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PEPPERDATA 2023

The State of Kubernetes Report 2023

Growing popularity of new workloads on Kubernetes. FinOps and cost optimization gain momentum.

Background

The 2nd annual Pepperdata State of the Kubernetes Report explores the thinking of 800 respondents from a survey conducted in early January 2023. This poll was run using Pollfish, a market research platform, by surveying cloud decision-makers and ITOps professionals in the US across various industries.

The respondents revealed their experiences, insights, and challenges with Kubernetes. The technology has "crossed the chasm", moving from small-scale deployments to larger numbers of clusters. New workloads like Data Ingestion (Apache Spark) are now the most popular deployments on Kubernetes containers.

Today's top challenges have been unexpected infrastructure spend and a steep learning curve of the technology. Organizations are in early stages of implementing cloud cost optimization and FinOps measures to reduce cost overruns.

Key Findings

1 Cloud-native deployments are maturing, growing to six to 10 clusters per organization

2 The top workloads deployed on Kubernetes are Data Ingestion, Cleansing, and Analytics (61%), Databases (59%), Microservices (57%), and AI/ML (54%).

3 Over 57% cited the "significant or unexpected spend on compute, storage, networking infrastructure, and/or cloud-based IaaS" as their biggest challenge.

4 43.5% of the organizations are implementing cloud cost reduction and FinOps initiatives to reduce cost overruns.

How many clusters are you running in your Kubernetes environment?

Takeaway: Our survey of Kubernetes deployments found an optimistic trend in adoption and scalability: the majority of organizations ran between six to 10 clusters, and a considerable number reported three to five clusters on Kubernetes. This indicates that cloud-native deployments are starting to mature by utilizing more resources.
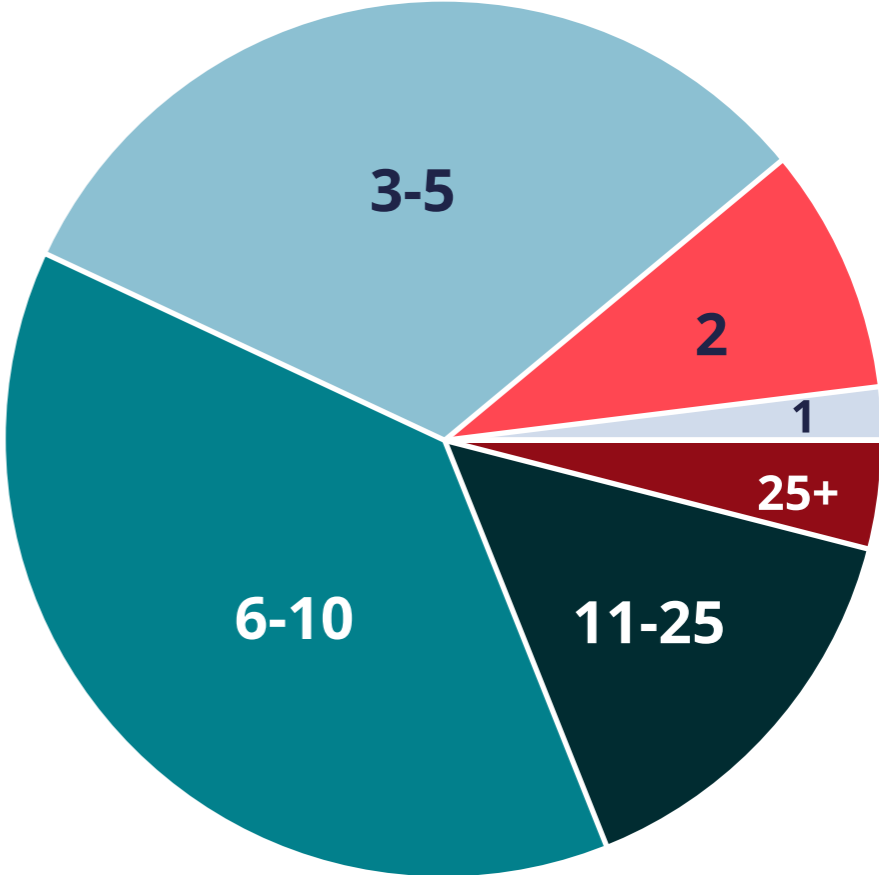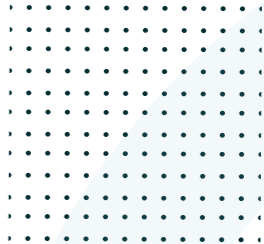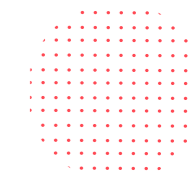

A. 1 (2%)

B. 2 (9%)

C. 3-5 (32%)

D. 6-10 (38%)

E. 11-25 (15%)

F. 25+ (4%)

Which of the following are you deploying on Kubernetes containers?

