

What is Object Storage?



What is object storage?

Object storage is a technology that stores and manages data in an unstructured format called objects. Modern organizations create and analyze large volumes of unstructured data such as photos, videos, email, web pages, sensor data, and audio files. Cloud object storage systems distribute this data across multiple physical devices but allow users to access the content efficiently from a single, virtual storage repository. Object storage solutions are ideal for building cloud native applications that require scale and flexibility, and can also be used to import existing data stores for analytics, backup, or archive.

Metadata is critical to object storage technology. With object storage, objects are kept in a single bucket and are not files inside of folders. Instead, object storage combines the pieces of data that make up a file, adds all the user-created metadata to that file, and attaches a custom identifier. This creates a flat structure, called a bucket, as opposed to hierarchical or tiered storage. This lets you retrieve and analyze any object in the bucket, no matter the file type, based on its function and characteristics.

Object storage is the ideal storage for data lakes because it delivers an architecture for large amounts of data, with each piece of data stored as an object, and the object metadata provides a unique identifier for easier access. This architecture removes the scaling limitations of traditional storage, and is why object storage is the storage of the cloud.

The major benefits of object storage are the virtually unlimited scalability and the lower cost of storing large volumes of data for use cases such as data lakes, cloud native applications, analytics, log files, and machine learning (ML). Object storage also delivers greater data durability and resiliency because it stores objects on multiple devices, across multiple systems, and even across multiple data centers and regions. This allows for virtually unlimited scale and also improves resilience and availability of the data.

Why is object storage important?

As businesses grow, they're managing rapidly expanding but isolated pools of data from many sources that are used by any number of applications and business processes and end users. Today, much of this data is unstructured and ends up in multiple different formats and storage media, and does not easily fit into a central repository. This adds complexity, and slows down innovation because data is not accessible to be used for analysis, machine learning (ML), or new cloud native applications. Object storage helps break down these silos by providing massively scalable, cost-effective storage to store any type of data in its native format. Object storage removes the complexity, capacity constraints, and cost barriers that plague traditional storage systems because object storage delivers unlimited scalability at low per-gigabyte prices.

You can manage unstructured data in one place with an user-friendly application interface. You can use policies to optimize data storage costs and automatically switch your storage tier when necessary. Cloud object storage makes it easier to perform analysis and gain insights, allowing for faster decision-making.

While objects can be stored on premises, object storage is built for the cloud and delivers virtually unlimited scalability, high durability, and cost-effectiveness. With cloud object storage, data is readily accessible from anywhere.

What are the use cases for object storage?

Customers use object storage for a wide variety of solutions. Here are common use cases.

Analytics

You can collect and store virtually unlimited data of any type in cloud object storage and perform big data analytics to gain valuable insights about your operations, customers, and the market you serve.

Data lake

A [data lake](#) uses cloud object storage as its foundation because it has virtually unlimited scalability and high durability. You can seamlessly and nondisruptively increase storage from gigabytes to petabytes of content, paying only for what you use. It has scalable performance, ease-of-use features, native encryption, and access control capabilities.

Cloud-native application data

Cloud-native applications use technologies like containerization and serverless to meet customer expectations in a fast-paced and flexible manner. These applications are typically made of small, loosely coupled, independent components called microservices that communicate internally by sharing data or state. Cloud storage services provide data management for such applications and provide solutions to ongoing data storage challenges in the cloud environment. Object storage allows you to add any amount of content and access it from anywhere, so you can deploy applications faster and reach more customers.

Data archiving

Cloud object storage is excellent for long-term data retention. You can use it to replace on-premises tape and disk archive infrastructure with solutions that provide enhanced data durability, immediate retrieval times, better security and compliance, and greater data accessibility for advanced analytics and business intelligence. You can also cost-effectively archive large amounts of rich media content and retain mandated, regulatory data for extended periods of time.

Rich media

Accelerate applications and reduce the cost of storing rich media files such as videos, digital images, and music. With object storage you can create cost-effective, globally replicated architecture to deliver media to distributed users by using storage classes and replication features.

Backup and recovery

You can configure object storage systems to replicate content so that if a physical device fails, duplicate object storage devices become available. This ensures that your systems and applications continue to run without interruption. You can also replicate data across multiple datacenters and geographical regions.

ML

English ▾

Contact us

AWS Marketplace

Support ▾

My account ▾



re:Invent

Discover AWS

Products

Solutions

Pricing

Resources



Search

Sign in to console

How does cloud object storage compare to other types of storage?

There are three types of [cloud storage](#): object, file, and block. Each is ideal for specific use cases and storage requirements.

File storage

Many applications need shared file access. This has been traditionally served by [network-attached storage](#) (NAS) services. Common file level protocols consist of Server Message Block (SMB) used with Windows servers and Network File Systems (NFS) found in Linux instances. File storage is suited for unstructured data, large content repositories, media stores, home directories and other file-based data.

Comparing object storage and file storage

The primary differences between object and file storage are data structure and scalability. File storage is organized into hierarchy with directories and folders. File storage also follows strict file protocols, such as SMB, NFS, or Lustre. Object storage uses a flat structure with metadata and a unique identifier for each object that makes it easier to find among potentially billions of other objects.

