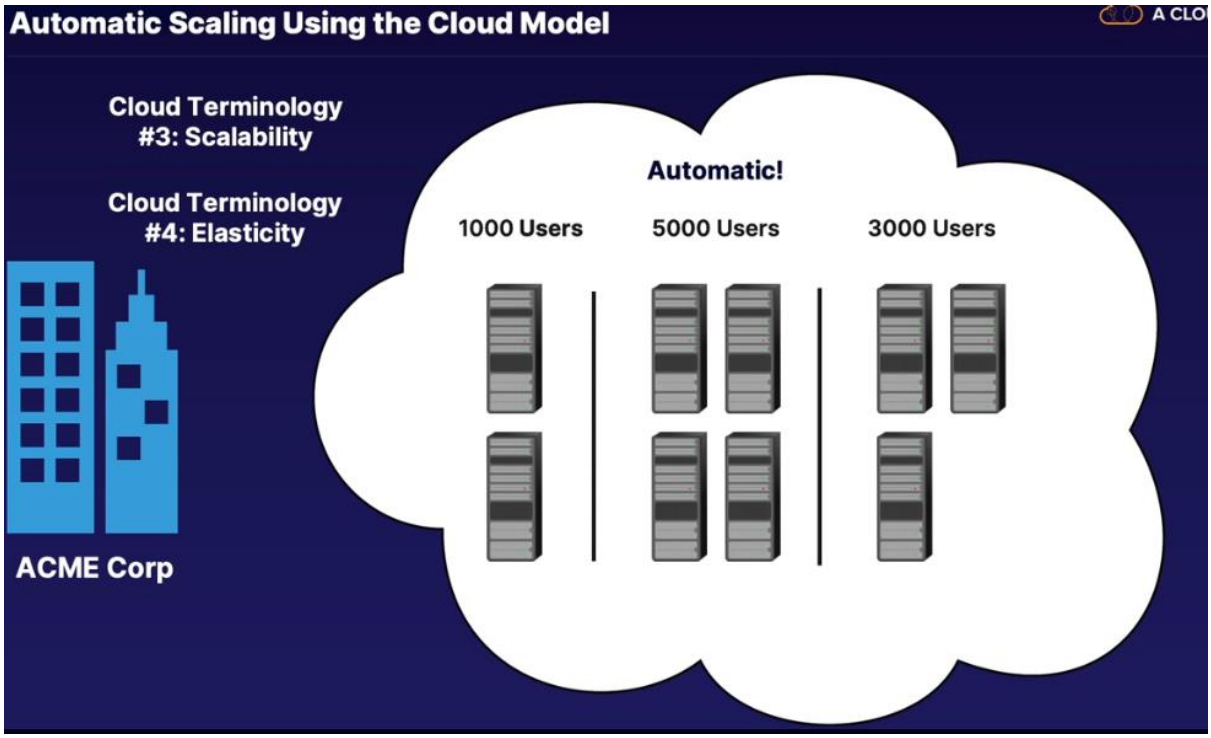
Fault tolerance

High Availability



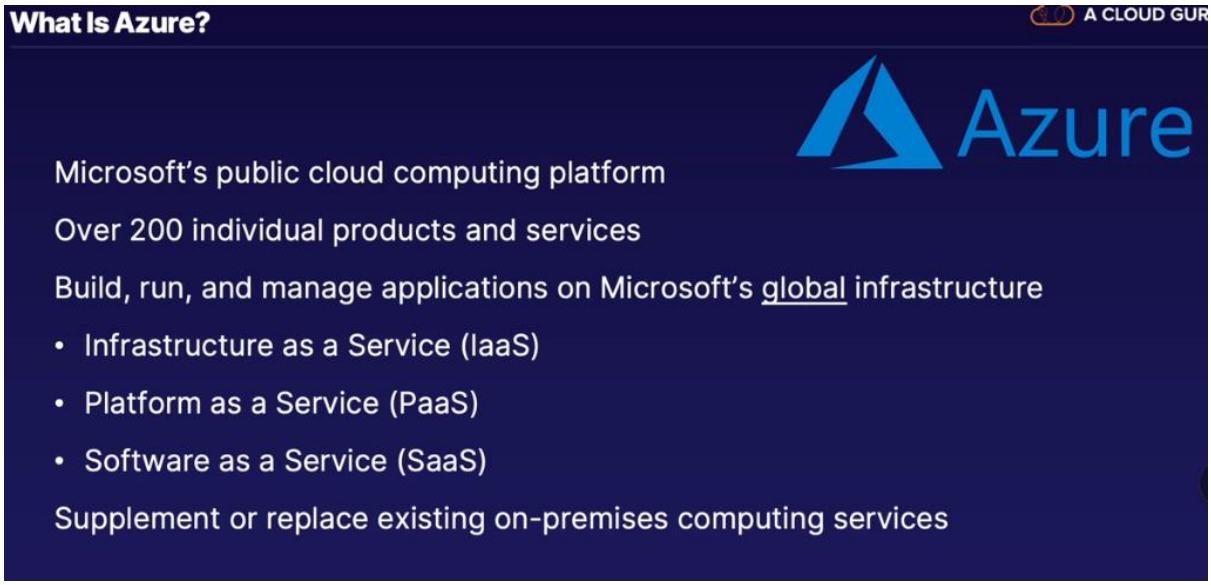
Scalability

Elasticity

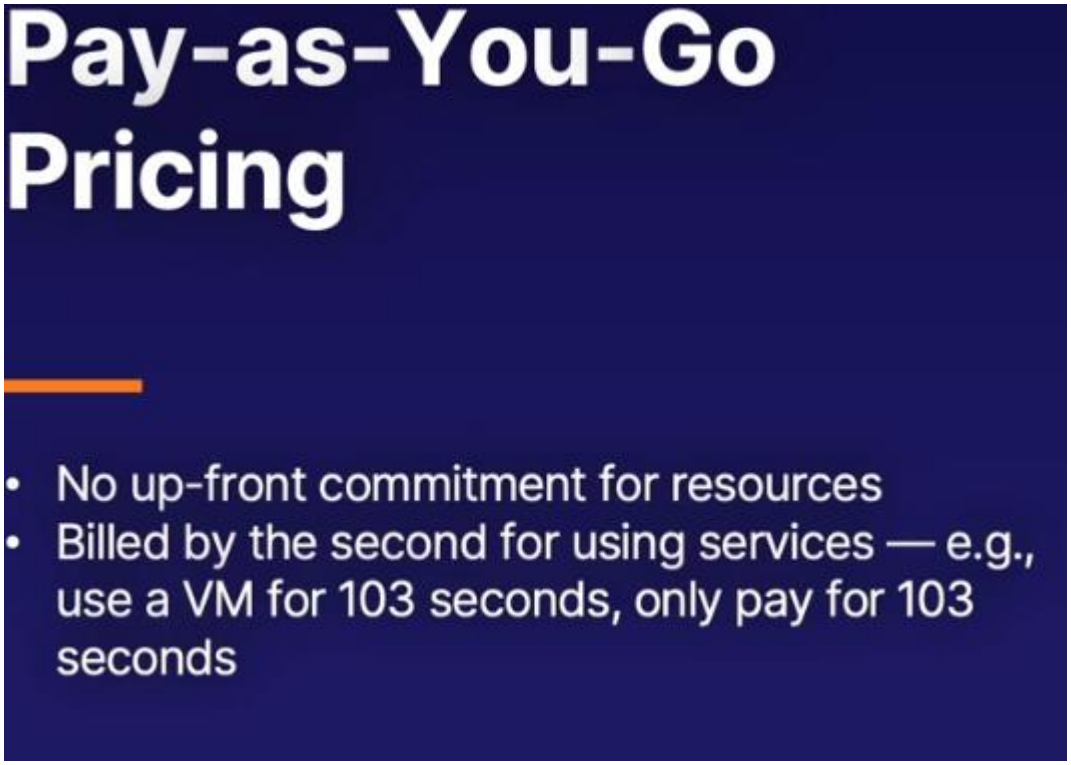


 # Chapter 2

Microsoft Azure



Cloud computing power is a Pay as you go service



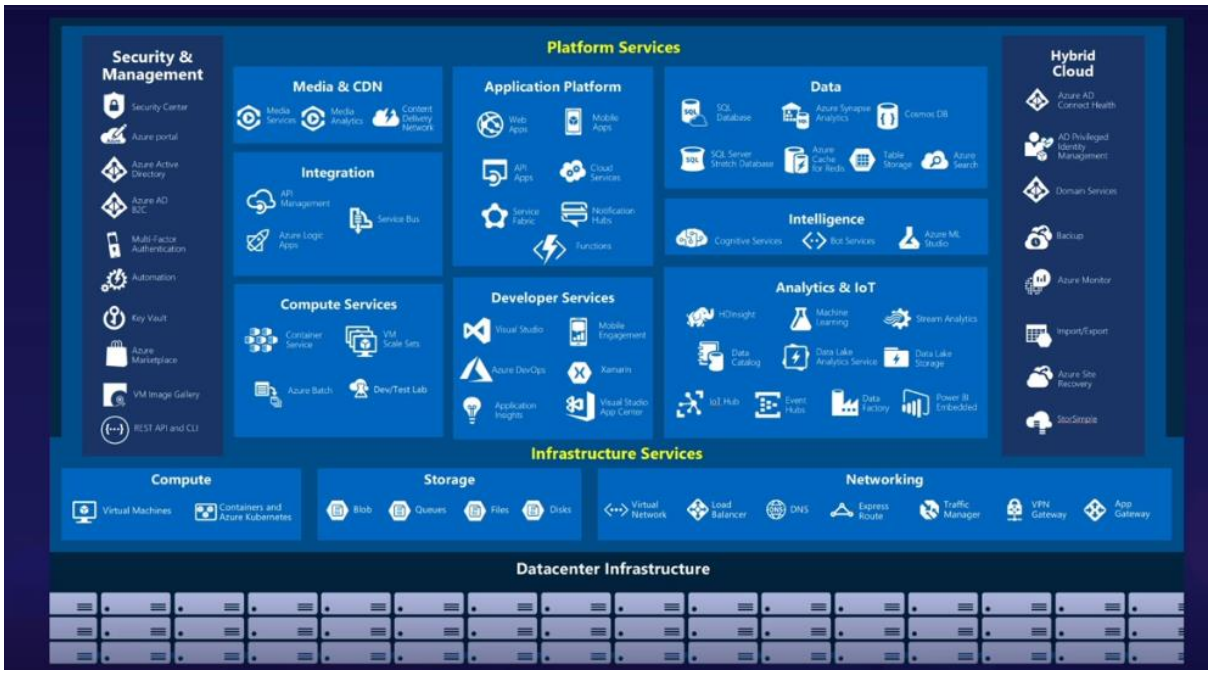
Availability and Regions

Region	**Group of datacenters in a single geographic location.**	**Central US, South India**
Availability Zone	**One of several unique locations in a region.**	**One or more individual datacenters per zone. Each zone is self-contained (power, cooling, networking).**

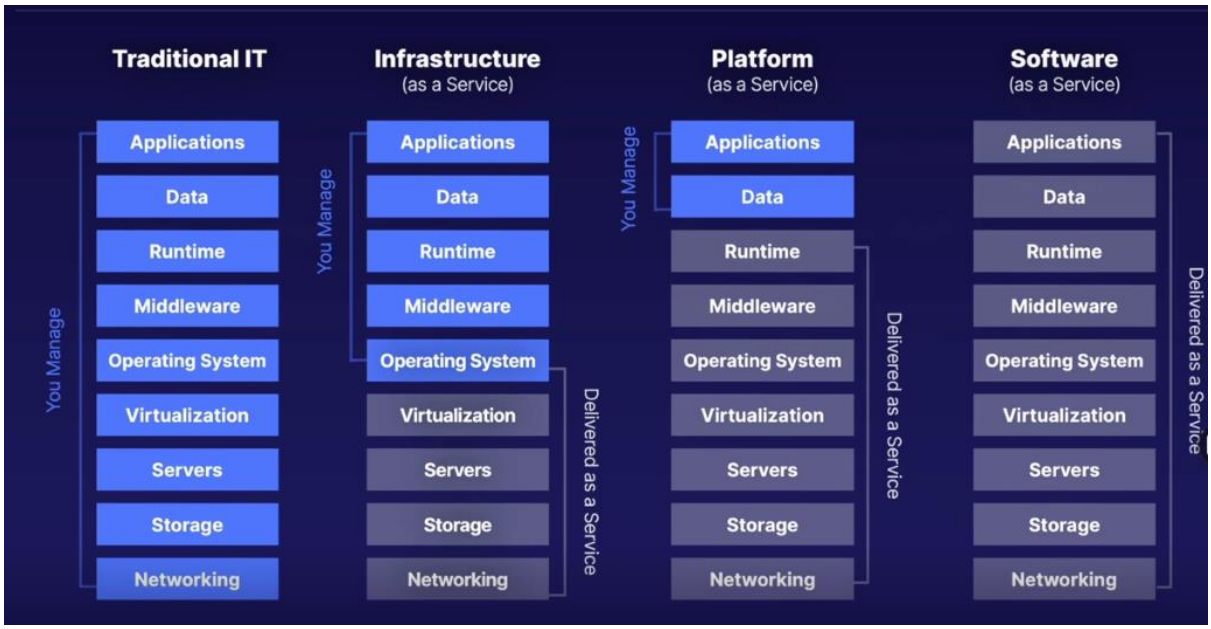
Purpose of Regions and Availability Zones

