Solution Showcase

Oracle Tape Economics

Date: February 2016 **Authors:** Jason Buffington, Principal Analyst; and Monya Keane, Senior Research Analyst

Abstract: Today, businesses have to fight to meet their production, protection, and preservation goals without breaking the bank. That's because their storage needs are growing faster than their budgets, and they can no longer maintain the capacity expenditure levels of years past. Happily, though, an appealing alternative solution is available—modern tape. It is extremely reliable, extremely fast, extremely economical, and extremely well-suited to serve as an integral component of a broad storage strategy.

Introduction

Organizations everywhere have been reimagining and redesigning their storage strategies. Some are doing so proactively … others, more reactively.

- **Proactive storage strategy redesign**—These organizations are trying to keep up with aggressive growth in their production and protection storage—managing data growth was cited as a challenge by 35% of ESG survey respondents, making it the most frequently mentioned challenge among 13 responses.[1]

   Before the struggle becomes a huge undertaking for them, they are looking actively for ways to keep up—for example, they are seeking out less-expensive backup processes or trying to find ways to support preemptive archival grooming of production data.

- **Reactive storage strategy redesign**—Storage is growing fast, but IT budgets are only growing about 3% annually on average.[2] That gap forces some organizations into "chronic reactive mode." Eventually, IT leadership has to force the teams to reassess their current IT solutions and come up with new solutions to combat persistent problems.

Either way, these organizations are reconsidering how they store data for production, protection, and preservation because they can't afford to just continue scaling linearly. In fact, managing data growth and improving data backup/recovery were two of the top-five IT priorities reported by ESG survey respondents in 2016.[3]

Organizations Are Rediscovering Tape

Regardless of whether storage-strategy rearchitecting is a proactive or reactive effort, and regardless of whether it is a technical- or business-centered decision, many organizations are relearning how valuable tape can be to the process.
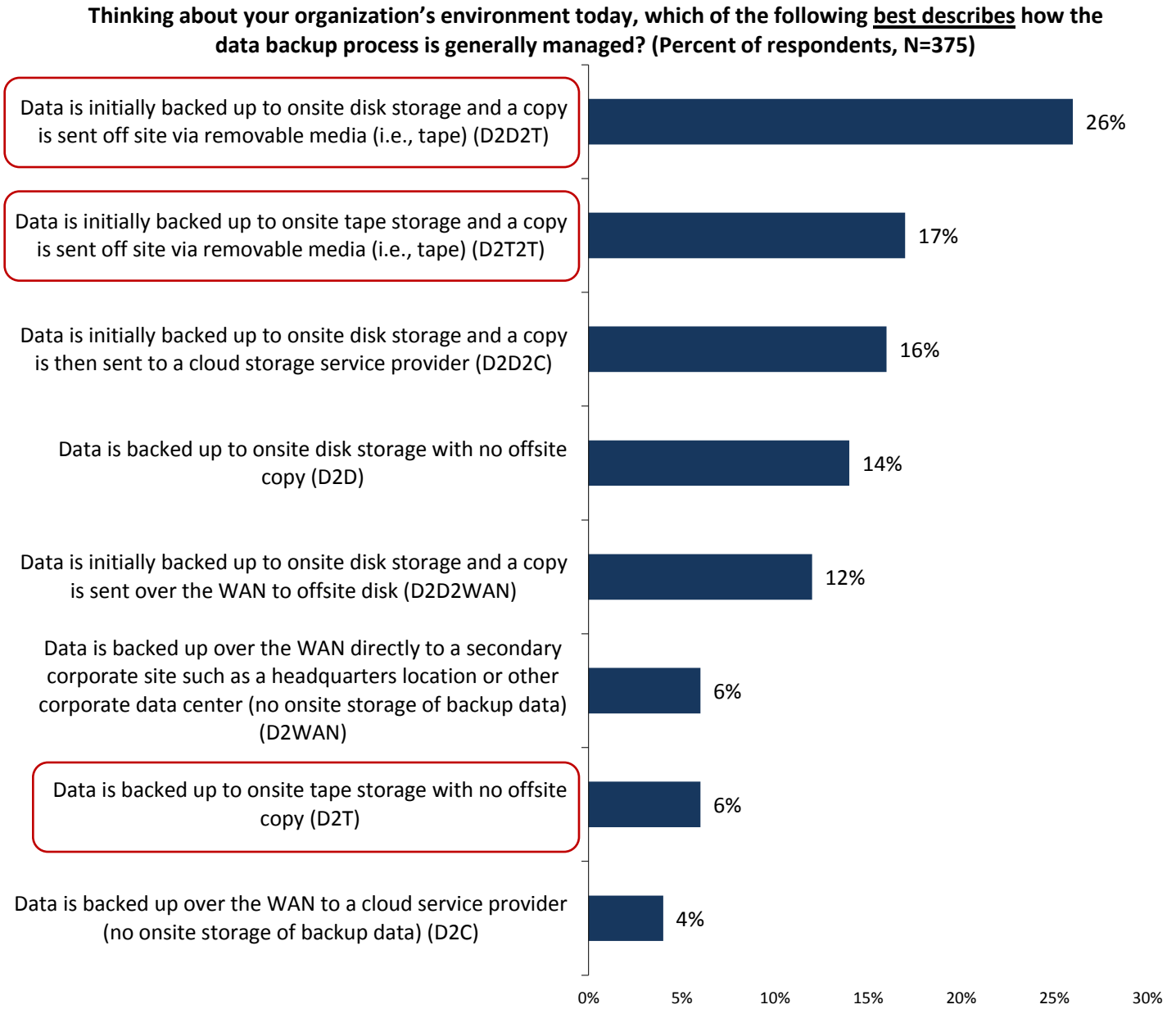
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[1] Source: ESG Research Report, _Backup and Archiving Convergence Trends_, April 2014.
[2] Source: ESG Research Report, _2016 IT Spending Intentions Survey_, to be published.
[3] ibid.

