

*Enterprise storage applications benefit from the right  
Ultra2 SCSI RAID Adapter*



# IBM Netfinity® ServeRAID-3H and -3L Ultra2 SCSI Adapters

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## Highlights

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### **Powerful enterprise storage adapter**

Power and performance matched to your needs. Using an advanced 80MHz RISC I/O processor, Ultra2 SCSI technology with twice the data-rate of Ultra Wide SCSI, and an advanced 64-bit high-performance (up to 264Mbps) PCI interface you can support data intensive applications. The ServeRAID-3H has three SCSI channels—all can be external—accessible from a single PCI slot, 32MB of write cache included as standard and optional 32MB battery backup write cache (on ServeRAID-3H only)—for a total of 64MB of mirrored cache. ServeRAID-3L provides one SCSI channel and 4MB cache.

### **Superior scalability**

Grow and adapt your Netfinity server system storage with Ultra2 SCSI channels capable of supporting up to 15 devices each at up to 80MBps data throughput. Select Netfinity models support up to 8 adapters for up to 4.3TB<sup>1</sup> of storage using the EXP15.

### **Outstanding reliability and control**

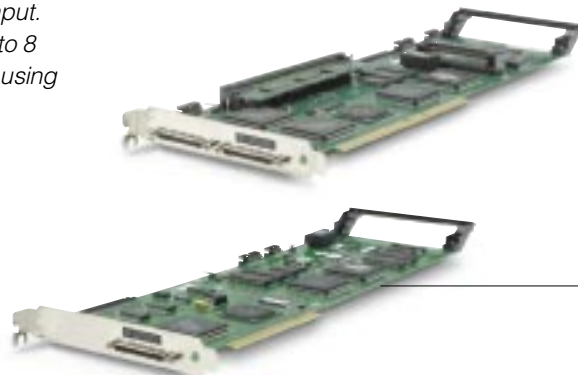
Add or remove disks or redefine arrays without shutting down your system with Logical Drive Migration. Both adapters support RAID levels 0, 1, 5 and Enhanced RAID 1 and give you “on-the-fly” freedom to change RAID levels of existing configurations or add additional disks to existing arrays if more storage is required. Triple redundant storage of vital RAID configuration data is also provided for greater system availability.

### **Warranty service**

IBM ServeRAID adapters assume the three-year, on-site, parts and labor, limited warranty<sup>2</sup> of the Netfinity server in which the adapter is installed.

### **Protecting your data, your investment, and your growing business**

If you want enterprise-class scalability, reliability and control, Microsoft Cluster Server support or support for I<sub>2</sub>O™ (planned availability 1Q99), consider the new IBM ServeRAID-3H and -3L Ultra2 SCSI Adapters. ServeRAID-3H and -3L Ultra2 SCSI Adapters offer you a powerful, more reliable way to grow storage.



ServeRAID-3H and -3L Ultra2 SCSI Adapters

# Options by IBM

## The logical approach

Until now, adding drives to an existing configuration meant shutting down your system, backing up your data to tape, adding and/or removing disks, defining a new configuration and finally restoring your data. Thanks to a technology known as Logical Drive Migration (LDM), IBM ServeRAID-3H and -3L adapters let you make crucial changes without shutting down your system. The adapter handles capacity changes to existing RAID arrays in background mode and allows new RAID arrays to be added while your server continues to operate.

Plus, because IBM ServeRAID-3H and -3L Ultra2 SCSI adapters store critical RAID configuration information in three different places—Flash ROM, nonvolatile RAM on the adapter and in a reserved area on the attached disk—you achieve triple redundancy for the most crucial portion of your RAID subsystem data. You can recover quickly and easily from a disaster, or you can migrate to another system. And even if you're not in a critical recovery mode, you can still move disks easily from one server to another. You simply take the disks from one server and install them in any order in another server<sup>3</sup> with either the IBM ServeRAID-

3H or -3L Ultra2 SCSI Adapter. The IBM ServeRAID-3H and -3L Ultra2 SCSI adapter takes care of the rest, getting the proper configuration from the disks and remapping them as necessary.

The Netfinity ServeRAID-3H Ultra2 SCSI Adapter now includes enterprise-class high-availability features for Microsoft Cluster Server and IBM Netfinity Cluster Pack by Vinca. New functions have also been added to help you set up, modify and monitor your disk array more conveniently and with a higher degree of confidence.

