

Product Brief

Oracle ASM: A Frontrunner in Storage Management Solutions

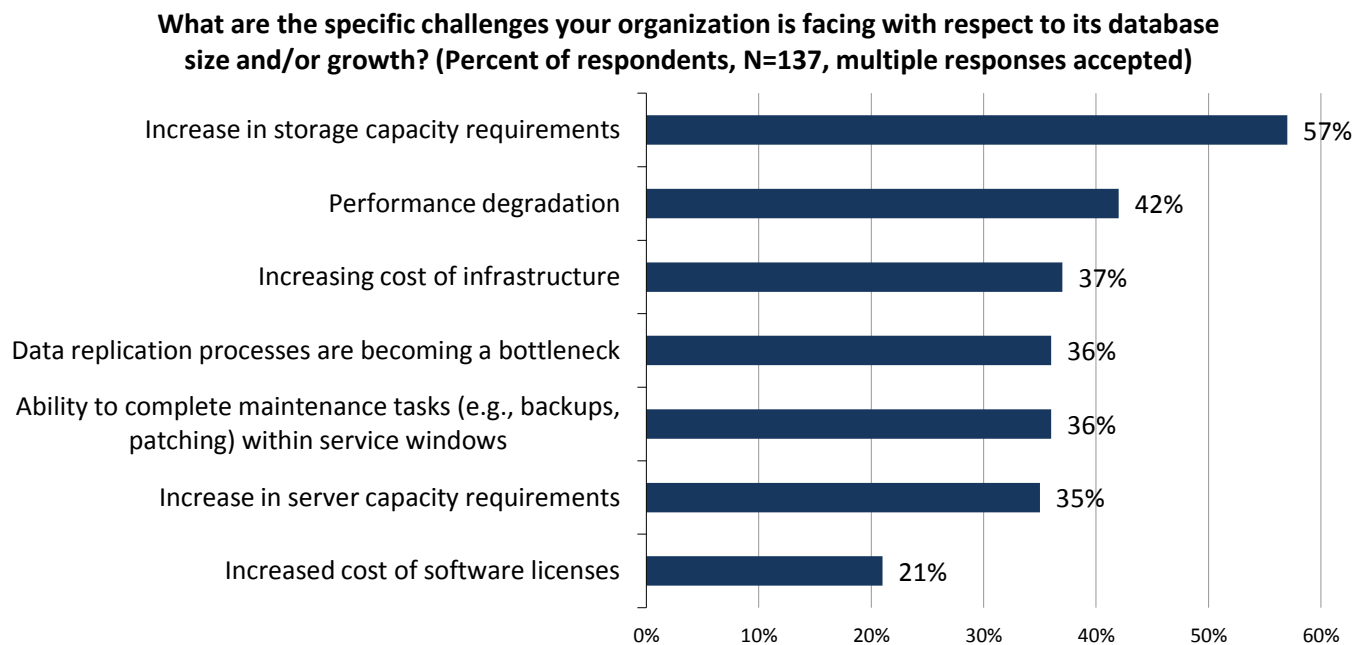
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Abstract: *Optimizing IT resources is a top priority for organizations seeking to control costs and respond quickly to requests from the business as data volumes continue to grow. Managing the increasing requirements for storage capacity, as a result, is a hot topic among IT and corporate management. Data governance introduces the promise of significant efficiencies by aligning corporate goals with day to day needs and then prioritizing technology investments. Any technology that introduces simplified management and automation in support of data governance best practices—such the Automatic Storage Management (ASM) feature available in [Oracle Database 11g](#)—should be considered as a core enabler to address storage capacity management challenges.*

Overview

According to ESG research, controlling costs remains among the top business initiatives impacting IT spending, but conservative financial practices are only of value if they do not hinder business operations and development. It comes as no surprise, then, that despite economic concerns, IT organizations continue to invest in new application deployments and/or existing application upgrades to respond to constantly changing business requirements.¹ These activities are not simple tasks: with every new application deployment or upgrade, storage and other infrastructure must be provisioned as well. This is especially true for database applications. Among the top IT challenges cited with regard for managing database environments, 57% of respondents pointed to issues with storage requirements.

Figure 1. Top Challenges Related to Database Size and/or Growth



Source: Enterprise Strategy Group, 2011.

As data accumulates through new application deployments, application upgrades, or an increase in transaction volumes, controls must be put into place. Without control, organizations will continue to suffer from the effects of data glut which

¹ See: ESG Research Report, [2011 IT Spending Intentions Research](#), January 2011.

include the same challenges identified above, such as keeping ahead of the increase in storage capacity requirements, performance degradation if the underlying infrastructure or database is not upgraded or tuned accordingly, and difficulties completing standard maintenance tasks within designated maintenance windows. Data governance initiatives that incorporate information lifecycle management (ILM) strategies can help organizations address storage-related inefficiencies.

