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TECH BRIEF

Data Protection With Wasabi Hot Cloud Storage

wasabi hot cloud storage

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Wasabi Hot Cloud Storage is well-known in the cloud storage industry for providing significant price and performance advantages relative to cloud storage services offered by the hyperscalers (AWS, Azure, and GCP). Data protection is also a critically important attribute of Wasabi's service, and this tech brief offers insight into details on Wasabi's protection capabilities. Wasabi provides a highly durable storage infrastructure engineered to preserve data integrity and ensure high service availability. To achieve 11 x 9s of data durability and to provide high service availability, Wasabi stores objects in multiple redundant elements across one or more Wasabi storage regions. The Wasabi service is designed to handle concurrent element failures by rapidly detecting and repairing any lost redundancy.

Wasabi's data protection capabilities can be summarized as:

- Engineered for 99.999999999% (11 x 9s) durability and 99.99% availability
- Data availability in the event an entire Wasabi storage region is lost
- Use of top-tier secure and redundant data centers
- Backed by the **Wasabi Service Level Agreement**

In addition to data protection capabilities achieved through data center hardware redundancies, you can achieve further protection through the use of Wasabi's object replication, versioning, and object lock capabilities. These data protection functions are further complemented by Wasabi's strong data security capabilities and Wasabi's use of top-tier data center facilities that provide maximum protection at the facility level.

Achieving High Data Durability

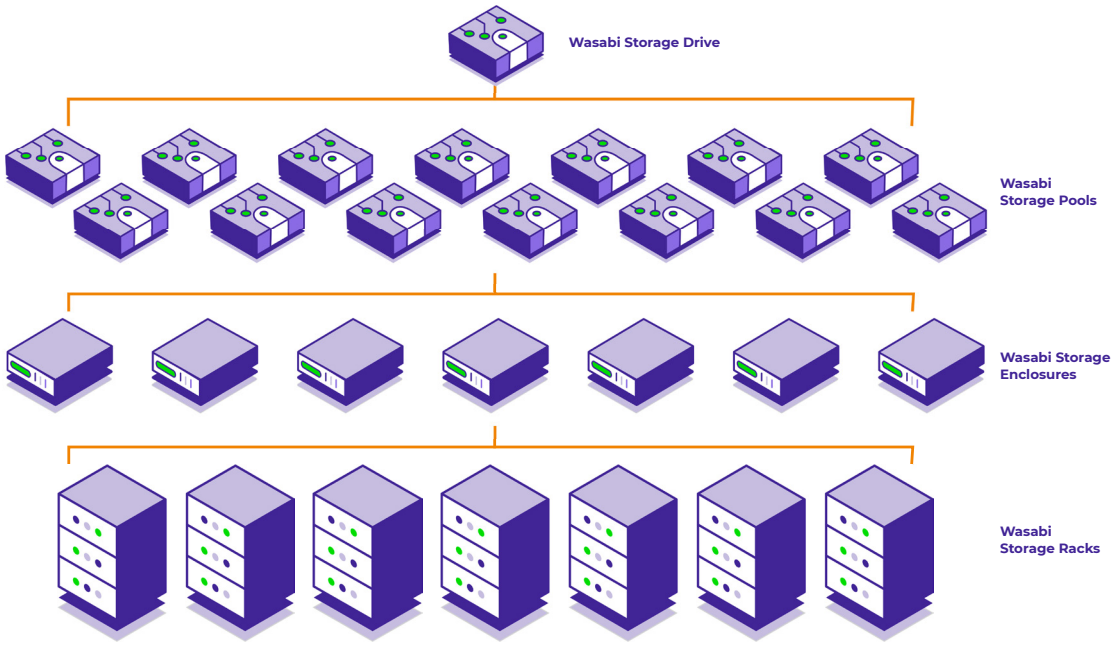
An important aspect of data protection is data durability. For public cloud object storage services like Wasabi, eleven nines (generally expressed as 11 x 9s or 99.999999999%) is viewed as the gold standard in data durability. To better understand how Wasabi achieves 11 x 9s of data durability, let's first examine the Wasabi storage architecture building blocks.

The first building block in any storage platform is a disk drive. In Wasabi's storage architecture, 14 drives are used to form an element known as a Wasabi storage pool. Incoming storage data is encoded for redundancy across the 14 drives in a storage pool to ensure that the loss of multiple drives does not impact data integrity.

