

DevOps Pulse 2022: Observability Trends and Challenges

Microservices, Kubernetes and Tool Sprawl Hinder DevOps Progress, as MTTR Grows



REPORT BRIEF

What is the DevOps Pulse?

The DevOps Pulse Survey and Report are based on Logz.io's annual analysis of the DevOps industry highlighting key trends, challenges and intricacies faced by the organizations and individuals working to advance related practices on a daily basis.

With this year's spotlight on production issue resolution, observability expansion and related organizational challenges, the report offers direct insight into the manner in which over 1000 engineers are striving for more effective visibility into their cloud environments to optimize and accelerate performance.

Who is Logz.io?

Logz.io delivers a SaaS-based observability and security analytics platform that provides full visibility into modern cloud infrastructure and applications. Customers can unify their logs, metrics, and traces with open source data collection to avoid vendor lock-in, while taking control of their noisy data to reduce costs and MTTR.

DevOps **pulse**





OVERVIEW

2021 DevOps Pulse Survey

Based on over 1000 survey responses culled over the final months of 2021, the DevOps Pulse 2022 survey strongly reinforces multiple trends spanning the four previous iterations of the report, while highlighting numerous challenges and emerging strategies.

Underlining the continued march toward pervasive use of cloud applications and infrastructure among organizations of all sizes—as outlined in previous years—a majority of 2021 Pulse Survey respondents indicated that their DevOps practices continue to mature quickly, driven in part by the growing realization of their cloud migration plans. Further, as modern observability capabilities rise to the occasion in support of these efforts, most respondents indicated that they are well along in their respective journeys around the adoption and use of these technologies.

However, increasing cloud and DevOps maturity, along with broader adoption of observability, has not arrived without lingering challenges.

Notably, respondents consistently reported increasing complexity across their cloud environments. This is being driven by everything from expanding microservices architecture to the proliferation and complexity of observability tools themselves. As a result, many organizations are struggling to maintain clear visibility, quickly resolve production issues, and manage related monitoring costs.



EXECUTIVE SUMMARY

Troublesome Trends - Increased Complexity, Slower MTTR

Mean Time to Recovery, or the average time it takes to recover from a product or system failure, is arguably the most critical metric that today's DevOps teams use to measure their ability to successfully operate and support their cloud applications. Reducing MTTR—as it is widely known—has in this regard become the Holy Grail for most DevOps organizations.

Yet, in 2021, roughly 64% percent of DevOps Pulse survey respondents reported that their MTTR during production incidents was over an hour, compared to only 47% in the previous year's report.

That this alarming trend manifested even as greater numbers of respondents reported that their cloud, DevOps and observability strategies have matured, underlines a range of related issues surfaced in other areas of the latest research. These findings include:



Observability tool sprawl persists: with 90% using multiple tools, 66% using at least 2-4 observability systems and roughly 24% employing anywhere from 5 to 10. In 2020, roughly 20% were using only 1 tool, with only 10% using over 5.



Monitoring Kubernetes and microservices remains difficult: with over 52% of respondents citing Kubernetes, microservices and serverless among their primary challenges in gaining observability into their cloud environments.



Distributed Tracing remains nascent: while adoption of Log Management (67%) and Infrastructure Monitoring (59%) is now relatively high, only 27% of respondents report that they have deployed this critical observability component.



Security responsibilities and concerns loom large: as 50% of respondents indicated they now bear primary responsibility for infrastructure and application security and roughly 36% cite data security as a primary observability challenge.



Cost is increasingly having an impact: some 88% of respondents indicated they are evolving observability practices related to cost, with 62% seeking to collect less data and/or adapt their data management practices as a result.

SECTION 1 Charting DevOps and Cloud Maturity

Given the growing emphasis on digital business and the cloud, supported by DevOps, it comes as little surprise that most DevOps Pulse respondents note continued progress in their efforts to adopt and mature these methodologies. Meanwhile, organizations continue to expand their breadth of specific DevOps practices, supported by a wide range of cloud infrastructure. According to the 2021 DevOps Pulse Survey:

Most cloud journeys are well underway: with 44% of respondents now "fully migrated" and running everything in the cloud and another 34% at least partially migrated, only 11% remain in the planning stage, and another 11% not started.



