DATA AUTHORITY

WHITE PAPER: DATA PROTECTION

Business Case:

True Cost of Tape Backup

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The Remote Backup Appliance Company

Economic Value Creation (EVC™) Experts

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The True Cost of Tape Backup

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Introduction

When trying to justify a new technology solution, it's often difficult to look beyond the initial cost of the hardware and/or software. Even when a solution is purchased specifically for its ability to improve employee productivity or eliminate a business risk, companies experience real challenges turning these concepts into dollars and "sense".

To assist IT administrators in justifying a new backup solution such as the Remote Backup Vault technology (RBV) Data Authority has developed a business case identifying the primary costs of tape backup. These costs are useful to any administrator proposing to replace a tape backup solution. Naturally, to complete the business case, an IT Administrator will need to identify the costs related to their proposed solution including hardware, software, hosting, and any ongoing labor or maintenance.

Rather than develop ad hoc Excel worksheets, Data Authority leverages the Glomark-Governan Economic Value Creation (EVC™) methodology and Genius Pro™ business case tools. Glomark's business case analysts provide substantial credibility to the savings claimed by Data Authority sales representatives and the Glomark tool simplifies the tracking and presentation of these savings.

Cost of Managing Tapes

To understand and quantify the costs related to tape backup, the EVC methodology focuses on specific, measurable variables that can be, with the assistance of simple formulas, converted into dollar savings. Three activities were identified in relation to tape management, nightly tape rotation, tape cleaning, and transportation of tape to a remote location.

Labor Savings When No One Gets Fired

The Perception: End customers are skeptical about labor savings from efficiency improvements because they rarely fire employees. Without firing someone, there is confusion about how the company realizes this value.

The Reality: Employees are extremely busy. "Efficiency" time is reinvested in activities that they were unable to complete before purchasing the technology. If these activities are productive, they lead to additional sales, improved customer satisfaction, and other valuable outcomes.

Rotation

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To evaluate the cost of tape rotation, we need to understand the total amount of time that a company can expect to invest in this process:

We will assume that an employee replaces a tape once during each of the 250 work days in a standard 2000 hour work year (8 hour work days).

We will use a $30 fully loaded hourly rate for the backup administrator. A “fully loaded rate” also includes benefits, which typically run 20% to 30% of salary, so $30 per hour implies approximately a $50,000 salary. If you use a consultant, your hourly cost could easily be double this figure.

Finally, we need to determine how much time is spent each day for rotation. This must include the actual time to physically replace the drive along with the time to travel to the server room and any additional time spent validating backups or labeling and organizing tapes. We’ll use ten minutes as a reasonable estimate of productive time lost to the IT staff.

To calculate the total cost of this activity, we take:

Work days per year		250 days per year
Average time to rotate tapes	*	10 minutes per day
Convert average time into hours	/	60 minutes per hour
Fully loaded cost for a backup admin	*	$30 per hour
Total Cost	**=**	**$1250 per year**

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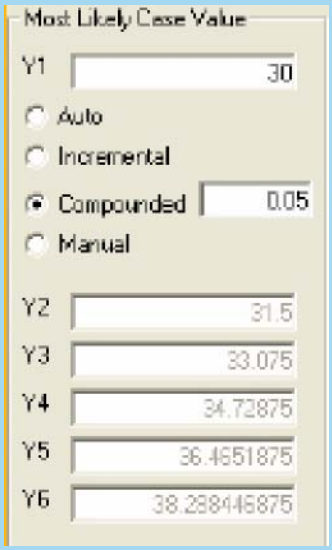
Handling Salaries and Raises

To improve the accuracy of ROI models, salaries should be increased over time to reflect raises.

The Tool: When defining a variable in the Genius Pro, the compound option allows you to increase a particular value, like an hourly rate, by a given percentage each year. For example, the salary used in the business case can be increased by 5% per year. If this increase is not expected to compound, the incremental option permits you to increase a variable by a specific amount each year.



