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Top 10 Trends That Will Shape Modern Infrastructure And Operations In 2020

by Charles Betz
December 6, 2019

Why Read This Report

Infrastructure and operations (I&O) professionals have never been under more pressure to change. From cloud-native approaches to product teams and DevOps, the challenges just keep coming, and many I&O pros report great uncertainty about their career futures. This report describes the top trends that will shape the I&O role in 2020 and summarizes what the modern I&O team should start, continue, and stop using.

Key Takeaways

Stop Overcontrolling And Overspecializing
Operations no longer owns production; it's a collaboration with development. Deep expertise is a fine thing, but you need to balance it with broad perspective. Integrated product teams are here to stay.

Process Is A Power Tool — Use It With Care And Only Where Appropriate
Processes and standard procedures are changing with increasing speed. Trying to document every activity with hyperformalized processes leads only to disdain for process. Instead, focus on automation and collaboration with rich audit trails.

Your I&O Platforms Are Products
Integrated product teams are all the rage, but in large, complex environments, it's the collaboration of products that will deliver outcomes. Cloud providers promote a bewildering variety of options, and your platform teams need to curate them, construct approved templates, and maintain guardrails, all with product team empathy for their internal customers.

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by Charles Betz

with Stephanie Balaouras, Julia Caldwell, and Diane Lynch

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Table Of Contents

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I&O's Value Is More Than The Sum Of Its Current Tasks

Cloud-native, DevOps, and automation are turning I&O's world upside down. As organizations move to self-provisioning, I&O professionals are rightfully concerned about their futures. In the world of self-service consumption, the traditional tools and tasks of I&O teams are subject to constant overhaul and replacement. AI and automation continue to transform traditional I&O capabilities such as the service desk.[1] The cloud-native ecosystem is flourishing, and the days of waiting six months for a server seem medieval. DevOps is not only climbing in adoption but also growing in its application across full portfolios. At the intersection of these trends, the semi-autonomous product team is emerging as the new basis of the digital economy. This leaves many wondering how the I&O organization is relevant.

› **Value isn't changing, but culture, tasks, and structure are.** The work of the I&O team is changing. It's even shrinking in its overall area — outsourcing infrastructure tasks and automating repeatable work — and developers are embracing new autonomy, such as that provided by infrastructure-as-code (IaC) (see Figure 1).[2] What's left isn't less work, but it's denser work.[3]

› **The good news is, you're in a position to lead.** Today's businesses face a future of complexity and fragmentation, with a fractured picture of costs, risks, and legacy workloads alongside innovations. I&O's function is to see this big picture and wrangle it with end-to-end knowledge and systems-thinking approaches.

