



Tivoli software

IBM Tivoli Storage Manager

Highlights

- **Data backup and restore**
- **Manage data archive and retrieve**
- **Protection for 24x365 business-critical applications**

Attributes setting Tivoli Storage Manager apart:

- *Centralized, comprehensive management*
- *Broad hardware support*
- *Intelligent data movement*
- *Intelligent data storage*
- *Policy-based automation*

IBM Tivoli Storage Manager helps protect your organization's data from hardware failures and other errors by storing backup and archive copies of data on offline storage. Scalable to protect hundreds of computers running a dozen operating systems, its intelligent data movement, storage techniques and automation can help reduce administration costs.

Data backup and restore

Backups create a copy of your active online data stored on offline storage. Should an online storage device fail, a data error occur or someone accidentally delete a file, the offline copy of that data can be copied (restored) to online storage. Tivoli Storage Manager uses multiple techniques to make data backups

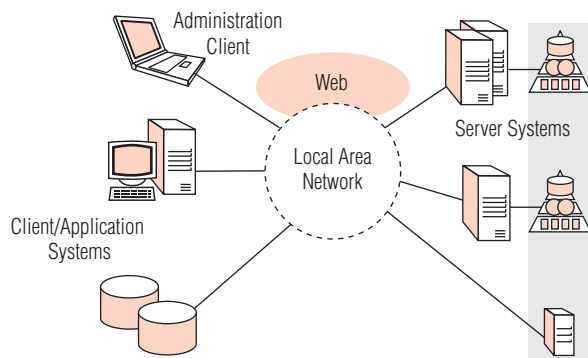
and restores as fast, flexible and low-impact as possible.

Manage data archive and retrieve

Data archives are copies of active or inactive data from online storage copied to offline storage. Archives are used to keep point-in-time copies of important data for regulatory or bookkeeping requirements and to move inactive data from expensive online storage to less-expensive offline storage. Managed data archives implemented by Tivoli Storage Manager are managed for a defined lifetime through the policy-automation engine, just like backed-up data. The Tivoli Storage Manager client can help quickly and easily retrieve the archived data, helping to effectively extend your data storage capabilities without the need for more expensive online storage.

Protection for 24x365 business-critical applications

Some of today's most business-critical application programs must remain on and active continuously. Many of these applications have built-in



Powerful data protection with ease of administration

capabilities to control external data-protection applications and allow them to continue operating without interruption. Tivoli Storage Manager offers separate add-on modules to interface with these applications, including:

- *IBM Tivoli Storage Manager for Mail*
- *IBM Tivoli Storage Manager for Databases*
- *IBM Tivoli Storage Manager for Enterprise Resource Planning (ERP)*
- *IBM Tivoli Storage Manager for Application Servers*
- *IBM Tivoli Storage Manager for Hardware*

Tivoli Storage Manager has many unique attributes that make it more efficient, more scalable and more automatic such as the following:

Centralized, comprehensive management

Tivoli Storage Manager is a client-server application. One server can handle hundreds of clients. The administration control of Tivoli Storage Manager is extremely flexible and enables management by a hierarchy

of administrators, each designated with different management authority levels and specific “domains” defining user groups or applications. Multiple administrators can manage Tivoli Storage Manager simultaneously. Multiple servers can be controlled from any server or through a Web interface from any computer on the network. Data restore requests can be initiated and controlled from the Tivoli Storage Manager client, greatly reducing workload for the administrator. With these methods and a single integrated application that includes multiple forms of data protection, Tivoli Storage Manager can greatly simplify the task of data protection for IT administrators.

Broad hardware support

Platforms—Tivoli Storage Manager client software supports more than a dozen different operating systems. The server software supports eight different operating systems. Platforms vary from laptops to mainframes, and servers can be combined with virtually any client—cross-platform—Solaris™ with Windows®, AIX® with MacOS and so forth.

Networks—supports a variety of networks connecting clients, servers and storage—remote and mobile users, dial-up lines, the Internet and wide area networks (WAN) can be used just as transparently as local area networks (LANs) for locally connected computers

Offline storage devices—also supports more than 100 offline storage devices, including optical disk and tape libraries up to two drives and 40 slots, from more than a dozen vendors

Intelligent data movement

Tivoli Storage Manager uses multiple techniques to reduce data transfer sizes to the smallest amount possible as well as reduce the total time required for both data backups and data restores.

