

## IBM Plunges Into Enterprise NAS With the NAS Gateway 500

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### Management Summary

NAS gateways have grown in popularity because of the flexibility they offer. Think of a gateway as a NAS appliance without the disk drives – just the brains and connectivity for serving files on an IP network. It can connect directly to a storage array and effectively become a NAS appliance. **Alternatively, it can connect to a SAN and leverage consolidated, networked storage – which is where its real value lies.** Most enterprises need both block and file storage access (i.e., SAN and NAS) because of applications where one is more suitable than the other. Converging SAN and NAS by using a NAS gateway can simplify management overall and help an enterprise get more out of its storage assets.

IBM has a broad and solid product line for SANs, but its NAS offering at the high end of the market has not been as strong as some of its competitors. It seeks to change that now with the introduction of its new enterprise-class gateway, the *IBM TotalStorage NAS Gateway 500*. The gateway supports IBM storage arrays (*Enterprise Storage Server, FASiT* – direct and SAN-attached) as well as third-party storage indirectly through IBM's *SAN Volume Controller*. Maximum capacity is 224 TB. It comes in dual node clusters with multi-path failover for high availability as well as single node configurations at a lower price point. Data replication capabilities include snapshot and rollback, and synchronous and asynchronous mirroring are scheduled for release in summer 2004. Per internal benchmarks, the performance of the NAS Gateway 500 is on par with competitors at the high end and is priced attractively for this segment.

Beneath the covers, the NAS Gateway 500 uses IBM *pSeries* Unix servers that are tightly integrated with a library of software for file serving, clustering, data replication, and management. This is not a general-purpose file server, however, because IBM has put a great deal of engineering into its integration and packaging for ease of installation and use, which the market has come to expect from a NAS product. This includes a Web-based GUI for centrally managing multiple units. For administrators already familiar with Unix, a menu-driven interface and CLI are also available.

By returning to its *Power Architecture* roots, IBM has just taken a serious plunge into enterprise NAS. For enterprises interested in a robust NAS solution, especially to complement an IBM SAN infrastructure, this product appears to be a natural fit. Read on for the details.

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## The Need for NAS

With the withdrawal of the IBM *NAS 100* and *200* appliances last August and it's just-announced planned withdrawal of the *NAS Gateway 300*, IBM found themselves back at square one without a NAS solution. They needed to satisfy the NAS needs of the enterprise community, where the previous product set missed the mark. Well, it turns out that when they returned to design mode and reviewed the requirements for enterprise NAS, they discovered an interesting phenomenon. The requirements that characterize the NAS gateway solution are identical to those of the enterprise level *pSeries*, with a base of more than one million units in the field. *AIX*, the *Power 4+* hardware, and the existing server surround architecture support the same environmental characteristics required by NAS. Any enterprise-class NAS gateway needs to have the resiliency characterized by IBM's current server solution and the capability to be SAN attached. It needs high performance, scalability, and more. It must be interoperable with a wide range of storage products. For a complete list of enterprise gateway characteristics, see Exhibit 1.

### Exhibit 1 Enterprise NAS Gateway Requirements

- SAN attachment
- High performance
- High availability
- High reliability
- Data protection and copy services
- Scalability
- Evolution characteristics
- Interoperability with other vendor's products

## IBM TotalStorage NAS Gateway 500

In an attempt to avoid the confusion caused today in every data center by a myriad of NAS solutions, from every vendor, including the previous IBM NAS prod-

ucts, IBM has decided to introduce a kind of chameleon. The *IBM TotalStorage NAS Gateway 500* satisfies a variety of needs at the SMB, department, or enterprise level. With a single initial identifier, IBM can deliver a fully functional NAS gateway that can morph into a solution for a spectrum of requirements in the IT environment, be it gateway or appliance.

This solution starts as a single-node, dual-processor NAS gateway based on the IBM *eServer pSeries 630* with the *Power 4+* 64-bit architecture running at 1.45GHz. It provides file services on the enterprise IP network and connects to the corporate Fibre Channel SAN on the back end. The *pSeries* includes a variety of built-in reliability, availability, and serviceability (RAS) features. (See Exhibit 2.) An easy-to-use set of management tools based upon *AIX 5L Release 5.2B* is integrated, as is the NAS operating system, to improve usability and make the operation transparent to the network. This operating system supports the major network file protocols such as NFS and CIFS.

### Exhibit 2 NAS 500 Resiliency Features

- Automatic First Failure Data Capture and diagnostic fault isolation
- Self-healing internal Power4 processor array recovery
- Industry first PCI bus parity error recovery
- ECC and Chipkill correction in main storage
- Fault tolerance with N+1 redundancy of power and cooling, dual line cords, and concurrent maintenance of power and cooling
- Predictive failure analysis on processors, caches, memory, I/O and DASD
- Processor run-time and boot-time deallocation based on run-time errors
- Deallocation extended to memory

The NAS Gateway 500 can also **scale up** from a dual-processor, single-node gateway to a quad-processor configuration as the workload connected to the IP network increases. This can be done without disruption in a dual-node clustered configuration. Alternatively, you can improve the resiliency of your architecture by **scaling out** to a two-node configuration in order to implement a no-single-point-of-failure environment. Pre-configured with IBM's High Availability Clustered Multi-Processing (HACMP) software, the NAS Gateway 500 can upgrade to mission-critical application status with automatic node failover in order to maintain continuous, non-disruptive operation. You can also upgrade performance by replacing the Power 4+ microprocessors with the latest chips, as they are introduced over the coming years. Based upon the pSeries, the NAS Gateway 500 will not become obsolete due to microprocessor improvements; it can grow with each new improvement to the Power family.

