

NEXT BIG THING

PROFIT



Ahead of the Curve

“Oracle Cloud makes the strongest case for what enterprise IT will look like in the future.”

Thomas Kurian,
President, Product Development

Oracle OpenWorld

SPECIAL ISSUE 2017

Larry Ellison's
“Big Deal” 

Cloud: The Path
to Innovation 

Oracle
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Playground 

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500+

visitors looking for new ways to
save time, money & resources
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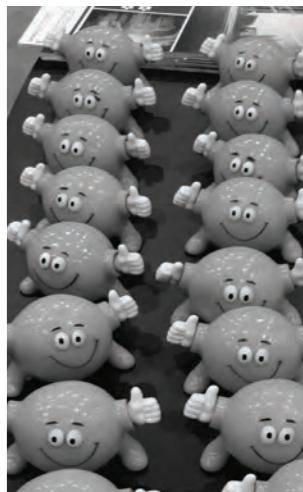
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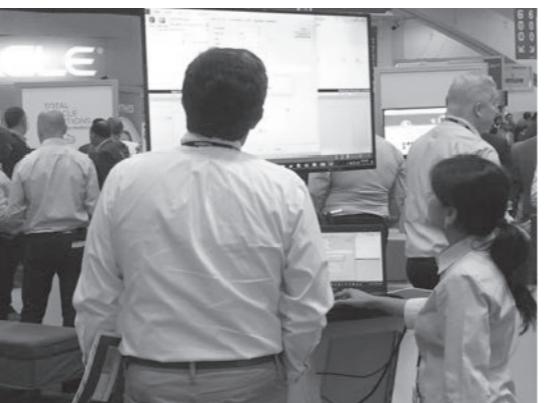
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PROFIT

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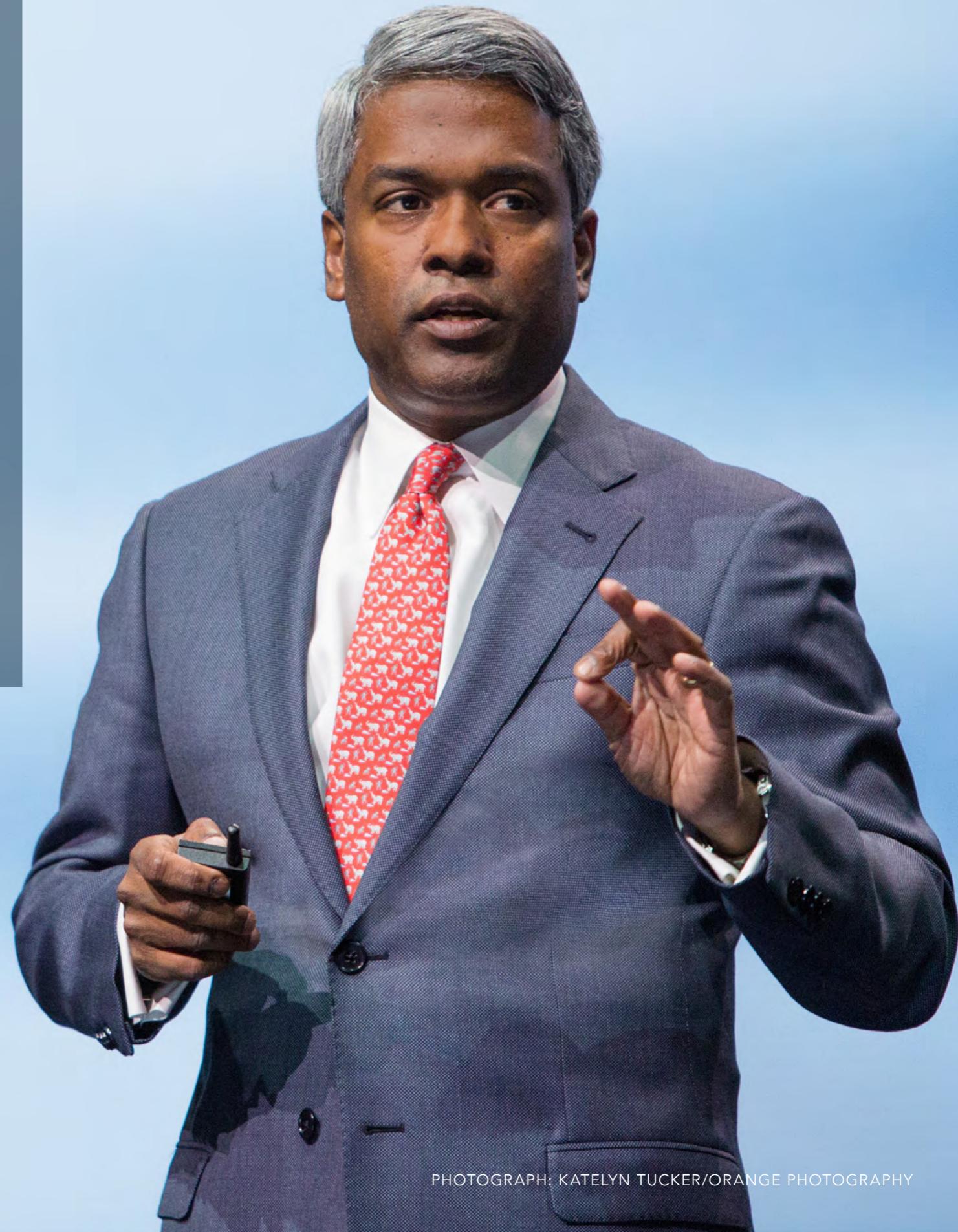


Oracle president Thomas Kurian says Oracle Cloud is at the front of today's cloud market. But how does that help customers adopt tomorrow's technologies?

