VERITAS Backup Exec™

for Windows NT/2000

White Paper

VERITAS

BUSINESS WITHOUT INTERRUPTION™

Table of Contents

Introduction:

This white paper covers in detail the new features and functionality of VERITAS Backup Exec™ for Windows NT/2000 version 8.0. Now in its sixth generation, Backup Exec continues to lead the industry in Windows NT and Windows 2000 data protection. Being the sole providers of the Windows NT Backup Applet in every version of Windows NT that has ever shipped, VERITAS has developed world class data protection solutions based on the technology that is inherent in the operating system.

The VERITAS/Microsoft Partnership

Microsoft® Windows 2000® is the largest operating system release ever conducted by Microsoft, with integrated support for client/server and peer to peer networks. It incorporates technologies that reduce the total cost of ownership (TCO), Directory service, improved security and performance in addition to providing scalability from a small business to a large enterprise network.

VERITAS Software Corporation, the industry's leading enterprise-class application storage management software provider, has established its leadership position with products that are clearly recognized as standards. VERITAS' unique technologies meet the demanding needs of e-business data management in a variety of ways. Database aware backup integrated with database management systems ensures transactionally consistent backup copies. Data migration allows data to be moved while it's being used. Hierarchical storage management discovers little-used data and moves it offline, freeing online storage and I/O resources to run the business. Monitoring technology provides an objective basis for making storage management policy decisions.

The Microsoft Standard

VERITAS Software is the author of the backup applets within Microsoft Windows NT 3.1, 3.5x and, 4 as well as Microsoft Exchange and Microsoft Small Business Server. Demonstrating its continued leadership, VERITAS Software now exclusively provides the backup applet in the latest generations of Microsoft's Windows products - Windows 2000 and Windows 98.

More Than Backup

Not only is VERITAS providing the backup applet for Windows 2000, we've been selected to provide other key components of the Windows 2000 operating system.

We are providing a single-tier Hierarchical Storage Management (HSM) solution as part of the core OS that Microsoft refers to as the Remote Storage Services.

Another new component of the operating system is the new Windows 2000 Installer. For applications written with setup programs that conform to the Windows Installer specification, the Windows Installer provides an administrative tool for checking and resetting applications to a pristine state, thereby enhancing system integrity. Application developers must write Windows Installer versions of their setup programs. Realizing this will not happen overnight, Microsoft has licensed WinINSTALL Limited Edition (LE) from VERITAS Software to be included within Windows 2000. By including the Windows Installer and WinINSTALL in Windows 2000, administrators get standardized application installation and reset capability across Windows 2000 and (certain) legacy OS machines.

The final component of the Windows 2000 operating system that Microsoft is licensing from VERITAS is called the Dynamic Disk Manager (DDM), a replacement to the Disk Administrator found in Windows NT 4. Based on the VERITAS Volume Manager™ product, it provides RAID 0, 1 (up to 2 disks), and 5 (no RAID 5 logging) support.

The MTF Tape Format Standard

The tape format that is used by the Windows NT backup applet and by Backup Exec is the Microsoft Tape Format (MTF). This format was co-developed by VERITAS and Microsoft to provide 100% read and write compatibility with the operating system. Users benefit with seamless migration from the embedded Windows NT backup applet to VERITAS Backup Exec and the ability to read all their legacy Windows NT backup tapes. Furthermore, the conversion period of users migrating their sites to Backup Exec typically occurs in stages. While a user's remote operation is using the applet, they can restore a tape created with Backup Exec to another Windows NT machine that does not have Backup Exec installed by simply using the Windows NT backup applet.

Microsoft Windows 2000 Rapid Deployment Program

As part of the Microsoft Windows 2000 Rapid Deployment Program, Microsoft asked VERITAS to provide a more robust backup solution for early adopters participating in this program. Based on our expertise with the Windows NT backup applet and Windows NT data protection, VERITAS was exclusive provider of this solution utilizing a special version of Backup Exec for Windows NT specifically for these RDP members that protected their Windows 2000 servers.

Field Proven Solutions

VERITAS Backup Exec for Windows NT/2000, now in its sixth-generation, is the field proven data protection solution utilized today to protect millions of servers and workstations, from small businesses and workgroups to highly distributed Windows NT and Windows 2000 environments, including those at Microsoft. On October 5, 1999, a VERITAS press release highlighted the fact that Microsoft selected Backup Exec with Network Storage Executive to protect their internal data in their Information Technology Group (ITG) worldwide. Backup Exec is now protecting over 8 TB of Microsoft's mission critical data every day!

Product and Scalability

Microsoft Windows 2000

Microsoft's Windows 2000 product line is segmented along desktop and server application and will be available in four different versions. The users' operating hardware configuration becomes the determining factor as to which version of the operating system is right for their needs.

- Windows 2000 Professional, replacing Windows NT 4 Workstation product, is a high performance, secure network client computer and corporate desktop operating system. It significantly extends the manageability, reliability, security and performance of Windows NT Workstation 4.0. This product will become the main desktop operating system for business of all sizes, supporting up to 2-way Symmetric Multi-Processor (SMP).

- Windows 2000 Server is a file, print and applications server, as well as a web-server platform, ideal for small to medium-sized enterprise application deployments, Web servers, workgroups and branch offices and supports up to 4-way SMP and delivers support for up to 4 GB of RAM.

- Windows 2000 Advanced Server is a more powerful departmental and application server that provides all of the features and benefits of Windows 2000 Server. Plus, it includes additional functionality to enhance availability and scalability of e-commerce and line-of-business applications. It will scale up by utilizing the latest 8-way SMP servers for more processing power and takes advantage of larger amounts of memory to improve performance and handle the most demanding applications, with support for up to 8 gigabytes (GB) of RAM with Intel's Physical Address Extension (PAE).

- Windows 2000 Datacenter Server will be the most powerful and functional operating system ever offered by Microsoft, optimized for large data warehouses, economic analysis, large-scale simulations in science and engineering and server consolidation projects. Servers running up to 32-way SMP requiring optimized performance and 4-way cluster failover capabilities are candidates for this version.

Protecting Windows 2000

VERITAS Software, the industry's leading enterprise-class application storage management software provider, has designed its new version of VERITAS Backup Exec for Windows NT/2000 to support both Microsoft's Windows 2000 and Windows NT environments.

Version 8.0 of Backup Exec for Windows NT/2000 offers complete data protection for the Windows 2000 system state, Active Directory, COM+ Class Registration Database, Registry, System Volume, and System Files. Additionally, new Windows 2000 file system changes, including disk quotas, encrypted files, Distributed File System, and reparse points utilized by Volume Mount Points, Directory Junctions, and Remote Storage Service are fully protected with VERITAS Backup Exec for Windows NT/2000. To further support Microsoft's new features in Windows 2000, VERITAS Backup Exec incorporates updated disaster recovery, clustering, Removable Storage Management integration and new fault tolerant capabilities.

Early Adopters of Windows 2000 have stated that having a data protection solution available for securing their Windows 2000 environments removed a major obstacle to their migration to the new operating system. Backup Exec is the first storage solution to support both Windows NT and Windows 2000 systems.

