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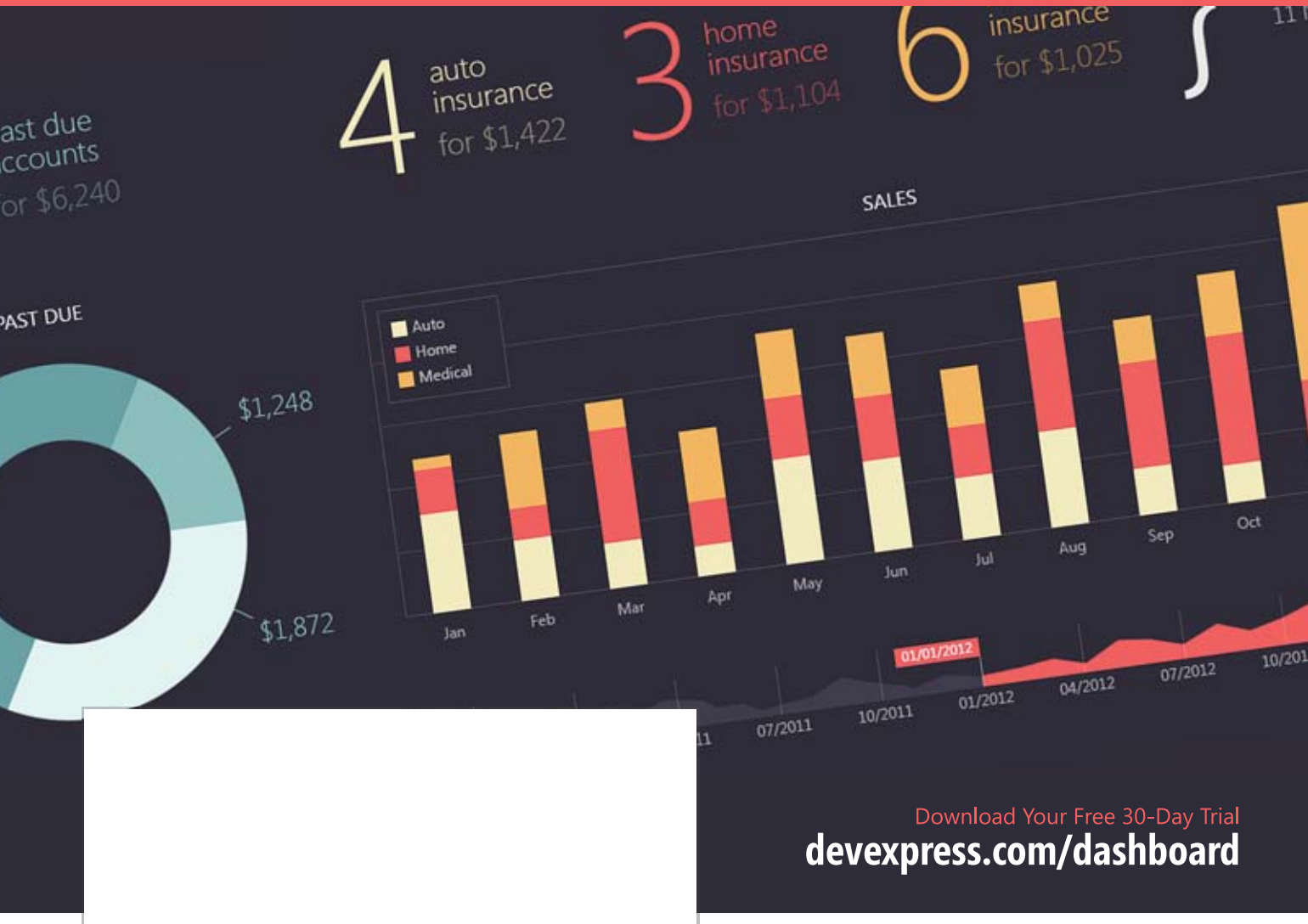

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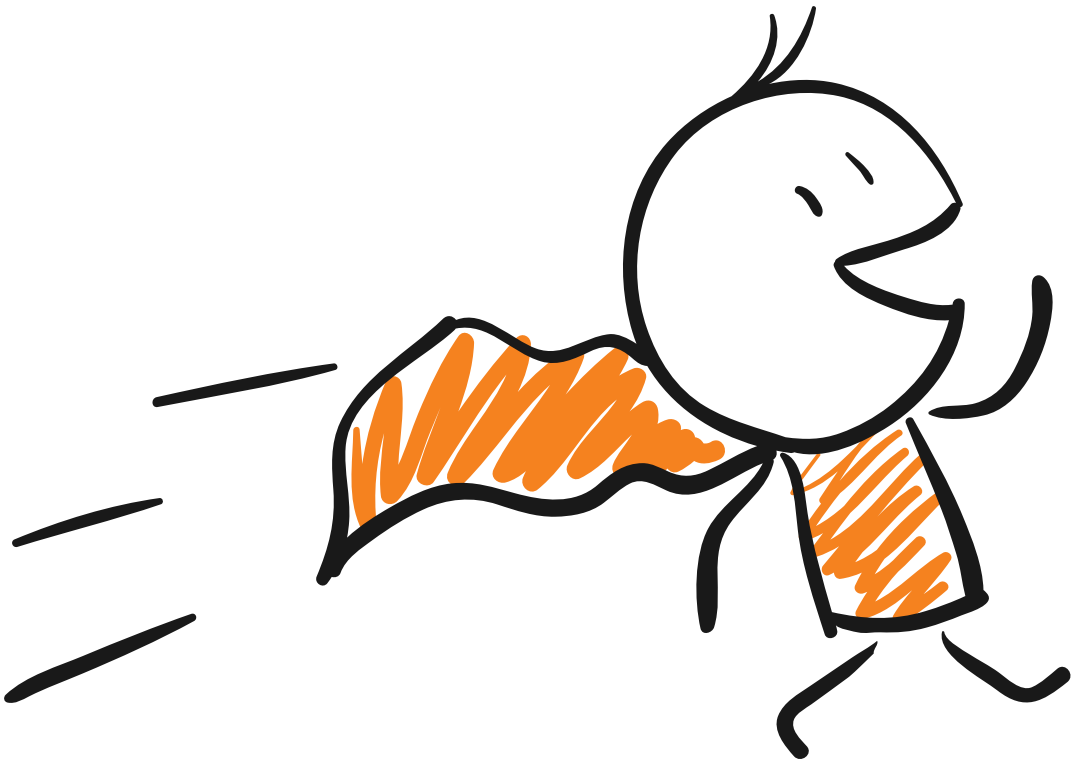

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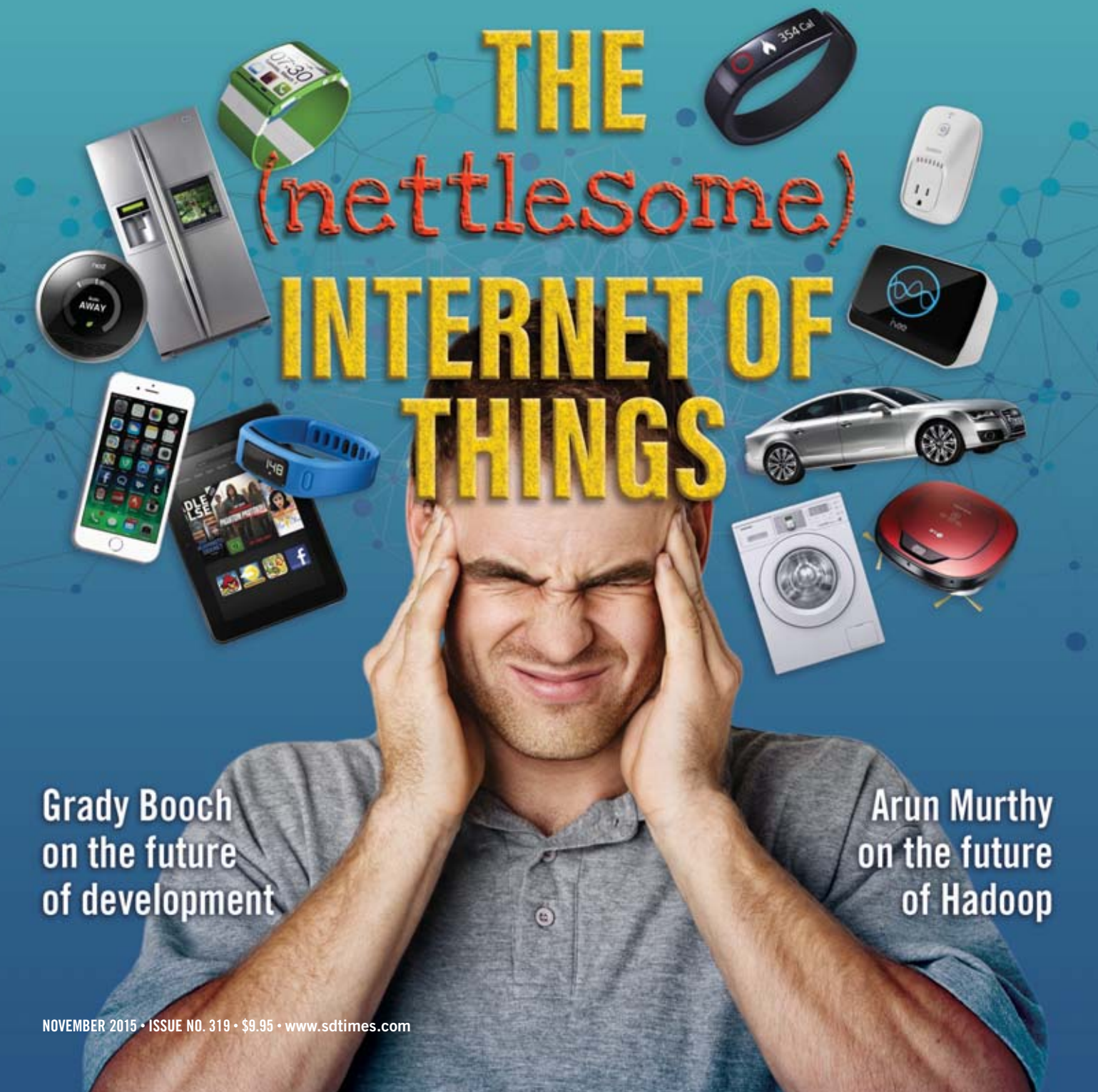

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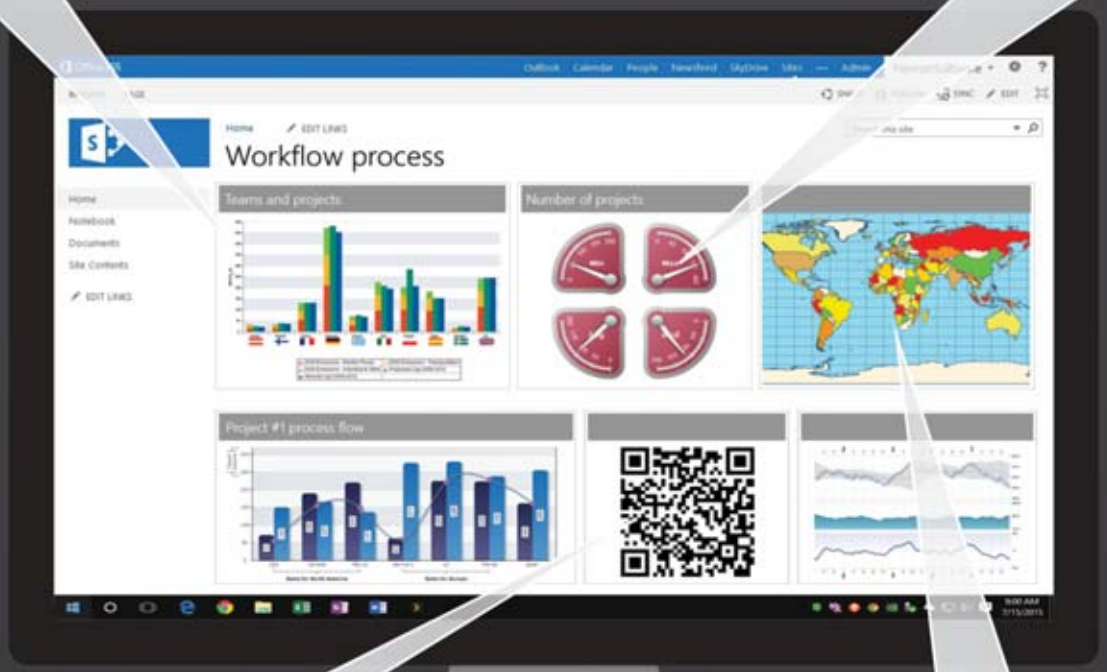

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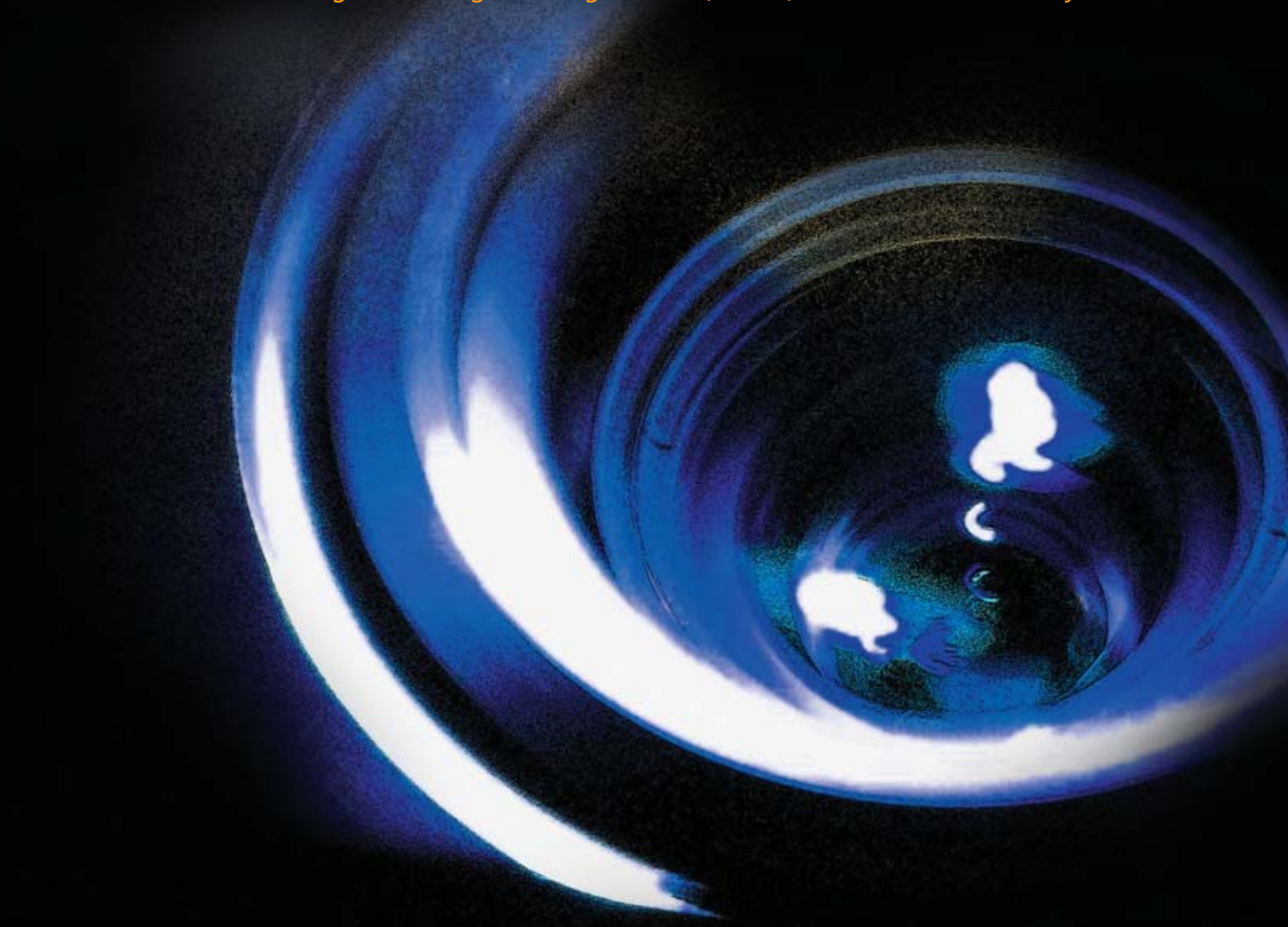

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SD Times ON THE WEB

How agile are your IT Operations?

You might be overlooking the IT Operations people at your company. They're the folks who scale environments and maintain stability, among other things. But their jobs face a few hurdles, such as: "The automation of virtual machine images and other process automation tasks helps to an extent, but there's no denying that this demand from the business for application-ready infrastructures absorbs a significant amount of Ops team time and resources." Automic's Ron Gidron explains what else you can do to help IT Operations at tinyurl.com/agileitoperations.