Alternatively, the IT department can configure the NAS 500 as an appliance if your NAS environment does not call out for a gateway solution. With the simple connection of a *FAST<sup>1</sup>* disk array or an *Enterprise Storage Server<sup>2</sup>* (a.k.a., Shark) to the back end, it can transform it into a NAS appliance. Doing this enables your NAS with all of the on-demand functionality introduced for those products.

While the NAS Gateway 500 will work in any server environment, it is an ideal NAS complement within an IBM pSeries environment. It was designed with the pSeries Systems Management and AIX software in mind, and tested rigorously in conjunction with IBM storage. However, the implementation staff does not require any AIX training as the installation process

and management is all GUI controlled. Systems management features included in the basic package include:

**WebSM** – For the configuration and management of multiple, remote NAS Gateway 500 units via a web-based graphical user interface (GUI) from a single workstation. It is designed for administrators with no previous experience with AIX servers.

**SMIT** – For a menu-driven management environment, likely preferred by AIX administrators.

**CLI** – For experienced systems administrators that are more comfortable using command-line interface commands for configuration and management.

The NAS Gateway 500 does not include any external disk as part of the standard distribution, but all of IBM's current line of storage solutions have been qualified and certified to attach to the NAS server, either direct- or SAN-attached. These include the full line of *FAST Storage Servers*, including the 200, 500, 600, 700 and 900, as well as all of the *ESS* models, the *F10*, *F20*, and *800*. To the storage arrays, the gateway looks like any other attached server, and it can take advantage of the performance characteristics and data protection capabilities on the array. The gateway can connect to up to four arrays and scales to 224 TB of raw capacity. In addition, the *IBM TotalStorage SAN Volume Controller<sup>3</sup>* (SAN-VC) has been qualified with the NAS Gateway 500. SAN-VC is an intelligent, network-resident platform that delivers universal block virtualization, replication services, and centralized storage management. This opens access to a range of non-IBM storage solutions from companies such as Hewlett Packard and Hitachi, providing support for heterogeneous storage environments, thus preserving the investment made in these arrays.

<sup>1</sup> See **The Clipper Group Navigator** entitled *IBM Supercharges FAST Family* dated August 31, 2003 at <http://www.clipper.com/research/TCG2003038.pdf>.

<sup>2</sup> See **The Clipper Group Navigator** entitled *Enhancements to IBM Shark Facilitate Comprehensive e-Business Continuance* dated May 27, 2003 at <http://www.clipper.com/research/TCG2003024.pdf>.

<sup>3</sup> See **The Clipper Group Navigator** entitled *Managing More Storage with Less Effort – IBM Unveils Its SAN Volume Controller* dated April 30, 2003, at <http://www.clipper.com/research/TCG2003018.pdf>.

Several software data protection features are also included:

- **Snapshot and Snap Rollback** – Creates local snapshot images, up to 15 per volume. Rollback allows the primary volume to be restored from a snapshot at a previous point in time.
- **Synchronous and Asynchronous Mirroring** – Replicates volumes in real-time between systems for disaster protection purposes. This feature is scheduled to be available in August 2004.
- **Multi-path failover to ESS and FASTT** – Support continuous access to data in the event of a connection failure.
- **Support for enterprise backup solutions** – IBM Tivoli Storage Manager is supported, as are solutions from Veritas and Legato.

List price for a single-node, 2-way configuration with 4 GB of memory starts at \$67,400, which includes basic software and maintenance.

### Benefits to the Business

Most enterprises have a requirement for NAS because of its file sharing capabilities, ease of management, and access over ubiquitous IP networks. The particular benefits that the IBM NAS Gateway 500 delivers will depend on how it is used. Here, we assume that it augments an IBM SAN infrastructure, or a heterogeneous one behind the SAN Volume Controller, to meet a requirement for enterprise-class NAS with the throughput and availability characteristics that implies. Then the NAS Gateway 500 can save on both capital and operating costs as follows:

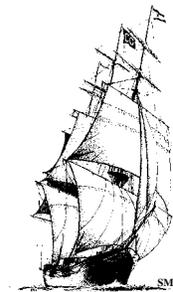
- **First, IBM intends to price this product competitively**, so it would not be surprising if the price comes in under key competitors in this segment (e.g., EMC and Network Appliance).
- **Second, by sharing the consolidated SAN storage with other applications**, it can help raise utilization in the data center and avoid stranded islands of capacity, as

well as maintaining the investment made in legacy platforms. Better utilization means fewer unused spinning disks on the floor that would otherwise consume space and electricity, lowering operating costs. It is also easier to manage a centralized storage pool, which cuts back on management costs – by far the largest component of storage total cost of ownership.

- **Third, the flexibility of the architecture allows it to scale in an on-demand fashion from an entry-level, single-node to a high-availability configuration, on demand, with no single-point-of-failure.** This enables the enterprise to preserve the investment made in the NAS environment.

### Conclusion

By leveraging the pSeries server family, IBM was able quickly to bring to market an enterprise NAS gateway, gaining a window of opportunity on the enterprise market. pSeries is a tried-and-true technology, with widespread acceptance, that has the performance and robustness to deliver on the requirements. This NAS product will give enterprises more confidence than would a new product built from scratch. So the NAS Gateway 500 is a solid front-end to complement IBM storage environments. If you have previously looked elsewhere for a high-end NAS solution, it is time to take another look at IBM.



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