

Commentary

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Moving to the Head of the Enterprise Class with NAS Gateways

Enterprise-class NAS gateways are not so much about NAS-SAN convergence (which is simply a consequence) as they are about the declaration of independence of file serving intelligence from its associated storage. In other words, NAS gateways do the same thing for files (although not in the same way) as SANs did for blocks — decoupling of server and storage. For the first time, NAS really qualifies for what the acronym "NAS" stands for — network-attached storage — as a true partner in storage networking. And that brings the power of storage networking to NAS in order to help tame the out-of-control file growth tiger.

Taming the File Growth Tiger Is the Responsibility of the Data Center

Cut costs, improve manageability, and deliver better service — that seems to be a mantra to IT organizations, especially in trying to manage the unruly growth of their storage. And even though the database side of storage continues to present its challenges, IT is more and more turning its attention on how to tame the file growth tiger.

Today, the files that need to be tamed extend beyond what is currently centralized in a data center to files distributed to workgroups and departments and even distributed geographically to remote sites, such as branch offices.

File growth becomes a crisis when two conditions are met. First, an enterprise has to recognize that the files are critical to its business. Second, the

growth of the file storage has to have reached the stage of non-linearity from a complexity perspective. That stage of complexity means that current file management practices — even with Band-Aids — are, for all practical purposes, broken. The result is increasing cost inefficiencies, an inability to manage the storage of files effectively, and the threat of poorer — not better — service.

More and more enterprises are coming to realize that the crisis either exists now or is going to exist very soon. Enterprise data centers tend to be assigned to deal with the problem. A data center of any size (otherwise it is not a data center) has the concentration of professional IT skills, experience, and disciplines to provide a home for enterprise-class storage. A data center has the resources to focus effectively on — what else? — cutting costs, improving manageability, and delivering better service.

File Management Services Move toward the Data Center

Saying the mantra and delivering on it are different. How is the data center going to deal with the file management growth crisis?

Putting in more file servers is a universally unpalatable choice, as even the current number of file servers is typically already seen as a culprit, due to capacity scaling limitations, lack of cross-filer file sharing capability, and the burden from backing up each server individually. Although more distributed NAS appliances might help, the enterprise is likely to have exhausted that avenue by the time it turned to the data center.

The next alternative that holds the promise of taking advantage of the data center's economies of scale, from both an infrastructure and a manpower perspective, seems to be to put in network-attached storage (NAS).

The Integrated NAS Appliance

The traditional way of delivering NAS is through the close coupling of the NAS head (the file server's "alter ego") and its associated storage for ease of integration and management. An integrated NAS appliance can work well at any level from department to midrange to enterprise when targeted to a single application or bounded set of applications where "optimization" of some key parameter, such as scaling of storage capacity, high performance, or specialized file service management functionality is paramount.

Enter the Enterprise-Class NAS Gateway

However, an integrated NAS appliance typically does not have the current

storage-asset perseverance and reconfiguration flexibility capabilities of an enterprise-class NAS gateway

The difference between an integrated NAS appliance and a NAS gateway sounds simple. A NAS gateway is simply the NAS head without the direct-attached storage (DAS). The NAS head and the storage decision have been decoupled. That difference is profound, as decoupling the two is the real essence of storage networking. That decoupling unleashes the full power of storage networking that was previously unavailable to NAS.

Build It Your Way — the Power of an Enterprise-Class NAS Gateway

Headlines proclaiming NAS-SAN convergence that give "glamour" to enterprise-class NAS gateways are nice, but having a SAN or even building a SAN to take advantage of the power of this category of NAS gateways is not mandatory (although probably useful). The ability to negotiate storage purchase decisions separately from NAS head decisions and the ability to protect an existing storage investment are valuable benefits, but also not where the real power of having NAS gateways resides.

No, the real power resides in one simple word — flexibility. Flexibility is ease of modification and adaptation; ease of designing, configuring, and tailoring a solution to the file management crisis that is built around the resources and capabilities of your organization. The alternative is buying into a pre-configured solution that as an approximate "force-fit" may or may not be able to solve the problem the way that you need it solved.

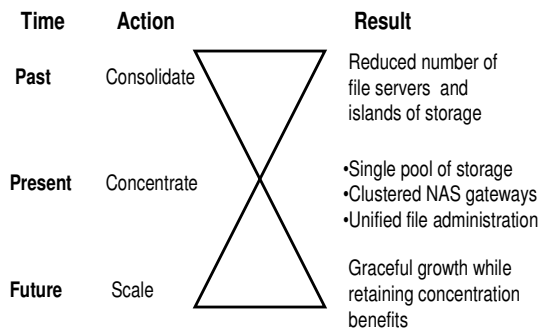
Solving the file management crisis is not a point in time event, but rather putting

in place a foundation that can serve as a platform for future growth as well. A solution that has growth potential must be able to scale non-disruptively on a number of dimensions. An enterprise-class NAS gateway solution has to be planned for today and tomorrow.

Enterprise-Class NAS Gateways — Raise To the Third Power

In implementing an enterprise-class NAS gateway strategy, view your organization's "present" as *concentration* (Figure 1). The "past" was the stage of *consolidation*, where steps were taken to reach the current stage of concentration. The future is the stage of *scaling*, where the focus is on being able to adjust to change with "minimal" impact.

