

Introduction to Cloud Storage

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Key concepts, benefits, common models, and best-practice considerations

1. What Is Cloud Storage?

Aspect	Description
Definition	Delivery of scalable, on-demand storage resources over the Internet, managed by a third-party provider.
Location	Data resides in the provider's data centers (often distributed across multiple regions).
Access	Users and applications interact via APIs, web consoles, or native OS integrations (e.g., mount points, drive letters).
Pay-as-you-go	Billing is based on actual usage (capacity, operations, data transfer).

2. Core Service Models

Model	Primary Use-Case	Typical Operations
Object Storage	Unstructured data (photos, backups, logs, multimedia).	PUT/GET, lifecycle policies, versioning, bucket policies.
Block Storage	High-performance, low-latency workloads (databases, VM disks).	Attach/detach volumes, snapshot, resize.
File Storage	Shared file systems for applications needing hierarchical directories.	NFS/SMB mounts, directory permissions, POSIX compliance.

Tip: Most public clouds combine all three models (e.g., AWS S3, EBS, EFS) so you can pick the right tool per workload.

3. Major Cloud Providers & Their Offerings

Provider	Object	Block	File	Notable Features
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Amazon Web Services (AWS)	S3, Glacier	EBS, EBS? Optimized	EFS	S3 Object Lock, Transfer Acceleration
Microsoft Azure	Blob Storage, Cool/Archive tiers	Managed Disks	Azure Files	Azure Data Lake Storage Gen2
Google Cloud Platform (GCP)	Cloud Storage (Standard, Nearline, Coldline, Archive)	Persistent Disks	Filestore	Uniform bucket-level access, Object Lifecycle Management
IBM Cloud	Cloud Object Storage	Block Storage	File Storage	Integrated with Watson AI services
Alibaba Cloud	Object Storage Service (OSS)	Elastic Block Storage	NAS	Strong presence in APAC region

4. Key Benefits

1. **Scalability** – Expand capacity instantly without hardware procurement.
 2. **Durability & Redundancy** – Multi?zone or multi?region replication (often ?? 99.999999999% durability).
 3. **Cost Efficiency** – Tiered pricing (hot, cool, archive) aligns cost with data access patterns.
 4. **Global Accessibility** – Access from anywhere with internet connectivity.
 5. **Managed Operations** – Provider handles hardware maintenance, firmware updates, and security patches.
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5. Common Terminology

Term	Meaning
Bucket / Container	Logical namespace for storing objects.
Object	File + metadata (size, content?type, custom tags).
Region	Geographical location of a data center (e.g., us - east - 1).
Availability Zone (AZ)	Isolated location within a region, used for redundancy.
Lifecycle Policy	Automated rule to transition or delete data based on age or access.
Versioning	Keeps previous copies of an object when it is overwritten or deleted.
Cold/Archive Tier	Low?cost storage for infrequently accessed data; higher retrieval