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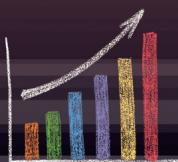
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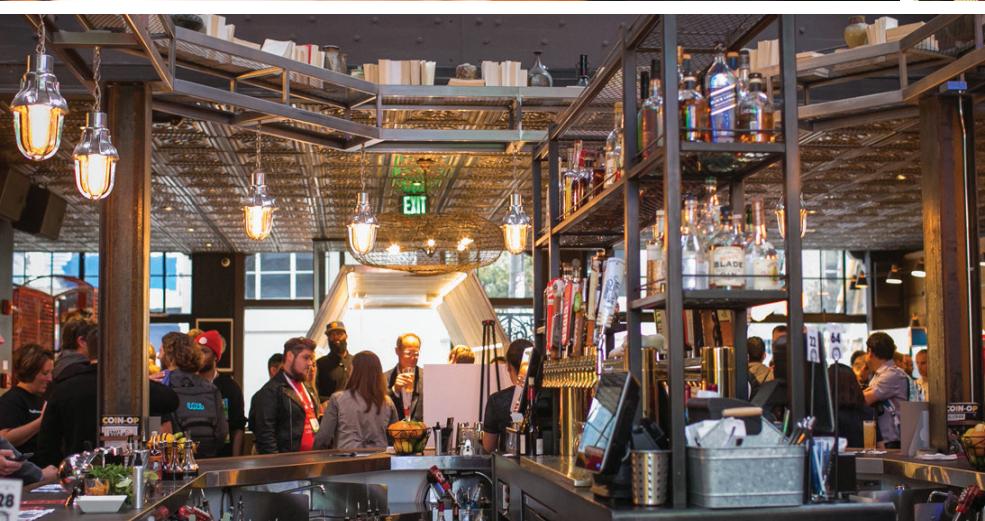
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NEWS WATCH

TIOBE Index names C the programming language of 2017

The results are in, and the TIOBE Index has declared C the programming language of the year.

"Surprise, surprise, oldtimer language C appears to be the fastest grower of 2017 in the TIOBE index and thus is declared programming language of the year. The C language gained 1.69 [percent] in 2017. Usually this is not sufficient to become language of the year, so C has actually won because there were no outstanding alternatives," the index stated.

While C has held on of the top positions on the TIOBE Programming Community Index in the last several years, it has come a long way. In 2016, the index revealed that interest in C was plummeting as it struggled to compete in the web and mobile development world.

"Despite all this, it is remarkable to see that C is getting more popular after a steep downward trend that started at the end of 2015. C had a rating of more than 17 [percent] at that time and lost more than 10 [percent] after that in the next 18 months. A possible reason for this revival is that C is very popular in the growing manufacturing and machine industry (including the automotive market)," according to the index.

Runners up included Python, which saw a 1.21 percent increase, and Erlang with a 0.98 percent increase.

In addition, the TIOBE Index found the the most interesting improvements of the year were R's jump from 16 to 8 on the index, Erlang's jump from 44 to 23, and Kotlin's jump from 89 to 39.



motion tracking, environmental understanding and light estimation.

"ARCore's understanding of the real world lets you place objects, annotations, or other information in a way that integrates seamlessly with the real world. You can place a napping kitten on the corner of your coffee table, or annotate a painting with biographical information about the artist. Motion tracking means that you can move around and view these objects from any angle, and even if you turn around and leave the room, when you come back, the kitten or annotation will be right where you left it," Google wrote on ARCore's website.

ARCore is available today as a developer preview. It currently supports Google Pixel, Pixel XL, Pixel 2, Pixel 2 XL and Samsung Galaxy S8.

Support for Tango will end on March 1, 2018.

Other promising languages include: Julia, Hack and Rust.

Apache Hadoop reaches 3.0

The Apache Software Foundation has announced version 3 of the Hadoop open-source software framework for distributed computing. Apache Hadoop 3 is the first major release since Hadoop 2 was released in 2013.

Apache Hadoop has become known for its ability to run and manage data applications on large hardware clusters in the Big Data ecosystem. The latest release features HDFS erasure coding, a preview of YARN Timeline Service version 2, YARN resource types, and improved capabilities and performance enhancements around cloud storage systems. It includes Hadoop Common for supporting other Hadoop modules, the Hadoop Distributed File System, Hadoop YARN and

Google to shut down its augmented reality platform Project Tango

Google has announced plans to kill Project Tango. Project Tango was first announced in February of 2014 as an experimental Android phone designed to bring 3D motion and augmented reality to smartphones.

The project used motion tracking, area learning and depth perception to bring computer vision to phones. It will be deprecated on March 1st, 2018. However, the company explains this will not mark the end of its augmented reality journey. Google is killing off Project Tango in favor of **ARCore**, a new platform for creating augmented reality apps for Android devices.

Similarly to Project Tango, ARCore uses three key technologies:

"ARCore's understanding of the real world lets you place objects, annotations, or other information in a way that integrates seamlessly with the real world. You can place a napping kitten on the corner of your coffee table, or annotate a painting with biographical information about the artist. Motion tracking means that you can move around and view these objects from any angle, and even if you turn around and leave the room, when you come back, the kitten or annotation will be right where you left it," Google wrote on ARCore's website.

ARCore is available today as a developer preview. It currently supports Google Pixel, Pixel XL, Pixel 2, Pixel 2 XL and Samsung Galaxy S8.

Support for Tango will end on March 1, 2018.

Hadoop MapReduce.

"This latest release unlocks several years of development from the Apache community," said Chris Douglas, vice president of Apache Hadoop. "The platform continues to evolve with hardware trends and to accommodate new workloads beyond batch analytics, particularly real-time queries and long-running services. At the same time, our Open Source contributors have adapted Apache Hadoop to a wide range of deployment environments, including the Cloud."

JS Foundation pairs serverless app development projects

The JS Foundation has paired up two of its projects in order to deliver a set of tools that would allow JavaScript developers to deploy serverless apps. Serverless applications have many benefits, such as modularity, ease of upgrade, and cost

reductions, but often teams have problems getting started with the build process, the foundation said.

"As the way we maintain our application infrastructure has evolved from physical servers to virtual machines to containers, a key turning point has been reached in the move to functions as a service or serverless architectures. Functions as a service do not fit that physical server metaphor that virtual machines and containers have been built on. What this means is that the tools developers use also need to leave behind that old metaphor and embrace this new way of designing and maintaining application architectures," Kris Borchers, executive director of the JS Foundation, wrote in a post.

The first project, architect, allows teams to provision and deploy serverless architecture with a simple manifest file. This allows them to create things

such as functions, routes, DNS, static assets, and databases. According to the foundation, architect empowers developers to "design, develop, and deploy their application with minimal infrastructure knowledge."

The second project, Marko, is a UI library that provides a component-based model and the necessary performance and stability to be trusted by high-traffic sites. Marko was originally created by eBay to power its website. The JS Foundation announced it was taking on the project in October of last year.

Together, the two projects will provide new integrations and collaborative efforts for JavaScript developers in a serverless world.

Node.js reached new milestones in 2017

The Node.js company NodeSource is releasing a Node by Numbers 2017 analysis to look at the growth and adoption of

the JavaScript project.

2017 saw three supported long-term support releases: Node.js 4.x ("Argon"), Node.js 6.x ("Boron"), and Node.js 8.x ("Carbon"), making it the first time in history the project has had three supported LTS release lines.

"From this point on, unless something changes in the way Node.js LTS releases are managed, we will always have three actively supported LTS release lines when Node by Numbers rolls around," the NodeSource team wrote in a post. "This means that 2017 is the first time we'll be seeing the dynamics of adoption and movement from one Node.js LTS release to another—giving the project, maintainers, and end-users better insight into which versions are most supported and most relied upon."

The most popular download was and continues to be Node.js 6 despite Node.js 8's upward trend. Node.js LTS usage saw a downward trend last year.

Some anomalies the company saw in Node last year included: a jump in Russian downloads, an uptick in Node.js 9 downloads, and a spike in Node.js 7 downloads from April to May.

GitLab amends PIAA for side projects

GitLab is expanding on its core tenet of "everyone can contribute" by amending its Proprietary Information and Assignment Agreement (PIAA). The agreement has been updated to clarify how contributors can maintain projects that are unrelated to GitLab.

In a recent Twitter poll, the company found 85 percent of respondents have a technical side project outside of their main job, 46 percent used company resources for that side project, and 44 percent are worried about the IP ownership of that side project.

"Our goal is to give contributors a way to gain confidence in their ability to pursue inde-

pendent projects ahead of time, and reduce the risk of potential conflicts down the line," Jamie Hurewitz, senior director of legal affairs at GitLab, wrote in a post.

As a result, GitLab decided to amend its PIAA to ensure that developers that use the company's resources won't have to worry about the IP of their projects.

"At GitLab, we want to give our contributors confidence that their developments will not be owned by GitLab simply by virtue of their use of GitLab-issued computers, GitLab facilities, or the GitLab source code repository. Furthermore, we want to alleviate stress of not knowing whether they are in violation, given that there is necessarily some ambiguity about which projects relate to or don't relate to our business. So, we are making some changes," Hurewitz wrote.

Kubernetes releases machine learning toolkit KubeFlow

The Kubernetes project has announced the creation of a new project called Kubeflow, aimed at solving some of the challenges of deploying complicated workloads. Kubeflow is designed to make it easier to use machine learning stacks on Kubernetes. Since it relies on Kubernetes to run, it can run anywhere that Kubernetes runs, making it easy to set up for Kubernetes users, according to the team.

David Aronchick and Jeremy Lewi, a PM and engineer on the Kubeflow project, wrote in a post, "One of the fastest growing use cases is to use Kubernetes as the deployment platform of choice for machine learning." ■

Postman releases a directory for public APIs, API Network

Postman has launched one of the largest public API directories. The Postman API Network is designed to provide API publishers a place where they can publish their APIs, and developers a place where they can get everything they need to work with those APIs.

According to Abhinav Asthana, CEO & co-founder of Postman, one of the biggest challenges API publishers face is getting developers to work with their APIs while developers face challenges determining whether an API will authenticate or not. Past API directories are put together by third parties and collected from different sources, so it can be difficult to tell if developers are working with the most up-to-date API definitions, he explained.

"Postman APIs Network brings publishers on a unified platform and gives them direct access to developers," said Asthana.

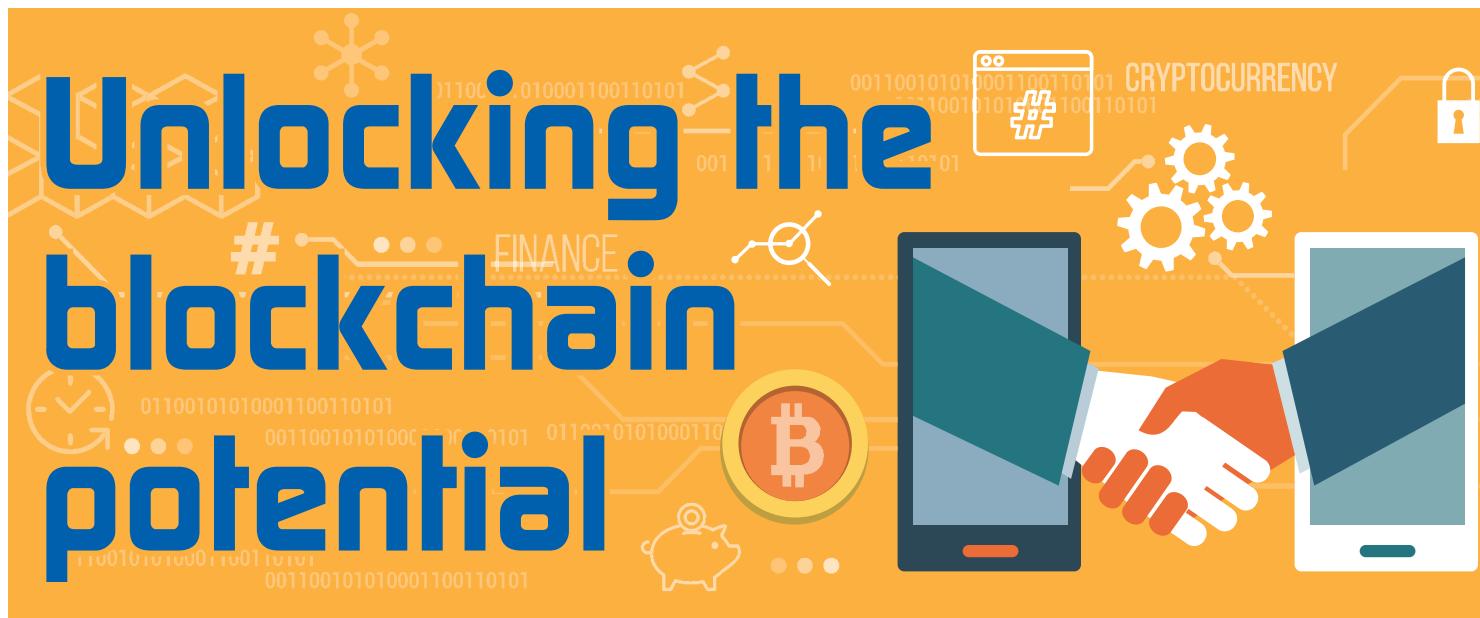
Asthana explained this solution was necessary because APIs are the building blocks of modern software today. Developers can't get around building a web, mobile, IoT or AI solution without being aware of APIs and working with them.

"This is a big step for the API landscape because one of the things APIs have been dealing with is massive fragmentation across different tools and services," said Asthana. "We are hoping this helps make the API ecosystem and experience much more streamlined."

APIs published to the network will be published as Postman collections. Postman collections will include detailed, executable descriptions of the API as well as necessary requests, documentation, mocks and tests that work with the APIs.



Abhinav Asthana



BY CHRISTINA CARDOZA

A new and emerging technology is hitting the ground running, and creating a frenzy in the industry. Bitcoin. Cryptocurrency. Initial Coin Offering (ICO). These are just some terms being seen in the headlines every day lately, but the real importance is the technology behind these terms: Blockchain.

Blockchain is a new technology that has been taking the industry by storm. Just the mere mention of blockchain can send stock prices soaring.

According to Gartner, a blockchain is “a shared, distributed, decentralized and tokenized ledger that removes business friction by being independent of individual applications or participants.”

It is the driving force behind things like bitcoin because bitcoin is a decentralized digital currency that works without a central bank or authority. It

verifies transactions through network nodes and records them in a public distributed ledger. That distributed ledger is called a blockchain. “With distributed ledgers, virtually anything of value can be tracked and traded in a permanent, secure way that makes it easier to create cost-efficient business networks without requiring a centralized point of control,” said Brian Behlendorf, executive director of the blockchain consortium Hyperledger.

For instance, say you want to gamble online and you go to a gambling website run by a specific party. That is a centralized point of control. Although it is illegal, that party can technically and potentially run away with your money, explained Alok Bhardwaj, the CEO of the Epic Privacy Browser and blockchain expert. Because blockchain is decentralized, it does not require a particular party, or middleman, to be in charge of it.

To put it simply, blockchain is really just a database that is stored by a lot of people, explained Bhardwaj. “Blockchain technology is very interesting because it removes the human element,” he said. “It can make things a lot more efficient in terms of confirming a transaction and storing data. It is a way of establishing trust in a way that is more efficient than trusting a single centralized party.”

