Lower TCO While Meeting Oracle Performance Resilience and Mission-Critical Operations Requirements

Each year, businesses invest millions in Oracle databases and applications and rely on them for their corporate survival and competitiveness. But few organizations have formulated a truly complete Oracle strategy. Many approaches rely on Oracle-specific solutions that do not integrate into the larger corporate IT strategies or infrastructure and lack the flexibility your business needs. This lack of full-system, application-to-storage integration causes performance problems and gaps in data protection. It masks cost overruns in hardware acquisition and complicates systems management. You need a partner who can help you reduce the total cost of ownership (TCO) for your infrastructure while improving performance, protection and flexibility of your Oracle environment. That’s where Hitachi Data Systems comes in.

Since Hitachi Data Systems was founded in 1989, thousands of Oracle’s most demanding customers have chosen to trust their Oracle environment to highly reliable, high-performance Hitachi storage solutions. Early on, Hitachi Data Systems realized that optimal Oracle reliability, performance and economy required a solid, application-centric storage platform. We developed high-availability components, performance-enhancing controllers and software, as well as a series of solutions and services to guarantee reliability and greater throughput in Oracle environments.

Because of this knowledge and attention to detail, Hitachi storage systems are rated year-in and year-out as the most reliable in the industry, with superior I/O performance in heavy database environments. More than 60% of all Hitachi Data Systems customers use Oracle databases and applications in their enterprise environments, including 9 of the top 10 commercial banks, 8 of the top 10 insurance companies and 8 of the top 10 U.S.-based Fortune 100 companies. These customers know: Hitachi Data Systems is the best choice for supporting their Oracle environments.
The depth of our Oracle experience and engineering expertise allows Hitachi Data Systems to provide the most comprehensive database storage solutions on the market, with innovative product features and world-class support. Hitachi storage solutions improve performance, protection, flexibility and TCO in virtually any business that relies on Oracle databases and applications.

Overview
Companies around the globe rely on Oracle solutions. Those organizations that choose to run Oracle on Hitachi storage can:
- Lower total cost of ownership.
- Better protect data and improve application performance.
- Easily manage service level agreements (SLAs) and compliance.
- Simplify Oracle administration.

Through a combination of our solutions and our expertise in Oracle environments, Hitachi Data Systems can help companies control, and often lower, capital and management costs, while increasing performance, protection and flexibility. Simply put, we can help organizations ensure they have the right information available in the right place, at the right time — and for the right cost.

Lower Your Total Cost of Ownership
For large-scale Oracle environments, running multiple database instances can quickly become a management nightmare. Furthermore, the licensing costs associated with supporting multiple, discrete databases can drive up the overall cost to maintain your environment.

Hitachi storage solutions have industry-leading price-to-performance ratios, with up to 50% less TCO within the 1st year of operation than competing solutions. Our storage solutions enable database administrators to consolidate multiple database instances on a single storage system. Hitachi storage solutions also include innovative features that contribute to lower TCO, while improving resilience and efficiency of available storage capacity.

While managing large Oracle databases can overwhelm administrators, Hitachi offers a single unified management platform to manage all of our storage solutions. With Hitachi Command Suite, administrators can configure, provision and manage their overall Oracle storage infrastructure from a single tool quickly and easily, reducing operating costs and complexity.

Other innovative features that Hitachi storage solutions offer include Hitachi Dynamic Tiering (HDT) and Hitachi Dynamic Provisioning (HDP). HDT simplifies storage administration, solves the complexities of implementing data lifecycle management and optimizes the use of tiered storage. It eliminates the need for time-consuming manual data classification and data movement to improve tiered storage efficiencies.

HDP is thin provisioning software that allows for a common virtualized storage pool. It simplifies application storage provisioning by allowing administrators to draw from a central virtual pool without immediately adding physical disks. When an application requires more storage capacity, the storage system automatically allocates the necessary physical storage. This just-in-time method of provisioning decouples the provisioning of storage to an application from the physical addition of capacity to the storage system.

Hitachi Storage Economics is a proprietary suite of methodologies and tactics that uses 33 points of reference to help organizations reduce costs in their IT environments. To support an understanding of a complete storage environment, Storage Economics analysis can identify areas where storage inefficiencies that almost certainly affect Oracle performance are costing companies money. This full-system analysis can pinpoint enterprise-wide storage waste and bottlenecks.
Together, these features can enable you to significantly lower TCO associated with running Oracle databases, without compromising performance, efficiency or availability.

**Protect Data and Application Performance**

**Data Protection**

Oracle-based data is the lifeblood of many companies. If applications and data are not available, organizations see potential business-ending losses. Corporations need to protect Oracle resources from the bottom up, from the disk drive to the application layer, to truly realize comprehensive protection.