Cleaning (Cost Reduction)

Vendors often suggest that you clean a tape drive after 8 to 24 hours of use. If such a regiment is followed, it represents an additional cost and burden on administrators. If a drive is not cleaned properly, it increases the risk and cost of failure.

Handling Alternatives

This is an example of a situation where you must account for one cost or the other but not both. Either, you calculate the labor associated with cleaning the tape drive or you calculate the cost of the increased risk. Since we'll show how to calculate risk later, we'll continue here with the labor cost of cleaning.

To calculate the cost of cleaning, we will continue to assume that a backup admin costs the company $30 per hour. If the backup is running daily, a weekly or biweekly cleaning schedule would be consistent with the advised schedule.

Unlike changing out a tape, cleaning is a more involved process. By the time an admin has gone to the computer closet, found the cleaning system, run the cleaning process, and returned to work, the admin could easily lose 30 minutes of productive time.

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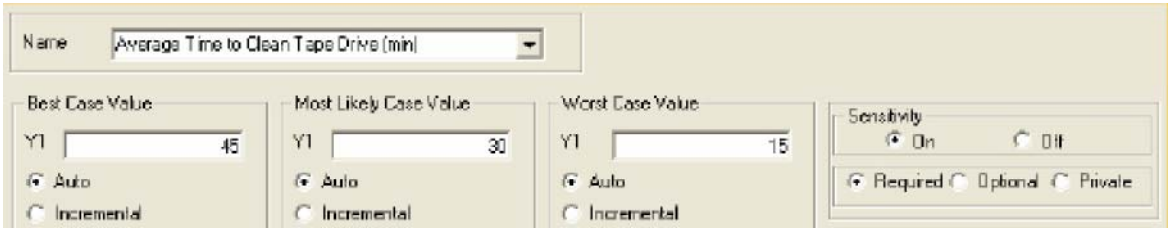
To calculate the total cost of this activity, we take:

Work weeks per year		50 weeks per year
Average time to clean a tape drive	*	30 minutes per week
Convert average time into hours	/	60 minutes per hour
Fully loaded cost for a backup admin	*	$30 per hour
Total Cost	**=**	**$750 per year**

Cleaning: Advanced Analysis

While it's relatively easy to estimate the amount of time it will take an average customer to replace their tape, the cleaning process is far less certain. To ensure that the results of their analysis are robust, 3X Systems provided a range of values for the cleaning time. These were entered into the Genius tool as "best case", "most likely case" and "worst case" values.



Unlike manual Excel models, all three values are automatically run though the business case calculation and a concisely summarized in the business case output.

Year	Best Case	Most Likely Case	Worst Case
Year 1	$1,125	$750	$375

It is no surprise that the overall time to clean the tape drive has a substantial impact on the savings realized by eliminating the activity. By enumerating several possible values, 3X Systems enhances customer confidence in the potential savings.

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Uncertainty: "I'm not sure how long cleaning takes"

Business cases frequently deal with high levels of uncertainty. The correct way to handle uncertainty is to do situational analysis. In the traditional Excel models, this frequently involves three copies of the business case worksheet with different values for each situation. Be careful interpreting worst and best and worst case results since they include the best case of every single variable. If each variable had a 10% chance of coming true and you had 5 variables, the odds of seeing either extreme is around 1/1000th of a percent.

Offsite Storage (Cost Reduction)

To get the data safely to a remote location, companies often hire a tape rotation and storage service. While the cost of these services vary considerably, it is not unusual to spend $300 per month for these services.

To calculate the total cost of this activity, we take:

Months per year		12 months per year
Monthly transportation and storage cost	*	$300
Total Cost	**=**	**$3600 per year**

If a company depends on an internal employee to take care of tapes, we would calculate the direct cost of picking the tape up on the way out the door. Indeed, even with a tape service, an employee may need to be available to accompany the employee back to the computer room.

