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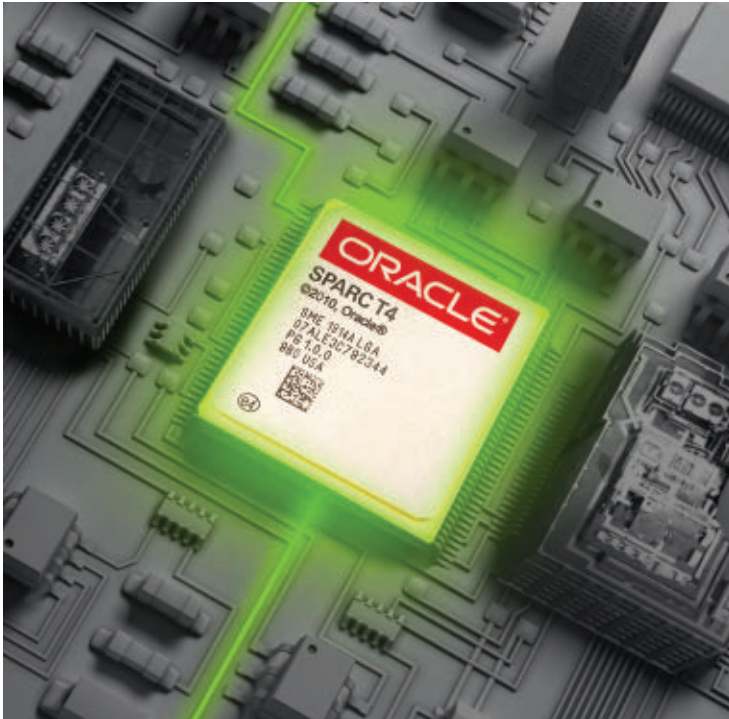


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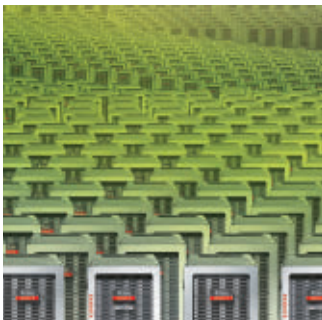
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With the recent release of the SPARC T4 chip, Oracle has arrived at better-than-promised performance on the SPARC roadmap. The latest advancements in SPARC chip technologies—combined with the Oracle Solaris T1 operating system, which has been optimized for SPARC—are delivering better application performance and availability. Learn why Tucson Electric Power Company is counting on the past, present, and future of SPARC and Oracle Solaris to run highly available applications in a virtual environment. —By David A. Kelly

Cover: I-Hua Chen

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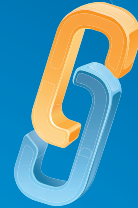
# Comprehensive Oracle Data Access



## ADO.NET Technology

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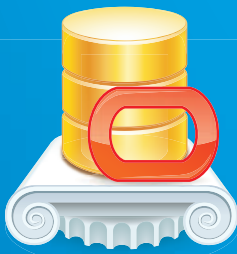
Direct  
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Features  
Support



High  
Performance



## Cross-Platform Solution

Cross-platform solution for developing native applications on the most popular operation systems such as Windows, Mac OS X, Linux, and FreeBSD for both x86 and x64 platforms.

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**EDITORIAL**

**Editor in Chief**

Tom Haunert tom.haunert@oracle.com

**Senior Managing Editor**

Caroline Kvitka caroline.kvitka@oracle.com

**Managing Editor**

Jan Rogers

**Contributing Editor and Writer**

Blair Campbell

**Editor in Chief, Oracle Technology Network**

Justin Kestelyn justin.kestelyn@oracle.com

**Technology Advisor**

Tom Kyte

**Contributors**

Marta Bright, Jeff Erickson, Fred Sandsmark, Rich Schwerin, Leslie Steere

**DESIGN**

**Senior Creative Director**

Francisco G Delgadillo

**Design Director**

Richard Merchán

**Contributing Designers**

Jaime Ferrand, Chris Strach, Kathy Cygnarowicz

**Production Designer**

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**EDITORIAL BOARD**

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**PUBLISHING**

**Publisher**

Jeff Spicer jeff.spicer@oracle.com

**Production Director and Associate Publisher**

Jennifer Hamilton jennifer.hamilton@oracle.com +1.650.506.3794

**Senior Manager, Audience Development and Operations**

Karin Kinnear karin.kinnear@oracle.com +1.650.506.1985

**ADVERTISING SALES**

**Associate Publisher**

Kyle Walkenhorst kyle@sprocketmedia.com +1.323.340.8585

**Northwest and Central U.S.**

Tom Cometa thomas.cometa@sbcglobal.net +1.510.339.2403

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**Your corrections, your opinions, and your requests: Here's your forum for telling us what's right and wrong in each issue of *Oracle Magazine*, and for letting us know what you want to read.**

### DOCUMENTATION DEARTH

"Security for Everyone" by Frank Nimphius (January/February 2012, [bit.ly/ygbm2l](http://bit.ly/ygbm2l)) offers the most comprehensive example I have seen on how to secure applications in Oracle Application Development Framework (Oracle ADF). But as much as I enjoyed looking through it, it lacked the procedures for deployment into Oracle WebLogic Server, configuration in Oracle WebLogic Server, and procedures for Oracle Access Manager to protect the Oracle ADF application. It is really tough to get the full picture if one needs to go digging for it in a ton of docs to get a sample working.

*Madhu Iyengar*

**Frank Nimphius replies:** *I agree that a single document covering Oracle ADF security and related technologies (such as Oracle Access Manager) is needed to make it easier for developers to develop and deploy secure applications. However, such a document, if done right, would probably have a page count between 100 and 150 pages. But I will surely get back to security in a future article, and deployment is a good security topic.*

*In regards to complete Oracle ADF and related security documentation, there currently is a related discussion on the Oracle ADF Enterprise Methodology Group forum aiming at gathering requirements for such a write-up. The URL for your reference is [bit.ly/zmYCTq](http://bit.ly/zmYCTq). This group is free of charge and open to everyone, so you may want to contribute to the effort with your ideas and the requirements you see. For the time being, I'll copy your requirements to the thread so they are listed there. Thanks for reading the Oracle ADF column.*

### SPEAK ENGLISH

I received an offer to renew my subscription to your magazine, but it will be difficult to do so unless you decide to put out an edition in the English language. I can read the Technology section without any trouble, and I can even read columns that talk about more-esoteric technologies that I have not studied.

But the front of the magazine is filled with some sort of unintelligible MIS [management information systems] buzzword gibberish, and although English is my native language and I have been programming in Oracle Database for more than 20 years, I find it almost impossible to read. I appreciate learning about various hot new concepts, some of which may actually be useful, but it would help if you would define terms instead of assuming that I have read about them in the other 20 MIS magazines that I don't subscribe to.

*Michael Zvi Krumbein*

### LOST IN TRANSLATION

In "Working with Strings" by Steven Feuerstein (September/October 2011, [bit.ly/zs5GGZ](http://bit.ly/zs5GGZ)), I stumbled upon an error. Where Feuerstein writes about replacing characters in a string (page 68), it says: "Notice that when you are replacing a single character, the effect of REPLACE and INSTR is the same." I'm sure that he wanted to say "... the effect of REPLACE and TRANSLATE is the same."

*Silvio Marghitola*

**Steven Feuerstein replies:** *Thanks, Silvio, for catching this. The online article has been corrected.*

### SEVENS AND NINES

I am reading the "Modeling and Accessing Relational Data" SQL 101 column by Melanie Caffrey (November/December 2011, [bit.ly/wW9oxW](http://bit.ly/wW9oxW)). On page 73 Caffrey writes, "Note that the SALARY column's datatype is defined as NUMBER(9, 2). The first number in the parentheses (9 in this example) is referred to as the *precision*, and the second number (2 in this example) is known as the *scale*. This precision and this scale mean that the SALARY column can have a maximum of nine digits before the decimal point and two digits after it."

It's very refreshing to read a SQL 101 column like this (because I learned this 15 years ago in graduate school). But from what I have learned about the Oracle NUMBER datatype, (9, 2) means that the total number of digits that can be stored is 9, with a maximum of 7 digits before the decimal point and a maximum of 2 digits after it.

*Ben Gong*

**The editors reply:** *Thanks for pointing out the error. The online article has been corrected.*

### SEND MAIL TO THE EDITORS

Send your opinions about what you read in *Oracle Magazine*, and suggestions for possible technical articles, to [opubedit\\_us@oracle.com](mailto:opubedit_us@oracle.com). You can also follow our [@oraclemagazine](https://twitter.com/oraclemagazine) Twitter feed or join us on Facebook at [bit.ly/orclmagfb](http://bit.ly/orclmagfb). Letters may be edited for length and clarity and may be published in any medium. We consider any communications we receive publishable.



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# Video Conversion

Point of clarity for big data is delivered by videos.

**W**hen I'm looking for source material on information technology, I don't usually look for it in video content. I have nothing against video as another way to communicate information, but I typically prefer to get technology information from articles, Web pages, white papers, documentation, and so on. Recently, however, I saw a series of information technology videos that filled in the proverbial blanks for me about a particular technology: big data.

## BIG ISSUES

My search for clarity on big data began a couple of years ago, and the initial challenges were many. First, as an editor, I often query or delete the word *big* in descriptions of technology problems and solutions, because *big* as a descriptor in enterprise technology doesn't usually add much value. (In *Oracle Magazine's* coverage of enterprise-class Oracle platforms, frameworks, and tools that manage the ever-growing volumes and types of structured and unstructured data in today's information explosion, the word *big* may also be redundant.)

Second, in my initial search for definitions and descriptions of big data, I found what seemed to be different definitions from different companies. And although I also found some comfort in editorial content substantiating my opinion that the definitions of big data at the time were variable, that same content didn't help with my understanding of big data as a technology.

Finally, the examples of information included in big data stores and the technologies that used them were as variable as big data's definitions. And most examples seemed to be presented as new data silos

for specific industries, making the application of an example to another industry a challenging task.

Things got better, of course. With time, the definition of the information behind big data enjoyed more-consistent descriptions. And while I continue to query or delete the word *big* in a lot of technology content in *Oracle Magazine*, when I see the *big* in big data, I now map it to the generally accepted high-volume, high-velocity, and high-variety characteristics of that information. Finally, the practical application of big data solutions made sense to me after I saw five short videos about big data that presented an example of big data in action (literally) and integrated into a larger enterprise information context.

## POPCORN OPTIONAL

I first saw the videos—see Next Steps for their titles and links to access them—at Oracle OpenWorld 2011 during a general session on big data. They tell a story about a fictional company with a big data challenge and its solutions, which address the storage, integration, analysis, and visualization of big data information. Together, the videos tell a good, general, and accessible story about big data, and each video ends with pointers to Oracle big data solutions, including Oracle NoSQL Database, Oracle Exadata, Oracle Data Integrator, Oracle Loader for Hadoop, Oracle R Enterprise, and Oracle Exalytics.

If you're looking for information on big data, I encourage you to check them out.

**Tom Haurert, Editor in Chief**  
tom.haurert@oracle.com

## NEXT STEPS

### LEARN more about big data

[oracle.com/bigdata](http://oracle.com/bigdata)

"Oracle: Big Data for the Enterprise"  
[bit.ly/yldUFD](http://bit.ly/yldUFD)

Oracle Big Data Appliance  
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*Big Data Episode 2: Gold Mine, or Just Stuff?*  
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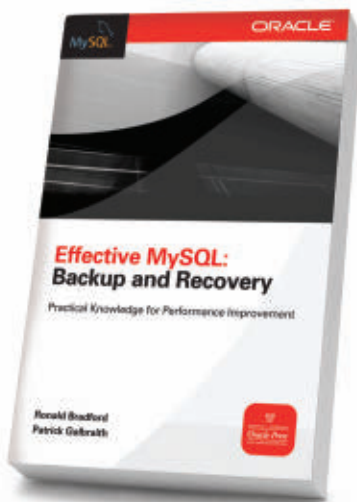
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# 33,000 and Counting

People have questions, and Tom Kyte has answers.

**T**om Kyte, architect in server technologies at Oracle, is the man with the answers in his Ask Tom column in Oracle Magazine and at the AskTom Website ([asktom.oracle.com](http://asktom.oracle.com)). Oracle Magazine Editor in Chief Tom Haurert recently sat down with Kyte to ask him still more questions. The following is an excerpt from that interview. Download the full podcast at [oracle.com/magcasts](http://oracle.com/magcasts).

**Oracle Magazine:** When did you start answering questions, and how many questions have you answered so far?

**Kyte:** Well, it actually started in about October of 1994. That was the first time I posted to the internet Usenet news groups, which is the discussion forum precursor to Facebook and Twitter and everything else like that. I spent most of my time in [comp.databases.oracle.server](http://comp.databases.oracle.server) answering questions about Oracle Database.

From '94 to about 2000, I posted about 12,000 times to those forums. And then starting in January/February of 2000, I started doing the Ask Tom column in *Oracle Magazine*, and the AskTom Website started in April of that year. So it's been about a dozen years of Ask Tom and going on 17 or 18 years of participating in the community answering questions online.

**Oracle Magazine:** What has motivated you to answer all of these questions?

**Kyte:** I like the education aspect of it: being able to convey to someone the right way to do something and the best way to do a particular thing inside the Oracle Database software. And I like seeing the lightbulb come on in someone.

Over time I've enjoyed watching people "graduate." Many of the people who used to ask me questions are now the speakers at Oracle OpenWorld, IOUG [Independent Oracle Users Group] conferences, user groups, technical symposiums, and so on. I enjoy watching the people come up



Oracle Server Technologies Architect Tom Kyte

**If people are interested in these Real World Performance Tour sessions, we'll be doing more in 2012.**

through the ranks, and I've seen many more than one go from asking the questions to answering the questions to delivering the technical material. That's a pretty cool thing.

**Oracle Magazine:** You've been quoted as saying that using Oracle Exadata involves some level of unlearning certain Oracle Database practices. What does that mean?

**Kyte:** The vast majority of us, close to 100 percent of us, learned everything we know about databases and tuning in a transac-

tional environment that I'll call a small rows environment. In that environment, you're running queries that might hit tens or hundreds of rows. Your processes affect a small number of rows at a time, so doing things row by row works very well.

When you get into an Oracle Exadata environment, in particular a data warehousing environment, you have to unlearn some of the things you've learned. For example, in an OLTP [online transaction processing] environment, you were taught many times that if you were going to retrieve a small percentage of a table through a query, an index was the right way to go. So if you were going to retrieve 1 percent of the rows in the table, you would use an index.

Now that works well on a small number of rows—hundreds or thousands. But if you're going to retrieve a million rows out of a 100-million-row table, all of a sudden that approach doesn't scale very well. That would result in a million single-block operations against the database table, and the typical I/O might take 5 milliseconds, so you're talking about almost an hour and a half of processing time. You could run a full table scan on that information over and over again many hundreds of times in that hour-and-a-half period.

So the tuning techniques—the toolkit—that you've developed based on predominantly OLTP small-number-of-rows implementations do not scale up in an Oracle Exadata warehousing environment. I/O is suddenly not a problem in this environment. You need to look at different mechanisms and different methods for doing what you do.

**Oracle Magazine:** You've been participating in a multiyear tour with some other notable Oracle technologists. Tell us about the tour and who is involved.

**Kyte:** IOUG came to us and said, "It would be cool if some of your performance experts could come out and talk to our user base

and explain their real-world performance techniques.” So three of us put together a daylong seminar, which became the Real World Performance Tour.

The three people involved are myself; Graham Wood, who’s been with Oracle since the early 1980s and is actually the father of Statspack, Automatic Workload Repository, and related tuning technologies; and Andrew Holdsworth, who also has been with Oracle longer than I have. He is the senior director of the Real World Performance group within Oracle and works with customers and prototypes and on fixing systems that are not working in the real world. We get together for a day and talk about data warehousing in the morning; then in the afternoon, we talk about OLTP.

If people are interested in these Real World Performance Tour sessions, we’ll be doing more in 2012. Just look at [ioug.org](http://ioug.org) under Events, and you’ll see a list of dates that we’ll be appearing—maybe in a location near you.

**Oracle Magazine:** Tell us more about what goes on at these Real World Performance Tour events.

**Kyte:** Well, they’re very interactive. We have an audience that’s typically anywhere from 40 to 100 people, and even with 100 people, you’d be surprised at the degree of interaction and the back and forth that goes on. And while we’ve given the seminar more than 15 times now, we’ve never covered the same material in the same way twice. In fact, sometimes we don’t even cover the same set of slides twice in a row because the conversations we’re having take us down different paths.

One of the unusual things about the Real World Performance Tour is that we have a rather large machine with us. We have access to an Oracle Exadata full-rack machine, so we’re able to turn around and prove the points that we’re talking about. We can put numbers behind what we’re saying. So sometimes there’s a lot of unlearning on the part of the attendees during these days. Unlearning something that you’ve learned is true for the last 10 or 20 years can be a very painful process.

**Oracle Magazine:** In so many years of answering questions, are there any that

**The best questions are when I have to fire up SQL\*Plus and develop a small test case—an example—to either prove or disprove a point. Those are the best to me because they’re the most fun.**

really stand out? Is there a best question or maybe a worst question?

**Kyte:** There have been so many questions—more than 33,000 on AskTom in the last dozen years. So coming up with the best or worst question is not really possible, but let me say this: I usually start the morning by answering some questions. If I can get through 10 questions and I haven’t had to get into the database to answer anything, that’s sort of a bad day for me. That means the questions have been asked and answered previously. I simply answer them by taking the subject of the question and running a search of AskTom and saying, “This is what I found when I searched—what did you find?” So that sort of describes the worst questions—the ones that are easily answered because they’ve been answered so many times and people didn’t bother searching.

The best questions are when I have to fire up SQL\*Plus and develop a small test case—an example—to either prove or disprove a point. Those are the best to me because they’re the most fun. I have to actually think about what I’m doing when I do the answer. And they’re generally questions that have not been asked before, or not been asked in that way, so they’re sort of new.

**Oracle Magazine:** What’s the best way to ask a technology question?

**Kyte:** Step one should be to go ahead and look to see if you can’t solve it yourself really quickly by taking a look at the documentation or actually using the search features on the sites where you’re going to post the question. Because 9 times out of 10, you’ll find that your question has been asked and answered by someone else.

Once you think you have a unique question that you can’t answer yourself, when you post the question—and this goes for Ask Tom as well as any other forum—ask the

question as if you were asking your mom the question. Give that level of detail. The people you’re asking haven’t been sitting staring at the problem for a day or a week, like you have. We don’t have all the information you have. So rather than being very terse and saying, “How can I get this output from this data?” explain what the output is. Explain the logic behind getting that output.

And then when you have the data that we’re supposed to get this output from, phrase it in a series of CREATE TABLES and INSERT INTOs. If you want us to help you develop a SQL query, for example, it would be really useful if we had your tables and some of your data. If you just post the output from a SQL\*Plus SELECT statement, it’s going to take us 5 or 10 minutes to reverse-engineer that, create a CREATE TABLE statement, and insert all the data into it. Save us that time, and make it easy for us to answer you. Give a lot of detailed information, and provide a reasonable test case. ◀

## NEXT STEPS

### LISTEN to the podcast

[oracle.com/magcasts](http://oracle.com/magcasts)

### LOOK UP the Real World Performance Tour schedule

[ioug.org](http://ioug.org)


### ASK Tom

Tom Kyte answers your most difficult technology questions.  
[asktom.oracle.com](http://asktom.oracle.com)

### READ more Tom

*Oracle Database Concepts 11g Release 2 (11.2)*  
[bit.ly/aonqPP](http://bit.ly/aonqPP)

*Expert Oracle Database Architecture: Oracle Database 9i, 10g, and 11g Programming Techniques and Solutions, Second Edition*  
[amzn.to/ckGXaR](http://amzn.to/ckGXaR)

 DOWNLOAD Oracle Database 11g Release 2  
[bit.ly/epBiUG](http://bit.ly/epBiUG)



# Great minds don't think alike.

To continue to lead the way in technology and science, we must develop the next generation of innovators. Steps we take today can empower young people to develop and test their own ideas and approach science, technology, engineering, and math not just as fields of study in school but as ways of understanding our world.

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[lawrencehallofscience.org/brilliant](http://lawrencehallofscience.org/brilliant)



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## JOB HUNTING APPS

### Indeed Jobs

Search millions of vacancies on company Websites, recruiting agencies, and job boards in the U.S., Canada, the U.K., Ireland, India, South Africa, Hong Kong, New Zealand, Singapore, and Australia. Free (Android, iPhone). [indeed.com](http://indeed.com)

### Pocket Resume

Need a résumé on the spot? Pocket Resume lets you fill in forms and connect to your LinkedIn profile to first generate a good-looking PDF résumé and then e-mail it or upload it to Dropbox. US\$2.99 (Android, iPhone, BlackBerry). [pocketresume.net](http://pocketresume.net)

### Craigslist

Several apps let you search listings and notify you when jobs are posted on Craigslist. CraigslistPro+ (free, iPhone; [escargotstudios.com](http://escargotstudios.com)), Craigslist Notification (free, Android; [bit.ly/zzeiHY](http://bit.ly/zzeiHY)), and Craigslist Mobile (US\$4.99, BlackBerry; [movela.com](http://movela.com))

### What Color Is Your Parachute? Job Interview Tool

Based on the classic book by Richard N. Bolles, this app gives advice to prepare for, conduct, and follow up after an interview. Includes links to job-hunting sites and a 40-minute audio book. Free (iPhone). [bit.ly/AiyXkt](http://bit.ly/AiyXkt)



**“If what seems to come so naturally to a select few can be learned by the rest of us, then perhaps we can draft a universal blueprint for success. And one that works in the rapidly evolving marketplace.”**

—James Marshall Reilly, author of *Shake the World* (Portfolio/Penguin, 2011)



## SMART COOKIE

Looking for a tasty way to share information with customers or friends? Send them Qkies—actual edible cookies with a QR code on top. When recipients scan the Qkie with their smartphones, they are whisked to a Website where an invitation or offer awaits. (Then they can eat the invitation.) One package of Qkies, a cooperative project of German food company Juchem Gruppe and DFKI, the German Research Center for Artificial Intelligence, comes with cookie mix and 20 QR codes on edible paper; you bake the cookies and then set up the redirect on the Qkies Website. €6.90. [qkies.de](http://qkies.de)

## WIRELESS RIDE



You can get online in 84 percent of major Asian subways compared with 67 percent in the Middle East, 56 percent in the European Union, 41 percent in the U.S. and Canada, and 25 percent in Eastern Europe and Central Asia.

Source: New Cities Foundation, [bit.ly/zkUI5V](http://bit.ly/zkUI5V)

## MOST PASSWORDS FALL SHORT

A survey of 1,000 adults in the U.S. found a variety of shortcomings in the passwords these adults used online. (A strong password, for this survey, was at least eight characters long and combined upper- and lower-case letters, a numeral, and a special character.)



Don't Use Strong Password

Personal Reference

Insecure Storage

Seven or Fewer Characters

Same Password

Source: Consumer Reports, [consumerreports.org](http://consumerreports.org)



## PIN-Secured Flash Data

If you're storing data on a USB flash drive, you need to secure it. Many USB flash drives implement data protection using biometrics, cryptography, and onboard software. Aegis Secure Key from Apricorn is a new flash drive that achieves security and simplicity. It unlocks with an onboard PIN pad and is compatible with any operating system that supports USB. It uses military-grade 256-bit AES CBC hardware encryption, and you'll need to enter a 7-to-15-digit PIN to unlock it. You have 10 tries to enter the right unlock PIN before the data on the drive self-destructs. A wear-resistant keypad hides key usage to avoid tipping off a potential hacker to frequently used keys. 4 GB, 8 GB, and 16 GB models are available. US\$65–US\$125. [apricorn.com](http://apricorn.com)



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[oracle.com/specialized](http://oracle.com/specialized)

# Technology Events

Conferences and sessions to help you stay on the cutting edge



## COLLABORATE 12

April 22–26, Las Vegas, Nevada

Cosponsored by Independent Oracle Users Group (IOUG), Oracle Applications Users Group (OAUG), and Quest International Users Group, this conference offers keynotes, breakout sessions, interactive panel discussions, hands-on learning opportunities, product news, networking opportunities, an exhibitor showcase, and more, all related to Oracle technologies and applications. Get details and register at [collaborate12.com](http://collaborate12.com).

### AAMGA Automation and Technology Conference

March 3–6, Atlanta, Georgia

► [aamga.org/node/3516](http://aamga.org/node/3516)

Insurance industry leaders tackle social media, mobile apps, and regulatory issues at this American Association of Managing General Agents (AAMGA) event.

### Insurance Canada 2012 Technology Conference

March 5, Toronto, Ontario, Canada

► [bit.ly/xOhIAL](http://bit.ly/xOhIAL)

Canadian insurance industry workers explore how technology can enable insurance management applications, improve communications, and boost customer service.

### IHS CERA Week

March 5–9, Houston, Texas

► [www2.cera.com/ceraweek2012](http://www2.cera.com/ceraweek2012)

Global energy leaders will discuss the energy sector's role in stabilizing and rebuilding the global economy at this Cambridge Energy Research Associates (CERA)—sponsored event.

### Red Rock Oracle Leadership Forum

March 8, Milsons Point, New South Wales, Australia

► [bit.ly/wWovoF](http://bit.ly/wWovoF)

Designed for senior managers, this conference features more than 30 presentations and case studies covering Oracle applications, middleware, technology, and engineered systems.

### SXSW Interactive

March 9–13, Austin, Texas

► [sxsw.com](http://sxsw.com)

This event has become *the* place to preview what's unfolding in the world of technology. It features presentations on emerging technology and showcases new Websites, video games, and startup ideas.

### Human Capital Management Defense

March 12–15, Arlington, Virginia

► [wbresearch.com/hcmdusa](http://wbresearch.com/hcmdusa)

Managers of human capital throughout the U.S. defense and intelligence communities learn about current and future strategic initiatives and explore new tools and best practices at this event.

### OAUG Connection Point Dubai

March 14–15, Dubai, UAE

► [connectionpoint.oaug.org/2012/dubai](http://connectionpoint.oaug.org/2012/dubai)

Oracle Applications Users Group (OAUG) and Middle East Oracle User Group (MEOUG) sponsor this conference for Oracle E-Business Suite users.

### Cloud Computing China Congress

March 16, Beijing, China

► [cloudcomputingchina.org](http://cloudcomputingchina.org)

This conference, for IT and business executives who evaluate and purchase on-demand infrastructure and software services, includes speakers from the cloud computing industry, panel discussions, and hands-on demonstrations.

## ORACLE USER GROUPS

### Israel Oracle Users Group E-Business Suite Day

March 5, location to be announced  
[iloug.org.il](http://iloug.org.il)

### UK and EMEA Primavera Conference

March 8, London, England  
[ukoug.org](http://ukoug.org)

### St. Louis Java Users Group Meetings

March 8 and April 12, St. Louis, Missouri  
[ociweb.com/javasig](http://ociweb.com/javasig)

### Twin Cities Java User Group Meetings

March 12 and April 9, Eagan, Minnesota  
[tcjug.org](http://tcjug.org)

### Sacramento Java Users Group Meetings

March 13 and April 10, Sacramento, California  
[sacjug.org](http://sacjug.org)

### UKOUG Availability Infrastructure and Management SIG Meeting

March 14, London, England  
[ukoug.org](http://ukoug.org)

### Chicago Java Users Group Meetings

March 20 and April 17, Chicago  
[cjug.org](http://cjug.org)

### OUG Ireland Conference

March 21, Dublin, Ireland  
[ukoug.org](http://ukoug.org)

### Atlanta Java Users Group DevNexus 2012

March 21–22, Atlanta, Georgia  
[devnexus.com](http://devnexus.com)

### Java Posse Roundup

March 26–30, Crested Butte, Colorado  
[bit.ly/yjZHL](http://bit.ly/yjZHL)

### Journée Utilisateurs

March 28, Paris, France  
[journeeutilisateurs.free.fr](http://journeeutilisateurs.free.fr)

### Circulo de Usuarios Oracle de España (CUORE) Congress

March 28–29, Madrid, Spain  
[cuore.es](http://cuore.es)

### Scandinavian Developer Conference

April 16–19, Göteborg, Sweden  
[scandevconf.se](http://scandevconf.se)

### UKOUG Seminar Featuring Tom Kyte

April 18, London  
[ukoug.org](http://ukoug.org)

### UKOUG Security Special Event

April 19, London  
[ukoug.org](http://ukoug.org)

### OBUG Benelux Connect

April 24, Maastricht, Netherlands  
[obug.nl](http://obug.nl)



Cloud, big data, and global business are hot topics at Oracle OpenWorld Tokyo, April 4–6.

