

# NewsBytes

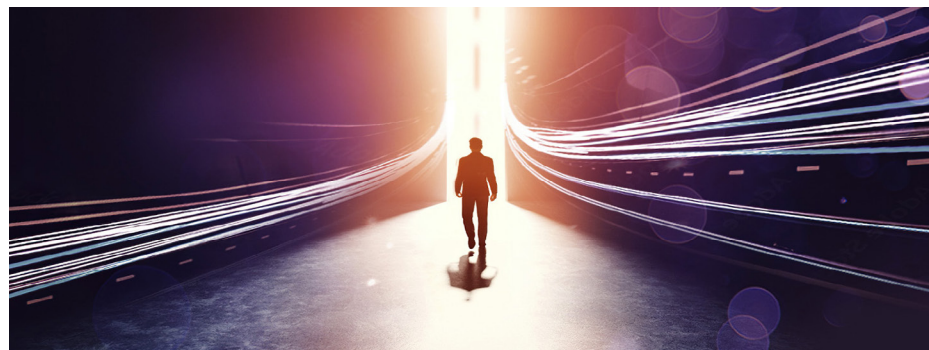
AUTUMN 2022

In this NewsBytes edition, we are leading with the news that the LTO Technology Roadmap is being extended to 14 generations and over 1.4 PB of compressed capacity! And we examine a new reliability benchmark for LTO-9 that means your data is safer than ever on LTO tape!



## THE FUTURE OF LTO TECHNOLOGY IS BRIGHT – AND BIG (FOR CAPACITY)!

Introducing an Extended Technology Roadmap.



**New generations of LTO technology have been introduced regularly with higher capacity and transfer rates along with new features to further protect data. This year, the LTO Program has extended the roadmap through 14 generations.**

The roadmap calls for tape capacities to double with each new generation, with LTO-14 delivering up to 1,440 TB<sup>1</sup> (1.44 PB) per tape. Once introduced, LTO generation 14 will surpass the capacity of current LTO-9 cartridges by 32 times.

With the extended roadmap, LTO tape continues to show how it's optimized to support rapid data growth year over year by offering industries a sustainable, reliable, cost-effective way to protect and secure their short- and long-term data storage archives.

### LTO-9 TECHNOLOGY HAS MORE CAPACITY, AT A LOWER COST

While storage managers grapple with exponential data growth, fending off cyberattacks and reducing carbon footprints, the LTO Program has developed the right solution to address their needs. The most recently available generation, LTO generation 9, builds on more than two decades of data protection and storage innovation to offer increased tape cartridge storage capacity of up to 45 TB (compressed). It provides full backward read and write compatibility with LTO-8 cartridges, and supports many previously introduced features, including enhanced security via hardware-based encryption, WORM (Write-Once, Read-Many) functionality and ease of data movement via the Linear Tape File System (LTFS).



### LTO-9 TECHNOLOGY & BIT ERROR RATE

LTO-9 technology maintains LTO's unique position of a powerful, scalable, and adaptable open tape storage format that can provide more confidence for safe and secured offline storage.

Magnetic recording capacities are a function of areal density and recording surface area. LTO-9 achieves 18 TB native capacity with 12 Gbit/in<sup>2</sup> areal density whereas a Hard Disk Drive (HDD) with the same capacity requires 84X higher density with 1,014 Gbit/in<sup>2</sup>. In this instance, the higher number is not 'better' because it means that HDD manufacturers need to use much smaller bits to store the same amount of information. As the bits become smaller, it is more technically challenging to maintain magnetic stability and thus the reliability of the recording process.

Also, even compared to the latest 9-platter HDD products, LTO's magnetic surface area is still substantially larger due to the use of Kilometer long tape medium, providing vast, low cost, green, ransomware resilient and highly durable magnetic recording surface area. This means LTO has far more headroom before it runs into the same challenges faced by HDD manufacturers today. These are the fundamental reasons why LTO can continue to enjoy a robust capacity road map over the next decade by doubling every generation.

Recent tape technology demos published by [IBM](#) independently showed the feasibility of 317 and 400 Gbit/in<sup>2</sup> areal densities translating to greater than 600 TB LTO capacities even at current tape lengths. The potential of higher areal densities with larger magnetic recording area will translate to continued support of doubling capacities over the next decade and more. It's important to note that similar futuristic capacities maybe extremely difficult if not impossible with current HDD technologies since it will require areal densities well above 30,000 Gbit/in<sup>2</sup>. Therefore, LTO has a long way to go with a robust and technologically feasible capacity roadmap for years to come.



