

Hope Versus Reality: Containers In 2016

CLOUD **F**OUNDRY

Global Perception Study

June 16, 2016



Study Conducted By



Key Findings

1

Containers are a key enabler as organizations adopt continuous delivery as part of their digital transformation.

2

Increased container adoption raises new concerns about managing containers at scale.

3

Users prefer platforms over orchestration tools for container management.

Background

Cloud Foundry Foundation is home to the open source cloud application platform Cloud Foundry. The Foundation engaged ClearPath Strategies, a strategic consulting and public opinion research firm for the world's game-changing political and technology leaders, to conduct a first-of-its-kind, multi-national study of qualitative and quantitative research about the container phenomenon. The study, conducted in the first quarter of 2016, investigated the awareness of container technologies, how they were used, key benefits and challenges of their use, as well as what products and services were used alongside containers. This report details trends in container usage unveiled in that study.

Introduction

In 2011, Marc Andreessen, founder of Netscape, LoudCloud, and Andreessen Horowitz, wrote a frequently cited essay for the Wall Street Journal on “Why Software is Eating the World.” Five years later, this process is well underway. Fortune 500 organizations across all industries—healthcare, insurance, financial services, automotive, telecom—are transforming into software-based businesses to compete in quickly changing markets. Organizations are adopting agile practices as well as new technologies with a focus on delivering more software at a faster rate than ever before.

As these organizations search for tools to enable their digital transformation, they increasingly land on containers as a technology to enable that shift to cloud native application architectures. Organizations are moving from the use of containers as a means of increasing density in existing infrastructure, to using them to increase the velocity of application development as well as the scalability of applications.

The increased adoption and deployment of containers over the last two years prove that companies believe containers play an important role in this shift to cloud native application architectures. Research found that the majority of global organizations are evaluating or running container technologies. While only a small percentage of respondents are running containers in production, a significant number of users say they are planning to run containers in production within the next year.

As organizations take advantage of containers to enable their digital transformation, they discover that this technology comes with serious challenges.

This report discusses the key findings from Cloud Foundry Foundation’s Global Perception Study (GPS). The GPS is a study conducted by the Cloud Foundry Foundation among identified global IT decision-makers.

The study referenced throughout this report was conducted in the first quarter of 2016 with 711 respondents across seven geographies (US, Canada, United Kingdom, Germany, China, Japan, South Korea) in five languages (English, German, Chinese, Japanese, Korean).

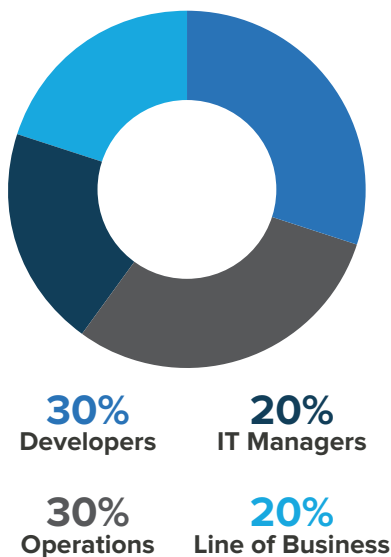
Who Took the Survey?



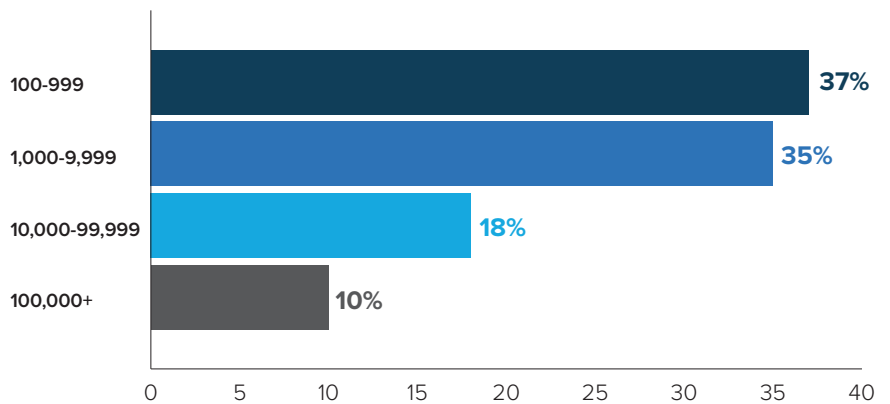
Respondents were divided nearly equally among four broad roles (developer, operations, IT manager, and line of business) from companies with a minimum of 100 employees.