### HEUG Alliance 2012

March 18–21, Nashville, Tennessee

► [bit.ly/xnQg88](http://bit.ly/xnQg88)

Sponsored by Higher Education User Group (HEUG), this is the world's largest meeting of higher education, public sector, and federal users of Oracle Applications.

### CPIC Conference 2012

March 20–21, Washington DC

► [cpicconference.com](http://cpicconference.com)

This conference brings together government and industry professionals to examine federal capital planning and investment control (CPIC) trends, regulatory compliance, best practices, lessons learned, and tools for working with other agencies and oversight authorities.

### AIIM Conference

March 20–22, San Francisco, California

► [aiimconference.com](http://aiimconference.com)

Assembling more than 400 information management professionals, this conference sponsored by the Association for Information and Image Management (AIIM) hosts some 60 sessions covering three tracks: engagement, process, and control. A training day precedes the conference.

### Forum on Clinical Trial Management Systems

March 22–23, Philadelphia, Pennsylvania

► [cbinet.com/conference/pc12134](http://cbinet.com/conference/pc12134)

Clinical, business, and IT professionals congregate for in-depth discussions regarding clinical trial management systems (CTMS). Topics include CTMS selection, adoption, and training; cloud-based CTMS; integration with other data-sources; and more.

### EclipseCon 2012

March 26–29, Reston, Virginia

► [eclipsecon.org/2012](http://eclipsecon.org/2012)

This gathering of the Eclipse open source community focuses on Eclipse tools and frameworks spanning the software development lifecycle. Modeling, language development environments for Java and other languages, testing and performance, business intelligence, and embedded development are on the agenda.

### Xplor Conference and Vendor Forum

March 27–29, Tampa Bay, Florida

► [xplor.org/xplor2012](http://xplor.org/xplor2012)

With more than 60 educational sessions, networking events, and a vendor forum, this event addresses the future of document communications and delivery. Attendees can find and share solutions to document-related challenges.

### DoDIIS Worldwide Conference

April 1–4, Denver, Colorado

► [ncsi.com/dodiis12](http://ncsi.com/dodiis12)

Hosted by the Defense Intelligence Agency's Directorate for Information Management, the Department of Defense Intelligence Information Systems (DoDIIS) Worldwide Conference is a venue for the intelligence and information technology communities to partner and collaborate.

### Oracle OpenWorld Tokyo

April 4–6, Tokyo, Japan

► [oracle.com/openworld/jp-ja](http://oracle.com/openworld/jp-ja)

Cloud, big data, and global business are the themes for this year's annual conference, which will also cover Oracle's engineered systems. Admission is free with preregistration. The event is held concurrently with JavaOne Tokyo.

### NAB Show

April 14–19, Las Vegas, Nevada

► [nabshow.com/2012](http://nabshow.com/2012)

Sponsored by the National Association of Broadcasters (NAB), this gathering of 90,000 media and entertainment professionals from 150 countries includes more than 500 educational sessions.

### JAX 2012

April 16–20, Mainz, Germany

► [jax.de](http://jax.de)

This German-language conference presents more than 100 speakers and more than 150 sessions, workshops, and keynotes related to Java in enterprise environments.

### Devoxx France

April 18–20, Paris, France

► [devoxx.com/display/FR12](http://devoxx.com/display/FR12)

The largest independent conference of Java professionals in France includes 70 presentations—25 percent of which are in English—covering topics including the Java Virtual Machine, cloud, mobile, and project management.

### World Health Care Congress

April 16–18, Washington DC

► [bit.ly/yO3zBZ](http://bit.ly/yO3zBZ)

This gathering of more than 1,600 global healthcare, pharmaceutical, and employer leaders includes keynote presentations, debates, case studies, networking opportunities, and forums on trends and issues facing the health-care industry.

### LOMA Life Insurance Conference

April 23–25, Orlando, Florida

► [bit.ly/w5uWNp](http://bit.ly/w5uWNp)

LOMA, an international association of more than 1,200 insurance and financial services companies, sponsors this event for the life insurance industry. Among the featured topics are global trends, social media, and regulatory updates.

### EVENTS LOCATOR

#### Oracle Events

[oracle.com/events](http://oracle.com/events)

#### Locate User Groups

[bit.ly/yOFrOc](http://bit.ly/yOFrOc)

# What's New at Oracle

The latest videos, podcasts, blogs, and more

## VIDEOS

### **AutoVue Enterprise Visualization for Digital Building Permit Processing**

▶ [bit.ly/wk29nb](http://bit.ly/wk29nb)

See how Oracle AutoVue solutions help municipalities and local governments access and collaborate on digital building-permit documents.

### **Real-World Benefits of Oracle Exalytics**

▶ [bit.ly/wnNo8H](http://bit.ly/wnNo8H)

Executives from Polk, Nykredit, Savvis Communications, and Key Energy Services discuss how Oracle Exalytics has improved data analysis and reporting, provided better visualization tools, and enabled more end users to access data.

### **Oracle Communications: Optimize. Innovate. Thrive.**

▶ [bit.ly/ys6xGP](http://bit.ly/ys6xGP)

Oracle Communications leaders discuss the challenges facing the communications industry and explain how Oracle helps communications service providers thrive in the marketplace.

### **TechCast Live: Introducing Oracle Public Cloud**

▶ [bit.ly/y989Mw](http://bit.ly/y989Mw)

Sandeep Banerjee, senior director of product management at Oracle, shares the roadmap for Oracle Public Cloud and outlines its benefits for developers, partners, and customers.

### **TechCast Live: Inside the Oracle Java Cloud Service**

▶ [bit.ly/yIBpbY](http://bit.ly/yIBpbY)

Reza Shafii, project manager for the Oracle Java Cloud Service offering of Oracle Public Cloud, explains the role and benefits of the Java cloud.

## CONSULTING

### **Oracle Communications Strategy Consulting Services**

▶ [bit.ly/wq2886](http://bit.ly/wq2886)

Discover the Oracle Communications strategy consulting services available for communications companies, including market trend analysis, archi-

ture development, business model innovation, and technical transformation planning.

## PODCASTS

### **"Using XBRL to Make SEC Filings Easier at Oracle"**

▶ [bit.ly/yV9LoV](http://bit.ly/yV9LoV)

Members of Oracle's external reporting team explain how they use Oracle Hyperion solutions to file U.S. Securities and Exchange Commission (SEC) forms in XBRL format.

### **"Introducing Oracle NoSQL Database"**

▶ [bit.ly/yhV7Mo](http://bit.ly/yhV7Mo)

Hear Oracle Director of Product Management Dave Segleau explain what NoSQL databases are and when to use them.

### **"MySQL Enterprise Backup"**

▶ [bit.ly/xBJQ9Q](http://bit.ly/xBJQ9Q)

This overview of MySQL backup practices and tools covers MySQL Enterprise Backup, which provides hot online backup for InnoDB.

### **"Oracle Linux Podcast: Ensuring Data Integrity"**

▶ [bit.ly/xOdMwF](http://bit.ly/xOdMwF)

Learn how Oracle Linux and Oracle storage networking products, powered by QLogic, help prevent data corruption.

## WHITE PAPERS

### **"Guide to MySQL and NoSQL—Delivering the Best of Both Worlds"**

▶ [bit.ly/ziMc5u](http://bit.ly/ziMc5u)

See how MySQL users can blend relational and NoSQL technologies into solutions that reduce cost, risk, and complexity. Integration with big data stores and frameworks is covered.

### **"Architecting Oracle ATG Web Commerce for Maximum Availability"**

▶ [bit.ly/A3Cbr5](http://bit.ly/A3Cbr5)

Learn how to architect a single Oracle ATG Web Commerce site running at two or more separate physical data centers for maximum availability.

### **"Exalogic: The Optimal Platform for ATG"**

▶ [bit.ly/wC4ywR](http://bit.ly/wC4ywR)

Read why Oracle Exalogic, Oracle's engineered system for middleware and applications, is the best platform for Oracle ATG applications.

### **"Guide to MySQL as an Embedded Database"**

▶ [bit.ly/z9gYDa](http://bit.ly/z9gYDa)

Learn how using MySQL Database as an embedded database can lower the cost of goods sold and increase customer satisfaction.

### **"Integrating XBRL Into Your Financial Reporting Process"**

▶ [bit.ly/y3JFFt](http://bit.ly/y3JFFt)

This paper offers guidelines, tools, resources, and

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## OVERHEARD

**“The return on investment was 986 percent with a payback period of three months from the go-live date. . . . Basically, at the end of the pilot for the first project, the system paid for itself, and from that point it’s been funded out of the benefits.”**

—Jonathan Lisitz, Forrester Consulting, highlighting a financial services firm’s results in the “ROI Case Study—Growing Revenue with Oracle Real-Time Decisions” Webcast ([bit.ly/ygbwnA](http://bit.ly/ygbwnA))

processes to help companies meet the SEC’s new XBRL filing requirement.

 **WEBCASTS**
**“ROI Case Study—Growing Revenue with Oracle Real-Time Decisions”**

▶ [bit.ly/ygbwnA](http://bit.ly/ygbwnA)

Jonathan Lisitz of Forrester Consulting explains how one financial services firm used Oracle Real-Time Decisions to increase customer acquisition, conversion, and retention.

**“New Innovations in Oracle Linux”**

▶ [bit.ly/vWZqWY](http://bit.ly/vWZqWY)

Oracle’s Linux experts discuss improvements in Oracle Linux, including DTrace, Btrfs, virtualization with Linux Containers, and transcendent memory.

**Mastering Oracle BPM Suite 11g**

▶ [bit.ly/AtdDk3](http://bit.ly/AtdDk3)

This seven-part series covers Business Process Model and Notation (BPMN), business process management (BPM) development with APIs, ways to empower business users, and more.

**“How to Expand the Usage of Analytics in Your Organization While Driving Down IT Spend”**

▶ [bit.ly/xeljdW](http://bit.ly/xeljdW)

Find out how Oracle Business Intelligence foundation can improve visibility, align business and IT goals, and reduce IT total cost of ownership.

 **ONLINE FORUMS/SOCIAL MEDIA**
**Oracle Systems Online Forum**

▶ [bit.ly/zauJT6](http://bit.ly/zauJT6)

Keynotes, analyst insights, and customer case studies show how Oracle’s optimized solutions lower cost, mitigate risk, and increase productivity.

**Oracle Hardware Goes Social**

▶ [facebook.com/oraclehardware](http://facebook.com/oraclehardware)

The Oracle Hardware Social Media Hub is a

new online meeting place where the global hardware community can interact with Oracle hardware experts.

**Oracle Enterprise Management Online Forum: Gain Total Control of Enterprise Clouds**

▶ [bit.ly/zJi4Kx](http://bit.ly/zJi4Kx)

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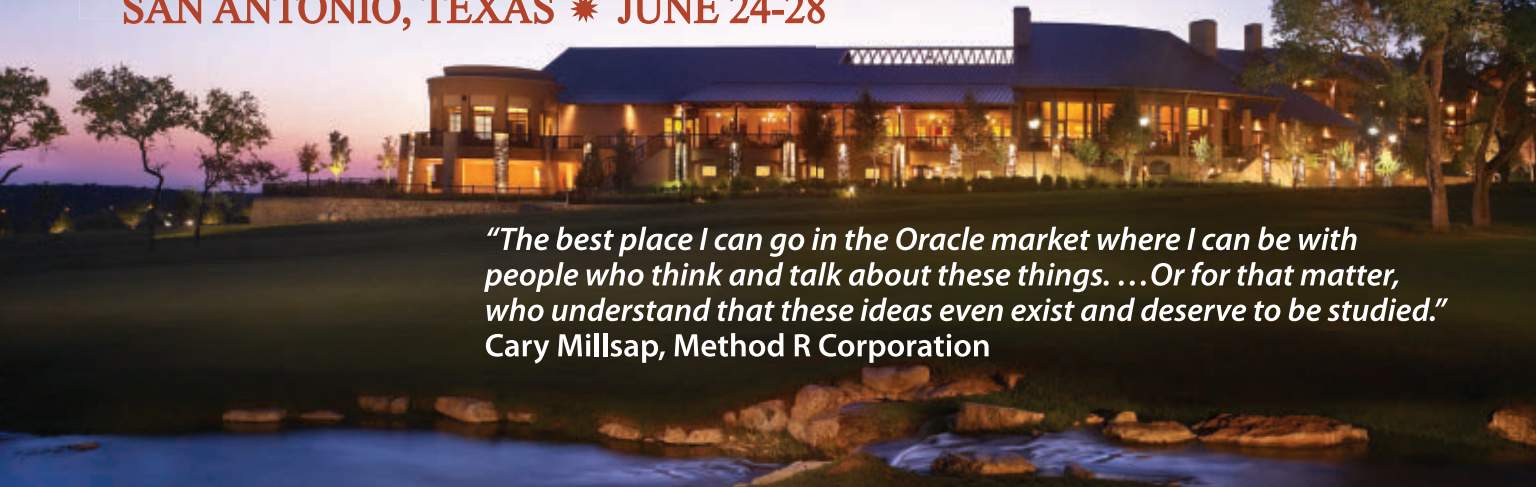
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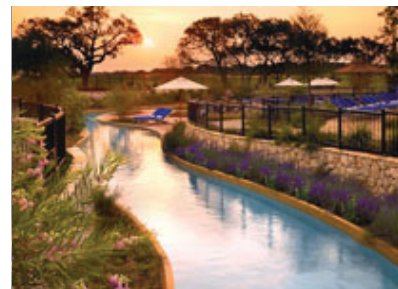
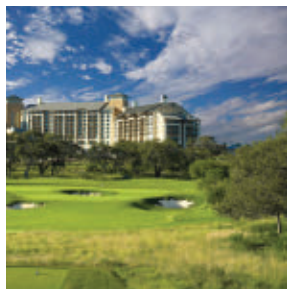
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Waseem Daher, Ksplice cofounder and senior director of product management at Oracle, demos Ksplice technology for Oracle Linux and discusses how it can help lower costs and increase security. Ksplice updates the Linux operating system kernel while it is running, without a reboot or any application downtime.

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See how Oracle Hyperion Disclosure Management streamlines the creation of eXtensible Business Reporting Language (XBRL)-based documents to reduce cycle times for financial filings.

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### Configuring Oracle Solaris 11 Virtual Networking

In this tutorial, you explore Oracle Solaris 11 network virtualization by configuring virtual network interfaces and an etherstub to work within two preconfigured Oracle Solaris Zones, and then configure that virtual network for public access.

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### Configuring a ZFS Encrypted File System

In this hands-on practice, you create an encrypted ZFS file system using a raw key.

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### How to Use the Oracle TimesTen Enterprise Manager Plug-In

This tutorial gives you an overview of the CPU, disk, and memory usage on an Oracle TimesTen host machine and teaches you how to monitor any alerts or warnings, run the system-supplied reports, and get real-time performance rate data for a specific metric.

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## DOWNLOADS

### New Downloads

NetBeans IDE 7.1

► [netbeans.org](http://netbeans.org)

Oracle WebLogic Server 12c

► [bit.ly/xkSwHg](http://bit.ly/xkSwHg)

Oracle Data Access Components for Windows

► [bit.ly/z56cPV](http://bit.ly/z56cPV)

## Oracle and Cloudera Partner on Big Data

Oracle has partnered with Cloudera, a leader in Apache Hadoop-based software and services for the enterprise, to provide an Apache Hadoop distribution and tools for Oracle Big Data Appliance. Together, Oracle and Cloudera deliver the full power of Hadoop—a software framework that supports data-intensive distributed applications under a free license—on an easy-to-deploy, easy-to-use platform for Oracle Big Data Appliance, an engineered system designed to provide a high-performance and scalable data processing environment for big data.



Oracle has integrated Cloudera's Distribution including Apache Hadoop (CDH) and Cloudera Manager software into Oracle Big Data Appliance. CDH is an enterprise-ready, 100 percent open source distribution of Apache Hadoop. Cloudera Manager is an end-to-end management application for Apache Hadoop. The integrated Oracle and Cloudera architecture has been fully tested and validated by Oracle; Oracle will also collaborate with Cloudera to provide support for Oracle Big Data Appliance.

Cloudera's experience in Hadoop makes the company a good fit for Oracle. "As the leader in Apache Hadoop-based data platforms, Cloudera has the enterprise quality and expertise that make them the right choice," says Andy Mendelsohn, senior vice president, Oracle Server Technologies.

► [bit.ly/yVSfku](http://bit.ly/yVSfku)

## Oracle Big Data Connectors Available

Now shipping, Oracle Big Data Connectors are a portfolio of software products that integrate data stored in Hadoop and Oracle NoSQL Database, Enterprise Edition with Oracle Database 11g to simplify the implementation and management of big data projects.

Oracle Big Data Connectors work with Oracle Big Data Appliance and other Apache Hadoop-based systems. The portfolio includes: Oracle Loader for Hadoop, which uses MapReduce processing to load data into Oracle Database 11g; Oracle Data Integrator Application Adapter for Hadoop, which enables Oracle Data Integrator to generate Hadoop MapReduce programs;

Oracle R Connector for Hadoop, which gives R users native, high-performance access to the Hadoop Distributed File System and MapReduce programming framework; and Oracle Direct Connector for Hadoop Distributed File System, which enables the Oracle Database SQL engine to access data from the Hadoop Distributed File System.

"Oracle Big Data Connectors make it easier for Oracle customers to integrate Hadoop with their existing infrastructure, speeding time to value for big data projects," says Cetin Ozbutun, vice president of data warehousing technologies at Oracle.

► [bit.ly/wH7eLE](http://bit.ly/wH7eLE)

## New Data Model Aids Health Research Organizations

Now available, Oracle Health Sciences Omics Data Bank is a molecular data model that provides integration and analysis of cross-platform omics data to support translational research. It is part of Oracle Health Sciences Translational Research Center, which enables pharmaceutical, biotech, and research organizations to normalize, aggregate, and analyze data from internal and external sources to identify new predictive biomarkers, best practices for diagnosis and treatment, and more-effective personalized therapies.

The data bank enables turnkey integration and analysis of multiple types of molecular data. The omics data model provides researchers with unprecedented power and agility in analyzing large molecular data sets.

"Oracle Health Sciences Translational Research Center now has the power to help researchers address the big data challenges associated with bioinformatics," says Neil de Crescenzo, senior vice president and general manager, Oracle Health Sciences.

► [bit.ly/xuqSX9](http://bit.ly/xuqSX9)

## Oracle Solaris Cluster 4.0 Delivers Advanced High Availability

Oracle has unveiled Oracle Solaris Cluster 4.0, the first release providing extended high-availability (HA) and disaster recovery (DR) capabilities for Oracle Solaris 11. Oracle Solaris Cluster 4.0 delivers built-in support for cloud implementations through virtual clusters for secure deployment of mission-critical applications in private, public, and hybrid clouds as well as enterprise data centers.

With Oracle Solaris Cluster 4.0, customers can deploy multiple, isolated, and secure virtual clusters through Oracle Solaris Zones clustering. Oracle Solaris Cluster offers an HA solution for enterprise applications through instant and load-resilient failure detection and fast service recovery time through kernel-level integration with Oracle Solaris 11. It also provides out-of-the-box support for a wide range of Oracle and third-party software prod-

ucts, with application-specific failover in both traditional and virtualized environments.

"Oracle Solaris Cluster 4.0 delivers unrivaled high availability on Oracle Solaris 11 for enterprise applications and databases and offers comprehensive capabilities for keeping customers' most demanding applications up and running in the face of nearly every conceivable situation," says John Fowler, executive vice president of systems at Oracle. "Customers can now combine the additional critical HA and DR features of Oracle Solaris Cluster with the new cloud-ready features of Oracle Solaris 11 to help simplify their infrastructure, significantly reduce planned and unplanned downtime, and protect mission-critical applications in both traditional and cloud deployments."

[bit.ly/xubJBw](http://bit.ly/xubJBw)

## PeopleTools 8.52 Enhances UI, Search, and Mobility

Oracle's PeopleSoft PeopleTools 8.52, a development toolset for PeopleSoft applications, is now available. Enhancements in this product update include intuitive keyword search, iPad support, an interactive UI, and an integrated reporting functionality.

"Thousands of customers around the

world depend on Oracle's PeopleSoft to help run their organizations, and any way we can improve user experience and adoption directly supports their business success," says Paco Aubrejuan, group vice president, Oracle's PeopleSoft.

[bit.ly/Axe4Sf](http://bit.ly/Axe4Sf)

## Oracle Database Firewall Supports MySQL

Now available, Oracle Database Firewall 5.1 extends support for MySQL Enterprise Edition and delivers enhanced reporting capabilities. Oracle Database Firewall protects MySQL databases against data breaches without requiring any changes to existing applications, the database infrastructure, or the existing operating system of the target database. The new release provides a reporting infrastructure for running and modifying the layout of existing reports, with 10 new out-of-the-box reports to further help organizations comply with privacy and regulatory mandates. The new release also offers a proxy-operating mode that allows organizations even greater flexibility in deploying it on the network. In addition,



new multicore management capabilities offer administrators fine-grained control over the resources allocated to protect specific databases for even greater scalability.

Oracle Database Firewall establishes a defensive perimeter around databases, while monitoring and enforcing normal application behavior in real time to help prevent SQL injection attacks as well as unauthorized attempts to access sensitive information.

"Organizations can further enhance enterprise database security with Oracle Database Firewall," says Vipin Samar, vice president of database security at Oracle. "With new MySQL support, Oracle Database Firewall extends the combination of databases that organizations can secure across their enterprise. The improved reporting capabilities automate time-consuming regulatory compliance reporting functions."

[bit.ly/wJPbIL](http://bit.ly/wJPbIL)

## Directing Traffic For Oracle WebLogic Server

In conjunction with the release of Oracle WebLogic Server 12c, Oracle has unveiled Oracle Traffic Director, which provides traffic routing and load balancing in the application server. It can deliver a three-to-four-times performance boost to applications running on Oracle WebLogic Server 12c and Oracle Fusion Middleware, compared to traditional Web-based architectures. Oracle Traffic Director is available only with Oracle Exalogic Elastic Cloud, where it has been optimized for extreme performance.

"Formerly these capabilities were available only in the network layers and therefore weren't accessible to the application developer," says Hasan Rizvi, senior vice president of Oracle Fusion Middleware and Java.

[bit.ly/yLTyt9](http://bit.ly/yLTyt9)



## Oracle Updates Oracle Tuxedo 11g

The latest release of Oracle Tuxedo 11g delivers optimized integration with Exalogic Elastic Cloud X2-2 and new features for improved usability, faster migrations, greater availability, enhanced monitoring and control capabilities, and integration with Oracle Berkeley DB and the COBOL-IT compiler.

The enhanced integration between Oracle Tuxedo 11g and Oracle Exalogic Elastic Cloud enables up to seven times performance and scalability gains and five times improvement in Oracle Database 11g access throughput. The new release includes Oracle Tuxedo Application Runtime for IMS 11g, which accelerates the migration of IBM mainframe IMS applications to open systems.

"Organizations are looking to streamline mainframe migration and modernization," said Frank Xiong, vice president of development at Oracle. "The new release of Oracle Tuxedo 11g and the addition of Oracle Tuxedo Application Runtime for IMS 11g further simplify the process by optimizing integration with Oracle Exalogic Elastic Cloud and simplifying the migration and modernization of IBM mainframe IMS applications."

[bit.ly/AoxLpy](http://bit.ly/AoxLpy)

## Connected Digital Lifestyle Solution Now Available

Oracle has introduced the Oracle Communications connected digital lifestyle solution to help communications service providers (CSPs) create their own digital content stores. Oracle's connected digital lifestyle solution offers a unified platform for service exposure, content management and delivery, and advertising that enables CSPs to deliver innovative and revenue-



generating applications. Oracle has also unveiled Oracle Communications Services Gatekeeper 5.0, part of Oracle's connected digital lifestyle solution, which CSPs can use to leverage their key network assets, such as billing, messaging, and location.

"These solutions help CSPs maximize their revenue opportunity by facilitating the development and deployment of innovative applications and services," says Liam Maxwell, vice president, products, Oracle Communications.

[bit.ly/x25mZH](http://bit.ly/x25mZH)

## Oracle Solaris Studio 12.3 Speeds Application Performance

Oracle has released Oracle Solaris Studio 12.3, the latest release of its C, C++, and Fortran development platform for building fast, scalable, secure, and reliable enterprise applications for Oracle Solaris systems. The updated suite accelerates the performance of SPARC T4- and x86-based applications up to 300 percent by leveraging Oracle's advanced compiler technology.

Oracle Solaris Studio 12.3 is optimized for both Oracle Solaris and Oracle Linux operating systems and provides developers with the latest in compiler optimizations, multithread performance, and code verifica-

tion tools. Built-in remote access capabilities allow the creation of Oracle Solaris or Linux applications from Oracle Solaris, Linux, Windows, or Mac OS desktops. A new Code Analysis tool enables developers to quickly detect application vulnerabilities.

"The combination of the newly released Oracle Solaris 11 and Oracle Solaris Studio 12.3 streamlines the creation of enterprise-critical applications with the security and agility necessary for public, private, and hybrid cloud services," says Don Kretsch, senior director of software development at Oracle.

[bit.ly/xYp74F](http://bit.ly/xYp74F)

## Faster Netra SPARC T4 Servers for Telecom

Oracle has introduced new Netra SPARC T-Series servers based on the SPARC T4 processor that provide the security, performance, and scalability the telecommunications industry requires for 4G network infrastructures and cloud-based deployments.

Oracle's Netra SPARC T-Series servers with Oracle Solaris deliver up to five times better single-threaded performance than the previous generation while maintaining massive throughput on multithreaded applications. In recent tests running Oracle Communications ASAP, software used by the world's largest communications service providers to activate a variety of services, the Netra SPARC T4-2 server delivered nearly a 2-times performance improvement over previous-generation systems, with each SPARC T4 processor providing 7.7 times the performance of the Intel Itanium 1.7 GHz processor in an HP server.



"Oracle's new Netra SPARC T4 servers with Oracle Solaris 11 deliver the performance and scale communications companies require to rapidly deploy new services and support cloud-based offerings," says Raju Penumatcha, vice president of Netra Systems and networking at Oracle. "With Oracle's new carrier-grade servers and complete solutions portfolio for the communications industry, customers have a rock-solid platform for long-term service deployments."

[bit.ly/AdrtVG](http://bit.ly/AdrtVG)

## Oracle TimesTen Boosts Performance, Scalability

Oracle TimesTen In-Memory Database 11g Release 2, the latest iteration of Oracle's application-tier in-memory database, is now available. Oracle TimesTen In-Memory Database is a full-featured relational in-memory database designed to run in the application tier to provide both the rapid transaction response time and high throughput required by mission-critical applications.

This latest release incorporates significant performance and scalability improvements for real-time online transaction processing (OLTP) applications and introduces new functionality to support analytic applications with real-time in-memory data management. The new features further enable organizations to enhance application performance and scalability by supporting more concurrent users, higher volumes of requests, and more sessions.

Oracle TimesTen In-Memory Database is available with Oracle Communications Billing and Revenue Management, enabling that product to achieve significantly faster response time and higher throughput and to support more subscribers than prior releases.

Oracle has also unveiled Oracle TimesTen In-Memory Database for Exalytics, an application-tier in-memory database cache for Oracle Exalytics In-Memory Machine. Oracle TimesTen In-Memory Database for Exalytics enables Oracle Business Intelligence Foundation Suite to achieve up to 20 times response time improvement for speed-of-thought visualization and store up to 5 times more data in memory by using advanced columnar compression capabilities.

"In-memory data management is a key enabling technology for real-time data analysis and decision-making. Organizations need to put in place a strategy for taking advantage of in-memory technology for both OLTP and analytics workloads," says Donald Feinberg, vice president and distinguished analyst, Gartner. "Application-tier in-memory data management is an element of that overall solution that should be carefully considered."

[bit.ly/yESimE](http://bit.ly/yESimE)

# One for All

Oracle WebLogic Server 12c provides a standards-based platform for developing, deploying, and consuming cloud applications.

Oracle has introduced Oracle WebLogic Server 12c, the next generation of its market-leading Java application server. According to Hasan Rizvi, senior vice president of Oracle Fusion Middleware and Java, Oracle WebLogic Server 12c adds more than 200 new features to support the development, deployment, and management of public, private, and hybrid cloud computing environments. To enable Oracle WebLogic Server customers to incrementally move to the cloud, Oracle WebLogic Server 12c also provides enhancements for on-premises architectures.

