

# WHITE PAPER

## **Hitachi's Approaches for an Increasingly Cost-Conscious Data Storage World**

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## The Issues Defined

Whatever word you apply to it—'meltdown,' 'catastrophe,' perhaps the slightly less ominous 'uncharted waters'—we can all at least agree that the global economy is facing challenging times. The financial headlines and business pages tend to be dominated by the stock markets and the first editions of 2009 were chock-full of charts proclaiming that 2008 was the worst year for stocks since the Great Depression. If you have a company, a job, a house, a pension, or any savings and investments, then the economic slump—and, of course, the eventual recovery—is of great interest. With stocks declining and both revenue and profits under pressure in most organizations, the drive to find smarter ways to get things done is pulled into sharper focus than ever.

*The popular calling to 'do more with less' has been leading IT users to prioritize infrastructure purchases based on cost containment for some time; now, however, the call is more urgent and requires more imagination.*

No parts of business are immune from the big economic picture. Even those few organizations for which business is booming have challenges: to cope with their unexpected upturn and to ensure they do not disappear when the inevitable recovery comes. For most organizations, however, the constraints have come as a swift and unpleasant surprise. Both capital and operational budgets are being cut. Routes to weather the economic uncertainty of the next 12-24 months must be charted. Across the supply chain, and within the organization itself, everything is subject to review. IT sits at the center of this maelstrom. Whether it is seen as a weighty cost-center or a potential margin-booster, the essential challenge remains the same: while IT demands increase and data continues to grow exponentially, the resources with which to address such challenges are being flattened or cut. The popular calling to 'do more with less' has been leading IT users to prioritize infrastructure purchases based on cost containment for some time; now, however, the call is more urgent and requires more imagination.

Storage is a striking example of the opportunity—on the one hand, growth in demand continues to be strong. Yet on the other, within most data centers, storage has historically focused more on effectiveness than efficiency. Of course, it was never stated *quite* like that, but that was the essential truth. Of course, it never felt *quite* like that either—everyone likes to feel that they're running a 'tight ship' at all times, whether that be in development, manufacturing, sales, or the data center. Only when the going gets even tougher are we all forced to find more imaginative ways to improve. With a timing that is fortuitous, there *are* a number of emerging technologies and implementations that offer the promise of genuinely 'doing more with less' in terms of storage. As with all promising technologies, the key is to find practical ways to 'operationalize' them and to figure out what is most applicable where in the IT hierarchy. Put bluntly, all the technology in the world is useless if it's not applied well. Good storage approaches will combine optimum technologies with maximum impact on real business issues—that is the purpose of this paper. In addition to looking generically at IT cost consciousness and containment, it looks specifically at how one vendor—Hitachi Data Systems—is addressing the need to make storage simultaneously more cost-effective and more business-efficient. This is not accomplished through a long list of products and functions, but rather by looking at how currently available offerings from Hitachi can actually deliver value in the real world.

There's an old saying that goes something like 'tough times don't last...tough people do.' Well, such fortitude is just as true when applied to IT vendors and data center managers. The economic tough times are here—it's how suppliers and users alike deal with the issues that counts; and that, in turn, will determine which ones merely cope, as well as those that go on to fail and those that grow to succeed. As this paper outlines, the difference between wither and thrive is the same for vendors and users: the acceptance that things are different and a willingness to do something different as a result. It may not sound like much, but in an increasingly cost-conscious world, embracing a different approach can be everything.

# Cost Consciousness and Storage

## What's New and What's Not?

The crux of the issue, when it comes to cost-consciousness and its impact on storage decisions, is as much about the 'why' as it is about the 'what.' The rest of this section will examine both aspects in considerable detail, using research to back up the opinions. Contrary to much of the business-writing practice, which tends to build up to the 'aha' moment, for this section, it makes sense to actually lead with the main point before giving the corroborative information.

Although some of the key storage initiatives being discussed are using technologies and approaches that are indeed relatively new, at least in any commercially-successful sense (deduplication and thin provisioning for example), what is truly new is the willingness—or, in many cases, the absolute necessity—to employ them and to look broadly for smarter, more cost-effective ways to manage and store data. While the current world financial crisis has not *itself* created the storage issues (after all, the underlying storage challenges within data centers are pretty much the same now as they have been for decades), what it *has* done is to bring them to the forefront and sharply into focus. The macroeconomic conditions have created a 'collateral interest' in IT and in storage.

*Growing services in a growing business is fine and even limiting services in stalled or shrinking economic times is doable—but providing more services in a time of constraints and restricted resources is another trick altogether!*

That is what's new. Typically, a bigger organization means a bigger storage expense. And now, that means an intense interest in what can be done for less money and/or a better ROI. It is a great opportunity for users to improve efficiency, to get streamlined, and to offer strategic value to their organizations. It is not often that IT, let alone storage, gets to be in the business spotlight—and it's a chance to make 'operational lemonade' out of the 'macroeconomic lemons' that should be grabbed by data center managers. The challenges of storage are not new, but the motivation to search for storage efficiencies to support broader organizational goals (whether for profits or mere survival) is. With an impetus to action supplied by the wider economy, the job for IT managers is not only to grasp it, but to ensure that the solutions they choose have not only a short-term payoff, but also long term applicability and value.

With that understanding, let's turn to look at what enterprise users are actually planning to do to embrace and address the new motivation to be optimally cost-conscious; as well as what that means for storage technology choices.

