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MAGAZINE

SECURITY

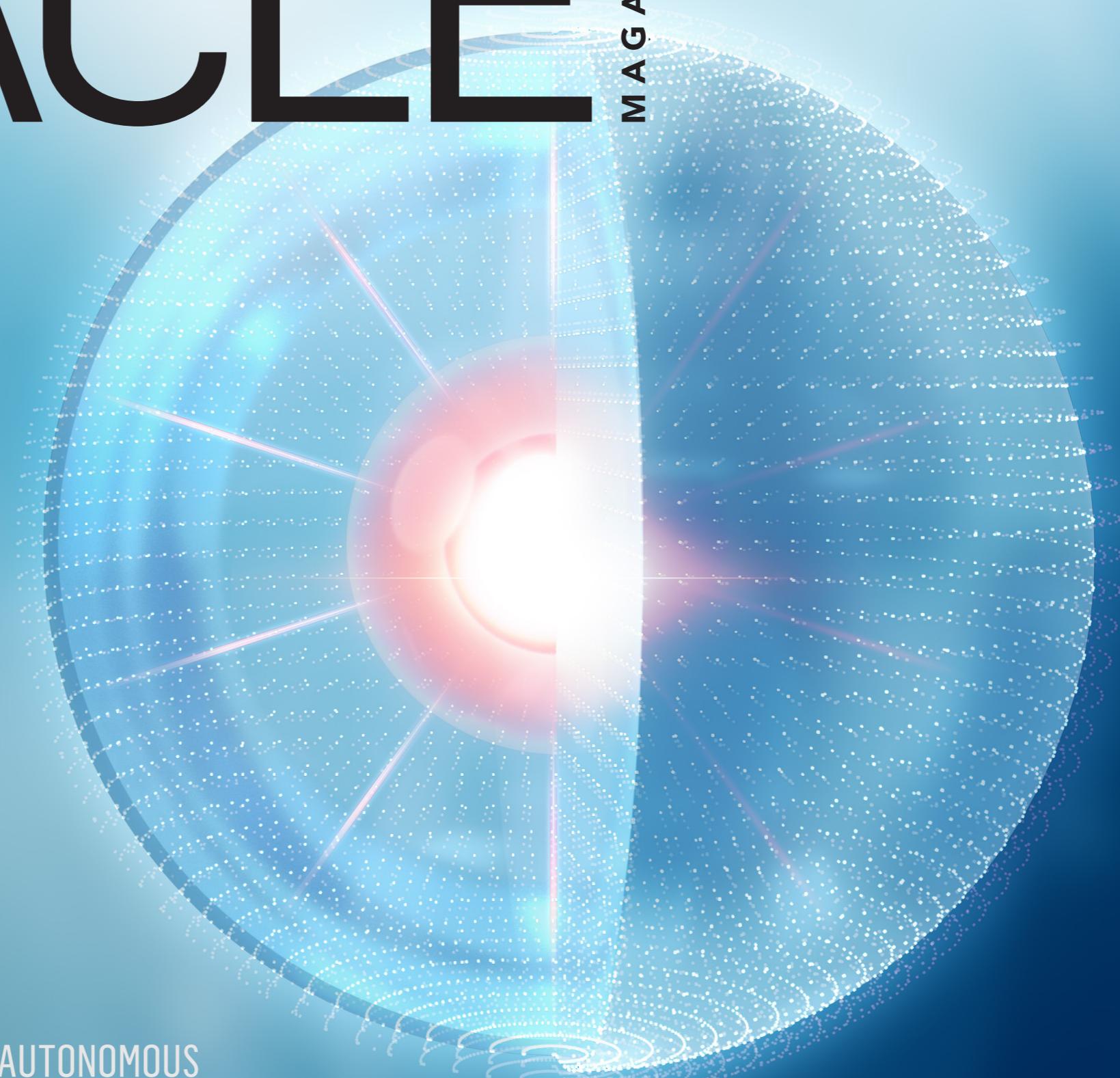
FROM THE CORE TO THE EDGE

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GENERATION 2:
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IT'S TIME

AUTONOMOUS
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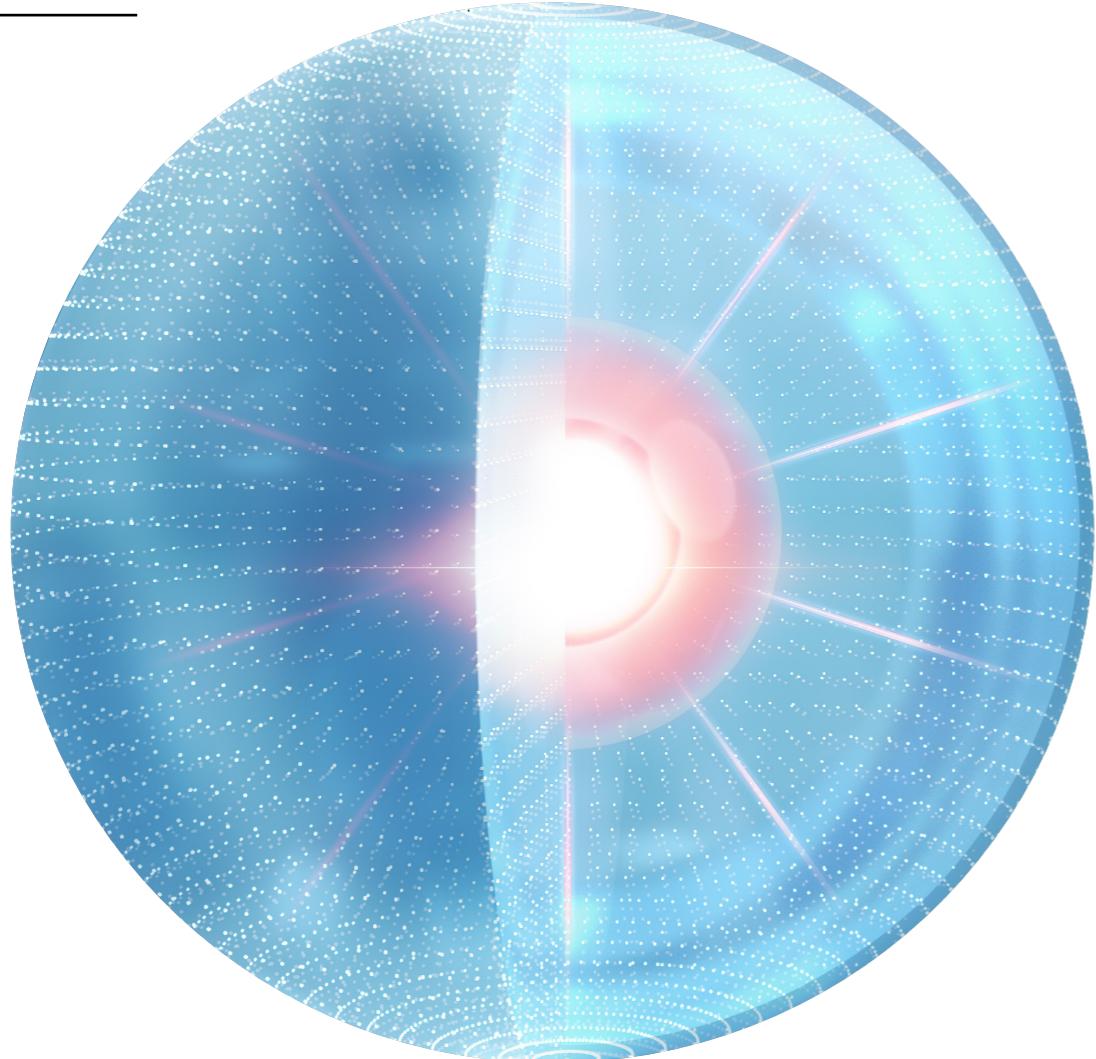
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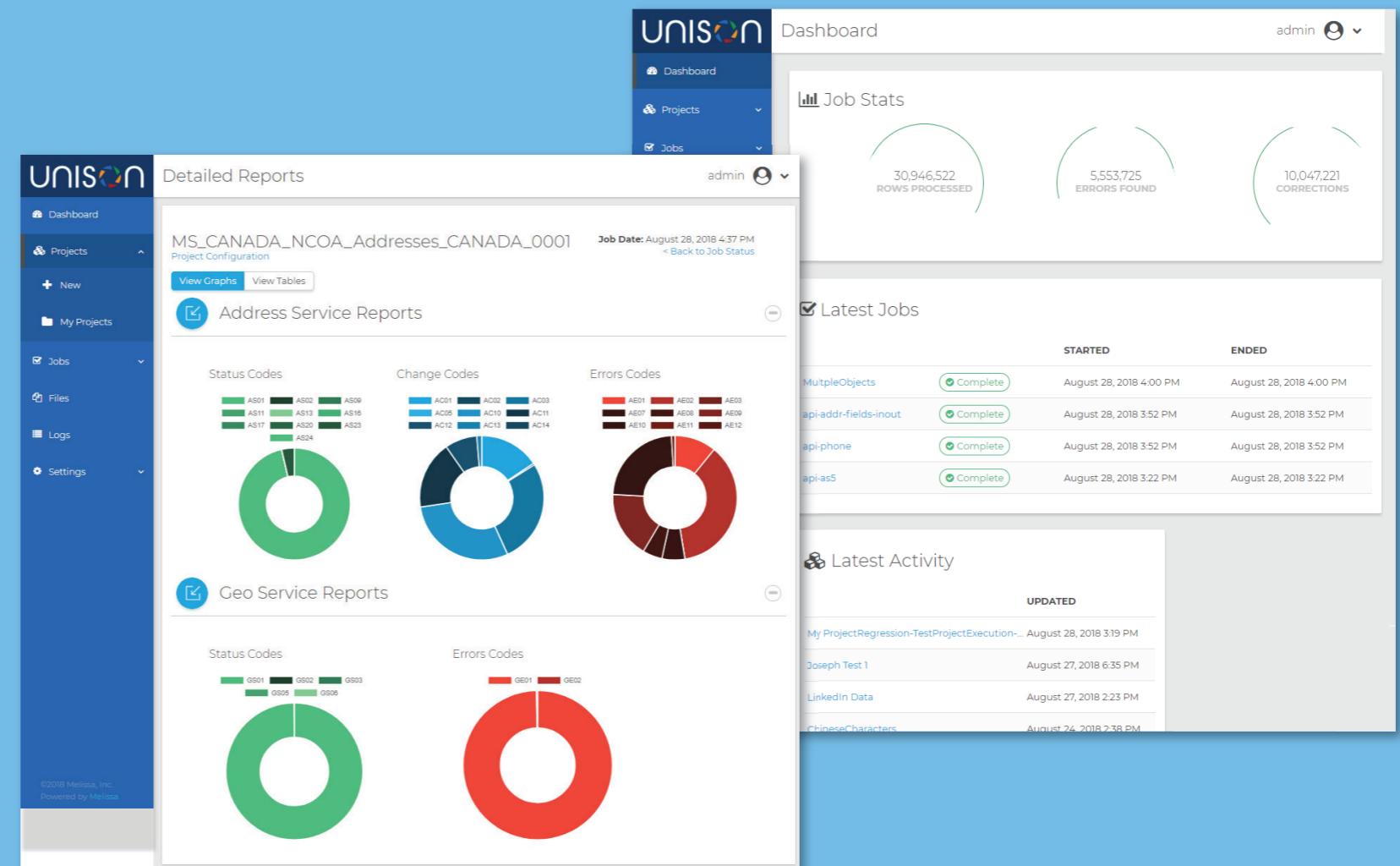
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- Reduce analytics busy work
- Services: Address, Name, Email, Phone Verification & Geocoding



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Tom Haunert



And the New Survey Says

The “Oracle and KPMG Cloud Threat Report” looks at trends and new concerns.

Having previously produced world-class security reports, Oracle and KPMG are due to release their next one in February 2019, based on extensive interviews with 450 companies.

I recently sat down with Greg Jensen, senior director of cloud security at Oracle, to talk about the data he'd just received from those interviews and what will make the “Oracle and KPMG Cloud Threat Report” different from other security reports. While some reports are based on metrics gathered by security vendors, others are survey-based.

“Oracle saw there was too little conversation about the security risks and challenges organizations are facing as

they're lifting and shifting their workloads to the cloud,” Jensen says. “We concluded we wanted to align with an industry partner such as KPMG to consolidate our research and findings.”

The 2019 report will confirm, for example, that companies are moving more and more of their sensitive data to the cloud. It also will delve into the issues of unsanctioned application use in the cloud, and it will look at the challenges of maintaining consistent security practices and configuration baselines both in the cloud and on premises. The 2019 report will also look at how ineffective patch management programs are having a negative impact on orga-

nizations, as well as how effectively leadership's goals are being delivered in completed security projects.

NEEDED: A BROAD VIEW

I asked Jensen how Oracle expects people to use the report's findings, and he surprised me.

"People should consume four or five different reports to get a broad overview of security risks," he says. "Organizations need a variety of security information from a variety of sources, and the 'Oracle and KPMG Cloud Threat Report' can be a primary source of that security information. Informed security practitioners can then engage C-level leadership in conversations on risk, security, and compliance."

In the next (March/April) issue of *Oracle Magazine*, look for more on the "Oracle and KPMG Cloud Threat Report" as well as articles on Oracle security technologies and cloud services.

Meanwhile, in this issue's ["Generation 2: Ready for Anything,"](#) Kyle York, vice president of product strategy for Oracle Cloud Infrastructure, talks about Oracle's next-generation cloud infrastructure in general and infrastructure security in particular—from the core to the user edge.



Tom Haunert,
Editor in Chief

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PHOTOGRAPH BY BOB ADLER/GETTY IMAGES

NEXT STEPS

EXPLORE the "Oracle and KPMG Cloud Threat Report."

LEARN more about Oracle Cloud security.

Onapsis Puts the Process of Security to Work for Oracle E-Business Suite

Complementing Oracle's security toolsets to deliver deeper, more actionable recommendations

An Interview with Michael Miller, Senior Security Architect, Onapsis

A proven market leader in cybersecurity, Onapsis offers solutions to automate the monitoring and protection of enterprise resource planning (ERP) systems, keeping these business-critical applications compliant and safe from insider and outsider threats. Global enterprises trust Onapsis to protect the essential information and processes that run their businesses.

Experts at the Onapsis Research Labs are instrumental in helping popular ERP solution providers such as Oracle uncover and address security vulnerabilities.

Their patented technology is well known industrywide and has gained Onapsis recognition on the Deloitte Technology Fast-500, as a Red Herring North America Top 100 company, and as a SINET 16 Innovator.

Q: We're seeing constant evolution in the threat landscape, from hacktivist groups to nation-state sponsored actors. New entities are increasingly targeting internal ERP applications. What is the Onapsis strategy to combatting these new threats?

A: Although the business benefits



Michael Miller, Senior Security Architect, Onapsis

provided by ERP solutions such as Oracle E-Business Suite are immense, the complexity of supporting and securing these sophisticated solutions can be an issue. Everything we do here at Onapsis is about the process of security. No one team, tool, technique, or vendor is going to secure you. Security is only created by you, your teams, and your people following processes—and often using tools. What we do here at Onapsis is think about those processes and consider how we can make people work smarter, add value, and create solutions.



For more information, visit
www.onapsis.com

Q: How does Onapsis work with ERP leaders like Oracle to put this strategy into motion?

A: Our relationship with Oracle and other industry leaders is based on a productive, ongoing dialogue. Oracle offers a variety of tools to help clients build stronger security processes, such as the Oracle Advanced Security option, Oracle Database Vault, and Oracle Audit Vault and Database Firewall. All of these products are excellent tools and work superbly with ERP platforms such as SAP, PeopleSoft, and Oracle E-Business Suite. We do our best to make clients aware

Update included 254 security patches—176 of which were reported by Onapsis after discovery in our research labs. ERP applications are complex, and our objective is to offer clients a security and compliance solution, so they can operate their environments with more security and sleep easier at night.

Q: How do Onapsis solutions build on the capabilities that Oracle's own tools deliver?

A: Onapsis complements Oracle's robust security tools with a platform that acts

For ERP systems, we simplify some of the technical data, while at the same time pulling back to provide the level of granularity for those people who need it.

Q: Organizations have access to many security tools that examine their ERP databases. What makes the Onapsis solution and approach different?

A: The Onapsis platform is more than just a scanner that looks only at the database. Our focus is very much on the applications. It's the blind spots in the application layer that the traditional security tools aren't really identifying. We find those blind spots, running scheduled scans and automating that process, to uncover vulnerabilities and provide recommendations on what to do. We are looking to provide a holistic sense of risks involved in operating an ERP platform such as Oracle E-Business Suite.

We are giving clients complete visibility into how their ERP applications are secured. Your company's crown jewels sit in the Oracle database, which can be exploited through ERP application vulnerabilities. Onapsis gives you visibility into those applications, identifies the vulnerabilities, and helps you mitigate the risks to keep your company's most critical assets secure.

