



Highlights

- Manage unstructured data with flexible, enterprise-class data availability
 - Streamline data storage with compelling cloud storage economics and scalability
 - Alleviate security concerns with rich data encryption and access control options
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IBM Cloud Object Storage Public Services

Unleash the power of your data with innovative storage options

Cloud, mobility, Internet of Things (IoT), social media, analytics. Not only are these technologies transforming entire industries, they're also generating an avalanche of unstructured data. In fact, 90% of all data was created in the last two years¹. What's more, 80 percent of all data created, replicated and transmitted today is unstructured². This data provides both opportunities and challenges. How do you cost effectively store and manage these large amounts of unstructured data? How do you secure this data and control its access so that authorized users can mine this data efficiently for valuable insights?

For your unstructured data that requires enterprise-class availability security and access control, and compelling cloud storage economics and scalability, consider IBM® Cloud Object Storage Public Services. This offering gives you the ability to consume storage in various locations around the world with flexible resiliency models. It can accommodate a broad range of workloads, including cloud-native applications with dynamic data access pattern, and collaboration, backup and archiving applications that have predictable data access pattern.

This service is fully managed by IBM personnel and lets you pay for storage as you consume it. You can sign up for this service quickly and easily on IBM Cloud to manage and interact with your data using an intuitive console or through application programs. It is seamlessly integrated with compute, analytics, cognitive or other services on IBM Cloud to enable data mining or to build cloud native applications and data lakes.



Managing massive unstructured data with flexible, enterprise-class data availability

Accessed through a self-service portal, IBM Cloud Object Storage Public Services use a shared multitenant cloud infrastructure spanning a global network of IBM Cloud facilities managed by IBM specialists. Users can access these security-rich services from virtually anywhere in the world through object storage RESTful application programming interfaces (APIs), including Amazon Simple Storage Service (S3)-compatible APIs.

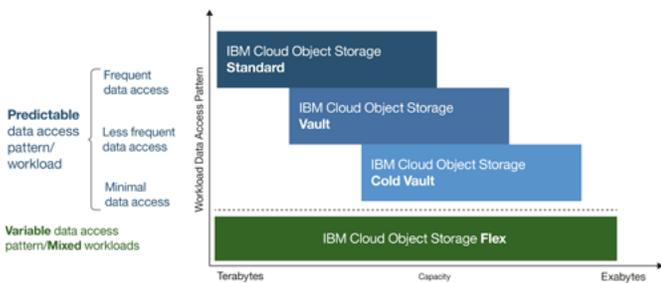


Figure 1: IBM Cloud Object Storage Public Services include a range of options to store your data to meet your workload requirements

As shown in Figure 1, IBM Cloud Object Storage Public Services are available in four classes to meet storage requirements for two broad categories of workloads:

- Public Services for workloads with predictable data access pattern—These services are available in three classes:
 - Standard, ideal for unstructured data that requires frequent access, such as multiple times a month
 - Vault, better suited for workloads with data that is accessed less often, such as once a month or less
 - Cold Vault, ideal for minimally accessed archiving and long-term retention data, such as once every three months or less
- Public Service for mixed workloads or workloads with variable data access pattern—This service is available in a single class and is designed to encourage you to cost-effectively access and use your data as often as you want:
 - Flex, ideal for unstructured data that is “hot” today and “cold” tomorrow.

In addition, each class of service is available in two resiliency options to meet your business needs:

- Regional—your data is stored in three or more IBM Cloud facilities within a single geographic region. This helps protect your data from most common component failures and power outages. It also tolerates facility failure with no interruption in data availability.
- Cross-region—your data is stored in IBM Cloud facilities across three or more geographic regions, which are designed to provide business continuity and workload data accessibility from multiple regions. This also helps provide additional protection from region wide outages because of circumstances such as natural disasters.

It helps to visualize these options as a matrix, as shown in Figure 2.

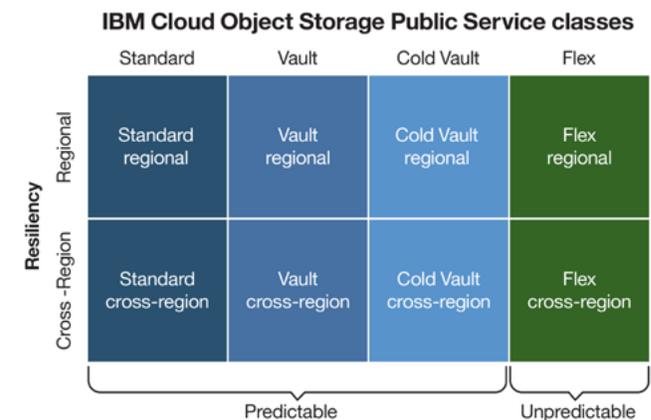


Figure 2: IBM Cloud Object Storage Public Services include a range of resiliency options and storage classes

Selecting the right IBM Cloud Object Storage Public Service for your application is easy. Robust service descriptions and resiliency options are explained below. Or, if you want a snapshot analysis of how each service aligns with your requirements, see Table 1.