Key Influencers to Windows 2000 Adoption

Performance and Administration

Microsoft Windows 2000 builds on the strengths of Windows NT Server 4.0 by providing a platform that is faster, more reliable and easier to manage. Most important, it delivers a comprehensive set of distributed infrastructure services based on the Active Directory service, the first multipurpose directory service that is scalable, built from the ground up using Internet-standard technologies and fully integrated at the operating system level.

PC Week Labs[1] recently evaluated Microsoft's Windows 2000 final code release to manufacture and provided the first opportunity to benchmark it for production performance. The results were impressive, with Windows 2000 twice as fast as Windows NT 4.0 in some cases. However, it's the operating system's management capabilities, made possible by Active Directory, which makes the move to Windows 2000 most compelling.

Since Active Directory's security model integrates with everything in the enterprise, with the management components touching every desktop, its authorization model affects every user. In addition, other enterprise directories can be integrated into Active Directory.

While Microsoft has allowed for mixed-mode domains, with some servers running as primary domain controllers and others as Active Directory servers, IT managers would be wise to limit the feature set of their mid-mode implementations, using Active Directory only to authenticate users until thorough testing is completed in their own environment.

It's important that companies take time to figure out how to map their familiar domains into the new organizational structure of Active Directory. Resource domains, for example, will no longer be necessary and will have to be broken up and distributed under Active Directory.

The most important change from Windows NT is in the way trust relationships are developed within domains. Using Windows NT, there is no transitive trust — every relationship must be explicitly stated. Active Directory enables transitive trust and this specific capability will save administrators in large companies from big headaches.

Transitive trust between domains simplifies the management of interdomain trust accounts. Since trust relationships provide secure communication between two domains, with a trust relationship, a domain will accept user accounts created on other domains as valid accounts and allow those accounts to access local resources. Transitive trusts go further to provide members of the domain tree a defined two-way trust relationship with the parent domain tree, with all domains in the tree implicitly trusting other domains in the tree. In situations where a specific domain does not want a two-way trust, explicit one-way trusts can still be defined. But for organizations with multiple domains, the overall number of one-way trust relationships are significantly reduced.

The hierarchical capabilities of Active Directory will also come as a welcome relief, allowing managers to delegate responsibility in a granular manner. Administrators can easily delegate authority to change user accounts spread across several Windows 2000 Organizational Units (OUs). A policy defined and assigned using the MMC (Microsoft Management Console) interface and the policy definition can even be dragged onto a junior administrator account. This capability will allow network architects to design Windows 2000 domains and OUs based on business functions instead of the geographical basis required by Windows NT.

Challenges in Adoption

Although the price of Windows 2000 licenses will remain steady compared with Windows NT 4.0, analysts agree there are a number of added costs to consider, including training, added memory for servers and lost production time as the Windows 2000 network gets up to speed.

Giga recently completed a study of a sample network of 30 servers and 5,000 workstations. In that study, a company would have to spend $535,000 to get Windows 2000 up and running on its servers, and another $973 per workstation — a total of $5.4 million. Because of that, few companies will initially be willing to install Windows 2000 within the first three months of its release, according to research firm International Data Group.[2]

---

[1] Datasource: http://www.zdnet.com/pcweek/stories/news/0,4153,2411198,00.html

Upgrading to Windows 2000 requires extensive planning, design and implementation phases that vary depending on your Windows 2000 environment. The processes should take into account your existing network components, business requirements and future directory needs.

Most upgrade processes include simplifying your network consolidating servers and domains, as well as upgrading servers and workstations. You will need to plan for servers that can take advantage of the improved performance Windows 2000 offers. Consolidating servers and domains to simplify the network infrastructure will require more powerful servers, in addition to deployment of Windows 2000 Professional on all your workstations requiring replacing some older PCs. Depending upon your Windows 2000 design and the features you intend to implement, your network infrastructure might see either an increase or a decrease in traffic.

Cost of migration, planning and implementation cycles, availability of experienced IT resources and users typical concerns regarding stability of first releases are all factors that will affect the adoption of Windows 2000. Because of these issues, mixed environments running a combination of Windows NT 4 and Windows 2000 will be predominant until the second release, unofficially called "Windows 5.1," ships late 2000 or early 2001.

Windows 2000 Specific Backup Considerations

Windows 2000 introduces a number of new features and architectural enhancements that affect how users protect, access and manage their applications. Many of these features require direct changes to storage management applications and how they interact with the operating system. In addition, other general operating system enhancements, although not directly related to storage, may require changes in how companies utilize third party data protection products in conjunction with built-in operating system functions to protect their overall environment.

Microsoft API's

The Windows NT Server 4.0 operating system meets the storage needs of enterprise file/print and applications servers by supporting multiple file systems (including NTFS), and by including a fault-tolerant disk manager and other management tools such as NTBackup, developed by VERITAS and provided to Microsoft. This open architecture also integrates with a wide variety of third-party management tools that provides additional storage-related functionality.

While these features are essential to enterprise computing, there are several factors that necessitate enhancements to this storage architecture and feature set. These factors include the cost of supporting growing storage requirements in large environments, the scalability requirements of mission-critical applications, and the continued need to support third-party management solutions in the storage market. To address these needs, the Windows 2000 operating system provides an enhanced storage subsystem architecture, an improved NTFS file system, and an extensive list of new storage services and applications.

Many of the enhancements provide independent software vendors (ISVs) with the infrastructure they need to write enterprise-class storage applications and features. Historically Microsoft has provided this type of functionality, using well-documented APIs, system services and features, and made available a variety of development tool kits and frameworks. These subsystem components allowed ISVs to invest their time in developing business solutions, rather than requiring them to invent items that should be core operating system services. As a result, customers who invest in Windows-based platforms benefit from solutions that are built on a consistent and well-documented set of system services and interfaces.

Second, changes to the overall storage subsystem architecture provide the Windows 2000 operating system with a more manageable storage subsystem. This helps customers to deal with storage demands in their environment today and in the future.

The single major difference in the architecture of Windows 2000 API's, in comparison to Windows NT, that affects server data protection is that **certain Microsoft Windows 2000 APIs are NOT remoteable**. This means that backup applications MUST install a remote agent on any remote server requiring protection in order to capture specific objects. Backup Exec accomplishes this via the exclusive Agent Accelerator for Windows NT/2000 that is a requirement and must be installed for protection of any remote Windows 2000 based server.

---

[2] Datasource: Enterprise Class Storage in Windows 2000 White Paper© 1999 Microsoft Corporation

Using Backup Exec to Protect Windows NT and Windows 2000

VERITAS Backup Exec for Windows NT/2000 is the first shipping third-party backup and restore software application to fully support Microsoft Windows 2000 and Windows NT 4.0.

Backup Exec Editions

Version 8.0 of Backup Exec for Windows NT/2000 is available in 2 different editions, the BENT/2000 Server Edition and the BENT/2000 Advanced Server Edition. As Windows 2000 Datacenter Server and Small Business Server 2000 are not scheduled for release by Microsoft until later this year, follow on release of VERITAS Backup Exec will provide support for the Windows 2000 Datacenter and Small Business Server editions.

