# Overview of Azure Compute - Part 1

INTRODUCTION TO AZURE



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# Serverless vs. Stateless

**Serverless**

- Not about the absence of servers
- Abstracts infrastructure management
- Scales automatically based on workload

**Stateless**

- Does not remember any prior interactions
- Each transaction is treated as a new one
- Efficient, but lacks continuity

# What is Azure Compute?

- It is a core pillar of Microsoft Azure
- Run virtual machines, web applications, and code in several ways
- Harness the cloud and optimize your available resources



# Key Features of Azure Compute

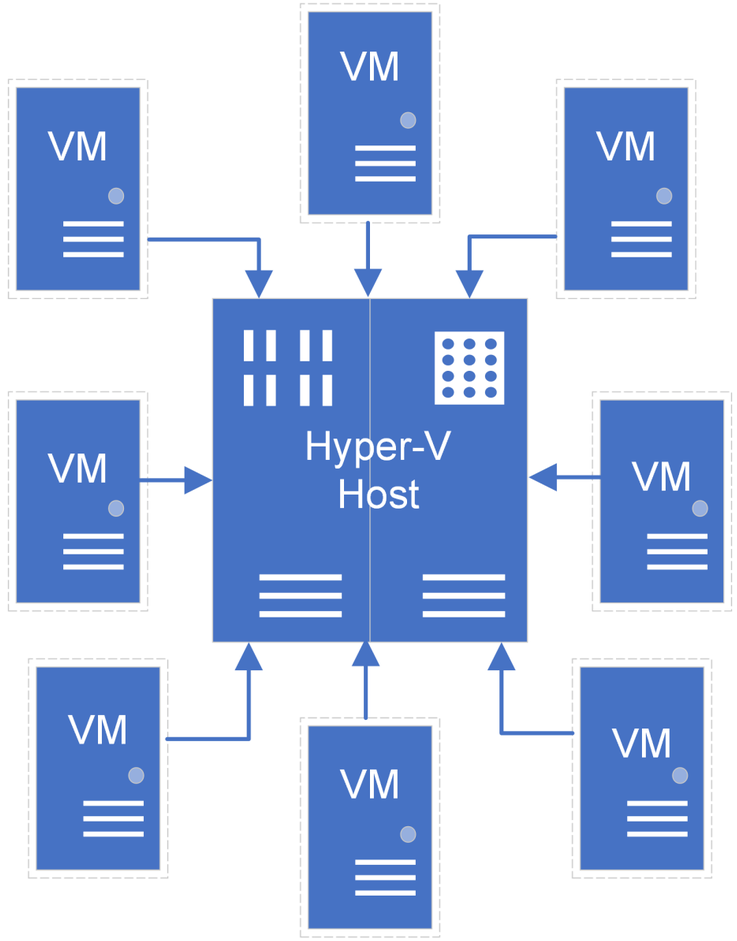
There are many options available in Azure compute

- Azure virtual machines (VMs)
- Azure App Service
- Azure Functions

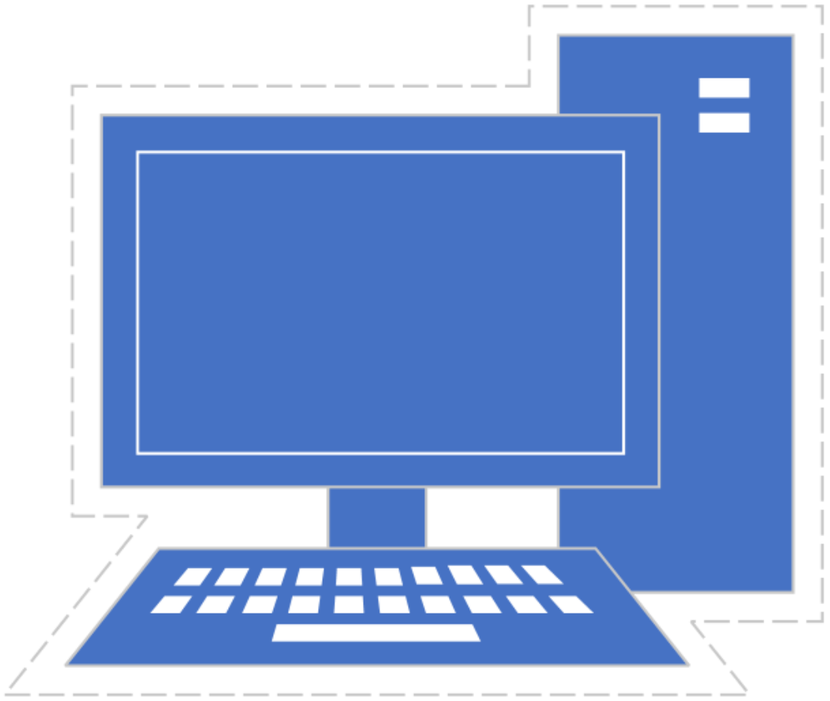
# Azure Virtual Machines

They are a core service in Azure.

- The foundation of infrastructure as a service (IaaS)
- On-demand scalable resources
- As many VMs as you need



# Azure Virtual Machines

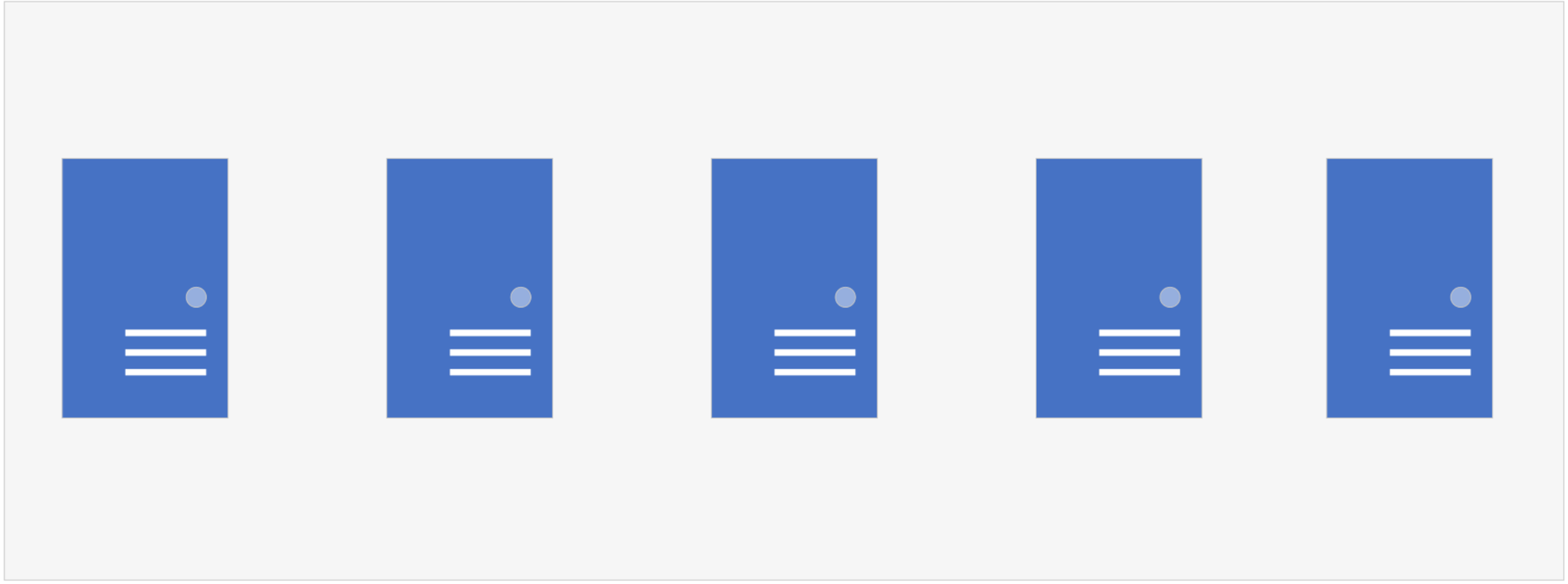


From a single computer that you configure how you need.

