Backup: The last line of defense and imperative for the "data age"

Contents

We live in the age of big data, in which the data generation process takes place continuously every second. Both technology and needs have evolved, and while data remediation remains an IT feature, uses now include mapping, evaluating, parsing and optimizing data from all sources in order to extract information that can be leveraged by different roles in the company.

An organization must therefore allow its users to access and act on the data they need from anywhere, with any device, in real time, while complying with security rules. As such, corporate information governance must become a genuine long-term strategy. This means not only protecting the enterprise's digital assets, but also complying with regulations, and all in an environment where data proliferates.

In 2023, the world created 123 zettabytes of data, expected to rise to 221 zettabytes in 2026.[1] One zettabyte equals 1 billion terabytes, so it is easy to imagine the amount of data that must be stored in a secure yet easily accessible manner. Experts predict that 181 zettabytes will be created in 2025, and 49 percent of this colossal amount will be stored in the cloud. As a result, storage is a major challenge for companies. If we consider emerging technological developments (analytics, artificial intelligence/machine learning, IoT, edge computing, etc.), forecasters may well be understating the truth.

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1 Statista, Volume of data/information created, captured, copied, and consumed worldwide from 2010 to 2023, with forecasts from 2024 to 2028, 2024
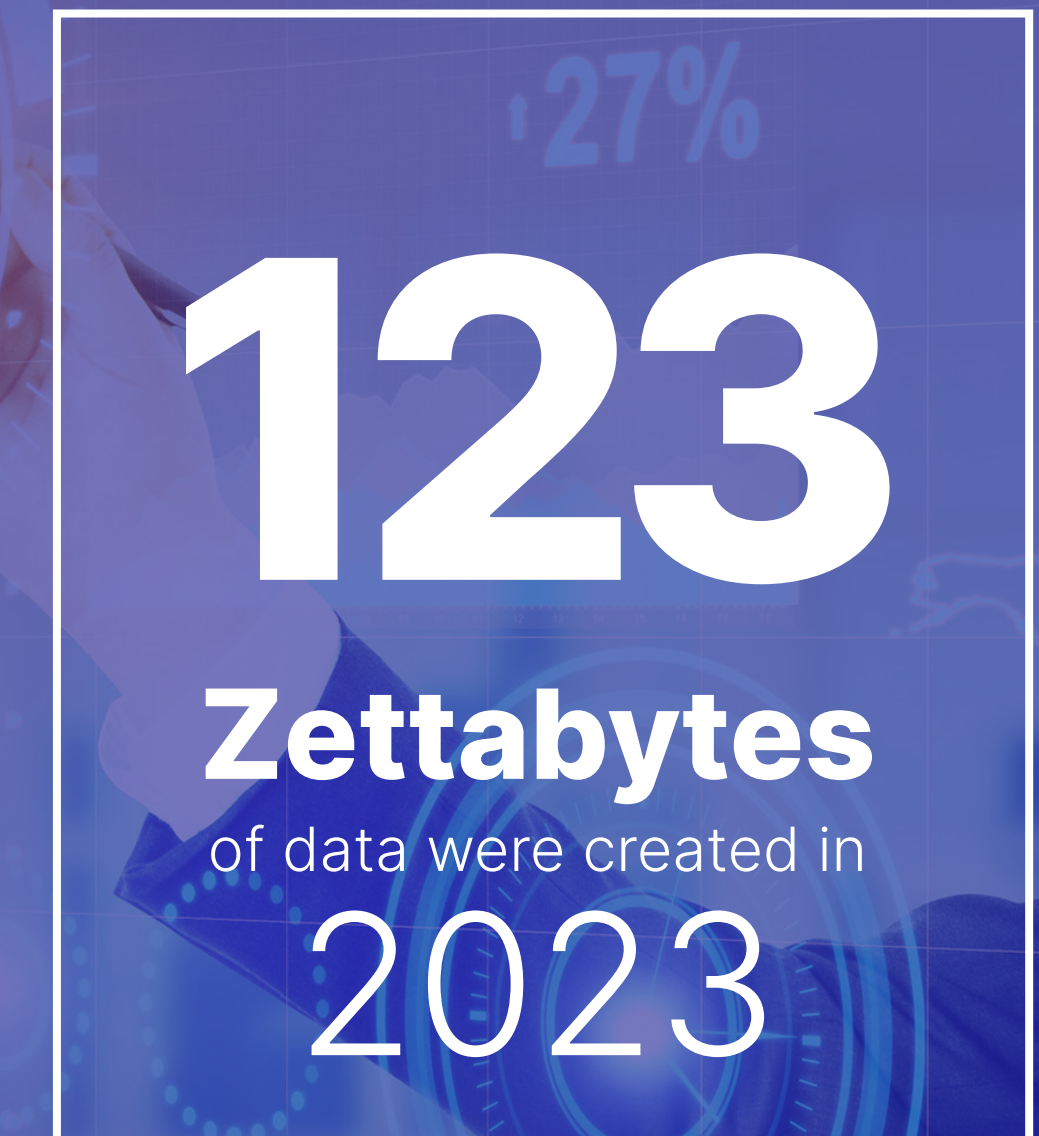
Cloud storage: A flexible model

