



TRANSFORMING BUSINESS THROUGH EXTREME PERFORMANCE

Reforming daily operations by radically rethinking traditional data warehouse and database processing approaches can lead to competitive differentiation, better innovation and cost efficiencies.

When is extreme performance required? A better question might be, when *isn't* it?

To understand when, it's important to understand what defines an "extreme performance" enterprise. This is a company that has reshaped the pace at which it does business to become more competitive. This company's knowledge workers and front-line service staff use critical business data—from the data warehouse to online transaction processing (OLTP) applications—in an effort to speed service and product delivery, to better innovate, to quickly realize competitive differentiation, and to align the IT spend in a way that helps the business rather than burdens it.

To evolve into an extreme performance enterprise, the business must make better use of information as it moves through its daily operations, which demands a radical rethinking of traditional data warehousing and transaction processing. The ability to rapidly pose more complete and complex queries enables more up-to-date views of business information. This allows the business to be more intelligent in the midst of what are normally thought of as transaction interactions, which leads to better, faster decisions, with a positive impact on everything from customer relationships to overarching corporate strategies.

Consider the prospect for improving decisions at the speed of business—and much more—when:

- ▶ Technology limitations no longer constrain an analyst's effort to conduct deeper analysis of historical enterprise data—terabytes or even petabytes of information stored in a data warehouse—to quickly gain invaluable insight into patterns that result in first-mover advantage revenue opportunities.
- ▶ OLTP systems become so powerful that workload calculations for time-critical operations don't lag, and the business can recalculate fast-changing components 24/7 to offer customers the best deals—especially in hotly contested markets, such as online travel, where price competitiveness rules.
- ▶ A true, real-time data warehouse can at last be achieved, via consolidation of OLTP and data warehouse systems onto a single platform that speeds source data bulk loading so that analytics and reports are built off the freshest data, all the time—while also presenting a model for lowering infrastructure costs.

"Instead of posing queries three or four times a day, and coming back an hour or two later to figure out what to do next, imagine doing three or four of those every half-hour or hour," states Tim Shetler, vice president of Exadata product management at Oracle. Alternatively, consider the ability for customer service agents to tap into a data warehouse that, based on input service request information, delivers recommendations within a fraction of a second to resolve a client's need, in order to keep that buyer loyal to the company. Such efficient scenarios have long been desired and discussed, yet have not been feasible due to the limitations of technology—or at minimum the limits of how much money a company can realistically invest in traditional technologies in an attempt to achieve these capabilities.

THE NEED FOR SPEED

Business technology leaders who see the opportunity and capitalize on this will be amongst the vanguard of those fueling technological transcendence. "Probably 95 percent of companies today are all chasing the same thing, which is really about operational streamlining and reducing what it costs just to run basic data center operations. They are attempting to transform IT into a competitive differentiator to benefit their bottom line and multiple stakeholders. Yet they are not quite at the point where they are talking about transforming the business through IT," says Shetler. "If you can change the way you do business, the benefits can just go on and on." Those who don't, he continues, will risk not positioning themselves to be one of the 5 percent to have achieved breakout levels of performance and reap the profits from that extreme performance.

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One forward-thinking enterprise that has revolutionized key parts of its data strategy is the global research-driven pharmaceutical firm, Merck & Co. The company's electronic laboratory notebook (ELN) system for sharing experimental data had seen rapid growth in both volume of information as well as the user base. Yet the very success of this system led to performance issues: It was taking scientists too long to get answers to queries they posed about prior research, with bottlenecks in the architecture leading to timeouts or cancelled requests. Merck's move to the Oracle Exadata Database Machine, which features innovative technologies that radically boost performance, led to an

estimated fivefold increase in query response speed, even as the user base grew by 30 percent.

Enabling extreme performance positively impacted Merck researchers' ability to discover information. Scientists can now explore every promising idea, thanks to the exponential jump in ELN performance that lets them handle more sophisticated searches and get faster access to information. Being connected to the research of their colleagues across the company also strengthens collaboration and builds the foundation for market innovation. Imagine how this collaborative engagement will contribute to developing the next blockbuster drug, a return on investment that could measure in the billions of dollars. "What an ROI that could be, and it is not likely to happen unless you have that level of performance," says Shetler.