- DevOps journeys are also largely executed: as 39% report that they are fully adopted in embracing DevOps in everything they do, and another 38% partially adopted. Some 15% remain in the planning stage, with less than 9% yet begun.
- DevOps practices abound: given the option to indicate the domains in which they are practicing DevOps, roughly 72% cited that they've implemented CI/CD, with 64% building out automation. Some 57% are using infrastructure as code and 54% are using microservices architecture and containerization. Automated process/workflow orchestration, advanced services and infrastructure monitoring, and continuous configuration management each scored over 40%, as well.
- AWS (72%), Google Cloud (36%) and Azure (29%) all remain widely used.

SECTION 2

Observability Practices and Challenges Expand

As organizations progress their Cloud and DevOps journeys, the DevOps Pulse Survey highlights a growing appetite for Observability platforms—typically defined as consolidating log, metric and trace data, increasingly complemented by security data—to ensure detailed, real-time visibility into their cloud applications and infrastructure.

However, while observability tooling and practices continue to proliferate, survey respondents also communicate a range of challenges specific to more advanced forms of related monitoring—in particular focused on matters of tracing, and in developing visibility into Kubernetes, microservices, serverless, and cloud native architecture.

SECTION 2A

Positives: Observability Continues Expansion

Continued expansion across observability practices and tooling is evident in the 2021 DevOps Pulse Survey, and further underlined by direct comparison to the 2020 iteration of the research. Among the results that clearly articulate the increased reach of observability among DevOps practitioners, are findings including:

• **Observability is clearly maturing:** when asked to indicate how extensive and mature their observability program/strategy has become on a scale of 1-5, over 77% of respondents rated their efforts over 3, with 23% awarding a 4 and 7% ranking themselves as 5, or "extremely high". In the previous year's survey, over 30% of respondents indicated a low score of 2 or under.

How extensive and mature respondents observability program/strategy has become on a scale of 1-5



of respondents rated their efforts over 3

- **Tools are further diversifying:** this year's survey responses highlighted the full range of observability tools in use by practitioners including log management and analysis (67%), and infrastructure monitoring (59%), followed somewhat behind by distributed tracing (27%) and APM (22%). Meanwhile some 21% said that they have deployed all of these capabilities.
- Tracing is gaining greater mindshare: hunger for distributed tracing is growing. Used to monitor complex microservices architectures—the leading challenge of observability practices according to this survey—a massive 80% of respondents selected 3 or higher when asked to rank the importance of distributed tracing to their observability strategy on a 1-5 scale. This is compared to 68% who ranked it 3 or higher last year. Further, in the 2020 survey, 32% of respondents said they had no plans to invest in distributed tracing. This year, that number fell to 25%.
- Planned deployment of tracing is also growing: compared to the 2020 survey, more organizations that have not yet deployed tracing have immediate plans to do so. While 65% of such respondents reported plans to deploy tracing in the next 1-3 years in 2020, in 2021 that number grew to over 75%.
- **Popular frameworks abound:** when queried about the monitoring and observability frameworks they are using, respondents indicated a long list highlighted by well known open source projects (Grafana, Prometheus and ELK, for example), as well as cloud services (AWS CloudWatch, Azure Monitor, etc.).

SECTION 2B

Challenges: Tool Sprawl, Kubernetes and MTTR

In the arena of common observability challenges, DevOps Pulse respondents touted a number of pervasive issues across an array of potential obstacles, ranging from the proliferation of numerous observability tools, monitoring of Kubernetes and microservices, and the aforementioned issues in reducing MTTR.

Reflecting the many hurdles that organizations must overcome as they continue to drive observability practices forward were key challenges including:

• **Persistent observability tool sprawl:** in last year's survey, only 11% of respondents indicated their organization used 5 or more observability tools. This year, that number jumped to 24%, a palpable increase. With 66% using at least 2 tools and over 5% using more than 10, this trend bears watching.

Monitoring of Kubernetes, microservices, serverless, and cloud native architecture was highlighted by 52% of Pulse respondents as their main challenge in gaining observability into their cloud environments.



