Virtual Servers and Virtual Storage Make Sense!
By George Teixeira, DataCore Software Corporation

Everyone is pretty much in unison that virtualization is strategic and delivers real benefits by making IT infrastructures more efficient, agile and productive. From storage, servers, desktops to networks, virtualization is being employed since it makes sense. The term virtualization is now used in virtually (pardon the pun) all aspects of technology today.

Virtualization is definitely not new. However, the phenomenal success of VMware and the proliferation of virtual server technologies over the last few years have helped popularize and redefine the term virtualization. Virtualization is a proven concept that was first developed in the 1960s to partition and optimize the use of large, mainframe hardware. Since mainframes were very expensive resources, partitioning made sense as a way to fully leverage the hardware and optimize the investment. Now virtualization as defined by VMware and other virtual server solutions (Citrix XenServer, SUN VM, Oracle VM, Xen, Virtual Iron, Parallels, Microsoft Hyper-V, etc.), is hardware independent software that maximizes the hardware and CPU utilization of today’s PCs and standard server platforms. Likewise Virtual Memory which also has been around since the 1960s makes a relatively small amount of expensive memory hardware act as if a large amount of memory resources were available to systems. Virtual Memory is another form of virtualization that ‘gets the most out of hardware’ and it is now taken for granted as an essential element of modern computing systems.

Virtualization changes what you have to think about

One thing you might miss in all the virtualization excitement is that, when you look underneath the covers at virtualization, what you will quickly see is that it is really all about software doing things we used to count on hardware to do. Software brings the flexibility to meet future needs, providing both independence from hardware and portability. VMware, Citrix and DataCore solutions are all examples of portable software solutions that live beyond the life of their underlying hardware platforms. By not tying the brain of the solution to its body, your investment in the solution survives and benefits from future advances and cost savings from new generations of those underlying platforms.

"No one would ever dream of throwing away Exchange, VMware or Citrix because the servers they run on became obsolete. So why do we let this happen with storage?" Unlike traditional storage solutions, DataCore (like Microsoft, VMware and Citrix) is a portable software solution that radically improves productivity and resource utilization and survives multiple generations of hardware obsolescence.
Put another way, virtualization gives you a simple way to manage and look at things that are very complicated – such as complex, physical devices like computers and storage arrays. Virtualization turns physical devices and their specific complexities into simpler-to-use software representations. A good example might be your own PC and network printers. When you want to add a printer – or if you simply want to print something – you simply click on an icon. That printer icon represents a physical device and the user is not concerned with what type of printer it is or how such a printer must be configured or connected. You click on it to find the printer you want to print on, click on that printer, and you have printing capability. What virtual servers have done is turn servers into icons. When you click on the icon, you can create or deliver a new server. Virtual storage, likewise, turns the disk drives of many and disparate storage devices into an icon. By simply clicking on the icon, you can serve or provision storage. What all these advances have done is turn independently managed devices into a network service. Pointing and clicking to an icon on a centralized console replaces the need to physically run around and manually manage and administer many physical devices.

Virtualization changes what you have to think about. No longer do you have to think about how the physical device will work with your computer in order to deliver the service you want. The virtualized approach is one where you are now dealing with a network service to get you the appropriate services out of a pool of resources. That pool can be servers from a pool of virtual servers, storage from a pool of virtual storage, or printers from a pool of virtual printers – a concept that we all understand.

**What is the driving force to go Virtual?**

Virtualization fundamentally changes for the better the economics of IT investment and productivity by consolidating underutilized IT resources, such as servers and storage, and pools them so that you can use and manage them much more efficiently and effectively. The result is that you don’t have to buy as much or as often because you are getting more out of what you already own. Server virtualization gives you far better utilization of the servers and the PCs you have in-house. Likewise, storage virtualization software gives you the full utilization of the storage you already own because you can fully share and manage your storage as a common pool of storage resources over network connections.

