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Consolidate and Future-Proof Your Data Center With the Right NAS Platform

Achieve the Correct Balance Among Performance,
Capacity, Environmental Impact and TCO While
Reducing Your NAS Footprint

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Consolidate and Future-Proof Your Data Center With the Right NAS Platform

Executive Summary

In today's economic climate, it's a given that companies are under more pressure than ever to reduce costs, do more with less, and stretch IT resources to the limit. However, when it comes to data growth, this formula is no longer enough. In fact, for many organizations, data growth is in a near-crisis situation.

Unfortunately, most IT budgets simply cannot keep up with increasing data growth, forcing organizations to make tradeoffs between what's best for the business and what's affordable. This can leave business opportunities to more nimble competitors as companies look for ways to reduce the total cost of ownership (TCO) of their IT infrastructure.

One solution that's helping data center administrators meet the data growth challenge is network attached storage (NAS). The NAS growth story is an impressive one, growing at 60% year over year in many environments. However, until recently, NAS implementations were made up of corporate "home" drives and small file sharing environments such as audio, video, presentations and documents, and other rich media. When it came to growth, the answer was to simply add more disks. While this low-cost strategy has worked in the past, these environments have grown to include enterprise applications, resulting in inefficiencies and high cost. This area is ripe for improvements, consolidation and cost reduction.

Today, NAS environments have been developed and configured to support:

- Fast-growing virtualization environments (virtual machine and virtual desktop environments).
- High-speed video streaming and transcoding.
- Large-capacity stores and file sharing environments for medium, large and enterprise organizations.

With these improvements to NAS technology, the NAS environment is now a critical piece of the data center for performance and mission-critical applications. This paper examines the challenges facing most organizations within the NAS environment, and how choosing the right NAS platform can address performance, capacity, efficiency and scalability demands, while reducing overall TCO. In addition, this paper explains how storage economics plays a key role in helping organizations obtain the maximum value out of their current storage investments.

Introduction

The story of explosive data and capacity growth is nothing new. Organizations have been forced to deal with 25% to 30% growth in data storage and performance requirements for years now. However, the growth is neither going away nor getting any easier to deal with. In fact, it often feels like a ticking time bomb. Unstructured data such as social media, digital images, contracts, video, presentations, Web pages and now more mission-critical workloads like VMware are growing at unprecedented rates. As it relates to the NAS environment, there is seemingly no end to this growth in sight.

At the same time, many organizations struggle to gain control over the spiraling costs, complexities and risks associated with this data growth and data center sprawl. Consequently, the need to better utilize IT resources while increasing performance and reducing costs has never been more critical. This is where choosing the right platform can mean the difference between upgrading equipment after just 1 year or building a future-proof system that scales for 3 or 4 years.

The Reality of Flat Budgets and the Role of TCO

The story with IT budgets hasn't changed either. Purse strings in the data center are as tight as ever and with valid reasons. At the economic level, austerity programs, currency devaluation and government sequestration are all impacting a company's ability to support new technology and capacity in the data center.

At the infrastructure level, server sprawl and storage growth, as well as rising power, cooling and floor space costs, and storage management costs all vie for dwindling budget dollars. This reality can force IT decision-makers to make some tough choices. One such choice could be canceling vital IT projects that might effectively address data growth or find other ways to reduce costs further.

With growing demand for capacity and performance in an environment of flat or declining budgets, IT needs a better solution to meet these demands. It must focus on reducing the TCO of the solution over its useful life, instead of focusing on acquisition price or cost per GB. Indeed, these upfront capital costs (hardware, software, and so forth) are becoming less of a focus in purchasing decisions relative to the greater, more comprehensive metric of TCO. TCO includes acquisition costs and operating costs like management and environmental expenses. In fact, a recent survey by ESG reported that 65% of respondents felt TCO was the most important criteria for selecting a storage solution.¹