Standard

This option is designed for storing and managing frequently accessed data, providing high performance at lower cost for use cases such as collaboration, analytics, cognitive, active content repositories, and sync-and-share applications. This class of storage is ideal for unstructured data that is accessed multiple times a month.

Standard service is available in both regional and cross-region resiliency options explained below.

Pricing for this service is primarily based on storage capacity, the public outbound bandwidth consumed and the frequency of operations made on the data*. That means you pay only for what you use every month, with no separate charges for deploying your data in multiple IBM Cloud facilities and the bandwidth consumed for transferring data between these facilities.

Vault

This option is designed for storing and managing your less-frequently accessed data for functions such as tape replacement, backup and disaster recovery. This class of storage is ideal for unstructured data that is accessed once a month or less.

Vault service is available in both regional and cross-region resiliency options explained below.

Pricing for this service is based on storage capacity, the public outbound bandwidth consumed and the frequency of operations made on the data*. An additional retrieval charge applies each time data is read for this service. There is a minimum threshold for object size and storage period, consistent with the intended use of this service for colder, less-active data. You pay only for what you use each month. There are no separate charges for deploying your data in multiple IBM Cloud facilities and the bandwidth consumed for transferring data between these facilities.

Cold Vault

This service is ideal for storing and managing unstructured data that is minimally accessed for use cases such as archiving, digital asset preservation and long term-backup for compliance. This class of storage is ideal for long-term retention of data that needs minimal access.

Cold Vault service is available in both regional and cross-region resiliency options explained below.

Pricing for this service is based on storage capacity, the public outbound bandwidth consumed and the frequency of operations made on the data*. An additional retrieval charge applies each time data is read for this service. There is a minimum threshold for object size and storage period, consistent with the intended use of this service for colder, less-active data. You pay only for what you use each month. There are no separate charges for deploying your data in multiple IBM Cloud facilities and the bandwidth consumed for transferring data between these facilities.

Flex

This service is designed for workloads with unpredictable data usage patterns, for example, cloud-native applications or dynamic websites where data is “hot” today and “cold” tomorrow. It is also ideal for storing data for mixed workloads where the overall data access pattern varies from month to month. This service has a cap on the combined capacity and retrieval charge, encouraging you to cost-effectively access and use your data as often as you need, capitalizing on IBM’s cognitive and analytics tools.

Flex service is available in both regional and cross-region resiliency options explained below.

Pricing for this service is based on storage capacity, the public outbound bandwidth consumed and the frequency of operations made on the data*. A retrieval charge applies each time data is read for this service, but there is a cap on the combined data and retrieval charge. You pay only for what you use each month. There are no separate charges for deploying your data in multiple IBM Cloud facilities and the bandwidth consumed for transferring data between these facilities.

Regional resiliency

In the regional resiliency option your data is stored in three or more IBM Cloud facilities within a single geographic region. This helps protect your data from most common component failures and power outages. It also tolerates facility failure with no interruption in data availability. Your data is available through multiple public and private endpoints across three data centers within the region.

Cross-region resiliency

This resiliency option is designed for mission-critical data that requires a high level of data availability to help ensure business continuity during region-wide outages because of natural disasters. Your data is available through multiple public and private endpoints across three geographic regional data centers.

	Standard	Vault	Cold Vault	Flex
Ideal for active, frequently accessed data such as collaboration, content distribution and born-on-the-cloud application data.	✓	—		
Ideal for infrequently accessed data such as digital asset preservation and backup and disaster recovery data.	—	✓	—	—
Ideal for minimally accessed data for long-term retention functions such as archiving, long-term backup and historical data for compliance.	—	—	✓	
Ideal for dynamic data where data access frequency is unpredictable from month to month, for example, cloud-native applications or mixed-data-access frequency workloads.				✓
Ideal frequency of access	Multiple times a month	Once a month or less	Once every 3 months or less	As often as you want
Minimum storage duration	None	30 days	90 days	None
You pay only for what you use. Pricing is based on storage capacity, the bandwidth consumed and the frequency of operation on the stored data .	✓	✓	✓	✓
Regional resiliency option protects data from most common component failures and power outages	✓	✓	✓	✓
Cross-region resiliency provides additional protection from region-wide outages such as natural disasters to help ensure high availability of mission-critical data	✓	✓	✓	✓

