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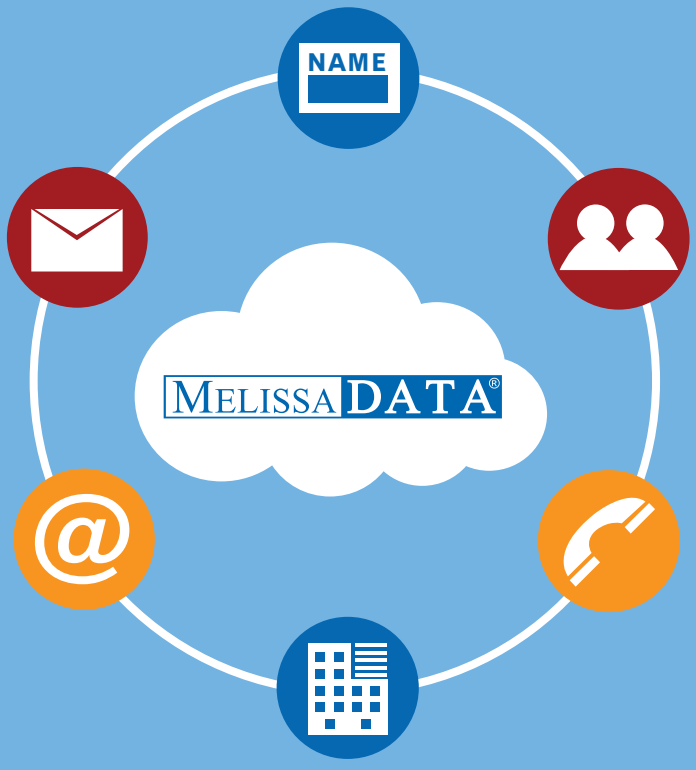

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NEWS WATCH

Yelp offers up Kafka tools to open source

Yelp saved itself US$10 million by building out its Apache Kafka-based Data Pipeline, and now it wants to spread that love to other enterprises. Just before the holidays, Yelp open-sourced its Data Pipeline and assorted utilities used to maintain and build out this streaming data platform.

Data Pipeline is now available on GitHub under the Apache 2.0 license. Using Data Pipeline, developers can tie their applications into the constantly flowing stream of Kafka data.

Jason Fennell, vice president of engineering at Yelp, said that Data Pipeline coupled with Kafka provides benefits to all data streaming through the company's systems. "We'll build a connector from Kafka to our Salesforce instance, and now we have this real-time stream of updates from our core databases into Salesforce. We managed to make a process that could take as long as three weeks to get data down to a few seconds," he said.

GrapeCity enters the JavaScript market with SpreadJS

GrapeCity is giving JavaScript developers a new way to present and interact with their data in the latest release of its enterprise spreadsheet tool. Spread Studio 10 comes with SpreadJS, a JavaScript spreadsheet and data presentation solution.

Spread Studio version 10 also features new charts, formula extenders, touch toolbar, and support for Microsoft Edge and Google Chrome.

Google open-sources DeepMind Lab

Google is open-sourcing its flagship AI 3D platform for agent-based AI research, DeepMind Lab.

According to Google, the research done at DeepMind has been to develop intelligent agents with advanced cognitive skills, as well as providing an environment where those agents can be trained and analyzed. Those simulated environments are meant to be AI labs for research. Researchers can also take advantage of the lab's programmatic level-creation interfaces. The customizable levels can include gameplay logic, observations and the ability to pick up items.

DeepMind Lab, along with its code, maps and level scripts, will be available on GitHub.

The company also recently released ActiveReports 11, its .NET reporting solution. The update targets both ActiveReports Developer and ActiveReports Server components. The latest features include performance improvements, a faster report rendering engine, native support for JSON and CSV data sources, a query builder for the XML data provider, and a new Excel Import tool.

CA Technologies acquires Automic

CA Technologies continues to add to its cloud-based capabilities with its recent acquisition of Automic, a European business automation software company. The transaction, according to CA Technologies, is valued at approximately 600 million euros, and it has been approved by both boards of directors. The transaction is expected to close in the fourth quarter of 2017.

This acquisition comes on the heels of CA's acquisition of BlazeMeter, the continuous application performance testing company, where it integrated with CA's Continuous Delivery solutions to offer customers a diverse set of testing capabilities.

With the acquisition of Automic, CA will add the company's automation and orchestration capabilities to its portfolio so customers can have more options that will address their IT and DevOps challenges, especially for on-premises, the cloud, and hybrid cloud environments, said Ayman Sayed, president and chief product officer at CA Technologies.

OpenAI opens new AI universe

OpenAI is giving artificial intelligence researchers a new way to test and evaluate their research. The organization has announced Universe, a software platform designed to train and measure the general intelligence of AI across games, websites and applications.

Researchers will also be able to turn their programs into Gym environments. (Gym is OpenAI's recently launched toolkit for reinforcement learning.)

Environments currently include Atari games, Flash games, extracting rewards, browser tasks, browser interactions, and real-world browser tasks.

OpenAI plans to release a "transfer learning benchmark" to help researchers determine the progress on their experiments.

OpenMake open-sources ARA solution

OpenMake Software wants to improve how developers use the Continuous Delivery pipeline with its recently open-sourced Application Release Automation (ARA) solution, Release Engineer, which is based on version 7.7 of the ARA solution and offered under the FreeBSD license.

According to cofounder of OpenMake Tracy Ragan, the ARA solution is fully functional and will have an upgrade path for things like security roles, user groups, folders, audit tracking, and release training management, which are all strategic features that are specific to what an enterprise would need.

Those features are avail-

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NEWS WATCH

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able in the Enterprise Upgrade to the open-source edition, while the base version will be good for development teams, said Ragan. With that version, which is hosted via GitHub, developers can build out a solution that can be consumed by the production environment and then tested in real production, she said.

ARA aims to strengthen the Continuous Delivery pipeline by allowing deployments through it, from development through production. Ragan said developers tend to write more lightweight agile processes, and other offerings typically are heavy and require an end-target agent on every microservice, Docker container, physical server, etc. What happens in the Continuous Delivery pipeline is developers do the turnover on the operation side, where the team is forced to have a discussion about how they are going to be able to do the deployments, according to her.

JNBridge releases JNBridgePro 8.0

JNBridge is giving developers a new way to work with software frameworks in JNBridgePro 8.0. JNBridgePro is the company's general-purpose Java and .NET interoperability tool.

According to Wayne Citrin, CTO of JNBridge, this fills a huge gap and addresses a problem that developers have been facing. While developers can't modify software framework code, they can extend it through additional code and overriding behaviors. However, if a developer wanted to previously write .NET code to extend a Java framework, there are limitations and involve time-consuming workarounds to change underlying code or add new components. With this release, JNBridge supports a natural way of doing developers, he explained.

In addition, the company made changes to JNBridgePro's user interface providing a flatter and more modern look.

ActiveState announces ActiveGo

ActiveState has announced that it would be solving one of the biggest problems enterprises still have with Go.

ActiveGo will be available in beta form in February, said Jeff Rouse, director of product management at ActiveState, and the package will offer long-term support for the Go environment. That means developers in enterprises will be able to back up their Go applications with corporate support and services.

Rouse said that enterprises have trouble moving at the speed of a new language like Go. The biggest problem can simply be keeping up with fast-moving libraries. To that end, ActiveGo includes packages that will be supported long term in their current versions, even if the upstream packages advance quickly in the coming years.

Additionally, the ActiveGo package includes cryptographic packages and database connectivity helpers. The Komodo IDE is also available to use with the Go language, with ActiveState planning to enhance this support even further over time.

Google evaluates FIDO authentication

For years the FIDO Alliance has been dedicated to changing and improving online authentication. FIDO, which stands for Fast Identity Online, envisions a future where online security methods go beyond passwords and provide stronger authentication solutions such as biometrics and second-factor solutions.

Google recently did a two-year research study on FIDO's approach to examine how well it worked.

FIDO-based Security Keys are devices designed to make two-step verification more secure and easier to use. "Our system design goals required Security Keys to be easy to use; easy for developers to integrate with a website via simple APIs; non-trackability to ensure privacy; and protect users from password reuse, phishing, and man-in-the-middle attacks," said the company. "The currently most common version of our Security Key is a tiny dongle that plugs into a computer's USB port, although the Security Key's underlying protocols are standardized and can also be used via NFC (contactless) and Bluetooth Low Energy."

The company compared the Security Keys against one-time password generators and two-step SMS verifications looking at usability, deployability, and security. According to the company's results, FIDO Security Keys proved to be the most secure as well as the easiest to use and deploy. ▮

Report: Wearables need to be more rewarding

Wearables are giving businesses new opportunities for innovation, but in order to be truly successful, they have to go beyond the hype and provide users more capabilities. A recent report revealed interest in wearables is waning because they aren't valuable enough to users.

In Gartner's user survey analysis, the organization found the abandonment rate for smartwatches is 29%, while fitness trackers are at 30%, because users aren't finding them useful.

The survey looked at responses from 9,592 online participants from Australia, the U.S. and the U.K to gauge their perception of wearables and their purchasing habits. The report also revealed smartwatches are still in their infancy, while fitness trackers have reached early mainstream usage. According to the report, 34% of fitness trackers and 26% of smartwatches are given as gifts.

In addition, the survey revealed people think wearable devices are overpriced; a majority of people who own fitness trackers wear them every day; users under 45 years old believe a smartphone is all they need; users over 45 years old don't plan on purchasing a fitness tracker because of the expense; and people 44 years old and younger use smartwatches the most. Gartner believes unknown wearables providers will have a harder time against popular brands.

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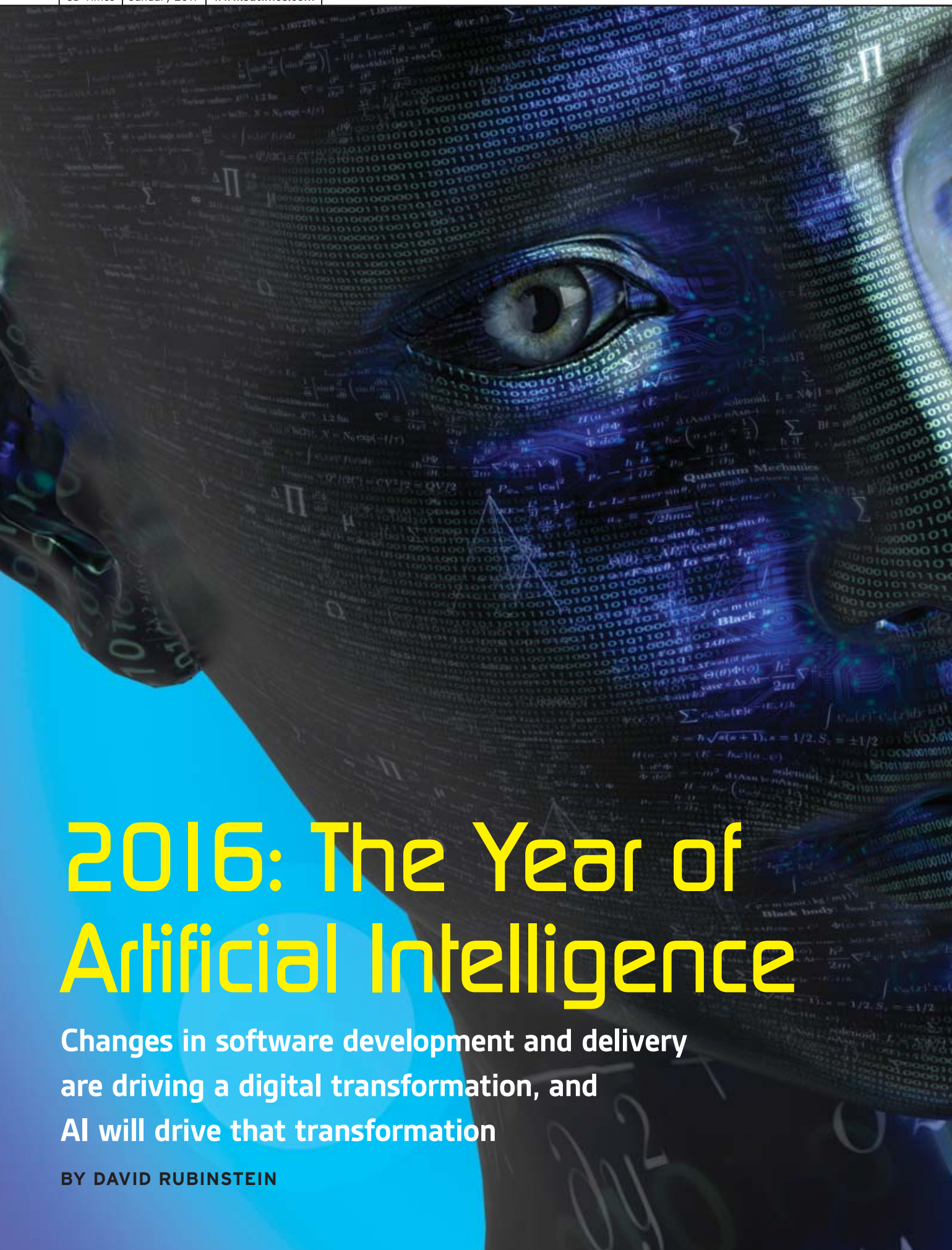

2016: The Year of Artificial Intelligence

Changes in software development and delivery are driving a digital transformation, and AI will drive that transformation

BY DAVID RUBINSTEIN

In the software development industry, 2016 was truly transformative. The way software is developed, what it is being created for, and where it resides and is used all changed to a large degree last year. More development teams adopted agile and DevOps techniques, while QA "moved left" and integrated into the process, rather than being a post-development effort.

The definition of the application life cycle changed (or expanded, depending on your point of view) to include deployment. Development shifted from doing nightly builds to Continuous Integration. Software release went from a major one-time event to Continuous Delivery. Testing struggled to stay with the pack, with the realization that automated testing would be the only way to keep up with the quickening pace of development.

And we saw more software being deployed as a service in 2016, living on cloud servers with functionality that's just an API call away for developers looking to add certain elements to their software. The cloud began as "infrastructure as a service," then enabled "software as a service," and has become the platform for hosting these reusable assets. But how do you know which cloud to choose? As the market matures, decisions will have to be made.

Meanwhile, we're seeing more open-source code being used in commercial software as developers realize they don't have to reinvent the wheel every time they want to create a program. But how and where open source can be used remains a bone of contention in the industry, as different licenses call for different use cases.

But atop of all of this, organizations realized the need for their systems to be able to react to input and make recommendations or decisions on their own. Therefore, the editors of SD Times have declared 2016 "The Year of Artificial Intelligence."

More than winning game shows or beating game champions, artificial intelligence represents the brains within these new systems, and 2016 saw an explosion of APIs that enable developers to build such functionality as natural language processing, personality insights and sentiment analysis into their software.

An exciting year, indeed. We invite you to enjoy our look back at the year that was on the following pages, and to share your thoughts with us via e-mail or comments online.

And, while we can't imagine what 2017 will hold, we're pretty certain many of you do. We've included "Predictions for 2017" from industry thought leaders to share what they're thinking with you. ▮

The year artificial intelligence exploded

Companies made huge strides in using it for Big Data, making it easier to understand, and letting it watch the house

BY CHRISTINA CARDOZA

Artificial intelligence isn't a new concept. It is something that companies and businesses have been trying to implement (and something that society has feared) for decades. However, with all the recent advancements to democratize artificial intelligence and use it for good, almost every company started to turn to this technology and technique in 2016.