Economics and Productivity – the opportunity to get better utilization from existing assets and gain productivity by centralizing common administrative tasks, process and resources. Processor utilization, for example, in the Intel/AMD space averages around 10 percent. In storage, as little as 25% of allocated physical disk space in Microsoft and Intel/AMD-based server environments is actually consumed by users. Overcoming these inefficiencies and reducing the high cost and burden of administering many versus few systems is the driving force.

Bottom-line, users want better flexibility and cost savings. While there are significant differences between virtual servers and virtual storage, both attack exactly the same fundamental problem – making the many work as simply as one. Both seek to optimize the utilization of common resources (CPUs and disks) and stress the ability to readily redeploy these resources (virtual machines and virtual storage) when and where they are needed.
**Storage Virtualization Enhances Server Virtualization**

**DataCore:**
**Eliminates Waste, Optimizes Utilization, Simplifies Provisioning**
Virtual servers allocate disk capacity per virtual machine and create templates that reserve disk capacity that may or may not ever be consumed. DataCore’s thin provisioned storage for example makes it easy to create volumes for any number of virtual servers (VMware ESX, Citrix XenServer, etc.) without wasting storage capacity and best of all it ensures that any unused storage resources are available to any application or OS.

**Accelerates Performance and Maximizes Cost Savings**
Virtual servers impact I/O performance, therefore having faster storage helps improve overall performance. DataCore’s advanced self learning adaptive cache dramatically improves performance, often by a factor of 2 or more times, by optimally responding to I/O requests at memory speeds versus slower disk access speeds. DataCore also supports storage domains which can supply guaranteed quality of services and performance levels to virtual machines. Virtual servers are inefficient storage consumers. DataCore maximizes cost savings by optimizing storage utilization and supporting storage tiers enabling users to utilize the most cost effective storage where needed, when needed.

**Makes Continuous Data Availability & Continuous Data Protection Practical**
Virtual servers suffer from the “all the eggs in one basket” scenario and therefore highly available shared storage is required. DataCore supports high-availability fail-safe shared storage to ensure business continuity for virtual server platforms. Users can also build on VMware’s HA by taking fast disk snapshots of virtual machines enabling rapid recovery of virtual machines when problems arise. These disk snapshot images can be used to easily validate backup systems and provide cost-effective high availability for all applications. In addition, DataCore Traveller is a continuous data protection (CDP) solution that enables users to go back in time and recover the state of virtual machines, files and disk storage just as it appeared prior to disruptions or data corruption.

**Revolutionizes Server and Storage Management**
Rapidly and efficiently provisioning virtual machines and their storage from a central management console is another key requirement to meeting user’s changing needs. DataCore’s virtual storage makes it simple to allocate storage and thin provision space as needed where needed. Users can easily deploy or backup virtual machines from the DataCore SAN by doing a Boot from SAN or using Traveller CDP or fast disk to disk snapshots for backups. Users also can rapidly provisioning VMware virtual machines from a centrally-stored golden image or test patches and roll-out multiple virtual machines in minutes.

**Simplifies Migration and Enables Cost-Effective Disaster Recovery**
Virtual infrastructures respond to change by allowing motion and migration of key resources. In addition to live migration of virtual machines users can implement DataCore SANmotion for simple data migration across the SAN. Virtual servers make it easier to do disaster recovery but they still require storage that supports synchronous mirroring, thin replication and asynchronous replication in order to implement cost effective disaster recovery plan.

**Consolidates Data Center Resources - ‘Go Green’ + Lower Operating Costs**
Virtual server and virtual storage go hand in hand in managing data center infrastructures more efficiently. Consolidating physical server and storage resources with DataCore and virtual servers improves productivity while reducing data center floor space, power consumption and CO2 emissions. Studies show that customers who deploy Thin Provisioning and Thin Replication technologies such as those found in DataCore’s SANmelody and SANSymphony can take a data center capacity requirements from 10TB down to 4TB. On average just one terabyte of capacity is needed for every 2.5 terabytes required with traditional storage arrays. These Thin technologies can reduce necessary disk capacity and the associated carbon footprint by as much as 60% as compared with traditional fat storage.
Virtual Servers & Virtual Storage = Flexibility and Cost Savings

