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Oracle E-Business Suite Order Management &
Advanced Pricing for Engineered Systems
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Executive Summary

This white paper illustrates how Oracle Engineered Systems (Exadata and Exalogic) benefit Order Management and Advanced Pricing customers by significantly improving end user response and batch processing time. This powerful combination is essential for customers processing large number of orders on a daily basis. The across-the-board improvement in performance allows customers to minimize processing time leading to expedited order fulfillment and revenue recognition.

Order Management is an order-to-cash solution that provides the capabilities for customers, partners, and employees to select the right products and services, negotiate the best prices, and ensure timely fulfillment.

End user functions such as order entry, mass update and releasing holds and batch processes such as order import and scheduling are extremely time sensitive in high order volume environments. To ensure customer satisfaction, a large number of orders have to be entered, processed, and fulfilled at an extremely rapid pace. In addition to ensuring customer satisfaction, speed is essential to maximizing recognizable revenue.

Advanced Pricing is a robust, flexible, and rules based engine that is seamlessly integrated with several E-Business Suite applications such as Order Management, iStore, Quoting, Service Contracts, and Channel Revenue Management. Most customers define complex pricing rules incorporating various dimensions. In a high order volume environment, the ability to rapidly retrieve accurate prices is an essential aspect of order entry and processing. In addition, price list and price rule maintenance are intensive batch processes that are conducted frequently in today’s dynamic and rapidly changing business environment.

Oracle’s next generation Engineered Systems combine massive memory and low-cost disks to deliver the highest performance at the lowest cost, and is the ideal database platform for the varied and unpredictable workloads of cloud computing.

Customers can reduce IT costs through consolidation, store up to ten times more data, improve performance of Order Management and Pricing, deliver a faster time-to-market by eliminating systems integration trial and error, and make better business decisions in real time.
Introduction to 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 pre-built 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-down-time maintenance.

Exalogic dramatically improves performance of Oracle Applications, Fusion Middleware and 3rd party applications without requiring code changes and reduces costs across the application lifecycle, from initial set-up to on-going 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 Oracles 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 pre-configured, pre-tuned, and pre-tested 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 SuperClusters**

Similar to Engineered Systems such as Exadata, Exalogic, Oracle E-Business Suite can be deployed on Oracle's SPARC SuperCluster to achieve high availability, performance, scalability and environment consolidations. Here is a brief description of Oracle's SPARC SuperCluster's technical capabilities.

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. Deployment speed, application performance, and availability can all be optimized with the multiple layers of enterprise application infrastructure consolidated onto a high-performance, highly available SPARC SuperCluster system. 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 Oracle E-Business Suite environments with minimum disruption, without fear of performance degradation, and the ability to achieve required service levels.
Technical Benefits of Oracle’s Engineered Systems

Overview

Internal benchmarking indicates that Oracle E-Business Suite running on Oracle’s Engineered Systems performs 3 to 10 times faster for forms and self service applications depending upon the concurrency load profile. And linear scaling allows for very large deployments and multiple applications to run simultaneously while maintaining consistent response times. Oracle’s Engineered Systems are architected to deliver maximum availability, high performance, and scalability helping Oracle E-Business Suite customers to consolidate environments, and reduce server footprint resulting in an overall reduction in cost of application ownership.

Here are some of the technical benefits delivered by Engineered Systems:

- Oracle E-Business Suite applications consists of many batch processing programs that create large workloads. These workloads are highly CPU intensive. High concurrency of these workloads requires systems with large memory capacity with large Systems global area (SGA) and Program global area (PGA) capable of processing high speed disk input/output (I/O). Oracle’s Engineered Systems are architected to deliver these superior technical capabilities to manage such large workloads.
- Engineered Systems can handle twice as many users per core compared to other servers delivering the scalability required to add more application users during growth and expansion.
- Linear Scaling easily supports very large deployments.
- Resource Manager can help consolidation of database and application environments by controlling CPU usage, managing CPU contention via instance caging, controlling disk I/O usage, and managing contention via IORM’s inter-database resource plans. Customers can achieve higher throughputs as more transactions can be processed using single Exadata core compared to other servers.
- Exalogic has been engineered to leverage a technique known as Single-Root I/O Virtualization to eliminate virtualization overhead and deliver maximum performance and scalability. Mission-critical server virtualization offers a whole new level of consolidation where multiple virtual machines are sharing a single physical server in order to maximize the utilization of server hardware, while minimizing associated cost.
- Oracle VM template for Exalogic reduces installation and configuration time and allows rapid deployment of Oracle E-Business Suite applications.
- Oracle E-Business Suite customers can load balance web and forms servers, configure parallel concurrent processing and configure Oracle RAC and Oracle Data Guard for high availability.
- Oracle Enterprise Manager Cloud Control (EM) helps with Exadata manageability and provides a composite view of all health indicators of a cell or cell group to diagnose and troubleshoot performance problems efficiently.
Oracle E-Business Suite customers benefit from using following unique features of Oracle’s Engineered Systems:

