BackupEDGE™ has cloud storage capabilities via the **S3** multi-cloud object storage API.

Using *BackupEDGE* with S3-Compatible Cloud Services

Introduction

Cloud storage is here. Internet-based storage service permeate our lives, from a PC desktops, to our cell phones and tablets, to our servers.

As bandwidth availability increases and storage costs decrease, cloud storage becomes the most cost-effective way to ensure that you have safe, off-site backups for servers.

In 2004, *BackupEDGE* began supporting cloud storage with FTP/FTPS backups.

In 2008, *BackupEDGE* added support for Object Storage-based cloud backups in the US to the *Amazon Simple Storage Service (S3)* using what was referred to as the "***Amazon DevPay***" protocol (discontinued by Amazon in 2017).

In 2014, *BackupEDGE* added support for worldwide object storage backups by implementing the *S3 API* (signature version 2), a protocol that has been adopted by many storage vendors around the world.

In 2017 *BackupEDGE* added support for S3 signature version 4, opening up many more *Amazon* Regions sites around the world.

In 2018 and again in 2019, major engineering work was done to optimize *BackupEDGE* performance with S3-compatible sites.

In 2021 *BackupEDGE* added S3 signature version 4 support for *Wasabi Hot Cloud Storage*, *Digital Ocean Spaces* and *Backblaze B2*, as well as switchable port support enabling open-source multi-cloud support for NAS devices and software products such as ***MIN****IO*.

Other Microlite documents discuss the **URL** Resource type for ***FTP/FTPS Backups***. This document focuses on cloud backups using the *S3 Object Storage API*. We call this storage *Resource* type **S3CLOUD**.

There are a large number of storage vendors using the **S3 API**. These include five that we've tested and certified...

- Amazon Web Services "Simple Storage Service" or **S3** (worldwide).
- Google Cloud Storage (US and other).
- Wasabi Hot Cloud Storage (US and EU).
- Digital Ocean Spaces.
- Backblaze B2.

Each has their own special features and benefits. *BackupEDGE* enables you to choose the cloud Object Storage service that makes the most sense for you. You may now choose the closest, or the most cost-effective, or whichever storage service best fits your needs.

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Theory of Operation

BackupEDGE treats **S3CLOUD** *Resources* as any other standard *Resource*, It is fully functional, and capable of:

- Full or partial system backups.
- Checksum and full bit level archive verification
- Instant File Restore™
- Bare metal disaster recovery with *RecoverEDGE*.

As with any other *BackupEDGE* Resource, servers can be set up to perform complete *Master*, *Differential* and *Incremental* system backups. Individual backup subsets (we call them backup *Domains*) may be created as a supplement to locally hosted backups.

Pricing

Every cloud storage vendor has their on pricing model. Some charge for storage only. Some charge for storage plus downloads. (*BackupEDGE* uses upload (ingress) bandwidth for backups and download (egress) bandwidth for listing, verification, and restore.)

NAS / Private Cloud

Many NAS vendors support Object Storage services. For instance, QNAP has the QuObjects service, and TrueNAS has an S2 Object Storage service. Additionally, products such as **MIN*IO*** may be deployed on almost any server to allow it to function as an S3-compatible server for in-house and private network **S3CLOUD** Object Storage.

Benefits

Internet backups are fast becoming a preferred method of off-line storage. Possible uses include:

- All server backups.
- Periodic off-site backups to supplement local tape/disk/NAS etc. backups. For instance, perform local backups daily and a weekly Internet backup.
- Specialized backups of critical data files / directories.
- Automatic copies of backups made to another storage *Resource*.

BackupEDGE "Transparent Media Technology™" ensures that users can use any combination of storage *Resources* to create the best possible protection scenario.

S3CLOUD backups provides storage with guaranteed protection from data loss and high availability, all at reasonable prices.

BackupEDGE "Instant File Restore" ensures maximum possible data retrieval performance. When files or directories need to be restored, only the actual data needed is transmitted. It is not necessary to scan the entire archive looking for the desired data.

BackupEDGE 3.x has a quota management system with "*Lazy Reclamation*". For instance, setting a 100GB quota would ensure that the user will never exceed the base monthly fee for storage space, while archives will not be deleted unless the space is needed for new archives.

BackupEDGE can disable it's "*Lazy Reclamation*" feature on *S3CLOUD Resources*. Any expired archives will be deleted whenever *BackupEDGE* attempts a new backup, minimizing cloud storage expenses.

Security

All communications between *BackupEDGE* and *S3CLOUD* servers are performed over an encrypted link. Strict authentication ensures that data is kept secure from unauthorized access.

As long as the *S3CLOUD* account remains open, stored archives may be retrieved. Closing the account will result in the loss of all stored data.