## The adapter that's right for you

The IBM ServeRAID-3H and -3L Ultra2 SCSI Adapters are designed to perform optimally in your Netfinity server system, but they offer a different range of features to meet your specific needs. The four most significant differences are the number of channels, the processing power, the amount of cache and battery backup. The ServeRAID-3H has three channels (all external capable), a more powerful processor than the -3L, 32MB cache and optional battery backup mirrored write cache with its own 32MB of cache. Memory "chip kill" connection

technology allows the optional write cache to tolerate a memory chip failure without losing data. Write cache mirroring technology allows you to exchange a failed adapter (with good battery backup) and not lose data, or you can replace a bad battery backup and you will not lose data. The ServeRAID-3L has one channel, a less powerful processor, 4MB cache and does not offer optional battery backup.

How do you know which adapter is right for you? Your IBM representative can help, but here are a few scenarios that can get you pointed in the right direction.

Figure 1 shows a Netfinity 5000 operating as a department file-and-print server. With a single channel, the ServeRAID-3L Ultra2 SCSI Adapter provides excellent internal RAID and data redundancy protection for this system. The ServeRAID-3H offers not only internal RAID, but two extra channels to handle external RAID capacity—for instant system scalability and protection of your server investment. Optional battery backup for the ServeRAID-3H gives your data additional security.

### ServeRAID-3 at a glance

Feature	ServeRAID-3H	ServeRAID-3L
<b>Number of Channels</b>	3 (2 external, 1 internal or 3 external)	1 (internal or external)
<b>Cache size</b>	32MB	4MB
<b>Processor</b>	403 PowerPC 80/40 MHz	403 PowerPC 50/25 MHz
<b>Bus</b>	64-Bit PCI	32-Bit PCI
<b>Interface</b>	Ultra2 SCSI (Up to 80Mbps)	Ultra2 SCSI (Up to 80Mbps)
<b>I<sub>2</sub>O support</b>	I <sub>2</sub> O Ready	I <sub>2</sub> O Ready
<b>Hot pluggable</b>	Yes	Yes
<b>Battery backup Cache</b>	Yes (optional with 32MB Cache)	Not available
<b>Clustering support</b>	Yes	Yes (Netfinity 5500 series only)
<b>Logical Drive Migration</b>	Yes	Yes
<b>Number of services support</b>	Up to 45	Up to 15
<b>Number of terabytes using 18GB drives</b>	4.3TB	1.4TB

Figure 2 shows Netfinity 5500 series servers operating in a workgroup server and server cluster configuration. Because the Netfinity 5500 was designed with built-in internal RAID, the ServeRAID-3H offers the scalability and flexibility of three channels available for external RAID. With three EXP 15s holding up to 10 HDDs each, the ServeRAID-3H delivers superior storage and data redundancy capability. Add a second Netfinity 5500 and ServeRAID-3H adapter for a cast-iron clustering solution for business-critical applications operating in a 24x7x365 environment.

In Figure 3, Netfinity 7000 and 7000 M10 servers are depicted as large enterprise servers. Dual ServeRAID-3H Ultra2 SCSI Adapters provide excellent system scalability—supporting up to 60 HDDs in

six Netfinity EXP 15 external storage units all mounted together in a Netfinity Rack. Taken one step further with the introduction of IBM Netfinity Fibre Channel solutions, the ServeRAID-3L handles internal RAID for the Netfinity 7000 M10. Additional external enterprise storage beyond SCSI could be obtained via Fibre Channel for greater speed and scalability.

