

# Lifecycle Storage Automation from Novell® Storage Manager 2.5

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# The Network Growth Explosion

**Understaffed corporate IT departments performing storage management tasks when they have some free time is a management method that simply cannot keep pace with today's network storage management requirements.**

Computer network data storage continues to grow at an unprecedented, exponential rate. IDC projects that the annual capacity growth rate for unstructured data in traditional enterprises is expected to grow at 62.2 percent compared to a 54.4 percent growth rate in 2006, according to IDC's Enterprise Disk Storage Consumption Model.<sup>1</sup> For this paper, "unstructured data" refers to file-based, rather than database, data.<sup>2</sup>

because many data centers will be unable to provide the necessary power, space or cooling. As a result, companies need to be more effective and efficient in the way they provide storage resources."<sup>4</sup>

## The Need for Storage Management

Exponential storage growth and the factors that contribute to it have magnified the need for file storage management. Understaffed corporate IT departments performing storage management tasks when they have some free time is a management method that simply cannot keep pace with today's network storage management requirements. Yet, some companies continue to address storage needs with no real "management" at all.

Unmanaged network storage is like an unmanaged budget. Imagine what it would be like if you did not know:

- *How much you had in your bank account*
- *The amount of money being deposited into your account*
- *How much money you were spending each month*
- *Whom you were paying*

Putting this in perspective to network storage, it is all too common for enterprises to be unaware of:

- *The rate at which storage disk space is being filled*
- *How much disk space is already filled*
- *How much disk space is remaining in server volumes*
- *Which individuals and groups are storing the most files*
- *Changes in disk storage usage over time*

No matter what industry you work in, chances are you're affected in some way by this storage capacity growth. A big factor in that growth is industry regulations that require, among other things, the long-term storage of company data. Many people are somewhat familiar with regulations such as the Sarbanes-Oxley Act (SOX) and the Health Insurance Portability and Accountability Act (HIPAA), but similar regulations exist for over 10,000 other industries.

But compliance regulations are only one factor in the explosion of data storage. Another contributor to storage growth is pervasive computing where PDAs, MP3 players, cellular phones and other devices can record, access and store data, and then allow users to easily move content to the network. In a "keep-everything culture,"<sup>3</sup> network storage areas are being affected dramatically by the storage of photos, videos, MP3s and other types of personal files.

And then there is storage hardware itself. In an effort to comply with industry regulations, many organizations are simply adding more lower-cost storage hardware and saving everything. But as IDC pointed out in a 2007 report, "Simply continuing to add more storage through traditional methods is unsustainable

- <sup>1</sup> "IDC's Enterprise Disk Storage Consumption Model: Analytics and Content Depots Provide A New Perspective on the Future of Storage Solutions," Aug. 2008, Doc #214066 Industry Development and Models
- <sup>2</sup> Examples of file-based unstructured data might include word-processing text documents, spreadsheets, presentation files, JPEG and GIF images, music and video files, etc.
- <sup>3</sup> "The Toxic Terabyte", Paul Coles, Tony Cox, Chris Mackey and Simon Richardson, IBM Corporation 2006
- <sup>4</sup> "Next-Generation Storage: The Lean, Green Compression Machine" December 2007. Adapted from Worldwide Server Power and Cooling Expense 2006.2010 Forecast by Jed Scaramella, IDC #203598

In most enterprises, the few storage management tasks that are addressed are done so manually. This requires IT personnel to individually assign, maintain, archive and clean up all the storage used by every employee in the company—an expensive, ongoing cost. When IT staffs have many responsibilities, storage tasks, such as data archiving and disposition, tend to take lower priority.

Manual processes are also more subject to human error. With potential fines levied for inadequate data retention, integrity and security, organizations cannot afford to jeopardize compliance with the risk of human error.

Automating storage management is the answer. Automation not only assures that file-based storage is being assigned, cleaned up and archived at appropriate times, but that corporate storage policies, along with applicable industry regulations pertaining to this storage, are being enforced.