Microsoft has announced that Alpha platform support will not be included with Windows 2000. Consequently, Backup Exec for Windows NT/2000 protects Intel- and Alpha-based systems running Windows NT 4, as well as Intel-based systems running Windows 2000.

Backup Exec for Windows NT/2000 Server Edition installs on and protects any supported version of Microsoft Windows 2000 or Windows NT except Datacenter or Advanced Server, and also includes Backup Exec agent software for workstations running on Windows 2000, Windows 98, Windows 95, UNIX, and Macintosh platforms.

This edition supports unlimited stand-alone drives and one single-drive autoloader. Backup Exec's Library Expansion Option (purchased separately) allows support for multi-drive autoloaders. Support for protecting additional Windows 2000 or Windows NT servers, NetWare servers, databases, open files, and more can be purchased separately.

Backup Exec for Windows NT/2000 Advanced Server Edition installs on and protects any supported version of Microsoft Windows 2000 or Windows NT except Datacenter, and also includes Backup Exec agent software for workstations running on Windows 2000, Windows 98, Windows 95, UNIX, and Macintosh platforms.

This edition supports unlimited stand-alone drives and one single-drive autoloader. Backup Exec's Library Expansion Option (purchased separately) allows support for multi-drive autoloaders. Support for protecting additional Windows 2000 or Windows NT servers, NetWare servers, databases, open files, and more can be purchased separately.

Backup Exec for Windows NT/2000 Datacenter Edition installs on and protects any supported version of Microsoft Windows 2000 or Windows NT 4, and also includes Backup Exec agent software for workstations running on Windows 2000, Windows 98, Windows 95, UNIX, and Macintosh platforms.

This edition supports unlimited stand-alone drives and one single-drive autoloader. Backup Exec's Library Expansion Option (purchased separately) allows support for multi-drive autoloaders. Support for protecting additional Windows 2000 or Windows NT servers, NetWare servers, databases, open files, and more can be purchased separately.

Determining the Backup Exec Edition Required

Both the Backup Exec Server and Advanced Server editions are standard "single server" editions when first installed.

To determine what edition of Backup Exec for Windows NT/2000 is required for the backup server, users should first determine which Operating Systems are running on all local and remote servers requiring protection. This is due to the fact that, when protecting servers running Windows 2000, Backup Exec requires the backup server to be running the Backup Exec edition that matches the highest version of Windows 2000 that is being protected. This means that if the backup server is locally or remotely protecting a server running Microsoft Windows 2000 Advanced Server Edition, the backup server must be running Backup Exec for Windows NT/2000 Advanced Server Edition as well.

If only protection for Windows NT 4 is required, the Backup Exec for Windows NT/2000 Server Edition is required. If an upgrade to Windows 2000 Advanced Server is being planned, users should consider initially installing Backup Exec Advanced Server Edition now. This will provide them the flexibility to just add Agent Accelerators for the remote servers in the future since the Backup Exec Advanced Server Edition will be capable of protecting Win2000 Server and Advanced Server editions when required.

Remote Server Protection, Agents & Options

Next, users need to determine if they need to protect both local and remote servers.

Remote Workstations

If the backup server is remotely protecting Windows NT 4 Workstation or Microsoft Windows 2000 Professional Edition, W95/98, Unix/Linux or MAC OS, remote server protection is included standard in both the BENT/2000 Server and Advanced Server Editions.

Remote Servers

Backup Exec for Windows NT/2000 can be expanded with database protection and storage management solution tools for the diverse application needs of growing network environments. These agents have been designed to allow the trouble-free operation of functions such as complex messaging and support of transactional intensive databases. All options for storage system management and server recovery can easily be installed from a centralized backup server.

- **Agent Accelerator for Windows NT/2000 -** By using the Agent Accelerator technology, Backup Exec significantly improves throughput over network backups while distributing its workload between the client and backup server.

- **Agent Accelerator for NetWare Option -** This agent adds complete NetWare support to Backup Exec and allows network administrators to perform backup and restore operations on NetWare servers that are connected to the network. The Agent Accelerator technology significantly improves backup performance.

- **Intelligent Disaster Recovery™ Option -** Backup Exec's Intelligent Disaster Recovery option provides a fast and automated method of restoring a Windows NT or Windows 2000 workstation or server in its entirety.

- **Network Storage Executive -** Backup Exec Network Storage Executive (NSE) allows you to use a single console to manage and control multiple Backup Servers in a user-defined domain.

- **Agent for Microsoft SQL Server -** This agent provides a complete solution for online back up of Microsoft SQL Server databases on the network while they are in use. By making frequent backups of SQL databases and transaction logs, you can quickly recover the databases in the event of a critical failure.

- **Agent for Microsoft Exchange Server -** This agent provides a complete solution for online backup of Microsoft Exchange databases on the network while they are in use. By making frequent backups, you can recover your databases in the event of a critical failure. This agent features support for backing up and restoring individual mailboxes.

- **Agent *for Oracle*® Server -** The Backup Exec Agent *for Oracle*® Server provides a complete solution for online backup for and restoring Windows NT/2000 server-based Oracle databases using Backup Exec. It has been designed to protect either the database server running a single Oracle database, or the database server running multiple Oracle databases, and allows you to backup Oracle databases while they are in use.

- **Agent for Lotus® Domino™ -** The Agent for Lotus Domino provides a complete solution for online backup and restore of local and remote Lotus Domino databases using Backup Exec.

- **Agent for R/3™ *for Oracle*® Server -** The Backup Exec Agent for R/3™ allows you to submit backup, restore, and file grooming jobs *for Oracle* via the SAP™ BackINT interface.

- **Open File Option -** The Open File Option permits you to back up open files on Windows NT/2000 servers and workstations. By creating and backing up a point-in-time or static view of the files on a volume, the Open File Option can back up files even as they are being changed.

- **Library Expansion Option -** The Library Expansion Option provides multi-drive autoloader support for Backup Exec.

- **Shared Storage Option -** The Shared Storage Option allows multiple Backup Exec servers to share secondary storage devices. These secondary storage devices are not directly connected to a single server but, as an example, could be connected to a fibre channel arbitrated loop (FC-AL), a high speed storage network in which all devices are linked together.

- ***RAIDirector™ -*** *RAIDirector* is a software utility that allows you to build a tape drive-based RAID (Redundant Array of Independent Devices) storage subsystem using the existing stand-alone SCSI tape devices connected to your Backup Exec server.

- **IBM ADSM Option -** The Backup Exec IBM ADSTAR™ Distributed Storage Manager (ADSM) Option lets you combine the speed and localized control of Backup Exec with the ADSM policy-based system of centralized storage management. The IBM ADSM Option allows the ADSM server's storage resources to appear as an autoloader in the list of target devices on the Backup Exec server. Backup Exec administrators can then direct the output of any Backup Exec job to the ADSM server simply by selecting the name of the ADSM autoloader as the destination when submitting the job.

Selecting Options and Agents

In order to protect any remote Windows NT, Windows 2000 or NetWare server, it requires the purchase of an Agent Accelerator Option for each remote server being protected. In order to protect remote database applications, the database agent is required. This provides simple scalability for users to add protection as their environment grows.