Details from the research provide key insights into some of the major trends among IT decision makers around the world and across industries. The research exposed fascinating trends in containers and platform adoption. This report summarizes the data discovered—highlighting how far technology adoption has come, but also that it is on the brink of a major technology shift in enterprise organizations.

Primary Responsibility



Organization Size by Number of Employees



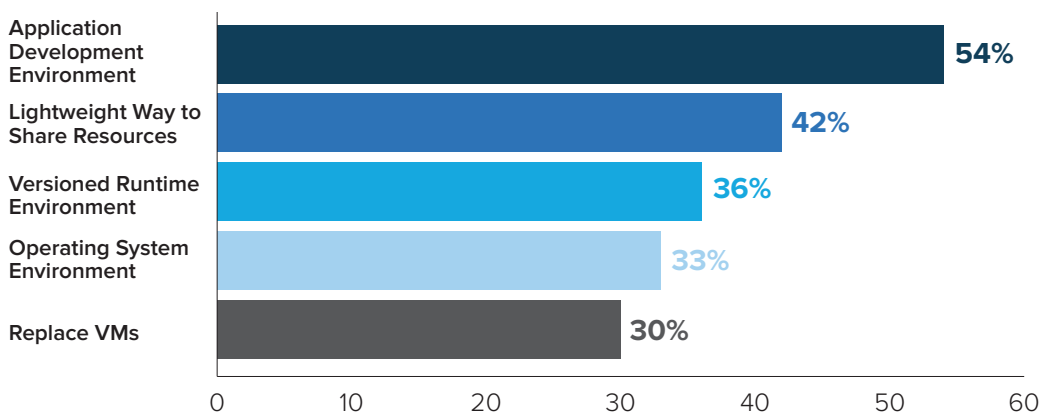
1

Containers are a key enabler as organizations adopt continuous delivery as part of their digital transformation.

As organizations begin their digital transformation journey, they find containers to be an instrumental tool to start establishing continuous delivery practices. Creating a repeatable and reliable process for application releases is a key principle for continuously delivering software. Based on the responses in this research, continuous delivery seems to play a key role in organizations adoption of containers.

When we dig into how containers are being used in organizations we find that the majority of respondents (54%) are using containers as “application development environments.” This indicates the potential for new cloud-native application architectures. Combine that with another 36% that are using containers to provide a “versioned runtime environment” and you see a trend towards deployment automation.

