# Overview of Azure Compute - Part 1

INTRODUCTION TO AZURE

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Technical Lead and Training Architect

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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 Compute?

# Virtual Machines

- On-demand, scalable and customizable computing power
- Power of a physical computer in a virtual environment

# Virtual Machines

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- Control over OS and applications

# Virtual Machines

- On-demand, scalable and customizable computing power
- Power of a physical computer in a virtual environment
- Control over OS and applications
  - Windows, Linux etc.

# Virtual Machines

# App Service

- Supports web and mobile development
- Build, deploy, and scale APIs and applications
- Developers focus on code instead of infrastructure
- Continuous integration through version control tools

# Functions

- Allows event-driven code execution
- Intelligent traffic lights
  - change color based on certain triggers
- With Azure Functions triggers include:
  - HTTP requests, database changes, specific event
- Auto-scales to meet demand, maintaining applications responsiveness

# Summary

- Azure Compute provides scalable resources on demand
- Cost-effective with pay-as-you-go for sporadic workloads
- Fully managed services; Microsoft handles infrastructure and updates
- Focus on app development, not hardware management

# Let's Practice

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# Overview of Azure Compute - Part 2

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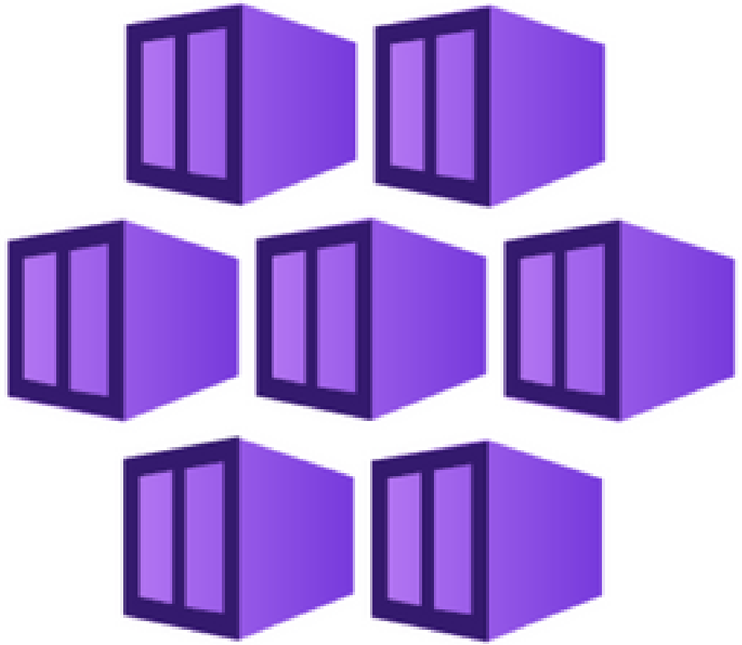
# Containers

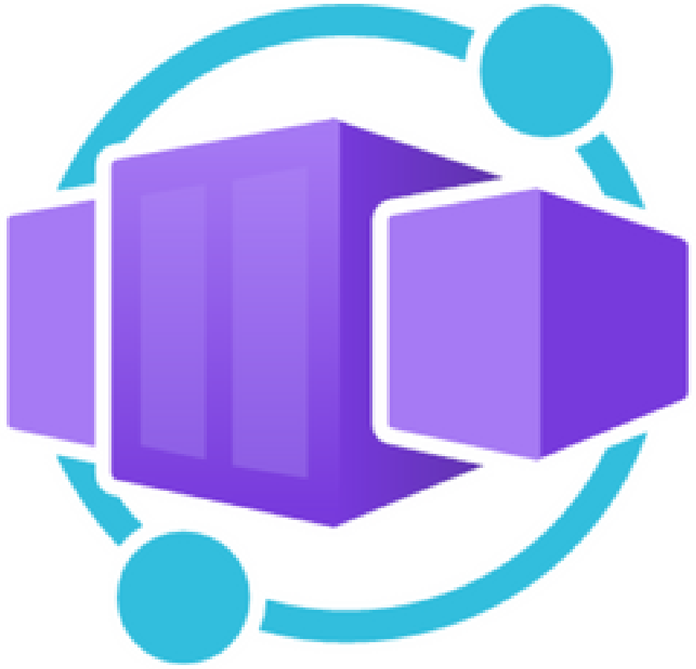
- Containers are like motor homes:
  - portable and self-contained
- Motor homes contains
  - kitchen, bedroom, and bathroom
- Containers package all necessary components to run an application

# Containers

- Bundles apps with all dependencies into a portable package
- Runs on any machine, avoiding compatibility issues
- Easily moves between different environments
- Supports simultaneous running of multiple containers