# Azure Virtual Machines

To multiple computers, configured the same or differently.

- Add as many as you need, when you need them



# Azure Virtual Machines



Use when you need full control.

- Use if you need specific versions of software
- Windows or Linux servers
- Familiarity = ease of migration
- Choose the best fit for your application

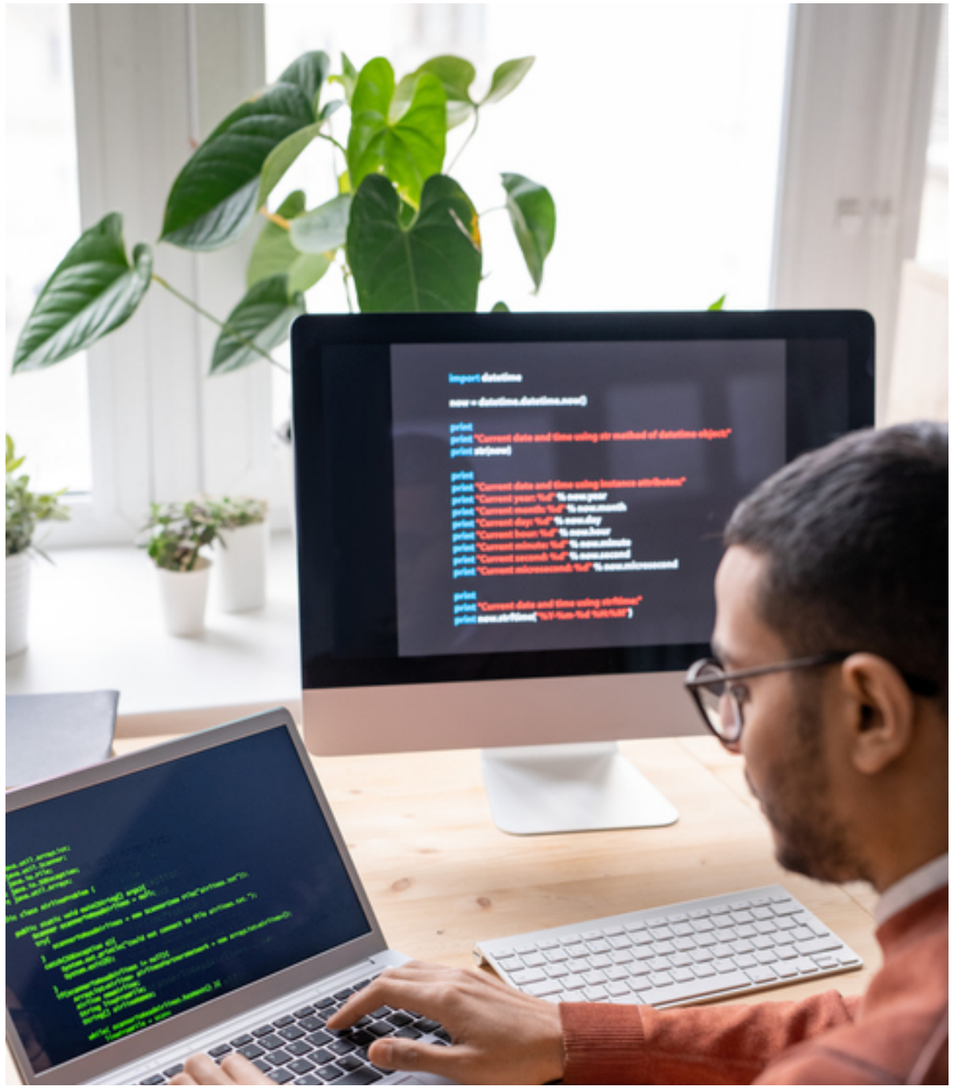
# Azure App Service




Azure App Service is a fully managed platform for deploying applications.

- It's ready for you to run your applications

# Azure App Service



Azure App Service allows you to focus on what's important.

- Infrastructure is managed for you
- You can focus on writing code and building applications
- Supports multiple development languages

# Azure App Service




Simplifies the process of creation and oversight.

- Update code and deploy instantly

**Examples:**

- For a dynamic smart city app requiring regular updates, Azure App Service enables quick code revisions.

# Azure Functions

A serverless computing service.

- Serverless runs on servers managed by Azure, requiring no user intervention
- Execute code when an event happens
- Functions scales your applications automatically



# Many Benefits of Azure Compute



Using Azure compute provides a world of benefits.

- Scalability
- Cost effectiveness
- Managed Services

# Let's Practice

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# Overview of Azure Compute - Part 2

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# Containers

Containers are portable packages that include everything needed to run an application.

- They are easy to move, deploy, and manage
- Multiple containers can run at the same time
- Azure has several options for managing them