The increased use of server virtualization products like VMware, Citrix XenServer and Microsoft Hyper-V are driving the growth of storage virtualization solutions. These products drive the need for shared storage that can be networked and used by multiple machines. When you only had individual servers, you would use only the attached captive disks installed in the server. With server virtualization products, it makes sense to virtualize storage – so that the storage can then be served up to one server, to many servers, or to a farm of servers. With virtualized servers creating many virtual machines, a lot more capacity and flexibility is required. Virtual servers on the same system often create an imbalance of computing power and I/O load since they typically have an excess of CPU power but they have limited I/O performance and flexibility to work with different and multiple storage devices. It’s an interesting cycle: server virtualization drives the need for greater storage efficiency and I/O performance, resulting in the need for virtual storage pools that can readily serve up disks when and where needed to more application servers which are then virtualized and deployed as they are needed.

With the above in mind, let’s look more closely at the benefits of virtual servers and virtual storage and explore powerful new capabilities such as “Thin Provisioning Virtual Capacity” (profiled on pages 10-12), Storage Area Networks (SAN) and “VM motion technology” since they are significant advances that are further simplifying administrative workloads, reducing response times, and lowering costs.

Storage Virtualization – SANs, Performance, & High Availability

Virtualization Simplicity: In its purest form, storage virtualization allows users to hide underlying hardware complexities and simplify the management and the process of adding storage capacity. Using existing physical storage networks (SANs), storage arrays or inexpensive, commodity disks, users can consolidate and dynamically manage the storage resources as virtual storage pools with little regard for what physically resides on the back-end. Furthermore, the technologies can increase performance and availability, providing a means to do fast disk-based backups, auto failover and recovery and remote replication to better protect data either over fibre channel or by using existing TCP/IP infrastructures.

High-availability: Increasing business continuity and productivity by cutting downtime is a key point to consider. If you look at virtual servers, what you have done is put all the ‘eggs in one basket’ by consolidating all of your applications. The big issue becomes – if I have a virtual server failure, all of a sudden I am taking down many different applications or many different computers. Proven storage virtualization solutions like DataCore can enable automatic mirroring and failover protection of the data over a shared storage area network (SAN) over iSCSI or Fibre Channel networks. In other words, it provides failsafe protection of the data storage and it also protects the stored images of the virtual machines so they can be easily recovered in the event of a disaster. By doing this, you fundamentally change the uptime characteristics of the system. A rule of thumb here is that typically the down-time for direct-attached storage is somewhere between one and two weeks of down-time per year. Once you embrace a virtualized high-availability SAN with automatic failover, your typical downtime drops down to less than 60 minutes a year. Reducing downtime from weeks to minutes can save a business a lot of money, not to mention aggravation.

Performance: We should also touch on performance. One of the outstanding features of an advanced storage virtualization platform like DataCore’s technology is that it must also address the performance problems that are typically inherent to virtualization. When you
add virtualization layers, you are adding software to the mix and that often adds overhead. However, DataCore for example effectively takes advantage of memory speeds to accelerate and address the I/O traffic requests and bottlenecks by using smart caching software. By doing so, users can see as much as a 2-4x performance improvement of all the storage that is being managed under the DataCore storage virtualization layer. What that means is that the systems can handle twice as much work in the same period – greatly enhancing their overall productivity.

**SAN-wide Storage Services:** Products such as DataCore SANsymphony™ and SANmelody™ enable customers to better utilize their storage. DataCore can also enhance availability over a network and also improve overall performance. New approaches to allocate and provision disks, storage network pooling, and virtual storage software are letting users "buy back" storage and add universal storage services across different disk devices from different vendors. Monolithic storage systems today limit you to using higher-level functions, such as snapshots or remote mirrors, with a single array type. For example, you cannot snap or mirror a volume from an EMC array to an IBM array with either of the vendor's embedded array management software.

