Technology Report

DCIG

Tintri Analytics Make the Invisible Visible

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DCIG

TECHNOLOGY REPORT

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Tintri Analytics Make the Invisible Visible

COMPANY

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INDUSTRY

Data Storage

SOLUTION

Tintri VMstore

FEATURES

- Integrated real-time analytics
- Cloud-based predictive analytics
- VM-aware coss-stack analytics
- Deep hypervisor integration, including vSphere Tag support
- Capacity and performance forecasting
- Powerful search and filtering capabilities
- Instant what-if analyses

BENEFITS

- Consistent application performance
- Automatic problem avoidance
- Reduced management expense
- Enhanced IT and business agility

Executive Summary

Tintri built analytics into the foundation of the VMstore product line. Tintri's integrated real-time analytics actively and automatically optimize application performance from day one. Beyond day one, Tintri's predictive analytics enable ongoing workload optimization for even the largest virtual machine infrastructures with a single click.

Tintri analytics are native to every aspect of managing VMstore resources. As a result, VMstore all-NVMe appliances can run thousands of virtual machines and SQL Server databases (and soon container volumes) with astonishingly little storage management effort.

Tintri delivers high levels of application availability, consistent performance across time, and maximum infrastructure agility with minimum IT infrastructure and management overhead.

Predictive Analytics Fundamentals

Telemetry Data is the Foundation for Predictive Analytics

Many enterprise storage arrays transmit not just fault data but extensive additional telemetry data about workloads back to the vendors. This data includes IOPS, bandwidth, and latency associated with workloads, front-end ports, storage pools, and more.

Most vendors evaluate the collected fault data and advise customers how to resolve problems, or they remotely log in and resolve problems for their customers. Some vendors apply predictive analytics and machine learning algorithms to data collected across the entire installed base to identify potential problems and optimization opportunities for each array in the installed base.

Visionaries Pursue Autonomous Infrastructure Optimization

Most enterprise storage vendors now offer some level of Artificial Intelligence for IT Operations (AIOPs). Most vendors approach AIOps from a support perspective that focuses on reducing application downtime by exposing component failures and helping troubleshoot performance problems. Some vendors have added predictive and cross-stack analytics to their support tools to reduce application downtime further. These advances can have a meaningful impact on availability and data center operations.

However, the end goal of predictive analytics for the more visionary providers goes beyond eliminating downtime. Their goal is to enable data center infrastructures to autonomously optimize themselves for application availability, performance, and total cost of ownership based on the customer's priorities.

Vendors who commit to this path and execute better than their competitors create real value for their customers. The benefits include:

- Measurably reducing downtime
- Avoiding preventable downtime
- Optimizing application performance
- Significantly reducing operational expenses

Predictive Analytics Features That Matter

Proactive interventions and recommending configuration changes are two predictive analytics features that contribute the most to reducing downtime and optimizing application performance.

Proactive interventions identify something that will create a problem and then notify clients about the issue. Interventions may include providing guidance on how to avoid the problem. A wide range of interventions is possible, including identifying when an array will reach full capacity or identifying a network configuration that could create a loop condition.

Recommending configuration changes enhances application performance at a site by comparing the performance of the same application at similar sites, discovering optimal configurations, and recommending configuration changes at each site.

"Tintri's focus on optimizing application performance is a fundamentally better approach to applying analytics to enterprise storage."

Tintri Actualizes the Predictive Analytics Vision

Tintri Analytics Focus on Optimizing Application Performance

Tintri focuses its analytics on optimizing application performance, not break/fix support. This focus is a fundamentally better approach to applying analytics to enterprise storage than many other vendors offer. As a result, Tintri delivers all four of the benefits mentioned above to a degree that is astonishing to experienced virtualization professionals.

Plus, Tintri's proactive interventions go beyond notifying clients about problems and providing guidance on how to resolve those problems. Tintri's integrated VMstore analytics actively avoid problems. Tintri also goes beyond merely recommending configuration changes. Instead, Tintri enables one-click workload optimization.

