PeopleSoft Applications on Oracle Engineered Systems: Extending the Value of PeopleSoft
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Executive Overview

Organizations today must squeeze as much value from their business systems as possible. As enterprises expand, they are forced to deal with growing pains in order to meet their business needs. Batch jobs run longer due to higher customer order processing volumes, more employees must be paid, and the financial reporting environment is increasingly complex. Expanding into new geographies often means existing batch windows must be compressed. Online systems are also stressed with maintaining acceptable response times as more employees enter purchase orders, file expense reports, or review their paychecks and update HR records. If flexibility is not built into the IT strategy, performance of batch and online systems begins to degrade and soon Support Level Agreements become a challenge to meet.

Running on Oracle Engineered Systems, PeopleSoft applications realize amazing performance and scalability, and provide greater benefits to your business. PeopleSoft is a metadata-driven application that is stored in the database. With Exadata using components like Smart Flash Cache and Smart Scan to deliver the fastest Oracle database platform, PeopleSoft benefits. The intensive PeopleSoft batch workloads like the General Ledger close process, heavily utilize the Oracle database and its ability to exploit Exadata’s Flash Cache, which keeps data in memory instead of accessing it from disk. Exadata’s Smart Scan allows the underlying PeopleSoft SQL requests that are generated in the business logic to be processed on multiple storage devices simultaneously, which further enhances not only batch performance, but online performance, too. Complementing Exadata is Oracle Exalogic, which is used to deploy all PeopleSoft business applications and Oracle Fusion Middleware. Exalogic powers the PeopleSoft middle tiers, which have utilized Tuxedo and WebLogic since the inception of a three-tier architecture. These strategic Fusion Middleware components have a number of enhancements—specifically for Exalogic—incorporated into them, giving PeopleSoft a unique advantage on Exalogic. Both systems use an enhanced networking technology, InfiniBand, which provides a significant performance boost and is another benefit to PeopleSoft without any change to the application required. Using Oracle Virtualization capabilities on Exalogic, customers will benefit from the Oracle Virtual Machine (VM) templates provided by PeopleTools, resulting in faster deployment, better scaling and utilization, and easier patching.

So what does all this mean? PeopleSoft running on Oracle Engineered Systems gives your payroll department more time to complete payroll processing and perform data validation; with more accurate data, fewer corrections are required and money is saved. Your Finance department will see period close completing faster with a higher degree of accuracy, giving
them more time for compliance reporting and data analysis. Your online users will experience better performance, making them happier and more productive. Your IT department saves by deploying pre-configured and pre-tested Engineered Systems (Exalogic and Exadata), freeing up resources to focus on growing the business—not designing, building, and maintaining platforms. The IT department will also benefit from templates provided by Oracle to more quickly and easily perform PeopleTools patching, respond to spikes in usage with dynamic provisioning, and provision new environments faster than they have ever been able to do before. Best of all, you will have the flexibility to scale to meet your business needs in a predictable, cost-effective manner.

Introduction

Oracle’s PeopleSoft suite of applications has long been considered one of the best available in the marketplace. PeopleSoft Human Capital Management (HCM) is widely recognized as the best-of-breed business application used for paying staff, administering benefit plans, tracking and developing employee skills, and self service for both employees and managers. PeopleSoft Financials helps customers complete their financial close process promptly and accurately. Entering expense reports, tracking accounts receivable and accounts payable, generating purchase orders, and providing compliance reports are all accomplished with PeopleSoft Financials.

PeopleSoft HCM modules such as North American Payroll, Global Payroll, Benefits, and HR Self Service, along with Financials modules like General Ledger, Accounts Payable, Accounts Receivable, and Expenses, contain a mix of application types. Some of these modules, including Benefits, HR Self Service, and Expenses, are primarily online applications where a user is looking to sign up for benefits, review a pay stub, or submit an expense report. These users demand a system that is able to perform, especially when they, and all their coworkers, might be up against a deadline such as annual benefits enrollment. Oracle’s Exalogic system provides the performance, versatility, and stability that customers demand in a state-of-the-art online application system today. When Exadata powers the underlying database, the Engineered Systems complement each other to provide an even better online experience. With SPARC SuperCluster, you have an Oracle Engineered System providing a consolidation platform with extreme performance.