Blockchain is able to avoid a middleman through the use of

smart contracts. A smart contract is a protocol embodied within the code that builds logic into the transactions. “If you build a system correctly that uses smart contracts, you can reduce your amount of code by an order of magnitude. A system that utilizes smart contracts is able to react to situations and say ‘when this happens, this is true’ and so forth. Actions get handled in the blockchain by smart objects as opposed to one monolithic system,” said Mike Morris, CEO of Topcoder. “Blockchain is bringing the concept of trust to the Internet. It allows you to have interactions with users and have trust be a requirement of that interaction or an aspect of that interaction.”

According to Rob Bailey, founder of the blockchain accelerator company MState, a smart contract is not required for using blockchain technology, but it is beneficial in that it acts as an application logic layer for executing business rules.

The reason it is most commonly associated with bitcoins is because of all the hype around cryptocurrencies, according to Morris. He explained that the hype around bitcoin has helped blockchain technology become more well known. “Cryptocurrency is undoubtedly the most famous ‘flavor,’ with bitcoin being the most famous (but far from the only) player in that space. Smart contracts is another flavor, with Ethereum and Hyperledger





arguably being the most famous players,” he said.

While financial services is where blockchain technology stems from because of its ability to embed encryption, there has been a push to get the technology to go beyond cryptocurrencies.

“This has huge potential and implications for nearly every industry — it can be applied it to a number of things of value, whether it be financial assets, manufacturing, intellectual property, government services, supply chain management or real estate,” said Hyperledger’s Behlendorf. “Anywhere a company participates in a network of trading partners, a supply chain, a regulated market, etc., then they likely will see an operational and strategic investment in blockchain.”

Gartner predicts that blockchain will go beyond the financial industry and be applied to government, healthcare, content distribution and supply chain sectors. However, the firm notes that blockchain tools and technologies are still in early days. “Although it holds long-term promise and will undoubtedly create disruption, blockchain promise outstrips blockchain reality, and many of the associated technologies are immature for the next two to three years,” the firm wrote in its 2018 technology trends report.

By utilizing the encrypted and

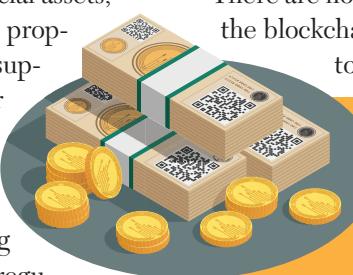
decentralized method of storing value and information that the blockchain provides, developers have the ability to disrupt a variety of industries, according Max Beddows, co-founder of the blockchain startup Lisk. “Developing a blockchain-based healthcare system, or a file storage database using a decentralized ledger, can significantly improve security, remove unnecessary middlemen and cut costs for consumers. Similarly, we can find blockchain applications in charitable causes. Using an encrypted ledger to track and ensure food safety in a supply chain, or enabling third world citizens easy access to a blockchain-based,” he said.

However, the problem is that there are not enough tools to help developers with blockchain technology.

Enabling developers to leverage blockchain technology

Just as developers have tools for rapidly developing applications, they need tools to come up with blockchain applications, Lisk’s Beddows explained. Lisk is on a mission to provide developers with those tools and democratize blockchain technology.

“There are not enough developers in the blockchain space, and we want to fix that problem,”



“This has huge potential and implications for nearly every industry – it can be applied it to a number of things of value.”

—Brian Behlendorf, Hyperledger

said he said. “If you want the technology to thrive, you need developers who are unlocking the real potential of the technology.”

According to MState’s Bailey, there are three major use cases for blockchain: cryptocurrency, supply chain or track and trace, and around the federation of consumer data.

Since blockchain technology is still a unproven and new territory, it is taking a lot longer for developers to successfully build user apps, according to Beddows. Lisk aims to change this by eliminating the hard parts of a blockchain

and providing the cryptocurrency, algorithms, and network stack developers need to build applications. Over the next year, the company plans to release the first major version of Lisk Core 1.0 and an alpha version of the Lisk SDK For Blockchain applications.

“If the full potential of blockchain is realized, a world will exist which is entirely interconnected through public ledgers organized and used by AI,” said Beddows.

In addition, there are blockchain app platforms like etherum that aim to help developers build apps that run on a custom blockchain. “Ethereum is a decentralized platform that runs smart contracts: applications that run exactly as programmed without any possibility of downtime, censorship, fraud or third party interference,” according to its website.

Etherum is run by the Ethereum Foundation, whose mission is to promote and support the development and education of decentralized protocols and tools as well as empower the next generation of decentralized apps.

The Hyperledger Consortium is an open source collaborative effort, hosted by the Linux Foundation, designed to advance cross-industry blockchain

technologies. “Not since the web itself has a technology promised broader and more fundamental revolution than blockchain technology... Together [blockchain and smart contracts] can be used to build a new generation of transactional applications that establishes trust, accountability and transparency at their core, while streamlining business processes and legal constraints,” according to consortium.

The consortium plans to provide more educational and training content over the next year to get developers more

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Unlocking the potential of blockchain

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familiar with blockchain technology.

“Technical talent that understands the inner workings of these systems are in high demand today, and we haven’t even gotten to widespread production deployment yet. This is a skill that will be highly relevant for many years to come. It’s hard to argue there is an

industry that can not be touched by blockchain in some way,” said Hyperledger’s Behlendorf.

MState’s Bailey warns against getting too caught up in the blockchain hype. “It is important to not develop blockchain in a vacuum, but really focus on solving real business problems,” he said. “What we are seeing right now is

what we see with the launch of any new technology. People try to use it for any use case, and a lot of them make sense, but not all do. What startups and enterprises really need to do is not just think of blockchain as a magical solution, but understand what it is and therefore the great business problems it can uniquely solve.” ■

Riding the blockchain hype

Despite being a fairly new technology, the interest in blockchain is undeniable. Lately, it seems all a company needs to do is mention the word blockchain and all of a sudden its stock prices skyrocket. While blockchain has been more associated with cryptocurrencies and financial services, companies from every industry are taking hold of the movement.

In December, the **Long Island Iced Tea Corporation** decided to rebrand itself as Long Blockchain Corp. The Long Island Iced Tea Corporation is exactly what it sounds like. It is a company that sells bottled iced tea. Before rebranding itself, it had no place in the blockchain world at all. The company says the news means it will shift its primary corporate focus towards exploring and investing in blockchain technology opportunities. Additionally, the company will continue to leverage the Long Island Iced Tea brand name.

“We view advances in blockchain technology as a once-in-a-generation opportunity, and have made the decision to pivot our business strategy in order to pursue opportunities in this evolving industry. We are committed to enhancing shareholder value and believe that our new focus is the best path towards this goal. We will, in the coming weeks and months, be taking a series of steps related to our efforts to assemble a world-class team of industry professionals to help us realize this vision. We are pursuing our new direction in a thoughtful and deliberate manner,” said Philip Thomas, CEO of Long Blockchain Corp.

Shortly after making the announcement of the rebranding, the company’s stock price went up more than 200 percent.

Chanticleer Holdings, a restaurant company known for its franchises like Hooters, Little Big Burger, and Just Fresh, followed Long Blockchain Corp’s move, and decided to invest in blockchain. The company announced plans to use **Mobivity Mind**, a blockchain-architected platform for commerce and customer communication, across its brands. The blockchain plat-

form will power Chanticleer Holdings’ customer loyalty and rewards program.

“Eating a burger is now a way to mine for cryptocoins! Every meal enjoyed at any Chanticleer Holdings brand will accrue currency for the consumer that can be used for future meals or traded with other consumers. It transforms traditional consumer rewards into something that the consumer can control,” said Dennis Becker, CEO of Mobivity.

After this announcement, Chanticleer Holdings’ stock price went up by nearly 50 percent. “We wanted to expand our existing loyalty program with something that really changes the way our customers can leverage their rewards; Mobivity Merit is real cryptocurrency, leveraging the same infrastructure and principles of Bitcoin, Ethereum, Ripple, Litecoin, and more, and will enable our customers to make use of their rewards in entirely new ways,” said Michael Pruitt, chairman, president and CEO of Chanticleer Holdings.

More recently, the imaging technology company **Kodak** announced a partnership with **WENN Digital** to launch a photo-centric cryptocurrency and an image rights management platform. **KODAKOne** platform will utilize blockchain technology to create an encrypted, digital ledger of rights ownership for photographers to register new and archive work. **KODAKCoin** will enable photographers to receive payments and sell their work on a secure blockchain platform.

“For many in the tech industry, ‘blockchain’ and ‘cryptocurrency’ are hot buzzwords, but for photographers who’ve long struggled to assert control over their work and how it’s used, these buzzwords are the keys to solving what felt like an unsolvable problem,” said Kodak CEO Jeff Clarke. “Kodak has always sought to democratize photography and make licensing fair to artists. These technologies give the photography community an innovative and easy way to do just that.”

After its announcement, Kodak’s stock jumped 44 percent. ■
—Christina Cardoza



2018 will be the breakout year for PWAs

Progressive Web Apps are expected to grow this year as Apple, others get on board

BY DAVID RUBINSTEIN

Progressive Web Apps (PWAs) — browser-based applications that take on some performance aspects of native applications — are expected to break out this year, as Apple will begin to ship core features of PWA in its WebKit web browser engine.

PWA has been a drum Google has beaten — mostly as a solo act — since 2015, and even though it has become a web standard, that has not lent enough momentum to convince developers to use it. “But with Apple in the game, developers will get off the sidelines,” said Todd Anglin, vice president of product and developer relations at Progress.

Progress Web Apps is a term that represents different specifications advancing independently but collectively, Anglin said. Two of the key technologies behind PWAs are Service Workers and Web App Manifest. Service Workers give developers the ability to manually manage the caching of assets and control the experience when there is no network connectivity, Anglin explained. The Web App Manifest allows users to give the web app meta-

data describing the app — “things that you’d need for an app store,” Anglin said — so the browsers can give users the choice to install the web app on their home screen.

The point of PWAs is to create an experience that works regardless of network connectivity. “HTML5 was the first big wave of new APIs, and now PWA is the next wave of pushing the web forward,” Anglin said. He said other specifications, such as web payments and push notifications, are also in the works for PWAs.

Although PWAs can present a native-like experience on mobile devices, Anglin said the industry should move the web-versus-native debate away from PWAs replacing mobile apps. “There are a lot of voices hailing PWA as a replacement for mobile apps, because it’s the fastest way to get people into that content. The web will eventually be able to do everything, but people need to ship apps today. They can’t wait for ‘forever’ processes to catch up,” he said.

“There will always be a category of apps best served by native,” Anglin added. “PWAs are about making the

web a more reliable, enjoyable experience” even when there is no internet connectivity. “It’s still the web, and it’s still JavaScript,” he added. For PWAs, “developers will just have to learn a few new APIs.”

Anglin did say the Service Workers API can be very daunting, as it is quite complex. But several software companies are working to deliver frameworks that will handle a lot of that connectivity for developers, he said.

Further, Anglin said Progress is working to bring convergence across web and native applications with such efforts as support for the JavaScript ecosystem around react, view.js and Angular, which he said will give developers “the ability to have web and mobile. They won’t have to make the decision up front.” And, with NativeScript, developers can use the same JavaScript skills they already have to create native apps. “That creates a unified workflow,” Anglin said.

Progress is working with the Angular team at Google to have NativeScript be a part of Angular. “We’re working through the prototype of that integration,” Anglin said. ■

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Mobile-Only Banks: Cashing

BY ALYSON BEHR

Mobile banking is the new banking “mode du jour” for the millennial market. Digital banks like European-based N26, Monzo, and Orange Bank, part of French telecom operator Orange, along with U.S.-licensed Aspiration and BankMobile, are poised to make a dent in the more traditional “brick and mortar” banks’ markets and revenues globally.

The mobile-first and mobile-only digital banking market is currently underdeveloped and wide open for business. Nicolas Kopp, U.S. chief executive for N26, points out that mobile banking is just now picking up on the transformation that other industries have already begun to capitalize on. “Look at transportation with Uber and Lyft, accommodation with Airbnb, or music with Spotify,” he said. “There is a shift from offline to online to mobile.”

These disruptor banks have streamlined business plans, which often leads to lower operating expenses that enable them to pass along lower fees, or even no fees, to their customers. They offer simplified, more transparent business practices, easy-to-navigate smartphone and tablet user interfaces and more efficient customer service; all features the millennial workforce that has grown up mobile hunger for. Michael Ellison, president and co-founder of the analyst group Corporate Insight, said, “When you think of a millennial as 25, 30, or 35, and consider the mobile platform has been around for 10, maybe 15 years, and the iPhone turned 10 this year, that’s been their gateway to the internet. They are just used to it. They tend to have jobs that are more mobile as well, not spend their time at a desk. Even if they are desk-bound, they will probably opt to use their own mobile device, not their employer’s computer. I think there’s just a historical comfort level with mobile, and the expectation of getting everything when they want it, and where they want it.”

Overwhelming evidence that the

tide is turning to mobile is clear from Corporate Insight’s February 2016 survey of online investors. According to the survey, 71 percent of millennials indicated that they had logged into their brokerage account using a mobile device in the past 12 months, compared to 44 percent of baby boomers. It also finds 51 percent of millennials said that their brokerage firm’s mobile capabilities were “very important” or “extreme-

ly important” to them, versus 23 percent of baby boomers.

Millennials are also big on social responsibility and Aspiration Bank has made a name for itself by doing business differently. Its creed is, “Do well. Do good.” Theresa W. Carey, a Barron’s columnist who covers fin-tech from the retail investor’s point of view, describes the company’s business model and its customers’ key criterion as “socially

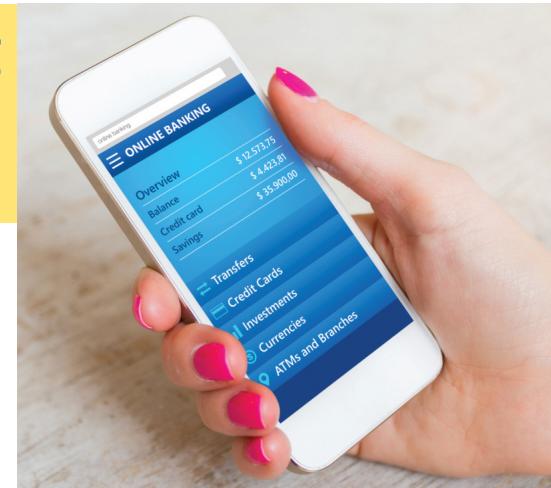
Mobile banking is giving brick and mortar banks a run for their money

ly important” to them, versus 23 percent of baby boomers.

Selling points

The Corporate Insight survey focused on investors’ experiences with traditional financial services building an online presence. The differences between the user’s experience with an app modeled from traditional service offerings and a business model supported only with a mobile app are marked. Mobile-only banks are quick to point this out. N26 is a fully authorized mobile-only bank in Europe. It does business in 17 countries and is positioning itself to launch in the United States in 2018. Kopp said, “Traditional banks’ systems are not built towards offering an app, but towards offering general retail banking services like you’d find at a branch. They’ve developed their online portals and mobile apps so they can say they offer an app. N26 is very different because we built our whole technology infrastructure towards offering banking services through the app.”

