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An Oracle White Paper  
April 2013

# Oracle Transportation Management on Oracle Engineered Systems:

## Optimized Performance and Business Value

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## Executive Overview

Two major trends make the efficient and reliable transportation of goods throughout a company's supply chain more important than ever. First, the expansion of supply chains in search of new sources of supply and new markets for finished goods has resulted in transportation networks that are more global and complex in nature. These global transportation networks are more prone to disruptions, longer lead times, increased transit time variability, and higher transportation expenses. Second, fuel cost volatility and sustainability initiatives have brought greater focus to transportation processes as companies search for both cost and carbon footprint efficiencies. The net result is a heightened need for transportation management solutions that enable companies to continuously optimize their transportation networks, provide near real-time visibility to in-transit shipments, and support operations anywhere in the world. Gartner's recent transportation market trends report described the situation as "a golden opportunity" in the transportation management system market<sup>1</sup>.

Oracle Transportation Management enables companies to meet these supply chain challenges. Case studies from Oracle Transportation Management customers have documented the following business benefits: (1) 23% reduction in freight costs; (2) 95% reduction in expedited shipments; and (3) 99% on-time delivery performance.

In addition to meeting a demanding set of functional requirements, transportation management systems must also meet the highest standards of mission critical systems in terms of availability, performance, scalability, and security. This whitepaper describes how Oracle Transportation Management in combination with Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud provide the optimal solution for today's transportation management challenges.

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<sup>1</sup> Gartner, Chad Eschinger, C. Dwight Klappich, "Market Trends: A Golden Opportunity in the Transportation Management System Market, 2012-2016", September 24, 2012.

## Oracle Transportation Management Introduction

Oracle Transportation Management enables companies to minimize freight costs, optimize on-time delivery service levels, support sustainability initiatives, and create flexible transportation business processes within their supply chain networks. Designed to support the needs of manufacturers, retailers, distributors, and logistics service providers, Oracle Transportation Management’s unique single-platform design creates an information bridge across functional silos, geographic regions, and business units that enables companies to deploy an enterprise-wide transportation solution. Combining ease of use with sophisticated and broad transportation management functionality, Oracle Transportation Management supports customers with basic transportation needs as well as those with highly complex requirements.