## Introducing Novell® Storage Manager

Novell Storage Manager introduces management and structure to an unmanaged and unstructured network storage system and, in the process, automates the full lifecycle management of user and group storage. Leveraging network directory services (commonly referred to as “the directory”), Novell Storage Manager automates a comprehensive set of storage management tasks based on events, identities and policies that reside in the directory. In the process, Storage Manager can assure storage compliance while saving time and money.

Novell Storage Manager delivers secure, automated and flexible management for personal and group storage, and saves a lot of time.

You define through policy (and just once in your network directory) how storage should be handled for a particular user identity, role

or group. After that, the rest is automatic. Storage is allocated, shared, moved, resized, deleted and archived automatically according to the policies you predefined. Novell Storage Manager delivers an identity-driven solution for storage management that makes an immediate difference: it cuts costs, saves time and ensures regulatory compliance.

## A Closer Look

Chances are your enterprise has established written policies pertaining to network storage. These policies might specify the size of a user’s home folder based on the user’s role in the organization. They might also specify which types of files can and cannot be stored in the home folder, and on which volume the home folder is to reside.

Additionally, industry regulations may contribute to the enterprise policies with specifications for network access areas, archiving and disposition.

Novell Storage Manager lets you define your storage policies in the directory (either Novell eDirectory™ or Microsoft\* Active Directory\*). Once in the directory, the policies dictate the actions to be taken when certain directory events take place.

A directory event is anything that changes the status of a user or group. Examples are the creation of a new user or group, the change in role of a user, the transfer of a user from one Organizational Unit (OU) or group to another, elimination of the user or group, etc.

In a Novell Storage Manager deployment “Event Monitors” are deployed on servers to capture directory events as they take place. Event Monitors can be deployed on native Novell NetWare® servers and Novell Open Enterprise Server running on either SUSE® Linux Enterprise Server or virtualized NetWare. And now with Novell Storage Manager 2.5, you can deploy Event Monitors on servers running SUSE Linux Enterprise Server natively.

**Novell Storage Manager will save you time and money by:**

- Automating thousands of hours of manual work and doing so in a consistent manner
- Alleviating personnel from doing mundane, error-prone storage jobs
- Assuring that your users will have the storage resources they need—whenever they need them
- Providing the confidence that storage is secure and available should an organization need to prove compliance with government or industry regulations

With network storage growing at an exponential rate and projected to continue to do so, an automated, identity-driven, policy-based user and collaborative storage solution is needed more than ever.

**Novell Storage Manager is the only solution on the market today that provides automated user and collaborative storage management through identity in network directory services.**

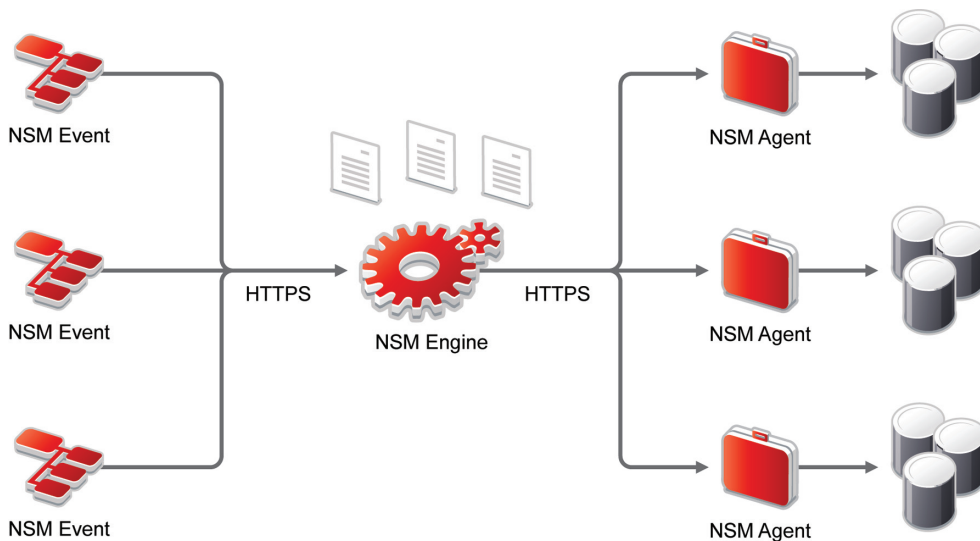
Directory events are sent from the Event Monitors to the Novell Storage Manager "Engine." If a policy stipulates that an action be taken based on the directory event, the Engine initiates the action. The Novell Storage Manager Engine resides on a NetWare server or a Novell Open Enterprise Server running virtualized NetWare.

