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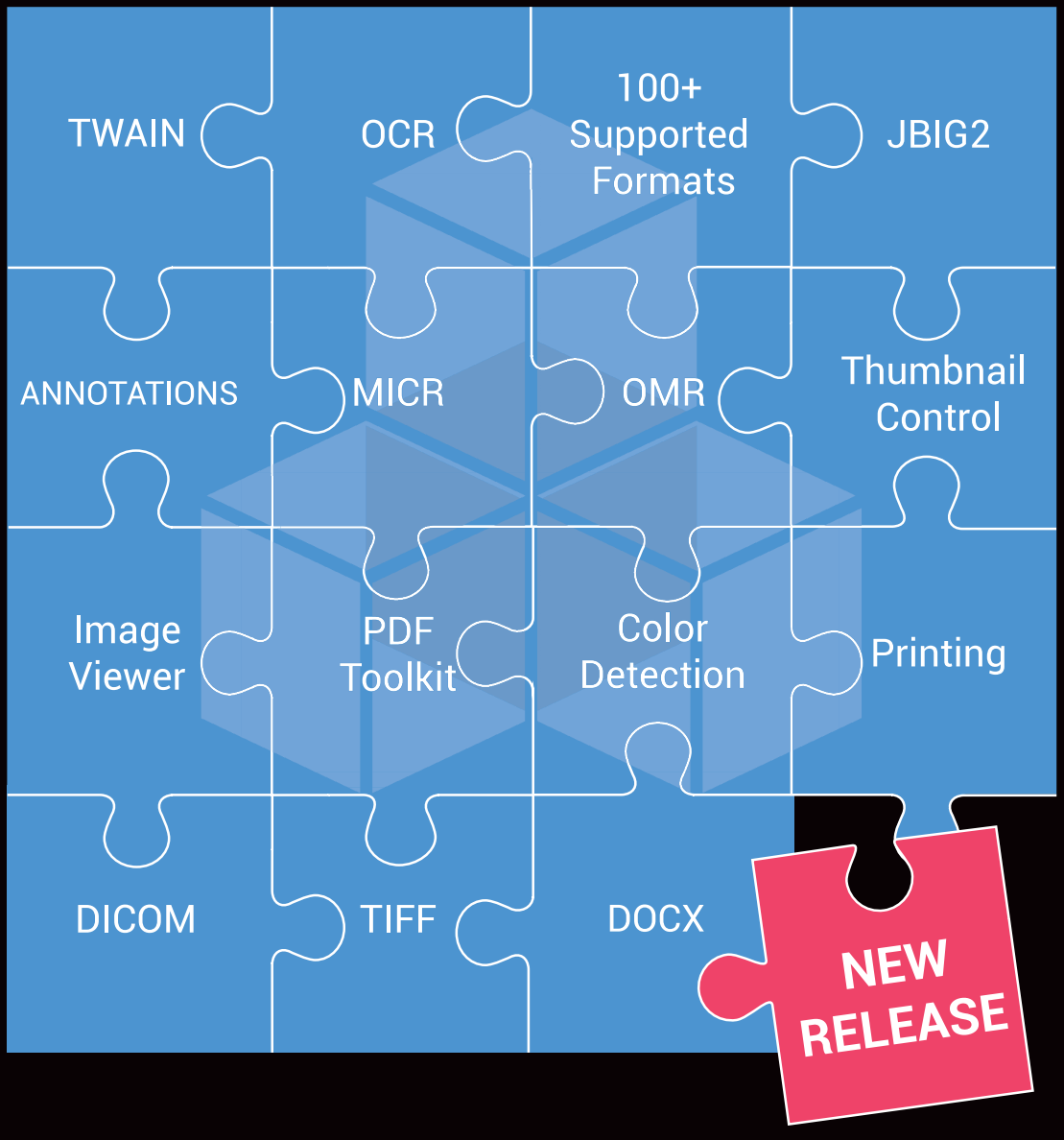

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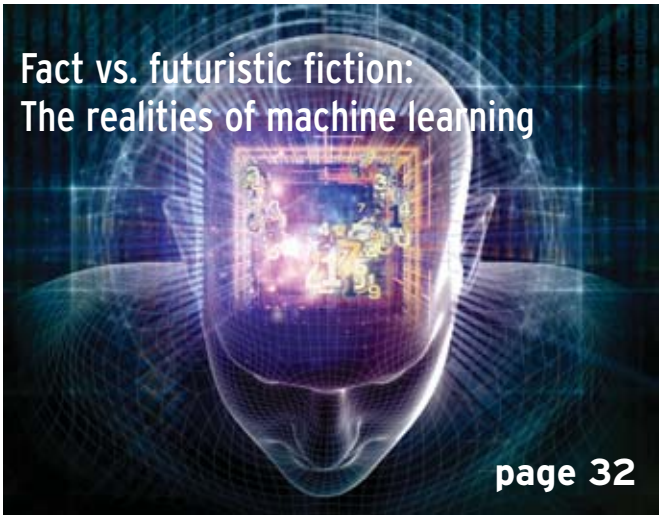

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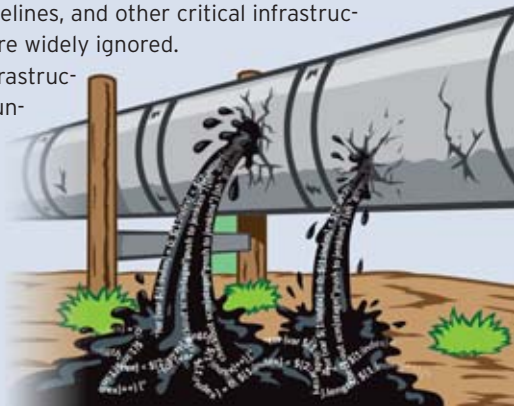
NEWS WATCH

MIT experts warn Trump administration about cybersecurity issues

MIT experts are urging the Trump administration to take cybersecurity more seriously. According to the experts, electric grids, oil pipelines, and other critical infrastructure in the U.S. pose huge hacking risks, but are widely ignored.

"The digital systems that control critical infrastructure in the United States and most other countries are easily penetrated and architecturally weak, and we have known it for a long time. Yet Presidential leadership on infrastructure security has been hesitant and chiefly rhetorical, while system operators have tended to focus on short-term fixes and tactical improvements," the researchers wrote in a recently released report.



Jenkins project releases Blue Ocean 1.0

Jenkins is getting a new user experience with the release of Blue Ocean 1.0. Blue Ocean is a new UX implementation designed to create, visualize and diagnose continuous delivery (CD) pipelines.

"The new and very modern and intuitive UX makes Jenkins more approachable and continues to enhance the power and usability of Jenkins. It takes an organized team of contributors like CloudBees provided to the Jenkins project to drive a large effort like Blue Ocean," said Kohsuke Kawaguchi, Jenkins founder and CTO at CloudBees.

Turing Award 2016 awarded to Sir Tim Berners-Lee

The Association of Computing Machinery (ACM) has announced its 2016 ACM A.M. Turing Award is being awarded to Sir Tim Berners-Lee. Berners-Lee, a professor at MIT and the University of Oxford, is widely known for creating the World Wide Web, first web browser, and the protocols and algorithms that brought the web to scale.

"It is an honor to receive the Turing Award and to be included in such extraordinary company with the other winners. I'm also humbled to be connected to Alan Turing. My parents, who worked on the Manchester/Ferranti Mark I, knew Turing when they were at Manchester. He changed everything: By pointing out that computers are all equivalent, he threw down the gauntlet to all who programmed them, what was possible with computers is limited only by our imaginations," Berners-Lee said in a statement.

The ACM Turing Award is often referred to as the "Nobel Prize of Computing" and comes with a $1 million prize.

Microsoft's CodePlex to shut down

Microsoft cannot compete with GitHub. The company announced it will be closing the doors on CodePlex, its open-source project hosting site. CodePlex was designed to give developers a place to share, collaborate, and download open-source software.

"Over the years, we've seen a lot of amazing options come and go but at this point, GitHub is the de facto place for open source sharing and most open source projects have migrated there," Brian Harry, vice president for cloud developer services, wrote in a post.

In order to migrate data out of CodePlex, Microsoft has partnered with GitHub to provide a simple-to-use import experience. In addition, the company is working on a migration tool for issues, and a new option to add an "I've moved" banner to projects that will direct to the projects' new home.

ISO C++ committee completes C++17 standard

The next version of the general-purpose programming language C++ is underway. The International Organization for Standardization (ISO) C++ committee has announced the C++17 standard is complete, and there should not be any more major changes before the final specification is published.

"C++17 is now technically finished and being sent out for its final ISO balloting. All that remains for C++17 now is some ISO red tape and minor touch-up to get it officially published, which is expected to be just mechanical," Herb Sutter, chair of the ISO C++ standards committee, wrote in a post.

Apache Tomcat 8.5.13 released

Apache Tomcat wants to replace Tomcat 8.0.x with the latest release of its open-source implementation. The Tomcat team announced 8.5.13 with new features and improvements.

Tomcat is an open-source software implementation of the Java Servlet, JavaServer Pages, Java Unified Expression Language, Java WebSocket and Java Authentication Service Provider Interface for Containers technologies.

The release includes HTTP2 improvements, bug fixes for sendfile related issues, and a Servlet 4.0 early access update. The full changelog is available here.

Angular 4.0 released

The Angular development team announced a major release to its mobile and desktop development framework. Angular 4.0 follows the team's announcement of semantic versioning adoption, and features major improvements and functionality from the last three months.

The latest release expands on the team's commitment to make Angular apps smaller and faster by reducing the size of generated code by about 60%, and creating an

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NEWS WATCH

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animation package to help developers find documentation and use autocompletion.

The 4.0 version is backwards-compatible with 2.x.x. Going forward, developers can expect patch updates and ongoing work on version 4.1. The team is still creating a roadmap for the next six months.

Google launches new open source software site

Google is giving its open-source projects and initiatives a new place to live. The company announced a new site, https://opensource.google.com/, designed to provide information on how Google uses, releases, and supports open-source software.

"This new site showcases the breadth and depth of our love for open source. It will contain the expected things: our programs, organizations we support, and a comprehensive list of open source projects we've released. But it also contains something unexpected: a look under the hood at how we 'do' open source," Will Norris, engineering manager for Google's open source office, wrote in a post.

Visual Studio Code update and the .NET framework 4.7

Microsoft is providing new updates to its open-source code editor and software development framework. The company announced the March 2017 update of Visual Studio Code as well as the .NET Framework 4.7.

The latest update of Visual Studio Code was released to address a number of issues such as losing editor contents when upgrading, and the SCM progress API. In addition, the release focuses on the VS Code's editor, workbench, languages, debugging, Node.js debugging tasks and extension authoring.

Key highlights of the release include a preview of workbench theming; a new keyboard shortcut; improved text search; ability to copy with drag and drop capabilities; a new debug menu; async call stacks; and the public release of the Source Control API. The new API allows developers to create source control extensions integrated within the code editor.

API developers can simulate a back-end with Mock Service

API management company Postman has released Mock Service, a tool that enables teams to simulate a back-end server, freeing up developers who were previously restrained by development dependencies.

Postman's service lets front-end developers simulate each endpoint in a Postman Collection and corresponding environment to view the potential responses without having to spin up a back end, writes CEO Abhinav Asthana. This means front-end, back-end, and API teams can work in parallel.

Also, this workflow forces clear communication about how the client and server will communicate, enables isolated debugging and empowers teams to develop independently and simultaneously, according to the company.

Besides Mock Service, Postman features enhancements such as customizable domains for API documentation, a Data Editor Interface that lets users view and manipulate large amounts of data in a fast manner, and autocomplete for variables feature.

Magenta Commerce announces digital cloud offering for B2B

Magento Commerce, a cloud commerce solution provider, announced its release of the Magento Digital Commerce Cloud. The new release allows business-to-business (B2B) merchants to handle B2B commerce requirements to best meet the needs of its digitally-connected customers.

With Magento's platform, merchants can fully support corporate buyers with commerce account management, catalogs and price lists. They will have access to tools for rapid ordering, online requests for workflow, and inventory will be visible across retail outlets.

Also, Magento's platform with APIs and extensions integrate with many ERP, CRM or other backend systems, letting businesses leverage technology investments.

IBM releases the Bluemix App ID

IBM is launching a new security authentication service for its developer platform Bluemix. The Bluemix App ID service provides tools to build third-party security authentication solutions without having extensive software security knowledge.

With Bluemix App ID, developers can enable users to log into their applications using existing social media credentials from sites like Facebook and Google. According to IBM, App ID aims to save time and effort by configuring the login security layer for developers. ▮

Amazon Alexa features let developers build more engaging skills

In order to make Alexa more useful and engaging, Amazon introduced two new development features: a Device Address API and a new metrics dashboard.

Both the Device Address API and the new metrics dashboard allows developers to build new Alexa skills with deeper insights. As of February this year, there are 10,000 skills available on Alexa. Skills are capabilities that enable customers to interact with devices in a more "intuitive way," according to Amazon, and they are essentially apps that users talk to instead of touch.

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It's all about that face: AI

Innovators working on recognition technology to provide users with more personalized experiences

BY CHRISTINA CARDOZA

As technology progresses and the world becomes more virtual, there is a fear that we will lose the human connection and communication; but what if our devices could replace those interactions? Developers and researchers have been advancing artificial intelligence to not only create systems that think and act like humans, but also detect and react to human emotions.

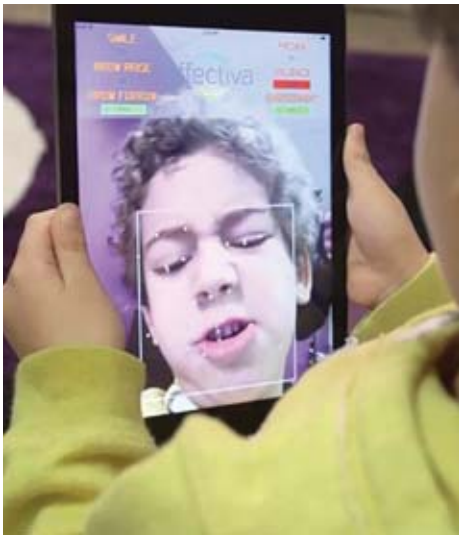
This type of AI has been dubbed emotion or emotional AI. Boisy Pitre, an emotion AI evangelist for Affectiva, a emotional recognition software and analysis provider, says emotion AI allows developers to train machines to learn facial patterns and understand emotions based on user reactions. The point of this research is to develop personalized user experiences that can help improve lives.

"The Internet has created a huge divide between emotions and communications. How many times have you ROFLed with a straight face? How many times have you shown surprise just by sending an emoticon? Our life has become a series of straight faces staring at the mobile screen. The intention of using Emotion AI is to bridge this divide. It is time to take virtual communication to the next level," said Sumesh Dugar, CEO and founder of True Emoji, a emotional AI app provider.

The technology company Brain Power has been using emotion AI to help families create an emotional connection with their autistic loved ones. The company has created an augmented reality device that aims to improve how those on the spectrum understand and recognize emotions. "We create augmented reality games with the goal of creating new, engaging ways for families to play together and grow closer while learning about emotions. With Emotion AI, we can add a new layer of intelligent interactivity, where the games can respond to the mood of players — either real or acted out — in real time and respond accordingly," said Joey Salisbury, director of software development at Brain Power.

Affectiva provides software development kits that enable developers to incorporate this type of emotional intelligence into their applications. The company's SDKs are able to detect anger, contempt, disgust, fear, joy, sadness and surprise. "With these seven, developers can capture a range of emotional states from their users using just the camera on their device," said Affectiva's Pitre.

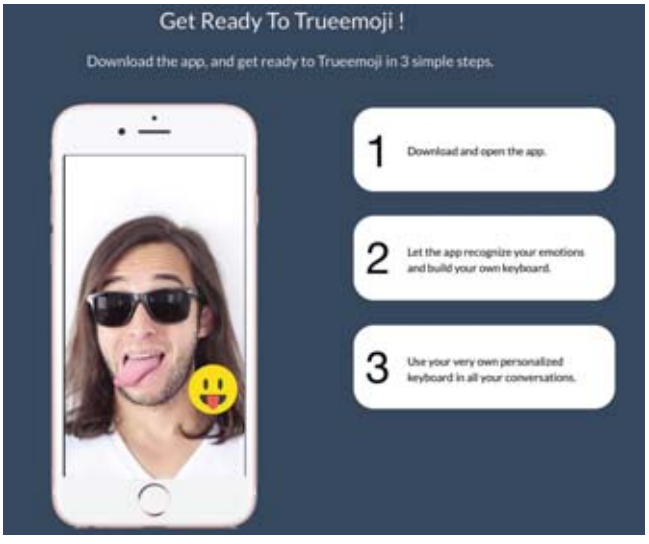
True Emoji uses Affectiva's SDK to create an application that can read and



Affectiva's emotion AI technology on iOS.

can read your emotions

recognize user emotion. Its emotionally intelligent app detects a user's facial expression, matches it with the appropriate emoticon and provides a personalized emoji keyboard to help users express their true emotion through message conversations, according to Dugar. "The beauty of the SDK [is that] it...makes you focus on the application of the technology," Dugar said. "It uses machine learning and has a huge data set to give great accuracy of reading."



Dugar explains we are in a world today where the roles of people and technology are reversing. Instead of humans learning from the use of technology, technology is beginning to learn as humans use it. "Technology has come of age and has started understanding one of the most nuanced feature of being human: Emotions. Thus, while thinking of its applications, the old-world assumptions and limitations need to be dropped and the new emergence needs to be understood more from a social and psychological standpoint and above all from an anthropological proposition," he said.

However, despite all the advances being made in this space, Affectiva's Pitre explains emotion AI still has a ways to go before it can truly reach its full potential. "The face, while an important canvas for emotional expression, isn't the only channel of information. Our voice can also convey emotion, as can our physiological characteristics [such as] heart rate, skin conductivity, pupil dilation, etc. Being able to measure these in real-time requires advances in sensor technology. With more measurement comes more data, which will improve the experience," said Pitre.

THE REALITIES OF MACHINE LEARNING
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Developers who are looking to integrate emotion AI into their applications should experiment and create prototypes in order to get a feel for how best they could apply the technology, according to Brain Power's Salisbury. This will help developers learn the strengths and weaknesses as well as get a creative understanding of the technology, he explained. "Like people first getting started with virtual reality, you might have some ideas for what you'd want to do with it, and then realize afterward there's more to consider and certain applications will work better than others. It's a rapidly evolving technology, so it will continue to grow more and more sophisticated. Staying on top of what's state-of-the-art and how it can be most effectively applied is critical," he said.

Salisbury does believe as the technology develops there will be huge positive potential to make technology more humane and thoughtful.

"Emotion AI's true peak is on the horizon. It will reach billions of people and assist them in their daily lives, making us feel connected in a more human way," True Emoji's Dugar added. ▮

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The Best CRASH! and BUG Reporters: 2017

BY STEVE UFFELMAN

"Quality is never an accident; it is always the result of intelligent effort."
—John Ruskin

As creators of software, we strive to eliminate bugs to create the best experience for our users. But we can only fix problems we know about, and the more we know, the faster it goes.

All third-party mobile bug reporting platforms seek to provide timely data on the sources of crashes and bugs, but they differ in their approaches and capabilities.

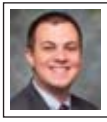
Finding the right platform will depend on the project's needs, but here is a high-level comparison of some of the best tools for iOS and Android: Appsee, Bugsee, Bugsnag, Crashlytics, HockeyApp and Instabug.

Crash Location

A crash report is useful insofar as it reveals what happened, where and why. In this, the major offerings differ in quality of their symbolication—properly identifying the line of code that caused the crash. **(Fig. 1)**

While each provides insight into which class or method experienced an error, not all with the same level of accuracy.

CrashProbe's robust tests reveal the strength of Bugsee and HockeyApp in this area. Important to note here, that Bugsnag (ranked 3rd) data is about a year old, so update is due.



Steve Uffelman is an iOS developer and attorney.

Leading up to the Crash

So we see where the app crashed, but often enough, we lack the key data about how we got there in the first place. What exactly caused our code to execute that particular flow?

That's where some of the tools provide important historical data about what preceded the crash.

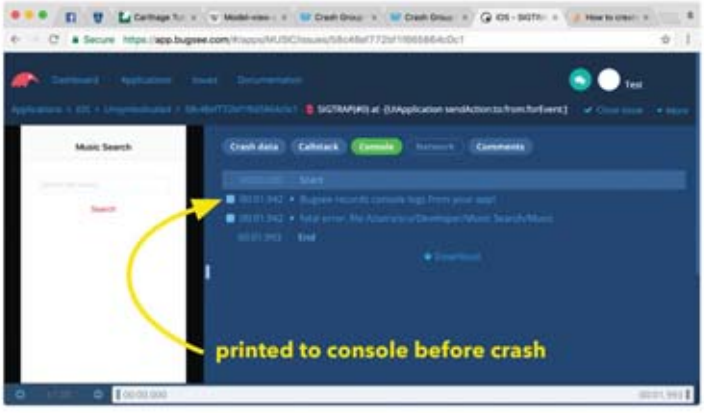


Figure 1

Console Logs

Bugsee and Bugsnag also provide a readout of an app's console log immediately before the crash. This empowers a developer to understand more about the state of the application at crash time.

Video

Beyond mere crash reports, Appsee and Bugsee will play back an app's interface in the moments preceding the error. While both match the event timeline to a video step-by-step, Bugsee's videos are of higher fidelity, whereas Appsee's seem more like a series of screenshots.

There is no substitute for the ability to witness the user's actions that led to a crash. It can significantly reduce the time required to reproduce and diagnose a bug. Especially, if it is a rare and intermittent problem.

Both Appsee and Bugsee overlay circles indicating the user's taps onto the video. This makes it even easier to retrace the steps that caused the error, separating them from the others.

Network

Bugsee and Instabug characterize the network activity preceding a crash, something their competitors should strive to include. This helps to understand whether it was the server failure that might have caused the problem.

In-App Bug Reporting

Many bugs do not cause crashes, but diminish the experience of an app nonetheless. In addition to receiving reports and videos of crashes, Bugsee and Instabug provide users and testers the ability to report bugs manually from within the application.

In both cases, the user may upload an annotated screenshot and description of the problem. This can be triggered from a gesture or from explicit UI within the application, and is particularly useful for beta testers who are motivated to provide feedback.

It should be as easy as possible for a tester to report problems. Bugsee and Instabug excel in this regard, delivering the necessary information directly to the developer's inbox.

