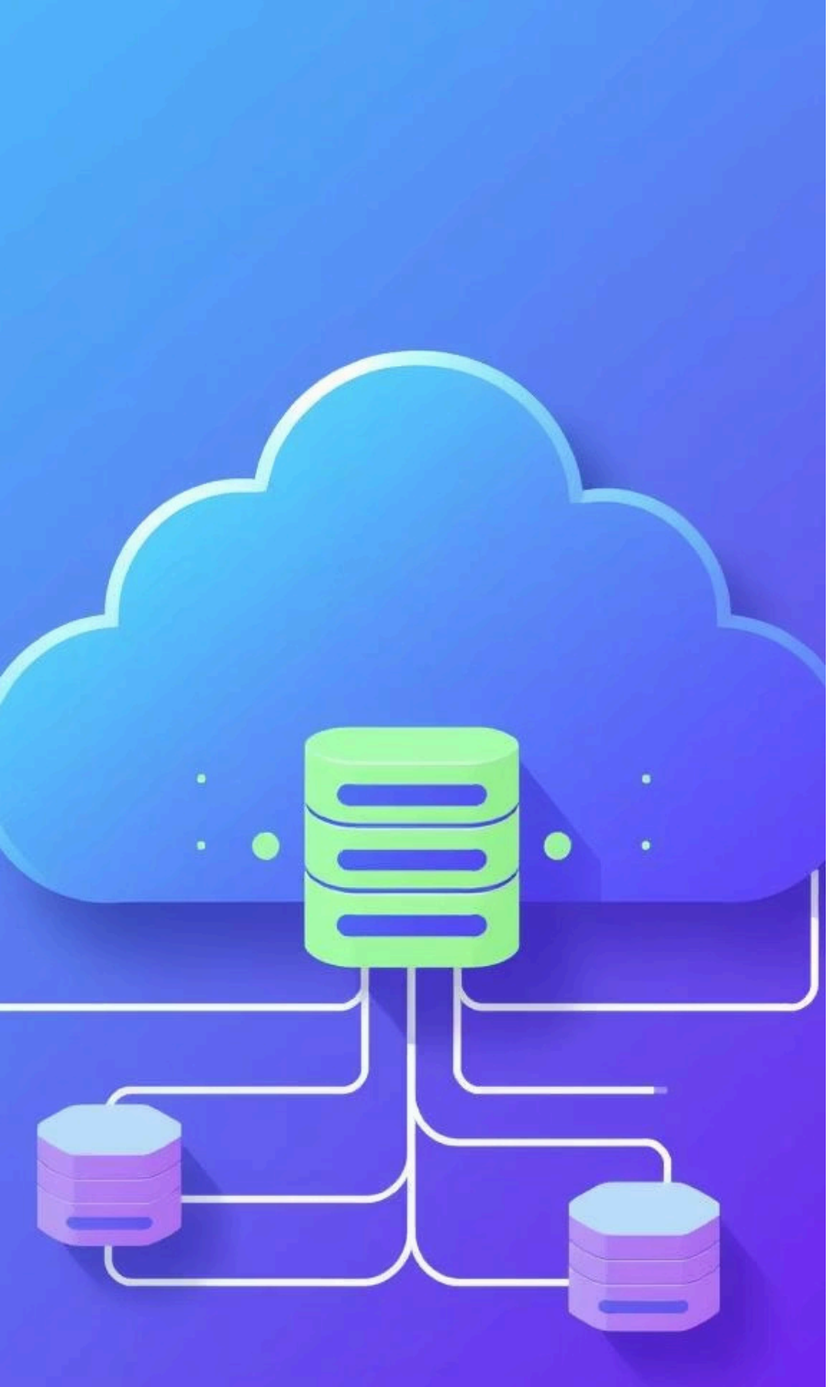


Tanisha Maratha

Roll No. - 32

Azure Container Storage

Cloud - Azure

Simplifying data management for containerized applications.

What is Azure Container Storage?

A Microsoft cloud service designed for storing data for container-based applications.

Cloud Storage Service

Provided by Microsoft for containerized app data.

Best for real-world Applications
Cost-effective and scalable

Useful for Stateful Apps

Helps apps **store and keep data** even if containers restart or move.

No need for complex Setup

No need for complex CSI driver setup — it's native to Azure.

Why Azure Container Storage?