Optimizes Application Performance Automatically

Tintri's TxOS storage software applies analytics to telemetry data in real time to operate the VMstore. TxOS knows the IO characteristics of each SQL Server database, virtual machine, and Tanzu persistent volume—Tintri calls these "managed objects." It also knows which IO requests map to which managed objects. Thus, TxOS knows how much latency each managed object is experiencing and uses AI to dynamically adjust performance resources among even thousands of active workloads to optimize application performance, delivering consistent sub-millisecond responsiveness to each workload.

VM-aware Storage Enables Application-level Management

Second, VMstore—as its name implies—is designed for one of the most challenging storage environments, the highly virtualized enterprise data center. Such data centers may support tens of thousands of applications and may also serve up thousands of virtual desktops.

Because Tintri designed VMstore specifically for virtual infrastructures, it foregoes traditional volume and LUN storage constructs. Deep integration with VMware and other hypervisors enables VMstore to automate application performance management and data protection for each managed object. This automated management applies equally to virtual machines, SQL Server databases, and Tanzu persistent volumes; and is dramatically more efficient than managing volumes and LUNs.

The integrated analytics can use vSphere tags in conjunction with Tintri service groups. Thus, protection policies, snapshots, replication, and more can be based upon tagging in vSphere. This is important because communication failures between virtual server managers and storage administrators can result in incorrect workload placement and protection. Once vSphere tag-based workload placement and protection policies are in place, organizations can avoid these missteps. Enterprises can also use tags to group managed objects for reporting, trending, and planning.

"It is difficult to overstate how powerful Tintri analytics are."

Tintri Analytics Optimize Infrastructure at Scale

In larger environments with multiple VMstore appliances in a scale-out configuration, Tintri applies AI and machine learning to do what no human could do. Tintri's workload intelligence evaluates the thousands of active workloads in the cluster and offers workload placement recommendations to optimize the performance of every workload. The system administrator clicks the "execute" button to implement the recommendations, and Tintri manages all the moves non-disruptively in the background.

The Power of Tintri Cloud-based Predictive Analytics

Tintri Analytics Make the Invisible Visible

As stated above, Tintri Analytics is focused on application performance, not break/fix support. Nevertheless, Tintri's deep integration with multiple hypervisors enables impressive visibility across the virtual infrastructure, exposing sources of latency in a way that facilitates rapid root cause analysis when application performance issues arise.

Application performance problems in traditional virtualized environments are notoriously difficult to troubleshoot and resolve. VMstore's integrated real-time analytics automatically keep applications performing at a consistently high level. But when performance issues occur, Tintri analytics enable IT staff to resolve the trickiest storage issues in seconds or minutes, restoring applications to full performance and saving administrators many hours of troubleshooting.

Cloud-based Tintri Analytics Provide Insight Across Time

Based on up to three years of historical performance data, Tintri Analytics uses machine learning (ML) and artificial intelligence (AI) to guarantee that every application performs at consistently high levels of responsiveness--automatically.

It is difficult to overstate how powerful Tintri analytics are for understanding and optimizing an organization's virtual infrastructure. Tintri analytics enable insight into historical storage and workload performance, trend-based capacity and performance planning, rapid troubleshooting, what-if analyses, and effective cost allocation.

The Tintri analytics cloud database keeps three years of historical data in 10-minute intervals. The database includes data from thousands of VMstore appliances, but each customer has access only to their own data. Nevertheless, customers benefit from the larger pool through more accurate workload modeling, especially when modeling a new type of workload that the customer has not previously deployed.

Powerful Search and Filtering Capabilities

Tintri analytics provide powerful search and filtering capabilities. These enable nearly any question about the storage and workload performance to be answered in seconds, even in large environments of tens or hundreds of thousands of VMs.

This tool feels like it was thoughtfully designed by and for virtualization professionals. Views include intelligent default values, yet those values are easily changed to get the information you seek. The filter criteria are sticky, so as you drill down into the data, the filter stays in place until you clear it.

vSphere Tag Support

Like VMstore's integrated analytics, Tintri's cloud-based analytics support vSphere tags, and system administrators can use these tags to search and filter the time series data. Depending on the tags the business uses, vSphere tags can be used to view and report on the performance of business-critical applications, infrastructure utilization per corporate division, or the cost of running a particular application.