Testing can't afford to lag behind

CIOs are concerned about three things: security, DevOps and testing. Except that testing is too slow to be included in many development environments. This is unacceptable, says Appvance's CEO Kevin Surace. "The QA and test industry failed to give [organizations] the tools to go that fast. With the tools companies have today, they know that to go faster, they have to give up quality for velocity. That's the tradeoff people have been making." What, then, can be done about this? David Rubinstein tries to find the answer at tinyurl.com/testingfallsbehind.

Don't be a fool, go back to school

It seems that returning to higher education is becoming a thing once more. Coding boot camps offer people weeks of training in many languages, such as Ruby on Rails, Python and Django. But is it worth it? Tech entrepreneuer Dave Parker thinks so: "One of the key benefits of attending a coding school is the outcome: a new job. A number of students that attend coding schools will admit that they've put their career ladder against the wrong wall and will enroll in a program in order to jump-start their new career," he says. There are other reasons to go back to school, and you can find them at tinyurl.com/backtobootcamp.

No need to worry about a burst

"The Silicon Valley bubble is prime to burst." You've probably heard that a lot by now, but Alex Handy doesn't think the end of the Silicon Valley heyday has to be catastrophic. "This new generation of startups will be significantly leaner, far more focused, and definitely more profitable. With fewer developers on board, there will be more money for the investors to pull back later on, and thus less need for multiple rounds of funding at insane, multi-US$100 million levels," he says. For a look at his reasoning, visit tinyurl.com/bubbledeflation.

In case you missed it: A drifting DeLorean

Back to the Future Day came and went in October, but not everyone spent it posting meme pictures. One group of Stanford researchers took a DeLorean (named MARTY) and made it do something nifty—by itself. "One of the goals [Stanford researcher Chris] Gerdes has for MARTY is to use it to drift alongside other cars operated by professional drivers. According to him, this is a common technique in motorsport competitions, where drivers have to anticipate each other's movements." You can see MARTY in action at tinyurl.com/driftingdelorean.

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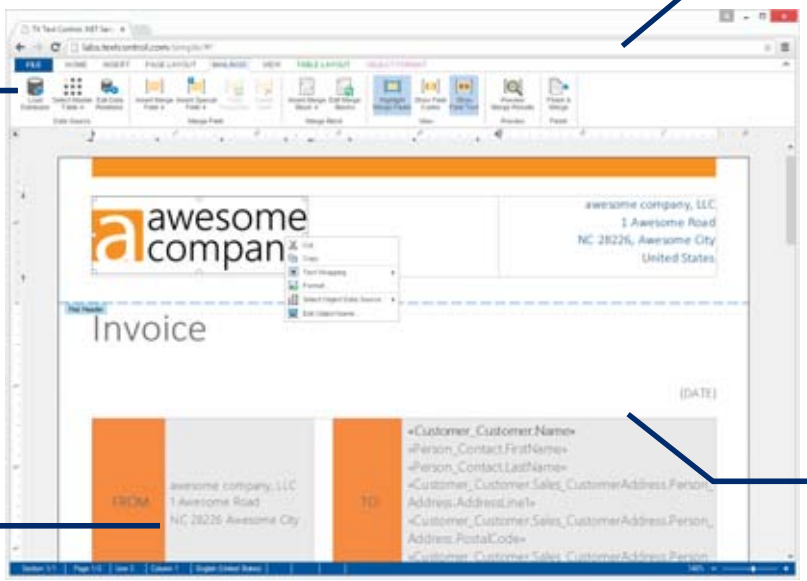

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FROM THE EDITORS

U.S. government joins modern era

Common methodologies and development practices seemed foreign to the U.S. government, which could simply throw money at software problems that never appeared to get solved. But recent ventures lead us to believe that the government might be ready to shake off the dust and join the 21st century.

It's no shock that the government needed to take a look at its information technology. It's trying to make a difference for the greater good, and to do so (as reported in this issue), it needs digitalization and the latest technology.

Let's go back to the HealthCare.gov failure of 2013; it's the best example of a multimillion-dollar website failure based on poor architecture, a lack of load and functional testing, and neglect of the user experience. One of its biggest problems was the login system, which had the largest amount of errors. Additionally, it took users 20 minutes to complete an application online, with the worst-case scenario involving more than 76 screens.

Non-partisan, non-profit organizations have sprung up to tackle some of these problems themselves. Code for America is one of them, using the talent of the industry to solve some very big social and civic problems.

While HealthCare.gov's failure was probably one of the biggest public website failures of the decade, it made it obvious that the government needed to change its view of how to serve the public electronically. The administration of President Barack Obama recognized this and created the U.S. Digital Service, which is adopting common software development practices, technology, and focusing on the end user by—get this—actually talking to folks who interact with the government via the Web.

The U.S. Digital Service is unique in that it is made up of engineers, coders and developers who left startups and large tech companies to join Washington, D.C., to create software solutions that serve the public good.

Now, they're working on things like benefits for veterans, the health insurance marketplace, student loans, electronic health records, and tools to combat human trafficking. And yes, they revamped and simplified the HealthCare.gov site.

It's not rocket science; it's just focusing on how technology can actually change America. Breaking with past practices, updating policies and adapting common methodologies is what the government is doing now to improve digital public services, and maybe with more smart people joining the force, it can finally deliver what the public needs. ▮

A look back at a look into the future

Oct. 21, 1985. That was the day young Marty McFly hopped into a DeLorean equipped for time travel to save his family on the same date 30 years in the future.

That date—Oct. 21, 2015—was a couple of weeks ago. McFly encountered such things as videogames played without controllers, drones and biometric identification (all of which we have today), and hoverboards, flying cars and self-lacing shoes (which we don't have).

We thought it would be fun to look at some of the things our industry pundits were predicting in 1985 for the future, to see which were right and which were wrong. First, we must travel back to that time, when LISP and Smalltalk were top programming languages of the day. Windows 1.0 was just released and cost US$100. But the dominant operating system was Unix. Most innovation in software was occurring in games. Richard Stallman created the Free Software Foundation, and the GNU manifesto was published in a paper magazine known as "Dr. Dobb's Journal."

What predictions did they get right? That there would be a computer in every home. And that's actually only partly right; most homes today (at least in developed countries) have multiple devices that are more powerful than anything we could have conceived of in 1985.

And that's about it.

Who back then could have dreamed of microservices and container architectures, Hadoop, or even the Internet?

Cellphones, tablets, artificial intelligence, wearable devices and virtual reality? That was the stuff of science fiction in 1985.

And what will the world look like 30 years from now? Here's what we think:

The Internet of Things will be built out, delivering the vision of near-complete interactivity between devices with little or no human intervention.

Robots will be ubiquitous. They already are in use on production floors in manufacturing plants around the world, and will move from industry into our daily lives. We already have the Roomba robotic vacuum cleaner. What's next, the "Wafflebot"? (#NTHAK—Nod To "Harold and Kumar").

Man does not stand still for long. He'll create something, admire it for a while, then someone else will invariably look to improve on it. That's the human spirit. And, our final prediction: We're already prototyping driver-less cars, commercial space travel, even trying to determine if future generations can survive on Mars. If those things come to pass, we'll say, of course. It's the things we don't anticipate now, though, that will take us aback...aback to the future! ▮

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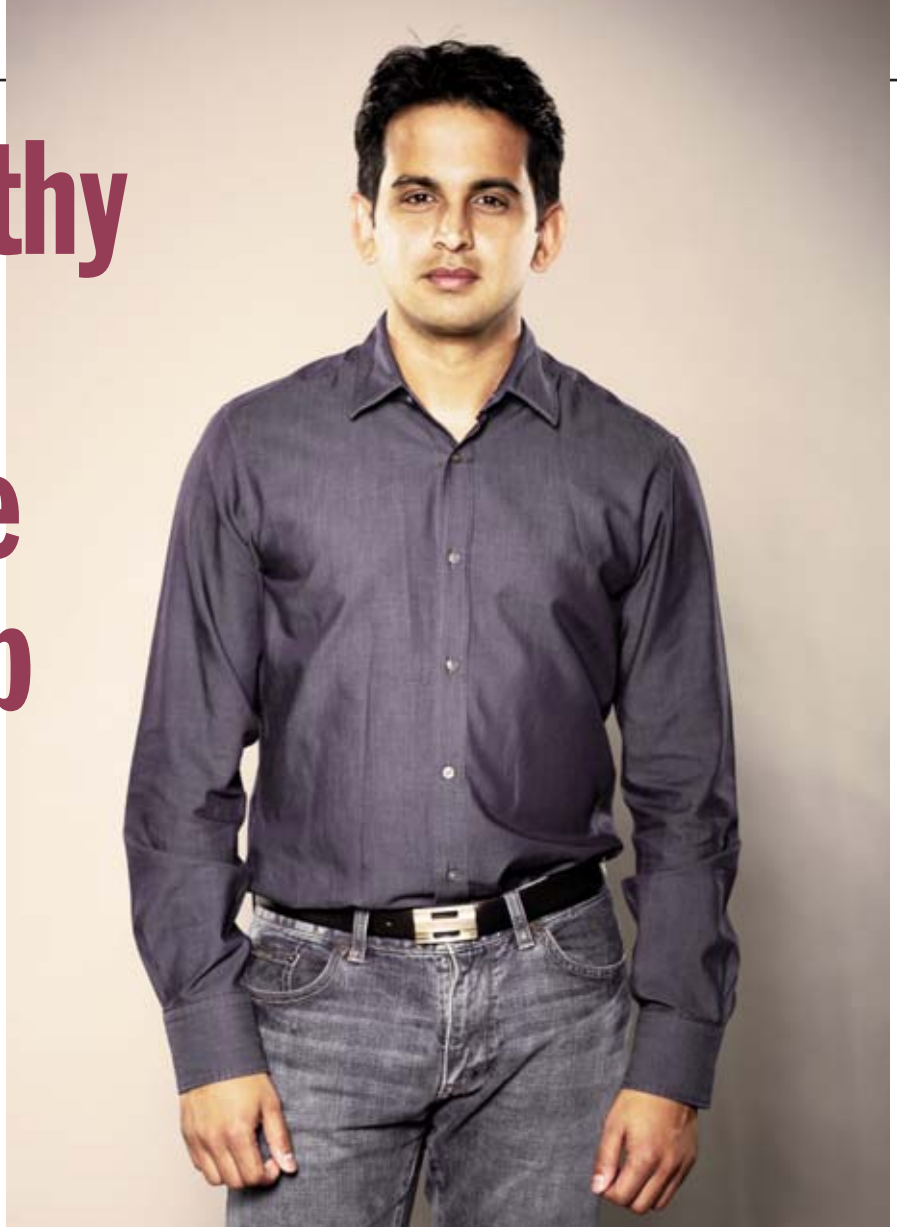
Arun Murthy discusses the future of Hadoop



Founder of Hortonworks talks end-user engagement and community participation

BY ALEX HANDY

Arun Murthy is a busy fellow. When he's not acting as architect at Hortonworks, the Hadoop company he founded, he's flying around the world giving keynote addresses. This is quite a long ways from where he was 10 years ago, working on Hadoop inside Yahoo.

But then, the future is, typically, uncertain. That's why we sat down with Murthy to talk about the future of Hadoop and Big Data processing as a whole.

What is the next big focus for Apache Hadoop as a whole?

I think if you look at the big picture, Hadoop started off as map/reduce and HDFS. Things have obviously changed a lot. We've had things like YARN for a while now, so map/reduce is no longer the be all end all. We also have Spark and Flink, and a better Hive, and on and on. The infrastructure side of the Hadoop space is alive and kicking.

The infrastructure side is alive and kicking. The idea always was to let a thousand flowers bloom, and that has happened. It's not just the open-source communities that have done this, either. It's also other sorts of vendors, like IBM, EMC and SAS. These guys are taking their product lines and making them Hadoop-compatible.

That's really great. If you look at Hadoop, we're coming now to the end of the first big wave of Hadoop. The first wave has been about establishing technologies and making sure enough of the gaps are filled well enough so you can build apps on top of pure data.

As they start to build newer and newer applications, we start going from post-transactions to pre-transaction. Predictive analytics has been around for a long time, but with Hadoop, you can do analytics with very fine granularity. You can make every customer feel special.

What people have realized as they build more and more of these apps, a lot of these new-generation apps are primarily driven by data. You can build apps that delight and inform the end customer, but every model app we're going to build is also a data app.

That's one view of the world. If we look at the data-centric part of the world, for a time it was only one machine, then you had virtualization. Now you have things like containerization that are primarily driving efficiency.

Docker is the poster child of that. I think of these raw data apps, and Docker helps you build apps that are DevOps-friendly and repeatable. The Hadoop community should take a step back and say, 'Instead of focusing on what's the next HBase, Spark or Flink,' let's take a step back and say, 'How do we make it easy for people to build these apps that allow you to take advantage of the data in your platform?'"

I would also say simplicity for developers and end users is important. Say the end user is a businessperson at an enterprise. If he or she wants to extract data from what he or she has, they have to use registries. There are all sorts of

technologies that have to work together: Spark has to work with HBase and with NiFi. You have to put them together yourself, if you are the enterprise user.

If you are at Accenture helping people put these apps together, you're doing a lot of grunt work. You really want to focus on the core business logic. What we want to do—what we have to enable as a community—is allow you to get off-the-shelf applications, sort of download and go on the platform.

You want to be able to download an app that does predictive analytics; there will be some amount of customization, but the base is available.

A lot of that would be at the very high level; you want it to look like an app you download and run on your platform. The same way with developers and solutions and software, now it has to run on a distributed cluster of Hadoop. It needs distributed data, it must obey the security model of your enterprise, and you have to have some data governance.

Finally, it needs to have a very user-friendly management console. We have all these in the platform now, but you as the enterprise business user have to put them together yourself.

What does this look like for the end user?

We as a community want to make it easier for these integrations to be done by someone else—to have them just be done.

Think of this as an assembly line you put together. Maybe it's Docker containers. You have some simple controls to be able to launch these assemblies, and implement security governance and management in a simple management interface. You download a bundle and click 'Go,' and it should just go. If you can assume you have technologies in the open like YARN and HDFS, that becomes the equivalent of POSIX for the data world.

You have the Docker containers for the actual business process, then you have Ambari, which allows you to manage this. I should be able to download an assembly that you wrote, and I can modify the business logic, or I can decide that I don't want Spark Streaming but I want Storm.

In the beginning, a year or so ago, we started this Apache Slider Project to make it easy to bring new apps onto YARN. If you blow that up and say it's not just to bring an app onto YARN, we want to be able to post apps onto the Hadoop Platform. In the next year or two, we'll spend a lot of time and effort getting that to work.

Slider was baby steps. We have a lot of work going on inside the community and so on.

What is the community doing to help simplify and unify the Hadoop ecosystem?

I think one way the community is doing that is having things like YARN and Spark APIs...but really to me, look at the end users as business users. The way to ultimately make it easier for them is to make products and solutions available out of the box so you don't have to understand Hadoop at all. You download an app on Windows or Mac, you don't care much about the underlying OS.

For the first two to three years, what we really wanted to focus on is making sure you can build any app on this platform. For putting together Storm and HBase and Spark, we want to make it an out-of-the-box experience.

I was talking to a Wall Street firm the other day. They're trying to build something out of Spark to predict customer churn. Now the bank is hiring people who understand Spark, Scala and Hadoop. It'd be much better if that customer churn app was built by some third party out there, and they could download and just run.

A customer churn app would represent an assembly because it has to understand all these parts.

I think the call of action is, let's focus as a community on making it trivial for people to get value out of data. Hadoop is less about technology, and more about applications of the technology. It's a shift, but, if in five years from now all we focus on is building the next Spark, HBase or whatever, that's going to cause more confusion than add value.

Innovation is important, but we have to pay attention to uptake innovation, rather than just the next API or the next storage platform. ■

Red Hat to acquire AnsibleWorks

BY ALEX HANDY

Red Hat announced that it is acquiring AnsibleWorks, the company behind the infrastructure-provisioning software known as Ansible. The tool is a somewhat slimmed down take on the Chef and Puppet model.

Ansible, rather than having a prescriptive language and framework for infrastructure provisioning, relies instead on logging into machines via SSH and running commands on the end device. This has always simplified the provisioning process, as compared to other solutions that require an agent on the end computer.

Said Ziouani, cofounder and CEO of Ansible, said, "We're thrilled that Red Hat, a global leader in open source, has chosen Ansible to tackle the future of IT automation and systems management. This is a strong validation that Ansible's simplicity, enterprise customer base and robust community is winning in enterprise IT automation, from compute to networking to cloud to containers."

Joe Fitzgerald, vice president of management at Red Hat, said, "Ansible is a clear leader in IT automation and DevOps, and helps Red Hat take a significant step forward in our goal of creating frictionless IT. Red Hat is transforming IT management, driving innovation that is 100% open source, built on an open management platform, and relentlessly focused on reducing cost and complexity through ease of use and automation. I am thrilled to welcome Ansible to Red Hat to help us expand that commitment."

While no actual purchase price was published, rumors have surfaced alleging the amount was around US$100 million. Ansible leaves behind three other startups in the provisioning space: Chef, Puppet and SaltStack. ■

STEM definition expanded to include computer science

BY CHRISTINA MULLIGAN

Computer science education efforts are getting another boost. President Obama has officially signed the STEM Education Act of 2015 into law, expanding the STEM definition to include computer science.