# Containers

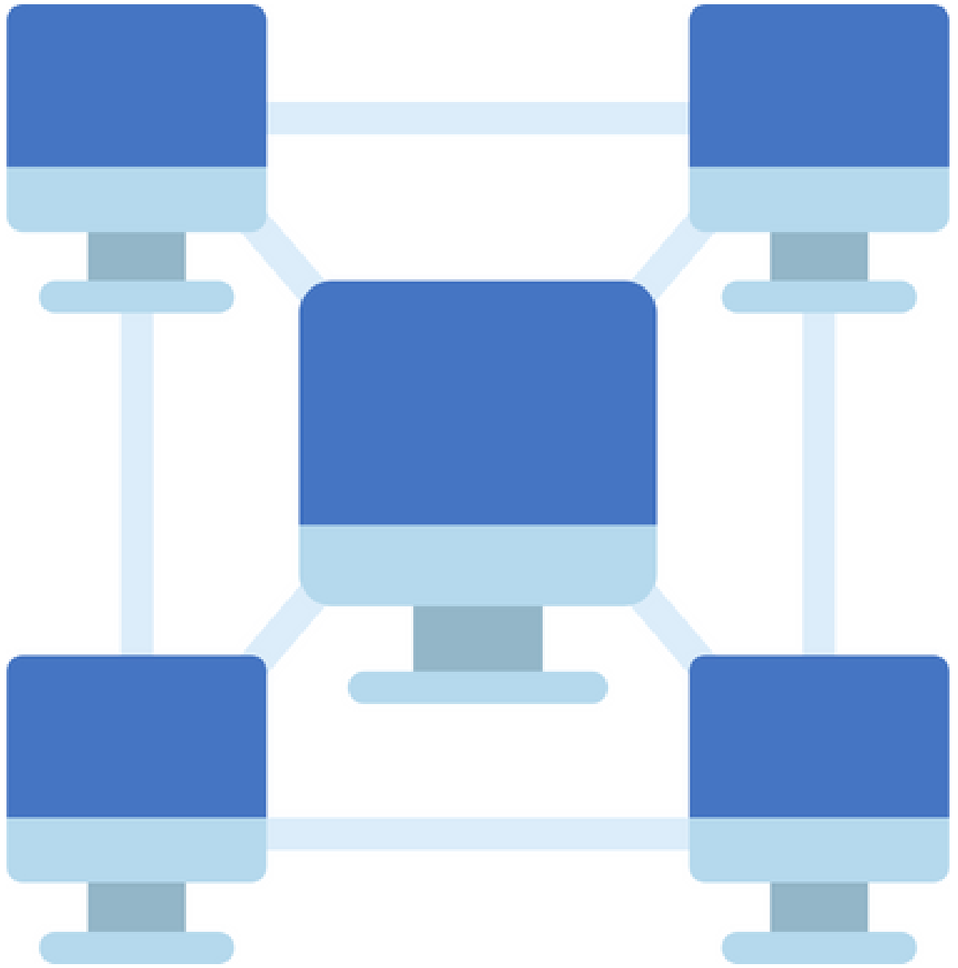




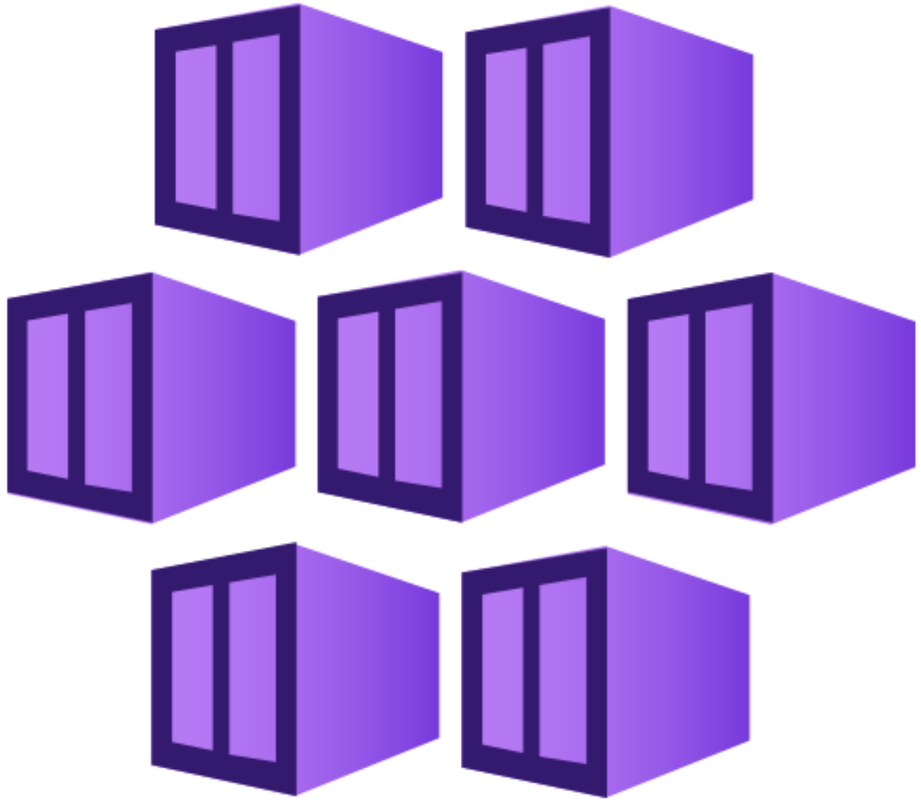
# Kubernetes

# Kubernetes

- Manages containers across a group of computers
  - clusters
- Kubernetes cluster - unified set of containerized applications working together
- Cluster forms the backbone of Kubernetes
- Workloads are deployed and supervised



# Azure Kubernetes Services



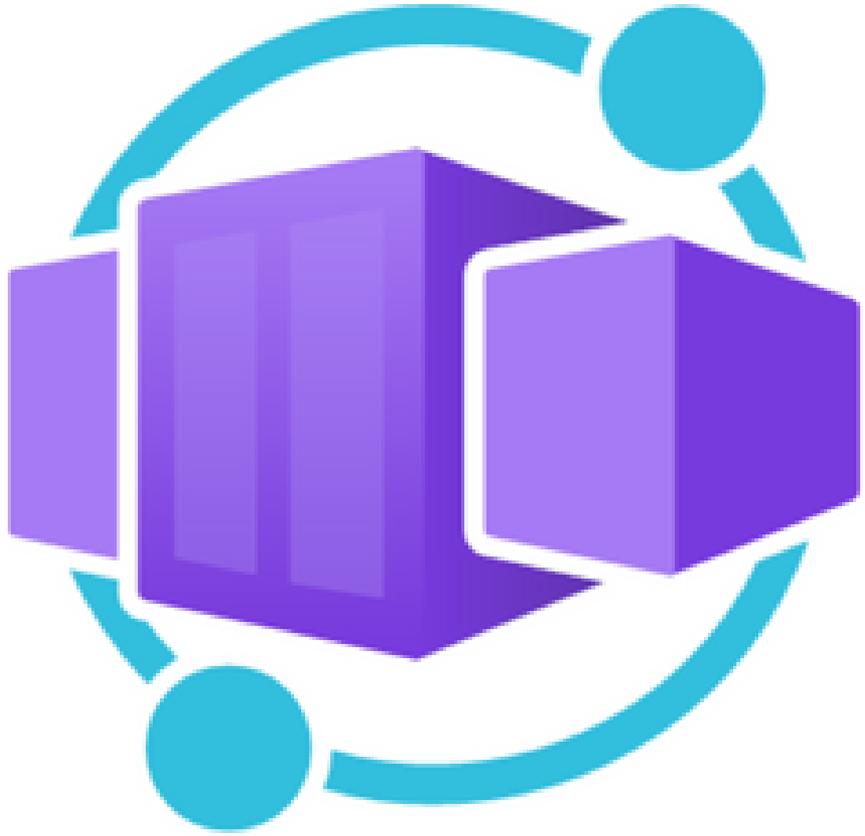
- Azure's AKS automates container tasks:
  - scheduling, monitoring, scaling
- Enables easy build, test, and deployment of applications

# Azure Container Instances

- Azure Container Instances offers serverless container execution
- Ideal for quick development and testing
- Supports batch jobs, microservices deployment, and specific workloads
- Lightweight, less complex than AKS
- Lacks AKS's full orchestration features