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If we took an extremely conservative assumption that there was 5 minutes of distraction for an employee making only $10 per hour, the total cost of this activity would be:

Work days per year		250 days per year
Average time to pick up tapes	*	5 minutes per day
Convert average time into hours	/	60 minutes per hour
Fully loaded cost for support staff	*	$10 per hour
Total Cost	**=**	**$208 per year**

Having an employee take tapes home can be very attractive when the alternative is a pricey tape transportation and storage service. Unfortunately, this approach generates substantial hidden cost by exposing the company to increased risk of data loss: tapes can be lost, damaged in transport, or the employee who stores the tapes could leave the company. This last scenario is particularly frightening because many companies do not realize that their tape backup is no longer being completed and that they've lost access to the last good backup until it's too late.

Total Cost of Managing Tape (annual)

The following table provides a summary of the annual cost of manual management of a tape backup solution:

Solution	Operational Benefit	Measurable Assumption	Best Case	Most Likely Case	Worst Case
3X RBA	Eliminate Tape Cleaning		$1,125	$750	$375
3X RBA	Eliminate Tape Rotation		$1,250	$1,250	$1,250
3X RBA	Eliminate Offsite Tape Storage Costs		$3,600	$3,600	$3,600
3X RBA	Eliminate Time to Pick Up Tapes		$208	$208	$208
TOTAL			$6,183	$5,808	$5,433

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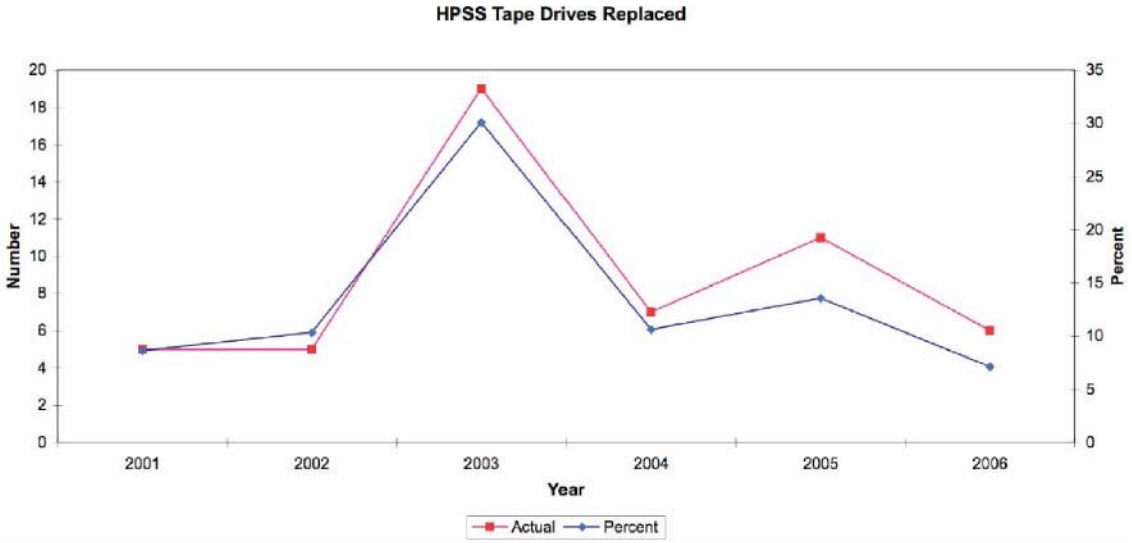
Clarification: The worst case is the best case

If you were running a company, having an extremely high cost for a particular activity would be a bad thing, the worst case. If a technology solution is eliminating that cost, however, then big costs translate into big savings. With this in mind, business cases generated by the Genius Pro tool list the highest cost in the best case box.

Valuing Risk Reduction

It goes without saying that tape drives are notorious for reliability issues.

Of course, good data is critical to a solid business case. Fortunately, the Lawrence Berkeley National Laboratory investigated replacement rates for actual hardware in their environment from 2001 to 2006. For example, on their HPSS system, they found that replacement rates for tape drives were consistently 5 to 15 percent per year (peaking at 30% during 2003) while replacement rates for hard drives never exceeded 2½ percent.



