Should You Reconsider Your Approach to Storage?

"No one would ever dream of throwing away Exchange because the server became obsolete. So why do it with Storage?"

Sometimes it takes a direct challenge to shake IT people out of "We've always done it that way" zone of comfort and into rethinking their approach to storage. **Can rethinking your approach to storage make your business more efficient and your infrastructure investments last longer?**

In the following fictionalized account, it took a push from the CIO in the direction of virtualization to help this company answer this question affirmatively.

To: Ian, CIO
Cc: Allison, Director of IT Network Operations
From: Matt, Director of IT Storage Operations
Date: January 15, 2008

Re: Follow ups from last month's meeting topic, "Should we do more with virtualization and modernize more of our infrastructure?"

Background: When we met last month, you asked me to figure out if we can bring to our storage infrastructure the same kind of benefits we are getting from VMware in regard to our servers and desktops. Although at first I was skeptical about the wisdom and feasibility of doing so, I did take a fresh look at storage virtualization and found that a lot has changed – the solutions are mature, the cost is affordable, and some of our competitors have already shifted to joining virtual storage infrastructures with virtual server infrastructures. It has changed my thinking and I want to bring you up to date on my findings.

We discussed that over the past year we've shifted fulfillment of our growing server requirements from frequently purchasing new physical servers to using virtualization software (VMware) to address these requirements by creating many virtual servers out of a much smaller number of physical servers. By using server virtualization to consolidate our servers, we now only purchase new physical servers when the existing ones are fully utilized.

Aside from the obvious cost savings from consolidating and optimizing the utilization of our server investments, the software-based virtualization layer gives us tremendous flexibility and control in our infrastructure. Administration is easier, more powerful, and less costly. We can quickly and non-disruptively provision a virtual server to meet a need, as well as add or change out physical servers when we choose to do so. As you pointed out, since the "value is baked into software," and the software can be implemented and re-implemented on any standard server, our virtualization investment isn't locked up in a hardware appliance that will fail or become obsolete in a few years. The question was raised,
"**Can we get similar benefits for our storage infrastructure through virtualization?"**

In a follow up email you added, "When I go into the data center, on one side, I see the industrial age – single purpose, dedicated, proprietary, big storage hardware boxes; expensive, specialized machines moving steadily toward obsolescence. On the other side, I see the modern age – racks

of uniform, commodity servers running portable software that gives each the "personality" required to deliver a specific IT service, (e.g. Exchange server, Oracle server, VMware server, Citrix server, etc.). When servers get old, we replace them inexpensively, but the software remains. I don't have to repurchase the 'brains' when I replace the 'body.' **I don't understand why we still treat storage differently.**
When will we be able to apply this more modern model to our storage?"

Conclusion: Having researched this over the past month, we think that DataCore storage virtualization software will do for our storage what VMware has done for our servers. It is portable software that runs on a standard server that can even be a virtual machine, and is a virtualization layer for our storage infrastructure. It will pool storage (of all kinds) into a storage area network (SAN), let us slice up and serve that storage to our servers as we like, automate capacity allocation and management and other administrative tasks for maximum utilization and efficiency, and protect our data. It is also a relatively low cost solution, especially when compared to our current "hardware-centric" storage model.

Discussion: As you know, I was skeptical about moving in the direction to which the two questions lead. I also had other concerns, such as: Would we see a loss of performance by adding a software layer? What about our existing storage investments, would they have to be replaced? What is the impact of virtualization in terms of data protection and high-availability?

For many years we've addressed each storage need, such as additional capacity, disaster recovery, etc., by buying new storage hardware from major vendors. It is a model to which we've grown accustomed. However, our growth has made this model very expensive (more so because our storage utilization remains at about 30% of capacity), complex to administer (because of the number of devices and because of the different brands of hardware we have taken in through our business acquisitions), and disruptive (production downtime is required for maintenance, capacity expansion, backup, etc.).

Now that virtual infrastructures have come of age, there is a newer model that looks to "hardware independent" software (i.e. software that runs on a standard server), rather than an appliance, to create the solution. Storage hardware is then chosen (based on price/physical storage characteristics) to support that solution. We recognize the way the winds are blowing and that we must graduate to this more modern, cost-efficient model to remain competitive.

