



KUBERNETES IN THE ENTERPRISE:

*Uncovering Challenges & Opportunities
On The Path To Production*

**D2
IQ**

Executive Summary

To keep pace with the accelerating digital landscape, today's enterprises are moving to Kubernetes as quickly as possible. Many organizations are implementing cloud native and open source technologies to enable agility and increased time-to-value. This cloud native journey has become a critical part of an organization's digital transformation, with 77% of organizations citing Kubernetes as a central part of the strategy. In fact, organizations expect that projects in production using Kubernetes will rise 61% in the next two years.

However, this journey from Day 0 to Day 2 operations and Kubernetes success is not an easy one. Day 2 is a DevOps concept that has been around for some time, referring to the phase of the development lifecycle that follows initial deployment to where the real application demands exist. Challenges are common and complexity increases as developers add stacks and applications to keep pace with their business goals and growth. Almost all organizations that use cloud native technologies have run into challenges, most commonly during the development phase. As many as 94% of respondents indicated Kubernetes is a source of pain or complexity for their organizations. This puts a strain on already over-taxed development teams to solve problems quickly and keep projects on track.

This report will share Kubernetes deployment insights from a comprehensive survey of IT leaders and developers from organizations of all sizes and industries. The use of Kubernetes enables organizations to quickly and strategically roll out new applications and services in response to continually evolving customer and market demands. It's no surprise then that, on average, organizations have been using cloud native technology for almost two years and most expect to complete their cloud native journey in another two years.



Key insights from the study include:



The real value of cloud native journeys is realized in production environments. When it comes to Kubernetes specifically, it takes an organization an average of around **five months to get Kubernetes platforms into production environments.**



Enterprises are maturing on their cloud native journeys, with **60% of organizations claiming that all of their cloud native applications successfully made it into production in the last year.** The benefits of cloud native applications continue to be critical as digital transformations accelerate across the globe.



The COVID-19 pandemic has had a **disruptive effect on almost every (91%) organizations' cloud native journey.** The challenge for most organizations is how to move forward with their cloud native journeys and Kubernetes deployments with fewer resources.

The following sections will dive deeper into survey responses, uncovering industry trends and highlighting new opportunities for organizations deploying kubernetes clusters on their cloud native journeys.



The cloud native journey is critical to an organization's success

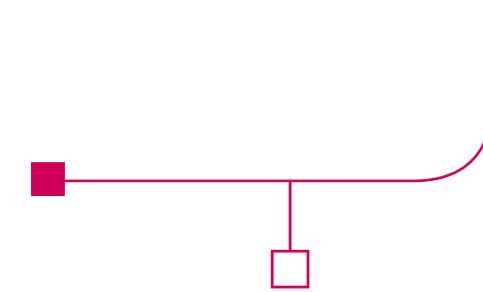
In March 2020, nearly every organization in the world became a digital business. Response to the COVID-19 driven global shutdown forced the acceleration of digital transformation efforts, unveiling that nearly all organizations (99%) are currently engaged or planning to engage in a digital transformation. **For more than half (54%) of organizations, digital transformation is the most crucial company initiative.**

While digital transformation is a priority, opinions vary among IT leaders and developers regarding whether it is the most crucial tech initiative. **35% of IT decision makers feel digital transformation is the most important company initiative, compared to 63% of developers and architects who feel the same. On the other hand, 50% of IT decision makers feel it is the most important IT initiative, compared to only 24% of developers and architects who feel the same.** This disconnect exposes a potential lack of clear ownership and investment in digital transformation strategies, leading to additional challenges as projects grow and evolve.

54% of organizations state that digital transformation is the most crucial company initiative.

Today's digital transformation is driven by Kubernetes. More than three-quarters (77%) of organizations say Kubernetes is a central part of their digital transformation strategy. The focus on digital transformation means that cloud native applications likely drive an immediate impact on the bottom line. More than a third (36%) of organizations claim successful cloud native applications in Day 2 operations are critical to their long-term success. It's interesting to note that higher levels of an organization tend to place more value on cloud native applications, with 54% of IT decision makers citing that successful cloud native applications in Day 2 operations are critical to long-term success, compared to only 27% of developers and architects.

While the macro driver behind most cloud native journeys is digital transformation, there are more specific and tangible goals that put organizations on the path. **When deciding to begin their cloud native journeys, the majority of organizations did so to improve operations (57%), to improve customer experience (50%) and for the future success of their business (46%).** More streamlined, cost-effective operations and more personalized and consistent customer interactions are critical to building and growing brands in the coming years. Making the right (or wrong) decisions on a cloud native journey often holds the keys to an organization's future and determines if it will be an industry leader or laggard.