- Kubernetes and microservices remain hurdles: despite over 63% of respondents indicating that they have to some extent implemented Kubernetes container orchestration in production, and only 23% reporting no plans to do so, monitoring of Kubernetes, microservices, serverless, and cloud native architecture was highlighted by 52% of Pulse respondents as their main challenge in gaining observability into their cloud environments.
- **Kubernetes poses a diverse set of challenges:** when asked to highlight which specific difficulties pose the greatest obstacles when running Kubernetes in production, respondents cited a litany of related issues including security (34%), monitoring and troubleshooting 31%), networking (30%) and cluster management (27%), among others.
- MTTR times have increased markedly in the last year: one of the most interesting and troubling findings is that the mean time to resolve production issues is growing longer. Last year, 53.4% of people said they resolved production issues within an hour on average. This year, that number dropped to 35.94%.

SECTION 2C

Observability Data Volumes and Costs are Under Growing Scrutiny

As observability practices and implementations expand, organizations are clearly becoming more concerned about the impact of related data volumes on both the efficiency and cost of their efforts. These issues were underlined by practitioners' responses to the 2021 survey related to charting both their most significant observability challenges, and perceptions on total cost of ownership, including:

• Observability costs and data volumes are growing concerns: with some 27% of respondents ranking total cost of ownership (TCO) and the large volumes of data being ingested into the tools among their main challenges in maintaining effective observability into the cloud.



 Lacking visibility into observability costs also persists: as 43% of respondents indicated that efforts to increase visibility into observability costs has become a primary goal —suggesting many organizations are struggling to do so in the face of spiraling data volumes and popular vendor pricing models.

SECTION 3

Organizational Observability Trends Take Shape

Beyond general observability trends and challenges, continued evolution of organizational best practices related to use of the involved systems and data continued to play out in the 2021 DevOps Pulse Survey. As practitioners advance their processes regarding monitoring responsibilities and oversight of observability tooling, the research highlights key management trends including:

• Dev and Ops continue to split the work: mirroring results from last year's Pulse Report, most organizations have tasked dedicated DevOps teams with ensuring observability (34%), while some still spread the work across developers (28%) and operations (20%), as well as SREs (17%). Among all the findings of the 2021 survey, these results changed perhaps the least compared to the previous year, outlining general stability in these practices.

- A shared services model is growing in popularity: despite this consistency in day-to-day observability oversight, a vast majority of respondents—roughly 85%—indicated that their organizations operate using a shared services observability model in which a central team is responsible for implementing and maintaining tooling for other stakeholders such as app developers, SREs and DevOps teams.
- Shared services has numerous desired benefits: those organizations using a shared services model noted a wide range of reasons for adopting the practice across benefits including providing a consistent platform across individual teams (47%), sharing relevant data across multiple teams (45%), the ability to roll up monitoring results centrally (44%), cost efficiency across the organization (37%) and the ability to enforce guardrails for compliance (24%).

Top reasons respondents adopted a shared services model



across individual teams

45% sharing relevant data across multiple teams

44%

ability to roll up monitoring results centrally

37%

cost efficiency across the organization

24%

ability to enforce guardrails for compliance

 General observability knowledge is still maturing: while these organizational trends underline a growing stability and refinement around observability teams and processes, respondents indicated that an observability skills gap remains present across their workforce, with 36% citing lack of knowledge among the team as a primary observability challenge.

SECTION 4

Open Source Remains a Key Observability Enabler

As the DevOps Pulse Report carries into its fifth year of publication, its focus on practitioners' use and advancement of open source tooling as a critical element of their overall observability strategies, continues to be borne out of the survey data. From maintaining a consistent presence among the platforms that organizations are using to facilitate their work, to the fundamental reasoning behind this widespread phenomenon, the latest research pinpoints evolving open source observability trends including:

