



## The Storage Virtualization Diet: Thin Provisioning is “In”

*DataCore hardware-independent thin provisioning puts “fat” storage on a diet – enabling companies to trim conventional storage by 60%.*

*Thin Provisioning provides just enough space, just-in-time and makes “Virtual Capacity” automation a reality. Because thin provisioning enables enterprises to dynamically allocate capacity and fully utilize disk space, it also allows them to defer disk purchases until more capacity is really needed.*

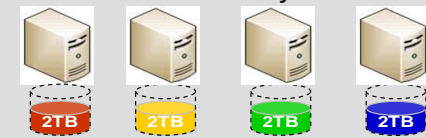
DataCore has developed an innovative technique to efficiently and automatically dole out disk space where needed, when needed, allowing system administrators to maximize disk utilization and recover previously unreachable surplus capacity. This also eliminates the need for IT operations to continually shut down applications to deal with undersized volumes that need to grow. Pioneered by DataCore in 2001, network-based thin provisioning 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. Thin provisioning solutions as offered by other traditional storage array vendors, such as 3PAR and HDS, require the purchase of their proprietary storage hardware that typically cost hundreds of thousands of dollars, making it difficult or impossible for those who are interested in trying out thin provisioning.

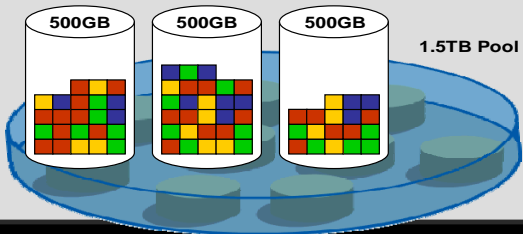
**DataCore First to Offer Downloadable, “Free to Try” Thin Provisioning**  
Test drive a [30-day free trial of Thin Provisioning](#).

### Thin Provisioning - Hands Free Capacity

**Virtual Servers and/or Physical Servers**



**DataCore Virtualization Layer**  
Thin Provisioning - Virtual Capacity




1.5TB Pool

Just-in-time Thin Provisioning takes the guesswork out of disk allocation.

Thin Provisioning presents large virtual volumes to applications however, it only allocates disk blocks dynamically on writes as the application consumes them.

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

Increase storage utilization and storage management productivity.





***Put Fat Storage on a Diet: Hardware-independent thin provisioning can trim conventional fat storage by 60%, reducing one data centers up front needs from 10TB down to 4TB; DataCore's software radically reduces storage hardware burden on wallet and planet.***

*According to Mike Gayle, Director of IT, Calvary Chapel Ft. Lauderdale, "Thin provisioning is a great solution. What made us choose DataCore, besides its low cost of implementation, is that it's portable software that's not dependent on a single vendor's expensive hardware. My investment is protected because DataCore thin provisioning will keep working for me over different generations of platforms for much longer than any hardware-based solution can."*

## **Circumventing Hardware Constraints**

Disks, after all, are inherently handicapped:

- They come in fixed sizes.
- They sit in fixed locations – not necessarily where you want them.
- They have relatively slow access times.
- They occasionally crash.
- There's never enough of them.

Because of these and other constraints, an inordinate amount of time is spent managing disks and interrupting critical applications that depend on them. In turn, storage management costs continue to soar, as does planned downtime. DataCore's SANsymphony™ and SANmelody™ software reverses those costly trends and lowers the Total Cost of Ownership.

## **Divorcing capacity allocation from physical disk constraints using DataCore software 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 50-60% which could more than pay for the introduction of DataCore software.
3. Critical applications run undisturbed as their capacity requirements climb.
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.

Put differently, business applications run smoother, more predictably and cost less to operate and maintain after the introduction of DataCore's unique thin-provisioning technology. Simply put, thin provisioning reduces costs and maximizes productivity.

## **Virtual Capacity Provides Just Enough Space, Just-in-Time**

It is by way of thin provisioning that DataCore provides Virtual Capacity. This powerful capability provided by network storage virtualization software has finally and fully taken shape. Its compelling economic value is derived from the software's ability to compensate for many of the undesirable and costly properties of managing



disk hardware – especially the antiquated and wasteful methods of physically allocating and moving disk space.

End-users have been continually confused by conflicting and misleading claims regarding storage virtualization. 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. Users have high expectations; simply put they don’t want to be burdened by the operational details of disk management. They wish they could automate manual tasks and abstract themselves away from the fixed size constraints of hard drives to cope with the unrelenting growth, complexity and endless change they face daily in IT environments. Users also want the flexibility and freedom of choice to buy latest open market disks to avoid being locked-in to specific storage suppliers. But, with all the hype in the marketplace, users are disappointed to find that vendors are using the term “storage virtualization” to describe everything but what they truly need, that is until now.