Kopp, describing Chase and Bank of America’s efforts to build apps that hook into their legacy systems, said, “It’s much more difficult to produce or actually code versus us where the whole tech company is built on that mobile-first principle.” The result is a mobile-first user experience that’s easy to mar-



responsible spending.” According to Carey, in late April it updated its app with a new feature, Aspiration Impact Measurement, or AIM. “With this feature, the four-year-old bank wants its clients to know how their personal shopping habits measure up against the firm’s creed. The scores are based on a proprietary algorithm that checks 75,000 data points, including diversity, employee pay, energy efficiency, carbon reduction, renewable-energy use, access to health care, and other factors,” she said. Buy something from a company that doesn’t yet have an AIM score, and you can send them a tweet, asking them to report their sustainability and personnel data.

A few more customer-friendly features? Its banking product, Summit Checking, offers a much higher than typical 1% annual interest rate, with no monthly service fees. It rebates ATM fees for cash withdrawals made at other banks’ ATMs here and abroad, and also offers two socially responsible mutual funds.

in on the 18-35 Crowd

Vetting the customer base

With a myriad of different cyber attacks aimed at financial institutions, it's critical that mobile-only accurately identify customers as being who they say they are, that they are in fact, human. Dan Armstrong, chief digital officer for BankMobile, described the typical mobile-only customer landscape, "The millennial age group has a strange kind of a spin to it: latte drinking, jumping off trains with funny hats and stuff like that. Not so much. Really, what we're talking about is also middle-income and lower-income Americans, and middle-class or under-banked individuals. For the most part, these people, as well as millennials, are kind of cut out of traditional financial services."

Armstrong emphasized that BankMobile made a point to vet its customer base in a non-traditional manner. He offers, "When we set up the ability to onboard customers of this segment, we didn't just use the traditional perfunctory credit union checks like, Experian, LexisNexis or ChexSystems. It was just a black and white version of whether you were who you say you were, because we don't really care that much about whether you're a bad customer or a good customer. We care that you are actually who you say you are, since you don't actually walk into a bank, present any license or signature card. Once we know you are who you say you are and then we'd love to have you as a customer."

BankMobile uses 14 data sources, not just one or two, and does its own scoring. Armstrong said, "We rescore everybody's opinion about you based on what we think about our identity validation. So we turn the traditional validation of customers upside down and take responsibility for really thinking how to attract millennials and under-banked people." Issues like overdraft problems or no credit score because the customer was too young don't play a big role. "All that kind of traditional scoring we think is great, but we wanted to add it together to make a new, more mature version of who we thought you were."

Show me the money

Buoyed up by abundant venture capital (VC) and private equity funding, these start-ups are challenging traditional models when it comes to banking, payments, investing, and financial advice. But how are they ultimately going to make their money? N26's Kopp says the bank's revenue streams are comparable to what other financial institutions' are. "We might earn money on some of the savings or personal loan products that we offer. I think the key difference to more traditional banks is that these fees are always very transparently presented to our customers and also the deals we offer are usually fair. Our whole fee structure is not set up on just making money from customers, it's actually giving the best value for money to our users." An important piece of the profit puzzle is that mobile-only banks may have much lower operating expenses. Kopp points out that they don't operate bricks and mortar branches that have building rents, employee expenses, and expensive infrastructure costs compared to their competition. Also, Kopp said, a second factor lays in their services pricing. "We try to be very attractively priced versus the competition. Again, why can we do that? Because our whole cost structure is so efficient. We need to make less revenues to still be profitable."

Development tips from the trenches

BankMobile's app was built completely from scratch, so all the controls are customized. It has six patents in process. Armstrong, who has been in mobile banking since 2003, which was before the first smartphone, lays out the challenge of being mobile. The business model needs to be more than just a pre-paid card that's drained and then thrown in a drawer. There is no recurring interchange revenue, there isn't an extended period to upsell new products like loans or student refinancing loans to retain to the customer long-term. According to him, "You need to reimagine how you're engaging a customer and

probably it's not to be understated that actual customer service is critical. And it's never gonna be perfect, there's always going to be errors. You have a problem, you need to call somebody and feel you have received empathy and sympathy and you're talking to a real person who can help you out, as well."

Armstrong used VASCO in Europe with a rival bank for years and was very happy with it. At the time, it was oriented towards bigger banks with significant engineer resources to manage it. But once he got on board to build BankMobile's software division he realized if they got hacked they would have a major problem as a digital-only asset or property. He said, "We'd be stuffed. So, I made a very strong play for doing a next-generation version of security to try to get experts into the end-to-end encryption part of things. I knew we didn't really have the skills to do it in-house, and that's where I came back to VASCO and had them implement their apps."

From the mobile perspective, BankMobile does not allow its apps ever to communicate with the internet directly. He says, "No web views, there's no nothing. Everything, services like LexisNexis, PFM, and remote check deposit, to operate from its server to their server through the VASCO pipe. So, from the client application on the phone, all the way to the server with the VASCO server software, everything is completely encrypted. The local loop is locked down, which kind of allows me to sleep better at night."

Resistance is futile

N26's Kopp ponders the transformation, "The shift from offline to online to mobile is unstoppable. Over the longer term, potentially entirely. As the older generation ages out and stops conducting financial transactions, the current millennial generation will age and the bulk of the population will end up using mobile and online services. This transition is something that's happening in all industries. It's inevitable." ■

Why your app's database stinks – and your ORM too

BY ALEXANDER STIGSEN

At the dawn of the millennium, somewhere in the depths of a company contracted by the United States Navy, D. Richard Hipp designed SQLite so that you could finally stick a database inside an application. Its original purpose was to power guided missile destroyers, which surely could have used a fast, lightweight database that ran locally instead of on a remote database server. After all, if there's ever been a great offline-first use case, it's being out at sea.

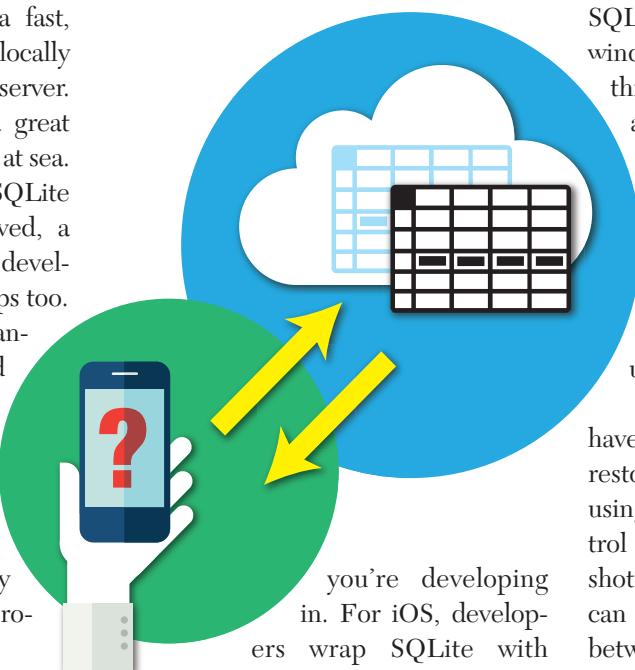
In the years since, as the SQLite spec was expanded and improved, a whole new generation of mobile developers have used it inside their apps too. It may be built on a 45-year-old language, and based off a 43-year-old standard, but today, it runs pretty much anywhere — from being the stock database in Django apps to running natively on Android and iOS devices. And its ubiquity means that many apps live with it, and all the compromises it demands.

SQLite made it possible for an app to interact with the database via function calls, but today, it's pretty unlikely that developers are interacting with SQLite's APIs directly. It's still possible, and allows you to avoid bringing in thousands of objects into memory, but it's awkward. After all, you still need to write SQL to deal with data stored in the database. That's not exactly fun to do in a modern, object-oriented language like Kotlin or Swift.

Once you do create or receive data from SQLite, you still need to make it work for you in the language you've written your app in. That requires painstakingly mapping and serializing the data that SQLite returns into

objects that you can do real work with, and then serializing any changes back into SQLite for storage.

Which is where object-relational mapping libraries — ORMs — come in handy. They do the hard work of translating SQLite's functions into a set of APIs that feel native to the platform



you're developing in. For iOS, developers wrap SQLite with

CoreData: Apple's long-supported, long-maligned ORM. Consider the example of an RSS reader app, where the user wants to mark all her 10,000 articles as read. With CoreData, you need to bring everything into memory, eventually, marking it as read in a loop, and re-saving each object, one at a time. SQLite gives a sane way of doing it in a single call, but CoreData expects you to treat its object-oriented abstractions seriously, and introduces problems as a result.

The way all ORMs work is by serializing database values into in-memory objects. And by working with what's in memory instead of what's on disk, you can easily end up working with stale data. You can, using good practice and modern ORM features, avoid this being too pernicious a problem. But every once in a while, you'll end up with an unexpected result.

It's called the impedance mismatch. Your ORM has to make a copy of the data in the tabular SQLite database, and turn it into a graph of objects that you can work with. By itself, that sounds fine — but the moment you start working with data from multiple threads, any ACID guarantees your SQLite database makes will go out the window. Objects can be changed by one thread in ways that break consistency, and lead other threads to make changes to data that might be stale, or simply not exist anymore. When an object makes a change on another thread, there's nothing in SQLite or any ORM to let other objects know that they must update or cause major problems.

There are solutions, but they do have tradeoffs. The first solution is to restore the "I" in "ACID": isolation. By using multi-version concurrency control (MVCC), you can work on a snapshot of the database, and the database can do the work of resolving conflicts between many concurrent writers. That way, you can be sure your data won't change underneath you. But that's also a problem: it means your data won't be responsive. To show what the user should see, you have to go back to the database to get the latest data and the latest version.

Inevitably, we confront a simple reality: SQLite and object-oriented languages do things differently from the ground up. They model the world in different ways, and so we incur costs by converting things between the two ways of dealing with data. And we may offer a modern, object-oriented way to help us manage what SQLite does, but sometimes its representation of data simply diverge from the database. And while we could just deal directly with SQLite, we'll likely end up making our very own bad, ad-hoc ORM. ■



Alexander Stigsen is founder and CEO of Realm, a mobile database for iOS and Android.

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CSCC updates its 10-step reference guide for cloud computing security

BY JENNA SARGENT

The Cloud Standards Customer Council (CSCS) announced version 3 of its Security for Cloud Computing: 10 Steps to Ensure Success. The 10 steps are meant to be a reference guide for organizations to better analyze the security effects of cloud computing on the organization as a whole.

According to the CSCS, cloud security risks include loss of governance, isolation failure, management interface vulnerabilities, vendor lock-in, service unavailability, business failure of provider, malicious behavior of insiders, and insecure or incomplete data deletion.

Major changes to the guide take into account new worldwide privacy regulations, a focus on different aspects of cloud computing security, more emphasis on security logging and monitoring, and the importance of a formal information governance framework.

"When considering a move to cloud computing, customers must have a clear understanding of potential security benefits and risks associated with cloud computing, and set realistic expectations with their cloud service providers," the organization wrote in a post.

The steps are:

STEP 1 **Ensure effective governance, risk and compliance** by establishing chains of responsibility, understanding risk tolerance, understanding specific laws, notifying users if a breach occurs, and ensuring app and data security.

STEP 2 **Audit operational and business processes.** Audits should leverage an established standard, be carried out by skilled staff, and be done as part of a formal certification process, according to the CSCS.

STEP 3 **Manage people, roles and identities.** "Customers must ensure that the cloud service provider has processes and functionality that govern who has access to the customer's data and applications. Con-

versely, cloud service providers must allow the customer to assign and manage the roles and associated levels of authorization for each of their users in accordance with their security policies, and apply the principle of least privilege. These roles and authorization rights are applied on a per-resource, service or application basis," the CSCS wrote.

STEP 4 Ensure proper protection of data and information.

According to the CSCS authors, "data protection is a component of enterprise risk management." Protecting data is crucial in terms of risk management.

STEP 5 Enforce privacy policies.

"Enterprises are responsible for defining policies to address privacy concerns and raise awareness of data protection within their organization. They are also responsible for ensuring that their cloud service providers adhere to the defined privacy policies. Thus, customers have an ongoing obligation to monitor their provider's compliance with customer policies. This includes an audit program covering all aspects of the privacy policies, including methods of ensuring that corrective actions will take place," the council wrote.

STEP 7 Assess the security provisions for cloud applications.

The authors say that "organizations must apply the same diligence to application security in the cloud as in a traditional IT environment." The responsibilities differ depending on the deployment model. For example, in IaaS, the customer is responsible for most security components. In Platform-as-a-Service model, the provider is responsible for securing the operating system while the customer is responsible for application security. For Software-as-a-Service, the provider is responsible for application security, while the customer is responsible for understanding things such as data encryption standards, audit capabilities, and SLAs.

STEP 7 Ensure cloud networks and connections are secure.

The authors suggest that customers should have assurance on a provider's internal and external network security.

STEP 8 Evaluate security controls on physical infrastructure and facilities.

Security controls include: holding physical infrastructure in secure areas, protecting against external and environmental threats, putting controls in place to prevent loss of assets, proper equipment maintenance, and backup, redundancy and continuity plans.

STEP 9 Manage security terms in the cloud service agreement.

"Since cloud computing typically involves at least two organizations — customer and provider, the respective security responsibilities of each party must be made clear. This is done by cloud service agreement (CSA), which specifies the services provided and the terms of the contract between the customer and the provider," according to the council.

STEP 10 Understand the security requirements of the exit process.

Customer data should not remain with the provider after the exit process. The provider should be forced to cleanse log and audit data, but may not be able to because retention of records might be required by law.

"Cloud computing offers many benefits to organizations, but these benefits are likely to be undermined by the failure to ensure appropriate information security and privacy protection when using cloud services, resulting in reputational harm, higher costs and potential loss of business," according to the CSCS. "The aim of this guide is to provide a practical reference to help enterprise information technology (IT) and business decision makers analyze the information security and privacy implications of cloud computing on their business."



New Jenkins plugin tackles DevOps pipelines and app maintenance

BY JENNA SARGENT

Infostretch has announced a free Jenkins plugin and service intended to assist enterprises with streamlining DevOps development. The plugin will significantly decrease the time needed to code DevOps pipelines and migrate to Jenkins 2.0.

It will be able to auto-convert about 90 percent of freestyle Jenkins jobs. Now, instead of developers having to go through thousands of jobs to understand tools, configurations, or parameters, the plugin can just generate the appropriate code for them, the company said.

"DevOps teams depend on CI/CD tools to drive digital transformation," according to The Forrester Wave: Continuous Integration Tools, Q3 2017. "Automating manual tasks is a key accelerator for digital, so teams should actively embrace tools which eliminate

manual tasks and enable repeatable processes to take place automatically. Automation saves time and effort which can be redirected to move pipelines forward faster and more efficiently."

Once the auto-generated jobs are in the DevOps pipeline, Infostretch's testing and QA support will ensure everything is working properly.

By using Infostretch's plugin, teams can reduce the cost of application maintenance by 40 percent, according to the company.

"Jenkins jobs can pile up. Converting freestyle jobs used to be a time drain, and that can derail even the best laid DevOps plans," said Rutesh Shah, CEO and co-founder of Infostretch. "We created the Jenkins plugin simplify the process, dramatically reduce the manual effort required and bring down costs to do with application maintenance." ■

In other DevOps news...