Disk to disk data movements—Tivoli Storage Manager has been built around the concept of offline “storage pools” that use disk storage in addition to optical and tape storage devices. Disk-to-disk data transfers save considerable time for every individual client, adding up to greatly reduced backup windows for

entire organizations. After an administrator-specified length of time (hours, days, weeks) the data in the disk storage pool automatically migrates to other less-expensive, offline storage devices; such as optical or tape. Because most requests for data restores happen within a few hours or days of a backup, the disk storage pool also provides much faster disk-to-disk data restores.

Multiple parallel session data backups and restores—The disk storage pool also acts as a central repository and staging area for simultaneous parallel collection of data from various tapes for restore to a single client. This process makes data restores many times faster.

Progressive, incremental backups—For bandwidth-limited network connections between clients and server, progressive incremental backups minimize the total amount of data that must travel over the network. Instead of moving every file in a directory, only the files that have changed since the last backup are copied. When a data restore is

required Tivoli Storage Manager only transfers the necessary files, not the full directory backup. This method reduces the data movement load on both networks and servers. For organizations with large daily data backup requirements, this technique can make the difference between having data protected or not.

Adaptive subfile differencing—For remote and mobile users with limited bandwidth connections to a Tivoli Storage Manager server over a dial-up phone line, the Internet or WANs, adaptive subfile differencing can make regular backups a faster, lower-impact experience by transferring only the individual bytes of data files that changed since their last backup.

Checkpoint restart—For those same remote and mobile workers, nothing is more frustrating than losing the network connection and having to start a data transfer all over again. Tivoli Storage Manager knows where the data movement was disconnected so when a connection is restored the backup or data restore will resume from that point.

Data encryption—If data security over any type of network connection between a client and a Tivoli Storage Manager server is a concern, Tivoli Storage Manager can encrypt the data.

Cyclical redundancy check (CRC)—As a further protection of data integrity, Tivoli Storage Manager performs an automatic CRC on data movements.

Non-disruptive online image backup and restore—For those data protection instances where speed is more important than bandwidth utilization, Tivoli Storage Manager incorporates complete image backups and restores that can transfer entire disk volumes, directories or files with no questions asked. For LAN- or SAN-connected clients with plenty of bandwidth to the Tivoli Storage Manager server and disk storage pool, this process can be the fastest method of data protection.

Intelligent data storage

Relational database—At the heart of the Tivoli Storage Manager server is an integrated, relational database.

Borrowing the methods of “systems managed storage” from IBM mainframes, Tivoli Storage Manager performs lifetime management for data that has been backed up or archived. Down to the file-level, this data is cataloged, assigned expiration and migration attributes and linked to the original data files they were spawned from and their predecessors and siblings on offline storage.

The power of the Tivoli Storage Manager relational database is apparent with progressive, incremental and adaptive subfile differencing backups. Whenever a data file is first backed up it is catalogued in the database. When that file is backed up a second time only the new or changed data of that file must be backed up. The database saves transfer time and network bandwidth on both backups and restores and also provides for a nearly unlimited number of file versions, each taking up few additional offline storage resources. A user can define how many versions of any file should be kept and for how long before they are automatically expired and deleted. Tivoli Storage Manager essentially

provides a central “undo” capability for any data from any application

Collocation—The database keeps data grouped in logical sets on individual tapes to improve the performance of simultaneous data restores for multiple clients.

Tape reclamation—The database also automatically deletes expired files on tapes and consolidates the remaining unexpired files to other tape volumes. The resulting empty tapes are then reused for new data. For companies with large amounts of data with frequent expirations, this process incurs substantial annual savings on tape media.

Policy-based automation

Along with the relational database inside of Tivoli Storage Manager is an extremely granular policy engine that automates capabilities. Like the database, this policy engine can be configured down to the individual file level. Policies can be set as simple defaults, or highly tuned and customized to help keep costs low and still meet specific service-level agreements. The end result is a “set-it

and forget-it” experience making Tivoli Storage Manager highly suited for “lights-off” implementations. Once configured Tivoli Storage Manager can literally manage the data protection for thousands of computers, with minimal administrator assistance.

