

IT Operations Predictions 2021



Opportunity and acceleration:
Remote work, automation,
observability, cloud and more.

splunk >

Staying Ahead of the Business in a Faster World

The big story for IT operations in a post-COVID world is the massive acceleration of digital transformation. The pandemic has thrown IT organizations headlong into the Data Age, in which ubiquitous and interconnected digital technologies use data to enrich every decision and enable real-time action. In this era, IT leaders have to finally live up to a decade's worth of promises to evolve from maintaining a basic utility to being strategic partners who provide innovative IT services.

Earning that much-discussed “seat at the table” is a slow process of incrementally building trust-based relationships. In no small part because the rising complexity of IT services can be at odds with the seemingly simple business imperative: “I just want to get the job done.”

With the pace of business demands and marketplace disruption in eternal overdrive, a CIO’s customers don’t want stability and consistency as much as they want velocity. (Oh, the minute they don’t have consistent stability, they’ll howl, but until then, they take that for granted.) The old IT mindset of providing a utility doesn’t work in this world.

“From an enterprise architecture standpoint, and an applications and solutions standpoint, if my team has a service mindset with a very specific point of view on how to achieve velocity, we can stay ahead of the business teams,” says Splunk CIO Steve McMahon. And that specific POV, he says, depends on two things: instrumentation and automation.



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Prediction

CIOs who don't nail down instrumentation and automation are going to lose their jobs.

Splunk CIO Steve McMahon says he wants to know what's happening right now, and he wants to do something about it right now. Fundamentally, he says, that drives IT toward observability. Observability is a measure of how well you can understand how a system is operating. And instrumentation is what you measure, and how you do it, to achieve that insight. "Ultimately," McMahon says, "if you lack the instrumentation to know what your service is doing, how could you operate?"

What makes it challenging is that IT needs to measure a more complex universe now. On-premises, private cloud, multiple public cloud instances, serverless computing, software as a service ... and hard as that is, COVID-19 has made it more difficult by accelerating organizations' evolution to cloud solutions, and their dashboards and analytics reports have yet to catch up.

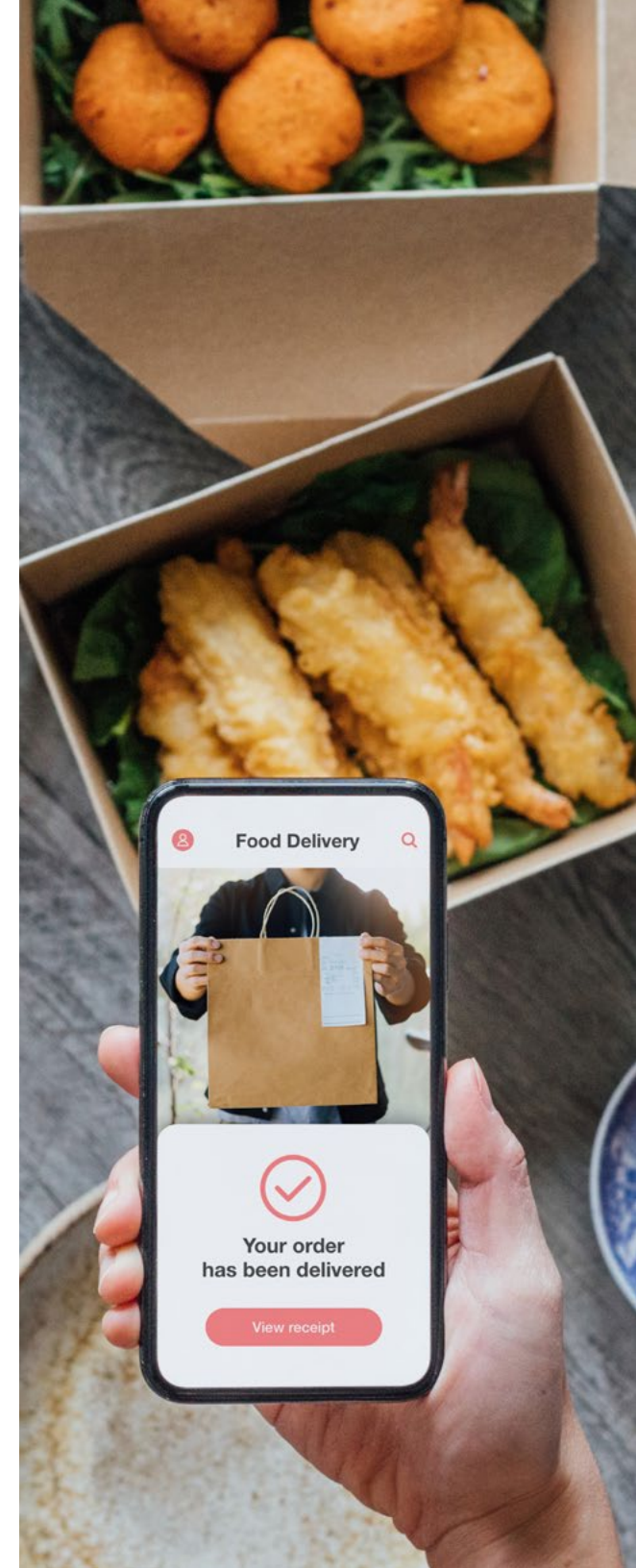
"CIOs who aren't planning for their rapid transformation and changing their organizational structure and trying to drive a service-oriented mindset will be fired in three years," he says. "And I'm not trying to be melodramatic. The people who are moving slowly and methodically are going to be left behind."