Agent Accelerator Options

If Windows NT/2000 or Novell NetWare "file and print" servers require protection, each server requires an agent accelerator option to enable remote protection. Agent Accelerator options establish the ability to backup remote servers and are REQUIRED for any server in order to perform a recovery operation using the BENT/2000 IDR Option. They also increase performance of database agents.

If running Windows NT or Windows 2000, an Agent Accelerator for Windows NT/2000 is required for each remote server being protected and are sold in 3-packs.

If running NetWare, remote servers require the Agent Accelerator for NetWare option for each NetWare server being protected, also sold in 3 packs.

Database Options

If database application servers require protection, each server should run the appropriate database option with the Agent Accelerator Option. All backup Exec database options allow the backup server to protect and recover the database that resides on any local or remote server. With the purchase of a DB option, the user can install that option serial number on any backup server to allow that single database to be protected by any backup server. An Agent Accelerator for Windows NT/2000 should be a standard purchase for all remote servers that need protection, even when a database agent is also being purchased.

If transactional or messaging database applications require protection, establishing which databases the user needs to protect is the next step in the process.

Backup Exec's database options provide more flexibility and granular protection levels of protection over standard open file technology, with the SQL point-in-time rollback capability, which simplify restoring a database to a specific date/time rather than the last backup. This, along with recovery of individual SQL 7 Filegroups or Microsoft Exchange Mailboxes, makes Backup Exec's database options an ideal solution for any environment.

Intelligent Disaster Recovery™

Proactive preparedness is the key to ensure mission critical data is available quickly in the event of a disaster. Statistics show that many businesses fail shortly after these unplanned events. Backup Exec is equipped to assist with this inevitable occurrence. The Intelligent Disaster Recovery™ Option (IDR) provides the only "point-in-time disaster

recovery solution for both local and remote Windows NT and Windows 2000 systems. It restores data to the most recent normal (full), incremental, differential or working set backup. The Backup Exec Intelligent Disaster Recovery Option offers multiple approaches in setting up the disaster recovery process. Version 8.0 IDR allows for automated recovery of Intel-based servers running Windows NT 4 or Windows 2000 and is especially key since the Automatic Server Recovery function of Windows 2000 (ASR) will not be part of Windows 2000 until a future release. Even once ASR is released, it will only handle local server recovery.

In version 8.0 of Backup Exec, IDR is licensed "per protected server." An IDR Option must be purchased for every server to be recovered (whereas v 7.x allowed a single IDR option to be used for an unlimited number of servers).

Since recovery of a Windows NT 4 or Windows 2000 server can take over 10 hours in certain cases, users can automate the recovery process and improve productivity with this option. Also, because certain Microsoft APIs are not “remoteable,” a Backup Exec Agent Accelerator for Windows NT/2000 option must be installed on ANY server in order for IDR to function. Therefore, anytime an IDR option is purchased, an Agent Accelerator Option should be purchased if one is not already installed on the server.

Storage Devices

Backup Exec for Windows NT/2000 allows unlimited stand-alone storage devices or single drive/unlimited slot autoloaders to be used with a single backup server - without the need to buy any add-on options. This represents a significant cost savings for most users due to the common usage of single-drive autoloaders. Environments requiring high-performance, multi-drive libraries can easily add storage devices to meet their storage demands with the Backup Exec Library Expansion Option (LEO).

Library Expansion Option

The Backup Exec Library Expansion Option enables an additional drive to be added to a wide range of multi-drive autoloaders or library storage systems connected to a backup server via SCSI or fibre channel environments running the Backup Exec Shared Storage Option. Each multi-drive autoloader or library storage system connected to a Backup Exec server requires the purchase of the Library Expansion Option for EACH additional drive within the loader/library.

Users should determine what storage hardware is in use and whether the Library Expansion Option is required. If using a multi-drive autoloader or library storage system with Backup Exec for Windows NT/2000 or the Backup Exec Shared Storage Option, a Library Expansion Option is required for all drives beyond the first unit in the storage system.

Using Backup Exec to Protect Windows NT and Windows 2000

VERITAS Backup Exec for Windows NT/2000 is the first shipping third-party backup and restore software application to fully support Microsoft Windows 2000 and Windows NT 4.0.

User Interface

The on-going shortage of experienced IT personnel dictates the need for solutions that can be deployed quickly by users with a wide range of technical skill sets. VERITAS Backup Exec for Windows NT/2000, with its combination of intuitive Windows NT-based user interface, Microsoft Explorer-like views and configuration management wizards, provides an optimum balance of simplicity and advanced features for the novice or the power-user.

Flexible Device and Media Management

With Backup Exec's Advanced Device and Media Management, backup performance is maximized by using drive pooling, dynamic load balancing and device cascading. Media Management wizards simplify the complexity of device allocation, media rotation schemes, and media labeling and also ensure reliability by controlling critical functions such as media overwrite protection, retention periods and media pooling.

Media Management

Backup Exec vastly simplifies the complexities of high capacity storage device management. Users are in total control of the organization and allocation of all devices attached to the backup server.

Using the Backup Exec media rotation wizard you are quickly assisted in establishing a Grandfather-Father-Son media rotation with added flexibility of user-defined schemes. Built-in media management extends beyond just placing the data on the media. It includes:

Automatic media labeling, usage tracking, cleaning protection, and catalog views to simplify overall media management.

- Scratch media pool holds media until needed.
- User-defined retention period controls overwrite protection.
- Media statistics for the life span of backup media helps you plan media usage.
- Disk and tape based catalogs display volume or media centric views.
- Integrated slot partitioning lets users partition slots within an autoloader and target jobs to a specific partition.

Small Business and remote sites without IT resources readily available can benefit greatly with Backup Exec's Low Administration Backup Mode (LABM) feature. This provides automated, worry-free protection for a backup server connected to a dedicated single drive autoloader (with a minimum of six media slots). It includes automatic execution of scheduled backups, media rotation and device cleaning without any user administration required.

Performance

Backup Exec for Windows NT/2000 provides Agent Accelerator technology which utilizes distributed processing and source compression at the client to increase backup performance and decrease network traffic. To further address performance needs, Backup Exec's Shared Storage Option utilizes fibre channel/LAN-free SAN networks to increase backup speeds and dramatically reduce network traffic.

High Availability

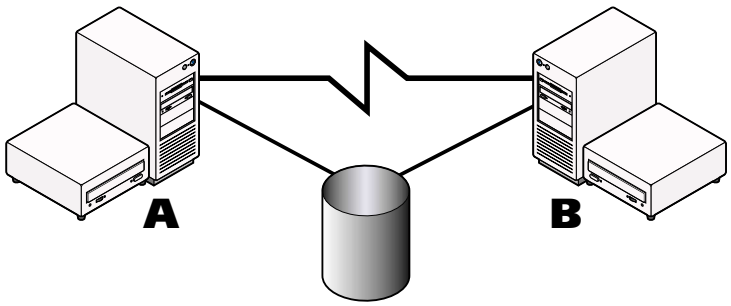
Supporting high availability Microsoft Cluster Services (MSCS), VERITAS Backup Exec Advanced Server edition leverages Microsoft's clustering API's to provide automatic failover in cluster environments. With VERITAS Backup Exec running on both nodes in a cluster, upon failure of the primary server, VERITAS Backup Exec automatically begins operations on the secondary node. Current and remaining scheduled jobs from the failed server are automatically redirected to the secondary server in the cluster.