The benefits

The attributes of Tivoli Storage Manager combine with the broad data protection provided in a single integrated application—backup/restore, archive/retrieve, hierarchical storage management (HSM), business-critical application protection and disaster-preparation planning and recovery. Combining these attributes can help provide a fast return on investment by greatly reducing:

- *The amount of offline storage space required for any given amount of data*
- *The network bandwidth required for data movements*
- *The time required for data movements*
- *The CPU impact on application servers*
- *The IT manpower resources required to protect virtually any given amount of offline storage*

Return on investment

Tivoli Storage Manager can help provide a fast payback by reducing the amount of offline storage space required, the network bandwidth required for data movements, the CPU impact on application servers and the IT resources required to protect virtually any given amount of offline storage.

Tivoli Storage Manager family of products

IBM Tivoli Storage Manager is available in two packages and provides the following functionality:

Tivoli Storage Manager

- *Data backup and restore*
- *Managed data archive and retrieve*
- *Integration with optional 24x365 application protection modules*
- *Small tape library management*

Tivoli Storage Manager Enterprise Edition

- *Data backup and restore*
- *Managed data archive and retrieve*
- *HSM*
- *Disaster-preparation planning and recovery*
- *Integration with optional 24x365 critical application protection modules*
- *NDMP control for NetApps NAS Filers*
- *Large tape library support*
- *LAN-free data movements over a SAN*
- *Expanded administration to handle thousands of client computers*

To learn more

For information on IBM Tivoli Storage Manager and integrated solutions from IBM, contact your IBM sales representative or visit info.tivoli.com/storageforsuccess

IBM Tivoli Storage Manager supported operating systems and file systems



Tivoli Storage Manager, Version 5.1 servers

- IBM® AIX® 4.3.3 or later, or AIX 5.1 or later
- HP-UX 11.0 or 11.11
- Windows® Windows XP Professional, 2000 Server, 2000 DataCenter, Windows NT 4.0 SP5, SP6a
- Sun Solaris 2.6 (32-bit), or Solaris 7 or 8 (64-bit)
- OS/400® PASE, Version 5, Release 1
- OS/390® with z/OS, Version 1, Release 1 or later, or Version2, Release 8 or later

Tivoli Storage Manager, Version 4.2 stabilized servers

(will work with Version 5.1 clients):

- VM VM/ESA Version2, Release 4; z/VM Version 3, Release 1; or z/VM Version 4, Release 1 or 2

Tivoli Storage Manager, Version 5.1 clients:

- AIX™ 4.3.3 or AIX 5L for POWER, Version 5.1
- HP/UX with 32-bit and 11.0 and 11I with 64-bit
- Linux/x86 7 (2.4 kernel): Red Hat 7.1 or 7.2; SuSe 7.1,7.2 or 7.3, TurboLinux 7.0
- Linux/390 7 (2.4 kernel), SuSe 7.0
- Macintosh 9.1, X(10).x
- Novell NetWare 5.1, 6
- S/390, Version 2, Release 9 or 10 with SMP/E; z/OS Version 1, Release 1; or z/OS, Version 1, Release 2
- OS/400 5.1
- SGI IRIX UNIX, Release 6.5 with EFS or XFS File Systems
- Sun Solaris 2.6, 7, 8 (32-bit) or Solaris 7, 8 (64-bit)
- Tru64 UNIX, Version 5.1 or 5.1A
- Windows XP, ME; Windows 2000 Professional, Server, Advanced Server and DataCenter; Windows NT 4.0 SP5, SP6a

Tivoli Storage Manager, Version 4.2 stabilized clients

(will work with Version 5.1 servers):

- NUMA-Q PTX
- Linux 6 (2.2 kernel)
- Mac 8, 9.0
- NetWare 4.20
- OS/390, Version 2, Release 8
- Windows 98

Tivoli Storage Manager, Version 5.1 HSM clients:

- AIX 4.3.3 or AIX 5L for POWER, Version 5.1
- Sun Solaris 2.6, 7 (32-bit) or Solaris 8 (64-bit)

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The IBM home page on the Internet can be found at **ibm.com**

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