Business teams will take their credit cards off on shadow IT adventures — IT's responsiveness, insightfulness, business impact and reputation will crater. "IT will just have to clean up the mess," McMahon says. "And that's not good for anybody."



Automation

Automation was already being driven by digital transformation imperatives. Then came COVID-19. Any organization that hadn't quite tipped into the Data Age got a good hard shove when workplaces emptied out and all our interactions went digital. So, as with the broader category of digital transformation, the rapid adoption of automation is only getting faster.



Prediction

Ultimate success with automation will depend on a surprising factor: The human element.

Automation is not as discrete as 5G or AI/ML. It's less a singular technology than an approach to any kind of work: Remove the human factor from the management of extreme data volumes and execution of repetitive tasks to achieve speed, scale and precision.

Splunk Customer Success Officer John Sabino notes in this year's Emerging Technology report that everything from trading stocks to running a brewery line is largely automated at this point. Furthermore, food manufacturers are **adopting process automation** to standardize and improve safety. In China, the pandemic has **unleashed a wave of robots** that are sanitizing hospitals, workplaces and public spaces; taking people's temperatures; and in one hospital, preparing meals. Worldwide, robots have been delivering groceries, ringing up in-store purchases, and screening hospital patients in a world where human contact has been a risky proposition.

Automation drives innovation as well as efficiency. And innovation, even in a highly automated world, is a human discipline, says Ram Sriharsha, Splunk's head of machine learning.

"Today, before a business can ask a meaningful question of its data or automate a resulting process," Sriharsha says, "there have to be data engineers preparing data, data scientists coming up with data science workflows, AI/ML engineers and infrastructure teams to stitch all this together."

And then, he says, there's the actual fruit of all this analysis and response.

"Ultimately, your business value proposition is not in engineers and data scientists. It's in people who have your domain expertise, and can ask the right questions and define the processes that automation handles," Sriharsha says. "In that case, your business value proposition is in hiring people who can model your business, who can ask the right questions and interpret the results correctly."

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Ultimately, your business value proposition is ... in people.”

Ram Sriharsha, Head of Machine Learning, Splunk

Observability

Cloud-based innovations like microservices, containers and orchestration let developers code better, faster, but the underlying infrastructure becomes dynamic and ephemeral, and service-level interactions are hard to see. It's a critical evolution, but the rapid change reduces visibility, predictability and control. Hence, observability.