Cutting Costs via a Sound Data Governance Strategy

Data governance processes ensure that important data assets are formally managed. A sound data governance strategy contributes to improved data quality, information security compliance, and data optimization. Because this discipline crosses all organizational boundaries, it enables effective sharing of information assets and fully utilizes data created by multiple business units. A sound data governance policy alone cannot, however, solve data management problems associated with large data volumes and database sizes: technological support systems robust enough to deal with a rapidly growing warehouse of knowledge while providing a structured mechanism for storing, managing, and accessing that knowledge are also required.

A successful data governance framework aligns business needs with technology requirements. When the charter of a data governance program focuses on cost reduction or containment in the form of data optimization, a common measurement for success is how well IT assets are leveraged with minimal waste while maintaining service level agreements. ILM strategies, incorporated as part of a data governance framework, provide the tools and processes necessary to meet data optimization goals.

For data in an Oracle database, ensuring that it is available to support business needs can be challenging as requirements change over time. Application developers and DBAs can partition data within the database leveraging features and tools such as Oracle Advanced Partitioning to separate the data based on business logic; however, if they want to optimize their investments in the underlying storage as part of an ILM strategy or tiering storage, they need to develop processes to facilitate data movement from one class of storage to another. A solution that makes this process more efficient ultimately results in better utilization of storage assets.

Oracle ASM

The Frontrunner in Storage Management Solutions

One of the biggest challenges Oracle DBAs face is coordinating storage management with storage and system administrators in order to align business requirements with the capabilities of the underlying storage. Oracle Automatic Storage Management (ASM) provided a framework that enabled DBAs to own more of the management process, and to do so via a familiar database interface. With ASM, storage administrators could focus on provisioning the appropriate class/capacity of storage, and DBAs could concentrate on coordinating data placement using application-aware database partition logic. In the current Oracle 11g release, Oracle ASM brings significant improvements and enhancements, making it a recommended standard component for any Oracle application that could benefit from tiered storage.

Key Benefits of Oracle ASM

- **Use of disk groups to accommodate growth.** ASM enables administrators to reference disk *groups* rather than individual disks and files. These disk groups, which are comprised of several physical disks, are then controlled as a single unit. The files stored within a disk group are evenly distributed (striped) across the disks to provide uniform performance that is comparable to the performance of raw devices.
- **Easy addition/removal of disks, with continuous access to data.** Disks can be added or removed from a disk group while a database continues to access files in the group. ASM automatically redistributes the files, and eliminates the need for downtime while content is being redistributed.
- **Reduced administrative overhead/improved performance.** ASM reduces administrative overhead for managing database storage by consolidating the storage into larger disk groups. This enables administrators to consolidate storage for multiple databases, and provides overall improved IO performance.

- **Easy integration into pre-existing environments.** ASM files can co-exist with other storage management options, such as raw disks and third-party file systems, thereby simplifying the integration of ASM into pre-existing environments.
- **Easy-to-use management interfaces.** ASM interfaces include SQL*Plus, the ASMCMD command line interface, and Oracle Enterprise Manager.
- **Flexible server-based mirroring options.** ASM normal and high redundancy disk groups enable both two-way and three-way mirroring for high availability.
- **Automation of SAME methodology.** Oracle’s “Stripe and Mirror Everything” (SAME) methodology ensures optimized availability, performance, and manageability by recommending striping across as many physical devices as possible. This can be achieved without Oracle ASM, but if the storage configuration changes, the layout of the database files on the devices should change as well. Oracle ASM performs this task automatically without manual intervention.²
- **It’s included with the Oracle Database at no extra charge.**

ASM in an ILM Environment

To achieve optimum throughput from storage devices, multiple disks must work in parallel. This is achieved through striping, which stores data blocks in equally-sized slices across multiple devices. In an ILM environment, striping cannot occur across all devices because data would be distributed across storage pools which may have different performance characteristics. What’s more, tablespaces should not span storage pools and the data files for the same tablespace should not be stored in multiple storage pools. Rather, storage in an ILM environment should be configured to use striping across all devices *within* a storage pool.

Oracle ASM creates separate disk groups for each storage pool within the ILM environment. Tablespaces will not store data files in different disk groups, so data can be moved online using partition movement operations for partitioned tables or, in cases where the tables are not partitioned, using the DBMS_REDEFINITION package.³

The Bigger Truth

Changes in technology can often introduce unnecessary barriers to business communication. Focused on keeping up with the technology itself, DBAs often don’t talk to storage administrators, storage administrators don’t talk to business teams, and business teams don’t fully explain data access needs to DBAs. The result is an organization that is unaware of the full strength of the data it possesses.

The design and development of a sound structured data governance strategy addresses the data needs of the organization as a whole, rather than as individual disconnected business units. Data governance provides a framework with which organizations can break down barriers and focus on common goals such as improving efficiency, controlling costs, maintaining compliance, and addressing other key corporate initiatives.

Data governance on its own cannot resolve the problem of inefficient storage for data stored in Oracle databases. The technology to support those data governance rules and policies within an ever-expanding data store is also needed. Oracle ASM offers a simple, straightforward means of provisioning IT infrastructures that fully supports data governance rules and policies, and add/delete disks as needed to ensure continuous access to vital information distributed and protected by a cost-effective, streamlined data center.

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² See: Oracle Database storage Administrator’s Guide

³ Ibid.