

A BACKUP SYSTEM YOU CAN TRUST MORE THAN YOURSELF!



CARBONIO

BACKUP

YOUR BEST-DEvised PLAN

ZEXTRAS®

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Backup Matters: Stop Ignoring It

World Backup Day is held on March 31 to remind users to back up their data and not make a fool of themselves on the following day, April 1st. ¹

Why is data backup and recovery so important? We won't annoy you again and again with long reasoning on how data became the current centuries' gold. Let's go straight to a use case. What if tomorrow morning you wake up and discover that you have lost 8 hours of work of all your employees? Let's try to calculate the damage, at least the economical one. Then, there'll be time to think about collateral damages, such as employees' frustration.

With Zextras Carbonio there's **zero possibility of losing data**. Zextras Carbonio Backup is reliable and extremely stable; it simply never stops working.

Ready to safeguard your server data? Let's go on then!

Read this whitepaper if...

- You struggle with backing up your data
- You think your current backup system is not reliable / You don't have one
- You need to be compliant with data privacy regulations
- You're curious about how Zextras Carbonio realtime backup system works

¹ <http://www.worldbackupday.com/en/>

Zextras Carbonio is a **private e-mail server and collaboration platform**.

With this paper, you'll learn how Zextras Carbonio helps **large-scale enterprises, public and private organizations, public sectors, and service providers** implement a private digital workplace where data is safe and always accessible.

Can You Relate?

I bet you can easily recall hundreds of times you needed to restore some data. Generally, two very common circumstances can badly corner a system administrator.

- When a **huge disaster** jeopardizes the entire server.
- When a user asks the system administrator to help them **restore something important** that they deleted.

The first one is devastating and can easily cause a lot of distress for the administrators, and will be thoroughly discussed later: a system crash is a very common example. The second one on the other hand requires a lot of time and resources for the administrator to restore the single item. Although you might think the second one is only the result of users' negligence, it is really common. A common scenario could be when a user deletes a calendar to reschedule it to a different time, but the deleted appointment included an important contact number which is not available in the new appointment entry anymore. Therefore, the only hope they have is to ask the administrator to help them restore the deleted item. **Requesting to restore a single item is far more common** than the case of a disaster (almost 90% of the time).

Either it is demanded by one of the users who accidentally deleted an e-mail or a disaster striking the whole server, you need to have access to the lost data to **restore** them. There is only one way out of these situations, and that is having **a full-fledged backup system**.



Zextras Carbonio backup has cleverly addressed both the situations mentioned, via implementing a lot of **features that a conventional backup procedure lacked** for a long time in a unified package that can be conveniently used by the system administrators.

Later in these pages, we will see how many problems a traditional or conventional backup system can cause. However, we want to start defining the **difference between traditional backup and the real-time backup** provided by Zextras Carbonio.

Just a quick example: the most common task of restoring a single item. It can easily take the administrator half a day to restore the whole system and be able to retrieve the needed item. With Carbonio backup system, on the other hand, **it can be done within a minute of work**.

Conventional Backup Procedures

Incremental backup is not enough.

Every system administrator who has worked with e-mail servers has at least once wondered why having a built-in backup system with advanced features is so rare in their environment. The reason probably lies in the fact that implementing a backup system of this caliber **is not an easy task**. Therefore it is more probable to see e-mail servers relying on conventional backup procedures done by system administrators.

Furthermore, no third-party alternatives are usually perfect; whether free or premium, they **are not implemented** by the developers involved in designing the platform. How to choose between them? Which one works better? How to evaluate their performance? Which one is more effective? Should I use a home-cooked one for myself? These are all legit questions a system administrator might ask. Answering these questions is not easy either.

Therefore, when something happens, and a restore is needed, a system administrator should have already gone through the hassle of investigating all these tough questions or regrets not doing so - which might cost them their job. However, a third option is handling everything with **Zextras Carbonio** and its **real-time backup and restore system** relying on **innovative** and **easy-to-configure** features **baked into the platform**.

Every system administrator deserves the benefits of a **real-time backup** system with **full disaster recovery** features.

Why Zextras Carbonio Backup is Different

There are different ways to take a backup of a Linux machine or an e-mail server. Some of the most common ones are as follows.

- In virtual environments, a common method is to back up the entire virtual machine using dedicated softwares such as Veeam, Zerto, Acronis, etc.
- Backup the filesystem using Acronis, Veeam, rsync or other similar softwares to back up the e-mail server.
- Backup the corresponding folder using rsync or other similar software
- Backup mailboxes content using rest API and configuration dumping the LDAP
- Use script you can find on GitHub but often they are obsolete not maintained and no one can guarantee they work as you need.

These options have a lot of drawbacks. For instance,

- No **backup granularity**. If you have to recover to a time distant from the backup you can possibly lose a large amount of data.
- To have consistent filesystem backups, you need to **stop services**.
- Rest API overloads the CPU and **is not reliable for large numbers of mailboxes** or for big ones.
- The amount of space needed by these backup methods is not optimized and the **size can be extremely huge** depending on the kind of backup performed.
- The ability to restore **can depend on infrastructure architecture** because, in the multi-server installation, the data you need to back up and then restore can be distributed on different servers.
- Another important drawback they all share is the **extremely tedious and laborious way to restore data**.

Based on the kind of backup method that was used, a huge amount of time and work is required to restore the entire system or the single mailbox or the deleted data.

As already discussed, backup and the way it is acquired is very important but for daily needs, restoring data **easily and quickly** is crucial.

A smart and reliable instrument to restore data can save precious system administrator's time because the most common requests from users are:

- **Recovering e-mail they worked on for a while and they deleted it by mistake,**
- **Restoring something they deleted but don't remember where,**
- **Asking for one or more restores because they are unsure about deleted data nor restored ones.**

Zextras Carbonio has solved all these problems for system administrators by implementing all sorts of different features. For instance, a real-time backup which is craved by all system administrators is only one of the many features of Zextras Carbonio backup.

With Zextras Carbonio, any object inside the server is backed up. Users and admins can recover anything that was deleted. An e-mail? A whole mailbox? All the files of a local disk? Consider it done.

Let's compare two scenarios with and without Zextras Carbonio real-time backup features. The situation is a bit different in traditional backup methods.

WITH A TRADITIONAL BACKUP,
WHAT IS LOST IS LOST FOREVER.

WITH CONVENTIONAL MANUAL BACKUP

A traditional backup must be launched every 8, 12, or 24 hours. It may take days to be completed, even weeks. If you lose something in the meantime, it is gone forever.