Only the https port (443) needs to be open outbound on the user firewall for *S3CLOUD* services to function. Private cloud services may use any desired port.

Performance

This is purely a function of the internet bandwidth capabilities of the user and storage provider overhead. Backup schedules should be planned around this bandwidth. *S3CLOUD* has no artificial bandwidth limitations.

Bandwidth examples (estimated), assuming all bandwidth is available to *BackupEDGE*:

Service (per second)	Download (Verify/Restore)	Upload (Backup)
Common Cable Plans		
100Mb/10Mb	750MB/Min. - 45GB/hr.	75MB/Min. - 4.5GB/hr.
50Mb/5Mb	375MB/Min. - 22.5GB/hr.	37.5MB/Min. - 2.25GB/hr.
30Mb/5Mb	225MB/Min. - 13.5GB/hr.	37.5MB/Min. - 2.25GB/hr.
20MB/2Mb	150MB/Min. - 9GB/hr.	15MB/Min. - 900MB/hr.
10MB/1Mb	75MB/Min. - 4.5GB/hr.	7.5MB/Min. - 450MB/hr
3Mb/1Mb	22.5 MB/Min. - 1.35GB/hr.	7.5MB/Min. - 450MB/hr
Common FIOS Plans		
75Mb/75Mb	450MB/Min. - 27GB/hr.	450MB/Min. - 27GB/hr.
50Mb/50MB	375MB/Min. - 22.5GB/hr.	375MB/Min. - 22.5GB/hr.
25Mb/25Mb	187.5MB/Min. - 11.25B/hr.	187.5MB/Min. - 11.25B/hr.
Common DSL Plans		
10Mb/1MB	75MB/Min. - 4.5GB/hr.	7.5MB/Min. - 450MB/hr.
6Mb/768Kb	45MB/Min. - 2.7GB/hr.	5.76MB/Min. - 346MB/hr.
3Mb/768Kb	22.5 MB/Min. - 1.35GB/hr.	5.76MB/Min. - 346MB/hr.
768Kb/768Kb	5.76MB/Min. - 346MB/hr.	5.76MB/Min. - 346MB/hr.
Common Dedicated Circuits		
T-1 / DS-1 1544Kb/1544Kb	11.58MB/Min. - 694MB/hr.	11.58MB/Min. - 694MB/hr.
T-3 / DS-3 45Mb/45Mb	337.5MB/Min. - 20.5GB/hr.	337.5MB/Min. - 20.5GB/hr.

(Kb=kilobit, Mb=Megabit, MB=Megabyte, GB=Gigabyte)

While these are theoretical limits, the actual net uncompressed throughput will always be lower due to segmentation caching and other network overhead.

The high performance compression built into *BackupEDGE* is effectively able to improve on these speeds, depending on the type of data you are

BackupEDGE - Amazon **S3** Support

storing, the compression level you choose (there are 9) and the performance of the system CPU.

Various Uses - Single Server to Enterprise

There are many ways to handle the account management system with *BackupEDGE* and *S3CLOUD*.

- Setup and use *S3CLOUD* with a single server only.
  - This is the most common anticipated use.
- Use multiple copies of *S3CLOUD* with a single cloud storage vendor account.
  - The keys for a single account can be downloaded to an unlimited number of systems.
  - Systems can use separate backup "buckets" and within those buckets, directories.
  - A common bucket / directory strategy may be implemented in scenarios where "backup from system A, restore to system B" are required.
  - All systems share the same GB/month pricing and overages with one monthly fee.

Summary

BackupEDGE with *S3CLOUD* support enables "cloud storage", providing secure, high reliability off-site backups at speeds limited only by the end users' internet bandwidth, and at prices data centers generally cannot match. More information can be found on the Microlite Corporation website, http://www.microlite.com/s3/index.html and in the *BackupEDGE* User Guide.

Notes

BackupEDGE 03.01.01 and later is required for *S3CLOUD* support.

BackupEDGE 03.01.04 build 1 added many software updates, plus the most recent OpenSSL security fixes and the ability to disable *Lazy Reclamation* if desired, to minimize storage requirements.

BackupEDGE 03.01.05 and later have Amazon *signature version 4* support, opening up many more storage locations around the world.

BackupEDGE 03.01.02 build 3 and later have significantly improved *S3CLOOUD* performance and larger segment size capability.

BackupEDGE 03.01.02 build 7 and later have improved memory management when using *S3CLOOUD* Resources.

BackupEDGE 03.01.04 build 4 and later incorporate *signature version 4* support for *Wasabi Hotcloud Storage*, *Digital Ocean Spaces* and *Backblaze B2*. They also incorporate selectable ports, enabling NAS cloud backups and software products like *MINIO* to be configured on any port.