Hitachi storage systems and controllers have the highest reliability ratings in the industry, which is why an increasing number of companies trust their Oracle data to Hitachi Data Systems. Hitachi storage virtualization technology, Hitachi RAID, redundant controllers and our full range of data replication and disaster recovery solutions complement all the latest Oracle features and functions. From each individual block of data to the entire application environment, Hitachi storage solutions have your Oracle environment covered.

**Application-Performance Protection**

You are always seeking better performance from your Oracle environment. However, have you looked to your storage system to enable these improvements? Hitachi storage solutions offer a range of hardware and software options to improve Oracle performance. Hitachi hardware, including symmetric active-active caching controllers, and both SAN and NAS hardware, offers industry-leading storage performance. Hitachi Dynamic Tiering software, Hitachi Resource Manager utility package, Hitachi Command Suite and many other software enhancements provide finely tuned performance control of the entire storage environment for Oracle.

**Manage SLAs and Compliance**

Corporate SLAs demand consistent, predictable performance and reliable storage uptime. Regulatory compliance requires proof of secure and fully protected data. Hitachi storage solutions offer unprecedented Oracle SLA improvements and compliance proof points with better-performing storage systems and comprehensive data protection, disaster recovery and business continuity solutions.

**Improve Oracle Administration**

Oracle solutions are the strategic heart of many worldwide enterprises. Hitachi storage solutions dramatically improve Oracle environments by:

- Keeping applications running smoothly.
- Easing the management burden of managing ever-increasing Oracle data sets.
- Protecting the entire Oracle environment.
- Improving performance, protection and TCO in virtually any business that relies on Oracle applications.

**Keep Applications Running Smoothly**

Oracle applications and the Oracle environment need ample resources to perform smoothly. Degraded application performance causes problems, ranging from curtailed user productivity to application crashes and data loss.

In a race to keep Oracle applications running correctly, IT administrators and database administrators (DBAs) tend to overprovision storage capacity for Oracle databases. This wastes capital expenses and, in many cases, increases management costs.

Intelligent provisioning of Oracle disk space is required to ensure that Oracle has exactly the amount of space it needs to function correctly. Hitachi Dynamic Provisioning enables you to make sure the right amount and the right type of storage is online to maximize performance and efficiency in your Oracle environment.

To further enhance performance, Hitachi Dynamic Tiering guarantees that critical production data is available on the fastest and nearest tier of storage. It stores less-frequently accessed data on more cost-effective storage media.

Hitachi TrueCopy synchronous, Hitachi TrueCopy Extended Distance and Hitachi Universal Replicator software ensure that Oracle data is protected both on-site and off-site, and provide disaster recovery for Oracle environments. Hitachi Virtual Storage Platform G1000 and Hitachi Unified Storage family systems use dynamic load balancing and cached controllers to ensure system availability and increased I/O performance.

Hitachi storage solutions can also be used in conjunction with Oracle Enterprise Manager, providing protection and performance no matter where your Oracle data resides.

**Ease the Management Burden**

Adding and maintaining storage for Oracle should not drastically increase your storage administration tasks. In fact, with the correctly tiered solution, storage administration requirements should decrease.

Hitachi Command Suite, Hitachi Dynamic Provisioning and Hitachi Tiered Storage Manager all reduce, or even eliminate, many time-intensive storage management tasks. Our Storage Evaluator for Database tool offers measurement capabilities that show Oracle DBAs exactly how much performance their disk system needs to deliver. This reduces guesswork and trial-and-error system tuning.

**Protect the Entire Oracle Environment**

From high-performance, highly reliable hardware solutions, to extensive storage management and optimization tools, Hitachi Data Systems provides the highest level of Oracle expertise and experience. Hitachi
product reliability rankings and customer adoption rates underscore our commitment to improving the Oracle experience for businesses worldwide.

Database administrators know the importance of advanced data protection, disaster recovery and business continuity that Hitachi storage solutions provide (see Table 1).

Hitachi storage systems provide optimized backup and recovery mechanisms for Oracle databases and applications. We integrate with Oracle features such as Automatic Storage Management (ASM) and Recovery Manager (RMAN) to deliver high performance and reliable backup and recovery. Critical data is restored and fully available within minutes after application failure or data corruption. Simplified backup methodologies are easy to implement and remain transparent to users.

Our improved efficiency, centralized management and a rich feature set combine to provide a highly available infrastructure that easily meets service-level expectations for Oracle environments. Hitachi storage solutions help avoid both scheduled and unscheduled downtime, and they ensure that Oracle environments can scale quickly and easily to accommodate rapid business growth.

**Hitachi Data Systems: The Choice for Oracle**

- Hitachi Data Systems runs its business on Oracle.
- Nine of the top 10 U.S. commercial banks, 8 of the top 10 U.S. insurance companies and the top 3 U.S. telecommunications companies run Oracle on Hitachi storage.
- Our Storage Evaluator for Database analysis tool allows for peak optimization of Oracle storage space.
- Storage virtualization allows Hitachi Virtual Storage Platform G1000 and Hitachi Unified Storage VM to manage heterogeneous, externally attached storage systems, which can be redeployed, migrated or utilized more easily and effectively.
- Hitachi Dynamic Provisioning software works well with Oracle ASM in accurately managing capacity and providing superior performance, utilizing wide striping on the storage system.

