Accelerate the Business Value of Enterprise Storage

Hitachi Unified Storage VM

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Executive Summary

When it comes to enterprise storage, IT has always had to choose between features and cost. Tradeoffs are ongoing between the best technologies to support business operations and an adequate budget to pay for those technologies. And these tradeoffs generally impede an organization’s ability to be competitive, innovative and cost-efficient. With global market volatility seeping into every crevice of commerce, now more than ever, companies need more opportunities to differentiate, grow their business and delight their customers.

Since data drives today’s business world, we need to ensure that data infrastructure, including storage assets, is highly scalable, flexible and reliable. These characteristics are vital to swiftly accommodate changing needs of business and end customers. But with ever-increasing data volumes and IT complexity coupled with continually dwindling budgets, how are organizations supposed to create the right infrastructure to adapt?

Hitachi Unified Storage (HUS) VM offers a way to maximize business value without forcing tradeoffs between higher efficiencies, better economics and market advantages. For organizations in need of enterprise functionality without an enterprise storage budget, Hitachi Unified Storage VM is ideally suited to straddle the gap between midrange and enterprise storage needs. Its optimized combination of enterprise virtualization, data unification and economical packaging means businesses can extract more value from their data for less. They can capitalize on a better storage environment.

This paper examines data storage challenges of most IT organizations and how Hitachi Unified Storage VM serves to address them. Capabilities of HUS VM range from lowering the total cost of storage ownership and increasing operational productivity to providing greater value to customers and improving energy efficiency. HUS VM provides IT executives with the features necessary for business success.

Hitachi Data Systems is an industry leader in proven, cost-efficient storage virtualization platforms for all data types. We have a long history of helping customers design, deploy and leverage economically superior storage architectures across the data center.
Compromise is the norm for most businesses, especially in economically volatile times, and particularly when it comes to enterprise storage. Organizations want the best set of technologies they can afford to meet the rising costs of doing business. At the same time they require those technologies to help mitigate the impacts of fickle markets, dwindling customer spending and increasing regulatory burdens. The reality is tough. Daily decisions must be made on how to be competitive while remaining solvent, differentiate and innovate while cutting costs, and grow the business while reducing inefficiencies.

Enterprise storage technologies simplify operations and support business growth but at a heftier price than many flat or smaller budgets will bear. This “pay to play” paradigm typically results in organizations having to capitulate on the best combination of storage technologies because of costs. Larger enterprises may outlay for the best-of-the-best storage because they can meter out expenses longer term. The smaller to medium enterprises, however, tend to sacrifice certain technologies or features for budget’s sake.

Tradeoffs between what is best for the business and what is affordable are not new. Operating expenses are surpassing financial resources. Data growth and retention requirements continue to rise. Conciliatory tradeoffs force decisions to be made but frequently result in added complexity, disruptions in data mobility, missed service levels, and less efficiency overall. Business activity can no longer bear these costly missteps and continue to be competitive.

Modern organizations are refocusing on deriving greater business value from their data and storage investments. From cloud to big data, business value goes beyond simple economics. It includes the value supplied to customers, to internal operations, and to other company ethos such as social or environmental value. Organizations want, and need, to do more with less, and make what they do matter more.

This is why smart organizations are revisiting the storage realities of justification and balance, and considering how storage investments can help achieve business goals. With every investment dollar thoroughly scrutinized, companies need to apply laser-like precision to ensuring that business value is at the top of the decision-making list. They must be sure that storage capabilities truly justify the investment.

Enterprises of all sizes are looking to drive business value while better serving customers. At the same time, they are attempting to reduce cost structures while maintaining service quality. Consequently, the desire to better utilize current resources while increasing performance has never been more ardent. Businesses are struggling to increase momentum while mitigating risk or managing for change. All these dynamic targets, all at once, can be overwhelming.
these challenges comes the demand for more balanced storage products to alleviate frustrating give-and-take tradeoffs prevalent today.

Looking beyond a product’s “bells and whistles” and “speeds and feeds” has become commonplace as IT organizations strive to understand the business value of potential infrastructure investments. The question is how to accelerate the business without the typical limitations of technology and price tradeoffs.

ESG research has repeatedly investigated the business initiatives that have the greatest impact on storage expenditures. The highest reported impact, by a very significant margin, is cost reduction — across all organization sizes. A storage investment’s ability to deliver consistent cost reduction, and consequently business value, has moved from a goal to a necessity. Organizations do not want to purchase multiple storage systems for different purposes as this results in sprawling silos, different management schemes, and new levels of complexity.

The current business environment dictates a better balancing act, an ability to effectively find equilibrium between seemingly opposing needs. In storage, finding balance is accomplished with the right combination of technologies and budget dollars to meet data requirements. It is where market advantage meets better economics, customer service meets efficiency, and innovation meets productivity. And for organizations with data requirements in-between midrange and enterprise storage, no single storage solution has yet been quite able to strike that balance.

