IBM Netfinity SAN Solutions

Fifth Edition (December 2000)

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Introduction

The IBM SAN initiative is an IBM corporate commitment to provide the complete range of services, infrastructure, and technology required for businesses to successfully implement a Storage Area Network (SAN).

The SAN value-add solutions layer covers the solutions that provide the true customer value of SAN technology.

- Software, servers, fabric and storage are the building blocks used to construct, use and manage the SAN.
- The services and system integration components are critical to the success of the SAN initiative because of the complexity of heterogeneous, multi-platform environments.

Program/Function SAN Solutions Matrix

The following matrix represents the list of the storage management programs versus key SAN functions. It is possible to combine applications to achieve more than the functions inherent to each individual program.

Backup and Restore	LAN-free Backup	Serverless Backup	File Sharing	Remote Mirroring Extension for MSCS	Storage Virtualization	LUN Management	Online Volume Growth	Virtual Volume Snapshot	SAN Management	MSCS Backup Failover		
o										o		CA ARCserve 2000 Advanced Edition
	o									o		CA ARCserve 2000 Tape Library Option
	o	o										CA ARCserve 2000 Storage Area Network Option
		o										CA ARCserve 2000 Serverless Backup Option
					o		o	o				Compaq SANworks Virtual Replicator
				o								Legato Mirroring Extension for MSCS
o										o		Legato Networker for Windows 2000
	o											Legato Smart Media
						o						Netfinity FAStT Storage Manager
o	o								o	o		Tivoli Storage Network Manager
o	o									o		Tivoli Storage Manager 4.1
			o			o						Tivoli SANergy File Sharing
o										o		VERITAS BackupExec
	o									o		VERITAS BackupExec Shared Storage Option

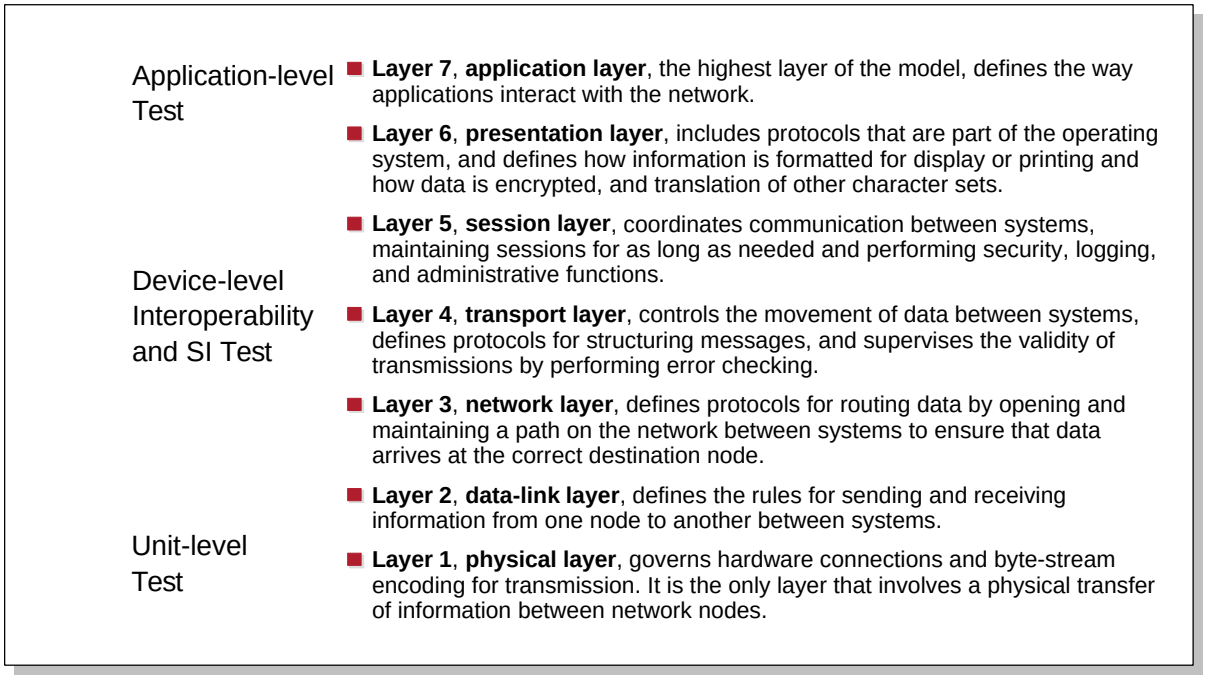
Note 1:
Serverless Backup requires IBM 2108 R03SAN Data Gateway Router with FC2840, or IBM 2108 G07 SAN Data Gateway with FC2214, and a Data Mover license key (from IBM or Pathlight Technologies)

