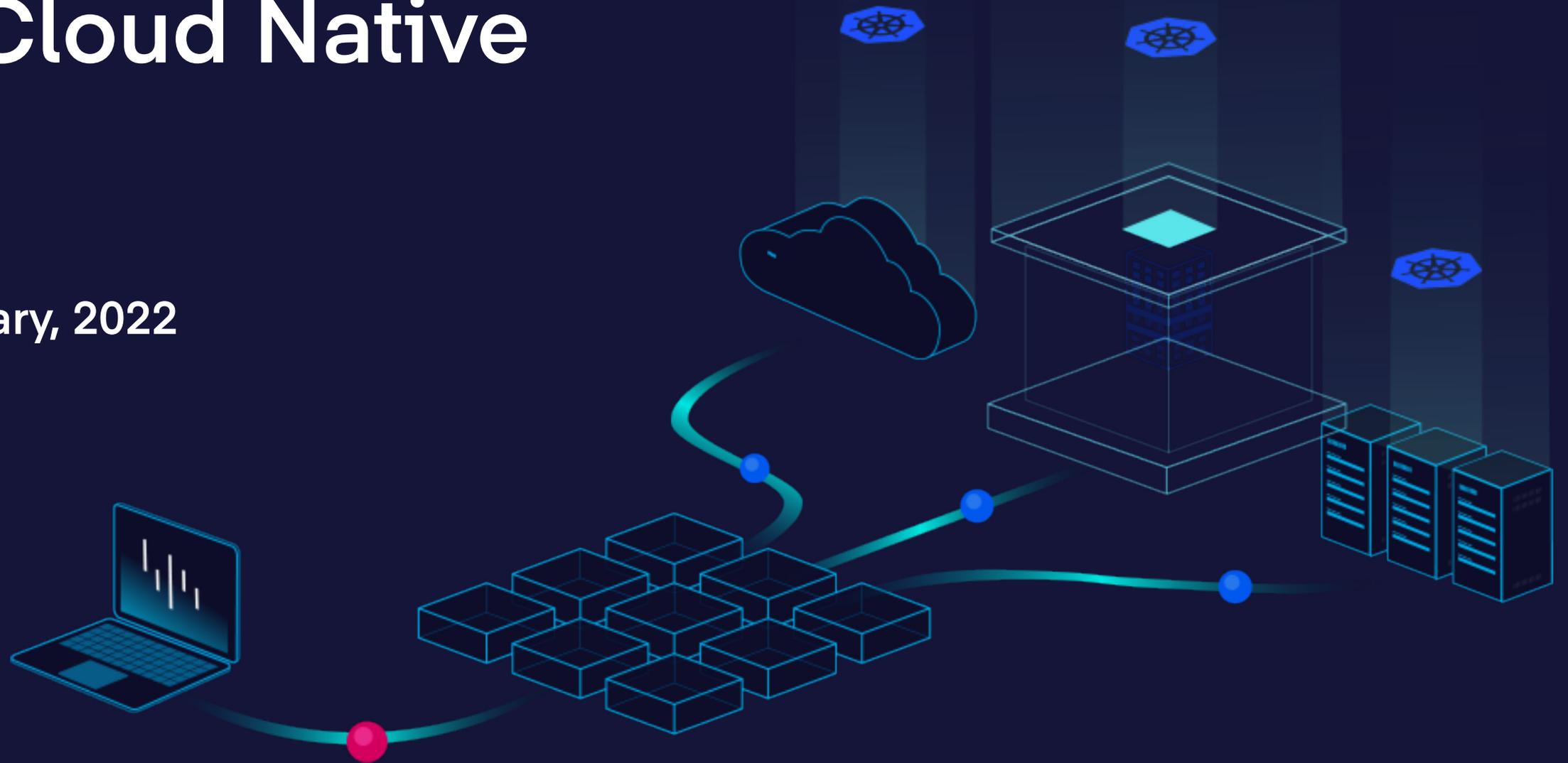


# 2022 Enterprise Trends in Cloud Native

February, 2022



**This report examines how enterprises are adopting cloud-native technologies such as Kubernetes and their 2022 investment priorities for cloud infrastructure, staffing, and services.**

**It compiles survey results from 526 architects, DevOps engineers, cloud platform engineers, managers, and executives across 450 unique companies in 85 industries.**

The report includes qualitative feedback and quotes from survey participants from companies such as Deutsche Bank, Verizon Wireless, Atos, First American, JP Morgan Chase, and CSC Global who participated in 1:1 interviews to provide detailed insight and information.

These technology leaders, in enterprises of all sizes and in a variety of industries, are investing significantly in cloud-native technologies, DevOps staffing, cloud platforms, and in cloud-competency centers. In particular, Kubernetes is becoming a leading tool for enabling cloud-native transformation. 65% use Kubernetes today, which represents a footprint of more than 70,000 nodes. An additional 20% have plans to deploy Kubernetes in the next six months. Survey data also reveals that public- and private-cloud infrastructure are the top areas of their investments in 2022.

However, respondents have major concerns about vendor lock-in and operational complexity:

- 61% expressed high or moderate concern regarding vendor lock-in.
- 91% cited security and operational concerns.
- The top four challenges are security, managing consistently across clouds/environments, HA, and observability/troubleshooting.

The findings in this report provide data you can use to benchmark your enterprise and determine how best to invest and accelerate your cloud-native initiatives in 2022. We hope it helps you avoid pitfalls and succeed in the highly complex world of continuously evolving cloud-native apps and services.