PeopleSoft also has several modules like Payroll and General Ledger that are primarily batch oriented in nature. These jobs churn through a lot of data and require a system that can handle
the intensive demands of the number crunching performed. These types of processes benefit from Oracle’s Exadata Database Machine, which is designed to be the fastest platform to run the Oracle database. The speed and reliability of Exadata make it the best platform to use with PeopleSoft batch processes.

Most PeopleSoft customers have a mix of online and batch needs, with significant opportunities to benefit from Oracle Engineered Systems. All PeopleSoft applications whether batch or online in focus, rely on the underlying database to store, access, and update information. With Exadata providing the fastest platform for the Oracle database, online users realize the snappy performance they demand. When Exadata and Exalogic are used together in a PeopleSoft environment, they amplify the performance and benefits for customers.
Overview of Oracle Engineered Systems

Oracle’s engineered systems combine best-of-breed hardware and software components with game changing technical innovations. Designed, engineered, and tested to work best together, Oracle’s engineered systems can power the cloud or streamline data center operations to make traditional deployments even more efficient. The components of Oracle’s engineered systems are preassembled for targeted functionality and then—as a complete system—optimized for extreme performance. By taking the guesswork out of these highly available, purpose-built solutions, Oracle delivers a solution that is integrated across every layer of the technology stack—a simplicity that translates into less risk and lower costs for your business. Only Oracle can innovate and optimize at every layer of the stack to simplify data center operations, drive down costs, and accelerate business innovation.

Oracle Exalogic

Oracle Exalogic is an Engineered System on which enterprises deploy Oracle business applications, Oracle Fusion Middleware, or third-party software products. Exalogic comes prebuilt with compute nodes, memory, flash storage, and centralized storage; all connected using InfiniBand in a high redundancy architecture delivering five-nines availability, with fault tolerance and zero-downtime maintenance.

Exalogic dramatically improves performance of Oracle Applications, Fusion Middleware, and third-party applications without requiring code changes and reduces costs across the application life cycle, from initial setup to ongoing maintenance, as compared to conventional hardware platforms. Oracle has made unique optimizations and enhancements in Exalogic firmware, Exalogic software, and in Oracle’s middleware and applications. These include on-chip network virtualization based on near zero latency InfiniBand fabric, high-performance Remote Direct Memory Access, workload management in Oracle WebLogic Server, and optimizations in Oracle Coherence and Oracle Traffic Director. Exalogic includes support for a highly optimized version of the Oracle VM, which significantly outperforms comparable virtualization solutions and is an ideal consolidation platform for Oracle Applications. Templates to simplify install, deployment, and configuration of applications on Exalogic are available.

Oracle Exadata Database Machine

Oracle’s Exadata Database Machine is Oracle’s database platform delivering extreme performance for database applications, including Online Transaction Processing, Data Warehousing, Reporting, Batch Processing, or Consolidation of mixed database workloads. Exadata is a preconfigured, pretuned, and pretested integrated system of servers, networking, and storage all optimized around the Oracle database. Because Exadata is an integrated system, it offers superior price performance, availability, and supportability. Exadata frees users from the need to build, test, and maintain systems and allows them to focus on higher value business problems.

Exadata uses a scale out architecture for database servers and storage. This architecture maintains an optimal storage hierarchy from memory to flash to disk. Smart Scan query offload has been added to
the storage cells to offload database processing. Exadata implements Smart Flash Cache as part of the storage hierarchy. Exadata software determines how and when to use the Flash storage for reads and write as well as how best to incorporate Flash into the database as part of a coordinated data caching strategy. A high-bandwidth, low-latency InfiniBand network running specialized database networking protocols connects all the components inside an Exadata Database Machine. In addition to a high performance architecture and design, Exadata offers the industry’s best data compression to provide a dramatic reduction in storage needs.