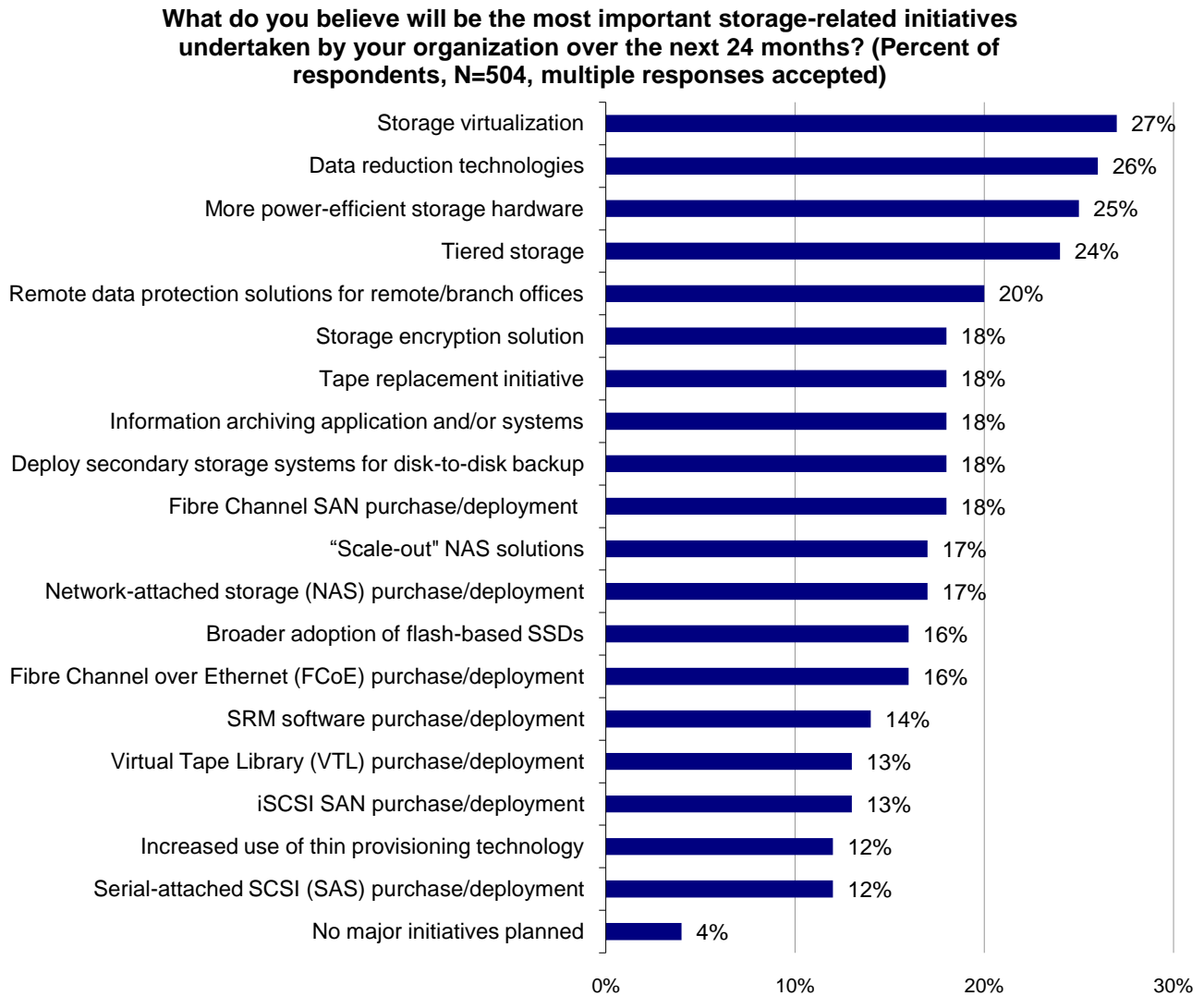
## Themes and Challenges

As the drama of the current economic turmoil unfolds, and with uncertainty rife, IT managers have to adjust plans amidst challenged assumptions. However, for most IT shops, the macroeconomic conditions are a somewhat surreal backdrop to an operation that is still 'enjoying' vibrant growth. Users want new applications, more data, increasingly rich media web sites, more data, more accessible and searchable archives, and—yes—more data. This is the essential conundrum facing data center managers: growing services in a growing business is fine and even limiting services in stalled or shrinking economic times is doable—but providing more services in a time of constraints and restricted resources is another trick altogether! All storage purchases have to have a robust ROI.

Rather than merely make glib assertions, ESG Research has sought to evaluate the extent to which this is actually happening by examining the top storage-related purchasing priorities of enterprise-scale users for the next two years.<sup>1</sup> Figure 1 shows that the most cited storage-related initiatives are those that can be very clearly linked to cost-conscious awareness and approaches on the part of users; and indeed, such initiatives are likely to be those that have the best likelihood of offering a clear and compelling ROI.

<sup>1</sup> Source: ESG Research Brief, *Enterprise Storage Priorities Emphasize Efficiency*, Publication due January 2009.

