Revolutionizing SQL Server Storage Management for Educational Services

Expect *and Get* More from Database Storage with Tintri SQL Integrated Storage

As today's education system evolves to support different models for learning and curriculum delivery inside and outside the classroom, education systems and institutions and higher-ed research environments are faced with a new set of technology challenges. In addition to delivering curriculums and content in more accessible and innovative ways, new online technologies are driving an exponential increase in data. Relational databases are now the engines that drive most important decisions and services and power almost all functional operations in public as well as private enterprises.

The explosive growth of databases that are vital for mission-critical applications has intensified the need for both higher performance and lower administrative burden – such that end-users of educational services have come to expect databases to execute operations with high efficiency and zero delays. Yet most database administrators (DBAs) in educational environments probably wonder why their jobs still rely on tedious manual-intensive operations from the previous century. Many of these activities are related to storage infrastructure, which in many ways hasn't evolved to complement the capabilities of databases like Microsoft SQL Server.

Unfortunately, DBAs have long come to expect that storage will create bottlenecks, cause user complaints, require storage expertise to troubleshoot, manage and scale resources, and will generally make their lives more difficult. The inability to easily understand and cost-effectively manage storage to meet required database performance, growth and uptime requirements can result in a range of inefficiencies– from time-consuming troubleshooting and tuning to costly overprovisioning of storage resources and IT staff. The lack of database-level visibility and control further complicates matters by making it more difficult to determine where issues originate, when resources should be allocated and how quality of service can be maintained or adjusted across all databases in the environment

Tintri SQL Integrated Storage Advantages

- **End-to-end visibility and actionable insights** across entire SQL Server database infrastructure
- **Per-database insight, data protection, cloning** and recovery to improve control and efficiency
- **Real-time and predictive analytics** for fast issue resolution and accurate resource planning
- **Predictable, self-optimized performance** for all SQL Server databases
- **Self-service capabilities** that empower DBAs as well as storage admins and IT generalists
- **Instant, zero-stun snapshots and clones** for cost-efficient data protection and DevOps

Application Development Benefits

- **Save time and storage space for non-prod systems**
- **Provide each developer with a database copy**
- **Eliminate loss of development hours due to shared database resources**
- **Refresh non-production databases in seconds**

EDUCATION SOLUTION BRIEF

SQL

– without spending a lot on storage and network headroom "just in case."

Speed has become a competitive advantage and cross-organization collaboration and data-sharing are key to modernization. Educational institutions need a smarter infrastructure solution that supports today's demanding database and application environments, simplifies the lives of DBAs and infrastructure teams, and also positively impacts operational efficiency.

Purpose-built Intelligent Infrastructure for SQL Server Databases

Tintri SQL Integrated Storage is a non-disruptive, agent-less storage technology that integrates directly with SQL Server databases and is used with Tintri VMstore Intelligent Infrastructure systems. It leverages patented, proven VM-integrated Tintri technology and applies those benefits to SQL Server environments. The result is a database-centric, database-integrated approach that simplifies and automates storage management to drive efficiencies, empower DBAs, and provide consistent performance – in short, delivering an outstanding database experience for all SQL Server stakeholders.

Tintri SQL Integrated Storage uniquely offers database-level granularity in the context of visibility, analytics, performance and capacity management, data protection, cloning, and more. This granular approach, combined with ML-driven intelligence, is how Tintri SQL Integrated Storage stands apart from every other storage offering. It's also why it represents a game- changing evolution from the cumbersome world of LUNs, volumes, RAID groups and other legacy storage constructs and associated tasks.

Tintri SQL Integrated Storage enables VMstore systems to support SQL Server databases running on virtual or physical servers – or a combination of both. This flexibility enables organizations to apply the benefits of this solution across a broader set of applications.

Drive Efficiencies with Intelligent Insights and Architectural Simplicity

Tintri SQL Integrated Storage improves operational efficiency with a combination of broad end-to-end visibility and granular database-level insights. DBAs can gain actionable information about each and every SQL Server database instance in the infrastructure from a single view.

In fact, SQL Integrated Storage presents information in a simple, standardized manner that enables DBAs, storage and infrastructure administrators, application owners and IT generalists alike to quickly understand it. For example, any of the above IT team members can easily cut through

the noise and immediately identify database outliers by name across the IT stack to proactively address hotspots before users are impacted. There's no need to spend hours trying to locate the offending database(s), which may reside in a LUN that contains many other databases. Such LUN or volume-based scenarios, common with standard infrastructure, inevitably cause delays to resolution and potentially mask other issues. The ability to pinpoint the root cause of latency in seconds and view real-time performance and capacity metrics for any SQL database and database file enables organizations to avoid lengthy investigations, take prompt action and mitigate productivity slowdowns.

Real-time insights are complemented by advanced predictive analytics that leverage three years of historical database storage trends and advanced machine learning capabilities, enabling staff to accurately plan resources and budgets 18 months in advance. This ensures that storage is purchased only when needed and eliminates the cost of overprovisioned, wasted resources.

The unique Tintri VMstore design also provides additional means of reducing storage resource requirements and management complexity. By enabling a single storage pool to support thousands of databases, Tintri SQL Integrated Storage helps organizations avoid setting up and managing – and consequently overprovisioning – numerous LUNs and volumes typically associated with standard database storage.

Empower DBAs with Autonomous Operations and Self-Service

Tintri SQL Integrated Storage is the only storage solution that enables self-service capabilities for DBAs. Its database-centric approach and ML-driven task automation eliminate the need for deep storage expertise and can reduce administrative overhead by up to 95%. Tintri SQL Integrated Storage ensures that Tintri VMstore systems are self-optimized for SQL Server, which means there's no need to spend time configuring and tuning storage for databases; it's done autonomously and continuously.

Streamlined, effortless processes enable snapshot copies and database clones to be created instantly for data protection and DevOps environments, respectively. Both snapshots and clones can be created with zero performance impact (zero stun), using zero storage space. Databases can also be recovered from snapshot copies instantly, and individually, while clones can be used to refresh test environments   in seconds as opposed to hours. DBAs can now be more independent and productive, and IT can eliminate helpdesk tickets that are usually required to address performance complaints and grow LUNs and volumes. And both storage and database experts can focus their time where it counts – on strategic activities that advance the business.

Improve User Experience with Predictable Performance

Predictable performance is a key attribute that is increasingly expected by users. That's why IT staff usually aren't congratulated when application performance is acceptable, but they are quickly blamed when expectations aren't met. Unlike traditional storage, Tintri SQL Integrated Storage ensures consistent, predictable performance by isolating each database from "noisy" workloads and other databases that might be processing disruptive queries. A database running the heaviest I/O loads in the data center can be placed alongside any other database without requiring initial or subsequent storage configurations. All databases will perform flawlessly with Tintri SQL Integrated Storage. By dynamically and autonomously adjusting resources as I/O requirements change, performance and QoS are maintained without overprovisioning or administrator intervention – each database always gets the exact resources it requires. To keep production databases unaffected, Tintri SQL Integrated Storage can also offload resource-intensive activities to other SQL Servers instances, including integrity checks, maintenance, reporting and copy-only backups.

Discover how Tintri SQL Integrated Storage is Intelligent Infrastructure that easily and efficiently powers Microsoft SQL Server solutions for educational institutions and services.

Visit us at: www.tintri.com/sql

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