**Bigger, faster, smarter**

The IBM ServeRAID-3H and -3L Ultra2 SCSI Adapters take advantage of the very latest developments in Ultra2 SCSI technology, offering you independent SCSI channels, each capable of supporting up to 15 devices. Of course, both IBM ServeRAID-3H and -3L Ultra2 SCSI Adapters still support existing SCSI-2

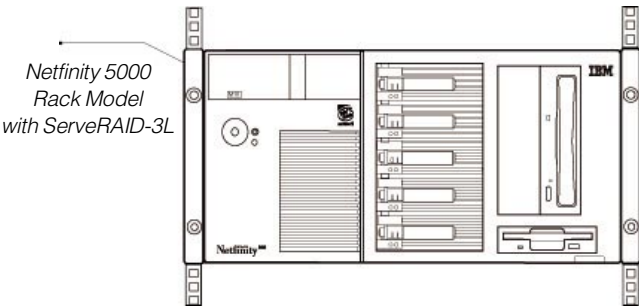
standards, but with Ultra2 SCSI your data travels at up to 80MBps, twice as fast as with Ultra SCSI. To keep things moving, the IBM ServeRAID-3H and -3L adapters use a 64-bit and 32-bit PCI adapter, respectively. In addition, all IBM ServeRAID cache is dedicated cache. By not sharing this resource with the RISC I/O processor, the ServeRAID-3H and -3L optimize RAID performance in our examples and similar scenarios.

The 32MB/battery-backup cache option available with the ServeRAID-3H provides additional high-speed cache memory that optimizes RAID performance and protects against data being lost in the event of a component or power failure.

**Figure 1.**

## DEPARTMENT FILE-AND-PRINT SERVER

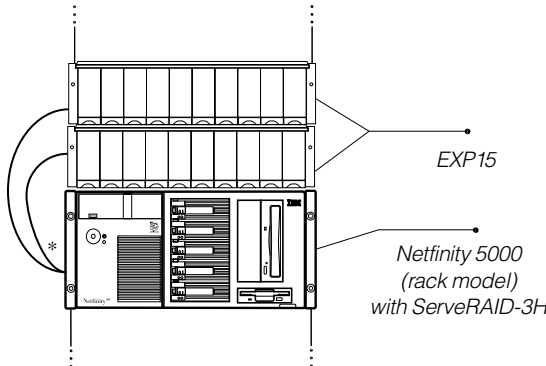
### ServeRAID-3L



**Benefits**

- **Internal RAID**
- **Data redundancy**

### ServeRAID-3H



**Benefits**

- **Internal RAID**
- **Two channels external RAID**
- **Data redundancy**
- **System scalability**
- **Investment protection**
- **Optional battery backup**

\* Channels shown for illustration only. IBM rack storage systems enable neat and efficient connections.

### Adapting to change

As your enterprise grows, so does the need to keep your system flexible. IBM's ServeRAID-3H and -3L SCSI Adapters support RAID levels 0, 1, 5 and Enhanced RAID 1, allowing you to choose the performance/protection combination that suits your needs. What truly sets the ServeRAID-3H adapters apart is three