"We must prepare our students for degrees in STEM subjects to ensure that they have the ability to thrive in today's technology-based economy," said Texas Republican Lamar Smith, chairman of the House Committee on Science, Space and Technology, who introduced the bill. "This means motivating more American students to study STEM subjects, including computer science.

"Unfortunately, America lags behind many other nations when it comes to STEM education. American students rank 21st in science and 26th in math. The STEM Education Act expands the definition of STEM, encourages students to study these subjects, and trains more teachers."

STEM stands for Science, Technology, Engineering and Math education. While computer science has never been a part of the acronym, it was thought to fall under the technology category. Officially including it in the definition signals the importance of a computer science education, according to Washington Partners' vice president for legislative and public affairs Della Cronin, who handles federal affairs for Code.org.

"Computer science advocates have long felt that STEM programs have ignored computer science," she said. "They felt there needed to be a signal from Capitol Hill and a statute that governs some of these programs and says computer science is important, you as an agency should be supporting the teaching and learning of it, and investing public dollars in it."

The STEM Education Act doesn't bring any additional funding for computer science, but it does bring the option for schools that are running programs backed by a STEM fund to include computer science programs as part of that funding, according to Kelly Calhoun, research director of education at Gartner.

"The thought here was looping this in as part of STEM funding gave the maximum amount of flexibility for individual school districts to tailor programs to meet the needs of their local communications," she said.

Computer science education has been an ongoing conversation in the technology industry because of the lack of people to fill computer science jobs. According to Code.org, there will be 1.4 million more computer science jobs than there will be people to fill them by 2020.

"It's not just about IT, it's not just the Silicon Valley companies; it is important to financial companies, it is important to the world of retail," said Cronin. "You would be hard-pressed to get through a day without relying on some software designed by a computer scientist or some device that involved a computer scientist."

Cronin added that even if you aren't planning on pursuing computer science as a professional, it can help you make sense of what you are consuming as a user of technology.

"It is a great opportunity to have kids exposed to computer science at least at the entry level," said Calhoun. "There are logic principles that are developed as part of studying computer science, and for a lot of kids this could be a great doorway into learning new ways of thinking, reasoning and problem-solving."

However, students will not be the only ones to benefit from the new education act; teachers will also have more opportunities as well. The bill amends the National Science Foundation's Robert Noyce Master Teaching Fellowship program to enable individuals pursuing a master's degree to participate in the program, and it includes computer science as part of the scholarship program.

"The purpose of this is to pull more people from math and science into a teaching profession," according to Calhoun.

Calhoun and Cronin both noted that while this is a step in the right direction, it is only one step, and there still needs to be more investment and work at the state level to improve computer science education.

"Enactment of our bipartisan STEM Education Act demonstrates that we can work together to help our students thrive and to help ensure that they are prepared for the careers of tomorrow," said Elizabeth Esty, a member of the House Committee on Science, Space and Technology. "More and more jobs of the 21st century require science, technology, engineering, and math skills. We need to make sure that all of our students have opportunities to thrive in STEM education." ▮

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Photo courtesy of Github

Git supports large files

Two-factor authentication support highlighted at conference

BY ALEX HANDY

GitHub announced the availability of Git Large File Support (LFS) 1.0, as well as new two-factor authentication, at its GitHub Universe show in October.

Historically, Git has had trouble storing and versioning large files due to constraints in the basic design of the software. There have been third-party attempts to solve this by companies like GitLab and Perforce, but LFS' release marks the point where a true solution has arrived. Even GitHub competitor Atlassian has signed on to support Git LFS.

For users concerned more about security, GitHub distributed at its show YubiKeys, two-factor authentication USB sticks that allow developers to further secure their repositories from outsiders attackers.

Brandon Keepers, head of open source at GitHub, said that GitHub is the leading contributor to Git and was a driving force behind the addition of LFS.

"A significant number of the recent additions to Git have been done by GitHub," he said. "The design of Git is intended to keep the entire repository on your disk. You take it wherever it is, and you go. This is not practical for designers working on large assets.

"We worked on establishing the standard for Git LFS. People like Atlassian are adopting it. There have been many attempts at having that in the past, but having the people on the staff has enabled us to go far."

Keepers said that GitHub is not used by just software developers. Museums, like the Museum of Modern Art in New York, have uploaded the metadata for their collections into the system, for example.

"We see tons of people using GitHub for non-software things," said Keepers. "City governments are starting to put laws on GitHub. You see people writing books on GitHub. The software community is showing the way for collaboration. We use GitHub internally. The legal team uses it. It's been a blast to send pull requests to our legal department."

Sam Lambert, director of technology at GitHub, said that new non-software users are an interesting target for Git. But for now, the company remains focused on developers almost exclusively.

"We've talked about it in the past and experimented, but primarily our focus now is around the developer," said Lambert. "Git's core component is making changes to text files. It's a new workflow, but people are applying our workflow to other areas. For example, we do Continuous Integration on blog posts that checks for grammar, images, text, and runs CI against it. That's a workflow, applied backward to writing. We're seeing more and more industries taking cues from how we work."

GitHub continues to push its GitHub Enterprise on-site edition. Lambert said that the tool is still successful, and that many developers are pushing for Git in their environments. "I think if you're working on enterprise, you can be used to working with more draconian, hard-to-use systems," he said. "But you spend your weekend working on GitHub; it's great for collaboration and it's the place where code gets built. Enterprises can purchase that.

"We have NASA talking about how they use GitHub Enterprise, and it's knocking years off development times. We've seen massive growth; the demand is everywhere." ▮

Government revisits how it

Inside the efforts to fix HealthCare.gov, make lives better

BY MADISON MOORE

"When I got my bachelors degree in computer science, I never thought, 'You know what? I'm going to help people change their lives and make their lives better.'"

While it might not have crossed her mind at the time, Lisa Gelobter, chief digital service officer at the U.S. Department of Education, is now in a position to make a better world for millions by using digital initiatives to solve some of the government's biggest problems.

At the O'Reilly Velocity Conference in New York, Gelobter discussed many of these issues, including increasing access to healthcare, improving service benefits for veterans, streamlining how people immigrate to the U.S., increasing access to higher education, and working with individual federal agencies to figure out the services that will have an impact on the greatest number of people.

Gelobter introduced the Digital Coalition, which is made up government organizations and was created by the Obama administration for a "smarter IT agenda." The coalition plans on growing initiatives by using the same methodologies and practices used in software and product development in the last decade.

To start, the coalition rescued HealthCare.gov, which at first took users 20 minutes to complete an application online, with worst-case scenarios taking more 76 screens. When they fixed it, it went down to 16 screens, with the worst-case application taking nine minutes to complete.

According to Gelobter, the login system had the "largest number of errors." After rebuilding it from scratch, the response rate went from five seconds down to two milliseconds.

With immigration, the coalition wanted to have an online application process for individuals to efficiently replace their green cards. Gelobter said that the coalition moved from waterfall to agile, "left the building, and did user research and talked to people." They launched a successful online system that now allows users to track their progress and get notifications. They already have 40,000 individuals who have filed online.

The Department of Education's Lisa Gelobter shows how agile solved government problems.

Gelobter discussed her own work for the Department of Education, including the release of its interactive College Scorecard, which provides students and families with information about where to enroll for higher education, how to get funding and more.

Gelobter said the coalition built a consumer tool on top of the API as a reference implementation, and she believed this is the only instance where the government has "dogfooded their own API."

She discussed three other examples of where the government is using software to do the "greater good," including initiatives such as Veterans' Medical Health Record Interoperability, the Police Data Initiative, and a crowdsourced mapping effort that facilitated the delivery of aid to victims of an earthquake in Nepal.

"You get thrown into a problem and you try to solve it," said Gelobter. "We are making change that will impact millions."

She added that the government used methodologies familiar to developers, such as agile development, product-management practices, goal setting, user-centered design, open-source software, design patterns, and dashboards.

Application performance at Velocity

A word that was heard frequently at the Velocity conference was "performance." The conference provided a new perspective to performance and Web operations, and it gave everyone from developers to technical executives solutions to solve their dynamic website and application challenges.

Keynote speakers came from a variety of organizations like Dropbox, Etsy, Hewlett-Packard, IBM and the U.S. Department of Education. Companies showcased their platforms, talking about what was new and how attendees can overcome their performance issues, including Web and testing challenges.

Offering a cross-enterprise test automation framework for the whole team (including DevOps, operations and QA) was **BlazeMeter**. The company was born out of the DevOps movement, and it is trying to redefine testing. BlazeMeter emphasizes that load and performance testing should be part

does technology

of the software delivery workflow. Its platform allows developers to use their preferred language. CEO Alon Girmonsky did a live demonstration where attendees could see how they could write in the language that they choose.

"We make performance testing as easy as code, and allow developers to start testing for performance while they are writing code," he said.

Chef, an IT automation company, turns infrastructure into code by automating how to build, deploy and manage an infrastructure, allowing it to become as testable and repeatable as code. Representatives at the Chef booth said that speed and quality is a focus for the company: Developers gain quality the faster they go.

Another focus at Chef is "compliance at velocity," which allows enterprises to specify compliance-related requirements in ways that can be automatically tested.

Neptune.io announced its Remediation-as-a-Service offering for DevOps teams, which will allow engineers to automate their incident response actions and runbooks when receiving alerts from their monitoring and alerting tools.

Neptune released its resiliency system, which lets users recover their systems automatically while collecting logs, graphs and diagnostics. This allows development teams to figure out issues instead of doing a temporary fix.

Neptune has built auto-remediation tools for companies like Amazon, which manage many servers. And now Neptune is making a tool available for everyone with ready-to-use integrations with popular monitoring tools like Datadog, Nagios, New Relic, and more. The service can manage both cloud and on-premise servers.

Helping customers engage with a business' software is the goal behind software analytics company **New Relic's** platform. The company's SaaS-based solution collects data wherever it lives. Simply put, it can take the data and figure out the blind spots, resulting in a better user experience, improved performance and insight to the production environment.

In October, the company announced a new set of features across the New Relic Software Analytics Cloud that allow for monitoring development, predeployment, and production application health and performance on Amazon Elastic Compute Cloud.

Nouvola was at Velocity to demonstrate how it can solve performance-testing issues with its predictive performance analytics engine, DiveData. It focuses on speed and responsiveness.

According to Nouvola reps, their platform eliminates the "heavy lifting" for developers by allowing them to create, run and check results of an application. Nouvola is built to proactively measure the responsiveness of an application, and recent updates include DiveData, a Jenkins plug-in, and API testing support.

Opsmatic is a provider of real-time change visiblity of the live state of computing infrastructure, and it sends alerts to users before problems begin. Opsmatic can detect when files change, which is helpful for a developer who might have hundreds of libraries and is constantly building new versions of an app.

Opsmatic was involved from the start of the DevOps movement, and its team believes in communication as a way that DevOps can be successful. Chris Haupt, who works in development at Opsmatic, said that when developers and operations can work together, they're faster and produce higher-quality software.

Sauce Labs gave a demonstration to show coders and developers how its platform can run all of their tests in the cloud on its single platform. With Sauce Labs, developers can use automated cross-browser testing, which can speed up test cycles without managing infrastructure. Its platform also offers automated mobile testing, which allows developers to determine where mobile apps are failing on actual Android and iOS devices. There is the option to manually test apps across more than 500 browsers and OS combinations.

The platform allows for collaboration between developers and coders, and there is an option to share with team members and in the cloud in real time.

The big question of performance is, "How is it impacting my business?" Kevin Sickles, sales executive at **SOASTA**, said that in order for him to get senior managers to understand that question, he just has to show them. With SOASTA, businesses can see how performance and user experience are directly affecting their revenue.

SOASTA recently launched the Consumer Performance Index, which will help developers and operations teams (as well as business owners) get a better understanding of user engagement and conversion. At the conference, Buddy Brewer, who leads strategic initiatives for SOASTA mPulse (a user-measurement tool), gave a talk about increasing performance and speed. ▮

Photos courtesy of O'Reilly Conferences

Third-party tools at Velocity focused mainly on increasing development speed.

Microsoft covers containers, IoT in newest product release

BY ADAM LOBELIA

Microsoft announced several new products that cover containers, security and Internet of Things. Those products will be applicable to Microsoft's Azure product line.

"We live in a connected world, and the intelligent cloud is powering it all," said Scott Guthrie, executive vice president of Microsoft's Cloud and Enterprise Division. "As data and devices continue to proliferate, there is vast opportunity for businesses to tap into their data to make their applications more intelligent."

Chief among the announcements was the availability of Azure IoT Suite. According to Takeshi Numoto, Microsoft's corporate vice president the Cloud and Enterprise Division, "There are a vast number of companies who can realize the benefits of IoT, but may have encountered roadblocks to deployment in the past, including struggling with the resources needed to deal with millions of devices with real-time data streams, the time to move from 'proof of concept' to 'production ready,' and managing the complexity of implementation."

As such, the Microsoft Azure IoT Suite, he said, uses interactive dashboards and visualizations. It also is part of a program called Microsoft Azure Certified for IoT, which includes devices from Intel and Raspberry Pi, among other companies.

Microsoft also launched Azure Container Service. According to Jason Zander, corporate vice president of the Azure team at Microsoft, Azure Container Service is "an open-source container scheduling and orchestration service which builds on our partnerships with both Docker and Mesosphere, as well as our contributions to open source projects in this space."

Additionally, Microsoft announced a new security service called Azure Security Center, as well as a new collection of Azure VMs called N-Series Azure Virtual Machines. ▮

Google Glass joins fight to treat autism disorders

BY CHRISTINA MULLIGAN

A group of researchers from Stanford University have found a new use for Google's wearable device. They are using it as a behavioral aid for individuals with autism spectrum disorders.

Individuals on the spectrum often have a hard time recognizing emotions or reading social cues, and the researchers believe the Google Glass can help them interpret that social information.

"We believe that the wearable device's ability to provide continuous behavioral therapy outside of clinical settings will enable dramatically faster gains in social acuity for children with autism and bring quantitative progress measures like eye contact to today's behavioral intervention programs," said Catalin Voss, founder of the Autism Glass Project at Stanford University.

According to him, current behavioral therapy methods for getting an individual on the autism spectrum to recognize social cues have been flashcard therapy, which involves memorizing facial expressions, while the project aims for individuals to learn them in real time.

"As a result, many children with autism fail to build core social skills and can quickly regress down a path of isolation that worsens their symptoms," Voss added.

The Autism Glass Project uses machine learning and artificial intelligence to provide facial expression recognition, and also records eye contact for an additional behavioral intervention layer.

Eric Hollander, director of the Compulsive, Impulsive and Autism Spectrum Disorder Program at the Albert Einstein College of Medicine in the Bronx, New York, believed approaches like this can help, but he worries about the potential downsides of using technology.

"You want to make sure you are not taking vulnerable populations and then exposing them to highly stimulating activities that would then increase their risks of adopting Internet addiction or Internet gaming kinds of problems," he said.

However, Hollander said, if this is done in a smart way, he believed the technology could be used to identify biomarkers, which could then be used to track the progress of the treatment, and to facilitate kinds of social cues or social communication.

"I think that there is a lot of work that still needs to be done, but I am completely convinced that Big Data and wearable technology can play an important role in therapeutics of autism," he said.

Voss hoped that the project will help provide scalable behavioral therapy at home, as well as building a social interaction dataset that can be used to get a better understanding of autism as a whole.

While the project utilizes Google Glass, Voss said they have plans to support more platforms once they pass the clinical evaluation stage. ▮

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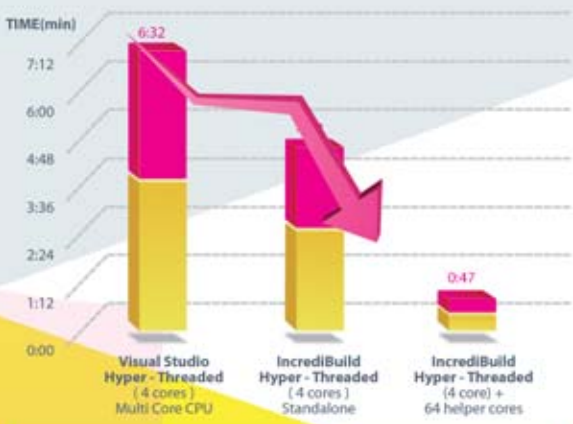


Chrome Compilation with Visual Studio

Code for America takes on civic problems, solutions

Organization wants to help governments use software for the people

BY ALEX HANDY

When Code for America met at its annual Code for America Summit, it took on how best to work with government organizations, how to propose solutions for civic problems, and perhaps most importantly, how to fix civic software procurement.

Have you ever seen a government software contract? They take years to obtain, months to sign, and weeks to understand. The software they typically cover is almost always ancient, poorly supported, and takes additional years to implement. Code for America, while ostensibly about developers programming to help government, is tackling this problem as well.

Founded in 2009, this non-partisan, non-profit organization has been encouraging coders to help their civic institutions through hackathons and the formation of "programmer brigades." These brigades are often tasked with solving problems for the cities they work in.

