

# Global Deduplication

## Driving network & storage efficiency with global deduplication

Data deduplication is a specialized data compression technique that reduces storage needs by eliminating redundant data and storing only one unique instance of the data.

### Data deduplication options

Current data deduplication techniques fall into two broad categories:

- **Client-side deduplication:** occurs at the source (where the data is created and stored)
- **Target-side deduplication:** takes place on the server (after the data has already been transported to its archival storage location).

While both forms of deduplication generally provide the same level of storage savings, client-side deduplication provides additional efficiencies through reductions in network bandwidth consumption.

Carbonite's client-side data deduplication process goes one step further and provides additional benefits with an enhanced security model to meet the requirements of enterprise customers.

### Carbonite's deduplication of encrypted data

As one of the core pillars of the Carbonite solution, addressing the end-to-end security and privacy of data is a primary requirement.

- **Automated key management:** By utilizing our automated key management and encryption technology in conjunction with our unique data deduplication technology, Carbonite has solved the problem of deduplicating encrypted data.
- **No compromises:** Other forms of data deduplication technology require a choice between decryption on the server (which compromises security, privacy, multi-tenancy, etc.) or deduplication that is limited to data from individual data sources (instead of data across the enterprise).

### How it works

- **Client-side processing:** With Carbonite Endpoint Backup, each block of data is completely processed on the client. So from the server's point of view, each block is an opaque unit. In fact, no data analysis is even possible on the server, which just files the data in the data store. Each file is disassembled into a set of variable length blocks that are then processed on the client. After scoping rules have been applied to a data block, a unique Block Encryption Key is deterministically generated.

### Key Trends

- **End user satisfaction and productivity:** user requirements are increasingly taxing the corporate network for video, conferencing, voice services. It is becoming increasingly expensive to provide sufficient capacity and avoid bottlenecks for corporate users
- **Bring your own device signifies more trouble ahead:** Devices are changing and laptops, smartphones, and tablets are going to increasingly drain corporate networks
- **Storage requirements are growing:** Storage capacity requirements for most organizations double every 12-18 months<sup>1</sup> (Forrester 2014)
- **Regulatory pressure to retain data:** Legal and other trends are requiring that as much backup data as possible is retained in disk and kept there as long as possible

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- **Block encryption:** This key is then used to encrypt the block using AES-256 bit encryption. The end result is an Encrypted DataDNA Block. The block encryption process ends after each data block has been encrypted. And as a final step, the Block Encryption Key is then itself encrypted and any clear text representation of the key is removed from the system.
- **Data deduplication:** Following data deduplication, each file can be represented by a simple index that associates a list of unique data blocks required with their order of arrangement, and identifies the Block Encryption Key required to completely reassemble an instance of the original data.

Carbonite is the only endpoint protection vendor that can perform client-side global deduplication of encrypted data. Carbonite Endpoint Backup provides the full economic benefit of data deduplication to be achieved across the enterprise without sacrificing data security or privacy.

## Carbonite Endpoint Backup deduplication in action

A global corporation has 1,000 salespeople spread across 4 locations with QuickCaches installed in each remote office. The marketing department regularly emails out graphically rich PowerPoint presentations to the entire team. Therefore, 1,000 copies of the same file would need to be backed up and available.

With Carbonite Endpoint Backup's global deduplication capabilities, one copy of the PowerPoint file would be sent by the first user to the Carbonite Endpoint Backup Vault but it would be available as a backup to the other 999. Furthermore, when any salesperson makes a change to their version of the presentation, for example updating the date or adding their name to the title screen, then only the delta block change of the file is sent to the Carbonite Endpoint Backup Vault and not the entire presentation.

### Impact

- Global deduplication reduces data in storage by 50-60%
- Carbonite Endpoint Backup also saves ~10% of bandwidth utilization versus products that do global deduplication on a per server/storage location basis
- QuickCaches in remote offices reduce backup-related WAN traffic during peak traffic by up to 98%

<sup>1</sup><https://www.sagiss.com/blog/bid/235ae4/data-storage-21-interesting-facts-figures>

## Carbonite Endpoint Backup offers:

- Increase end user satisfaction and productivity by reducing backup-related WAN traffic by 98% during business hours
- Reduce total storage requirements by 50-60% by only storing unique data
- Reduce cost of long-term data storage
- True global deduplication across all users and their data. Not per user, per server, or per storage location like other vendors
- Global deduplication over encrypted data which provides efficiency and security
- Unlike competitors, Carbonite does not use a single-key for all users – this is a shortcut that compromises security
- Carbonite Endpoint Backup does not require decryption on the backend so it doesn't tax the backend servers
- Only block level changes are sent over the network to the Carbonite Endpoint Backup Vault
- Carbonite Endpoint Backup reduces the amount of storage required for the Carbonite Endpoint Backup Vault

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