FIGURE 1 As Application Teams Expand Into Build/Run Product Teams, I&O Will Inevitably Downsize
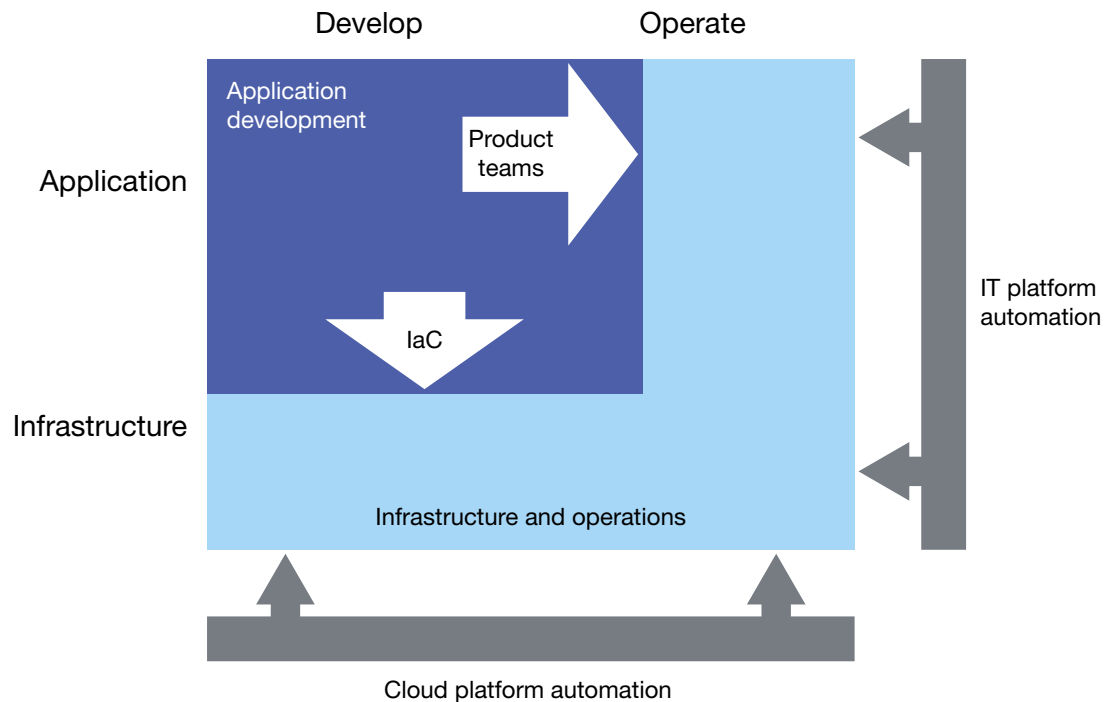
Ten Trends Will Reshape I&O Pros And The Way They Lead

You're an I&O pro, and your job is changing. These changes are significant, and how you navigate them within the context of your organization will determine your ability to add the most value. Forrester has identified the top trends that will dramatically transform the I&O role and boiled down the top 10 ways I&O pros can modify their behaviors and practices to lead effective change. We've organized these 10 trends and areas of modification by what you need to start, maintain, or stop.

› **Start X:** Adopt these behaviors and practices to jump-start your transition into a modern I&O role.

› **Maintain Y:** Maintain these behaviors and practices for the time being.

› **Stop Z:** Abandon these altogether for modern alternatives.

No. 1: Integrated Build/Run Product Teams Will Gain Even More Traction

Perhaps the most significant difference between old-school IT and modern digital organizations is the latter's use of integrated, cross-functional product teams. These teams are more efficient and effective because they don't need to wait for other teams (at least, not as much). And as product-team alignment replaces the project team construct, the build/run ("you build it, you own it") model is gaining traction in organizations.

› **Start supporting build/run product teams.** Under build/run, everyone needed to run the service sits on a cross-functional team.[4] Instead of siloed dev teams, ops teams, testers, and systems administrators all throwing work over the wall to one another, the organization assigns members from each discipline to a service where they work in step with their counterparts to build and maintain the given application or service — sharing ownership and accountability. Implemented correctly, build/run creates autonomous, productive employees, better-quality services, and happier customers.[5] Keep in mind that you can only create cross-functional teams if the skills exist in your organization or if you have confidence that teams can learn the skills in a reasonable time frame.

› **Maintain managing software in a maintenance mode.** As with all tenets of your operating model, you should tailor applications of build/run to your organization and roll them out on an application-by-application basis. Shawn Thayer of H&R Block told us, "We have a handful of legacy applications that will never move into a DevOps model."[6] For legacy systems or enterprise applications that require little updating, avoid overspending and overengineering. Instead, outsource to a managed services provider (MSP) if you can afford it and look to software-as-a-service (SaaS) if necessary.

No. 2: Infrastructure Will Turn To Product-Team Thinking

To develop a user-level feature, a product team (six to eight people, rarely more) might have a designer, front-end and back-end developers, testers, and even some basic infrastructure expertise. But what about complex infrastructure? The I&O organization has much to learn from product-team thinking.