Kubernetes has grown exponentially in recent years due to its ability to support a vast range of workload types. According to our survey findings, the utilization of Kubernetes is no longer limited to microservices; over 60% of respondents are tapping into data ingestion, cleansing, and analytics with programs like Apache Spark. This trend further confirms that Kubernetes is maturing as an industry standard, with tech leaders deploying a wide variety of workloads on the platform.

A. Databases or data cache (e.g., PostgreSQL, MongoDB, Redis) (59%)

B. AI/ML software (e.g., Python, Tensorflow, Pytorch) (54%)

C. Web servers (e.g., NGINX) (58%)

D. Logging and monitoring (e.g., Elastic, Splunk) (42%)

E. Data ingestion, cleansing, and analytics (e.g., Apache Spark) (61%)

F. Programming languages (e.g., Node.js, Java) (48%)

G. Application servers (35%)

H. Message broker services (10%)
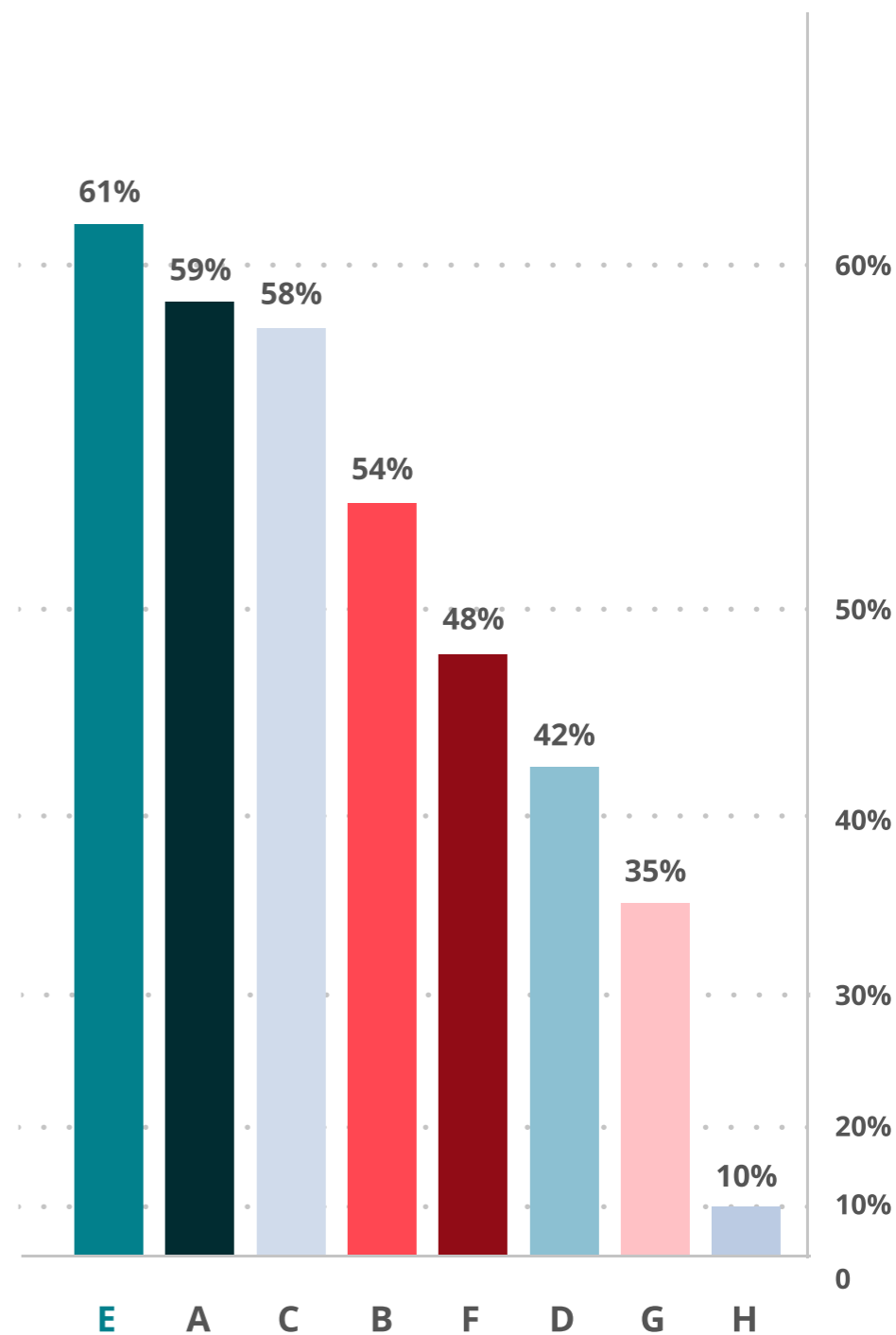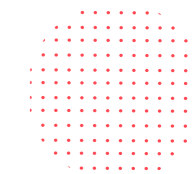
Which of the following challenges have you encountered in your company's adoption of Kubernetes?