**Virtualization and Infrastructure-wide Storage Services:**

What if, instead of just residing on and virtualizing a single device, the software layer were also a software network to which all your storage devices could be connected, then virtualized and served out as virtual disks across the network to users as virtual disks? All your storage would then have the virtualization benefits of consolidation, flexibility
and ease of management, no small thing. But you would also have given those virtual
disks, all their data, and even the virtual machines that find their embodiment on those
disks the ability to go anywhere in your enterprise!

Perhaps less obvious is that you would also have created the optimal environment for
advanced storage services to be deployed on an infrastructure-wide basis, not only
because the storage is networked through that layer, but because in this layer these
applications are able to draw upon and affect all storage resources in a general,
virtualized context and do not have to contend with them in their individual, device
limited forms.

DataCore Virtualization and Storage Services
Infrastructure-wide Usability

This is exactly what DataCore has done. DataCore storage virtualization software
networks and virtualizes both physical and virtual disks. It also delivers highly advanced
storage services, like high availability, data and virtual machine migration, disaster
recovery, thin provisioning, guaranteed quality of service levels and performance
acceleration, surpassing the performance of even the most expensive storage arrays.
Unlike traditional storage arrays, DataCore for example provides a virtualization layer and
a set of storage services that can be applied across all the storage devices on the
network, physical and virtual, and are not be confined to the disks located in one box or
to the boxes of just one vendor.

And that’s another important difference—no box. This might seem strange when talking
about storage, but it makes a lot of sense to lose the sheet metal wrapper. Today, even
the most expensive storage arrays are software running on standard computers using
commodity hardware components. Clearly, the brains, the solution, the value, are in the
software. They certainly aren’t in the hardware components that anyone can buy at
commodity prices and (given the production cycles of these arrays) in better, faster,
newer versions at the local computer store. The sheet metal wrapper blurs this
distinction, tricking us into continuing to think of “storage” as a “thing,” a singularity, a
box, instead of as a “result”— using software to create storage services from raw
resources produced by physical devices. But there’s a steep price for this ‘togetherness,’
and at no time is this clearer than when the useful life of that box is over and you throw it all away, together, only to invest once again in a hardware-imprisoned, but software-dominated, storage solution.

Think about it this way: No one would ever dream of throwing away Exchange, Oracle, VMware or Citrix because the servers they run on became obsolete. So why should anyone accept this wasteful paradigm when it comes to storage?

Instead of falling for this over and over again, we need to clear our heads and realize that what we’ve come to expect of ‘Storage‘ today is much less about physical storage devices than it is about “storage services”— an arena in which intelligence and flexibility are paramount and, thus, software, not hardware, is the star. DataCore (like Exchange, Oracle, VMware, Citrix, etc.) is hardware independent, fully upgradable software that runs on any standard server, and as a result it and the storage services it delivers survive many generations of hardware replacements and upgrades.

**Server Virtualization**

Fundamentally, server virtualization harnesses the idle and unused processing power of server platforms. Processor utilization on Intel/AMD servers averages around 10 percent utilization. Adding to that, processing power continues to double each year while operating systems and applications fail to take advantage of the CPU power available. Server virtualization optimizes hardware utilization.

By using server virtualization technologies from VMware, Citrix or Microsoft, a user can install, on a single server, multiple copies of Microsoft Windows or Linux therefore creating multiple machine images or virtual machines. The combined processor load of each OS and application allows users to push the utilization of processors up to 80 percent plus. Take a look at the number of systems in your environment. Would running say eight of your servers on a single system make sense? Most likely it would. Smaller footprint, less power and cooling, centralized management, lower maintenance costs and total cost of ownership - just some of the benefits that quickly add up.

**Where do we go from here?**

Beyond better utilization, virtualization adds a new level of flexibility to meet change. The challenges continue but new products and advances are helping users manage the new virtual world. Virtual machine migration and true virtual infrastructures that also manage storage are two crucial issues that have to be addressed. Luckily, new products already exist and the future holds even greater promise...