› **Start embracing product-team thinking.** Just because the user-facing teams know a little IaC doesn't mean that I&O goes away. There's still a variety of critical platforms requiring ongoing care and feeding: networking, monitoring, storage, continuous delivery, and cloud providers (what parts of Amazon are fit-for-purpose in your organization?) Such platforms require automated, self-provisioning interfaces and even consultative services when other teams need assistance with harder questions. There's lots here for the I&O pro to do!

"I was previously at a major US retailer where we pivoted the I&O organization to a product-team model, allowing us to cut our service-level agreement (SLA) times in half and provide services to development teams at a much higher rate of delight. As a result, our internal customers would proactively choose to come to our team for services rather than building their own."[7] (Yasmin Rajabi, product manager, Puppet)

› **Stop hiding behind queues.** Ticketing systems damage company culture and team productivity. These first-come-first-served interfaces are clunky and antiquated, creating unnecessary barriers and checkpoints in what otherwise might be a seamless workflow. Move toward automating infrastructure provisioning, change and incident management, the network operations center (NOC), and service desk onboarding. Lean on automation and APIs to make this a reality.[8]

No. 3: Site Reliability Engineering (SRE) Will Become A Foundation For Resiliency

Digital-first companies are increasingly adopting SRE models and principles to ensure resiliency within a build/run product-team model.[9] Site reliability engineers can manage an increasingly complex technology stack, improve managed services, ensure that they meet business obligations, and provide the documentation necessary for smooth operations.

› **Start implementing SRE.** SRE involves a comprehensive set of tenets that vary in their applicability to individual organizations.[10] Many of these tenets, however, are universally beneficial to companies looking to maximize robust momentum in software delivery. Reflect on your business goals and your software development lifecycle to locate areas where SRE can be beneficial. In particular, you'll need to decide whether you want a consultative SRE team, an embedded community, or a next-generation operations team that still accepts production turnover.

› **Stop tolerating repetitive toil.** I&O managers have (sometimes) been ambivalent about their teams spending time scripting. Google flips this and tells its teams, "We want you to spend half your time automating."[11] Computer operations and software engineering are therefore converging.

No. 4: A More Collaborative NOC Will Emerge To Ensure Availability With Product Teams

The days of the I&O pro as professional gatekeeper are over. I&O should no longer have a "private property" sign in front of production infrastructure. Prohibiting developers (who have the best understanding of the system) from seeing the production environment is an outdated and poor practice. Change your state of mind when it comes to collaboration.

› **Start supporting the cross-functional product team.** The principle of build/run is reducing the need for fulltime operations staff staring at screens in the NOC. Instead, day-to-day availability is a partnership between the product and platform teams. Developers are on call, which is a powerful incentive for them to create stable, operable systems.

› **Maintain orienting the NOC and the help desk to outcomes.** But what happens when you can't easily localize an outage to a particular team? You still need overall monitoring of outcomes: service, platform, and channel availability at the highest level, as evidenced by event management and the flow of incoming calls to the service desk. Someone must handle triage and routing and ensure that the right people are notified of issues as soon as possible. Automation will help, but it will never completely replace the people with these responsibilities.