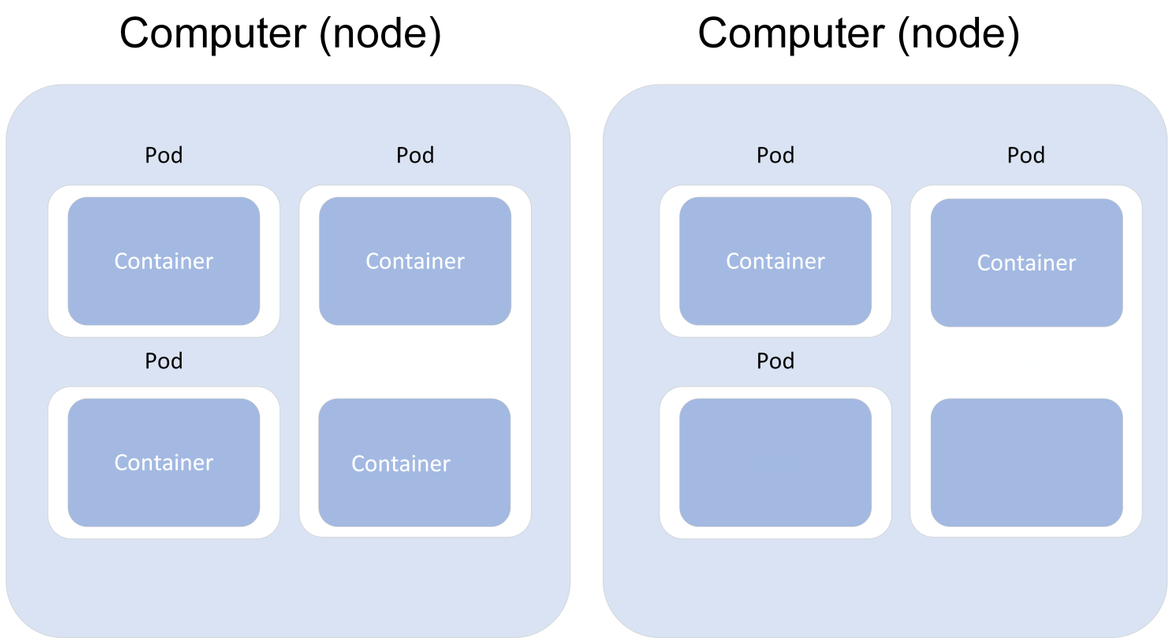
# Kubernetes

An open-source platform designed for the orchestration of containerized apps.

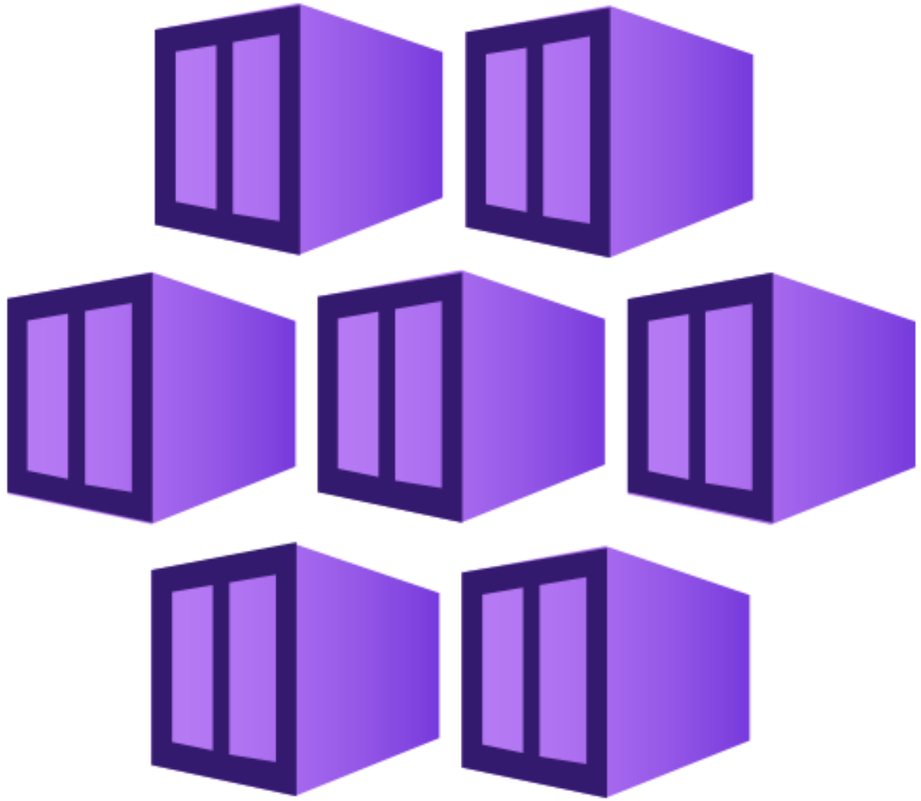


# Kubernetes

- Containers run on nodes in clusters
- A cluster comprises a set of nodes (machines) grouped
- It's where workloads are deployed and managed



# Azure Kubernetes Services

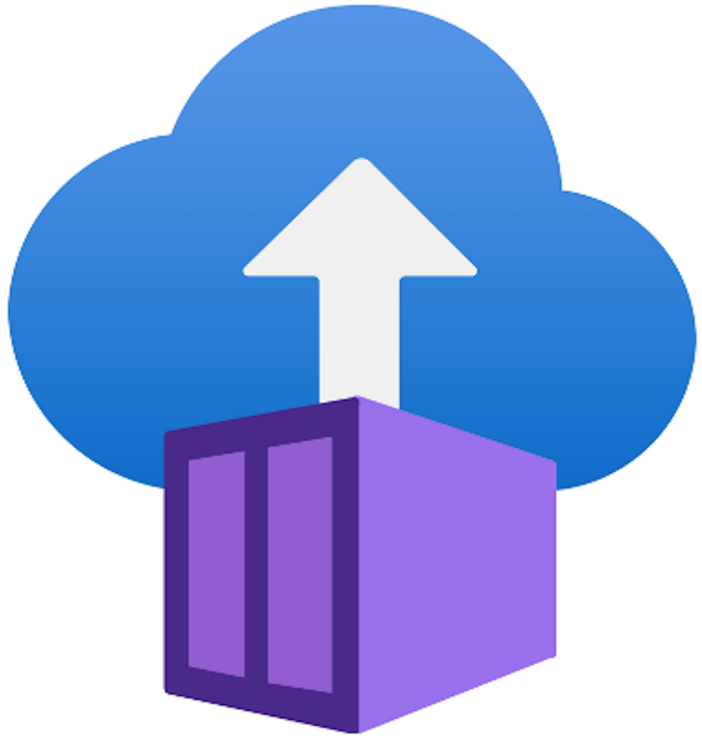


AKS provides managed Kubernetes.

- AKS simplifies container deployment
- Auto-manages and scales clusters

Note: AKS costs depend on cluster size and apply even without active containers

# Azure Container Instances



Azure Container Instances is a serverless container service.

- No need to manage the underlying infrastructure
- Fast deployment for containers
- Useful for containers on demand
- Good for short-term container use
- Pay for only the resources used

# Azure Container Apps

A fully managed application platform for modern applications and microservices.

- Microservice - a small unit of code
- Splits apps into smaller, independent parts
- Self-contained units for specific functions
- Deploy apps from code or containers
  - Avoids creation of complex infrastructure



# Azure Container Apps



- Can be confused with Azure App Service
  - Both are designed to host applications
- Azure Container Apps:
  - Offer a flexible environment
  - Specifically for use with containers
- Azure App Service:
  - Specializes in hosting web apps/APIs
  - Not used for containerized applications

# Let's practice!

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# Azure Storage Services

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# Navigating Storage Needs

- A vast repository of image files accessed via the internet
- Petabytes of mixed legacy data for analytics
- Shared files for internal use and collaboration
- Backing up and recovering critical business data

- **Azure Blob Storage**, low latency, scales well, unstructured data
- **Azure Data Lake**, variable latency, structured and unstructured data
- **Azure Files**, low latency file sharing, structured, scalable.
- **Azure Backup and Recovery**, variable latency, optimized for backup and recovery

