



Maximize the value of cold storage with Amazon S3 Glacier

Archive your data with long-term, secure, and durable storage classes offering the most retrieval flexibility and the lowest cost storage in the cloud



Data.

It's everywhere, all the time.

Data coming from TV and movies, music and photos. Sensor data generated by autonomous vehicles, Internet of Things (IoT) devices, genome sequencing, geospatial satellites, and energy equipment. Data being leveraged for analytics, machine learning (ML) model training, and digital asset preservation.

Organizations across all industries create and store massive amounts of data every day. In fact, analyst firm IDC estimates that the volume of data will grow 61 percent year over year—and that by 2025, 175 zettabytes of data will have been created.

While all this data creates unprecedented opportunities for businesses and industries, it also comes with multiple challenges. Not the least of these is how to store “cold” data—archiving inactive or infrequently accessed data for future use, as opposed to “warm” or active data. Leading industry reports suggest that 60–80 percent of all stored data is cold, necessitating an infinitely scalable archive—“infinite” meaning data that is stored as long as your needs and circumstances require, and that can be retrieved at any time. Data never needs to be considered “inactive” if it is accessible all the time.



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The cool thing about cold data

As organizations look for ways to secure a competitive foothold in the ever-evolving economic and consumer landscape, data is proving to be the most valuable asset in any organization's arsenal. "Value" not only applies to warm data, but cold data as well. **At Amazon Web Services (AWS), we firmly believe that cold data is just data that's not being used at the moment.**

You might think of cold data as a store of potential energy waiting to be unleashed and converted into the kinetic energy of insights—insights that can be used to drive competitive advantage for those organizations that can harness and maximize them.

Many customers tell us that they are keeping their data because they recognize its future value potential, and that they plan to monetize it sometime in the future through business intelligence, improving products through collective insights, improving user experiences, making quicker decisions, improving operations—the list goes on. But as the volume of your data grows, so does the challenge of archiving and managing it. Clearly, organizations need a way to optimize costs associated with the retention and manipulation of their "infinite" data.

The solution lies in the cloud. **Amazon S3 Glacier storage classes** offer flexible access to your **archive data** and the lowest-cost archival storage in the cloud, while providing you with the most retrieval flexibility and the ability to get access to your cold data in just milliseconds—along with the highest levels of security, durability, and scalability.

[Learn all the benefits of AWS data archiving solutions and how to get started ›](#)



[Listen to our podcast to learn more about how you can modernize your data archive with AWS ›](#)

Archive your data on premises or in the cloud? The answer is clear.

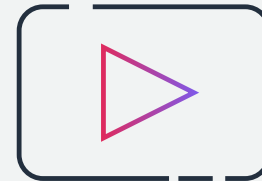
Many organizations continue to store cold and archival data in an outdated way: in on-premises tape or disk infrastructure, or physically shipping data to an offsite third party. Instead of creating business value, these strategies create a huge infrastructure management headache—from physical tape deterioration and costs to capacity limits and security concerns. It's no surprise, then, that more and more organizations are looking for alternative solutions that provide *lower costs, enhanced data durability, faster data retrieval times, better security and compliance, and easier access to their data* to unlock new opportunities and transform their business.

Today, modern organizations must have an archiving strategy that answers these needs, or they risk being left behind. Ideally, data strategies should be implemented and proper retention practices set up early on, when you have a relatively small volume of data. This promises better margins and rewards from cold data in the future.

So, what should an ideal cold storage strategy look like? It should:

1. Ensure that your data is secure, available, durable, and scalable
2. Support the governance and compliance edicts of your organization
3. Provide inexpensive and flexible access to cold data when it's needed
4. Provide reliable data protection, data integrity, long-term backup, and disaster recovery

AWS delivers on all of the above with the **Amazon S3 Glacier storage classes**. The Amazon S3 Glacier storage classes provide you with long-term, secure, and durable storage options to optimally archive your data at the lowest cost while still being able to access your data in just milliseconds.