IBM Global Services and IBM Personal Systems Group are working together to bring to the IBM sales teams and business partners a set of pre-defined and tested SAN configuration. If these need modifications, or if application scalability performance testing, SAN 'proof of concept' and SAN performance testing is required, the IGS SAN Interoperability Lab at the National Testing Center in Gaithersburg, Maryland is available.

Information about IBM Global Services: http://www-1.ibm.com/services/its/us/testing.html

Test Philosophy

The IBM Netfinity SAN Solutions test philosophy is mapped on the ISO OSI Reference Model, as follows:



The Netfinity SAN Solutions are predicated on application-level interoperability testing. The following paragraphs describe three test levels: Application-Level Interoperability, Device-Level Interoperability and Unit-Level test.

1.0 Application-Level Interoperability Test

The application-level interoperability test ensures that an application, such as backup/restore, LAN-free back-up, serverless backup, server clustering, etc. will run as designed on a combinations of hardware components that are representative of customer configurations. At this level, the hardware configurations are, for the most part complex and can involve numerous devices that differ by type, vendor and operating system. Since the objective of this test is to determine the feasibility of typical IBM supported customer SAN solutions, not every functions of the application can be tested. While application level interoperability test addresses the major functions of the application, successful completion of the test does not guarantee full interoperability. However, it does provide a reasonable high level of confidence that the application will function well in most Netfinity SAN solution scenarios.

2.0 Device-Level Interoperability

The device-level and system integration test verifies functionality of the device with additional hardware and software.

Interoperability and System Integration Test insures conformance with the ANSI Fibre Channel (FC) standards and interoperability between these devices:

- **Server Interoperability**
  This ensures there are no problems between the HBA and the server. Potential problems that may be found in this testing include incompatibility between the HBA and server PCI chipsets, and conflicts between the HBA driver/BIOS setting and drivers/BIOS setting of other installed devices/adapters in the server.

- **Storage Interoperability**
  Storage devices such as disk arrays and tape devices are tested with SAN hardware and HBAs. This ensures compatibility between the end device and SAN hardware. Potential problems that may be found include improper LIP handling, AL_PA and Worldwide Name problems, jitter, etc.

- **Application device-level interoperability**
  Application device-level interoperability insures coexistence with the operating system environment and typical user shrink-wrapped software. It also ensures that the software works with the applicable hardware.

In the case of a Windows environment, the component should have either successfully completed all applicable Microsoft Hardware Certification program tests, or have almost completed the tests with no blocking defects pending.

3.0 Unit-Level Test

The Unit-level Test performs environmental, thermal, EMC/EMI, ESD, safety, diagnostic and reliability stress testing. All product features should be verified with the component by itself, or with minimum amount of additional hardware and software, as applicable. The Manufacturer's Component Test Plan and Results documentation is required for review before a component is included into a Netfinity SAN Solution.

Statement of Support

IBM Service and Support

IBM has defined the server life cycle into four phases: *Plan*, *Implement*, *Run* and *Replace*. IBM provides comprehensive service and support throughout these phases of ownership and IBM Netfinity service offerings are organized under each of these areas.

The program details are available at
http://www.pc.ibm.com/ww/eserver/xseries/services/index.html

There are two types of support available for devices on the IBM Netfinity ServerProven Compatibility web site:

1. **Supported by IBM**

   The Startup Support Program provides 90-day support covering installation, configuration, and setup for all listed IBM products and for select products from non-IBM manufacturers. During such 90 days, IBM will assist you with problem determination and contact the non-IBM manufacturer, if necessary, for any available support.

