issue / four.two

VOX VERITAS®

THE VOICE OF VERITAS

DATA AVAILABILITY 101:
Questions and Answers
with Availability Expert Evan Marcus

VERITAS DELIVERS NEW QUALITY OF STORAGE SERVICE
for Storage Area Networks

VERITAS SANPOINT CONTROL™ V2.0
Realizing SAN Potential
with a Powerful Centralized Management Tool

THE VERITAS STORAGE MIGRATOR™
Product Family
Storage Management for Intelligent Data Growth

EXCITE@HOME
Uses VERITAS Technology
To Improve ROI and
Increase Backup Performance

VOX VERITAS®

Contents

ISSUE / FOUR.TWO / WWW.VERITAS.COM

Editor
Chris Lemoine (clemoine@veritas.com)

Layout Design
Dennis Ocasio (docasio@veritas.com)
Sarah Hardy (shardy@veritas.com)
VERITAS Marketing Communications
Creative Services
400 International Parkway
Heathrow, Florida 32746

Cover Illustration/Design
Sarah Hardy (shardy@veritas.com)

Contributing illustrations by Creative Services designers James Poole and Sarah Hardy.

Comments or Questions
Send e-mail to vox@veritas.com for comments or questions regarding VOX VERITAS, or to receive your free subscription.

VOX VERITAS magazine is published quarterly by VERITAS Software Corporation, 1600 Plymouth Street, Mountain View, CA 94043.

Letter from the CEO

Availability Concepts

Success Story

SANS

Products and Applications

TechVOX

Services

Activities

Events

JUST RELEASED

VERITAS Backup Exec™ *for Microsoft Windows NT and Windows 2000* Version 8.6 Enhances Market-Leading Data Protection Software

VERITAS just released version 8.6 of its leading data protection software for Windows environments, VERITAS Backup Exec™. Backup Exec 8.6 will be covered in more detail in the next issue of VOX. The product comes with a large number of new capabilities and enhancements of existing functions.

New and enhanced features in Backup Exec 8.6 include:

Intelligent Image Option – The Intelligent Image Option allows for shorter backup times and the reduction of host-server CPU cycles by creating a map of the file system, then producing a single file of the volume's image, eliminating the overhead of file-by-file backup.

Agent for Microsoft SharePoint Portal Server – Backup Exec is the first solution to offer integrated online data protection for Microsoft's SharePoint Portal Server, the intranet knowledgebase management application.

Agent for Lotus Domino – This Agent is now enhanced to use the native backup APIs in Lotus Domino R5 for online, integrated recovery of R5 messaging and databases. It protects both local and remote R4 and R5 databases.

Certified for Microsoft Windows 2000 Datacenter – Only VERITAS data protection solutions carry certification for the complete line of Microsoft operating systems. The Advanced Server Edition of Backup Exec for Windows NT and Windows 2000 will be able to install on and protect local or remote Windows 2000 Datacenter Server deployments.

Backup to Disk – This allows you to execute faster backups and restores by using disk hardware, including hard drives, NAS appliances and RAID systems as storage media.

Specified Backup Network – This feature allows administrators to isolate backup traffic to a sub-network through which to send backup traffic. Doing so will reduce the amount of traffic on the primary LAN and lead to increased data transfer performance.

Web-based ExecView – This backup server monitoring tool is now updated with a new architecture and Web-based graphical user interface. From any computer with a Web browser, administrators can log into the network and review the current activity of all Backup Exec servers.

Want more information? Take a look in the VERITAS Backup Exec pages in the Products area of VERITAS.com.

CEO Corner

Gary Bloom | Chief Executive Officer and President of VERITAS Software

Dear Customer:

The arrival of the Internet has forever altered the role of data in business. The "connected" marketplace creates limitless reach and opportunities – presenting the possibility of soliciting new mass markets while simultaneously fostering highly personalized one-on-one customer relationships. This introduces unprecedented competitive pressures and customer demand for real-time response.

In this environment, data is clearly a company's greatest asset and must be intelligently leveraged to assure survival… tracking and pursuing new markets… anticipating and meeting individual customer needs… documenting market trends to develop better products and services. The solutions necessary to manage this new age of digital information go beyond the conventions of storage management, which are tactically focused on simply "parking" and protecting data.

In the digital marketplace, data achieves its maximum strategic value and impact when in motion – allowing it to be rapidly accessed, shared, replicated and manipulated in critical applications at every level of a business enterprise. Data availability keeps data in motion by enabling reliable, unfettered delivery across diverse computing environments, from the desktop to the data center. Broader and more strategic than storage management, data availability empowers users to fully leverage data storage, applications and the Internet.

VERITAS Software is The Data Availability Company. We're uniquely suited to this mission because we envisioned the need and shaped our technological innovations, relationships and infrastructure to provide a data availability "platform" for the market. Validating this vision are the world's leading technology vendors who have integrated and leveraged VERITAS technology as a vital component of their own innovative solutions and market positions. The ever-growing VERITAS partnership list features the biggest names in virtually every segment of enterprise storage, server, application and networking technology. They have helped create an industry-standard VERITAS data availability "layer" across multivendor systems. When installed, all of our highly featured solutions integrate easily on a common foundation, to provide seamless and highly automated data availability.

> "VERITAS solutions create the means not only to rapidly convert data into business intelligence, but to make it widely accessible as well."

Data availability solutions from VERITAS yield profound business benefits. VERITAS solutions create the means not only to rapidly convert data into business intelligence, but to make it widely accessible as well. The result: the virtual elimination of downtime, reduced operating costs, enhanced productivity and unmatched flexibility to respond to new opportunities. Ultimately, VERITAS data availability solutions deliver a better bottom line and a stronger, more competitive market position – an imperative for companies seeking success in the Internet age.

VERITAS plans to further solidify its place in the technology market's highest tier by aggressively executing our three-pronged expansion strategy:

1. Extend our leadership position in the data availability market through innovation and continued increases in research and development investments. Our investments enable our customers to achieve increasing levels of data availability.

2. Continue expanding support for the diverse combination of servers, operating systems, networks and storage systems used by our customers. VERITAS' heterogeneous strategy enables our customers the broadest choice for interoperability of multiple hardware solutions in the market, leading to improved access to data and dramatically lower costs.

3. Increase the strength and success of our international operations by further expanding our sales and service capabilities to tap into the global markets where interest and requirements for our software are accelerating.

VERITAS is uniquely positioned to thrive in today's ever-changing economic climate. Thank you for your support, and I look forward to sharing the next chapter of our growth adventure with you.

Gary L. Bloom
President and Chief Executive Officer
VERITAS Software

Q&A with Evan Marcus

Availability 101: Creating Data Availability in your Business

Evan Marcus is a data availability specialist with VERITAS Software. He has more than 15 years of experience in UNIX systems. After spending five years at Sun Microsystems, Evan joined Fusion Systems and, later, OpenVision Software, where he worked to bring the first high availability software applications for SunOS and Solaris to market. Evan is the author of several articles and gives talks on the design of high availability systems. Together with Hal Stern of iPlanet he wrote **Blueprints for High Availability: Designing Resilient Distributed Systems** (2000, John Wiley & Sons). The book has been a runaway success, demonstrating the need for useful, practical information about this topic. It's about to go into its fifth printing.

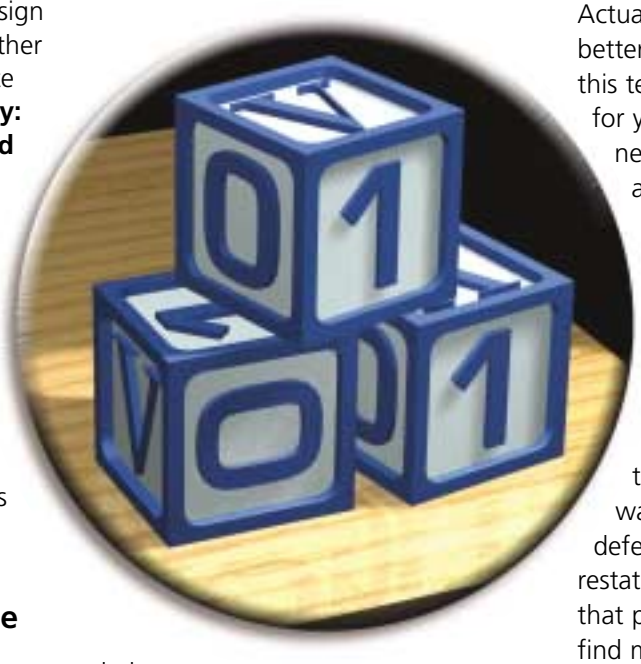
Evan has a B.Sc. in Computer Science from Lehigh University (1984) and an MBA from Rutgers University (1989).

Planning and defining the right level of availability

Evan, how would you tell a business to go about deciding what level of data availability it should have?

EM: I never tell a business what level of availability they need. They tell me. You need to learn what the cost of downtime for a particular system is. If my customer doesn't know that, then I dig deeper and ask what business is done with the system. Availability costs money. In order to find an appropriate level of availability for a particular system, you need to determine how much money you can afford to spend to protect it.

Customers will often say that they want hundred percent uptime. Even if hundred percent uptime were possible – it's not – nobody could afford it. You have to strike a balance.



There will always be calamities that you cannot protect against. What's more, there will always be certain types of failures you cannot recover from without a brief interruption of some sort. Even if hundred percent availability were to become possible at some point in the future, it would probably be at such a high cost that it would not make good business sense to implement it.

How do you know that the basic level of data availability, backup, is not enough for your operation anymore?

EM: Work through a thought experiment. If your system went down, and you were forced to restore from backup tapes, how long would that take? A thought experiment may not be adequate. Actually doing a restore is a much better and more reliable way to run this test. If recovery takes too long for your business and production needs, then it's time to find additional levels of protection.

Do you think businesses will need increasingly higher levels of data availability as time goes on?

EM: I believe that most will. What I have seen is that when there is a significant outage that was not properly foreseen or defended against, a company will restate its availability requirements for that particular system, and suddenly find more money to protect it. I expect that that evolution will continue. Beyond that, many businesses are becoming more and more dependent on their systems to run their business, or to perform other critical functions. If those systems fail, the business can go down. Those systems definitely require additional protection.

What is the biggest risk to data availability in the businesses you see?

EM: Ignorance. People who design and implement critical systems often have limited knowledge of what it actually takes to deliver acceptable levels of availability. There are hundreds of stories of people who tried to build highly available systems, but missed some single component that caused the whole thing to come tumbling down. For example, there are anecdotes of people plugging systems into the same outlet, power strip, or electrical circuit, causing an overload. Or the company who had a jet engine powering their backup generator, but the day they needed it they realized that they had never filled the jet engine's gas tank. These may be extreme situations, but many of us make avoidable mistakes.

Building a high availability infrastructure

How would you define a high availability environment?

EM: High availability can be lots of things. Anything that will make computing resources available to your users a higher percentage of the time is high availability. Sometimes that's just good practice: testing, documentation, separating production from development, and so on. Sometimes it's failover or replication. The more involved the solution the more it costs. Different systems have different requirements for availability, and so different levels of spending that are appropriate. You wouldn't necessarily put failover on a small development system at a small college, but you might still take steps to protect it against simple forms of failure.

Is it plausible that a storage service provider (SSP) would be able to guarantee 99.999% availability of its services?

EM: Probably not. Any vendors who guarantee any level of availability in any product or service either don't know what they're doing or they have so many caveats that the guarantee is meaningless. There are too many external events that could cause downtime. My local phone service was out for three days last year due to a hurricane, for instance. Could a provider in California protect you against rolling blackouts? UPS systems are just battery backups, and eventually they drain.

In high availability environments many users forget to document procedures, let alone practice them thoroughly. How could one improve this?

EM: Make documentation a critical part of the effort. Make it policy for new system administrators to spend their first days reviewing the documentation. Don't accept new development efforts without adequate documentation and documentation plans. Documentation must simply become part of the routine. I also recommend you keep fully up-to-date copies of all documents available offline. You don't want to have the documentation needed to reboot a system on the system that's down.

Do you have any suggestions how businesses should best allocate their funds for training as opposed to hardware and software?

EM: Training doesn't replace hardware and software. Training makes your personnel more efficient, and better able to do their jobs. Training can save money on personnel; you don't need to hire as many people, and you can make better use of those scarce resources when they are properly trained.

What is the best way to write up the projected return on investment to justify an expenditure in technology?

EM: This is going to sound much simpler than it really is. The way I would approach ROI is to consider all of the outages that a particular solution will prevent or reduce, or even increase as part of a larger solution. Determine the likelihood of each downtime event, the expected duration of the outage, and cost of downtime per hour. Examine the state of the system relative to these factors before you apply a particular solution, and then look at it after you apply the solution. Subtract the first from the second, and compare that to the total cost of ownership of the solution.

What do you think of the state of SANS today, and how will they play into high availability?

EM: SANs are likely the future of high availability. They make failover configurations much more economical. They make it easier for more systems to take part in a cluster. They also make it easier to centrally protect data. Data can be, say, mirrored or RAIDed in a central data store, and then made available to cluster members already protected. This simplifies administration on the system end a great deal.

With the advent of SANS and cluster file systems, where multiple hosts can serve the same application or data,

how important is single-host availability?

EM: What matters most is application availability. The host is nothing more than a mechanism for delivering application service. That is the place to concentrate your protection efforts. Any particular host is valuable, of course, but only in its ability to deliver the expected service. SANs make it much easier to keep services going, though, because more hosts are available to back each other up.

Increasing the viability of your high availability solutions

Most high availability solutions on the market today center around RAID, with a single point of failure at the controller. Is there a way to avoid this?

EM: The more common single point of failure that I have seen is in the box itself. Any RAID-array solution has single points of failure. I do not recommend putting all of your disks in a single container. My favorite approach for avoiding this single point of failure is to use multiple controllers that each connect to separate disk arrays, and mirror the data between the arrays. I am not aware of any specific products that may be coming along to address this, though.