Oracle WebLogic Server 12c—part of Oracle's cloud application foundation, Oracle's open platform for running applications in the cloud—is designed to provide maximum flexibility and performance, Rizvi said at a live Webcast in December 2011. Oracle's cloud application foundation integrates Oracle WebLogic Server 12c with Java Platform, Enterprise Edition 6 (Java EE 6), distributed caching, online transaction processing, virtualization, and traffic optimization. "With our proven, industry-standard Oracle WebLogic Server platform," Rizvi said, "users can take applications they have developed for the IT shop and deploy them in the cloud, and, conversely, they can start on the cloud and bring their applications in-house."

Oracle WebLogic Server 12c can run on any hardware platform but is optimized for Oracle Exalogic Elastic Cloud, an engineered system that combines hardware, software, and storage to boost the performance of Java applications, Oracle Applications, and all other enterprise applications.

## THREE GOALS

Oracle included the new features in Oracle WebLogic Server 12c with three goals in mind, said Rizvi: to provide a more productive platform for developing cloud-based



Hasan Rizvi, Senior Vice President, Oracle Fusion Middleware and Java

applications; to make deployment and management of those applications easier; and to provide a better, more reliable experience to users through increased performance, higher availability, and more-efficient disaster recovery.

For developers, Oracle WebLogic Server 12c includes a complete implementation of Java EE 6, with support for annotations, dependency injection, and POJOs (Plain Old Java Objects). It is also tightly integrated with leading integrated development environments, such as Eclipse and NetBeans, and popular open source tools, such as Maven and Hudson. Developers can now leverage Java Platform, Standard Edition 7 features to create cleaner, more maintainable code.

When these features are added together, Rizvi explained, a typical developer will need to write "25 percent fewer Java classes, 50 percent less Java code, and 80 percent less XML code" for an Oracle WebLogic Server 12c application versus a similar one on its predecessor, Oracle WebLogic Server 11g.

To aid application deployment, Rizvi explained, Oracle WebLogic Server 12c is designed to work well with Oracle Virtual Assembly Builder, which allows developers to create and configure multitier application topologies and provision them onto virtualized resources. Rizvi added that the tool makes all the necessary connections to deploy the various components of an application as a single entity. "This makes deployments repeatable and more efficient by orders of magnitude," Rizvi said.

## ENHANCED AVAILABILITY AND RECOVERY

For consumers of cloud services, performance and availability are key, said Rizvi. Oracle WebLogic Server 12c provides enhanced availability and disaster recovery through such features as active grid links, transaction and Web session affinity, early notification systems, and better integration between Oracle Real Application Clusters and Oracle WebLogic clusters. "We achieve three times better throughput than the previous release through these affinities," said Rizvi.

Oracle WebLogic Server 12c is available for immediate download. Built-in tooling provides a seamless upgrade path for existing Oracle WebLogic 11g applications, and Oracle is offering migration tools and capabilities for users of GlassFish and Oracle Internet Application Server products. Finally, Oracle offers consulting services packages to upgrade to Oracle WebLogic Server from JBoss Application Server and IBM WebSphere Application Server. ◀

Philip J. Gill is a freelance writer and editor.

## NEXT STEPS

**LEARN** more about Oracle WebLogic Server 12c  
[bit.ly/wggCdl](http://bit.ly/wggCdl)

# Big Data Management

Oracle NoSQL Database facilitates efficient storage of massive amounts of data in a simple, flexible format.

**F**ollowing the announcement of the availability of Oracle NoSQL Database, Rich Schwerin, Oracle Magazine contributor, sat down with Dave Segleau, director of product management at Oracle, to talk about the new offering for big data management. The following is an excerpt from that interview. Download the full podcast at [oracle.com/magcasts](http://oracle.com/magcasts).

**Oracle Magazine:** Let's start at the beginning. What is a NoSQL database?

**Segleau:** NoSQL means not only SQL, and it encompasses a set of database technologies that have been under development for the past 12 years. NoSQL databases in general try to address some of the data management requirements of what's been called big data in the industry. In very general terms, a NoSQL database is a nonrelational database that can manage data over a distributed set of storage servers, is designed to be highly available and highly scalable, and supports a variable data schema and data formats. NoSQL databases often avoid ACID [atomic, consistent, isolated, and durable] transactions and table joins in order to achieve faster throughput. There are several different kinds of NoSQL databases, and each implementation tends to have its own particular set of technical features and behavior. The tough part about defining what a NoSQL database is, is that there are no standards for NoSQL today. There are literally hundreds of products claiming to be NoSQL databases or having NoSQL capabilities.

**Oracle Magazine:** When would a developer choose a NoSQL database?

**Segleau:** The most common use cases involve Web or internet-centric applications—what we like to call Web-scale applications or Web services, in the broadest sense. These applications are providing either data capture or data services over the Web. *Data capture* is the ability to monitor, capture, and query



Dave Segleau, Director of Product Management, Oracle

incoming data from a multitude of data points, such as network monitoring, sensor networks in factory automation, and mobile device management. *Data services* are Web-scale, high-performance, customer-oriented Web services, like Amazon, LinkedIn, or Facebook. Often, it's both data capture and data services.

**Oracle Magazine:** What are some of the pros and cons associated with NoSQL databases?

**Segleau:** The pros include the ability to scale out compute and storage capacity horizontally over a wide range of hardware resources, simple and fast queries, and a flexible and simple approach to schema management. The cons include a lack of support for complex queries, a lack of support for multitable joins, limited transaction support, and having to learn a new database technology approach.

**Oracle Magazine:** You mentioned several different kinds of NoSQL databases. What kind of database is Oracle NoSQL Database?

**Segleau:** Oracle NoSQL Database is a distributed key-value database, like the ones currently used at LinkedIn and Amazon.com.

The key might be the user or membership ID, and the value contains some information about that user—for example, basic profile information including address, picture, and other vital information. Other records associated with that key might contain the user IDs or e-mail addresses of friends and the products that the user has recently purchased.

If you're an RDBMS person, you can think of a key-value database as the simplest form of a two-column relational table: the first column is the key, and the second column is the value. Keys and values can be very simple values or complex structures. Oracle NoSQL Database stores records that contain a key-value pair and retrieves records based on the requested key. Oracle NoSQL Database distributes those key-value records, based on the hashed value of the key, across any number of servers that we call storage nodes. The database is designed to scale out to many systems as your data management needs grow and provides many of the features common to other NoSQL database implementations, as well as providing several key features that are not available in other NoSQL products.

**Oracle Magazine:** What are some of those key features?

**Segleau:** There are several key features that I'd like to highlight, but what it boils down to is that Oracle NoSQL Database is general purpose, as well as simple to use and deploy. Lots of the existing NoSQL products are specially tuned for specific kinds of problems. The issue is that this approach doesn't adapt well to other types of problems. For example, Dynamo—Amazon's NoSQL database—is very good for Amazon's requirements because Amazon wrote it. But most customers are not Amazon, and what they want is a more general-purpose solution that will address *their* NoSQL database needs.

A common complaint is that many of the existing NoSQL products discard fundamental

database technology, such as transactions, in order to run fast, pushing those fundamental requirements onto the application developer. With Oracle NoSQL Database, that functionality remains in the database where it belongs. Quite frankly, we heard from several existing NoSQL users that concepts such as high throughput without transactions and eventual consistency were interesting theoretical models, but that they made application development a nightmare. Hence, Oracle NoSQL Database has flexible, ACID transactions.

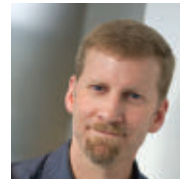
**Oracle Magazine:** How does Oracle NoSQL Database fit into Oracle's big data strategy?

**Segleau:** Big data is really a multifaceted problem, which includes the acquisition, organization, and analysis of large amounts of data that come from multiple formats and repository sources. Oracle NoSQL Database is primarily focused on data acquisition. It is one of the products that can be used to acquire and quickly query large amounts of simple data.

**Oracle Magazine:** How do you organize and analyze the data that Oracle NoSQL Database acquires?

**Segleau:** Oracle NoSQL Database stores the distributed key-value pairs in storage nodes across a wide set of systems. For simple statistics, especially things like counts and other scalar aggregates, you can use Hadoop MapReduce processes to quickly generate statistics that are useful to the application. For deeper, more-complex analysis, typically you'll want to move the data of interest into an Oracle data warehouse and then use the rich set of tools and processes, including Oracle R Enterprise, that are available there to generate more-complex, multifaceted results. There are a variety of ways of moving data from Oracle NoSQL Database into an Oracle data warehouse, including Oracle Data Integrator, Hadoop MapReduce processes, and even in-database MapReduce that can pull NoSQL data directly into a

query in the data warehouse. In other words, through the use of SQL functions—in this case, a MapReduce SQL function—you can have data directly extracted from an external source accessible to MapReduce into a query that's running in the Oracle database. ◀



**Rich Schwerin** is a senior manager with Oracle Publishing who focuses on social media.

#### NEXT STEPS

**LEARN** more about Oracle NoSQL Database, Enterprise Edition  
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### Expert Indexing in Oracle Database 11g



By Darl Kuhn, Sam Alapati, and Bill Padfield

Apress  
apress.com

Database system performance is a top concern in today's world, where access and activity are driven by the proliferation of phones, tablets, and other computing devices as well as PCs. *Expert Indexing in Oracle Database 11g* focuses on the one database structure at the heart of almost all performance issues: the index. In one compact reference volume, the book outlines the different types of indexes available in Oracle Database 11g and explains the circumstances in which each type of index is best applied. It also helps developers recognize when queries aren't using indices as the developer intended, and it explains in detail how to manage indexing for maximum performance.

### Oracle JDeveloper 11gR2 Cookbook



By Nick Haralabidis

Packt  
packtpub.com

Available in RAW (read as it is written) format, this cookbook is a task-based guide to the complete

Oracle Fusion Applications development life-cycle using Oracle JDeveloper 11g Release 2 and Oracle Application Development Framework (Oracle ADF). Readers will learn about deploying, debugging, testing, profiling, and optimizing Oracle ADF applications with Oracle JDeveloper 11g Release 2. With more than 120 recipes, the book helps readers learn concepts such as setting up application workspaces and projects; they'll then delve into specific components such as entity objects, view objects, application modules, and more. Practical recipes with Oracle ADF Faces, UI components, and backing beans are included.

### Migrating to the Cloud: Oracle Client/Server Modernization



By Tom Laszewski and Prakash Nauduri

Syngress  
syngress.com

IT professionals who choose service-oriented, Web-based cloud architectures for database migrations, desktop application migrations, or IT infrastructure consolidation projects can use this book to plan, budget, design, execute, and roll out their projects. Focusing on Oracle cloud

relational database technology and Oracle Fusion Middleware as the target cloud-based architecture, the book recommends tools, strategies, and best practices for migrating legacy applications to service-oriented, Web-based cloud architectures for IT efficiency, agility, and lower total cost of ownership. The authors advise readers on how to determine the amount of effort and financial investment that a database and application migration might involve, and share a real-world case study.

### Oracle Service Bus 11g Development Cookbook



By Guido Schmutz, Edwin Biemond, Jan van Zoggel, Mischa Kölliker, and Eric Elzinga

Packt  
packtpub.com

With more than 80 task-based, immediately usable recipes, this book shows readers how to create a simple service on the Oracle Service Bus and shares strategies for working efficiently with the Oracle Enterprise Pack for Eclipse. It then covers ways to send and consume messages through the Java Message Service transport (both topics and queues), and other transport technologies such as Enterprise JavaBeans transport, HTTP transport, and poller transports. Communicating with the database, communicating with Oracle SOA Suite, reliable message processing, and other topics are also covered. The last two chapters discuss how to achieve message- and transport-level security on Oracle Service Bus.

### Java 7 Recipes



By Josh Juneau, Carl Dea, Freddy Guime, and John O'Conner

Apress  
apress.com

This book offers solutions to common programming problems encountered while developing Java-based applications. Updated to cover the newest features and techniques, *Java 7 Recipes* provides code examples involving Servlets, JavaFX 2.0, XML, Swing, and more. This book uses the popular problem-solution format: readers can look up the specific programming problem they want to solve, read the solution, and apply that solution directly in their own code. The authors focus on problems and solutions rather than on the Java programming language itself. Readers are free to crib from the book and apply the code examples in their own projects.

Look for other Oracle books at [oracle.com/technetwork/community/bookstore](http://oracle.com/technetwork/community/bookstore).

## Tata Consultancy Services Named Diamond Partner

Tata Consultancy Services (TCS) has attained Diamond status, the highest ranking in the Oracle PartnerNetwork. TCS is an IT services, consulting, and business solutions organization that employs more than 214,000 consultants in 42 countries and offers a consulting-led, integrated portfolio of IT, business process optimization, infrastructure, engineering, and assurance services. The company has achieved 21 Oracle specializations and 8 advanced specializations.

TCS's Diamond status recognizes its breadth and depth of services in Oracle E-Business Suite, Oracle's PeopleSoft solutions, Oracle's Siebel Customer Relationship Management, Oracle Fusion Middleware, Oracle Exadata Database Machine, and other solutions. TCS operates centers of excellence for many of these Oracle technologies and serves customers in Asia Pacific, Europe, the U.K. and Ireland, South Africa, the Middle East, and North America.

[tcs.com](http://tcs.com)

## RTTS Achieves Gold Partner Status

RTTS, a provider of software quality assurance services, has become an Oracle Gold Partner. RTTS has offered software testing services, solutions, and training to more than 400 organizations for 15 years and is the developer of QuerySurge, a software-testing tool for data warehousing projects.

QuerySurge can verify as much as 100 percent of data from source systems passing through the extract, transform, and load process to a target data warehouse. It increases test coverage and reduces test cycle times, allowing organizations to mitigate risk and meet business requirements. QuerySurge has also been used for data migrations and database upgrades.

Gold partner status gives RTTS access to additional Oracle resources to help the company respond to customer needs. The New York, New York-based company has satellite locations in Philadelphia, Pennsylvania; Atlanta, Georgia; and Phoenix, Arizona, and offers many of its consulting and education services through the cloud.

[rtts.com](http://rtts.com)

## Two Partner Products Achieve Oracle Exadata Ready Status

Solutions from two Oracle partners have achieved Oracle Exadata Ready status through Oracle PartnerNetwork's Oracle Exastack Ready program. Oracle Exadata Ready status assures organizations that a partner solution has been thoroughly tested to run on Oracle Exadata Database Machine with Oracle Database 11g and Oracle Linux.



### cVidya Networks'

MoneyMap Version 6.5 is Oracle Exadata Ready. cVidya is an Oracle Gold Partner and provider of revenue intelligence solutions for telecom, media, and entertainment service providers. MoneyMap helps companies identify and reclaim revenue leak-

ages by reconciling all network, operations, and business systems. MoneyMap is part of cVidya's IRIS suite, which also includes solutions for fraud detection, risk management, relationship management, margin analysis, and more.

**Neuralitic Systems'** SevenFlow 3.1 is also Oracle Exadata Ready. Neuralitic Systems, an Oracle Gold Partner, offers mobile data intelligence solutions. SevenFlow provides actionable insights into mobile customer preferences and behaviors in order to maximize carrier returns on subscriber acquisition and retention investments. According to Neuralitic Systems, SevenFlow customers' data traffic is tripling every year, making the Oracle Exadata Database Machine an appropriate choice for its product.

▶ [cvidya.com](http://cvidya.com)

▶ [neuralitic.com](http://neuralitic.com)

## AdvancedEPM Consulting Achieves Consumer Goods Specialization

AdvancedEPM Consulting, an Oracle Platinum Partner focused on Oracle Hyperion enterprise performance management (EPM) solutions, has achieved Oracle PartnerNetwork Specialized status for consumer goods. This specialization underscores AdvancedEPM's knowledge of the consumer goods industry and signifies that the company has appropriate skills to identify and address consumer goods clients' business challenges.

AdvancedEPM has implemented, upgraded, and trained consumer goods clients on Oracle Hyperion EPM and Oracle Business Intelligence solutions. AdvancedEPM's clients leverage EPM and business intelligence to link strategic goals to operational decisions and deliver consistent insights that drive action. AdvancedEPM previously achieved specialization in Oracle Hyperion Planning and Oracle Essbase.

▶ [advancedepm.com](http://advancedepm.com)

## BioPharm Systems Achieves Specialization, Releases Migration Tool

Oracle Gold Partner BioPharm Systems, a provider of clinical trial, data, drug safety, clinical development analytics, and the-saurus management system solutions, has achieved Specialized status for Oracle Life Sciences Data Hub. The specialization acknowledges BioPharm Systems' expertise in Oracle's clinical data warehousing solution, as well as its overall commitment to Oracle Health Sciences applications.

BioPharm Systems is an Oracle Accelerate for Midsize Companies solution provider with experience implementing, integrating,



migrating, and hosting many Oracle products including Siebel Clinical, Oracle Argus Safety, Oracle Adverse Event Reporting System, Oracle Life Sciences Data Hub, Oracle Clinical, and Oracle Remote Data Capture.

The company has also released ACCEL-Copy, a software product that enables life sciences companies to copy studies from one Oracle Clinical instance to another, including hosted environments. ACCEL-Copy can also archive a global library, archive clinical studies, and refresh patient data in a nonproduction environment.

▶ [biopharm.com](http://biopharm.com)

## Mannai Trading Company Achieves Oracle Exadata Specialization

Mannai Trading Company, an Oracle Platinum Partner, has achieved Specialized status in Oracle Exadata.

Mannai, a systems integrator and technology and infrastructure services company based in Doha, Qatar, met rigorous business and technical criteria to achieve Oracle Exadata specialization. The achievement also confirms Mannai's commitment to incubating and introducing new technological developments in the Middle East and across its customer base. Mannai has achieved a total of eight specializations.

▶ [mannai.com](http://mannai.com)

## Teleran Upgrades Data Warehouse Management Software Suite

Teleran Technologies, an Oracle Gold Partner, has released version 4.2 of its data warehouse management software suite for Oracle Database 11g and the Oracle Exadata Database Machine. The new version improves visibility and transparency of how business users leverage applications and data and provides real-time user policy management for business intelligence (BI) applications.

The Teleran solution continuously tracks users, their business context, BI applications activity, and data usage. By automating user controls, Teleran helps IT organizations support expanding databases and thousands of users without adding staff. The Teleran solution complements the native management capabilities of Oracle Database 11g Release 2 and Oracle Enterprise Manager.

▶ [teleran.com](http://teleran.com)

## Jaffer Brothers Accelerates

Oracle Gold Partner Jaffer Brothers has earned Specialized status for Oracle Accelerate in recognition of bringing industry-specific capabilities to midsize companies in Pakistan. Jaffer participates in the Oracle Accelerate for Midsize Companies program, which provides simple-to-deploy, packaged solutions to midsize organizations.

▶ [jaffer.com](http://jaffer.com)



## Performance Architects Achieves Education and Research Specialization

Performance Architects, an Oracle Platinum Partner, has achieved specialization in education and research. Oracle defines the education and research markets as including both higher education and research as well as primary and secondary education (K-12).

Performance Architects achieved Specialized status through competency development, business results, and proven success. The Performance Architects team has worked with Oracle Hyperion products

since these products were launched. The company also has extensive experience with Oracle Business Intelligence Enterprise Edition. Performance Architects' services include implementing or augmenting financial applications and reporting and analysis solutions, as well as underlying technologies. The company works with entire organizations or specific functional areas such as finance, IT, HR, sales and marketing, and operations.

▶ [performancearchitects.com](http://performancearchitects.com)

## Enhanced Oracle PartnerNetwork Solutions Catalog Available

Oracle has released an updated Oracle PartnerNetwork Solutions Catalog, a centralized online directory that provides partners and customers instant access to Oracle partners' solutions and services worldwide.

The Solutions Catalog features listings for Oracle's 21,000-plus partners, making it easier for customers to find solutions and

service providers that best meet their specific business needs, regardless of industry or location. Partners can customize their entries with multimedia, social media, references, and more to better showcase their offerings. Enhanced search capabilities and user reviews are new in this release.

▶ [solutions.oracle.com](http://solutions.oracle.com)

## Atos Delivers Test and Acceptance Management to Oracle Fusion Applications

Atos, a Paris, France-based global IT services company and an Oracle Platinum Partner, is offering Test and Acceptance Management (TAM) services for Oracle Fusion Applications. Atos' TAM for Oracle solution provides full application lifecycle management, including deployment of Oracle



Fusion Applications in heterogeneous environments. The service leverages a variety of tools, including Oracle Application Testing Suite

(part of Oracle Enterprise Manager 12c) and Atos' Testing and Acceptance methodology and assets.

TAM for Oracle incorporates Atos' extensive experience with customers using Oracle E-Business Suite, Oracle's Siebel Customer Relationship Management, and Oracle's PeopleSoft and JD Edwards solutions. Available globally, the new service can be used on its own or in conjunction with other offerings in the Atos test and management service catalog.

▶ [atos.net](http://atos.net)

## CyberSource Achieves Oracle Validated Integration

Payment management company CyberSource, an Oracle Gold Partner, has achieved Oracle Validated Integration of CyberSource Payment Management Services with Oracle ATG Web Commerce 10. Oracle ATG customers can now more rapidly adopt CyberSource's industry-leading portfolio of payment management services, helping them to get to market faster and grow with less cost and complexity. These services

include global payment services to accept and transact payments worldwide—including global tax calculation services; fraud management services to reduce the risk of payment fraud and increase operating efficiency; and payment tokenization services to protect payment data and reduce the scope of Payment Card Industry Data Security Standard (PCI DSS) compliance.

▶ [cybersource.com](http://cybersource.com)

## Entuity Integrates and Upgrades Eye of the Storm Enterprise

Entuity, an Oracle Gold Partner, has completed beta testing of a plug-in that integrates Eye of the Storm Enterprise 2011 (EYE 2011) with Oracle Enterprise Manager 12c. EYE is Entuity's network management software for heterogeneous environments. The EYE 2011 plug-in allows organizations using Oracle Enterprise Manager to monitor networks and ensure application health by detecting potential network problems that affect application service delivery. The plug-in pushes real-time network events, status information, and metrics from EYE 2011 to the Oracle Enterprise Manager console in an intelligent, filtered manner. Oracle Enterprise Manager users can then drill down into EYE 2011 to expedite incident resolution. EYE 2011 and the plug-in are available for Oracle Solaris, Oracle VM Server for x86, and other platforms.



Entuity has also unveiled EYE 2012, a new release that includes virtual switch support, interactive charting capabilities, simplified license administration, and port-sensitive high-frequency polling. The new version is available for multiple platforms and supports the EYE 2011 plug-in.

▶ [entuity.com](http://entuity.com)

## NaviSite to Offer Select Oracle Licenses on a Subscription Basis

NaviSite, a provider of enterprise-class hosting, managed application, managed messaging, and managed cloud services, is offering monthly licenses for select Oracle software to independent software vendors (ISVs) through Oracle's software as a service (SaaS) for ISVs model. NaviSite, an Oracle Platinum Partner, is a Time Warner Cable company.

With consolidated monthly Oracle software licensing and billing through NaviSite, ISVs can receive a usage-based service that scales with company growth and end-user demand. The new service is expected to speed time to market for ISV cloud applications.

▶ [navisite.com](http://navisite.com)

# Drill into Oracle Solaris 11

Find out how Oracle Solaris 11 will change your job.

**I**n this issue, Rick Ramsey, Oracle Technology Network systems community manager, provides an update on Oracle Solaris 11.

After seven years of continuous development, Oracle launched Oracle Solaris 11 in November 2011 with a completely new approach to software packaging, patching, and management. This new architecture will dramatically change the way sys admins manage their software, as well as the way developers package and distribute it.

Those of us who are fans of Oracle Solaris 10 learned to recite UNIX SVR4 (System V Release 4) package nomenclature in our sleep. Times change, however, and we need to let go of the “old ways.” The economic pressures on data centers are too intense to waste precious sys admin resources on mundane tasks. Better to use them for higher-level duties, such as identifying performance bottlenecks, guarding against security breaches, and developing an effective provisioning strategy that includes the cloud.

## MEET IMAGE PACKAGING SYSTEM

Oracle Solaris 11’s new packaging architecture, called Image Packaging System (IPS), spans the entire software lifecycle, including software installation, patching, upgrades, and removal. IPS takes the uncertainty out of software updates by relying exclusively on repositories.

Before any software is placed in these repositories, it will be validated by Oracle. Validation is an automated process that identifies and catalogs dependencies between the packages in those updates and patches. As a result, when you download a patch or update to Oracle Solaris 11, you don’t have to look through the ReadMe’s, cross-check dependencies, or spend any more time making sure the patch or update will work.

If you administered Oracle Solaris 10, you probably used JumpStart to manage

## This new architecture will dramatically change the way sys admins manage their software.

your patches and updates. JumpStart uses profiles to help organize different configurations of software. IPS in Oracle Solaris 11 uses something similar but more powerful. It is called a *manifest*.

A manifest defines what a particular operating system image contains, including the names of the packages to be included in the image, the location of the repository from where they will be retrieved, any scripts used to create the new image, and more. IPS has default manifests for images that will be distributed on a CD or through an x86 or SPARC text installer, an x86 or SPARC AI ISO image, or a virtual machine. You can either edit those or create your own.

Another benefit of IPS is that it manages virtual versions of the OS in the same way as bare-metal versions. IPS lets you deploy a particular version of the OS into a bare-metal configuration, a zone, or Oracle VM Server for SPARC in exactly the same way. No need for a different manifest.

IPS provides three tools to help you manage software updates. The `pkg(1)` command is a traditional, full-featured command-line interface. Package Manager is a GUI that you can use to search and manage installed packages. Launch it by using `packagemanager` from the command line. Update Manager, also a GUI, helps you get a high-level view of full system updates. Launch it by entering `updatemanager` on the command line. In addition, you can

continue to use `pkgadd(1M)` to support SVR4-based software from your Oracle Solaris 11 installation.

Because the new architecture and tools were bound to change the way sys admins manage Oracle Solaris software, we asked one of our favorite writers, Ginny Henningsen, to do a little research. Ginny downloaded Oracle Solaris 11 Express and used the new tools to perform routine software management tasks. She distilled what she learned into a series of three articles: “Best Way to Update Software With IPS in Oracle Solaris 11,” “Best Way to Automate ZFS Snapshots and Track Software Updates,” and “Best Way to Update Software in Zones.” To read Henningsen’s articles or find other resources to help you become familiar with IPS and its tools, go to the Oracle Solaris 11 product page of the System Admin and Developer Community of Oracle Technology Network.

Oracle Technology Network is all about sys admins helping sys admins. (And let’s not forget developers of C, C++, and Fortran applications that run on Oracle Solaris or Oracle Linux!). Join us. We’d love to have you around. ◀

## WEB LOCATOR

### Oracle Technology Network Home

[oracle.com/technetwork](http://oracle.com/technetwork)

### System Admins and Developers Home Page

[oracle.com/technetwork/systems](http://oracle.com/technetwork/systems)

### “Best Way to Update Software With IPS in Oracle Solaris 11”

[bit.ly/wWzmJR](http://bit.ly/wWzmJR)

### “Best Way to Automate ZFS Snapshots and Track Software Updates”

[bit.ly/yfOPkG](http://bit.ly/yfOPkG)

### “Best Way to Update Software in Zones”

[bit.ly/xCP3Ur](http://bit.ly/xCP3Ur)

### Oracle Solaris 11 Installation Resources

[bit.ly/xjoFKI](http://bit.ly/xjoFKI)

### Oracle Solaris 11 Package Management Resources

[bit.ly/xOeyJv](http://bit.ly/xOeyJv)

# Creating Architecture

Seek inspiration for great IT architecture solutions.

A June 2009 *Fast Company* article listed the 10 most creative people in building architecture. The photos that accompanied the article offer ample evidence that something weird and wonderful is happening in the minds of the people responsible for some of the world's most wildly imaginative structures. But what about IT architecture? Given its sharp focus on designing practical technological solutions for business problems, is there a place for such creativity? And what role, if any, does creativity play in the day-to-day work of IT architects?

Ben Stopford, architect and development lead at RBS Global Banking and Markets, rates creativity as the most important quality in his role. "Creativity is the key to innovation, which in turn is the key to great technology," says Stopford. "Great technology attracts and retains great technologists." Stopford describes that attraction and retention as a cyclical process—one that will roll past architects who lack creativity.

Brian Jimerson, chief architect at Avantia, describes creativity as "a huge part" of his role in designing custom technical solutions that solve business problems for clients. "Solving those problems requires a lot of creativity—if it didn't, someone would've solved them before," Jimerson says. "Helping a business with the right mix of technology, process, and pragmatism is definitely more of an art than a science."

