



## Tintri Infrastructure Insight

Having an end-to-end view into the performance of individual virtual machines can be tremendously helpful in virtualized environments. This white paper discusses the challenges IT faces in pinpointing performance issues and how Tintri VMstore™ and Tintri Global Center™ deliver deep insight in to utilization and performance helping IT detect trends and enhance troubleshooting.

## What you can't see can definitely hurt you

Virtualization is seen as one of the best ways for IT to tackle the task of supporting legacy workloads. By virtualizing and consolidating multiple workloads, IT can expend fewer resources on under-utilized applications and infrastructure.

Virtualization and consolidation on to shared infrastructure has its challenges. In addition to performance issues and management complexity, virtualizing multiple workloads makes it harder for admins to identify bottlenecks, understand the impact of new workloads and troubleshoot problems such as mis-configuration of VMs and shared infrastructure including storage.

Traditional storage architectures can be problematic to troubleshoot. They can provide a performance view from the LUN, volume or file-system standpoint. But their architecture cannot isolate VM performance or provide insight into VM-level performance characteristics. So it becomes difficult for administrators to understand situations such as the impact of a new VM workload, without access to relevant VM performance metrics. In rare cases administrators may resort to allocating a single LUN or volume for a single VM. Unfortunately this is not practical with traditional storage architectures due to scaling limitations and management overhead.

Identifying the cause of performance bottlenecks is a time consuming, frustrating and sometimes inconclusive process that requires iteratively gathering data, analyzing the data to form a hypothesis and testing the hypothesis. In large enterprises, this process often involves coordination between several individuals and departments, typically spanning many days or even weeks. To gain deep insight into virtualization environments using traditional storage architectures requires IT to deploy separate, complex software solutions. Even then, IT can spend days troubleshooting performance issues due to complexity and lack of skills. This is enough to cause IT to steer clear of mixing workloads on the same storage, resulting in silos of virtualization.

Tintri VMstore provides a complete, comprehensive view of VMs including end-to-end tracking and visualization of performance across the entire data center infrastructure. This ensures administrators can procure the critical statistics they need for individual VMs.

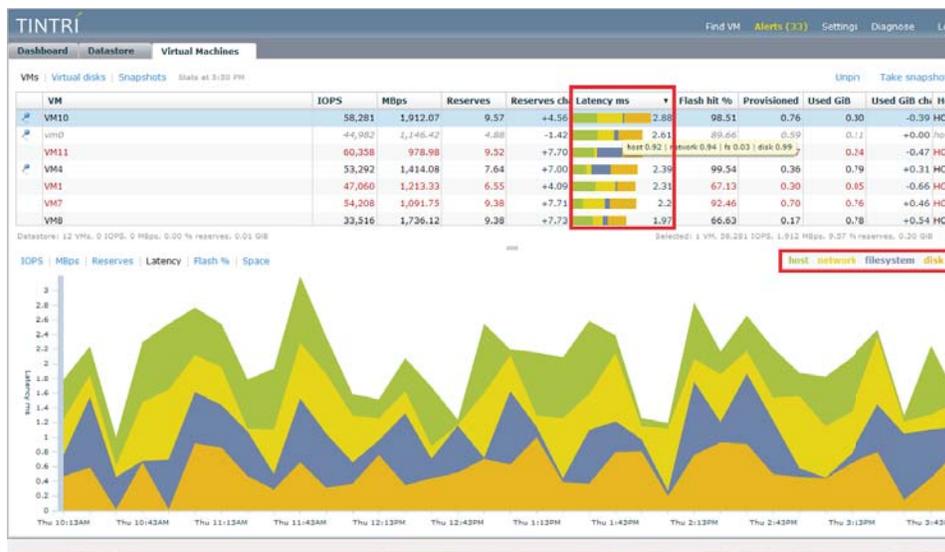


Figure 1: Tintri VMstore displays end-to-end latency statistics for each VM for automated bottleneck visualization.

By monitoring IO requests at the vdisk and VM level and integrating with vCenter APIs, Tintri VMstore knows the identity of the corresponding VM for each IO request and can determine if latency occurs disk at the hypervisor, network, or storage levels. For each VM and vdisk stored on the system, IT teams can use

Tintri VMstore to instantly visualize where potential performance issues may exist across the stack. Latency statistics are displayed in an intuitive format (Figure 1). In an instant, administrators can see the bottleneck rather than trying to deduce the location from indirect measurements and time-consuming detective work.

Administrators can detect trends with data from VMstore and individual VMs, all without the added complexity of installing and maintaining separate software. This built-in insight can reduce costs and simplify planning activities—especially around virtualizing IO-intensive critical applications and end-user desktops.

To handle monitoring and reporting across multiple VMstore systems, Tintri created Tintri Global Center. Built on a solid architectural foundation capable of supporting more than one million VMs, Tintri Global Center is an intuitive centralized control platform that lets administrators monitor and administer multiple geographically distributed VMstore systems as one. IT administrators can view and create summary reports across all or a group of VMstore systems—with in-depth information on storage performance (IOPS, latency, throughput), capacity, vCenter clusters, host status, protection status and more (figure 2).



Figure 2: Tintri Global Center extends deep insight across multiple geographically distributed VMstore systems and their resident VMs.

In addition to summary information presented at a glance, Tintri Global Center also provides the ability to filter and display results, including by individual VMstore systems and specific VMs, for easy troubleshooting. Tintri Global Center is designed to enable a rich ecosystem built around REST (Representational State Transfer) APIs. In future revisions, the APIs will be available for Tintri partners and customers to develop custom solutions combining various VM-granular tasks, such as performance monitoring across multiple VMstore systems and their VMs.



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