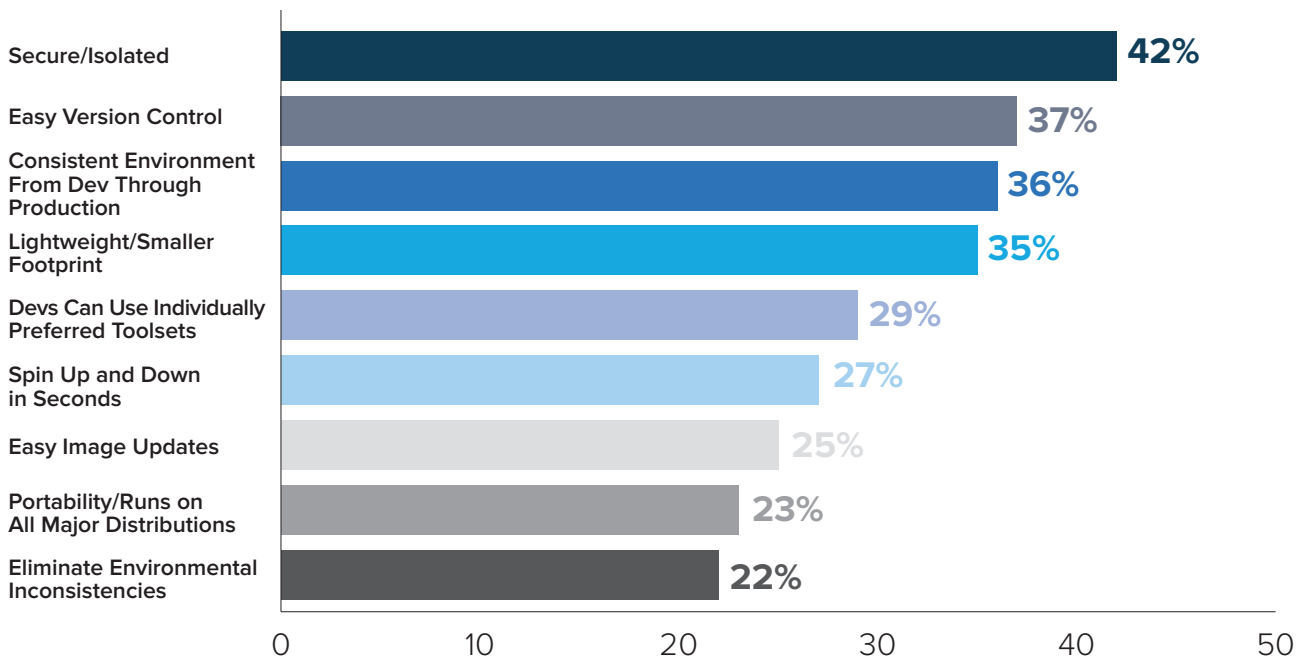
How Containers are Being Used



Respondents were asked to select top 3 uses. n=374

While many organizations gain value in the “secure/isolated” capabilities (42%) that containers provide, we still see organizations honing in on continuous delivery capabilities, like “easy version control” (37%) and a “consistent environment from development to production” (36%).

Benefits of Containers



Respondents were asked to select top 3 benefits. n=374

Consistent with the transition to “mainstream” use, operational concerns begin to come into focus, with 25% of respondents seeing “easy image updates” as a key container benefit, 23% finding value in “portability/runs on all major distributions,” and 22% reporting confidence that containers are able to “eliminate environmental inconsistencies.”

Interestingly, the research also found that 72% of User respondents believe “containers should be treated as just another component of infrastructure controlled policies,” as opposed to a “discrete step in the application development and application deployment process.”

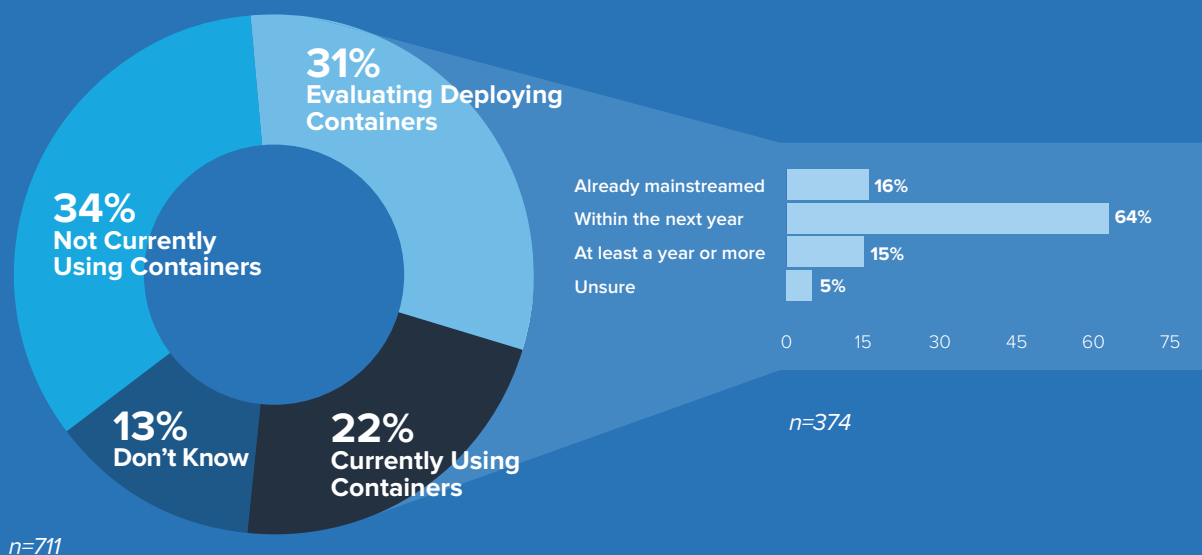
2

Increased container adoption raises new concerns about managing containers at scale.

As organizations transform the way they develop and manage applications, the one tool they turn to increasingly is containers. At the time of our survey, a majority of companies (53%) had either deployed (22%) or were in the process of evaluating (31%) containers.