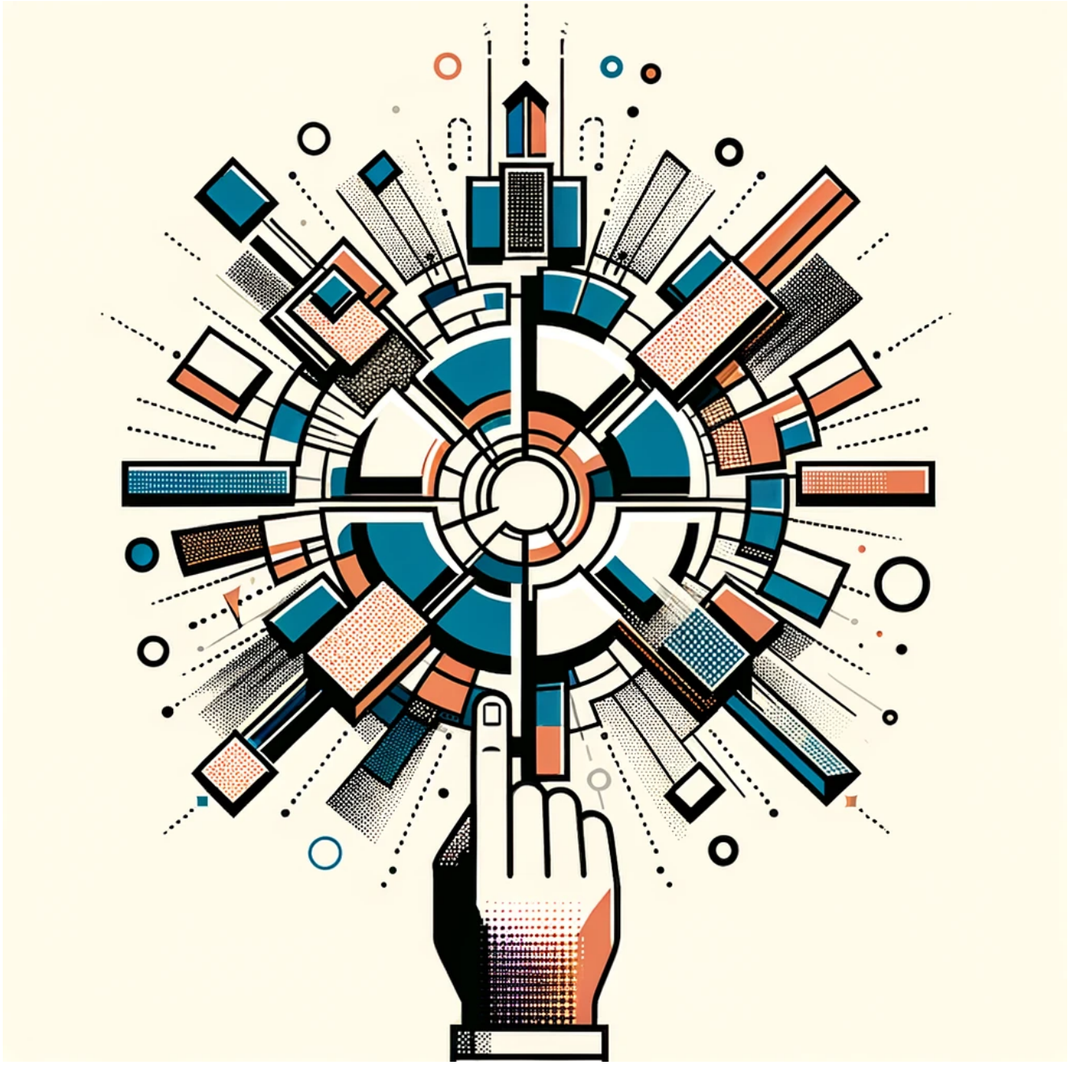
# Azure Container Apps

A fully managed application platform for modern applications and microservices



# Azure Container Apps

- Microservice - 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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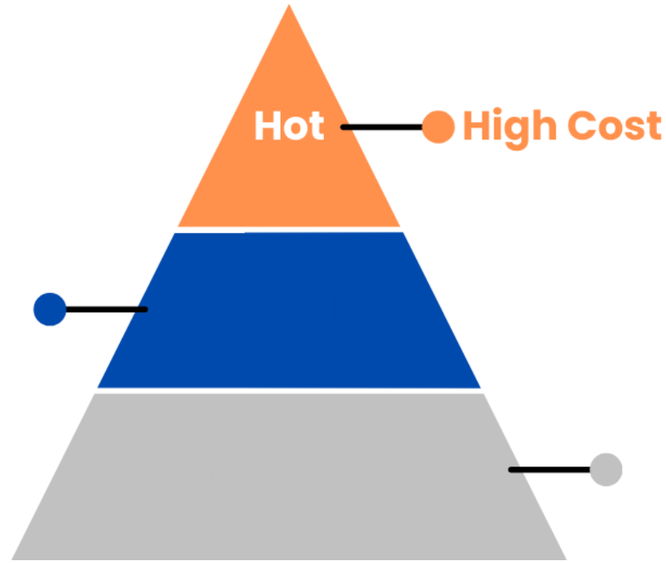
# Navigating storage needs

- Azure provides diverse storage for various needs
- Supports businesses in digital transformation challenges

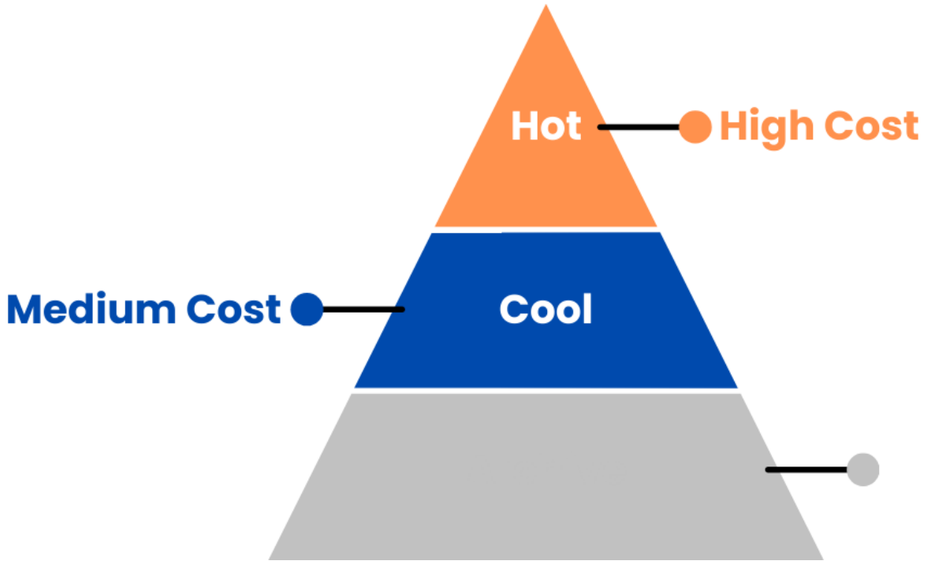
# Storage tiers

- Azure storage tiers tailored for access and cost
- The tiers are:
  - Hot: fast, for frequent access, higher cost