AHEAD OF THE CURVE

BY AARON LAZENBY

The emergence of enterprise cloud computing is no longer a matter of debate—and the numbers bear that out. Research firm IDC found that companies are acquiring cloud services at more than six times the rate of IT spending, while Deloitte predicts that IT-as-a-service will account for more than US\$500 billion in economic activity by 2018.



“

Cloud architecture must be engineered with future use cases in mind. Otherwise, you’re going to be trapped in a cloud that is not keeping up with the market—and that would undermine one of the core benefits of cloud computing.

”

As the leader of one of the world’s largest cloud development organizations, Oracle President of Product Development Thomas Kurian has an enviable view of the cloud economy. And whether in private conversation or on the public stage at events (such as Oracle OpenWorld), Kurian makes a strong pitch for Oracle’s position in the marketplace.

“We’re the only cloud vendor that provides infrastructure as a service [IaaS], platform as a service [PaaS], application software as a service [SaaS], and data as a service [DaaS],” says Kurian. “We have an unmatched breadth of functionality and integration across our platform and application portfolio. And we can run that

cloud stack in any data center. This affords us some very unique capabilities as we look into the future.”

In the days after Oracle OpenWorld 2017, Kurian spoke to *Profit* about some of those unique capabilities—including the impact of emerging technologies such as artificial intelligence (AI) and the Internet of Things (IoT) on enterprise cloud computing.

PROFIT: Oracle is ten years into its cloud journey. What have we learned from customers about our cloud portfolio?

KURIAN: Customers today understand the value of cloud computing—how much money you can save, how fast you can deploy workloads, and how easy it is to

run and use applications without having to manage the systems themselves. All of that is clear at this point.

Now, customers are making requests for novel uses of the technology. I’ll give you an example. We are currently working on a project with an oil and gas exploration company. They are moving hundreds of terabytes of data to Oracle Cloud as the foundation of their exploration and science algorithms. That critical part of their business uses Oracle Cloud Infrastructure to run the computations, and they’re using our analytics and Oracle Big Data Cloud Service as a platform to manage the large data assets that they’re loading into the cloud.

We're also working with a grocery retailer who wanted to connect our software-as-a-service applications to their mobile user base. They wanted to use a bot to make that connection. So the bot and the user interface run on our platform as a service connecting up our SaaS applications.

There are hundreds of such examples: supply chain companies using our IoT platform as well as customers activating the AI technology inside our applications and then using that as part of a platform to do trending. These use cases largely reflect what an IT footprint looks like within a traditional corporate enterprise. IT needs the whole stack, but they can't say, "Hey, we've got to go to four different clouds to do that."

PROFIT: How does Oracle's cloud portfolio support customers' need for the flexibility to adopt new technologies as they emerge?

KURIAN: Well, take AI and machine learning as an example. These are areas of enormous importance as we go forward,

and our strategy is threefold. First, we've put very fast computers in Oracle's IaaS, based on a technology called graphical processing unit [GPU] that runs machine learning algorithms with extremely high performance. So the computation is lightening fast. Second, we're building out a PaaS so data scientists and experts can build applications on top of their own algorithms or off-the-shelf algorithms.

Third, we have taken a specific set of AI algorithms and integrated that into our SaaS applications. There are a number of business processes these AI algorithms could help with. For example, an AI algorithm could tell a marketer the best message to send to a lead. It could tell sales reps which of the many leads they should focus on closing or what's the best product to recommend. It could tell a customer service representative what to say in response to a customer's query. All of these are scenarios where human beings write very sophisticated, complicated rules to try and drive what a person should



do. In our view, algorithms can do it a lot better than just human-encoded rules.

But the overall cloud architecture must be engineered with future use cases in mind. Otherwise, you're going to be trapped in a cloud that is not keeping up with the market—and that would undermine one of the core benefits of cloud computing.

**Oracle President of Product Development
Thomas Kurian believes Oracle Cloud makes the strongest case for what enterprise IT will look like in the future.**

PROFIT: How is Oracle uniquely qualified to help companies introduce emerging technologies such as AI and machine learning into their business processes?

KURIAN: We understand the application's function domain in great detail, so we can tailor unique algorithms for specific domains. For example, traceability is important with an AI algorithm that's assisting a human with workflow tasks—you must have clarity on why the algorithm recommended or rejected something. This is just a fact we know because of our work with our customers.

It's also very important to optimize algorithms for the domain, so that you avoid statistical skew and selection bias. For example, algorithms on ecommerce recommendations are relatively simple to do with a large number of shoppers and an assortment of products. But what if you have a really small number of customers and a small assortment of products? You have to be careful to avoid statistical skew in the recommendation that the software is making.

It gets even more complicated when you introduce a new product, because the state of the art in algorithms is looking at what an individual and people like that individual are buying, and then making a recommendation based on that information. But nobody has bought the new product yet, so how do you introduce novelty into the algorithm? Our experience in enterprise workloads and enterprise data helps us understand and create machine learning algorithms very differently.

PROFIT: What role does AI and machine learning play in the area of security?

KURIAN: The fundamental heart of a security algorithm is an understanding of what people are doing what operations on what systems in the organization and whether any of those operations are malicious. Our technology uses AI, particularly machine learning and clustering, to understand the patterns by modeling systems. What are the relationships between systems? Who is accessing these systems?

Why are they accessing these systems? Our AI allows us to very quickly compare anticipated behavior against a user's actual activity within the system to flag whether the user is nefarious or authorized.

We also applied AI and machine learning to the Oracle Autonomous Database solutions, which Larry Ellison announced at Oracle OpenWorld. There are many mundane tasks required to operate a piece of software. There's a certain tedium associated with these tasks, and staff often does not perform them consistently. They don't really add competitive advantage, so they are not a priority to senior management. But if you don't make these mundane tasks a priority, you can introduce significant security vulnerabilities to the system.