■ **Compuware** and **SonarSource** is bringing DevOps insights to COBOL code. The companies announced new integrations that will enable enterprise DevOps teams to track and validate code coverage of COBOL app testing. The new integrations will feed code coverage results captured by Compuware's Topaz for Total Test into SonarSource's SonarQube solution. According to the companies, this will provide DevOps teams with a unified view of metrics and milestones.

■ **XebiaLabs** announced the latest release of XebiaLabs DevOps Platform 7.5. This updated version features customizable risk intelligence, cloud and container capabilities, and cross-pipeline DevOps features. Highlights include: automatic alerts when release delivery is at risk, customizable risk profiles, continuous delivery infrastructure support, cloud and container integrations, and the release of XL Impact. XL Impact is a KPI based DevOps solution that analyzes performance and measures the business impact of DevOps initiatives.

■ **ZeroStack** is giving IT new visibility with the release of customized alerts and thresholds. These capabilities will enable cloud admins to define and enable alerting policies based on the status of physical hosts, and ensure DevOps workbench users have access to resources they need without overloading the IT infrastructure. DevOps users also can set up their own alerting policies within their workbench. "Our mission is to provide self-provisioned access to DevOps Workbench tools for developers while making it easier and more cost-effective for the IT staff to retain control," said Kamesh Pemmaraju, vice president of product management at ZeroStack. "We help IT managers give their DevOps customers what they want without overtaxing resources." ■

DeployHub now certified by Red Hat

BY CHRISTINA CARDOZA

In an effort to make application release automation easier for DevOps teams, Red Hat has announced DeployHub OSS and Pro by OpenMake is now certified by the company and available in its Connect Container Catalog.

DeployHub OSS is an "open source continuous deployment tool built by developers for developers to achieve agile DevOps," according to Red Hat. It features a fully functional version, ansible integration, an agentless architecture, and CI integrations.

"DeployHub OSS allows developers to define the software deployment package and logic once, and then push it across the continuous delivery pipeline where it adapts to the next environment — even when environments have mixed platform configurations. Automated

software deployment driven by the continuous delivery pipeline is the ultimate goal of agile DevOps. And doing agentless deployment is the quickest way to get it done," according to Red Hat's website.

The Pro version of the solution provides similar features as well as support for two applications, advanced security and release management features. "An application is a collection of both infrastructure and application components that are managed as a complete software solutions.

There is no limit on the number of users or the number of endpoints, according to Red Hat.

Being included in the Red Hat Connect Container Catalog means it is a trusted, secure, certified and up-to-date solution. ■

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The newsletter features a header with the SD Times logo and the date MAY 8, 2017. The main article is titled "Open source drives 'composable infrastructure'" and discusses the growth of the software world towards more cloud-based and microservices-oriented architectures. It includes a graphic of interconnected nodes and a "READ MORE" link. Below this is an advertisement for Revulytics, followed by another article on Docker-based microservices with a photo of shipping containers. Further down is an article on controlled chaos and differentiation, and finally an article on crash and bug reporters.

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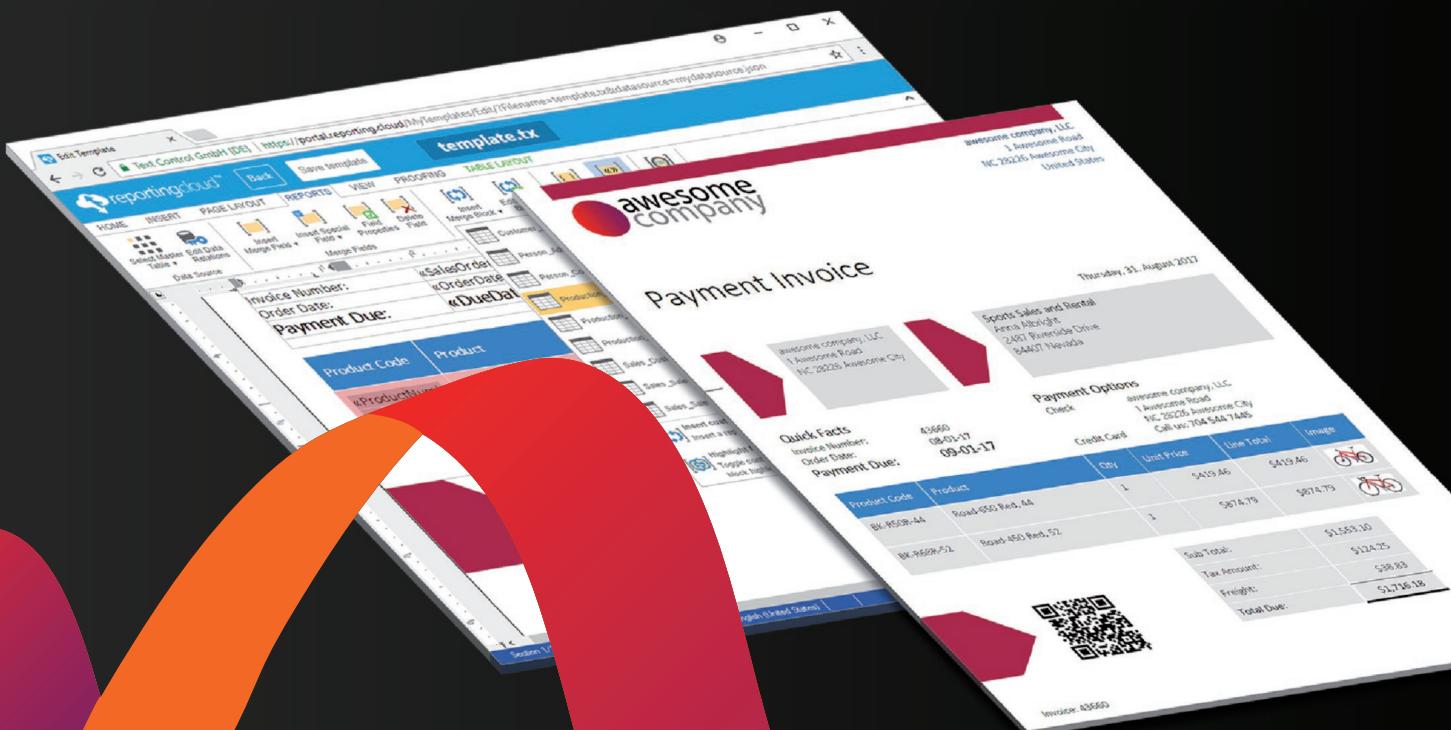
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Riding herd over your microservices

BY CHRISTINA CARDOZA

By now, the benefits of microservices have been well established. Reliability. Scalability. Productivity. What you don't hear about are the tradeoffs, challenges and complexities it takes to transition from a monolith to a microservice. All of these smaller components in a microservice may make it easier to develop software, but instead of only having one application to manage, you now have hundreds or even thousands of services to worry about.

"Microservices often bring the same complexities that come with distributed computing. You have more things to build and deploy. You have more things to monitor. Concerns such as data consistency and handling multiple updates across multiple microservices is a tricky problem to solve," said Nandan Sridhar, product manager at Google.

Building a monolithic application is actually the easy part because you have all your teams working together in the same room, at the same time and on the

same codebase, according to Lawrence Crowther, head of platform architecture at Pivotal.

The problem, however, is you don't have the ability to upgrade, patch, redeploy or re-architect individual components of an application like you would in a monolith. In a monolith, any change you make can change the entire application, and that can cause negative impacts to the rest of the business, according to Ross Garrett, technology evangelist at Cloud Elements.

"Many companies fail to implement microservices simply because it is drastically clashing with the way they themselves are organized on a human level and a process level," said Viktor Farcic, senior consultant at CloudBees. "Many companies don't understand that you can't have technology change without culture change, and the other way around."

To successfully transition and maintain a microservice architecture, people and technology need to be aligned, Farcic explained. On a human level, companies need to convert their teams into autonomous small groups of people who can operate without much management. "That means if they want to successfully manage microservices, they need to have a single team in charge of it and that team can't depend on anyone else within the company," said Farcic. "Many companies still treat teams as children that need to be guided, ask for permission or be watched over." If that dependency exists, then most of the benefits of microservices are gone because you introduce too much wasted time.

Those teams not only have to be autonomous, but they also have to be cross-functional. "It is almost unthinkable to deploy, create, design and operate a microservice-based app without an organization adopting a DevOps-centric

approach to management where development and operations come together," said Sandro Guglielmin, senior solution architect at Instana. Teams need to push code on a continuous basis into a production environment, and absorb and accelerate change on a continuous basis, and they can't do that if they don't work together, he explained.

On the technology side, Farcic noted companies can't skip through time. If they have technology or processes that are say 50 years old, they can't just jump to the present. "You need to go through all that history that others went before you much faster than real time, but you still need to go through all of that and learn what things like cloud, containers, and infrastructure as code mean before you get to the present tense, otherwise, the gap might be [too] big to jump through," he said.

Having autonomous teams is also good when choosing a set of technologies, according to Instana's Guglielmin, because it promotes a polyglot environment, allowing independent teams to implement different components, frameworks, and programming languages.

Principles and design patterns

Once you deploy microservices, Guglielmin said, there are three principles to successfully manage: Observability, auditability and portability. Services should be observable, enabling anyone to inspect its state, health, and current performance. Services should be auditable, meaning you can obtain information about what a service has done in the past under certain circumstances in a certain business context. And services should be portable, meaning you can move a service from one environment to another without having to make changes at the code level, Guglielmin explained.

In addition, an artificial intelligence solution is necessary because it can become impossible and incredibly complex to maintain control and keep track of all the microservices — not to mention all the small pieces running and executing in a microservice. "A

machine learning-based system is capable of learning the platform, how it operates, and what different performance prerequisites are necessary for different times of the day or week. It can predict how a service will perform, anticipate resource utilization, and prevent possible outages," said Guglielmin.

IBM approaches microservices management with five guiding principles: operations, monitoring, eventing and alerting, root cause analysis, and collaboration. "The principles assist the operations team to adopt microservice-based applications. They also help developers think about the operational facets of their application, as both developers and operations share a common goal of services that are robust and of high quality," Ingo Averdunk, distinguished engineer at IBM, wrote in a post.

While a microservice doesn't require the use of containers, IBM's Daniel Berg, distinguished engineer and cloud container service architect, explained that containers fit nicely with microservices because they enable rapid development and delivery while standardizing operational aspects.

Containers enable software to be pack-



Many companies fail to implement microservices simply because it is drastically clashing with the way they themselves are organized on a human level and a process level.'

—Viktor Farcic, CloudBees

aged into isolated, lightweight bundles, and a container orchestration tool like Kubernetes provides the ability to deploy, scale, self-heal, load balance and rollback.

Things that should be monitored in a microservice include: availability, performance, response time, latency, error rate, and application logs, according to Berg. An event-management system is needed to correlate all the data from feeds like service monitoring, log monitoring, and infrastructure monitoring, and provide actionable alerts when something happens. "You absolutely

need to have monitoring pieces put in place from day one so you understand what is happening within that distributed environment, those distributed instances and how they work together," said Berg.

Berg also suggested a service mesh to help provide the overall visibility and insight into your microservices. According to IBM, a service mesh can be thought of as "network of interconnected devices with routers and switches, except in this case the network exists at the application layer, nodes are services, and routing, delivery, and other tasks are off-loaded to the service mesh." It provides the visibility into how services are interacting, and enables a user to control those interaction models programmatically. "A service mesh moves a lot of the complexity that is typically in your application code and distributes it out into the mesh. It moves the complexity of routing, managing failures, retry logic, policy enforcement, security, and metric gathering to the mesh itself and distributes them across the microservice architecture," said Berg.

Another key element to tracking and understanding everything that is happening within a microservice is through collaboration. ChatOps platforms should be utilized and provide a central place

where people can interact, and those interactions and communications can be logged. "The delivery pipeline process should be well documented and well understood because if changes are delivered into your production environment or all of your environments, everyone on the team should know how that system works and how to contribute to it," said Berg.

Teams can also collaborate on root-cause analysis and prevent the incident from happening again. "This investigation must be operated in a blameless

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culture; only through that approach are people willing to share their insights and help others to learn from the experience,” Averdunk wrote.

Pivotal’s Crowther also noted microservice management practices can come from the design patterns of the architecture itself. Design patterns like service discovery can automatically find new services that become available in the platform so developers don’t have to worry about it. Centralized configuration allows developers to deploy across multiple different environments without having to worry about the infrastructure. And a circuit breaker pattern can safeguard against unpredictability. For instance, if you have a microservice that depends on another microservice, but can’t guarantee that microservice is always available, you can provide an alternate path to a different service. “A

good example would be the Amazon homepage. If a customer goes to buy a book, but the recommendation service is currently down, it shouldn’t stop people from buying the book,” said Crowther. “If you have a graceful way of handling that outage on the recommendation engine without disrupting the rest of the flow, then that is a good design pattern to implement because at least you are giving 95 percent of the functionality back to the customer.”

Lastly, if you really want to successfully manage a microservice architecture Cloud Element’s Garrett warned against falling into the trap of what other people define as best practices. “Just because it says in some book it should be done this way doesn’t mean that is how it should be done in your organization,” he said. “It shouldn’t be an exercise of academia. It should be focused on business outcomes.”

Mini vs micro services

An easier way to approach microservices is through the notion of miniservices, according to Ross Garrett, technology evangelist at Cloud Elements. A miniservice takes the pragmatic approach to microservices, but enables users to take a simpler integration technique between services without having to learn new integration patterns.

“The purist notion of a microservice follows a very specific model. It should really be an event driven architecture. There is a need to ensure all your services are loosely coupled, and in truth a lot of organizations that think they are doing microservices actually have this inherent coupling between services that is forced upon them simply because of how each of those services communicate with one another,” he said. “A miniservice enables a user to take some of the architecture purist out of the picture and think about what they are really trying to achieve. What business objectives they are trying to meet. Quite often, they will find they want that loose coupling, but what they really need are services that can be managed and scaled independently.”

Traditional integration patterns like HTTP via APIs is the simplest approach because it enables you to build individual services that can be written in different environments and supported on different platforms, but HTTP requires you to know something about other services, and that is counter to the true notion of microservices, Garrett explained.

With the pure notion of microservices, you would have to learn new integration patterns, and rethink the messaging infrastructure of event driven infrastructure that interconnect the services you are building.

“Microservices are an architectural construct that perhaps doesn’t really account for the real world very well,” said Garrett. “Purist believe each service should have no knowledge of the services around it, and the reality is that it is just not practical in many cases. There are no additional business benefits created by that level of decoupling. The business benefit is derived by being able to scale and manage independently.”

Event driven design is complicated and requires people to learn new skills that isn’t always ideal for every organization, Garrett explained, however it is becoming more and more mainstream, he pointed out. For instance, the Open API specification now has support to document event driven components of a web API inside version 3 of their standard. ■



Ross Garrett

Microservices management solutions

A lot of challenges that exist in microservices are around the fact that networking, security, monitoring, distributed tracing and resiliency are done piece by piece in every service rather than in a more consistent way, according to Varun Talwar, a product manager at Google Cloud.

To address this, Google, IBM and Lyft announced the open source project Istio in May of last year. Istio is an open platform designed to connect, secure, manage, and monitor microservices in a uniformed way. “Writing reliable, loosely coupled, production-grade applications based on microservices can be challenging. As monolithic applications are decomposed into microservices, software teams have to worry about the challenges inherent in integrating services in distributed systems: they must account for service discovery, load balancing, fault tolerance, end-to-end monitoring, dynamic routing for feature experimentation, and perhaps most important of all, compliance and security,” the Istio team wrote in a post.