**System Migration in a Virtual World - Move your computer without moving hardware**

New virtualization advances such as VMware’s VMotion or Citrix’s XenMotion technology are making users rethink system migrations. VMotion transfers the entire system and memory state of a running virtual machine from one VMware Server to another. The system’s disk, including all of its data, software and boot partitions, must be stored on a shared storage infrastructure such as a SAN facilitated with virtual storage. By reducing the problem to one of migrating system and memory state, VMware is able to leverage the basic suspend/resume capabilities of virtual machines, while providing an extra layer of availability that enables end-user services to continue uninterrupted with VMotion. VMotion represents another important step forward in virtualization.
While these innovations are having great impact, they can go much further. These technologies are still constrained by particular vendors offerings (eg, VMotion only works with ESX) and the need to have like similar machines on each side of the migration. Users in the future will want more general approaches to deal with any to any VM migrations as we move forward. One consequence of having greater choice in virtual server vendors is the need to work better across all of these platform choices. It is very interesting to note that VMs are actually data representations of machines that are stored in each vendor’s virtual disk formats in order to encapsulate the machine image and its configuration details. Just like storage virtualization broke down the proprietary vendor lock-ins to disk devices. This market need will open up the opportunity for companies like DataCore that understand disk formats and migration to play a greater role in the future of defining virtual infrastructures and where they are heading.

**Total Enterprise Virtualization – Servers plus Storage**

"Virtual servers and virtual storage both seek to optimize the utilization of common resources (CPUs and Disks) and stress the flexibility to readily redeploy these resources (virtual machines and virtual storage) when and where they are needed."

–George Teixeira, CEO & President, DataCore Software

The success and benefits of server virtualization begs the question; Why can’t we do this with storage? Server virtualization enhances hardware utilization and reduces server sprawl; why can’t storage virtualization doe likewise and address storage sprawl and capacity utilization and growth?

IT users are already figuring this out and they are now beginning to actively seeking complementary solutions to extend virtual infrastructure across the entire enterprise, from storage to server to desktop. DataCore considers this move to "Total Enterprise Virtualization" the biggest change in the market today. Before, if people thought at all about virtualization, it was in the context of a given point solution. Today, virtualization is being understood as a comprehensive infrastructure solution that is absolutely strategic to a competitive business.

There’s a natural connection in the data center and in the field between what DataCore does and what the server virtualization vendors do. When you consolidate servers, you are putting “all your eggs in one basket” to the extent that a single failure can take out a lot of virtual machines. That’s why server virtualization best practices call for a shared storage solution with true failover.

DataCore software makes storage and SAN infrastructures fault tolerant, flexible and virtual. It is the virtual storage layer of a total enterprise virtualization strategy. For more information and details, please see the Total Enterprise Virtualization Matrix of Challenges, Solutions and Benefits. [Click here to download PDF]
Virtual Servers and Virtual Storage Make Sense!

**Benefits Summary:** Virtual servers and virtual storage working together make it easier for enterprises to lower costs, respond faster and deliver flexible and consistent services from their information technology (IT) departments. Together they:

**Lower Costs**

- You don't pay for what you don't need
- You get more out of your IT investment dollars
- Makes it easier to separate the strategic IT investments from the commodity IT functions

**Respond faster to business demand**

- Simplifies growth and expansion
- Resources can be deployed or moved quickly to users or business units that need them

**Deliver IT that's more flexible and consistent**

- Leverages technologies you are already investing in: SAN, Servers, Networks
- Gives you lower-cost disk and platform options
- It lowers business risk through flexibility and increased responsiveness

Server and Storage Virtualization software technologies allow users to manage more with less. Users can treat their hardware as commodities and utilize that hardware at levels never previously achieved. Virtualization:

- Increases utilization rates up to 80% or more
- Reduces Provisioning times for new applications from days to minutes
- Accelerates Response times for change requests, time is money
- Eliminates costly disruptions from failures upgrades and maintenance