So instead of having a human do all of those tasks for a database—install, configure, patch, upgrade, back it up, and encrypt it—the software does this automatically on behalf of the user. This gives you greater predictability and accuracy in the way sys-

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IT needs the whole stack, but they can't say, “Hey, we've got to go to four different clouds to do that.”

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tems are configured, at a substantially lower cost.

PROFIT: Aside from AI and machine learning, what other emerging technologies do you see having the greatest potential to radically change business in the decade ahead?

KURIAN: Three of the most important new technologies we're looking at are chatbots, IoT, and blockchain. The chatbot makes messaging a client to any application, essentially becoming the new browser. It offloads the need for human beings to be involved in very mundane tasks—such as answering basic questions—by having a digital assistant do the job. I believe chatbots will transform the human interface.

IoT is a way to improve business process efficiencies by instru-

menting devices with sensors, and it delivers the ability to respond when sensors send information up to the cloud-based system that's monitoring them. When you are able to monitor logistics and assets in that way, you can make business process more efficient. This will transform supply chains, for example, by digitizing the flow of data from the physical world, which allows algorithms to interact with physical space.

Blockchain is enabling any business process that's highly centralized in a company to be decentralized or distributed in a fundamentally different way. For example, intracompany transactions could be totally transformed. Today, when two different divisions of a company reconcile their financial positions, they have to do a lot of manual reconciliation of

intracompany transactions. With blockchain, you can use the [open source project] Hyperledger as a mechanism to guarantee integrity of data, validating data that may be subject to regulatory or market scrutiny.

Each of these new technologies will transform the modern business in its own way. Our job is to make sure our customers have the platform they need to adopt these technologies as they see fit. That is why I believe Oracle Cloud makes the strongest case for what enterprise IT will look like in the future. □

Aaron Lazenby is editor in chief of Profit.

ACTION ITEM

- [Try Oracle Cloud for Free](#)



From Sunday, October 1, through Thursday, October 5, Oracle OpenWorld 2017 brought together top technologists and IT leaders for immersive, interactive demonstrations and deep dives into cutting-edge technol-

ogies and innovative solutions at both Oracle and customer companies. The conference hosted 60,000 attendees from 175 countries; offered 2,300 sessions; provided a speaking platform for more than 3,000 customers and part-

ners; and featured more than 500 Oracle technology sessions, demos, and case studies. In addition, this year's live coverage of the conference on Oracle's social channels garnered more than 18 million views.



Executive Chairman and CTO Larry Ellison announced Oracle Database 18c, which he described as the world's first "self-driving" autonomous database.

Day 1

INTRODUCING “A BIG DEAL”

Oracle Executive Chairman and CTO Larry Ellison's opening keynote is always a highlight of the first day of the conference, and in this year's Sunday night address Ellison told a rapt audience that he has seen the future of IT: autonomous, adaptive, self-managing systems that are more secure than ever.

That future has arrived, Ellison revealed, in the form of Oracle Database 18c, which he described as the world's first 100 percent "self-driving" autonomous database. This new release is an even more reliable, lower-cost next generation of the company's flagship database, Ellison said.



“
This is a big deal, by the way.
No one else does this. This is the
most important thing we've done
in a long, long time.

—ORACLE EXECUTIVE CHAIRMAN AND CTO LARRY ELLISON
”

Oracle Database 18c's self-patching and self-tuning capabilities, powered by machine learning—a “technology that's every bit as revolutionary as the internet,” Ellison said—will minimize human intervention and virtually eliminate human error, helping reduce security risks while freeing database man-

Attendees gather on Howard Street to network, lunch, relax, and watch Oracle OpenWorld presentations in real time.

agers to focus on higher-level work.

“This is a big deal, by the way. No one else does this,” Ellison said, adding, “This is the most important thing we've done in a long, long time.”

Just as autonomous vehicles, robots, drones, and other machine learning-based smart machines will transform the transportation, manufacturing, package delivery, and other industries, so too will machine learning technology fundamentally change IT security and management, he said. Machine learning algorithms will, for instance, help companies improve their information security by analyzing reams of logged data and flagging outliers and anomalous patterns before intruders can do



Interactive robots and virtual reality were front and center in the Exhibition Halls this year.

damage. Ellison offered the example of a California-based retailer being able to proactively block someone posing as the CFO from logging in to its finance systems from a computer in Ukraine.

"It's our computers versus their computers in cyberwarfare," Ellison said, noting that the recent Equifax breach, which exposed roughly 143 million Americans' personal information, appeared to be largely the result of human

error—a failure to patch key network systems. "And we have to have a lot better computer systems, a lot more automation, if we're going to defend our data."

As with all Oracle cloud offerings, the company will deliver all versions of its next-generation database in its public cloud as well as behind customers' firewalls under the Oracle Cloud at Customer program. And Oracle plans other autonomous services, including Oracle Autonomous Express Database Cloud Service and Oracle Autonomous NoSQL Database Cloud Service.

18 MILLION
NUMBER OF VIEWS LIVE COVERAGE OF ORACLE OPENWORLD GARNERED ON ORACLE'S SOCIAL CHANNELS

Day 2 “INEVITABLE” PATH TO INNOVATION

Taking the stage on Monday at Oracle OpenWorld, Oracle CEO Mark Hurd addressed the mounting pressure the current economic climate and rapid pace of disruption across industries is putting on CEOs to produce greater customer value and shareholder returns at lower cost. These conditions, said Hurd, are driving companies to the cloud in an effort to quickly free up resources for investment in customer-facing innovation. "The movement to cloud is an inevitable destination," said Hurd in his morning keynote. "This is how computing will evolve over the next several years."

Hurd noted that corporate IT budgets



(Top) During his keynote address, Oracle CEO Mark Hurd discussed how current market conditions are driving companies to the cloud to free up resources for investment. **(Bottom)** Customers mingled and enjoyed the show at the Customer Support Services VIP Reception.