As the Kubernetes market matures, the focus shifts from launching on the platform to optimizing deployments. However, "substantial or unexpected" spend on compute, storage, and network infrastructure is seen as the top challenge, closely followed by the steep learning curve or the lack of skilled staff to manage these deployments.

A. Limited support for stateful applications (52%)

B. Significant or unexpected spend on compute, storage, networking infrastructure, and or cloud-based IaaS (57%)

C. Steep learning curve required for employees to upskill across software development, operations, and security (56%)

D. Lack of visibility into Kubernetes spend, leading to cost overruns (50%)

E. The complexity of Kubernetes compared to other orchestrators (41%)

F. Lack of automation and developer-friendly tools for running applications on Kubernetes (22%)
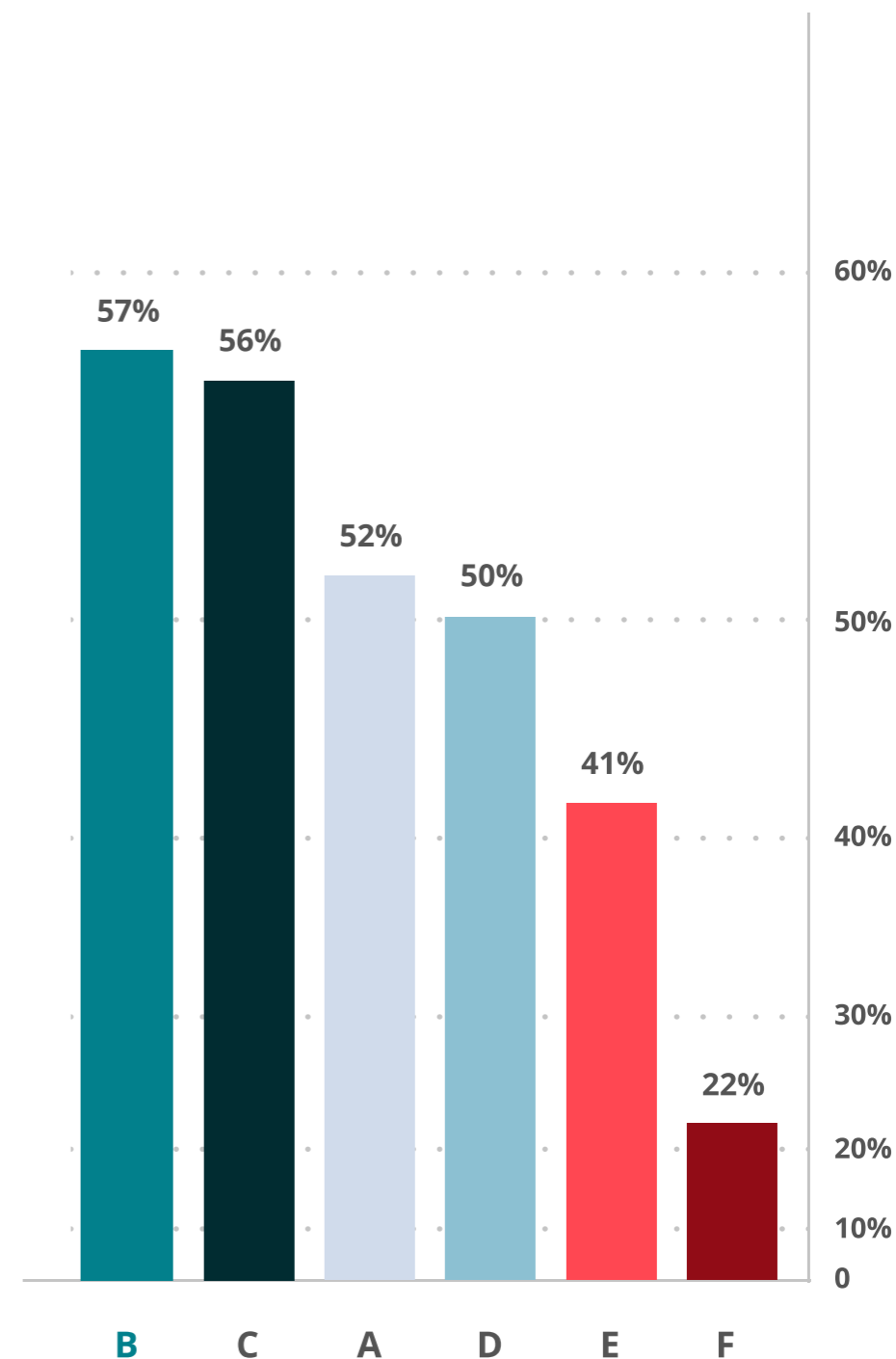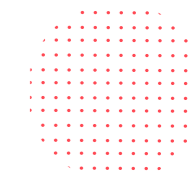
How do you measure the ROI of your Kubernetes deployments?

