



CAN TAPE STORAGE SAVE US FROM THE ZETTABYTE APOCALYPSE?

BY JON TOIGO

The next four years will see the addition of between 40 to 60 zettabytes of new data to the digital information burgeon. Each zettabyte equals 1000 exabytes or one billion terabytes. That's a lot of bits, and they'll all be seeking a home that is durable and affordable. So what are the options for storing all of these zettabytes?

Disk storage is no longer growing its capacity at a sufficient rate or with the affordability characteristics that will make it suitable for zettabyte storage, at least according to Microsoft. Moreover, even as innovations come on line to expand capacity, the total manufacturing capability of the disk industry will not be able to keep pace with data growth.

So, we are left with one remaining digital medium to catch the tremendous influx of data that analysts are predicting. That medium is tape. Here are five reasons why tape storage is the best way to manage the coming zettabyte apocalypse:

1. TAPE PLAYS NICE

Tape is a technology that has been relegated to the history books many times, but it continues to enjoy fairly widespread adoption. Two of the three "industrial farmers" of the Cloud world, Google and Microsoft, admit to using tape in their storage infrastructure and to having big plans for tape storage going forward. So, increasingly, when you talk cloud storage, you will likely be talking about tape.

2. TAPE IS RESILIENT

The problems that most anti-tapers cite when deriding the technology are mostly misguided. Contrary to the hyperbolic (and now recanted) statements of analysts in the late 1990s, tape is not more prone to failure than other storage media and is, in fact, among the most resilient. With a non-recoverable bit error rate that is an order of magnitude less than SATA hard disks and on par with the best flash memory in the market today, tape is very reliable. And because of improvements in substrate materials and coatings, the durability of tape storage is about 30 years - much more than flash, disk or optical.

3. TAPE IS GROWING IN CAPACITY

Tape storage is growing its capacity by leaps and bounds. Owing to Barium Ferrite (BaFe) coatings, which replace metal particle tape coatings of the past and enable a variation of perpendicular magnetic recording on tape media that rivals PMR on disk, tape has a long runway of capacity improvements ahead. The Linear Tape Open (LTO) roadmap currently goes out to 120TB of compressed capacity per tape. This is actually a modest projection since demonstrations have been made of BaFe cartridges with 220TB raw (uncompressed) capacity within the last year, courtesy of Fujifilm and IBM.

4. TAPE IS ENHANCED WITH LTFS

Tape technology has been further enhanced by the [Linear Tape File System \(LTFS\)](#) technology from IBM, which has been standardized by the Storage Networking Industry Association. LTFS provides a way to bridge transparently the file systems (and object storage systems) of the flash and disk world to tape, enabling files and objects to be stored to and retrieved from tape in much the same way as they are from a USB drive or disk drive. This usability improvement mitigates the retraining requirements that may be created by reintroducing tape into a central storage role. It also helps to eliminate the need for problematic backup software which has long been the source of the acid indigestion that operators blamed on tape technology to begin with.

5. TAPE WILL BE REQUIRED

If zettabytes are to be stored cost-effectively, tape will be required. This simple conclusion has been reached by leading cloud vendors and by a growing number of enterprises, especially those considering hybrid cloud architectures (“build your base, buy your burst” applied to storage and processing technology). Only tape can be manufactured in sufficient quantity to handle a 40 to 60 ZB spike in storage capacity demand by 2020.

For more information about how you can set a plan for the zettabyte apocalypse before it happens, [listen to a recent podcast discussion](#) on this topic.

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