Setup

These top platforms strive to make installation simple, and they mostly succeed, but differ in small ways. **(Fig. 2)**

Most of the solutions require to run

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scripts for the build phase of an application, and require the upload of a dSYM file to symbolicate crashes. This is a simple step, but can be a hassle when using dynamic frameworks, as most crash reporters only handle the main app's dSYM, and anything further requires additional legwork.

Bugsee's upload agent, however, tackles this in one step. Crashlytics and HockeyApp, on the other hand, provide Mac apps which walk developers through SDK integration, which can be effective to verify that installation was done correctly, but these helper apps are ultimately not necessary.

Figure 2

Documentation

Typically, the online documentation is straightforward enough to integrate any of these frameworks into a project. Documentation for these reporting providers is generally top-notch, particularly when it comes to the basics.

Each has a website with hierarchical navigation that makes it easy to find relevant information. Where this fails, a simple Google search will do. Chances are, that a problem encountered with one of these providers will be discussed on Stack Overflow.

There can be some quirks with error reporting frameworks, however. For example, utilizing multiple offerings at once may result in one "catching" the crash before another.

Upon encountering problems, the documentation should be your first stop. Paying careful attention to the details upfront can avoid many hassles later, so review the documentation carefully before deploying.

Dashboard

Each of these crash reporting platforms has a dashboard where bugs are listed and described. As bugs begin to roll in for an app, its developers will need to determine which are the most important.

Some platforms, such as Crashlytics and Instabug, automatically prioritize particular crashes and problems based on their frequency and the number of users affected. The others generally allow you to filter or sort by these metrics, but do not do so automatically.

Integrations

While each of the reporting platforms will integrate with other services, Bugsnag and Crashlyitcs' offerings are the most robust.

Bugsnag offers clever, two-way data sharing with some popular project management tools. Conversely, HockeyApp's integrations require a bit more effort, and Appsee is a bit behind the rest, but most provide a way to communicate with BitBucket, Github, Jira, Slack, or Trello.

Be sure to check the reporting platform's documentation to ensure your desired integration is supported.

Cost

Any of the options can be tried for free. With the exception of Crashlytics, which is always free, and Appsee, which offers a 14-day trial.

The top bug reporting platforms begin to charge for their services as the number of account logins or published apps/users increase. All of the providers publish their pricing schemes on their websites, with the exception of Appsee, which requires a call to their sales department.

All services structure their pricing slightly differently, making it a bit difficult to compare. Some charge per team members, some — per number of apps, or events, or per app users.

So while your mileage may vary, typically, for a small company with a handful of apps, the monthly price won't rise above a few hundred dollars, but larger enterprises can expect to pay upwards of $1,000.

One may wonder why Crashlytics is free, given that its competitors all charge for their services. Crashlytics was acquired by Google in early 2017, with plans to integrate it into Firebase. It is not clear whether Google intends to use the free pricing to encourage adoption of other developer-related services from Google, or perhaps its ad offerings.

Nevertheless, developers should consider whether sharing competitively useful information with a third party is worth the risk, regardless of the price.

Summary

So how do you choose the best solution? It depends on your needs. If cost is an issue, then Crashlytics is hard to beat. However, free does not always mean the best.

Not only other tools do not compromise your usage data, they also offer a way more comprehensive suite of features. These features are quite helpful in chasing those pesky bugs in mobile apps. However, those are paid services.

Below **(Fig. 3)** is a handy comparison table of the aforementioned bug and crash reporting tools. ▮

	Symbolication Accuracy	Console Logs	Video	Network	In-App Bug reporting	Issue Prioritization	Integrations (Jira, Slack, etc)	Cost
Appsee	Good	NO	Video + touches (low fps)	NO	NO	Manual	Good	call for pricing
Bugsee	Highest	YES	Video + touches (high fps)	YES	YES	Manual	Good	$0-$599
Bugsnag	Good	YES	NO	NO	NO	Manual	Most Robust	$0-$999
Crashlytics	Good	NO	NO	NO	NO	Automatic	Most Robust	free
HockeyApp	Near Highest	NO	NO	NO	NO	Manual	Good	$30-$500
Instabug	N/A	NO	NO	YES	YES	Automatic	Good	$0-$349

Figure 3

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Running middleware in containers

BY LISA MORGAN

"Ops-life without containers is difficult."

This is a common feeling for many enterprises looking for the benefits from containers. However, once customers look to migrate to containers, what are the main issues they will have and how are successful companies making the transition? This can include developing new cloud-native applications as well as leveraging containerized middleware software applications.

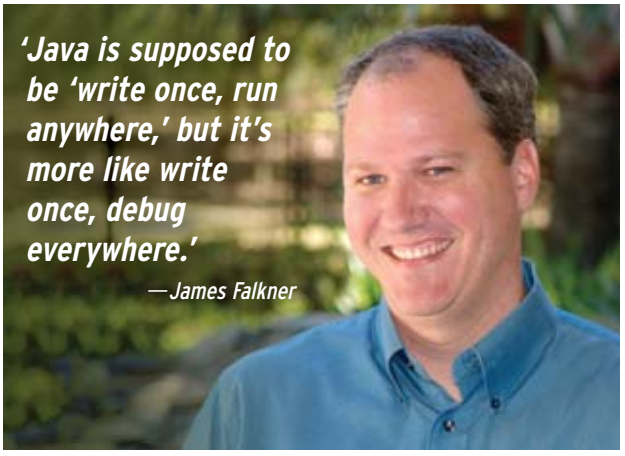
Many software teams are moving toward containers, albeit not at the same rate. The organizations making the most progress are those who focus on containerizing applications mainly to take advantage of microservices and portability across public, private and hybrid clouds. Businesses moving at a slower rate are concerned about running mission-critical apps in the cloud and having to rewrite their applications. At the same time they are thinking about the future, and for developers that future is in cloud and containers. Moving apps to containers and lightweight app platforms lets companies innovate quicker today, while setting them up for tomorrow.

"If you're using containerized middleware services, developers can build their applications in the same environment that's going to be deployed in production," said James Falkner, technology evangelist at Red Hat. "It gives the IT staff more confidence in what they're going to support. And developers no longer have to rely on the underlying operating system to resolve dependencies and to ensure that the apps work on different operating systems."

Red Hat created containerized middleware services — a set of container images of all its middleware — that work seamlessly with OpenShift. This enables customers to modernize existing apps and build new cloud-based infrastructure for more agile processes across IT and the business. They can also implement new ways of architecting, delivering and integrating applications.

Containerization Is efficient

Containerized middleware and containerized apps share many of the same benefits. For example, apps built on a PaaS use an underlying runtime provided by middleware. When the app and runtime are packaged and deployed together, developers benefit from container portability and ease of use for both the app and the middleware. In addition, they no longer have to worry about the runtime environment or operating system issues.



"Abstracting the operating system from the developer is a huge benefit," said Falkner. "Java is supposed to be 'write once, run anywhere,' but it's more like write once, debug everywhere. We've eliminated a lot of the pain Java developers faced around portability."

Apps do not have to be re-architected

Organizations that have traditional Java EE apps running on bare metal or a VMware virtualized container are starting to move away from heavy-handed virtualization to lightweight containers. They want to be able to do that without re-architecting their apps.

"We wanted to support customers who have legacy apps that they want to move to a modern deployment platform," said Falkner. "We can support them at whatever speed they want to move at in terms of modernizing their apps and IT infrastructures."

Even without re-architecting the apps, DevOps teams can develop and deploy faster with fewer resources.

Leverage middleware as a service

OpenShift container orchestration enables middleware as a service. Because the middleware is modularized, it's ideal for software organizations moving to containers and microservices because it mirrors what's happening at the application level. When apps and middleware share a common architecture, DevOps teams can avoid the unnecessary overhead and complexity they would face if they were running containerized apps on traditional middleware.

"Even if you move apps without touching them, you can discover what works and doesn't with your mission-critical apps quickly instead of waiting 18 months or two years to come out with the latest version of your apps, or even the next generation of your business," said Falkner. "It gives you more time to focus on innovation."

For example, a European airport transformed hundreds of legacy applications into containerized applications using Red Hat JBoss Fuse, EAP and OpenShift. The integrated apps now push important flight information out to customers via mobile devices and the web.

Learn more at www.redhat.com. ∎

New threat: Underprotected APIs

OWASP also adds Insufficient Attack Protection to Top Ten list

BY MADISON MOORE

The Open Web Application Security Project (OWASP) released its Top 10 2017 project for public comment. This is the fourteenth year OWASP is raising awareness of security risks with its list, and it contains two major vulnerability updates, example attack scenarios, and a list of free and open resources for security-conscious developers.

When Jeff Williams, OWASP Top 10 project creator and coauthor, first wrote the OWASP Top Ten, he said the application security industry was "shrouded in darkness." There were only a few individuals who gained knowledge through hand-to-hand combat with applications, and these individuals recognized that they had to make this information public.

"For all the advances we've made at OWASP, application security isn't part of every software project, it's not taught regularly in university, and it's often not viewed well by development projects," said Williams. "In fact, based on the OWASP T10 data we just collected, the average number of serious vulnerabilities per application is a stunning 20.5. That's an insane number that just shows how far we have to go."

The OWASP Top 10 2017 release is based on the analysis of over 2.3 million vulnerabilities across 50,000 applications, and it follows the 2013 updates, said Williams. The two major additions to the T10-2017 release includes Insufficient Attack Protection, since one of the most basic security capabilities is being able to detect, prevent, and respond to manual and automated attacks, said Williams. Given the threats applications face, every modern application should have the ability to block these attacks, so they can dramatically improve the ability to defend against both manual and automated attackers, he said.

The next major addition is Underprotected APIs, since the use of APIs has exploded in modern software, said Williams. There are a variety of protocols and data formats used by these APIs, including SOAP/XML, REST/JSON, RPC, GWT, and others. It's important to note that these APIs are often unprotected, and they contain numerous vulnerabilities, said Williams. He also added that these APIs represent a "major blind spot" for security programs in organizations, and OWASP is helping to refocus teams on this expanding problem.

"To me, T10-2017 reflects the move towards modern, high-speed software development that we've seen explode across the industry since the last version of the T10 in 2013," said Williams. "While many of the vulnerabilities remain the same, the addition of APIs and attack protection in this version is designed to focus organizations on the key issues for modern software."

Williams said it's important to understand that the Top 10 is an awareness document, but it's incredibly useful to organizations that have extremely low awareness of application security. He said it can help application security "champions" gain executive sponsorship to start a program, or it could help companies gather information on how they are doing in terms of security.

Application security is 'optional'

According to Williams, companies need to decide if they are going to be an organization that isn't going to put its business, employees, and users at risk with code that contains known and obvious vulnerabilities. Companies that are not taking application security seriously, or those that choose to ignore the 10 items listed in OWASP's document are taking a "crazy risk," he said.

Williams said that none of this is "very complicated," but far more organizations are just getting started with application security. As a result, the application security industry is going to have to reinvent itself, he said.

"Security experts are going to have to figure out how to deliver 'security as code,'" said Williams. "Essentially, they have to translate every security requirement, every coding guideline, every 'best practice,' every threat model, and every security architecture into code that can run during the development, build, test, and deployment process. Even in operations, it's critical that attack detection and response is fully automated."

OWASP plans to release the final public release of the OWASP Top 10 - 2017 in July or August 2017 after a public comment period ending June 30, 2017. ▮

Proceed with caution

Williams suggests companies review the 10 application security risks listed in OWASP's Top 10 2017, and he strongly encourages organizations to consider the following:

- Ensure the company has an up to date inventory of what applications and APIs exist
- Figure out if the business has a threat model and establish a high-level application security architectures with some standard defenses.
- Give development teams (not just coders) the tools and libraries that they need in order to reliably deliver code securely. Be sure they're trained in application security basics and the details of the company's program.
- Continuously verify applications for vulnerabilities throughout the software lifecycle, including both known and unknown vulnerabilities. Make sure this includes libraries.
- Check that the company has visibility and control over attacks during operation, so teams can respond in less than a day to any new threat.
- Put in management dashboards to ensure that the company is covering the entire application portfolio, and check that the company achieved the level of security commensurate with the threat model.

Namespaces: A key to container security

BY CHRISTINA CARDOZA

Liz Rice

Everyone is talking about containers these days, but what do containers actually mean for software development? There are many different pieces involved to put a successful containerized application together. SD Times caught up with Liz Rice, technology evangelist for container security specialist Aqua Security, to talk about a very important piece: Namespaces. Rice spoke at DockerCon late last month about namespaces, and what they can do for containers.

SD Times: What are namespaces, and why are they necessary for containers?

Rice: Namespaces are one of the key building blocks that are used to create containers. When you start a process on Linux, you can ask the kernel to give the process its own namespaces, and that means it has a restricted view of what's going on. So for example when you look at the list of running processes within a container, you only see the ones inside that container and none of the processes running elsewhere on the machine. It's namespacing that gives the container this constrained view. I'll be demonstrating exactly how it works in my talk at DockerCon.

What are the benefits to using namespaces?

Namespaces are an incredibly lightweight way to isolate containers from each other. From inside the container, it looks a lot like being inside a virtual machine, but there's none of the overhead of a hypervisor. Starting a virtual machine can take minutes, whereas starting a container is almost instantaneous.

Are there any challenges developers should be aware of when using namespaces?

The main challenge is that you don't have the full isolation that you get with true virtualization, and that does have some security implications. For example, although the container can only see its own running processes, the host machine has a view of everything that is running inside all containers, and — as I'll show in my talk — all their environment variables. If you're using environment variables to pass secrets (like, say, database passwords) into your containers, they'll be accessible from the host machine.

What do you hope developers will take away from your talk?

As well as namespaces, I'll be talking about cgroups. If a namespace limits what a container can see, a cgroup limits the resources it can use, like memory or CPU. I'll be demonstrating all of this by writing my own container in Go, and then I'm going to subject it to a security exploit to test whether I have really isolated my container from the rest of the machine. If you like live coding and demos, and you want to really understand what's going on when you run code in a container, you should definitely come along. ▮

How two millennials are changing the tech startup industry

BY MADISON MOORE

The two millennials who launched their own technology development and coding company, WeKanCode, are finding new ways to prepare clients for the challenging startup environment. Their recently introduced platform, WKC Ventures, assists them with everything from business requirements to product design and development.

The brains behind the year-old company are co-founders and tech entrepreneurs Pablo Jimenez Godoy and Sathya Nellore Sampat. Jimenez Godoy cofounded his first startup, a biometric payments solutions provider, during his undergraduate studies at LÉcole Superieure du Commerce Extérieur in Paris, France. The Venezuelan-born Jimenez Godoy has bachelor's and master's degrees in business and finance.

As for Nellore Sampat, he previously worked at the Indian Space Research Organization, and graduated from New York University with a masters in management and systems, and a bachelor's degree in computer science from the College of Engineering in India.

Nellore Sampat and Jimenez Godoy met in New York and joined forces in 2014, scoping out technical conferences to build a client network. From these efforts, the two partners found there were a lot of people that needed help building software products. The problem was, these people had great ideas, great execution capabilities, but they didn't have the money to test the product in the market.

Nellore Sampat and Jimenez Godoy saw this gap as an opportunity to start a business where they can provide not only the development resources, but invest in the ideas that they believe will succeed.

Initially, WeKanCode started off as an engineering company, but after realizing that all startups need the same thing — technology, legal advisory, marketing service, fundraising — WeKanCode transformed into a full-360 one-stop-shop partnership model, ensuring startups are on "their road to success," said Jimenez Godoy.

WeKanCode co-founders Pablo Jimenez Godoy and Sathya Nellore Sampat.

These one-stop-shops are not unheard of; there are plenty of businesses that offer full design and development services for startups looking to create the next big application or product. The problem, according to Jimenez Godoy, is most people do not have the kind of money to finance such ideas.

That's why WeKanCode approaches clients on a case-by-case basis and invests in the ideas they think have market potential. They provide them with technology, help them centralize a product, build the technology and help them test and market the product in order to get feedback from potential users. Once WeKanCode determines that there is real need in the market for the product, they begin to raise money for the startup.

One of the startups WeKanCode funded was the "Airbnb for horses" application, Staller. It's a website and mobile app that allows horse owners to rent stalls at or near equestrian competitions in the U.S. The company also funded health and wellness startup GreenHopping, which lets users find healthy food choice options on the go or when traveling.

Through WKC Ventures, the company's new platform that identifies ideas with potential, is structured so WeKanCode serves as a technology partner. WeKanCode becomes an extension of the client's team, so they can help define a clear project roadmap, infrastructure consulting and market testing. Also, WeKanCode will expand into a consulting model, which gives their client "go-to market strategies," said the company.

"Our vision is to create innovative technology solutions for real-life business problems," said Nellore Sampat. "As a firm, our goal is to unlock access to high-quality and affordable technology, offering a fair partnership to promising early-stage ventures. Additionally, we aim to leverage a diverse network of investors and strategic partnerships in order to ease the access to capital for these startups," he added. ∎

Three cloud PaaS trends to watch in a serverless world

Cloud-native Platform-as-a-Service offerings range from open-source to low-code

BY ALEXANDRA WEBER MORALES

The future may be serverless, but for now, commoditized infrastructure is making platform-as-a-service increasingly attractive for startups, enterprises and developer shops. Led by Amazon and Microsoft, vendors such as Salesforce, Google and Oracle are pitching platforms for every development style, architecture, language and use case. And cloud-native programming is even attractive on-premises: a desire for consistent processes and DevOps-style tools is driving Microsoft's Azure Stack, which works seamlessly in hybrid deployments with various Azure platform services. There's also a thriving community around Cloud Foundry, an open source PaaS that comes in commercial distros by Pivotal, HPE and IBM.

Open source is holistic

Though Amazon Web Services is usually top of mind for infrastructure, it's slightly less sought-after on the platform side. Here, Microsoft Azure shines, thanks to years of developer tool expertise — and a well-documented ability to pivot toward any market it initially missed.

But before perusing Azure's plethora of options, it's worth taking a closer look at how San Francisco-based Pivotal runs its two core open source projects, Cloud Foundry and Spring Boot.

"Pivotal Cloud Foundry goes the whole way from embedded operating systems — so you don't have to buy anything from Red Hat ever again, to cloud orchestration — so you don't need Puppet and Chef, to middleware — so you don't need IBM WebSphere or Oracle WebLogic, to load balancing and some API services, all the way up to cloud-native frameworks such as Spring Boot, which is the most popular Java framework for cloud apps in the world," according to James Watters, general manager of Pivotal's Cloud Platform Group, in a January 2017 video interview with Datamation.com.

As Watters sees it, Pivotal's holistic vision is exemplified by its cloud-native apps consultancy, Pivotal Labs. Ford's connected car service, for example, chose Cloud Foundry running on multiple clouds and partnered with Pivotal Labs to execute their apps.

To be sure, any of the current PaaS vendors, including IBM and HP, building off of Cloud Foundry are adding many features for orchestration, containers, DevOps, testing and management, not to mention more specialized features such as chat bots, AI, blockchain-as-a-service and functions-as-a-service. But one thing no PaaS user should take for granted is the potential for malicious activity.

Security is critical

"The cloud has made delivering software easier but has opened up a huge attack surface. We use AWS serverlessly to protect AWS," said Matt Fuller, founder of CloudSploit, which provides open source and hosted automated security and configuration monitoring software for AWS cloud environments.

According to Fuller, "Even the most secure cloud providers only offer security of the cloud. The user is responsible for security in the cloud. As groups, roles, devices, etc. change, oversights and misconfigurations open vulnerabilities that lead to outright hacks or just a financial DDOS [distributed denial of service]. Unfortunately, a single misstep can compromise your entire infrastructure."

CloudSploit monitors your AWS instance for anomalous activity with tests you choose or create. An open source project, security experts from around the world contribute to CloudSploit with the goal of increasing compliance with best practices, to protect the company infrastructure and their client's information.

Even those who eschew specialized monitoring take confidence in the fact that a core benefit of PaaS is not having to patch the underlying frameworks and operating system. According to Omar Khan, Redmond-based general manager for Microsoft cloud app development and tools, "Developers spend a lot of time, especially in a DevOps world, making sure that the components that their code is running on are updated to avoid any vulnerabilities. PaaS eliminates a lot of that, because the patching is done automatically, and that's a huge time savings."

The shift to DevOps culture has also taken effect, Khan explained: "Cloud is enabling DevOps more and more. And we're seeing developers bringing security into the lifecycle through 'rugged DevOps' or 'shift-left' of the scanning within the development process — not having to wait to do that stuff once in production."

Low-code PaaS gains traction

As PaaS gains in popularity, the panoply of flavors increases. In addition to iPaaS (integration PaaS) and PaaS for testing and QA, there are low-code options available. In September 2016, Oracle launched Project Visual Code, a low-code platform for business users and developers to extend services and build new applications with little to no coding.

Low-code platforms are emerging around specific niches, such as UK-based Naqoda's recently launched Core Banking Platform as well as its existing Tax Engine. The cloud-enabled system enables European open banking via the Payment Services Directive 2 (PSD2), which enables financial information sharing and APIs for new financial products.

QuickBase is a veteran player in the space and has been collecting metrics on low-code speed gains. Last fall, the company's "2016 State of Citizen Development" report found that among respondents, a majority said they were able to deliver apps in less than a month. In contrast, for delivering traditional hand-coded apps, two-thirds of developers reported requiring over two months, and nearly one-third required over six.

For some, no-code is a game-changer: "Because all of our applications are produced on a no-code platform as a service, we are able to staff our team with individuals who are less experienced and/or less technical than traditional development shops," said Treff LaPlante, CEO and founder of Citizen-Developer.com and WorkXpress in Harrisburg, PA.

"The results have been astounding. We have reduced the average hours to deliver a project from beginning to end to only 273. On this platform we have materially grown our business year over year and are now able to pursue new markets," he said.

When PaaS isn't the answer

Of course, PaaS isn't a panacea. Kim Rowe, CEO and founder of Toronto-based RoweBots Ltd., does custom embedded and Internet of Things development with PaaS, but notes that embedded PaaS is weak in one way or another. Like any good coder, Rowe's solution was to build his own PaaS.

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Could Serverless be the next Docker?

In 2014, Amazon unveiled its Lambda functions, and since then there's been a flurry of new serverless offerings.

Along with Iopipe.com and Apex, there's Serverless Inc., the company behind the actively managed MIT open-source project of the same name. All comprise a new ecosystem of tools to manage, version and test serverless functions, especially Lambda functions. And similar — but by no means identical — compute services are evolving, including Microsoft Azure Functions, IBM Bluemix OpenWhisk, and Google Cloud Functions. Finally, you know it's a trend when a conference appears: On cue, Serverlessconf.