One example was a team that helped in New Orleans after Hurricane Katrina. New Orleans was packed with potentially abandoned and ruined homes. It took the city weeks of hand-searching to determine the status of any given home.

The city contacted a government software firm and got a bid back for a system to automate status lookups: three years and millions of dollars. The New Orleans brigade of Code for America took up the charge and built a working application in months, for free.

But that's what happens when the stakeholders in a city are able to solve its problems with their own blood, sweat and tears, rather than relying on a large contracting firm to handle it.

Not a typical software non-profit

It was 11 years ago when I first interviewed Nicole Neditch for Oakland Magazine. At the time, she and friend Jen Loy had opened a coffee shop called Mama Buzz on Oakland's Telegraph Avenue. Their stretch of the avenue was coated in abandoned buildings, a supermarket, and liquor stores. Within the year, Loy and Neditch had built their coffee shop into a hipster island, and they'd begun a First Friday art crawl known as the Oakland Art Murmur.

Photo by Drew Bird

Oakland Mayor Libby Schaaf addresses the crowds at Code for America, asking that they help spread access to technology into communities.

Fast-forward 10 years, and the work of Loy and Neditch has single-handedly transformed Uptown Oakland. With pioneering bar owner Peter Van Kleef (who will be honored with a statue) working the other end of Telegraph, Uptown Oakland is now a destination for bars, high-class restaurants, and shows. Grace Jones played the Fox Theater this year, and The New York Times declared Oakland No. 2 in its top cities to visit in 2012.

For a time, Neditch worked for the City of Oakland, helping it deal with artists and the burgeoning Art Murmur, now so large it closes off the Telegraph Avenue entirely. But Neditch is no longer working for just Oakland.

As senior director of government practices at Code for America, Neditch now puts her expertise in building communities to use for the entire country. Working with coders is certainly different from working with artists. But Neditch has already figured out where the pain points are for cities when it comes to dealing with software.

"A lot of the practices that are coming out of the work are based around how you evaluate technology," said Neditch. "That knowledge has to be embedded in government. One of the big things we push—and we're excited about and we're starting to see more and more—is more people who really understand technology going in and working with government. I think Oakland is looking for a new CIO: Someone who has forward-thinking digital leadership skills. It takes having those types of people in government to evaluate a system.

"Governments, when they are evaluating technology, they have to evaluate it in a way that works for everyone. A lot of times—and we saw a lot of examples of this in the Summit—the default has been, 'Let's produce things on paper, then let's convert it to digital, or not convert it at all.' I think we're starting to see more and more governments shift to thinking about the digital-first per-

spective. Actually, in this day and age, it is more accessible to make things digital first and then print things when it's necessary."

Neditch said one of the ways to fix the procurement process is to break down the requirements into an iterative process. "If we start to break things up by need, we start to break down that process and start building technology in an iterative way, [and] we can do the work of procuring tech in an iterative way," she said.

Oakland's mayor and keynote speaker for the Summit Libby Schaaf said that she wants to use technology to bridge the digital divide. She coined the term "Techquity" to refer to spreading technology around a community equally.

"Techquity is the idea that we can deliver city services in a way that reaches our most vulnerable populations; that we use technology to drive techquity," she said. "Let's be honest: Government hasn't always served people equally, but now we have tools to make that happen."

Getting started

But how is a Luddite municipality to get started in technology? "On the [Code for America] website, you can find guides on how to start thinking through some of that. What do you need to think about what are you trying to achieve?" said Neditch.

But Code for America also helps to train software developers through its Fellowship programs. Developers, it seems, need to learn how to deal with government, just as government need to learn how to deal with developers.

"One of the things we did with the civic startups is help guide them on how to sell technology to government," said Neditch. "There are some ways to get your software into government. One of those things is that a lot of governments don't have credit cards. It was all setup to protect people's dollars, but that means you have to have a purchase order. A lot of these companies have learned how to navigate those things. We're seeing more and more of these smaller startups being able to actually sell to government. We're starting to see that happen as of this year." ∎

Dell announces $67 billion acquisition of EMC

Buyout expected to complement storage capabilities to compete with HP and Cisco

BY DAVID RUBINSTEIN

After a little bit of speculation, Dell announced it will acquire EMC for US$67 billion—the largest technology buy in history. VMware, a subsidiary of EMC, will remain an independent, publicly traded company. The deal is expected to close in mid-2016, with EMC becoming a wholly owned subsidiary of Dell.

Pivotal, the cloud computing company that is a joint venture of EMC and VMware, also will "continue to operate as is," EMC CEO Joe Tucci said in a conference call. And EMC will continue its partnership with Cisco, he added.

"From my perspective, EMC and Dell had one of the great partnerships in the IT industry from since 2002 to 2008," he said, which reached about $2 billion in end-user storage revenues. "Now the winds of change have once again brought us together, and in fact we see these winds of change forming a tailwind that will help us move forward in creating a new company for a new era in IT that we are entering."

Funding the deal are Dell, owner Michael Dell's MSD Partners investment arm, equity firm Silver Lake, and others. According to Zane Rowe, EMC's CFO, Dell is paying $33.15 per share of EMC, which includes $9.10 per share of "tracking stock" for VMware Inc. The tracking stock, created to help Dell track its ownership interest in VMware, is intended to represent 65% EMC's economic interest in the 81% of VMware stock it owns. Dell will retain a 28% economic interest in VMware.

"Having known and worked with Michael [Dell] for many years, I'm confident this is the best outcome for Dell, EMC and VMware," said Pat Gelsinger, CEO of VMware. "It is Michael's intention to be a larger, longer-tern owner of VMware over time; he intends to repurchase more economic interest in the company."

Industry experts, though, believe it is likely that Dell will have to sell off a lot of its interest in VMware to fund the deal. "Michael has a lot of money, but not that much," said Glenn O'Donnell of Forrester Research. Dell, though, has stated it wants to maintain control over VMware, so its future now is ambiguous, he noted.

The deal, O'Donnell said, gives Dell "a beautiful cash flow with EMC's core [storage] business. We get hung up on what's new and sexy, but there's an awful lot still going on in the datacenter. Dell's getting revenue and cash flow from that."

Daniel Ives, of investment analysis firm FBR, wrote, "We believe Dell selling a piece of the VMware ownership position down to 60% to 70% is likely as it could help fund the massive price tag. While Dell obtaining the potential $30 billion to $40 billion in debt financing is still a question mark for the Street, we believe Dell would look to sell off some of the non-core units to get cash as well as sharpen the focus at the combined tech behemoth.

"We would also expect Dell to sell off the RSA unit and possibly the joint Pivotal initiative over time as the core storage and cloud capabilities from EMC and VMware remain the underlying attractiveness of this deal, in our opinion, with many of the non-core units expected to be sold," he continued. "Tech investors across the Street are watching this situation extremely closely given the wide-reaching ramifications an EMC/Dell deal will have across the tech landscape for years to come." ∎

Cigital's BSIMM6 finds software security lagging

Survey now includes healthcare services, which need to catch up to other industries

BY MADISON MOORE

With 29x more data than its first model, Cigital has released its most recent findings of its Building Security in Maturity Model (BSIMM), declaring that software security is lagging.

Cigital is an application security firm that studies industries to see what their organizations do for software security. The firm announced that it has added healthcare companies to its analysis, joining financial services, independent software vendors, and electronics.

Gary McGraw, CTO of Cigital, said that the company started 20 years ago to study firms that are doing software security, and then describe what efforts they are taking so that their peers can see what they are doing right. He said BSIMM is based on observation, and it serves as a "measuring stick" for software security.

"Over the past 20 years, we have seen software security grow," said McGraw. "The industry is focused on getting developers to do the right thing when they are designing and implementing software."

Adding the healthcare industry will bolster the BSIMM dataset and get the industry to "buckle down and work on doing software security right," said McGraw.

Some of the main risks for healthcare firms include data breaches and hackable medical devices. "It's not just protecting important data, but in some cases, preserving life in a secure fashion," said McGraw.

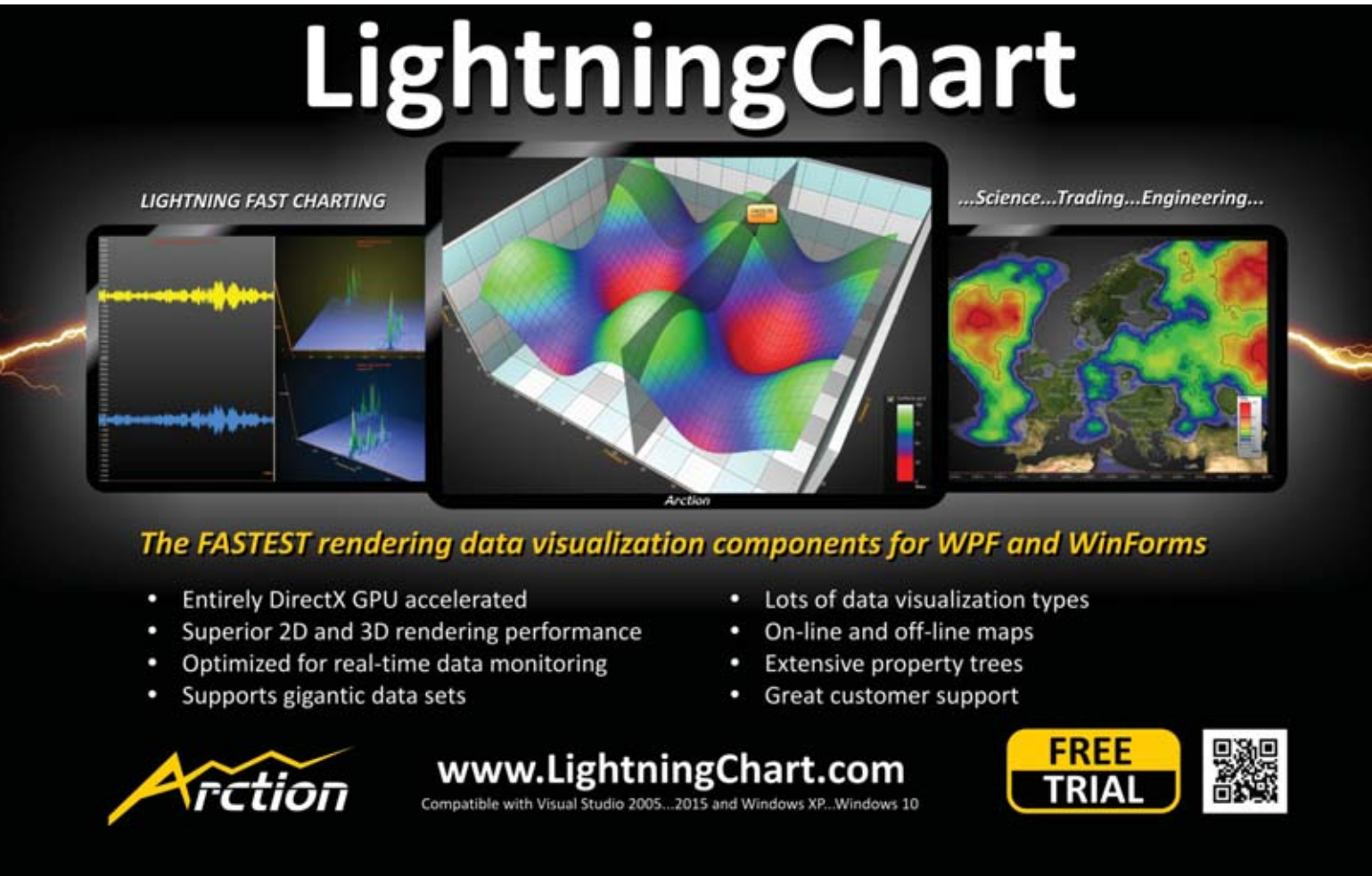
BSIMM indicated that healthcare organizations are lacking in software security practices, falling behind software vendors and financial services. For organizations looking to address the issues, BSIMM provides objective measurements of an organization's software security initiatives and where they fall within their industry.

Besides adding healthcare to its verticals, Cigital's BSIMM6 model was slightly adjusted, but its data pile is continuing to grow, which is what will help firms become secure.

With BSIMM6, Cigital now covers 78 firms. Some of these companies include Adobe, Aetna, Cisco, EMC, JPMorgan Chase, LinkedIn, Nokia, PayPal, TomTom, Vanguard, VMware and Zephyr Health.

Cigital's hope for the future is to scale to all developers and use BSIMM6 to find out what people are doing for software security. One of its main challenges is getting software developers to learn and take advantage of the data—something McGraw hoped will change with developers using the model.

"The good news is we know what to do; we just need to do it," he said. ■



Taking agile where it hasn't gone before

Tool providers offer benefits to business beyond development

BY ALEX HANDY

Software developers have had a long-standing love affair with agile methodologies. Now, it seems that the rest of the business world is starting to realize that agile provides not only a better way to work, but also an easier path to collaborative business development.

Atlassian's JIRA issue-tracking system recently split into two new versions: one targeted at help desks, the other at generic usage. That leaves developers with their own targeted version, including all the bells and whistles for dealing with enterprise software development.

But why make a software development tool available for other departments? Is this what the market is demanding?

HapnApp's Richard Everts demolishes an iPad, one of several unusual presentations at the Space Camp conference.

According to Atlassian's president Jay Simons, "Part of the key to JIRA's success is that it's a product that is desired by technical people because it's accessible to non-software people. As people are exposed to it, they understand the virtues and want the capabilities on other projects."

GitHub too sees usage of its services by non-software developers for non-software purposes. Sam Lambert, director of systems at GitHub, said that GitHub leads the way internally by using its service for typical business work.

"People are applying our workflow to other areas," he said. "We do Continuous Integration on blog posts that checks for grammar, images, text, and runs Continuous Integrations against it. That's a workflow, applied backward to writing. We're seeing more and more industries [using it]."

GitHub is currently used, for example, by museums so they can keep copies of their assets online for use by developers who might want to visualize or otherwise process that information.

Video-pushing limits

One area where workflows are changing is in marketing. At Space Camp, a recent conference in San Francisco focused on video marketing, the presentations were filled with stories of marketers building workflows online with ever-evolving storage of cloud-hosted content.

As one would expect from a conference focused on video, there were flashy presentations; HapnApp's CEO Richard Everts smashed an iPad on-stage with a sledgehammer, for example. The event's keynote speaker was Canadian astronaut Chris Hadfield, and members of the Vidyard management team wandered around in space suits.

Rob Bois, director of product marketing at Plex Systems, spoke of building and spreading videos about his company's manufacturing automation systems. Plex is currently pushing into the Internet of Things with a cloud-hosted manufacturing ERP system.

Despite being a marketing director, Bois' talk sounded suspiciously like a software development talk, particularly when he discussed analytics and metrics. He sounded like a development manager saddled with making sense of an enterprise-wide software landscape.

"We had this real data problem," said Bois. "Our videos were in lots of different places. We were trying to track things in Google Analytics. We were trying to share them with salespeople on Dropbox. It was a significant challenge.

"Even if I could get these metrics, they're not answering those important questions: Who's watching our videos? Are videos influencing our funnels? When you're spending US$30,000 to $50,000 on a video and you can't point to ROI on that...that's not a conversation I want to have with my CFO."

Bois said that, as his video strategies were implemented, he kept the number of people involved small, as everyone has opinions on video—not unlike software UI. He added that he did not bring IT in on his projects initially either.

Tools expanding

Back at GitHub, even the lawyers are using Git to manage the development of their contracts. This sort of home-grown usage is typical at GitHub.

Atlassian, on the other hand, has been slowly building a body of third-party tools that can expand JIRA to take care of things like contracts.

"I think we've already got a really strong toehold for people looking to take JIRA even further," said Simons. "There's an opportunity for the ecosystem to build on top of these three offerings. In the same way one of the key add-ons for JIRA is contracting. That's a good example: We don't need to build because our ecosystem builds it. With JIRA Service and JIRA Core, there's a long tail of opportunity for third parties to build things on top of JIRA." ▮

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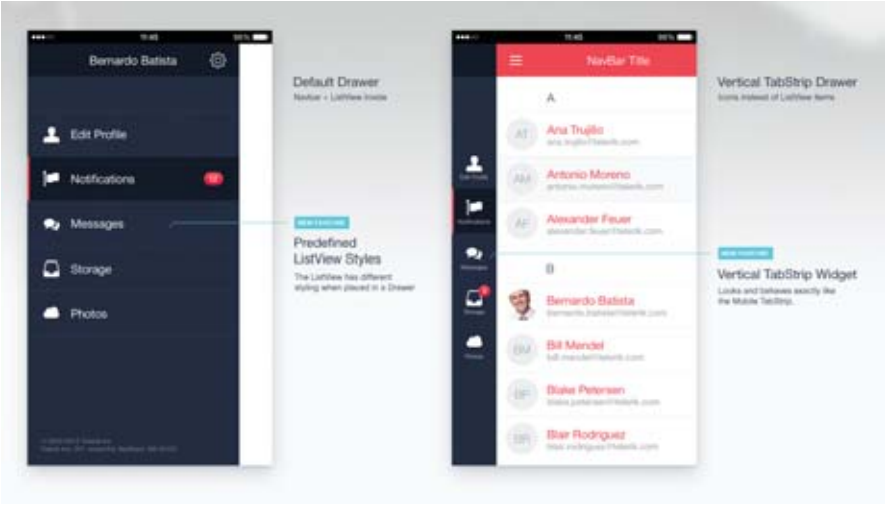

Kendo UI's new NOVA theme allows developers to build next-generation UIs that provide a unified experience for all devices.