Until now.

**Introducing Hitachi Unified Storage VM**

Welcome to a new measure for unified storage: Hitachi Unified Storage (HUS) VM. This single unified storage platform for all data offers enterprise functionality in an entry enterprise package for greater speed to value, without compromise.

HUS VM is simple to manage, supports critical business applications, and offers high performance with low operating costs. Bringing together best-in-class enterprise storage virtualization, data unification and economical packaging, HUS VM allows organizations to simultaneously accelerate key drivers of business growth and optimally balance information infrastructure. HUS VM alleviates the need to choose higher efficiencies over better economics or market advantages, so companies can extract more value from their data for less.

Hitachi Unified Storage VM sets a new standard for entry-level enterprise storage. It delivers higher value, superior functionality and greater capacity efficiency across all block, file and object storage needs (up to twice the file capacity efficiency). HUS VM enables organizations to do more with less, to foster operational efficiencies and economic results, while improving productivity and achieving better use of data. With HUS VM, organizations will be able to make what they do matter more. They can delight customers with better service and new offerings or become a better corporate citizen by enhancing environmental initiatives, without sacrificing data performance.

Where does the Hitachi Unified Storage VM sit within the unified storage portfolio? This product inherits its powerful enterprise functionality from Hitachi Virtual Storage Platform (VSP), the flagship of

enterprise storage architecture with exceptional scaling of performance and capacity. VSP delivers 3-D scaling, universal replication and unique management capabilities across all data types, multi-vendor storage and multiple data centers. It is ideal for organizations with more than 100TB of storage. For organizations at the precipice of enterprise functionality, HUS VM is effectively cradled in an economical package. It delivers the same technology and common tools for managing data growth while controlling costs for data infrastructures typically managing 100TB or less of storage. HUS VM exceeds the capabilities of midrange storage by providing additional enterprise functionality.

Hitachi Unified Storage VM is built with legendary Hitachi reliability, architecture and efficiency. Hitachi Data Systems has long supported business value through principles of economically superior storage architecture coupled with high performance, which extend the IT organization’s ability to:

- Scale performance and capacity based on business need.
- Reduce administrative costs with simplified management.
- Move and tier data based on information value.
- Migrate in and out of new and existing platforms with ease.
- Do it all faster, cheaper and easier than with other products.

Top down, bottom up and end-to-end, Hitachi solutions are built to seamlessly integrate as unified, virtualized and scalable data management architecture. The solutions are built for all open systems and mainframe platforms, and all data and information types. This federated approach is in stark contrast to many vendors, who offer discrete products and tools for different data types or silos.

Economically superior storage architectures, such as HUS VM, rely on technologies that maximize utilization of current storage investments to better handle data growth and delay purchase of additional assets. These technologies include external storage virtualization, dynamic “thin” provisioning, dynamically tiered storage, zero page reclaim, and integrated archiving.

The economic benefits of these storage architectures include lower total cost of ownership (TCO). They also include better utilization and higher productivity as well as less impact on business operations and the environment.

Hitachi Data Systems is continually enhancing storage architectures to reduce unit costs while improving bandwidth, connectivity and scalability. By simplifying, unifying and building flexibility into every Hitachi solution, organizations can have better cost efficiencies, greater availability and fewer risks.

**Technical Challenges That Hinder Business Success**

To fully grasp the benefits of Hitachi Unified Storage VM, it makes sense to 1st identify critical deficiencies in the storage environment that hinder business goals. When these issues are crystallized, IT leaders are better able to substantiate the right set of requirements necessary for success. Only then is it feasible to consider possible storage solutions and begin building the business justification for the best investment to satisfy the goals at hand.
Improved Efficiencies

"We need to be more efficient while maintaining services, quality and momentum."

Challenges such as reducing costs and risks or managing growth and opportunities can quickly surmount any progress towards innovation or new investments. Operating and capital expenses may grow, but budgets likely remain flat or decline. Organizations are looking to control costs and simplify the management of valuable information. Emphasis is on technologies that can alleviate costly inefficiencies, automate and unify operations, and reduce the strain on resources. At the same time, these technologies must help organizations meet service level agreements and competitive market demands.

Data Growth

"Significant data growth is making it difficult to support the business."

Data storage inefficiencies can grow faster than the data itself. Regulatory obligations, archival demands, rampant increases in unstructured data, and constant data availability all push storage requirements to their limits. The endless needs for storage capacity, advanced management and support of big data applications contribute to increased complexities and risks. Operating expenses often spiral out of control even when administrators are just trying to manage and "sweat the assets" of the data infrastructure. Unintentional sprawl and disparate systems emerge with attempts to keep up with growth and scaling the environment becomes more complicated, risky and expensive. Administrators need more than just raw capacity. They also need storage strategies that help to prioritize data and provide a high standard of service.