Region	**High Availability Fault Tolerance**	**Be closer to your end users. Defend against regional outage.**
Availability Zone	**Fault Tolerance**	**Deploy resources across zones. Protect against single point of failure.**

Azure Services



IaaS vs PaaS vs SaaS



Infrastructure as a Service (IaaS)

- Virtual servers
- You are responsible for maintaining OS

Platform as a Service (PaaS)

- Cloud vendor maintains infrastructure for you
- You focus on application code and data

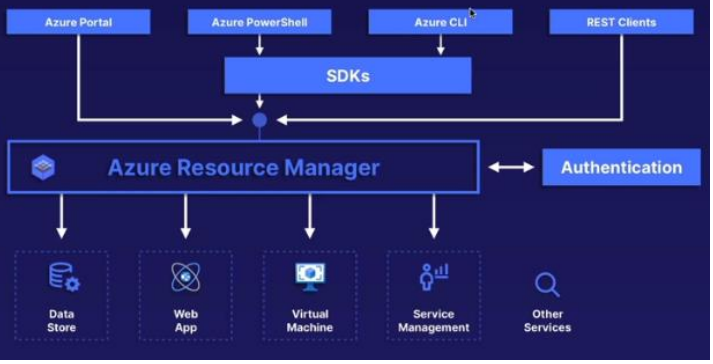
Software as a Service (SaaS)

- Vendor provides full software stack

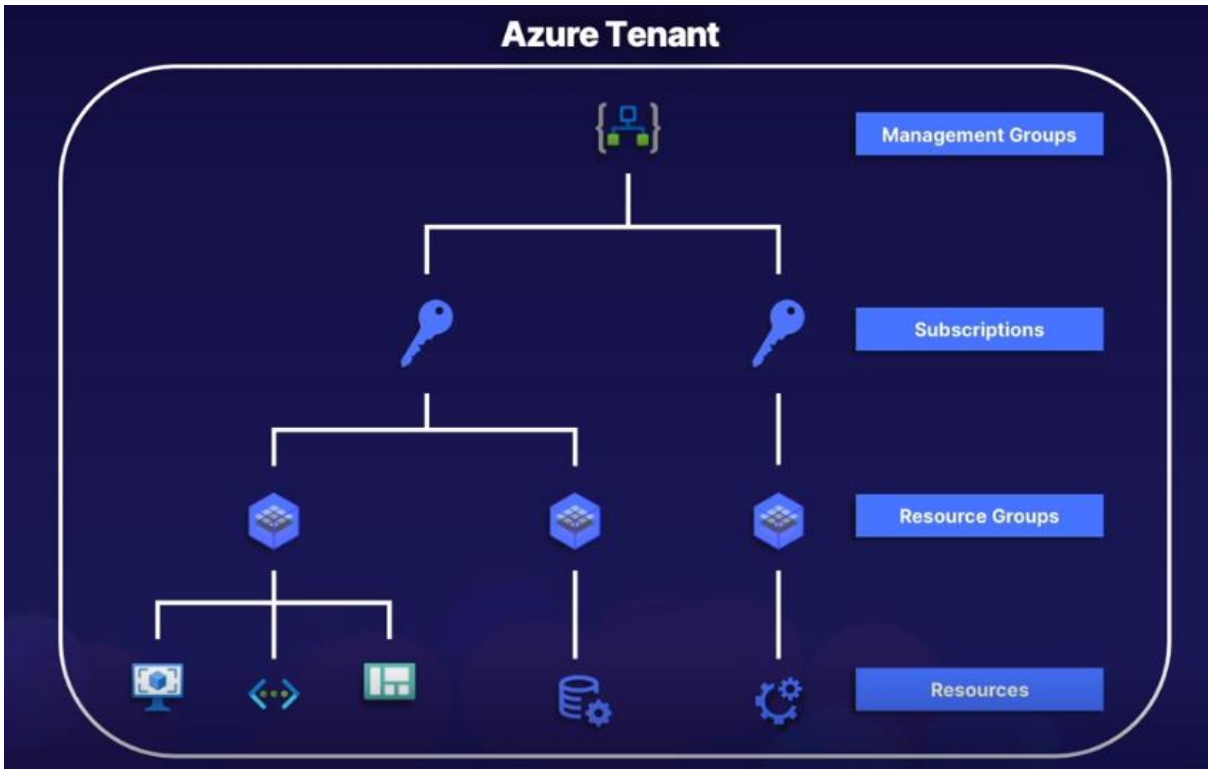
Interacting with Services

All service interaction via Azure Resource Manager (ARM)

- **Centralized** management layer
  - Web portal
  - Command-line interface (CLI)
  - Application access
  - Access control (authentication)

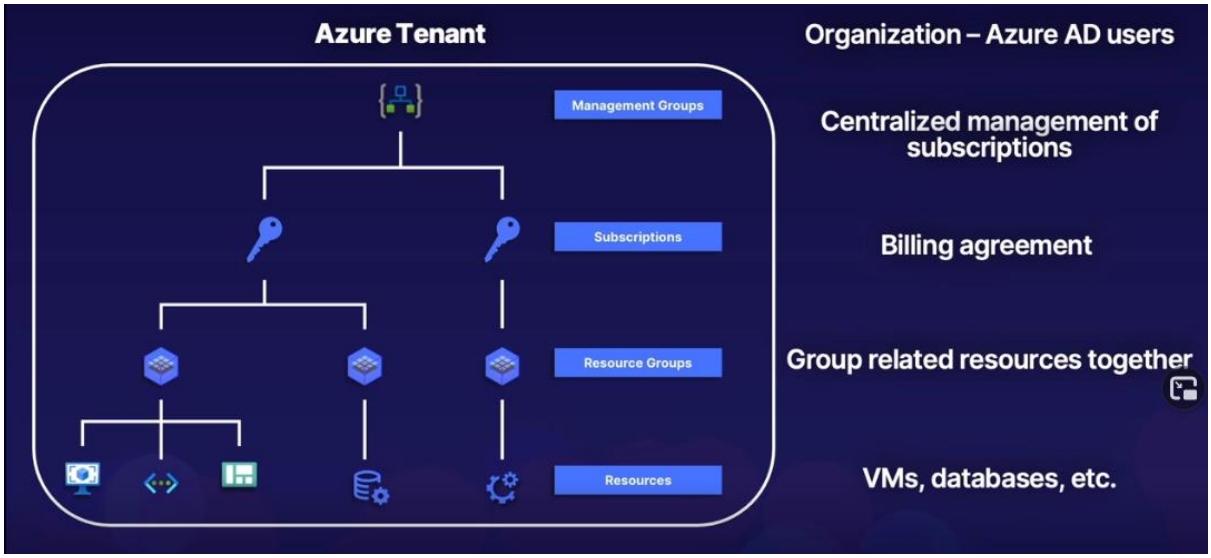


Azure Resource Hierarchy



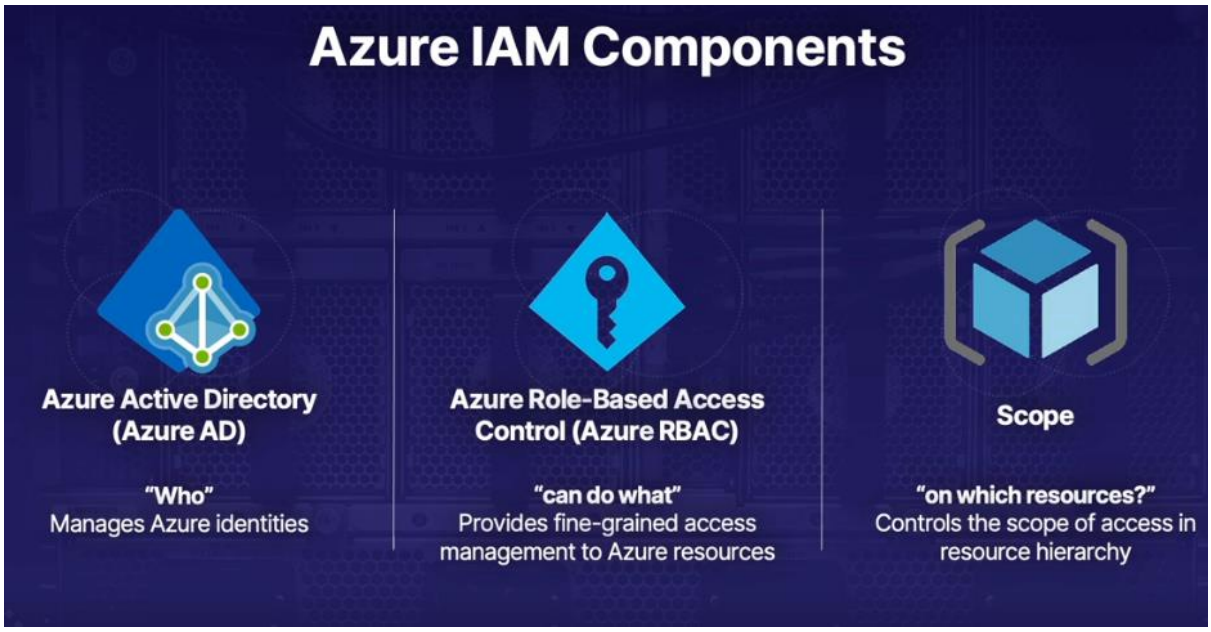
Azure Resource Hierarchy Components

Tenant	Single organization instance of Azure AD	Single "bucket" to manage all users
Management groups	Grouping component (technically optional)	Central management of multiple subscriptions
Subscriptions	Primary billing and access isolation boundry	Each subscription has its own billing agreement
Resource groups	Group resources together for same purpose/lifecycle	All Azure resources created in Resource Group
Resources	Anything created on Azure (VM, storage account, etc.)	

