

HP Storage Media competitive testing

Not all LTO Ultrium tapes are created equal!



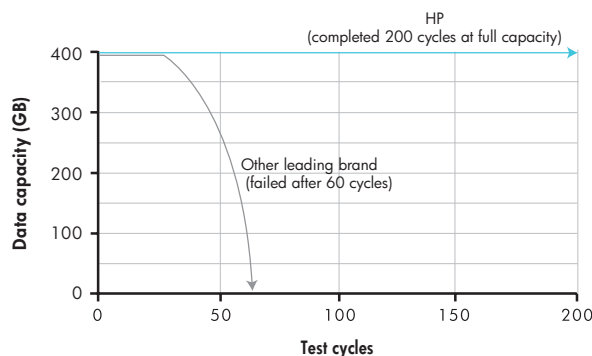
We hear it day-in and day-out, tape is all the same. But is it really? We asked ourselves that same question because despite consistently testing our media, we do not always consistently test our competitor's. This time we did.

The test

We wanted to confirm significant differences between HP storage LTO Ultrium media and the competition. Specifically, we wanted to see if HP media would consistently outperform our competitor's in number of times the tape could be used and its ability to store the stated storage capacity.

Our test engineers took four LTO3 Ultrium RW cartridges through 100 continual full-volume, 400 GB native capacity, backup and restore cycles (that is 200 full-volume operations total) and measured the bit error rate at regular intervals throughout the process in a low humidity environment. To try to ensure that our testing procedures were not influenced by the performance of individual drives, we exchanged the HP LTO3 Ultrium Cartridge 1 in Drive A with the Other Leading Brand (OLB) Cartridge 1 in Drive B and the HP LTO3 Ultrium Cartridge 2 in Drive C with OLB Cartridge 2 in Drive D for the second stage of our tests.

Competitive testing results



The results

HP LTO3 Ultrium

The results for each of the two HP LTO3 Ultrium cartridges, in each of the drives in which they were tested, showed consistently low and stable error rates throughout the 200 continual backup and restore cycles.

We also measured the amount of the data backed up on each cycle to ensure the cartridge was continually providing a full 400 GB of data, the maximum native capacity available. The results proved that after writing 80,000 GB of data the HP cartridges were still providing optimum performance and maximum capacity without the risk of data loss.

OLB LTO3 Ultrium

The results for each of the two OLB cartridges, in each of the drives in which they were tested, were equally consistent but demonstrated significant performance differences. After only 30 full backup and restore cycles, less than one-third of the way through the first stage of the test, performance levels quickly started to decline. After no more than 60 continual backup and restore cycles, error rates were so high, on both cartridges, that it was no longer possible to complete a full 400 GB backup operation.

The difference

The main reason that HP LTO3 Ultrium media is able to produce consistent and stable error rates is because it is designed and manufactured to optimize both media and drive performance. It is important to maintain whole solution performance, not just half. There is no visible difference between one tape and another. Tape meeting the required specifications to obtain the right to bear the LTO Ultrium logo should, accordingly, all produce optimum results under equal testing environments. However, HP has learned that subtle differences in media, such as lubricant design, binder composition, and particle selection, and differences in manufacturing—coating, drying, burnishing, slitting, servo writing—produce significantly different levels of performance in fully deployed working environments. HP sets high standards and holds their suppliers to them. Our testing enables us to deliver the most reliable data storage solutions.

The benefits

The benefits of using HP Storage Media are clear. Based upon the test results, HP Storage Media users gain:

- Greater productivity. Less human interaction is required because HP tapes do not generate high error rates (requiring the use of cleaning cartridges). The result is increased productivity.
- Reduced costs. Tests show that HP tapes can be used repeatedly for full backup and restore operations without decreased performance—resulting in fewer tapes to buy and reduced costs.
- Less storage space. With full-volume backup capabilities in each tape, fewer tapes are needed to store data ultimately providing decreased storage space.

Cost versus quality

With HP's LTO3 Ultrium tapes, companies will no longer have to choose between cost and quality. The following tables demonstrate that, while on the surface, it may appear that there are higher initial costs when purchasing HP LTO3 Ultrium tapes, OLB tapes will cost you more overall.

The bottom line

As of July 2007, the average cost of an LTO3 Ultrium cartridge is approximately \$40. According to the 2006 International Data Corporation Disk Based Data Protection Study, the average size of a mid-size company's disk storage needs is 250 TB. This indicates that over 150 LTO3 tapes would be required to archive one quarter (60 TB) of the disk storage capacity.

If HP LTO3 Ultrium tapes are purchased at \$40 each and OLBs cost \$37, you save \$450 initially.

Purchase costs for 150 LTO3 tapes

Initial costs for 150 LTO3 tapes

| | Cost per tape | Total cost for 150 tapes |
|-----|---------------|--------------------------|
| HP | \$40 | \$6,000 |
| OLB | \$37 | \$5,550 |

HP initially costs \$450 more.

However, you need to factor in that you actually need to purchase twice as many OLB tapes to equal the same storage capacity of HP's tapes.

60 TB storage comparison

| | Actual GB per tape | No. of tapes needed to equal 60 TB |
|-----|--------------------|------------------------------------|
| HP | 400 | 150 |
| OLB | 200 | 300 |

OLB requires twice the amount of tapes than HP.

Now comparing actual costs, the OLB costs over \$5,000 more to store the same amount of data.

Comparison of costs to purchase LTO3 tapes to equal 60 TB

| | Cost per tape | No. of tapes needed to equal 60 TB | Total cost |
|-----|---------------|------------------------------------|------------|
| HP | \$40 | 150 (400 GB) | \$6,000 |
| OLB | \$37 | 300 (200 GB) | \$11,100 |

Using OLB costs \$5,100 more.

Usage models and purchasing frequency may differ, but the underlying principle is the same. If you need two OLB cartridges (even if the individual cartridge is lower in cost) for every one HP tape you purchase, you are spending more and receiving less. Don't sacrifice quality for small initial savings. Choosing HP LTO3 Ultrium tapes will give you significant savings in the long run without having to choose. You get to free up storage space, with larger capacity tapes, that cost less than Other Leading Brands.

Storage Media 101

An error rate is the ultimate guide to how well data is being saved or recovered. As a drive writes to tape, it checks to see how closely the copy matches the original and re-records the data if the two versions do not match. High error rate means the tape drive has to continually re-record information, which increases time, decreases productivity, consumes more tape, and in the worst case, can result in a backup failure. Ideally, the error rate curve should be flat and constant, even as the tape is used more frequently. If the error rate reaches too high a level, the drive will struggle to accurately record information, or worse, will stop recording. The greater number of errors, the more tape is used and the less data is saved in that cartridge. This is because every time the drive has to go back and re-record, to ensure a perfect copy, it uses more tape. The tape inside the cartridge isn't infinite. What you may be left with is half of a tape of usable data and half of a tape of failures and missed attempts.

High error rates result in:

- More frequent use of a cleaning cartridge
- Reduced cartridge capacity. You have to purchase more cartridges to back up the same amount of data.
- Lower transfer rates. The drive will repeatedly attempt to re-write or re-read the same user data until it has been able to successfully verify that the written or restored data is 100% accurate.
- Failed backup and restore operations, as there are too many errors to correct, resulting in an increased risk of data loss

Note: Proprietary test software from HP enables measurement of error rates in great detail. However, this level of detail is not often seen by IT managers and they may be unaware of poor performance.

For additional technical information, please visit our website at: www.hp.com/go/storagemedia

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