STORAGE SWITZERLAND

HOW TO BUILD AN ACCURATE STORAGE BUDGET
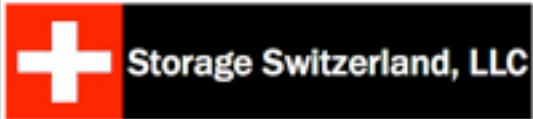
Storage Switzerland, LLC

George Crump, Senior Analyst

With the start of another year, IT professionals start to turn their attention toward building a budget for their data centers. One of the more challenging line items in that budget is for the storage infrastructure that supports most of the data center operations. Storage, as everyone knows, is growing at unprecedented rates. In addition, budget year has its own set of unique challenges; the potential for a shortage of hard disk drives, the rise of solid-state storage and the continued rollout of both server and desktop virtualization.

Building an accurate storage budget in is more challenging than ever, but if mastered, has the potential to bring the greatest benefit to the applications in the data center. As IT administrators look out into this sea of disk capacity, the storage manager's single biggest question is: "What's the best way to get started?" The first step is to know what you have and that requires capturing or inventorying the environment.

How to capture the storage analysis

There are three options when trying to capture the information needed to begin to form a budget for storage. The first is a manual process using spreadsheets. With this process, administrators manually access each system and faithfully record information like total capacity and space

available. The problem with this approach is that in the modern data center, there are simply too many variables to properly capture all the required information across all the servers and storage.

Another option is to use the built-in utilities that come with some of the components in the storage environment. These include software that manages the switch, the storage or potentially manages the server. While often inexpensive, these separate components are not integrated and can't provide a single view the environment. They also almost always show a total lack of understanding of the *virtual* environment which is of course a growing element in most data centers.

That means that these tools need to be manually consolidated and where there are gaps, data still needs to be manually captured. Once again, this takes time and has the potential for errors.

The third option is to use software like Storage Manager available from SolarWinds. These third-party, independent software tools provide a heterogeneous view of multiple vendors' storage systems. They also provide an end-to-end view of the storage environment, even in a virtualized infrastructure. As virtualization's adoption rate continues to rise, this end-to-end view becomes critical.

Software tools like Storage Manager also have the ability to provide real-time monitoring of the environment. As a result, when a storage plan and its associated budget are created, it is reflecting accurate and recent information which should allow for better decision making.

Step one: understand what you have

Once armed with a software application that can provide an end-to-end analysis of the environment, the first step in developing a storage plan and budget is to understand what's currently installed in the environment. This includes relatively basic information like current capacity, current usage and current growth but should also include calculating performance utilization statistics like disk queuing and latency.

Step two: before you budget, reclaim

One of the key values of a tool like SolarWinds Storage Manager is that prior to doing any planning or budgeting, Storage Manager can identify and reclaim storage capacity and performance that's being wasted. Many of these opportunities for reclamation require no change to applications or user profiles.

For example, tools like this can identify LUNs that have been created on the storage system but were never assigned to the server. They show up as used volumes but typically have no data at all on them. Simply returning them to the global pool immediately increases the amount of available disk capacity. In the same manner, orphaned LUNs can be identified. These are LUNs that are assigned to a server but not used, typically not even formatted. Once again they can be returned to the global storage pool. In both cases, the amount of available total storage system capacity is increased without making any changes to the attached servers and their applications.

Another savings opportunity comes from identifying the old data that can be potentially moved off primary storage onto secondary storage or tape. While this does potentially mean a change to application or user access, the cost savings can be significant. Depending on the realities of the upcoming budget, those changes may be well worth the effort.

The virtual environment has also created an opportunity for capacity waste. This includes orphaned VMDKs that were created for virtual machines (VMs) that are no longer in use. While an unused physical server is typically pretty rare in a data center, the virtual nature of VMs make the occurrence of inactive VMDKs much more common.

Another side product of the virtual environment that creates storage waste are VMs that have been provisioned from a template and have had a large default capacity assigned to them. In these cases, terabytes of disk capacity can be wasted. A storage management tool can identify these cases so that the storage manager can return the wasted space to the global storage pool.