**Exadata Unique Features**

**Exadata 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 database blocks from disk to flash in real time, thus ensuring that "hot" data is in Flash memory when the next access occurs. Blocks that should not be in Flash are similarly recognized, maximizing the amount of space in Flash for active data.

Internal bench marks for Oracle E-Business Suite have shown following results as a result of Smart Flash Cache:

- Average I/O latency reduced by 58% and no special tuning is required to achieve I/O performance improvement.
- Log file sync events improved by 5% and no special tuning is required to achieve log file sync event improvements

**Exadata Smart Scan**

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 often complete 10 times faster than conventional systems.

**InfiniBand**

The use of InfiniBand as the networking fabric within Exadata 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 from InfiniBand.

Oracle E-Business Suite benefits resulting from InfiniBand are:

- 30-40% lower CPU utilization and 100% or more throughput compared to Gigabit Ethernet
- 20% improvement in online transactions response times
- Easier scaling of E-Business Suite online transactional processing through low latency

**Exadata Scale-Out Storage**

Exadata Scale-Out Storage enables the full performance of Exadata to be realized against large and growing databases, without fear of bottlenecks. As the database size grows and storage capacity is added to Exadata, storage performance and networking bandwidth scale in equal proportion. As a result,

- Backups and Clones can be executed at a rate of 20TB/hour
- Faster incremental backups can be performed
I/O Resource Manager (IORM)

IORM allocates I/O bandwidth across different applications and databases, based on a prioritized allocation plan, to ensure that the most important applications get the performance they need when they need it. As a result, customers can consolidate database and application environments without worrying about resource contention and performance degradation.

Exalogic Unique Features

Exalogic Exabus

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. Applications 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 the database tier on Exadata, Exabus delivers faster I/O, reduces CPU usage on both the mid-tier and DB-tier and providing higher connection pooling efficiency.

Oracle VM for Exalogic

Exalogic Oracle VM can sub-divide a physical compute node into multiple virtual machines to increase application deployment efficiency while maintaining application performance. Oracle VM has been engineered for tight integration with Exalogic Exabus I/O backplane using a technique called Single Root I/O Virtualization (SR-IOV) ensuring Oracle VM significantly outperforms comparable hypervisors from other leading vendors. The benefit of this approach is unmatched application performance. In an Exalogic configuration, the impact of virtualization on application throughput and latency is negligible.
Improved Business Efficiency for Order Management

End User Response Time

Deploying Order Management on Engineered Systems leads to enormous performance improvements in end user response time that directly impacts the bottom line by increasing revenue and customer satisfaction.

A common business scenario is where there are thousands of users entering orders while being in direct communication with the customer on the phone. In this scenario, the user is constantly iterating and updating the order to determine the optimal price and availability combination. During this process of determining the optimal order for the customer, complex business logic such as pricing, defaulting, scheduling, and credit checking is constantly being executed and re-executed on the order. Executing and re-executing this business logic also ensures accuracy of orders and eliminates unnecessary delays during order fulfillment.

Since the order information is being communicated in real-time to the customer over the phone, dramatically reducing the response time associated with these processes maximizes the probability that the customer is satisfied and confirms the order, thereby increasing revenue and margins.

This is particularly essential during peak processing times when users are concurrently entering and iterating orders with a substantially larger number of customers. The benefits of improved end user response time are even greater when entering and iterating orders with a large number of lines and complex configurations.
In our benchmarks using the standard E-Business Benchmark kit, Exalogic and Exadata demonstrated superior performance compared to Commodity hardware. Figure 1 shows comparative response times for common Order Management transactions. In addition it was observed that Exalogic X2-2 and Exadata X2-2 scaled to support 2100 concurrent users on X2 version. Together this demonstrates both performance and density which will support reduction in hardware needed to support critical Order Management deployments for E-Business Suite.

