



MANAGING AND SCALING APPLICATIONS IN KUBERNETES

A Traefik Labs 2021 Survey Report

Table of contents

- 3 Introduction
- 4 Key Takeaways
- 5 Demographics
- 6 While on the Rise, Kubernetes Adoption is Still Early
- 7 Complicated, Fragmented Technologies and Platforms
- 8 Kubernetes Operations Are Rife With Challenges
- 9 Configuration and Maintenance are Top Observability Platform Concerns
- 10 Solutions Lack Actionable Clarity
- 11 Growing Pains: Scaling Kubernetes is Not Frictionless
- 12 Moving from Complexity to Harmony: Better Tools, Not More

Introduction

In early 2021, Traefik Labs conducted a survey to measure the market adoption of Kubernetes and to understand the challenges organizations face in managing and scaling applications. The results show that while businesses clearly see the need for Kubernetes, they still face difficulties when it comes to adopting and scaling the technology. Part of it stems from the fact that Kubernetes is surrounded by a fragmented ecosystem with hundreds of vendors, tools, and platforms running in multi-cloud, multi-cluster, and multi-ingress environments. This report – gleaned from more than 1,000 survey respondents – examines the state of Kubernetes' use and the challenges companies face.

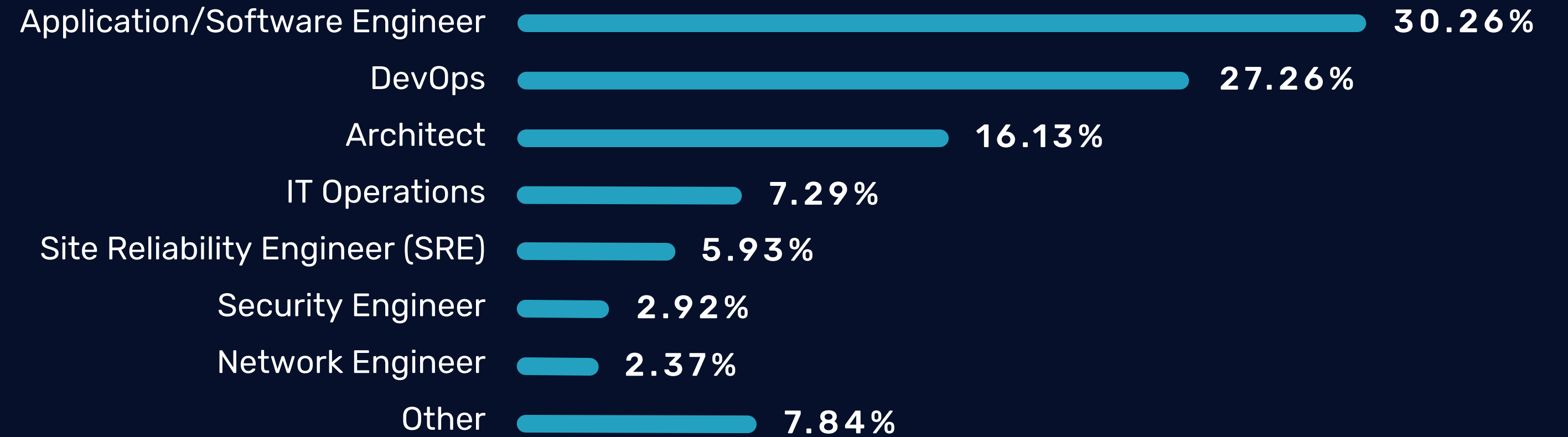
Key Takeaways

- 1 High Kubernetes adoption, but there is room for wider use.** More than 70% of respondents report using Kubernetes for a business project. However, applications running on Kubernetes typically represent less than 50% of an organization's business-critical services.
- 2 Multi-cluster (and multi-cloud) are becoming the norm.** The rise of multi-cluster and multi-cloud strategies adds an increased level of complexity – more than 60% of Kubernetes users are running two or more clusters, while more than half of all respondents are using multiple clouds.
- 3 Deploying multiple ingress technologies is a common practice.** Sixty percent of survey respondents use multiple ingress solutions, indicating the use of disparate toolsets to manage these technologies as end users navigate a landscape filled with many similar vendors and offerings.
- 4 Numerous operational challenges plague Kubernetes users.** When asked, respondents cited a number of challenges, including quickly identifying root cause when troubleshooting distributed applications, having a clear view of everything deployed within clusters, and automating certificate management to ensure all certificates are always valid.
- 5 Setup and configurations are the top pain points with observability platforms.** Though many companies already use observability platforms (i.e. Grafana, Prometheus), 43% of respondents agreed that "setup and configuration" was their top pain, with maintenance and simply having too many platforms tying for second.
- 6 Insufficient tools are a weak link in the observability chain.** While most organizations have some sort of observability platform, developers are still logging directly into their clusters to manually review logs when things go wrong. This suggests that the tools developers have in production may not be sufficient.
- 7 Cost management remains a top concern.** Cost may be holding companies back from scaling Kubernetes deployments to maturity – 44% of respondents said that cost management causes friction as they scale and expand Kubernetes clusters.