When deciding to begin their cloud native journeys, the majority of organizations did so to improve:

- Operations (57%)
- Customer experience (50%)
- Future success of their business (46%)

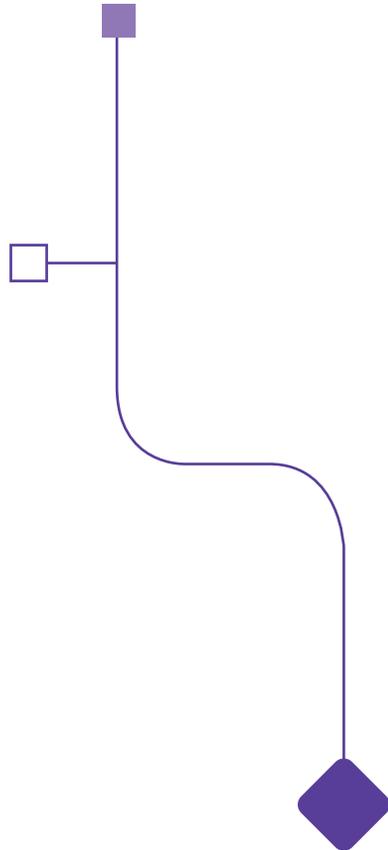


Adoption of Kubernetes

Organizations, varying in industry and size, are taking advantage of the hundreds of technology services that the cloud native landscape offers. However, the foundation of many cloud native journeys is Kubernetes. **With 89% of organizations running Kubernetes in production (63%) or pre-production (26%), we are clearly past the early adopter stage for the container management and automation platform.**

While Kubernetes is a clear choice for most enterprises, how they approach their journey can differ significantly. For example, organizations use or plan to use various methods and resources to deploy Kubernetes. **The majority of organizations running Kubernetes utilize outside resources, such as a Kubernetes management platform (64%), a cloud SaaS service (64%) and/or public cloud (55%).** These external resources help streamline the management and scaling of a Kubernetes deployment by reducing the strain on internal IT resources and infrastructure.

89% of organizations are currently running Kubernetes



When it comes to methods for deploying Kubernetes clusters, the most commonly used method is through automated deployments, such as continuous integration/continuous delivery (CI/CD) and GitOps, with 65% of organizations selecting this approach. Coming in a close second, 62% of organizations follow a traditional DevOps tooling approach for deploying Kubernetes clusters. And just over half (51%) of organizations deploy Kubernetes using packaged deployments. Note that there is substantial overlap among these three groups. These approaches highlight the critical need for both speed and agility when harnessing the full potential of containerized, Kubernetes-powered applications.

DevOps and CI/CD also remain popular for organizations running Kubernetes, even if the organizations don't use DevOps tooling or CI/CD specifically for Kubernetes deployments, **with more than three quarters (78%) of organizations running Kubernetes having also adopted DevOps and just under half (49%) also adopting CI/CD practices.**

Interestingly, 64% of organizations have also adopted cloud native storage to complement Kubernetes deployments. Every cloud native journey is unique, but coupling Kubernetes with other cloud technologies and having a clear development strategy appear to be the chosen path for many organizations.

Organizations utilize Kubernetes clusters to run various workloads that support the needs of the overall business or individual business line.

This broad mix of popular workloads highlights the power of Kubernetes clusters to accelerate a number of IT initiatives. However, the enormous benefits of Kubernetes do not come without challenges.

The most popular workloads for organizations are:

- Build structures (64%)
- Distributed (nosql) data servers (61%)
- Windows containers (59%)
- Data analytics or machine learning workloads (58%)
- Traditional data services (sql) (57%)

Complexities of Kubernetes: challenges getting to production

The journey to Day 2 success with Kubernetes is not often an easy one. **Almost all (95%) organizations that use cloud native technology have run into challenges, most commonly during the development phase (47%).** Successful production deployments at scale require a deep understanding of how Kubernetes integrates with the existing IT infrastructure and extensive experience building cloud native applications.

The benefits of Kubernetes are widely understood and its challenges are also similar to many IT projects. **The most common challenges organizations face when it comes to adopting Kubernetes are security concerns (47%), difficulty scaling up effectively (37%) and lack of IT resources (34%).** While organizations may cite these same challenges for many IT deployments, Kubernetes raises the stakes, as it often sits at the center of the cloud native journeys that are critical to every digital transformation.