You have to switch off machines and stop working to backup data. You need specialists to support you with that.

First, you wait for the backup to finish, then you know what is saved and what you can recover.

You will likely need the same infrastructure as before to use the backup files. Sometimes you can't re-create that, so recovered files are useless.

To increase security you need more backup, but you can't be sure they'll be consistent.

YOU CAN RECOVER EVERYTHING,
AND IT'S A MATTER OF MINUTES.

WITH ZEXTRAS CARBONIO REAL-TIME BACKUP

Zextras Carbonio backup is transactional and continuous. There is no timespan which is not covered.

Backup is automatic. It runs without affecting the workday and there is no need of having specialized support.

It's punctual. You choose what to recover, set a date and a time and your infrastructure state will be restore to the specified moment.

It's universal. You can use the backup you recovered on any software version, or any server.

It's redundant. Your files can be copied in more geographical areas. Don't worry about the storage: thanks to Zextras Carbonio storage management system the more space you occupy, the greater your savings are. There is the possibility to save on external storage, too.

The Importance of Data Recovery

Data loss costs. A lot.

The **cost of data loss** depends on the **value of data** and the **size of the business**, despite it being widely accepted to be very expensive. For example, a data center outage can cost a business **\$7,900 each minute**.¹

Data is an important aspect of any business, regardless of its size. Loss of data, whether due to natural calamities or malware, can cost a business a huge amount of **money**, in addition to losing its **customers' trust** and its **reputation**.

Data Loss Is More Common Than One Might Think

Human error is one of the most common reasons for data loss. Files can be accidentally deleted or compromised. Each year, **1 out of 5 organizations** experiences at least 22 data-loss events in which sensitive data is stolen, lost, leaked, or destroyed.²

Competitive Advantage

Having a data backup solution gives you an important advantage over your competition. After a significant data loss, a company **loses much more** than mere data: businesses around the world have suffered huge damages to their reputation, customer reach, and revenue after losing data. Looking at Cisco's 2017 Annual Cybersecurity Report, which covers ransomware and other security attacks, we see that the numbers are quite alarming. For example:

- **49%** of organizations experienced public scrutiny after a breach.
- **22%** lost customers because of attacks.
- **29%** lost revenue as a result of attacks.
- This is while **44%** of security alerts aren't even investigated.

¹ Ponemon Institute survey, sponsored by Emerson Network Power. The two organizations partnered in 2010 to calculate downtime costs.

² IT Policy Compliance Group surveys

When Else Is a Backup Needed?

Besides the situations we have dealt with in the previous pages, there are others where a backup can be really useful, such as:

- Data retention policy (i.e. recovery of an earlier version than the current one)
- Protection against internal / external security threats
- Legal requirements and compliance with institutional regulations
- Data transfer (migration) requirements

In all cases, you need an efficient backup system that works!

A **verifiable** backup system is also essential. This can be achieved by **constantly checking** the integrity of the items in the destination and their conformity with the original. This way you will certainly be able to restore the original data in case of need.

If you're not on top of it, attackers will be!

(Cisco's 2017 Annual Cybersecurity Report)

Some Real-world Examples

- A major hack led TalkTalk to lose **£60m** in October 2015. This included IT costs and the loss of **101,000 customers**.¹
- In May 2016 Salesforce lost **four hours of transactions** and customer data after an outage.²
- Lloyds, Barclays, and Bank of America have had data losses due to malicious data hacks as well.



¹ https://www.theregister.com/2016/02/02/talktalk_hack_cost_60m_lost_100k_customers/

² https://www.theregister.com/2016/05/13/salesforcecom_crash_caused_data_loss/

“But it Will Never Happen to Me!”

Here are some sources of statistics that show how probable these causes are, and how expensive lost data is.

Disaster causes in a 5 year period ¹

CAUSE	% OF AFFECTED ORGANIZATIONS
1. System upgrades	72%
2. Power outage/ failure/ issues	70%
3. Fire	67%
4. Configuration change management	64%
5. Cyberattacks	63%
6. Malicious employees	63%
7. Data leakage/ loss	48%
8. Flood	46%
9. Hurricane	46%
10. Earthquake	46%
11. Tornado	46%
12. Terrorism	45%
13. Tsunami	44%
14. Volcano	42%
15. War	42%
16. Others	1%

¹ Symantec 2010 Disaster Recovery Study, Global results, CA, USA, November 2010.)

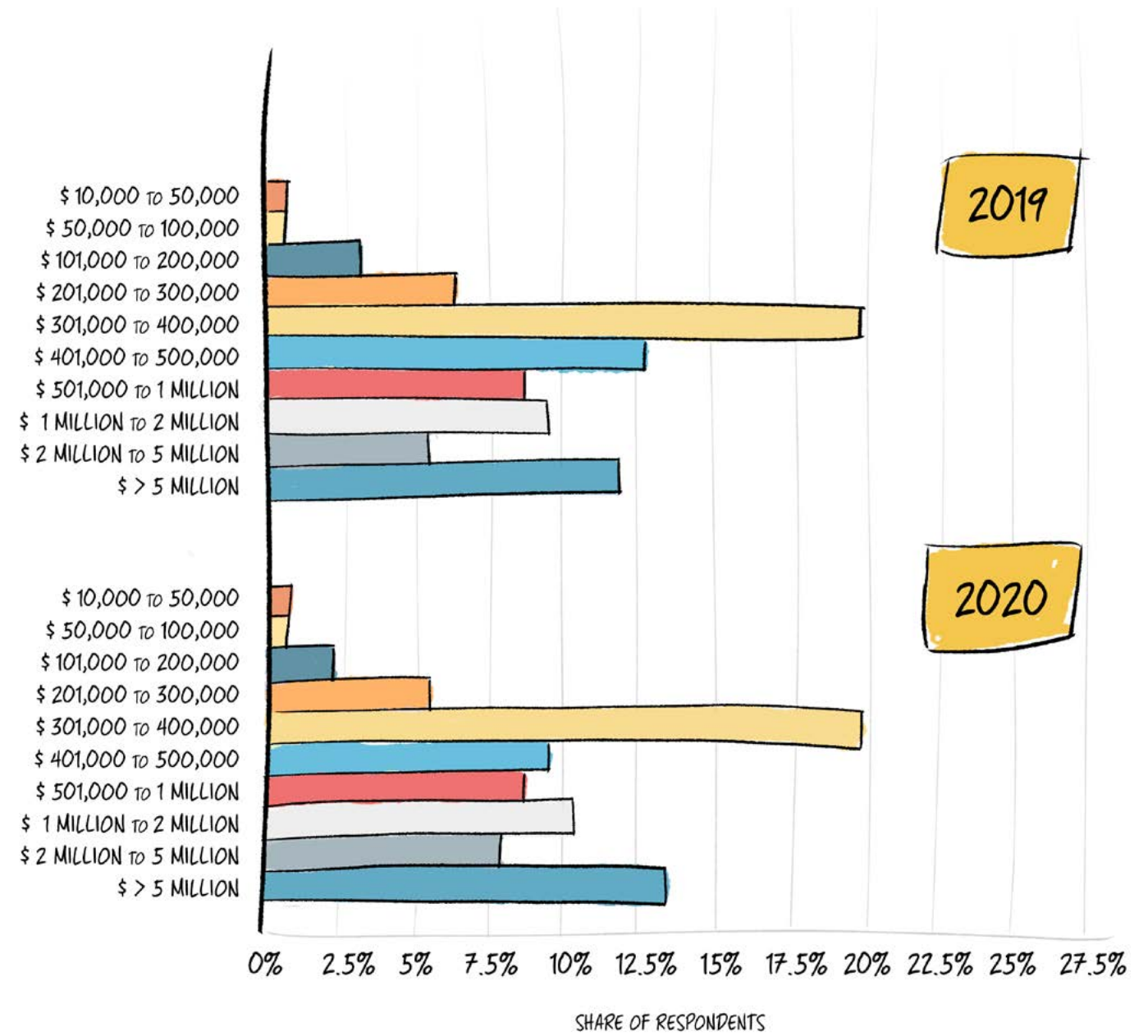
² Alhazmi, Omar & Malaiya, Yashwant. (2013). Evaluating disaster recovery plans using the cloud. Proceedings - Annual Reliability and Maintainability Symposium. 1-6. 10.1109/RAMS.2013.6517700.