No. 5: Process Thinking Will Take Hold In Operations

Process is at the heart of every organization, for better or worse. Process is a powerful tool that you can use to empower — or to overmanage and complicate. Amazon CEO Jeff Bezos called out the danger of "process as proxy" in his 2017 letter to shareholders:
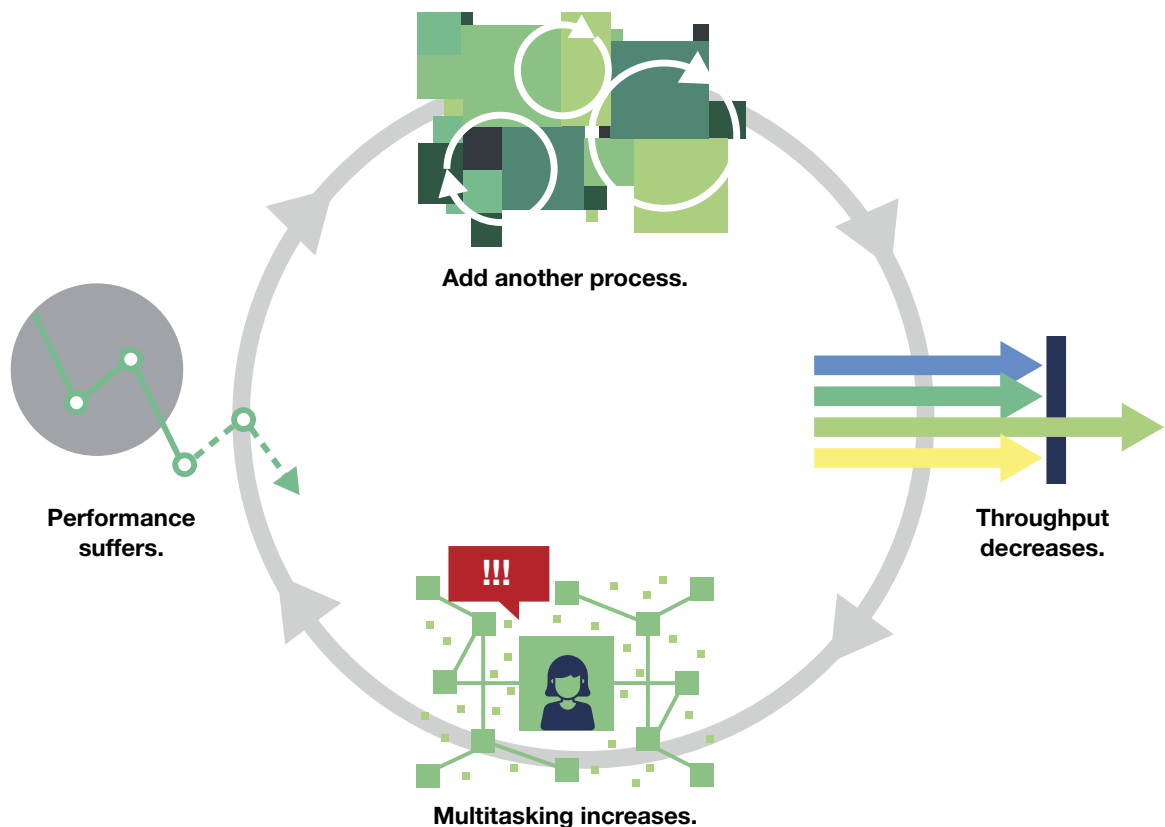
"Good process serves you so you can serve customers. But if you're not watchful, the process can become the thing. This can happen very easily in large organizations. The process becomes the proxy for the result you want. You stop looking at outcomes and just make sure you're doing the process right. Gulp. [. . .] It's always worth asking, do we own the process, or does the process own us?"[12]

› **Start limiting work in process (WIP).** Lean Thinking is one of the most important philosophies for digital managers to embrace. Lean insists that WIP is waste, and this (critically) applies to invisible as well as visible work in process. Invisible work in process includes tickets, requests, and requirements — the day-to-day work of the I&O pro. Kanban is a well-accepted framework that focuses on limiting WIP.[13]

› **Stop accepting too much WIP and too many processes.** Processes are power tools that can too easily destroy value. Work stuck in processes leads to multitasking (as people want to be busy), which leads to poor results, which can lead to more processes (as misguided compensating controls) (see Figure 2). Avoid this vicious cycle at all costs. ITIL, in its influential earlier version 3, called for 26 discrete processes, but companies that attempted to implement such a complex IT operating model consistently failed, leading to industry skepticism of ITIL.[14]

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FIGURE 2 The Process Vicious Cycle

The process vicious cycle

Add another process.