Lack of Technical Flexibility

"Our ability to innovate is limited by the lack of technical flexibility."

Storage infrastructure can support or impede innovation. For example, lack of flexibility within systems or across the data center obstructs an organization’s opportunity to quickly respond to changes, assess problems, provision services, or optimize resources. Furthermore, vendor lock-in often leads to limited purchasing and pricing options and ultimately less flexibility. Organizations relying on only 1 vendor and 1 infrastructure will need assurances from that vendor of lower risks and lower operating costs, while still having the flexibility to meet business goals. Ensuring data agility with more open standards, unified interfaces and seamless interoperability increases the opportunity for and impact of innovation.

Underutilized Assets

"Underutilized assets and poor productivity have bogged down administration."

Companies are forced to become smarter about storage utilization and capacity. They develop the efficiency to do more with less, to accomplish more with the right combination in place.

Often, IT environments have storage hardware that sits idle, is not accessible, or is simply not available. And this inability to leverage existing disk space contributes directly to storage management costs. Consequently, storage managers are stretched thin as they attempt to free up capacity and resources, all while customers are asking for more. Organizations need to be able to take advantage
of cost-saving features, such as virtualization, to increase hardware utilization and lower operating costs.

**Better Manageability**

*"We need fewer tools to manage the information infrastructure, not more."*

Managing large or separate storage environments can mean also managing a bewildering variety of tools and interfaces. Each vendor platform usually requires a unique management product to be mastered. Having to stay up to date on all the functions and features of each tool and operating environment prevents administrators from developing a deep understanding of any 1 product. As the number of management tools increases, so does the amount of time and money needed to control storage. Organizations want the ability to cost-effectively offer shared services to all storage consumers via virtualization. A unified management framework that manages multiple data types across varied storage environments provides higher value and functionality with less drain on resources.

**Mitigated Risk**

*"Managing technical change and risk is resulting in lost business opportunity."*

When the data infrastructure does not operate effectively and cannot rapidly adapt to changes, it often leads to considerable spending on resources and unnecessary risk exposure. Consequently, companies are not able to fully take advantage of business opportunities in the market. Risks include out-of-control projects related to large data migrations, which can significantly impact production environments and might take weeks or months to complete. Technical refreshes, limited maintenance windows and complicated SAN or database changes contribute to downtime durations and budget overruns, especially when there are not adequate expertise and resources. And even fragmented systems with disparate data protection affect the flexibility of data mobility, and ultimately, the quality of business continuity. IT must mitigate the hazards of manual efforts by employing transparent data migration activities and more cohesive data protection across the entire storage infrastructure.

**Optimized Performance**

*"We need high performance and functionality but in an entry enterprise package."*

Most administrators are seriously in need of highly functional storage systems that can scale dynamically and perform at blazing speeds to meet taxing demands of mission-critical or high-capacity applications. The challenges of achieving enterprise-level performance and flexibility for companies without dedicated IT expertise or simply enough resources can be show-stoppers. Organizations operating enterprise-size storage demands with midrange-size budgets or staff are looking for a flexible and unified foundation. They seek a solution that delivers better performance with more IOPS per square foot, simple and dynamic scalability, and the utmost availability of business-critical data.

**Improved Environmentals**

*"Environmental dependencies are a real and ongoing concern."*

As data infrastructure grows, so do power consumption, physical space requirements, and the need
for more efficient hardware to handle enormous data volumes. Administrators try to sweat assets as long as possible, but the options for improving these environmental factors are limited. Companies focused on energy efficiency and lower operating expenditures still want outstanding performance and high capacity. Being able to consolidate file, block and object data natively on a single platform helps to dramatically lower environmental overhead while increasing utilization and efficiencies.

Consider the Business Value of Efficient Technology

The value of storage efficiency may mean different things to different professionals within your organization. An IT architect, for example, probably views storage efficiency as a ratio of input and output. This architect, most likely, is looking for infrastructure that can deliver the greatest amount of valuable output based on the least amount of input. Storage engineers think of efficient technology in terms of performance and tuning, and how best to meet the needs of applications in a practical and consistent way. The business value of efficient technology to administrators is more about how to reduce IT costs while improving service. The focus is more on operational efficiencies, uptime, performance and how to take advantage of automated tools and processes that reduce human effort. For senior managers, it is a simple business case of lowering capital and operational expenditures for the best return of investment and customer gain.

Collectively, however, most organizations want to remain focused on how the right technology will add value to the direction of the business. Using business value as a barometer by which storage technologies are measured means your team is better able to construct a smarter storage infrastructure that matches company needs with better data performance, availability and cost factors. Subsequently, the goals and realities of building an intelligent storage infrastructure based on derived business value are the same, meaning that the right technology will facilitate:

- Improvement of overall efficiency and business economics.
- Increase in operational productivity, performance and flexibility.
- Support for competitive business advantage and market innovation.
- Greater flexibility and future growth for better opportunities to serve customers.