File system corruption on a shared disk often becomes a single point of failure. How can I remove it?

EM: When vendors introduce file system rollback, as there is for databases today, you should be able to send the file system back in time to a point when no corruption existed. Of course, doing all the right things, such as shutting down systems when you can, will prevent an awful lot of file system corruption.

What are the most common sources of failures in single-site high availability designs?

EM: In single-site high availability designs, it's most often the environment: power, cooling, interference from neighboring systems, things like that.

What do you recommend to configure high availability between businesses that may each own parts of a transaction or a relationship?

EM: Separation. Would you want a problem in business A's application to affect business B's? In most environments, that's just not going to be acceptable.

Today, a lot of companies are placing their Web hosts in sophisticated IDCs – Internet data centers – with several layers of redundancy in their power delivery and internet connectivity. How much emphasis should be on bare metal recoverability of the hosts themselves?

EM: Bare metal recovery is a very important element of availability. If you lose a system disk, it could take hours to rebuild it if you have to reinstall the operating system and then reinstall your applications, as opposed to performing a bare metal recovery.

Can I fail over between a system at a main site in one city and a remote site in another city in a different state?

EM: Yes, but there is a fundamental difference between local failover and remote failover. Despite what some vendors tell you, it is a really bad idea to fail over between two remote sites. The cut-off between local and remote sites is determined by the technology. If two systems can access the same disks at the same time and can live on the same subnet, then they are candidates for local failover. Updates made to one system can be quickly and easily accessed from the other once a failover is completed.

I've seen problems of "false failover" due to loss of network heartbeat. Besides being a hardware issue, how common is it for this to happen?

EM: I have not seen this happen very much at all. Good failover software gives its heartbeating a high priority, and when the system can squeeze out even a cycle or two, those will go toward heartbeat maintenance. Of course, if your critical systems are performing that poorly, then you have other availability problems that need to be addressed.

Do you recommend looking at fault-tolerant systems?

EM: Not really. Failover technology, implemented properly on reliable and well-designed hardware systems, can be just as reliable as any fault tolerant system. Remember, fault tolerant systems only protect against hardware faults. A software or operating system fault will crash one of those systems just as quickly as it will a regular UNIX box.

Do you have any suggestions for how businesses should evaluate providers of data storage management software?

EM: The advice I would offer here is the same as I would offer when evaluating any provider of hardware or software. Look for stable,

Continued on page 15

SUCCESS STORY

Excite@Home Uses VERITAS Technology to Improve ROI and Increase Backup Performance

The customer

The Excite portal, provided by Excite@Home, the leader in broadband, is a leading Internet content site that more than 15 million visitors view per day. Excite initially offered users free, customized news and information. Today, the Excite portal's services have expanded to include 18 programmed channels of content, state-of-the-art search technology, Web-based e-mail, PAL instant messaging, chat functions and online shopping.

The challenge

Excite@Home needed a tool that would give it the highest reliability and confidence in the systems that run the Excite portal. Because it has more than 15 million online users per day, downtime would mean lost customers, and lost customers would mean lost revenue. "Lack of availability is one of the most compelling reasons for today's online users to go somewhere else," said Rich Inglis, senior systems administrator at Excite@Home. "We knew from the start that our systems needed to be available to our customers 24 hours a day, seven days a week."

Excite@Home also needed a backup solution to protect the large amount of critical online data generated every day on the Excite portal, such as customer profiles, content and billing information.

The solution

The criteria for selecting a data-management solution are always more stringent for an Internet-based business. With customers accessing information 24 hours a day, seven days a week, there is no time to bring down the system to optimize files or restructure databases. All this must be done quickly and in the background, without affecting the customer's experience.

Excite@Home initially received an offer for a data management solution from its hardware vendor. The software package was compatible with Excite@Home's servers and was free, but the company declined. Instead, it chose VERITAS Database Edition™ *for Oracle*, a package that includes VERITAS Volume Manager™ and VERITAS File System™ with VERITAS Quick I/O™. "We had previous knowledge of VERITAS software and we knew that it was scalable, reliable and easy to use," stated Inglis. "In a business world centered on ROI and cost analysis, it's really a testament to the quality of the VERITAS Software products when customers choose them over a free software solution."

The automation and functionality of VERITAS Database Edition allow Excite@Home to effectively manage the systems that run the Excite portal. "With VERITAS Software we can have far fewer administrators managing a large array of storage," explains Inglis. "It has been said that you need one administrator for every 250 GB of storage. We're operating with only one administrator for every 10 TB of storage." Excite@Home attributes this performance to the manageability brought by VERITAS Volume Manager and VERITAS File System.

VERITAS Quick I/O also reduces the operating costs of Excite@Home by offloading CPU burden onto disk. As a result, Excite@Home can operate the Excite portal with fewer computers. "If we didn't have VERITAS Quick I/O, we would need to buy bigger computers. This would not

be cost-effective," stated Inglis. "VERITAS software has definitely saved us a lot of money. We figure that for every VERITAS Quick I/O instance we save $50,000 per server."

As a backup solution, Excite@Home initially implemented a software package recommended by a vendor. It worked for a while but couldn't keep up with the vigorous growth of the Excite portal. Two years after implementing the software, it became ineffective. "We had 1.5 million files that we were backing up at the time," said Inglis. "If we had to restore the files, it would have taken the software 20 days, working around the clock, to restore. This isn't timely. At one point it became quicker to re-create the data by hand than to restore it off the tapes."

Then Excite@Home implemented VERITAS NetBackup™ DataCenter. Excite@Home anticipates that the VERITAS solution will be able to keep pace as the Excite portal grows and continues to add broadband features. The Excite portal currently has 120 TB of data and expects this number to double every year. With VERITAS NetBackup DataCenter in place, Excite@Home feels confident that the Excite portal data will be backed up consistently and will be recoverable in a matter of hours.

"VERITAS Software is a successful company because it is always writing the scripts and improving its products the way that the administrators would like them to be improved. So you know that it is providing you with tools that are going to be useful to you," said Inglis. "I count on VERITAS Software to continue to provide new and better ways for my team and me to get our jobs done right – the first time. That's what's critical to me and critical to Excite@Home."

Overview

Excite @ Home

The Customer

The Excite portal provided by Excite@Home, the leader in broadband, features free, personalized Web services, multiple programmed channels, state-of-the-art search technology, Web-based e-mail and online shopping

The Challenge

Replace legacy backup system with a solution that will scale to meet the growing demands of the Excite portal

The Solution

- VERITAS Database Edition™ *for Oracle*
- VERITAS NetBackup™ DataCenter

Business Benefits

- Less administrator time needed to manage database
- Scalable database backup solution
- Reduced costs by eliminating need for larger computers

VERITAS™

By Debbie Perry, Product Marketing Manager, SAN Solutions, VERITAS Software

VERITAS Delivers New Quality of Storage Service for Storage Area Networks

"Storage is a highly visible investment for most IT organizations. VERITAS Software has been working with a wide range of enterprise customers over the past year, defining new processes and tools to efficiently deliver storage as a service to critical applications. The Quality of Storage Service model satisfies the requirement of our customers for heterogeneous management of SANs and ensures VERITAS' continued leadership in the SAN software market."

— Gary Bloom
President and CEO
VERITAS Software

Last March, CEO Gary Bloom and other executives presented VERITAS' Quality of Storage Service (QoSS) vision and technology roadmap to a large group of customers, partners, press, analysts and industry observers at corporate headquarters in Mountain View, California. Announcements included key partnerships with Cisco and INRANGE Technologies and the introduction of VERITAS SANPoint Control™ 2.0, the software application that simplifies and centralizes the management of heterogeneous SANs (see page xx of this issue).

Guests attending the event took part in the first public tour of the VERITAS Integration Lab (iLAB). The iLAB, tightly integrated with VERITAS' SANPoint Consulting Services, is a key component of the VERITAS SAN initiative. The VERITAS iLAB has generated a wide variety of pre-tested SAN configurations by working closely with virtually every server, storage and infrastructure vendor in the industry. Leveraging ten years of software development and testing expertise, the iLAB performs extensive stress and interoperability testing on complete SAN solutions in order to recommend truly robust configurations. When they use the extensive SAN knowledge base that results from thousands of hours of deployment and integration expertise, IT organizations can accelerate the deployment of SAN solutions with confidence.

A new IT operations model to reduce cost and complexity of managing storage

While SANs deliver the physical connectivity necessary for centralized storage management, storage virtualization is an enabling technology that makes centralized, logical representation of mixed physical infrastructures possible. Storage virtualization dramatically reduces the need to manage heterogeneous storage infrastructures on a vendor-specific basis.

Managing these highly centralized infrastructures and data centers has increased the accountability of data center teams. A wide range of "storage accounts" such as end-users, applications, departments or even external organizations (in the case of xSPs) often rely on overburdened teams to supply access to storage in such a way that it meets their unique performance, availability or security needs. In order for data center teams to efficiently support the complex storage needs of individual storage accounts, they need to adopt a new administrative model.

The new Quality of Storage Service model makes use of many years of SAN deployment expertise at VERITAS. This administrative model outlines best practices for monitoring and managing enterprise storage environments. QoSS acounts for the fact that IT organizations are creating a new role of the storage administrator, a person qualified and

equipped with all tools to manage highly centralized and heterogeneous storage environments successfully. Specialized storage administrators are then accountable for delivering the quality of storage needed by each organization, called a storage account. The storage administrator must be able to deliver storage management services in four key areas of the QoSS model. For this, IT organizations need to define requirements and measure storage service delivery for each of their storage accounts in these metrics:

- **Time-to-recovery** defines the time required for an application to recover after a failure and have its data back online
- **Time-to-capacity** is the rate that new storage with the necessary reliability and performance characteristics can be assigned to an application and available online, or "provisioned"
- **Application performance guarantees** ensure the storage infrastructure delivers the performance needed by specific applications
- **Survivability of data** gives assurance that an application's stored data can be recovered from a range of failures or administrative mistakes

VERITAS is supporting its customers with new storage virtualization and centralized data availability solutions that address elements of each of the four identified QoSS metrics. VERITAS SANPoint Control 2.0, a comprehensive SAN-management application, has the advanced storage provisioning features necessary to dramatically decrease time to capacity for each storage account. VERITAS SANPoint Foundation Suite HA, announced in January 2001, delivers advanced, integrated high availability clustering, using VERITAS Cluster Server™ and data-sharing storage virtualization technologies to dramatically reduce the time required for enterprise applications to recover from a failure. Important VERITAS solutions that address survivability of data include VERITAS NetBackup™, including VERITAS VERTEX™ Initiative innovations, and VERITAS Volume Replicator™. In combination with VERITAS Volume Manager™, the expanded VERITAS V³™ Storage Virtualization Initiative will be an increasingly powerful platform for solutions to address QoSS concerns.

Business and operational benefits of QoSS

The QoSS model can yield significant efficiency increases as it addresses the escalating costs of storage and optimizes the impact of highly skilled IT staff. By combining new processes, tools and technologies, there are five ways in which deploying a QoSS can affect your bottom line:

- QoSS increases the visibility of the generally hidden administrative costs of data storage with a billing or charge-back model for each storage account, based on levels of service, giving you an improved cost control mechanism.
- QoSS reduces delays for IT projects caused by lack of storage skills by relying on a specialized storage administrator team with up-to-date storage expertise.
- QoSS removes inefficiencies by exploiting the economies of scale of centralized procurement and by sharing of consolidated server and storage resources.
- QoSS enables flexibility to optimize storage costs and characteristics for the changing needs of specific applications or organizations by allowing storage administrators to configure varying levels of service without a high degree of manual reconfiguration.
- QoSS supports high levels of storage service – e.g., very fast application time to recovery – and makes it possible for data to remain available even when the business is experiencing potentially catastrophic failures; this service level might be impossible without a working QoSS model because of costs or complexity.

New developments in VERITAS V³ storage virtualization technologies

As part of the ongoing VERITAS V³ SAN initiative, the company develops innovative storage virtualization technologies that work in combination with VERITAS SANPoint Control to let storage administrators further reduce time to capacity. As an optional element to VERITAS SANPoint Control, VERITAS Software will soon deliver a new V³ Intelligent Provisioning Service (IPS) to intelligently automate the provisioning of storage to storage accounts with a rules-based engine. V³ IPS reduces the complexity of storage provisioning based on needs of server applications in increasingly large, heterogeneous SAN installations. VERITAS engineers are also developing VERITAS V³ SAN Volume Manager, a scalable SAN-wide volume provisioning service based on VERITAS Volume Manager™. SAN Volume Manager will allow SAN administrators to more flexibly provision storage at a logical level.

Continued on page 15

By Gina Kieslich Bajenaru, Senior Product Marketing Manager, VERITAS Software

VERITAS SANPoint Control™ 2.0: Realizing SAN Potential with a Powerful, Centralized Management Tool

VERITAS SANPoint Control Key Features

- *Automatic and comprehensive SAN discovery, visualization and inventory reporting*
- *Physical and logical mapping of storage resources to host applications to ensure secure ownership*
- *Logical storage grouping and capacity reporting to aid in the effective allocation of storage, including integration with VERITAS Volume Manager™ for storage virtualization*
- *Centralized event management, ensuring SAN device performance and availability*
- *Easy, user-customizable policy management*
- *Real-time and historical performance data for quality of service reporting*

SAN deployment has numerous advantages, including cost management through storage consolidation, higher availability of data, better performance and seamless management of online and offline data. These resources can become truly effective only when administrators enjoy full control over the entire SAN environment with a centralized SAN management solution. VERITAS SANPoint Control™ gives SAN administrators the comprehensive centralized management functionality they need. The product supports the Quality of Storage Service model VERITAS recently published (see article on page 10). VERITAS' partnerships with leading SAN providers and participation in SAN standards initiatives ensure that SANPoint Control continues to find broad industry and customer acceptance (see article on page 16). SANPoint Control can deliver the availability, scalability and manageability essential to SAN operations for existing, growing and new SANs. This article is an overview of what this product does and what's new in version 2.0.