Going beyond traditional application or infrastructure monitoring, observability helps you understand how your systems and processes (aka your business) are operating. The Silicon Valley mantra to “fail fast” works better when you also have the ability to “learn more” and “find and fix fast.” In a complex hybrid/multicloud world, instrumenting the right tools to provide effective observability will (and should) keep IT leaders busy in 2021.



Prediction

Cloud complexity will drive a rush to better, more integrated monitoring tools.

The addition of cloud technology to existing on-premises or hybrid infrastructures increases the complexity for practitioners. Even cloud-first or cloud-native organizations add new complexity as they adopt new technologies or techniques, such as a microservices approach that brings containers, Kubernetes and service mesh into the organization. All of which needs to be not just monitored, but observed and secured.

“The way that people build applications is evolving very quickly, from applications that lived in a Java virtual machine in the data center to a model where it’s entirely in the cloud composes a series of services,” says Splunk Chief Technology Officer Tim Tully. “And you need to be able to monitor that application that’s now mostly in the cloud, talking to mobile devices. That 180-degree change is naturally driving rapid adoption of observability tools.”

Observability differs from monitoring in that monitoring tools tell you when something’s wrong, while observability tools give you the what, along with insight into why, and therefore how to

remediate. It’s essential as software architectures shift to a modern approach. We will still have applications that are run without a cloud-centric or microservices approach, and monitoring the marriage of these different approaches increases complexity.

To establish visibility into cloud environments, monitoring tools must be able to collect and process data at scale and provide advanced analytics and support for automation. Tools also need to see across silos created by discrete tools and applications.





“Traditional monitoring tools don’t work across multiple environments. The legacy tools are geared for the on-prem data center,” says Splunk CIO Steve McMahon. “And then there’s the new class of tools for the cloud. But I don’t care about the underlying infrastructure; I need to know what’s happening.”

Splunk’s chief product officer and SVP of cloud, Sendur Sellakumar, agrees. “How do you take a retailer’s e-commerce or mobile experience and tie it to their backend, SAP supply chain experience?” he asks. “Those are two different systems with materially different ways that they operate, and ways that they’re monitored. But you’ve got to bring those worlds together when you think about, say, a customer buying a pair of shoes on her mobile phone.”

This situation is driving an appetite for integrated monitoring solutions, which will push vendors to deliver.

“It’s an issue we hear about when we talk to customers and investors,” Tully notes. “And the need for an integrated approach is only growing.”



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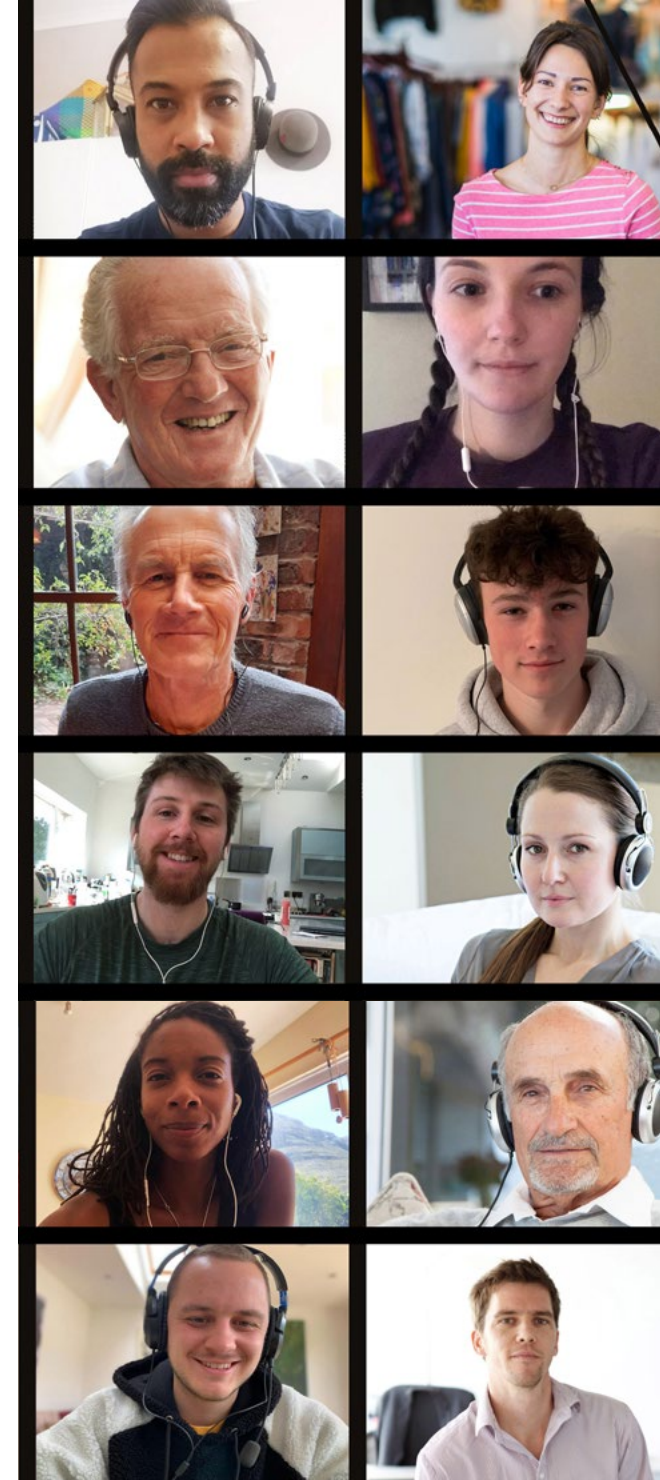
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Steve McMahon, CIO, Splunk