Simplifies storage management, reducing manual effort and errors.

Simplifies Complexity

Replaces complex CSI (Container Storage Interface) drivers for storage connection.

Fast & Built for Containers

Designed specifically for container environments.

Reduces Manual Effort

Automates storage management, minimizing errors.

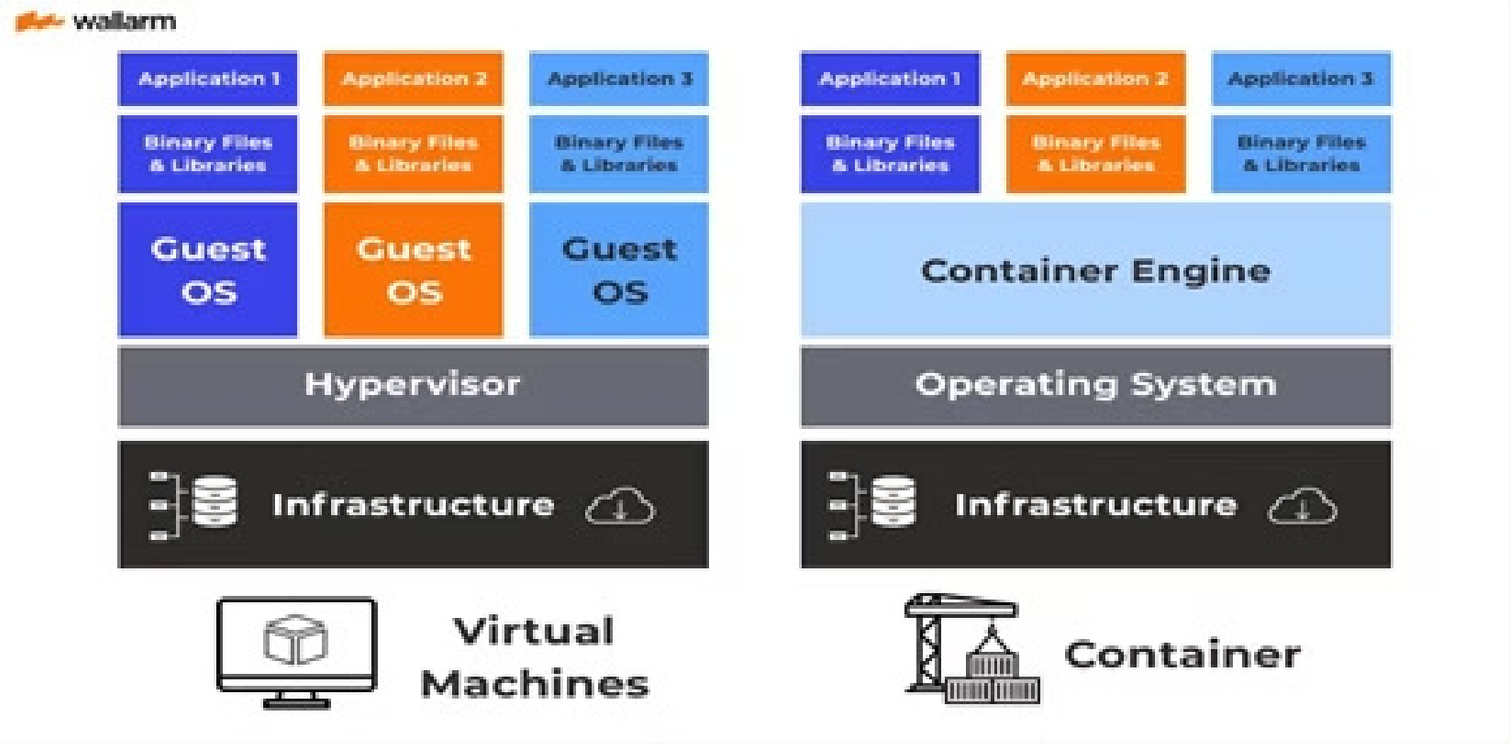
* Fewer Setup Steps Compared to CSI

- Traditional container storage uses **CSI drivers** (manual & complex).
- Azure Container Storage is **fully managed and built-in**.
- No need to write or maintain scripts to connect storage.
- Reduces **deployment time** and errors.

Understanding Containers

Containers package an app's code, tools, libraries, and settings, ensuring consistent operation across environments.

