MOVING ORACLE TO THE CLOUD:
WHAT TO LOOK FOR IN STORAGE
AND INFRASTRUCTURE

ABSTRACT

This white paper discusses the advantages and challenges of moving Oracle databases to the cloud, describing the storage and converged infrastructure features and functions that are most critical to DBAs and infrastructure managers.
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Moving Oracle databases to a cloud platform is making more and more sense for many enterprises. Databases are growing rapidly, and enterprises find they are spending too much time and budget maintaining their existing physical environments. They are turning to highly virtualized cloud environments to improve efficiencies and reduce costs. For many organizations, the question is not whether to move Oracle to the cloud, but how to do so most effectively and efficiently.

One of the key decision points in moving Oracle to the cloud is the choice of the storage and infrastructure platform. This decision is particularly critical to those involved in the day-to-day management of the database and the underlying hardware infrastructure, specifically database administrators and IT infrastructure managers.

Why is the storage and infrastructure platform choice so critical to database administrators (DBAs) and infrastructure managers? There are several reasons:

1. **Roles are changing quickly in the data center.** The emergence of cloud computing and big data analytics is creating new opportunities for individuals with the skills to manage data more strategically. DBAs and infrastructure managers should look to spend less time on routine maintenance—especially Oracle patches and upgrades—in order to focus on the skills needed for the next-generation data center.

2. **DBAs are increasingly involved in decision making for storage and infrastructure.** Database administrators have to ensure that the choices they make give them the best opportunity to improve productivity without compromising or changing their basic responsibilities.

3. **The right platform for the storage architecture and underlying infrastructure can significantly reduce the time involved in managing the database.** Choosing the right platform should ensure that the overall IT infrastructure delivers the required levels of performance and quality of service in an environment that supports standardization and heterogeneous systems.

**ADVANTAGES OF THE CLOUD**

The cloud offers DBAs and infrastructure managers the potential to simplify and automate many of the tasks involved in database management, particularly in activities such as monitoring availability, diagnosing performance and managing backup and recovery.

This addresses a key challenge: Oracle customers report spending huge portions of their IT budgets on routine tasks such as applying upgrade fixes and patches; maintaining uptime and availability; and creating and maintaining copies of database information. In fact, nearly 40% say the share of their IT budgets devoted to these activities has increased during the past three years.

Oracle itself recognizes that customers are spending too much time and money maintaining their environments and, as a potential cloud solution, the company is aggressively marketing engineered systems such as the Exadata Database Machine. For Oracle, this makes sense: Now that the company is in the hardware business, it needs to sell more hardware.

For customers reliant on Oracle databases, however, the move to the cloud is so important and strategic that they must strongly consider the long-term ramifications of locking into an approach that, basically, sets up one cloud for the database environment and a separate cloud for the rest of the IT infrastructure.

Under careful scrutiny, most IT decision makers will recognize that having separate clouds is not the best approach—particularly because cloud-based solutions typically cut across enterprise applications. This requires high levels of integration with the underlying database for almost all key initiatives, from day-to-day business transactions to big data analytics.

Fortunately, there are storage and infrastructure choices that are far more strategic and will satisfy the needs of DBAs and infrastructure managers—while delivering an approach that will save the business significant money, dramatically improve productivity and position the organization to most effectively reap the benefits of big data analytics.
WHAT TO LOOK FOR IN CLOUD INFRASTRUCTURE

In understanding which characteristics are most important in building the underlying storage and infrastructure platform for Oracle in the cloud, it is important to understand how data centers have evolved.

The foundation of the cloud is virtualization and the x86 infrastructure. According to research firm Gartner Inc., roughly two thirds of x86 workloads are now virtualized. Within these highly virtualized infrastructures, organizations can readily abstract, pool and share compute, server and storage resources across databases and applications. Virtualized applications, particularly those that are business-critical, run best on x86-based servers.

Once applications are virtualized, IT has the freedom to add, remove or change virtual machines dynamically. This has created a need for greater speed, throughput, bandwidth, capacity and agility from the underlying storage infrastructure. Initially, the adoption of virtualization and x86 architectures created a performance gap between servers and traditional storage architectures as more database workloads could now be added on the fly and mixed workloads could be deployed on the same infrastructure. However, the availability of enterprise-grade flash storage has bridged this gap. Flash allows IT organizations to deliver the right performance where it is needed within the storage infrastructure—or even within the database servers themselves, with PCIe flash. With just a targeted use of flash, database latency can be dramatically reduced—improving response times and scaling Oracle performance.

In addition to optimizing performance, in a virtualized model where multiple databases and applications are sharing the same infrastructure, backing up and protecting that infrastructure becomes critical. Oracle DBAs now have access to storage functionality within the database, including:

- Oracle Recovery Manager (RMAN) for backups
- Flashback for point-in-time recovery
- Data Guard for remote site disaster recovery of database files
- Real Application Clusters (RAC) for active-active availability

These features can empower DBAs and give them more involvement in decision making for the purchase of storage solutions. It also means DBAs must look beyond the database and understand the ways in which databases interact and integrate with the rest of the organization’s applications and infrastructure. This is particularly important in cloud environments, where IT organizations must address these three critical issues:

1. The need to standardize **backup and data protection** across databases and applications, so that DBAs are empowered with direct control of backup and recovery through Oracle RMAN.