Remote Work/ Collaboration

The shift to remote work is creating new reliance on video conferencing and other digital interaction technologies. Office-bound knowledge workers were fairly lucky during the pandemic, in that many of them were able to unplug from their cubicle and set up shop at home. The massive and sudden shift to remote work brought many strains, from bandwidth challenges to childcare issues to a numbing blur of work and personal time. In the context of the workday, it also demonstrated the shortcomings of digital collaboration tools.

In the United States, shelter-in-place orders started rolling out in mid-March. By late April, headlines about “Zoom fatigue” were appearing everywhere from *The Harvard Business Review* to *USA Today*. (The earliest “Zoom fatigue” headline that turned up in a casual search was [April 4](#), from, appropriately enough, Psychology Today.) In other words, the new status quo is ripe for a status upgrade.



Prediction

The pandemic will inspire a new generation of immersive tools for digital collaboration.

Splunk CTO Tim Tully sees a startup opportunity in the growth of remote work and long-distance collaboration. “In the coming year, we’ll see better collaboration tools start to pop up,” he says. He points to the summer debut of a beta app called Mmhhh that aims to layer a Saturday Night Live Weekend Update feel onto standard videoconferencing platforms. “With so much remote work, the hunger for that kind of solution will be huge.”

And, of course, there are new entrants and new use cases among video/collaboration consumers. Start with telehealth, which venture capitalist and leading tech trendspotter Mary Meeker [pegged](#) as a key healthcare innovation in her report on coronavirus trends. Video appointments surged in the early days of the pandemic. An April BBC report found that general practitioners in England were holding in-patient appointments with only [seven of every 100 patients](#); the other 93% were remote interactions.

The importance of collaboration tools can't be underestimated. Even before the pandemic supercharged the issue of remote work, Tully and Jesse Chor, Splunk's head of mobile engineering, were motivated by poor bandwidth, low video quality and other issues to make time in their demanding day jobs to research, test and select a new platform.



"I actually interviewed people," Chor says. "I called up friends at Facebook, Google, Uber and other companies and asked, 'What do you guys use? Do you like it? Does it scale?'"

And that was before the pandemic made the UX of our collaborative tools our entire work experience. Going forward, demand for better, more creative solutions will only rise.

Chor adds that AR/VR technology might also make its way into digital collaboration tools, providing more immersive and interactive experiences that replicate, and improve upon, the whiteboards we used to use when we were all in the same stuffy conference rooms.