- Self-contained units for applications.
- Run consistently on any computer.
- More efficient than virtual machines for stateful apps.



What is Kubernetes ?

- Kubernetes is an **open-source tool** that helps you **deploy, scale, and manage containers**.
- It **automates** tasks like starting, stopping, and scaling containers.
- Originally developed by Google — now widely used across cloud platforms.

Why Use Kubernetes?

- Keeps your apps running even if something crashes.
- Makes it easy to **scale apps up or down**.
- Works perfectly with Azure Container Storage.

Simple Analogy:

> Think of Kubernetes as a **traffic controller** that keeps containerized apps moving smoothly.

Key Features & Stateful Apps

Azure Container Storage works with Kubernetes for scalable storage, keeping data safe even when containers restart.

Kubernetes Integration

Provides automatic, scalable storage.

Data Persistence

Keeps data safe during container restarts or moves.

Stateful Applications

Ideal for apps that save data and remember progress.

Examples of Stateful Apps:

- Databases (MySQL, MongoDB) – store user data
- Messaging apps – save chat history
- Streaming apps – remember watch history

These apps **must keep data** even if they restart — Azure Container Storage helps ensure that.

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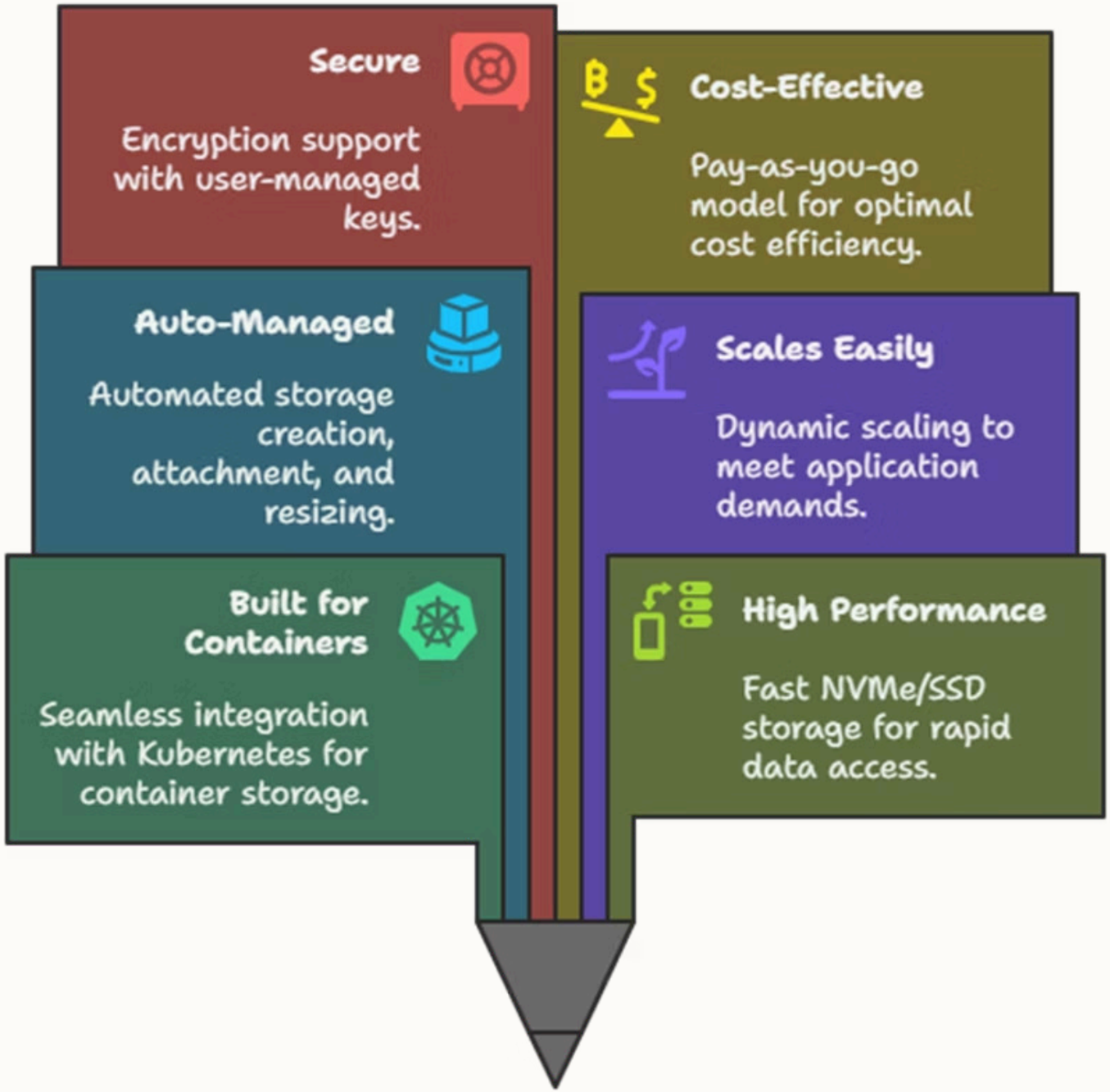
* Security -