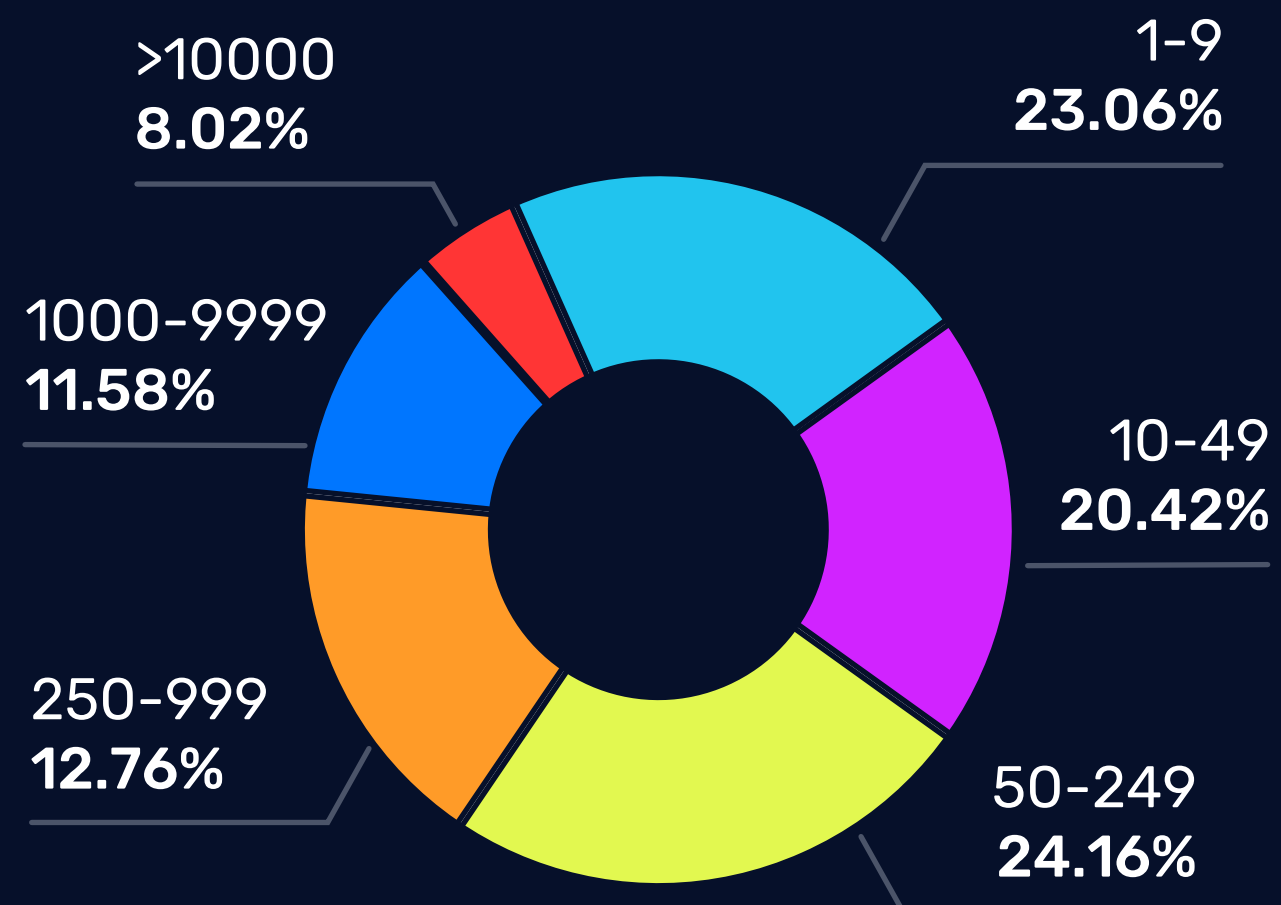
Demographics

Traefik Labs surveyed 1,097 respondents, led by applications/software engineers and DevOps professionals. The majority of respondents, 67%, were from companies with fewer than 250 employees, while 75% of respondents work for businesses with engineering teams smaller than 50.