The year started with Facebook's CEO Mark Zuckerberg announcing his plan to build an artificially intelligent assistant to do everything from adjusting the temperature in his house to checking up on his baby girl. He worked throughout the year to bring his plan to life, with an update in August that stated he was almost ready to show off his AI to the world.

In November, Facebook announced it was beginning to focus on giving computers the ability to think, learn, plan and reason like humans. In order to change the negative stigma people associate with AI, the company ended its year with the release of AI educational videos designed to make the technology easier to understand.

Microsoft followed Facebook's pursuit of artificial intelligence, but instead of building its own personal assistant, the company made strides to democratize AI. In January, the company released its deep learning solution, Computational Network Toolkit (CNTK), on GitHub. Recently, Microsoft announced an update to CNTK with new Python and C++ programming language functionalities, as well as reinforcement learning algorithm capabilities. In July, Microsoft also open-sourced its Minecraft AI testing platform to provide developers with a test bed for their AI research.

But the company's AI goals didn't stop there. At its Ignite conference in September, CEO Satya Nadella announced his company's objective to make AI easier to understand. "We want to empower people with the tools of AI so they can build their own solutions," he said. Following Nadella's announcement, Microsoft formed an artificial intelligence division known as the "Partnership on AI" with top tech companies such as Amazon, Facebook, Google DeepMind and IBM. Microsoft ended the year teaming up with OpenAI to advance AI research.

Google started the year with a major breakthrough in artificial intelligence. The company's AI system, AlphaGo, was the first AI system to beat a master at the ancient strategy game Go. In April, the company announced it was ready for an AI-first world. "Over time, the computer itself—whatever its form factor—will be an intelligent assistant helping you through your day," said CEO Sundar Pichai. "We will move from mobile-first to an AI-first world."

Pichai reiterated that sentiment at the Google I/O developer conference in May where he announced that the company's advances in machine learning and AI would bring new and better experiences to its users. For instance, the company announced the voice-based helper Google Assistant, updates to its machine learning toolkit TensorFlow, and the release of the Natural Language API and Cloud Speech API throughout the year. To help bring wider adoption to AI, Google also created a site called AI Experiments in November designed to make it easier for anyone to explore AI. The year ended for Google with the open-source release of its DeepMind

Lab, a 3D platform for agent-based AI research.

IBM, the company known for its cognitive system IBM Watson, also made waves in the AI world this year. The company started the year with the release of IBM Predictive Analytics, a service allowing developers to build machine learning models. In October, the company announced the Watson Data Platform with Machine Learning, and a new AI Nanodegree program with Udacity at its World of Watson conference in October. The company ended the year with the release of Project DataWorks, a solution designed to make AI-powered decisions. It also announced a partnership with Topcoder to bring AI capabilities to developers.

There was a smattering of AI news to be found as well. Baidu Research's Silicon Valley AI Lab released code to advance speech recognition at the beginning of the year. NVIDIA began to develop AI software to accelerate cancer research. Carnegie Mellon University researchers announced a five-year research initiative to reverse-engineer the brain and explore machine learning as well as computer vision. Researchers from MIT's Computer Science and Artificial Laboratory developed a technique to understand how and why AI machines make certain decisions. Big Data companies turned to machine learning and deep learning techniques to help derive value from their data. OpenAI rounded out the year with the release of Universe, a new AI software platform for testing and evaluating the general intelligence of AI.

Artificial intelligence is "intended to help people make better decisions. The system learns at scale, gets better through experience, and interacts with humans in a more natural way," said Jonas Nwuke, platform manager for IBM Watson. ■

Testing kept up with agile in 2016

BY MADISON MOORE

In addition to the new testing suites and solutions companies introduced this past year, we saw the testing industry as a whole recognize that in order to keep up with the pace of agile, their own testing processes need to be in check, especially if they want to stay on track with this new way of working.

The testing in production movement shifted its focus beyond just development; now it's more about bringing performance and load testing into the picture. Companies should realize testing in production is easy to add and hard to mess up, according to Antony Edwards, CTO of TestPlant. In 2017, software teams should consider the load they put on their servers, the variants that need to be tested, and the right tests that are needed in general.

Testing in production takes effort, and so does software automation, which the industry has seen take over in terms of testing strategies. Businesses are moving to faster releases, and time to market has changed. Last year, testing was all about automation, and while manual testing is still relevant in an agile environment, developers are incorporating more automating tests with "test early, test often," the oft-spoken mantra.

Testing shouldn't stop your agility, so companies are going to have to get used to digitized businesses, where software is the business. Get your teams "test-infected," as Eric Taylor, director of agile software delivery for Agile-Trailblazers, said, and devise a plan where the process goes from business to development to quality assurance. Teams need to change their mindset and realize that testing should be first, as opposed to something that's just added at the end of the process, he said. That strong feedback loop and strong communication between the business, development and QA is the key to testing success.

This new mindset should be coupled with testing automation. Companies should consider getting started with automation by first figuring out their needs. Automation is not a one-size-fits-all solution.

For instance, one company might be better off with an open-source solution, whereas an off-the-shelf suite could be better for another. Rogue Wave product manager Walter Capitani said that new tools have contributed to the evolution of software testing, but "The reality is any modern software that is being developed should have some form of automated testing." If a company is not doing any sort of automation, they are really behind the times.

Companies are seeing the value of testing early and often, but there were still too many vulnerabilities in software security efforts. We saw cybersecurity remained a huge problem in 2016's world of software testing. Too many companies are relying on bug bounty programs, which only provide a quick fix (and can be expensive), according to a September report released by Veracode.

The same report said 83% of IT decision-makers admitted to releasing code before testing or resolving issues. Chris Wyspoal, CTO and cofounder of Veracode, said that security needs to be a part of the entire software life cycle. The best way to get IT teams to perform adequate security testing is to listen to customers, train developers, and incorporate threat modeling into the design process, he said. ■

The cloud matures, Amazon sees stiffer competition

While Microsoft forges ahead on Azure, Google bides its time for 2017, and everyone agrees that vendor lock-in is bad

BY ALEX HANDY

Last year, the world was excited about the prospect of Docker lowering cloud complexity and removing the need to run virtual machines in the cloud. This year, however, the industry seemed to awaken to the need to be cross-cloud-capable to avoid vendor lock-in.

That industry-wide realization came at a time when Microsoft's Azure was turning into not just an Amazon alternative, but a legitimate competitor. The company doubled its revenues on Azure this past year, but that doesn't mean it was slowing down. In fact, Microsoft spent a billion dollars in 2016 alone on data centers in Europe to expand its cloud operations there.

Which isn't to say Amazon is not still the leader in the cloud. That company's web service offerings continued to expand in 2016. Among the new features were HIPAA compliance for more of its services, price reductions, and new features for Storage Gateway. And at the end of the year, support for desktop Windows 10 deployments. That last addition gave users access to desktop computer use from the cloud.

Amid all the wild news from Microsoft and Amazon, you'd expect Google to be racing alongside with its own big announcements. But Google spent most of 2016 preparing for a revising of sorts of the Cloud Platform as a whole. After acquiring her startup in 2015, Google installed VMware founder and former CEO Diane Greene as vice president of Google's cloud business.

This hire was supplemented later in the year with the acquisition of Apigee and the hiring of former Apigee strategy chief Sam Ramji. The underlying shift in the platform may not actually be a shift in the platform itself, but rather is a major shift in the strategy behind bringing Google Cloud to market. The company has already made moves to keep the platform competitive, and as of this writing, Google Cloud is about half the price of Amazon for certain services. But we expect 2017 to be the year the dial begins to move on the somewhat left-behind Google Cloud.

No matter how Google does in 2017, it's a safe bet that OpenStack continues to grow and mature. This open platform for data centers has grown significantly over the past few years. Today, it's got an appealing position inside the enterprise as a bridge between the public and private clouds.

Interestingly enough, OpenStack's original value proposition of offering internal developers the same on-demand cloud-like hosting capabilities available in AWS and Azure has now given way to a much more mundane use case: maintaining infrastructure portability.

Developers are now using OpenStack as a way to push their internal deployments, and are then bursting to external clouds when demand peaks. This ensures applications cannot simply be written to work in Amazon and nowhere else.

And that's a major trend we expect to see continue in 2017: avoiding vendor lock-in. While Amazon has provided developers with some of the easiest and most powerful APIs and services inside its cloud, using them is tantamount to pouring concrete on your application's feet and shoving it into the ocean: Once you've built with a specific cloud's services, it's unlikely you'll be getting away from them any time soon.

That's the one thing every software developer and manager learned to avoid back in the 1990s. Only now is the industry starting to see it is possible to build multi-cloud applications without having to invest in significant internal development to make it happen. ■

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Companies are reaping the

Mainstream adoption means new tools and a growing need for changes in practices

BY MADISON MOORE

DevOps is the buzzword software and technology companies are all too familiar with. Despite how mainstream the concept is, organizations are only just now implementing appropriate DevOps strategies, especially since automation, continuous testing and getting to market faster are the ways to remain on top.

DevOps is designed to improve the quality of applications, but it's also designed to improve the quality of the organization itself. This year, organizations explored new ways to get their teams to adopt DevOps, like making sure management plays a new and different role, and truly breaking down silos. These are steps that vice president of community development at Chef, Nathen Harvey, recommends teams consider in the future.

Another way companies can break down siloes is to align the people with the processes and technology. The main issue agile experts like Zubin Irani, CEO of cPrime, saw with organizations is that they approach agile from different angles, and as a result, there is absolutely no connectivity. Agile and DevOps are meant to solve problems, but these problems cannot be solved unless companies see the big picture, he said.

In addition to companies ramping up their collaboration efforts, there were a few big announcements in terms of DevOps solutions and testing suites. CA Technologies

Open source grows, but conflict remains

Microsoft firmly embraces it, while the Linux Foundation grapples with commercial concerns

BY ALEX HANDY

Depending on where you stand, 2016 was either the best year ever for open-source software, or it was a year of controversy and danger. While it's undeniable that 2016 saw more contributors to open source and more open-source projects than any prior year, it's also true that this was a year of strife for communities, developers and users alike.

Chief among those problems would have to be the Dirty COW local privilege escalation attack, a major vulnerability that seems to have been hiding inside the Linux kernel for the past nine years. The discovery of this exploit isn't necessarily a knock against open-source software as a whole: The bug might never have been found if the sources weren't also available.

The Dirty COW bug, however, highlighted one of the most difficult problems challenging open-source software ecosystems, and one that in particular affects Android. How does one even begin to comprehend how to patch this hole across the Android ecosystem? With billions of Android phones out there, and a huge number of them no longer supported or updated by their manufacturers, it would appear that the Dirty COW will be a going concern in Android until the heat death of the universe.

This is just another part of the perpetual fragmentation problems Android has had to deal with from day one. It's a dramatic difference from the world of servers and desktops, where patches were issued within a month of discovery. Here, Linux has solidified into a reliable platform with long-term support vectors and emergency patch routines and channels. But the Android ecosystem doesn't even have a concept of long-term support.

Elsewhere in the open-source world, the Apache Foundation pushed Jonathan Ellis out of his position as chair of the Apache Cassandra Project. While Ellis' involvement with the project will in no way decrease, the move was indica-

benefits of agile, DevOps

acquired BlazeMeter in October in order to strengthen its position in testing efficiency and to broaden its DevOps portfolio.

CA later acquired Automic in December after releasing its unified suite of business automation products for DevOps teams a few months earlier. The acquisition of Automic would give customers more options to address their IT and DevOps challenges, especially for on-premise, the cloud and hybrid cloud environments, said Ayman Sayed, president and chief product officer of CA.

CollabNet also joined the DevOps movement this year, after it introduced a DevOps solution and partnership with Clarive Software. Its DevOps Lifecycle Manager was created to help teams deliver applications faster while still having visibility across the entire tool chain of work items.

HashiCorp ventured into enterprise sales this year with Vault Enterprise, its DevOps tool chain that enables organizations to adopt DevOps practices in their approach to security. Specifically, Vault offered developers a simpler interface for dealing with hardware security modules, along with a unified path for developing security modules.

Tuleap wanted agile teams to improve their engineering practices like code reviews, Continuous Integration and regular release delivery. Its latest release, the open-source Tuleap 9, came with an easy-to-use kanban tool and production-scale Git for DevOps teams.

Security was also a big topic of conversation this year for DevOps teams, because the shift in speed and agility exposed some major gaps in application security, according to an HPE Security Fortify survey of security developers.

According to this report, 99% of respondents agreed that DevOps culture needs to improve when it comes to application security, and yet only 20% actually test security throughout their development processes. A lack of security testing in DevOps environments creates some barriers for teams, and moving forward, companies should consider the top-down and bottom-up approach when it comes to security. Security should be a shared responsibility, and developers need to help identify these vulnerabilities earlier on in the development life cycle.

In the new year, it's possible DevOps won't be around anymore. Not the practice or processes, but the word itself. According to Todd DeLaughter, CEO of Automic Software (now a part of CA Technologies), today's catchy technology phrases have become "so intrinsic" to business and operations that there isn't a need for them anymore. And DevOps is at the top of the list of words that are no longer needed since it's becoming more mainstream.

DevOps is on its way to achieving its full potential, but the only way to know will be if people stop saying its name, said DeLaughter. Perhaps "DevOps" will be dead in 2017. ▮

tive of a larger concern within the Foundation over increasingly blurry lines between commercial enterprise software offerings and their open-source, free counterparts under its jurisdiction.

Even the Free Software Foundation saw some waves of controversy this year, with its general counsel Eben Moglen stepping down on Oct. 27 and leaving a vacancy still unfilled in the position. While he did not respond to requests for comment, multiple sources have intimated that his departure came at the behest of Richard Stallman himself, who felt Moglen was no longer in sync with the Foundation and movement. Moglen had been the FSF's general counsel for more than 20 years.

Fortunately, 2016 also saw some major updates to open-source projects. Open-source efforts in the JavaScript world, such as Angular 2, Node.js and Meteor, all grew and expanded their feature sets in 2016.

Yet in keeping with the theme of controversy in 2016, Node.js had its own problems. When left-pad, an 11-line bit of code in the NPM repositories, was removed due to its developer becoming irate, it broke thousands of applications around the world, some of them mission-critical.

For 2017, you can expect the Node.js and NPM community to continue to mop up after this embarrassing failure. In fact, NodeSource has already taken up the reins by offering an enterprise-focused service that blesses NPM packages as worthy of corporate use.

Still, no amount of controversy or success could cover up the biggest open-source news of 2016: Microsoft. In the past, Microsoft had been outright hostile to open source. Even its attempts to make up with the open-source world were ham-fisted, like the company's CodePlex efforts in 2008, which created what it called an "open-source museum" of look-but-don't-touch software.

Today, however, Microsoft is a veritable pillar of the open-source community. Whether it's supporting Linux on Azure, or building the next revisions of C# and the .NET platform in the open-source community, Microsoft's movement to open source has to be the biggest and most dramatic story of the year. ▮

What's on the 20

Experts see more changes in DevOps, and how developers interact with

John Schroeder, executive chairman and founder, MapR

AI is now back in mainstream discussions, and is the umbrella buzzword for machine intelligence, machine learning, neural networks, and cognitive computing. Why is AI a rejuvenated trend? The three V's come to mind: Velocity, Variety and Volume. Platforms that can process the three V's with modern and traditional processing models that scale horizontally providing 10x-20x cost efficiency over traditional platforms.