The cost of downtime in different industries in 2000²

INDUSTRY	REVENUE/ HOUR	REVENUE/ (EMPLOYEE.HOUR)
Energy	\$ 2,817,846	\$ 569.20
Telecommunications	\$ 2,066,245	\$ 186.98
Manufacturing	\$ 1,610,654	\$ 134.24
Financial institutions	\$ 1,495,134	\$ 1,079.89
Information technology	\$ 1,344,461	\$ 184.03
Insurance	\$ 1,202,444	\$ 370.92
Retail	\$ 1,107,274	\$ 244.37
Pharmaceuticals	\$ 1,082,252	\$ 167.53
Banking	\$ 996,802	\$ 130.52
Food/beverage processing	\$ 804,192	\$ 153.1
Consumer products	\$ 785,719	\$ 127.98
Chemicals	\$ 704,101	\$ 194.53
Transportation	\$ 668,586	\$ 107.78
Utilities	\$ 643,250	\$ 380.94
Health care	\$ 636,030	\$ 142.58
Metals/natural resources	\$ 580,588	\$ 153.11
IT professional services	\$ 532,510	\$ 99.59
Electronics	\$ 477,366	\$ 74.48
Construction and engineering	\$ 389,601	\$ 216.18
Media	\$ 340,432	\$ 119.74
Hospitality and travel	\$ 330,654	\$ 38.62

The following image is based on a worldwide survey in 2019 and 2020 that shows different cost ranges for a **single hour** of server downtime, and how many enterprises fall into each range. ¹

Hourly server downtime cost of enterprises



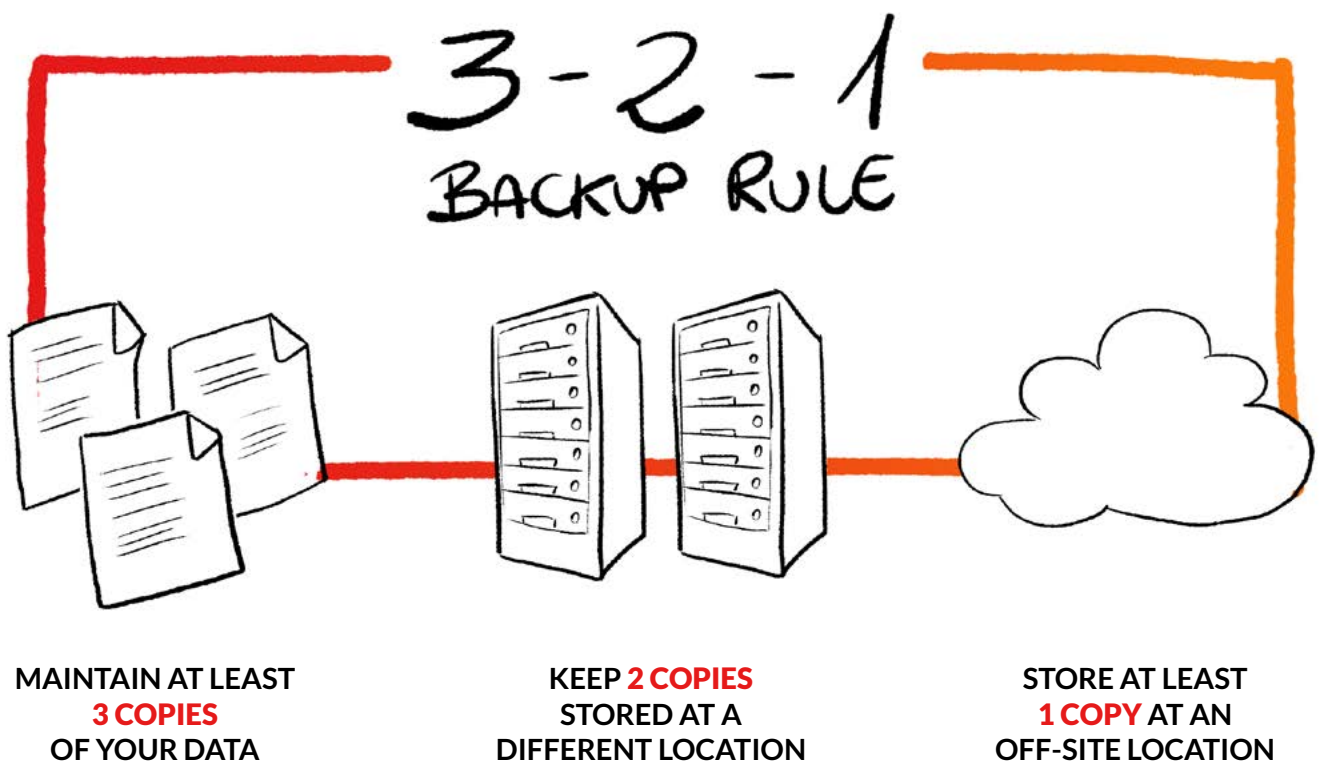
1 ITIC 2020 Global Server Hardware, Server OS Reliability Report, Information Technology Intelligence Consulting; IBM, April 2020, [ITIC 2020 Global Server Hardware, Server OS Reliability Report, page 31](#)

