Introduction
Server virtualization delivers IT benefits that are every CIO’s dream: greatly simplified management, better business responsiveness, higher application availability, reduced hardware and software costs, lower power consumption, and a cooler data center.

Is this technology too good to be true? Some say there is a downside: an acceleration in data growth and thus storage costs. Deploying a new server is now “free,” removing one of the factors providing at least a little drag to rampant application growth rates. Without the server deployment speed bump, data and the storage needed to keep it can grow even faster. Without adjustment for this new reality, storage infrastructures and their associated costs can become a problem.

The good news: storage architectures can be configured to support a virtualized server environment without breaking the IT budget. Risky investments in unproven technologies are not required. Thoughtful application of the storage tools available within today’s leading storage systems is enough to deliver scalable and efficient virtual server storage. Best-in-class storage deployment can result in lower storage costs than the pre-virtual data center environment, despite virtualization-driven data growth.

How to Make Storage Work for Virtual Servers
Rule 1: Get out of the way.
Before virtualization, storage was not the primary bottleneck for business applications. Storage allocation efficiency matched or exceeded server deployment efficiency.

Virtualization has moved servers out of the critical path for application deployment. Successful storage for a virtualized environment must at all costs keep up with server deployment.
One successful strategy to achieve this is virtualizing storage for virtualized servers. Pool physical storage resources and allocate them virtually as needed as virtual servers are deployed.

There are many ways to pool storage. Whatever vendor or technology is being evaluated, the following capabilities for your server virtualization-friendly storage should be considered:

- **Centrally managed storage allocation** so storage can be deployed—at a minimum—at the same aggregation level that servers are deployed
- **Extreme scalability**, including expansion slots, support for 1-TB+ SAS and/or SATA drives, and the ability to upgrade drives over time for higher capacity
- **Thin client support**. The ability to over-provision virtual resources to improve storage utilization efficiency

**Rule 2: Lower cost per utilized gigabyte**

With the right virtual storage in place, virtual server deployment becomes even easier. Data and storage can and will grow at an even faster rate.

Without dramatic reductions in storage cost per gigabyte, the costs of storage growth will diminish or even cancel out virtualization productivity gains. Moreover, there is a near-direct relationship between storage cost per gigabyte and storage power consumption. Higher power consumption in many cases is an even bigger issue than increased storage acquisition costs.

There are two “levers” that can be used to reduce storage cost per gigabyte (and storage power consumption):

- Increase capacity utilization
- Rebalance the storage media mix

The pooling effect of virtualizing storage naturally increases storage capacity utilization: bigger pools mean better-managed allocation, resulting in less unused space.

Better utilization will help, but even the best management systems will rarely increase utilization by more than 50 percent. This will not be enough by itself to counteract the incremental growth that comes with server virtualization.

Additional productivity can be gained by changing the storage media mix. The key is to provide the storage performance required for each new application, but no more.

For example, high-capacity enterprise hard drives are available in 3.5-inch and 2.5-inch form factors that dramatically reduce cost per gigabyte and watts per gigabyte at the cost of some performance. But many applications don’t require higher-performance storage.

- **High-capacity 3.5-inch enterprise SAS and SATA drives** can reduce cost per gigabyte by a magnitude for some applications. The efficient design of 7200-RPM drives dramatically reduces per-drive costs, and capacity per drive is two to three times higher than high-performance 10K-RPM and 15K-RPM enterprise drives.

- **High-capacity 2.5-inch enterprise drives** are now readily available. For example, the Seagate® Constellation™ drive delivers up to 50 0GB, SAS and SATA interfaces, and an enterprise design that is from the ground up distinctly superior to notebook hard drives. Today’s 2.5-inch drives lag their larger cousins in capacity, but they can reduce drive power consumption by up to 70 percent compared to 3.5-inch drives.

Today’s best-in-class 2.5-inch- and 3.5-inch-based storage systems offer tiered storage options. Tiered storage makes it possible to blend high-performance 10K-RPM and 15K-RPM hard drives with high-capacity 7200-RPM enterprise drives. Several systems available from vendors today will auto-migrate data between tiers over time in response to data activity level.
Rule 3: Holistic backup and recovery

Storage for virtual servers also requires a new perspective on data protection. This new storage infrastructure is now a critical, interdependent part of a virtual server farm. It is important to think of it this way when establishing backup and recovery processes.

It’s best not to assume that conventional processes will work in this new environment. Push on everything, and test it mercilessly.

Things to design in and test for in a virtual server/storage environment:
• Server-level recovery
• Point-in-time recovery
• Recovery point granularity
• Remote recovery
• Multi-path failure recovery

Mistakes to Avoid In Deploying Storage for Virtual Servers

It’s easy to forget that some conventional storage thinking goes out the window when virtual storage and virtual servers enter the equation. Here are a few common mistakes to avoid:
• Migrating legacy storage architectures (and cost structures) to a new virtual environment
• Underestimating data growth, or trying to throttle it too severely with policy
• Over-provisioning performance. Don’t bring a gun to a knife fight—it costs too much!
• Rigid storage architectures that limit the inherent benefits of virtual server deployment
• Relying on piecemeal recovery capabilities

Conclusion

Server virtualization is one of the most productive data center innovations of the decade. Getting the most from this powerful technology depends on thoughtful storage deployment.

Rather than fighting against the inevitable data growth that server virtualization creates, apply readily available storage technology to embrace it. With a solution optimized for the virtual server environment, storage can become a cost-neutral, complementary asset.

With the right storage choices, IT managers can look at virtual server data growth and say “Bring it on!”