Kendo UI supports AngularJS 2.0 framework in its latest release

BY CHRISTINA MULLIGAN

Progress is celebrating the four-year anniversary of the Telerik Kendo UI suite with a new release. The HTML5/JavaScript framework includes support for new frameworks and Web standards necessary to build modern and rich applications.

"When we first introduced the Telerik Kendo UI suite to the world four years ago, we began with a simple goal: to provide everything developers need to build modern, rich sites and apps with HTML5 and JavaScript," said Marina Hristova, vice president of product marketing and management for Telerik DevTools at Progress. "Since then, the Telerik Kendo UI suite has become one of the fastest-growing products in our company's history, and the single most popular and successful UI library.

"With this release, we continue to embrace new Web technologies and frameworks to ensure the Telerik Kendo UI suite remains the best professional JavaScript UI library, delivering best-of-breed UIs for business app development today and tomorrow."

The latest release includes support for the popular open-source JavaScript framework AngularJS 2.0, as well as the Web Components set of standards. Together, developers can build next-generation user interfaces for any modern website, according to the company.

In addition, the company announced a new spreadsheet widget designed to give developers the ability to organize and manage their data. The widget features similar Excel functions such as formulas, sorting, filtering, and frozen panes; and it provides import and export capabilities that allow users to load and save offline data.

Other new features include a new nova theme, as well as ready-to-use project templates that aim to cut development times with pre-configured common scenarios. ▮

In other component news...

■ File format solution provider **Aspose** has a new plug-in for developers to read, create, manipulate, compress and convert PDFs. The company recently announced Aspose.Pdf for Java, an IntelliJ IDEA plug-in that allows developers to work with PDF documents without using Adobe Acrobat. The plug-in features two wizards to help developers work with the Aspose.Pdf for Java API. The Aspose.Pdf Maven Project wizard allows developers to create Maven projects. The Aspose.Pdf Example wizard allows developers to import and copy latest downloaded example source codes.

■ **Infragistics** has announced the release of Infragistics Ultimate 15.2 with improvements to its mobile, desktop and WebUI tools. The latest release features updated jQuery/HTML5 components, a new WPF Busy Indicator, an enhanced Data Chart, improved Android controls, and a cloud-based prototype collaboration service. In addition, the company announced all Infragistics Professional and Ultimate customers will receive a desktop version of the company's BI and Dashboarding tool ReportPlus.

■ PDF document-management solution provider **Soft Xpansion** is adding new and extended features to its PDF Xpansion SDK. The company just announced version 11 of the SDK with Windows 10 and Universal Windows Platform support. Other features include a new XMP programming interface, and extended capabilities to the ZUGFeRD API.

■ **Syncfusion** has announced the release of Essential Studio 2015 Volume 3 with enhancements to its Web, desktop and mobile offerings. The release introduces a new spreadsheet control for Web developers, a 3D surface chart for desktop developers, and a visual theme composer for Web and desktop developers. In addition, Volume 3 improves the company's Universal Windows Platform suite with a PDF viewer, data grid control and ribbon control. ▮


THE
(nettleSome)
INTERNET OF
THINGS
07:30
AWAY

It's an appealing concept, but having everything connected to the Internet means headaches for now

BY ALEX HANDY

The Internet of Things is all around us, and every day we're soaking it in. It is giving the Internet senses for the first time, which will drive us to the future of business technology.

Sensors are a huge part of the Internet of Things—and soon a big part of the Internet as a whole. According to McKinsey & Company, the Internet of Things will make a US$4 trillion to $11 trillion impact in the world's economy by 2025. As much as $3.7 trillion of that will come from the manufacturing sector, according to McKinsey.

But what does that mean for your average run-of-the-mill business application? For data processing? And perhaps most importantly, for security?

From the developer's perspective, the Internet of Things might well appear as a nebulous blob of a million SDKs all layered on top of one another and manifesting in droplets of code everywhere.

For the manager, it can mean lots of little projects and orphaned items running around in the corners, as single items enter the market, become obsolete, and are replaced.

And for the business analyst, it means more data, better business intelligence, and, possibly, a promotion.

Finally, however, for the frontline systems administrator, the Internet of the Things looks more like the Internet of Nightmares.

The elephant in the room

From a security perspective, the Internet of Things offers snooping noses plenty of Things to sniff. Imagine if every server on your network was also attached to a camera, heat sensor, or worse yet, a big fat kill switch?

Cameras alone are a known problem, as cheap, Web-accessible devices float into the market, are installed by novice users, and then are abandoned by their original manufacturers. Technical skill is not even needed to access such devices, with Google offering a tantalizingly easy way to search for open Web servers of specific breeds.

Sean Lorenz, director of IoT market strategy at LogMeIn, said that a lot of devices in the marketplace are not secure to begin with. (He oversees Xively, LogMeIn's IoT solution.)

"A lot of these products are going to market in the past year or two, and they just are not ready to be out in the wild," he said. "A lot of that is because they apply same principles of Web applications for IoT, and that's just not going to work."

Kevin Surace, CEO of Appvance, said that security is tough in an IoT environment. "You don't want that data to get in the wrong hands, or to execute against your service in the wrong way. The security [standard] is higher than for a website. The overall service has to not be taken over, the data can't be stolen, and people can't create mischief with these things. We're not making IoT toasters, but if someone did, you can imagine what'd happen. These are really serious issues from a technology perspective," he said.

"Any enterprise trying to get connected is going to have to do it in a couple ways," said Lorenz. "They need a

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really good library, they need the circuit board itself, and they need a good messaging bus; MQTT is what we use. We've gotten it to scale now to millions of devices and connections in a day, and really the next step of that is not just making sure we do it out of the box, but that it's encrypted and secure."

The heart of the security problem in IoT, however, is the same problem for a lot of networks, said Lorenz. "Identity is at the very core of the problem of security in IoT. Everything is based around who is using your product. There's a massive many-to-many problem. It's not just one app to one light bulb. It's mom, dad and grandma need access when they comes to visit. It's the housekeeper, the person coming to repair the house, and the reseller's third-party apps that want access to the data. There are a lot of different identities, and it gets really complex really fast. That's where I think solving those issues around growth are around authentication and ID access management," he said.

Tony Rems, CTO of Appvance, said that the way the space is evolving now, many IoT devices are already in a position to be quite invasive of the user's privacy if their security is compromised. "When you look at how this space is likely to evolve, devices like Amazon Echo or Nest—devices in the home—they're not technically IoT, but they're a preview of what IoT can do," he said.

"Think about the fact that Nest knows about your movements. Look at Xbox Kinect: It knows where people are sitting and how they're interacting. Echo could be listening to everything you say and capture that data. What happens when someone is able to hack into that network and listen in on homes around the world? What happens if someone hacks into your fridge?

"Ultimately, there's been a change in the way we think about how we develop applications. When Internet apps became the norm, we never got to a place where there was a standard around requiring that rigor of testing and security before they got deployed. You're seeing the outcome of that now, with all the hacks that have happened."

Developmental problems

The Internet of Things means dollar signs for product and marketing departments. There are, in theory, billions of new devices in demand in the marketplace, many of which have yet to be invented!

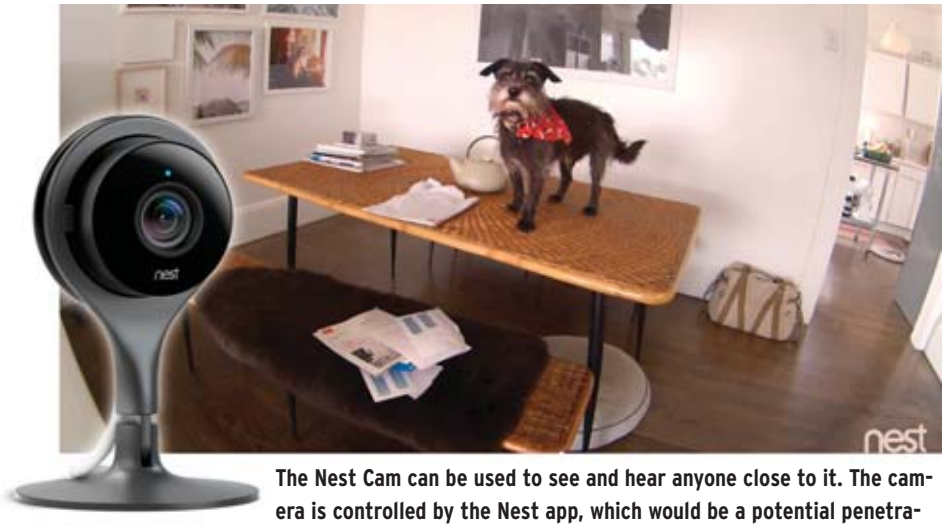
Teams working on those devices, however, have many problems to work out. Managing and analyzing all the data these devices create is one of those problems, while life-cycle management of thousands of individual devices is another.

One thing many developers may be considering to help with this problem is a commercial IoT platform. Said Lorenz, "The purpose of the IoT platform is to centralize data flow. It's meant to be a harbinger of truth. It's basically saying, 'You're allowed to have access to this...' and basically be Grand Central Station for understanding who can do what with what data.

"Really, I think everyone is going to live in the cloud Web app, but the routing of the data has not been figured out. We just announced our whole new platform with Blueprint, which is something that does that. It is that Grand Central Station for understanding how to model your entire connected business.

"Obviously, the goal of the IoT is 'What do you do with all this data?' As far as market maturity, we're not there. We tried to connect things a couple years ago, but they break [or] get hijacked. When I turn the damn light bulb on, a lot of people complained it took three seconds to turn the light on. If the experience is worse than the Clapper, it's not an experience that will succeed. That's where that middleware helps. But then, where we're starting to mature in the IoT is...how do we handle complex event processing? How do we do stream processing and event triggers to build on the promise of the IoT, not build on one thing, but multiple things?"

Surace suggests that even testing IoT devices can be a major source of difficulty for teams. "You've got functional testing, then you have performance testing off the network. Can the network take all this traffic?" he said.



The Nest Cam can be used to see and hear anyone close to it. The camera is controlled by the Nest app, which would be a potential penetration point for hackers if it were not secure.

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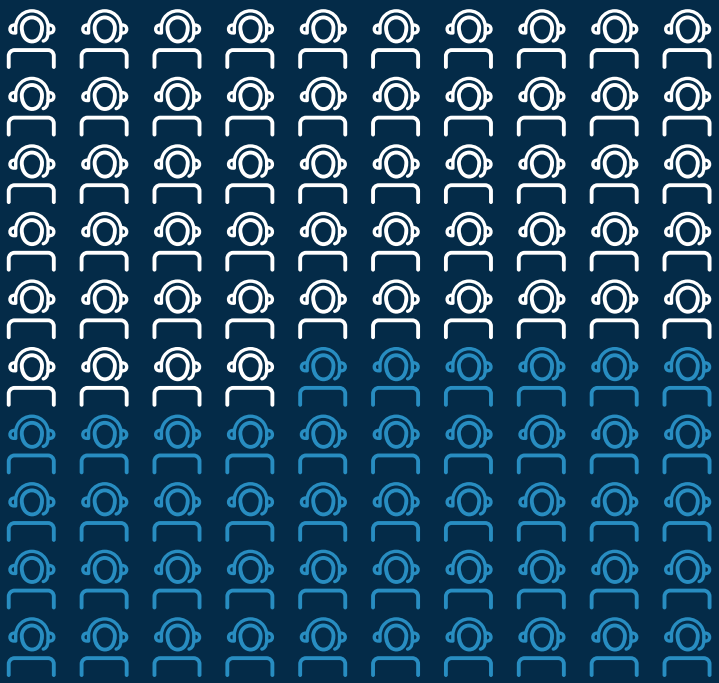

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Standards for the Industrial Internet of Things

BY RICHARD SOLEY

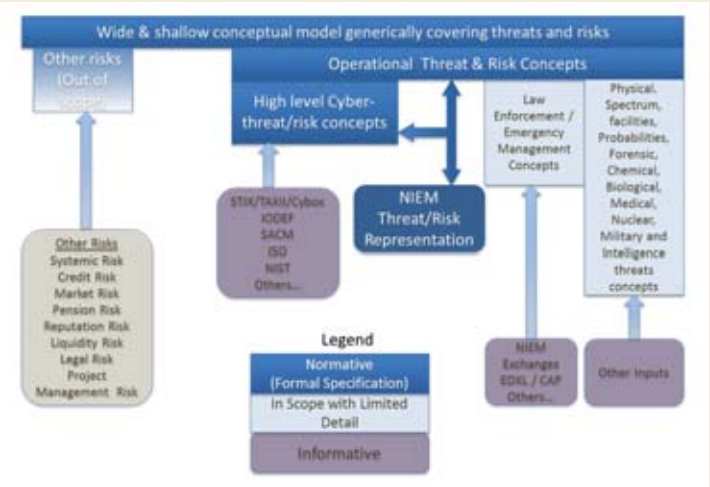
Only 10% of an iceberg is visible above the waterline. The same can be said for software, especially in the age of the Industrial Internet.

With the Industrial Internet of Things (IIoT), machines converge with devices and both converge with intelligent data. The rise of interconnected devices and machines with smart analytics increases the complexity of IIoT software.

Just as a huge block of underwater ice supports the tip of the iceberg, the software beneath the surface of an application supports many layers: data storage, data access, frameworks, business logic and APIs. And each layer requires a different protocol to interact with the other layers.

And as users refuse to buy all of their devices from one manufacturer, the issue of multiple layers and protocols interoperating and communicating with each other can impede the progress of IIoT.

So what can expedite the kind of interoperability that will maximize the potential of IIoT? Standards.



The OMG Systems Assurance Task Force is currently working on a standard for operational threat modeling.

The Object Management Group (OMG) has been active in IIoT standardization efforts stretching back to the early 2000s. More recently, the OMG-managed Industrial Internet Consortium, led by open-source organizations and international research organizations, is leading the way to collaboratively build and manage test beds that enable industrial systems to use IoT technology. These test beds identify new products and services, as well as priorities and requirements for standards that are pushing the technical boundaries of industrial automation.

OMG IIoT standards

The OMG Interaction Flow Modeling Language standard gives designers the ability to express the content, user interaction and control behavior of the front end of applications, including complex systems found in IIoT devices. Despite the hype of self-driving cars, the Dependability Assurance Framework for Safety-Sensitive Consumer Devices standard addresses the need for consumer device manufacturers such as automakers to design safer, more dependable and reliable products.

The OMG Data Distribution Services for Real-Time Systems standard is a protocol that meets the demanding scalability, performance and quality-of-service requirements of IIoT applications in industrial control, healthcare, aerospace, telecommunications, defense, energy, smart cities, and transportation, among others. The high complexity of IIoT applications leaves software susceptible to security and software quality failure. Three recently adopted quality standards detect if application software is structurally vulnerable to security breaches, system outages, and defects that drive up maintenance costs. One of the main concerns of IIoT centers on securing devices connecting with and having access to information from other devices. With this in mind, the OMG Systems Assurance Task Force is working on a standard for threat modeling so that system engineers and architects can build systems-of-systems that implement and leverage capabilities to share threats and security attacks across multiple devices, IT systems, and other standards.

Devices and networking capabilities that make up the IoT are manufactured by thousands of companies—all with varying criteria on safety, integrity, reliability, privacy, and security properties and behaviors. And with new IoT devices entering the marketplace, manufacturers need to prove that their offerings are secure, safe, resilient and trustable to avoid product recalls, integration disasters, or media fallout. The Assurance Case Metamodel standard streamlines the complexity of IIoT systems with clear and well-defined claims about a system's or service's attributes, so that IIoT end users know they are making good investments in their IIoT platforms, products and services.

The efforts outlined above aren't the only standards that OMG has identified as being important for IIoT. The organization has released a whitepaper, "Standards for Things: OMG Standards in the Age of the Industrial Internet of Things," which outlines all of its IIoT-related standards. In addition, OMG created a "Hot Topics" page on its webpage, creating a resource hub for its IIoT documents, case studies, and news.

As the IIoT continues to transform (and in some ways disrupt) transportation, financial management, medical devices and other industries, the Industrial Internet Consortium and OMG will continue to support its immense potential for innovation with test beds that are delivering the next generation of IIoT standards. ▮

Richard Soley is chairman and CEO of OMG. In 2014, he helped found the Industrial Internet Consortium.

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"One of the biggest areas of IoT that we see is building sensors. You look at lighting sensors, CO2 sensors, etc. You could easily have billions of sensors in a handful of years, across commercial buildings in the U.S. alone. A single service might have to service millions of requests every two minutes. You have to have it not reject those requests. There has to be a protocol for handling requests that come in malformed. Then there has to be security around those.