DataCore pioneered “true’ storage virtualization, the capability to do what users expect on DataCore’s proven, enterprise-level SANsymphony™ platform installed at thousands of sites worldwide. DataCore’s simple but powerful Virtual Capacity auto-provisioning capability is also available on SANmelody™ disk server platforms. Storage users now have a choice of affordable platforms from which to experience the compelling productivity and cost savings benefits of automated Virtual Capacity.

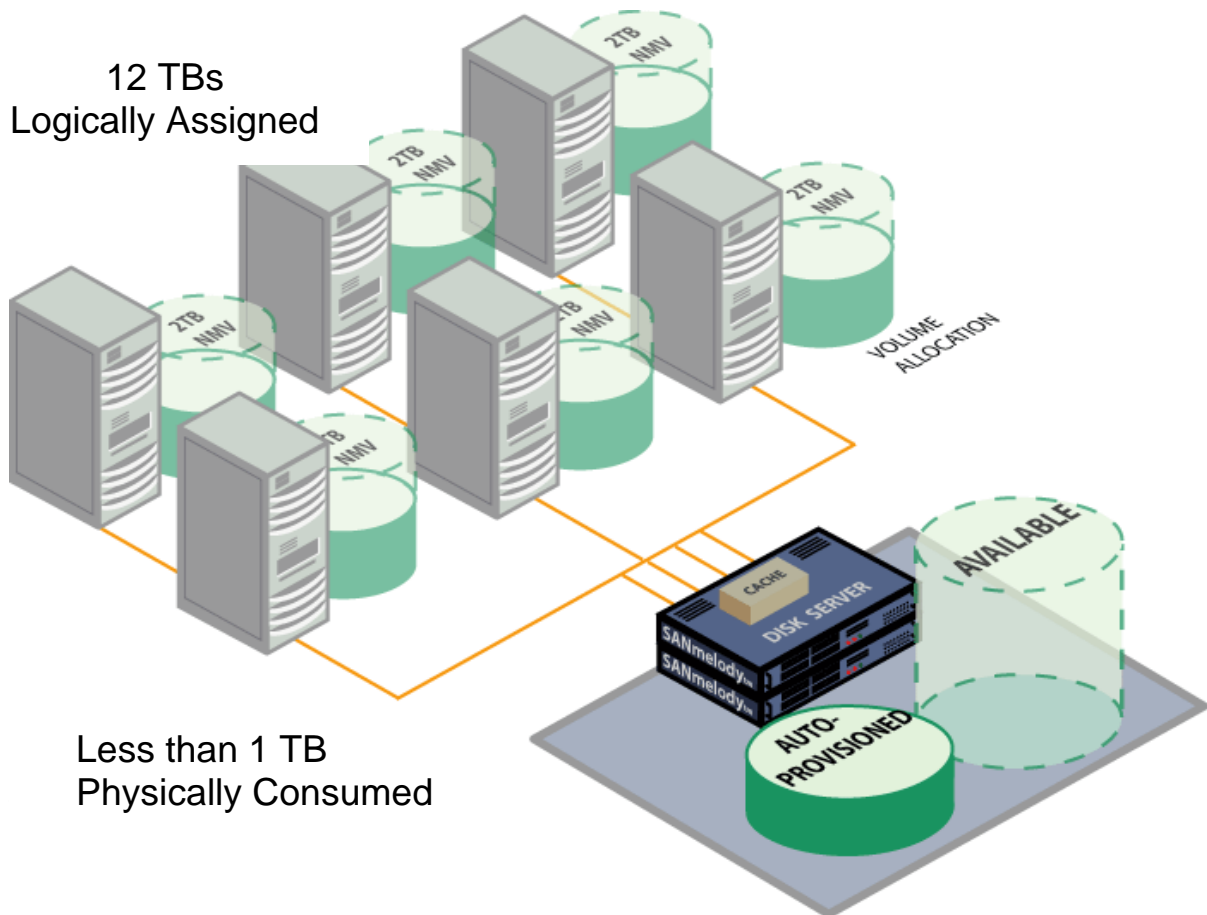
*“The current manual approaches for provisioning storage often require hours not seconds to create volumes and make them available to an application or an end user. Many of the newer virtualization products on the market require users to lock in to a specific hardware vendor’s ‘solution set’ and concerns 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, IT consumer advocate and CEO of Toigo Partners International.”*

### **“True” Storage Virtualization That Performs and Works “Just Like Any Other Locally Attached Disk”**

DataCore’s powerful 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. Thin-provisioned or 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 Auto Provisioning – Dynamic Capacity Allocation