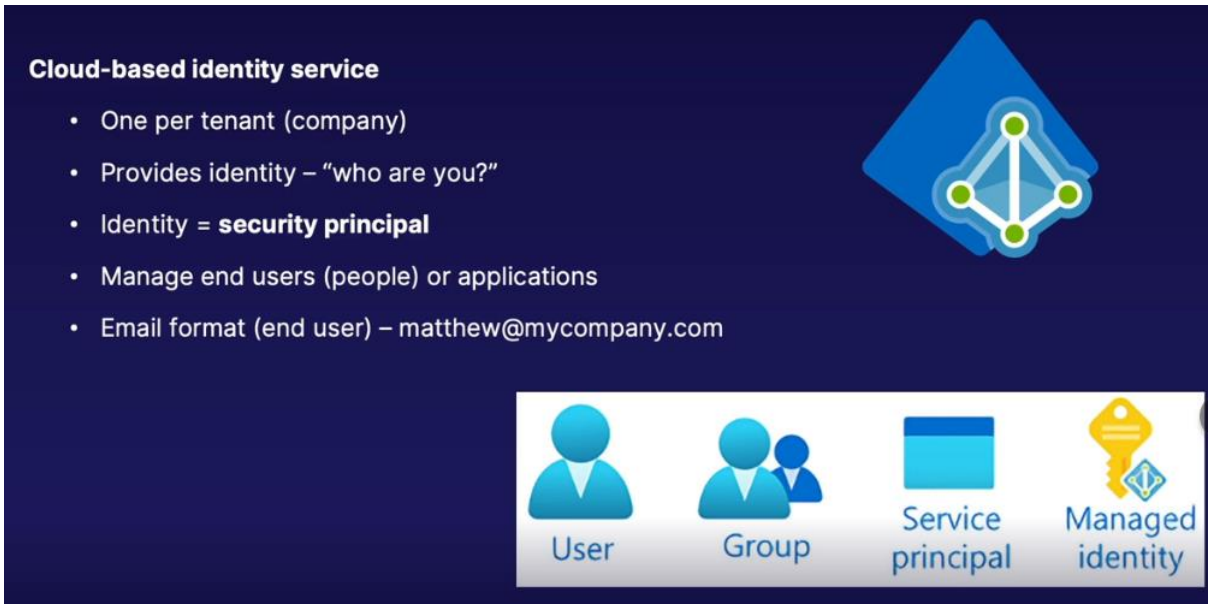


Identity and Access Management

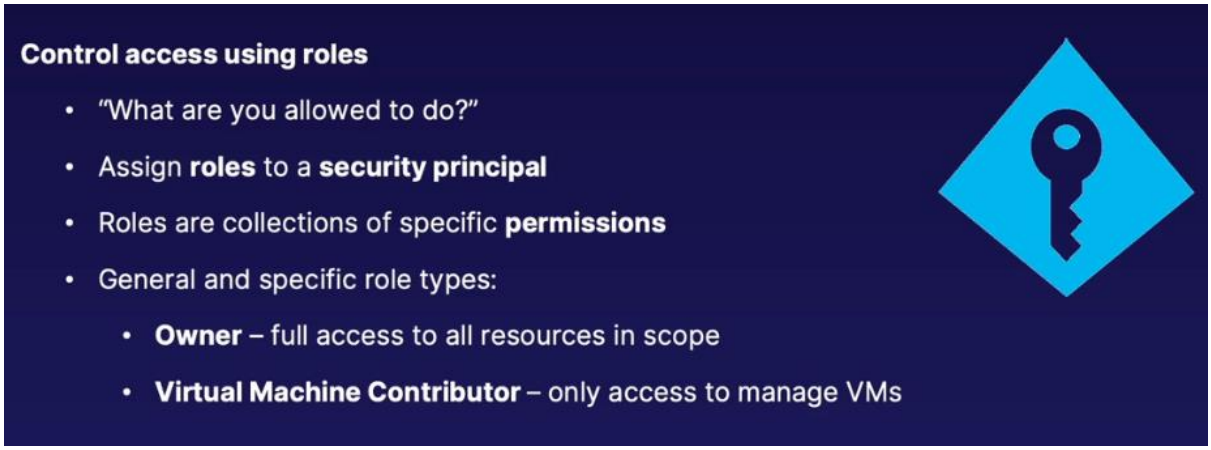
Who can do what on which resources



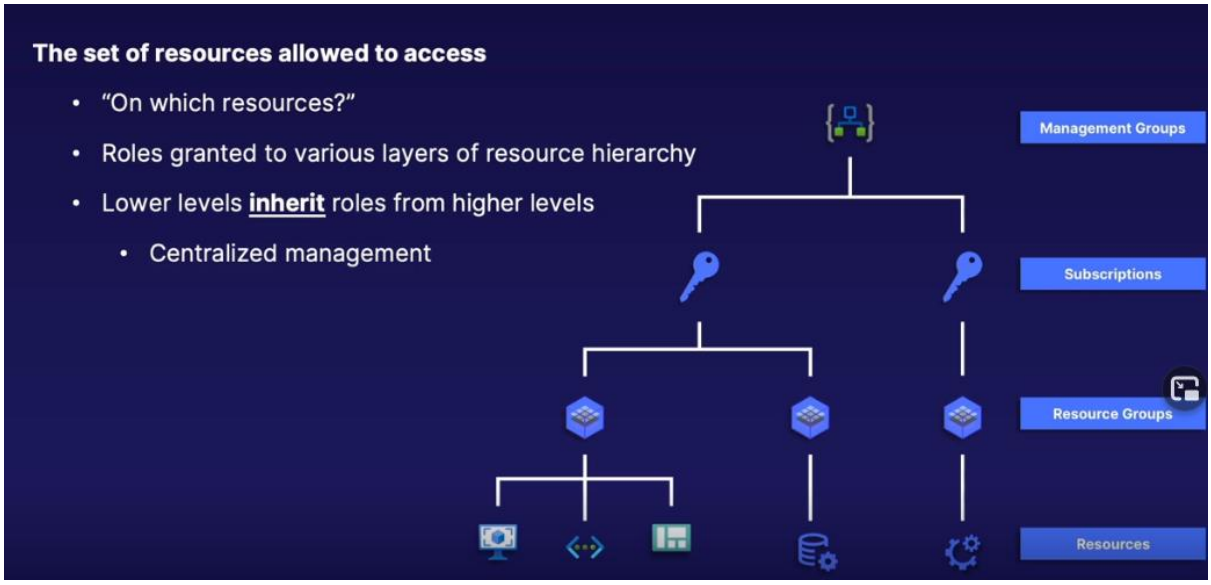
Azure Active Directory

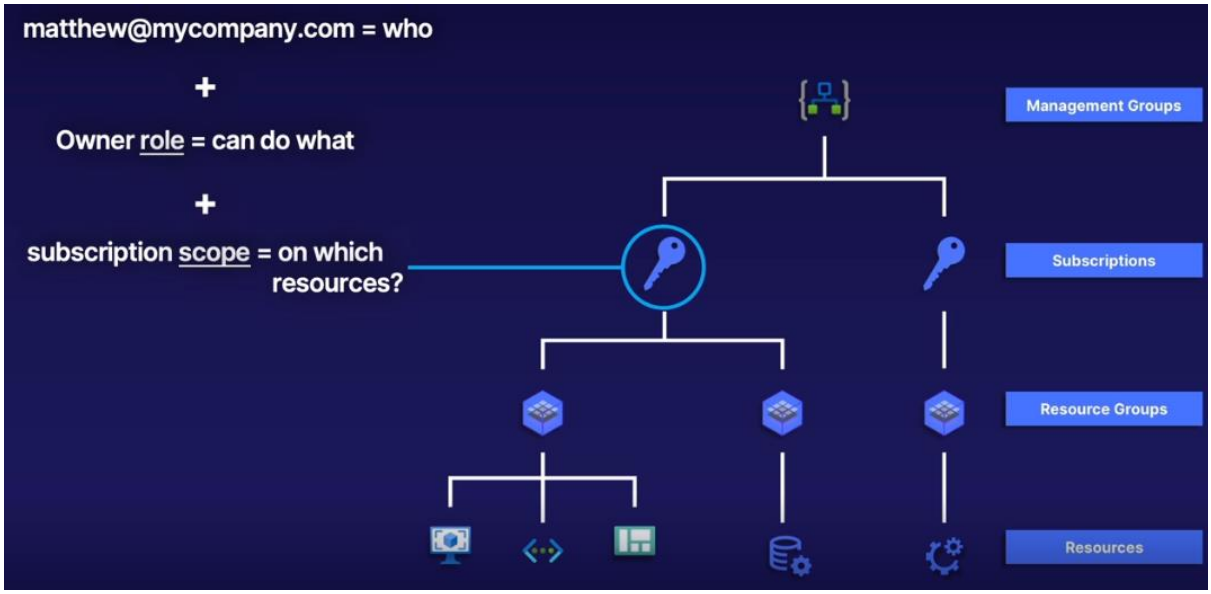


Azure Role Based Access Control - Azure RBAC



Scope – The set of resources allowed to access





Azure Monitoring

Cloud visibility mechanism to provide information about what's happening within our resources.

Logs

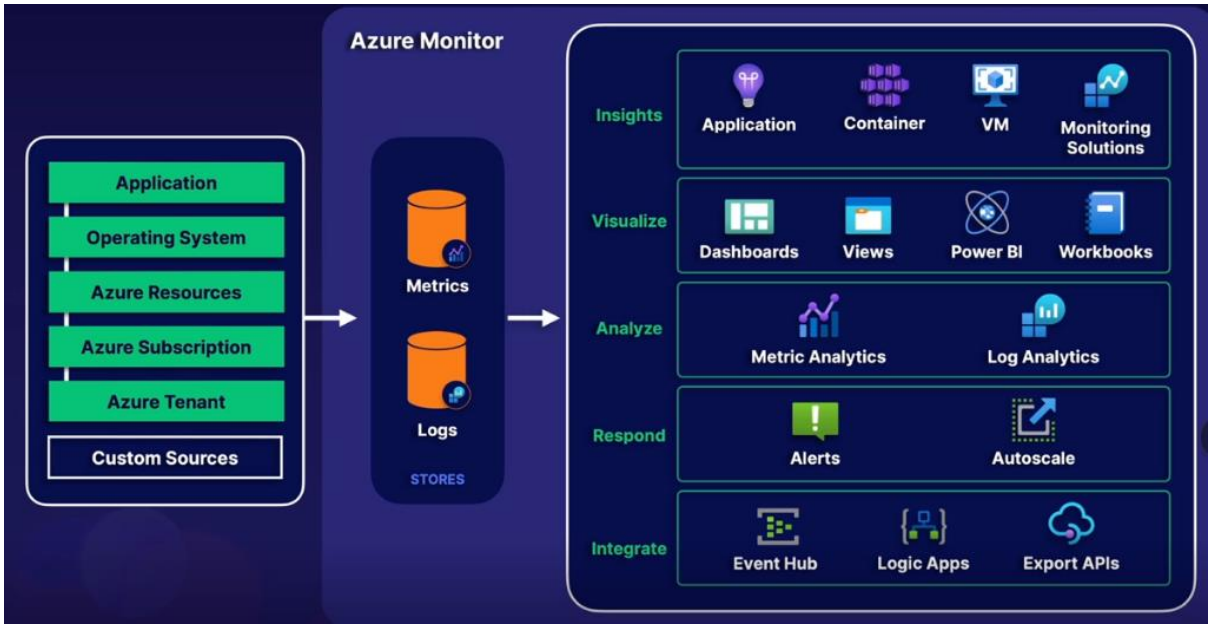
Text-based records of events

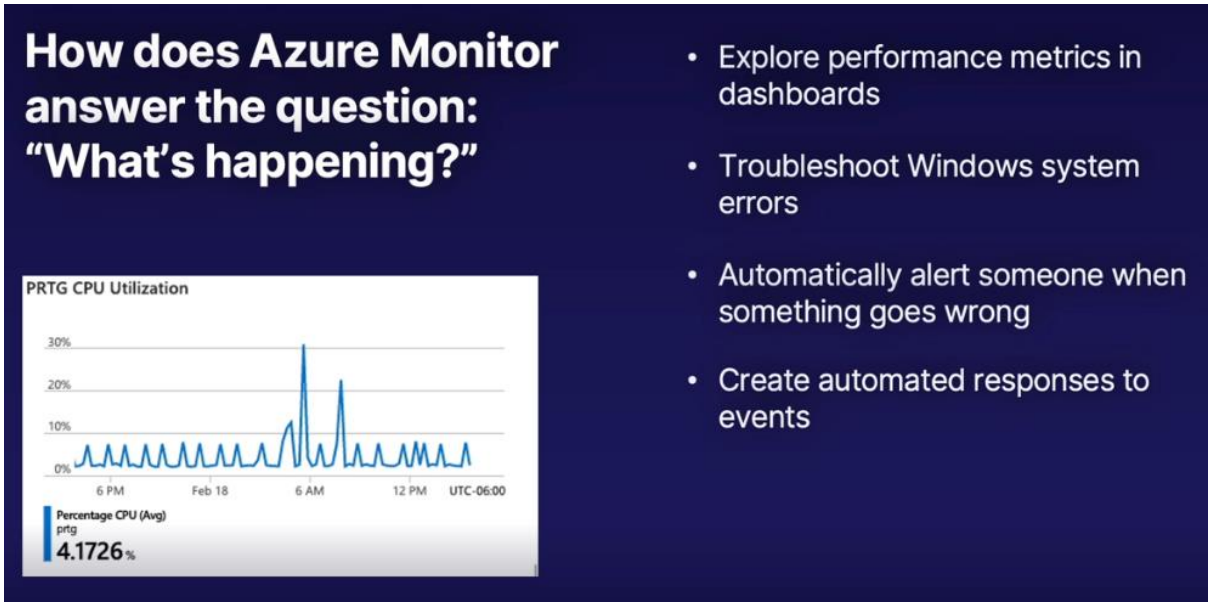
- **Activity logs:** "Who created the resource and when?"
- **OS logs:** "Why is Windows giving an error?"