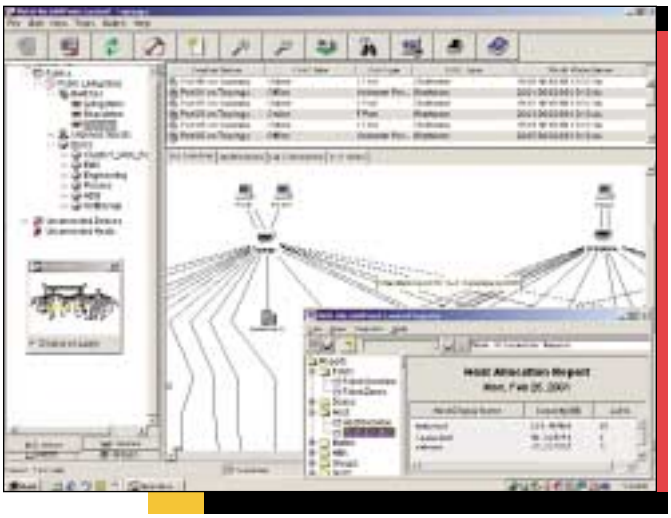
Many SAN management products offer the ability to understand the physical connectivity of the SAN through the discovery of device interconnects. This approach is limited to a one-sided view of the SAN, only displaying a "switches perspective" of physical connections. Optimal SAN management must occur at two levels – physical and logical – to maintain control, regardless of the underlying device environment. With the discovery of host attributes like operating system platform, operating system handles and IP address, SAN management software can make the critical link associating logical devices to a host and its applications.

VERITAS SANPoint Control delivers this data-centric management from host application through interconnect to the storage resources, regardless of the underlying hardware and operating system. As the product of a hardware-independent company, VERITAS SANPoint Control can seamlessly manage physical and logical components, bridging all the layers in the SAN. SANPoint Control has a modular architecture, enabling the integration of new standards and devices as they become available.

Keys to understanding the SAN environment: accurate discovery, visualization and inventory reporting

Keeping track of devices and their connections in the SAN is a daunting task. Today, many administrators track and provision their SAN using spreadsheets and inventory reports that are immediately outdated. SANPoint Control eliminates this by automatically discovering the physical and logical connections of the SAN, displaying the information in a

graphical topology map, and logging the data in a variety of inventory reports. Using both in-band and out-of-band protocols, leveraging industry standards, SANPoint Control automatically captures and displays details, including device-driver version, firmware level, status, performance, free and in-use port count, hardware manufacturer, model number, worldwide name (WWN) and more. With SANPoint Control, the storage administrator also can define an unlimited amount of customized attributes for each device in the SAN to track information, such as physical location, account code and many others.



With an intuitive and easy-to-use graphical user interface, SANPoint Control supports intelligent management with the capability of drilling down into the logical and physical devices on the SAN. The zooming ability makes navigating through SAN topology easy. In the topology map, integrated tool tips help identify devices and paths in the SAN, making needless navigation unnecessary. Information on SAN devices – including hosts with host bus adapters (HBAs), interconnects and storage devices – appears in context, revealing resources in zones as they are physically and logically connected. SANPoint Control also includes an easy and comprehensive search capability.

Securing storage ownership: centralized LUN management, zoning control and integration with VERITAS Volume Manager™

To give SAN applications the storage resources they require, they need secure storage from arrays and tape backup devices to the hosts within the SAN. SANPoint Control seamlessly integrates secure storage masking from leading array providers, including Hitachi Data Systems and EMC, to hosts in the SAN through easy-to-use logical unit (LUN) security wizards. SANPoint Control also supports data-path zoning control for interconnects from Brocade, QLogic, and McDATA. Using a Zone Wizard to abstract the individual interconnects' complex zoning tools, creating, adding to or deleting zones is as simple as selecting the devices.

Using VERITAS Volume Manager™ on a SAN gives the administrator many additional storage virtualization capabilities, including pooling storage across multiple disparate arrays on the SAN. When Volume Manager and SANPoint Control are integrated, the administrator can easily manage a SAN from a single centralized console, which automatically discovers and displays VERITAS volumes in its interface. In addition, SANPoint Control makes adding storage to a Volume Manager host very easy. When zoning storage to a Volume Manager host, SANPoint Control automatically initiates an operating system rescan so that the new device is immediately available for use by Volume Manager on the host.

VERITAS SANPoint Control ensures that unauthorized users cannot access SAN settings. To give administrators and operators the access they require, SANPoint Control offers two modes of security access: administrator and user. The administrator can make changes and zone the SAN. Users are limited to viewing information.

Effectively allocating storage with logical storage grouping and capacity reporting

In many enterprises and storage solution providers businesses, end customers want to know whether storage resources are managed as a group and have the focus that they require. With SANPoint Control, administrators can easily define and locate resources that are owned or leased by a specific group to make management of critical customer resources easy. In addition, the LUN Query Tool in SANPoint Control enables administrators to search the SAN for a specific type of storage that matches user-defined quality-of-service (QoS) requirements (capacity, configuration, location, RAID level, cost) and returns a list of all storage that meets those requirements.

SANPoint Control can deliver detailed capacity reports to aid in growth planning and gathers detailed information for use in charge-back reports. SANPoint Control tracks

LUN allocation to hosts as well as to storage groups, distilling real-time and historical reports that clearly show where storage resources are being consumed.

Tracking SAN events using centralized device management

The SANPoint Control real-time alert viewer monitors heterogeneous device status, providing extensive proactive management capabilities of the SAN environment. By supplying advanced policies on SAN devices, SANPoint Control monitors the status and performance of the devices and alerts when behavior falls outside acceptable user-defined boundaries. If vendor-specific management is necessary – for firmware updates, for example – SANPoint Control gives in-context launch support for element managers supplied by the device vendor. In addition, the administrator can telnet to the device to manage it directly by simply right-clicking the device in the SANPoint Control console.

Proactive SAN quality-of-service management and SAN policies

SANPoint Control presents both real-time and historical performance data for critical service-level parameters such as connectivity, available space and throughput. Real-time performance monitoring, with flexible user-defined thresholds, notifies administrators about issues that could affect overall SAN performance before they have an impact. Logging this data for reporting greatly extends the administrator's capability to audit and validate service-level agreements.

SANPoint Control has a powerful and flexible policy-management service. With this, each SAN environment can be customized to define what parameters are monitored and how they should be responded. Notification and action options for these responses include e-mail, command line script, PERL Script, and SNMP traps. Out-of-the-box policies are included, based on the collaborative knowledge of VERITAS and its partners who are SAN hardware providers. Standard reports support common storage service-level agreements.

New Features in Version 2.0 of VERITAS SANPoint Control

Support for Microsoft Windows 2000 and Windows NT 4.0

Discovery and visualization of the following devices:

- Brocade 2040/50 and 2240/50 switches
- Compaq StorageWorks array enclosures
- McDATA and QLogic switch support, enhanced with latest in-band methodologies
- Additional VERITAS Volume Manager attributes: Media Host, Media IO Paths and Media Public Capacity

Event and performance management

- Threshold-based monitoring
- Switch device and/or port status (online/offline)
- Fabric events (fabric split/join etc.)
- SNMP traps from switches and arrays
- Traffic/error thresholds on switch port or link
- Utilization/error statistics on arrays
- Environmental (power, temperature, fan etc.)
- Notification services, via e-mail or the administration console, use SNMP to communicate with management frameworks (Openview etc.)
- Policies can be either preconfigured out-of-the-box, or can be modified by the administrator, with the option of invoking a command or script

Reporting

SANPoint Control 2.0 comes with over 40 out-of-the-box reports. It also includes an ODBC-compliant database with the ability to export and create custom reports. Reports cover:

- Inventory of fabrics, devices, hosts, switches, HBAs and groups
- Capacity by host, storage device or group
- Historical alerts
- Real-time and historical performance, including traffic, errors, summary and detailed performance reports

Logical storage grouping

You can now:

- Define logical groups of SAN objects:
- Generic groups: hosts, storage devices, interconnects
- Storage groups: storage devices
- Storage accounts: hosts and devices
- Add user-defined attributes to storage
- Perform a search with the advanced storage search tool to discover LUNs that match one or more properties, like type (mirrored LUN, raid-5 LUN, etc.) or vendor (EMC, HDS, etc.)

Enhanced storage access and allocation

- Switch-based zoning administration
- LUN security (LUN binding and LUN masking) for EMC, HDS and Compaq arrays
- Centralized interface with simple wizard to:
  - Add a suitable storage object to a storage account or perform the necessary zoning and/or masking operations to assign a LUN to a specific host
  - Rescan the operating system and make VERITAS Volume Manager aware that a new disk is available after zoning and masking operations are complete
  - Improve launch-in-context of the Volume Manager console to add a disk to a disk group

Availability 101 — Continued from page 7

successful companies, who partner with, or at least work well with, your other key vendors. Look for vendors who will not lock you into a technology.

You've written a book about high availability and how to accomplish it in a business operation. Do you have any other plans for writing or teaching?

EM: There is a full day seminar based on the material in the book, which I present several times a year, at conferences like VERITAS Vision, along with SANS, LISA, and Usenix. I expect that there will be a second edition to the book sometime in the next couple of years. At this point, I don't see myself writing another whole book from scratch.

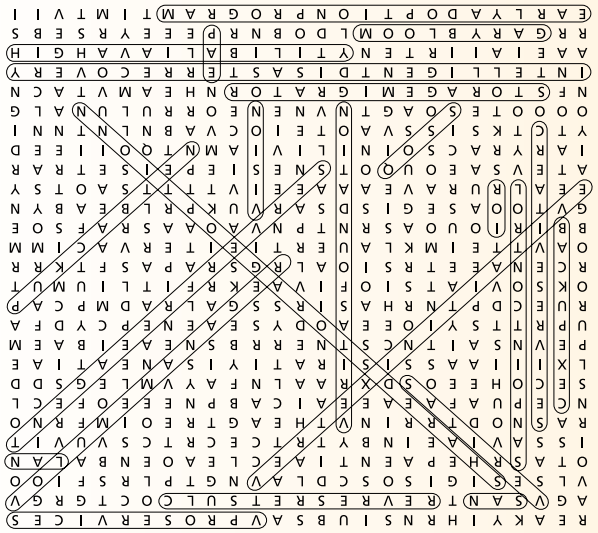
QoSS in SANs — Continued from page 11

These initiatives are based on emerging storage networking standards, and will evolve with them. VERITAS Software is an active participant in a number of standards groups including the Storage Networking Industry Association (SNIA), the Fibre Alliance, the Jiro platform expert group and the Fibre Channel Industry Association (FCIA).

For additional information on VERITAS' Quality of Storage Service vision, please go to **www.veritas.com/us/products/san/**.

Word Search Puzzle Solution — From page 20

Read the Solution upside-down.



VERITAS SANPoint Control™ Technology Partners

Working Together to Bring SAN Benefits to Customer Operations

VERITAS is actively engaged with industry-leading providers of SAN technology and standards organizations enabling solutions that meet the requirements of our shared SAN customers. The web of partnerships surrounding VERITAS SANPoint Control™ is very typical for the degree of cooperation and collaboration VERITAS engages in. The scope of these strategic partnerships ranges from adoption of VERITAS core technologies and OEM agreements to full product interoperability and integration support. The VERITAS approach to doing business reflects a spirit of cooperation and true heterogeneity. As a customer, you will be able to enjoy a wide array of viable platform choices.

VERITAS SANPoint Control 2.0 supports discovery and visualization of a wide range of SAN storage suppliers products including those from ADIC, IBM Corporation, LSI Logic Corporation, MTI Technology Corporation, STK, SUN and many others (see article on page 12).

BROCADE

VERITAS SANPoint Control in a Brocade environment

SANPoint Control 2.0 supports the Brocade Silkworm 2040, 2050, 2240, 2250, 2400 and 2800 switches. With SANPoint Control, administrators can discover and visualize Brocade Silkworm switches, their principal or subordinate role in the SAN, total and free ports, firmware level, what devices are connected to each port, port status, zoning information and more.

Through integration of the VERITAS and Brocade SAN technology, customers can work with a single point of management and control. Its capabilities include:

- Discovery and visualization of the Brocade switch
- Integration of VERITAS SAN management technologies and the Brocade Fabric OS for improved enterprise SAN management
- Support for the latest Brocade Fabric OS, version 2.3
- Launch-in-context of Brocade Web tools
- Wizard-based zoning through SANPoint Control console and command line interface
- Out-of-the-box performance, availability and status management of the interconnect as well as easy, immediate deployment of event management and notification services

VERITAS and Brocade joint programs

- Brocade encloses a 60-day trial version of VERITAS SANPoint Control with every Brocade switch
- A cooperative beta program ensures out-of-the-box compatibility
- Joint marketing and educational activities promote SAN adoption and management
- VERITAS is a Brocade Fabric Access Partner

COMPAQ

VERITAS SANPoint Control in a Compaq environment

VERITAS SANPoint Control 2.0 will automatically discover and visualize the Compaq StorageWorks arrays with their exposed logical units (LUNs).

VERITAS SANPoint Control in an EMC environment

SANPoint Control 2.0 will automatically discover and visualize the EMC Symmetrix arrays and their associated LUNs. SANPoint Control also supports LUN masking – including management, creation and editing – of the EMC Symmetrix devices.

VERITAS SANPoint Control in an EMULEX environment

SANPoint Control 2.0 supports the Emulex LightPulse LP7000E, LP8000 and the LP8000DC. SANPoint Control automatically discovers these host bus adapters and their physical and logical host-based connections to the interconnect and any underlying storage devices.