As businesses attempt to maximize their Kubernetes investments, they are attentively studying a variety of ROI indicators. Among these ROI indicators, cost savings is on top of the list of the majority when calculating ROI performance. The next, most important factors include top-line growth and resource usage. Firms are expecting that Kubernetes will increase ROI by lowering administration and operations burdens, accelerating deployment times, and making resource management more efficient.

A. Developer productivity (46%)

B. Deployment frequency (48%)

C. Top-line growth (54%)

D. Resource utilization (49%)

E. Cost savings (57%)

F. Infrastructure utilization (35%)

G. IT staff productivity savings (25%)
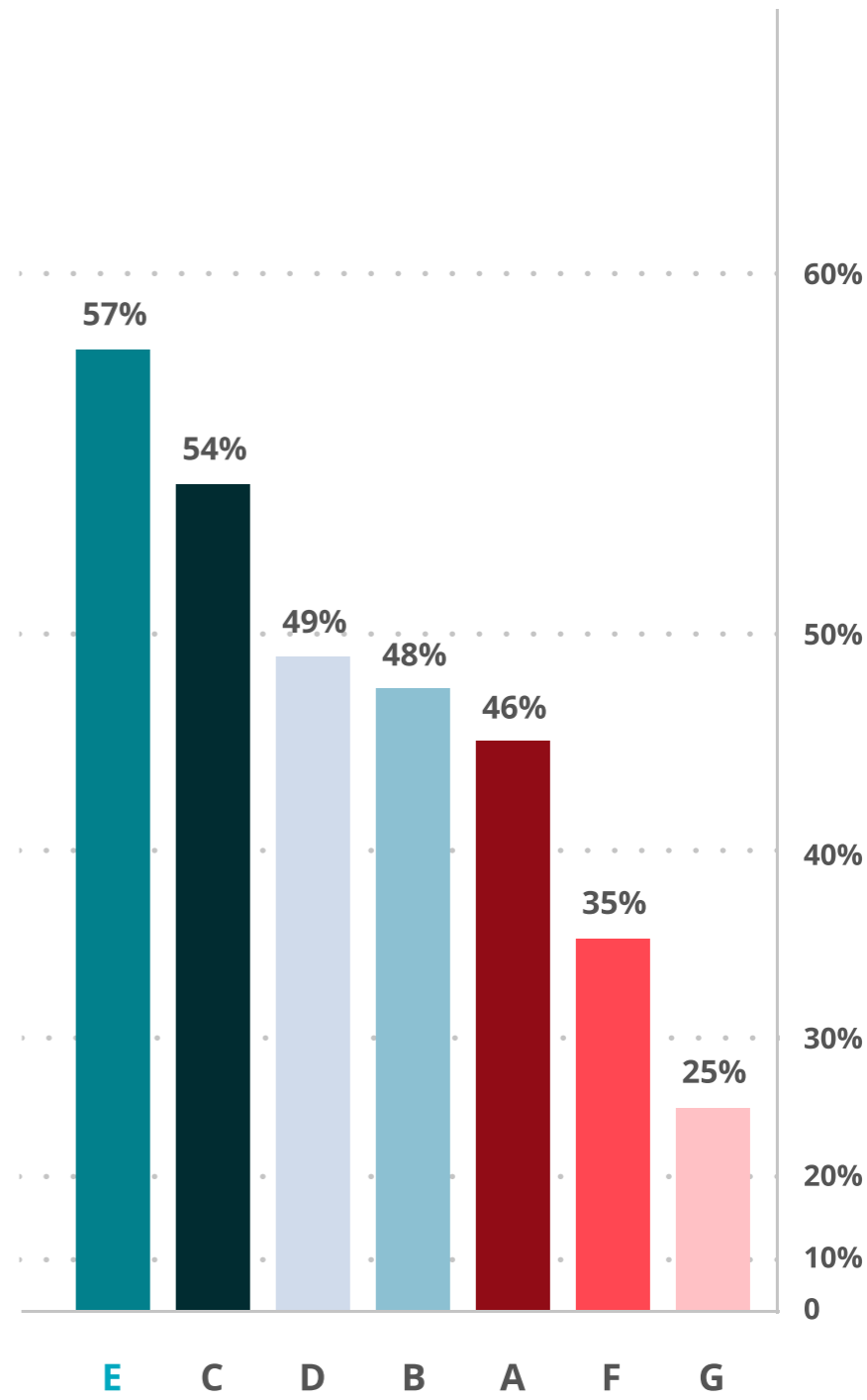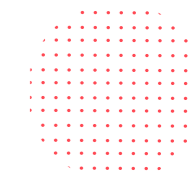
# How does your company optimize your Kubernetes environment today?