Metrics

Telemetry-based performance data

- CPU utilization
- Website latency

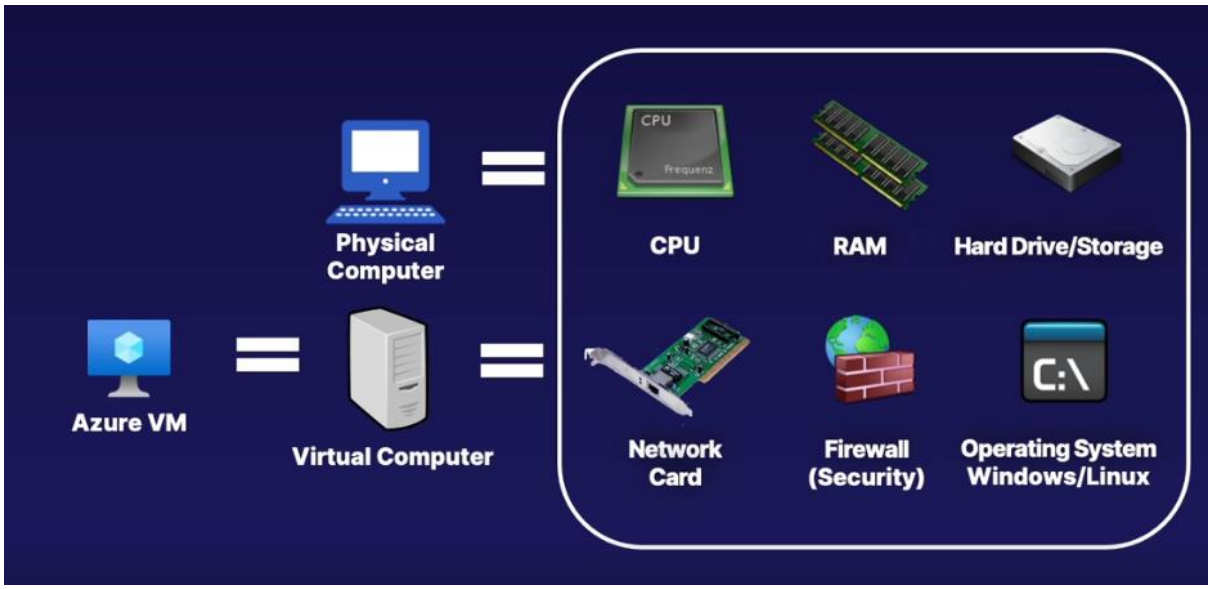


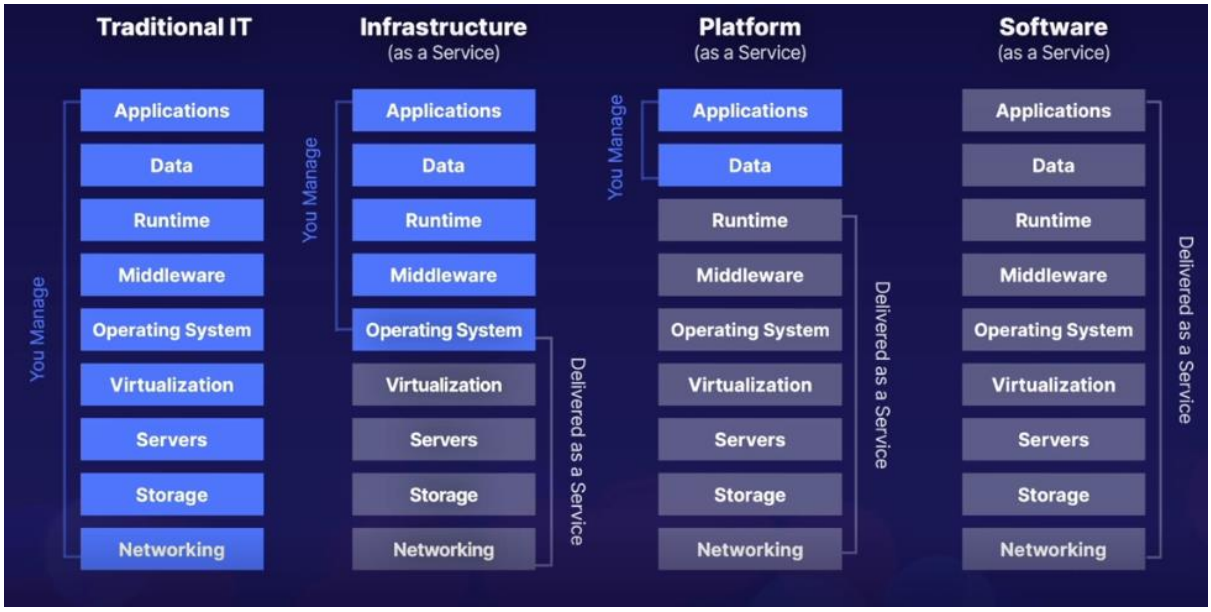


 # Chapter 3

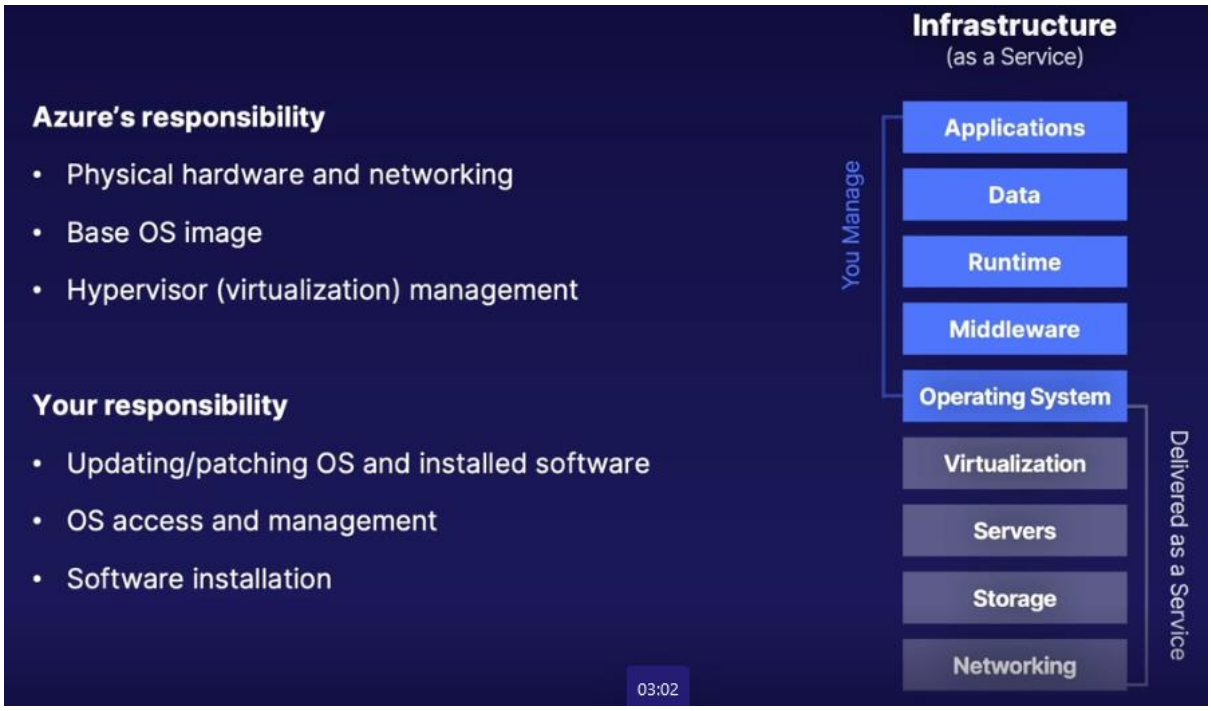
Virtual Machnes

A virtual computer

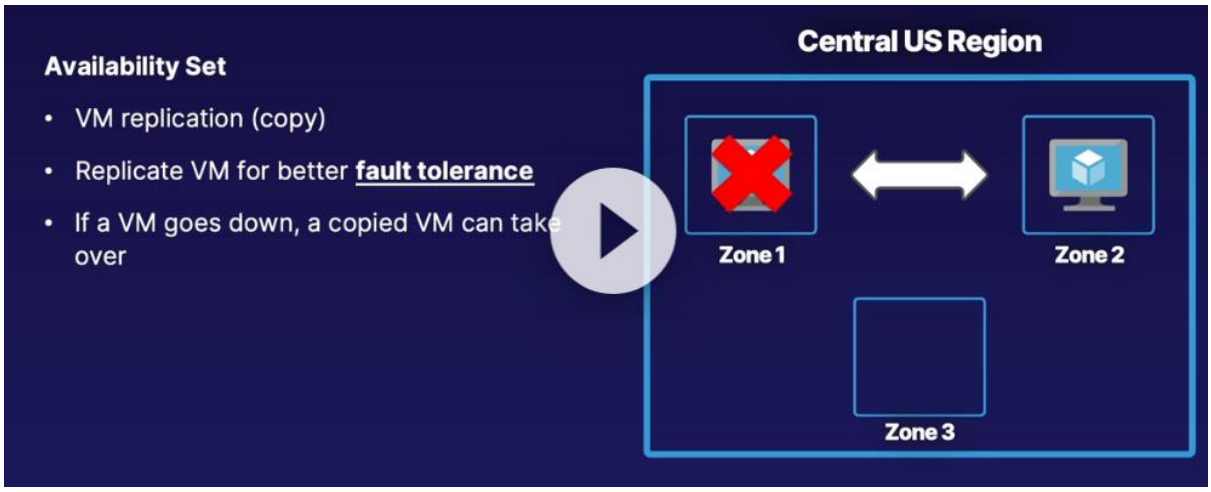




Scope of Responsibility



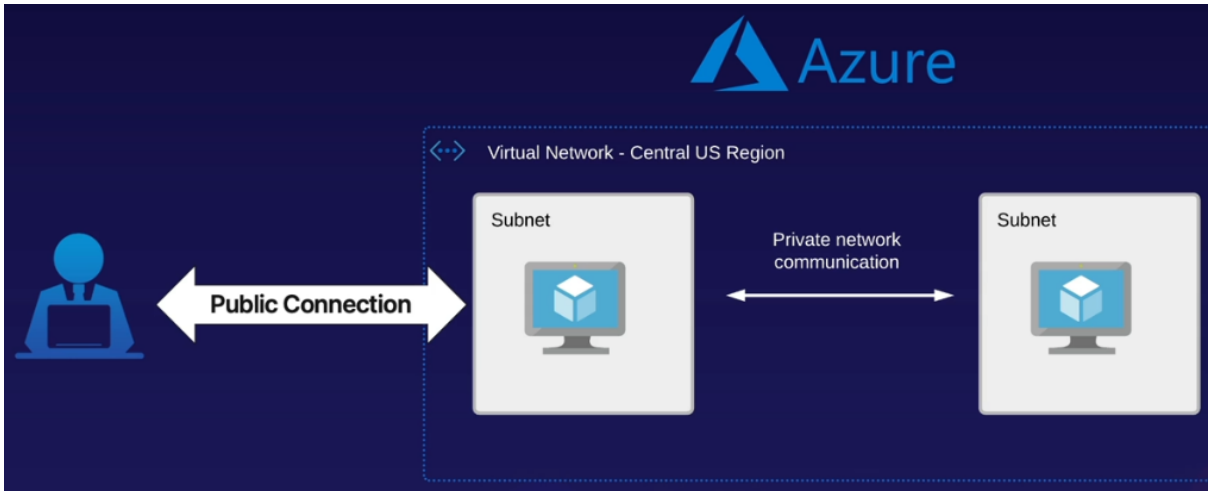
Availability Set



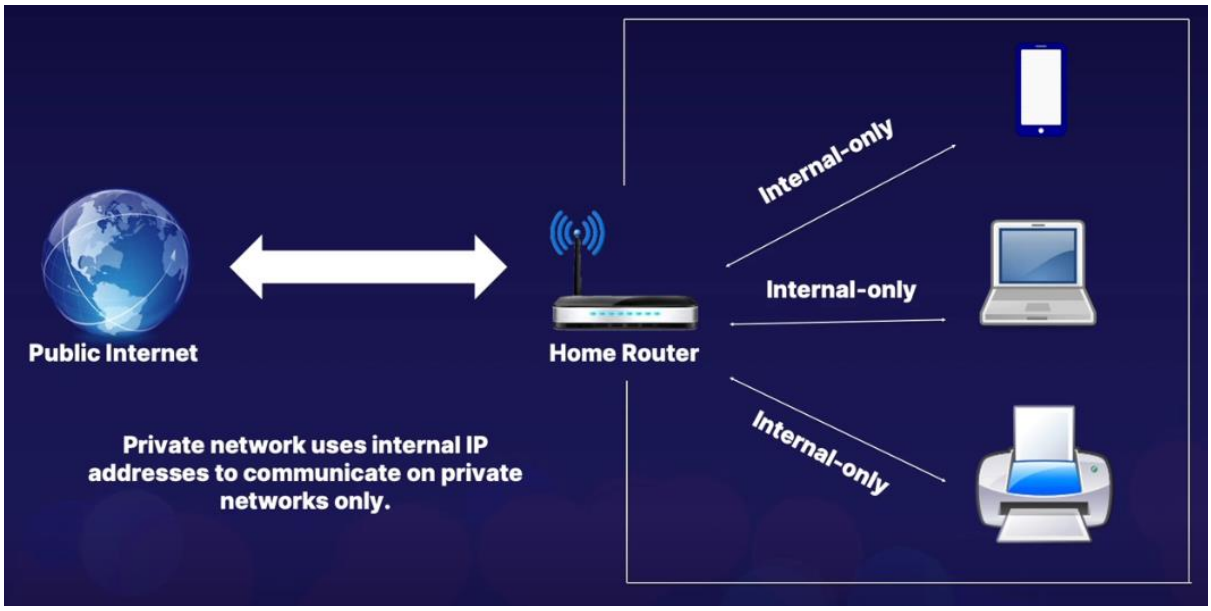
Scale Set

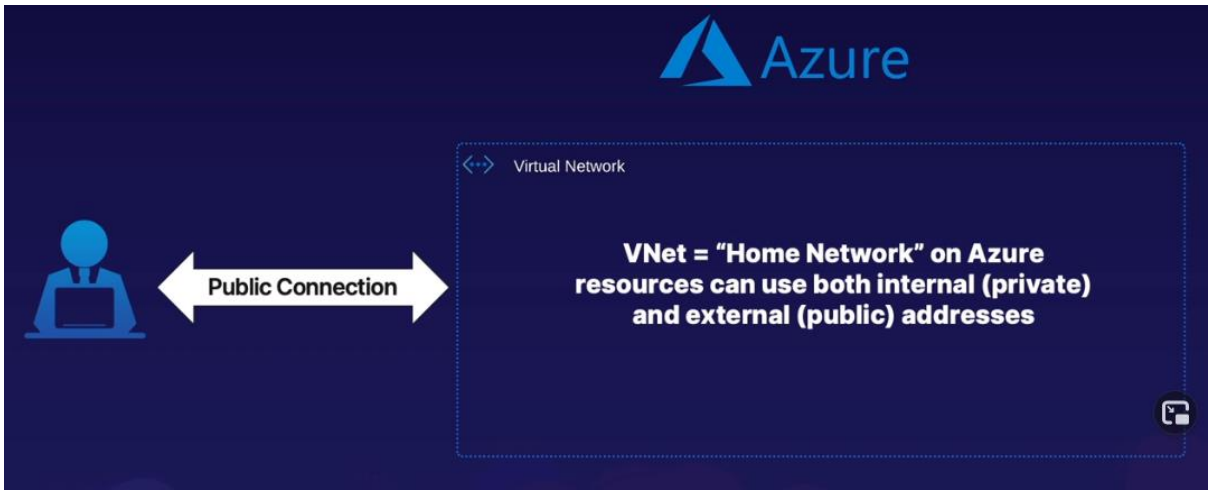
Networking

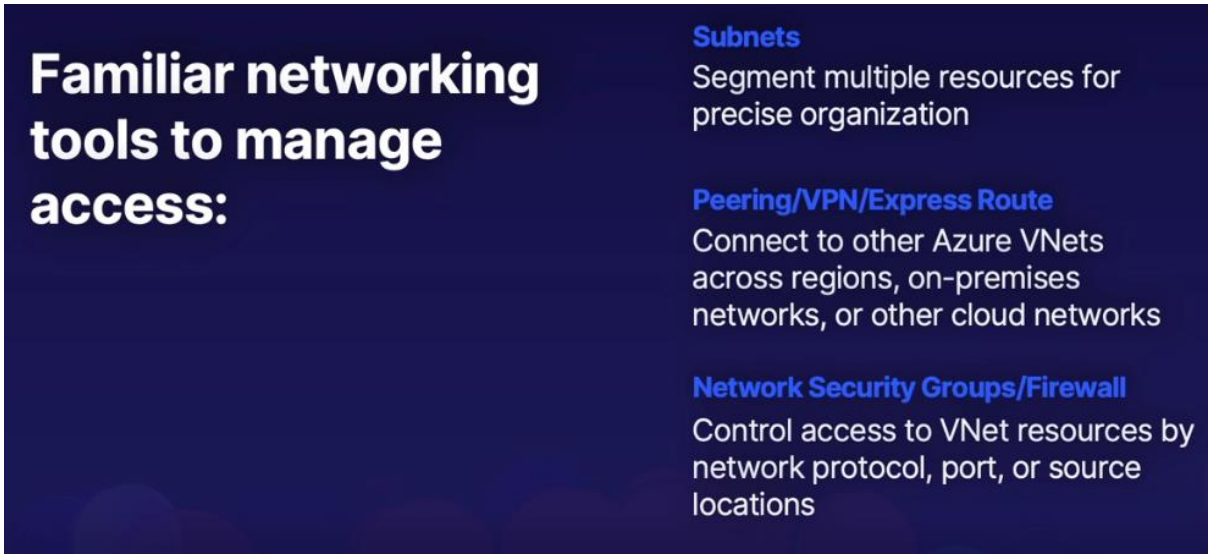
Azure Virtual Network – VNet



Private Network