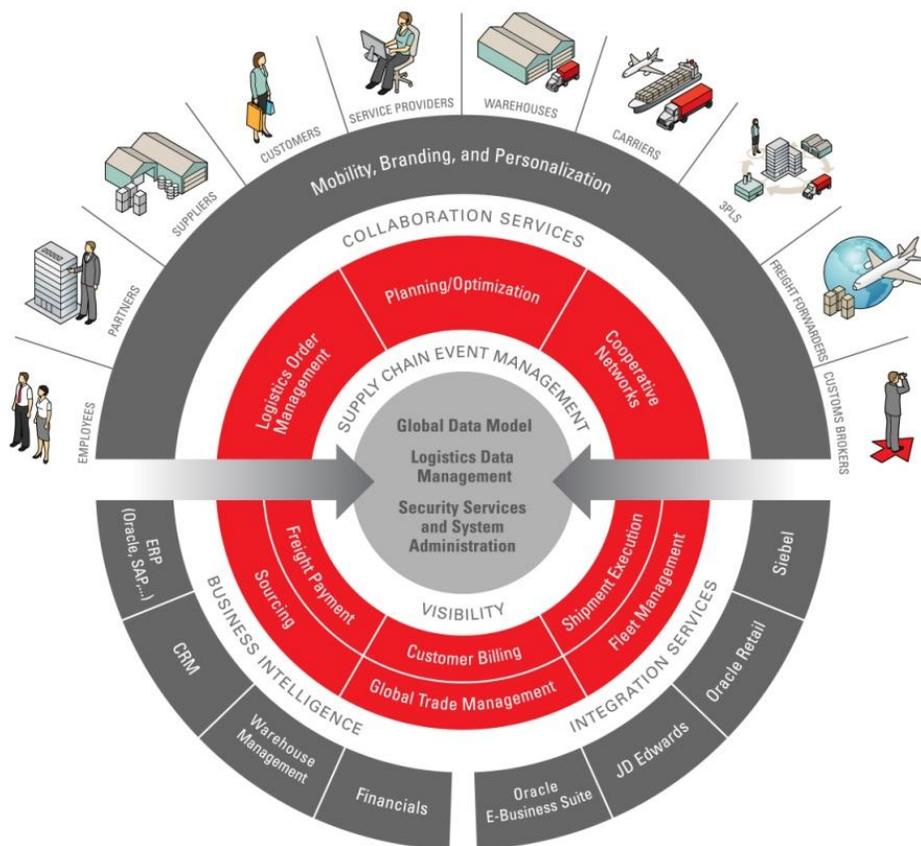


Figure 1 Oracle Transportation Management Solution Overview

### Global Control, Local Execution, Central Management

Oracle Transportation Management enables companies to manage their transportation networks on a global basis in terms of supply chain flows (outbound finished goods, inbound supplies, inter-facility/company shipments, service parts, reverse logistics, etc.), modes of transport (truck, air, ocean and rail), and geographic area (regional and international). Oracle Transportation Management

provides simultaneous support for multiple languages, currencies, units of measure and business functions that may vary by business unit and geographic region. As a result, companies can support the requirements of their global operations while reaping the efficiencies provided by a single transportation management solution.

## Foundation for Transportation Management Best Practices

Oracle Transportation Management provides support for the following transportation business functions:

- **Transportation Order Management:** Integration with external order management, purchasing, warehouse and other systems for purposes of managing transportation demand. Transportation order management functions can be extended to external parties in the supply chain, such as suppliers who provide “ready to ship” information for their purchase orders.
- **Rate Management:** A global repository and rating engine for service provider contracts for transportation and related services. Oracle Transportation Management enables companies to manage all of their rates centrally, including support for truckload, less-than-truckload, parcel, air, rail, and ocean rates. Oracle Transportation Management supports full “sell side” rating for logistics service providers and other companies who provide transportation services.
- **Operational Planning:** Customers can apply their specific business rules and logic in conjunction with powerful algorithms and optimization engines to optimize shipments based on cost, service level, and asset utilization. Scenarios for multi-stop consolidation, pooling, cross-docking, and three-dimensional load configuration are supported. Manage dock appointments for greater warehouse efficiency with advanced scheduling and collaboration capabilities.
- **Booking and Tendering:** Collaborate with transportation service providers using multiple communication formats – email, web, mobile phone, and XML. Share transportation plans and manage service provider responses (e.g., conditional bookings, tender acceptances). Automated support for multiple types of tender processes, such as sequential tendering and broadcast tendering.
- **Event Management and Visibility:** Proactively manage the lifecycle of orders and shipments through automated milestone monitoring. For example, automatically expedite shipments when pickup confirmations have not been received within a specified tolerance interval. Receive status updates from transportation service providers using multiple communication formats – web, XML, and mobile phone.
- **Freight Payment, Billing and Claims:** Eliminates unnecessary charges and automates the time consuming and error prone processes of freight payment, customer billing, and managing freight claims. Using the actual shipment data captured throughout the transportation lifecycle, Oracle Freight Payment, Billing and Claims ensures that companies are paying, billing, and tracking only for the transportation services that were provided.
- **Fleet Management:** Manage private fleet and common carrier networks on a single platform for increased asset utilization, lower transportation costs, and reduced environmental impact. Oracle Fleet Management provides support for all aspects of managing a fleet for shippers with a private or

dedicated fleet and logistics service providers who employ their own assets in providing service to their customers. Supported business functions include: driver and equipment assignment, dispatch, asset tracking and event management, and financial settlement for driver payroll, supplier payment, and customer billing.

- **Transportation Sourcing:** Utilize sophisticated optimization algorithms to model your sourcing rules and objectives to minimize costs while streamlining the sourcing process for transportation services. Oracle Transportation Sourcing automatically uses historical shipment data to build bid packages and then seamlessly loads the awarded bids back into Oracle Transportation Management in the form of executable rates. This significantly enhances the accuracy of the bid package as well as reduces the time and overhead it takes to run a procurement cycle.
- **Business Intelligence:** Create a real-time transportation dashboard for your operational and strategic planning needs by automatically leveraging the operational data stored in Oracle Transportation Management. By taking operational data and converting it into meaningful information, companies are better able to avoid future inefficiencies and make real-time changes to plans that are not going as expected. For example, planners can view the historical performance of carriers in the context of making a carrier assignment for an expedited shipment. Oracle Fusion Transportation Intelligence eliminates the need for a separate, siloed, data warehouse that supports transportation processes.