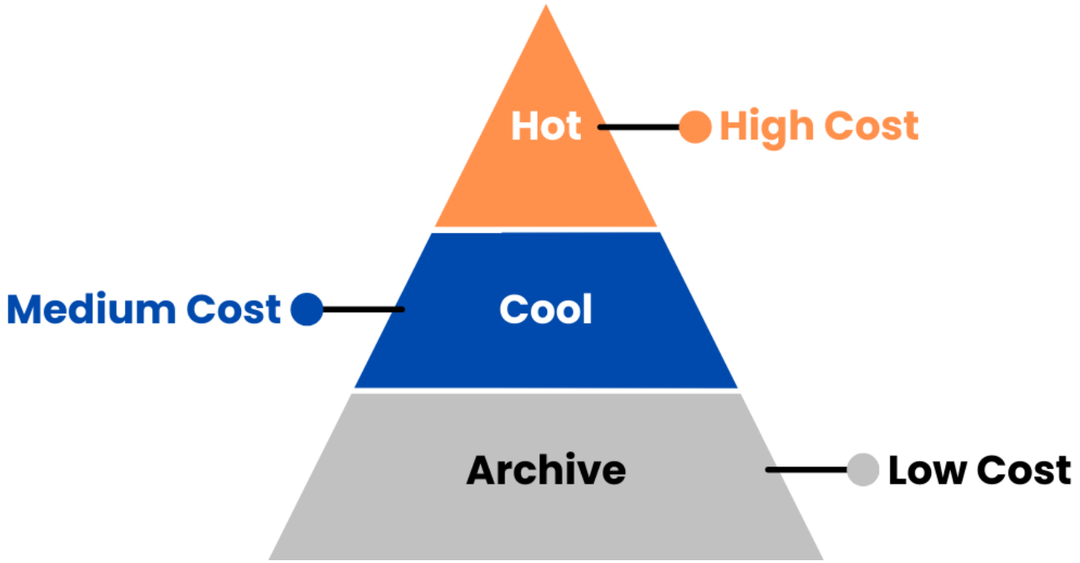
# Storage tiers

- Azure storage tiers tailored for access and cost
- The tiers are:
  - Hot: fast, for frequent access, higher cost
  - Cool: cost-effective, for less frequent access, still fast

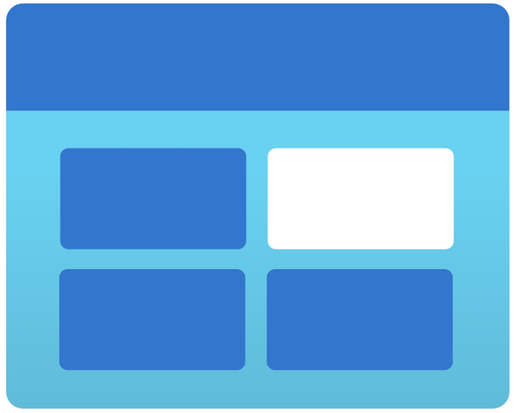


# Storage tiers

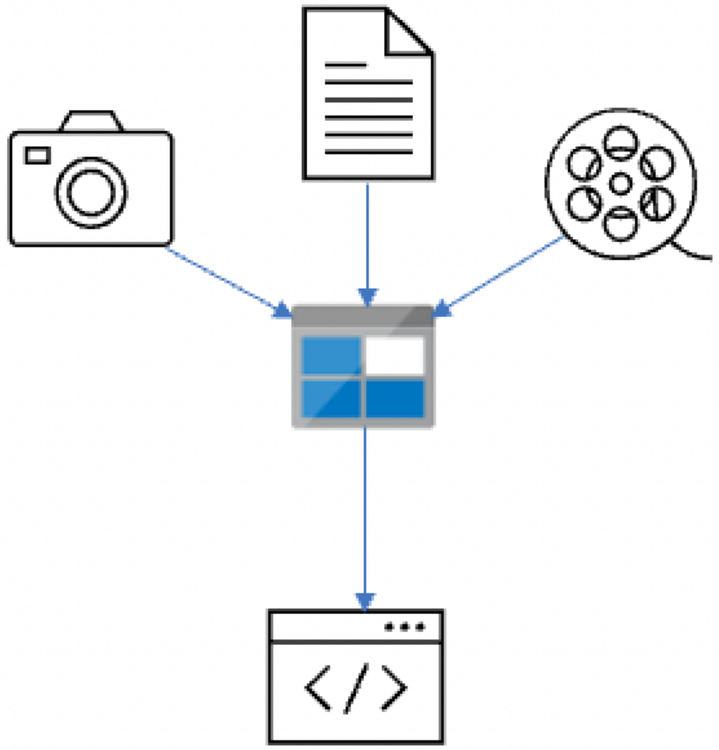
- Azure storage tiers tailored for access and cost
- The tiers are:
  - Hot: fast, for frequent access, higher cost
  - Cool: cost-effective, for less frequent access, still fast
  - Archive: low-cost, for long-term storage, slow access
- Azure shifts tiers automatically as needed



# Storage offerings



# Azure Blob Storage



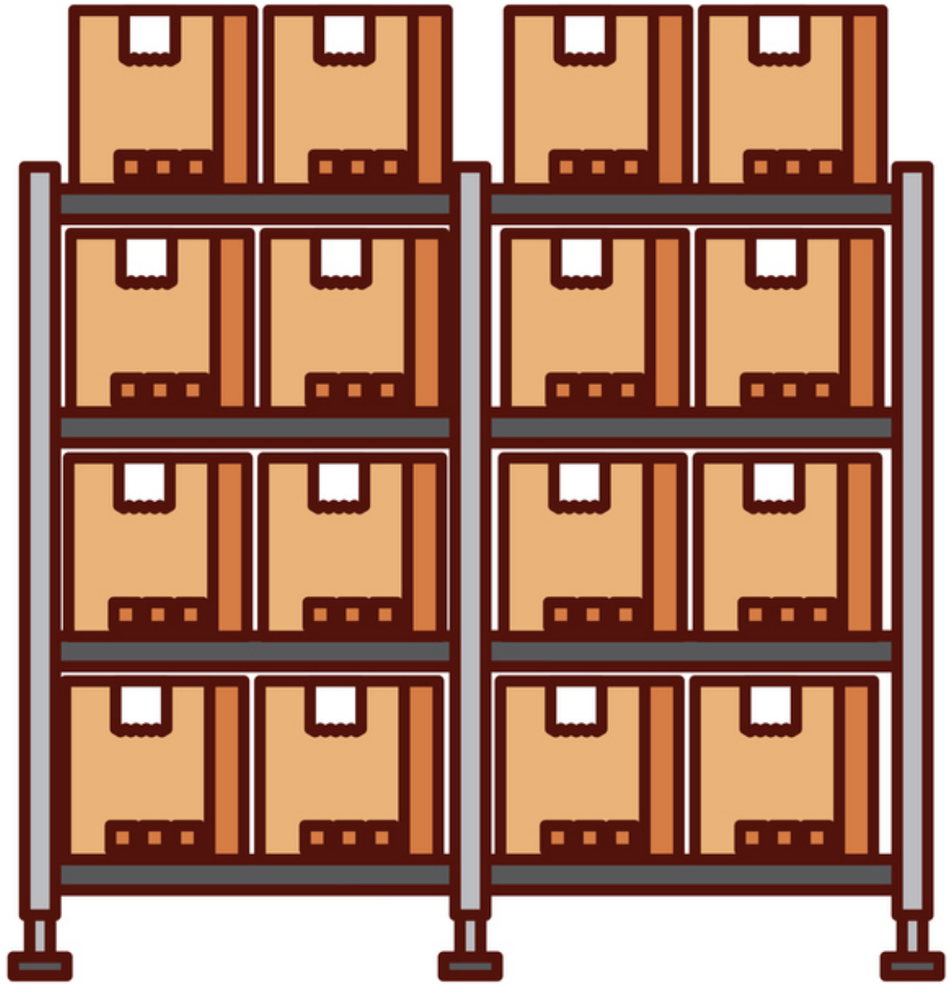
- Blob (**B**inary **l**arge **ob**ject) storage
- Designed to store unstructured data:
  - text, video, or images
- Ideal for serving images, videos, documents, and backups