Watch this video introducing the Amazon S3 Glacier storage classes ›

Amazon S3 Glacier: flexibility and agility at low cost

For over 17 years, Amazon S3 has been building industry-leading scalable, available, durable, secure, and performant storage. [Amazon S3 Glacier](#) is a leader in the cloud cold storage market and was the first to offer a branded solution in this space over 10 years ago. AWS continues to innovate archive storage solutions today. Amazon S3 Glacier storage classes are purpose-built for the next generation of data archiving by offering multiple archive storage classes that are purpose-built for data archiving and designed to cater to a large variety of workloads, costs, and retrieval performance.

Simply put, **there is no better place in the world for cold data than in AWS.** This eBook will tell you why, and show how Amazon S3 Glacier is helping organizations of all sizes and from all industries transform their data archiving to unlock business value, increase agility, and save on storage costs.



There is no
better place in
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3 storage classes. Virtually any archival workload.

AWS gives you the choice of three archive storage classes optimized for different access patterns and storage duration: Amazon S3 Glacier Instant Retrieval, Amazon S3 Glacier Flexible Retrieval, and Amazon S3 Glacier Deep Archive. This eBook explores the benefits of each storage class, and presents real-life stories of how organizations are solving data storage challenges and gaining value with Amazon S3.

S3 Glacier storage classes are designed for 99.999999999 percent (11 9s) of data durability. Each of the three storage classes provides unique benefits that apply to specific use cases and workloads:

1 Amazon S3 Glacier Instant Retrieval

S3 Glacier Instant Retrieval is designed for rarely accessed data that still requires immediate access in performance-sensitive use cases (such as image hosting, online file-sharing applications, medical imaging and health records, news media assets, and satellite and aerial imaging). S3 Glacier Instant Retrieval is ideal for cold production data, as nothing needs to change in production apps when using this storage class. S3 Glacier Instant Retrieval offers the high durability, high throughput, and similar low latency of S3 Standard-Infrequent Access (S3 Standard-IA), with a lower per-gigabyte storage price and slightly higher per-gigabyte retrieval price. It delivers up to 68 percent lower-cost storage than S3 Standard-IA.

2 Amazon S3 Glacier Flexible Retrieval

S3 Glacier Flexible Retrieval delivers low-cost storage—up to 10 percent lower cost than S3 Glacier Instant Retrieval, for archive data that is accessed one or two times per year and is retrieved asynchronously. S3 Glacier Flexible Retrieval delivers the most flexible retrieval options: expedited retrievals that typically complete in 1–5 minutes, standard retrievals that typically complete in 3–5 hours, and free bulk retrievals that return large amounts of data typically in 5–12 hours, balancing cost with access times. It is the ideal solution for backup, disaster recovery, offsite data storage needs, and for data that occasionally needs to be retrieved in minutes without cost concerns.

3 Amazon S3 Glacier Deep Archive

S3 Glacier Deep Archive delivers the lowest-cost storage in the cloud—up to 75 percent lower than S3 Glacier Flexible Retrieval—with data retrieval in 12–48 hours. It is designed for long-lived archive data that is accessed less than once per year and is retrieved asynchronously. At just \$0.00099 per gigabyte a month (or \$1 per terabyte a month), S3 Glacier Deep Archive saves you significant costs compared to storing and maintaining data in on-premises tape or archiving data offsite. It is designed for companies that must retain datasets for 7–10 years or longer, such as financial services, healthcare, and public sector.

Modernizing data archiving and putting data to work with Amazon S3 Glacier

Amazon S3 Glacier offers unlimited opportunities to reinvent your business, providing the foundation for modernized workflows in your environments. Amazon S3 gives you multiple ways to turn your data into business value.



See how moving data archives to AWS leads to lower costs and new insights >

Increase business agility and data protection

The Amazon S3 Glacier storage classes are highly durable and scalable. They run on the **world's largest global cloud infrastructure** with virtually unlimited scalability and are designed for 99.999999999 percent (11 9s) of durability. Data is redundantly stored across multiple Availability Zones that are physically separated within an AWS Region.