**Expect AR/
VR to make its
way into digital
collaboration
tools.**



Cloud

When we talk about accelerated digital transformation, a lot of it is embodied in the move to cloud computing. However, the “journey to cloud” will not be uniform across organizations and industries, says Sendur Sellakumar, Splunk’s chief product officer and senior vice president of cloud. The uncertainty of the pandemic means that in 2020, many organizations tried to rein in spending to get some last value out of existing infrastructure investments.

Yet some things you can’t skimp on, and if you suddenly have thousands of workers forced to connect from home, you have new needs for SaaS services and cloud resources that must be met. But the challenge of the cloud is not just spending money on new resources. It takes time, and talent, to manage any transition to the cloud. Yet cloud will be even more essential as the economy stabilizes toward a new normal. IT teams will transform into much more cloud-centric organizations — not just for efficiency and scale, but because of the elevated importance of resilience.





Cloud services can provide greater resilience in a world more prone to disruptive pandemics, wildfire seasons that engulf the entire U.S. West Coast or the continent of Australia, brutal heat waves in southern and central Europe, and hurricanes that batter the U.S. East Coast and South on an annual basis.

“Cloud offers a lot of flexibility and adaptability,” Sendur Sellakumar notes. Having your data backed up in multiple cloud centers, for one thing, helps if disaster strikes your data center. “You want nimbleness in your business against the realities that your business faces. How do you adapt to disaster? Cloud and other tools enable you to be resilient to that change.”

Prediction

Moving fast breaks things. There will be a lot of failure and waste in 2021.

You can't make an omelette without breaking a few eggs. But it's harder to cook something up while also trying to put out a kitchen fire. That metaphor may not work, technically, but it kinda paints the picture: Our rapid response to the shutdown of physical reality has often included a pell-mell rush to digital environments, and some chaos will ensue.

Quickly implemented solutions to pandemic challenges, and the complexity of a multicloud world, will create problems of performance and security. Performance failures will result from gaps in technology and process as you unravel years of legacy complexity and struggle with new APIs, refactoring applications for the cloud, etc.

Security issues are the most problematic. These, Sellakumar says, result from not having a handle on new procedures. The innovation-enabling flexibility of the cloud still requires guardrails, he says.

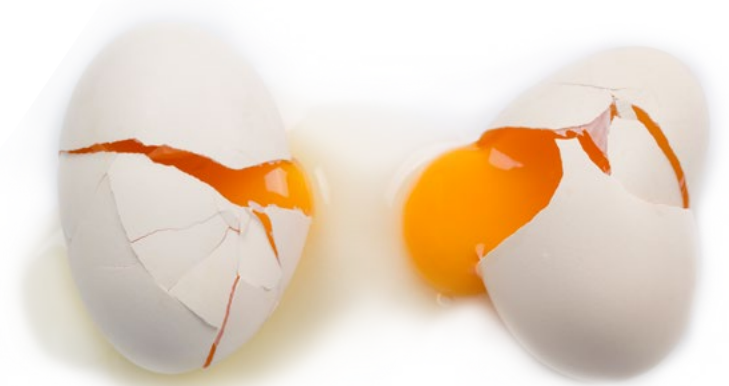
"I hold briefings with our customers, and 99 out of 100 will say that their developers can spin up a server on Amazon or Azure on their standard model," he says. "So I'll ask whether the company mandates a policy on that server so that it never can touch the

internet. A much smaller percentage says that's the case. Then I ask, 'Well, do you restrict what you can upload to that server? Like a purchase order or a customer list, for example.' Maybe a few hands are still up. These are the kinds of new security considerations you have as you move to the cloud."

It's very easy to turn to the cloud to, say, run some quick BI analytics. But policies around what data goes where, and how it's protected, must be implemented and socialized.

"That's hard," Sellakumar says.

"Products like Splunk help organizations watch for and manage those behaviors, but it's a level of complexity that many organizations have not considered."



Besides security and performance, there is a third vector of potential cloud failure: cost control. The celebrated beauty of the cloud is that you can spin up resources as you need them, and then decommission — and stop paying for — them when you don't. But that requires procedures to evaluate and scale down at the right time. It requires centralization of cloud resource management.