# Azure Blob Storage

- Blob (**B**inary **l**arge **ob**ject) storage
- Designed to store unstructured data:
  - text, video, or images
- Ideal for serving images, videos, documents, and backups
- High tech version of a modern-day storage facility
- Multiple storage tiers
- Access objects via HTTP/HTTPS from anywhere

# Azure Data Lake Storage

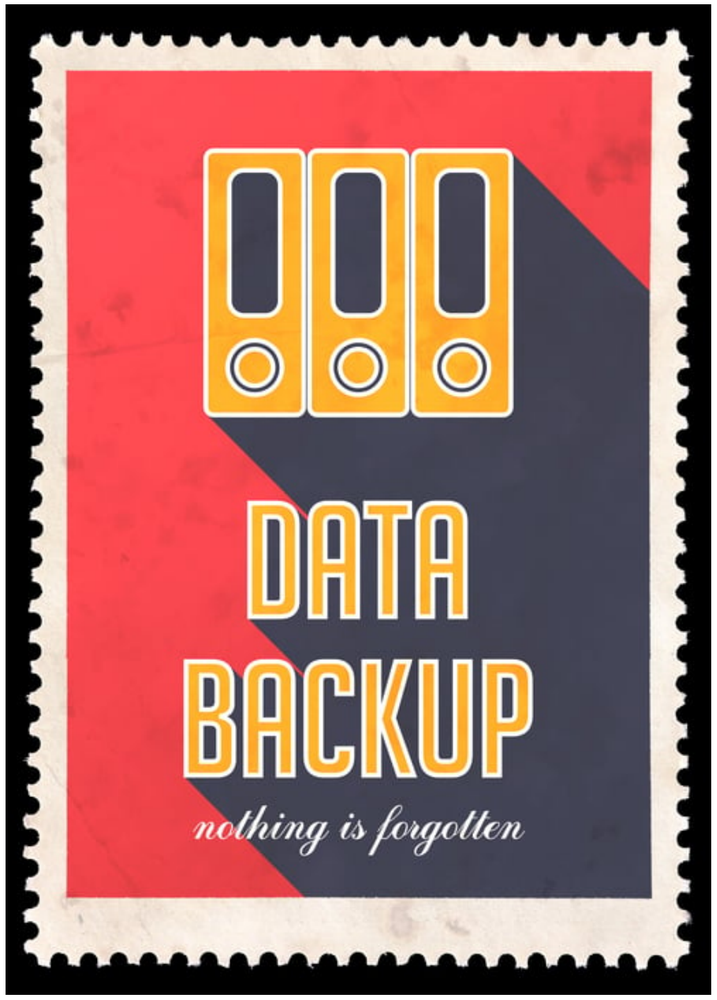
- Combines Blob Storage with file system for large data
- Streamlines data access for analytics
- Suits petabyte-scale structured to unstructured data
- Ideal for complex big data analysis
- Unifies diverse data in one space



# Azure Files


- Offers cloud-managed file sharing
- Enhances internal collaboration within organizations
- Integrates with Windows applications and Azure Services
- Provides redundancy options for data protection

# Azure Backup and Recovery



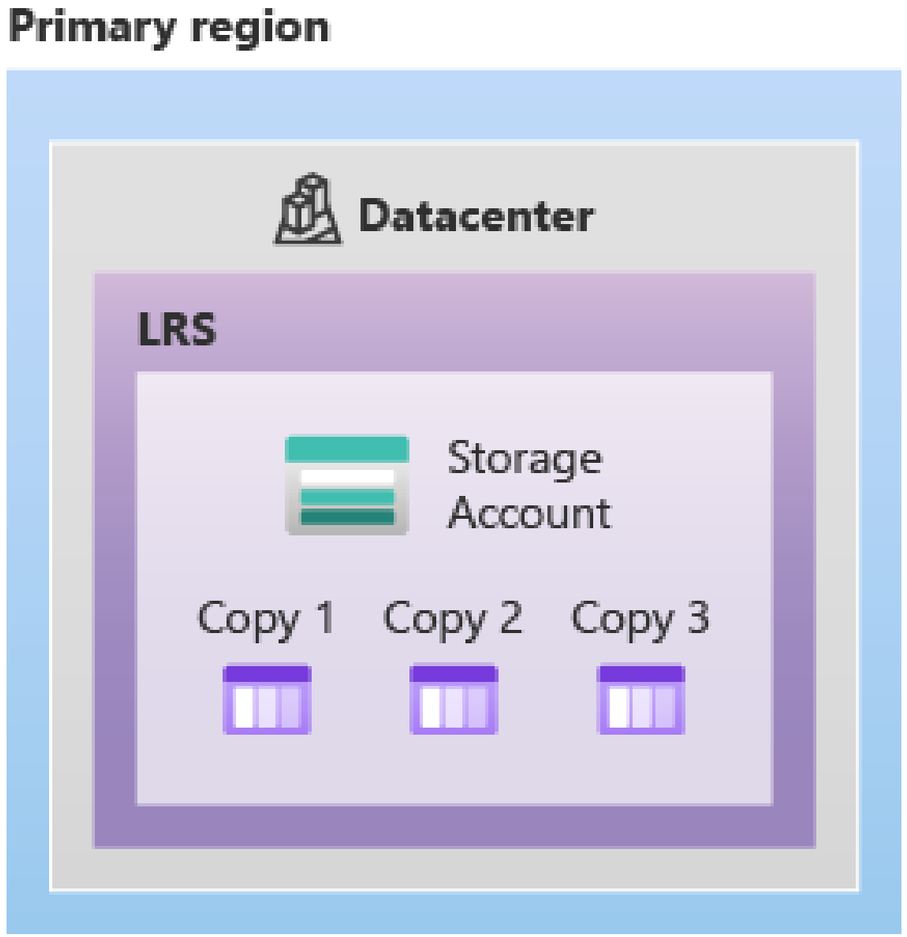

- Azure Backup and Recovery secures on-premises and cloud backups
- Utilizes Azure Storage Services for secure data storage
- Emphasizes data protection and easy disaster recovery
- Backups run seamlessly in the background

# Data redundancy

- Azure data redundancy duplicates data for availability during outages
  - Locally Redundant Storage (LRS)
  - Geo-Redundant Storage (GRS)
  - Zone-Redundant Storage (ZRS)