While the exact proportions may vary, the blending of art and science in IT architecture mirrors civil, landscape, and other architecture disciplines, according to Eric Stephens, a director of enterprise architecture at Oracle. "Regardless of the type of architecture, the discipline is an amalgamation of other disciplines and types of thinking," Stephens says.

Practical considerations are a significant part of that amalgam, regardless of whether the end product is an office building or an

**"IT is supposed to make a business better. Figuring out how to accomplish that is the fun part."**

—Brian Jimerson, Chief Architect, Avantia

enterprise IT solution. "The disciplines of project management, budgeting, and engineering are required to ensure the stability and operation of the resultant systems," Stephens says. Creativity, however, must enter the picture in dealing with other equally significant considerations.

"Artistry and asceticism come into play because the systems we create must interact with humans," says Stephens. "The best minds in history knew how to fuse left- and right-brain thinking," he adds, citing Leonardo da Vinci and Steve Jobs as examples.

So what can one do to get those left- and right-brain hemispheres in peak creative shape? Jimerson takes a straightforward approach. "IT is supposed to make a business better," he says. "Figuring out how to accomplish that is the fun part." He maintains his creative edge in part by keeping abreast of the evolving technology landscape so that he can apply that knowledge to determine how best to solve his clients' business problems.

Stopford takes a more holistic approach. He recommends a combination of rest, introspection, and human interaction. "Combine periods of deep thought with interaction with others," Stopford suggests. "Utilize different sorts of people. People who think in similar ways to you are great for charging through a solution. People

who think differently help challenge your way of thinking," he continues, adding that drawing all of his designs by hand also helps him think creatively.

Stephens takes an oblique approach, looking to the arts and beyond to bolster his creativity. "I draw upon good literature, office and workspace design, and food and wine," he says. Music also plays a role. "I look for intricate beats, unpredictable patterns, and mixtures of styles to stir up my creativity," he says. "It's about honing one's senses and mental acuity, which aids in finding new ways to solve problems."

It doesn't matter what you use to stir your own creativity, as long as you stir it. A strong creative sense will help to make you a better IT architect. You may not end up the da Vinci or Jobs of the IT architecture world, but your work will be more effective, and certainly a lot more personally fulfilling. It may, however, be difficult to photograph. ◀



**Bob Rhubart**

(bob.rhubart@oracle.com) is manager of the architect community on Oracle Technology Network, the host of the

Oracle Technology Network ArchBeat podcast series, and the author of the ArchBeat blog (blogs.oracle.com/archbeat).

## NEXT STEPS

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feeds2.feedburner.com/otnarch2arch  
bit.ly/9X6j2T

**READ** the *Fast Company* article "The 10 Most Creative People in Architecture"  
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# IT Superman

Architect by day, user group leader by night: IOUG President Andy Flower guides his organization on a powerful new course.

The growing international membership of the Independent Oracle Users Group (IOUG) means that outgoing president Andy Flower sometimes gets mistaken for a famous international cricket player by the same name. But while *that* Andy Flower might be an expert batsman, he probably can't manage a database or run a growing global networking and knowledge-sharing group.

IOUG's Andy Flower is actually a mild-mannered Kansan whose day job has him focusing on strategic information architecture and integration solutions. And he *does* have an alter ego: this IT Superman has doubled as IOUG president since 2010. He got involved with the group almost by accident: In 1998, his boss at the time asked Flower to take his place on an IOUG conference committee at the last minute. "And 13 years later, here I am: president of IOUG," he says.

Now Flower, who has been an IOUG board member for six years, is wrapping up his term as president. I caught up with him at Oracle OpenWorld 2011 to discuss the evolving role of IOUG, his experience with the organization, and what's next.

## NETWORKING AND COMMUNICATION

IOUG's primary role is as a networking and knowledge-sharing organization. "We want our members to participate, network, and talk about how they can optimize their Oracle products and get the most out of their investments," Flower says.

The group's secondary role, which has grown and improved over the years, is communicating with Oracle. "We let Oracle know what our members are thinking and give them direct feedback about products, contracts, licensing, and the pain points of being an Oracle customer," Flower explains.

IOUG leaders take pride in listening to the needs of their members and relaying those



IOUG President Andy Flower

needs back to Oracle. The organization regularly surveys its members in targeted ways to find out what's important to them. "The surveys help us see the trends and understand the challenges that our members are dealing with, such as big data," Flower says. Survey results in hand, IOUG leaders meet with Oracle executives to convey the issues of importance to their members. Oracle has been very open to this information, Flower says, and has responded to requests related to Oracle Database, virtualization, and security, among other topics.

## HOT TOPICS

While the group's core interest has always been Oracle Database, the scope has expanded as Oracle has grown to include a complete Oracle technology stack and more. One of the hottest topics among members these days is Oracle Exadata Database Machine. "It's still new and not known for those who haven't had a chance to touch it," says Flower. "Members are looking for more information about engineered systems and their benefits to organizations." In response,

IOUG is creating more Oracle Exadata-related programming and networking opportunities, both in person and online. For example, COLLABORATE 12 (April 22–26, 2012) will feature more than 30 Oracle Exadata-focused sessions that are nearly all customer-led, and an all-day boot camp, Flower says. The group has active Oracle Exadata special interest and LinkedIn groups and also offers monthly Webinars on Oracle Exadata topics.

In addition to Oracle Exadata, other hot topics include Oracle Exalogic Elastic Cloud and Oracle Database Appliance. "I think IOUG is at an interesting point in its history," Flower says. "There was a period of time where the only thing we had to talk about was the next big [Oracle Database] release. Not that that was unimportant, but it wasn't a massive sea change. Now, with the 'Exa' machines, there's a whole lot more to talk about."

It's an interesting time for Flower, too. As he steps back from IOUG, he is planning to spend more time with his family and at his day job and to look for new opportunities to give back. "I have a feeling that I'll find a way to continue to contribute to IOUG, but perhaps I'll find other outlets for some of my volunteer time—maybe something more local and closer to home that has an impact on my community." Just don't look for Flower to take up cricket any time soon. ◀



**Caroline Kvitka** is senior managing editor of *Oracle Magazine* and *Java Magazine*.

## NEXT STEPS

 **WATCH** the interview  
oracle.com/oramag/upclose

# Community Counts

Three peers on the value of providing patches, getting social, and giving feedback



**MATSUNOBU YOSHINORI**



**ORACLE**  
ACE Director

**Company:** DeNA, a social mobile gaming company

**Job title/description:** Principal infrastructure architect, responsible for DeNA's MySQL Database infrastructure

**Location:** Tokyo, Japan

**Oracle credentials:** Oracle Certified Master Platinum (Oracle9i Database) and Oracle Certified MySQL Developer and DBA, with 8 years of experience using Oracle products

**What technology has most changed your life?** Open source software. When I started evaluating MySQL solutions in early 2004, I noticed that MySQL Database 4.1 incorrectly converted Japanese local character sets. I checked the source code, found the root cause, filed a bug report, and submitted a small patch. Soon after that, the patch was merged with the MySQL source code and the problem was solved. This is a pretty typical scenario in open source communities, but I was very excited about having the opportunity to work with the original developers.

**What would you like to see Oracle do more of?** Oracle has managed MySQL products very well, and I hope to see more of this type of product management. MySQL Database 5.5 was released in a very timely manner, and Tomas Ulin, vice president of MySQL engineering at Oracle, has been great at product development.

**What advice do you have about getting into Web and database development?** Work at a relatively large Web services company. The more servers you have, the more problems you'll encounter, so you're bound to learn a lot.



**TARIQ FAROOQ**



**ORACLE**  
ACE Director

**Company:** BrainSurface, a consulting firm specializing in Oracle Database-related solutions

**Job title/description:** Founder and CEO, serving as an Oracle consultant and architect with a focus on Oracle Real Application Clusters (Oracle RAC) and Oracle VM

**Location:** Boston, Massachusetts

**Oracle credentials:** Oracle Certified Expert (Oracle RAC 10g), Oracle Certified Professional (Oracle E-Business Suite 11i, Oracle9i Database, Oracle Database 10g, Oracle Database 11g, and multiple other Oracle technologies), and Oracle E-Business Suite Certified Consultant, with 18 years of experience using Oracle products

**How did you get started in IT?** My IT journey began when I went to college for a computer science degree. During college I wrote my first Oracle-centric application—along with a thick manual—for the Lahore Stock Exchange in Pakistan, which earned me first prize in a nationwide software competition.

**How are you currently using cloud computing in your work?** I'm using it in a SaaS [software as a service] project for one of my clients, UnitedHealth Group. I've been integrally involved in architecting, modernizing, and managing the Oracle Database infrastructure for multiple SaaS applications hosted within the cloud.

**How are you using social media?** I use it everywhere in my professional life. Twitter, Facebook, LinkedIn, FeedBurner, Oracle Mix: you name it, I'm there! Along with my fellow Oracle ACEs, I recently organized and cohosted VirtaThon 2011—the largest online-only conference for the Oracle, Java, and MySQL communities.



**DIRK NACHBAR**



**ORACLE**  
ACE

**Company:** Philip Morris International

**Job title/description:** Senior technical analyst, serving as a subject matter expert on Oracle technologies

**Location:** Lausanne, Switzerland

**Oracle credentials:** Oracle Certified Trainer for SQL, Oracle Data Guard, and Oracle WebLogic Server administration courses, with 15 years of experience using Oracle products

**Which new Oracle Fusion Middleware and Oracle Database products and features are you finding most valuable?** As far as Oracle Fusion Middleware, Oracle WebLogic Server has brought a lot of great new features, such as clustering possibilities and new deployment options. On the database side, my current top features and options are Snapshot Standby and Oracle Active Data Guard. With Snapshot Standby, it's really easy to test or validate against real production data without losing your high availability or rebuilding the standby database after the validation.

**What advice do you have about getting into Web and database development or software architecture?** A good starting point is the Oracle Learning Library on Oracle Technology Network ([bit.ly/zZWzgt](http://bit.ly/zZWzgt)). The how-tos and demos provided are really helpful.

**What would you like to see Oracle do more of?** A long time ago Oracle started Project Marvel, which led to HTML DB and what is now Oracle Application Express. Every interested Oracle user could join the project, give feedback and input, and have a great influence and a strong voice. I'd like to see more of such projects. ◀

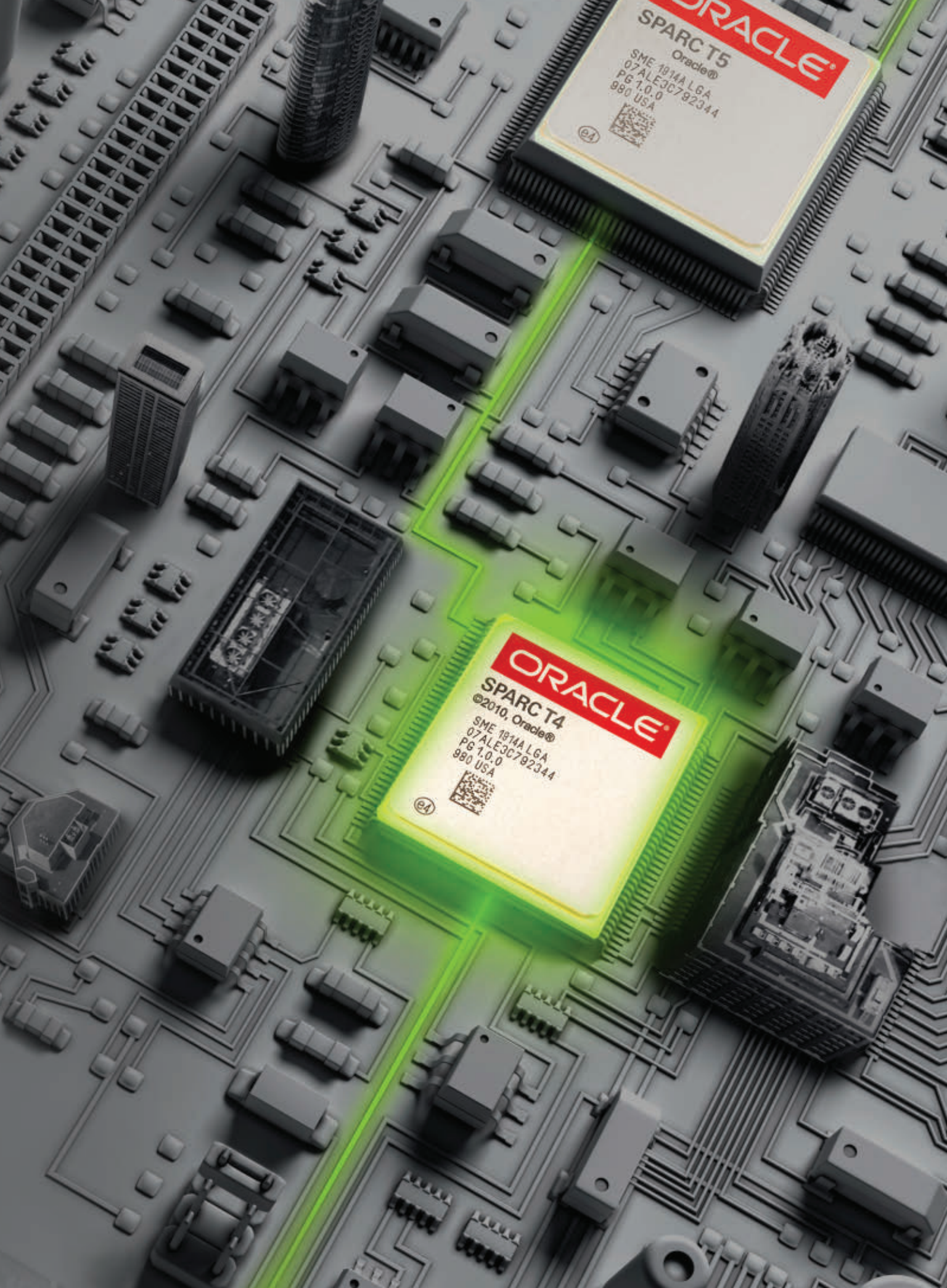
# Destination: SPARC

Organizations are following Oracle's **SPARC** roadmap to improved performance.

BY DAVID A. KELLY

In 2010 Oracle committed to delivering new SPARC chips and server hardware every 12 to 18 months. Over a five-year period, this SPARC roadmap called for improvement of 4 times the cores, 32 times the threads, 16 times the memory capacity, 40 times the database transactions, and 10 times the Java operations per second. So far, on-the-ground results exceed those commitments.

Instead of what was promised on the SPARC and Oracle Solaris roadmap, Oracle is delivering more. The driving time to major SPARC milestones has gotten shorter, and with the recent release of the SPARC T4 chip, Oracle is providing better-than-promised performance.



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SPARC T5  
Oracle®  
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07ALE3C792344  
PG 1.0.0  
980 USA

**ORACLE**

SPARC T4  
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980 USA



## “Over the course of all the upgrades and server switchovers we’ve done since 1998, we’ve only needed about an hour of planned downtime for each upgrade.”

—Scott Myers, Senior Systems Administrator, IT Operations Group, Tucson Electric Power Company

“With the SPARC T4 chip, we’ve actually delivered a faster chip in terms of raw gigahertz than we promised when we initially announced the roadmap,” says Chris Armes, vice president of engineering at Oracle. “And that’s the type of improvement we’ll continue to deliver against the SPARC and Oracle Solaris roadmap through 2015.”

### INTEGRATED PLATFORM FROM BOTTOM TO TOP

Advancements in core chip technologies deliver the best results if the operating system, infrastructure, and applications running on top of the chips can leverage those chip advances. To that end, Oracle has invested heavily in integrating hardware and software; in many respects, that integration starts with Oracle Solaris.

In November 2011, Oracle announced the Oracle Solaris 11 operating system, with its new-and-improved integration with the rest of the Oracle technology stack.

“We optimized Oracle Solaris to run on SPARC, and we optimized Oracle Applications and Oracle Database to run on Oracle Solaris,” says Armes. “We’ve introduced a whole set of new technologies into Oracle Solaris 11 that the rest of the Oracle stack can leverage directly.”

“Future Oracle Solaris updates in 2013, 2014, and 2015 will track with SPARC innovation,” says Armes. “They’ll provide higher availability, increased memory, improved virtualization, enhanced system management, greater I/O capacity, and improved scalability.”

That’s good news for companies such as Tucson Electric Power Company (TEP), in Tucson, Arizona, that are counting on the future of SPARC and Oracle Solaris to run highly available business applications in virtual environments.

### POWER ZONES

When you’re in the business of delivering a critical utility, downtime isn’t an option. That’s why TEP decided long ago that SPARC-based servers and Oracle Solaris should power its business.

TEP has been using SPARC-based systems since 1998, when the organization first decided to deploy Oracle E-Business Suite. The organization chose a SPARC-based solution to run Oracle E-Business Suite because of Oracle’s strong support for SPARC and Solaris.

A subsidiary of UniSource Energy Corporation, TEP serves more than 400,000 electric customers in southern Arizona. The organization has nearly 1,400 employees and focuses on providing power generated from clean, sustainable sources.

Providing power to that many customers requires a range of mission-critical systems that need to be always available, including its customer care and billing system and Oracle E-Business Suite, which the company uses for financials, project planning, accounts payable, accounts receivable, and more. In addition, TEP relies on Oracle’s PeopleSoft applications for its HR systems and has many Oracle databases for custom applications.

One of the driving factors for TEP in designing its server architecture was the fact that the company has limited space in its data center. So, instead of each application or system having its own server, the organization used Oracle Solaris Zones to consolidate several existing SPARC-based servers onto Oracle’s SPARC Enterprise M5000 servers. First introduced in Oracle Solaris 10, Oracle Solaris Zones are built-in, lightweight virtual machines that securely isolate workloads on the same system.

“We went from using more than 20 servers and a bunch of different operating systems to having everything running on Oracle

### Oracle on Oracle

A company that stands behind the software or hardware products it sells is one thing, but a company that runs its mission-critical enterprise resource planning (ERP) business on its own applications shows real commitment. According to Chris Armes, vice president of engineering at Oracle, Oracle’s business is committed to Oracle technology.

“We run our ERP business on a combination of SPARC, Oracle Solaris, Oracle databases, and Oracle Applications,” says Armes. “Oracle very much believes in running Oracle on Oracle’s technology.”

Nothing serves as a better example of this belief than what happened after Oracle closed its acquisition of Sun, when the organization needed to integrate Sun’s IT systems and almost 30,000 former

Sun employees as quickly as possible into the main Oracle IT systems. Oracle needed to rapidly scale its data center to support the vastly increased demands for its core business applications, as well as integrate IT resources from the acquisition.

At the core of the challenge was finding a way to scale Oracle’s global single-instance database and the middle-tier infrastructure that supports Oracle’s financial and human resources applications as well as its management, supply chain, marketing, sales, and partner portals. The combined solutions need to have 24/7, 99.99 percent availability.

“We needed to take Oracle’s existing infrastructure and add 150 percent capacity to it to support the additional 30,000 employees,” says Armes. “And we didn’t have a lot of time.”

To meet the challenge, Oracle migrated its existing SPARC infrastructure from running on four Sun servers to running on two SPARC Enterprise M-Series servers running Oracle Solaris 10—all in two months.

The results were significant. Oracle was able to realize more than US\$50,000 in yearly savings on facilities expenses alone, due to the reduction in space, power, and cooling costs. At the same time, overall performance increased two times for mission-critical processes, and disaster recovery time was cut by 95 percent.

“It was a huge migration, but we did it all in less than eight weeks with only 16 people,” says Armes. “And the reason we could do it in eight weeks is because the whole stack, from the CPUs up to the applications, is engineered to work together.”



Scott Myers, senior systems administrator, IT Operations Group, at Tucson Electric Power Company, says that Oracle has exceeded his expectations in terms of the SPARC roadmap. "The SPARC T4 is really an incredible chip in performance, expandability, and capabilities," he says.

Solaris 10 inside Oracle Solaris Zones," says Scott Myers, senior systems administrator, IT Operations Group, at TEP.

Myers likes the zone approach because it doesn't come with a performance hit. In fact, Myers notes that even if an application is going to take up the full capacity of a SPARC Enterprise M5000 server, he still puts it into Oracle Solaris Zones to make it portable. It makes upgrades easier, provides greater flexibility, and reduces potential downtime.

"We create Oracle Solaris Zones that keep systems isolated," says Myers. "Oracle Solaris Zones allow us to consolidate more operations on a single server, cut costs, simplify maintenance, save space, and reduce power consumption."

With Oracle Solaris Zones, TEP is protected against risks such as system outages. "If we have a system outage or need to upgrade the hardware, we can migrate a zone to another host with just a couple minutes of downtime," says Myers. "It provides us with added flexibility and greater portability."

Management is also simpler. "Consolidating our systems has really cut down on the management overhead compared to having everything on a separate

physical server, because we can do global zone patches with Oracle Solaris," says Myers. "When we patch a server, the patch rolls up to everything on the server, so we have fewer systems to patch and manage. It's definitely easier."

Oracle Solaris Zones capabilities have also enabled Myers and his IT colleagues to address new business requirements faster and more efficiently.

"We keep excess capacity in all servers, so if they do have to house more zones or we need to bring up new applications or move applications, we have the capacity to do it," says Myers. "It has tremendously increased our flexibility in being able to bring applications to market."

#### SNAPSHOT

##### Unisource Energy Corporation (UNS)

[uns.com](http://uns.com)

**Location:** Tucson, Arizona

**Industry:** Utilities

**Employees:** 2,000

**Oracle products:** Oracle E-Business Suite, Oracle Database, PeopleSoft applications, Oracle Utilities Customer Care and Billing solutions, Oracle Fusion Middleware, Oracle Hyperion solutions, Oracle WebLogic Server, Oracle Solaris 10, SPARC Enterprise M5000 and Sun SPARC Enterprise T5120 servers, Sun ZFS Storage Appliance

#### FOLLOWING SPARC

An important part of TEP's commitment to Oracle Solaris and SPARC-based servers has been Oracle's own commitment to SPARC, including the future SPARC roadmap and continued upgrade path. TEP is currently beta-testing the new SPARC T4-based servers and is impressed with the results.

"The SPARC T4 is really an incredible chip in performance, expandability, and capabilities," says Myers. "We've been testing it with Oracle E-Business Suite, running a nightly

## SPARC Engineered System

Designed as a universal platform for data center consolidation, Oracle's SPARC SuperCluster T4-4 is built on the new SPARC T4-4 server, which uses the new SPARC T4 processor. The SPARC SuperCluster T4-4 is a highly scalable system that can be used for the consolidation of multiple databases and applications, and for deploying multiple tiers of applications, database, and middleware.

"The SPARC SuperCluster is aimed at large, data-intensive and performance-intensive applications, spread across many clusters," says Chris Armes, vice president of engineering at Oracle.

"The SPARC SuperCluster makes it possible to integrate them all into one rack."

The integrated components of the SPARC SuperCluster T4-4 include

- Oracle's SPARC T4-4 servers
  - Oracle Exadata Storage Servers
  - Oracle's Sun ZFS Storage Appliances
  - QDR InfiniBand networking technology
  - the Oracle Solaris operating system
  - Oracle Solaris Cluster software
  - Oracle's Exalogic Elastic Cloud Software
- SPARC SuperCluster T4-4 combines capabilities of Oracle Exadata and Oracle Exalogic

systems, and it supports both database and application/cloud/middleware workloads, so organizations can deploy an entire multitier application on one system.

The result is a consolidated increase in performance and a smaller footprint.

"The SPARC SuperCluster provides an opportunity for massive consolidation and massive increase in performance delivered and supported by one vendor," says Armes. "You wheel it in, and it's plug-and-play. Migrate your existing applications and data across, and you're all set to go."

batch process. So far, our T4-based test system, a SPARC T4-2 server, is outperforming our [SPARC Enterprise] M5000 nicely. We're pretty impressed with it."

Another advantage that Myers sees in the SPARC T4 chip is its improved single-thread performance capabilities.

"Our T3-based systems worked great for Web servers, but the T4 chip has improved single-threaded performance so we're running databases on T4-based systems, and they're performing every bit as well, if not better, than our current M5000 systems," says Myers.

Eventually, Myers sees T4-based systems taking over the solutions running on the company's SPARC Enterprise M5000 servers. "It's a more energy-efficient chip, and it can handle more processes," says Myers. "It's a revolutionary design with on-chip cryptographic acceleration and built-in 10 gigabit Ethernet, which improves performance, throughput, and I/O."

The company is also looking forward to Oracle Solaris 11, with all its new features. "There's so much good stuff baked into Oracle Solaris 11," says Myers. "We're really excited about moving to it."

"One thing that we've really appreciated about SPARC and Oracle Solaris is that over the course of all the upgrades and server switchovers we've done since 1998, we've only needed about an hour of planned downtime for each upgrade," says Myers. "We've never had an issue with the application binary compatibility, thanks to the

Oracle Solaris Guarantee Program. We've never had a single issue migrating from Solaris 2.6 through Oracle Solaris 10 with different SPARC chipsets. Everything has just gone flawlessly."

"Oracle's binary compatibility guarantee is a huge money saver for us or anyone that has to upgrade applications or systems," Myers adds. "It's just huge to be able to upgrade without worrying about your application, so we can do upgrades in about an hour of planned downtime."

According to Myers, Oracle Solaris 11 streamlines the patching process as well as adding fast reboot. "Oracle Solaris 11 allows us to do a fast reboot for new patches, and even if there's an issue it can fall back in a couple of minutes to the unpatched or previous version," he says.

Another important factor for Myers is the reliability that his SPARC-based systems deliver. "We maintain five-nines reliability, and that's without clustering," says Myers. "We're doing it with Oracle's Sun hardware and Oracle Solaris and our applications."

From TEP's perspective, Oracle's ability to deliver on its SPARC and Solaris roadmap is paying big dividends.

"I think Oracle's doing very well staying on their SPARC roadmap," says Myers. "In fact, I'd say [Oracle is] ahead of my expectations." ◀

**David A. Kelly** ([davidakelly.com](http://davidakelly.com)) is a business, technology, and travel writer who lives in West Newton, Massachusetts.

## The First Cloud OS

Oracle Solaris 11 is not only keeping pace with advancing hardware capabilities; it's also designed to deliver infrastructure as a service. The first cloud OS, Oracle Solaris 11 delivers built-in server, storage, and network virtualization to meet the security, performance, and scalability requirements of mission-critical deployments.

"The concept of the cloud is built into Oracle Solaris 11," says Chris Armes, vice president of engineering at Oracle. "Virtualization, for example, is built into the networking functionality, so that the networking stack is completely virtualized. Virtualization was added at the design stage, not as an afterthought."

For Oracle Solaris 11 users, the cloud features deliver the ability to support many users in a single, secure multitenant platform. "When you're sharing the same platform, you need an operating system that has security at its heart, with the ability to scale and provide a virtualized infrastructure for cloud environments," says Armes. "That's what Oracle Solaris 11 does."

## NEXT STEPS


**READ more about the SPARC roadmap**  
[bit.ly/zqqrJ](http://bit.ly/zqqrJ)

**SPARC SuperCluster T4-4**  
[bit.ly/xQtWJb](http://bit.ly/xQtWJb)

**Oracle Solaris 11**  
[oracle.com/us/products/servers-storage/solaris](http://oracle.com/us/products/servers-storage/solaris)

**Oracle Solaris Guarantee Program**  
[bit.ly/w5v2hF](http://bit.ly/w5v2hF)

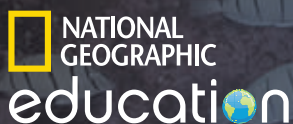
**Oracle Solaris Zones**  
[bit.ly/y5yP4B](http://bit.ly/y5yP4B)

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# A Better Breed

Monsanto develops better seeds for better crops  
with **Oracle Exadata** and the **Sun ZFS Storage Appliance**.

BY DAVID BAUM

High-capacity and high-performance engineered information systems enable organizations to handle more data and process it faster than ever before. What engineered systems contribute to a company and its customers varies by industry—from spotting and taking advantage of sales trends in retail and bringing competitive products to market more quickly in financial services to cutting batch-processing time in chemicals and increasing on-time delivery in consumer goods. For one agricultural company, engineered systems are helping to feed the planet.

Monsanto Company is a leading global provider of agricultural products that improve farm productivity and food quality. The company's charter is to improve farmers' lives by helping them produce more from their land while conserving natural resources. Through innovative breeding and biotechnology techniques, Monsanto produces seeds that—among other things—help farmers to reduce agricultural inputs such as pesticides and improve crop yields.



