EMC Storage Monitoring

It has been years since the introduction of storage-dedicated networks in IT departments. SANs, with disk arrays, fiber switches and dedicated tape libraries have been put in place to provide advanced storage services to servers and applications, to isolate the storage issues from the servers and consolidate the storage needs in one place. With the growing use and deployment of virtual systems and blade servers, the SAN has become a critical piece of the IT architecture and constitutes in many cases a single point of failure for many applications. Because SAN Administrators cannot take the risk to lose access to critical data, they are looking for a solution that will help monitor all the aspects of their storage environment and prevent failures to occur.
MANAGING A SAN

SAN administrators spend 20% of their working time managing their storage environment; which in practical terms means resolving storage shortages, identifying and resolving performance issues, and ensuring data is available at all times. Another 15% is required to monitor this environment and analyze metrics on usage, performance, availability, and status reports. Finally 10% are reserved for capacity planning, i.e forecasting storage growth and determining the allocation of different storage types.

RESOLVING STORAGE SHORTAGES

Storage shortages can lead to tragic situations where crucial information is lost with no chance to restore them. This risk should not be underestimated since past unfortunately taught us that this could actually occur: a storage shortage destroyed the original Apollo 11 moon walk videos, one of the most important events of the 20th century! How could this happen? Well, the NASA needed to reuse the tapes on which the quality originals were stored until the 1980’s…. If losing a part of your history affects you, imagine how your CEO would feel if he loses data essential to his business? This example makes it easy to understand why it is so important to prevent and resolve storage shortages; the question being how to do it efficiently and smoothly?

Your first inclination to prevent storage shortages from occurring might be to purchase as much capacity as possible but this will truly be throwing money away. Let’s face the truth: up to 75% of an organization’s current investment in storage is wasted, because typically just 25% of storage capacity is utilized.

A better alternative to additional storage purchase will be to reclaim the disk space uselessly consumed by looking for unmapped LUNs, or volumes that are no longer used by any server.

TROUBLESHOOTING PERFORMANCE ISSUES

Storage administrators are constantly trying to maximize performance. When an application starts performing poorly and happens to rely on a SAN, administrators struggle to isolate the performance bottleneck. Performance issues can be the result of anything from a misconfigured component to subtle interactions between various parts of the SAN. When performance issues occur, administrators can rely on Sentry Software’s monitoring solutions to check signs of physical faults, such as I/O retries, suspect data movement, and poor response times.

Other metrics should also be closely monitored. Since performance issues can also be caused by an improper workload balancing, it is extremely important to have the controller processor utilization monitored. Indeed, under certain conditions, one controller may handle the majority of the workload while the other one stays almost idle. Quickly identifying which controller constitutes a bottleneck will thus prevent costly down-times.

Monitoring the efficiency of the caching mechanism to determine the optimal size of the read and write caches will also help administrators improve performance. To make sure the caching mechanism is efficient, administrators need to know the percentage of the write cache that has been modified by host write operations and not yet written to the disks and make sure this percentage does not reach 100%. Better performances can sometimes be achieved by simply modifying read cache size, write cache size, and cache page size.

CAPACITY PLANNING

Managing storage capacity implies assigning storage resources to meet the capacity, availability, and performance needs of applications. To perform this operation, administrators must know the exact storage capacity available in their disk arrays. Inaccurate information may lead to approximate storage provisioning and oversubscription situations. Such situations are highly critical since they will cause catastrophic data loss and corruption. The most valuable information for administrators to prevent these troubles is to know if the total disk space visible to the hosts is greater than its actual capacity or if the actual consumed capacity is nearing 100%.

Administrators are not only asked to assign storage resources but also to plan for both current and future storage requirements. Because under-purchasing and over-purchasing capacity will respectively result in downtimes and wasted storage, both situations must be prevented. Smoothly storage administration can only be achieved if administrators know exactly the disk space available and consumed. With this information, they will be able to guarantee enough remaining space to answer allocation requests as quickly as possible.
Monitoring a storage environment is complex and can become extremely challenging when monitoring high-level storage devices, such as EMC Symmetrix VMAX or EMC CLARiiON. Sentry Software developed the EMC Disk Arrays monitoring solution – EMC Disk Arrays KM for PATROL - to help administrators more efficiently manage their storage devices directly from their BMC TrueSight Operations Management environment.

**PREVENTING STORAGE SHORTAGES**

To prevent storage shortages, administrators need to know the exact disk space available and which disk space is actually uselessly consumed. With EMC Disk Arrays KM for PATROL, the disk space available and used in the storage pool is constantly monitored and displayed in the BMC TrueSight Operations Management environment. While the SubscribedCapacity parameter indicates the amount of disk space that has been made available to the subscriber hosts, the ConsumedCapacity parameter displays the actual space usage in the storage pool. For “thin” pools, this value is normally lower than the SubscribedCapacity; for traditional pools, both values are usually equal.

Likewise, administrators can be notified when a specific device is running out of space so they can determine the need for acquiring additional storage space. Setting EMC Disk Array KM for PATROL to trigger an alert on a specific metric is a simple operation: it simply consists in setting a threshold, for example of 75%, on the ConsumedCapacityPercentage parameter. When the threshold is reached, EMC Disk Array KM for PATROL triggers an alert warning the administrator that additional storage capacity will soon be required.