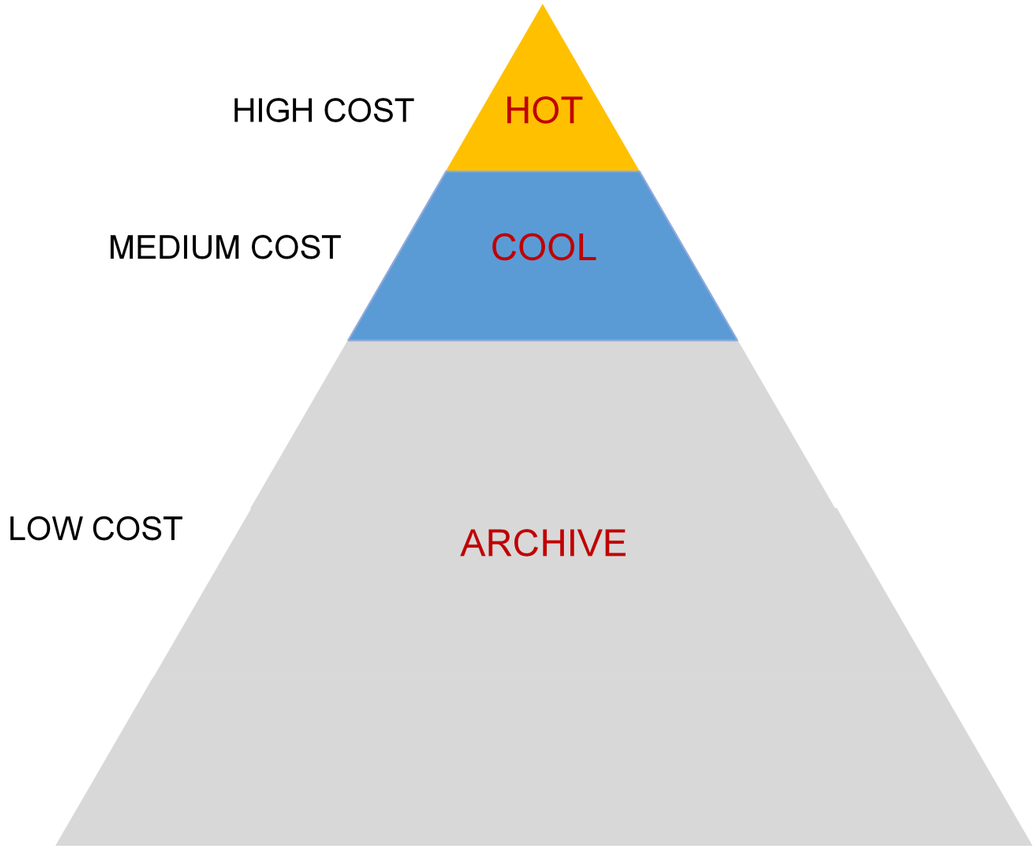
# Storage Tiers

Azure has multiple storage tiers.

The tiers are:

- Hot access = Frequently Accessed
- Cool Access = Infrequently Accessed
- Archive = Long-term Retention

Balance cost and accessibility for your data



# Data Redundancy

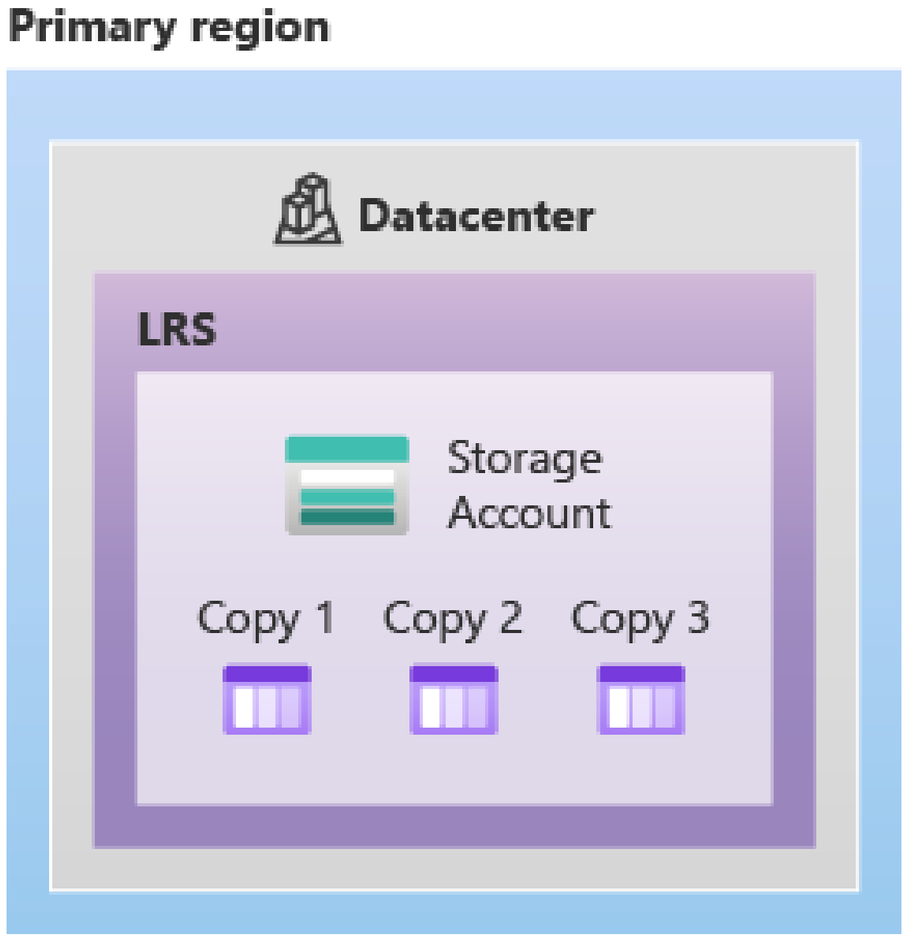
Involves duplicating your data to create a safety net for availability, with different levels of this approach.

- Locally Redundant Storage (LRS)
- Geo-Redundant Storage (GRS)
- Zone-Redundant Storage (ZRS)