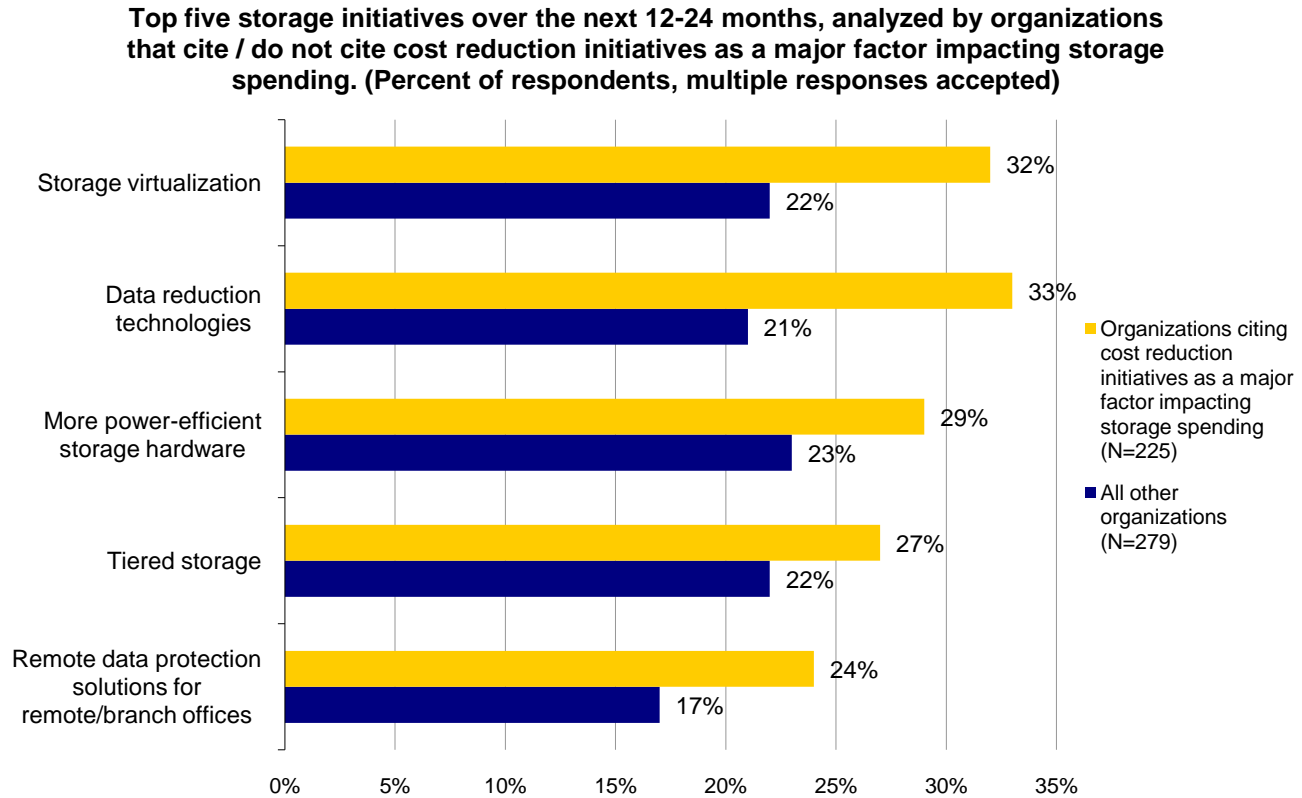
**FIGURE 1. MOST IMPORTANT STORAGE-RELATED INITIATIVES FOR ENTERPRISE USERS (NEXT 2 YEARS)**



Source: ESG Research Report, Enterprise Storage Systems Survey, December 2008

ESG Research went further and analyzed the importance of the initiatives when split between those enterprises that either *did* or *did not* cite 'cost reduction' as a major factor impacting their storage spending intentions and plans over the next 12 to 24 months. Figure 2 looks at the top five initiatives (from Figure 1). It can be seen that all of the top five, cost -focused initiatives are relatively *even more important* to those enterprise organizations that cite cost reduction as a major factor impacting their storage spending than to those that do not.

**FIGURE 2. TOP 5 STORAGE INITIATIVES MEASURED BETWEEN ORGANIZATIONS THAT DID OR DID NOT CITE COST REDUCTION AS A MAJOR FACTOR IMPACTING STORAGE SPENDING**



Source: ESG Research Report, Enterprise Storage Systems Survey, December 2008

Indeed, the breadth of the spread gives us an insight into the extent of that importance; once again, it strongly verifies that the two top storage issues for cost-reduction-focused enterprises are:

- 1) Data Reduction Technologies (such as data deduplication)
- 2) Storage Virtualization.

Users seeking to pursue such initiatives must obviously find a vendor with both the ability and the appetite to fulfill them. Hitachi Data Systems, as this paper will show, not only meets this criteria, but offers a surprisingly wide portfolio with which to address individual issues.

Finally, having cemented the link between certain storage technologies and their recognized ability to provide cost containment or reduction, ESG Research sought to determine if organizational size makes any difference to the particular priority order for those storage initiatives. Figure 3 shows the answers and, although the mentions cannot be related directly to ultimate value, a handful of interesting deductions can be made:

**FIGURE 3. TOP STORAGE INITIATIVES AMONG ENTERPRISES OF VARYING OVERALL INSTALLED STORAGE CAPACITIES**

Less than 25 TB installed disk-based capacity (N=107)	25 TB to 99 TB installed disk-based capacity (N=126)	100 TB to 249 TB installed disk-based capacity (N=102)	250 TB or more installed disk-based capacity (N=136)
1. Storage virtualization / Data reduction technologies (25%)	1. Storage virtualization (25%)	1. Data reduction technologies (34%)	1. More power-efficient storage hardware (32%)
2. Tiered storage (24%)	2. Data reduction technologies (24%)	2. More power-efficient storage hardware (32%)	2. Storage virtualization (30%)
3. Tape replacement initiative (22%)	3. Remote data protection solutions for remote/branch offices (23%)	3. Storage virtualization (31%)	3. Tiered storage (30%)

- Certainly, there is some similarity in the overall mix, irrespective of absolute size.
- Storage virtualization is the highest priority for those sites having up to 99 TB of installed capacity. Although mentioned more often for the larger sites, it is not the highest priority—this might mean that the larger data centers have already implemented some level of storage virtualization and are looking to extend it, whereas the relatively smaller sites are still looking to get into storage virtualization.
- What moves up the priority list for the largest sites is the importance of getting more power-efficient storage hardware—it is hard to know exactly why this would be the case, but it is likely that larger organizations have a more defined ‘Green’ focus<sup>2</sup> and—separately or combined—there is a level of sheer scale at which the costs of powering storage start to gain focus.