Happens to the Best of Us ...

Among the notable cloud failures [logged by CRN.com](#) in the first half of 2020:

- A faulty code update caused a Twitter disruption
- Demand spikes due to remote work disrupted Microsoft Azure, Microsoft Teams and Zoom in March and April
- Trouble with an identity and access management API disrupted Google Cloud services from Gmail to Nest home security cameras
- GitHub suffered rolling outages in April for reasons not immediately identified
- Adobe's Creative Cloud suite was down for a full day in April for undisclosed reasons

The point: The most established cloud giants have bad days, whether due to coronavirus disruptions or the inevitable moment of imperfection. As we all rush into new territory with our own cloud migrations, amid a general skills shortage and pandemic disruptions, more crashes are inevitable.

Prediction

The combination of AI/ML and cloud will significantly enhance customer experience for heretofore less sophisticated businesses.

User experience is a big deal. For public-facing interfaces, the friction of a bad customer experience can send potential business to your competitors. For IT services delivered within your organization, bad UX is one of the main drivers of shadow IT. And per this year's Splunk IT Security Trends 2021 report, the rapid increase in remote work has all kinds of security implications, notably a spike in unauthorized IT adoption.

A May analysis from IDC predicts that the incorporation of AI/ML to modern, cloud-native applications will have a powerful effect on customer experience: "The most important enhancements to these modern applications in the next several years will be the deep integration of AI and machine learning into cloud infrastructure, platform, and applications to improve efficiencies and accelerate digital delivery of services to customers/patients/constituents."¹

¹ IDC, "Cloud Flattens the COVID-19 Dip But Has Room for More Improvement," May 14, 2020



The companies that are most attentive to customer experience are already cloud-native, and they're already applying machine learning to their customer interactions. A Deloitte article that ran in The Wall Street Journal in March [pointed out several ways](#) in which AI improves customer experience: There's the direct interaction of the customer with recommendation engines designed to present more attractive content/offers. There are operational analytics that improve customer-facing performance. For industries such as auto sales (or auto insurance), where prices are competitive and variable, there are market analytics that look at competitors and other factors to identify the best pricing.

And with the acceleration of digital transformation, and cloud adoption in particular, expect more companies to modernize their customer experience.

"The cloud has enabled more companies to take advantage of AI/ML, which is a means to an end," says Sendur Sellakumar, Splunk's chief product officer and SVP of Cloud. "Look at Facebook, Netflix, Amazon: They use a ton of ML underneath the covers. But none of us get exposed to that ML. We just get a better experience."

And he notes that it's easier to achieve now that public cloud providers offer out-of-the-box ML tools.

"If I'm a regional retailer for auto parts, I may not have a data science team that is on the scale of Amazon or Splunk," Sellakumar says. "But I can now leverage the data science capabilities that vendors provide to enhance CX on my website. This democratization of machine learning is critical to truly capture the value proposition this technology can offer."

With the acceleration of digital transformation, and cloud adoption in particular, expect more companies to modernize their customer experience.



Strategy

Cloud transformation takes talent.

Digital transformation is hard enough when your only pressure is keeping up with the industry Joneses. When you're responding to a global disruption, or as we come out of that crisis to find everyone moving faster as a rule, it's much harder.

Sendur Sellakumar says the first thing leaders need to do is make sure they have the right talent on their teams.

"First, make sure you have the right DNA in your organization to understand the digital experience you need to deliver," he says. Looking back on Splunk's rapid cloud transformation before the pandemic, he notes that the potential skill gap goes beyond the technology back end.