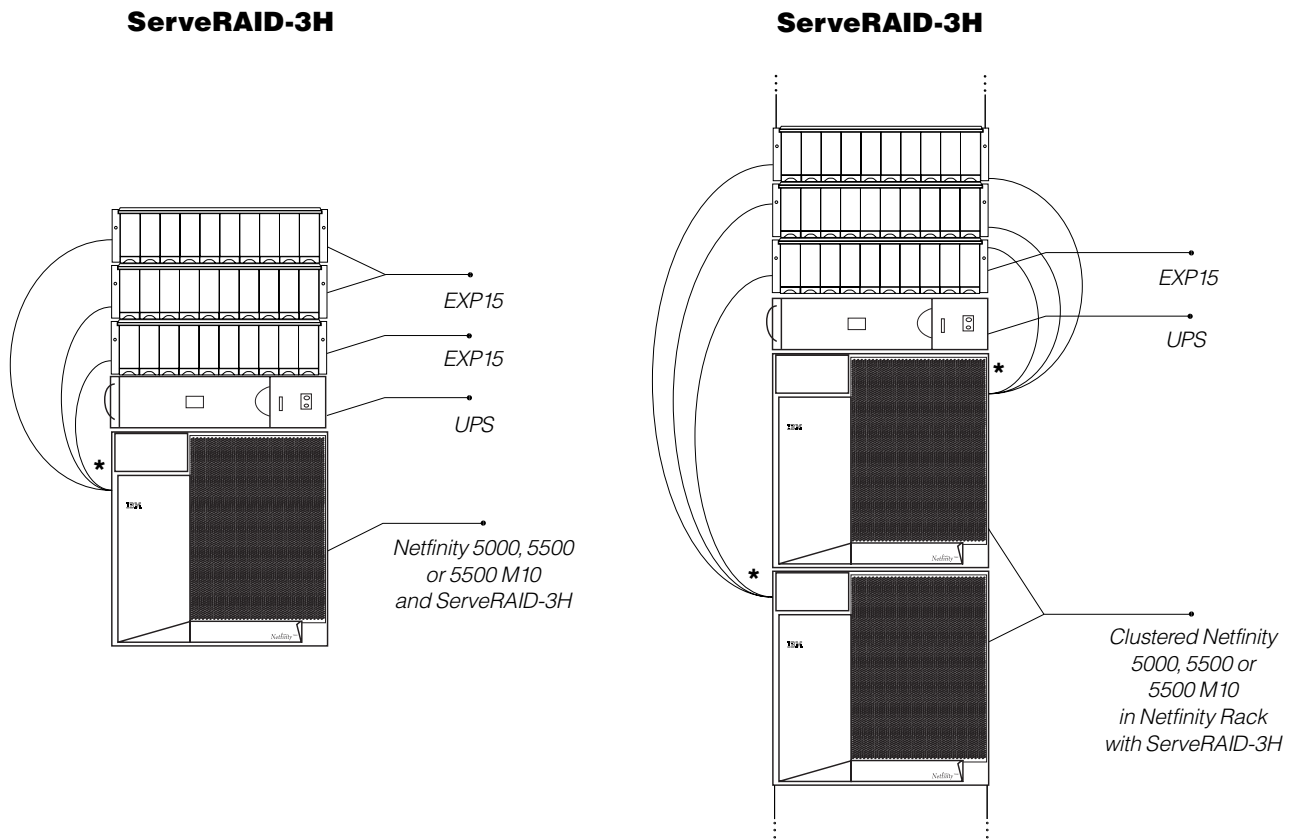
channels—all external-capable—giving you extensive expansion capability with the Netfinity EXP15. In addition, both ServeRAID adapter models let you change RAID levels or add new RAID arrays as your requirements shift. For maximum availability, these LDM functions can run without forcing you to power down your system.

### IBM: At your service

IBM's three-year, on-site limited warranty on Netfinity servers extends to cover certain installed options, such as the ServeRAID-3H and -3L Ultra2 SCSI Adapters—saving you time if maintenance is ever required.

Figure 2.

## IBM NETFINITY 5500/5500 M10 WORKGROUP SERVER AND SERVER CLUSTER RACK CONFIGURATION



### Benefits

- **Internal RAID\*\***
- **Three channels external RAID**
- **System scalability**
- **Investment protection**
- **Data redundancy**
- **Optional battery backup**

### Benefits

- **Clustering with Netfinity 5000, 5500 or 5500 M10**
- **System scalability**
- **Investment protection**
- **Data redundancy**
- **Optional battery backup**
- **Internal RAID\*\***
- **Three channels external RAID**

\* Channels shown for illustration only. IBM rack storage systems enable neat and efficient connections.

\*\* Netfinity 5500 and 5500M10 have RAID built into the system that can be used for internal or external HDD RAID.