# About our advisors



Several industry veterans helped us interpret survey results:



Henrik Blixt is Principal Product Manager, Open Source and Platform at Intuit. He is a specialist in hybrid cloud infrastructure, containers, Oracle databases, and infrastructure products after years at VMware and Oracle.



Roy Chua is founder and principal at AvidThink, an independent research and analysis firm providing cutting-edge insights into the latest in infrastructure technologies. Having co-founded SDxCentral in 2012, Roy spun off the research arm as AvidThink in 2018.



Janakiram MSV has 20+ years of networking and cloud experience at companies including Microsoft, Amazon Web Services, and Alcatel-Lucent. He currently consults as a cloud analyst and architect.



Ravi Ravichandran is currently running the digital transformation at Juniper Networks as VP Engineering, Cloud Platform Engineering & DevOps. He served previously at GE Digital as CTO of SaaS/Cloud Platform Engineering & DevOps.

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The survey concretely reflects concerns Platform9 has heard from enterprise and service-provider users adopting container and cloud-native platforms.

Evidence points towards containers as today's preferred abstraction and packaging for enterprise application development and deployment. And now that we are a few years along in the mainstream shift to containers, leading users are reflecting their expertise and concerns across strategic, scaling, and operational elements of container and cloud services.

*"This survey provides useful insights and should be required reading for enterprises early in their container and cloud platform transition. Even seasoned container and cloud adopters will find nuggets of wisdom in Platform9's survey findings."*

— Roy Chua, AvidThink



# 61% of respondents have a high or moderate concern about vendor lock-in

**65% of executives and architects are more concerned about vendor lock-in than engineers. 71% of advanced users with larger deployments are more concerned than early users.**

In the world of cloud computing, lock-in is a significant concern for organizations that migrate to a single public cloud. Interviewees cited cost escalation, the loss of flexibility and control, and the inability to exit contracts as major worries.

Advanced users have experienced the cost and scaling issues and see the challenges of lock-in more clearly than early users who are just getting started. Managers, executives, and architects who own the financial and business KPIs understand the real financial and business risks of lock-in more than engineers.

*"We need to find the right cloud capabilities that match the business needs of our customers. It does not work the other way around. We can't be at a cloud vendor's mercy and lose flexibility to do what is right for our customer."*

— Cloud innovation leader at a leading systems integrator

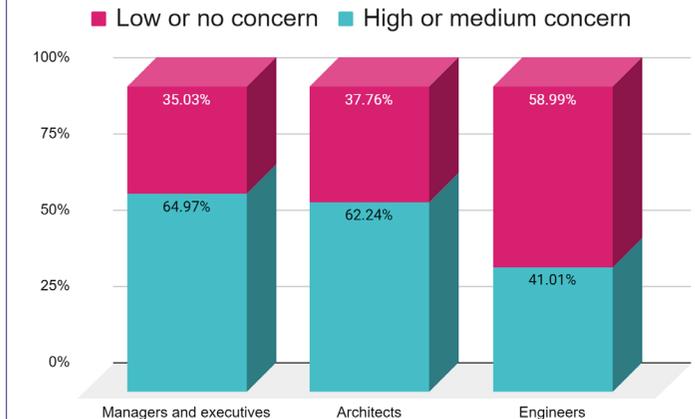
*"As a large diversified financial-services company, we are required to store customer data for seven years for auditing purposes. That's a long time in the technology industry. It's impossible to forecast a cloud vendor's pricing, strategy, and viability for so long."*

— Cloud architect at a financial service company

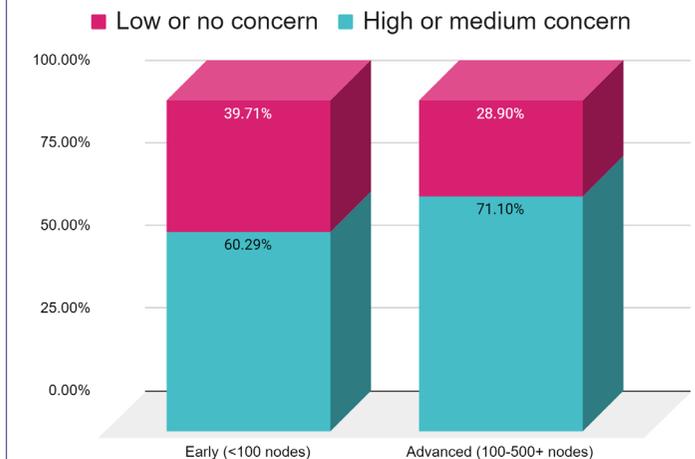
*"Vendor lock-in was always a challenge and a huge constraint for us to meet our business objectives. My strategy was to build our cloud platform from basic building blocks using container-based architecture and sticking to pure open-source technologies."*

