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Getting the Most Out of Your Applications With Oracle Exalogic

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Introduction

More than ever before, business performance depends on software applications. It's a rare business that can afford even a few minutes of application downtime before it begins marking critical losses. But with an explosion in transaction volumes, keeping applications up and running is more difficult than ever. Users have ever-higher expectations about the range and capability of applications, the speed with which data is delivered, and the responsiveness of those applications. These demands are radically changing how IT works. Once IT was solely responsible for assembling and maintaining the stack of components needed to run an application, but now it's under pressure to find faster and more efficient solutions.

The old models of ad-hoc assembly are struggling to keep up. Sourcing and connecting of components—software, computing and storage hardware, and network equipment—is time consuming and expensive. Many enterprises end up building multiple application stacks that are unique to their organizations. These become untenable, due to incompatible technical standards within the organization and isolated knowledge among the staff who built them, particularly when the enterprise goes through mergers and acquisitions. Much testing is required as each component is adjusted to work with another. The patch and upgrade process becomes complex and risky when vendor software updates aren't tested on a custom application infrastructure.

Infrastructure problems make business application deployments and upgrades an arduous process. Implementations of software applications, such as Enterprise Resource Planning (ERP), can take months or years. Any custom changes have to be tested and documented. Even when the application finally goes into production, it's difficult to manage because there are so many moving parts in the data center. Problems in application management quickly translate into business problems, so customers become dissatisfied with slow service, and companies miss opportunities to get to market because they're grappling with application deployments.

This paper explores how Oracle Exalogic Elastic Cloud, an engineered system for business applications, can help enterprises deploy and upgrade applications quickly, handle massive transaction volumes, maintain a consistent set of technological standards across the application stack, and connect components seamlessly. Success in these areas allows companies to improve customer satisfaction, get to market faster, improve operational efficiency, and reduce cost and complexity, delivering applications with the performance and ease of use that customers and business users demand while simplifying deployment and administration.

The Business Applications Challenge

Business applications are critical to an enterprise's daily activities. An application problem is both a user problem and a business problem. When applications don't meet expectations, the business implications are tangible—orders are unfilled, opportunities are lost, financial reporting is delayed, and productivity drops. For example, according to Aberdeen Group, a one-second delay in page loading translates to a 16% reduction in customer satisfaction and a 7% reduction in conversions.¹

User expectations are growing. With the explosion of transactions from round-the-clock use of electronic devices, the pressure will only become more acute for enterprise systems such as e-commerce and CRM. Here are just a few examples across various industries:

- **National government.** 1.5 million people processed on US borders each day
- **Communications.** 5 billion text messages sent in the US each day
- **Utilities.** 2.2 billion smart meter transactions daily
- **Retail.** 32 sales per second on Amazon.com; 60 billion US debit/credit transactions per year

Under the pressure of these high volumes, it's becoming more challenging to ensure application uptime. Scalability—the ability to add or remove capacity quickly—is hampered. Reliability is far from assured. Application IT teams are further challenged with deployment complexities and the need to make changes quickly to meet business needs and maintain watertight security and operational efficiency.

¹ "Just One Second Delay In Page-Load Can Cause 7% Loss In Customer Conversions," Tag Management Blog, <http://blog.tagman.com/2012/03/just-one-second-delay-in-page-load-can-cause-7-loss-in-customer-conversions/>.

Critical Business Goals

Some goals are universally applicable to almost any business and require a superior business application experience. Businesses want to:

- **Seize market opportunities.** In order to get new products and services to market quickly, applications must be fast—fast to deploy, fast to update, and fast once they’re up and running.
- **Reduce business risk.** Applications must be reliable and secure in order to support business objectives. If users think their data is insecure, they will resist using the application.
- **Reduce cost and complexity.** Lines of business continually demand more application features, capacity improvements, and integrations, but CIOs don’t have more resources to satisfy those demands. CIOs must accommodate growing business demands without big increases in the cost or complexity of the systems supporting them.

Critical Constituencies

The business applications challenge comes from three core groups in the enterprise, each with differing needs.

The **business applications/line-of-business user** wants to take advantage of market opportunities as they arise. To do this, applications need to be fast, reliable, and easy to modify. They need to support a variety of client devices, anywhere at any time. Applications’ responsiveness to user requests is paramount, and they must maintain stability during business peaks, such as retail seasonality or the quarterly financial close.