“Your company’s crown jewels sit in the Oracle database, which can be exploited through ERP application vulnerabilities. Onapsis gives you visibility into those applications, identifies the vulnerabilities, and helps you mitigate the risks to keep your company’s most critical assets secure.”

—Michael Miller, Senior Security Architect, Onapsis

of them and how Onapsis complements them to strengthen overall security.

Our research organization maintains close communication with Oracle. For example, Oracle's April 2018 Critical Patch

as a lens by and for security and risk professionals, as well as technologists, to deliver a centralized view and provide the insights they need to get their teams working together harmoniously.

Q: Uptime is especially critical for ERP applications that support an organization's most essential business processes. How do you help organizations prioritize their security choices?

A: We triage the risk and present information so that it can be applied directly to decision-making. Every organization has limited time and resources, and they need to understand how to best spend their next dollar, or their team's next hour. They're thinking about whether they need to apply a particular set of patches, or work through configuration changes and test those for safe operation. Onapsis provides automation to help them avoid the need to manually examine all their security configuration variables and free up resources for more strategic tasks.

Q: Given the tremendous scale and complexity of many Oracle E-Business Suite environments, what strategic steps would you recommend to help an organization move forward in terms of security strategy?

A: There are four security strategies I recommend for organizations wanting to establish their own process of security.

1. Implement defense in depth, which is a time-tested recommended best practice.

Consider one of Oracle's security offerings such as Oracle Advanced Security to strengthen your security in depth. Oracle Advanced Security is a superbly designed, low-risk tool, fully certified for use with ERP solutions such as Oracle E-Business Suite. It provides security functionality such as data-at-rest (encryption). Of particular note, with release 12c, Oracle has done a phenomenal job with the data redaction that comes as part of that option.

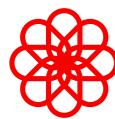
2. Run Oracle's E-Business Suite diagnostics. Within the diagnostics module in Oracle E-Business Suite, there are a number of comprehensive security checklists that you can use. You should absolutely run those if you haven't. Run them often if you can, ideally on a recurring schedule.
3. Document your processes, whether you are running Oracle E-Business Suite or another solution. Develop a formal policy in writing that identifies the governance and behaviors for securely building, operating, maintaining, and using databases, as well as your ERP product of choice. Once these policies are documented, you can communicate to your employees, as well as to third

parties and external auditors, what your process of security is and how you are going about meeting those process requirements.

4. Visit our website and learn more about what we are doing with the process of security, how we are taking that thought process to the next level. If you're interested in Oracle diagnostics, come take a look at our Onapsis Security Platform—we take that to the next level.

Q: How can readers get a better sense of where they are today, to understand the best ways to enhance their security processes?

A: Onapsis offers a [Business Risk Illustration](#), which is essentially a security compliance assessment for ERP platforms such as Oracle E-Business Suite. We look closely at a client's security checks, running our Onapsis Security Platform within their environment. For example, with [Onapsis Security Platform for Oracle E-Business Suite](#), we might focus on their development, testing, or QA environments. It takes 30 minutes to install, it's noninvasive to the Oracle E-Business Suite environment, and it produces a detailed summary report of all existing vulnerabilities. ■



Intelligence Everywhere

AI-driven gadgets and apps, security 101, and results from a massive developer survey



Bonjour

Using an alarm clock that adjusts your wake-up time to weather and traffic conditions, turns up the thermostat, and flicks on the lights—that's a truly intelligent way to start your day. Tell your AI-driven voice-activated Bonjour smart alarm clock to remind you what's first on your agenda for the day, ask it how long it will take you to commute to work, remind it to let you sleep in if it's raining, order it to play relaxing music and dim the lights at bedtime, and more. US\$249. [holi](#)

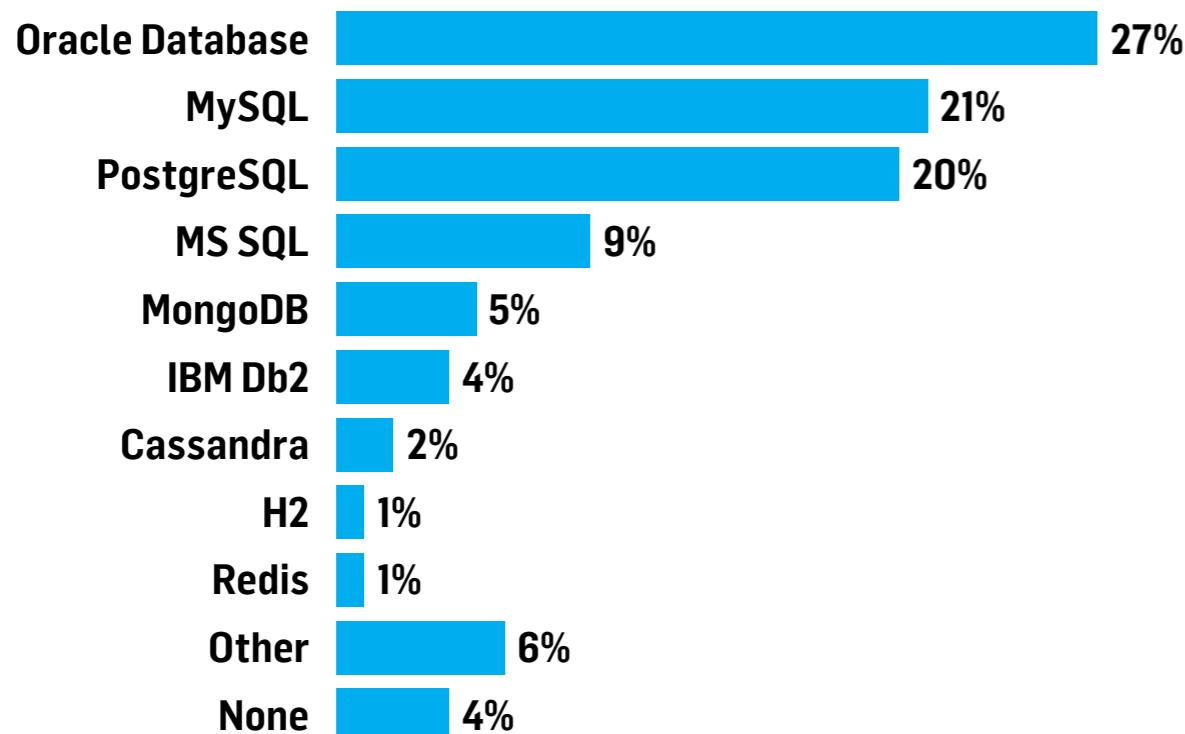


Netatmo Smart Indoor Camera

Place this sleek Netatmo security camera indoors, point it at your door, use its (free) app to teach it to recognize loved ones' faces, and voilà: The next time a stranger enters your house, you get an immediate alert along with video footage. The camera's AI machine learning capabilities help it recognize faces from any angle or direction—and prevent false positives when a welcome relative or pet wanders in. The Netatmo also alerts you when it hears smoke, CO, or other alarms in your home. US\$199. [Netatmo](#)

Top Database for Java Developers?

Java Magazine and security startup Snyk recently announced the results of the largest survey of Java developers ever conducted. On the question of which database developers use in production, almost 3 in 10 of the more than 10,500 respondents named Oracle Database, with the open source MySQL coming in a close second, at 21%. For a full analysis of the survey—which includes information about JDKs, tools, JVM languages, testing technologies, and more—see “[The Largest Survey Ever of Java Developers](#),” in the November/December issue of *Java Magazine*.



Source: [Java Magazine November/December 2018](#)

DO YOU SPEAK TECH? QUIZ YOURSELF!

1. A piece of code intentionally inserted into a software program to set off a malicious function when certain conditions are met is called
 - A. A logic bomb
 - B. Slag code
 - C. A trapdoor
 - D. All of the above

2. A maintenance hook is a security risk because
 - A. It's a gateway security vulnerability—so easy to exploit that it “hooks” technologists to a life of cybercrime
 - B. It allows entry into software code without the usual security checks
 - C. It prevents DBAs from maintaining a software program, because it “hooks” their identity and proceeds to track their digital activity for 30 days

3. In the context of security, a COOP is
 - A. A continuity of operations plan
 - B. The room in which DBAs are sequestered when a security breach is detected
 - C. A compromised overflow operation patch

Answers: 1. D, 2. B, 3. A

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Three (very) smart apps for your mobile device



ELSA Speak

If for some reason you have to speak like an American, meet ELSA—an English language speech assistant and coach that fits in the palm of your hand. Powered by state-of-the-art voice recognition technology, ELSA boasts an AI-driven pronunciation coach that recognizes your voice and gives you instant feedback on pronunciation—not just via conversational exercises but also for common American expressions, idioms, and any word you select from the app's free online dictionary. [Free \(iOS, Android\)](#)



Socratic

What better use for AI than for doing homework? The Socratic app uses AI and data from millions of student questions to interpret your homework challenges. With jargon-free, bite-size answers gathered from a huge community of teachers, students, and other experts, the app gives students a 24/7 digital tutor for a variety of academic subjects such as math, science, English, history, and economics. Just snap a photo of the homework problem, and Socratic uses its AI capabilities to predict and present the concepts needed to solve it. [Free \(Android, iOS\)](#)



Ulli

Billed as the first predictive AI-powered mobile browser, Ulli removes the pain of typing and navigating the web with your big fingers on your little iPhone buttons: Tap on Ulli's Magic Button while viewing a web page, and the app's natural language processing capabilities bring up the most-relevant actions you might want to take—watch a movie trailer, say, or purchase a ticket, find a restaurant, or view a map. "Siri: Open my Ulli app and then say, 'Goodbye'?" [Free \(iOS only\)](#)

Real-Time Homomorphic Security Increasing ROI and Time to Market for Development Projects

ShieldIO and Oracle Cloud solve developer and tester problems with Developer Shield

An Interview with Simon Bain, Founder and Chief Technology Officer, ShieldIO

Developing against real, live data has always been the gold standard for application developers and testers—but security and compliance concerns have continued to move that data further out of reach. To solve this problem, Silicon Valley-based ShieldIO introduced Developer Shield, an innovative solution that allows developers to access and use real, live data securely, revolutionizing the development process while maintaining speed and security levels that until now have been elusive.

Q: Why is it important—and yet so challenging—for developers and testers to access real data?

A: Developers and testers must have access to data for the application development process to work. They can either develop against real data or create false data that approximates that data. Working with real data is complicated by compliance regulations. Working with false data has its own drawbacks. It can be very expensive to create, and while similar to the real data, it is totally different and can produce skewed results.



Simon Bain, Founder and Chief Technology Officer, ShieldIO

Q: How does Developer Shield give developers and testers access to real data quickly yet securely?

A: Developer Shield takes the live database and secures it using AI algorithms and keystore-less homomorphic security. As a result, sensitive fields cannot be read in plaintext and it provides a virtualized database that can be fully searched. The developers and testers never work with the live data. The data is protected while development, testing, and analytics are performed. The data is not



For more information, visit
www.shieldio.com

mocked up, and that allows for a faster, more robust, and accurate testing cycle—and a faster return on investment (ROI).

Q: What makes Developer Shield—and ShieldIO—unique in the marketplace today?

A: First, Developer Shield uses homomorphic encryption, which allows you to search encrypted data without

those changes will never be seen by other developers, and they're not reflected in the original database.

Q: How does ShieldIO work with Oracle Cloud to bring great solutions like Developer Shield to joint customers?

A: We use the Oracle platform to install, demonstrate, and test our software. To give developers secure access to data,

away from it because they think it's less secure. With Developer Shield and Oracle Cloud Infrastructure together, it's actually more secure—and it's definitely more cost effective.

We work closely with the Oracle Cloud Infrastructure team and we have a great two-way relationship. Our product delivers a secure virtualized instance to our customers' desktops through the cloud. Developer Shield is available for you to try on Oracle Cloud Jump Start Demo Labs and Oracle Cloud Marketplace. Check us out on [Oracle Cloud Marketplace](#) and request a [Developer Shield Demo](#). ■■

“The data is protected while development, testing, and analytics are performed. The data is not mocked up, and that allows for a faster, more robust, and accurate testing cycle—and a faster ROI.”

—*Simon Bain, Founder and Chief Technology Officer, ShieldIO*

decrypting it. We've overcome the speed lag that homomorphic encryption has had in the past, which means that developers and testers can work on the database without delays. Second, because we virtualized the database on the desktop, if anyone makes changes to the data structure,

you have to put it somewhere, and there's where you run into compliance issues. With virtualization and cloud delivery, your data never has to leave your area. That, combined with the cost savings, means that moving to the cloud is a very good option, even for those who have shied



Kyle York, vice president of product strategy at Oracle Cloud Infrastructure, explains that part of Oracle Cloud Infrastructure bare metal architecture means businesses can “move and improve” all of their tech investments to the cloud.

Generation 2: Ready for Anything

Oracle’s gen 2 cloud infrastructure is secure and ready for all workloads. **BY TOM HAUNERT**

The first wave of cloud technology was great at addressing the needs of startup companies building cloud native apps, but established companies with significant investments in on-premises technology needed a more powerful cloud infrastructure. In 2019, with a more secure, second-generation cloud infrastructure, the time for enterprise technology to “move and improve” from on-premises data centers to the cloud is now.

“Oracle Cloud Infrastructure enables businesses to take what they’re running in the data center and move it all to the cloud.”

Oracle Magazine sat down with Kyle York, vice president of product strategy at Oracle Cloud Infrastructure, to talk about generation 2 cloud infrastructure, cloud strategies, security, and more.

Oracle Magazine: At a high level, what is Oracle’s generation 2 cloud infrastructure?

York: One can think of the first-generation cloud as built for cloud native, net-new applications.

Gen 2 cloud infrastructure is excellent for those use cases as well, but it also enables enterprises to replace on-premises data centers with a cloud deployment model.

Oracle Cloud Infrastructure is Oracle’s gen 2 cloud infrastructure, and it’s what we’re building and operating today. It’s purpose-built for the enterprise and couldn’t have been built 10 years ago or 5 years ago, from both an architecture and an open-source-capabilities perspective.

Oracle Cloud Infrastructure is available globally, and it has the feature set, the capabilities, and the differentiation to run all the mission-critical, high-volume, high-performance databases and workloads for the world’s most demanding enterprises. Oracle Cloud Infrastructure is ready for any and all workloads.

Oracle Magazine: What are the key benefits to businesses using Oracle Cloud Infrastructure?

York: Oracle Cloud Infrastructure enables businesses to take what they’re running in the data center and move it all to the cloud. How Oracle Cloud Infrastructure supports that move and modern cloud-based operations maps to five strategic pillars.

The first pillar is all about protecting existing

INTERVIEW

"We view all security from the core to the edge. That's from the core of the infrastructure—the data center's compute, storage, and network—all the way to the edge of the infrastructure," says Kyle York, vice president of product strategy at Oracle Cloud Infrastructure.

investments. Businesses may have decades and decades of on-premises technology investments, and they are not just going to throw out all those investments. Part of Oracle Cloud Infrastructure bare metal architecture means businesses can "move and improve" all of their tech investments to the cloud.

The second pillar is security. This includes everything from network architecture and design to partnerships in networking and hardware. Oracle Cloud Infrastructure security encompasses security operations, network operations, and the Oracle products and services running on



Oracle Cloud. This kind of shared security and these shared security operations are incredibly important. Data security is a top priority in choosing enterprise infrastructure, and concerns about security are one of the reasons why we think the enterprise has been so slow to move to the cloud sooner, because there hasn't been a cloud that businesses can trust.

The third strategic pillar is mission-critical performance. It's important to look at the performance of cloud infrastructure, from the low latency of the network to the compute and the storage. But it's also important to deliver high performance at the lowest cost. The goal for Oracle Cloud Infrastructure is to have better performance than the rest of the cloud market—based on new architectures, new capabilities, and new technologies—but also deliver the best pricing for that performance so that our customers can more predictably manage costs. This is important for businesses looking at cloud offerings and measuring the cost benefits of their potential cloud solutions. Your cloud infrastructure should scale with your business needs, not run away from them.

The fourth pillar is Oracle's enterprise expertise, and that includes everything from tooling and support to professional services and our partner ecosystems. We have the ability to help enterprises migrate and operate in the cloud, and we are able to offer enterprise-grade technology to companies of any size, because of the nature of our cloud, which is very scalable and available on demand.

“Oracle Cloud Infrastructure isolates all customer traffic in a completely private, flat, three-layer, software-defined overlay network.”

The fifth pillar is openness, and that includes support for open source technology and interoperable standards. Openness makes it easy to move on-premises workloads, manage workloads, and orchestrate different workloads across customers' premises in a hybrid and multicloud world. We're also continuing to drive innovations in other areas, such as serverless computing, containers, orchestration, and streaming.

These five core pillars really drive business success and business value, and they're very deliberate strategic decisions made from day zero in building Oracle Cloud Infrastructure.

Oracle Magazine: What are the security-focused features of Oracle Cloud Infrastructure?