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The movement to cloud is an inevitable destination. This is how computing will evolve over the next several years.

—ORACLE CEO MARK HURD

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continue to be flat in many companies. With more than 80 percent of those budgets typically allocated to things such as patching, upgrading systems, and maintenance, that leaves little funding for investing in the kinds of modern applications and customer touchpoints expected by consumers and business customers alike. Security concerns drain even more from potential investments in innovation, as data theft has become a board-level concern.

The paradox of not enough investment in innovation on one hand and a

more difficult economic landscape on the other is leading more companies to shift more of their IT workloads to cloud service providers such as Oracle.

Business managers are saying, “I want to move this risk. I want to move this complexity. I want to move this cost,” Hurd recounted. “I want to move it from here to there—i.e., from you to me.”

This trend has been borne out by Oracle customers who joined Hurd during the keynote, including Caesar Entertainment CEO Mark Frissora, who appeared via video broadcast.



Caesar's move of its financial accounting software to Oracle Cloud has allowed the company to save "millions and millions of dollars," said Frissora.

For Bloom Energy, a provider of green fuel cell technology that now has one-quarter of the Fortune 100 as customers, the Oracle Cloud application suite has helped the company make use of more timely and accurate data "that has helped us keep up with that growth," said the company's CFO, Randy Furr. And for Gap, Inc., Oracle Retail Cloud is helping

provide a unified customer experience across stores and a single ecommerce shopping experience across its brands, said Gap Executive Vice President and CIO Paul Chapman, in a conversation with Hurd.

Chapman quipped that he wanted Gap to patch sport coats instead of its computer systems. "We have to get out of that business," he said.

KEEPING CLOUD OPEN

Later on Monday, Amit Zavery, senior vice president of product development for Oracle Cloud Platform,

Advice from eighteenth century First Lady Abigail Adams on the nature of learning was still relevant at the Collective Learning Session.

laid out the Oracle Cloud Platform roadmap in an [Oracle OpenWorld general session](#). From the start, Zavery focused on the theme of keeping the platform open.

"This is something that we really believe is important," he said, highlighting five ways that Oracle Cloud Platform delivers on that open promise: container-based application development, blockchain-based collaboration, new channels for chatbots, API-first and third-party application integration, and a choice of technology stack.

In particular, Zavery offered the example of the new Oracle Blockchain Cloud Service. Blockchain is a cloud-based distributed ledger that can be used in business-to-business

partner ecosystems for more-secure transactions and data sharing; Oracle Blockchain Cloud Service is built on Hyperledger Fabric, the open source effort led by the Linux Foundation to spur cross-industry blockchain standards.

Zavery noted that open doesn't mean undifferentiated, and he pointed out that Oracle enhances the best open source innovations with the tools for management, security, development, and high-performance infrastructure that companies need to put them to practical use.

In addition, Oracle makes sure companies are ready for the ground-breaking idea that's likely just around the corner. Said Zavery, "We have a technically unified and proven PaaS [platform as a service] offering, completely based on open standards, delivering continuous innovation."

Day 3

THE WAY FORWARD

On Tuesday at Oracle OpenWorld, Thomas Kurian, Oracle president of product development, mapped out the technology path ahead for Oracle—a path that includes artificial intelligence, machine learning, chatbots, and new human interfaces. In his [morning keynote](#), Kurian said these emerging technologies now fit into the vision Oracle has had since it started building its cloud offerings more than a decade

ago: let anyone, anywhere in the world, access the power of all of Oracle's technologies using only a browser or a phone.

"We're going to show you not just the new innovations we have in Oracle Cloud, but also a glimpse into the future of Oracle, of how we're infusing the new technologies of autonomous computing, artificial intelligence, IoT [Internet of Things], blockchain, and new forms

of human interface into our cloud offering," Kurian said.

For more in-depth coverage of the topics he explored, see our [cover story interview with Kurian](#).

Also on Tuesday, Oracle Executive Chairman and CTO Larry Ellison took the stage for his [second keynote of the week](#), during which he introduced the industry's first cloud-native, integrated security and systems management suite: Oracle Identity Security

Oracle CEO Mark Hurd moderated a lively discussion between former adversaries former US Senator Barbara Boxer and former Speaker of the House Newt Gingrich during a Leaders Circle session focusing on the future of the country.

Operations Center portfolio of services coupled with Oracle Management Cloud.

Like Oracle Database 18c, these integrated cloud services rely on machine





learning—specifically machine learning algorithms that identify anomalous patterns in reams of data pulled together from a variety of enterprise databases, servers, and applications. This application of machine learning is designed to help companies forecast, quickly detect, and ward off security attacks as well as system performance issues.

"The real problem is loss of information," Ellison said. "If your system is down and you can't sell tickets or sell flashlights or whatever you're

doing on your online system, that's not good—you'd like the system to be available all the time. But you don't get called in front of Congress for that. If you lose data, that's a big problem. And that's fundamentally what . . . our system is designed to protect against."

POLITICAL LUMINARIES DEBATE

Tuesday's other big news was a [lively discussion](#) between Democrat Barbara Boxer and Republican Newt Gingrich, former adversaries during

Dave Donatelli, executive vice president of Oracle's Cloud Business Group, took the audience on a tour of the many ways Oracle customers can journey to the cloud.

their decades of service in the United States Congress, who debated a range of political and economic issues at the Leaders Circle, a forum for business and technology executives. Asking the questions and keeping the peace was Oracle CEO Mark Hurd.

After both speakers shared their views on the current state of the country, Hurd shifted the conversation to the US Congress, whose approval ratings range between a dismal 9 percent and 20 percent in public opinion polls. "What are your views on what you'd like your respective parties to do right now?" he asked the two political veterans.