VERITAS and Emulex joint programs

Joint initiatives include support of the Common Host Bus Adapter (HBA) application programming interface (API).

VERITAS SANPoint Control in a Hitachi environment

SANPoint Control 2.0 supports the Hitachi Freedom 5800, 7700E, 9200 and 9900. SANPoint Control will automatically discover and visualize the Hitachi arrays and their associated LUNs. SANPoint Control 2.0 also offers launch support of Hitachi's Freedom Storage Remote Management Console as well as the Freedom Storage Resource Manager. In addition, SANPoint Control 2.0 allows out-of-the-box performance and status monitoring with notification services for the HDS line of arrays.

VERITAS further extends its capability with the new 9960 to provide LUN Masking and LUN binding support natively through the SANPoint Control console.

VERITAS and Hitachi joint programs

- The companies will jointly engineer technology for open, heterogeneous enterprise SAN management
- Hitachi will include a 60-day trial version of SANPoint Control 2.0 with every 5800, 7700E, 9200 and 9900 array
- Hitachi and VERITAS will collaborate on joint sales model and development programs to support these efforts

VERITAS SANPoint Control in an INRANGE environment

SANPoint Control 2.0 supports the FC/9000 Director as well as the FC/9000 8- and 16- port edge switches through discovery and visualization, giving SAN managers information about the FC/9000 line, including: the principal or subordinate role in the SAN, total and free ports, firmware level, what devices are connected to each port, port status and more. In addition, SANPoint Control 2.0 supports out-of-the-box performance and status monitoring with notification services.

VERITAS and INRANGE joint programs

- INRANGE will include a 60-day trial version of SANPoint Control 2.0 with all INRANGE FC/9000 Directors and switches, starting in the second quarter of 2001
- INRANGE will develop consulting packages around the installation and configuration of SANPoint Control with the FC/9000 Director and FC/900 8- and 16-port edge switches
- INRANGE will resell SANPoint Control licenses as part of its consulting package
- INRANGE and VERITAS will cooperate in joint marketing initiatives
- INRANGE and VERITAS will jointly develop SAN management solutions that compliment mutual customer needs

VERITAS SANPoint Control in a JNI environment

SANPoint Control 2.0 supports the FibreStar FCI-1063-N and the FC64-1063-N host bus adapters. SANPoint Control automatically discovers these host bus adapters and their physical and logical host based connections to the interconnect and any underlying storage devices.

VERITAS and JNI joint programs

Joint initiatives include support of the Common HBA API.

VERITAS SANPoint Control in a McDATA environment

SANPoint Control 2.0 supports the McDATA ED-5000 Director through discovery and visualization of the McDATA Directors, their principal or subordinate role in the SAN, firmware level, total and free ports, what's connected to each port, port status, zoning information and more.

Integration of the McDATA and VERITAS technology offers centralized management capabilities, including:

- Wizard-based zoning through the SANPoint Control console
- Out-of-the-box performance, availability and status management of the interconnect
- Out-of-the-box policy, event management and notification services
- Launch-in-context of the McDATA Enterprise Fabric Connectivity (EFC) Manager

VERITAS and McDATA joint programs

McDATA will distribute a demonstration version of SANPoint Control 2.0 on a partner marketing CD with every McDATA Director shipped with EFCM Manager in the second quarter of 2001.

VERITAS SANPoint Control in a QLogic environment

SANPoint Control 2.0 supports the 2200F and 2202F QLogic SANBlade host bus adapters as well as the QLogic SANBox 8- and 16-port switches. SANPoint Control discovers these host bus adapters and their physical connection to the SAN. SANPoint Control also supports discovery of QLogic switches and their principal or subordinate role in the SAN, firmware level, total and free ports, what devices are connected to each port, port status, zoning information and more.

Integration of QLogic technology and VERITAS SANPoint Control results in:

- Discovery and visualization of the SANBlade host bus adapter and interconnect
- Wizard-based zoning for QLogic SANBox switches through the SANPoint Control console
- Out-of-the-box performance, availability and status management of the SANBox switch
- Out-of-the-box policy, event management and notification services
- Launch-in-context of the QLogic SANsurfer interconnect manager

VERITAS and QLogic joint programs

- QLogic is currently including a 60-day trial version of VERITAS SANPoint Control with every QLogic SANbox switch and host bus adapter
- As a one-stop shop for customers, QLogic is reselling VERITAS SANPoint Control directly, branded as VERITAS SANPoint Control for QLogic
- Joint initiatives to inform and educate the market on our shared SAN solutions and support of the Common HBA API

VERITAS and Sun Microsystems SAN collaborative programs

Sun Microsystems is licensing VERITAS V3™ SAN Access Layer technology and VERITAS SANPoint Control. Sun will distribute these technologies integrated into the Jiro technology-based Sun StorEdge management console.

VOX VERITAS®

We are updating our subscription list!

We are revamping the subscription list for VOX VERITAS and we don't want to lose your order. Please take a moment to fill out the form below to keep your name on our free subscriber list.

Fax your completed subscription form to 407-418-5217, or e-mail your subscription request with the information listed below to vox@veritas.com.

Don't forget to pass this on to a friend that would like to receive a free subscription as well!

❑ Subscribe me to VOX VERITAS. My complete mailing information is below.

❑ Change my address or contact information. My name, company name and any information that has changed is noted below.

❑ Cancel my subscription. Please see my name, company name and e-mail.

* First name_____ Middle Initial _____ *Last name_____

Title _____

Company name _____

* Address 1 _____

Address 2 _____

* City _____

* State/Province_____ *Zip/postal code _____

* Country _____

* E-mail _____ Telephone _____

Fields marked with * are mandatory.

I would prefer to read VOX VERITAS…

❑ In print ❑ Web-based

My relationship to VERITAS is that of a …

❑ Customer ❑ Partner ❑ Consultant

❑ Investor ❑ Analyst ❑ Employee

❑ Other Please explain _____

If you have any comments and feedback on the content of VOX VERITAS, please e-mail it to the editor, Chris Lemoine, at clemoine@veritas.com. Thank you very much for your help!

VERITAS™

The VERITAS Word Search Puzzle

Now that you've completed and faxed in your VOX VERITAS subscription information update form, it's time for a moment of recreation. Locate and circle the terms listed below. Each of these terms appears somewhere in this issue of VOX VERITAS. Search forwards, backwards, horizontally, vertically and diagonally. Have fun!

R E A K Y I H R N S I U B S A V P R O S E R V I C E S
A G V S A N T R E V R E S R E T S U L C O C T G R G V
V L S E S I G I S O S C D L A V N G T P L R S F I O O
O T A S R H E P A E N T I A E C L E A O E N B A L A N
I S S A V I A E I N B Y T R T C E C R T C S V U V I T
R A S N O D T R R I N V T H E A G T R E O I M F R N O
N C E P U A F A E A E E A I C A B P N E E E O F E C L
S E C O H E E O S D X R A A L N F A Y V M L E G S D D
L X I I I A A S S I S I R A T I Y I S A N E A T I A E
P E V N S A I T N C S T N E R R B S N E A E I B A E M
U P R T T S Y I O E E A O D Y S E A E N E P C Y D F A
R U E C D P T N R H A S I R S S G A L R A D M P C A P
O K S O V I A T S I O F I V A E K R F I T L I U M U T
R C E N A E E T R S I O A L R G S R A P A S F T K R R
O A V T T E I M K L A U E R T I E I T E R V A C I M M
B B I R I O U O A S R N T P N V A O A A S R A F S O E
G V T O O A S E G I S D S A R V U K P R L B E A B Y N
E E A L R U R A V E A A A E E I V T T T T S A O T S Y
A T E V S A E O U Q O T S N E S I E P E I S E T R A R
I A R Y R A C S O I N I L I V I A M N T Q O I I E E D
Y T C T K S I S S V A O T E I O C V A B N L N T N N I
O O O O T E S O A G T N V N E N E O R R U L U N A L G
N F S T O R A G E M I G R A T O R N H E A M V T A C N
I N T E L L I G E N T D I S A S T E R R E C O V E R Y
A A E I A I I R T E N Y T I L I B A L I A V A H G I H
R R G A R Y B L O O M L D O B N R P E E E Y R S E B S
E A R L Y A D O P T I O N P R O G R A M T I M T V I I

Backup Exec
Cluster Server
Creative Services
Data Availability
Database Edition
EAP
Early Adoption Program
FastResynch
Gary Bloom
High Availability
Intelligent Disaster Recovery
LAN
NetBackup
QoSS
ROI
SAN
SANPoint Control
Server Free Agent
Shared Storage Option
Storage Migrator
VERITAS
VERITAS Foundation
VERTEX Initiative
VISION
VPro Services
Volume Manager

Solution on page 15

By Michael Adams, Product Marketing Manager, VERITAS Software

The Real Business Benefits of Server-Free Backup

VERITAS recently introduced VERITAS NetBackup™ version 4.0 with its ServerFree Agent. Server-free backup from VERITAS means moving data directly from disk to tape without going back through the host server. The technology is meant to reduce the impact on IT storage infrastructures and reduce the cost of systems ownership, but what does this actually mean? How will users be able to state the real benefits of this VERITAS technology? More importantly, how will VERITAS server-free technology lead to an improved bottom line from both a business and an IT point of view? To answer these questions, let's take a look at two of the main benefits associated with server-free backup technology.

Advantage #1 – server and LAN resource savings: reduced CPU, I/O, memory and network impact

The problem

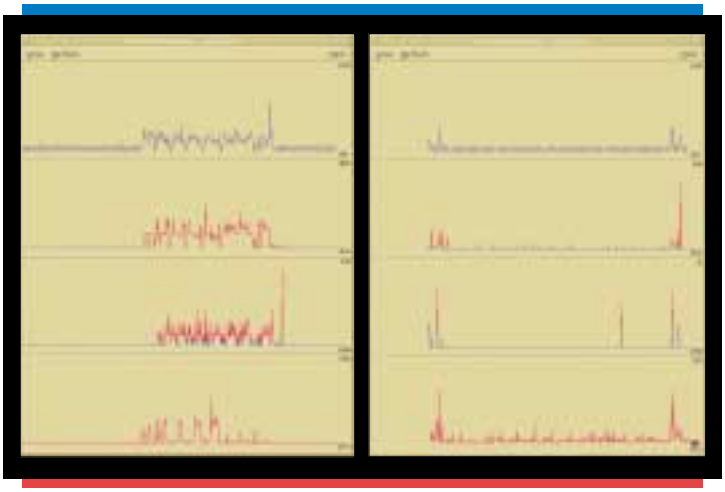
In most LAN-based backup architectures, data flows from each server being backed up across the LAN to a dedicated backup server. This means each server being backed up is involved in the backup process. In the past, businesses could handle this process during allocated backup windows. Today, nobody will want to tolerate this sort of impact on critical servers. Resources such as CPU, I/O, memory and network facilities must be dedicated to business transactions, not backup. Backup is important, but it must consume as little of these resources as possible.

In addition, some corporations have begun to spend more of their IT budgets to purchase additional servers for backups. However, IT purchasing dollars for hardware, software or human resources are not keeping pace with data growth. Portions of the budget are being lost to the purchase of additional hardware. While this might fix the problem initially, data growth is not slowing down, but keeps increasing. This spending model does not lead to a scalable technology. IT departments need to make their dollars go further.

Snapshots combine with direct disk-to-tape movement for high performance backup

The largest benefit associated with the VERITAS server-free technology is the reduction in the "backup footprint" at the host server-level. The ServerFree Agent's use of snapshot technology combines with direct disk-to-tape movement to significantly reduce CPU, I/O and memory overhead in the host server. It also places fewer burdens on the network. A test shows how dramatic this reduction can be. In figure 1, the performance meter shows the impact a standard Oracle backup using VERITAS NetBackup can have on a system. While this is justifiable for some IT operations, global enterprises usually cannot afford such a high impact on their systems. In figure 2, we can see how small the impact is on an Oracle backup that was performed using the VERITAS NetBackup ServerFree Agent. The same values (CPU, I/O, memory and network) go down to the point of almost being non-existent. Testing has also shown that these results only improve as the amount of data increases.

Figure 1 *Figure 2*



In addition, being able to deliver more performance with a single backup server will also allow IT departments to reduce capital expenditure on additional server hardware. This becomes possible, because server-free technology from VERITAS requires that a server only receive and pass a small amount of metadata to a third-party copy engine instead of handling all backup data by itself.

Advantage #2 – leveraging storage area network technology and application investments

The problem

Storage area network (SAN) technology supports server and storage consolidation, improves performance, distance bridging and connectivity through fibre channel, and increases the backup and restore capabilities for IT operations. IT managers are looking to maximize the value SANs contribute to their businesses.

Hot backups currently serve as the best solution to back up critical applications such as Microsoft Exchange or Oracle Financials. However, enterprise environments need more advanced and higher performing techniques for backup and recovery. In addition, users may not be aware of the fact that application vendors must enable their APIs so that third-party vendors can make server-free technology happen for these applications. Without enabling these application APIs for advanced functionality, server-free backup is not possible.

Low-impact backup and ROI improvement with VERITAS server-free backup

VERITAS server-free backups introduce a new level of functionality to a SAN environment beyond what is currently available. The movement of data across a dedicated network without host/server involvement can help leverage SAN infrastructure and expenses beyond LAN-free backup (see figure 3). This will help justify $400 to $1,000 per-port costs of SAN hardware. In addition, it will maximize the use of SAN hardware such as fibre channel switches and software like the VERITAS NetBackup Shared Storage Option™.

