Oracle Database - the best choice for PeopleSoft Applications
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Introduction

The Oracle Database is the database market leader underneath enterprise business applications, including PeopleSoft Applications. This paper covers the business and technology reasons behind customers' continued choice of Oracle Database for their PeopleSoft Applications deployments.

PeopleSoft Applications were originally developed to run on the Oracle Database and over the years Oracle and PeopleSoft developed a very strong technical relationship, allowing for quick technology adoption and effective customer support.

Now, as part of Oracle, the collaboration is even stronger, with PeopleSoft Applications taking advantage of Oracle’s unique options such as Real Application Clusters (RAC), Partitioning, Database Vault, Data Guard and others. This collaboration means that deployments of PeopleSoft Applications inherit all of the scalability, high availability, and ease-of-management and security capabilities of the world’s leading relational database.

In addition, the PeopleSoft Applications are also supported on the Sun Oracle Database Machine, allowing PeopleSoft users to experience the extreme performance gains provided by this integrated combination of application, database, hardware and storage.
Database Market Share for Enterprise Applications

"Embarq is running PeopleSoft, Siebel, and Hyperion application suites with BEA middle tier, and we utilize Oracle Database 10 and 11g in our grid infrastructure with ASM, partitioning, and RAC." - Donald Eyberg, Manager of Database Administration Technology, Embarq

Oracle's database market position has real advantages for customers considering database platforms for their PeopleSoft system. A large installed base demonstrates that Oracle is able to meet the database requirements of PeopleSoft customers across all industries and geographies, reducing the risk of new PeopleSoft deployments for customers.

A large install base of PeopleSoft-Oracle Database customers also leads to a well-tested product and an efficient support organization primed to handle PeopleSoft issues. Thus, customers choosing Oracle Database for PeopleSoft Applications get the accumulated benefits of years of product deployments in the real world.

Supported Oracle Database Editions

PeopleSoft Applications can be deployed on the Enterprise Edition and Standard Edition of Oracle Database. Oracle Database 11g Release 2 is fully supported with PeopleSoft Applications.

Ease of use and automated database management with Oracle Database and Enterprise Management packs

Out of the box, PeopleSoft Applications take advantage of the built-in self-management capabilities of the Oracle database, such as Automatic Undo Management, Automatic Space Management, Locally Managed Tablespaces, Automatic Segment Space Management, etc, making PeopleSoft-Oracle deployments very easy to manage.

ORACLE ENTERPRISE MANAGEMENT PACKS

"Oracle Enterprise Manager has helped us raise visibility of best practices across the company, improving quality of service. With Oracle Enterprise Manager enabling increased efficiencies, we now have more resources to dedicate to providing value to the business." – John Young, Systems Architect, Enterprise Rent-A-Car

Spanning applications, middleware, and database management, Oracle Enterprise Manager's unique "top-down" management approach allows IT departments to focus on what matters to the business - greater agility, better service quality and lower operational costs. Oracle Enterprise Manager allows Oracle customers to manage their PeopleSoft Applications completely - from monitoring service levels to
proactively isolating business exceptions before they escalate, and remediating issues at any level of the IT stack.

Oracle Enterprise Manager also provides unique capabilities for manageability and ease-of-use for DBAs.

- **Day-to-Day Administration**: Oracle’s automation of important day-to-day administrative tasks and improvements in Oracle Enterprise Manager GUI enables DBAs to save time on mundane tasks and concentrate their effort on more important aspects of the database. In this area, Oracle Database 11g Release 2 demonstrated 27% advantage in time and 25% in steps over Microsoft SQL Server and 15% advantage in time and 11% in steps over IBM DB2 UDB 9.1.

- **Performance Diagnostics and Tuning**: Oracle has competitive advantages in the area of proactive performance diagnostics and automatic SQL tuning. In this area Oracle Database 11g Release 2 took 74% less time and 38% fewer steps than Microsoft SQL Server and 20% less time and 13% fewer steps than IBM DB2 UDB 9.1.