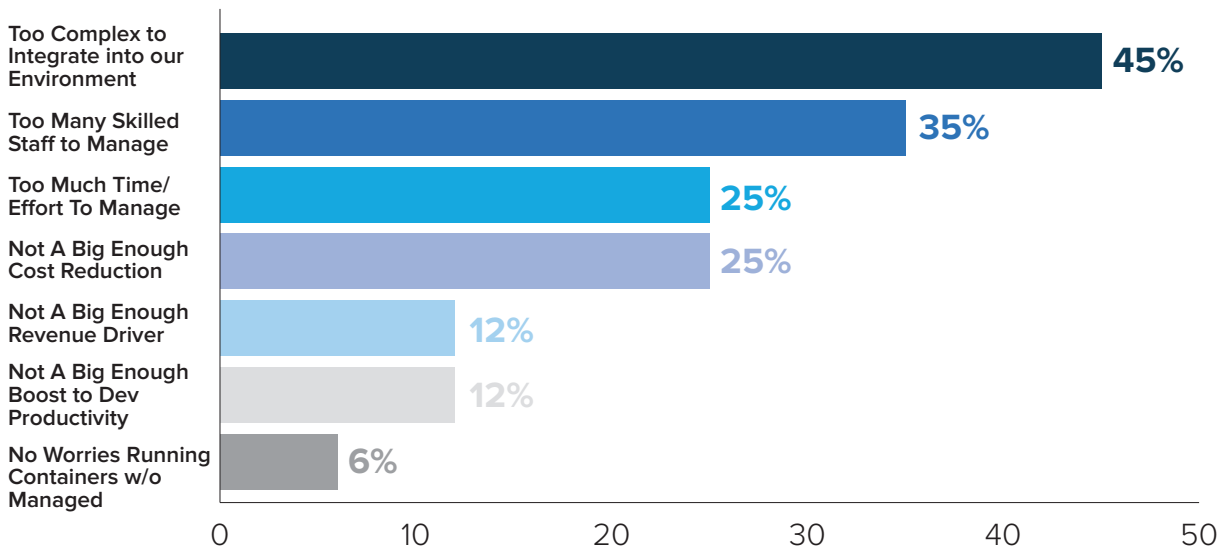
Organizations are moving rapidly to explore and adopt containers. Of the 53% who have deployed or are evaluating containers, 16% have “already mainstreamed” their use. Another 64% expect to mainstream the use of containers in the next year.

Container Adoption & Usage



The research uncovered that the more exposure an organization has to containers, the more complexities are exposed. Respondents said they found containers “too complex to integrate into existing environments,” and require “too many skilled resources to manage.” This could be attributed to where organizations are in their transformation journey, as they figure out how to develop cloud native applications at a velocity that was previously unattainable. With this newfound velocity, organizations find themselves deploying and running containers at the scale of the enterprise.

