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Jon Collins

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DevOps Automation, GitOps, and Kubernetes: The State of Play 2021 v1.0

A GigaOm Research Survey Report

DevOps & Applications, Kubernetes Management

DevOps Automation, GitOps, and Kubernetes: The State of Play 2021

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1. Summary

This research study was produced by GigaOm based on both current and yearly data gathered by CodeFresh in its annual “State of DevOps” survey. Overall, we found:

- Kubernetes is moving to the mainstream—while adoption is continuing to build, Kubernetes has become part of the core strategy for most organizations. This is driven by a need to operate applications at scale.
- GitOps practices are seen as a key element of Kubernetes’ success. GitOps enables organizations to deliver on operational goals while keeping control. Also important is DevSecOps, for similar reasons relating to risk.
- Deployment frequency is increasing yearly, but manual activities continue to create bottlenecks as development processes and deployments increase in complexity. The challenges created by manual activities are similar year on year, suggesting that most automation platforms, while improving, are only keeping pace with the rate of change.

Overall, we see a golden opportunity in moving from deployments that take weeks to deployments that happen within a day. There is no middle ground—get things right and deployments can increase by an order of magnitude. By leveraging GitOps to automate development, forward-thinking organizations can leverage Kubernetes to its full potential, reducing application downtime while elevating developer productivity.

2. Key Findings

2.1 Kubernetes Moving to the Mainstream

A headline result is that the percentage of organizations that were leveraging Kubernetes in some way has doubled in the last year (**Figure 1**). Just over 40% of the survey respondents had already implemented or begun implementing Kubernetes, and only 13% said that they had no intention of ever embracing it. Overall, 54% of respondents saw Kubernetes as a strategic initiative for 2021 (**Figure 2**), followed closely by advanced deployments at 47% and GitOps at 33%.