- **Backup and Recovery**: Oracle’s architectural and functional capabilities, like Flashback, provides the ability to quickly recover from human errors, far beyond what’s offered by other database vendors. In this area Oracle Database 11g Release 2 took 62% less time and 67% fewer steps than Microsoft SQL Server and 7% less time and 9% fewer steps than IBM DB2 UDB 9.1.

Oracle has also introduced an Application Management Pack for PeopleSoft to provide a comprehensive management of PeopleSoft Applications. The application pack works seamlessly with Enterprise Manager. It provides Automatic Recovery to establish detailed inventory of the application environment, Configuration Management to track changes made to the configuration, Proactive Monitoring and Alerting to monitor key performance, usage and health metrics, Interactive Transaction Performance Analysis to investigate and analyze problems with the environment and Service Level Management to define Service Level Objectives (SLO).

The Application Management pack provides PeopleSoft administrators with a consolidated view of the entire enterprise, enabling them to monitor and manage all components from a single location. Please refer to http://www.oracle.com/technology/products/oem/pdf/apps_mgmt_psft.pdf for more information.

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1 This study can be obtain from Edison Group, Inc. web site at http://www.theedison.com/index.php/articles/c51
Increased scalability and availability with Oracle Real Application Clusters (RAC)

“...All of a sudden, we can get business done a lot faster. Our financial staff is not sitting around waiting for reports to be generated, so there’s no doubt we are seeing some efficiency benefits. Everything is running, for the most part, a lot quicker.” — Paul Rashleigh, Systems Architect, Asciano running PeopleSoft Applications

Oracle Database 11g comes with Oracle Real Application Clusters (RAC), which provides the foundation for Grid Computing. Grid Computing provides the ability to support a low-cost, scale-out hardware architecture that supports all types of workloads and can transparently recover from the loss of one or more database servers.

Oracle RAC delivers a true active-active configuration with shared cache, delivering seamless scalability, and is available on Linux, Unix and Windows platforms.

Oracle Database 11g Release 2 has introduced many features to dramatically simplify installation and on going management of a cluster and Oracle RAC database, making it easy to adopt clustering and Oracle RAC and to reap the benefits of this technology.

No changes in PeopleSoft applications are required to run on Oracle RAC. PeopleSoft has supported RAC since it is first introduction in 2003. Please refer to https://support.oracle.com/CSP/main/article?cmd=show&type=ATT&id=663340.1:RED_PAPER_ORACLE_9I white paper (requires support.oracle.com login) for more information.

Microsoft SQL Server has no equivalent to RAC. SQL Server very rarely is used in a true active-active cluster environment, and when it is, it is based on a Federated Database model, which is a collection of independent servers connected over a network. Data is horizontally partitioned across each participating server, and applications see a logical view of the data through UNION ALL views and distributed SQL. This type of architecture is not supported for PeopleSoft environment.

IBM DB2 implements a shared-nothing architecture, which requires partitioning of the data across all the nodes in a cluster. Once again, this is used for data warehousing implementations, and is not suitable for PeopleSoft deployments.

Both technologies are hard to manage and require manual repartitioning and database downtime when nodes are added.

Increased performance and management of data with Oracle Partitioning

Oracle Partitioning allows very large tables and indexes to be subdivided into smaller pieces. Each piece is called a partition, which can then either be managed collectively or individually. Partitioning provides
Oracle Database 11g supports Range, List, Hash, Interval, and Composite partitioning. This flexibility allows a multitude of different performance, manageability, and availability issues to be solved.

In case of PeopleSoft applications Oracle Partitioning is mostly used for manageability and availability. For example, large tables in Global Payroll application can be RANGE partitioned by Fiscal_Year and Accounting_Period and then old partitions can be put on Read Only tablespaces, which in turn will reduce time and space required for nightly backup. Partitioning also helps to reduce the number of scanned rows in such applications as Global Consolidations and Accounts Payables. Partitioning can also be used when running PeopleSoft batch process in parallel. Isolating each job stream in its own partition on large, high-volume transaction tables reduces I/O contention. A partitioning strategy can also be used for effective data loads and purges.