"Tintri enables customers to align infrastructure planning with the organization's overall planning and budgeting processes."

Beyond Capacity Planning to Performance Forecasting

System administrators can use Tintri analytics to quickly forecast when storage capacity and storage performance will be exhausted. Capacity can be displayed per VMstore appliance, group of appliances, or across an entire VMstore estate.

Tintri analytics automatically generate forecasts based on application trends in historical data. System administrators can easily tune forecasts by adjusting the date range used as the basis for the forecasts. Predictive analytics tools generally help with capacity forecasting, but very few can be used to show when storage performance limits will be reached.

Beyond Tintri's ability to forecast both storage capacity and storage performance, IT administrators can quickly model the impact of adding and removing specific VMstore appliances. This simple yet sophisticated modeling capability enables Tintri customers to align infrastructure planning with the organization's overall planning and budgeting processes.

Rapid Troubleshooting and Problem Resolution

Tintri analytics enable rapid troubleshooting and problem resolution. Application performance problems in traditional virtualized environments are notoriously difficult to troubleshoot and resolve, especially intermittent issues. Tintri analytics use up to three years of data to troubleshoot long-term and intermittent issues. Tintri analytics make it simple to see spikes in utilization and the exact status of each VM or group of VMs at any given point in time.

Instant What-if Analyses

Tintri analytics include powerful what-if analysis capabilities that enable IT to provide accurate information to business leaders when evaluating new business opportunities and initiatives.

Actions that can be modeled include:

- adding any VMstore
- removing existing VMstore appliances
- adding more instances of existing workloads
- adding new applications.

In every case, the resulting views update instantaneously.

For example, IT staff can use Tintri analytics to quickly model the impact on storage and compute requirements of adding several large SQL Server databases. The modeling for common enterprise applications is based upon actual usage data from other VMstore users. IT staff can fine-tune forecasts if needed by adjusting these default values to reflect unique circumstances.

These tools are valuable for lifecycle planning, evaluating the impact of a possible corporate acquisition on the data infrastructure, understanding the infrastructure costs associated with adding a new application, the impact of hiring 10 new software developers, and more.

"Tintri what-if analysis capabilities add agility by enabling IT staff to provide answers quickly and confidently."

These what-if analysis capabilities add agility to a business by enabling IT staff to provide business unit and corporate leaders with answers to their questions quickly and confidently.

Cost Allocation

Many corporate IT organizations seek to function as internal cloud service providers to the rest of the enterprise. Those organizations can use Tintri analytics to show back or charge back central IT services to the business units.

Tintri VMstore Integrated Analytics and Cloud-based Tintri Analytics

Summary of Business Benefits

• **Consistent application performance yields happy internal and external customers.**	
• **Automatic problem avoidance increases application uptime.**	
• **Tintri's vast reduction in storage administration requirements eliminates most of the costs associated with day-to-day storage management.**	
• **Agility**	Automatic problem avoidance eliminates the overhead associated with documenting performance issues, performing root cause analysis, remediating the issues, manual workarounds, and follow-up communications with unhappy customers.
	Rapid, accurate root cause analysis
	Confident and smooth application rollouts.
	Instant what-if analyses inform business decisions

Continued Enhancements to Tintri Analytics

Tintri continues to invest in Tintri analytics in ways that create even more value for its customers.

Tintri is working on:

- Anomaly detection that uses machine learning to predict issues, enabling a proactive response
- Ransomware detection and actions for increased cyber resilience
- Additional insight into the resources (storage and compute) being used by containers to provide more granular insights into container infrastructure

"Tintri analytics go beyond eliminating storage headaches to enabling business agility."

Analytics that Make an Impact

Tintri's integrated real-time analytics actively avoid problems from day one, and Tintri's predictive analytics enable ongoing workload optimization for thousands of applications across a VMstore cluster with a single click. As a result, VMstore all-NVMe appliances can run thousands of virtual machines and SQL Server databases (and soon container volumes) with astonishingly little storage management time and effort. Thus, Tintri analytics go beyond eliminating storage headaches to enabling business agility. ■