Oracle SPARC SuperCluster

Oracle’s SPARC SuperCluster is the world’s most efficient multi-purpose engineered system, delivering extreme efficiency, cost savings, and performance for consolidating mission critical applications and rapidly deploying cloud services. Oracle’s SPARC SuperCluster represents a complete, pre-engineered, and pre-tested high-performance enterprise infrastructure solution that is faster and easier to deploy than a collection of individual database and application servers. The system combines innovative Oracle technology—the computing power of Oracle’s SPARC servers, the performance and scalability of Oracle Solaris, the Sun ZFS Storage Appliance, the optimized database performance of Oracle Database accelerated by Oracle Exadata Storage Servers, and a high-bandwidth, low-latency InfiniBand network fabric—into a scalable, engineered system that is optimized and tuned for consolidating mission-critical enterprise applications

Oracle’s SPARC SuperCluster provides both the capacity for growth, as well as the fine-grained server virtualization needed to isolate individual application components. With multiple layers of enterprise application infrastructure consolidated onto a high-performance, highly available SPARC SuperCluster system, deployment speed, application performance, and availability can all be optimized. Designed as a pre-configured, pre-tested, and ready-to-deploy SPARC SuperCluster engineered system, the solution provides a complete and optimized infrastructure solution for applications, built around robust compute, networking, storage, virtualization, and management resources. The result is a system that is orders of magnitude easier to manage, and up to five times faster to deploy than alternatives, all while
occupying considerably less real estate requiring less power. Furthermore, the SPARC SuperCluster system provides full built-in redundancy resulting in a highly reliable infrastructure without single point of failure. An issue with one component will not impact other components of the system offering true isolation. Customers can consolidate multiple environments with minimum disruption, without fear of performance degradation, and the ability to achieve required service levels.

Business Benefits of Deploying PeopleSoft on Engineered Systems

Customers running PeopleSoft applications with Oracle Engineered Systems will enjoy a number of benefits for their business. The following sections discuss some of these benefits in PeopleSoft HCM and PeopleSoft Financials, as well as benefits applicable for all PeopleSoft applications in more detail.

Benefits to PeopleSoft HCM

Payroll departments are continuously facing challenges as they generate the employee data used to get payroll completed on time. Batch windows are always shrinking as a company expands into new geographic locations. Employees want the system available to them so they can review their paychecks and vacation balances. Other online users may want to update personal data. Customer applications today need to be more responsive and available; and that is where PeopleSoft applications on Engineered Systems really excel.

PeopleSoft Payroll is a flexible system that calculates complex pay calculations using the earnings, deductions, and taxes that have been defined. The batch jobs use row processing, meaning employees’ checks are processed one at a time instead of all at once (set based processing). Normally, set based processing is faster, but this is where Engineered Systems come into play.

The payroll processing for PeopleSoft has been known to be somewhat “chatty” on the network. However, when it is run using Exadata and Exalogic, the InfiniBand network layer connecting the two systems drastically reduces any slowdown caused by the communication between the application server and the batch server. Using InfiniBand as the networking fabric within Engineered Systems ensures the lowest latency for messages and the highest bandwidth for data transfers. High-speed transactions as well as data-intensive queries and reports reap the benefits. Customers have reported their payroll batch processing improved an average of 50 percent (and more) over their previous servers. With payroll being an iterative process to ensure no errors exist before the final run, the performance benefits of Oracle Engineered Systems will save the department countless hours in analysis time prior to payroll being submitted each pay period. The more often employees are paid, the bigger the savings recognized.

This substantial time savings allows organizations to not only complete payroll on time, but it gives additional benefits of shortening the batch window for other processing to get started sooner, or simply to make the system available for general use quicker. The payroll department may use the additional time for data validation, reducing the need for any corrections—all with less employee overtime required.
Benefits to PeopleSoft Financials

Finance departments have their own set of challenges to face. As they close a fiscal period, make no mistake—it’s crunch time. A lot of anxious eyes are watching for the earliest of results. The CFO and the rest of the executive team, board of directors all need to know how the company performed so they can prepare to share the company’s performance with analysts and stockholders.

In addition to the many eyes peering over their shoulders throughout the process, the finance department faces other challenges. During a GL close cycle, collecting and processing the massive amounts of data from all the various geographical locations in a very short time can be a daunting task. Once the finance team has all the data, the iterative process of reconciliation with the GL system begins. When the books are closed, it is time to start the measuring and reporting phase, which generates the required financial information of publicly traded companies.