Match Business Needs to Hitachi Unified Storage VM

After reviewing the deficiencies and objectives of the current infrastructure, let’s consider how Hitachi Unified Storage VM addresses these items and maps to a smarter storage solution for your business. Two key business value queries to pose throughout this section are "what are we trying to achieve?" and "how can we best achieve it?"
Do More With Less, More Effectively

Doing more with less is really a rendition of being able to proficiently manage more data while driving down the overhead of doing so. It also means enhancing productivity of systems and operations to be able to more effectively access and use the data to promote business goals.

Lower the Overall Storage Cost Structure

Lowering TCO for storage investments is critical to overcoming many of the cost-efficiency challenges prevalent in the data center. TCO is a proven method for calculating all the costs that will be incurred over the storage asset’s useful life, from acquisition and administrative labor through technical refresh and migration. TCO accounts for the total lifetime operating and purchasing expenses and is used for side-by-side comparisons of 2 or more proposed solutions. By determining accurate hard and soft costs associated with storage decisions, organizations can gain clarity into the more nebulous expenditures occurring across the data center and begin to lower TCO.

The top ways to lower storage TCO using Hitachi Unified Storage VM include:

1) **Consolidate for a single view of the environment.** In a survey of more than 200 Hitachi virtualization customers, 70% rated consolidation and simplification as a “4” in importance on a scale of 1 to 5, with 5 being most important. The consolidation of storage allows assets to become virtualized and centralized into a common storage pool. When storage assets are consolidated, the infrastructure is considerably simpler to manage. The reduction of TCO can be as much as 31% when using these techniques. HUS VM is a smaller form factor, highly efficient in size and energy usage. Using HUS VM with consolidation of older machines, there is significant opportunity to cut the costs of power, cooling and floorspace requirements.

2) **Unify with 1 platform for all data.** Consolidating block, file and object data on a central platform brings costs down while increasing control over the storage environment. HUS VM architecture allows the effective sharing of resources for different uses. This, in turn, reduces capital purchase demands. When data storage is unified with a single management interface, IT is able to take advantage of higher-level features that further efficiency and business value. HUS VM uses Hitachi Command Suite software for consolidated management of storage assets within the virtualized framework, to deliver enterprise storage service levels when, where and how they are needed.

3) **Boost capacity efficiency with advanced technologies.** Achieving capacity efficiency across the data storage infrastructure requires diligent processes and habits, akin to extreme thriftiness.

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**Global Bank Uses Hitachi Virtualization to Reduce Administrative Costs**

The HDFC Bank Limited was one of the first organizations to receive approval from the Reserve Bank of India to set up a bank in the private sector. HDFC provides banking services for target retail and wholesale customer segments. To ensure top-quality customer service while controlling operating costs, HDFC evolved from a localized direct-attached storage environment to a highly available, centralized 150TB infrastructure using Hitachi storage virtualization. The bank saves more than 2,000 hours in IT administration costs per year since deploying Hitachi virtualization.

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2 TechValidate Survey, TVID: EC4-04B-275
The focus is on using practices and technologies to improve storage utilization, reclaim capacity, repurpose existing systems, and take advantage of cost-saving features.

Storage virtualization is fundamental to capacity efficiency, enabling a single view of the environment and simplifying device management for improved storage services. Storage virtualization eliminates silos and helps reclaim available yet inaccessible storage capacity. In fact, of nearly 100 Hitachi customers surveyed, 72% were able to reduce their storage cost per unit by up to 40% using Hitachi storage virtualization.\(^3\) Equally, it assists in the deferment of net new storage purchases.

Another sibling in the capacity efficiency family is Hitachi Dynamic Provisioning. Unlike conventional provisioning that requires space to be allocated even if not entirely used, Dynamic Provisioning assigns only what is needed. It consumes physical capacity only when required by applications, allowing storage capacity and performance to be maximized. This type of provisioning goes a long way in improving utilization rates, performance gains and environmental costs. (See Figure 1.)

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**Figure 1. Improved Storage Utilization with Hitachi Virtual Storage Platform.**

\(^3\) TechValide Survey TVID: 9D0-2F4-8FB
Cousin to Dynamic Provisioning is zero page reclaim, which scans virtual volumes for zero pages and helps to return unused storage to the virtualized pool as free space. This type of storage reclamation is low-hanging fruit for improving capacity efficiency. These efficiencies are quick and easy to achieve with an up to 60% return of the unused capacity. And they can delay or avoid the purchase of extra capacity.

**Hitachi Virtualization Improves Storage Utilization and TCO**

Atos is a global systems integrator and outsourcing company based in Europe and Asia Pacific. By re-engineering its infrastructure to include Hitachi virtualization and tiered storage, Atos was able to significantly increase utilization rates while lowering the overall total cost of storage ownership.