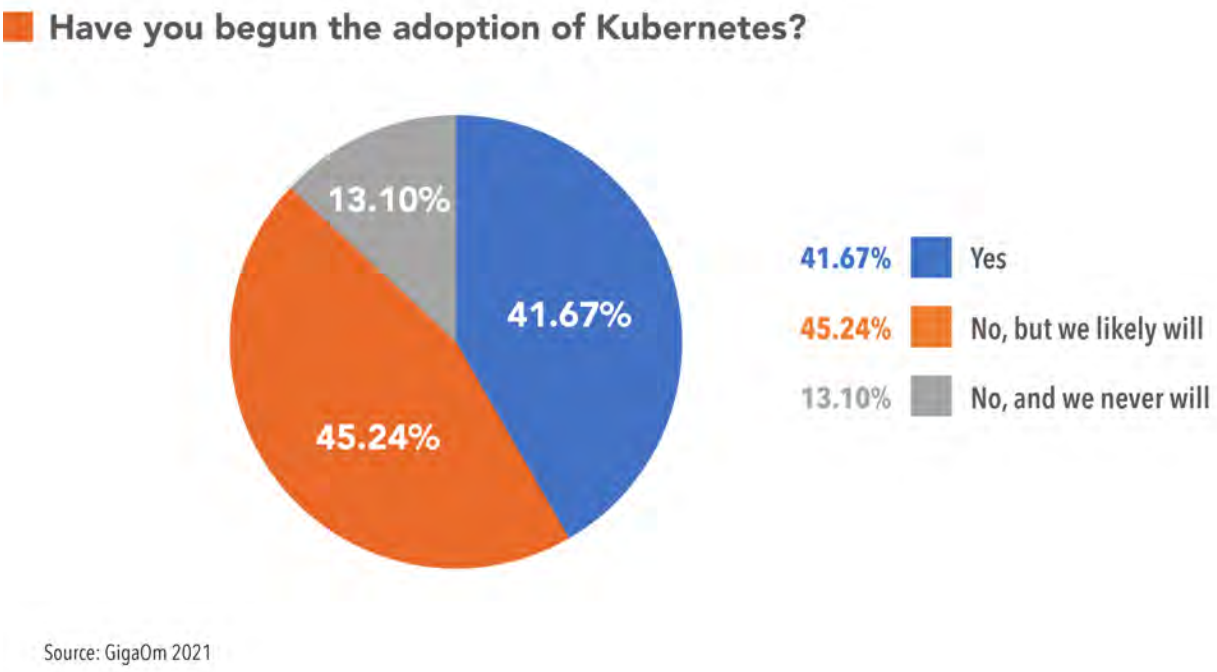

Figure 1. Kubernetes Adoption

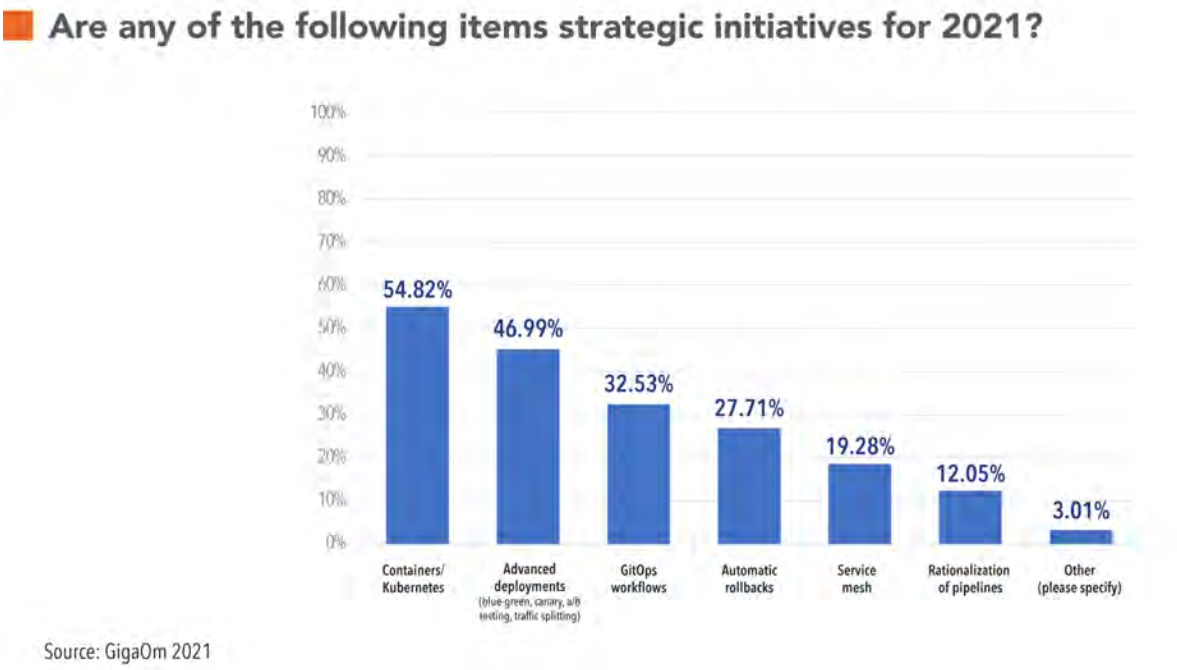

Figure 2. Strategic Initiatives

This strategic ambition is translating into action from organizations on a variety of scales, as shown in **Figure 3**. Thirty-four percent of organizations reported that over half of their new projects were Kubernetes based, with a similar number embracing Kubernetes for 10% or less of their projects. This picture is shifting quickly toward broader Kubernetes adoption (41% and 17% respectively) by the end of 2021, as shown in **Figure 4**. Given that the research (see sample) was based on general DevOps, the adoption of Kubernetes can be seen as an undeniable trend.

