Are you taking a chance with your media?

All tapes are equal. But some tapes are more equal than others.

"A backup is one of those things you hope you never have to use. But when I do have to restore data, I don't trust it to anyone but HP. HP media has proven time and time again to be solid, reliable and error free on our MSL6000."

Harold Kelley
H.L. Kelley Electric Company

This sentiment from George Orwell's Animal Farm fits perfectly with the dilemma all purchasing and IT managers have when it comes to choosing their media. In each format category, different brands of tape are the same. Naturally, you choose the cheapest.

It's not rocket science, after all. You buy the format to match the drive, load the tape, record data onto it – and then, whenever you need it as back-up, you just re-load it – and all the data is there – just as you left it.

Oh, if only that were true.

As we are the world-leading tape manufacturer, you would expect us to say that our tapes are better than the rest. Our competitors claim to offer identical performance and reliability – for a lower price. So why pay more for something that you can buy cheaper from another manufacturer?

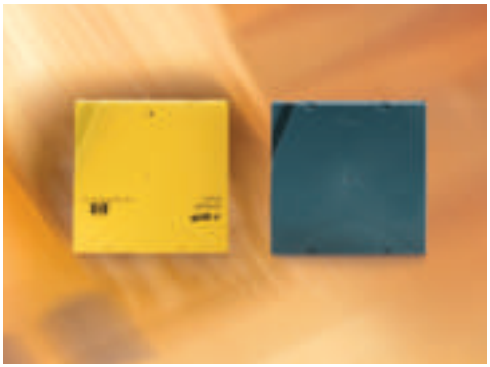
Because it's always worth paying a small premium for the certainty that your data is always retrievable. Some day, your business could depend on it.

But you need proof.

You need to know that behind all the marketing speak lies more than a grain of truth. HP has always made strenuous efforts to gain independent evidence to verify the integrity of its products. Most important of all, since technology and opinion doesn't stand still, we continually strive to reinforce our claims with fresh research to show that HP storage really does provide the best value for money and the greatest certainty that your data can always be retrieved.

Our Ultrium and DAT tapes have spent many difficult days in the company of the world's most intrepid explorers, undergoing the most extreme, volatile and turbulent conditions on the planet: from Everest and the Sahara, Alaska to Tierra del Fuego, and finishing off with a rough Atlantic crossing in a rowing boat. Inside the battered tape casing, all the data remained intact and completely recoverable.

On top of this, there are the exhaustive and extreme lab tests that HP regularly carries out on all its drives and media. But these are



not everyday conditions – few tapes will ever undergo such pressures. What's more, the development of industry standards encourage the misconception that there's no difference, other than price and service, between one tape and another - especially with industry specifications as uncompromising as LTO-3. Unsurprisingly, but mistakenly, many businesses regard the LTO spec as a guarantee of performance and reliability.

Our tests prove there's no comparison!

You may not be able to see it, but our tests prove that there's a huge difference between HP LTO-3 Ultrium data cartridges and other leading brands. If we can prove to you that our tapes will give you twice the data capacity per backup and significantly greater reliability, with up to three times as many continuously successful backup and restore cycles, would you still buy a cheaper brand?

An HP LTO-3 Ultrium cartridge may cost a little more than a competing brand, but the reality is that over time it may actually cost you half as much.

To settle the argument once and for all, we ran a direct comparison between HP LTO-3 cartridges and another leading brand.

Our test engineers took four LTO-3 Ultrium RW cartridges - two from HP and two from another leading brand—and tested them in four HP StorageWorks Ultrium 960 drives in a controlled environment.

We used our own drives, not because HP tapes work best with HP drives, but because they use software that enables us to analyse tape performance in far more detail than is possible with off the shelf backup applications.

To be doubly sure our results were not influenced by the performance of individual drives, we swapped the cartridges between the drives for the second stage of our tests.