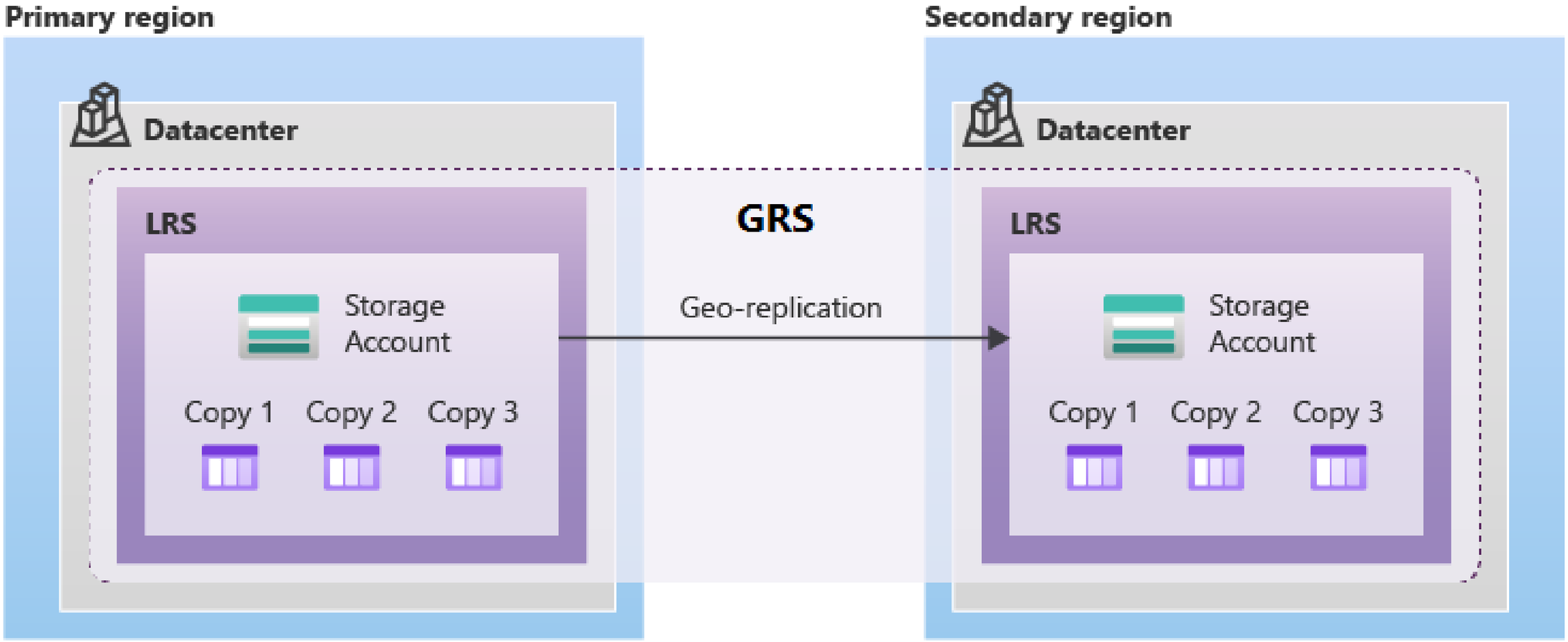
# Data Redundancy

**Locally Redundant Storage:** multiple copies in one datacenter



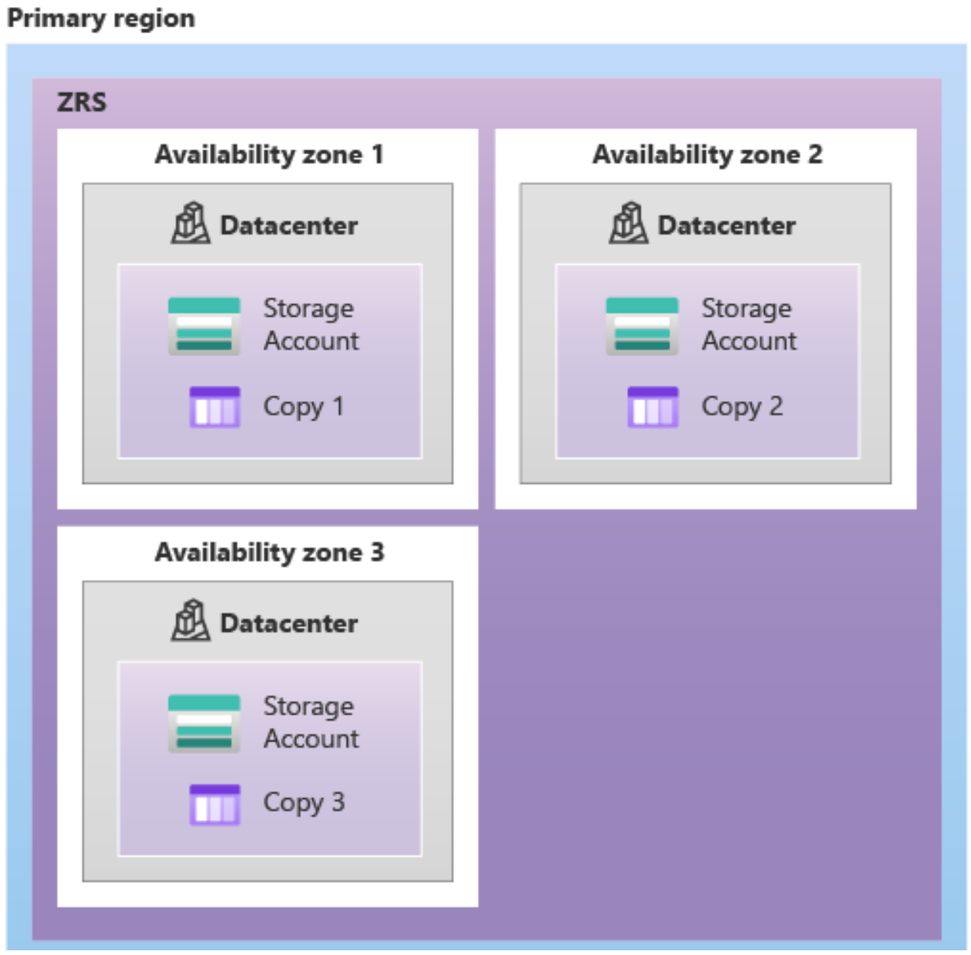
# Data Redundancy

**Geo-redundant storage:** copies across different regions

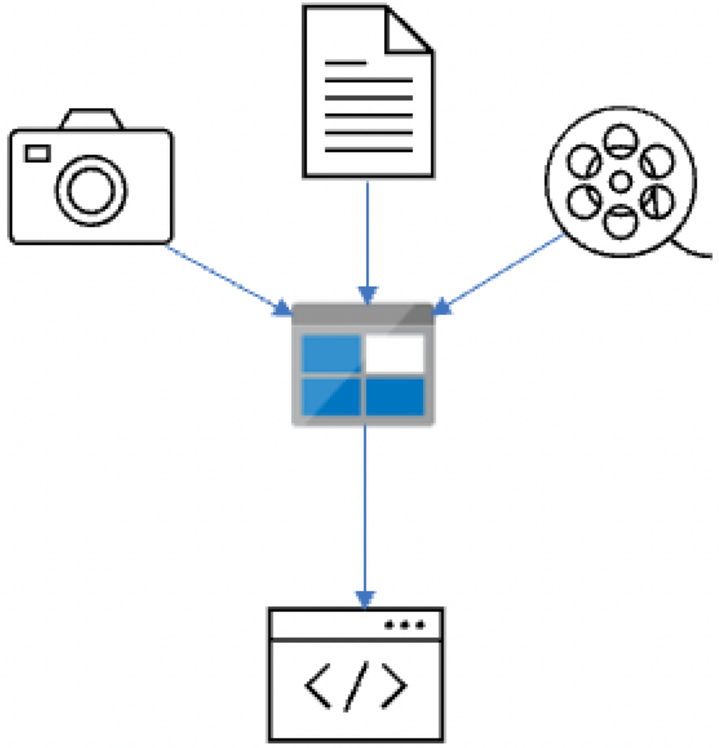


# Data Redundancy

**Zone-redundant storage:** copies in availability zones within one region



# Azure Blob Storage



Designed to store unstructured data like text or binary data.

