



Kubernetes Simplified

Removing Complexity from Container
Orchestration and Deployment

Since its initial release in 2014, Kubernetes has become a widely popular tool, with [78% of all cloud-native projects](#)^[1] using Kubernetes to manage their container infrastructure. Developers [look to Kubernetes](#)^[2] to streamline development, improve productivity, and make application deployments more stable. But there's even more potential. The projected market for application container technologies is expected to reach [\\$4.3 billion](#)^[3] by 2022, according to 451 Research.

Kubernetes reduces the complexity of managing containers and has seen unbridled success. "This was the simple, basic job that Kubernetes was hired for," [writes](#)^[4] RedMonk's Stephen O'Grady.

However, because it's open source and deeply customizable, Kubernetes has introduced different challenges. There's an entire ecosystem of management platforms designed to simplify Kubernetes, but many of them aren't that simple at all. Most Kubernetes management solutions make entry only incrementally easier and still leave developers with too many customization and integration options to navigate on their own. Roughly a third of users (38%) say container implementation [complexity](#)^[5] is a top concern.

Managed Kubernetes orchestration engines should do more than just help deploy Kubernetes. It has to do what it promises: manage—and do so with simplicity, security, and affordability in mind.

31% 

Compound Annual Growth Rate (CAGR) of the application container technologies market between 2017 and 2022.

70% 

By 2024, almost three out of every four new applications will be deployed in containers.

21% 

One out of every five enterprises with less than 1,000 employees are testing or using Kubernetes in production.

^[1] Cloud Native Computing Foundation (CNCF), 2019 CNCF Survey results are here: *Deployments are growing in size and speed as cloud native adoption becomes mainstream*, March 4, 2020

^[2] CoreOS Blog, *451 Research study reveals rapid adoption of Kubernetes for hybrid cloud infrastructure*, June 16, 2017

^[3] 451 Research, *451 Research Says Application Containers Market Will Grow to Reach \$4.3bn by 2022*, December 5, 2018

^[4] RedMonk, *The Kubernetes Lesson*, March 2, 2018

^[5] CNCF, 2019 CNCF Survey results are here

Implementing Kubernetes is an Uphill Battle

Although Gartner estimates that by 2022, 75% of organizations will be running containerized applications in production, “organizations often underestimate the effort required,” Gartner analyst Arun Chandrasekaran wrote in a [report^{\[6\]}](#), citing the steep Kubernetes learning curve.

By 2024, [70% of new applications^{\[7\]}](#) will rely on containers for improved development speed, application consistency, and portability. But with teams spending too much time on the infrastructure side of Kubernetes, they can miss out on the acceleration [potential^{\[8\]}](#). The Cloud Native Computing Foundation (CNCF) [found^{\[9\]}](#) that setting up the security infrastructure was a top challenge for 40% of users, while 32% said monitoring was the toughest component. Roughly 25% of users also found establishing networking and storage to be significant obstacles. And that’s all before developers even begin tailoring their clusters to suit their specific business needs.

^[6] Gartner, *Best Practices for Running Containers and Kubernetes in Production*, February 25, 2019

^[7] IDC, *DC releases Top Ten Developer and DevOps Predictions for 2020: DevOps to Gain Wide Recognition*, February 20, 2020

^[8] The New Stack, *The New Stack Context: Is Kubernetes the New App Server?*, May 15, 2020

^[9] CNCF, *2019 CNCF Survey results are here*

Top Challenges Using/Deploying Containers



40%

Setting up security infrastructure



38%

Implementation complexity



32%

Monitoring



25%

Establishing networking and storage

Vendors that offer Kubernetes management engines claim they can simplify deployment and management, but the reality is often different. Early on, providers rushed to offer management technology quickly without developing it enough to address Kubernetes' complexity. Now, management engines like AWS or GKE (Google Kubernetes Engine), have so many capabilities that they do little to make Kubernetes implementation simpler. Developers often find themselves so overwhelmed by what's possible that they have trouble identifying what they need their Kubernetes orchestration to do.

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A product like GKE is complicated because it does a lot more, some of it which we don't need.

Understanding all the integrations, and deciding what is not worth using, takes time and effort.

Gerhard Lazu, Site Reliability Engineer,
Changelog Media

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“A product like GKE is complicated because it does a lot more, some of it which we don't need. Understanding all the integrations, and deciding what is not worth using takes time and effort,” says Gerhard Lazu, site reliability engineer at Changelog, a platform that provides news and podcasts for developers.

The other part of the problem is that these management solutions aren't cost-efficient, often [costing over \\$50,000^{\[10\]}](#) with much of the price covering features that developers don't end up using. Because developers—especially at smaller companies—don't necessarily need all of the available options, the cost is unjustifiable. The key to finding the right tool is identifying the capabilities that an organization needs and ensuring that the cost model reflects the functionality.



^[10] Replex, *The Ultimate Kubernetes Cost Guide: AWS vs GCP vs Azure vs Digital Ocean*, September 19, 2018

Meeting Modern Container Management Needs

No doubt, an easy UI for initial implementation is a must-have for a Kubernetes management engine. If configuring, provisioning, and managing your initial Kubernetes clusters takes more than just a few steps, the management engine isn't simplifying much of the process. Factors like security and load automation are also important to consider when choosing a Kubernetes management engine.