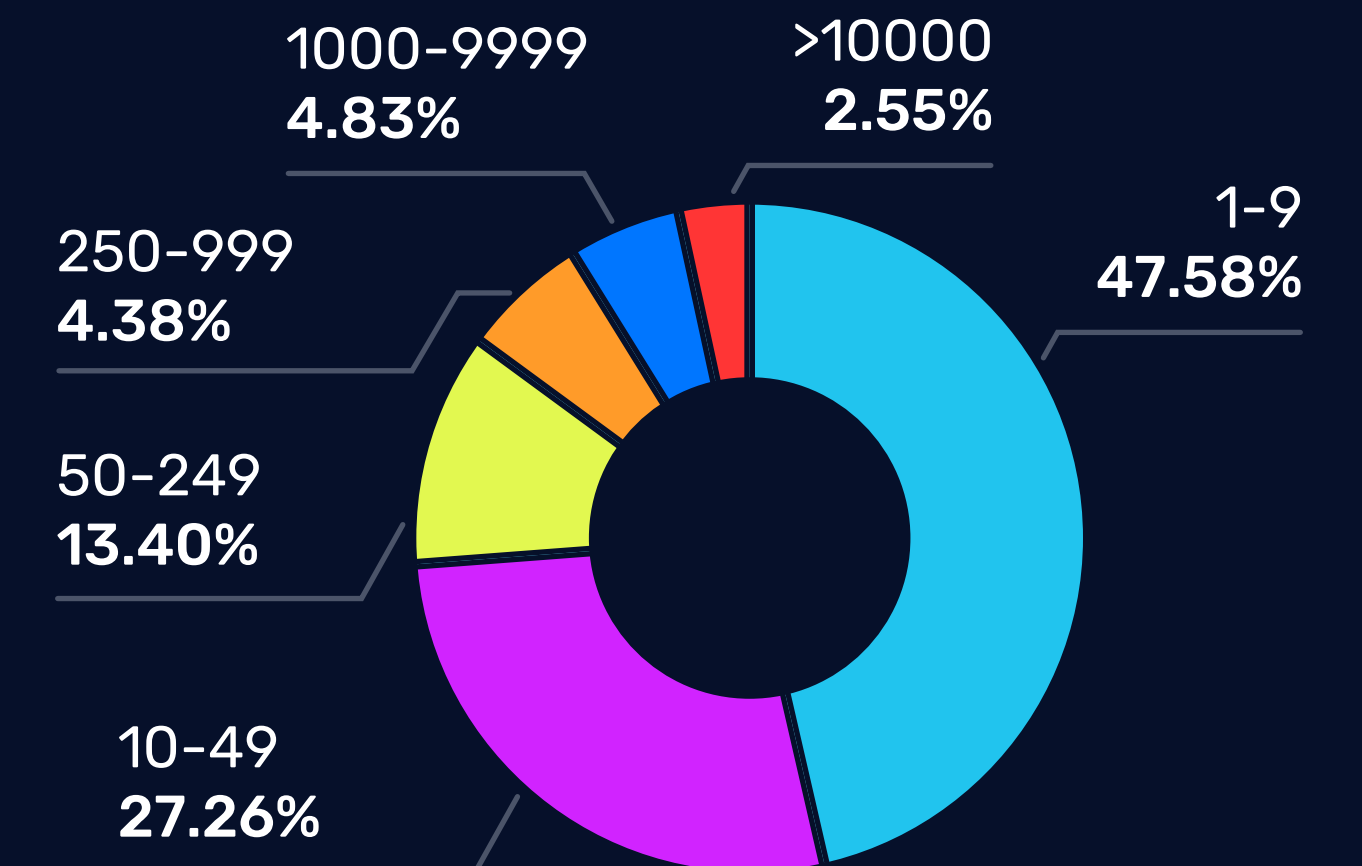
Roles



Company Sizes



Size of Engineering Teams

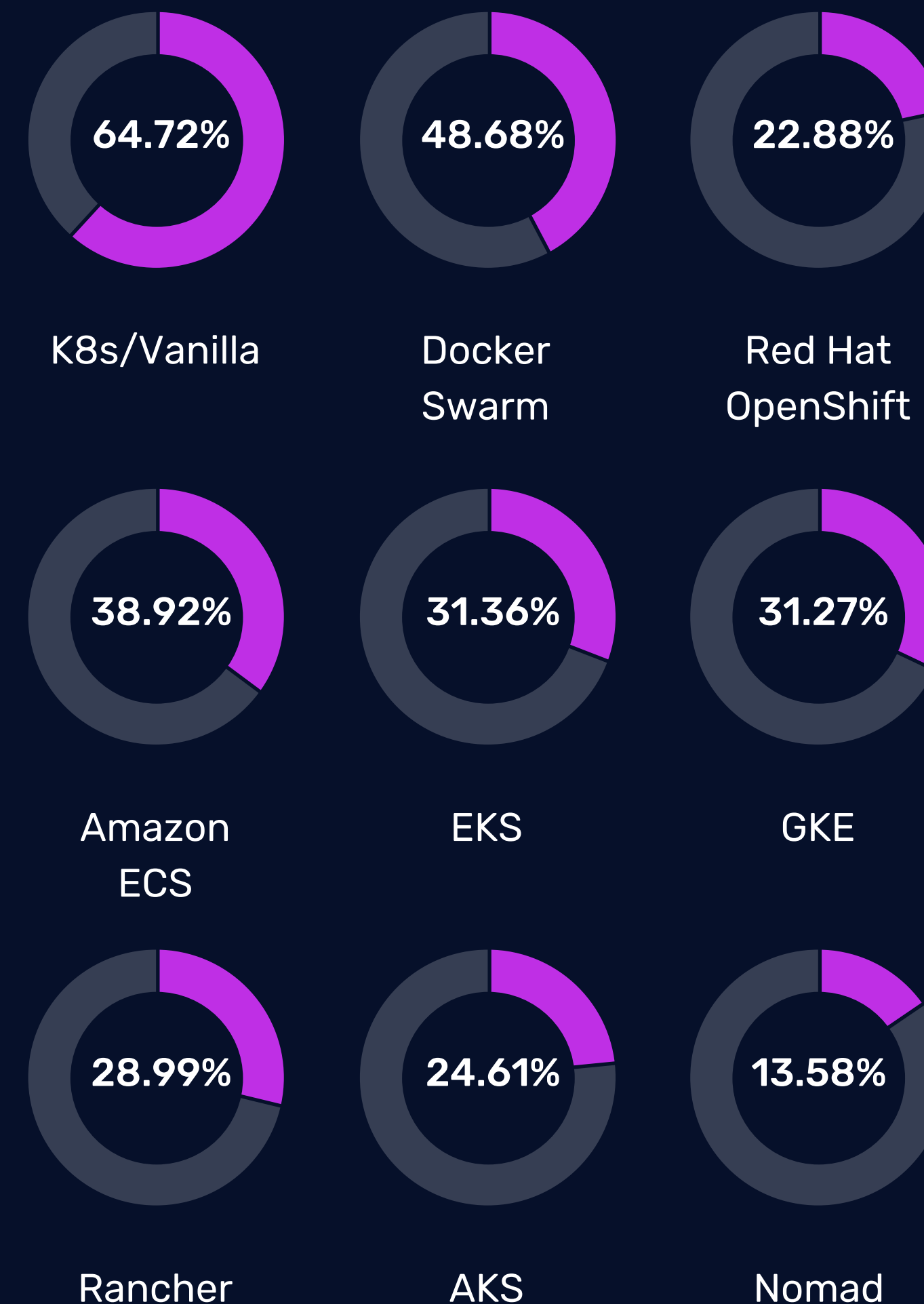


While on the Rise, Kubernetes Adoption is Still Early

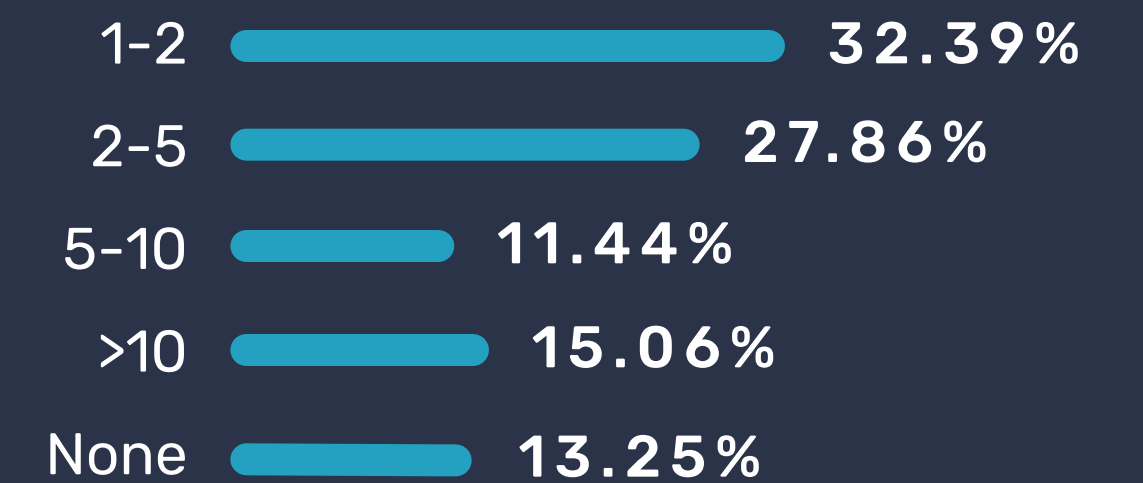
More than two-thirds of respondents report using Kubernetes-based container orchestrators, with 45% of them running less than two Kubernetes clusters in production. Of those using Kubernetes, 58% are running less than half of their business critical applications on Kubernetes. This could suggest that a majority of companies are testing the Kubernetes waters yet are still early in their adoption. That said, roughly a quarter of Kubernetes users say they run more than 75% of their business-critical applications on Kubernetes.