What all these function tools have in common is the ability to execute standalone commands in languages such as JavaScript, Python, C#, or Java on cloud infrastructure, with pricing-based requests, duration and memory. In his forthcoming book "Serverless Architectures on AWS," Peter Sbarski, VP of engineering at A Cloud Guru, defines five principles of serverless architectures:

1. "Execute code on demand."
2. "Write single-purpose stateless functions."
3. "Design push-based, event-driven pipelines."
4. "Create thicker, more powerful front ends" and
5. "Embrace third-party services."

Indeed, Andreesen-Horowitz parter Peter Levine believes PaaS and the centralized mentality of the cloud will be supplanted by edge devices communicating with each other. That's not inconceivable, according to Microsoft.

"Moving from a server-based deployment to a container-based deployment really increases agility around being able to update and deliver value faster. When you look at serverless, it continues that trend," said Omar Kahn, Redmond-based general manager for Microsoft cloud app development and tools.

"Serverless enables you to architect code that is very much a microservices pattern by nature, because each function is its own thing," he said. "Serverless enables microservices at a smaller granularity than even containers. And when you get more granular microservices, then you think, well, some of these microservices . . . why wouldn't these run at the edge as well?"

— Alexandra Weber Morales

Six ways platform-as-a-service is giving developers super powers

BY ALEXANDRA WEBER MORALES

We asked developers, CTOs, entrepreneurs and consultants across the country to describe concrete ways in which PaaS has changed their development style.

1 Reducing headcount

Rob Reagan, CTO • Text Request
Chattanooga, TN

At Text Request, we're able to reduce headcount using Azure's PaaS offerings. Without PaaS, we'd have to staff a very senior infrastructure and security expert. It's pretty rare to find developers who really know how to harden servers.

Note: There is likely a point where the cost curve for PaaS bends backwards. If you're maintaining a site like Reddit and have a few hundred servers, an infrastructure team is probably cheaper than multiple PaaS services.

With PaaS like Azure Web Apps, I don't stay awake at night worrying about network-level intrusions. Microsoft's security experts at their Azure data centers are probably going to do a much better job than our comparatively smaller team.

2 Conserving startup cash flow

Peter Kirwan, CEO • Collexion, Inc.
Portland, OR

My latest startup, Collexion, has built its entire product on PaaS. Our core features are built on AWS, but we have gone a lot farther than other companies by making the commitment to develop critical parts of our application architecture incorporating many specialized AWS applications.

For example, we use AWS's Cloudsearch to index millions of items to increase performance and take the load off our database. There are other examples, like their AI tools and image recognition, that are pay-per-query via an API so that we use the platform but don't manage any of the infrastructure. In addition to AWS, we integrate with third-party cloud-based applications through APIs, Zapier and IFTTT.

I made a strong push when founding the company to use as many PaaS and cloud applications to rent vs. build, which not only saves a massive amount of software development, but eliminates the need for 24/7 management of the site in the early stages of the company.

3 Accelerating HMI development

Kim Rowe, CEO and founder • RoweBots Ltd
Toronto area

PaaS allows us to accelerate analytics and human-machine interface (HMI) development, while still having embedded solutions that are secure and precisely meet embedded sensor requirements. For example, we built a concussion sensor demonstration in 30 calendar days with 2.5 developers. This would have been impossible without the Microsoft Azure framework.

The powerful analytics developed by the cloud vendors are readily available for a price, accelerating development by years in some cases, which is certainly a superpower.

A system that would have taken 6-8 months to complete can now be completed in 30 calendar days. An Azure system that will scale to multiple wireless routers and hundreds of end users is underway with an extra month of effort in total.

Our favorite tools are MQTT (a machine-to-machine connectivity protocol for IoT-type publish/subscribe messaging transport) and Azure — and we're currently looking at Ayla, MediumOne and Watson for other clients.

4 Building a DevOps pipeline

Marek Sadowski • IoT advocate
San Francisco, CA

As a Bluemix developer, I can spend more time on the business logic of the application itself. Before developing on Bluemix, a large amount of my time was unfortunately consumed by implementing container fixpacks, upgrades, etc. Now it is all provided for me. I have access to enterprise grade systems — regardless if I'm developing for a large corporation or a startup. Also, all of the configuration and the connectivity to the other elements of the system are elevated now — I use what is provided in the description of the service table.

As an architect, it is very easy to rely on the availability of the system. Simple scaling up (or down) mechanisms take care of the irregularities of traffic to my apps and services. Furthermore, there is no need for system administrators — this role is taken over by Bluemix as well.

If I deploy an application on Bluemix it can be reachable globally, and I can achieve this reach quickly without database administrators, system support teams or hardware engineers.

Finally, there is no need for upfront investment, so startups can now match large enterprises with access to infinite resources — paying for them as they go, starting small and growing with the user base and app usage flexibly.

Recently, I started to leverage DevOps services on Bluemix to automate deployment from development to test and to production. The production cycles are counted in single weeks instead of months or even quarters. So everything becomes very efficient. The most modern languages

(Javascript, Swift) and standards and concepts (cognitive services, Kubernetes, serverless computing) also become instantly available to my team.

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31	Portugal	47.14

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Cloud PaaS

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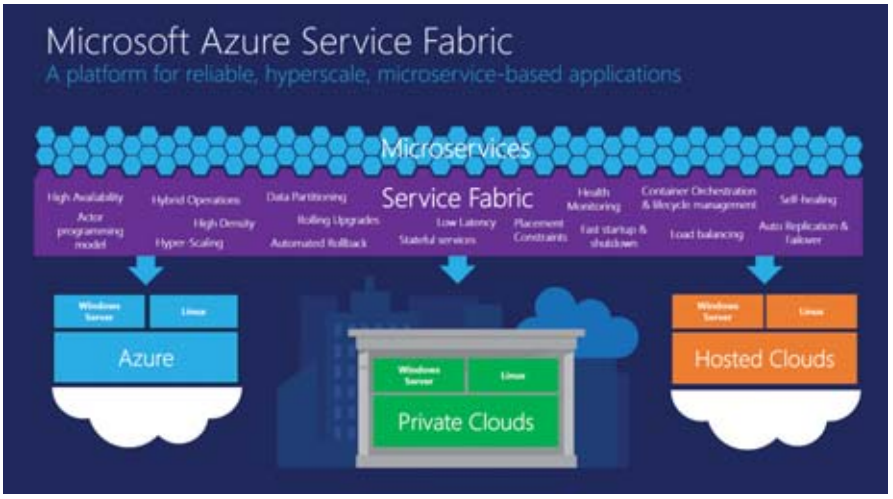
Unison RTOS tackles what he calls the seven key characteristics (lean, adaptable, secure, safe, connected, complete, and cloud) required to build quality embedded systems. Perhaps an eighth key is cost.

"For example, a concussion-detection system we created needs servers running in the cloud. Even if it may not be used for a significant portion of the time, we're still charged for hosting. Figuring out cloud billing needs to be built into the design. It is one thing if it is a mine collecting data 24/7/365, and another if it is a ball team that uses the sensors two hours per day, four times per week during the school year," Rowe said.

Adam Stern, founder and CEO of Infinitely Virtual, a cloud service provider, is not a fan of using PaaS to develop for external customers.

"PaaS is ideal for companies writing applications that are specific to their business. PaaS makes it possible, even easy, to develop applications rapidly with little technical know-how — applications that aren't intended to be sold but that run on a single, captive platform," Stern said. "When it comes to creating an app for customers, however, it's a different story. If the platform for which the app was written changes or ceases to exist, you're stuck."



The danger, as Stern sees it, is too much ease-of-use: "PaaS does tend to put internal development teams on the IT rollercoaster, forever investing and reinvesting in platform-specific application development."

Finally, all that convenience doesn't always come cheap, either in terms of freedom or finances. "We like Amazon Web Services quite a bit, so let's pick on them. Their DynamoDB (on-demand database) service is great, but after using it for a few months, it becomes quite an undertaking to port it to a different platform," said Scott Williams, director of software at Tallwave.

"As Fred Brooks says, there are no silver bullets; PaaS systems do tend to be more expensive, and that cost can go up significantly. It's easy to throw a switch, quadruple your processing capabilities for a spike, and then pass out when the invoice arrives," Williams said. ▮

Six ways

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5 Faster prototyping

Hernan Santiesteban
Founder, Great Lakes Development Group
Milwaukee, WI

PasS has definitely changed the way I build software. The ability to quickly get a system up that contains all the necessary tools is a great time-saver. I mainly work with Azure, but the same can be said for most of the cloud services providers. With PaaS tools, you can get a fully functional web application up in just a few minutes. This includes all the basic necessities like a database, web API scaffolding and authentication.

The ease with which you can get a system up makes prototyping a breeze. This gives you ability to focus on the problem you're trying to fix. No need to spend valuable time setting up the foundation of a system that may not be in existence for more than a few hours or days.

If you're running a production application, the ability to automatically scale if your app encounters an unexpected traffic spike can help you rest at night.

However, if you're just running an app with a small number of users, you have no need to prototype, and you can easily handle all the maintenance yourself, then PaaS may not be the right answer.

6 Microservices architectures

Gal Oppenheimer, Sr. product mgr. • Built.io
San Francisco, CA

A proper, stable PaaS can be a breath of fresh air. When we launched PaaS as a feature in Built.io Backend in October 2013, it enabled both our internal teams and developers. Any developer could now build a fully automated application — frontend, backend and mobile — on their own.

If you factor in the time it takes to setup, secure and scale a server, you could easily bring a three-month project down to 1.5 months or less. For a project with one web developer and one application developer, you can completely forgo a 50% DevOps engineer.

At Built.io, we're very big fans of Docker and Node.js. Combined, they offer significant simplifications in your server stack and enable cleaner cross-compatibility of code and content by eliminating data transformations between your APIs and server code.

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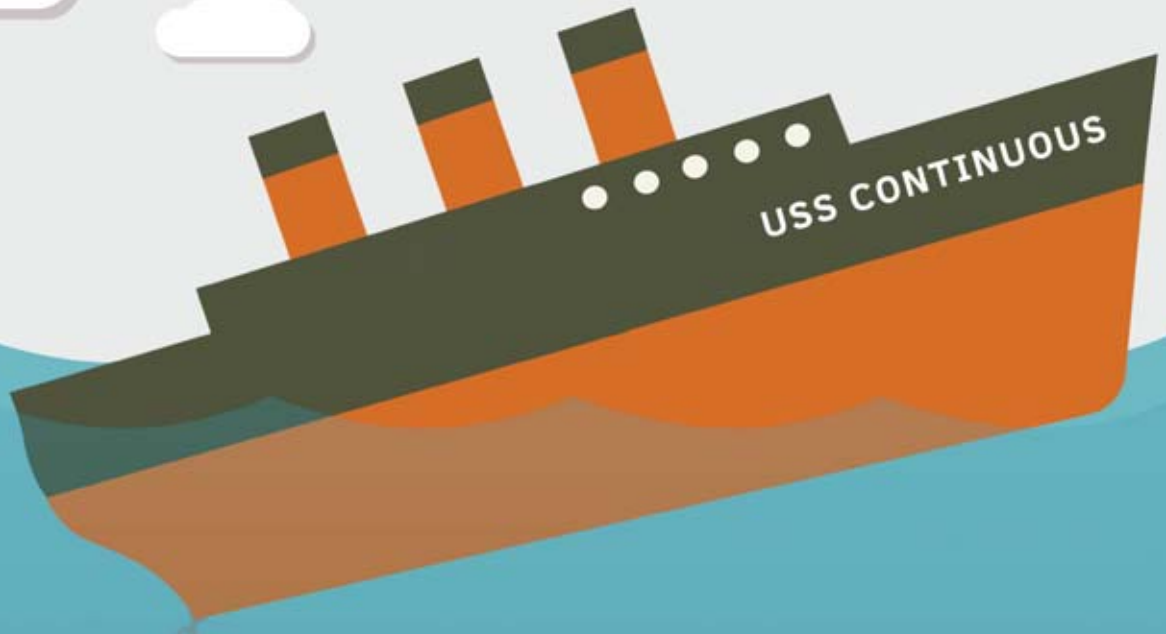

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Overcoming problems of managing cloud infrastructure at scale

BY DAVID RUBINSTEIN

Getting to cloud today is not difficult. If you're an individual looking to spin up a test environment in the cloud, for instance, the barrier to entry is quite low.

But when you have an application that calls on numerous services to perform, and allows access to multiple users in multiple roles — not to mention the number of changes made to numerous components of the application — the complexity makes it difficult to do cloud right. Automation is critical to managing this type of infrastructure environment, but certain steps must be followed for a cloud infrastructure to be truly dynamic.

As the cloud began, development organizations needed a way to build their applications in the cloud. Then, they needed a way to monitor the applications, to make sure they were doing what they were supposed to do. Then, there needed to be a way to manage the infrastructure, such as having the ability to change the infrastructure and the ability to decide who can make that change. According to Josh Stella, CEO of cloud infrastructure orchestration startup Fugue, organizations layer on these additional kinds of control features and management features, cobbling an inefficient solution together from point solutions for build and monitoring, when they should be striving to achieve dynamic infrastructure. Stella describes the term as "an automation of the system where you're no longer thinking about infrastructure, it's just automatically responding, self-healing, self-enforcing to the environment." And, he noted, everyone inevitably ends up going there if they go far and deep enough to the cloud.

"What Fugue did is at the very beginning," he said, "we addressed the very hardest problem, which is how do you fully automate the whole stack and make it so that you can add the new services cloud providers come up with quickly over time and integrate those into that solution. And it turns out when you do that, the control, management, monitoring and build stuff become kind of side effect... If you start trying to glue-code these things together you end up with this sort of Rube Goldberg machine of point solutions and glue code."

'In the Fugue model, all interactions with the APIs go through the Conductor and it knows the state of everything, it enforces the state of everything and it builds everything.' *—Josh Stella*

There are two main components to Fugue. The first is Fugue Conductor, which Stella said can be thought of as an orchestration engine, though he also thinks of it as being like an operating system kernel on a traditional computer. "In the Fugue model, all interactions with the APIs go through the Conductor and it knows the state of everything, it enforces the state of everything and it builds everything," he said. "It does all the provisioning; it does all the teardown. It does all the automated healing over time.

Fugue suggests setting up the Conductor in its own AWS account for security reasons. Conductor has zero network attack surface and does not listen on any ports. The way you talk to the Conductor, Stella said, is through messaging. A user can send it a signed, asynchronous SQS message and when Conductor detects an inbound message, it will only read it if it's properly signed with correct credentials, he said.

The second piece is called Composition, in which users define their configuration as code. Behind Composition is Fugue's own DSL statically typed language and a compiler that will let users know if they're trying to do something that AWS won't allow. "A great example is... if you try to deploy to a region that doesn't exist, the compiler will reject it and tell you, 'No, there is no region US West 4.' You might have meant US West 1 or 2," Stella said.

Fugue also has released a new Team Conductor that gives control of multiple AWS accounts as well as multi-user role-based access.

Stella gave an example of Fugue Conductor in action. "It would be, 'I want to have only these certain ports open on my firewall,' and somebody goes into the AWS console or runs a script, or is a bad guy and breaks in and opens a hole, a back door, to open another port. Within 30 seconds Fugue is going to see that that has happened and it's going to log it, it's going to alert on it, and it's going to fix it. This 'over time' automation of the environment is the hard part; that's the important part. If you don't have that, even if you automate your provisioning, you don't really have infrastructure as code, because you never know past the moment of creating whether it's changed. And so you can't trust your code to tell you what's in your infrastructure. With Fugue you can." ▮

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Scrum, DevOps combine to drive continuous value

BY CHRISTINA CARDOZA

Scrum.org and the DevOps Institute are teaming up on ScrumOps, a new approach to software delivery. ScrumOps is designed to transform IT organizations into the next-generation, agile era of working by bringing Scrum an DevOps together.

According to the organizations, while some believe DevOps and Scrum don't work well together, ScrumOps can be applied to any IT organization. It aims to provide a way for teams to continuously delivery secure and working software while measuring success.

"I believe that without agile, DevOps lacks direction, as agile is the heartbeat of empiricism and places focus on inspection and adaption. On the other hand, Scrum needs DevOps because it creates the foundation to help you scale by reducing the pain the Scrum team faces when releasing software. It's time to finally stop water-scrum-fall," said Dave West, CEO and product owner of Scrum.org.

Scrum provides a framework for delivering software. DevOps provides the automation, culture and practices to support that delivery, according to West.

"When we bring the practices and ideologies of Scrum and DevOps together, we can truly shape the end-to-end IT organization," said Jayne Groll, CEO of the DevOps Institute. "This new model shows how business, development, delivery, security and operations fit together to support continuous value in a governed way."

West explained there is a common myth with Scrum that you can only release an increment of done software once per sprint. However, the Scrum Guide says only that teams must be able to deliver a minimum of one working increment, not that they can't deliver more. In addition, West believes businesses and teams have forgotten that the Agile Manifesto puts emphasis on people, not tools.

"Both Scrum and DevOps have been proven to work, so bringing the thinking together from both will only make the teams better. We should stop thinking of a development team as working in one way and the operations teams working in a different way," said West. "By using Scrum together with DevOps, we believe that lines of communication can open even more broadly and through the exact nature of Scrum being empirical, teams can keep learning, adapting and improving. We cannot let delivery get stagnant, we must keep improving and that is a big part of bringing DevOps and Scrum together in ScrumOps."

ScrumOps is a new approach to software delivery, says Scrum.org's Dave West.

The two organizations have also agreed to collaborate on content, training and resources over the next couple of months. "This is just the start. We are working together to deliver workshops, training and in general to bring our communities of people who are out there every day dealing with difficult situations within their organizations together to improve how they do what they do. You can expect more to come from this combined effort," West said. ▮

In other news...

■ **Acquia** announced a new continuous delivery service to enable developers and DevOps teams to automate processes for code building and testing. Acquia Cloud CD enables faster development and better integration with continuous integration tools. Features include the ability to automate testing and static analysis of build artifacts; ability to speed provisioning and deprovisioning with self-service CD environments; and the ability to run controlled and secure development on one platform.

■ **CA Technologies** has completed its acquisition of the software security provider Veracode. The company has acquired Veracode for approximately $614 million. Veracode provides a SaaS-based secure DevOps platform that will allow CA to broaden its DevOps portfolio and add to its growing SaaS business. In addition, the acquisition sets up CA to compete with the secure DevOps market through automation and scaling of app security testing, according to the company. Veracode also features an app security solution with both static and dynamic testing, developer training, app protection, open-source security management, and the ability to test mobile apps.

■ **Red Hat** announced the latest version of its agentless open-source IT automation framework. Ansible 2.3 is designed to adapt to new IT needs and DevOps workflows. It provides DevOps tools that enable customers to optimize network operations and automate the entire app lifecycle. The latest release also introduces new networking modules and persistent connections framework to enable DevOps for the network.

■ **VersionOne** recently released its 11th annual State of Agile report. The report found that DevOps is quickly growing. Seventy-one percent of respondents revealed that their organizations had current or planned DevOps initiatives. Other findings included organizations measure enterprise agility with business value, and 98% of respondents are succeeding with agile. ▮

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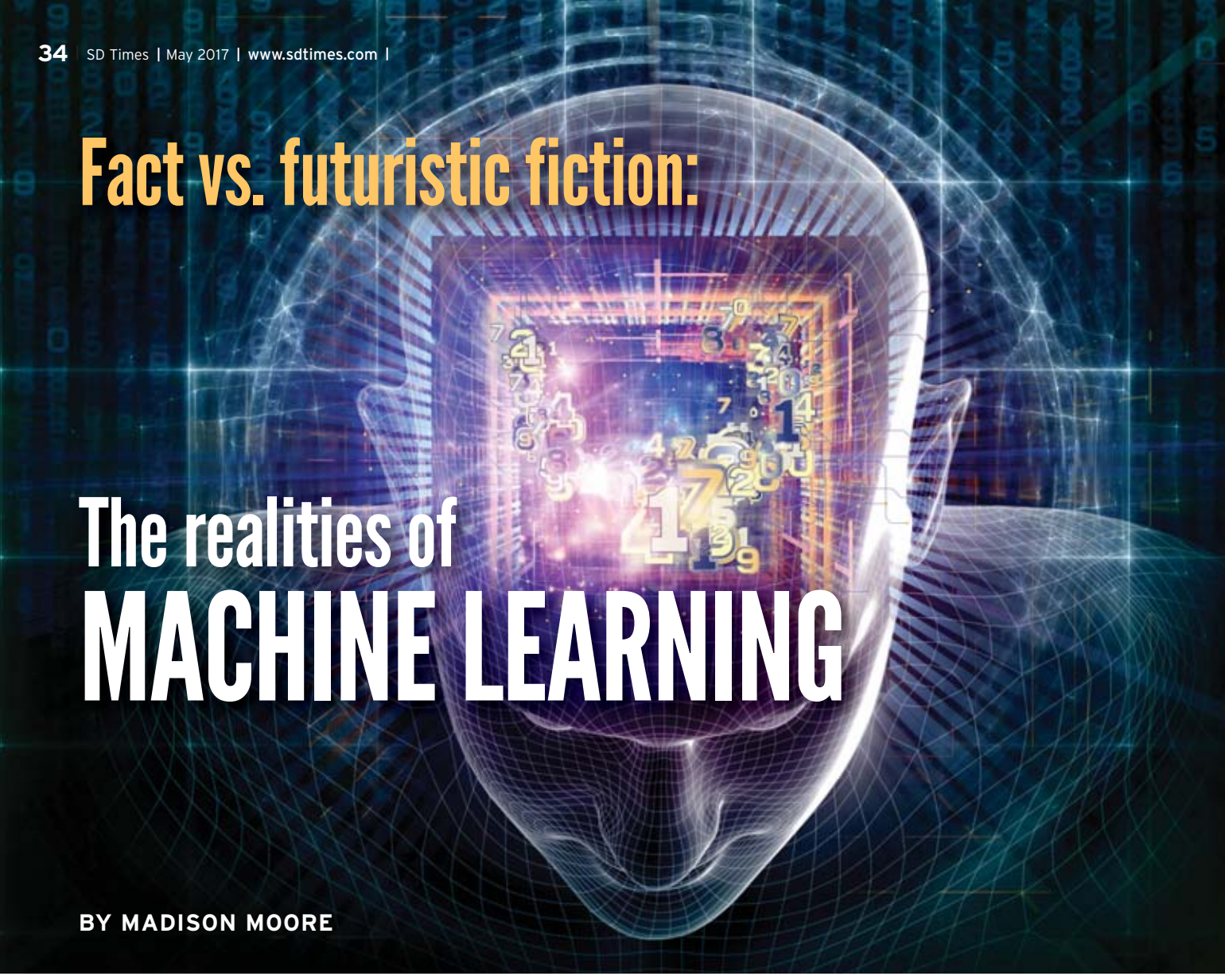

The realities of MACHINE LEARNING

BY MADISON MOORE

In the late 19th century, the Industrial Revolution introduced complicated farm machinery that changed the way farmers planted, cultivated and harvested their crops. These machines meant fewer farm hands were needed, but it created jobs for people to build and repair farm equipment. The improved benefits of utilizing farm machinery impacted the quality of life, it produced food faster, and it created jobs and a new life for farmers.