York: Security, as I mentioned, is a strategic pillar and a core principle of Oracle Cloud Infrastructure. It starts with the infrastructure of our data centers, from the way we architect networks to the way we isolate compute environments and network resources. That isolation ensures that no customer can see another customer's data or traffic or have access to the cloud control plane. Everything's isolated to ensure the utmost security for customers.

Oracle Cloud Infrastructure isolates all customer traffic in a completely private, flat, three-layer, software-defined overlay network. Our compute isolation provides each customer a dedicated bare metal server where customers can run their own operating system or hypervisors. Customers can also choose to leverage other types of computing resources, such as virtual machines and containers.

Our isolation between the vendor and the customer means that customers deploy their workloads in our compute and storage environments without any of our control code being accessible. It's a unique isolation mechanism and a first-class principle from the day we launched Oracle Cloud Infrastructure.

We view all security from the core to the edge. That's from the core of the infrastructure—the data center's compute, storage, and network—all the way to the edge of the infrastructure. That includes the domain name system (DNS), the global monitoring, and the global data services. But the edge also includes the end user connecting any application or workload. Security from core to edge is the end-to-end visibility and control that customers demand.

At Oracle OpenWorld 2018 in San Francisco, we announced four unique infrastructure security services and features. We launched the cloud infrastructure Web Application Firewall, which protects the edge of your network from malicious traffic, preventing botnet attacks and blocking bad traffic while ensuring that only

the good traffic gets into your applications and workloads. The firewall uses machine learning algorithms to train the technology to not let a bad actor who was in yesterday back in today. So it's whitelisting and it's blacklisting—it's a very adept service.

We also announced our distributed-denial-of-service (DDoS) protection. This is all about stopping volumetric and dispersed attacks, which are attacks that "fill the pipes" or send loads of bandwidth at your infrastructure and try to slow down access and/or take down endpoints. Web Application Firewall and DDoS are both edge security services.

The other two infrastructure security services are our Oracle CASB Cloud Service

(Oracle Cloud Access Security Broker Cloud Service) and Oracle Cloud Infrastructure Key Management. Oracle CASB Cloud Service is for monitoring and enforcing configurations inside your environment—and ensuring that things don't break because of human error. It also leverages machine-learning-based behavioral analytics to predict threats. Oracle Cloud Infrastructure Key Management gives customers the ability to control the encryption of their data. We use certified hardware security modules (HSMs) to deliver highly available, isolated, and encrypted data. Oracle CASB Cloud Service and Oracle Cloud Infrastructure Key Management Cloud are both core security services. □

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NEXT STEPS

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INTERVIEW



When it comes to “plans to build out AI and machine learning capabilities, companies today stand at a crossroads,” says Ian Swanson, vice president of product management AI and machine learning for Oracle Cloud.

Artificial Intelligence: It's Time

The technology is ready for business. Is your business ready? **BY BRITTANY SWANSON**

People may continue to call artificial intelligence and machine learning emerging technologies for decades, but the technology is ready to implement today. In order to avoid falling behind, businesses need to start moving on plans for AI and machine learning now.

“The good news is that the rise of solutions with integrated AI capabilities is helping to accelerate the journey to AI maturity.”

Oracle Magazine sat down with Ian Swanson, vice president of product management AI and machine learning for Oracle Cloud, to talk about enterprise AI and machine learning today: adoption challenges, ways to succeed, and how Oracle supports innovation.

Oracle Magazine: AI and machine learning, in particular, have been emerging technologies for some time. What is the state of these technologies in the enterprise today?

Swanson: In terms of plans to build out AI and machine learning capabilities, companies today stand at a crossroads. On the one hand,

by the end of the next decade, these technologies won’t be optional—McKinsey reports that AI will have an impact of US\$13 trillion on the global economy. Nonadopters will see significant decreases in cash flow. Yet, the challenges of supporting AI at scale—such as complex infrastructure and technology requirements and significant competition for limited talent—have, in many cases, caused companies to hesitate or fumble.

I talk to a lot of executives who are sold on the value of AI and machine learning but are unsure of how to scale. That pretty much defines the enterprise AI landscape right now. My former company, DataScience.com, which was acquired by Oracle in the summer of 2018, was focused on mitigating the issues that popped up along the way to enterprise AI: siloed teams, disparate tools, and limited computing power. Rarely did I encounter someone who didn’t see the potential value; often I heard, “How do I do this well?”—especially if they were looking to build and deploy AI from start to finish.

The good news is that the rise of solutions with integrated AI capabilities is helping to accelerate the journey to AI maturity. The goal of enterprise AI and machine learning

is not to achieve the kinds of feats you see in sci-fi movies but to automate redundant and time-consuming tasks, create more-personalized customer experiences, and improve operations.

Oracle Magazine: You mentioned infrastructure and technology challenges, among others. What keeps companies from capitalizing on the promise of AI?

Swanson: Let's say your data science team builds a machine learning model that returns results to customers in under one second. That's great—until you realize the fire hose of new data feeding the model causes it to decay just three hours after deployment. By the 24-hour mark, your model is useless. This is not hypothetical; this is a real scenario that played out at a multinational oil and gas company.

In order to keep this extremely valuable system up and running, the model in question needed to be retrained constantly—and as close to the time new data was produced as possible. This is the kind of challenge people don't talk about much when they wax poetic about AI. However, as you get into enterprise-scale projects that involve huge volumes of data, you're likely to run into a problem that seems, at first,

completely insurmountable. You're certainly not going to have the time to manually retrain models every three hours. But if you stop thinking about ad hoc fixes and start thinking about the system as a whole, there are plenty of solutions available.

Oracle Magazine: How do businesses overcome the talent challenges, the data volumes, the model retraining, and other requirements to succeed with AI and machine learning?

Swanson: What I always tell business leaders is this: Yes, you have to consider your talent needs, but you must also look at your technology and processes. At the beginning of the data science boom, everyone was rushing around trying to hire data scientists, with the mistaken impression that they'd solve all of a company's data problems. But the outcome was usually a bunch of reports that got lost under all the paperwork on someone's desk—or, even more disappointing, a machine learning model that would live and die on a data scientist's laptop because it was never deployed into production.

If you want to build a sustainable system that delivers predictions directly into applications,

you're looking at a problem that demands significant infrastructure capabilities, along with people who can move big data around and a way to push data science projects into a live production environment. You'll also be contending with a lot of tools. Data scientists are highly loyal to open source tools, so expect to support a wide variety of them.

Oracle Magazine: What is Oracle doing to help customers rev up their AI capabilities?

Swanson: Oracle offers solutions that touch every stage of AI maturity. As I mentioned before, some companies are in a place where they can't support custom AI. Oracle has brought machine learning-powered applications, intelligent user experience (UX) components, and conversational agents to enterprise resource planning (ERP), customer experience (CX), human capital management (HCM), and supply chain management (SCM). That means, for instance, that Oracle customers today can use the Oracle Customer Experience Cloud suite to generate offer recommendations—rather than building their own recommendation engine from scratch.

Organizations that want to build AI capabilities in-house can take advantage of Oracle product offerings in the cloud that allow them to build, train, deploy, and manage their own machine learning models. Along with the AI product offerings, Oracle Cloud Infrastructure adds significant value. AI and

“Oracle Autonomous Database is another great example of how Oracle is infusing its products with machine learning capabilities.”

machine learning projects regularly suffer from issues related to a lack of computational power; deep learning models, for example, often require GPU instances. Oracle offers the latest GPUs and also resolves other issues such as latency problems and high costs for heavy workloads by providing the best price per performance, low-latency data centers, and clustered networking.

And, of course, Oracle Autonomous Database is another great example of how Oracle is

infusing its products with machine learning capabilities: The database automatically upgrades, patches, and tunes itself, saving time and reducing costs for users, with the help of machine learning.

Oracle Magazine: How does Oracle support the future of AI?

Swanson: Oracle has a product stack that can support enterprise AI—all stages of it—today. That's a big deal. At the end of 2018, most research and advisory firms were reporting that

companies now know they need to embrace AI—evolve or die—but they haven't laid all the groundwork, especially in terms of infrastructure and process. Oracle's portfolio is poised to accelerate their journey to AI maturity on a massive scale. □

Brittany Swanson has been writing about technology and sales for nearly a decade. She is a principal product manager for Oracle Cloud, AI, and machine learning.

PHOTOGRAPHY BY RAFFI ALEXANDER

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HighJump and Fortinet bring ironclad security to supply chain management on Oracle Cloud

How Fortinet teamed up with Oracle to provide HighJump's customers with next-gen security

An Interview with Jared Mendenhall, Director of Cloud Operations/Security at HighJump



For more information, visit
www.fortinet.com

HighJump, a global provider of supply chain execution software solutions, provides warehousing and transportation systems across multiple verticals, including third-party logistics providers, retailers, wholesalers, and manufacturers. To secure its solutions on Oracle Cloud, HighJump turned to Fortinet, an Oracle partner and global provider of network security appliances, to provide the enhanced level of security to meet their customers' needs.

Q: What challenges brought you to Fortinet and Oracle Cloud?

A: At HighJump, we've been in the cloud space for a long time—even before it was actually called “the cloud.” Several of our products have been offered as a managed service for more than 15 years, so we've developed extensive expertise in building software as a service over that period of time. One of the keys to our success is staying in front of new and emerging technologies, and then finding ways to deliver our products



Jared Mendenhall, Director of Cloud Operations/Security at HighJump

in a way that adds meaningful value for our customers.

Our customers today are more demanding than ever, looking for a higher level of performance, security, availability, and scalability at a lower cost. Oracle and Fortinet help us deliver on those key elements.

Q: How does Fortinet deliver the same level of excellence that you deliver to your own customers?

A: Fortinet has partnered with us extensively to rely on Oracle Cloud

as our new cloud infrastructure. There was a lot of architectural design and work that went into building something that can both service our customers as they are today and to scale out into the future. Fortinet has gone above and beyond in assisting us with that effort, making sure that all the bits and bytes are working as designed, even pulling us together with development to find areas to improve the product. Our customers expect the same level of diligence within our solutions, so it's important that we align with vendors who have strong values.

“Fortinet’s continuous engineering effort brings the best products and features to the marketplace on behalf of the customer, specifically to Oracle and, in this case, to HighJump and our customers.”

– Jared Mendenhall, Director of Cloud Operations/Security, HighJump

Q: How does the relationship between Fortinet and Oracle help you bring added value to your customers?

A: Fortinet has a very mature firewall product stack—in terms of customer ratings and satisfaction for a firewall vendor, they're rated quite highly in the upper

right-hand quadrant for several Gartner Magic Quadrants. Our customers need and expect a high level of security, and some of Fortinet's key features are, from a customer penetration and customer support perspective, frankly unmatched. That was a key driver for us.

The relationship between Fortinet and Oracle makes it easy for us to take advantage of Fortinet's offerings, which bring an enhanced level of security to our customers. With this relationship, Fortinet

inside of the Fortinet product offering that will become more available in the marketplace as it continues to mature.

Fortinet's continuous engineering effort brings the best products and features to the marketplace on behalf of the customer, specifically to Oracle and, in this case, to HighJump and our customers. We're taking advantage of that. We're starting out with Fortinet's next-generation firewall and getting required components as our adventure in the cloud continues.

Q: Why is security always top of mind with anything that HighJump delivers to its customers?

A: The last couple of years have been a watershed moment for the supply chain industry around security. With new and emerging security threats, new compliance guidelines, and other pressures, security concerns are coming to the attention of people who haven't had to focus on it before now. Even warehousing staff, who aren't working extensively with PCI or sensitive personal data, are highly involved and engaged in the conversation. We think that's a great thing, and we want to exceed expectations when they come to us looking for a solution.

can provide more of its solution offerings in Oracle Cloud Marketplace. So it's not just the next-generation firewall that we're able to take advantage of, it's the management, it's the analytics, it's the troubleshooting components that are available, and it's the advanced features. There are other features

Q: Why does Fortinet on Oracle Cloud work so well for HighJump?

A: With its super-high performance at a low cost, Oracle Cloud has been a great differentiator for us. When you take the best performance you can get in the cloud and combine it with the best firewalling and security technology, you have a winning solution. Fortinet worked closely with Oracle to put the right solution together, making it easy and secure for us to do business with them. With Oracle helping Fortinet move forward with progressive customer interactions and network complexity requirements, we benefit from the work they've done behind the scenes to keep everything running smoothly, and we pass those benefits on to our customers in the form of top-notch security and peace of mind for their supply chains.

Q: How are Fortinet and Oracle working together to serve the needs of companies like HighJump?

A: Their relationship is all about the collaboration and the success of the customer. Everyone is moving to the cloud. Fortinet continues to work to understand the changing security requirements to be in the cloud versus on premises. While working

with us at HighJump, they were looking for and anticipating the unknown to solve and prevent problems. When they found problems, Fortinet reacted very quickly. They went through their proof of concept with great diligence. Together, Oracle and Fortinet have learned so much along the way. We've all come so far since our very first conversation. They have a commitment to doing smart things with smart people and providing smart solutions. With Fortinet and Oracle, we know they will keep doing the right thing for us and continue to be easy to do business with.

Q: What does the future hold for HighJump and Fortinet on Oracle Cloud?

A: Oracle Cloud is our go-to future-state cloud platform across our entire portfolio. One of the things that excites us about our relationship with both Fortinet and Oracle Cloud is the amount of development that's going into both of those solutions. Fortinet is adding new security functionality, and Oracle is building out next-generation features and technologies. Being in Oracle Cloud positions us to take advantage of those emerging technologies and build our solutions on them. When you team with people who are moving the market,

developing and establishing thought leadership, whether in security or in the cloud, you'll have a much higher chance of success—and being successful means providing a better experience for the customer. ■



By Bob Rhubart



Still Having Fun

The meandering career of Oracle Groundbreaker Ambassador Maurice Naftalin

In the early '60s in a public library in a small English town, a teenage Maurice Naftalin took the first step in a decades-long career when he discovered a book on the ALGOL 60 programming language. "I thought, 'This looks like it would be a lot of fun,'" Naftalin says.

But he wouldn't have access to a computer until 1971 while pursuing a postgraduate degree in chemical spectroscopy. One of his classes required him to write small Fortran programs for analyzing the imaging spectra. Other pursuits beckoned, "but I felt like programming was one thing that I really enjoyed, and it seemed like at that time, it was very easy to get a job," Naftalin explains.



Oracle Groundbreaker Ambassador Maurice Naftalin manages career and technology changes as he looks for the next big thing.

RECOGNIZE

The Oracle Groundbreaker Ambassador program recognizes modern experts who blog; write articles; and give presentations on topics such as containers, microservices, SQL, NoSQL, open source technologies, machine learning, and chatbots.

[Learn more and follow the Oracle Groundbreaker Ambassadors.](#)

The job he got was with British Steel Corporation, in 1974, where he worked on “an eccentric project” led by someone who had decided to invent a new programming language for operational research. Naftalin landed what he calls his “first real programming job” in 1977 but in 1982 shifted to a life in academia, turning down the ivory towers of Oxford University to teach at Wolverhampton Polytechnic. Two and a half years later, Naftalin moved to Scotland to take a position as a research fellow at the University of Stirling, where he split his time between research and teaching.

While at Stirling, Naftalin wrote a program that was designed to support “a different style of a specification development.” As he explains, “It was about refinement. The idea is you start off with a mathematical specification and you gradually transform it into a program, with every step being mathematically provable. So you end up with a program which you have proved, during its devel-

opment, is going to satisfy the precise specification you started off with. It’s a very attractive idea. Quite difficult to practice.”

But eight years at Stirling left Naftalin feeling “stuck.” So in 1992 he took a job at Lloyd’s Registry, a 200-year-old company whose original focus had been on certifying the seaworthiness of ships. The company wanted to move into the business of certifying software.

At Lloyd’s, Naftalin worked on the certification of the secondary protection system for the Sizewell nuclear power station, then the biggest nuclear development in Britain. He also worked on certifying the software for the power protection system in the Lockheed C-130 Hercules military transport aircraft, to ensure that the software met the stringent standards of the Royal Air Force.

In 1996 the internet and the World Wide Web were building up some serious steam and driving interest in Java. Naftalin left Lloyd’s to become a

freelance trainer specializing in Java.

"There was a period right up until the early years of this century when people just wanted to learn Java and you didn't have to teach them anything else," Naftalin says. And although Java's ubiquity has reduced the demand for introductory courses, "people still tend to want courses in Java enterprise technologies and Spring."

The training process has also changed, as online teaching eclipses classroom courses. "That's the way you have to go if you want to survive as a trainer."

That survival also means incorporating new languages—including Python, Kotlin, and Scala—into his course.

But adaptation is nothing new for Naftalin. In a career spanning more than half a century, three forces have dramatically shaped the programming landscape, he says.

The first is the ubiquity of cheap computing power. "When I started," he explains, "you submitted a deck of

cards and then waited for hours to be told that you had a typo on one line of your program."