Todd Eyrick, business alignment and strategy lead in Monsanto's Global Infrastructure organization, and Wendy Poulsen, R&D IT strategy and operations lead at Monsanto, rely on Oracle Exadata Database Machines to meet the company's speed, capacity, and throughput requirements.

Advanced breeding is an information-intensive activity. During the critical harvest cycle, high volumes of data collected from the field must be processed very quickly so scientists in Monsanto's R&D organization can make decisions about which potential products should advance to the next stage of testing. Researchers must analyze huge quantities of data to determine which potential products have the right combinations of traits for combating insects, controlling weeds, and increasing yield—not to mention considerations about the quality, flavor, and nutrition of the resulting harvest.

"September to November is a critical time frame for us," says Wendy Poulsen, R&D IT strategy and operations lead at Monsanto. "We gather a tremendous amount of information from the field that must be analyzed and turned back around to breeders very quickly so they can determine which seeds to ship to winter nurseries. The speed by which that analysis can be done is extremely critical to us, but it has become increasingly challenging over time, as more information is available from which to make decisions."

In addition to greater data processing speed, Monsanto's R&D team needed more data storage capacity.

"When we plan for the harvest season, we look at what we expect to see and then we plan for two or three times that load on our information systems," explains Todd Eyrick, business alignment and strategy lead in Monsanto's Global Infrastructure organization. "There are multiple factors, such as weather, over which we have no control that can cause our database management

systems to be under much greater load than we would have otherwise planned for."

To satisfy its need for greater speed, capacity, and throughput, at the end of 2010 Monsanto purchased three full-rack Oracle Exadata Database Machines. These engineered systems are now divided into a production environment, a preproduction environment, and a development/testing environment.

In July 2011, Monsanto consolidated four major R&D databases and 75 percent of its data to the Oracle Exadata platform. During the next phase of the project, wrapping up in early 2012, Monsanto will migrate 18 smaller databases that represent the remaining 25 percent of the data.

Monsanto used Oracle Consulting to supplement its internal resources during the implementation, and the company is currently engaged with Oracle Consulting Managed Services to support the Oracle Exadata environment. "We faced a very tight timeline to get

this new database environment up in time for harvest," says Poulsen. "Oracle partnered with us and brought in the right people when issues arose, which reduced the implementation risks throughout the project.

The responsiveness Oracle demonstrated showed they cared about our business and was one of the key reasons for our success."

The Oracle engineered systems have now been running in production during one complete harvest cycle. "We definitely have experienced a very smooth, highly available system during the past several months," says Eyrick.

#### SNAPSHOT

##### Monsanto Company

[monsanto.com](http://monsanto.com)

**Industry:** Agriculture

**Employees:** 22,000

**Revenue:** US\$11.8 billion in FY 2011

**Oracle products and services:** Exadata Database Machine X2-2, Sun ZFS Storage Appliance, Oracle Active Data Guard, Oracle WebLogic Server, Oracle Real Application Clusters, Oracle Service Bus, Oracle Coherence, Oracle Consulting Managed Services

## “Having an integrated, single-vendor solution was very appealing to us.”

—Todd Eyrick, Business Alignment and Strategy Lead, Monsanto

### FASTER GROWTH AROUND THE WORLD

One of Monsanto’s goals when it adopted Oracle Exadata was to minimize the turnaround time for making the raw field data available to researchers anywhere in the world. According to Poulsen, some of Monsanto’s researchers used to wait as long as 36 hours for the results from field experiments. Now data that arrives by 6 p.m. at Monsanto’s U.S. data center is available for researchers in Europe at the start of their next workday. “We’ve cut the turnaround time in half,” she notes.

Postharvest data analysis helps researchers determine which products to advance. Thanks to the increased speed of SQL queries on the Oracle Exadata platform, researchers can now run multiple queries with different data sets, which allows them to conduct more thorough analyses and make better decisions. Tests on Monsanto’s Oracle Exadata platform revealed significant performance gains for 90 to 95 percent of SQL queries.

In working with Monsanto to understand its business process and find opportunities to speed the breeding harvest cycle, Oracle recommended that Monsanto use Oracle Coherence to speed up data-processing performance by caching frequently used data. Oracle Coherence is an in-memory distributed data grid solution for clustered applications and application servers—and an important addition to Monsanto’s Oracle WebLogic Server environment.

“Oracle took the time to understand our business process so they could recommend how we can streamline the database activities,” says Eyrick. “They continually asked, ‘What else can we bring to the table that will help Monsanto speed up this harvest process?’”

One key benefit of using the Oracle Exadata system is its inherent redundancy, which permits administrators to manage, patch, and upgrade Oracle Exadata components without incurring an outage.

#### Engineered Storage for Engineered Systems

Oracle’s Sun ZFS Storage Appliance delivers enterprise-class network-attached storage (NAS) for enterprise applications, virtualization, cloud, storage consolidation, and data protection.

The Sun ZFS Storage Appliance combines cloud-ready software and hardware, designed to enable customers to start small and grow into a next-generation cloud-computing infrastructure. The performance and storage capacity of the Sun ZFS Storage Appliance make it a high-performance, cost-effective solution for the consolidation of multiple storage devices. The Sun ZFS Storage Appliance also provides secondary storage for data protection.

“The Sun ZFS Storage Appliance works with the Oracle Exadata Database Machine for data protection purposes. The Sun ZFS Storage Appliance is the only NAS appliance that can connect to the Oracle Exadata InfiniBand network,” says Michael Brown, director of storage product marketing at Oracle.

Sun ZFS Storage Appliance technology is also integrated with Oracle SPARC SuperCluster and Oracle Exalogic Elastic Cloud engineered systems to provide robust application and data storage.

“As our business becomes more global, we can’t afford even brief outages,” says Poulsen. “The built-in redundancy within Oracle Exadata has insulated users, so if there is an issue, it has no impact on the harvest. Routine system administration is a lot easier as well, because the Oracle Exadata system integrates the storage platform with the database environment.”

### STORING THE GRAIN

While improving its information capacity and performance with Oracle Exadata, Monsanto has also been improving its disaster recovery and backup capabilities by implementing Oracle’s Sun ZFS Storage Appliance. Because of the large amount of information stored, the company realized that the overall volume of data would make it difficult to perform complete backup and recovery operations in a reasonable time frame. Eyrick and his team deployed the Sun ZFS Storage Appliance to create a more reliable hot-backup environment that permits system administrators to restore data from disk very rapidly.

“We were no longer comfortable with our ability to recover the entire database within a day’s time,” Eyrick admits. “Now, with the Sun ZFS Storage Appliance, if we have any type of data corruption issue, we can resolve it very quickly. ZFS provides a more accessible, faster solution.”

### NEXT SEASON

When asked for words of wisdom to share with other companies considering Oracle engineered system implementations, Eyrick doesn’t mince words.

“Having an integrated, single-vendor solution was very appealing to us,” says Eyrick. “The Oracle Exadata systems contain Oracle hardware, Oracle software, and Oracle database technology, all integrated into a cohesive system. Working with a single vendor has made it a lot easier to resolve issues. There’s no question about responsibility or ownership if something goes wrong.”

Beyond the technology and support, getting the right people involved in deploying Oracle engineered systems is also key.

“Having Oracle implement its engineered systems and support them through the first harvest has worked out exceedingly well,” Eyrick concludes. “Whether or not you plan to ultimately support this type of environment internally, it’s a great idea to engage Oracle to get started. Their consultants have a direct line to all the right technical resources, and they can turn things around very quickly if you run into problems.” ◀

**David Baum** (david@dbaumcomm.com) is a freelance business writer based in Santa Barbara, California.

### NEXT STEPS

#### LEARN more about Oracle Exadata

[oracle.com/exadata](http://oracle.com/exadata)

#### the Sun ZFS Storage Appliance

[oracle.com/us/products/servers-storage/storage/nas](http://oracle.com/us/products/servers-storage/storage/nas)



# THE RIGHT FIT

CallSource turns to **Oracle Database Appliance** for a simple, reliable, and affordable system upgrade.

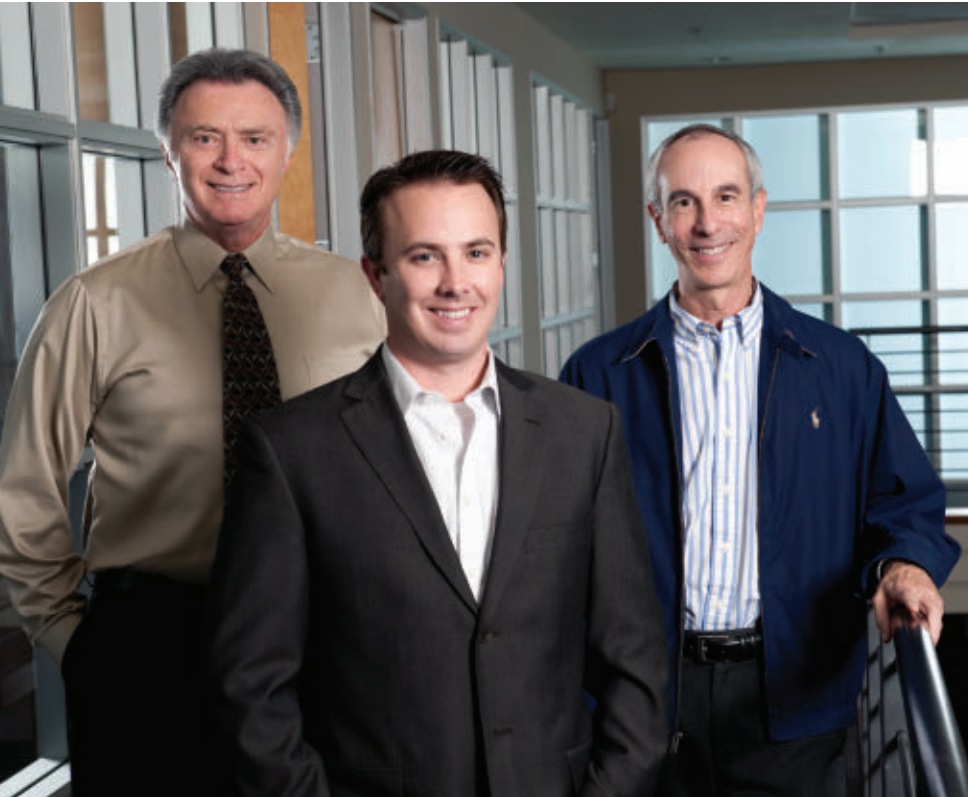
BY PHILIP J. GILL

**U**pgrading server, storage, and networking hardware to meet growing demands can be a complex, uncertain, and expensive process in a business of any size. In recent years, large businesses have been able to simplify these upgrades by moving to engineered systems such as Oracle Exadata, and they've realized significant improvements in system performance. Until recently, the initial cost and extreme compute and storage capacity of available engineered systems did not meet the needs of most midsize organizations. But with the release of Oracle Database Appliance, midsize companies now have an engineered systems option to fit their businesses.



## “With the engineering behind Oracle Database Appliance, the grunt work has already been done for you.”

—Jason Scinocca, Chief Technology Officer, CallSource



Oracle Database Appliance is perfect for a company with a database in the 1- to 2-terabyte range, says CallSource Chief Technology Officer Jason Scinocca (center), pictured here with CallSource CEO Jerry Feldman (left) and President Elliott Lieboff.

### WELL-TAILORED

CallSource, the world's largest call-tracking company, recently faced the decision about how to best upgrade its IT infrastructure. With more than 200 employees and US\$50 million in annual revenue, CallSource is the epitome of a thriving midsize company. On any given day, the Westlake Village, California, firm tracks up to 2 million ads for 300,000 clients in the United States and Canada. The company developed the first patented call-tracking technology 20 years ago and has since expanded its product portfolio to call recording, call analysis, marketing analysis, performance measurement, training, and other services.

Last fall CallSource realized that the company's IT infrastructure, which supports the company's core mission-critical Oracle Database 11g applications, needed an upgrade. "It was time," says CallSource Chief Technology Officer Jason Scinocca. "The servers were two-plus years old and couldn't handle the current load or future growth."

In the past, Scinocca says, such an overhaul would have been costly, complex, and time-consuming. Each component of the new system—servers, database, operating system, storage, networking,

and so on—would have to be researched, tested for compatibility, purchased, and stitched together, and then tested and retested before being put into production. Most daunting of all was the cost: according to Scinocca's own research, a system with all the features that CallSource needed—high performance, high availability, redundancy, large main memory, terabytes of storage, expansion capability, and more—would cost hundreds of thousands of dollars.

"Why should I need to spend more than US\$200,000, three months' worth of research, and two months' worth of configuring and testing?" says Scinocca. "That makes the project time six months before we even do a migration, and I've spent a great deal of time and allocated a lot of resources to get there—and we're not in production yet."

So Scinocca went looking for a simpler, faster, more affordable option. Because CallSource is an Oracle Database 11g shop, he didn't have to look far. Scinocca opted for Oracle Database Appliance, which combines hardware, software, storage, and networking in a single pretested unit.

The combination of components would also deliver multiple benefits. "Oracle Database Appliance is a complete integrated

hardware and software system," says Scinocca. "I can write one much smaller check to Oracle, and I can sit around for only a couple of hours installing Oracle Database Appliance. If you were in my place," he adds rhetorically, "which way would you want to go?"

### IDEAL SERVER

Oracle Database Appliance is a new member of Oracle's growing family of engineered systems, which includes Oracle Exadata, Oracle Exalogic, and Oracle Exalytics. Introduced in September 2011, Oracle Database Appliance was designed from the ground up for midsize firms such as CallSource, says Judson Althoff, senior vice president of Worldwide Alliances and Channels at Oracle. "We built Oracle Database Appliance to be the ideal server for customers who are just under the threshold of considering the smallest form factor of our Oracle Exadata line," Althoff adds.

"Oracle Database Appliance targets a broad customer base in which simplicity, ease of use, and little or lights-out management are of critical concern," Althoff explains. "It provides customers with a complete stack, including the operating environment, the manage-

ment software, the database software, and the hardware, and it's all been designed from the bottom up to provide the best Oracle Database infrastructure."

CallSource's Scinocca agrees that Oracle Database Appliance is the perfect database appliance for a company with a database in the 1- to 2-terabyte range, which he calls "the typical medium-sized firm." Currently, CallSource's Oracle Database 11g instance is 1.5 terabytes, but Oracle Database Appliance gives it the room it needs to grow.

The CallSource database stores the information collected from its clients' calls, including national, regional, state, city, zip code, and area codes. CallSource then analyzes that information to help clients maximize the return on advertising expenditures in any number of channels, including print, billboards, Yellow Pages, direct mail, and the Web.

### NEVER TOO BIG

The size of the database in use is a key factor in choosing the right hardware for a database deployment, but Oracle Database Appliance delivers flexibility that lets midsize organizations such as CallSource deploy the right-sized solution.

A unique feature of Oracle Database Appliance is its pay-as-you-grow licensing, which lets users pay for only the number of processor cores they need and grow their processing as demand increases. Scinocca says he likes the flexibility this approach provides—to start small and expand, paying only for what the company needs.

"When we install an Oracle Database Appliance in our backup data center in Chicago [Illinois] later this year, we're planning on starting small, with probably four cores to start," he adds. (Four cores is the base Oracle Database Appliance configuration.)

### OUT-OF-THE-BOX INSTALLATION

A low cost is the most obvious initial benefit of Oracle Database Appliance, but there are others, says Scinocca. First is the simplicity of installation. A system built the old way, from assembled parts from different vendors, would take three to six months and require

#### SNAPSHOT

##### CallSource

[callsource.com](http://callsource.com)

**Headquarters:** Westlake Village, California

**Industry:** Telecom services

**Revenue:** US\$50 million (estimated for 2011)

**Employees:** More than 200

**Oracle products:** Oracle Database Appliance

**Partner:** Cloud Creek Systems

lots of staff time and expensive outside consultants. In contrast, CallSource purchased its Oracle Database Appliance through Cloud Creek Systems, an Oracle partner also based in Westlake Village. After delivery, Scinocca says, "the system was up and running in two-and-a-half hours, not including data transfer time."

Out of the box and without any tuning, Oracle Database Appliance delivers a 300 percent performance boost, Scinocca says. "I haven't done one thing to optimize the system."

"My clients used to call up and complain that they couldn't run their previous 2010 year performance reports on the old system," Scinocca continues. "Now they can run their much larger 2011 performance reports in less than a minute with zero software changes."

Oracle Database Appliance also takes less space and consumes less power. For CallSource, Oracle Database Appliance replaced multiple components, including a 25 U, three-node rackmount server, a fiber optics networking switch, and a clustered storage array. Oracle Database Appliance is a 4 U, two-node rackmount configuration with dual six-core Intel Xeon processors, 96 gigabytes of memory, and 3 terabytes of storage, all built into a single unit. And at CallSource, that single unit uses 7 amps of power compared to 24 amps used by the systems it replaced.


Most importantly, ongoing maintenance of the new engineered system is much easier. "With a typical patch, you have to make sure your operating system is compatible, your kernel is compatible, and your drivers are compatible," Scinocca explains. "And you're going to have to check and maintain every piece of software, and you have to make sure it's not impacting your current drivers."

"With the engineering behind Oracle Database Appliance, the grunt work has already been done for you," he adds. "Because Oracle Database Appliance is an engineered system, you know that the hardware and software have been tested together already before you install a patch, and you know it will work."

As best-of-breed systems from multiple vendors become more complex, costly, and time-consuming to set up, Scinocca sees engineered systems as the future for CallSource. "I believe other parts of my business could benefit from using engineered systems such as Oracle Database Appliance," he says. "That's why I'm looking into what other Oracle systems could do for CallSource." ◀

**Philip Gill** is a San Diego, California-based freelance writer and editor.

### NEXT STEPS

 **WATCH the Oracle Database Appliance Exceeds Customer Expectations at CallSource video (with Jason Scinocca)**  
[bit.ly/xdq3kM](http://bit.ly/xdq3kM)

**LEARN more about Oracle Database Appliance**  
[oracle.com/us/products/database/database-appliance/overview](http://oracle.com/us/products/database/database-appliance/overview)

**GET answers (for Oracle partners)**  
Oracle Database Appliance Knowledge Zone  
[bit.ly/zilUiy](http://bit.ly/zilUiy)

#### The Future is Integrated and Open

Integrated, single-vendor systems such as Oracle Database Appliance aren't new; they've been around since mainframe systems bundled tightly controlled proprietary hardware and software.

But Oracle's engineered systems deliver single-vendor integration with a difference, says Judson Althoff, senior vice president of Worldwide Alliances and Channels at Oracle. "What we've done with Oracle Database Appliance is to give you the best of both worlds," explains Althoff. "You get all the benefits of having all the components tested by a single vendor, but this engineered system is built on industry-standard components."

If a user took Oracle Database Appliance apart, Althoff continues, what he or she would find are Intel x86 servers and the Oracle Linux operating system, both of which are open industry standards. "And then there's Oracle Database itself, which organizations large and small have adopted on a worldwide basis as a de facto database industry standard," says Althoff. "So, yes, it is an engineered system—but at the same time it is, in fact, open, so an organization could later run its Oracle database on other x86 hardware. There's no vendor lock-in."

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ORACLE JDEVELOPER and ORACLE APPLICATION DEVELOPMENT FRAMEWORK

# A Template with Behavior

Use the Oracle ADF Dynamic Tabs UI Shell template to build rich internet applications.

Partial page submit and instant page refresh via Ajax-enabled UI components don't, alone, guarantee a rich-client Web experience. A consistent page layout and predictable page behavior are just as important to application usability. The Dynamic Tabs UI Shell template in Oracle JDeveloper 11g helps developers give their Oracle Application Development Framework (Oracle ADF) application pages a consistent look that meets high standards for usability. The template includes prewired behavior such as programmatic tab opening and closing, tab navigation, and tracking of the transaction state for content displayed in a tab. Users gain a rich-client experience because the locations and behaviors of the application's prominent features are consistent and predictable.

This column provides an overview of the Dynamic Tabs UI Shell template and illustrates its key concepts through a sample application. Although the sample application doesn't implement all of the template's public APIs, it gives you a starting point for exploring how and when to use it. The column then delves deeply into the template's architecture to describe its full functionality and help inform your Oracle ADF programming practices.

To begin, download the sample application at [bit.ly/yvE8ZD](http://bit.ly/yvE8ZD) and unzip the file to a local folder on your computer. Ensure that you're using the studio edition of Oracle JDeveloper 11g Release 2 (11.1.2.1) or later, available as a free download on Oracle Technology Network.

A ReadMe.doc file with setup instructions for the `adf_summit` database schema used in the sample is located in the `dynamicTabShellSample/Schema` folder in the directory where you unzipped the sample application. After installing the `adf_summit` schema, open the `SummitADFUIShell.jws` workspace, located in the application

directory's `dynamicTabShellSample/SummitADFUIShell` folder in Oracle JDeveloper. Adjust the properties of the connection named `summit_adf` in the Application Resources zone of the Application Navigator until you can successfully test a connection to the `summit_adf` database schema, using `summit_adf` as both the username and the password.

In the Application Navigator, expand the `ViewController` project node and then the `Web Content -> temp -> WEB-INF` folder. Double-click the `adfc-config.xml` file to launch the Oracle ADF task flow visual

diagram. In the diagram, right-click the `Index` view activity and choose `Run` to launch the application in a browser.

If you are running an application in the integrated Oracle WebLogic Server for the first time, the `Configure Default Domain` dialog box will appear. Enter an administrative username and password of your choice for your domain, and click `OK`.

### SAMPLE APPLICATION OVERVIEW

The sample application manages customer and order information for a fictional seller of wholesale sporting goods. The applica-



Figure 1: Sample application start screen

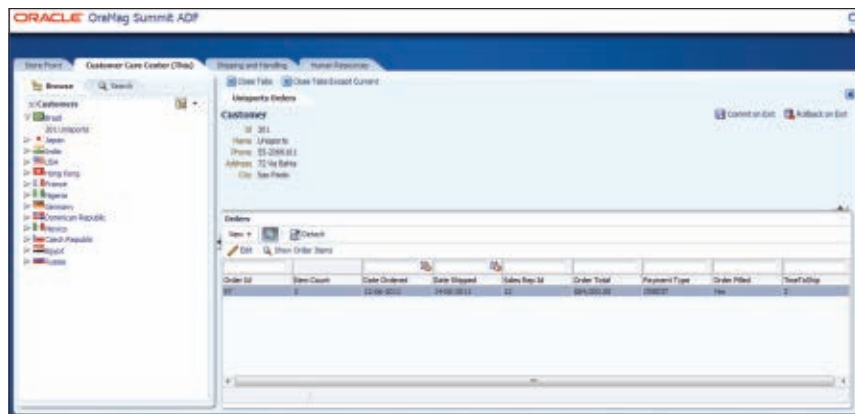


Figure 2: Customer Care Center view

tion launches with the index page shown in Figure 1. Click the **Customer Care Center** link or tab to start exploring the application's functionality. (**Customer Care Center** is the only option enabled; the other links and tabs are placeholders included for illustrative purposes only.)

The **Customer Care Center** module, shown in Figure 2, enables users to browse and edit customers and customer orders. At runtime, the contents of the page area that initially shows the welcome image are dynamically replaced with customer or order data that the user selects via a link, a tab, or a context menu.

### REUSABLE PAGE FLOWS

Reusable page flows—known as Oracle ADF *task flows*—are at the heart of the Dynamic Tabs UI Shell template. *Bounded* task flows enable you to define reusable page navigation flows that model a specific business use case—such as the create, read, update, and delete (CRUD) operation for a customer or an order entity.

The sample application uses three bounded task flows to handle the customer and order CRUD use cases:

- **CustomerOrdersCRUD-btf** enables users to browse and edit the orders belonging to a selected customer.
- **CustomersCRUD-btf** enables users to edit customer accounts and create new customers.
- **OrderItemsCRUD-btf** is referenced from the **CustomerOrdersCRUD-btf** task flow to edit the line items for a customer order.

Bounded task flows can be developed based on *task flow templates*, which you define visually and declaratively in Oracle JDeveloper and use by either direct reference or copy. Task flow templates expose the same set of properties as bounded task flows. For input parameter and navigation flow consistency, the sample application's bounded task flows were developed based on a reusable common task flow template. The task flow template contains the configuration for a managed bean that is referenced by predefined task flow input parameters. One of the template's input parameters is `tabContext`, which prepares task flows that are based on the task flow template to be used in the context of the Dynamic Tabs UI

Shell template. Defining a managed bean in the task flow template to hold input parameter values enables you to expose an easy-to-discover, easy-to-use API for predefined input parameters such as `tabContext`.

The **SummitADFUIShell** application does not contain the task flow source code, referencing it instead from Oracle ADF libraries. The task flow source files reside in the **dynamicTabShellSample** -> **ReusableModules** -> **BoundedTaskFlows** folder, located under the main application directory. The **BoundedTaskFlows** folder also contains **BoundedTaskFlows.jws**, a workspace you can open and explore in Oracle JDeveloper.

### DISPLAYING TASK FLOWS ON A PAGE

The Dynamic Tabs UI Shell template supports applications that enable the type of multitasking that call center agents must do, such as looking at the data of the customer currently on the phone while bringing up the data of the next customer in the queue. For this purpose, the Dynamic Tabs UI Shell template leverages Oracle ADF *regions*, which enable bounded task flows to run isolated in specific areas of a page.

Executing bounded task flows in an Oracle ADF region requires development of task flows with page fragments that render the views—a configuration option you specify in the task flow creation dialog box. The Dynamic Tabs UI Shell template then exposes APIs that enable you to manage these regions programmatically within UI Shell tabs.

### LAYING OUT CONTENT IN THE DYNAMIC TABS UI SHELL TEMPLATE

The Dynamic Tabs UI Shell template is applied to top-level pages in an Oracle ADF Faces application. In Oracle JDeveloper 11g Release 2, a top-level page is a JavaServer Faces (JSF) 2.0 Facelets document that can be run standalone to display in a browser. You use the Dynamic Tabs UI Shell template to partition the main application page (the index page) into different functional areas, such as customer care, storefront, and shipping. Each functional area has its own top-level page that also references the Dynamic Tabs UI Shell template. With this modular architecture, you can easily assemble top-level pages into a single application.

As shown in Figure 3, the template layout is broadly organized into a header area, a main area, and a footer area.

The **header area** contains the page logo, a branding title, and an area for placing global navigation links and search. You configure the logo and the title through template properties exposed in the Oracle JDeveloper Property Inspector feature. The link and search area are *facets* into which you can drag and drop Oracle ADF Faces components. These facets are simply placeholders for grouping components in a specific area of a parent component, such as a template. Facets that are left empty do not appear in the rendered page at runtime.

The template's **main area** supports global and local navigation. Global navigation—that is, switching among top-level pages—is performed by global tabs (represented by the

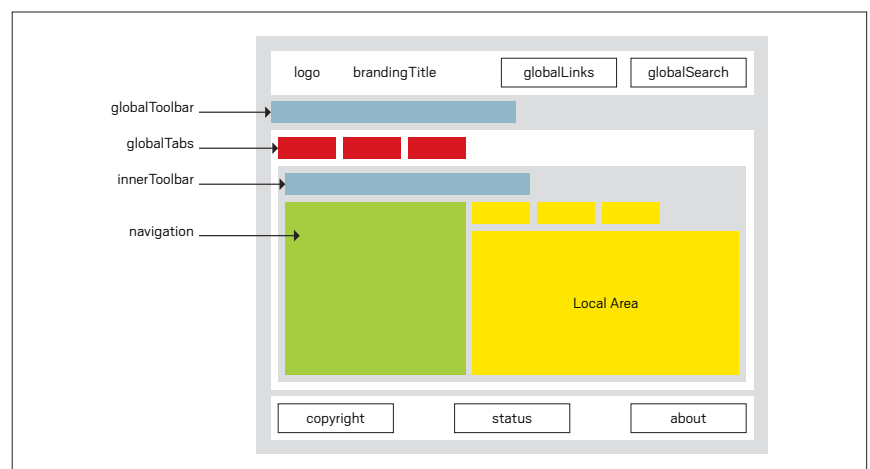


Figure 3: Dynamic Tabs UI Shell template design

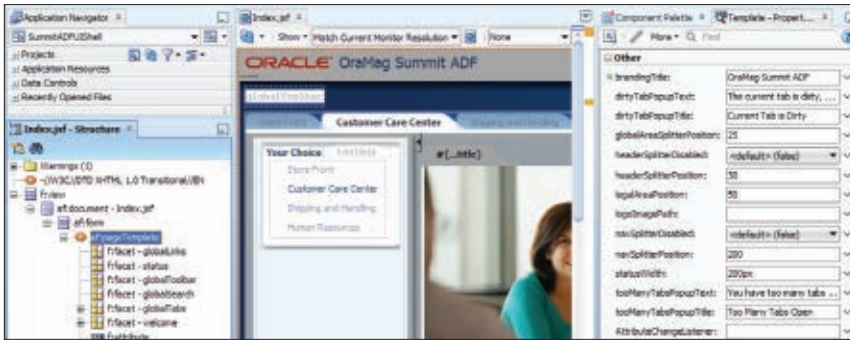


Figure 4: Visual editor, Structure window, and Property Inspector view of the sample application's Index.jsf page

red rectangles in Figure 3). Local navigation (content added to the green area in Figure 3) launches or switches among task flows exposed on tabs in the template's local area (the yellow rectangle in Figure 3).