The PeopleSoft GL close process plays well with Exadata’s Smart Flash Cache. Exadata Smart Flash Cache uses Flash memory to dramatically reduce the time to read and write database and log records. The intelligence in Smart Flash Cache transparently moves active information from disk to flash in real time, thus ensuring that “hot” data is in Flash memory when the next access occurs. Data that should not be in Flash is also recognized, maximizing the amount of space in Flash. With infrequently accessed data being sent to disk, a balance is struck between the increased performance with flash and the more inexpensive disk.

When trying to slice and dice information, the management team looks for the best possible way to view the results. Analysis of the data includes querying it in a number of different ways, and that means much time is spend running a lot of complex queries on large amounts of data. Exadata Smart Scan speeds up data-intensive queries by leveraging the processing power of Exadata Storage Servers to scan and filter out results. By moving queries to storage instead of moving the data to the database servers, long-running reports and queries often complete 10x faster than on conventional systems. With Oracle Engineered Systems, standard reports as well as ad hoc queries are run on systems designed to give the absolute best Oracle Database performance. Queries and reports complete faster, yielding more time for data analysis.

Running the PeopleSoft GL close process on Oracle Engineered Systems, the finance department will complete their period close faster. With additional time for analysis available, they are able to perform additional error checking and will enjoy a higher degree of accuracy in their results. The improved efficiency and timely reporting saves the company money and portrays the organization as a well run company—both to employees internally as well as potential investors, externally.

Benefits to All PeopleSoft Applications

A number of challenges are common to business applications. Improving online performance, handling peak usage periods, and reducing maintenance costs are all areas in which organizations attempt to improve. By adding Exalogue into their PeopleSoft environment, one large, international staffing company was able to immediately reduce their IT footprint by 50 percent and cut their maintenance window by a factor of 4. This significant savings allows resources to be freed up for other
projects. PeopleSoft is taking advantage of a number of Exalogic’s capabilities to assist in each of these areas.

**Improving Online Performance through Superior Technology**

PeopleSoft’s architecture has utilized proven, market leading technologies such as Tuxedo and WebLogic Server for many years. They have provided great performance in the past and still do, but these strategic Fusion Middleware components are reaching new performance heights with Exalogic. Development teams are collaborating with the Exalogic team to figure out how Engineered Systems can best be used to deliver ultra performance. Each of the areas discussed below has put in specific enhancements into their product to boost performance when Exalogic hardware is in use.

The great thing for PeopleSoft customers running on Exalogic is that all of these enhancements are built in—no development, reconfiguration, tuning, or testing is required. Enhancements such as these are what we mean when we talk about an engineered system, and only Oracle is able to bring hardware and software together in this fashion.

Figure 2 details a few of these enhancements in key PeopleSoft components:

**Oracle Tuxedo Optimizations on Exalogic**

PeopleSoft applications using PeopleTools 8.53 and higher benefit from a new implementation of JOLT over SDP (Sockets Direct Protocol), which runs natively on the InfiniBand/Exabus fabric, eliminating I/O bottlenecks between the web and application server tiers. PeopleSoft applications also benefit from Tuxedo’s self tuning of bulletin board locking mechanism, resulting in more efficient CPU consumption and improved application performance.

**Oracle WebLogic Server Optimizations on Exalogic**

PeopleSoft uses WebLogic Server and benefits from a number of optimizations for thread efficiency, faster inter-process communication and higher message throughput on Exalogic. An optimized work
scheduler balances the number of threads per core available on Exalogic systems, providing better application processing efficiency. WebLogic Server has changed to use shared byte buffers instead of array copies when passing data, improving application inter-process communication performance and a 66 percent reduction in number of objects created. This reduces heap usage and results in fewer expensive garbage collections for applications. WebLogic also optimizes socket calls to reduce lock contention on Exalogic, allowing fewer threads to process a larger number of message requests.

Oracle jRockit Optimizations on Exalogic

On Exalogic, the Java Virtual Machine (JVM) makes more efficient network I/O calls using collections of chunked data resulting in higher throughput for Java applications. The JVM optimizes object management with fewer copies resulting in reduced garbage collection and less heap size resulting in better Java application performance.