— Ravi Ravichandran, Juniper Networks

## Managers and executives, architects more concerned than engineers



## Advanced users are most concerned



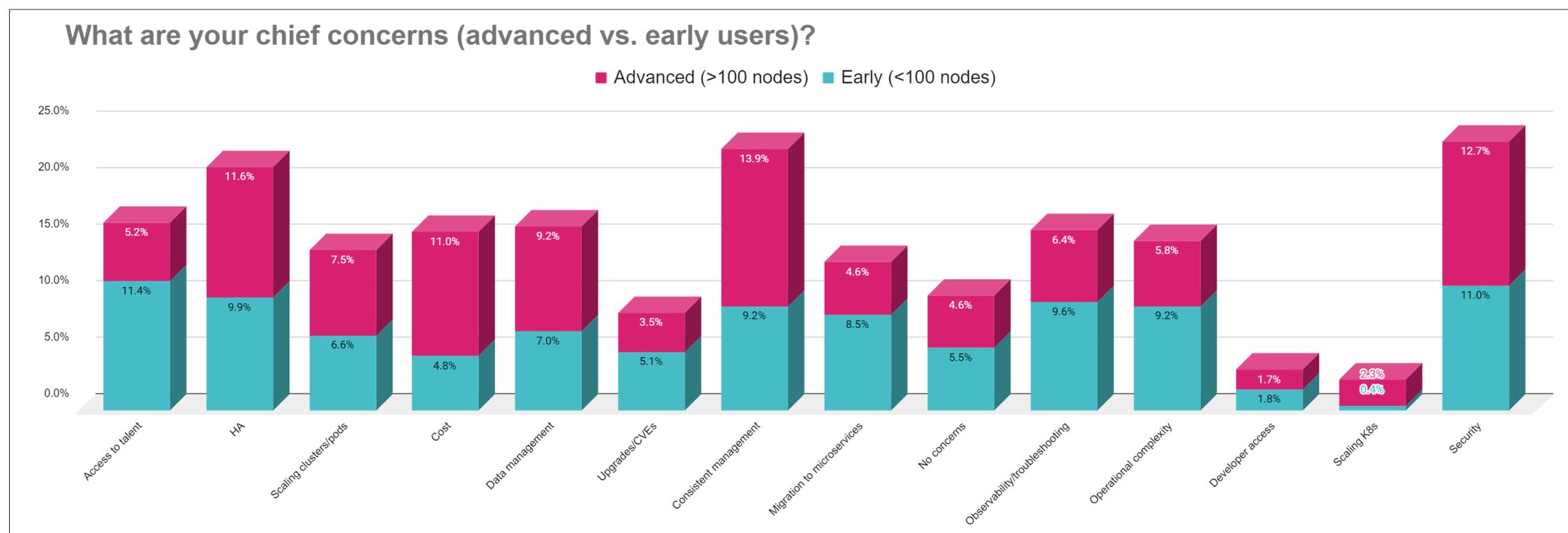
# 91% cite security and operational concerns



The top four reported challenges are security, managing consistently across clouds/environments, HA, and observability/troubleshooting.

Cloud-native technologies are new, complex, and constantly evolving. Operating them is hard, especially in production environments. Respondents who are more experienced with large-scale deployments have different concerns than those that are still early adopters. This data is useful for early users as they grow so they can effectively plan and save themselves considerable pain.

*“As a law firm, our data is our client data and we need to be ISO compliant. We are liable to be sued if we lose our client data. Security is always the #1 concern and so we don’t put our data in a public cloud at all”*  
— Data analyst at a large corporate law firm



# Addressing vendor lock-in — multicloud, open-source tools, and portable apps



Respondents indicated that they cannot avoid or completely eliminate lock-in. However, their anti-lock-in strategies are at best aspirational. For example, the use of multicloud as a means for ensuring app resilience and redundancy is not yet a reality given the overhead, skills, and expense associated with architecting such apps.

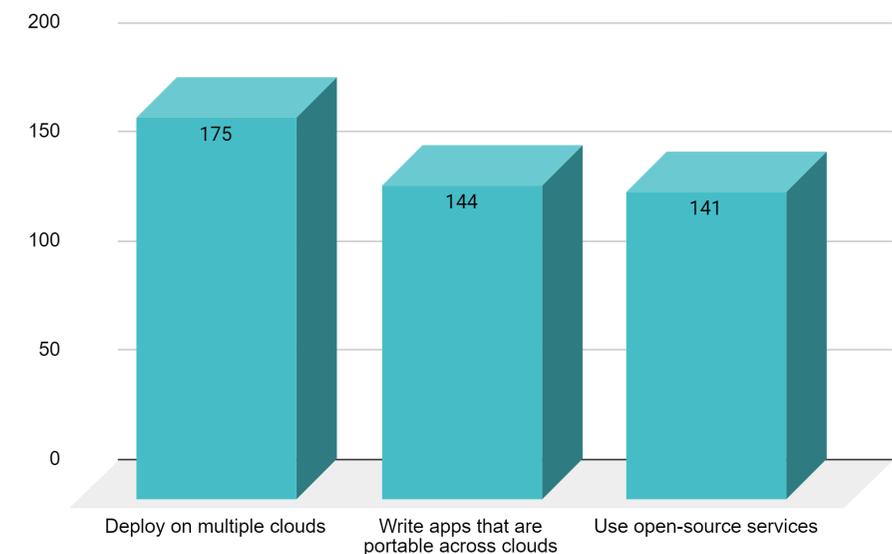
When signing up with a cloud vendor with a licensing contract for three years or more, companies must be aware of inherent lock-in risks. Price escalation at renewal is one such danger. Respondents picked using multicloud as a top choice to avoid lock-in along with the use of portable apps with containers.

However, individual interviews revealed that this is more aspirational than a reality. When respondents picked multicloud, they indicated that various teams, groups, and departments use different hyperscale vendors based on the specific cloud capabilities they needed and the availability of team skills.

It's critical for enterprises to establish an architectural strategy that provides a level of isolation from the underlying infrastructure. This means using containers as an abstraction mechanism, implementing GitOps, using tools like Argo CD that can inherently support multicluster and multicloud, and ensuring that your applications are built to run at scale.

When respondents picked open source as an anti-lock-in strategy, they referred to the use of non-proprietary, cloud-agnostic, open-source tools such as Terraform, Linux, Kubernetes, and MongoDB.

