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Introduction by W. Curtis Preston

My first backup was to a 9-track tape. Needless to say, backup was a little different then. A few years after my initial foray, I was working at a large company, and we had eight people specializing in backup alone. The group of us needed an entire weekend to back up the 300GB in our data center.

Today, backup has completely changed.

The technology has evolved. The expectations have expanded. This thing called cloud has become a target, and we have more vendors selling more solutions than ever before. The incredible availability of compute and storage means anyone with a little knowledge can create their own backup system. So when

you evaluate a solution, you don't know if you're dealing with a proven startup like Datto or a handful of young entrepreneurs. Backupify had no infrastructure at all, yet they managed to build an incredibly valuable product.

While there are impressive new solutions, many of the legacy offerings are just band-aid versions of the same products we've seen for decades. It's hard to find your way through all the marketing verbiage to figure out what a solution actually does. This eBook, authored by Nasuni, details the history of backup, the current state of the technology, where it might be headed in the future and, most importantly, what you should expect from a backup solution.

The one certainty is that backup is changing, and as data continues to grow, the need for effective and efficient data protection is going to be stronger than ever.

Furthermore, in 2018 and beyond, we cannot solve our data protection problems with the same old systems. The backup market is in need of a revolution.

It's going to be an interesting next few years.

-W. Curtis Preston, a.k.a. "Mr. Backup"



A Brief History of Data Protection

What is a Backup?

A backup is used to restore a data set, file or directory that was deleted or damaged.

To do so, backup carries out two distinct and crucial jobs:

- It captures point-in-time versions or snapshots of a data set
- It writes a copy of each point-in-time version to a different system, location or preferably both

In addition, backup needs to be able to restore to any of those point-in-time versions. That means finding the right version—in a location that hopefully is not too far away from the

system you want to restore—and then copying the data back to a fresh production system.

Specifically, you need:

- The name and location of the restore target
- The name of the entity; the file system, for example
- The name of the file, directory or database to be restored
- A time frame; for example, you need to specify that you want to restore to three days before the damaging event

When backups and restores work, they protect us against point-in-time

corruptions such as accidentally deleted files, ransomware attacks* or complete system meltdowns.

In the past, though, backups did not always work. They were notoriously unreliable, and IT often discovered that its backups were flawed only after attempting a restore.

Of course, this is not a new story. These shortcomings have been a part of backup from the beginning.



When I first started doing backups, we had a giant event once a year where we'd pretend the company was down. We'd go to a recovery site and try to recover our primary servers. It was a huge expense. We had to rent the facility, bring in the tapes, etc. We did it once a year and it never worked. It literally never worked without some sort of major hitch.

– W. Curtis Preston,
Mr. Backup

*Some ransomware attacks directly target backup systems, so this isn't always a foolproof defense. For more information, check nasuni.com/ransomware



1980s

The Tape Acceleration

Backups began with tape drives, but in the early days, tapes were slower than the networks on which they ran, creating a bottleneck. Then the technology improved, and tapes suddenly became too fast for the backups to be able to stream them.

1990s

A Really Good, Bad Idea

To address the speed gap, backup products started multiplexing, or running multiple backups on one tape. This addressed the whole problem of the tapes running too fast for the backups, but it slowed down the restores.

2000s

Backup Gets a New Target

In the early 2000s, two fundamental shifts changed everything:

Cheap Disks

The advent of cheap disks meant that companies could place ATA or SATA disks behind a standard disk array for the first time.

Deduplication

Creating duplicate copies of the same data during backups generated tremendous waste. Deduplication reduced this excess and made backups more efficient.

Suddenly, disk became an attractive backup target.

And once disk was no longer just an expensive band-aid for tape, companies started to design backup software products with disk in mind, adding features that simply were not possible only a few years before, including faster restores and geo-replication.



STATE OF FLUX:

Backup in Today's Organizations

No one loves their backup. It's expensive, complex and often unreliable. Yet it is necessary. The technology exists because the alternative is worse. Losing files or other data is one of those job-ending and potentially career-ending events in IT.

82%

of IT professionals don't think their current data protection will meet all their expected challenges in the coming year!



After all these years, backup is often still very complex and sometimes still quite brittle.