**TABLE 1. TYPICAL ORACLE APPLICATION CHALLENGES AND HITACHI SOLUTIONS**

<table>
<thead>
<tr>
<th>Oracle Application Challenges</th>
<th>Hitachi Storage Solutions</th>
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<tbody>
<tr>
<td>Achieve a lower total cost of ownership for your Oracle environment.</td>
<td>In the rush to keep up with Oracle growth, companies scramble to add capacity, wasting resources in the process. With Hitachi thin provisioning and storage virtualization capabilities, companies can reclaim lost capacity stranded on enterprise storage systems and make better use of storage that is already available. This results in lower costs and higher performance, as well as reduced management requirements on current systems.</td>
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<tr>
<td>Oracle data must be fully protected.</td>
<td>Hitachi TrueCopy synchronous, Hitachi TrueCopy Extended Distance and Hitachi Universal Replicator provide a platform for both on-site and off-site disaster recovery and protection of Oracle data. Whether in conjunction with existing Oracle backup tools or on their own, Hitachi storage solutions for Oracle provide full protection, not only for Oracle-specific data, but also for the entire enterprise. These solutions consolidate disaster recovery and backup costs.</td>
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<tr>
<td>Oracle performance must be improved from top to bottom to meet corporate demands.</td>
<td>Hitachi Dynamic Tiering software makes sure enterprise applications have the right data, in the right place, at the right time, which saves on disk and administration costs. Hitachi active-active controllers provide reliability and performance caching for the best disk I/O.</td>
</tr>
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- Hitachi Dynamic Tiering software puts the right data on the highest performing or most cost-effective media at the right time.

**Summary**

With more than 20 years of Oracle experience, Hitachi Data Systems has developed the solutions and expertise to support the largest and most demanding of Oracle’s customers worldwide.

**Hitachi Virtual Storage Platform G1000 (VSP G1000)**

The ideal storage platform for running mission-critical Oracle workloads offers 4 times the internal bandwidth, 3 times the IOPS capacity and 25% better power efficiency than the previous generation. Hitachi Virtual Storage Platform G1000 is the new gold standard for enterprise storage. VSP G1000 is backed by a set of solutions and services, including thin provisioning with Hitachi Dynamic Provisioning and automated data tiering with Hitachi Dynamic Tiering software. VSP G1000 also includes 3-D scaling, application-centric unified storage management and secure multitencancy, as well as simplified, unified data replication across heterogeneous storage systems.

At the heart of VSP G1000 is Hitachi Storage Virtualization Operating System (SVOS), the software that supports our industry-leading storage virtualization, HDT, HDP and so much more.

**Hitachi Unified Storage (HUS) VM**

Hitachi Unified Storage VM can manage all of your existing storage and consolidate all of your data in a single, virtualized platform to ease the management of information. HUS VM is built with trusted Hitachi reliability for application availability, performance and lower cost of ownership. Delivering enterprise storage virtualization in a unified platform lets you manage information more efficiently.

**Hitachi Unified Storage 150**

Hitachi Unified Storage 150 provides data availability and features symmetric active-active controllers with dynamic load balancing. Features include native multipathing and host load balancing to spread I/O workloads across resources, which make setup faster, reducing administrator and software costs, while optimizing performance.
With built-in automation that optimizes performance, your end users can be assured that they will get the most out of their investment. Intuitive and easy-to-use software that comes with each of our storage systems has been designed to simplify even the most complex operating environments.

Meeting service level objectives for critical business applications has never been easier with a solution that provides the highest level of performance, data availability and data protection.

**Hitachi Accelerated Flash**

Hitachi Accelerated Flash is designed to accelerate the performance of your Oracle databases. With integrated Hitachi Accelerated Flash storage, both VSP G1000 and HUS VM systems are able to deliver faster access for optimal Oracle database performance. They also increase efficiency through centralized management of all storage assets.

Hitachi Accelerated Flash features a module built specifically for the most demanding Oracle performance requirements along with improved response times. It features innovative Hitachi-developed embedded flash memory controller technology. And, it is designed to achieve higher performance, increased durability and greater capacity compared to the commodity solid-state drives found in competitive solutions.

Hitachi Accelerated Flash storage is fully compatible with all VSP G1000 and HUS VM features, including Hitachi Dynamic Tiering for creating tiers of storage. HDT allows the system to automatically optimize data placement by putting the most active data on Hitachi Accelerated Flash storage when the highest performance is required. At the same time it places less-active data on cost-optimized, lower performance disk. Thin provisioning is included to reduce capacity requirements by increasing utilization of your storage.

**For More Information**

To learn more about how Hitachi storage solutions can improve your Oracle environment please visit: www.HDS.com.