Google has documented how simple algorithms executed frequently against large datasets yield better results than other approaches using smaller sets. We'll see the highest value from applying AI to high-volume repetitive tasks where consistency is more effective than gaining human intuitive oversight at the expense of human error and cost.

Eric Mizell, vice president of global solutions engineering, Kinetica

Real change is coming to real-time intelligence in 2017 with graphical processing units. GPUs are capable of delivering up to 100x better performance than even the most advanced in-memory databases that use CPUs alone. The reason is their massively parallel processing, with some GPUs containing over 4,000 cores, compared to the 16 to 32 cores typical in today's most powerful CPUs. Amazon has already begun deploying GPUs, and Microsoft and Google have announced plans. These cloud service providers are all deploying GPUs for the same reason: to gain a competitive advantage.

Viktor Farcic, senior consultant, CloudBees

A significant change in 2017 will be focused not so much around running containers, but scheduling them inside clusters. Solutions like Docker Swarm, Kubernetes, Mesos, etc. will become mainstream. We will see more solutions that will go beyond simple scheduling. We'll see the rise of self-healing systems. In 2017, the battle for the "uber orchestrator" will become much more prominent.

One of the most exciting areas that will become prominent in 2017 will be unikernels. While the majority of the industry is still trying to wrap their heads around containers, we will start seeing unikernels taking over the stage. They will, in a way, unify functionalities provided by VMs and containers.

Abdul Razack, SVP and head of platforms, Infosys

Despite the advancements we've made in artificial intelligence, it is not a one-to-one replacement for people. While the technology amplifies human abilities, you cannot teach AI systems to be proactive, creative or think on their feet. In 2016, AI was applied to solve known problems. And as we move forward, we will start leveraging AI to gain greater insights into ongoing problems that we didn't even know existed. Using AI to uncover these "unknown unknowns" will free us to collaborate more and tackle new, interesting and life-changing challenges.

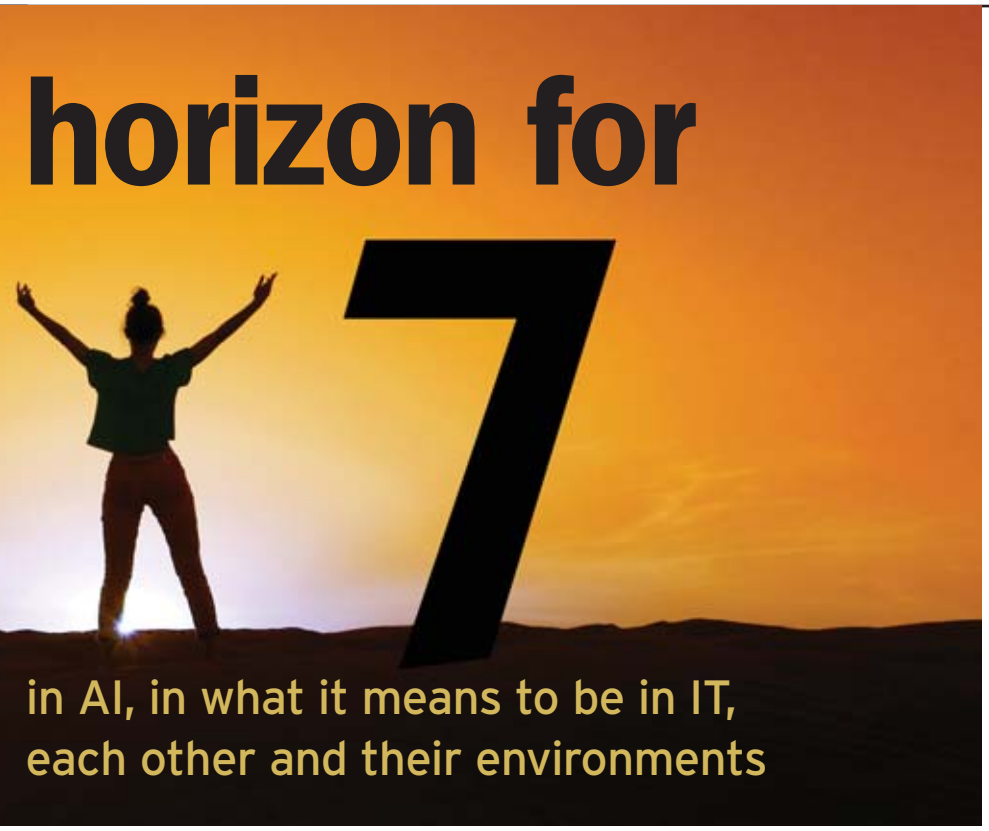
Scott Miles, senior director of cloud, enterprise and security portfolio marketing, Juniper Networks

In 2017, automation and analytics will help organizations address the shortage of security personnel. Often organizations invest heavily in effective security hardware and software, but lack the security specialists necessary to ensure their effectiveness.

As an example, breaches like the ones that impacted Target and Home Depot were detected by their high-end security systems, but the security operations practitioners were too overwhelmed by the thousands of alerts they received per hour to see which ones posed the most imminent threat. As automation becomes more integrated into security solutions, security personnel will receive fewer notifications with more relevance, relieving them of the manual task of hunting through a sea of alerts to find the truly malicious ones.

Roy Solomon, cofounder and vice president of product management, Applause

Companies of all sizes will put more emphasis on great digital experiences as users expect brands to engage with them through the digital channel of their choice, not the other way around. To facilitate this, companies will need to ensure all of their digital platforms create seamless user interactions, which means a heavier focus on technical elements that go beyond traditional QA such as APIs, in-app bug reporting and crash reports, as well as on great usability.



horizon for 7

in AI, in what it means to be in IT, each other and their environments

David Lee, vice president of platform products at RingCentral

There will be an exponential increase in the use of Web Real Time Communication (WebRTC) services for web and mobile apps. Driving this adoption is the enterprise need to provide rich interactions where workers can communicate seamlessly with each other. By being able to build those capabilities out of HTML and JavaScript, WebRTC will increasingly become the easiest and most popular choice for developers to embed real-time communications capabilities into custom applications.

Andrew Levy, Co-founder, Apteligent

2017 is a critical year for Microsoft. They have failed in the phone market with less than 1% market share, took a $7.6 billion write-down on their Nokia acquisition, and laid off thousands of employees. It also looks like they will discontinue the Lumia brand. On the flipside, they have found success with their Surface brand, especially the Surface Pro.

Most expect Microsoft to introduce a Surface Phone in 2017. Its Continuum product makes this especially interesting since your phone becomes your mobile desktop, capable of connecting to a larger monitor and input devices like a mouse and keyboard. It's not clear where Microsoft goes in the smartphone market from here if the Surface Phone fails. Perhaps it's their investments in the HoloLens. If this type of wearable is the future of computing (and telecommunications), then they will be well positioned for the future.

Ashley Kramer, director of product management and head of cloud strategy, Tableau

Many organizations are living a hybrid reality split between on-premises and cloud environments—cloud is no longer isolated from your on-premises data and infrastructure. Vendor investments in migration tools and strategies will help customers navigate through this hybrid world. For the end user, these solutions make complex hybrid environments function as one cohesive system. Investments in hybrid software will remain fully relevant even as organizations shift operations toward an all-cloud future.

Sean Regan, JIRA Software and Bitbucket team lead, Atlassian

The small, agile software team has never been more empowered as microservices, Continuous Delivery and cloud platforms rise in prominence and accelerating software development. The bottleneck today isn't hardware; it is people. You can't scale people like you can scale cloud computing.

As a result teams will be looking for ways to collaborate better and faster on high-value work and less on low-value repetitive work. We can expect to see a significant investment in collaboration and automation tools for DevOps practices, where simplistic tasks that require the speed and efficiency of modern computing will be handed over to the "robots" to accomplish.

Sirish Raghuram, CEO, Platform9

We will see serverless technologies gain real traction in 2017. The first use case that will drive adoption in 2017 is bot development. Today, a lot of DevOps automation involves writing bots that integrate with various systems using WebHooks. Serverless makes this incredibly natural and easy. Another major use case is making it easier and faster to start using containers without having to fully learn and understand all the concepts to systems such as Kubernetes.

With an intuitive experience that abstracts away the underlying layers of clusters, pods, networks and storage, serverless presents a developer-friendly consumption paradigm for containers and Kubernetes.

Jeff Prus, vice president of product management at QuickBase

Developers' roles will be redefined: They'll no longer be considered "IT" workers. In 2017, we'll see organizations start thinking outside the box to help fill development needs and seek out empowered problem solvers, regardless of where they sit in the organization. While coding skills will continue to be important and in high demand, in many cases they will no longer be the end-all, be-all.

While the definition of "developer" won't change overnight, 2017 is likely to mark the onset: Gartner predicts that by 2020, 60% of all fast-mode application development projects will be done outside of formal IT teams. This shift will present new challenges, as organizations of every size change the way they attract, evaluate and measure the performance of developers. ▮

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Top retailers are open to hacks

SecurityScorecard found that domain security was a universal problem

BY MADISON MOORE

During the holiday season, retailers watched their online sales climb. But while businesses may have had a windfall, consumers were likely unaware that 100% of those retailers had issues with domain security, according to SecurityScorecard's "2016 Biggest Holiday Retailers Cybersecurity Report."

When it comes to cybersecurity, retailers have a lot to worry about, especially since they handle billions of transactions each year. All of that consumer data needs to be protected, and oftentimes, according to the report, it is the largest retailers that "succumb to data breaches."

In February, Neiman Marcus also suffered from its own data breach, when 5,200 customer accounts were accessed through automated attacks.

SecurityScorecard wanted to see if other retailers were at risk for data breaches and other security vulnerabilities, so between April 1 and Oct. 31 of last year, its security researchers looked at the 48 biggest retailers that collectively represent more than US$1 trillion in annual sales, according to the report. Some of these retailers included Amazon, Costco, Lowes, Macy's, Sears, Staples, Target and Walmart.

According to Alex Heid, chief research officer at SecurityScorecard, the "correlation between disclosed breaches, leaking credentials, and hacker chatter" were some of the interesting finds from their research.

"In the retail industry, it seems that the circulation of compromised credentials and shared fraud methodologies are more open and public as compared to the financial industry or insurance industry," he said. "In financial and insurance, admissions of breaches are oftentimes attempted to be obfuscated or hidden in an effort to ensure longevity of the looted information."

Everybody's got problems

A big finding from SecurityScorecard's report was that all of the 48 retailers analyzed were found to have multiple issues with domain security, which indicates that retailers' domains aren't configured properly to defend against hackers or impersonation attacks.

Additionally, nearly 80% of retailers may not be using intrusion detection or prevention systems to monitor their traffic within the cardholder data environment. Heid said that many hackers hit retailers in the form of web application attacks, and the use of web application firewall technologies aids in the detection and mitigation of common web application attacks, he said.

SecurityScorecard also looked at the overall performance of companies over a seven-month period. According to the report, these retailers have been struggling with maintaining a high grade in the problematic security categories, such as network security, where 69% of retailers had multiple entry points for hackers. Also, 73% of retailers had misconfigured website domains, which impact DNS health.

"With grades like these, if a hacker decides to take action while organizations scramble to keep up with an uptick in activity, they may find an easy way into the organization's network, opening the floodgates to a potential data breach," read the report.

Another analysis in the report examined the Payment Card Industry (PCI) Data Security Standard, which is a set of security standards for any retailer that processes, stores, or transmits credit card information. The fines for companies that do not comply with these standards could cost companies tens of thousands of dollars, said the report.

SecurityScorecard looked at how well the 48 retailers met the PCI compliance standards to get more insight on possible shortcomings, and the company found that 50% had issue types that "may be grounds for a company failing to meet the standard," said the report.

Part of the reason why these retailers are failing to meet security standards is due to their large size, according to SecurityScorecard in the report.

"Zero-day vulnerabilities that aren't patched, low security awareness among employees, weak network security, and improper domain and e-mail configurations are all signs of slow-moving and inflexible companies that aren't quick to react to potential new risks," the report read. "Given the influx of new activity that these companies need to consider with the upcoming holiday season, extra resources and attention should be levied on their security department."

Moving forward, SecurityScorecard recommends better security awareness training for employees of these large retail companies. With adequate training, employees may be able to "fend off" phishing and other vulnerabilities that can take over their systems. Companies also need to make sure they protect their internal and external customers, especially private and sensitive information like passwords and credit card information.

"Retailers should examine the use of next-generation firewalls, endpoint protection solutions, and web application firewall technologies in combination with a continuous information security monitoring solution that examines both the security posture of the enterprise, as well that of their related partners and vendors," said Heid. "Many breaches originate from insecure third parties that provide a pathway to exploitation." ▮

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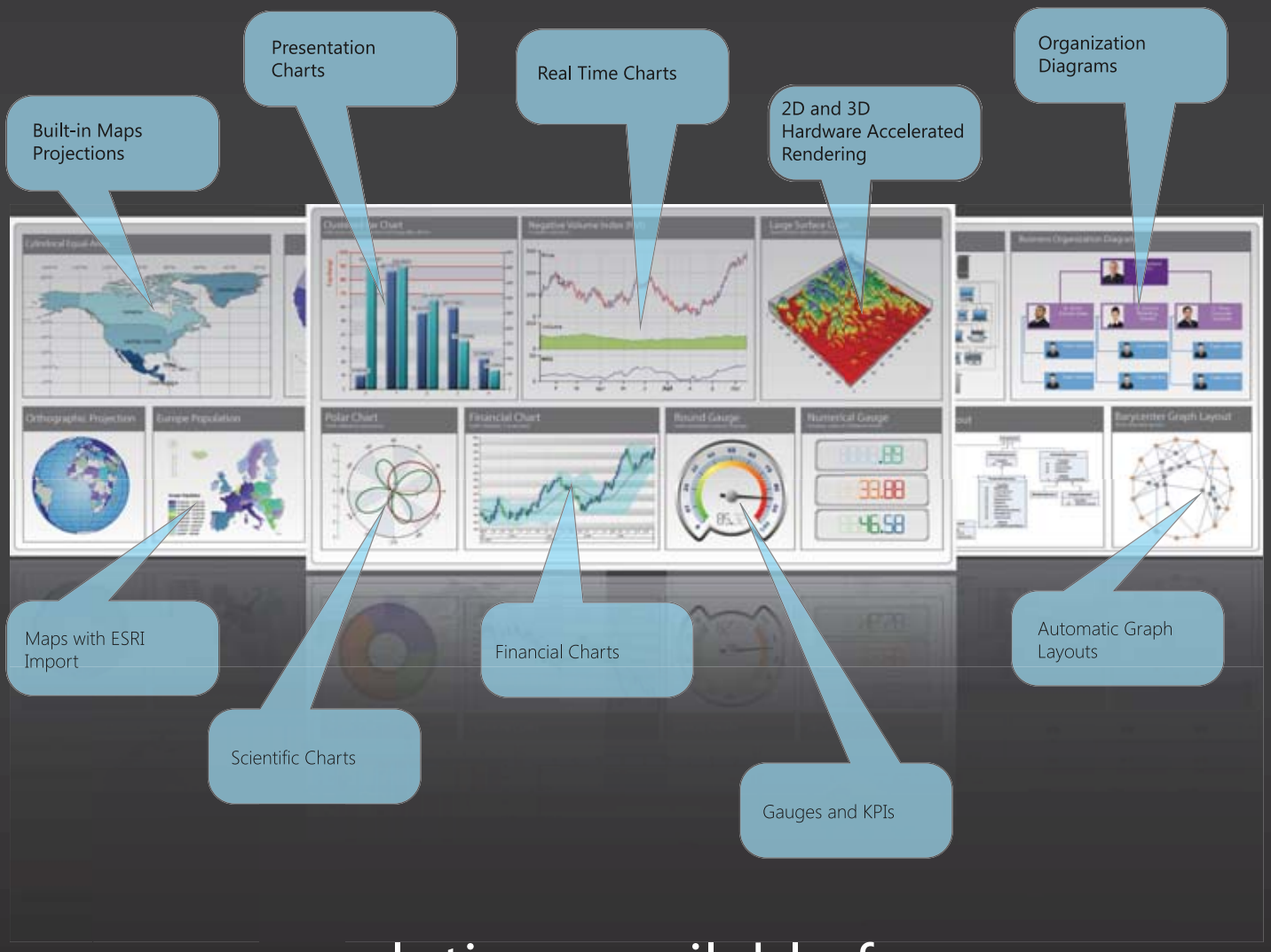