Creating a Backup Plan

A Couple of Tips from Experts

Whether you choose to backup your data on physical storage or the cloud, these are some recommendations to avoid the crippling consequences of data loss:

- **Always store backups off-site:** In case of natural disasters like a fire, if your backups are right next to your original data, the chance of losing the backups is extremely high.
- **Backup your data regularly:** If you backup once a year, you might end up losing the data of an entire year if the disaster happens near the end of the backup cycle.
- **The 3-2-1 backup rule** says that you should have at least **three copies of your data**, on at least two different types of media, with at least one copy offsite.



The Properties of a Backup Plan

An effective backup plan has a very important set of indications. These indicators can tell you how efficient your strategy is:

- **Recovery Point Objective (RPO)** - It represents the distance between the moment when the last backup copy is made and the moment when the event causing data loss occurs. The lower the RPO, the higher the percentage of recovered data.



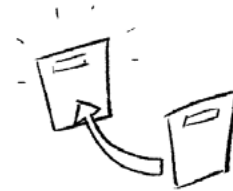
- **Recovery Time Objective (RTO)** - It expresses the amount of time elapsed between the disaster event and the restoration of the services provided.



- **Data Retention Period** - Institutional rules or company policies may impose not only the preservation of data for a specific period but also the obligation to delete data beyond that period.



- **Atomicity of Backup Transactions** - A transaction is an atomic unit when it has no intermediate stages: it can conclude successfully or fail. The Zextras backup module manages transactions in this way. They can be successful, producing a consistent copy of the data in the backup destination, or they can be rolled back without the failed transaction having any effect on the system.



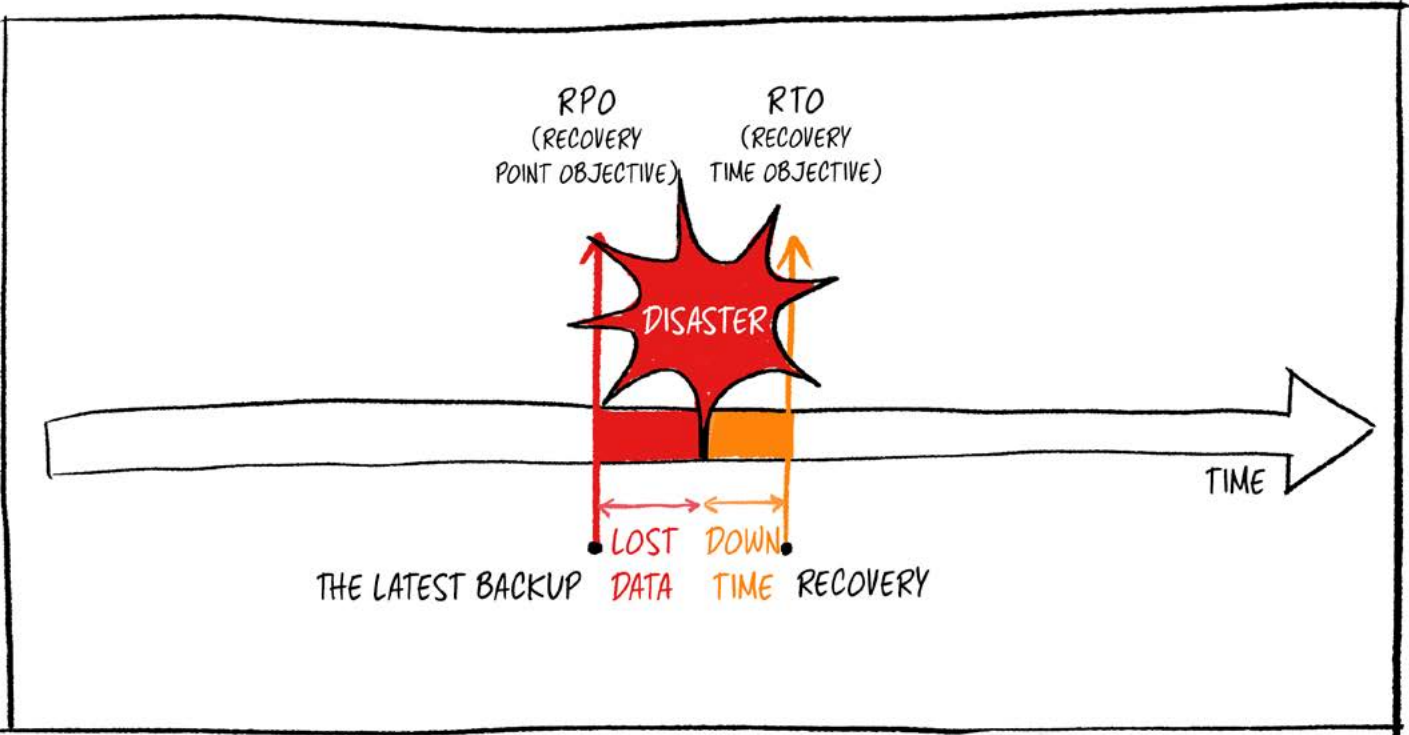
- **Work Recovery Time (WRT)** is defined as the maximum amount of time needed to verify data integrity to resume operation.