To define global navigation, you add the Oracle ADF Faces `af:navigationPane` component to the `globalToolBar` facet and add `af:commandNavigationItem` components as child components to handle the navigation. Alternatively, you can use an XML menu model that you can create from page navigation defined in the `adfc-config.xml` file to dynamically render the `af:commandNavigationItem` instances.

The sample application has `af:tree` and `af:table` components added to the `navigation` facet representing the navigation area (green in Figure 3). The navigation facet enables users to navigate content exposed in the local area. The local area of the template is managed by the Dynamic Tabs UI Shell API to conditionally display, hide, and navigate content exposed in bounded task flows. Each new task flow dynamically opens in a tab panel. An inner toolbar can be used to manage opened tabs—to, for example, close all tabs or all but the selected tab, as implemented in the sample application.

The footer area consists of three facets you can use for adding copyright, status, and descriptive information.

### ADDING THE DYNAMIC TABS UI SHELL TEMPLATE TO A PAGE

To create a new JSF page based on the Dynamic Tabs UI Shell template, open and select a `ViewController` project and then choose `File -> New`. In the New Gallery dialog

box, create a new JSF page, using the `Page` entry of the `Web Tier -> JSF/Facelets` option. In the Create JSF Page dialog box, select the `ADF Page Template` option, choose `Oracle Dynamic Tabs Shell`, and then click `OK`.

The new page opens in the visual page editor, showing the template facets and default labels. You can use the Oracle JDeveloper Structure window, shown in Figure 4, to add components to the template facets easily by dragging them there. To edit the template logo and default labels and messages, select the `af:pageTemplate` node in the Structure window and open the Oracle Property Inspector (`Ctrl + Shift + I`).

When you use the Dynamic Tabs UI Shell template, Oracle JDeveloper automatically updates the project libraries' dependencies with a reference to the Oracle page template library. To see this, open the `ViewController` project properties by double-clicking the `Projects` node. In the Project Properties dialog box, select the `Libraries and Classpath` node and scroll through the list of configured libraries to locate the `Oracle Page Templates` entry. Select `Oracle Page Templates`, and click the `View` button to see the reference to the `oracle-page-templates.jar` file, which is an Oracle ADF library. This library contains—along with the page template itself—the Java classes and task flow configuration that provide the dynamic functionality. Click `Cancel` to close the dialog box.

### DYNAMIC TABS UI SHELL TEMPLATE ARCHITECTURE

By taking a deeper look at the Dynamic Tabs UI Shell template architecture, you'll better understand how the template works and

how it should be used and also learn some good Oracle ADF programming practices.

The Dynamic Tabs UI Shell template architecture consists of a `JSPX` document, a `JSF` page fragment, Java objects, Oracle ADF bindings, and task flow configuration files, as illustrated in Figure 5.

The `dynamicTabShell.jspx` document is an Oracle ADF Faces page template—located in the Dynamic UI Tab Shell library Java archive (JAR) file—that defines the layout and facets. The Dynamic Tabs UI Shell template does not yet expose extension hooks enabling application developers to decorate the template's default or customize the look. If you do require changes to the template, you can download and edit the template's source code, available on Oracle Technology Network, and make it the basis of a custom template you then maintain.

In Oracle ADF, page templates can have an associated Oracle ADF binding file in which the template can expose Oracle ADF bound data content to the pages referencing it. The Dynamic Tabs UI Shell template uses the `dynamicTabShellDefinition.xml` Oracle ADF binding file, located in the tab shell library JAR file, to configure task flow bindings as placeholders for as many as 15 concurrent task flows that a template consumer page can reference and open in the local content area. Any attempt to open more than 15 task flows will cause an exception that the template will handle by displaying a preconfigured dialog box telling the user to close currently open tabs before new tabs can be opened in the local area.

Note that both the `dynamicTabShell.jspx` and `dynamicTabShellDefinition.xml` files are internal and not accessible for modification.

An Oracle ADF `DataBindings.cpx` registry file is also deployed with the template to map the template `JSPX` document (`JSPX`) with its Oracle ADF binding file, which is usually referred to as the `PageDef` file in Oracle ADF.

The `TabContext.java` class defines the public API of the Dynamic Tabs UI Shell template. Application developers—and the template, internally—use the public API to control the template behavior. Functionality exposed by the `TabContext` API includes

- `Add tab`. Calling this API opens the referenced bounded task flow in a new dynamic



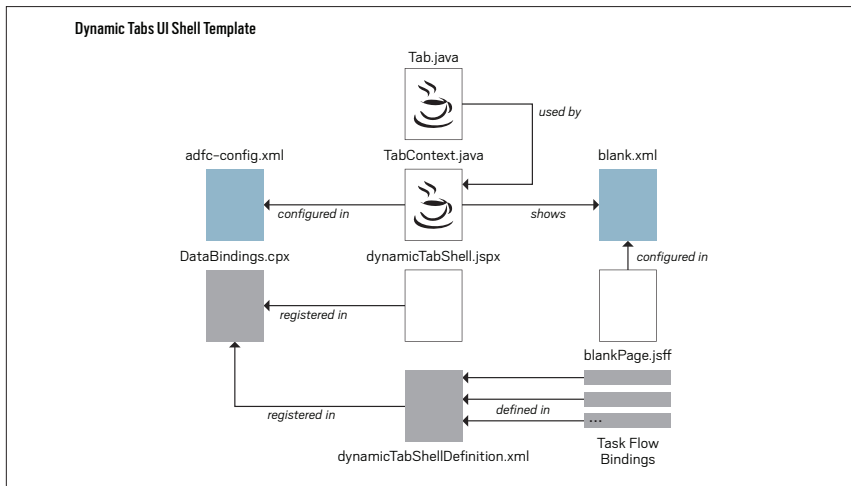


Figure 5: Dynamic Tabs UI Shell template architecture

tab within the local content area of the template. This option is best suited for isolated task flows.

- **Add or select a tab.** Before opening a task flow in a new tab, the system checks whether this task flow already exists on a tab. If it does, the existing tab status will be changed to *selected and displayed*. This option is best suited for bounded task flows that share their Oracle ADF data-control instance with the parent page.
- **Access template UI components.** The TabContext API exposes methods for accessing components that are privately used by the template, such as the inner tool bar, the global navigation tab container, the template content area, and the dialog box used to show system messages.
- **Access the tab transaction state.** Tabs can be marked as having their content changed, in which case they are referred to as *dirty*. A warning dialog box will appear if users or the application try to close these tabs. A tab's dirty state can be checked and manipulated with the TabContext API.

Within the Dynamic Tabs UI Shell template, the TabContext class is configured as a managed bean, and the Expression Language (EL) expression `#{viewScope.tabContext}` is used to reference it from Oracle ADF Faces components on the page, the Oracle ADF binding, or task flow method call activities.

Because EL in Oracle JDeveloper 11g does not allow you to pass method arguments, you might need to use Java code exposed

from a custom managed bean to access TabContext, using `TabContext.getCurrentInstance()`;

Whether necessary or not, it is a good practice to access the TabContext class from a custom managed bean, because doing so builds an abstraction layer between the application and the Dynamic Tabs UI Shell template behavior. Avoiding direct access to the TabContext objects enables you to define more-specialized APIs that make application EL references independent from future changes in the template's public API.

The managed bean configuration of the TabContext class is referenced in the tabContext input parameter definition added to the 15 task flow bindings that the `dynamicTabShellDefinition.xml` file holds as placeholders for the task flows the template launches dynamically at runtime. For task flows used in the context of the Dynamic Tabs UI Shell template to reference the TabContext class, each task flow must expose a tabContext input parameter. The Dynamic Tabs UI Shell template uses the tabContext input parameter to inject a reference to its TabContext managed bean instance into each opened task flow. Using the injected reference, any called task flow can control the template behavior—to close or open tabs, for example.

As an Oracle ADF developer, you should adopt this context injection approach as a solution for your own inter-region communication requirements. The

CustomerOrdersCRUD-btf task flow in the `BoundedTaskFlows.jws` workspace accompanying this sample, for example, uses the tabContext reference to close the tab displaying the task flow upon rollback and commit—which also is when the task flow is exited. In addition, when data changes are performed within a task flow, the tab's dirty state is changed to indicate to the template that the tab title needs to be shown in italics.

The Tab class in the Dynamic Tabs UI Shell template architecture is not considered a public API. Rather, it is used by and exposed through the TabContext class. The Tab class represents an instance of a tab in the local content area.

The blank.xml configuration file in the Dynamic Tabs UI Shell template architecture shown in Figure 5 defines an empty page that is always displayed when no tab is open within the local template content.

## CONCLUSION

The Dynamic Tabs UI Shell template provided in Oracle JDeveloper 11g enables developers to write rich internet applications with consistent page layouts and predictable behavior. In addition, the template promotes an application design based on Oracle ADF bounded task flows that unleashes the real power of Oracle ADF application development, setting the stage for code reuse, team development, modular application development, and increased developer productivity. ◀

**Frank Nimphius** is a senior principal product manager for Oracle JDeveloper and Oracle Application Development Framework.


## NEXT STEPS

### READ more about Oracle ADF

Dynamic Tabs UI Shell Template Functional UI Pattern  
[bit.ly/y9bdMn](http://bit.ly/y9bdMn)

ADF Region Interaction Functional Pattern  
[bit.ly/Azwx4X](http://bit.ly/Azwx4X)

Warning on Unsaved Changes Functional UI Pattern  
[bit.ly/AmfWLg](http://bit.ly/AmfWLg)

 **DOWNLOAD** the sample application for this article  
[bit.ly/yvE8ZD](http://bit.ly/yvE8ZD)

ORACLE BUSINESS INTELLIGENCE MOBILE

# On the Road with BI

Oracle Business Intelligence Mobile gives your iOS device the business.

In addition to accessing dashboards, analyses, and scorecards through Web browsers on laptop and desktop computers, many users of Oracle Business Intelligence solutions now want to access their BI content on the go—on smartphones and tablet devices. Oracle Business Intelligence Mobile, part of Oracle Business Intelligence Foundation Suite, provides the ability to deliver analyses, dashboards, alerts, and other BI content directly to mobile devices, enabling users to view and then take action on BI insights wherever they are.

Built on Oracle Business Intelligence Enterprise Edition 11g Release 1 (11.1.1.5), Oracle Business Intelligence Mobile delivers BI content to mobile devices such as the Apple iPad, iPhone, and iPod touch. Oracle Business Intelligence analyses and dashboards do not have to be specifically formatted for mobile use, and no additional setup is required for your server installation before users can start accessing their data on the move. In this article, I show how you can configure your iPad and iPhone to access mobile BI content, and I access data and analysis from the Oracle Business Intelligence Enterprise Edition 11g sample application (deployed via Oracle VM VirtualBox), available for download on Oracle Technology Network ([bit.ly/wZlptB](http://bit.ly/wZlptB)).

## CONFIGURING YOUR MOBILE DEVICE

Oracle Business Intelligence Mobile is currently available for mobile devices running Apple iOS, such as the Apple iPad and iPhone. To access BI information through your iOS mobile device, first download the Oracle Business Intelligence Mobile app from the Apple App Store to your iOS device and install it, and then create the connection to your organization's Oracle Business Intelligence Enterprise Edition 11g sample application installation or the product's sample application deployed via Oracle VM VirtualBox.

You do not need to specially configure your BI installation to enable mobile access, but you must ensure that Oracle Business Intelligence Presentation Services is accessible to your mobile device (typically via `http://[server_name]:9704/analytics` or `http://[server_name]`). If your BI installation is behind a firewall, you can configure your iOS device to connect first, using a virtual private network, to your company network.

To create a connection with Oracle Business Intelligence Mobile on an iPad, follow these steps:

1. Start the Oracle Business Intelligence Mobile app, and if it is the first time you are using it, tap **Accept** to accept the end user license agreement.
2. The app then displays the list of available Oracle Business Intelligence servers. The first time you use the app, tap **+** (next to **Add Server**) to add your server to the list.
3. In the Server Settings dialog box, enter the following details:
  - Name:** The name, such as `SampleApp`, that you will assign to this server.
  - Host:** The hostname or IP address, such as `192.168.1.30`, for the server.
  - Port:** The port number for the server. This should typically be set to `7001` or `9704` if you have not enabled Secure Sockets Layer (SSL) or to `443` if you have enabled SSL. If you are using the Oracle VM VirtualBox sample application image mentioned earlier, the port number will be `7001`.

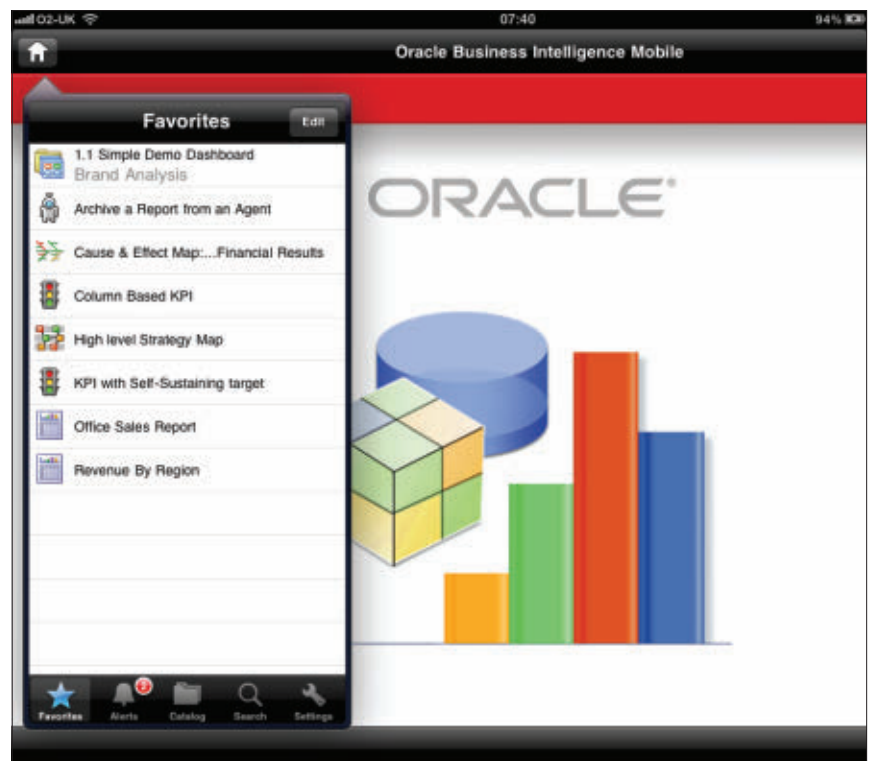


Figure 1: Viewing the Favorites list

**SSL:** The default setting is ON. Change the setting to OFF if your server does not have SSL enabled.

**SSO:** The default setting is OFF. Change the setting to ON if your server has single sign-on (SSO) enabled.

**Username:** Your username, such as `asmith`, on the server.

**Password:** Your password, such as `welcome1`, on the server.

**Save Password:** The default setting is ON. The ON setting means that your password will be saved on your iOS device. Select OFF if you are working on a shared mobile device or you want to enter a password each time you connect to the server.

**Device Locale:** The default setting is ON. The ON setting means that the mobile device's locale settings will be passed to the Oracle Business Intelligence server. Select OFF if you want to use the default locale for your login credentials.

**Analytics Path:** Accept the default value: `/analytics/saw.dll`.

**Publisher Path:** Accept the default value: `/xmlpserver`.

When you've entered the server setting information, tap **Save** to save your details, and then when you return to the list-of-servers screen, tap **Login** to use these details to connect. The first time you connect to the business intelligence server, a small set of files will be downloaded to your mobile device, and you can then start analyzing your BI content from your iPad, iPhone, or iPod touch.



Figure 2: Viewing a dashboard with Oracle Business Intelligence Mobile

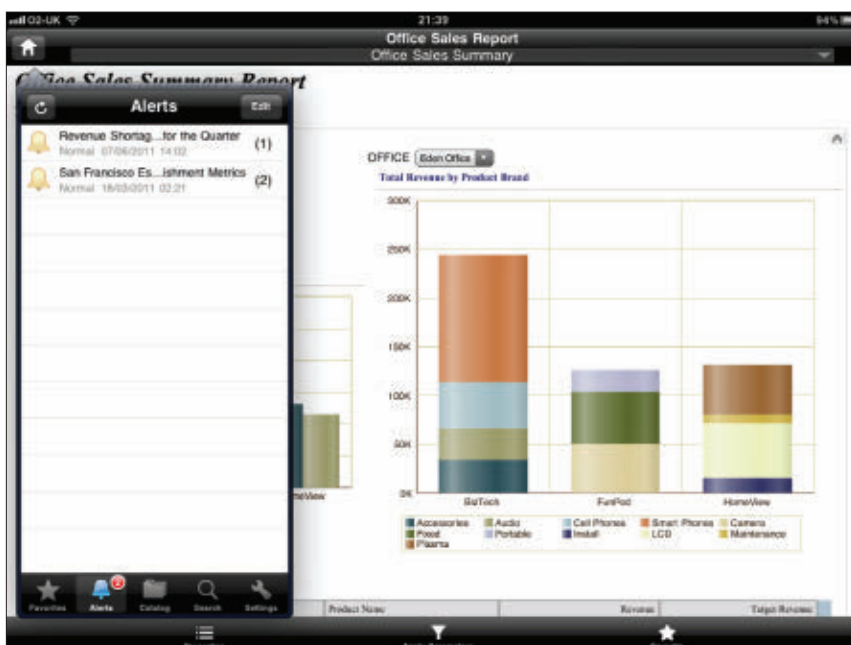


Figure 3: Viewing a list of alerts

## ANALYZE WITH ORACLE BUSINESS INTELLIGENCE MOBILE AND THE IPAD

Now that you have created your connection to an Oracle Business Intelligence server, you can start to analyze your data. In this example, you are using your iPad first thing in the morning, while drinking a cup of coffee, to update yourself on how your organization is performing. To start, view your Favorites list—which shows, among other BI content, your Brand Analysis dashboard—shown in Figure 1.

You can add a screen to the Favorites list by tapping **Favorites** at the bottom of any Oracle Business Intelligence Mobile screen. For now, though, select **Brand Analysis** from the Favorites list to view a dashboard of brand performance in the form of a pivot table, several graphs, a ticker, and some prompts and controls on the left-hand side of the screen. To switch to another page in



Figure 4: Content formatted with a mobile layout on the iPhone

this dashboard, tap the down arrow at the top of the page, as shown in Figure 2.

Just as you can with dashboards on your laptop or desktop, you can interact with pivot tables, prompts, and other objects on the iPad screen to further explore your data. For example, you can tap **Email** at the bottom of the screen to send a link to that page to someone, and you can tap **Refresh** at any time to update your view of the data, live. (Note that Oracle Business Intelligence Mobile requires a connection with your Oracle Business Intelligence server, through either Wi-Fi or a cellular network.)

You can also expose key performance indicators (KPIs) through Oracle Business Intelligence Mobile to keep up to date with performance measures for your organization, and you can use Alerts on your Favorites list, shown in Figure 3, to receive messages sent from the Oracle Business Intelligence server, such as when revenue is likely to fall short for a quarter or metrics for a store are out of tolerance. To define alerts such as these, create agents (which run analyses in the background) with the Oracle Business Intelligence dashboard to determine whether an alert condition is met; when this happens, the alert will appear in the list of

alerts on your mobile device so that you can respond appropriately.

All of these alerts, analyses, and dashboards are the same BI objects that are defined on the Oracle Business Intelligence server, ensuring that you are kept up to date with your company performance wherever you access your data.

You've finished your coffee and you have today's updates on how your organization is performing. With the most current analyses in hand, you're ready to take action.

### BUSINESS INTELLIGENCE IN YOUR POCKET WITH THE IPHONE

Although tablet computers such as the iPad are great for analyzing data on a relatively large screen, you might want to consult your company data while on the move and with only a smartphone in your pocket. Oracle Business Intelligence Mobile is also available for the iPhone and iPod touch and is downloaded, installed, and configured in the same way as on the iPad.

With Oracle Business Intelligence Mobile installed and configured on your iPhone or iPod touch, you can access dashboards in the same way as with the iPad. Given the smaller screen, however, you might want to take advantage of the mobile layout—available on the iPhone, iPod touch, and iPad—which, instead of displaying all content in the desktop layout, rearranges the content in a vertical, stacked layout and resizes graphs to make them fit the screen better, as shown in Figure 4.

Tap **Menu** in the top left corner of the screen to bring up the View menu, and then select either **Mobile Layout** or **Original Layout** to switch between the two layout modes on your iOS device.

### SO HOW DOES ORACLE BUSINESS INTELLIGENCE MOBILE WORK?

Oracle Business Intelligence Mobile is a "hybrid" iOS application that uses native controls with server-side rendering to deliver BI content to your mobile device. To reduce network load, it caches content and strips out unneeded JavaScript code, and Oracle Business Intelligence Presentation Services renders graphs in an image format that can be displayed by iOS devices. Prompts and

sliders are converted to native controls, and map views are simplified to display better on mobile devices. As a BI content developer, though, you do not need to do anything special to make your content available to mobile users, and as an iPad, iPhone, or iPod touch user, all you need are the details for connecting to your Oracle Business Intelligence server.

### CONCLUSION

With Oracle Business Intelligence Mobile, you can access your BI content on the road, in a café, or wherever else you may be when you need that information—fast. All content on your BI server is available to you, and you can access content such as KPIs, alerts, published reports, and performance dashboards from your mobile device. To try out Oracle Business Intelligence Mobile now, download the app from the Apple App Store, install the Oracle Business Intelligence Enterprise Edition 11g Release 1 (11.1.1.5) sample application—which contains several mobile-focused dashboards, alerts, and analyses—on the server you will connect to, and access your business intelligence on the go! ◀



**Mark Rittman** is an Oracle ACE Director, technical director at Rittman Mead, and an executive board member of the Oracle

Development Tools User Group. He writes for the Rittman Mead blog at [rittmanmead.com/blog](http://rittmanmead.com/blog).

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## ORACLE DATABASE

# Error Management

Part 6 in a series of articles on understanding and using PL/SQL



Even if you write absolutely perfect PL/SQL programs, it is possible and even likely that something will go wrong and an error will occur when those programs are run. How your code responds to and deals with that error often spells the difference between a successful application and one that creates all sorts of problems for users as well as developers.

This article explores the world of error management in PL/SQL: the different types of exceptions you may encounter; when, why, and how exceptions are raised; how to define your own exceptions; how you can handle exceptions when they occur; and how you can report information about problems back to your users.

## EXCEPTION OVERVIEW

There are three categories of exceptions in the world of PL/SQL: internally defined, predefined, and user-defined.

An *internally defined exception* is one that is raised internally by an Oracle Database process; this kind of exception always has an error code but does not have a name unless it is assigned one by PL/SQL or your own code. An example of an internally defined exception is ORA-00060 (deadlock detected while waiting for resource).

A *predefined exception* is an internally defined exception that is assigned a name by PL/SQL. Most predefined exceptions are defined in the STANDARD package (a package provided by Oracle Database that defines many common programming elements of the PL/SQL language) and are among the most commonly encountered exceptions. One example is ORA-00001, which is assigned the name DUP\_VAL\_ON\_INDEX in PL/SQL and is raised when a unique index constraint is violated.

A *user-defined exception* is one you have declared in the declaration section of a

program unit. User-defined exceptions can be associated with an internally defined exception (that is, you can give a name to an otherwise unnamed exception) or with an application-specific error.

Every exception has an error code and an error message associated with it. Oracle Database provides functions for retrieving these values when you are handling an exception (see Table 1).

A PL/SQL block can have as many as three sections: declaration, executable, and exception. (See Part 1 of this series, “Building with Blocks,” at [bit.ly/i9rSxd](http://bit.ly/i9rSxd) for more information on PL/SQL blocks.) When an exception is raised in the executable section of the block, none of the remaining statements in that section is executed. Instead, control is transferred to the exception section.

The beauty of this design is that all exception-related activity is concentrated in one area in the PL/SQL block, making it easy for developers to understand and maintain all error management logic. The next paragraphs describe generally the flow of execution in a block when an error occurs (see Figure 1). The process of raising exceptions and the structure of the exception section are described more fully later in this article.

If a WHEN clause in the exception section catches that exception, the code in that clause will be executed, usually logging

information about the error and then re-raising that same exception.

If the exception is not caught by the exception section or there is no exception section, that exception will propagate out of that block to the enclosing block; it will be *unhandled*. Execution of that block will then terminate, and control will transfer to the enclosing block’s exception section (if it exists).

## RAISING EXCEPTIONS

In most cases when an exception is raised in your application, Oracle Database will do the raising. That is, some kind of problem has occurred during the execution of your code and you have no control over this process. Once the exception has been raised, all you can do is handle the exception—or let it “escape” unhandled to the host environment.

You can, however, raise exceptions in your own code. Why would you want to do this? Because not every error in an application is due to a failure of internal processing in the Oracle Database instance. It is also possible that a certain data condition constitutes an error in your application, in which case you need to stop the processing of your algorithms and, quite likely, notify the user that something is wrong.

PL/SQL offers two mechanisms for raising an exception:

- The RAISE statement

Description	How to Get It
<b>The error code.</b> This code is useful when you need to look up generic information about what might cause such a problem.	SQLCODE Note: You cannot call this function inside a SQL statement.
<b>The error message.</b> This text often contains application-specific data such as the name of the constraint or the column associated with the problem.	SQLERRM or DBMS_UTILITY.FORMAT_ERROR_STACK Note: You cannot call SQLERRM inside a SQL statement.
<b>The line on which the error occurred.</b> This capability was added in Oracle Database 10g Release 2 and is enormously helpful in tracking down the cause of errors.	DBMS_UTILITY.FORMAT_ERROR_BACKTRACE
<b>The execution call stack.</b> This answers the question “How did I get here?” and shows you the path through your code to the point at which DBMS_UTILITY.FORMAT_CALL_STACK is called.	DBMS_UTILITY.FORMAT_CALL_STACK

Table 1: Key error information to record

- The `RAISE_APPLICATION_ERROR` built-in procedure

**The RAISE statement.** You can use the `RAISE` statement to raise a user-defined exception or an Oracle Database predefined exception. In the following example, I have decided that if the user has supplied a `NULL` value for the department ID, I will raise the `VALUE_ERROR` exception:

```
CREATE OR REPLACE PROCEDURE
process_department (
    department_id_in IN INTEGER)
IS
BEGIN
    IF department_id_in IS NULL
    THEN
        RAISE VALUE_ERROR;
    END IF;
```

You can also use `RAISE` to *reraise* an exception from within the exception section (see “Handling Exceptions” for an example).

**RAISE\_APPLICATION\_ERROR.** The `RAISE_APPLICATION_ERROR` statement raises an exception, stopping the current block from continuing. It also sets the current error code and error message. This error message—such as “ORA-06502:

PL/SQL: numeric or value error”—is supplied by Oracle Database and is usually generic.

This kind of error message might be sufficient for reporting database errors, but what if an application-specific error—such as “Employee is too young” or “Salary cannot be greater than \$1,000”—has been raised? A “Numeric or value error” message is not going to help users understand what they did wrong and how to fix it.

If you need to pass an application-specific message back to your users when an error occurs, you should call the `RAISE_APPLICATION_ERROR` built-in procedure. This procedure accepts an integer (your error code), whose value must be between `-20,999` and `-20,000`, and a string (your error message).

When this procedure is run, execution of the current PL/SQL block halts immediately and an exception (whose error code and message are set from the values passed to `RAISE_APPLICATION_ERROR`) is raised. Subsequent calls to `SQLCODE` and `SQLERRM` will return these values.