70% Respondents using Kubernetes-based container orchestrators

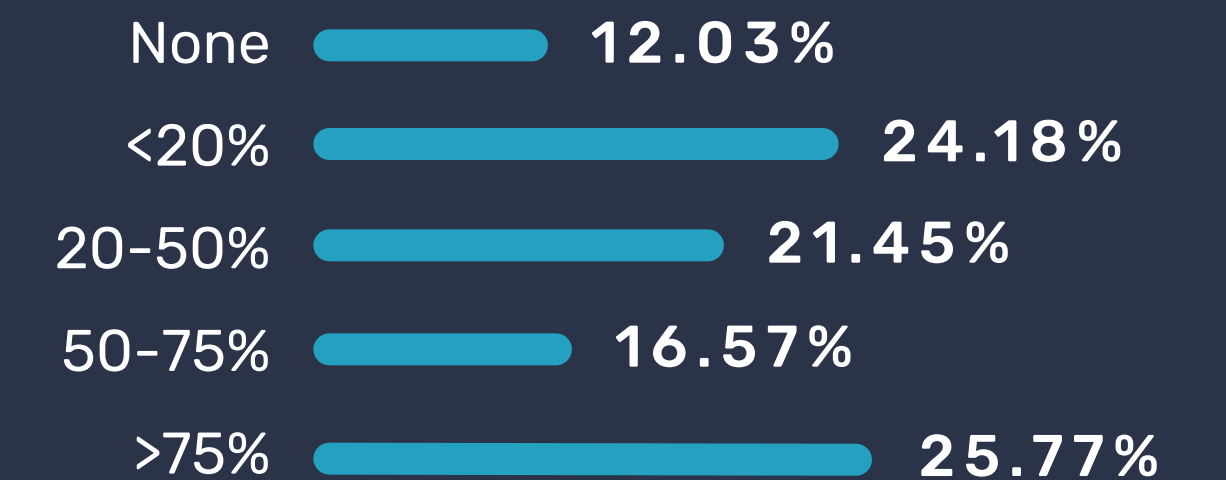
Container Orchestrators



Kubernetes Clusters used in production



Business critical applications running on Kubernetes



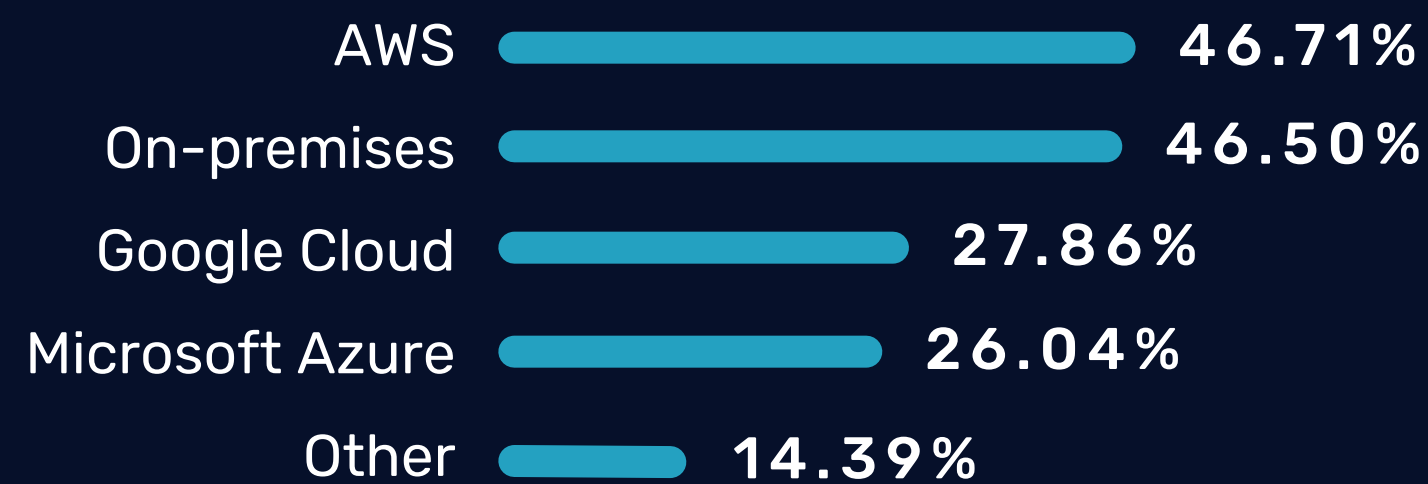
Complicated, Fragmented Technologies and Platforms

Organizations use a dizzying array of tools and solutions just to keep their applications and services running. For example, 60% of respondents have multiple ingress technologies deployed, implying that multiple management tools are often required. Companies also use a variety of solutions for network

observability, including Grafana, Prometheus, and Datadog. To further complicate things, 61% of companies use one or more public cloud providers, and 21% use two or more. Private and hybrid cloud arrangements are also popular: 46% use on-premises options, while 35% use on-premises and a public cloud.

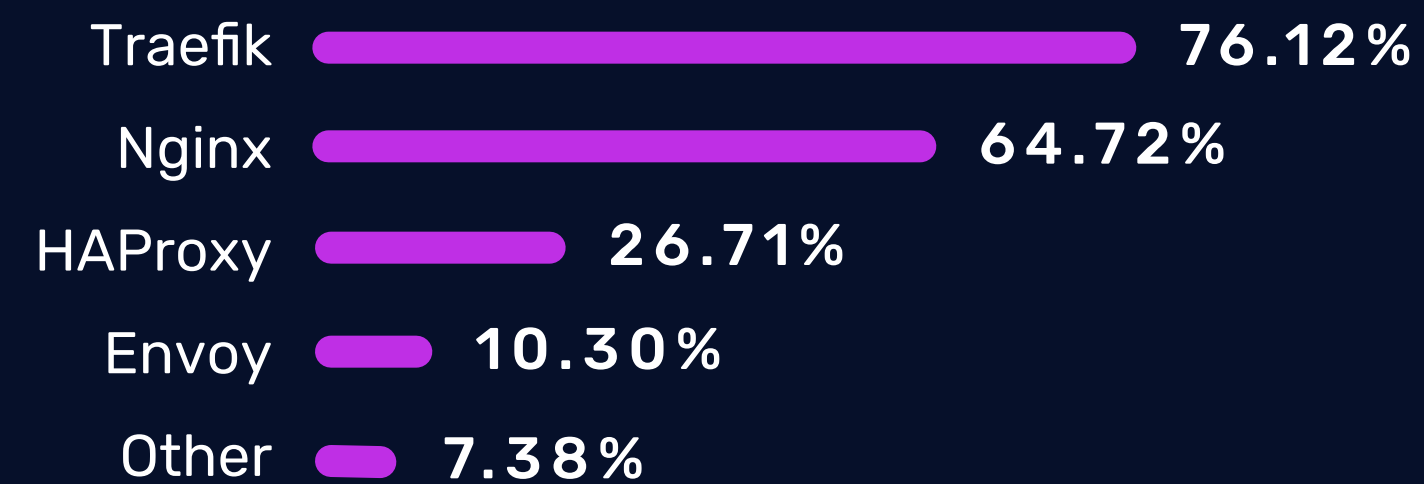
Considering all of this, it's no wonder the tails of Kubernetes maturity are fat: it can be challenging to move from day-one usage to production.