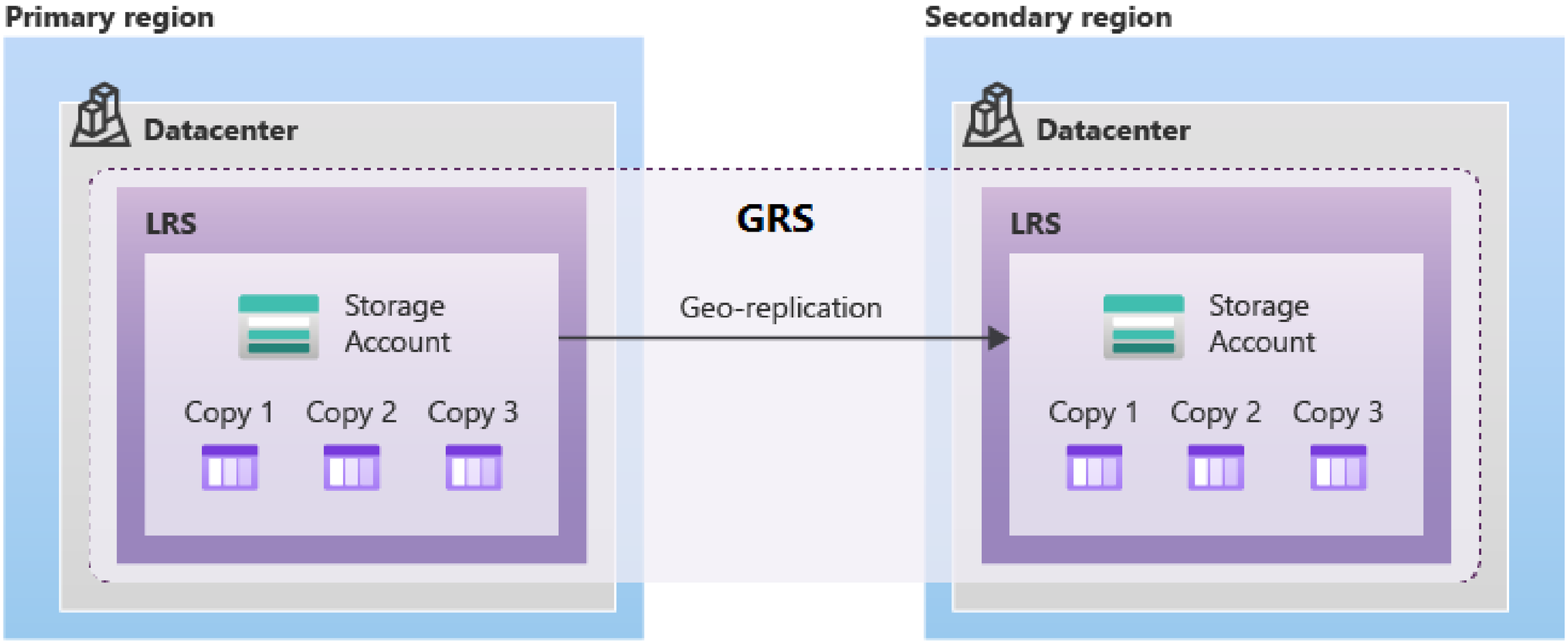
# Data redundancy

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



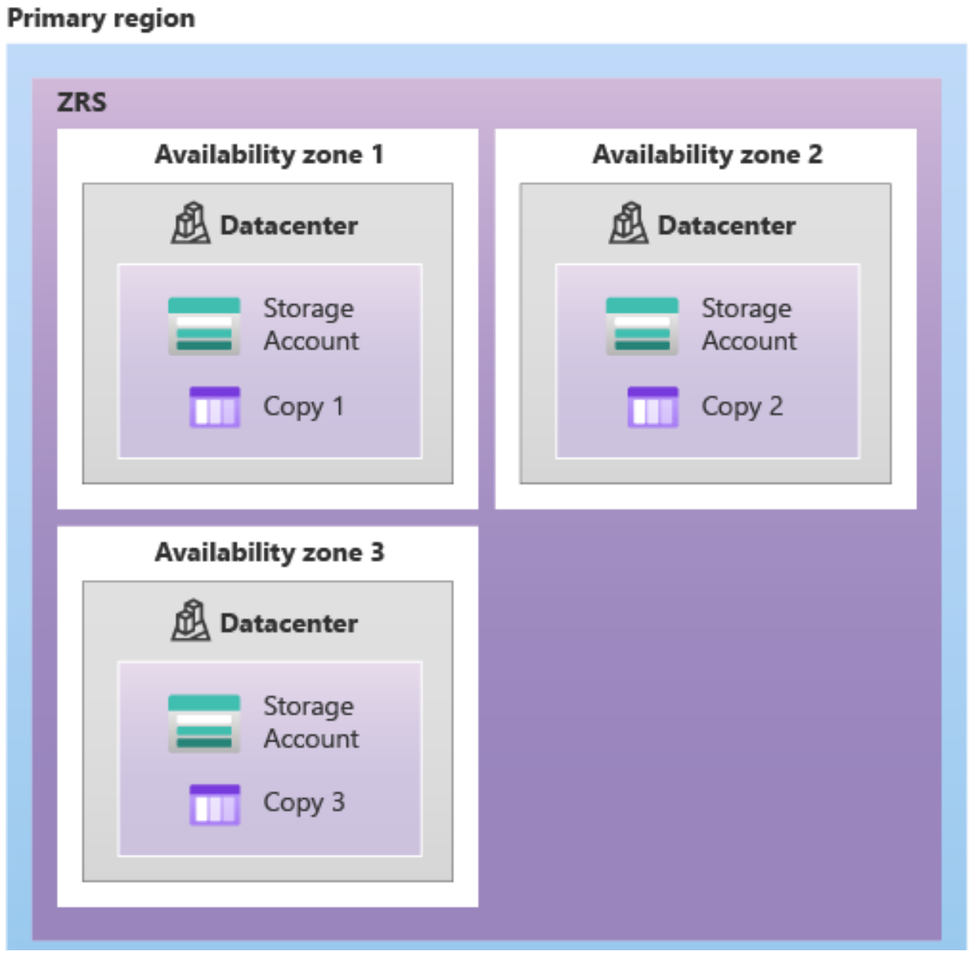
# Data redundancy

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



# Data redundancy

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



# Let's practice!

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# Creating an Azure storage account

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# Let's practice!