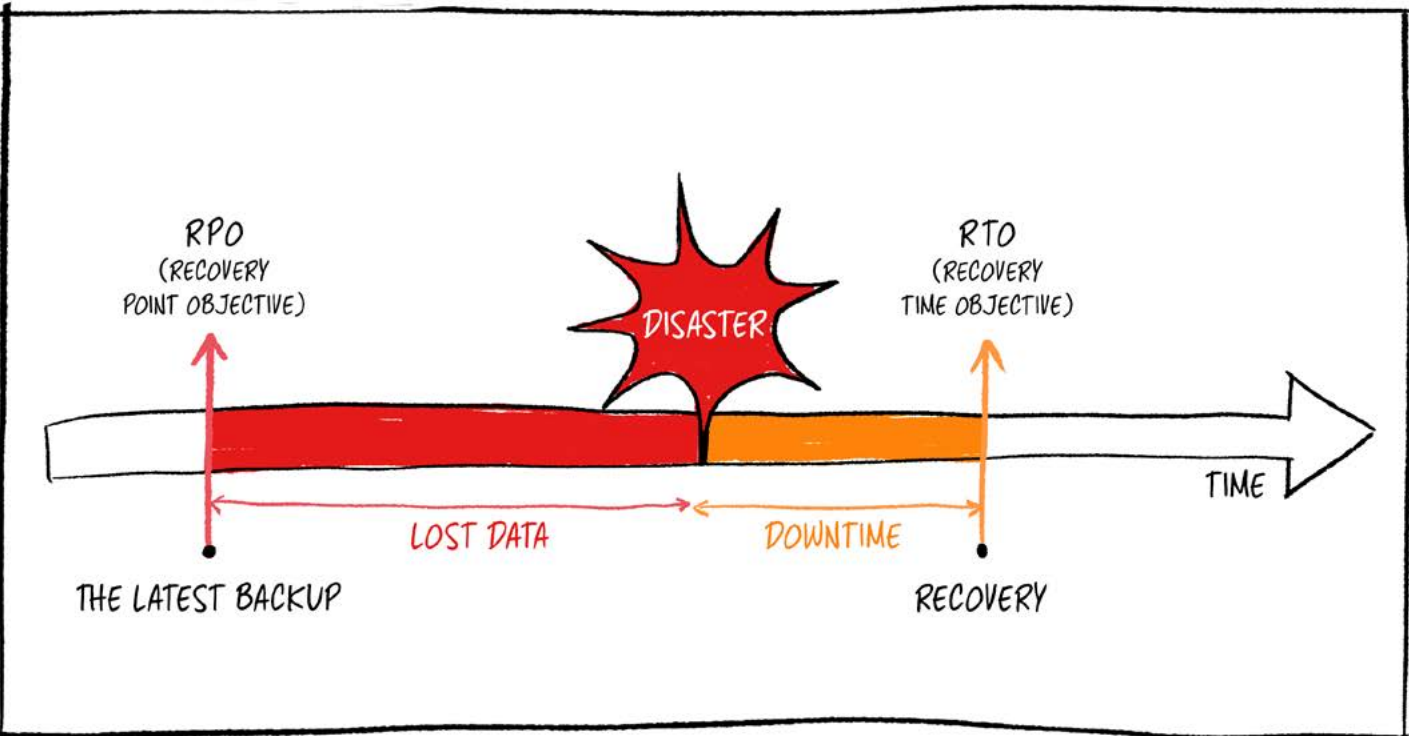
- **Maximum Tolerable Downtime (MTD)** is defined as the amount of time a business process can be disrupted without causing significant harm to the organization's mission.



You want this:



Not this:

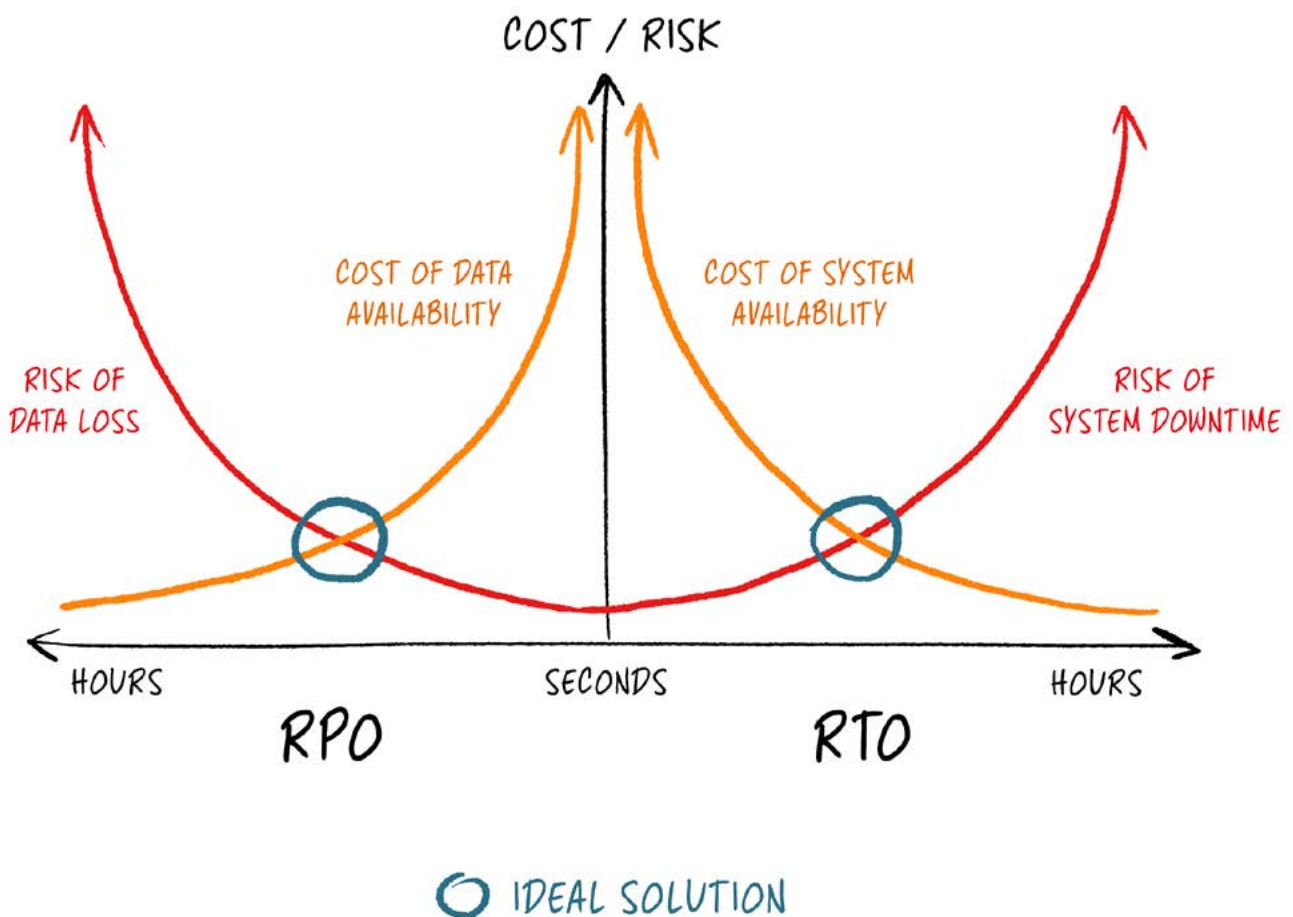


The system downtime can be extremely costly.