## Introduction to Oracle Engineered Systems

Oracle Engineered Systems combine best-of-breed hardware and software components with game-changing technical innovations. Designed, engineered, and tested to work best together, Oracle Engineered Systems can power the cloud or streamline data center operations to make traditional deployments even more efficient. The components of Oracle 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 Elastic Cloud Introduction

Oracle Exalogic Elastic Cloud is an Oracle 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 Oracle 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 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.

## 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.

Together, these features come together to provide the optimal database platform for Oracle Transportation Management. The following sections examine four specific benefit areas of running Oracle Transportation Management on Oracle Engineered Systems.

## Benefit #1: Optimization of Transportation Operations

For the layperson, transportation is a deceptively simple process as trucks, planes, ships and trains take freight where it needs to go with relative ease. To the logistics professional, however, developing the optimal transportation plan is a highly complex process. First, there are many variables that need to be considered for any shipment of goods:

- **Packaging:** How should the goods be packaged for transportation? For example, should the goods be packaged into individual cartons or palletized or can multiple shipments be combined into a single pallet?
- **Consolidation:** Can multiple shipments of goods be consolidated for all or part of their journey? For example, can multiple supplier shipments be placed in the same ocean container while traveling from Shanghai to Long Beach?
- **Load Configuration:** What is the optimal way of loading the goods in order to maximize the utilization of the transportation equipment? For example, how should the pallets be layered and stacked in order to fill out a trailer?
- **Route:** What is the optimal route for the goods to take from their origin to their final destination? For example, which port of export and port of import should be used for an ocean shipment? Can multiple customer deliveries be serviced by the same truck as it travels through a given region?
- **Mode/Carrier/Service Level:** What mode of transportation should be utilized? What transportation service provider should be assigned? What service level is required? Selecting between different modes, carriers and service levels can involve complex cost and transit time tradeoffs.

All of these variables and more need to be considered. In addition, there are multiple operational constraints that need to be adhered to, including:

- **Pickup & Delivery Time Windows:** On time pickup and delivery of the goods is often the primary constraint to be considered when optimizing transportation. For example, when is the material ready

to ship? When does the customer require it to be delivered? When is the facility open to receive or ship goods?

- **Carrier & Equipment Capacity:** Optimizing shipments needs to account for the operational constraints of the transportation service providers who physically move the goods. For example, how much capacity does a given transportation carrier have for a given portion of the network for a given time period? What is the frequency of service between a particular pair of ocean ports? How many pieces of equipment are available?
- **Location Capacity:** Warehouses, manufacturing facilities, cross-docks and other transportation related locations have finite capacity to handle goods. For example, how many dock doors are available for loading or unloading products? How long does it take to cross-dock freight from the distribution center's receiving to shipping areas?
- **Customer Compliance:** Customers often place constraints on how their goods need to be shipped. For example, certain goods cannot be consolidated or co-loaded with other goods. Specific equipment or special services may be required (e.g., inside delivery, high value goods).



Figure 2: Optimized Transportation Plan Displayed Geographically in Oracle Transportation Management

The net result of these many facets of optimizing transportation is a highly complex and computational intensive process. The challenge is even greater given the operational nature of the transportation process. Companies typically don't have weeks or days to make decisions, often they only have hours or minutes to determine the best plan.

The way that traditional transportation management systems solve this complex problem is by using either heuristics based algorithms or optimization techniques. The former are generally faster and less resource intensive, while the latter usually take much longer to run and require significant compute

resources, but achieve a more optimal solution. Oracle Transportation Management is unique in the field of transportation management systems in that it allows the user, through its bulk planning feature, to 'dial up' their solution quality. The user has an option so they can choose heuristic based algorithms for larger sets of orders (where optimization would take too long to run) and optimization engines for smaller sets of orders. The powerful combination of Oracle WebLogic, tuned to run faster on Oracle Exalogic, communicating via InfiniBand to the Oracle Transportation Management database on Oracle Exadata, using the Smart Scan and Flash Cache capabilities, yields unprecedented performance gains in runtime for Oracle Transportation Management's bulk planning process and allows transportation planners to 'dial up' the optimization techniques.

The use of InfiniBand as the networking fabric within Exadata ensures the lowest latency for messages and the highest bandwidth for data transfers. The Exadata Smart Scan capability speeds up the data-intensive queries of the Bulk Plan 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 order, rate and itinerary queries often complete 10 times faster than on conventional systems.