## What actions will you take to address cloud lock-in?



*"It's important to remember that open-source tools can be highly complex and managing them can require substantial, long-term support. This could end up being more expensive than using a knowledgeable vendor."*

— Henrik Blixt, Intuit



## Additional insight into multicloud adoption

For many companies, multicloud is not an explicit strategy but rather a natural part of their cloud evolution. Other companies, particularly independent software vendors and system integrators, can't wait: multicloud is an immediate necessity. As these companies scale with new products and serve new customer segments, they need to address their customer requirements and preferences in diverse public, on-premises, and edge infrastructure.

Established enterprises have a large footprint of legacy applications. Their journey to the cloud starts with migrating some of their legacy applications to one major public cloud. Over time, they may build preferred partnerships with one or two additional cloud providers. However, as these applications evolve in one or two clouds, they end up becoming the new legacy bound to the specific details of these environments.

The challenge is, how do you shield your users and applications from the differences in these environments? Even though they are public clouds, they are all different. How do you abstract that away from the users and applications? How do you avoid having to rewrite applications and retrain users?

Truly portable apps that run across multiple clouds and can weather outages and services in one cloud and switch seamlessly to another functional cloud are, in actuality, quite rare.

If you focus on augmenting Kubernetes with ancillary services such as monitoring, logging, and foundational services that you manage and you control, you can move those across different clouds, different platforms, private, hybrid, or public. It's also important to pick mature open-source stacks with strong community momentum for these ancillary services as well.

If you're deploying your clusters across multiple endpoints, analysts have recommended standardizing on open-source tools like Prometheus and Fluentd for monitoring, observability, and logging. You can have all of your apps and custom resources send their metrics in a standardized way to the agent and then forward all the data to a central logging solution. This simplifies a lot of the observability challenges while helping you stay relatively cloud-independent for these services.

*"Generally speaking, it's good to keep as close to generic, open-source Kubernetes as possible. Specialized flavors quickly get problematic, and locking-in to a proprietary platform can eliminate your portability."*

— Roy Chua, AvidThink

# For Kubernetes, public-cloud solutions are the most common

Despite lock-in concerns, public-cloud Kubernetes solutions (AKS, EKS, GKE) from the top three hyperscalers dominate.

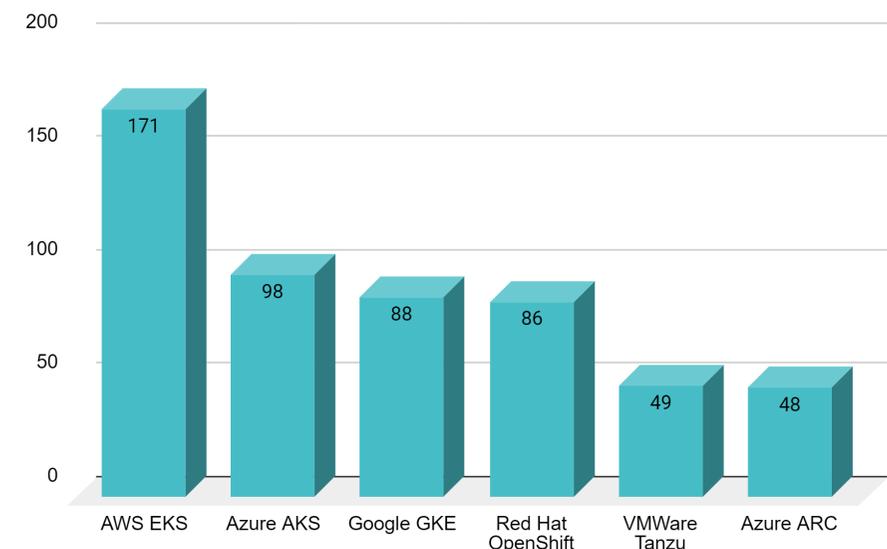
The reality of the enterprise explains this quite well. Time-to-market pressures drive decisions and public clouds provide comparatively fast and easy (if expensive and proprietary) end-to-end solutions with a rich variety of services. Another factor is that siloed departments and teams tend to make their own decisions based on their isolated needs and skills.

Consistent architecture, central governance, and effective cost management across multiple clouds and the need for a common platform for hybrid and edge deployments are challenges that companies have to deal with eventually. These are actually the primary challenges identified by advanced users who are already running at scale at a hyperscaler.

Most enterprises do not have all of their workloads in public clouds. Hybrid infrastructure is a reality as evidenced by the next survey result. Edge computing is growing rapidly. With AI/ML and other modern apps increasingly being deployed at the edge and in on-premises data centers, data sovereignty and bringing compute close to data becomes a key imperative.

Users getting started with cloud native and adopting public-cloud Kubernetes should carefully consider how they can expand their use cases to hybrid and edge without the constraints of lock-in challenges.