Flexibility Is the Key

When it comes to planning the backup, one might look at the definitions and think that the lower the RPO and RTO, the lower the cost.

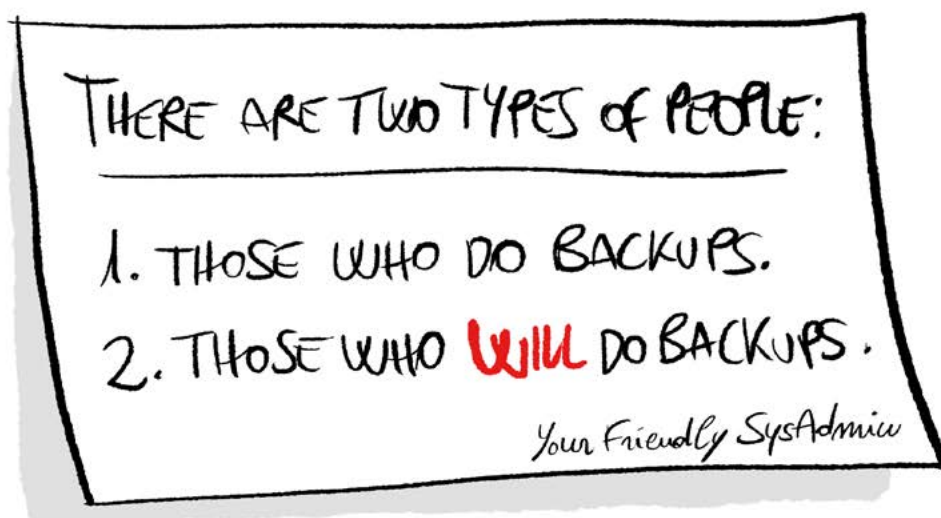
But it's not always true, because **data availability costs too** (the cost of data availability increases by reducing RPO and RTO). It can seem counterintuitive, as lowering RPO and RTO reduces respectively the amount of lost data and system downtime which translates to lower costs. However, storage and recovery of data with a very low RPO and RTO might cost so much that can't be easily justified by reducing the lost data and system downtime. In fact, **we need always a balance** between the two.



To achieve the ideal solution, **you need a flexible backup solution** that lets you plan freely. Zextras Carbonio backup system gives system administrators the flexibility they need to devise an **efficient backup plan**.

Zextras Carbonio Backup Solutions

Zextras Carbonio offers a wide range of solutions through its backup system. It gives you the option of storing your data including **e-mails, accounts, attachments** of any kind, etc. **either locally and in the cloud**. It also provides you with an advanced tool to recover your data in case of any incidents.



With Zextras Carbonio plan your backup based on your needs:

Local Backup

When we hear the word backup, we immediately think of a physical and external device to store a copy of our data. Tools as basic as a USB Flash Drive or more likely an external Hard Disk Drive can be used for this purpose, although there are more professional solutions such as NAS systems or dedicated servers (or virtual machines). Regardless of the means, backup operations are usually handled by **dedicated software** since it is not recommended to perform these operations manually.

PROS

- High transfer speed between disks.
- Easily accessible within the company
- Better protection from external intrusions and attacks

CONS

- Not accessible from outside the company
- Capacity is limited to the physical space
- Need for additional measures to prevent physical damage
- Additional costs for maintenance and upgrades

Cloud Backup

In recent years, storing backup data on cloud storage has increased dramatically. Services such as Amazon S3, Google Cloud, or Microsoft Azure are some of the common solutions employed. Unlike local backup, cloud backup is done on remote media. These media are only available through the network and managed by third-party companies.

PROS

- Accessible from outside the company
- Better protection from physical damage
- Capacity is not limited to the physical space
- Low initial costs and no costs for maintenance

CONS

- Transfer speed limited to your internet connection
- Vulnerable to external intrusions and attacks

ADVANTAGE	LOCAL BACKUP	CLOUD BACKUP
Fast access within the company	•	
Accessible outside the company		•
High transfer speed	•	
Better protection from external intrusions and attacks	•	
Capacity isn't limited to the physical space		•
Not prone to physical damage		•
No upgrade cost		•
No maintenance cost		•

There is no clear winner

Which One to Choose?

Choosing one of these approaches is a difficult job. First, it depends on the situation you are in. Second, even in the simplest form of comparison between the two, it is not clear which approach could be best for you. The table above lists the advantages of both methods.

A combination of both gives you the benefits of local backup such as faster backup capability and better control, as well as the flexibility and better protection from physical damage that come with cloud backups. This **hybrid approach reduces all types of risks to almost zero**, while it provides you with a more flexible, and cost-effective backup strategy. Moreover, with Zextras Carbonio you have also the possibility of using a **private cloud** to back up your data and maintain your users' privacy.

Best Carbonio Backup Features



Real-Time Scanner

Zextras Carbonio introduces an unprecedented backup system that completely removes the need of scheduling backups. This new feature is called the real-time scanner.

The real-time scanner is a process that is **constantly active** on the mailbox servers and intercepts events such as the arrival, creation, and modification of an item, and then records the changes into the backup destination.

The way Zextras Carbonio achieves this is by separating the metadata from the blobs. Metadata is the record on the database containing characteristics of the elements, and blobs are the files on the filesystem containing the essential parts like the body or header of e-mails. This way a backup copy can be created in a local folder or an external device. The structure, characteristics, and history of the elements are replicated.

Therefore, the entire history can be preserved allowing you to restore the data to its status at a specific time.

Blobs take on the name of their digests after being copied into the backup destination. Digests are the identifiers in the reference metadata corresponding to the checksum of the elements. This ensures two things:

- The **integrity** of the copied data, and
- The **deduplication** system stores only one version of the element when it is referenced by several objects, avoiding redundant copies of files and improving the backup speed.

Blobs and metadata are both copied to specific folders. The path to these folders is called a backup path and is generated based on the identifier of the account the data belongs to.

Snapshot-based Backup System

Thanks to the highly evolved virtualization solutions in the past years, virtual machines are the most common way to deploy server solutions.

Most hypervisors feature customizable snapshot capabilities and snapshot-based VM backup systems. In case of a disaster, it's always possible to roll back to the latest snapshot and import the missing data using the **External Restore** feature of Zextras Carbonio backup system - using the server's backup path as the import path.