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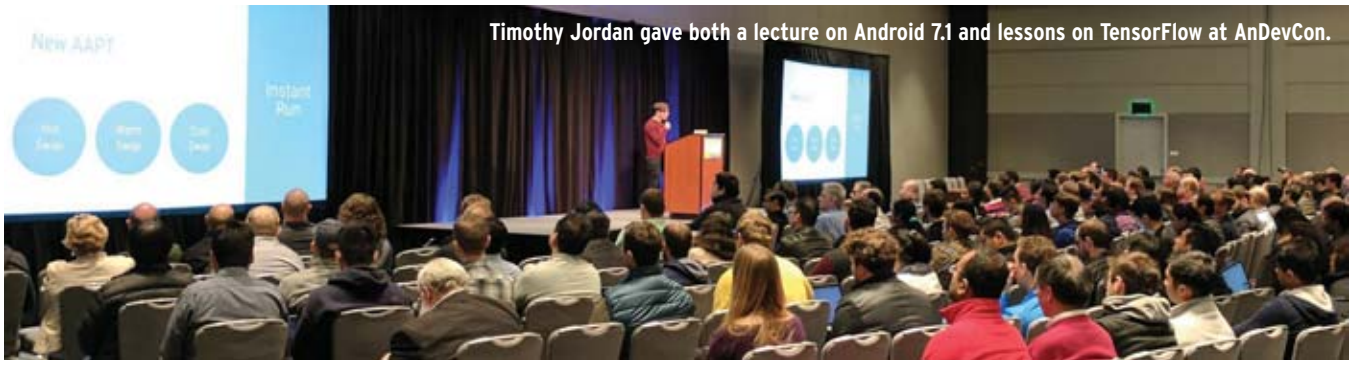

Timothy Jordan gave both a lecture on Android 7.1 and lessons on TensorFlow at AnDevCon.

Photo by Mark Scheel

Android 7.1: What you can expect

App shortcuts, round icons, and expanded Firebase offerings coming in 2017

BY ALEX HANDY

At AnDevCon in December, Timothy Jordan, head of Google platform developer relations, gave a keynote to detail the current and future state of the platform and its ensuing toolsets. He described changes coming in Android 7.1, and he taught attendees how to get started with TensorFlow on Android devices.

The next release of the Android platform will offer developers new features designed to make their applications easier to use. First in line is app shortcuts, which would allow users to select from a set of predefined actions when tapping an app icon.

With an app shortcut, users long-pressing a messaging application might be offered a pop-up list of tasks that can be performed within it. These could include creating a new message or jumping to a recent conversation.

These new app shortcuts are described with CML files, and developers can build these actions around intents. Jordan said that this will enable users to get to the functionality they need quickly and easily from the home screen.

Android 7.1 will also add support for round icons, which can be created in the Image Asset Studio. Another image-based feature coming in 7.1 is support for image-based keyboards. For users inputting text into an application, this new Commit Content API will allow images and other rich content to be pushed into the text field.

Applications will declare what types of media they support, and doing so will allow users to select images or other content from a sliding bar at the bottom of the screen, acting as a sort of keyboard. The new API is also supported all the way back to the Honeycomb releases of Android.

Retailers will most be able to make use of Demo User mode. This enables developers to throw their applications into demo mode, making them perform in a manner more appropriate to being shown on a retail floor. Some examples of demo mode toggles include disabling the creation of new users, or removing billing screens.

Jordan also discussed forthcoming changes to Android Studio 2.3. These include an overall update to the latest version of IntelliJ, as well as new support for lint checks. This version also adds support for Android 7.1.

As for Firebase, Jordan said it has expanded its offerings to support developers on the back end of their applications. New features for Firebase include Unity support, better analytics, and a new Udacity course to teach developers how to use the service.

Jordan spent half his time talking about these new products and features, and then started a half-hour tutorial on how to build a Hello World project with TensorFlow, Google's machine learning library.

"When I talk to developers worldwide who are building applications and thinking about machine learning, it sounds very complicated the way they describe it. And it is," said Jordan. "However, the first overview is simpler than you think. You can start understanding it pretty quickly, and you can start using it even quicker than that. I'm not an expert in machine learning, but I am an expert in the tools. That's what's exciting now. It's the first time we've been able to access this level of intelligence without having two or three Ph.D.'s on our team."

Jordan then described some of Google's machine learning offerings. On mobile devices, for example, Google's Vision API can be run locally. He also discussed Cloud Machine Learning support in Google Cloud, which can train machine learning algorithms in Google's data centers. Google's Vision API is open source and available for free.

Jordan demonstrated some simple machine learning capabilities, such as style transfer on artworks. Using style transfer, the developer can combine two images, merging their imagery and style together. TensorFlow was used to build Google's Deep Dream project, which created truly bizarre images by analyzing and reimagining them with a machine learning algorithm.

TensorFlow can be used to do textual analysis through Parsey McParseface, an open-source library released earlier this year, according to Jordan. He said that the work Google is doing on machine learning is no longer in the research phase, and is now ready for business use. ■

HashiCorp and the state of automation

Mitchell Hashimoto talks about what to expect for deployment in 2017

BY ALEX HANDY

Mitchell Hashimoto has been writing software since he was 12 years old. Since he cofounded HashiCorp in 2012, however, he's been focused on automation software, such as that created by his company. HashiCorp now offers a host of products to automate the software development life cycle, and those products do everything from managing security between services to provisioning environments in the cloud.

We spoke with Hashimoto about his company's past, present and future, and to discuss the impact of Vagrant on his life and work.

SD Times: HashiCorp's tools require a certain way of thinking about software development and deployment. Can you describe that?

Hashimoto: We have something we published called the Tao of HashiCorp. One of our core beliefs is how we think software and infrastructure automation should work. Those tenets are infrastructure as code, and really everything as code.

We believe human memory is fallible, and you want a source of truth for accountability and history. The only way to get automation on top of that is to write something down in a very literal way, which is code.

We favor declarative versus imperative. We believe everything should be declarative at a certain scale and complexity. If you're writing down how to do something, it becomes too complex versus saying what you want to happen and letting things get there.

It's scarier because you have a lack of control getting to your desired state, but as something matures, when you use a declarative system really well, it's indistinguishable from magic.

From an organizational perspective, you should be striving to automate as much as possible. When I look at people, I think what makes us special is being creative and creative problem solving: adapting to things we haven't seen before. Whenever I found myself doing something that wasn't creative, like a repetitive task, it felt like a waste to me.

The gift we have is this creativity, and it's great when that's focused on software or marketing or whatever. We should be striving to automate as many rote tasks as possible so we can do creative things.

This all got started with Vagrant. What does that tool mean to you now?

Vagrant in a lot of ways is the first thing I think anybody does. There's a lot of times where I didn't realize the decisions I were making, but Vagrant caught a lot of them. We solved a smaller-scope problem really well, versus trying to do everything at once. It also embodied the problem set I described. I found myself doing this rote task whenever I hopped into new client work. I had to re-set up my laptop, reading a readme [and] doing what the readme said. I looked at it and said there's no reason a human should do this.

Did developing Vagrant awaken you to the need for more automation tooling in the life cycle?

It was all kind of in parallel. When I was working on Vagrant with Armon Dadgar, my cofounder, we were working on a large-scale research system. We had all these other problems. In hindsight, we were experiencing the pains of microservices and multi-cloud and problems in that space, and we just couldn't manage that scale for that application delivery life cycle. We couldn't manage it with the tools we had. We were pretty young.

We were writing down the challenges we were facing. As Vagrant grew in popularity and we got more involved in the DevOps movement, I started seeing that this movement, these problems and this academic research all line up to solve these problems.

What made you build out more tools and found HashiCorp?

Vagrant hit a limit. How do I actually deploy this thing? And there was no good answer. We started looking at what additional software we could make. When I announced HashiCorp, we came out with Packer, but over a two-year period we released a lot.

It was more intentional. When you release a puzzle piece and you haven't given out all the pieces, it adds more confusion. There were a number of pieces we wanted to get out there, so it was a semblance of a puzzle. We needed the first five to be out there to give a decent end-to-end story: to give a major key frame story for getting from development to production.

What's next for HashiCorp?

In the future, there are a few trends we find interesting. One in particular we're

continued on page 26 ▸

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Notes from Node.js Interactive

VM neutrality, security project, and NodeSource NSolid 2.0

BY CHRISTINA CARDOZA

The Node.js Foundation is continuing its mission to make Node.js VM-neutral. The foundation announced major milestones toward allowing the solution to work in a wide variety of VMs at the Linux Foundation's Node.js Interactive conference.

According to the foundation, VM-neutrality will allow Node.js to expand its ecosystem to more devices and workloads, such as the Internet of Things and mobile devices. Other benefits include developer productivity and standardized efforts.

As part of VM-neutrality, the foundation has announced that the Node.js API is now independent from any changes in V8, the open-source JavaScript engine. "A large part of the Foundation's work is focused on improving versatility and confidence in Node.js," said Mikeal Rogers, community manager of the Node.js Foundation. "Node.js API efforts support our mission of spreading Node.js to as many different environments as possible. This is the beginning of a big community web project that will give VMs the same type of competition and innovation that you see within the browser space."

In addition, the foundation revealed the Node.js build system will start to produce nightly builds of node-chakracore, allowing Node.js to be used with Microsoft's JavaScript engine, ChakraCore.

"Today, there is a proliferation in the variety of device types, each with differing resource constraints," wrote Arunesh Chandra, senior program manager for Chakra, in a blog post. "In this device context, we believe that enabling VM-neutrality in Node.js and providing choice to developers across various device types and constraints are key steps to help the Node.js ecosystem continue to grow."

The Node.js Foundation also announced plans to oversee a Node.js security project at the conference, which is designed to detect and disclose security vulnerabilities in Node.js. According to Rogers, the foundation will allow security vendors to contribute to its common vulnerability repository.

"Given the maturity of Node.js and how widely used it is in enterprise environments, it makes sense to tackle this endeavor under open governance facilitated by the Node.js Foundation," said Rogers. "This allows for more collaboration and communication within the broad community of developers and end users, ensuring the stability and longevity of the large, continually growing Node.js ecosystem." A Node.js security project working group will be established as part of the Node.js Foundation.

In other Node.js news, enterprise Node company NodeSource announced it is expanding its production toolset with NodeSource Certified Modules and the release of NSolid v2.0. NodeSource Certified Modules is designed to provide security and trust to third-party JavaScript solutions. The solution verifies trustworthiness through the NodeSource Certification Process, and it ensures a stable, reliable and secure source.

NSolid v2.0 is the latest release of the company's enterprise-grade Node.js platform, and it features automated error reporting, real-time metrics, built-in security features, CPU profiling, and performance monitoring. ▮

The state of automation

◂ continued from page 24

really latching onto is shifting this infrastructure as code to more categories. Our two biggest growth drivers in the past 18 months have been Terraform and Vault. Terraform is for creating infrastructure as code, and Vault is our security tool that provides certificate management and key management. They are both seeing the same level of growth: multi-100% growth every quarter. They are related in where they are heading, in that our road map revolves around pushing those even further.

Let's describe more things as code. But also, let's bring security as code into Vault. Right now, Vault is very imperative. It's, "This person can access this secret"; it's very much old school. You have to do that with security so they feel comfortable.

As we gain heavy adoption of Vault, we're starting to look into what is the next step in security. How do we jump security to make it more manageable. There's a real problem we're seeing in microservices. It's so difficult to reason about security. You're in the cloud, there are no end points or out points; it's just sort of the Internet. What you really want is to secure every connection with every service really fast.

We think that when we see that complexity, when I look at it, you need a declarative system. You need to trust the security systems, and that's a big leap. But I don't see a future where you have a thousand microservices and you're connecting every tube together. I don't see a future where a security engineer is reasonably doing that. You need more automation there.

What do you find interesting in technology these days?

I am paying attention to the serverless stuff popping up. None of it says to me this is the way to do it, but I do think if I had a lot more free time, I would be playing a lot more with serverless. It's really unknown what the business value is, but that unknown is really intriguing to me. Anything that pops us as serverless, I take a look at it. It can be fun, but I see a lot of challenges scaling that up to real business uses, like business analytics. But I think there's something there. ▮

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Ready, set, TEST!

Competition helped one team to get a sense of scope, asssigning objectives on the fly

BY NICK BITZER

On the day of the Software Testing World Cup Finals in early December, it was an understatement to say my team and I were nervous. We knew we had worked our hardest to prepare, but the fact that none of us knew exactly what lie ahead for us to test left us with an air of uncertainty. The stakes were high on the biggest global stage for software testing, and the pressure was rapidly mounting.

We started off the day by getting physically set up for the competition, held in the largest conference room at the Dorint Hotel in Potsdam, Germany. Each of the seven teams had their own workstation, although they only consisted of a couple of tables along with some power supplies. We were also given large paper flip boards for whiteboarding ideas or problem-solving while in the heat of the battle. Our laptops were charged and primed to operate at peak speed and performance, and our phones were juiced and ready.

Once we had our workstation prepped, we headed off to a quick interview with an STWC judge who quizzed us on how we prepared for the competition and how we planned to go about testing the still-unknown application. We tried not to give away too many secrets.

After the interview, we retreated to our workstation. As in the prelims, each team member was assigned an area that they would focus on testing. Whereas I handled security in the previous round, my area of concentration changed to become application performance and exploratory testing. When you're testing in that type of team and high-pressure environment, the key is to remain flexible. The rest of the team was poised to focus on everything from security to third-party application integration to static code analysis.

Team "RT Pest Control" (clockwise from left): Samantha Yacobucci, Zala Habibi, Nick Bitzer and Alex Abbott

In order to be sure that we were ready to hit the ground running when the timer started, we had every testing tool we needed open and running. This included things like Android Studio for app debugging, and Slack so that we could communicate important facts or ideas without other teams being able to overhear us. (The workstations in the room were only about 10 feet apart and had no sound or vision barriers, adding another wrinkle to the challenge.)

It was also important that I spent some time double-checking that all the developer options I needed were enabled on both of the Android devices I was set to use: an LG Nexus 5 running Android 4.4.4 (KitKat), and a Dell Venue 8 tablet running Android 5.0 (Lollipop). Other members of the team strategically utilized different brands and types of devices along with various versions of Android to ensure that we had comprehensive OS and hardware coverage when it came time to test the application. That turned out to be a smart move.

The game begins

No more than 30 minutes before the competition started, we received an e-mail informing us that we'd be testing an Android app called Moovel, a transit application that enables consumers to book public transit or ridesharing options on the go. The e-mail contained information from the Moovel product owner about what aspects of the app they were most concerned with testing, hardware/software requirements, and a debug .apk file, as well as what was in and out of scope for testing.