The Engine sends directives to the Novell Storage Manager "Agents" (known as "Sentinels" in previous versions of the product) to perform the action dictated by the policy. Agents can reside on NetWare servers or Novell Open Enterprise Server 2 servers running either SUSE Linux Enterprise Server or virtualized NetWare. Agents can perform actions on a variety of server volume types including traditional NetWare, NSS, ext3 and Reiser.

For a simple example of how all the components above interact, suppose that a new employee is hired to work in the human resources (HR) department of a large insurance firm. The firm's IT department sets up the new user account and makes the new user a member of the HR group.

Upon creation of the account, the Event Monitor sees that the action has taken place and notifies the Engine. The Engine looks to the policies that reside in the directory and sees that, according to one policy, each HR department employee is to be allocated a 200 MB home directory on a Novell Open Enterprise Server volume with a subfolder that includes some papers for new employees to print, read and sign. Another policy states that each member of the HR group have a 100 MB subfolder created in a HR group collaboration folder, where the users have read/write rights to personal folders, but read-only rights to the other member subfolders.

The Engine sends the directive to the Agent for Novell Open Enterprise Server where the HR home folders reside. The Engine creates a new 200 MB home folder for the user and the Agent provisions the subfolder with the papers for the new employee to read, print and sign. On the server where the group folder resides, the Engine adds a new 100 MB subfolder for the user and grants read-only rights for the user to the other subfolders in the group folder.



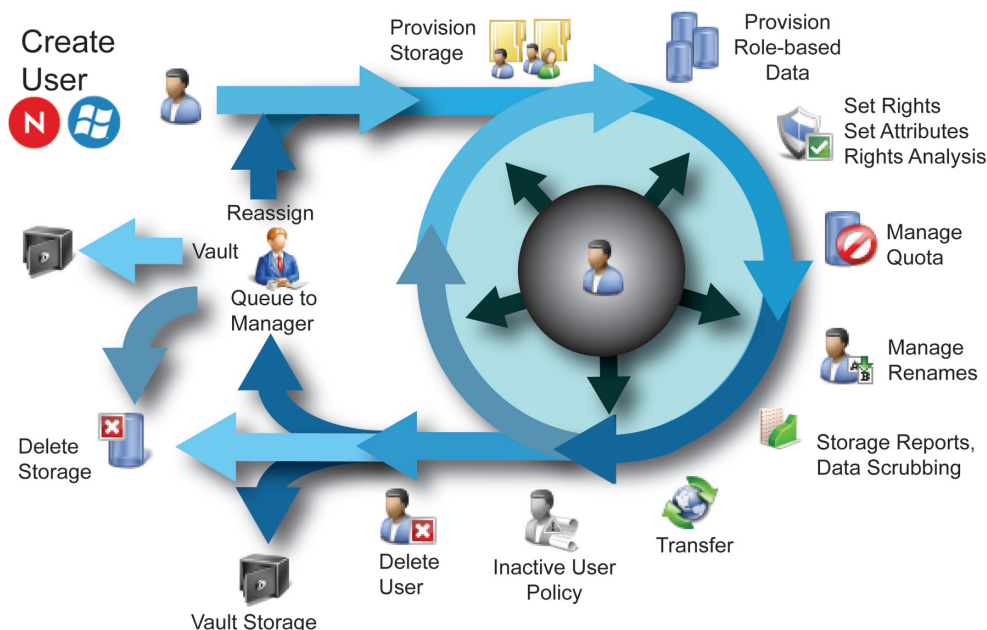
**Figure 1.** Event Monitors capture directory events, sends them to the Engine where actions are initiated, and then sends them on to the Agents, which can perform additional actions.