Both Gingrich and Boxer acknowledged the difficulty

of getting things done in Congress, with Gingrich referring to it as "535 high school class presidents," and commenting, "Congress is always a mess." Boxer attributed the legislative inertia partly to the fact that members of Congress are in constant fund-raising mode, distracting them from their core duties. "They're afraid to do anything much because they don't want to get 'primaried' in the next election," she said.

As time was starting to run down, Hurd asked Boxer and Gingrich for their thoughts on the recently proposed overhaul of the US tax system. President Trump and congressional Republicans unveiled a sweeping tax reform plan in September that calls for lowering the corporate income tax rate, eliminating the estate tax, eliminating certain tax deductions, and simplifying the tax code.

It's hoped that the plan would also incentivize US



Attendees were treated to some exotic dance moves during the NextUp reception at the Oracle NetSuite SuiteConnect conference.

companies to “repatriate” to the US the estimated US\$3 trillion they currently hold abroad in lower-tax countries. Boxer said she’s been a longtime supporter of repatriation efforts, as long as the money US-based companies are incentivized to bring home comes with some infrastructure investment and job-creation “strings attached.” She also warned against turning to the trickle-down economics of yesteryear, cutting taxes for the wealthy in the hopes

that those savings generate investments that buoy the entire economy.

Gingrich sees supply-side economics as sound policy. “A lot of the advantage that both George H. W. Bush and Bill Clinton had was the underlying dynamic that Reagan had created between deregulation and tax cuts and then tax reform,” he said, going on to argue for an aggressive combination of tax reform, pressure on trading partners, and deregulation.

4

NUMBER OF
TIMES FASTER
OLTP ACCESS
PERFORMS
WITH ORACLE
AUTONOMOUS
DATABASE
CLOUD

Day 4

THE FUTURE IS NOW

On Wednesday, Oracle leaders continued to announce new products and discuss upcoming capabilities that harness the power of several emerging technologies.

“AI has the power to be more transformative for the enterprise than any other technology in recent history,” said Oracle’s Amit Zavery during his Wednesday session.

Zavery noted that because Oracle has embedded AI into its PaaS offerings, customers now have access to common AI libraries, machine learning frameworks, and development tools they can use to build AI code into their own custom applications. Chatbots are one example of a service

e Exchange



Explore Your Tomorrow Today was the theme at the Innovation Studio, where attendees got to experience firsthand demos of breakthrough products and solutions Oracle customers and partners are creating with Oracle technology.

underpinned by Oracle's AI technology. These seemingly human agents interact with people, both consumers and employees, like extremely knowledgeable

staff members. In large part because they are animated by AI, rather than strict business rules, they can understand context and learn from experience.

For example, chatbots built using Oracle Mobile Cloud Enterprise can infer earlier parts of a buyer-seller conversation, so that consumers don't have to reiterate

or contextualize their queries. Integrated APIs, such as a recommendation API, give chatbots access to customer purchase histories and preferences, improving a company's chances of selling additional goods or services.

"As user behavior has dramatically shifted to mobile and messaging platforms, it is critical enterprises evolve to support stakeholders' preferred channels," said Zavery. "By using Oracle Mobile Cloud, businesses will be able to continue strengthening these relationships, even as users might be moving away from engaging on websites and traditional mobile applications to messaging channels."

Also on Wednesday, Juan Loaiza, senior vice president of Oracle database systems technologies, discussed Oracle Database 18c and Oracle's online transaction processing (OLTP) version, called Oracle Autonomous



(Top) Oracle CloudFest.17 rocked the crowd with performances by The Chainsmokers, 2017 Grammy winner for best new artist, and by Grammy nominee and pop sensation Ellie Goulding. **(Bottom)** Students from local Design Tech High School (d.tech) in partnership with Oracle Education Foundation shared their innovative interactive prototypes with attendees at Oracle OpenWorld Innovation Studio.



Database Cloud, which is developed to provide four times faster in-memory OLTP access. "It's [been] a four-year effort that is in beta test now," Loaiza said.

Loaiza noted that Oracle Database already included many of the automated features of the forthcoming self-driving database—but the autonomous database requires complete automation of all parts of the database lifecycle.

"If you put together your own system and configure the database yourself, we can't make it autonomous," he said. "The cloud allows Oracle to automate the entire system from disks to database, enabling a fully autonomous database."

INTERACTIVE PLAYGROUND

The future of technology was also front and center at Oracle OpenWorld's Innovation Studio, where

attendees were given the chance to explore tomorrow today by viewing demos of innovative products and solutions Oracle customers and partners are creating with Oracle technology.

There was also an opportunity to engage with innovative interactive prototypes, courtesy of students from Design Tech High School (d.tech) in Burlingame, California, in partnership with Oracle Education Foundation. Vibrant, diverse startups from the Oracle Startup Cloud Accelerator ecosystem were on hand, representing technologies from AI to machine learning and virtual reality.

Students from d.tech were particularly excited to demonstrate their projects alongside both startups and global companies including GE Digital and Toyota. Top projects from d.tech's Oracle Education Foundation classes traditionally get showcased

at Oracle OpenWorld, and this year's projects included a student wellness scanner that helps teachers prepare for class by collecting students' attendance and assessing their mood; Project Roam, an IoT solution that helps connect staff and students throughout the school day; a water monitoring system that uses sensors to provide a clear picture of water quality in local wetlands; and a patent-pending pickpocket-proof purse.

Capping off Wednesday's keynotes, sessions, and all the action in the Innovation Studio was Oracle CloudFest.17, an appreciation event held annually at San Francisco's AT&T Park on the eve of the final day of the conference. This year's event featured standout performances by The Chainsmokers, 2017 Grammy winner for best new artist, and by Grammy nominee and pop sensation Ellie Goulding.