For both stages of the test we ran the cartridges through 100 continual full volume, 400-GB native capacity, backup and restore cycles - that's, 200 full-volume backups and 200 full-volume restores altogether.

After every 2GB we measured the bit error rate (BER) – the most reliable way of measuring tape performance – and then worked out and compared the average error rate for each full volume.

The principle is fairly obvious. More errors equal more risk of losing your data. And the scale of errors is directly influenced by the materials and processes used in the tape's manufacture. And that's what makes the difference between HP and the rest.

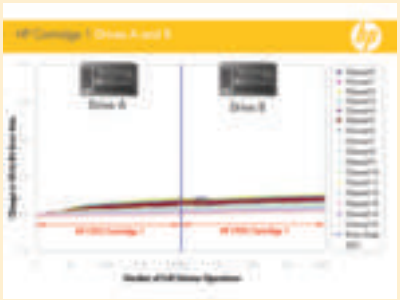
The higher the error rate, the harder the drive has to work to verify that data is being saved (or restored) properly. Distorted and noisy signals caused by sub-standard coatings and surfaces will produce high error rates At worst, these can reach a point where the drive cannot cope with correcting mistakes and data may be lost altogether.

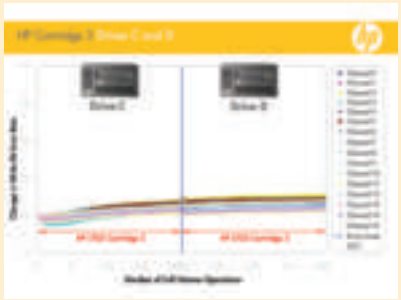
The results speak for themselves

"HP stands behind their products and HP storage media was a natural choice for Deloitte. HP storage systems have demonstrated that our data can be restored in an emergency. This is critical in our industry where losing data is not an option. That is Deloitte's commitment to our clients."

Angel Mosquera
IT Manager, Grupo Deloitte

The results for HP showed consistently low and stable error rates throughout the tests.



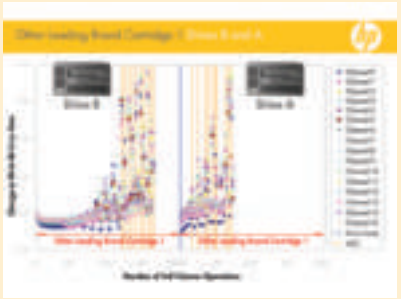


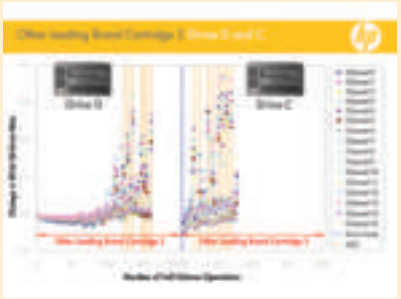
They also showed that, after writing 80,000 GB, the HP cartridges were still providing optimum performance and maximum capacity without any risk of data loss.

"Last year when our system crashed we lost all our data from the past week. We had no server for a week while they tried to recover our data. Now we know that with our HP storage media we will never lose our valuable data again. Thanks HP."

Rosa Lee Perfect Finish

The results for each of the two other leading brand cartridges were also consistent. But there any similarity ends. After just 30 full backup and 30 restore cycles – that's less than one-third of the way through the first stage of the test, performance began to tail off.





By the time we had got to 60 continual backup and 60 restore cycles, error rates were so high on both cartridges, the drive simply couldn't complete the full 400 GB backup operation. The test could only continue after a cleaning cartridge had been inserted and run.

What's more, the tape's available capacity also deteriorated. Sometimes only half the total capacity could be utilised before the end of the tape was reached.

Neither of the other leading brand cartridges managed to complete the full 100 backup and 100 restore cycles in either of the drives in which they were tested.