Optimization of Kubernetes deployments is an ongoing initiative for companies. In an effort to enhance efficiency, developers are optimizing code, and configurations, and implementing FinOps tools.

A. Run workloads on spot instances (38%)

B. Developers optimize code for performance, reliability, and to meet SLAs (59%)

C. Optimize Kubernetes configurations to maximize node utilization (59%)

D. Implement FinOps tools for cloud cost visibility and allocation (56%)

E. Use tools for automation and optimization of resources (43%)

F. Rightsize instance types for application profiles (15%)
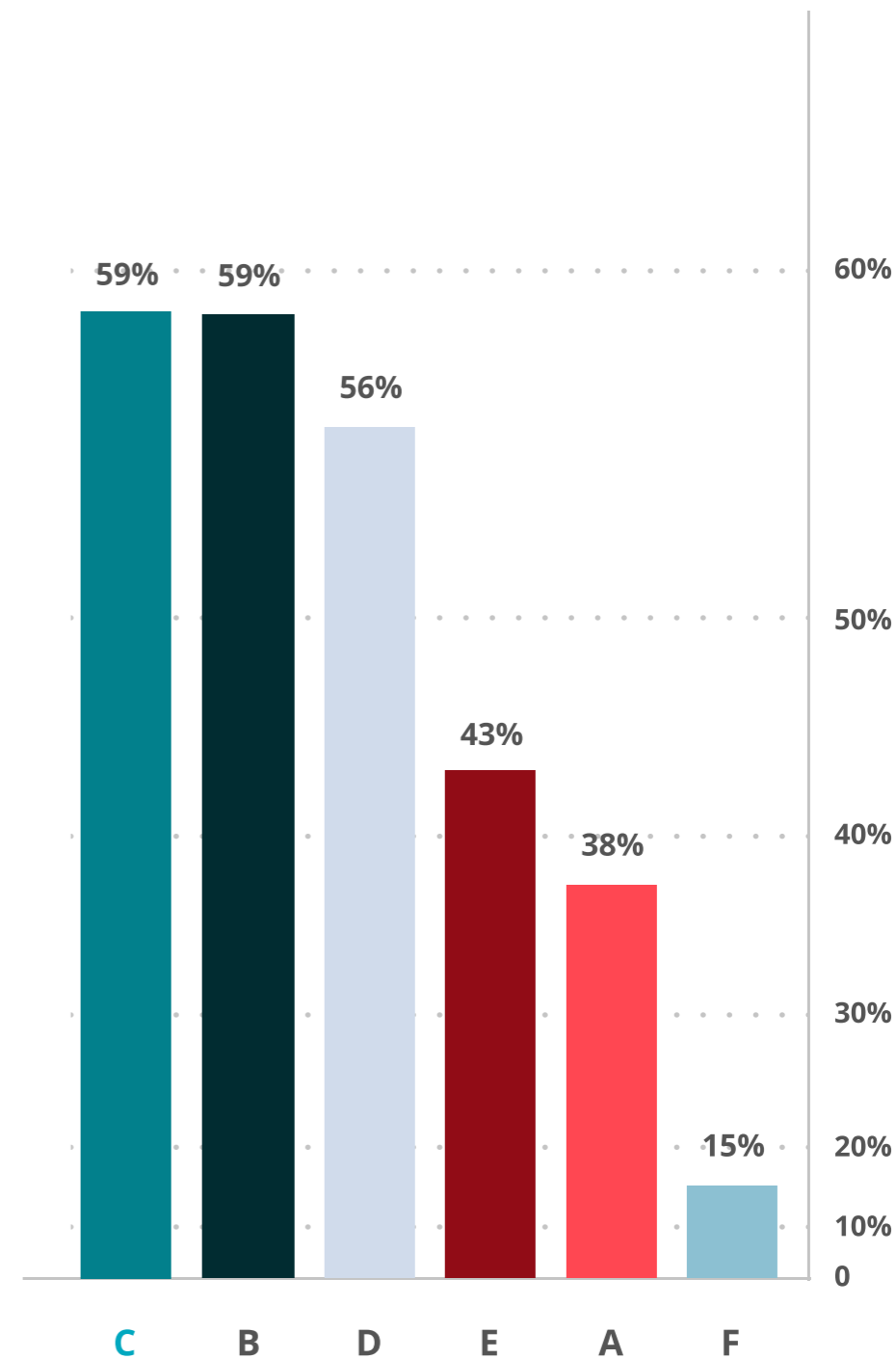
Where are you on your cloud FinOps journey?