The second force is the internet and the ease of distributing programs. Shelves of programming manuals have given way to Stack Overflow and similar sites. "There's an infinite amount of reference material available for free," Naftalin observes.

The third force, and the one that was the most surprising to Naftalin, is the influence of free software. "That's an extraordinary transformation," he says. "All of this stuff, which was proprietary, behind closed doors, and hidden, is now available for free. These free libraries have transformed the world for programs."

Along his winding career path and amid all the changes, Naftalin has earned his stripes. A Java Champion and Oracle Groundbreaker Ambassador, Naftalin continues to speak at developer conferences, teach, and write. "I'm not

inclined to retire," he says. "I still haven't really decided what I want to do when I grow up." □

*Oracle Architect Community Manager
Bob Rhubart is the host-engineer/*

producer of the [Oracle Groundbreakers Podcast](#) series; produces the [2 Minute Tech Tip](#) video series; and interviews technology experts in DevLIVE videos recorded at Oracle Code, Oracle OpenWorld, and other events.

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BOB ADLER/GETTY IMAGES

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READ Maurice Naftalin's Lambda FAQ.



By Alexandra Weber
Morales

Always Be Optimizing

How Java developer Jeanne Boyarsky finds flow

By day, Java expert and Oracle Code One speaker Jeanne Boyarsky works for a New York City bank. In her spare hours, she's a distinguished toastmaster, a volunteer high school robotics team mentor, and a developer with Code Ranch. So when she added authorship to her overflowing plate, she put a lot of thought into how best to manage her time-consuming hobbies and side projects.

"When I started book writing, I set boundaries on how much time I was willing to let that take up," Boyarsky says. "It's too easy to sacrifice time with friends and family—and relaxing, for that matter. Productivity isn't about getting the most out of each moment of the day. It's about getting the



Java expert Jeanne Boyarsky maintains a sustainable pace, rejects disturbances, and optimizes the little things.

most done within the time limits I've set for my work and my hobbies."

SUSTAINABLE PACE WITH POMODORO

The Pomodoro technique—named for the red, tomato-shaped Pomodoro 25-minute kitchen timer—is a popular method for improving concentration and productivity by working in 25-minute increments. It has inspired many books and videos, as well as a simple timer app, which Boyarsky swears by.

A morning person, Boyarsky knows that her most productive time typically is the first two to two and a half hours of the day. At work, Boyarsky finds that "getting in the zone" is time-boxed by meetings, questions, and other interruptions—and that turns out to be a good thing. Because she works on a team that follows the Scrum Agile methodology, "the daily standup meeting will prevent me from staring at the computer for too long," she says. "At home, there aren't such constraints, which means I could easily write while staring at the

computer and forget to drink water for hours."

Not only is that unhealthy but she has also learned that doing too much computer work for too long results in a giant productivity hit. "After a few hours, I have a headache, and instead of working on the book, I'm taking a nap. Using the Pomodoro timer app gets me to take breaks and work at a sustainable pace," she says.

DO NOT DISTURB

Now that digital nomads are the norm, traditional office setups often seem "uncool." Boyarsky doesn't agree. "I'm sorry to the 'open office' folks," she says, "but just sitting at a table with a laptop is *not* as productive as a proper setup."

At work, she swears by her "Do Not Disturb" sign. "Seriously, it's an actual physical red sign," she says. "When it is up, I know nobody will talk to me unless there is a production problem. I set 'Do Not Disturb' on Skype at the same time. This combination gives me a period

“Productivity isn’t about getting the most out of each moment of the day. It’s about getting the most done within the time limits I’ve set for my work and my hobbies.”

—*Jeanne Boyarsky,
Java expert*

of uninterrupted time to get into and maintain flow.” When she flips the sign over, it’s yellow, which means she’s on a phone call or webinar but available by instant message.

At home, her “cubical” is laid out in an L shape for productivity. Next to a computer desk with a slide-out keyboard tray, there’s a table with a second monitor, papers, and frequently referenced books, including those she’s written. (She wrote Sybex’s wildly popular Java 8 Oracle Certified Associate and Oracle Certified Professional certification books.) The whiteboard directly above her desk lists keyboard shortcuts and other optimizations. “At both home and work, I have some motivational posters and tchotchkes, plus a few toys,” she says. “Never underestimate the impact of a ball or yo-yo in becoming unblocked.”

A CULTURE OF OPTIMIZATION

A Java developer for 16 years, Boyarsky is a longtime user of the Eclipse IDE, but she is now considering alternate code

editors. “I’ve always been reluctant to switch, because learning a different tool and set of keyboard shortcuts results in a temporary productivity hit. But I’ve seen some IntelliJ wizards, and the refactorings do seem better,” she says. This year, she’s trying it out. “The robotics team I mentor is using Visual Studio Code, which means I already have to deal with two sets of tools and keyboard shortcuts,” she says. “Since I’m already taking that hit, I’m using it as an opportunity to give IntelliJ a serious try.”

It’s worth taking the time to learn your tools inside out, she says—even the mundane ones, such as web browsers. Further, Boyarsky believes in fostering a team culture of optimization. “We say ‘Control W’ instead of ‘Close’ when looking at defects in Jira [a project and issue tracking tool], so it is clear whether we are closing the browser tab or the defect. My teammate taught everyone how to close the most recent browser tab and how to change between tabs. When we are in the IDE, we share faster

ways of doing things," she adds.

Here are some examples of optimizations Boyarsky and her team recommend:

- Make sure your Scrum team has a stable definition of story points so that you can compare the story points completed after each sprint.
- Share useful dashboards when using a DevOps tool such as Jenkins.
- On the whiteboard, keep a list of the keyboard shortcuts you're trying to internalize.

- Create keyboard shortcuts for launching common configurations, tests, and programs.
- Learn Gmail shortcuts such as # to delete a message.

"These micro-optimizations may sound silly," Boyarsky says, "but saving 5 to 15 seconds adds up when you do something hundreds of times!" □

Alexandra Weber Morales is Oracle director of developer content.

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SAN ANTONIO





Autonomous Databases Give You Time for Data Modeling

Not busy patching and backing up?
Turn your focus toward database design.



By Jeff Erickson



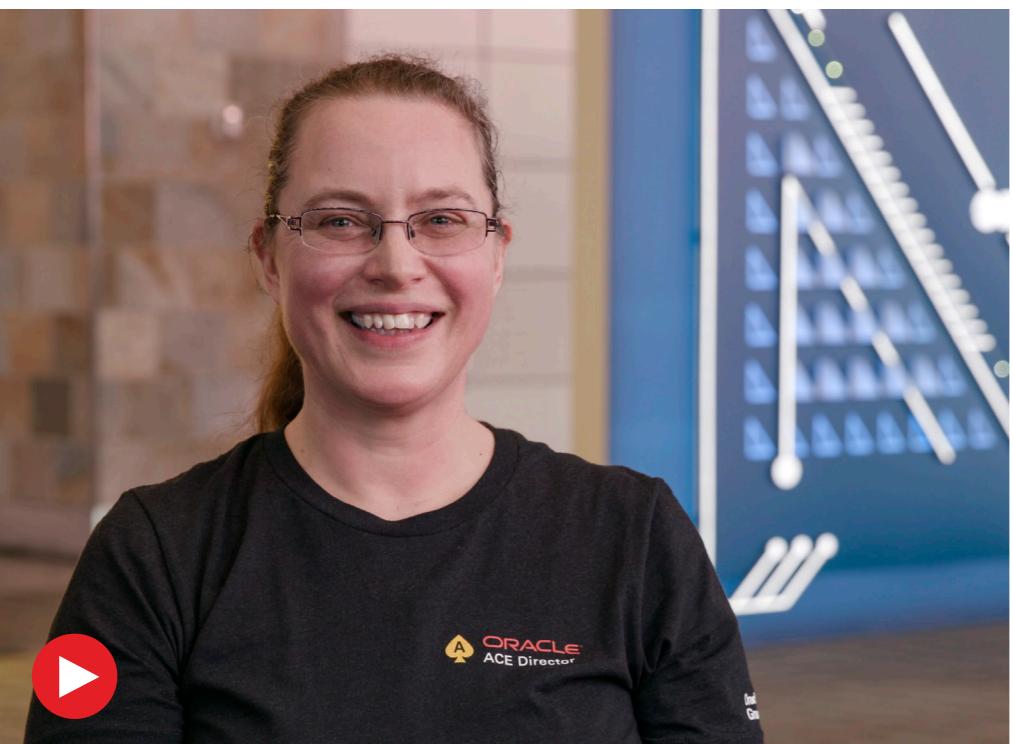
Anyone who's worked with Heli Helskyaho—Oracle ACE director, EMEA Oracle User Group community ambassador, and author—on a database project or experienced one of her talks knows she likes to make things fun. That, she says, is one reason she's excited about autonomous databases from Oracle.

Autonomous databases take over the parts of her DBA work that worry her the most—unpatched databases and infrastructure, and untested backup and recovery plans—so she can focus on things she likes the most. “Now autonomous databases can do all that by

themselves,” says Helskyaho, so she can spend more time having fun, which quite often involves making applications perform at the highest-possible level.

“I’ve been solving performance problems for so long that I know that most performance problems come from bad database design,” she says. Now she talks about “how to design the database correctly the first time.”

“If you’re a database administrator, database design is a skill you should acquire now,” she advises. One reason to grow your data modeling and database design skills? “Because they are things



Oracle ACE Director Heli Helskyaho wants DBAs to design the database correctly the first time and have fun doing it.

after task over the years. “Autonomous is something that’s been building in Oracle Database for a long time,” she says, “and now that it’s here, we’ll all still have our jobs but they will change a little bit for the better.”

Her career advice for DBAs in the age of autonomous databases: “Speaking

that only a human can do,” she says. “A computer cannot do it for you,” because only the DBA “can understand the many, many things you have to combine to have the right data model.”

CONSTANT CHANGE

Helskyaho and her fellow DBAs have seen Oracle Database automate task

with people is even more important now,” she says. “That will be the #1 skill that you should have in IT.”

To build the right data model for a business application, for example, means talking to businesspeople and developers. As this type of conversation increases, Helskyaho believes that DBAs and developers will begin to speak similar languages, “because both will be focused on collaborating to make the application better by using the database better.”

Perhaps the biggest benefit of Oracle Autonomous Database, according to Helskyaho, is that it gives DBAs the time and resources to do more-interesting things. “Autonomous makes things more fun!” she says. □

Jeff Erickson is editor at large for Oracle Content Central.

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Rita Núñez 

Buenos Aires, Argentina



Company/URL: [Tecnix Solutions](#)

Job title: CEO

Oracle credentials: Oracle

Certified Professional

Length of time using Oracle products: 20 years

How did you get started in IT? I started studying systems engineering at university in Buenos Aires, because I liked the exact sciences. At the time, I didn't have a computer at home—nor had I taken any programming classes in high school. Right away, though, I really liked programming—and in my third year, when I was

introduced to database topics, I immediately knew that I wanted to specialize in databases.

You've taken Oracle University [OU] classes in the past. What led you to do this? Years ago when I was working as a DBA, my manager offered me the chance to take OU courses, so I did all the courses recommended for the DBA career path and earned my Oracle Certified Professional certification. In 2006 I became an OU instructor myself, and I now teach classes in

database administration and cloud services.

Which new features in Oracle Database are you currently finding most valuable? I've been testing Oracle Database Backup Cloud Service. I know a lot of customers who don't have enough backup library capacity to back up all their databases in a nightly window. Using Oracle Database Backup Cloud Service, they can implement their backups in the cloud without having to invest in new backup libraries.



Liron Amitzi

Vancouver, British Columbia,
Canada



Company/URL: Self-employed

Job title: Independent senior
DBA consultant

Oracle credentials: Oracle
Certified Professional (Oracle
Database 11g)

**Length of time using Oracle
products:** 20 years

What's the most common cause you see when IT projects go wrong? People often underestimate the time or budget involved in a complex IT project—or they let other stakeholders dictate unrealistic constraints that can jeopardize the entire project. On top of that, companies often pay a lot of money for experienced external consultants but fail to follow their recommenda-

tions. The benefit of consultants is that they have usually been involved in several comparable projects and have seen different scenarios, so they can assist in building the right solution.

What would you like to see Oracle, as a company, do more of? I hope Oracle will continue to make an effort to be appealing to younger technologists and smaller companies—in business opportunities, licensing, and pricing. Oracle is trying hard to become more relevant for smaller companies, and this effort is evident in the new [Oracle Database 18c, Express Edition](#).

What's your go-to Oracle reference? I use the Oracle documentation quite often on the web when I'm looking for something specific. I also really value blog posts and articles written by people I trust, mainly from the Oracle ACE Program. I turn to [Tim Hall's Oracle-Base](#) a lot. Some other people I follow are [Jonathan Lewis](#), [Frits Hoogland](#), and [Mike Dietrich](#). And I like to read anything that [Franck Pachot](#) is writing—his work appears in a lot of different places.



Ron Ekins

Haywards Heath,
United Kingdom



Company/URL: [Pure Storage](#)

Job title: Oracle solutions architect, Office of the CTO

Length of time using Oracle products: 25 years

What's your favorite tool on the job? Oracle Database's Direct NFS Client feature is an amazing technology and one of those little-known, underused gems that, when configured correctly, can be used to deliver superfast Oracle Recovery Manager backups and restores.

What advice do you have about getting into software architecture? Visit Oracle Technology Network to download Oracle VM VirtualBox, and [download the database](#)

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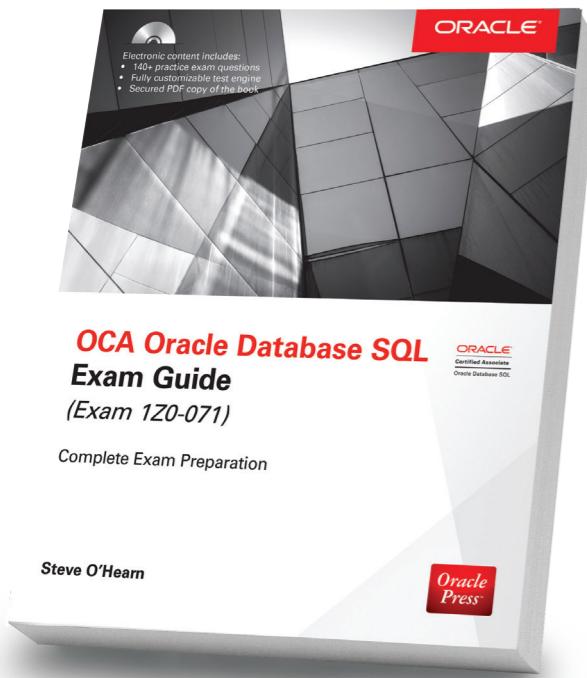
This provides an Oracle Database 12c Release 2 database and Oracle SQL Developer running on Oracle Linux 7. The environment also comes with some hands-on labs for you to try. It's a great way to learn and also provides a way to explore the different components of the technology stack to see if any area is of particular interest.

What's the next big thing driving change in your industry? The explosion in the volume of data being created by machines and sensors is leading to changes in the way we think about, manage, and store our business data.

Only a few years ago, we talked about very large databases being approximately 1 TB. Now, we see many companies having multiple 10 TB databases and other large datasets spread across multiple clouds, SaaS providers, and on-premises solutions. This, combined with shrinking project timelines, is driving the need for greater levels of automation across the entire development life-cycle. Automation is key in helping us reduce time to market, build and maintain consistent IT platforms, distribute secure data, improve the quality of testing, and reduce the risk of human errors by eliminating IT toil.

