Buyer's Guide for Data Protection

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How complete is your data protection solution?

Evaluate your storage options.

To be competitive, businesses must address an ever-expanding set of data storage demands. Enterprises are becoming increasingly heterogeneous, incorporating a wide variety of platforms and environments. IT staffs can be stretched thin by the data demands of local and mobile users, customers, partners and vendors—all of whom want fast access to the data they need and do not want to hunt through archived tapes or wait while someone in your organization does it for them.

In addition, users and administrators alike are seeking ways to automate the storage process so that they can focus on more strategic issues. Finally, organizations simply must be prepared at all times in the event of a catastrophic data-loss event. Without a solid data recovery plan in place, an organization can expose itself to significant risk.

More than backup and recovery
Some data storage applications are labeled "enterprise storage management" products but are limited primarily to automating backup and recovery routines. While it's true that

backup and recovery are a significant part of any storage solution, the business of today needs more. Different approaches to enterprise data protection deliver significant differences in total cost of ownership, particularly for midrange to large computing environments.

Intelligent data protection software products can help deliver substantial savings and productivity improvements over less advanced or less comprehensive offerings. How substantial is "substantial"? While the benefit experienced by customers may vary, a recent Tivoli® software case study showed that one customer could achieve up to a fivefold reduction in tape hardware requirements by exploiting the right data protection system. The same study showed that similar reductions could be achieved with respect to the network bandwidth required for transferring backup data.

Reductions in tape hardware and network bandwidth requirements are just the beginning. An intelligent data protection system delivers other key advantages including potential

savings in administrator time, speed of data recovery, and reliability and integrity of backups. As data protection needs grow more complex, the benefits of a flexible, scalable architecture become even more important. Such a solution can help minimize operating costs while improving the ability of IT departments to respond quickly to business demands.

Growing enterprises also need to eliminate the necessity for multiple products and instead have one comprehensive product that offers backup, managed archive, mobile backup support, space management, disaster recovery planning, programmable application program interfaces (APIs) and 24x365 application protection. Having one product offer all these functions can create cost savings not only in purchasing but also in management.

What to look for

What does an intelligent data protection solution look like? The answer differs slightly based on the needs of each organization. Generally speaking,

you need a strategic data protection solution about which you can answer "yes" to the following key questions:

- *Is it a complete solution that offers backup, recovery, data archiving and retrieval, disaster recovery planning and hierarchical storage management in one package?*
- *Does it have the flexibility to cover your entire enterprise, from the laptop to the mainframe, across multiple platforms and environments?*
- *Is it intelligent enough to only back up new and changed files at either a file, byte or block level?*
- *Can it move files from one storage device to another?*
- *Does it use tape space efficiently by reclaiming wasted space caused by expiring files, and not waiting until all the data on the tape expires?*
- *Can it meet your business requirements down to the file level through granular policy management?*
- *Can you manage storage from any platform in the enterprise through a supported Web-based interface?*

IBM® Tivoli Storage Manager is the only data protection solution on the market known to fulfill all these criteria.

The comprehensive solution
Tivoli Storage Manager offers backup, recovery, data archiving and retrieval, disaster recovery planning, hierarchical storage management and an open API in a single, integrated solution from laptop to mainframe. These functions work together to provide a virtually seamless storage solution without expensive upgrades or add-ons and without worries about the interoperability of third-party modules to provide these functions. From the beginning Tivoli Storage Manager provides the functionality you need to maximize the business value of your information. And it can be controlled from a central console.

Flexibility for your enterprise
The enterprise systems of today are more diverse than ever, with multiple platforms and environments interconnected to meet the needs of your organization and those of your customers. Tivoli Storage Manager

client software supports 17 different operating systems, and the server software runs on eight different operating systems. Platforms vary from laptops to mainframes, and servers can be combined with virtually any client—cross-platform. Networks supported include dial-up, the Internet, wide area networks (WANs), local area networks (LANs) and storage area networks (SANs). Supported platforms include:

- *IBM AIX®*
- *HP-UX*
- *Microsoft® Windows,® Windows XP, Windows ME, Windows 2000, Windows NT,® Windows 98*
- *Sun™ Solaris™*
- *OS/390® with z/OS®*
- *VM VM/ESA*
- *OS/400®*
- *Linux®/x86*
- *Linux/390*
- *Macintosh*
- *Novell NetWare*
- *SGI IRIX UNIX®*
- *Tru64 UNIX, Version 5.1 or 5.1A*
- *NUMA-Q PTX*

Progressive backup/adaptive subfile backup

Tivoli Storage Manager uses a progressive incremental backup strategy. Progressive incremental backup does away with the outdated paradigm of full-plus-incremental/differential backups. Instead, the progressive incremental method only backs up new or changed files. The relational database that empowers the Tivoli Storage Manager server makes this possible by tracking each file. Similarly, when you are performing a restore, only the version of the file you want to restore is restored—there is no need to restore the full version and then the incrementals/differentials.