Amazon S3 Glacier is also highly secure and compliant. It offers sophisticated integration with AWS CloudTrail to log, monitor, and retain storage API call activities for auditing. S3 Glacier also supports three different forms of encryption as well as security standards and compliance certifications, including SEC Rule 17a-4, PCI DSS, HIPAA/HITECH, FedRAMP, EU GDPR, and FISMA. Amazon S3 Object Lock enables WORM storage capabilities, helping satisfy compliance requirements for virtually every regulatory agency around the globe.



NASCAR modernizes media archive at speed with Amazon S3

NASCAR (National Association for Stock Car Auto Racing) had challenges with their archive storage. The company was storing raw media files used for taped highlights, creating approximately 2 petabytes of data per year. This meant potentially running out of tape library slots before the next generation of tape was released and needing to buy outdated and expensive library technology. To solve these challenges, they brought their archived data over to Amazon S3 Glacier.

First, the NASCAR team kept their raw files in the S3 Standard storage class for about 24 hours for highlights. Then they migrated their data to S3 Glacier Instant Retrieval, which still provided milliseconds access to the raw media files but at a lower storage cost. After two years, the company tiered down even further to S3 Glacier Deep Archive to keep the files available if and when they needed them, with the benefit of even lower cost.

[Read the blog post ›](#)



Ryanair saves 65% in data backup costs

Ryanair, Europe's largest airline group, flying more than 150 million passengers per year, faced challenges with its physical tape backup, a resource- and cost-intensive system involving monthly tape purchases and ongoing support and management. Ryanair switched to the cloud using **AWS Storage Gateway's Tape Gateway** and stored them in Amazon S3 Glacier Flexible Retrieval and Amazon S3 Glacier Deep Archive for long-term storage. As a result, the company achieved 65 percent savings in backup costs and created a risk-free infrastructure for its critical flight and back-office systems.

[Hear the #1 reason Ryanair switched to Amazon S3 Glacier storage ›](#)

Cost savings opportunities unlocked

All S3 Glacier storage classes are designed to be the lowest-cost storage for specific access patterns, allowing you to archive large amounts of data at very low cost. You can retain all the data you want for use cases like data lakes, analytics, IoT, ML, compliance, media asset archiving, and more. **You pay only for what you need.**



Snap gains fast, low-cost access to over 1.5 trillion archived photos with AWS

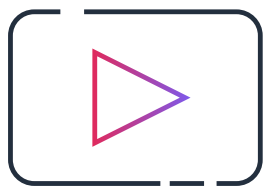
Snap's storage needs increased after the launch of Snapchat Memories, a feature that automatically archives media and resurfaces it over time. Snapchat users might view this content for a few days and then not view it again for months or years, so the company wanted to optimize its storage on AWS for further cost savings—without diminishing performance or compromising user experience. By choosing Amazon S3 Glacier Instant Retrieval for long-term, rarely accessed media files, Snap is saving tens of millions of dollars while powering new business opportunities.

[Read the full story ›](#)

Automated cost savings

Amazon S3 Intelligent-Tiering is designed for customers who want to optimize their storage costs automatically when data access patterns change. S3 Intelligent-Tiering automates storage cost savings without impacting performance and without operational overhead, lifecycle fees, or retrieval fees.

When you place an object into S3 Intelligent-Tiering, it lands in the Frequent Access tier and remains there for 30 days of no access. Then, it automatically tiers down to the Infrequent Access tier, reducing your storage costs. After 90 more days without access, your object will tier down again into the Archive Instant Access tier, which further optimizes costs. If at any time in this process an application comes along to read an object, it will automatically be returned to the Frequent Access tier and the process will start again. There are no retrieval fees for data brought back to the Frequent Access tier. In addition to the Automatic Access tiers, you can also choose to opt in to the Archive Access and Deep Archive Access asynchronous tiers to save even more.



stripe

Watch the story of Stripe's journey to cost savings with Amazon S3 ›

To date, customers have saved

**\$1
BILLION**

by using S3 Intelligent-Tiering

Deriving business value from cold data

With the Amazon S3 Glacier storage classes, you get the best of both worlds: low-cost archive storage, and retrieval times in milliseconds, minutes, or hours, depending on your archive storage class. Organizations are archiving their data in AWS to cost-effectively get the most out of their critical assets. Customers are using their own archives as a treasure trove of data for analytics, ML, and business intelligence.