The use of video is becoming widespread, including in large enterprises. Meanwhile, mobility trends before the pandemic, and the spread of remote working after it, have replaced face-to-face interactions with digital ones, generating a significant amount of data. The emergence of the market for connected objects and sensors is expected to be another major source of data in the years to come. These objects generate data on the edge of the network, which is then stored in the company's infrastructure.

This exponential growth in data is accompanied by a series of associated costs, and customers are seeking ways to better control this increase. If we look specifically at data backup and storage, we can see that new paradigms of the services hosted and managed through monthly subscriptions have given rise to flexible financing models. The subscription model allows companies to use their financial assets to dynamically manage the infrastructure according to their needs. The emergence of this cloud-based storage model has contributed significantly in shifting capital expenditures (CapEx) into operating expenses (OpEx).

The Software as a Service (SaaS) model's subscription economy has spread quickly due to its convenience and immediacy, since the customer buys access to the application rather than ownership of it, such as with Microsoft® 365. However, customers may not always be aware that service providers do not back up the data generated by these solutions. And even if backup is performed for applications, this is not the case for the files generated. It is the user's responsibility to ensure that everything is secure by setting up systems that can retrieve and restore data quickly when needed.

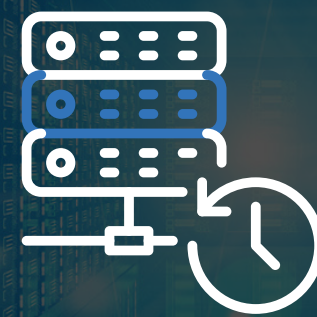# 3-2-1 backup: The strategy of dispersion

However, this data is increasingly diverse and extremely complex in terms of structure (structured, unstructured, or semi-structured) with problems related to indexing, sorting, searching, parsing and visualization. It represents a major challenge for today's organizations. That is why there is a need for a backup system and a backup strategy that make it possible to deploy or lease a storage framework with a medium- and long-term vision, to predict future needs and costs. In addition, customers must be able to use the most basic level of analysis to optimize the framework as their needs change.

For several years, the backup strategy has been based on the 3-2-1 rule, the principle of multiple redundancies and the physical differentiation of the media for users to avoid "putting all their eggs in one basket." Distributed storage systems provide the best guarantee of data backup in the event of problems thanks to redundancies being distributed across multiple storage systems. The 3-2-1 rule consists of having at least three copies of the data, including two that are local but stored on different media, and at least one off-site copy. The three copies must be on different systems in different locations to prevent an incident, such as a fire, from destroying all copies at the same time. This also means that the use of different backup technologies is highly recommended. Using different formats reduces the risk of all your backups being damaged, because each one has different strengths and weaknesses as a redundancy.

Governing the data to learn from it

In addition to choosing the right technology, a good backup strategy is based on an equation that meets the changing needs of the business over time, while providing a favorable cost-benefit ratio. An organization must analyze its IT needs and determine what technologies will be used, such as the type of storage device (flash, magnetic, magneto-optical, etc.) and the mix that the enterprise needs. IT also requires the integration of several tools to be able to review the data and ensure its integrity over time. Some of these tools need to be integrated into backup solutions to create data that can be used by data analysis tools, which requires considerable product integration.