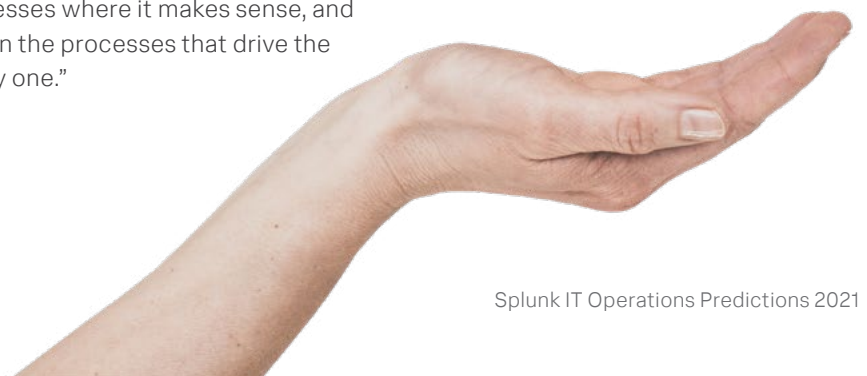
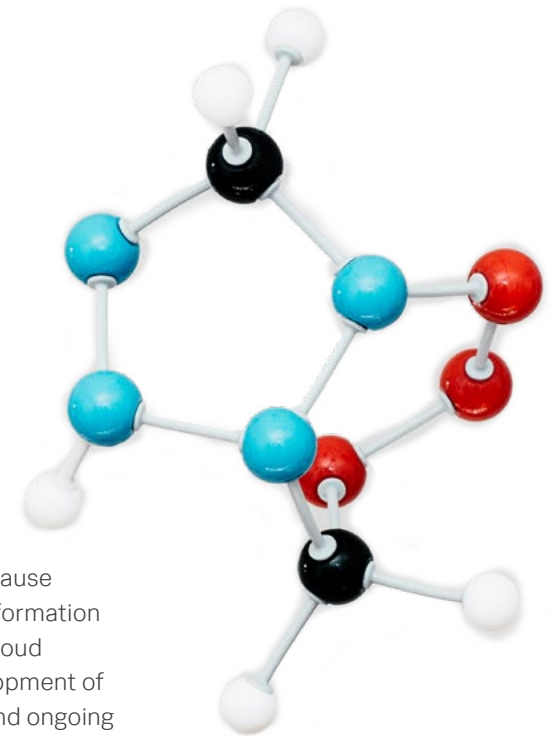
"When our platform was focused on on-premises, we had product managers, engineering managers and sales reps who had never sold a cloud service," he says. "It's a different motion, in terms of engineering, sales, marketing. We had to make sure everyone, on every team, was ready for the change and enabled customer success in the cloud — that's where the rubber meets the road."

That means changing the skills you hire for (and hiring faster, perhaps). It means engaging your current staff and retraining them to expand their skill sets.

"It also means not over-engineering the solution," he says. "Get something out to customers as fast as possible, and iterate from there."

And even when you think that first rush of iterative transformation is finished — it's not. Just because organizations move quickly to accelerate digital transformation doesn't mean that the work is done once those new cloud resources are online. Change management, the development of new processes, training and hiring for new skill sets, and ongoing attention to the security implications of each infrastructure change are ongoing efforts.

"The timing of the transformation accelerates, the launch date moves up, but you're not going to be done in three months," Sellakumar says. "It's going to take years to make sure you convert all those processes where it makes sense, and you're going to focus on the processes that drive the most revenue from day one."



DevOps

The agile, DevOps approach to IT, as enabled by nimble, scalable cloud services, encourages incremental wins and daring experimentation. Release new features in smaller, quicker updates; try new things, assess and adjust quickly, and pull the plug if necessary. Chalk up a loss to experience and growth, rather than slam some ambitious engineer or product manager for an unsuccessful venture.

“Cloud platforms, DevOps disciplines and digital technologies enable a culture of experiment, fail and iterate,” says Sendur Sellakumar. But that’s because we’re no longer in a waterfall world where just the “experiment” part of that equation took 18-24 months. “It can’t take three years to fail. And in a digital world, it doesn’t have to.”

Even allowing for factors such as varying levels of regulation or data sensitivity from one industry to the next, organizations are going to find that their increasing adoption of cloud will enable — and instigate — a more experimental mindset.



Prediction

Leading organizations will learn to “fail fast.”