"All those have to be thought about. Most the people we know that are doing IoT devices today have given almost lackluster thought to testing. They test the device and their cloud service works, so it [must] be good. It's true as you roll out 50, or 100, or 1,000 requests, but when you get to millions, you have not simulated it. What happens when you have bad communication? What happens when devices go out of service? How do you know? How can you know if it's giving you false data? What if it keeps turning up the heat? That's a serious issue."

Standardizing the Things

A number of platforms and tools have arrived to help calm the rough waters around the Internet of Things. IBM's Bluemix offers a platform solution for managing and developing large numbers of items. Other platforms, such as ThingWorx, ThingFabric, and LogMeIn's Xively offer one place to rule all the Things.

But Hortonworks and Neustar are taking a different approach. They're working to establish some standards in the IoT and processing spaces, so that future work will be less convoluted and more in sync with other developers.

Hank Skorny is Neustar's new senior vice president of Internet of Things. He recently joined the company after having worked at Intel for many years.

"One of the things I saw while I was at Intel in our proof of concept deployments was that there was no standardization of ways to address the IoT world, and if you look at any platform, to take off, there are three things it needs to do: have a standard way of interacting, have a standard way of exchanging data, and a standard way of apps to interact," said Skorny.

He said of the standards effort he's working with: "How do we—in a universal plug-and-play manner—discover new devices coming onto the network? How do we discover them, test them, authenticate them, establish an ID around them and wrap a policy around how we communicate with them? Once you do that, then you can start to learn the best ways to talk to them and to acquire data in the most efficient manner and then keep it all secure along the way."

Joe Witt, senior director of engineering at Hortonworks, said that building a standard for the Internet of Things is not something that can happen overnight or in a vacuum.

He said of the standards building process, "In the very beginning, when you're talking about the data, one thing you have to do is understand there's going to be diversity. You have to have platforms that can deal with that. From the very beginning, Hadoop is a system that was designed to accept many data formats and data structures. As far as what we see being standardized, there are not a lot of winners there. But based on Neustar being able to do device cataloging and management of that, that's how we're going to see convergence to a standard that makes sense."

Witt recently joined Hortonworks through its acquisition of Onyara. He and the team at Onyara were the originators of the Apache NiFi project, which allows developers to build data process workflows through simple drag-and-drop models.

NiFi was originally created for the NSA to allow it to process huge amounts of incoming data in a manner that didn't require a data analyst to build the flow. It has the potential to be a game-changer for Internet of Things data processing, said Witt.

For the future of NiFi, however, the work is starting to focus on making the software ready for larger-scale deployments. "Over the next seven months, the focus is on multi-tenancy and expanding what we can do with the data provenance we're capturing. It's going to play very nicely with the vision Neustar has not only for driving standards but driving uptake," said Witt.

He also said the NiFi project will be taking on real-time data processing. "Today, when people talk about real time, really what they're focused on is how quickly they can get data from wherever it's produced at the edge of the architecture back to the core. Real time largely means how quickly they get access to the data. But the exciting part is how fast you can turn it into an actionable insight. NiFi and Hadoop [are] shifting to focus on real-time behavior changing. Being able to take the results and immediately affect how the processing systems all behave, which in turn is going to play really nicely with how data from devices is produced and processed."

So it's still early days for the Internet of Things. Rest assured, any Thing you release today will be built on obsolete software within a year or two. Perhaps when the standards start to emerge, however, Things will become a little less confusing and proprietary. That can only be a good Thing. ▮

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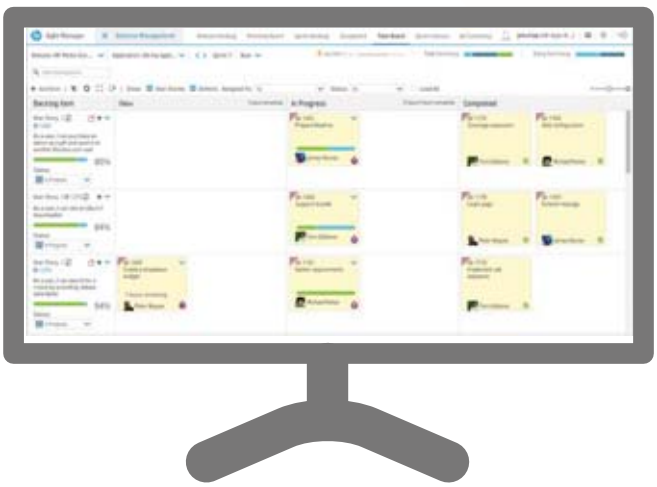

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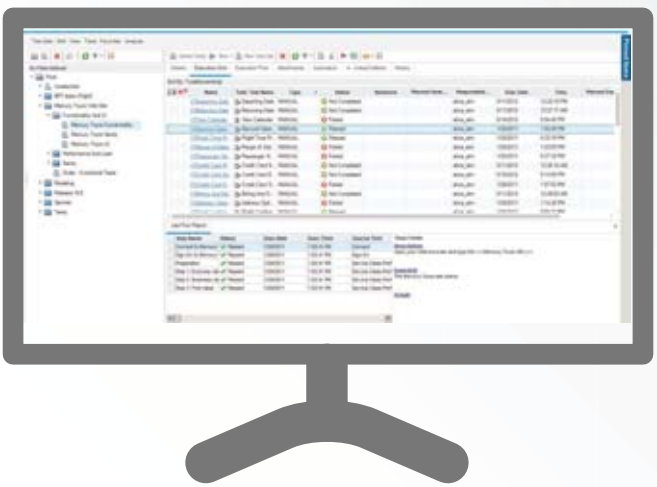

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Getting all hands on deck with agile

Organizations hash out what works and what doesn't to leverage practices in all areas

BY CHRISTINA MULLIGAN

In any given industry, the world moves quickly, and organizations need to be able to respond to changes at any given moment. To do so, businesses are reaching into their software departments and applying an approach that has been proven to work: agile. Agile has demonstrated itself at the team level, but organizations are looking to take the benefits you get from agile teams and expand them to the enterprise.

"By and large people have a handle on team-level agile," said Lee Cunningham, director of enterprise agile at VersionOne. "The next frontier is really how do we take what works really well at the team level in terms of quality, in terms of throughput, in terms of the morale of the people; how do we get that in and have that permeate our entire enterprise?"

Organizations who have implemented agile at the team level have experienced improved time to market, more predictability in costs and timelines, better ability to engage users, and high retentions of developers, and now they want to see those benefits work

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for the entire business, according to Andrey Akselrod, cofounder and CTO of Smartling. "Speed and quality of product development is a significant competitive advantage. Enterprises can no longer avoid being agile if they want to survive very competitive markets and very tech-savvy competitors," he said.

According to Cunningham, although departments such as HR, finance, marketing and sales may not have the same work as the software development department, agile can still help with their daily workflows. "They are really dealing with the same things that your software organization is dealing with," he said.

"They have more work than they can possibly do in the time they are given, things are changing, and the things that they are being asked to do are often ambiguous. They need to have some systematic way to think about their work."

But scaling agile beyond the team level is a lot harder than it is implementing it into one department. According to Christine Hudson, solutions manager at Rally (a CA Technologies company), it needs everyone in the entire organization to be involved and on board, and requires a lot of time, money and resources. Organizations may shy away from the approach because of the complexity, but Hudson believes the benefits are worth the risks.

"The benefits of agile at scale are beyond exceptional, and the costs of standing still greatly outweigh the costs of adoption," she said.

Are you ready to scale agile?

If you want to scale agile, you have to have agile to scale in the first place, according to VersionOne's Cunningham. He believes it is essential for an organization to have success at the team level before it can move beyond that.

"An organization has to first understand how agile works on a small scale, because the way I look at scaling agile is really taking those principles, those things that work at the team level, and just figuring out how to make them work on a larger scale," he said.

In addition, since enterprise-level agile requires participation from everyone in the organization, everyone needs to embrace it, and achieving that executive support and participation is required. Executive support will help solidify that movement to agile is the right move, according to Cunningham.

"It is not only about an understanding of the agile principles and mechanics, but also the extent to which there is a demonstrative willingness to embrace it and to undergo the necessary organizational change," he said. "Those two things are really good at indicating the extent the organization is not only ready to embark on something, but also [are] a leading indicator on how successful they might be."

Another good way to measure how the company's current business strategy is performing can simply be by answering these questions: "How does work flow to your teams? How far into the future do you plan? Do you include people from outside IT or engineering in your planning? What happens if the world changes after you plan?" said Rally's Hudson. "And finally, you should ask yourself if you can afford not to adopt agile practices across your organization. Are your current methods for working keeping up with the rate of change and disruption influencing you?"

The answers to these questions can help gauge where the company is at right now, but perhaps one of the most important question an organization should ask themselves is "Do you want to keep your business alive in the 21st century? If so, then you're ready for agile," Hudson added.

Although Larry Maccherone, director of analytics and research for AgileCraft, argues that an organization is never really ready. "You'll likely never be as ready as you wish you were," he said. "The best course is to decide that you are going to do it, and then essentially do what you need to do to get ready."

Maccherone adds that more and more organizations are seeing success with "big bang" agile transformations. A big bang agile approach consists of taking a leap and rolling out the deployment all at once, rather than the recommended small start into scaling.

"You would likely need expert help to take this approach, but it does offer the quickest path to reaping the benefits of scaled agile," he said.

Prerequisites for agile

While Maccherone doesn't think organizations will ever be completely prepared to scale agile, there are some basic principles and practices that can make the transition smoother.

According to Maccherone, there is a critical stepping stone organizations should use. "The first critical step is to orient around the product or service that you provide rather than the activities that the various workers perform," he said. To achieve this, organizations should change their periodic planning activities, and eliminate organization obstacles to product or service orientation, according to Maccherone.

"If the testers, analysts, UX and Ops folks all think of themselves as working for their functional manager rather

Top reasons agile transformations fail

Every organization will have their own unique failures and success, but according to Larry Maccherone, director of analytics and research for AgileCraft, there are seven recurring themes in agile failures. They include:

1. Lack of executive commitment
2. Overly expensive or ineffective planning, alignment and steering activities
3. Inability to get a real-time single source of truth for resource management, value planning and progress reporting
4. Organizational structure obstacles to orienting around the product or service you provide rather than the activities of the users
5. Mid-level and functional managers failing to let go of their prior control and accept a new role
6. Lack of team-level agility
7. Failure to plan out and acquire the necessary training and resources to accomplish the transformation

—Christina Mulligan

than on an agile team that is focused on a product initiative, you'll never accomplish that first critical step," he said.

Since agile is based on the idea of collaboration, communication is key and is not something that organizations can overlook when scaling their agile efforts, according to Baruch Sadogursky, developer advocate at JFrog.

"Agile is all about the communication and getting feedback. In order to get rapid feedback, team members and stakeholders need to be able to talk to each other to explain the work, what needs to be done, and what has already been completed," he said.

If communication channels are not in place, then driving the agile message across the organization is going to be problematic, Sadogursky added. "Organizations need to put more efforts to make the communication channels open in order to maintain the flow of information," he said.

Having a disconnected information flow is often the source of failed rollouts at scale, according to Steve Elliott, CEO and founder of AgileCraft. "Without a scaled agile platform in place to provide transparency from top to bottom and side to side—or said another way, without transparency from enterprise to portfolio to program to team—it is almost impossible to see progress and target coaching across the enterprise. It's also difficult to measure the impact of the transformation or the value of the work being done during this phase," he said.

Organizations should also make sure they are open to an agile mindset, according to Rally's Hudson. "You need to be prepared to question the efficacy of your standard operating procedures," she said. "And you need a willingness to inspect, adapt and improve as you go."

Other organizational and development process changes that need to be in place before scaling include moving from a centralized command-and-control system to a decentralized system, according to Smartling's Akselrod. A decentralized system can help teams become more in tune with their product.

"On the development side, processes like Continuous Integration, log monitoring, fully automated testing, and push-button deployment must be in place to make technology teams truly agile," he said.

Finally, organizations need to realize that if they are going to embark on an agile transformation, the transformation will never be completed. According to Hudson, an organization will never be 100% agile because there is always going to be ways they can improve.

"The minute you're complacent is the minute your competitors begin to close the gap," she said. "That said, each iteration of the transformation is finished. You bite off small chunks, implement a step toward the desired change, finish, and evaluate it—then look at the results so you can determine the next right step to implement. The goals of enterprise-scale agile aren't just predictability, performance improvements, quality improvements, and increasing customer happiness; you also

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need to strive to continuously improve."

While the task can never be completed, JFrog's Sadogursky does note that there is a point where organizations can say they are doing it correctly. "Converting or adopting agile is a process. It is not a task that can be completed," he said. "We can definitely get to some point when we say what we are doing is correct, but it is a very long process and includes joining the new organization all the time, and making the communication channels better."

If an organization decides to scale agile, they should expect a constant state of learning and improving from that point on, AgileCraft's Maccherone added. "The entire concept of agile is about trying something out, and then improving based upon feedback from the real world."

Major roadblocks standing in the way

Changing the thinking and workflow of an entire organization is difficult, and requires a lot of time, resources and money. Organizations want all the benefits of scaled agile, but not the costs that comes with it. Those costs are a major obstacle standing in the way of an organization's path toward success, according to Smartling's Akselrod.

"It takes time and money that you have to spend on the toolset, hiring a DevOps team, implementing all the software and practices enabling agile," he said.

Akselrod justifies the costs by believing it is an investment that is worthwhile, and is a matter of spending the money or losing your business. "It really comes down to a very simple equation: Adopt agile or be destroyed by your competition. It is as simple as that," he said.

In order to make the costs worthwhile, organizations need to have expectations set properly, which will help determine their readiness to move forward and guide them in terms of those expectations, according to VersionOne's Cunningham. "The last thing that you want to happen is for a company to make a big investment in coaching, training and tooling, only to become disillusioned a few months down the road."

In addition to investments, organizations need to remember that agile is a culture shift. Concentrating on the tools and process too much, and forgetting about how this is going to impact employees is usually what fails in a transition to agile, according to JFrog's Sadogursky. "When organizations just blindly use the tools that were recommended by some agile book without actually explaining what they are trying to achieve and what are the end goals, that is 100% a recipe for failure," he said. Driving the message about what's really important—and deemphasizing what's less important—will help the employees better understand the path they are on, he added.

"Agility requires a willingness to adapt at enterprise scale, and it takes courage to re-architect a whole business system for speed, steering, and opportunity capture," said Rally's Hudson.

Sadogursky also believes organizations who want to take that big bang approach will fail because it is easier to start small and then scale from there. "A more granular or step-by-step approach is more successful, because when you start with smaller teams, you can actually explain what they are trying to do, [and] you can monitor the process and get feedback," he said.

VersionOne's Cunningham went on to explain that an organization first needs to understand how fast they can absorb change before jumping too quickly into anything. "You are not only transforming the way people think about work, or do their work," he said.

In the end, agile will help an organization be more responsive, more in tune with customers and competitors, and do things much more efficiently with less waste and less defects.

"You may have heard the quote that 'Culture eats strategy for breakfast.' Well, execution eats strategy for breakfast, lunch and dinner." said Maccherone. "Agility means being able to change your strategy to fit your most recent understanding of the market." ▮

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Choosing a methodology

There are many flavors of agile: lean, Kanban, Scrum, and custom-made ones organizations build from their previous methodologies. According to said Lee Cunningham, director of enterprise agile at VersionOne, there is no wrong approach; organizations just have to decide what works best for them.

"Even at the high level of the organization, they may be borrowing some practices from XP, some from Scrum and blending them and kind of putting them together in a method that works well for them," he said.

Agile refers to methodologies built on iterative development. Focuses on collaboration and cross-functional teams.

Kanban aims to provide continuous collaboration, visualization, limited amount of work in progress, and ongoing learning.

Lean focuses on delivering value to customers, eliminating waste, and providing fast delivery cycles, rapid feedback, and continuous learning.

Scrum is a lightweight framework that focuses on short iterations and team collaboration for quickly solving complex problems.

XP, also known as Extreme Programming, is designed for communication, feedback, simplicity, small releases, simple design, pair programming, test-driven development, refactoring, collective code ownership, and sustainable pace.

Cunningham also notes that while organizations will take different approaches, a high-level approach should have more lean workflows and principles in place. "Lean agile is really more than having visibility into the workflow, limiting the work to the actual capacity, and forcing prioritization and decision-making up the line," he said. "It also helps the enterprise as a whole have a really better feel on where they need to make investment, where they need to allocate or periodically reallocate people." ▮

—Christina Mulligan

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Don't scale Agile before you ask yourself these questions

An interview with Suzie Prince of ThoughtWorks

Enterprise organizations are beginning to buy in to Agile techniques outside of their development teams, to gain companywide benefits from being Agile. Enterprises require scale, and with that scale comes process.

A big question remains left unanswered: How do you ensure that future Agile teams have "agility" and can collaborate and deliver value, instead of just "doing Agile?" How can you allow teams to continue to respond to change while still working within the parameters of large organizations? Ultimately, how do you help teams deliver value over blindly following the Agile process?

SD Times reached out to Suzie Prince, head of products for ThoughtWorks. Prince leads product development for Mingle, GoCD and Snap CI. We talked with her about how organizations can help their teams remain true to agility and deliver value as they scale Agile—without following a one-size-fits-all process.