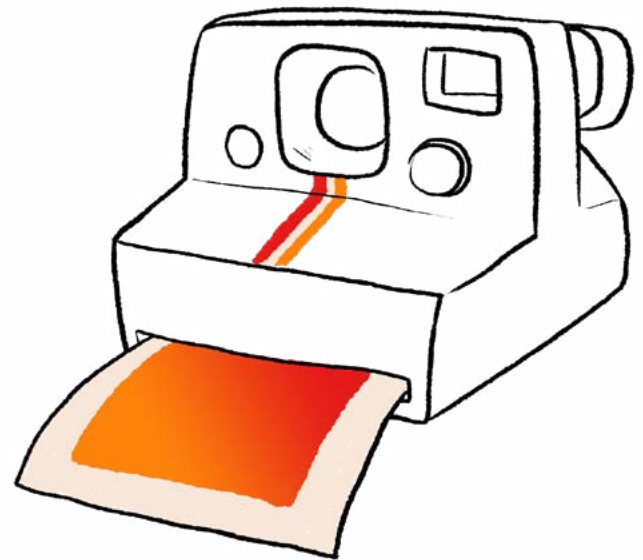
Zextras snapshot-based backup system has two main advantages:

- **Consistency** of data,
- **Casual restore** of a single item.

Snapshot-based backup systems allow you to keep a frozen copy of a VM in a valid state and roll back to it at will. Using a snapshot-based backup as opposed to a database backup tremendously helps with the **consistency of data**.

To 100% ensure data consistency, it's better to take snapshot copies of switched-off VMs, but this is not mandatory. It also made restoring single items possible which is one of the most common problems an administrator faces.

This Zextras Backup function is called **undelete restore**, and will be discussed in detail in a later section.



Backup Export

Backup Export is a snapshot of the mail system that can be easily used for **migration** or **recovery**.

During this process, deduplication and compression are also performed on the data to optimize disk utilization, I/O speed, and transfer time. It includes all the accounts, items, lists, classes of service, and domain configuration.

Another distinguishing factor is that all of these are done on an active server **without the need to stop any services**: the entire infrastructure or a single domain can be exported and used to be easily imported into another server running Zextras Carbonio to update the infrastructure. It also doesn't depend on the version or operating system used in the new server.

Undelete Restore Function

We have all experienced deleting important e-mails that you might need again while cleaning up unimportant messages like newsletters or old e-mails.

In most cases you can restore those from the trash folder, but what if you cleared the trash before realizing that you deleted those?

In cases like this, Zextras Carbonio can save your day with Undelete Restore. With this feature, a system administrator can easily **retrieve the deleted items** of a time interval that has been specified before and there is no more need for restoring the whole system. The undeleted items are restored into a dedicated folder in the original mailbox.

Backup on External Storage

Imagine a situation in which fire or large physical damage destroys the server drives completely, in such scenarios there is a good chance the **backup drives would be destroyed too**. That is why it is so important to have the possibility of backing up data on external storage.

Zextras Carbonio backup system allows you to store its data on a **third-party store**. This function gives you the possibility of performing backup remotely on the cloud or external storage. This would be a powerful choice for secure data backup since the **backup files will remain available** regardless of whatever your server is going through.

With Zextras Carbonio backup system you can store the backup data on **S3 cloud storage** or **NFS/FUSE local network storage**. In both cases, the backup is stored separately from the server which secures data even if the server is physically destroyed. The structure of stored data is similar to the one of the backup path.

The difference is that the metadata of mailboxes is compressed in a single .tar.gz file instead of being stored uncompressed in multiple subfolders.

Saving Space Through Deduplication and Compression

Deduplication and compression implemented in Zextras Carbonio can immensely help to **reduce the backup size**. This is not only **cost-effective** but also leads to **better performance**.

Dedicated storage devices supporting deduplication and compression at block level can benefit from customizable compression level, as the deduplication of already compressed files is more difficult and also in some situations, double compression can increase the final size.

Therefore, if you have already invested in these storage appliances, Zextras Carbonio gives you the ability to disable compression to save CPU cycles for the storage devices. Compression and deduplication can also help to lower WRT explained before.

Coherency Check

Although Zextras Carbonio backup system is a reliable solution, it still is recommended to check backup data in case of a system failure like crashes, power loss, and storage issues, to ensure no data loss. **Coherency Check** is a component of Zextras Carbonio backup system that reads the backup metadata and checks if the corresponding blobs are there using the digest function.

Use cases:

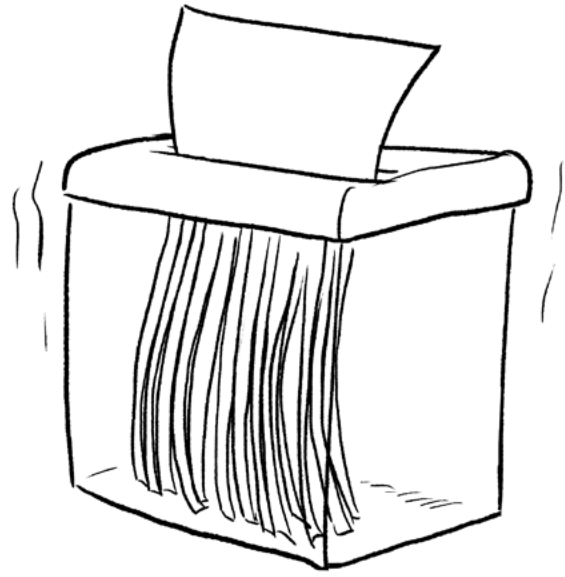
- **Idle backup** - The backup operations may have been manually paused before a maintenance task. They could have been stopped automatically if the license expired and hasn't been renewed in time. To safeguard your data, we suggest you solve the blocking issue and start the backup operations again as soon as possible. Then, run the coherency check.
- **System crash or power loss** - One or more mailbox nodes of your infrastructure may have shut down abnormally. This event can cause a loss or corruption of the data saved on the storage. Remember to run coherency check when the systems are up again.
- **Storage issues** - When you're informed about malfunctions of your storage hardware, you should check the consistency of the data you saved there to be sure you can access it in the future. For the Zextras backup, it's not enough to know that you can access and read the backup files. Each piece of data must be checked upon its linked items. coherency check will do this for you.

Smart Scan

Smart Scan is the main coherency check for the health of your backup system. It's called smart because it considers that some accounts have been modified since the last scan. Therefore, it greatly improves performance by decreasing the need for processing resources and time.

Backup Purge

Backup Purge is a process that removes the items in the backup path that exceed the retention time specified in the data retention policy.



Flexible Licensing

Usually, not all of the accounts on a platform require a backup. Therefore a **flexible** service that allows you to **select which accounts have a backup** becomes particularly useful.

