



Scaling Virtual Environments with Tintri Smart Storage

Tintri VMstore makes scaling simple and predictable; Tintri Global Center adds central monitoring, reporting, and control.

Scaling Storage in Virtual Environments

Virtualization is the fastest growing environment in nearly every data center today. Gartner forecasts that server virtualization will grow from 75.2% in 2012 to 82.4% in 2015¹. Although the benefits of virtualization are indisputable, several challenges must be addressed to ensure the success of any virtualization initiative.

Virtualized environments are very dynamic by nature. To accommodate rapid growth and fluctuations in demand, the infrastructure needs to support easy scaling of individual VMs, as well as the addition of new virtualized workloads. Today's virtualization solutions were designed for easy scaling of compute, simply by adding virtualization hosts using a 'building block' approach. Network scaling is becoming more simplified with software-defined network architectures. Unfortunately, scaling storage continues to be one of the top challenges for increasing the level of virtualization in the modern datacenter.

By using a 'one size fits all' approach, traditional storage frequently becomes the bottleneck when scaling virtualized environments. Let's take a moment to review some of the challenges enterprises face when using general-purpose storage solutions for virtualization.

Scaling Adds Complexity

Storage can be scaled for either capacity or performance. Traditional disk-bound storage architectures scale both storage capacity and performance by adding disks. Unfortunately this doesn't make for an efficient environment. IT organizations usually over-provision traditional storage to obtain the performance needed by their virtualized environments, resulting in excess unused capacity and unnecessary operational complexity.

Scaling capacity or performance by adding disks works up to the limit of what traditional storage controllers can support. When the maximum number of disks is reached, enterprises have to either add another storage controller and manage it separately or perform a forklift upgrade to the entire storage system. In either scenario, scaling storage to meet the growing needs of virtualized environments adds a significant amount of complexity.

Lack of Control and Increased Overhead

Although storage performance and costs of scaling are top concerns for IT, the increased management burden is the most significant issue for most organizations. Starting with the complex operations needed for provisioning and mapping storage in dynamic virtualized environments, administrators are forced to plan far in advance how they want their storage environments to map to the different groups of VMs they will be creating. Many organizations are still using extensive spreadsheets for storage LUN or volume-to-VM mapping. This practice can overwhelm IT administrators as they manually track the assignments of virtual servers and VMs to storage arrays and volumes. This is an incredibly time-consuming, inefficient, and error-prone way to manage storage.

In addition to increased management complexity, traditional storage systems make it extremely difficult to predict how scaling will affect existing virtualized workloads. With traditional storage solutions, all VMs are thrown into one big pot of storage. There is little to no visibility into the performance of individual VMs, and no way to easily or accurately apply and measure the quality of service (QoS) for specific VMs. The problem is further exacerbated in the cases when environments with related VMs are forced to span multiple storage systems for performance reasons.

The lack of visibility into individual VMs across all storage makes troubleshooting very time consuming for administrators, who are forced to investigate all issues or problems across multiple dimensions and multiple workloads. With traditional storage, finding the source of any performance issue – especially at scale – requires multiple layers of management software, which often times translates into multi-day, trial and error exercises for the IT teams.

¹ Gartner Report: Forecast: x86 Server Virtualization, Worldwide, 3Q12 Update.

The deficiency of insight and control over storage leads to unpredictable behavior in the virtualized environment. This can have serious consequences for organizations, especially when combining different types of critical workloads with dissimilar performance requirements onto the same storage system. Performance planning is simply out of reach for organizations using traditional storage platforms, since it is impossible to know if new VMs will fit on the existing storage or cause any performance issues with the applications or services.

Clearly, there is a need for a new kind of storage solution that addresses the challenges of scaling virtualized environments by design – not as an afterthought.

Tintri VMstore and Tintri Global Center: A Better Approach for Scalable Virtualization Storage

Tintri has taken an entirely different approach to scaling storage in virtualized environments. In virtualized environments, each server or host is a ‘building block’ that can be added to scale compute resources. Intelligent features, such as automatic load balancing of VMs across hosts, ensure simple and predictable scaling.

Tintri believes that storage should be scaled the same efficient way as the ‘building block’ approach used for the compute layer. By understanding and operating at the VM level, Tintri VMstore is able to leverage the management constructs from the virtualization layer, making scaling storage extremely simple and predictable.

Taking a Building Block Approach

Tintri uses a simple building block approach to scaling storage in virtualized environments, where each VMstore appears as a single datastore in the virtualization layer. This is in contrast to traditional storage, where administrators must spend time creating separate LUNs or volumes for each new group of VMs, and then creating and exporting the corresponding different datastores. With VMstore, there is no longer any need to create and manage complex webs of LUNs and volumes.

As an added bonus, VMstore provides administrators with a clear and comprehensive view of system performance and capacity utilization. IT no longer needs to interpret piles of complex system capacity and performance data, or worry about not knowing how much spare performance they have to work with.

Tintri VMstore also ensures that there is never any impact from ‘noisy neighbors’ on the same system. With VM-level QoS functionality, storage performance is equitable and predictable. Different types of VMs, such as IO-intensive OLTP workloads and latency sensitive end-user desktops, can reside on the same Tintri VMstore. Application-awareness, deep insight, and VM-level QoS are some of the reasons why Tintri VMstore is the ideal building block for scaling storage.

If administrators need to scale beyond the performance and capacity of a single VMstore, it is as simple as adding an additional system to the virtualization layer – a task that takes less than five minutes. This effectively adds another datastore that can be managed by the virtualization layer.