Once we got the application, we were able to divvy up specific objectives for testing and estimating our testing process. I'll admit it was tough to lay out an official test plan. When you don't know what kind of application you're going to be testing, and you've got such a finite timeframe, exploratory testing tends to be the best way to find bugs.

Upon seeing the link to the debug .apk, a wave of relief washed over me. Since I had a debug version of the app, I knew I could do a lot more with performance metrics in Android Studio. With the debug application, I'd be able to gather CPU, memory and network performance statistics in a more reliable fashion.

It was finally our moment of truth: time to start testing. We actually had two hours and 40 minutes to test the app, write bugs and put together a final report, which was abbreviated from an

continued on page 30 ▸

Nick Bitzer is a DevOps engineer at ReadyTalk.

The Software Testing World Cup chronicles

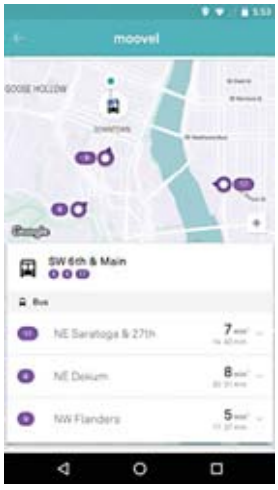
◂ continued from page 29

already compressed three hours in the prelims. As such, prioritizing what to test was even more of a challenge. Before we even knew exactly what the app was, going purely off the knowledge that it was Android, the team had already decided upon a few universal tools that we were going to use to do some static analysis on the .apk file, as well as other tools to do automated testing.

I grabbed the .apk file, tossed it into Firebase (a platform developed by Google to help build quality applications), and used the Firebase Test Lab to run some automated tests against the application. I used the built-in automated "robo" tests that come with Firebase. I honestly wasn't expecting too much to come out of the Firebase test, but since it took very little effort and time on my end, I figured it couldn't hurt. In the end, it didn't surprise me that Firebase didn't turn up any bugs.

Another automated tool my team used was the open-source MobSF (Mobile Security Framework). We mainly turned to MobSF to uncover security flaws in the application code. Unlike Firebase, MobSF actually turned up some results, the best of which was an SQL injection vulnerability—a bug that would ultimately lead to us winning the "Holy Cow Bug Award," a distinction for finding the most difficult bug.

We also leveraged Exerciser Monkey, a UI exerciser tool within Android Studio to try to find bugs. In our preparation for the World Cup, we used Monkey with great success on other dummy apps, but unfortunately (or perhaps fortunately for the product owners) had no such luck when using it against the Moovel app.



After the automated steps finished running, it was "all hands on deck" for exploratory testing. The application had some well-defined functions, so it was pretty easy for the team to decide who was going to test what once we had the application in our hands. For the next couple hours, we peeked into every corner of the application trying to find as many bugs as possible, although we thankfully didn't have to repair any of the bugs we found.

We ran into a couple major obstacles right away. Only two team members had local cell phone service on their Android phones, and part of the testing required us to leave the building and go out to taxicabs to make sure we could reserve them. Because of this unexpected snare, only half of the team was able to test all portions of the application.

Individually, I also ran into an expired trial period license for Firebase. I had been using it to do some prep testing, but didn't realize that I was running a trial version of it, and I now had to pay for the service. I (of course) didn't have my wallet on me, so I had to track it down and pony up for the full Firebase subscription. Lesson learned: Always check the terms and conditions for your software.

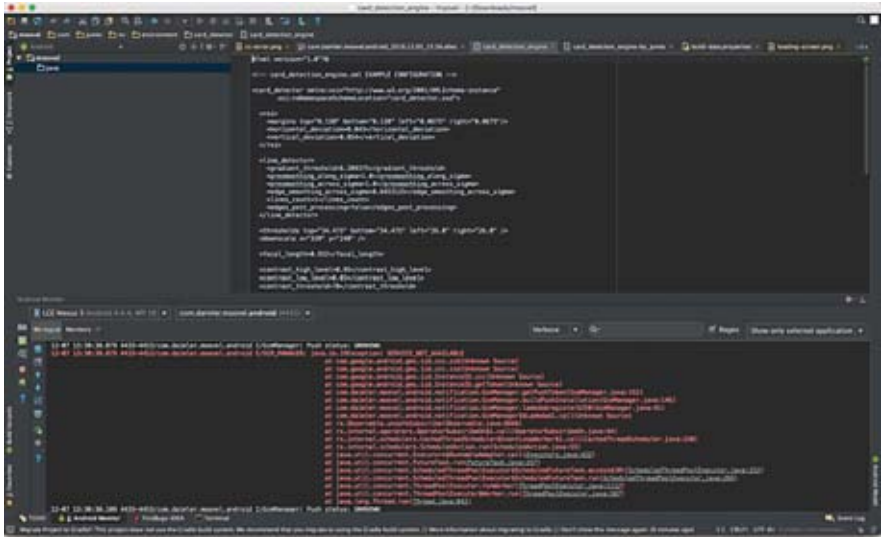
I noticed the approaches the competition used to write up bugs. Some would keep a running list of bugs on paper and then write them all in one fell swoop toward the end of the exercise. Other teams, including ours, wrote bugs as they came up. We made a conscious, collective decision to handle it this way so that the recreation steps were fresh in our minds and the logs for each failure were readily available.

Who won?

After all was said and done, we were able to rack up a count of 39 bugs. They ranged from suggestions on user experience design to Java threads stuck in endless loops. As a team, we felt very positive about the bugs we submitted and felt as though our test report was comprehensive and laid out a clear overview of everything we thought should be fixed.

Frankly, I was just relieved it was all over—the weeks of staying up late, poring over practice application code, and the stress and energy that were necessary elements of being ready to test anything and everything.

Although we ultimately didn't end up taking home the title of "Best Software Testers in the World," the entire competition was an absolutely unforgettable experience. We met a lot of amazing test engineers in the process, among them the Pan Galactic Gargle Blasters, the team from the Netherlands that earned the championship. They were fantastic, and we feel privileged to have competed alongside them. ■



In the thick of searching for bugs in the Moovel app for Android.

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CollabNet enters DevOps arena

New offering focuses on speed for building apps

BY CHRISTINA CARDONZA

CollabNet is joining the DevOps movement. The company announced a new DevOps solution and partnership at the DevOps Enterprise Summit.

"The No. 1 driver of DevOps in the business is the desire of software developers and the IT department to move at the speed of business and to drive innovation faster," said Thomas Hooker, vice president and strategic market expert at CollabNet. "We can no longer wait nine months to a year and a half to release new functionality to our customers."

The DevOps Lifecycle Manager is designed to help teams deliver high-quality applications faster. It provides the ability to see and trace across tool chains of work items, monitor events, and automate actions. In addition, it provides key performance indicators reports in order to help businesses identify and drive value.

"Increasingly the defining characteristics of so many products are software, and the innovation speed required by the market is just getting quicker," said Hooker. "DevOps mitigates risks by having smaller releases and getting those releases out quicker and innovating quicker."

The company also announced it is teaming up with DevOps software provider Clarive Software in order to bring development and operations teams closer. "You have to be able to not just write code; you have to deploy that code into production," said Hooker. "We can write code fast. We can plan. We can test and we can deliver code fast, but...we can't deploy into production. We have a bottleneck. We don't have an automatic way to pick up code, take it, put it on the thousands of servers it needs to go live on, and then if there is a problem [of] how can I pull it back and manage all those releases that are out there." The partnership with Clarive is designed to address that challenge.

According to Rodrigo Gonzalez, CEO of Clarive, the company focused on how operations is handling DevOps today. The partnership will help the businesses retool their whole stack from ALM to application release automation, giving them full visibility and generating insight to the business, developers and operators. The solution features demand management, monitoring, configuration management, delivery management, traceability phase development, planning, rollback, and code quality. In addition, Clarive allows users who are still doing waterfall approaches to benefit from application release automation.

"We are continuing to see DevOps become not a fringe thing, but mainstream," said Hooker. "One of the things that makes us excited is how many existing enterprise and companies are looking to adopt DevOps and looking for help on how to be faster." ▮

In other DevOps news...

■ **CA Technologies** has announced additions to its DevOps portfolio in order to improve user experience. The release includes updates to its application performance management and virtual network assurance solutions. Features include real-time insights, automated workflows, continuous testing, software-defined networking support, and cloud connectors. The company also recently acquired Automic in order to address IT and DevOps challenges.

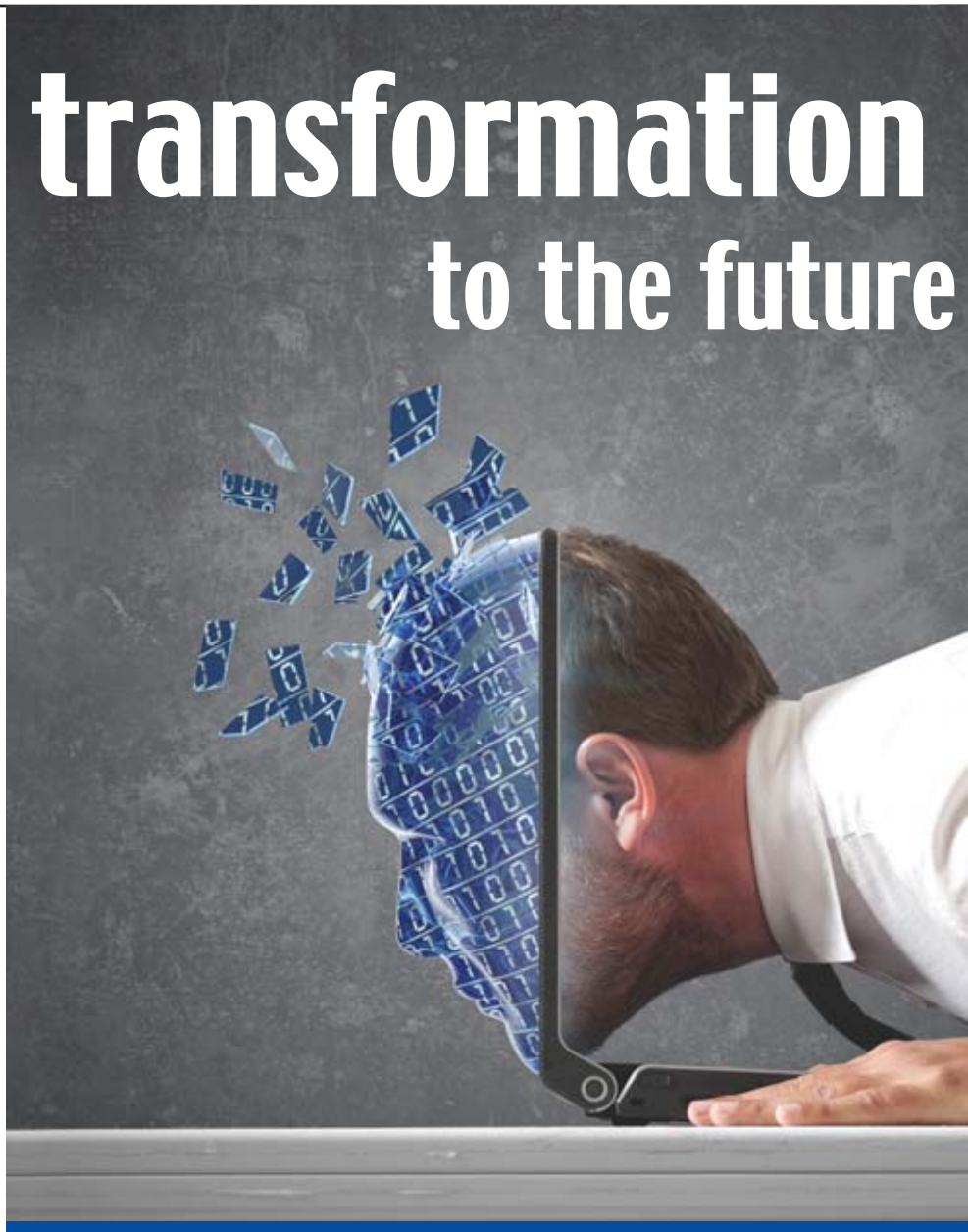
■ **IBM** has announced new Bluemix services aimed at making it easier and faster to develop apps in the cloud. The new services enable developers to access and construct tool chains using DevOps tools such as GitHub and Slack. Services include IBM Bluemix Continuous Delivery, tool-chain templates, an availability monitoring service, and a partnership with Slack to bring Watson to Slack developers.

■ **SourceClear** has unveiled new features to help DevOps teams build secure software. The company announced features like issues reports and suppressions; project and subpath enablement; and project-specific reports. In addition, the company launched the Dependency Visualizer to help teams see what dependencies exist within a project or library.

■ **XebiaLabs** has announced the 6.0 release of its DevOps solution. The latest update to the XebiaLabs DevOps platform is designed to help organizations with diverse teams manage and gain insight into complex app releases. The main highlights include multi-functional release folders, flexible release tags, improved dashboards for compliance and security, and enhanced productivity for large-scale deployments. ▮

Digital transformation to the future

BY ALEX HANDY



Companies can expect great rewards for terrible consequences for falling short

The digital transformation is something of a dream for the corporate world. Whether executives have grown jealous of fast-moving competitors' products, or managers are sick of broken processes and hand-driven products, the end goal of just about every business in the world these days is to increase software development budgets, and to create more products that are driven by bits rather than wheels.

Take, for example, carmaker Volkswagen. For it the future holds terrifying prospects that can only be met with software-based solutions. One major aspect of this future is the active collection of user data.

When Tesla Motors began shipping its cars in 2008, it quickly became apparent that those vehicles were collecting large amounts of data. Tesla Motors founder Elon Musk famously got into a scrap with then British TV show "Top Gear," citing the car's data stores as a method of refuting the show's relative dissatisfaction with the Tesla Roadster's reliability.

Today, that data is not just being collected onboard, it's being sent directly to Tesla, allowing the company to analyze its entire fleet's behavior and shortcomings. While this has transformed the way Tesla handles its customer service, it's also thrown other automakers into a situation where this type of data collection is now table stakes.

That's fine to say on paper, but actually collecting millions of points of data every day from millions of users in millions of locations around the world is the sort of shoot-the-moon problem that would keep software developers and architects working briskly for a decade. For Volkswagen, the imperative is a great deal closer to the windshield.

Roy Sauer is the man at Volkswagen tasked with figuring out how to turn an automaker into a software maker. As IT CTO, he is responsible for the company's internal systems and its customer-facing applications. Volkswagen has another CTO tasked with the technology of automobiles, but Sauer is the one forced to face a growing influx of data, and an expanding need for software.

Sauer said that Volkswagen created its first customer-facing application this past fall. The app helped Volkswagen owners work with their dealers to participate in the company's massive recall of its diesel fleet in the United States.

While this was just a small app with a single purpose, Sauer's teams are now pivoting to meet demands placed upon him by the business. One of those demands is to grow the company's software revenue from zero to multiple billions of dollars sometime in the next decade.

That's a major requirement that will require Sauer and his teams to be the drivers of the digital transformation inside of Volkswagen. Thus, working with Pivotal, Volkswagen has had to dramatically redesign its software organization. "As we are at a point where we change completely, we now want to move forward to a much more enhanced and increased software development approach," he said. "Until

now, we had much less capacity in software development."

Given success on the app front, only half the battle is won: Sauer still has to deal with the influx of all that driver data over the next four years. Managing that data is a big part of his road map.