## Lifecycle Management of Storage

Novell Storage Manager automates the full lifecycle of user and group storage through the directory-stored policies discussed previously. In addition to creating user and group storage, Novell Storage Manager automates the management of:

- **Role-based Data Provisioning.** *This means populating created user or group folders with specific documents. An example might be HR forms for the employee to complete during his or her first day on the job.*
  - **Rights.** *Novell Storage Manager ensures that file system rights are applied consistently for users based on their roles in the enterprise.*
  - **Quotas.** *Novell Storage Manager manages storage quotas or storage allocation as a user's role changes. If, for example, a user's role is changed, the storage quota could be increased or decreased automatically—according to policy.*
  - **Renames.** *When a user is renamed in Novell eDirectory or Active Directory, the user home folder automatically renames*
- the associated home folder and updates the home folder attribute in the directory, so the user can log in and access his or her storage.*
- **File Grooming and Vaulting.** *You can set policies to move prohibited file types to a vault location on less expensive hardware or delete them altogether.*
  - **User Moves.** *A common manual process for IT departments within companies with multiple locations is moving an employee's storage when they transfer to a new city. Novell Storage Manager completely automates this process.*
  - **Actions for Deleted Users.** *When an employee leaves your enterprise, you can have Novell Storage Manager automatically vault the storage, defer the cleanup of the storage for a set number of days or queue the storage to a defined manager.*
  - **Inactive Users.** *Many enterprises do not delete users immediately but move them to an inactive state. Novell Storage Manager supports this practice by allowing you to configure an Inactive Users policy. When someone gets associated with this policy, his or her storage is moved to another location and rights are removed.*

For more information on Novell Storage Manager, visit: [www.novell.com/storagemanager](http://www.novell.com/storagemanager)



**Figure 2.** From user and group storage provisioning to archiving and disposition, Novell Storage Manager automates the full lifecycle management of user and group storage.

Novell Storage Manager delivers an identity-driven solution for storage management that makes an immediate difference: it cuts costs, saves time and helps ensure regulatory compliance.

## Regulatory Compliance and Risk Management

A heightened focus on security has prompted a wave of government and industry regulations for the storage and transmission of electronic data. To effectively comply with many of these regulations—including SOX, HIPAA and more—you need a secure, identity-based storage solution. You also need to minimize risk. Noncompliance will be the least of your worries if you lose key data or end up in a legal entanglement.

Novell Storage Manager helps ensure regulatory compliance and reduces risk through identity and policies. An identity-driven management solution—one based on clearly defined policies—is much less vulnerable to certain types of security threats, particularly human errors in manual data input and manipulation. You can use Novell Storage Manager to limit the types of files users are allowed to save and the locations where users can save them. This will help your organization keep resource-draining or damaging files out of sensitive areas or off the network altogether.

With Novell Storage Manager, misplaced data is never an issue. Users' storage will follow them, no matter where they work in the organization. When an employee leaves, you can know that your company's intellectual property remains safe and accessible. You can configure policies so that Storage Manager automatically does any number of things with the user's storage: archives it, deletes it or even forwards it to a manager for further review.

## New to Storage Manager 2.5

Exponential storage growth, regulatory compliance, requested product enhancements, and even the green IT movement were all factors in the development of features new to Novell Storage Manager 2.5. The most notable of these features are as follows:

## Auxiliary Storage

Auxiliary User Storage is an enhancement that Novell also added at the request of many Novell Storage Manager enterprise customers. It allows administrators to create a policy in Novell eDirectory that creates auxiliary storage folders when a new user is created. This auxiliary storage can even be invisible to the user for whom it was created.

For example, an organization's HR department may keep an individual folder on each user in the organization. With Auxiliary User Storage enabled, this folder could be created when the user joins the company and Novell Storage Manager creates and provisions his or her home folder. The user would never see the auxiliary storage as the policy would give read/write rights only to the HR department.