Machine learning is today's Industrial Revolution. TV shows and movies currently portray machine learning as this creepy, self-aware, futuristic technology that takes over humans' jobs, but these examples do not properly show the real advancements of these cognitive systems. The real improvements are like that of farm machinery; these systems will work together with humans side by side, creating experiences that have never been attainable before.

Machine learning is not "new," but in order to understand how far the industry has come, it helps to take a step back and see where the technology and research began.

It was in the 1950s when machine learning research was conducted using simple algorithms. Around this time, Alan Turing proposed his "learning machines," and he created the Turing Test to determine if computers have real intelligence. Following this achievement in 1957, psychologist Frank Rosenblatt invented the perceptron, or an algorithm for supervised learning of binary classifiers.

In 1980, research scientist Kunihiko Fukushima published work on a type of neural network, which later inspired research on convolutional neural networks, or neural networks that can be applied to visual recognition tasks. The rest of the 1980s was filled with other machine learning discoveries, like research on recurrent neural networks, backpropagation, and reinforcement learning.

In 1992, principal researcher at IBM's TJ Watson Research Center Gerald Tesauro developed a computer backgammon program that used an artificial neural network. It became a rival to human backgammon players. Then, IBM's Deep Blue beat the world champion at chess in 1997, and most recently, Google's AlphaGo became the first Computer Go program to beat a professional Go player.

What is machine learning?

The previously highlighted milestones led to successful scenarios of machine learning doing things like recommending items to consumers on platforms like Amazon, Netflix, and Spotify. That

technology has led to such things as spam filters, speech recognition systems, retargeted Internet advertising, and machine translations.

Today, machine learning is easier and developers or researchers can tap into power that didn't exist before. We can hardly go a few months without seeing a new deep learning architecture or machine learning framework that claims it suprasses all previous standards, said CEO of Bonsai, Mark Hammond. Bonsai centralizes the programming and management of AI models into one platform.

Machine learning is a word that gets tossed around, but Steve Abrams, vice president of developer advocacy for IBM Watson, said machine learning is simply a set of algorithms whose behavior is determined by experiences.

Here's an example: Imagine you want to build a computer vision system that can recognize trees, he said. With machine learning, you can build a system that can be fed examples of pictures of trees and non-trees. Over time, the computer determines what features and patterns depict a tree, said Abrams, so eventually, the system can recognize what is a tree and what isn't.

"Machine learning is this set of capabilities; it can learn models that can predict the future, it can learn models that are going to interpret sensor data, and each of those models are shaped by the experiences they've been given," said Abrams.

Another way to translate machine learning and understand its purpose is to think about predictive models or probabilistic machine models, said Mike Gualtieri, vice president and principal analyst at Forrester Research. Predictive modeling uses data mining and probabilistic models to formulate a statistical model, which represents the data-generating process. Essentially, machine learning takes raw data and it tries to predict something from that data, he said.

This raw data comes in handy for companies that want to predict if a customer is going to leave and go to a rival, for example. According to Gualtieri, the company would use machine learning on historical data to determine a predictive model, which would give them valuable business insights, he said.

"If you know within 89% probability if that customer is likely to leave you, then you have time to do something about it," said Gualtieri. "If you think about the recommendations on Netflix, those are done with machine learning and that's a predictive model as well; it's predicting what TV or movie you are most likely to enjoy watching. Machine learning is all about creating that predictive model."

The reality of machine learning

There have been examples of machine learning being able to do things like flip burgers and write novels, but the realities of machine learning extend beyond just "cool" capabilities.

Think of machine learning as the "latest new old thing," said Phil Tee, CEO of Moogsoft, an IT operations analytics company. It's not news that businesses are using machine learning, but the important thing to note is that now, the technology is being used at a bigger scale.

The big difference of machine learning today is the role that data plays in its algorithms. It's true, according to Kerry Liu, CEO of Rubikloud Technologies, a machine intelligence platform for enterprise retailers, that the industry can't talk about machine learning without mentioning the underlying shift in where data is stored and where it lives, and who is going to be the company to deploy it, he said.

Right now, the majority of data for enterprises lives on-premises in an Oracle, IBM or SAP ecosystem, and this has created an almost war-like effort of who will win the "infrastructure battle," said Liu. Because of all the data that exists, companies have to consider if it is cost-efficient to buy all the gear and host the data on premises, or if it makes more sense to rent the equipment or have a cloud-based model.

Besides the role data plays today, the other notable change is the power of the platform, said Tee. He also sees advancements in voice recognition, image recognition, statistical translation, and semantic indexing of knowledge. Tee believes that we are headed into a digital assistant future, and the next 10 to 15 years will consist of advancements in self-driving vehicles and other digital assistants in applications, homes, and other devices.

The biggest advancement, according to Abrams, is that machine learning is not just a theory; it's a set of mature technologies that can actually be applied to the real world, like in healthcare, applications, automobiles, and hospitality scenarios. Years ago, these technologies were applied in much more narrow domains, and now it's readily available for developers, researchers, and other to consume, he said.

"Go back in time, and you pretty much needed a PhD in machine learning and you needed a PhD in data science to make progress with these technologies," said Abrams. "Because of the way we've been able to encapsulate [the technology] and make it available as APIs that are consumable by mere mor-

continued on page 37 ▸

Today, machine learning is easier and developers or researchers can tap into power that didn't exist before.

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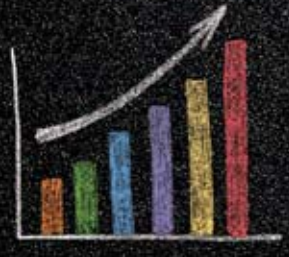

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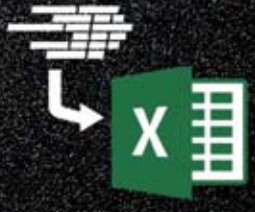

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tal developers, if you will, we are really kind of democratizing the access to the capabilities."

This means developers without extensive background knowledge in data science can actually crowdsource the training of a vision model and produce a vision model to "do amazing things," said Abrams. For instance, one of IBM's partners, OmniEarth, was able to build a model that can recognize landscape features and building features, and use it to predict water consumption. This was done using aerial photography and IBM machine learning technology, he said.

These examples extend into the enterprise world, too, according to Rubikloud's Liu, but enterprises are not the companies buying the algorithms that are available today, they are not buying the machine learning libraries, nor are they implementing them at a practical level, he said.

Enterprises are waiting for the software to come out, whether it be from Google, Oracle, Microsoft, or startups, and they want to buy machine learning software that solves their day-to-day problems. The also want to make sure it connects to their ROI, said Liu.

"If I buy a piece of software, which now has the machine learning technology embedded in it, what part of my P&L is going to be driven? Am I going to save money by not buying that other piece of software? Am I going to make more money because my customers are more optimized?" said Liu. "These companies are trying to connect the machine learning hype with the realities of their business, and until you can prove that connection to them, you are not going to sell it to them."

Getting machine-learning savvy

According to Hammond, the shortage of talent for data scientists and developers who can create high-level machine learning algorithms is very real. For companies that are competing against the big names like Google and Amazon, who are all fighting to get the best data scientists, it becomes more of an issue of availability of the resources that have the talent to do the actual work, he said.

Machine learning used to be an obscure elective, but now, many developers are graduating with enough knowledge about machine learning to get out there and start doing something

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THE POWER OF DEEP LEARNING

Machine learning isn't the only term getting all the buzz. Deep learning, or a class of machine learning algorithms, is showing great promise, primarily because it's getting results.

Deep learning historically was largely inaccessible because it had such high demand on computational resource and data, but with the progression of technology, storage costs have come down and the computation has gone up, said CEO of Bonsai, Mark Hammond. It demands a lot of resources, but there are a few organizations focusing on making this technology and research accessible and easy to use (think: OpenAI or Google's DeepMind).

According to vice president and principal analyst at Forrester Research, Mike Gualtieri, machine learning is trying to find a predictive model, whereas deep learning is based upon a hierarchical network, roughly fashioned after the human brain, he said. Since it's modeled after the brain, people argue that deep learning actually lets systems "learn," said Gualtieri.

"Does it learn the way we learn? Roughly," said Gualtieri. "The reality is we are not sure. It's a very narrow scope; you can train a machine, but it's always about predicting one thing. Our brain and your brain, we can do much more than just predict the next move someone likes. It's not generalized learning."

Deep learning is a subfield of machine learning based on neural networks, which was first written about in 1943 by neurophysiologist Warren McCulloch and mathematician Walter Pitts. In order to describe how neurons in the brain might work, they modeled simple neural networks using electrical circuits. According to Gualtieri, deep learning neural networks were hard to train, and around the year 2012, there was a research breakthrough that made it very practical to do deep learning. The reason why deep learning is just now getting all the attention is because it's making new state-of-the-art results.

"The fact that these technologies are easier to apply, easier to scale, easier to get good results, means there is just a huge range of applicability," said chief application architect at MapR, Ted Dunning. "Maybe even in three years it will be a standard part of a developer's toolkit to build simple [deep learning] models and integrate them into their systems."

Machine learning, and specifically deep learning, has allowed researchers to do a number of things substantially better than before, said Ash Munshi, CEO of Pepperdata.

For instance, using deep learning, we can understand images, speech, translate language, play games, and build self driving cars — all of these advancements were not possible just a few years ago, said Munshi.

Deep learning can be used to review an image and generate a textual description of the image. It can be used to translate from one language to another accurately, and it can even speak text naturally without "any of that robotic tone that we are all so accustomed to hearing," added Munshi.

"Machines with deep learning capabilities will likely replace call center personnel, personal assistants, physician assistants and a whole host of other such tasks and jobs," said Munshi. "They will simply be better and more accurate than humans in these regards, and since they will be natural to use, they will become omnipresent. Deep learning will be like electricity, it will be everywhere." ▮

—Madison Moore

◂ continued from page 37

with existing tools, said Gualtieri.

However, machine learning and deep learning are not tied into most average computer science curriculums, said chief application architect at MapR, Ted Dunning. Deep learning is not the skill, he said, data orientation is the skill.

"[Developers need] to see where data might come from, see when it is corrupted or valueless, have the ability to build simple visualizations to see how data is connected to things, and be able to prove simple hypotheses from data," said Dunning.

There are also pretrained models in the cloud, said Gualtieri, where developers can tap into available data from companies like Microsoft or IBM, and they can access it as API calls on the Internet. So if a developer wants to do an image analysis, they can call the AWS Rekognition service, for example. The developer feeds the service an image, it has a machine learning model, and it displays the objects with keywords from the actual photo, he said.

Anyone who wants to get started with machine learning or deep learning needs to make sure they have a rich enough and large enough data set, said Ash Munshi, CEO of Pepperdata, a Big Data performance company. Those that do not have a large data set will not get any worthwhile results, he said.

"It is also extremely important that you understand how to train and test your models. In most cases, simple techniques are all that are needed, [so] look at examples and find the best matches," said Munshi.

Developers can also incorporate some machine learning capabilities by using APIs, and the more ambitious developers can use open-source tools to create the models themselves, said Gualtieri. He said there are a lot of mathematical tests that developers need to apply to a model in order to make sure it works, and this is getting easier with tools since they have those built-in capabilities.

"There will be new skills [developers need] but they are not that hard to pick up if you have basic science backgrounds; the idea that you measure the real world, you get data and you draw conclusions from that data," Dunning said.

Getting started with machine and deep learning

There are plenty of open-source frameworks for deep learning and machine learning, but choosing one to implement depends on the goals and problem at hand. Here are some popular deep learning and machine learning frameworks and projects found on the Internet and recommended by some of our machine learning experts:

- **Keras:** A high-level neural networks API written and Python. It can run on top of TensorFlow or Theano. Use Keras for a deep learning library that supports fast prototyping, convolutional networks and recurrent networks, and if you want to work in Python code.
- **TensorFlow:** This popular open-source deep learning framework leverages Google's infrastructure for scalable training. It provides rich higher level tools for language, image and video understanding.
- **Theano:** A Python library that lets developers define and evaluate mathematical expressions involving multi-dimensional arrays. It uses GPUs and performs efficient symbolic differentiation.
- **Mxnet:** An open-source framework built by Amazon. Mxnet produces models that are compact, require less memory and CPU for inference.
- **Caffe:** A deep learning framework made with expression, speed and modularity in mind. Speed is a big feature in Caffe; it can process over 60 million images per day with a single NVIDIA K40 GPU.
- **Sonnet:** This is a library built on top of TensorFlow (TF) for building complex neural networks. Google's DeepMind is developing the codebase for building neural network modules with TF. Models written in Sonnet can be freely mixed with raw TF code and other high-level libraries.
- **Scitkit Learn:** This is a toolkit for doing classical machine learning, since not all problems need the power of deep learning. Scitkit provides a rich set of tools for data mining and data analysis.

When machines rule the world

Fear not machine learning skeptics, the world will not be filled with robots who plan to take over the world. But, we would be deluding ourselves to say machine learning will not impact the workforce, said Bonsai's Hammond.

To some extent, the hype that machine learning will take over jobs is "silly," said Forrester's Gualtieri. Some jobs of course are very narrow and manual, and these are positions that would benefit from machine learning technology. But in cases where careers require a great deal of creativity, there's no way to build that into a machine, he said.

"It's augmenting the abilities of the humans that are doing the work, and allowing them to do more and do it better as opposed to replicating them," said Hammond. "That is almost always the path the technological progress follows."

The bottom line is, machine learning will make humans more productive, especially with the rise of "personal assistants," or systems that take on some of the manual, tedious work that humans get bogged down with.

Physicians might spend half their day on paperwork or manual tasks, but imagine a machine learning assistant that could do all of this work and explain the prognosis in 17 minutes, said Abrams. This would allow the doctor to spend more time doing what they need to do, like meeting with patients.

In the future, one of the things the industry will see is the focus on the emotional connection that people develop with machine learning assistants, said Abrams. He's not referring to the chilling sci-fi scenarios depicted in movies; he means building systems that don't just understand the meaning of word, but the context of the word.

"When I look down the road, I think that systems that understand people are going to be increasingly important," said Abrams. "AI systems are here to work with us; not take over us." ■

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BUILD 2017: Better Together

BY DAVID RUBINSTEIN

The way organizations build software has changed dramatically. The software development lifecycle is morphing from a series of independent steps — code, build, test, deploy — into interconnected, continuous loops that bring all stakeholders in from beginning to end. Today, marketers, business decision-makers, developers, testers and operations people are working together to ensure each bit of software produced meets the organization's objectives and works the way it is intended.

At Build 2017, the focus is on Visual Studio and the tools that enable these teams to create next-generation applications and services. Applications built for a cloud-first, mobile-first world will need artificial intelligence, and the ability to give a great experience across mobile devices and more. Intelligent cloud applications will make organizations more efficient and competitive.

In discussing the March release of Microsoft's IDE, Visual Studio 2017, director of program management for Visual Studio and .NET John Montgomery described software development today as "a team sport." The tooling Microsoft and its partners offer for individual developers has been enhanced in this release, but Montgomery made a point to say that the IDE can do a lot for developers working in teams — especially those teams using modern agile techniques and DevOps workflows. Working in teams, he said, is "a big, big change for developers."

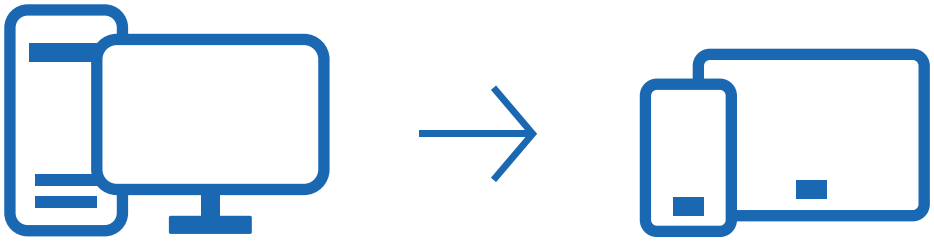
Visual Studio 2017 embraces database DevOps with the ability to configure a CI/CD pipeline directly from within the IDE, Montgomery. Integrations with software created by Microsoft's partners extend the robustness and ease of use of the offerings. There are more than 10,000 extensions — free, paid and open source — for Visual Studio, Visual Studio Code and Visual Studio Team Services available in the Visual Studio Marketplace.

Welcome to Build 2017. If you're at the conference, take the time to speak with Microsoft's partners. If you're not here, we hope you enjoy this look at Microsoft's developer ecosystem and the solutions that have come to market. Or, if you have an idea to extend the capabilities of Microsoft's tools, you can learn more at vspartner.com. ▮

Look to sdtimes.com for all the news announced at the conference!

Desktop Apps in The Windows Store

The same code, in a new package



Win32 and .Net

UWP Apps

Convert your apps for free

advancedinstaller.com/dbc

Desktop Apps in The Windows Store

As the Windows 10 adoption rate continues to grow, developers are looking for simple ways to package their apps for the Windows Store. In today's competitive market, developers must deliver software faster while keeping costs down, so they don't have the luxury of rewriting their code base. Caphyon solves the problem with Advanced Installer. Now developers can package their existing Win32 and .NET desktop apps and games in the modern AppX format, which can be published inside the Windows Store with minimal changes or no changes to their original code.

"Advanced Installer is the most powerful and easy-to-use Windows Installer authoring tool for MSI, AppX and App-V," said Bogdan Mitrache, product manager at Caphyon. "Rewriting an entire codebase is not something most ISVs can afford to do. The costs and time required to do that could be fatal for some companies."

Advanced Installer is a Windows Installer authoring tool which helps developers install, update, and configure their products safely, securely and reliably. Using Advanced Installer, software teams can save substantial amounts of money in development costs while increasing customer satisfaction and reducing support costs.

Caphyon is a Microsoft Visual Studio Industry Partner (VSIP) that has attracted more than 200,000 Advanced Installer users. The company has been providing elegant and easy to build installer products to Windows developers since 2004.

Convert Apps for Free

The Desktop Bridge converter built by the Advanced Installer team from Caphyon is a free tool based on Microsoft's Desktop Bridge technology. With it, developers can convert old installers such as MSI and EXE to the modern AppX format. The converter is similar to the Desktop App Converter from Microsoft, although it includes additional features such as a GUI, integration with Hyper-V and VMware virtual machines, and smart processing of installer resources including file type associations and firewall rules. This helps developers speed up the conversion and evaluation process for their applications.

"The Desktop Bridge Converter from Caphyon makes the conversion process smother and faster, compared to the command-line tools offered by Microsoft," said Mitrache. "It can convert any installer regardless of the install UI level, unlike the Microsoft converter which can only convert applications that install silently. This gives developers the flexibility to customize and debug their old installers, which is important because some installers fail to convert correctly due to legacy configurations."

Using the latest version of Advanced Installer, developers can import or package a Windows 10 AppX package and obtain a project to maintain and improve with the entire team. They can also build and debug Universal Windows Platform (UWP) and Microsoft Installer (MSI) packages directly in Visual Studio, from 2017 all the way back to 2012 edition, using Advanced Installer's extension for VS.

In addition, developers can build UWP and Windows Server Apps packages (WSA) from existing MSI projects. Alternatively, they can build UWP packages from scratch for full UWP apps.

Simplify Development and Debugging

With Microsoft's help, Caphyon built a Visual Studio extension that allows developers to import any AppX package into their existing Visual Studio solutions as a new project. That way, they can continue to debug and build new projects just like they do with their current ones.

"The extension provides full support for MSBuild integration, along with other continuous integration systems," said Mitrache. "It makes build system management a no-brainer."

The Visual Studio integration is worth noting because Advanced Installer can package and debug apps in AppX format regardless of whether a developer is using Visual Studio 2015 or Visual Studio 2017. By comparison, the single other alternative, provided by Microsoft, can only do that if developers are using Visual Studio 2017.

> *'Rewriting an entire codebase is not something most ISVs can afford to do.'*
> —*Bogdan Mitrache*

Save Time and Money

Advanced Installer is completely GUI-driven so there are no scripts to learn, no databases to edit, and no XML to write. It includes hundreds of powerful features that are ready to use in a few mouse clicks. Businesses of all sizes are saving hundreds of hours and thousands of dollars by taking advantage of the expert knowledge built into Advanced Installer.

Advanced Installer also enables developers to reduce the number of incidents that arise from improper installers, which helps minimize support costs and increase conversion rates for new users. Advanced Installer's highly responsive support team is available to answer developers' questions.

"Developers appreciate the support we provide. In fact, it's one of our key selling points," said Mitrache.

Developers using Advanced Installer save money on tools since the product includes an updater, a java launcher, a bootstrapper, trialware, serial validation, a WYSIWYG dialog editor, and more. Migrating from other tools is also very easy because Advanced Installer allows developers to repackage older installers, import MSIs, and import Windows Installer XML (WIX) or Visual Studio Setup projects.

Learn more at www.advancedinstaller.com. ▮

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For InstallShield or InstallAnywhere

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Designed for software developers, FlexNet Code Aware is an automated open source risk assessment and package discovery solution that enables you to quickly scan your products for security and intellectual property (IP) compliance risk. By seamlessly integrating with InstallShield and InstallAnywhere, FlexNet Code Aware becomes a standard part of your build process, helping you expose and assess intellectual property and security vulnerability risks before your product ships.

Ensure a vulnerability-free build and error-free installation with FlexNet Code Aware.

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Ensure Safe, Secure Software Products

Software developers use a lot of third-party software today, much of which is open source. As software designs continue to become more modular, the use of third-party software is increasing. As a result, software is becoming more difficult to understand, even by the people who built it, which enables licensing and security risks to creep in. Flexera Software is addressing the problem with FlexNet Code Aware.

FlexNet Code Aware is an automated open source risk assessment and package discovery solution that enables software developers to quickly scan their products for security and intellectual property (IP) compliance risks. It integrates seamlessly with InstallShield or InstallAnywhere, so it becomes a standard part of the build process. Using FlexNet Code Aware, developers can expose and assess IP and vulnerability risks before their products ship.

"Developers depend on 50 percent of code they did not write and no one is able to track it by themselves," said Jeff Luszcz, vice president of product management at Flexera. "As a result, they aren't able to securely manage, track, discover, and get vulnerability alerts on the third-party software they're using."