In Wasabi's design, up to 3 drives can be lost in a storage pool without impacting data integrity. Multiple Wasabi storage pools are housed in Wasabi storage enclosures, along with spare drives to enable quick replacement of drives that fail. Each enclosure is connected to 2 different control servers through different data paths, and both servers monitor the drives, the enclosure, and each other for maximum resiliency. This means loss of a server does not impact the reachability of the data.

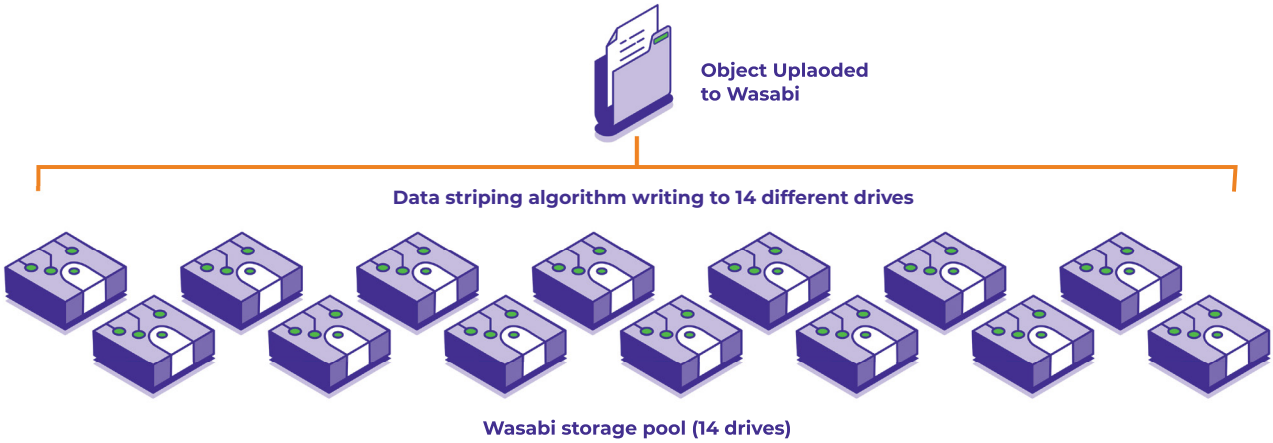
Up to ten enclosures are deployed in a Wasabi storage rack and these racks are arranged with the supporting infrastructure to form a Wasabi storage vault. All Wasabi storage vault elements are interconnected via redundant networking connectivity and have redundant power feeds. These highly redundant Wasabi storage vaults are the basis for a Wasabi storage region.

To better understand Wasabi's storage architecture redundancy in action, let's consider an example.
When an object is written to Wasabi, the Wasabi data striping algorithm converts the object into a series of stripes and parity fragments and stores each data stripe on 14 different drives.



Wasabi Storage Architecture Building Blocks

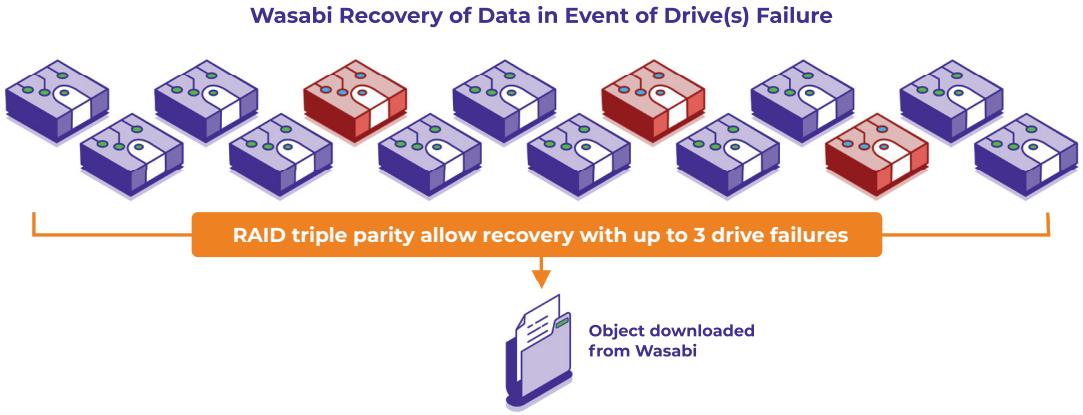
The process uses a **RAID triple-parity** technique to allow for data recovery in the event of up to three disks failing in the storage pool. This technique ensures that customer data is protected even in a rare event of multiple disks failing at the same time.



Wasabi's Data Striping Algorithm in Action

When you read an object from storage, Wasabi reassembles the object using the data stripes. In the event one or more drives fail, Wasabi can withstand the failure of up to any 3 drives within a storage pool without impacting data integrity.