In Zextras Carbonio, you don't need to enable backup for all the users: simply choose the accounts requiring backup.

More importantly, this is also **beneficial in terms of pricing**. The price of an inbox without the backup is lower, so you don't need to pay extra while they don't use this service.



For instance, a platform requires different accounts for different users and needs. Let's say a platform for university on which the student accounts don't need a backup, while account dedicated to professors require it. Carbonio flexibility allows the university to save a considerable amount of money, especially since most users are students who don't need the backup.

Advantages of Using Carbonio Backup

One of the huge advantages of Zextras Carbonio backup system is its **space optimization**. It reduces the backup size by **more than 50%** of the original size. The backup files will only occupy half or even less space compared to a third-party solution or manual procedures. For instance, the backup of a mailbox with 5GB of data in the last 30 days takes less than 3GB.

Backup space is reduced by 50% compared to the operational filesystem.



Zextras Carbonio backup system with the use of real-time scanner and its ability to copy any object on the backup destination **almost instantly**, gives system administrators the ability to recover from **a single deleted message to the entire domain, reducing the RPO to almost zero**, because you don't need to put the system in a maintenance state. In this way, you allow it to perform recovery operations while users are using the platform.

Complete and constant control of the archiving storage is ensured through the **automatic deletion** of the backup data once the **retention time** threshold has been exceeded (which is customizable) and the definitive elimination of the data beyond the period defined by the adopted regulations is guaranteed.

The recovery procedures are **independent** of the operating system, type of filesystems, and product versions used. It allows you to use external platforms when it's needed, for example, when you need to import from an external platform, or when a partial or complete migration into other infrastructures is needed. It also does not require additional software or special technical skills as a system admini, which all significantly reduce the RTO. All the processes can be performed via both GUI and the CLI.

Hardware

I/O latency and IOPS are more important than RAM or CPU in real-time backup performance. Although a server with hundreds of accounts doesn't require any additional hardware, to get the most out of Zextras Carbonio backup system, consider:

- 2vCPU,
- 2 to 4 gigabytes of RAM,
- Most importantly, a dedicated SSD for backup metadata.

If your infrastructure handles millions of items, for example, having 1000 accounts with a 10GB quota each, using a filesystem like XFS to support billions of inodes would be a good option. Furthermore, different block sizes for backup metadata and backup digest leads to improving the folder structure walkthrough.

Greatly Increase your Backup Performance

Your backup performance is increased thanks to:

- **Operation optimization**

By deduplicating and parallelizing the backup operations thanks to an internal scheduler. Put simply, the new scheduler keeps track of all changes in the mailbox and puts the operations into a queue with an ultra-light memory structure to be scheduled, deduplicated, and optimized.

- **JSON parsing library optimization**

The JSON parsing library has been improved. It's now faster and can optimize CPU and memory usage, reducing the garbage collector activation.

- **Taking advantage of multicore architecture**

The system administrators can choose the number of threads to be used in the process.

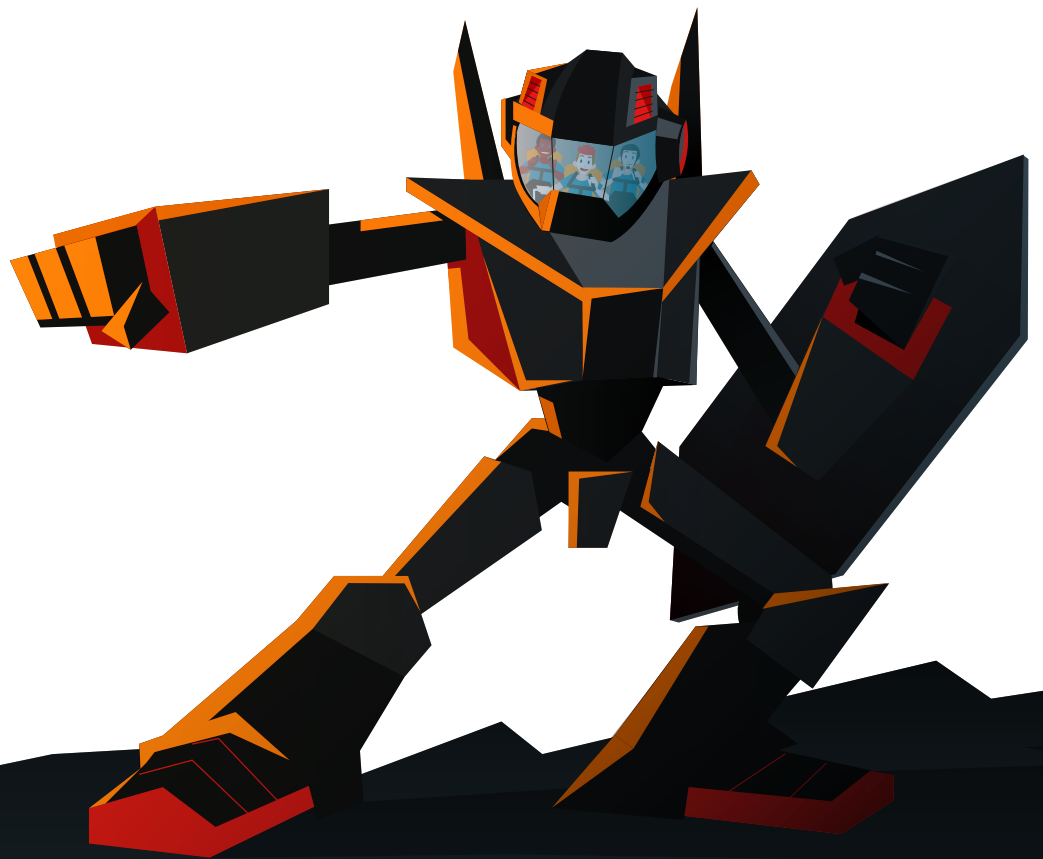
Conclusions

We hope you didn't recognize yourself in one of the disaster scenarios above, but we're pretty sure you felt the worries we described.

It's not only a matter of disaster recovery. Sometimes, a person's worst nightmare is losing some hours of their work, or even only an important e-mail. This is why recovery is very important, not only for safeguarding a whole company but also for daily life.

Zextras Carbonio makes your servers 100% secure: **your data is safeguarded and easy to recover.**

Start now and lower your RPO and RTO ... towards 0!



ZEXTRAS[®]

**If you need more information,
or want to book a demo
of Zextras Carbonio**

CONTACT US!