Make no mistake, tape in 2016 is not the tape of 20 years ago, which often was considered (somewhat justifiably) to be slow and unreliable.[4] Today's modern tape is able to serve an important role as a protection and long-term-retention medium of choice for many organizations (see Figure 1).[5]

FIGURE 1. Primary Data Backup Process

Thinking about your organization's environment today, which of the following <u>best describes</u> how the data backup process is generally managed? (Percent of respondents, N=375)

Source: Enterprise Strategy Group, 2016

Figure 1 reveals two findings of note:

- **Nearly half (49%)** of the organizations surveyed are using tape as part of their primary backup solution.

- **Nearly one-fourth (23%)** are using tape exclusively without any disk or cloud usage.

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[4] Tape's poor reputation also was exacerbated by the disk-only-solution vendors of that era. At every opportunity, they perpetuated and exaggerated tape's perceived downsides to give their own disk-based offerings more appeal.
[5] Source: ESG Research Report, *2015 Trends in Data Protection Modernization*, September 2015.

The percentages from Figure 1 relate specifically to data backup, but ESG sees similar attitudes/behaviors from respondents in regard to data archiving.[6] In fact, ESG has seen equitable sentiment for using tape to support backup, archiving, business continuity/disaster recovery (BC/DR) preparedness, and even some transportable-production scenarios.

What Modern Tape Looks Like

Recognizing the renewed interest in tape as a sustainable part of a broader storage strategy, ESG Lab recently completed an independent, hands-on evaluation[7] of one of the more prominent tape formats on the market today—Linear Tape-Open (LTO). In its validation, ESG Lab found yesteryear's complaints of tape vulnerability and poor performance truly relegated to mere "*fear, uncertainty, and doubt*" (FUD).

For example, ESG's engineers found error rates for tape cartridges to be lower than those for single disk spindles. (Perhaps that's why many storage solutions not only offer "enterprise-class" drive components, but *also* use RAID technology to mitigate spindle failures.)

Essentially, data stored on a single tape cartridge is more reliably error-proof than data on a single disk spindle (see Figure 2). According to ESG's assessment, one would be far less likely to encounter an uncorrectable error in an LTO-7 tape than to:

- Be struck by lightning (odds of one in a million).
- Be killed by a shark (odds of one in 11.5 million).
- Win a multi-million-dollar lottery (odds of about one in 259 million to one in 300 million).

Download the ESG Lab Review: "LTO for the Next-generation Data Center"

FIGURE 2. Understanding How Low the Chance Is for Media Error in Modern Tape
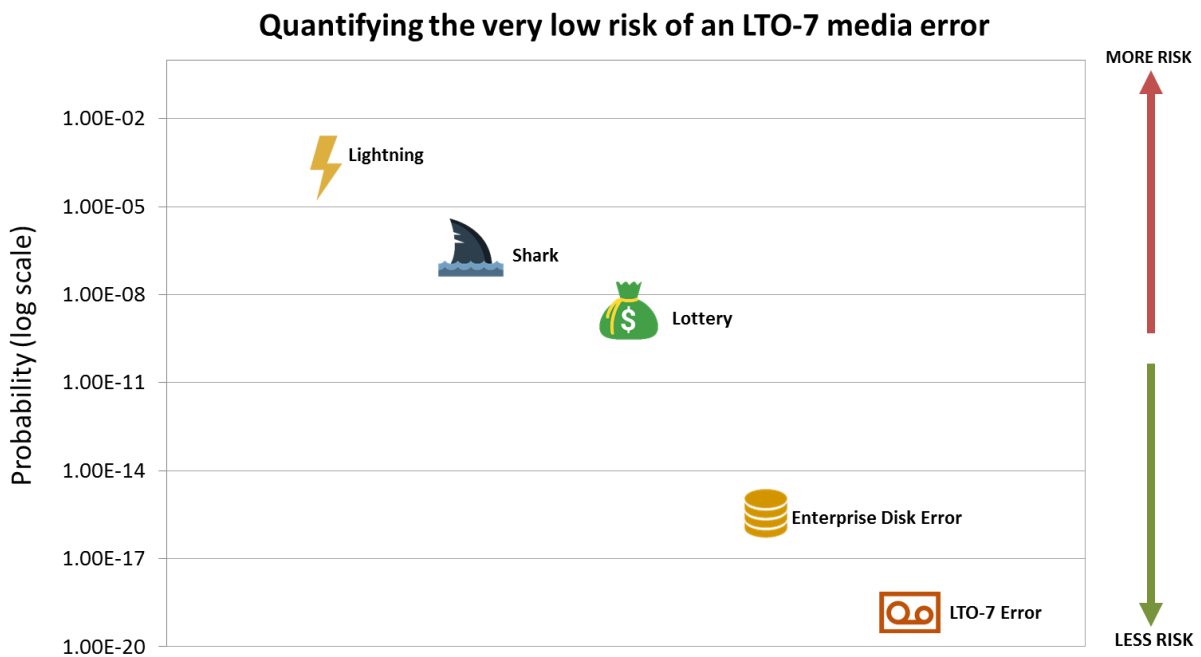
Source: Enterprise Strategy Group, 2016