95% organizations that use cloud native technology have run into challenges

The pain of these Kubernetes challenges is felt by almost everyone, with 94% of respondents claiming that Kubernetes is a source of pain or complexity for their organization. **Those in the Kubernetes trenches often feel the brunt of that pain, with 78% of developers and architects claiming that Kubernetes add-ons cause a great deal of pain and introduce complexity (only 56% of IT decision makers cite a similar sentiment).** While DevOps and other development philosophies have gone a long way toward connecting developer personnel across levels and disciplines, this insight uncovers where the most help is needed in an organization's Kubernetes deployment.

Diving deeper into Kubernetes add-ons, it's clear that while they may extend the platform's functionality, these add-ons also introduce challenges. Organizations running Kubernetes say add-ons cause at least some pain and complexity challenges, and these challenges persist regardless of where organizations acquire the add-ons. **57% of organizations acquire add-ons from an open source distribution and 54% acquire them from vendors offering purpose-built add-ons.** While there's no clear preference for acquiring add-ons, organizations often require assistance in coupling them with their Kubernetes deployment.

DevOps teams can overcome these challenges with a dedicated Kubernetes strategy that considers potential obstacles at each stage of the deployment process, from pre-production and testing to scaling in production. Ensuring your organization has the right technologies and expertise will set you up for Kubernetes success.



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IT Developer satisfaction

The rapid rise in popularity of Kubernetes has created a critical need for experienced and skilled developers to help navigate the complexities of the technology. Building Kubernetes clusters requires innovative and creative thinking so it's not surprising that **93% of developers and architects agree that building cloud native applications make them feel excited to come to work every day**. However, it's not all smiles when it comes to working with Kubernetes.

In contrast to the positive feelings toward cloud native application development, developers and architects report several frustrations. **38% of developers and architects claim their work makes them feel extremely burnt out**. Long hours, short deadlines and high-pressure situations can create a work environment that is draining on these DevOps teams. **32% of respondents say that building cloud native applications causes stress, while 28% admit that building applications is very frustrating**.



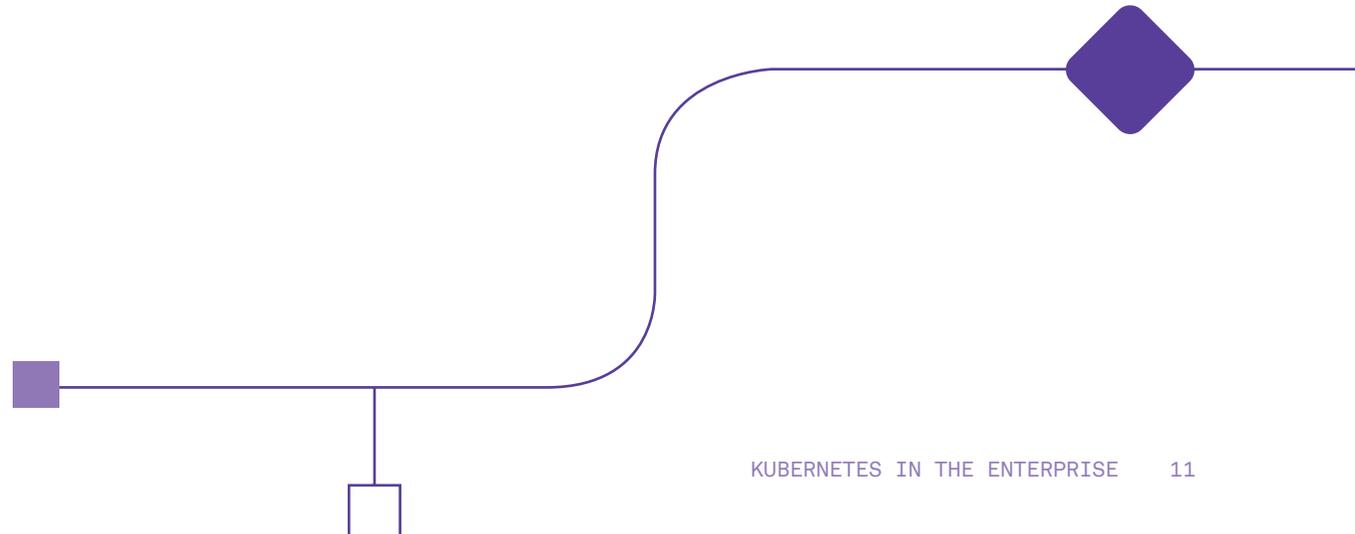
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Burnout, stress, and frustration drive IT teams to consider some drastic measures, including changing their scenery. This should be alarming to C-level and IT leaders who desperately need the brainpower of these teams to achieve digital transformation and overall business success.