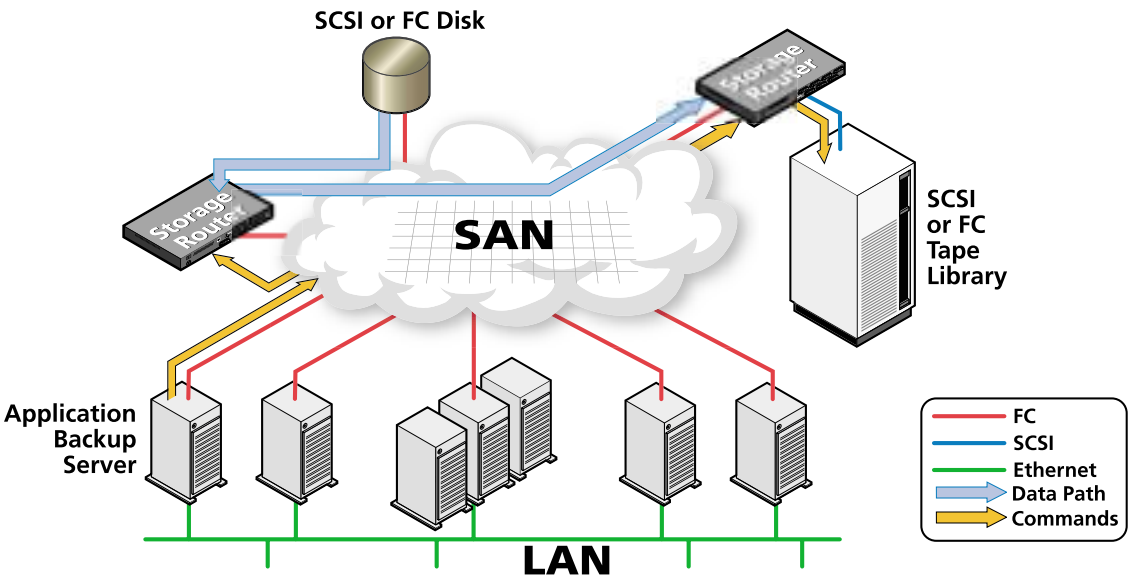
When applications can be backed up using the NetBackup ServerFree Agent, data protection will not have a major impact on users trying to access them. Once the ServerFree Agent creates a snapshot, it releases the application, which can then continue with its transactions. Applications are no longer involved in the backup process. VERITAS takes hot backups to the next step, increasing the productivity of the application server while delivering data protection.

While it is true that application vendors must enable APIs to make this functionality available, some of the most popular application and database vendors on the market either have this technology or will offer it in the very near future. For the rest, it will not be long before global enterprise class users require vendors to enable APIs for snapshot type capabilities.

Future outlook

VERITAS continuously enhances its products. VERITAS' server-free technology will see improvements in terms of flexibility, meaning multiple operating system platforms and snapshots that can be taken, and more, as well as performance. However, bear in mind that this is already a fully viable, highly effective technology. While VERITAS server-free technology is not for everybody, its benefits for users with increasing backup and performance needs cannot be overlooked.

Figure 3



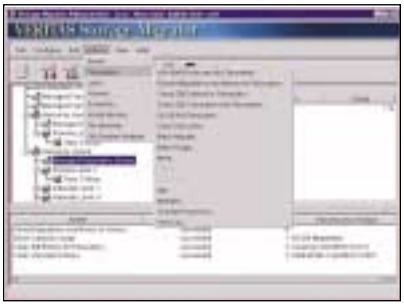
By Jeff Lundberg, Product Marketing Manager, VERITAS Software

The VERITAS NetBackup Storage Migrator™ Product Family:

Storage Management for Intelligent Data Growth

If IT organizations had limitless amounts of disk storage available to satisfy the needs of users and applications, the concept of storage management (HSM) would not exist. However, IT budgets are limited, and data and data storage resources must be managed intelligently.

Storage management and hierarchical storage management (HSM) are proven concepts in the mainframe world. HSM uses management policies according to which data is migrated to secondary storage on the basis of criteria such as file age and size. This allows system managers to manage data proactively by ensuring that only relevant data is kept online, and gives them an automated way of moving idle data to a less expensive storage medium. Research shows that as much as 80 percent of networked files are used less than once per month. Often, IT organizations are incurring the overhead of managing data that has not been accessed in months or years.



VERITAS NetBackup Storage Migrator™ has a Java GUI. Storage Migrator features menu options to set the file system state to simplify administration.

File migration for more efficient, less expensive data storage

The VERITAS NetBackup Storage Migrator™ family of products is the solution for keeping critical data available while reducing the amount of online storage to manage and maintain. NetBackup Storage Migrator monitors disk capacity on network servers and, when necessary, moves infrequently accessed data to secondary storage, such as tape, optical libraries or even low-cost disk subsystems. This reduces the amount of time required to perform backups and restores. NetBackup Storage Migrator frees up storage space on network servers and eliminates difficult out-of-space messages. Users and applications do not need to know that a file has been migrated, and retrieval is completely transparent.

VERITAS NetBackup Storage Migrator™ Major Benefits

Control hardware costs

Delay or eliminate disk hardware expenses by proactively managing data. Reduce peak quarter- or year-end disk requirements by adjusting usage thresholds to guarantee maintenance of minimal levels of free space.

Reduce backup times

Stop backing up inactive files, wasting online disk space as well as tape, server CPU and network resources.

Increase application availability and user productivity

Eliminate outages due to out-of-space errors by monitoring disk storage on networked servers and automatically migrating inactive files to secondary storage when a disk begins to fill.

Avoid user distraction

Users and their applications can see and access files without being concerned with their actual location; NetBackup Storage Migrator retrieves requested files automatically and transparently.

Enjoy simple and flexible configuration

Administrators can configure NetBackup Storage Migrator to meet their unique needs; they may exclude specific files from migration, schedule retrievals in advance and design multiple-level migration strategies.

Manage your heterogeneous systems

NetBackup Storage Migrator supports heterogeneous computing environments; it manages and migrates data from both Windows and UNIX servers.

Policy-based storage management and transparent access

NetBackup Storage Migrator leaves behind small placeholder files to ensure that users maintain their familiar directory structure. The placeholders allow easy transparent file access, automatically retrieving migrated files. When a user attempts to access or open a migrated file, it is automatically retrieved from secondary storage and cached to the online file system. NetBackup Storage Migrator automatically manages the storage on the file server according to administrator-defined guidelines set for each individual managed volume. In addition to the automatic storage management features, an administrator can create and schedule activity to move specific data to and from secondary storage at specific time intervals, using the calendar-based JAVA interface.

A complete family of migration solutions

The NetBackup Storage Migrator family of products includes VERITAS NetBackup Storage Migrator *for UNIX*, VERITAS NetBackup Storage Migrator *for Microsoft Windows* and VERITAS NetBackup Storage Migrator *for Exchange*. The latter was previously called "VERITAS Remote Storage *for Exchange*" and was discussed under that name in VOX VERITAS 4.1. The NetBackup Storage Migrator family integrates easily into almost any enterprise architecture. NetBackup Storage Migrator *for UNIX* supports Sun Solaris, HP-UX and SGI IRIX. The products support optical disk storage systems and tape vaults as well as mainframe-based data centers. NetBackup Storage Migrator *for UNIX* integrates with VERITAS NetBackup™ to manage media. NetBackup Storage Migrator *for Exchange* migrates Exchange attachments to near-line or offline media managed by VERITAS Backup Exec™, VERITAS NetBackup or Windows RSM.

Integrate with VERITAS NetBackup™ for faster backups

NetBackup Storage Migrator can integrate with VERITAS NetBackup for very efficient backup and easy recovery of data. There are strong performance and operational advantages to recommend this. In this configuration, all your data is recoverable, and backups are faster. Migrating seldom-used files to secondary storage, NetBackup Storage Migrator helps you shorten backup times by reducing the amount of data written during a backup. When integrated with VERITAS NetBackup, any file system backups write only the placeholder files for migrated files. NetBackup is HSM-aware, so backup operations do not trigger unnecessary caches of migrated files. Also, NetBackup and NetBackup Storage Migrator use the same media manager, which allows the applications to efficiently share secondary storage devices.

Download a free performance analysis tool

From the Storage Replicator page on the VERITAS Web site, you can download a free File System Analyzer(FSA). The FSA graphically illustrates the benefits of using NetBackup Storage Migrator. It scans the file system and lets you perform a what-if scenario, setting different criteria for migration to observe possible file system space usage improvements. Go to

http://www.veritas.com/us/products/storagemigration/

for this download.

See also "*A Closer Look at Enterprise Data Management with VERITAS Storage Migrator for UNIX*" on page 27 of this issue.

By James Gentes, Product Manager, and Craig Huber, Product Marketing Manager, VERITAS Software

Achieving High Availability of Applications and Data in a Microsoft Windows Environment

VERITAS Cluster Server™ and VERITAS Volume Manager™ Integration

New challenges for Windows Systems administrators

Protecting applications and data in today's rapidly growing Microsoft Windows environments is challenging. The amount of data that needs to be managed is increasing, as are availability requirements. Administrators have to do more, but have less time to do it in. Adding to the challenge has been the lack of sophisticated management tools for the Windows platform and Windows applications. Information from a recent Dataquest study confirms that Windows systems administrators spend on average twice as much time managing storage than their peers in the UNIX world.

With the release of VERITAS Cluster Server™ v1.2.1 for Microsoft Windows NT, two key VERITAS solutions for achieving high application and data availability in a Windows environment – VERITAS Cluster Server and VERITAS Volume Manager™ 2.6 *for Microsoft Windows NT* – are now integrated. In this article, we describe a few benefits of this integration.

Advantages of product integration

VERITAS Cluster Server and VERITAS Volume Manager both help to increase the availability of applications and data. Both support heterogeneous platforms, operating in both UNIX and Windows environments.

VERITAS Cluster Server is a powerful clustering solution that ensures business continuity for applications and data. A VERITAS Cluster Server cluster configuration consists of a group of interconnected servers (also called "nodes") that use a common set of storage disks or disk groups. Applications and services installed to the shared disks can be hosted by any node in the cluster. Cluster Server monitors all critical components for failure by performing tasks such as querying a network interface, writing to an active database, or reading from a physical disk. If it detects a failure with any component on the system that an application is dependent on, VERITAS Cluster Server migrates, or "fails over" that application to another server in the cluster. In the event of another failure, it will migrate the application to another node in the cluster, allowing continuous client access even in the event of multiple system- or application-level failures.

VERITAS Volume Manager is an advanced disk and storage management solution for Windows enterprise computing environments. It alleviates downtime during system maintenance and unplanned outages by enabling easy, online disk administration and configuration. Volume Manager supports disk usage analysis, RAID techniques and the dynamic reconfiguration of disk storage while a system is online. These tools ensure continuous data availability and data protection. They also eliminate the need for servers to be taken offline for administrative and maintenance tasks, allowing system administrators to keep data available to end users when they need it.

The integration of VERITAS Cluster Server and VERITAS Volume Manager *for Windows NT* brings several key benefits to users. Most importantly, the integration enables them to take advantage of a key Volume Manager feature – the ability to dynamically grow storage in a clustered environment without taking data or applications offline. In addition, when used with VERITAS Cluster Server, Volume Manager can present disk resources as cluster disk resources. This enables VERITAS Cluster Server to communicate with Volume Manager about which servers need access to specific storage devices in the cluster, both before and after application failover in the cluster itself. This ability to re-map applications to storage is particularly useful in a storage area network (SAN) environment to ensure overall availability of both applications and data.

Managing shared disks in a clustered environment

Data growth is a constant challenge for Windows administrators; Volume Manager helps meet this challenge by enabling administrators to grow or alter storage online, without making applications or data

unavailable. The ability to grow storage without taking applications or data offline is especially critical in a clustered environment.

In both clustered and non-clustered environments, the volume construct that Volume Manager operates on is known as a dynamic volume. When shared dynamic disk groups are under the control of VERITAS Cluster Server, Volume Manager organizes the disk groups into cluster disk groups. All of the operations that Volume Manager can do on non-clustered disk groups are also enabled with clustered disk groups. The system administrator can create, import, deport, rename and delete cluster disk groups from the Volume Manager console as well as from the command line.

Volume Manager supports two types of disk groups – dynamic disk groups and cluster disk groups. When used with VERITAS Cluster Server, Volume Manager uses cluster disk groups to ensure that no more than one node in the cluster can control the same disk group at any given time. VERITAS Cluster Server manages the ownership of the disk group and communicates to Volume Manager when a failover is taking place between nodes in the cluster, so that the disk group ownership can be changed to the node that is the failover target, ensuring data integrity. This failover of cluster disk groups with the benefits enabled by Volume Manager is simply not possible when using native Windows NT 4.0 alone – it requires the combination of VERITAS Cluster Server and Volume Manager.

VERITAS Cluster Server provides separate resources to control two specific functions of Volume Manager: the disk group and the mount. A mount resource can be configured in VERITAS Cluster Server to assign any drive letter to a specific volume. A disk group can be configured to check the file system prior to import or, if necessary, be forcefully deported. This functionality allows complete control over SAN resources and how they are distributed and used during failover in a VERITAS Cluster Server cluster.

High availability clustering in a SAN environment

SANs are an ideal complement to high availability clustering. The integration of VERITAS Cluster Server and Volume Manager makes it easier than ever to create SAN-enabled clusters. SAN-attached storage managed by Volume Manager can be assigned through VERITAS Cluster Server to be hosted on servers based on priority, allowing the most efficient use of resources. Moving disk ownership from one server to another becomes a simple administrative task.

Using Cluster Server in a SAN enables groups of servers in the cluster to share access to data in a pool of storage. By taking advantage of the ability of Volume Manager to quickly re-map storage to applications, applications can fail over between nodes in the cluster and still have access to their data. Read-only applications can share a single copy of data between multiple application servers, removing the necessity of replicating data in a cluster. All of this can occur while applications are online, maximizing availability and productivity.

Implementing VERITAS Volume Manager in a SAN environment also allows users an increased capacity for handling data growth. As data requirements grow, new storage can be added to the SAN, so server applications in the cluster always have the storage capacity they need.