“We have grown from 1PB to 1.8PB, and have converted from a single, Tier 1 structure to very well-organized multiple tiers. We have already improved storage utilization from its original 25% to 35%, to now utilizing at 66% and counting.”

— Stephen Ko, Director of Operations for Atos Managed Services in the APAC Region

4) **Store data based on business value.** To further the organization’s opportunity to mine greater business value and cost efficiencies, Hitachi Unified Storage VM provides intelligent tiered storage. This means having the right data on the right storage device at the right time. Data is tiered according to its business value, ranked by importance, activity level and retention policies.

Built-in Hitachi Dynamic Tiering software eliminates the need for painstakingly manual data classification and movement, for better optimized tiered storage and management of data lifecycles. Data is moved automatically on fine-grain pages within the virtual volumes to the most appropriate media, according to workload requirements. HUS VM integrates tiered storage architecture. This improves performance, simplicity and availability, because intelligently tiered storage dynamically moves data to various tiers in response to changing access needs. The outcome is efficient, comprehensive and intelligently stored data, which improves the cost-to-value ratio.

5) **Extend the useful life of assets.** One of the quickest ways to extend the useful life of storage assets is through virtualization. Once external storage systems are pooled through Hitachi Unified Storage VM, they enjoy all the benefits of its enterprise virtualization functionality such as nondisruptive migration. When migration time is reduced, the system is available for a longer period of time at purchase and at refresh.

In addition, virtualized systems inherit the latest features and functionality of the parent storage system. For example, older storage systems virtualized behind the HUS VM would immediately benefit from recent advancements in hypervisor integration, such as VAAI.

6) **Repurpose, don’t retire.** Data that can be easily promoted or demoted will cost less to manage throughout its lifecycle. By managing heterogeneous storage capacity as a single pool, existing assets can therefore be repurposed. Older assets can now be used as lower tier storage systems for less critical business data. For example, less important data previous kept on Tier 1 might now be effectively managed on a new Tier 3.

7) **Scale based on business need.** Scaling storage according to business needs or changes can be tricky. IT leaders know that scalability is about more than just capacity. It is about being able to
cost-effectively scale performance and capacity linearly. Finding a solution that can scale up, out and deep without degrading performance or requiring forklift upgrades is critical to adapting to known and unforeseen business change.

8) Commoditize the procurement process. By externally virtualizing heterogeneous storage from different vendors, administrators effectively commoditize the storage and benefit from pricing power, not pressure. External virtualized storage allows the user to purchase the right storage at the best price rather than be locked to any one vendor’s offerings.

Increase Operational Productivity and Flexibility: Manage With Automated Tools in a Common View

Accomplishing more with less, more effectively, also means simplifying management of data storage, both immediately and for the future. Designed to accelerate productivity and time-to-market opportunities, Hitachi storage platforms all benefit from a common management interface: Hitachi Command Suite (HCS).

Hitachi Command Suite is an advanced suite of IT management software. It offers a framework to simplify and automate storage tasks as well as streamlined management for business application availability, performance and access to critical data. HCS offers built-in chargeback capabilities and reporting, along with configurable attributes for multitenance and policy-based automation. These tools help equip organizations to implement and manage virtualized environments and data migrations without disruption. Providing a common view of the storage environment reduces administrative responsibilities with more features and flexibility, fewer steps and better performance.

HCS allows administrators to take full advantage of the extensive functionality of Hitachi storage. The combination of Hitachi Unified Storage VM and Hitachi Command Suite provides added business value. Together, they provide advanced protection of data, faster response times for applications, support of asset consolidation, and dynamic virtualized environments. By using 1 set of cohesive, simplified and automated storage management tools, IT can reduce management overhead by as much as 50%. And with the ease and flexibility of HCS, the need for separate expert IT staff is diminished or eliminated, helping companies delay or avoid IT staff expansion as data volumes grow. Thirty percent of IT organizations polled were able to improve storage capacity utilization using Hitachi Command Suite, and a medium enterprise healthcare company is effectively managing 500TB of storage with a single administrator who is using HCS.

Increase Data Mobility and On-Time Data Migration With Less Effort

Data migration projects are complex and pose significant cost and risk. According to a recent TechValidate survey, data migration project costs on average run 200% of the actual acquisition cost of enterprise storage, exceeding US$15,000 per migrated terabyte. Costs are directly tied to duration and efficiency of the migrations, so for storage administrators, the ability to securely move data on time and on budget is paramount.