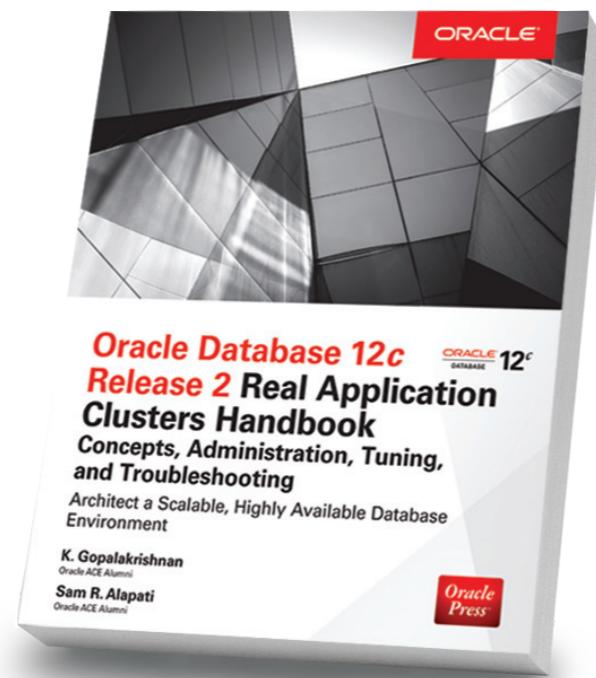
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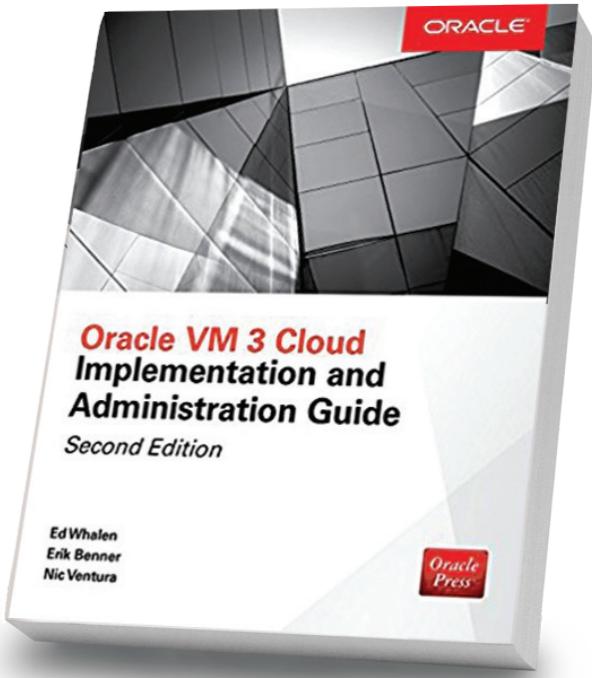
Oracle Database 12c Release 2 Real Application Clusters Handbook

K. Gopalakrishnan, Sam R. Alapati
Master Oracle Database 12c Release 2 Real Application Clusters with this comprehensive, fully updated guide.



Oracle Mobile Cloud Service Developer's Guide

John Ray Thomas
Create modern, enterprise mobile apps with Oracle Mobile Cloud Service.



Oracle VM 3 Cloud Implementation and Administration Guide, Second Edition

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Autonomous Database: A DBA's New Best Friend?

Things you'll do less of, and things
you'll want to do more of

BY JEFF ERICKSON



When technology turns a corner, as it has with the Oracle Autonomous Database, people who work with that technology rightly ask what it will enable them to do. With the self-driving, self-securing, and self-repairing autonomous database services in Oracle Cloud, the question for DBAs becomes, instead, “What will it allow me *not* to do, and how can that make me more valuable?”

This is a time for DBAs to look up from patching, tuning, backing up, and other database maintenance tasks that can take most of a DBA’s time and take stock of just how much their expertise means to the increasingly data-driven organization they work for, says Andy Mendelsohn, Oracle’s executive vice president of database server technologies. “Now they can use their database knowledge to get more involved in capturing value out of the data,” he says.

But how? The transition from turning knobs in the database to capturing value from data will mean learning new technologies, collecting new certifications, and developing new communication and networking abilities—with the simple aim of making IT applications work better for

the organization. With that in mind, here are three ways to become more valuable in the age of autonomous databases.

Explore What the Database Can Do

“If you’re not spending time managing schemas, extending tablespaces, or creating new users, this is a great time to explore all the new, powerful analytics capabilities in the database,” says Keith Laker, a senior principal product manager for data warehousing and big data at Oracle. “You’ve always wanted time to see more of what it can do,” he says. “Now we’re giving you that opportunity.”

Oracle Autonomous Database services for transaction processing and data warehousing are built on Oracle Database 18c, the latest edition of the leading enterprise database platform.

Jump in and “push the boundaries of the in-database analytics and business-focused machine learning algorithms” for security, authentication, and auditing, Laker implores. For example, he says, Oracle Autonomous Data Warehouse comes with an [extensive library of machine learning algorithms](#) that can help you predict customer behavior, target your best customers, develop sophisticated customer pro-

“Once you start using this tool [Oracle SQL Developer Data Modeler], you’ll understand what database design is all about.”

—Penny Avril, Vice President of Product Management, Oracle

files, identify cross-selling opportunities, and detect anomalies and potential fraud. These capabilities, he says, will drive the next level of business-driven, analytical innovation.

Within the database, says Laker, “there’s so much that’s been added in the last few releases that DBAs might not have had time to explore,” such as [SQL pattern matching](#), which provides a completely new, efficient way of recognizing patterns in a sequence of rows, and new [JavaScript Object Notation \(JSON\) capabilities](#) for working with unstructured data. “And [approximate query processing](#) is a powerful set of analytics we’ve added that allows you to do really fast, efficient data discovery.”

Improve Your Data-Modeling Skills

Although some of the mundane work of database management is taken over by autonomous database services, the valuable work of data modeling requires people. A well-thought-out

data model can help an application work more smoothly and can avoid performance problems down the line, says Oracle’s vice president of product management, Penny Avril. Data modeling is not as predictable as backup, patching, and tuning work, but it’s interesting work for DBAs, she adds. “The fun parts of what you do are still there,” Avril says. “You couldn’t get to them before, because you were too busy keeping the lights on. Now you can, and you become more valuable than ever.”

The fastest way to improve data modeling, says Avril, is to download [Oracle SQL Developer Data Modeler](#) and begin using it. Oracle SQL Developer Data Modeler is a free graphical tool that enables you to create, browse, and edit logical, relational, physical, multidimensional, and data type models. The data modeler provides forward- and reverse-engineering capabilities and supports collaborative development through integrated source code control. “Once

you start using this tool,” says Avril, “you’ll understand what database design is all about.”

Help Developers and Data Scientists Use the Database to Further Their Aims

“There are more in-house developers at our enterprise customers than ever before,” says Maria Colgan, a master product manager at Oracle, and she notes that they all need access to data and database services.

If DBAs are spending less time provisioning, patching, and tuning databases, she says, they can engage developers and help them understand what the database can do. For example, “If developers can do something their application needs inside the database, such as quickly returning highly aggregated datasets, they can save themselves a whole lot of effort and make their application more efficient,” Colgan says.

It also helps to learn something about the developer’s world, she adds. For starters, a DBA might explore developer tools such as

GitHub, Docker, and REST services and get to know something about JavaScript. A trip to the [Oracle Developer Portal](#) will open a DBA’s eyes to a wide array of ways to get more involved with the application development process. And if DBAs aren’t already familiar with it, Oracle Application Express, a feature of Oracle Database, is a rapid application development tool, and using it is a good way to extend SQL and PL/SQL skills into application development.

Likewise, says Colgan, a DBA’s knowledge of datasources and formats is in high demand by data scientists and business analysts who need access to clean, real-time data to do their work.

With less time spent managing databases and more time helping the company use data to innovate, “DBAs will become even more valuable partners for developers, analysts, and business leaders,” Colgan concludes. □

Jeff Erickson is editor at large for Oracle Content Central.

ILLUSTRATION BY **WES ROWELL**

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The Mutua Madrid Open is known as being on the cutting edge of technology and customer service, says Head of Marketing Javier Garcia. The MatchBot chatbot helps bolster that reputation.

ADVANTAGE!

The Mutua Madrid Open tennis tournament scores points and engages fans with an intelligent chatbot. **BY ALAN ZEICHICK**

Deuce. Advantage. Match point. What will happen next? Thrilling action—and the best players in the world—await tennis fans at the Mutua Madrid Open tournament each year. On the court, spectators watch players such as Rafael Nadal and Simona Halep battle for supremacy. Off the court, there's MatchBot, an innovative chatbot that helps everyone book tickets, find stadium parking, share photographs on social media, and even order refreshments. Thanks to MatchBot, the Mutua Madrid Open tournament is a more inclusive, more interactive, and more engaging experience—and more profitable.

¿Hola, Cómo Puedo Ayudarte?

Tennis enthusiasts looking to attend a Mutua Madrid Open match have questions. Lots of questions. Questions about buying tickets. Questions about the best way to arrive at the stadium via car or public transit. Questions about which entrance to use, based on where the seats are. And more besides, says Javier Garcia, head of marketing for the Mutua Madrid Open.

Now they get answers from the MatchBot chatbot, which can converse in Spanish

and English with customers using Facebook Messenger, Twitter, the tournament's own mobile app, or the organization's website.

Driven by Oracle Intelligent Bots, a key component of Oracle Autonomous Mobile Cloud Enterprise, MatchBot uses natural-language technology to understand the questions, determine the customer's intent, find the answer, and present the results back to the customer in conversational English—or more often, given the venue, conversational Spanish. So, if you text "Hola" to the chatbot, MatchBot will respond, "¿Cómo puedo ayudarte?" If you text "Hello," the chatbot will say, "How can I help you?"

Take food. "Can I eat burgers? Can I take the meal to my seat?" The Mutua Madrid Open drew from multiple scenarios regarding food and beverages as well as prices, locations, scheduling, and the like before launching the chatbot, says Garcia. In some cases, answers to the hundreds of resulting questions were fairly predictable, such as those regarding policies for bringing in outside food. Others were data-driven, letting fans know when their favorite players would be on court. And still others required interaction with transactions systems, such as to let fans reserve seats for, say,

“The Mutua Madrid Open is not only a good sporting event but also a social event and an innovative event. It’s mandatory to always look for new technologies we can bring to the customers . . . to give the best experience.”

—Javier Garcia, Head of Marketing, Mutua Madrid Open

tomorrow's matches featuring Nadal, Halep, Caroline Wozniacki, Alexander Zverev, or Serena Williams, who won the women's singles at the Mutua Madrid Open in 2012 and 2013.

Why a chatbot? The Mutua Madrid Open is known as being on the cutting edge of technology and customer service, says Garcia, and MatchBot helps bolster that reputation. “We are already in the top of mind of the customers. The Mutua Madrid Open is not only a good sporting event but also a social event and an innovative event,” he says.

Innovation is a real driver, explains Garcia: “It’s mandatory to always look for new technologies we can bring to the customers in order to be more proactive with them and also to

give the best experience.”

“Always we want to attract people to say, ‘You can’t believe the experience we have going to the Mutua Madrid Open,’” Garcia says. “Not only tennis. It’s social. It’s family. It’s technology. It’s innovation. It’s fun.”

MatchBot was initially designed to simplify the process of buying tickets, explains Garcia. “We have 16 sessions per day, with 10 days of tournament. Three categories of tickets. Four locations in the center court, the sides, and the back. Once you know that you want to go to the Mutua Madrid Open, you have a complex process to buy a ticket. So the idea for the chatbot was to simplify the ticketing process as much as we can.”



"I want to introduce voice recognition—that's my goal for 2019," says Mutua Madrid Open Head of Marketing Javier Garcia. "I want to use both Siri and Alexa to help my customers with information from MatchBot."

Ten Days of Tennis and Fan Cams

MatchBot debuted in 2018, and in the first year, 28,000 individual customers had nearly 60,000 text conversations with the chatbot. They also took 68,000 pictures, using a series of "fan cam" cameras that interact, using MatchBot

and the tournament's mobile app, says Garcia. The customer-controlled fan cam system, launched in 2015, is now integrated into the chatbot functionality.

"I call it the Selfie 3.0," Garcia explains. "We set eight cameras in the catwalk of the main

stadium of the center court. With our app, you can choose where you are seated, so if you're seated in row 16, seats 2 and 3, you can tell the cameras, 'Three, two, one.' When the countdown finishes, you will receive on your cell phone the picture in a frame that could be sponsored by any brand."

The business payoff: social media, says Garcia. "The only way people have to conserve the picture is by sharing it on the social networks. With this technology we had the first year, we had close to three million impressions on the social networks."

Let's Talk Tennis

The next Mutua Madrid Open, scheduled for May 4 to 13, 2019, will feature tennis stars including Rafael Nadal, Garbiñe Muguruza, Novak Djokovic, Simona Halep, Alexander Zverev, Petra Kvitova, Siri, and Alexa. Well, the last two are part of Garcia's plan to expand the MatchBot with communications channels beyond texting.

"I want to introduce voice recognition—that's my goal for 2019," says Garcia. "I want to use both Siri and Alexa to help my customers with

information from MatchBot. That's what we are working on already."

Voice recognition "will be the big challenge for this year, and we want to add to MatchBot all the things that people can find on our website," adds Garcia. For some things in 2018, he says, customers still had to use the tournament website or the mobile app. That is not good enough, Garcia insists. "We want to add all these things to the chatbot directly. I want to do everything by the chatbot."

The Oracle bot platform underpinning MatchBot not only provides the interfaces to text and voice channels such as Twitter and Siri but also incorporates the AI engine used for natural-language processing. Embedded machine learning helps the chatbot improve its performance by learning from customer interactions, and the bot can also tie into databases and user experience systems. Each day, MatchBot is asked new questions and finds new answers by using its databases; when it doesn't know the answer intrinsically, the human team behind the Mutua Madrid Open provides the responses—and MatchBot knows how to respond the next time that same question arises.

Real-time processing, database access, and mapping provide much of the power behind MatchBot, enabling the chatbot to help tennis fans find their seats; buy tickets to see their favorite players in an ever-changing schedule; and even engage in ecommerce, using a bilingual natural-language interface from every phone—and, soon, from every smart speaker.

Beating all comers with fast footwork and a devastating ground stroke: That's Nadal's passion. Delivering an innovative customer experience before, during, and after a major sporting event: That's MatchBot's skill. Advantage! ☺

Alan Zeichick is director of strategic communications for Oracle. Follow him @zeichick.

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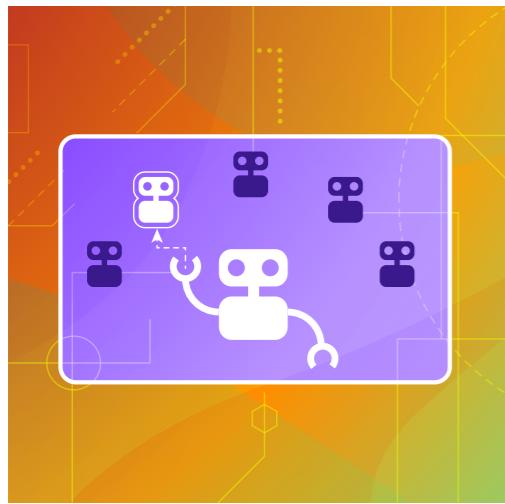
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**ORACLE DIGITAL ASSISTANT, BOTS**

Using Oracle Instant Apps in Oracle Digital Assistant

Help your app users input structured data.

Building chatbots that assist users via a conversational interface is not about technology alone—it requires conversational design skills as well. Good conversational design aims to deliver the best-possible guidance and help to a user completing a bot task. Good guidance, however, may require navigating users *out* of the conversational channel and into a web view if, for example, data input would be cumbersome and painful otherwise.

Using the hands-on instructions in this article, you are going to complete the implementation of a flower-ordering application that uses a web view to define the recipient's name and address as well as delivers the sender's name and a short message with the flowers. To do all this, you will use Oracle Instant Apps, a feature of Oracle Digital Assistant.

ABOUT ORACLE DIGITAL ASSISTANT

Oracle Digital Assistant is the next generation of the Oracle's chatbot solution. It manages and coordinates multiple smaller-scoped *skill bots* to a composite chatbot solution that assists users in completing multitask conversations. You can imagine Oracle Digital Assistant as a concierge bot that intelligently routes user requests to the skill bot that best matches the user query. If you used Oracle Intelligent Bots in the past and you read [previous Oracle Magazine articles about the technology](#), then you will recognize the bots you created with the tool (or read about) as skill bots in Oracle Digital Assistant.

ABOUT INSTANT APPS

Instant apps are reusable microscoped web applications you build declaratively for use in the context of a skill bot conversation. At runtime, instant apps are executed in the mobile device's web view or a browser window outside of the conversational channel.

Oracle Instant Apps enables bot designers to create instant apps to provide users with an easy way for entering structured form data in a bot conversation. However, Oracle Instant Apps also provides cross-messenger support for a set of user interface components such as charts, a signature, YouTube, and many others that don't natively exist in messengers. [Figure 1](#) and [Figure 2](#) show common and special user interface elements currently available in Oracle Instant Apps.

You integrate instant apps into a skill bot conversation by adding the System .Interactive system component to the dialog flow. You can pass input parameters to an instant app at launch time and receive return data when the instant app exits.