The majority of respondents in our poll were in the "walk" stage of FinOps, meaning they have already began applying cloud cost reduction measures, similar to the conclusions found in The State of FinOps 2022 report from the FinOps Foundation. A sizable proportion of respondents classified themselves as being in the "crawl" stage—capable of visualizing and analyzing expenses, but not yet actively implementing optimization advice. Nearly every respondent was familiar with cloud cost optimization approaches, and over 17% are actively reducing costs through autonomous procedures. The data indicates a solid awareness of the significance of FinOps in achieving cloud investment profitability.

Crawl Stage
32%

Not yet started/ no plans
6%

Not familiar
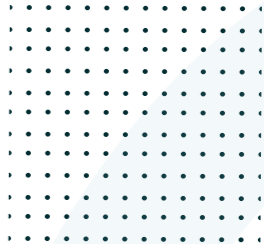2%

Run Stage
17%
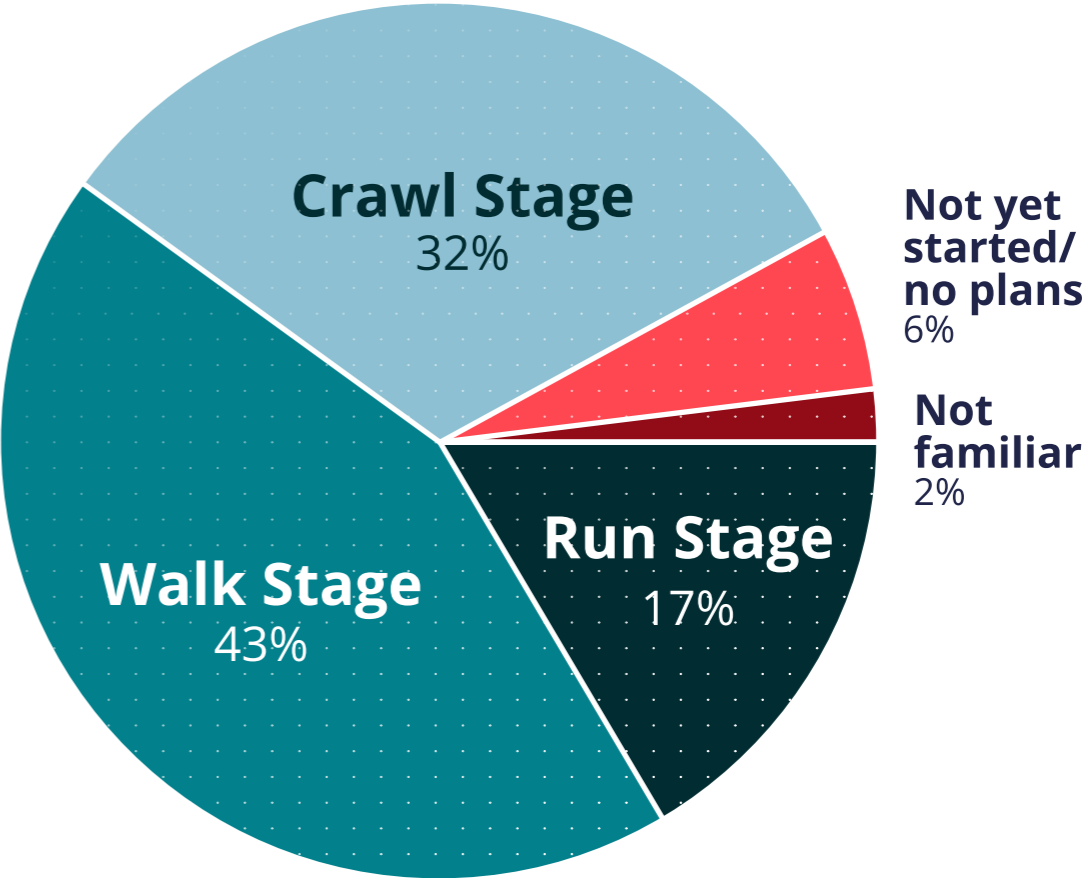
Walk Stage
43%

A. Not familiar (2%)

B. Not yet started/no plans (6%)

C. Crawl Stage: The ability to visualize cloud costs (32%)

D. Walk Stage: The ability to implement cloud cost reduction recommendations (43%)

E. Run Stage: The ability to remediate cloud cost autonomously (17%)

When do you plan to deploy microservices such as NGINX, application servers?

(First choice responses)

Kubernetes provides an optimal platform for microservices, with many organizations already benefiting from its advantages. This translates to the survey results, which show that most companies are either currently deploying or are planning to deploy their data workloads on Kubernetes. This trend indicates that enterprises recognize their opportunity to gain more business insights by leveraging Kubernetes, and we can anticipate increased adoption in the coming years.