Having looked at the variations between enterprises of different storage capacities, it is also interesting to briefly note how these results differ from medium-size users. ESG carried out similar research on such medium-size organizations in the middle of 2008.<sup>3</sup> Of the top five initiatives, three were the same: storage virtualization, data reduction technologies, and remote data protection solutions for remote/branch offices. The other two top initiatives for medium-size users were new NAS deployments and digital archiving. The former offers obvious cost efficiencies by consolidating sprawling file servers; the latter is often motivated as much by using digital archiving to improve storage resource management (perhaps by moving archive data off of expensive storage or removing it from backup processes altogether) as it is by the obvious compliance and electronic discovery.<sup>4</sup> It thus has something in common with the tiering mentioned in the enterprise study.

### How Cost-Consciousness Affects Storage Strategies and Priorities

The overall picture is clear: in an increasingly cost-conscious world, the onus is on IT managers to find ways to add efficiency to their data centers’ effectiveness and to drive costs out of, and value into, their storage infrastructures. The ESG research already quoted shows clearly that users understand this and are focusing on storage strategies and priorities that promise to deliver a better ROI. Why do certain technologies make sense?

**Virtualization** – By offering users the ability to treat multiple storage assets as a single, centrally-managed pool of storage, there is an opportunity to improve utilization, drive efficiency in the correct use of assets, and hence reduce costs. Items such as migrations can become a matter of choice and value (rather than just a painful ‘must do’), and data placement can be done with far more granularity and with respect to the relative needs of the data as much as the mere availability of space. One of the most

<sup>2</sup> ESG’s Research on *Global Green Business and IT Initiatives* (2008) confirms that larger organizations tend to have more focus on ‘green’ issues, plus the organization to support it. Further findings from this research are in this paper.

<sup>3</sup> Source: ESG Research Report, *Medium-Size Business Server and Storage Priorities*, June 2008.

<sup>4</sup> Source: ESG Research Report, *2007 File Archiving Survey*, December 2007.

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valuable technologies in this respect is thin provisioning. Because it is a tool born of virtualization, it can support the flexible and 'optimum' allocation and use of space in three ways:

- Any given type of data can be placed on the best available class of storage for that data.
- Capacity is usually only allocated as needed and invariably not marked as 'used' unless data is actually written.
- Changes can be made dynamically to respond to operational and business needs.

**Data Reduction** – Technologies such as deduplication drive efficiency by eliminating redundant data. The cost savings can be large, with 64% of current data deduplication users experiencing a 10:1 or greater capacity reduction ratio.<sup>5</sup> Additionally, the ultimate in data reduction is the other 'D' word: *delete*. Deletion is an important tool for data managers seeking maximum efficiency—why store something you no longer need? And yet, of course, the skill is to know what can be deleted and then being able to find it in order to delete it.

**Power Efficient Storage Hardware** – Using the right storage for the right data is one step, since slower, high capacity drives can use under 10% of the electricity of faster, smaller capacity disks. Better power supplies, spin-down capabilities, and solid state technologies compound the potential to save. Naturally, all the other aspects mentioned in this list contribute as well—less overall storage and more correctly allocated storage all help to drive down power consumption.

**Tiered Storage** – A combination of points already mentioned, tiering utilizes the ability to painlessly move data as needed. It ensures that data is always on the cost-appropriate type of storage and that it is not needlessly replicated and stored multiple times. Archiving is a tier that can be misunderstood. It is not a dump for old data; rather, it should be a low-cost, high capacity storage facility for data that is less active. While it is even conceivable to have tiers within an archive architecture, it is reprehensible and inefficient not to employ one at all.

**Remote Backup for Branch Offices** – These solutions help organizations lower costs by reducing or eliminating onsite storage hardware, media, and staff at far-flung remote and branch offices. This consolidation effort can significantly reduce duplication—of infrastructure even if not of data—and the poor utilization of expensive people and resources. As such, it is a specific example of consolidation (very often NAS) that is also valuable in terms of standard 'headquarters' operations.

Putting the current overall economic constraints together with these, and other, technical approaches allows us to now look briefly at the real world IT applications and business challenges that can benefit from a fresh storage approach—before turning to evaluate what Hitachi can specifically bring to the table in such areas.

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<sup>5</sup> Source: ESG Research Report, *Data Protection Market Trends*, January 2008.

## Specific IT and Business Challenges

As already suggested, the challenges facing IT are not capable of being phrased myopically in terms of an IT and technology vacuum. Much as IT suffers or benefits as a result of the surrounding business environment, so it must also play a role in whatever business it supports. Focusing on simply a data center's operational niceties can, of course, be important, but greater strategic value can be demonstrated by looking at the ways in which IT—and imaginative, efficient storage approaches—can contribute to an overall business's endeavor. This can be anything from a very broad desire to a very specific one—everything from 'be greener' to 'improved cash flow.' Making the connection between any given storage approach and the ultimate business value is what allows storage to be a contributor of **value to** an organization rather than just a **cost upon** it. Such a connection is always important, but never more so than in a period of heightened cost consciousness.