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# Data Processing in Azure

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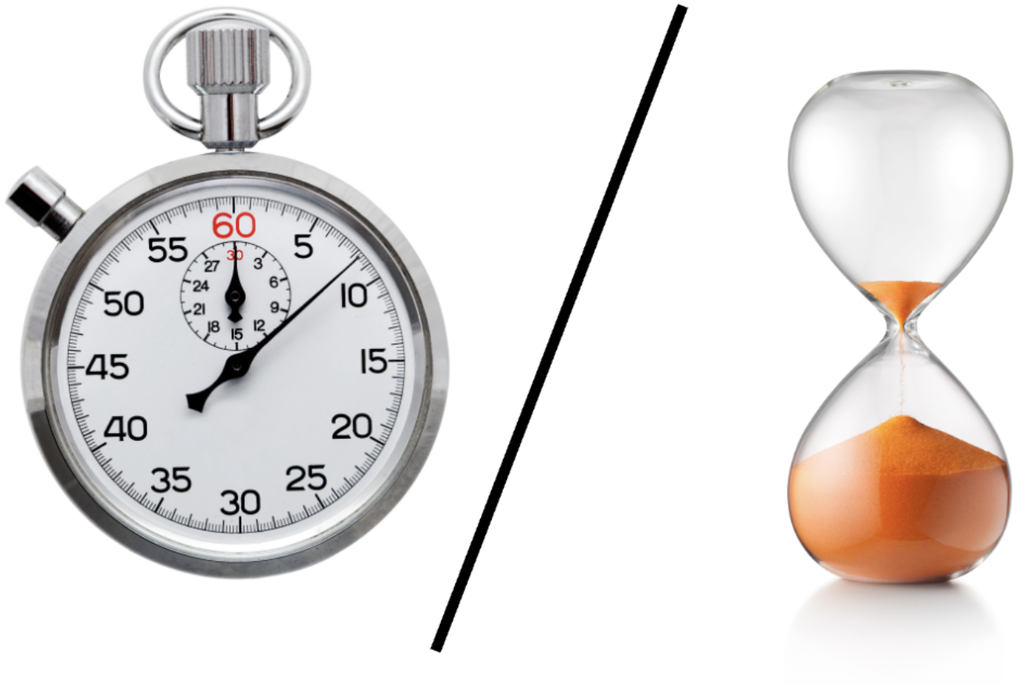
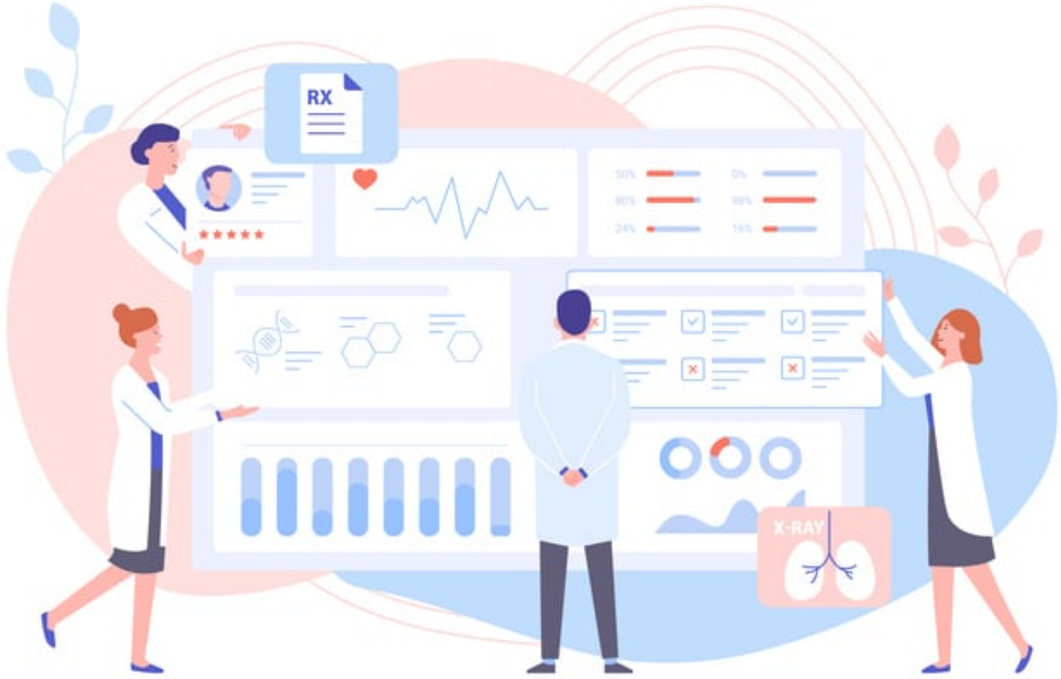
# Real-time vs Batch Processing

- Consider processing type before choosing a service: real-time or batch.
- Real-time: Immediate analytics
- Batch: Scheduled or ad-hoc analytics



# Real-time vs Batch Processing

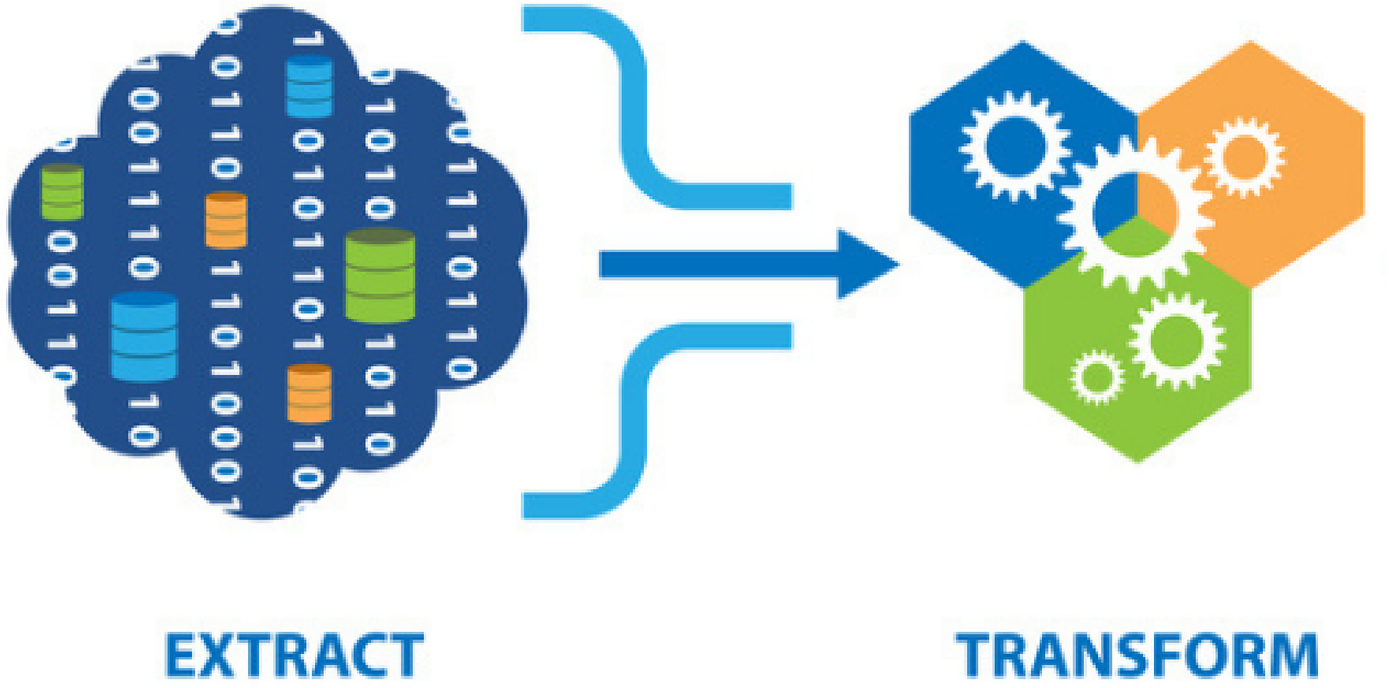
- Consider processing type before choosing a service
- Real-time: Immediate analytics
- Batch: Scheduled or ad-hoc analytics
- **Example in healthcare:**
  - Real-time - hospital emergency dashboards
  - Batch - weekly-updated dashboards
- Different infrastructure and cost implications