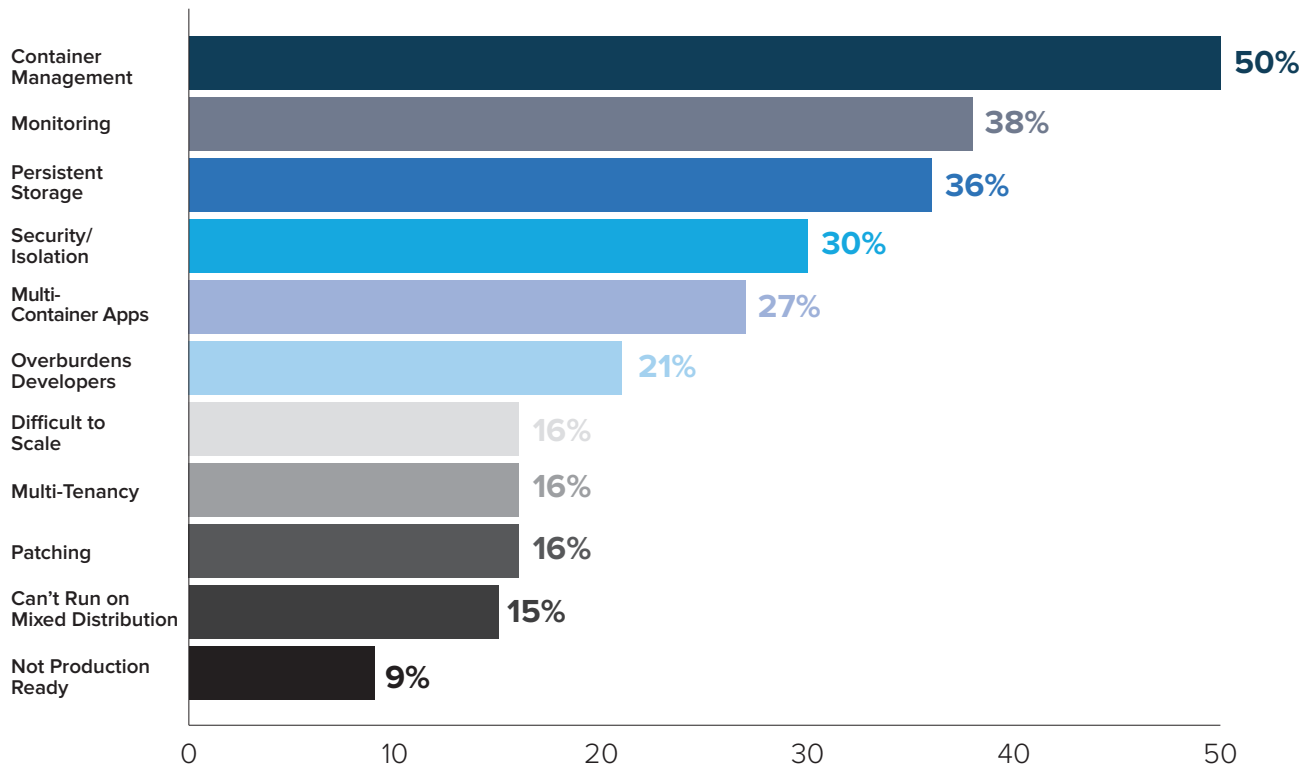
Biggest Deployment Worries



Note: Respondents selected their top 2 worries. n=711

As container adoption increases in an organization, administrators must contend with container sprawl. The #1 challenge of containers, according to the 53% of respondents who are either using or evaluating containers, is “container management.” “Container management,” by a large percentage, is considered a more significant challenge to organizations today than “monitoring,” “persistent storage,” or even “security/isolation.” This reinforces the complexity challenges organizations face managing containers at scale.

Top Container Challenges



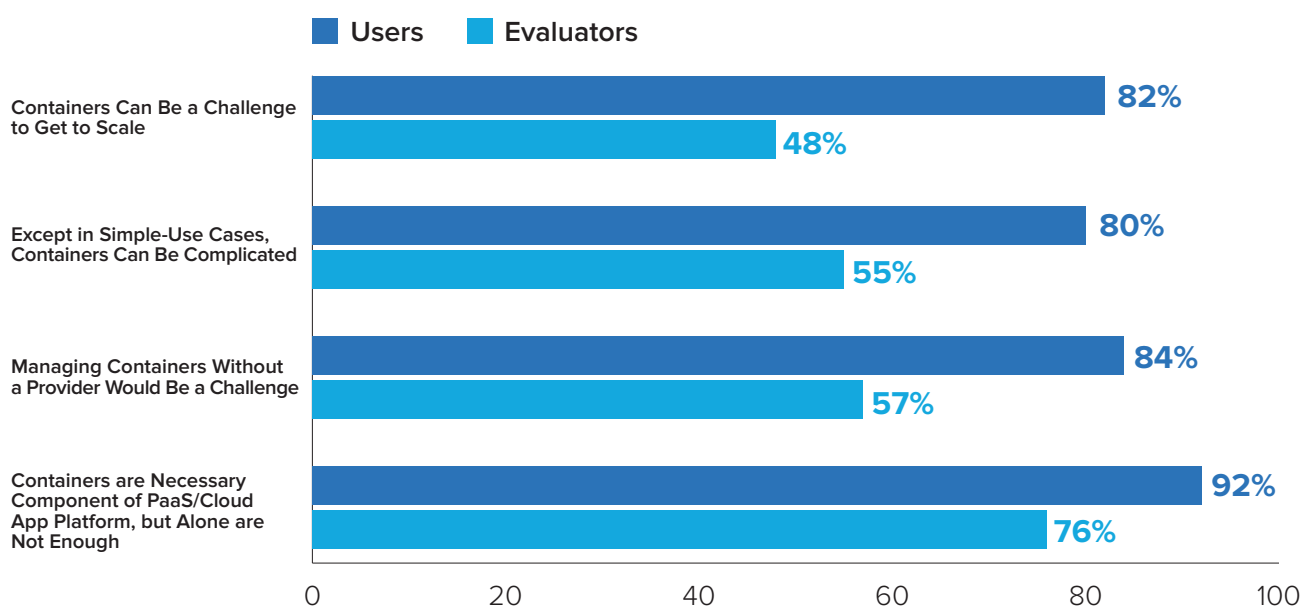
Respondents selected their top 3 challenges. n=374

Organizations evaluating containers don't feel this impact as acutely—yet. While they see the complexity challenges down the road, these Evaluators are not nearly as concerned as the organizations who are running containers in production and are looking to scale at the speed of their market.

Containers alone are not enough.