When installing Backup Exec within a cluster, components are installed on Server A, Server B, and the quorum disk. Server A then acts as the active Backup Exec server and handles all backup jobs. Backup Exec on Server B acts in a passive mode and does not handle any backup jobs. If Server A fails, Backup Exec on Server B detects it. Backup Exec on Server B automatically starts up its system services. Backup Exec on Server B then automatically restarts the job that was in process on Server A when it failed. Backup Exec on Server B also automatically takes over the rest of the jobs that Server A was going to run.

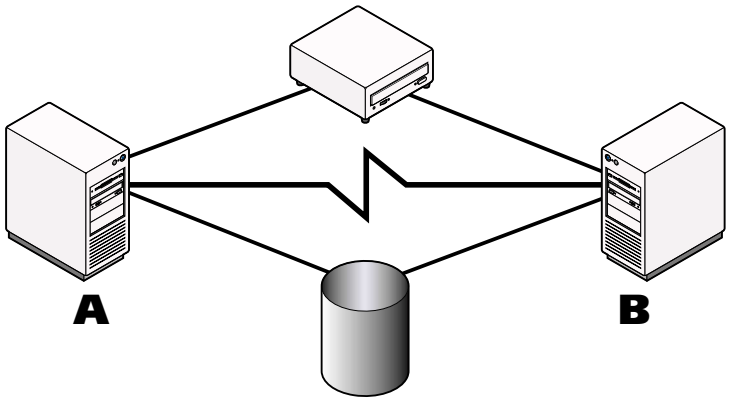
Users should be cognizant when operating in a Microsoft Cluster environment and note that two (2) licenses of Backup Exec and any agents or options are required.

Within a MSCS environment, Backup Exec can be configured one of three different ways as illustrated below:

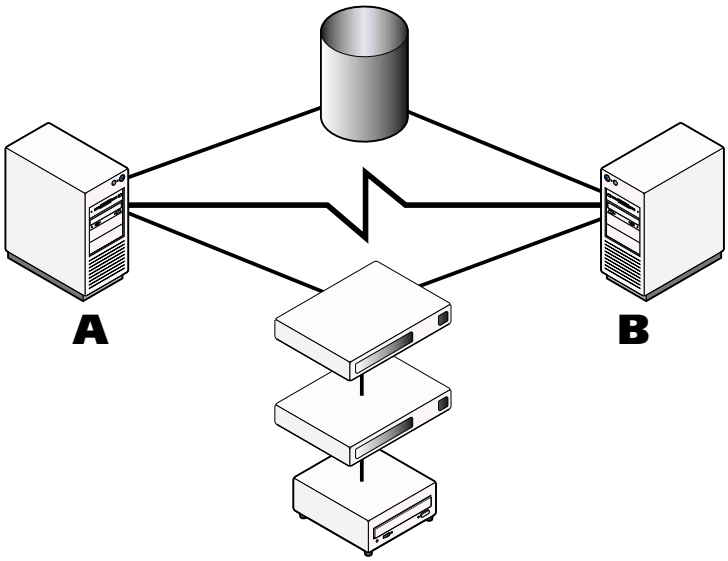
- **Separate Dedicated Backup Devices -** Both Server A and B have their own independent backup devices.



- **Shared SCSI Backup Device -** Both Server A and B can share a backup device via separate, dedicated SCSI bus.



- **Shared SCSI Backup Device -** Both Server A and B can share a backup device via the Backup Exec Shared Storage Option, providing a Fibre Channel based LAN-free backup solution.



Multiple Server Automation

The requirements for tools that automate administration are met with features included in Backup Exec's advanced scheduling options. This benefits administrators with in-depth job scheduling options, calendar based views that shows, by job, when the schedule goes into effect, what the time window is set for. Also, holiday scheduling via the advanced schedulers exclude date setting allow scheduled jobs to be excluded from dates when operations are on holiday and administrators determine normally scheduled jobs should not be run. A new time window setting specifies the time period during which the task can begin on any scheduled run day ensuring jobs run only when there is available bandwidth for backup operations.

To increase the percentage of successful jobs, Back Exec's automated job retry capabilities allow administrators to set the minutes/hours/days or weeks to wait before a failed job is re-run. This provides a fault tolerance benefit because a job may fail originally if the network or server is not available or if there are communication problems.

Centralized Management Option

To automate the processes for users in managing multiple copies of Backup Exec, the Backup Exec Network Storage Executive (NSE) is a brand new option that provides several key features. These features include:

- Centralized administration - This allows users to centrally manage all backup, restore, and device operations from a single location.
- An intuitive user interface - The UI for this option is based on the new Microsoft UI framework called the Microsoft Management Console (MMC).
- Allows for policy-based management - This offers users a more scalable method to manage and automate multiple backup jobs.
- Backup server pooling - This allows users to load balance their backup workload across multiple backup servers and also provides fault tolerance in the event that one backup server is not available.
- Microsoft SQL Server 7.0 database integration - This option includes a version of Microsoft SQL Server 7 and is used to centrally store all job, device, media, and configuration information.

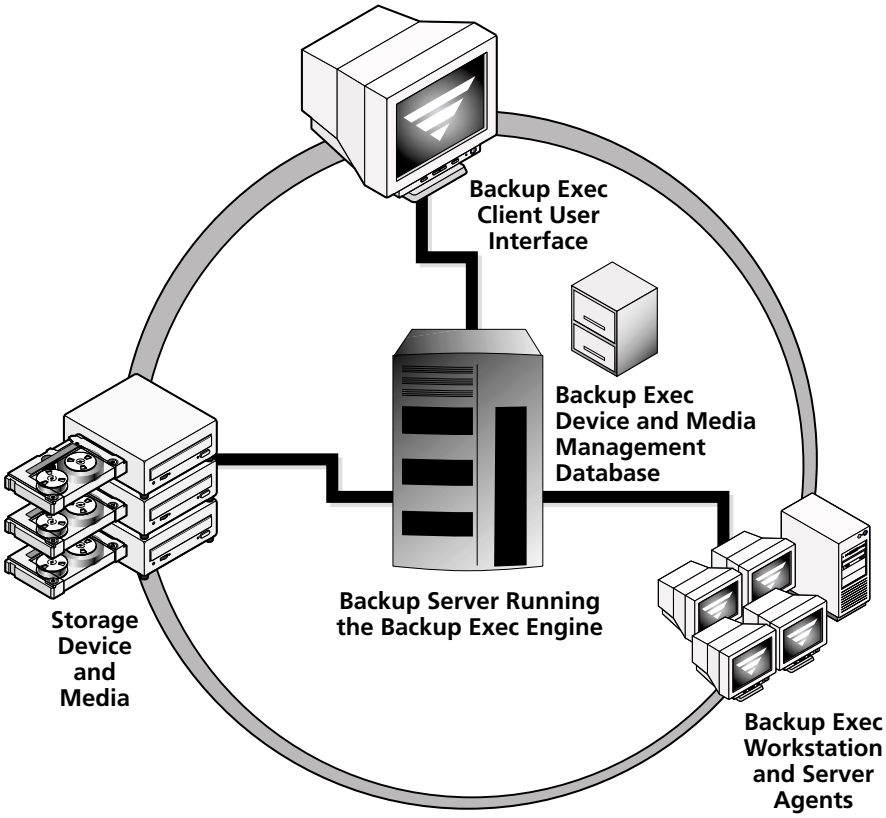
Ultimately, Backup Exec for Windows NT/2000 provides the answers for high-performance data management within Windows NT 4 and Windows 2000 and scales to protect standalone servers to highly distributed environments. With its true 32-bit client/server design, Backup Exec provides fast, reliable backup and restore capabilities for servers and workstations across the network. Backup Exec is available in configurations that can accommodate multi-platform networks of all sizes.