Throughput decreases.

Multitasking increases.

Performance suffers.

No. 6: Incident Management Practices Will Take On Greater Importance

As digital services become more integral to critical human services, the management and remediation of incidents should be top of mind for organizations looking to maintain public trust and brand value. Hang onto your control tower but with some behavioral modifications.

› **Start looking for wisdom outside of IT.** IT isn't an island unto itself. Domains such as fire, safety, and military have been accountable for high-stakes incident response for decades. Take advantage of what they've learned and study the culture, disciple, and procedures typical of these safety sciences. Resilience engineering is an emerging topic.[15] Integrating these behaviors and practices appropriately will improve alerting, escalation, and collaboration in your organization

› **Stop playing the blame game.** While this point may seem obvious, it's often overlooked or unrealized. Finger pointing can lead to delays in finding and remediating actual problems. It can also completely obscure underlying systemic problems. Recognizing that incidents in complex systems often have a multitude of causes is key to an effective incident management strategy. Adopt blameless postmortems (AKA "retrospectives," a less morbid term) to improve culture and accelerate remediation.

No. 7: Change Management Will Remain Critical But Become Leaner

The value of change management in the organization remains intact. Having a cohesive practice to ensure auditability, coordination, and a quantified risk management function will be foundational for years to come. Concentrate on preserving this strong sense of coordination while incorporating leaner, more modern change management behaviors.

› **Stop relying on the change approval board (CAB).** Consider dialing back, or even discontinuing, the CAB as a formalized, scheduled meeting. Data from the "State of DevOps" report has shown for years that external review and approval of all changes negatively correlates with organizational performance.[16] Start delegating change approvals to the product teams, allowing them to work out dependencies with other product teams. In at least one case, a large company downsized the CAB to the point that it no longer needed its own meeting. Instead, it became a standing agenda topic on a larger "scrum of scrums" coordination meeting, where members could discuss large-scale changes and assign actions. CSG, a billing service provider for Comcast and other large companies, recently noted that it has discontinued its CAB.[17]

› **Maintain using change management as a practice and process.** Keep logging change records, preferably in as automated a fashion as possible. Many organizations, for example, have integrated DevOps pipelines with ITSM tools such as BMC Helix or ServiceNow to automatically create change records as part of automated deployments. Powerful analytics, such as those provided by Micro Focus SMAX, can flag particularly risky changes that may still merit human discussion. Target uses a concept of "change credit rating" to reward teams that consistently deliver stable systems and successful changes; the higher the score, the less the likelihood of external review.[18]

No. 8: Configuration Management Will Undergo A Major Reimagining

The sun has set on manual management of infrastructure. IaC and immutable containers are eating the I&O world, and automation is accelerating to keep up. While these new configuration management approaches do minimize toil, the risks of configuration drift and compliance violations are still very real.[19] You need a comprehensively reimagined approach to configuration management.

› **Continue managing the information requirements of your digital pipeline.** Any large-scale activity produces and consumes information; it's a basic law of organizational physics. You need to track inventories (hardware, software, and services), dependencies, artifacts, and state.[20]

› **Start rethinking CMDB.** A centralized database can't do it all, and even a "federated" configuration management system (ITIL's recommendation) needs to integrate a wide variety of sources. Ultimately, evolve CMDB into a digital pipeline information fabric (see Figure 3). Base this architecture on the fundamental distinction between service, software, and element configuration management. It must integrate event and log management, as well as application performance management, in a more holistic and comprehensive way.