Implementing partitioning in PeopleSoft Applications does not require changes to the application. Currently if partitioning is implemented, a few simple changes need to be made to the provided upgrade DDL scripts to preserve partitioning during the upgrade. For more information please refer to http://www.oracle.com/us/products/database/peoplesoft-partitioning-bwp-068458.pdf white paper.

Microsoft SQL Server only supports Range and List partitioning. The implementation is complicated and non-intuitive. It requires creation of a partitioning function and every addition of a partition requires modification of the function. PeopleSoft doesn’t provide support for SQL Server partitioning.

IBM DB2 only supports Range and a limited version (intra-node only) of Hash partitioning. The partitioning for DB2 is used primarily to increase parallelism, while Oracle Partitioning is used to improve performance, availability, and manageability of the applications.

“Partitioning is a key enabler for the performance of our system. Its pruning capabilities allow us to process only the relevant data, which may be as little as 10% of a schema depending on the case and it allows us to quickly purge and archive the older data without impacting the performance of the applications in general. We just could not process our data volumes without Partitioning.”- Arup Nanda, Starwoods Hotels
Reduced storage costs with Oracle Advanced Compression

“Oracle technology had a big impact on how we manage our mission-critical data. Through compression, we are using one-tenth as much storage space as before, and thanks to query rewrite our aggregates refresh five times faster.” – Jacek Sosnia, Atomic Data Warehouse Technical Platform Engineer, Procter & Gamble

Exponential increases in data volumes are putting pressure on IT infrastructures to conserve space by employing efficient techniques to reduce storage needs. Oracle has been one of the pioneers in the field of database compression. Oracle Database 11g packages several new capabilities in its Advanced Compression option, providing a comprehensive set of functionality to optimize usage of storage, memory, and network bandwidth.

Oracle Advanced Compression allows IT administrators to significantly reduce their overall database storage footprint by enabling compression for all types of data – be it relational (table), unstructured (file), or backup data. Oracle Database 11g introduced a new feature called OLTP Table Compression that allows data to be compressed during all types of data manipulation operations, including conventional DML such as INSERT and UPDATE. In addition, OLTP Table Compression reduces the associated compression overhead of write operations making it suitable for transactional or OLTP environments as well. OLTP Table Compression, therefore, extends the benefits of compression to all application workloads. In addition to compressing data stored inside the database, Oracle Advanced Compression also includes the capability to compress backed up data. Recovery Manager (RMAN) and Data Pump are the two most commonly used tools to backup the data stored inside an Oracle Database.

Oracle Advanced Compression is completely transparent to PeopleSoft Applications.

Both IBM DB2 and Microsoft SQL Server provide similar functionality. Both offer Table Compression and Unstructured Data Compression. The key difference between Oracle Database table compression and DB2 compression is the level at which the symbol table (or compression dictionary, in DB2 terminology) is managed.

DB2 stores a dictionary per table object while Oracle Database has a block level symbol table included in each block. Oracle has consciously chosen to implement the dictionary at the block level for several reasons:

- Better performance: A block level dictionary can provide significantly better performance compared to a table level dictionary: compression symbols are stored within the same block, so reading compressed data does not require fetching any additional blocks. In addition, Oracle Database provides the flexibility to compress partitioned tables at the individual partition level.

- Adaptive Compression: DB2's table-level dictionary is a static read-only dictionary, which does not adapt with time. DB2's dictionary gets created the first time compression is turned on for a table. A static dictionary may lead to significant deterioration in compression ratio over time, if new data is different from the data used for creating the original dictionary. Oracle, on the other hand, dynamically adapts to changes in data distribution thereby providing consistent compression.
No minimum data requirements for initiating compression: DB2 cannot create an effective dictionary until it has sufficient representative data from which to derive symbols at the table level. At the time the compression is turned on, if the table does not contain enough data, the compression dictionary will either not be created or be ineffective as future data may be quite different. Oracle Database creates symbols for each block separately, and hence can automatically create symbols relevant to the new data being added or updated.

Microsoft has finally introduced compression in SQL Server 2008. As has been the case with various features, Microsoft is attempting to catch up to Oracle’s substantial lead in compression technology. SQL Server’s new compression features provide similar functionality to what Oracle offered in Oracle 9i Database Release 2.