"Cheaper is not always better. We've tried other brands of storage media and we've been disappointed in the reliability of some of the tape cartridges. Netbank's experience is that HP's technology actually does work better together. It provides superior quality and reliability across the entire disk and tape storage line. We are comfortable that HP tape media has a strong future or many years to come."

Todd Warnock
Director of Technology Services, NetBank

We proved that HP LTO-3 Ultrium data cartridges can provide over THREE TIMES as many continuously successful backup and restore cycles when compared to an alternative leading brand.

The HP cartridges achieved 400 successful write/read cycles of a 400GB tape (more than 160,000 GB of data), compared with just over120 cycles before the first failure occurred with the other leading brand. That's 47,000 GB of data but only 29% of HP's performance.

What's more, the HP LTO-3 data cartridges also delivered over TWICE the capacity during backup of the other leading brand.

While the HP tapes always provided the full 400GB, in the worst case, the other leading brand managed just 168GB. In many instances, we simply couldn't compare capacity because the test would abort.

How much error margin can you afford in the real world?

Error rates tell us how much margin there is before failure. Did the backup and restore operation only just complete successfully, or did it complete with lots of margin? You may never know how close you come to failure – or realise how much it is costing you to get just 50% of the quoted capacity of your cartridges.

Low error rates are tolerable, but there comes a point when error rates are critical to drive performance and data security.

Excessive error rates mean:

- More frequent use of a cleaning cartridge.
- Less cartridge capacity. You have to buy more cartridges to back up the same amount of data.
- Lower transfer rates (ie. poorer performance) because the drive has to keep trying to rewrite or re-read the same user data before it can successfully verify that the data is 100% accurate.
- Failed backup and restore operations because there are too many errors to correct. You lose your data.

OK. So how can an HP LTO Ultrium tape, with an identical spec to another leading brand, produce such different performance characteristics?

That's largely because HP LTO Ultrium media is designed and manufactured to optimise both media and drive performance. What matters is the performance of the whole solution, not just one half of it.

All tapes look the same. And the LTO Ultrium specification is unequivocal in the standards required to bear the logo. In theory, all LTO Ultrium media should produce optimum results under test.

We have learned, though, that subtle differences in media (such as lubricant design, binder composition and particle selection) and manufacture (coating, drying, burnishing, slitting and servo writing) combine to produce vastly different performance in real-life situations.

We proved that HP LTO-3 Ultrium data cartridges can provide over three times as many continuously successful backup and restore cycles when compared to an alternative leading brand.

Why would anyone buy a tape that delivers less than half its capacity? Why would any business risk revenues on goodwill, for the sake of saving a few cents per gigabyte?

An HP tape may not be the cheapest on the shelf – and a cheaper brand may appear to work perfectly in your drives. But in the long run, you could be paying a very high price in lost data and lost business.

In July 2007, the average price of an LTO-3 cartridge was about $40. The average size of a mid-sized company's disk storage is, according to IDC, about 250TB. That means you need just over 150 LTO-3 tapes to archive a quarter of that disk storage capacity, amounting to a total media cost of $6,250.

Although the way businesses use and purchase media are different, the underlying principle is the same. If you need two other leading brand cartridges for every single HP tape that you buy, you'll be spending almost double what you need – even though the other leading brand starts off several dollars cheaper.