FIGURE 3 Beyond CMDB, Base Your Digital Pipeline On An Information Fabric

Digital pipeline information management capabilities
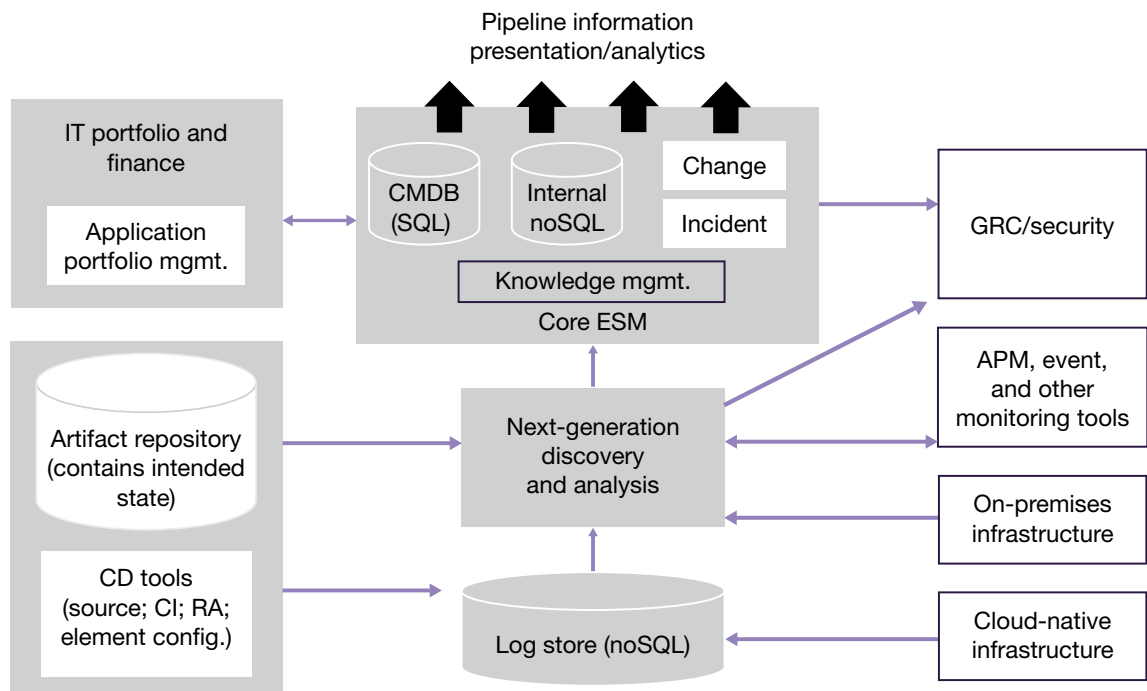
Note: This is assuming an integrated architecture suitable for a mixed environment with both cloud-native and legacy infrastructure.

No. 9: Enterprise Service Management Will Extend To Business-Centric Use Cases

Organizations able to deliver a wide range of services both internally and externally will be in the best position to thrive in the coming years. Forrester defines enterprise service management (ESM) as:

Extending IT service management capabilities beyond technology services to address business-centric use cases; managing service demand and supply through a common platform, portal, and service catalog; and speeding up innovation and workflow automation through PaaS/low-code development tooling.

› **Start embracing and expanding ESM.** As I&O organizations have come to understand the shortcomings of ITSM, ESM has stepped in as its worthwhile successor.[21] Build on ITSM to create an effective ESM platform, and don't limit its application to IT. Extend ESM into HR, finance, research contracts, communications, and wherever else you can improve services for internal and external customers. Of 43 reference customers that Forrester interviewed for our recent ESM research, close to 80% were using their ITSM tool for non-IT workflows, with an average of 50% of non-IT usage.[22]

› **Maintain investing in the service catalog.** This traditional outcome of service management is still very relevant in the DevOps world. The service catalog provides a unified place that exposes all the enterprise's resources, enabling end users to discover the valuable services available to them as participants in the enterprise. A well-maintained service catalog has the ability to improve provisioning, save costs, encourage IT productivity, and even improve employee experience.[23]

No. 10: Siloed Efficiency Metrics Will Take A Back Seat

Individual efficiency doesn't mean collective effectiveness. Hyperfocusing on efficiency in siloed areas leads to systemwide ineffectiveness; well-meaning tunnel vision will cost the organization in time and resources. I&O leaders need to change the way they think about their day-to-day work.