A. Planning to deploy in 2023 (44%)

B. Currently deployed (36%)

C. No plans to deploy (20%)

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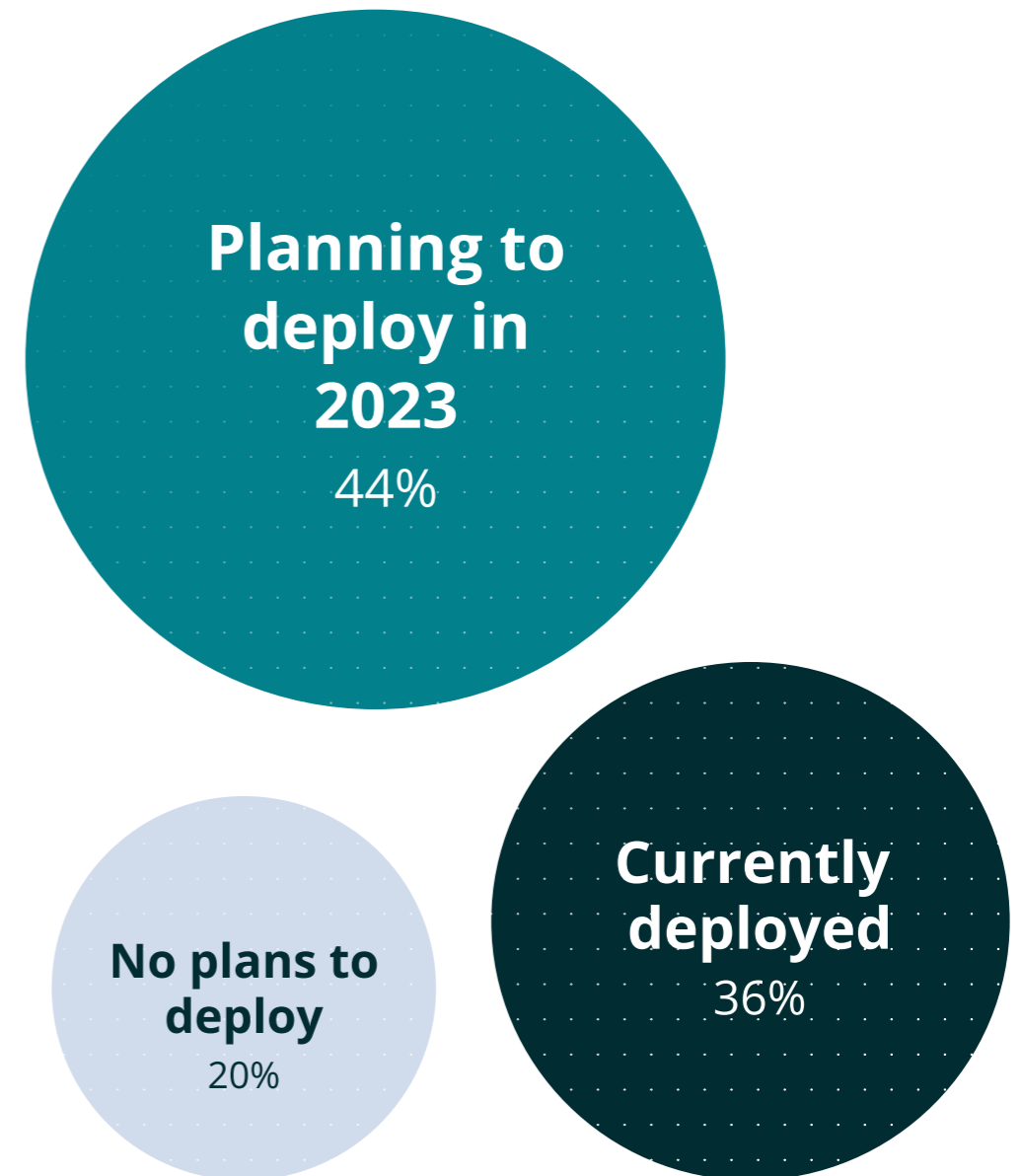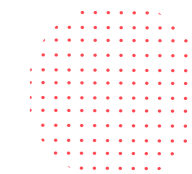
Which of the following statements are motivating your company's adoption of Kubernetes?

(Top 3 answers, based on mean average)

As indicated by the increasing usage of Kubernetes and the expansion of clusters, our respondents see the value of accelerating their application deployment process. Time-saving features, such as rapid deployments and code updates/modifications, create a more efficient environment, allowing the organization to quickly operate with less overhead expenditures. Respondents also indicated a strong preference for Kubernetes to be their microservices deployment architecture of choice in 2023. This versatile tool provides the solid foundation required to effortlessly launch and manage complex workloads.