### USER BIT ERROR RATE

User Bit Error Rate (UBER) is an industry standard metric defining durability of written data with magnetic, optical, or flash memories assuming errors are random. It defines how much user data bits are expected to be read before the system may encounter an unrecoverable read error event: the more bits, the better the durability.

The goal for data storage technologies has always been at best to maintain but also improve UBER as capacities increase. For example, HDD UBER has typically been constant even as capacities increase, typically around 1 error event in 10<sup>15</sup> user bits translating to 125 TB of data. However, LTO historically is able to improve UBER as its capacities increased. For instance, UBER for LTO-6 was 10<sup>17</sup>, LTO-8 offered 10<sup>19</sup> and now LTO-9 offers UBER metric with 10<sup>20</sup> which translates to an unprecedented 12.5 Zettabytes, significantly higher data reliability compared to current HDD's.

Even though both Tape and HDD are based on similar magnetic recording technologies, the reason for LTO's UBER advantage is mainly due to its multi-channel, dual orthogonal Reed Solomon ECC with multi-dimensional interleave technology that also benefits from unique iterative decode algorithm. A recently published technology [white paper by LTO](#) goes into excruciating technical details of what UBER really is and how it is derived.

While uncorrectable error events in LTO tape are extremely rare, these findings continue to underscore the reliability and dependability of tape technology especially when it is compared to HDD whereas the same metric can be at least 10,000 times worse.



### RANSOMWARE PREPAREDNESS

Ransomware has become a permanent threat for organizations with 79% of companies having experienced a ransomware attack within the last year.

Cyber criminals have become more sophisticated over time, and organizations are experiencing frequent and impactful ransomware attacks.

### More News From The LTO Program:

For news and information on the LTO Program, as well as hot industry topics, find us on: [BlogBytes](#), [LinkedIn](#) and [Twitter](#). Come and join us!

### What's Next for the LTO Program?

The LTO Program is heading to Amsterdam for [IBC2022](#) from September 9-12! Come find us at Booth 7.B04 and follow [@TheLTOProgram](#) for more news and updates from the show.

According to new research in partnership with [ESG](#):

- 47% of companies are experiencing ransomware attacks on a monthly basis
- 69% say they recover in less than 12 hours
- 56% are paying the ransom
- 61% of whom get less than 75% of their data back

What seems to be clear is that many companies appear to have conceded ransomware is a battle they cannot win and instead are adopting a 'damage limitation approach.' **Here at the LTO Program, we feel that businesses should expect better. When thinking about cyber recovery, it's time that organizations reconsidered what LTO technology has to offer.**

LTO technology provides an inherent air gap solution that can give organizations greater confidence that they can recover their data in the event of an attack. While it is true that disk storage has other benefits such as faster recovery times, it has a higher TCO than tape, and it is not offline nor completely secured from ransomware attacks.

LTO technology is an essential element of an organization's layered security approach to protect and restore data.



### CATCHING UP ON BLOGBYTES

Aside from the success of LTO-9 technology and new ransomware preparedness research, there has been plenty of other news issued by the LTO Program this year.

### So Much Data, What Do We Do With It?

With growing petabytes, or even exabytes, of data, organizations are looking for economic, secure and accessible storage solutions. With the help of LTO technology, organizations can implement active archives that conserve backup storage space, preserve collections of information, allow for the mining of data to remain competitive, help protect the data and save costs. Read more [here](#).

### Unstructured Data is Taking Over the Data Center. Help!

By 2025, IDC predicts the Storage Sphere will swell to about 7.5 zettabytes of data annually that must be stored and managed, with 80 to 90% of it being unstructured data. Object based storage (OBS) has emerged as a methodology that can help provide an always on data repository with the scalability needed to handle unstructured data. Using tape in an active archive, which can scale to billions of objects, allows organizations to manage, access and protect data and in addition to getting low TCO and saving energy. Read more [here](#).

### Second-Hand Tapes. What Should You Know?

A compelling study is now available by [Ovation Data](#) that dives deep into using tape media as a way to secure data. One method storage managers should not consider is to purchase used tape media. When shopping the second-hand tape media marketplace, IT managers should be mindful that data can remain on tape cartridges and the price of second-hand cartridges is hardly sufficient to justify the risks that come along with them.

<sup>1</sup>Assumes 2.5:1 compression. <sup>2</sup>[https://www.researchgate.net/publication/352715516\\_317\\_Gbit\\_in2\\_Recording\\_Areal\\_Density\\_on\\_Strontium\\_Ferrite\\_Tape](https://www.researchgate.net/publication/352715516_317_Gbit_in2_Recording_Areal_Density_on_Strontium_Ferrite_Tape) <sup>3</sup><https://ieeexplore.ieee.org/document/9543681>