› **Start targeting systemwide efficiency.** It's easy to become sentimental about the particular services you're working with. Move from an obsession with siloed efficiency to an obsession with "flow," the marriage of efficiency and effectiveness within a systems perspective.

› **Maintain tracking KPI's/business objective metrics.** While a focus on efficiency metrics alone can obscure spending and hide potential areas of growth, KPIs that align to real business objectives and key results are essential to realizing the full value of I&O.

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Endnotes

[1] See the Forrester report "Scaling Agile: Can The Spotify Approach Work For You?"

[2] See the Forrester report "Digital Transformation Requires Development Transformation."

[3] See the Forrester report "Update Your I&O Operating Model With Product Team Principles."

[4] See the Forrester report "Scaling Agile: Can The Spotify Approach Work For You?."

[5] Source: Stephen Orban, "Enterprise DevOps: Why You Should Run What You Build," Medium, September 1, 2015 (https://medium.com/aws-enterprise-collection/part-3-in-the-enterprise-devops-series-why-you-should-run-what-you-build-c62f0990f4c3).

[6] Source: Forrester interview with Shawn Thayer, H&R Block, August 2019.

[7] Source: Forrester interview with Yasmin Rajabi, product manager, Puppet, July 1, 2019.

[8] Source: Charles Betz, "Product Teams For Infrastructure And Operations," Forrester Blogs, August 21, 2019 (https://go.forrester.com/blogs/product-thinking-not-just-for-developers/).

[9] Source: Niall Richard Murphy, Betsy Beyer, Chris Jones, and Jennifer Petoff, Site Reliability Engineering: How Google Runs Production Systems, O'Reilly Media, 2016.

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[11] Forrester interview with Google, April 2019.

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[14] Forrester clients have reported multiple reinforcing accounts of disastrous ITIL-based IT operating model initiatives, driven by large global systems integrators, between 2010 and 2015.

[15] See the Forrester report "The Changing Landscape Of IT Incident And Crisis Management."

[16] Source: Dr. Nicole Forsgren, Jez Humble, and Gene Kim, "Accelerate: State of DevOps," Google Services, 2018 (https://services.google.com/fh/files/misc/state-of-devops-2018.pdf) and Dr. Nicole Forsgren, Dr. Dustin Smith, Jez Humble, and Jessie Frazelle, "Accelerate: State of DevOps 2019," Google Services (https://services.google.com/fh/files/misc/state-of-devops-2019.pdf).

[17] Source: @ScottPrugh Twitter account, September 18, 2019.

[18] Source: "Service Management World Announces 2018 Program Featuring Sessions from Target, Chick-fil-A, Time Warner & More," GlobeNewswire, July 25, 2018 (https://www.globenewswire.com/news-release/2018/07/25/1541926/0/en/Service-Management-World-Announces-2018-Program-Featuring-Sessions-from-Target-Chick-fil-A-Time-Warner-More.html).

[19] See the Forrester report "The Forrester Wave™: Configuration Management Software For Infrastructure Automation, Q4 2018."

[20] See the Forrester report "Refine Configuration Management And CMDB For The Modern Digital Organization."

[21] See the Forrester report "Now Tech: Enterprise Service Management, Q3 2019."

[22] Source: Forrester interviews with Forrester Wave reference customers. See the Forrester report "The Forrester Wave™: Enterprise Service Management, Q4 2019."

[23] Source: Adam Shearin, "5 Reasons Why You Need A Service Catalog," Solarwinds Service Desk Blog, December 1, 2016 (https://blog.samanage.com/it-service-management/5-reasons-why-you-need-a-service-catalog/). See the Forrester report "Shift To Enterprise Service Management To Improve The Employee Experience."

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