**The best in the business, working together**

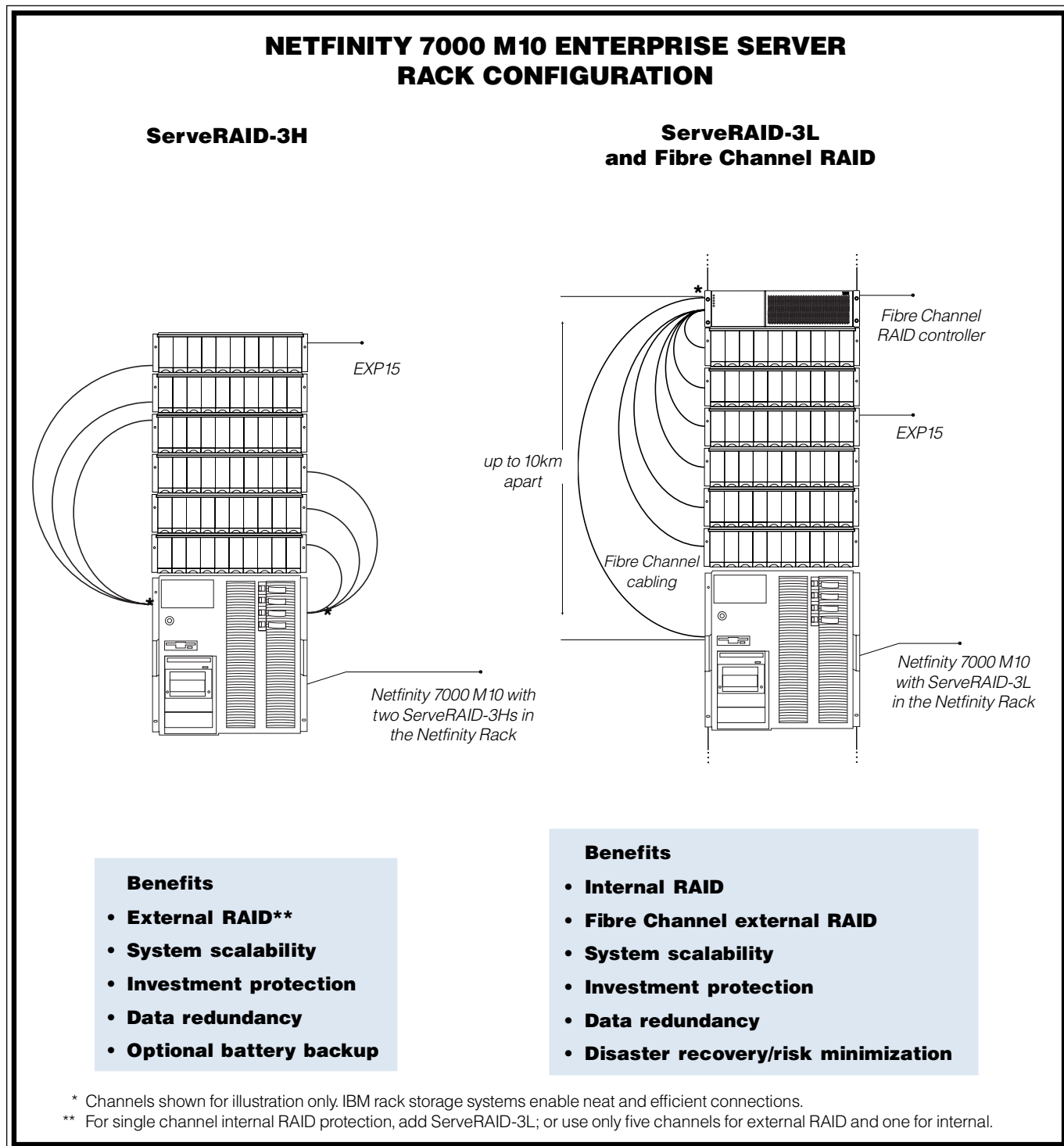
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other industry leaders including Microsoft, Intel, Lotus, Oracle, Novell, SCO, J.D. Edwards and Baan to incorporate in our products the leading-edge technologies needed to drive your business forward.

**The case for IBM**

So, why IBM? What other company has the depth of experience and the track record to produce solutions for your business with first-rate hardware and software products, a dazzling list of options and world-class service and support? IBM...It's just better business.

**Figure 3.**






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Netfinity Fibre Channel Solution	#43044	#45469
Netfinity Service and Support	#43031	#45487
Netfinity ServerProven Solutions	#43047	#45473

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**Online Information**

WorldWideWeb	
Netfinity	<a href="http://www.ibm.com/netfinity">www.ibm.com/netfinity</a>
ServerProven	<a href="http://www.ibm.com/pc/us/netfinity/serverproven">www.ibm.com/pc/us/netfinity/serverproven</a>
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IBM Personal Systems Group  
Department LO6  
3039 Cornwallis Road  
Research Triangle Park, NC 27709

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- <sup>1</sup> TB or terabyte means one trillion bytes. Total user-accessible capacity may vary depending on operating environments.
- <sup>2</sup> For terms and conditions or copies of IBM's limited warranty, call 1 800 772-2227 in the U.S. and in Canada call 1 800 426-2255. Limited warranty includes International Warranty Service in those countries where this product is offered. Telephone support may be subject to additional charges.
- <sup>3</sup> Disks are fully interchangeable only between Netfinity servers with the same HDD tray.

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