Archiving data at very low costs gives you the benefit of quickly restoring inactive data and putting it to work for your business. AWS recently launched a **10 times increase in S3 Glacier archive restore throughput** to make it even easier to put your archive data to work. Now you can restore archived data from S3 Glacier up to 90 percent faster than before.

Restore performance is especially important when you are using archive data for artificial intelligence (AI) and ML or performing analytics on historical data. Ancestry is using S3 Glacier to restore terabytes of images in mere hours instead of days. This allows the company to use more images to train cutting-edge handwriting recognition AI models and help bring even more valuable content to customers. And Capital One is using Amazon S3 Glacier coupled with AI and ML to gain new insights on tens of millions of objects in under a day. With most of the world's stored data being cold, that's a lot of archive data that can drive outcomes for your business.

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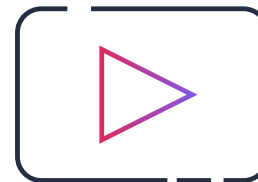
In 2022, AWS customers restored over 32 billion objects from Amazon S3 Glacier storage classes



Ancestry uses Amazon S3 Glacier to restore terabytes of images in mere hours instead of days

The genealogy company Ancestry operates a large network of historical records and related genetic genealogy websites. It has more than 3.5 million users and some 30 billion records in its online database. The company is using ML for handwriting recognition, training algorithms on thousands of pages of hand-written historical documents. These documents, hundreds of terabytes in size, are stored in Amazon S3 Glacier. This enabled Ancestry to restore hundreds of terabytes of images within hours instead of days to train its ML models, allowing them to train against massive datasets cost-effectively, and enabling Ancestry customers to connect with their ancestors and family histories.

[Learn more ›](#)



Watch this video on how to derive business value from your cold data ›

Preserve your most priceless assets

By creating more unique content than ever to engage audiences and grow revenue, many organizations may be overlooking the hidden value in their media archives and constraining their ability to access those archives from anywhere. It is essential to preserve your organization's most priceless assets and have the flexibility of using them easily when pursuing new business goals.

Archive data can represent assets such as intellectual property (IP), or original, high-quality media assets that are frequently remastered or remixed or otherwise reused decades later. S3 Glacier enables you to store these assets in highly durable and massively scalable storage solutions at very low cost, allowing you to easily move data from archival to distribution when needed.

Amazon S3's unique architecture gives customers an industry-leading combination of durability, security, availability, and performance at virtually unlimited scale. AWS is constantly optimizing costs so it can pass the savings on to you.

As you might guess, delivering on all of these fundamentals takes a huge amount of time, effort, and experience. At AWS, we focus every day on raising the bar on the fundamentals. This frees up your time to focus on innovation instead of how to store and retain your data. Amazon S3's execution on the fundamentals over the course of over 17 years is the reason why AWS has earned the trust of millions of customers around the world.



CNN archives data in Amazon S3 Glacier to support daily news production

CNN's video library contains over three million video files representing one million hours of video—nearly 30 petabytes and growing. This content must be restored in minutes to be ready for airing. On average, CNN restores hundreds of files representing 1–2 terabytes, and 25 percent of restores are for content less than 90 days old. Another 25 percent of restores are for content more than five years old.

In 2005, CNN built its first digital archive on premises, serving four major production centers and dozens of bureaus worldwide. But there was no disaster recovery plan—a predicament that became a problem when a tornado struck in 2008. CNN decided to use the cloud as the primary backup, with a plan to eventually move all backup files to the cloud. But, when CNN's parent company decided to sell the building in which CNN's on-premises data center was housed, CNN had to quickly migrate to the cloud as its primary storage and backup solution and it had to encrypt and secure all data. The company moved forward with a multi-region strategy using S3 Glacier Instant Retrieval as its primary storage and S3 Glacier Deep Archive for rarely used data and backup storage.