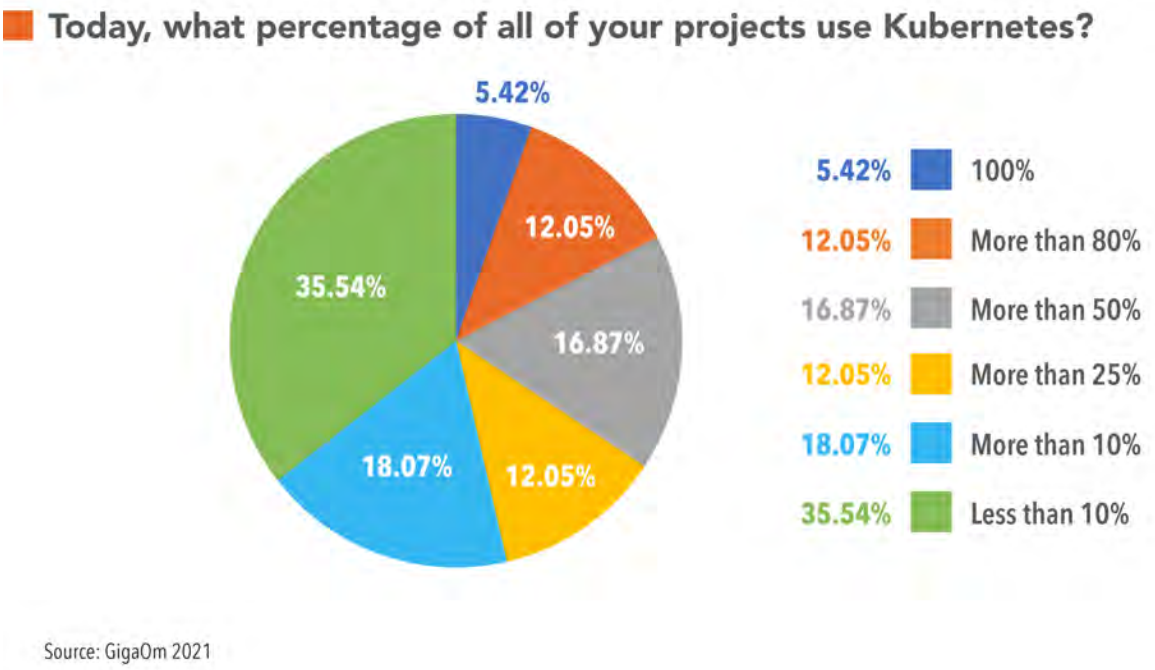

Figure 3. Kubernetes Use Today

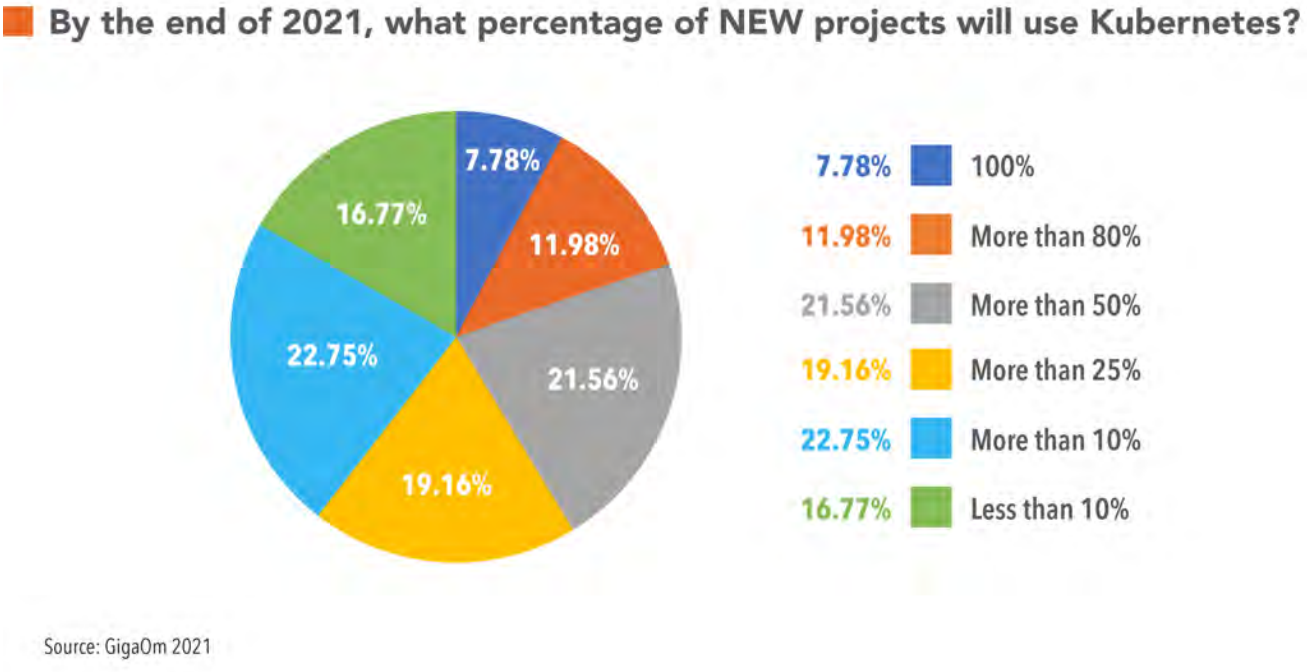

Figure 4. New Projects Using Kubernetes

2.2 Operating at Scale and GitOps Adoption

Driving adoption is the ability to operate at scale—avoiding downtime and scalability are seen as the two leading factors, as shown in **Figure 5**. This in turn is driving high demand for GitOps practices to empower organizations to plan, track, and control these deployments in a way that is consistent and efficient (**Figure 6**).

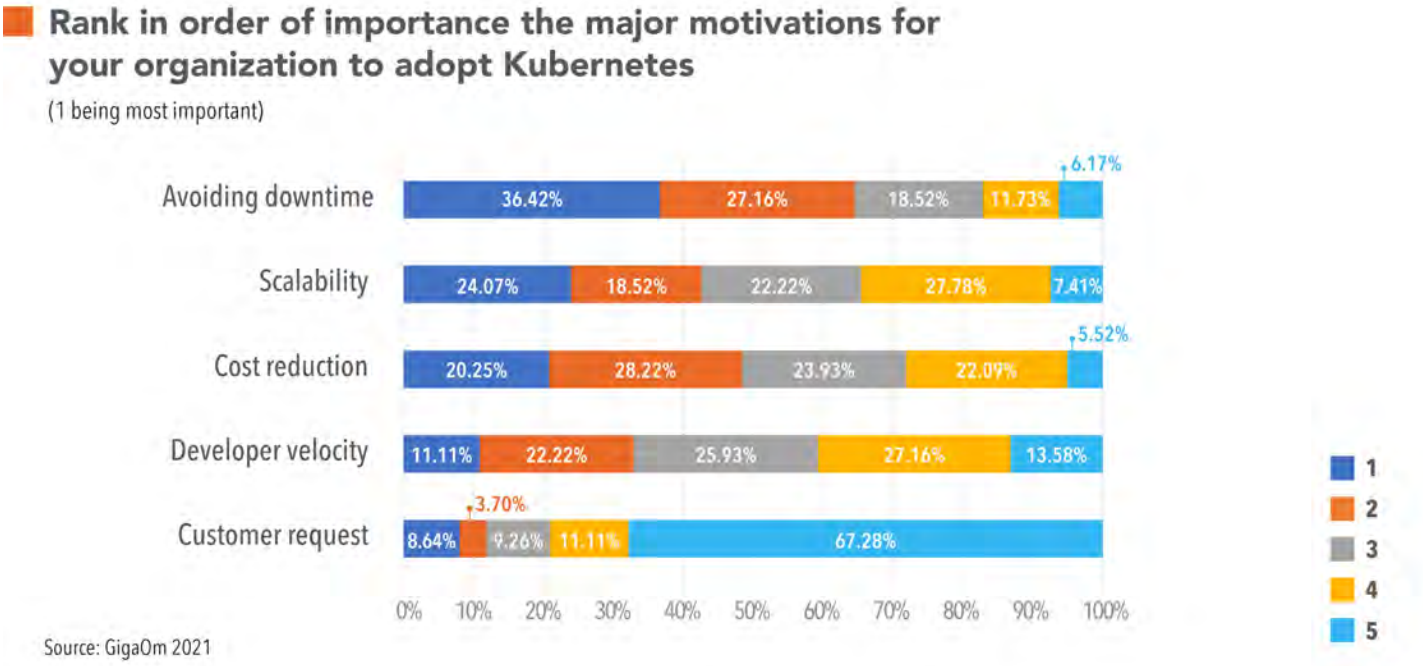

Figure 5. Kubernetes Motivators

Figure 6. Kubernetes Standards and Best Practices

This point is reinforced when we see that a third of respondents selected “infrastructure management” as the tooling and methodology of primary importance, compared to only a quarter that saw a figurative need for cloud-native applications (**Figure 7**). Operations, not “the latest big thing,” is driving these choices.