"This is one of the hardest topics," he said. "What we know is that we will have a huge volume of data, and that is a big asset. It will be very important that we can handle this data. It starts again with our cars: We will produce as a group 10 million cars per year, and from 2020 on we will have 10 million connected cars per year, and we will have a huge number of devices in the Internet, like sensors for autonomous driving. They will produce a huge volume of data.

"The challenge is how to handle this data, how to use this data, and how to enhance further services for our customers. One critical challenging topic will be who actually owns the data and what will be legal. Where do we have to store this data? What is the data protection policy in U.S., in the EU and in China? This will be a really sophisticated kind of data management we have to do there."

Dam transformation

One successful digital transformation took place inside BC Hydro, the power generation company in British Columbia, Canada. It decided to roll out IoT devices to its entire power grid as early as 2005, but the real effort to do so did not begin until 2011.

Pushing sensors into its network was no small task. While the software development behind those sensors took plenty of time, the project had help from Bit Stew Systems, a consulting firm that was acquired by GE. The efforts made on computer screens, however, were insignificant compared to the amount of work that was required in the field to deploy those sensors.

As British Columbia is quite large and includes some rather remote areas, one sensor, for example, requires a full day's drive into the wilderness coupled with a full day's hike to it.

David DeYagher, manager at BC Hydro, said that the entire project required solutions that would last at least 20 years. "Our program was going to cost our company CA$900 million," he said.

"With that we had to lay claim to $1.6 billion of benefits. The first part was the reduction in system losses using advanced equipment, and to put out intelligent apps to support system losses. This would do things like help us find where we had folks borrowing power from us and not paying."

Just as with Volkswagen, however, once BC Hydro had deployed 2 million sensors to its grid, the real problems came around the management and analysis of the data.

"We went from 30,000 data points a day to over 270 million data points a day. We needed someone with experience in terms of not only being able to ingest, but to also integrate some of the data into our source systems to drive the value. We also realized we had a plethora of systems our operators had to use. What the Bit Stew team offered was a single pane of glass, a manager of managers for tier two and tier-three operators have single pane of glass to understand every metering device, every operating device that drove a lot of value for us."

Which brings the digital transformation story back to the data, where many have said that the transition should begin. Jack Norris, CMO of MapR, said that bringing the data together can bring the organization as a whole together.

"The reason for convergence is that the digital transformation is about converging operations and analytics together: Combining analytics with operations so you're not reporting; you're adjusting the business as it happens," he said.

"Less attention has been focused on the underlying data layer, but it's the underlying data layer that enables real-time and missions critical capabilities. If you look at the dimensions of speed, scale and reliability, it's very difficult to do all three across a large distributed cluster. I think regardless of what you call it," said Norris, building a data lake can draw developers, analysts and other stake holders in to a single place to get their data.

"That's just a small step on the journey, and by no means the stopping point because it's about the ability to leverage that data in context and in real time. It's the enabling layer for these types of apps and transformations. That's where the second key of stream processing comes in," said Norris.

"It's typically these event-based data flows that are important to harness, whether it's web events and machine sensors, or biometrics or mobile. If you can leverage those events and leverage those in context, and provide the historical aspects of data in motion as well as data at rest, that solves the problem of failure alert, monitoring and adjusting,

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supply chain optimization, ad optimization—the list goes on and on."

That data is the heart of the transformation is echoed by Shaun Connolly, chief strategy officer of Hortonworks. "The journey to digital transformation from our perspective is around the data and how do you assemble it in a way to fuel the digital transformation initiatives," he said.

"For their digital transformation initiatives, enterprises are focused on cloud, IoT and Big Data all swirl around with the commonality being data. It isn't necessarily about getting data in one place; it's about getting data into places it needs to be."

Another enabler for the digital transformation, said Connolly, is the merging of public and private clouds. Offering internal developers a quick and easy way to provision their systems is important, but being able to scale those systems into public clouds when needed is just as crucial, he said.

"That connected architecture on premise and in cloud...we're increasingly seeing this as a digital transformation architecture," he said. "You get some analytics, and in many cases want to act on real-time data and assemble it for cloud-based analytics and machine learning scenarios for a 360 view on root causes, in a manufacturing or repair type scenarios.

"We're seeing it when you look at the videos of Hadoop Summit. We had well over 20 different customers sharing architectures, like Comcast, Ford or Capital One. When you look at their digital transformation initiatives, they're increasingly inherently hybrid. It isn't hybrid around 'Let me burst my data to the cloud.' It's 'How do I get my data sets where they need to be in a way that's secure and well governed?' Data science can explore, but you can also do that 360-degree view of customer on premise because you can mix it with data from the enterprise that may or may not make sense to put in the cloud."

Customer transformation

Adam Seligman, executive vice president and general manager of Salesforce App Cloud, said that while digital transformation is a murky prospect, many companies are diving in headfirst.

"I'm actually blown away by how companies are leading into this customer-centric transformation," he said. "It's happening in every industry, and every segment. Banks and healthcare service companies are all reinventing themselves in the age of the customer with the concept of digital transformation. I had a financial services institution said they used to wrapped their customers around their products, but now they want to wrap their products around their customers."

The demand for the digital transformation of enterprises is not something that has been creeping up on companies for years, either, said Seligman. It's something they suddenly realize is a business necessity: One day a competitor makes it a priority, or perhaps there's a top-down mandate. However it happens, it seems to be more of a race than a saunter.

"They wake up one day and suddenly they're in the software business. These are 150 year old companies and they have to rethink their business with an app at the center of it. Their products and services are all threaded through this. It's not just one app, it's a whole cloud of apps. It's connecting the customer with the community they participate in and making sure sales engages in a really customized way," said Seligman.

"Fitbit is a brilliant device you wear on your wrist, but the true greatness of Fitbit is this community, the apps you use, and the communications from Fitbit keeping you motivated. That's the brilliance that keeps you using the Fitbit," said Seligman.

And that's the overall goal of the digital transformation: to turn great products into great communities that react to the customers' needs in real time, without guessing and without humans driving every step in the process. ▮

Read this story on sdtimes.com

IoT as digital transformation enabler

We sat down with Colin Parris, Ph.D., vice president of GE Software Research at the company's Minds and Machines conference to find out just how GE has navigated its dramatic digital transformation, and to get some tips on how enterprises can move along their transition path.

Colin Parris

"How I think about digital transformation coming together is, I look at my processes. How do I make the process of designing my gas turbines more effective? What we've done is built advisors using AI in software. When I actually try to design something with the advisor, it tends to see things. What if the problem you have with this design is it's not manufacturable?

We also use the AI to do a lot more simulation than before. I would run 50 combustion experiments before because to fire this up at a big site takes a week to set up the experiment. Now I am using AI when we consider doing 50: Here's the next eight you can do. You can simulate the points between and you can test in the middle.

In the data, I can realize two things. One is that when I would bring in the jet engines every 500 flights to check, I can do a digital twin based on the data I collect. What do I repair? That's the digital transformation: transforming the key processes by using knowledge I have and by using machine learning and AI techniques to predict the future.

Most people collect data, but it's never tagged. I collect from five sources, but when I ask you to show me the sources, we find one sensor is dead, or part of the data is corrupted, or the timestamps are off. I need to know if this data came out of a good system.

You've got to make sure you've normalized and cleaned the data. Collect it and store it, but it could be useless because someone flipped a switch on a machine. Take some time...to run some initial analytics to see how useful the data is.

Finally, try to figure out what's the value in the data... It may be very valuable to know the humidity, but if you didn't save the humidity, the entire value is lost. Take it with the value in mind." ▮

—Alex Handy

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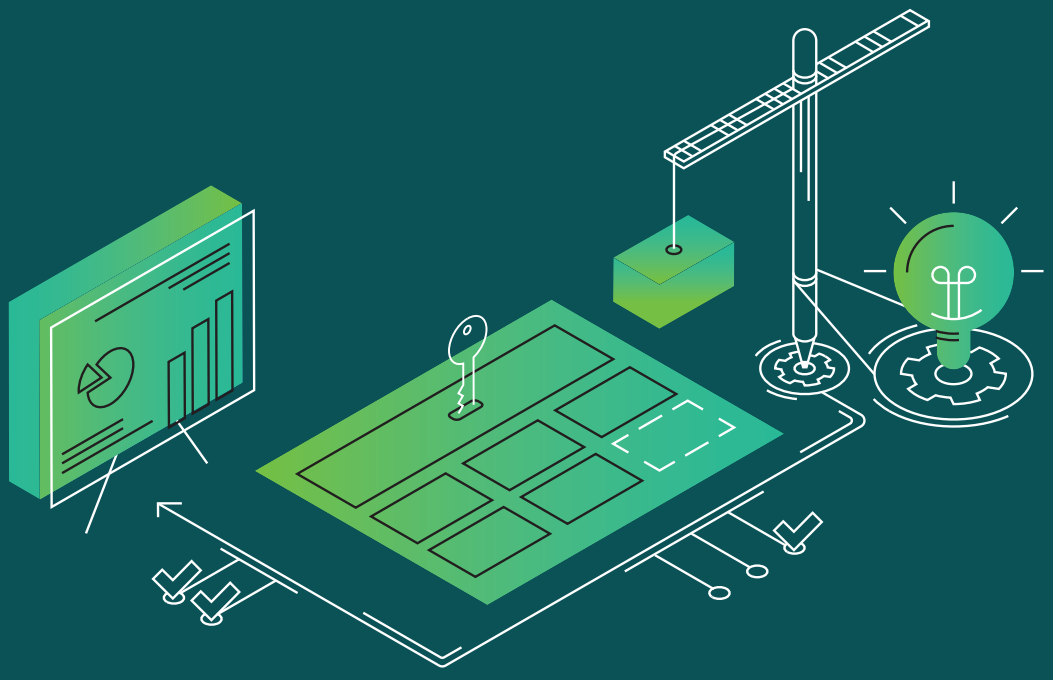

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Red Hat powers the API economy

BY LISA MORGAN

APIs are the building blocks of today's digital economy. Although more organizations are building APIs with the goal of driving more value from their digital assets, many of those companies have trouble managing their APIs effectively, especially at scale. Red Hat brings order to API chaos so software teams can spend more time creating tangible business value.

"You can't just create an API and think you're done with it," said Sameer Parulkar, product marketing manager, Enterprise Middleware, at Red Hat, Inc. "You may create an API for a particular purpose today, but what about when requirements change tomorrow? How will you manage and secure that API? You need a scalable, enterprise-class way of doing all that."

Managing and securing APIs requires a platform capable of providing caching, fault tolerance, traffic routing and load balancing. Red Hat 3scale API Management Platform scales to billions of calls and its distributed architecture ensures no single point of failure.

3scale also provides enterprise-class API access control and security. With it, companies are able to provide different levels of access to different types of users. They are also able to control how different applications interact with a particular API. 3scale's powerful API access, policy and traffic controls make it easy to authenticate traffic, restrict by policy, protect backend services, impose rate limits and create access tiers. It also has the analytics developers need to monitor trends and peak usage times. The analytics also help developers better understand which applications generate the most traffic, which APIs are most popular, and which APIs or endpoints are used the least.

Businesses that want to create new revenue streams from their APIs can use 3scale's platform to set pricing rules, invoice customers, and collect payments.

Enable Real-Time Integration

An enterprise's information is spread across multiple applications and processes, which makes APIs complex and difficult to manage. To address the problem, organizations need an effective means of integrating applications, data, and devices within and beyond the enterprise. Progressive companies choose Red Hat JBoss Fuse because it enables rapid integration across extended enterprises on-premises or in the cloud.

Sameer Parulkar

"Today's APIs use multiple information sources, so organizations need a way to connect those information sources together in a modular way," said Parulkar. "Red Hat JBoss Fuse is a robust, flexible, and easy-to-use platform for integrating applications, data services and devices. It uses popular open source technologies like Apache Camel to provide transformation, routing, and protocol-matching service."

Red Hat JBoss Fuse also includes Red Hat JBoss A-MQ, a high-performance messaging platform based on Apache ActiveMQ. Its integration capabilities eliminate manual touch points, automate processes, and connect enterprise assets for improved efficiency. It also includes the real-time messaging capabilities agile businesses require.

As companies move to microservices architectures, they need the ability to create and connect an API in an agile, continuous fashion. To achieve that, they need a platform that supports the creation of the API as well as its deployment and redeployment. Red Hat OpenShift Container Platform is a comprehensive application development and hosting platform that automates tedious management tasks so developers can spend more time building apps that align with business goals.

Red Hat OpenShift also facilitates DevOps by enabling development and operations to work faster and more efficiently. Like all Red Hat products, OpenShift provides enterprise-grade security and improves the effectiveness of DevOps. The platform enables development teams to develop, deploy, and automate modular, reliable, and serviceable applications across their infrastructure regardless of the application's architecture.

Notably, OpenShift integrates all of the architecture, processes, platforms and services needed to empower development and operations teams. Finally, businesses can create ideal cloud computing services tailored to applications, integration, or mobile.

Mobile, social computing, and the cloud require organizations to integrate flexible software into the very fabric of what they do. To succeed, the APIs they build must be able to access core systems and resources that may have become information silos. By exposing data, business processes, services and resources through APIs, companies are in a better position to improve mobile experiences, grow their ecosystem, expand their reach, power new business models and catalyze internal innovation. ▮

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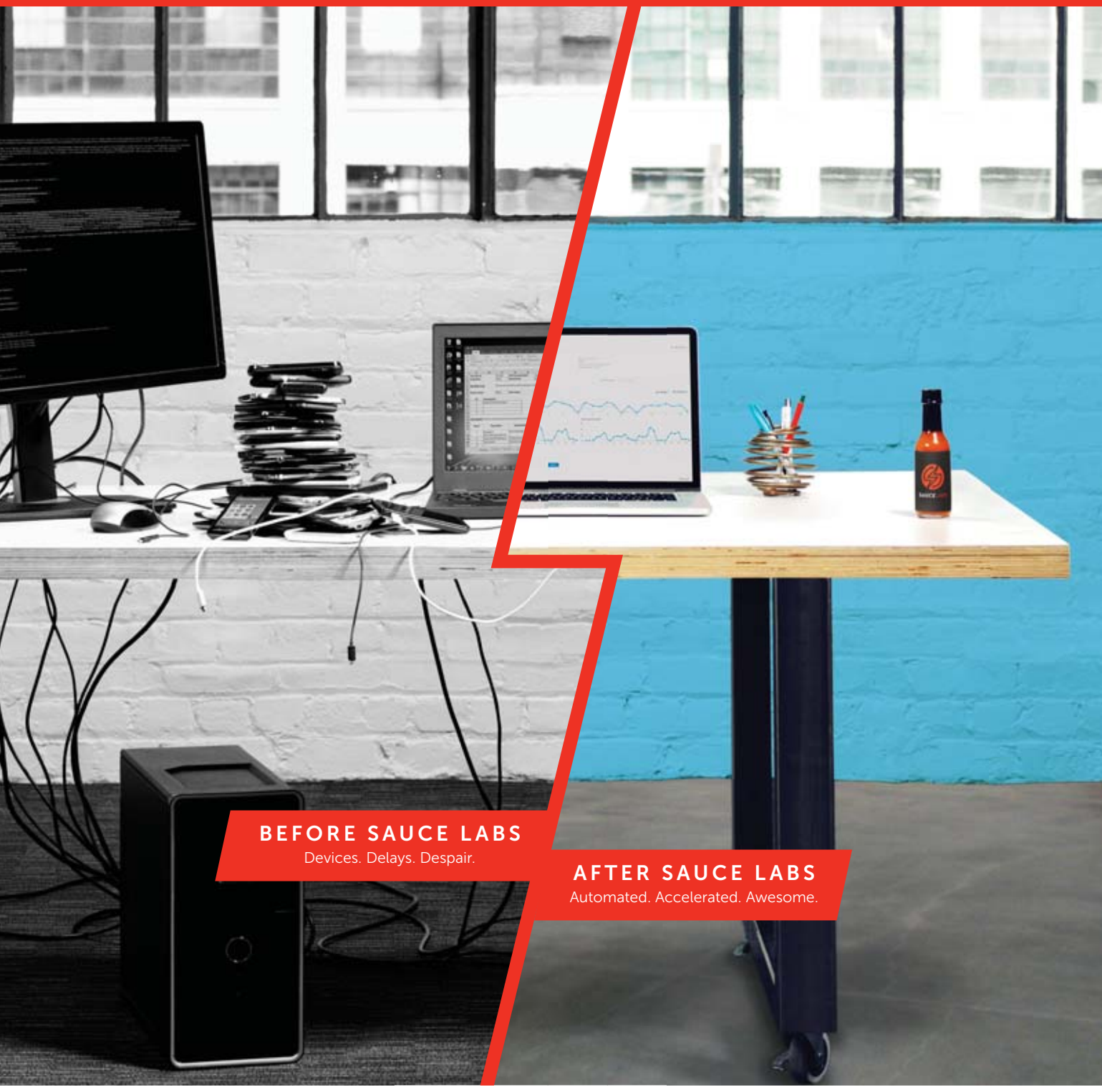

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Buyers Guide

Move fast while avoiding automated testing pitfalls

Slowing down and cutting corners are not options, and neither is overconfidence about your processes

BY MADISON MOORE

Companies today are like teenagers learning how to drive; there's a lot of stop and go, and a strong desire to go fast. While it's necessary for organizations to find a solution that fits their agile transformation, experts suggest there is no need to rush. Before getting the green light to go to market, teams should slow down and take a step back so they can avoid some major automation pitfalls.