Source: Reliability Results of NERC Systems, 2008

The Cost of Failure Incident

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Now that we have some understanding of the rate of failure, we need to convert failure rates into a real business cost.

Consider a typical backup strategy:

- 1 weekly full backup
- 6 daily incremental backups

In this strategy, if a weekly full backup were to fail, the company would be forced to go back to their previous week's backup and would lose at least a week's worth of data. If an incremental backup failed, a company would have to restore to a point-in-time before the failed incremental and would lose an average of three days worth of data.

Now let's assume:

- A company has 50 employees that use a critical server
- Much of an employee's time is spent on activities that would survive a server failure. Assume that only 2 hours of each day is spent on an activity that would be lost or need to be redone in the event of a server failure.
- Based on our estimates above, a company would lose 3 to 7 days of data in the event of a backup tape failure.
- $25 per hour as the average fully loaded cost for our 50 employees

If an incremental backup tape fails to restore, your average cost of failure is:

Employees		50 employees
Days Lost	*	3 days
Productivity Lost	*	2 hours per employee per day
Fully loaded cost for an employee	*	$25 per hour
Total Cost	**=**	**$7500 per failure**

If a full backup were to fail, this cost would be:

Employees		50 employees
Days Lost	*	7 days
Productivity Lost	*	2 hours per employee per day
Fully loaded cost for an employee	*	$25 per hour
Total Cost	**=**	**$17,500 per failure**

In some cases a tape drive failure is not detected for months and all of the subsequent backups have failed. If a company were to lose three months of data, or approximately 60 business days, of data due to a failure the cost would be:

Employees		50 employees
Days Lost	*	60 days
Productivity Lost	*	2 hours per employee per day
Fully loaded cost for an employee	*	$25 per hour
Total Cost	**=**	**$150,000 per failure**

Companies purchase a backup system specifically to mitigate these kinds of risks. The idea that the backup system itself could fail and go undetected for months should raise serious concerns for technology administrators and business executives.

Customizing the Business Case

Once a business case is developed in the Genius Pro tool, it's very easy to customize the business case for each customer. A special Excel spreadsheet can be provided to the customer, who enters the correct variables (like employees and hourly rates) for their company. This data can be automatically imported into the Genius tool and the full case is updated for those new values.

Required Assumptions	Units	Best Case	Most Likely	Worst Case
Staff				
Fully Loaded Hourly Cost of Backup Admin	$		30	
Fully Loaded Hourly Cost of Support Staff	$		10	
Tape Backup				
Average Time to Clean Tape Drive (min)	min	45	30	15
Average Time to Pick Up Tapes (min)	min		5	
Average Time to Rotate Tapes (min)	min		10	
Monthly Cost of Tape Transport and Storage	$		300	

The Cost of Failure Risk

Unlike annual labor costs, the cost of failure is not certain. Instead, we must factor in the probability that a failure occurs. Thanks to the Lawrence Berkeley National Laboratory data, we can estimate the probability of different failures. We will assume that:

- The probability of a tape failure in a given year is 10%
- The probability of a hard drive failure in a given year is 2%
- The probability that both drives in a mirrored RAID fail in the same year is 2% * 2% or 0.04%. Since most disk systems provide alerting, a single disk failure can usually be resolved within a week. The probability that both drives fail within a week long period is a miniscule 0.000015% per year.

If we assume that a company does not verify their tape backups, a frequent practice in small businesses, then the only time a failure is realized is during a disaster-related restore. This means that a tape backup install will be exposed to the full 10% failure rate in the event of a server failure.

If we factor the difference in hardware failure between a tape drive and a monitored RAID backup

system, the cost of server failure remains quite high:

Failure Period	Cost per Failure	Probability	Weighted Cost
Three Day Failure	$7,500	10%	$750
Seven Day Failure	$17,500	10%	$1,750
Sixty Day Failure	$150,000	10%	$15,000

Of course, this only calculates the employee time to bring your company back online. If deliveries are late or other Service Quality issues arise, the reputation costs could be much higher.