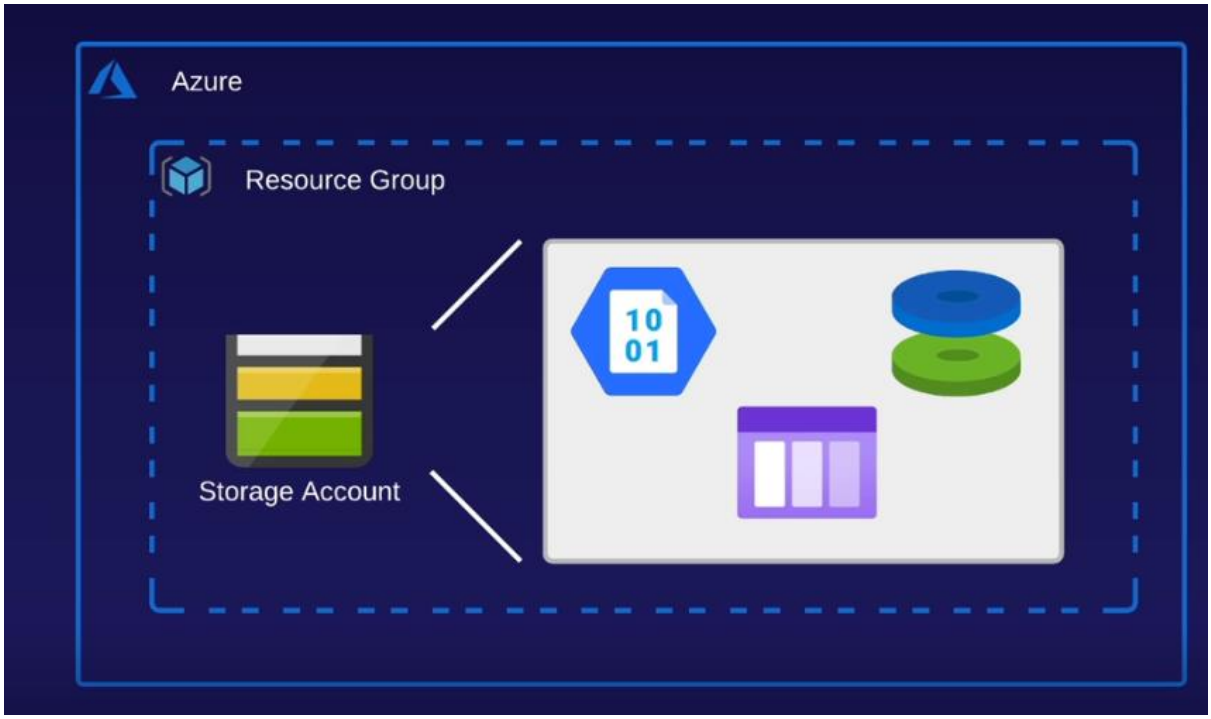


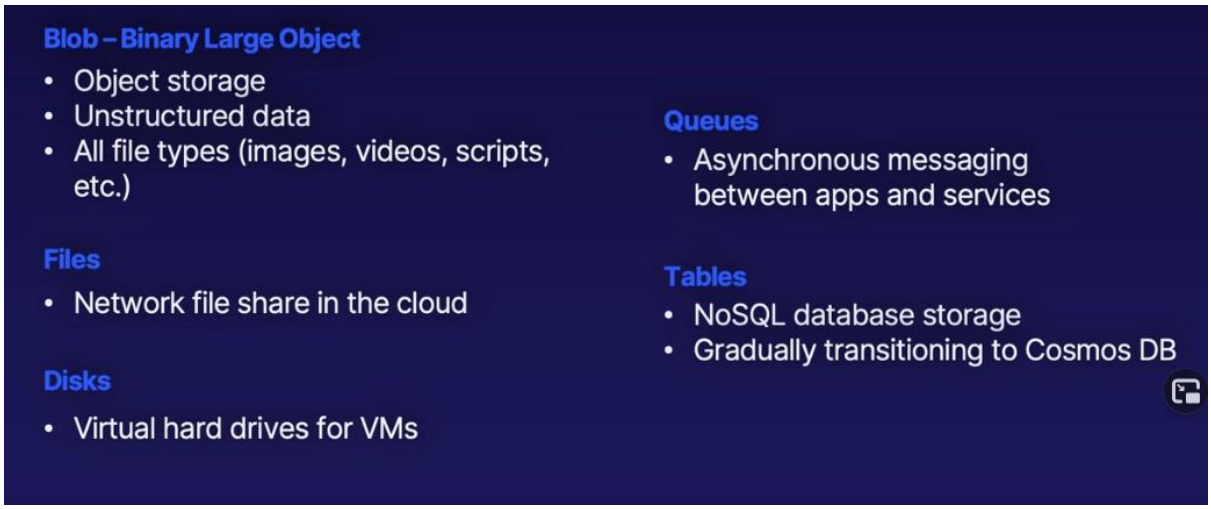




Storage

Storage Account Infrastructure



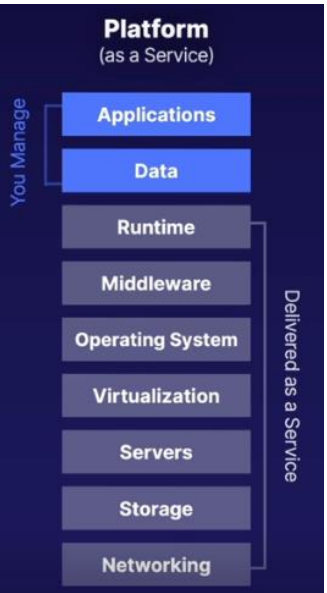


Databases and Analytics

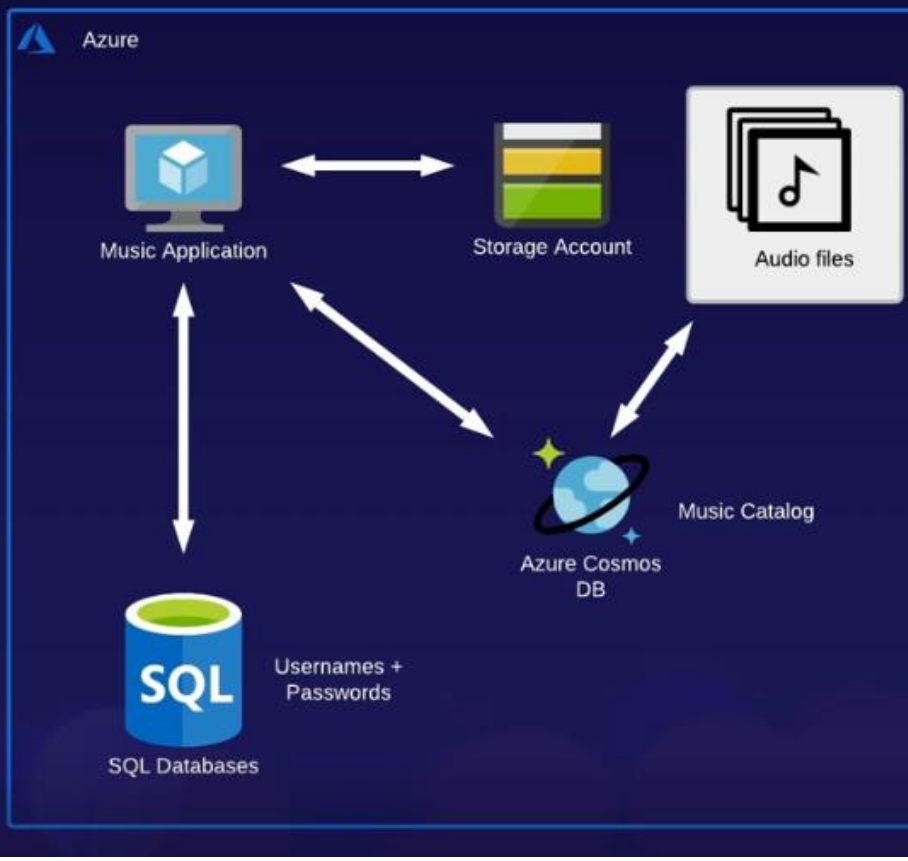
Multiple managed database services (PaaS)

Azure SQL, Cosmos DB, Managed MySQL/PostgreSQL, and others

- Multiple options with different use cases/levels of management
  - SQL vs. NoSQL
  - "Fully managed" vs. provisioned infrastructure
    - You set the compute specs/storage space vs. Azure dynamically doing it for you
  - Single region vs. multiple regions
  - Open source vs. proprietary