The digital economy is more than a large online market. Digital also enables us to work from home and collaborate securely with employees, partners and customers. In this context, good management and governance of information over time depends on how the data is stored and managed so that lessons can be taken from it.

Cybersecurity, technologies and backup strategies

The growing adoption of cloud storage, including in some vertical industries such as healthcare, media and entertainment, has enabled organizations to take advantage of cost-effective data backup (by adopting the subscription model) and operational managed platforms that do not require maintenance fees. In the process, many companies have shifted this spending from the CapEx model to the OpEx model, which has helped to stimulate the market.

However, challenges to this development persist. To start with, there are security challenges, since the increase in successful attacks has created an incentive for companies to minimize data exposure and vulnerabilities. As with any good information management and governance plan, backup is part of a medium/long-term strategy. As a result, backup and disaster recovery solutions need to be able to adapt to heterogeneous, complex and hybrid IT environments. They must be built on scalable architecture, combining security and analytics features, and enabling customers to meet business continuity and compliance requirements in a secure and cost-effective manner.

Reducing the costs and carbon footprint of backup

It is universally recognized that data backup is an essential component of any digital transformation project. In today's companies, critical business information is increasingly generated by multiple distributed sources, requiring IT departments to cost-effectively manage and protect data that is spread across several backup systems. In this context, new business models based on information use and increased security requirements have forced companies to rethink their data protection policies and implement solutions that integrate global capabilities.

According to feedback, the drivers of change will be motivated primarily by the management of data complexity, scalability and security. In fact, the reliability and qualitative improvement of backups are at the top of the list for chief information officers. The same is true for increasing backup and restore performance, as well as reducing the footprint of backups. Companies also plan to take advantage of the benefits of the cloud for greater agility in high-intensity applications and handling large amounts of data during backup and disaster recovery.

Finally, environmental concerns are featuring more and more in purchasing decisions for IT services. An increasing number of companies are adopting corporate social responsibility policies and setting targets for reducing their carbon footprint. This is now one of the concerns to which IT departments are seeking answers. Several mechanisms can be used for more effective control of electricity consumption. Flash storage devices are beginning to provide the answer. They carry the hope of reducing energy consumption costs in data centers. In addition, their prices continue to decline as the technology becomes more reliable and media capacities continue to increase.

BACKUP

Data deduplication for optimized storage

In recent years, cloud storage systems have emerged as a popular solution due to their flexibility. However, in addition to the classic request for more security, reliability and performance, one of the most common requests is for the reduction of backup volumes. The explosion in the amount of data has caused a number of problems in storage and recovery processes: backing up duplicate data significantly increases backup time and resource consumption. An effective technique is therefore needed to reduce the number of versions of the same file.

One of the key mechanisms integrated into cloud storage solutions to reduce the footprint of backups is deduplication. Along with many other backup features, data deduplication remains one of the most important and fastest-growing storage optimization techniques. During the deduplication process, duplicate data is deleted, leaving only one copy of the data to be stored. However, for security reasons, the indexing of all the data is still maintained in case such data is required. With this removal and indexing, deduplication reduces storage space consumption because just one single copy of each data item is stored.

Deduplication has many advantages; in addition to reducing power consumption, it also decreases bandwidth consumption and saves on storage space. Another goal of data deduplication is to provide better performance for data-intensive applications by optimizing response and data access times.

Unalterable, and thus incorruptible, data

There are many security mechanisms to protect backups from unsafe or unauthorized behavior. Immutability, along with many other backup functions, is one of the techniques used to ensure that data has not been altered. During attacks, hackers systematically try to corrupt stored data so as to successfully infiltrate into the invaded information system. Their goal is to ensure that the data recovery process does not end the attack, but instead worsens the situation further in order to get the ransom quickly.

