WHITEPAPER

The Dollars and Sense of Online Backup

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Executive Summary

Businesses today face unrelenting data growth. IT staffs are struggling to ensure data availability under tight fiscal constraints. The unreliability and intensive management of traditional tape-based backup has forced backup administrators to create manual, error-prone processes in order to protect their data. Consequently, other critical objectives, such as supporting distributed environments and complying with regulatory requirements, are not being adequately met.

Online backup, offered as a managed service, answers these challenges by leveraging existing server and network infrastructures to securely and efficiently protect servers and desktops against data loss. Its ability to immediately move backed up copies of data securely off-site away from any potential site disaster is a key differentiator. Greater security and reliability, and easier, more centralized administration, suggest that online backup is the right choice for businesses that are serious about protecting their business-critical data.

But is online backup really more cost-effective than traditional backup methods?

IT Challenges: It's ugly out there

In order to understand the cost advantages of online backup, it is first important to understand the challenges that businesses face in protecting their business-critical data. The reliance on data and application availability has created internal and external challenges for business owners and their IT staffs. As data volumes grow rapidly, IT personnel are asked to manage more projects. They struggle to support more computers and people across distributed environments because of the disproportionate amount of time spent on managing backup tasks. These issues can be made worse by company expansion or acquisition when additional time and resources are needed to create, integrate and standardize new processes.

External forces are also adding to the backup-related challenges that organizations are facing today. Heightened awareness around business Continūity and regulatory compliance has caused businesses to increase spending on their data protection activities. In fact, companies spent an estimated $5.5 billion to comply with Sarbanes-Oxley alone in 2004.[1] While compliance and headline-grabbing disasters are often credited for increased focus on business Continūity, the truth remains that IT staffs must solve difficult, everyday issues if they are going to maintain optimum data availability (See Table 1).

Table 1: Today's Backup Problems

Problem	Cause
Shrinking backup windows	Proliferation of data-intensive, high-availability applications such as Web-based services (email, order processing) and other applications now required for around-the-clock availability.
Rapid data growth	Data Continūes to rapidly climb. It is reality, not a trend. These data-intensive applications are generally the culprits.
Lack of central control over distributed systems	IT staff managing off-site backups frequently must trust untrained co-workers to conduct backup activities such as swapping out and replacing tape media. Managing redundant hardware and software components in multiple offices also adds to the complexity.
Increasing rate of recovery failure	Business Continūity is jeopardized by viruses, accidental data deletion, and data corruption. As systems grow more complex, the inability to adequately recover an organization's business-critcal data increases.
Human error	Accidentally deleting an email or crashing a server from overfilling a disk drive is among the human errors that represent some 32 percent of application downtime and data loss.[2]

Traditional tape backup or even local disk-to-disk data protection is no match for these daunting challenges.

The problem with tape

For more than 50 years, businesses have utilized tape-based backup schemes. While proponents tout low media costs and portability, tape backup increases the amount of time and effort needed to administer backup and recovery tasks.

Slower backup and recovery speeds – Tape's linear recording format takes more time to write and restore backup data when compared to the random-access capability of disk. Tape restore times are further slowed by having to locate and mount the media to fi nd the needed information.

Manual intervention required to get data off-site – Without manual intervention, backup tapes remain in the tape drive, leaving the data vulnerable to physical events. While disk-to-disk backup (external drives, appliances) is attempting to solve this problem, it is only adequate for short periods of time. Ultimately, data must be moved off-site.

Inability to verify backup data – Most people do not turn on the option to "verify after write" on their tape drives because this adds 30-50 percent to the time required to complete the backup. No quick 24x7 access to data for recovery – If tapes are removed from the drives to be sent off-site, there is a significant delay in those tapes returning for recovery purposes.

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Incrementals Defined

Incremental backup methodologies used by tape-based software store all files that have changed since the last full or previous incremental backup. Incremental backup tasks are a much faster alternative to repeatedly conducting full backups because only the fi les that have changed since the most recent backup are backed up.

However, restores take longer. With incrementals, the most recent full backup is needed as well as every incremental backup made since the last full backup. For example, a full backup on Saturday is conducted with subsequent incrementals performed on Monday, Tuesday and Wednesday. If the server crashes Thursday morning, all four backup jobs (Saturday's full backup in addition to the incrementals on Monday, Tuesday and Wednesday) are required to get all that data back.