Backup Exec Operation

Processing Jobs

In the Backup Exec client/server architecture, backup and restore operations (jobs) are submitted using the Backup Exec client (BKUPEXEC.EXE). Administrators can run the client from the backup server or a remote system. After jobs are submitted, they are processed by the Job Engine (BENGINE.EXE), which runs on the Windows NT/2000 server with storage hardware attached (backup server). All interaction to the Backup Exec system (e.g., submitting jobs, viewing results, hardware utility functions) is done through the client.

The following diagram illustrates how the components work together to provide complete backup and restore functionality to the entire network:



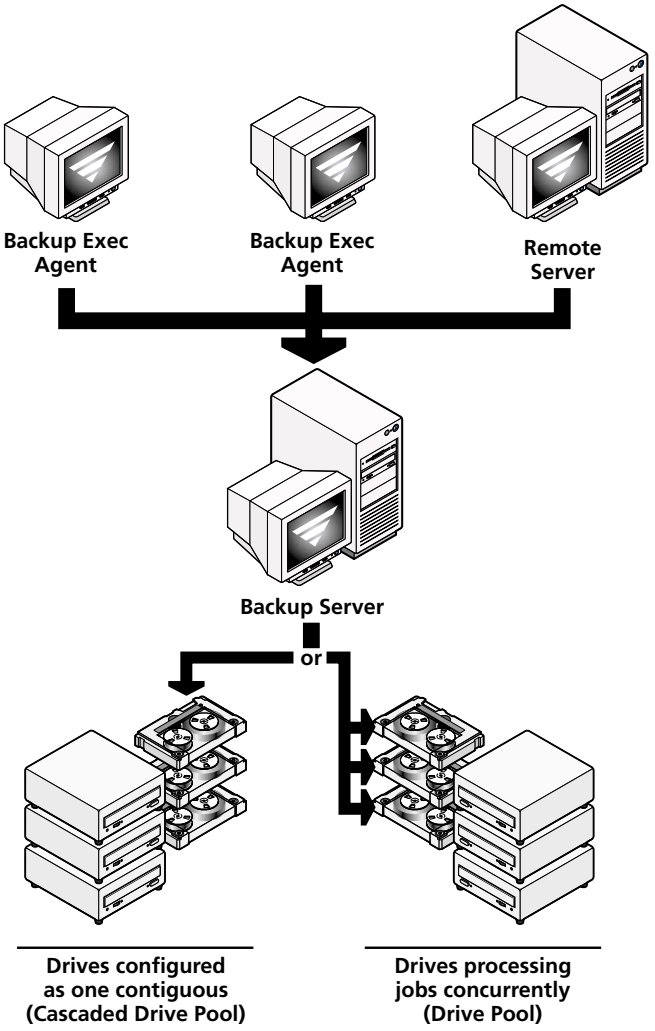
After a job has been processed, the job's results are sent to a job history log file and a record of the data that was backed up is kept in Backup Exec's catalog. The job history log file is a report of what happened during the processing of the job (statistics, errors, and so on), and the catalog file is the database from which restore selections are made.

Device Management

Backup Exec's device management functions simplify the process of organizing and allocating the storage devices attached to your backup server. With Backup Exec, you can maximize your hardware investment by organizing your drives in one (or both) of the following ways:

- Drive pools - you can assign two (or more) devices to a drive pool where jobs targeted to the drive pool during job setup run on the first available. Setting up drive pools in this manner offers the following benefits:
- Automatic job rescheduling, so that if a drive fails while a job is running on it, that job is rescheduled and placed on hold. Other scheduled jobs are rerouted to working devices in the drive pool.
- Concurrent processing allows storage devices in the drive pool to run different jobs at the same time, allowing maximum hardware efficiency.
- Dynamic load balancing is achieved because jobs are more evenly distributed between all of the devices included in the drive pool.
- Cascaded drive pools - you can group two (or more) devices of the same drive type and capacity together so that large backups that exceed the capacity of one media automatically continue on the next drive defined in the drive pool. In other words, you can group two or more devices together to appear as one logical drive of larger capacity.

The following illustration details a Backup Exec Drive Pool Model:



Integrated Device Partition Utility - Backup Exec for Windows NT/2000 features an integrated device partition utility that defines partitions and offers a view in the device tab. This enables the submission of jobs to partitioned drive pools and allows a library in a shared storage fiber environment to be shared by Backup Exec for Windows NT and Backup Exec for NetWare products.

Using Microsoft's Removable Storage Feature with Backup Exec

Removable Storage is a feature of Windows 2000 that allows applications to share the use of removable storage devices such as tape drives and autoloaders. Removable Storage queues requests for tape mounting and drive use from different applications and performs the actions on a FIFO basis. It also tracks media usage for online media (media currently mounted in an autoloader) and for offline media that has been installed previously in an autoloader.

On the backup server, you can allow Removable Storage to share the devices between two or more applications, or you can allow some or all devices to be controlled and used exclusively by Backup Exec's Advanced Device and Media Management (ADAMM). If the device is enabled in Removable Storage, Backup Exec will use Removable Storage for device and media operations; if the device is disabled in Removable Storage, Backup Exec's ADAMM will control the device directly.

If you do not need to share the devices, exclusive use by ADAMM will allow faster tape backups and restores due to Backup Exec's usage of VERITAS' own tape drivers. If you allow exclusive use by ADAMM, you can still enable or disable devices in Removable Storage while ADAMM is running; ADAMM will respond by switching to other devices as appropriate.

Note: If the Shared Storage Option is installed on this backup server, Backup Exec disables all fibre channel-connected devices in Removable Storage. You cannot re-enable the devices in Removable Storage until the Shared Storage Option is uninstalled.

The Removable Storage database is automatically backed up by Backup Exec and can be restored if necessary.

Choosing Removable Storage during Backup Exec Installation

During installation of Backup Exec onto a Windows 2000 server, you can choose to allow all newly-discovered devices attached to the backup server to be used exclusively by Backup Exec and disabled for use by Removable Storage Manager (RSM). If Backup Exec is the only application you expect to use that will require storage devices, this is the recommended setting. You can re-enable a device for use with Removable Storage later using the Microsoft Management Console.

If you are running other applications that also need to access the storage devices, you can choose to keep the current Removable Storage setting for any newly-discovered devices and allow Backup Exec to share those devices with the other applications.