The improved response time is also essential when using the “Pricing & Availability” inquiry feature. In several instances, a customer calls to inquire on pricing and availability of a set of products and services. In this scenario, the user is not creating an order and is purely in inquiry mode. In inquiry mode as well, pricing and availability rules have to be executed in real-time to ensure that the information can be rapidly communicated to the customer on the phone. Deploying Order Management on Engineered Systems offers a substantial advantage that leads to higher customer satisfaction and retention.

Another scenario where improved response time is essential is when orders that are placed in the e-commerce sales channel are immediately created and booked in Order Management. The advantage of this process is that each order is instantly validated and the fulfillment process commences without any further delay. While creating and booking an order in Order Management, business logic related to order validation, payment authorization, etc. is executed immediately. Validating and confirming the order rapidly ensures a superior user experience for site visitors. Engineered Systems substantially
improve the response time associated with order validation and confirmation, ensuring customer satisfaction and maximizing revenue through repeat orders and referrals.

**Batch Processing**

There is extensive batch processing related to order processing and fulfillment. Customers import and process a large number of order lines on a daily basis. These order lines are captured from a variety of sources including partners and distributors. It is essential that these orders be processed rapidly and the status of these orders during the order lifecycle be continuously communicated to partners and distributors so they, in turn, can keep the end customers up-to-date.

Importing orders is an important example of a batch process that performs substantially faster with Engineered Systems. Rapidly import a large volume of orders from partners and distributors and process by executing complex business logic such as defaulting, credit checking and scheduling.

Moreover, several customers have extremely time-sensitive requirements related to importing and fulfilling a large number of orders. For example, in the retail industry, thousands of retail stores submit replenishment orders in the morning and the orders need to be delivered from the warehouse to the store by early afternoon the same day. If there is even the slightest delay, retail stores do not have adequate inventory resulting in loss of revenue and decrease in customer satisfaction. Deploying Order Management on Engineered Systems substantially accelerates the entire order fulfillment lifecycle, thereby ensuring optimal inventory levels in retail stores.

**Reducing Total Cost of Ownership for Order Management**

**Storage Costs**

Customers operating in high volume order environments process anywhere from a hundred thousand to a million order lines daily. In a very short period of time, there are millions of lines in Order Management. In addition, for those customers who are using the audit tracking feature for high visibility into changes over the course of the order lifecycle, there are substantial amounts of additional data in Order Management. Using Engineered Systems reduces the size of Order Management tables leading to significant cost reductions with the added business benefit that data from these tables has to be purged less frequently. As a result, order history and change history can be maintained for a longer period of time.

**Improved Business Efficiency for Advanced Pricing**

**End User Response Time**

Advanced Pricing is the engine that powers price calculation and determination in several E-Business Suite applications such as Order Management, iStore, Quoting, Service Contracts and Channel Revenue Management. Several customers leverage the robust flexibility of the Advanced Pricing engine to define complex rules (including custom extensions). Executing these rules in real-time is very processing intensive. Deploying Advanced Pricing on Engineered Systems has a multiplier effect that dramatically improves end user response times across multiple applications in E-Business Suite.
Batch Processing

Pricing and re-pricing is tightly integrated into several batch processes that are essential to the Order-To-Cash flow. In case there are updates to price lists and pricing rules, a batch process is used to re-price all open orders. At several key milestones during order fulfillment, orders are re-priced to obtain the most current prices, for example, customers can choose to re-price orders during Booking, Shipping, etc. In addition, the batch process to calculate accruals in Channel Revenue Management is tightly integrated with Advanced Pricing.

Several customers also use batch processes for maintaining and updating price lists and price rules with partners and distributors. In industries with high price volatility such as commodities, pricebook maintenance is a daily and highly time-sensitive process.

Deploying Advanced Pricing on Engineered Systems has a multiplier effect that dramatically improves the efficiency of the order fulfillment and pricebook maintenance processes.
Conclusion

Deploying Order Management and Advanced Pricing on Engineering Systems has a direct impact on the bottom line by increasing revenue and improving customer satisfaction. Tremendous improvement in end user response and batch processing time accelerates the entire order lifecycle from entry to processing to fulfillment. In addition, dramatic reduction in the size of the tables leads to substantially lower operating costs.