The **Applications IT staff** is charged with configuring, customizing, and running applications that serve internal and external users. Applications IT wants a complete platform that functions seamlessly and is easy to deploy, without a great deal of coordination between hardware, software, networking, and storage staff. To serve end-user requests as efficiently as possible, they need powerful administrative tools that allow easy upgrades and the ability to perform maintenance with the least possible user impact. Applications IT staff wants to simplify support and reduce risk associated with application deployment and management.

The **Data Center/Operations IT** traditionally has to deal with some of the greatest complexity in the business applications stack. Separate groups often manage network, virtualization, computation, memory, and storage components. Given budget and time pressures, Data Center IT wants to reduce the amount of coordination needed between these groups, which requires better integration. Data Center IT is also concerned with reducing the total cost of ownership (TCO) of hardware and software while increasing automation. They want to speed up troubleshooting and reduce operational risk and complexity, while ensuring minimal downtime.

The IT Imperative

Given these critical business goals and expectations, IT must deliver applications that meet the following requirements:

- **Ease of deployment.** The less time spent configuring hardware and software components, the faster an application starts supporting the business.
- **Performance.** Responsiveness is critical; a few seconds of delay can cause customers to go elsewhere.
- **Scalability.** As business conditions are unpredictable, the application stack needs to be able to expand and contract, without causing service problems or requiring extensive coordination.
- **Availability.** It's an "always-on" world. Availability is especially challenging when recovering from disasters and service interruptions.
- **Security.** Applications need to run without compromising data or interfering with each other on shared equipment.
- **Integrated management.** The entire application stack can be monitored and managed from a single point of view.
- **Low cost of ownership.** Applications and their associated components need to process data and deliver a great experience at the lowest possible cost.
- **Open standards.** Using industry standards makes it easier to port and integrate with other applications, and reduces reliance on specific technology vendors.

Pursuing the Ideal Application Platform

The choice of a business application platform is increasingly critical to fulfilling these requirements. The platform—the combination of hardware, software such as the operating system and middleware, and networking technology—must be architected with an eye toward today's business applications.

Even though business users don't typically interact directly with an applications platform, the platform nevertheless has a huge impact on their ability to achieve their goals. If the platform's performance is better, users feel the difference. If the management system is more efficient, users experience less downtime. If deployment is automated, business users become productive sooner and seize business opportunities faster. If the platform is more cost-effective, it's possible to deploy more applications.

A new crop of technology is rising to meet the challenges of enterprise applications: **engineered systems**, which are integrated systems from the application layer all the way down to the disk layer. An engineered system combines the four layers of an enterprise application stack—software, computing, network, and storage—into an optimized package that eliminates many of the integration difficulties of building an applications platform. Gartner estimates that by 2015, 35% of all server shipments will be integrated systems.²

During the assembly and testing phase, all components in an engineered system are pre-engineered, certified, and configured to work together, so it's much faster and cheaper to get the system up and running.

Once the application is live and in production, all the coordination that would otherwise have to happen between the business users, Applications IT, and Data Center IT can be managed in one box, through role-based interfaces appropriate to the requirements of each constituency.

Oracle Exalogic: A Complete Business Application Platform

Oracle Exalogic pioneered the concept of engineered systems for business applications. Exalogic combines software (including the operating system, virtualization technology, middleware and networking software and device drivers), computing and storage hardware, and networking equipment in a single system. Exalogic is honed to support complex application environments with maximum throughput and minimal administrative work.

Oracle Exalogic was designed so that hardware and software work together to satisfy the needs of business users, Applications IT, and Data center IT. Enterprises are confident of full support from Oracle because Oracle has performed all integration, testing, benchmarking, and certification work to ensure that Exalogic optimally supports their business applications and middleware components. This is much safer and cost-effective than running applications on a one-off platform designed by the IT department.

Certified applications include Oracle E-Business Suite, Oracle's PeopleSoft, Oracle ATG Web Commerce, Oracle's JD Edwards EnterpriseOne, and hundreds of other Oracle and third-party applications. Additionally, several Oracle middleware products have special integrations into the Exalogic system to further optimize performance; these include Oracle WebLogic Server, Oracle Tuxedo and the Oracle Coherence in-memory data grid solution, as well as Oracle SOA Suite.