We think that we have found in DataCore Software an enterprise-proven, storage virtualization software vendor that can take us there confidently. With DataCore, we can comfortably transition to a more effective and cost-efficient storage model in which we get full utilization and control of our storage infrastructure and make future storage hardware purchases based on the physical storage characteristics we desire and on the cost of obtaining them. We can use all our existing storage, regardless of vendor, and DataCore will improve the performance of that storage and any future storage hardware we purchase. This is important, because it is likely that for a while we will continue to buy storage hardware from the major vendors, like IBM, EMC or HP, when the need arises. However, we'll be able to buy their lower cost models because, when used in conjunction with DataCore, they'll perform like their higher priced models. As a result, even before we move completely to a software primary/hardware secondary model, we'll be able to save money on our storage hardware costs.

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As part of our inquiry, we met with the IT consulting team at the system integration firm we used for our VMware implementation. After completing an initial assessment of available options, we completed a free, on-site evaluation of DataCore storage virtualization software working in conjunction with our VMware virtual infrastructure. From this evaluation, we have concluded that:

- By implementing DataCore we will achieve for our storage all the benefits that we are getting from VMware with respect to our servers.
- In addition, DataCore will provide the data protection and failover that are critical (and thus vendor-recommended) to our VMware. DataCore adds another level of failover protection and it automates the process so that applications are not impacted by storage device failures or changes in the underlying hardware levels.
- Better performance is an unexpected bonus. While you might think that a software layer between physical storage and servers might slow things down, just the opposite is true. With DataCore, we will see major performance gains on our storage intensive workloads (perhaps double current performance). DataCore software runs on the latest server class devices and it takes advantage of the server's memory to cache the traffic that goes back and forth to disk drives. The intelligent software harnesses the CPUs and memory of the servers to boost performance and optimize the traffic to respond to disk requests from cache at memory speeds versus having to always go to the disks, which are slower since they are mechanical devices.
- "Total Enterprise Virtualization" is an objective that we should consider. Total Enterprise Virtualization is the extension of a virtual infrastructure across an enterprise, from desktop to server to storage. Virtualization benefits stop where physical infrastructures take over. The dependence of desktops and servers on storage means that the benefits of virtualizing these infrastructures (flexibility, utilization, control, the ability to make changes non-disruptively) are attenuated by the limitations of physical storage. Consequently, DataCore will help us get the most out of our current and future investments in server and desktop virtualization by extending our virtual infrastructure all the way through to our storage.

The following matrix was provided to me by DataCore. It shows the benefits of virtualization and how Citrix, VMware and DataCore achieve them for desktops, servers and storage, respectively. It also shows how DataCore storage virtualization complements server and desktop virtualization.

If you are in agreement that we should proceed, I'd like to review budget with you next week, and then begin the process with the objective of completing the implementation within 90 days of your giving the go-ahead. Fortunately, DataCore makes it easy to get started: See [Trial Software Download and Solutions Overview]. I've confirmed with our system integrator that this timeframe is practical. Thoughts?

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DataCore: The Storage Foundation for Total Enterprise Virtualization