With these differences in structure, file storage and object storage have different capacity to scale. Object storage offers near-infinite scaling, to petabytes and billions of objects. Because of the inherent hierarchy and pathing, file storage hits scaling constraints.

Block storage

Enterprise applications like databases or ERP systems often require dedicated, low-latency storage for each host. This is analogous to direct-attached storage (DAS) or a storage area network (SAN). Block-based cloud storage solutions are provisioned with each virtual server and offer the ultra-low latency required for high-performance workloads.

Comparing object storage and block storage

Object storage is best used for large amounts of unstructured data, especially when durability, unlimited storage, scalability, and complex metadata management are relevant factors for overall performance.

Block storage provides low latency and high-performance values in various use cases. Its features are primarily useful for structured database storage, VM file system volumes, and high volumes of read and write loads.

How can AWS help with your cloud object storage needs?

[Amazon Simple Storage Service \(Amazon S3\)](#) is an object storage service that offers industry-leading scalability, data availability, security, and performance. Customers of all sizes and industries can use Amazon S3 to store and protect any amount of data for a range of use cases, such as data lakes, websites, mobile applications, backup and restore, archive, enterprise applications, IoT devices, and big data analytics. Amazon S3 provides management features so that you can optimize, organize, and configure access to your data to meet your specific business, organizational, and compliance requirements. The following are some examples of Amazon S3 benefits.

Durability, availability, and scalability

Amazon S3 was built from the ground up to deliver 99.999999999% (11 9s) of data durability. With Amazon S3, your objects are redundantly stored on multiple devices across a minimum of three Availability Zones (AZs) in an Amazon S3 Region. Amazon S3 is designed to sustain concurrent device failures by quickly detecting and repairing any lost redundancy, and it also regularly verifies the integrity of your data using checksums.

Security and compliance

Amazon S3 protects your data with security, compliance, and audit capabilities. Amazon S3 is secure by default. Upon creation, only you have access to Amazon S3 buckets that you create, and you have complete control over who has access to your data. Amazon S3 supports user authentication to control access to data. You can use access control mechanisms such as bucket policies to selectively grant permissions to users and groups of users. Additionally, S3 maintains compliance programs, such as PCI DSS, HIPAA/HITECH, FedRAMP, SEC Rule 17 a-4, EU Data Protection Directive, and FISMA, to help you meet regulatory requirements. AWS also supports numerous auditing capabilities to monitor access requests to your Amazon S3 resources.

Flexible management

AWS offers the most flexible set of storage management and administration capabilities. Storage administrators can classify, report, and visualize data usage trends to reduce costs and improve service levels. Objects can be tagged with unique, customizable metadata so you can see and control storage consumption, cost, and security separately for each workload. The S3 Inventory tool delivers scheduled reports about objects and their metadata for maintenance, compliance, or analytics operations. Amazon S3 can also analyze object access patterns to build lifecycle policies that automate tiering, deletion, and retention. Finally, since Amazon S3 works with [AWS Lambda](#), customers can log activities, define alerts, and invoke workflows, all without managing any additional infrastructure.

Cost-effective storage classes

Amazon S3 offers a range of storage classes that you can choose from based on data access, resiliency, and cost requirements of your workloads. Amazon S3 storage classes are purpose-built to provide the lowest cost storage for different access patterns. You pay only for what you use. The rate you're charged depends on the size of your objects, how long you stored the objects during the month, and your chosen storage class. Find the best [Amazon S3 storage class](#) for your workload.

Efficient analytics

Amazon S3 is the only cloud storage platform that lets customers run sophisticated analytics on their data without requiring them to extract and move the data to a separate analytics database. Customers with knowledge of SQL can use [Amazon Athena](#) to analyze vast amounts of unstructured data in Amazon S3 on-demand. With [Amazon Redshift Spectrum](#), customers can run sophisticated analytics against exabytes of data in Amazon S3 and run queries that span both the data you have in Amazon S3 and in your Amazon Redshift data warehouses.

Largest community of customers and partners

AWS has millions of active customers and tens of thousands of partners globally. Customers across virtually every industry and of every size, including startups, enterprises, and public sector organizations, are running every imaginable use case on AWS. The AWS Partner Network (APN) includes thousands of systems integrators who specialize in AWS services and tens of thousands of independent software vendors (ISVs) who adapt their technology to work on AWS.

Get started with object storage by creating an [AWS account](#) today.

AWS Object Storage next steps



Learn

- What Is AWS?
- What Is Cloud Computing?
- What Is Agentic AI?
- Cloud Computing Concepts Hub
- AWS Cloud Security
- What's New
- Blogs
- Press Releases

Resources

- Getting Started
- Training
- AWS Trust Center
- AWS Solutions Library
- Architecture Center
- Product and Technical FAQs
- Analyst Reports
- AWS Partners

Developers

- Builder Center
- SDKs & Tools
- .NET on AWS
- Python on AWS
- Java on AWS
- PHP on AWS
- JavaScript on AWS

Help

- Contact Us
- File a Support Ticket
- AWS re:Post
- Knowledge Center
- AWS Support Overview
- Get Expert Help
- AWS Accessibility
- Legal

Back to top ↑

Amazon is an Equal Opportunity Employer: Minority / Women / Disability / Veteran / Gender Identity / Sexual Orientation / Age.