A key concern from Users and Evaluators alike is that containers increase the complexity of a technology deployment, with 82% of Users saying that “containers can be a challenge to get to scale” and 80% of Users saying that “except in simple use cases containers are complicated.” Containers alone are not enough. In fact, 84% of Users say that “managing containers without a PaaS/cloud application platform would be a challenge” for them.

Container Scale and Management



Respondents were asked to answer True/False statement. n=374

Another concern among both Users and Evaluators is that containers will be “too complex to integrate into existing environments” without a platform. Similarly, 92% of Users say containers alone are not enough for an application development platform that delivers velocity at the speed they desire, and 76% of Evaluators agree.

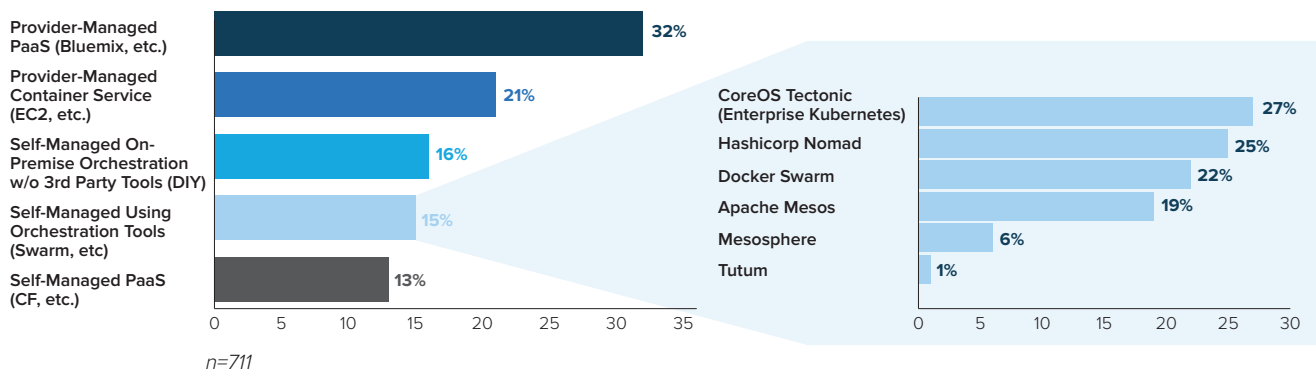
While there is a gap between Users and Evaluators on managing containers, there is agreement that both containers and a PaaS/cloud application platform are necessary for successful application development and deployment at enterprise scale.

3

Users prefer platforms over orchestration tools for container management.

Uncovered in this research, Users and Evaluators are relying less on “self-managed orchestration tools” (15%) and more on both provider-managed and self-managed PaaS/cloud application platforms (45%) to manage their containers. This reinforces Finding #1 - that managing containers at scale is complex - but that complexity can be reduced by implementing a platform.