Figure 1: NAS Gateway Hourglass Effect



Source: Mesabi Group September 2005

The Power of Consolidation

Consolidation is a word in fashion in today's IT, because reducing the number of anything tends to lower costs, simplify management, and increase availability. Enterprise-class NAS gateways lead the fashion parade

on the file server side with three possible types of configuration.

- *File-server consolidation* — a small group of NAS heads can replace a larger number of independent file servers
- *Storage consolidation* — isolated islands of storage that were hard-wired to their commanding file server can be aggregated into a common pool of storage
- *Site consolidation* — distributed NAS with its associated storage can be aggregated at a data center level, e.g., local branch office or store or department

The Power of Concentration

Consolidation is the process of achieving a state of concentration. Concentration is what you do when the consolidation has taken place. Concentration is defined as:

- The ability to give undivided attention (unified file administration)
- The ability to put into a single place or group (single logical pool of storage)
- The ability to make stronger, denser, or pure (clustered NAS gateways)

The Power of Scaling

Enterprises are dynamic, not static. File growth is likely to continue, so enterprises want to scale harmoniously while maintaining the key capabilities from the concentration stage.

The traditional dimensions of enterprise-class NAS scaling revolve around bandwidth (NFS operations per second) and capacity (TB).

With the advent of denser disk drives and clever packaging arrangements to squeeze as much as possible out of 1U,

2U, et. al., of standard rack space, vendors can claim scalability because of the large number of terabytes that can be supported. And solid schemes exist for scaling bandwidth.

Ah, but the power of a clustered NAS gateway system is to be able to scale bandwidth and capacity independently. That increases flexibility, as IT can match demand to need when the demand for either bandwidth or capacity grows disproportionately).

The other power is to be able to scale NAS gateways non-disruptively in two dimensions — *out* by adding more NAS heads in a cluster or *up* by adding more powerful NAS heads (or upgraded firmware). In addition, the logical pool of storage should also be able to grow non-disruptively.

Translating the Power Into Benefits

Enterprise-class NAS gateways do their part to help IT act upon our mantra —business-related cost reduction, improved IT management, and increased service levels — and not just talk about it (Table 1), with each of the three actions — consolidation, concentration, and scaling.

Of course, a your-mileage-may-vary type caveat applies: the benefits are not necessarily exclusive to a NAS gateway solution and any particular NAS gateway solution may not deliver all of the benefits.

A Case in Point

North West Geomatics LTd. (North West) is a Calgary-based aerial data acquisition and geospatial data content provider.

Table 1: Fulfilling the Mantra — Action and Effect

Action	Effect		
	Business Cost	IT Management	Service
Con-solidate	Redeploy or sell excess file servers	Simplified management	Higher availability
Con-centrate	Deferral of disk acquisition costs as underutilized space is used	<ul style="list-style-type: none"> •Unified file management •Simplified backup/restore. 	Data sharing
Scale	No waste in buying bandwidth and storage	Little — if any — increase in management support needed	Non-disruptive data migration

Source: Mesabi Group September 2005

Mapping firms, government agencies, and other organizations use the information processed from data that is captured from a fleet of aircraft. Each aircraft typically generates between 150GB and 500GB of data in a flight day so it is no wonder that North West has around 140TB of storage.

North West processes large image files (typically 2GB chunks) through a number of steps before delivering the final images to its customers. An existing combination of servers in conjunction with external servers in a SAN did not scale effectively for these large image files in terms of manageability, cost-effectiveness, performance, and data availability.

North West examined a number of NAS solutions that deliver the ease of management, performance, and availability that they required.

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However, North West found that only a NAS gateway solution from ONStor was able to deliver the benefits of NAS without requiring the additional cost of replacing disk storage and the SAN that they already had in place.

As part of delivering the manageability, performance and availability benefits, the enterprise NAS gateway from ONStor enabled the consolidation of Windows, Linux, and UNIX servers into one scalable environment. That scalability included the ability to scale disk capacity and bandwidth independently. That means that North West can balance its performance requirements with its capacity requirements without having to tie its NAS head purchase decisions with its storage purchase decisions. North West also finds the ONStor virtual server capability vital for transparent workload migration for load balancing and failover, which delivers both performance and customer-satisfying higher availability.

The Class of 2005

Although there are relatively many NAS integrated appliance offerings, surprisingly few companies play at the enterprise-class NAS gateway level. EMC and NetApp are the acknowledged leaders at the enterprise level. They offer both integrated NAS solutions as well as NAS gateway solutions. The ability

for IBM to offer this class of solution through its partnership with NetApp is still unfolding. Hewlett-Packard also has a high-end clustered NAS gateway product.

BlueArc, MaXXan, and ONStor are representative private companies in the enterprise-class NAS gateway market.

All of the class of 2005 competes on a number of variables — which may or may not matter to you now, but may in the future — including clustering, data sharing, grid computing, global namespaces, breadth of heterogeneous storage platforms supported, tiering, and virtualization.

Conclusion

Enterprise-class NAS gateways have really not gotten the attention that they have deserved — simply being categorized under the label of NAS-SAN convergence is not enough. The real power of such gateways is helping IT organizations solve the very real and growing problem of how to tame the file server growth tiger through the flexibility delivered by consolidation, concentration, and scaling. Current and emerging solutions need to be examined carefully to determine which one tames your file growth tiger.

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