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Virtual Servers and Virtual Storage Make Sense!

By George Teixeira, DataCore Software Corporation

First off, virtualization is nothing new to the industry, so it is nothing to be feared. Unless of course, you were scared by IBM's VM/ESA, VSAM, Digital's VMS or Virtual Memory which just about every operating system supports.

The term is used in virtually (pardon the pun) all aspects of technology today. From storage, servers, web services to networks, virtualization is employed and takes on different meanings.

As companies cope with right-sizing their open systems infrastructure through a variety of approaches including consolidation, new server or storage deployments, and cost-cutting efforts or growth, newer technologies make these tasks more manageable. In the mainframe arena, virtual memory, virtual storage, virtual tape and virtual systems, known to most as Logical Partitions (LPAR), stand as the norm. These technologies exemplify the breadth of the larger opportunity and the rationale for virtualization advances to flourish in the open systems world.

What is the driving force to go Virtual?

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 less than 10 percent. In storage, as little as 25% of allocated physical disk space in Microsoft and PC 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 (servers and storage) when and where they are needed.

Virtual Servers and Virtual Storage = Flexibility and Cost Savings

Thus it makes sense that a key driver for storage virtualization has been the increase in server virtualization products like VMware and Microsoft Virtual PC. These products drive the need for 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 – the storage can then be served up to one server, or many servers, or a farm of servers. 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 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 "Virtual Capacity" and "VMotion technology" since they are significant advances that are further simplifying administrative workloads, reducing response times, and lowering costs.

Storage Virtualization

In its purest form, storage virtualization allows users to add storage capacity. Using inexpensive, commodity disks, users can dynamically manage storage resources as virtual storage pools with little regard for what physically resides on the back end.

Furthermore, the technologies increase performance and availability, providing a means to replicate and therefore protect data either over fibre channel or by using existing TCP/IP infrastructures.

Products such as DataCore SANsymphony™/SANmelody™ and IBM TotalStorage SAN Volume Controller enable customers to better utilize their storage. 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 ESS (Shark) with either of the vendors' embedded array management software.

"Virtual Capacity" Storage Breakthrough Lowers Cost and 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.

DataCore recently announced an automated capability known as "virtual capacity," which exemplifies a new way to dramatically lower 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" 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

Virtual Capacity gives users hardware independence and the ability to pay only for the capacity needed since storage gets allocated "just-in-time," therefore there is no waste. White papers and additional literature on Virtual Capacity are available at: www.datacore.com.

Many of the same benefits and concepts discussed above equally apply to server virtualization.

Server Virtualization

The Intel space now includes the same capabilities as mainframes or high-end UNIX systems ... the ability to run multiple copies of an operating system on a single processor or set of processors. Processor utilization in the Intel space averages less than 10 percent. Although processing power continues to double each year, operating systems and applications fail to take advantage of the CPU power available.

It comes down to being able to fully use the processing power available. By using server virtualization technologies from VMware or Microsoft, a user can install, on a single server, multiple copies of Microsoft Windows products, Linux, or Novell 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?

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...

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

New virtualization advances such as VMware's VMotion 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.

A white paper and further information on VMotion and migration are available at: http://www.vmware.com/pdf/vi_wp.pdf.

A Complete Virtual Infrastructure – Servers plus Storage

DataCore's Virtual Capacity covered earlier enables virtual servers to go well beyond single machine limitations and expands the advantages and cost savings that virtual infrastructures and storage networking provide.

"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 (servers and storage) when and where they are needed."

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

- Integration with partners and customers is easier
- Expansion or M&A activities can happen faster
- Resources can be deployed or moved quickly to the business units that need them

Deliver IT that's more flexible and consistent

- Leverages technologies you are already investing in: SAN, Servers
- Gives you lower-cost disk and platform options
- It lowers risk and increases responsiveness

Virtual Servers and Virtual Storage Make Sense!

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.

- 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 disruptions for upgrades and hardware maintenance

So what is virtualization, really?

It is the smart, cost effective use of technology that lends itself well to today's challenging business climate.



About DataCore Software

DataCore Software fundamentally changes the economics of managing storage with innovative software that combines advanced functions and services with the agility and savings of hardware independence. The company's award-winning SANsymphony and new low-cost SANmelody disk server software products provide unprecedented purchasing flexibility and future-proofing by empowering customers to fulfill portability and price/performance requirements across a broad choice of systems and devices. Small to Medium Enterprises, Global 2000 data centers and OEM storage subsystems rely on this comprehensive product portfolio to deploy disk servers, to easily add capacity expansion and to centralize and automate storage management for Windows, UNIX, Linux, MacOS and NetWare systems. DataCore is privately held with corporate headquarters in Ft. Lauderdale, Florida. For more information, visit www.datacore.com.