Cloud Providers



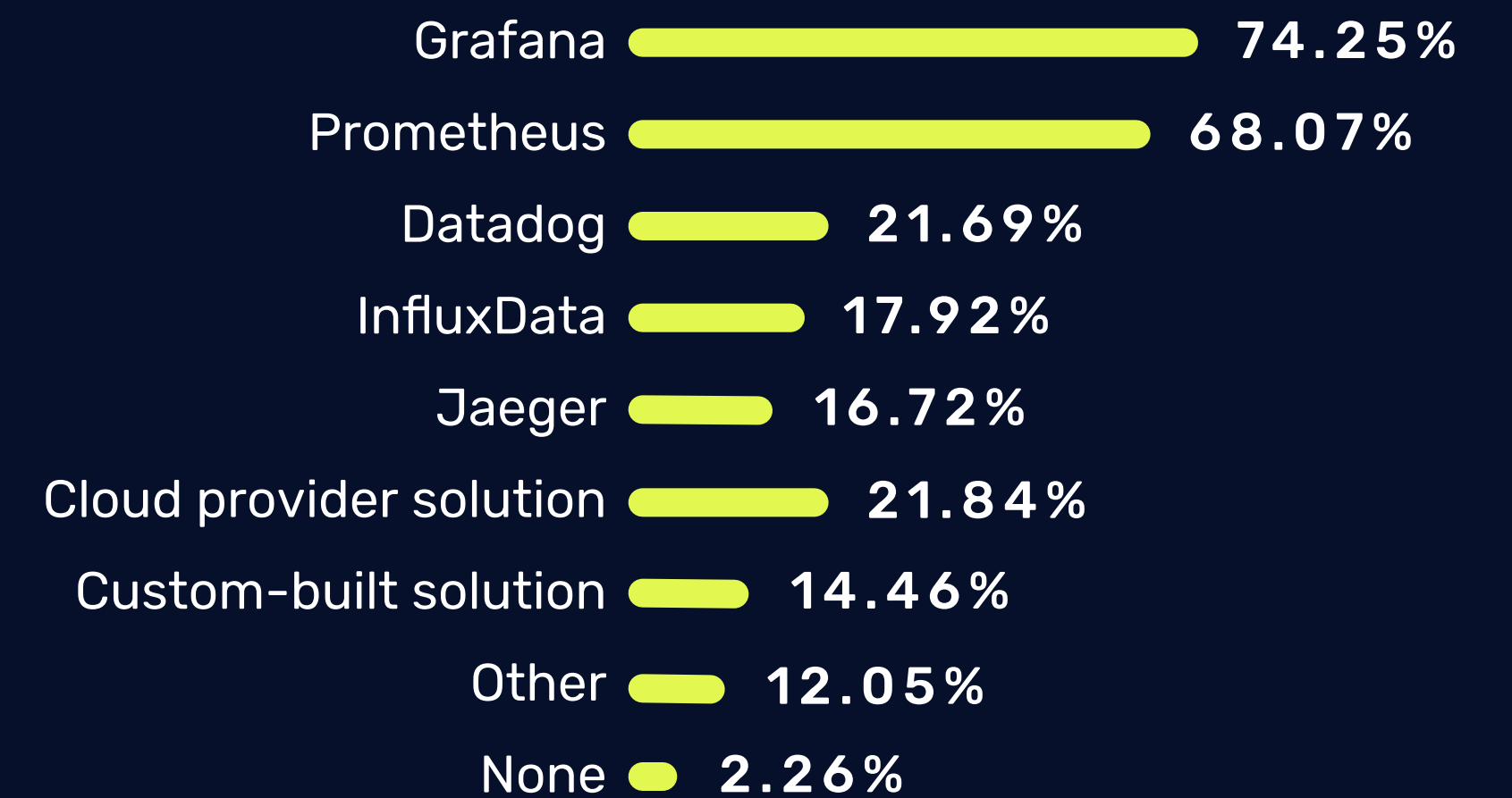
61% Respondents use 1 public cloud or more

Ingress



60% Respondents use multiple ingresses

Observability platforms



Kubernetes Operations Are Rife With Challenges

Perhaps not surprisingly, the previously mentioned presence of complicated environments leads to plenty of challenges for those wanting to make the most of Kubernetes. Having a clear view of everything deployed within clusters and quickly identifying root cause when troubleshooting distributed applications are the two challenges most top-of-mind among respondents.