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4 TechValidate TVID: 030-DEA-8C5
5 TechValidate TVID: F34-680-6D0
6 A sponsored 2009 TechValidate survey, an independent market research firm, has quantified varying level of cost and risks.
Hitachi Unified Storage VM facilitates faster, easier data mobility, and, especially, on-time data migrations. Its virtualization capabilities support migration to and from multivendor storage at up to 90% less effort as compared to industry averages for host- or replication-based migration. By reducing application downtime, storage administrators are more productive. An impressive 88% of IT organizations surveyed reported on-schedule migrations to new systems, compared to 70% of non-Hitachi customers who reported schedule overruns averaging 30%.7

Make It Matter More
Hitachi Unified Storage VM takes business value beyond the lower cost of storage ownership to really zero in on helping companies better serve the needs of their end customers and the environment.

Better Serve Customers While Improving Competitive Advantage
Extremely successful companies understand that serving their customers is the highest goal while also managing to be competitive. Hitachi Unified Storage VM helps accomplish both by allowing organizations to meet this vision with the might to manage more data.

Achieve Enterprise-level Performance and Flexibility
Higher-quality services and better business relationships help companies delight their customers. In some cases, Hitachi Unified Storage VM supports almost 200% more IOPS than the competition. This performance supports better transaction rates and increased service levels, and highest levels of data availability, so data is there when customers need it. HUS VM supports high-capacity capabilities for content depots, and solid-state disks for higher performing data requirements, such as mission-critical applications.

Reduce Business Disruption and Time to Market
When IT is able to reduce or eliminate disruptions to operations, both internal and external customers win. The business gains richer use of its data with high availability, transparent technology refreshes and minimized maintenance windows. The business can then pass overall efficiencies and cost savings on to its customers.

When Hitachi technologies such as Dynamic Provisioning speed provisioning and accessibility of data resources, business can reduce its time to market with new customer offerings at lower price points. Hitachi Unified Storage VM delivers highest availability, integration of security functions and built-in replication tools to protect operations from disruption. In this way, it helps ensure compliance and support of today’s customer needs while flexibly planning for future business advantage.

Support Innovations With a Flexible Foundation
Keeping up with growth in business application data is a continual challenge. A flexible storage platform with unified management and dynamic technologies helps the organization support both IT and business innovations. Hitachi Unified Storage VM delivers the foundation for high availability, superior performance and data protection capabilities to meet service level agreements. With innovations of its own, such as automated data placement as well as business-view reporting, HUS VM delivers the benefits of reduced risks and immediate visibility across storage.

7 TechValidate TVID: 11B-C17-AF1
Be a Good Corporate Citizen While Maintaining Performance

In the context of this paper, being a good corporate citizen makes reference to choosing and operating energy efficient storage. Efficient architectures reduce storage requirements, improve storage utilization, lower energy-related expenses and increase administrative productivity for a greater return on assets and investments. Some of the "good corporate citizenship" benefits provided by the Hitachi Unified Storage VM can be seen in the following areas of improvement:

**Performance**

HUS VM helps the business reduce its carbon footprint while maintaining higher performance, which is a win-win for storage administrators and the environment. Its exceptional performance-to-power ratio delivers the highest random IOPS and a sequential transfer rate of unified vendors.

**Capacity**

Successfully controlling data growth requires powerful yet nimble scaling capabilities. HUS VM offers the most scalable unified storage platform in the market without sacrificing performance. Scaling capacity to external storage clears the hurdles of most midrange and entry-level enterprise systems otherwise limited by the confines of a single storage system. HUS VM easily provisions file and block capacity for virtual machines, to scale with data growth and to extend the life of storage assets.

**Power and Cooling**

Older machines are simply not as efficient as those designed for less impact on the environment. HUS VM is a highly efficient platform. Its progressive technologies coordinate the consolidation of separate file and block storage for up to 40% cost savings on power and cooling, compared to other industry solutions. Also, HUS VM supports 2.5" 10K RPM disks, which consume nearly half the energy of their larger 3.5" counterparts.

**Floorspace**

Less hardware on the data center floor means greater cost savings. This is particularly noticeable if migrating data from older systems to newer and fewer machines that are more energy efficient, higher density, and have a smaller footprint. HUS VM allows IT to manage the same or more storage with less floorspace requirements. The smaller form factor takes up less floorspace than other storage packages providing comparable capacity.
Overstock.com is a popular online retailer that offers brand name merchandise at deeply cut prices, emblazoning across its website the question, "What would you like to save on today?"

The ever-successful company has seen a data growth rate of 43% year on year. To keep its high-volume online business running smoothly, Overstock.com wanted to replace data migration woes and legacy storage systems with a highly flexible tiered storage infrastructure. Using Hitachi Universal Storage Platform® V and Hitachi Adaptable Modular Storage 2500, Overstock.com created a virtualized tiered storage environment that reduces data migration tasks from hours to minutes and can be managed from a single pane of glass. With its new Hitachi storage architecture, Overstock.com applied a 2-pronged approach to cost efficiency: 1st, reducing the overall storage "appetite" by reclaiming unused capacity and move to thin volumes; and 2nd, reducing the cost of growth with dynamic tiers.