Performance reclamation issues

With the rise of solid-state disk storage, there may also be the opportunity to reclaim disk space by converting to solid-state disk systems. Here, look for LUNS that have been designed with dozens of hard disk drives (HDDs) to help solve a performance issue. Again, these LUNS can have terabytes of available disk space. These configurations not only waste capacity but they also waste data center floor space and power. A single solid-state storage device can often replace dozens of hard drives offering better performance at the correct capacity, while saving floor space and power. One again, a storage management tool can identify applications with the large I/O queue depths that are ideal use cases for solid-state storage devices.

Another performance reclamation area may be in the switch infrastructure. Storage management software that has an end-to-end view of the environment can identify switch ports that are being overused, impacting overall switch performance. With this type of software, these connections can be rebalanced to other switches, which improves storage infrastructure performance and potentially eliminates the need for expensive bandwidth upgrades or additional switches.

Purchasing storage

Once the environment has been identified, inventoried and any reclamation potential has been captured, an accurate representation of what is truly in the environment can be developed. The next step is to trend the growth rate of the existing storage and existing applications to see how much, if any, additional capacity is needed, both in terms of storage and performance. Storage Management software like SolarWinds Storage Manager can accurately plot capacity utilization over time and then forecast that into the future.

After that, there must be a business examination conducted to understand any internal or external changes that will substantially alter the growth curve. Internal changes are typically new initiatives or expansion of existing initiatives that will increase capacity and performance demands. Examples might be increased rollout of server virtualization, movement of desktop virtualization from test to production and a rollout of exchange 2010.

External business issues are typically represented in the form of mergers and acquisitions. While sometimes these are hard to predict, in many cases they are the integration work from the previous year's business decisions. As a result, it is something that's known and can be planned for.

Mergers can often result in a further mixing of vendors and a consolidation of the environments so that storage

investments can be maximized. In this case, storage assets from the other organization need to go through the above analysis prior to being integrated into a combined data center.

With an understanding of organic storage capacity and performance growth, as well as growth caused by new projects or external sources, a reasonable prediction of additional storage capacity and performance can be projected. The final decision is whether to purchase a new system, add to the existing system or augment the existing infrastructure with storage system 'point purchases'.

System decisions

When developing a new storage system, the budget status of the current system of course has to be factored in. For example, if the current system is coming off of lease or has been fully depreciated then it may be time for a storage system refresh. This is especially true if the cost to keep the system under maintenance is prohibitive compared to the cost of a new system with a warranty.

If either of these scenarios is the case, the storage team has to be careful not to use the *current system's* capacity as a starting point. Instead they should look at the data collected through the above discovery process and at the storage efficiency features that the storage system may offer (thin provisioning cloning etc.) to develop a required capacity for the *new system*. Another factor is the ease of expansion of the new storage system. For example, if storage can be added relatively quickly with little disruption it may be worth it to run the system at a higher utilization level than was the norm for the past.

The new technology available in modern storage systems combined with the reclamation steps above may, in many cases, lead to storage system purchases that have less overall capacity than the current one. This of course also means better data center floor space utilization and increased power efficiency.

The other consideration is an existing storage system that has not been fully depreciated and needs to be expanded. Again, armed with the trending data of growth as well as the added business processes, an accurate projection of additional capacity and performance can be made. However, in the modern data center it may not make sense to expand the "old war horse" - instead it may make more sense to add a project-specific storage system alongside the existing system.

For example, a VMware environment, where a percentage of the VMs are having performance issues, may be better served by buying a solid-state storage appliance and migrating just those VMs to it. Conversely, older data could be migrated to a high-capacity storage system allowing the current storage system to focus on more performance-sensitive operations. In either case, a storage management software application like those available from SolarWinds make it easier to manage and monitor this mixed environment.

Summary

Building an accurate storage budget and plan requires first understanding the state of the storage environment as it stands today. Next, the reclamation of both wasted capacity and performance will produce an accurate picture of the storage asset base. Both internal and external business initiatives that will distort the storage growth curve should be factored in so that managers get an accurate understanding of how much additional storage, if any, will be required. Finally, don't be locked into assuming that additional capacity performance must come from the current system but instead evaluate systems that can augment the current system.

The key though to making this informed decision and charting the right course for the storage infrastructure is an independent storage software management application that can provide real time management and monitoring of a mixed environment. This allows you to make the right decisions, at the right time at a price you can afford.