This intelligent strategy can mean cost savings to you, because less data is transferred across the network, saved on the tapes and managed by administrators. Also, because only the data needed is backed up or restored, precious time is saved—making it easier to shrink backup windows and enabling faster restores.

Mobile backup capability

Tivoli Storage Manager includes the capability for backing up laptops or remote desktops that are doing their backups over a WAN or telephone line. Adaptive subfile differencing allows just the portion of the file that has changed to be backed up. This function, combined with progressive incremental backup, protects the data of your remote users while sending the smallest amount of data possible across their low-bandwidth connection. While giving remote users fast backups to the Tivoli Storage Manager server and easy restores should they lose a file or volume, Tivoli Storage Manager also provides the ability to encrypt data that is being sent to Tivoli Storage Manager servers.

Managed archive

Tivoli Storage Manager goes beyond just data backups to include managed archives. Archive allows you to retain a copy of a file for a specified period of time. Optionally, archive can automatically erase the original copy of the item archived from its originating

location. Retrieving the archived file is just a click away through the Web client interface.

An example of a file that would be perfect for archive would be financial reporting data (weekly, monthly, quarterly or annual data) that needs to be retained for future trending/requirements/audit but does not need to consume valuable disk space where live data should reside. So it is archived for quick and easy retrieval by using Tivoli Storage Manager. Virtually anything can be archived—and it is policy-managed and tracked by Tivoli Storage Manager.

Storage pool
By default Tivoli Storage Manager clients back up to a disk storage pool on the Tivoli Storage Manager server. This has multiple positive effects. First, the number of clients backing up at the same time is not limited to the number of tape drives available. Other solutions have multiple clients backing up at the same time to one tape, resulting in fragments of multiple clients' data being woven together in a complicated pattern. This can make

for a nightmare when doing a restore because a client's data has to be picked out from among the fragments. By going to disk first, Tivoli Storage Manager also can strategically organize each user's data together, so that when it is written to tape it resides coherently and in an organized manner that facilitates fast restores.

This organization can be taken a step further to help businesses meet their service-level agreements (SLAs), with collocation. Generally used in situations where the client requires a fully optimized recovery time, collocation helps minimize the number of tapes needed during a restore by storing the files belonging to a specific client on a minimal number of sequential access volumes.

Collocation also makes it possible to avoid conflicts in the restore process, such as when a single tape volume would have to be mounted to restore data for two different clients. When the collocation feature is used, each client's restore can be completed simultaneously and independently.

Tape reclamation

With thousands of files marked for expiration at various times, how do you keep track of and maximize the use of your data storage infrastructure—in other words, make the best use of your tape media? The answer lies in an automated tape reclamation feature offered by Tivoli Storage Manager.

Often a particular tape volume will contain files that expire on different dates. When these files reach their expiration date, "virtual" empty spaces begin to appear on the tape volume. This fragmentation wastes space on the tapes and slows the restore process because of the time required to skip over empty spaces. Because tapes are sequential media—that is,

they can be written only from beginning to end—it is not possible to rewrite new data into the spaces occupied by expired files.

Tivoli Storage Manager has an innovative tape reclamation feature used to free entire tape (or optical) volumes in sequential storage pools. As individual files get marked for expiration, the amount of space that can be reclaimed on a volume increases over time. After this available space reaches a specified threshold, Tivoli Storage Manager automatically initiates a process to reclaim the volume. There is no need to wait until the all the data on the tape expires to reuse the space.

Granular policy management
Every business has different needs, and the ability to implement granular policy management lets you manage your storage according to those needs. It allows you to automatically set backup policies according to your predefined business needs and define them at any level of the hierarchy: single file, directory, file system, volume, client computer or group of clients. Policies can be set as simple defaults, or highly tuned and customized to help keep costs low and still meet specific SLAs.

A policy-based approach is the key to effective data protection. After the storage administrator has invested time in identifying and planning for business needs, Tivoli Storage Manager can provide policy-setting capabilities that let the administrator exactly match the requirements. After policies are defined, the data can be managed automatically.