While this integration can be performed today in a Windows NT 4.0 environment, VERITAS engineers are working on bringing it to Windows 2000 as well, with arrival expected this fall.

Learn more about VERITAS Cluster Server and VERITAS Volume Manager at the 2001 VERITAS High Availability seminar series

To learn more about Cluster Server and Volume Manager, register for the VERITAS Software High Availability seminar series. More information on these half-day events is available at

http://www.veritas.com/us/promotions/haseminar

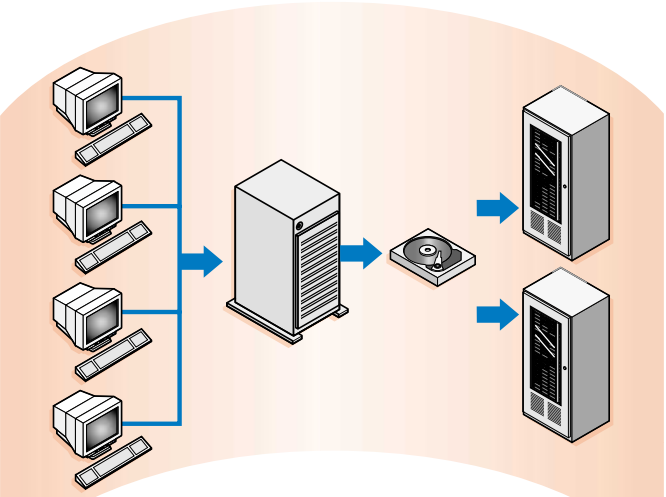
You can also get more information on VERITAS Cluster Server and VERITAS Volume Manager at **http://www.veritas.com/us/products**

By Jeff Lundberg, Product Marketing Manager, VERITAS Software

A Closer Look at Enterprise Data Management with VERITAS NetBackup Storage Migrator™ for UNIX

VERITAS NetBackup Storage Migrator™ *for UNIX* is ideal for enterprise environments with many terabytes of data. Its powerful administration functions fit perfectly into large data center environments with centralized management. NetBackup Storage Migrator enables enterprise environments to manage their data from heterogeneous platforms to a central location, using one of several remote method options of storing data.

The sophisticated media management capabilities of NetBackup Storage Migrator appeal to data center managers who have thousands of tape or optical volumes in the data center and at off-site locations, and who might have experience with mainframe media management. The support for high-end robotics and high-speed devices will be important to those of you who have already made an investment in that hardware.



Storage Migrator manages the oldest data that is stored on the network servers.

As secondary storage, NetBackup Storage Migrator *for UNIX* uses directly connected tape, optical disk, or magnetic devices. It also supports the VERITAS NetBackup™ Media Manager Shared Storage Option and its method of attaching SAN devices. The remote options include Alternate Disk (for NFS-mounted file systems), FTP, and automatic migration using NetBackup. The Media Manager component equips NetBackup Storage Migrator with the interface to the tape and optical libraries. Support for large-capacity library devices eliminates the need for operator action to either migrate or cache files. The net result is seemingly unlimited online storage at a lower cost per megabyte, because the extra storage is on lower-cost media such as tape or optical.

How the migration process works

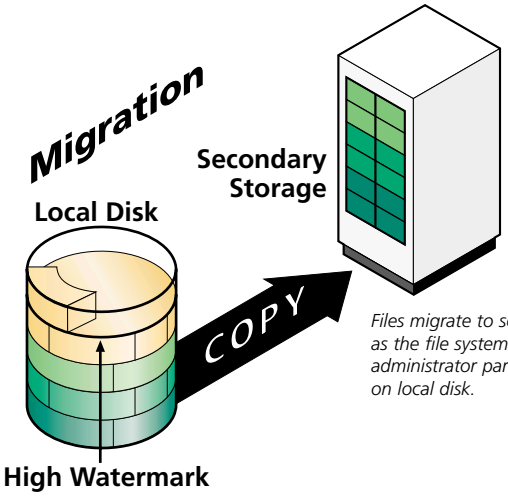
There are two main steps in the data migration process.

- NetBackup Storage Migrator selects files to be migrated based on predefined selection criteria and "pre-migrates" them, by adding them to a list which will be processed.
- NetBackup Storage Migrator copies these files to one or more secondary storage devices.

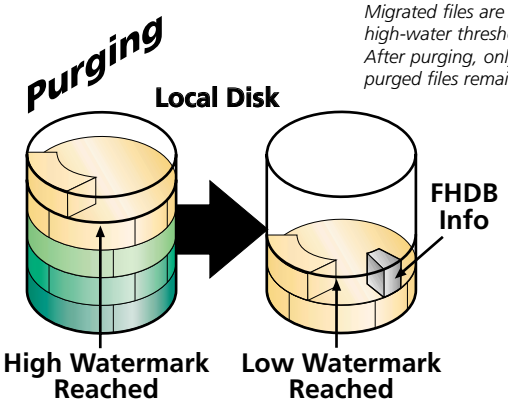
However, the "pre-migrated" (now migrated) files remain available on the disk until it is necessary to purge them in order to make their space available to the file system. When the managed file system becomes full or reaches its predefined high-watermark level, NetBackup Storage Migrator automatically purges the migrated file copies from disk to quickly provide additional space. The placeholder (UNIX inode) still remains in the user's directory and information about each migrated file (size, number of copies, location, and type of media for each copy) resides in a database on the server.

When a user or process accesses a migrated file, NetBackup Storage Migrator makes it available by caching the data back to disk. Users and processes on remote systems can access a managed file system by using FTP or NFS. After NetBackup Storage Migrator caches the migrated files back into the file system, FTP or NFS transfers occur as if the files had never been migrated.

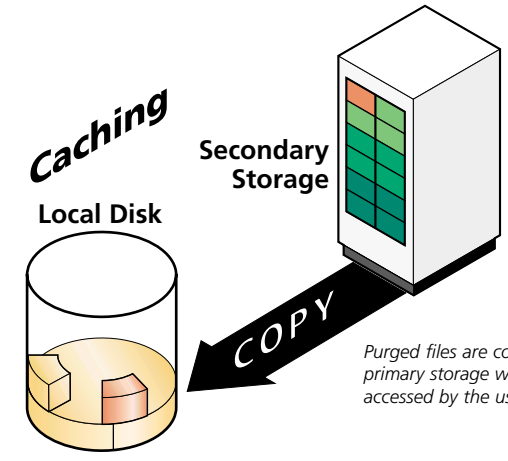
NetBackup Storage Migrator can also use an NFS-mounted file system as a secondary storage device. However, NetBackup Storage Migrator cannot migrate files from an NFS-mounted file system.



Files migrate to secondary storage as the file system fills, based on administrator parameters. Files stay on local disk.

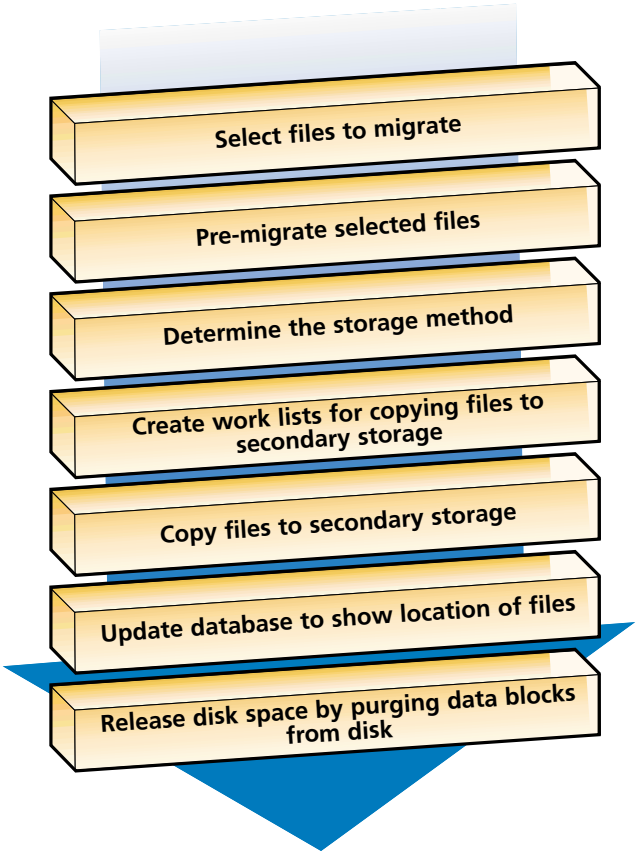


Migrated files are purged when high-water threshold exceeded. After purging, only "slices" of purged files remain.



Purged files are coped back to primary storage when they are accessed by the user.

During the migration phase, NetBackup Storage Migrator selects files and then copies them to secondary storage. If the file system becomes full or fills to a predefined high watermark, NetBackup Storage Migrator makes space available by purging migrated files from the disk. The main steps are:



NetBackup Storage Migrator selects files whenever the high watermark is exceeded or the migbatch process is run for "grooming" the file system. The selection process applies the controls selected by the administrator. NetBackup Storage Migrator selects files by scanning the file systems it manages and evaluating each file according to the selection criteria established. The default criteria are based on file size and time elapsed since the last access, and additional criteria can be used. Files that meet the criteria become candidates for migration, and NetBackup Storage Replicator places them on a list. During the pre-migration phase, NetBackup Storage Migrator makes the work list and extends the database. Each migrated file receives a file handle number, which NetBackup Storage Migrator uses to identify migrated files. It stores the file handle in the file handle database (FHDB) for the file system. Each managed file system uses a separate file handle database.

NetBackup Storage Migrator selects these files until there are no more files that meet the selection criteria, or until it selects enough to reduce space used to a predefined level called the low watermark.

Customizable file caching and easy access

The name of a migrated file remains in its original directory and visible to the administrator as a migrated file. Not to confuse end users, migrated files appear to them as if they had never been migrated. Before a user can access data in a migrated file, NetBackup Storage Migrator must cache the data back. If NetBackup Storage Migrator has not purged the migrated copy from disk, it simply accesses the data, resulting in a no-caching delay. Otherwise, NetBackup Storage Migrator copies files from secondary storage and "reattaches" the data blocks to the original placeholder in the original directory and file name.

Caching places the file's data blocks back on disk and sets a cached flag in the extended attributes of the inode. If a cached file is left unmodified, the FHDB entry remains valid. When the file is re-migrated, NetBackup Storage Migrator simply purges the data blocks. When a user modifies a cached file, however, NetBackup Storage Migrator sets its FHDB entry to "obsolete," making the modified file into a non-migrated file, which may again become eligible for migration at a later time.

If there are two copies of the file and one copy is somehow damaged, NetBackup Storage Migrator automatically caches from the other copy. In all instances, caching occurs automatically and without extra effort by the user. Because the application accessing the data is blocked during the cache operation, there may be a delay when caching migrated files to primary disk. The length of the delay depends on several factors:

- Availability of drives
- Availability of the volume
- Load time of the media
- Transfer rates from secondary storage to primary disk
- Size of the files
- Level of activity on the system

You can minimize caching delay by configuring enough tape or optical devices to handle the peak demand, and matching device characteristics to the size and frequency of access for migrated files. For instance, if one device is available, then only caches or migrations on one piece of media can be processed at a time. All other cache requests must wait. However, if four devices are available to Storage Migrator, a maximum of four simultaneous caches is possible, assuming no migrations are active.

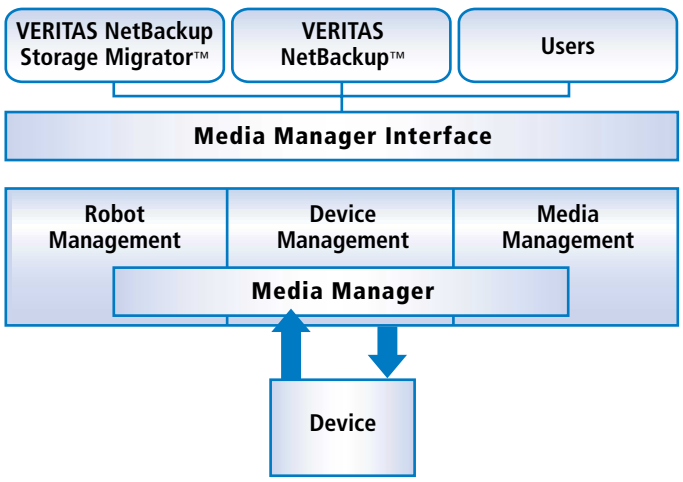
Slices

During the migration process, NetBackup Storage Migrator copies all data blocks to secondary storage. However, it allows you to configure an amount of data that you want to retain on disk after a purge is complete. The portion of the file copy that NetBackup Storage Migrator keeps on disk is called the "slice."

The slice value is a configurable file system parameter and can be set to a different value for each file system. A read request in the amount of the configured slice will be immediately satisfied, using the data blocks remaining on the disk. If the read request spans the slice or is completely beyond the slice, the whole file is cached back. In this situation, NetBackup Storage Migrator also allows for a partial file caching option. Depending on the size of the slice, you can prevent some GUI interfaces and standard utilities like file and head from accidentally caching a large number of migrated files.

Tape and optical media management

NetBackup Storage Migrator makes use of the same media manager as VERITAS NetBackup™, which results in streamlined, more efficient data management and reduces the number of required robots. During configuration, the NetBackup Storage Migrator administrator defines the storage methods that will be available to it. Possible media types are magnetic disk, tape, optical disk, or remote storage. The administrator also defines which methods, and therefore which media, to use for specific



file systems. The configuration for one file system could specify that the migrated files go on a tape, and files from another file system could go to the same or different storage media.

When it transfers data to or from a storage device, NetBackup Storage Migrator determines from its own volume database on which volume it should store the migration data. It includes the volume information in a tape request to the device manager, which then assigns drives based on availability.