OBSTACLES TO GOALS

The obstacles that Merck and other companies face in the ongoing attempt to effectively leverage mission-critical information assets, unfortunately, are well known. Achieving extreme performance is challenging when data volumes continue to grow exponentially. Companies are collecting more and more information, are required to store it for longer and longer periods, and must provide access to more and more users. More data and more users drive up total requests, severely straining system performance. Or, sacrifices are made regarding just how much historical data can remain active. Another challenge lies in ensuring that decisions are made based on the most up-to-date information and that the data used to support those decisions is complete and consistent. Results based on incomplete or inconsistent data will never help any company be faster, better or more innovative.

Another challenge is that companies that want to deploy a streamlined approach to drive continuous, real-time capture and delivery of the most-recently changed data between OLTP systems and the data warehouse don't have many database appliance options to choose from. That's because most of these vendors have focused exclusively on data warehousing. But there are very tangible cost-performance benefits enabled by consolidating mixed

transactional and data warehousing workloads on the same system to more seamlessly integrate with each other.

Many companies may be held back from realizing such benefits because they are too focused on existing obstacles, rather than on the opportunities presented by the ability to process and analyze data as soon as it arrives. “You have to envision a changed company, one that is substantively different from others in your industry because it is enabled by access to information that you don’t have today or that you think you can’t have today,” says Shetler.

“You must challenge your company [or organization] to alter the notion, and assume the technology will enable you to do that,” he continues. “I think people who often have concerns about so much data are under the impression that they have to deal with constraints that may not exist anymore.”

HOW ORACLE EXADATA SURMOUNTS THE CHALLENGES

The extreme-performance enterprise can be a reality today, enabling the business analyst to ask new questions that lead to even more probing questions and ultimately superior insight. This means reports are processed and distributed more quickly, enabling more informed decisions to be made around offering new revenue-generating efforts or architecting competitive differentiation. And front-line workers can quickly gain access to a customer solution based on assessments of historical information. After all, better customer service that builds loyalty and breeds recommendations not only spurs profits now, but those profits help make more funds available for developing new products, completing acquisitions, and even attracting more talented staffers—all of which can contribute to a cycle of innovation and ongoing growth.

To create a more high-performance, innovative, differentiated and efficient enterprise requires an evolution in data management technologies. A forward-thinking company will integrate purpose-built, highly-engineered systems that feature innovative technologies to significantly improve application and database performance.

Oracle Exadata, an intelligently engineered, preconfigured database machine, is changing the landscape and delivering massive performance improvement for any Oracle database workload without further configuration or optimization—whether for data warehouses or OLTP applications, mixed or in dedicated environments. Its architectural advantages include:

- ▶ An intelligent storage layer that handles data-intensive query processing, and avoids the need to move large amounts of data to improve performance and concurrency of both simple and complex queries.
- ▶ Hybrid columnar compression for compressing data 10-fold or more, driving savings in spending on storage arrays, speeding scan query performance during typical data warehouse queries, and enabling IT to forego moving historical data to tape, where it is no longer directly accessible by the application, taking a toll on fast-paced business requirements.
- ▶ Smart flash cache that drives ultra low latency movement of hot data while disk storage provides economical yet still efficient access to less frequently-required information.
- ▶ Multiversion read consistency, which guarantees a user will always see a consistent view of the data requested—even as underlying data may change during the user’s query execution from events such as a trickle-feed update of a large data warehouse table.
- ▶ 40 Gb/sec InfiniBand network that provides connectivity many times faster than traditional storage or server networks. Scaling is simplified by adding multiple machines together via connected InfiniBand cables.

Many customers are realizing gains thanks to Oracle Exadata’s integrated hardware and software components that drastically improve performance and achieve high availability for both OLTP and data warehousing.