At the broadest level, most large organizations are assiduously looking for greater efficiency—in other words, finding ways to increase productivity for each given amount of resource. The caveat, of course, is that quality and effectiveness cannot be compromised in the process! In the meantime, most large organizations are also looking to become 'greener.' One might assume that such efforts could be reduced as the economy wanes, however, many 'green' initiatives—especially those in storage—are essentially efficiency improvements that not only save money, but that can also present the IT group in a very positive light.

The previously mentioned ESG research on 'green'<sup>6</sup> reveals, for example, that 58% of large enterprises (5000+ employees) see the consumption and sourcing of electricity as a major/moderate risk and a possible constraint on their business operations. Imagine, then, how a well-designed and implemented storage strategy could contribute to easing that risk, especially when the same research tells us that the metric most closely tracked by senior business executives in order to evaluate the success of their green initiatives is the cost reduction from reduced energy consumption. This metric was stated as most important by 70% of senior business respondents (significantly ahead of metrics such as compliance and carbon emission statistics) and yet the link was, interestingly, only mentioned as most important by 40% of senior IT managers.

Making links such as these certainly matters. For example, as Figure 4 shows, the extent to which senior business and IT managers view the IT managers as leading their organizations in green initiatives varies widely. Although 58% of IT managers view themselves as leading the organization overall or in at least one or two areas, that view is shared by only 25% of their business management peers! Conversely, the business managers see IT managers as merely supporting or rarely involved in such initiatives in 66% of cases, a situation with which only 39% of IT managers concur.

While, certainly, green initiatives are only a subset for overall cost-consciousness endeavors, it's a reasonable assumption that they are a good proxy for the lack of appreciation that general business managers have for the potential contributions IT can make. As well as a revelation, this constitutes an opportunity for IT in these challenging economic times; IT managers must focus on awareness and publicity as this could lead to retaining budget to make infrastructure investments with a strong ROI. The caveat, once more, is to find a vendor with both the ability and the appetite to drive efficiency by applying storage efficiencies across a range of business and IT challenges. Before looking specifically at how Hitachi fits this description, here are some of the typical challenges facing many organizations:

- Mergers, acquisitions, and changing business structures
- Suspended server and storage technology refreshes
- Straightforward mandates to reduce Cap/Ex and Op/Ex
- Workforce reductions
- Desired waste management improvement
- Implementing tiered storage
- Increasing server virtualization
- A freeze on data center improvements and building

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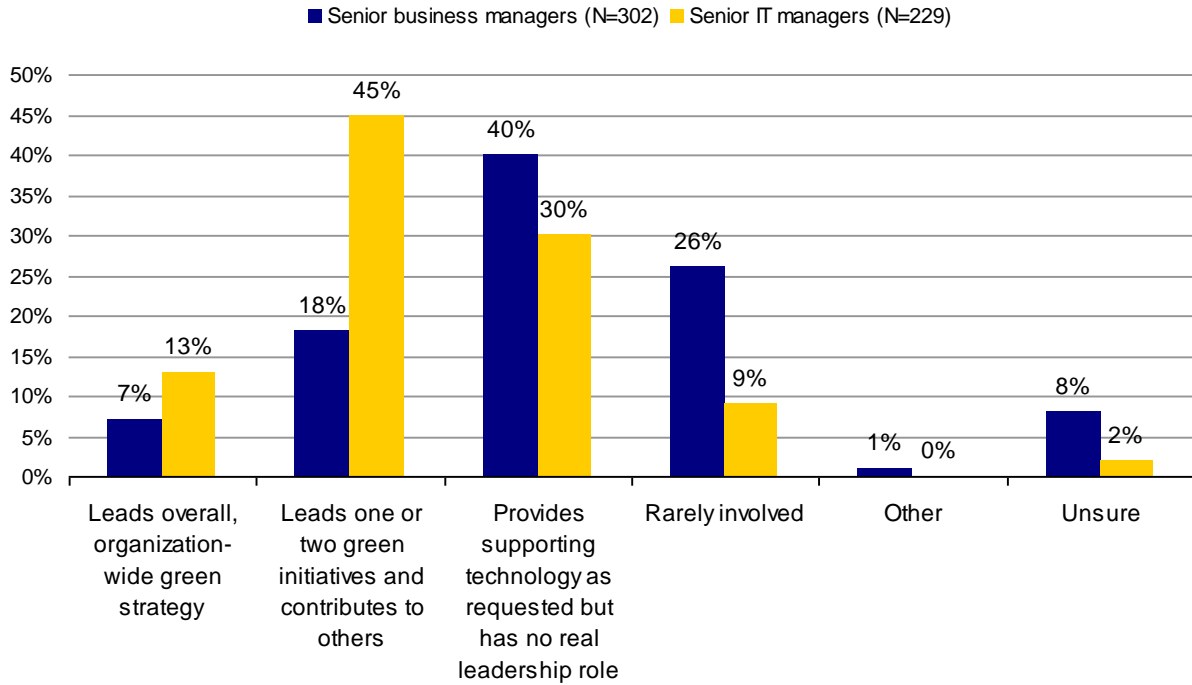
<sup>6</sup> Source: ESG Research Report, *Global Green Business and IT Initiatives*, 2008.

- Need to retain or grow customers and improve relationships
- Improve/generate cash flow for the business

So, how can a particular vendor's streamlined and improved storage play a role in mitigating such a varied set of challenges?