– Gartner's 2016 Magic Quadrant for Data Center Backup and Recovery Software





The ongoing growth of data is making backup windows longer and longer, and admins have to manage it with little to no increase in budget. It's not necessarily just the growth of data in the environment and the need to manage it that's so challenging, but the budget and the efficiency that they are trying to manage it with. Everybody is trying to figure out how to find the right balance.ⁱⁱ

*– Brett Roscoe,
General Manager,
Data Protection for
Dell Software*

This Lack of Confidence is Driven by 3 Major Factors



Too Much Data

Across organizations and industries, data is growing at unprecedented rates. This is especially true of unstructured file data, which is growing faster than any other segment.

For some businesses, the files themselves are small, but the volume generated is exploding. Other organizations are struggling with high-resolution images and videos and complex engineering files that are constantly increasing in size.

These file growth trends only increase the importance of deduplication – otherwise the cost of backups will grow to such a scale that their net business value diminishes.

20x

the increase in file size as medical images have evolved from 2D to 3D



It's more crowded than ever before. Not that long ago there were 50 products I had to track. Now there are many hundreds if not thousands of companies selling and reselling backup solutions.

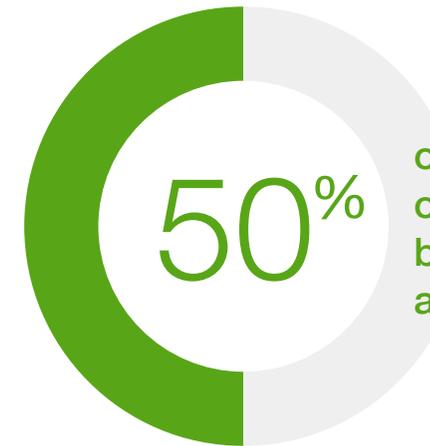
– W. Curtis Preston, Storage Switzerland Senior Analyst

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Too Many Vendors

The challenge is identifying the ideal system. Gartner says there are hundreds of backup solutions on the market. Other experts suggest that this could be an understatement.

Given the number of new companies and resellers, along with the legacy vendors retrofitting their old backup products, it can be hard to distinguish which system is right for your needs.



of enterprises will replace or augment their existing backup solution by 2018, according to Gartner.ⁱⁱⁱ

3

Too Few Solutions

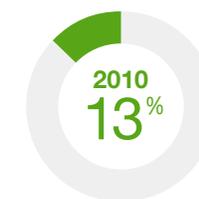
Effective solutions that is.

The incredible number of backup products on the market does not mean that the quality has increased.

In fact, some statistics suggest the opposite. One recent poll found that recovery times have actually increased relative to a decade ago.

Forrester and DRJ asked readers:

Were you able to recover from your most recent disruption in less than one hour?



RESPONDED YES



Data is Increasing But IT Professionals Are Not

Over the next 10 years servers, data, and files are growing at a much faster rate than the number of allotted IT staff.*

*IDC Digital Universe Study (2014)

1.5x



IT STAFF

10x



SERVERS

50x



DATA

75x



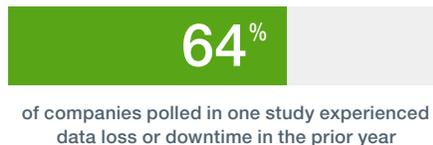
FILES





The Need for a Revolution

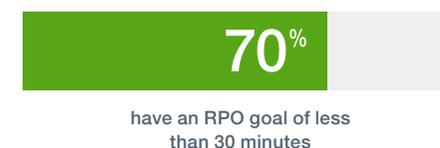
All the challenges created by today's backup environment haven't changed the risks associated with not doing backup. It's still a top concern for data management professionals:



This should not be a surprise, as losing data can be painfully expensive:



Backup's unimpressive track record has not stopped organizations from demanding more and more efficiency from their backup and recovery operations:



The need for some revolutionary changes to the backup landscape are clear. Luckily some key developments are coming along just in time.

New Developments in Data Protection

Two recent trends are playing a role in bringing backup under control:



Data Reduction Technologies

In addition to deduplication, many products have started adding features that limit the amount of data a backup solution creates, including source-level dedupes, block-level incrementals and forever incrementals.



