## DATA CENTER BEST PRACTICES:
# MANAGING DATA WITH CLOUD COMPUTING

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Leveraging data in innovative ways offers businesses unparalleled opportunities to understand and respond to the needs of a rapidly moving and changing market. Yet as an increasing volume of data from ever-growing numbers of sources pours into data centers, today's enterprise is just as likely to drown in its data as it is to harness it for a strategic market advantage.

The sheer volume of data—terabytes and increasingly petabytes of information—suggests why managing and analyzing it is a challenge. It's no longer efficient for data warehouses (DWs) to manage single, homogenous workloads. Business analysts need access to a wide variety of data, in real time, for diverse uses such as standard and specialized reporting, online analytical processing(OLAP), advanced analytics such as data mining and data marts, and staging for detailed or real-time data sources. The strategic requirement for real-time data warehousing also adds online transaction processing (OLTP) workloads to the mix, furthering the strain on existing infrastructures.

With so much data being used in so many ways, the IT infrastructure has to accommodate constantly fluctuating demands on processing and storage. Traditional distributed approaches to infrastructure and architecture lack the flexibility required

to maintain processing speed and scalability. As a result, IT organizations end up spending precious time and resources building up and reallocating excess capacity to support shifting workloads.

IT organizations must become more effective at meeting the challenge of deploying, scaling, and responding to business requirements faster than ever before—all the while maintaining or preferably cutting costs. In order to meet these demands, data centers are looking at cloud computing as a way to deliver the necessary flexibility, scalability, efficiency and speed. Because cloud computing is based on pooled computing resources and the ability to rapidly provision and elastically scale capacity, it is well suited for environments with high data growth and highly variable processing workloads.

"Many data centers are migrating toward the cloud, or at least a cloud-like model, so that they may take advantage of the pooled resources that form the fundamental core of cloud computing," says Rex Wang, vice president of product marketing at Oracle. "By pooling or sharing resources across multiple applications, cloud delivers the efficiency and increased flexibility data centers require to help the business be market-competitive. For data processing and analysis, having a shared, standardized, and consolidated database architecture for all DW and OLTP workloads is an effective strategy."

## BENEFITS OF CONSOLIDATION

Shifting to a cloud model enables IT organizations to recover and re-allocate resources on the fly as workloads shift and temporary structures like data marts go in and out of use. To support this move, however, they need to consolidate applications and databases onto a shared, pooled architecture, either by leveraging the public cloud or by creating a private cloud using on-premises infrastructure.

Consolidation can be done at two levels: onto shared hardware infrastructure and onto shared and standardized platforms. This choice will both drive and be driven by strategy.

At the infrastructure level, organizations can consolidate by sharing hardware through virtualization, reaping benefits such as lower hardware, power, cooling and data-center costs. However, consolidation at the infrastructure level does nothing to reduce the cost and complexity of the heterogeneous application and data siloes running on top of virtualized servers. Addressing this more fully will require standardization and consolidation at a platform level, creating a single database architecture capable of handling both data warehousing and OLTP workloads across the enterprise.

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This further boosts IT productivity, agility and responsiveness to business needs and shifting market conditions.

This consolidation prepares organizations for ongoing data growth by ensuring ample capacity for new users and applications. It also enables IT organizations to develop and deploy new applications faster for more timely responses to workload fluctuations, whether that means rapid long-term growth or sudden spikes in activity. In addition, consolidation facilitates faster, simpler backups and lowers the overarching storage cost through improved data compression.

Finally, consolidating workloads in the cloud delivers dramatic cost savings by minimizing the human costs of IT systems management. Consolidating many databases into one reduces IT costs as the organization's need for database administrators, vendor support, and time allocated to upgrades and patches is greatly reduced if not eliminated all together. With fewer databases to maintain, IT can now operate more efficiently—and hold the line on labor costs at the same time.

## CHOOSING A SOLUTION

To generate these benefits, IT organizations must look for a solution that combines a wide array of features. Here's a checklist of what to look for:

▸ **A single integrated platform** that combines servers, low-latency storage, high-performance networking, and intelligent software for rapid deployment and scalability as well as easy interoperability with minimal performance tuning requirements.

▸ **Extreme performance for all workloads** including data warehousing, OLTP and mixed workloads, to ensure fast access to larger volumes of data so more data is available for more purposes in less time.

▸ **An archival mode optimized for space,** to maximize server and storage space and deliver significant storage capacity at extremely low cost, lowering the total cost of ownership (TCO) on existing hardware and limiting the size and frequency of future storage purchases.

▸ **Ease of implementation,** to maximize return on investment (ROI) by freeing IT resources to focus on strategic efforts rather than database maintenance.

▸ **A resource manager to manage workloads,** to allow IT to set a minimum level of input and output for each database and the workloads within them, making it easier to guarantee service levels and ensure consistent performance.

Properly implemented, a solution with these attributes and features can deliver rapid ROI and low TCO while providing end users with significantly faster results against the consolidated database.