Additionally, the auxiliary storage would be as large as the policy dictated. This means that even though the user's home directory may be 500 MB, the auxiliary storage could be as small as the HR department needed it to be for storing HR-specific documents on the user. In fact, the policy can dictate that the auxiliary storage be provisioned with needed HR documents when the auxiliary storage is created.

There is no limit to the number of auxiliary folders that can be created. Auxiliary folders can be created in volumes that differ from the location of the user's home directory.

Lifecycle management capabilities in Novell Storage Manager easily manage auxiliary storage for the specific needs of the organization. For example, if a user transfers from one city to another and the user home directory gets moved to a new OU object as a result, the policy can dictate what becomes of the auxiliary storage including moving it; moving it and expanding it; moving it and re-provisioning it; leaving it where it currently is; etc.

## Expanded Linux Support

As Novell networked organizations expand their environments to include SUSE Linux Enterprise Server or Novell Open Enterprise Server (OES) running SUSE Linux Enterprise Server, Novell Storage Manager 2.5 addresses this expansion with Event Monitors that can be hosted on servers running either Novell Linux offering. Agents (known previously as “Sentinels”) can now be hosted on Novell OES 2 running SUSE Linux Enterprise Server. New supported file types include OES 2, ext2/3 and Reiser if you have the NCP extension.

## Collaborative Storage Enhancements

Many organizations create collaborative storage areas for all members of a Novell eDirectory OU. In previous versions of Novell Storage Manager, a network administrator had to first create a group object, add all of the users in the OU to the group and then create a policy for creating storage for the group.

With Novell Storage Manager 2.5, an administrator can create collaborative storage based on the OU object itself. Once a policy has been created for the OU, the administrator can perform a backfill operation to provision existing users to the collaborative storage area, where they can collaborate—with policy-defined rights—among all members of the OU.

Novell Storage Manager 2.5 also extends its powerful file vaulting and grooming capabilities to collaborative storage. Now, administrators only need to set collaborative storage vaulting policies for aged files and unallowable file types. And just like user file vaulting, these files will be moved to a vault location on less expensive hardware or deleted altogether.

Many network administrators that are in the process of consolidating servers will

appreciate the ability Novell Storage Manager 2.5 has to migrate collaborative storage. By simply changing the storage location path within the collaborative storage policy, the collaborative storage can be migrated automatically to a new storage hardware device.

## Action Objects

Novell Storage Manager 2.5 includes new “Action Objects” APIs to enable the automation of very distinct storage actions outside of what is practical with Novell Storage Manager policies. Action Objects enable specific actions in coordination with other applications that manage through Novell eDirectory or LDAP. One such example is Novell Identity Manager.

Action Objects are ideal for exception-based access to folders. For example, an employee in an organization may need access to a secure folder in the legal department. However, making that employee a member of that department would provide him too much access. With Action Objects, the employee could submit a request for approval for access to the folder. Once approved an Action Object can be generated through an approval process in Novell Identity Manager for read-only access.

## New Interface

Novell Storage Manager 2.5 features a fresh new NSMAdmin interface. Icons and dialogs have all been given an updated look. Additionally, the interface has been redesigned to be easier to use. For example, where an administrator had to previously perform certain tasks through multiple steps in NSMAdmin, many of these steps can now be addressed through a single form. In addition, a Quick Links tab lets you place and access your most frequently used management options.

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Novell Storage Manager 2.5 includes a new “Custodian” feature that maintains a history of file movements in the Novell Storage Manager catalog.