² Gartner Data Center Conference presentation, "Will Fabric Computing Change the Concept of the Traditional Server?" December 2011.

Exalogic's five major areas of functionality are:

- Mission-critical virtualization – with Oracle Virtual Machine
- Extreme performance – with Oracle Exabus
- Applications-to-disk management – with Oracle Enterprise Manager Ops Center
- Virtual assemblies – with Oracle Virtual Assembly Builder
- Application delivery control – with Oracle Traffic Director

The components of Exalogic, which would usually be pieced together from multiple vendors, work together as an engineered system to support your applications.

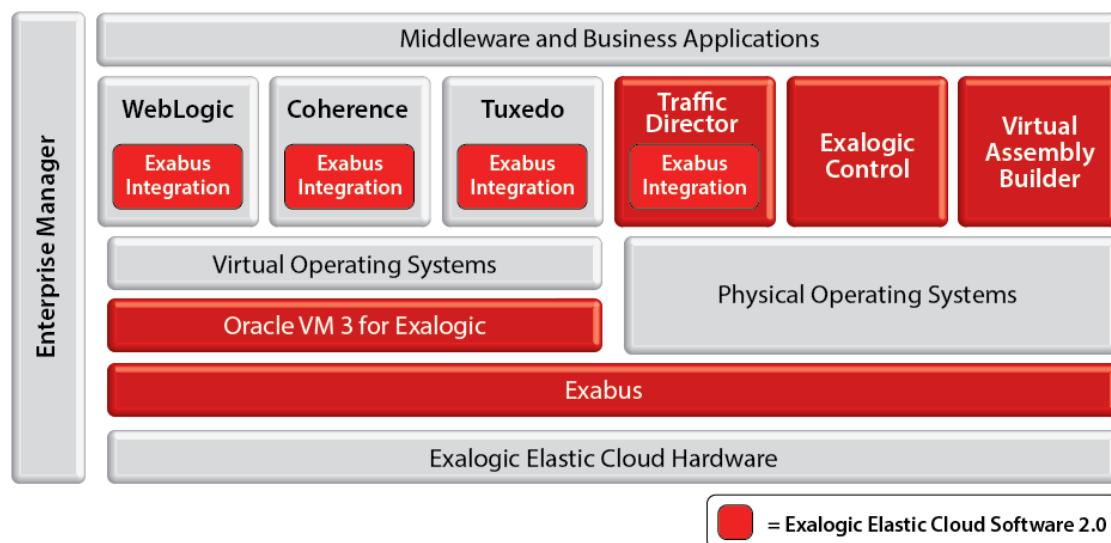


Figure 1. Oracle Exalogic Architecture

Mission-Critical Virtualization

Oracle Exalogic supports full server virtualization via **Oracle Virtual Machine**. Oracle VM integrates with the Infiniband networking fabric, a high-speed communications backbone built into the Exalogic solution. It provides tight integration with the rest of the platform to allow a tuned deployment impossible to get from standard virtualization solutions. Oracle VM doesn't just consolidate servers; it can manage an integrated stack of components, up to the application level, providing high-density consolidation and deployment with support for physical partitioning. This results in near-native performance when compared with physical hardware, plus the ability to cost-effectively run multiple applications on one box with no security concerns. Customers can also run a private cloud, with user self-service capabilities, within an Exalogic box or across multiple Exalogic boxes.

Extreme Performance

Oracle Exabus is the defining architectural feature of Exalogic. It is the communications (I/O) fabric that ties together the integrated stack of components. Consisting of InfiniBand, a high-speed switched fabric communications device, firmware, and software, Exabus eliminates I/O bottlenecks that characterize typical composite application infrastructures. Instead of working with dozens of cables and connections, IT works with an integrated, cost-effective, easy-to-manage, and inherently secure infrastructure.

Exabus allows high-speed communication between application and middleware components in the Exalogic box. All of the layers in the Exalogic product are supplied by Oracle, and the software and hardware layers are optimized for Exalogic.