Manage Known Vulnerabilities

Software developers using third-party software have had no effective means of managing all their licenses and detecting security vulnerabilities, historically. FlexNet Code Aware solves those problems so organizations can minimize the likelihood of costly and embarrassing exploits like the OpenSSL Heartbleed vulnerability.

"FlexNet Code Aware provides a data feed to the National Vulnerability Database which is the clearing house for vulnerabilities. It's the single source of truth for the industry," said Luszcz. "The database tells you what the problem is, how serious it is and where to go for more information."

FlexNet Code Aware identifies the libraries developers are using and what the associated licensing terms are so they can use components with greater levels of confidence.

"Open source people are very nice. They say, 'You can use my library as long as you do A, B, C, and D," said Luszcz. "However, we've got to make sure we're doing those things. FlexNet Code Aware helps you discover what you have to do in order to use those components in a practical way."

Enable Consistent Vigilance

Some organizations check the status of their licenses annually, which is insufficient given the fast pace of software delivery and the rate at which technology and software methods change. FlexNet Code Aware ensures that licensing and security vulnerabilities are checked during every build.

"If you're only doing this once a year, the lists get stale, which means you're not managing risks and you're not alerting developers in a timely manner," said Luszcz. "You need to do this for every build, every day so that you're always watching out for new problems that may be introduced. It's the only way to ensure that you're really building a compliant and secure product."

According to Flexera research, companies are only aware of 4 percent of the third-party software they're using. As software teams continue to become even more dependent on third-party software, they need to be better informed about the associated rights and obligations they inherit when they use that software.

"Four percent awareness is pretty close to zero," said Luszcz. "FlexNet Code Aware helps these teams deal with serious problems they're not addressing adequately. For example, they're not managing their open source software usage and they're not managing third-party software usage. FlexNet Code Aware makes it easy to start that process."

A decade ago, developers were using less than 100 open source libraries per release. Now they using as many as 600 and over 1,000 in some industries, Luszcz said.

> ***'Developers depend on 50 percent of code they did not write and no one is able to track it by themselves.'***
>
> *—Jeff Luszcz*

"Today's software supply chains are very long. We're all wrapping up our own applications and other people's applications and there's only that 4 percent disclosure rate," said Luszcz. "We're not passing on the right compliance information to the supply chain and we're not asking for that information when we're buying things. That's something our industry really needs to address."

As enterprise developers use more code from external parties, the number of dependencies increases and the complexity of projects increases. The trend will become more pronounced as software development becomes even more modular, particularly with the growing popularity of containers and microservices.

"It's a lot more about wiring than coding," said Luszcz. "We're wiring together pieces of third-party software as opposed to writing the majority of it ourselves. In doing that, we've given up some of our first-hand knowledge of the code so we need to respect what the licenses say."

Where to Go for Help

Flexera is reimaging the way software is bought, sold, managed, and secured. Its products collectively address those issues. The company also provides a rich set of educational resources which include free webinars, white papers, basic education services, training services and software support services.

Learn more at www.flexerasoftware.com. ▮

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GrapeCity Builds on Mobile Leadership

Developers need to extend their mobile and .NET toolbox to build more competitive solutions for their customers. GrapeCity strives to empower its customers to achieve more with its popular ComponentOne .NET controls, ActiveReports reporting solution, Spread spreadsheets solution, Xuni Xamarin native mobile controls and Wijmo JavaScript controls.

"We develop the highest-quality, fastest, lightweight and most flexible cross-platform controls on the market," said Joe Lininger, head of global marketing at GrapeCity. "They're easily extensible and have a small footprint, and easy-to-use APIs for developers to build better products, faster."

Developers have been building native iOS and Android applications using GrapeCity's Xuni Xamarin product since 2015. With Microsoft's purchase of Xamarin and Xamarin's integration with Visual Studio 2017, GrapeCity decided to focus on Xamarin development, and has released the beta for ComponentOne Xamarin Edition, which provides enhanced performance, APIs and designer support for Xamarin users.

"We're an industry leader for developer controls and solutions in the Microsoft space, and we are a longstanding Microsoft partner," said Lininger. "We're making Xamarin development as easy as possible with an established and time-tested set of Xamarin controls."

Go Mobile

ComponentOne Xamarin Edition is supported in Visual Studio and Xamarin Studio. Developers who want to write in C# and XAML to deliver an application that runs on Windows Phone, UWP, iOS and Android can save time and deliver better user experiences with the ComponentOne Xamarin controls. Developers can also use ComponentOne Xamarin to build Xamarin iOS and Xamarin Android apps.

The ComponentOne Xamarin Edition beta provides enterprise controls such as a grid, gauges, calendar, and CollectionView data control, all of which include features unavailable in the Xamarin platform. The new product also includes full support for the Xamarin Designer and iOS StoryBoard. From FlexGrid's spreadsheet-like interface to a wide collection of modern charts and gauges, ComponentOne Xamarin Edition delivers the high-performance and flexible feature sets developers want for mobile enterprise applications. A powerful data visualization control (called FlexChart) and an input control including masked input, ComboBox, and classic CheckBox will also be released during the beta.

With Xamarin.Forms and ComponentOne Xamarin Edition, developers can code once in C# and XAML to create a cross-platform app that delivers a universal experience to all users. In addition, with the NuGet package distribution, ComponentOne Xamarin can be added easily to any Xamarin app in Visual Studio or Xamarin Studio.

Microsoft Dynamics Team Chooses Wijmo

Developers choose Wijmo's cutting-edge HTML5 controls for modern enterprise mobile applications. With touch-first design and full AngularJS and Angular support, Wijmo's FlexGrid and chart controls deliver top performance with zero dependencies on other code libraries. The flexible API enables users to develop in an easy, enjoyable way. It is the most complete control toolset for building enterprise applications.

Microsoft used Wijmo for the 2016 update of Microsoft Dynamics CRM. While preparing the update, Microsoft wanted to ensure its new mobile capabilities would have an intuitive interface that is easy to use across mobile platforms.

Wijmo's touch support and its ability to work well on virtually every device enabled the user-friendly interface Microsoft was striving to create. In addition, Wijmo 5's clean design, highly customizable controls, globalization for 40+ cultures and flexible input and gauge control collectively provided what Microsoft needed. Using Wijmo 5, developers could focus on the business side of the application instead of building proprietary UIs.

> ***'We're making Xamarin development as easy as possible with an established and time-tested set of Xamarin controls.'***
>
> *—Joe Lininger*

Wijmo 5 enabled Microsoft to reduce development times, even though the products would be used on different platforms and in different global locations. With Wijmo 5, Microsoft was able to develop a consistent solution much faster than if it had built the same native application for the individual platforms. Because Wijmo 5 functions on all of the newest Android, Windows, and iOS mobile devices, there was no reason to create unique solutions for each platform. The Wijmo 5 controls also provided the ability to adapt and essentially "translate" themselves to conform to the user's location.

"With Wijmo's extensibility model, the Microsoft Dynamics team was able to quickly customize and incorporate Wijmo 5 controls into our new release," said Param Kahlon, general manager, Product Management, Microsoft Dynamics CRM.

Wijmo caters to the trends in an increasingly mobile and touch-centric market. Its focus on touch support and mobile-friendliness makes it the premiere tool for mobile developers. With Wijmo 5 controls, developers can create great customer experiences that are suited to their specific app.

Users in data-driven organizations enjoy apps built with Wijmo 5 UI controls because they can adapt to the way data is entered and displayed, which simplifies data analysis.

ComponentOne Xamarin Edition and Wijmo controls are both available in the ComponentOne Ultimate suite.

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LEADTOOLS: the Ultimate Imaging Development Multitool

Life is full of decisions. Some are easy, like whether or not to run across a busy freeway wearing a chicken suit. Others are difficult, like ordering lunch at a Mexican restaurant (seriously, why are their menus so big?!). Developing software also has its own unique set of decisions to make: do it myself or use an SDK? Open source or commercial? Which open-source SDK? Which commercial SDK?

The answer to the first question is often wrapped up in a single word: time. Most programmers love the challenge of developing something from the ground up, but reality bites back with project deadlines and/or the pressure of earning a paycheck. Complexity naturally plays a major role in deciding whether or not you need to rely on the development expertise and time others have put into an SDK. For a project with imaging requirements, the complication factor is high even for the most basic requirements like loading, displaying, and saving various file formats. However, projects rarely stop there and require advanced features like OCR, barcode, PDF, forms recognition, DICOM, PACS, and multimedia streaming, further cementing the need for an SDK to get the job done in a timely fashion.

Open Source or Commercial: the Never-Ending Battle

Decision #1 made, you need an SDK! Now use your favorite search engine to look for "[YOUR FEATURE REQUIREMENT] SDK" and you'll discover your next decision is much less concrete. There are many options between commercial and open source. Notable gems obviously exist, but sometimes using an open-source library is like building prefabricated furniture. It gets the job done, but the assembly instructions are awful and the quality pales in comparison to a hand-made, solid oak bookshelf. On the flip side, you don't always get what you pay for with the expensive oak bookshelf since a commercial SDK doesn't necessarily guarantee quality.

Another factor that typically differentiates a commercial SDK from open-source options is how bug resolutions and feature requests are handled. No piece of software is perfect, and your unique situation can shed light on something not heavily tested, or reveal shortcomings in the product offering. Open-source SDKs can be both good and bad here. You have the source code, so simple issues can be quickly resolved on your own. However, when time isn't on your side and the library is complex (as we've established with imaging SDKs), you need to rely on the project author and contributors to fix the issue. Unfortunately, the author may no longer be involved, or he/she may not be available when you need them. Commercial SDKs have a personal stake in their customers, so resolving issues and growing the product through feature requests is something most of them are happy to oblige. This mutually beneficial relationship scores major points for commercial SDKs when unexpected hiccups occur during your development.

Getting Everything in a Single SDK: LEADTOOLS

The next and final hurdle is cost. This is where open-source can at times provide some value however, the ROI from a comprehensive commercial SDK like LEADTOOLS may surprise you. Comprehensive is important because some commercial SDKs are still limited in what they will accomplish. This would mean buying multiple SDKs, maintaining multiple licensing relationships, and mult…you get the idea, it's a hassle. LEADTOOLS maintains the largest and most comprehensive collection of imaging SDK technology and makes it possible for its customers to eliminate the multi-vendor headache and deploy their application sooner.

Most programmers love the challenge of developing something from the ground up, but reality bites back with project deadlines and/or the pressure of earning a paycheck.

One of the best industry examples of this benefit can be found in the document imaging market. Document imaging applications can have a lot going on: scanning an image, loading and saving TIFFs and PDFs, drawing annotations on images, OCR, OMR, and forms recognition can all be a realistic set or requirements for one application. Integrating all those features together with LEADTOOLS is not only possible, but will result in a faster, easier development cycle and actually saving money in the long run.

On top of that, LEADTOOLS also includes imaging SDKs for medical and multimedia. Though they have a heavy focus on Microsoft platforms, they also include libraries for HTML5/JavaScript, Java, iOS, macOS, and Android. You really can exclusively use LEADTOOLS for any imaging requirement!

Bonus Round: Future Reliability

LEADTOOLS also has a proven track record of keeping up with the latest development trends, especially when it comes to Microsoft platforms. LEADTOOLS was a launch partner for Visual Studio 2017 and is currently working on creating imaging components specifically designed for .NET Core.

Make the easy decision to use LEADTOOLS and save time, money, and hassle on your next imaging software project. That decision will free you up to get back to deciding between lunch combination #15 or #47. ▮

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OpsHub Enables Rich Collaboration

In this digitally enabled, highly competitive world, to become successful is more challenging than ever. Enterprises need to provide exceptional pre-sales and post-sales experiences in addition to delivering best quality solutions in short release cycles. To achieve this level of excellence, organizations need to democratize the decision-making process without compromising the ability of individuals to use their preferred tools. OpsHub delivers a suite of solutions to help them achieve this goal effectively — solutions that seamlessly integrate the best-of-breed tools into a unified ecosystem.

Bring Tools Together

OpsHub enables real-time integrations and comprehensive migrations between 50+ Application Lifecycle Management (ALM), DevOps, IT Service Management (ITSM), and Sales Force Automation (SFA) systems. OpsHub solutions connect development, quality assurance (QA), sales, support, and operations teams, to facilitate rich, real-time cross functional collaboration between them.

"Every person wants to use the best-of-breed tool for their role. As a developer, I may use Atlassian JIRA or Microsoft Team Foundation Server (TFS); as a product owner, I may use VersionOne or CA Agile Central; and as a quality engineer, I may use quality management solutions such as QASymphony's qtest or HPE ALM," said Sandeep Jain, CEO of OpsHub.

"However, if these best-of-breed tools are not seamlessly integrated, they will impede cross-functional collaboration and effective decision-making processes, which would eventually lead to poor quality solutions and services."

Elaborating on the importance of seamless integration, Sandeep said, "Imagine an ecosystem in which the epic, features and user stories created or revised in VersionOne by a product owner are automatically updated in JIRA or TFS, so that the developers know which epics, features and stories are in their backlog. Conversely, the product owner using VersionOne can also review how a user story is being interpreted by developers, developer's plan, and the state of related activities in real time. This is what OpsHub does — connect all tools in the ecosystem so that the associated teams can collaborate in real time while using the best-suited tools for their work."

Enable Collaborative Decision-making

It is important to connect the ALM or DevOps ecosystem, not only internally, but also with the business and customer-facing systems, such as Salesforce Automation, Service Desk, and Self-Service portals. If the development teams have complete business context, they can not only deliver quality solutions, but also assist other teams in making better decisions.

A senior executive at a leading IT firm said, "With OpsHub, we don't have to compromise between collaboration and effectiveness, so we can deliver better quality products faster. With OpsHub Integration Manager, developers have the timely and comprehensive information, in the tools of their choice. This facilitates collaborative decision-making with participation of all stakeholders, eliminating wasteful interactions."

According to the development manager at enterprise software ISV, "We have recaptured 15-20% of our developer productivity. The developers always have clarity on which items are top priority, and we can give customers real-time status updates on the spot. With OpsHub, everyone is much more relaxed, and we can resolve more issues faster."

Create Customer Obsession

In the new world of software-enabled systems and services, customer experience is crucial. Therefore, software teams need to go beyond "delighting customers" to achieving "customer obsession." It is critical that business and customer-facing systems, such as Microsoft Dynamics and ServiceNow, are connected with the ALM/DevOps tool chain. An integrated environment ensures that account executives, while talking to customers, are up-to-date with the status of all issues and equipped to provide relevant updates.

> *'When you start allowing external drivers to accelerate your value chain, it leads to better value creation and better productivity.'* —Sandeep Jain

At a software provider for student information systems, OpsHub has integrated CA Agile Central with Zendesk. According to the director of product management and implementation, "This has increased our development efficiency and improved customer service through clear and proactive communications. We now get a wealth of information that helps us really understand the issues being raised by the customers such as the number of defects by release and escalation by module. OpsHub deployment helped the company in further improving its solutions and supporting future growth."

The cross-functional transparency across business verticals becomes even more important in a world where customer experience is the key driver for company's and product's success. "When you start allowing external drivers to accelerate your value chain, it leads to better value creation and better productivity," Sandeep added.

Conclusion

Efficiency gains come from connecting the dots. In the context of the digitally enabled software-driven world, the goal is to connect all disparate elements of the ecosystem to create a productive, collaborative, and customer-focused environment.

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Database DevOps

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Redgate Leads Database DevOps

Development teams are under pressure to deliver reliable releases faster to meet business needs and user requirements in a timely fashion. DevOps supports this by encouraging better collaboration, and introduces practices like continuous integration and continuous delivery to speed software delivery. The result is improved productivity, agility and performance across teams, and the business, but the database is commonly a bottleneck.

Without the right processes in place, and the additional safeguards needed when dealing with business-critical data, database change management slows things down while adding risk and uncertainty. With Redgate, the database can be included alongside the application to make sure that business-critical data is kept safe.

"We uniquely solve the problem of incorporating your database in your DevOps processes," said Stephanie Herr, product manager at Redgate. "Redgate is the leading Microsoft SQL Server tools vendor with an established solution for Database DevOps."

Redgate helps DevOps teams remove the database bottleneck by giving them a reliable, scalable and repeatable process for building, deploying and maintaining SQL Server databases, in the same way they do for application code. With Redgate, DevOps processes can be extended to SQL databases and Azure SQL databases using the same tools already in place for application development, including Visual Studio Team Services (VSTS) and Team Foundation Server (TFS). Now application and database changes can be made in unison, providing a single source of the truth.

In addition, database provisioning plays a key role in DevOps as development teams require up to date, realistic environments to develop, test and fix code.

Redgate Partners with Microsoft

Redgate and Microsoft introduced a partnership at the recent Visual Studio 2017 launch event. Together they are extending DevOps to SQL Server databases and enabling higher levels of productivity when working with SQL Server databases in Visual Studio.

"We're excited about the partnership announced with Microsoft at the VS 2017 launch event," said Herr. We're working together to extend DevOps to SQL Server databases and improve productivity when working with SQL databases in Visual Studio."

As a result of the partnership, Redgate Data Tools are now included free in Visual Studio Enterprise 2017. At Build, Redgate will showcase its tools for Database DevOps, which include ReadyRoll Core, SQL Prompt Core and SQL Search.

Redgate launched SQL Clone earlier this year, which is a new database provisioning tool. At Build, Redgate will announce a new Visual Studio Team Services (VSTS) extension for SQL Clone. The company will also demonstrate how teams can leverage SQL Clone within their automated delivery pipeline to run builds and tests against full-sized realistic data sets.

"The new extension allows you to include provisioning in your pipeline so you can use realistic copies of production databases quickly without taking up much disk space," said Herr. "That way you can make sure that you're testing and finding issues sooner before going to production."

Understand the State of DevOps

Redgate published a report in late 2016 entitled, "The State of Database DevOps Report." Of the more than 1,000 survey respondents, all of whom are SQL Server database professionals, 80 percent said their companies want to adopt DevOps, which supports DevOps' status as a mainstream practice.

"Big companies are doing it, small companies are doing it, new companies born in the cloud are doing it. Legacy companies are moving this way too," said Herr. "Working with Microsoft to bring Database DevOps to Visual Studio helps with that."

'We uniquely solve the problem of incorporating your database in your DevOps processes.'
—Stephanie Herr

The report also revealed that 75 percent of companies have developers working across the application and database, which underscores the importance of having a database solution that incorporates developers' existing processes and tools, including Visual Studio, TFS and VSTS.

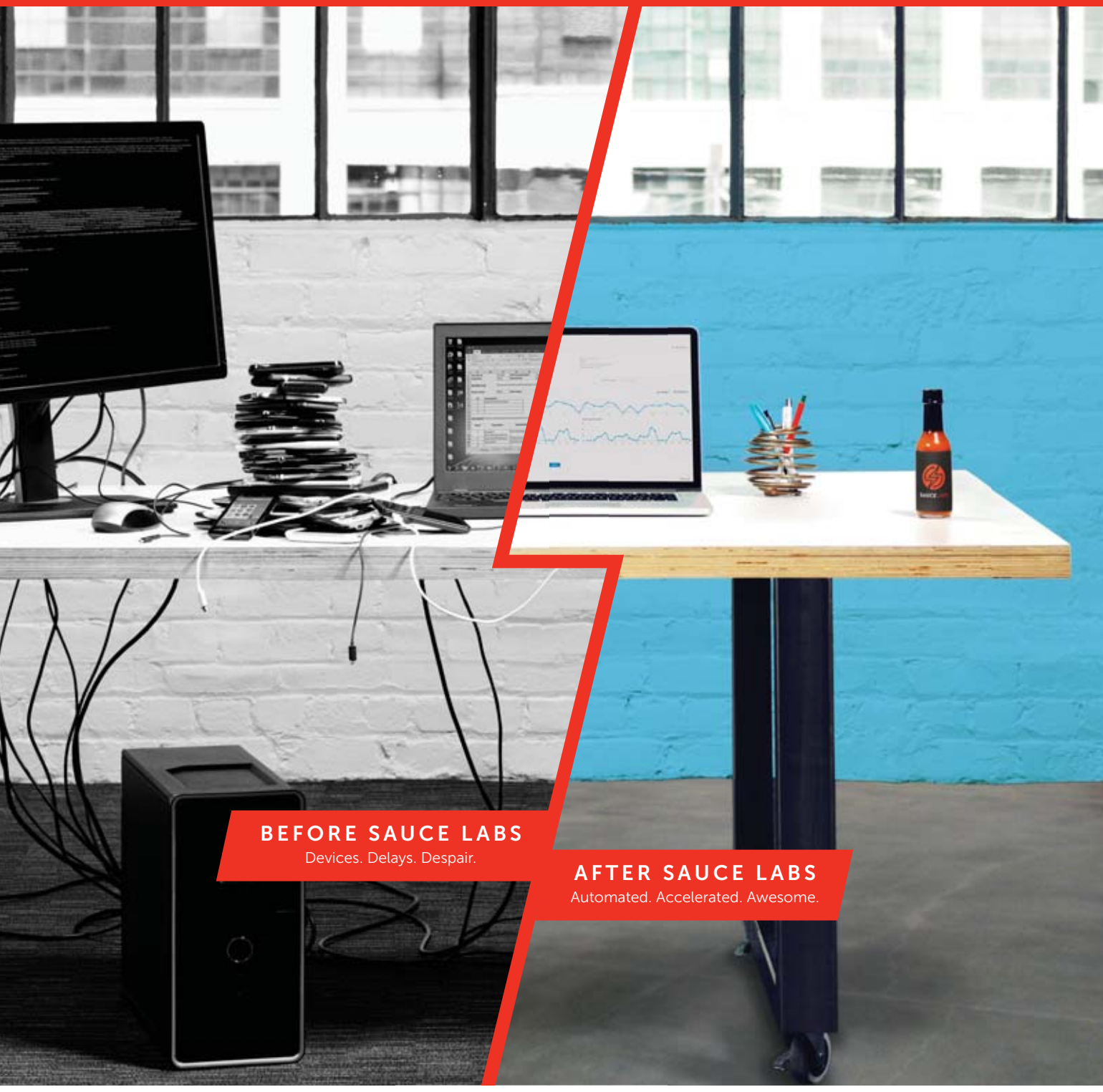
"If 75% of people are working across both the application and the database, we don't want to make them learn something new or require a different process that's not aligned with development," said Herr.

The report also revealed that increasing the speed of delivery was the main reason people want to include the database in their DevOps processes. That way, they can prevent the database from becoming a barrier to delivering value quickly.