The Exadata Smart Flash Cache capability uses Flash memory to dramatically reduce the time to read and write database records. The intelligence in Smart Flash Cache transparently moves active database blocks from disk to Flash in real time, thus ensuring that "hot" data, such as rates and itineraries, is in Flash memory when the next access occurs. Blocks that should not be in Flash are similarly recognized, which maximizes the amount of space in Flash for active data.

On the Exalogic tier, the JVM makes more efficient network I/O calls using collections of chunked data resulting in higher throughput for the Oracle Transportation Management application. The JVM optimizes object management with fewer copies resulting in reduced garbage collection and less heap size, which in turn leads to better performance of Oracle Transportation Management's planning processes.

The figure below illustrates the performance improvements that are possible when Oracle Transportation Management is deployed on Oracle Engineered Systems. These benchmarks demonstrate that significant performance improvements are possible both in terms of the time required to run a transportation bulk plan (4.7 times improvement) as well as the time required to store the results in the database (8 times improvement). Additional tests during customer proof of concept projects have demonstrated transportation bulk plan improvements of over 11 times reduction in run times.

## OTM Internal Benchmarks on Exa (X2)

Exalogic and Exadata for OTM 6.2

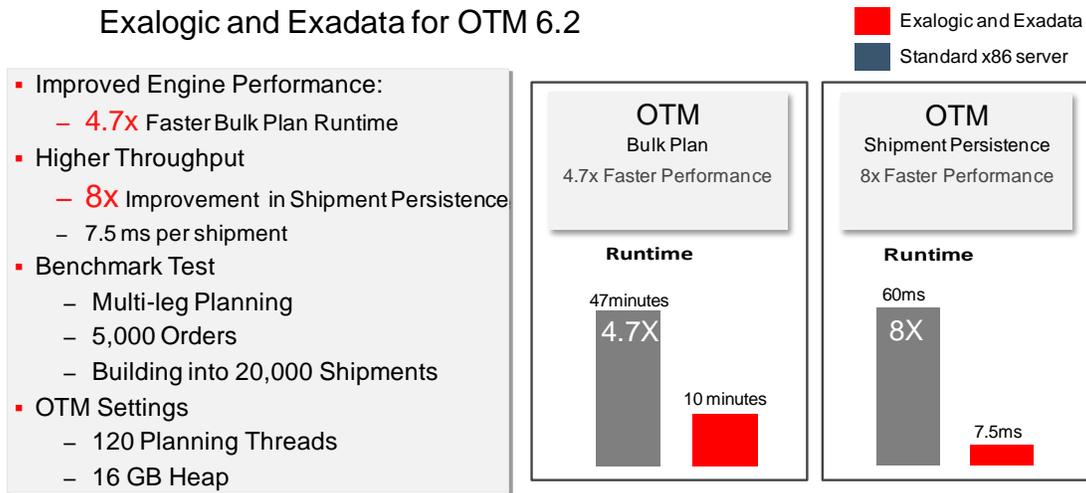


Figure 3: Transportation Bulk Plan Performance Benchmark Results

The ability to handle larger order sets with increased levels of optimization improves the possibility of order consolidation and thereby lowers the overall transportation costs significantly.

### Benefit #2: Supply Chain Visibility

Optimizing transportation is only one aspect. The real challenges often arise during the execution of the plan. Order changes, damaged shipments, production backlogs, bad weather, and other unplanned events can lead to late shipments and supply chain problems regardless of how optimal the original plan. As a result, companies are striving to achieve the ultimate objective of real-time visibility to their products anywhere in their supply chain including goods that are in-transit. Visibility enables companies to anticipate potential problems and mitigate their impact. For example, if a shipment of critical components is delayed in-transit additional components can be ordered and expedited for delivery in order to avoid costly production shutdowns and missed customer service level commitments.

Technology advances have made for improved access to in-transit shipment information. For example, global positioning systems (GPS) can provide real-time location information for trucks, ships, containers, and other transportation assets. Radio-frequency identification (RFID) technology can help automate the process of confirming which specific goods have been loaded, shipped and received. Mobile computers and smart phones have made it easier to communicate with a mobile workforce and capture information closer to the source as events occur (e.g., capture of proof of delivery information, monitor the temperature of a refrigerated shipment).