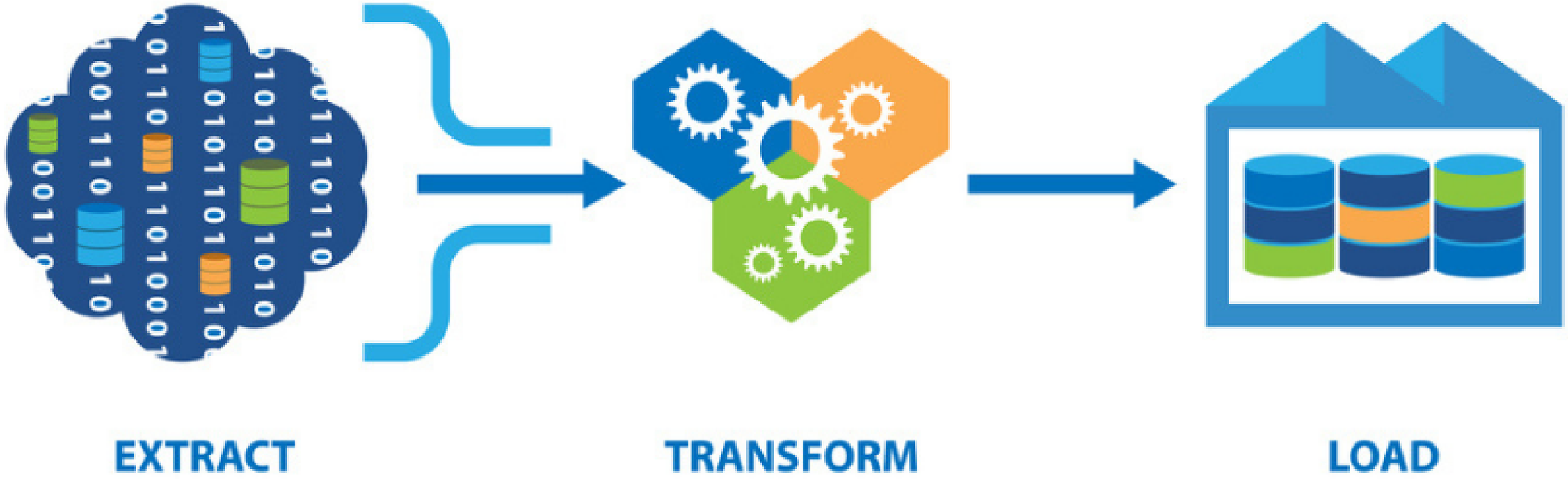
# ETL Processes

EXTRACT

# ETL Processes



# ETL Processes

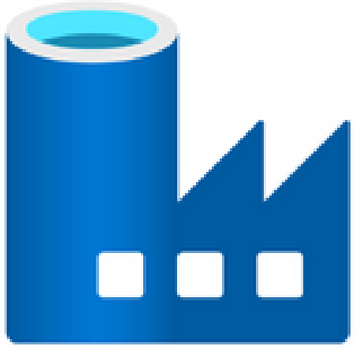


# Processing tools

Synapse Analytics

Stream Analytics

Databricks



Data Factory

HDInsight

# Azure Synapse Analytics

- Part of Microsoft Fabric
  - integrates big data and data warehouses
- Unified experience for data ingestion, preparation, management, and delivery
- Supports real-time insights and batch processing
- Acts as a turbocharged analytics engine

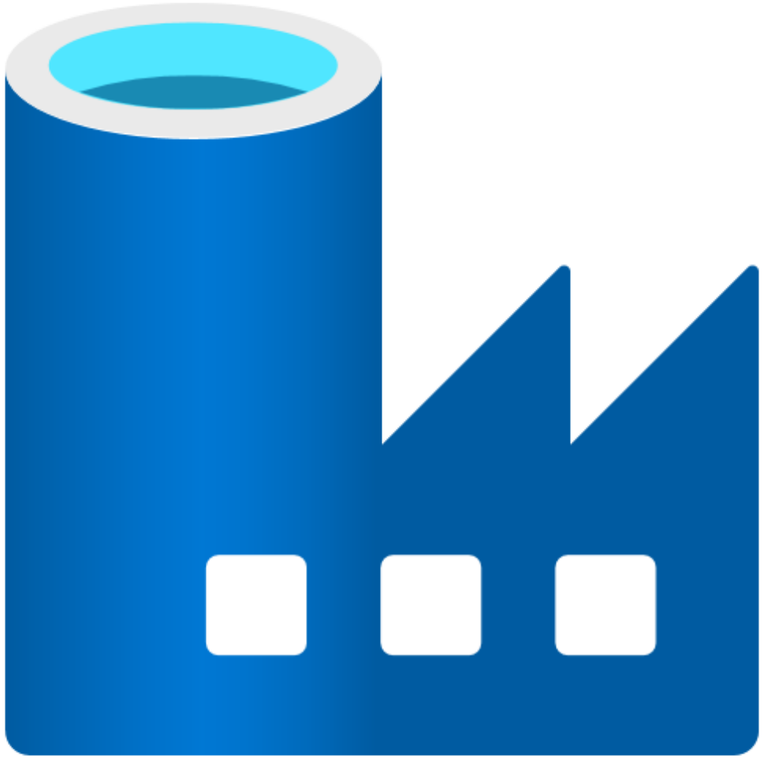
# Azure Stream Analytics

- Enables real-time data access
- Sets up real-time analytics with straightforward query definition
- Handles data streaming from diverse inputs like blob storage
- Essential for immediate insights:
  - fraud detection in a bank
  - dynamic pricing on the stock market

# Azure Databricks

- Microsoft-Databricks collaboration
  - Analytics platform optimized for Azure
- Unified environment for data engineering, analytics, and machine learning
- Collaborative workspace for data scientists and engineers
- Built-in Data Lake support
- Real-time and batch

# Azure Data Factory



- Cloud-based integration service
- Creates, schedules, orchestrates data workflows
- Streamlines ETL processes
- Handles diverse data sources and formats
- Automates workflows for flexibility

# Azure HDInsight

- Managed service for fast, customizable data processing
- Runs on popular open-source platforms:
  - Hadoop
  - Spark
  - Kafka
- Easily scales resources based on demand
- Seamlessly connects with Azure storage solutions

# Let's practice!

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