*"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, of EngenderHealth.*



### Defeat the "Running Out of Space" Downtime Problem

Virtual Capacity is a revolutionary, yet sensible, approach to the "never enough disk space" problem. A symptom of that problem is revealed in Gartner studies of conventional fat storage deployments (i.e., without DataCore) where only 30% of physical capacity is fully utilized, leaving a whopping 70% allocated but not being put to good use. Why? Because it's impossible to predict just how much disk capacity an application will consume over its life. When you allocate too much space, you waste expensive resources, and when you underestimate, downtime is required – mostly resizing volumes and reconfiguring applications to take advantage of additional disks. DataCore's answer is simple: don't guess. Let software handle it.



## Virtual Capacity Auto Provisioning – Dynamic Capacity Allocation

DataCore's software dynamically allocates storage space effectively and economically through thin provisioned, Virtual Capacity volumes. 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. The software notifies you as the physical space gets depleted so that you may add more drives early enough to meet future demands. Virtual Capacity does away with labor-intensive and disruptive resizing and repartitioning of disks on each host as well as the wastefulness of over-provisioning. Instead, thin-provisioned, Virtual Capacity provides "just enough space, just in time" to fulfill the demands of applications. Taking a cue from data processing technology, DataCore applied the principle of virtual memory to virtual disks. Logically, Virtual Capacity volumes appear to applications as the largest disks addressable by their operating systems.

In reality, only a fraction of that address space is actually reserved from the physical storage pool. As the application encroaches on the current physical allocation, DataCore software takes additional disk blocks from the Virtual Capacity free space pool. For example, an application might be assigned a 2 Terabyte Virtual Capacity, although the initial physical space reserved may only be 128 MB. As the application starts to fill up the initial 128 MB, the software transparently and automatically allocates additional blocks from the free pool. The original logical unit (LUN) assignment is good for life. Such benefits will especially resonate with system administrators since they never have to think about stretching file systems for these applications again. On the other hand, the applications that turn out to use very little space are not tying up unused capacity.

*"It's become indispensable," said Ryan Engh, IS Infrastructure Manager, Wasatch Advisors. "Before DataCore, we were buying more storage than we actually needed at any time because we had to over-allocate to make sure that the capacity was there when we needed it. Now, with DataCore thin provisioning, we only allocate what we need when we need it, we've dramatically reduced our storage over-capacity, and we have effectively reduced our costs and energy footprint by more than 50%."*

## Lightening the Administrative Load

In the absence of Virtual Capacity, system administrators relying on conventional storage tools use a hit or miss approach to disk allocation. Usually, a disk of a specific size is assigned exclusively to a client regardless of their actual requirements. Many times that capacity goes to waste while other applications quickly exceed their forecasted consumption. In either case, all the physical capacity must be available when the disks are initially allocated – even though they may not need all that storage for months. Managing individual disk sizes to be the exact amount required for the data to be stored is an impractical administrative task made impossible by the lack of certainty in application requirements. With DataCore software, the assignment of disks can be completely divorced from the physical allocation of capacity. And the much finer-grained provisioning strategy inevitably leads to much better resource utilization.



Another obvious benefit thin provisioning delivers is that the Virtual Capacity volumes eliminate the frequent outages and manual intervention that come with poorly apportioned space. Rather than relying on IT staff to keep vigil on each server's disk appetite, as is done with host-based volume management, the software signals capacity planners when the global amount of free space in the Virtual Capacity pool reaches a low-water mark. Such monitoring is done by software across the entire network, replacing futile manual attempts to individually track hundreds or thousands of disks. One can now watch the gradual change in free space and anticipate future needs with greater precision. When physical space nears exhaustion, DataCore's software allows new disks to be introduced into the Virtual Capacity pool without disturbing any of the host assignments or taking down applications.

*"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, CPA firm Wall, Einhorn & Chernitzer, P.C.*

## **DataCore's Automated Virtual Capacity Benefits At-a-Glance**

### ***Optimizes productivity in a single step***

Storage industry experts have documented the 12-step manual process required to do traditional disk provisioning. DataCore enables administrators with a single command to allocate "generously large" amounts of virtual disk capacity to applications upfront, therefore follow-on provisioning tasks and workflow process steps are eliminated - radically reducing pain, complexity and time.

### ***Eliminates forced "out-of-disk space" shutdowns to add disks***

Clients see virtual disks with enormous capacity (e.g., 2 TB), while in the background the software automatically provisions only the minimal amount of physical capacity needed "just in time". Virtual Capacity can easily be sized to fit the application need, which eliminates the need for wasteful over-provisioning. Future capacity expansion needs can be easily met without having to reconfigure application systems or manually intervene.