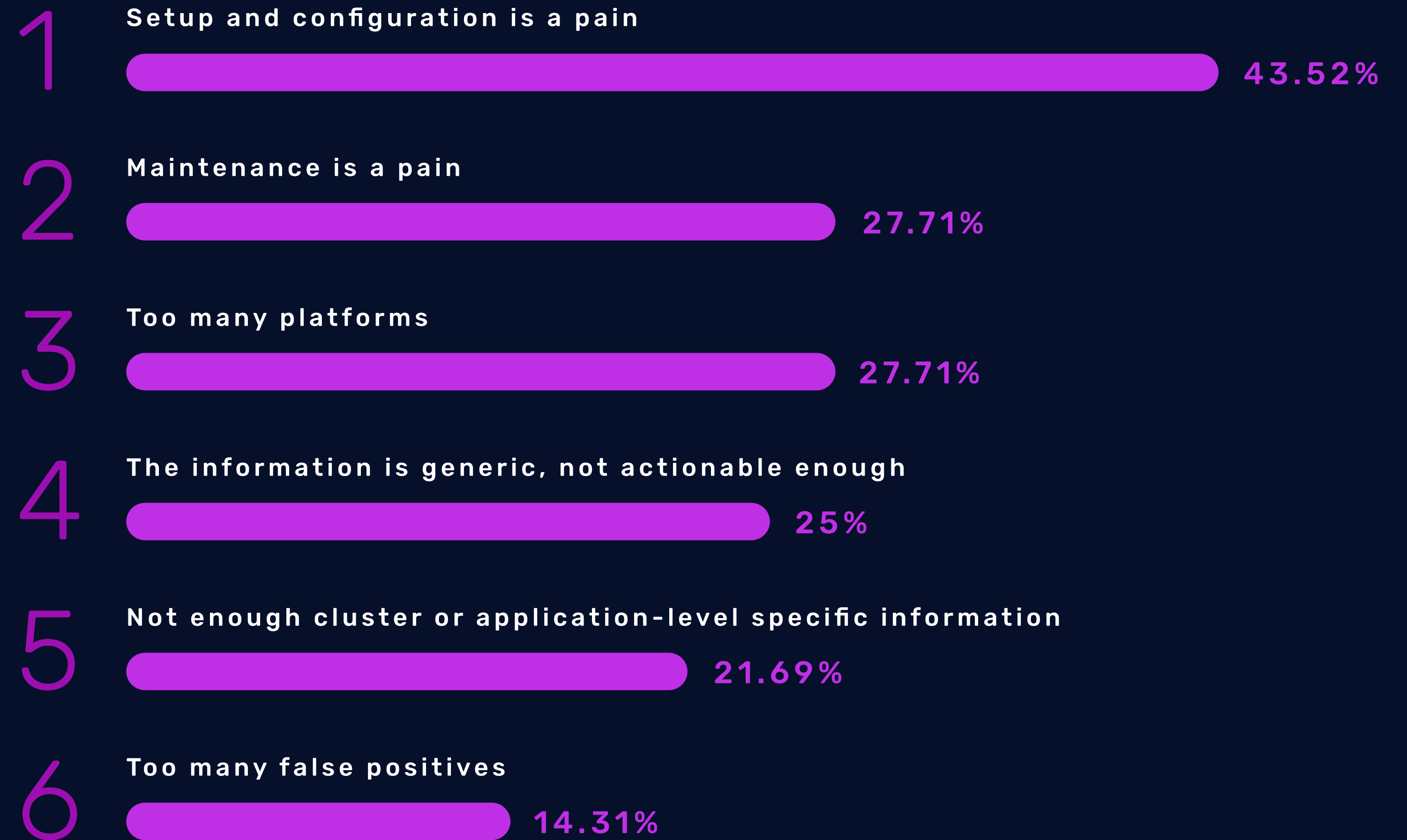
Top 5 challenges



Configuration and Maintenance are Top Observability Platform Concerns

Though organizations leverage observability platforms to help address the aforementioned challenges, many still encounter difficulties with these platforms. Nearly half of respondents say that setup and configuration are a pain, while 28% cite both maintenance and too many platforms. Further, 25% say the information they receive from these platforms is generic and not actionable enough. Another 22% say they don't receive enough specific cluster- or application-level information, creating a need for tools that enable teams to easily troubleshoot, monitor, scale, and operate Kubernetes clusters and applications safely and securely.