2. The need to move toward **Database as a Service operations**, enabling IT users—including DBAs—to monitor the complete database environment and infrastructure from a single point of control, and eventually be able to provide database and infrastructure resources directly through a self-service portal.

3. The need for **continuous availability**, 24 hours a day, seven days a week, 365 days a year. Taking down the system for operational issues such as mandatory quality patching in Oracle is fast becoming unacceptable and can be crippling in a cloud environment across multiple mission-critical applications. In addition, protection against unplanned outages is needed to ensure zero recovery-time objectives and zero recovery-point objectives.
ADDRESSING ORACLE CLOUD CHALLENGES

When DBAs and infrastructure managers look at some of the key storage and infrastructure challenges in moving Oracle to the cloud, they see impactful issues to address, including:

- Simplified monitoring and tuning of databases
- Improved performance through the use of flash storage
- Centralized backup and recovery across databases and applications
- Continuous data protection and active-active availability
- Standardization across the IT infrastructure.

Using an Oracle engineered system might seem at first glance like a simple way to move Oracle to the cloud, but it fails to address many of these core issues, such as standardization, centralized backup and recovery and database protection across the database and application infrastructure. It also potentially locks customers into a single vendor solution, when innovations such as big data may open up opportunities for alternative databases, such as those that are column-based rather than row-based.

Storage solutions built on EMC's VMAX or VNX architectures and converged infrastructure solutions using the VCE Vblock architecture™ give DBAs and infrastructure managers far more flexibility, while also leading to significant savings in cost and time involved in day-to-day management of the database. Here are some of the ways in which EMC solutions address some of the challenges involved in moving Oracle to the cloud:

- **Integrated database and storage monitoring for DBAs**: EMC and Oracle have jointly developed system-monitoring plug-ins for Oracle DBAs. These plug-ins allow DBAs to directly monitor availability, performance and capacity across EMC VMAX and VNX platforms through Oracle Enterprise Manager.

- **EMC Data Protection** enables centralized backup, recovery and deduplication across Oracle, Microsoft and SAP environments. Through application integration, DBAs can directly control backup, recovery and replication to EMC backup protection storage through Oracle RMAN directly.

- **EMC RecoverPoint** enables point-in-time recovery across Oracle, Microsoft and SAP databases applications locally or remotely using transaction-level bookmarks. This can be used in conjunction with Data Guard to complement the DBA’s technology and protect the entire cloud database and application infrastructure.

- **EMC VPLEX** is certified with Oracle RAC to enable stretching Oracle RAC clusters over a distance. VPLEX uses cache-coherency technology to allow applications to run active-active over distances.

- **VCE Vblock™** converged infrastructure systems enable IT organizations to standardize infrastructure across databases and applications while avoiding the pitfalls of building a proprietary vertical stack for each application. The compute, server and storage resources in a Vblock™ converged architecture system can be shared across Oracle, Microsoft and SAP environments. Production and test and development environments can be combined within the same platform, across online transaction processing, data warehouses or mixed workloads. In addition, the Vblock™ can be run as a physical or virtual infrastructure, allowing the IT department to choose the pace at which to virtualize.

BENEFITS TO INFRASTRUCTURE MANAGERS

From the perspective of infrastructure managers, building an integrated storage solution and converged infrastructure enables them to move Oracle to the cloud while focusing on key issues, including:

1. Deploying a cloud-enabled infrastructure optimized for Oracle database environments, while delivering economies of scale to provide similar benefits to Microsoft, SAP and other application environments.
2. Bridging the gap between DBAs and storage administrator teams by providing DBAs with more visibility and control to accomplish daily tasks faster.

3. Standardizing IT at the infrastructure layer to simplify deployment of network, server and storage resources for Oracle databases and all database and application environments.

**BENEFITS TO DATABASE ADMINISTRATORS**

Likewise, an integrated storage solution and converged infrastructure address many of the key requirements of DBAs in moving Oracle to the cloud. Now that DBAs are often becoming more involved in the decision making on hardware platforms, they need to choose solutions that give them a view directly into the storage system so they can improve productivity, focused on:

1. Monitoring availability
2. Diagnosing performance
3. Managing backup and recovery
4. Automating routine day-to-day tasks
5. Ensuring continuous availability of the Oracle database

By adopting best practices in Oracle environments, DBA productivity is improved by 27% to 50%, according to research by Wikibon.

**CONCLUSION**

As companies analyze the cost and time involved in managing and maintaining physical Oracle databases, many are seeing huge advantages in moving to a cloud-based solution. This means DBAs and infrastructure managers must think strategically about the role of the Oracle database in a cloud environment, particularly as they look to a future of big data analytics and an even more strategic role for data insight in driving business decision making. Strategically, it’s worth asking if it really makes sense to get locked into a long-term Oracle solution because it may seem convenient now.

This is particularly the case when there are solutions from a leading vendor such as EMC, which provides significant benefits in integration, performance, centralization, high availability, standardization and other characteristics that DBAs and infrastructure managers seek in moving Oracle to the cloud. More Oracle databases are already running on EMC storage than any other platform, including Oracle. Are you ready to think strategically about this most critical decision? Here’s where you can get more information: [http://emc.com/everythingoracle](http://emc.com/everythingoracle)
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