IBM DB2 can only compress unstructured data that is small enough (32K or smaller), to be stored inline with the corresponding relational data. Consequently, large unstructured data cannot be compressed with DB2. DB2 does not offer LOB de-duplication technology.

SQL Server stores unstructured data in a LOB_DATA allocation unit. The LOB_DATA allocation unit cannot be compressed, and SQL Server also does not offer LOB de-duplication technology.

Reducing unplanned downtime with Oracle Data Guard

“The State of Connecticut was able to satisfy its demands for increased system availability and reliability by deploying its PeopleSoft system on Oracle RAC with a Data Guard physical standby database” – Angelo Romano, IT Manager, State of Connecticut

Data Guard is an integrated data protection and disaster recovery solution for Oracle Databases and is part of Oracle's Maximum Availability Architecture (MAA). Oracle Data Guard allows one or more standby databases, which are the synchronized copies of the production database, to be created and automatically maintained. These standby databases can be located either in a remote data center (for disaster recovery purposes) or locally within the same data center. In the event of a loss of a production database, the applications and end-users can be failed-over to one of the standby databases, ensuring high availability against system outages or data center disasters.

Data Guard enables the use of either a physical standby database (Redo Apply) or a logical standby database (SQL Apply). A physical standby database provides a physically identical copy of the primary database and is typically used for disaster recovery. A logical standby database contains the same logical information as the production database and is typically used for reporting and rolling upgrades.

Oracle Database 11g has introduced the Active Data Guard Option that allows a physical standby database to be open for read-only access, removing the need to deploy both a physical standby database for Disaster
recovery, and an additional standby database for reporting and rolling upgrades. Active Data Guard allows offloading of ad-hoc queries, reporting, and fast incremental backups from the primary database, improving performance and scalability on the production system while preventing data loss or downtime. Oracle Active Data Guard puts idle standby systems to work improving the overall utilization.

Oracle Data Guard is integral part of Oracle Maximum Availability Architecture (MAA). It is used to maximize systems availability and meet the most aggressive Service Level Agreements (SLAs) for system availability, quality of service, and data protection.

PeopleSoft supports both physical and logical standbys out of the box allowing customers to enjoy the full range of Oracle Data Guard capabilities. A local standby allows the switchover to be performed transparently to the PeopleSoft users. MAA allows PeopleSoft server processes to stay running during the database outage and to reconnect and resume work when the database transition is completed.

In 2008, Microsoft SQL Server 2008 has introduced a technology called Data Mirroring. Microsoft describes Database Mirroring as the process of transferring log records directly from one server (the principal) to another (the mirror) with the ability to quickly fail over to the mirrored copy. Even though Oracle and Microsoft SQL Server technologies sound similar, Oracle Database Guard is a more mature technology. There are also significant differences in functionality. Database mirroring does not allow the mirrored standby to be used for backups, it doesn’t support multi-standby databases for the same production database, it does not allow rolling upgrades across major database releases, and it doesn’t support cascaded standbys.

Microsoft SQL Server also does not have a version of Logical Standby allowing a mirrored standby to be continuously opened for read/write while being used for read-only applications.

IBM DB2 offers a similar technology called High Availability Disaster Recovery (HADR). HADR has all the same limitations as Microsoft Database Mirroring. HADR does not provide an equivalent to Logical Standby, and hence precludes customers from using standby for read-only access, read/write access and reporting capabilities. HADR does not provide an integrated automatic failover; and it cannot be used for backups. It does not have built-in mechanisms to prevent/undo data corruption related to human errors, it does not support multiple standbys, and it has many other limitations as compared to Oracle Data Guard.