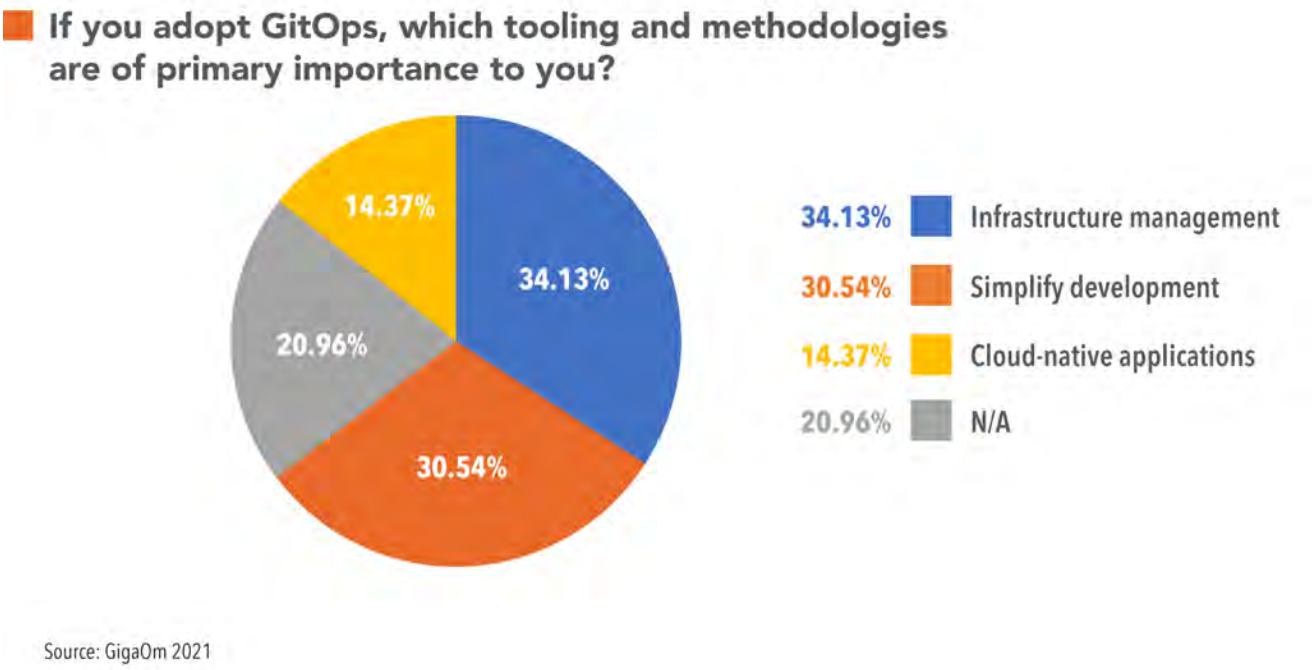

Figure 7. GitOps Tool and Methodology Adoption

Note how organizations are also embracing DevSecOps practices in response to Kubernetes adoption. By leveraging CI/CD tools that empower organizations to integrate security early, applications can be scanned for vulnerabilities, and test suites can be integrated into pipelines, rather than run as an afterthought. The result is better software that creates more safety and stability for end users, with development times, expenditure, and indeed, overall stress, significantly reduced.

2.3 Rising Deployment Frequency and Manual Bottlenecks

Year on year changes to the average deployment frequencies of the organizations surveyed highlighted how far the industry has come. **Figures 8** and **9** reveal that the locus of deployment frequency is now firmly into weekly, away from quarterly (which has dropped from nearly 30% to more than 15% in the past two years). Monthly deployments have likewise dropped. The shift toward multiple deployments per day is accelerating too, with 12% of respondents stating that they now deploy with that frequency.