Oracle Exalogic Elastic Cloud

Applications running on Exalogic utilize Exabus, the underlying InfiniBand fabric, which provides low latency and high throughput eliminating I/O bottlenecks in every application layer. Application components are typically deployed in more than one server and Exabus provides low latency for I/O across nodes on same Exalogic rack. Access to ZFS storage device over Exabus greatly reduces latency for log file writes and other file access operations. For applications running on Exalogic and accessing database tier on Exadata, Exabus delivers faster I/O, reduces CPU usage on both the mid-tier and DB-tier and provides higher connection pooling efficiency.

Handling Peak Demand with Dynamic Scaling and Oracle VM

There are always certain periods of the year when online systems are heavily utilized. Some of these times include:

- Benefits Enrollment - Even though employees are given two weeks to make their benefits selections, the vast majority always seem to wait for the last day.
- View Paycheck - When payday comes, employees like to view their checks just as soon as payroll completes.
- Submitting Expenses - When the end of the quarter comes and the Finance department wants all expense reports submitted, it doesn’t seem to matter how much notice is given; the reports always stack up on the last day.

These types of cyclical activities resulting in peak usage can bring performance to a crawl. To prepare for these, IT departments often need to purchase additional hardware or suffer through it by trying to “tune” the same application for the 7th time. PeopleSoft has a better alternative using Oracle virtualization.

Oracle VM can be used to sub-divide a physical compute node into multiple VMs to increase application deployment efficiency while maintaining application performance. Oracle VM has been engineered for tight integration with Exalogic Exabus I/O backplane, ensuring Oracle VM significantly
outperforms comparable hypervisors from other leading vendors. PeopleTools takes advantage of Oracle VM capabilities by delivering VM templates for the middle tier on Exalogic. These VMs can be used to easily respond to a peak usage situation. When a usage spike is experienced, a virtual server containing another application server, web server, or both can be brought on line dynamically. No downtime or reconfiguration is required. The required resources are added and once the spike subsides, the added resources are transparently removed and the virtual machine is shut down until the next time it is needed. The system resources used by the added VM during the spike may now be utilized by other projects instead of just sitting idle. The VM templates provide a great way to respond to usage spikes while ensuring the most efficient use of hardware resources with negligible impacts on application throughput and latency.

Reducing Maintenance Costs with PeopleTools VM Templates

Delivered VM templates provide another benefit to PeopleSoft customers using Exalogic: they significantly reduce time and effort when it comes to patching PeopleTools. The PeopleTools templates that Oracle now delivers include:

- Updated operating system
- Required Tuxedo and WebLogic releases
- Pre-configured web, application and batch servers

No longer do customers need to find and download the right versions of Tuxedo and WebLogic and then locate, download and install the required patches. Configuring the application, batch, and web servers is already done, with a fully tested VM template. Typos in the configuration of an application or web server are eliminated. The need for testing, one of the largest costs of maintaining an application, is dramatically reduced. By using the virtualized templates provided by Oracle, PeopleSoft customers significantly reduce the steps required in maintaining the environment, saving time and providing measureable cost savings for the company.

Deploying Environments Faster Using Oracle Virtualization

In addition to making it easier to handle usage spikes and simplifying the PeopleTools patch process, VM templates also help deploy new environments for use in a customer’s development and quality groups. New application servers, web servers, and batch servers can be waiting to be booted up for anyone who needs them. No longer does it take days to get a new environment available; it can be done in minutes. Boot up the environment and it is ready to go. Using the template ensures that each environment is a known quantity with no verification testing required. With Oracle VM templates on Exalogic, new environments can be rapidly deployed at a fraction of the cost.

Conclusion

Organizations are under continuous pressure to become more efficient and reduce costs. PeopleSoft is uniquely well positioned to help customers meet these demands by fully exploiting the benefits of
Exadata and Exalogic, and reap the rewards. Batch processes run on Exadata experience faster performance, which shortens batch windows. Online users see performance improve with Exalogic, and they become more productive. IT departments respond to the needs of the business more efficiently and with lower costs. PeopleSoft applications running on Oracle Engineered Systems provide significant performance gains that allow organizations to spend more time concentrating on how to grow the business and not just run it.
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April 2013

Oracle PeopleSoft Product Development

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200
oracle.com

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Hardware and Software, Engineered to Work Together