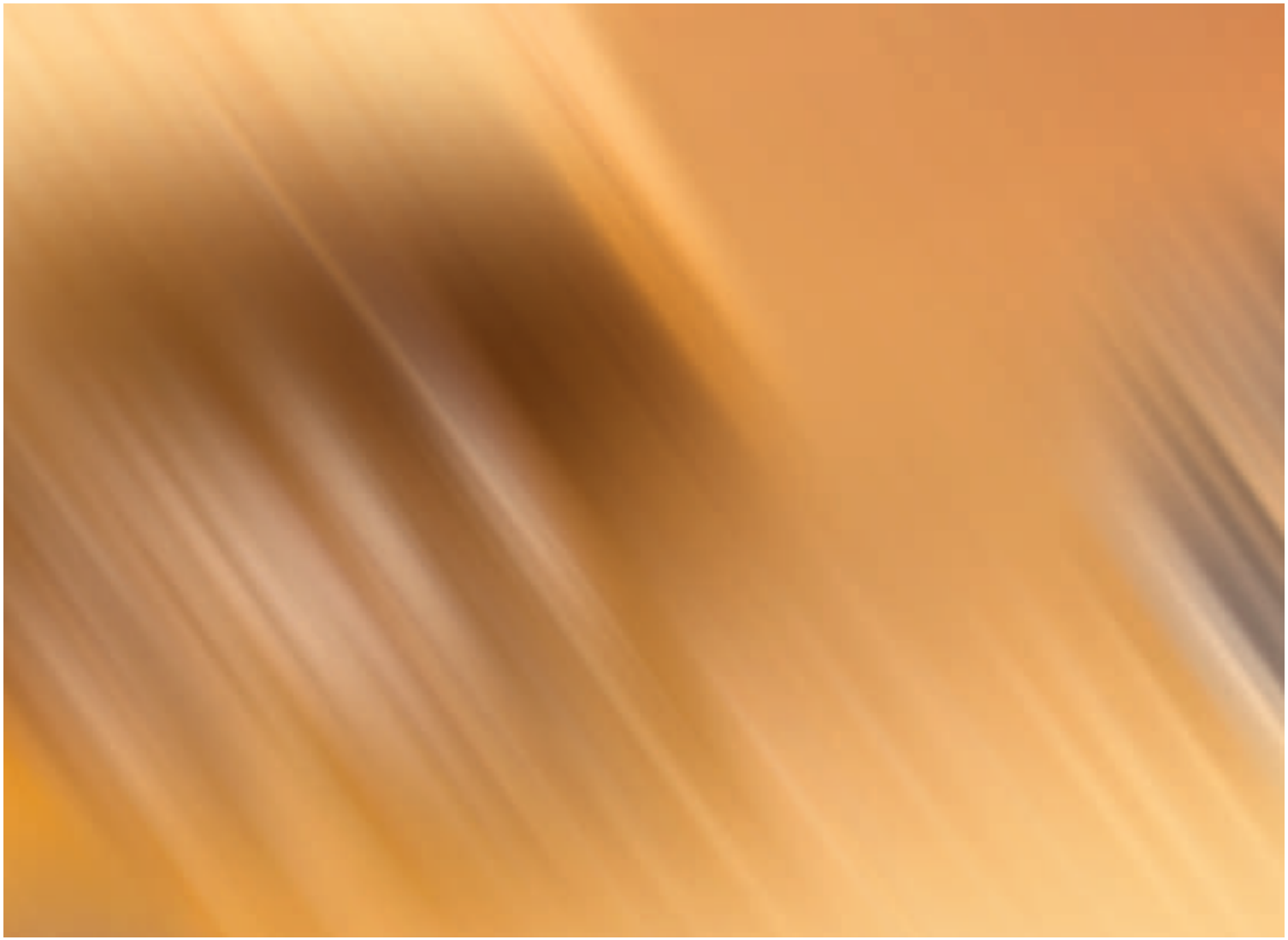
Let's do the sums.

Say the HP tape costs $40 and the Other Leading Brand cost $37. On 150 tapes, buying the other leading brand would save you almost $500. But to get the same capacity from these cheaper tapes, you would need to buy another 200.

That's another $7,000!

Price matters. But as so many of our customers know, value and data security matter more.

Whether it's a comprehensive lab test, a real world test in extreme conditions, or a customer's first hand experience, the fact is HP LTO-3 cartridges offer three times the performance and reliability, and twice the capacity of other leading brands. When it comes to the integrity and security of your data, do you really have a choice?



To learn more, visit www.hptapemedia.com

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