- Main takeaway: Azure offers multiple managed database solutions to cover any structured data scenario



Database Scenario: Music Streaming Service



Analytics

Databases and Analytics

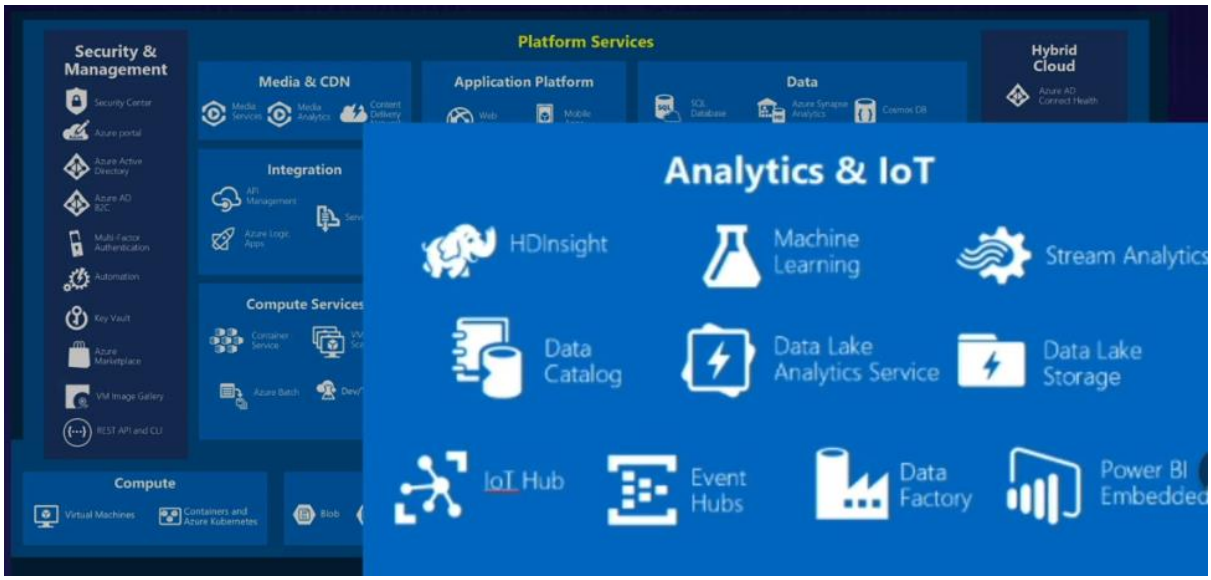
Analytics?

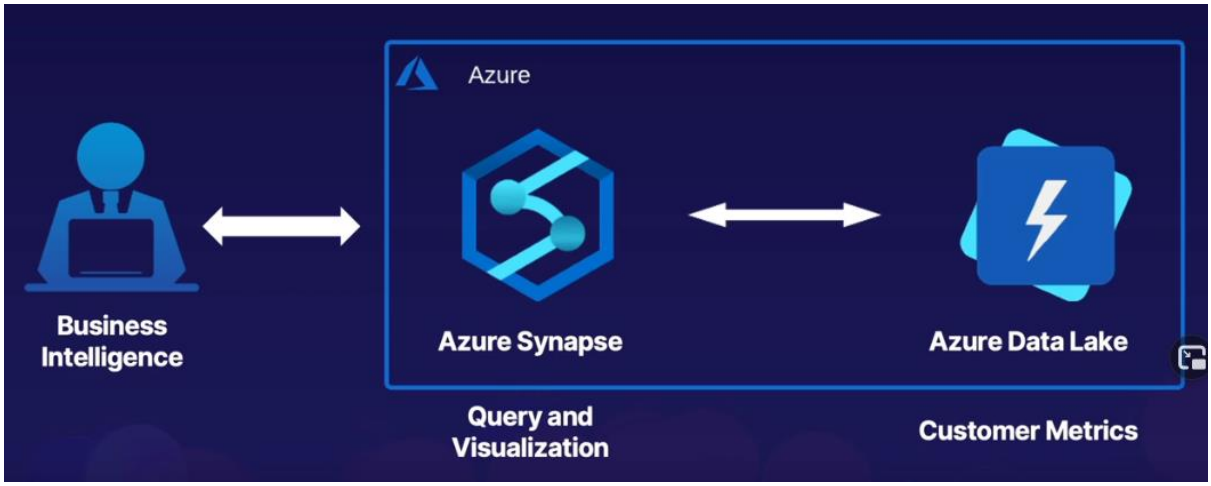
Analyzing data (in databases) for insights

Massive amounts of queried data

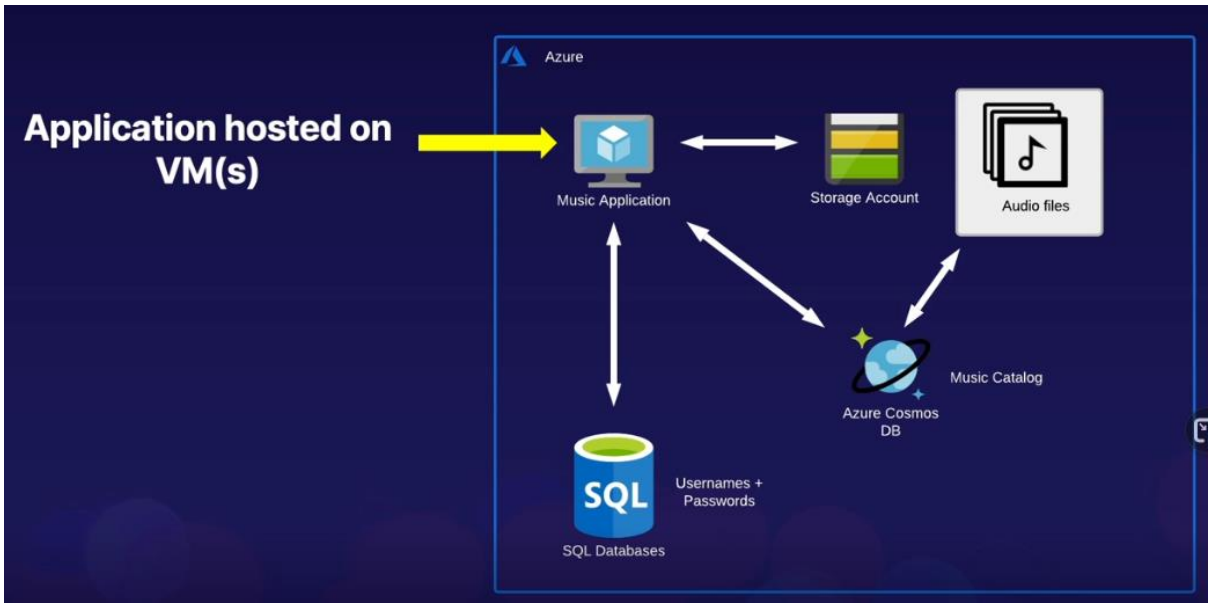
"What are our most popular features?"

"How happy are our customers?"





App services / Serverless



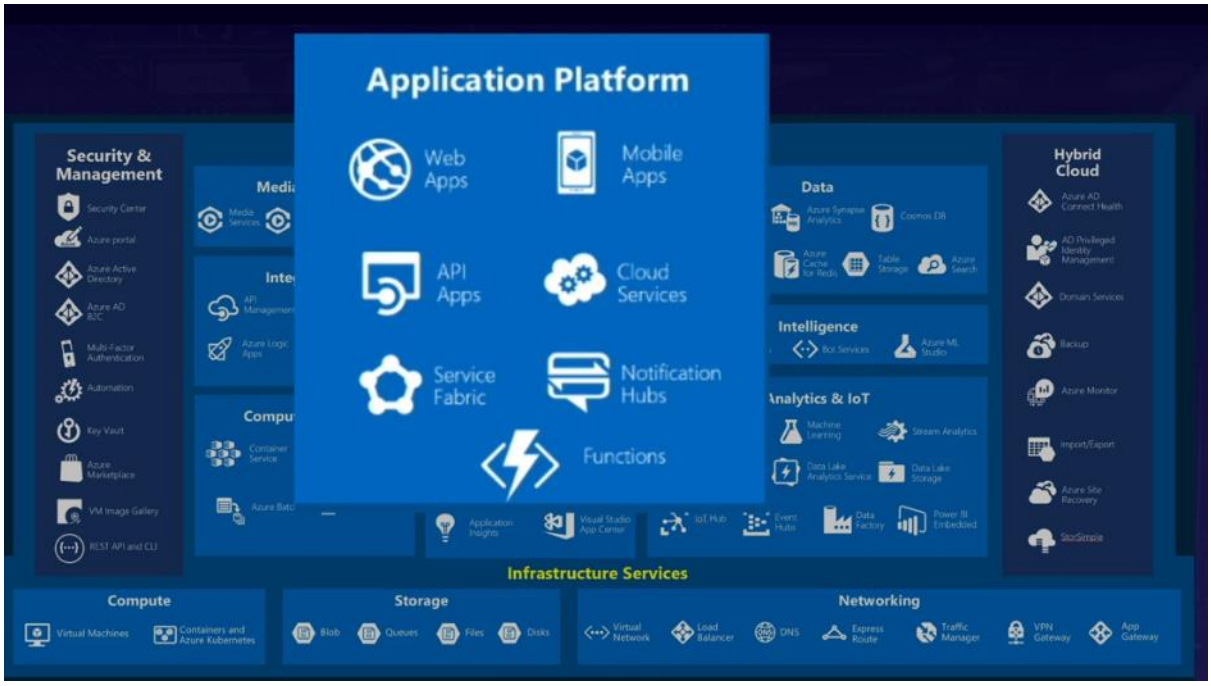
Challenges on Hosting Application on VM's