Oracle has been able to optimize the performance of the entire application stack because it knows exactly what's inside the box and has deep expertise in building and optimizing applications for business. Oracle is the only vendor that integrates all of the components in the application stack, including the actual applications.

The benchmarked results translate directly to the customer environment. For example, Oracle E-Business Suite processes orders 40 to 50% faster on Exalogic. Oracle's JD Edwards EnterpriseOne improved response time threefold over standard configurations. Web delivery of the Oracle Retail planning system performs 10 times better on Exalogic.

Applications-to-Disk Management

Oracle Enterprise Manager Ops Center consolidates administration, providing the ability to trace issues through all layers of the system with a single tool. Enterprise Manager comes built in with Exalogic and manages every layer of the stack, handling all of the components in the context of the application lifecycle. It also manages every aspect of virtualization and deployment. It provides user-specific views of the system while supporting requirements for flexibility and control. With Oracle Enterprise Manager, the enterprise can prioritize computing resources and IT work according to business need.

Virtual Assemblies

Oracle Virtual Assembly Builder (OVAB) streamlines deploying applications and managing virtualization projects. OVAB lets IT build assemblies—complete, ready-to-run application configurations. Customers can download an assembly from Oracle or build one using OVAB. Oracle applications can be consumed as single packages that contain metadata about all of the components required to support the application, as well as the application itself. When these applications are launched, Exalogic can determine how to install and configure all the necessary components to support the application, including multiple virtual machines and networking configurations. Installation happens at the push of a button, dramatically speeding time-to-market. What's more, OVAB simplifies ongoing maintenance by handling patching and upgrades in an automated fashion.

Application Delivery Control

Oracle Traffic Director (OTD) is an application delivery controller (ADC) that handles traffic between servers in the Exalogic environment and mediates between Exalogic and web servers. OTD provides hardware-level application acceleration, including SSL encryption. It supports fault tolerance through built-in load balancing, connecting components with the Exabus fabric. As traffic volume on the Exalogic system varies, Oracle Traffic Director may be easily scaled in lockstep with the required application compute resources.

With OTD, enterprises give application developers the ability to build service levels for and shape traffic into and out of applications. It allows developers to set service levels for different workloads and change rules dynamically, without the need to coordinate with other IT constituencies. There's no need to purchase a separate, software-based ADC since Oracle Traffic Director is built in.

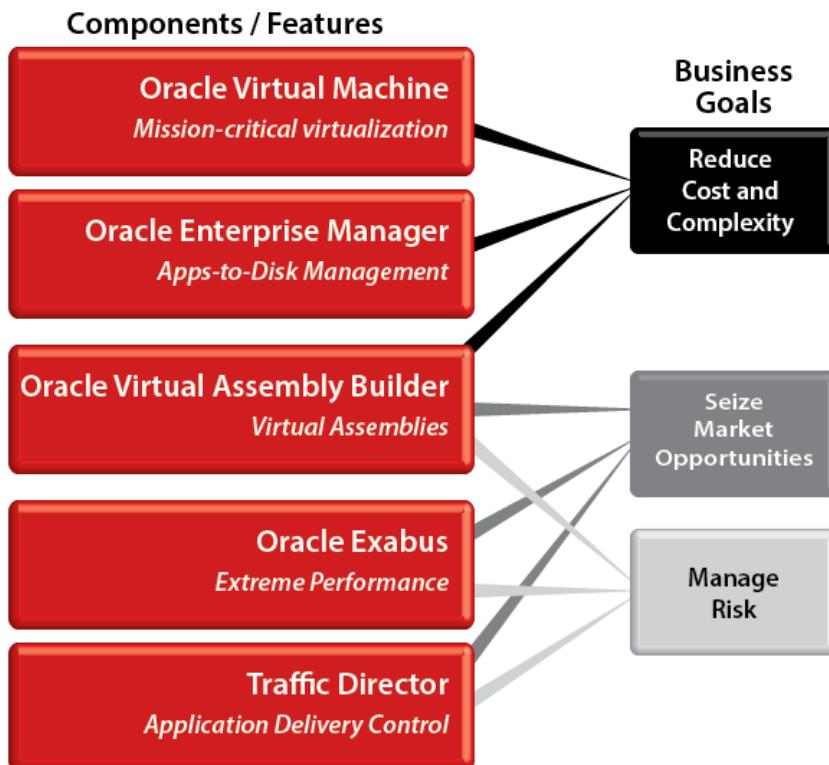


Figure 2. Features and Benefits of Oracle Exalogic

Platinum Services

Oracle offers complete, integrated, and proactive support for Exalogic.