Like anything with software testing, there is risk. Automating tests takes effort in order to be successful, and the last thing business leaders want are poorly conceived and executed tests, creating a costly and time-wasting mess.

Lubos Parobek, vice president of product at Sauce Labs, said a major risk he sees companies concerned with is the idea of test flakiness, where tests fail because they were badly written. This is why best practices are important, he said, because the more teams are educated, the better chance they have at building tests that are maintainable and reliable.

Michael Eckhoff, software test automation veteran at Tricentis, said one of the biggest pitfalls he sees is companies trying to pick a software automation tool and expecting it to solve all of their problems. What companies need to do is figure out how to pick the tool that best meets their needs, and to ensure that the company is ready for it, he said.

"You can typically get that first quick win with intuitive test-case design," said Eckhoff. "Getting to that second phase of really intelligently designing your test portfolio to ensure that you are testing to get the best risk coverage or best business value is where that [best-practice] methodology comes back into play."

Another risk comes from overconfidence, said Eckhoff. Companies look at their processes, see a large amount of automated test cases, and assume they are in "good shape," he said. The problem in this case is the tests are not clearly defined, and in many cases, the test definition doesn't stay consistent with what the test is actually doing, he said.

Companies need to get their teams to buy into the concept of test automation, or organizations will continue to treat agile as the "Wild West," where teams do whatever they want just to release things fast, and then when it breaks, they do it again, said Eckhoff. He said this way of thinking just doesn't work for the enterprise, and those organizations need more than just a tool to achieve speed and quality applications; they need a process in place that supports agile development and QA early on.

Rushing to automation

When getting started with a software automation tool or solution, organizations should pause and do a bit more planning up front before jumping into the deep end, according to Parasoft's software industry expert, Marc Brown. He said he has seen organizations select an automation tool based on a very limited developer group, but in the end, the assessment wasn't broad enough to see how it impacted their daily activities or how it helped their agile initiatives.

Brown also said that a lot of teams get into problems with their testing strategies because they rush into using an automation tool to quickly solve one problem, which means they lack the "big picture," or what software automation can do over time for their company.

"I think if operations slows down and they get guidance from people who have expertise in agile development [and] Continuous Testing, and have looked [at the tool] broadly to see how it supports the developers, the testers, the managers, and the executives," said Brown, "most people will recognize there is value in getting a solution that covers all of those various roles."

continued on page 42 ▸

What testing pitfall does your solution aim to solve?

Marc Brown, software industry expert, Parasoft

Parasoft helps organizations perfect today's highly connected applications by automating time-consuming testing tasks while providing management the analytics necessary to focus on what matters.

We also help developers become highly efficient at software validation using various technologies and techniques—from static and runtime analysis, to unit testing, to API testing all on a scalable software virtualization platform. Furthermore, we help the management team focus on what matters through highly unique data analytics and reports. By doing so, the team eliminates issues that will impact quality, security, performance, reliability, and customer satisfaction.

Parasoft solutions help teams eliminate defects early in development minimizing cost and rework, and focus on the risky areas of an application, saving time while improving quality and lowering security threats.

Lubos Parobek, vice president of product, Sauce Labs

The right tools are critical for a successful outcome when embarking to adopt continuous delivery and automated testing. For example, many organizations struggle with getting the required test coverage across platforms, while keeping testing from becoming a bottleneck in their delivery pipeline.

Many also struggle with higher error rates and flaky tests, particularly when the flakiness is caused by a failure in their in-house test infrastructure, not the test code itself. Sauce Labs can dramatically increase the speed, coverage and accuracy of automated testing. For example, Sauce Labs allows our customers to run tests at much higher levels of concurrency, with better coverage and with lower error rates than most can achieve on their own. We run over 1.3 million tests a day across 800+ OS, Browser and Device combinations.

Gerd Weishaar, vice president of product management, Tricentis

It's become increasingly difficult for teams to build a test suite that not only covers the risks that are most critical to the business, but also is maintainable and efficient enough to be used for continuous testing of rapidly-evolving applications. Delivering positive user experiences requires continuous testing—and accelerated development cycles mean there's less time available for designing, creating, updating, and executing tests.

Our solution is designed to help testers rapidly identify and create the tests that are most important for protecting key end-to-end business processes. Based on many years of R & D focused on Model-based Test Automation, we're able to scan the application under test to help testers understand and define the optimal set of test cases that will cover their organization's highest priority risks. The resulting test suite is perfectly-suited for continuous execution as part of the delivery pipeline, and it's easily updated as the application evolves.

All this is accomplished without coding or scripting. Scripted tools lead to long complex test scripts, which get "fixed" in the script if technical challenges arise. At some point these scripts become too many, too complex and end up as maintenance nightmare. This is typically the reason why manual testing is still so popular (80% of test cases) after 20 years of (script based) automated test tools like QTP/UFT.

Rod Cope, CTO of Rogue Wave

Developers and QA engineers have to consider what might go wrong with code, but they aren't able to anticipate everything. Despite best efforts, they're building in and shipping bugs and security vulnerabilities with code.

Klocwork, our automated static analysis tool, enables software teams to find and fix bugs early in the life cycle, which saves time and money while speeding software delivery. It continuously monitors every line of code so errors can be identified that developers and QA engineers miss. Klocwork can be integrated seamlessly with continuous integration environments so issues can be identified and remediated prior to a build. As you're writing code, it will tell you if you've introduced an error so you can fix it immediately. Klocwork also improves workflows and enforces best practices by enabling software teams address issues earlier in the life cycle.

Klocwork users are able to prevent security exploits and compliance issues that can negatively impact brands, customer relationships and profitability. ∎

◂ continued from page 41

Brown added that the one shortcut he sees companies taking is not testing adequately. He said these companies "race to market with blinders and really cross their fingers hoping they won't get caught up with a bad defect." The risk of not testing can be as detrimental as hurting the company's brand or market reputation. And in some cases, having a malfunction in software could really physically hurt the customer.

Parobek said that he also sees companies trying to cut corners, and in his personal experience, it's never worth it.

"Consumers more and more have very high expectations of web and mobile apps that are coming from the services they use, whether that's banks, retailers, etc., so having the application that you cut corners with that you deliver early and it is buggy, it's a bad tradeoff," said Parobek. "Going to Continuous Delivery, Continuous Integration, and [automated] testing is a way you can speed everything up and get higher quality."

He does believe that with the right tool, companies can "have your cake and eat it too," but that requires proper investment and planning to do it right. ∎

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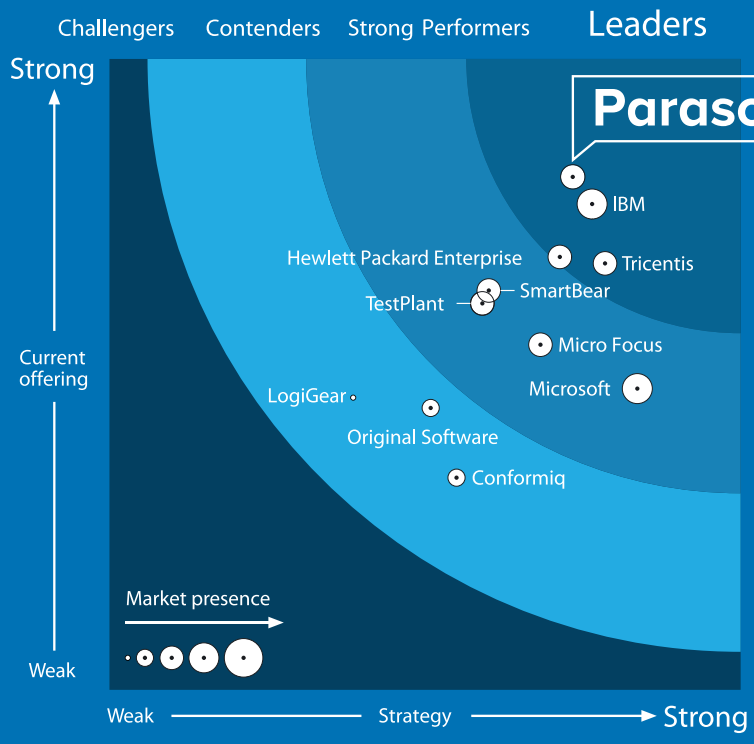

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A guide to automated testing tools

■ **Applause** delivers unmatched in-the-wild testing, user feedback and research solutions by utilizing its DX platform to manage communities around the world. The company's testing solutions span the entire app lifecycle and include access to its global community of more than 250,000 professional testers in more than 200 countries and territories as well as access to specific, client-requested digital users.

■ **CA BlazeMeter:** The solution ensures faster delivery of applications by enabling DevOps teams to quickly and easily run performance tests on-premises, in the cloud or on virtual private clouds against any app, website or API at massive scale to validate performance at every stage of software delivery.

■ **HPE Software's** automated testing solutions simplify software testing within fast-moving agile teams and for Continuous Integration scenarios. Integrated with DevOps tools and ALM solutions, HPE automated testing solutions keep quality at the center of today's modern applications and hybrid infrastructures.

■ **LogiGear:** With the no-coding and keyword-driven approach to test authoring in its TestArchitect products, users can rapidly create, maintain, reuse and share a large scale of automated tests for desktop, mobile and web applications.

■ **Microsoft** provides a specialized tool set for testers that delivers an integrated experience starting from agile planning to test and release management, on premises or in the cloud.

■ **Mobile Labs'** deviceConnect provides secure remote access to mobile devices for managed use by developers and testers. With deviceBridge (an extension to deviceConnect), many test automation frameworks and developer tools used for checkout and debugging can retain cloud-based devices as if locally connected by USB.

■ **Neotys** load testing (NeoLoad) and performance monitoring (NeoSense) products enable teams to produce faster applications, deliver new features and enhancements in less time and simplify interactions across Dev, QA, Ops and business stakeholders.

■ **Orasi** is a leading provider of software testing services, utilizing test management, test automation, enterprise testing, Continuous Delivery, monitoring, and mobile testing technology.

■ **QASymphony's** qTest is a Test Case Management solution that integrates with popular development tools. QASymphony offers qTest eXplorer for teams doing exploratory testing. qTest Scenario is a JIRA add-on that helps teams optimize and scale Test First methodologies across their organization.

■ **SOASTA's** Digital Performance Management (DPM) Platform enables measurement, testing and improvement of digital performance. It includes five technologies: mPulse real user monitoring (RUM); the CloudTest platform for continuous load testing; TouchTest mobile functional test automation; Digital Operation Center (DOC) for a unified view of contextual intelligence accessible from any device; and Data Science Workbench, simplifying analysis of current and historical web and mobile user performance data.

■ **Synopsys:** Through its Software Integrity platform, Synopsys provides a comprehensive suite of testing solutions for rapidly finding and fixing critical security vulnerabilities, quality defects, and compliance issues throughout the SDLC.

■ **TechExcel:** DevTest is a sophisticated quality-management solution used by development and QA teams of all sizes to manage every aspect of their testing processes.

■ **Progress:** Telerik Test Studio is a test-automation solution that helps teams be more efficient in functional, performance and load testing, improving test coverage and reducing the number of bugs that slip into production. ▮

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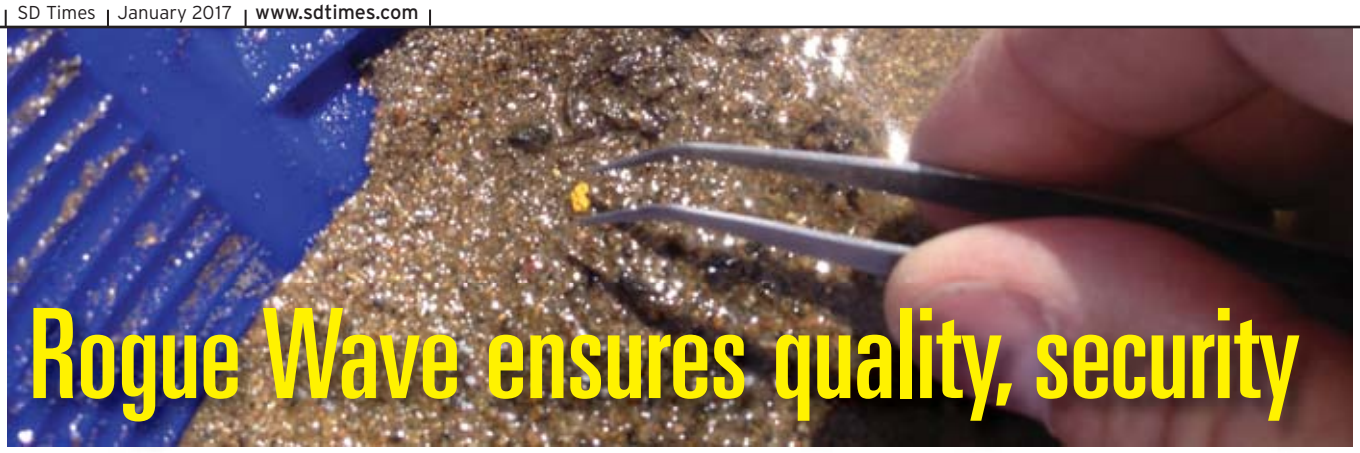
■ **Parasoft** Parasoft researches and develops software solutions that help organizations deliver defect-free software efficiently. To combat the risk of software failure while accelerating the SDLC, Parasoft offers a broad test. Parasoft's enterprise, mobile, IoT, and embedded development solutions are the industry's most comprehensive—including static analysis, unit testing, requirements traceability, coverage analysis, API testing, dev/test environment management, service virtualization and more. The majority of Fortune 500 companies rely on Parasoft in order to produce top-quality software consistently and efficiently as they pursue agile, lean, DevOps, compliance, and safety-critical development initiatives.