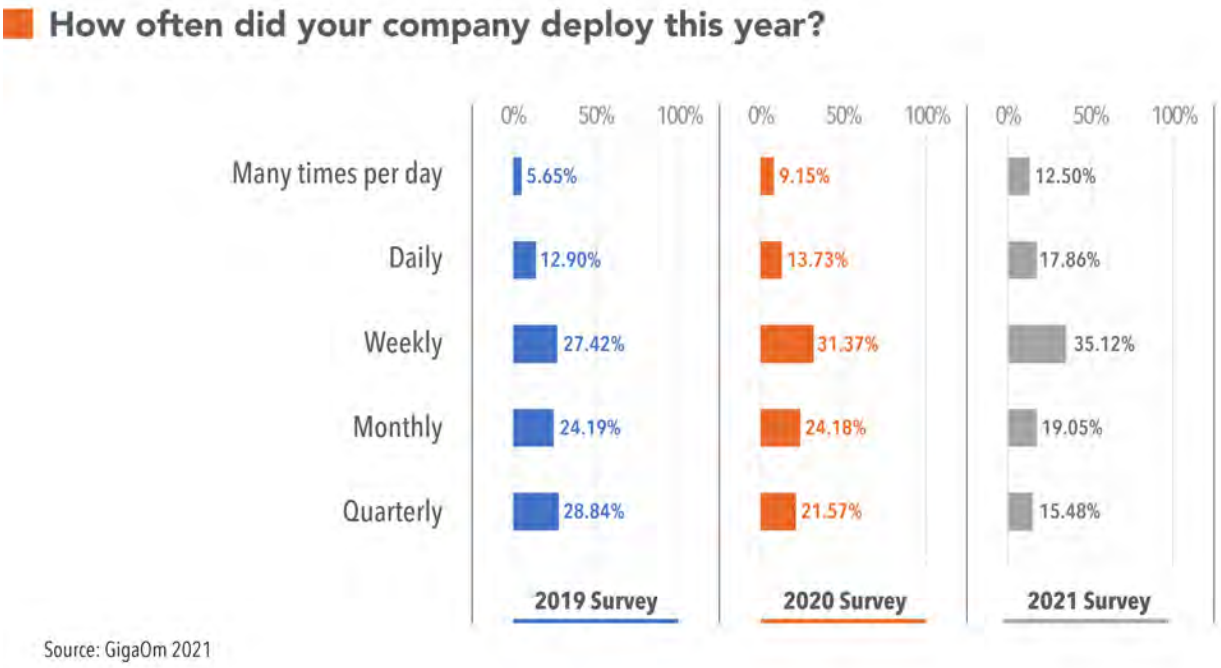

Figure 8. Deployment Frequency Today

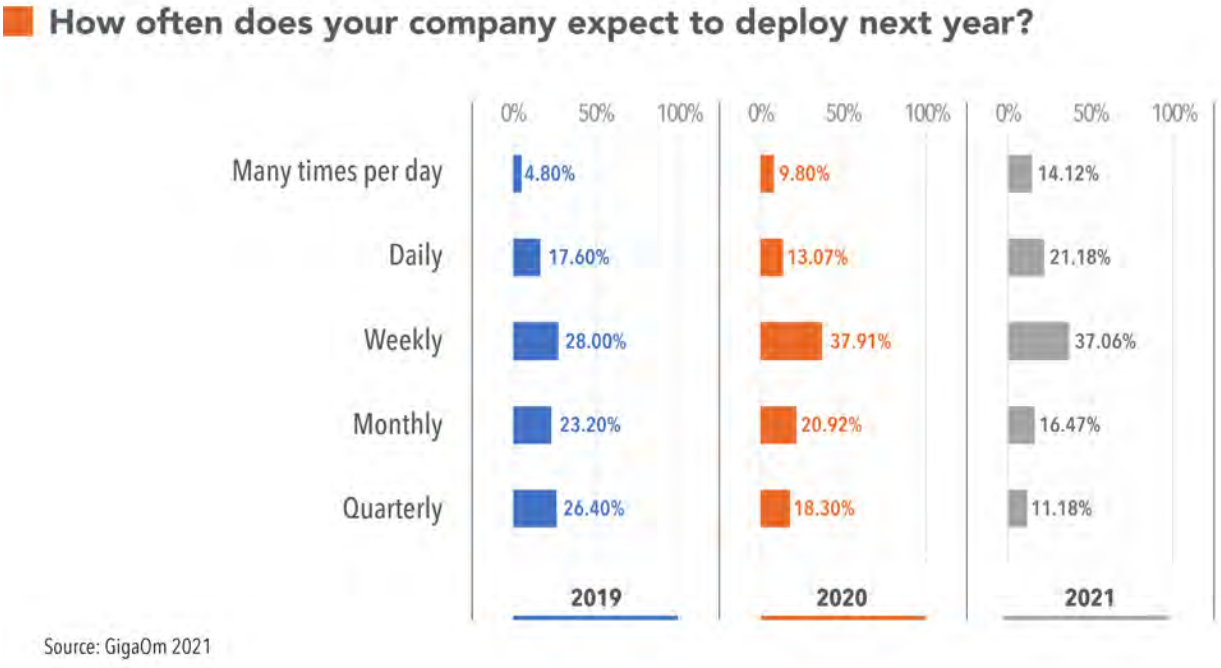

Figure 9. Deployment Frequency Next Year

Looking at the factors that are preventing organizations from deploying with more frequency (**Figure 10**), topping the list are "Too many manual processes" and "Not enough staff"—very much two sides of the same coin. While this may appear initially as a lack of progress, it is missing important context. The increase in the complexity of software being built (and the associated delivery processes), coupled with the greater uptake of automation by organizations (**Figure 11**), shows us that most platforms are simply keeping pace with the evolving challenges of development.