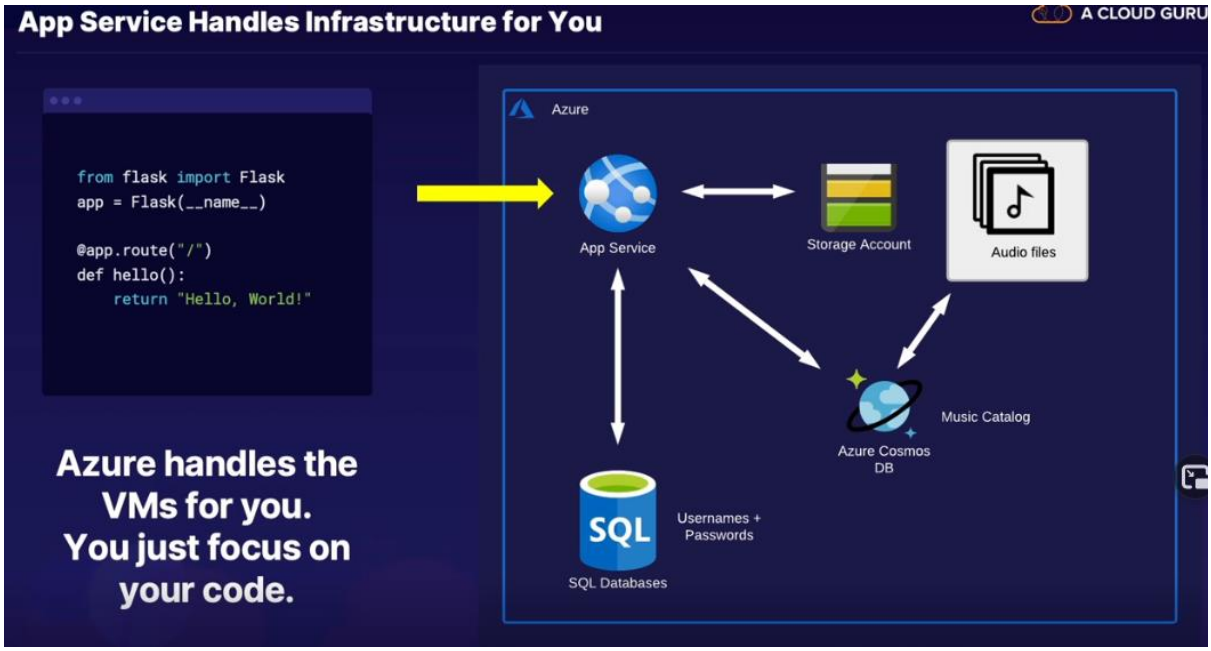
Full flexibility, but with increased responsibility

- You manage:
  - OS updates/patching
  - Compute (CPU/RAM) and storage management
  - Scaling via VM scale sets
- Result: higher management overhead

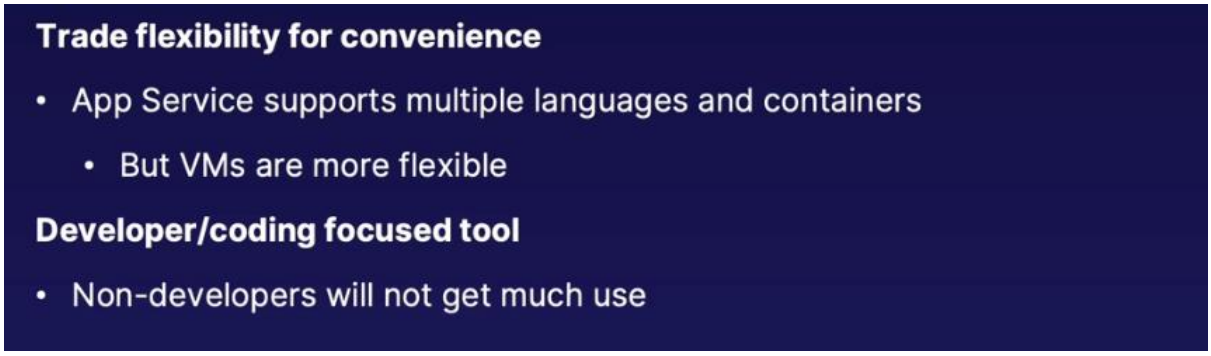
What if we want to just focus on application code, and let Azure handle everything else?

