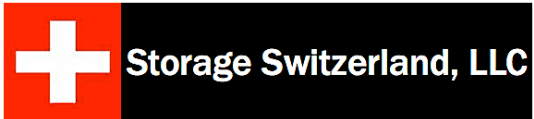


STORAGE SWITZERLAND

SERVER VIRTUALIZATION MONITORING REQUIRES OBJECTIVE STORAGE VISIBILITY



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Server virtualization has caused dramatic changes to the data center's storage infrastructure. In many cases, it has driven the first purchase and implementation of a shared storage system. In others, it has created a situation where performance or capacity of their shared storage is a problem, again, for the first time. To address these issues, data centers of all sizes should look for a storage monitoring and management tool that goes beyond the capabilities of the vendor software, especially if the data center is moving toward a virtualized server environment.

Storage management has become more challenging in recent years because of two factors. First, server virtualization abstracts the storage allocation and usage from the user and makes it easier to consume storage quickly. Second, users are no longer loyal to a single storage vendor, picking the storage system that best suits each need. Each purchase of additional capacity or different device increases the complexity of the environment and the effort to manage it effectively.

In response to these challenges almost every storage vendor now offers some form of storage monitoring and management tool with their disk storage systems. The capabilities of these software applications range from the very basic system functions like LUN creation and provisioning, to very sophisticated performance and storage analysis. However, most of these array monitoring

packages have limited knowledge of *other* storage systems and they often don't understand the virtual and application environment to which they are connected. In other words they have a 'myopic', storage-only view when a more holistic, end-to-end view of the environment is really needed. As a result, organizations would do well to consider a third party disk monitoring tool like the [SolarWinds Profiler Suite](#), to gain control of the storage infrastructures that support their virtualized environments.

Storage Utilization

Determining how much storage capacity is being used and by which server is a classic management requirement in any shared storage environment. As stated above, it's particularly challenging in the virtual environment, not only because of the abstraction layer but because of the ease at which virtual machines (VM) can be created. In a non-virtualized environment, there's always the problem of storage being assigned to physical servers but not actually being used (a file system hasn't been placed on it). This situation is compounded in the virtual environment because a virtual machine may have storage allocated to the VM but it may not be actually using it. Most tools would show that storage as 'in use', since there is a file system laid on it by the hypervisor. Identifying this situation requires a more 'virtualization aware' software product.

In another virtualized-environment specific example, a VM is typically created from a template, which automatically allocates the storage while providing other VM settings. Use of templates typically leads to VM sprawl because users may never put the VM into production or it might be used temporarily and is “powered off”, still consuming disk capacity. A similar, but bigger challenge is identifying VMs created from these templates where the necessary capacity for the VM is much less than the pre-allocated amount set of the template. Without a way to identify and correct these situations, virtual machines can continue to be created with “built-in” storage waste ‘built-in’.

Typically, a storage management application from the array vendor won’t report on any of these conditions, as their visibility ends at the allocation to the host. In most cases they cannot report if a LUN has had a file system placed on it by the host indicating that it’s actually in use. Even fewer, if any, of these applications will allow the storage manager to see if there are virtual machines using this allocation. And hardly any can determine which VMs could have their capacities reduced and assigned to other systems that need it.

Also, many of these storage vendor-provided tools are not cross-platform, which is now prevalent in virtualization environments. Users are leveraging capabilities like Storage vMotion from VMware to implement storage tiers, where live VMs can be migrated between dissimilar hardware platforms with no downtime. This allows the use of a slower SATA tier of storage with the more traditional tier of fibre channel or SAS-based storage from a variety of vendors. It even allows the use of an SSD tier to help mitigate performance spikes by moving VMs to a higher performing tier of storage while the demand is elevated. The limiting factor to this strategy of picking best of breed storage is management, as most bundled storage management products can’t provide cross-platform information.

Performance Utilization

Server virtualization puts additional pressure on the storage management software to provide meaningful performance information. Before virtualization, most data centers would have only a handful of systems that could stress the storage array. Now, since hosts are housing dozens of virtual machines that are sharing the storage, the performance load is much higher and almost every host can stress the storage array.

Once again, most storage management software is storage-system centric and typically only understands performance as it relates to the LUN, not the host or the VMs on that host. As a result, if there’s a performance problem, the software can’t identify which VM is the cause or what VMs are impacted. While there are some tools to identify the top users of storage bandwidth, often known as a “top talker” statistic, they seldom can identify which specific VMs are on which specific physical disk drives.

Many times, an “accept the defaults” approach to LUN, volume and VM design can lead to dozens of VMs all accessing the same disk spindles. While many of these VMs would not end up at the head of a top talker report, their sheer number could cause a set of disk drive spindles to thrashing, degrading performance of the entire environment.

A third party application like Profiler from SolarWinds Software that takes a holistic view of the virtual and storage infrastructure, correlating and monitoring common metrics like queue depth and response time, even across different storage platforms and vendors. This provides a single console that can monitor performance for the enterprise, allowing both a bottom-up view from storage to the VM and top-down view from the VM or host down to the specific storage hardware. This deep visibility into the infrastructure enables users to properly leverage their compute and storage resources without putting themselves in jeopardy of overallocation or underutilization.

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