**So what is virtualization, really?**

It is the smart, cost effective use of software technology that optimizes underlying hardware resources and provides the needed services and infrastructure flexibility to meet today’s challenging business climate.
**Feature Profile Addendum:**

**DataCore’s Thin Provisioning Virtual Capacity**

“Aside from performance, one of the distinct advantages that was instrumental in my buying decision was the flexibility DataCore provided – it runs on standard servers, uses any disk, works over iSCSI, Fibre Channel or both, and it can serve up virtual capacity efficiently to a wide variety of Windows, Novell, Linux, and Unix application systems” – Ann Schneider, IT department, CPA firm Wall, Einhorn & Chernitzer, P.C.

**Thin Provisioning Virtual Capacity Lowers Cost & Complexity**

Managing and provisioning storage is typically a cumbersome and disruptive process. Administrator labor hours and downtime as a result quickly add up. Additionally, for a variety of reasons, IT administrators tend to significantly overbuy disk capacity, which sends overall capital and operating costs skyward. According to some industry estimates, only 25% of allocated physical capacities in Microsoft and PC server environments are actually ever consumed by users. In other words, 75% of disk space is wasted.

Just like virtual memory, users want “virtual capacity” disks that grow capacity automatically to meet their needs, eliminate their “out of disk space” warnings that force system shut downs to add more disks, and yet perform as fast as local disks even if located over a network.

Pioneered by DataCore in 2001, network-based thin provisioning ‘virtual capacity’ non-disruptively and automatically allocates physical storage capacity to application servers only when it is actually used. This dramatically improves storage utilization and can reduce the total number of disk drives required, and the energy needed to operate and cool them, by half or more. The software installs on any standard Windows platform in minutes.

According to Mike Karp, senior analyst, Enterprise Management Associates, "Thin provisioning can be great solution for budget-strapped IT managers. It saves money, time, worry, and is 'green', so it makes companies good environmental citizens. The DataCore approach, like that of VMWare, and Citrix, is not wrapped in expensive hardware. A customer's investment is protected because DataCore thin provisioning will keep working even if their hardware infrastructure changes."

DataCore provides an automated capability known as thin provisioning or “virtual capacity,” that improves utilization and dramatically lowers the cost of managing storage. DataCore’s auto-provisioning capability lets users serve up massively large logical disk volumes, sized from gigabytes to terabytes. To application servers, these “virtual capacity” disk volumes are simple to use since they appear, perform and work just like any other locally attached disk. The difference is that the actual physical disk capacity is drawn from a storage pool on an as-needed basis therefore ensuring optimal disk space utilization. Setting up disks that grow automatically is simple and requires just a single command. “Virtual capacity” volumes work not just over fibre channel SAN networks but also on existing IP/LAN-based infrastructures using iSCSI storage networking.
“Virtual capacity,” or “thin provisioning” as it is more often called today, solves two major pain points – it eliminates the 'out of disk space' stoppages that require business downtime to add disks and restart applications, and reduces the amount of time you have to spend formatting, allocating and provisioning disks, a tedious, labor intensive, ongoing process that begs for automation. Thin provisioning lets you 'point and click' and automatically serve virtual disks to storage starved application servers, where needed, when needed, in sizes ranging from gigabytes to terabytes. To application servers, the virtual disk appears, performs and works just like a locally attached disk. The difference is that the actual physical disk capacity is drawn from the storage pool automatically over the SAN on an as-needed basis, therefore ensuring optimal disk space utilization. Applications never have to run out of space. Once it is set up, Thin Provisioning is a completely automated process, providing "as needed" capacity without human intervention.

**Thin Provisioning "Virtual Capacity” Increases R.O.I. and Cost Savings**

Divorcing capacity allocation from physical disk constraints returns five important cost-reduction and productivity benefits:

1. Disk utilization is maximized since all free space remains in the global storage pool.
2. Applications only occupy space they are really using. This effectively stretches storage budgets by as much as 50-75%.
3. Critical applications run undisturbed as their capacity requirements climb. Unlike conventional approaches in which adding storage causes application downtime and user interruption.
4. IT personnel no longer spend time responding to disk re-allocation and resizing requests.
5. Capacity planners have a much better understanding of their total disk needs to properly address long-range provisioning.

