Optimizing Oracle Databases with IBM DS5000, DS4000 and DS3000

DS5000 Solutions Guide

Business Challenge

When faced with the prospect of optimizing Oracle databases for online transaction and/or analytical processing, questions about tuning the storage in conjunction with internal Oracle structures and maximizing database protection are not easily answered. Database administrators often may not understand all of the challenges involved in a storage environment and storage administrators are not usually database experts. Furthermore, organizational boundaries can make it difficult for the two disciplines to collaborate effectively. Some of the considerations involved include characterization of Oracle workloads, storage sizing and provisioning, interoperability, deployment, configuration, performance, availability, scalability, security, array-based data protection, database cloning, and tuning Oracle itself.

The challenge for IT is to provide database and storage administrators with the knowledge, tools, and guidance needed to work more collaboratively in order to optimize Oracle performance and availability and minimize associated costs.

Storage Solution Description

IBM has developed a number of Whitepapers and a storage sizing tool to simplify the process of optimizing Oracle databases that are stored on IBM System Storage™ DS5000, DS4000 and DS3000 series disk systems. The following provides a list of these documents, and a brief description of their content and usage.

Solution Deliverable	Key Deliverable Benefits
Best Practices Whitepaper	
Oracle Best Practices Utilizing the IBM System Storage™ DS5000	In-depth description of how to simplify and speed the successful deployment of Oracle databases, for primary storage, on IBM DS4000 and DS5000 disk systems. Covers: • Cabling and Setup • Volume and Disk Layout • HBA settings
Cloning Oracle Databases—Best Practices Using Storage Manager Data Replication Features	• Accurately evaluate cloning options • Reduce time and effort required to clone for backup, recovery, training, test, quality assurance, reporting, etc. using hardware assisted synchronous mirroring, snapshots, and volume copies • Minimize DBA intervention

Achieving High Availability on a Linux Two-Node Cluster Using Oracle's Maximum Availability Architecture	• Achieve a highly available Oracle environment using detailed configuration and performance guidelines • Minimize downtime—both planned and unplanned • Improve service level agreements • Eliminate the cost of high priced consultants • Maintain high availability as the Oracle environment evolves • Establish change control and security procedures • Increase Oracle resiliency and decrease TCO with commodity servers and resilient, low cost storage
Installation and Configuration Guides	
Deploying an Oracle 10g Database on Linux Red Hat 5 with an IBM DS3200 disk system	• Benefits of an IBM DS3200 SAS-based disk system Describes proven steps on how to simplify: • Configuring the host • Configuring the storage system • Oracle setup and configuration, including Clusterware
Deploying Oracle 10gR2 on AIX 5.3 with an IBM DS4800	• Benefits of an IBM DS3400 disk system Describes proven steps on how to simplify: • Configuring the host • Configuring the storage system • Oracle setup and configuration, including Clusterware
Deploying Oracle Database 10gR2 RAC on a Windows Server 2003 with an IBM System Storage DS3400	• Benefits of an IBM DS3400 disk system Describes proven steps on how to simplify: • Configuring the host • Configuring the storage system • Oracle setup and configuration, including Clusterware
Deploying Oracle Database 10g RAC on SUSE Linux Enterprise Server 9 and an IBM DS4800	• Benefits of an IBM DS4800 disk system Describes proven steps on how to simplify: • Configuring the host • Configuring the storage system • Oracle setup and configuration, including Clusterware
Oracle 10g Deployment Guides for Solaris, Linux, Windows 2003	• Simplify Oracle implementation • Achieve the full benefits of IBM DS4000 series storage (high performance, high availability, data replication features) • Avoid key obstacles associated with tuning kernel parameters, setting file permissions, providing storage access to shared devices, partitioning storage, and verifying interoperability
Technical Whitepapers	
The Optimal Oracle Configuration—Using the Oracle ORION Workload Tool to Accurately Configure Storage	• Improve storage purchasing decisions • Gain a vital edge in predicting and maintaining Oracle performance • Avoid solving performance problems with extra CPUs or memory • Simplify performance modeling