[Watch how CNN uses Amazon S3 Glacier to support daily news production ›](#)



Warner Bros. preserves “the stuff that dreams are made of” with the help of Amazon S3 Glacier

For Warner Bros., archiving means preserving “the stuff that dreams are made of.” In 2022, Warner Bros. merged with Discovery, Inc. to create one of the largest media companies in the world, controlling some of the world’s most important and extensive collections of movies and television along with some of the world’s greatest IP franchises, from DC Comics to Harry Potter. While Warner Bros. uses state-of-the-art cold vault facilities for managing its film assets, employees know that there’s no guarantee that the film will be in usable shape when they pull the masters out. From film degrading to formats becoming extinct, Warner Bros. needed a modern solution. AWS provided it, helping the media giant optimize storage costs and turn a “we’re out of room” scenario into “room to grow.”

[Watch how Warner Bros. maximizes the value of data to preserve the stuff of dreams ›](#)



Capital One optimizes costs and maximizes resources with AWS

With AWS’s recent enhancements to Amazon S3 Glacier restore throughput, Capital One was able to restore hundreds of millions of objects in a single day, an undertaking that used to take several days. Additionally, this request came at zero cost to Capital One because bulk retrievals from Amazon S3 Glacier Flexible Retrieval were free of charge.

[Read the blog ›](#)

Amazon S3 Glacier for virtually every archiving use case



Here are a few common Amazon S3 Glacier use cases:

- **Media asset workflows:** Archive older media content affordably while still making it available in milliseconds when it's needed.
- **Medical imaging:** Reliably archive patient records (such as LIS, PACS, and EHR) securely at very low cost. Amazon S3 Glacier is also ideal for medical images or genomics, where milliseconds access is required.
- **Scientific data storage:** With Amazon S3 Glacier, research organizations that generate, analyze, and archive vast amounts of data (for genomics or to train ML models, for example) can avoid the complexities of hardware and facility management while benefiting from the lowest-cost storage and milliseconds retrieval.
- **Long-term backup retention:** Eliminating the need for expensive on-premises storage systems, the S3 Glacier storage classes deliver the lowest-cost archive storage for backups while also making the data available when needed.
- **Regulatory, compliance, and business policy archiving:** Amazon S3 Glacier helps you set compliance controls to help address your regulatory and compliance objectives, such as SEC Rule 17a-4(f), and provides services for indefinite retention of data such as finance, tax, HR, or email records.
- **Digital preservation:** Libraries and government agencies face data integrity challenges when preserving data. Amazon S3 Glacier performs regular, systematic data integrity checks and is automatically self-healing.
- **Tape replacement:** On-premises or offsite tape libraries can require large upfront investments and specialized maintenance. The S3 Glacier storage classes have no upfront costs, eliminate the cost and burden of maintenance, and provide faster access than on-premises tape archives.

The limitless possibilities of reinventing your business with archived data

Maximizing the value of archived assets to reinvent your business and accelerate your innovation: that is the real value that Amazon S3 Glacier delivers.

S3 Glacier frees you from managing the complexity and cost of on-premises archives. By archiving your data in AWS, you can quickly move data from archival to production when needed and extract valuable insights by easily accessing adjacent AWS services. You can expand cloud workflows rapidly or gradually and quickly deploy new business models that leverage your archived assets.

Whether you are moving away from tape or other archive infrastructure or leveraging the backup solutions from our AWS Partners, Amazon S3 Glacier supports all your backup and archive use cases.

And with AWS, you can focus your valuable IT resources on developing applications that differentiate your business instead of the undifferentiated heavy lifting of managing archival data on premises.

There is no better way to accelerate your innovation. And no better place in the world for your archive data than AWS.

[Learn more about transforming your archive data strategy with AWS ›](#)

[Get started using the Amazon S3 Glacier storage classes by following this hands-on tutorial ›](#)

[Contact an AWS sales representative for more information ›](#)



Additional Resources

[Video: Archiving and digitally preserving your data with AWS](#)

[Tech Talk: Preserving and maximizing the value of digital media assets with S3](#)

[Tech Talk: Modernize your data archive with Amazon S3](#)

[Blog: Best practices for archiving large datasets with AWS](#)

[Blog: Restoring archived objects at scale from S3 Glacier storage classes](#)

[Learn all the benefits of modernizing your data archiving with AWS](#)