Istio is a service mesh that proxies service interactions and provides three sets of value-added features: Security, observability and traffic management and networking, according to Talwar. It ensures all service interactions are secure and encrypted no matter where those services are deployed, and provides service identity and access control. It monitors services in a consistent way, provides automatic metrics logs and traces all traffic within a cluster. And it enables fine-grained control of traffic behavior with routing rules, retries, failovers and fault injection.

“The service mesh empowers operators with policy control and decouples them from feature development and release processes, providing centralized management regardless of the scale and velocity of applications,” Google wrote in a post.

The team plans to release Istio 1.0 later this year. In addition, the team will work towards improving Istio’s performance and availability in various environments. The project can currently be deployed on Kubernetes, with

—Christina Cardoza

The Twelve-Factor app

The Twelve-Factor app is a methodology for apps that use declarative formats, have a clean contract, are suitable for modern cloud platforms, minimize divergence, and can scale up without significant changes. According to IBM's Daniel Berg, the 12 factors are directly related to the same principles for developing apps with the microservices architecture.

The Twelve-Factor app was published by Heroku co-founder Adam Wiggins in 2011 based on the development, operation and scaling witnessed on the Heroku platform. "Twelve Factor apps are built for agility and rapid deployment, enabling continuous delivery and reducing the time and cost for new developers to join a project. At the same time, they are architected to exploit the principles of modern cloud platforms while permitting maximum portability between them. Finally, they can scale up without significant changes to tooling, architecture or development practices," the Heroku team wrote in a post.

Recently, with the rise of microservices, the 12 factors have started to become more

popular because it aligns with the microservices principle, according to Pivotal's Lawrence Crowther.

**According to its website,
the 12 factors are:**

- 1. Codebase:** One codebase tracked in revision control, many deploys
- 2. Dependencies:** Explicitly declare and isolate dependencies
- 3. Configuration:** Store configuration in the environment
- 4. Backing Services:** Treat backing services as attached resources
- 5. Build, release, run:** Strictly separate build and run stages
- 6. Processes:** Execute the app as one or more stateless processes
- 7. Port binding:** Export services via port binding
- 8. Concurrency:** Scale out via the process model
- 9. Disposability:** Maximize robustness with fast startup and graceful shutdown
- 10. Dev/prod parity:** Keep development, staging, and production as similar as possible

11. Logs: Treat logs as event streams

12. Admin processes: Run admin/management tasks as one-off processes

Crowther suggests those starting on a microservices journey from scratch should strictly follow the 12 factors if they wish to gain agility and the ability to scale. However, if they are taking a legacy monolithic application and transitioning it to a microservice, it will be harder to adhere to those 12 factors. Over time, companies can start introducing or improving the codebase more in line with the 12 factors, Crowther explained.

"The 12 factor apps check-list is really just a set of guidelines that dictate how a microservice should be built to properly support the concept of independently managed and iterated services. These factors are important when building decoupled, stateless microservices," said Matt Ellis, product management and strategy architect at TIBCO. ■

—Christina Cardoza

plans to support additional platforms like Cloud Foundry and Apache Mesos.

"The main goal for Google is to enable developers and operators to operate in this microservices world much more easily," said Talwar. "Our main goal is to make sure microservices is not just great on paper. We want to make it usable and operable at scale."

For development teams building Internet of Things solutions, TIBCO Software recently introduced Project Flogo: an ultralight edge microservices framework aimed at integrating IoT devices. "We are a firm believer that you can't take an existing technology stack or framework and retrofit it for IoT," said Matt Ellis, product management and strategy architect at TIBCO.

Flogo started out solely as an integration solution for IoT, but TIBCO recently reintroduced the project with a focus on microservices. "While Flogo was designed for IoT, the same lightweight and performant characteristics also benefit cloud-based microservice deployment models. Its robust extension

framework supports use cases like service discovery, circuit breaker, and other cloud-native microservice patterns—and even 'nanoservices' for serverless computing," the company wrote.

Microservices are a good fit for Internet of Things because it allows you to break out functions and pieces and push them to various edge devices without the need for an entire monolithic application running at the edge. "You embrace microservices because you want to build smaller, discrete units of work that are easily or more easily managed. Building microservices that you push out to the edge is something we see as an architecture paradigm," said Ellis.

Edge computing enables the ability to add additional logic such as on-device aggregation and filtering, and reduces network dependencies. Similarly to microservices, edge computing has two principles: applications need to be optimized, and able to run without dependencies.

According to Ellis, the team is currently working on adding more server-

less computing support to the project. Project Flogo recently announced support for AWS Lambda in October of 2017. AWS Lambda enables developers to run code without having to worry about provisioning or managing services. "You no longer focus on microservices, whereby you build small services that contain a few operations, rather, you focus on the development of functions and a function is exactly that, a single unit of business logic implementing value. That said, with microservices you may build and deploy 10s of microservices, however with functions you're building 100s or 1000s. Another magical bit is the fact that you literally can scale infinitely, but also scale back to zero when your functions are not in use. That is, you don't pay for idle time," the Project Flogo team wrote.

Other microservices management solutions to consider include: Linkerd, a transparent proxy for discovery, routing, failure handling and visibility into modern apps; and Prometheus, an open source monitoring solution. ■

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INDUSTRY SPOTLIGHT

Why microservices need Service Mesh

To solve network resiliency issues, to handle shaping, traffic routing

BY LISA MORGAN

More of today's backend developers are embracing microservices so they can iterate faster and avoid single points of application or website failure. However, what they gain in speed can be at least partially offset by offset by the complexity of operating, debugging, and coordinating changes in a Microservices system. Microservices communicate over the network and that brings a lot of uncertainty.

"When you break your application or a website into microservices, those microservices need to be able to talk over the network, but networks are unpredictable by definition," said Christian Posta, chief architect, Cloud Application Development at Red Hat. "Traditionally, developers have solved network resiliency issues in an application-centric way using circuit breaking, retries timeouts, certain types of exception handling and reporting. Service Mesh provides a much more elegant way of solving the problem."

In the past, big web companies like Twitter, Netflix, Google and others solved these challenges with language-specific solutions. However, a general purpose solution would be preferable.

"Container platforms like Kubernetes provide a new means of implementing resiliency solutions. That's where the Service Mesh comes in," said Posta. "The Service Mesh sits in between individual services written in Java, Ruby, Python and other languages which addresses distributed-systems concerns, among other things."

Shape, control microservices traffic

Service resiliency is the most likely outcome of initial Service Mesh efforts, although some of the other possibilities are just as, if not more, intriguing.

"The resiliency aspect is what developers really want to see and get their hands on right now," said Posta. "However, once their applications have the Service Mesh in between them, they'll be able to do a lot of interesting things that traditional enterprise developers and operations folks are not as used to or familiar with, such as shaping and routing the traffic between services."

For example, if Service A needs to talk to Service B, but Service B also has

parity between production and those lower environments, so getting new code into production still involves a lot of risks."

If Service Mesh were used to gain control over the traffic, developers could achieve lower-risk deployments to production.

"Service Mesh would also allow you to do thinks like shadow or canary testing so you could do phased or graduated rollouts," said Posta. "You could also



'Container platforms like Kubernetes provide a new means of implementing resiliency solutions. That's where the Service Mesh comes in.'

—Christian Posta

to talk to Services C and D simultaneously, then network traffic fans out from a single request. Using Service Mesh, developers would be able to see the traffic flow and control it.

Lower production risks

Service Mesh could also be used to reduce the scope of unpredictable network issues that adversely impact applications and websites running in production.

"When we deploy code, we do testing in the lower environments, hoping that those lower environments and the production environment are identical. If the tests pass, we assume the new version works and we replace the older version," said Posta. "However, in big microservices systems where there's a lot of uncertainty in the network, there's no such thing as having exact

build complicated A/B and cohort testing with this type of control that reduces the risk of bringing code changes to production."

Red Hat is currently investing in bringing Service Mesh technology to its OpenShift platform, and is actively discussing the possibilities with customers and partners who are eagerly looking for simpler and more elegant solutions than have been available to date.

"The continuous evolution of container platforms means we must continually reimagine how best to build microservices and implement resiliency," said Posta. "Container platforms provide a foundation that will allow us to do these things more elegantly. Service Mesh is just one opportunity to reimagine historically difficult problems as a more elegant, polyglot, solution."

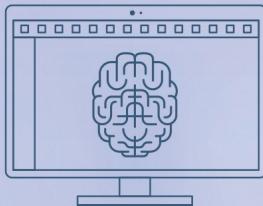
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Framework, standards are the ‘Essence’ of agile at scale

Since its creation, the agile software development methodology has been increasing in popularity. With its almost universal use, agile has now become less of a different and new methodology and more just the way developers operate. In other words, it is now standard practice for most teams to be using agile.

With that in mind, we must ask the question: where does agile go from here? Is agile at its end, or is there more room to grow?

In a talk given by Ivar Jacobson a few months ago in St. Petersburg, Russia, the man best known as a father of use cases, UML and Rational Unified Process posed the following question to the audience: Are we driven by fashion? He spoke about the history of software development methodologies and how we have followed a zig-zag path moving from one to another throughout the years.

Twenty-five years ago, everyone was crazy about object orientation, Jacobson explained. Five years later, the focus was on components. Techniques such as UML and Rational Unified Process were widely used. Fifteen years ago all of the major companies were

BY JENNA SARGENT

using CMMI. Finally, we got agile, and now, agile at scale, he said.

Jacobson discussed the most adopted method frameworks for scaling agile, which are the Scaled Agile Framework (SAFe), Nexus, Disciplined Agile Delivery, and Large Scale Scrum. SAFe is the most widely used of those, he said. “These methods all bring something good to people who adopt them,” he said. “That is not the problem. So what is the problem?”

He cited six problems with these methods in his talk:

- 1) We are at methods war for 50 years
- 2) Practices are locked in method prisons
- 3) Method prisons are controlled by method gurus
- 4) All methods are monolithic
- 5) Every method’s description is home-grown
- 6) Methods have no common ground

“This,” he concluded, “is immature and foolish.”

“Take for example point 2. Every method is just a composition of practices. Examples of practices are user stories, continuous integration, DevOps,

microservices, pair programming. The problem is, they are not separated. They are all in one soup, all integrated more or less tightly. You can’t take out one practice and replace it with another. Since they’re locked in the prison, you can’t take out practices and reuse them in another context. It is not very practical. The specific practices are described in a language that is method specific, embedded in a soup that is the method’s.” He said “it is immature and foolish.”

In his talk he described how all these problems could be eliminated by the new OMG standard Essence, which is a common ground for software engineering methods. His company uses this platform to address these problems with the additional key values being that methods are significantly easier to learn, adopt and change. “Moreover, he said, you can measure progress and health of your endeavor in a method-agnostic way and your organization becomes forever learning.”

In a press release in December, Ivar Jacobson and Jeff Sutherland, co-creator of Scrum, announced that Scrum has been “Essence-ized” to provide Scrum with a navigable glossary. Simi-

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INDUSTRY SPOTLIGHT

5 lessons learned from agile transformations

BY STEVE ELLIOTT

After a night of WebMD bingeing, you diagnose yourself with a disease called Waterfallitis (subtle, I know). Good news: WebMD says it's treatable! The new cure is a revolutionary pill called AgileAspirin. You go to a doctor for a prescription, and she says this:

"You have Waterfallitis. If you want to take AgileAspirin, your boss must approve. The treatment takes three to five years. You'll feel good in one year, at which point you'll be tempted to stop taking AgileAspirin. If you do, your Waterfallitis will come back. All your coworkers will be flustered by the failed treatment and tell you AgileAspirin didn't deliver as promised. Then, some guy named Steve from Austin, Texas will tell you what went wrong."

So here I am. A few years ago, I would have talked about Agile as if your company hadn't tried it. Today, most companies have already popped the pill, yet many relapse into the Waterfall mentality. The arduousness of transformation has made Agile a dirty word — undeservedly.

The doctor's warning covered the basic pattern of Waterfall relapses. Let's divide it into five lessons:

1. No executive sponsorship? Don't bother. The notion of needing a boss's "permission" for AgileAspirin sounds absurd on the surface. Don't all the tech people say, "It's better to beg for forgiveness than ask for permission"? They do, but if you want an Agile transformation to work at a large company, ignore that for now.

Before you tackle Agile, make sure an executive supports it (that might be you) and can win the political battles. If you don't have these leaders on board yet, sell the idea to them.

2. Set realistic expectations. As the doctor said, the Agile trans-

formation takes three to five years at a large enterprise and one to three years at a small company. Many find this timeline difficult to swallow — people in the transformation grow jaded. They thought after a year they'd be releasing software daily, but they're not. The truth is the urgency to transform is real but the process requires patience.

I can't sugarcoat the timeline. Five years for anything sounds insane in our world, but that's what it may take. Not going Agile is an existential threat for companies that compete in technology, so it's better to spend the five years and transform the entire business than not have a company at all (comforting, right?).

3. Broadcast wins along the way. Some sports and hobbies invent mini-wins to encourage participants and prevent burnout. Martial arts have belts. Video games have levels and rewards. An Agile transformation also needs mini-wins to keep momentum.

The solution is to make one member of the Agile transformation team responsible for documenting and publicizing wins. Could he make a chart that shows how release frequency has improved? Could he make a graph showing how bugs or downtime have decreased? The goal is to promote a positive mindset around accomplishments during the transformation.

4. Don't alarm middle management. Agile transformations can seem threatening to middle managers who interpret it as a revolt against hierarchy and chains-of-command. They wonder, will the company need me afterward? If middle managers feel insecure, they'll bash and undermine Agile.

Agile does change organizational hierarchy from deciding what individuals do to deciding what teams do. Project teams self-organize around their tasks. Be inclusive, and make

middle management members of the Agile transformation team, like portfolio or program managers. Or, move them onto the DevOps side where they can tackle software infrastructure and automation.

5. Make it safe to fail. Most business cultures condemn or punish 'failures' and discourage people from taking risks. Experimentation is always a risk and integral to Agile culture. Your transformation needs a game plan to make failure ok.

There's a happy medium between risk tolerance and recklessness. Facebook's mantra used to be, "Move fast and break things." In 2014, Zuckerberg changed it to "Move fast with stable infrastructure" because too much speed led to bugs, and bugs slowed development.

The new mantra is lame, as Zuckerberg admits, but it makes sense. What you can do is design a program that builds your own rituals around risk matching your specific organizational needs.

Done?

After three to five years of treating Waterfallitis with AgileAspirin, you might imagine yourself asking, "Are we done?". The answer is no: Agile companies continually iterate. You are always learning, adapting, and transforming, or you'll fall behind competitors.

If you've had a false start with Agile, don't be discouraged. Three to five years is a daunting commitment. At the end, your company will be able to match or surpass the speed and quality of any competitor. That's a good reason to start on your course of AgileAspirin to cure your case of Waterfallitis. ■



Steve Elliott is founder and CEO of AgileCraft.



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larly, Scott Ambler, the founder of Disciplined Agile Delivery, is working with Ivar Jacobson International to bring Essence to key practices in his method.

Jacobson said that SAFe is a very important part of the consulting side of his business. "SAFe has a lot of values, and it really helps many organizations," he said. "And, it has the potential to become even better if adopting Essence."