Now is the time for online backup

Mature technology, falling disk prices drive adoption

Market conditions and IT administrators' ever-growing weariness of tape backup have caused businesses to seriously consider the security, reliability, availability and scalability advantages of online backup. Technology maturation and other market conditions have also contributed to the traction online backup and recovery has made over the past few years. Adoption of disk-based storage rose by 114 percent from 1999 to 2002.[3] Other market factors contributing to this adoption include:

- Continūed price reductions in reliable and high-bandwidth network connections
- Large and easily scalable RAID storage systems lowering in price, increasing in reliability
- Acceptance of encryption security methods
- Regulations mandating off-site storage have superseded concerns about moving data to third-party data centers

Automation provides added security layer

From a security perspective, online backup uses industry-standard encryption algorithms that have made data transport over private or public networks no longer a concern for many distributed businesses. In fact, security is enhanced compared to manually managing removable tape media and engaging untrained staff in remote locations.

Online backup centralizes resources, which improves the security and reliability of backup tasks. For larger organizations, IT staffs are centralized at their data centers, while tape backup devices and unqualified personnel tasked with managing them are located in remote offices. Online backup enables remote installation and management of agents that initiate the backup process and push backed up data to a central repository.

Increased reliability drives better processes, lowers cost

A 2004 survey of IT executives revealed that more than 40 percent of respondents had been unable to recover data from tape in the past year because of media unreliability.[4] A year earlier, an end-user survey indicated that 52 percent of the respondents believed their current backup/recovery solutions left their data somewhat exposed.[5]

Efficient processes and improved resource centralization have made online backup a more reliable choice over tape backup. Delta-block scanning techniques, for example, minimize the volume of data traveling across the network. These techniques give businesses the equivalent of full backups in a smaller storage footprint because only new or changed data blocks are compressed, encrypted and then backed up and copied to hard disk.

Having less data to backup provides financial benefits that cascade throughout a company:

- Less data means disk drives fill up at a slower pace than with file-based full or incremental backup methods.
- IT personnel have the option to keep backups on disk for longer periods without incurring financial repercussions as quickly.
- Organizations can expect considerable cost savings by devoting less time to remote office backup administration, off-site storage and emergency retrieval costs and tape media management.
- Businesses do not have to upgrade their infrastructure to take advantage of online backup services.

Over time, an inefficient backup process may become the de facto operational method that dictates corporate policies for businesses. Instead, corporate policies should dictate IT procedures and processes.

Online backup enables administrators to set up policies that eliminate error-prone manual processes associated with tape-based backup such as swapping tapes for backups and having to retrieve them in a restore situation.

The dollars and sense of online backup

Online backup places significantly less data on storage arrays than the incremental methods used by tape-based software. Delta-block processing techniques within online backup are extremely fast and efficient. Similar to incrementals, only new or altered files are backed up. However, once an initial, full or "seed" backup has been sent to the electronic storage device, every subsequent backup is the equivalent of a full backup. To conduct a restore in this scenario, an administrator accesses the GUI to make a file or folder restore. No manual retrieval and assembly of full and incremental tapes are needed.

So far, this paper has discussed how online backup efficiently helps solve today's most pressing data availability and protection issues. But is there also a way to show how online backup saves money? The answer is a compelling yes.