"It's been great developing a deeper relationship with Microsoft and partnering with them to enable Database DevOps" said Herr. "Being acknowledged as a great way of enabling Database DevOps really validates what we're doing. We're solving the very difficult problem of delivering changes to the database. So many companies have terabytes of customer data now, they can't just drop their current database and recreate it. They need to make sure the data is protected and secure when releasing, and Redgate helps this."

Learn more at www.redgate.com/db-devops. ▮

A brief history of web and mobile app testing.



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SAUCELABS
Testing at the speed of awesome.

Automate Testing with Confidence

Today's developers need to automate more testing to ensure they can deliver software on time. To do it right, they need access to a testing environment that mirrors the operating systems, browsers and mobile devices customers actually use in the real world.

Sauce Labs helps accelerate development processes by providing actual devices and virtual machines developers can test against in an automated way using Selenium, Appium and Espresso.

"Functional testing can take a lot of time, especially if you're trying to test against all those different platforms that are relevant to your particular installed base," said Lubos Parobek, vice president of product at Sauce Labs. "For example, if you're an e-commerce retailer, you want to make sure that your latest website or mobile app works across the different desktop browsers, mobile browsers, devices etc. Doing that testing can be quite time-consuming and so one of the big problems that we're focused on here at Sauce is how to accelerate that by doing testing in the cloud."

Increasingly, developers are turning to Sauce Labs for testing since setting up a realistic test environment is too expensive and burdensome for enterprises or ISVs to build and maintain.

"What they realize is that while the initial setup of one or two browsers might not be super difficult, trying to cover all the platforms, browsers and devices, and keeping them all up to date can be really time-consuming and expensive," said Parobek. "Not only do you have to run all the usual server infrastructure to have a Windows or Linux Selenium grid, but you need Mac hardware for macOS and iOS support, and then you need real mobile devices which just add additional layers of complexity."

More than a billion tests have been run at Sauce Labs to date — with over one million every day.

Test Affordably

With Sauce Labs, developers no longer have to worry about how to test against all the different operating systems, devices and browser combinations because Sauce Lab's comprehensive cloud covers all of that. What's more, developers can choose from testing options that meet their requirements and budgets.

"We offer people lots of options and flexibility. Whether you have a native mobile application, hybrid application or web application, or whether you need to test against a specific real device, we have you covered," said Parobek. "Sauce Labs provides the most comprehensive testing cloud for web and mobile testing."

Sauce Labs has more than 800 combinations of different operating systems, browsers, and real devices available for testing. Zillow chose Sauce Labs because it was the only Selenium cloud-based solution that allowed its developers to automate testing on any operating system and browser combination.

"One of the important parts about our service is making sure we give organizations options in terms of the budget required for effective testing," said Parobek. "Even if you use a cloud service, you don't want to spend an exorbitant amount of money. We let organizations choose between emulators and simulators and real devices, based on their testing volume and frequency, requirements and budget. We have hundreds of real device, simulator and emulator combinations."

That way, developers can weigh testing features and cost, and choose an appropriate option.

Sauce Labs has become popular among developers because they can test affordably and save time. In fact, some developers have been able to reduce the time required for testing from weeks to days and from days to hours. For example, Campus Explorer, a college search and planning site, cut its testing time from 72 hours to 72 minutes. The time savings enable developers to focus on building features for their website or app, rather than focusing on testing.

> *'People are trying to automate as much of their delivery pipeline as they can.'*
> —Lubos Parobek

New VSTS Plugin Available

Sauce Labs just announced the Sauce plugin for Microsoft Visual Studio Team Services (VSTS) that automates the build process.

"People are trying to automate as much of their delivery pipeline as they can," said Parobek. "When a developer finishes a feature, they'll do a pull request that automatically runs unit and functional tests on that code before it's merged into master. They want to make sure they are not introducing a breaking change."

One way to avoid testing errors and speed testing is to remove the need for human intervention. With the plugin, developers can configure tests via VSTS so whenever there's a pull request or a check-in, the developer can use Sauce Labs to run a set of integration or functional tests.

"The plugin enables you to pass credentials to Sauce Labs so you can automatically start your tests using a secure tunnel," said Parobek. If you're testing behind your firewall, you have a secure tunnel automatically."

The test results come back via VSTS so developers can see what tests succeeded and failed, without leaving VSTS.

Learn more at www.saucelabs.com. ▮

Syncfusion Eases Mobile Development

The explosion of mobile devices and apps has completely disrupted .NET development. While desktop and web applications remain popular in enterprises, the same developers have had to adapt their applications for mobile devices or develop entirely new mobile apps. Syncfusion was an early supporter of Xamarin that continued to enhance its offerings as Xamarin matured and was more deeply integrated with Microsoft products post-acquisition. Syncfusion has also changed its revenue model from per-seat licensing to flat-fee, which is great news for enterprise developers in any size organization.

"The rapid expansion of the mobile space was somewhat of a shock for C# developers because up until that time, everything was Microsoft-centric," said Daniel Jebaraj, vice president at Syncfusion. "A number of them had to figure out how to get their critical applications onto iOS and Android devices, which was challenging because they had to learn Java, Objective-C or Swift, or hire the talent."

Some developers side-stepped the problem by building mobile websites or mobile applications that were really wrappers around a website, but the user experience wasn't the same as a native application. The Xamarin platform was an attractive option, and it's a lot more attractive now that Xamarin dovetails well with the .NET stack.

'The rapid expansion of the mobile space was somewhat of a shock for C# developers.'
—Daniel Jebaraj

Reuse Code

One of Xamarin's main features is its ability to reuse code. However, developers also want best-of-breed functionality. Syncfusion's Xamarin controls that are similar to the ones it built for desktop and web environments. Now, Syncfusion offers more than 90 Xamarin controls which include chart and grid controls, a calendar control, a Kanban control, a treemap, an Excel-like spreadsheet, gauges, and reporting packages for Excel, PDF and PowerPoint — all in one package.

"Our controls are well-integrated with the Visual Studio environment so you can work with them just as you work with Microsoft's native controls," said Jebaraj. "They behave the same way as Microsoft controls and they are designed for optimal performance. If you're maintaining an application on a XAML platform such as WPF, then a lot of that code will simply carry over."

Syncfusion provides about 80 percent of the standard building blocks enterprise application developers need to build an app so they can focus on innovation rather than reinventing controls that are available off-the-shelf.

Get Everything You Need, And More

Syncfusion's unlimited license gives developers access to more than 800 components and ready-to-use platforms for Big Data, data integration, dashboards and reports — everything developers need to build stunning applications for desktop, web, and mobile users plus the tools they need for data, analytics and reporting.

"We've spent a lot of time and effort building our finished platform products because we see customers building things like dashboards and reports over and over again," said Jebaraj. "They're fairly complex products to build and support, and fairly expensive to license from other vendors."

Syncfusion has spent several years building its dashboarding and reporting products, both of which rival some the most popular data visualization and reporting packages available today. Users get access to all the functionality they need to build highly aesthetic, high-performance decision-making tools on which today's businesses rely.

"We license those products along with our controls so the same team using our controls can benefit from pre-packaged products and deploy them as these as they see fit," said Jebaraj.

"You can also customize them and embed them in an application using our SDK."

Get a Flat-fee License

Syncfusion now offers annual flat-fee licenses so the number of developers using the product is now irrelevant. In addition, its licensing model has flexibility built in so customers can buy licenses scoped to a project, a department, or a line of business.

"We used to license by the seat, but it was challenging for us and our customers," said Jebaraj.

"We don't want to be in a position where we're counting heads, we don't want to put our customers in a position where they're counting heads, so we came up with the idea of a flat license which is a flat fee paid every year."

For example, an organization with $100 million annual revenue would pay just $4,000 for a global license, which is what Syncfusion used to charge for two seats. The new revenue model has been popular among existing customers and it has also attracted many new customers who have discovered that the flat fee is more affordable than competitive options.

"Any company that is doing a lot of development in house can potentially save a lot of money on licensing costs," said Jebaraj. "We find the new model to be better for our customers and better for us."

Another thing that distinguishes Syncfusion from its competitors is its heavy investment in R&D. That strategy has enabled Syncfusion and its customers to continually deliver greater value.

Learn more at www.syncfusion.com. ▮

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Tasktop Enables Agile and DevOps

Today's enterprise developers are working in highly complex environments, especially those working in large organizations or startups that have scaled. How they deploy code is changing as their organizations move from data centers to IaaS, containers and microservices. And because their products are more sophisticated than they once were, so are their planning and product management tools. Developers who are working in regulated industries or building products subject to regulation must also keep compliance in mind. When all of those tasks are executed in a disconnected fashion, it's much harder to drive business value.

"We've shifted away from a simplistic world in which developers wrote code and then hit a run or deploy button. Now there's this sophisticated thing called a value stream," said Mik Kersten, CEO of Tasktop. "A value stream is really the end-to-end flow of business value, a new feature or an entirely new application that you want to deliver to your customer. It also involves a shortened feedback loop that tells you what's working and what's not, faster."

Many of today's developers are grappling with the burden of disconnected systems. In order to understand what they should be working on, they have to check three or four different tools, which makes prioritization difficult. If they don't have feedback about where their application is failing or what's causing the most performance problems, they have to wade through tickets and support cases that are being generated.

"Development has become so specialized, each role on the team has its own set of tools. The disconnects among them are getting in the way of what developers do best, which is creating solutions and delivering them," said Kersten. "That's the number one bottleneck impeding software delivery scaling and what we focus on at Tasktop."

Build a Value Stream

Software teams have to orchestrate the information collected and generated by their tools. They also need the ability to collaborate regardless of the tools they're using. Tasktop's value stream integration technology is capable of connecting any tool, any process and any set of stakeholders in a value chain so it's clear how business ideas fit into Agile product management, requirements, development, testing the support desk, and security.

"Tasktop Integration Hub enables better feedback loops and collaboration among the various stakeholders. Everybody is connected," said Kersten. "If a defect is reported, it is instantly triaged by the security team and then routed to the developer's backlog so it can be scheduled for the next release, which is connected to the right application requirements."

As tool categories continue to become more fragmented, Tasktop is able to connect them into the expanding value stream ecosystem.

How Tasktop Benefits Developers

Developers building applications in Visual Studio or TFS can connect to the service desk, build tools, Java developers using different development tools, and others while enjoying the great experience Visual Studio 2017 provides.

"Every one of those third-party tools is able to connect into your TFS backlog and security. You can also collaborate in real time, from within Visual Studio with developers using a tool like Jira," said Kersten. "We connect a developer, a team, or development organization to all the third-party tools that are part of the modern value stream."

Visual Studio acts as the front end of all of that, linking code and all development activities with Tasktop's help. So, for example, if a security vulnerability is reported on a service ticket, the developer can comment on it from within Visual Studio.

> ***'We've shifted away from a simplistic world in which developers wrote code and then hit a run or deploy button.'***
>
> *—Mik Kersten*

Leadership Should Focus on the Value Chain

IT leaders, development managers and entire organizations need to start thinking about the value chain first. While more companies are using Agile and DevOps to compete more effectively, they have to look beyond development and operations so they can include upstream activities.

"If a developer is waiting for a mobile app wireframe, it doesn't matter how much you automate deployment, because your bottleneck is further upstream," said Kersten. "Take a look at your end-to-end stack and make sure all of that is connected because you can do that now."

For example, a top U.S. insurer and a top U.S. bank have embraced the value chain concept, although the transformations have begun in slightly different phases throughout those organizations, depending on the maturity of the software teams. Regardless of where they started — deploying Agile planning tools, automating the continuous integration and continuous delivery pipelines, or automating testing, each of those organizations has succeeded in enabling a value stream that is capable of delivering business value more effectively.

"Tasktop has enabled the largest and most interesting Agile and DevOps transformations on the planet by providing an integrated and visible value stream," said Kersten. "We're able to connect up tools like Selenium, Agile Central, and Quality Center — whatever tools comprise your value chain."

Learn more at www.tasktop.com. ▮

2017 Microsoft Build Partners

Alachisoft: NCache is a 100% Native .NET Open Source distributed cache (released under Apache License, Version 2.0). Software teams use NCache to remove performance bottlenecks related to their data storage and databases and to scale their .NET and Java applications to extreme transaction processing (XTP). TayzGrid was developed from NCache source into a native Java product in 2013 its features are identical to NCache except in Java-specific areas.

Aqua Security: Aqua Security enables enterprises to secure their virtual container environments from development to production, accelerating container adoption and bridging the gap between DevOps and IT security. Aqua's Container Security Platform provides full visibility into container activity, allowing organizations to detect and prevent suspicious activity and attacks in real time. Integrated with container lifecycle and orchestration tools, the Aqua platform provides transparent, automated security while helping to enforce policy and simplify regulatory compliance.

Caphyon: Caphyon makes software products like Advanced Ranking, a website ranking software which helps manage search engine rankings intelligently. The software company also offers its Advanced Installer, which is a powerful, easy to use, Windows installer authoring tool which lets teams create .MSI installs in minutes. Advanced Installer also lets team install, update, and configure products safely, securely, and reliably.

CData Software: CData is a leading provider of standards-based drivers and data access solutions for real-time integration with online or on-premise Applications, Databases, and Web APIs. The CData drivers are universally accessible, providing straightforward access through popular data-access technologies, such as ADO.NET, ODBC, JDBC, Xamarin, SQL SSIS, BizTalk, PowerShell, etc. Developers can leverage these standards-based drivers with Microsoft technologies to easily build applications that integrate with more than 80+ data sources, including Big Data & NoSQL databases, CRM, ERP, and Accounting packages.

Checkmarx: Checkmarx is an application security software company, whose mission is to provide enterprise organizations with application security testing products and services that empower developers to deliver secure applications. The new Checkmarx (CxSAST) Microsoft Visual Studio Team Services Plugin allows organizations with agile development practices to embed security into their software development lifecycle (SDLC) without the delays traditionally caused by application security testing.

Chef: The Chef DevOps platform is designed for innovation, speed, collaboration and safety. Chef Server serves as the foundation for creating and managing flexible, dynamic infrastructure for companies managing 50 to 500,000 nodes, across multiple data centers, public and private clouds, and in heterogeneous environments. Other elements address delivery, compliance, analytics, and high availability, respectively.

DevExpress: DevExpress engineers feature-complete Presentation Controls, IDE Productivity Tools, Business Application Frameworks, and Reporting Systems for Visual Studio, along with high-performance HTML JS Mobile Frameworks for developers targeting iOS, Android and Windows Phone. Whether using WPF, ASP.NET, WinForms, HTML5 or Windows 10, DevExpress tools help teams build and deliver their best in the shortest time possible.

eDev Technologies: Modern Requirements by eDev Technologies provides a collaborative requirements environment, uniquely built on Microsoft TFS or VSTS. The fully featured, web-based requirements suite provides end to end traceability, WI baselining, and visualization support. With its optional bi-directional Microsoft Office integration, the suite is natural to learn, mitigating the impact of change for ALM, DevOps, or product development. Agile and structured requirements teams, have completed their projects in half the time, reduced rework, simplified compliance reporting and improved quality.

Flexera Software: Flexera Software helps application producers and enterprises increase application usage and security, enhancing the value they derive from their software. InstallShield is the world's leading Windows installer development solution. It enables development teams to be more agile, collaborative and flexible when building InstallScript and Windows Installer (MSI) installations for PCs, servers, Web, and virtual applications.

GrapeCity: GrapeCity is an award-winning Microsoft Gold Certified Partner, a premier Visual Studio Industry Partner, and one of the world's largest providers of developer components. Its comprehensive ComponentOne Studio provides Microsoft Visual Studio developers, designers and architects with an array of components, controls, tools, and solutions that enable them to efficiently build applications and projects for Windows, Web, or Mobile. GrapeCity's Ultimate 2017 v1 comes with Visual Studio 2017 integration, and the cross-platform component suite includes ComponentOne Studio, Wijmo, and Xuni. Also, ComponentOne Studio's FinancialChart control was updated this year with five new indicators and overlays.

Infragistics: Infragistics Ultimate makes it easy to build apps that deliver great user experiences. The most recent release, Infragistics Ultimate 15.2, includes many new features, new controls, and new updates across platforms, including WPF, Windows Forms, ASP.Net MVC, iOS and Android. Using Ignite UI's powerful data visualization capabilities, developers can bring huge volumes of data to life. With Indigo Studio, they can rapidly prototype and collaborate on app experiences before writing code.

JetBrains: JetBrains, creator of the Java IDE named IntelliJ IDEA, is a technology leader specializing in the creation of intelligent development tools. JetBrains' ReSharper product is a Visual Studio Extension for .NET developers. ReSharper extends Visual Studio with over 2,300 on-the-fly code inspections for C#, VB.NET, ASP.NET, JavaScript, TypeScript and other technologies. For most inspections, ReSharper provides quick-fixes (light bulbs) to improve code in one way or another.

LEADTOOLS: LEADTOOLS provides SDKs for document, medical, DICOM, PACS,

raster, vector, and multimedia image technologies. Its latest release features the DICOM Hanging Protocol SDK and it comes with Visual Studio 2017 compatibility. New features and enhancements were recently added to LEAD's Document Viewer, which is a document-viewing solution for .NET (C# & VB), Java, and HTML5/JavaScript. LEAD also made its Credit Card Reader SDK available to .NET and C programmers.

Mobilize.Net: Mobilize.Net migration technology is Microsoft's chosen solution for Visual Studio and MSDN customers enabling them to reduce risk, cost, and time while modernizing applications to web, mobile, and cloud. Mobilize uses Artificial Intelligence algorithms to transform 90's legacy code (VB, PowerBulider, ASP, Silverlight…) into modern languages, platforms, and architectural patterns following standards like .NET, C#, JavaScript, HTML, and AngularJS. For over two decades, millions of developers have used Mobilize technology to successfully modernize billions of lines of code.

OpsHub: Unify DevOps and customer experience ecosystems by using OpsHub integration & migration solutions. Often teams using Visual Studio (VSTS/TFS) need to collaborate with other members using third party products. This heterogeneous ecosystem, results in poor collaboration, fragmented information and poor traceability, severely impacting productivity, quality and transparency. OpsHub Integration Manager integrates all tools to create a unified ecosystem, which enables rich collaboration, seamless information exchange and traceability, resulting in effective collaboration and increased productivity.

PreEmptive Solutions: PreEmptive Solutions is a trusted global leader of protection tools for Desktop, Mobile, Cloud, Internet of Things (IoT) apps. It helps organizations serious about hardening and protecting their apps to secure their trade secrets (IP), reduce piracy/counterfeiting, prevent discovery & tampering of their applications and hindering data breaches. PreEmptive works very closely with Microsoft to help its mutual customer's layer application self-protection into their security lifecycle development process.

Redgate: Redgate, a Visual Studio Gold partner, produces software for teams of application developers and SQL professionals, helping over 800,000 users improve productivity, protect their data, and become more agile. New to Visual Studio Enterprise, developments teams can extend DevOps processes to their SQL Server databases in Visual Studio with Redgate Data Tools. These tools – ReadyRoll Core, SQL Prompt Core, and SQL Search are included in Visual Studio Enterprise, but are available to try free for all Visual Studio developers. At Build 2017, Redgate is launching a new Visual Studio Team Services extension to make provisioning databases for testing fast and easy in continuous integration and continuous delivery pipelines.

Sauce Labs: Sauce for Visual Studio Team Services gives Visual Studio (VSTS) and TFS users access to the world's largest, most stable, and highly secure test automation platform. Sauce for VSTS enables teams to speed up their testing by running hundreds of tests in parallel on over 900 platforms, including mobile devices. With its integration to Visual Studio and TFS platforms, Sauce Labs provides an all-in-one tool for developers striving to achieve true CI/CD. The integration allows users to easily authenticate and launch tests on Sauce Labs as a part of their VSO build process.

SmartBear: Supporting more than five million software professionals and over 20,000 companies in 194 countries, SmartBear is the leader in software quality tools for teams. The company's products help deliver the highest quality and best performing software possible while helping teams ship code at nearly impossible velocities. With products for API testing, UI testing, code review and performance monitoring across mobile, web and desktop applications, SmartBear equips every development, testing and operations team member with the tools to ensure quality at every stage of the software cycle.

Syncfusion: Syncfusion, an enterprise technology partner, lets developers move beyond coding applications to delivering business innovation. The company offers more than 800 controls and frameworks and suites of components available for .NET and JavaScript, including charts, grids, schedulers, Gantt controls, maps, gauges, and more. Syncfusion also offers a comprehensive suite of ASP.NET MVC components for enterprise web development, which includes several complex widgets like DataGrid, Spreadsheet, Schedule, Pivot Grid, and more.

Tasktop: Tasktop takes the various tools used in software delivery and integrates them into a unified toolchain. Tasktop integrates Microsoft TFS, Visual Studio Team Services, Test Manager, Project Server and SharePoint to each other and to most other popular Agile, DevOps and SDLC tools. It automates the flow of artifacts across these tools, eliminating wasted time and bottlenecks while increasing velocity, collaboration and employee satisfaction. Tasktop can automatically collect the activity data into a central database, enabling the creation of consolidated dashboards and traceability reports, allowing for greater project visibility and artifact traceability.

Telerik, a Progress Company: Telerik Platform 2.0 gives developers complete access to the app development life cycle from a single app-centric interface. With it, developers can create, connect, test, deploy, and measure an app from a single unified interface, reducing the effort required when working with multiple disparate technologies. The new app-centric interface simplifies the integration of cloud services into the app development process, including push notifications and analytics.

UXDivers: UXDivers is a product design company with focus on user experience and user interface design. The company is committed to helping developers close the gap between good coding and good user interface design. Proof of this commitment are UXDivers most popular products including Grial UI Kit and Gorilla Player for Xamarin .Forms. Grial UI Kit, the first user interface kit for Xamarin.Forms, is a complete collection of UI layouts, styles and resources. UXDivers' Gorilla Player is a multiple device previewer for Xamarin.Forms application.

Xablu: Xablu coaches teams and organizations on Enterprise Mobile App Development by bringing structure, creating culture and delivering Mobile Enterprise Apps. Xablu will be at Build 2017 with its extension XabluCross for MvvmCross. It shows a new template 'MvvmCross by XabluCross' under C# projects and creates a ready-to-run Xamarin MvvmCross-based project. The wizard provides all kinds of options, including choosing different MvvmCross versions. ▮

Speed release and empower others

BY LISA MORGAN

Getting great software products to market quickly is tough when there's no way to get timely feedback from all stakeholders. Once a product has been released in beta or in production, features may not perform as they're supposed to, and there's no easy way to customize who gets access to which features at a granular level.

LaunchDarkly solves those problems with its feature flag management and continuous delivery platform. With it, software developers can build better quality products faster that truly align with the desires of their users.

