ESG SHOWCASE

In the Zettabyte Era, All Roads Lead to Tape

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ABSTRACT: Tape has been "making a comeback" because of the enormous amounts of data that must be stored, its ability to store these data volumes, and its attractive economic profile. Designed for scale and efficiency, tape technology is leveraged for many use cases across industries.

What If We Could Use Tape for IT Data Storage?

A couple of years ago at an IT industry event, ESG analysts met with executives of a vendor in the tape and automation space. While discussing general market trends and the state of the business, the CEO received a call from some "young IT folks" who were struck by two elements of the vendor's solution: not only was the automation impressive, but also they loved the tape drives and media. They told the CEO they had tracked him down because they had a question pertaining to a potential business proposition, depending on his answer: *they wanted to know if his company had ever considered packaging and tuning tape drives for use in the general IT environment.*

This story tells us that tape technology's benefits to business and IT may at times be missed by a generation of IT leaders who may not have had the opportunity to use it for storage and may not therefore understand all of its benefits.

The main reason tape has been making a comeback is that there's just too much data to store, and no other medium can do it either due to areal density limitations or, more importantly, economic realities. According to LTO.org, the archive market *by itself* will reach a capacity of 6 zettabytes by 2025, as mentioned by Tom Coughlin in a recent Forbes article.[1] The explosion of data in many industries, at the core and at the edge, the need for intelligent data management, and the desire for smarter reuse and leverage of data assets are only further accelerating the inherent benefits of leveraging tape.

Organizations maintain a lot of backup and archive data. Indeed, according to recent ESG research, organizations store on average 4 petabytes for backups and another 3 petabytes for archives, growing at 39% and 41% respectively year over year. And 52% of respondents identified that archive data retention time, in the case of the maximum length of time data is retained, is between 4 and 10 years, and 14% of organizations said their maximum retention time is indefinite. A lot of this data ends up on tape at some point in its lifecycle, or permanently.[2]

The research further indicates that tape users reap key benefits from their tape infrastructure: reliability, optimized cost, and improved security are the primary advantages most often cited. Tape's cost effectiveness relative to other media options is also evident in the response shown in Figure 1, where it was ranked as the most cost-effective media type by more than four in ten respondents.[3]
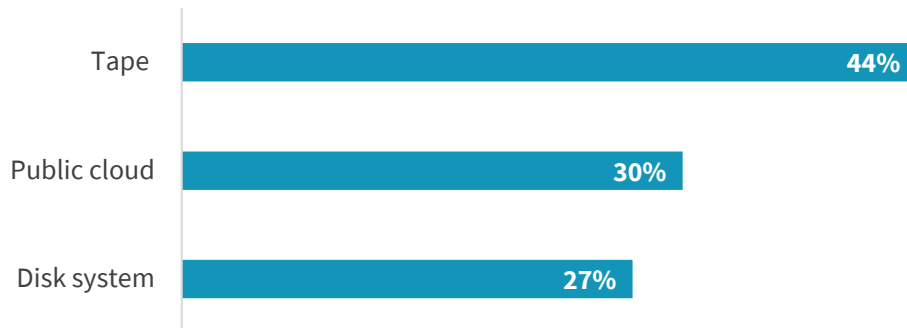
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[1] Source: Forbes.com, *The Engines of Digital History*, June 2020.
[2] Source: ESG Master Survey Results, *2020 Tape Landscape*, to be published November 2020.
[3]Ibid.

Figure 1. Tape Is Considered the Most Cost-effective Medium

How would you rank the following data backup media types in terms of their cost-effectiveness? (Percent of respondents, N=252, percent ranked #1 displayed)

Media	Percent
Tape	44%
Public cloud	30%
Disk system	27%

Source: Enterprise Strategy Group

ESG Senior Analyst Mark Peters once said, "Most of the issues with tape have to do with perception rather than reality. The challenge is fiction, not function." Let's take a closer look at why and how that is the case.

Designed for Scale And Efficiency

Some inherent technology benefits of leveraging tape just can't be reproduced by other technologies in the context of the current and future seemingly unstoppable data growth.

Data Storage

While disk technologies offer many advantages in terms of performance, there are physical limitations to how much data can be stored on them—or "track density." Comparing tape and disk shows tape way ahead by a density factor of 50 to 100 and probably more in the future as the industry continues to progress technologically. In other words, tape can and will likely hold a lot more data than disk for the foreseeable future.