SD Times: What should be the measure of success for Agile scaling?

Prince: There's a lot of discussion about doing Agile vs. being Agile. The measure of success is not the label; it's delivering the right thing at the right time.

There is no right level of agility that is the same for every organization. For some organizations, agility only goes so far as it is needed for software delivery, while others may need to implement a holistic, organization-wide change to achieve enterprise agility. It is important to remain focused on what is needed to bring the most value to an organization above all else.

A good way to assess the agility needed for a particular organization is to understand the level with which a business must become adaptive to achieve its goals. One way to do this, as described by Jim Highsmith, is to determine whether your organization is striving for responsiveness (agility) or efficiency. Organizations can—and do—care about both responsiveness and efficiency, but understanding which one prevails as the top priority may help you understand the extent with which agility needs to extend in your organization.

What are the different approaches for scaling Agile?

> **"The measure of success is not the label; it's delivering the right thing at the right time."**

Among [ThoughtWorks' project management software] Mingle's customers and the companies I consulted for, I've experienced top-down and bottom-up approaches, and mixed top-bottom. Top-down Agile scaling is common, in which one Agile framework is selected for all teams and rolled out. Bottom-up Agile scaling is where individual teams are enabled and coached to be Agile, and they work out their own goals, processes and mechanisms to achieve the goals. There is a third approach: mixed top-bottom. There are also organizations that use a mixed approach and tailor it to fix their organizational goal.

What are the pros and cons of a top-down approach?

The top-down approach is convenient, understandable, well explained and (in some cases) it's all that's needed for a particular business. If your organization's goals are to streamline delivery and allow for releases every three months vs. every year, a cookie-cutter framework may well bring success (and if it does, you should celebrate!).

Often when organizations do a top-down approach, they pick a SAFe-like framework. But strictly structured, hierarchy-enforcing frameworks are by their nature inflexible. It's easy to get a veneer of agility: The appearance of the organization may have changed, but teams still do not have the autonomy and flexibility to respond to change organically. Instead, they are often left to do Agile "out of the box," meaning doing what they're trained to do without really understanding (or possibly caring about) the underlying principles.

What are the pros and cons of a bottom-up approach?

A bottom-up Agile scaling approach gives individual teams more autonomy and freedom within the existing framework of the organization. They work out their own goals, processes and mechanisms to achieve the goals.

By using the bottom-up approach, individual teams, business units or products might deliver more value than before, but the effect on the larger organization is still constrained. The organization does not change quickly to a new way of working. Teams can become siloed and organizational goals are lost to individual team goals. In organizations where value is only delivered through many people and many teams working together, value cannot

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Don't scale Agile before asking these questions

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be achieved simply by team-level agility. In many cases team-level agility is stifled by the rest of the organization continuing to work as before. This is exemplified when we examine the reasons cited for Agile failures. Many individuals and teams assert that Agile failed in their environment because the culture was at odds with core Agile values, lack of management support, or lack of support for cultural transition.

How should organizations choose the right approach?

As I said, it really depends on the needs of the organization at a given point in time. Which is more important: responsiveness or efficiency? You can ask the following questions to help you understand:

- Does the organization view responsiveness as a differentiator?
- To what extent is our future characterized by:
  - high uncertainty?
  - high levels of innovation vs. maintenance?
  - stochastic demand?
- Is the organization planning or undergoing a major pivot or shift?
- Does first-to-market matter for our business?

If your answers are more on the "effectiveness" side, a more top-down Agile process, where one way of working is rolled out to many teams at once with a few coaches, may be sufficient.

If your answers to these questions are leaning more toward the "responsiveness" side, you should consider a bottom-up or mixed top-bottom approach to scaling Agile.

What needs to be considered for following a mixed top-bottom approach?

We recommend a combination of a top-down approach with leadership buy-in, alongside teams working the way that suits them. You need to focus on creating value, and spreading awareness within your organization that creating value is more important than pushing out "Agile" processes.

You need to create the right environments for teams and their organizational structures to create value within the Agile organization. The principles to create such an environment and to follow a mixed top-bottom approach to scaling Agile are:

- **Leadership buy-in:** Management must understand the goals of the organization. They should communicate goals consistently and often to the rest of the organization. They should ensure that work is discussed in terms of value delivered, and that they allow everyone to easily see how they fit into achieving that goal.
- **Support autonomy:** Teams should be allowed to create, inspect and adapt their own processes. They should be encouraged to learn best practices and continue to create a process that allows them to deliver their best to the organization, and to encourage and empower teams to create their own way of working to deliver value and meet goals.
- **Encourage collaboration:** Agile teams should be collaborative—not just among team members, which is a given, but between teams as well. Once the shared goals are clear, it is much easier for independent teams to work together to achieve them.
- **Standardize only what is important:** Standards are a bit of a conflict in Agile. They impede creativity, which should make you want to limit them, but some standardization can help scale your agility by helping your organization understand the big picture and therefore, allowing it to effectively respond to change.

As a final thought, can you recommend any processes over others to scale Agile throughout the enterprise?

There is no one way to scale Agile. In order to find the right way for your organization, you need to understand what you are trying to achieve and create a process that works to deliver that outcome. If you're more concerned with cutting costs or efficiency, then maybe a more regimented Agile framework that supports regular, predictable delivery such as SAFe is the best approach for you. If you really need to be adaptive and responsive to industry trends, then a more lean approach to Agile would work better. And as you bring Agile to the organization, don't forget to give your teams the tools they need to be successful too: goals, minimal and clear standards, autonomy and the ability to organize themselves into collaborative networks delivering organizational goals. ▮

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Buyers Guide

LOW-CODE SOLUTIONS

Empowering businesspeople to make their own applications

BY DAVID RUBINSTEIN

As organizations seek faster time-to-market releases of the software necessary to stay ahead of the competition, new solutions that enable the business to create applications without the need for IT to get involved are starting to emerge.

As with all things, of course, there are several angles from which to approach this need. Some platforms aim at what are being called citizen developers: business analysts or marketing folks who can do small, department application compilations such as for workflows, forms and the like.

Other platforms are actually made for developers, to help them speed along the more mundane development tasks so the bulk of their time is adding business value. These solutions, which have evolved from the Rapid Application Development tooling from at least a decade ago, aim to make developers more productive.

But regardless of approach, one thing is clear: Low-code solutions will not replace developers. In fact, they could give them even more to do, according to the experts interviewed for this article.

Paulo Rosado, CEO of RAD platform provider OutSystems, looks at typical businesses and sees a spectrum of skill sets. "At the one end you have the citizen developer/Excel power user, and at the other end you have the uber-geek, Stanford/MIT graduate doing complex development," he said.

"What we've noticed is software managed by low-code platforms evolves and becomes so large that you hit the competence wall of Visual Basic/Access developers. The application grows, the number of integrations increases, the complexity increases, and now you need to do real software engineering."

Derek Roos prefers to call the citizen developer a "business engineer." Roos, CEO of Mendix (which has created a RAD platform in the cloud), said, "People entering the workforce today are not uncomfortable with technology," noting that in previous generations, business people would not even think to jump in and build an application on their own. Mendix, he said, wants to enable businesses to speed up their time to market for new multi-channel,

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multi-device applications that are primarily user-facing but integrated with back-end systems. He said the platform is meant to facilitate cross-functional teams (business and IT) to build applications quickly.

Solutions such as these had often lived in the dark corners of "shadow IT," where small, departmental teams create quick-and-dirty apps. "Shadow IT, or rogue IT, has been seen as a bad thing, but should be seen as a positive," Roos said. "A strategic platform can make business more agile and competitive."

OutSystems' Rapid Application Delivery Platform is meant to put IT at ease by allowing control to remain there. "Shadow IT is always a pain for IT, because IT ends up getting things that are not maintainable, because the tool cannot evolve with the software," Rosado said. "You need IT buy-in [for low-code solutions], because ultimately they're the ones who will end up managing these types of platforms" and the applications created in them.

The platform, Rosado said, is a model-driven toolset integrated with the back-end systems that works out of the box with OutSystems' cloud platform. "So you can do QA, staging and deployment right from the platform. IT installs it, and will start using it out of our cloud to do iterative development," he said.

Rosado noted the platform facilitates very fast iteration cycles. "When the code stabilizes, then you stage it to a production environment with one-click staging, and all elements of the app get deployed," he said. Once deployed, the platform will measure latency on the client and server sides, and when issues are detected, you can troubleshoot to find the component that's the culprit and complete cycles to change the code within minutes, he added.

For Mendix, speed is a byproduct of its platform, not the end. "It's about agility and collaboration between business and IT," Roos said. ▮

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Developers want openness in low-code solutions, says OutSystems' Rosado.

Overcoming developer fear

When developers hear "low-code solution," a chill runs down their spines as they envision having to correct and maintain Frankenstein creations built by—gulp!—businesspeople who wouldn't know a line of code from a plate of spaghetti.

Yet OutSystems' CEO Paulo Rosado believes it is possible to convince developers that these platforms can in fact make them more productive.

The main objections developers have to these kinds of platforms are:

- Fear of losing control of their code
- Getting locked in to a vendor and a platform
- The ability to do complex work
- The power and openness of the platform

Rosado said developers will be more accepting of a low-code platform if they can see the underlying code that's been abstracted away for their convenience, and if they can be sure the platform is powerful enough to handle big, complex applications and integrations beyond the simple workflows and forms. "To gain IT acceptance," he said, "the platform needs to be open and powerful, and developers have to feel that they are not locked into boxes they can't get out of." ▮

—David Rubinstein

The state of citizen development

Intuit tracks how many workers make their own apps

What are your non-technical staffers working on? The Intuit-sponsored 2015 "State of Citizen Development Report" found workers are creating their own apps to gain efficiency, to get it done more quickly, and actually consider creating apps as part of their jobs.

"True citizen development is here now," said Jeff Prus, director of product management for Intuit QuickBase. "The way people work is changing. Gone are the days where employees will sit back and wait for IT to help them develop a solution. Instead, they want to do it themselves. What that means is individuals without any formal coding skills are actively building apps on their own. According to the research, 68% of respondents consider developing apps part of their day job, yet only 8% of respondents have a traditional coding skill set."

Citizen development often scares developers, though, because they fear work—and perhaps their jobs—will be taken away from them. Prus dismissed this. "That's not to say IT is left out of the picture. In fact, we found that 75% of IT builders developed the foundation of their company's apps, leaving the last mile of the apps to the citizen developers," said Prus. "This allows each person to play to their strengths. IT serves as a strategic advisor for the business to ensure the apps created are scalable, secure and compliant, while business users can focus on solving the challenges at hand and customizing the app to fit their business processes exactly." ▮

—David Rubinstein

THE FUTURE

of

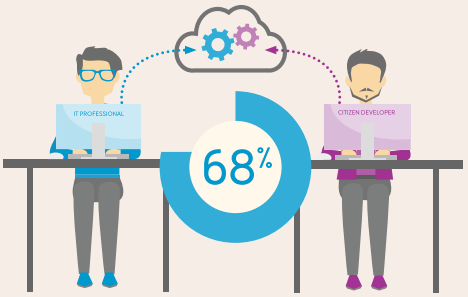
NO-CODE CITIZEN DEVELOPMENT

Citizen Development transcends simply utilizing a platform to create Web and mobile apps to save time. It's about inviting non-coders outside of IT to take a bit of the work off your shoulders–especially the last mile where challenges and requirements are unique to their jobs and skills.

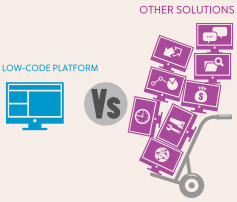
DIGITAL TRANSFORMATION

SAY GOODBYE TO "CAN YOU JUST..."

Empower others outside of IT who are Citizen Developers to build apps that inspire a culture of problem-solving across the organization.

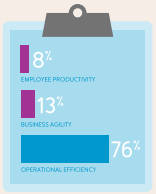


68% of respondents built apps with somebody outside of their functional area.



On average, **8 point solutions** are required to replace the low-code platform for Citizen Developers!

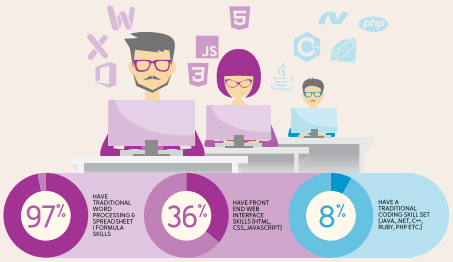
What is the primary reason for using a low-code platform for digital transformation?

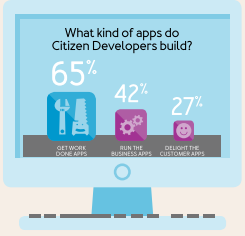


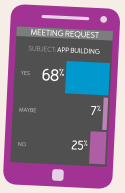
CITIZEN DEVELOPERS:

OPTIMIZING MODERN APP DEVELOPMENT

A Citizen Developer is a person who builds, configures and rolls out cloud applications without writing a single line of code.





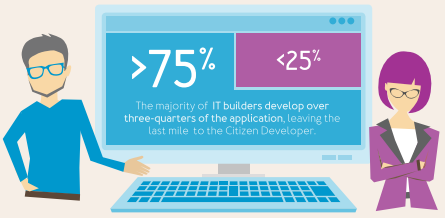


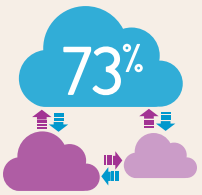
68% of respondents consider developing apps part of their day job.

SELF SERVICE WITH CONTROL:

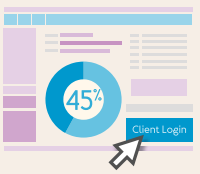
RIGHT-SIZED GOVERNANCE

Strike a balance between productivity and control by uniting app builders and business stakeholders to work together efficiently.





73% of respondents plan to integrate their apps into existing cloud-based systems.



45% of respondents indicated they have shared apps with customers and partners as dashboards and reports.

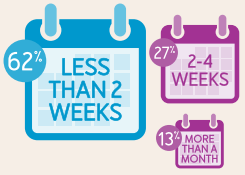
INCREASED APP SPEED & ROI

THINGS GET DONE QUICKLY. REALLY.

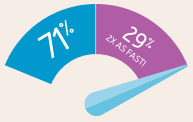
Leverage real-time app experimentation and prototyping to get things started, then iterate with IT.

90% of the IT developers surveyed currently had **less than 5 app requests** per month in backlog.

How long does it take for an app to be **completed by Citizen Developers**?



71% of all Citizen Developers have increased their application delivery speeds by at least 50%!

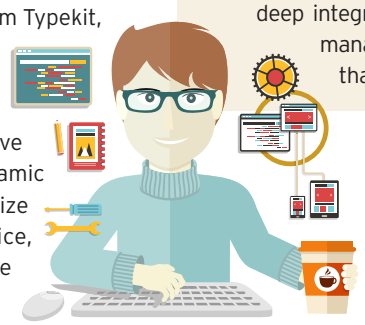


29% have seen a **2X or more** increase in application delivery speeds!

Source: 2015 State of Citizen Development Report, Intuit, 148 respondents

A guide to low-code offerings

■ **Adobe: Adobe Muse CC** is a Web-design software tool, available through Adobe Creative Cloud, for creating and publishing custom websites for desktop and mobile devices that meet the latest Web standards, without writing code. The latest updates to Muse include instant access to premium fonts from Typekit, integration with images from Adobe Stock, and updates coming soon that will add free-form responsive design capabilities for dynamic scaling designs for any size screen, browser or device, without code or restrictive templates.



■ **Alpha Software:** Alpha Software products deliver significant productivity gains to developers of all levels building cross-platform mobile and Web business apps. **Alpha Anywhere** is a front-end and back-end, low-code, rapid mobile application development and deployment environment. Alpha Anywhere applications showcase built-in offline capability, extensive data integration and advanced security. Developers and business leaders in thousands of organizations across a hundred countries have used Alpha Software products to cost-effectively deploy enterprise applications with outstanding user experiences.

■ **Appcelerator:** The **Appcelerator Platform** provides low-code solutions for both client (app) and back-end (API) mobile development. App Designer enables drag-and-drop creation of native, cross-platform mobile apps. Arrow Builder delivers mobile-optimized, fully documented APIs for any data source via a visual design wizard. Both capabilities work bi-directionally, meaning that users can switch between visual or programmatic development, with both source code and designs kept automatically in sync.

■ **AppGyver: Composer 2** is an end-to-end visual builder for creating smart apps around business data. Building apps is simple: import data, visually create the UI from interactive features, select smart rules to automate tasks, then publish and distribute. The platform also offers the option to expand resulting apps with custom HTML5 modules, cloud code and custom data connectors. Composer 2 is cloud-based and completely free to start using.

■ **App Press: App Press** is a Web-based mobile authoring solution used to create, deploy and manage apps. It offers a service that makes code-free, cross-platform mobile app development as easy as maintaining a website. With a range of plans for individuals to enterprises, App Press helps customers tell their mobile story.