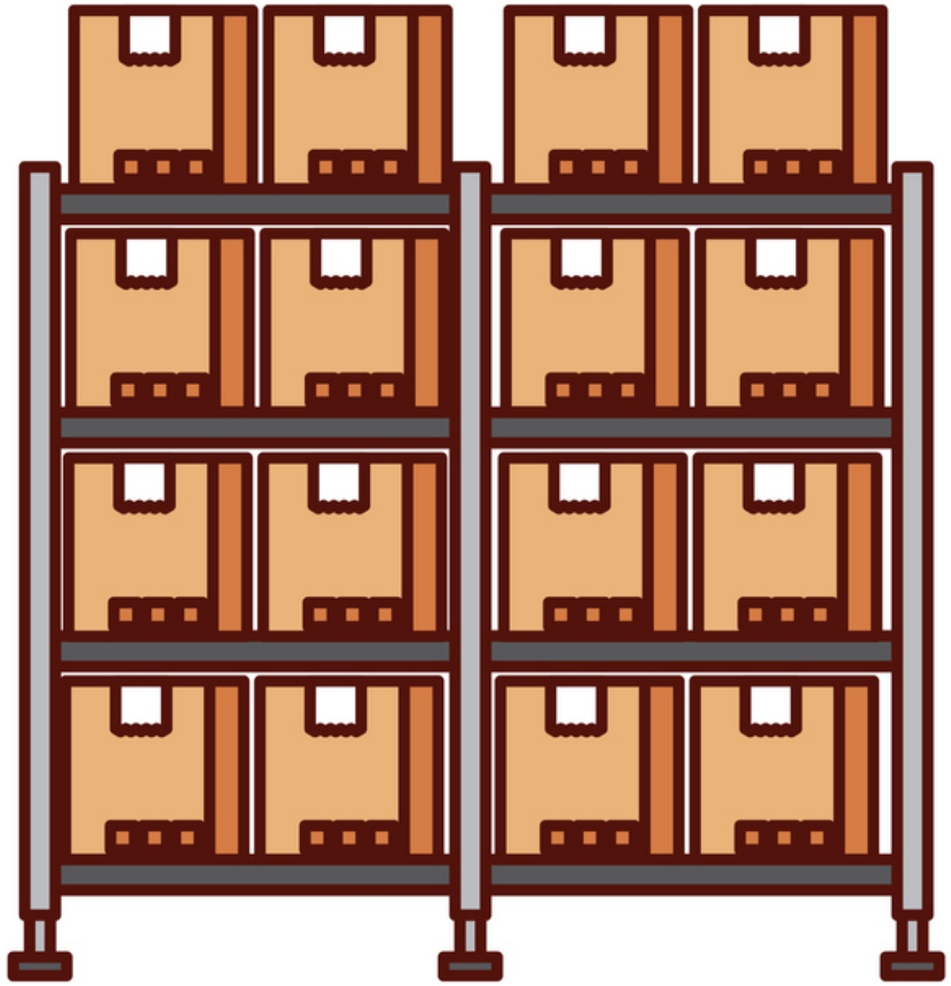
It's like a high tech storage unit for your things.

- Ideal for serving images, videos, documents, and backups
- Multiple storage tiers and redundancy
- Access objects via HTTP/HTTPS from anywhere

# Azure Data Lake Storage

A powerful solution for big data analytics.

- A centralized repository for all data
- Can handle huge data volumes
- Tiered storage options ensure data accessibility and availability



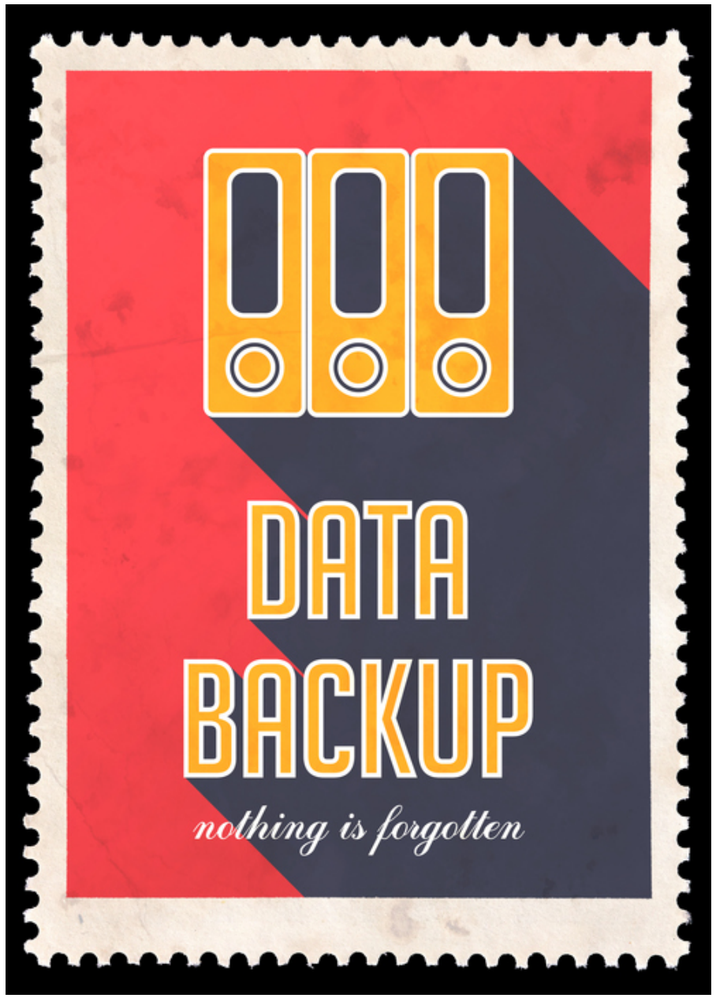
# Azure Files




Managed file sharing.

- Integration with Windows applications
- Designed to handle large amounts of data
- Multiple data redundancy options
- Integrates with other Azure services

# Azure Backup and Recovery




Safeguard your data.