"We have a platform where developers can allow different people, either within their organization or outside of their organization to see code," said Edith Harbaugh, CEO and co-founder of LaunchDarkly. "You can actually have functionality pushed out, deployed, live and then control access to the actual functionality of the code."

In just two years, LaunchDarkly has become an important addition to the continuous integration and delivery stack, because it helps software teams develop and deploy applications faster. Its feature flagging capabilities enable users to turn features on and off so developers don't have to do it. The software can be used to A/B test an application in beta, or control what users see and access at an individual level.

Notably, feature flags can be managed at enterprise scale across multiple development environment with flag statuses, auditing, and custom roles.

Microsoft, AppDirect and CircleCI are just a few of the companies taking advantage of LaunchDarkly's platform.

Get Valuable Feedback Faster

LaunchDarkly enables developers to get stakeholder feedback much faster.

"Everybody is getting access to this information in the SDLC," said Harbaugh. "It could be as simple as your QA team being able to test features, your marketing team getting access, or designers doing usability tests — everybody in the lifecycle."

One software team shaved two weeks off a multi-month project by getting QA user response faster than any of the other groups. Now, the rest of the development teams in that organization also use LaunchDarkly.

'If something breaks at 3:00 in the morning, you don't need all hands on deck to diagnose and patch the issue.'

—Edith Harbaugh

Control Feature Access

LaunchDarkly gives development teams considerable control over how they user-test products and how they enable or disable features. For example, if a piece of functionality isn't working right, the feature can simply be turned off so it can be fixed later. It's also possible to slowly scale the delivery of features to a customer base to ensure there are no scalability issues. If there are some users that should never see certain features, they can be blocked from seeing them.

LaunchDarkly can also be used to control the timing of feature availability. That way, engineering can write test, and deploy software on their own schedule. Meanwhile, the controls can be given to marketing so the product can be launched whenever marketing is ready.

If something goes wrong after a release, the problematic features can simply be turned off.

"You can do all of this without running a release so you don't have to redeploy code, everything is just available so it saves you a lot of time and stress," said Harbaugh. "If something breaks at 3:00 in the morning, you don't need all hands on deck to diagnose and patch the issue. You can just turn off the feature and keep it off until you figure out how to fix it."

Developers embracing containers and microservices can use LaunchDarkly to control access to the microservices and to version the microservices.

Empower Others

Developers don't need to control everything when their application is out in the wild. If some users should have access to certain features and others shouldn't, there's no need for prolonged discussions and complicated processes that waste of valuable time.

A better solution is to put control in the hands of business users so, for example, one customer gets access to one set of features and another customer gets access to another set of features. Different versions of a product can accomplish that, albeit not with the same precision.

Alternatively, if an issue arises, customer support can be trusted to control access without involving developers.

"The old way of doing things is archaic because developers had all the control over the code, and every time somebody wanted to enable access, you'd open up a ticket, it would get assigned to a developer and you'd have to wait for a release," said Harbaugh. "Developers are using our platform to offload that burden to the people who are closest to the problem, such as sales, marketing, or customer support."

One of LaunchDarkly's customers had to engage an engineer every time they wanted to change the way an application worked. What used to take four or five days then, now takes two minutes.

Learn more at www.launchdarkly.com.

The new **Gartner Magic Quadrant** for **Software Test Automation 2016** is here!

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Buyers Guide

Moving testing out of the slow lane

BY CHRISTINA CARDOZA

In a world where businesses not only have to become software companies to compete, but deliver higher quality software to market faster, what does this mean for testing? Businesses and software teams have become so concerned with developing and delivering in an agile fashion, they have had to stop and rethink their entire testing process.

This is because traditional or legacy testing tools and processes don't comply with speed, according to Aruna Ravichandran, vice president of DevOps product and solutions marketing at CA Technologies. To compete in a world where high-quality app experiences are the expectation, testing needs to be efficient and effective, and that requires a continuous testing approach, according to Ravichandran.

"Testing needs to be as fast and as dynamic as our agile development processes, otherwise we are going to have delays in developing and shipping it to operations," said Wolfgang Platz, founder and chief product officer of Tricentis.

Platz explained agile has always been thought of as a development initiative from the beginning, which was too narrow. While it accelerated the speed of development and brought value to customers faster, agile development needed to take operations into consideration. "All of a sudden we weren't talking about agile anymore, but talking about DevOps," said Platz. But as soon as people started to pursue a DevOps agenda, they realized there was an ugly stepchild in the middle that needed to be taken care of, which is testing.

"In many ways, testing is the final frontier of DevOps and continuous delivery. To release the high-quality code that enables businesses to stay ahead of their competition faster, organizations must adopt next-generation testing practices that enable them to test early, often, automatically and continuously," said Ravichandran.

However, according to Marc Brown, product portfolio strategist for Parasoft, continuous testing should actually be a prerequisite for continuous delivery and continuous integration, and continuous delivery should be a prerequisite for people who want to get to DevOps. "You have to think of it as a set of building blocks where at the core you have organizations that want to have more flexibility and have adopted agile, they then have to adopt continuous testing to ensure what they are developing can be tested on an ongoing basis," he said

But this fast-paced way of working creates many challenges for testers, according to Jason Hammon, director of product management at TechExcel. Hammon explained testers now have to struggle with the lack of time and need to respond as quickly as plans change.

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In an agile world, testers no longer have the luxury of a clear roadmap on what they are going to test, time to prepare the tests, and then time to execute on the testing.

But if teams are able to implement a good continuous testing strategy with the proper tools to support that strategy and scale, it will lessen the pain, according to Rod Cope, chief technology officer at Rogue Wave. With continuous testing, Cope says teams get the benefit of always having code in a good state. They no longer have to write code, test it, and then wait to find issues, stop the presses and go back and fix things. Instead, they are able to constantly take pieces of the solution and constantly test, instead of waiting for a big-bang delivery and testing phase.

"You can get much more done much more quickly with better quality, better security and less rework so you are getting more bang for your buck out of your development team," said Cope. "You clearly can't take a year anymore to get a product out the door; you have to be much more agile, and continuous testing is absolutely mandatory in today's world. You really can't afford to have problems in the field. You have to get it right the first time, and you have to do it very quickly. "

Automation is key

One way continuous testing can help pick up the pace of testing is with automation. Agile and continuous testing have a tremendous amount of potential value to add to organizations, but if they aren't fully automated it can be very taxing on the organization and create a lot of overhead, according to Parasoft's Brown.

Tricentis' Platz explains automation allows teams to test at the speed of agile and DevOps; reduce the time and effort it takes to obtain realistic and accurate test results; minimize test maintenance; and reduce false positives.

In order to successfully deploy test automation, teams need to have a good understanding of what test automation is, how it can be leveraged, and where it is going to be most successful based on the type of product, according to TechExcel's Hammon.

This requires connecting a number of tools together within the overall software development chain, Brown explained. "Automation tools need to be very easily integrated with the continuous testing tools to really power the continuous testing process," he said. Brown adds organizations need to adopt tools that enable service virtualization to support automation. "It is the easiest way to create test environments on demand without the effort. The process and vision of continuous testing needs to be completely coupled with the technologies and automation to realize the value, otherwise it is going to create a lot of overhead for teams," Brown added.

In addition, test teams should be comfortable with developer assets to write test cases in the form of automated scripts, according to Kelly Emo, director of life-cycle and quality product marketing at Hewlett Packard Enterprise (HPE). "They need to be comfortable with IDEs, programming languages and application models. Whether Java, C#, Java script or other, they have to be comfortable working at the code level to create the most effective and reusable

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The resurgence of testing

For so long testing was an afterthought, but today the mantra 'test early and test often' is drilled into the heads of developers and testers. This is largely due to the increased speed of delivery and the push to adopt agile and DevOps, according to HPE's Kelly Emo.

Even the smallest releases can have a large impact on the end user experience, and if an application delivery isn't what it was expected to be, that response can spread around the market very fast, Emo explained. It is now more important than ever to put testing techniques in place throughout the entire life cycle so testing does not become a bottleneck, and teams can keep up with continuous quality.

The acceleration of development is a correlation of the consumer expectation. People expect the first version of something to work very well and be very obvious to use. They want their solutions to be simple to understand, but do way more things, according to Mobile Labs' Dan McFall. That demand for quality is driving the demand for testing. "You have to be developing all the time to keep up with the timeline demands, and the only way to meet the quality demands is to be testing it constantly," he said.

McFall also explains the concept that software is eating the world is also having a huge impact on testing. Today, everything has to become software in some way, shape or form. The digital transformation is adding more complexity to the testing world because devices are starting to take many different forms, provide more capabilities, and interconnect between features and functions.

This software complexity is not only turning up the dial on speed, but also changing the ways to deliver. Because of this, more teams are starting to move to a software architecture that is extremely agile such as service-oriented architecture or microservice architecture, according to Emo. "This is great from an architectural and developer agility perspective, but it gives you a lot more to manage, and a lot more dependencies," she said. In addition, the software is being deployed across a multitude of operating systems, mobile environments, mobile devices, and Internet of Things devices, Emo added.

To deal with this, teams need to be continuously testing. McFall explains it doesn't always have to be test everything all the time, but something should always be being tested, whether it is unit tests, interoperability, or white box/gray box testing. "Teams need to be able to anticipate problems, and that means feedback loops need to be automated and process loops need to be automated to be able to keep up," he said. ∎

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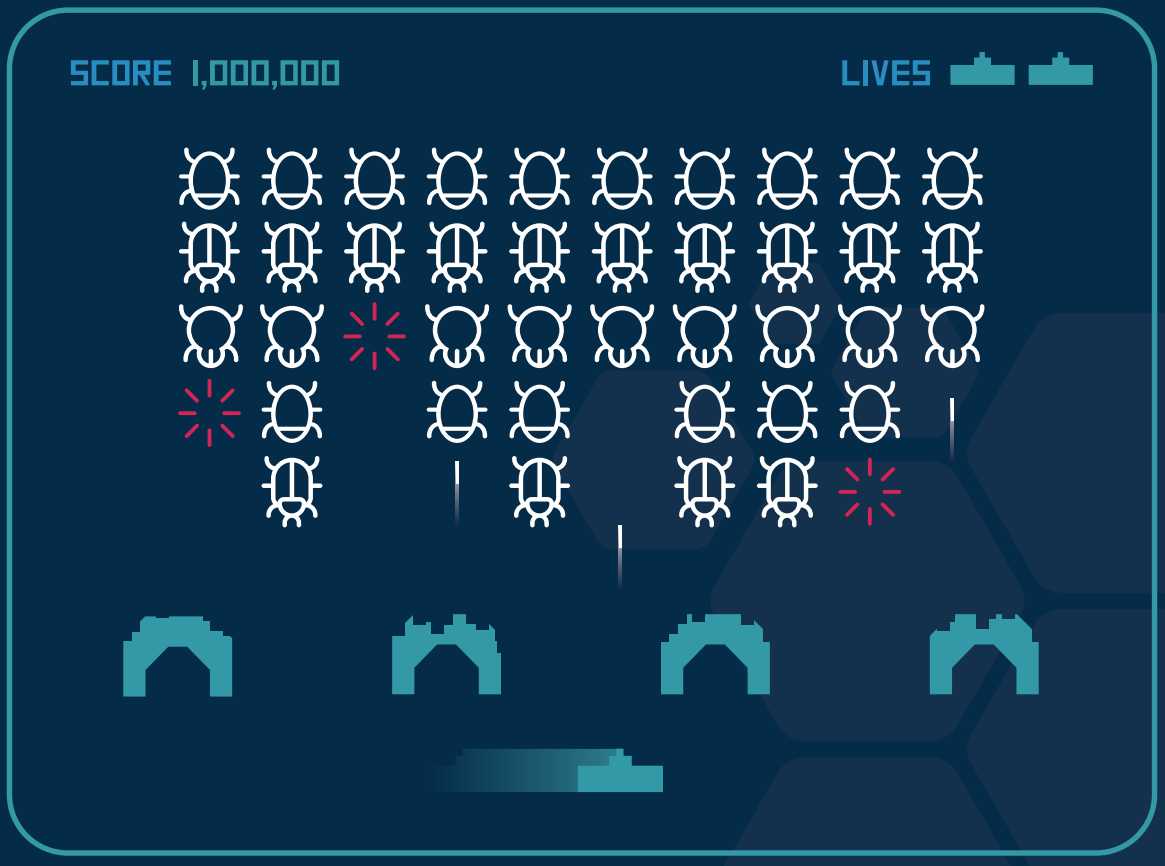

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automation assets," she said.

However, businesses should note that continuous testing is not just another buzzword for test automation. According to Dan McFall, president of Mobile Labs, automation is just a piece of the continuous testing puzzle, and it doesn't mean that every test is going to be automated or even continuously tested. "You have to design the process and figure out where things are going to go, and then you figure out which technologies are going to come fit in and be in support of that," he said.

In addition, automation doesn't just apply to testing. Automation can be applied to data transfer, data flows, deployment, builds, and build management, according to McFall.

According to Rogue Wave's Cope, in an ideal world everything would be fully automated, but realistically that is difficult unless you invest early on in the codebase, design and architecture. Cope adds at least on the UI side teams are always going to have to have some manual check and review in place if not heavy testing with every release. This is because things as simple as fonts and colors are hard to automatically test.

In addition, it requires a complex infrastructure to set up application servers, web servers, databases and configure all the different moving parts to be deployed in an isolated environment and run all the tests. However, more teams have been moving to containerization to make it easier to get environments up and running quickly, automate the process, and automate all the testing around it, Cope explained.

Other pieces of the puzzle

On top of automation, there are a multitude of other key strategies and tools necessary for a continuous testing workflow. "The continuous testing journey is a change. You can't just jump into things, you need to take care of several other things first," said Tricentis' Platz.

For instance, Tricentis provides a continuous testing maturity model where customers can assess where they are today, and come up with a plan on how to get to the most mature stage.

"While we've all heard about organizations that were 'built to last,' the truth is, the only way an organization can survive and thrive today is to make sure they are 'built to change,'" said CA's Ravichandran.

Parasoft's Brown says organizations need to invest in their developers, testers and release managers, and train them on what it means to be continuously testing. Then, you must train them on the environment and on the tools so they realize the value of what they invest in versus buying a product, not seeing its full potential, and becoming shelfware. "Training is probably the biggest element outside of the necessary tools and technologies needed to really power this, and make sure customers are successful at their continuous testing endeavors," he said.

Testers should make sure they are still a part of the agile team, and participate side by side with development.

That requires a lot of communication, according to TechExcel's Hammon. Teams need to understand why they are moving in a certain direction and choosing specific tools.

Communication is also a good skill QA engineers should have. That way, if an issue comes up, they can easily explain to the developer what happened and why it needs to be fixed. "They could also communicate with people that may be on the marketing or product management side to fully understand the initial goal of the feature to make sure they are really able to provide test cases that verify and validate the feature is actually implemented correctly," Hammon said.

In addition, communication means taking into account customer feedback so teams can integrate that into the functionality of their system and make sure they are testing the right things. Having a good feedback loop in place gives teams the ability to see the overall health of the solution and provide early warning into issues, according to Mobile Labs' McFall. "Without metrics or a good strategy, teams will be lost on whether or not they are actually delivering what the customer is expecting. If you don't have a clear destination, just because you are going fast doesn't mean you are going to the right place."

HPE's Emo explains there will always be some defects that leak out into production, but if you have that closed feedback loop and communication and an incident is found in production, it can get back to the agile team fast and they can quickly fix the problem.

CA's Ravichandran adds to have a successful continuous testing strategy, teams need integrated solutions that enable "1) test environment simulation, 2) automatic test case creation, even from requirements, 3) on demand test data management, 4) always available SaaS-based performance testing, 5) open source integrations with tools like JMeter, Jenkins, Selenium, Appium, and 6) automated application performance monitoring and post-production performance testing to achieve continuous feedback."

Who is responsible for testing?

Agile development requires cross-platform teams. This means that not only are teams made up of QA engineers, developers, and project managers, but the responsibilities are shared amongst the team members. Because of this, CA's Ravichandran says testing and quality is everyone's job.

"Continuous testing makes testing activities part of everyone's role…from the business analysts, to the developers, to the performance engineer, to the operations manager… all are responsible to make sure the end users have a fantastic experience with their soft-

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What makes your continuous testing solution stand out?

Aruna Ravichandran, vice president of DevOps solution marketing and management at CA Technologies

Our goal at CA Technologies is to help organizations develop applications and experiences that excite and engage their customers. To achieve this goal, the company integrates continuous testing into an end-to-end continuous delivery ecosystem that enables uninterrupted flow of ideas from design to operations faster, without compromising on quality while delivering desired user functionality. The company's next-generation, integrated solutions enable test environment simulation, automatic test case creation, on-demand test data management, application pipeline orchestration as tests are passed, SaaS-based performance testing, and open-source and third-party integrations.

No other vendor can offer an end-to-end, integrated continuous testing solution like CA. CA's continuous testing solutions include automated modeling of test cases right from the requirements phase, test case creation, identifying the optimal regression tests required for full coverage, data masking and subsetting as well as test data generated on demand, deployment of virtualized test environments, shift-left performance testing using open source and SaaS-based testing early on,running the selected tests, and then tying it all together with an orchestrated release engine that promotes the code, build, and application as soon as all the tests pass — all with zero touch workflow. And now with the acquisition of Veracode, CA provides a superior SaaS-based AST software to help organizations mitigate risk early in the development process with secure application testing.

This is testing unleashed, going hand in hand with agile development to accelerate quality into production.

Kelly Emo, director of life-cycle and quality product marketing at HPE

We look at continuous testing as a holistic pattern. Our offering really has three primary components: automated testing products, management products, and service and network virtualization. At the core you have the testing solutions that accelerate creating automated tests. They have the power tools that make it easier to automate a test whether it is a functional test where you need to have tools that help you identify the objects you are using to automate, or you are working with different APIs.

The second part is the management layer. Once you have a continuous testing process, you want to be able to provide information in real time to your developers and testers so you know exactly what is going on. You have a continuous view of the state of quality.

The last piece is the virtualization piece. If you are doing this so quickly how do you deal with your constraints? How do you deal with your blockers? How do you deal with those dependencies that you need to have to test, but you can't get a hold of? That is where our service and network virtualization products will work with testing tools and the management layer to give you that complete solution.

Dan McFall, president of Mobile Labs:

The first thing we offer is a managed Mobile Infrastructure as a Service solution. What that means is we provide a seamless real-time virtual device experience. It is a repository of real devices that you can bring up, and manually interact with just as if you were holding them in your hand or you tethered them to your laptop. This solution works whether you are a developer, a manual tester, an automation engineer or just an execution environment.

The biggest thing that we offer is that we open the device up as an open platform to be utilized by a variety of solutions. What is nice about that is if you look at the continuous testing maturity model, there is testing that is being done by developers. Developers have toolsets that they will use for native application development environments, whether it is Xcode from Apple, Android Studio or some cross-platform solution; they are going and writing that and they might be writing test cases there. We will hook the devices up for you so you will be able to access them and use them as part of that portion of your testing.

We really allow you to maximize the device farm, and we handle the lifting for integrating and interfacing that to a wide variety of testing strategies. We don't force a homogeneous or uniform strategy for how you do testing, we pro-

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vide a uniformed way to access the devices for that.

Marc Brown, product portfolio strategist for Parasoft:

What we offer is the tools necessary to support a continuous testing process in three markets. We support the embedded market, people developing embedded software that is going to be pushed into a device; we support the IoT market, which is a huge opportunity for people developing equipment; and we support the IT organization.

Parasoft is unique in that we have the tools that support all three of those core markets. The other thing is that we really have an end-to-end set of tools to power continuous testing. We have service virtualization, we have a free community edition and we have a very high-end enterprise performance edition for people that need a lot of capabilities and scale within their organization.

Then on top of all that, we have an API testing tooling, load testing tooling, security tooling, and reports and analytics that support the ongoing activities within the teams.

Parasoft is one of the few remaining independent companies that is very focused on having an end-to-end testing platform for the development organization. We provide the tools necessary for the developer, for the tester and for the analysts to determine that the software they are actually building is going to do what they think it is going to do both functionally and non-functionally.

Rod Cope, chief technology officer at Rogue Wave:

The piece of our portfolio that is closest to continuous integration and continuous testing is Klocwork. It is a static code analysis solution that integrates into continuous integration and continuous delivery environments, and make sures code is good, clean, and doesn't have any nasty security vulnerabilities or quality issues. It is like writing all the tests that your developers can't write or don't have the time to write. It is always watching over the shoulder of the developer to make sure that as they write their code or as they check it in to Jenkins or other CI environments it always stays well-tested and clean.

The major new change we recently released was a feature called SmartRank. SmartRank is all about automatically prioritizing issues so that the most problematic and the most dangerous issues get sorted to the top of the list, and developers can spend their time resolving the worst security issues and the most potentially damaging quality issues first. That is a way to save a lot of time, be more efficient in development, get good results and get good code out of it.

One of the key differentiators of Klocwork is it actually watches the developers as they type in their editor of choice and automatically highlights when they introduce a quality or security issue. You are basically preventing a bug up-front so you don't have to find and fix it later, which can be slower and more expensive, and the developer gets out of their workflow. Instead, the developer is always highly productive because they don't have to stop and fix something, it is just part of their process of writing code.

Jason Hammon, director of product management at TechExcel:

We make sure our tool is flexible enough to adapt to whatever process your team has. Our analytics solution will work in environments like continuous integration, agile, or waterfall.

One of the things that makes us unique is you can utilize our tool in environments that might be mixed. If you have a team that is waterfall within a larger enterprise and another team that is more agile or practicing continuous integration, or maybe you want to start small and take baby steps in that direction, our tools are flexible enough to allow you to incorporate those concepts into your releases without having to completely dive in and try to do it all at once. The tools can really be configured to meet your needs without having to change your process.

The tools are also very open and flexible. It is modular so that you can use the pieces of it that you want. You can use our test management tool with JIRA or Bugzilla or other tools. We allow you to mix and match what you want to use and we have APIs to fill in any gaps that might be there too.

We are just about to release a new version of our analytics solution and one of the things that we have done in that release is we really focused on tools that allow teams to better communicate.

Wolfgang Platz, founder and chief product officer of Tricentis

Our continuous testing solution has two major aspects that are differentiating.

One aspect is that the core element of continuous testing is automation. You cannot get to the quick response that you need from test and the comprehensive response you need from your test with manual testing anymore. You need to automate; otherwise it is not working.

What we do differently from anybody else in the industry is that we enable former manual testers to do that test automation. This is fundamentally different.

We present automated test cases in a business-readable language. It is plain English. and this is true not only for test cases that go through the user interface and interact with the application, but also true for test cases that use API interfaces to do the testing.