- **Open source observability tools remain widely adopted:** with 90% of respondents indicating they are utilizing open source capabilities in some capacity, and over 75% reporting that open source accounts for at least 25% of their systems. Almost 40% responded that 50% or more of their tools are open source, with roughly 20% citing that they rely on over 75% open source tooling. 10% of respondents were 100% open source.
- Open source drivers and benefits remain diverse: respondents highlighted a wide range of reasons for turning to open source observability capabilities, including ease of integration (49%), the opportunity to engage in and benefit from the open source community (41%), lower cost of ownership (36%) and general familiarity with the tools (33%). All of these factors indicated some level of increase comparative to the previous year's research.
- Avoiding vendor lock-in grows in perspective: among the drivers for use of open source, one particular statistic changed markedly in the 2021 report, compared to the previous year. In 2021, some 34% of respondents cited the desire to avoid vendor lock-in as a contributing factor to their use of open source, whereas in 2020, only 13% selected that specific benefit.
- Some open source challenges still persist: while ranking well below other issues such as Kubernetes monitoring and the shortage of observability expertise, 36% of survey respondents pointed to issues around the scaling and management of open source monitoring tools as one of their leading cloud observability challenges.

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SECTION 5

An Increasing Focus on Application and Data Security

As observability teams, tools and practices travel down the path toward growing maturity, practitioners clearly highlight an increasing need to maintain related visibility into matters of application and data security, along with emerging threats.

From expanding their role in security based on an increasing emphasis on the cloud, to managing oversight of varied tooling, security issues continue to command an even greater focus of DevOps Pulse respondents across matters including:

- Growing security challenges related to cloud adoption: when asked whether or not going increasingly "cloud native" was impacting security considerations, respondents answered resoundingly "yes" (77%), driving related challenges including centralizing and prioritizing relevant security data (30%), security tool integration (24%) and understanding roles and responsibilities (17%).
- Security responsibility is felt by DevOps teams: the survey shows that respondents clearly consider their teams to be central stakeholders in infrastructure and application security, with 75% indicating they either own or share oversight of these matters, and a full 50% responding that their teams currently lead these efforts.



- Security tooling is diverse, and in-depth: respondents indicated that they are applying a wide range of dedicated security tooling to address these responsibilities, with web application firewalls (39%), firewalls/Intrusion Prevention Systems (22%) and Security Information Event Management (SIEM) systems (19%) leading the way.
- Numerous threats dot the landscape: respondents also alluded to a long list of threats that occupy their focus, led by ransomware (46%), DDoS (41%), access misconfiguration (39%), and insider threats (39%), among others.
- Data security to the forefront: to further contextualize the central role that security oversight is claiming among DevOps teams, data security, in particular, also ranked among the survey's primary observability challenges, landing fourth overall at 33%.

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DEVOPS PULSE 2022

Key Takeaways

Covering a considerable range of topics validated to be centrally important to today's modern DevOps teams and observability practitioners, the 2022 DevOps Pulse Report can be practically applied to advance a number of compelling conclusions. Without question, the latest iteration of the research clearly outlines a growing mindset around widely held requirements and pervasive challenges faced by many of its respondents.

To that end, the 2022 DevOps Pulse Report outlines a number of trends that can be broadly applied to frame the current state of DevOps best practices and further profile the growing observability space around these key assumptions:



Cloud and DevOps practices will continue to evolve quickly as more organizations complete their cloud migrations and advance their DevOps strategies to enable optimized delivery of digital services.



Observability is the increasing source of truth

related to the efforts of DevOps practitioners to centralize and improve their visibility into crucial, contextual matters of cloud applications and infrastructure performance.



Huge observability challenges remain

as organizations seek to onboard "full stack" observability including distributed tracing, and push to gain better insight into increasingly complex, ephemeral microservices, including Kubernetes.



Data volumes and cost have become central concerns

with organizations closely tracking their ability to understand what data is most central to their core observability requirements, and better calculate associated spending and ROI.



Reducing MTTR will only become more difficult

intensified by issues ranging from growing cloud data volumes and systems complexity, observability tool sprawl, and the need for greater expertise among their DevOps teams.



Additional best practices are needed

to address these issues outlined by the report, as well as facilitate the needs of today's shared services teams, while addressing the mandate for data security, backed by flexibility and guardrails.

As the world holds its collective breath in hopes of a slowing pandemic and the potential return to more traditional business conditions, the DevOps Pulse Report would seem to serve as further evidence that, regardless of any impending turnaround, DevOps and Observability are here to stay, no matter the global backdrop.