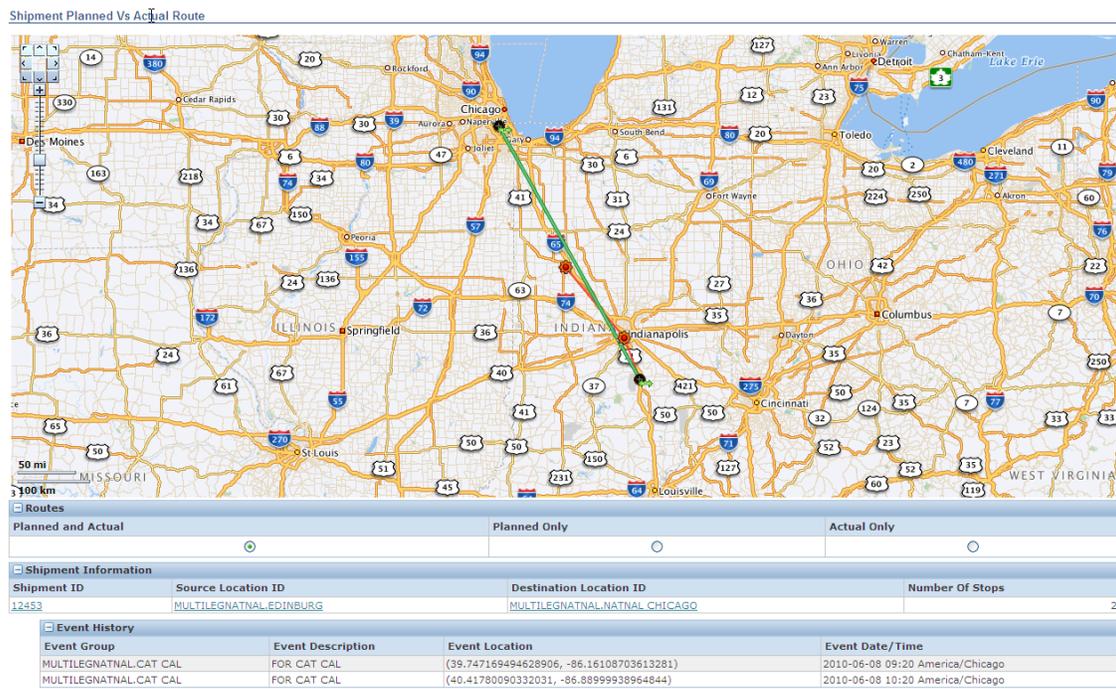


Figure 4: Real-Time GPS Tracking Events Displayed in Oracle Transportation Management

To harness this information, transportation systems must be capable of processing very large amounts of data (millions of shipment status events per day is not uncommon). Limitations in computational processing have prevented companies from fully leveraging all of their potential data sources, and as a result, companies have suffered the consequences of having less than optimal supply chain visibility. These negative supply chain impacts can include: service delays, increased inventory levels, and higher logistics costs. The combination of Oracle Transportation Management and Oracle Engineered Systems helps companies address the supply chain visibility challenge.

Achieving the performance for real-time visibility at this level of status messaging requires both the individual transactions to process at peak performance and the transactions to process in parallel in a highly multi-threaded architecture. Oracle Exalogic and Exadata enable this industry-leading performance through vertical integration between hardware and software and the elimination of I/O bottlenecks through Exabus technology. Oracle Transportation Management provides the ability to configure the application components to use one thread or hundreds of threads. On traditional platforms, scaling Oracle Transportation Management to this high level of threading typically exposes the bottlenecks in the infrastructure. Networks become flooded, disk access slows the system, and thread context switching overhead is exposed. This is not the case on the Oracle Exalogic and Exadata platform.

Exalogic's optimized work scheduler balances the number of threads per core available on Exalogic systems, providing better application processing efficiency. WebLogic Server changes to use shared byte buffers instead of array copies when passing data, improves OTM inter-process communication and a significant reduction in the number of objects created. This also reduces OTM heap usage and

results in fewer expensive garbage collection processes. WebLogic also optimizes socket calls to reduce lock contention on Exalogic, allowing fewer threads to process a larger number of message requests.

In addition to the Exalogic feature advantages, the Exadata Scale-Out Storage feature enables the full performance of Exadata to be realized against a large and growing OTM database, without fear of bottlenecks. As the OTM database size grows (which is typical in high volume visibility solutions) and storage capacity is added to Exadata, storage performance and networking bandwidth scale in equal proportion.

In addition, the Exadata Hybrid Columnar Compression capability dramatically reduces the storage space consumed by the OTM database, while at the same time speeding up queries against the compressed data through reduced I/O. Compression reduces the data storage by a factor of 10 times or more, depending on data composition. Since compressed tables remain compressed in Flash memory as well as on disk, very large amounts of OTM visibility data can fit in Flash memory when compressed, thus reducing the physical reads to the storage.