If you are currently running Backup Exec on Windows NT 4, and you upgrade the server to Windows 2000, Removable Storage claims all devices by default. If necessary, use the RSM MMC console to disable some or all devices in Removable Storage. Any disabled devices in Removable Storage are claimed by Backup Exec.

Note: Install Backup Exec only when Removable Storage is running. If Removable Storage is started after Backup Exec has been installed, it is unable to attach to the SCSI changers, and consequently, will mark all of the changers as offline. You must reboot the server in order for Removable Storage to operate, even if you stop Backup Exec services. Set Removable Storage to automatic start so that subsequent rebooting of the server does not re-introduce the problem.

Using Removable Storage with Devices and Media

Backup Exec's ADAMM uses Removable Storage to manage the short term, online life cycles of media that are otherwise managed over the long term by ADAMM. While Backup Exec allows media to be moved from one server to another without loss of media identity, Removable Storage does not. Therefore, when ADAMM media is physically removed from a changer or stand-alone drive, information on that media is deleted from the Removable Storage database.

When the media is reintroduced to a changer or stand-alone drive on either the original server or any other server within ADAMM's domain, the header media identification information is re-synchronized and entered into the local Removable Storage database. This re-synchronization step ensures that media will be protected from being accidentally overwritten by another application.

Using Media in Drives Managed by Removable Storage

Use the RSM Microsoft Management Console to manually control the movement of media into and out of the changers and drives managed by Removable Storage. Additional functions are provided to allocate media to one application process or another and to prepare new, imported, or unrecognized media for use within the Removable Storage domain.

Operations that may be detrimental to data, such as erasing a tape that is still in use by an application, are rejected by Removable Storage. Similarly, Removable Storage does not allow media to be moved from one application's assigned media pools to another. For example, Backup Exec cannot acquire a tape used by NT Backup via Removable Storage.

Whenever you perform a manual function that affects the status of removable media, ADAMM receives a notification so that it can immediately take any appropriate action. This action is reflected in the views provided by the MMC. For example, if a tape is inserted into a changer managed by Removable Storage and that tape has an ADAMM signature stored in its header, that tape is automatically moved from the import pool to the Backup Exec pool as soon as the header is read by Removable Storage and reported to ADAMM. You will see the tape disappear from the Import pool with no other local notification if it is being viewed at the time that this occurs.

Media that is assigned by Removable Storage to another application cannot be accessed by ADAMM. Media in the Removable Storage Import and Free media pools are available for use in Backup Exec, and can be assigned to Backup Exec using one of the following methods:

- In Computer Management on the local machine, under the Storage node, open Removable Storage, and then open Media Pools. Move media from the Import or Free media pools into a Backup Exec media pool (see your Microsoft Windows 2000 documentation or online help for details). The next time that Removable Storage is scanned, any media that is in the Backup Exec pool is allocated to Backup Exec and marked as in use by Backup Exec.

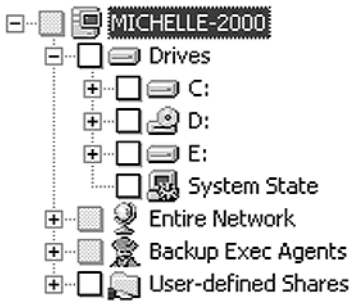
- Acquire available media through normal ADAMM operations or through interaction with the Backup Exec alerts. This media is then placed in the Removable Storage Import pool and can be accessed by ADAMM using the policies you established for Imported media. Media that is in the Removable Storage Free media pool or that is unrecognizable by Removable Storage is marked as unknown media within ADAMM. You must run Backup Exec's Inventory utility to mount and read the media header. The media is imported into Backup Exec and marked as in use by Backup Exec.

If you do not want that media used by Backup Exec, delete it from the ADAMM database via the Backup Exec user interface. It will return to the Removable Storage Free media pool.

Selecting Devices and Data to Back Up

Similar procedures are used to select data for backup operations whether you are making selections from local drives, System State, network drives, Backup Exec Agents, Novell Storage Management Services, or User-defined Shares.

In the Backup Exec Backup Selections tab, you can select data to back up from the following types of devices (the Novell SMS devices are only displayed when the NetWare Agent is used):



Note: If the account to which you are logged in does not have sufficient rights, you are required to supply the user name and password for any remote device you select.

Backup Methods

You are required to specify a backup method when setting up a backup operation. This becomes especially important when you implement a backup strategy. In most backup strategies, it is important for the backup software to "know" whether a file has been created or changed on the system since the last backup. This is accomplished by a file attribute called the "archive bit."

When files are created or updated, their archive bit is switched "on" to indicate that they have not been backed up. Depending on the backup method you specify for the backup operation, Backup Exec will either switch the archive bit "off" to show that the file has been backed up, or leave it intact, indicating that it has not been backed up. Does this mean that you always want to specify a backup method that switches the archive bit off? Not necessarily. Many backup strategies require a combination of backup methods.

Normal - All selected files. Using this method, the archive bit is switched off so the files will appear to the system as having been backed up.

Copy - All selected files. Using this method, the archive bit is left intact so the files will appear to the system as not having been backed up. Copy allows you to back up data without affecting your backup strategy.

Differential - Selected files that were modified or created since the last Normal backup. Using this method, the archive bit is left on so the files will appear to the system as not having been backed up.

Incremental - Selected files that were modified or created since the last Normal or Incremental backup. Using this method, the archive bit is switched off so the files will appear to the system as having been backed up.

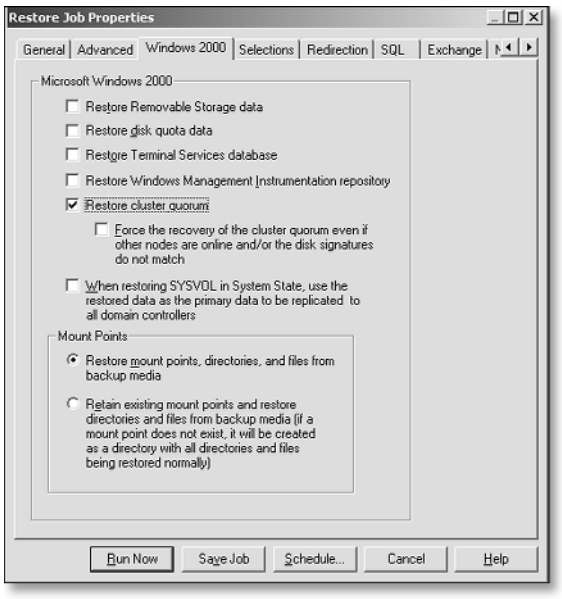
Daily - Files that were changed or created today. The archive bit is left intact.

Working Set - Includes all files that were created or modified since the last Normal or Incremental backup, AND you can specify to include all files accessed within the last x days. Using this method, the archive bit is left on so the files will appear to the system as not having been backed up.

Restoring Windows 2000 Features

A view of Backup Exec's Restore tab illustrates the ease of navigation and granularity that users have in determining their Windows 2000 protection strategies.