"We saw a lack of flexibility in our existing IT infrastructure and maintenance bills beginning to climb so I wanted to refresh older equipment and find a way to better manage our heterogeneous environment. From a business standpoint, running cost-efficient operations and eliminating downtime are critical to staying competitive and satisfying customers. We needed more advanced technology that works for us not against us."

— Sam Peterson, SVP, Technology at Overstock.com

After virtualizing older, smaller storage systems, the common pool of storage yielded approximately 60 usable terabytes that were assigned to new capacity requirements. This reclaimed amount not only set a new trajectory for storage demand, but also provided real capital expenditure (CAPEX) avoidance. Over the last 2 years, Overstock.com has been able to change the overall demand for storage (in terms of raw capacity), while still maintaining the 43% growth rate for business data. This represented a real savings impact in terms of power, space, labor and CAPEX costs.

Justify the Investment: Hitachi Unified Storage VM Economics and Value Using Storage Economics

Hitachi Data Systems Storage Economics builds a comprehensive framework for understanding how to make the most of technologies, roadmaps and opportunities within today’s prevailing budget constraints. Storage Economics is a proven analytical methodology for helping customers assess, quantify and justify storage infrastructure investments in order to gain predictive economic benefit and meet larger business goals. To fully appreciate how the Hitachi Unified Storage VM can help to overcome complicated and pressing data storage challenges, it is worth examining its storage economics.

Total Cost of Ownership Reduction

For many organizations, lower TCO is a huge driver of business value. It’s why 52% of IT organiza-
tions chose Hitachi storage virtualization to reduce storage costs. Hitachi Unified Storage VM delivers that value across many of the critical storage requirements, including:

- Up to 31% reduction in TCO as a result of:
  - 40% lower cost of environmental resources (power, cooling, and data center floorspace).
  - 90% less effort migrating from 3rd-party storage.
  - Hitachi Command Suite requires 50% fewer administrative tasks.
  - Up to 40% capacity cost savings through retiering.
  - Storage virtualization enables up to 50% greater utilization through capacity reclamation.

**Environmentals**

The energy efficiency aspects of Hitachi Unified Storage VM, as summarized in the previous section, are now being compared to a variety of other solutions in the industry (see Table 1 below). Overall, HUS VM cuts data storage operations by up to 40% for monthly total floorspace, power and cooling, based on current vendor-published data. In addition, HUS VM has industry-leading performance and virtual capacity attributes.

**TABLE 1. HITACHI UNIFIED STORAGE VM VERSUS INDUSTRY (COMPETITION)**

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<tr>
<th>Storage Qualities</th>
<th>HUS VM Capabilities Versus Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>Highest random IOPS and sequential transfer rate of unified vendors</td>
</tr>
<tr>
<td>Virtual Capacity</td>
<td>Up to 2x more than nearest competitor (maximum virtual capacity)</td>
</tr>
<tr>
<td>Power</td>
<td>Up to 40% less [power consumption in Watts]</td>
</tr>
<tr>
<td>Cooling</td>
<td>Up to 40% less (BTU per hour heat dissipation)</td>
</tr>
<tr>
<td>Floorspace</td>
<td>Up to 30% more (maximum terabytes per square foot)</td>
</tr>
</tbody>
</table>