2. **Supported by non-IBM Manufacturer**

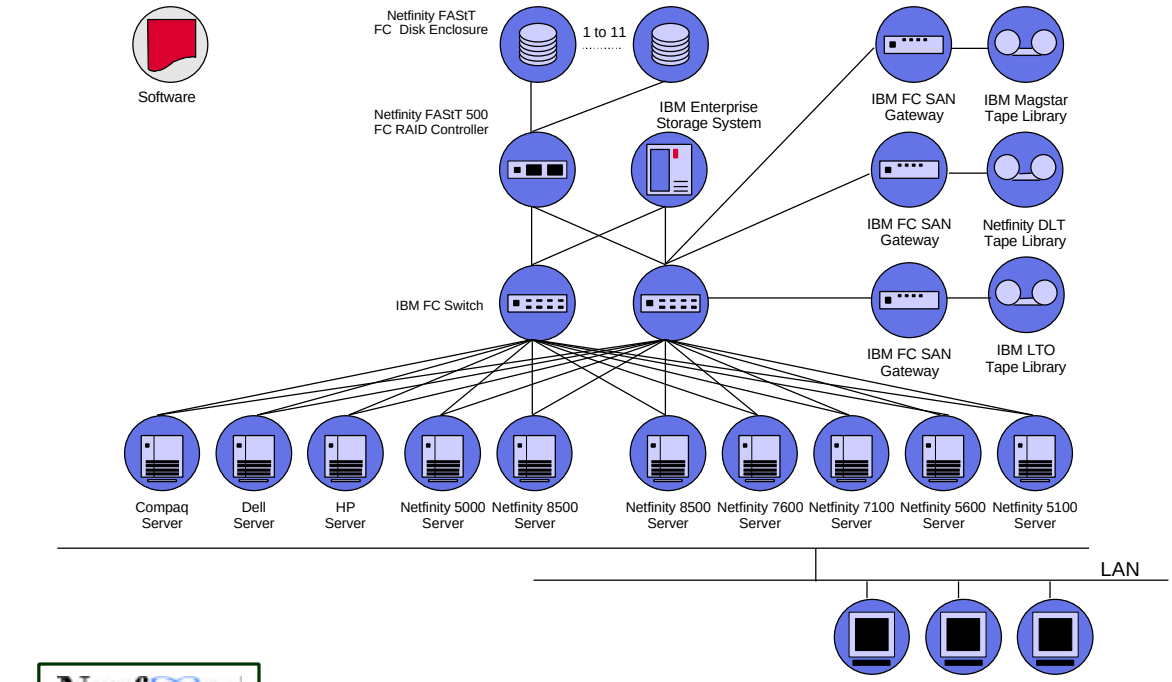
   Products that are supported by non-IBM manufacturers are those that IBM testing labs have shown to work properly when installed exactly as listed. The IBM PC Company does not provide remote telephone support for these products. For these products, support issues should be directed to the manufacturer of the product in question.

SAN Solutions Test Set-up

1.0 Disk Pooling, Tape Pooling, Storage Consolidation, Serverless Backup, File Sharing

SAN Solutions Test Set-up for

Disk Pooling, Tape Pooling, Storage Consolidation, Serverless Backup and File Sharing