To restore the Removable Storage database, disk quota data, Terminal Services database, Windows Management Instrumentation repository, a cluster quorum, SYSVOL in System State, and Windows 2000 mounted volumes, select options from the Restore|Windows 2000 tab.



Restore|Windows 2000 tab

Restore Removable Storage Data - Backup Exec allows the flexibility to restore the Removable Storage database. The Removable Storage database is stored in the Systemroot\System32\Ntsmsdata directory and is automatically backed up when the system directory is selected for backup. Removable Storage is a service used to manage removable media and storage devices; it allows applications to access and share the same media resources.

Restore Disk Quota Data - Users can elect to restore disk quota data. Disk quota data is automatically backed up when the root directory of a volume is selected for a backup. Disk quotas track and control disk usage on a per user, per volume basis; the values can be restored to the limits that were set before the backup.

Restore Terminal Services Database - Backup Exec provides the ability to restore the Terminal Services database. The default location for the Terminal Services database, which contains licensing data for client licenses, is the Systemroot\System32\LServer directory and is automatically backed up when the system directory is selected for backup. Terminal Services allow client applications to be run on a server so those client computers can function as terminals rather than independent systems.

Restore Windows Management Instrumentation Repository - Users can restore the Windows Management Instrumentation (WMI) repository. The WMI repository is stored in the Systemroot\System32\wbem\Repository directory and is automatically backed up when the system directory is selected for backup. The Windows Management Instrumentation repository provides support for monitoring and controlling system resources and provides a consistent view of your managed environment.

Restore Cluster Quorum - Backup Exec can restore the cluster configuration. Users also have the option to force the recovery of the cluster quorum even if other nodes are online and/or disk signatures do not match. This allows a restore of the cluster configuration even if other nodes in the cluster are online and/or the disk signatures do not match. Any changes made to the cluster quorum after the last backup will be lost. This option is only available if Restore Cluster Quorum is also selected.

When restoring SYSVOL in System State, use the restored data as the primary data to be replicated to all domain controllers - If there is more than one domain controller in your organization and you want to ensure that the restored data is replicated to other servers you can use this option. If this option is not selected, the restored data will appear to be older than the data that currently exists on the domain controllers which may cause the servers to overwrite the restored data.

Note: If you select this option, you must first perform a restore of the System State data.

Restore mount points, directories, and files from backup media - Select this option to overwrite existing mount points on your system.

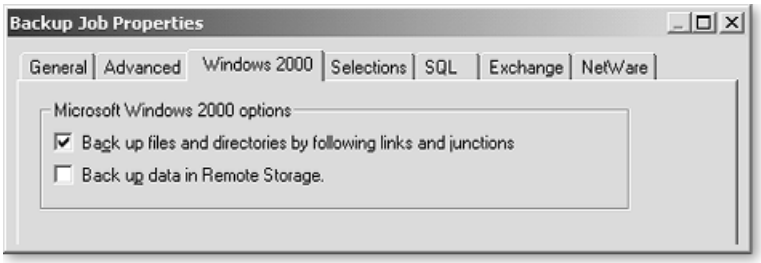
Retain existing mount points and restore directories and files from backup media (if a mount point does not exist, it will be created as a directory with all directories and files being restored normally). Backup Exec provides flexibility to prevent the mount point data on the backup media from overwriting the existing mount points on your system. If a mount point does not exist, the mount point data will be restored as directories and files from the backup media.

Note: To ensure that the mount points are not overwritten, you can perform a redirected restore.

Optimization for Mixed Environments

As pure Windows 2000 environments are months or even years away, users of mixed environments require products that allow them to realize Windows 2000's benefits without having to maintain an older application for the purpose in managing and protecting their legacy Windows NT 4 applications.

Users of VERITAS Backup Exec can benefit greatly by the fact that VERITAS, the industry's leading enterprise-class application storage management software provider, has designed its new version of VERITAS Backup Exec for Windows NT/2000 to support both Microsoft's Windows 2000 and Windows NT environments. Backup Exec for Windows NT/2000 is ideal for environments still running a mix of Windows NT 4, since it has isolated within the user interface items that must be considered when protecting Windows 2000. This provides users one application where they can incorporate their Windows NT and Windows 2000 specific protection criteria within a single backup or restore operation.



Backup/Windows 2000 tab

This localization of Windows 2000 specific protection criteria further benefits legacy users of Backup Exec for Windows NT resulting in minimal training requirements based on the user interface that they are already familiar with. By isolating the Windows 2000 specific protection elements to a single tab, user productivity is enhanced allowing the product to be installed and utilized right out of the box.

Users should take note that to restore data to a Windows 2000 Professional, Server or Advanced Server system, the backup server running Backup Exec must be a Windows 2000 system. Although Backup Exec installed on a Windows NT 4 system can backup Windows 2000 systems, it cannot be used to restore data to these systems due to the new Windows 2000 operating system components that Windows NT 4 servers are not designed to handle.

Conclusion

The Microsoft Windows 2000 offers users an operating system built for businesses of all sizes, along with the comprehensive set of Web services, performance enhancements and administration advantages over Windows NT 4. These changes provide significant user benefits but result in new challenges for all backup applications.

VERITAS Backup Exec for Windows NT/2000 leverages Windows 2000 core components to provide a high performance, reliable, easy to use data protection solution.

Standard features include built-in wizards that make even the most complex operations simple; a unique Backup Exec Assistant that streamlines start-up, system configuration, job scheduling, device and media management; centralized management and network-wide scheduling that automates backup operations from a single console.

VERITAS Backup Exec already protects millions of servers and workstations, from small businesses and workgroups to highly distributed Windows NT environments, including those running the Professional, Server, Advanced Server or Data Center editions of Microsoft Windows 2000. It uses a licensing structure that scales from the entry-level to high-end servers as well as stand alone storage devices, library storage systems and SAN technology that maximizes a company's hardware investment.

Combined with the wide array of options – including Disaster Recovery for Windows NT/2000, "best of breed" database agents for SQL Server and Exchange database Server – VERITAS Backup Exec v 8.0 ensures continuous availability of user data and applications, providing "business without interruption."

Notes

VERITAS Software
Corporate Headquarters
1600 Plymouth Street
Mountain View, CA 94043

North American Sales Headquarters
400 International Parkway
Heathrow, FL 32746
800-327-2232 or 407-531-7501
407-531-7730 Fax

Global Locations

United Kingdom
0800-614-961 or
44-(0)870-2431000
44-(0)870-2431001 Fax

France
33-1-41-91-96-37
33-1-41-91-96-38 Fax

Germany
49-(0)69-9509-6188
49-(0)69-9509-6264 Fax

South Africa
27-11-448-2080
27-11-448-1980 Fax

Australia
1-800-BACKUP
612-8904-9833 Fax

Hong Kong
852-2507-2233
852-2598-7788 Fax

Japan
81-3-5532-8217
81-3-5532-0887 Fax

Malaysia
603-715-9297
603-715-9291 Fax

Singapore
65-488-7596
65-488-7525 Fax

China
011-8610-62638358
011-8610-62638359 Fax

Electronic communication

E-Mail:
sales.mail@veritas.com

World Wide Web:
http://www.veritas.com

90-00984-910 • NT01-W2KTERMWPR-9900