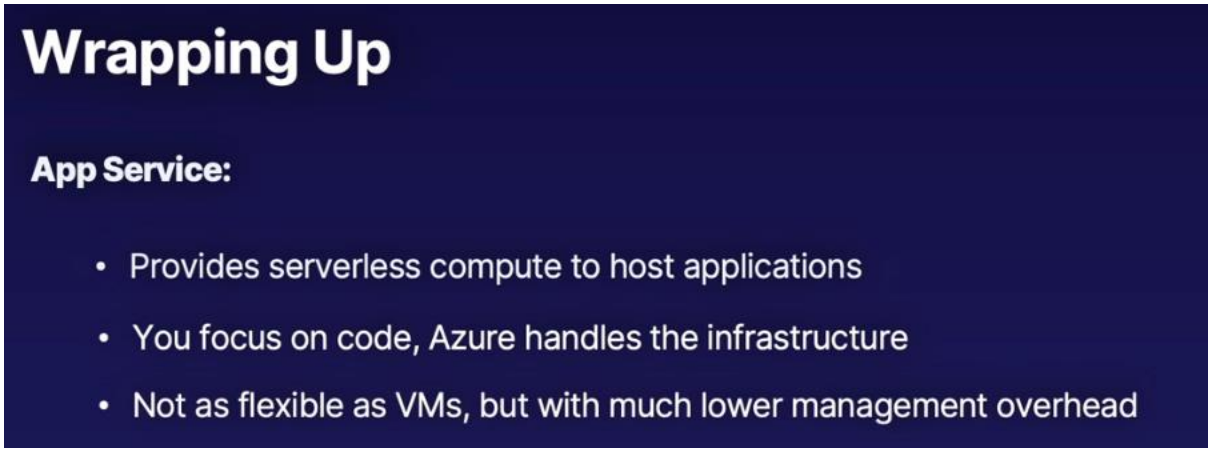
- Solution: Azure App Service





App service considerations

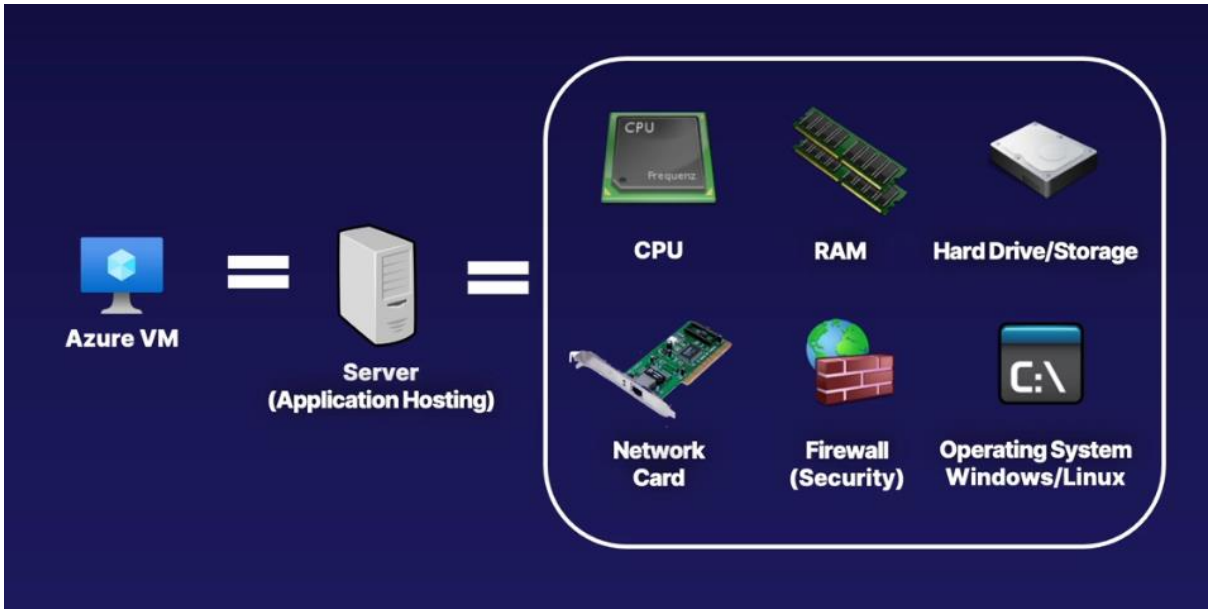




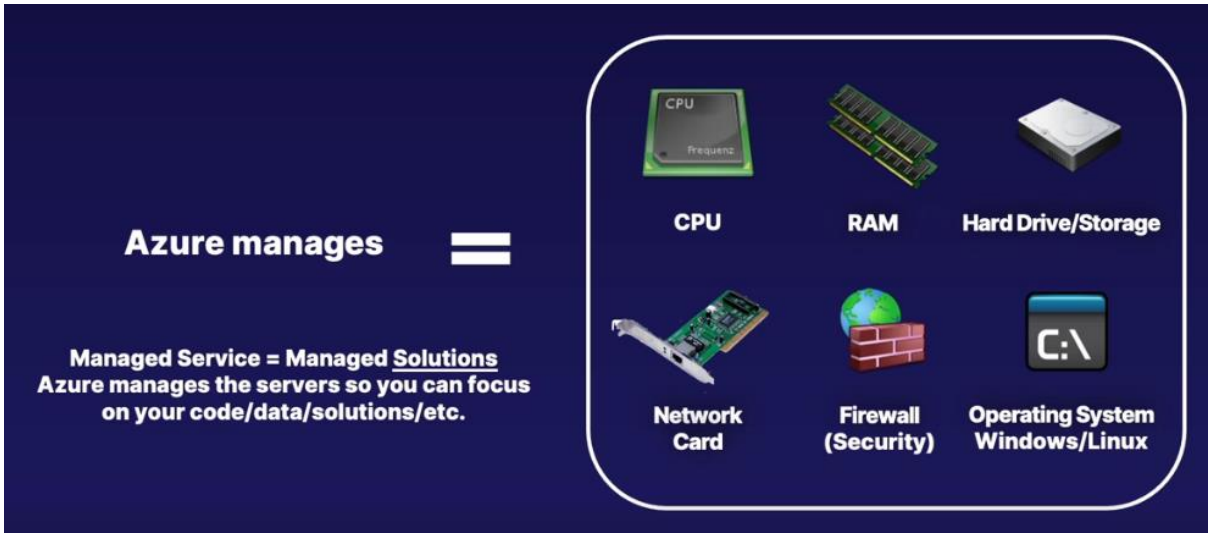
#Chapter 4

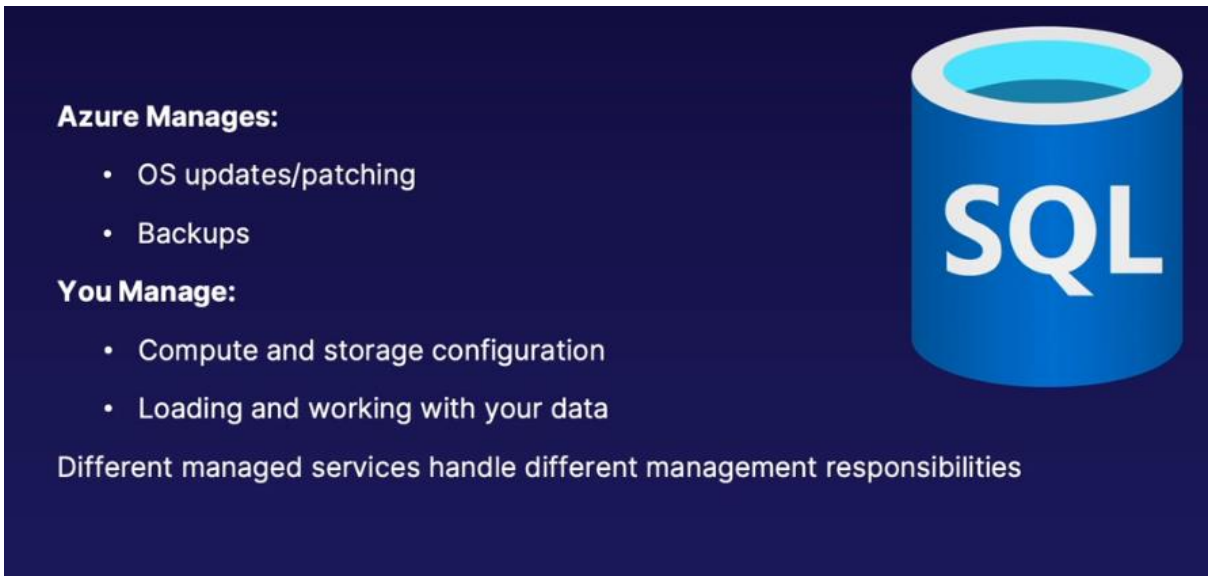
Azure Managed Services

Customer need to manage =>

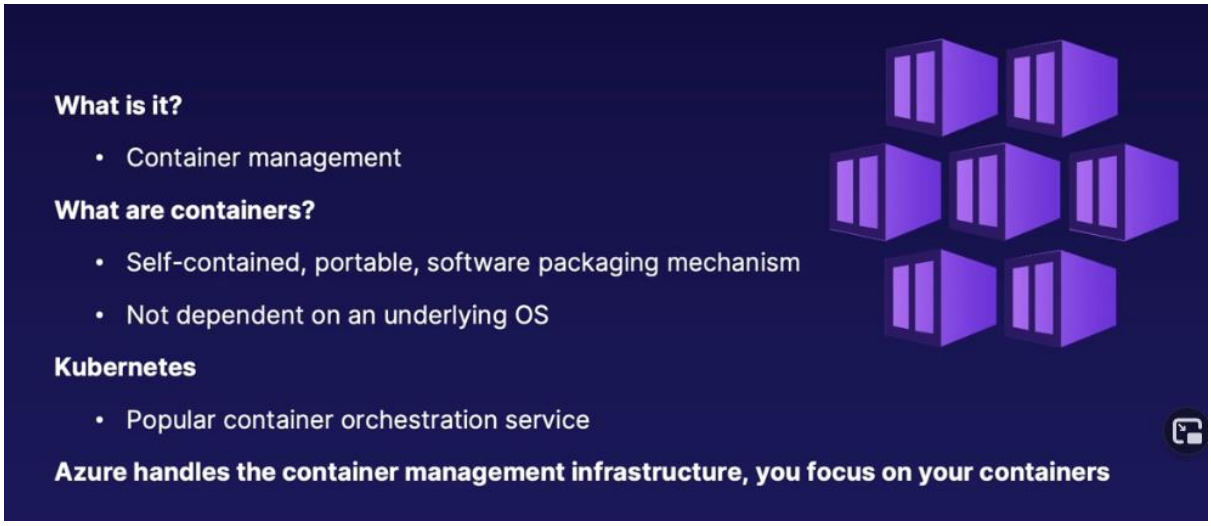


Azure manage

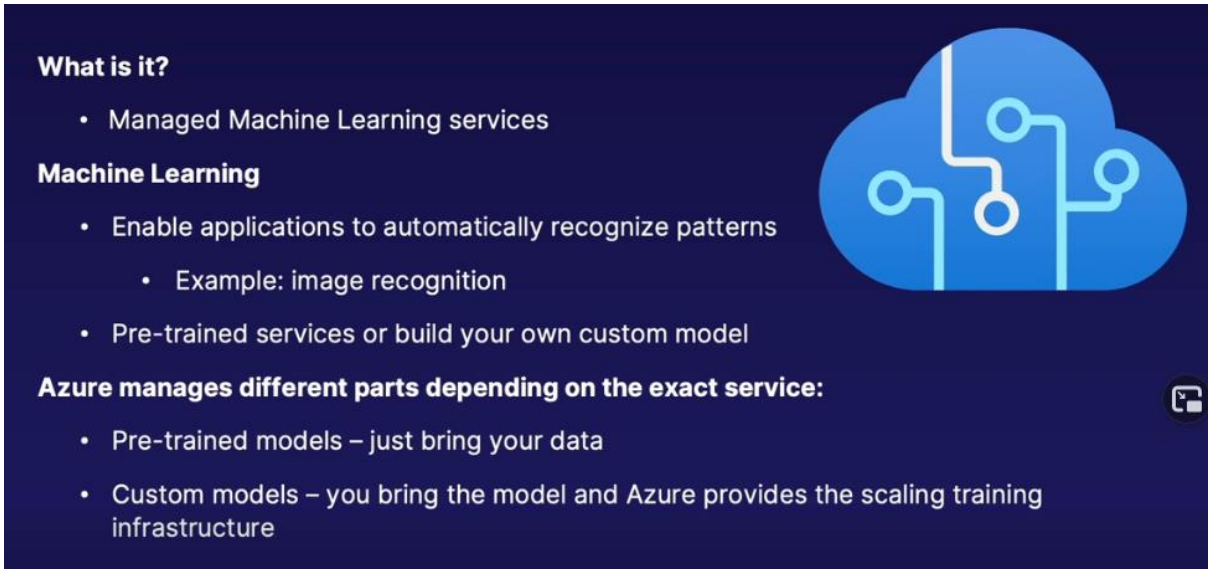




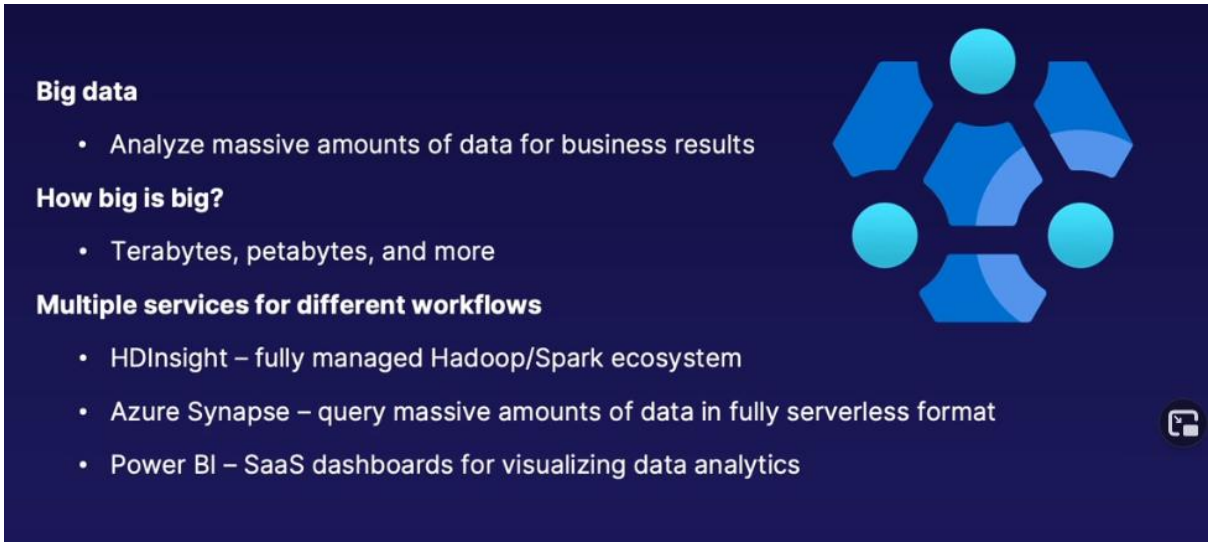
Container / Kubernetes Services



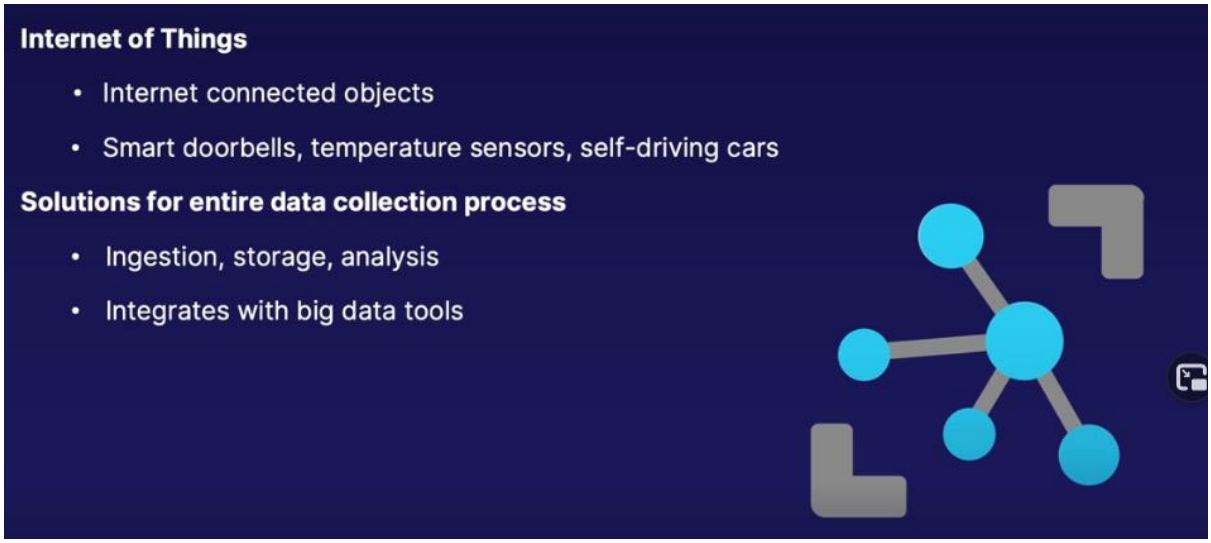
Artificial Intelligence / Machine Learning

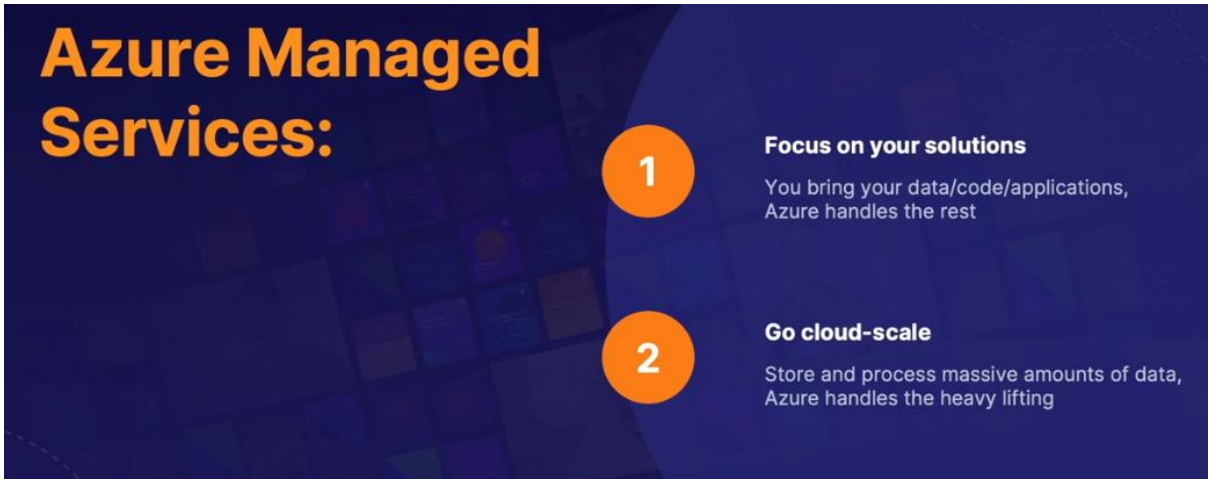

What is it?
• Managed Machine Learning services
Machine Learning
• Enable applications to automatically recognize patterns
• Example: image recognition
• Pre-trained services or build your own custom model
Azure manages different parts depending on the exact service:
• Pre-trained models – just bring your data
• Custom models – you bring the model and Azure provides the scaling training infrastructure

Big Data


Big data
• Analyze massive amounts of data for business results
How big is big?
• Terabytes, petabytes, and more
Multiple services for different workflows
• HDInsight – fully managed Hadoop/Spark ecosystem
• Azure Synapse – query massive amounts of data in fully serverless format
• Power BI – SaaS dashboards for visualizing data analytics

IoT





Cloud Advantages

Fault Tolerance (a.k.a. redundancy / resiliency) Ex: 100K users

High Availability Ex: US based 😊 DC closed to users near their regions

Scalability Ex: On demand automatic

Elasticity Ex: Automatic failover => redirected working server=> recreate server => navigate users

Next steps >

AZ 900 – Broad understanding and certification prep

Linux on Azure

Azure CLI Essentials

Azure PowerShell Essentials