A FORMULA FOR ACHIEVING TCO THROUGH THE RIGHT NAS PLATFORM

To understand the full benefits of the right NAS system, it may help to look at a hypothetical example and ponder some essential questions. Let's assume that a typical company requires 50TB of capacity. Ideally, the company would like a new NAS solution to last 3 to 4 years without a technical refresh or hardware upgrade to save on migration and business disruption costs. If this company is growing at a steady 30% year over year pace, the following questions should be top of mind when considering a NAS solution:

1. Does the NAS solution scale to meet capacity needs for the next 3 to 4 years? This is important to note as current growth rates will require year 4 to be well over 100TB.
2. Does the NAS solution scale to meet growing performance demands? Many environments' performance requirements are growing at a rate equal to or higher than the capacity growth rate.
3. If the NAS solution can scale to meet both capacity and performance demands, is this accomplished efficiently?

For example:

- What is the scaling impact? How many more NAS nodes will be needed?
 - Does the NAS have capacity efficiency technology like deduplication to keep capacity requirements down?
 - How much data center space will be necessary?
 - How much more storage management time and effort will be necessary?
 - What is the impact on power, cooling and so forth?
4. Does the NAS solution have all the application integration needed to grow the environment over this period of time? Will VMware integration be needed in year 2 or 3?
 5. Can existing storage be leveraged? This is essential to know because many NAS systems require a separate architecture at an additional cost.

¹ ESG Research Report, 2013 IT Spending Intentions Survey, January 2012.

Not All NAS Solutions Are Created Equal

There is a wide range of NAS solutions on the market, but not all are built to last more than 1 year without significant upgrades, especially in growing environments. The right NAS solution can address current challenges of “server sprawl” by consolidating existing systems from many to one. It can address rising capacity and data center costs by providing superior capacity, management and environmental efficiency, as well as application integration. It can also provide a “future-proof” investment by scaling up for service level agreement (SLA) and performance requirements and scaling out for capacity demand (“leg room” for growing resource demands). Let’s examine some of the key attributes an IT decision-maker should look for in a NAS solution.

Scale With Confidence (Capacity and Performance)

A NAS solution should provide a path for adding storage to meet new application or business needs, and to consolidate disparate storage into a single point of management. For best scalability, the solution should support shared storage technologies, including network file system (NFS), server message block (SMB), iSCSI and Fibre Channel SANs. A NAS solution that delivers linear scalability with each cluster node delivers higher input/output operations per second (IOPS) and random workload optimization, accelerating overall throughput and productivity.

With the right NAS solution, businesses can scale to multiple nodes in a single storage cluster without incurring additional overhead or downtime, and meet performance objectives with fewer nodes. A cluster meeting the same performance with 8 nodes as a 16-node cluster results in lower power, cooling, floor space, and IT management costs. Having a more powerful, consolidated system up front can lead to overall TCO savings.

Drive Capacity Efficiencies

Unstructured information dominates the data growth curve, especially in environments containing high numbers of duplicated files and mail servers that store large numbers of file copies. A smart way to improve capacity efficiency is through deduplication. Doing so reduces the file system size, does not conflict with normal I/O workloads, and executes separately so it will not impact regular operations.

An optimal NAS solution drives efficiencies to enable significant economic benefits. For example, if a NAS system could reclaim 40% of a terabyte of duplicated file data, the result is 400GB of space reclaimed for other uses. This allows organizations to stretch existing capacity to store more data than normal and defer purchases of additional storage. That means less storage space for the same files, more value and capacity per spindle, and lower overall operating costs.

Provide Tight VMware Integration

Random workloads and data services, both virtualized and nonvirtualized, can severely tax the storage ecosystem because I/O varies greatly between peak workload (boot, login and virus scan storms) and steady-state workload. This also forces the need for almost instantaneous, granular recovery of virtual machines, fast snapshots, deduplication and improved recovery point and recovery time objectives (RPO/RTO).

As virtual machine (VM) environments grow, storage administrators can be consumed with processes that can become inefficient and costly. For example, they must address the challenges of cloning VMs, creating and restoring snapshots more frequently, and having fast replication in place to move secondary copies to off-site recovery locations. To ensure there is no improperly sized storage that results in greater hardware requirements and resulting costs, administrators need to address storage capacity and density. They can use nondisruptive tiering to free up inactive or stale user data, while properly sizing storage resources.