The orchestration engine should ensure that Kubernetes automatically distributes containers across the cluster to provide the most efficient use of resources, and should also automate backup and recovery so data are never lost when errors occur. Scalability should be automated too; [70% of Kubernetes^{\[11\]}](#) users look to it for autoscaling, which ensures that resources grow in real-time as workloads increase. The significance of security goes without saying that developers must be able to trust that the Kubernetes engine they choose is committed to consistently protecting their data. “Security can’t be an afterthought,” Gartner’s Chandrasekaran [warns^{\[12\]}](#).

Top Priorities for Container Usage



Developers turn to Kubernetes to unlock the full potential of containers. When surveyed, developers indicated they want a container-orchestration system that:



33%

Helps deliver operations efficiency



32%

Enables hybrid cloud integration



21%

Improves speed and serves developers



12%

Makes applications more portable

^[11] CNCF, 2019 CNCF Survey results are here

^[12] Gartner, Best Practices

Beyond these basics, however, what differentiates a powerful Kubernetes management engine is its adaptability. While selecting a vendor with an extensive web of proprietary frameworks and services might seem like an obvious choice, getting locked into one set of tools is limiting.

"To me, the biggest challenge is deploying Kubernetes in a way that is independent of and allows flexibility for various deployment infrastructures including public cloud, private cloud, and on premises," Mark Stadtmueller, VP of product strategy at Lucd, an enterprise AI platform, [told Threatstack](#)^[13]. "Most companies need flexibility in deployment infrastructure choice, and so when deploying Kubernetes, maintaining that flexibility is the biggest challenge."

Meanwhile, infrastructure that enables developers to build their apps on multiple clouds through shared development and operations approaches is a truer reflection of the promise of cloud technology. That's also why open APIs to manage and modify clusters, and flexible integrations with popular Kubernetes tools such as Rancher, Helm, and Operator, are important.

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We prefer a simpler Kubernetes experience that delivers on all the key requirements, and then gets out of the way.

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It's precisely this adaptability that makes some management engines simpler than others. Rather than bombarding developers with available features, they get the option to pull in the integrations and customizations that they see fit.

"We prefer a simpler Kubernetes experience that delivers on all the key requirements, and then gets out of the way," Lazu said. "We also prefer fewer options and better defaults, because we don't have all day to spend on Kubernetes."

Lastly, the pricing structure also has to be adaptable. Management engines with a simple, flat, and predictable price model are more attainable for most companies. While Amazon EKS and GKE charge a per cluster management fee of \$.10 per hour or \$73 per month, alternative cloud providers offer customers a more cost-efficient option for running Kubernetes. For example, Linode doesn't charge per cluster so that developers can save up to 50% with full-time usage.

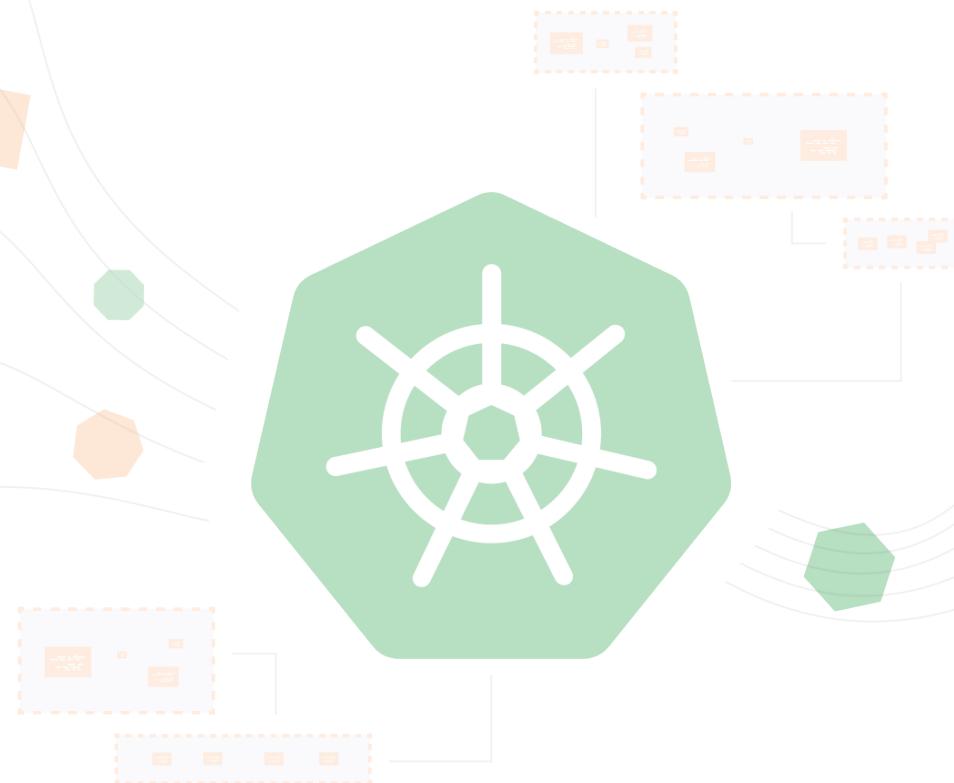


^[13] Threat Stack, 20 Developers and Kubernetes Experts Reveal the Biggest Mistakes People Make During the Transition to Kubernetes, December 20, 2018