Figure 1: Oracle Instant Apps common user interface components

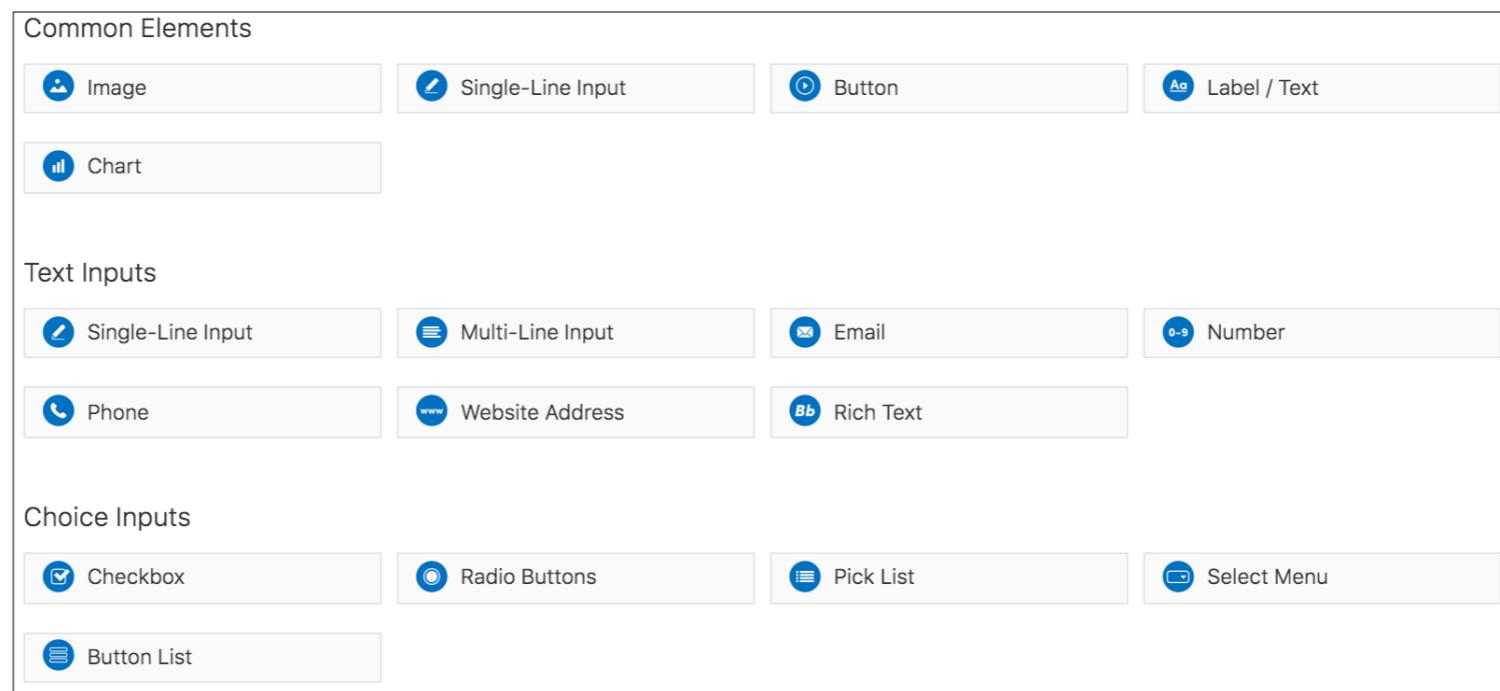
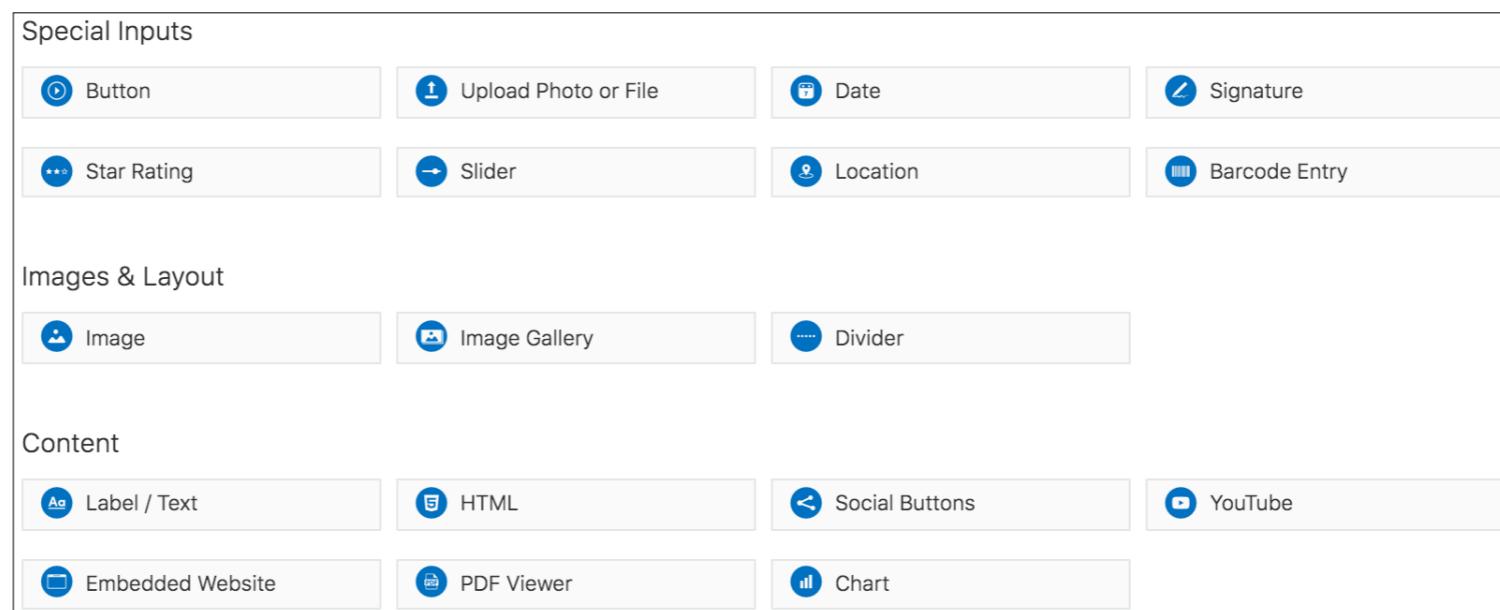


Figure 2: Oracle Instant Apps special user interface components



GETTING READY

The use case for the hands-on example in this article is a simplified version of a flower-ordering bot. A starter bot is provided so that you need to focus only on implementing the Oracle Instant Apps integration by following the instructions in this article.

The following are prerequisites for following along with the hands-on steps in this article:

- You need a trial or paid instance of Oracle Digital Assistant. [You can sign up for a free trial at cloud.oracle.com](#).
- You need to [download and extract to your computer the resources for this hands-on example](#).

Follow these initial hands-on steps to start the service and import, train, and test the bot.

1. Start Oracle Digital Assistant in a browser by typing `https://<your cloud URL>/botsui/` into the **URL** field.
2. Click the **hamburger** icon (≡) located in the top left corner.
3. Choose **Development** and then **Bots**.
4. Close the menu by clicking the **hamburger** icon (≡).
5. Click the **Import Bot** button in the upper right corner.
6. Navigate to the downloaded and extracted resources for this article, and navigate to the **starter** folder.
7. Select the **OracleMagazineTwenty4hoursFlowers.zip** starter bot file, and click **Open**.
8. Click the **OracleMagazineTwenty4hoursFlowers** tile in the bot dashboard to open the bot.

Note: If you don't see the imported bot because other bots fill your screen, type `OracleMagazine` into the **Filter** field above the **+ New Bot** tile.

9. Train the bot by clicking the **Train** link ( Train) in the top right.
10. In the opened dialog box, accept the default settings and click **Submit**.
11. Run the embedded bot tester by clicking the **Test** icon ( Test) in the top right.
12. Type **Hi** into the **Message** field, and click **Send**.
13. In the displayed menu, select a flower type.
14. Follow the bot conversation, and provide input values for all bot questions.
Note: The bot conversation does not validate input other than the input type. So when you are asked for a credit card number, you can enter 1234567. The same approach works for the expiration date.
15. Click the **Yes** or **No** button when asked, “Do you want to submit this order?”
16. Click **Reset** to run the flower order bot again. This time, type **I like to order 12 red roses for overnight delivery to be charged to my AMEX.**
17. Complete the bot conversation as you did earlier.

What you just did: Following the instructions above, you imported, trained, and tested the provided starter bot.

You experienced the conversation from the perspective of a new user (starting the conversation with **Hi**) and a returning user (starting the conversation with a more detailed input phrase). Both conversations ended with questions about the name and address of the flowers’ recipient, your credit card number and its expiration date, and the name to put on the card along with a greeting message.

ADDING A DIALOG FLOW STATE FOR INSTANT APPS

The conversation you experienced is a bit long for a simple task such as ordering flowers. Ideally, you’d want an input form to be provided where the user could edit it in a single block of input fields. And this is exactly what you are going to do next, using Oracle Instant Apps.

18. Click the **Flows** icon (Ξ) to open the dialog flow editor.
19. Navigate to the askCreditCardNumber state in line 142.
20. *Delete all content from line 142 to line 188 (inclusive).*
21. Change line 140 to next: "getOrderPaymentAndDeliveryDetails".
22. Scroll to the top of the dialog flow window.
23. Click the **+ Components** button (+ Components).
24. In the opened dialog box, select the **User Interface** category.
25. In the **User Interface** component dialog box, select the **Interactive** option.
26. Set the value of the **Insert After** list box to **askPaymentType**.
27. Toggle the **Remove Comments** switch so it is enabled.
28. Click the **Apply** button.
29. Change the name of the added state from **interactive** to **getOrderPaymentAndDeliveryDetails**. The state should look as shown in **Figure 3**.

Figure 3: askPaymentType and getOrderPaymentAndDeliveryDetails states

```
132 askPaymentType:  
133   component: "System.List"  
134   properties:  
135     prompt: "${rb.orderPaymentTypePrompt}"  
136     options: "${paymentType.type.enumValues}"  
137     variable: "paymentType"  
138     nlpResultVariable: "iResult"  
139   transitions:  
140     next: "getOrderPaymentAndDeliveryDetails"  
141  
142 getOrderPaymentAndDeliveryDetails:  
143   component: "System.Interactive"  
144   properties:  
145     sourceVariableList:  
146     variable:  
147     id:  
148     prompt:  
149     linkLabel:  
150     cancelLabel:  
151     translate:  
152     transitions:  
153       actions:  
154         cancel:
```

30. Navigate to line 29.
31. Add to line 29 a new context variable of type string with the name instantAppReturn, as shown in **Figure 4**.

Figure 4: instantAppReturn context variable declaration

```
27   senderName: "string"
28   senderMessage: "string"
29   instantAppReturn: "string"
30 states:
```

32. Navigate back to the getOrderPaymentAndDeliveryDetails state (line 142) and edit the properties as shown in the table below (include the surrounding quotes for the values):

Property Name	Value
sourceVariableList	"orderProductName,orderNumber"
variable	"instantAppReturn"
id	"orderPaymentAndDelivery"
prompt	"Please provide payment and delivery information"
linkLabel	"Please click to launch the edit form"
cancelLabel	"No, thanks. Cancel order."
cancel	"exitBot"

33. Delete textReceived: action (line 155).
34. Compare your configuration with **Figure 5**. Ensure that it looks the same.
35. Click the **Validate** link () at top of the dialog flow editor, and correct any formatting errors.

Figure 5: System.Interactive component state with configuration

```
142 getOrderPaymentAndDeliveryDetails:  
143   component: "System.Interactive"  
144   properties:  
145     sourceVariableList: "orderProductName,orderNumber"  
146     variable: "instantAppReturn"  
147     id: "orderPaymentAndDelivery"  
148     prompt: "Please provide payment and delivery information"  
149     linkLabel: "Please click to launch edit form"  
150     cancellLabel: "No, thanks. Cancel order."  
151     translate:  
152   transitions:  
153     actions:  
154       cancel: "exitBot"
```

What you just did: In this part of the hands-on steps, you first used Oracle Instant Apps to remove the dialog flow states that handled the part of the conversation that you want to shorten. You created and configured a new dialog flow state: `getOrderPaymentAndDeliveryDetails`. You also created a new context variable, `instantAppReturn`, for Oracle Instant Apps to return values to.

BUILDING THE INSTANT APPS

Now use Oracle Instant Apps to build new functionality.

36. Start by clicking the **Instant Apps** button at the top of the page.

Note: Instant App Builder opens in a separate tab. If the tab doesn't open, check for and disable any popup blocker that may be active in your browser.

37. In Instant App Builder, click **Add Instant App**.

38. Click **Start from Scratch**.

39. Enter `orderPaymentAndDelivery` in the **Name** field of the instant app.

40. Press the Tab key to navigate to the **API ID** field.

41. Enter `orderPaymentAndDelivery` in the **APP ID** field.

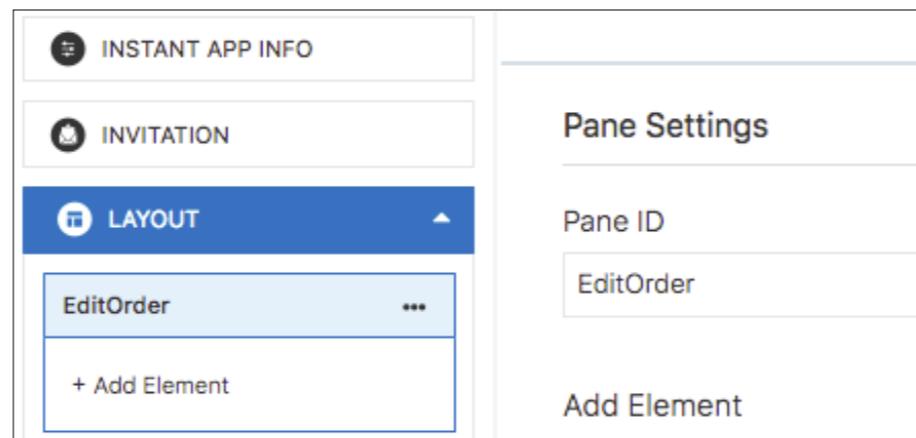
42. Click Save.

43. In the dialog box that opens, click Got It!

44. Select the LAYOUT tab.

45. In the Pane ID field, enter EditOrder, as shown in Figure 6.

Figure 6: Setting the pane name to EditOrder



46. For each item in the table below, follow these steps:

- a. Within the pane, click Add Element.**
- b. In the palette in the middle of the designer, click the button for the element type shown in the second column (such as Image, Single-Line Input, or Button).**
- c. In the Element ID field, enter the element ID shown in the third column.**
- d. Fill in the properties that are specified for that element in the fourth column of the table.**

Order	Element Type	Element ID	Properties
1	Single-Line Input	inputProductOrder	Initially Enabled: Uncheck, Label: Product Order
2	Single-Line Input	inputRecipientName	Label: Recipient Name
3	Single-Line Input	inputRecipientAddr	Label: Recipient Address
4	Single-Line Input	inputCreditCardNo	Label: Credit Card Number
5	Single-Line Input	inputCreditCardValid	Label: Expiry Date
6	Single-Line Input	inputSenderName	Label: Sender Name
7	Single-Line Input	inputSenderMessage	Label: Message to go on card
8	Button	btnSubmit	Label: Submit

Hint 1: As an alternative to using the **Add Element** button, you can drag and drop UI elements directly into the layout. This is useful when you want to insert an element in a specific place.

Hint 2: If you need to delete an element, first select it, then click the **ellipsis (...)** icon that appears, and then select **Delete**.

47. Click the **PARAMETERS** tab.

48. Within the **PARAMETERS** tab, click **Add Parameter**.

49. In the **Parameter ID** field, enter `orderProductName`.

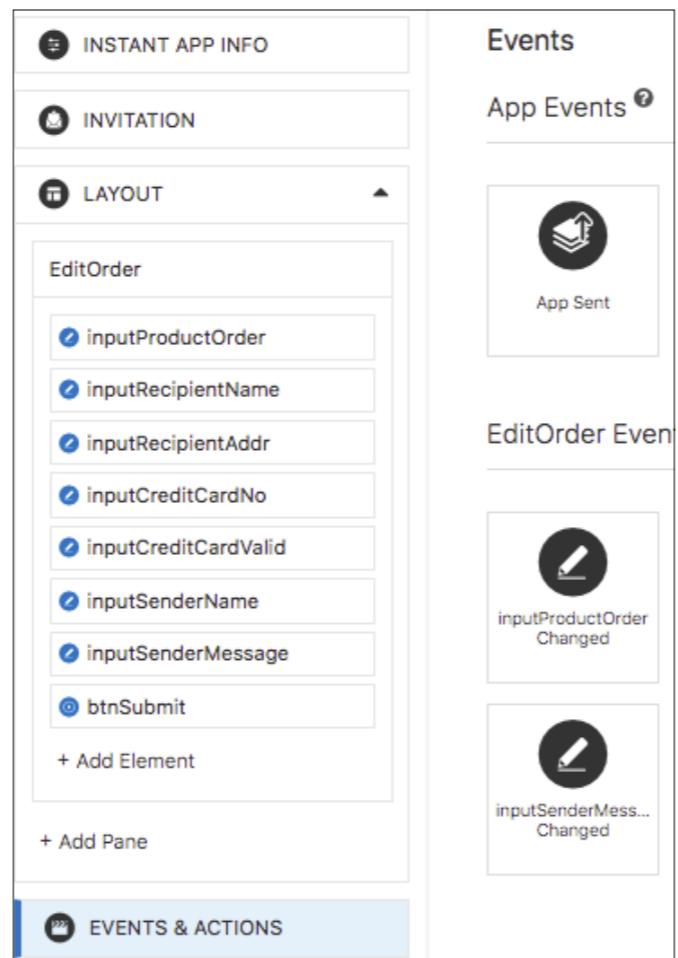
50. Again, click **Add Parameter**, and in the **Parameter ID** field, enter `orderNumber`.