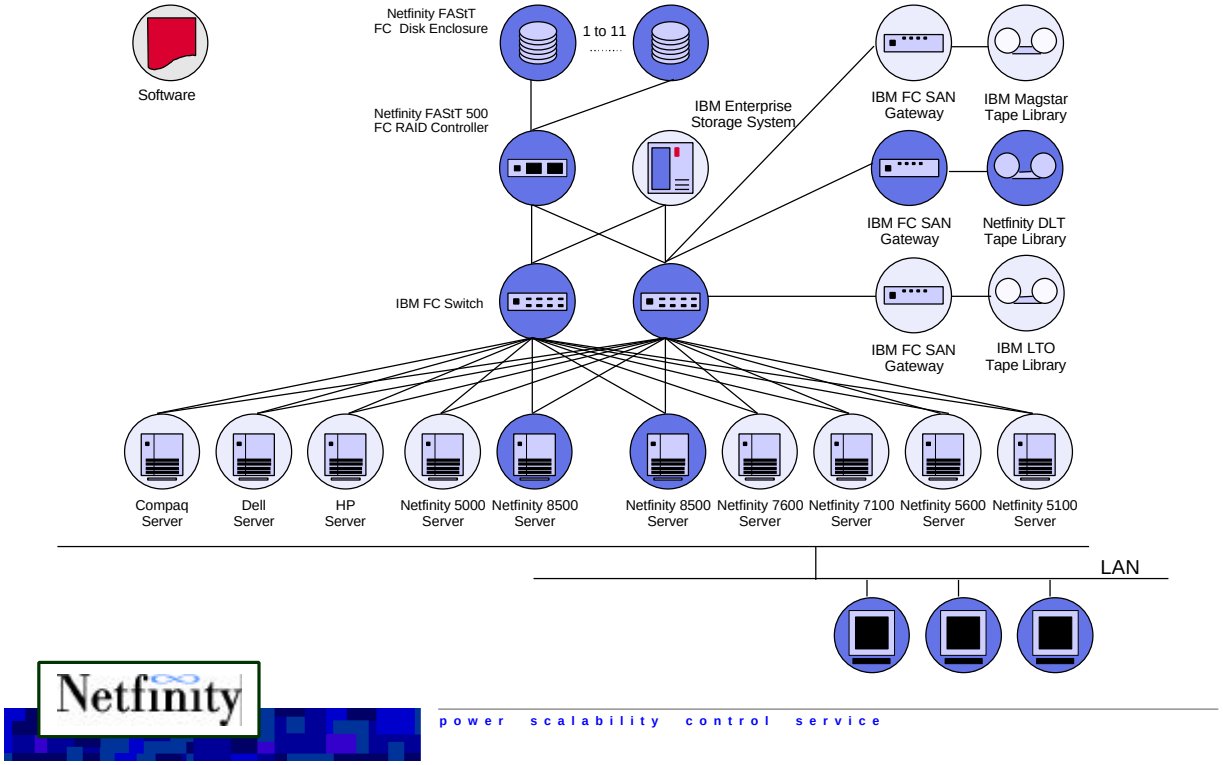
Netfinity

power scalability control service

2.0 Microsoft Cluster Service Tape Pooling

SAN Solutions Test Set-up for

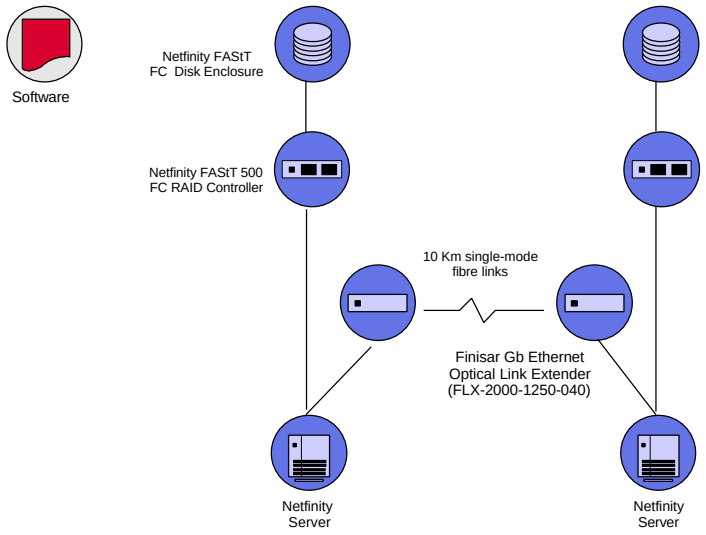
Microsoft Cluster Service Tape Pooling



3.0 Legato Mirroring Extension for Microsoft Cluster Service

SAN Solutions Test Set-up for

Legato Mirroring Extensions for Microsoft Cluster Service



See www.microsoft.com for Microsoft certified configurations

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power scalability control service