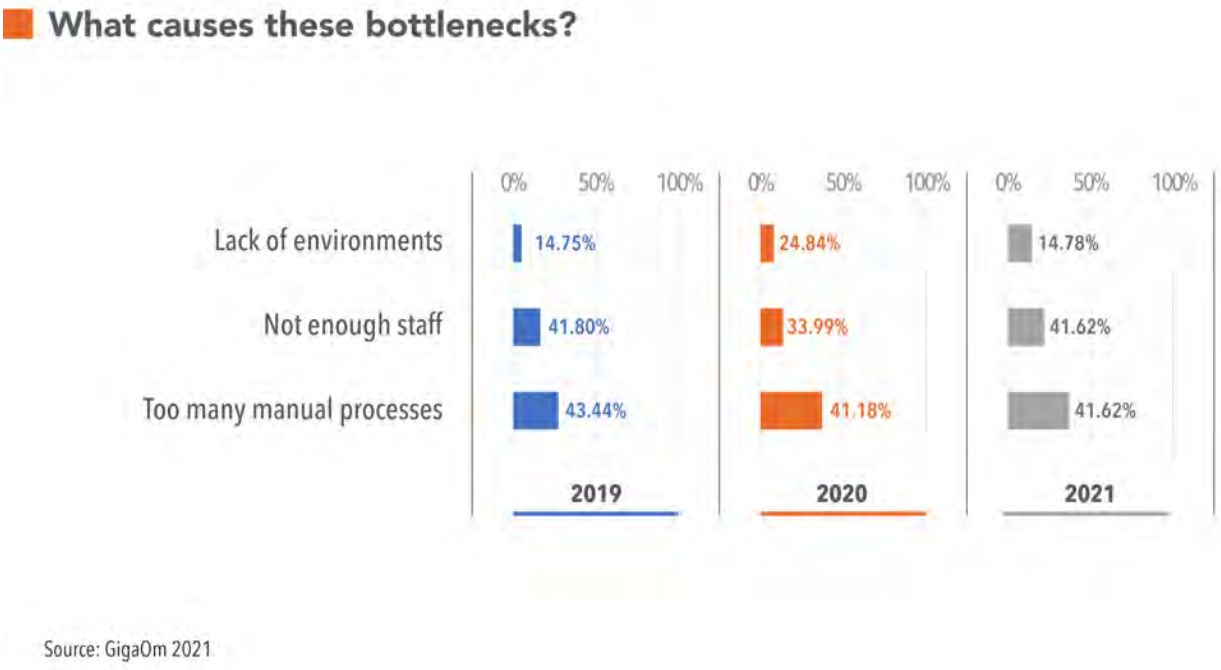

Figure 10. Behind the Bottlenecks

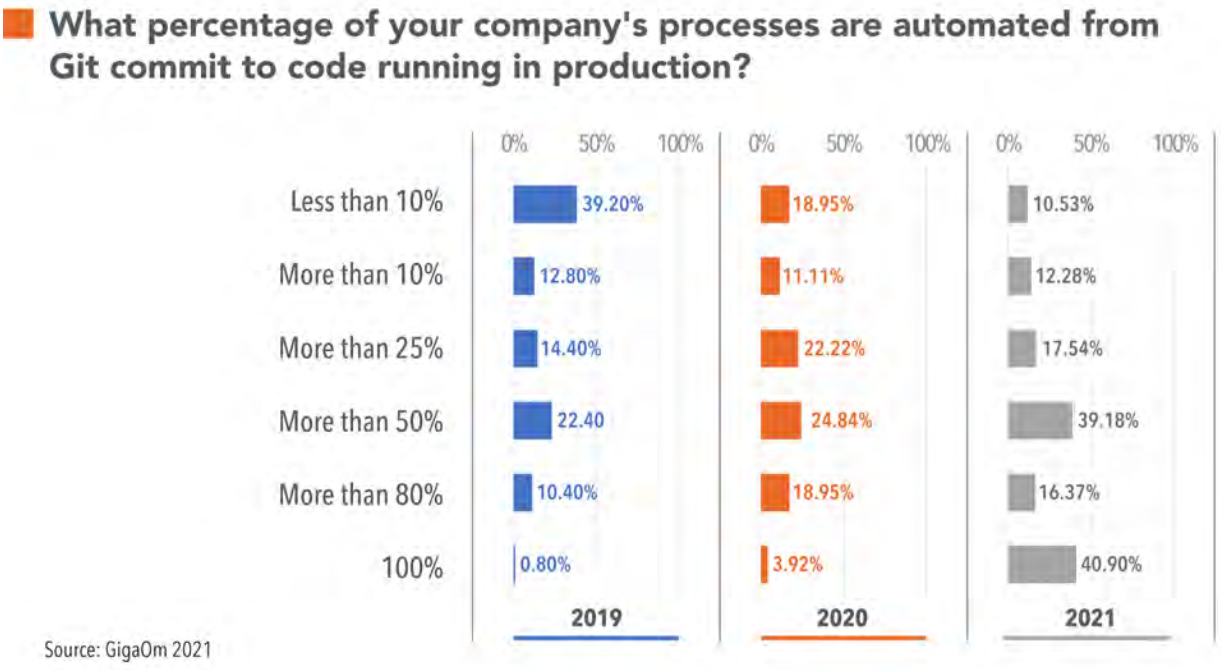

Figure 11. Automated Workflow

By embracing tooling that is built with the intention of managing and simplifying these increasingly intricate development and deployment processes, organizations can relieve the burden of manual processes and empower developers, engineers, and security teams to innovate and create more effectively. **Figure 12** shows where gains can be made.

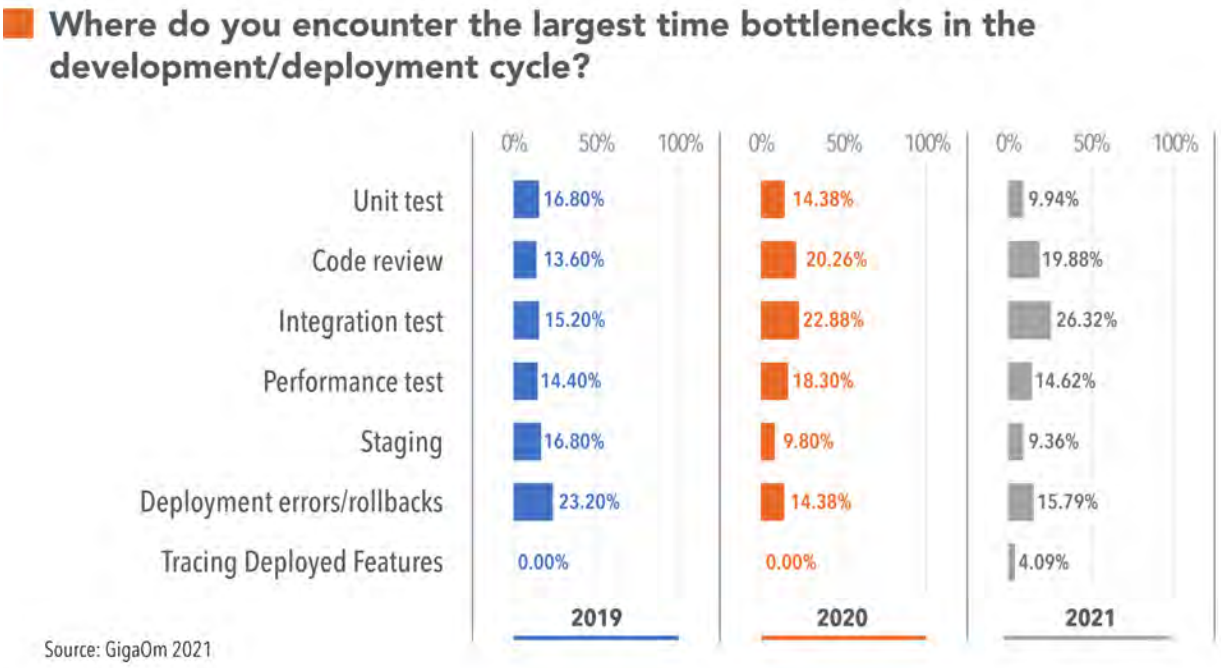

Figure 12. Identifying Bottlenecks

As more organizations fully adopt advanced deployment strategies, such as A/B testing and canary deployments (**Figure 13**), having automated support for these strategies built into the CI/CD platform will be a crucial driver of efficiency and value.