- Easy recovery and data restoration
- Tightly integrated with Azure Storage Services
- Efficiently restore data and applications
- Seamless backup for on-premises and cloud

# Let's practice!

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# Data Processing in Azure

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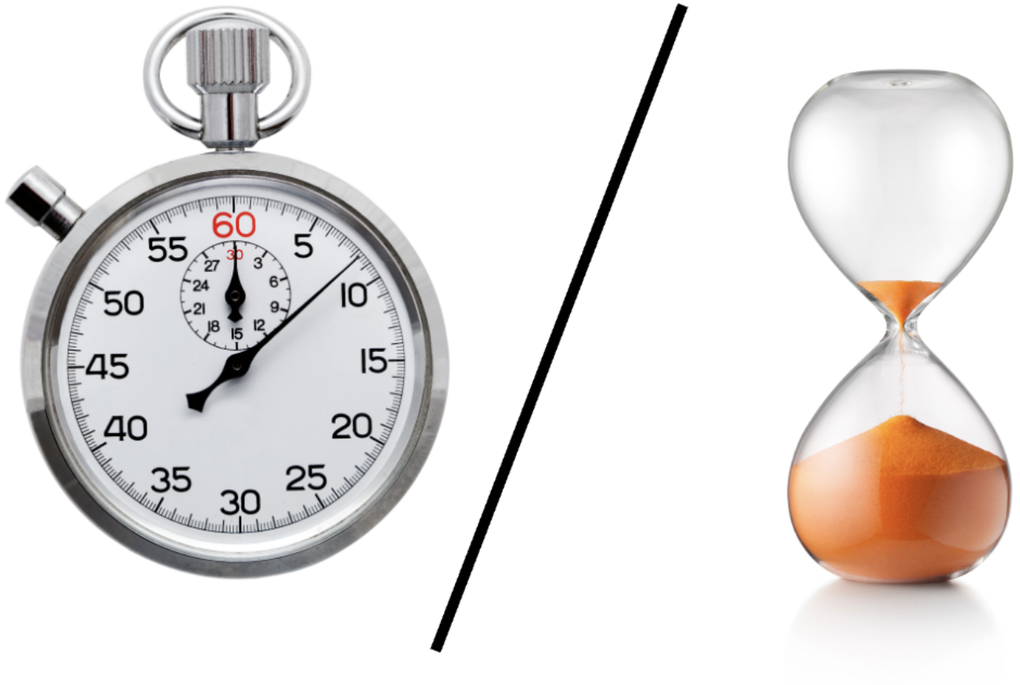
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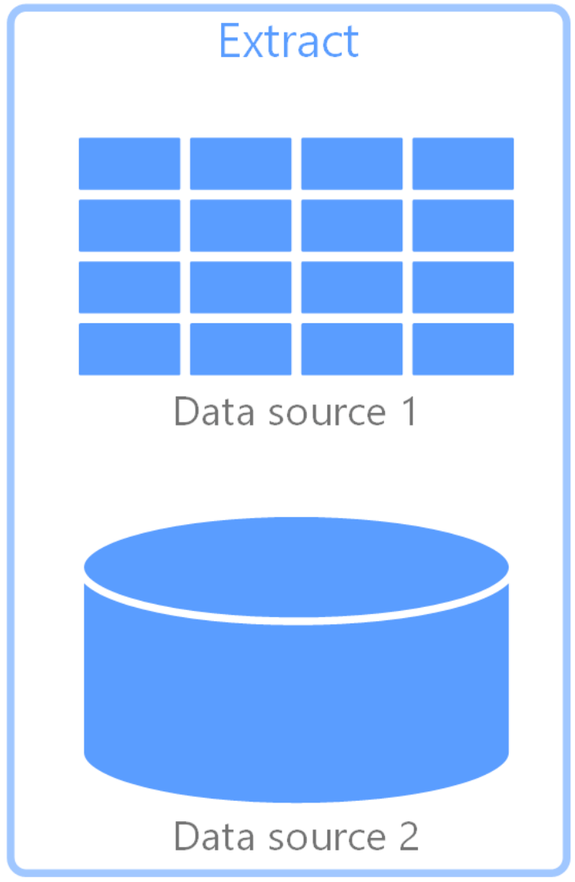
# Real-time vs Batch Processing

Some services are real-time, and some are batch.

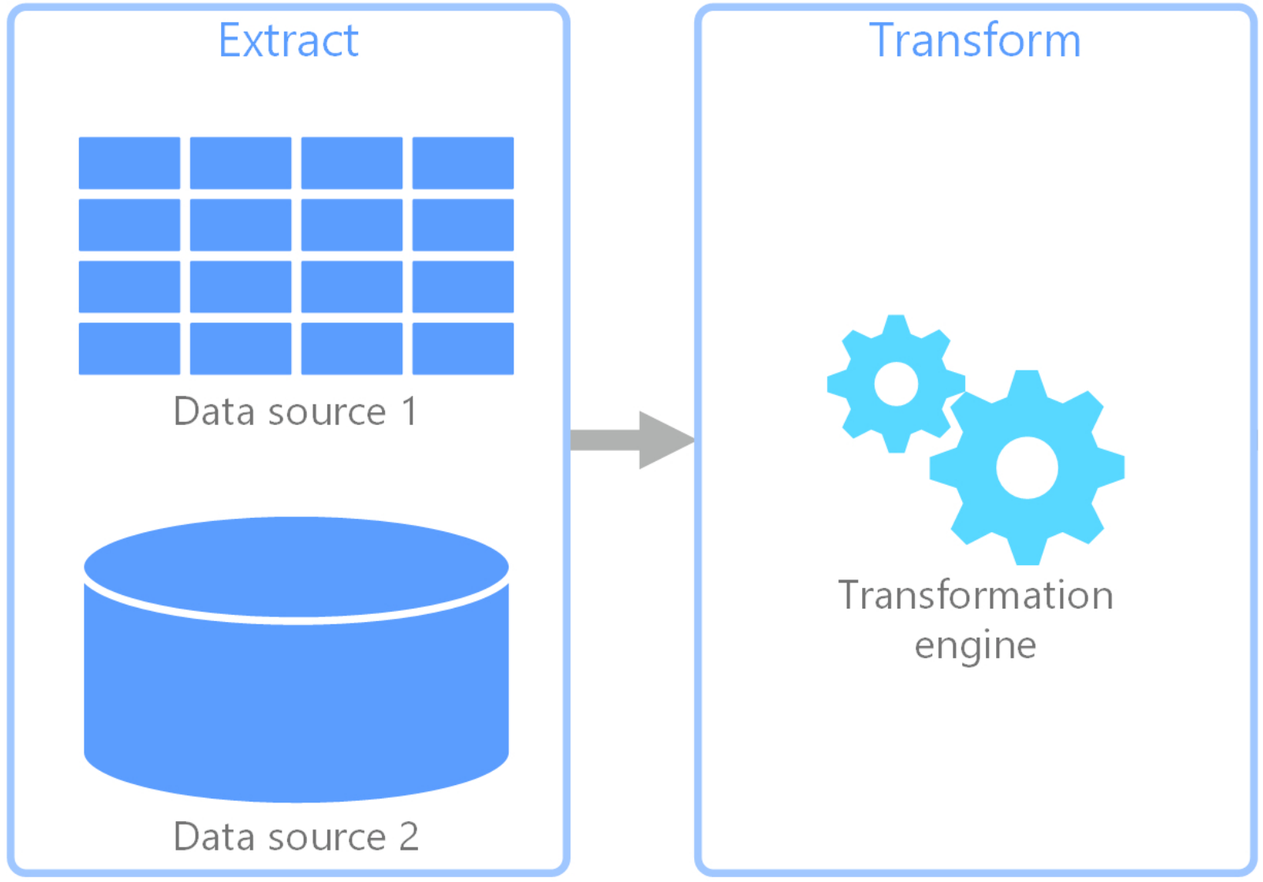
- Real-time: Immediate analytics (e.g., Azure Stream Analytics)
- Batch: Scheduled or ad-hoc analytics (e.g., Azure HDInsight)
- Different infrastructure and cost implications