DataCore SOFTWARE

Total Enterprise Virtualization	Virtual Desktops **Citrix/VMware…**	Virtual Servers **Citrix/ VMware/Microsoft…**	Virtual Storage **DataCore**	**DataCore Adds Compelling Value to Virtual Servers & Desktops**
Solutions& Benefits	**Applications**	**Systems (VMs)**	**Data Storage Services**	***DataCore The Virtual Storage Foundation***
Business Continuity & Disaster Recovery				**Affordable Data Protection**
Keep Business Running Non-Stop	**"All the eggs (apps) in 1 basket"**	**"All the eggs (VMs) in 1 basket"**	**High-Availability Virtual SAN**	**Fundamental Advantage - Data Protection & Uptime**
Greater Peace of Mind	**Requires high-availability shared**	**Requires high-availability shared**	**Auto-Failover & Auto-Recovery**	**Affordable, Automatic and Transparent to Apps**
Failure and disaster recovery	**storage protection & App failover**	**storage protection & Vmotion**	**Transparent to Apps & VMs**	**Enterprise Class Availability, CDP and DR**
			Mirrors, Snapshots, D2D Backups	**Full Feature Set of Data Protection**
			Virtual vs Fixed Storage Mappings	**Protects constantly changing virtual machines**
Provisioning & Migration				**Agile Virtual Storage vs Fixed & Hardware Dependent**
Flexibility	Provision Access/Desktops	Provision Machines	**Provision Storage**	**Point and Click Storage Allocation**
Automation	Access policies	Processing resources	**Automate Capacity Provisioning**	**Eliminate steps & 'out of disk space' stoppages**
Ease of Migration	Change Access	Vmotion, Xenmotion VM migration	**SANmotion Storage Migration**	**Serve up ready to go disks, "Hot Swap" pools, etc…**
Hardware Independence	Swap/Redeploy server platforms	Swap/Redeploy server platforms	**Swap/Redeploy servers & disks**	**Software Portability for New Technology Infusion**
	But, Disks fixed & dedicated/App	But, Disks fixed & dedicated per VM	**Storage virtual & shared as needed**	**Virtual Shared Storage Agility vs Fixed & Dedicated**
Consolidation				**Standard Server + DataCore "Software Personality"**
Optimize Resources and Staff	Manage a Delivery System	Manage a Server System	**Manage a Storage Server**	**Resource Pooling, Automated Provisioning**
Increase Operational Efficiency	vs 100s or 1000s (Apps)	vs 100s or 1000s (Machines)	**vs 100s or 1000s (Disks)**	**Storage servers are same class used for VMware/Citrix**
Reduce Sprawl and Variations				**Common Staff, Common to Maintain/Update/Upgrade**
				Optimal Storage Consolidation & Mgmt Approach
Utilization				**Full Utilization - No Waste**
Stop Wasting Money	**From: 10% Use - 90% Waste**	**From: 10% Use - 90% Waste**	**From: 25% Use - 90% Waste**	**Serve storage to Windows/Macs/Linux/Netware/UNIX…**
Maximize ROI	**To: 90% Utilization - Apps**	**To: 90% Utilization - CPU**	**To: 90% Utilization - Capacity**	**'Just in Time' provisioning over iSCSI LAN or Fiber SAN**
Reduce Costs				**Buy/Add storage only when you need it**
Central Admin/Upgrades/Updates				**Infrastructure Simplification**
Enhance Productivity	**Leverages Staff/Skills/Process**	**Leverages Staff/Skills/Process**	**Leverages Staff/Skills/Process**	**Same tools and process use on different vendor arrays**
Efficiency & Simplification	**Do once vs many times**	**Do once vs many times**	**Do once vs many times**	**Automation, Group Operations, Wizards**
Reduce Complexity	**Mange 1 App**	**Manage 1 System**	**Manage 1 Storage Pool**	**Comprehensive Storage Management & Network Agnostic**
Performance				**Faster Data Access & Higher Productivity**
Time Savings & Productivity	Access time & app performance	Machine performance	**Accelerate R/W performance -2-4X!**	**Get more work done in the same given time**
User Satisfaction	QoS/SLAs and Access to Apps	QoS/SLAs and Access to VMs	**QoS/SLAs and Access to Storage**	**Sophisticated Caching technology and Performance Tools**
Future Proofing	Ease of Tech Infusion	Ease of Tech Infusion	**Ease of Tech Infusion**	**Future Proofing - Easily Advance & Upgrade Platforms**
Speed ups & Uniformity	Bandwidth optimizations	Computing distribution	**Caching across Storage Pool**	**Accelerate storage intensive application**
Control, Security, Protection				**Consolidated Management & Control**
Greater Control & Management	Manage Apps in one place vs many	Manage VMs in one place vs many	**Manage storage in one place vs many**	**Centralized Storage Management & Administration**
Greater Peace of Mind	Simpler to secure/control/protect	Simpler to secure/control/protect	**Simpler to secure/control/protect**	**Centralized Control reduces complexity and # of tasks**
Agility & Rapid Response				**Hardware Independent Flexibility**
Fast Response to Change	Deploy Apps/Desktops rapidly	Deploy Machines rapidly	**Deploy Storage rapidly**	**Not Hardware Dependent - Point and Click to Allocate**
Software Portability	Add/swap apps or servers easily	Add/swap VMs or servers easily	**Add/swap disks or servers easily**	**Easy to scale, simple to migrate to new platforms**