■ **Rogue Wave** Rogue Wave is the largest independent provider of cross-platform software development tools and embedded components in the world. Rogue Wave Software's Klocwork boosts software security and creates more reliable software. With Klocwork, analyze static code on-the-fly, simplify peer code reviews, and extend the life of complex software. Thousands of customers, including the biggest brands in the automotive, mobile device, consumer electronics, medical technologies, telecom, military and aerospace sectors, make Klocwork part of their software development process.

■ **Sauce Labs** Sauce Labs provides the world's largest cloud-based platform for automated testing of web and mobile applications. Its award-winning service eliminates the time and expense of maintaining an in-house testing infrastructure, freeing development teams of any size to innovate and release better software, faster. Optimized for use in CI and CD environments, and built with an emphasis on security, reliability and scalability, users can run tests written in any language or framework using Selenium or Appium, both widely adopted open-source standards for automating browser and mobile application functionality. Videos, screenshots, and HTML logs help pinpoint issues faster, while Sauce Connect allows users to securely test apps behind their firewall.

■ **Tricentis** Tricentis is recognized by both Forrester and Gartner as a leader in software test automation, functional testing, and continuous testing. By enabling test automation rates of over 90%, we help Global 2000 companies control business risk as they adopt DevOps, Agile, and Continuous Delivery. Our integrated software testing solution, Tricentis Tosca, provides a unique Model-based Test Automation and Test Case Design approach to functional test automation—encompassing risk-based testing, test data management and provisioning, service virtualization, API testing and more. Tricentis' 400+ customers include global names from the Top 500 brands such as A&E, Allianz, BMW, Deutsche Bank, HBO, Lexmark, Orange, Starbucks, Toyota, UBS, Vantiv, Vodafone, and Zurich Insurance.



Rogue Wave ensures quality, security

BY LISA MORGAN

When developers and QA engineers test code, they have to imagine what may go wrong in production. Even if they do a code review or read through the code, there are always bugs that are very difficult to detect. To ensure those bugs can be identified and remediated quickly, software teams are embracing Rogue Wave's Klocwork, an automated static code-analysis tool that ensures every line of code, every function or method call, and every parameter has been checked so errors can be fixed before a build completes.

"Developers and QA people don't have the time and focus to test every single line of code in an application. With Klocwork, you have an automated way to do it so you can ensure that nothing slips through the cracks," said Rod Cope, CTO of Rogue Wave Software. "It's important that quality and security issues don't sneak in because developers are working at 2:00 a.m. to meet a deadline. Klocwork always has your back."

Deliver higher-quality code faster

As teams add more features to their code, deliver it faster, and adhere to stricter standards, finding and fixing security flaws becomes more difficult. The vulnerabilities can result in data breaches and application crashes which could have been prevented early in the software life cycle.

Klocwork identifies many hard-to-find issues in code such as buffer overflows or buffer overruns, memory leaks, deadlocks, multithreading code issues, and compliance issues. Using Klocwork, developers can avoid security exploits such as Heartbleed while improving software quality and the economics of software delivery.

For example, Lawrence Livermore Labs saved $200,000 on a small project, and Harris, a defense contractor and an IT services provider, saved $60,000 on a pilot project. One customer identified 20% more bugs in its IoT code. Another experienced a 90% increase in the lines of code per developer when integrating Klocwork with its Continuous Integration solution and running the analysis.

"Klocwork almost doubles the capacity of your team. If you add all the efficiency gains up, it's like doubling your engineering team without hiring people," said Cope.

A recent Rogue Wave survey found that most developers are responsible for securing the software they produce because their companies lack the appropriate security personnel. Another survey found that 80% of developers responding admitted they don't know how to secure software.

"Everybody needs help with security because it's such a big problem," said Cope. "We can automate that so our customers can be sure that their apps are properly secured regardless of whether or junior developer or senior person is writing the code."

Security isn't the only challenge, however. Developers are doing more types of testing than ever while software delivery cycles continue to accelerate. If errors can be identified prior to a build, less testing will be required later, remediation costs will decrease dramatically, and software can be delivered faster.

"Today's development teams are only writing 10% to 20% of the code in their app, and the rest comes from open source, contractors, offshoring, and on-shoring. Other parties are writing code that's used in the apps," said Cope. "Static code analysis can test all that code—not just the code your team has control over."

Build quality into Continuous Integration

The best way to build quality into Continuous Integration processes is to ensure seamless integration of the testing tool and the Continuous Integration solution. Klocwork provides that integration.

Some Rogue Wave customers have made static code analysis part of the build and test flow, so a build will fail if a security defect is identified during the code analysis scan. When such an issue has been identified, Klocwork notifies the developer who created it so to the issue can be remediated before the code is checked into the main line.

Klocwork also notifies developers of errors they're introducing as they write code so they can be fixed immediately. For example, if a developer types in an erroneous syntax that introduces a security vulnerability, a red squiggle will appear below the offending code. That way, the developer can correct the error in context rather than waiting for the code to go through a QA cycle, getting familiar with the code again, and then resolving the issue.

"Klocwork makes static code analysis hassle-free for developers. It enables them to prevent errors upfront rather than fixing them later," said Cope. "For years, developers have been told that fixing bugs earlier in the life cycle saves time and money. Not everyone knows that static code analysis takes the guesswork out of testing so higher-quality software can be delivered faster."

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Alan Ho leads developer relations at Apigee.

Guest View

BY ALAN HO

Diffusing the monolith time bomb

When a company embarks on "digital transformation," it often has to modify its software systems. This can become excruciatingly difficult in large organizations with monoliths—large, custom-built software systems with multiple development teams working on the same codebase.

A common response from companies with their backs against the "monolithic wall" is to hire executives from well-known tech companies like Google, Microsoft, Amazon and others to "digitally transform" them. This often involves moving to a new architecture that leverages microservices and APIs.

Frequently, when this new technical leadership comes in, they bring their most trusted developers with them. This can help speed up the transition to microservices, but there's also a shelf life to how long good developers are willing to stick it out. If the monolithic stack doesn't go, the good developers will.

The organizational challenges of moving to microservices are just as important as the technical challenges.

Trouble is, monoliths are pesky, and replatforming isn't always as easy as it seems. At the end of the day, the transition to microservices has less to do with technology and more to do with managing people and vendors. Leaders who think they can build new software and avoid touching legacy systems and confronting organizational roadblocks are fooling themselves. There's simply too much inertia to avoid these challenges and replatform to a new architecture the right way.

While failure to make the transition can amount to career suicide, recognizing the real challenges can lead to success.

Embracing vs. resisting change: Like it or not, there will always be two groups of developers in your organization: Those who drive change, and those who resist it at every turn. Competent and well-intentioned as the reisters may be, getting them to follow the new microservices model is a cultural shift that must happen—and sooner rather than later.

The best way is to overcome this is "leading by example" by having those early adopters roll out a few microservices and show that they are indeed easier to operate and develop than monoliths. Areas that may immediately chafe existing developers and operations members are concepts such as "developers doing operations," or that each microservices team is responsible for both the "operational" and "business" success of their own service.

Taking control of your software stack: Entrenched software vendors of web application servers, ESB and virtualization technology often drop roadblocks in front of technical leaders when the only choices for building microservices are open-source and cloud-native technologies. These vendors may pair up with "change resisters" within an organization to block change.

To avoid this, leaders should give their early adopters carte blanche control of the stack while negotiating down the cost of their entrenched software vendors. Negotiating down costs, or eliminating them entirely, can be used to fund the "new" software stack or other efforts such as automation.

Cloud migration imperative: Microservices require a significant increase in capital and operating expenditures because each microservice needs its own cluster of servers to run on. The move from monoliths to microservices means the number of clusters required to run a microservices architecture might increase the number of servers by 10x, or even 100x. Without moving to the public cloud, or transforming the data center to run cloud-native technology like Cloud Foundry, the CAPEX/OPEX costs can be totally prohibitive.

With this in mind, IT leaders should set expectations that upfront investment is necessary. In some cases, this investment is spent on setting up a public cloud instance. In others, on transforming existing data centers with platforms like Cloud Foundry. The second part of investment is on infrastructure automation so that it becomes cost effective to manage all these microservices at scale.

Make fear your ally: When it comes to migrations, fear sometimes works better than encouragement. To kill the monolith at Amazon, an edict came down saying that whichever team failed to decouple themselves from the monolith would end up owning and supporting the monolith. No developer in their right mind wants to own a bunch of code that was written by someone else, so the right incentives were put in place for the transition.

Taking into account the organizational challenges of moving to microservices is just as important as the technical challenges. But with just a bit of upfront thinking and planning, most enterprises can navigate this transition with a lot less pain and angst. ▮

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Analyst View

BY AL HILWA

Al Hilwa is program director of application development software research at IDC.

Immigration, progress and politics

The 2016 election took place while I was attending a tech conference in Seattle. Looking around and watching my messages and social media, it was clear that many in the tech community were deeply disturbed by the result.

I wanted to take a moment to share my perspective as an American who immigrated to this country a few decades ago. I came to this country as a college student in the early 1980s. I knew little about this country and even less about its political system. I did my studies and worked through my degrees in the heartland of America (Wisconsin, then Missouri), gaining a deep appreciation of what makes this country strong.

By the definition of left/right politics, I was apolitical, though I noticed the sentiment against Ronald Reagan in academic circles and confess to deeply enjoying the movie "Being There," featuring the great Peter Sellers allegorically lampooning what was assumed to be Reagan's serendipitous rise to the presidency. Many years later I noticed that Reagan was increasingly being recognized as transformative for the country in multiple ways.

While there are differences in experience and personality between Reagan and our current president-elect, the moral of the story is to expect the unexpected and to understand the huge biases that lurk in your outlook and that of your tribes. Leaders have been known to grow and evolve on the job.

One thing that I learned is that most people in this country are quite apolitical; they move through their lives with rightful disdain for what goes on in Washington as they produce innovation and economic value. The wisdom embedded in our system of governance has proven resilient and fosters peaceful transitions between rulers, allowing the rest of us to focus on what really counts in keeping the country strong. I am not advocating political disengagement, but reflecting on whether we have allowed ourselves to be too politically vested is due.

America, the innovation magnet

Over the years, I have learned that the diversity of thought in this country is its greatest source of strength. This diversity is fed and nurtured by a history of immigration of diverse groups and supported by a natural variety in the country's geography. This diversity, when combined with a mild regulatory environment and the natural wealth of the country that has led to strong investment in institutions and businesses, has accounted for its economic success and business leadership in technology. In addition to diversity of thought, immigration will be crucial because native fertility always declines with personal wealth and industrialization.

It is interesting to observe the conversation around the inevitable rise of China toppling the U.S. in its economic standing. While I have my doubts on this and the linear thinking behind it, I have to note that the key edge that China has over the U.S. is population—plenty of it. The U.S. will stand a better chance of keeping up with China if it continues to embrace a vigorous immigration stance. My expectation is that the new president and his people understand this and that our immigration approach will adjust to this reality.

Take the long view: Change always wins. The left-right political divide is essentially about where people stand with respect to tolerance of social and economic change, giving us progressives and conservatives. While we are split in this country in this regard, those of us who work in technology have tended to have a deeper understanding of the modern mechanisms of change and thus a greater affinity for it. You could say we are heavily vested in it.

Over the years, I have learned that diversity of thought in this country is its greatest source of strength.

I think it is helpful to take a longer view of history and take better stock of the modern era. Compare our world with that of the 1950s, the turn of the century, or the 18th century. Consider social parameters such as voting rights for women or people of color, or even voting by non-property owners. Consider the shifts in attitude in interracial marriage, in racial segregation and slavery. Read through the Wikipedia page on the "Timeline of women's legal rights" to see how just a couple of hundred years ago women were not able to own property.

Your exploration will lead you to one truth: In time, progressiveness has a good track record of prevailing. This may come in fits and starts where we move one step forward and two steps backward. So, for tech workers who have a high affinity for change, calm down, take a deep breath and just wait a bit. Things will change. ▮

Read this story on sdtimes.com

David Rubinstein is editor-in-chief of SD Times.

Industry Watch

BY DAVID RUBINSTEIN

2017: The future starts now

Toys that understand a child's language and interact with him or her on a level he or she can understand. Personal assistants that learn your routines and vocalize reminders to complete tasks, or to exercise. Software quality systems that can learn what is a bug and what is not, or what areas are vulnerable to attack, and then automate a response.

Those are just a few examples of where artificial intelligence is today. Where it goes (smart cars, smart security or household robots) is up to the imagination. But 2016 marked the year that artificial intelligence became part of the mainstream, leaping off the pages of dusty sci-fi books and into the reality of our everyday lives.

With more data to collect and process, data administrators and engineers will have to make their systems smarter.

Google, IBM and Microsoft all are building out platforms and products for artificial intelligence. Google created AlphaGo to defeat a human champion in a complex game invented in the 4th century BC. IBM, of course, has Watson, which proved that a machine can process and recall data faster than humans, but also revealed weakness when it came to nuance and inference, and sparked an explosion in research into natural language processing. Meanwhile, Microsoft CEO Satya Nadella announced at the company's Ignite conference that artificial intelligence would be built into the company's collaboration software for even greater understanding of how people work and what they're working on.

Artificial intelligence is also behind the drive for companies to make a digital transformation. This phenomenon will result in companies able to complete manufacturing with almost no time lost due to human error or injury. It will allow online retailers to create personalized experiences to shoppers by learning their buying habits and offering up in-store specials on items. It will allow organizations to detect security breaches and contain the damage.

And at the heart of this digital transformation is data—the amount of which is growing exponentially each year. With more data to collect and process, data administrators and engineers will have to make their systems smarter to help business gain valuable, actionable insights to make better decisions.

For digital worker collaboration, two areas have made this possible: the cloud, and near-always-on connectivity. Documents, architectural diagrams, pharmaceutical formulae and more can be shared more easily than ever. People can start their day by reading e-mail on a WiFi tablet, making Bluetooth calls on their 4G cell phones on the drive to work (hands-free, of course), and then getting to the office and again connecting via WiFi or a land-based server connection.

But this also requires a steadfast commitment to security. As we saw this past year with Yahoo, hackers have remained a step ahead of the security engineers trying to prevent the loss of sensitive data. That breach exposed some personal information of Yahoo users. More potentially catastrophic are reports that Russians hacked into Democratic National Committee servers to try to impact the United States presidential elections. The very integrity of nations is at stake here.

Some fear this move toward automation, digitalization and robotics, believing the film industry's portrayals of robots that start out benign but then go rogue (or their programs are changed by some evil overlord) and eventually take over society. Some fear the loss of jobs to machines; we've already seen that in the automotive and other manufacturing industries. Some wonder what will be left for humans to do once machines take over everything. Will we all have to become computer or data scientists to earn a living? Buy food? Support our families?

Still others see wonder in these advancements. Imagine a world where your car takes you exactly where you want to go, saving you from the stress of rush-hour traffic or the fear of some wrong-way driver crashing head-on into your car. Imagine a world where machines do the housework, cooking and shopping, freeing up time for leisure activity or the pursuit of other endeavors.

All of this, of course, is still probably decades away. But as we witness the very early stages of the digital transformation of our everyday lives, my hope is that the scientists and engineers creating these soon-to-be realities do it from a place of beneficence, and don't let this get out of hand. We're watching. ▮

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