A. Kubernetes provides a strong foundational architecture for microservices

B. Kubernetes enables applications to be deployed more rapidly

C. Kubernetes supports platform consistency across development, testing, staging, and production clusters

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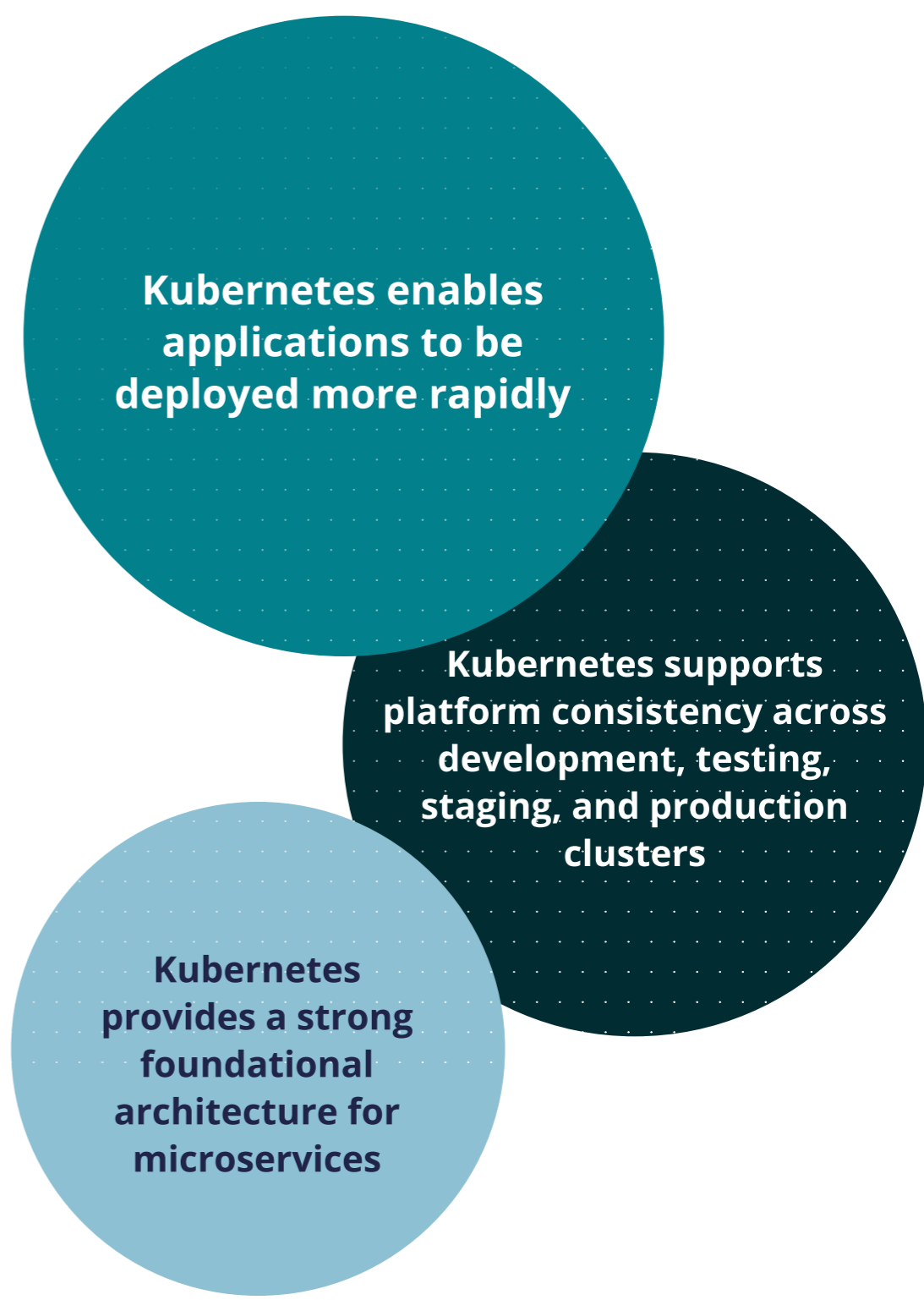
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Pepperdata is the only optimization solution that slashes cloud cost and transforms the performance of big data and Kubernetes workloads without manual interventions or code changes. Pepperdata products autonomously reclaim waste and scale system resources while providing detailed, application-level observability via hundreds of real-time metrics. As a General Member of the FinOps Foundation, Pepperdata powers the most complex and highly-scaled cloud and on-premises infrastructures in the world at top enterprises like Citibank, Expedia, Royal Bank of Canada, and those in the Fortune 5.

START OPTIMIZING TODAY