99.995

PERCENTAGE
AVAILABILITY
GUARANTEED
WITH ORACLE
DATABASE 18c



On the final day of the conference, attendees got one last chance to participate in developer sessions and visit the exhibition halls and Oracle DEMOgrounds. And while Oracle OpenWorld keynotes concluded on Wednesday, Thursday morning brought the always entertaining Java Community Keynote, delivered with comic flourish by Oracle Developer Community Director Stephen Chin.

Part of the annual JavaOne conference, which is collocated with Oracle OpenWorld in and around San Francisco's Moscone Center, Chin's keynote began with a deadpan request for the audience to clear the room in order to allow a film shoot to proceed. Thankfully that request was not granted; the audience remained and was treated to a simulated shoot that paid

Live for the Code! photo ops were a big hit in the Developer Loft.



Oracle Developer Community Director Stephen Chin delivered a *Matrix*-themed Java Community Keynote to an enthusiastic crowd.

homage to both Java technologies and *The Matrix*.

It's no wonder that those Java devotees stuck around; with more than 12 million developers running Java and more than 1 billion downloads each year, Java remains the world's most popular programming language—and community involvement and enthusiasm has long been a hallmark of the platform. JavaOne is the world's largest

gathering of software developers using Java technologies, and this year's conference took place on the heels of the release of Java SE 9 and Java EE 8, so attendees were able to get insights from the experts who built those technologies.

In the opening keynote of the conference, Mark Cavage, vice president of software development at Oracle, gave an overview of 2017's major



The Java Developer Lounge was the place to see what's happening in the developer community.

announcements around the Java platform and provided a glimpse of the future of Java, which focused on Java's pervasiveness in the cloud, new cloud-related features and projects, and the need to support container-centric microservices and serverless architectures. "We want the next decade to be Java first, Java always," said Cavage.

Notable among JavaOne's customer keynotes were

presentations by Michael Greene, vice president of system technologies and optimization at Intel; and John Duimovich, Java CTO and distinguished engineer, and Ian Robinson, distinguished engineer and chief architect of the WebSphere Application Server, both at IBM.

NEXT STEPS

The whimsical conclusion of JavaOne was indicative of



Everyone loves a photo op with Duke, the Java community mascot.

the playful spirit that both conferences embodied throughout the week—a week that offered technologists and IT leaders alike the chance to experience work as play for a stretch. If you can't wait to keep playing, be sure to register early for Oracle OpenWorld 2018 and JavaOne 2018. [Sign up](#) to be notified when registration is open for both conferences, which take place October 28 through November 1 in San Francisco.

12 MILLION
NUMBER OF DEVELOPERS RUNNING JAVA WORLDWIDE



On the Saturday prior to JavaOne's kickoff, Oracle's Java team engaged the next generation of developers with [JavaOne4Kids](#), a daylong series of computer science workshops for children, many coming from underserved schools. A collaboration of the global Devoxx4Kids initiative and the Oracle Academy, JavaOne4Kids includes workshops covering such topics as programming Finch robots, assembling gadgets powered by Raspberry Pi boards, coding games and websites with JavaScript and HTML5, and learning the Java programming language through technologies such as Greenfoot, Alice, Scratch (from the

MIT Media Lab), and BlueJ.

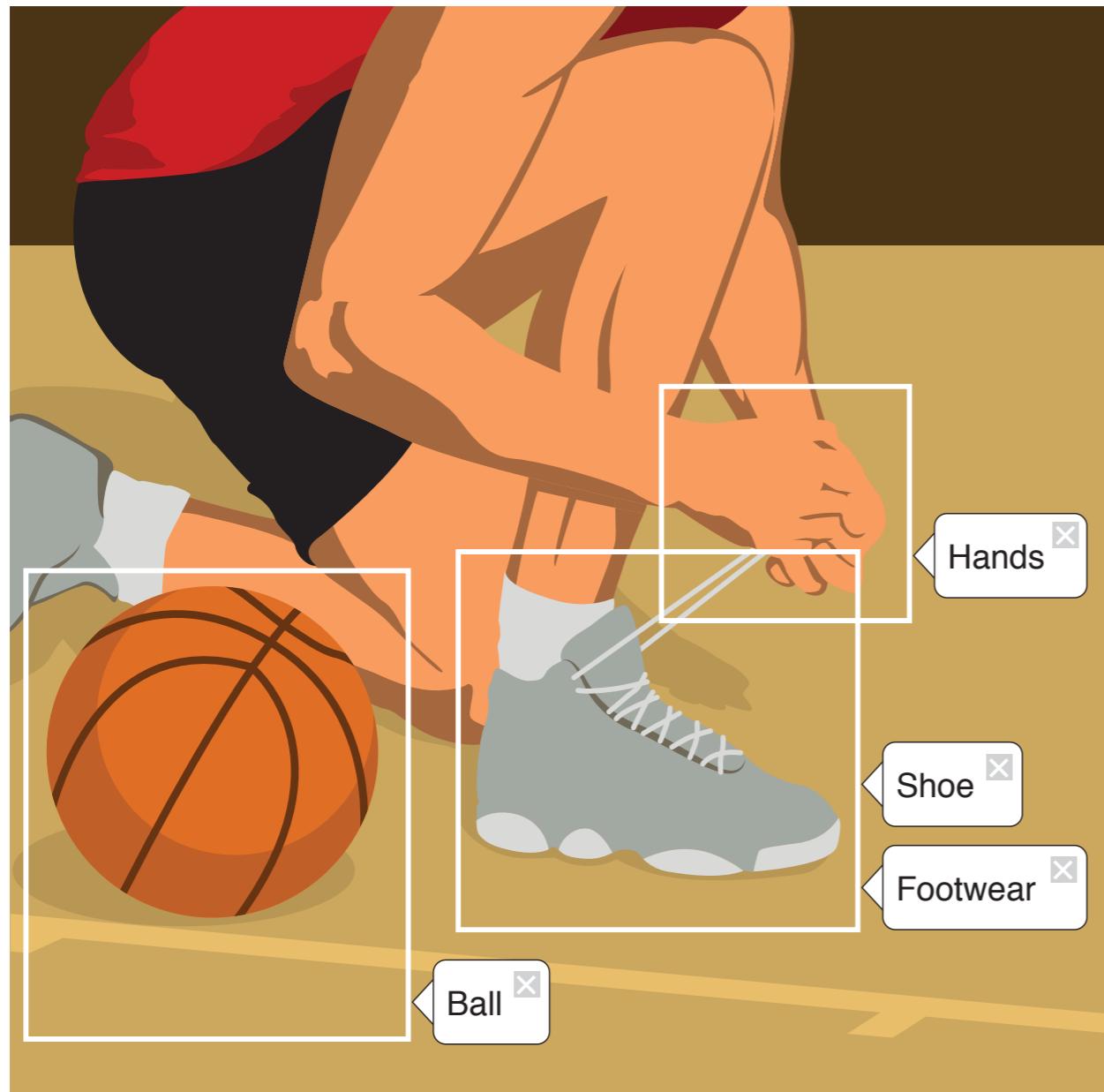
"This is the fourth year that we're doing JavaOne4Kids, and the really exciting news is that we were over-subscribed. We had 450 registration spaces and we filled them all," says Alison Derbenwick Miller, vice president of the Oracle Academy.