IBM HADR recently introduced a new active standby database capability with Fix Pack 1 of IBM DB2 UDB 9.7 but Oracle Active Data Guard has a number of advantages over IBM’s implementation. For example:

- Read-only queries on Oracle active standby always return consistent results with the primary database. It is impossible for queries to access uncommitted data
- There are no datatype limitations for Oracle active standby databases (e.g. XML, LOB, LONG, ADTs)
- Oracle active standby database is accessible to user connections all the time
Increased security and compliance with Oracle Advanced Security and Database Vault

“Our aim is to have the most secure database systems in our industry which protect our client data and our business from internal and external threats. The Oracle security components underpinning our standard Oracle security configuration bring a new level of assurance to our senior management and audit teams.” – Akash Gharu, Global Database Services Manager, CMC Markets

Transparent Data Encryption with Oracle Advanced Security

Transparent Data Encryption (TDE) enables users to encrypt data within a database. When an application such as PeopleSoft accesses the data, Oracle Database transparently decrypts the relevant data for the application. Encryption is a very important tool for applications. Retailers can use Oracle Advanced Security TDE to address PCI-DSS requirements while university and healthcare organizations can use TDE to safeguard social security numbers and other sensitive information. Encryption plays an especially important role in safeguarding data in transit. Oracle Advanced Security network encryption protects data in transit on the intranet from network sniffing and modification. Oracle Advanced Security TDE protects sensitive data on disk drives and backup media from unauthorized access, helping reduce the impact of lost or stolen media.

Transparent Data Encryption encrypts entire tables of data at the tablespace level in the database. Tablespace encryption does not require the complicated database triggers and views most commonly associated with other database encryption solutions. This means that no PeopleSoft application changes are required to take advantage of this feature. Data for existing PeopleSoft applications can be encrypted with minimal performance impact. PeopleTools 8.50 supports Oracle TDE out of the box and provides an upgrade path. For more information please refer to http://www.oracle.com/technology/deploy/security/database-security/pdf/ds_advanced_security_tde_psft.pdf Datasheet and http://www.oracle.com/technology/deploy/security/database-security/pdf/rp_tse_ptools_8.48.pdf white paper.

Microsoft SQL Server 2008 has introduced its own encryption APIs but in order to use these APIs application developers have to make extensive code modifications. PeopleSoft does not support SQL Server encryption APIs.

IBM DB2 is new to the encryption space and provides only very basic capabilities, which are also complex to set up and carry the risk of data loss during the setup.

Segregation of duties with Oracle Database Vault

Oracle Database Vault addresses common regulatory compliance requirements and reduces the risk of insider threats by:
• Preventing highly privileged users (DBAs) from accessing application data
• Enforcing separation of duty
• Providing controls over when, where, and how applications, data, and databases can be accessed.


Extreme Performance on the Sun Oracle Database Machine

Since November 2009, Oracle has been offering a fully integrated platform for hosting all database applications called the Oracle Exadata Database Machine. It provides an optimal solution for all database workloads, ranging from scan-intensive data warehouse applications to highly concurrent OLTP applications. It is also well suited for consolidation of multiple databases onto the same grid. The Database Machine utilizes Oracle clustering and management capabilities to deliver extreme performance and scalability. The Oracle Exadata Database Machine is fast, reliable, secure solutions that can easily scale to meet all of the requirements of the most demanding organizations.

“A query that used to take 24 hours now runs in less than 30 minutes. The Oracle Database Machine beats competing solutions on bandwidth, load rate, disk capacity, and transparency.” – Allegro, Christian Maar, CIO

PeopleSoft Applications run seamlessly on the Oracle Database Machine, improving performance and enabling consolidation of multiple applications onto the same hardware.

The success of the Oracle Exadata Database Machine has not gone unnoticed by our competitors. IBM storage subsystems have no database awareness. Specifically, they do not have the ability to offload database processing from the database server to storage. In IBM's traditional storage subsystems all blocks are read off disks, fetched across a slow interconnect (Fiber Channel), and delivered to the database server for processing. In addition, the IBM hardware costs significantly more than the equivalent Oracle Database Machine.
Conclusion

Oracle Database 11g is the best choice for PeopleSoft Application customers. PeopleSoft Applications are now an integral part of the overall Oracle customer solution. PeopleSoft Applications take advantage of Oracle Database technology as soon as it becomes available. PeopleSoft customers recognize this and continue to choose Oracle Database for their PeopleSoft Applications implementation to take advantage of the performance, scalability, high availability, security and manageability provided by the best database in the world.