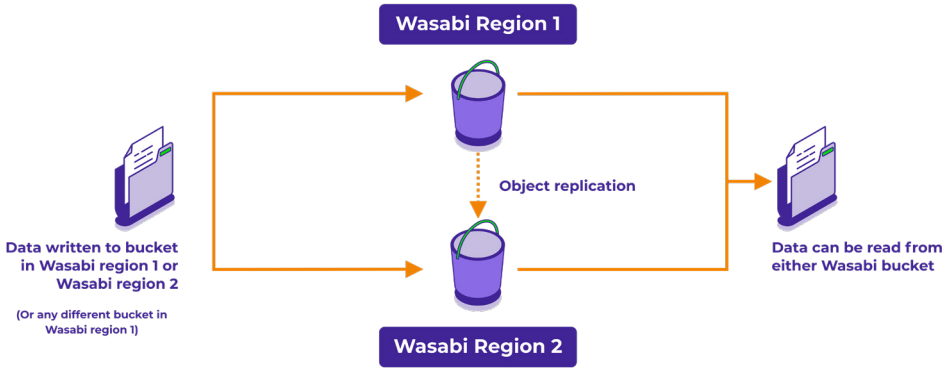
As demonstrated by this example and the associated redundancy details, Wasabi's techniques to achieve 11 x 9s of data durability at the storage hardware level provide a solid foundation for Wasabi's data protection capabilities. Further protection can be provided by leveraging the additional capabilities described below.



Additional Data Protection via Object Replication

For data protection requirements that extend beyond Wasabi's protection of data within a single Wasabi storage region, Wasabi recommends using our object replication feature. This feature allows you to implement geo-redundancy by replicating the contents (for example) of your us-east-1 bucket to a bucket in the us-west-1 storage region.

When object replication is enabled, the objects of your choosing in the designated source bucket will be synchronously copied to the destination bucket in the region of your choice. You can select a destination bucket in a different Wasabi storage region or the same Wasabi storage region.



Enhancing Data Protection via Versioning & Object Lock

Wasabi can further protect your data using versioning. You can use versioning to preserve, retrieve, and restore every version of every object that is stored in your Wasabi bucket. With versioning, you can easily recover from both unintended user actions or application failures. By default, read requests retrieve the most recently written version. You can retrieve older versions of an object by specifying a version of the object in a read request.

Wasabi also supports data immutability via object locking. Object locking protects data against administrative mishaps or abuse. With object lock-enabled buckets, retention periods can be set at the object level for each individual object. Alternatively, buckets can be configured for a default retention setting for all objects that are placed in them. For example, if the bucket level policy is set to retain an object for 30 days, the 30 day retention is calculated and applied as each object is added. Therefore, users do not have to set each object's retention individually.

With Wasabi's object locked immutable buckets, all objects are made immutable according to a uniform set of parameters. All of the objects in the bucket share the same expiration date. There can be no variation in the retention period between individual objects. The use of the object lock feature prevents the most common causes of data loss due to accidental or intentional data modification or deletion.

Data Protection via Top-Tier Data Center Facilities

As a means of further protecting your data, Wasabi deploys our storage regions exclusively in top-tier **data center facilities** that are highly secure, fully redundant and certified for SOC 2 and ISO 27001 compliance. Each individual Wasabi data center is based on a highly scalable, fully distributed architecture with redundant system components, power sources and network connections to ensure high availability. The system design eliminates single points of failure as all system elements are protected using 1:1, 1+1 or N:M redundancy. This article provides an example of the protection capabilities supported by our data center providers.

Data Protection via Strong Data Security

Wasabi is secure by default and all data stored in Wasabi hot cloud storage is always encrypted at rest (even if the data is already encrypted by the storage application prior to sending it to Wasabi). Wasabi follows industry-best security models and security design practices, including the AWS Identity and Access Management (IAM) model, Multi Factor Authentication (MFA), and enterprise single-sign-on (SSO). Examples of Wasabi security features include:

- HTTPS is supported for the secure upload/download of data
- Buckets are only accessible to the bucket and object creators
- Wasabi supports user authentication to control access to data
- Access control mechanisms such as bucket policies and Access Control Lists (ACLs)

Conclusion

Wasabi provides a highly durable and reliable storage infrastructure, engineered from the ground up to provide 11 x 9s of data durability and provide high service availability. Wasabi's advanced data protection capabilities provide hyperscaler levels of data protection at a fraction of the price.