When Oracle developers tested the performance of Oracle Transportation Management on the Oracle Exalogic and Exadata platform, multi-threaded processing did not expose any bottlenecks in the infrastructure, but instead pointed to contention in java and application code. Oracle developers made code improvements to Oracle Transportation Management and to jRockit as a result of this performance testing, eliminating contention from these highly threaded conditions, bringing Oracle Transportation Management messaging and workflow performance on Oracle Exalogic and Exadata to levels nine times higher than any other platform that was performance tested with Oracle Transportation Management. The figure below illustrates the workflow performance improvements that are possible when Oracle Transportation Management is deployed on Oracle Engineered Systems.

## OTM Internal Benchmarks on Exa (X2) Exalogic and Exadata for OTM 6.2

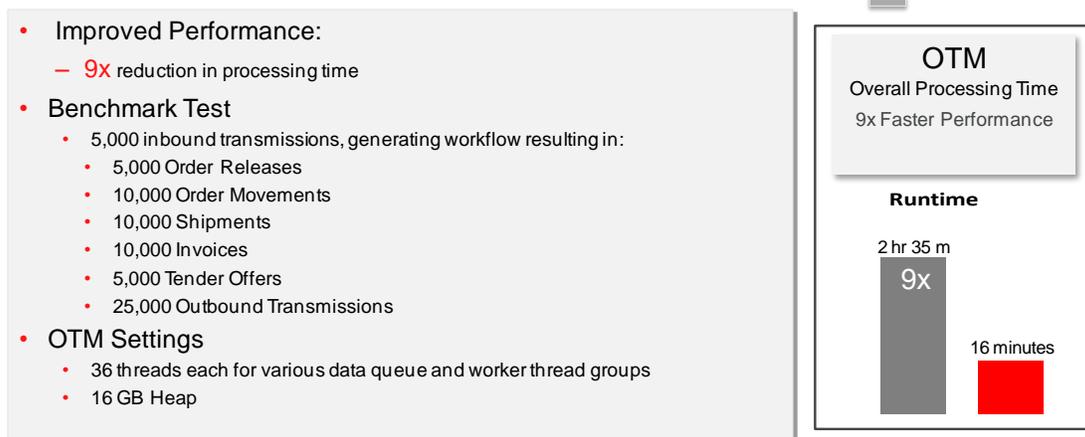
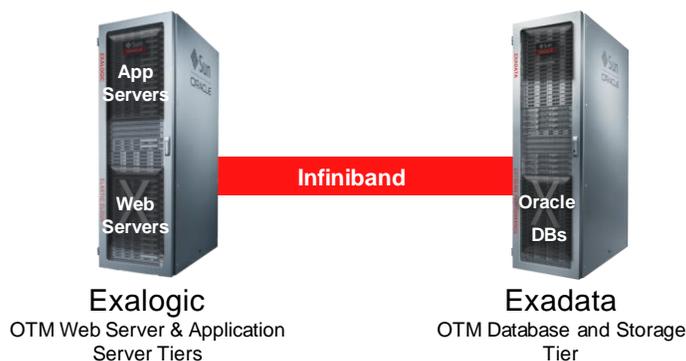


Figure 5: Transportation Workflow Processing Performance Benchmark Results

## Benefit #3: High Availability

Oracle Transportation Management was designed from inception to be a single instance, central transportation solution for shippers and logistic service providers alike. As such, the system has been designed to handle both the business needs of a flexible, multi-enterprise system and the information technology needs for a robust, scalable architecture. This is accomplished via the functional design of the application that supports multiple languages, multiple units of measure and even multiple businesses to co-exist in the same database. It is also accomplished via an architecture that allows for scaling of the solution at all tiers – web, application and database – and provides for high availability operation. Oracle Transportation Management’s web tier achieves high availability via load balancing the multiple web instances. The application tier of Oracle Transportation Management (OTM) achieves this via a feature called OTM Scalability. OTM Scalability is a JMS-based solution of Oracle Weblogic server clustering that allows for multiple Oracle Transportation Management application server instances to run in separate processes on the same server or on separate physical servers. These Oracle Weblogic servers then communicate with each other to provide high availability, so that data integrity will be kept synchronized, processes will only run once, and an Oracle Transportation Management instance will be able to failover to another Oracle Weblogic server. This concept allows Oracle Transportation Management to scale horizontally across Oracle Weblogic servers, JVMs, and physical servers. Finally, Oracle Transportation Management’s database tier achieves high availability by using the RAC feature of the Oracle database.