Business Case

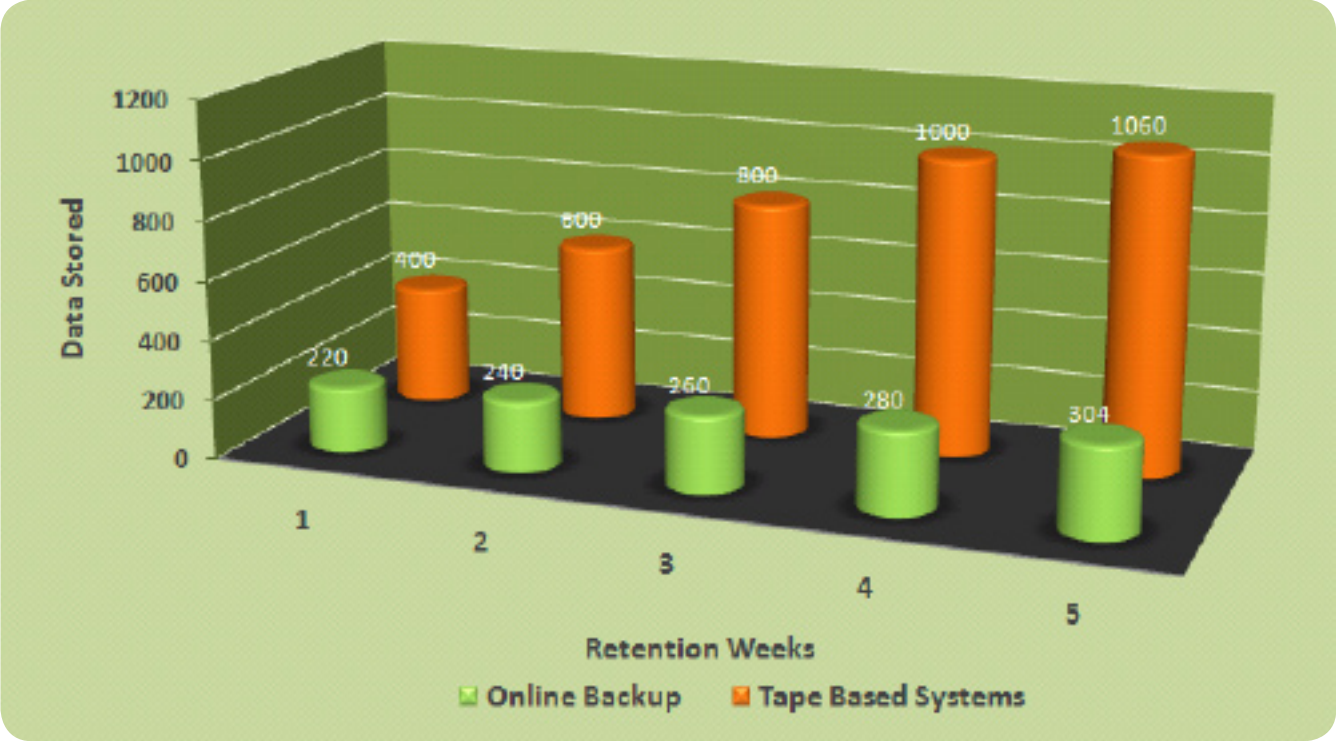
Key Assumptions:

- 250GB of original data
- 20% compression = 200GB of compressed data
- Retention Policy = One month of data stored online
  - o 6 daily backups online
  - o 4 weekly backups online
- Daily data change rate
  - o 2% average for Delta-block processing*
  - o 5% average for Incremental style backup (tape or disk

** Achievable with Continū Vault Delta™*

Every IT environment is different, and there are several variables in terms of hard and soft costs that make the case for online backup even more compelling. The complexity of a company's IT environment (e.g. distributed offices, heterogeneous servers, large databases) and its data retention policies also help determine the ROI from deploying online backup. This example focuses on the core difference in costs between the full/incremental approach used by traditional backup software and delta-block processing techniques, such as Continū Vault Delta.

The graphic below illustrates the difference in data created. Because each week a full backup is required using incrementals, the total after just five weeks is 1.06TB. Taking Continū Vault Delta as an example and using the same retention policy, only 304GB has been added over the same period.



If that difference in capacity is applied to a business looking to outsource its backup and recovery processes, the cost delta from just data growth alone is quite significant. Online backup prices can vary based on the amount of data stored, length of customer contract and other factors. Average pricing for tape-based sytems including offsite transportation and storage costs ($4/GB) and online backup ($8/GB) was used before multiplying those prices by the amount of data stored on the respective media:

1.06TB x $4/GB = $4,200 (Tape sytems with offsite storage, media, Administratin, etc)
304GB x $8/GB = $2128

Cost savings: ***$2,072*** *after just one month alone*

The cost savings from deploying online backup will only increase as data volumes grow. The $2,072 is only one month of cost savings, which can compound over the course of several months or years.