Configurations Details

	Software Components **T**ested / **P**lanned	**Version**				
T	Windows 2000 Advanced Server	5.00.2195				
T	CA ARCserve 2000	7.0				
T	CA ARCserve 2000 Tape Library Option	7.0				
T	CA ARCserve 2000 Storage Area Network Option	7.0				
T	CA ARCserve 2000 Serverless Backup Option	7.0				
T	Compaq SANworks Virtual Replicator	2.0				
T	IBM StorWatch SAN FC Switch Specialist	2.17				
P	Legato NetWorker					
P	Legato SmartMedia					
T	Legato Mirroring Extension for MSCS	1.0				
T	Netfinity FAStT Storage Manager	7.01				
P	Tivoli Storage Network Manager					
T	Tivoli Storage Manager	3.7				
T	Tivoli SANergy File Sharing	2.1				
T	VERITAS BackupExec	8.0				
T	VERITAS BackupExec Shared Storage Option	8.0				

	Storage, HBAs, Other Options **T**ested / **P**lanned	**P/N**	**Object**	**Level**	**Object**	**Level**
T	IBM 3502-314 Tape Library	3502-R14	Drive CP	V030-0		
T	IBM Ultrium LTO Drive	3580		5.0.1.4		
T	IBM Ultrium LTO Library	3583		5.0.1.4		
T	IBM UltraScalable LTO Library	3584		5.0.1.4		
T	IBM Enterprise Storage Server	2105-E20	LIC	SB0619		
T	IBM Magstar 3570 Tape Library	3570-C22	Drive CP	D1I5_313	Library CP	
T	IBM Magstar 3575 Tape Library	3575-L06	Drive CP	D1I5_313	Library CP	2.17
T	Netfinity FAStT RAID Controller	3552-1RU	AppWare	94.00.01.35	Bootware	94.00.01.06
T	Netfinity FAStT FC Host Bus Adapter	00N6881	Win2K driver	7.04.03.02	BIOS	1.44
T	Netfinity FAStT EOP500 FC Storage Unit	3560-1RU				
T	Netfinity FC Hard Disk Drive 9.1GB	36L6209				
T	Finisar GigaBit Ethernet Optical Link Eotender	Flo20001250				

	Servers **T**ested / **P**lanned	**P/N**	**BIOS**			
T	IBM Netfinity 5000	8659	44A			
T	IBM Netfinity 5100 **XSeries 230**	8658	11A			
T	IBM Netfinity 5600 **XSeries 240**	8664	33A			
T	IBM Netfinity 7100	8666	9A			
T	IBM Netfinity 7600	8665	13A			
T	IBM Netfinity 8500R	8681	27A			
T	Compaq ProLiant	6400	P11			
T	Compaq ProLiant	8500	P42			
T	Dell PowerEdge	6350	812			
T	Dell PowerEdge	6400	A05			
T	Dell PowerEdge	8450	A03			

	FC Interconnect **T**ested / **P**lanned	**P/N**	**Firmware**			
T	IBM SAN Fibre Channel Switch	2109-S16	2.1.7			
T	IBM SAN Fibre Channel Switch	2109-S08	2.1.3			
T	IBM SAN Data Gateway Router	2108-R3S	3.41.29			
T	IBM SAN Data Gateway	2108-G07	3.41.29			
T	IBM SAN Fibre Channel Managed Hub	3534-1RU	2.1.3			

Storage Management Applications

CA ARCserve 2000 Advanced Edition
CA ARCserve 2000 Tape Library Option
CA ARCserve 2000 Storage Area Network Option
CA ARCserve 2000 Serverless Backup Option

Computer Associates International is the world leader in mission-critical business computing provides software, support and integration services in more than 100 countries around the world.

Software

- **ARCserve 2000** delivers centralized management, assured virus-free backup/restore, SAN serverless backup and integrated fail-over with Microsoft Cluster Services.

- **ARCserve 2000 Tape Library Option** provides flexible, unattended operations by optimizing the capabilities of tape libraries or autoloaders. ARCserve 2000's Tape Library Option supports multiple drive libraries and is required for the Storage Area Network Option.

- **ARCserve 2000 SAN Option** enables users to fully exploit leading edge Fibre Channel technology. Fibre Channel SAN support offers numerous benefits to the enterprise, providing the ability for multiple servers to share storage devices, high-speed backup and restore over a fast fiber-optic storage backbone, flexibility of extended distances for storage devices, advanced device management tools and total scalability of the storage network. Includes the Tape Library Option

- **ARCserve 2000 Serverless Backup Option** leverages SNIA Standard, Extended SCSI Copy command to significantly enhance performance by taking the backup load off servers, and freeing CPU time for mission critical tasks. The serverless backup technology, combined with ARCserve 2000 SAN solutions delivers high performance, hot online protection of SAN volumes, unlimited scalability and reduced administrative costs.