Observability Pains



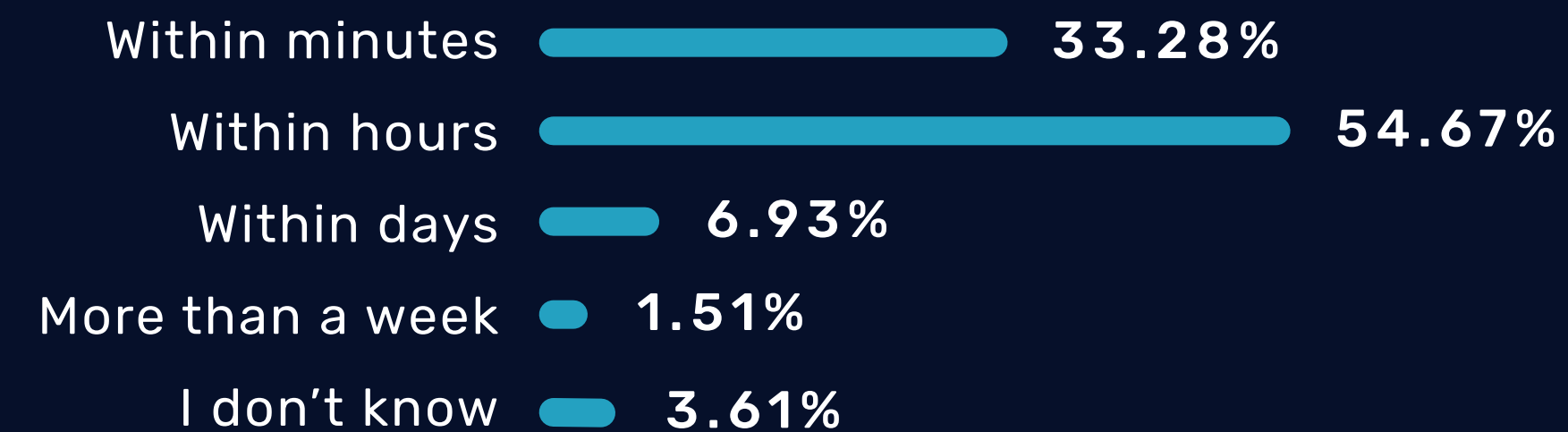
Solutions Lack Actionable Clarity

Even with loads of solutions at their disposal, respondents experience quite a few challenges while troubleshooting Kubernetes issues. First and foremost is knowing which tool to use to begin with – respondents ranked it as the most frequently experienced challenge. Tools that point teams in the wrong direction and a lack of insight into cluster-level issues make the waters even murkier. With this the case, roughly half of all organizations say they log directly into their Kubernetes platform to troubleshoot their problems.

Top 3 troubleshooting challenges

- 1 We have too many tools
- 2 The Tools we have don't point us in the right direction fast enough
- 3 Lack of insight into cluster-level issues

Average time to identify problem root cause



50%

Directly log into Kubernetes cluster to solve an issue

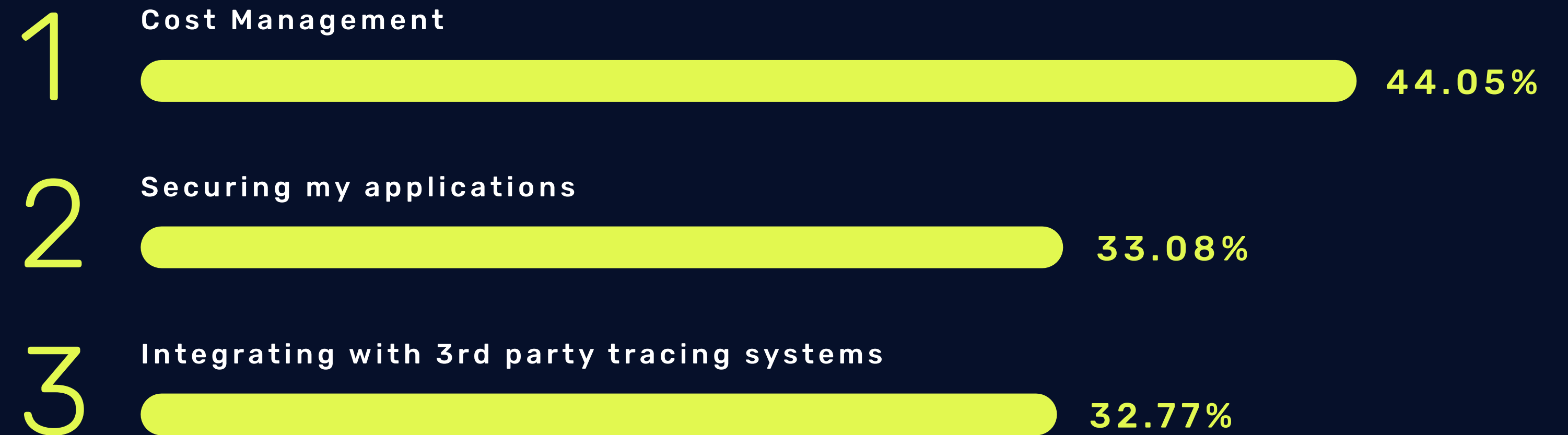
DevOps

Primarily responsible for managing Kubernetes

Growing Pains: Scaling Kubernetes is Not Frictionless

Although plenty of organizations leverage Kubernetes in some capacity, scaling these implementations presents challenges. When asked the reasons they face friction when scaling or expanding Kubernetes clusters, the top response was cost management, indicating a need for upfront cost transparency. Other top responses included integrating with third-party monitoring systems, and integrating with third-party tracing systems.

Points of friction when scaling Kubernetes



Moving from Complexity to Harmony: Better Tools, Not More

Despite the popularity of Kubernetes, **many companies struggle to operate and scale their Kubernetes deployments.** Specifically, they have trouble **identifying root causes when troubleshooting**, in large part because of a **lack of visibility into their clusters.** Even when organizations use observability platforms, setup, configuration, maintenance, and an overwhelming array of tools keep them from overcoming their obstacles.

These struggles exacerbate an already complex and distributed Kubernetes environment that's full of multiple networking ingresses, hosting providers, and dozens or sometimes hundreds of other tools. For companies who have or are on their way to adopting Kubernetes but struggle to scale their implementations, **solutions that help ease configuration, maintenance, and scalability pains for distributed systems are vital.**

Organizations don't need yet another tool to add to their ever-growing list, or something that is overkill in terms of what they need to actually get their job done. Rather, they **need domain-agnostic solutions that are ready and easy to use out of the box.**

About Traefik Labs

The combination of cloud computing adoption trends and the recent growth of containerization technologies has led to a shift in mindsets regarding how enterprise applications should be architected.

Founded in 2016, Traefik Labs (formerly Containous) is the leading cloud-native networking company that offers a powerful stack to ease the deployment of modern IT environments.

Traefik Labs' mission is to bring the first cloud-native networking stack for dynamic infrastructure to simplify cloud and microservices adoption journey for all enterprises.

Traefik Labs' development model is based on open source solutions. We believe that community-backed open-source software along with enterprise-grade consulting provides our customers with the confidence they need to focus on their business.



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