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"Virtual Capacity" - 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."

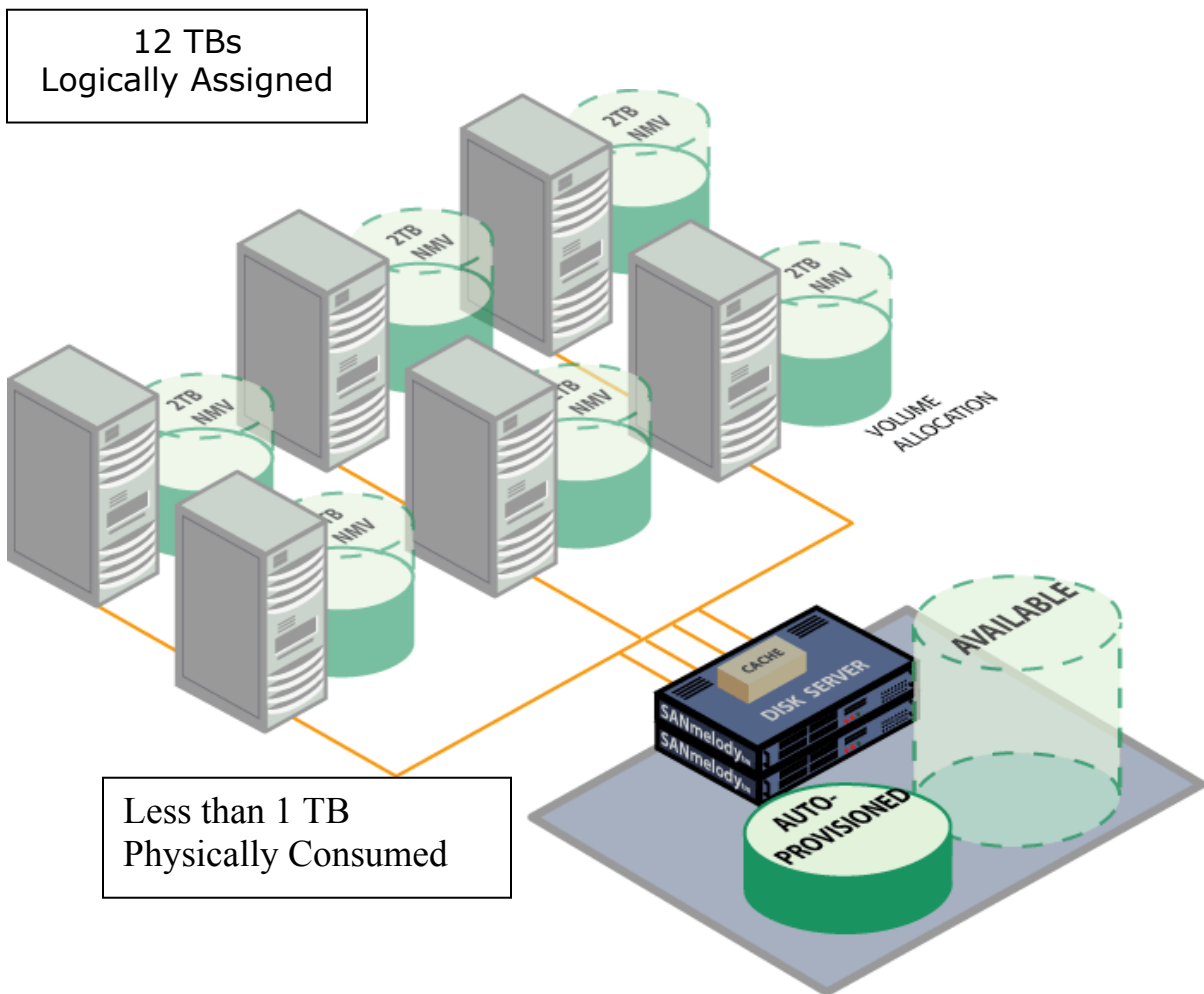
"We are now enjoying much greater flexibility in the administration of our storage capacity and we are realizing significantly better utilization with DataCore 'virtual capacity' auto-provisioning the disk space from our Hitachi disk arrays. According to our tests, we now serve our SAP R/3 users at a speed five percent better than the legacy systems and availability and utilization have increased drastically," states Uwe Siller, the IT Department Manager at Bitburger Group, one of Germany's largest Beer brewers.

"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.

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.



"Virtual Capacity" - Auto Provisioning



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