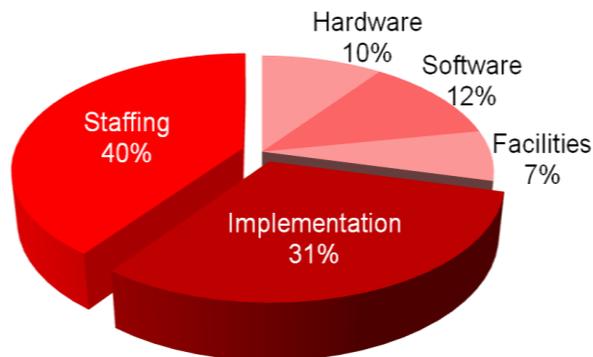


**Figure 6: Oracle Transportation Management on Oracle Engineered Systems**

Oracle Exalogic and Exadata further enhance Oracle Transportation Management’s scalable architecture by providing hardware redundancy for every major component including power, I/O and cooling. Furthermore, the Exabus architecture allows both the JMS messaging of Oracle Transportation Management’s application tier and the RAC messaging at the database tier to operate at near zero latency, thereby making the high availability features nearly instantaneous. Often, different software and hardware layers are not well integrated. For example, database connections in the app server may be trying to use an Oracle RAC node in the database that is overloaded or has died. Without that tight vertical integration between the app server and database (as we have with Active GridLink for Oracle RAC), there could be problems. Oracle has taken substantial measures to ensure that all layers of the stack work together seamlessly.

## Benefit #4: Lower Total Cost of Ownership

Gartner attributes 71% of a system's total cost of ownership to staffing (people who maintain systems) and implementation (people who build and deploy systems)<sup>2</sup>. Oracle Exalogic and Exadata provide dramatically reduced total cost of ownership by reducing the amount of work that people have to do. This allows organizations to focus their limited resources on activities that contribute to the top-line revenue.



Source: Gartner, Credit Suisse

Figure 7: Total Cost of Ownership for Information Technology Systems

Oracle Exalogic and Exadata reduce the total cost of ownership in the following three ways:

- The systems are pre-built so there is no need to design, procure, assemble, deploy, and tune each one.
- The systems are easier to manage because of the holistic management approach that is taken with Oracle Enterprise Manager.
- Oracle also provides Platinum Services, which is a free support entitlement under standard hardware support for Exalogic and Exadata.

Instead of being a collection of individual components, Oracle Exalogic and Exadata are single cohesive systems providing all the benefits of being single systems. Oracle Exalogic and Exadata are maintained, managed, monitored, deployed and tested as one system.

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<sup>2</sup> Philip Winslow, "Dr. Exalove: How I Learned to Stop Worrying (about Sun) and Love Exalogic Too," Credit Suisse, Nov. 23 2010