Note: Parameters are named to match the context variable names that are passed from the bot to the instant app. (If they don't match, they won't work correctly.)

51. Now you will assign values to the matching UI elements, based on data retrieved from the parameters. To do this, first expand the **LAYOUT** tab.

52. Click **EVENTS & ACTIONS**, and then click the **App Sent** button (shown in **Figure 7**).
53. Click **Add Action**.
54. Select **Set Element Value**.
55. Drag the **inputProductOrder** layout component (under LAYOUT->EditOrder) to the **Drag and drop elements from the Layout field area** in the tile for the action.
56. In the **New Value** field, enter `{orderNumber} - {orderProductName}`. Now add a message page to display a message for the user to close the web view when the **Submit** button is clicked.

Figure 7: Select EVENTS & ACTIONS, and click the App Sent button.



57. In the **LAYOUT** section, click **Add Pane**.
58. In the **Pane ID** field, type CloseMessage.
59. In the **CloseMessage** pane, click **Label / Text** to create a label.
60. In the **Element ID** field, enter doneMessage.
61. In the **Text** field, enter Your payment and delivery options have been saved.
You can now close the browser tab and return to the bot.
62. Select the **EVENTS & ACTIONS** tab.
63. Select the **btnSubmitPressed** tile in the **EditOrder Events** section.
64. Click the **+ Add Action** button.
65. In the opened dialog box, scroll to the bottom and click the **Activate and Show Pane** button.
66. Drag the **CloseMessage** pane from the **LAYOUT** tab to the **Drag and drop a Pane from the Layout** field.
67. Once again, click **Add Action**.
68. In the opened dialog box, scroll down to the bottom and click the **Exit to Bot** tile.
69. In the **Parameter Name** field, enter recipientName.
70. In the **Parameter Value** field, enter {inputRecipientName}.
71. Fill in the rest of the parameters for the Submit action by clicking **Add Parameter** and entering the Parameter Name and Parameter Value for each of the rows in the table below:

Parameter Name	Parameter Value
recipientAddress	{inputRecipientAddr}
creditCardNumber	{inputCreditCardNo}
creditCardValidDate	{inputCreditCardValid}

Parameter Name	Parameter Value
senderName	{inputSenderName}
senderMessage	{inputSenderMessage}

72. Click **Save** to save the new instant app.

73. Click **Test** (on the right) to test the Edit Order instant app.

What you just did: In this part of the hands-on steps, you created a web form where the bot user can provide payment and delivery information for a given order. Note that the form you created does not validate the user input, though this could be done using Oracle Instant Apps. When the user exits the instant apps form, the values of the input fields are returned to the bot, where they can be accessed through the `instantAppReturn` variable.

APPLY FINAL CHANGES TO THE DIALOG FLOW

So far, the order confirmation is printed from context variables. With your new instant app, some of the values are now saved in the `instantAppReturn` context variable. Next you are going to change some of the context variable references to instead point to the instant app return values.

74. In the dialog flow editor, navigate to the **orderSummaryCntd1:** state.

75. Change `${recipientName.value}` to `${instantAppReturn.value.recipientName}` .

76. Change `${recipientAddress.value}` to `${ instantAppReturn.value .recipientAddress}` .

77. Navigate to the **orderSummaryCntd2:** state.

78. Change `${creditCardNumber.value}` to `${instantAppReturn.value .creditCardNumber}` .

79. Navigate to the **orderSummaryCntd3:** state.

80. Change \${senderName.value} to \${instantAppReturn.value.senderName}.
81. Change \${senderMessage.value} to \${instantAppReturn.value.senderMessage}.

TESTING YOUR BOT

Now see how your instant app form works with the bot.

82. Click the **Test** icon (▶) in the upper right.
83. Click the **Reset** button at the top of the tester.
84. In the message field, type I like to order 12 red roses for overnight delivery to be charged to my AMEX.
85. Click the **Send** button.
86. Click the **Please click to launch the edit form** link.
87. Fill in all the form fields in the opened browser tab. (Because there is no validation applied to the form, you don't need to provide a real credit card number.)
88. Click the **Submit** button.
89. Close the browser tab.
90. Back in the bot, you should see the printed order confirmation with the information you added in the instant app.
Note: It may happen that the callback from the instant app failed for the embedded tester. In this case, you won't see a print statement. If this happens, click the **Reset** button and try again.

CONCLUSION

This article introduced Oracle Instant Apps, a feature of Oracle Digital Assistant that bot designers can use to simplify structured data entry or to shorten otherwise

lengthy conversations. You can look at Oracle Instant Apps as a tool and an option to use when your bot design would benefit from it. □

Frank Nimphius is a master principal product manager in the Oracle Mobile Platform Product Management group, where he focuses on Oracle Mobile Cloud Enterprise, chatbots, and content experience and analytics (CxA).



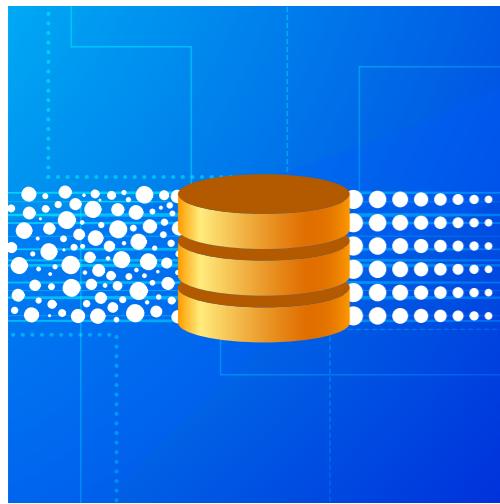
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**ORACLE DATABASE**

Are We All on the Same Page?

Pagination of data can make (or break) your database.

For as long as user-facing computer applications have existed, there has been the concept of the *page*, where a page on the screen is a metaphor for a page in a book. The page presents a subset of the total information available, and once that information has been digested by the user, the page is “turned” and the next subset of information is presented.

I started my computer programming career observing pages of data on a green-screen mainframe terminal where the size of the page was fixed at a constant 24 rows, each containing up to 80 characters of data. The advent of graphical user interfaces evolved the concept of a page into a more dynamic set of information, with the user controlling the amount of the content displayed on the page, and the current trend seems to be toward the “never-ending” page, where content is retrieved and rendered in real time as the user consumes it on screen. For example, most blog platforms dynamically display more and more blog posts as the user scrolls downward. As such, there is no longer the concept of a “next” page—the

current page just continues to grow. Despite these advances, the underlying challenge for the database developer remains the same: to source from the database an ordered subset of an entire dataset, namely a subset that is defined by an ordering sequence related to one or more of the attributes in that data.

FIRST PRINCIPLES

Because this ordered-subset requirement has existed for so long, the SQL technique for accessing a page of data in an ordered fashion is well known: sort the data within an inline view and only then retrieve the number of rows required to render the page. This is typically known as a Top-N query, because it retrieves the top “n” rows from a dataset.

For example, the SQL in **Listing 1**, which is *not* using an inline view, aims to show the most recently submitted questions from the Ask TOM database, but it clearly returns incorrect data, since we’ve definitely taken questions more recently than 18 years ago!

Listing 1: Incorrect Top-N query

```
SQL> select question_id, created
  2  from asktom.ate_submitted_questions
  3  where rownum <= 5
  4  order by created desc;
```

QUESTION_ID	CREATED
348459360553	10-MAR-2001
348431169703	10-MAR-2001

```
3612348048 02-MAY-2000
```

```
212348047 02-MAY-2000
```

```
612348047 02-MAY-2000
```

Transforming this into the correctly functioning SQL statement in **Listing 2** is easy, and reading the text of the query in top-down fashion maps to the logical operation to be performed: *first* sort the rows and *then* extract five rows from that sorted dataset.

Listing 2: The familiar inline view approach

```
SQL> select *
  2  from (
  3    select question_id, created
  4    from   asktom.ate_submitted_questions
  5    order by created desc
  6  )
  7 where  rownum <= 5;
```

QUESTION_ID	CREATED
9533142000346451403	19-AUG-2018
9537700100346275665	18-AUG-2018
9537699900346476947	18-AUG-2018
9537697900346933719	18-AUG-2018
9537696800346355200	18-AUG-2018

```
9533142000346451403 19-AUG-2018
9537700100346275665 18-AUG-2018
9537699900346476947 18-AUG-2018
9537697900346933719 18-AUG-2018
9537696800346355200 18-AUG-2018
```

As I mentioned, this technique is generally well known and widely adopted in the developer community, so why am I covering old ground here? It is because I am seeing questions on Ask TOM and other Q&A sites indicating that an alternative mechanism is becoming popular. I think this is a reflection of the challenges modern developers face. They are now called upon to know many more components of the entire technology stack. While developers are growing their skills in HTML5, CSS, JavaScript, back-end languages, and the infrastructure that supports them, they often avoid direct interaction with SQL, instead relying on an object-relational mapping (ORM) library, such as Hibernate, to handle that task for them. Handling the pagination of data is therefore now often performed *not* with SQL techniques as described above but in the *application* tier.

The recent advent of the never-ending-page metaphor could also inspire a developer to adopt a similar mindset when retrieving data from a database. A developer could issue a single query to obtain all the data in the desired order, and the application tier could fetch only the rows required to be rendered, yielding a code structure along the lines of **Listing 3**.

Listing 3: Application tier processing of Top-N (pseudocode)

```
public static void ...
{
    PreparedStatement sql_stmt =
        conn.prepareStatement(
            "select question_id, created          //"
            "  from asktom.ate_submitted_questions // Query to get all rows"
            " order by order by created desc");   //
```

```
ResultSet rset = sql_stmt.executeQuery();
int i = 0;
while( rset.next() )
{
    ...
    i = i + 1;
    if (i > 10) {
        break;
    }
}
rset.close();
}
```

This approach is often attractive to developers unfamiliar with SQL, because the query text is a very simple “retrieve data and sort it”—which could be automatically generated by ORM—and developers do not need to trouble themselves with the idiosyncrasies of inline views and the like. But although this approach might be fine for small, fixed-size datasets, there are risks as the data volumes increase.

SCALABILITY THREATS

To demonstrate these risks, I'll now explore the “retrieve data and sort it” approach on a larger dataset. I have an existing table, SALES_TRANSACTIONS, that is a simulation of a fictitious high-volume retailer that is recording sales of its products. The table has approximately 10 million rows and occupies 1.5 GB on disk, as shown in [Listing 4](#). Obviously, real-world applications could have even larger volumes of data, but this will suffice for the demonstration.

Listing 4: Disk size of total sales transactions

```
SQL> select num_rows, blocks*8192/1024/1024 mb
  2  from user_tables
  3 where table_name = 'SALES_TRANSACTIONS';
```

NUM_ROWS	MB
10308870	1522.625

To track the work being performed by the database to execute Top-N queries, I am going to focus on the dynamic performance view V\$SQL_WORKAREA_HISTOGRAM. V\$SQL_WORKAREA_HISTOGRAM displays cumulative memory work area execution statistics, where work areas include the memory required for the sorting operations that Top-N queries will have to perform to provide the correct information for the desired page of results. The columns for this view are shown in **Listing 5**.

Listing 5: The V\$SQL_WORKAREA_HISTOGRAM columns

```
SQL> desc V$SQL_WORKAREA_HISTOGRAM
```

Name	Null?	Type
LOW_OPTIMAL_SIZE		NUMBER
HIGH_OPTIMAL_SIZE		NUMBER
OPTIMAL_EXECUTIONS		NUMBER
ONEPASS_EXECUTIONS		NUMBER
MULTIPASSES_EXECUTIONS		NUMBER

TOTAL_EXECUTIONS	NUMBER
CON_ID	NUMBER

The V\$SQL_WORKAREA_HISTOGRAM view contains a row for a distribution of the memory size used by database sessions for operations such as sorting, yielding a frequency histogram of memory utilization for the database instance. Here are two sample rows from this view:

LOW_OPTIMAL_SIZE	HIGH_OPTIMAL_SIZE	OPTIMAL_EXECUTIONS	ONEPASS_EXECUTIONS
1048576	2097151	3	0
16777216	33554431	0	2

The data in row 1 shows that since database instance startup, there have been three operations between 1 MB and 2 MB in size (LOW_OPTIMAL_SIZE and HIGH_OPTIMAL_SIZE). These operations were deemed to be optimal executions (OPTIMAL_EXECUTIONS), where *optimal* means that the operation could be completed in memory without needing to spill to temporary storage.

The data in row 2 shows that since instance startup there have been two operations between 16 MB and 32 MB in size that were one-pass executions (ONEPASS_EXECUTIONS), where *one-pass* means that the operation could be completed only by spillage of some data to temporary storage in one phase of the processing.

V\$SQL_WORKAREA_HISTOGRAM displays data that is cumulative since instance startup for all database sessions, so to track the usage for a single query, I will need to capture the contents of the view immediately before executing a Top-N query and then, immediately after its execution, extract the delta between the two. Another

obvious prerequisite is that I must be the only person doing any work on this database, which is why I'm using my fictitious SALES_TRANSACTIONS data rather than the Ask TOM database tables used earlier.

First I capture the current state of the view into a global temporary table called QUERY_BEFORE, as shown in **Listing 6**.

Listing 6: Snapshot of current histogram data

```
SQL> create global temporary table QUERY_BEFORE
  2  on commit preserve rows as
  3  select * from V$SQL_WORKAREA_HISTOGRAM;
```

Table created.

Next I'll get the most recent 10 rows from my SALES_TRANSACTIONS table, as defined by the SALE_TIMESTAMP column. My table currently has no indexes, so all rows must be scanned to determine the 10 most recent ones. I'll use the standard inline view mechanism to let the database know that I am interested in only the first 10 rows, as shown in **Listing 7**.

Listing 7: Inline view to fetch the 10 most recent transactions

```
SQL> set timing on
SQL> set feedback only
SQL> select *
  2  from
  3  ( select *
  4    from   SALES_TRANSACTIONS
```

```
5      order by SALE_TIMESTAMP desc
6  )
7 where rownum <= 10
8 /
```

10 rows selected.

Elapsed: 00:00:05.01

This query took five seconds, and now in **Listing 8**, I'll perform a simple join from my previously created QUERY_BEFORE table to the current state of the V\$SQL_WORKAREA_HISTOGRAM view to compare before and after values to get a measurement of the memory utilization of the Top-N query just executed.

Listing 8: Memory consumption histogram

```
SQL> select
  2  s.low_optimal_size,
  3  s.high_optimal_size,
  4  s.optimal_executions - b.optimal_executions delta_opt,
  5  s.onepass_executions - b.onepass_executions delta_onepass,
  6  s.multipasses_executions - b.multipasses_executions delta_multi,
  7  s.total_executions - b.total_executions total
  8  from v$sql_workarea_histogram s,
  9       query_before b
 10 where s.low_optimal_size = b.low_optimal_size
 11 and s.total_executions - b.total_executions > 0 ;
```

LOW_OPTIMAL_SIZE	HIGH_OPTIMAL_SIZE	DELTA_OPT	DELTA_ONEPASS	DELTA_MULTI	TOTAL
1048576	2097151	3	0	0	3

1 row selected.

The memory consumption to retrieve the 10 most recent transactions is three chunks, each between 1 MB and 2 MB in size. Even in the worst case, it takes only 6 MB to perform the operation.

When I perform this demo live at conferences, people are astounded at this result, to the extent of disbelieving the validity of the measurements in V\$SQL_WORKAREA_HISTOGRAM. Recall that the SALES_TRANSACTIONS table has 10 million rows consuming 1,500 MB of storage. How is it possible to sort all that data in only 6 MB of memory and yet not spill to temporary storage? It seems impossible.

The true implementation details are buried deep in the Oracle Database kernel, but even conceptually, it is possible to come up with a strategy using only a small amount of memory to complete the operation. Here is an example of such a strategy:

1. Read the first 10 rows from SALES_TRANSACTIONS, where *first* is simply the first encountered rows from storage. The rows are not guaranteed to be the 10 most *recent* rows I am seeking.
2. Sort these rows, based on SALE_TIMESTAMP, and hold them in a sorted memory structure. This structure is fixed in size to hold only 10 rows.
3. Now read the 11th row from the SALES_TRANSACTIONS table. There are two possibilities to consider:
 - This 11th row has a SALE_TIMESTAMP *older* than that of the oldest row in the

sorted memory structure, in which case I simply discard it and continue on to the next row.

- This 11th row has a `SALE_TIMESTAMP` *newer* than that of the oldest row in the sorted memory structure. In this case, I insert this row into its appropriate sequence in the sorted memory structure, so the oldest row in the structure is pushed out and discarded.
4. Repeat step 3 for the remaining rows in the table.