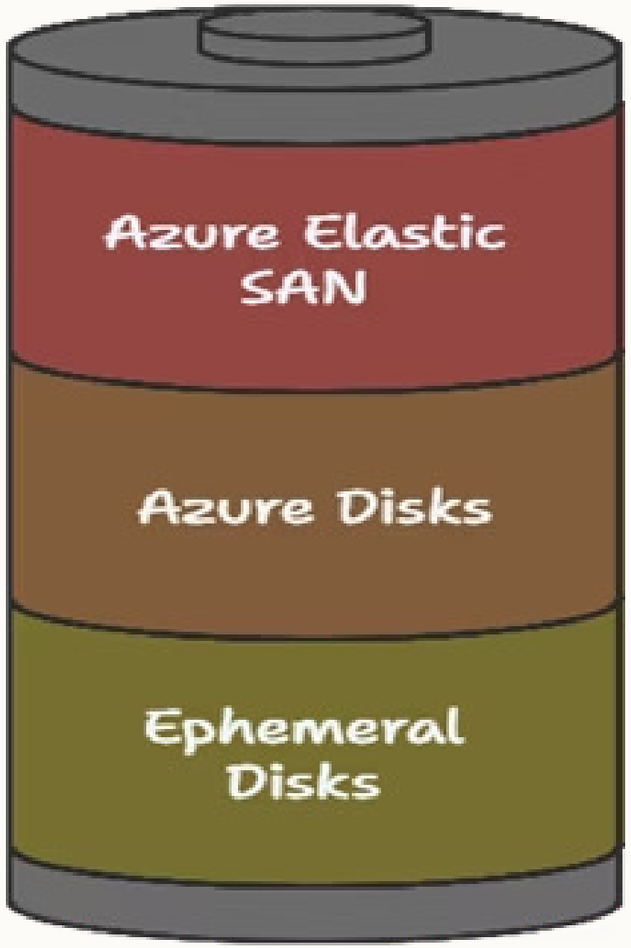
- **Encryption at rest** to protect stored data.

- **Customer-Managed Keys (CMKs)** for full control using Azure Key Vault.

- **Role-Based Access Control (RBAC)** to define who can access resources.