The optimal NAS solution efficiently addresses the unique storage requirements of VMware environments. It streamlines the entire VM lifecycle by providing fast snapshot, replication and cloning utilities. These utilities save time for IT administrators, allowing them to grow their VMware deployment and extend data protection best practices while freeing up storage capacity and reducing costs.

Simplify Storage Administration

Streamlining and centralizing storage management tasks reduces complexity while lowering the need for more IT staff. A NAS platform should provide a unified dashboard view of block, file and object consumers, solve issues quickly, and simplify operations with fewer management steps. With more comprehensive, easy-to-understand storage analytics, organizations can have the business-oriented view necessary to regain control of fast-growing storage environments.

Another necessity is seamless integration with VMware vCenter for quick and efficient data management of virtual server and virtual desktop infrastructure (VDI) environments. This integration allows administrators to manage storage-based snapshots for flexible scheduling and automated backups. By working in unison, these tools provide end-to-end storage performance monitoring and consolidate complex storage-management statistics to enable better-informed decisions. IT can then optimize capacity and performance utilization, and improve the use of existing storage resources, while at the same time planning for future growth.

Streamline Hardware and Software Upgrades and Updates

Disruptive hardware and software upgrades that involve data migration can challenge even the most efficient data center. Moving data from one system to another can result in application downtime, business disruption, and even revenue loss. The good news for many administrators is that the right technology is available to alleviate or eliminate all disruptions associated with these updates.

For the simplest of updates such as software upgrades (including operating system), a critical consideration is whether the vendor has a history of providing forward- and backward-compatible hardware and software. This will ensure that data migration is not necessary. When a data migration is necessary, such as when upgrading a NAS system's hardware, options like host-based replication can provide a seamless transition. However, this often comes at the expense of server performance.

Array-based data migration using storage virtualization provides the lowest risk migration by reducing or eliminating application downtime while preserving host performance. In addition, storage virtualization not only reduces the outage window to applications to speed up technology refresh, but it can also extend the longevity of the system.

Leverage Industry-Leading Storage

Organizations should not have to buy completely new infrastructure and be limited to having block storage isolated as one silo and NAS storage as another. True consolidation breaks down silos by leveraging existing storage frameworks and tightly integrating disparate data types through the storage gateway, which also improves utilization of 3rd-party storage.

Organizations are looking for enterprise-level storage features that are cost-efficient and optimized. The right NAS solution utilizes a powerful storage foundation that manages and controls other storage systems in a virtualized environment. At the enterprise level, the storage system should provide a wide range of high-end features, including dynamic provisioning and dynamic tiering to improve system performance and storage efficiency at a lower cost. Dynamic tiering also gives IT the option of mixing high-performance disks such as flash drives with slower, lower-cost disks, while still achieving the same overall high performance.

Reduce Total Cost of Ownership

Clearly, procuring a system with this combination of superior scale, integration and capacity efficiency against a backdrop of flat to declining costs may seem like a daunting task. However, looking at TCO demonstrates that including these elements in the purchasing decision will ultimately reduce costs in growing environments.

IT Economics Delivers a Cost Reduction Framework

While choosing the right NAS solution is essential to managing data growth and keeping costs in line with budgets, IT economics can help organizations get the maximum value from their current storage investments. IT Economics from Hitachi Data Systems is a unique methodology that calculates the 34 costs contributing to TCO of an organization's storage. Furthermore, Hitachi can assist companies in mapping technologies that are proven to reduce the cost areas most important to their business.

IT economics is about understanding the costs and identifying the technology framework to deliver the TCO and the performance benefits that meet each organization's unique needs. According to IDC, IT Economics from HDS takes an approach that helps to demonstrate the true value of relatively complex storage architectures, and allows return on investment (ROI) analysis to become a routine part of the storage investment decision-making process.

The Right NAS Will Reduce TCO and Future-Proof Your Data Center

When companies are able to scale a storage environment more efficiently, the net results are more productivity and less administrative overhead. With fewer hardware and software components, storage management costs are reduced. And lower power, cooling and floor space costs can yield savings in a smaller, more cost-effective data center. When you look at the bottom line after 3 years of deploying the right NAS solution, the overall TCO savings are significant.