The Media Manager tracks the location of both online and offline volumes and keeps this information in its database. The device manager and robotics software use this information to verify correct media usage.

Disk Space Management

NetBackup Storage Migrator supplies parameters and processes that allow the administrator to maintain free space between configured limits and avoid a full disk condition. Migration parameters include the high and low watermarks, which determine when files are pre-migrated and purged. In addition, NetBackup Storage Migrator can use minimum age and minimum size parameters to determine which files to migrate.

The administrator can start grooming processes from the NetBackup Storage Migrator JAVA GUI, the command line or the JAVA GUI's calendar-based scheduler. These scripts perform the following functions:

- Select and migrate files to secondary storage without removing the pre-migrated copies from the disk (migbatch)
- Create more disk space immediately by purging migrated files from the disk (miglow)
- Force the migration of designated files (migpurge/mignospace)

Find additional information about VERITAS NetBackup Storage Migrator *for UNIX* at

http://www.veritas.com/us/products/storagemigratorunix/

or e-mail **PM-HSM@veritas.com.**

An updated list of supported platforms is at

http://www.veritas.com/us/products/storagemigratorunix/matrix.html

DOWNLOAD

Efficient Off-Host Processing in Clustered Systems with VERITAS FastResync

Download the New Administrator's Guide

Many of you have asked how best to take advantage of the VERITAS FastResync option. There is excellent new documentation available now. The VERITAS Off-Host Processing Using FastResync Administrator's Guide tells you how to implement off-host processing for offline and online backup of databases and cluster-shareable file systems, and for decision support and database error recovery on clustered systems. Once activities such as backup and decision support are offloaded from critical production server nodes, you are likely to find improved overall system throughput and reduced resource contention in your clusters. FastResync was recently certified by our engineers for VERITAS SANPoint Foundation Suite™ HA, which includes VERITAS Cluster Volume Manager™. This vastly increases the range of the performance improvements you can produce with FastResync.

Download the Administrator's Guide at

http://www.veritas.com/us/products/sanpointfoundationsuiteha/

or

ftp://ftp.veritas.com/pub/products/ohps.doc.tar.Z

The Guide is intended for system administrators who are already familiar with installing, configuring and maintaining high-availability clustered systems using VERITAS software.

VERITAS NetBackup™ DataCenter 3.4 Passes Benchmark Test with over 700 Gigabyte-per-Hour Restore of the Oracle8i Database

VERITAS recently released the results of the largest restore benchmark ever performed on an Oracle8i database. In conjunction with Sun Microsystems and its enterprise-class hardware, VERITAS NetBackup™ DataCenter 3.4 restored an Oracle8i database of more than 25 TB with sustained throughput between 700 and 800 gigabytes per hour. The aggregate throughput was over 1.1 TB per hour. A 1 TB per hour milestone had been accomplished in the past on a Sun system, also using VERITAS NetBackup (see **http://www.sun.com/storage/whitepapers/hspeedbackup.html**). This new benchmark presented a much greater challenge because of the extremely large amount of Oracle data involved and the demanding system configuration requirements.

The benchmark was performed with Acxiom Corp., a leading provider of information technology outsourcing services in Little Rock, Ark. Acxiom's client required maximum backup and recover performance out of its large Oracle database over a gigabit network infrastructure. All benchmark testing was performed at the Sun Benchmark facilities in Menlo Park, California.

A demanding test setup

The IT architecture consisted of a Sun Enterprise 10000 server and a Sun Enterprise 6500 server, connected to two Sun StorEdge L700 libraries with 20 fully configured DLT700 tape drives each. A unique aspect of this configuration was that the E10000 and E6500 needed to be able to stream backup and restore data via a gigabit network interface backbone. This was an unusual configuration, because that both servers were connected to fully populated L700 tape libraries with the E10000 configured as a NetBackup Master Server and the E6500 as a NetBackup Media Server.

To stream data as efficiently as possible between these two systems, the powerful and flexible configuration capabilities of NetBackup DataCenter came fully into play. NetBackup DataCenter 3.4 drove 40 tape drives concurrently for backup and recovery operations. Used as VERITAS NetBackup master server and client, the Sun Enterprise 10000 housed the more than 25 TB instance of Oracle8i data, while the Sun Enterprise 6500 server acted as the VERITAS NetBackup media server.

The operating system for this test was Solaris 8 on kernel patch 108528-02. Test engineers made several modifications to the file /etc/system, mostly for configuration of shared memory. They placed modifications to network parameters made via the ndd command in the directory /etc/rc2.d. These modifications, introduced at the request of network engineers at Sun, were made to account for special requirements of the Sun gigabit network interfaces.

Fast recovery and low CPU utilization

When a disastrous event occurs, computer downtime can be significantly reduced with quick and efficient recovery of data. Backups are of very limited value unless recovery can be fast, efficient and accurate. Data recovery from tape can be problematic and slow. In this test, VERITAS NetBackup DataCenter software demonstrated its powerful capabilities. In the benchmark, data recovery throughput averaged over 800 GB per hour, with peak rates approaching 900 GB per hour. This means that recovery times are not significantly longer than the time it takes to back up the original data.

In addition, the low CPU utilization observed during these tests is an indication that the NetBackup DataCenter software has the capacity to scale to even higher throughput levels. Even at backup rates of 1 TB per hour, VERITAS NetBackup DataCenter has not reached its limit.

Increased data integrity for gigabit networks

Gigabit technology is one of the most anticipated new network architectures since 100-megabit networks. With the validation of this benchmark study, customers of VERITAS Software and Sun Microsystems looking to implement a gigabit network now can rely on VERITAS NetBackup DataCenter as a proven high-performance, scalable data protection solution.

Ask the Doctor

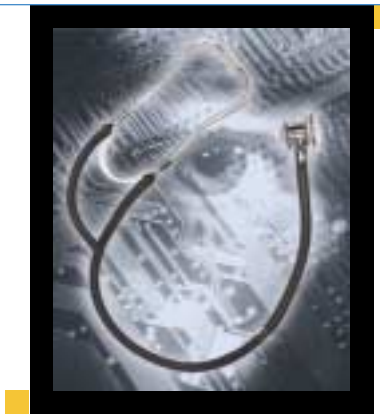
I am looking to invest in a SAN and have heard about 3PC. What is it and should I be buying some?

3PC or third-party copy is the latest technology to be enabled by SANs. In simple terms, it enables data to be copied from disk to tape, without the need for it to go via a server. Hardware within the SAN fabric interconnect, such as a fibre bridge, does all the data movement, having been instructed in what needs to be transferred by a backup server.

By making it unnesessary for the data to go via the server, and having the data travel over the SAN (rather than the LAN or WAN) 3PC allows the server to continue to operate efficiently, even while in use by end users. This effectively removes the need for a backup window, as it can now happen at any time. There were a number of technical issues that had to be resolved before 3PC could become a reality. Not least of them is the requirement of a consistent mapping from the file system to the blocks on disk. While this may at first seem simple, there are many end cases, such as running a defragmentation of the disk while 3PC is being carried out. Without this, data corruption is inevitable, because the server can move a block and the 3PC data mover, which is in the SAN fabric, would then move the wrong block. One major advantage that VERITAS has is its ownership of the underlying file system and volume manager. We have fully integrated them into our backup 3PC solution and can therefore avoid the problems created by operations such as defragmentation.

What do you see as the biggest issue with SANs today?

SANs have come a long way in the last two years. More and more corporations have a SAN, and those SANs are starting to become big. Effective management of these rapidly growing environments is the largest issue we have today. VERITAS SANPoint™ Control is becoming more and more important in the battle for people to manage more with less. Being able to automatically discover and visualize the increasingly complex environment is a real benefit, but it will be the increased reporting facilities in version 2.0 that will be key in helping to manage the environment. We created more than 40 reports to offer resource inventories, capacity statistics and both real and



historical performance information. All of which are essential if the management is to scale with the implementation. Further integration with products such as VERITAS Volume Manager™ and an intelligent provisioning service will ensure that resources on the SAN are fully utilized.

Every few years we hear that the time for hierarchical storage management (HSM) has come. Now it's being said again, with SANs being the driver this time – what do you think?

HSM has been in open systems for many years, with a strong niche market in industries such as oil and gas exploration and other huge data producers. The concept behind HSM is simple: you move data off expensive primary storage, such as disks, onto slower but cheaper secondary storage, leaving behind a small stub or placeholder. When the stub is accessed, the HSM engine retrieves the data from the secondary storage and puts it back onto disk, where the application accesses it as if it had never been away. Performance is the big issue here. You need to be able to restore the data in a timely manner so the user doesn't notice too much of a delay. When carrying out a restore in some environments (where the data travels across the LAN) there can be noticeable effect on users as the LAN becomes saturated – this may not be acceptable. In this instance there are a couple of solutions. One is to have a locally attached tape drive and the other is to use a SAN. In a SAN environment, the data passes over the SAN, leaving the users the LAN. HSM can help in justifying a SAN by improving the return on investment, because it will not only be a further application that makes use of tape libraries, but also can reduce the need for new disk purchases as data can be stored on cheaper tape. However, HSM is not for everyone. It depends on the size of the files and how frequently the data is accessed.

So, yes, I think that the time of HSM has really come – both for UNIX and for Windows. SANs have brought the technology back into the minds of administrators and are now in many different environments.

There is a free performance analysis tool available from our Web site, in the VERITAS Storage Migrator™ product section. It will analyze your file systems and show you how you would benefit from using VERITAS Storage Migrator and its HSM technology.

What are the distance limitations when looking to mirror VERITAS Volume Manager™?

This is a bit of an open-ended question... in other words, I need more information. However, if you have a SAN, then a distance of 10 miles is very obtainable, with distances of around 30 to 40 miles obtainable using additional third-party products. If the distances are sufficiently small and the fibre infrastructure is in place, then mirroring is the easiest mechanism and options such as setting the preferred plex can be used to optimize read performance. If the infrastructure is not in place, or the distance is too great, then you can use VERITAS Volume Replicator™. This is being successfully done in a variety of scenarios, even across very large distances through a WAN using either synchronous or asynchronous replication – and it has the added benefit of being able to replicate to up to 32 nodes, in a one-to-many or many-to-one format, to best utilize your hardware.

There seems to be a lot of press coverage of iSCSI – how is this different from SCSI?

ISCSI, or IP storage, is, in essence, SCSI but over standard Ethernet. Some people see this as an alternative to fibre channel, offering block-level storage over existing infrastructure – if you happen to have gigabit Ethernet.

VERITAS is involved in iSCSI and has been an active participant in the standards discussions since the IETF started its working group last year to ensure that our products use the technology to its fullest extent.

What happens in VERITAS Cluster Server™ when the node I am attached to with the GUI fails?

Quite simply, the GUI reconnects to another node in the cluster – automatically.

When the GUI first connects, it gets all the hosts that are in the cluster. When the node it is attached to fails, it first takes a snapshot of the current configuration and then loops through the hosts listed and tries to connect to it. Once connected, it sends the cached user name and password to become authenticated. When authenticated, a new version of the cluster configuration is sent. The GUI compares this with the one it had stored and will update the GUI with the differences.

If, for example, the network is down between the host with the GUI on it and the server, then the GUI will continue to attempt to reconnect to all the hosts in sequence for a period of time before giving up.

In general, the whole process is very quick and takes only a few seconds. Often the user doesn't even notice that the GUI is now automatically connected to a different host in the cluster.

Questions?

The doctor is available. E-mail **doctor@veritas.com**.

INVITATION

New VOX VERITAS Readers' Forum: Share your Good Ideas and Experiences

System engineers, UNIX or Windows system administrators, database managers, data storage specialists and all of you working with VERITAS products in your organizations: we want to hear from you.

Did you resolve any business issues, get rid of performance bottlenecks, control costs or have other successes in your data availability strategy? Do you feel that this may be something your peers might find interesting and useful? Please take a moment to write a note. E-mail it to the editor, Chris Lemoine, at clemoine@veritas.com.

We will publish the most interesting contributions, and we'll have a gift for you. So please make sure you include your telephone number and mailing address. VOX will also credit you with your full name and title.

By Arya Barirani, National Business Development Manager, Enterprise Consulting Services, VERITAS Software

VERITAS Consulting Services: Turning Data Availability Potential into Reality

VERITAS has now streamlined all of its services to make sure you receive the same quality of consistently responsive and business-oriented service anywhere in the world. The family of VERITAS services includes technical support, consulting and education. In the last issue of VOX VERITAS we gave you an update on VERITAS Vsupport™. This time, we'll take you on a brief tour of VERITAS Consulting Services.

VERITAS Consulting guides your IT decision makers through the maze of business and data availability challenges. We understand information technology and your business requirements, and can maximize the success of your IT strategy through the rapid deployment of new data availability solutions. The VERITAS Consulting VProServices apply our experience and resources to derive the maximum value and performance from your IT and availability infrastructure.

A complete data availability solution consists of VERITAS' platform-independent software products expertly applied in your environment to meet your business objectives. With VERITAS Consulting, you can make use of VERITAS expertise in all aspects of data availability technology including high availability, storage area networks, data protection and data management. VERITAS Consulting will:

- Assess your current practices to match your data availability strategy with your business needs
- Design a solution to help you achieve your data availability goals while minimizing risk and maximizing your investment in our products
- Launch an optimized VERITAS solution rapidly and effectively
- Extend the capabilities of VERITAS software products to meet any specific business needs
- Help manage your solution by sharing VERITAS expertise in extended maintenance and project management projects

VProServices: comprehensive data availability consulting services for dynamic business environments

The new structure of VProServices reflects the typical lifecycle of bringing new data availability technology into your business. This framework allows you to enter at any point in the lifecycle, giving you full control over services when you need them.

VProAssess helps you define a data availability plan which matches your business strategies. It addresses all data availability technology disciplines including high availability, data protection, storage area networking and data management. In a VProAssess engagement, we match your business goals with your current environment, identify any gaps are identified and determine possible solutions. We capture the resulting analysis in a detailed report.