Many of the children who attended were repeat customers. "We're programming a button and a light sensor right now. We made a game where you press a button and an icon goes into the hole because the zombies can't go into the light," said Miriya, a 12-year-old girl who attended last year as well. "I think I might buy a Raspberry Pi."

GAME ON

How five keynote demos used a simulated basketball team to showcase the potential of AI, chatbots, IoT, and more

BY CHRIS MURPHY



When Oracle President of Product Development

Thomas Kurian mapped out the technology path ahead for Oracle during his Oracle OpenWorld keynote, he cast the 10-year effort to deliver all of the company's technologies via the cloud as just a starting point. The next wave of innovation, Kurian said, will include weaving new technologies such as artificial intelligence (AI), the Internet of Things (IoT), and new forms of human interface into those cloud foundations.

The result, said Kurian, is "a canvas on which you can paint your vision and your ambitions and dreams; to use information technology in a fundamentally new way; to transform your organization, your companies, and the world."

Kurian's keynote brought these grand ideas to life with demos. In preparation, members of his development team created the scenario of a basketball team, the Huskies, using cloud-based technology to quickly launch new platforms for fans to engage via social media. Kurian and his team members then took the stage to show how the Huskies organization could use cloud-based AI, analytics, marketing, and IoT systems to turn that fan engagement into revenue. Here are

snapshots of the five technology demos supporting that vision.

DEMO #1: CLOUD INFRASTRUCTURE FOR AI-POWERED APPS

The first demo of the presentation began with an app idea—one that lets a fan snap a photo of a player and upload it to get stats on that player and vote for him as the league's most valuable player. What this simple concept revealed, however, was the cloud infrastructure necessary to support that kind of AI-powered app. Such an app requires machine learning, because it needs to be trained on a bank of images to recognize players. That requires an infrastructure using high-performance GPU microprocessors—plus the ability to handle the streaming data of images and to use open source machine learning libraries such as TensorFlow.

The following three steps are needed to set that up in Oracle Cloud Infrastructure using only a browser: 1) set up a multiple-GPU infrastructure cluster by clicking the preferred options for a virtual

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—THOMAS KURIAN, PRESIDENT OF PRODUCT DEVELOPMENT, ORACLE

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cloud network and for the cluster itself, such as the operating system, bare metal servers or virtual machines, the number of nodes, and the like; 2) set up a streaming data service to ingest the images; and 3) train and run an AI application using that image data.

Once the streaming data service pulls in tens of thousands of player images, the app needs a deep learning model to recognize a player and pull stats on him. Oracle's infrastructure supports leading open source machine learning libraries such as TensorFlow, which this demo used. The high-speed GPUs speed up

the work, which means paying for less computing power than a slower option would require.

DEMO #2: LET FANS BUY TICKETS USING FACEBOOK MESSENGER

Chatbots let customers use their favorite text platform or voice-powered assistant to ask questions such as, "Are there tickets for Sunday's game?"—and the second demo showed how to quickly build such a chatbot for Facebook Messenger using Oracle Mobile Cloud.

Say a fan asks the bot the date of the next Huskies game. The bot

responds with ticket options at various price ranges and then lets a fan go through to purchasing, without ever leaving the Facebook Messenger platform. Developers and non-developers alike can use the new bot-building capabilities of Oracle Mobile Cloud to build a bot and map how these conversations should flow. For example, creating dialogues of possible customer conversations starts with typing in a few different ways to say, "I'd like to buy tickets," and the built-in natural language capability understands other variations. If a fan uses new phrasing, the platform's "intent" capability shows the developer that the bot has an 85 percent confidence that it falls under the "buy tickets" option.

With machine learning, the bot also continually learns the different ways that fans ask similar questions. And tools for mapping the flow of conversation let a business manager insert options such as offering a discount for pre-

DEVELOPERS TAP THE IOK—INTERNET OF KEGS

When it's time to demo the latest application of the IoT for a bunch of developers, you might as well have fun. Creating an imaginary basketball team is one way to accomplish that; serving them beer is another.

In a live demo at the JavaOne conference, which was colocated with Oracle OpenWorld in San Francisco, California, members of the Oracle Developer Community worked with local brewery Alpha Acid to show how an IoT setup could

improve both beer manufacturing and product-improvement processes.