NAS for Today and Tomorrow: Hitachi NAS Platform 4000 Series

Hitachi NAS Platform (HNAS) 4000 series provides the highest performance and usable capacity in the industry to help you consolidate your storage and save time and money. HNAS is an advanced, high-performance and highly scalable network attached storage system.

HNAS offers nondisruptive deduplication for maximum capacity efficiency with no degradation of performance. The platform supports your largest big data workloads and consolidates multiple NAS filers at a lower TCO. Plus, HNAS provides superior VMware integration, simplifies data management, and increases capacity utilization. At the same time it offers the scalability and flexibility necessary to manage workloads of enterprise data centers, medium organizations and remote data centers.

Moving to HNAS simplifies your overall IT infrastructure and reduces the complexity of storage management. Advanced virtualization, tiering and deduplication capabilities give you the efficiency and agility you need, and the automated operation results in lower operational costs. The bottom line: HNAS offers the exceptional performance that businesses with performance-driven applications need to improve productivity and competitiveness.

Win From Both Technical and Economic Perspectives

Hitachi NAS Platform 4000 series enables you to gain technical advantages in performance, scale, efficiency, data protection and VMware integration that today's organizations need to stay ahead of competitors. HNAS also offers economic benefits, including reduced TCO, fewer storage management requirements, and an environmentally friendly footprint.

Improved Performance

From a technical perspective, HNAS helps your organization win in several ways. For example, many organizations are dealing with thousands of random I/Os coming from email, online transaction processing (OLTP), and so forth. And organizations deploying VMware over network file systems and scaling these environments are dealing with an exponential increase in IOPS requirements year over year. Some solutions address the resulting IOPS bottleneck

by adding more filers; however, this approach means more hardware, software and labor costs, as well as increased TCO.

HNAS remedies this IOPS bottleneck problem by providing more consistent and linear performance at scale. It accomplishes this improved performance by separating processing activities into core operations executed within the FPGA system. Such activities may include snapshots and file system operations, and the data management functions, including file locking within a CPU. In addition, HNAS also provides an “intelligent superflush,” which converts random workloads to sequential block operations to deliver higher IOPS. The only hybrid-core VMware NFS platform available, HNAS offers high efficiency and unique performance capabilities.

Because HNAS scales linearly as IOPS requirements increase, there’s no fall off due to CPU utilization. This scalability provides a much higher level of maximum performance that translates into more users per system, more functions, and fewer overall file servers and licenses. Reducing the number of file servers simplifies management so IT can focus on more important issues.

Greater Scalability

It’s no secret that NAS environments are growing fast: in many cases at much higher rates than structured environments. That’s why organizations are looking to grow their systems out with increased metadata, snapshots, clones and other requirements. However, some solutions have poor metadata management, issues with scale and LUN size, as well as limitations on the number of VMs per LUN and snapshots.

Unique HNAS architecture allows you to efficiently traverse the file system, even at tremendous scale. It provides the highest maximum number of clones and snapshots available: 100 million clones or snapshots per file server. And, it enables cloning a 1TB VM in 4 seconds.

Scalability is critical to high-growth organizations, and HNAS supports 16TB capacity. To enable the same capacity, competitors would have to deploy at least 3 times the number of systems to meet the same capacity as HNAS 4100. And HNAS also offers a file system that is twice as large. This capacity means there are fewer file systems to manage, and strong Microsoft® Windows® storage consolidation allows more virtual servers and greater capacity scaling.

High-Capacity Efficiency

Achieving high-capacity efficiency requires storing the maximum amount of data in the minimum space and at the lowest cost. Capacity efficiency is also one way to determine how hard your system is working and measure a return on assets. Hitachi NAS Platform capacity efficiency provides another technical win with exceptional deduplication, file system overhead, and data tiering.

A strong deduplication solution can significantly reduce capacity costs. Yet many organizations struggle with deduplication software that offers limited support and size, and adversely impacts system performance. In addition, some NAS solutions require as much as 48% overhead for deduplication. Not HNAS.