Here is an example of using `RAISE_APPLICATION_ERROR`: An employee must be at least 18 years old. If the date of birth is more recent, raise an error so that the `INSERT` or `UPDATE` is halted, and pass back a message to the user:

```
CREATE OR REPLACE PROCEDURE
validate_employee (
    birthdate_in IN DATE)
IS
BEGIN
    IF birthdate_in >
        ADD_MONTHS (SYSDATE, -12 * 18)
    THEN
        RAISE_APPLICATION_ERROR (-20500
            , 'Employee must be at least
            18 years old.');
```

### DEFINING YOUR OWN EXCEPTIONS

There are two reasons you might want to define your own exception (employ a user-defined exception): to give a name to an error that was not assigned a name by Oracle Database or to define an application-specific exception such as “Balance too low.”

To define your own exception, use the `EXCEPTION` datatype, as in

```
DECLARE
    e_balance_too_low EXCEPTION;
```

By default, the error code associated with this exception is 1 and “User Defined Error” is the error message. You can, however, associate a different error code with your exception by using the `EXCEPTION_INIT` pragma. In the block below, I have decided to associate the “Balance too low” error with code `-20,000`.

```
CREATE OR REPLACE PROCEDURE
process_balance (
    balance_in IN NUMBER)
IS
    e_balance_too_low EXCEPTION;

    PRAGMA EXCEPTION_INIT (
        e_balance_too_low, -20000);
BEGIN
    IF balance_in < 1000
    THEN
        RAISE e_balance_too_low;
    END IF;
END;
```

### HANDLING EXCEPTIONS

Oracle Database might raise an internal or predefined exception, and you can also explicitly raise an exception you’ve defined for your application. Next, you need to decide how you want your program to deal with, or *handle*, that exception.

If you don’t want an exception to leave your block or subprogram before it is handled, you must include an exception section that will catch the exception. The exception section starts with the keyword `EXCEPTION` and then contains one or more `WHEN` clauses. A `WHEN` clause can specify a single exception (by name), multiple exceptions connected with the `OR` operator, or *any* exception.

Here are some examples of `WHEN` clauses:

1. Catch the `NO_DATA_FOUND` exception, usually raised when a `SELECT-INTO` statement is executed and finds no rows.

```
WHEN NO_DATA_FOUND
THEN
```

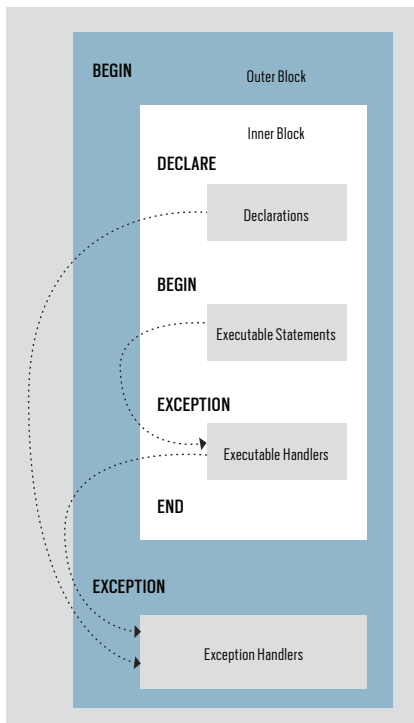


Figure 1: Exception propagation

2. Catch either the NO\_DATA\_FOUND or DUP\_VAL\_ON\_INDEX predefined exceptions.

```
WHEN NO_DATA_FOUND OR
     DUP_VAL_ON_INDEX
THEN
```

3. Catch any exception:

```
WHEN OTHERS
THEN
```

You can have multiple WHEN clauses in your exception section, but if you have a WHEN OTHERS clause, it must come at the end.

It's easy enough to define one or more WHEN clauses. The trickier part of the exception section is deciding what to do after you have caught an exception. Generally, code in an exception handler should perform the following two steps:

1. Record the error in some kind of log, usually a database table
2. Raise the same exception or a different one, so it propagates unhandled to the outer block

**Reraising exceptions.** You *could* simply record information about an error and then not reraise the exception. The problem with this approach is that your application has “swallowed up” an error. The user (or the script that is being run) will not know that there was a problem. In some scenarios, that may be OK, but they are very rare. In almost every situation

#### Answers to the Challenge

Here are the answers to the PL/SQL Challenge questions in last issue's “Working with Dates in PL/SQL” article:

##### Answer 1:

Choices 2, 3, and 4 all offer an implementation that returns the first day of the month. The best and simplest way to return this value is to use the TRUNC function.

##### Answer 2:

Choices 2 and 4 perform the correct arithmetic on the original date—the former by subtracting one day and the latter by truncating the date back to midnight, subtracting one day, and then adding one second.

For full explanations of both of these answers, visit [plsqlchallenge.com](http://plsqlchallenge.com), register or log in, and click the Closed/Taken tab in Play a Quiz.

## The exception section makes it easy to centralize all your exception handling logic and thereby manage it more effectively.

when an error occurs, you really do want to make sure that the person or the job running the code that raised the error is informed.

Oracle Database makes it easy to do this with the RAISE statement. If you use RAISE in an executable section, you must specify the exception you are raising, as in

```
RAISE NO_DATA_FOUND;
```

But inside an exception handler, you can also use RAISE without any exception, as in

```
RAISE;
```

In this form, Oracle Database will reraise the current exception and propagate it out of the exception section to the enclosing block.

Note that if you try to use RAISE outside of an exception section, Oracle Database will raise a compile-time error:

```
PLS-00367: a RAISE statement with
no exception name must be inside
an exception handler
```

**Recording errors.** Suppose something's gone wrong in your application and an exception was raised. You can certainly just let that exception propagate unhandled all the way out to the user, by not writing any exception sections in your subprograms. Users will then see the error code and message and either report the problem to the support team or try to fix the problem themselves.

In most cases, however, you'd like to store the information about the error before it is communicated to the user. That way you don't have to rely on your users to give you information such as the error code or the error message.

When you record your error, you should include the information shown in Table 1, all obtainable through calls to functions supplied by Oracle Database. All of this information will help a developer or a member of the support team diagnose the cause of

the problem. You may, in addition, want to record values of application-specific data, such as variables or column values.

If you decide to store your error information in a table, you should *not* put the INSERT statements for the error log table directly inside your exception. Instead, you should build and call a procedure that does this for you. This process of “hiding” the way you implement and populate your log will make it easier and more productive to log errors.

To understand these advantages, let's build a simple error log table and try using it in my exception section. Suppose my error log table looks like this:

```
CREATE TABLE error_log
(
  ERROR_CODE      INTEGER
, error_message   VARCHAR2 (4000)
, backtrace       CLOB
, callstack       CLOB
, created_on      DATE
, created_by      VARCHAR2 (30)
)
```

I *could* write an exception handler as shown in Listing 1.

No matter what error is raised in my program, this handler will catch it and store lots of extremely useful information about that error in my table.

I strongly suggest, however, that you never write exception handlers like this. Problems include

- **Too much code.** You have to write lots of code to store the error information. This leads to reduced productivity or fewer exception handlers (programmers don't feel that they have to write all this code, so they rationalize away the need to include a handler).
- **The error log becomes part of a business transaction.** I inserted a row into a table. I know that this table is different from the “real” tables of the application (for example, the Employees table of the human resources application). But Oracle Database



makes no distinction. If a rollback is performed because of the error, the INSERT into the log table will also be rolled back.

- **Brittle code.** If I ever need to change the structure of the error\_log table, I will have to change all the INSERT statements to accommodate this change.

A much better approach is to “hide” the table behind a procedure that does the INSERT for you, as shown in Listing 2.

All I’ve done is move the INSERT statement inside a procedure, but that simple action has important consequences. I can now very easily get around the problem of rolling back my error log INSERT along with my business transaction. All I have to do is make this procedure an *autonomous transaction* by adding the pragma statement and the COMMIT, as shown in Listing 3.

By declaring the procedure to be an autonomous transaction, I can commit or roll back any of the changes I make to tables inside this procedure without affecting other changes made in my session. So I can now save the new row in my error log, and a later rollback of the business transaction will not wipe out this information.

With this logging procedure defined in my schema, I can now very easily and quickly write an exception handler as follows:

```
EXCEPTION
  WHEN OTHERS
  THEN
    record_error();
  RAISE;
```

It takes me much less time to write my exception handler, and its functionality is more robust. A win-win situation!

**Exceptions raised while declaring.** If an exception is raised in the declaration section of a block, the exception will propagate to the outer block. In other words, the exception section of a block can catch only exceptions raised in the executable section of the block.

The following block includes a WHEN OTHERS handler, which should trap any exception raised in the block and simply display the error code:

```
DECLARE
  l_number NUMBER (1) := 100;
BEGIN
```

```
  statement1;
  ...
  statementN;
EXCEPTION
  WHEN OTHERS
  THEN
    DBMS_OUTPUT.put_line (SQLCODE);
END;
```

When I execute the block, Oracle Database will try to assign the value 100 to l\_number. Because it is declared as NUMBER (1), however, 100 will not “fit” into the variable. As a result, Oracle Database will raise the ORA-06502 error, which is predefined in PL/SQL as VALUE\_ERROR.

Because the exception is raised in the process of declaring the variable, the exception handler will not catch this error. Instead I’ll see an unhandled exception:

```
ORA-06502: PL/SQL: numeric or value
error: number precision too large
ORA-06512: at line 2
```

Consequently, you should avoid assigning values to variables in the declaration section

### Take the Challenge!

Each PL/SQL 101 article offers a quiz to test your knowledge of the information provided in the article. The quiz questions appear below and also at PL/SQL Challenge (plsqlchallenge.com), a Website that offers online quizzes for the PL/SQL language. You can read and take the quiz here in *Oracle Magazine* and then check your answers in the next issue. If, however, you take the quiz at PL/SQL Challenge, you will be entered into a raffle to win an e-book from O’Reilly Media (oreilly.com).

#### Question 1

Which of these blocks will result in an unhandled ORA-00001 exception?

a.

```
BEGIN
  RAISE DUP_VAL_ON_INDEX;
END;
/
```

b.

```
BEGIN
  RAISE -1;
END;
/
```

c.

```
CREATE TABLE plch_tab (n NUMBER PRIMARY KEY)
/
```

BEGIN

```
  INSERT INTO plch_tab
    VALUES (1);
```

```
  INSERT INTO plch_tab
    VALUES (1);
END;
/

d.
BEGIN
  RAISE DUP_VAL_ON_INDEX;
EXCEPTION
  WHEN OTHERS
  THEN
    RAISE;
END;
/
```

#### Question 2

Assume that the plch\_tab table has been created with a single numeric column. What change can I make in the following procedure so that it will compile without error?

```
CREATE OR REPLACE PROCEDURE plch_proc (divisor_in in NUMBER)
IS
BEGIN
  INSERT INTO plch_tab
    VALUES (100/divisor_in);
EXCEPTION
  WHEN DUP_VAL_ON_INDEX AND NO_DATA_FOUND
  THEN
    RAISE;
END;
```

**Code Listing 1:** Exception handling section inserting into log table

```

EXCEPTION
  WHEN OTHERS
  THEN
    DECLARE
      l_code  INTEGER := SQLCODE;
    BEGIN
      INSERT INTO error_log (error_code
                           , error_message
                           , backtrace
                           , callstack
                           , created_on
                           , created_by)
        VALUES (l_code
                , sys.DBMS_UTILITY.format_error_stack
                , sys.DBMS_UTILITY.format_error_backtrace
                , sys.DBMS_UTILITY.format_call_stack
                , SYSDATE
                , USER);

      RAISE;
    END;

```

**Code Listing 2:** Exception handling procedure inserting into log table

```

CREATE OR REPLACE PROCEDURE record_error
IS
BEGIN
  INSERT INTO error_log (error_code
                       , error_message
                       , backtrace
                       , callstack
                       , created_on
                       , created_by)
    VALUES (l_code
            , SQLERRM
            , sys.DBMS_UTILITY.format_error_backtrace
            , sys.DBMS_UTILITY.format_call_stack
            , SYSDATE
            , USER);
END;

```

**Code Listing 3:** Exception handling procedure as autonomous transaction with COMMIT

```

CREATE OR REPLACE PROCEDURE record_error
IS
  PRAGMA AUTONOMOUS_TRANSACTION;
BEGIN
  INSERT INTO error_log (error_code
                       , error_message
                       , backtrace
                       , callstack
                       , created_on
                       , created_by)
    VALUES (l_code
            , SQLERRM
            , sys.DBMS_UTILITY.format_error_backtrace
            , sys.DBMS_UTILITY.format_call_stack
            , SYSDATE
            , USER);

  COMMIT;
END;

```

unless you are certain that no error will be raised. You can, instead, assign the value in the executable section, and then the exception handler can trap and record the error:

```

DECLARE
  l_number  NUMBER (1);
BEGIN
  l_number := 100;

  statement1;
  ...
  statementN;
EXCEPTION
  WHEN OTHERS
  THEN
    DBMS_OUTPUT.put_line (SQLCODE);
END;

```

### EXCEPTIONS AND ROLLBACKS

Unhandled exceptions do not automatically result in the rollback of outstanding changes in a session. Indeed, unless you explicitly code a ROLLBACK statement into your exception section or the exception propagates unhandled to the host environment, no rollback will occur. Let's look at an example.

Suppose I write a block of code that performs two data manipulation language (DML) operations:

1. Remove all employees from the Employees table who are in department 20.
2. Give a raise to all remaining employees by multiplying their current salary by 200.

That is very generous, but the constraint on the salary column is defined as NUMBER(8,2). The salary of some employees is already so large that the new salary amount will violate this constraint, leading Oracle Database to raise the "ORA-01438: value larger than specified precision allowed for this column" error.

Suppose I run the following block in a SQL\*Plus session:

```

BEGIN
  DELETE FROM employees
         WHERE department_id = 20;
  UPDATE employees
         SET salary = salary * 200;
EXCEPTION
  WHEN OTHERS
  THEN

```

```

DECLARE
  l_count  PLS_INTEGER;
BEGIN
  SELECT COUNT (*)
     INTO l_count
     FROM employees
     WHERE department_id = 20;

  DBMS_OUTPUT.put_line (l_count);
  RAISE;
END;
END;
```

The DELETE completes successfully, but then Oracle Database raises the ORA-01438 error when trying to execute the UPDATE statement. I catch the error and display the number of rows in the Employees table WHERE department\_id = 20. "0" is displayed, because the failure of the UPDATE statement did not cause a rollback in the session.

After I display the count, however, I reraise the same exception. Because there is no enclosing block, PL/SQL returns an unhandled exception error to SQL\*Plus (or whichever host environment is being used). The default behavior of SQL\*Plus (and all host environments I know of) is to issue a rollback of any outstanding changes in the session and display the error information.

So after this block is run, the employees in department 20 will still be in the table.

### CONCLUSIONS

PL/SQL provides a wide range of features to help you catch and diagnose errors as well as communicate application-specific errors to your users. The exception section makes it easy to centralize all your exception handling logic and thereby manage it more effectively.

In the next PL/SQL 101 article, I will explore the record datatype in PL/SQL: use of the

%ROWTYPE anchor, how you can declare and use your own record types, record-level inserts and updates, and more. ◀




### Steven Feuerstein

([steven.feuerstein@quest.com](mailto:steven.feuerstein@quest.com)) is Quest Software's PL/SQL evangelist. He has published 10 books on

Oracle PL/SQL (O'Reilly Media) and is an Oracle ACE director. More information is available at [stevenfeuerstein.com](http://stevenfeuerstein.com).

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# Help Us Help the Polar Bear

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## ORACLE DATABASE

# On Unlearning and Modeling

Our technologist goes back to school for Oracle Exadata and vows to be a MODEL student.

I frequently receive questions (on AskTom, at [asktom.oracle.com](http://asktom.oracle.com)) about Oracle Exadata Database Machine. Many of them center on relearning—or, more specifically, “unlearning” (a concept I’ve written about before, at [bit.ly/vLsE8b](http://bit.ly/vLsE8b)). I’d like to briefly describe some of the concepts that need to be unlearned for working with an Oracle Exadata Database Machine for data warehousing.

First, you need to understand how Oracle Exadata is architected in order to appreciate why some of your past tried-and-true techniques are not the right approaches in an Oracle Exadata environment.

An Oracle Exadata Database Machine is big, a common configuration being eight server nodes coupled with 14 storage arrays. Each of these components has 12 CPU cores, delivering 96 cores at the database server level and 168 cores at the storage level for processing data. That is a lot of CPU horsepower right there. And *all* of the Oracle Exadata storage, I/O bandwidth, cache, and CPU is dedicated to *your* databases. This is a departure from most environments today, in which many, if not all, of those resources are shared by many other functions. A key to providing consistent, guaranteed performance is to ensure that your operations do not have to share resources with other functions.

So, you have this big server machine, coupled with a large amount of dedicated storage—storage that comes with its own CPU and memory for processing data at the storage layer. That in itself is impressive, but Oracle Exadata goes two steps further. First, all of this storage is connected to the database via a series of 40-gigabit-per-second InfiniBand switches—a private, dedicated network whose sole purpose is to move your bits and bytes from disk to database server CPU at a rate of up to 75 GB/sec. (See [bit.ly/tkTYqD](http://bit.ly/tkTYqD) for information on this 75 GB/sec performance.) Compare this with your typical

**Code Listing 1:** Creating object types for PL/SQL pipelined function

```
SQL> create or replace type myScalarType as object
  2 ( study_site number, cnt number, the_group number )
  3 /
Type created.

SQL> create or replace type myTableType as table of myScalarType
  2 /
Type created.
```

corporate network, in which you might have a 1 Gb/sec or maybe a 10 Gb/sec network capable of maybe 100 MB/sec or 1 GB/sec over a shared network. (And you’ll never really get the 100 MB/sec or 1 GB/sec transfer rate, because the resource is shared.) The second step is the addition of up to 5 TB of Exadata Smart Flash Cache flash memory dedicated to caching disk-based information at the storage level. With Oracle Exadata, you have about 1 TB of database server memory for caching information, along with 5 TB of flash memory at the storage level.

The servers, storage arrays, network switching, and memory in Oracle Exadata are impressive, but, as they say on late-night television, “Wait, there’s more!” The CPUs and memory at the storage level are there to run more software. Oracle Exadata includes eight nodes for the conventional database server, but its storage-level software understands that what is stored on disk is Oracle Database blocks. For the first time, the storage array not only knows how to perform I/O but also understands that the I/O it is performing is being done to retrieve Oracle Database blocks. This enables the storage to not only read the database blocks but to process them as well.

If you were to do a full scan of a terabyte of data with conventional SAN or NFS servers, you would have to not only read a terabyte of data but also transmit that same terabyte over the wire and then process it all at the

database server level. With the storage cells in Oracle Exadata, however, you don’t need to do all that. Instead, the storage cells will read the terabyte of information, process it (before sending anything over the wire), and then send just the bits and bytes that are relevant to the database server. For example, a query such as “SELECT A, B, C FROM some\_table WHERE D > 42” would cause the storage cells to do a full-table scan in parallel (all 14 storage cells would be processing a bit of the table), and as they were reading the data, only columns A, B, C, and D would be considered relevant and sent back to the database server. Furthermore, only rows in which D was greater than 42 would be sent back to the database server. (There could be hundreds of other columns, but the storage cells would not send them to the database server.) In short, only the rows and columns of interest would be transmitted to the database server. Even though you scanned a terabyte of data, you might send back only 200 MB over the wire—a considerable difference.

So, you have lots of disk storage with excellent read performance, the ability to retrieve just the rows and columns of interest, the ability to transmit massive amounts of information if needed (at 75 GB/sec), and the ability to process the resulting data with eight database server nodes and 96 CPU cores.

In short, with Oracle Exadata—all of a sudden—I/O isn’t your problem. Historically, I/O has been the major gating factor in a

data warehouse, with many systems “under-configured” and therefore delivering performance reduced by orders of magnitude. When you remove I/O from the equation, the game changes entirely. The processes you had in place in an I/O-constrained system do not work effectively in a system without I/O constraints. Not that those processes were efficient in the I/O-constrained system either! They were suboptimal there as well, but given the poor I/O performance, it was not as noticeable.

What does this mean to you? What do you need to unlearn for Oracle Exadata? The first thing to look at is your load and query process. On AskTom I frequently see people asking how to speed up their load, claiming they cannot load 5,000,000 new records in their multihour processing window. When they say it takes hours to load millions of rows, I know something is seriously wrong, because I can load millions of rows in minutes—on my *laptop*. It is all in how you approach the load.

Most people adopt what I’ll call a slow-by-slow (row-by-row) approach. They load and validate a single row millions of times. What they need to do is load and validate millions of rows *once*. There is a big difference between those two approaches, because they scale entirely differently.

Let’s look at the numbers: If you wanted to load 5,000,000 rows and it took a slow-by-slow process 1 millisecond (1/1000 second) to process each row during a validation/transformation phase, you would be looking at 5,000 seconds—or almost 1.5 hours. Now, 1 millisecond is probably being very generous, because there would be network round-trips for each row, database CPU, client CPU, and reading of input files to be loaded and other steps involved in the process. You can easily see how a row-by-row approach to loading 5,000,000 rows will quickly become your bottleneck as the row counts go up and up. When you take a big number (millions or billions) and multiply it by a little number (the amount of processing time per row) you end up with . . . still a big number!

If, on the other hand, you bulk-load your data, using direct path operations and parallel query to validate and transform the data, you can do in seconds or minutes what

**Code Listing 2:** PL/SQL pipelined function solution

```
SQL> create or replace function foo( p_cursor in sys_refcursor,
                                     p_threshold in number )
    return myTableType
2  pipelined
3  as
4      type array is table of t%rowtype index by binary_integer;
5
6      l_data          array;
7      l_running_total number := 0;
8      l_group         number := 1;
9      n               number := 100;
10 begin
11     loop
12         fetch p_cursor bulk collect into l_data limit N;
13         for i in 1 .. l_data.count
14             loop
15                 l_running_total := l_running_total + l_data(i).cnt;
16                 if ( l_running_total > p_threshold )
17                     then
18                         l_group := l_group + 1;
19                         l_running_total := l_data(i).cnt;
20                     end if;
21                 pipe row( myScalarType( l_data(i).study_site,
                                           l_data(i).cnt, l_group ));
22             end loop;
23         exit when p_cursor%notfound;
24     end loop;
25     close p_cursor;
26     return;
27 end;
28 /
```

would otherwise take hours. If you don’t believe me, watch a series of videos available on YouTube. They were developed by a team including Graham Wood, father of Statspack and Automatic Workload Repository, and Andrew Holdsworth, senior director of Oracle’s Real World Performance group, and delivered by Holdsworth. They show how you would approach loading 1 TB of data (8 billion rows) into an Oracle Exadata Database Machine, gathering statistics, and validating all of it in about 20 minutes—yes, 20 minutes. This can be achieved only with parallel direct path operations. The videos are parts 1, 2, and 3 of *Migrate a 1 TB Datawarehouse in 20 Minutes*:

- [bit.ly/vq2AI1](http://bit.ly/vq2AI1)
- [bit.ly/vV1QuT](http://bit.ly/vV1QuT)
- [bit.ly/rUXY69](http://bit.ly/rUXY69)

Once you’ve decided to use large, bulk, direct path loads, choosing a tool is important as well. Historically, many of us have used SQLLDR as our tool of choice for performing large loads. That worked well in the 1900s, but it isn’t the right tool for the twenty-first century. A new century demands new tools,

because the scale of our loading problems has increased by many orders of magnitude.

Consider how SQLLDR works. If you wanted to do a parallel direct path load with it, you would have to set up a script that started *n* SQLLDR processes (where *n* was your chosen degree of parallelism). You would need to have *n* input files, one for each SQLLDR process. Additionally, each SQLLDR process would need to allocate a large chunk of memory to cache the metadata about the segment it was loading into, and that memory can be considerable. Today, it would not be outrageous to have a table with tens of thousands of partitions (say 40,000), with each partition having hundreds of extents. All of a sudden, a table structure might include millions of pieces of information, and each and every SQLLDR process would need to cache this metadata over and over. That can quickly add up to needing a terabyte of memory—just for SQLLDR.

The solution to this dilemma? The external table introduced in Oracle9i Database. External tables allow for a file—or the output of a program—to be read as a

table source, using SQL directly. That is, you can invoke "SELECT \* FROM some\_file" and read directly from a file that exists outside of the database. (See [bit.ly/vYSoDo](http://bit.ly/vYSoDo) for an article that demonstrates the power of external tables.) Because SQL can execute in parallel and perform direct path loads, a parallel direct path load of a table becomes simply "INSERT /\*+ append \*/ INTO some\_table SELECT \* FROM some\_file".

There is no script to run outside of the database. Changing the degree of parallelism to support more (or fewer) CPUs is trivial (just run the SQL statement in a database that has the `cpu_count` initialization parameter set differently) compared to changing parallelism in SQL\*Loader, in which you would be reprogramming a script. Additionally, with direct path loads, the memory considerations are moot. SQL uses the shared pool in the system global area (SGA), so there would be one cached copy of the table's metadata—not one copy per SQL\*Loader process. Last, using an external table is a lot more flexible than using SQL\*Loader.

The next thing you might need to unlearn for Oracle Exadata is how to tune queries. Your toolbox has always included using indexes as a query tuning technique. This works well in systems that have to process tens or hundreds or maybe even thousands of rows, but it quite simply does not scale up when you are considering millions or billions of rows. It is time again for a little math to put things in perspective.

Suppose you want to retrieve 1 percent of a table to process. For most of you, the word that would immediately pop into your mind would be *index*—you are getting only 1 percent of the rows, so an index would be appropriate. Well, what if I told you the table in question has 100,000,000 rows? Would an index still be appropriate? Let's work the numbers and see.

To begin, I can safely assume that the table blocks I need are likely not in the buffer cache, so I'll have to perform physical I/O to read most of them. I can also assume that my buffer cache would not likely hold this result set (given a database with an 8 K block size, the table blocks I'd need to cache could total as much as 7.6 GB), because there are many other objects in this database as well. (Over

**Code Listing 3:** Query for running PL/SQL pipelined function solution

```
SQL> select min(study_site), max(study_site), sum(cnt)
2   from (
3   select *
4   from TABLE( foo( cursor(select study_site, cnt from t
                               order by study_site), 65000 ) )
5   )
6   group by the_group
7   order by the_group
8   /
```

MIN(STUDY_SITE)	MAX(STUDY_SITE)	SUM(CNT)
1001	1022	48081
1023	1044	62203
1045	1045	3360

time, repeated runs of the query would have to perform as many I/Os as the first run.) I'll also make an assumption that will make the math easier: the index is entirely cached and is "free" to access. It takes 0.0 seconds to retrieve a block from the index, which leaves just the table blocks to consider. Now, seeing as a good I/O system would likely do a random seek, read, and transfer in about 5 milliseconds, I can see that it would take 5,000 seconds to perform the 1,000,000 random I/Os, which means that query is going to take 1.5 hours just to do the I/O! But if I turned that index scan into a full-table scan, I could get those I/Os performed in a few seconds or maybe minutes. (See [bit.ly/srjB0c](http://bit.ly/srjB0c) for a classic example of this.)

With Oracle Exadata, you need to unlearn most all of the rules of thumb you learned for online transaction processing (OLTP). For example, you learned, "If you are getting a *small percentage* of a table, use an index." The rule should be, "If you are retrieving a *small number of rows* from a table, use an index." With Oracle Exadata, you need to employ large bulk operations to process large amounts of data and you need to carry out CPU- and random I/O-intensive operations to process small amounts of data. In short, your mind-set needs to change.

The next mind-set change required for Oracle Exadata involves resource management. I/O used to be your bottleneck—your resource manager, in effect. To get your data warehouses looking busy—to get their CPUs doing work—you would try to process as many queries simultaneously as possible. Because most queries used to be throttled by

lack of I/O resources, they would not demand too much of the CPU resources at any given point in time and the database would appear idle if you ran just a few queries at a time.

Now, if you "fix" the I/O problem with Oracle Exadata—if you eliminate the I/O bottleneck—queries will not be throttled by the lack of I/O resources. Instead, queries will now all be simultaneously fighting with each other for CPU resources. If that happens, if you try to run more things that all have heavy CPU demands at the same time, you'll basically have a machine whose plug you have to pull.

Enter resource management and queuing. The goal is to fully utilize the machine but not attempt to overutilize it. You want to "fill the machine up" with queries, but when it gets full, you want to make any new queries wait—to queue them—until resources (CPU, memory) become available. If you allow the machine to become overwhelmed, you will not get your answer in a reasonable amount of time. On the other hand, if you do as much work as possible (and not one drop more than that) and you queue up new requests until you finish processing some of your current workload, everyone will get their responses faster (even those who have to wait in line for some period of time).