Infrastructure for Longevity

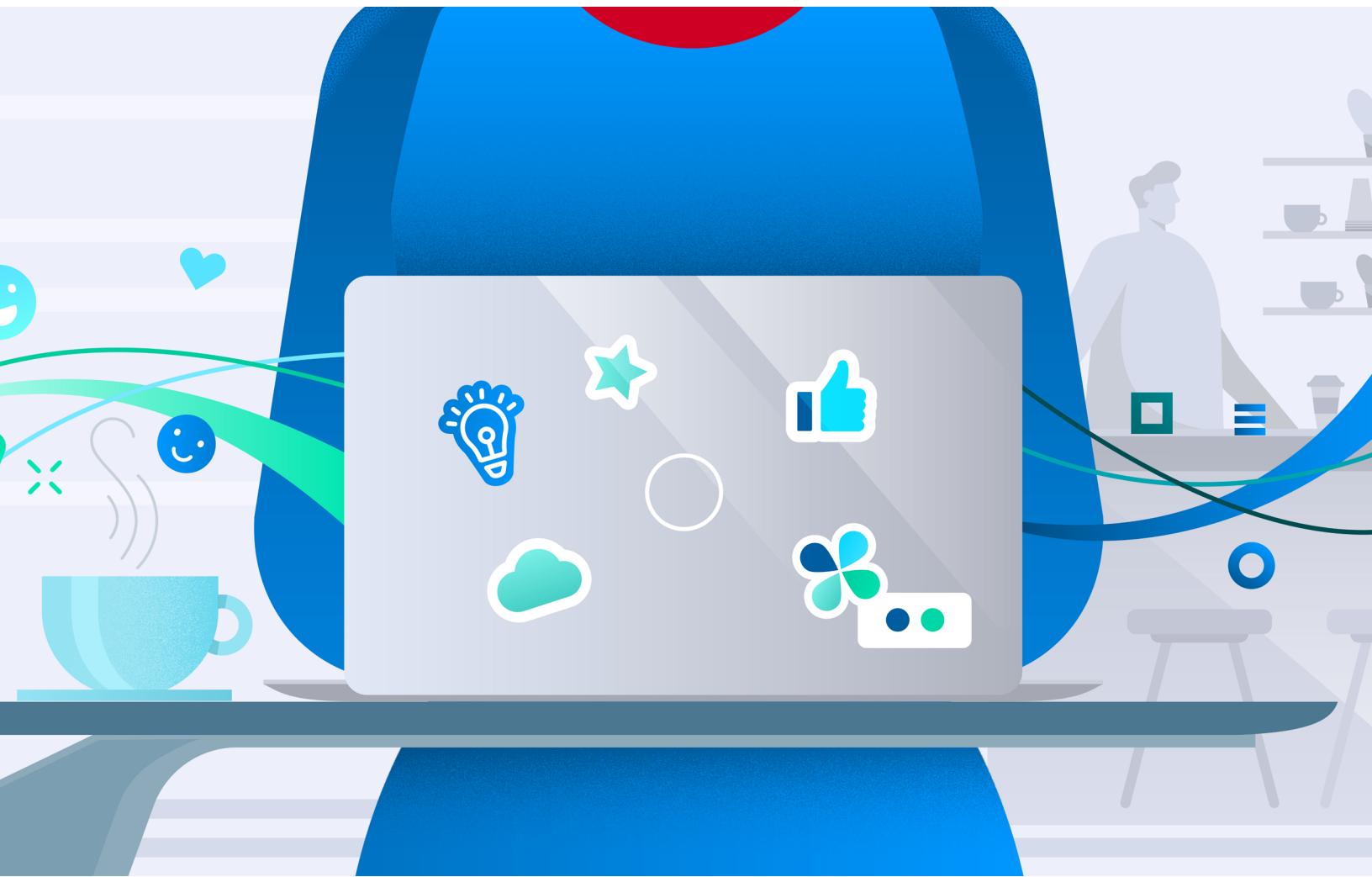
Kubernetes allows users to build a common infrastructure between multiple cloud providers to create a unified data realm. This approach depends heavily on the proper configuration and maintenance of Kubernetes (and its underlying infrastructure). To get the most out of Kubernetes, IT teams need to set it up right from the get-go.

For companies to build environments that truly speed up application development, they need Kubernetes management engines that are affordable, adaptable, and simple. Only then will they be able to leverage Kubernetes' fullest potential as data infrastructures get more complex.



About Linode

Linode accelerates innovation by making cloud computing simple, accessible, and affordable to all. Founded in 2003, Linode helped pioneer the cloud computing industry and is today the largest independent open cloud provider in the world. Headquartered in Philadelphia's Old City, the company empowers more than a million developers, startups, and businesses across its global network of 11 data centers.





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