Low-cost Bandwidth

The cost of bandwidth has dropped so significantly, and capacity has expanded so dramatically, that data can affordably be sent over the wire from one site to another.

In the past, moving TBs of data from one site to another meant handing tapes to a man in a van.

Today, the man in the van has been replaced by the wire...

Enter the Cloud

The advent of cloud solutions may prove to be the most influential force in backup solutions. The number of enterprises using cloud as a backup target will double in the next two years.^v

That is no surprise, since the cloud is enabling new data protection solutions that can:



ELIMINATE
backup as a
separate operation



DELIVER
continuous versioning
with fast restores



PROVIDE
unprecedented
georedundancy

Expect Impressive New Features

Thanks in part to the increase in data reduction technologies and the availability of low-cost bandwidth, organizations can expect a number of impressive new features from a backup solution.



Cloud Georedundancy

Previously, creating offsite backups for a multi-TB data center was impossible without the man in the van. Now, with cloud, it is easier and less costly to have data in two or three different places.



Business Continuity

If a disaster or outage destroys access to your primary storage, it is now possible to immediately begin using your backups as primary storage.



Automated Recovery Testing

Instant recovery allows for the possibility of automated testing. For example, you can specify that five or six servers need to come up in a recovery group together, schedule that to happen automatically and then get a report detailing the results.



Simplified Management

You don't want to spend time managing backups because the task is not tied to revenue. Today's best backup solutions require little to no management—and you should expect as much from any backup system you're evaluating.

*Compared to past backup capabilities, instant recovery and instant recovery testing are like the difference between walking and **flying**.*

– W. Curtis Preston,
Storage Switzerland Senior Analyst



The Future of Backup

Key developments such as the advent of cloud-enabled functionality will impact the future of backup profoundly.



Data protection will no longer be an add-on triggered only during failure modes. Instead it will serve as an integral component of a healthy production system.



Real-time backups will become the standard. The days of scheduled nightly or weekend backups are over.



Disk-to-Disk-to-Anything^{vi} is here. The final target could be tape (it's not going away), disk or even public, private or hybrid clouds.



Disaster-recovery-as-a-service can augment the enterprise hot site approach. The idea of maintaining a second data center as a disaster recovery option may not make sense in a world of secure, affordable, cloud-linked DR.



Backup systems have been a staple of business continuity and disaster recovery since the dawn of the data center, but new options are eliminating the need to perform traditional data backup and recovery.

– Forrester Research, February 5, 2016



Enterprise File Services

Just because the future is here doesn't mean everyone will be quick to adapt. Especially not in the backup world. "We are incredibly paranoid people," says Preston. And in this sense, relying on the traditional solutions providers can be comforting. Yet these systems are often far more expensive and still error-prone.

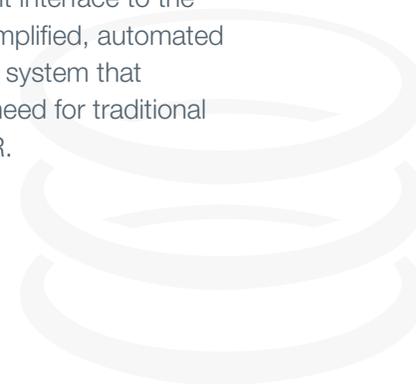
This may be one of the reasons Gartner's research suggests that enterprises are more open to less-established backup vendors and innovative solutions than ever before.

Nasuni Enterprise File Services uses continuous versioning to automate backup and securely store an

unlimited history of your file system in the cloud. By synchronizing file-level versions with their cloud storage backends as often as every 60 seconds, Nasuni protects files almost as quickly as they are being created and changed. IT can slice into the version stream at any point to run tests, and since there is no limit to the number versions with Nasuni, the complete history of each file is protected forever.

The result is a secure volume of immutable versions that optimizes both restore time and recover point.

The Nasuni cloud is built on Microsoft Azure, Amazon, and others. Alternately, enterprises can create their own private cloud solution with Nasuni and IBM. Regardless of which backend vendor you choose, Nasuni's file system solution gives you a consistent interface to the cloud, and a simplified, automated data protection system that eliminates the need for traditional backup and DR.