Table 1: This chart helps you assess the various IBM Cloud Object Storage Public Services against your workload data access and resiliency requirements

Streamlining data storage with compelling cloud storage economics and simplicity

Using IBM Cloud Object Storage public service for storing, retrieving and managing your data for safekeeping and long-term retention or for analytics and application development is quick and easy. You can use this service as part of an integrated experience within IBM Cloud. The unified experience is designed to simplify start up, make it easier to manage and interact with your data and accelerate application development

Ease-of-use features for streamlining your data include:

- A simple registration and management process to provision an account and storage buckets in minutes.
- An intuitive object storage console to easily create and manage buckets, upload and download objects, and view and monitor details of service instances such as endpoints, credentials, storage class and usage metrics.
- SDKs for Java, Node.js and Python with support for S3 APIs and identity and access management permissions to easily develop and integrate applications and services.
- A perpetual no-cost service plan option with no credit card pay wall to evaluate the service. This option can be upgraded to a pay go or subscription service.

IBM Cloud Object Storage public service is seamlessly integrated with other services, like compute, analytics, and cognitive applications on IBM Cloud. This allows organizations to build scalable cloud data lakes and data catalogs for cost-effective persistent storage of their enterprise data and metadata. You can develop virtually any cloud-native application or service for any user, including ad hoc and predictive analytics, real-time streaming or event driven messaging, and more. In such cloud data lakes and data catalogs, IBM Cloud Object Storage public service provides the following features and benefits:

- Flexibility: Users can independently provision and de-provision compute and storage resources whenever they need them.
- Data governance: Permissions and access control features allow only authorized users to access the data.
- Built-in disaster recovery: The Cross Region resiliency option, coupled with strong consistency of all operations, provides disaster recovery with no data loss (RPO is zero) even during region wide outages.
- High performance at scale: Purpose built integrated connector to Apache Spark enables execution of large analytics jobs at high performance.
- Improved collaboration: High performance world-wide access of data and metadata streamlines end-to-end workflows improving collaboration and eliminating complexity of fragmented tool chains.

Helping to alleviate security concerns with built-in data security features

In this era of high-profile breaches, the security of your data is a critical concern. Accordingly, IBM Cloud Object Storage Public Services offerings are designed with a high level of security in mind. Your data is highly guarded with built-in security using innovative IBM SecureSlice technology (Figure 3) that combines encryption, erasure coding and data dispersal.

Each object written into the system is divided into a number of slices, with no copy of the data residing in any single disk, node or location. Each object can be read bit-perfectly using a subset of those slices. As a result, even if one disk, node or location is physically breached, it is virtually impossible to decode the data using algorithmic computation.

When it's time for data access, credentials are generated and managed for each user. Digital certificates are issued to each node, helping to protect data against unauthorized user access and to guard network connections against rogue node attacks. IBM Cloud Object Storage also provides multiple bring-your-own-key (BYOK) data encryption and access control options.

Features of IBM Cloud Object Storage carrier-grade security include:

- SSE-Provider (Server Side Encryption using IBM Cloud Object Storage Managed Encryption Keys) data at rest encryption: IBM Cloud Object Storage Public Service automatically encrypts data at rest using uniquely generated encryption keys for each object segment. Keys are secured and reliably stored using information dispersal algorithms (IDAs) that protect object data using an All-or-Nothing Transform (AONT) (Figure 3).

IBM Cloud Object Storage Public Service uses one of the strongest block ciphers available, 256-bit Advanced Encryption Standard (AES-256) and 256-bit Secure Hash Algorithm 2 hash function (SHA-256). This is the default data-at-rest encryption option.

- SSE-C (Server Side Encryption–Customer Managed Encryption Keys) data at rest encryption: Customers can maintain control over their data security by bringing their own encryption keys (BYOK). IBM Cloud Object Storage Public Service provides two options for implementing BYOK:
 - Support for Customer Keys through API: This option adds a header to APIs that gives customers the ability to provide their own keys to encrypt objects. It allows customers to integrate data-at-rest encryption of objects with their on-premises key management solutions.
 - Support for Customer Keys through IBM Key Protect: This option, available in the 1st quarter of 2018, gives you the ability to encrypt objects using the IBM Key Protect service, which can securely generate, store and manage encryption keys in the IBM Cloud. It supports both customer-imported and IBM Key Protect service-generated customer root keys (CRKs).