Still not convinced? Consider downtime and the loss of money and reputation it can bring. Analyst firm International Data Corp. (IDC) estimates that companies lose an average of $84,000 for every hour of downtime. However, your business does not have to be in the Fortune 1000 to feel the financial crunch from data loss. As pointed out earlier in this paper, many tapes are not readable come time to conduct a restore. What if a single, significant restore is needed from tape and your business is down for two hours? A company could expect to spend the following[6]:

Tape Recovery Steps	Online Recovery Steps
Declare emergency, ask tape storage provider for rush delivery of media	Access management console
Deliver media	Find file/directory and click restore
Mount and load media	Data accessed
Locate data on sequential-access media	
Data accessed	
Tapes rewound and unloaded	
Repeat process if more tapes are required for restore	
Total downtime: 2 hours	Total downtime: 5 minutes

Many businesses will need to restore data several times throughout the year. Even if your business does not experience substantial downtime, there is significant ROI from online backup. Automated, point-and-click restores when you need them will result in significant resource savings, and keep your business running smoothly. And, while more intangible, there is the peace of mind gained from working with a trusted online backup service provider and knowing that business-critical data is securely stored off-site and immediately available.

Factors for evaluating vendors

Before choosing an online technology provider, weigh the following technology and cost considerations and do not be shy about asking the tough questions. If they are to be your trusted partner, learn up-front their capabilities and cost structure.

What to look for:

- Automated and unattended backups with the ability to backup open files and open databases
- Ability to centrally manage the backup and restore process from one or more locations
- Control of files and directories to be backed up, with file-filtering capabilities
- Secure, Tier-1 plus facility
- Spontaneous file restores 24x7x365 via end user or central administrator control
- No special hardware requirements or changes to your network
- Ability to restore data either over the network or via a dedicated storage device
- Customizable data retention schedules
- Data encryption while data is stored on the storage array and during transmission over private or public networks
- Automatic restart and resume capabilities for handling a variety of network conditions
- Automatic notification of exceptions and problems encountered
- Detailed usage reporting capabilities