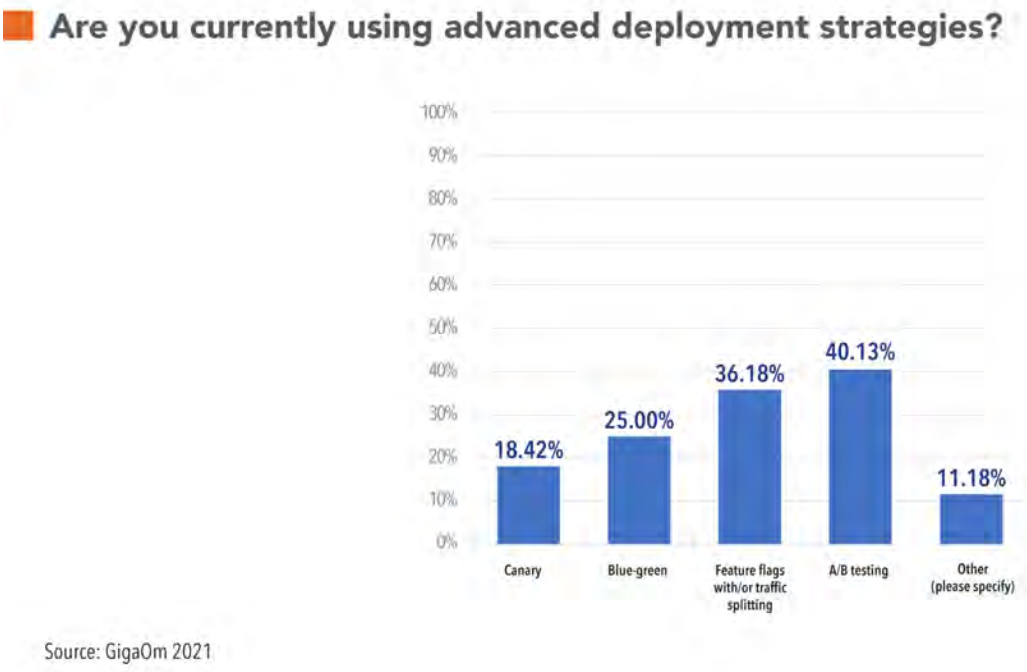

Figure 13. Advanced Deployment Strategies

When we look at the average time from Kubernetes commit to production (**Figure 14**), we see a fundamental split. Most respondents said that their commit-to-production times were either less than 24 hours or more than two weeks—note the conspicuously empty middle ground in software delivery velocity. Either organizations are fully on-board and achieving faster delivery with better automation, or they are not. Tooling, processes, and best practices all need to work in tandem to deliver on this goal.

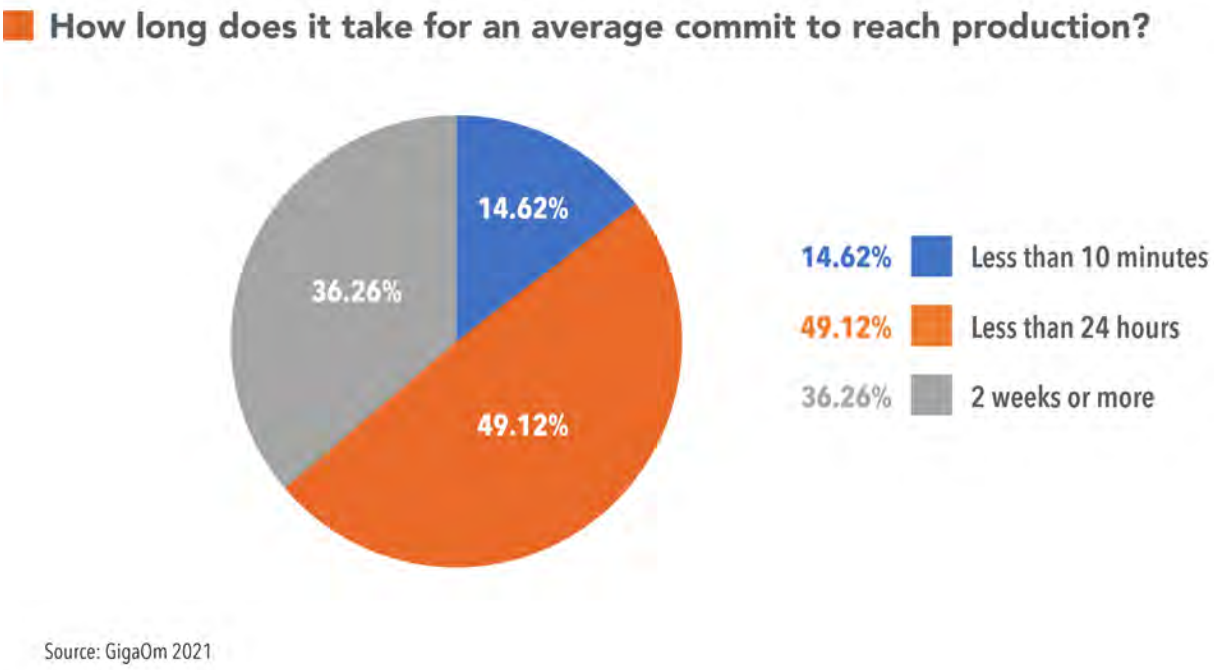

Figure 14. Time from Commit to Production

As the tools to create and manage both the development process and the provisioning of infrastructure already exist and are growing in popularity, the onus is now on organizations to invest in embracing them.