Since auto-provisioning volumes don't need to be resized, applications are not impacted. Conversely, adding, removing and resizing capacity using traditional methods typically requires taking down systems.

### ***Breaks the link between allocated and purchased capacity***

For a variety of reasons (notably, the need to service application data growth and avoid disruption from disk additions), IT administrators tend to significantly overbuy disk capacity, which sends overall capital and operating costs skyward. As previously noted, as little as 30% of allocated physical capacity is actually ever consumed in user environments. DataCore's Virtual Capacity lets you pay only for the capacity you need and since storage gets allocated "just-in-time", there is no waste.



### ***Increases R.O.I. and cost savings***

DataCore's auto-provisioning software significantly improves savings by:

- Accelerating return on investments since upfront committed costs are kept to a minimum
- 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
- Reducing workload impacts on storage, system and DB administrators

### ***Eliminates or Defers Costs***

To gain a better understanding, let's look at an example of how one might provision storage for a new application. Let's take the case in which a system administrator allocates 1 Terabyte (TB) or roughly a trillion bytes of disk capacity to a particular user's database application. That capacity once committed cannot be used by any other application. As a new application, only some portion, say 100 Gigabytes (GB) is actually being stored; therefore basically one-tenth the total is really used upfront. But because the administrator is anticipating growth, he or she pre-commits and pays for the full 1 TB amount of disk space. Over the life of that application, it may actually only use 500 GB; therefore 500 GB is left unused and wasted. In other words, 50 cents on the dollar was spent and never utilized.

With DataCore, a system administrator allocates 1 TB to a volume, but it is not committed. In other words, the application sees a 1 TB volume but only 100 GB of physical storage is actually being consumed. As more data is stored, it just gets more disk space from the pool of storage as needed. Those embracing Virtual Capacity therefore pay only for what they need and the storage gets allocated "just-in-time" so there is no waste. These users dramatically improve savings by maximizing disk utilization since other applications can use the excess capacity and since they only need to buy disks when they absolutely need to. From a cost savings standpoint, these adopters get the ability to postpone some purchases and leverage falling drive prices far more effectively.

*According to Alberto Natal Cruz, PACS System Administrator, Hunterdon Medical Center, "We truly love the fact that DataCore frees us to use whatever hardware WE deem worthy or necessary. We get to decide what is best for us, not some other vendor. I would encourage anyone who is looking at any sort of storage solution to try DataCore for 30 days; it's free and if you don't think it is a fit for you, you can move on. How many storage virtualization vendors out there are willing to let you do that?"*



## Compelling Economic Value and “Green Technology”

For more information, please visit: [Energy and Storage Cost Backgrounder](#)

DataCore makes the benefits of thin provisioning practical and affordable, allowing data centers, as well as small and mid size companies, to virtualize, consolidate and automate the provisioning and management of their storage. In addition, this versatile, hardware-independent, storage virtualization software radically reduces the storage hardware burden on both your wallet and our planet. How so? Thin provisioning is “green” technology that promotes energy efficiency and saves money. Cost savings and user benefits of DataCore thin provisioning include:

- Lowers energy costs and “carbon footprint”: Highly efficient utilization reduces space, power and cooling costs because fewer physical disks and arrays are required.
- Reduces total cost of ownership (TCO) by providing up to 50-percent improvements in capacity utilization, thereby reducing the total amount of storage that must be purchased.
- Better consolidation and efficient load balancing for all storage; capacity usage is optimized and balanced across many application servers.
- Lessens time and resources required to perform storage provisioning tasks. Automates and simplifies by eliminating unnecessary provisioning steps.
- Instantaneous provisioning of storage capacity, significantly reduces disk administration burden and time management
- Eliminates application service disruption by transparently provisioning physical storage capacity
- Smarter purchasing: Facilitates just-in-time storage purchasing by enabling capacity planning across all applications — not just one

### DataCore First to Offer Downloadable, “Free to Try” Thin Provisioning

DataCore Software has made thin provisioning easily available by download to anyone who wants to try it. Thin provisioning is revolutionizing storage management and energy savings in data centers around the world, but most potential users have limited access to the technology because vendors restrict their thin provisioning solutions to work only with their own higher priced storage arrays and disks.

### DataCore First to Offer Downloadable, “Free to Try” Thin Provisioning

Test drive a [30-day free trial of Thin Provisioning](#).

Pricing for DataCore™ thin provisioning software solutions starts at \$1,000. Please visit: [DataCore Virtualization and Thin Provisioning Solutions](#)

For more information visit: [www.datacore.com](http://www.datacore.com) or email us at [info@datacore.com](mailto:info@datacore.com).