Again, I could talk about this and try to convince you, or you can see it for yourself in the real world. I'll point you to YouTube again for Holdsworth's fourth installment of *Migrate a 1TB Datawarehouse in 20 Minutes*, at [bit.ly/sYSLih](http://bit.ly/sYSLih). In this example, Holdsworth demonstrates the various techniques for

**Code Listing 4:** Factored subquery solution

```

with data1 as
(
  select row_number()over(order by study_site) as rno,
         study_site Site_no, cnt tot_rec from t
)
,
rec (rno, Site_no, tot_rec, Total, flg) as
(
  select rno, Site_no, tot_rec, tot_rec, 0
  from data1 where rno=1
  union all
  select d.rno, d.Site_no, d.tot_rec,
         case when r.total + d.tot_rec > 65000
            Then d.tot_rec
            Else r.total + d.tot_rec END,
         case when r.total + d.tot_rec > 65000
            Then r.flg+1
            Else r.flg END
  from data1 d, rec r
  where d.rno=r.rno+1
)
select min(site_no), max(site_no), sum(tot_rec)
  from rec
  group by flg
  order by flg

```

study_site	tot_rec
1001	10000
1002	20000
1003	30500
1004	50000
1005	25000
1006	36000
1007	28000
1008	21000

*I need running totals that do not exceed 65,000, and for every running total, I need to get the starting site number, ending site number, and the sum of records for those sites:*

start_site	end_site	running_total
1001	1003	60500
1004	1004	50000
1005	1006	61000
1007	1008	49000

**Code Listing 5:** SQL MODEL clause solution

```

SELECT s, MAX(e), MAX(sm) FROM (
  SELECT s, e, cnt, sm FROM t
  MODEL DIMENSION BY(row_number()
                     over(order by study_site) rn)
  MEASURES(study_site s, study_site e, cnt, cnt sm)
  RULES(sm[rn > 1] =
    CASE WHEN (sm[cv() - 1] + cnt[cv()]) > 20000
      OR cnt[cv()] > 20000
    THEN cnt[cv()]
    ELSE sm[cv() - 1] + cnt[cv()]
    END,
  s[rn > 1] =
    CASE WHEN(sm[cv() - 1] + cnt[cv()]) > 20000
      OR cnt[cv()] > 20000
    THEN s[cv()]
    ELSE s[cv() - 1]
    END))
GROUP BY s ORDER BY s;

```

*As you can see, sites 1001, 1002, and 1003 form the first group and site 1004 starts the second group in my output. (If site 1004 remained in the first group, the running total would have been 110,500, which exceeds 65,000, so the first group is full and I start the second group. The second group is 1004 all by itself because if I had put 1005 in with it, the running total would have again exceeded 65,000.)*

This is difficult to answer efficiently with just straight SQL. What I'll do here is propose three approaches. The first approach was my initial one and employs a PL/SQL pipelined function. The second and third approaches were supplied by other users on AskTom. The second approach utilizes a new Oracle Database 11g Release 2 feature—recursive subquery factoring—and the third involves a new Oracle Database 10g feature: the MODEL clause. (You can see the evolution of this question and answer and the refinement of the two SQL-based approaches at [bit.ly/vjiMVw](http://bit.ly/vjiMVw)) This answer will show that there is more than one way to attack a problem. I particularly liked the MODEL clause approach, and it prompted me to make a New Year's resolution to learn and master the MODEL clause in 2012! Expect to see it used to answer many more questions in the future.

managing many queries attempting to run concurrently, with the end result that queuing provides the best overall runtimes, from an average, minimum, and maximum runtime perspective.

So, in short, the main concepts you need to unlearn for Oracle Exadata are

- **How you approach data loads.** Slow-by-slow mechanisms that worked for thousands or a few million rows simply do not scale up and work for tens of millions or billions of rows.
- **What tools you use.** It's the twenty-first century—you need to reevaluate your

toolset if it dates back to the 1900s.

- **How you tune queries in a warehouse.** If your first thought is to index, you are probably doing it wrong.
- **Resource management.** Because you are losing your de facto resource manager (the I/O bottleneck), managing resources and making sure you do not overuse your CPU resources (which will lead you to pull the plug) are critical.

#### GROUPING RANGES

*I need to write a SQL statement to group data in ranges. Here is the data:*

The question also involves a bit of a bin-fitting problem, where the goal is to group rows until some threshold is met and then start a new group. This is quite challenging to do in “pure SQL,” so I cheated a little with my approach, which uses a small bit of PL/SQL.

To implement the PL/SQL pipelined function, I first need to create some object types. These types, shown in Listing 1, describe the “table” the function will return.

Next, I need the procedural code that will return the result I want. Basically, I’ll be sending this function a result set via a `SYS_REFCURSOR` type. This result set will be an ordered selection of the rows I want to see, and it will be ordered by `STUDY_SITE` so that I can process the data in ascending order—because the answer requires that. I’ll also pass in the “threshold” of 65,000 instead of hard-coding 65,000 in the PL/SQL, and I’ll be a little more flexible and make it a parameter. Listing 2 shows the code I implemented.

As you can see, I just read the rows from the `SYS_REFCURSOR`, and because my running total exceeds the threshold that was passed in, I reset the counters and increment the group number. The `PIPE ROW()` call returns the data I am making up. (Pipelined functions are great for implementing a tiny bit of procedural processing in relational queries.) To use this function and see the required output, I would run the query in Listing 3.

That PL/SQL pipelined function works, but as I mentioned earlier, there were also some SQL solutions. The first I’ll use is the new recursive subquery factoring. This is a new feature in Oracle Database 11g Release 2, and I first looked at this feature when it came out: [bit.ly/tYWtBG](http://bit.ly/tYWtBG). (Look for “Recursive Subquery Factoring” for an explanation of how it works and what it does.) Listing 4 contains the recursive subquery approach.

Let’s look at this piece by piece. First there is a factored subquery (available since Oracle9i Database)—the “WITH DATA1 AS” part of the query. This will take my set of data and assign a row number from 1 to N to each row in the base table after sorting it by `STUDY_SITE`.

Then I have the second factored subquery—`REC`—which is, in fact, a *recursive* factored subquery, in that its definition references itself. Note the second part of the `UNION ALL`—it queries itself.

Here’s what the `REC` recursive factored subquery does. When the first part of the `UNION ALL` is executed, the subquery finds the first record from `DATA1` and outputs that record into the result set. It then feeds that single row it found into the second part of the query; in short, it joins the first record to the second record. If the value of `R.TOTAL` (the first row’s total) plus the second row’s total—`D.TOT_REC`—exceeds the threshold, then the running total will reset and become just `D.TOT_REC`. If `R.TOTAL+D.TOT_REC` does not exceed that threshold, the running total will not reset and will continue to be `R.TOTAL+D.TOT_REC`. The `FLG` column—the grouping column—will either increment if `R.TOTAL+D.TOT_REC` exceeds its threshold or stay the same if it does not.

Then the subquery takes this second fabricated record and joins it to the third record in `DATA1`, performing the same operations. After that the subquery joins the third record to the fourth and so on until there are no records left to process. When you execute that query in full, it returns the same result as the pipelined function.

However, before you get too excited about this approach, think about the work it requires. You have to take the entire result set and sort it to assign the row numbers (which is OK, because all approaches will pretty much include a sort). Then you have to query this subresult to find the first row, scan it *again* to find the second row, scan it *again* to find the third, and so on. Suffice it to say, this query does a ton of work over and over again; using it is not the most efficient approach. If you are interested in the numbers, visit [bit.ly/vjiMVw](http://bit.ly/vjiMVw) to see a tkprof report of this query, demonstrating how much work it performs.

The last approach, using the `SQL MODEL` clause, was supplied by Jichao Li from Tianjun, China. Li supplied the query in Listing 5.

Li used a threshold of 20,000 to demonstrate a different grouping, but the net result is the same. (Simply replace or bind in a different value wherever you see 20,000 in this query to change it.)

I used procedural code in PL/SQL to answer the question, and Li used procedural code—to a degree—directly in SQL to answer the question. (See [bit.ly/rZtatb](http://bit.ly/rZtatb) for docu-

mentation on the `SQL MODEL` clause.) This SQL query takes the same basic approach as the solutions above but uses different syntax. It starts by ordering the data by `STUDY_SITE`, assigns a row number to each row, and then uses that row number as an index on the result set, retrieving specific rows and columns (which is sort of like writing functions in a spreadsheet—only this spreadsheet is a result set). And it does the same sort of processing as in the PL/SQL and recursive subquery factoring solutions.

The end result: the `SQL MODEL` clause would be the best-performing approach overall to this problem by far. The PL/SQL pipelined function would come in second, and the recursive subquery-factored result third. Does that mean that the `MODEL` clause is always better than PL/SQL or the recursive approach? Absolutely not. Any of these three will be the “best” approach in different circumstances. It is always good to have many approaches in your tool belt and to benchmark them to see which is best for solving a specific problem. ◀



**Tom Kyte** is a database evangelist in Oracle’s Server Technologies division and has worked for Oracle since 1993.

## NEXT STEPS

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Tom Kyte answers your most difficult technology questions. Highlights from that forum appear in this column.  
[asktom.oracle.com](http://asktom.oracle.com)

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**ORACLE®**

## ORACLE DATABASE

# Why WHERE Matters

Part 4 in a series on the basics of the relational database and SQL



Part 3 in this series, “Getting Answers with SELECT Statements” (*Oracle Magazine*, January/February 2012), introduced the anatomy of a SELECT statement (or *query*) and the importance of ascertaining which tables contain data of interest. Now that you’re familiar with a SELECT statement’s basic functionality, you can start filtering your data to limit the output in meaningful ways. The WHERE clause enables you to narrow the scope of the data a SELECT statement retrieves (or *fetches*). WHERE, and its associated comparison and logical operators, are the focus of this article.

To try out the examples in this and subsequent articles in the series, you need access to an Oracle Database instance. If necessary, download and install an Oracle Database edition for your operating system, available at [bit.ly/fherki](http://bit.ly/fherki). I recommend installing Oracle Database, Express Edition.

If you install the Oracle Database software, choose the installation option that enables you to create and configure a database. A new database, including sample user accounts and their associated *schemas*, will be created for you. (Recall from Part 1 of this series that a schema

is typically a grouping of objects, such as tables, that serve a similar business function.) SQL\_101 is the user account you’ll use for the examples in this article; it’s also the schema in which you will create database tables and other objects. When the installation process prompts you to specify schema passwords, enter and confirm passwords for SYS and SYSTEM and make a note of them. Finally, whether you installed the database software from scratch or have access to an existing Oracle Database instance, download and unzip the SQL script available at [bit.ly/z4VEU4](http://bit.ly/z4VEU4) and run it to create the example tables for the SQL\_101 schema.

The SQL queries in this article are executed against tables in the SQL\_101 schema with the SQL\*Plus tool.

## SETTING LIMITS BY COMPARING

To filter the data a query retrieves, you add a WHERE clause—also called a *predicate list* or a *set of conditions*—to your SQL statement. In a nutshell, the WHERE clause specifies criteria that must be met before records are included in your query result set. The WHERE clause must specify a WHERE clause *condition* (or conditions)

that the database software evaluates to be true or false—alternatively, the software can determine the absence of a value. A WHERE clause consists of conditional *expressions*. A conditional expression takes the form

```
<left_expression> <as compared with>
<right_expression>
```

Here are some examples of common types of conditional expressions:

```
WHERE <column_name> =
<literal_character_value>
WHERE <column_name> IN (3, 7, 9)
WHERE <column_name> >= 100
WHERE <column_name> LIKE 'E%';
WHERE <column_name> BETWEEN 100 AND 500;
```

A literal character value, or *string*, is any list of alphanumeric characters enclosed in single quotation marks, such as ‘Smith’, ‘73abc’, or ‘15-MAR-1965’.

*Comparison operators* compare expressions to determine the appropriate data for selection. Table 1 shows commonly used comparison operators.

## THE IMPORTANCE OF (IN)EQUALITY

The most commonly used comparison operator is the *equality* operator, =. For example, if you wanted to find out the names and hire dates of all employees with an annual salary of \$70,000, you could execute the SQL query in Listing 1.

The value stored in the SALARY column is compared with the literal value 70000 to determine whether the values are equal. Each row that satisfies the WHERE clause condition is retrieved.

Sometimes you might want to exclude certain data from your query results. For example, after the query and result in

Operator	Definition	Example
=	Equal	WHERE last_name = 'Michaels'
!= <>	Not equal Not equal	WHERE salary <> 100000
> >=	Greater than Greater than or equal to	WHERE salary >= 70000
< <=	Less than Less than or equal to	WHERE salary <= 85000
IN (...)	List of values	WHERE SALARY IN (70000, 85000, 100000)
BETWEEN ... AND ...	Inclusive of two values (and all values between them)	WHERE SALARY BETWEEN 70000 and 100000
LIKE	Does pattern matching with wildcard characters % and _	WHERE first_name LIKE 'F%'
IS NULL IS NOT NULL	Tests for null values Tests for non-null values	WHERE manager IS NULL

Table 1: SQL WHERE clause comparison operators

Listing 1, you already know the name, hire date, and salary of the employee named Matthew Michaels. To get the same information for all other employees, you could

execute the query in Listing 2. As you can see, the query uses the inequality operator, `!=`, and retrieves every row except the one with the `LAST_NAME` value of Michaels.

**Code Listing 1:** Query for finding employees whose salary equals \$70,000

```
SQL> select first_name, last_name, hire_date, salary
  2   from employee
  3   where salary = 70000;
```

FIRST_NAME	LAST_NAME	HIRE_DATE	SALARY
Matthew	Michaels	16-MAY-07	70000

1 row selected.

**Code Listing 2:** Query that excludes the employee Michaels

```
SQL> select first_name, last_name, hire_date, salary
  2   from employee
  3   where last_name != 'Michaels';
```

FIRST_NAME	LAST_NAME	HIRE_DATE	SALARY
Frances	Newton	14-SEP-05	75000
Emily	Eckhardt	07-JUL-04	100000
Donald	Newton	24-SEP-06	80000

3 rows selected.

**Code Listing 3:** Query using a literal value (case-sensitive) in a WHERE clause condition

```
SQL> select first_name, last_name, hire_date, salary
  2   from employee
  3   where last_name = 'MICHAELS';
```

no rows selected

**Code Listing 4:** Query that performs an implicit datatype conversion

```
SQL> select first_name, last_name, hire_date, salary
  2   from employee
  3   where salary = '70000';
```

FIRST_NAME	LAST_NAME	HIRE_DATE	SALARY
Matthew	Michaels	16-MAY-07	70000

1 row selected.

**Code Listing 5:** Query for selecting records within a range of values

```
SQL> select first_name, last_name, salary
  2   from employee
  3   where salary BETWEEN 75000 and 85000;
```

FIRST_NAME	LAST_NAME	SALARY
Frances	Newton	75000
Donald	Newton	80000

2 rows selected.

Be aware that when you compare a database column value with a character literal, or string, the case of the data contained in the database column must, by default, exactly match the case of the data contained in the string. The query in Listing 3 returns no rows, because the case of the string denoting the employee's last name is different from that of the data stored in the `EMPLOYEE` table's `LAST_NAME` column.

You'll learn about converting string literal data to match the case of data contained in a database column (and vice versa) in subsequent articles in this series.

Note in the example in Listing 3 that when you compare a string literal with a database column value, you must enclose the string literal value in single quotation marks. The same requirement is true for comparing date literals with database column values.

Any two values you compare with each other must be of the same datatype. Compare only numbers with numbers, strings with strings, and dates with dates. Whenever possible, Oracle Database will perform an implicit datatype conversion, but in general, you should avoid allowing Oracle Database to do so. The query in Listing 4 will return a result, but as a best practice, you should never compare a number with a string.

## THE RANGE OF INCLUSION

Sometimes you need to obtain a set of records (rows) that falls within a certain range of values. You can do so with the `BETWEEN` operator, as in Listing 5.

The results of a `BETWEEN` operation can include the listed values that define the range. Therefore, in the example in Listing 5, the result list includes an employee with a salary of \$75,000, the lower end of the range, along with one whose salary of \$80,000 is between the upper and lower listed values. The `BETWEEN` operator is used most often for number and date comparisons.

## THE GREATER AND THE LESSER

The comparison operators `>`, `>=`, `<`, and `<=` are useful if you need to obtain a set of records that fall either above or below

**Code Listing 6:** Query using less than or equal to operator

```
SQL> select first_name, last_name, salary
2   from employee
3   where salary <= 80000;
```

FIRST_NAME	LAST_NAME	SALARY
Frances	Newton	75000
Donald	Newton	80000
Matthew	Michaels	70000

3 rows selected.

**Code Listing 7:** Query using LIKE operator with literal string and wildcard values

```
SQL> select first_name, last_name, salary
2   from employee
3   where last_name like 'N%w%';
```

FIRST_NAME	LAST_NAME	SALARY
Frances	Newton	75000
Donald	Newton	80000

2 rows selected.

**Code Listing 8:** Query using LIKE operator with wildcard and literal values

```
SQL> select first_name, last_name
2   from employee
3   where last_name like '__w%';
```

FIRST_NAME	LAST_NAME
Frances	Newton
Donald	Newton

2 rows selected.

**Code Listing 9:** Query using IN operator with a list of values

```
SQL> select first_name, last_name, salary
2   from employee
3   where salary in (75000, 85000, 100000);
```

FIRST_NAME	LAST_NAME	SALARY
Frances	Newton	75000
Emily	Eckhardt	100000

2 rows selected.

**Code Listing 10:** Query using NOT and LIKE operators

```
SQL> select first_name, last_name
2   from employee
3   where last_name NOT LIKE 'N%';
```

FIRST_NAME	LAST_NAME
Emily	Eckhardt
Matthew	Michaels

2 rows selected.

certain criteria. In Listing 6, the *less than or equal to* operator, `<=`, is used to fetch a list of employees whose yearly salary is less than or equal to \$80,000.

### MATCH WHAT YOU LIKE

Whenever you don't know or remember the exact spelling of a data value such as a name or you suspect data corruption (incorrect values in your database), you may want to perform an inexact search. The LIKE operator can help you carry out such a task. This operator performs pattern matching by using wildcard characters. The underscore (`_`) wildcard denotes a single character, and the percentage (`%`) wildcard denotes any number of characters (including zero characters). The query in Listing 7 obtains records in which the last name begins with the uppercase letter *N* and contains the lowercase letter *w*. In the query in Listing 7, an unknown number of characters can exist between the *N* and the *w*, and an unknown number of characters can exist after the *w*—hence the use of two `%` wildcards in the expression.

Consider the query in Listing 8. In this example, the WHERE clause limits the result set to rows in which the last name begins with two characters, has a lowercase letter *w* as the third character, and ends with any character(s) or at the third character. You can place the `%` or `_` wildcard character anywhere within a literal character string (which, as always, must be enclosed in single quotation marks).

### THE IN CROWD

The IN operator evaluates a comma-delimited list of values enclosed within a set of parentheses. The query in Listing 9 uses the IN operator to retrieve employees who have an annual salary of \$75,000, \$85,000, or \$100,000.

### NEGATING WITH NOT

The BETWEEN, IN, and LIKE comparison operators can all be negated with the NOT *logical operator*. (I'll describe logical operators shortly.) Consider the query in Listing 10. This query returns all the employees whose last name does *not* begin with an uppercase letter *N*.

**Code Listing 11:** Query using IS NULL operator

```
SQL> select first_name, last_name, manager
2   from employee
3   where manager IS NULL;
```

FIRST_NAME	LAST_NAME	MANAGER
Frances	Newton	
Emily	Eckhardt	

2 rows selected.

**Code Listing 12:** Query using AND logical operator to combine multiple predicates

```
SQL> select first_name, last_name, manager, salary
2   from employee
3   where salary > 75000
4   AND manager IS NULL;
```

FIRST_NAME	LAST_NAME	MANAGER	SALARY
Emily	Eckhardt		100000

1 row selected.

**EXISTENCE OR ABSENCE OF VALUES**

Recall from Part 1 in this series that the absence of a value is referred to as a *null* value. A null value cannot be equal or unequal to another null value or to any non-null value. Therefore, you must always use the IS NULL or IS NOT NULL comparison operators to evaluate whether a data value is null or not. For example, the query in Listing 11 returns employees who do not yet have an assigned manager.

Note that the DISTINCT keyword (which you learned about in Part 3 of this series) recognizes and returns NULL values:

```
SQL> select DISTINCT manager
2   from employee;
```

MANAGER
28

2 rows selected.

To eliminate null values from a result set derived from a query that uses the DISTINCT keyword in its SELECT list, you can use the IS NOT NULL operator in your WHERE clause:

```
SQL> select DISTINCT manager
```

```
2   from employee
3   where manager IS NOT NULL;
```

MANAGER
28

1 row selected.

**TRUTH IN LOGIC**

WHERE clauses with only one predicate are rare. The logical operators AND and OR are used to group multiple predicates contained within the same WHERE clause of a single SQL statement. Each added predicate further filters your result set. If two conditions are combined via the AND operator, both conditions must evaluate to true to produce a result. If two conditions are combined with the OR operator, only one of the conditions needs to evaluate to true to yield a result.

For example, the SQL statement in Listing 12 combines two comparison operators by using the AND logical operator. The result displays employees who do not have an assigned manager (according to the EMPLOYEE table) and whose salary is greater than \$75,000.

Using the OR logical operator instead of the AND operator changes the result set to

include two more rows, as shown in Listing 13, available in the online version of this article at [bit.ly/z3k0qj](http://bit.ly/z3k0qj).

The online article also includes information and examples on the precedence of the AND and OR logical operators and how grouping expressions in parentheses helps to control the order of SQL operation.

**CONCLUSION**

Only rarely will you write a query without a WHERE clause, and this article has shown you how to use the WHERE clause to expand upon simple SQL SELECT statements and filter data of interest to receive a more meaningful result set. You've seen how comparison operators are used in conjunction with the WHERE clause to help you specify your desired result. You've also seen how logical operators can be used to further filter your data by grouping predicates.

The next installment of SQL 101 will examine the ORDER BY clause of a SQL statement and take a closer look at Oracle's SQL\*Plus tool. ◀

**Melanie Caffrey** is

a senior development manager at Oracle. She is a coauthor of *Expert PL/SQL Practices for Oracle Developers*

and DBAs (Apress, 2011) and *Expert Oracle Practices: Oracle Database Administration from the Oak Table* (Apress, 2010).

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# Happiness Is a User Group

Feedback connects user group membership to happy customers.

I've talked before about the value of user groups, and in particular the value of membership within Oracle Development Tools User Group (ODTUG). In this column, I'd like to provide an example of this value proposition.

During our most recent conference, Kscope11 in Long Beach, California, one of our members—Blake Hughes, a data architect with Meridium—approached ODTUG Director Monty Latiolais with questions about Oracle Label Security. When Latiolais could not come up with the answers, he got Hughes' contact information and promised to try to help him find the answers he needed.

Hughes was looking for resources, understanding of the performance implications, pricing and other costs, software dependencies, and references from customers who have implemented Oracle Label Security. Latiolais reached out to ODTUG's contacts on the Oracle Global Customer Programs team, who then connected the proper experts with Hughes to answer his questions.

This connection process is not unusual for user group leaders, nor is it unique to ODTUG. We form many critical relationships with many members of the Oracle team. These Oracle team members might be in the Oracle Global Customer Programs area, or they might be product managers, developers, or instructors. We leverage these relationships for the betterment of the user community.

Could Hughes have found his answers elsewhere? Maybe the better question is, could Hughes have gotten better or faster answers elsewhere? My answer would be an emphatic *no*. User groups not only provide a network among users, but the members are also able to leverage other relationships for the good of the community.

## FEEDBACK HIGHLIGHTS

Oracle Global Customer Programs solicits feedback from Oracle customers, and recent

**User groups not only provide a network among users, but the members are also able to leverage other relationships for the good of the community.**

customer feedback—based on a mix of customers who were members of user groups along with customers who were not—produced some very interesting findings. Jeremy Whyte, senior director of customer feedback and reporting at Oracle, summarized the information to various user groups and Oracle employees. The reporting clearly indicated that Oracle's customers who were members of user groups (and this could be any user group, including international, national, regional, and local) are more satisfied with Oracle than customers who were not user group members, and they are more likely to recommend Oracle products and services to others.

This information highlights the value of user groups, both to the members of the user groups and to the greater Oracle ecosystem. The user groups provide learning, networking, and support systems to assist their members. Whether it be from conference experiences and networking opportunities, online education efforts, or user group infrastructure such as discussion forums and online educational resources, user group members take full advantage of the user group offerings to do their jobs better. Everyone, including Oracle, benefits from this satisfaction.

Underscoring the value of the user groups to their membership and to the Oracle ecosystem, Jeb Dasteel, senior vice president and chief customer officer at Oracle, has this to say: "Over and over again, we see that user group members are by far the most active and satisfied customers in our entire customer base. One of the best things that any Oracle customer can do to maximize the value from the investment is to join a user group."

As a member of a user group, I have personally benefited from that membership. If I find myself having technical questions I cannot answer, I pick up the phone or send off an e-mail. This was true prior to my being elected to ODTUG's board of directors, and it's remained true since I have become an ODTUG board member. I have also helped other members in answering their questions or pointing them in the right direction, just as Monty Latiolais did for Blake Hughes. I hope that if you are not already a user group member, this column will encourage you to explore becoming a member of one of the many Oracle user groups worldwide at [oracle.com/technetwork/community](http://oracle.com/technetwork/community). You'll be glad you did! ◀



**Mike Riley** ([mriley@hortica-insurance.com](mailto:mriley@hortica-insurance.com)) is the president of ODTUG and an Oracle ACE.

## NEXT STEPS

### LEARN more about user groups

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# On the Road

An interview with Oracle President Mark Hurd

**P**rofit magazine Editor in Chief Aaron Lazenby recently interviewed Oracle President Mark Hurd for his insights on leadership, the state of the technology industry, and Oracle's product strategy. Hurd also reflected on his first year as president of what he calls "arguably the best-positioned IT company in the world." Excerpts from the interview appear below. For more of his thoughts, see "Mark Hurd: The Road Ahead," in the February 2012 issue of Profit magazine.

**Lazenby:** What initially attracted you to the technology industry?

**Hurd:** I was a business major in college and I liked the pace, the speed, and the growth opportunities in the technology industry. Technology offers the opportunity to completely transform businesses, and there's no doubt in my mind that it's still the most exciting place to be today.

**Lazenby:** What's the biggest change you've seen since your first technology job more than 30 years ago?

**Hurd:** Consumers today are more powerful, more global, and accessing more data—from everywhere in the world. And with the systems they have in place now, companies aren't going to be able to get consumers all the information they want when they want it. Data is doubling every three to three-and-a-half years. However fast you think the world has changed, that change is accelerating, and it's getting tougher to keep up.

**Lazenby:** What do you see as the core IT challenges facing businesses today?

**Hurd:** We as an industry have pushed tremendous complexity onto the customer.



Can you imagine buying a car from the IT industry? You'd get a muffler dropped off in your driveway. Someone else would drop off a set of seats. Another person would bring the pistons. Then you'd hire a systems integrator to come put it all together. At some point you'd have a car in your driveway, but then they'd say, "Well, you can't really drive it on the weekends because we've got a batch upload that happens then." In the IT industry, someone sells you a server, someone else sells you a storage array, we give you some software, and you get other software from someone else. Then you have to put it all together and make it work. And by the way, when something is broken, you figure it out. In the end, our industry has to change. We have to get people to think about this differently—to think about the opportunity before them now to integrate multiple pieces of their infrastructure so it all becomes simpler.

**Lazenby:** How is Oracle working toward this change?

**Hurd:** Today in the enterprise, Oracle Exadata is doing what the Apple iPad is doing in the consumer market—bringing together server, storage, and software into one integrated solution and changing the game on how services are deployed. How much of your IT budget is spent gluing together hybrid products? We're doing that for you now. With all of our engineered systems, we solve your problems with our R&D budget, not your IT budget.

**Lazenby:** As the highest-profile free agent executive on the market when you joined Oracle, why was this company the right fit for you?

**Hurd:** You don't get many recruitment calls from companies that say, "Hey, why don't you come to work for a very well-positioned company, to help make it greater? Oh, by the way, nothing is broken." Taking something that's really good and making it great—there aren't many of those opportunities.

**Lazenby:** How would you describe Oracle's corporate culture?

**Hurd:** Oracle is a very focused company with a performance-oriented culture. It's got a clear strategy, it's got an operating model that supports that strategy, and it's got great people. And I think it's a company that can be catalyzed to do even more and do it faster. ◀

**Aaron Lazenby** is editor in chief of Oracle's Profit magazine.

## NEXT STEPS

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