Furthermore, if your business needs change, then a simple central update can be made to the Tivoli Storage Manager policies, helping facilitate a fast change in how storage routines are managed. Tivoli Storage Manager provides a set of policy components that are defined in a hierarchy; this hierarchy lets administrators provide logical groupings of data at virtually any level of granularity. The hierarchy also makes it possible to provide separately managed services for different data types, such as backup, archive and hierarchical storage management.

The Tivoli policy-based approach to data protection can help deliver additional value in several specific ways:

- *File-level management capabilities let administrators finely tune data storage needs against business requirements.*
- *The cost of storage infrastructure can be minimized through the use of accurate policy definitions, helping avoid the waste of resources common to a "one size fits all" approach.*
- *Stored data can be placed on the storage devices that exactly meet business needs. For example, critical small files can be targeted for storage on online disk devices, thereby helping enable fast recovery.*
- *Automation can help greatly reduce the cost of administration.*
- *Change controls are simplified, which can help improve business availability.*

Open API

The open API feature of Tivoli Storage Manager facilitates the ability to further integrate Tivoli Storage Manager into your environment. The fully documented APIs let you store and manage virtually any type of object within the Tivoli Storage Manager server. The APIs are used by many vendors to create products that seamlessly integrate into Tivoli Storage Manager, and they can be certified through the Tivoli Ready™ program. You can learn more about the Tivoli Storage Manager open API at http://www.tivoli.com/products/documents/updates/storage_mgr_features.html

Web-based interface

The Tivoli Storage Manager Web-based interface provides enterprise console functions that enable the administrator to manage Tivoli Storage Manager servers and clients from any platform in the enterprise through a supported Web browser. This allows the administrator to navigate, log on and perform functions on any Tivoli Storage Manager server or backup-archive client from virtually any location.

Disaster recovery

The disaster recovery function helps maintain business continuance by managing offsite server database backup and storage pool backup volumes.

This capability also facilitates and automates the establishment of thorough data disaster-recovery plans, tracks and reports systems destroyed in a disaster, automates vital recovery steps and prioritizes restores.

That way, should a disaster strike, your business can be operational quickly, helping minimize the impact on your business and your customers.

Add-on modules

Specific systems often require specialized support. With modules for mail, databases, ERP, application servers and hardware, IBM Tivoli Storage Manager can be expanded to support the specific needs and systems of almost any enterprise business. These modules can help you get the most out of your technology investment.

Make the right choice

Choosing a data protection solution is not the easy process it was when simple backup tools could be used to efficiently manage the data stored on standalone machines. Enterprises today must deal with enormous growth in the amount of data being stored, as well as complex new environments and an ever-increasing range of storage devices. The unique architecture of Tivoli Storage Manager is designed to meet these new challenges.

Unlike many enterprise storage management products that are little more than enhanced backup and recovery applications, Tivoli Storage Manager is specifically designed to efficiently manage storage resources in an enterprise computing environment. Its flexible architecture provides an integrated, intelligent storage management solution for backup and recovery, disaster recovery, archiving and other vital storage tasks. This architecture can deliver significant cost savings and improved restore performance, particularly as data protection needs grow more complex.

Therefore, Tivoli Storage Manager should be thoroughly evaluated by any IT organization concerned with minimizing its total cost of ownership for data protection solutions.

To learn more
For information on IBM Tivoli Storage Manager and integrated solutions from IBM, contact your IBM sales representative or visit **www.tivoli.com**/storage

Tivoli software from IBM
An integral part of the comprehensive IBM e-business infrastructure solution, Tivoli technology management software helps traditional enterprises, emerging e-businesses and Internet businesses worldwide maximize their existing and future technology investments. Backed by world-class IBM services, support and research, Tivoli software provides a seamlessly integrated and flexible e-business infrastructure management solution that uses robust security to connect employees, business partners and customers.

IBM software integrated solutions
IBM Tivoli Storage Manager supports a wealth of other offerings from IBM software. IBM software solutions can give you the power to achieve your priority business and IT goals.

- *DB2^c software helps you leverage information with solutions for data enablement, data management and data distribution.*
- *Lotus® software helps your staff be productive with solutions for authoring, managing, communicating and sharing knowledge.*
- *Tivoli software helps you manage the technology that runs your e-business infrastructure.*
- *WebSphere® software helps you extend your existing business-critical processes to the Web.*

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