## What Kubernetes solutions are you currently using? (>45 responses)



*"My team uses AWS/EKS to deliver customer billing and communication microservices applications. However, our company as a whole does not use one vendor. Another team that requires AI/ML may choose GCP/GKE because they get the capabilities they need there."*

*— Architect and development manager at a wireless service*

# 67% of cloud deployments are on-premises, hybrid, and edge



**Public-cloud deployments are growing fast but most deployments are spread out across private on-premises, hybrid, and edge clouds. Enterprises are increasingly deploying distributed infrastructure.**

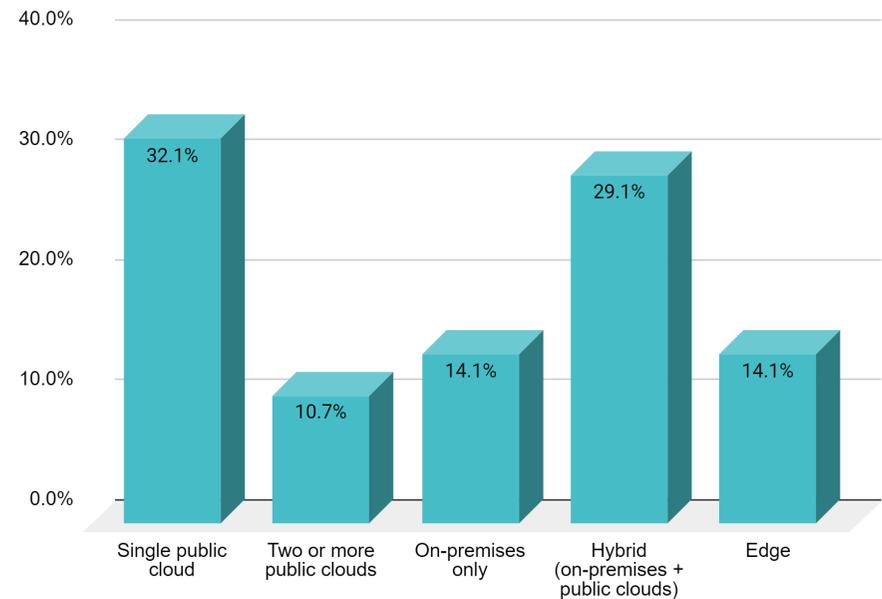
With on-premises, hybrid, and edge clouds being the dominant environments, organizations need a consistent, cloud-agnostic framework that lets them run their workloads anywhere just as easily as with a public cloud but without vendor lock-in.

With Kubernetes deployments, experts recommend using infrastructure abstraction and GitOps principles to provide a level of management consistency. More specifically, using initiatives like CAPI, the cluster API project, lets you manage clusters at scale with a declarative API very similar to Kubernetes. This model lets users deploy identical clusters with defined policies and templates at any given moment or destroy them and recreate them without any worry of misconfigurations. This provides for better governance to enforce policies that have some level of consistency for cluster deployment across the organization. And if there are deviances, you're able to catch them.

*"Our public-cloud investment is very small compared to our private cloud (which is based on VMware and Oracle OCI). Our philosophy is cloud-smart rather than cloud-first. A lot of our critical applications are legacy monolithic apps and our on-premises infrastructure is heavily regulated. We are going through an app rationalizing exercise to identify apps that can be rearchitected for cloud native."*

— Architect at a large utility company

## Where are your clouds deployed?



*"We have over 300 customers who use our container software on on-premises and edge infrastructure spread across thousands of global locations. Life-cycle management at such scale is always a challenge."*

— Network engineer at a communications service provider

*"For consistent management across multiple clusters and clouds, anticipate cloud-agnostic manageability, reliability, troubleshooting, and other Day-2 operational tasks."*

— Roy Chua, AvidThink



# Staffing up with cloud-native skills is critical for success



**DevOps, cloud-platform engineering, cloud-native developers, and security are the top hiring priorities in 2022.**

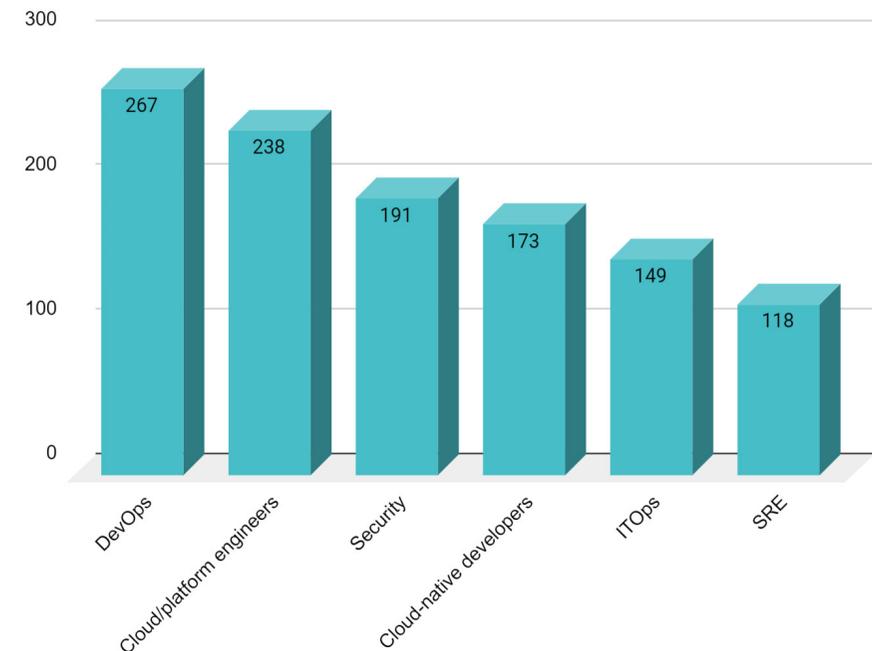
As cloud-native technologies go mainstream, companies struggle with balancing DevOps, cloud-native development, platform engineering, and legacy technology skills. Survey respondents are clear about their hiring priority in 2022: focus on the skills needed to enable cloud native. Many companies are setting up cloud competency centers and dedicated cloud teams as they skill up.

