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Simplifying the Virtual Data Center — CloudPhysics Predictive Analytics Makes It Easy

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Management Summary

When shopping for a new car, many consumers are satisfied by meeting certain basic requirements, namely: price, mileage, GPS/entertainment center, and of course, the number of cup holders and type of upholstery. However, there are some who have more specific requirements, such as performance and safety, as specified by government agencies and insurance company consortia. Now, safety can come in a variety of ways, for example, front- and side-door air bags or, perhaps, an alerting system to help you avoid a disaster. Wouldn't it be nice if your car alerted you to a potential collision when backing up? Now, it can, and soon in the United States it will be required. Wouldn't it be nice to have an alerting system to warn you of a potential collision when changing lanes? Now it can, but typically only on high-end vehicles and often as an extra cost option. Wouldn't it be nice to have forward-looking sensors to enable your car to alert you to a potential crash? Now it can, along with many other features – for a price, of course.

The staff in any mid-size or enterprise data center may not be worried about air-bags or back-up alerts, but it is certainly concerned about slowdowns and potential crashes, or, for that matter, any potential breakdown in the infrastructure that can bring mission- and business-critical operations to a halt. Business continuity is essential in every operational environment. In today's virtualized environment, when a VM is in trouble, more frequently than not, the problem can be traced back to storage. *Wouldn't it be nice if the data center staff could get an alert to a potential storage disaster before it occurred?* Even though the infrastructure may be virtualized over a network of servers and storage devices, many of the tools to diagnose, or predict, storage problems are static and siloed applications. The staff has a virtual plethora of data, but no recommendations or answers on what to do to fix it. Visibility into the storage pool is almost non-existent. As a result, the performance of the infrastructure can be severely affected, wasting both CPU resources and staff efficiency, raising the total cost of ownership (TCO) of that infrastructure. High-resolution analytics are needed to turn all of the raw storage data into actionable information, alerting the data center staff to any, and every, potential problem. They need the ability to immediately diagnose storage performance bottlenecks, preempt problems caused by poor storage performance and capacity disruptions, and proactively manage the storage environment with intensive health checks, ensuring proper configuration and promoting improved operational efficiency.

One company that has attacked this problem and grabbed it by the throat is CloudPhysics. Its recently announced *Storage Analytics* enables the virtual data center to pinpoint and preempt storage-induced performance and capacity issues with data-driven and actionable answers, enabling the data center to eliminate wasted time and money. To learn more about CloudPhysics Storage Analytics, please read on.

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Virtualized Data Center Environments

Today's data center is faced with a growth rate in storage that never before has been experienced. Combine that with the constantly changing virtualized environments that are being deployed to improve server efficiency, and you have a disaster waiting to happen. The virtualization of multiple mission- and business-critical applications onto a single platform has transformed IT operations through resource abstraction and workload consolidation. More and more VMs are trying to access more and more storage, creating bottlenecks that would not exist in a non-virtualized world. This abstraction results in increased complexity for IT operations, particularly when multiple VMs are trying to access the same storage, putting business continuity at risk and increasing the possibility of a data center outage. *Unscheduled downtime is not merely an inconvenience; it can put an enterprise out of business!*

It has become increasingly difficult for mere mortals to understand what is going on within the multiple cores of the multiple processors of the multiple servers that make up today's data center architecture. Systems administrators are now required to pull together, collate, and correlate data from multiple layers in order to make operational decisions. They desperately need a tool that can alert them to a pending disaster and cut through all of the layers and combinatorial complexity and turn raw storage into actionable data – without the need to hire additional storage experts, buy an expensive appliance, or waste hours of tedious perusing of too many spreadsheets. *They need a tool that will provide them with improved operational predictability for virtualized storage.*

What type of features does the staff require? They need the capability to provide ease-of-use to a beleaguered staff to:

- **Immediately diagnose storage performance issues** before they become a problem;
- **Preempt performance and capacity disruptions**;
- **Proactively manage storage capacity**, eliminating (or at least reducing) unnecessary over provisioning;
- **Conduct regularly scheduled, comprehensive health checks** in a fraction of the time required by systems administrators; and
- **Create custom storage analytics** for interactive exploration and reporting, root cause analysis, and ongoing management.

This is exactly what CloudPhysics provides.