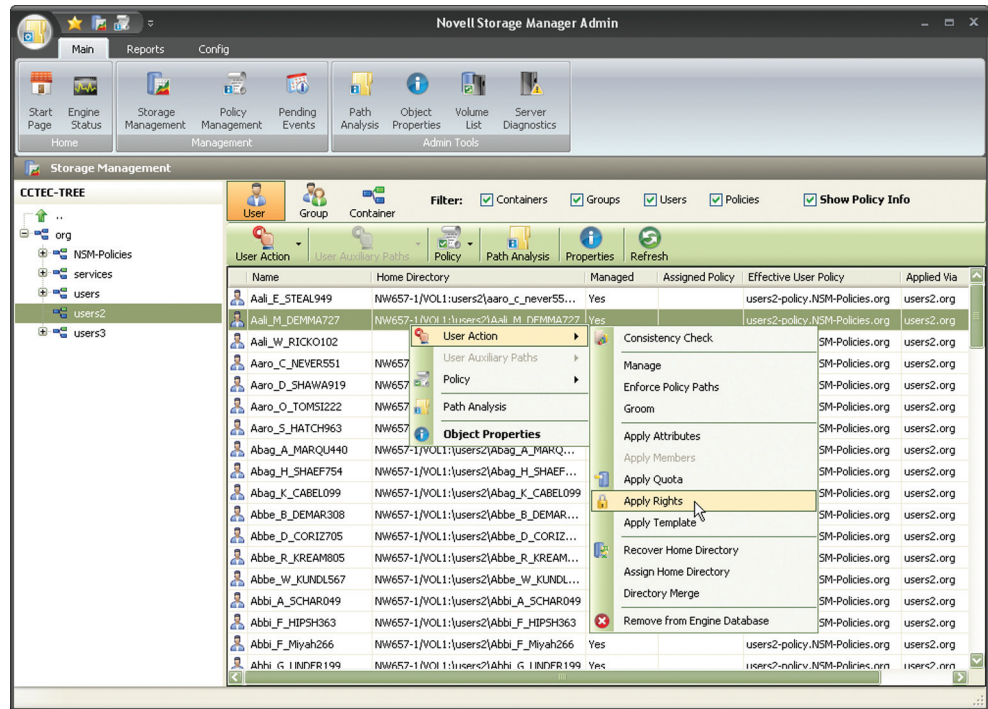


Figure 3. Novell Storage Manager 2.5 includes a completely new management interface in NSMAdmin that is easier to use.

## Enhanced Cataloging

A constant challenge among network administrators is assuring the availability of network storage disk space. This oftentimes means the movement of older data from more expensive primary storage devices to less-expensive secondary or tertiary backup storage devices. Over the lifetime of an archived file on the network, it can reside in many different physical locations.

But what happens when someone needs to retrieve a particular file that has been moved a number of times to various storage locations? Unless a network administrator has been documenting each move—a very unlikely practice—the needed document could be very time consuming and costly to find.

Novell Storage Manager 2.5 includes a new “Custodian” feature that maintains a history of

file movements in the Novell Storage Manager catalog. Similar to a building custodian that comes in (normally after business hours) to perform regular cleanup and maintenance tasks, the Custodian updates the catalog with time-based data recording. This means that whenever an administrator moves data managed by Novell Storage Manager 2.5, the Custodian records it in the catalog.

With Novell Storage Manager’s ability to create auxiliary storage directories per object (e.g., user), individual user directories can be created for specific purposes. For example, in addition to a home directory, a directory might be created for terminal services data and another one for application data. To locate a moved file, the administrator can then search the catalog by purpose (user’s home directory, user’s terminal services data directory, user’s application data directory, etc.), locate it and recover it.

The catalog maintains rights, quota and other attributes of managed storage. That means that when a user's home or collaborative storage directory is restored, Novell Storage Manager 2.5 can be used to restore the original quota, trustee assignments, etc. automatically—a task that backup software by itself generally cannot do.

The Custodian also does maintenance work. It can report and even fix file storage anomalies. For example, correcting differing file location information between the catalog, file system and directory services.

## Graphical Analytics

The Custodian also gathers and presents an extensive amount of analytical summaries pertaining to file system data in a Novell eDirectory-managed network. In fact, once you launch NSMAdmin, you are presented some of this analytical data in the main screen. Analytical information is available covering the distribution of data per server or volume, the distribution of disk space quota between user and collaborative storage, the number of orphaned home directories, percentage of managed versus unmanaged storage, historical time lines and much more.