Finally, administrators can use the LUNs Mapping Table functionality to identify LUNs or volumes that are no longer used by any server. These LUNs, while unused, still take up disk space. Being able to identify such LUNs and reclaim the disk space uselessly consumed by these LUNs will help administrators avoid unnecessary upgrades and extensions.

**PREVENTING PERFORMANCE ISSUES**

Several metrics are provided by EMC Disk Arrays KM for PATROL to help administrators prevent, identify, and resolve performance issues. Among many other features, the Sentry Software’s monitoring solution allows comparing the processor utilization of the controllers to identify the one that constitutes a bottleneck for the disk arrays. To easily obtain this information, administrators can display the values of the ProcessorUtilization parameter for both controllers in the same graph and thus easily determine which controller is overused in order to restore a balanced workload.

The Sentry Software’s monitoring solution can also be used to evaluate the efficiency of the caching mechanism and determine which size is optimal for the read and write caches. Administrators can for instance refer to the ReadCacheSize and WriteCacheSize parameters to know the amount of memory allowed by each controller for the read and write operations. Likewise, they can compare the graphs of the WriteFlushByteRate and WriteByteRate parameters. While the latter represents the amount of data written per second, the former indicates the rate at which data is committed to the disk.

Finally, Administrators can refer to the CacheDirtyPagesPercentage parameter to know the percentage of the write cache that has been modified by host write operations and not yet flushed to the disks. Reaching 100% may indicate that write cache is too small and cannot handle the flow of write operations.
EMC STORAGE MONITORING

CAPACITY PLANNING
Administrators can rely on the information provided by EMC Disk Arrays KM for PATROL to cleverly put together a capacity plan. Several metrics are collected to provide devices’ total size, total subscribed and consumed capacity, as well as the total amount of free disk space of storage systems. Based on this data, administrators are able to guarantee, at a reasonable cost, enough available space to meet storage allocation requirements as quickly as possible.

EMC Disk Arrays KM for PATROL also helps detect situations where an over-subscribed pool is reaching its full capacity. When a pool reaches its full capacity, the storage system can no longer satisfy new data write requests, which leads to unrecoverable data loss and corruption. To prevent this situation, EMC Disk Arrays KM for PATROL triggers an alert when the SubscribedCapacityPercentage parameter for a thin pool reaches 75% to inform the administrator that there is a risk of running out of space.

MONITORING TRAFFIC
Traffic reports can be generated to help SAN administrators understand the impact of the nightly backups, of the amount of data a specific application writes to a LUN and how this evolves (with upgrades for example). In general, this type of information helps administrators analyze the impact of various features of the disk array on the long term. Using EMC Disk Arrays KM for PATROL, administrators can display a graph over several days to view the traffic recorded for one or several disk arrays, controllers, fiber ports, storage pools, volumes, disk groups, or disks. Information can be displayed using daily or hourly interval depending on the level of details required.

CONCLUSION
In an era of tight spending, reduced profit expectations, and rising energy costs and environmental concerns, enterprise computing infrastructures are increasingly reliant upon virtualization, outsourcing, and cloud computing. Managing and monitoring ever growing storage systems are challenging tasks for SAN administrators. They are not only asked to guarantee enough available space to answer allocation requests as quickly as possible; they are also requested to do it at a reasonable cost. Because these tasks become even more complicated as storage systems get more complex, administrators need to rely on proven storage monitoring solutions. EMC Disk Arrays KM for PATROL fully integrates with the BMC TrueSight Operations Management environment to gain visibility into the performance of your entire infrastructure — including multi-vendor hardware, storage, backup and high availability environments, and custom applications — through a single, proactive monitoring platform.
ABOUT MARKETZONE DIRECT PRODUCTS

The BMC MarketZone Direct program sells and supports third-party products that complement and/or augment BMC solutions. MarketZone Direct products are available under BMC license and support terms.

BUSINESS RUNS ON I.T.
I.T. RUNS ON BMC SOFTWARE™

Business thrives when IT runs smarter, faster and stronger. That’s why the most demanding IT organizations in the world rely on BMC Software across distributed, mainframe, virtual and cloud environments. Recognized as the leader in Business Service Management, BMC offers a comprehensive approach and unified platform that helps IT organizations cut cost, reduce risk and drive business profit. For the four fiscal quarters ended September 30, 2011, BMC revenue was approximately $2.2 billion.

ABOUT SENTRY SOFTWARE™

Sentry Software, a BMC MarketZone Direct and Technology Alliance Partner, provides monitoring solutions that expand and enhance the capabilities of BMC TrueSight Operations Management, thus enabling up to 100-percent coverage of any infrastructure. Sentry Software specializes in single solutions for multi-platform monitoring of hardware, storage, custom applications, or any IT infrastructure component. Its products are deployed in diverse industry sectors around the globe.

LEARN MORE

To learn more about our solutions, please visit: www.sentrysoftware.com/solutions

Sentry Software products are made exclusively for BMC Software and are marketed, sold and supported by BMC Software as “BMC” products. They are listed on the BMC Software website products page under the BMC TrueSight Operations Management category.

To learn more about BMC TrueSight Operations Management, please visit www.bmc.com

BMC, BMC Software, and the BMC Software logo are the exclusive properties of BMC Software, Inc., are registered with the U.S. Patent and Trademark Office, and may be registered or pending registration in other countries.

All other BMC trademarks, service marks, and logos may be registered or pending registration in the U.S. or in other countries. All other trademarks or registered trademarks are the property of their respective owners.

© 2012 BMC Software, Inc. All rights reserved.