Said differently, business applications run smoother, more predictably and cost less to operate and maintain after the introduction of “virtual capacity.” Users and administrators gain flexibility and greater purchasing power by:

- Allowing more applications to be quickly deployed while leveraging the existing storage assets
- Eliminating “overbuy” disk capacity expenditures immediately
- Lowering hardware costs due to being able to buy any open market disks (e.g. SATA)
- Enabling greater purchasing power by timing buys of falling drive prices more effectively
- Lowering the maintenance, power, cooling and floor space costs for unnecessary disk drives
- Stopping application shutdowns to allow reconfiguration and rebooting when adding capacity and disks to systems
- Reducing workload impacts on storage, system and DB administrators

Of course, it is virtualization that makes this possible – the ability to affect and allocate resources independently from the physical devices that create them. Thin Provisioning is one way that we are able to deliver very High Utilization and Ease of Administration, two of the key benefits that are leading businesses to virtual
infrastructures. It is estimated that in the average business, storage utilization is less than 30%, and this is now hitting home at the highest levels. Thin Provisioning and storage pooling are proven ways that DataCore storage virtualization can help customers increase utilization to upwards of 90%. The ability to have many different systems use and share pooled storage, and the ease with which additional physical storage can be added without disruption to support applications, makes this practical.

**Go Green with DataCore’s Thin Provisioning “Virtual Capacity” - Cost and energy savings up to 60%!**

Hardware-independent thin provisioning can trim conventional fat storage by 60%, taking a data center from 10TB down to 4TB; DataCore’s software radically reduces storage hardware burden on wallet and planet.

Learn more by downloading the Energy and Storage Cost Backgrounder for Server Virtualization and Thin Provisioning. Put fat storage on a diet – [Cost Backgrounder](#).

Virtual capacity gives users hardware-independence and the ability to pay only for the capacity needed, since storage gets allocated “just-in-time” and as a result there is no waste. To make the benefits of thin provisioning even more accessible to all, DataCore has made a 30-day free trial available for download at [www.datacore.com/download.asp](http://www.datacore.com/download.asp).

**DataCore Thin Provisioning- User and Analyst Feedback:**

“DataCore’s virtual capacity is a major leap forward. You now can defeat the ‘running out of space’ downtime problem and avoid the ‘guesswork’ cost of over buying storage. This innovation truly automates the process of storage provisioning and delivers dramatic improvements in utilization.” – John Padovano, Manager of Technology for EngenderHealth.

"The current manual approaches for provisioning storage often require hours not seconds to create volumes and make them available to an application or an end user. Many of the newer virtualization products on the market require users to lock in to a specific hardware vendor’s 'solution set' and concerns remain over whose hardware can be included in the hardware-based virtualization scheme. DataCore's approach is superior. I am hard pressed to think of any other storage software vendor who offers anything close in terms of giving users so much choice on which vendor’s disks and hardware to use," says Jon William Toigo, renowned storage analyst and author, IT consumer advocate and CEO of Toigo Partners International in Tampa Bay, FL."
DataCore’s “Virtual Capacity” Auto Provisioning Storage

Just-in-time auto provisioning takes the guesswork out of disk allocation. This option presents large virtual volumes to applications but only allocates disk blocks dynamically as the application consumes them. Disk space is served without interruption or downtime to application servers.

The software notifies you as the physical space gets depleted so that you may add more drives early enough to meet future demands.

12 TBs
Logically Assigned

Less than 1 TB
Physically Consumed

“Virtual Capacity” - Thin Provisioning

For more information on the SANsymphony open storage networking platform or SANmelody Storage Server Software, contact DataCore Software Corporation at www.datacore.com or email us at info@datacore.com.

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