■ **Intuit: QuickBase** offers the only low-code platform purpose-built for Citizen Development. The modern Rapid Application Development platform empowers front-line business stakeholders to initiate and self-develop no-code applications to help drive business efficiency and agility within their organizations. QuickBase helps unify IT and business users to optimize the application development and delivery processes while offering citizen developers the freedom to build and innovate new applications with a right-sized level of governance required by IT.

■ **iRise:** iRise takes a unique approach to product definition and delivery. Its **platform** combines text requirements and user stories with interactive prototyping and code generation. This allows developers and stakeholders to experience, test and validate what was built to ensure the best solution. iRise also integrates with the leading ALM tools, so the requirements-management process is end-to-end. And when it comes time to develop, developers can generate code to jump-start the process. The development team also has the hi-fidelity prototype to reference as a "blueprint" for what to build. The end result is better software produced in less time.

■ **KeyedIn:** The **KeyedIn Konfigure aPaaS** uses a simple drag-and-drop environment that enables users to create forms and data models quickly and efficiently to develop enterprise-level applications. Konfigure automatically builds databases, interfaces and relationships, and users can create workflow steps to automate processes, manage tasks and add business rules to applications. Once created, custom applications are quickly deployed to the cloud with no need to manage servers or upload files.

■ **Mendix:** Mendix helps organizations drive digital innovation through a bimodal IT strategy. Its unified **application Platform as a Service (aPaaS)** empowers customers to bring new digital products to market, delight online users, educate global populations, and reinvent themselves by developing and deploying applications at the speed of ideas. Mendix's application platform uses visual models to abstract away from technical details so that users can focus on Rapid Application Development and delivery.

■ **ViziApps: ViziApps** is the only mobile platform that enables the use of existing office software skills to visually create the user experience, task navigation, native device feature use, and back-end access to 40+ data types for their business mobile apps without coding. App features can be easily extended with JavaScript and HTML5. An enterprise-grade platform with partners such as AT&T, Apperian, Google, Intuit, Red Hat and Salesforce.com, mobile apps are created in one tenth of the time of coding. ▮

■ FEATURED PROVIDER ■

OutSystems: OutSystems Platform is the world's leading Rapid Application Delivery platform for the enterprise—meticulously designed, engineered and crafted to move at the speed of today's digital business. It is the fastest and most comprehensive platform to create, deploy, change, and manage custom mobile and Web applications—delivered seamlessly across all devices. Available as a cloud or on-premises solution with deep integration to all existing systems and an open architecture, OutSystems manages the complete application life cycle of large portfolios at more than 500 enterprise organizations in 25 countries across 22 industries.

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Code Watch

BY LARRY O'BRIEN

Larry O'Brien is a software developer who lives on the Big Island of Hawaii

Java: Not dead yet

Just months after celebrating Java's 20th birthday, the programming world is abuzz with rumors that Java is doomed. In September, it was widely reported that Oracle had laid off a significant number of its Java evangelism team, and then, in October, InfoWorld ran a gloomy article about an e-mail from a "former high-ranking Java official," with the subject line "Java's planned obsolescence."

The claim is that Oracle, which took over Java when it bought Sun Microsystems in 2010, has been a bad steward of the language and is abandoning Java while it reinvents itself as a cloud computing business. This is just par for the course for Oracle, whose developer relations have always been defined by something in between neglect and contempt.

Oracle has always emphasized sales relationships with executives and managers over the opinion of developers, and it has a long history of producing buzzword-laden initiatives and pie-in-the-sky promises. Oracle has a reputation for abandoning unprofitable or redundant product lines, but it's these new projects—not proven technologies—that Oracle has a history of giving up on. While this leads to dissatisfaction among elements of the technical rank-and-file, it's worked out fine for Oracle's bottom-line.

To be fair, Oracle itself is somewhat responsible for talk about Java's declining prospects. According to Oracle, Google's use of Java in Android has "destroyed Java's fundamental value proposition as a potential mobile device operating system." This claim comes from Oracle's lawsuit against Google, which has been ongoing since about five minutes after Oracle acquired Sun.

While the truth of the lawsuit is the desire to extract rent from Google for using Java on phones, the legal battle centers on whether Google has performed copyright infringement on the Java API. From a developer's perspective, it seems clear that APIs should not be covered under copyright. Even if one believes, as I do, that the law should give creative people an incentive to invent, a group of function signatures should not be protected the same way a novel is protected. If anything, APIs should be protected with something closer to patents.

In 2012, Google (essentially) won, but Oracle won a partial appeal in 2014. It is the nature of lawsuits to drag on, and it is the nature of lawyers to use dire language to describe damages. Thus, we have people from Oracle offering the previous hyperbolic statement about Java's value, apparently as part of an effort to extend the lawsuit.

A lot of online comment about the "destroyed value" statement pretended that it wasn't limited to the absurd scenario of a highly profitable, Java-based, Oracle-produced mobile operating system. So, instead of eye-rolling at lawyer-driven hyperbole, we have hand-wringing about buzzword-driven technical abandonment.

Java is, for better or worse, *the* legacy enterprise language. There are millions of Java programmers, all around the world, and there is a broad distribution of ability. There are many brilliant programmers who work in Java. There are many people who ought not to be in the business who work in Java. There are great codebases written in Java. There are bad codebases written in Java. Java is now owned by a company that markets and responds to the concerns of executives and risk-averse department heads, not to entrepreneurs hammering out their business plans at the San Francisco Ferry Building. Of course Oracle is going to undersell the power of "plain old" Java and push the use of Oracle's higher-level, enterprise-focused tools, infrastructure, and consulting services.

For Oracle's bread-and-butter customers, slow-and-steady evolution is exactly what they want.

Is this the same as "planned obsolescence"? I don't think so. Although I've heard rumors of a new direction in terms of the Java Community Process, Java is probably going to remain one of the slower-evolving mainstream languages. It's certainly not going to leapfrog, say, Swift in terms of language features. For Oracle's bread-and-butter customers, slow-and-steady evolution of the core language is exactly what they want.

By the time you read this, JavaOne will have occurred and Oracle will have made reassuring announcements about the language and tools. Perhaps this year or next it will release new higher-level tools that work with legacy Java codebases and promise greater productivity and ease than ever. Perhaps they'll deliver less than they promise while introducing complexity and cost.

What I'm sure of, though, is that Java will continue to be supported and updated. And that the lawyers will continue to get paid. ▮

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Adam Serediuk is director of operations for xMatters.

Guest View

BY ADAM SEREDIUK

How to create a successful NoOps team

It's often easier to talk about what NoOps *isn't* than what it is.

It doesn't mean you fire your Operations team. It doesn't mean the end of Operations, or that Operations is dead.

DevOps is an important incremental step toward something more than a focus on process, tools and people. Almost all of the problems the DevOps movement tries to solve are based on the idea that the development, deployment and reliability of software are very different things. Most DevOps strategies focus only on Operations as a bottleneck, but fail to consider how Development could make software more operationally friendly, or how that software might work in production.

With NoOps, developers deploy and scale their own code and apply equal importance to acceptance criteria. It's not "done" until it's in production with Continuous Delivery, metrics and monitoring. It's a system designed to operate as a whole, as a single artifact.

With NoOps, developers deploy and scale their code and apply equal importance to acceptance criteria.

NoOps is based on the belief that the operation, development and delivery of software are equally important. Sometimes referred to as the "You build it, you run it" model, NoOps brings developers in close contact with the day-to-day operation of their software—and the responsibilities that come with that.

Can't we all just get along?

The approach is sometimes criticized for putting more responsibility back to Development and leaving Operations to do... just what, exactly?

I beg to differ. The criticism is based on the idea that Development and Operations are separate to begin with, or that Operations just doesn't want to deal with software. In reality, NoOps is based on the notion of "No Operators." Modern software shouldn't need operators to run and maintain it. Classic operations summon images of operators changing tapes on reel-to-reel nine-track tape machines while operating the software and hardware, and generally being the human interface. Yet many Operations teams still behave this way even if they don't realize it!

A NoOps-focused organization aligns all the operational aspects of software as part of Development. An agile organization's acceptance criteria include the deployment of the software *and* the operational aspects, such as monitoring, metrics and Continuous Delivery. They make the tools and infrastructures readily available for Development to deliver higher-quality software and build it as a system, not just a collection of parts.

At xMatters, Operations has built deployment tools and frameworks to utilize services, such as infrastructure and monitoring, as part of our NoOps approach. This enables Dev and Ops alike to write services that automatically get the benefit of being deployable (including the infrastructure). These toolsets are included like libraries and wrappers to perform those functions. This puts the deployment and monitoring code directly with the application codebase so it can be tested and promoted through the environments by anyone.

As part of DevOps, we have embedded Operations engineers into Development teams and developers into Operations, so they can utilize these frameworks and tools as area experts. They work with these teams directly, providing instant and constant feedback from both viewpoints. This aligns the teams and provides for simplified resourcing.

Ironically, this makes Operations even more operational. The modern Operations team is actually a service-oriented extension of the Development team. Modern Operations teams can develop monitoring as a service, logging as a service, and other services that other teams can easily integrate with. Want distributed logging? Add this hook. They're writing deployment frameworks and services everyone can consume, and are taking an agile approach to delivering core services as software.

Therein lies part of the challenge: Classic system administrators aren't well versed in development approaches such as the languages, processes and often even agile methodologies. And the reverse is true: Developers aren't well versed in operational approaches. It's turning Operations into developers and it's turning developers into Operations, bringing the Operational aspects of software into the spotlight. It doesn't leave these items to chance and brings everyone together.

At the very least, NoOps is a conversation starter. ▮

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Analyst View

BY AL HILWA

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

A microservices architecture checklist

In a previous column, I discussed the important shift taking place toward microservices and provided a characterization of the key aspects of this new architectural approach. Here I discuss the factors that will help enterprises transition to a microservices approach to software development.

Culture and skill: Evaluate your organization's culture and skill and make any necessary changes before starting. Enterprises need to look at cultural tolerance for risk and failure, then make changes in structure, responsibility and authority. Specific skills around APIs, open-source tools and modern DevOps practices are essential ingredients to the success of a microservices initiative.

Tools: Microservices are only possible because of the rapid evolution in build automation tools, testing automation, and the abundance of frameworks over the last decade. The absorption of agile into modern software development is also a key factor. It goes without saying that teams using a microservices approach must have a solid Continuous Integration/Continuous Delivery workflow anchored in a solid implementation of CI tools.

Tools spanning collaborative development, deployment configuration management and application performance analytics are also key ingredients. Strong microservices teams have to overcome any aversion to experimenting with new or open-source tools. Microservices can be hard to manage because of their sprawling distribution. Building the infrastructure to fully support a microservices architecture may be tantamount to the buildout of a complete PaaS and IaaS layer, and you should leverage public or private cloud systems.

Developer infrastructure: Effective microservices delivery relies on decentralization and decoupling between the teams working on the services. At the same time, standardization on tool chains enables efficiencies in rolling out new services and for developers moving between projects and teams.

What should be standardized and what DevOps workflows should be used have to be negotiated as the environment scales up. The early adopters of microservices have tended to standardize to a great degree on tooling across teams, and they have a separate developer infrastructure group that manages the developer tooling stack. Given the low maturity and open-source nature of many of the tools used in modern microservices, the skill needed for developers and DevOps specialists who manage the developer infrastructure should not be underestimated.

Greenfields: Choose a microservices approach for new opportunities, rather than a modernization effort involving the re-architecting of existing systems. Research favors the use of microservices architectures that are organically built.

In re-architecting systems, sizing services properly can be difficult. The practices around taking systems and applying microservices architectures are still evolving and are thus riskier to undertake. This means finding new initiatives, often around some aspect of the enterprise transformation agenda.

Incremental: Proceed with an incremental service rollout. Avoid launching too many services at once, and be aware that you may have to change course on short notice. While certain services may be straightforward to design and implement, the overall microservices architecture can be complex and hard to manage at first.

Microservices teams have to overcome any aversion to experimenting with new or open-source tools.

Performance: While there are challenges in designing high-quality software systems, performance is often the hardest to solve in microservices environments. Microservices architecture is distributed and operates across networks. This means that system functions that might have historically resided inside of the same address space, or run on the same machine, now have to work across network connections and API boundaries.

The importance of this depends on the function and implementation, but it also depends on the ability to use caching layers and optimizations in API-management layers and other components. Strong network architecture expertise is important.

Microservices architecture is not the solution to every IT problem, and with the current state of knowledge, it should be employed on the right projects. The above checklist should help enterprises moving in the direction of microservices tackle it with a higher degree of success.

This column is based on the recently released IDC Report, "The Emergence of Microservices as a New Architectural Approach to Building New Software Systems" (IDC #256906, June 2015). ▮

Read this story on sdtimes.com

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

Industry Watch

BY DAVID RUBINSTEIN

Back to the future of development

In last month's issue, I wrote of my conversation with Grady Booch, a legendary thinker who first made his mark in the mid-1990s (as co-inventor of the Unified Modeling Language and contributor to the Rational Unified Process). He continues to be on the cutting edge in his role as IBM Fellow.

He spoke of a new generation of information worker who's not afraid to and get down and dirty in code. With websites such as Code.org, Booch said he sees "an effort to teach the average person coding as a skill. There is a degree of fragility in non-programmers building things, and it produces a security risk as well. You might meet a short-term need, but you don't realize the technical debt as people build on it in ways that were never intended."

'We build systems that learn, and that's an element of software design we didn't have in the past.'

Meanwhile, professional developers have a responsibility to deliver up frameworks that can glue many existing systems together, he said. "Like sewers and plumbing, they don't get press but they are essential. Building large software systems is more like city planning. Facebook and LinkedIn had it great for a long time because they had no legacy code. [Facebook founder Mark] Zuckerberg would say, 'Move fast and break things often.' Now, they don't want to break things as often" because of all the legacy code.

"Even Facebook is starting to begin having legacy issues," said Booch. "It's not a lot of fun dealing with [code] hygiene. It's also easier not to floss, but you suffer the consequences if you don't. In software, that means incurring technical debt."

Businesses today underfund their legacy systems, Booch said, because they see more of a competitive edge in Web and mobile user experiences. He noted a "transit point" you see in start-ups: As a company grows in maturity, it sees the tedious stuff involved with software. And that has led to a rise in such things as microservices and containers, small pieces of configured code that can easily be swapped for other microservices in other containers.

Booch pointed out that it's challenging to build large systems in today's world of agile development and continuous software delivery. "So today we build lots of small systems," he said. "We build systems we teach and that learn, and that becomes an element of software design we didn't have in the past."

Systems that learn. Artificial intelligence. The rise of the machines.

Some fear a takeover by super-intelligent machines that could lead to the extinction of the human race as foretold in books and films, such as "Ex Machina." Philosopher Nick Bostrom is the founding director of the Future of Humanity Institute and has done work on the existential risk of artificial intelligence. "I don't fear the rise of robotic overlords," Booch said. "I fear the shaky software on which today's world exists."

"We need transparency and public discourse" around the research and construction of artificially intelligent machines, he said. Machines can learn, but when they learn how to learn, "we've reached a threshold where there's no turning back," he continued.

But Booch cautioned that we're still at least a generation away from building a system with the intelligence of a reptile: flexible and adaptable, but lacking the versatility of the human mind. "And we're years off from where machines can move from system to system. The systems we're building now change the way we work. Not only machines evolve. There are deep-learning algorithms and neural networks, and we still don't have good theories into why they work."

Today, Booch is working on cognitive systems. "What does it mean to take Watson and embody it in the world?" As for his research, he said, "It's at a point in time we don't know the journey but know the direction to walk. We can see the end point but don't know the mountains or crevices along the way." ▮

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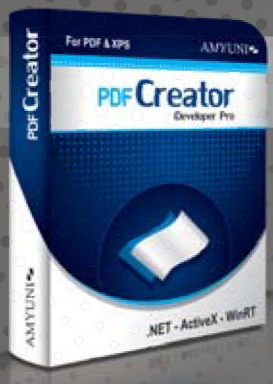

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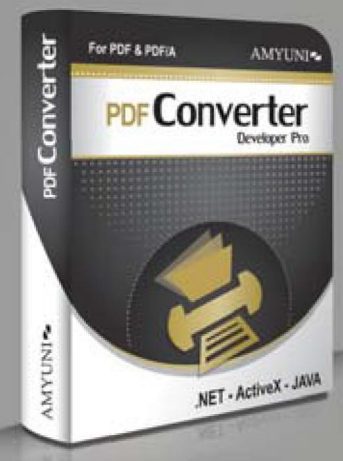

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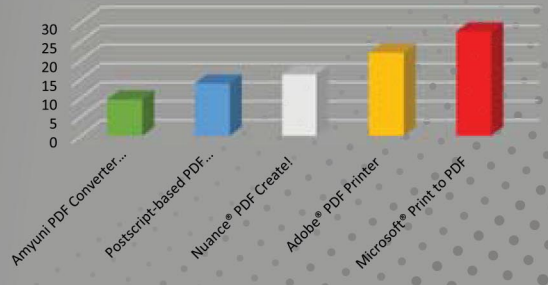
- Print to PDF in a fraction of the time needed with other tools. WHQL tested for all Windows platforms. Version 5.5 updated for Windows 10 support

Benchmark Testing - Amyuni vs Others
Seconds required to convert a document to PDF



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