The Nasuni approach takes the unenviable task of data protection and makes it...



Reliable



Continuous



Unlimited

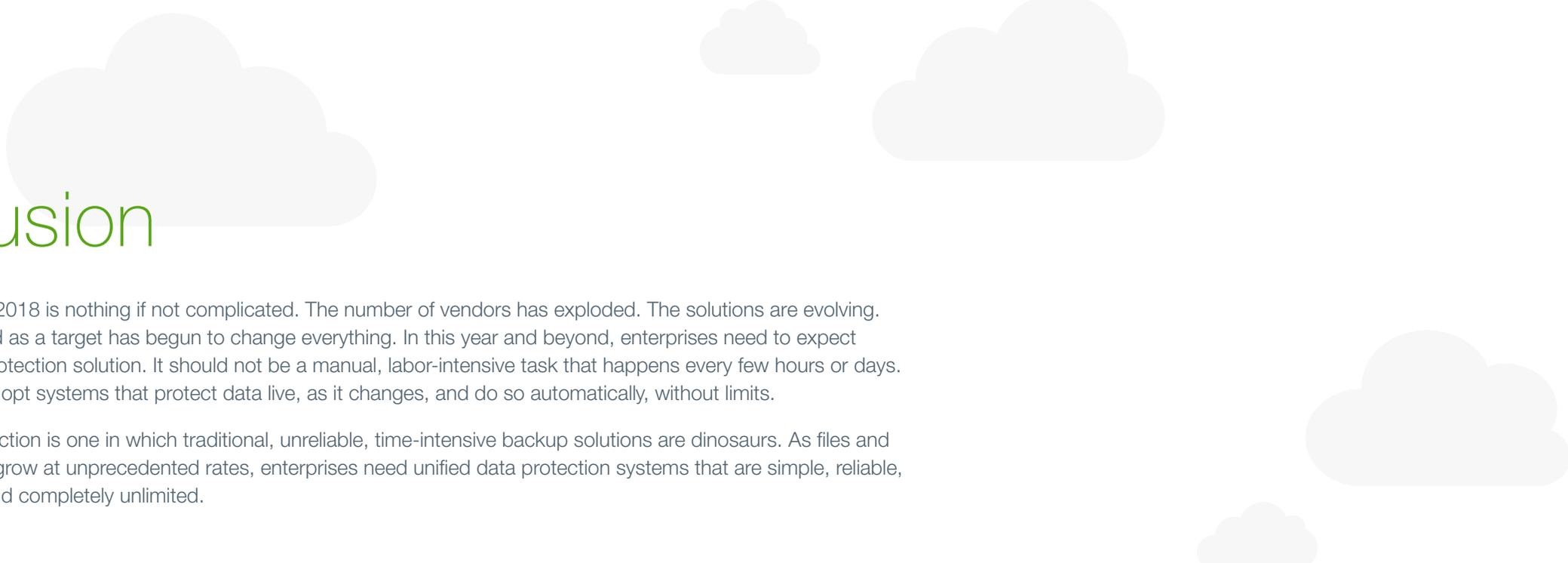


Testable



Automatic





Conclusion

The state of backup in 2018 is nothing if not complicated. The number of vendors has exploded. The solutions are evolving. And the advent of cloud as a target has begun to change everything. In this year and beyond, enterprises need to expect more from their data protection solution. It should not be a manual, labor-intensive task that happens every few hours or days. Enterprises can now adopt systems that protect data live, as it changes, and do so automatically, without limits.

The future of data protection is one in which traditional, unreliable, time-intensive backup solutions are dinosaurs. As files and other data continue to grow at unprecedented rates, enterprises need unified data protection systems that are simple, reliable, continuous, testable and completely unlimited.

Find out more about how you can back up to the future at nasuni.com.

ⁱ Dell EMC Global Data Protection Index II

ⁱⁱ DCIG: "A Glimpse into the Next Decade of Backup and Recovery"

ⁱⁱⁱ 2016 Gartner Magic Quadrant for Data Center Backup and Recovery Software

^{iv} 2015 Public Cloud Disaster Recovery Survey by CloudEndure

^v 2016 Gartner MQ