The fact that DevOps is the top hiring priority indicates the need for greater cloud operational and automation skills. However, it's challenging to find the right talent. And although anything can be managed or built in-house, that doesn't necessarily mean a DIY approach will meet business goals.

*"The last thing you want is to hire someone, wait six months, and then have that person move on with all their expertise. You have to consider what your core competencies really are and how you'll get the outcomes you need. Managed services are often more cost effective."*

— Ravi Ravichandran, Juniper Networks

**What skills do you plan to hire in the next year? (>75 responses)**



*"We are a heavily regulated industry. Security compliance, data regulation, and auditing need to be implemented in the cloud-native world, so we are investing heavily in DevSecOps. However, to scale this approach, we spent 2½ years building a shared self-service platform that many teams shared."*

— Lead DevSecOps engineer at a multinational bank



# Nearly everyone uses Kubernetes

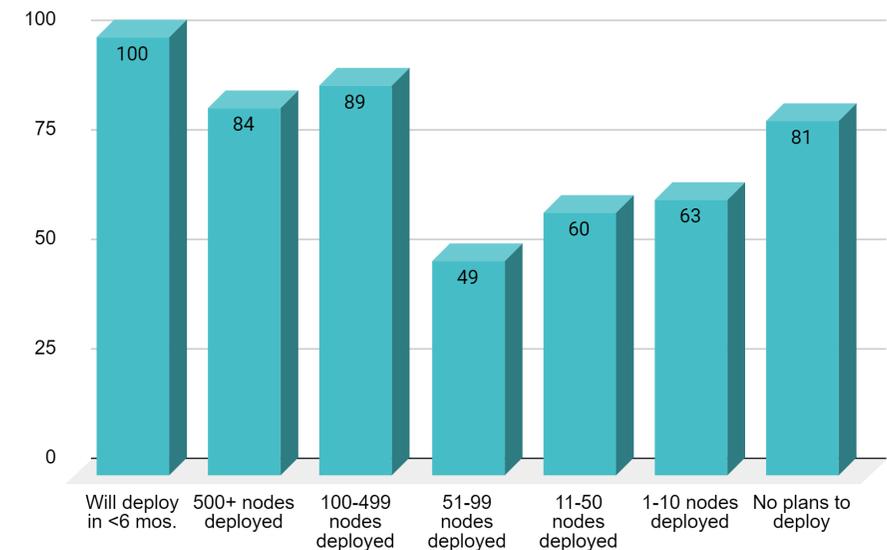


Nearly 85% of respondents are using Kubernetes today or have plans to deploy it in the next six months. The deployed footprint from this survey sample represents almost 70,000 nodes. What's surprising is the scale of deployment: 33% of the respondents have 100+ nodes in production.

For CI/CD and regular build-and-push CI/CD operations, Kubernetes and the container ecosystem is purpose-built. It makes it easy to roll-forward, roll-back, and checkpoint deployments. For modern app development, there's no reason to go back to a VM-based packaging solution that doesn't really meet these needs.

Another emerging use case for Kubernetes is running VMs using the new KubeVirt project. This is particularly critical for edge deployments where hardware is limited and you can't run two separate stacks, one for VMs and another for containers. KubeVirt runs VMs using Kubernetes, enabling consolidating on a single container stack. Metal<sup>3</sup> enables provisioning bare metal servers with Kubernetes as well. Every part of the stack can be automated using Kubernetes to improve performance and agility and reduce costs.

## What is your Kubernetes deployment status?



*"Kubernetes is a new operating system that brings a level of portability and is becoming the vehicle for hybrid and edge cloud deployments. We often see it being deployed for modern cloud-native applications as well as for systems of intelligence such as machine learning and analytics."*

— Janakiram MSV, Janakiram & Associates



# App containerization is accelerating

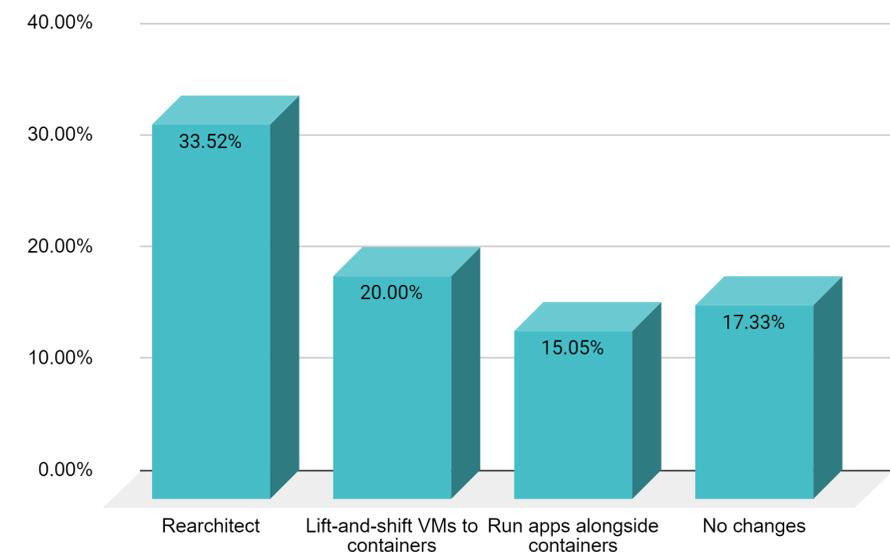


**53% of respondents plan to containerize their apps. A full 33% have plans to rearchitect their apps to microservices.**

20% of respondents expressed that they are planning to lift-and-shift apps to containers in 2022. However, they also indicated that their lift-and-shift initiatives were often motivated by cloud-first mandates and pressures to move to the cloud quickly. While it may take additional effort and time to rearchitect their apps, they felt that it was well worth gaining the power of cloud-native containers and microservices.