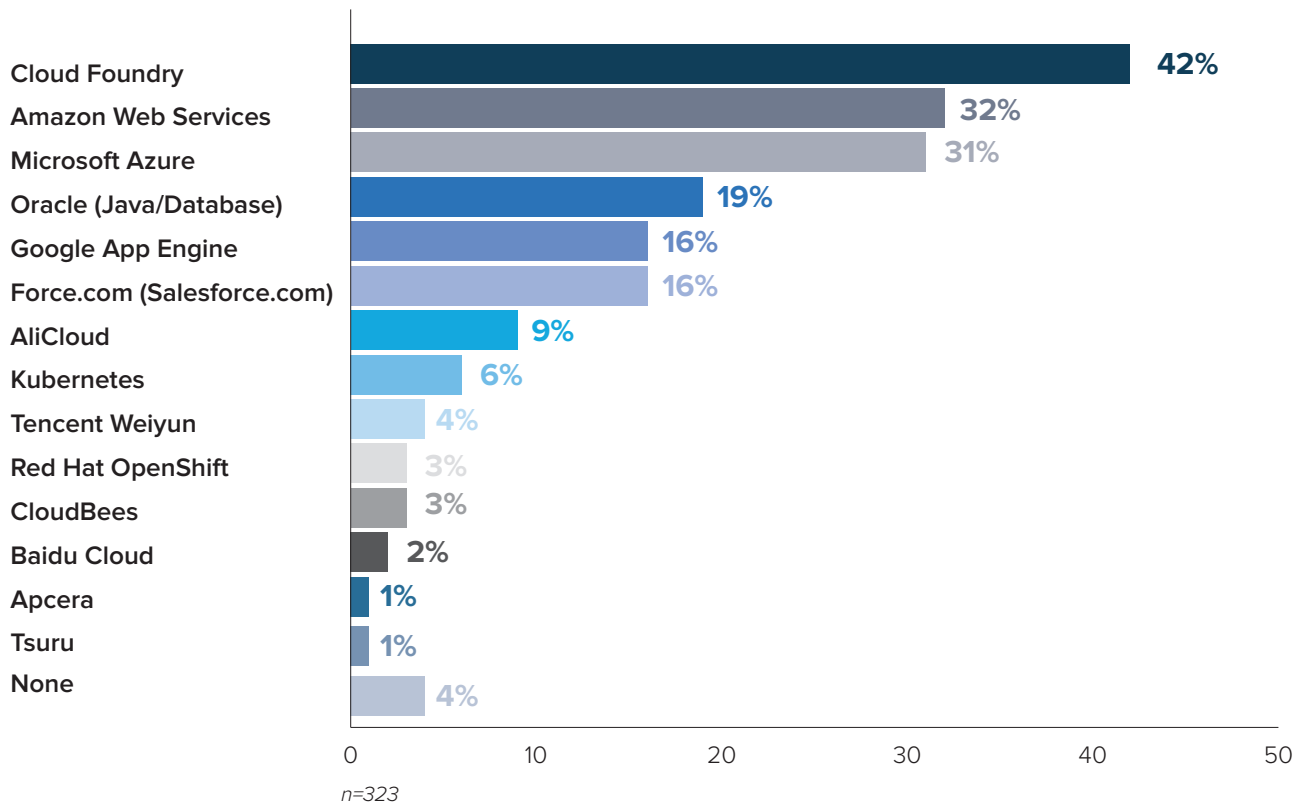
Container Orchestration and Management



If we expand those 15% using “self-managed orchestration tools,” the breakdown is interesting. CoreOS Tectonic, a commercial distribution of Kubernetes and CoreOS, leads with 27%, followed closely by Hashicorp’s Nomad (25%) and Docker Swarm (22%). Trailing the top three are Apache Mesos (19%), Mesosphere DCOS (6%), and Tutum (1%).

The Users and Evaluators that already use a PaaS to run and manage containers (45%) provided a great deal of insight in the platforms that they are using or are under evaluation. Cloud Foundry leads the pack with 42% of the respondents, followed by Amazon Web Services (32%) and Microsoft Azure (31%).

Top Container Management Platforms



While platforms are the preferred way to run and manage containers at scale, this could easily shift by the next survey, and use of orchestration tools could increase. We saw Docker adoption nearly double in just a few short months following the prior survey. From a global perspective, it is still too early to tell what role these technologies will play in container management.

Summary

This report summarizes the broadest and deepest survey to date on containers. The research provided a peek into how and why containers are being used, as well as highlighted a few of the key challenges to their adoption.

Through this research we discovered that containers are being used as a tool by organizations to initiate continuous delivery practices as they embark on their digital transformation journey. While containers alone are not going to provide continuous delivery, they are a good start.

The research also showed that as the adoption of containers increases in an organization new challenges are exposed when managing containers at scale. Containers alone are not enough. Users at scale have made it clear - they prefer managing containers with a platform to a combination of orchestration tools.

The report provides valuable insight into the current state of containers in organizations, as well as a hint of things to come. Organizations are undergoing a shift - a digital transformation. As organizations continue along this journey the role and their use of containers will evolve.

ClearPath Strategies Research Notes

This survey was conducted and produced by ClearPath Strategies (<https://www.clearpath-strategies.com>), a strategic consulting and research firm for the world's game-changing leaders and progressive forces. Following are the firm's research notes for this survey.

Respondent selection. Respondents in this survey were sourced from a leading global online panel provider. They were selected from the panel based on geographic and role-based quotas, as well as screening questions based on role in IT, decision-making role, company size, and how long they have been in IT. Selected respondents were further screened based on self-reported IT knowledge and attentiveness to survey questions.

Role quotas. The survey divided respondents into four broad IT "roles": Developer 30% ("I develop, deploy, and scale software applications."), Operations 30% ("I maintain, monitor, and install IT systems and platforms."), Manager 20% ("I manage staff and oversee the direction and procurement for IT."), and Line of business leadership 20% ("I lead a non-IT division but am responsible for IT decisions for my line of business."). Respondents were asked to select which role most closely described their primary responsibility, even if no one was quite right or even if they performed more than one of these rules.

Geographic quotas. The survey included respondents from the US (26%), UK (23%), China (16%), Japan (15%), Germany (10%), Canada (7%), and South Korea (2%). We combine these broadly into three regions: North America (33%; US and Canada), Europe (33%; UK and Germany), and Asia (33%; China, Japan, and South Korea).