Performance

There may also be a misconception when it comes to performance. The performance of LTO technology can reach transfer rates of 750 MB/sec compressed. Comparing native data rates at 360 MB/sec, tape is much faster than the typical 7,200 RPM hard drive at 160 MB/sec.

Durability

It should also be noted that the commonly accepted average lifespan of a server is in the three-year range, with HDDs falling in the four-to-five-year range. In comparison, tape drives can function for up to 10 years, and tapes can be stored for 30 years in proper conditions according to the LTO Consortium. Tape is in essence and by design more durable, which is an obvious advantage for data retention but also for operational efficiencies.

Cyber Resiliency

Cyberattacks are commonplace today and expose organizations to significant risks of data loss and business interruption. ESG's recent research shows that 60% of organizations report experiencing at least one attempted ransomware attack in the last 12 months.[4] Tape happens to be the perfect medium since, by design, it can be isolated or "air gapped," offers

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[4] Source: ESG Master Survey Results, *2020 Technology Spending Intentions Survey*, January 2020.

significant security capabilities, and can hold vast amounts of data. Tape is a natural component of a modern cyber-resilient organization.

Green Data Center

The low power and cooling profile of tape-based systems is another advantage for modern data centers and in the broader context of establishing "greener" practices across IT to support global emissions reduction. Tape uses less power than disk and, as discussed, is much more scalable. The ability to use removable media and the low impact of automation are at the heart of this architectural advantage. This also translates into a smaller footprint. Adding it all up, this means savings. ESG compared the 10-year TCO of HPE StoreEver with that of an all HDD-based solution (and a public cloud solution) and found that its TCO is 86% lower than the alternatives.[5]

Cloud

Cloud is omnipresent and its use continues to grow in organizations of all sizes. While the apparent flexibility and "elasticity" cloud infrastructures (IaaS, SaaS, and PaaS) offer are attractive at first, there is always a cost, and sometimes hidden costs as operations scale. In the space of IaaS, hyperscalers have optimized the storage layers they offer: The cheaper or "cold" storage layer is actually tape. While there are benefits to leveraging cloud, there are also limitations associated with the very nature of infrastructure: bandwidth, latency, transfer rates, recovery/recall costs and time, and compliance. In reality, recovering large volumes of data from the cloud is impractical, slow, and onerous.

Addressing Many 'Data-hungry' Use Cases

With such characteristics, it should not be surprising that tape technology finds itself at the heart of many use cases across industries (see Table 1).

Table 1. Tape Technology Use Cases Summary

Use Case	Description
Compliance	Many regulations mandate the retention of data for several years or decades. In addition, data backups must be maintained for many years.
Active Archive	Active archives allow organizations to extract and unlock value from their archival data and move the data into value-generating workflows on-premises or in the cloud.
"Cold" Data Storage	Cold data storage is inactive data that is rarely used or accessed. Hyperscalers use tape in this context, as do many organizations that must retain data for long periods of time.
On-premises Cloud	Many enterprises are updating their hybrid infrastructure to leverage cloud-like services and consumption models on-premises, making tape a perfect solution for the "cold" layer of such topologies.

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[5] Source: ESG Economic Validation, *The Economic Benefits of HPE StorEver as Active Archival Storage*, August 2020.

Use Case	Description
Cyber Resilience	The acceleration of cyber-attacks and rampant ransomware has made the need for isolated recovery and air-gapped solutions more critical, which makes tape a perfect medium for these implementations.
Media	Extremely large amounts of content are created by the media industry, with higher data storage needs amplified by newer technologies and services. All of this content can be offloaded to tape for further processing, later recall, and similar processes.
Video Surveillance	Video surveillance is another area in which footage generates significant volumes of data that must be kept for extended time periods.
Big Data	Leveraging vast amounts of data for analytics and decision making is at the heart of many technological and societal transformations today, with no limit in sight. Tape is recognized as the most economical way to leverage and preserve the data for the long term in cases where instant access is not needed.

Source: Enterprise Strategy Group

The Bigger Truth

The explosion of data is unavoidable and vastly unpredictable as new technologies evolve and produce more data at the edge and at the core of the IT infrastructure. Being prepared technologically and economically is the only way for organizations to not only handle these changes, but also position themselves favorably, at the right cost, to leverage data as an asset whose value is currently largely untapped.

The technology is not only proven, it is unique, and it's evolving further to deliver more capacity and optimized costs, combined with more creative and automated hybrid solutions to serve our data-hungry world.

If someone had to invent a new medium today, it would have to meet requirements that in combination seem impossible to achieve, yet tape can do it. All zettabyte roads lead to tape.

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