Once all of the rows have been read, the 10 rows remaining in the sorted memory structure will be the 10 most recent rows from the `SALES_TRANSACTIONS` table. You can see from this style of implementation that there is a small sorting cost in step 2 but the entire set of 10 million rows is never sorted. Those rows are definitely read, because I *must* visit every single row to find the 10 most recent sales, but the large sorting cost has been avoided. I stress that this is *conceptually* what I envisage is happening. The true code implementation could be entirely different, but it demonstrates that a low-memory-utilization approach is definitely possible.

Now I will repeat the task, this time taking the approach that the application code bears responsibility for the pagination. In this example, I will present a simple `ORDER BY` query to the database and then the application tier will fetch from the result set until the number of rows to be rendered is retrieved.

Again I capture the current state of the `V$SQL_WORKAREA_HISTOGRAM` view into a global temporary table, this time called `QUERY_BEFORE2`, as shown in **Listing 9**.

Listing 9: Snapshot of histogram memory data

```
SQL> create global temporary table QUERY_BEFORE2
  2  on commit preserve rows as
  3  select * from V$SQL_WORKAREA_HISTOGRAM;
```

Now I'll get the most recent 10 rows from my SALES_TRANSACTIONS table, as defined by the SALE_TIMESTAMP column, not directly via SQL but by using a simple PL/SQL FOR loop, as shown in **Listing 10**. I'll increment a counter on each fetch and exit the loop after 10 fetches. To the database, this approach looks like a query to retrieve *all* rows.

Listing 10: PL/SQL loop to fetch 10 rows from a sorted result

```
SQL> set timing on
SQL> declare
  2    cnt int := 0;
  3    begin
  4    for i in
  5      ( select *
  6        from   SALES_TRANSACTIONS
  7        order by SALE_TIMESTAMP desc
  8      )
  9    loop
 10      cnt := cnt + 1;
 11      exit when cnt = 10;
 12    end loop;
 13  end;
 14  /
```

PL/SQL procedure successfully completed.

Elapsed: 00:00:08.83

Recall from the first example that the elapsed time was five seconds. Before we look at the underlying memory utilization of this example, it is already apparent that this block of code seems to have worked harder in the database, with its nearly doubled execution time. Again, as shown in **Listing 11**, I'll perform a simple join from my previously created QUERY_BEFORE2 table to the current state of the V\$SQL_WORKAREA_HISTOGRAM view.

Listing 11: Memory utilization for application tier fetch test

SQL> select

```

2      s.low_optimal_size,
3      s.high_optimal_size,
4      s.optimal_executions - b.optimal_executions delta_opt,
5      s.onepass_executions - b.onepass_executions delta_onepass,
6      s.multipasses_executions - b.multipasses_executions delta_multi,
7      s.total_executions - b.total_executions delta
8  from v$sql_workarea_histogram s,
9       query_before2 b
10 where s.low_optimal_size = b.low_optimal_size
11 and s.total_executions - b.total_executions > 0 ;

```

LOW_OPTIMAL_SIZE	HIGH_OPTIMAL_SIZE	DELTA_OPT	DELTA_ONEPASS	DELTA_MULTI	DELTA
1048576	2097151	1	0	0	1
1073741824	2147483647	0	2	0	2

2 rows selected

The first row in the output is a (worst case) 2 MB chunk of memory for a query that was performed optimally, but the second row is the main culprit here. There were two operations, each sized between 1,000 MB and 2,000 MB, which—given that the size of the source data is 1,500 MB—suggests that the entire set of source data was processed in a sorting operation, potentially more than once. Note that these operations occurred in the `DELTA_ONEPASS` column. This indicates that my database server could not process these memory operations solely in RAM. During the operation, information was forced to spill to disk.

Now consider a production use case here. If every connected database session had the potential to consume up to 2 GB of memory just to show simple pagination results, then even the most powerful database server, with terabytes of RAM, is going to be unable to cope if the connected session count climbs to moderate levels. Pagination control being done in the application tier is a large scalability risk.

You may be thinking, “Why didn’t the database server use the same conceptual approach of not sorting the entire set of data?” That approach can be applied only if the number of rows desired on the first page is *known* to the database. If the database hadn’t had the information that only 10 rows were required, it wouldn’t have been able to determine the size of the sorted memory structure and hence would have fallen back to sorting the entire source data.

REFACTORING EXISTING CODE

Once developers observe the benefits in memory consumption and performance of structuring their SQL statements appropriately, refactoring existing code is easy to do. Even if they were previously relying on the application tier to perform the fetching of the desired number of rows, this logic can be left in place, even though the fetch count checking is redundant, since the query will return only the number

of rows required. For example, the previous Java pseudocode only needs the SQL statement to be replaced in order to reap the benefits, as shown in **Listing 12**.

Listing 12: Drop-in replacement SQL for application code

```
public static void ...
{
    PreparedStatement sql_stmt =
        conn.prepareStatement(
            "select question_id, created          //
             from asktom.ate_submitted_questions // Query to get all rows
             order by order by created desc");   //

    "select * from (
        select question_id, created          //
        from asktom.ate_submitted_questions // Improved query
        order by order by created desc      //
    ) where rownum <= 10");                //

    ResultSet rset = sql_stmt.executeQuery();
    int i = 0;
    while( rset.next() )
    {
        ...
        i = i + 1;
        if (i > 10) {
            break;
        }
    }
}
```

```
        }
    }
rset.close();
}
```

Because the efficiency benefits materialize with production-scale data volumes, it is difficult in smaller development and testing databases for developers to validate that their SQL changes will have the desired results from performance tests alone. But developers can use the execution plans for the SQL statements to get an indication that the memory-efficient operations are in play.

For a *conventional* sorting operation in a SQL query that sorts *all* the rows in the source data, the execution plan will show the `SORT ORDER BY` line, as shown in **Listing 13**.

Listing 13: Standard sorting operation in execution plan

```
SQL> select empno, ename, hiredate
  2  from   emp
  3 order by hiredate desc
```

Id	Operation	Name	Rows	
0	SELECT STATEMENT		14	
1	SORT ORDER BY		14	
2	TABLE ACCESS FULL	EMP	14	

However, when the database can switch to the efficient *stop after “n” rows* style of sorting operation for pagination queries, you will see the STOPKEY keyword, as shown in **Listing 14**.

Listing 14: STOPKEY optimization for Top-N queries

```
SQL> select *
  2  from (
  3    select empno, ename, hiredate
  4    from   emp
  5    order by hiredate desc
  6  )
  7 where rownum <= 5;
```

Id	Operation	Name	Rows	
0	SELECT STATEMENT		5	
* 1	COUNT STOPKEY			
2	VIEW		14	
* 3	SORT ORDER BY STOPKEY		14	
4	TABLE ACCESS FULL EMP		14	

For small, fixed-size datasources such as static lists, a refactoring effort may not be required to present ordered subsets of data, but for any source of data where the

total volume is unknown, using an appropriate Top-N query syntax is vital for application performance and scalability.

SUMMARY

A property of relational databases is that data is never stored or presented in any guaranteed order. Data will almost always need to be sorted to be presented in a meaningful way to users who consume that data. When that sorting also involves providing subsets of data, it is important to convey the size of the subset required to the database engine via the Top-N SQL syntax. Failing to do so will result in poorly performing applications that will not scale under production workloads and data volumes. 



Connor McDonald is an Oracle Developer Advocate for SQL. His passions are database design, SQL, and PL/SQL, and he can answer your database questions on [Ask TOM](#).



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Database Professionals: Still the Hub of the Technology World?

What's the same, what's different, and what to do next in a hybrid reality **BY LESLIE STEERE**

Oracle Magazine took advantage of **Oracle OpenWorld 2018** to catch up with leaders from several key Oracle user groups and communities. In the first of a series of articles based on our conversations, Independent Oracle Users Group (IOUG) President Ray Smith shares his thoughts on the changing job of DBAs, success strategies for moving to the cloud, and the importance of standardization.

Founded in 1993 with a mission to represent “the voice of Oracle technology and database professionals,” [IOUG](#) has a long view on the ever-expanding world of technologists who bet their careers on Oracle.



“DBAs need some relief from all that they have to do, because nobody is a pure Oracle DBA anymore,” says IOUG President Ray Smith.

EVOLVING JOB ROLES

"You've got to continue to hone your skill set. The best thing DBAs can do is keep current on their learning," says IOUG President Ray Smith. Stay involved with user groups. Read technical articles. Attend technical conferences such as [COLLABORATE](#). In addition, he says, database professionals must "have a mindset aligned with the business. They have to look for positive business outcomes, and this can be challenging when you've been trained to focus entirely on the technical outcome."

Top of mind for Smith are the challenges currently facing database professionals, along with the need for automation and standardization. "Because to me," he says, "that's where Oracle Cloud will really shine. DBAs need some relief from all that they have to do, because nobody is a pure Oracle DBA anymore."

These days, says Smith, "whether it's MySQL, Hadoop, an open source database, or a competing relational database, there are too many other things that the DBA is responsible for, and there are a lot of challenges for balancing their efforts. So the more automation and the more standardization, the better.

"I see that as one of the benefits of Oracle

Cloud—that some of the things are going to be removed from people's plates," Smith says. "High availability, disaster recovery, all those things that can take a lot of time and cost a lot of money—if you can have someone else responsible for that, it gives you time to do all of those other things: to manage all the interfaces, to take care of not only the Oracle database but all of the other responsibilities, and to continue to learn and develop on all of those platforms."

That said, today's reality for many is a hybrid cloud-and-on-premises world—which provides, says Smith, an opportunity for user groups such as IOUG to talk about key elements common to both of those environments. "All of those fundamentals—they haven't gone away," he adds. "We're still talking about security, availability, and tuning, whether we're on Oracle Cloud or whether we're on premises."

In addition, says Smith, in the hybrid world, "there are a lot of interfaces

that need to be worked and other database types that need to be learned and managed. To me, that's the challenge today: It's not just how can I do my Oracle databases best; it's how do I do everything else."

Another challenge—or opportunity—for database professionals is connecting their work to business outcomes. DBAs are schooled to care about the technical outcome, "but there are business outcomes that are directly related to their

activities," says Smith. "Can I make this faster? Can I work with this particular group to improve performance in this particular aspect of our application? Can I train people to do things better? All of those improve business outcomes, but it's not something that the heads-down kind of DBA has been doing. If you've been sitting in your cube for 15 years writing shell scripts, getting out there and actually talking to people is a challenge."

How to adapt? "At IOUG, we've been telling folks for quite a while that this is something they've got to do," says Smith. IOUG's EVOLVE program, for example, provides support including webinars and tracks at the annual COLLABORATE user conference that encourage technologists to "step back for just a second, stop being a technician, stop thinking at the command line, and think about how you as a professional fit into the business, how you fit into the success of your

STANDARDIZATION AND AUTOMATION

"Standardization is the very basis of being able to do automation," says IOUG President Ray Smith, and automation is key to productivity. You've only got so many hours in a day, he says, "and you're probably on call that night, so you want to get as much packed into your day as possible. Reduce the non-value-added tasks such as adding more disks or doing a manual backup. They have to be done, so automate them. Get that stuff out of the way so you can do more value-added things such as integrating databases or apps."

REDUCING RISK

This is a hybrid world and will continue to be one for at least 5 years—maybe 10, says IOUG President Ray Smith. “So we’ve got to have things that are as reliable, safe, and easy to do as possible. If Oracle Cloud fits that definition, that’s great. If an on-premises solution includes Oracle Enterprise Manager, great. Any means to make it less risky. Reduce risk by reducing variability of your shell scripts, your inputs, your platforms—anything to reduce risk.”

company,” says Smith.

It’s a growth opportunity, he adds. “When you start thinking in those terms, it’s like, ‘Ok, I’ve heard all this about standardization and working with other teams. Maybe I should get more involved with the DevOps opportunities. I’ve been handling this by myself, but maybe I could reach out to others.’”

Database professionals may feel as if they are “the center of the technology universe,” says Smith, “but you can’t do it all by yourself.” □

Leslie Steere is editor at large for Oracle Content Central. She has more than 30 years of journalism and marketing content experience.

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Opportunities, Cost Savings, and an EPM Case Study

How ODTUG leaped from spreadsheets to SaaS—and how to take advantage of change **BY LESLIE STEERE**

Oracle Magazine took the opportunity at **Oracle OpenWorld 2018** to catch up with leaders from several key Oracle user groups and communities. In the second of a series of articles based on our conversations, Gary Crisci describes ODTUG's adoption of an Oracle enterprise performance management (EPM) cloud solution, talks about the benefits of embracing change, and outlines ODTUG's mission to support its members in the present and prepare them for the future.

As director and treasurer of [ODTUG](#), a global organization whose purpose is to keep members "on the cutting edge of the constantly changing Oracle



When we look at things like moving to the cloud, says ODTUG Director and Treasurer Gary Crisci, people need to know that we are creating new jobs in the process.

CREDIT FOR CLOUD

The beauty of a SaaS application is that you don't have to do things such as install and capitalize hardware assets and depreciate them on your balance sheet, buy on-premises licenses, or patch the software, says ODTUG director and treasurer Gary Crisci. "I have no capital investment. I don't have to put anything in a physical location. All I have to do to order a service is give them a credit card, and we start using it."

technology landscape," Crisci has many areas of expertise, one of which is EPM (in his day job, Crisci is a principal architect and director of product management at GE; he is also an Oracle ACE Director).

"EPM is a way of using a suite of technology products to look at what we're doing in our business, report on it, and understand where we are and where we can go," he explains. It's "the last mile of finance reporting in a lot of ways, because most of the finance work gets done in the ERP system first and then you bring it down into the EPM modules, where you can do your consolidation, eliminations, financial planning, and analysis and come up with your external reporting. EPM is critical to running a business. In my experience, I have

found that when things are going well, you want EPM. And when things are going badly, you need EPM."

OUT WITH SPREADSHEETS, IN WITH THE CLOUD

No surprise, then, that one of Crisci's first moves as ODTUG treasurer was to upgrade the user group's own financial reporting structure from Microsoft Excel to Oracle Planning and Budgeting Cloud Service. "We manage a 14,000-member user group," he explains. "We spend a tremendous amount of money on conferences, booking them five years out; our contingent obligations are in the millions of dollars; and we managed everything in Excel. As an EPM professional, I found the idea that we were managing our budgets and our finances in a spreadsheet very painful."

If questions arose during ODTUG finance committee meetings, "I would have to ask our accountant and she would have to find the data, build an

EMBRACE CHANGE—OR ELSE

"You have to be comfortable with change, because things are changing at a pace that we haven't seen before and they're only going to continue to get faster," says ODTUG director and treasurer Gary Crisci. "You have to alter your mindset to see change as opportunity. When things change, it means there's an opportunity to do more, to do something else, to right a wrong—whatever the case may be. It's an excuse to transform and do things that can benefit you."

Excel report, and send it to us," he says—which sometimes took a day or two. If the committee had more questions, she'd do it again, "and we'd go back and forth like this," says Crisci. "So when Oracle Planning and Budgeting Cloud Service came along, we got a subscription. I was able to log in the next day, and within

a few days, I was able to start migrating away from those Excel files and start doing a better analysis of the way the organization works."

Prior to cloud services, "we couldn't adopt any kind of tools like this, because it would have involved a capital investment in servers, location storage, maintenance, patching—all kinds of things that a volunteer organization cannot do," he says.

Now ODTUG runs its financial close and board meetings directly out of Oracle Planning and Budgeting Cloud Service. With the cloud service, says Crisci, "we have a full visual picture of what our organization's finances are and we can drill down into the details if we need to answer a question. As a board, we operate faster and much more efficiently."

ODTUG financial close meetings now last about 10 to 15 minutes, says Crisci, "and it's been a great shift for us and a real success case in how cloud technology and SaaS applications can revolutionize and change things for organizations of all sizes."

EMBRACE CHANGE

"I think that one of the things everyone has to recognize is that if you're not comfortable with change, it's too bad," says Crisci. "People who hold on too tightly to what they've done before are going to struggle in the future. I think you have

to be the kind of person who embraces change and sees it as an opportunity; you must be willing to adapt."

"When we look at things like Oracle Autonomous Database and we see organizations moving to the cloud, where people are asking whether they are still going to have a job, they need to know we are creating new jobs in this process," says Crisci. "We're talking about jobs that are going away, but the jobs that go away should be the non-value-add jobs. The jobs where so much money is spent just to keep things working are not a good spend of capital and not a good use of human resources," he says. "And that's what we want to do with our membership base, through our education programs and our confer-

ences, and the kind of things that we do such as networking—to help people keep pace with change and understand where the opportunities are and be prepared to take advantage of them.

"Those people who are just keeping the systems running are smarter than that," says Crisci, "and we need to learn as business leaders how to repurpose those people now that they're freed from those shackles and use them in a way to actually start providing more value to the organization. So I don't think they go away; I think they get repurposed." □

Leslie Steere is editor at large for Oracle Content Central. She has more than 30 years of journalism and marketing content experience.

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