- Data in motion encryption: Data in motion is secured by using built-in carrier-grade Transport Layer Security/ Secure Sockets Layer (TLS/SS) or SNMPv3 with AES encryption.
- Data Access Control: You can set bucket level permissions and policies to enable data isolation and access control using the IBM Identity and Access Manager (IAM) service in the IBM Cloud. For example, customers can assign user roles and create policies at the bucket level to control the actions users can perform for access to data.

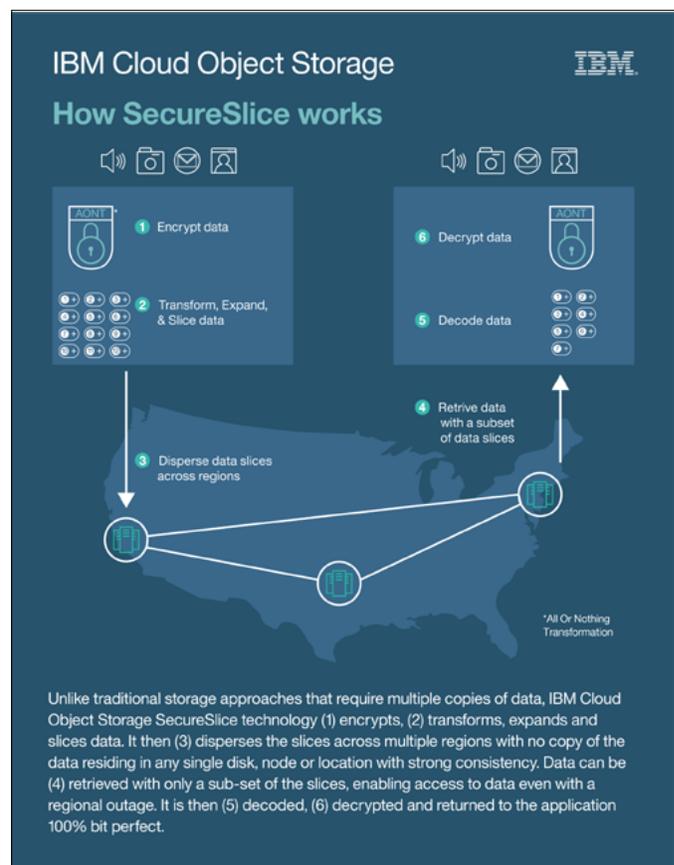


Figure 3: SecureSlice technology combines encryption, erasure coding and data dispersal to facilitate high availability and security of stored data

IBM Cloud Object Storage Public Services

Discover flexible and security-rich storage that scales with your business needs.

Flexible

- Offers multiple data classes and resiliency options to match your workload requirements
- Accommodates cloud-native applications such as IoT, analytics and mobile platforms
- Helps move on-premises application data such as backup, archiving and content repositories to the cloud
- Scalable
- Start at any initial capacity with virtually unlimited upward scalability
- Add or remove capacity, paying only for what you use

Security-rich

- Delivers carrier-grade security: data encryption options while at rest or in motion, bucket level permissions and policies and digital certificates to help regulate access
 - Divides each object into a number of slices, with no copy of the data residing in any single disk, node or location
-

Why IBM?

IBM Cloud Object Storage provides robust solutions that clients have used to turn storage challenges into business advantages. These offerings help reduce storage costs while more reliably supporting both traditional and emerging cloud-born workloads for enterprise mobile, social, analytics and cognitive computing. IBM Cloud Object Storage is built on technology from object storage leader Cleversafe®, acquired by IBM in 2015. Some of the world's largest repositories rely on IBM Cloud Object Storage, and the solutions are recognized across the industry:

- Gartner, Inc., has given IBM Cleversafe dsNet (now IBM Cloud Object Storage) the highest scores in the Analytics, Archiving and Cloud Storage use cases in the Object Storage Critical Capabilities report³.
- Cleversafe (now IBM Cloud Object Storage) solutions are 72% less expensive than equivalent redundant Array of Independent disks (RAID) solutions⁴.
- IBM is ranked as the overall leader in hybrid cloud by Technology Business Research, Inc⁵.

For more information

To learn more about IBM Cloud Object Storage Public Services, please contact your IBM representative, or see the following website: ibm.com/cloud-computing/products/storage/object-storage/public-service

*For current pricing information, visit: <http://ibm.com/2e8DlSh> or ibm.com/cloud-computing/products/storage/object-storage/public-service/#othertab2



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