Support

Unless otherwise specified, warranty, service, and support for non-IBM products are provided directly to you by the product manufacturer, supplier, or publisher of the product. IBM makes no representations or warranties regarding the non-IBM products.

Detailed information about how to access CAI Technical Support http://support.cai.com/ available on the company's web site.

Compaq SANworks Virtual Replicator

Compaq Computer Corporation, a Fortune Global 100 company, is the largest supplier of computing systems in the world. Compaq designs, develops, manufactures, and markets hardware, software, solutions, and services, including industry-leading enterprise computing solutions, fault-tolerant business-critical solutions, and communications products, commercial desktop and portable products, and consumer PCs.

Software

SANworks Virtual Replicator v2.0 is the latest product release and introduces a number of new features. Windows 2000 support and Online Volume Growth are the most important new features.

- **Virtualization** allows companies to respond quickly to ever-changing storage capacity requirements. With storage virtualization, multiple storage arrays can be grouped into a pool of disk space for individual or clustered systems to use. Multiple virtual disks, up to 1TB in size, can be created from a pool for users and their applications. System administrators can tailor disk space to specific requirements.

- **Online volume growth** enables easy, non-disruptive growth for Windows 2000 with zero downtime. System administrators design servers with growth in mind. However, one cannot plan for everything. Online Volume Growth allows a system administrator to grow an existing volume on a SANworks Virtual Replicator virtual disk and also a Windows 2000 basic disk. The system will remain online, and the data on the volume will remain intact.

- **Snapshots** enable the instant creation of multipurpose virtual replicas of production data without the requirement of a physical copy. Snapshots function identically to ordinary physical disks with both read and write capability. Whenever a quick copy of production data is needed, snapshots can be used with minimal disruption to running applications. For example, the snapshot can be the source for backup using standard backup tools. Snapshots can remain online for restore operations, testing, and data mining.

- **Management** simplification through easy-to-use interfaces using Microsoft Management Console, or a command line. Interactive wizards are available to guide the administrator through all management tasks and create automatic schedules of operations.

Support

Unless otherwise specified, warranty, service, and support for non-IBM products are provided directly to you by the product manufacturer, supplier, or publisher of the product. IBM makes no representations or warranties regarding the non-IBM products.

Further information about can be found on the company's web site
http://www6.compaq.com/storage/index.html

IBM StorWatch ESS Specialist
IBM StorWatch SAN Data Gateway Specialist
IBM StorWatch SAN Fibre Channel Switch Specialist

IBM Storage Systems Division

Software

- **IBM StorWatch Enterprise Storage Server Specialist** is an integrated storage management tool that enables storage administrators to centrally monitor and manage IBM ESS. Using commonly available browser software, users can access the StorWatch Enterprise Storage Server Specialist tool from work, home, or on the road via a secure network connection.

- **IBM StorWatch SAN Data Gateway Specialist** simplifies the management of SAN Data Gateways and routers across the enterprise

- **IBM StorWatch SAN Fibre Channel Switch Specialist** provides a comprehensive set of management tools that support a Web browser interface for flexible, easy-to-use integration into existing enterprise storage management structures.

Support

Detailed information about how to access IBM Storage tech support is available on IBM's web site http://www.storage.ibm.com/techsup.htm

Legato NetWorker for Windows 2000
Legato Mirroring Extension for Microsoft Cluster Service

Legato Systems is a worldwide leader in the enterprise storage management software market. Helping companies leverage their business-critical, corporate data assets, Legato's products enable "Information Continuance," a seamless approach to the movement, management and protection of data throughout an enterprise

Software

- **Legato Mirroring Extension for Microsoft Cluster Service**. Legato integrated its high-speed block-level mirroring technology to work transparently with Microsoft Cluster Service (MCS) software. Customers now have the choice to implement a mirroring configuration in place of the shared disk currently required by Microsoft Cluster Service. Mirroring Extension eliminates the single point of failure of the data set, while maximizing investments in Microsoft standards and training.