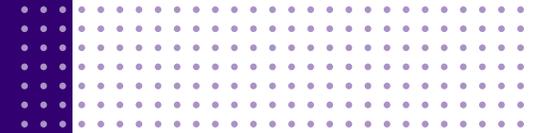
Kubernetes has made scaling applications on multiple cloud environments a reality, but it has also introduced tremendous amounts of complexity into IT departments. And these complexities are not just at the technical level, as there appears to be some Kubernetes confusion among IT team members themselves. The study revealed an apparent disconnect among developers and architects on how building Kubernetes stacks impacts their team. **While 93% feel building cloud native applications brings their entire IT teams together, 82% claim it creates conflict.** This contradiction may represent some of the challenges when building cloud native applications at light speed.



51% of developers and architects say building cloud native applications makes them want to find a new job



Disruption caused by the COVID-19 pandemic



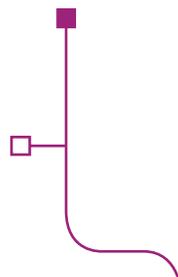
When it comes to challenges, none may pose a more significant threat (or opportunity) than the COVID-19 pandemic. In the last six months, the unprecedented global environment has forced many companies to cut back on operations and adjust their business models. Most organizations' challenge is how to move forward with their cloud native journeys and Kubernetes deployments with fewer resources--both money and personnel.

While disruptive, COVID-19 has also driven home the value of completing a cloud native journey for many organizations. 35% of organizations agree that the pandemic has accelerated their move to cloud native. In the wake of the pandemic, organizations are accelerating digital transformation initiatives by moving to the cloud and leveraging Kubernetes to improve business agility.

The ongoing pandemic has had a disruptive effect on **91% of organizations' cloud native journeys.**

Most commonly, this means:

- Budget cuts to **development (41%)**
- **Technology acquisition (39%)**
- Freezing or slowing down **hiring (39%)**
- **Project delays (37%)**



Cloud native talent and training is critical for organizations and IT pros

As organizations move from legacy to cloud native applications, the demand for Kubernetes has significantly increased. However, as they move closer to production and Day 2 operations, they are often met with the complexity of migrating to a complete Kubernetes-powered environment while also struggling to keep pace with the skills required to maintain it. **While 96% of organizations can find Kubernetes talent, 24% say it could take a while to find the right candidate.**

Enterprises are under pressure to unlock the benefits of cloud native applications to reduce costs and accelerate innovation. As organizations continue on their cloud native journeys, the demand for advanced skills only increases. **95% of organizations with cloud native applications believe they have the talent required to successfully complete its cloud native journey**, but 53% of organizations confirm that their workforce is most commonly composed of a combination of in-house talent and contractors/partners.

Kubernetes skills are clearly valued, but organizations still have a ways to go to fill the cloud native talent gap. The investment in training is a good sign, given that **93% of developers and architects agree that adopting Kubernetes increases their job security and 81% of respondents agree that the adoption of Kubernetes is critical to their career success and future employability.** This data highlights the importance of Kubernetes to developers and architects, something that IT leaders can use when recruiting new talent.

98% of organizations are currently investing or planning to invest in Kubernetes training to fill that gap

Conclusion

The importance, value and business impact of a successful cloud native journey is undeniable, and Kubernetes has shown a clear path to achieving this goal. While this winding path is fraught with challenges and unique to every enterprise, developing the right strategy begins with selecting the best technologies and partners. As a pioneer in cloud native technologies, D2iQ has been helping organizations across the globe build and scale Kubernetes clusters since the introduction of the technology, empowering them to achieve their goals at all stages of the journey.

Methodology

The **2020 State of Kubernetes in Production Environments Study** is based on an online, quantitative market research study commissioned by D2iQ and conducted by independent research firm Vanson Bourne in Q2 and Q3 2020. Respondents included 300 completed responses from in the US via online surveys, including 200 developers, architects, DevOps employees (platform architects and cloud architects) and 100 senior IT decision makers.

About D2iQ

D2iQ provides the leading independent Kubernetes platform which simplifies and automates the really difficult tasks needed for enterprise-grade production at scale, while reducing operational burden and reducing costs. As a cloud native pioneer we have more than a decade of experience tackling the most complex, mission-critical deployments in the industry. The D2iQ Kubernetes Platform is a complete solution that includes the technology, expert services, training and support necessary to ensure your success on Day 2 and beyond. Our independence provides us the agility to meet the needs of our customers first, while always keeping TCO top of mind. Find us at <https://d2iq.com>