**FIGURE 4. PERCEIVED ROLE OF IT IN GREEN INITIATIVES – DISCONNECT BETWEEN BUSINESS AND IT VIEWS**

**Which statement best describes the role your information technology (IT) group plays in your organization's overall green strategy and initiatives, by role of respondent. (Percent of respondents)**



Source: ESG Research Report, Global Green IT and Business Initiatives, 2008

# Addressing the Challenges with Hitachi's Offerings and Approaches

## Review of Hitachi's Offerings

The need for a vendor that has both the ability and the appetite to help drive efficiency and change has already been mentioned. This means not only offering a wide range of product offerings that can produce real ROI benefits, but also having a business attitude that embraces more than just the next product sale. Hitachi Data Systems meets both of these criteria. Not only does its technology focus on systemic ease and efficiency, but its approach to the market and users (driven largely by its culture and somewhat also mandated by its market position, which is very focused) is a highly consultative and cooperative one.

At its core—both as a product framework and as a strategic framework for Hitachi storage offerings—is Service Oriented Storage Solutions (SOSS), which has the laudable goal of enabling users to leverage their storage infrastructures in order to provide a service to their business. This is not some new rushed-out marketing package in response to the current global economic woes—it has been Hitachi's direction for years. It is an approach, not just an attempted product sale. As such, it includes everything from services and consultancy through to federated search capabilities and heterogeneous cooperation. It is, therefore, about helping IT transcend the nuts and bolts of the operational quagmire to become a strategic and core contributor to the business. Having an automated, intelligent, virtualized, flexible, and cost-effective common pool of storage is a great place to start as it removes so much of the knob-twiddling and manual intervention that prevents those IT and storage managers stuck in a traditional world from even attempting to contemplate innovation and business value.

Of course, even the most well thought out and well intentioned strategy has, ultimately, to be underpinned by real products and services. Hitachi Data Systems benefits from its focus on storage in this respect: since it is not an overall systems vendor and since it has built its enviable quality reputation from the high-end downwards, it has always had a singularity in its approach. This can be described as rock-solid, high functioning, and highly interoperable storage systems. It is a market leader in many respects (and well regarded as such), but not *the* market leader in terms of scale; therefore, it has to offer differentiation based on value and ability. Its offerings are all tied to the SOSS framework and are not designed as 'point-products' (although they can be employed as such), but are instead designed to be a part of a broader whole. Some of the key offerings from Hitachi are:

- **Virtualization** – the Hitachi Universal Storage Platform (USP) is very powerful *and* notably can support a wide heterogeneous range of storage devices. And it is more than just an advanced SAN implementation. Because of its central position in the architecture, it also serves as an excellent tool to support NAS consolidation, providing additional capacity efficiencies (as well as, notably, improving access and sharing effectiveness).
- **Deduplication** – removing unnecessary copies of anything is a vital component for any cost-conscious storage user these days.
- **Thin Provisioning**<sup>7</sup> – is a valuable tool to reduce or eliminate the abuse of available storage capacity by only allocating and using free space as it is needed.
- **Tiered Storage** – an automated, policy driven tool is a key part of the virtualized storage infrastructure and Hitachi supports the ability and can manage it across multiple vendors.
- **Intelligent Archiving** – this could be termed 'refined archiving' rather than 'blind archiving.' Since the main benefit of archiving is to reduce operational costs by eliminating 'stale' or infrequently-accessed data from the 'working' or frequently-accessed set of data, a discovery stage should be the first step.

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<sup>7</sup> Hitachi's branded thin provisioning is called Dynamic Provisioning, but the more common industry term is used in this paper.

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Many traditional archiving approaches ignore this and just move everything based on date or application, rather than data usage. The intelligence in the Hitachi approach uses parameters to identify 'candidate' data so that either people or policies can then take the appropriate action. The two main choices are to move the data to a more cost-appropriate storage tier in line with its business value at that time or to go ahead and delete the data, which has the obvious added benefit of saving the resources that had been spent until that point on compliance practices for that data.

- **Hitachi Data Discovery Suite** – offers federated management and search capabilities across a user's storage infrastructure.
- **Services and Consultancy** – awareness, design, and implementation are what differentiates leading, cost-effective data centers from simply average ones.
- **Solid State Storage** – a great alternative where extreme throughput and/or high speed IO needs are the challenge, solid state can preclude the necessity to 'waste' capacity (by 'short-stroking' for example) to artificially boost the performance of regular disks.

### Hitachi is Addressing the IT and Business Challenges

Turning to the list of IT and business challenges mentioned in the preceding section, we can now match Hitachi's offerings and approaches to see how its storage—effectively applied—can help mitigate such real-world issues. To make 'digestion' easy, the challenges are arranged below into three groups and deliberately characterized rather than ranked as each user faces a varying and dynamic set of priorities.

- 1) Challenges that are very common and typically 'staring IT in the face' so that they are the lead items on many departmental meetings:
  - Suspended server and storage technology refreshes
    - By adding functions (such as storage tiering, deduplication, or NAS consolidation) to existing installations, Hitachi can extract additional value from prior expenditures by extending the useful life of—while avoiding wholesale replacement of—existing infrastructure, which in turn can save budget (by not causing the user to purchase any or all of the actual storage capacity as part of the storage refresh).
  - Straightforward mandates to reduce Cap/Ex and Op/Ex
    - While it's relatively straightforward to reduce expenditures *today*, it is a challenge to ensure that you are not merely delaying the pain of and/or creating worse problems for *tomorrow*. A selection of Hitachi tools can limit the financial impact today (for instance, with consolidation, thin provisioning and SSD), yet still ensure a strategic approach to protect tomorrow.
  - Implementing tiered storage
    - Effective tiering optimally aligns the business value of data with the cost of storing that data; in practical terms, it is less a matter of supporting multiple types of storage and more a matter of automating the movement between them so that the whole environment can be managed based on policies that permit more granular (and if needed, more frequent) data movement. And since Hitachi can use virtualization to manage across not only its own products but many others too, it also happens to ensure that multiple types of storage can indeed be managed.
- 2) Challenges that, while still experienced by many users, are usually a little less obvious and not always the 'squeakiest wheel' or on IT's immediate radar. They still represent a significant opportunity to deliver added value:
  - Workforce reductions
    - Although personnel reductions, forced purely by a need to trim costs, are unfortunate, implementing or extending a Hitachi storage infrastructure allows IT to support the business

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by genuinely enabling a way for fewer employees to manage more—especially via automation and heterogeneous software management, but maybe also by more aggressive archiving to rebalance data access costs and benefits.