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[6] Source: ESG Research Report, *Backup and Archiving Converge Trends*, April 2014.
[7] Source: ESG Lab Review, *LTO for the Next-generation Data Center*, November 2015.

The other type of FUD surrounding yesteryear's tape relates to slow performance during recoveries. During the same hands-on evaluation, ESG's engineers found that in many cases, modern tape drives achieved speeds beyond what many backup solutions can stream: It was not possible to max-out the drive. Basically, the backup software was slower than the tape hardware.

With that level of performance, and recognizing that many organizations are accelerating their disk performance with flash, this is a particularly interesting time. Flash may become the ingest approach of choice for data of all types, *and tape may arguably be "better than fast enough" as a second tier.* That's something that many disk-based vendors may not have counted on.

The performance ratings described in this document are specific to ESG's assessment of LTO technology, but today's other modern tape technologies boast similar (and sometimes better) error and performance rates, including Oracle T10000 and IBM TS1150. Modern tape truly is viable for organizations of all sizes. Considering tape's near-perfect reliability, it's easy to understand why many organizations believe it to be the best choice for retaining their "copy of last resort" for both backup and archival scenarios.

What About the Operational Labor Costs of Managing the Tapes?

One of the last remaining anti-tape claims made by disk and cloud solution vendors is that "*managing tape cartridges is laborious*." However, one vendor of enterprise disk, cloud, and tape offerings, Oracle, recently conducted a survey of its own customers with some interesting results. Oracle surveyed 48 of its enterprise customers with an average of 5PB of disk storage and 24PB of tape storage, which was managed by multiple storage administrators for each media type. The goal of Oracle's survey was to assess the labor requirements of disk management versus tape management (see Table 1).

TABLE 1. Summary of Oracle Survey in Assessing Storage Labor Requirements (PB/administrator)

	Disk Management	Tape Management	Ratio of Tape : Disk Efficiency
Average	1.9PB/admin	10PB/admin	5.2 : 1
Median	0.3PB/admin	6.8PB/admin	20.3 : 1

Source: Oracle, 2016

While numbers will vary for each environment, the findings in Table 1 are interesting in that Oracle has enterprise solutions that are both disk- and tape-based, unlike some vendors that only sell one or the other, therefore producing numbers that may be slanted. In this case, while disk (and flash-accelerated disk) will continue to be the norm for primary storage, those who struggle with data management and retention should not assume that managing tapes is more cumbersome (see Table 1) or that modern tapes are unreliable (see Figure 2).

The Bigger Truth

Many organizations are struggling to keep pace with the storage requirements that will enable them to meet their production, protection, and preservation goals. From a CapEx perspective, their storage needs are likely growing much faster than their storage budgets are. These organizations cannot sustain their traditional annual capacity-expenditure levels much longer.

Fortunately, the situation is leading organizations to rediscover tape's potential to serve as an integral component of a broad storage strategy. Tape's reputation of yesteryear has more or less been proven baseless. Today's cartridges boast such low error bit rates that they are more reliable than disk spindles, and they offer read/write performance that is more than adequate for many protection and preservation scenarios. In its survey research as well as in discussions with IT

decision makers, ESG continues to hear positive sentiments from organizations of all sizes about using tape for backup, archiving, and BC/DR preparedness—particularly as scale forces them to rethink and redesign their strategy.

In regard to ongoing OpEx requirements, many organizations are also discovering something else important: By taking advantage of robotic automation and managed services (and thereby enjoying the pragmatic advantages of having fewer cartridges in their environments), old OpEx-related cost concerns fade away as well.

Organizations should always do their own economic and performance assessments. But just as ESG can offer an independent perspective on modern tape functionality to assist them with their TCO and ROI evaluations, IT vendors like Oracle (which happens to offer solutions in all major storage categories) can provide calculations and insights that should help today's cost-constrained organizations better determine the potential CapEx and OpEx benefits of rediscovering tape.

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