HNAS solves these issues with a new breed of deduplication that uses auto throttling to eliminate performance impacts, offers minimal overhead, and provides significantly higher scalability with fewer limitations. Hitachi also offers industry-leading file tiering with a data migrator solution that automatically moves data between tiers or to Amazon E3 Clouds, based on characteristics such as file age, type, size and so forth.

Efficient VM Backup and Recovery

Today's organizations need to back up and recover everything, and they need to do it efficiently. However, some NAS VM data protection solutions are not only constrained at the volume level, but they also require up to 20% of overhead.

HNAS provides highly efficient VM backup and recovery with up to 100 million snapshots and VM-level snapshots as well as the capability to leverage a stable NDMP for integration with a wide variety of backup products. VM administrators can also employ Hitachi NAS Virtual Infrastructure Integrator software, which allows them to apply scheduling and retention policies directly to HNAS, making VM RTO and RPO faster. For example, HNAS can restore a 1TB VM in seconds.

Seamless VMware Integration

Integration with VMware gives an organization a technical edge, especially in achieving lower TCO in virtual environments. Most analysts agree that VM environments over NFS are growing at about 70% a year, making NFS the future of virtual environments.

With an efficient, seamlessly integrated solution like HNAS, businesses can provision, back up and protect a NFS file system and data store. By employing Hitachi NAS Virtual Infrastructure Integrator and a site recovery manager (SRM) application they can complete these tasks in just 4 minutes.

TCO Savings, Simplified Management and Sustainability

With a host of technical advantages over competing solutions, added HNAS efficiencies offer more productivity, less administration and clear economic benefits. For example, HNAS can quickly lower TCO by reducing NAS server requirements.

If an organization has a growing NAS environment, HNAS can reduce TCO by up to 30% in 1 year. A key to these lower costs is the reduction in storage management when scaling out NAS. A company simply needs fewer resources to manage the same environment with HNAS. And fewer nodes and hardware makes HNAS a truly green, environmentally friendly solution with reduced power, cooling and floor space.

HNAS in Action: 3 Real-World Examples

To illustrate how Hitachi NAS Platform helps organizations gain technical and economic advantages over competitors, here are 3 examples from actual deployments.

Software Firm Attains Twice the Performance, 66% Lower Capex

When a leading design automation software firm needed to update its NAS solution, HNAS was one of the finalists selected. After a head-to-head proof of concept that included a truly random mixed read and write test, HNAS was 2 times as fast and 1/3 the price of the competitor's solution.

Game Maker Consolidates Servers and Storage, Reduces Build Delivery Time by 67%

A large video game maker challenged with data growth, I/O bottlenecks, system sprawl and backup issues needed a cost-effective solution. With HNAS and VMware, they consolidated 32 servers and 3 storage systems and cut their build delivery time by up to 67%.

Global Semiconductor Firm Dedupes 1.2 million Files in 16 Minutes

A global semiconductor company was looking to boost its primary storage efficiency. HNAS deduped 1.2 million files in 16 minutes, with minimal impact on file server activity.

Summary

Data growth is here to stay, and so is the demand for faster access to that data. However, IT budgets are not rising fast enough to keep pace with the current solutions to the data growth challenges. The right NAS solution can process more and increasingly diverse workloads faster, consolidate and scale with greater efficiency through deduplication, and integrate tightly through intelligent tiering and automated data protection. Just as important, the right NAS solution can fully align with an organization's storage economics by delivering the highest value and lowest storage TCO.

Hitachi NAS Platform provides all the storage features required to support a wide range of workloads, applications and deployments, with a significantly smaller hardware and environmental footprint. Simplifying data protection, storage efficiencies, high performance and massive scalability are all reasons why HNAS is an optimal solution for storage economics.

HNAS also provides peace of mind that organizations can address data growth from all sources, including structured, unstructured and virtualized, from one centrally managed storage system. At the same time, they realize the most value from infrastructure investments.

For additional information about HNAS, please visit <http://www.hds.com/products/file-and-content/network-attached-storage/>.

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