- Increasing server virtualization
    - As the drive to server virtualization continues (with its own cost-conscious proposition), users are increasingly turning to virtualized storage as a complementary consolidation effort that also helps them realize the full benefits of flexibly networked computing. Hitachi offers a very interoperable solution.
  - Need to retain or grow customers and improve relationships
    - The link between storage and the level of business retention and growth is not often discussed. However, everyone has at some time suffered the 'I'm sorry, but our system is down' frustrations. Hitachi has built a reputation for extreme reliability across all of its products, with and without High Availability options, meaning higher SLAs can be achieved.
  - Improve/generate cash flow for the business
    - With storage, the focus is often on hardware speeds and feeds. While understandable, what matters to the overall business are such things as inventory turns and invoice efficiencies—where a reliable, fast, and well-tuned storage back-end that efficiently manages between the many heterogeneous systems so common in many businesses can pay real dividends.
- 3) The final set includes some challenges that tend to be more binary: some users face them, some do not. Where they exist, they tend to be extreme issues or of significant importance to the organization as well as IT:
- Mergers, acquisitions, and changing business structures
    - Hitachi's extensive capabilities in the area of heterogeneous management (applying virtualization into the bargain) can reduce the headaches normally associated with melding disparate storage architectures and redundant software, and thus make savings possible.
  - Desired waste management improvement
    - Attacking waste can be achieved via a number of tools that Hitachi offers—improved reporting, increased consolidation, and even multi-tenancy (the ability to run Virtual Private Machines and thus drive utilization rates higher) as well as the more obvious thin-provisioning, can all have a direct impact on reducing wasted data-center resources.
  - A freeze on data center improvements and building
    - Combining a selection of its own offerings—from thin provisioning and deduplication to heterogeneous management and aggressive tiering—Hitachi can delay or preclude the need for data center expansion and replacement. This can be achieved by requiring less overall capacity and/or by moving some data onto less power- and cooling- intensive storage tiers, thereby enabling the current data center and its infrastructure to serve for longer.

All of the above specific business and IT examples also tie directly back to the technology and storage initiatives that ESG Research found were top priorities for enterprise users.

**Virtualization** – Hitachi's Universal Storage Platform (USP) is a powerful storage virtualization engine that can support not only heterogeneous O/S platforms (such as Windows, Linux, Unix variants, and z/OS) on the front end, but also heterogeneous storage systems of varying classes on the back-end. The USP V and USP VM can include internal (virtualized, of course) storage while simultaneously managing everything else. User applications see all storage systems as a single entity. The Hitachi USP provides—amongst other things—dynamically provisioned volume management, data migrations, snapshot copies, and remote mirroring functionality for all of these storage systems. Although the actual implementation of

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something as capable as the USP is an engineering tour-de-force, what makes it so useful is its conceptual elegance and simplicity. It is built as a virtualization 'hub' at the center of users' meritocratically-chosen processors and storage systems.

**Data Reduction** – The Hitachi offering is market-proven and excellent, with the potential for rapid and significant payback once implemented. Indeed, ESG Lab testing has shown a 20:1 reduction is both realistically achievable. Furthermore, Hitachi, as already mentioned, does not shy away from discussing or recommending data deletion as a key management and cost-containment tool that should not be overlooked.

**Power Efficient Storage Hardware** – Not only does Hitachi support a range of power-efficient devices itself (such as the latest 1 TB SATA drives and spin down in the new AMS range), but its overall *appetite* to reduce storage needs (for instance, via deduplication and thin provisioning) and to tier as appropriate further reduces consumption.

**Tiered Storage** – Hitachi provides best-in-class intelligent tiered storage through its storage management software, storage virtualization solutions, digital archiving, and NAS and VTL offerings (both its own and from other vendors). Although best known for its high-end SAN systems, Hitachi embraces a hierarchy that includes everything from SSD to archive, from thin provisioning to consolidated NAS, and from federated search to deduplication.

**Remote Backup for Branch Offices** – Hitachi can improve the cost-consciousness of a centralized back-up facility by applying other attributes. Deduplication and tiering, for example, will help to reduce infrastructure and operational costs, while HDDS can make recovery granular and simple (raising productivity and reducing other network and organizational costs).

## Implementation Considerations

While all the products, features, and functions (the 'ability,' to use the same description as before) have to be supported by an 'appetite' for change (and indeed, at Hitachi, it's OK to promote cost-consciousness), it is also true that an appetite for change and efficiency is just a wish-list item itself without an implementation approach and the ability to follow through. What are the implementation considerations for users wanting to take advantage of a more cost-conscious storage infrastructure from Hitachi?