Cloud-based digital transformation will drive the “fail fast” mentality beyond the venture capitalist ZIP codes.

“That’s not to say that the Silicon Valley approach to innovation is perfect,” says Sendur Sellakumar. “But I think it’s good to recognize what it optimizes for, such as iterative development. On the other hand, we in the tech world often force change on consumers rather than responding to genuine needs.”

His recommended path: Marry Big Tech’s willingness to experiment, measure, and quickly adjust to an empathetic (and preferably data-backed) understanding of what customers or end users actually need.

And when you think that way, you not only fail fast, you can succeed faster, too. Sellakumar’s go-to example: Cars roll out new features in their newest models, once a year. But since the average car owner keeps the one in their driveway for six years, that’s a long wait between upgrades. But Tesla updates its cars’ software to add new features on the fly.

“The car has cameras all around it, but when you reverse the car, it would only show your rear view mirror,” he says. “Then last summer, they released an update where the screen now shows the side views as well. It’s a nice added feature that they didn’t have to save for next year — they can roll it out right now. That introduces a different model of working, and it’s in line with customer expectations that software updates will enhance the products they buy.”

Prediction

Successful organizations will blur (or erase) the line between ITOps and DevOps.



The embrace of cloud, the related importance of observability, the “fail fast” mantra ... why didn't we just cut this whole thing down to two words: Adopt DevOps?

Because it's not that simple. DevOps is not an inevitable destination for every IT organization. In fact, says Sendur Sellakumar, it's not exactly a destination at all.

“People say the DevOps movement is a transformation and a journey; I actually don't think it's a journey,” Sellakumar says. “I think it's a different way of adopting, and it increases the heterogeneity of the operating model for our companies.”

In other words, for most organizations, DevOps has to coexist with traditional IT operations.

“There's a natural limit to where it makes business sense to transition to DevOps,” Sellakumar says. “If you're a large insurance organization that has a third of your business running

on mainframes, it probably doesn't make sense to change that to a DevOps model.”

But don't try telling insurance CEOs that their industry is no place for agility and digital experimentation. Velocity and customer focus are central to every industry in the Data Age, and DevOps' more holistic view of software development — from conception to consumer — help get you there.



“The DevOps practices of continuous integration and continuous deployment are fundamental to achieving necessary velocity,” says Splunk CIO Steve McMahon.

So bring a little DevOps to every aspect of IT operations. You don’t even have to call it DevOps, McMahon says.

“DevOps means something different to everyone, anyway,” he notes. “To me, it means that I deploy code and am responsible for that code after it goes live. So I have to have the relevant

information to understand how the code is performing so that if need be, I can quickly roll it back, and the service is barely impacted at all. That’s really what DevOps and the core practices of continuous integration and continuous deployment mean to me.”

These are the values, regardless of the specific tools, technologies and terms of art, that will drive IT operations in the Data Age.

Contributors



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Jesse is head of mobile engineering at Splunk. Before that, he was director of software development engineering at Yahoo, which had acquired Sparq, a mobile marketing startup he founded and led as CEO.



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Steve McMahon

Splunk CIO Steve McMahon has 20+ years in the high-tech industry, having previously held transformative roles at Cisco, IBM and several startups. At Splunk, he has led the Business Transformation, Global Customer Support and Cloud Operations and Engineering organizations.



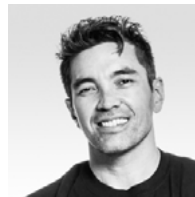
Ram Sriharsha

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John is Splunk's customer success officer, which means he and his team help customers adopt industry best practices and Splunk technology to drive success through data. John was also senior vice president of commercial operations for both GE Capital and NBC Universal.



Tim Tully

Tim is our chief technology officer, responsible for Splunk's Products and Technology organization. Before that, he spent 14 years at Yahoo as chief data architect, VP of engineering and more. He's big on the intersection of data, design and mobile, and advises entrepreneurs, startups and universities.

Get the 2021 predictions Executive Report, and our focused editions on Emerging Technology and Data Security for more insights.

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