However, when rearchitecting is simply cost-prohibitive, enterprises are often content to let them slowly fade away and incrementally move cloud native.

## What are your plans for containerization and microservices?



*"We did an exercise of lifting and shifting one of our Java-based monolithic applications to a container on an EC2 instance and found the storage performance to be terrible. We then spent one-and-a-half years rearchitecting many of our apps for microservices. You have to spend money to save (and make) money."*

— Development management at a wireless company



# DIY management — planned for despite significant complexity

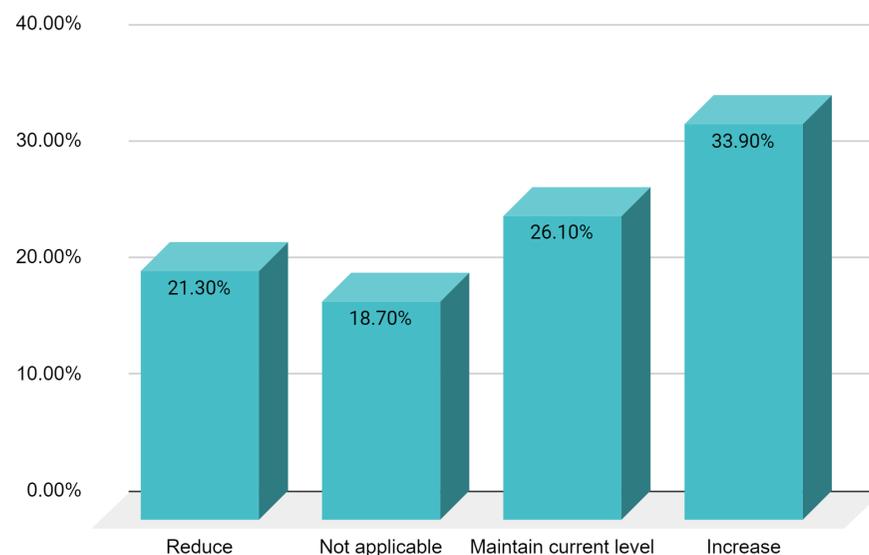
A slim majority indicated they'd continue or try to take on more DIY management of their Kubernetes deployments.

DIY management includes a considerable range of activities such as:

- Terraform scripts development and maintenance for config management and orchestration
- Managing CI/CD tools and pipeline automation
- Disaster recovery
- Operating system upgrades and patching
- Security integration and management both in the DevSecOps pipeline and for compliance
- Data management (backup, replication, and protection)
- Storage management (integrating with existing storage solutions)
- Network integration and security
- End-to-end SLA and uptime management
- Infrastructure management

Analysts have suggested that enterprises can easily underestimate the full extent of DIY management tasks and the difficulty in staffing the highly skilled positions necessary to perform them. The alternative is considering a fully managed Kubernetes-as-a-service layer.

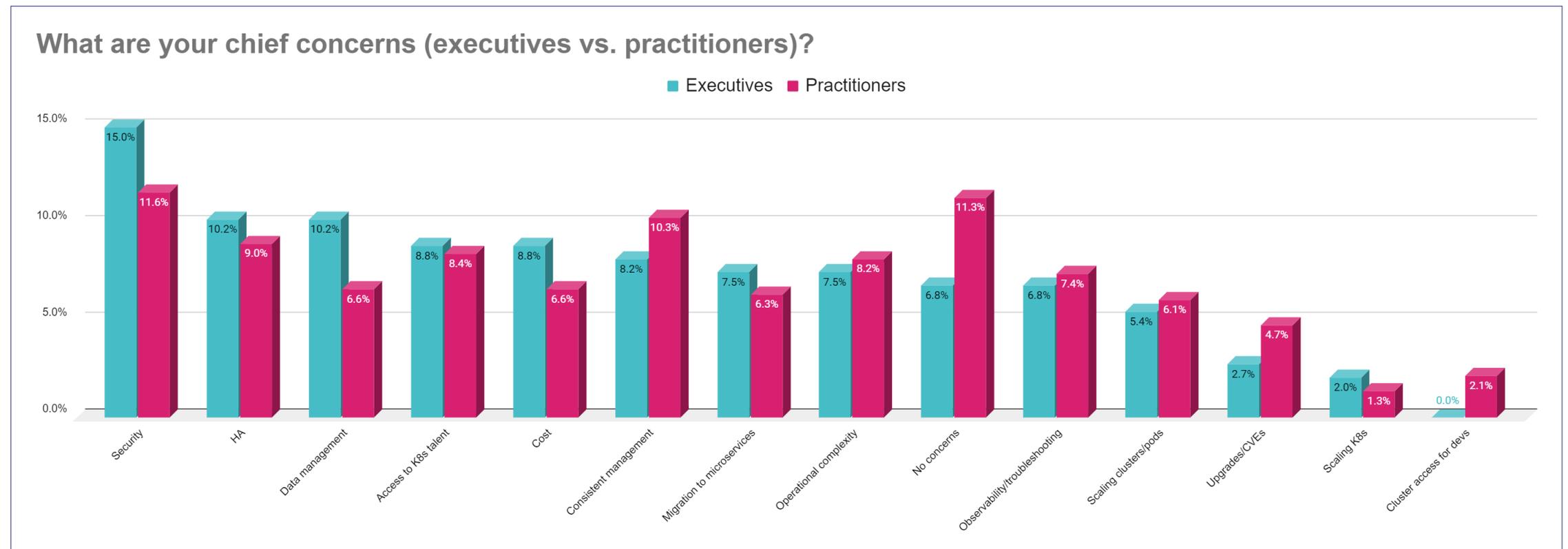
## What are your plans for DIY management?