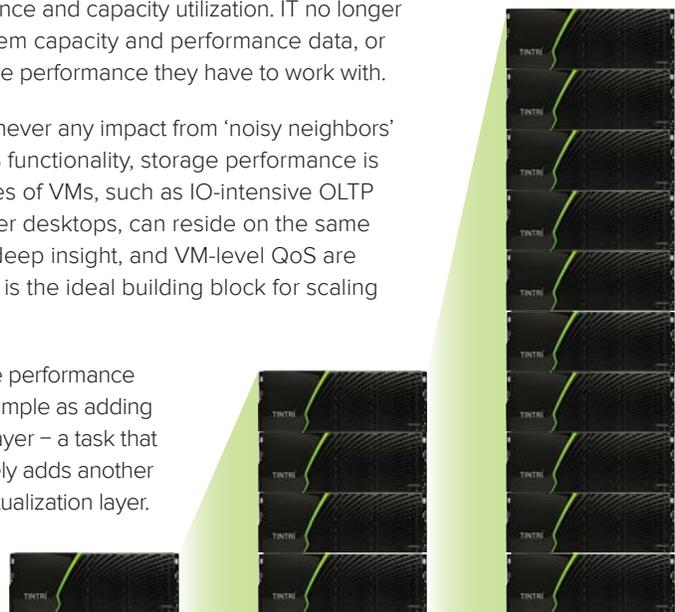


Figure 1: Easily scale storage for virtualization by adding additional VMstore systems.

Centralized Control with Tintri Global Center

Central administration and control are important when scaling storage. For this reason, Tintri has created Tintri Global Center, a unified, intuitive control platform that lets administrators monitor and administer multiple VMstore systems as one.

Designed with simple scalability in mind, Tintri Global Center's solid architectural foundation is capable of supporting over one million VMs – a number well beyond what is deployed in some of the most demanding virtual environments today. Tintri Global Center and VMstore together enable IT teams to quickly and easily build large virtualization environments without the need for any complex clustering technologies common with traditional storage platforms that are prone to failures and performance issues.



Figure 2: Get an aggregated view of multiple VMstore systems, including performance and capacity metrics, with Tintri Global Center.

Tintri Global Center provides administrators with comprehensive insight across multiple VMstore systems and their resident VMs from a single pane. IT admins can view and create summary reports across all VMstore systems – with in-depth information on storage performance (IOPS, latency, throughput), capacity, vCenter clusters, host status, protection status, and more. 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.

In a future release, Tintri Global Center's architectural foundation will enable administrators to apply consistent policies such as snapshot and replication schedules, on logically related VMs across different VMstore systems. With the ability to apply consistent policies for data protection across all VMstore systems, administrators can ensure consistent and synchronized data protection for groups of VMs across VMstore systems.

Leveraging network-efficient per-VM replication of VMstore, future releases of Tintri Global Center will perform automatic load balancing of VMs across multiple, potentially geographically distributed VMstore systems. Such functionality will ensure critical workloads are evenly distributed across multiple VMstore systems. Examples of when this functionality would be valuable include end-of-quarter reporting, or handling peak performance needs during software development.

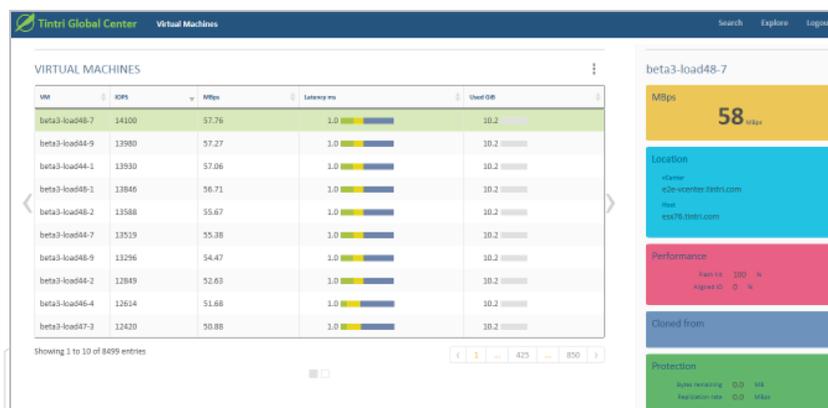


Figure 3: Monitor and run reports for all virtual machines stored on multiple VMstore systems with Tintri Global Center.

Empowering a Third-Party Ecosystem of Complementary Solutions

Tintri Global Center is designed to enable a rich ecosystem built around REST (Representational State Transfer) APIs and PowerShell integration. This ensures that all Tintri partners and customers will be able to leverage the APIs to develop custom solutions combining various VM-granular tasks, such as performance monitoring, snapshot and replication control, local and remote cloning, and more across multiple VMstores and their VMs.

With the high level of flexibility and functionality provided by the Tintri Global Center APIs, possibilities are limitless for the growing ecosystem of Tintri partners and customers. Examples of possible complementary third-party solutions include the creation of custom environments for software testing, automating the deployment of sets of VMs associated with an IT service across multiple VMstore systems, or integration into tools such as vCenter Orchestrator for end-to-end automation of workflows.

Conclusion

Virtualization requires storage to scale, and the easiest way to scale is by using a building block approach to adding performance and capacity. Traditional storage systems designed before the advent of virtualization are difficult to administer and scale as an enterprise's virtualization storage needs change.

IT needs storage that understands virtualization by design, in order to step up to the demands of dynamically changing virtualized environments. They also need simple, intuitive tools that can provide comprehensive visibility and control into the entire storage environment while empowering them to monitor and operate storage at the VM level.

Tintri VMstore and Tintri Global Center offer IT organizations the best choice for building and scaling virtualized environments. VMstore is the industry's leading storage solution designed for virtualized environments, and Tintri Global Center adds the visibility and control to enable all VMstore systems to function as one. This winning combination of intelligent storage and deep insight makes Tintri the best choice for simply and predictably scaling storage in virtualized environments.



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