Optimizing Oracle Databases with IBM DS5000, DS4000 and DS3000 System Storage and Best Practices	
Oracle Database Protection Using Storage Manager Data Replication Features	• Understand how data replication features (FlashCopy, VolumeCopy, Enhanced Remote Mirror) can be used for cold, hot, and export methods of protecting an Oracle database • Using array-based backups, achieve higher service levels • Increase success rates of backups and recoveries • Improve backup performance • Minimize backup windows • Offload backup work from servers • Implement a cost effective disaster recovery strategy with improved recovery point and recovery time objectives
Performance and Scalability of the IBM DS4800	• Enable the Oracle DBA and storage administrator to speak the same language and make more intelligent decisions about Oracle storage • Achieve storage system scalability as Oracle databases grow in size and workload • Handle a variety of workloads with exceptional I/O rates (for OLTP) and throughput (for OLAP) • Implement a "pay as you grow" strategy • Avoid performance roadblocks that result from lack of scalability as databases grow
Tuning Oracle with Consideration for Storage and Oracle Database Files	• Simplify Oracle tuning with a systematic approach • Understand the mapping between system files and Oracle structures • Implement an approach for monitoring, detecting, and tuning Oracle performance
Tuning Oracle with Consideration for Storage and Oracle Memory Usage	• Simplify Oracle tuning with a systematic approach • Better understand components of the System Global Area that impact I/O • Optimize performance by tuning internal Oracle memory structures and the underlying storage system
Tuning Oracle with Consideration for Storage and Your Application Mix	• Simplify Oracle tuning with a systematic approach • Better understand the tuning aspects of application mix, Oracle workload, active sessions, and resource contention • Optimize performance by improving both application design and database configuration
RMAN Disk to Disk Backup Solution	• Provides a high-level description of how to implement an RMAN backup and recover methodology using IBM System Storage

Business Value of Optimizing Oracle Databases

These solution deliverables, in conjunction with IBM DS5000, DS4000 and DS3000 series disk systems, are designed to assist a customer in solving the business challenge of optimizing Oracle performance and availability while minimizing associated costs. When used conscientiously, they are designed to help—

- Increase the performance of applications that utilize Oracle databases, boosting employee productivity and expanding support for eBusiness
- Improve the recovery and availability of these applications, providing higher service levels that can lead to greater business success
- Reduce server acquisition costs and ongoing costs for maintenance, floor space, power and cooling by minimizing the number of CPUs and amount of memory required
- Enhance the productivity of IT staff involved with storage and Oracle databases
- Lower overall costs required to deliver exceptional IT services associated with Oracle databases

By using Orion and SPC benchmark guidelines and extensively testing the IBM DS5000, we have demonstrated the DS5000 has exceptional scalability and balanced performance for Oracle OLTP and OLAP workloads. This scalability applies to the largest DS5000 configuration. When Oracle databases are stored on IBM DS5000 disk systems, the following additional benefits may be realized—

- Minimize the number of storage systems required, even as your capacity and performance needs increase, cutting acquisition costs and

ongoing costs for maintenance, floor space, power and cooling

- Minimize storage acquisition costs even further by implementing a "pay-as-you-grow" strategy that leverages IBM DS4000 and DS5000 series modularity and its scalable architecture
- Protect your storage investments through proven scalability and tiered storage capabilities (both Fibre Channel and SATA drives are supported within the same disk system)
- Achieve outstanding sustained storage performance from the SPC (Storage Performance Council) benchmark leader for modular storage
- Realize new levels of Oracle database availability with dynamic expansion of physical capacity and Oracle volumes, dynamic migration of RAID levels, and dynamic segment sizing
- Free up servers from data replication tasks with integrated FlashCopy, VolumeCopy and Enhanced Remote Mirror capabilities
- Maximize storage price/performance while lowering your total cost of storage ownership

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