IT organizations are typically busy and often do not have the time to learn all the intricacies and nuances needed to implement, operate, or optimize each and every new technology or solution. Sound, capable Professional Services can help prevent software from becoming shelf-ware and hardware from becoming useless. Such consultancy and service teams design, install, and configure similar solutions and products on a regular basis, so they have the knowledge and skills necessary to deploy them quickly and accurately. Hitachi Data Systems offers both business consulting and technical services to enable users to design and deploy an integrated solution that can be tailored to deliver optimum cost efficiency by enabling users to align the key cost, performance, reliability, and availability characteristics of storage with their applications *and* business requirements.

Hitachi has made a number of tools, processes, and practices—including its "Storage Economics" methodology—available to its specialist teams, helping them accurately compute potential benefits and predict operational savings in terms that apply to both the IT and the business managers within an organization. In multiple acronyms, that means detailing things such as ROI, TCO, ROA, NPV, and IRR—in a single word, it means specifying the value. Hitachi's Storage Economics Assessment Service is therefore an excellent place for users to start their 'cost-conscious storage investigations,' as it allows them to model not only the *overall* anticipated impact of a comprehensive storage efficiency approach, but also to look at the *relative* impact of the different possible approaches and components that could constitute the whole. Naturally, this allows for an implementation (usually a mix of process and infrastructure) to be planned with priorities that are based on known impacts.

Clearly, then, the best place to start is with such an investigation and then a plan. And, since Hitachi has both the ability and the appetite for such cost-conscious undertakings, it can make a good partner in most cases. Additionally, as it embraces heterogeneity, it is unlikely that users will ever hear 'my way or the highway.' Hitachi suggestions will include the initial and appropriate storage tiers to balance resource utilization and satisfy defined service-level objectives (SLOs) for all the data. Often, this will necessitate some amount of data migration, which can be handled—not just once, but dynamically and automatically going forward—by a USP. This ease of migration is important because ESG research has found that the number one challenge for users to address when implementing energy-efficient IT products and architectures in data centers is centered on mitigating the cost, disruption, and complexity of migrating data to more efficient systems.

The speed and extent of uptake of the overall plan is, of course, up to the individual user, but it's also worth remembering that this should not be a one-off event. Users occupy a dynamic IT—*and* business—environment, so it's only sensible to re-check for new and extended opportunities as time passes. The key is for users to actually investigate their options and opportunities, thereby replacing the attraction of inertia with a drive to efficiency. Yes, it's easy to stick with what works and to simply do more of the same, but if the current macroeconomic situation 'encourages' more IT managers to seek optimization and efficiency, it may be a blessing in disguise!

## Conclusion

Although living in a cost-conscious world may be uncomfortable at times, it can also be a positive in some ways—inspiring users and vendors alike to look for the optimum approach to data storage and management might just be one such positive. In more a more regular and comfortable business environment, what looks like constant change on the surface can be hiding a more insidious and general inertia underneath. Of course, even with the motivation of a poor macroeconomic situation, vendors and users still have to *want* to apply change.

From the user perspective, there are some common reactions: many are (or will be!) secretly pleased to be forced—or now at least able—to do things that they should have done before. The bottom line is that this is all about efficiency... and that's good, irrespective of the motivation. Whether it is viewed from a pure business ROI perspective or more from a 'green' resource-reduction perspective doesn't matter. Even ardent 'anti-green' skeptics would admit that reducing unnecessarily profligate IT behaviors and using resources wisely and—wherever possible—in a sustainable fashion are all good things.

What of the vendor community in general, and Hitachi in particular? Yes, times are tough and—as in all business segments—some will flounder and some will flourish. To flourish, a vendor will require a mix of excellent technologies and solutions, together with financial strength and an understanding of storage's links to genuine business results. Against this backdrop, Hitachi has both the tools *and* the desire to succeed. Many vendors have some of one or the other—few have both at adequate levels. Hitachi should be applauded for approaching the debate and the market in this way. Even now, many vendors are mentioning 'the economic issues,' but doing so more as a supportive point for a specific product pitch than starting at the generic level of the issues. This is akin to the 'green-washing' that we've seen over the last year or two. Vendors love to be seen to be relevant to the issues of the day. But you cannot gain an attribute just by mentioning it.

Thankfully, Hitachi's approach to the cost-conscious user is not a kneejerk reaction designed simply to capitalize on the current economic news. It is, instead, an approach that the company has honed over the years, embracing virtualization, efficiency, and heterogeneity—three of the key tools to optimum efficiency in a storage environment. Indeed, in terms of achieving such 'optimum efficiency' (or at least part thereof), ESG's main recommendation to users is simply to decide to make the effort and to invest some time to stop and consider what is actually possible. For this endeavor, Hitachi's Storage Economics assessment and methodology represents an excellent starting point for any user wanting to model both what's possible in terms of cost effectiveness in their particular storage environment, as well as to frame a pragmatic approach.

The challenge for Hitachi in all this is to get a chance to tell its story and showcase its capabilities; in other words, to get to the table. It has a broad and applicable portfolio and approach, and yet can still be placed in the box of 'ultra reliable enterprise SAN,' when in fact—and this is still something of a secret in some quarters—it has a great deal more to offer. If Hitachi can address this and become generally perceived as a full storage provider (and not just a provider of the highest end system for the elite few), the current economic conditions could be a boon for Hitachi's level of business while also providing significant value to its new and existing customers. After all, the general challenge 'to do more with less' is in extreme focus, with data growth still high and unstructured growth making management even harder. When resources are constrained, agility and new approaches are at a premium. The old adage says that 'necessity is the mother of invention' and, in a similar vein, economic turmoil may turn out to be just the impetus needed to motivate more fervor for, and adoption of, improved efficiency in data storage. Hitachi has both the ability and the appetite to support users looking to operate their storage in a more cost-conscious manner.



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