It is therefore essential to put mechanisms in place to ensure the inviolability of data. The principle is to prevent any modification or deletion by anyone for a fixed period of time. Setting a retention period is a regulatory compliance requirement. In addition to protecting against malicious acts, immutability is also "insurance" against mishandling and the accidental deletion of data.
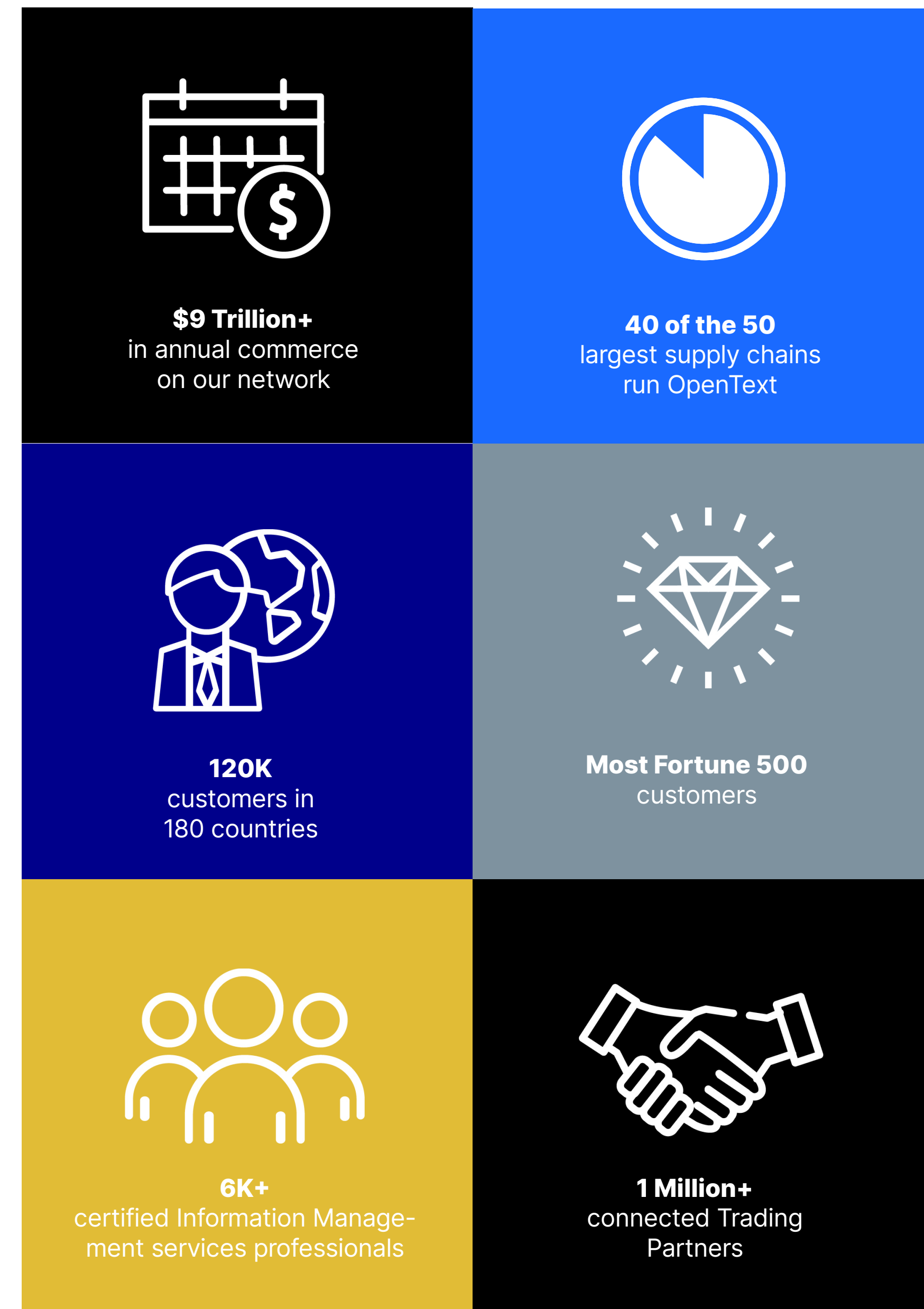
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Partners

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