Industry. Although no industry-level quotas were deployed, we monitored the data to ensure that no single industry was over-represented in the data. The final breakdown of respondents by industry is as follows: IT (software, hardware, services) 23%, Manufacturing 18%, Financial services 10%, Business services 6%, Telecommunications/ISP/Web hosting 6%, Construction/engineering 5%, Government 5%, Health care 5%, Retail 5%, Education 3%, Consumer services 2%, Transportation and logistics 2%, life sciences 2%, arts, entertainment, and recreation 1%, agriculture 1%, Extractive and refining 1%, Non-profit 1%, Utilities 1%, and Other 3%.

Respondent screens. Potential respondents were screened on several criteria:

- **Role:** All respondents who selected either “IT professional / Support / Help Desk—I provide general HW and SW support to non-IT staff” or “Non-IT professional—I do not work in an IT division and am not responsible for IT decisions in my line of business” were excluded from the survey.
- **Decision-making:** All respondents must self-identify as a decision-maker. Specifically, in order to qualify for the survey, they must choose either “I am a key decision maker” (31%), “I directly influence the decision” (43%), or “I do not directly influence the decision but do provide feedback necessary to the decision makers” (27%). Anyone selecting “I am not involved in the decision making process” was excluded from the survey.
- **Company size:** All respondents must self-report that their companies have minimum 100 employees. All potential respondents from smaller companies were excluded. In total, the survey includes 37% from companies with 100-999 employees, 35% from companies with 1,000 to 9,999 employees, 18% from companies with 10,000 to 99,999 employees, and 10% from companies of 100,000 or more employees.
- **Time in IT.** Respondents must have spent minimum 2 years working in or with IT in order to qualify for the survey. In total, 63% of respondents have spent 10 or more years in IT, with 37% having spent 2-9 years.
- **Information level.** In our experience, it is possible to have “qualifying respondents” who nevertheless prove to have too little information or knowledge about the space to provide useful data from which to draw insights. We therefore apply an “information” screen to respondents as well. Specifically, we ask whether or not respondents could explain certain terms to their colleagues, if asked to do so. In order to qualify for this survey, a respondent must say “yes” to this question for both the terms “cloud computing” and “virtualization.” There were a few exceptional respondents allowed in who did not say yes to both of these questions, but over 94% of respondents in the data said yes to both.
- **“Attention” level.** It is easy for respondents to speed through surveys or not pay enough attention to provide useful data. We make an effort to exclude these respondents as well, as they provide generally less useful data. In this survey, respondents were screened out for “attention” reasons if they said they could explain the made-up term “Greenfield as a Service (GaaS)” to a colleague in the same question used for the Information Screen noted above. Additionally, respondents were excluded if—when answering the “PaaS awareness question”—they selected the logo/company names for McDonald’s or Starbucks. Both of those companies were included in the list of PaaS products, and respondents were asked only to select the PaaS offerings they were familiar with and specifically instructed not to select non-PaaS offerings.

Definitions. An important finding from our GPS studies to date—both qualitative and quantitative—is that IT decision makers have a much less clear-cut vision of the technology and do not always make clean distinctions between IaaS and PaaS as we might. Therefore, although we might not ourselves describe AWS, Azure, or Kubernetes as being true “PaaS” or might say they have “PaaS-like features,” the respondents may have a different perspective. Therefore, in the survey, the following definitions were used for PaaS and Containers:

- **PaaS.** “PaaS—also called Cloud Application Platform—is a category of cloud computing services that provides a platform allowing companies to develop, run, and manage enterprise and web applications without the complexity of building and maintaining the infrastructure and middleware typically associated with developing and launching an app.”
- **Containers.** “Containers are a category of cloud computing services that enable developers and sysadmins to build, ship, and run distributed applications efficiently by packaging applications with all of its dependencies into a standardized unit. Containers can be deployed on a wide variety of platforms or infrastructures, managed either on-premises or in the cloud.”

A note on Kubernetes. Regarding the topic of Kubernetes and its placement in different categories, our questionnaire allowed respondents two places to indicate Kubernetes use—as either a PaaS or a container management tool. Nevertheless, question wording and formatting impacts results, and any differences with other data may result from choices made in this process.

A note on margin of error. It is technically impossible and improper to list a margin of error for a survey of this type. The respondents for this sample were drawn from an online panel with an unknown relationship to the total universe, about which we also do not know the true demographics. As such, the exact representativeness of this, or any similarly produced sample, is unknown.

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