According to a report created by cPrime, Scaling Agile Report 2017, 45 percent of respondents chose SAFe as their framework of choice for scaling agile.

According to its website, "The Scaled Agile Framework (SAFe) helps businesses address the significant challenges of developing and delivering enterprise-class software and systems in the shortest sustainable lead time."

"SAFe is a very prescriptive way of enterprise planning and reporting," said Matt Schenck, Global Solutions Engineering Manager of Atlassian in the Scaling Agile Report. "My take, after working with many of our customers, is that many folks who say, 'we're doing SAFe' are really just trying to do portfolio management for Agile. Metaphori-

cally, if I have a papercut, I'd say I'm using a Band-Aid, but it might not be a brand specific adhesive bandage. More specifically, companies are struggling to scale Agile beyond teams, and are borrowing many of the key principles of SAFe without fully committing to the entirety of the framework."

"SAFe provides a way for organizations to take large scale initiatives or important products and take them to market sooner with the right features," said Zubin Irani, CEO of cPrime, a SAFe Gold Partner. "It allows organizations to align all of the teams needed to pull that off."

"I would say that what makes SAFe unique is the breadth of coverage from team to program to portfolio," said Dean Leffingwell, creator of the SAFe Framework and its chief methodologist. "Enterprises don't just want to have agile teams, they want to be an agile shop." In other words, it's not really effective to just have a few agile teams within the organization. The whole organization should be practicing the agile methodology.

Leffingwell explains that teams want to be able to evolve more quickly. "That involves things like a portfolio of strategy, turning large epics into smaller ini-

tiatives that can run very quickly through the pipeline and be discovered," Leffingwell said. This is the vertical depth of SAFe, he explained.

The horizontal depth is evolving along with the industry in order to incorporate trends that originally were created and appeared in parallel with agile development, Leffingwell explained. According to him, the first of those trends is lean startup and the second trend is DevOps.

"Massive movement is causing really large companies to rethink the way they organize and make their investments and innovations," Leffingwell said. He believes that the thirst for innovation is what is driving this initiative. "You see very large enterprises now rethinking how they innovate," he said.

The DevOps side is all about using "agile DNA to very quickly turn ideas into code," Leffingwell explains. "Deploying to DevOps practices is a real, relatively unique end-to-end process. From portfolio ideation or program ideation through to release we provide comprehensive coverage for all of that."

"I actually think agile is going to drive DevOps transformations and all of the tooling required around it," said Irani.

While it may seem like everyone is using agile, there are still a few sectors

Agile estimation is the key to a successful SAFe

With all of the benefits of SAFe, getting it right is key. Using agile estimation can help.

"For organizations that are implementing SAFe, they're really trying to coordinate a lot of different stakeholders within the organization and the real benefit they're looking to get out of it is a much more nimble delivery," said Larry Putnam Jr., co-CEO of QSM. "To be able to do that, we've got all these different stakeholders that we have to coordinate. That becomes really complicated and estimation is kind of the communication vehicle for these different stakeholders."

Putnam explains that the highest level of an organization is the business and its stakeholders. The stakeholders or senior managers within an organization need to ask in what direction the business needs to go and how software will support that. These needs are usually articulated at a

high level, said Putnam.

"Those are going to get apportioned across different value streams, and they're really looking at the whole portfolio of what's going on within the enterprise," Putnam said. "In order to implement all those capabilities the business wants, you've got all these different cross-functional teams that are working on different pieces of the system."

Putnam said that there is a minimum capability, usually referred to as minimum consumable value, that businesses need before they will go through all of the overhead of a formal release. Businesses need to translate what they need at that high level into what systems they need to utilize in order to get that value. "Estimation, then, allows you to take that high-level scope and figure out: What is the duration that I could deliver that within and what is

the cost to do that?" Putnam said.

Business won't fund two-week iterations at a time, Putnam explained. They will fund projects based on major capabilities that will be released and entered into production. "That is really where estimation is crucial because it can help you figure out what is the appropriate timeline for those teams to implement all of the things that meet the strategic goals of the organization so that they can do their budgeting and planning at that level," said Putnam.

He went on to explain that within organizations there is a natural tension between people at the low-level, such as developers, and those at the enterprise-level. He explained that agile estimation can provide a buffer between the two groups by getting everyone on the same page.

Both groups must know what is needed and what a reasonable timeframe for it is.

such as the defense industry, the medical industry, and large-scale system builders, where agile is still a relatively new idea to them, Leffingwell explains. There is about a ten year gap before practitioners in those industries become part of an agile team, he said.

"I would just guess that if I walked into an average large shop of any kind, you're probably going to have 10 to 20 percent of the people really executing agile and 70 or 80 percent still waiting for permission, waiting to finish a program, or change administration or management, and so on," Leffingwell said.

Leffingwell said that one of the challenges organizations face when trying to scale agile is getting everyone in the organization on board. Teams can decide they want to adopt an agile methodology. They can say "we're going to talk about this more frequently, we're going to plan, we're going to get feedback," Leffingwell explained. "Well, you go one level up in the organization and somebody managing that will say 'well I need to know what the outcome is before we start,' and one level above that somebody is looking at a portfolio of programs and saying they need to know exactly how these programs are going to deliver it."

"The deeper the organization, the

implementation

"Estimation allows you to figure out for all of these capabilities the business needs, what the resource demand is that's going to be required to deliver that, and how that matches up with the capacity that's available within the organization today," Putnam said.

"If the strategic direction that we are going in in the future requires different types of labor, estimation can help us figure out what are the types of people that I need to be going out and looking for and hiring to support the demand in the future," he said.

"It's all about coordinating and trying to get the benefits you're looking for through this continuous delivery concept. I think one of the things about agile that has been attractive is that it takes a lot of this process away from the teams and allows them to spend more of their time

What are other scaling frameworks?

Nexus

Nexus is a framework based on Scrum that is used for scaling Scrum. The framework guides multiple Scrum teams on how to work together deliver results in every sprint. It uses an iterative and incremental approach to scale software development.

Disciplined Agile Delivery

The Disciplined Agile Delivery framework provides guidance that helps organizations streamline processes and provides a foundation for business agility. It shows organizations how different business activities interact with each other. Disciplined Agile Delivery explains what those activities need to address and provides options for doing that.

Large Scale Scrum (LeSS)

Large Scale Scrum offers two different frameworks for scaling agile. LeSS focuses on directing the team's attention onto the product as a whole rather than on individual parts. LeSS is designed for up to eight teams, each with eight people on it, while LeSS Huge is designed to work for up to a few thousand people working on a product.

harder it is for them to understand this transformation and transition," Leffingwell said. "I still think it's very natural for middle or senior managers to ask what they are going to get out of agile and when they are going to get it. It is the most natural question you can ask."

Another challenge that organizations face when trying to scale agile is that it's a massive commitment, the scope of which is not always understood by everyone involved, said Irani. "A lot of people think they know what scaling agile really means, but then in actuality

delivering value to the client," he said.

"Any time you are trying to roll things up to an enterprise level, there's a certain amount of process that you have to bring back in to coordinate all these different stakeholders and drive out the risks associated with deploying something across the entire organization. I think estimation and metrics and measurement play a big part of that in helping you manage that enterprise implementation and transition."

He explained that it's important to be able to quantify what benefits you are getting over time. "Are we getting our releases out more timely? Are we becoming more productive? Are we delivering better quality systems over time? Measurement and estimation allows you to answer all those questions. And those are generally things that the senior people in the organization are asking and care about." ■

—Jenna Sargent

they don't really know," said Irani. "I think they go into a transformation thinking they have a clear picture of what that is gonna look like and then when they get into it they realize they were completely misjudged. So a lot of it is just education, from the top to the bottom level, and I think that's where people struggle." He goes on to explain that the knowledge gap between what executives and team members or staff want is quite large.

According to cPrime's Scaling Agile Report 2017, a lack of general understanding was the biggest reason that organizations were prevented from scaling agile, with 34.8 percent of respondents citing this as a factor.

The report indicates that company culture makes up for 65.6 percent of the roadblocks to scaling agile and lack of experience with Agile accounts for 45.6.

"I've seen organizations say they're Agile, yet still make their teams conform to all the waterfall

phase gates without modifying them for the Agile process," said SAFe expert and trainer Ken France, CEO of Blue Agility, in the report. "I've also seen where they still require integration and user acceptance testing at the end, which means...they always have a large slowdown at the end."

"I think much of the challenge is still ahead of us," Leffingwell said. "The buzzword is accepted, but the real agile behaviors in the larger enterprise are still mostly to come." ■



Accelerate Business Agility with Panaya Release Dynamix

A collaborative ALM platform
for Enterprise Agile Delivery

Plan, execute and monitor
release cycles with real-time
visibility into quality and risk

INDUSTRY SPOTLIGHT

Expanding the dynamics of business agility

BY JACQUELINE EMIGH

To be truly agile, businesses must focus on user-oriented agile principles, not just on agile IT practices. That's the key reason why, seven months after the availability of Release Dynamix, almost 70 of Panaya's customers have already gone into production with the vendor's latest product.

With the dawn of digital transformation, organizations want to quickly respond to customer needs with rapid delivery of high-quality software, said Rafi Kretchmer, VP of marketing at Panaya. Businesses are also recognizing that improving the customer experience increases revenues.

According to a recent report by Forrester Research, a one-point improvement in what Forrester calls the CX (Customer Experience) Index produces an additional \$3.50 per airline customer. Since airlines have 48 million customers on average, a one-point improvement would result in an average of an extra \$168 million in revenues.

Ideally, a focus on the user experience will have a ripple effect on IT. "Customers drive business, and that in turn drives IT to respond. Agile organizations transform their application delivery to accelerate change, in turn meeting customer demand," Kretchmer elaborated.

The mere adoption of agile practices does not equate with the agile principles required for digital transformation.

"Agile is a culture, not a process. Applying agile practices like Scrum or Kanban without changing organizational culture will not work," noted Kretchmer.

Even in organizations that are adopting agile IT and DevOps, business and IT functions often remain siloed, according to the VP. "There are specialized teams — CRM, BI, testing, security, system, database, and development, for example — with mutual dependencies. This scenario is contradictory to

cross-functional teams," he observed.

Furthermore, most of the enterprise ALM toolsets on the market do not support the move to an agile culture. "Traditional ALM solutions didn't make the switch from waterfall to agile. Cloud-based solutions focus mainly on the needs of ISV developers. They don't apply a business view and have difficulties breaking the IT/business silo," he contended.

On the whole, enterprise IT organizations are spending the vast majority of their time on maintenance and support projects, as opposed to new initiatives. As a result, IT is being marginalized, and is now at risk of losing its strategic position within the organization, Kretchmer said.

Panaya ties business, IT

First established 12 years ago, Panaya stands out against competitors by recognizing the important roles played by both business requirements and IT efficiency in producing business agility, Kretchmer told SD Times. Aside from Panaya Test Center, its flagship product, and the new Release Dynamix, Panaya also provides specialized digital transformation tools for SAP, Salesforce.com, Oracle Cloud, and ERP environments.

Allianz, one of the world's leading financial services firms, used Panaya's tools in installing a new SAP system for Europe and Asia. Allianz Global Investors had committed to outsourcing full-stack to a single supplier and to putting a new standardized process template in effect within one year. As a major part of that effort, the investment arm ran 1,000 tests among 40 testers in seven different locations, all within a total of only two weeks.

Maximilian Mayrhofer, global program manager at Allianz Global Investors, pointed to three big differentiators for Panaya. First, Panaya's tools are able to model the company's business

processes in software. Second, Panaya's management of defects and new requirements is best in class, enabling full oversight throughout the organization, Mayrhofer said. Third, Panaya is able to fully automate test documentation.

Release Dynamix makes its entrance

Release Dynamix takes a number of additional steps to further collaboration between business and IT, ensuring faster delivery times and high-quality releases regardless of which agile and DevOps practices are in place.

For one thing, Release Dynamix supports cross functional teams by allowing all team members to view and access detailed information about both business requirements and the software development cycle. Companies can plan their software releases around business priorities. If priorities change, so too can the development cycle — and right away.

Also unlike most other toolsets, Release Dynamix focuses not just on time to market, but on quality. "[Other solutions] lack key business criteria. What is the quality of the stuff we deliver on top of the devops road? What boards these agile trains?" Kretchmer asked rhetorically.

Release Dynamix supplies quality assurance through technologies known as change impact analysis and risk analysis. "Change impact analysis enables mapping and tracking your packaged application changes to specific requirements, project and release-level risk analysis, to assess readiness for testing and production. Real-time insights allow for preemptive code fixes prior to test execution," Kretchmer explained.

"With our unique risk analysis capability," he added, "IT and business managers can for the first-time weigh in Time, Scope and Quality, allowing them to make informed decisions, shorten release cycles, and ensure quality changes." ■

Buyers Guide



Atlassian brings development pieces together

Through third-party integrations and a marketplace, developers get a robust ecosystem in which to work

BY DAVID RUBINSTEIN

Gaining entry into organizations one development team at a time, Atlassian has managed to create a vibrant ecosystem of software tools that has become among the most popular in the developer arsenal.

And it's no accident. By lowering the barrier to entry for its tools, Atlassian has gained a broad developer following. And partners have jumped on board to extend and enhance the functionality of Atlassian's platform.

"What we want to accomplish is to enable our customers, vendors and partners to do what we call 'custom fit' of Atlassian products," said Max Mancini, head of ecosystem at Atlassian. "And so, we're focused on what do we do to enable customers to custom-fit, and they do that through either developing themselves, getting things from a marketplace, or working with a solution partner — a more traditional engagement to build custom capabilities and roll them out."

Perhaps the most popular of Atlassian tools is Jira, the issue-tracking soft-

ware used to find defects in applications. "Jira is something the developer world is very familiar with and had been using," Mancini continued, "and that was probably quite fortunate for us from an ecosystem perspective; there's nothing better than having a tool in the hands of developers who think, 'Hey I can make this better by adding this capability.' So, the ecosystem certainly evolved and accelerated as a result of having the right user base if you will, as developers are our users, so that solves a lot of the problem of figuring out what types of things you want to build."

Mancini went on to say that the foundation of the ecosystem is people wanting to extend the capabilities. "So if you look at the marketplace today, we

have over 250 million dollars in sales. I like to express it in terms of customer value. It's not about the sales; the reality is our customers have spent 250 million dollars on apps in the marketplace, so they're getting that value. All of those are extending the capability — everything from test management, integration and automation to timesheet management to workflow automation to reporting," he said. "All of those have apps that are sold in the marketplace."

One vendor that sells in the marketplace is **TechExcel**. Jason Hammon, director of product management, said the ease of acquisition certainly is how it started. "For individual teams within a larger organization, Atlassian made it extremely easy to have a team download it and use it internally at a very low price point," Hammon said. "They were certainly cutting edge in the way they approached the distribution of their tool, which lead to explosive growth, with Jira in particular."

Nicole Bryan, vice president of product as **Tasktop**, said her company integrates Jira to 57 other systems. "We live and breathe what we call the connected value stream," she said. "Developers love Jira. The people above them say 'we need visibility and traceability throughout the organization.' They approach software development as the connected value stream, so executive IT is getting more involved."