**Feature-to-Cost-Reduction Mapping**

While the Hitachi Unified Storage VM orchestrates a unified storage environment, it is important to examine how each of its significant technology features contributes to the overall efficiency and business value (see Table 2).
<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit/Impact</th>
<th>Top Storage Economics Cost Categories Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Storage Virtualization</strong></td>
<td>• Single view of storage reducing administration and labor costs.</td>
<td>• HW costs and depreciation.</td>
</tr>
<tr>
<td></td>
<td>• Consolidation of HW and SW — reduced capital expenses.</td>
<td>• SW costs and depreciation.</td>
</tr>
<tr>
<td></td>
<td>• Extended asset life of hardware and software — defer new purchases.</td>
<td>• HW and SW maintenance costs.</td>
</tr>
<tr>
<td></td>
<td>• Repurposing of existing assets — defer new purchases.</td>
<td>• Storage management and labor costs.</td>
</tr>
<tr>
<td></td>
<td>• Reduced SW licenses — CAPEX.</td>
<td>• Cost of migration and remastering.</td>
</tr>
<tr>
<td></td>
<td>• HW + SW maintenance costs — reduced operating expenses.</td>
<td>• Cost of growth.</td>
</tr>
<tr>
<td></td>
<td>• Reclaimed capacity — defer new purchases.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Non-disruptive migration — reduced business downtime and expense.</td>
<td></td>
</tr>
<tr>
<td><strong>Unified Storage</strong></td>
<td>• Reduced capital costs of purchasing separate systems for different data types.</td>
<td>• HW costs and depreciation.</td>
</tr>
<tr>
<td></td>
<td>• Common management and administration for all data in the data center.</td>
<td>• SW costs and depreciation.</td>
</tr>
<tr>
<td><strong>Dynamic Provisioning</strong></td>
<td>• Defers capacity purchases by reclaiming allocated but unused capacity and making it available to other applications.</td>
<td>• HW and SW maintenance costs.</td>
</tr>
<tr>
<td></td>
<td>• Improves application performance if you deploy data dispersion (or wide-stripping) technologies.</td>
<td>• Storage management and labor costs.</td>
</tr>
<tr>
<td></td>
<td>• Improves the IT department’s responsiveness to new storage demands without downtime.</td>
<td>• Data center floorspace.</td>
</tr>
<tr>
<td></td>
<td>• Aligns storage usage with actual business usage.</td>
<td>• Provisioning time.</td>
</tr>
<tr>
<td></td>
<td>• HW costs and depreciation.</td>
<td>• Cost of waste.</td>
</tr>
<tr>
<td></td>
<td>• SW costs and depreciation.</td>
<td>• Cost of growth.</td>
</tr>
<tr>
<td></td>
<td>• Cost of performance.</td>
<td></td>
</tr>
<tr>
<td><strong>Dynamic Tiering</strong></td>
<td>• Reduce total cost of ownership by storing data based on business value — based on price, performance, etc.</td>
<td>• HW costs and depreciation.</td>
</tr>
<tr>
<td></td>
<td>• Automate the data migration process — reducing operational expenses.</td>
<td>• SW costs and depreciation.</td>
</tr>
<tr>
<td></td>
<td>• Extend to external tiers — repurposing existing assets.</td>
<td>• Cost of migration and re-mastering.</td>
</tr>
<tr>
<td></td>
<td>• Reduced operating expenses relative to service level agreements.</td>
<td>• Data mobility.</td>
</tr>
<tr>
<td></td>
<td>• Cost of copies.</td>
<td>• Cost of waste.</td>
</tr>
<tr>
<td></td>
<td>• Cost of growth.</td>
<td>• Cost of copies.</td>
</tr>
<tr>
<td></td>
<td>• Storage management and labor costs.</td>
<td>• Storage management and labor costs.</td>
</tr>
<tr>
<td><strong>Common Management</strong></td>
<td>• Manage entire data center from 1 view.</td>
<td>• SW costs and depreciation.</td>
</tr>
<tr>
<td></td>
<td>• Reduced labor for storage management.</td>
<td>• Storage management labor.</td>
</tr>
<tr>
<td></td>
<td>• Reduced training.</td>
<td>• Cost of monitoring.</td>
</tr>
<tr>
<td></td>
<td>• Reduced software and licensing.</td>
<td></td>
</tr>
</tbody>
</table>

Note: HW = hardware, SW = software
Total Cost of Ownership Reduction: 3 Simulations

Figure 2 outlines 3 example simulations where HUS VM was able to significantly reduce TCO. These simulations were conducted in different geographies with different growth rates.

Figure 2. Three Simulations for Hitachi Unified Storage VM Total Cost of Ownership Reduction

The baseline in Figure 2 refers to nonvirtualized, nonthinned systems that do not benefit from common management or nondisruptive migration. Specifically, the various categories of TCO are reduced due to:

- **End of Life Migration.** Cost is reduced by shortening the migration period and reducing business disruption from days to hours or less.
- **Storage Management.** One common view reduces the cost of additional software consoles, training and maintenance.
- **Software Maintenance.** Cost is reduced through consolidation and common management.
- **Hardware Maintenance.** Cost is reduced through consolidation and common management.
- **Environmentals (power, cooling and floorspace).** Costs are reduced by improving storage utilization (capacity reclaim) and using small form factor hardware.
Furthermore, what is not included in this graph is the inorganic growth in capacity. Without capacity efficient technologies (baseline), the administrator grows the environment by adding new disk, not by reclaiming existing capacity and improving storage utilization. This is an important distinction to make: With HUS VM, administrators can reduce or defer their purchase of new HDD by using more of existing assets.

**Concluding Notes**

Making storage work means more than it used to. Today, as storage technologies continue to evolve, so do the obstacles they attempt to overcome. Storage solutions need to have built-in capabilities to encompass rapid and unexpected changes across the data infrastructure and cost-efficiently scale and perform to meet new business and data requirements.

Hitachi Unified Storage VM transforms storage in a way that allows organizations to embark on enterprise functionality without the enterprise price tag. With its entry-level enterprise virtualization, thin provisioning and unified management, the Hitachi Unified Storage VM hits the business value sweet spot.

For more information on Hitachi Unified Storage VM or Hitachi business value, please visit [www.HDS.com](http://www.HDS.com).