HISCOM Ltd., the systems integration business of the Hokuriku Coca-Cola Bottling Co., Ltd., is an excellent example. The company is achieving benefits that would not have been possible had it continued to operate its data warehouse and its database as separate systems to process and analyze sales and order data from Coca-Cola retailers and vending machines. With Oracle Exadata, HISCOM saw data processing speed improve by 30 times, compared to using a separate data warehouse and database to complete the same function. Today, with Exadata in production as an integrated system:

- ▶ There is no need to extract, process or load data from database to data warehouse.
- ▶ Complex search queries are completed in five seconds rather than three minutes as previously experienced.
- ▶ Batch processing speed was reduced from 50 minutes to 80 seconds.

This new level of performance enabled by Oracle Exadata ensures all new data is included in business intelligence analysis and that order, logistics, sales and financial reports can be provided to managers much faster because of improvements in batch processing speed. This has improved the timeliness of data and enabled Hokuriku Coca-Cola Bottling sales representatives to engage existing and potential customers with accurate information.

BOTTOM LINE

Forward-thinking business-technology leaders will first want to map out their own goals for using information to drive innovation and competitive differentiation. Then, they need to envision how the benefits of extreme system performance can help them get there, and assess innovative technologies, such as Oracle Exadata, that deliver extreme performance.

“It is possible now to have technology fuel transcendence into the upper echelon to become a great company,” says Shetler. “Yes, it’s risky to break out of the pack. You become very visible and if you don’t succeed, or don’t succeed fast enough, people want to go back to their comfort zones. But when you take the risk it gives you the chance to have a breakout company or product.” The future you envision, he says, is possible to achieve today. ■



Tim Shetler

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Shetler leads product management for the Systems Technology group, responsible for the Exadata Database Machine, database high-availability, database performance, compression, backup and archiving.

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Rethinking The Present To Enable the Future

It's obvious that the enterprise is in the early stages of a significant transformation in how information technologies are deployed. Tim Shetler, vice president of Exadata product management at Oracle, discusses the trend and what it portends for enabling extreme performance.

How is IT becoming different today compared to the past?

For as long as I have been involved in IT, almost 25 years, the IT department has had to understand how to take different pieces from different vendors—database servers, storage, networking components, software—and figure out how to put them together. Other industries went through that phase quickly and got to the point

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where they were selling a finished product. In IT, we're finally now in the era, with Exadata and similar engineered machines, that systems can be prebuilt and sold and supported as one complete unit.

How is that shift helping the business to speed transformation at market pace?

Our customers talk about how, when Exadata showed up, it was just two to three days to start using, vs. the typical weeks or months it takes when a mound of boxes from different vendors show up and IT has to stack, test and figure out how to create as balanced and high-performance a system as possible. Our notion of Exadata is 1+1=3. If you marry software to hardware for specific kinds of workloads, like database workloads, then you can tune, tweak, and optimize in ways that you can't if you are just buying hardware and running some software on it. That is, building a generic platform that might serve a lot of different purposes—and maybe none of them optimally. We decided to build something instead that would run databases or database

workloads as fast as possible with as high security and reliability as possible. We know exactly what we tune the system to do.

In what respect can an engineered system, like Exadata, enhance cloud computing?

This kind of platform has great appeal for those who want to do cloud computing. Because it delivers fast performance for all workloads, you can consolidate multiple databases onto one machine. You are talking about not dedicating a server to one application, database or department, or one customer, but sharing a big system across many of these. There is this big pool of resources for sharing, so you don't have idle servers dedicated to one project. Economically

it's a much more effective solution. Exadata and all these engineered systems are ideal platforms for the world we are moving toward more aggressively, where there is this notion of shared computing resources.

Can you give an example of an enterprise realizing the extreme performance benefits of sharing projects on a single platform?

The Commonwealth Bank of Australia has decided to provide a flexible, responsive platform for internal organizations that have to create databases for projects and then maybe decompose them when they're done. It's very much a database-as-a-service platform they built around Exadata. The value is not just that they economize on the operations side by being able to share a lot of databases on one platform. But spinning up that project when people are excited about it and can start working with it means something to the business overall. If people are ready to go, and you can match their eagerness and desired pace of business with the pace of IT, that could pay some significant dividends.

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