Atlassian's Mancini said the company is looking to drive the Atlassian marketplace with three important parts to it. "The first part is of course you need a good platform and you need to enable developers to build on that platform. I can do that certainly by allowing deep integrations, having extensive APIs and good tools to understand how to use those APIs.

"The second thing is, and this is where people fall short in a lot of ecosystems and development communities that are out there, is you have to give them access to opportunity," he continued. "There's a reason that companies flocked to the AppStore with the iPhone because they saw the growth and the opportunity. That opportunity is very difficult to penetrate now, obvi-

Atlassian's Core Products

Jira Software

- Jira is for team planning and project management
- Jira Software is the #1 software development tool used by agile teams
- Easily integrated with the tools you already use with 1300+ Marketplace apps

Confluence

- Confluence is for team content creation and sharing
- Increases transparency and makes it easier for teams to work together by providing tools that make content creation and organization simple
- Teams can extend Confluence with 700+ apps, a rich set of APIs and integration with other popular services

Bitbucket

- Bitbucket is for team code sharing and management
- Bitbucket supports 900,000+ teams and 5 million developers

Jira Service Desk

- Jira Service Desk is for tracking and managing internal services and support requests
- Easily adapts to customers' needs, with set-up time and pricing at a fraction of traditional service management software
- Jira Service Desk is the fastest growing product in Atlassian history

Trello

- Trello is the visual collaboration tool that creates a shared perspective on any project, acquired in January 2017
- Trusted by over 25 million users, Trello's boards, lists and cards enable you to organize and prioritize your personal and work life in a fun, flexible and rewarding way

Stride

- Stride is the latest addition to Atlassian's portfolio, built from the ground up and launched in September 2017
- Complete communication solution with best-in-class team messaging, audio and video conferencing, and collaboration tools

ously, because there's so much noise. We do the same thing from an Atlassian perspective, giving access to 100,000 enterprise customers to be able to sell to the marketplace. The reason this matters is not just the fact that you have customers there, and you're building something to integrate with them; the reality is a small company or even a medium-sized company that wants to sell into 100,000 enterprise customers can't go set up those relationships independently. It's too hard to scale to that. If they try to scale to that, they're probably not spending their time building great products.

"The last piece that's super important to having a program is, does the

program support you being successful? I have a whole marketing team that is focused on making sure that our customers know that these solutions exist for them; that these apps are out there for them," Mancini went on. "We want to match customer need with apps in the marketplace. It's a win-win-win. The customer wins, they solve a problem. The vendor wins, they made a sale. We win, because we get a ride share off the sale and our customers are happy. It's really a great environment to drive that kind of success."

Nick Menere is co-founder of a company called **CodeBarrel**, which offers add-ons to the Atlassian ecosys-

continued on page 42 ▶

How does your tooling expand and enhance the Atlassian ecosystem?

Jason Hammon, director of product management, TechExcel



TechExcel enhances the Atlassian Eco-system by providing integrated ALM, Quality Management and Traceability that can be integrated with JIRA. TechExcel's ALM suite DevSuite is a fully integrated ALM solution that has its roots in development and QA management but has expanded to monitor and control all processes of ALM including definition, design, development, testing, and deployment. This modular ALM solution allows users to choose the modules they wish to use with the option to integrate those modules with other third-party solutions, including JIRA, using out-of-the-box integrations, plugins and RESTful APIs. DevSuite's Quality Management module, DevTest, offers a JIRA plugin called "DevTest for JIRA" which is now available in the Atlassian Marketplace.

DevTest for JIRA extends JIRA by providing test management and full traceability to QA teams using JIRA. DevTest users can submit JIRA bugs from test cases and with flexible, built-in field mapping, easily regress failed tests. This makes testing more efficient because once a tester completes the test, all of the relevant information from the test as automatically mapped to the JIRA bug. Additionally, developers can easily view test details and tester comments from directly inside JIRA by clicking on the linked test case.

DevTest also extends the lifecycle reporting for JIRA. Users can create traceability reports that show the relationship between all requirements, user stories, test cases and development items, even if those items are in JIRA. Users can also generate reports detailing executed test coverage and associated JIRA issues directly from the DevTest interface. Any reports created can then be automatically (or manually)

emailed to other stakeholders and/or exported to multiple formats.

Nick Menere, co-founder, CodeBarrel



Automation for Jira saves you time by automating away tedious, repetitive Jira work so you can focus on the things that really matter. It adds powerful yet easy to use functionality on top of Jira that you'd normally have to write scripts for or engage expensive consultants. As a general purpose App, it enables capturing business requirements that were previously not possible and often replaces many single purpose add-ons.

We provide a huge number of different components that can be combined to solve almost any use-case. Some popular examples are:

- Keep sub-tasks and parent issues synchronized
- 16 ways to assign issues (load balanced, round-robin, ...)
- Create recurring tasks
- Track SLAs
- Add sub-tasks on create
- Set defaults for system fields
- Automatically close Stories and Epics

With over 12,000 customers and multiple awards, Automation for Jira provides the simplest way to automate your team's process. Built by early Atlassian employees with usability and security in mind, any project admin can safely make their team more efficient within minutes.

Naomi Lurie, director of product marketing, Tasktop



Tasktop makes Jira and other best-of-breed tools even better by enabling them to work together.

By creating an integration infrastructure that connects Jira with all other specialized tools, Tasktop automatically flows

product-critical information — artifacts such as requirements, features, epics, stories, test and defects — across the software value stream.

Informal and invisible handoffs through emails, chats, and ad-hoc integrations are replaced with a formal and traceable flow of information, eradicating wasteful manual work that can cost organizations up to \$10 million in productivity overhead.

An integrated best-of-breed tool-chain maximizes productivity by giving every single practitioner the information they need, when they need it, in the tool they love. It also provides management with a single source of truth — the integration layer — to view and measure performance, detect bottlenecks and prioritize future IT investments.

As an example, let's consider the workflow patterns between Requirements Management, Agile Planning and Test Management:

A requirement originates in a requirements management tool like Jama. This requirement will be implemented by epics and stories created, managed and maintained in Jira. And it will be tested by a set of tests created, managed and maintained in a test management tool, such as Tricentis Tosca.

Tasktop synchronizes the data flow provides each practitioner with the information needed to get the job done without ever leaving their tool — including all the relevant fields, descriptions, comment threads, attachments, and relationships.

Tasktop replaces any brittle point-to-point integrations you may already have and eliminates the cost to develop and maintain them. And thanks to the visible and traceable flow of information that Tasktop creates, you can employ the right set of metrics and optimization strategies to control and optimize the speed, and quality, of your software delivery to ensure continuous business value to end users. ■

Dear Jira,

I love you.

You make my job easier and inspire my best work.

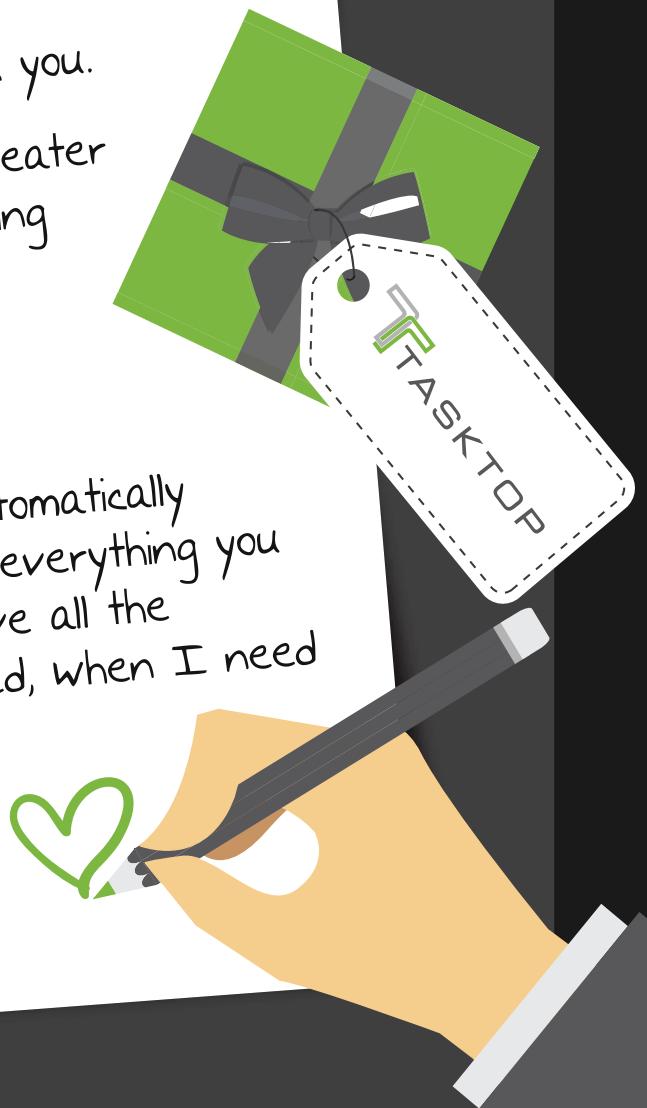
I couldn't imagine a life without you.

So I got you **Tasktop** to say thank you.

Let's make this love story even greater
by connecting you to all other leading
tools in the value stream.

Yours forever,
Your number one developer xoxo

P.S. with artifacts now flowing automatically
between all tools, you now have everything you
could ever need. And me? I have all the
product-critical information I need, when I need
it, in the tool that I love (you!).



Contact us at info@tasktop.com to learn how Tasktop optimizes Jira

www.tasktop.com



A guide to Atlassian's ecosystem

■ Adaptavist: Adaptavist helps the world's most complex enterprises optimize their application lifecycle. The company is the provider of Atlassian professional services, managed services, training, and Marketplace apps. Adaptavist offers some of the most popular apps in the Atlassian marketplace, including more than half of the Fortune 500. **ScriptRunner for Jira, Test Management for Jira, and Project Configurator** are just a few of the road-tested, premium apps offered across the Atlassian stack. A full list of Adaptavist apps is displayed on the Atlassian Marketplace website.

■ BigPanda: Big Panda has an IT Operations teams that maintain applications and infrastructure that are more complex and fragmented than ever, and change just as frequently. To track everything, the average IT stack now consists of 6-8 monitoring tools. Unfortunately, the alerts generated by these monitoring tools are very noisy and can easily overwhelm your JIRA queue with hundreds or thousands of low level and repetitive issues. That leaves IT Ops teams struggling to detect and resolve critical incidents in a timely manner, resulting in outages, missed SLAs, and angry customers. **BigPanda for JIRA and HipChat** solves the noisy alert problem by automatically correlating IT alerts and events to provide visibility into what's really going on at a faster pace.

■ Black Duck Software: Black Duck collaborated with Atlassian to help companies build software agilely and securely by integrating **Black Duck Hub** with the processes and tools software development teams already use at every step of the DevOps pipeline. Continuous delivery and open source are changing the face of software development. Teams are building and releasing at a faster pace and are relying on open source to build applications smarter.

■ DataDog: Datadog extends Atlassian's tools by connecting them to your critical infrastructure and applications. You can easily overlay code changes in **BitBucket** on performance metrics in Datadog to more clearly understand the impact of application changes. Or have more informed technical discussions in **HipChat** or **Stride** by instantly sending graphs from

■ FEATURED PROVIDERS ■

■ CodeBarrel: Code Barrel specializes in creating add-ons for Atlassian products. We have over 40 years combined experience in working on Atlassian products and Agile software development. We believe that great software is found at the intersection of design and engineering. The company created **Automation for Jira**, winner of Atlassian Codegeist 2016, which makes it simple to combine triggers, conditions and actions to handle even the most complex scenarios. There is no more need to install many different add-ons, figure out Jira's API or learn how to write custom scripts.

■ Tasktop: Tasktop enables Atlassian Jira to remain dedicated to supporting the way Agile Development teams track workflow. Instead of bloating Jira with additional functionality, Tasktop integrates Jira with other best-of-breed specialist tools for planning, building and delivering software. By automatically flowing product-critical information (epics, stories, defects etc.) between roles in the software value stream in real-time, Tasktop enables precise configuration of what flows in and out of Jira, meaning the productivity powers of Jira are felt end-to-end.

■ TechExcel: DevTest provides total control of every aspect of your testing process from test case creation, planning and execution through defect submission and resolution, DevTest manages the complete quality lifecycle. Implement quality processes earlier in the development lifecycle to manage shorter deadlines, address complex contemporary testing challenges, and improve your deliverable software. DevTest supports multiple test interface options including a matrix-based test interface specifically designed for game and multi-platform testing. Best of all, DevTest crunches the numbers for you while your team is testing, providing built-in, dynamic test analysis without having to break out the spreadsheets.

Datadog. And finally, you can prioritize your next steps using Datadog to create Jira tasks from metric-triggered events.

■ Dynatrace: Dynatrace directly connects monitoring data into the Atlassian DevOps tool chain to empower pipeline contributors to make better decisions at the right time based on real time performance and end user data. From Dev to Ops, Dynatrace acts as a quality gate in delivery pipelines (**Bamboo, Bitbucket**); gives real time performance and user behavior feedback back to epics, stories, change requests and support tickets (**JIRA, JIRA Service Desk, Trello**); and optimizes triage through **ChatOps** (HipChat, Stride).

■ LaunchDarkly: The management platform enables organizations to reduce risk while delivering value. Feature flagging is a best practice in modern application development to separate code deployments from feature releases. LaunchDarkly provides management of the entire feature lifecycle—full visibility of your features, who controls them, who uses them, and who changes them. LaunchDarkly integrates with

grates with **JIRA** providing users visibility of the current state of a feature in the release process alongside your JIRA ticket.

■ Lucidchart: Harness the power of collaborative visual communication within the Atlassian apps you already use to save time and increase productivity. With Lucidchart, teams can insert diagrams into **Confluence, Jira Software, and Hipchat** that clarify ideas, information, and processes. In **Bitbucket**, teams can generate easy-to-reference UML class diagrams from code in their repository. Whether you need to create process flows, ER diagrams, or org charts, it's easy to work visually in Lucidchart.

■ InVision: **InVision for Jira** allows you to bring your design workflow right into Jira to give every issue instant context with always up-to-date design access. **InVision for Confluence** allows you to Bring your projects into Confluence, view what you're building and enhance collaboration team-wide.

■ PagerDuty: ChatOps extensions with Stride and HipChat bring speed, productivi-

continued on page 42 ▶



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DevTest

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◀ continued from page 37

tem. He noted everyone working at CodeBarrel is a former Atlassian employee, so they had a deep understanding of how Atlassian partners to bring more robust solutions to market. “We’re developers by trade, so we were weak in the areas of marketing and sales,” he said. “We created a half-dozen or dozen things in the marketplace. The first add-on was a failure. The next one, Automation for Jira, really caught fire, with 12,000 customers in 18 months. If you understand the model, you can leverage it. The key is a low barrier, a low price. At a higher price, we couldn’t leverage [Atlassian’s bottom-up] model. To do that, we have a free version.”

The idea of getting software into enterprise organizations through development teams has made Atlassian successful. TechExcel’s Hammon noted that this approach was a shift for the task and big-tracking side. “It allowed them to get a lot of individual teams in larger enterprises, where Rational or HP or some of the larger players in that space, Microsoft... were going for a more centralized approach across the enterprise, where, you know, Atlassian essentially accomplished the same thing, team by team.”

TechExcel integrates its quality management solution with Jira, giving multiple QA teams a tool that is very much their own but can seamlessly communicate with developers as well.