Senior User Experience Architect Mark Vilrokx and fellow members of the emerging technologies team in Oracle's AppsLab group worked with Alpha Acid to install sensors in the brewery

to collect data on various facets of beer making, such as temperature, pressure, and CO₂ levels in the fermentation tank. "Before, if the brewer wants to know how warm the brew is, he pours it on his hand," Vilrokx told visiting developers. "That's not very scientific. And he gets a measurement for now, but maybe 10 minutes later it has cooled down and he doesn't know."

Vilrokx and his team tracked measurements over time and provided a chart where "hopefully it's always

within the range and you can see it," he said.

The next part of the product-improvement process came when tasters (in this case, developers at JavaOne) rated different batches of beer. Using the sensor data collected at the Alpha Acid site, the brewer can correlate the relevant beer-making data with the feedback on the batches that were rated highly and not so highly, allowing the brewer to improve processes over time, Vilrokx explained.

The demo in the JavaOne Developer Lounge was also outfitted with sensors linked to Oracle Internet of Things Cloud Service, letting Vilrokx' team measure the number of pours, the number of ounces in each pour, and the amount of beer left in each keg, all visualized on tablet screens at each keg.

—Jeff Erickson

purchasing beer or wine before checkout. "This is a very visual, drag-and-drop way of building the dialogue flow," said Oracle Vice President of Product Management Diby Malakar.

But fans don't use only Facebook Messenger. One of the most valuable bot-builder features in Oracle Mobile Cloud is the connection to a range of messaging platforms such as Slack, WeChat, and voice-powered assistants. This lets developers build once and add a new channel by clicking these new options—rather than having to recode for all the variations of how message platforms display data and handle errors.

DEMO #3: ANALYZE FANS' FACEBOOK, TWITTER, AND INSTAGRAM ACTIVITY

The Huskies business team wanted to better understand and analyze fans' social media activity. So while the first demo showed how the team could ingest images from social media, the third demo showed new ways to analyze that data using image recognition and AI and to share it among team

members via mobile channels. Kurian described Oracle's analytics vision as allowing "anyone in the world, not just professional analysts, to be able to analyze any type of data from any data-source—not just numbers, but images, audio, video, textual data, sensor data."

Oracle Analytics Cloud uses AI to make recommendations about how to cleanse data and parse it. Before analyzing image data gathered from social media, for example, it makes recommendations ranging from the simple (filling in missing zip codes) to the more complex (filtering out bot traffic based on typical bot behavior). The analytics platform also suggests ways to tag and sort image data, such as identifying brands, detecting certain objects such as shoes or basketball jerseys, and even identifying emotions.

With the data cleansed, the system can make recommendations for analysis, such as identifying which players are most popular with different age groups of fans. Analysts can also run their own analysis by comparing dif-

ferent datasets. And, they can share that data in new ways, such as via a mobile app that offers a smart feed to automatically deliver analysis the system thinks is most important. Using natural language capability in the app, analysts can set up alerts—when social mentions of a star player exceed the 4 million mark, for example.

"We've moved from a world where analytics is a passive system, where you have to go ask questions, to a system that's constantly looking out for the best interest of the company," said Oracle Senior Director of Product Strategy Jacques Vigeant.

DEMO #4: RECOMMEND PRODUCTS TO WEB SHOPPERS USING AI-POWERED APPS

Tracking and understanding social engagement doesn't help the Huskies if it doesn't lead to higher ticket and merchandise sales. The fourth demo of the keynote showed how, by combining anonymized, third-party browsing history data from Oracle Data Cloud with first-party data such as an individual's purchase history,

the Huskies can provide personalized ads and offers in real time on web platforms, email, or chat. Across its cloud applications, such as Oracle Commerce Cloud and Oracle Marketing Cloud, Oracle is applying AI, through what it calls *adaptive intelligence*, to use data to make recommendations such as what product to offer when and what channel to use.

That kind of data-driven personalization is increasingly common, but doing it right takes two big things, said Oracle Vice President of CRM Product Management and Product Strategy Melissa Boxer. The first is having the volume and variety of high-quality data to power the system. And the second is being able to understand and react as the data changes, moment to moment.

"We're able to capture changes in customer interests, or searches, or past orders, and process and rescore for every user, click by click," as would-be customers buy or reveal new browsing interests, Boxer said. A data-as-a-service user can't see a shopper's browsing history directly but can see

anonymized profiles based on people with interests and tendencies similar to a shopper.

DEMO #5: IOT PLUS SUPPLY CHAIN CLOUD AND CHATBOTS

The final demo of the presentation envisioned an online shopper taking a picture of a Huskies player's shoes, uploading it via a chatbot, and asking the bot to order those shoes in a particular size with gold lettering instead of black. Connecting such a bot to a supply chain means integrating with Oracle's cloud applications for supply chain, order management, and manufacturing.

Once the shoes are in production, the process gets oversight from Oracle Internet of Things Production Monitoring Cloud, which can track data from thousands of sensor readings from machines on the factory floor. If it spots a serious problem, the IoT application can trigger a maintenance request, a technician can use Oracle Internet of Things Asset Monitoring Cloud Service to pinpoint the problem, and the supply chain app can flag orders

that would be delayed by a production slowdown. Oracle Internet of Things Fleet Monitoring Cloud can track the goods to their destination.

The demos as a whole showed how companies can use emerging technologies in highly practical ways, and how Oracle has honed its cloud offerings to support and integrate those tools. As Kurian put it, "We're infusing the new technologies of autonomous computing, artificial intelligence, IoT, blockchain, and new forms of human interface into our cloud offerings." □

Chris Murphy is director of cloud content at Oracle.

ACTION ITEMS

- [Oracle Cloud free trial](#)
- [Oracle Mobile Cloud video](#)