As organizations continue to address their needs for more storage capacity through the purchase of storage area networks (SANs) and large servers, management will certainly want to see what sort of return they are getting for these expensive IT investments. With Novell Storage Manager, you can easily show management how much a SAN is being used in comparison to other storage devices, the percentage of users with enforced storage quotas versus no limits, Storage Manager-managed user and collaborative storage versus unmanaged storage, and more.

## Software Appliance Installation Option

New to Novell Storage Manager 2.5 is the ability to install the product as a "software

appliance." This means that the Storage Manager Engine can be installed on a Windows\*, Linux\* or any other VMWare\*-based host. This installation option makes the deployment not only more efficient and smaller, but it eliminates the need for a Novell NetWare server or Novell Open Enterprise Server running Virtual NetWare as the host for the Engine.

## Path Analysis

The new Path Analysis feature helps ensure compliance by allowing administrators to browse down a file path from any server and volume to a particular folder and perform an analysis of both access rights through either direct assignment or inherited rights through both the file system and directory services.

Path Analysis can also report file types that are being stored in a folder and all subfolders based on file extension. For example, by selecting a home folder, you can easily see the number of .MP3, .MOV, .JPG, etc., files the user is storing on the network.

## Saving Time and Money

Since its initial release as "File System Factory" in 2003, the objective of the product has always been to save network administrators time and money by automating the manual tasks associated with storage management for users in Novell networks. With the product now known as Novell Storage Manager, the features and enhancements have grown to include collaborative storage management, reporting and support for multiple directories (e.g., Microsoft Active Directory) and file systems. Yet the initial objective remains the same: to save network administrators time and money by automating storage tasks.

Novell Storage Manager will save businesses time and money by:

- *Automating thousands of hours of manual work and doing so in a consistent and auditable manner*

**With Novell Storage Manager, you can easily show management how much a SAN is being used in comparison to other storage devices, the percentage of users with enforced storage quotas versus no limits, Storage Manager-managed user and collaborative storage versus unmanaged storage, and more.**

- *Alleviating personnel from doing mundane, error-prone storage jobs*
- *Assuring that your users will have the storage resources they need—whenever they need them*
- *Providing the confidence that storage is secure and available should an organization need to prove compliance with government or industry regulations*

There are hundreds of Novell Storage Manager success stories across the world in organizations such as small businesses, government agencies, school districts, hospitals, universities, airlines, financial institutions and many more. Perhaps just one example of a government agency will demonstrate the potential savings customers could realize with Storage Manager.

The agency employed 30,000 workers and was spending approximately US\$48,000 each year to manually provision and manage employee storage. The agency was considering a customized, home-grown solution but was worried that it would be difficult and costly to deploy and integrate.

Then the agency heard about Novell Storage Manager. It fit right in with the agency's infrastructure, working seamlessly with its existing servers. Full deployment took about six weeks, and the agency started seeing a

return on its investment within three months. Automation and the easy-to-use management tools nearly eliminated storage-related expenses. Annual storage management costs dropped to US\$6,000, saving the agency US\$42,000 per year.

## Conclusion

With network storage growing at an exponential rate and projected to continue to do so, an automated, identity-driven, policy-based user and collaborative storage solution is needed more than ever.

Novell Storage Manager is the only solution on the market today that provides automated user and collaborative storage management through identity in the network directory. Storage Manager automates storage management tasks through directory-stored policies. These policies oversee the full lifecycle management of user and collaborative storage from home folder creation until folder archiving or deletion, and provide an expansive set of other storage management services for user and collaborative storage.

Automation through identity and policies within Novell Storage Manager will save enterprises time and money while assuring that industry and government regulations pertaining to storage are being followed.



Contact your local Novell Solutions Provider, or call Novell at:

1 800 714 3400 U.S./Canada  
1 801 861 1349 Worldwide  
1 801 861 8473 Facsimile

**Novell, Inc.**  
404 Wyman Street  
Waltham, MA 02451 USA