Aside from issue tracking, other areas are presenting opportunities for the ecosystem as well. Among those are SaaS applications in the cloud, and IT service management. Mancini said, “Our SaaS integrations, with things like New Relic, and Datadog and Mercato, people like AppDynamics and Dynatrace.. all of these have capabilities, whether they’re ITSM capabilities or DevOps capabilities or design capabilities, that enterprises are using but want to integrate into their workflows. Whether they want to integrate them into a support workflow, or a development workflow or a business workflow, they see integration points with our products.” ■

A guide to Atlassian’s ecosystem

◀ continued from page 40

ty and efficiency to modern-day DevOps teams managing incidents. Additionally, bi-directional integrations with JIRA Software and Server empower teams to automate the escalation of high-priority JIRA issues for faster resolution, as well as create follow-up work in JIRA to learn and prevent future issues.

■ Perforce: For teams that use Atlassian’s Jira for issue tracking but need more coverage of their workflow, **Helix ALM** offers a simple answer. It’s a modular solution — with requirements management, issue management, and test case management capabilities — that integrates with Jira to cover the rest of the product development workflow. With Helix ALM and Jira, you need only two tools, not multiple plugins, to manage and link all the artifacts a product generates.

■ QA Symphony: The platform provides Agile teams with a suite of software testing tools to improve speed, efficiency, and collaboration throughout the software testing lifecycle. For example, **qTest Pulse** is a continuous testing solution that is designed for teams practicing DevOps to deliver quality at every step in the process. **qTest Scenario for Jira** is a free add-on to allow teams to optimize and scale the Test-First approach across the enterprise.

■ SmartBear: SmartBear provides frictionless tools and integrations, including Atlassian JIRA. With **Collaborator**, developers directly link code reviews to JIRA tickets. With **TestComplete** and **Ready API**, reporting a bug is fast and painless. Open source and commercial tools are available for free



trial — start to power continuous testing efforts today.

■ Splunk: Atlassian and Splunk work closely together to enable joint customers to tackle IT, Security and DevOps challenges through product integrations, including **Hipchat**, **Bamboo**, **Jira Software** and **Jira Service Desk**. For example, Dominos, an Atlassian and Splunk joint customer, uses the **Splunk App** for Jira and Splunk ITSI to track trends across Jira projects and protect the security health of their codebase.

■ Tricentis: **Exploratory Testing for Jira** allows teams to plan and timebox sessions, write charters, define objectives, invite team members, and add artifacts directly from a Jira environment. QA, developers, UX specialists, technical writers, product owners, business analysts, etc. can all be invited to participate, and start then testing with a single click. Session owners gain quick overviews of results and progress, while testers get instant access to all the details required for testing.

■ VictorOps: VictorOps supports Confluence (Runbooks), Jira (Issue Tracking and Status), Jira ServiceDesk (ITSM integration), Hipchat (Collaboration), StatusPage (Incident Status), and Bamboo (Release and Integration Awareness).

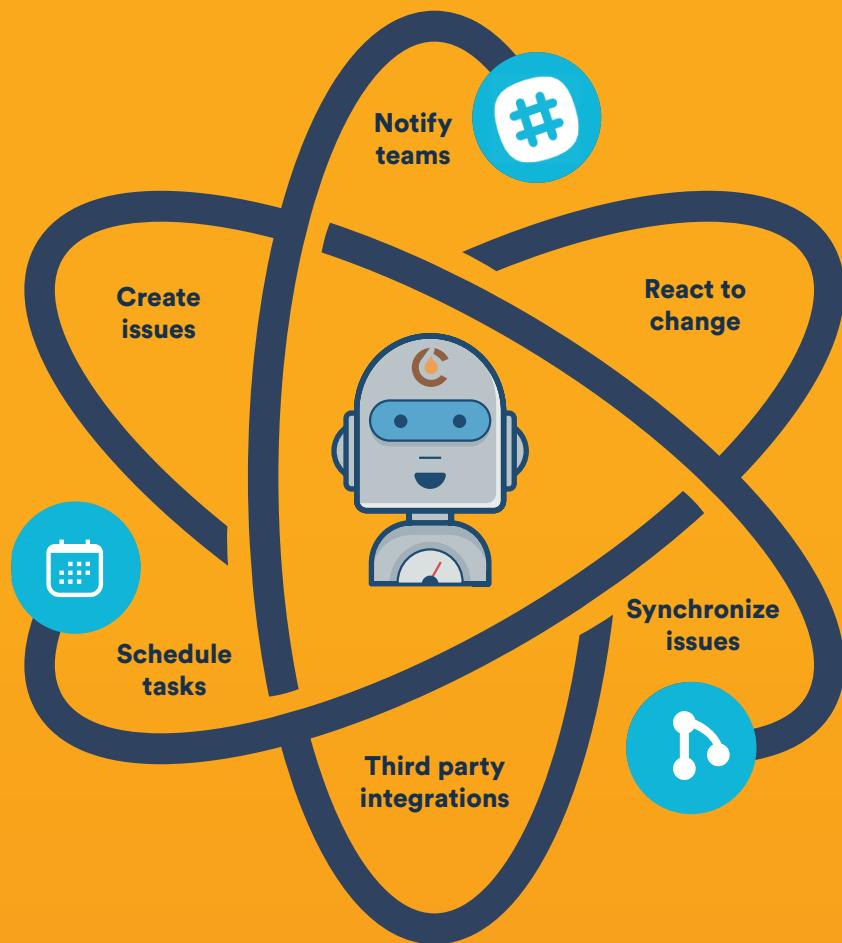
■ XMatters: XMatters accelerates business processes through intelligent communication and smart automation within key DevOps processes, fundamentally altering the way business units work together. The **XMatters-Jira Service Desk** delivers capabilities which eliminate the need for manual tasks for IT and customer support teams to resolve issues. It is a rapid, automated communication with the correct on-call resources. The integration with Atlassian JIRA service Desk allows IT teams to connect with key support escalations.

■ Zephyr: Zephyr offers metrics-based visibility via real-time dashboards into the quality and status of software projects. Customers experience improved productivity. **Zephyr for Jira** provides a full featured and sophisticated test management solution — all inside Jira. **Capture for Jira** provides visual feedback and testing tool for all teams. ■



Automation for Jira

The simplest way to automate your team



“ Amazing product. Great support. This is so useful and well-done, it should have already been part of Jira ”

“ This is awesome plugin is a must for everybody who is using Jira! Very good UI - intuitive and easy to use ”

“ By far the most valuable add-on that I'm using with the best support I've ever experienced! ”

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ATLASSIAN



IBM





Guest View

BY RAMA ANEM

Use this approach to catch the most bugs

Rama Anem is a technical professional leading a team of senior consultants and data quality analysts providing technology solutions.

You are trying to break the software, testing each and every corner case to find bugs to add to your bucket. Once development is complete and your build is deployed, you start testing to find potential issues. After you find bugs you try to add enough information on the defect report to show that the issue you found is actually a bug. And then you compete with fellow test engineers to find bugs first before they find the same bug. The test engineer who finds the bugs first thinks he/ she wins.

Well, is that only area where testing can be done? Can you also think of finding bugs differently? If so, which areas can you think of or consider for finding bugs? How does that approach look like? Will it make any changes/ cause impact to your defect tracking? How will it benefit?

Well, after gaining experience in the quality field, my perception towards quality has changed. Quality

is a broad term, so you can apply it broadly throughout the software development life cycle.

So you need not just focus on finding bugs during the QA phase. In fact, you can contribute testing at various stages of the application life cycle.

Follow this approach to verify the different areas in a product.

1. Validate requirements
2. Validate design aspect/ architecture
3. Validate the coverage
4. Validate the developed code
5. Validate in different environments
6. Validate production operation

1. Validate Requirements. A test team should know each and every function of the product that they test, simply because they don't just focus on specific components like developers. They get familiar with the product so well with their repeated regression testing, functional testing, etc. So, for instance, a QA team can validate the requirements before development starts to find potential issues in requirements, such as some feature that doesn't make sense because of a missing dependency. This saves development time. Discovering issues before actual development saves money and adds tremendous value. Hence, the QA team

should engage in validating requirements and work closely with the product owner/ business analyst.

2. Validate design aspect/ architecture. Follow the documentation on design, go through the mapping design documents. Validate the actual architecture or design is as documented to find out potential problems.

3. Validate the coverage. Validate that all the requirements have 100% code coverage. There are many tools that facilitate these. This will help to ensure enough coverage is implemented, and if not implemented, which features are missing from the coverage.

4. Validate the developed code. After finding issues/bugs in the first three stages discussed above, you can focus on this part of the software cycle to find potential defects. Here both manual and automated approaches can take place. Here you can go beyond by testing data/ back end/ middleware/ front end, and can validate all layers and have quality achieved at full stack level. Here you should also touch different platforms, for example, browsers, screen sizes, devices and the like.

5. Validate in different environments. Validation in different environments helps to find environment-related issues. Generally there are different environments involved. The number of environments and naming conventions of environments differ from organization to organization. In general, there are development, QA, pre-production (or staging) and production environments. It is important to perform some level of testing in each environment. Many times there are configuration-related issues, deployment-related issues, data refresh-related issues and others. Often, development environments can be ignored, but environments post-development must be considered.

6. Validate production operation. Generally, QA teams perform smoke test/ basic validation test automation on production environments. We can adapt where QA contributes in production operation testing for a successful software product release. This is a very important piece and any miss will carry a heavy cost for the product/ team. Validations in this stage can be such things as checking configuration changes, check for integrations with correct service endpoints, database schema change validations and more. ■

A test team should know each and every function of the product that they test, simply because they don't just focus on specific components like developers.

Analyst View

BY MICHAEL AZOFF



Michael Azoff is a principal analyst for Ovum's IT infrastructure solutions group.

From monoliths to microservices

Once organizations and their development teams have mastered agile and DevOps, the next step is to look at what software architecture is the best fit for DevOps.

DevOps introduces automation into operations with continuous delivery. However, the benefits of rapid change in production can only be realized if it is possible to make these changes with minimal disruption. Large monolithic systems need to be taken down before changes can be made, creating delay. So, in this respect Microservices architecture (MSA) is an ideal fit.

It has many other benefits as well:

- It allows systems to scale horizontally efficiently
- It allows development to be scaled effectively as project size grows
- It introduces event-driven computing which can exploit serverless computing
- It makes it easy to mix programming languages and technologies (polyglot feature) as microservices are highly decoupled
- It is a natural path to cloud native computing

Microservices architectures also have a downside: the degree of overhead in running it is higher than monolithic for small projects, only switching over to being lower than for monolithic for high internet-scale usage and highly complex applications. It is also a novel technology for many developers and experience in designing it well is still limited. Martin Fowler, chief scientist at ThoughtWorks, advocates building a monolith first, and if it proves necessary, transforming it into MSA. Starting to build MSA from scratch is fraught with pitfalls. Even with experienced developers building

the first version of a system is still a learning experience, for both developers and business stakeholders. There is a lot to be said for throwing away the first version, even as far back as Fred Brooks Jr., who wrote in his seminal 1975 book, "The Mythical Man-Month," that pilot systems are essentially "throw-aways."

MSA technology is also evolving. 2017 saw the emergence of the service mesh, with open-source projects such as Envoy and Linkerd, operating at the data plane. 2018 will see a new type of service mesh gain adoption, that includes both data and control planes, e.g. Istio and Conduit. The service mesh makes working with MSA a lot easier, by removing the need for developers to build communications 'plumbing' between services. With a service mesh every microservice now has a proxy network server or 'sidecar'. All communications are channeled through the proxies. There are multiple benefits in using a service mesh, but it will encourage a better and easier style of building MSA.

As a final thought, the emergence of many new styles of building software applications today, and the huge benefit that open-source software has introduced, has created a large gap between developers at the lead of building with these technologies, and the many others in enterprises that are still struggling with agile and DevOps transformation. The gap between the leaders and the rest has widened considerably compared to say the 1990's. That's not saying it is bad, just highly noticeable. ■

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Industry Watch

BY DAVID RUBINSTEIN

DevOps: An idea born by developers

DevOps. What a concept. Developers and IT operations teams working together to ensure applications are performant, can scale, and can deal with multi-stage deployments and rollbacks.

But has it been a collaboration, or more like a railroading?

If you look at the industry since business executives bought into the need for speed in application development, developers have used that cover to force changes in how testing is (or isn't) done, and are now using it to circumvent IT processes that have long protected businesses from costly downtime and security breaches.

Lucas Carlson, vice president of strategy at CA Automic, shares this view.

"DevOps to this day," he said, "is really built by developers and for developers, and it really feels like a misfit to try to force IT operations to use DevOps

tools, given their heritage, because they were built with developers in mind... They're great for developers but not for IT operations, and that's kind of created a shift, a divide, and it seems like almost ever since DevOps has been gaining traction and popularity,

the developer role within organizations has become more and more raised and lifted. Everybody's trying to hire developers. Developers are kind of the kingpins of the technology world... IT operations has really been left behind in all of this."

Development and IT operations teams historically have had more of an adversarial relationship than a collaborative one, simply because each team has very different goals. Developers want to introduce new features and fix old ones; IT Ops teams want to make sure changes to the application do not bring the system down, and that the app scales and meets performance metrics.

"IT operations has kind of that baggage history of being slow and not very responsive, and that goes against the agile 'fast, let's go, let's go' mentality of the day," Carlson said. "That might have been fair 10-20 years ago, but it's not a fair representation of what IT operations wants today. The reason that IT operations has the tradition of being slower is because they're responsible for making sure things don't break, and you can't do that if you're

moving too fast. But, it's not that they're against automation, it's not that they're against being able to do continuous deployment, it's just that they want to make sure they are able to manage the complexity with as minimal downtime as possible."

Carlson suggested that a new term needs to be popularized: AgileOps. "It's development thinking applied to an operational process," he said.

"There's a place in the tech world for both groups, and it's kind of sad that IT operations has been left out of the discussion," he added. "It feels like IT Ops has been the forgotten stepbrother that doesn't get invited to Christmas parties. You can't do DevOps properly leaving out your forgotten stepbrother. It's impossible to do it correctly because you'll end up with code that doesn't scale, that breaks, with downtime during high seasons. We see this with things like the Bitcoin exchanges breaking every time new people want to sign up. It's not working and why is that? There's probably not a great IT operations team behind it because they thought, 'We can do DevOps so we can handle anything.' Well, it turns out that's not quite as true as everybody thinks it is. DevOps as is without a complementary operations group is not nearly as good as it is promised to be. It's not the solution; it's only half the solution."

And Carlson suggested a solution, under the new term "AgileOps." The point, he said, is to give IT operations the tools that do the same things that tools for DevOps did for development. "DevOps reduced the software development life cycle for developers. If you have a philosophically similar approach for IT operations — trying to reduce the SDLC time — but you do it from the philosophic standpoint of IT operations, it is now a collaboration of equals instead of forcing developer tools down the throats of IT operations."

At last November's Gartner IT Infrastructure and Data Center conference, I revealed to a number of vendors that D2 Emerge was launching a news website dedicated to the IT operations side of DevOps. The news was met with very positive reactions, along the lines of "We need a site for IT Ops. We're underserved."

ITOpsTimes.com is now live, with news and analysis for IT operations managers. We hope that by shining a light on these issues, we can help the two sides attain parity. ■

***It feels like IT Ops has been
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