The second is that we are the comprehensive suite in continuous testing. Comprehensive means we go way beyond automation, and it is all fully integrated in one suite. We do not just offer automation. We offer risk-based testing, test case design, test data management, service virtualization and last but not least exploratory testing all fully integrated into one suite.

Our customers do not need to learn a plethora of tools. They do not need to get acquainted with a slew of different tools; they can just stick to one suite, which is the continuous testing suite from Tricentis. ▮

A guide to Continuous Testing Tools

▪ FEATURED PROVIDERS ▪

■ **CA Technologies:** Only CA delivers next-generation, integrated solutions that enable test environment simulation; automatic test case creation, even from requirements; on-demand test data management; orchestration that progresses applications from phase to phase based upon the passing of test cases; SaaS-based performance testing; and open source integrations with tools like JMeterTM, Jenkins, Selenium, Appium, and more. CA's continuous testing solutions enable a robust continuous delivery model, so your organization can meet the demands of today's application economy.

■ **HPE:** HPE Software's **Functional Testing** solutions help to deliver high-quality software while reducing the cost and complexity of functional testing. HPE's solutions address the challenges of testing in agile and Continuous Integration scenarios, as well as hybrid applications, cloud and mobile platforms. HPE ALM Octane provides insights into software, speeds up delivery, and ensures quality user experiences.

■ **Mobile Labs:** Mobile Labs provides enterprise-grade on-premises and hosted mobile device clouds that improve efficiency and raise quality for agile, cross-platform mobile app and mobile web deployments. The company's patented open platform device cloud, deviceConnect™ is available in both public and on-premises configurations. deviceConnect provides affordable, secure access to a large inventory of mobile devices across major mobile platforms to developers, test engineers, and customer support representatives, among others. At the heart of enterprise mobile app deployment, deviceConnect enables automated continuous quality integration, DevOps processes, as well as automated and manual app/web/device testing on real managed devices. For more information please visit www.mobilelabsinc.com.

■ **Parasoft:** **Parasoft:** Parasoft helps organizations perfect today's highly connected applications by automating time-consuming testing tasks and providing management with intelligent analytics necessary to focus on what matters. Parasoft's technologies reduce the time, effort, and cost of delivering secure, reliable, and compliant software, by integrating static and runtime analysis; unit, functional, and API testing; and service virtualization. With developer testing tools, manager reporting/analytics, and executive dashboarding, Parasoft supports software organizations with the innovative tools they need to successfully develop and deploy applications in the embedded, enterprise, and IoT markets, all while enabling today's most strategic development initiatives — agile, continuous testing, DevOps, and security.

■ **Rogue Wave:** The largest independent provider of cross-platform software development tools, components, and platforms in the world. With Rogue Wave **Klocwork**, detect security, safety, and reliability issues in real-time by using this static code analysis toolkit that works alongside developers, finding issues as early as possible, and integrates with teams, supporting continuous integration and actionable reporting.

■ **TechExcel:** **DevTest** is a sophisticated quality-management solution used by development and QA teams of all sizes to manage every aspect of their testing processes from test case creation, planning and execution through defect submission and resolution. It aims to give teams control over product quality; enhance test standardization, reuse and revision; increase team productivity; and ensure ultimate accountability for all test phases. Other solutions the company offers include: **DevSuite** for ALM initiatives**, DevSpec** for requirements management, and **DevTrack** for task management.

■ **Tricentis:** **Tricentis Tosca** is a Continuous Testing platform that accelerates software testing to keep pace with Agile and DevOps. With the industry's most innovative functional testing technologies, Tricentis Tosca breaks through the barriers experienced with conventional software testing tools. Using Tricentis Tosca, enterprise teams achieve unprecedented test automation rates (90%+)—enabling them to deliver the fast feedback required for Agile and DevOps.

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

■ **Appvance:** The **Appvance Unified Test Platform** (UTP) is designed to make Continuous Delivery and DevOps faster, cheaper and better. As the first unified test automation platform, you can create tests, build scenarios, run tests and analyze results, in 24 languages or even codeless.

■ **IBM:** IBM provides a number of test automation teams for agile teams to gain continuous feedback throughout the software delivery lifecycle. The solutions provide user interface and integration test automation, performance testing and service virtualization. Some of the company's continuous testing products include: IBM Rational Test Virtualization Server, IBM MobileFirst Platform Quality Assurance, and IBM Rational Test Workbench.

■ **JetBrains: TeamCity** is a Continuous Integration and Delivery server from JetBrains. It takes moments to set up, shows build results on the fly, and works out of the box. TeamCity will make sure software gets built, tested and deployed, and will notify users of that in the way they choose. TeamCity integrates with all major development frameworks, version-control systems, issue trackers, IDEs, and cloud services, providing teams with an exceptional experience of a well-built intelligent tool.

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Continuous testing guide

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

■ **Microsoft: Visual Studio Team Services**, Microsoft's cloud-hosted DevOps service, offers Git repositories; agile planning; build automation for Windows, Linux and Mac; cloud load testing; Continuous Integration and Continuous Delivery to Windows, Linux and Microsoft Azure; application analytics; and integration with third-party DevOps tools. Visual Studio Team Services supports any development language and is the hosted SaaS service of Team Foundation Server.

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

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

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

■ **QASymphony:** QASymphony recently released **qTest Pulse**, a continuous testing solution for teams practicing DevOps. It features agile test planning, source code traceability, real-time updates, and JIRA integration. Additionally, QASymphony's **qTest** is a Test Case Management solution that integrates with popular development tools.

■ **Rainforest QA:** Rainforest aims to help teams perform QA testing at the speed of development with its web, mobile and exploratory testing solutions. It provides an AI-powered crowdtest platform for agile testing and development that provides results from regression, functional and exploratory tests.

■ **Sauce Labs:** Sauce Labs provides a cloud-based platform for automated testing of web and mobile applications. Its service eliminates the time and expense of maintaining an in-house testing infrastructure, freeing development teams of any size to innovate and release better software, faster.

■ **SOASTA:** SOASTA's **Digital Performance Management** (DPM) platform provides the ability to continuously monitor, test, analyze and optimize solutions in real-time and at scale. It includes five technologies: mPulse real user monitoring (RUM); the CloudTest platform for continuous load testing; TouchTest mobile functional test automation; Digital Operation Center (DOC) for a unified view of contextual intelligence accessible from any device; and Data Science Workbench, simplifying analysis of current and historical web and mobile user performance data.

■ **Synopsys:** Through its **Software Integrity** platform, Synopsys provides a comprehensive suite of best-in-class software testing solutions for rapidly finding and fixing critical security vulnerabilities, quality defects, and compliance issues throughout the SDLC. Solutions include static analysis, software composition analysis, protocol fuzz testing, and interactive application security testing for Web apps.

■ **Tasktop: Tasktop Sync** provides fully automated, enterprise-grade synchronization among the disparate life-cycle-management tools used in software development and delivery organizations. **Tasktop Data** collects real-time data from these tools, creating a database of cross-tool life-cycle data and providing unparalleled insight into the health of the project.

■ **XebiaLabs:** XebiaLabs' enterprise-scale **Continuous Delivery** and **DevOps software** provides companies with the visibility, automation and control they need to deliver software better, faster and with less risk. Global market leaders rely on XebiaLabs' software to meet the increasing demand for accelerated and more-reliable software releases. For more information, please visit www.xebialabs.com. ■

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ware," Ravichandran said.

While this may be true, TechExcel's Hammon believes QA and testing teams should still lead the charge. "It is great to have developers do unit tests on what they are checking in, but you still want to make sure the overall work of the individual developer when put together with the rest of the solution isn't resulting in additional problems. You still need someone to make sure the overall product is what it was initially intended to be," he said.

According to HPE's Emo, testers have a mindset and specialty for solving functional, regression, performance and security issues that developers don't have. But the testers should make sure they are still a part of the agile team, and participate side by side with development. This requires new skills such as the ability to understand the fundamentals of software development. "Understand agile processes and be able to understand good software design patterns and architecture. This way [the QA team] can focus on how to test in a way that will surface issues related to the fundamental way the application is constructed.

Some businesses come up with a test Center of Excellence (CoE). Traditionally CoEs provide a large test team that delivers test as a service to the development team, but this provides distinct disadvantages, according to Tricentis' Platz. Platz explains in a traditional CoE, communication isn't as connected as it should be, causing testers to be informed late about changes.

CA's Ravichandran recommends that CoEs become Centers of Enablement. This allows teams to collaborate in an environment where developers are integrated into testing from the beginning. "When testing is conducted earlier, the entire team is focused on quality, and a culture of "getting code done right the first time" saves time and reduces the number of iterations teams need to perform for a particular code," Ravichandran said. ■

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Rob Enderle is a principal analyst at the Enderle Group.

Analyst View

BY ROB ENDERLE

Picking the strongest product partner

When HP split into HPE and HP Inc. the smart money seemed to be on HPE. That was where the CEO that architected the deal was and were most of the growth seemed to be largely because "everyone" knew that PCs were dead. But HP has been growing the laptop computer and printer segment significantly and their new hot product is actually a market-making mobile printer called the Sprocket. Or, rather than some kind of endemic irreversible problem, the reason that printers and PCs were in decline was likely because there wasn't enough demand generation going on. When HP Inc. was freed up to address that problem, and freed up to create some pretty attractive offerings, the market came back to them.

I think there is a good lesson here.

Engineering-driven vs. market-driven companies

The technology market is typically defined by companies that are run by engineers not marketers but it is interesting to note that when one of the strongest boards in the industry was faced with the failure of their firm, they didn't turn to an engineer they went out of industry to pick a marketer. That was IBM in the early 1990s and reflected on one of the biggest turn arounds of all time when Louis Gerstner came in from Nabisco tied to Jerry York, who was brought it from Chrysler to turn IBM around.

One of the hottest mobile products this holiday season may be a small mobile printer.

Steve Jobs repeated this effort, and it is interesting to note that he had York on his board when he did it, also because he was more of a marketer than an engineer. He understood better than most that, while you needed great products, you had to spend on creating demand for your products; otherwise, people were likely to buy other things. This was why he was able to be successful with the iPod which, on its face, was priced well above market, and turn it into the pivotal offering that changed Apple from a company on the brink of death to the most valuable company in the world.

Marketing, innovation and focus

HP Inc. focused like a laser on thinking about what customers wanted, and both building and marketing the result.

The company was able to improve their financial performance on printers and laptop computers and largely halt the decline on desktop computers as well, largely the result of the Apple-like combination of vastly improved products and significantly improved marketing execution. The market rewarded HP Inc. and its partners with big sales bumps and a strong counterpoint to the declines they, and their segment, had been experiencing.

HP's Channel Partners

I was at a meeting with HP Inc.'s channel partners recently for the Americas and it was like a religious revival meeting as a result of HP Inc.'s efforts. These people were fired up and excited about segments that just a few months earlier had been on life support. One of the products they seemed the most excited about was the small portable HP Sprocket printer that Millennials in particular seemed to be treating very similarly to the early iPods, largely because it was attractive and did one thing well: Printed small pictures you could stick on things and give to people. But that is because HP worked on building demand for the little thing and so nearly a decade after many folks though the printer was dead, one of the hottest mobile products this holiday season may be a small mobile printer.

Lessons learned

You have a choice between partnering with a lot of companies and handling a lot of products. You can't handle everything and picking the products that are worth the effort over those that aren't requires analysis you likely can't afford to do. But one thing you can look into is whether the firm is willing to step up and be a market maker for the products, whether they will create demand and pull the offerings through the channel. If they don't and you can't afford to maybe you want to pick a product and a partner that will step up to this responsibility. Picking vendors that step up to assure that process should likely be a higher priority than it is.

HP Inc. is stepping up to the need to generate demand for the product they sell and, as a result, their channel partners seem to love them. You might want to consider using them for a template on who you should partner with, or maybe just partner with them. Just saying… ▮



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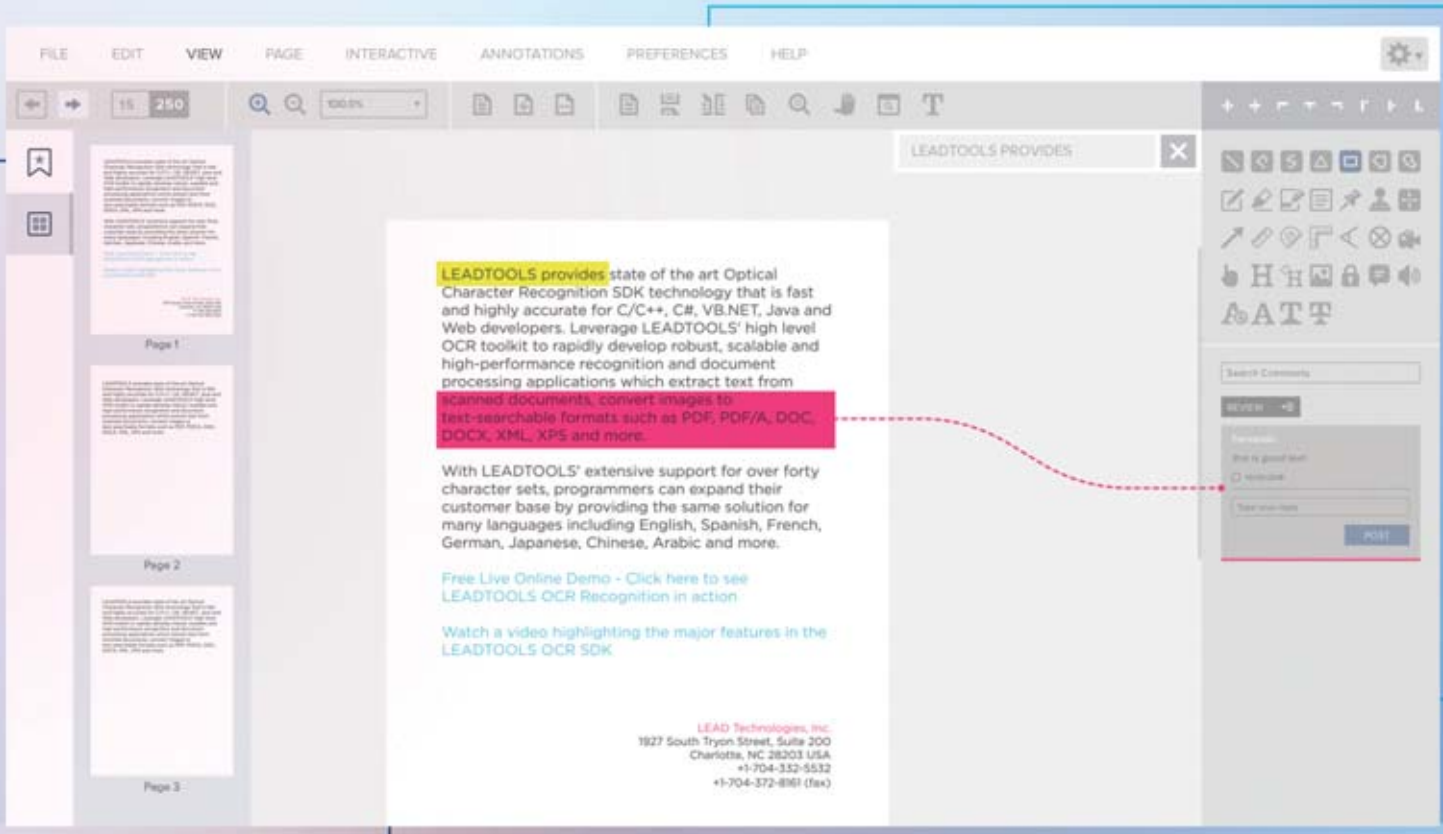

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Guest View

BY MARK LEVY

Mark Levy is director of strategy at Micro Focus, and hosts the webinar series "DevOps Drive-In."

Post-Mortems in Software

When something goes wrong and there is a major production incident in IT, the business usually suffers. Developing, delivering, and managing software systems and applications is complicated. People make mistakes, wrong commands get entered, bugs get introduced, and systems fail. When something like this happens, a cascade of unintended consequences often follows. Once the dust clears, there is usually an investigation or post-mortem to determine the cause of the problem. It might seem easier to assign blame to an individual or team, but in complex IT systems, it's usually not that simple as there can be many contributing factors. Ultimately, it's about finding the best way to improve service to the business. Your customers don't care about whom or what is responsible; they care about better service.

When blame is assigned, it tends to be counter-productive to the objective of reducing the risk of future errors. Using blame or shame as a form of punishment creates a culture of distrust and discourages communication. By removing blame, you create an environment where failure can be discussed openly and treated as a learning opportunity. Your teams actually become more accountable and your systems more resilient. Besides, casting blame is usually misplaced. Catastrophic system failures are almost never caused by isolated errors committed by individuals. Instead, most outages result from multiple, smaller errors in environments with serious underlying system flaws.

Let's take a look at the recent outage of Amazon's AWS cloud service. This post-mortem revealed that someone finger-checked a command to take down some servers while trying to debug a problem. This brought down a larger set of servers than intended and initiated the sequence of events that resulted in several hours of system outage. The servers that were brought down had not been restarted for years and to compound the problem, the system had experienced massive growth over the last several years. The process of restarting these servers and running the required system validation checks took hours. Who is really at fault? The person entering the initial command? The process for running the validation checks? The systems team for not periodically restarting the servers? Taking a systems approach can provide a framework for an analysis of errors and efforts to improve system resiliency. Here are some techniques to help with software post-mortems:

- **Agree to expect problems –** It's really valuable for teams and leaders to agree that problems are not a reflection of personal failure, but the expected cost of innovation. By making this public agreement, voices will emerge on current issues and potential problems.
- **Distinguish people errors from system errors –** People tend to be at the sharp end of the problem. You need to also understand the blunt end, the latent errors that can occur in complex systems due to the many process, organizational, and system layers. In the Amazon example, the sharp end was the person issuing the command, but there were latent errors in the system creating an accident waiting to happen.
- **Pre-mortems –** Don't wait for the problem to happen. Prospectively identify error-prone situations or failure modes by mapping current processes and identifying ways in which each step can go wrong.

Catastrophic system failures are almost never caused by isolated errors committed by individuals.

- **Learn from your successes –** Conduct post-mortem when you succeed. By studying success you will understand not just why you fail but why and how you succeed.
- **Share post-mortem results –** Ensure that you have a post-mortem write-up with timeline, root cause, and corrective action. If this was a production incident, you should follow Amazon's example and publish a public blog with a summary of the post-mortem write-up.
- **Remediate and measure –** make sure that the corrective actions are implemented and that the telemetry is in place to measure improvement based on these actions. Your systems and teams should be stronger as a result of this error. You need to measure, manage, and share your progress.

In complex systems, human error is inevitable and using punishment as a deterrent is a losing proposition. Create a culture of learning where the reporting of errors is encouraged, analysis of errors to identify latent errors in the system is standard, and people are not punished for making mistakes. ▮

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

Industry Watch

BY DAVID RUBINSTEIN

Developers are a rare breed

A lot has been written about the mythical developer. Loner. Only comes out at night, when the world is dark and quiet. Codes for a living and then, as a hobby, just for kicks, codes some more.

A recent survey of developers and their habits was released last month by Stack Overflow, and some of these beliefs are reinforced in the findings, while others are debunked.

For instance, the report found that 74% of the 64,000 developers who responded from 213 countries – making this the largest developer survey ever conducted – identify as web developers. The next most common were desktop application developers (29%) and mobile app developers (23%).

Diversity among developers is up, with women representing 10% of the developer workforce in the United States, up from 6% last year. Still, according to Stack Overflow VP Jay Hanlon, "that is an incredibly low number compared to what we'd hope to see." Women, he noted, were less like to be DevOps or systems administrators, and more likely to be data and graphic designers. One side note: more women than men reported they have been coding for less than 1 year. "That," Hanlon said, "seems to be a promising sign."

Some 53% of those who work remotely reported a higher job satisfaction than those who were in an office.

Interestingly, 2.6% of respondents chose something other man or woman when asked to check off their gender. "There's male, female, transgender, gender non-conforming, non-binary gender … these under-represented people tend not to respond" to surveys, Hanlon said.

A big focus of the survey was to see how developers go about finding jobs. And the survey found that in most cases, the job is likely to find the developer. "The market for talent is larger than it looks on its surface," Hanlon said, meaning that developers are open to taking new jobs even if they're not actively seeking a new position. In fact, 62% of respondents fell into this category. "A huge number of developers aren't entering the job market, but they're actively being recruited." In fact, Hanlon added, when developers did change jobs, they didn't first say, 'I'm going to find a job.' He said, "A large percentage of developers are happy enough in their jobs but they often change when recruited."

When it comes to finding jobs, though, 27% said someone they knew contacted them about a position, and 18% said they were reached out to by someone at a company. Another 13% said they went through a headhunter to find a position.

What do developers find most important in a job? Ongoing learning and the opportunity for professional growth. "That even beat compensation," Hanlon said. Another important factor for developers was the ability to work remotely. Some 53% of those who work remotely reported a higher job satisfaction than those who were in an office.

How about the perception that developers like to work alone, in the dark, at night, with massive amounts of caffeine to keep them going? Fake news. Sad. "Developers are more collaborative than in so many other fields," Hanlon said, noting that developers will share code online, answer questions from people they don't even know online. "It's part social interaction, but they also want to help and be a part of something bigger," Hanlon said.

How much do developers love their work? "They live and breathe this stuff," Hanlon said. In the survey, 75% of developers said they write code as a hobby. "Can you imagine finance guys getting home from work and then doing finance as a hobby?" Hanlon asked.

And how do developers see themselves? The survey asked them to choose which portrayal of developers in television or movies most closely reflected the real lives of developers.

The winner? According to the survey, "We can say that the television show Mr. Robot is having a moment, for the developer community at least," as the main character was one of the top choices in all versions of the question: most or least realistic/annoying/inspiring portrayal of a programmer.

Tony Stark ("Ironman") was chosen at a high rate for inspiration, while Sheldon ("Big Bang Theory") was rated highly for annoying. "Office Space" and "Silicon Valley" portrayals were considered very realistic. ▮

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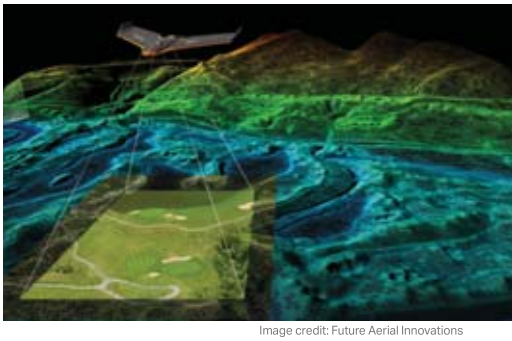

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