### IMPLEMENTATION AND BEST PRACTICES

Before an organization implements a cloud-based database solution combining DW and OLTP data, it should determine whether the move makes practical sense. Given that such a move is usually driven—at least initially—by potential cost savings, IT should examine the application portfolio to establish how many applications can effectively be migrated to a standardized database architecture. If enough applications (or, at minimum, the most business-critical applications) qualify, IT should compare the current cost of operating the application portfolio against the ROI and TCO during and after consolidation.

In most instances, IT managers will favor consolidating DW and OLTP data onto a single, standardized database platform. These best practices will help guide them through the process.

STEP 1 **INFRASTRUCTURE:** A pre-engineered solution quickly eliminates the design, integration and configuration work needed to deliver a database cloud with extreme performance, consolidation efficiency, and integrated cloud management. With hardware and software engineered to work together, IT can move past cumbersome, time-consuming design and testing and move directly to deployment—so IT can move on to other urgent business needs.

STEP 2 **DATA MIGRATION:** Much of the data migration process involves converting data into a single format at the database level. The approach depends on the data formats generated by source systems. If the contents of different databases do not need to be or should not be combined for operational or security reasons, they can be migrated separately to a single virtualized server. However, for a true, consistent, 360-degree view of data, schema consolidation may be used to convert all source data into one standardized format before loading it into a shared database.

STEP 3 **MAINTAINING THE CONVERGED ENVIRONMENT:** As consolidation reduces the overall hardware, power and cooling costs, it also reduces operational complexity by enabling IT to eliminate the hodgepodge of different management tools and

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methodologies for different components in the data center, replacing them with a comprehensive and integrated lifecycle approach that extends across the entire database cloud. Maximize efficient performance and simplify management of the newly consolidated database by implementing a single uniform backup routine, disaster recovery strategy, update and patch schedule, and monitoring and management processes.

### CONCLUSION

The best way to reap all the rewards of a cloud-based data center is to apply these best practices to an affordable, high-performance solution capable of handling both DW and OLTP workloads. One such solution is Oracle Exadata Database Machine, a complete, easy to deploy, preoptimized and preconfigured package of intelligent software, high-performance servers, low latency storage and high speed networking capable of delivering extreme performance for all database workloads and maximizing storage capacity.

By consolidating databases in a private cloud with Oracle Exadata, organizations can achieve dramatic performance improvements and cost savings like these:

▸▸ A leading Australian bank consolidated over 300 applications for a 50 percent reduction in operating costs and an increase in server utilization from 15 percent to 80 percent, achieving breakeven within the first year.

▸▸ A global financial services firm consolidated more than 60 applications onto a standard Oracle Exadata platform, reducing costs by more than 50 percent while consuming 57 percent less power.

▸▸ Another well-known bank leveraged database consolidation to achieve a 35 percent reduction in both operating costs and project costs while decreasing power consumption by 44 percent over four years.

"Consolidation may be driven initially by cost savings," Wang notes. "But once you've consolidated and standardized at the database level, you have a compelling, powerful asset: a platform on which you can innovate and build new business capabilities more readily. Oracle Exadata is best platform for database consolidation and database clouds."

# Data Center Best Practices: Cloud Computing

## Consolidating Data Warehousing and OLTP

**Rex Wang**

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**Rex Wang leads go-to-market planning, sales enablement, marketing and demand-generation for cloud computing and virtualization**.

**FOR MORE INFORMATION**:
please visit **www.oracle.com**

As data centers migrate to the cloud, or at least become more cloud-like, Oracle's vice president of product marketing Rex Wang offers his perspective on this momentous shift.

**What pain points are driving organizations to consider moving data centers to the cloud?**

IT organizations are under pressure to deliver better service faster and at lower cost to the lines of business. Cloud computing provides a simultaneous way to lower costs, increase responsiveness and flexibility, and improve quality of service.

**Why might decision-makers hesitate in committing to this transformation, and how would you advise them?**

Standardization is challenging. It requires a certain amount of effort to move from a fragmented, heterogeneous model to a standardized, consolidated model; and to move all or most applications to a common architecture, some may need to be rewritten. IT can't force business users to use the standard platform, but we've found that if IT offers standardized database platform services with superior capabilities at a lower cost, users will move to the

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**How does a cloud-based data center solve those challenges?**

In a traditional data center, each application runs in a silo, and each silo is sized for peak load. There's no way to share capacity between silos; you have to carry enough capacity for the peak workload of every application. Once you move to shared or pooled resources, you can increase utilization rates and carry only enough capacity spread across all workloads.

**What strategic advantages can a cloud-based data center offer?**

Pooling resources in a cloud model allows for greater flexibility and faster innovation for dynamic business demands. If your business is growing fast, has a high frequency of new projects, or experiences a sudden spike in demand, you can build new solutions for each of those initiatives much faster without affecting overall performance.

standardized offerings over time. We've seen this pattern in many customers, but it takes time and discipline to move toward a standardized platform approach.

**What's unique about Oracle's take on the concept?**

Oracle Exadata Database Machine is an engineered system that combines hardware and software that have been architected to deliver performance an order of magnitude better than anything else in the market. It's extremely efficient for mixed-workload consolidation; you can often consolidate 50 to 100 applications on a single quarter-rack Oracle Exadata Database Machine. You can't build anything like it by combining other vendors' products; and nothing else can deliver the same combination of high performance and low total cost of ownership.

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