“Intangible” Benefits

Glomark has extensive experience with “intangible” benefits like risk and reputation. Their consulting services can assist you in developing the appropriate formulas and identifying quality benchmarks or data for your specific business case.

Conclusion

When considering an investment in backup, companies frequently assume that their current solution can be retained at no cost to the company. Particularly in the case of tape backup, the reality is that the cost of doing nothing is quite high. In many cases, just eliminating the labor of managing a tape backup would fully compensate a business for the cost of a new solution.

Every company has an opportunity to realize additional benefits depending on their environment and proposed solution. Getting proposals through the bureaucracy can be a frustrating process and, particularly in tough economic times, be sure to find a partner who can assist you in identifying and communicating the dollars and "sense" of their solution.

Data Authority's Remote Backup Vault (RBV) Eliminates the Cost of Tape

The Data Authority Remote Backup Vault (RBV) is an investment in your business that eliminates the cost of tape backup. As an automatic, offsite backup solution, a backup administrator and their employer do not need to invest time or money in tape management, cleaning, transportation, and storage.

Along with a reduction in labor, the Data Authority RBV uses a redundant configuration and comprehensive alerting to mitigate the risk of data loss resulting from hardware failure. The Vault Backup feature of the Data Authority RBV further reduces the risk of data loss by permitting an administrator to copy encrypted data from the RBV to an external SAN for complete data redundancy. In the case of a catastrophic failure, the administrator could bring the RBV back to its last protected state and quickly restore backup services.

Data Authority's RBV Adds Value

The Data Authority RBV goes beyond simply eliminating cost and risk by offering additional features and capabilities.

Protect Laptops and Remote Offices. Data on laptops is particularly vulnerable to theft and loss and laptops are rarely in the office during backup windows. As a web-powered product, the Data Authority RBV is able to protect laptops and remote offices, mitigating risks related to data loss and ensuring that the backup system can expand along with your company's needs.

Restore a Single File. With a tape system, it's impractical to use the backup system to restore a single file, unless the file is mission-critical. The Data Authority RBV permits a customer to restore a single file across the internet, saving customers the trouble of recreating a file that was accidently de-

leted or overwritten.

Protect User Systems “as is”. Data deduplication technology permits the Data Authority RBV to protect multiple copies of the same file without consuming additional space on the appliance. This permits an administrator to protect a full system including program files, operating systems, and individuals settings without substantially increasing the size of the backup. When an endpoint is restored, this eliminates the need to reinstall programs and manually restore individual settings.

Additional benefits may be realized by your specific deployment – talk to your Data Authority representative to learn more.

Glomark-Governan helps enterprises around the world by providing them with the methodology, training, consulting, benchmarking research, and software tools necessary to assess, communicate and

measure the economic value of investments in technology and services initiatives.

Glomark-Governan has enhanced and refined its Economic Value Creation (EVC™) Methodology and Genius Suite of software tools for more than a decade, bringing to market a proven, complete solution that allows companies to justify their solutions' value, define operational and performance metrics, assess economic risk, and quickly create project-specific business cases.

For more information, please visit www.glomark-governan.com or contact the Glomark-Governan headquarters in Dublin, Ohio, USA, at 614-761-2400

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This white paper is one of several white papers provided by Data Authority to help IT Providers navigate the complexities of the backup and disaster recovery space. To view additional white papers or learn more about the Data Authority Remote Backup Vault product, please visit www.dataauthority.com .

About Data Authority

Data Authority is committed to providing a complete offsite backup solution for Small and Mid-sized businesses; Enterprise Remote Offices and Travelling Laptops; and IT Service Providers through its proprietary Remote Backup Vault (RBV). The Data Authority RBV provides all the benefits of an online backup solution that can be managed by the client.

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