3. Embracing GitOps and Automation to Leverage Kubernetes

As increasing numbers of organizations start to implement Kubernetes for their applications, the stakes become higher in terms of how software is produced and delivered. The core challenge is that of too many manual processes, so having dependable GitOps workflows will give organizations a critical competitive edge.

While the case is clear for both GitOps and automation, our survey showed that there was work to be done in conveying the business case for GitOps and associated tooling. The fact is that new architectures have emerged and developer needs have evolved, outpacing what can be achieved through traditional CI/CD tools. As a facility for developers, it greatly enriches and enhances the development process, driving savings for businesses through improved efficiency.

Research Approach

The research in this report is based on a yearly developer survey run by Codefresh. It targets individual organizations with a series of questions designed to establish the current state of play in the software development landscape, with a particular focus on the implementation of GitOps practices. The survey is not branded or immediately identifiable as originating from Codefresh, to minimize any biases in the results and gather a dataset that is as wide and reflective of the industry as possible.

Developers were surveyed on their working practices, and asked to assess key metrics relating to the organization that they work for (**Figure 15**). Factors such as the number of fully automated processes, the CI/CD platforms that are currently in use, and the time from commit to production for a given deployment are all considered.

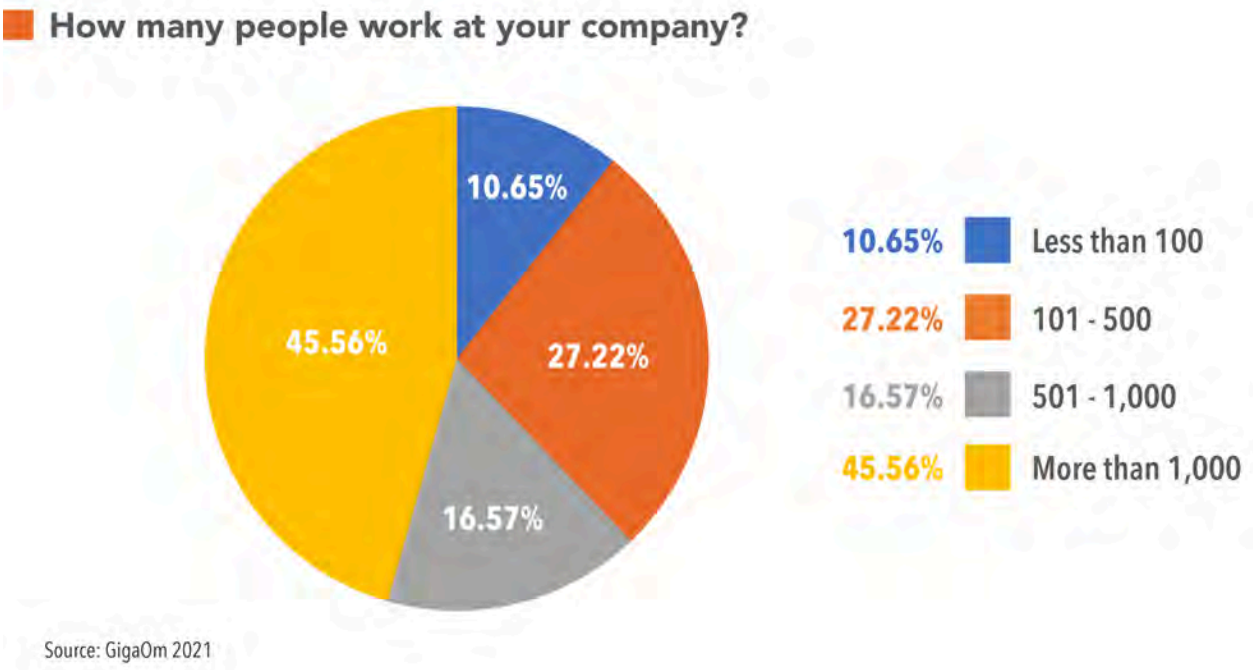

Figure 15. Company Size

This year, GigaOm was invited to analyze and evaluate the data gathered, both on its own merits and against data from previous years.

4. About Jon Collins

Jon Collins has nearly 35 years of experience in IT. He has worked as an industry analyst for a number of years, and has advised some of the world's largest technology companies, including Cisco, EMC, IBM, and Microsoft in product and go-to-market strategy. He has acted as an agile software consultant to a variety of enterprise organizations, advised government departments on IT security and network management, led the development of a mobile healthcare app and successfully managed a rapidly expanding enterprise IT environment. Jon is frequently called on to offer direct and practical advice to support IT and digital transformation initiatives, has served on the editorial board for the BearingPoint Institute thought leadership program, and is currently a columnist for IDG Connect.

Jon wrote the British Computer Society's handbook for security architects and co-authored The Technology Garden, a book offering CIOs clear advice on the principles of sustainable IT delivery.

5. About GigaOm

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GigaOm works directly with enterprises both inside and outside of the IT organization to apply proven research and methodologies designed to avoid pitfalls and roadblocks while balancing risk and innovation. Research methodologies include but are not limited to adoption and benchmarking surveys, use cases, interviews, ROI/TCO, market landscapes, strategic trends, and technical benchmarks. Our analysts possess 20+ years of experience advising a spectrum of clients from early adopters to mainstream enterprises.

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