# How executive concerns differ from those of practitioners

28% of respondents were C-level or decision makers. Their top concerns are security, achieving HA, data management, and cost optimization.

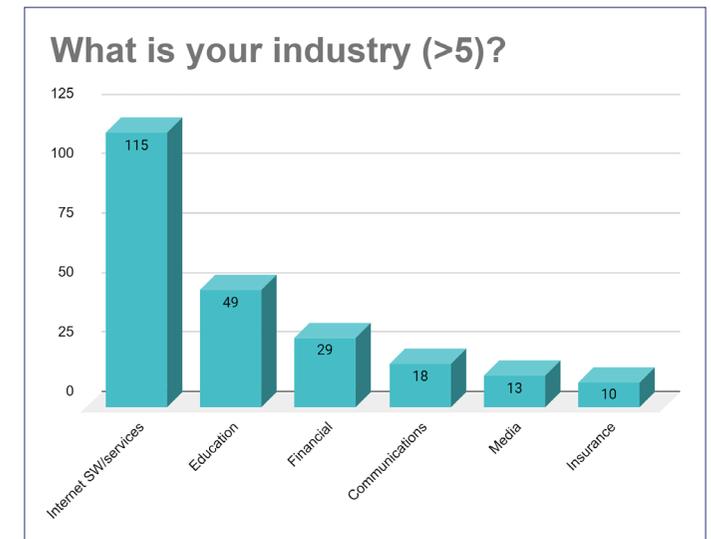
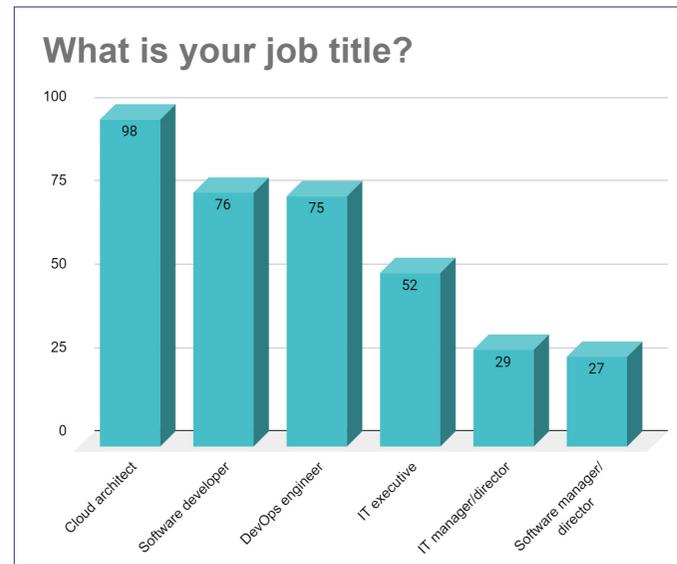
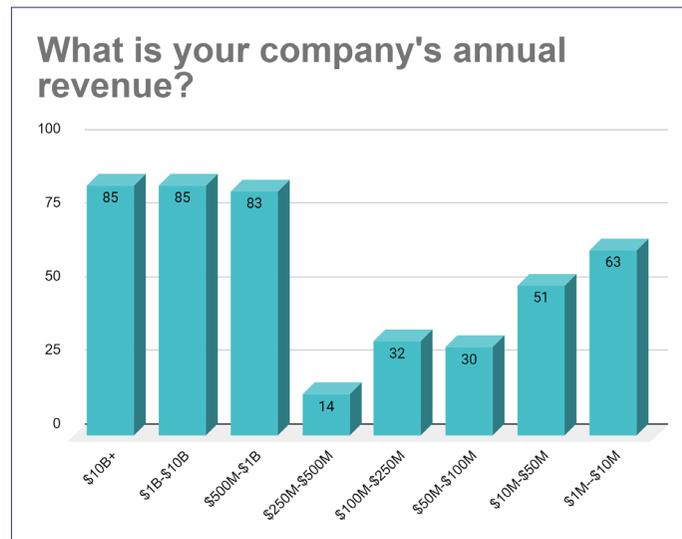
Results showed that practitioners are more concerned with Day-2 operational concerns such as upgrades, consistent management, and observability/troubleshooting. CIOs and decision makers had different priorities — they realize that many of their existing tools and processes are inadequate for cloud-native production environments.



# About our respondents



Our survey respondents represent 450 unique companies across 85 industry segments.



# Learn more about the Platform9 open, distributed-cloud service



Platform9 is the world's #1 open, distributed-cloud service, offering the power of the public cloud on infrastructure of a customer's choice, powered by Kubernetes and cloud-native technologies. Public clouds are walled gardens, and DIY is difficult and time-consuming. Platform9 offers a third option — an open and faster option — enabling a better way to go cloud native.

Platform9's service powers 40K+ nodes across private, public, and edge clouds. Innovative enterprises like Juniper, Kingfisher, Mavenir, Redfin, and Cloudera achieve 4x faster time-to-market, up to 90% reduction in operational costs, and 99.9% uptime. Platform9 is an inclusive, globally distributed company backed by leading investors.

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*"Platform9 has proven that their managed services work. They consistently help companies succeed with their Kubernetes deployments."*

*— Ravi Ravichandran, Juniper Networks*