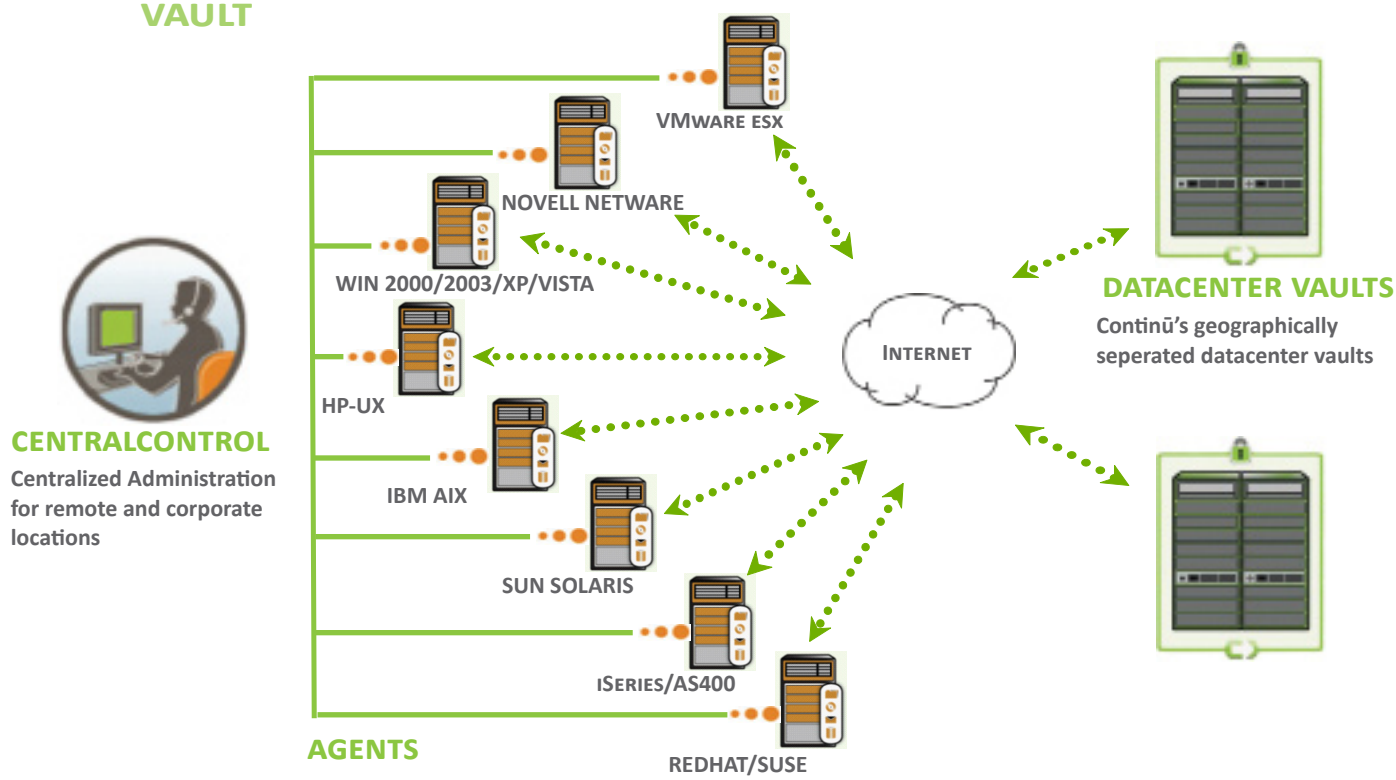
Be Prepared

In order to bid for your business, vendors will want to know:

- Your recovery point objectives and backup window
- Detailed information on server hardware and operating system: compile a list of servers to be backed up, including brand name, model number, nomenclature, and estimated amount of data storage
- Existing communication facilities connecting your locations: Internet, Frame Relay, ATM, etc
- Firewall management: How special ports on your firewall are opened to allow backup data to travel across
- your network?
- Your corporate data retention schedule
- How many people will be administering the backup/restore process and where they are located
- The location of an alternate processing facility in the event of a disaster

Continū VAULT

Platinum Architecture



Continū Vault CentralControl

The Continū Vault CentralControl management utility configures and then manages local and/or remote Agents. CentralControl defi nes the parameters for the Agents as to how, what, when, and where to back up. With CentralControl, users can easily manage hundreds of backups from computers across a LAN, WAN or public Internet from a single system. Restores can be initiated from either the Agent or CentralControl.

Continū Vault Agents

The Continū Vault Agent software resides on the server(s) that are being protected. The Agent initiates backups based on a set of parameters related to each backup task, which can be a single or multiple files, directories or a full system.

Continū Vault Delta delta-block processing technology

Continū Vault Delta technology provides intelligent extraction and transfer of backup data to a remote storage device. It reduces the amount of data being backed up. Placing far less data in the storage devices means less disk space to be purchased, faster backup times and lower management costs. Leveraging Delta, the Agent scans the server for only new or altered files since the previous backup. Only new or changed data blocks within those files are compressed and encrypted then transmitted to the Director.

By processing only new or changed data blocks, combined with compression, the amount of data being backed up can be reduced by up to 98 percent over traditional file-based backup methods. For example, if the server has 100GB of stored data, then the amount of actual new or changed block-level data in new or changed files is typically 2GB or less. If that data were transmitted over a network with available bandwidth of 1.5MB/second, then the backup window would be less than two hours.

Changes are detected in the blocks by comparing the current block with the previous block in the same position as the image representation from the previous backup. Changed blocks are addressed, compressed, optionally encrypted, and transmitted in order from the first through to the last block in the file. Continū Vault Delta is effective for databases and file systems with hundreds of thousands of files.

Conclusion

IT staffs face more challenges than ever before to keep costs in check as they service employees and customers who are increasingly dependent on data access and intolerant of downtime. A convergence of regulatory and economic drivers, as well as technical innovations has led thousands of businesses to implement online backup.

Continū Vault online backup provides businesses with the solution that best fits their needs. By controlling the growth of data being backed up, Continū Vault customers quickly realize significant cost savings. They are also better able to support the backup and restores of remote offices and meet applicable regulatory requirements.

The IT functions in your business are complicated enough. For the majority of businesses, adding data protection expertise as a core competency simply does not make fiscal sense. Turning that function over to the trusted experts in data protection—Continū Vault—will save you time, money and aggravation. Continū Vault has the right online backup solution for companies like yours that are serious about protecting their business-critical data.

? For more information on Continū solutions, visit www.Continū.net or call 541-607-3789.

End Notes

1 AMR Research

2 Merrill Lynch/McKinsey report, 2002

3 "How Much Information?"study, University of California, Berkeley, 2003

4 Yankee Group survey, March 2004

5 Enterprise Storage Group, May 2003

6 Totals based on average industry pricing and analyst estimates.

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