VProDesign services define the architecture of your desirable data availability environment. The design phase may include hardware recommendations and a project plan. As the leading platform-independent provider of data availability software, VERITAS is uniquely qualified to help you design an availability infrastructure that fully meets your needs and gives you full latitude in your platform selections.

VProLaunch applies our best practices to get the VERITAS products in your operation up and running quickly and efficiently. Using the VProLaunch services reduces ramp-up time and removes any guesswork from

the technology deployment phase. VERITAS consultants make sure the data availability layer is deployed optimally the first time.

VProExtend services add software tools to expand existing VERITAS products with additional capabilities to increase the usefulness of VERITAS technology in your business. These tools include the VERITAS SNMP Extension (see below) and VERITAS Vault Extension.

VProManage services keep the VERITAS technology in your business running at optimum performance levels. As your IT environment changes or new VERITAS product releases become available, your data availability infrastructure may need adjustment. VProManage services include system health checks and performance tunings services.

VProResource gives you continuing access to the expertise of VERITAS consultants. They are available to you for managing special projects or to help run and maintain data availability technology in your operation for an extended period of time.

VERITAS SNMP Extension: framework integration for intelligent proactive event management

Many companies have invested in framework tools which use Simple Network Management Protocol (SNMP). These tools allow them to manage vast system resources with limited staff, streamline their business processes, ensure maximum data availability and increase the ROI of their technology investments.

The VERITAS SNMP Extension delivers SNMP-based enterprise framework integration and intelligent proactive event management for VERITAS data availability products. It enables common framework tools such as HP OpenView or Tivoli TME to monitor, control and configure your VERITAS software environment. With the VERITAS SNMP Extension, system administrators can spend their time working on other projects, knowing that any event in their VERITAS software environment will generate a notification to their framework, pager or e-mail. The SNMP Extension can also be configured to automatically take corrective actions in case problems arise.

The SNMP Extension is suitable for any framework environment that supports the SNMP protocol and is available for VERITAS NetBackup™, VERITAS Cluster Server™, VERITAS Volume Manager™ and VERITAS File System™.

To find out more about VERITAS Consulting VProServices, please contact your VERITAS sales representative or go to our Web site.

The VERITAS Early Adoption Program (EAP)

Take an Active Role in Creating Tomorrow's Data Availability Solutions

VERITAS Software now has an Early Adoption Program (EAP). Complementing our beta programs, EAP gives you an opportunity to make your voice heard in the development of VERITAS technology.

If you are a customer who is strongly committed to continuous availability of the data and applications in your operations, the Early Adoption Program can be of great value in planning your technology infrastructure. You participate in shaping the direction of the technology that keeps your data available. You work with the developers to optimally implement this technology in your business. You see new VERITAS products early, and can test them thoroughly on the platforms used in your production environment. Thanks to your feedback, the final products will be more reliable and functional.

VERITAS EAP is a structured relationship with commitments on both sides. You sign an EAP agreement of participation that defines the scope of your involvement. VERITAS' obligations will typically include the following elements:

- Increased level of technical support, backed up by several VERITAS organizations including product management, product marketing management, multiple field support teams and engineering, throughout the program
- Assistance in building appropriate test scenarios for your environment
- An effective communications channel to make the resolution of any issues easy and fast
- Regular check-point conferences and a focus group forum

Your EAP commitments will usually include the following:

- Agreement to a specific level of product testing
- Participation in an initial program kick-off which gives your technical staff an introduction to the product, its features and requirements, and gives you a chance to give feedback on research and engineering specifications
- Contribution to setting VERITAS' product direction by taking part in a focus group conference
- Participation in periodic check-point conferences
- Reporting of beta test incidents and cooperation with VERITAS' technicians to clarify any confusion with those incidents
- Permission for VERITAS to use your company's name, and the success story relating to the VERITAS product implementation in your business, in marketing material such as press releases, white papers and case studies

The Early Adoption Program enhances our quality assurance efforts by incorporating real-life experience and testing results from our customers. EAP promotes data availability in your business by close cooperation with VERITAS experts during product implementation, and by leveraging your understanding of the needs for that technology.

To find out more about the VERITAS EAP, go to

http://beta.veritas.com/

or contact us at **eap@veritas.com**.

The Book on VERITAS: VERITAS Publishing

VERITAS Publishing is a publishing venture of VERITAS Software Corporation. It helps to satisfy the need for reliable, comprehensive and practical information on data availability and data storage management technology. VERITAS Publishing makes use of the wealth of experience at VERITAS, and also serves to promote VERITAS Software's leadership and innovation in the data storage industry.

VERITAS Software has established a partnership with **John Wiley & Sons**, the largest independent publisher in North America, to create the VERITAS Series for global distribution of its intellectual property in form of books. In keeping with VERITAS' focus and business interests, VERITAS Publishing will primarily deliver books about data availability and storage. Steered by an advisory council and editorial board, VERITAS Publishing is developing books at four different levels:

- **Strategy:** what CIOs need to know to build a data availability layer
- **Concepts:** defining and explaining data availability, SANs and other concepts
- **Best practices:** guidelines for optimal implementation of availability technology
- **Handbooks:** how to use VERITAS products most effectively

Earlier this year, VERITAS Software and VERITAS Publishing announced a book called **Disk Storage Management for Windows Servers**, by Paul Massiglia, Engineering Technical Director, VERITAS Software. This is a guide to help administrators implement and configure online storage in Microsoft Windows workgroup and enterprise environments. The book gives readers the architectural background that enables them to formulate online storage strategies, and shows how VERITAS volume management technologies apply these principles in Windows environments.

This book explores how disks, volumes, mirroring, RAID and fault-tolerant disk subsystems work and interact together. It outlines how VERITAS volume management technologies, including VERITAS Volume Manager™ *for Microsoft Windows NT and Windows 2000*, make easy, online disk and storage management possible. Readers also learn how they enhance the benefits of fibre channel-based storage area networks in a Windows environment.

Please contact your VERITAS representative if you're interested in the current version of this guidebook. An expanded and retitled version of the guide, titled **Highly Available Storage for Windows Servers**, ISBN: 0-471-03444-4, will be available in bookstores in the fall of this year. For the same timeframe, you can also expect the second book in the VERITAS Series by Richard Barker and Paul Massiglia, **Storage Area Network Essentials**, ISBN: 0-471-03445-2.

Other books from VERITAS authors currently available include:

- **Case Method: Entity Relationship Modelling**; by Richard Barker; Addison-Wesley; ISBN: 0201416964
- **Case Method: Tasks and Deliverables/Oracle: The Relational Database Management System**; by Richard Barker; Addison Wesley; ISBN: 0201416972
- **Case Method: Function and Process Modelling**; by Richard Barker; Addison Wesley; ISBN: 0201565250
- **UNIX Internals: A Practical Approach**; by Steve Pate; Addison Wesley; ISBN: 020187721X
- **Blueprints for High Availability**; by Evan Marcus and Hal Stern; John Wiley & Sons; ISBN: 0471356018

By Cecily Joseph, Executive Director, VERITAS Software Foundation

VERITAS Foundation News

VERITAS and Sun Partner to Donate Technology and Training to Schools

In March, VERITAS and Sun Microsystems teamed up at Payne Elementary School in San Jose to help the school to enhance the operation of its new computer learning lab for students. VERITAS presented the school with software, VERITAS NetBackup™ BusinesServer 3.4, and is also donating training and ongoing support. VERITAS hopes to remain involved with supporting the school and the school district as it expands its computing and network operations. Right now, VERITAS is still assessing how extensive the support needs of Payne Elementary are. It's important to VERITAS Vsupport™ to be responsive and accommodating to this school before expanding the program. Sun Microsystems donated the hardware for the learning lab. The network consists of 31 SunRay Network Appliances linked to a Sun Enterprise E250 server.

Students are using the technology to learn everything from math to making group presentations. They also do a lot of research. All files reside on the E250 server. All the SunRay Network Appliances need to do is run browser software. Teachers often embed other sites' links into the school's Web page. When the students do their assignments at home, they can access the same pages when they log on. School officials say the technology helps create a perfect learning environment, and helps students acquire valuable computing skills.

Payne Elementary is a pilot site. The school district is working to have a districtwide network with similar labs at each of its schools. Future plans also call for two SunRay Network Appliances in each single classroom. The lab and network at Payne Elementary are a training ground for effective data protection and best practices for the entire school district. The district's IT department is already replicating the same infrastructure at another school. They hope to use VERITAS technology to roll out a consistent data protection and recovery strategy for the entire district. The idea is to use NetBackup BusinesServer to perform centralized backups for all of the schools in the district. So far, Mike Jones, the Director of Information Technology for the Moreland School district, and his staff have to drive out to each school to do the backups. They look forward to having their time freed up for other tasks.

Mike Jones tells us that "As far as VERITAS, the thing that's exciting to me is [that] I like the idea of standardization and I want to apply a single backup strategy districtwide. So this is going to allow this school in particular and me and my staff to learn the VERITAS product, get it on a SunRay server, and learn what we learn and then based on that, start to migrate it out to all of our servers."

Grants Update

In keeping with VERITAS Software Foundation's focus for this year, all of its grants are education-related. VOX reported on the grant to the NEA Foundation for the Improvement of Education in its last issue. VERITAS Software Foundation also made four grants to schools in the Roseville, Minnesota, area. Grants during the second quarter of 2001 will be to schools in the Mountain View, California, area.

Hardware Donation Program

In the first quarter of this year, the Foundation, together with the VERITAS IS&T department, donated used cell phones to the Donate-A-Phone program, which refurbishes the used phones and makes them available to the elderly and victims of abuse. The Foundation and IS&T have now teamed up to define a hardware donation program. It will involve the recycling of all VERITAS hardware, including such old company items as computers, monitors, scanners, printers, phones, pagers and fax machines. These items will go to needy organizations.

Contact VERITAS Software Foundation at **vfoundation@veritas.com** or write to VERITAS Software Foundation, 1600 Plymouth Street, Mountain View, CA 94043.

Enabling High Availability (HA) Everywhere

You're invited to this special half-day seminar, where we'll discuss how to plan for and maintain high levels of data and application availability across your environment.

Who Should Attend?

When a user makes a request for data, that request often passes through multiple tiers in the data center – Web servers, application servers, database servers, storage, and now even more complex infrastructures such as storage area networks (SANs). If you're responsible for ensuring availability in any of these areas, you'll benefit from the information in this seminar.

Opening Keynote

"Perceived Availability: Managing Today's Internet Data Center" - Achieving availability from the applications all the way to the storage pool, across wide distances, in today's complex, heterogeneous environments.

Choose Either Breakout Session

"Deploying HA"

Fundamental availability planning and management, the cost of implementing highly available solutions, and how to build a recovery profile which matches to specific application or organizational needs. The session covers techniques and tools for deploying online storage management, clustering and data replication in environments with mixed hardware and operating systems.

"Advanced HA"

In-depth discussion of the next generation of best practices and tools that further shrink recovery times and increase scalability in critical environments. We will also discuss centralized management in a global, mixed environment.

Registration

Space is limited. Go to **http://www.veritas.com/us/promotions/haseminar/** to register today at your preferred location.

Go Everywhere with VERITAS

Want to be as global as your data? As a special bonus all attendees have a chance to win a trip around the world that includes three international cities over 14 days. Trip includes airfare, hotel, and even some tourist dollars!

DATES AND LOCATIONS

Go to:

http://www.veritas.com/us/promotions/haseminar/locations.html for dates and locations.

Coming to these locations worldwide:

June	San Francisco, CA, USA Long Beach, CA, USA Phoenix, AZ, USA Seattle, WA, USA Vancouver, British Columbia, Canada
July	Mexico City, Mexico Sao Paulo, Brazil Portland, OR, USA Denver, CO, USA Houston, TX, USA
August	Chicago, IL, USA Cincinnati, OH, USA Tokyo, Japan Hong Kong, China
September	Detroit, MI, USA Sweden Raleigh, NC, USA Atlanta, GA, USA Germany London, England
October	King of Prussia, PA, USA Tysons Corner, VA, USA New York, NY, USA Hartford, CT, USA Montreal, Quebec, Canada

5th Annual VERITAS Worldwide Users' Conference

November 4 – 8, 2001
Wyndam Anatole Hotel, Dallas TX

VERITAS VISION2001™, the Fifth Annual VERITAS Worldwide Users' Conference, is the premier event to gain knowledge about data availability and interoperability from users with real experiences, mingle with VERITAS executives and network with other VERITAS users.

You can preview the latest VERITAS solutions and participate in product updates and strategy discussions. Choose from over 70 sessions, technical presentations, business sessions, product demonstrations, complimentary product tutorials and forums on current issues in data availability and interoperability. Visit our Partner Solutions Pavilion, where VERITAS' key partners demonstrate the latest available technologies.

Don't miss –

- Complimentary tutorials
- Executive keynotes
- Breakout presentations
- Partner Solutions Pavilion
- Birds-of-a-feather sessions
- Evening entertainment

Conference registration

Advanced registration US$995

Onsite registration US$1,395

To register, visit **www.veritasvision.com**.

Call for presentations

If you are interested in making a presentation at the event, please see the Web site for details.

Check out the Events Calendar at the New VERITAS.com

VOX VERITAS will still make announcements on important VERITAS events such as VISION2001, but we won't try to incorporate the complete events calendar anymore. There are simply too many events. Please visit the Events Center pages at veritas.com. After July 1, the Web site will have many contextual features that will make it more responsive and interesting to you. You will be able to search for events by type, and link directly to detailed event information.

90-01447-399 • VER06-VOXNSL4.2-0003

VERITAS Software Corporation
Corporate Headquarters
350 Ellis Street
Mountain View, CA 94043
650-527-8000 or 800-327-2232