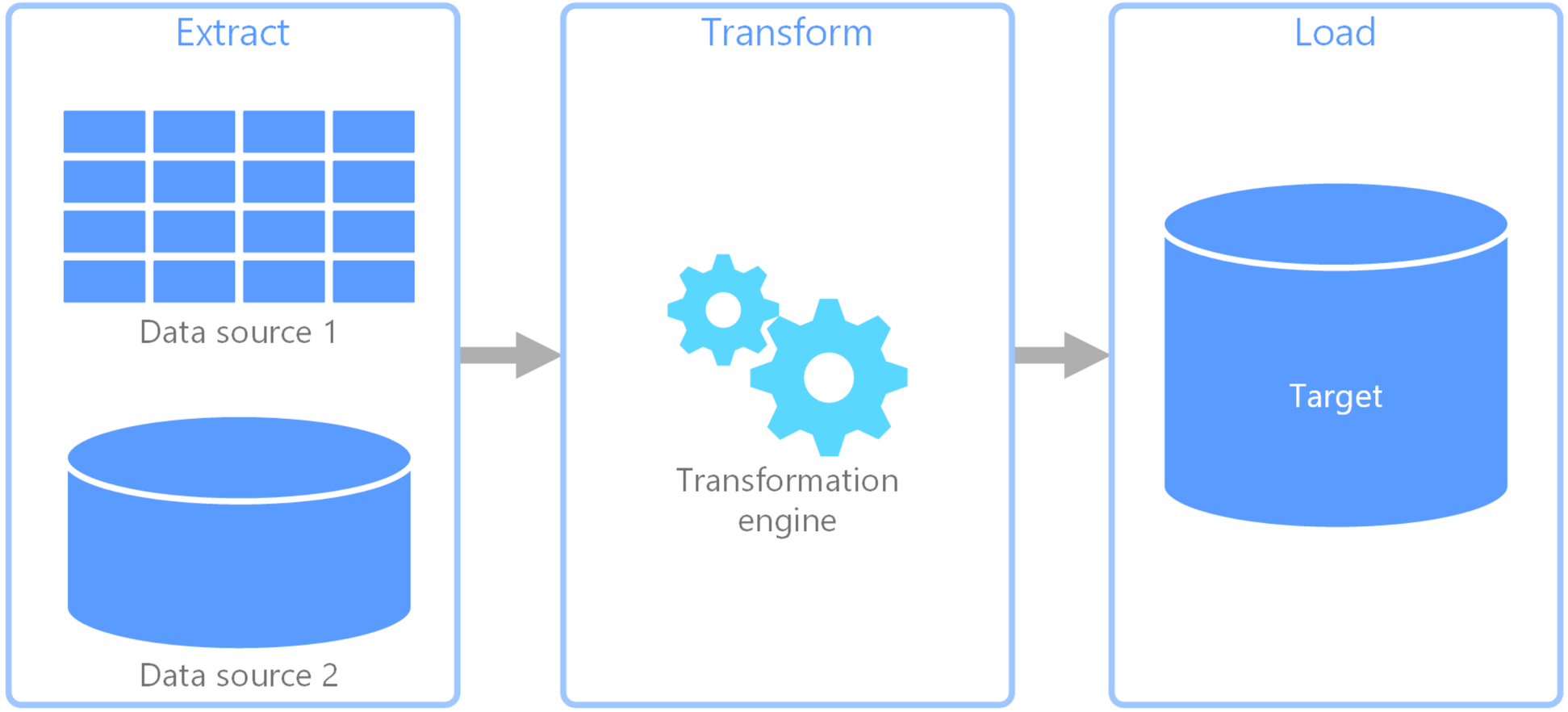
# ETL Processes



# ETL Processes



# ETL Processes



# Azure Synapse Analytics



Merge big data and traditional data warehousing.

- Unified Analytics Service
- Integrated with Power BI, Data Lake, and Blob Storage
- Real-time or batch
- Provisioned resources

# Azure Stream Analytics



Stream Analytics excels in scenarios demanding immediate insights.

- Real-time analytics
- Stream processing
- Quick Setup

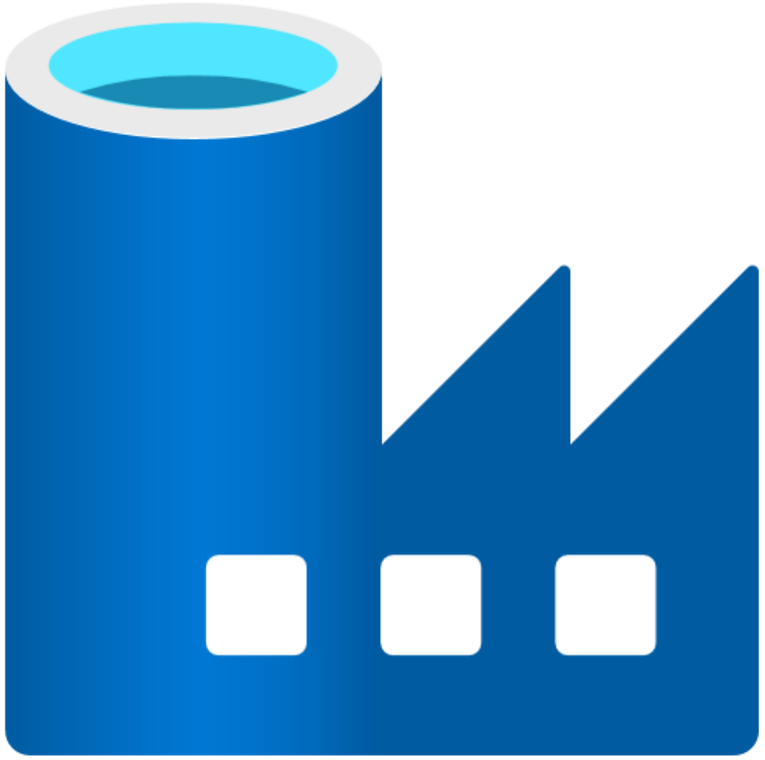
# Azure Databricks

It's an analytics platform optimized for Azure.

- A computing system designed for big data processing and analytics
- Collaborative workspace for data scientists and engineers
- Built-in Data Lake support
- Real-time and batch



# Azure Data Factory



A cloud-based data integration service for data workflows.

- Data integration service
- ETL simplified
- Supports multiple sources and formats
- Automate data workflows

# Azure HDInsight



Azure HDInsight is a managed Hadoop service.

- Hadoop is a platform for big data
- Built for large-scale data processing
- Supports various Hadoop ecosystem components
- Seamlessly connects with Azure storage solutions
- Easily scales resources based on demand

# Let's practice!

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