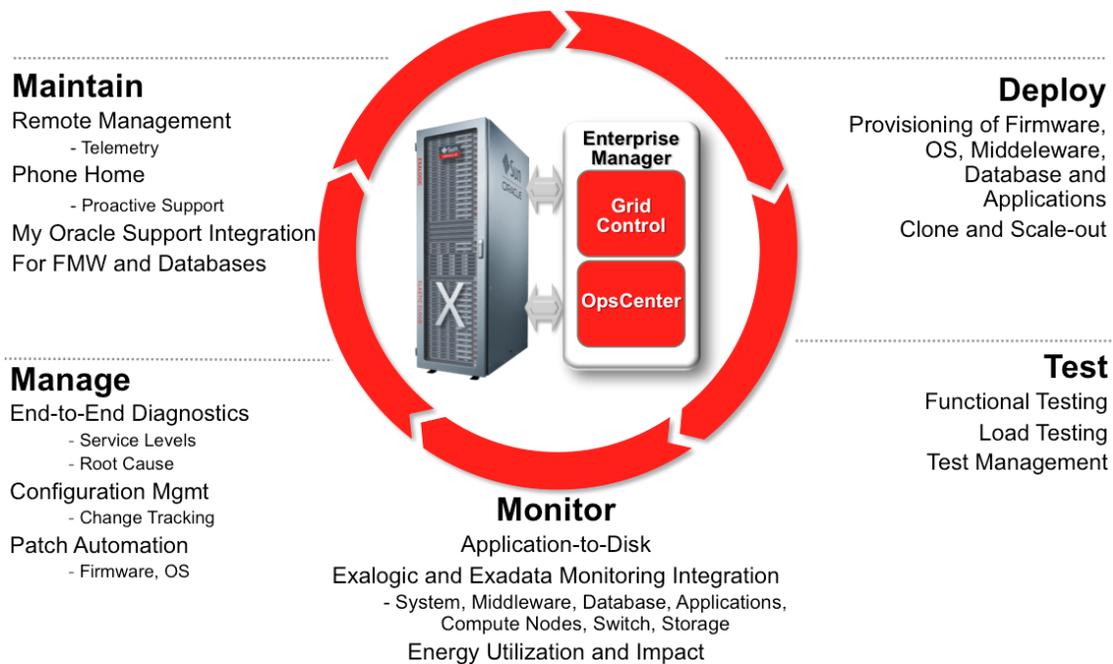


Figure 8: Comprehensive Lifecycle Management with Oracle Engineered Systems

The components of Oracle Exalogic and Exadata are engineered to work well together, leading to such benefits as single file patches and storage to application management through Oracle Enterprise Manager. Oracle Enterprise Manager has even been modified to work better with Oracle Exalogic and Exadata.

In addition to providing management and monitoring capabilities, Oracle Enterprise Manager 12c supports static (self-service) and dynamic (real-time load-based) provisioning. When it is used in this capacity, Oracle Exalogic is used as a pool of hardware resources that can be either statically or dynamically provisioned for different uses. For example, hardware in a single Oracle Exalogic system could be provisioned to a preproduction environment for testing, a production environment for the primary transportation operations, and then finally to a ‘what-if’ development environment as a test bed for new transportation capabilities. Provisioning in this manner is scaling out an environment. This drives up resource utilization, which allows for a greater return on investment.

Finally, Oracle also provides Platinum Services, which is a free support entitlement under standard hardware support for Oracle Exalogic and Exadata. Platinum Services provides comprehensive proactive monitoring, a specialized support team, “Phone Home” capabilities for automated service requests, free quarterly patching from the operating system down, and SLAs as follows: 1) 5 minute fault notification, 2) 15 minute restoration or escalation to development, and 3) 30 minute joint debugging with development. This reduces the long-term total cost of ownership

The integrated nature of Oracle Exalogic and Exadata, the quality of the products on their own, and the value of the integrations between these best-of-breed products allow for unparalleled management, consolidation and time-to-market, leading to a reduced total cost of ownership.

## Benefit #5: Faster Time to Value

In traditional implementations, Oracle software applications are installed and configured on a customer selected hardware system, and the time taken to install, tune and tailor the solution for a customer's hardware can be time consuming and costly, requiring expertise on the application, expertise on the hardware, and the knowledge of the proper alignment between these two solution elements. This time delay has a direct cost in terms of the required work effort to "tune" the hardware-software solution in addition to an opportunity cost in terms of delayed benefit realization. In addition, there is the risk of not achieving the optimal hardware-software configuration, which may result in subpar performance and additional costs and time delays associated with revising the hardware components. Deploying Oracle Transportation Management on Oracle Engineered Systems provide a highly valuable alternative.

Oracle Engineered Systems reduce the time-to-value and implementation cost for the business. Oracle Transportation Management requires shorter deployment and configuration times when using Oracle Engineered Systems since it is available as an Oracle Virtual Machine (OVM) template<sup>3</sup>. These OVMs are ready to be deployed on Oracle Engineered Systems as preconfigured, certified application instances ready to run and contain a full computing configuration pre-installed including Oracle Enterprise Linux, Oracle Weblogic Server, Oracle Transportation Management, combined with settings, configuration, and tuning already done. These OVMs can also be deployed automatically to an Oracle Exalogic machine using Oracle VServer that manages the OVM instances on an Exalogic machine.

## Conclusion

Transportation management is a critical opportunity area for many companies as they look to improve the efficiency and reliability of their global supply chains. Significant freight cost reductions, increased on-time delivery, and process automation are three primary areas of business value. Oracle Transportation Management is a best-in-class solution that enables companies to capitalize on these business value opportunities. Oracle Transportation Management in combination with Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud provides a unique value proposition for many organizations in terms of: optimization of transportation operations, supply chain visibility, system availability, and total cost of ownership.

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<sup>3</sup> OVM templates for Oracle Transportation Management are planned for general availability within the next 12 months



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