Key Benefits



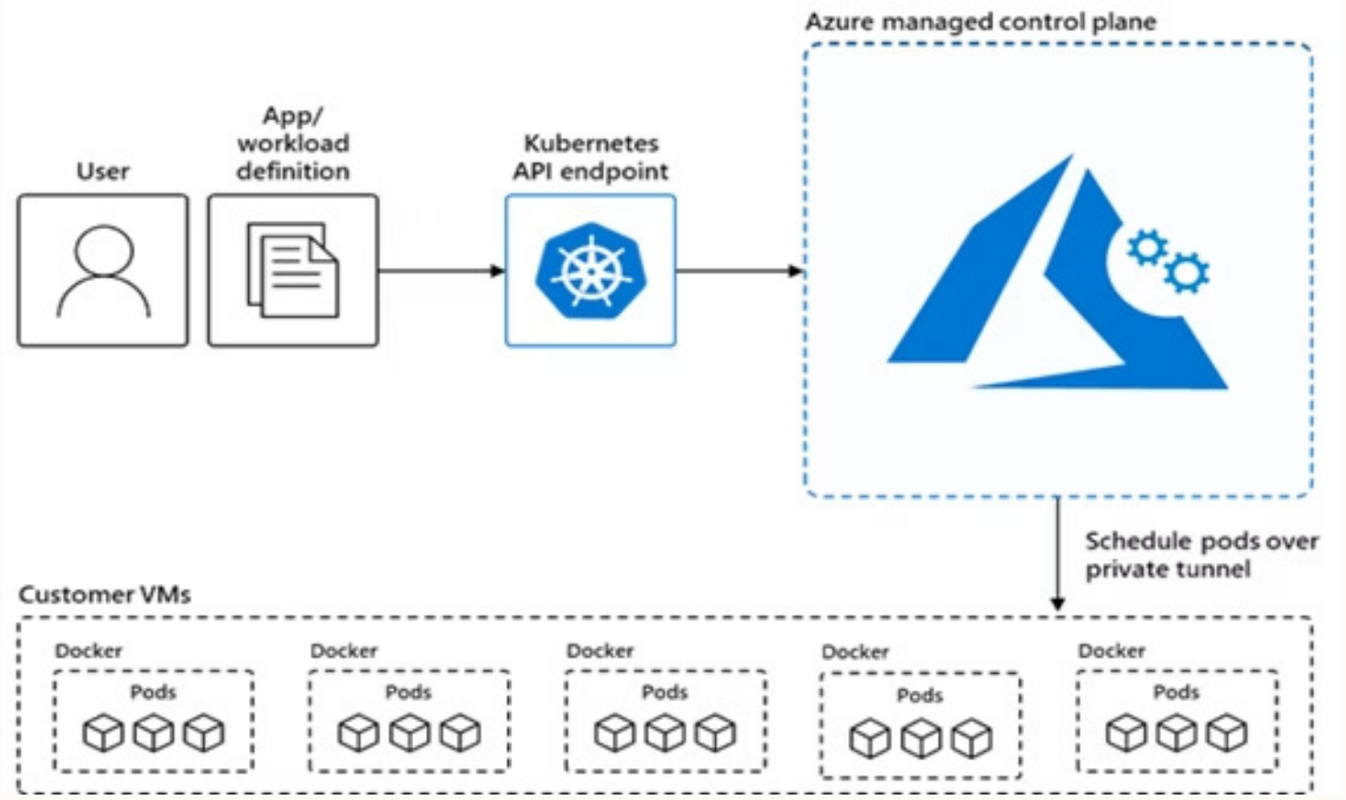


Storage Type	Best For	Durability	Speed
Elastic SAN (Storage Area Network)	**Large, complex applications** that need to share storage between multiple pods or apps.	✅ Persistent	⚡ Fast
Azure Disks	Databases, critical apps that need **persistent and reliable storage**.	✅ Persistent	⚡ Fast
Ephemeral Disks	**Short-term, high-speed tasks** like caching, or fast processing jobs.	❌ Temporary (Data is **lost when the pod shuts down**)	🚀 Super Fast

Pod with Volume

A Pod is a group of containers, and a Volume is shared storage attached to the pod, enabling data sharing and saving.

- **Pod:** A logical grouping of containers.
- **Volume:** Shared storage for the Pod.
- **Benefit:** Allows containers to share and save data persistently.



* Fargate Equivalent - AKS with Azure Container Storage

- Azure Kubernetes Service (AKS) can be used with Azure Container Storage.

- Works similarly to Fargate + ECS in AWS.

- You define what you need; Azure handles provisioning.

* Performance with NVMe Replication

- NVMe (Non-Volatile Memory Express) = Super-fast storage (**protocol** used to access high-speed **SSD storage**).

- Azure replicates your data to keep it **safe and accessible**.

* Benefits:

✅ Very low latency (fast data access).

✅ High availability (no single point of failure).

✅ Fast failover(switch to backup/redundant system) and recovery.

Pricing & Plans

Plan Type	Price Estimate	Billing Duration
Azure Disks (Standard HDD)	₹3–₹5 per GB	Per month
Azure Disks (Premium SSD)	₹8–₹15 per GB	Per month
Azure Ultra Disk	₹25–₹30 per GB	Per month
Azure Elastic SAN	Custom pricing (varies)	Based on provisioned capacity
Ephemeral Disks	Included in compute cost	Charged with VM use

✅ **Pay-as-you-go**
✅ Cost-efficient for all project sizes

Summary

Azure Container Storage simplifies data management for containerized applications, offering efficiency and reliability.

Simplified Storage

Streamlines data management for container apps.

Enhanced Efficiency

Reduces manual effort and integrates with Kubernetes.

Reliable Data

Ensures data persistence for stateful applications.