Premier Support is available 24/7 and features a specialized support team for engineered systems, including a 2-hour onsite support to troubleshoot hardware issues. Updates and upgrades for Exalogic Cloud software, storage, network, operating system, device drivers, and firmware are available. With My Oracle Support, users can access support via online portal and also receive automated service requests.

Platinum Services are available at no additional cost to Premier Support Customers. Oracle engineers perform patches and updates for certified configurations. During outages, Platinum Services offers 5-minute fault notification, a 15-minute restoration guarantee before escalation to development, and a 30-minute joint debugging session with support and development.

Your Best Solution for Applications

Oracle Exalogic is a compelling platform for business applications because it represents a new way of thinking about the application lifecycle. With an engineered system in place, developers can design an application with all of the characteristics it needs—scalability, availability, performance, memory requirements, and so on. If the infrastructure can elastically adjust, the application becomes a blueprint that defines the infrastructure. This leads to better-defined application behavior and lower complexity. Because Exalogic is an all-in-one solution, the imperatives of all IT constituencies are satisfied.

Case Study: Edcon Ltd.

Edcon is the leading clothing, footwear, and textiles retailer in Africa, with a substantial business in fast-moving, non-durable consumer goods. The company comprises three major chains, incorporating more than 1,500 stores in eight countries, with approximately 10 million customers in its database.

Edcon uses Oracle Retail Predictive Application Server (RPAS) to improve product flow through distribution centers, place inputs into stores, plan for holidays and promotional events, and avoid stock-outs, through capabilities such as retail demand forecasting, advanced inventory planning, and size profile optimization.

Edcon's initial plan was to deploy RPAS across 15 blade servers, but the need to purchase individual licenses for each additional blade quickly proved cost-prohibitive. Support costs would also increase per machine. Edcon needed a solution that would not just work now, but also prepare the company for future growth.

Prior to selecting Exalogic to support RPAS, Edcon recognized that it needed to support about 1,000 concurrent users. Its concerns included scalability, performance, stability, data integrity, and availability. Edcon needed to lower business risk by reducing the possibility that RPAS could fail under heavy use. It also needed to scale cost-effectively and minimize complexity. Had the company stayed with blades, it would have had to spend hundreds of thousands of

dollars on new licenses for all the required elements of the stack. By moving to Exalogic, the company recouped a license surfeit, meaning that the Exalogic solution had essentially paid for itself in technology software savings.

Retailers need to constantly assess the performance of goods lines and stores, cross-referencing purchasing trends with available supply, while assessing promotions, competitor's sales, weather, and economic trends on customer behavior. This involves an immense amount of data analysis. At Edcon, a batch job processes gigabytes of sales data, the entire product hierarchy and the location hierarchy, and then enriches the data and aggregates it. Using Exalogic, Edcon compressed the goods performance assessment operation from 2 hours to 18 minutes and processes 10 times as much data as before.

By consolidating a substantial number of applications on Exalogic, Edcon achieved enormous economies of scale on virtual machines and massive throughput, transmitting data between applications at an unprecedented rate. Because of the efficiency gains, Edcon referred to Exalogic as "a data center in a box."

Conclusion

Oracle Exalogic is a secure, flexible, reliable platform for deploying, consolidating, and maintaining your business applications. All the components are pre-integrated, tested, and certified to provide optimal application performance for users and ease of administration for IT.

Exalogic is the logical choice for mission-critical business applications, with benefits for every applications stakeholder. The business application owner and user get faster time-to-market; the Applications IT team lowers deployment risk; and Data Center IT reduces the cost and complexity of operations.

Enterprises choose to run mission-critical applications on Oracle Exalogic because no one is better suited to build an applications platform than Oracle. Only Oracle has all the necessary hardware and software components, including middleware and applications, and the required expertise to provide an optimized, end-to-end solution.

For more information, visit the Oracle Exalogic Web site at oracle.com/exalogic



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