- **Legato NetWorker Network Edition** is the mainstream storage-management solution for enterprise networks. Network Edition supports options that add client connections, expand client platform coverage, and deliver advanced data management services. Network Edition provides archiving, Storage Nodes, SNMP manageability and Legato NetWorker database/applications support.

Support

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Detailed information about how to access Legato Technical Support is available on the company's web site http://www.legato.com/support/

Tivoli Storage Network Manager
Tivoli Storage Manager
Tivoli SANergy File Sharing

Tivoli software manages the foundations of e-business, extending the boundaries of traditional network and systems management from the data center across the Internet, from the desktop to pervasive devices. Leading companies around the world use Tivoli software, Tivoli Ready third-party products and Team Tivoli partner services to reduce the cost and complexity of managing heterogeneous IT environments. Tivoli solutions, encompassing management of security, storage, and mobile devices, are helping these organizations to create a technology infrastructure to support the next generation of business. Headquartered in Austin, Texas, Tivoli is an IBM company (NYSE: IBM).

Software

- **Tivoli Storage Network Manager** provides the interface for managing your Storage Area Network infrastructure. Tivoli Storage Network Manager is a scalable solution utilizing open SAN standards. This comprehensive solution discovers, allocates, monitors, automates, and manages SAN fabric components and attached disk storage resources.

  Features:
  - Network Management:
  - SAN Topology Discovery
    - Continuous Monitoring
    - Single Interface
  - Disk Management
  - File System Policy Management
  - Event Reporting

- **Tivoli Storage Manager 4.1** utilizes high performance patented technologies to protect and manage your mission-critical business information in an enterprise-wide Storage Area Network (SAN) and traditional network environment.

- **Tivoli SANergy File sharing** enables multiple Windows NT, Macintosh, and UNIO systems to concurrently share SAN-based storage at full media speeds. Through a patented combination of standards-based file-sharing and the gigabit data rates afforded by Fibre Channel, SCSI and SSA storage area networks, SANergy gives delivers the power to
  - **Share storage devices** – centralize storage for multiple systems to reduce costs
  - **Share file systems** – replace slow NAS and file servers to increase productivity
  - **Share application data** – deploy high-speed file sharing for incredible scalability

Support

These software products are supported by IBM.

Detailed information about how to access IBM Storage is available on IBM's web site http://www.storage.ibm.com/techsup.htm

VERITAS BackupExec
VERITAS BackupExec Shared Storage Option

For enterprise customers who demand the continuous availability of business critical information, VERITAS Software Corporation, the industry's leading enterprise-class application storage management software provider, ensures information availability from business-critical applications by delivering integrated, cross-platform storage management software solutions.

Software

- **BackupExec** the system of choice for high performance, reliable Windows NT data protection - and the most comprehensive solution for growing networks. As the first backup solution designed for Windows NT, BackupExec incorporates database protection and storage management options for today's highly specialized networking environment. These agents are specifically designed for complex messaging and transactional intensive databases, along with options for storage system management and server recovery that can be installed from any centralized backup server.

- **BackupExec Shared Storage Option** allows multiple distributed backup servers to share common, centralized storage devices that are connected over a fibre channel storage network for greater efficiency and fault tolerance. The Shared Storage Option load balances activity across multiple BackupExec servers, increases performance and backup speeds, centralizes management tasks and lowers the total cost of ownership.

Support

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VERITAS offers an extensive Technical Support structure that is best accessed through the company’s web site http://support.veritas.com/

Additional Sources of Information

- IBM Global Services and IBM Personal Systems Group are working together to bring to the IBM sales teams and business partners a set of pre-defined and tested SAN solutions. If the pre-defined solutions need modifications, or if application scalability performance testing, SAN 'proof of concept' and SAN performance testing is required, the IGS SAN Interoperability Lab at the National Testing Center in Gaithersburg, Maryland is available. Additional information can be found at http://www-1.ibm.com/services/its/us/testing.html

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- Netfinity Server Configurator Guide document and the Netfinity Rack Configurator (select *Configuration Tools*) http://www.pc.ibm.com/us/eserver/xseries/library/index.html

- IBM news releases are available on the Internet, via the IBM Home Page at http://www.pc.ibm.com/