CloudPhysics Storage Analytics

What is the best way to avoid future bottlenecks and crashes – today and tomorrow? CloudPhysics believes that the ever-evolving virtualized data center needs advanced storage analytics to leverage the power of big data for an easy-to-use, predictive, virtualized management of a *VMware* infrastructure. Virtualized infrastructures are a breeding ground for finger-pointing and accusations as a result of something "running slow". Unfortunately, most of these accusations are directed at the IT staff. In some cases, the infrastructure is the culprit, and many times the issue can be traced to storage. Because of workload consolidation and shared resources, IT operations have become significantly more complex, with critical applications competing with each other for access to these resources. It has become increasingly more difficult to understand how these applications can work together successfully. Today's data center staff needs to find a way to improve performance and eliminate the pain in managing the storage resource, as today's tools are woefully inadequate.

CloudPhysics now can prevent storage-induced downtime, locate and fix storage problems faster than the existing processes, and reclaim wasted storage space using analytics. New capabilities in their Storage Analytics software enable an IT team to cut through the complexity and pinpoint and preempt storage-induced capacity and performance issues using simulations and actionable insight. One part of these new capabilities is *Smart Alerts*, a new feature that changes the focus of alerting from reactive to predictive. Smart Alerts are not based upon some artificial threshold, creating alerts *after* they have taken place. Smart Alerts are analytics-driven using the CloudPhysics' global dataset and examining patterns and trends from thousands of data centers to predict capacity or performance issues in a client's data center. CloudPhysics evaluates all objects in the virtual infrastructure against established criteria for latency, duration, outstanding I/Os, IOPS, and other factors. These storage analytics run throughout a client's entire virtual

Exhibit 1 —
Benefits of Storage Analytics

- **Accelerate performance troubleshooting** –See exactly where datastore contention is causing performance degradation;
- **Eliminate wasted disk space** – Pinpoint snapshot bloat for greater efficiency and reducing TCO;
- **Reduce VM sprawl** – Identify unused VMs and the disk space they are consuming;
- **Avoid datastore-induced disruptions** – Visualize all datastores across multiple vCenter instances to proactively manage space issues;
- **Optimize VM density for greater efficiency** – Use *VM Space Saver* to identify VMs with potential space savings which can be reclaimed through thin provisioning;
- **Proactively manage the needs of guests** – Identify the probability of a guest disk partition running out of disk space in the immediate future;
- **Provide cache benefit analysis** – Identify if performance can be improved for a specific workload and how much is needed for a specific improvement.

***Source**: CloudPhysics*

infrastructure, evaluating the configuration and behavior across all storage resources and VMs. CloudPhysics can then highlight, ahead of time, when conditions will be degrading and what the staff can do about it, i.e., initiating alerts containing recommendations for corrective actions.

Storage Analytics can help data center operations staff by doing the following.

- **Immediately diagnose storage performance causes**, reducing by a factor of ten the amount of time required to find and fix problems.
- **Preempt storage-induced performance and capacity disruptions**, enabling the staff to anticipate and plan rather than react, helping to eliminate storage-related downtime, responsible for more than 50% of data center downtime.
- **Proactively manage all storage continuously with intensive health checks**, to ensure proper setup and to reduce waste, thus lowering the TCO for the infrastructure.
- **Determine the potential value of SSD caching for virtual workloads** prior to investing in this new resource.
- **Create custom storage analytics and reports** for root cause analysis and ongoing management to address particular challenges or answer specific questions.

See Exhibit 1, at the left, for the benefits of CloudPhysics Storage Analytics.

CloudPhysics' Storage Analytics comes in two versions, a premium edition at $895 per host per year, with the first month free, and a free edition, with a first month trial of the premium edition free. Obviously, the free edition does not contain the same functionality as the premium edition, but it may contain all of the functionality that you require.[1]

Conclusion

With CloudPhysics, your data center staff will be able to reduce the risk of unscheduled downtime, find and fix problems much faster than the systems administrators using manual processes. It will reduce cost through the use of more optimized resources. Troubleshooting of datastore contention can be reduced from hours and days to minutes.

CloudPhysics uses Big Data from many data centers to generate really meaningful alerts to help the data center staff get ahead of impending disruptions and enable business continuity. CloudPhysics also provides the data center staff with the ability to reclaim wasted space. All of these easy-to-use features result in a reduced TCO and increased profitability.

If your data center staff is over-burdened by outdated manual processes to maintain operational efficiency, then you need to look into the capabilities of CloudPhysics Storage Analytics. It just may be the solution that you require.

[1] To determine if the free edition is sufficient for your needs, go to http://www.cloudphysics.com/product/editions/ to review the free functionality.

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